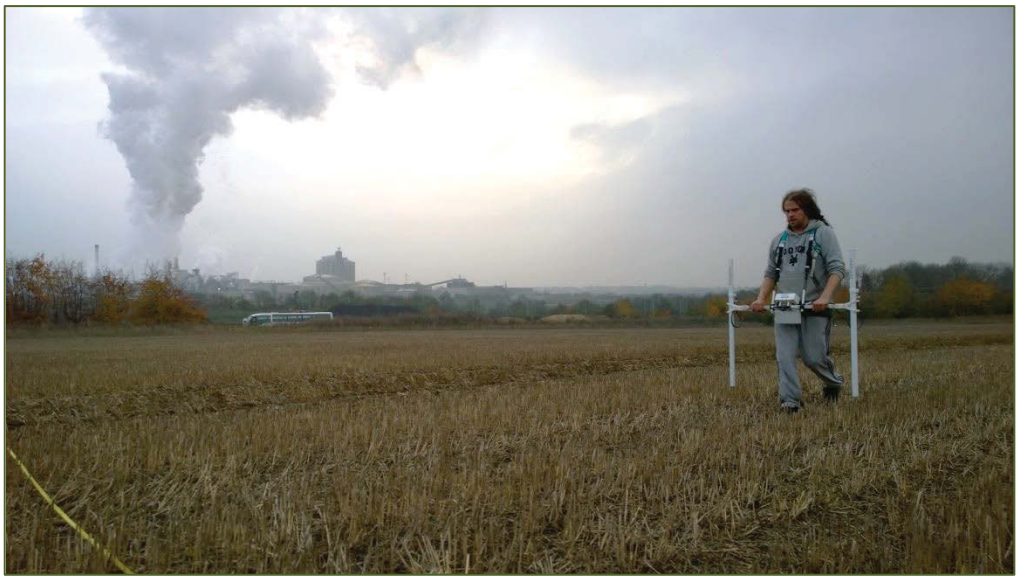
HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

DETAILED MAGNETOMETER SURVEY



Report Number: 1076 November 2014

HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

DETAILED MAGNETOMETER SURVEY

Prepared for:
Simon Marsh
Concertus Design and Property Consultants LTD
8 Russell Road
Ipswich
Suffolk
IP1 2BX

By:
Timothy Schofield HND BSc PIfA

Britannia Archaeology Ltd
115 Osprey Drive,
Stowmarket, Suffolk
IP14 5UX
T: 01449 763034
info@britannia-archaeology.com
www.britannia-archaeology.com
Registered in England and Wales: 7874460

November 2014

Site Code	FSM 024	**NGR**	TL 862 663
Planning Ref.	TBC	**OASIS**	britanni1-194733
Approved By	Matthew Adams	**DATE**	November 2014

The material contained within this report was prepared for an individual client and solely for the benefit of that client and the contents should not be relied upon by any third party. Britannia Archaeology Ltd will not be held liable for any loss or damage, direct, indirect or consequential, through misuse of, or actions based on the material contained within by any third party.

The results and interpretation of the report cannot be considered an absolute representation of the archaeological or any other remains. In the case of geophysical surveys the data collected, and subsequent interpretation is a representation of anomalies recorded by the survey instrument. Britannia Archaeology Ltd will not be held liable for any errors of fact supplied by a third party, or guarantee the proper maintenance of the survey stations

CONTENTS

ABSTRACT

In November 2014, Britannia Archaeology Ltd undertook a detailed fluxgate gradiometer survey over c.6 hectares of land at Hollow Lane Farmhouse, Hollow Lane, Fornham St Martin, Suffolk, in one agricultural field, in advance of a Waste Recycling Centre and Waste Transfer Station. A range of anomalies were recorded during the survey, some of which have a potential archaeological origin.

Isolated dipolar responses were most common and probably relate to ferrous material being introduced into the topsoil through manuring.

Three broad areas of magnetic disturbance recorded on the south-eastern border of the site represent ferrous readings associated with the new barn, one further area is recorded to the north within close proximity of the field boundary.

A series of broad weak positive anomalies that are predominantly of a linear nature and orientated approximately north-east to south-west are potentially of a geological origin, however an archaeological derivation cannot be ruled out.

Seven narrow positive linear trends recorded on a north-east to south-west alignment are indicative of agricultural land drains.

A pair of negative and positive linear trends recorded parallel with the western boundary are indicative of backfilled and ploughed-out bank and ditch remains.

Three positive discrete anomalies indicative of archaeological rubbish pits are recorded on the brow of the slope towards the centre of the dataset.

One positive linear anomaly aligned north-east to south-west indicative of a backfilled boundary sub-division has been recorded on a completely different orientation than the current field alignment. This suggests an earlier phase, perhaps relating to Roman features recorded during the excavation (HER No. SFM 081) to the south-east.

Two curvilinear anomalies indicative of archaeological ring ditches or potential drip gullies have been recorded on the brow of the slope, a geological derivation cannot be ruled out.

It would be prudent to test the hypotheses given in this report by targeting in particular the positive discretes, curvilinear and linear anomalies interpreted as being of potential archaeological origin. The weak broad anomalies recorded as being of potential geological origin should also be further investigated to prove their derivation.

1.0 INTRODUCTION

From Wednesday 19th to Friday 21st November 2014 Britannia Archaeology Ltd (BA) undertook a detailed fluxgate gradiometer survey over *c.*6ha of land at Hollow Lane Farmhouse, Hollow Lane, Fornham St Martin, Suffolk (NGR TL 862 663) in one agricultural field in advance of a Waste Recycling Centre and Waste Transfer Station (Figure 1).

This survey was commissioned by Simon Marsh of Concertus Design and Property Consultants Ltd in response to a design brief issued by Suffolk County Council Archaeology Service/Conservation Team (Brudenell. M, dated 27th October 2014). The weather was overcast for the majority of the three days, interspersed with short periods of sunshine following a prolonged period of precipitation.

2.0 SITE DESCRIPTION

The site is located to the east of the A134 and to the north of Bury St Edmunds, in one agricultural field, hedgerows bound the 6.6 hectare field to the north, east and south. An access road borders the eastern extent.

Bedrock geology is described as White Chalk, a sedimentary bedrock formed approximately 66 to 100 million years ago in the Cretaceous Period when the local environment was dominated by warm chalk seas depositing calcareous ooze of microscopic plankton (BGS, 2014).

Superficial geology is described as Diamicton Till, formed up to 3 million years ago in the Quaternary Period when the local environment was dominated by ice age conditions when glaciers scoured the landscape depositing moraines of till with outwash sand and gravel from seasonal and post glacial meltwaters (BGS 2014).

Site Visit 11th November 2014

A site visit was undertaken on the 11th November 2014 to ascertain whether the site was suitable for geophysical survey and to undertake a risk assessment. The field was covered in a low stubble, no potential hazards were highlighted (DP's 1 and 2).

DP1

Site shot looking south.

DP2

Site shot looking south-west.

3.0 PLANNING POLICIES

The geophysical survey was carried out on the recommendation of the county council (SCCAS/CT), following guidance laid down by the *National Planning and Policy Framework* (NPPF, DCLD 2012) which replaced *Planning Policy Statement 5: Planning for the Historic Environment* (PPS5, DCLG 2010) in March 2012. The relevant local development framework is *The Replacement St Edmundsbury Borough Local Plan (2016)*.

3.1 National Planning Policy Framework (NPPF, DCLG March 2012)

The NPPF recognises that 'heritage assets' are an irreplaceable resource and planning authorities should conserve them in a manner appropriate to their significance when considering development. It requires developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. The key areas for consideration are:

- The significance of the heritage asset and its setting in relation to the proposed development;
- The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance;
- Significance (of the heritage asset) can be harmed or lost through alteration or destruction, or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification;
- Local planning authorities should not permit loss of the whole or part of a heritage asset without taking all reasonable steps to ensure the new development will proceed after the loss has occurred; and
- Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.

3.2 The Replacement St Edmundsbury Borough Local Plan (2016).

The relevant section in the local plan (9. Heritage and Conservation) states the following aims and objectives:

9.1 To maintain and improve the quality of the built environment

9.2 To achieve this aim, the objectives are to:

a) retain and enhance the character and appearance of the historic environment and ensure that new development is sensitive to the character of the locality;

b) safeguard listed buildings, conservation areas and parks and gardens of special historic or design interest and their settings from inappropriate development;

c) protect and conserve the fabric of historic buildings, structures and other features, and the archaeological remains related to them; and

d) protect and conserve sites of archaeological importance and their settings.

4.0 ARCHAEOLOGICAL BACKGROUND

The site lies in an area of very high archaeological potential, as indicated by information held by the County Historic Environment Record (HER). In 2011 an area *c.*30 x 50m was excavated in the southeast corner of the proposed site, in advance of the construction of a barn (planning no. SE/11/0380, Suffolk County Council Archaeology Service Field Team Report 2011/210, HER no. SFM 021). The eastern part of the excavation revealed a high density of Roman features, including ditches, pits and finds indicative of occupation between the 2nd-4th century AD. These remains are likely to form part of a much more extensive possibly multi-period settlement. Roman and Saxon finds have also been recovered on land immediately adjacent to the south and west of the site (FSM 007 and BRG MISC).

5.0 PROJECT AIMS

A non-intrusive field survey by geophysical prospection was required of the area to determine the extent and significance of subsurface anomalies, followed by a subsequent trial trench evaluation, the aims and objectives are laid out as follows in Section 3 of the brief:

3.1 A geophysical survey is required over the application site to enable the archaeological resource, both in quality and extent, to be provisionally examined.

6.0 METHODOLOGY

6.1 Instrument Type Justification

Britannia Archaeology Ltd employed a Bartington Dual Grad 601-2 fluxgate gradiometer to undertake the survey, because of its high sensitivity and rapid ground coverage. The surveyors noted that that the background magnetic susceptibility signature was higher than average across the site, however a suitable zero station was located with relative ease.

6.2 Instrument Calibration

One hour was allowed in the morning for the magnetometers sensors to settle before the start of the first grid. The instrument was zeroed after every three to five grids to minimise the effect of sensor drift. An area with a relatively low magnetic reading was chosen to calibrate the instrument; this same point was used to zero the sensors throughout the survey providing a common zero point. The surveyors noted a degree of sensor drift during the outbreaks of sunshine, causing the characteristic parallel traverse 'striping' that is prevalent throughout the raw dataset (Figure 3).

6.3 Sampling Interval and Grid Size

The sampling interval was set at 0.25m along 1m traverse intervals, providing 4 readings a metre, the magnetometer survey was undertaken within 20 x 20m grids.

6.4 Survey Grid Location

The survey grid was set out to the Ordnance Survey OSGB36 datum to an accuracy of ±0.1m employing a Leica Viva Glonnass Smart Rover GS08 real time kinetic (RTK) survey system. Data were converted to the National Grid Transformation OSTN02 and the instrument was regularly tested using stations with known ETRS89 coordinates. The grids were positioned on a *c.*east to west alignment (Figure 2).

6.5 Data Capture

Instrument readings were recorded on an internal data logger that were downloaded to a laptop at mid-day and then also at the end of the day. The grid order was recorded on a BA pro-forma to aid in the creation of the data composites. Data were filed in job specific folders. These data composites were checked for quality on site by BA, allowing grids to be re-surveyed if necessary. The data were backed up onto an external storage device in the office and finally a remote server at the end of the day. A five metre exclusion zone was left between the boundaries and the survey area to reduce the amount of field boundary magnetic disturbance, which slightly reduced the area available.

6.6 Data Presentation and Processing

Data are presented in both raw and processed data plots in greyscale format (Figures 3 and 4). An XY trace plot of the processed data has also been included (Figure 5).

The raw data is presented with no processing, and was clipped to produce a uniform greyscale plot, processed data schedules are also displayed below.

Raw Data:
Data Clipping: 4.00 standard deviations;
Display Clipping: +/- 3 standard deviations.

Processed Data:
De-stripe: Median Traverse: 76, 77, 119, 124,129
Median Sensors: all other grids;
Data Clipping: 4.00 standard deviations;
Display Clipping: +/- 3 standard deviations.

An interpretation plan characterising the anomalies recorded can be found at Figure 6, drawing together the evidence collated from both greyscale and XY trace plots (Figures 3 and 4). All figures are tied into the National Grid and printed at an appropriate scale.

6.7 Software

Raw data were downloaded using DW Consulting's Archeosurveyor v2.5.16.0 and will be stored in this format as raw data. The software used to process the data and produce the composites was also DW Consulting's Archeosurveyor v2.5.16.0. Datasets were exported into AutoCAD and placed onto the local survey grid. Interpretation plots were then produced using AutoCAD.

6.8 Grid Restoration

Britannia Archaeology Ltd did not position any reference stations within the field as it was due to be ploughed following the survey. Three geo-referenced virtual survey stations are presented in Figure 2 that can be used to relocate the anomalies recorded and position any subsequent trial trenches.

7.0 RESULTS & DISCUSSION (Figure 6)

The most common anomalies recorded in the dataset were isolated dipolar ('iron spike') responses (yellow hatched circles) that probably relate to modern ferrous material introduced into the topsoil through manuring.

Three broad areas of magnetic disturbance (yellow hatching) present on the south-eastern border of the site represent ferrous readings associated with the modern barn (See DP1), constructed after the 2011 excavation (HER no. SFM 021) on which Roman remains were recorded. A fourth area of magnetic disturbance is also present on the northern border, here the magnetometer detected readings where the field boundary kinks in towards the survey area.

A series of broad weak positive anomalies (cyan hatching) that are predominantly of a linear nature are recorded across the dataset. These anomalies are orientated approximately north-east to south-west and run down the natural slope present on site. These anomalies are potentially fissures present within the chalk geology that is present on site; however they are located on the same alignment as the positive linear anomaly (red hatching) which may indicate an archaeological origin.

Seven narrow positive linear trends (green lines) have been recorded on a north-east to south-west alignment that are indicative of ceramic land drains likely to derive from modern agricultural practises.

A pair of negative (blue hatched) and positive (green hatched) linear trends recorded parallel with the western boundary are indicative of backfilled and ploughed-out bank and ditch remains formally present along this border. A field boundary is recorded in this location on the 1886 to 1994 Ordnance Survey Maps. It is also possible that these anomalies may derive from topsoil and subsoil accumulations where the plough has been turned forming headland along the boundary, or from material deposited when the A134 was constructed. A second narrower negative linear trend recorded only in the north-

western corner of the dataset on a north-east to south-west alignment is indicative of a potential service trench run.

A positive linear trend (magenta hatching) delineates the location of a backfilled former field boundary ditch that is recorded on thirteen Ordnance Survey maps dating from 1886 until 1994.

Three positive discrete anomalies (orange hatching) indicative of archaeological rubbish pits are located on the brow of the slope that is present in the centre of the site. The terrain here also changes from compacted dry conditions to heavier soils that slope down to the south-west and contain a higher degree of ground moisture.

One positive linear anomaly (red linear hatching) aligned north-east to south-west indicative of a backfilled boundary sub-division has been recorded. It is on a completely different orientation than the current field alignment which suggests that it dates from an earlier phase of site activity. It lies *c.*100m from the Roman features recorded during the excavation (HER no. SFM 021) and therefore could be an outlying associated ditch. As discussed earlier in this report the weak positive broad anomalies (cyan hatching) interpreted as being of potential geological origin, could have an archaeological derivation, they are similarly aligned to the positive linear anomaly (red linear hatching) and could therefore be associated.

Two curvilinear anomalies (red curvilinear hatching) indicative of archaeological ring ditches or potential drip gullies have further been recorded in the dataset, that along with the discrete anomalies are present on the brow of the slope. These anomalies may also be caused by natural magnetic variations within the geology.

8.0 CONCLUSION

This geophysical survey was successful in locating a fairly wide range of anomalies, some of which have a potential archaeological origin. The site appears to have been relatively heavily ploughed with linear striations caused by ploughing clearly present on a *circa* east to west alignment. The presence of a sub-soiler on site suggests that deep ploughing has occurred over the last few seasons, causing a degree of site truncation and deposit mixing which can prove detrimental in the recording of archaeological anomalies. It would be prudent to target the positive linear/curvilinear and discrete anomalies interpreted as being of an archaeological origin and also the weak broad anomalies interpreted as geological fissures to prove their origins.

9.0 PROJECT ARCHIVE AND DEPOSITION

A full archive will be prepared for all work undertaken in accordance with guidance from the *Selection, Retention and Dispersion of Archaeological Collections,* Archaeological Society for Museum Archaeologists, 1993. Arrangements will be made for the archive to be deposited with the relevant museum/HER Office.

10.0 ACKNOWLEDGEMENTS

Britannia Archaeology Ltd would like to thank Simon Marsh of Concertus for commissioning the project and arranging access, and to Dr Matthew Brudenell of Suffolk County Council Archaeological Service/Conservation Team for his advice throughout.

Bibliography

Ayala. G. *et al*. 2004. *Geoarchaeology; Using Earth Sciences to Understand the Archaeological Record*. English Heritage.

Clark. A. J. 1996. *Seeing Beneath the Soil, Prospecting Methods in Archaeology*. BT Batsford Ltd, London.

David. A. 1995. *Geophysical Survey in Archaeological Field Evaluation: Research and Professional Services Guidelines*. No.1. English Heritage.

David. A. *et al*. 2008. *Geophysical Survey In Archaeological Field Evaluation,* Second Edition. English Heritage.

Department for Communities and Local Government, 2012. *National Planning Policy Framework (NPPF)*

Gaffney. C, Gater. J. and Ovenden. S. 2002. *The Use of Geophysical Techniques in Archaeological Evaluations*. IFA Technical Paper No. 6.

Gaffney. C. and Gater. J. 2003. *Revealing the Buried Past, Geophysics for Archaeologists*. Tempus Publishing Ltd.

Gurney, D. 2003. *Standards for Archaeology in the East of England*, East Anglian Archaeology Occasional Paper 14.

Institute for Archaeologists. 2011. *Standard and Guidance for Archaeological Geophysical Survey*.

Linford. N. 2006. Notes from an English Heritage Seminar.

Schmidt. A. 2001. *Geophysical Data in Archaeology: A Guide to Good Practice*. Archaeology Data Service. Oxbow Books.

Whitten. D.G.A. 1978. *The Penguin Dictionary of Geology*. Penguin Books Ltd. London.

Witten. A.J. 2006. *Handbook of Geophysics and Archaeology*. Equinox Publishing Ltd. London.

Websites

The British Geological Survey, 2013, (Natural Environment Research Council) – Geology of Britain Viewer - www.bgs.ac.uk/opengeoscience/home.html?Accordion2=1#maps

APPENDIX 1 METADATA SHEETS

Raw Data

Filename	BSE1R.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS/DPM on 11/21/2014
Assembled by	TPS on 11/24/2014
Direction of 1st Traverse	45 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	1440 x 160
Survey Size (meters)	360.00m x 160.00 m
Grid Size	20.00 m x 20.00 m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	13.37
Min	-10.59
Std Dev	2.35
Mean	1.37
Median	1.03
Composite Area	5.76 ha
Surveyed Area	4.57 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Processed Data

Filename	BSE1P.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS/DPM on 11/21/2014
Assembled by	TPS on 11/24/2014
Direction of 1st Traverse	45 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	1440 x 160
Survey Size (meters)	360.00m x 160.00 m
Grid Size	20.00 m x 20.00 m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	9.65
Min	-9.40
Std Dev	1.45
Mean	0.11
Median	0.00
Composite Area	5.76 ha
Surveyed Area	4.57 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 133
1 Col:0 Row:1 grids\01.xgd
2 Col:0 Row:2 grids\02.xgd
3 Col:0 Row:3 grids\03.xgd
4 Col:0 Row:4 grids\04.xgd
5 Col:0 Row:5 grids\05.xgd
6 Col:0 Row:6 grids\48.xgd
7 Col:0 Row:7 grids\49.xgd
8 Col:1 Row:0 grids\06.xgd
9 Col:1 Row:1 grids\07.xgd
10 Col:1 Row:2 grids\08.xgd
11 Col:1 Row:3 grids\09.xgd
12 Col:1 Row:4 grids\10.xgd
13 Col:1 Row:5 grids\11.xgd
14 Col:1 Row:6 grids\50.xgd
15 Col:1 Row:7 grids\51.xgd
16 Col:2 Row:0 grids\12.xgd
17 Col:2 Row:1 grids\13.xgd
18 Col:2 Row:2 grids\14.xgd
19 Col:2 Row:3 grids\15.xgd
20 Col:2 Row:4 grids\16.xgd
21 Col:2 Row:5 grids\17.xgd
22 Col:2 Row:6 grids\52.xgd
23 Col:2 Row:7 grids\53.xgd
24 Col:3 Row:0 grids\18.xgd
25 Col:3 Row:1 grids\19.xgd
26 Col:3 Row:2 grids\20.xgd
27 Col:3 Row:3 grids\21.xgd
28 Col:3 Row:4 grids\22.xgd
29 Col:3 Row:5 grids\23.xgd
30 Col:3 Row:6 grids\54.xgd
31 Col:3 Row:7 grids\55.xgd
32 Col:4 Row:0 grids\24.xgd
33 Col:4 Row:1 grids\25.xgd
34 Col:4 Row:2 grids\26.xgd
35 Col:4 Row:3 grids\27.xgd
36 Col:4 Row:4 grids\28.xgd
37 Col:4 Row:5 grids\29.xgd
38 Col:4 Row:6 grids\56.xgd
39 Col:4 Row:7 grids\57.xgd
40 Col:5 Row:0 grids\30.xgd
41 Col:5 Row:1 grids\31.xgd
42 Col:5 Row:2 grids\32.xgd
43 Col:5 Row:3 grids\33.xgd
44 Col:5 Row:4 grids\34.xgd
45 Col:5 Row:5 grids\35.xgd
46 Col:5 Row:6 grids\58.xgd
47 Col:5 Row:7 grids\59.xgd
48 Col:6 Row:0 grids\36.xgd
49 Col:6 Row:1 grids\37.xgd
50 Col:6 Row:2 grids\38.xgd
51 Col:6 Row:3 grids\39.xgd
52 Col:6 Row:4 grids\40.xgd
53 Col:6 Row:5 grids\41.xgd
54 Col:6 Row:6 grids\60.xgd
55 Col:6 Row:7 grids\61.xgd
56 Col:7 Row:0 grids\42.xgd
57 Col:7 Row:1 grids\43.xgd
58 Col:7 Row:2 grids\44.xgd
59 Col:7 Row:3 grids\45.xgd
60 Col:7 Row:4 grids\46.xgd
61 Col:7 Row:5 grids\47.xgd
62 Col:7 Row:6 grids\62.xgd
63 Col:7 Row:7 grids\63.xgd

64	Col:8	Row:0	grids\78.xgd
65	Col:8	Row:1	grids\79.xgd
66	Col:8	Row:2	grids\80.xgd
67	Col:8	Row:3	grids\81.xgd
68	Col:8	Row:4	grids\82.xgd
69	Col:8	Row:5	grids\83.xgd
70	Col:8	Row:6	grids\64.xgd
71	Col:8	Row:7	grids\65.xgd
72	Col:9	Row:0	grids\84.xgd
73	Col:9	Row:1	grids\85.xgd
74	Col:9	Row:2	grids\86.xgd
75	Col:9	Row:3	grids\87.xgd
76	Col:9	Row:4	grids\88.xgd
77	Col:9	Row:5	grids\89.xgd
78	Col:9	Row:6	grids\66.xgd
79	Col:9	Row:7	grids\67.xgd
80	Col:10	Row:0	grids\90.xgd
81	Col:10	Row:1	grids\91.xgd
82	Col:10	Row:2	grids\92.xgd
83	Col:10	Row:3	grids\93.xgd
84	Col:10	Row:4	grids\94.xgd
85	Col:10	Row:5	grids\95.xgd
86	Col:10	Row:6	grids\68.xgd
87	Col:10	Row:7	grids\69.xgd
88	Col:11	Row:0	grids\96.xgd
89	Col:11	Row:1	grids\97.xgd
90	Col:11	Row:2	grids\98.xgd
91	Col:11	Row:3	grids\99.xgd
92	Col:11	Row:4	grids\100.xgd
93	Col:11	Row:5	grids\101.xgd
94	Col:11	Row:6	grids\70.xgd
95	Col:11	Row:7	grids\71.xgd
96	Col:12	Row:0	grids\102.xgd
97	Col:12	Row:1	grids\103.xgd
98	Col:12	Row:2	grids\104.xgd
99	Col:12	Row:3	grids\105.xgd
100	Col:12	Row:4	grids\106.xgd
101	Col:12	Row:5	grids\107.xgd
102	Col:12	Row:6	grids\72.xgd
103	Col:12	Row:7	grids\73.xgd
104	Col:13	Row:0	grids\108.xgd
105	Col:13	Row:1	grids\109.xgd
106	Col:13	Row:2	grids\110.xgd
107	Col:13	Row:3	grids\111.xgd
108	Col:13	Row:4	grids\112.xgd
109	Col:13	Row:5	grids\113.xgd
110	Col:13	Row:6	grids\74.xgd
111	Col:13	Row:7	grids\75.xgd
112	Col:14	Row:0	grids\114.xgd
113	Col:14	Row:1	grids\115.xgd
114	Col:14	Row:2	grids\116.xgd
115	Col:14	Row:3	grids\117.xgd
116	Col:14	Row:4	grids\118.xgd
117	Col:14	Row:5	grids\119.xgd
118	Col:14	Row:6	grids\76.xgd
119	Col:14	Row:7	grids\77.xgd
120	Col:15	Row:0	grids\120.xgd
121	Col:15	Row:1	grids\121.xgd
122	Col:15	Row:2	grids\122.xgd
123	Col:15	Row:3	grids\123.xgd
124	Col:15	Row:4	grids\124.xgd
125	Col:16	Row:0	grids\125.xgd
126	Col:16	Row:1	grids\126.xgd
127	Col:16	Row:2	grids\127.xgd
128	Col:16	Row:3	grids\128.xgd
129	Col:16	Row:4	grids\129.xgd

130 Col:17 Row:0 grids\130.xgd
131 Col:17 Row:1 grids\131.xgd
132 Col:17 Row:2 grids\132.xgd
133 Col:17 Row:3 grids\133.xgd

Appendix 2 – Technical Details

Magnetometer Survey

The magnetometer differs from the 'active' magnetic susceptibility meter by being a 'passive' instrument. Rather than injecting a signal into the ground it detects slight variations in the Earth's magnetic field caused by cultural and natural disturbance (Clark).

Thermoremanent magnetism is produced when a material containing iron oxides is strongly heated. Clay for example has a high iron oxide content that in a natural state is weakly magnetic, when heated these weakly magnetic compounds become highly magnetic oxides that a magnetometer can detect.

The demagnetisation of iron oxides occurs above a temperature known as the Curie point; for example haematite has a Curie point of 675 Celsius and magnetite 565C. At the time of cooling the iron oxides become permanently re-magnetised with their magnetic properties re-aligned in the direction of the Earth's magnetic field (Gaffney and Gater). The direction of the Earth's magnetic field shifts over time and these subtle alignment differences can be recorded. Kilns, hearths, baked clay and ovens can reach Curie point temperatures, and are the strongest responses apart from large iron objects that can be detected. Other cultural anomalies that can be prospected include occupation areas, pits, ditches, furnaces, sunken feature buildings, ridge and furrow field systems and ritual activity (David, 2011). Commonly recorded anomalies include modern ferrous service pipes, field drainage pipes, removed field boundaries, perimeter fences and field boundaries.

Fluxgate Gradiometers

Fluxgate gradiometers are sensitive instruments that utilise two sensors placed in a vertical plane, spaced 1 metre apart. The sensor above reads the Earth's magnetic (background) response while the sensor below records the local magnetic field. Both sensors are carefully adjusted to read zero before survey commences at a 'zeroing' point, selected for its relatively 'quiet' magnetic background reading. When differences in the magnetic field strength occur between the two sensors a positive or negative reading is logged. Positive anomalies have a positive magnetic value and conversely negative anomalies have a negative magnetic value relative to the site's magnetic background. Examples of positive magnetic anomalies include hearths, kilns, baked clay, areas of burning, ferrous material, ditches, sunken feature buildings, furrows, ferrous service pipes, perimeter fences and field boundaries. Negative magnetic anomalies include earthwork embankments, plastic water pipes and geological features.

The instruments are usually held approximately 0.30m to 0.50m above the ground surface and can detect to a depth of between 1-2metres. Best practice dictates that the optimal direction of traverse in Britain is east to west.

Magnetic Anomalies

Linear trends

Linear trends can be both positive and negative magnetic responses. If they are broad, relatively weak or negative in nature they may be of agricultural or geological origin, for example periglacial channels, land drains or ploughing furrows. If the responses are strong positive trends they are more likely to be of archaeological origin. Archaeological settlement ditches tend to be rich in highly magnetic iron oxides that accumulate in them via anthropogenic activity and humic backfills. Conversely surviving banks will be negative in nature, the material is derived from subsoil deposits that is less likely to be positively magnetic. Curvilinear trends can also be recorded and are indicative of archaeological structures such as drip-gullies.

Discrete anomalies

Discrete anomalies appear as increased positive responses present within a localised area. They are caused by a general increase in the amount of magnetic iron oxides present within the humic back-fill of for example a rubbish pit.

'Iron spike' anomalies

These strong isolated dipolar responses are usually caused by ferrous material present in the topsoil horizon. They can have an archaeological origin but are usually introduced into the topsoil during manuring.

Areas of magnetic disturbance

An area of magnetic disturbance is usually associated with material that has been fired. For example areas of burning, demolition (brick) rubble or slag waste spreads. They can also be caused by ferrous material, e.g. close proximity to barbwire or metal fences and field boundaries, buried services, pylons and modern rubbish deposits.

APPENDIX 3 OASIS FORM

OASIS ID: britanni1-194733

Project details	
Project name	Land at Hollow Lane Farmhouse, Hollow Lane, Fornham St Martin, Suffolk
Short description of the project	A range of anomalies were recorded during the survey, some of which have a potential archaeological origin. Isolated dipolar responses were most common and probably relate to ferrous material being introduced into the topsoil through manuring. Three broad areas of magnetic disturbance recorded on the south-eastern border of the site represent ferrous readings associated with the new barn, one further area is recorded to the north within close proximity of the field boundary. A series of broad weak positive anomalies that are predominantly of a linear nature and orientated approximately north-east to south-west are potentially of a geological origin, however an archaeological derivation cannot be ruled out. Seven narrow positive linear trends recorded on a north-east to south-west alignment are indicative of agricultural land drains. A pair of negative and positive linear trends recorded parallel with the western boundary are indicative of backfilled and ploughed-out bank and ditch remains. Three positive discrete anomalies indicative of archaeological rubbish pits are recorded on the brow of the slope towards the centre of the dataset. One positive linear anomaly aligned north-east to south-west indicative of a backfilled boundary sub-division has been recorded on a completely different orientation than the current field alignment. This suggests an earlier phase, perhaps relating to Roman features recorded during the excavation (HER No. SFM 081) to the south-east. Two curvilinear anomalies indicative of archaeological ring ditches or potential drip gullies have been recorded on the brow of the slope, a geological derivation cannot be ruled out.
Project dates	**Start:** 19-11-2014 **End:** 21-11-2014
Previous/future work	No / Yes
Any associated project reference codes	P1085 - Contracting Unit No. R1076 - Contracting Unit No. FSM 024 – Site code
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 3 - Operations to a depth more than 0.25m
Monument type	NONE None
Significant Finds	NONE None
Methods & techniques	'"Geophysical Survey"'
Development type	Waste Recycling and Transfer Station
Prompt	Direction from Local Planning Authority - PPS
Position in the planning process	Pre-application
Solid geology (other)	White Chalk
Drift geology (other)	Diamicton Till
Techniques	Magnetometry
Project location	
Country	England
Site location	SUFFOLK ST EDMUNDSBURY FORNHAM ST MARTIN Hollow Lane Farmhouse, Hollow Lane, Fornham St Martin, Suffolk
Study area	6.60 Hectares
Site coordinates	TL 862 662 52.2619340896 0.728765533563 52 15 42 N 000 43 43 E Point
Height OD / Depth	Min: 45.00m Max: 55.00m
Project creators	
Name of Organisation	Britannia Archaeology Ltd
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	Timothy Schofield
Project director/manager	Timothy Schofield
Project supervisor	Timothy Schofield
Type of sponsor/funding body	District Council
Name of sponsor/funding body	St Edmundsbury Council
Project archives	

Physical Archive Exists?	No
Digital Archive recipient	Suffolk HER
Digital Contents available	"Survey"
Paper Archive recipient	Suffolk HER
Paper Contents	"Survey"
Paper Media available	"Report", "Survey ", "Unpublished Text"
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Hollow Lane Farmhouse, Hollow Lane, Fornham St Martin, Suffolk; Detailed Magnetometer Survey
Author(s)/Editor(s)	Schofield, T. P.
Other bibliographic details	R1076
Date	2014
Issuer or publisher	Britannia Archaeology Ltd
Place of issue or publication	Stowmarket
Description	A4 Bound Report with A3 fold-out figures.
URL	www.britannia-archaeology.com
Entered by	Tim Schofield (tim@britannia-archaeology.com)
Entered on	14 January 2015

N

	Proposed Development
	Site Boundary

NGR:	REPORT NUMBER:
TL 8620 6630	1076

PROJECT:
HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT:
Concertus DESIGN & PROPERTY CONSULTANTS

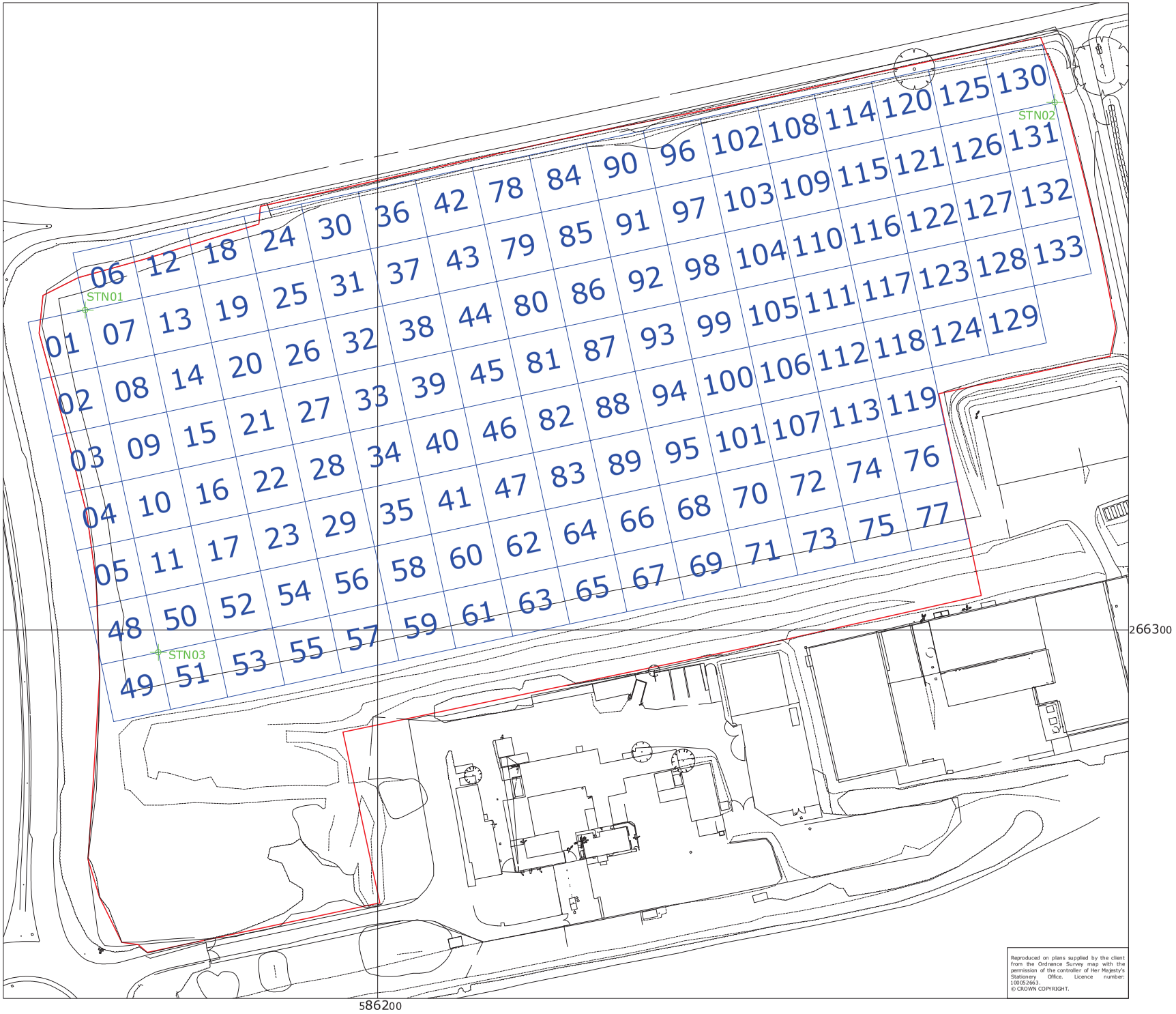
DESCRIPTION:
SITE & PROPOSED DEVELOPMENT LOCATION PLAN

BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK
IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE:		
1:2000	0 — 80m	
PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
NOV 2014	TPS	01



N

STATION	EASTING	NORTHING
01	586099.717	266409.675
02	586432.191	266480.814
03	586124.827	266292.327

Survey Grid Location

Site Boundary

NGR: TL 8620 6630

REPORT NUMBER: 1076

PROJECT: HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT: Concertus DESIGN & PROPERTY CONSULTANTS

DESCRIPTION: SURVEY GRID & GEOREFERENCING INFORMATION PLAN

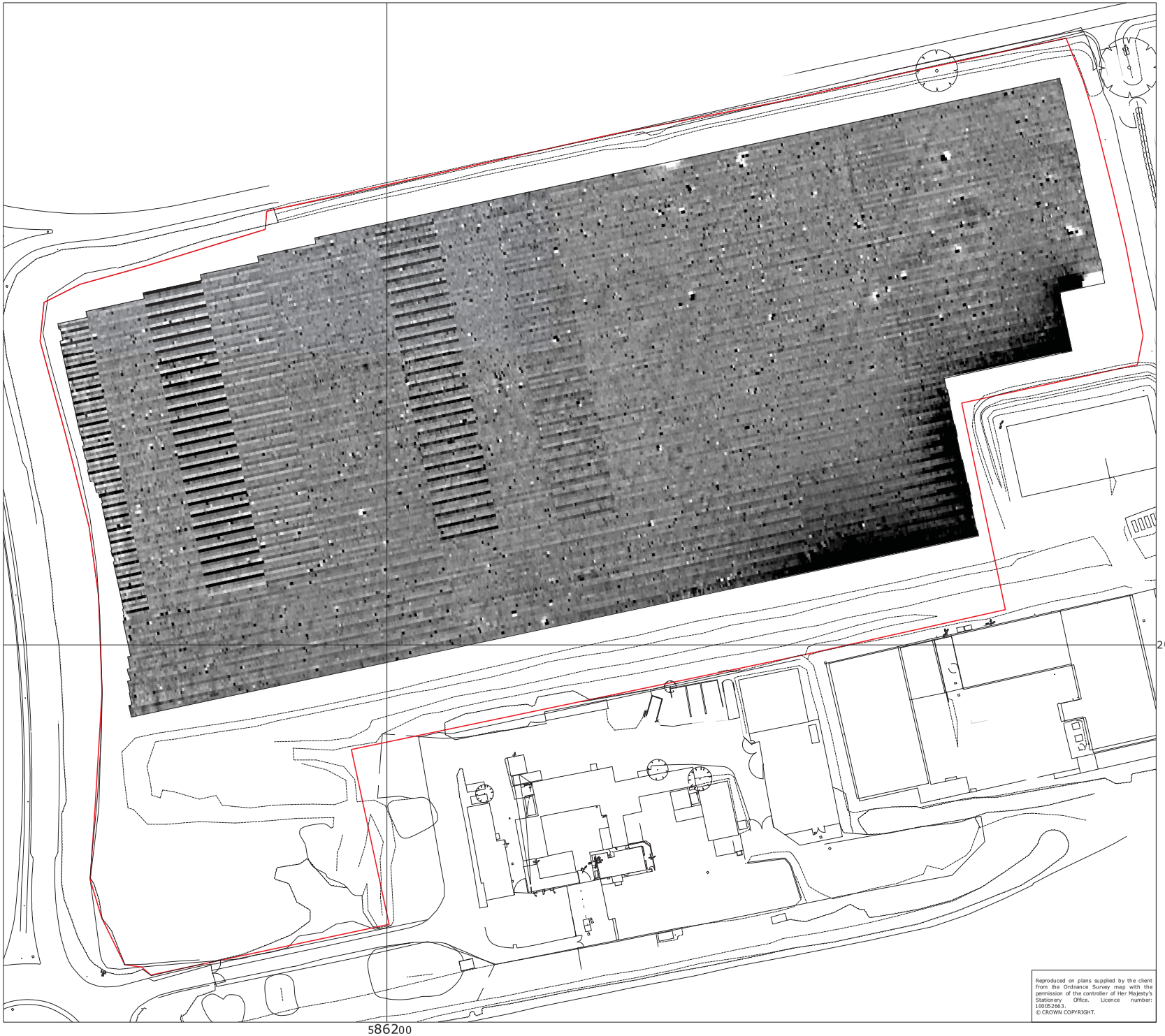
BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE: 1:1250 (0 – 50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
NOV 2014	TPS	02



Site Boundary

NGR: TL 8620 6630

REPORT NUMBER: 1076

PROJECT: HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT: Concertus DESIGN & PROPERTY CONSULTANTS

DESCRIPTION: RAW MAGNETOMETER GREYSCALE PLOT

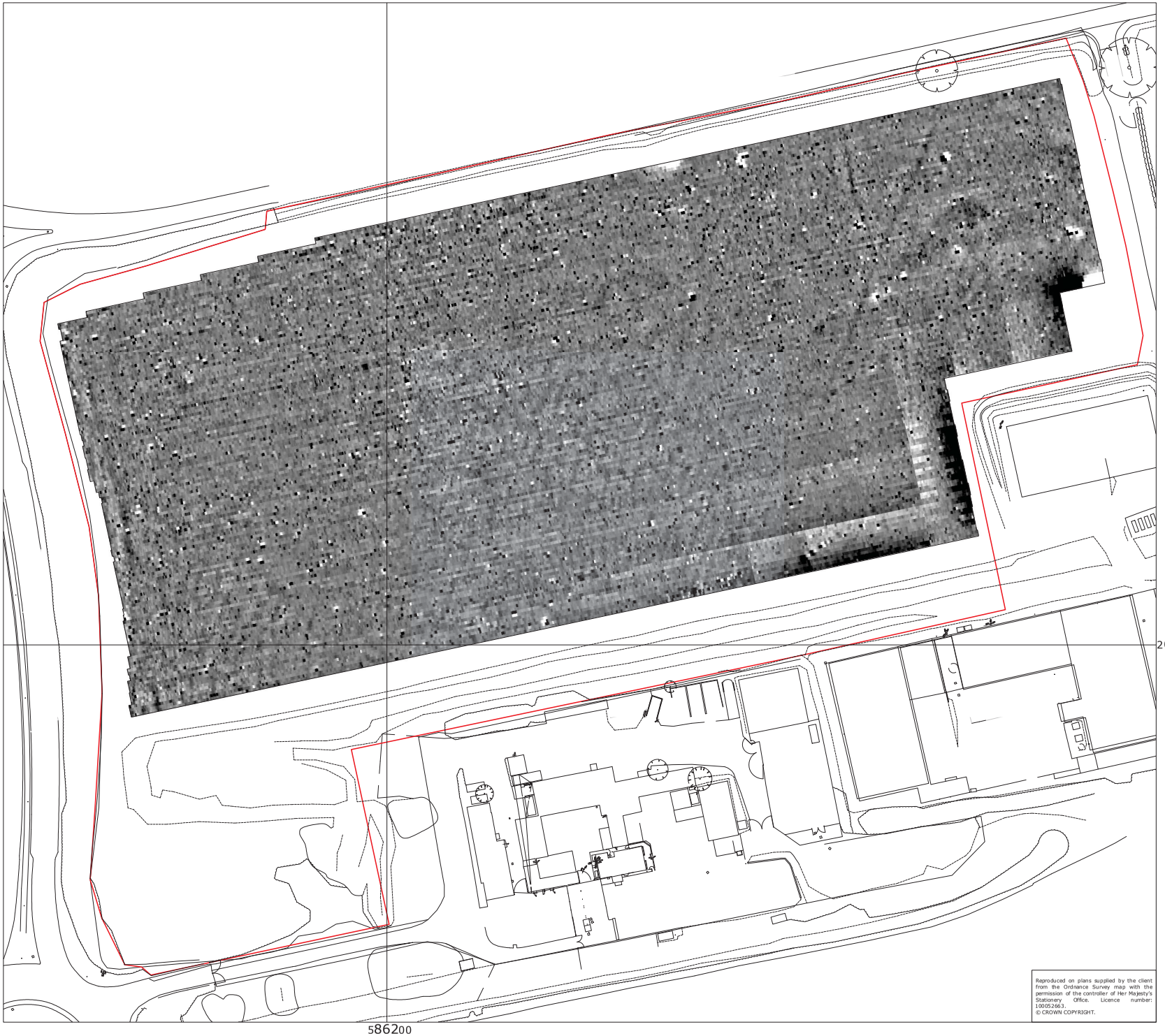
BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE: 1:1250 (0 – 50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE: NOV 2014	AUTHOR: TPS	FIGURE: 03



Site Boundary

NGR: TL 8620 6630

REPORT NUMBER: 1076

PROJECT: HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT: Concertus DESIGN & PROPERTY CONSULTANTS

DESCRIPTION: PROCESSED MAGNETOMETER GREYSCALE PLOT

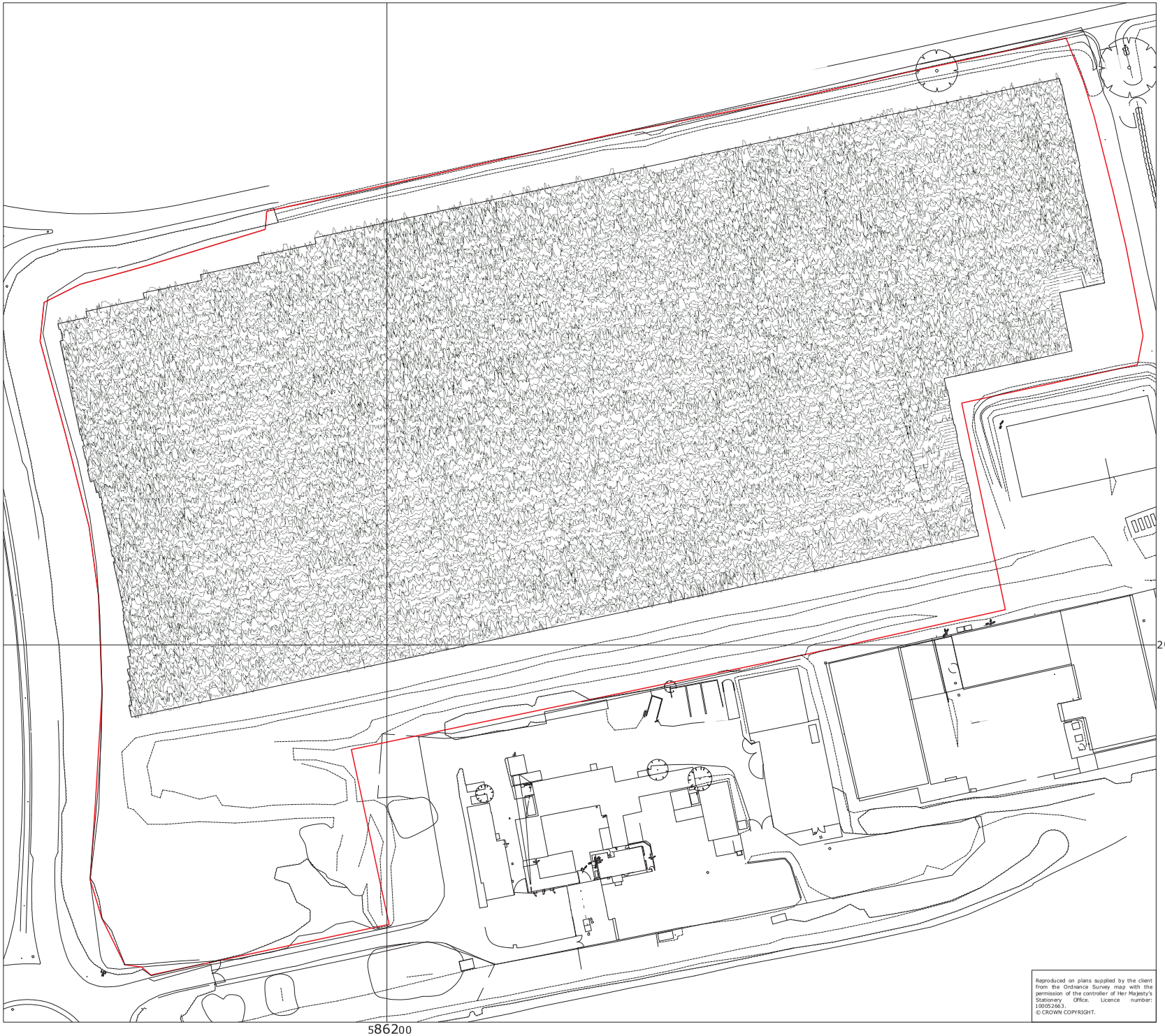
BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE: 1:1250 (0 – 50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
NOV 2014	TPS	04



13nT/cm	Scale Interval
	Site Boundary

NGR: TL 8620 6630	REPORT NUMBER: 1076

PROJECT:
HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT:
Concertus DESIGN & PROPERTY CONSULTANTS

DESCRIPTION:
PROCESSED MAGNETOMETER XY TRACE PLOT

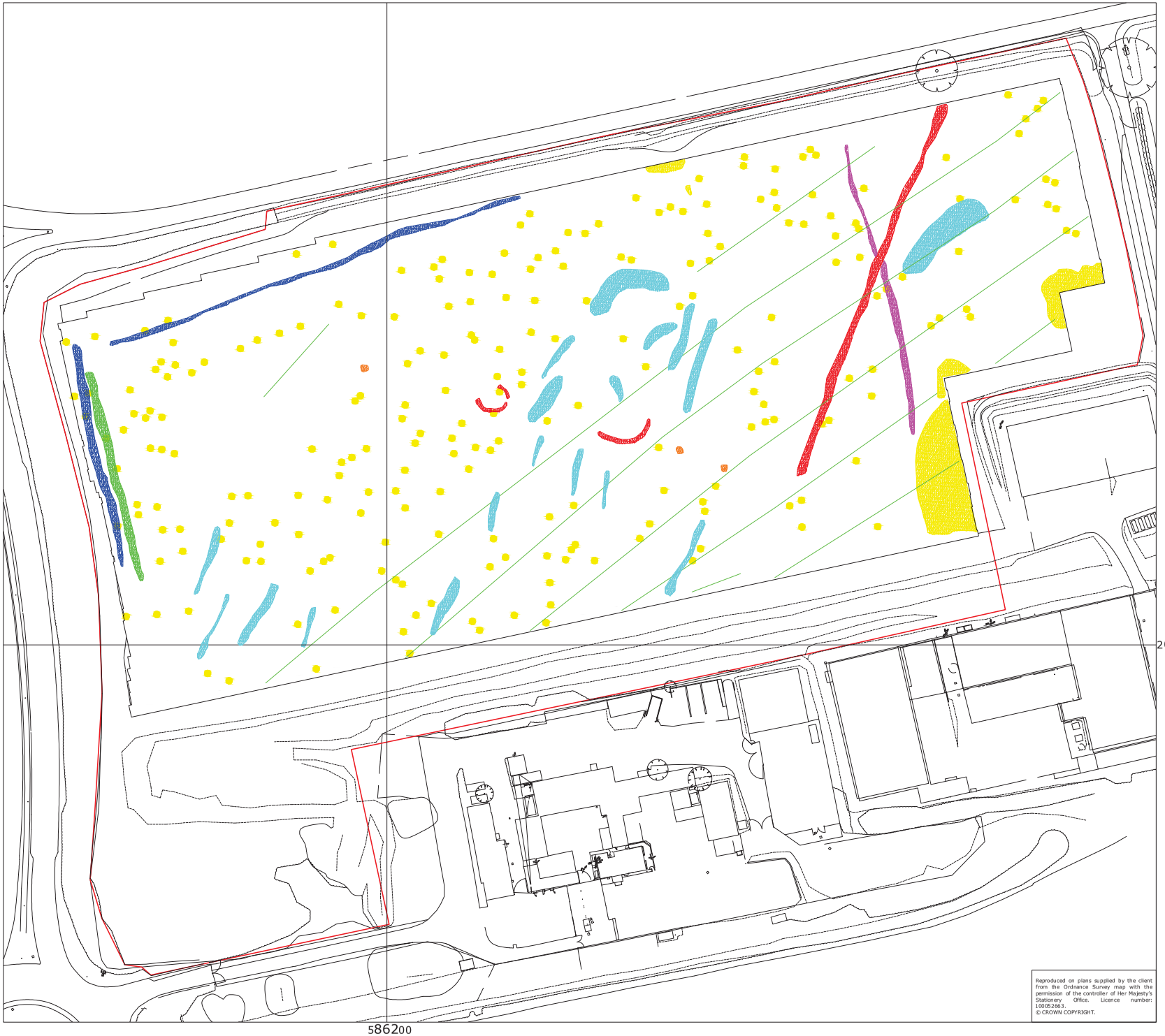
BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK
IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE: 1:1250 (0 – 50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE: NOV 2014	AUTHOR: TPS	FIGURE: 05



	Positive Curvilinear Anomaly, Archaeology?
	Positive Linear Anomaly, Archaeology?
	Positive Discrete Anomaly, Archaeology?
	Positive Linear Trend, Remnant Field Boundary.
	Positive Linear Trend, Agricultural Headland.
	Negative Linear Trend, Agricultural Headland.
	Narrow Positive Linear Trend, Agricultural Land Drains
	Broad Weak Positive Anomaly, Geology.
	Area of Magnetic Disturbance
	Isolated Dipolar Responses
	Site Boundary

NGR: TL 8620 6630

REPORT NUMBER: 1076

PROJECT: HOLLOW LANE FARMHOUSE, HOLLOW LANE, FORNHAM ST MARTIN, SUFFOLK

CLIENT: Concertus

DESCRIPTION: INTERPRETATION PLOT OF MAGNETOMETER ANOMALIES

BRITANNIA ARCHAEOLOGY LTD

115 OSPREY DRIVE, STOWMARKET, SUFFOLK IP14 5UX

T: 01449 763034
E: info@britannia-archaeology.com
W: www.britannia-archaeology.com

SCALE: 1:1250 (0 – 50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE: NOV 2014	AUTHOR: TPS	FIGURE: 06