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Engineering Archaeological Services Ltd

E O L O G Y

Millfield Farm Hecking
Geophysical Survey

June 2000

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SOURCE L16060

Lincolnshire County Council
Archaeology Section

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TF 1322 4458 cont'd.

TF 145W

Survey Commissioned
by
Archaeological Project Services

Surveyed
by
I.P. Brooks and K. Laws
Engineering Archaeological Services Ltd.

registered in England
No 2869678

SITE CODE - HMFOO

19/6/00 - I can see 90m x 30m oval enclosure
in figure 2.

Heckington NK

Millfield Farm Heckington
Geophysical Survey

June 2000

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Millfield Farm Geophysical Survey - Introduction:

NGR

Area 1 Centred on TF 1331 4463

Area 2 Centred on TF 1316 4450

Heckington.

Location and Topography

Both areas surveyed lie in a field directly to the north of Millfield Farm buildings. The field was gently rolling with a general slope to the north and was under a densely sown cereal crop.

Archaeological Background

A number of archaeological features have been identified by aerial photography to the north of the survey site.

*ADAS agent
LCC origin*

Aims of Survey

It was hoped that a combination of scanning and detailed magnetometry would detect any archaeological features and help to clarify their nature and extent.

SUMMARY OF RESULTS

A number of archaeological, largely related to previous agricultural practice, and potentially archaeological features were located.

Millfield Farm Geophysical Survey -Results:

Survey Results:

Area

An area of c. 7 Ha. was scanned and then two areas totalling c. 2 Ha were surveyed in detail.

Display

The results are displayed as Grey Scale Image and as X-Y Trace Plots.

Results:

Complicating Factors

The height of the cereal crop sown within the survey area resulted in the distance between the instrument and the ground surface being greater than is ideal to obtain the best results from this surveying technique.

Scanning

No definite archaeological features were detected during scanning. Magnetic disturbance detected on the southern most edge of the field coincides with the edge of a modern made up track in the area directly opposite the farm buildings. Magnetic disturbance on the northern edge of the field indicates the position of a drain. A small area of magnetic disturbance towards the middle of the field coincides with an area where the crop was not growing. Areas of magnetic disturbance are indicated in blue on the interpretation diagram (Figure 6).

Detailed survey

Forty four 20 x 20m grids were investigated. These consisted of two areas, Area 1 of grids 1 to 28 and Area 2 of grids 29 to 44 (Figure 1).

Area 1

Most prominent on the plots (Figures 2 and 3) are a series of parallel linear features aligned approximately north south and essentially parallel

with the modern field boundary but curving slightly towards the west at the northern end of the area. These probably represent a ridge and furrow field system. They are marked in green on the interpretation diagram (Figure 6).

Additionally two curvilinear features can be seen. These are indicated in red on the interpretation diagram (Figure 6) and are of possible archaeological significance.

Area 2

As with area 1 the most prominent features showing on the plots (Figures 4 and 5) are that of the ridge and furrow field system running approximately north south. Additionally another linear feature running diagonally across the ridge and furrow, through grids 34, 38, and 43 is of possible archaeological significance. (Figure 6)

Magnetic Susceptibility

Soil samples were taken from the area of detailed survey in order to assess the magnetic susceptibility of the soils. It was not possible to obtain a subsoil sample for comparison.

| Sample | Volume susceptibility χ_v | Mass susceptibility χ_m |
|---------------|-----------------------------------|---------------------------------|
| Area 1 | | |
| Grid 1 | 44 | 35.8 |
| Grid 3 | 49 | 40.5 |
| Grid 5 | 41 | 36.6 |
| Grid 7 | 47 | 38.8 |
| Grid 9 | 54 | 40.6 |
| Grid 11 | 41 | 31.8 |
| Grid 13 | 46 | 35.9 |
| Grid 15 | 47 | 38.5 |
| Grid 17 | 60 | 49.6 |
| Grid 19 | 54 | 44.6 |
| Grid 21 | 142 | 117.4 |
| Grid 23 | 63 | 48.1 |
| Grid 25 | 57 | 46.0 |
| Grid 27 | 59 | 54.1 |

Millfield Farm Geophysical Survey - Results:

| Sample | Volume susceptibility χ_v | Mass susceptibility χ_m |
|---------------|-----------------------------------|---------------------------------|
| Area 2 | | |
| Grid 29 | 60 | 49.6 |
| Grid 31 | 123 | 105.1 |
| Grid 34 | 85 | 68.5 |
| Grid 36 | 49 | 41.9 |
| Grid 37 | 47 | 38.8 |
| Grid 39 | 42 | 33.9 |
| Grid 42 | 46 | 39.0 |
| Grid 44 | 46 | 37.7 |

Within Area 1 the results are generally consistent, except for Grid 21 which has a considerably higher response. This may reflect increased archaeological activity within the area of this square, however two sets of tramlines met within the grid with the possibility of increased modern agricultural activity.

Within Area 2 two grids (31 and 34) had higher results than the general level possibly reflecting increased human activity in these grids.

None of the areas of increased magnetic susceptibility appear to relate to anomalies recorded in the detailed survey.

In general the levels of magnetic susceptibility recorded are moderate suggesting that the field was suitable for magnetic survey

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.

Linear features were detected indicating the presence of a ridge and furrow field system as well as a few other features of possible archaeological significance. The increased level recorded in the magnetic susceptibility may suggest increased activity in Grids 21, 31 and 34.

Millfield Farm 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 downloaded 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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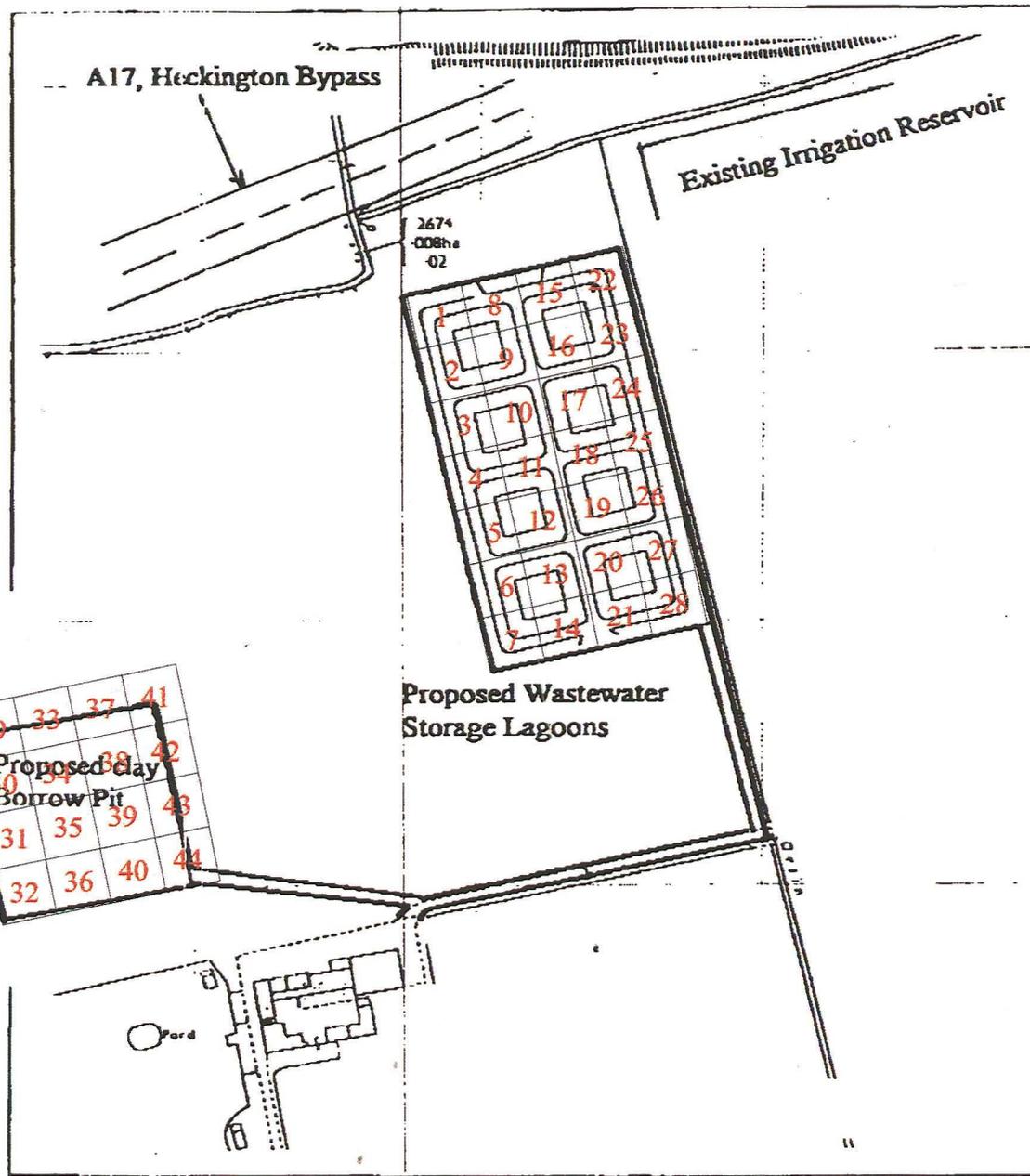


Figure 1: Location

Scale 1:2500

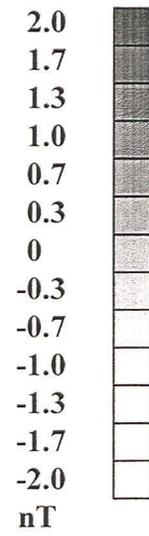
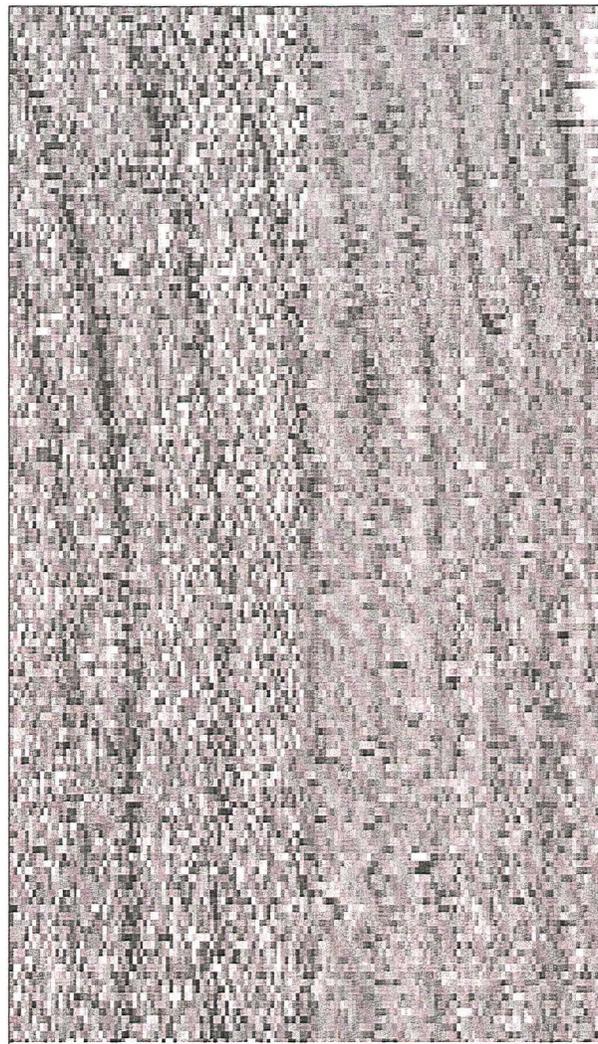
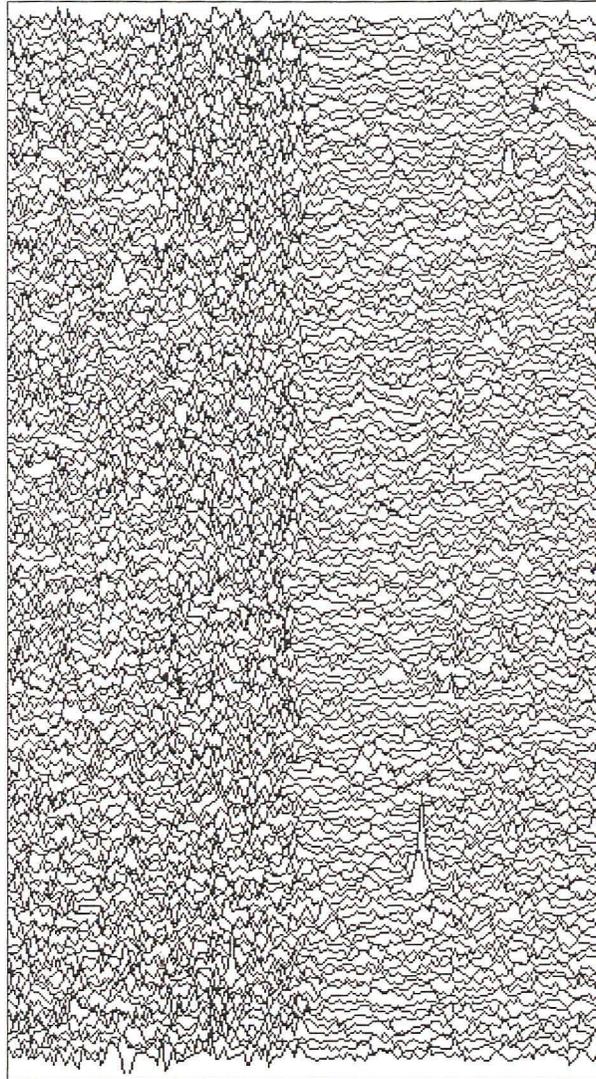


Figure 2: Millfield Farm Area 1. Grey Scale Image.
Scale 1:1000



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Figure 3: Millfield Farm Area 1. X - Y Plot.
Scale 1:1000

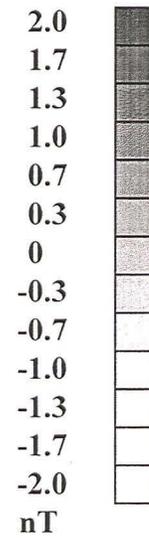
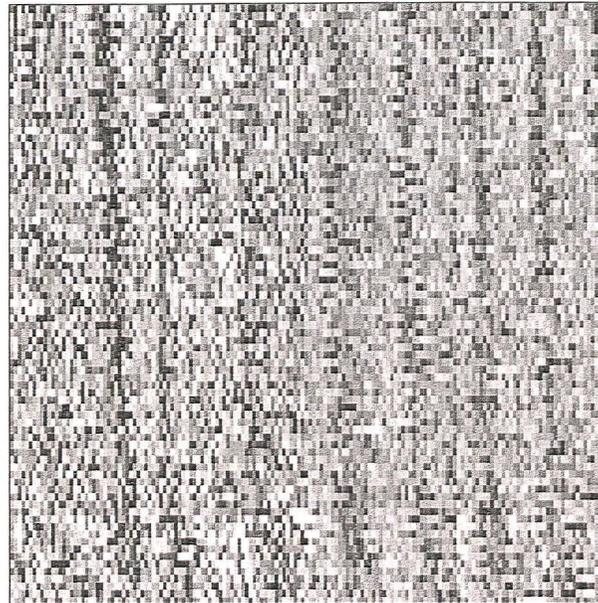
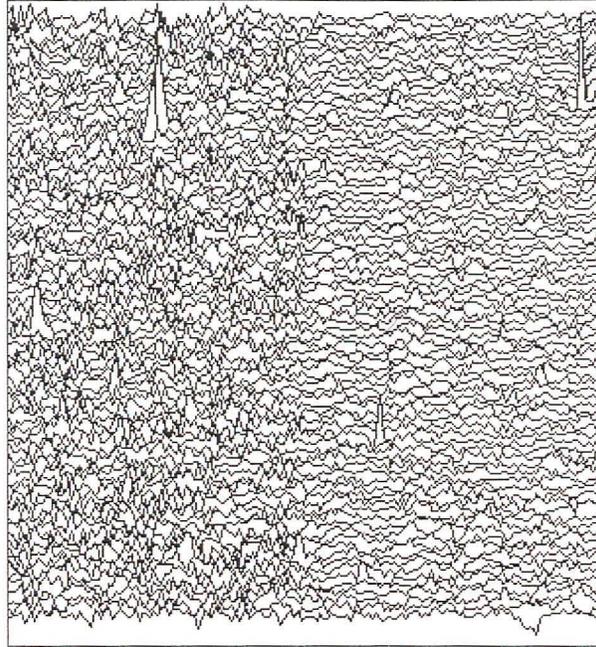


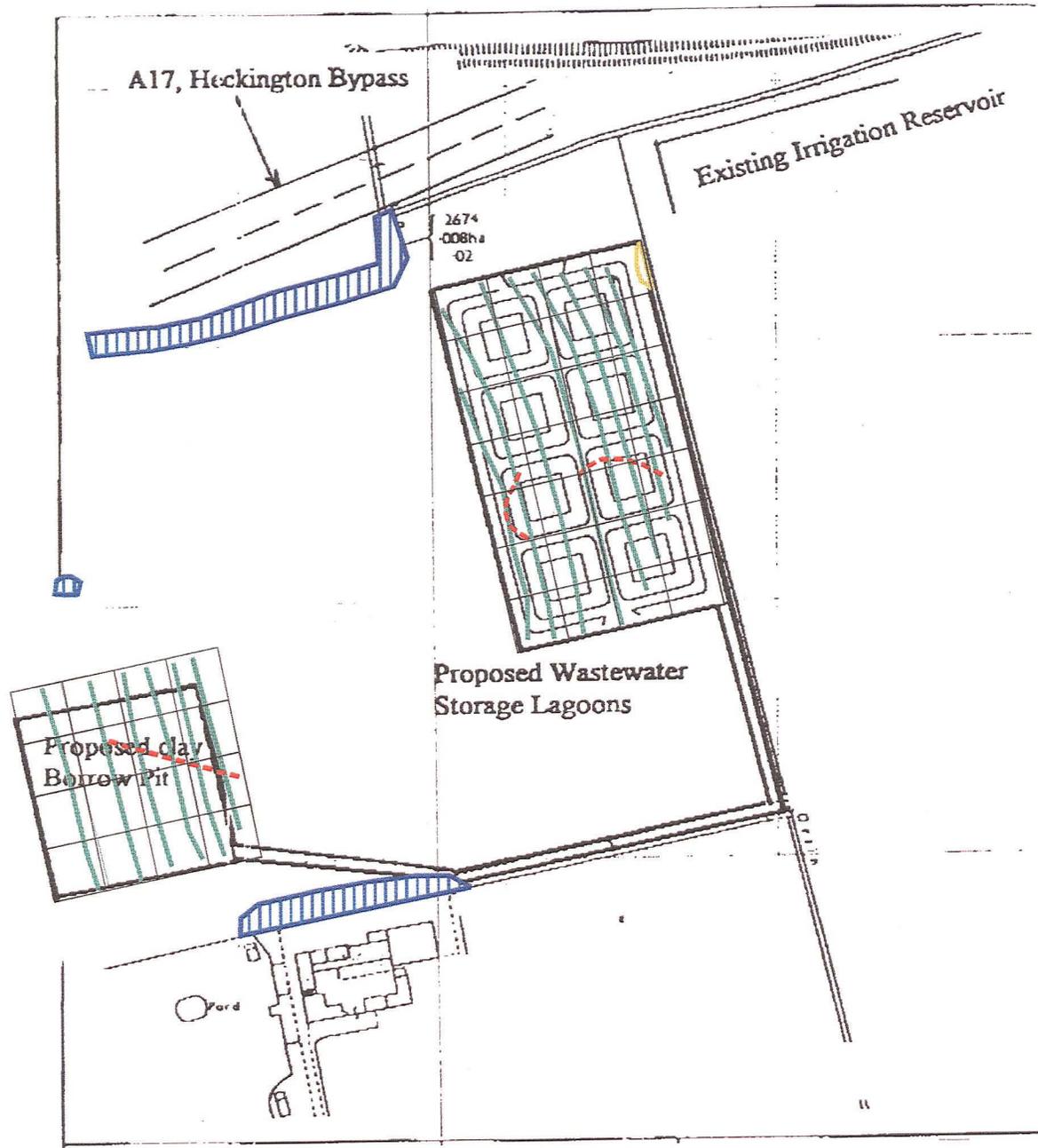
Figure 4: Millfield Farm Area 2. Grey Scale Image.
Scale 1:1000



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Figure 5: Millfield Farm Area 2. X - Y Plot.
Scale 1:1000



- - - Possible Archaeology
- ||||| Ridge and Furrow
- Modern Disturbance
- Magnetic Disturbance (Scanning)

Figure 6: Interpretation

Scale 1:2500