

T H A M E S V A L L E Y

ARCHAEOLOGICAL

S E R V I C E S

**Land at Newbury Road, Lambourn,
West Berkshire**

Geophysical Survey (Magnetic)

by Tim Dawson

Site Code: NRL16/215

(SU 3328 7852)

Land at Newbury Road, Lambourn, West Berkshire

Geophysical Survey (Magnetic) Report For Sheepdrove Organic Farm

by Tim Dawson

Thames Valley Archaeological Services Ltd

Site Code NRL 16/215

November 2016

Summary

Site name: Land at Newbury Road, Lambourn, West Berkshire

Grid reference: SU 3328 7852

Site activity: Magnetometer survey

Date and duration of project: 11th November 2016

Project manager: Steve Ford

Site supervisor: Tim Dawson

Site code: NRL 16/215

Area of site: 0.94ha

Summary of results: A range of magnetic anomalies were recorded by the survey. Two of these may represent buried cut features of archaeological interest although there is a strong possibility that one represents a modern pipe trench. The remaining anomalies represent previous agricultural activity and disturbance caused by nearby metal fencing and water troughs.

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 All TVAS unpublished fieldwork reports are available on our website: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.*

Report edited/checked by: Steve Ford ✓ 30.11.16

Land at Newbury Road, Lambourn, West Berkshire A Geophysical Survey (Magnetic)

by Tim Dawson

Report 16/215

Introduction

This report documents the results of a geophysical survey (magnetic) carried out on a parcel of land at Newbury Road, Lambourn, West Berkshire (SU 3328 7852) (Fig. 1). The work was commissioned by Mr Richard Potter of RPA Architects Ltd, Strathfield House, Chilton Road, Upton, Oxfordshire OX11 9JL on behalf of The Barro Settlement, Sheepdrove Organic Farm, Lambourn, West Berkshire RG17 7UU.

A planning application is to be made to West Berkshire Council to construct five dwellings on the site. A geophysical survey has been requested to be included in the application documents to inform the decision. This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012), and the Council's policies on archaeology. The fieldwork was undertaken by Tim Dawson and Anna Ginger on 11th November 2016 and the site code is NRL 16/215.

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 a 0.94ha plot of land on the northern side of Newbury Road to the south-east of the centre of Lambourn (Fig. 1) and some 25m to the west of the River Lambourn. It is rectangular in shape and occupies the south-western part of a slightly larger field, which is currently subdivided into three paddocks by electric fence (Fig. 2). The site slopes steeply downhill from 141.6m above Ordnance Datum in the north-east to 131.3m in the south-west and appears to have shallow ridge and furrow earthworks running perpendicular to the slope. The underlying geology is recorded as New Pit Chalk Formation with the interface between this and the Lewes Nodular Chalk Formation occurring approximately along the line of the survey area's north-eastern boundary (BGS 2006). Conditions during the survey were frosty and clear (Pl. 1-2).

Site history and archaeological background

The site lies on the fringes of the historic settlement of Lambourn, which is thought to have originated as a Saxon royal estate before developing into a town during the medieval period. Various archaeological

investigations have revealed evidence of early-middle Saxon, medieval and post-medieval activity around the historic core (e.g. Wallis 2003, Hindmarch and Ford 2003, Ford 2004, Platt and Porter 2014). The landscape around the town is an area of archaeologically rich chalkland within the Berkshire Downs (Richards 1978). Much of the archaeology of the area is recorded from the air, with extensive tracts of Roman fields visible as crop- and soil-marks, though areas close to Lambourn lack such features, presumably as they were overlain by later medieval open fields (Bowden *et al* 1993). Several earthworks are recorded, such as Earlier Bronze Age round barrows and including Late Bronze Age linear ditches, which are thought to have functioned as territorial boundaries.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 20m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 1600 sampling points across a full 20m × 20m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. The survey grid was laid out across the majority of the site area with only a 10m wide strip in the northern corner being unreachable due to the presence of electric fences and horses.

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 (2008) and the Chartered Institute *for* Archaeologists (2002, 2011, 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 a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set positioned at 1m horizontal distance. 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.

A Trimble Geo7x handheld GPS system with sub-decimetre real-time accuracy was used to tie the site grid 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 -1.80 to 2.20 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
Interpolate: y doubled	Increases the resolution of the readings in the y axis, enhancing the shape of 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. 3) with the processed data then presented as a second figure (Fig. 4), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 5). Anomalies are shown as colour-coded lines, points and

polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.58.00, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

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 2.16.2 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

Several magnetic anomalies were recorded across the survey area (Fig. 4). Most of these were positive in polarity, indicating the presence of a buried cut feature, such as a ditch or pit. Only two, however, are of archaeological interest. In the south-eastern half of the area a strong linear positive anomaly [Fig. 5: 1] runs in a north-west – south-east direction for *c.*35m and may represent a buried ditch. However, it was noted that two metal water troughs [5, 6] were positioned at either end of the line and joined by a plastic pipe which had been buried along most of its length. The magnetic anomaly may therefore be caused by the pipe trench rather than a buried archaeological feature. A second, much weaker, linear positive anomaly [2] was recorded in the north-western part of the site running eastwards from the site boundary. Again, this may indicate the presence of a buried ditch-type feature of archaeological interest. The remaining linear positive anomalies [3, 4] are visible running perpendicular to the hill slope across both areas of the site. These parallel lines most likely represent plough furrows of unknown date.

Several magnetic spikes were recorded scattered over the site. These indicate the presence of buried ferrous objects, usually fragments of farm equipment. The fences along the northern and southern boundaries of the site caused large areas of magnetic disturbance which may have a masking effect on any weaker anomalies in these areas.

Conclusion

The geophysical survey of the site was successfully completed, recording a range of magnetic anomalies across the area. Two of these may represent buried cut features of archaeological interest although there is a strong possibility that one represents a modern pipe trench. The remaining anomalies represent previous agricultural

activity, which is also visible in the surface of the field, and disturbance caused by nearby metal fencing and water troughs.

References

- BGS, 2006, *British Geological Survey*, 1:50 000, Sheet 267, Bedrock and Superficial Edition, Keyworth
- Bowden, M, Ford, S and Mees, G, 1993, 'The date of the ancient fields on the Berkshire Downs', *Berkshire Archaeol J* **74** (for 1991-3), 109-133
- CI/A, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading
- CI/A, 2011, *Standard and Guidance: for archaeological geophysical survey*, Reading
- CI/A, 2014, *Standard and Guidance: for archaeological geophysical survey*, Reading
- English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)
- Ford, S, 2004, '16-18 Oxford Street, Lambourn, West Berkshire: An archaeological watching brief', Thames Valley Archaeological Services report 04/47, Reading
- Hindmarch, E and Ford, S, 2003, '18-20 High Street, Lambourn, Berkshire: An archaeological watching brief', Thames Valley Archaeological Services report 02/35, Reading
- NPPF, 2012, *National Planning Policy Framework*, Dept Communities and Local Government, London
- Platt, D and Porter, S, 2014, '18-20 Oxford Street, Lambourn, West Berkshire: An archaeological recording action', Thames Valley Archaeological Services report 12/70, Reading
- Richards, J C, 1978, *The Archaeology of the Berkshire Downs*, Berkshire Archaeol Comm Publ **3**, Reading
- Wallis, S, 2003, '2 Newbury Street, Lambourn, Berkshire: An archaeological watching brief', Thames Valley Archaeological Services report 03/79, Reading

Appendix 1. Survey and data information

Programme:

Name: TerraSurveyor
Version: 3.0.29.3

Raw data

Survey corner coordinates (X/Y):
Northwest corner: 433300.29, 178425.98 m
Southeast corner: 433440.29, 178345.98 m
Surveyed by: on 30/12/1899
Assembled by: on 30/12/1899
Direction of 1st Traverse: 320.54686 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

Dimensions

Composite Size (readings): 560 x 80
Survey Size (meters): 140 m x 80 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats

Max: 96.17
Min: -100.00
Std Dev: 10.07
Mean: -2.00
Median: -0.30

Composite Area: 1.12 ha
Surveyed Area: 0.76115 ha

Source Grids: 28

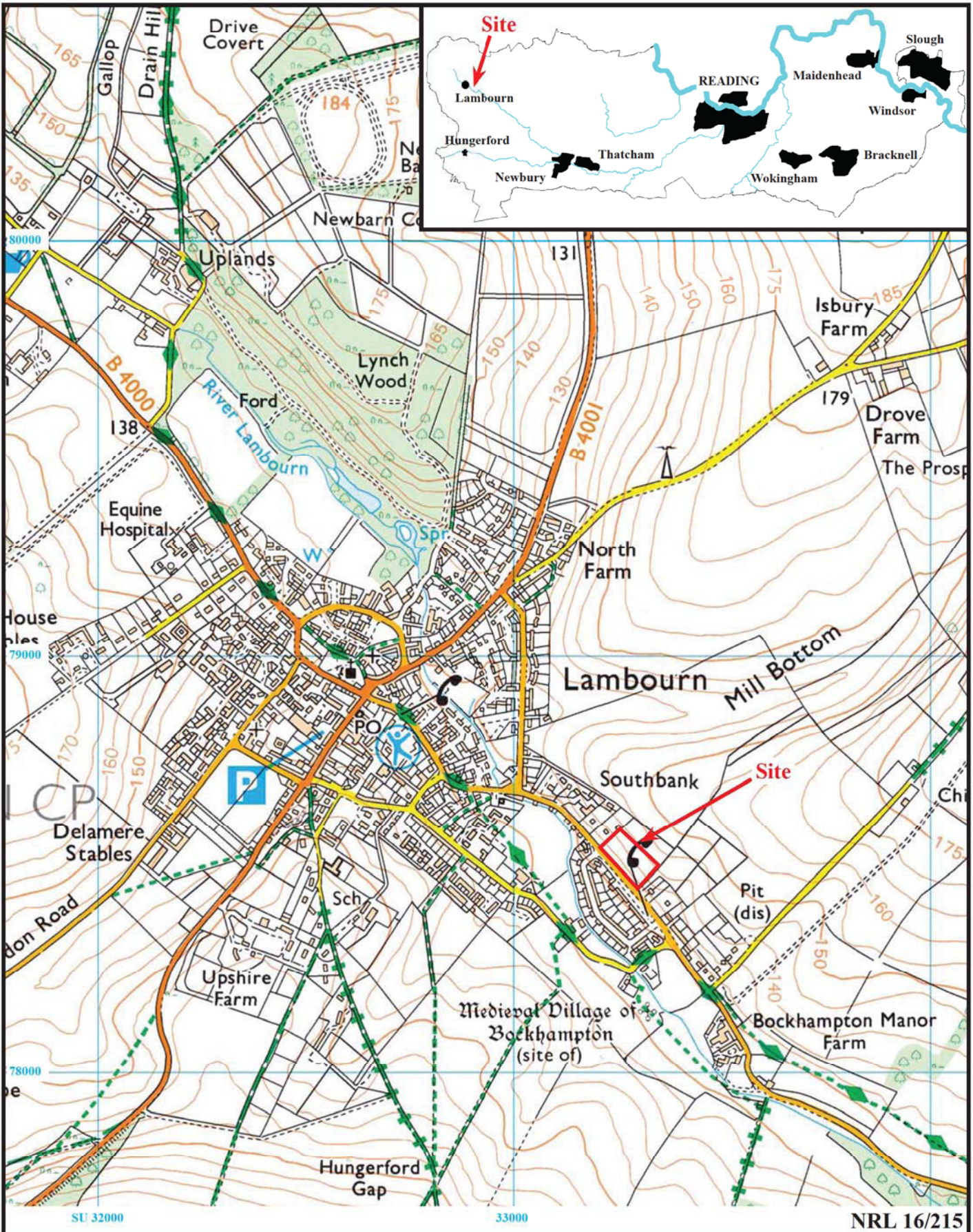
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\04.xgd
5 Col:1 Row:0 grids\05.xgd
6 Col:1 Row:1 grids\06.xgd
7 Col:1 Row:2 grids\07.xgd
8 Col:1 Row:3 grids\08.xgd
9 Col:2 Row:0 grids\09.xgd
10 Col:2 Row:1 grids\10.xgd
11 Col:2 Row:2 grids\11.xgd
12 Col:2 Row:3 grids\12.xgd
13 Col:3 Row:0 grids\13.xgd
14 Col:3 Row:1 grids\14.xgd
15 Col:3 Row:2 grids\15.xgd
16 Col:3 Row:3 grids\16.xgd
17 Col:4 Row:0 grids\17.xgd
18 Col:4 Row:1 grids\18.xgd
19 Col:4 Row:2 grids\19.xgd
20 Col:4 Row:3 grids\20.xgd
21 Col:5 Row:0 grids\21.xgd
22 Col:5 Row:1 grids\22.xgd
23 Col:5 Row:2 grids\23.xgd
24 Col:5 Row:3 grids\24.xgd
25 Col:6 Row:0 grids\25.xgd
26 Col:6 Row:1 grids\26.xgd
27 Col:6 Row:2 grids\27.xgd
28 Col:6 Row:3 grids\28.xgd

Processed data

Stats
Max: 2.20
Min: -1.80
Std Dev: 0.81
Mean: -0.04
Median: 0.02

Processes: 6

- 1 Base Layer
- 2 DeStripe Median Sensors: Grids: All
- 3 De Stagger: Grids: All Mode: Both By: -1 intervals
- 4 Despike Threshold: 1 Window size: 3x3
- 5 Interpolate: Y Doubled.
- 6 Clip from -1.80 to 2.20 nT

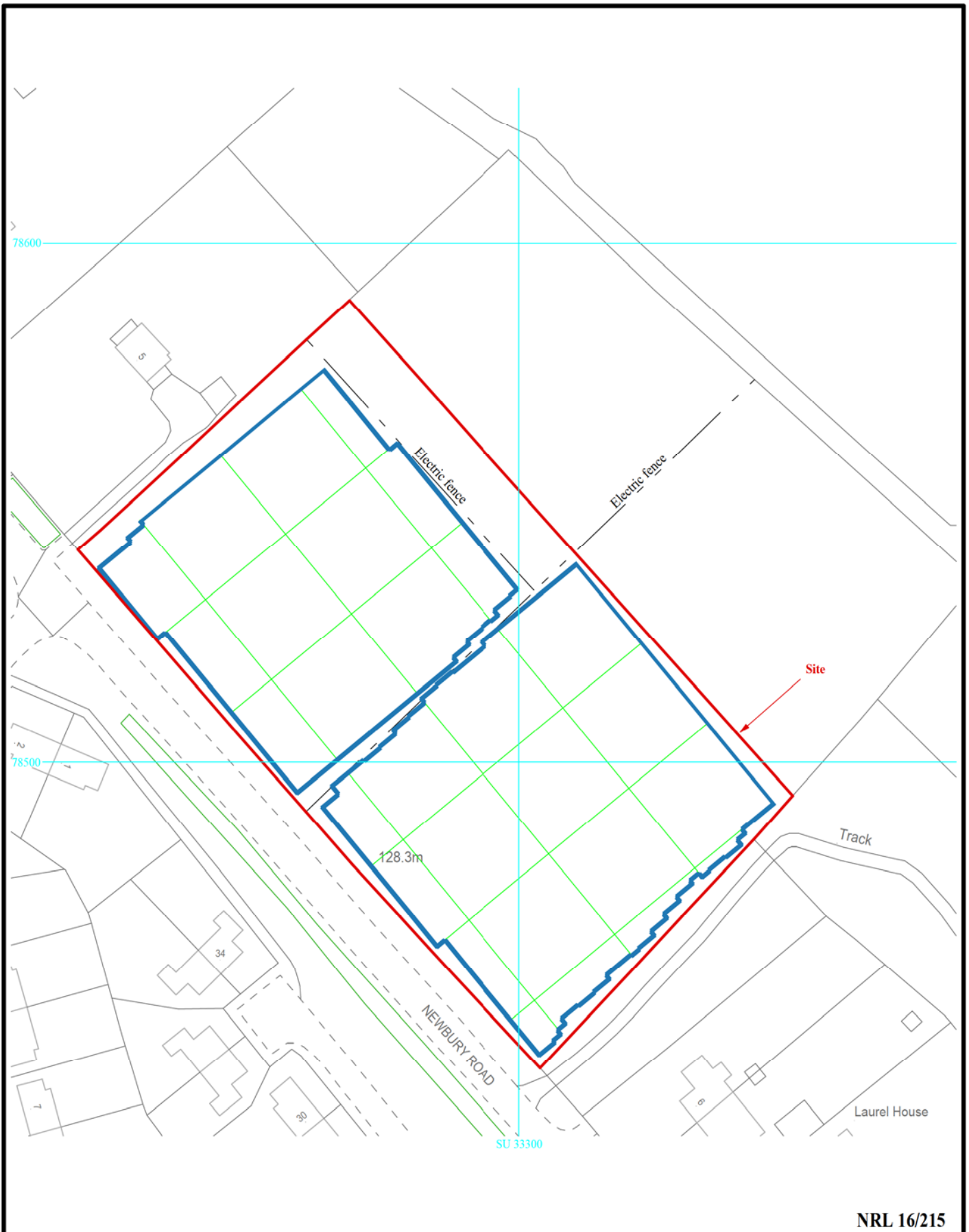


**Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)**

Figure 1. Location of site within Lambourn and West Berkshire.

Reproduced from Ordnance Survey Explorer digital mapping at 1:12500
Ordnance Survey Licence 100025880

THAMES VALLEY
ARCHAEOLOGICAL
SERVICES



NRL 16/215

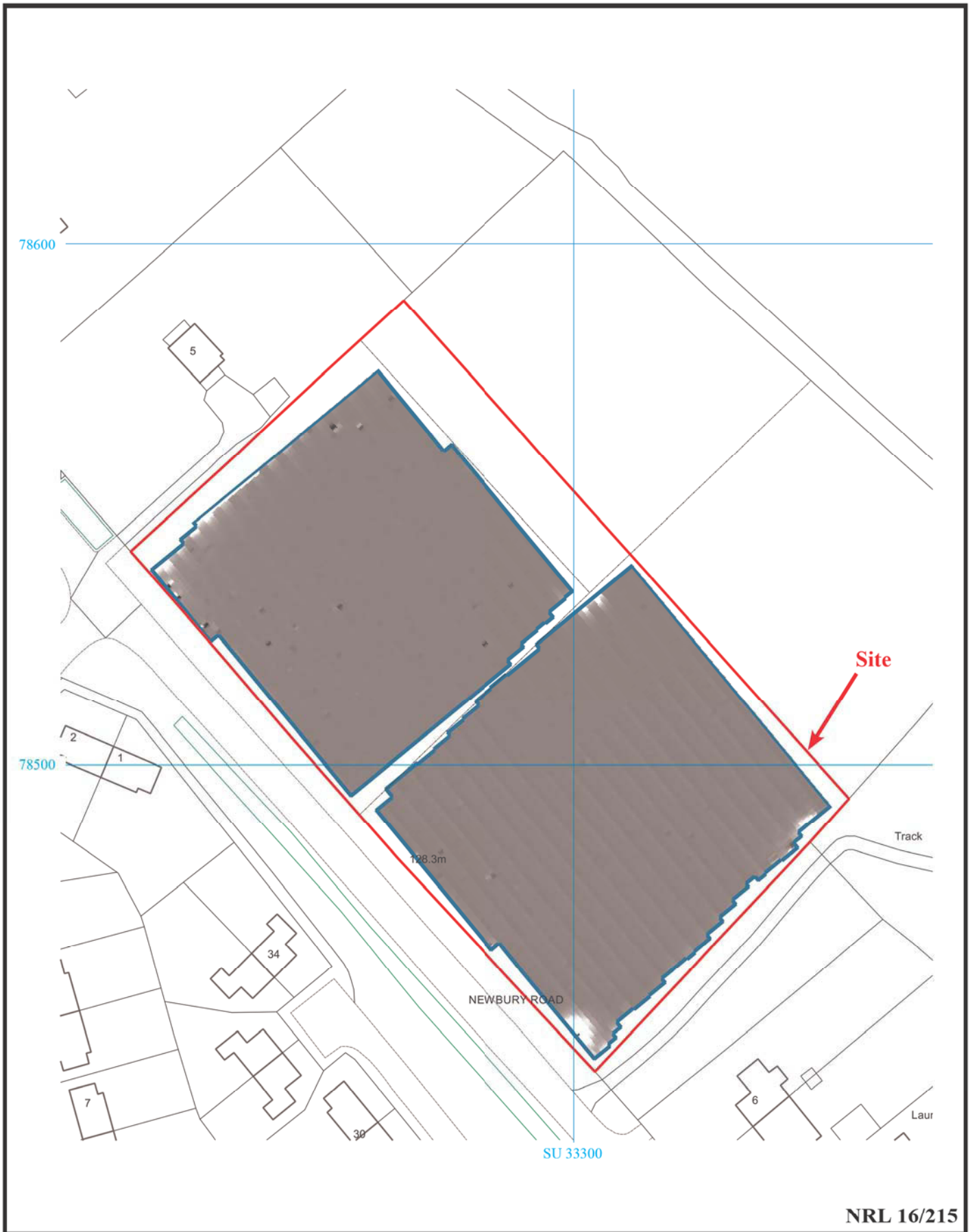
**Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)**

Figure 2. Survey grid layout.



THAMES VALLEY
ARCHAEOLOGICAL
SERVICES





**Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)**
Figure 3. Plot of raw gradiometer data.

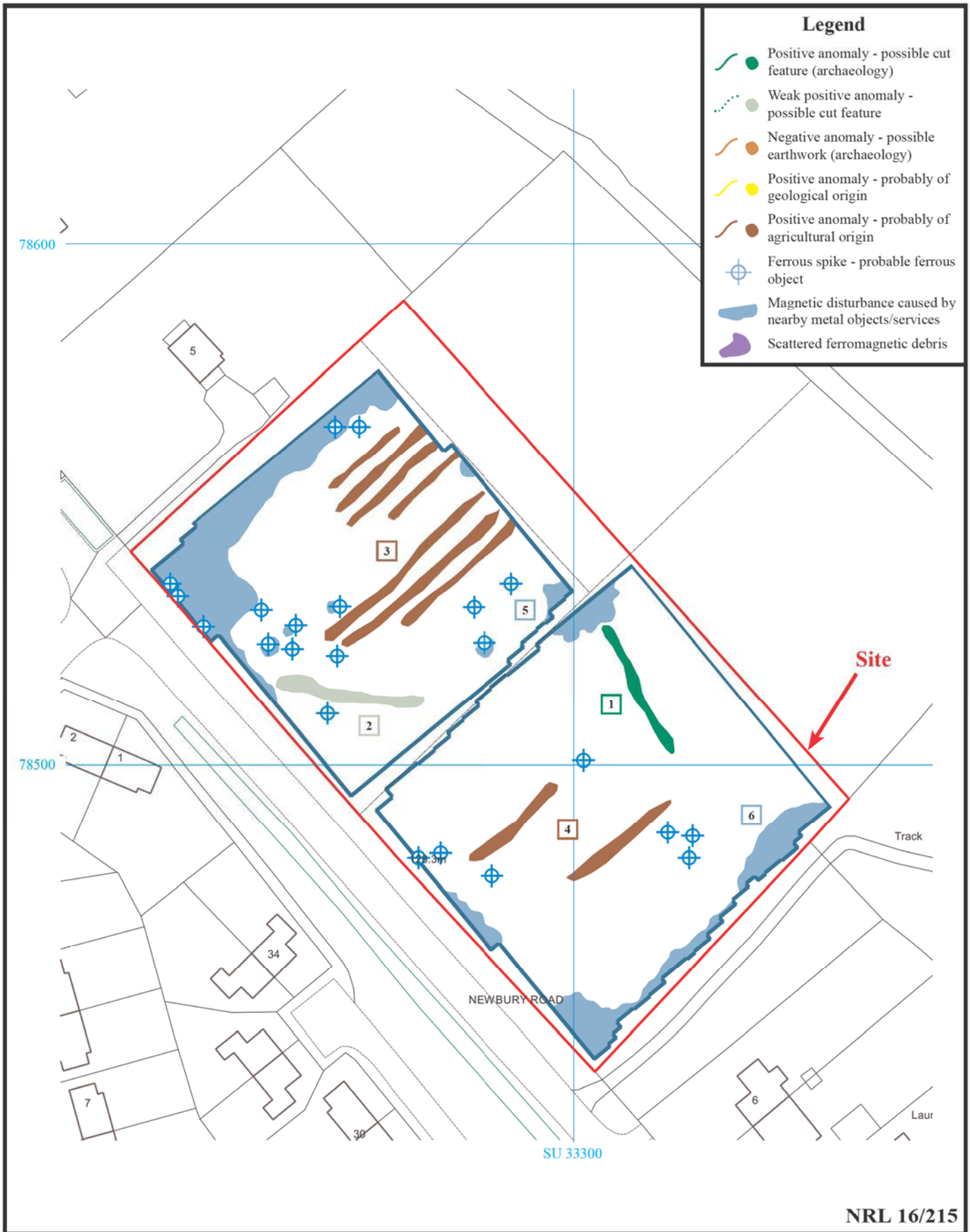




**Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)**

Figure 4. Plot of minimally processed gradiometer data.





NRL 16/215

Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.





Plate 1. The site, looking west from the eastern corner.



Plate 2. The site, looking west from the north-eastern boundary, showing electric fence subdivisions.

NRL 16/215

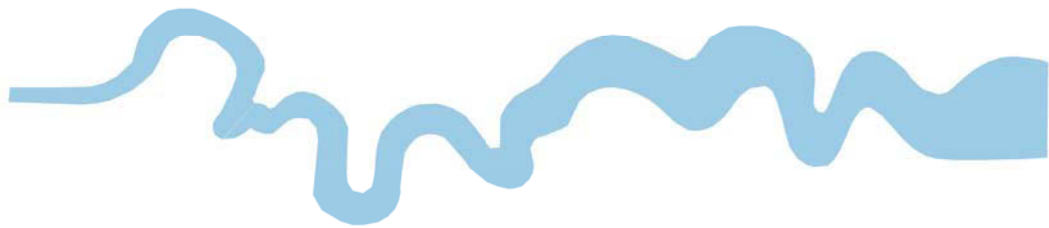
**Newbury Road, Lambourn,
West Berkshire, 2016
Geophysical Survey (Magnetic)
Plates 1 - 2.**

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
Iron Age _____	BC/AD 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,
Berkshire, RG1 5NR**

**Tel: 0118 9260552
Fax: 0118 9260553
Email: tvas@tvas.co.uk
Web: www.tvas.co.uk**