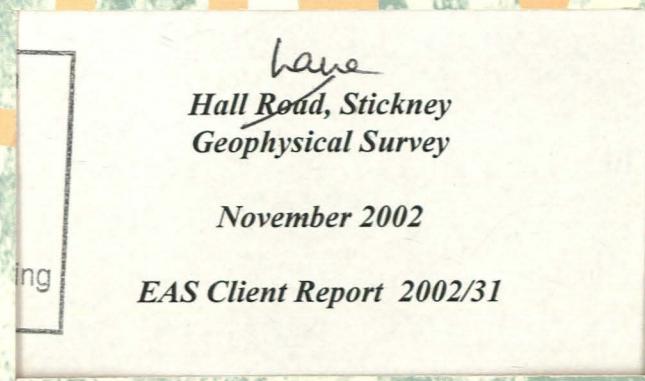


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Engineering Archaeological Services Ltd

EOLACV



November 2002

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EAS Client Report 2002/31

QENTS L13817 L13820 L13821 L13822
Mag scanning Dated 06 May MagSW Resistivity CL 16187

SOURCE L18465

PRNT (41050) 40194

*Survey Commissioned
by
Archaeological Project Services*

*Surveyed
by
I.P. Brooks
Engineering Archaeological Services Ltd.*

*registered in England
No 2869678*



*have
Hall Road, Stickney
Geophysical Survey*

November 2002

EAS Client Report 2002/31

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Hall Lane Stickney, Geophysical Survey - Introduction:

NGR

Centred on TF 34250 57075

Location and Topography (Figure 1)

The survey area was accessed from Hall Lane, Stickney, Lincolnshire where the proposed development site has a frontage. The majority of the site, however lies behind the cemetery associated with St Luke's Church and the rest home fronting onto the A16. The north and western sides of the survey area were bounded by agricultural land.

The survey area had been allowed to grow to rough pasture which had been cut prior to the survey. There was a slight ridge running roughly north-south in the eastern half of the survey and a slight hollow bounded on the south side by a low bank may suggest the presence of a infilled pond in the central area. Another low bank was also noted running east - west from the western boundary to the mid point of the field.

It has been reported that the western half of the field has been bulldozed. The ground was very wet at the time of survey with standing water both in the hollows on the site and in the ruts caused by the machinery used to cut the field.

Archaeological Background

Prehistoric and Roman remains have both been located within Stickney parish, although the prehistoric finds have tended to concentrate on the moraine edge close to the fen.

The proximity of the survey area to the church suggests that it is within the Medieval core of the parish. Indeed remains of stone building foundations have been identified within the eastern part of the development area together with ridge and furrow in the western side of the area. Documentary evidence would suggest that any structures are pre AD 1724 in date.

Several filled ponds have also been noted from the area.

Aims of Survey

To gather sufficient information to establish the location and extent of any archaeological features within the development area and, if possible, to characterise the archaeology located.

SUMMARY OF RESULTS

The Fluxgate Gradiometer survey would suggest the possibility of extensive archaeological activity within the proposed development area. This concentrates on the higher ground of the ridge running north south. It is possible that a sub-rectangular area in the north-east corner of the site may be associated with a structure.

Magnetic scanning would also suggest a level of archaeological activity within the western half of the development area. This was particularly noted on two low banks crossing the area.

The conditions for the Resistivity survey were not ideal with the ground being too wet, however, areas of high resistance were noted. One of these is adjacent to the rectilinear anomaly noted in the Fluxgate Gradiometer survey and may represent a spread of building rubble.

Hall Lane Stickney, Geophysical Survey -Results:

Methods

The western half of the proposed development was scanned with a Geoscan FM 36 Fluxgate Gradiometer. Transects were walked at approximately 10 m intervals across the fields and magnetic anomalies ± 5 nT were sketch plotted onto 1:2500 maps of the development area. The higher than normal tolerances were needed because of the level of magnetic variability within the survey area.

The Fluxgate Gradiometer survey was undertaken using six 30 x 30 m grid squares laid out as in Figures 2. Readings were taken at 0.5 m intervals along transects 1 m apart. These transects were walked in a zigzag pattern.

The survey was carried out using a Geoscan FM 36 Fluxgate Gradiometer with a ST 1 sample trigger. Grey Scale and X - Y Plots were produced using Geoscan Research "Geoplot" v. 3.00e.

The Resistivity survey was carried out on three 30 x 30 m grid squares laid out as in Figure 3. Readings were taken at 1 m intervals along transects 1 m apart with a Geoscan RM15 Resistivity Meter using a 0.5 m single twin array. Grey Scale and X - Y Plots were produced using Geoscan Research "Geoplot" v. 3.00e

Survey Results:

Area

The development area covers approximately 1.15 Ha, of which approximately 0.8 ha was scanned with a Fluxgate Gradiometer. A further 0.35 Ha was subjected to detailed survey with the Fluxgate Gradiometer. An area of approximately 0.2 was also subjected to Resistivity survey.

Display

The results are displayed as Grey Scale Image and as X-Y Trace Plots. Figures 4, 5, 7 and 8.

Results:

Magnetic Scanning

The scanned area was moderately noisy throughout the area, however it was possible to locate four areas which had higher magnetic variability than the background.

The southern part of the survey from its access onto Hall Lane to the point at which the field broadens out was very noisy with the magnetic field varying by as much as ± 60 nT. The proximity to the road in the south part of this anomaly may suggest modern disturbance, however the possibility of archaeological features cannot be discounted.

Two broad bands of magnetic disturbance were also noted. Both of these were associated with slightly higher ground. Indeed the northern of the two bands would appear to be on a low bank marking the southern edge of a possible filled pond. It is curious that these anomalies correspond to apparent physical features as the area is supposed to have been bulldozed.

A discrete anomaly approximately 4 m in diameter was also noted. This varied by ± 70 nT and although these readings are high they are not considered to be of a form suggesting a metal object and may represent a concentration of burnt clay such as an oven or brick structure.

These anomalies are shown in cyan on Figure 10.

Fluxgate Gradiometer Survey

The survey area was magnetically very active suggesting the presence of considerable archaeological activity. It was possible, however, to define a number of separate anomalies which are probably of archaeological origins. In the north east corner of the survey area a roughly rectilinear area can be defined. This is approximately 10 x 17 m in size and aligned NE - SW. It is particularly clear along its SE and NE edges, although it can be defined along the other

Hall Lane Stickney, Geophysical Survey - Results:

edges. Its form and shape may suggest the presence of a structure.

Four discrete, sub-circular anomalies have also been defined. Each of these are approximately 5 m in diameter. The size, shape and magnetic strength of these anomalies would suggest that they are not the result of a ferrous object within the plough zone. It is possible, however, that they may be the result of a concentration of burnt ceramic materials such as a hearth or oven.

There was a broad, bifurcating, linear anomaly in the southern half of the survey area. This starts in Grid 6 where it runs approximately north-south. It then turns to run approximately east-west and bifurcates. At the western end this anomaly roughly aligns with the anomaly, noted in the scanning, skirting the southern edge of an assumed filled pond. The origins of this anomaly is unknown.

The anomalies of possible archaeological origins are shown in red on Figures 6 and 10.

Two parallel linear anomalies were noted running approximately north-south along the eastern half of the survey area. It is possible that these represent the remains of ridge and furrow and are shown in green on Figures 6 and 10.

An anomaly on the eastern side of the survey area had a marked ferromagnetic response and was the result of modern rubbish along this boundary. This is shown in blue on Figures 6 and 10.

Magnetic Susceptibility

It was possible to take soil samples in order to assess the magnetic susceptibility of the soils. It was not possible, however, to obtain a subsoil sample for comparison.

Sample	Volume	Mass
	susceptibility χ_v	susceptibility χ_m
Grid 1	130	144.4
Grid 3	451	484.9
Grid 5	181	212.9

The susceptibilities, as measured, are much higher than would be expected for similar surveys within the Lincolnshire Fen. It is suggested that the magnetic susceptibility sample would indicate a level of archaeological activity within the survey area.

Resistivity Survey.

The conditions for the resistivity survey were not ideal. The ground was extremely wet tending to mask any anomalies. It was possible, however to define a number of possible anomalies.

Four areas of high resistance were located. Whilst the majority of these follow the higher ground within the survey area, that in the north-east corner would abut the rectilinear anomaly noted in the Fluxgate Gradiometer survey. It might, therefore, represent a spread of building debris associated with the possible structure already noted.

The areas of high resistance are shown in yellow on Figures 9 and 10.

Two areas of low resistance were also noted. These broadly align with low areas in the field and possibly with filled ponds. These are shown in green on Figures 9 and 10.

Hall Lane Stickney, Geophysical Survey - Conclusions:

Conclusions

It is a fundamental axiom of archaeological geophysics that the absence of features in the survey data does not mean that there is no archaeology present in the survey area only that the techniques used have not detected it.

The proposed development area contains considerable evidence for potential archaeological activity. This tends to concentrate in the eastern half of the field, although some evidence has also been located in the western half. Much of both the magnetic and resistivity anomalies are associated with the slightly higher areas within the field, suggesting these may have been the focus for previous activity.

The level of activity is such that it is difficult to define specific features, however, the rectilinear magnetic anomaly in the north east corner of the survey area, together with the high resistance anomaly immediately to the south may suggest a structure in this part of the field. The presence of discrete magnetic anomalies elsewhere in the survey area may also suggest other potential foci of activity.

It should also be noted that the high magnetic susceptibility values gained would also suggest a level of previous activity on the site.

Hall Lane Stickney, Geophysical Survey - Technical Information:

Techniques of Geophysical Survey:

Magnetometry:

This relies on variations in soil magnetic susceptibility and magnetic remanence which often result from past human activities. Using a Fluxgate Gradiometer these variations can be mapped, or a rapid evaluation of archaeological potential can be made by scanning.

Resistivity:

This relies on variations in the electrical conductivity of the soil and subsoil which in general is related to soil moisture levels. As such, results can be seasonally dependant. Slower than Magnetometry this technique is best suited to locating positive features such as buried walls that give rise to high resistance anomalies.

Resistance Tomography

Builds up a vertical profile or pseudosection through deposits by taking resistivity readings along a transect using a range of different probe spacings

Magnetic Susceptibility:

Variations in soil magnetic susceptibility occur naturally but can be greatly enhanced by human activity. Information on the enhancement of magnetic susceptibility can be used to ascertain the suitability of a site for magnetic survey and for targeting areas of potential archaeological activity when extensive sites need to be investigated. Very large areas can be rapidly evaluated and specific areas identified for detailed survey by gradiometer.

Instrumentation:

1. *Fluxgate Gradiometer - Geoscan FM36*
2. *Resistance Meter - Geoscan RM4/DL10*
3. *Magnetic Susceptibility Meter - Bartington MS2*
4. *Geopulse Imager 25 - Campus*

Methodology:

For Gradiometer and Resistivity Survey 20m x 20m or 30m x 30m grids are laid out over the survey area. Gradiometer readings are logged at either 0.5m or 1m intervals along traverses 1m apart. Resistance meter readings are logged at 1m intervals. Data is down-loaded to a laptop computer in the field for initial configuration and analysis. Final analysis is carried out back at base.

For scanning transects are laid out at 10m intervals. Any anomalies noticed are where possible traced and recorded on the location plan.

For Magnetic Susceptibility survey a large grid is laid out and readings logged at 20m intervals along traverses 20m apart, data is again configured and analysed on a laptop computer.

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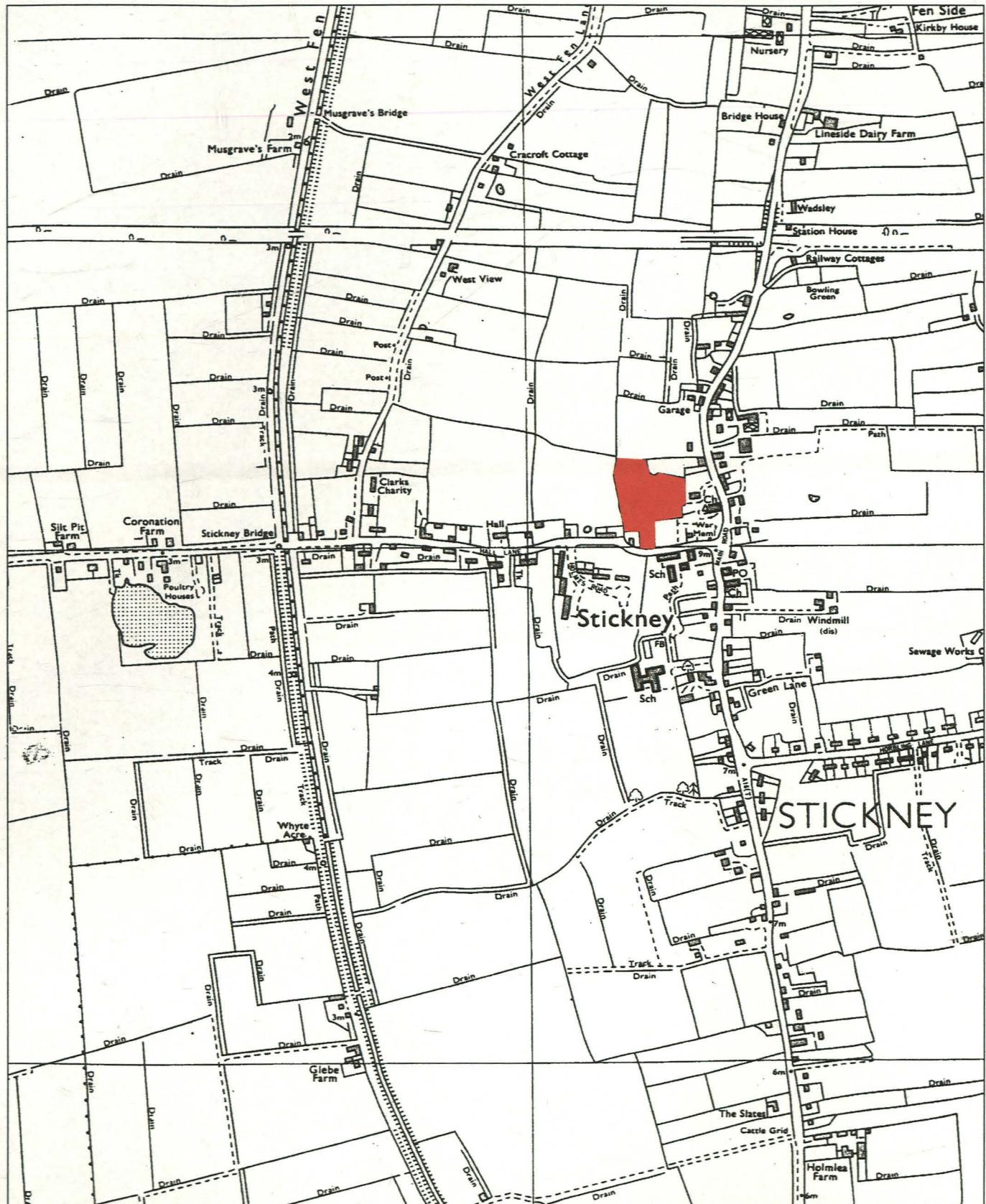


Figure 1: Location
Scale 1:10,000

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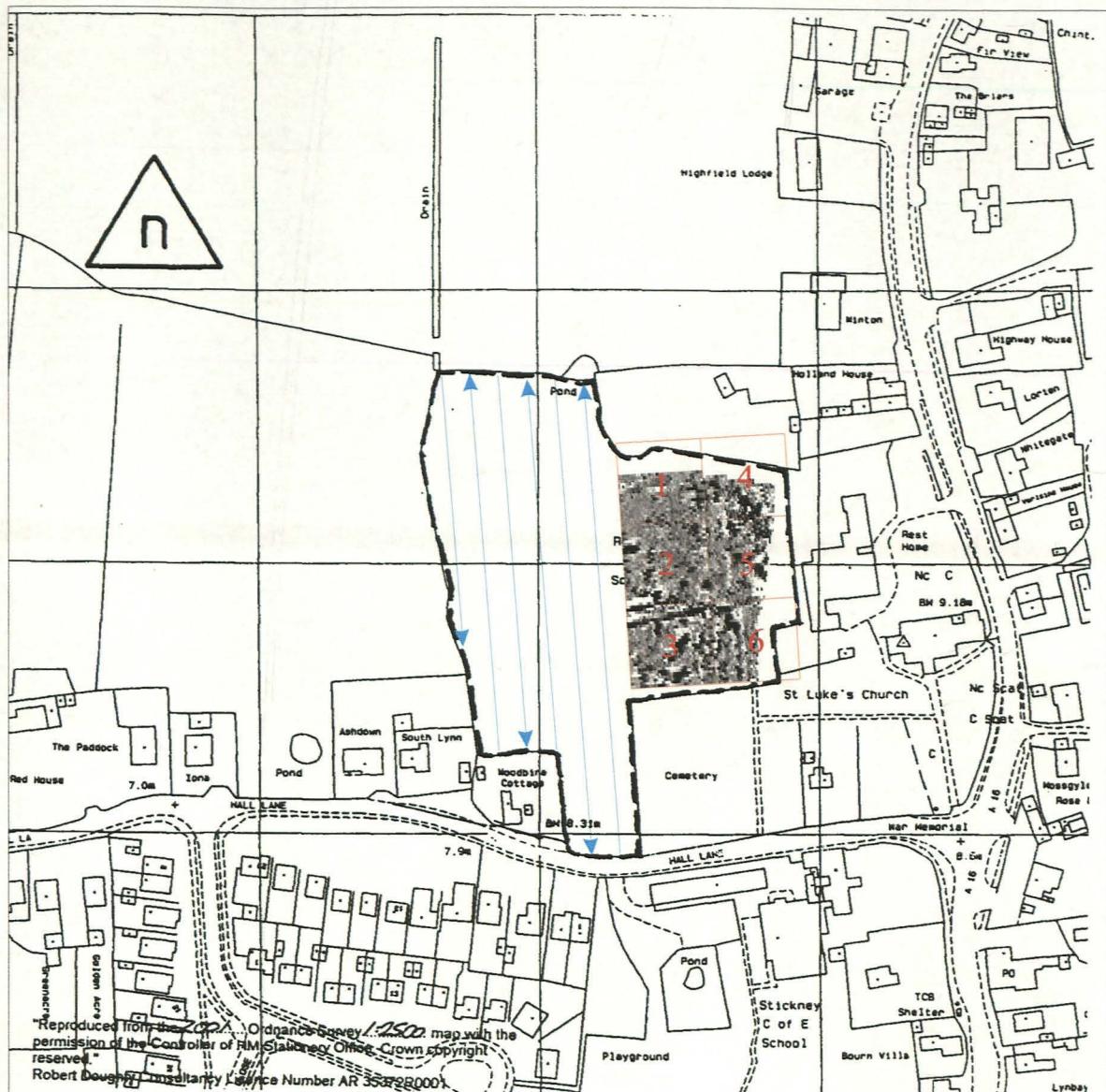


Figure 2: Location of Scanning and Fluxgate Gradiometer Survey

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Figure 3: Location of Resistivity Survey

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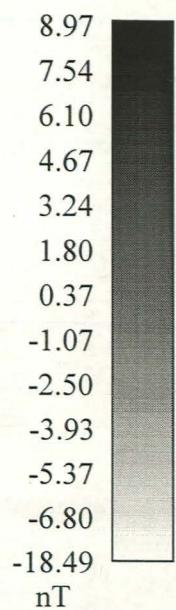
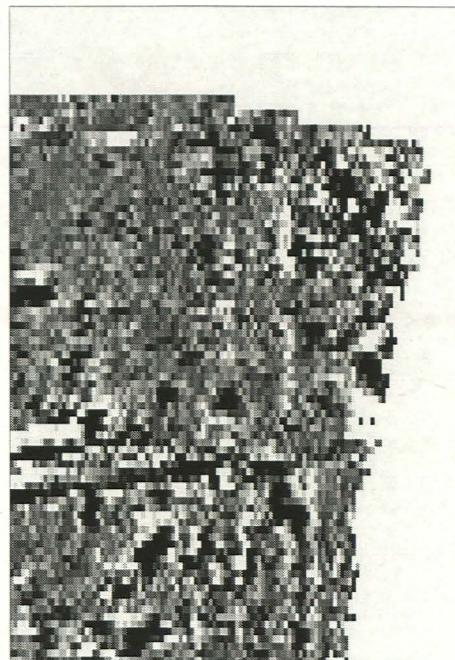
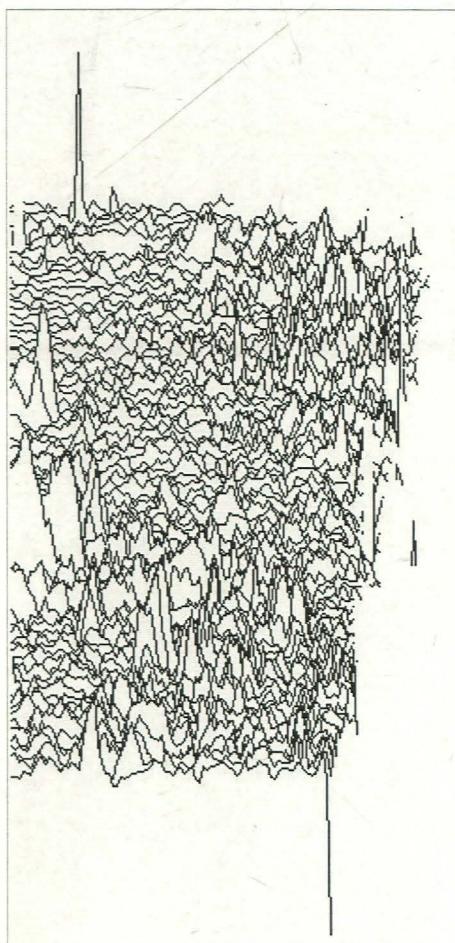


Figure 4: Grey scale plot of
Fluxgate Gradiometer survey

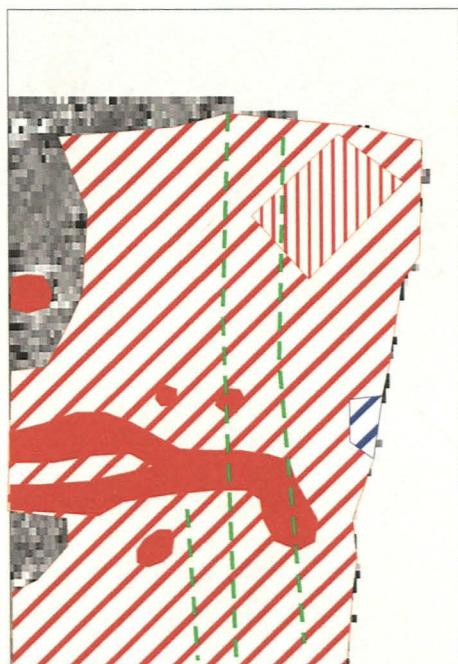
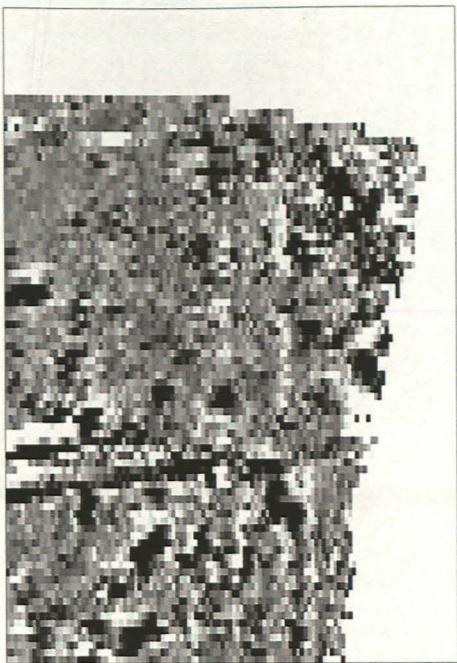
Scale 1:1000



80.00
nT

Figure 5: X - Y plot of
Fluxgate Gradiometer survey

Scale 1:1000



- Probable archaeological anomaly
- ▨ Possible archaeological anomaly
- ▨ Area of magnetic disturbance
- ▨ Ferromagnetic disturbance
- - - Possible ridge and furrow

Figure 6: Fluxgate Gradiometer survey
Interpretation

Scale 1:1000

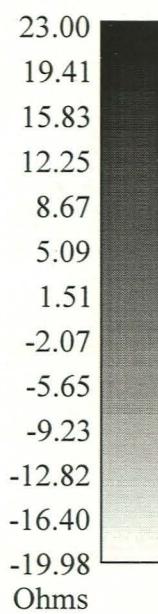
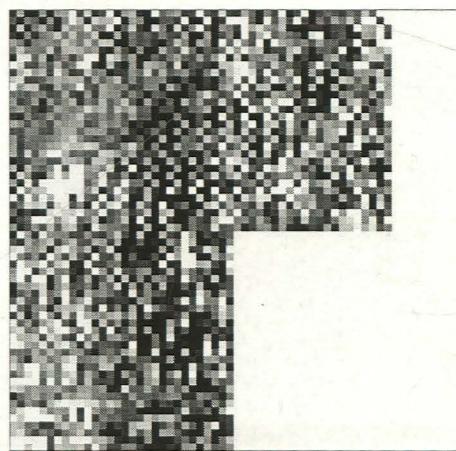
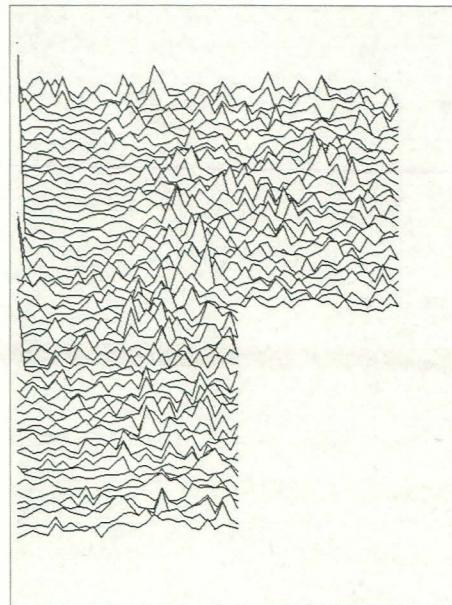


Figure 7: Grey scale plot of Resistivity survey

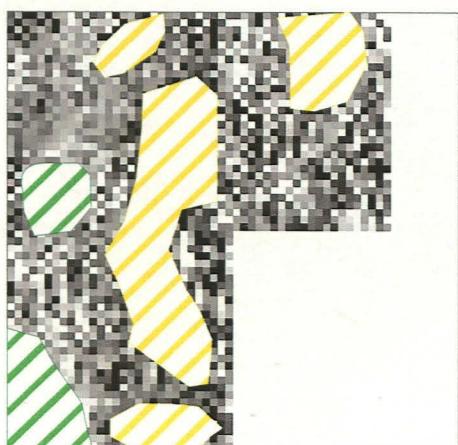
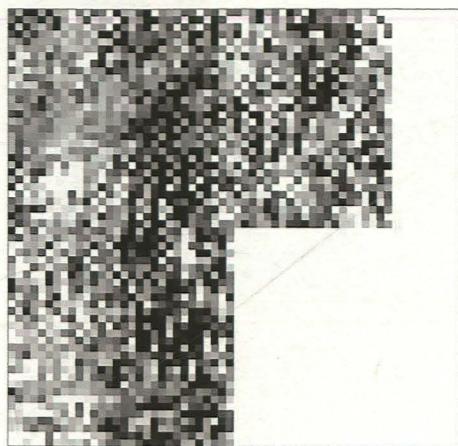
Scale 1:1000



100.00
Ohms

Figure 8: X - Y plot of
Resistivity survey

Scale 1:1000

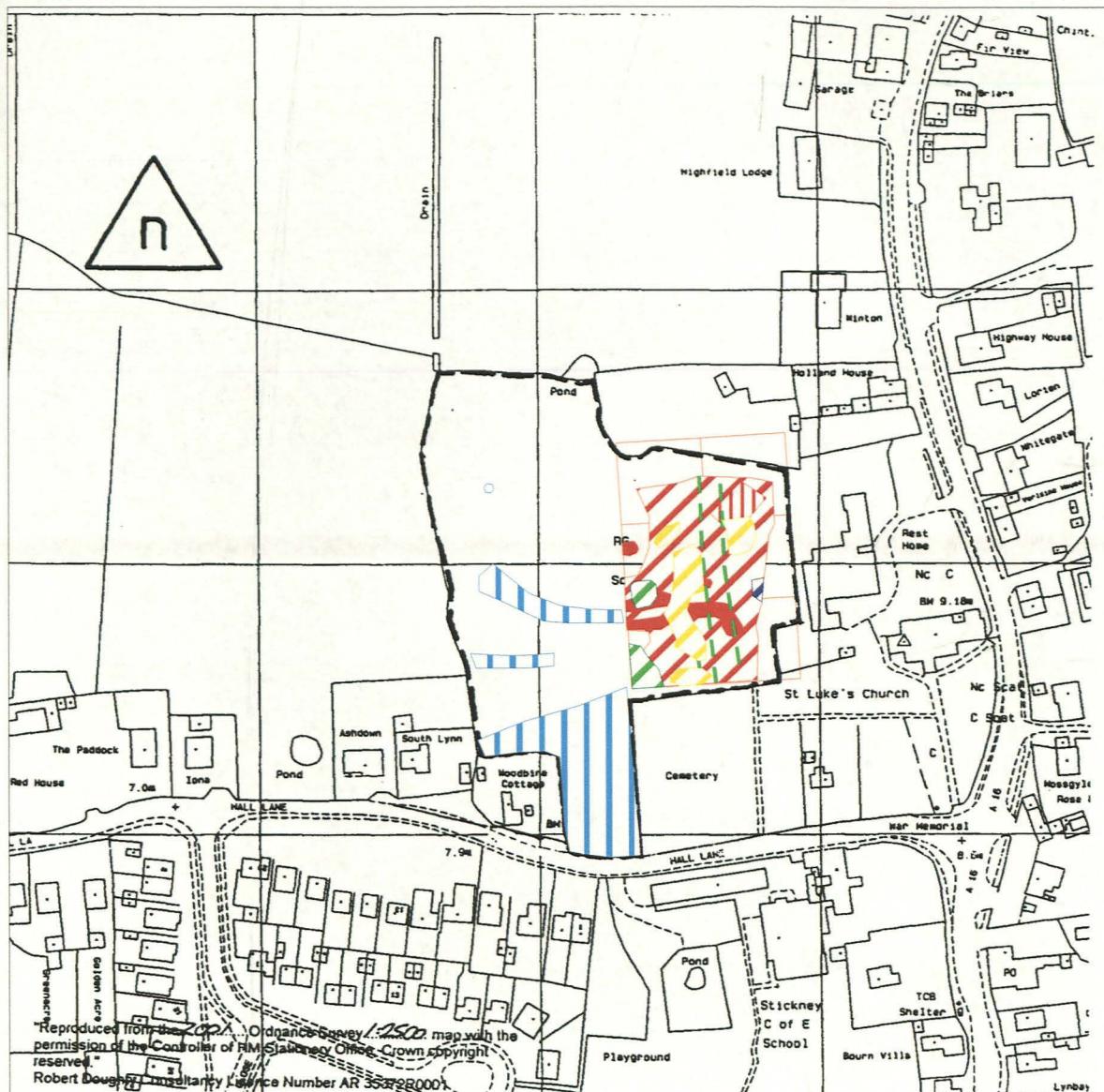


Area of high resistance

Area of low resistance

Figure 9: Resistivity survey
Interpretation

Scale 1:1000



- | | | | |
|---|---------------------------------|---|------------------------------------|
| | Probable archaeological anomaly | | Possible ridge and furrow |
| | Possible archaeological anomaly | | Area of high resistance |
| | Area of magnetic disturbance | | Area of low resistance |
| | Ferromagnetic disturbance | | Magnetic disturbance from scanning |

Figure 10: Summary

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