THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Land south of Haggs Lane, Urchfont, Wiltshire

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: HLU 23/94

(SU 0384 5679)

Land south of Haggs Lane, Urchfont, Wiltshire

Geophysical Survey (Magnetic) Report

For Urchfont LVA LLP

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code HLU 23/94

May 2023

Summary

Site name: Land south of Haggs Lane, Urchfont, Wiltshire

Grid reference: SU 0384 5679

Site activity: Magnetometer survey

Date and duration of project: 19 May 2023

Project coordinator: David Sanchez

Site supervisor: Kyle Beaverstock

Site code: HLU23/94

Area of site: c. 1ha

Summary of results: A few anomalies were identified by the geophysical survey including two linears that are likely related to agricultural land division, no other anomalies of archaeological interest were identified.

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:	Steve Ford✓ 31.05.23
	Tim Dawson✓ 30.05.23

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Land south of Haggs Lane, Urchfont, Wiltshire
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 23/94

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Haggs Lane, Urchfont, Wiltshire (SU 0384 5679) (Fig. 1). The work was commissioned by Matthew McShane on behalf of Urchfont LVA LLP, Unit 2K, Argyle House, Joel Street, Northwood Hills, Middlesex, HA6 1NW.

Planning permission is to be sought to develop a parcel of land south of Haggs Lane, Urchfont, Wiltshire. This is in accordance with the *National Planning Policy Framework* (NPPF 2021), and the Councils policies on archaeology. The fieldwork was undertaken by Kyle Beaverstock and John Conley on the 19th of May 2023 and the site code is HLU23/94.

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 south-western edge of Urchfont, approximately 5km south-east of Devises (Fig. 1). This relatively flat parcel of land sits at a height of 123m aOD and is currently not being utilised. The underlying geology is stated as Upper Greensand (BGS 2008).

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 south-west to north-east orientation across the survey area. The site had significant vegetation across the whole survey area with concentrations in the north and east of the survey 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 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 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.

Process	**Effect**
Clip from -2.20 to 2.21 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

A number of anomalies were detected by the geophysical survey, the most significant of which is an area of magnetic debris **[1]**, this is characterised by irregular positive and negative responses and likely represents disturbance in the underlying geology and ferrous objects possibly caused by a vehicle trackway. Along the western edge of the survey area is a positive linear **[2]**, this is orientated south-east to north-west and measures 74m long. This anomaly most likely represents a boundary ditch, the orientation suggests it may be related to the

current field system. To the east of this is a weak positive linear **[3]** also running along a south-east to north-west and measuring 69m long. This may represent land division, possibly related to the modern field system.

Conclusion

A few anomalies were identified by the geophysical survey including two linears that are likely related to agricultural land division, no other anomalies of archaeological interest were identified.

References

BGS, 2008, *British Geological Survey*, 1:50,000, Sheet 282, Bedrock and Superficial Edition, Keyworth

CI*f*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

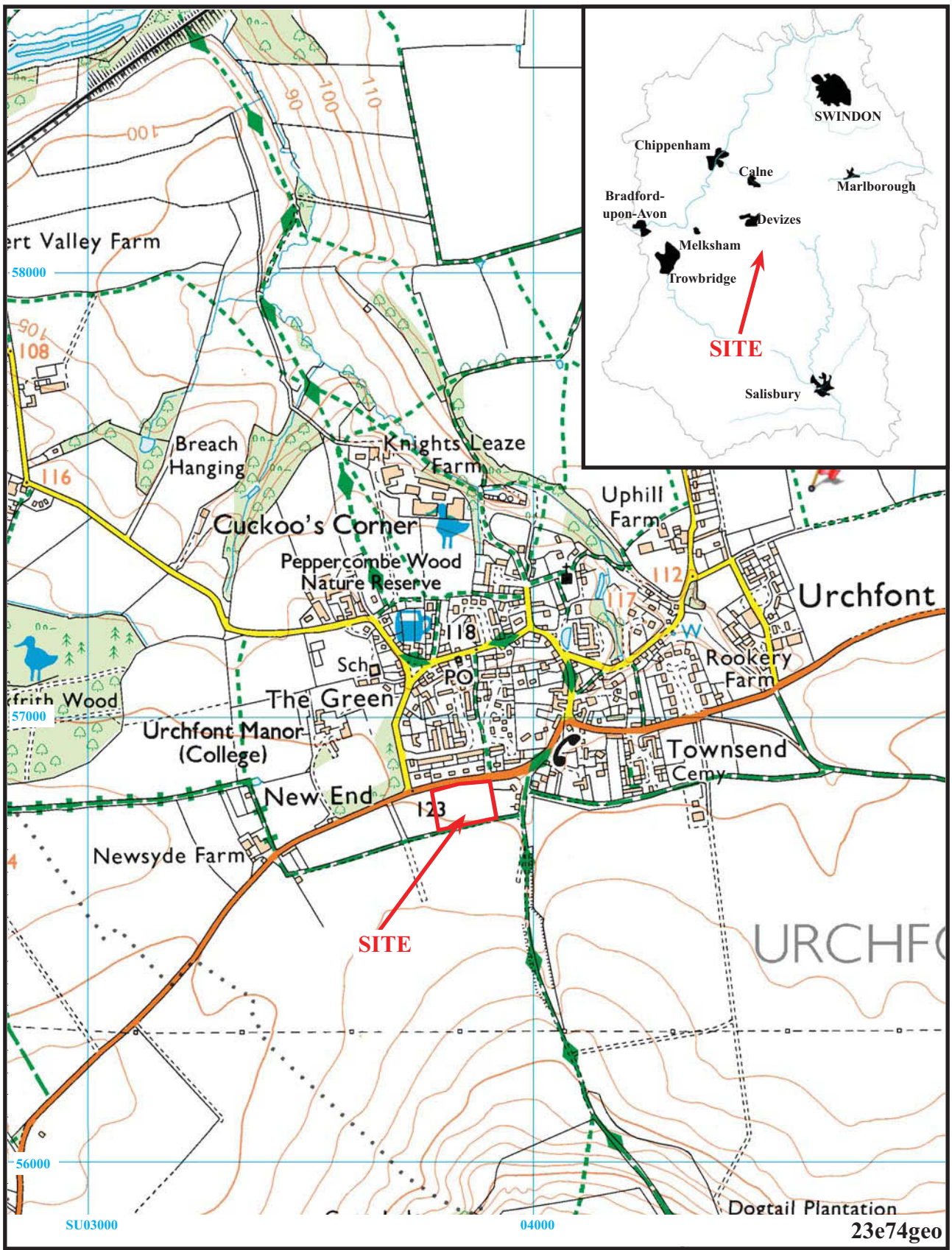
Raw data
Filename: Urchfont RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 403772.516655665, 156845.697365975 m
Southeast corner: 403905.506655665, 156747.937365975 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 133 m x 97.8 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 43703, Recorded: 43703

Stats
Max: 99.50
Min: -109.72
Std Dev: 2.60
Mean: -0.97
Median: -0.89
Composite Area: 1.3001 ha
Surveyed Area: 0.94957 ha

Processed data
Filename: Urchfont.xcp
Stats
Max: 2.21
Min: -2.20
Std Dev: 0.64
Mean: 0.03
Median: 0.02
Composite Area: 1.2542 ha
Surveyed Area: 0.9 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



Land south of Haggs Lane, Urchfont, Wiltshire
Proposal for geophysical survey (magnetic)

Figure 1. Location of site within Urchfont and Wiltshire.

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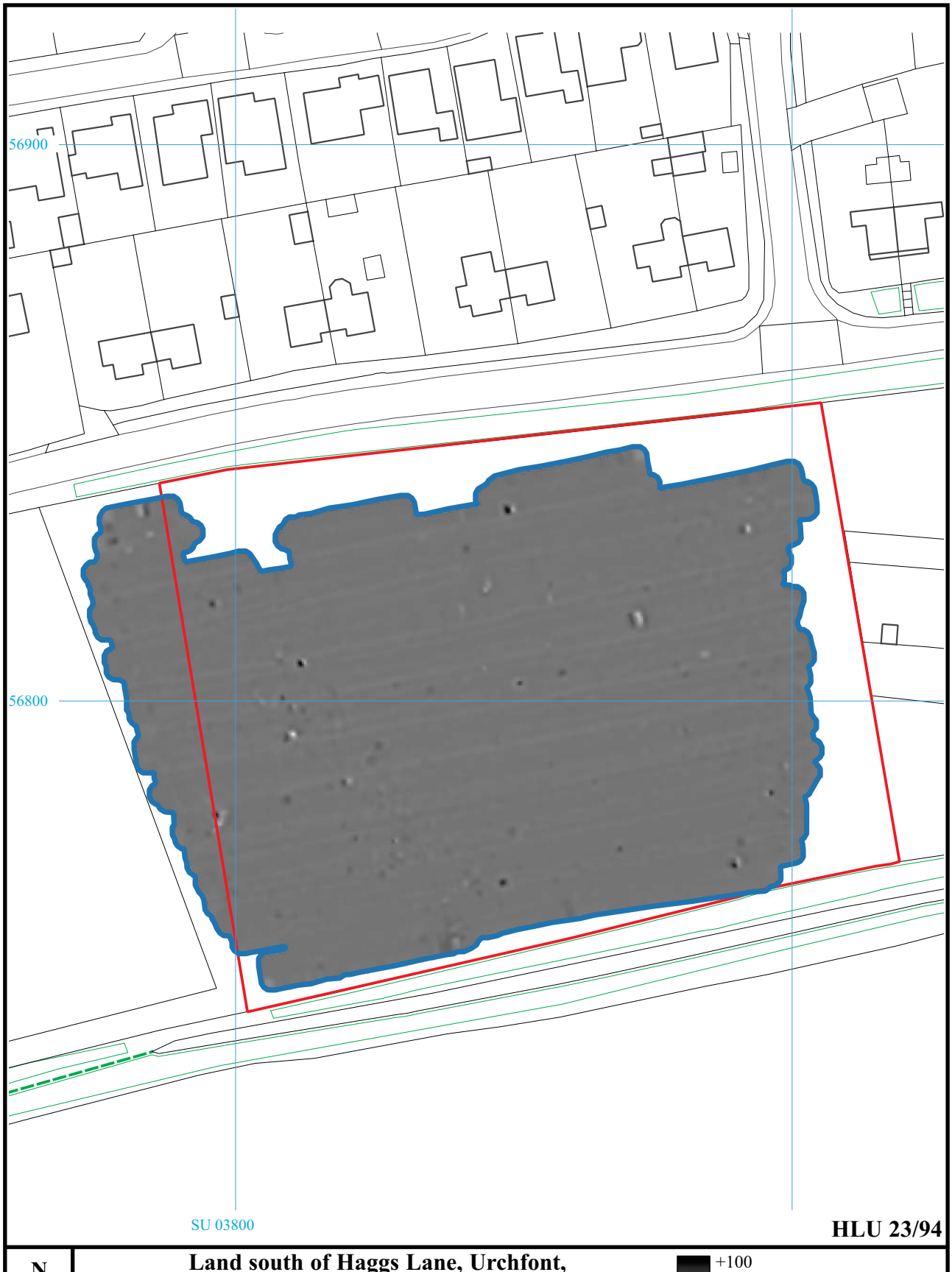
56900
56800
SU 03800
HLU 23/94
N
Land south of Haggs Lane, Urchfont,
Wiltshire, 2023
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.
0m
50m
+100
nT
-100
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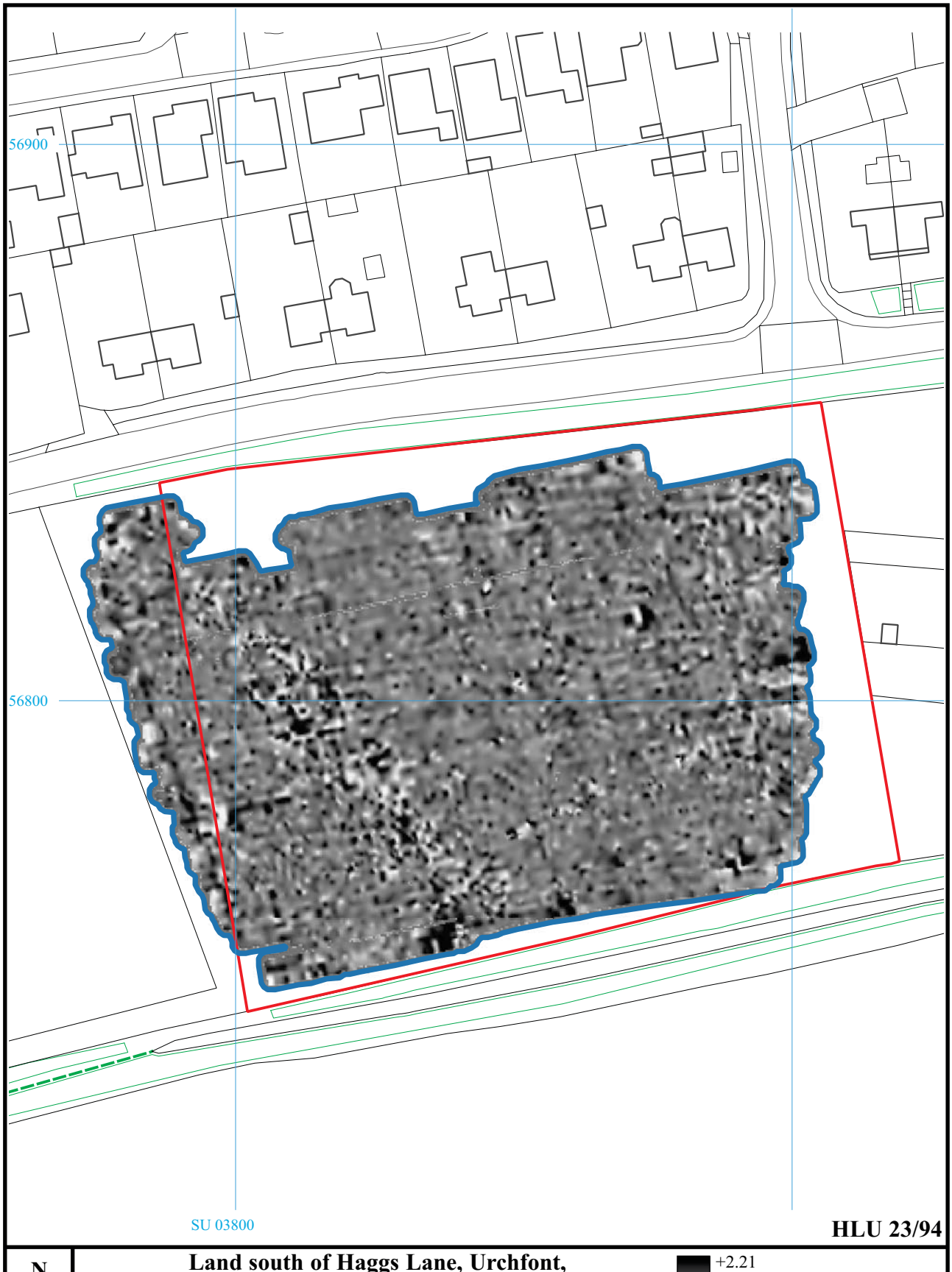
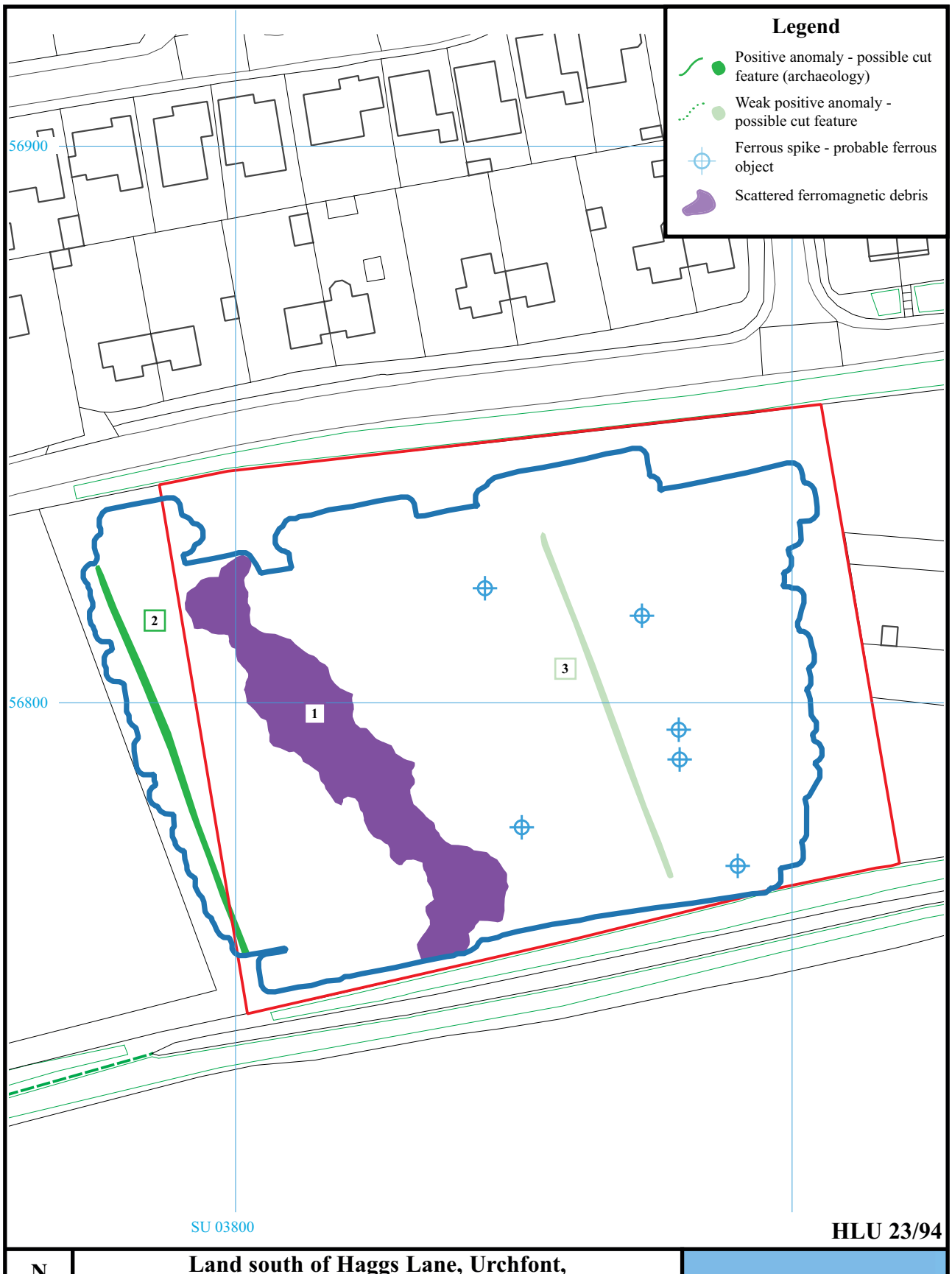


Land south of Haggs Lane, Urchfont, Wiltshire, 2023
Geophysical Survey (Magnetic)
Figure 3. Plot of processed gradiometer data.



HLU 23/94

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Geophysical Survey (Magnetic)
Figure 4. Interpretation plot.

0m 50m

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Plate 1. Survey area looking south-east

Plate 2. Survey area looking north

HLU 23/94

Land south of Haggs Lane, Urchfont, Wiltshire, 2023
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Plates 1 and 2.

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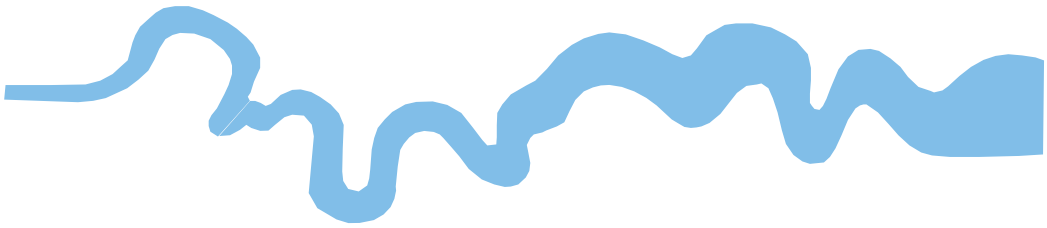
TIME CHART

	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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