LAND TO THE NORTH OF THE STREET LIDGATE, SUFFOLK

DETAILED MAGNETOMETER & EARTH RESISTANCE METER SURVEY

Report Number: 1066

September 2014

LAND TO THE NORTH OF THE STREET
LIDGATE, SUFFOLK

DETAILED MAGNETOMETER & EARTH RESISTANCE METER SURVEY

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September 2014

Site Code	LSG 018	**NGR**	572100 258000
Planning Ref.	N/A	**OASIS**	britanni1-187612
Approved By	Matthew Adams	**Date**	September 2014

Project Number: 1071

CONTENTS

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ABSTRACT

The detailed fluxgate gradiometer and earth resistance meter surveys were successful in identifying a range of anomalies, however only a small degree of correlation was observed between the two sets of data. Superficial deposits did cause a degree of issues with the earth resistance meter data collection. High resistance readings derived from the underlying geology may have prevented finer detail from being recorded. The narrow size of the cable easement has further caused a small degree of difficulty in the interpretation of the anomalies.

Areas of magnetic enhancement relating to potential backfilled earthworks and discrete positive anomalies interpreted as archaeological rubbish pits have been recorded in the western field and landscaped garden area by the fluxgate gradiometer. Two further positive linear anomalies were also recorded in the eastern field that are indicative of archaeological or agricultural ditches.

Discrete high resistance anomalies that are potentially of archaeological origin and larger areas of high and low resistance interpreted as potential ditches and banks were further recorded by the earth resistance meter in the western field and landscaped garden. One discrete area of high resistance in the eastern field recorded within the centre of the two positive linear anomalies recorded by the fluxgate gradiometer are also worthy of note. Two linear high resistance anomalies also in the western field could be of archaeological or agricultural origin.

Further archaeological investigations of these anomalies would be prudent to test the hypotheses given within this report.

1.0 INTRODUCTION

On Wednesday 30th and Thursday 31st September 2014, Britannia Archaeology Ltd (BA) undertook detailed fluxgate gradiometer and earth resistance meter surveys over *c.*0.90ha of land to the north of the Street, Lidgate, Suffolk (NGR 572100 258000), in three separate areas. The route traversed two pasture fields and a landscaped garden (Figure 1).

This survey was commissioned by Joanna Caruth Suffolk County Council Archaeological Service/Field Team. The weather was sunny on day one and overcast conditions prevailed on day two, following a period of intermittent precipitation.

2.0 SITE DESCRIPTION

Site Visit 11th June 2012

A site visit was undertaken on the 11th June to determine the suitability of the cable route for geophysical survey. All of the open plots were found to be suitable with only thick hedgerows causing issues along the boundaries. The route that runs alongside the road and the road itself are unsuitable for magnetometer and earth resistance meter survey (See Appendix 1).

The survey was located within three fields at a height of 75 to 85m AOD, the western-most field was given over to pasture being grazed by a few sheep, it contained large earthworks that were part of the Motte and Bailey castle’s defences. A landscaped garden was located in the central tract and was present to the north of the large Bailey Pond. The eastern-most field had been left to set-aside (see Figure 1).

The bedrock comprises Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk and Culver Chalk Formation. This sedimentary bedrock was formed in the Cretaceous Period when the local environment was dominated by warm chalk seas. It was overlain by superficial deposits of Head Clay, Silt and Gravel formed in the Quaternary period when sub-aerial slopes caused material to accumulate and be deposited by downslope movement (BGS, 2014).

3.0 PLANNING POLICIES

The archaeological investigation is to be carried out on the recommendation of the local planning authority, following guidance laid down by the National Planning and Policy Framework (NPPF, DCLD 2012) which replaces Planning Policy Statement 5: Planning for the Historic Environment (PPS5, DCLG 2010). The relevant local planning policies also include the *Replacement St Edmundsbury Borough Local Plan 2016 (Policy 9. June 2006*).

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;

- 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 Replacement St Edmundsbury Borough Local Plan 2016, (Policy 9. June 2006).

The *Replacement St Edmundsbury Borough Local Plan 2016* was adopted in June 2006 and is currently being updated by the Local Development Framework, which is at the consultation phase. Its aims and objectives for heritage and conservation are:

- To maintain and improve the quality of the built environment

- 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;

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

4.0 ARCHAEOLOGICAL BACKGROUND

The site is located in the historic core of Lidgate to the north of The Street in an area of high archaeological importance as defined in the Suffolk Historic Environment Record. Lidgate Castle is designated as a nationally important scheduled monument (SF125), that comprises wide ditches and probable house platform earthworks (HER ref LDG 010). The cable route crosses the outer bailey of the castle, encountering associated archaeological remains along the remainder of the route is therefore highly probable.

5.0 PROJECT AIMS & OBJECTIVES

This specific aim of the geophysical survey was to inform the suitability of the cable route.

6.0 METHODOLOGY

6.1 Instrument Type Justification

6.1.1 Fluxgate Gradiometer

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 site had a fairly high magnetic background susceptibility due to the amount of apparent ground disturbance caused by the landscaping of the garden and the background magnetic signature of the superficial geology.

6.1.2 Earth Resistance Meter

A Geoscan Research RM85 was employed to undertake the earth resistance meter survey, because of its on-board functionality and relative stability. It was noted during the set-up that there was a large variation in the natural background resistance with high and low resistance being encountered along the route. Sub-aerial slope deposits contained very large flint nodules and chalk lumps interspersed with Head-clays and silts, this caused both high and low resistance readings to be respectively recorded.

6.2 Instrument Calibration

6.2.1 Fluxgate Gradiometer

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 grids to minimise the effect of sensor drift. An area with a relatively low magnetic reading was chosen to calibrate the instrument in each field; this same point was used to zero the sensors throughout the survey providing a common zero point. Sensor drift did occur throughout the survey especially during sunny intervals.

6.2.2 Earth Resistance Meter

A single (twin pole-pole) 0.5m probe separation was considered to be most appropriate over the entire site, predominantly for ease of movement within a fairly constricted area that contained plenty of obstacles including large earthworks, trees and hedges. The Gain was kept at X10 which enabled the full range of readings to be recorded, high resistance readings attributed to large flint nodules in the sub-aerial superficial geology, remained within the instruments limits. The Frequency was set to 122.5Hz which allowed the readings to stabilise, output voltage was programed at 45v, the auto-log delay was kept at 300ms and the high pass filter was set to 13Hz.

An area of relative low resistance was chosen for each set-up station (located up-slope of the survey in each field), when the drum was moved to allow for survey progression the same figure was gained via widening the remote probe separation, allowing a consistent dataset to be collected.

6.3 Sampling Interval and Grid Size

6.3.1 Fluxgate Gradiometer

The sampling interval was set at 0.25m along 1m traverse intervals, providing 4 readings a metre, the magnetometer survey was undertaken on 20 x 20m grids, both geophysical surveys were undertaken on the same grid.

6.3.2 Earth Resistance Meter

To allow for speed of survey a 1m sampling interval was set along 1m traverse intervals, providing 1 reading a metre, the earth resistance survey was undertaken on 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) 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 variety of alignments along the cable route (Figure 1).

6.5 Data Capture

Both instruments recorded readings on internal data loggers that were downloaded to a laptop at lunchtime and 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. Data were backed up onto an external storage device in the office and finally a remote server at the end of the day. The location of trees, roads, hedges, garden furniture and Heras fencing surrounding portions of the excavated cable trench did slightly hinder the collection of data.

6.6 Data Presentation and Processing

Data are presented in both raw and processed data plots in greyscale format (Figures 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B). Accompanying these are a series of XY trace plots of the processed data (Figures 2C, 3C, 4C and 5C). A combined earth resistance meter and fluxgate gradiometer interpretation plan can be found at Figure 8.

6.6.1 Fluxgate Gradiometer

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

Raw Data:

Data Clipping: 1 standard deviation.
Display Clipping: 3 standard deviations.

Processed Data:
De-spike: X diameter = 3, Y diameter = 3, Threshold = 1, centre value=mean, replace with = mean;
De-stripe Median traverse: Grids: All
Data Clipping: 1 standard deviation;
Display Clipping: 3 standard deviations.

An interpretation plan characterising the anomalies recorded can be found at Figure 7, it draws together the evidence collated both from the greyscale and XY trace plots (Figures 4A, 4B, 4C, 5A, 5B and 5C). All figures are tied into the National Grid and printed at an appropriate scale.

6.6.2 Earth Resistance Meter

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

Raw Data:
Data Clipping: 1 standard deviation.
Display Clipping: 3 standard deviations.

Processed Data:
De-spike: X diameter = 3, Y diameter = 3, Threshold = 1, centre value=mean, replace with = mean;

An interpretation plan characterising the anomalies recorded can be found at Figure 6, it draws together the evidence collated both from the greyscale and XY trace plots (Figures

2A, 2B, 2C, 3A, 3B and 3C). All figures are tied into the National Grid and printed at an appropriate scale. A combined earth resistance meter and fluxgate gradiometer interpretation plan can be found at Figure 8.

6.7 Software

Raw data was downloaded from the fluxgate gradiometer using DW Consulting's Archeosurveyor v2.0 and will be stored in this format as raw data. The earth resistance meter was downloaded into Geoplot v3.00, and then imported into DW Consulting's Archeosurveyor v2.0. DW Consulting's Archeosurveyor v2.0 software was also used to produce the composites and process both sets of raw data, images were then imported into AutoCAD and placed onto the local survey grid. Interpretation plots were produced using AutoCAD, a combined magnetometer and earth resistance meter interpretation plot can be found at Figure 8.

6.8 Grid Restoration

Britannia Archaeology Ltd did not position any reference stations on the site due to its use as a garden and fields. The grid can be relocated using the geo-referenced stations printed in Figure 1; this can also enable the accurate location of the geophysical anomalies.

7.0 RESULTS & DISCUSSION (FIGURES 2 – 8)

7.1 Earth Resistance Meter (Figures 2, 3, 6 and 8)

Background resistance readings were found to be relatively high over the whole survey area and indicate the effect of the sub-aerial superficial geology being recorded below the earth resistance meter probes. Large flint nodules and chalk stones were noted by the surveyors within the backfilled topsoil of the cable trench, causing the high resistance 'speckled' nature of the raw dataset, contrasting with lower resistance Head-clay and silt deposits that contain higher moisture content.

7.1.1 Western Field

A low resistance linear anomaly recorded to the south of the dataset in the western field, running on an east to west course, delineates the location of a backfilled cable trench. This anomaly appears discontinuous in the dataset and was only recorded where the backfilled material held more moisture than the surrounding superficial geology.

Fourteen discrete, linear and curvilinear high resistance anomalies were also recorded in the western field, all of which could have an archaeological origin. There appears to be no particular correlation with the extant earthworks and a geological origin cannot be ruled out. There are two separate clusters of these anomalies, the first is to the west and the second to the east of the extant earthworks, it would be prudent to target these readings with further archaeological investigation to determine an origin. Five areas of high resistance however do correlate with two areas of magnetic enhancement and a positive discrete anomaly recorded by the fluxgate gradiometer (Figure 8), which may give credence to them being of archaeological derivation.

7.1.2 Garden Lawn

Three areas of high resistance were recorded within the garden lawn area. A small discrete area is present on the south-western boundary that continues further towards the Bailey Pond. This correlates well with an area of magnetic disturbance recorded by the magnetometer, it may be prudent to further ground-test this anomaly to determine an origin. Curvilinear high resistance readings are present to the east of this discrete but once again these readings run beyond the survey area towards the Bailey Pond. The largest area of high resistance is recorded to the east of the dataset, it appears to be related to two areas of low resistance, north-east and north-west of its location. This area of high resistance is believed to be more compacted and therefore impermeable to moisture, it has been interpreted as potential compacted bank material associated with the Motte and Bailey Castle. There is a small degree of correlation between this anomaly and areas of magnetic enhancement recorded by the fluxgate gradiometer, a high degree of anomalies recorded by both instruments are clustered within this area. Therefore it would be prudent to further ground-test this particular tract.

Two areas of low resistance are located to the north of the area of high resistance, they potentially relate to moisture rich material interpreted as backfill present within earthworks associated with the Motte and Bailey Castle. However, these readings could also be caused by moisture holding material that has been dredged up from the pond or by material imported to level the landscaped garden.

7.1.3 Eastern Field

Two areas of low resistance are present within the eastern field that are thought to be directly related to the recent cable trench excavations. The eastern-most anomaly could be of an archaeological or geological origin.

Four areas of high resistance were also recorded in this tract. One of which is located next to the low resistance anomaly, it has been interpreted as a compacted or stony backfill material also associated with the cable trench.

Two linear high resistance anomalies are present on the southern border of the data plot, these could be related to compacted impermeable material present near to the field boundary, possibly indicative of bank material. The final area of discrete high resistance is of possible archaeological origin, however a geological derivation cannot be ruled out. This small discrete anomaly is present between two positive linear anomalies recorded by the fluxgate gradiometer; it is likely therefore that they are related.

7.2 Fluxgate Gradiometer (Figures 4, 5, 7 and 8)

The surveyors noted that the sites overall magnetic background was relatively high, however a suitable zero station was found with no particular difficulty and located above the grids to the north in each separate field. Isolated dipolar (‘iron spike’) responses (yellow discs) were the most numerous anomaly recorded in the dataset and probably indicate the presence of modern cultural ferrous debris deposited within the topsoil, rather than buried archaeological artefacts. These responses seem to be fairly evenly spaced throughout the plots with no apparent clustering.

7.2.1 Western Field

The western field was given over to pastureland, located downslope of Lidgate Motte and Bailey Castle. Four linear areas of magnetic disturbance (yellow hatching) were recorded, three of which are present in close proximity to the ferrous field boundaries present along the southern edge of the plot. The 'S' shaped area of magnetic disturbance in the centre of the dataset demarcates where Heras fencing had been erected around an open portion of the cable trench. One large discrete area of magnetic disturbance lies to the north of three areas of magnetic enhancement. It is likely to be backfilled ferrous debris located within the extant earthwork.

Four large areas of magnetic enhancement were recorded in the western field. The three eastern-most were located in an area that contains extant earthworks and would appear to be related, two areas of high resistance show a degree of correlation (Figure 8) and are present within the limit of the eastern most area of magnetic enhancement. The western area of magnetic enhancement was located where no obvious earthwork remains were observed, however two areas of high resistance correlate well with this area of magnetic enhancement (Figure 8). It is possible that all of these areas of magnetic enhancement are of archaeological derivation.

Seven positive discrete anomalies are clustered to the east of the survey, all of which are potentially indicative of archaeological activity and may be possible rubbish pits. One of the discrete positive anomalies correlates well with a small area of high resistance (Figure 8). The areas of high resistance and the discrete anomalies are clustered together to the east of the extant earthworks, this is worthy of note and could provide evidence of settlement activity. It would be prudent to further ground-test at least a proportion of these anomalies.

7.2.2 Garden Lawn

The garden lawn area is located in the centre of the cable route to the north of the large Bailey Pond. Two areas of magnetic disturbance were located at the western end of the garden and are likely to relate to metal debris located within the landscaped lawn, however an archaeological origin cannot be ruled out. The southern-most area of magnetic disturbance also correlates well with an area of high resistance, it therefore may be worthy of further investigation.

The dipolar linear trend has been interpreted as a ferrous pipe that runs on a north to south alignment towards the Bailey Pond; it is probably of modern origin.

One negative linear trend, orientated north-east to south-west is recorded on what appears to be a former boundary or hedgerow that bisected the lawn. The former course of this boundary is mapped on the most recent OS data plan.

Five areas of magnetic enhancement were present within the garden lawn dataset. One was recorded to the west of the negative linear trend; the two on the eastern limit were located in slight depressions observed by the surveyors. It is possible that they are the remains of backfilled earthworks associated with Lidgate Castle. The lawn has been landscaped removing any obvious trace of potential earthworks. It is also possible that these readings could be caused by deposits related to the Bailey Pond, located just to the south, either from dredged material, garden landscaping or landscaped earthworks. The areas of magnetic enhancement to the east of garden lawn show only a small degree of correlation with the high and low resistance anomalies of the earth resistance meter; however these anomalies are clustered together. This suggests that a degree of activity, some of which may be of archaeological origin, has occurred within this particular area and further archaeological investigations would be prudent.

7.2.3 Eastern Field

Three areas of magnetic disturbance were recorded in the eastern field; they are all directly related to Heras fencing that surrounded the open cable excavations.

Two positive linear anomalies have been recorded in the centre of the dataset, they are indicative of ditch terminals potentially of agricultural or archaeological origin. A small discrete area of high resistance has also been recorded in the centre of the two linears (Figure 8) which suggests that they may be related. Further archaeological investigation would test these hypotheses.

8.0 CONCLUSION

The detailed fluxgate gradiometer and earth resistance meter surveys were successful in identifying a range of anomalies, however only a small degree of correlation was observed between the two sets of data (Figure 8). Superficial deposits have caused issues with the earth resistance meter data, the high resistance readings caused by the underlying geology may have prevented finer detail from being recorded. The narrow size of the cable easement has also caused a small degree of difficulty in the interpretation of the anomalies.

It would be prudent to target the large areas of magnetic enhancement that are present in the western field and the landscaped garden area, these anomalies have the potential for being backfilled earthworks associated with Lidgate Castle. The large area of magnetic disturbance, recorded close to three areas of magnetic enhancement in the western field is also worthy of further investigation, it appears to be ferrous material used to partially backfill one of the extant earthworks. Discrete anomalies recorded by both instruments in the western field should also be further investigated to test the hypotheses given in this report. The two linear anomalies associated with the discrete area of high resistance in the eastern field are also worthy of note, further archaeological investigations could reveal their origin. The high resistance linear anomalies in the western field may also warrant further investigation, potentially being of an agricultural or archaeological origin.

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 in the Suffolk County Historic Environment Record.

10.0 ACKNOWLEDGEMENTS

Britannia Archaeology Ltd would like to thank Jo Caruth for funding the project and to Dr Jess Tipper for his advice throughout the process.

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

Magnetometer Data

Raw Magnetometer Data

Filename	LidMag1R.xcp
Description	
Instrument Type	Grad601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/27/2014
Assembled by	TPS on 8/27/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	560 x 20
Survey Size (meters)	140.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	7.02
Min	-8.60
Std Dev	2.63
Mean	-0.54
Median	-0.08
Composite Area	0.28 ha
Surveyed Area	0.22 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 7			
1	Col:0	Row:0	grids\01.xgd
2	Col:1	Row:0	grids\02.xgd
3	Col:2	Row:0	grids\03.xgd
4	Col:3	Row:0	grids\04.xgd
5	Col:4	Row:0	grids\05.xgd
6	Col:5	Row:0	grids\06.xgd
7	Col:6	Row:0	grids\07.xgd

Filename	LidMag2R.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/27/2014
Assembled by	TPS on 8/27/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	240 x 20
Survey Size (meters)	60.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	6.18
Min	-6.84
Std Dev	3.13
Mean	-0.31
Median	-0.44
Composite Area	0.12 ha
Surveyed Area	0.10 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 3			
1	Col:0	Row:0	grids\08.xgd
2	Col:1	Row:0	grids\09.xgd
3	Col:2	Row:0	grids\10.xgd

Filename	LidMag3R.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	MB on 8/28/2014
Assembled by	TPS on 9/1/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	400 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25m
Y Interval	1.00m
Stats	
Max	14.58
Min	-20.20
Std Dev	7.99
Mean	-2.72
Median	-2.03
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\11.xgd
2	Col:1	Row:0	grids\12.xgd
3	Col:2	Row:0	grids\13.xgd
4	Col:3	Row:0	grids\14.xgd
5	Col:4	Row:0	grids\15.xgd

Filename	LidMag4R.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/28/2014
Assembled by	TPS on 8/28/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	400 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25m
Y Interval	1.00m
Stats	
Max	3.37
Min	-4.08
Std Dev	1.59
Mean	-0.46
Median	-0.49
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\16.xgd
2	Col:1	Row:0	grids\17.xgd
3	Col:2	Row:0	grids\18.xgd
4	Col:3	Row:0	grids\19.xgd
5	Col:4	Row:0	grids\20.xgd

Processed Magnetometer Data

Filename	LidMag1P.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/27/2014
Assembled by	TPS on 8/27/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	560 x 20
Survey Size (meters)	140.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	5.24
Min	-5.97
Std Dev	1.77
Mean	-0.10
Median	0.00
Composite Area	0.28 ha
Surveyed Area	0.22 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 7			
1	Col:0	Row:0	grids\01.xgd
2	Col:1	Row:0	grids\02.xgd
3	Col:2	Row:0	grids\03.xgd
4	Col:3	Row:0	grids\04.xgd
5	Col:4	Row:0	grids\05.xgd
6	Col:5	Row:0	grids\06.xgd
7	Col:6	Row:0	grids\07.xgd

Filename	LidMag2P.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/27/2014
Assembled by	TPS on 8/27/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	240 x 20
Survey Size (meters)	60.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	4.98
Min	-4.77
Std Dev	2.36
Mean	0.11
Median	0.00
Composite Area	0.12 ha
Surveyed Area	0.10 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 3			
1	Col:0	Row:0	grids\01.xgd
2	Col:1	Row:0	grids\02.xgd
3	Col:2	Row:0	grids\03.xgd

Filename	LidMag3P.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	MB on 8/28/2014
Assembled by	TPS on 9/1/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00 m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	400 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25 m
Y Interval	1.00 m
Stats	
Max	10.18
Min	-11.28
Std Dev	5.04
Mean	-0.30
Median	0.00
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\11.xgd
2	Col:1	Row:0	grids\12.xgd
3	Col:2	Row:0	grids\13.xgd
4	Col:3	Row:0	grids\14.xgd
5	Col:4	Row:0	grids\15.xgd

Filename	LidMag4P.xcp
Description	
Instrument Type	Grad 601-2 (Gradiometer)
Units	nT
Surveyed by	TPS on 8/28/2014
Assembled by	TPS on 8/28/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	2 @ 1.00m spacing.
Dummy Value	32702.00
Dimensions	
Composite Size (readings)	400 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	0.25m
Y Interval	1.00m
Stats	
Max	2.68
Min	-2.57
Std Dev	1.09
Mean	-0.01
Median	0.00
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\16.xgd
2	Col:1	Row:0	grids\17.xgd
3	Col:2	Row:0	grids\18.xgd
4	Col:3	Row:0	grids\19.xgd
5	Col:4	Row:0	grids\20.xgd

Earth Resistance Meter Data

Raw Earth Resistance Meter Data

Filename	LidRes1R.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	140 x 20
Survey Size (meters)	140.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	91.20
Min	-21.80
Std Dev	32.67
Mean	35.54
Median	31.25
Composite Area	0.28 ha
Surveyed Area	0.24 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 7			
1	Col:0	Row:0	grids\lid1.xgd
2	Col:1	Row:0	grids\lid2.xgd
3	Col:2	Row:0	grids\lid3.xgd
4	Col:3	Row:0	grids\lid4.xgd
5	Col:4	Row:0	grids\lid5.xgd
6	Col:5	Row:0	grids\lid6.xgd
7	Col:6	Row:0	grids\lid7.xgd

Filename	LidRes2R.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	60 x 20
Survey Size (meters)	60.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	82.28
Min	-13.17
Std Dev	31.70
Mean	28.24
Median	20.92
Composite Area	0.12 ha
Surveyed Area	0.11 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 3			
1	Col:0	Row:0	grids\lid8.xgd
2	Col:1	Row:0	grids\lid9.xgd
3	Col:2	Row:0	grids\lid10.xgd

Filename	LidRes3R.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	MB on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	100 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	96.45
Min	10.02
Std Dev	28.46
Mean	47.76
Median	41.15
Composite Area	0.20 ha
Surveyed Area	0.14 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\lid11.xgd
2	Col:1	Row:0	grids\lid12.xgd
3	Col:2	Row:0	grids\lid13.xgd
4	Col:3	Row:0	grids\lid14.xgd
5	Col:4	Row:0	grids\lid15.xgd

Filename	LidRes4R.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	100 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00 m
Y Interval	1.00 m
Stats	
Max	54.60
Min	-9.60
Std Dev	19.61
Mean	18.94
Median	15.75
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\lid16.xgd
2	Col:1	Row:0	grids\lid17.xgd
3	Col:2	Row:0	grids\lid18.xgd
4	Col:3	Row:0	grids\lid19.xgd
5	Col:4	Row:0	grids\lid20.xgd

Processed Earth Resistance Meter Data

Filename	LidRes1P.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	140 x 20
Survey Size (meters)	140.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	72.47
Min	-13.37
Std Dev	24.87
Mean	33.20
Median	32.80
Composite Area	0.28 ha
Surveyed Area	0.24 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 7			
1	Col:0	Row:0	grids\lid1.xgd
2	Col:1	Row:0	grids\lid2.xgd
3	Col:2	Row:0	grids\lid3.xgd
4	Col:3	Row:0	grids\lid4.xgd
5	Col:4	Row:0	grids\lid5.xgd
6	Col:5	Row:0	grids\lid6.xgd
7	Col:6	Row:0	grids\lid7.xgd

Filename	LidRes2P.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	60 x 20
Survey Size (meters)	60.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	55.32
Min	-2.76
Std Dev	21.05
Mean	24.25
Median	21.80
Composite Area	0.12 ha
Surveyed Area	0.11 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 3			
1	Col:0	Row:0	grids\lid8.xgd
2	Col:1	Row:0	grids\lid9.xgd
3	Col:2	Row:0	grids\lid10.xgd

Filename	LidRes3P.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	MB on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	100 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	81.62
Min	15.97
Std Dev	22.53
Mean	45.43
Median	41.10
Composite Area	0.20 ha
Surveyed Area	0.14 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\lid11.xgd
2	Col:1	Row:0	grids\lid12.xgd
3	Col:2	Row:0	grids\lid13.xgd
4	Col:3	Row:0	grids\lid14.xgd
5	Col:4	Row:0	grids\lid15.xgd

Filename	LidRes4P.xcp
Description	
Instrument Type	Resist. (RM85)
Units	Ohm
Surveyed by	TPS on 9/2/2014
Assembled by	TPS on 9/2/2014
Direction of 1st Traverse	90 deg
Collection Method	ZigZag
Sensors	1
Dummy Value	2047.50
Dimensions	
Composite Size (readings)	100 x 20
Survey Size (meters)	100.00m x 20.00m
Grid Size	20.00m x 20.00m
X Interval	1.00m
Y Interval	1.00m
Stats	
Max	34.79
Min	0.23
Std Dev	12.08
Mean	16.37
Median	14.91
Composite Area	0.20 ha
Surveyed Area	0.13 ha
Program	
Name	ArcheoSurveyor
Version	2.5.16.0

Source Grids: 5			
1	Col:0	Row:0	grids\lid16.xgd
2	Col:1	Row:0	grids\lid17.xgd
3	Col:2	Row:0	grids\lid18.xgd
4	Col:3	Row:0	grids\lid19.xgd
5	Col:4	Row:0	grids\lid20.xgd

APPENDIX 2 – TECHNICAL DETAILS

MAGNETOMETER

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.

EARTH RESISTANCE METER

The earth resistance meter is classified as an 'active' instrument, it utilises probes to pass a small electric current through the ground measuring the variance in soil resistance present within the soil matrix.

Soil resistance is measured using two pairs of electrodes; the current electrodes pass electricity into the ground that is measured by the potential electrodes. Precipitation allows the current to pass through the ground by reacting with soil minerals forming electrolytes, which in turn break down and become positive and negative ions. When the electric current is switched on the ions either repel or attract the current, driving it at varying depths through the soil matrix on its journey to find the path of least resistance.

Archaeological features have varying soil moisture capacity. A buried wall for example has low soil moisture content due to the density of the material it is constructed with, the current will not pass easily through this type of feature causing a reduction in the current density as the flow finds an alternative route. This increases the potential gradient that is measured by the instrument and a high resistance anomaly is recorded. Conversely a soil backfilled pit or ditch will have a relatively higher moisture holding capacity than that of the surrounding natural geology. The electrical current can pass with ease through this medium causing an increase in the current density and a corresponding decrease to the potential gradient, the instrument will then record a low resistance anomaly within the dataset.

Earth Resistance Meters

Modern earth resistance meters employ four probes/electrodes in two distinct sets. Each set has one current and one potential electrode. The first set are the remote probes and as their name suggests are placed outside the survey area and remain static throughout the survey. They act as the control that the remote probe readings are measured against. The second set are the mobile probes and are mounted on a frame set 0.5m apart. These probes are pushed into the ground causing an electrical circuit to form between the current electrodes of the remote and mobile probes; the potential gradient between the remote and mobile probes is then recorded automatically by the instrument. Every time the mobile probes are removed the instrument resets itself ready to take the next reading.

APPENDIX 3 – OASIS FORM

OASIS ID: britanni1-187612

Project details

Project name	Land North of the Street, Lidgate, Suffolk
Short description of the project	The detailed fluxgate gradiometer and earth resistance meter surveys were successful in identifying a range of anomalies, however only a small degree of correlation was observed between the two sets of data. Superficial deposits did cause a degree of issues with the earth resistance meter data collection. High resistance readings derived from the underlying geology may have prevented finer detail from being recorded. The narrow size of the cable easement has further caused a small degree of difficulty in the interpretation of the anomalies. Areas of magnetic enhancement relating to potential backfilled earthworks and discrete positive anomalies interpreted as archaeological rubbish pits have been recorded in the western field and landscaped garden area by the fluxgate gradiometer. Two further positive linear anomalies were also recorded in the eastern field that are indicative of archaeological or agricultural ditches. Discrete high resistance anomalies that are potentially of archaeological origin and larger areas of high and low resistance interpreted as potential ditches and banks were further recorded by the earth resistance meter in the western field and landscaped garden. One discrete area of high resistance in the eastern field recorded within the centre of the two positive linear anomalies recorded by the fluxgate gradiometer are also worthy of note. Two linear high resistance anomalies also in the western field could be of archaeological or agricultural origin. Further archaeological investigations of these anomalies would be prudent to test the hypotheses given within this report.
Project dates	**Start:** 30-10-2014 **End:** 31-10-2014
Previous/future work	Yes / Not known
Any associated project reference codes	P1071 - Contracting Unit No. LSG 018 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Grassland Heathland 4 - Regularly improved
Monument type	NONE None
Significant Finds	NONE None
Methods & techniques	"Geophysical Survey"
Development type	Pipelines/cables (e.g. gas, electric, telephone, TV cable, water, sewage, drainage etc.)
Prompt Direction from	Local Planning Authority - PPS
Position in the planning process	After full determination (eg. As a condition)
Solid geology	CHALK (INCLUDING RED CHALK)
Drift geology (other)	Head Clay, Silt and Gravel
Techniques	Magnetometry Resistivity - area

Project location

Country	England
Site location	SUFFOLK ST EDMUNDSBURY LIDGATE Land North of The Street, Lidgate, Suffolk
Study area	0.90 Hectares
Site coordinates	TL 720 580 52.1929187731 0.516720095967 52 11 34 N 000 31 00 E Point
Height OD / Depth	**Min:** 75.00m **Max:** 85.00m

Project creators

Name of Organisation	Britannia Archaeology Ltd
Project brief originator	Local Planning Authority (with/without advice from County/District Archaeologist)
Project design originator	Timothy Schofield
Project director/manager	Timothy Schofield
Project supervisor	Timothy Schofield

Type of sponsor/funding body	Telecommunications company
Name of sponsor/funding body	Suffolk County Council Archaeological Service
Project archives	
Physical Archive Exists?	No
Digital Archive recipient	Suffolk HER
Digital Contents	"Survey"
Digital Media available	"Geophysics", "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	Land to the North of The Street, Lidgate, Suffolk; Detailed Magnetometer and Earth Resistance Meter Survey
Author(s)/Editor(s)	Schofield, T. P.
Other bibliographic details	R1066
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	15 January 2015

STATION	EASTING	NORTHING
01	571867.451	258073.068
02	572007.256	258065.686
03	571991.031	258059.237
04	572049.950	258047.903
05	572075.508	258042.444
06	572141.925	257997.826
07	572175.857	257977.296
08	572249.132	257909.323

Survey Grid Location

Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: SURVEY GRID & GEOREFERENCING INFORMATION 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: 1:2000 (0–80m)

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

Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: RAW EARTH RESISTANCE METER 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: 1:1000 (0 – 40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	2A

Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED EARTH RESISTANCE METER GREYSCALE PLOT

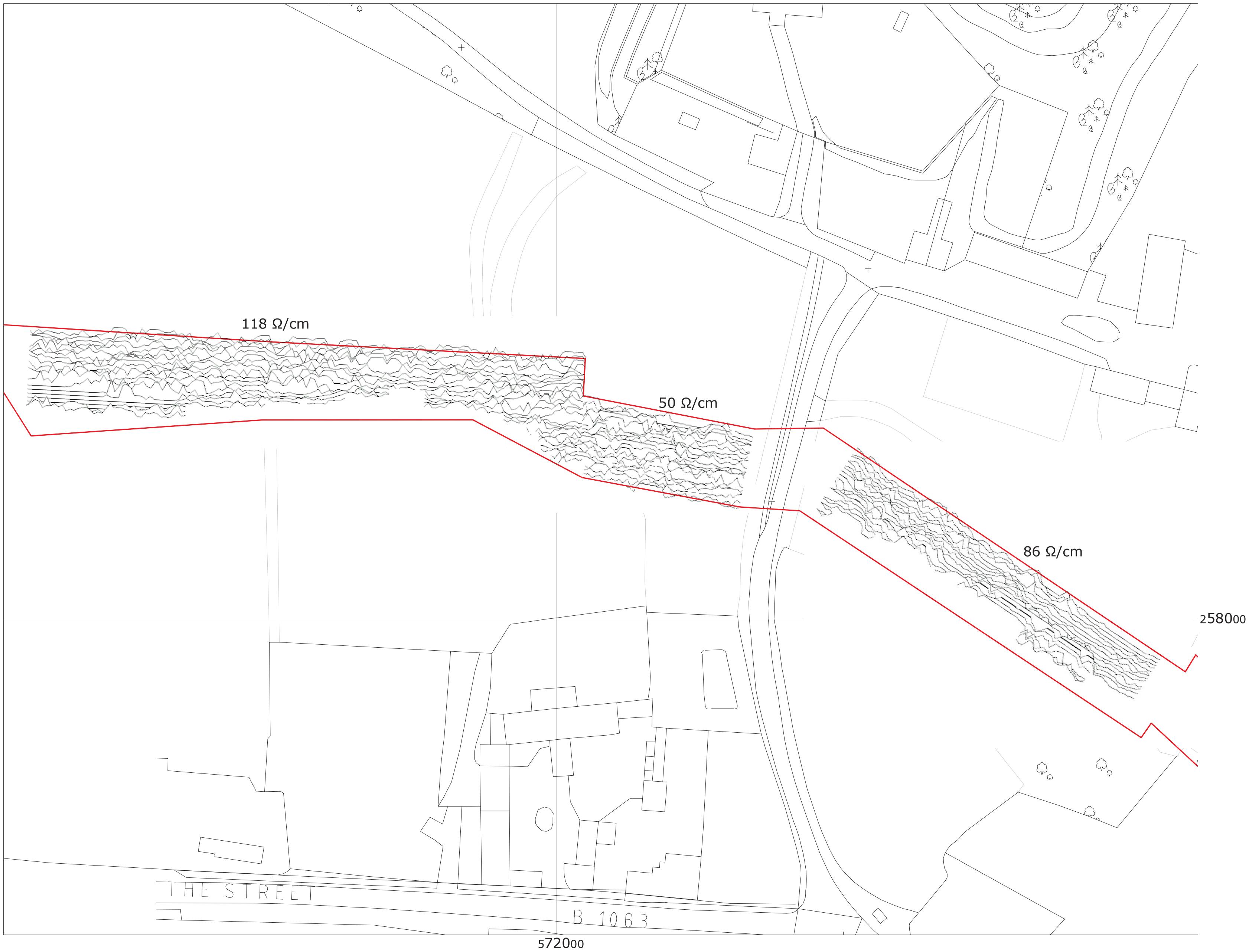
BRITANNIA ARCHAEOLOGY LTD

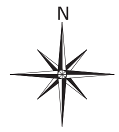
115 OSPREY DRIVE, STOWMARKET, SUFFOLK
IP14 5UX

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

SCALE: 1:1000 (0 – 40m)

PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 2B





94 Ω/cm	Scale Interval
	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED EARTH RESISTANCE METER 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: 1:1000 (0–40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	2C

Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: RAW EARTH RESISTANCE METER 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: 1:1000 (0 – 40m)

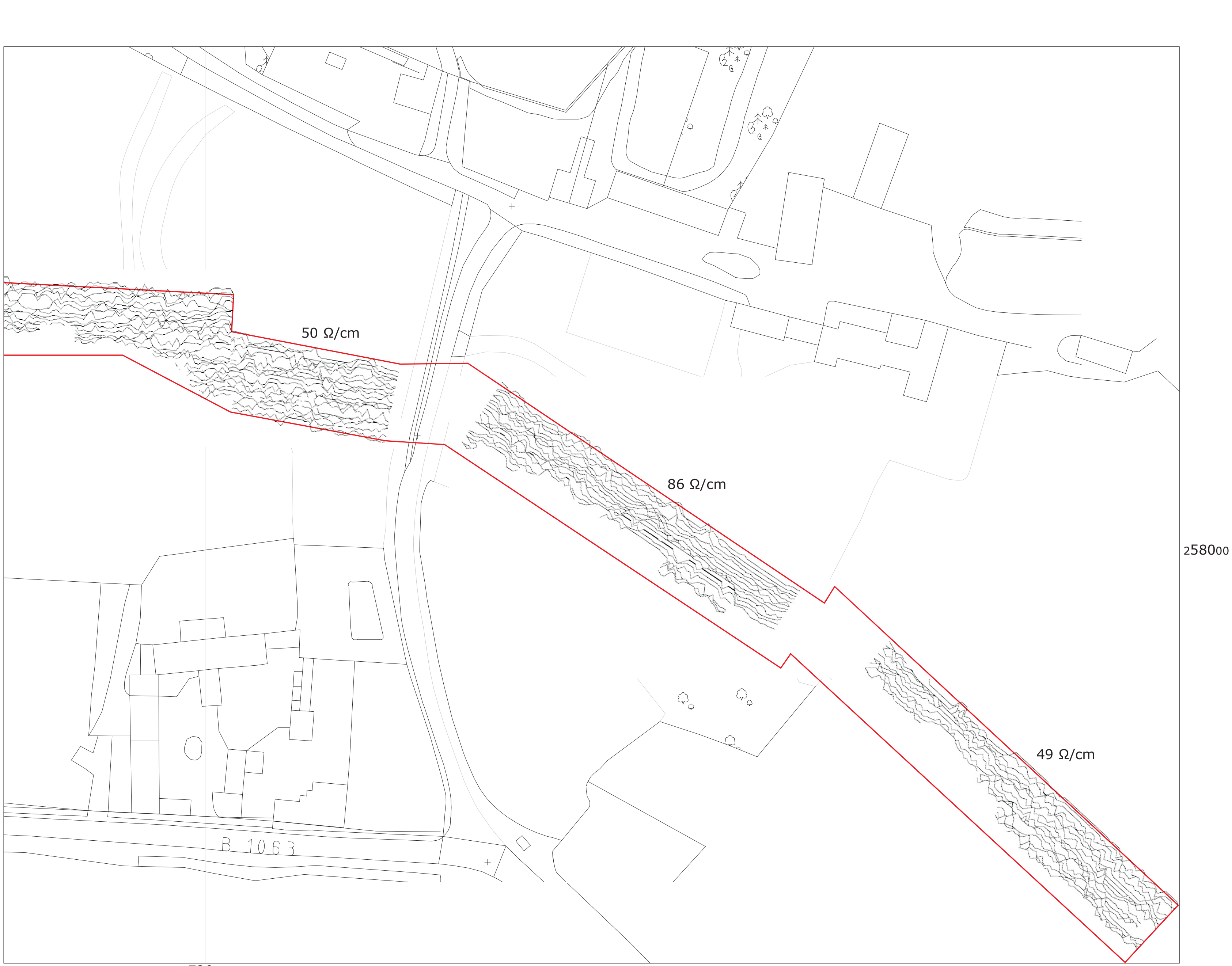
PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 3A

Site Boundary

NGR: 572100, 258000	REPORT NUMBER: 1066
PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK	
CLIENT: Suffolk County Council	
DESCRIPTION: PROCESSED EARTH RESISTANCE METER 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: 1:1000	0 – 40m	
PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 3B



94 Ω/cm	Scale Interval
	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED EARTH RESISTANCE METER XY TRACE PLOT

BRITANNIA ARCHAEOLOGY LTD

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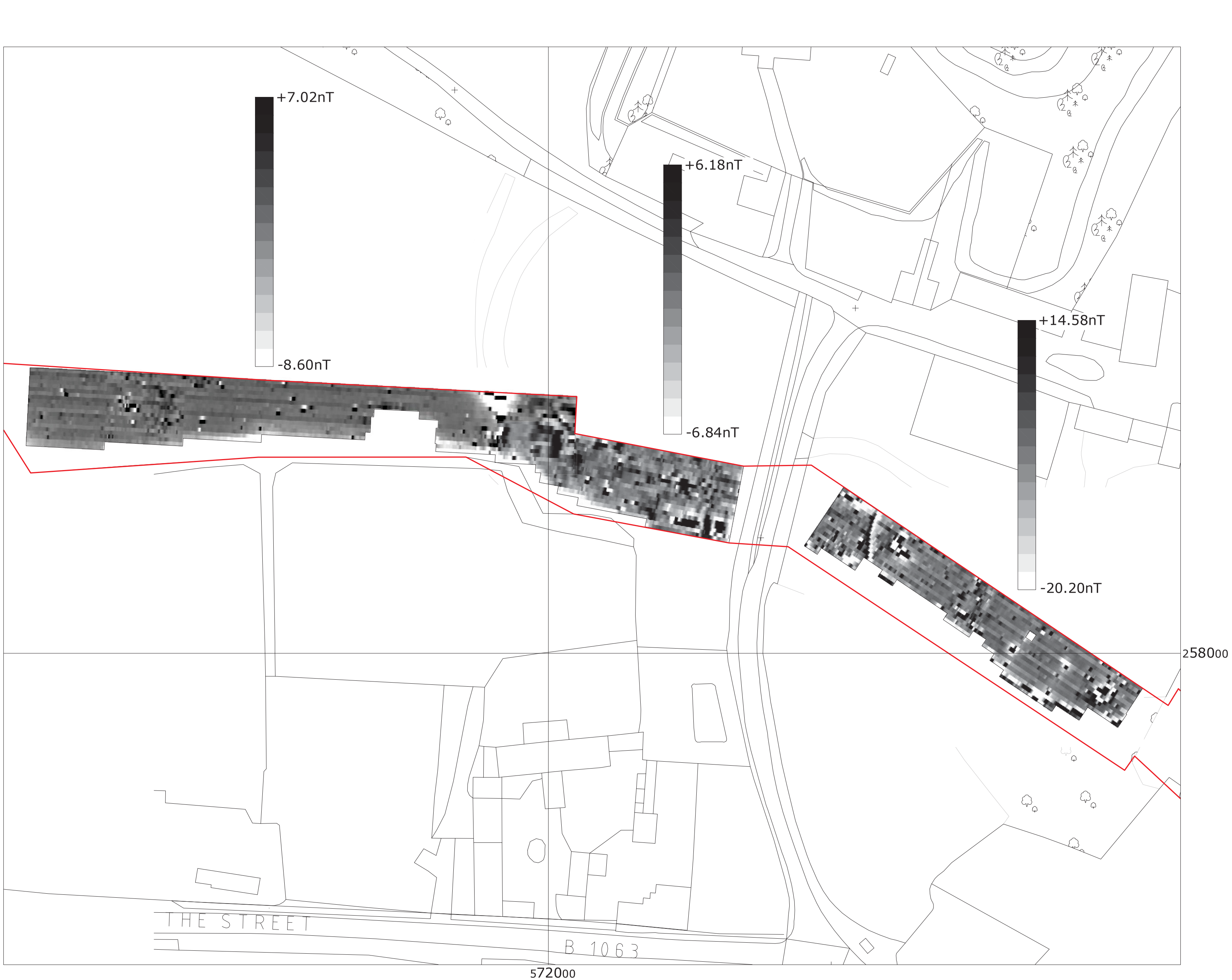
SCALE: 1:1000 (0 – 40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	3C



Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: RAW MAGNOTOMETER GREYSCALE PLOT

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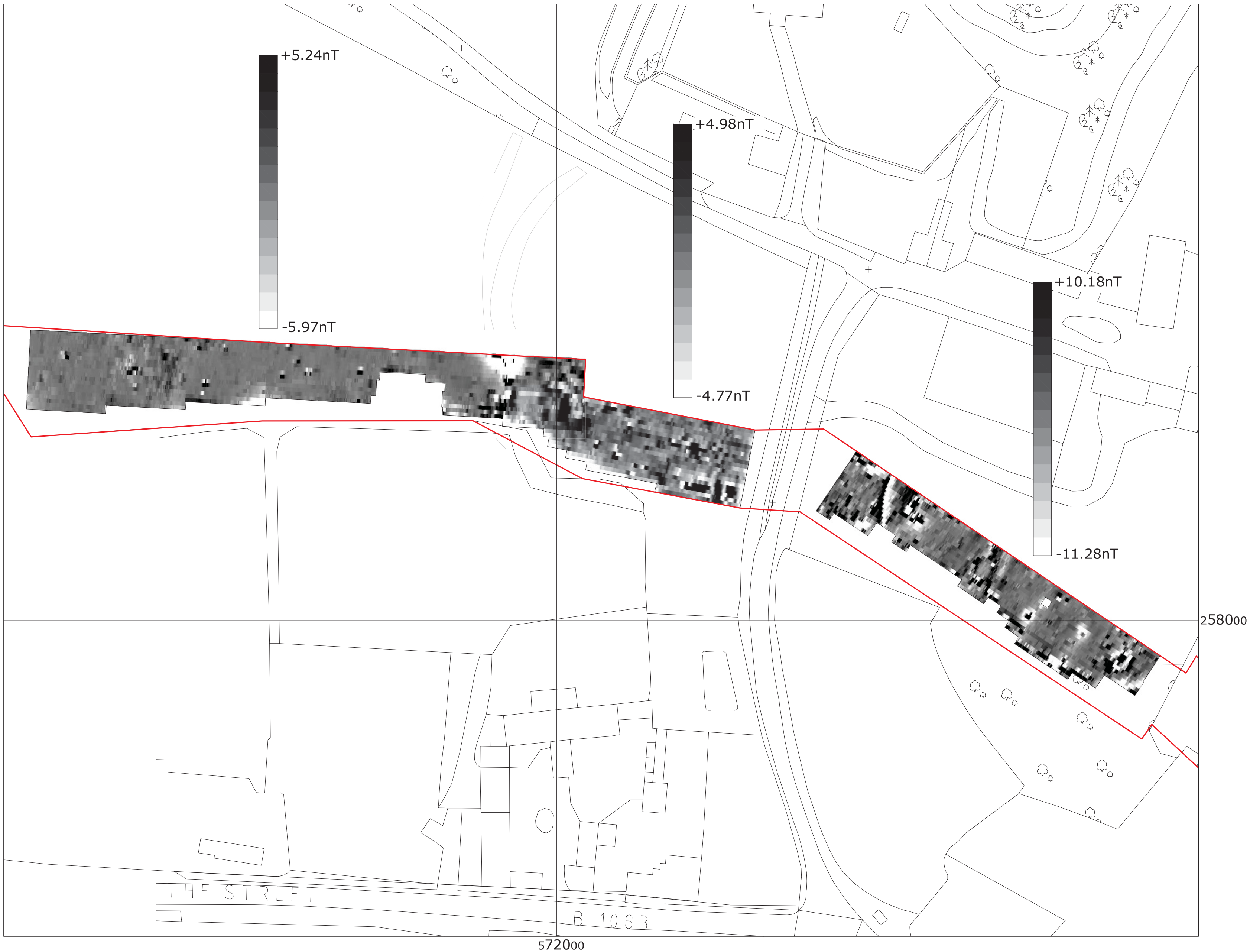
SCALE: 1:1000	0 — 40m	
PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 4A



N

Site Boundary

NGR: 572100, 258000	REPORT NUMBER: 1066
PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK	
CLIENT: Suffolk County Council	
DESCRIPTION: PROCESSED MAGNOTOMETER GREYSCALE PLOT	

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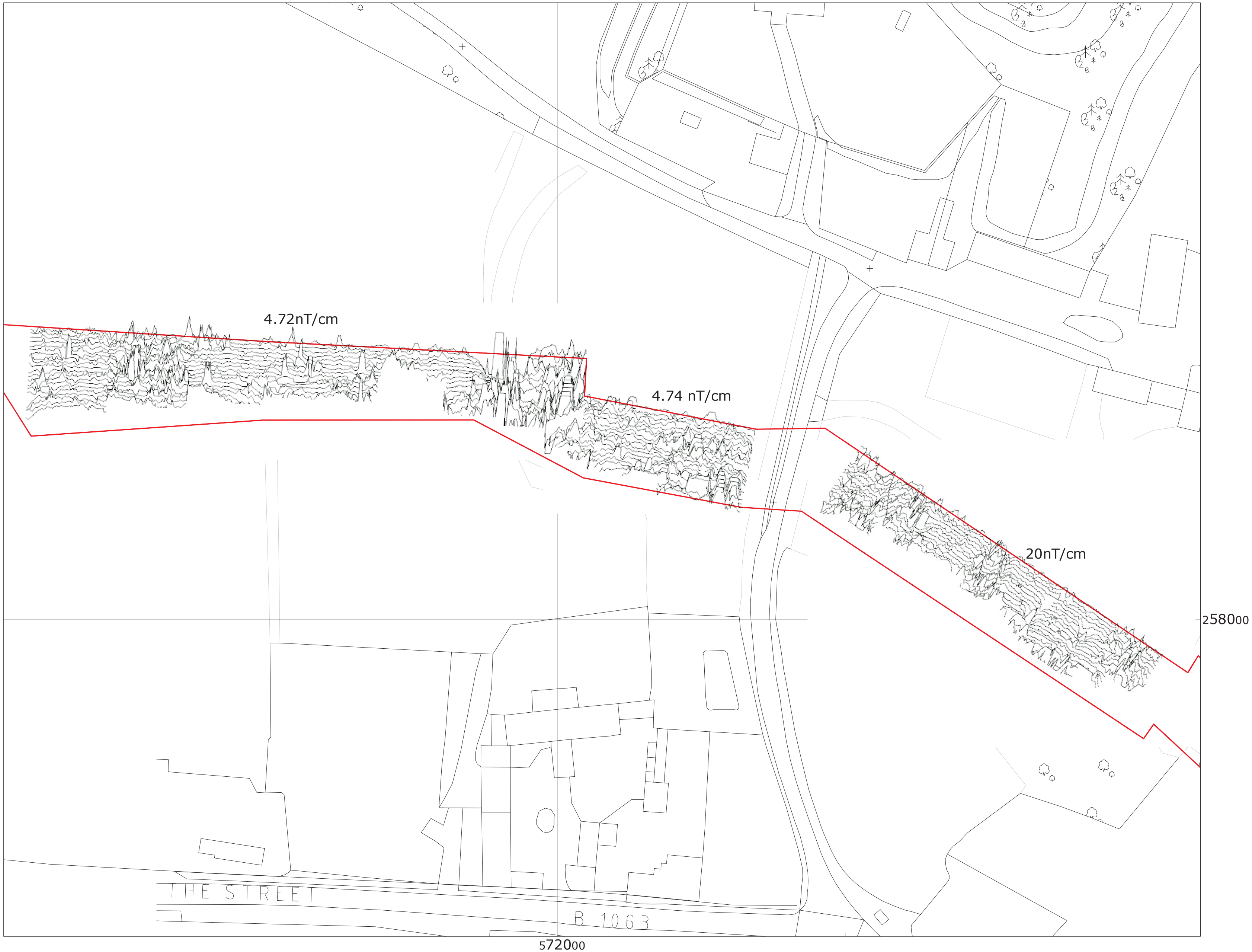
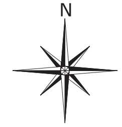
SCALE: 1:1000 (0 – 40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	4B





4nT/cm	Scale Interval
	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED MAGNOTOMETER XY TRACE PLOT

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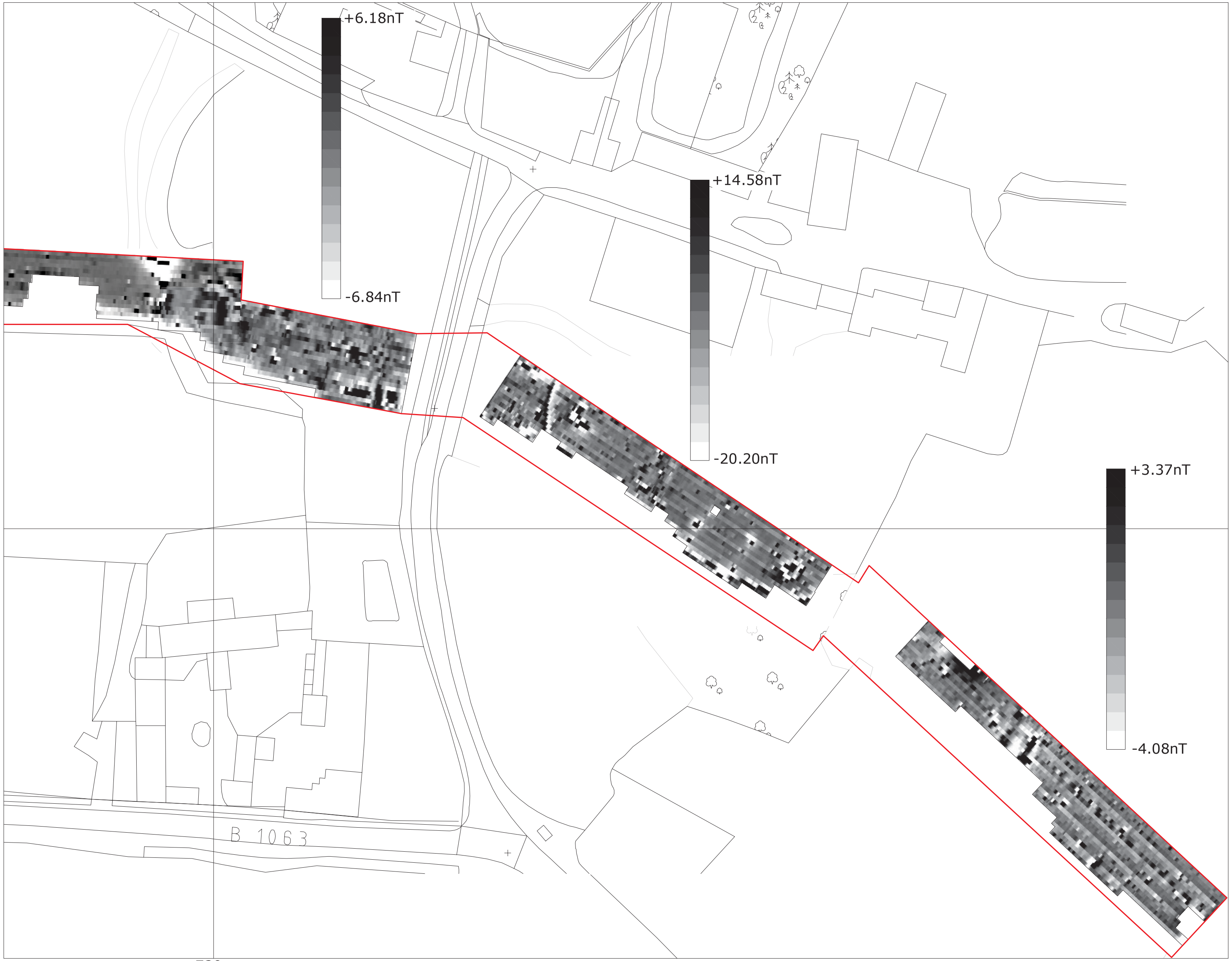
SCALE: 1:1000 (0 – 40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	4C



N

Site Boundary

NGR: 572100, 258000	REPORT NUMBER: 1066

PROJECT:
LAND NORTH OF THE STREET,
LIDGATE, SUFFOLK

CLIENT:
Suffolk County Council

DESCRIPTION:
RAW MAGNETOMETER
GREYSCALE PLOT

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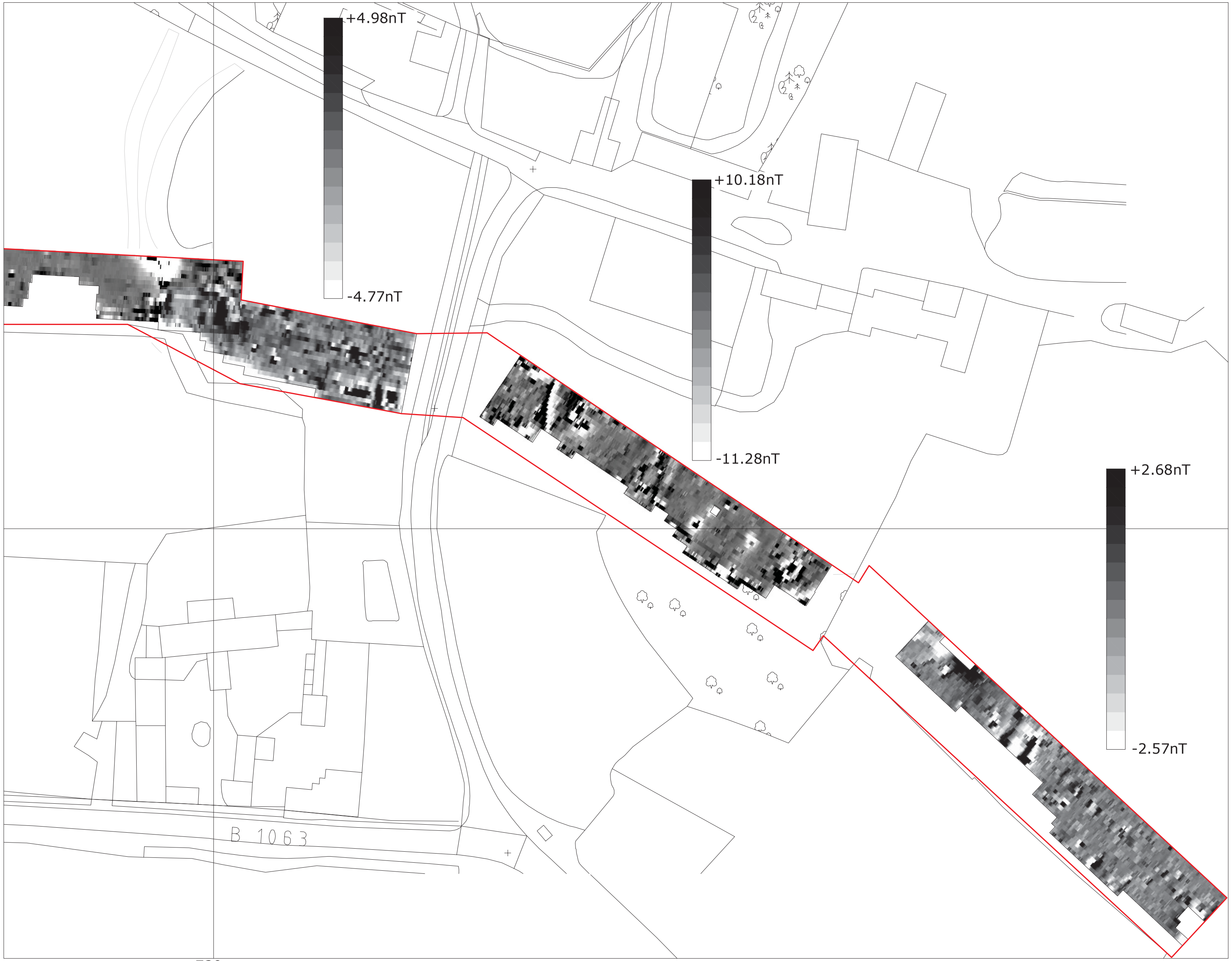
SCALE: 1:1000 (0 – 40m)

PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 5A



Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED MAGNETOMETER GREYSCALE PLOT

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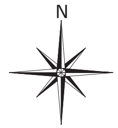
SCALE: 1:1000 (0–40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	5B



4nT/cm	Scale Interval
(red line)	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: PROCESSED MAGNETOMETER XY TRACE PLOT

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SCALE: 1:1000 (0 – 40m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	5C

Area of High Resistance
Area of Low Resistance
Site Boundary

NGR: 572100, 258000
REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: INTERPRETATION PLOT OF EARTH RESISTANCE METER ANOMALIES

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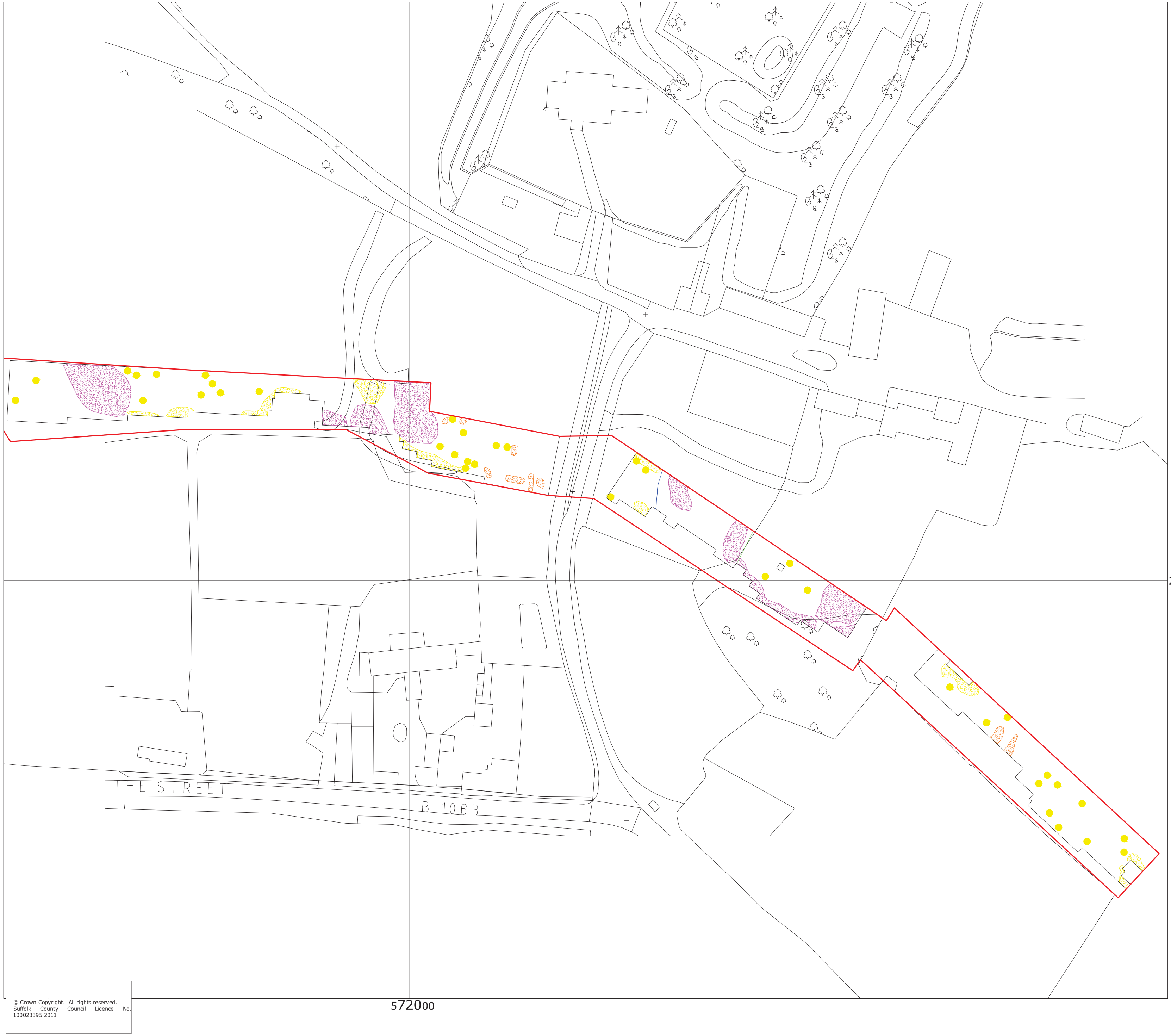
SCALE: 1:1250 (0 – 50m)

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



Key	
	Area of Magnetic Disturbance, Archaeology?
	Positive Anomaly, Archaeology?
	Negative Linear Trend, Archaeology?
	Dipolar Linear Trend, Ferrous Service Pipe
	Area of Magnetic Disturbance
	Isolated Dipolar Responses
	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: INTERPRETATION PLOT OF MAGNETOMETER ANOMALIES

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SCALE: 1:1250 (0 – 50m)		
PLOT: A3	APPROVED: MCA	VERSION: 01
DATE: SEP 2014	AUTHOR: TPS	FIGURE: 07

N

Key	
	Area of Magnetic Disturbance, Archaeology?
	Positive Anomaly, Archaeology?
	Negative Linear Trend, Archaeology?
	Dipolar Linear Trend, Ferrous Service Pipe
	Area of Magnetic Disturbance
	Isolated Dipolar Responses
	Area of High Resistance
	Area of Low Resistance
	Site Boundary

NGR: 572100, 258000

REPORT NUMBER: 1066

PROJECT: LAND NORTH OF THE STREET, LIDGATE, SUFFOLK

CLIENT: Suffolk County Council

DESCRIPTION: COMBINED INTERPRETATION PLOT OF MAGNETOMETER & EARTH RESISTANCE ANOMALIES

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W: www.britannia-archaeology.com

SCALE: 1:1250 (0–50m)

PLOT:	APPROVED:	VERSION:
A3	MCA	01
DATE:	AUTHOR:	FIGURE:
SEP 2014	TPS	08