

**T H A M E S      V A L L E Y**

**ARCHAEOLOGICAL**

**S E R V I C E S**

**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**

**Local Plan Site AL24**

**Geophysical Survey (Magnetic)**

**by Kyle Beaverstock**

**Site Code: LWM22/120**

**(SU 8658 7887)**

**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire  
Local Plan Site AL24**

**Geophysical Survey (Magnetic) Report  
For Berkeley Strategic Land Limited**

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code LMW 22/120

**December 2022**

## Summary

**Site name:** Lillibrooke, Land East of Woodlands Park Avenue, Maidenhead, Berkshire, Local Plan Site AL24

**Grid reference:** SU 8658 7887

**Site activity:** Magnetometer survey

**Date and duration of project:** 20 – 23 September 2022

**Project coordinator:** David Sanchez

**Site supervisor:** Kyle Beaverstock

**Site code:** LWM22/120

**Area of site:** c.16.6ha

**Summary of results:** The geophysical survey detected two pit-like anomalies of possible archaeological interest along with two linear features likely to represent buried services. A significant proportion of the site appeared to represent a wide spread of magnetic material (such as can be present in made ground) and which masked any archaeological anomalies which may have been present. Apart from the two pit-like features, no other anomalies of interest were discovered.

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

*This report may be copied for bona fide research or planning purposes without the explicit permission of the copyright holder. All TVAS unpublished fieldwork reports are available on our website: [www.tvas.co.uk/reports/reports.asp](http://www.tvas.co.uk/reports/reports.asp).*

Report edited/checked by: Steve Ford✓ 15.12.22 David Sanchez✓ 15.12.22
---

**Lillibrooke, Land East of Woodlands Park Avenue, Maidenhead, Berkshire,  
Local Plan Site AL24  
A Geophysical Survey (Magnetic)**

by Kyle Beaverstock

**Report 22/120**

## **Introduction**

This report documents the results of a geophysical survey (magnetic) carried out at Lillibrooke, Land East of Woodlands Park Avenue, Maidenhead, Berkshire Local Plan Site AL24 (SU 8658 7887) (Fig. 1). The work was commissioned by Matthew Smith on behalf of Berkeley Strategic Land Limited, Berkeley House, 19 Portsmouth Road, Cobham, KT11 1JG

A planning application is being prepared for the construction of residential housing, strategic open space, sports pitches and allotments. As part of the application a geophysical survey has been requested. This is in accordance with the *National Planning Policy Framework* (NPPF 2021), and the Borough's policies on archaeology. The fieldwork was undertaken by Kyle Beaverstock and Edmund Cush between the 20 – 23 September 2022 and the site code is LWM22/120.

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 along the south-west of Maidenhead (Fig. 1) bounded by Woodlands Park Road to the north, Woodlands Park Avenue to the west, Lillibrooke Manor estate to the east and industrial units to the south. The irregularly shaped parcel of land generally slopes from a height of 32m above Ordnance Datum (aOD) in the north to 26m aOD in the south and is currently being used for turf creation. The underlying geology is stated as Upper Chalk in the north and Lambeth Group in the south (BGS 1999).

## **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 0.13m intervals along traverses 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating zig-zag pattern along a north to south orientation across the western part of the survey area and east to west across the eastern part of the survey area. There were several obstructions across the proposal area, these include spoil heaps, buildings, machinery and some overgrown vegetation in the north-east. Conditions were dry and bright.

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 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 of a bank of four vertically-mounted Bartington Grad601-2 magnetic sensor tubes at 1m apart and a Trimble R2 Receiver, centimetre edition GPS. Readings were collected by two Bartington Grad601-2 loggers and collated using MLgrad601 software on a Geo 10 tablet running Windows 11 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 R2 Receiver, 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.

<b>Process</b>	<b>Effect</b>
Clip from -11.00 to 11.16 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.
De-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

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 2.18.15 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

Most of the south-east of the site is covered by a large spread of magnetic debris [1], this is represented by irregular positive and negative responses. These responses are mostly made up of low responses which are likely the result of thermomagnetic material from made ground which may be masking any potential features. Along the northern boundary are bipolar anomalies [2] with strong positive and negative responses which is likely caused by ferrous material in the surrounding fencing. Similarly, there are a number of sub-rounded bipolar anomalies [3], these are likely caused by ferrous objects connected to buried services. Between bipolar anomalies [3] are two positive linears [4], these are orientated north-west to south-east and south-west to north east and measure 91m and 66m long respectively. They appear to connect the bipolar anomalies and are likely to be cuts for a buried service. In the north-west and south-west of the site are two sub-rounded positive anomalies [5] measuring 5m in diameter in the north-west and 4.5m in the south-west. The morphology of these features appears to indicate a discrete cut feature such as a pit but with no associated features it is not possible to suggest a date.

## Conclusion

A large portion of the site appears to contain thermomagnetic material most likely as a result of the turf production making it impossible to ascertain clear readings. Of the visible portion of the site only two possible pit-like anomalies have any archaeological potential, no other anomalies of interest were detected.

## References

- BGS, 1999, *British Geological Survey*, 1:50,000, Sheet 269, Solid and Drift Edition, Keyworth
- CI/A, 2014, 'Standard and Guidance for archaeological geophysical survey', Reading
- EAC, 2015, *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*, EAC Guidelines 2, Namur
- IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading
- NPPF, 2021, *National Planning Policy Framework*, Ministry of Housing, Communities and Local Govt, London

## Appendix 1. Survey and data information

### Programme:

Name: TerraSurveyor  
Version: 3.0.25.0

### Raw data

#### **Filename:** Lillibrooke 1 RAW.xcp

Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 486576, 178799 m  
Southeast corner: 486750.85, 178604.78 m  
Surveyed by: on 30/12/1899  
Assembled by: on 30/12/1899  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1 m spacing.  
Dummy Value: 32702

Dimensions  
Survey Size (meters): 175 m x 194 m  
X&Y Interval: 0.13 m  
Source GPS Points: Active: 79495, Recorded: 79495

Stats  
Max: 107.97  
Min: -109.78  
Std Dev: 34.70  
Mean: -3.46  
Median: -2.68  
Composite Area: 3.3959 ha  
Surveyed Area: 2.4531 ha

#### **Filename:** Lillibrooke 2 RAW.xcp

Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 486488, 179035 m  
Southeast corner: 486642.18, 178958.95 m  
Surveyed by: on 30/12/1899  
Assembled by: on 30/12/1899  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1 m spacing.  
Dummy Value: 32702

Dimensions  
Survey Size (meters): 154 m x 76 m  
X&Y Interval: 0.13 m  
Source GPS Points: Active: 16207, Recorded: 16207

Stats  
Max: 106.71  
Min: -108.96  
Std Dev: 9.97  
Mean: 3.65  
Median: 3.15  
Composite Area: 1.1725 ha  
Surveyed Area: 0.63224 ha

#### **Filename:** Lillibrooke 3 RAW.xcp

Description: Imported as Composite from: Lillibrooke 3.xyz  
Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 486376, 178978 m  
Southeast corner: 486523.68, 178623.1 m  
Surveyed by: on 30/12/1899

Assembled by: on 30/12/1899  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1 m spacing.  
Dummy Value: 32702

Dimensions  
Survey Size (meters): 148 m x 355 m  
X&Y Interval: 0.13 m  
Source GPS Points: Active: 158303, Recorded: 158303

Stats  
Max: 107.02  
Min: -109.73  
Std Dev: 10.78  
Mean: 1.03  
Median: 0.60  
Composite Area: 5.2412 ha  
Surveyed Area: 4.1641 ha

#### **Filename:** Lillibrooke 4 RAW.xcp

Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 486223, 178941 m  
Southeast corner: 486390.31, 178638.62 m  
Surveyed by: on 30/12/1899  
Assembled by: on 30/12/1899  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1 m spacing.  
Dummy Value: 32702

Dimensions  
Survey Size (meters): 167 m x 302 m  
X&Y Interval: 0.13 m  
Source GPS Points: Active: 94383, Recorded: 94383

Stats  
Max: 107.23  
Min: -109.74  
Std Dev: 9.98  
Mean: 0.42  
Median: 0.65  
Composite Area: 5.0591 ha  
Surveyed Area: 2.7874 ha



**Processed data**

**Filename: Lillibrooke 1.xcp**

Stats

Max: 11.05  
Min: -11.00  
Std Dev: 6.48  
Mean: 0.01  
Median: -0.01  
Composite Area: 3.3221 ha  
Surveyed Area: 2.3474 ha

GPS based Proce4

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Clip from -10.00 to 10.00

**Filename: Lillibrooke 2.xcp**

Stats

Max: 11.16  
Min: -9.53  
Std Dev: 2.84  
Mean: 0.24  
Median: 0.02  
Composite Area: 1.1251 ha  
Surveyed Area: 0.591 ha

GPS based Proce4

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Clip at 1.00 SD

**Filename: Lillibrooke 3.xcp**

Stats

Max: 11.05  
Min: -11.00  
Std Dev: 3.59  
Mean: 0.14  
Median: 0.03  
Composite Area: 5.1416 ha  
Surveyed Area: 3.9815 ha

GPS based Proce4

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Clip from -10.00 to 10.00

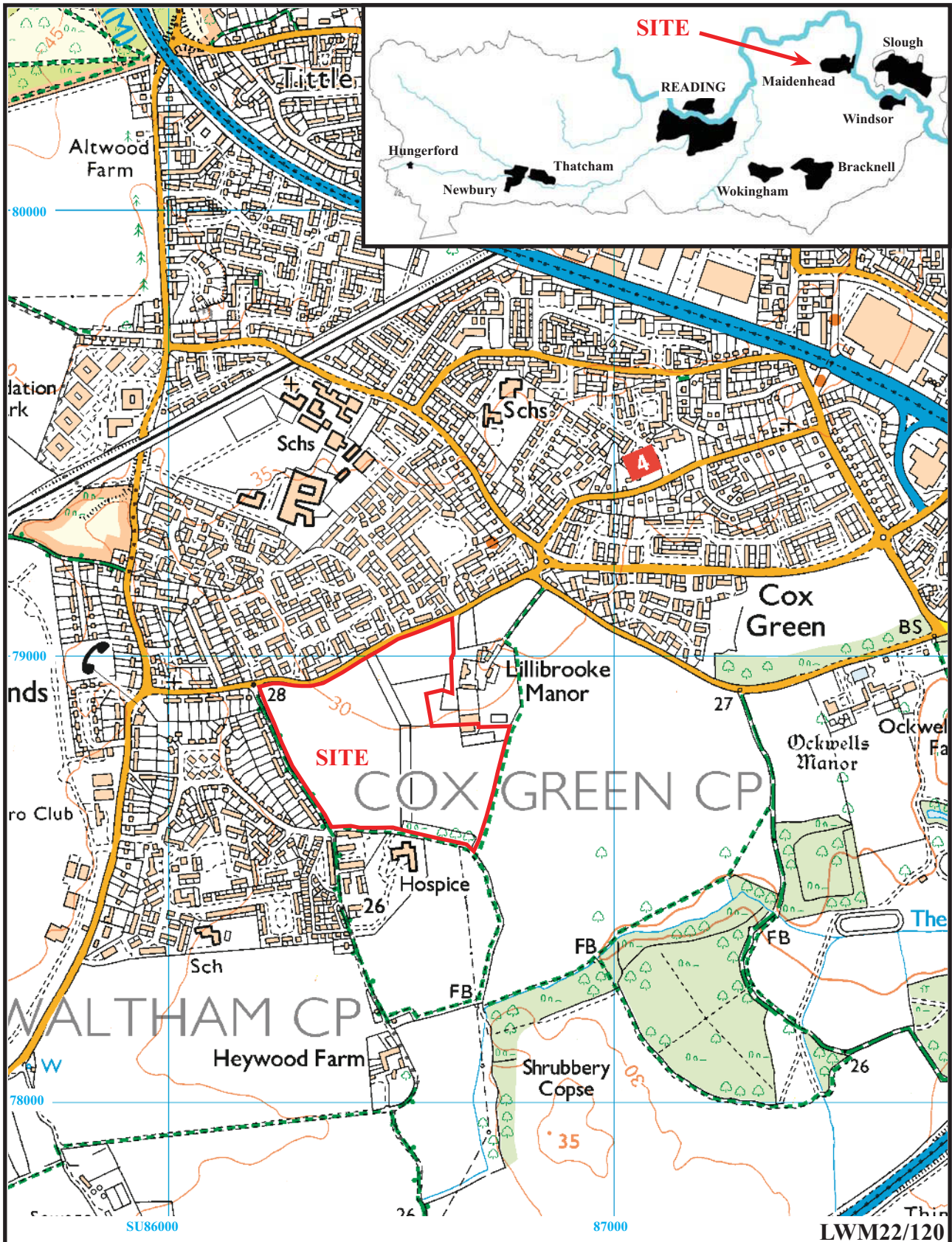
**Filename: Lillibrooke 4.xcp**

Stats

Max: 2.21  
Min: -2.20  
Std Dev: 0.86  
Mean: 0.02  
Median: 0.02  
Composite Area: 4.9679 ha  
Surveyed Area: 2.6765 ha

GPS based Proce5

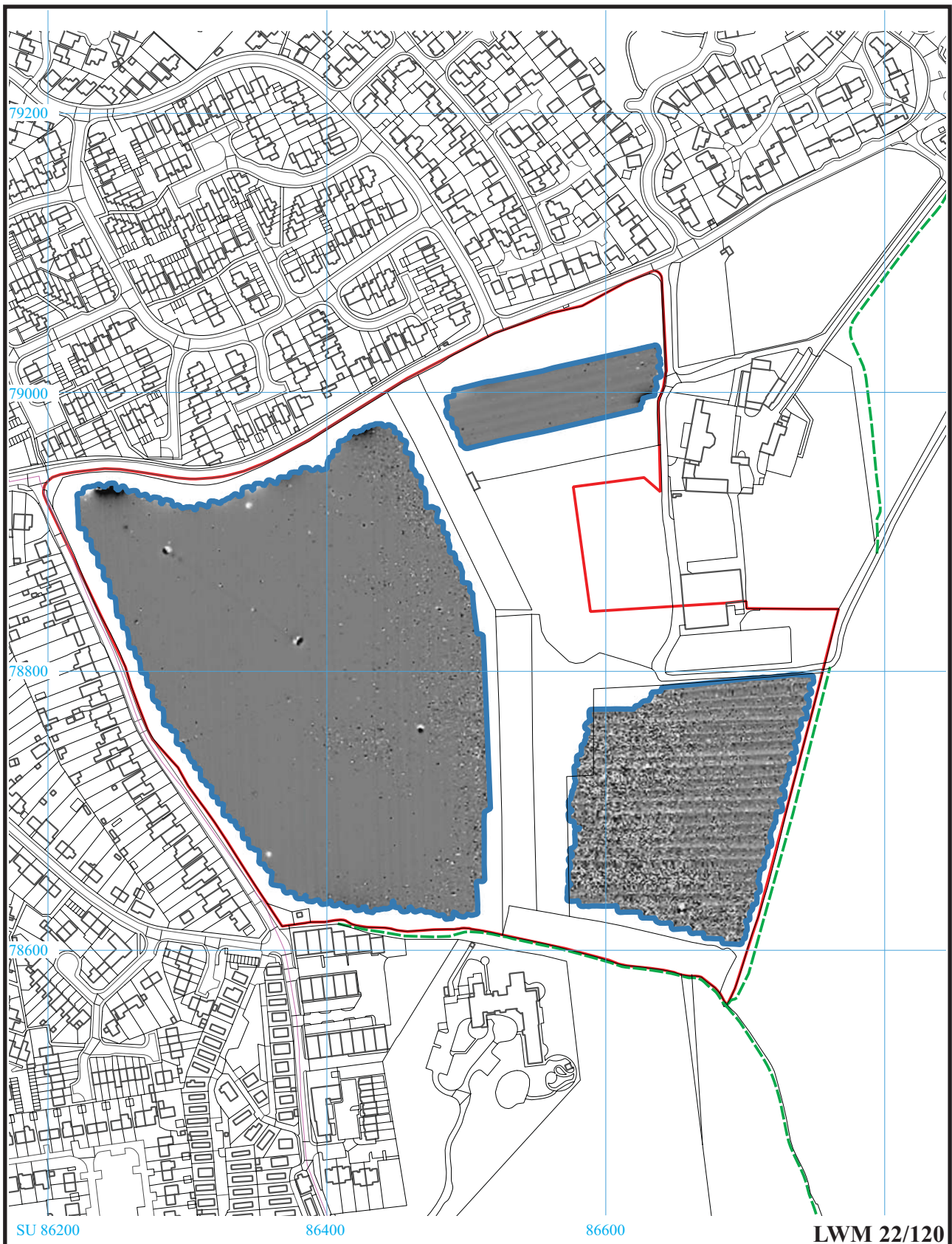
- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Clip at 1.00 SD
- 5 Clip from -2.00 to 2.00



**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**  
**Geophysical (magnetic) Survey**  
 Figure 1. Location of site within Maidenhead and Berkshire.

Reproduced under licence from Ordnance Survey Explorer Digital mapping at 1:12500  
 Crown Copyright reserved





SU 86200

86400

86600

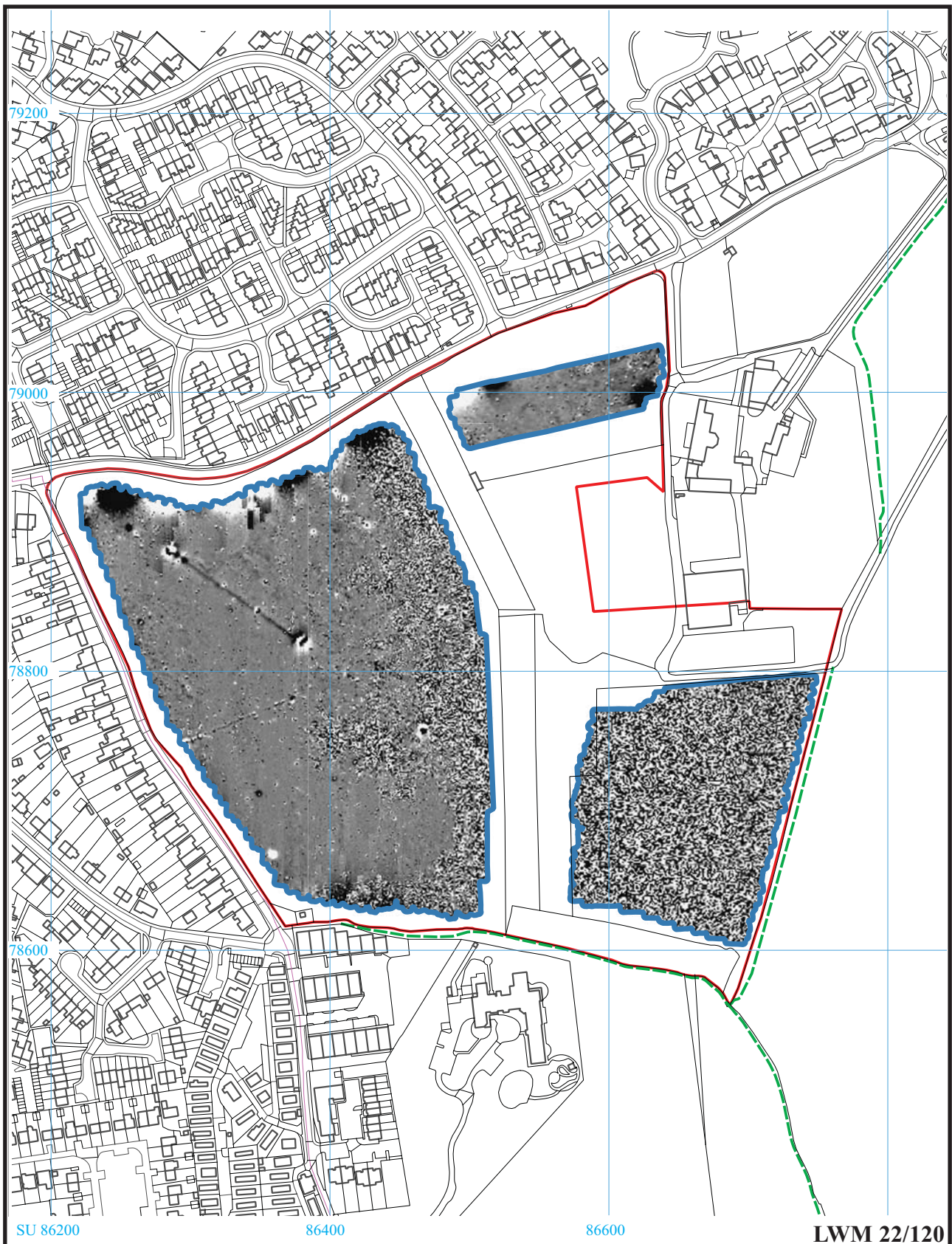
LWM 22/120



**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**

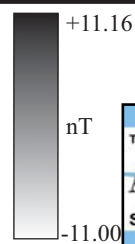
**Geophysical Survey (Magnetic)**  
Figure 2. Plot of raw gradiometer data.

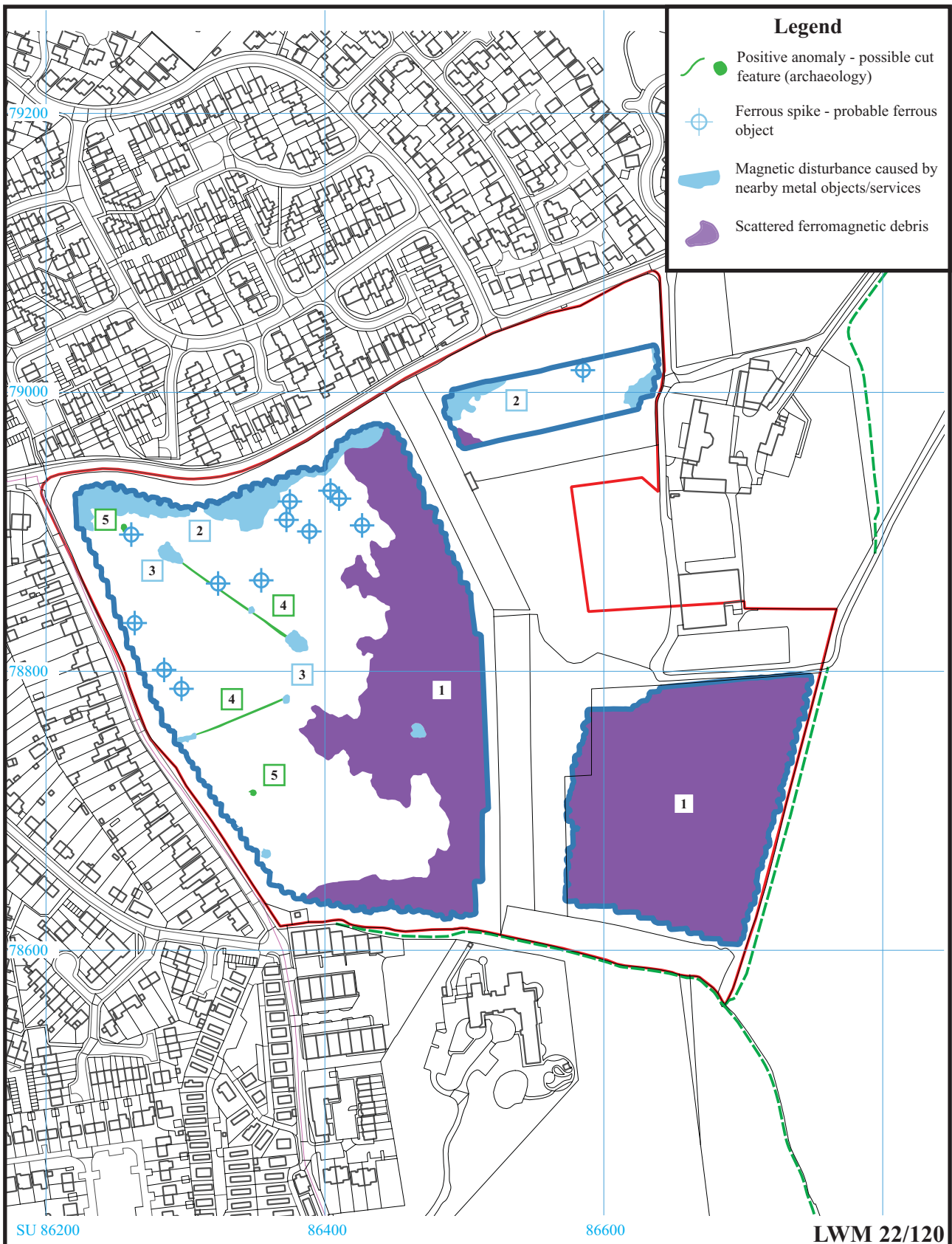




**Lillibroke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**

**Geophysical Survey (Magnetic)**  
Figure 3. Plot of processed gradiometer data.





LWM 22/120



**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**  
**Geophysical Survey (Magnetic)**  
 Figure 4. Interpretation plot.



THAMES VALLEY  
**ARCHAEOLOGICAL**  
 SERVICES



Plate 1. South-eastern field looking north-east



Plate 2. North-eastern field looking west



Plate 3. Western field looking north-west



Plate 4. Western field looking south

LWM 22/120

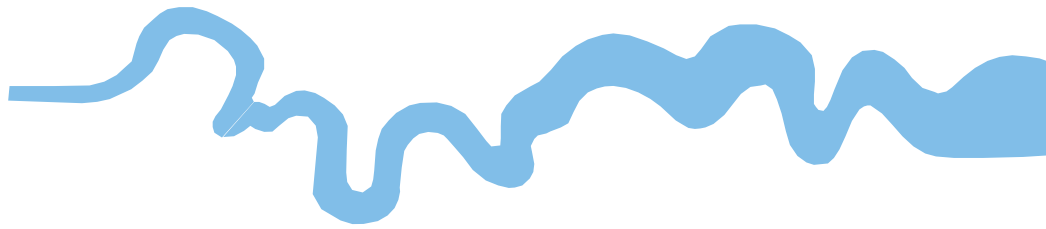
**Lillibrooke, Land East of Woodlands Park Avenue,  
Maidenhead, Berkshire**  
**Geophysical Survey (magnetic)**  
Plates 1 to 4.

THAMES VALLEY  
ARCHAEOLOGICAL  
SERVICES

## 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





**Thames Valley Archaeological Services Ltd,  
47-49 De Beauvoir Road,  
Reading RG1 5NR**

**Tel: 0118 9260552  
Email: [tvas@tvas.co.uk](mailto:tvas@tvas.co.uk)  
Web: [www.tvas.co.uk](http://www.tvas.co.uk)**

***Offices in:  
Brighton, Taunton, Stoke-on-Trent, Wellingborough  
and Ennis (Ireland)***