THAMES VALLEY
ARCHAEOLOGICAL
SERVICES

Maiden Erlegh, Chiltern Edge School, Sonning Common, Oxfordshire

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: MEC18/229

(SU 7027 7982)

Maiden Erlegh, Chiltern Edge School, Sonning Common, Oxfordshire

Geophysical Survey (Magnetic) Report

For Deanfield Homes

by Luciano Cicu

Thames Valley Archaeological Services Ltd

Site Code MEC 19/229

May 2022

Summary

Site name: Maiden Erlegh, Chiltern Edge School, Sonning Common, Oxfordshire

Grid reference: SU 70269 79817

Site activity: Magnetometer survey

Date and duration of project: 04/05/2022

Project coordinator: Tim Dawson

Site supervisor: Luciano Cicu

Site code: MEC 18/229

Area of site: *c.* 1.8ha

Summary of results: A number of potential archaeological features were identified by the archaeological survey including a small number of positive linear anomalies which may be associated with land division and a number of positive discrete anomalies which may indicate the presence of buried pit-type features.

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✓ 16.05.22 Tim Dawson✓ 18.05.22

Maiden Erlegh, Chiltern Edge School, Sonning Common, Oxfordshire
A Geophysical Survey (Magnetic)

by Luciano Cicu

Report 18/229b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Maiden Erlegh, Chiltern Edge School, Sonning Common, Oxfordshire (*SU 70269 79817*) (Fig. 1). The work was commissioned by Mr. Andy Harvey, on behalf of Deanfield Homes, Oakingham House, Kingsmead Business Park, Frederick Place, High Wycombe, Bucks, HP11 1JU.

Planning Permission has been sought from South Oxfordshire District Council for a residential development. Due to the potential disturbance of below ground archaeological features, geophysical survey is required, to inform the planning process. This is in accordance with the Ministry of Housing, Communities and Local Government's National Planning Policy Framework (NPPF 2019), and the District's policies on archaeology. The field investigation was carried out to a specification approved by Planning Archaeologist, Steven Weaver. The fieldwork was undertaken by Luciano Cicu and Emily Gibson, on the 4th May 2022 and the site code is MEC 18/229.

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 west of Sonning Common (Fig. 1), approximately 6.4km north of Reading bordered by Reade's Lane to the north and Kidmore Lane to the south. The site comprises school playing fields on a relatively flat parcel of land at a height of 89m above Ordnance Datum in the east rising to 92m aOD to the west. The underlying geology of the site is Winter Hill Gravel (7th terrace) (BGS 2000).

Site history and archaeological background

The archaeological background has been highlighted in a desk-based assessment (Baljikas 2019). The proposal site lies within a zone of the county which has recorded only a modest range of sites and finds. A coin hoard is recorded to the north of the site and various neolithic flint and stone tools are also noted. Several recent archaeological evaluations have also returned negative results though one did recover a neolithic flaked flint axe head (Foster 2021). Other recent development-led archaeological fieldwork has revealed a number of new sites in Sonning Common with Roman occupation and a probable kiln site at Blounts Court (Beaverstock 2019) and possible Roman or Medieval occupation at Little Sparrows (Taylor 2019). Further afield early Neolithic occupation has been identified at Woodcote (Sanchez 2021). The environs of the site are, however, notable for the presence of findspots of Palaeolithic date intimately associated with the sequence of older gravel terraces of the Thames, especially so an ancient channel that flowed from Caversham to Clacton-on-Sea via St Albans (Wymer 1968; Morigi, et. al 2011). The channel lies to the south and the gravel deposit on which the site lies is less well known for Palaeolithic findspots.

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 east to west zig-zag orientation across the northern survey area and north-west to south-east in the eastern field. The geophysical survey encountered a small number of obstacles including overhanging tree branches and fencing associated with the school tennis courts. Conditions were largely dry and bright but with infrequent light showers of rain.

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 -5.50 to 5.53 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. 3 and 4). These include an area of magnetic disturbance **[Fig. 5: 1]** found along the boundaries of the proposed site. Magnetic disturbance presents as positive and negative responses with a high amplitude and can be associated with ferrous material in structures such as fencing or buried objects such as service lines. Similar to this, there are three areas of magnetic debris **[2]** represented by irregular positive and negative responses with relatively high amplitude and are likely caused by subterranean disturbance, potentially containing ferrous objects.

In the south-western corner of the field is a strong positive linear anomaly **[3]**, leading to a weak positive linear anomaly at an orientation of south-east to north-west. The anomalies in question could possibly indicate the presence of a buried ditch which formed a boundary associated with a previous field system. To the east of the linear anomalies is a scatter of weak positive discrete anomalies, possibly representing buried pits **[4]**.

Towards the centre of the field is a strong positive linear anomaly **[5]**, shaped as a 'T', which extends into three lengths of weaker positive anomalies. The formation of these anomalies suggests that it is related to land division such as field boundaries. The orientation of the linear anomalies is south-east, north-east and south-west from their intersection point. In the north-eastern corner of the field, there are a pattern of weak positive circular and sub-circular discrete anomalies **[6]**. These may represent buried pits and are appear to form a roughly oval pattern measuring 30m across east to west and 18m north to south.

Conclusion

The geophysical survey has identified a small number of magnetic anomalies which suggest the presence of potential buried archaeological features. The boundary of the field is dominated by magnetic disturbances caused by fencing and the buildings. In addition to this, pockets of magnetic disturbance probably reflect buried ferrous materials. A small number of positive and weak positive linear anomalies were identified that likely represent the ditches of an earlier field system. A series of positive discrete anomalies suggest two groupings of buried pit-type features in the centre and north-eastern areas of the site. The survey shows a modest potential for archaeological remains to be present.

References

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Appendix 1. **Survey and data information**

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

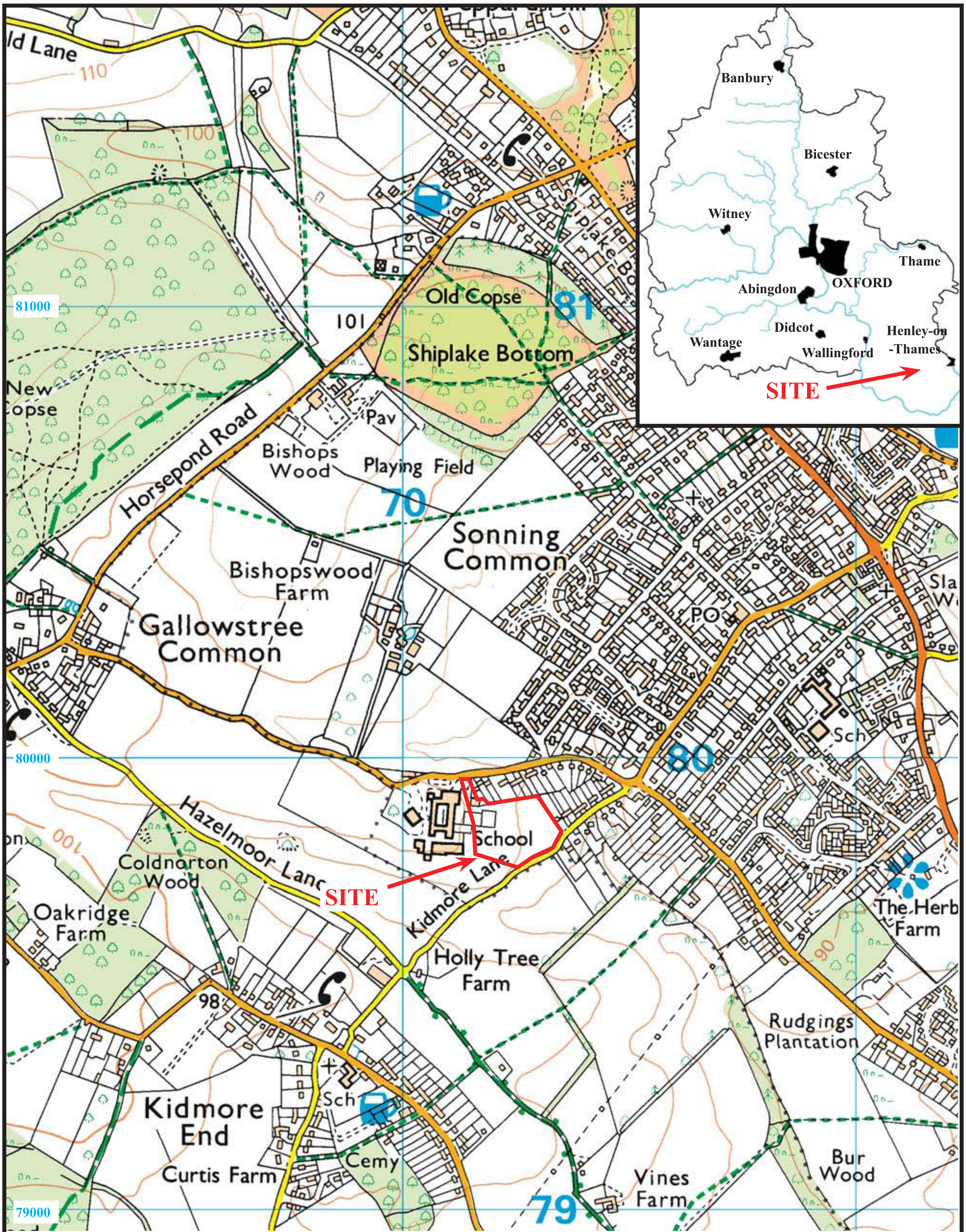
Raw data
Filename: Maiden Erlegh RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 470160.709761577, 179908.733857518 m
Southeast corner: 470352.719761577, 179758.843857518 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 192 m x 150 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 51551, Recorded: 51551

Stats
Max: 107.34
Min: -109.75
Std Dev: 17.25
Mean: 0.49
Median: 0.56
Composite Area: 2.878 ha
Surveyed Area: 1.8635 ha

Processed data
Filename: Maiden Erlegh Processed .xcp
Stats
Max: 5.53
Min: -5.50
Std Dev: 2.15
Mean: 0.10
Median: 0.03
Composite Area: 2.9476 ha
Surveyed Area: 1.9282 ha

GPS based Proce5
1 *Base Layer.*
2 *Unit Conversion Layer (Lat/Long to UTM).*
3 *DeStripe Median Traverse:*
4 *Clip from -5.00 to 5.00*
5 ***DeStagger by: 50.00cm, Shift Positions***



MEC 18/229

Maiden Erlegh, Chiltern Edge School,
Sonning Common, Oxfordshire, 2022
Geophysical Survey (Magnetic)

Figure 1. Location of site within Sonning Common and Oxfordshire.

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Sonning Common, Oxfordshire, 2022
Geophysical Survey (Magnetic)
Figure 2. Proposal area.

0m
100m

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MEC 18/229

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Sonning Common, Oxfordshire, 2022
Geophysical Survey (Magnetic)

Figure 3. Plot of raw gradiometer data.

0m 100m

+100
nT
-100

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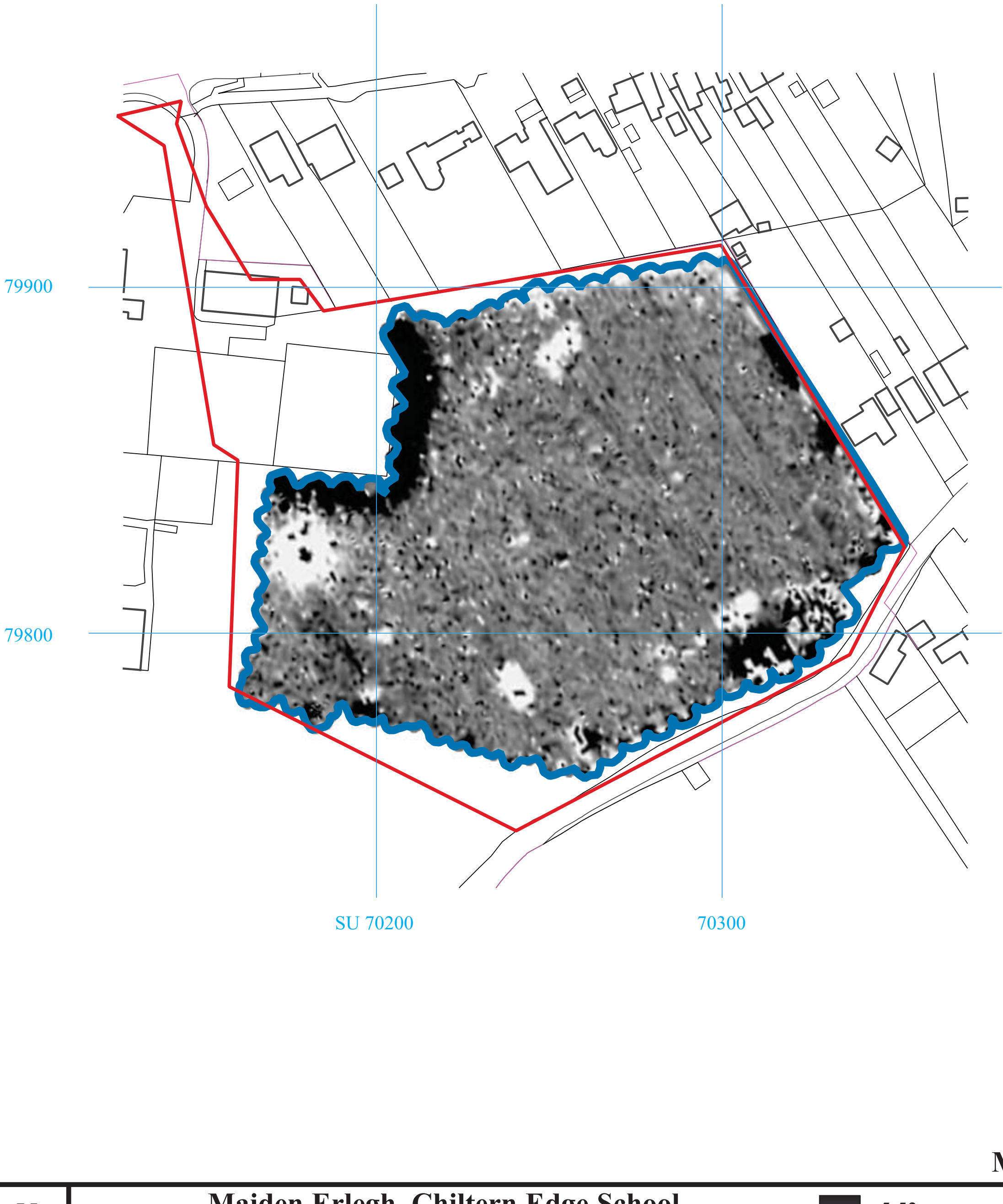

MEC 18/229

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Sonning Common, Oxfordshire, 2022
Geophysical Survey (Magnetic)

Figure 4. Plot of processed gradiometer data.

0m 100m

+5.53
nT
-5.50

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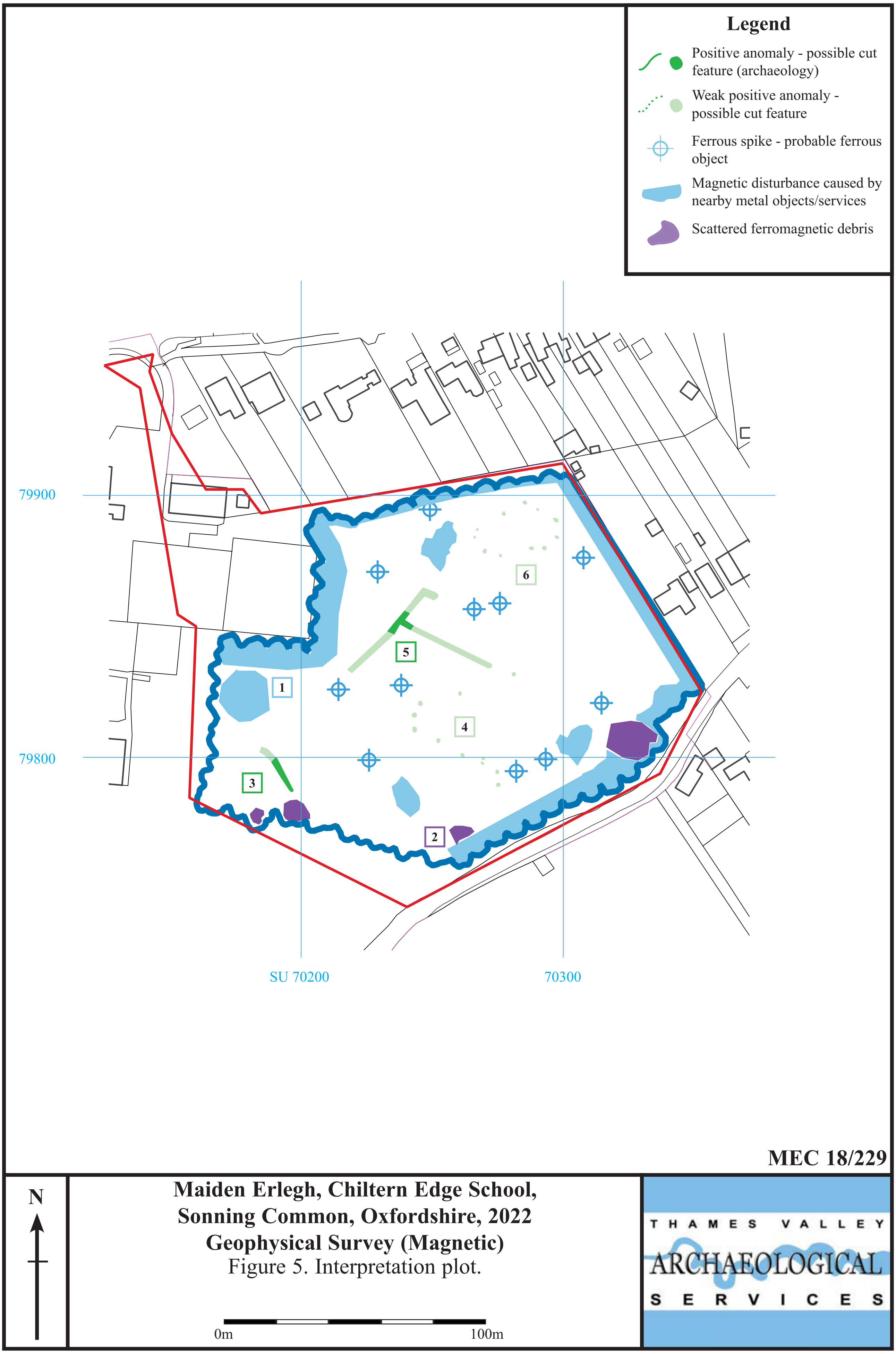

MEC 18/229

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Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.

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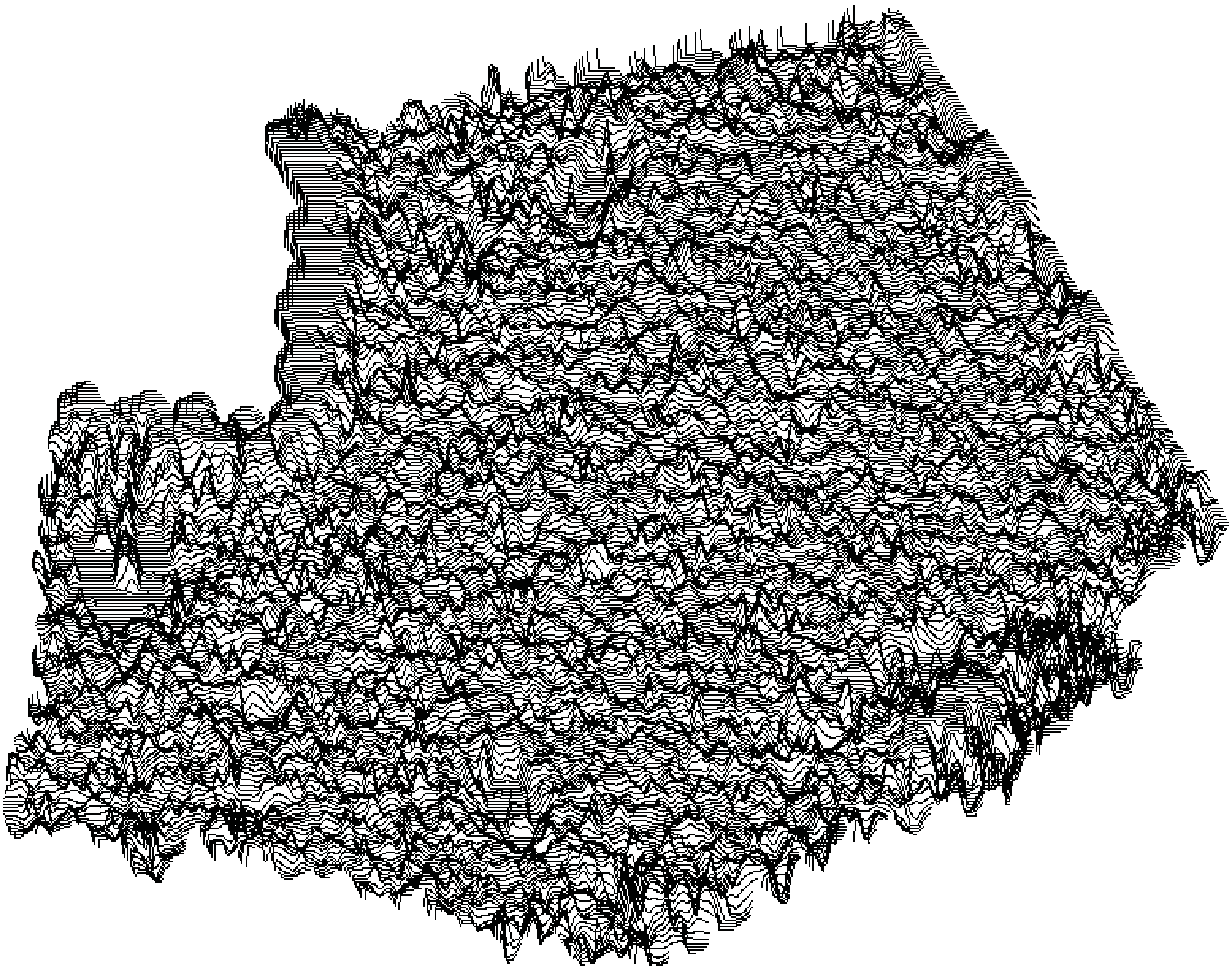

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Geophysical Survey (Magnetic)
Figure 6. XY trace plot.

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Plate 1. North-east facing, looking west

Plate 2. South facing, looking north-east

Plate 3. South-east facing, looking north-east.

Plate 4.South-east facing looking north-west.

Plate 5. West facing, looking east

Plate 6. South facing, looking north.

MEC 18-229

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Geophysical Survey (Magnetic)
Plates 1-6

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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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