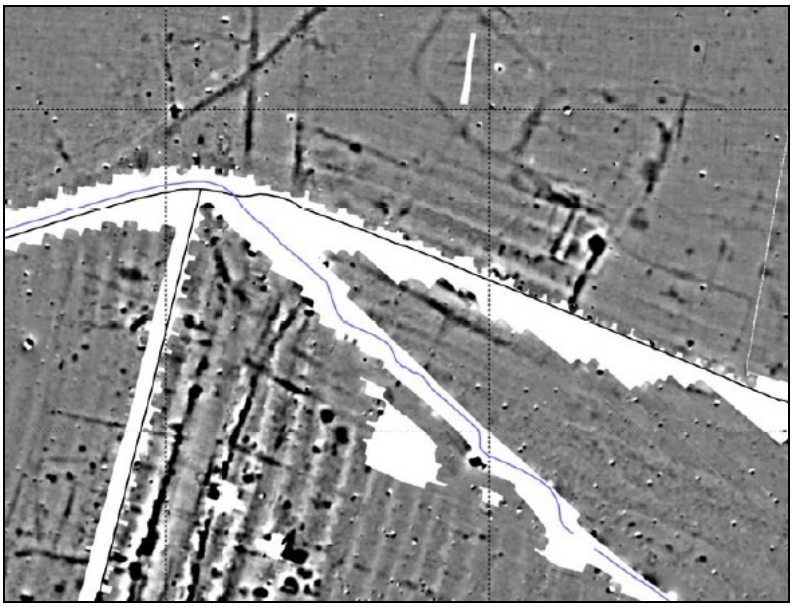

Archaeological geophysical survey on land alongside V10 Brickhill Street, Caldecotte, Milton Keynes

December 2017 - March 2018

Report No 18/51

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Quality control and sign off**:**

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1	16/04/2018	Claire Finn	Chris Chinnock	Mo Muldowney	Client approval

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OASIS REPORT

PROJECT DETAILS	**Oasis No. molanort1-314347**	
Project name	Archaeological geophysical survey on land alongside V10 Brickhill Street, south of Caldecotte, Milton Keynes	
Short description	MOLA (Museum of London Archaeology) was commissioned to undertake a magnetometer survey of *c*62ha of land to the south of Caldecotte, Milton Keynes. The survey area lay close to the scheduled remains of the Roman town of Magiovinium. A Roman road was detected leading north from the town, with suburban settlement or industrial remains lying to either side, and a separate area of Roman suburbs was detected in the southernmost part of the survey area. Few archaeological remains were detected elsewhere, apart from a large isolated enclosure of possible Iron Age or Roman date and medieval to early post-medieval ridge and furrow.	
Project type	Geophysical survey	
Site status	None	
Previous work	Desk-based assessment (Crothers 2015)	
Current land use	Arable and pasture	
Future work	Uncertain	
Monument type/ period	Iron Age or Roman enclosure Roman town Roman road Medieval ridge and furrow	
Significant finds	None	
PROJECT LOCATION		
County	Milton Keynes	
Site address	V10 Brickhill Street, Caldecotte, Milton Keynes	
Study area	*c* 62ha	
OS Easting & Northing	SP 892 341	
Height OD	*c* 71m aOD	
PROJECT CREATORS		
Organisation	MOLA	
Project brief originator	CgMs Heritage on behalf of Hampton Brook Limited	
Project design originator	MOLA	
Director/Supervisor	Adam Meadows, Graham Arkley	
Project Manager	Mo Muldowney	
Sponsor or funding body	Hampton Brook Limited	
PROJECT DATE		
Start date	11 December 2017	
End date	22 March 2018	
ARCHIVES	Location	Content
Physical	N/A	
Paper	MOLA Northampton	Site survey records
Digital		Geophysical survey & GIS data
BIBLIOGRAPHY	Journal/monograph, published or forthcoming, or unpublished client report	
Title	Archaeological geophysical survey on land alongside V10 Brickhill Street, south of Caldecotte, Milton Keynes, December 2017 to March 2018	
Serial title & volume	MOLA Northampton Reports 18/51	
Author(s)	John Walford and Adam Meadows	
Page numbers	7	
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Archaeological geophysical survey of land alongside V10 Brickhill Street, south of Caldecotte, Milton Keynes December 2017 – March 2018

ABSTRACT

MOLA (Museum of London Archaeology) were commissioned to undertake a magnetometer survey of c62ha of land to the south of Caldecotte, Milton Keynes. The survey area lay close to the scheduled remains of the Roman town of Magiovinium. A Roman road was detected leading north from the town, with suburban settlement or industrial remains lying to either side, and a separate area of probable Roman suburbs was detected in the southernmost part of the survey area. Few archaeological remains were detected elsewhere, apart from a large isolated enclosure of possible Iron Age or Roman date and near-ubiquitous traces of medieval to early post-medieval ridge and furrow.

1 INTRODUCTION

MOLA (Museum of London Archaeology) was commissioned by CgMs Heritage, on behalf of Hampton Brook Limited, to undertake an archaeological geophysical survey of land south of Caldecotte, Milton Keynes (NGR SP 892 341; Fig 1). The work was required by Nick Crank, the Senior Archaeological Officer for Milton Keynes, and was intended to map areas of potential archaeological interest within a proposed development site.

The fieldwork was conducted between December 2017 and March 2018. It followed the methodology outlined in the approved *Written Scheme of Investigation* (MOLA 2017) and conformed to standards and guidance issued by the Chartered Institute for Archaeologists and English Heritage (CIfA 2014, EH 2008).

2 BACKGROUND

2.1 Topography and geology

The survey area comprises *c*62ha of agricultural land located south of Caldecotte, between Bow Brickhill and Fenny Stratford. The main part of the area is a triangle of land between V10 Brickhill Street, the A5 dual carriageway and the Bletchley to Bedford railway line. Smaller areas of land south of the A5 and east of Brickhill Street were also covered by the survey (Fig 1). The majority of the land is under arable cultivation, though some of the land in the south-west is pasture.

The survey area lies on a gentle west-facing slope at around 70-75m above Ordnance Datum. A small stream, channelled into field ditches, flows across the area and discharges into the River Ouzel to the west.

The British Geological Survey indicates that the geology of the site comprises Oxford Clay Formation Mudstones, overlain by river terrace deposits in the west and by small patches of alluvium and head along the line of the stream (BGS 2018).

2.2 Historical and archaeological background

The survey area lies very close to the Roman town of *Magiovinium*, which lay astride Watling Street immediately east of its crossing of the River Ouzel. The core of the town, including its multivallate defences is a scheduled monument (National Heritage List for England 1006943) but its suburban fringes are not covered by the scheduling (Fig 1). There has been much piecemeal archaeological investigation of *Magiovinium*, with notable events in recent decades including the excavations undertaken in advance of the construction of the A5 dual carriageway (Neal 1987) and a geophysical survey of the southern half of the town (Walford 2014). Further details of the town's archaeology can be found in a recent desk-based assessment of the present survey area (Crothers 2015).

Cropmarks indicate that a pair of enclosures of probable Iron Age or Roman date lie near the centre of the survey area (Crothers 2015, fig 21). No other monuments are recorded within its boundaries, and the only recorded find is a Saxon strap-end from the north-eastern part of the area (Crothers 2015, 10).

The survey area does not encompass any known focus of medieval or early post-medieval settlement, so it seems most likely that the land was in agricultural use throughout those periods. Historic maps of the area dating from the late 18th century onwards (Crothers 2015, 23-28) depicts an agrarian landscape with no features of substantive archaeological or historical interest.

An archaeological watching brief was conducted during groundworks at Crossroads Farm, in the south-east of the survey area, in 2006. However, nothing of archaeological interest was observed (Crothers 2015, 10).

3 METHODOLOGY

The survey was undertaken with a magnetometer cart. This is a two-wheeled, lightweight sensor platform designed to be pushed by hand. It incorporates a bank of six vertically-mounted Bartington Grad601 magnetic sensor tubes, spaced at half-meter intervals along a bar aligned crossways to the direction of travel, and also incorporates a Leica Geosystems Viva GPS antenna mounted on the central axis, astern of the sensors. The magnetic sensors each output data at a rate of 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 pushed along straight and parallel traverses across the survey area, 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 *c*2m/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 greyscale raster plots rotated and scaled for display against the Ordnance Survey base mapping (Figs 2, 4 and 6). Figures 2 and 4 present the data at a standard range +8nT to -8nT (black to white), and Figure 6 presents a close-up of the main archaeological features at a scale of +/-10nT. Interpretive overlays are presented in Figures 3, 5 and 7, and plots of the unprocessed survey data in Figures 8-9.

4 SURVEY RESULTS

4.1 Archaeology

South-eastern archaeological features (Figs 2-3, Fields 13-14)
A group of archaeological remains have been detected in the south of the survey area, in Fields 13 and 14. Three ditches in the south of Field 14 are aligned south-west to north-east, and around these is a mass of small anomalies which although not fully intelligible, suggest a concentration of pits, ovens or hearths and other small domestic or industrial features. To the north there is what appears to be a square enclosure with rounded corners. This lies across Fields 13 and 14, with its central section obscured beneath the modern A5 dual carriageway. It is notable that these features lie very close to the scheduled area of *Magiovinium* and respect the alignment of Watling Street, the former Roman road.

North-western archaeological features (Figs 6-7, Fields 3, 6-8 & 11)
The other main group of archaeological remains extends northwards through Fields 3, 6-8 and 11. They are focussed along a former road, which is defined by a pair of parallel ditches spaced *c*15m apart. This road heads north-north-east up to the point where it reaches a small stream, then turns onto a heading only a few degrees east of true north. Further north its anomalies fade rapidly, becoming imperceptible for a distance but just discernible again as they approach the northern boundary of the survey area.

The land to either side of the road, over a distance of *c*300m, is divided into rectilinear plots bounded by ditches. The overall arrangement is fairly regular although there are some cases of intercutting ditches and ditches re-cut on closely parallel lines, which would suggest that the site saw prolonged use. Additional remains lie to the rear of the roadside plots, especially to the east and north-east where, in places, there are rectilinear enclosures extending up to 150m back from the road frontage.

Moderately strong positive anomalies, typically between 10nT and 40nT, lie in and around the roadside plots. There is a range of possible causes, including large pits, ovens and hearths and, although they cannot be interpreted more specifically, they illustrate that there was substantial domestic or industrial activity in this area. The strength of some of the ditch anomalies in proximity to the road also indicate intensive use of the land, suggesting that the ditch fills contain abundant refuse or magnetically enhanced industrial residues.

In the north-east of this feature group, in Field 3, there are two conjoined enclosures which correspond to the previously known cropmarks (Crothers 2015, fig 21). They are more substantial and, although broadly rectilinear, more rounded in form than the other enclosures in this area, which suggests that they may be of separate date.
.

Two linear ditches in Field 3 define a large triangular area of land encompassing a number of the other archaeological features. Their date is hard to establish. Whilst they could be projected to join up with the present pattern of field boundaries they do not correspond to anything recorded on historic maps dating back to 1791 (Crothers 2015, Figs 15-20) and the western ditch does not fully respect the layout of the medieval ridge and furrow (described below). Furthermore, the western ditch intersects the line of the former road obliquely, which suggests that it is not contemporary with the road and associated enclosures.

Other archaeological features

A large ditched enclosure lies in isolation in the eastern half of Field 3. It has an irregular form, approximating to a squared-off D-shape. It lacks any obvious internal features that might suggest its function (Figs 4-5).

Two linear ditches cross the northern end of Field 2 on an approximate east to west alignment, following the line of a medieval to early post-medieval plough headland (see below). They probably comprise the flanking ditches of a trackway contemporary in date with the ridge and furrow (Figs 4-5).

In the southern corner of Field 4 there is a complex set of positive magnetic anomalies which are hard to interpret but perhaps indicate an area of ground disturbed by quarrying. Slightly to their north-west is a linear anomaly which probably represents a short length of ditch (Figs 4-5).

A small, moderately intense anomaly in the eastern half of Field 8 is of uncertain origin, but shows a degree of structure suggestive of a man-made origin. It comprises an alignment of three small elements, the outer ones of similar size and strength, equally spaced around a weaker central element (Fig 6 inset). Some surrounding weak linear anomalies suggest that this feature may lie within a small trapezoidal enclosure, although the evidence is inconclusive.

Ridge and furrow

Parallel linear anomalies relating to medieval and early post-medieval ridge and furrow cultivation are very widespread across the survey area. The furrows are typically spaced at 5m to 8m intervals, and often follow gentle reversed-S curves rather than running straight. They occur in coherent blocks (furlongs) the ends of which (headlands) are sometimes followed by modern field boundaries. The clearest anomalies occur in the southern pasture fields where the ridge and furrow is best preserved, still surviving as earthworks. Elsewhere the anomalies vary from weak to very weak. This variation will principally reflect broad scale variations in the magnetism of the ploughsoil and subsoil, although the degree of truncation by later ploughing may also be a factor.

4.2 Modern features

Field boundaries

A linear anomaly in the west of Field 3 forms a link between two existing pieces of hedgeline, corresponding to a field boundary depicted on the 1950 Ordnance Survey map (Crothers 2015, Fig 20). Another linear anomaly heads east from this and then turns to the south, corresponding to a boundary which is depicted on various Ordnance Survey maps dating up to the 1980s (eg Crothers 2015, Figs 19-20). There are many small but intense magnetic dipoles along this anomaly, indicating an accumulation of ferrous debris within the backfilled boundary ditch. A third linear anomaly, seems to form part of the same system of boundaries, although it is not recorded on any historic map.

A narrow chain of small ferrous dipoles which bisects Field 7 from north to south probably indicates the line of a recent field boundary, although nothing is marked in this location on any historic map.

Field drains
There are some sets of parallel linear anomalies in Field 3 which, although resembling the ridge and furrow anomalies, are generally weaker and straighter. It is most likely that these relate to modern field drains. Some weak linear anomalies of alternating magnetic polarity in Fields 2, 3 and 8 can also be attributed to field drains.

Pipelines
The survey has detected many pipelines around the northern and eastern edges of the survey area, mainly paralleling the railway line and Brickhill Street (Fields 2-3 and 12-18). Each is represented by an intense linear anomaly, most of which have a characteristically alternating polarity with broad halos to either side. The halos are particularly pronounced in Fields 15-18, on the eastern side of Brickhill Street, where they dominate the data to the extent that little else can be discerned.

A thin negative linear anomaly aligned north to south through the eastern side of Field 13 probably represents a service trench containing a plastic pipe or some other non-magnetic feature.

Made ground
The survey results from Field 10, to the rear of Crossroads Farm, are dominated by an incoherent mass of large ferrous dipoles. This type of magnetic response is very typical of modern made ground containing a quantity of scrap metal within the make-up material. The size of the anomalies is more consistent with large pieces of buried debris than with superficial litter.

Telegraph poles
A row of regularly spaced magnetic anomalies of variable character lies almost parallel with the northern edge of the survey area (Fields 2-3), indicating the positions of telegraph poles. Two other telegraph poles located towards the centre of Field 3 have very weak magnetic dipoles, the weakness due to the height above ground at which the metal fittings are mounted on the poles.

Ferrous debris
Small but intense magnetic dipoles are abundant throughout the survey data. These will generally be due to insignificant pieces of ferrous debris within the ploughsoil. A few larger anomalies of similar type, such as that in the south of Field 11, will be due to larger ferrous objects.

4.3 Natural features

Geology
There are two main sets of geological anomalies in the data, one a swathe of small positive anomalies through the southern part of Field 9 and the other a broad, diffuse curvilinear anomaly extending into the northern part of Field 3. Neither can be interpreted more specifically.

Lightning strike?
An elongated anomaly in the eastern part of Field 11 is moderately intense and has alternate positive and negative quarters. It may be a LIRM (Lightning Induced Remnant Magnetism) anomaly, caused by the magnetising effects of the ground current from a lightning strike (*cf* Jones and Maki 2005). Its alignment follows that of the ridge and

furrow earthworks, suggesting that these controlled the direction in which the ground current flowed.

5 CONCLUSION

The survey has detected two areas of archaeological remains which, given their location and form, seem very likely to comprise suburbs associated with the Roman town of *Magiovinium*. Most of these lie in the western half of the survey area (Fields 3, 6-8 & 11), to either side of a what appears to be a leading north from the town, but a smaller area of remains has been detected in the south, alongside to Watling Street (Fields 13-14). In each case the results suggest moderately intensive domestic or industrial activity. The combined extent of these two areas of remains is estimated at roughly 7.5ha.

Three ditched enclosures have been detected which area undated but most probably Iron Age or Roman in origin. All lie in Field 3, two of them alongside each other at the edge of the northern suburb and the other in isolation, 200m to the north east. Apart from these, the only definite archaeological features to have been detected are ridge and furrow and a possible trackway of medieval to early post-medieval date.

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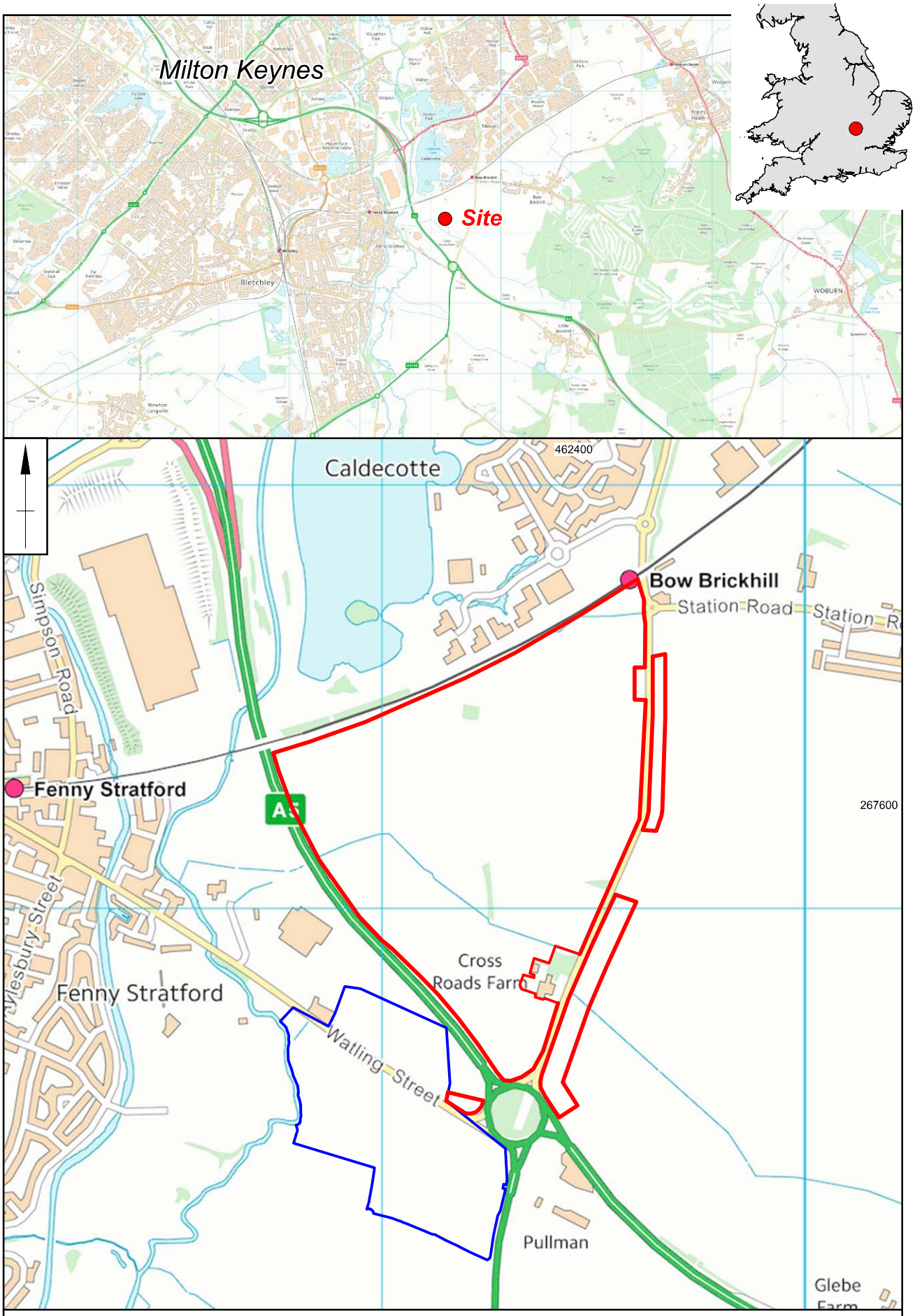
MOLA
17th April 2017



Scale 1:12,5000

Site location Fig 1

488800
489000
489200
489400
489600
234000
233800
233600
A5
Dropshort Farm
Watling Street
Crossroads Farm
Y10 Brickhill Street
5
6
7
8
9
10
11
12
13
14
15
16
17
3
0
1:2500
100m
Magnetic anomaly
-5nT
0
+5nT

Scale 1:2500 (A3)

Magnetometer survey results (south) Fig 2

488800
489000
489200
489400
489600
234000
233800
233600
A5
A5
Dropshort Farm
Crossroads Farm
Y10 Brickhill Street
5
6
7
8
9
10
11
12
13
14
15
16
17
3
Archaeology (ditch)
Archaeology (pit, etc)
Ridge and furrow
Former field boundary
Quarry pit?
Field drain
Pipe
Telegraph pole
Ferrous object / debris
Natural
0
1:2500
100m
Magnetic anomaly
-5nT
0
+5nT

Scale 1:2500 (A3)

Magnetometer survey interpretation (south) Fig 3

0 1:2500 100m

Magnetic anomaly
-5nT 0 +5nT

489400 489600

Overgrown - not surveyed

234000

233800

233600

18

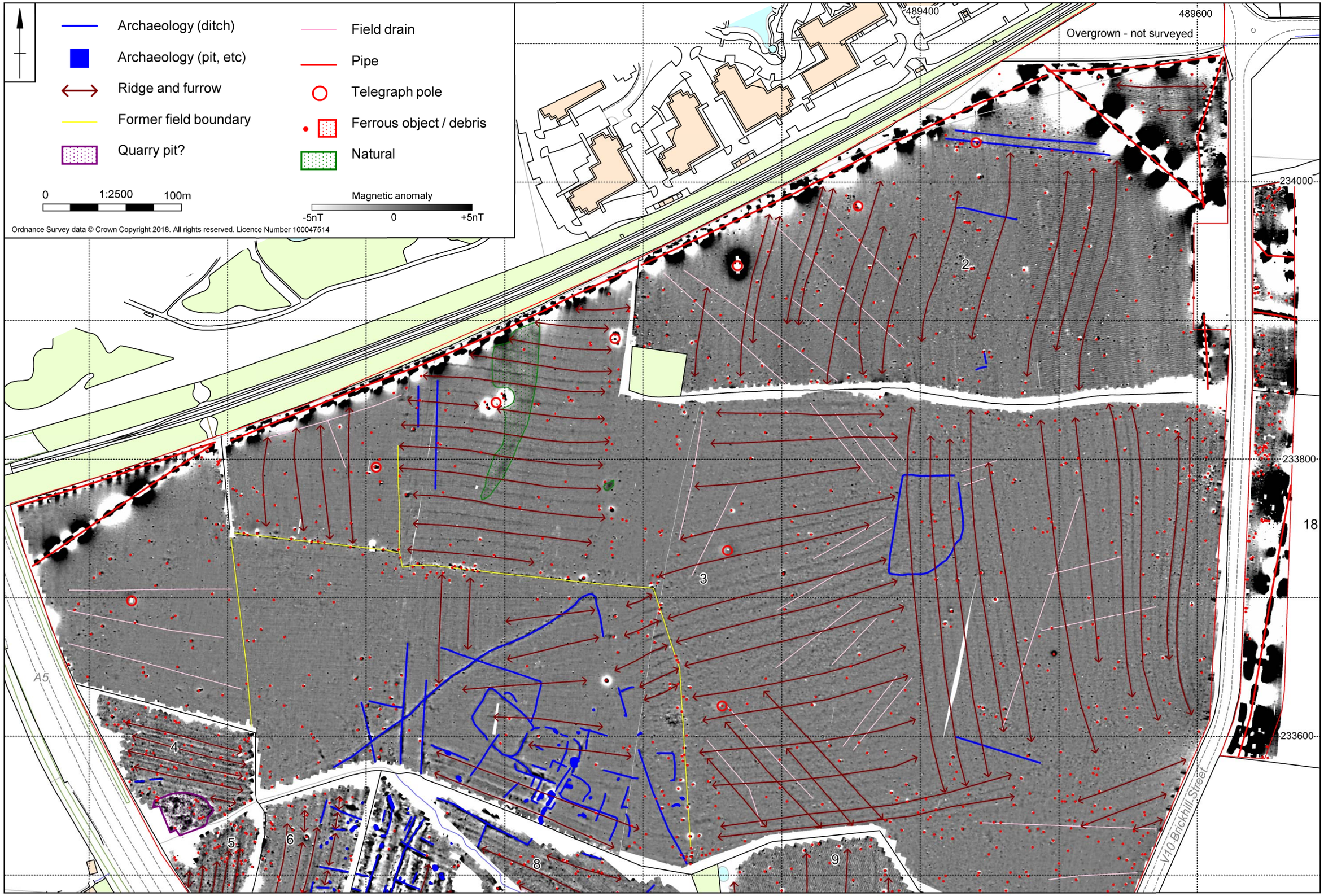
2 3 4 5 6 8 9

A5

V410 Brickhill Street

Scale 1:2500 (A3)

Magnetometer survey results (north) Fig 4

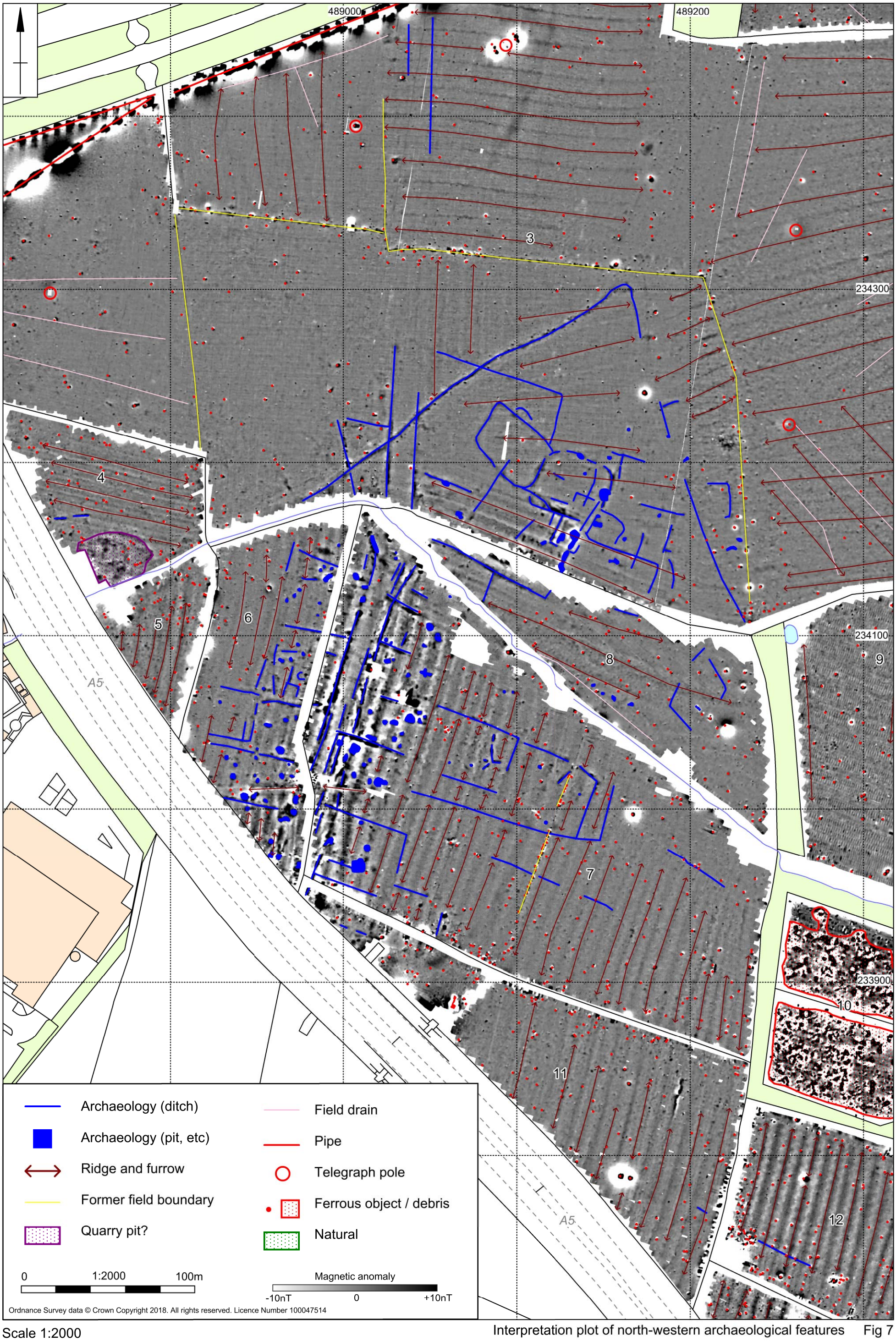


Scale 1:2500 (A3)

Magnetometer survey interpretation (north) Fig 5

Scale 1:2000

Detailed plot of north-western archaeological features Fig 6



Scale 1:2000

Interpretation plot of north-western archaeological features Fig 7

488800
489000
489200
489400
489600
234000
233800
233600
5
6
8
9
7
3
17
10
11
16
12
13
15
14
A5
Crossroads Farm
Y10 Brickhill Street
Dropshort Farm
Watling Street
A5
0
1:2500
100m
Magnetic anomaly
-10nT
0
+10nT

Scale 1:2500 (A3)

Unprocessed magnetometer data (south) Fig 8

0 1:2500 100m

Magnetic anomaly
-10nT 0 +10nT

489400
489600
234000
233800
233600
Overgrown - not surveyed
2
3
4
5
6
8
9
18
A5
V410 Brickhill Street

Scale 1:2500 (A3)

Unprocessed magnetometer data (north) Fig 9

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