



Archaeological geophysical survey of land west of Bromham Bedfordshire December 2017

Accession No: BEDFM2017.111

Report No: 17/139

Author: John Walford

Illustrator: Graham Arkley



Archaeological geophysical survey of land west of Bromham Bedfordshire December 2017

Accession No: BEDFM2017.111

Report No: 17/139

Quality control and sign off:

Issue No.	Date approved:	Checked by:	Approved by:	Reason for Issue:
1	20/12/2017	Rob Atkins	Mo Muldowney	Client approval
2	21/12/2017	-	Mo Muldowney	Minor revisions
3	04/01/2018	-	Mo Muldowney	Minor revisions

Author: John Walford

Illustrator: Graham Arkley

© MOLA Northampton 2018

MOLA
Kent House
30 Billing Road
Northampton
NN1 5DQ
01604 809 800
www.mola.org.uk
sparry@mola.org.uk

STAFF

Project Manager: John Walford MSc

Fieldwork: Graham Arkley MSc
Katy Davies BA

Text: John Walford

Illustrations: Graham Arkley

OASIS REPORT

PROJECT DETAILS		Oasis No. molanort1-304396	
Project name	Archaeological geophysical survey of land west of Bromham, Bedfordshire		
Short description	MOLA (Museum of London Archaeology) was commissioned by EDP to undertake a magnetometer survey of c19ha of land west of Bromham, Bedfordshire. The survey mapped a group of enclosures, pits and associated features of Iron Age or Roman date. Two groups of undated ditches, possibly representing parts of a field system and another enclosure, were identified further to the north. The survey also detected a large (c5.5ha) zone of magnetic disturbance in the north of the survey area, which very probably relates to a modern layer of made ground.		
Project type	Geophysical survey		
Site status	None		
Previous work	None known		
Current land use	Arable and pasture		
Future work	Trial trenching		
Monument type/ period	Iron Age or Roman enclosures Undated ditches Medieval ridge and furrow		
Significant finds	None		
PROJECT LOCATION			
County	Bedfordshire		
Site address	Land west of Bromham		
Study area	c19ha		
OS Easting & Northing	SP 996 505		
Height OD	c35m - 55m aOD		
PROJECT CREATORS			
Organisation	MOLA		
Project brief originator	Geoff Saunders, Bedford Unitary Authority		
Project design originator	MOLA		
Director/Supervisor	Graham Arkley		
Project Manager	John Walford		
Sponsor or funding body	EDP, on behalf of Martin Grant Homes		
PROJECT DATE			
Start date	4th December 2017		
End date	8th December 2017		
ARCHIVES		Location	Content
Physical	N/A		
Paper	BEDFM2017.111	Site survey records	
Digital		Geophysical survey & GIS data	
BIBLIOGRAPHY			
Title	Archaeological geophysical survey of land west Bromham, Bedfordshire, December 2017		
Serial title & volume	MOLA Northampton Report 17/139		
Author(s)	John Walford		
Page numbers	7		
Date	4th January 2018		

Contents

1	INTRODUCTION	1
2	BACKGROUND	1
	2.1 Topography and geology	
	2.2 Historical and archaeological background	
3	METHODOLOGY	2
4	SURVEY RESULTS	3
	4.1 The southern archaeological site	
	4.2 Other probable archaeological features	
	4.3 Ridge and furrow	
	4.4 Made ground	
	4.5 Miscellaneous modern features	
	4.6 Geology	
5	CONCLUSION	6
	BIBLIOGRAPHY	7

Figures

Cover	Magnetometer survey results	
Fig 1	Site location	1:25,000
Fig 2	Magnetometer survey results	1:2000
Fig 3	Magnetometer survey interpretation	1:2000
Fig 4	Unprocessed magnetometer data	1:2000

Archaeological geophysical survey of land west of Bromham, Bedfordshire December 2017

ABSTRACT

MOLA (Museum of London Archaeology) was commissioned by EDP to undertake a magnetometer survey of c19ha of land west of Bromham, Bedfordshire. The survey mapped a group of enclosures, pits and associated features of Iron Age or Roman date. Two groups of undated ditches, possibly representing parts of a field system and another enclosure, were identified further to the north. The survey also detected a large (c5.5ha) zone of magnetic disturbance in the north of the survey area which very probably relates to a modern layer of made ground.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by The Environmental Dimension Partnership (EDP), on behalf of their client Martin Grant Homes, to undertake an archaeological geophysical survey of c19ha of land west of Bromham, Bedfordshire (NGR SP 996 505; Fig 1). This work was prompted by a requirement from Geoff Saunders of Bedford Borough Council, and was intended to identify and map any archaeological remains which may be affected by a proposed development scheme.

The fieldwork was undertaken from 4th to 8th December 2017. It comprised a magnetometer survey that was conducted under the terms of a Written Scheme of Investigation (MOLA 2017) approved by the archaeological advisor, and adhering to Chartered Institute for Archaeologists and English Heritage standards and guidance (Cifa 2014, EH 2008). Bedford Museum was notified of the work and has allocated it accession number BEDFM 2017.111.

2 BACKGROUND

2.1 Topography and geology

The survey area comprises three adjacent fields located on the south-western edge of Bromham between the village and the A428 Bedford Road (Fig 1). The northern field, which is the largest at c11ha, was under a low oil seed rape crop at the time of the survey. The central and southern fields, which lie to either side of Stagsden Road, were both pasture.

The overall topography of the survey area comprises an east to south-easterly facing slope that falls from 55m to 35m aOD. At the base of this slope is a small stream that flows north along the eastern boundary of the area before turning and discharging into the River Great Ouse c 1.5km to the east.

The solid geology of the survey area comprises a succession of Jurassic strata, ranging from Great Oolite Limestone at the bottom of the slope, through Blisworth Clay, Cornbrash and Oxford Clay to Kellaways Sand at the top of the slope. The uppermost of these strata has no surface outcrop, being concealed beneath a drift of Pleistocene

boulder clay. A minor fault, with a downthrow to the south-east, crosses the southern part of the survey area (BGS 2017).

The northern field contained an undefined roughly square area set at a higher elevation than the remainder of the field, and with stepped sides to the northern and eastern extents. The survey results indicate that this is modern material, the derivation of which is presently unclear.

2.2 Historical and archaeological background

Cropmarks in the southern field of the survey area indicate the buried remains of a small D-shaped enclosure and a part of a larger rectangular enclosure (Google Earth, imagery dated December 2006). Whilst the exact date of these enclosures remains to be determined their general character would suggest an Iron Age or Roman origin and as such, they would fit into a pattern of other Iron Age and Roman sites dispersed across the local landscape. Cropmarks of other probable Iron Age or Roman enclosures have been recorded c350m west of the survey area (Historic Environment Record No. MBD16507) and a Roman building with associated features is known at Moor End, a similar distance to the east (MBD245). Furthermore, geophysical survey and excavation undertaken c700m south-west of the survey area prior to the construction of the Stagsden Bypass, revealed rural settlement remains dating from the Middle Iron Age to the Roman period (MBD14711; Dawson 2000, 21-59).

The survey area lies beyond the historic core of Bromham, and is believed to have been in agricultural use during the medieval and post-medieval periods. The only feature of this date recorded in close proximity to the area is Tymsyll Bridge, which carries Stagsden Road across the stream at the eastern boundary of the survey area (MBD3203).

Historic Ordnance Survey maps show the survey area to have been in agricultural use from the time of the First Edition map (1884) onwards. No features of particular archaeological or historical interest are depicted within the survey area although the earlier maps depict a small limestone quarry c100m west of the area, on the south side of Stagsden Road. The A428 is a modern road, bypassing Bromham, and was first depicted by the Ordnance Survey in 1992.

3 METHODOLOGY

The survey was undertaken with a Bartington magnetometer cart. This is a two-wheeled, lightweight sensor platform designed to be pushed by hand. As operated by MOLA it incorporates a bank of six vertically-mounted Bartington Grad601 magnetic gradiometers, spaced at half-metre intervals along a bar aligned crossways to the direction of travel, and also incorporates a Leica Geosystems GS16 GPS antenna mounted on the central axis, 1.02m astern of the sensors. The magnetic sensors each output data at a rate of 8Hz (eight readings per second) and the GPS antenna outputs NMEA format data (GGA messages) at a rate of one position every second. These data streams are fed into a laptop computer where they are compiled into a single raw data file by MultiGrad601 logging software specifically designed for that purpose.

The cart was propelled along straight and parallel traverses across each of the survey areas, with data logging being manually toggled on and off at the start and end of each traverse to avoid the collection of spurious data whilst turning. Traverse ends were marked with ranging poles to aid even coverage, and the evenness of coverage was further checked by monitoring the positional trace plotted in real time by the

MultiGrad601 logging software. The average speed of coverage was up to c2m/s and the effective data resolution thus approximated to 0.25m x 0.50m.

The raw survey data was initially processed with MLGrad601 software, which calculated an actual UTM co-ordinate for each data point by interpolating the GPS readings and applying offset corrections based on the array geometry and calculated heading direction. This produced an output file in XYZ format which could be imported into TerraSurveyor software for data visualisation and further processing.

The raw XYZ data exhibited striping caused by slight mis-matches in the calibration of the individual magnetic sensors. This was removed in TerraSurveyor by applying the median destripe function to runs of data from each sensor.

The processed data is presented in this report as a greyscale raster plot (range +5nT to -5nT / black to white), rotated and scaled for display against the Ordnance Survey base mapping (Fig 2). An interpretive overlay is presented in Figure 3 and a plot of the unprocessed survey data in Figure 4.

4 SURVEY RESULTS

The survey has detected a moderately substantial archaeological site in the south of the survey area, incorporating the two enclosures that had previously been identified from cropmarks. It has also detected possible field system ditches in the north of the central field and part of a possible enclosure in the north-east of the northern field. Various geological and modern features are also apparent in the survey results; in particular there is a large zone of magnetically noisy data that coincides with the anticipated extent of the made ground in the northern field.

4.1 The southern archaeological site

The southern archaeological site occupies the western half of the southern field and the southern part of the central field. It is represented in the survey data by magnetically positive linear anomalies that relate to enclosure ditches, boundaries and trackways and by smaller positive anomalies which relate to pits. The overall character and arrangement of these features would be consistent with an Iron Age or Roman date. The full extent of the site is undetermined as it clearly extends beyond the limits of the survey area, but the detected portion covers in excess of 2ha.

The focus of the site appears to be a substantial rectangular enclosure, measuring c60m x 45m, with a south-east facing entrance. This lies in the west of the southern field with its northern corner concealed beneath Stagsden Road. It is partly encompassed by two linear ditches which together define the edges of a trackway passing along the south-western edge of the enclosure, flaring out to form a wider space in front of the entrance, then funnelling down to a narrower course again towards the south-east.

A small rectangular enclosure, measuring c23 x 15m, lies along the eastern side of the trackway. Two other enclosures adjoin the trackway further south, but these lie largely outside the survey area with only their northern edges apparent in the data. Further east is a relatively empty part of the site, in which only a small irregularly shaped enclosure, c15m in diameter, and a possible roundhouse, c13m in diameter have been detected.

In the eastern part of the southern site there are a series of parallel features which probably represent a trackway with multiple re-cuts to its flanking ditches. There are no clear archaeological features to the east of this. Another ditch follows an irregular course

north-westwards from this trackway, deviating from a parallel course with the previously mentioned re-cut ditch.

Small positive anomalies indicative of pits are present within the southern site, the main concentrations being in the large rectangular enclosure and in one of the southern enclosures at the edge of the survey area. Only the most plausible examples have been highlighted on the interpretation plot, and it should be noted that there are other, superficially similar anomalies to the south that could have either an archaeological or geological origin.

A pair of parallel ditches, spaced c8m apart, follow a sinuous, looping course through the southern part of the central field. Their spacing is typical for a pair of ditches flanking a trackway, but their lack of a clear direction might argue against this interpretation. Forty five metres further north there is an isolated linear anomaly which probably represents another ditch, the date and significance of which are uncertain.

4.2 Other probable archaeological features

Four linear anomalies of probable archaeological origin are present in the north of the central field. Two of them follow roughly parallel alignments from south-east to north-west, and a third starts on the same alignment before making a sweeping turn onto a west-south-west alignment. A fourth is aligned south-west to north-east, spanning the gap between the southern and central anomalies. All four are likely to represent ditches, perhaps defining part of a former field system. A comparison of this data against the Tithe map (*pers comm* Ed Oakley) shows a possible correlation with a field boundary.

A set of linear anomalies in the north-eastern corner of the northern field is thought to represent part of a large irregularly shaped enclosure ditch with two internal partitions. The northern side of this putative enclosure is sinuous and the southern side is straight; the distance between these two sides is c80m. The western side cannot be traced, having presumably been destroyed or deeply buried when made ground was spread across it. The eastern side was not detected by the survey. In addition there are several short linear anomalies across the southern side of the enclosure.

4.3 Ridge and furrow

Sets of weak, parallel linear anomalies, relating to ridge and furrow cultivation of medieval to early post-medieval date, have been detected sporadically across the survey area. They are absent from the far south-east of the survey area, possibly because this low-lying land along the stream was more suited for pasture than cultivation. They are also absent from a large part of the northern field, probably due to masking by made ground (see below).

4.4 Made ground

There is a large zone of very densely clustered magnetic dipoles (magnetic noise) in the south-western part of the northern field and a lower density scatter of dipoles continuing to the east. The dipoles are indicative of ferrous debris, including some moderately substantial objects. Some objects which have produced large, weak and diffuse anomalies must lie at considerable depth. Ferrous debris in such quantity is inevitably a sign of recent ground disturbance, and in this case the distribution of the debris tallies well with other evidence for a recent deposit of made ground (see Section 2.1, above).

A linear anomaly, aligned north-east to south-west, apparently defines the northern limit of the made ground. The eastern limit is not so well defined but can be inferred from the abrupt termination of the probable enclosure ditch and from the restricted extent of the

ridge and furrow anomalies in the eastern side of the field. Assuming the modern field boundaries to define the other edges of the made ground, a total extent of c5.5ha could be suggested.

4.5 Miscellaneous modern features

A negative linear anomaly, aligned north to south, is present in the north-east of the northern field. Such anomalies typically represent modern service trenches, though other causes such as stone-lined drains could also be possible.

Further south in the same field there is a weak positive linear anomaly with many small dipoles along its line. This runs south-east from the area of made ground, linking up with an east-west aligned anomaly of similar character near the corner of the field. Both anomalies are likely to represent modern drains.

Two telegraph poles in the northern field have given rise to moderately large dipolar anomalies. Various other dipoles, typically much smaller, indicate a light background scatter of ferrous debris across the entire survey area. Much of this is likely to comprise insignificant pieces of agricultural scrap buried in the ploughsoil. A few large magnetic halos at the edges of the fields are also ferrous in origin, arising from gates, fences, vehicles and other large metallic objects located immediately adjacent to the survey area.

Some very weak positive linear anomalies in the north-west of the northern field are thought to relate to deep wheel ruts that were observed in this area during the course of the fieldwork. A much more regularly arranged set of weak, curvilinear negative anomalies in the southern field correspond to agricultural tramlines.

4.6 Geology

The striking pattern of broad, south-west to north-east trending anomalies that cross the central and southern fields undoubtedly reflects the underlying pattern of geological strata, with alternating beds of more and less magnetic sediment giving rise to the weakly negative bands and intervening positive anomalies. The absence of such patterning from the northern field is further circumstantial evidence that the natural strata in that area are masked beneath made ground.

Weak and amorphous magnetic patterning is present on the lowest lying parts of the survey area, around the south-eastern part of the southern field and the eastern side of the northern field. Such patterning may indicate the presence of alluvial or colluvial sediments in these areas. Elsewhere in the data there are a few amorphous magnetic anomalies which are probably natural in origin but cannot be more specifically interpreted.

5 CONCLUSION

The magnetometer survey has confirmed the presence of two probable Iron Age or Roman enclosures in the southern part of the survey area as well a series of other ditches and pits to the south and east which may be associated. Two hundred meters to the north there is a small group of linear ditches which perhaps define part of a pre-modern field system; a staggered field boundary on the Tithe map broadly corresponds with these anomalies. Another set of ditches in the north-eastern corner of the survey area define part of a large irregularly-shaped probable enclosure with internal divisions, the date of which remains to be determined.

Approximately 5.5ha of land in the north of the survey area has been found to be magnetically disturbed, with ferrous debris present in abundance. Topographic evidence and information from local residents indicates that this area is made ground, reportedly built up with spoil from a nearby cutting on the A428. The extent of earth moving which would appear to have taken place is clearly a factor to be considered when assessing the archaeological potential of this part of the survey area.

MOLA
4th January 2018

BIBLIOGRAPHY

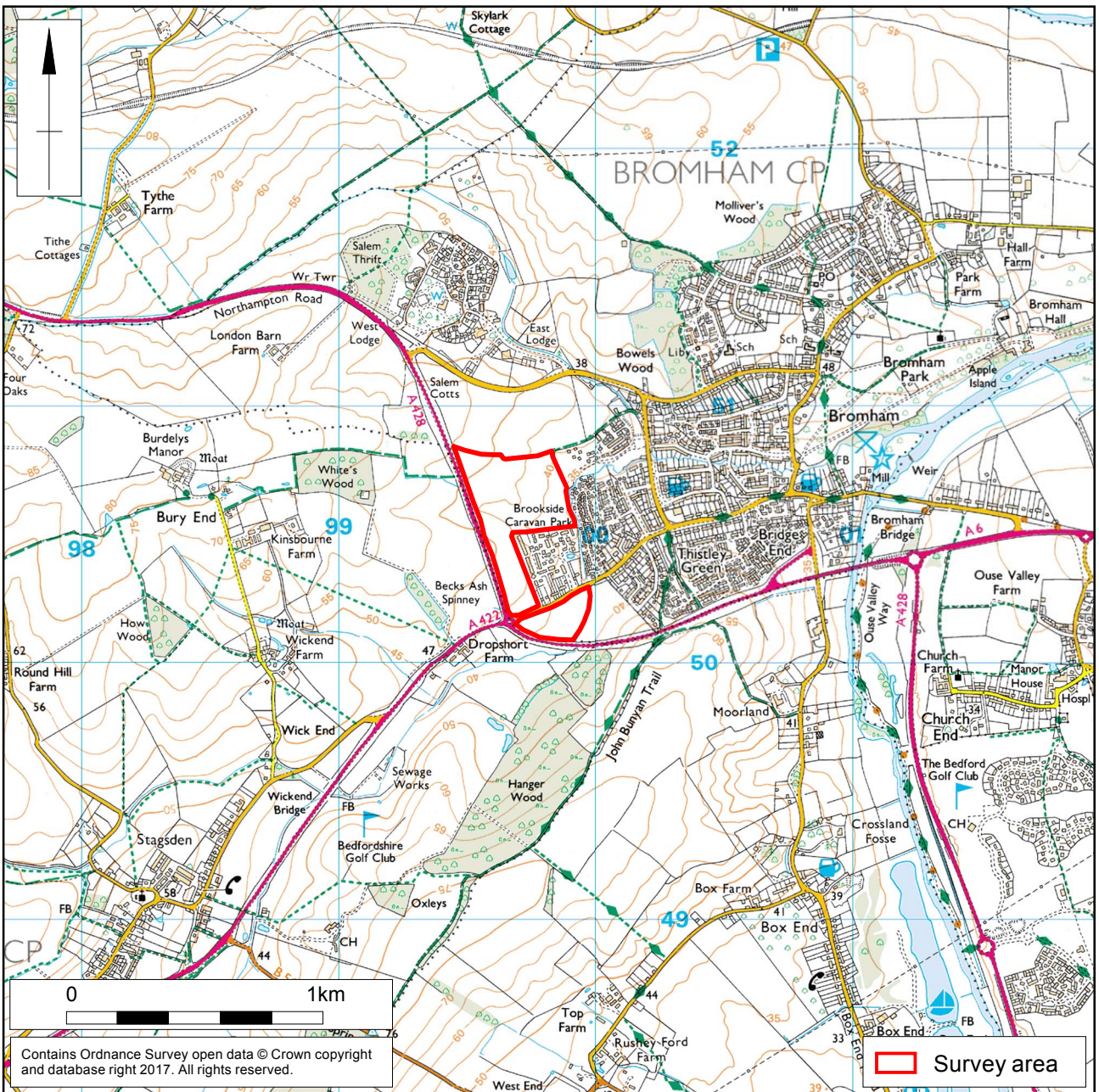
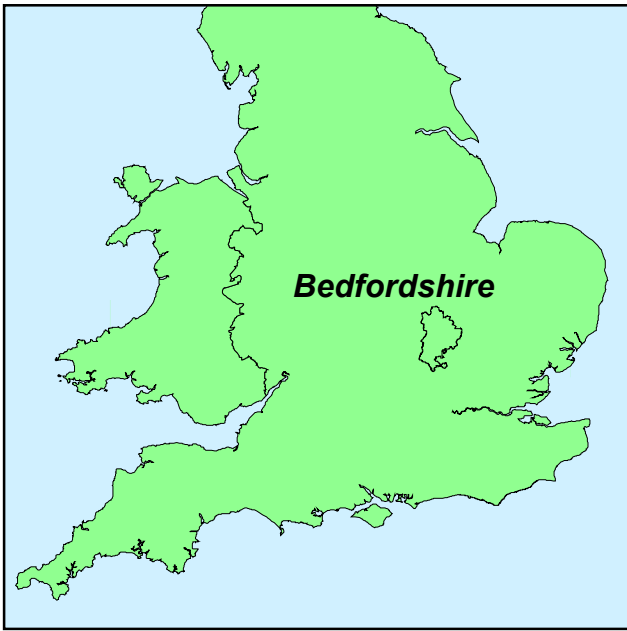
BGS 2017 *Geology of Britain Viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain>, British Geological Survey, consulted November 2017

CIfA 2014 *Standard and Guidance for Archaeological Geophysical Survey*, Chartered Institute for Archaeologists

Dawson, M, 2000 *Iron Age and Roman Settlement on the Stagsden Bypass*, Bedfordshire Archaeology Monograph 3

EH 2008, *Geophysical survey in archaeological field evaluation*, English Heritage

MOLA 2017 Written Scheme of Investigation

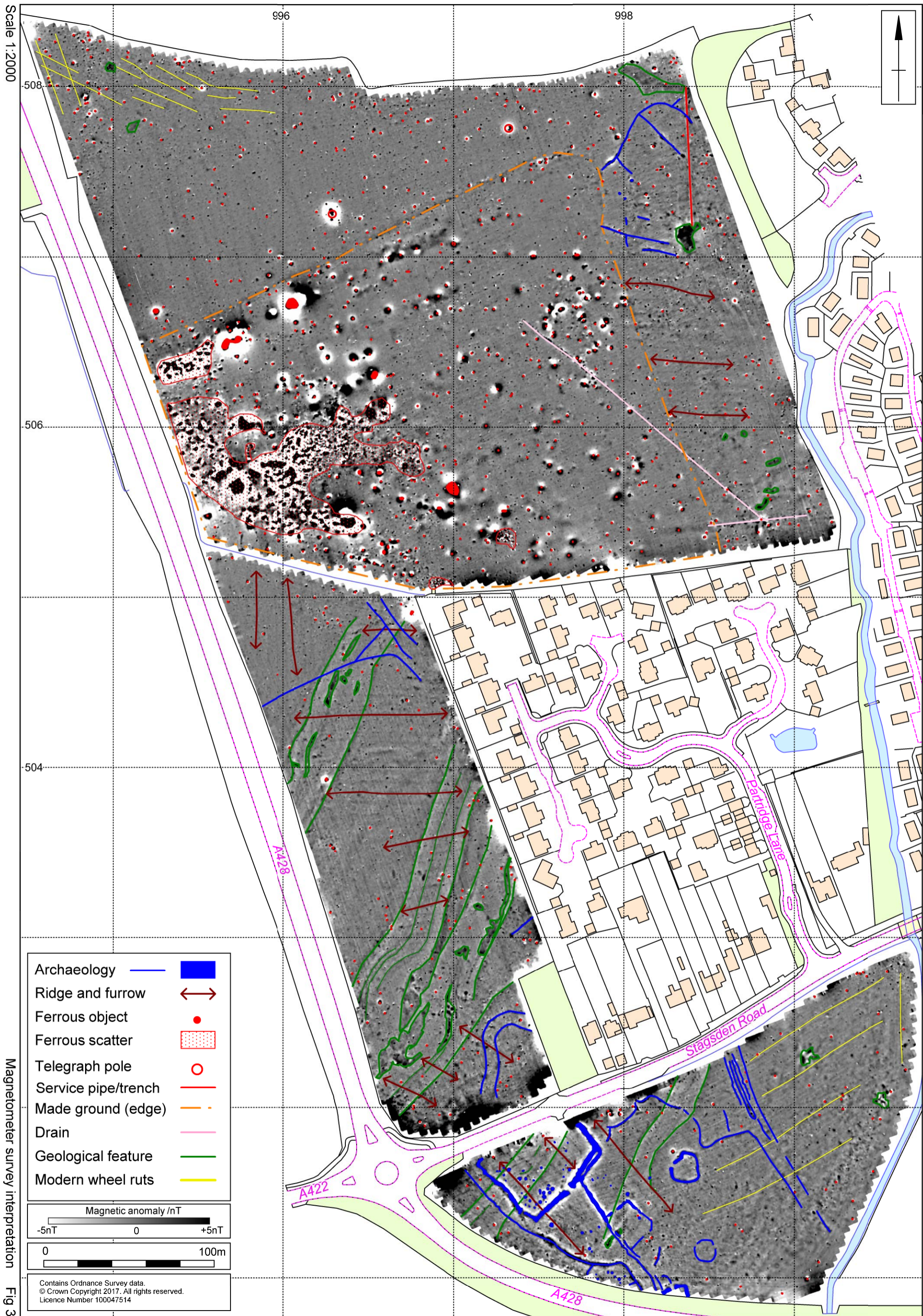


Scale 1:25,000

Site location Fig 1

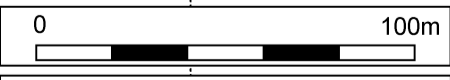
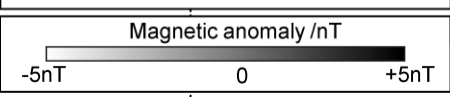


Magnetometer survey results Fig 2



Scale 1:2000
 Magnetometer survey interpretation
 Fig 3

- Archaeology ———— ■
- Ridge and furrow ↔
- Ferrous object ●
- Ferrous scatter
- Telegraph pole ○
- Service pipe/trench ———— —
- Made ground (edge) ———— - - -
- Drain ———— —
- Geological feature ———— —
- Modern wheel ruts ———— —



Contains Ordnance Survey data.
 © Crown Copyright 2017. All rights reserved.
 Licence Number 100047514





MOLA
Kent House
30, Billing Road
Northampton
NN1 5DQ
01604 700 493
www.mola.org.uk
sparry@mola.org.uk