A GEOPHYSICAL SURVEY ON LAND OFF OSGODBY LANE, OSGODBY, NORTH YORKSHIRE

A programme of research carried out on behalf of

On Site Archaeology

by

GeoQuest Associates

INTRODUCTION

This report presents the results of geomagnetic surveys which have been carried out on land adjacent to Osgodby Lane, Osgodby, North Yorkshire (NGR: 5057 4846) prior to a proposed housing development. The work was undertaken on behalf of On Site Archaeology in accordance with a brief prepared by Neil Campling, County Archaeologist for North Yorkshire.

The aim of the surveys was to establish the location and extent of subsoil archaeological features within a 1.2ha section of the application area. The study involved the survey of four fields (Areas 1-4) shaded yellow in Figure 1.

LANDUSE, TOPOGRAPHY AND GEOLOGY

At the time of survey the fields investigated were being utilised as pasture and were divided by gorse bushes and wire fencing. The entire study area slopes gently to the east and south with a mean elevation of approximately 76m AOD and includes the well-preserved remains of an ancient ridge and furrow farming system.

Information provided by the Geological Survey shows that the solid geology of the study area is close to the boundary between Upper Jurassic Corallian and the Oxford Clay and Kellaways Beds series. There are no rock outcrops in the study area.

THE GEOPHYSICAL SURVEY

Choice of Technique

The primary aim of the geophysical survey was to map any subsoil features of archaeological interest within areas of the proposed development. Previous research has shown that in the majority of cases a significant magnetic susceptibility contrast exists between the undisturbed subsoil and the fill of cut features such as ditches and pits, as well as between the subsoil and stone features such as foundations and tracks. Geomagnetic surveying should therefore be an appropriate and rapid technique for locating buried archaeological features in this instance.

Field Methods

Measurements of vertical geomagnetic field gradient were taken over a regular grid using a Geoscan FM36 fluxgate gradiometer with ST1 sample trigger (Appendix A provides further information about the technique). A zig-zag traverse scheme was

employed and data were logged in grid units of 20 x 20m at 1.0 x 0.5m intervals within each of the sample areas.

Data were downloaded on site into a Toshiba Satellite 110CT laptop computer for processing, printing and storage. These data were subsequently transferred to a laboratory computer for further processing, interpretation and archiving (Appendix B).

Data Processing

The GeoQuest **InSite®** Windows software was used to process the geophysical data and produce continuous tone grey-scale images of the raw data at a scale of 1:500 on base plans digitised from the 1:2500 OS map (Figures 2 and 3). Two levels of contrast have been used in these images in order to enable to detection of subtle geomagnetic features of possible archaeological interest.

The following basic processing steps were applied to the data:

Removal of Striping Artefacts in the images caused by alternating changes in level between zig-zag traverses.

Removal of Random 'Spikes' present in the data, usually due to small ferrous objects on or near the ground surface. This process replaces spikes with the mean of near-neighbours.

DeShear corrects for apparent shear in strong geomagnetic anomalies surveyed by zig-zag traversing.

Adjustment of Grid Mean Values to achieve an optimum match along the lines of contact between data grids.

Interpolation of the data, using a bilinear function, to generate a regular mesh of values at 0.25 x 0.25m intervals for the geomagnetic survey.

Printing of the processed data on a Hewlett Packard HP650C DesignJet plotter with 256 grey shades and 600 dpi resolution. A sigmoid function was used to map the data to printed grey tones since this provides a measure of contrast equalisation.

Appendix B provides a more detailed explanation of the processing steps.

INTERPRETATION

Key to Figures

A number of anomalies have been detected in the geomagnetic data and these are presented on a 1:500 geophysical interpretation plan using coded colours and patterns (Figure 4). The types of anomalies which have been distinguished are depicted as follows:

1 **Green:** Significant regions of anomalously *high magnetic field gradient* which could be associated with high susceptibility materials and structures such as *pits* and *ditches* or the *ridges* of a ridge and furrow farming regime.

2 **Blue**: Areas of anomalously *low magnetic field gradient*, corresponding to material with low magnetic susceptibility, such as *stoney areas* or the *furrows* of a ridge and furrow farming regime.

3 **Red:** Strong *dipolar anomalies* (paired positive-negative) whose most probable sources in this instance are near-surface ferrous objects such as *fence wire* or *litter*.

An archaeological interpretation is shown at a scale of 1:500 in Figure 4 and is discussed below.

Area 1

1 Eight c. 3m wide, N-S aligned, positive magnetic lineations have been detected in this area spaced approximately 10m apart (**f1**). Such sinuous positive magnetic anomalies are typical of ridge and furrow farming regimes, usually reflecting the soil-filled furrows between the former ridges. However, in this instance each positive lineation is more likely to correspond to the lens of upcast high magnetic susceptibility soil that comprises a surviving ridge.

2 In the northernmost part of this area a linear, positive magnetic anomaly and an adjoining negative magnetic lineation with E-W orientation have been detected (**f2**). These anomalies are approximately perpendicular to the trend of the ridge and furrow and correspond to the position of an existing bank and ditch, the location of which is typical of a headland of a ridge and furrow regime.

3 A weak, E-W oriented, negative magnetic lineation has been detected near the centre of this area (**f3**). This anomaly may reflect the position of a stoney pathway or a plastic service pipe associated with the houses to the northwest and clearly post-dates the ridge and furrow which it traverses.

4 A diffuse linear distribution of magnetic dipoles detected along the eastern limit of this survey area almost certainly reflects a deposit of ferrous litter along the line of a gorse hedgerow.

5 A scatter of small dipolar magnetic anomalies has been detected across this area and probably marks the presence of ferrous litter within the topsoil.

Area 2

1 Two prominent, positive magnetic anomalies have been detected in this area, which are similar in proportion and orientation to those in Area 1 (**f4**). Hence these lineations are also interpreted as the ridges of an ancient farming regime as discussed above.

2 A discrete group of dipolar magnetic anomalies detected in the southernmost part of this area almost certainly reflects a concentration of sub-surface ferrous debris (**f5**). It seems likely that this marked anomaly represents debris and ferrous litter infilling a former pond that is known to have been located in the vicinity.

3 An intense dipolar magnetic lineation located along the eastern limit of this survey area reflects the presence of a post and wire fence in this position (not shown on OS map).

4 All remaining magnetic anomalies detected in this area are thought to represent items of ferrous litter on or within the soil.

Area 3

1 Three parallel, positive magnetic lineations have been detected which are similar to those mapped in Areas 1 and 2 (**f6**). These anomalies are most likely to be ridges forming a continuation of the ridge and furrow farming regime evident in the adjacent Areas.

2 An intense, dipolar magnetic anomaly located in the northeastern corner of this area reflects the presence of an existing steel shed.

3 Several magnetic dipoles or various magnitudes almost certainly correspond to near-surface ferrous debris.

Area 4

1 A few positive magnetic anomalies have been detected in this area which reflect soil of increased magnetic susceptibility and probably represent a continuation into this area of the ridge and furrow farming regime detected in adjacent fields (**f7**).

2 Several large dipolar magnetic anomalies have been detected that correspond to the locations of ferrous structures which include: farm machinery, inspection covers, a shed, gates and wire fencing. These intense dipolar anomalies have masked the majority of the geophysical data in this area making a clear archaeological interpretation difficult.

SUMMARY AND CONCLUSIONS

The results of this research are summarised below:

1 A geomagnetic survey has been carried out over four fields adjacent to Osgodby Lane in Osgodby, North Yorkshire, prior to a proposed housing development.

2 Several positive magnetic anomalies have been detected that correlate with the ridges of an extant ridge and furrow system in Areas 1, 2 and 3. These positive magnetic lineations are separated by negative magnetic anomalies, almost certainly representing furrows, which are most evident in the eastern part of the application area where the earthworks are best preserved.

3 Other positive magnetic anomalies in Area 4 have been tenuously interpreted as archaeological features but may only be an extension of the ridge and furrow regime from the adjacent areas. In this area the confusion in the geomagnetic data resulting from the abundance of ferrous objects has made any archaeological interpretation difficult.

4 In the northernmost part of Area 1 two discrete lineations have been detected by the geomagnetic survey which could reflect a single archeological feature comprised of a bank and ditch. The location and orientation of this linear feature would suggest that it represents a headland to the ridge and furrow system.

5 A weak negative magnetic lineation detected in Area 1 may represent the position of a pathway or service pipe associated with the neighbouring houses.

6 A discrete concentration of magnetic dipoles located in the southern part of Area 2 is likely to reflect a collection of ferrous debris and may indicate the position of a filled pond.

7 Many intense dipolar magnetic anomalies detected in all the survey areas correspond to wire fencing, farm machinery, a shed, gates and miscellaneous near-surface ferrous litter.

CREDITS

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