



PROPOSED ABLE UK LTD MARINE ENERGY PARK, NORTH KILLINGHOLME, NORTH LINCOLNSHIRE

Archaeological Geophysical Survey

for Able UK Ltd

May 2012



HEADLAND
ARCHAEOLOGY Ltd



PROPOSED ABLE UK LTD MARINE ENERGY PARK, NORTH KILLINGHOLME, NORTH LINCOLNSHIRE

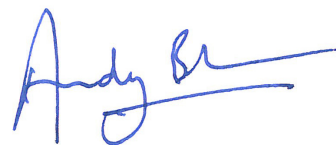
Archaeological Geophysical Survey

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Project Manager	Andy Boucher
Author	Alister Bartlett (Bartlett Clarke Consultancy)
Fieldwork	P. Cottrell and N. Paveley (Bartlett Clarke Consultancy)
Graphics	Alister Bartlett (Bartlett Clarke Consultancy)
Approved by	Andy Boucher – Project Manager



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Midlands & West

Headland Archaeology
Unit 1, Premier Business Park, Faraday Road
Hereford HR4 9NZ
01432 364 901
hereford@headlandarchaeology.com

www.headlandarchaeology.com

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Archaeological Geophysical Survey

A fluxgate gradiometer survey was undertaken over 13.2ha of land at Killingholme, North Lincolnshire. Previous work in the area had identified potential later prehistoric/Romano-British occupation. Within part of the site known as field 5 a comprehensive assemblage of magnetic anomalies was identified. These appear to be of human origin and form a continuation of a previously identified enclosure complex from the 2010 survey. The other parts of the survey were subject to a 50% sample. Field 12 yielded similar enclosure-type responses also forming a continuation of a site identified in 2010. Responses from field 21 appear to be more likely to be natural in origin, associated with bog-type deposits.

1. INTRODUCTION

This geophysical survey was undertaken as part of an archaeological field evaluation of a proposed development site at North Killingholme, Lincolnshire. The survey is required in support of a proposal by Able Humber Ports Ltd to construct a Marine Energy Park at a site centred at NGR TA167186. Much of the proposed development area has already been the subject of a geophysical investigation by GSB Prospection in 2010 (GSB report 2010/73). The present survey covers three areas (as cross hatched on the enclosed location plan, Illus 1) which were not previously accessible for geophysical coverage.

The previous survey produced a number of positive archaeological findings, some of which have now been shown to extend into the newly surveyed areas of the site.

Fieldwork for the survey was done between April 19–23 2012.

2. BACKGROUND TO THE PROJECT

The site is an area of open agricultural land adjacent to the Humber estuary, and 2km east of North Killingholme village. The topography of the area is gently undulating till surface (Middle Marsh) flanked by the much lower lying coastal plain (Outmarsh) which is largely below 4m

OD. The underlying geology comprises boulder clay overlying Upper Cretaceous chalk on Middle Marsh and marine and estuarine drift deposits (silts, sands and coarse gravels with occasional peat horizons) over the till surface on Outmarsh. This gives rise to slowly permeable and seasonally waterlogged soils.

The magnetic susceptibility readings taken during the course of the survey (as shown on the plot inset in Illus 7) were uniformly high (mean = 43 SI; standard deviation = 9), which indicates that conditions at the site should be favourable for the magnetic detection of archaeological findings. It is probable also, on a magnetically responsive soil, that non-archaeological features will be detected. It is often the case on marshland, or on wetlands subject to alluvial deposition, that strong natural magnetic anomalies will be detected. These may relate to the formation of iron pan in the subsoil, or to variations in the depth or distribution of silt, but are usually distinguishable from archaeological features on the basis of their characteristic broad and irregular plan. Such features were detected both in 2010 and in the present survey (mainly in field 21).

Findings from the 2010 survey included a number of clearly defined ditched enclosures and associated features probably representing Iron Age and Romano-British settlement features. One purpose of the present survey was to test for additional findings of this kind.



3. METHOD

The three fields covered by the present survey amount in total to c 13.2 ha. It was specified in the brief that the previously unsurveyed area in field 5 was to be surveyed in full, and that fields 12 and 21 were to be subject to 50% sampled coverage arranged as alternate 10m wide strips. The specified coverage amounts in total to c 8.45ha.

The methods used for the survey were recorded magnetometer surveying, supplemented by background magnetic susceptibility testing.

3.1 Magnetometer survey

The magnetometer 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 as grey scale plots (Illus 2–3), and as graphical (x–y trace) plots at 1:1250 scale in Illus 4–6. Inclusion of these alternative presentations allows the detected magnetic anomalies to be examined in plan and profile respectively. Grey scale plots reproduced from the 2010 GSB survey report have been included (for comparison and completeness) alongside the present survey plots in Illus 2–3.

2

The graphical survey plot shows the magnetometer readings after minimal pre-processing based on adjustment for irregularities in line spacing caused by variations in the instrument zero setting. Additional 2D low pass filtering has been applied to the grey scale plot to reduce background noise levels.

An interpretation of the findings is shown superimposed on Illus 4–6 (which permits the interpreted outlines to be compared with the underlying data), and is reproduced separately to provide a summary of the findings (Illus 7–8). Colour coding has been used in the interpretation to distinguish different effects. Features are indicated by coloured outlines, shading, or broken lines.

For consistency the colour coding and anomaly classification system used in the 2010 report has been followed as closely as possible. Features of probable and possible archaeological interest are shown in shades of purple/pink, and recent or non-archaeological disturbances in light brown. Small, and other perhaps mainly natural background disturbances are in green.

3.2 Magnetic susceptibility tests

The magnetometer survey was supplemented by a background magnetic susceptibility survey based on readings taken at 50m intervals with a Bartington MS2 meter and loop. Susceptibility readings can (sometimes) be used to provide a broad indication of previously occupied or disturbed areas in which burning associated with past human occupation has enhanced the magnetic

susceptibility of the topsoil, although the readings are usually affected also by non-archaeological factors, including geology and land use. A background survey of the kind done here is undertaken to test the (largely) geologically determined magnetic properties of the soil. This information provides an indication of the strength of magnetic response to be expected from the site, and can be of help when interpreting the magnetometer survey. Susceptibility readings are shown on a plot inset in Illus 7.

3.3 Survey location

The survey grid was set out and tied to the OS grid using a differential GPS system. The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans where required.

4. RESULTS

The survey findings are described for the three fields in turn.

4.1 Field 5

The most extensive and distinct archaeological findings in the 2010 survey were in the field immediately to the north of field 5 (as seen in the grey scale plots in Illus 2). The present survey has shown that this group of enclosures continues to the south, and links with features seen in the southern part of field 5 in the previous survey. Findings include a group of variously shaped ditched enclosures. Towards the north of the field these appear to be superimposed on a trackway, suggesting there could be more than one period of activity. The strength of some of the magnetic anomalies within the enclosures (as seen particularly in the graphical plot, Illus 4) would be consistent with the presence of kilns or hearths, suggesting there could have been industrial activity at the site. Elsewhere in the field there are a few more isolated pit-like features, some of which could be of archaeological origin. A linear feature (indicated as of uncertain origin) at the east of the field continues into the 2010 survey. It aligns with the present field boundary, and could perhaps be a cultivation headland or drain.

4.2 Field 12

The main finding here is a further group of ditched enclosures similar to, but less extensive than, those in field 5. These again represent a continuation of similar findings to those in the field to the north surveyed in 2010. There are fewer strong magnetic anomalies to suggest industrial feature here than in field 5 (although there could be at least one). Elsewhere in field 12 there may be some isolated and uncertain silted pits, but findings otherwise are limited to natural background variations.

4.3 Field 21

Potential archaeological findings here are limited to some isolated possible pit-like features, mainly towards the south of the field. Other disturbances near to the road to the south appear to be recent.

There are broad natural magnetic anomalies, of the kind mentioned previously, and which are typically found in marshland, to the north of the field. An extensive area of similar magnetic activity was seen in adjacent fields in 2010.

5. CONCLUSIONS

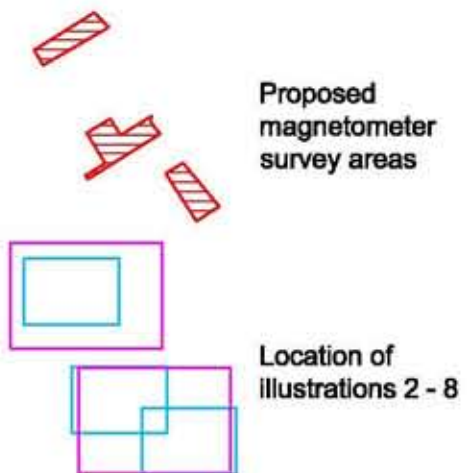
The survey has identified two areas of clearly defined archaeological features. These are in field 5, and towards the east of field 12. In each case the findings represent a continuation of similar features seen nearby in the 2010 survey, and are likely to represent settlement or industrial sites of late prehistoric or Roman date, as previously identified. Relevant findings in the western part of field 12 and in field 21 are limited to scattered individual pit-like features of uncertain significance.

6. APPENDIX 1 – ILLUSTRATIONS

On the following pages 8 A3 illustrations will be displayed.



KEY:



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**Geophysical Survey
2012**

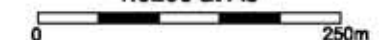
**Bartlett Clark
Consultancy**

Specialists in Archaeogeophysics

25 Estate Yard, Cuckoo Lane,
North Leigh, Oxfordshire,
OX29 6PW

01865 200864
bcc123@ntlworld.com

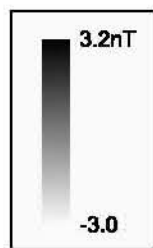
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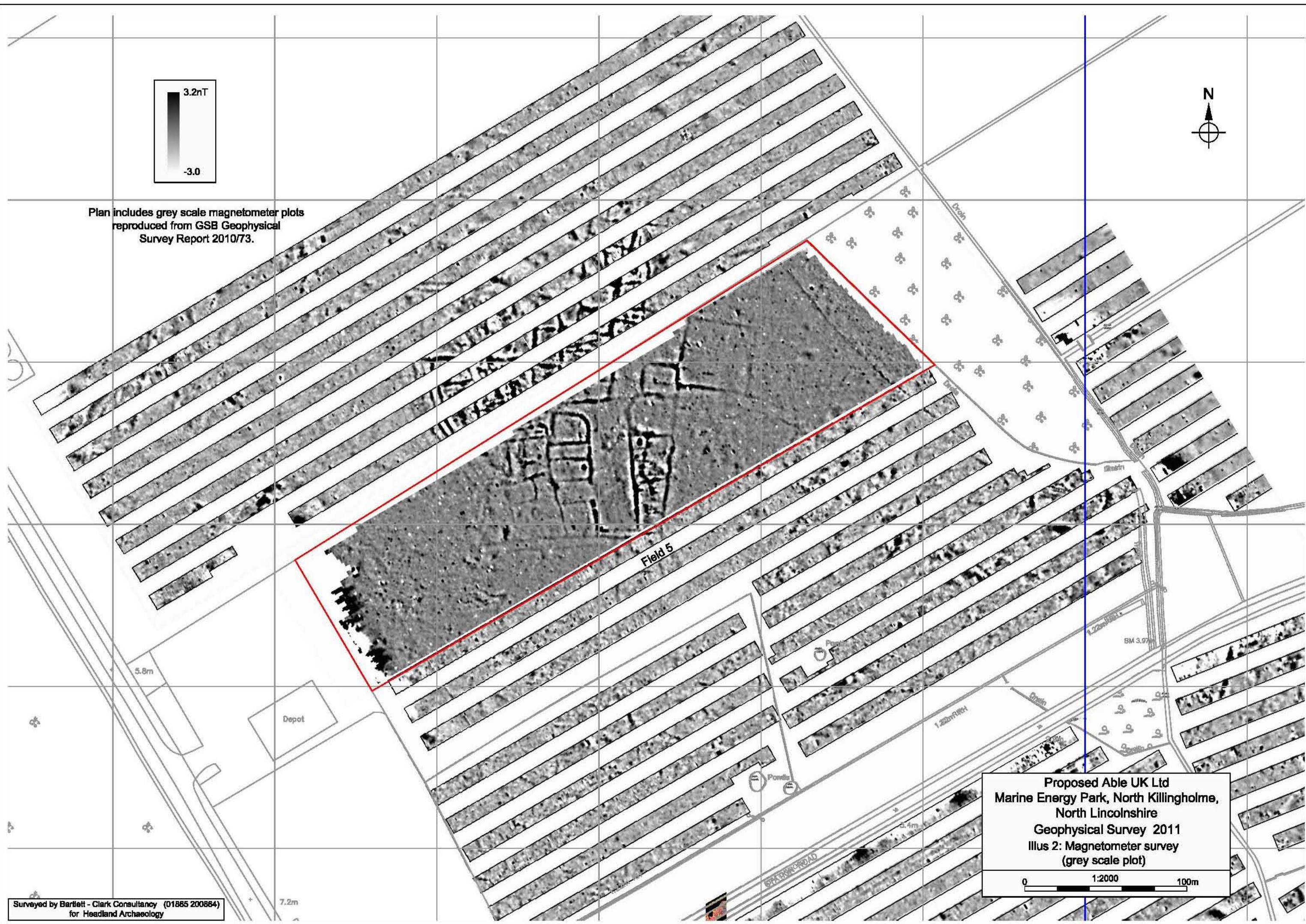
Background mapping includes OS digital
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**Surveyed by Bartlett Clark Consultancy
for Headland Archaeology**

**Illus 1: Location of magnetometer
survey areas and illustrations 2-8**



Plan includes grey scale magnetometer plots reproduced from GSB Geophysical Survey Report 2010/73.



Field 5

5.8m

Depot

7.2m

SHARPOUR ROAD

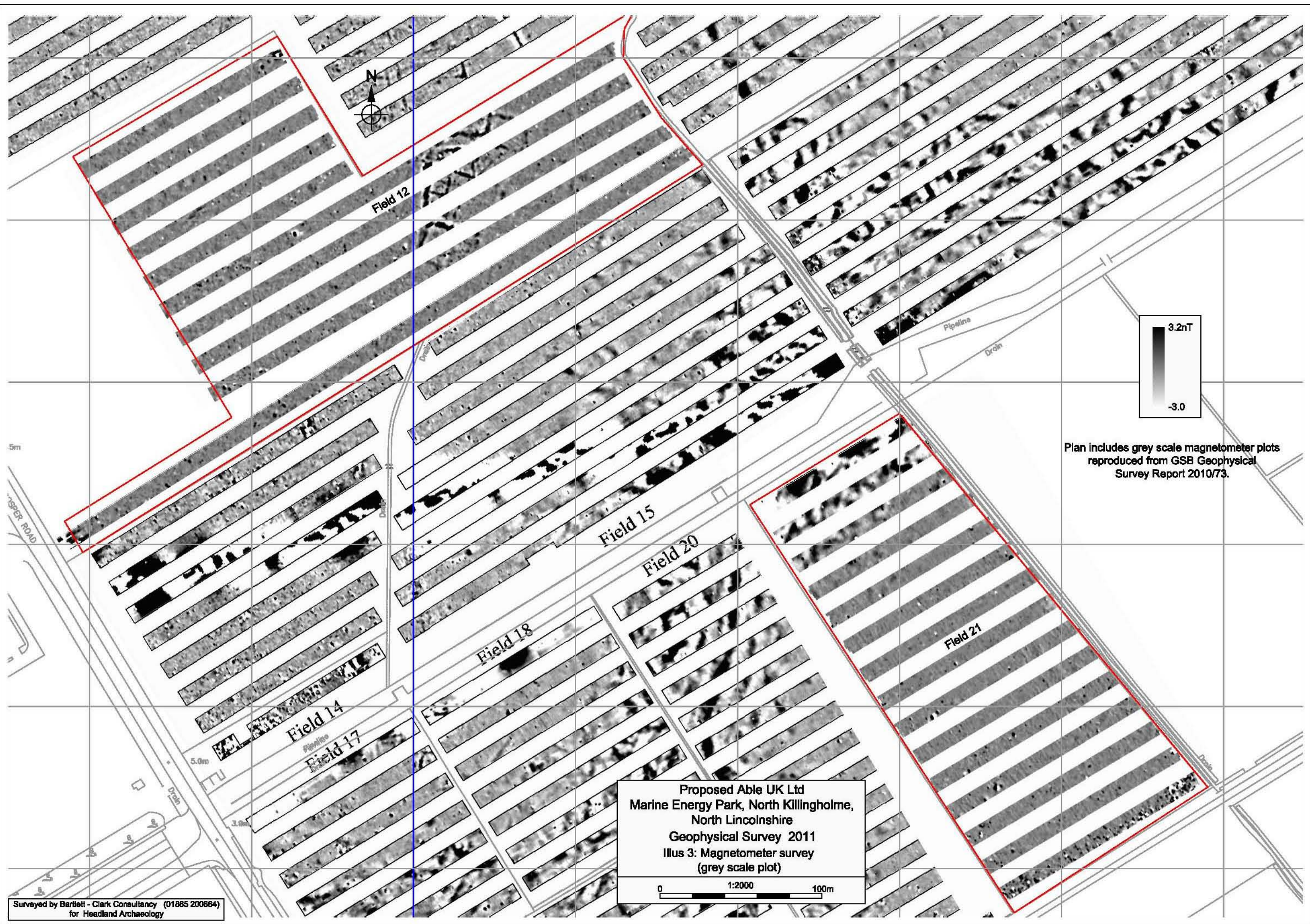
Ponds

1.22m RSH

BM 3.97m

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Geophysical Survey 2011
Illus 2: Magnetometer survey
(grey scale plot)






0 1:2000 100m



Plan includes grey scale magnetometer plots reproduced from GSB Geophysical Survey Report 2010/73.

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North Lincolnshire
Geophysical Survey 2011
Illus 3: Magnetometer survey
(grey scale plot)

0 1:2000 100m

-  magnetic anomalies (archaeological)
-  magnetic anomalies (archaeological ?)
-  magnetic anomalies (natural ?)
-  magnetic disturbances (recent / ferrous ?)
-  uncertain origin



50 nT

Field 5

Drain

Drain

Pond

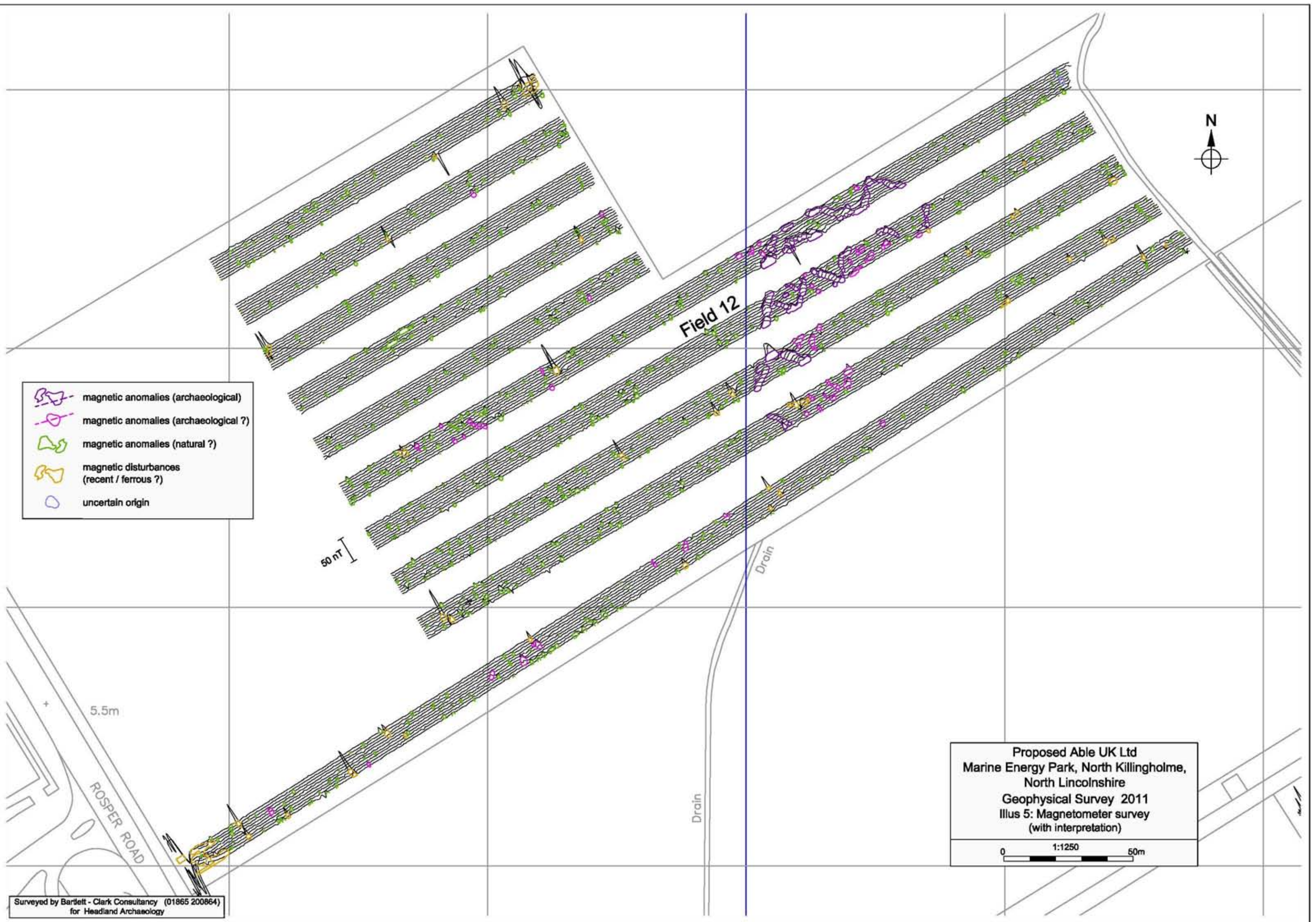
Depot

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 Marine Energy Park, North Killingholme,
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 Geophysical Survey 2011
 Illus 4: Magnetometer survey
 (with interpretation)

0

50m






1:1250



- magnetic anomalies (archaeological)
- magnetic anomalies (archaeological ?)
- magnetic anomalies (natural ?)
- magnetic disturbances (recent / ferrous ?)
- uncertain origin

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North Lincolnshire
Geophysical Survey 2011
Illus 5: Magnetometer survey
(with interpretation)

0 1:1250 50m

-  magnetic anomalies (archaeological)
-  magnetic anomalies (archaeological ?)
-  magnetic anomalies (natural ?)
-  magnetic disturbances (recent / ferrous ?)
-  uncertain origin



Field 21

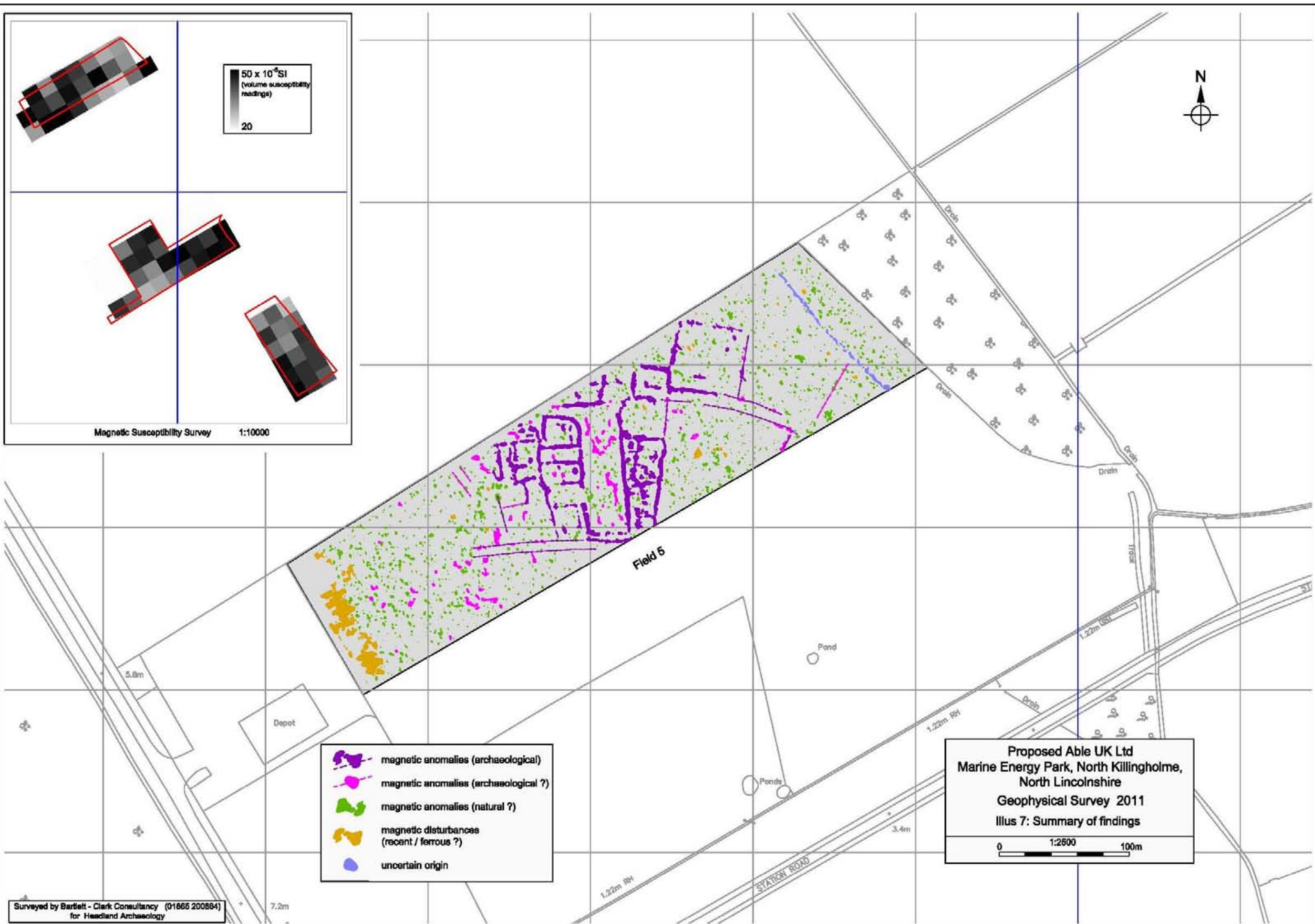
60 nT

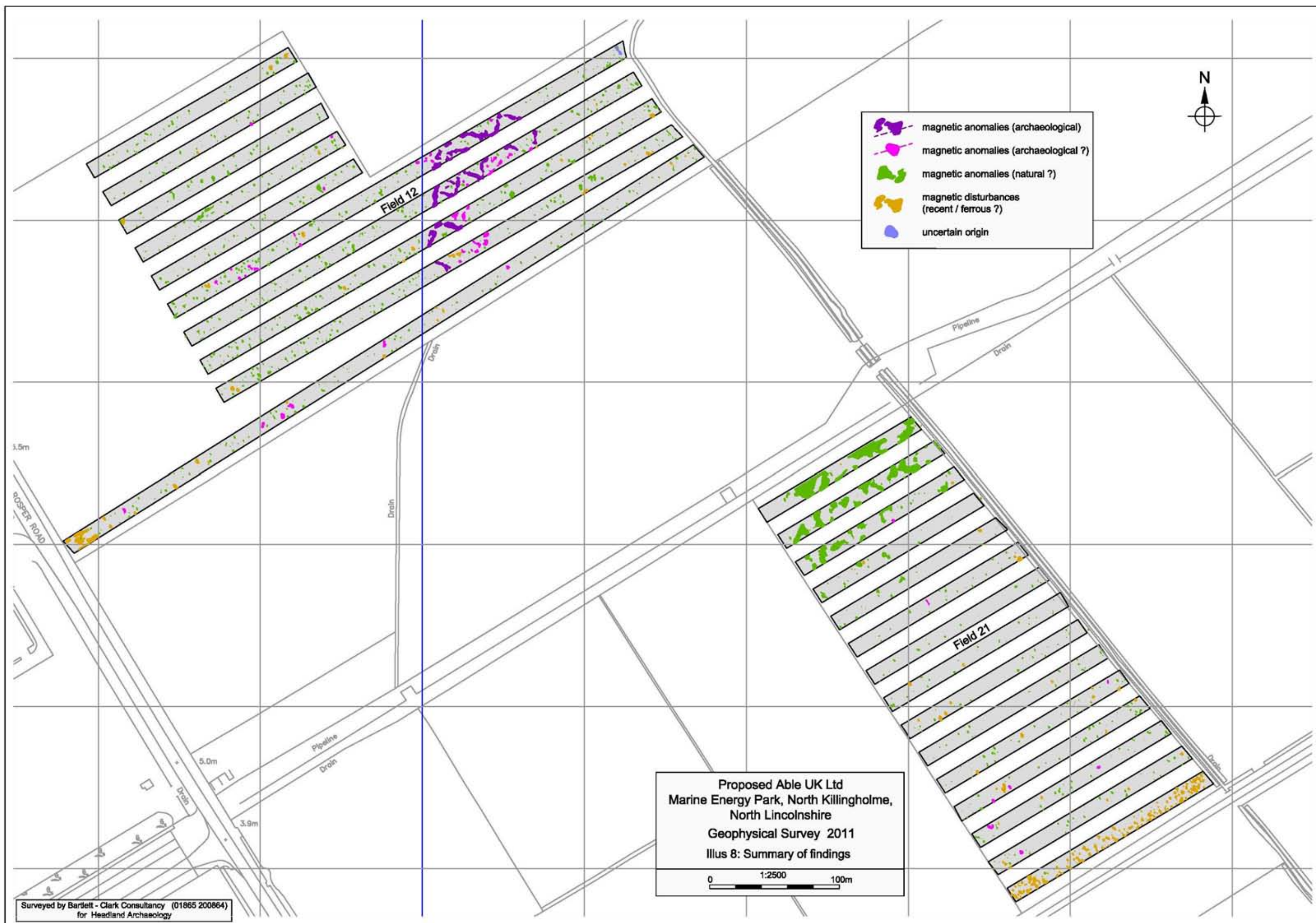
Drain

Drain

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Geophysical Survey 2011
Illus 6: Magnetometer survey
(with interpretation)

0 1:1250 50m







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Midlands & West

Headland Archaeology
Unit 1, Premier Business Park, Faraday Road
Hereford HR4 9NZ
01432 364 901
hereford@headlandarchaeology.com

South & East

Headland Archaeology
Technology Centre, Stanbridge Road
Leighton Buzzard LU7 4QH
01525 850878
leighton.buzzard@headlandarchaeology.com

North East

Headland Archaeology
13 Jane Street
Edinburgh EH6 5HE
0131 467 7705
office@headlandarchaeology.com

North West

Headland Archaeology
10 Payne Street
Glasgow G4 0LF
0141 354 8100
glasgowoffice@headlandarchaeology.com

www.headlandarchaeology.com