

AGSY11



ALDBROUGH GAS STORAGE PROJECT
PHASE II
GARTON, EAST YORKSHIRE

Archaeological Geophysical Survey

*for Vinci Soil Engineering
and Scottish and Southern Energy*

September 2011

**ALDBROUGH GAS STORAGE PROJECT
PHASE II
Garton, East Yorkshire**

**Report on Archaeological Geophysical Survey
2011**

A.D.H. Bartlett

Surveyed by:

**Bartlett-Clark Consultancy
25 Estate Yard, Cuckoo Lane,
North Leigh,
Oxfordshire OX29 6PW
01865 200864**

for:

**Headland Archaeology,
13 Jane Street
Edinburgh EH6 5HE
0131 467 7705**

on behalf of:

**Vinci Soil Engineering
and Scottish and Southern Energy**

Aldbrough Gas Storage Project

Phase II

Report on Archaeological Geophysical Survey, August 2011

1. Introduction

This report describes a geophysical survey which has been undertaken of a site which is to be developed in connection with an underground gas storage project on the Yorkshire coast. The survey was commissioned from Bartlett Clark Consultancy, specialists in archaeogeophysics, by Headland Archaeology (UK) Ltd. The survey was commissioned by Vinci Soil Engineering on behalf of Scottish and Southern Energy. Fieldwork for the survey was done between 9-15 August 2011.

2. The Site

The areas specified for investigation by geophysical survey included the main wellhead platform site, together with corridors for an associated haul road to the west, and pipe and cable routes to the northeast. These amount in total to 17.92ha. The greater part of the site was open farmland, but parts were obstructed by a barley crop, trees, and a fenced compound to the northeast. The remaining survey-able area amounted to 15.2ha. The main wellhead site (as indicated by a black outline on figure 2) is located to the north of Garton village at NGR 527200 436400, and is about 3km SE of Aldbrough.

The topography of the site is low lying and slightly undulating. It is on a chalk bedrock with a boulder clay drift deposit. These conditions should not present any particular difficulty for a magnetometer survey, although the strength of response and level of background magnetic activity may be influenced in part by the detailed composition of the drift material.

No archaeological desk-based assessment has been commissioned in connection with this survey. A rapid survey of online databases (www.heritagegateway.org.uk & www.archaeologydataservice.ac.uk) indicates that archaeological work associated with previous phases of Gas Storage at Aldbrough has been undertaken in the immediate vicinity, but no detailed information has been sought. Historic mapping indicates that this site has been open since first mapped in detail by the Ordnance Survey in 1855. Mapping indicates some drainage problems on, or in the vicinity of the site, with marsh and open drains running to the north indicated. The survey represents an initial reconnaissance to test for evidence of any detectable archaeological features which may be present.

3. Survey Procedure

Readings were collected using Bartington 1m fluxgate magnetometers, and are plotted at 25cm intervals along transects 1m apart. The results of the survey are shown as grey scale plots at 1:2000 scale in figures 3-5, and as a graphical (x-y trace) plot at 1:1250 scale which is reproduced in sections as figures 6-9. An interpretation of the findings is shown superim-

posed on figures 6-9, and is reproduced separately to provide a summary of the findings on the final plans (figures 10-11).

The survey plots show the magnetometer readings after standard treatments which included adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and slight linear smoothing. Additional 2D low pass filtering has been applied to the grey scale plot to reduce background noise levels.

Colour coding has been used in the interpretation to distinguish different effects. Magnetic anomalies of possible archaeological interest, or at least those which may not be of geological or recent origin, are outlined in red, with weak (and probably natural) features in a light brown. Similar features within an apparent palaeochannel are shown in a light green. Stronger, and probably recent, magnetic disturbances are outlined in a darker brown. Linear markings indicating potential cultivation effects are shown in green, and (selected) ferrous objects in blue. Possible land drains are indicated by broken lines.

The magnetometer survey was supplemented by a background magnetic susceptibility survey with readings taken with a Bartington MS2 meter and field sensor loop. The readings are presented in a data plot which is inset in figure 11.

Susceptibility surveying can provide a useful complement to a magnetometer survey, and indicates the strength of response which is likely to be obtained. It can also 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 may be affected by a number of non-archaeological factors, including geology, recent activity, and land use.

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 thermo-remnant 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.

The survey grid was set out and located at the required national grid co-ordinates by means of a c.10cm accuracy GPS system. OS co-ordinates of map locations can be read from the AutoCAD (.dwg) version of the plans, which can be supplied with this report.

4. Results

Conditions at the site appear to be favourable for a magnetic investigation of this kind. The topsoil magnetic susceptibility readings taken during the survey are relatively high (mean = 27×10^{-5} SI), indicating that features containing a silted topsoil fill (pits, ditches) should usually be detectable. Other non-archaeological disturbances which are associated with variations in topsoil depth might also be visible, as noted below.

Findings are described from west to east:

Haul road

A 50m easement width was surveyed where possible along this route. One field remained under a barley crop and could not be surveyed. The survey plots show a relatively quiet response from the remainder of the route. There are N-S cultivation markings, but it is unclear whether these relate to traces of ridge and furrow or more recent cultivation.

A few individual magnetic anomalies can be seen in the graphical plots (figures 6-7) to have rounded profiles, which is a usual characteristic of silted pits, as are often found at ancient settlement sites. Some examples are outlined in red in the interpretation, but they are probably too isolated and dispersed to be significant. There is also a short length of a ditch-like linear feature (labelled A on figures 10-11). This again is isolated, and does not appear to form part of an enclosure.

Wellhead platform site

The main construction site was surveyed in full except for a strip to the SE which extended into a field of barley. Findings include strong disturbances probably representing a hardcore surface along a N-S farm track (B on figure 11), and a nearby broad band of weaker magnetic anomalies (marked in light green at C on figure 11). These features are located within a visible N-S depression in the ground surface, which is otherwise relatively uniform across much of the site. The magnetic anomalies at C probably therefore represent silt deposits within a former palaeochannel. Deposits within such a channel could be of palaeoenvironmental significance and the feature itself may have attracted activity in the past. Any archaeological features which might also be present and buried at depth beneath silt would not necessarily be detectable in the magnetometer survey.

There is a further area of comparably broad and irregular magnetic anomalies, probably also caused by silt deposition, around D (figure 11) in the NE corner of the survey. These correspond to a distinct area of raised magnetic susceptibility values, but do not form a linear feature as seen at C.

A further clearly defined finding is an area of strong parallel features in the NW corner of the survey (E, figure 11). These are stronger than the cultivation effects seen across much of the remainder of the site (as indicated by broken green lines), and could well indicate remains of former ridge and furrow.

Some dispersed pit-like features have again been marked in red, but they are not always clearly distinguishable from the (mainly natural?) background magnetic activity, and do not anywhere in the survey form any potentially significant groups or concentrations.

A possible weak linear marking visible in the grey scale plot is marked by a broken line at F (figure 11). It could perhaps be an infilled (or piped) continuation of the drain shown on maps to the west. Other possible land drains (defined by weak intermittent magnetic anomalies suggesting sections of clay pipe) are similarly marked in the eastern half of the survey.

Some groups of magnetic anomalies (G & H, figure 11) are slightly rectilinear in plan, but are rather too irregular to represent enclosures, and these broad, weak magnetic anomalies

are likely to be natural. There are no dense concentrations of ferrous magnetic anomalies (blue) of a kind which would suggest the site has been subject to any substantial recent disturbance or activity.

Proposed pipe and cable route

This 20m corridor extending to the NE produced findings comparable to the wellhead site. These again included cultivation effects, scattered possible pit-like features, and weak irregular natural magnetic anomalies.

5. Conclusions

The site has produced varied magnetic findings including cultivation effects, land drains, a modern trackway and variably distributed alluvial deposits. The most interesting of these are probably the distinct band of magnetic anomalies which may indicate the silted fill of a former north to south palaeochannel (at C on figure 11). If present, this channel must pre-date the first OS map of the site made in 1855. There are also possible traces of ridge and furrow (at E on figure 11), but few other findings which appear to be of direct archaeological significance or concern.

A few magnetic anomalies which could be interpreted as silted pits of archaeological significance have been identified (red outlines), but they are widely dispersed across the site. It is possible that such features are not isolated and could be associated with other archaeological remains (such as flint scatters or ephemeral features relating to non-enclosed settlement) which are not directly detectable by the survey.

Report by:

A. Bartlett BSc MPhil

Bartlett - Clark Consultancy
Specialists in Archaeogeophysics
25 Estate Yard
Cuckoo Lane
North Leigh
Oxfordshire
OX29 6PW

01865 200864

25 August 2011

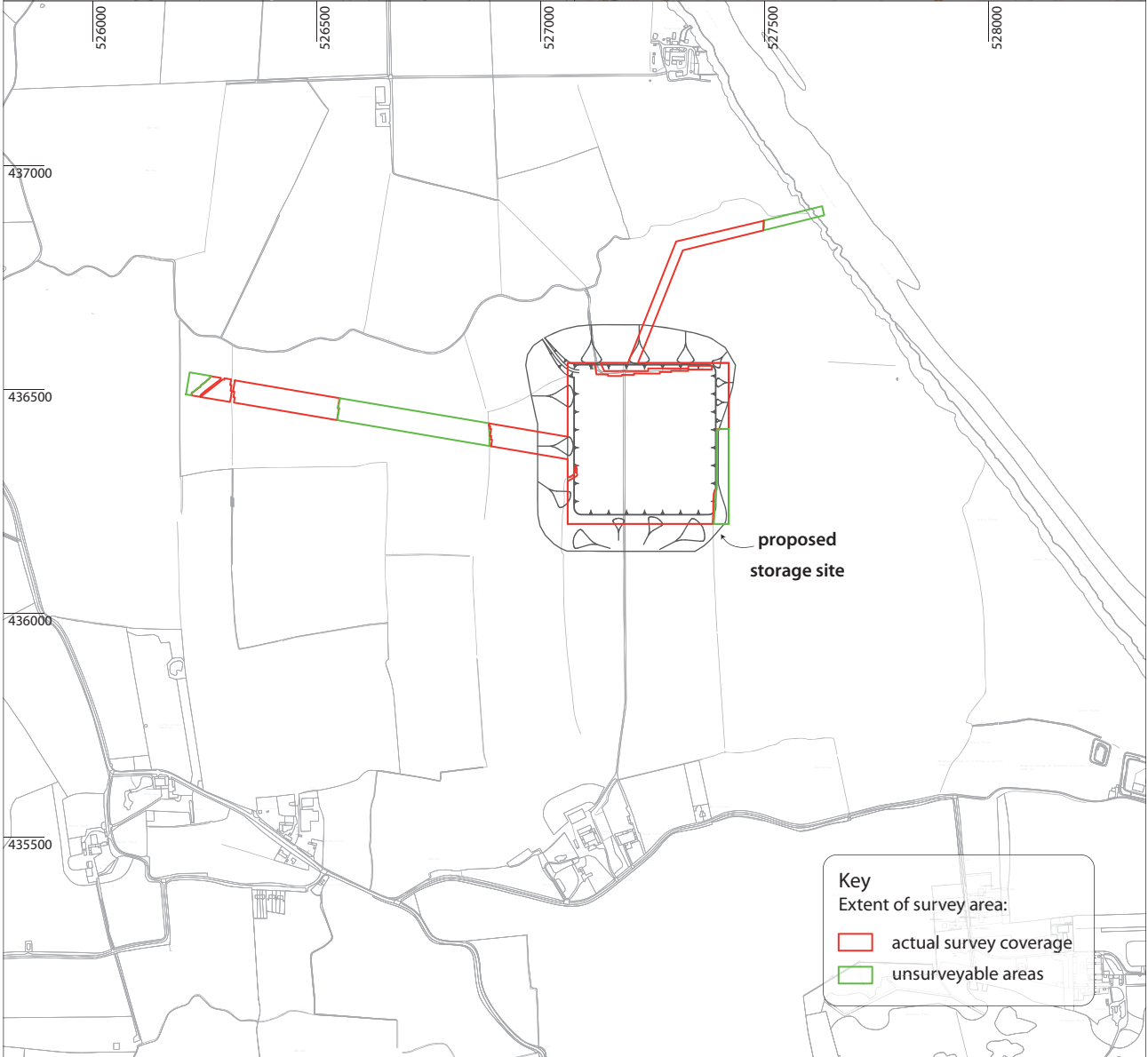
The fieldwork for this project was done by P. Cottrell and F.S. Prince.



Garton
Aldbrough
East Yorkshire



0 100km



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Scale 1:15,000 @ A4



0 750m

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437000N



527000E

526000E

Illus 10

Illus 11

Illus 9

Illus 3

Illus 6

Illus 7

Illus 4

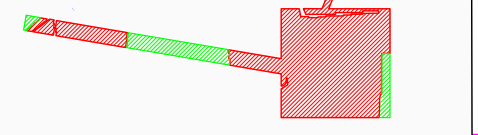
Illus 8

pipe and cable route

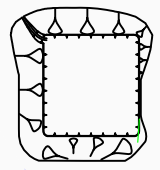
proposed haul road




Phase II wellhead platform

Extent of survey area:
- actual survey coverage (red)
- unsurveyable areas (green)



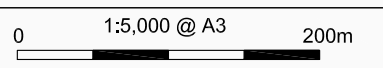
Proposed storage site:



-  Location of 1:2000 figures (2-4)
-  Location of 1:1250 figures (5-8)
-  Location of 1:2500 figures (9-10)

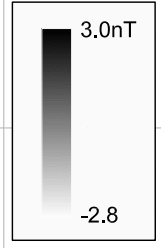
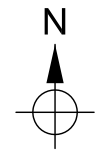
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Aldbrough Gas Storage Project
Phase II
Garton, East Yorkshire
Geophysical Survey 2011
Illus 2: Location of survey



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East Newton Drain

borehole pipe

young trees

young trees

barley crop

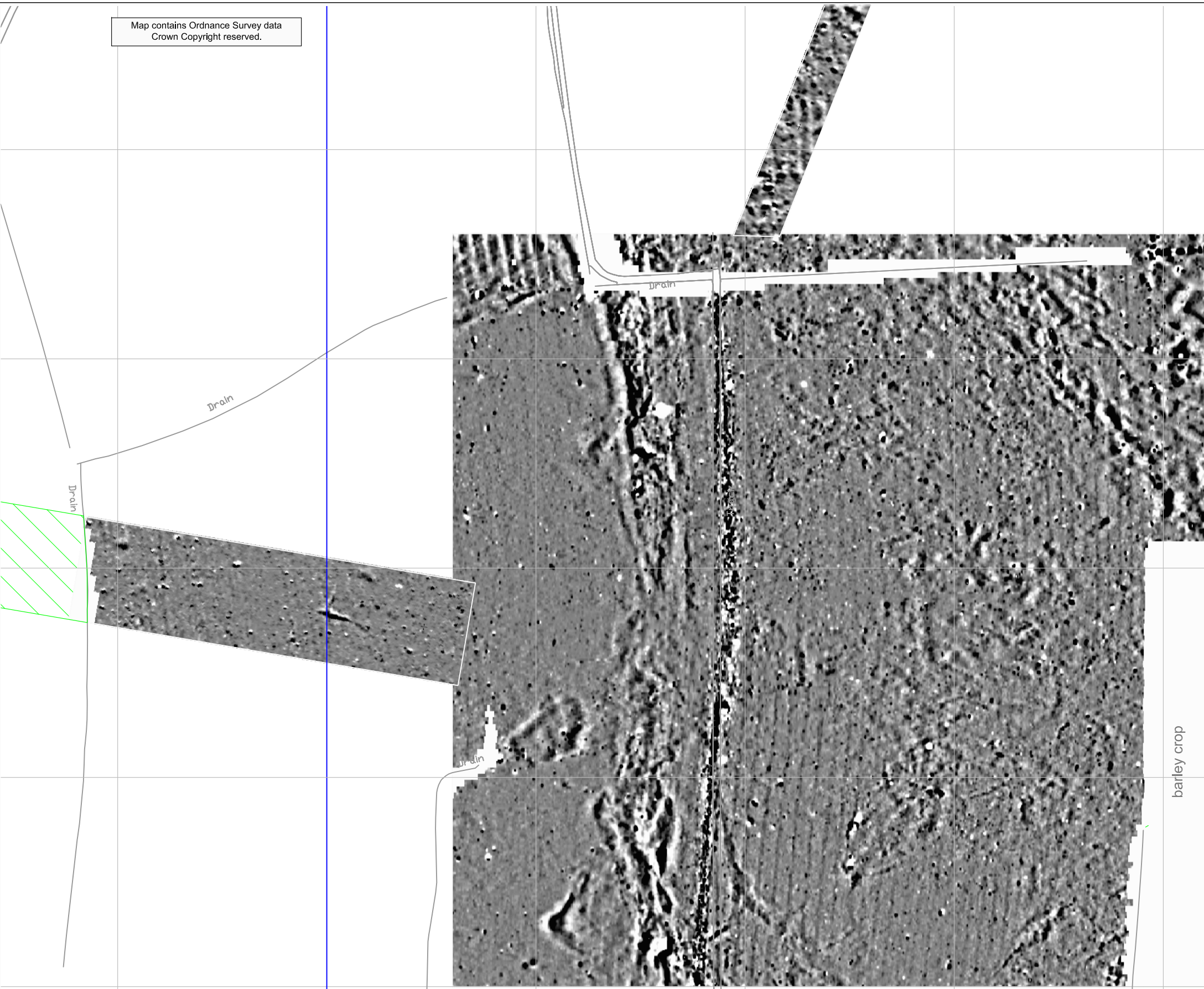
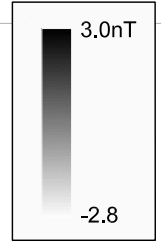
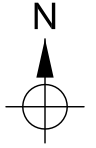


Aldbrough Gas Storage Project
Phase I
Garton, East Yorkshire
Geophysical Survey 2011
Illus 3: Magnetometer survey
(greyscale plot)

0 1:2,000 @ A3 100m

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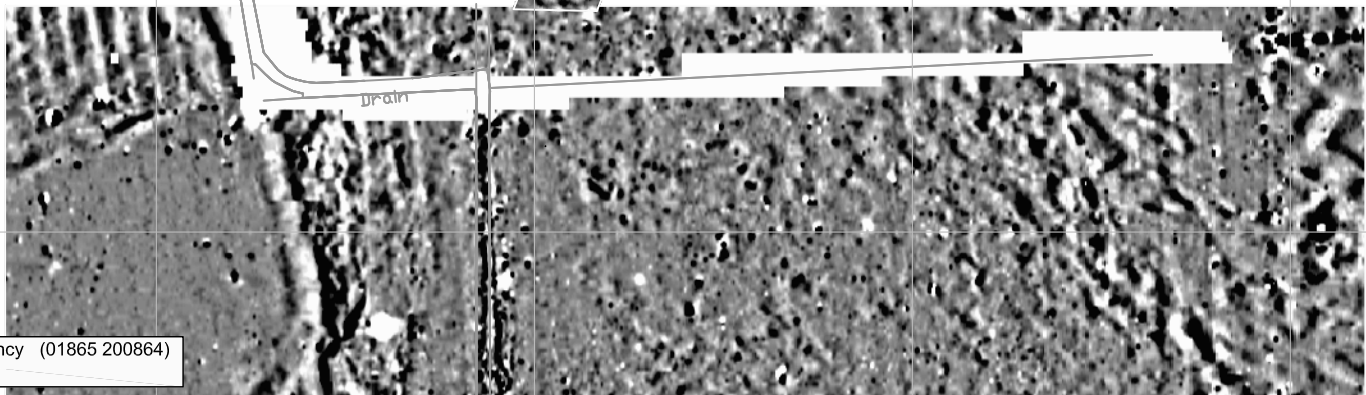
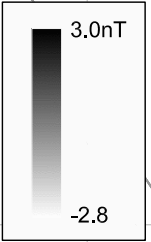
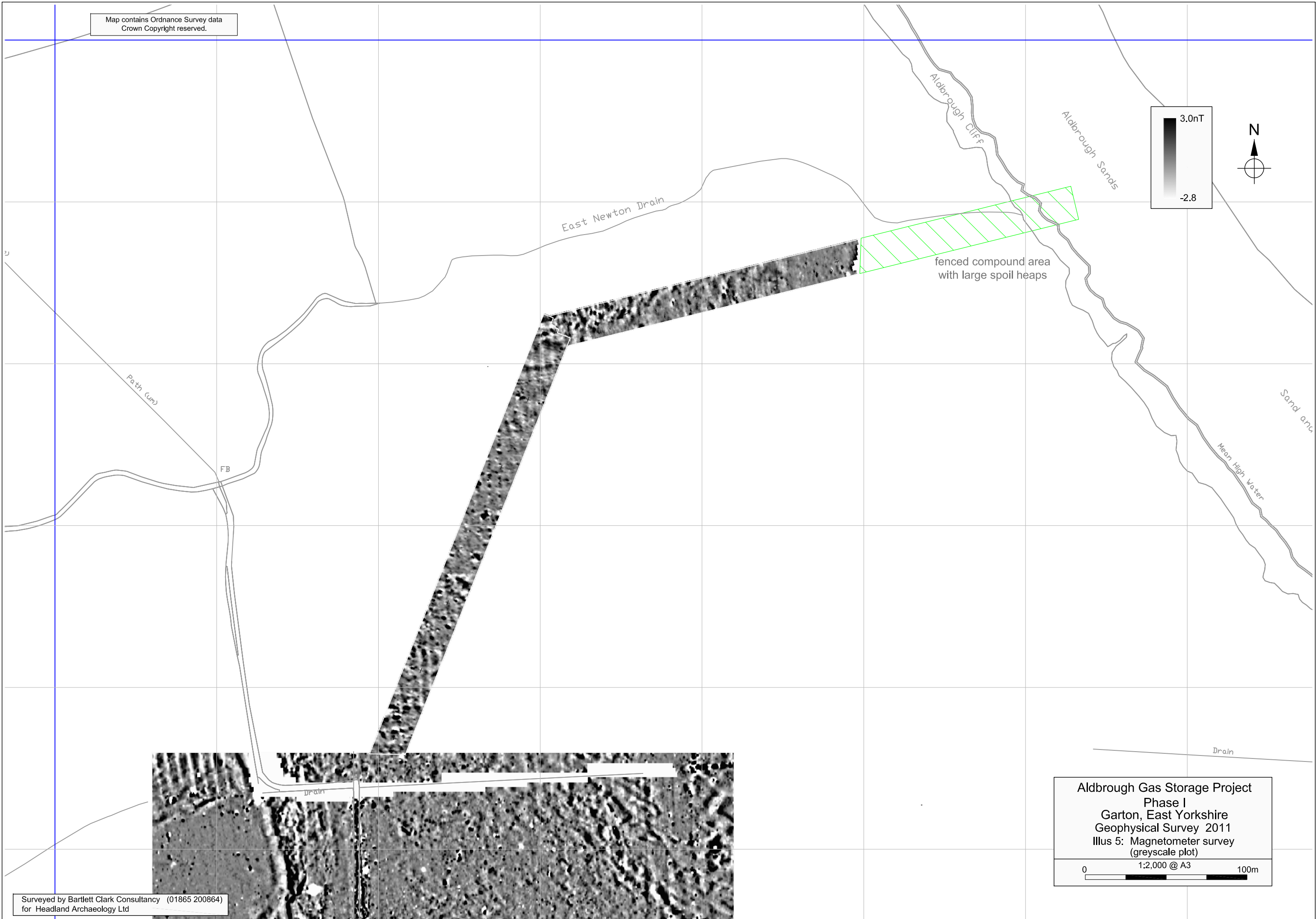


barley crop

Aldbrough Gas Storage Project
Phase I
Garton, East Yorkshire
Geophysical Survey 2011
Illus 4: Magnetometer survey
(greyscale plot)

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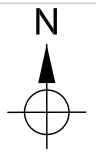
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




Aldbrough Gas Storage Project
Phase I
Garton, East Yorkshire
Geophysical Survey 2011
Illus 5: Magnetometer survey
(greyscale plot)

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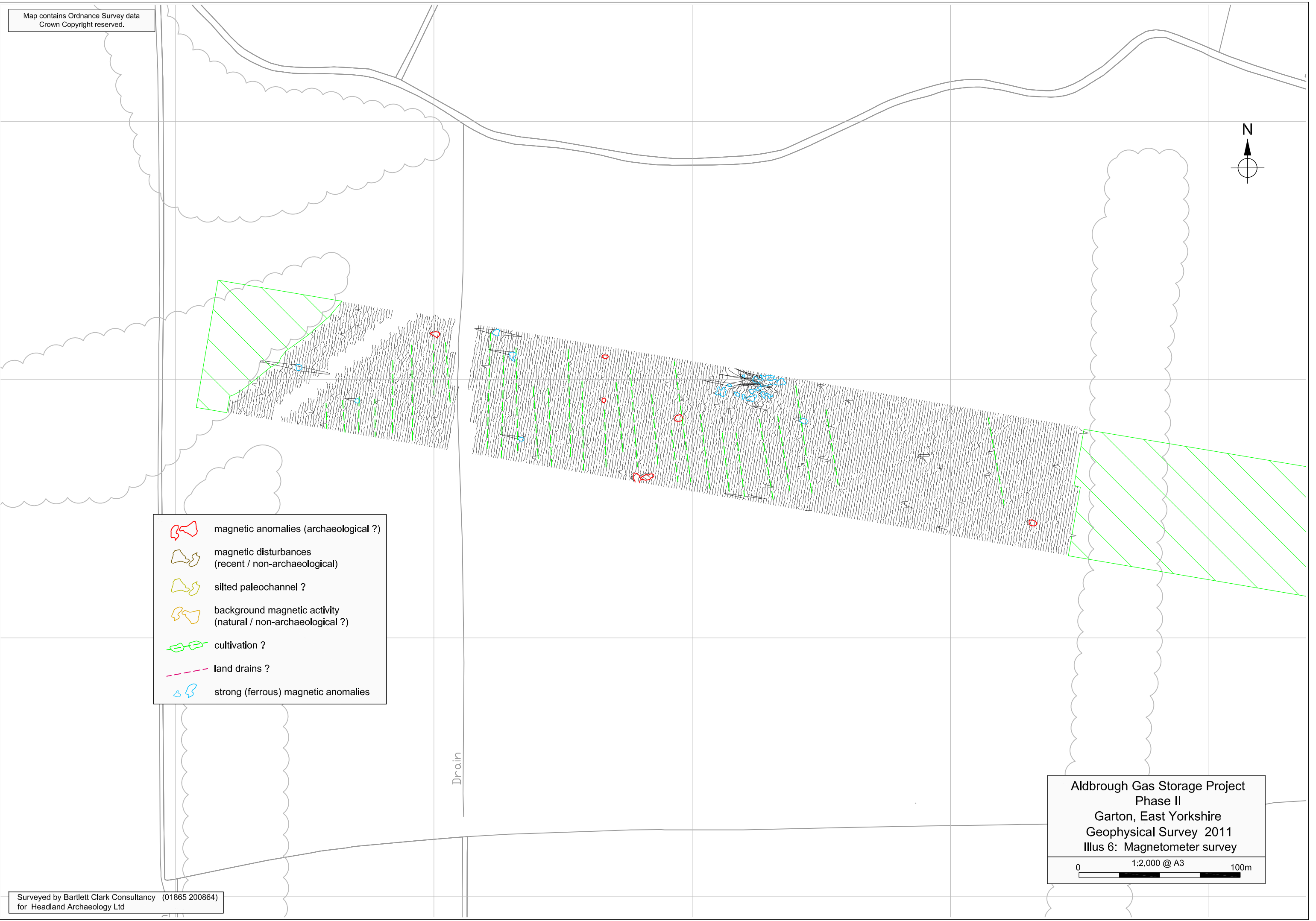
-  magnetic anomalies (archaeological ?)
-  magnetic disturbances
(recent / non-archaeological)
-  silted paleochannel ?
-  background magnetic activity
(natural / non-archaeological ?)
-  cultivation ?
-  land drains ?
-  strong (ferrous) magnetic anomalies

Drain

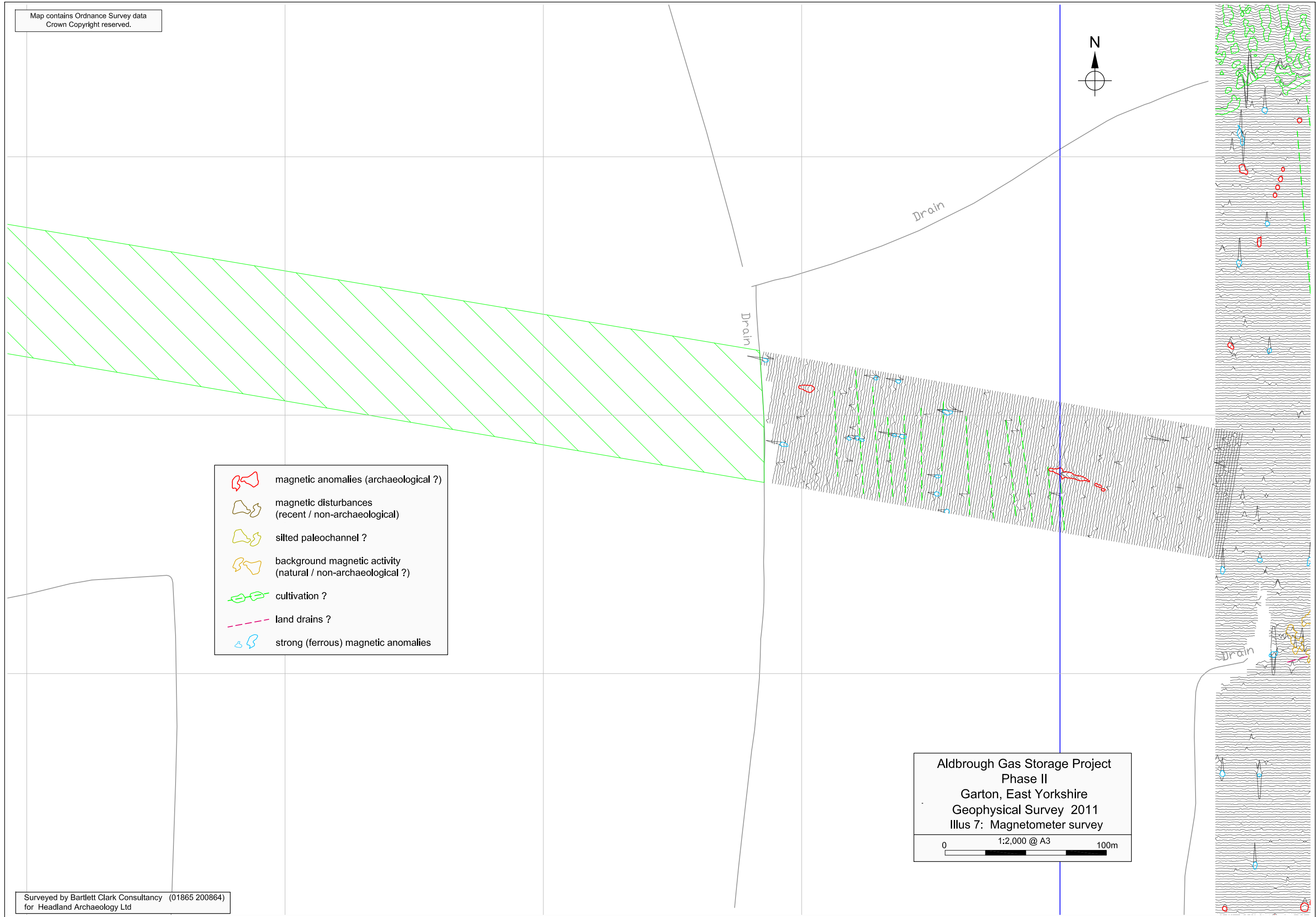
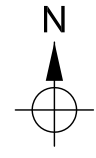
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Garton, East Yorkshire
Geophysical Survey 2011
Illus 6: Magnetometer survey








0 1:2,000 @ A3 100m

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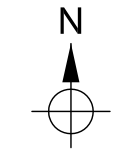









-  magnetic anomalies (archaeological ?)
-  magnetic disturbances (recent / non-archaeological)
-  silted paleochannel ?
-  background magnetic activity (natural / non-archaeological ?)
-  cultivation ?
-  land drains ?
-  strong (ferrous) magnetic anomalies

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Phase II
Garton, East Yorkshire
Geophysical Survey 2011
Illus 7: Magnetometer survey

0 1:2,000 @ A3 100m

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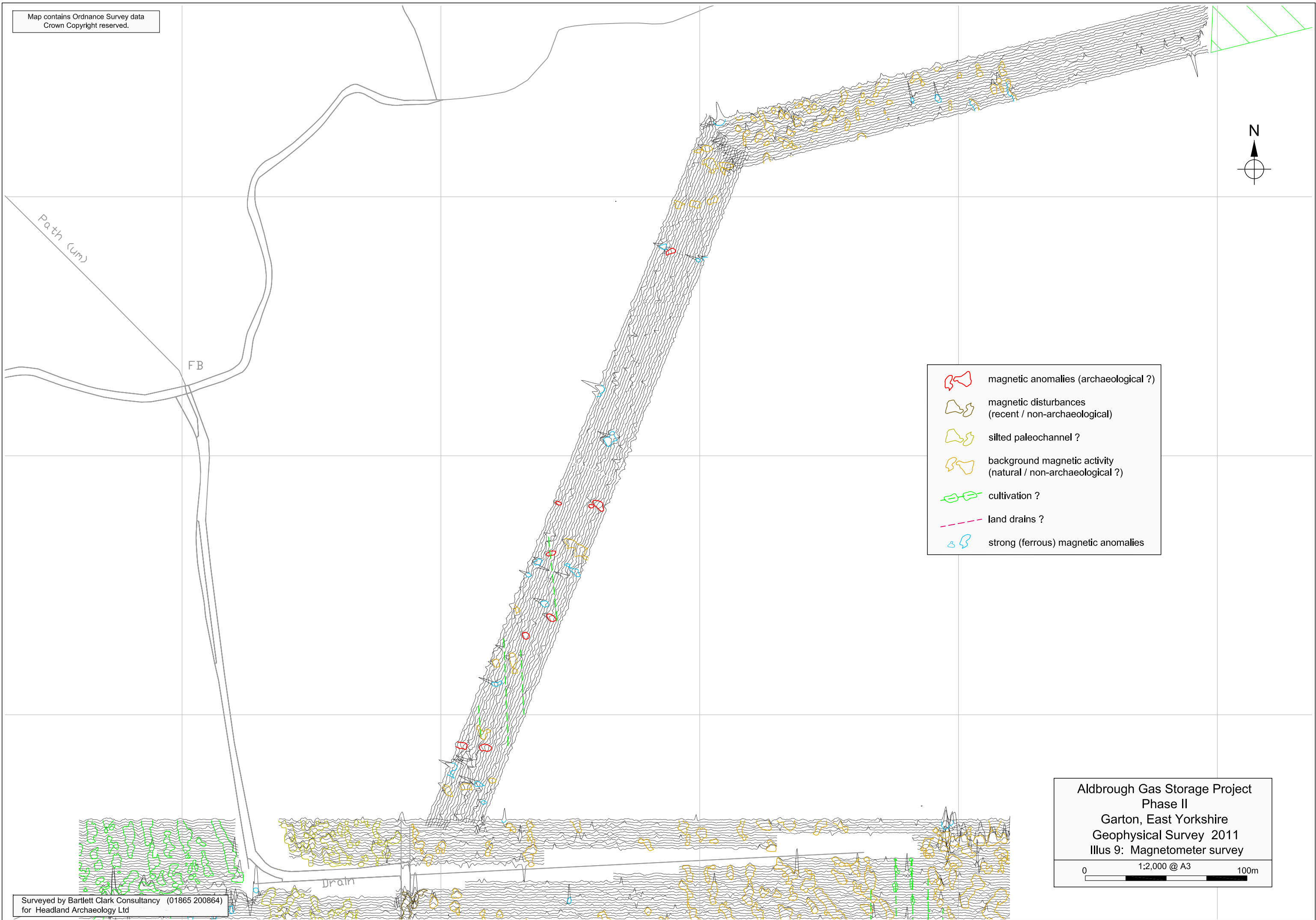


-  magnetic anomalies (archaeological ?)
-  magnetic disturbances (recent / non-archaeological)
-  silted paleochannel ?
-  background magnetic activity (natural / non-archaeological ?)
-  cultivation ?
-  land drains ?
-  strong (ferrous) magnetic anomalies

Aldbrough Gas Storage Project
Phase II
Garton, East Yorkshire
Geophysical Survey 2011
Illus 8: Magnetometer survey

0 1:2,000 @ A3 100m

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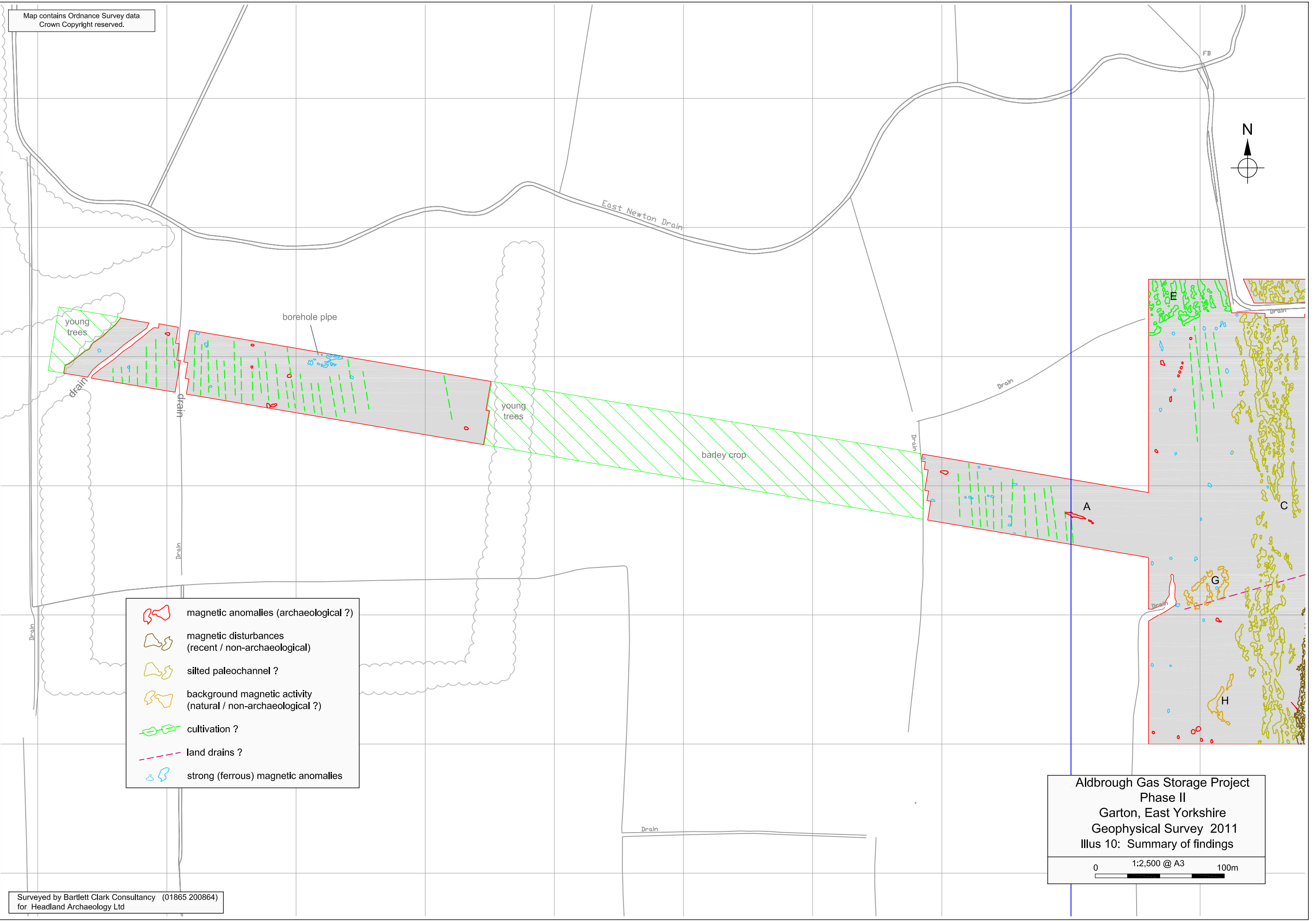
- magnetic anomalies (archaeological ?)
- magnetic disturbances (recent / non-archaeological)
- silted paleochannel ?
- background magnetic activity (natural / non-archaeological ?)
- cultivation ?
- land drains ?
- strong (ferrous) magnetic anomalies








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Illus 9: Magnetometer survey

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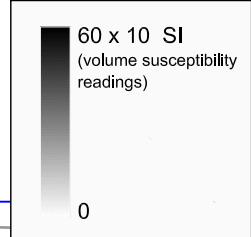
-  magnetic anomalies (archaeological ?)
-  magnetic disturbances (recent / non-archaeological)
-  silted paleochannel ?
-  background magnetic activity (natural / non-archaeological ?)
-  cultivation ?
-  land drains ?
-  strong (ferrous) magnetic anomalies

Aldbrough Gas Storage Project
Phase II
Garton, East Yorkshire
Geophysical Survey 2011
Illus 10: Summary of findings

0 1:2,500 @ A3 100m

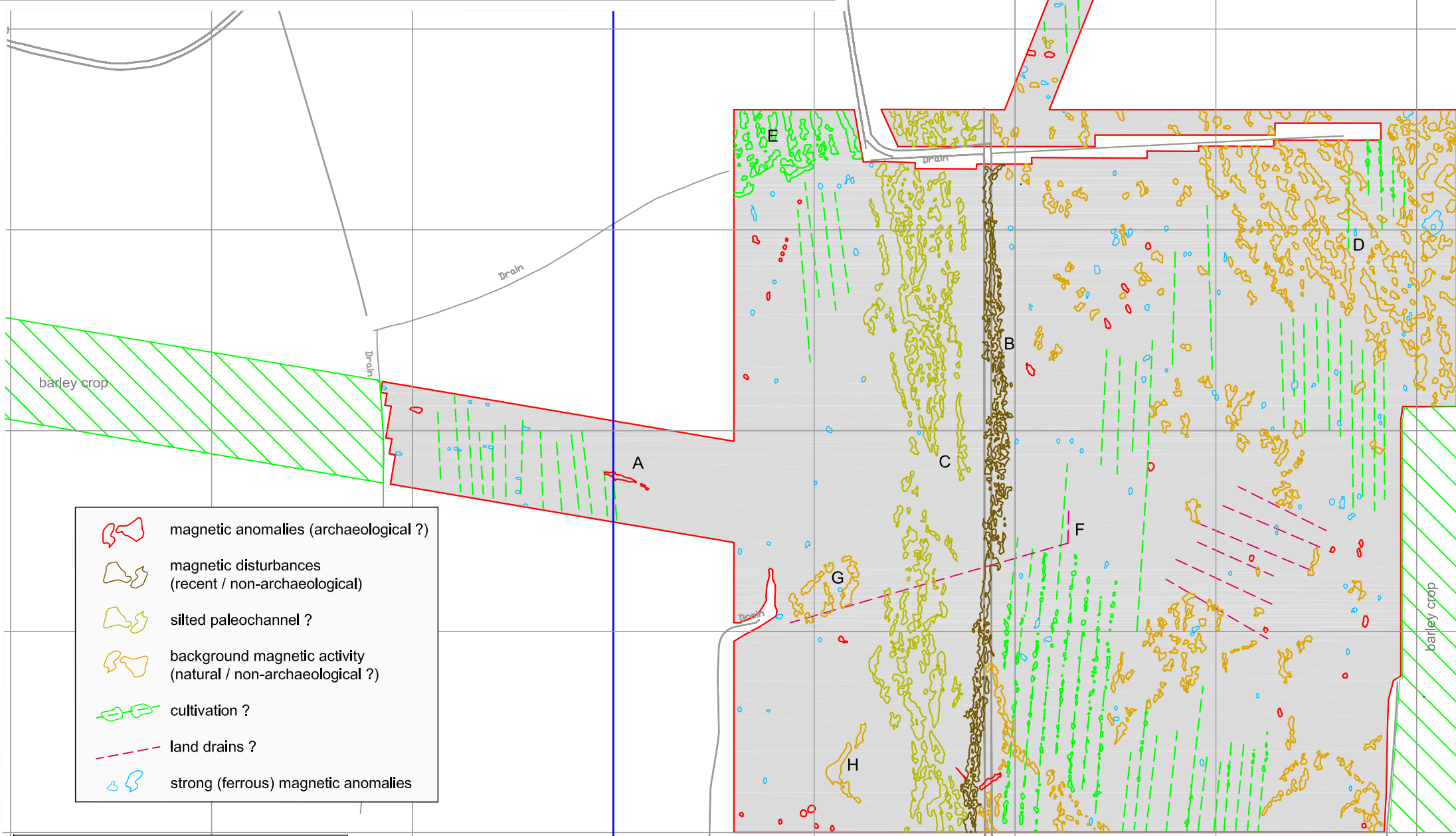
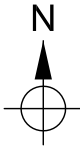
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Magnetic susceptibility survey
1:10000

fenced compound area
with large spoil heaps



- magnetic anomalies (archaeological ?)
- magnetic disturbances (recent / non-archaeological)
- silted paleochannel ?
- background magnetic activity (natural / non-archaeological ?)
- cultivation ?
- land drains ?
- strong (ferrous) magnetic anomalies

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Illus 11: Summary of findings





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North East (HQ)

13 Jane Street, Edinburgh EH6 5HE

T 0131 467 7705 • **F** 0131 467 7706 • **E** office@headlandarchaeology.com

North West

10 Payne Street, Glasgow G4 0LF

T 0141 354 8100 • **F** 0141 332 9388 • **E** glasgowoffice@headlandarchaeology.com

Midlands & West

Unit 1, Premier Business Park, Faraday Road, Hereford HR4 9NZ

T 0143 236 4901 • **F** 0143 236 4900 • **E** hereford@headlandarchaeology.com

South & East

Technology Centre, Stanbridge Road, Leighton Buzzard, Bedfordshire LU7 4QH

T 01525 850 878 • **E** leighton.buzzard@headlandarchaeology.com

www.headlandarchaeology.com