pre-construct geophysics LTD

ARCHAEOLOGICAL GEOPHYSICAL SURVEY

LAND OFF COLCHESTER ROAD
WEST BERGHOLT, ESSEX

SITE CENTRED AT NGR 596720 22500

REPORT PREPARED FOR

PEGASUS PLANNING GROUP

ON BEHALF OF GLADMAN DEVELOPMENTS LTD

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Illustrations

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Non technical summary

A fluxgate gradiometer survey of land off Colchester Road, West Bergholt in Essex has not recorded magnetic anomalies that can be confidently attributed to potentially significant archaeological remains; it is likely most weak variation relates to natural features.

Stronger variation was registered over a buried service, electric fences and likely modern debris.

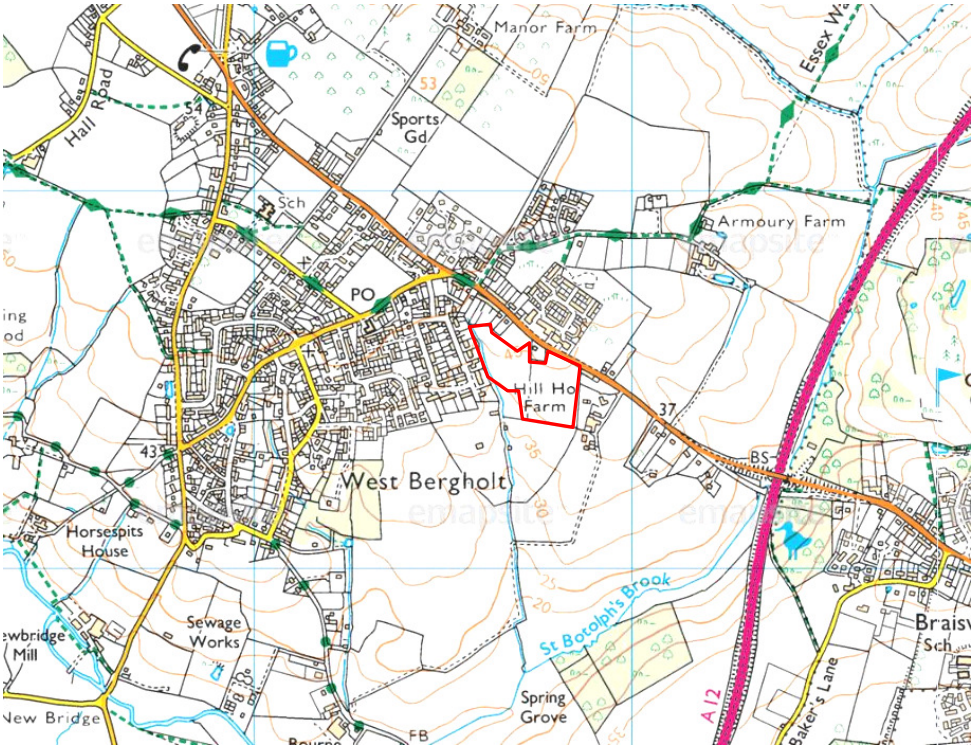

Fig. 1: Location of site

1.0 Introduction

Acting for Gladman Developments Ltd, Pegasus Planning Group Ltd commissioned a fluxgate gradiometer survey of c.4ha of land off Colchester Road, West Bergholt in Essex.

The objective of the survey was to detect and precisely locate any potential buried archaeological features using non-intrusive techniques.

2.0 Location and description (Figs. 1 & 2)

The site is located to the east of the settlement of West Bergholt (NGR c.596720 22500). It encompasses two arable fields, divided by a tree-lined and hedged boundary, and is bounded by residential development to the north; agricultural land to the north-east; residential development to the east; agricultural land to the south and residential development beyond an un-named watercourse to the west.

Most of the external perimeter and the entire boundary between the fields contained broad mature hedges and/or dense ground vegetation, the latter within a small triangular area to the immediate north east of Field 2. As such, these areas were unsuitable for safe/effective survey.

3.0 Geology and topography

The solid geology comprises London Clay Formation - clay, silt and sand (BGS, 2017). These sedimentary deposits were formed approximately 34 to 56 million years ago during the Palaeogene Period in a local environment previously dominated by deep seas. This is principally overlain by Cover Sand (clay, silt and sand) – wind blown deposits formed up to 3 million years ago during the Quaternary Period comprised of medium – fine grained materials, forming lenses, beds (and locally) dunes.

The topography of the site slopes slightly north to south towards St Botolph's Brook. The northern region lies at approximately 45m AOD, with the southern area situated at a height of approximately 40m AOD. The landscape then continues to slope gradually to the brook at approximately 20m AOD.

4.0 Archaeological Context

Extracts from the conclusions of a Heritage Desk-Based Assessment prepared by Pegasus Group (Gilbey, R., 2017):

There are cropmarks recorded in close proximity to the site, and although their orientation does not suggest that the features they represent extend into the site there may be some potential for associated remains within the site. Although the site was possibly close to the area of the oppidum of Camulodonum, it is not suggested that it lay within its area. Hence, although there are no recorded archaeological remains within the site of prehistoric date, the very large amount of prehistoric activity in the vicinity and proximity of remains suggested by cropmarks does suggest some potential for previously unrecorded archaeological remains within the site.

Within the study area there is somewhat sparse evidence for Roman activity including the findspots of Romano-British artefacts and road metaling, although there is no evidence from within the site. Therefore, the potential for significant Romano-British archaeological remains within the site is considered to be low.

Within the study area there is recorded evidence for medieval settlements and features associated with domestic and industrial use including the pottery kiln. There is no evidence for medieval settlement features or finds within the site and the recorded settlement pattern suggests that the potential for significant archaeological remains of medieval date to be present within the site is low.

5.0 Methodology

The survey methodology is based on guidelines set out in the documents *'Geophysical Survey in Archaeological Field Evaluation'* (English Heritage. 2008) and '*Standard and Guidance for Archaeological Geophysical Survey'* (Chartered Institute for Archaeologists, 2014). A Method Statement for the survey was prepared by PCG and submitted to Pegasus Planning Group (Bunn, 2017).

5.1 Fluxgate Gradiometry is a non-intrusive scientific prospecting tool that is used to determine the presence/absence of some classes of sub-surface archaeological features (e.g. pits, ditches, kilns, and occasionally stone walls).

The use of magnetic surveys to locate sub-surface ceramic materials and areas of burning, as well as magnetically weaker features, is well established, particularly on large green field sites. The detection of anomalies requires the use of highly sensitive instruments; in this instance the Bartington 601 Dual Fluxgate Gradiometer. This is accurately calibrated to the mean magnetic value of each survey area. Two sensors mounted vertically and separated by 1m measure slight, localised distortions of the earth's magnetic field, which are recorded via a data logger.

This technique only records magnetic variation in relation to natural background levels, established by careful selection of magnetically 'quiet' zones where instrument sensors are calibrated to 0nT. As such, the magnetic response of archaeological remains will vary according to geology/pedology, with a possibility that buried features could remain undetected should their magnetic susceptibility closely match that of the surrounding soils. Additionally, some remains may be buried beyond the effective 1m - 2m range of the instrumentation; for example beneath alluvium. Back-filled shallow pits or ditches might also exhibit minimal variation.

5.2 The survey was undertaken on the 5th and 6th of December 2017. The zigzag traverse methodology was employed, with readings taken at 0.25m intervals along 1.0m wide traverses.

One 40m x 40m grid was resurveyed at the end of each day to demonstrate repeatability of results (available on request).

The survey grid was established by Global Positioning Satellite using a Leica GS015 RTX, to an accuracy of +/- 0.1m.

The data were processed by using *Terrasurveyor V3*.

The raw data are presented as greyscale images on Fig. 4 (clipped to +/-10nT to enhance resolution). A 'Despike' function was applied to reduce the effect of extreme readings induced by metal objects, and 'Destripe' to eliminate striping introduced by zigzag traversing. The data were clipped to +/- 20nT on the traces (xy) plot (Fig. 5) and +/-2nT on the greyscale images of the processed data (Fig. 2).

Anomalies in excess of +/-10nT are highlighted pink and blue on the interpretive figure (Fig. 3). These are characterised magnetically as dipolar 'iron spikes', often displaying strong positive and/or negative responses, which reflect ferrous-rich objects (particularly apparent on stacked trace plots). Examples include those formed/deposited along current or former boundaries (e.g. wire fencing), services and random scatters of horseshoes, ploughshares etc across open areas. Fired (ferro-enhanced) material, such as brick/tile fragments (often where the latter are introduced during manuring or land drain construction) usually induce a similar though predominately weaker response, closer to c+/-5nT (highlighted in pink/blue on the interpretive image). Collectively, concentrations of such anomalies typically indicate probable rubble spreads, such as backfilled ponds/ditches and demolished buildings. On a cautionary note, fired clay associated with early activity has the same magnetic characteristics as modern brick/tile rubble. As such, the interpretation of such variation must consider the context in which it occurs.

It should be noted that this technique only records magnetic variation (relative to natural background levels). As such, the magnetic response of archaeological remains will vary according to geology/pedology. Additionally, remains may be buried beyond the effective 1 - 2m range of the instrumentation.

6.0 Results and discussion (Figs. 2 – 5)

The survey recorded widespread and magnetically weak variation in both fields (Fig. 3: greenscale). Elements of linear trends exhibit some potential as ditches (for example, in the central part of Field 2), though these have been primarily interpreted as potential silty deposits contained within palaeochannels. More extensive and seemingly amorphous variation is probably indicative of concentrations of ferrous-enhanced deposits within soils and/or wind blown sand. Whilst an alternative origin as pits for magnetically weak discrete anomalies should not be discounted, it has not been possible to confidently differentiate between natural and archaeological features (should any such remains lay within the site).

A moderately strong ditch-type response that was detected in proximity to the southern edge of Field 1 (dotted red line). This is probably of anthropogenic origin, though potentially merely a backfilled gully that drained into St Botolph's Brook and thus of minimal archaeological value.

Stronger responses (predominately pink and blue) include those induced by a SE-NW aligned buried service that extends across site (blue line), two electric fences in Field 2 (yellow lines), and probable modern debris in the north-eastern and south-eastern corners of Field 2. More isolated stronger anomalies probably signify miscellaneous ferrous-rich debris contained within the ploughsoil, such as ploughshares, other iron objects and fragments of brick and tile.

7.0 Conclusions

The survey has not recorded magnetic anomalies that can be confidently attributed to potentially significant archaeological remains; it is likely most weak variation relates to natural features. A potential backfilled ditch in the eastern part of the site possibly served as a drainage gulley.

Stronger variation was registered over a buried service, electric fences and likely modern debris.

8.0 Acknowledgements

Pre-Construct Geophysics would like to thank Pegasus Planning Group Ltd for this commission.

9.0 References

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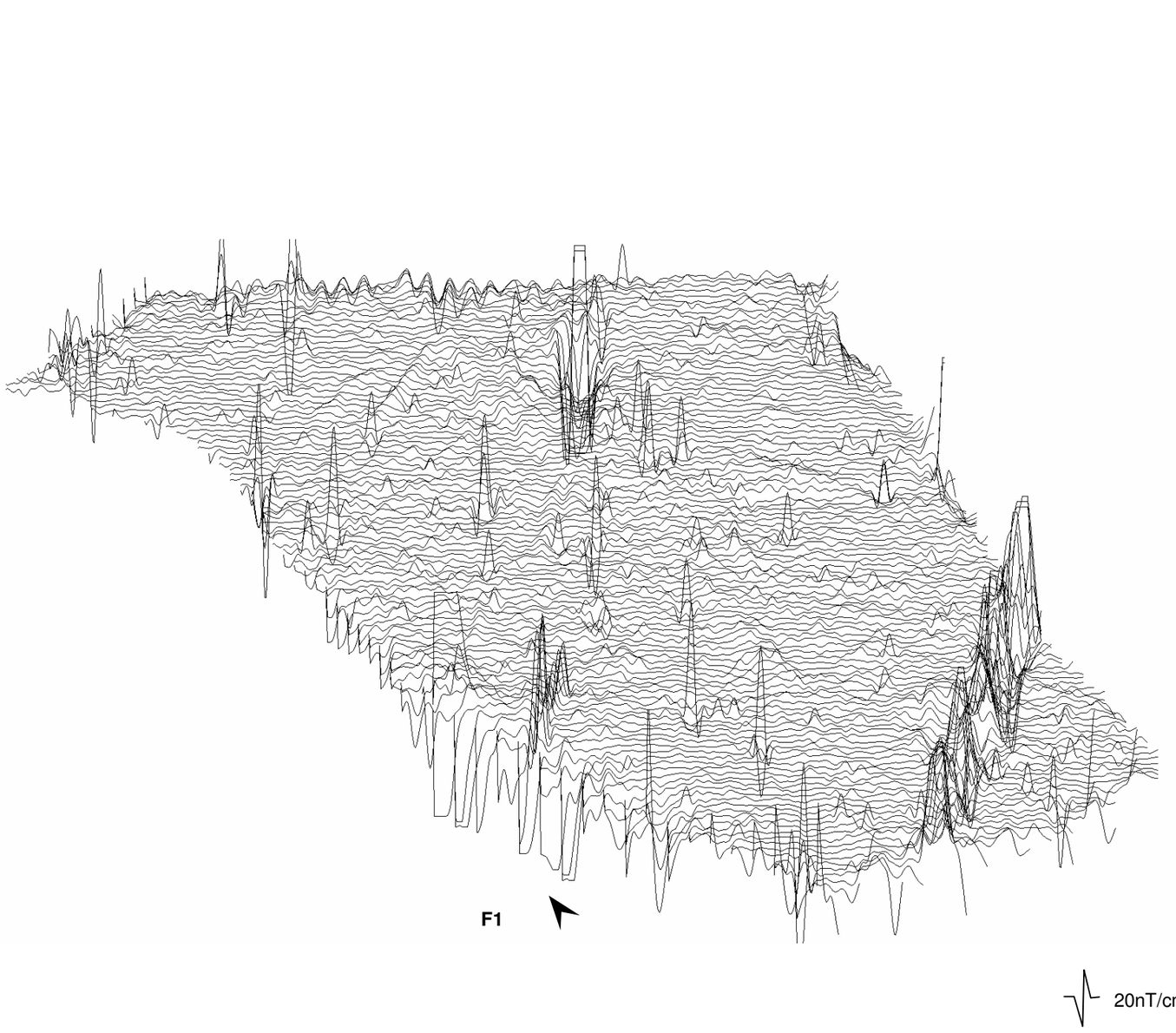
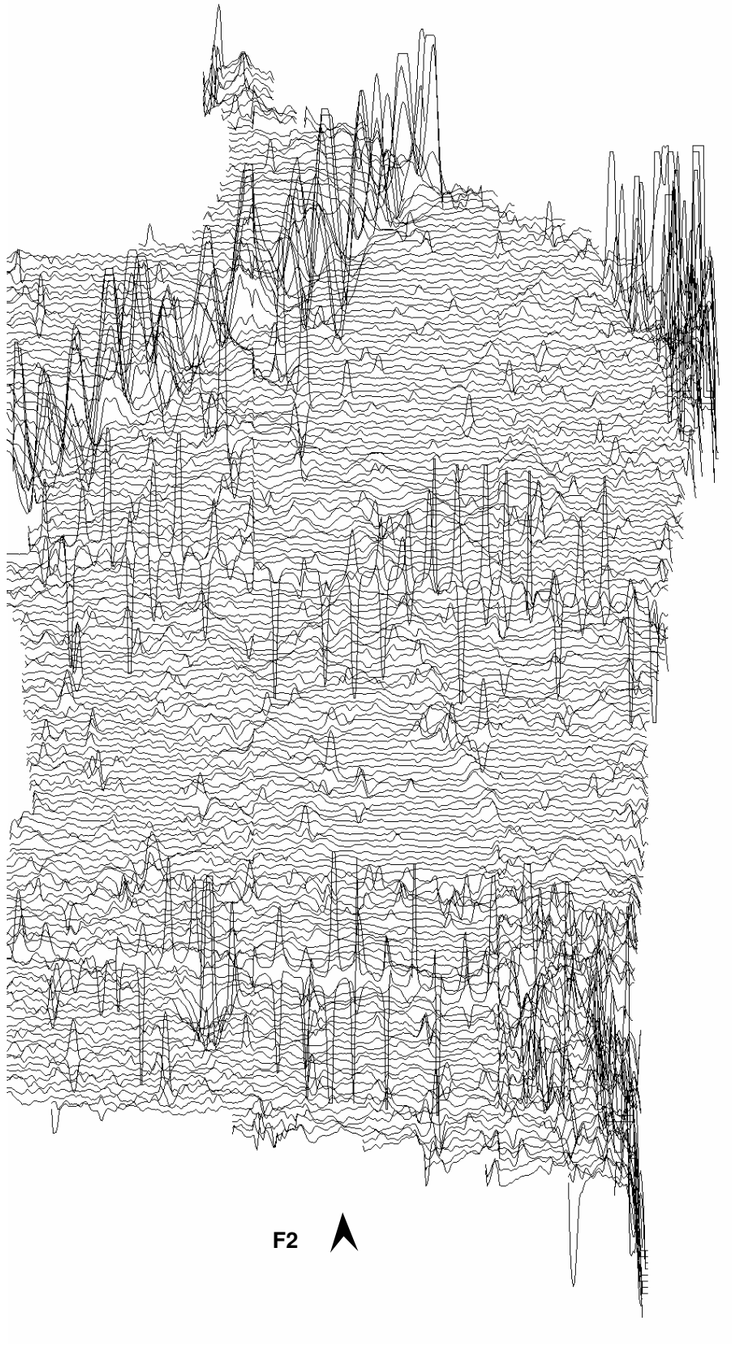
Fig. 2: Greyscale images of processed data

Fig. 3: Interpretation

Fig. 4: Greyscale images of unprocessed data





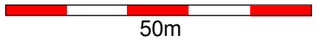


Fig. 5: Trace plot images