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GEOPHYSICAL SURVEY REPORT 2003/55

CAENBY CORNER
Lincolnshire

Client:

JSAC JOHN SAMUELS ARCHAEOLOGICAL CONSULTANTS

EVENT LI 4293 SOURCE LI8850

PRN PENDING

LI8848

SITE SUMMARY SHEET

2003 / 55 Caenby Corner, Lincolnshire

NGR: SK 968 894

Location, topography and geology

The application area is situated to the southeast of Caenby Corner roundabout between the A15 and A631, some 17km north of Lincoln. The site was level and under recently mown grass, although some of the area was unavailable for survey due to dumps of ferrous building rubble. The soil is a shallow, well-drained brashy calcareous fine loamy brown rendzina of the Elmton 1 (343a) association over a parent geology of Jurassic limestone (SSEW 1983).

Archaeology

The study area lies just off Ermine Street, one of the main routes between Lincoln and York, both *coloniae* towns of Roman Britain (Hunter and Ralston 1999). It lies some 3km to the north of Owmby, the site of a substantial Roman settlement (LI 309). Several deserted medieval villages are known in the area (Ordnance Survey Landranger sheets 112 and 121). The close proximity of the Roman road and other monuments in the area suggests that the site has some archaeological potential.

Aims of Survey

The objective was to locate detectable archaeological responses within the study area in advance of proposed development. This work forms part of a wider archaeological investigation being undertaken by **John Samuels Archaeological Consultants**.

Summary of Results *

The survey area was found to be severely magnetically disturbed. This is attributed to significant dumps of modern construction rubble and spoil that will have masked archaeological remains in their vicinity. Given that the site lies at a major cross-roads, it is likely that the application area has been the focus of various activities over many centuries and would have suffered significant levels of disturbance.

Two possible archaeological features and several trends have been identified despite the disturbed nature of the gradiometer data. There is the suggestion that enclosures may be present. However, extensive landscaping of the site and its use as a rubbish dump reduces the certainty of the interpretation of these anomalies and their origin may be modern or associated with past agriculture.

*** It is essential that this summary is read in conjunction with the results of the detailed survey.**

SURVEY RESULTS

2003 / 55 Caenby Corner, Lincolnshire

1. Survey Area

1.1 Approximately 0.54ha of gradiometer survey was carried out on the site. Figure 1 shows the location and extent of the survey at a scale of 1:1000.

1.2 The survey grids were set out by ***GSB Prospection Ltd*** and were tied in to existing field boundaries and buildings, with markers being left in the boundaries at either end of the survey baseline. Detailed tie-in information has been lodged with the client.

2. Display

2.1 Figures 2 to 5 display the results as a greyscale image, an X-Y trace, a dot density plot and an interpretation. These diagrams have been produced at a scale of 1:500.

2.2 These display formats and the interpretation categories used are discussed in the *Technical Information* section at the end of the text.

2.3 Letters in parenthesis in the text refer to anomalies highlighted on the interpretation diagram.

3. General Considerations - Complicating factors

3.1 The grass had been mown recently over the majority of the site and in these areas conditions for survey were good. However, survey was not undertaken in some parts where the grass was overgrown.

3.2 Given that the site lies adjacent to the crossing of two major roads, it is likely that the application area has been the focus of various activities over many centuries. It would therefore be expected to have been subject to significant levels of disturbance, landscaping and the introduction of foreign materials. These circumstances can make interpretation of the data difficult. Anomalies produced by archaeological features can be obscured or masked by responses from ferrous debris. However, it was hoped that substantial anomalies, such as those produced by fired structures, kilns and hearths, and ditch features might be recognisable despite strong levels of magnetic interference.

3.3 Significant dumps of construction rubble and spoil were apparent across the site at the time of the survey. The presence of such material suggests that extensive landscaping has indeed taken place, which may have affected any surviving archaeology and compromised the quality of the geophysical survey data.

4. Results of the Gradiometer Survey

4.1 The results show that the application area is affected by regions of magnetic disturbance. This can be attributed to modern debris from construction rubble and refuse tipped across the site. However, it should be noted that features and debris from occupation activity that have been disturbed by later landscaping, could produce such anomalies and, therefore, an archaeological source cannot be ruled out entirely.

4.2 Anomalies (A) and (B) may be of archaeological interest; the latter could indicate the location of a kiln or hearth. However, these anomalies lie in proximity to regions of ferrous disturbance and the interpretation is doubtful.

4.3 Despite the modern debris scattered extensively across the site, it is possible to discern several ill-defined trends. Some of these run parallel along the southern boundary of the survey area. These may be of archaeological interest, as there are suggestions of enclosures, though it is most likely that they are associated with more recent landscaping disturbance. Alternatively, indications of past agricultural activity, such as ploughing or even ridge and furrow cultivation, could account for these albeit tentative responses.

4.4 A negative trend (C) is likely to correspond to a plastic pipe trench that is, therefore, modern in origin.

5. Conclusions

5.1 The gradiometer data are dominated by areas of magnetic disturbance; this can be attributed to modern dumping, some of which was visible on the surface. Despite this, several trends have been noted that may be of archaeological interest; some may have been produced by ploughing or ridge and furrow cultivation.

5.2 In the south-eastern corner of the survey area two anomalies of archaeological potential have been recorded; one may represent a kiln or hearth. However, this interpretation is tentative; they lie in proximity to extensive magnetic disturbance and may relate to buried ferrous debris.

Project Co-ordinator: F. Robertson
Project Assistants: D Shiel, Dr S Ovenden-Wilson, B. Urmston & E. Wood

Date of Survey: 15th July 2003
Date of Report: 25th July 2003

References:

Hunter, J. & Ralston, I. 1999 *The Archaeology of Britain: An introduction from the Upper Palaeolithic to the Industrial Revolution*. Routledge, London.

SSEW 1983 *Soils of England and Wales. Sheet 4, Eastern England*. Soil Survey of England and Wales.

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GSB Prospection Ltd (GSB)** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GSB.**

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36 / FM256 and Bartington *Grad*601-2

Both the Geoscan and Bartington instruments comprise of two fluxgate magnetometers mounted vertically apart at a distance of 500mm and 1000mm, respectively. The gradiometers are carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT), or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method. Readings are logged at 0.25 or 0.5m intervals along traverses 1.0m apart, unless stated otherwise in the report. Having two gradiometer units mounted laterally with a separation of 1.0m, the Bartington instrument can collect two lines of data per traverse. The *Grad*601-2 has marginally greater sensitivity afforded by the increased fluxgate separation, unfortunately this also increases the instrument's susceptibility to external sources of interference.

(b) Resistance Meter - Geoscan RM15

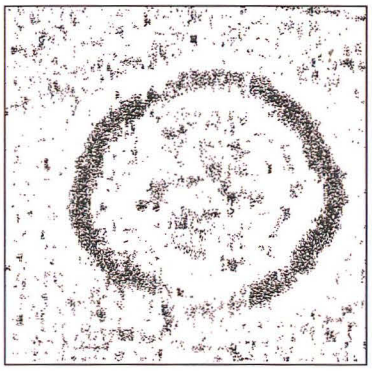
This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections". In area survey readings are logged at 1.0m x 1.0m intervals, unless stated otherwise in the report.

(c) Magnetic Susceptibility

Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. Sampling intervals vary widely but are often at the 10m or 20m level. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. The field coil measures the susceptibility of a volume of soil. The laboratory procedure determines the susceptibility of a specific mass of soil. For the latter 50g soil samples are collected in the field. These are then air-dried, ground down and sieved to exclude the coarse earth (>2mm) fraction. Readings are made using an AC-coil and susceptibility bridge, with results being expressed either as SI/kg x 10^{-8} or m^3/kg.

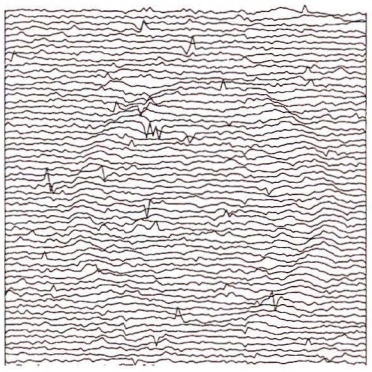
Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.



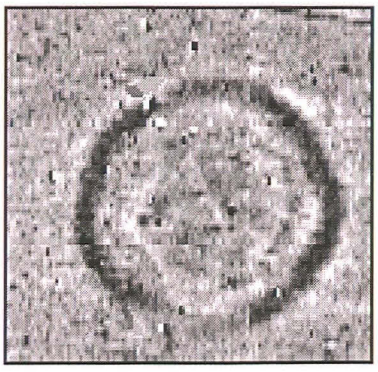
(a) Dot Density

In this display minimum and maximum cut-off levels are chosen. Any value that is below the minimum will appear white, whilst any value above the maximum will be black. Values that lie between these two cut-off levels are depicted with a specified number of dots depending on their relative position between the two levels. Assessing a lower than normal reading involves the use of an inverse plot that reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. However, this display is favoured for producing plans of sites, where positioning of the anomalies and features is important.



(b) XY Plot

This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white.



(c) Greyscale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey-scale. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, greyscales tend to be more informative.

Terms commonly used in the graphical interpretation of gradiometer data

Ditch / Pit
This category is used only when other evidence is available that supports a clear archaeological interpretation e.g. cropmarks or excavation.

Archaeology
This term is used when the form, nature and pattern of the response is clearly or very probably archaeological but where no supporting evidence exists. These anomalies, whilst considered anthropogenic, could be of any age. If a more precise archaeological interpretation is possible then it will be indicated in the accompanying text.

? Archaeology
The interpretation of such anomalies is often tentative, with the anomalies exhibiting either weak signal strength or forming incomplete archaeological patterns. They may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.

Areas of Increased Magnetic Response
These responses show no visual indications on the ground surface and are considered to have some archaeological potential.

Industrial
Strong magnetic anomalies, that due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.

Natural
These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions e.g. palaeochannels or magnetic gravels.

? Natural
These are anomalies that are likely to be natural in origin i.e geological or pedological.

Ridge and Furrow
These are regular and broad linear anomalies that are presumed to be the result of ancient cultivation. In some cases the response may be the result of modern activity.

Ploughing Trend
These are isolated or grouped linear responses. They are normally narrow and are presumed modern when aligned to current field boundaries or following present ploughing.

Trend
This is usually an ill-defined, weak, isolated or obscured linear anomaly of unknown cause or date.

Areas of Magnetic Disturbance
These responses are commonly found in places where modern ferrous or fired materials are present e.g. brick rubble. They are presumed to be modern.

Ferrous Response
This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes or above ground features such as fencelines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

NB This is by no means an exhaustive list and other categories may be used as necesssary.

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Figure 5:	Gradiometer Data:	Interpretation	1:500

GSB PROSPECTION Ltd	PROJECT: 2003/55 Caenby Corner, Lincolnshire	TITLE: Location of Survey Area	Based on a map supplied by the client

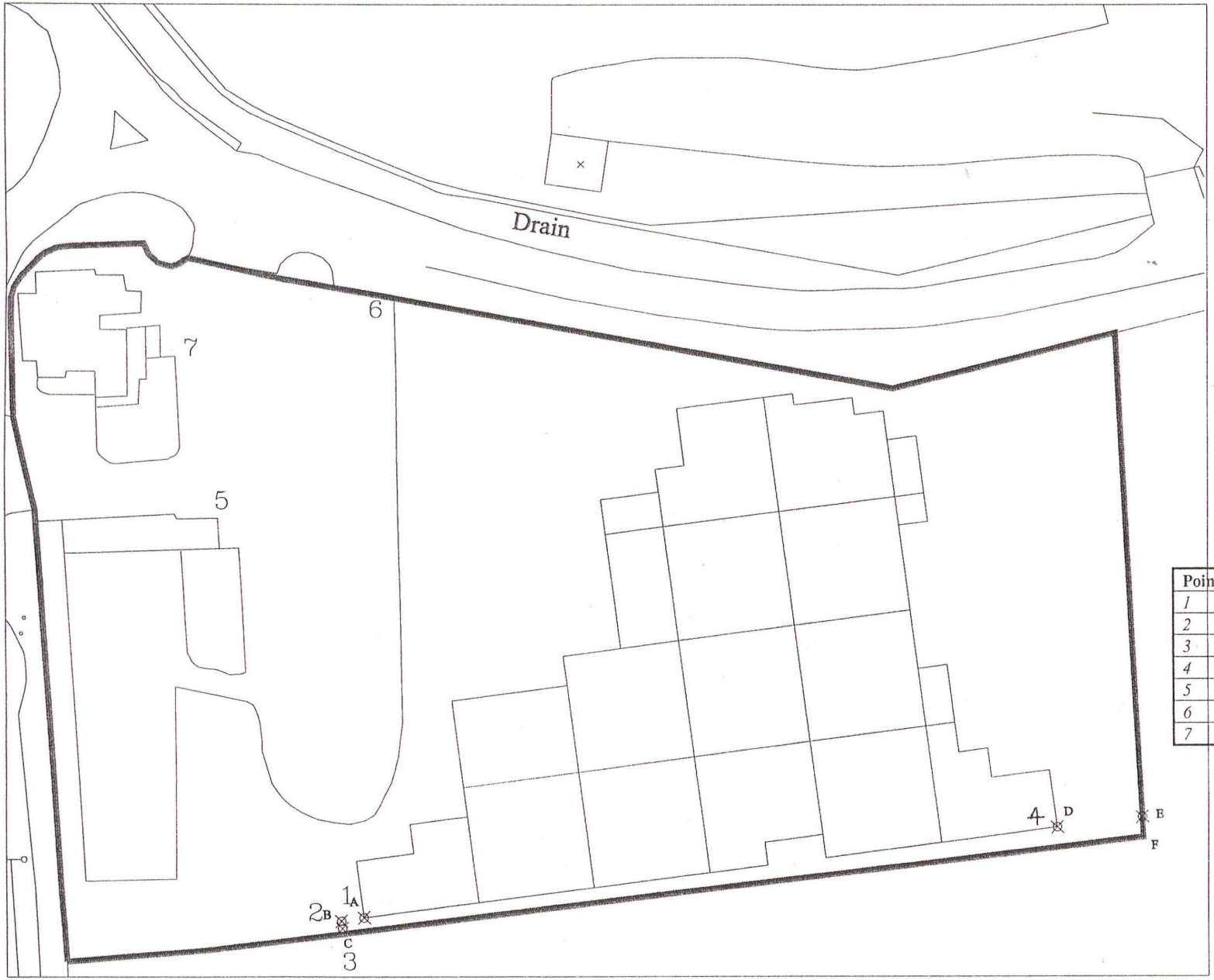
Application Area

Area of Gradiometer Survey

0 metres 40

Figure 1

GSB PROSPECTION Ltd	PROJECT: 2003/55 Caenby corner, Lincolnshire	TITLE: Tie-in Information	Based on a map supplied by the client



Application Area

Area of Gradiometer Survey

Field Tie-ins (letters)

A-B=4M
B-C=2M
D-E=18.5M
E-F=8M
A/B/C/D/E=Peg & Cane in situ

NB Field boundaries are no longer as they appear on the map.

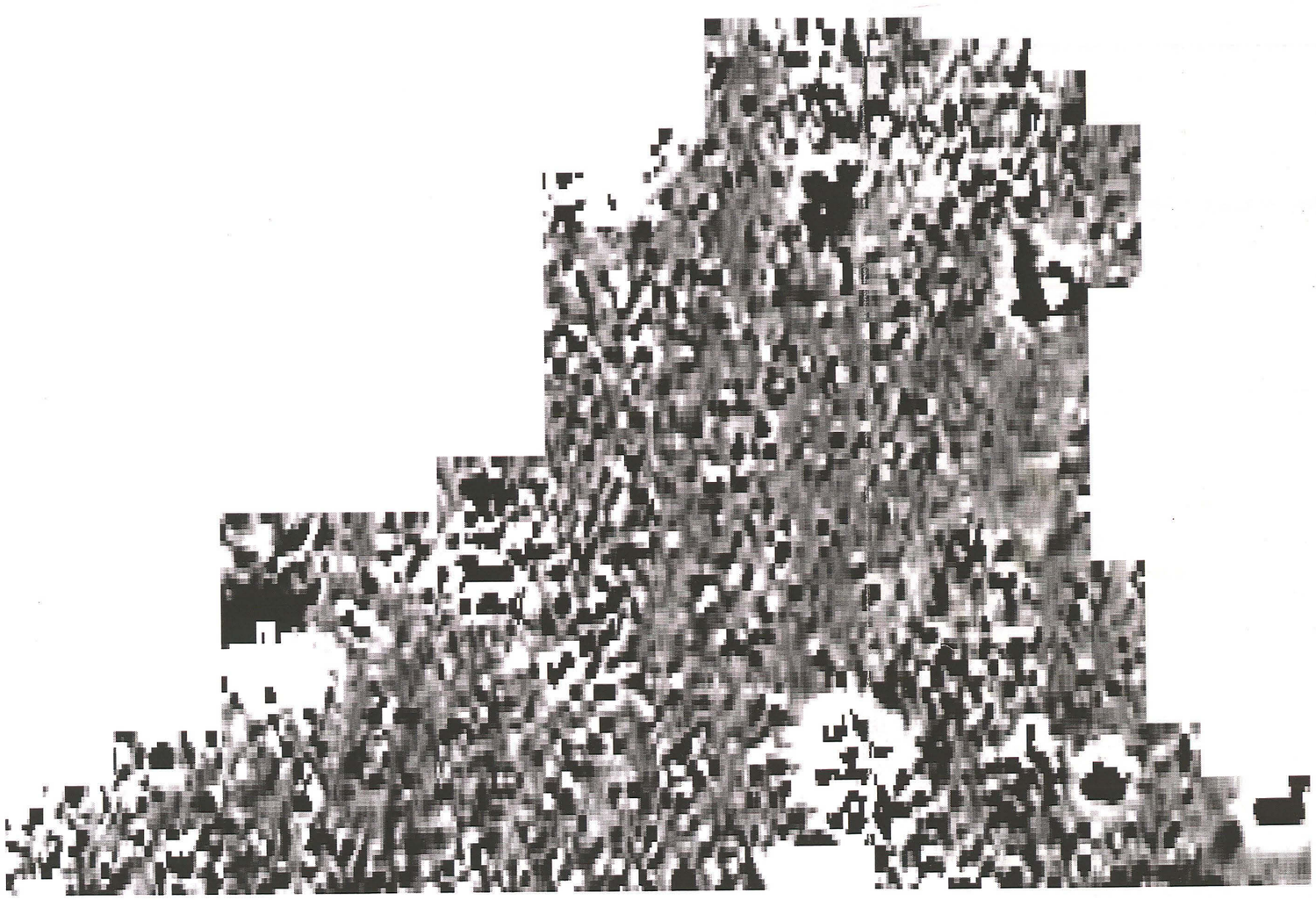
EDM Tie-ins (numbers)

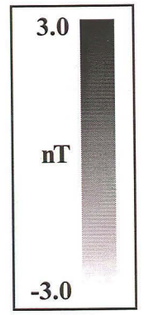
Point	Angle	Distance	Notes
1	63.469	44.771	West End of Baseline
2	65.501	48.359	Boundary Marker
3	64.155	48.886	Field Corner
4	284.277	82.487	East End of Baseline
5	132.848	75.573	Building Corner
6	165.538	86.675	Road Entrance
7	143.261	98.447	Building Corner

0 metres 40

Figure T1

CAENBY CORNER





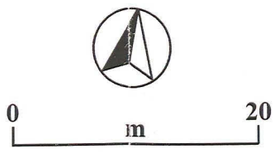


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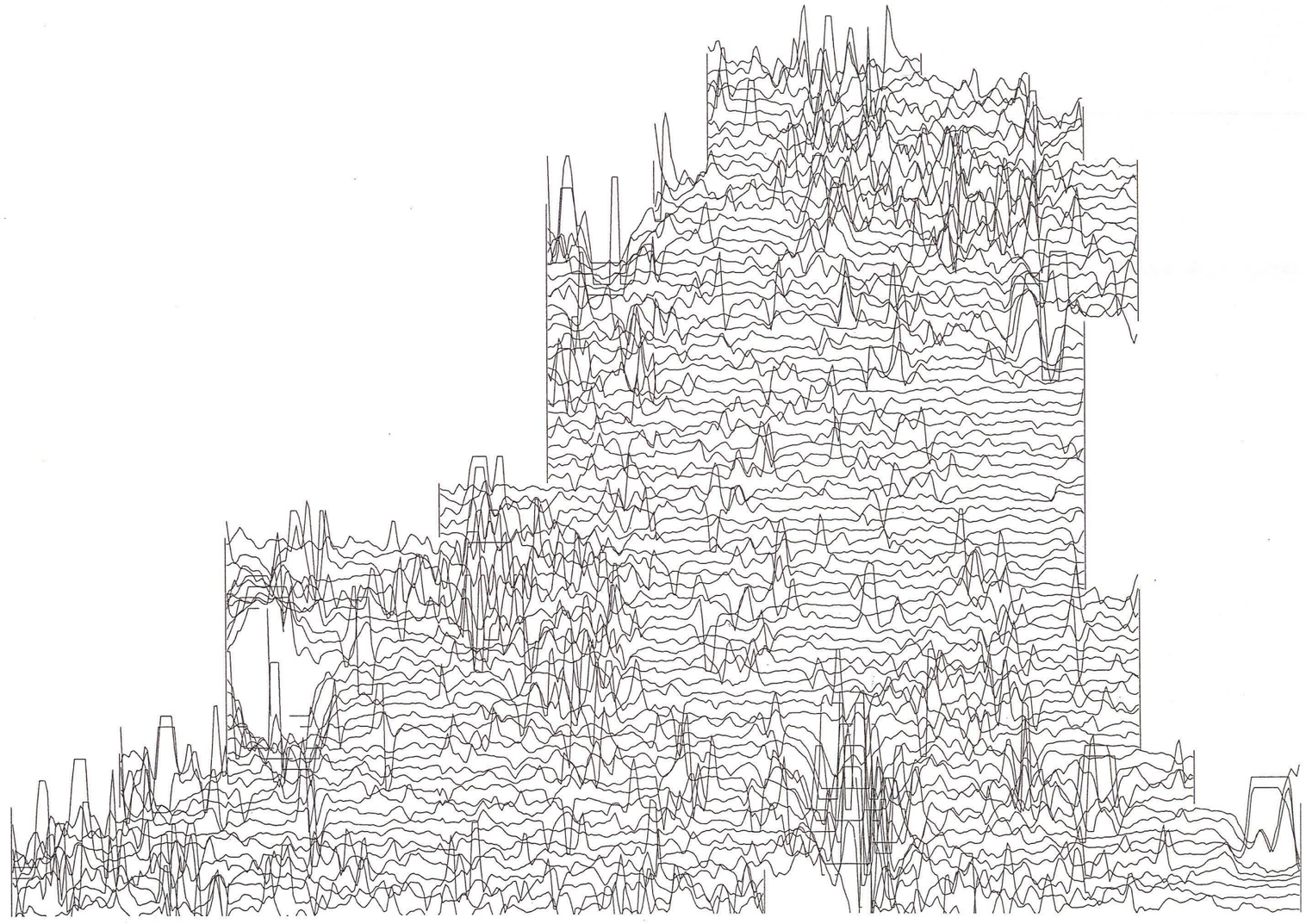
Figure 2

CAENBY CORNER



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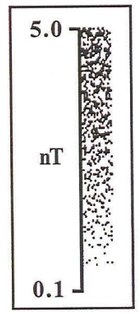
GSB Prospection 2003/55

Figure 3

CAENBY CORNER



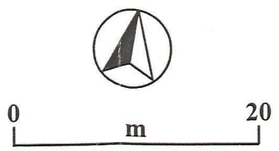


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Figure 4

GSB PROSPECTION Ltd

PROJECT: 2003/55 Caenby Corner

TITLE: Interpretation

Based on a map supplied by the client

?Archaeology

Trend

Area of Magnetic Disturbance

Ferrous

0 metres 20

Figure 5