STRATASCAN

Geophysical Survey Report

Cockshoot Farm, Wichenford, Worcestershire

for

Wichenford Local Heritage Group

September 2004

J1920.

David Sabin

REGISTERED ORGANISATION IFA

Document Title:	**Geophysical Survey Report** **Cockshoot Farm, Wichenford, Worcestershire**
Client:	**Wichenford Local Heritage Group**
Stratascan Job No:	**J1920**
Techniques:	**Detailed resistance survey**
National Grid Ref:	**SO 778 616**

Field Team:	Richard Smalley, Luke Brown, David Sabin, Alex Pimlow, Laurence Chadd
Project Manager:	David Sabin
Report written by:	David Sabin
CAD illustration by:	David Sabin
Checked by:	Kerry Donaldson

Stratascan Ltd.

Vineyard House
Upper Hook Road
Upton upon Severn
WR8 0SA

Tel: 01684 592266
Fax: 01684 594142
Email: ppb@stratascan.co.uk
www.stratascan.co.uk

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1 SUMMARY OF RESULTS

A resistance survey was carried out across two areas adjacent to Cockshoot Farm Wichenford, Worcestershire. Area 1, to the west of the farm, revealed a complex series of linear anomalies of uncertain origin. No clear relationship between these anomalies and an enclosure, visible as soil marks on aerial photography, could be established. Survey across Area 2, to the north of the farm, revealed ridge and furrow but no other archaeologically significant features.

2 INTRODUCTION

2.1 Background synopsis

Stratascan were commissioned by Wichenford Local Heritage Group to undertake a geophysical survey of an area identified by them as of possible archaeological interest. This geophysical investigation forms part of a detailed historical and archaeological study supported by the Heritage Lottery Fund.

2.2 Site location

The site is located at Cockshoot Farm, Wichenford, Worcestershire: OS Grid Reference SO 778 616

2.3 Description of site

The site consists of approximately 2ha of undulating agricultural land currently used to produce arable crops. Two survey areas were chosen to target soil and crop marks visible on aerial photographs. Area 1 is approximately 1.5ha and is located to the west of Cockshoot Farm; Area 2 is approximately 0.5ha located to the north of the farm.

The underlying geology is Triassic Mudstones including Keuper Marl (British Geological Survey South Sheet, Third Edition Solid, 1979). The overlying soils are known as Whimple 3 which are stagnogleyic argillic brown earths. These consist of medium loamy or medium silty drift over reddish-clayey material passing to clay or soft mudstone (Soil Survey of England and Wales, Sheet 3 Midland and Western England).

2.4 Site history and archaeological potential

The client provided aerial photographs and an abstract of their research to illustrate the reasons for their interest. Plate 1, below, shows distinct soil marks of a possible enclosure to the west of Cockshoot Farm and a less well defined smaller enclosure to the north of the farm.

Plate 1. Aerial photograph of Cockshoot Farm looking north east. A possible enclosure is clearly visible in the centre of the photograph (west of Cockshoot Farm) with a second smaller enclosure less well defined to the north of the farm.

2.5 Survey objectives

The objective of the survey was to locate anomalies associated with the two enclosure sites that may help to characterise their former purpose and period of use.

2.6 Survey methods

Detailed soil resistance measurements were taken to identify any archaeological features. Resistivity was considered the most effective technique on this geology which is known to produce poor results with magnetic techniques. More information regarding detailed resistance survey is included in the Methodology section below.

Rectification of aerial photography was also carried out in order to help interpretation of enclosures visible as soil marks. The rectification was carried out using ER Mapper with ground control obtained from Ordnance Survey base mapping.

3 METHODOLOGY

3.1 Date of fieldwork

The fieldwork was carried out over 2.5 days from Thursday 16 September to Tuesday 21 September 2004 when the weather was dry during the first two days of the survey and wet during the remainder.

3.2 Grid locations

The location of the survey grids has been plotted in Figure 2 together with the referencing information.

3.3 Description of techniques and equipment configurations

This method relies on the relative inability of soils (and objects within the soil) to conduct an electrical current which is passed through them. As resistivity is linked to moisture content, and therefore porosity, hard dense features such as rock will give a relatively high resistivity response, while features such as a ditch which retains moisture give a relatively low response.

The resistance meter used was an RM15 manufactured by Geoscan Research incorporating a mobile Twin Probe Array. The Twin Probes are separated by 0.5m and the associated remote probes were positioned approximately 15m outside the grid. The instrument uses an automatic data logger which permits the data to be recorded as the survey progresses for later downloading to a computer for processing and presentation.

Though the values being logged are actually resistances in ohms they are directly proportional to resistivity (ohm-metres) as the same probe configuration was used through-out.

3.4 Sampling interval, depth of scan, resolution and data capture

3.4.1 *Sampling interval*

Readings were taken at 1.0m centres along traverses 1.0m apart. This equates to 900 sampling points in a full 30m x 30m grid. All traverses were surveyed in a “zigzag” mode.

3.4.2 *Depth of scan and resolution*

The 0.5m probe spacing of a twin probe array has a typical depth of penetration of 0.5m to 1.0m The collection of data at 1m centres with a 0.5m probe spacing provides an optimum resolution for the technique.

3.4.3 *Data capture*

The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each job, data is transferred to the office for processing and presentation.

3.5 Processing, presentation of results and interpretation

3.5.1 *Processing*

The processing was carried out using specialist software known as *Geoplot 3* and involved the 'despiking' of high contact resistance readings and the passing of the data though a high pass filter. This has the effect of removing the larger variations in the data often associated with geological features. The nett effect is aimed at enhancing the archaeological or man-made anomalies contained in the data.

The following schedule shows the processing carried out on the processed resistance plots.

Despike	*X radius = 1*
	Y radius = 1
	Spike replacement
High pass filter	*X radius = 10*
	Y radius = 10
	Weighting = Gaussian

3.5.2 *Presentation of results and interpretation*

The presentation of the data for each area involves a print-out of the raw data as grey scale plots (Figures 3 and 6), together with grey scale plots of the processed data (Figures 4 and 7). Anomalies have been identified and plotted onto ‘Abstraction and Interpretation of Anomalies’ drawings (Figures 5 and 8). Additional plots were added to reveal the extent of the enclosure sites as determined by rectification and analysis of aerial photography (Figure 9) and a comparison between resistive anomalies and a trench excavated by the Worcestershire Archaeological Service (Figure 10).

4 RESULTS

Survey across Areas 1 and 2 produced a number of mostly high resistance linear anomalies with additional high and low resistance areas. The following discussion deals with the two areas separately and should be used in conjunction with the appropriate plots.

Area 1 (Figures 3 – 5)

Linear and curvilinear high resistance anomalies with an uncertain origin have been abstracted and categorised across the survey area (orange brown colour – Figure 05). A degree of complexity exists within this group of anomalies that does not allow a detailed interpretation or characterisation to be performed. Although there is some uncertainty in the interpretation of these anomalies, the category reflects an increased likelihood that some may relate to archaeological features. There are fragmented elements of rectilinear form towards the southern end of the area that are, unfortunately, too diffuse to allow confident interpretation but nevertheless are to be flagged as possible structural remains.

High resistance features are often associated with structural remains, such as building footings and demolition rubble, although a degree of caution should be exercised. Cut features, such as ditches, may become filled with material having different porosity and compaction compared to the surrounding undisturbed subsoil or solid geology, this may also result in the formation of a high resistance anomaly; Figure 10 possibly indicates such a case. An excavation trench cut across the south eastern corner of Area 1 by Worcestershire Archaeology Service located a former ditch correlating with the position of a high resistance linear anomaly. This feature forms part of the eastern side of the enclosure site noted from aerial photographs (see Plate 1 above). The upper fill of the ditch appears to have had a capping of firm clay silt almost indistinguishable from the surrounding marl possibly representing a phase of deliberate backfilling. The inclusion of post medieval tile in this fill could easily link the capping with building and rebuilding at the adjacent farm (D. Miller, Worcestershire Archaeological Service pers comm). The high resistance measured in this case is very likely to have been caused by the backfilled material and it is therefore possible that other high resistance linear anomalies across the survey area may also relate to ditch features that have been similarly in-filled.

An area of high resistance forms a diffuse anomaly within the northern half of the survey. As for the above linear anomalies, this too may represent a cut feature that has been backfilled. This type of response would, however, also be consistent with a spread of stone, rubble or other material of low porosity and natural pedological or geological variations should not be dismissed.

A high resistance linear anomaly crossing the survey area from west to east has been interpreted as a track way. This track correlates with a slight undulation in the ground surface and may have linked to former buildings at Cockshoot Farm. The high resistance response may be associated with compacted soil or surfacing materials used in the construction of the track.

An area of low resistance is associated with a small pond located within the survey area and is presumed to be relatively modern in origin. High resistance anomalies interpreted as agricultural in origin were caused mainly by subsurface 'mole' drainage operations carried out immediately prior to the survey.

Area 2 (Figures 6 – 8)

High resistance linear anomalies located across Area 2 have been caused by modern ploughing and former ridge and furrow field systems. No characteristically archaeological anomalies were located in the area.

Airphoto rectification (Figure 9)

The results of the rectification of aerial photographs in order to plot soil marks were poor. Due do a number of factors it was not possible to offer an accurate rectification and no confident statement of accuracy can be derived. Figure 9 offers a 'best fit' approach but is liable to contain significant distortion; scaling from the plot should be used with caution.

Although the image distortion is related to a number of factors such as lens and focal plane characteristics, obliqueness and aircraft position, the lack of adequate ground control has been the main reason for the poor rectification. Additional ground survey in order to improve the positional accuracy of ground control points used in the rectification would be required in order to produce a more accurate result. It should also be noted that the interpretation of former banks and ditches is as a result of the soil colour; lighter brown tones have been assumed to relate to former banks and darker browns are assumed to relate to former ditches. Colour variation is often as a result of differences in soil hydrology and organic content.

5 CONCLUSION

The resistance survey has identified linear and area anomalies in Area 1 that cannot be effectively interpreted due to their diffuse and fragmented nature. These anomalies should be considered as being of potential archaeological origin and further investigation through targeted excavation may be the only option to further understand the features. Survey across Area 2 has revealed no anomalies of archaeological significance although has revealed the orientation of the former ridge and furrow.

The relationship of features located by the geophysical survey across Area 1 and the surrounding former enclosure visible as soil marks on aerial photography is uncertain. Linear anomalies do not tend towards an orthogonal layout within the enclosure which may suggest different periods of unrelated activity at the location. The clear response to ridge and furrow within Area 2 would suggest that the enclosure visible on aerial photographs had an agricultural function only.