

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

ARCHAEOLOGICAL

S E R V I C E S

**Upper Farm, Hinton Parva,
Swindon, Wiltshire**

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: UHP21/148

(SU 2238 8341)

Upper Farm, Hinton Parva, Swindon, Wiltshire

Geophysical Survey (Magnetic) Report

For Mr and Mrs Coates

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code UHP 21/148

July 2021

Summary

Site name: Upper Farm, Hinton Parva, Swindon, Wiltshire

Grid reference: SU 2238 8341

Site activity: Magnetometer survey

Date and duration of project: 22nd June 2021

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: UHP21/148

Area of site: 0.2ha

Summary of results: The geophysical survey found a single L-shaped positive magnetic anomaly which likely represents a buried agricultural feature such as a boundary ditch.

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 All TVAS unpublished fieldwork reports are available on our website: www.tvas.co.uk/reports/reports.asp.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✓ 2.07.21 Tim Dawson✓ 2.07.21
--

Upper Farm, Hinton Parva, Swindon, Wiltshire A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 21/148

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Upper Farm, City Corner, Hinton Parva (SU 2238 8341) (Fig. 1). The work was commissioned by *Mr.* Rob Spurr of Sun Design and Consultancy Ltd, Southview, 22 Ham Rd, Wanborough, Swindon, Wiltshire, SN4 0DF on behalf of Mr and Mrs Coates.

An application has been submitted to Swindon Borough Council (S/21/0698) for the construction of a new dwelling with associated outbuilding, access and landscaping at Upper Farm, Hinton Parva, Wiltshire which will require an initial archaeological investigation. As such, a geophysical survey has been requested. This is in accordance with the *National Planning Policy Framework* (NPPF 2019), and the Borough's policies on archaeology. The field investigation was carried out to a specification approved by Melanie Pomeroy-Kellinger, County Archaeologist for Wiltshire Council advisor to the Borough. The fieldwork was undertaken by Kyle Beaverstock and David Platt on the 22nd June 2021 and the site code is UHP21/148.

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 in the western part of the hamlet of Hinton Parva, 7km east of Swindon (Fig. 1). The site is bounded by City Corner to the south, Upper Farm to the west, gardens to the east and farmland to the north. The topography of the site consists of a high, level area in the northern half, sitting at a height of 129m above Ordinance Datum (aOD) and slopes down to 120m aOD in the south. The underlying geology is stated as Head (BGS 1997).

Site history and archaeological background

In summary, the area is noteworthy for the presence of a 'small Roman town', *Durocornovium*, now a Scheduled Monument which lies c.2km north of the modern village, at the junction of the Roman road from Marlborough (*Cunetio*) with Ermin Street (Cirencester to Silchester). Archaeological investigations c. 300m to

the north of the site revealed a further Roman settlement (Pine and Taylor 2016). To the west the village of Wanborough has late Saxon origins and is mentioned in Domesday Book of 1086 (Williams and Martin 2002, 165) showing a potential for Saxon remains.

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 zig-zag pattern along an east to west orientation across the survey area. No significant obstructions were encountered other than a small tree stump in the north of the survey area. Conditions were dry and bright (Pl. 1-2).

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 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 -6.00 to 6.00 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 magnetic anomalies were detected by the geophysical survey (Figs. 2 and 3), the most significant of which is an area of magnetic disturbance [**Fig. 4: 1**], running along the northern and western boundaries of the site and projecting eastwards across the centre its site. This is represented by a bipolar response of high amplitude and most likely represents a modern intrusion such as a service running along the western boundary and an old fence line running across the centre of the site. In the southern area is an area of magnetic debris [**2**], this is represented by a mixed area of positive and negative responses of high amplitude and is likely the result of the presence of made ground. In the north-west of the site is a positive linear anomaly [**3**], which runs from the western boundary to the east for 15.5m before turning to the south for 12m into the area of magnetic disturbance. This likely represents a buried agricultural feature such as a ditch. There are also a number of magnetic spikes, these are represented by small, positive points with a high amplitude and may represent buried ferrous objects.

Conclusion

The geophysical survey recorded several magnetic anomalies but only one of these is of potential archaeological interest. This is an L-shaped linear positive anomaly, most likely an agricultural feature such as a boundary ditch although further investigation is required to determine a date. There was also a significant amount of magnetic disturbance which may be masking any features in the west and the south of the site.

References

- BGS, 1997, *British Geological Survey*, 1:50,000, Sheet 252, 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, 2019, *National Planning Policy Framework (revised)*, Ministry for Housing, Communities and Local Government, London
- Pine, J and Taylor, A 2016, 'Roman Occupation at Stanley Close, Wanborough, Swindon, Wiltshire', in J McNicoll- Norbury, J Pine, and A Taylor, 2016, *Two Roman Occupation Sites near Swindon: Wanborough and Purton*, TVAS Occas Pap 14, Reading, 1-32
- Williams, A and Martin, G H, 2002, *Domesday Book*, a complete translation, London

Appendix 1. Survey and data information

Programme:

Name: TerraSurveyor
Version: 3.0.25.0

Raw data

Filename: Upper Farm RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 422361.971363522, 183440.959165333 m
Southeast corner: 422403.961363522, 183384.019165333 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions

Survey Size (meters): 42 m x 56.9 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 4079, Recorded: 4079

Stats

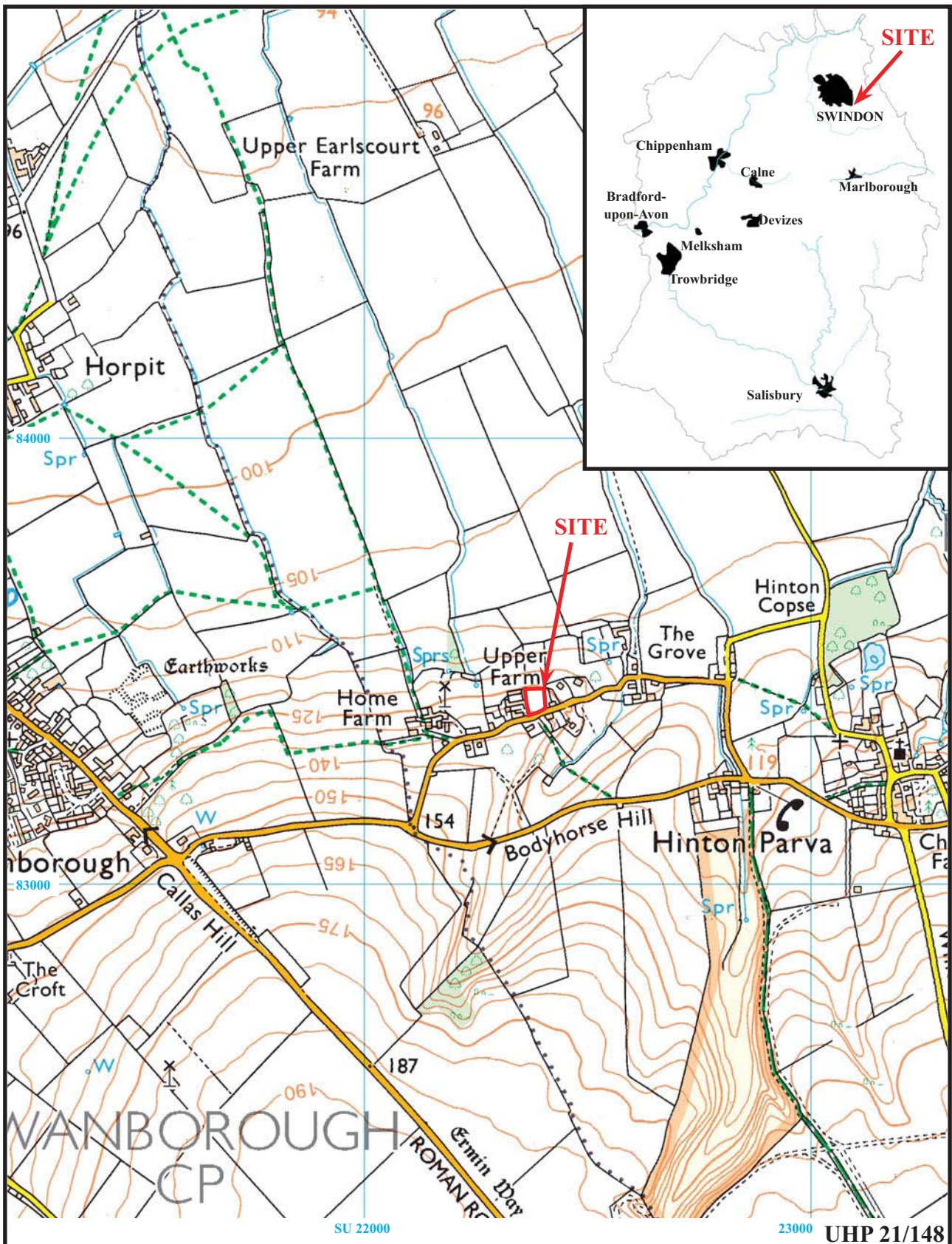
Max: 96.40
Min: -99.90
Std Dev: 24.05
Mean: 0.13
Median: 1.44
Composite Area: 0.23909 ha
Surveyed Area: 0.18065 ha

Processed data

Filename: Upper Farm.xcp
Stats
Max: 6.00
Min: -6.00
Std Dev: 3.80
Mean: -0.20
Median: -0.01
Composite Area: 0.23909 ha
Surveyed Area: 0.18065 ha

GPS based Proce6

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 DeStagger by: 150.00cm, Shift Values
- 5 Clip from -18.00 to 18.00
- 6 Clip from -6.00 to 6.00



**Upper Farm, Hinton Parva,
Swindon, Wiltshire, 2021
Geophysical Survey (Magnetic)**

Figure 1. Location of site within Hinton Parva and Wiltshire.

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

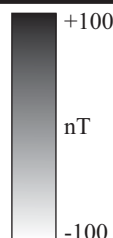
THAMES VALLEY
ARCHAEOLOGICAL
SERVICES



UHP 21/148



**Upper Farm, Hinton Parva,
Swindon, Wiltshire, 2021
Geophysical Survey (Magnetic)**
Figure 2. Plot of raw gradiometer data.





UHP 21/148



**Upper Farm, Hinton Parva,
Swindon, Wiltshire, 2021**
Geophysical Survey (Magnetic)
Figure 3. Plot of processed gradiometer data.



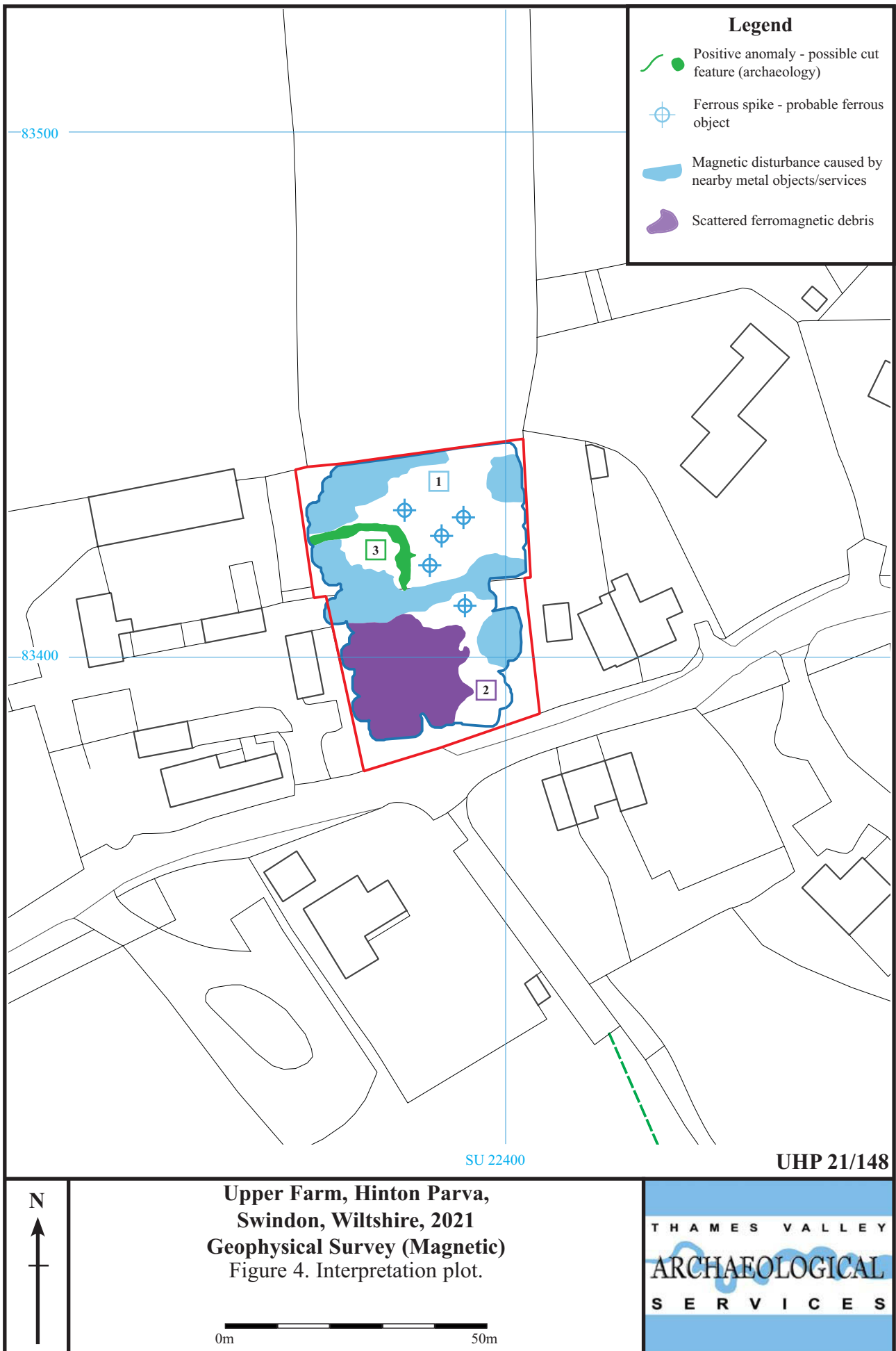




Plate 1. Northern area of the site looking north-east



Plate 2. Western boundary looking north.

UHP 21/148

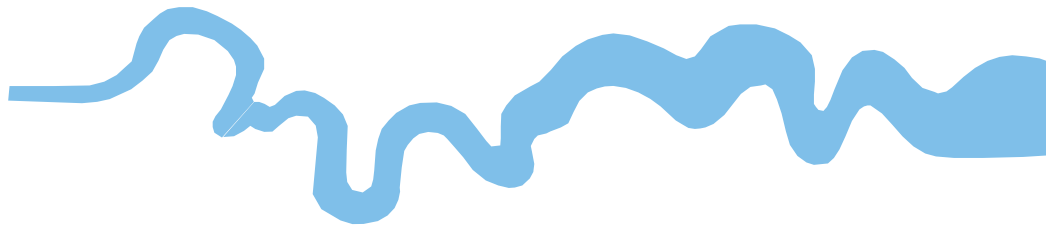
**Upper Farm, Hinton Parva,
Swindon, Wiltshire**
Geophysical Survey (Magnetic)
Plates 1 and 2.

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 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
Web: www.tvas.co.uk**

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