THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

# Land west of Home Farm, Forest Road, West End, Warfield, Berkshire

**Geophysical Survey**

**by Kyle Beaverstock**

**Site Code: HFW18/94**

**(SU 8640 7147)**

# Land west of Home Farm, Forest Road, West End, Warfield, Berkshire

**Geophysical Survey (Magnetic) Report**

**For Home Farm**

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code HFW 18/94

**February 2020**

## Summary

**Site name:** Land west of Home Farm, Forest Road, West End, Warfield, Berkshire

**Grid reference:** SU 8640 7147

**Site activity:** Magnetometer survey

**Date and duration of project:** 18th of December 2019 – 31st of January 2020

**Project coordinator:** Tim Dawson

**Site supervisor:** Kyle Beaverstock

**Site code:** HFW18/94

**Area of site:** c. 13ha

**Summary of results:** The geophysical survey detected two positive linear anomalies and one weak positive linear anomaly which may represent previous field boundaries.

**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✓ 13.02.20 |
| | Tim Dawson✓ 13.02.20 |




*Thames Valley Archaeological Services Ltd, 47–49 De Beauvoir Road, Reading RG1 5NR*
*Tel. (0118) 926 0552; Email tvas@tvas.co.uk; Website: www.tvas.co.uk*

# Land west of Home Farm, Forest Road, West End, Warfield, Berkshire
# A Geophysical Survey (Magnetic)

by Kyle Beaverstock

**Report 18/94(b)**

## Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Forest Road, West End, Warfield, Berkshire (SU 8640 7147) (Fig. 1). The work was commissioned by Kay Collins on behalf of Home Farm Ltd., Fox Cottage, The Straight Mile, Shurlock Row, RG10 0QP.

An application to Bracknell Forest Council (19/00075/OUT) for the construction of up to 197 dwellings with associated access roads has been refused and this decision is currently being appealed. The council's archaeological consultants have advised that non-intrusive geophysical survey followed by exploratory trial trenching, if necessary, would assist the appeal.

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 Roland Smith Archaeology Officer for Berkshire Archaeology. The fieldwork was undertaken by Kyle Beaverstock and Camila Carvalho, From the 18th of December 2019 to the 31st of January 2020 and the site code is HFW18/94.

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 western side of West End, 0.5km west of Warfield, 350m to the northwest of 'The Cut' (Fig. 1). The site is bounded by Forest Road (B3034) to the south, stables and private property to the east, woodland to the northwest and farmland to the north and west. This irregular parcel of land sits at a height of 64m above Ordinance Datum (aOD) in the east, sloping down to 59m aOD in the centre of the site before rising to 69m aOD in the southwest. The site is currently used as horse paddocks and the underlying geology is stated as primarily London Clay with some possible deposits of Sixth Terrace River Gravel deposits (BGS 1999).

## Site history and archaeological background

A desk-based assessment has been made of the site's archaeological potential (Preston 2018). In summary, the site lies in an area that has few archaeological investigations, although the archaeologically rich gravel terraces

of the Thames Valley have produced much evidence of prehistoric and Roman activity. However, the clay lowlands of southern Berkshire have long been considered as archaeologically poor. Recent developer-led investigations have showed that more intensive settlement of the area took place and has produced some evidence of both Roman and prehistoric activity in the area of the site. This includes investigations at Fairclough Farm (Torrance and Durden 2003) which revealed Iron Age occupational deposits as well as a few prehistoric and Roman deposits at Park Farm (Roberts 1995).

## 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 most of the survey area and an east to west pattern in the south-eastern and central areas as needed depending on the geometry of the land parcels. Across the site there were numerous electrified fences subdividing the fields into to smaller paddocks and trackways which inhibited surveying of certain areas and caused interference in others. Conditions were mostly damp with some areas of the site in the south-eastern area partially flooded.

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 -1.76 to 1.77 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

Across the site there were numerous areas of magnetic disturbance (Fig. 2), these are represented by bipolar and dipolar responses of a high amplitude (Fig. 3). These are usually caused by ferrous objects that have a magnetic field with a high magnitude. Most of the magnetic disturbance appears to be on the periphery of the survey sections indicating it was most likely caused by interference from above ground structures such as fencing. In the north-eastern field and the central-southwestern area of the site area several areas of magnetic debris (Fig. 4), these are represented by numerous dipolar responses of a generally low amplitude and indicate general ground disturbance, with their form and position suggesting it is most likely activity relating to the farm.

In the southern half of the survey area there are three possible features that may have archaeological potential (Fig. 4). A weak positive linear anomaly measuring approximately 125m in length and running from west to east before turning to the northwest and disappearing into the magnetic disturbance. This faint, ephemeral anomaly may possibly be the remains of a boundary ditch. To the immediate south of this running from the southeast to the northwest is a positive linear anomaly measuring c. 220m long. The western part of this probable ditch appears to be shown on the 1845 tithe map although the full extent does not appear suggesting that it pre-dates the tithe map. To the northwest of this feature is another positive linear anomaly running southeast to northwest and measuring c.145m long. These linear anomalies may represent peripheral agricultural features. More subtle features such as gullies and pits were not detected, however this may be due to the interference from the magnetic disturbances and debris.

## Conclusion

The site contained numerous areas of magnetic disturbance caused by above ground obstacles such as electric wire fencing and agricultural activity however a small number of possible features of archaeological interest were identified over the course of the survey. Two positive linear anomalies and one weak positive linear anomaly were detected and may represent former field boundaries of indeterminate date.

## References


BGS, 1999, *British Geological Survey*, 1:50,000, Sheet 269, Solid and Drift 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, 2019, *National Planning Policy Framework (revised)*, Ministry for Housing, Communities and Local Government, London

Preston, S, 2018, 'Land west of Home Farm, Forest Road, West End, Warfield, Berkshire: Archaeological desk-based assessment', Thames Valley Archaeological Services unpublished report 18/94, Reading

Roberts, M R, 1995, 'Excavations at Park Farm, Binfield, Berkshire 1990: an Iron Age and Romano-British settlement and two Mesolithic flint scatters', in I Barnes, W A Boismier, R J Cleal, A P Fitzpatrick and M R Roberts, *Early Settlement in Berkshire, Mesolithic-Roman occupation in the Thames and Kennet Valleys,* Wessex Archaeol Rep **6**, Salisbury, 93-132

Torrance, L and Durden T, 2003, 'A middle Iron Age settlement at Fairclough Farm, Bracknell, 1994' in S Preston (ed), *Prehistoric, Roman and Saxon Sites in Eastern Berkshire: Excavations 1989–97*, Thames Valley Archaeological Monograph **2**, Reading, 99-106

## **Appendix 1.** Survey and data information

**Programme:**
Name: TerraSurveyor
Version: 3.0.25.0

**Raw data**
*Filename: Warfield RAW.xcp*
*Instrument Type: MLgrad Import*
*Units:*
*UTM Zone: 30*
*Survey corner coordinates (X/Y):*
*Northwest corner: 486150.409954539, 171548.106211276 m*
*Southeast corner: 486318.759954539, 171333.866211276 m*
*Direction of 1st Traverse: 90 deg*
*Collection Method: Parallel*
*Sensors: 2 @ 1 m spacing.*
*Dummy Value: 32702*

*Dimensions*
*Survey Size (meters): 168 m x 214 m*
*X&Y Interval: 0.13 m*
*Source GPS Points: Active: 78663, Recorded: 78663*

*Stats*
*Max: 106.81*
*Min: -109.72*
*Std Dev: 8.88*
*Mean: 0.08*
*Median: 0.07*
*Composite Area: 3.6067 ha*
*Surveyed Area: 2.3676 ha*

*Filename: Warfield 2 RAW.xcp*
*Instrument Type: MLgrad Import*
*Units:*
*UTM Zone: 30*
*Survey corner coordinates (X/Y):*
*Northwest corner: 486314.967382759, 171553.78715862 m*
*Southeast corner: 486554.557382759, 171333.30715862 m*
*Direction of 1st Traverse: 90 deg*
*Collection Method: Parallel*
*Sensors: 2 @ 1 m spacing.*
*Dummy Value: 32702*

*Dimensions*
*Survey Size (meters): 240 m x 220 m*
*X&Y Interval: 0.13 m*
*Source GPS Points: Active: 134335, Recorded: 134335*

*Stats*
*Max: 106.92*
*Min: -108.47*
*Std Dev: 6.82*
*Mean: -1.03*
*Median: -0.57*
*Composite Area: 5.2825 ha*
*Surveyed Area: 4.3568 ha*

*Filename: Warfield 3 RAW.xcp*
*Instrument Type: MLgrad Import*
*Units:*
*UTM Zone: 30*
*Survey corner coordinates (X/Y):*
*Northwest corner: 486311.946879711, 171718.20511638 m*
*Southeast corner: 486611.856879711, 171548.81511638 m*
*Direction of 1st Traverse: 90 deg*
*Collection Method: Parallel*
*Sensors: 2 @ 1 m spacing.*
*Dummy Value: 32702*

*Dimensions*
*Survey Size (meters): 300 m x 169 m*
*X&Y Interval: 0.13 m*
*Source GPS Points: Active: 90479, Recorded: 90479*

*Stats*
*Max: 107.02*
*Min: -109.73*
*Std Dev: 11.22*
*Mean: 1.17*
*Median: 0.41*
*Composite Area: 5.0802 ha*
*Surveyed Area: 3.0163 ha*

*Filename: Warfield 4 RAW.xcp*
*Instrument Type: MLgrad Import*
*Units:*
*UTM Zone: 30*
*Survey corner coordinates (X/Y):*
*Northwest corner: 486552.281293966, 171543.04316142 m*
*Southeast corner: 486618.711293966, 171495.98316142 m*
*Direction of 1st Traverse: 90 deg*
*Collection Method: Parallel*
*Sensors: 2 @ 1 m spacing.*
*Dummy Value: 32702*

*Dimensions*
*Survey Size (meters): 66.4 m x 47.1 m*
*X&Y Interval: 0.13 m*
*Source GPS Points: Active: 8111, Recorded: 8111*

*Stats*
*Max: 102.33*
*Min: -109.71*
*Std Dev: 21.99*
*Mean: 2.18*
*Median: 0.52*
*Composite Area: 0.31262 ha*
*Surveyed Area: 0.24317 ha*

**Processed data**
*Filename: Warfield.xcp*
*GPS based Proce5*
*1 Base Layer.*
*2 Unit Conversion Layer (Lat/Long to UTM).*
*3 DeStripe Median Traverse:*
*4 Clip from -1.60 to 1.60*
*5 DeStagger by: 150.00cm, Shift Positions*

*Stats*
*Max: 1.77*
*Min: -1.76*
*Std Dev: 0.69*
*Mean: 0.02*
*Median: 0.02*
*Composite Area: 3.6067 ha*
*Surveyed Area: 2.3531 ha*

*Filename: Warfield 2.xcp*
*GPS based Proce6*
*1 Base Layer.*
*2 Unit Conversion Layer (Lat/Long to UTM).*
*3 DeStripe Median Traverse:*
*4 Clip at 1.00 SD*
*5 Clip at 1.00 SD*
*6 DeStagger by: 150.00cm, Shift Positions*

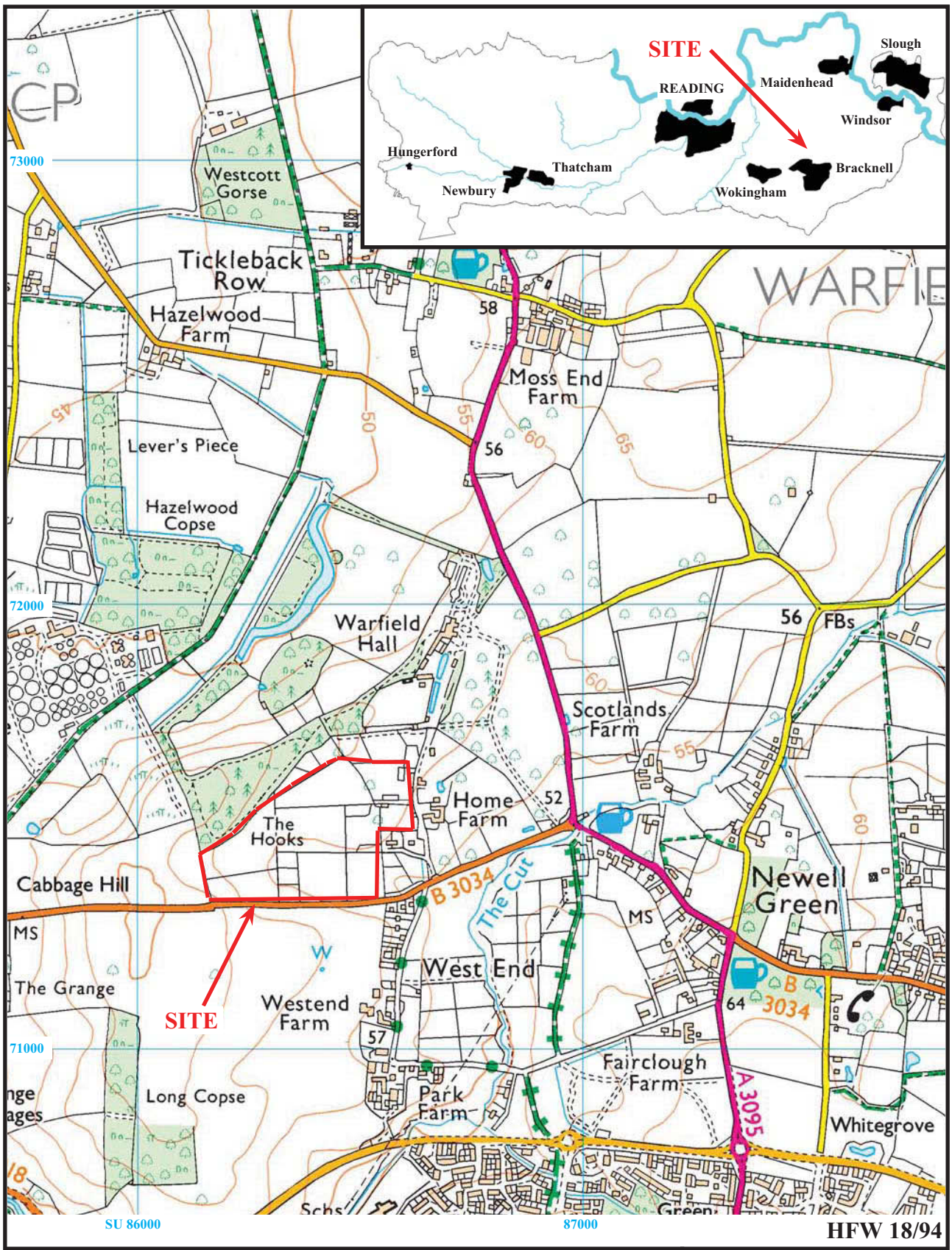
*Stats*
*Max: 1.67*
*Min: -1.63*
*Std Dev: 0.65*
*Mean: 0.01*
*Median: 0.01*
*Composite Area: 5.2825 ha*
*Surveyed Area: 4.332 ha*

*Filename: Warfield 3.xcp*
*GPS based Proce6*
*1 Base Layer.*
*2 Unit Conversion Layer (Lat/Long to UTM).*
*3 DeStripe Median Traverse:*
*4 Clip from -1.60 to 1.60*
*5 DeStagger by: 150.00cm, Shift Positions*
*6 DeStagger by: 150.00cm, Shift Positions*

*Stats*
*Max: 1.77*
*Min: -1.76*
*Std Dev: 0.81*
*Mean: 0.01*
*Median: 0.01*
*Composite Area: 5.0802 ha*
*Surveyed Area: 2.9607 halename: Warfield 3.xcp*

*Filename: Warfield 4.xcp*
*GPS based Proce4*
*1 Base Layer.*
*2 Unit Conversion Layer (Lat/Long to UTM).*
*3 DeStripe Median Traverse:*
*4 Clip from -1.60 to 1.60*

*Stats*
*Max: 1.77*
*Min: -1.76*
*Std Dev: 1.14*
*Mean: 0.01*
*Median: -0.02*
*Composite Area: 0.31262 ha*
*Surveyed Area: 0.24317 ha*




**Land west of Home Farm, Forest Road, West End, Warfield, Berkshire, 2020**
**Geophysical Survey (Magnetic)**
Figure 1. Location of site within Warfield and Berkshire.



THAMES VALLEY ARCHAEOLOGICAL SERVICES


**HFW 18/94**

N

**Land west of Home Farm, Forest Road, West End, Warfield, Berkshire, 2020**
**Geophysical Survey (Magnetic)**
Figure 2. Plot of raw gradiometer data.

0m 250m

+100
nT
-100

THAMES VALLEY ARCHAEOLOGICAL SERVICES


**HFW 18/94**

N

**Land west of Home Farm, Forest Road, West End, Warfield, Berkshire, 2020**
**Geophysical Survey (Magnetic)**
Figure 3. Plot of processed gradiometer data.

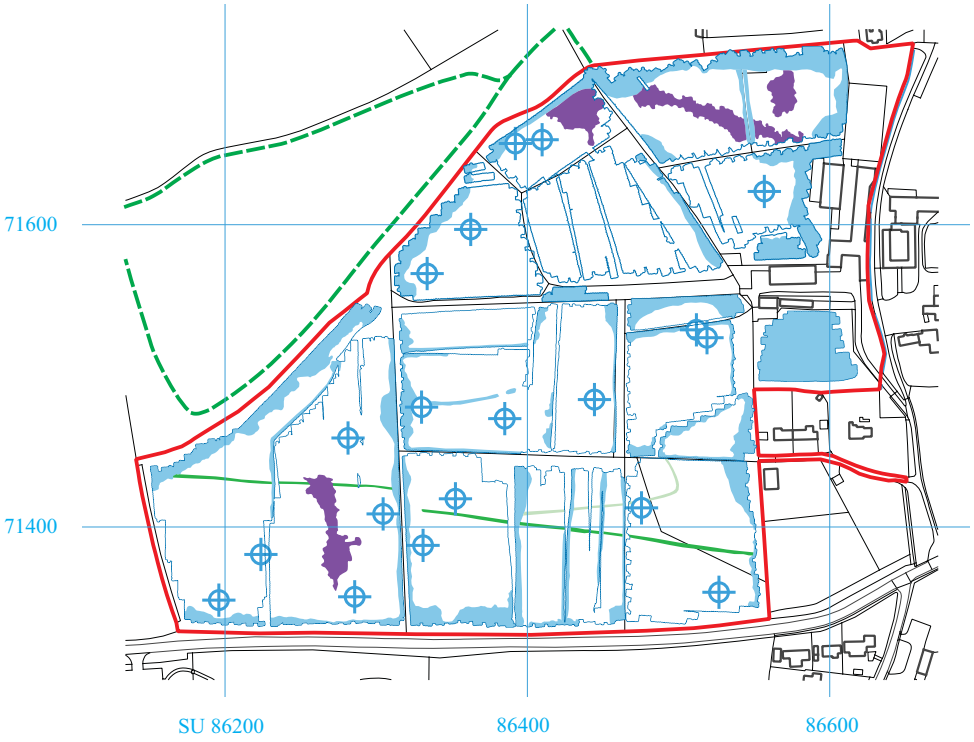
0m 250m

+2
nT
-2

THAMES VALLEY ARCHAEOLOGICAL SERVICES

## Legend

- Positive anomaly - possible cut feature (archaeology)
- Weak positive anomaly - possible cut feature
- Ferrous spike - probable ferrous object
- Magnetic disturbance caused by nearby metal objects/services
- Scattered ferromagnetic debris




**HFW 18/94**

N

**Land west of Home Farm, Forest Road, West End, Warfield, Berkshire, 2020**
**Geophysical Survey (Magnetic)**
Figure 4. Interpretation plot.

0m 250m

THAMES VALLEY ARCHAEOLOGICAL SERVICES

Plate 1. Paddock to the south of farm complex looking southeast.

Plate 2. Southern fields looking southwest.

**HFW 18/94**

**Land west of Home Farm, Forest Road, West End, Warfield, Berkshire, 2020**
**Geophysical Survey (Magnetic)**
Plates 1 and 2.

THAMES VALLEY ARCHAEOLOGICAL SERVICES

Plate 3. Southern fields looking south.

Plate 4. Central trackway looking west

Plate 5. Western fields looking west.

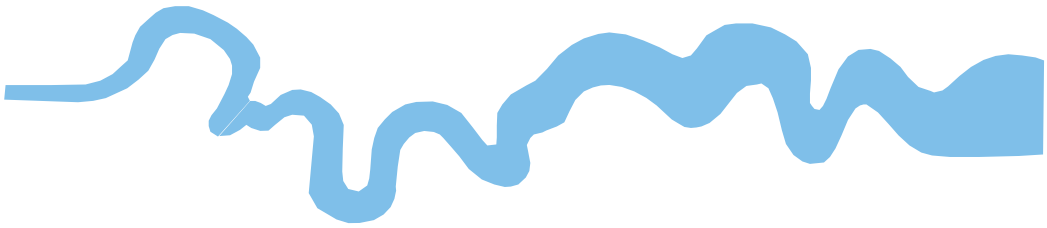
Plate 6. Northern field looking south.

Plate 7. Northeastern field looking northeast.

Plate 8. Unsurveyed eastern paddock area looking north.

# 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)***