Land Adjacent to the Bell Language School, Addenbrookes, Cambridge

Report on Archaeological Geophysical Survey 2012

Surveyed by:

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Introduction

This report describes the findings from a geophysical survey which was carried out as part of an archaeological field assessment of a site adjacent to the Bell Language School, Cambridge. The survey was commissioned from Bartlett Clark Consultancy (BCC), Specialists in Archaeogeophysics of Oxford, by Oxford Archaeology East (OAE). Fieldwork for the survey was done in September 2012.

The Site

The site has previously been the subject of an archaeological field evaluation consisting of trial trenching within the area which is now to be surveyed. This was done by the Cambridge Archaeological Unit in 2004, with findings as described in a report (dated January 2005) supplied to us by OAE [1]. The following notes on the site are summarised in part from this document, and were included also in the Method Statement for this project.

Topography and geology

The site covers about 7.5ha and is located on the southern edge of Cambridge on the west side of Babraham Road at NGR TL 468549. The south western half of the site, which rises slightly from south to north, is on a bedrock of lower chalk, giving way to second terrace gravels to the east. The site is divided into paddocks, with a sports field in the north east.

The relatively high background noise level seen in the survey plots suggests that gravel is present in the topsoil across the greater part of the site, and particularly to the east.

Archaeological background

The 2004-5 trenching confirmed that various previously identified cropmarks represent archaeological features.

Findings from the excavation include settlement remains, quarry pits and field systems of mainly late-prehistoric date. There are two groups of pits and post holes indicative of a Late Bronze Age to Early Iron Age settlement in the centre of the site. These features were seen in trenches 8, 9, 18 as numbered on the site plan (which is reproduced as a plan inset in figure 4 of this report).

The settlement remains are intersected by two alignments of post holes indicating one or two post-built boundaries. The holes average about 0.3m in width and depth. The strength of response

from such features in a magnetometer survey varies according to the magnetic enhancement of the fill, which may be increased in proximity to settlement activity, but pits of this size are likely to be at the lower end of detectability in most site conditions.

Further groups of (probably Iron Age) settlement features were seen further to the south in trenches 11 and 22, where there were additional pits, postholes and a gully, and also in the south eastern corner of the site (trench 32).

Other findings include Iron Age and Roman ditch alignments which possibly form an irregular enclosure around the main settlement features, and other ditch sections indicating a field system to the west of the site. Various large quarry pits (of possibly Roman date) were found to the north east of the site (trenches 17 and 20), and traces of medieval furrows were also identified, mainly around the centre of the site. Pipe trenches and post-medieval ditches are also present.

Survey Procedure

The method used for this geophysical investigation was magnetometer surveying, as described in the Method Statement (submitted by BCC to OAE on 17 September 2012) .

Magnetometer survey

The magnetometer readings were collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and are plotted at 25cm intervals along each transect. The results of the survey are presented as a 1:1500 grey scale plot (figure 1), and as a graphical (x-y trace) plot in two sections at 1:1250 scale in figures 2-3. Inclusion of these alternative presentations allows the detected magnetic anomalies to be examined in plan and profile respectively. An interpretation of the findings is shown superimposed on figures 2-3 (which permits the interpreted outlines to be compared with the underlying data), and is reproduced separately to provide a summary of the findings (figure 4).

The survey plots show the magnetometer readings after standard treatments which include adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and slight linear smoothing. Additional 2D low pass filtering has been applied to the grey scale plot to reduce background noise levels.

Colour coding has been used in the interpretation to distinguish different effects. Features are indicated by coloured outlines, or broken lines. Magnetic anomalies of possibly archaeological origin are outlined in red. Features of uncertain, but probably natural, origin are shown in a light brown. Strong magnetic anomalies which are likely to be of recent origin are shown in dark brown. Strong magnetic anomalies which appear to represent iron objects are in blue. Possible drains and pipes are also indicated.

Survey location

The survey grid was set out and tied to the OS grid using a differential GPS system. The plans are

therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans which can be supplied with this report.

Results

The survey has detected various subsurface disturbances, some of which are likely to indicate archaeological features, but has not fully detected the findings seen in the 2004 trenching. This may be a consequence of the size and composition of the fill of some of the excavated features, but it is perhaps also possible to conclude from the findings that the concentration of magnetically responsive archaeological features (of a kind which would be associated particularly with settlement remains) within the survey area is limited.

Findings include a distinct east-west ditch (labelled A on figure 4). This can be identified from the plans in the trenching report as a deep pipe trench (feature number F48). The pipe is non-ferrous, but could be a drain leading to or from a disturbance at B, where it appears to connect to a similar north-south feature C. An additional strong north-south ditch-like feature (D) terminates at the same location on the field boundary as C. Feature D could therefore be another drain, or perhaps a former field boundary.

Other weaker linear features visible in the grey scale plot could indicate traces of the Iron Age and Roman enclosures and field systems identified in the trenching. Some of the more distinct examples are labelled (E-H), none of which are intersected by trenches. It is possible that some of the ditches are obscured in part by strong magnetic interference from a pipe (J).

The site has a magnetically responsive topsoil, as was indicated by magnetic susceptibility readings taken at the time of the survey. Readings were in a (relatively high) range between 17 and 26 SI, although a sample of exposed subsoil gave a lower reading (8.2 SI). The generally weak response from the enclosure ditches perhaps therefore indicates that subsoil predominates in their fill. Features are described in the trenching report as containing pale or grey-brown fill, and presumably therefore contain a high proportion of chalk subsoil. It is often the case in a magnetometer survey that enclosure ditches respond well near to a settlement site, where the soil is magnetically enhanced as a result of occupation activity, and fade with distance. In this case the lack of any strong response from the enclosures suggests the settlement activity is localised and limited. The low density of excavated finds (37 pot sherds are mentioned in the report) would be consistent with this view.

The trenching report mentions a group of pits and post holes in the centre of the site (between trenches 9 and 18), but they are again described as containing a pale (chalky) fill. A few possible pit-like magnetic anomalies are outlined in red in the interpretation (as at K), but most are small or uncertain, and they do not define a clear focus of activity. It is also difficult to identify any conspicuous pit-like features near to the possible settlement features seen in the south east of the site in trench 32.

Other findings visible in the survey include scattered iron objects (blue), and various strong and probably recent disturbances (dark brown). These are mainly near boundaries, but there is a

cluster of magnetic anomalies (perhaps relating to levelling or landscaping) within the sports field (L). There is also strong magnetic interference at the ends of the field around the goals.

The report mentions the presence of quarry pits in the NE of the site (between trenches 15 and 26), but the fill (described as sandy) again appears to be magnetically unresponsive. The remaining findings include irregular linear markings which may be land drains, and others which correspond to the locations of the 2004 trenches.

Conclusions

The survey has detected various strong ditch-like features, but some appear to represent pipe trenches (A, C, D). Other much weaker linear features (E-H) may relate to the Iron Age and Roman enclosures and field systems identified in the trenching. The fill of the archaeological features is described in the report as usually grey or pale, suggesting they contain little topsoil or occupation debris, and so are not strongly responsive to the survey. The lack of any more conspicuous findings suggests that occupation activity at the site was limited in scale or duration, and the site is unlikely to contain settlement remains which are more dense or concentrated than those seen in the trenching.

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9 October 2012

The fieldwork for this project was done by R. Ainslie and S. Ainslie.

Reference

[1] Land Adjacent to the Bell Language School, Cambridge: An Archaeological Evaluation. Excavation report by M. Brudenell; Cambridge Archaeological Unit, University of Cambridge; 25 January 2005.

Background mapping based on site plan
by Survey Solutions (0845 0405969)

255000N

447000E

N

2.0 nT

-2.2

area proposed for
magnetometer survey

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Figure 1: Magnetometer survey
(grey scale plot)

0 1:1500 50m

Background mapping based on site plan
by Survey Solutions (0845 0405969)

magnetic anomalies (archaeological ?)

magnetic disturbances
(recent / non-archaeological)

background magnetic activity
(natural / non-archaeological ?)

pipe

strong (ferrous) magnetic anomalies

drains

magnetic disturbances corresponding
to 2004 trenches

N

50nT

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Figure 2: Magnetometer survey
(with interpretation)

0 1:1250 50m

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Background mapping based on site plan
by Survey Solutions (0845 0405969)

N

50nT

magnetic anomalies (archaeological ?)

magnetic disturbances
(recent / non-archaeological)

background magnetic activity
(natural / non-archaeological ?)

pipe

strong (ferrous) magnetic anomalies

drains

magnetic disturbances corresponding
to 2004 trenches

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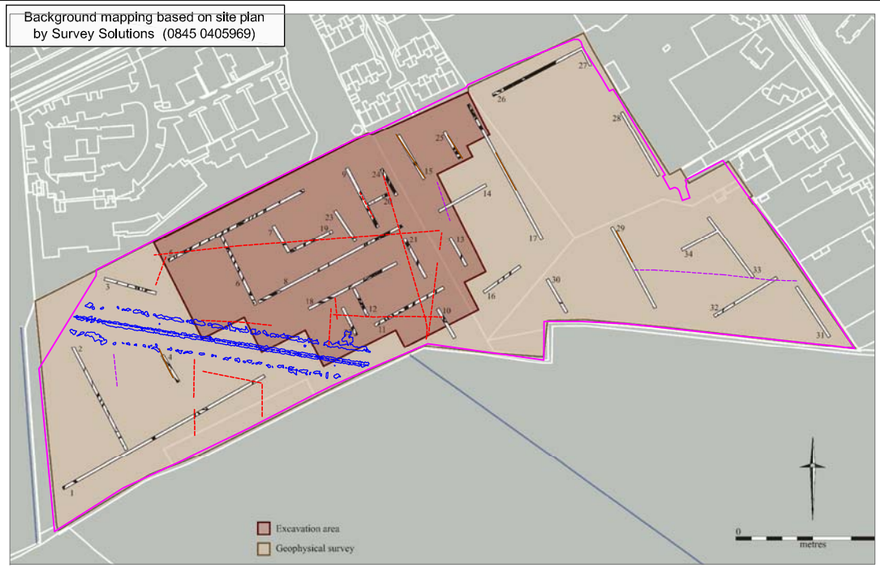
Figure 3: Magnetometer survey
(with interpretation)

0 1:1250 50m

Background mapping based on site plan
by Survey Solutions (0845 0405969)



Site plan with 2004 CAU trenches (and selected survey findings) 1:4000

447000E

255000N

N

A
B
C
D
E
F
G
H
J
K
L

magnetic anomalies (archaeological ?)

magnetic disturbances
(recent / non-archaeological)

background magnetic activity
(natural / non-archaeological ?)

pipe

strong (ferrous) magnetic anomalies

drains

magnetic disturbances corresponding
to 2004 trenches

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Figure 4: Summary of findings

0 1:2000 100m

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