THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Land at the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: TSM 16/112

(SU 6551 6427)

Land at rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire

Geophysical Survey (Magnetic) Report

For T A Fisher

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code TSM 16/112

December 2018

Summary

Site name: Land at rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire

Grid reference: SU 65517 64277

Site activity: Magnetometer survey

Date and duration of project: 13th - 18th December 2018

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: TSM 16/112

Area of site: c.8.4ha

Summary of results: No anomalies of archaeological interest were detected over the course of the survey.

Location of archive: The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Report edited/checked by:	Tim Dawson✓ 20.12.18

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Land at rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 16/112b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at The Street, Mortimer, West Berkshire (SU 65517 64277) (Fig. 1). The work was commissioned by Julian Pacey of T A Fisher, Theale Court, 11-13 High Street, Theale, Berkshire, RG7 5AH.

A planning application (17/03004/OUTMAJ) has been made to West Berkshire Council to develop land to the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire (SU 6551 6430) (Fig. 1). This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012), and the County's policies on archaeology. The field investigation was carried out to a specification approved by Sarah Orr, Senior Archaeologist for West Berkshire County Council. The fieldwork was undertaken by Kyle Beaverstock, Jim Webster and Caterina Gregori between the 13th and 18th of December 2018 and the site code is TSM 16/112.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Location, topography and geology

The site is located on the southern edge of Mortimer Common on the south side of The Street (Fig 1). Bounded by residential and commercial properties to the north, east and west and open farmland to the south, this irregular rectangle parcel of land is mostly being utilised for arable farming. The site is relatively flat in the north-eastern area of the field at a height of 93m above Ordinance Datum (aOD) before becoming more undulating and dropping to a height of 79m aOD in the south. The underlying geology in the northern half of the site is recorded as Silchester Gravel and London Clay in the southern half separated by a small band of Bagshot Formation sand and clay (BGS 2000). Conditions were cold and mostly dry turning wet in the latter stages of the survey (Pl. 1-4).

Site history and archaeological background

A desk-based assessment has highlighted the archaeological potential of the site (McNamara, 2016). In summary, the site lies within the hinterland of Roman Silchester, which lies c. 2km to the south west. The town developed from an Oppidum in the Late Iron Age into the Roman town with intense use of the hinterland (Fulford 1987; Ford and Hopkins 2011; Creighton and Fry 2016). A Roman settlement was also excavated just to the north east (Taylor 2011). A modest range of other periods, including a number of Bronze Age round barrows are recorded for the area (Lobb and Rose 1996).

Methodology

Sample interval

Data collection involved the traversing of the survey area along straight and parallel lines using two cart-mounted Bartington Grad601-2 fluxgate gradiometers. Even coverage was achieved with the use of regularly spaced markers at the ends of traverses and the real-time positional trace plot. Readings were taken at 0.25m intervals along traverses 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating north to south zig-zag orientation across the survey area. Although the majority of the field was unobstructed, the southern area of the field could not be surveyed due to thick brambles and bushes that covered the majority of this area. In the centre there was a thin trench exposing a service pipe as well as over growth around the edges of the proposal area.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to 10^{-9} Tesla, the SI unit of magnetic flux density.

Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both English Heritage as published by the European Archaeological Council (EAC 2015). and the Chartered Institute *for* Archaeologists (2002, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using two dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometers mounted upon a Bartington non-magnetic cart. A two-wheeled lightweight structure pushed by hand, the cart consisted a bank of four vertically-mounted Bartington Grad601-2 magnetic sensor tubes at 1m apart and a Trimble Geo 7x centimetre edition GPS. Readings were collected by two Bartington Grad601-2 loggers and collated using MLgrad601 software on a Linx 12x64 tablet running Windows 10 mounted at the rear of the cart. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

The Trimble Geo7x centimetre edition GPS system with centimetre real-time accuracy was used to tie the cart traverses into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

Process	**Effect**
Clip from -4 to 5 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by interference of metal objects within the survey area.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 2) with the processed data then presented as a second figure (Fig. 3), followed by a third plan to present the abstraction and

interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 3.4.2 and exported again in .PNG format in order to present them in figure templates in Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

Results

Over the course of the survey, several magnetic anomalies were detected (Fig. 3); these are most likely due to interference from modern sources. Running from the entrance in the northern edge of the field to the centre is a large body of magnetic debris (Fig. 4), this is characterised by various strong positive and negative readings or dipolar results. The underlying cause is usually areas spread with numerous fragments of ferrous objects or, as in this case, thermoremnant material (ash). Surrounding the field were several areas of magnetic disturbance with both bipolar and single polarity readings, these are due to interference from fencing and other objects with a high magnetic resonance. In the centre of the surveyed area is a bipolar linear anomaly running east to west for c. 80m, this linear is most likely a service as indicated by several man holes running along this area.

Due to the undulating nature of the field, there were two areas with weak background magnetic variations. These often appear organic in form but have no specific structure. These appear to be in the low areas of the surveyed areas and most likely represent run off or changes in the underlying geological makeup.

Conclusion

Although several magnetic anomalies were detected across the surveyed area, none are believed to be of archaeological interest.

References

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Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

Raw data
Filename: Mortimer RAW.xcp
Description: Imported as Composite from: Mortimer.xyz
Instrument Type: MLgrad601 import
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 634890.110871759, 5693364.84947211 m
Southeast corner: 634990.730871759, 5693131.88947211 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Source GPS Points: 54319

Dimensions
Composite Size (readings): 774 x 1792
Survey Size (meters): 101 m x 233 m
Grid Size: 101 m x 233 m
X Interval: 0.13 m
Y Interval: 0.13 m

Stats
Max: 107.02
Min: -109.73
Std Dev: 10.52
Mean: 0.21
Median: 0.74
Composite Area: 2.344 ha
Surveyed Area: 1.8417 ha

Filename: mortimer 18-12-18.xcp
Description: Imported as Composite from: mortimer 18-12-18.xyz
Instrument Type: MLgrad601 import
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 634979.644320275, 5693318.90047058 m
Southeast corner: 635147.864320275, 5693030.56047058 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

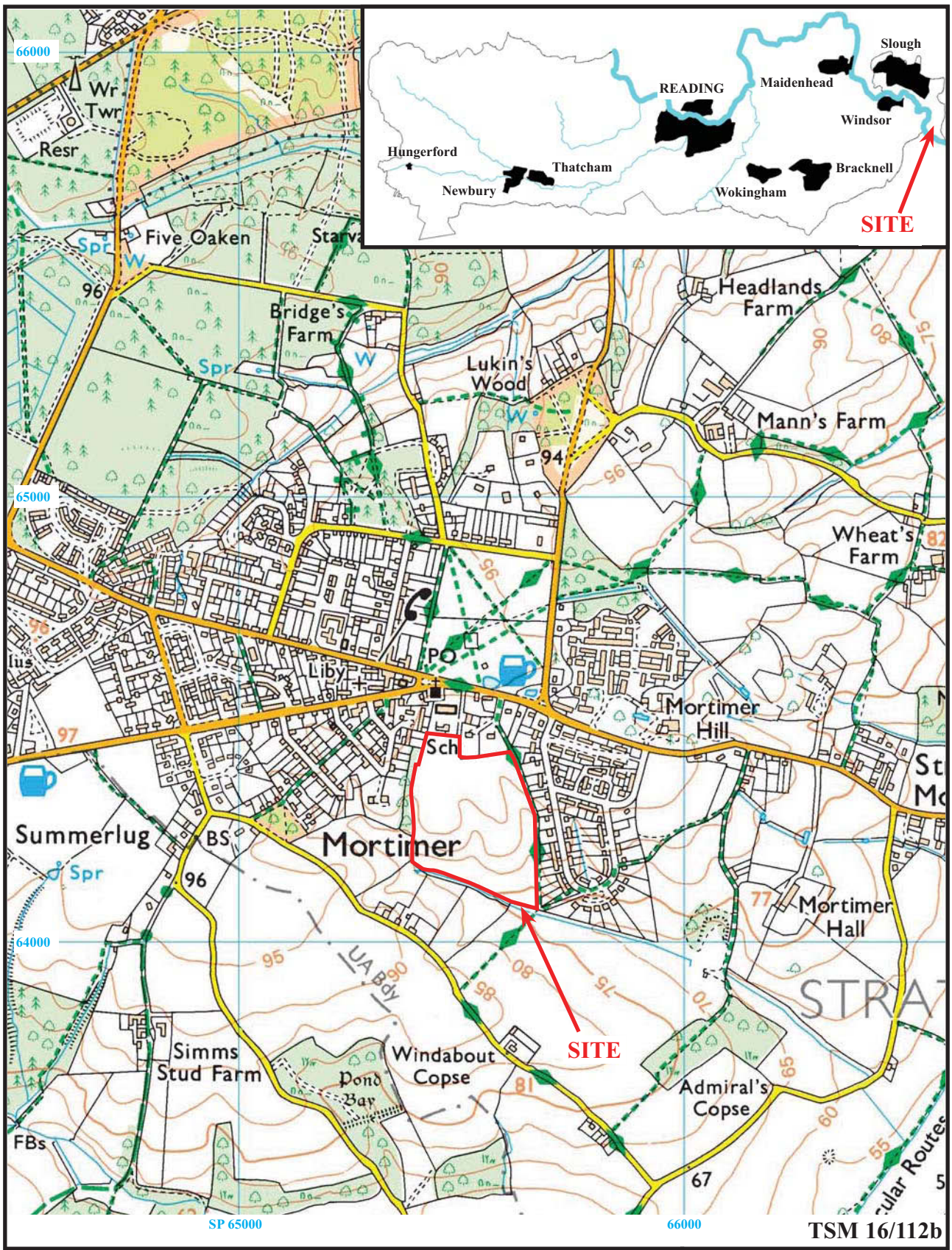
Source GPS Points: 131583

Dimensions
Composite Size (readings): 1294 x 2218
Survey Size (meters): 168 m x 288 m
Grid Size: 168 m x 288 m
X Interval: 0.13 m
Y Interval: 0.13 m

Stats
Max: 107.34
Min: -109.75
Std Dev: 5.62
Mean: 0.48
Median: 0.50
Composite Area: 4.8505 ha
Surveyed Area: 3.3459 ha

Processed data
Filename: Mortimer.xcp
Stats
Max: 11.05
Min: -11.00
Std Dev: 2.61
Mean: -0.17
Median: 0.00
Composite Area: 2.344 ha
Surveyed Area: 1.8417 ha

Filename: mortimer 18-12-18.xcp
Stats
Max: 5.53
Min: -5.50
Std Dev: 1.22
Mean: -0.03
Median: 0.00
Composite Area: 4.8505 ha
Surveyed Area: 3.3459 ha



Land to the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire, 2018
Geophysical Survey (Magnetic)

Figure 1. Location of site within Mortimer and Berkshire.

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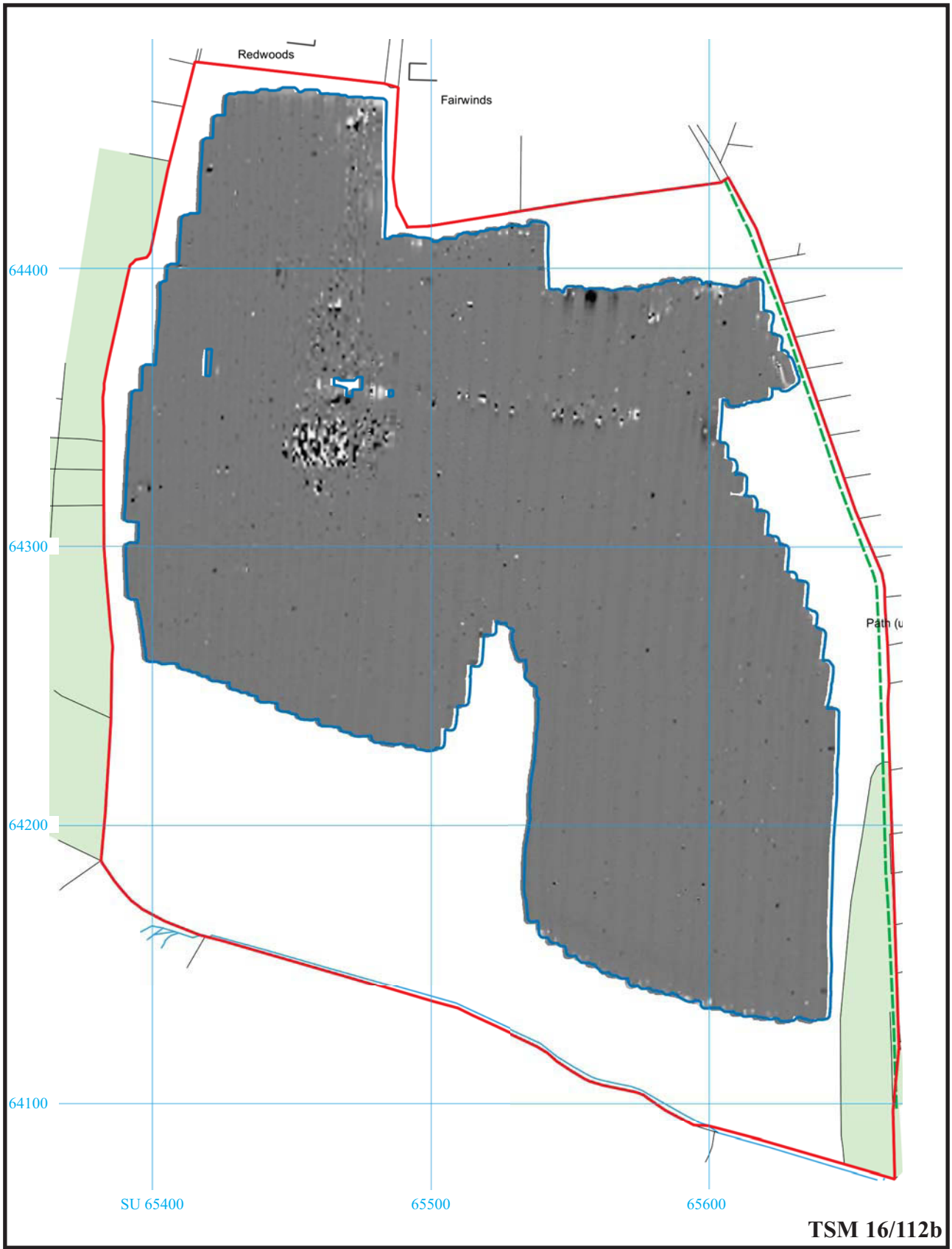

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Land to the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire, 2018
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.

0m 100m

+100
nT
-100

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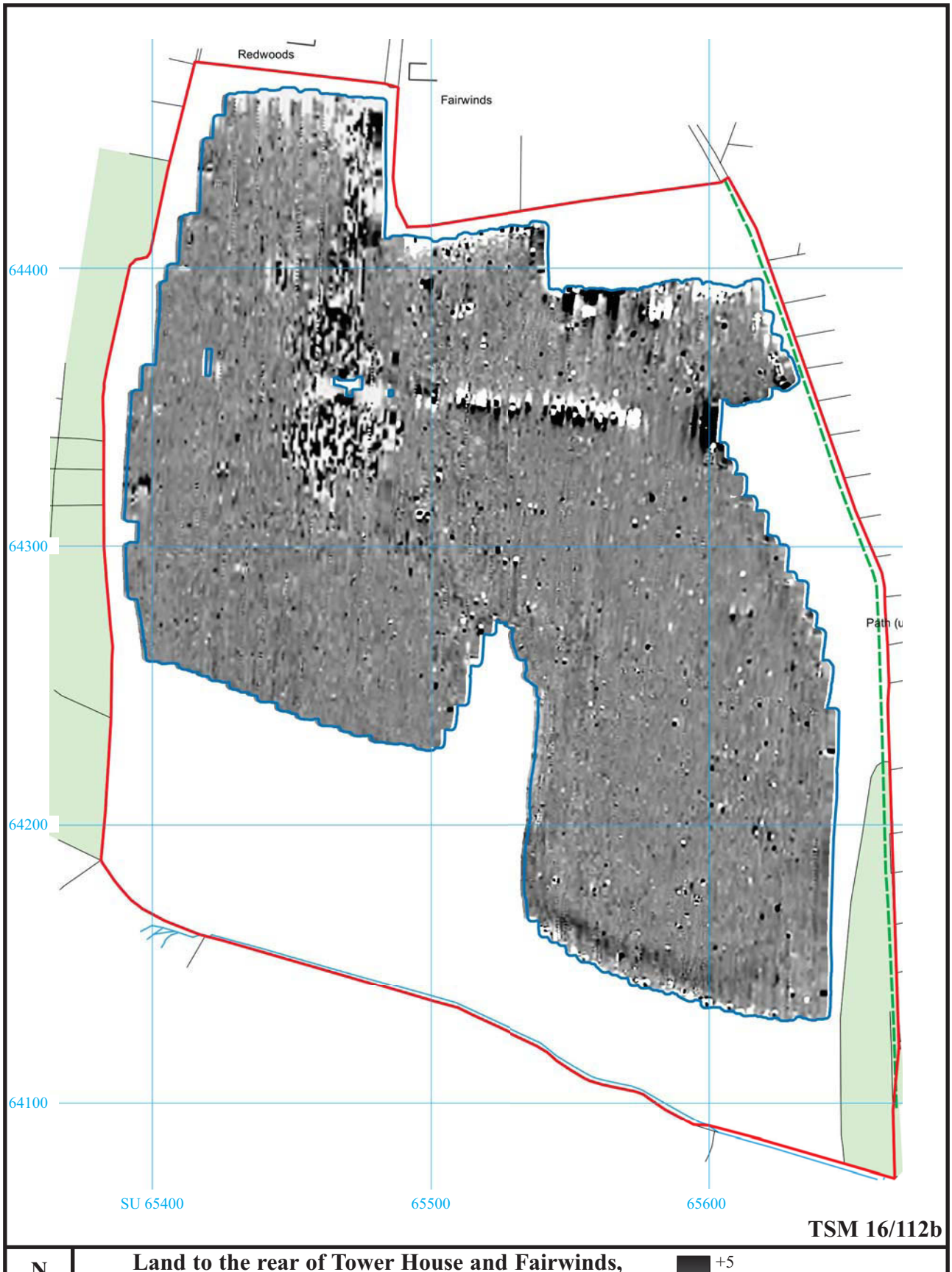

TSM 16/112b

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Land to the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire, 2018
Geophysical Survey (Magnetic)
Figure 3. Plot of minimally processed gradiometer data.

0m 100m

+5
nT
-4

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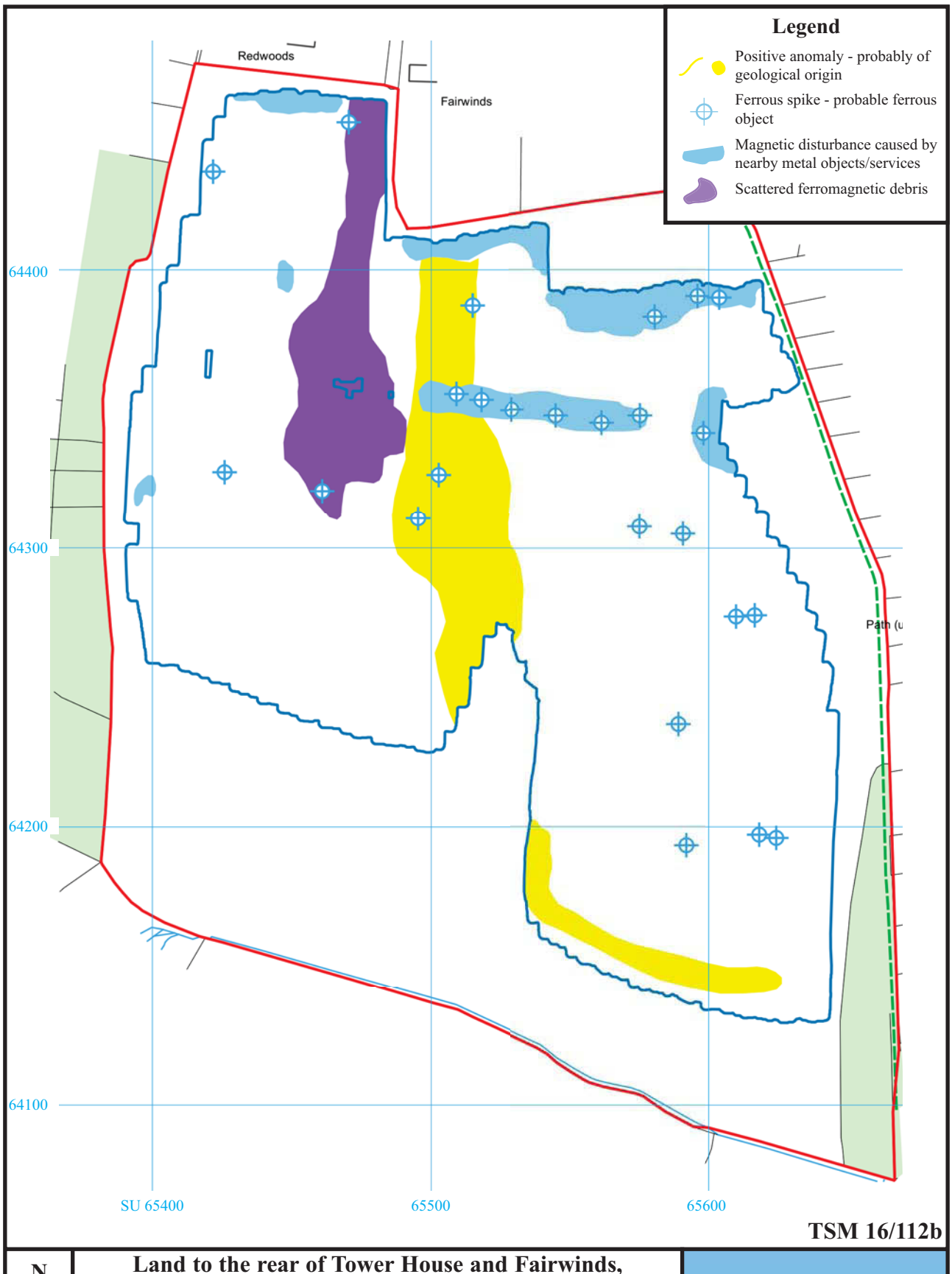

N

Land to the rear of Tower House and Fairwinds, The Street, Mortimer, West Berkshire, 2018
Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.

0m 100m

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Plate 1. The northern area of the field, looking south from the summit.

Plate 2. The eastern area of the field looking south-east from the centre of the field.

Plate 3. The southern boundary looking west from the south-eastern corner.

Plate 4. The south and western areas of the site looking north-west from the south, including badger sett.

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Land at rear of Tower House and Fairwinds,
The Street, Mortimer, West Berkshire, 2018
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Plates 1 to 4.

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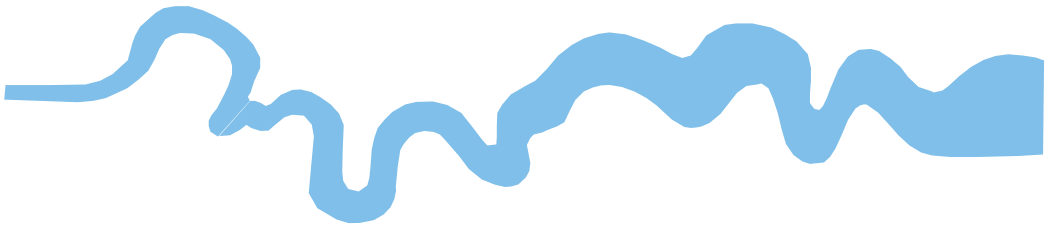
TIME CHART

	Calendar Years
Modern	AD 1901
Victorian	AD 1837
Post Medieval	AD 1500
Medieval	AD 1066
Saxon	AD 410
Roman	AD 43
	AD 0 BC
Iron Age	750 BC
Bronze Age: Late	1300 BC
Bronze Age: Middle	1700 BC
Bronze Age: Early	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC



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