ARCHAEOLOGICAL SERVICES
DURHAM UNIVERSITY

for
Oxford Archaeology Ltd

on behalf of
Bouygues UK

New Oldfield Primary School
Bray Road
Maidenhead
Berkshire

geophysical survey

report 3243
September 2013

Durham University

Contents

Figures

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1. Summary

The project

1.1 This report presents the results of a geophysical survey conducted in advance of the proposed New Oldfield Primary School, Bray Road, Maidenhead, Berkshire. The works comprised the geomagnetic survey of the proposed development area, measuring approximately two hectares.

1.2 The works were commissioned by Oxford Archaeology Ltd (on behalf of Bouygues UK) and conducted by Archaeological Services Durham University.

Results

1.3 Two distinct positive magnetic anomalies were detected. These comprise a sub-rectangular enclosure at the northern end of the proposed development area and a ring-shaped anomaly in the south of the area. The anomalies are interpreted as representing remnant structural elements of a 20th-century sports ground, based on the shared morphology of the anomalies with features depicted on the historic mapping. However, an earlier origin for the anomalies cannot be entirely ruled out.

1.4 Anomalies associated with modern services, barbed wire, abandoned baths and other ferrous material were also recorded.

2. Project background

Location (Figure 1)

2.1 The proposed development area was located on land west of Bray Road, Maidenhead, Berkshire (NGR centre: SU 89672 80435). The development area covers approximately two hectares and is bordered to the east by Bray Road, by Chalgrove Close to the north, the Cookham to Bray Canal to the west and further fields to the south.

Development proposal

2.2 The development is for a new primary school.

Objective

2.3 The principal aim of the survey was to assess the nature and extent of any sub-surface features of potential archaeological significance within the proposed development area, so that an informed decision may be made regarding the nature and scope of any further scheme of archaeological works that may be required in relation to the development.

Methods statement

2.4 The survey has been undertaken in accordance with instructions from the client and national standards and guidance.

Dates

2.5 Fieldwork was undertaken on the 9th September 2013. This report was prepared for September 2013.

Personnel

2.6 Fieldwork was conducted by Rebekah Watson and Nathan Thomas (supervisor). The geophysical data were processed by Nathan Thomas. This report was prepared by Nathan Thomas with illustrations by David Graham and edited by Duncan Hale, the Project Manager.

Archive/OASIS

2.7 The site code is **MBR13**, for **M**aidenhead**, B**ray **R**oad 20**13**. The survey archive will be supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** project (**OASIS**). The OASIS ID number for this project is **archaeol3-159241**.

3. Historical and archaeological background

Previous archaeological works

3.1 A desk-based assessment (DBA) of the site has been conducted as part of the scheme of works (Oxford Archaeology 2013). A summary of the results from the DBA is given below.

3.2 The development area is located on the first gravel terrace above the west bank of the River Thames. This is considered an area of good archaeological potential, particularly for prehistoric settlement and for palaeoenvironmental deposits.

3.3 The northern three-quarters of the development area will have been previously impacted by the construction and later removal of a sports ground in the mid-20th century.

4. Landuse, topography and geology

4.1 At the time of survey the proposed development area comprised a single field bounded by mature hedges and trees on each side. The site had been mown to enable the survey to be conducted, however, numerous obstacles were still present on site. These included trees, remnant barbed wire fences, old baths and pieces of modern dumped rubbish. The presence of this ferrous material is clearly apparent in the geomagnetic data.

4.2 The area was predominantly level with a mean elevation of approximately 22.5m OD.

4.3 The underlying solid geology of the area comprises chalk, which is overlain by sands and gravels of the Lynch Hill Gravel Member (BGS 2013).

5. Geophysical survey

Standards

5.1 The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) *Standard and Guidance for archaeological geophysical survey* (2011); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Guide to Good Practice: Geophysical Data in Archaeology* (Schmidt & Ernenwein 2011).

Technique selection

5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.

5.3 In this instance, based on the DBA and previous work in the vicinity, it was considered likely that cut features such as ditches and pits might be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) might also be present.

5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the development area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting the types of feature mentioned above. This technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth's magnetic field

caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

Field methods

5.5 A 30m grid was established across the development area and related to the Ordnance Survey National Grid using a Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.

5.6 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval was 0.25m and the traverse interval was 1m, thus providing 3,600 sample measurements per 30m grid unit.

5.7 Data were downloaded on site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

5.8 Geoplot v.3 software was used to process the geophysical data and to produce both a continuous tone greyscale image and a trace plot of the raw (minimally processed) data. The greyscale image and interpretations are presented in Figures 2-5; the trace plot is provided in Figure 6. In the greyscale image, positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. A palette bar relates the greyscale intensities to anomaly values in nanoTesla.

5.9 The following basic processing functions have been applied to the geomagnetic data:

clip	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
zero mean traverse	sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities
destagger	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
interpolate	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

5.10 The following filter has been applied to the geomagnetic data:

low pass filter	applied with Gaussian weighting to remove high frequency, small-scale spatial detail, such as some near-surface ferrous debris

Interpretation: anomaly types

5.11 A colour-coded geophysical interpretation plan is provided. Two types of geomagnetic anomaly have been distinguished in the data:

positive magnetic	regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches
dipolar magnetic	paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths

Interpretation: features

5.12 A colour-coded archaeological interpretation plan is provided.

5.13 A strong sub-rectangular positive magnetic anomaly was detected in the northern part of the survey area. This anomaly measures approximately 50m x 45m with the long axis oriented north-east to south-west. Remnant fragments of barbed wire fence were present in this part of the site, which have masked potential weaker anomalies.

5.14 A sub-circular positive magnetic anomaly has been recorded in the central-southern part of the area. This anomaly measures approximately 45m in diameter east-west. Together with the rectilinear anomaly to the north and a possible north-south oriented anomaly in-between, these anomalies correspond closely in plan to the layout of the 20th century sports ground known to have existed on the development area and depicted on the early 20th-century mapping. The anomalies appear to be contained within the existing land parcel and respect its morphology, suggesting that they were built within a pre-existing plot. These positive magnetic anomalies almost certainly reflect the materials used in the construction of the sports ground, however, it is also possible that the anomalies could reflect earlier ditched features.

5.15 Along the eastern and south-eastern boundaries of the development area, strong dipolar anomalies were recorded. These are likely to be caused by underlying services connected to the pumping station in this area. In addition, in the south-east part of the development area, they may reflect remnant structural elements of the sports ground grandstand or demolition material derived from it.

5.16 Two weak positive linear magnetic anomalies have also been interpreted in the south-east of the survey area. These anomalies are aligned north-west to south-east and measure 20m and 12m in length respectively. These anomalies may represent former ditches.

5.17 The only other anomalies detected are small, discrete dipolar magnetic anomalies. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as barbed wire, litter and brick fragments. These are likely to be of no archaeological significance.

5.18 Strong anomalies caused by upstanding fragments of barbed wire fences are present in the northern and central parts of the survey.

6. Conclusions

6.1 Two hectares of geomagnetic survey was undertaken on land west of Bray Road, Maidenhead, in advance of the proposed New Oldfield Primary School.

6.2 Two distinct positive magnetic anomalies were detected. These comprise a sub-rectangular enclosure at the northern end of the proposed development area and a ring-shaped anomaly in the south of the area. The anomalies are interpreted as representing remnant structural elements of a 20th-century sports ground, based on the shared morphology of the anomalies with features depicted on the historic mapping. However, an earlier origin for the anomalies cannot be entirely ruled out.

6.3 Anomalies associated with modern services, barbed wire, abandoned baths and other ferrous material were also recorded.

7. Sources

BGS 2013 British Geological Survey data Geology of Britain viewer available online; http://mapapps.bgs.ac.uk/geologyofbritain/home.html

David, A, Linford, N, & Linford, P, 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage

Gaffney, C, Gater, J, & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*. Technical Paper **6**, Institute of Field Archaeologists

IfA, 2011 *Standard and Guidance for archaeological geophysical survey*. Institute for Archaeologists

Oxford Archaeology 2013 *Historic Environment section, New Oldfield Primary School Environmental Impact Assessment*. Unpublished EIA chapter provided by client

Schmidt, A, & Ernenwein, E, 2011 *Guide to Good Practice: Geophysical Data in Archaeology*. Archaeology Data Service

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Figure 1: Site location

site location

0 1km

scale 1:25 000 for A4 plot

magnetic survey

-5 nT 5

Chalgrove Close

Bray Road

Avenue Road

AVENUE ROAD

MAYFIELD

THE OLD COTTAGE

SQUIRRELS

The Cut

RIVER

805

804

803

896

897

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0 40m
scale 1:800 for A3 plot

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Maidenhead
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Figure 2: Geophysical survey

magnetic survey

-1 SD 1

805

804

803

896

897

Chalgrove Close

Bray Road

Avenue Road

AVENUE ROAD

MAYFIELD

THE OLD COTTAGE

SQUIRRELS

The Cut

RIVER

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0 40m
scale 1:800 for A3 plot

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Figure 3: Geophysical survey (filtered)

magnetic survey

dipolar magnetic anomaly

positive magnetic anomaly

805

804

803

896

897

Chalgrove Close

BRAY ROAD (B3)

Avenue Road

AVENUE ROAD

MAYFIELD

THE OLD COTTAGE

SQUIRRELS

Bray Road

The Cut

RIVER

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0 40m
scale 1:800 for A3 plot

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Figure 4: Geophysical interpretation

magnetic survey

barbed wire fence

soil-filled feature

805

804

803

896

897

Chalgrove Close

BRAY ROAD (B3)

RIVER

The Cut

MAYFIELD

AVENUE ROAD

Avenue Road

THE OLD COTTAGE

Bray Road

SQUIRRELS

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0 40m

scale 1:800 for A3 plot

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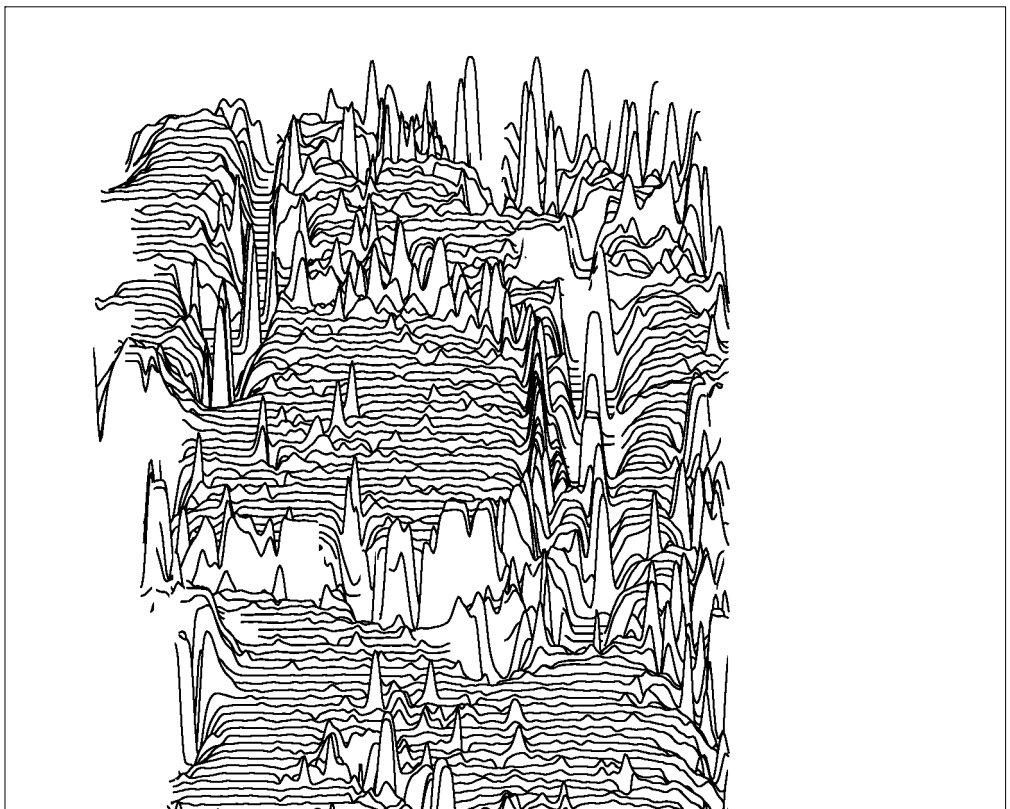
Figure 5: Archaeological interpretation

29.30nT/cm



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0 50m
scale 1:1000 for A3 plot

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Figure 6: Trace plot of geomagnetic data