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Ancient Monuments Laboratory
Report 103/93

# KINGSCOTE, GLOUCESTERSHIRE. INTERIM REPORT ON GEOPHYSICAL SURVEY, SEPTEMBER 1993

Peter Cottrell & Andrew Payne

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Summary

This pilot survey over parts of the Roman site at Kingscote has demonstrated that building remains, as well as a range of other features including roads and subsidiary enclosures, are detectable by geophysical methods. Limited survey outside the scheduled area (Gloucs 467) indicates only sparse archaeological activity in those areas covered.

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# KINGSCOTE, GLOUCESTERSHIRE

**Interim Report on Geophysical Surveys, 1993.**

## INTRODUCTION

A pilot geophysical survey at Kingscote was undertaken by the Ancient Monuments Laboratory, in support of an assessment of the Roman settlement site by the Cotswold Archaeological Trust.

The site is believed to be a Roman 'small town' covering some 30 hectares, based upon evidence from both field-walking and aerial photography. This area has been scheduled (Gloucester 467). The settlement is situated mainly on a relatively flat plateau with dry valleys to the north and south, which converge just to the east of the site. The underlying geology is Middle Jurassic Greater Oolitic limestone, and most of the area is arable land with pasture fields to the north and south.

The Cotswold Archaeological Trust requested surveys over two of the pasture areas outside the SAM to help determine the settlement boundaries. At the same time a more detailed survey was requested at the western edge of the scheduled area over the site of an earlier excavation by the Kingscote Archaeological Association, which had uncovered a sizeable multi-phase building, with mosaic and painted wall plaster. The archaeological relationships between the building and its surroundings were not fully understood, and it was hoped that a detailed geophysical survey of the area would add support to the post-excavation analysis and establish the extent of the complex.

## METHOD

The survey covered three distinct areas (see location plan, figure 1). Area 1 was surveyed by magnetometer and resistivity, while Areas 2 and 3 were surveyed by magnetometer only. Due to the constraints of time in the latter two areas, sample magnetometer surveys were carried out on two separate 60m x 60m blocks in each area to give as wide a coverage as possible. All grids were measured into the field boundaries.

### Area 1: Middle Chessalls area

(OS Fields 5500 & 7600; CAT grid area 1-4)

A grid of 30m squares was laid out over the site of the excavation and its surroundings parallel to the existing field boundary so that the survey would be at an angle to the known orientation of the building complex. (See figure 2 for location plan). All the survey squares marked on the location plan were surveyed using magnetometry, and in addition a resistivity survey was carried out over a more restricted area of the grid (shaded on the plan).

*i) Magnetometry*

The area was surveyed with Geoscan FM36 fluxgate gradiometers with 30m long traverses running approximately N-S, 1.0m apart, and with reading intervals of 0.25m along each traverse.

*ii) Resistivity*

The shaded area on the location plan was surveyed with a Geoscan RM15 resistivity meter, using a Twin Electrode probe configuration, and a 0.5m mobile probe spacing. Readings were taken at 1m intervals along N-S traverses 30m long and 1m apart.

*iii) Magnetic Susceptibility*

Topsoil samples were taken at 15m intervals along a traverse running E-W across the centre of the surveyed area (Numbered 01-09 on the location plan). These samples were dried and sieved before being measured for their magnetic susceptibility in the laboratory using a Bartington MS.1 susceptibility meter, calibrated for 100g samples.

**Area 2: Field adjacent to Barnhill Farm**
(CAT grid area 9-10)
and
**Area 3: Field adjacent to A 4135**
(OS field No.2300; CAT grid area 6-7)

*i) Magnetometry*

Eight 30m squares were surveyed in each area using the Geoscan FM36 with traverse spacing and reading interval the same as for Area 1 (see location plans 5a and 6a).

*ii) Magnetic Susceptibility*

Topsoil samples were also taken for magnetic susceptibility measurement at 30m intervals along an E-W traverse across each field (numbered ms1-7 and ms1-6 respectively).

The presentation of the magnetometer and resistivity data is in the form of either traceplots or greyscales of the raw data and, for Area 1, enhanced greyscale plots. The latter data was enhanced using algorithms discussed by Scollar (1990): a low-pass gaussian filter for the magnetometer data (figure 3i), and a high-pass gaussian filter and directional edge-detector for the resistivity data (figures 4b and 4c).

The magnetic susceptibility data is presented as bar charts.

## RESULTS

### Area 1.

*i) Magnetometer survey (figure 3)*

The enclosed, enhanced, greyscale plot of Area 1 (figure 3i) shows that both clear negative and positive anomalies have been detected.

The site of the KAA excavation can be seen as an area of disturbance in squares 2D, 3D, 2E, and 3E. Within this disturbance it is possible to see negative linear anomalies which appear to represent some of the in-situ walls of the Roman building, apparently continuing northwards beyond the excavation.

There are two very clear positive and parallel linear anomalies running NW-SE across the survey to the south of the Roman building. These correspond with roadside ditches visible in part on aerial photographs and thought to run through the settlement (Timby 1993, Fig 8). However, there is no indication from the magnetometer data that they continue eastward beyond a line extending southwards from the villa building. Nevertheless, there is a slight positive linear anomaly visible between the ditches which does appear to continue and this may indicate a hollowed out or even robbed roadway. Immediately to the south of the road, and aligned on it, is a rectangular enclosure marked by positive linear anomalies (squares 1H and 2H).

There are several very large positive anomalies, many of a roughly oval shape, adjacent to the road and to the west of the building complex. These may well represent quarries such as those found by the KAA excavation beneath the Roman building (Timby, 1993. 18-19)

*ii) Resistivity survey (figure 4)*

Despite the backfill from the excavation, the resistivity survey has located several of the walls of the Roman building as high resistivity anomalies; this is particularly clear in the enhanced greyscale plots b) and c) which also suggest activity to the immediate south and west of the building. In square 2D a linear high resistivity anomaly parallel to the length of the building could well be an enclosure wall to the complex. This feature corresponds to a rather subtle negative linear anomaly which can be seen in the enhanced magnetometer plot (figure 3i), between squares 1F and 2C, running parallel to the long axis of the building.

The roadway has also been located as a linear high resistance anomaly, corresponding to its position in the magnetometer survey. The data also suggests that the roadway continues eastward beyond the building complex. It is notable that this continuation is as a single linear anomaly rather than the apparent double anomalies to the west.

The 'quarry' features appear in the raw data plot (4a) as low resistivity anomalies.

The resistivity survey has also responded to a series of linear low resistance features that criss-cross squares 1G, 2G, 1H, and 2H, and a long, diagonal, feature running from square 2F to 3H. These do not show up in the magnetometer plots and this, coupled with their irregular alignment, makes their association with the other Roman features uncertain. They could perhaps relate to cultivation of another period.

**Area 2.**

*Magnetometer Survey (figure 5)*

The greyscale plots of this area (5b) show very little magnetic activity except for a very weak linear anomaly between squares 5 and 7 and an isolated positive anomaly of about 3-4 m diameter in square 6, giving the sort of reading that might be expected from a pit or a hearth.

**Area 3.**

*Magnetometer survey (figure 6)*

The greyscale plots (6b) show two strong linear anomalies, one running E-W across both survey grids, and the other at an angle, crossing squares 01 and 03. These are modern and their

strong magnetic effects obscure any other anomalies in the immediate vicinity. However there are indications of occasional archaeological activity, such as the isolated positive anomaly at point A on the plot.

**Magnetic Susceptibility Measurements**

The magnetic susceptibility (MS) of each sample was measured in the laboratory and the results are shown as a series of bar charts for each area (figure 7). The sample locations refer to the points marked on the location plans for the respective areas.

The readings obtained from Area 1 show a gradual fall-off of susceptibility to the west of the building complex which corresponds with the lack of magnetic anomalies seen in the magnetometer data (figure 3).

There is a clear difference in the average MS of the three sample groups. Although other extraneous factors, such as the superficial geology under each area and the different land use that each area has undergone, may effect the local susceptibility, it is likely that enhancement due to archaeology has caused the higher readings in Area 1. Conversely, the likelihood of archaeological enhancement in Areas 2 and 3 are correspondingly lower.

## CONCLUSIONS

This pilot survey has shown that both magnetometry and resistivity are suitable field techniques for geophysical survey over the Kingscote settlement, and complement each other. The success in locating archaeological features in Area 1, and the high magnetic susceptibility found there, suggest that Areas 2 and 3, with their correspondingly lower susceptibility and lack of many identifiable anomalies are probably peripheral to the Roman settlement.

The magnetometer survey of Area 1 also failed to find any substantial archaeological anomalies to the west of the Roman building group, supporting the RCHME belief that the Middle Chessalls field probably marks the western edge of the settlement.

Surveyed by : P. Cottrell 13-18 September 1993
A. Payne

Reported by : P. Cottrell & A. Payne November 1993

ARCHAEOMETRY BRANCH, Ancient Monuments Laboratory.

## REFERENCES

Timby, J, 1993 Roman Small Towns in the Cotswolds, *Cotswold Archaeological Trust Report 93108*

RCHME, 1976 *Iron Age and Romano-British Monuments in the Gloucestershire Cotswolds*, 71, HMSO

Scollar, I, (ed) 1990 *Archaeological Prospecting and Remote Sensing*, Cambridge University Press

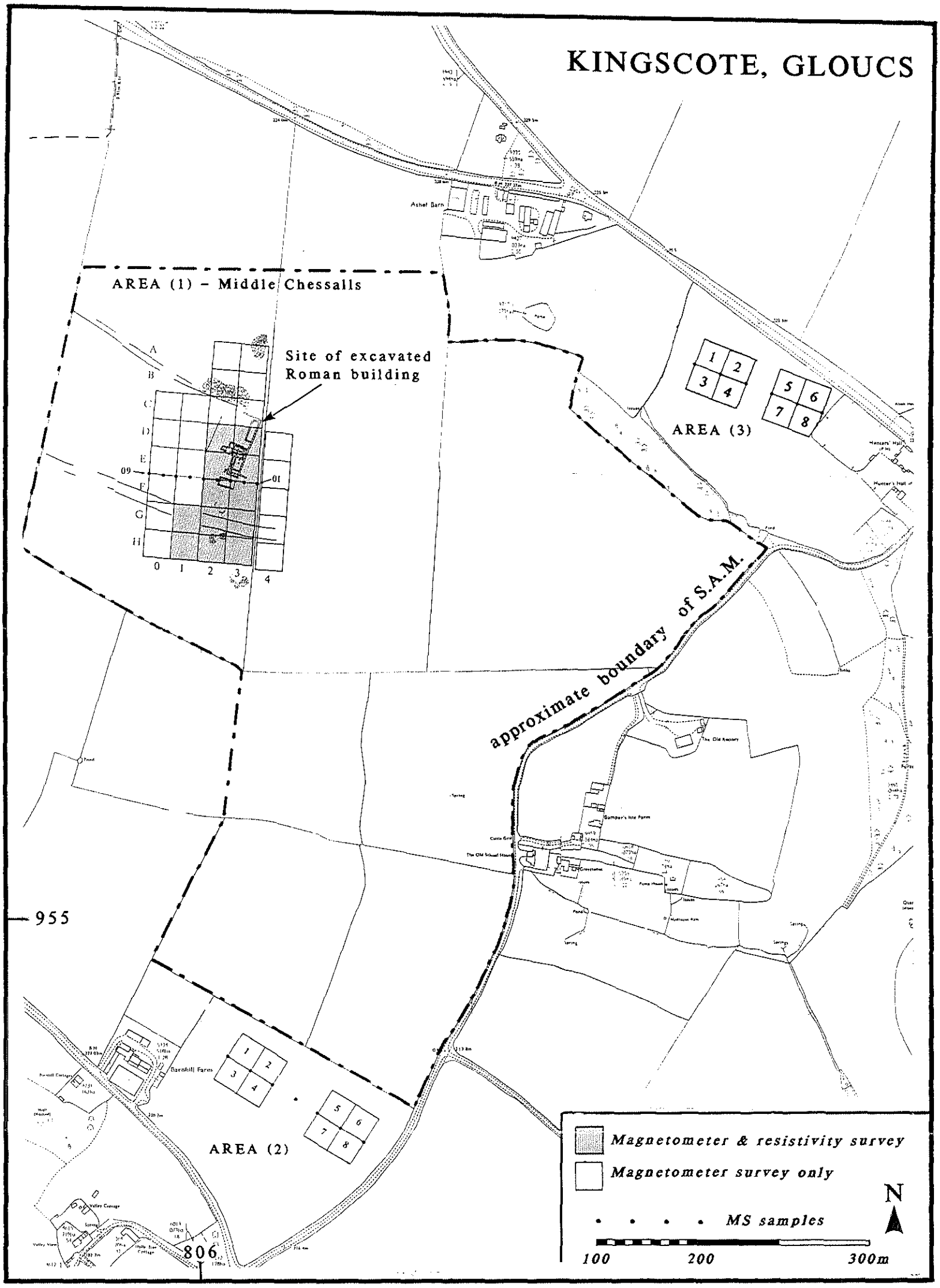


*Figure 1. Location of survey areas, 1:5000.*

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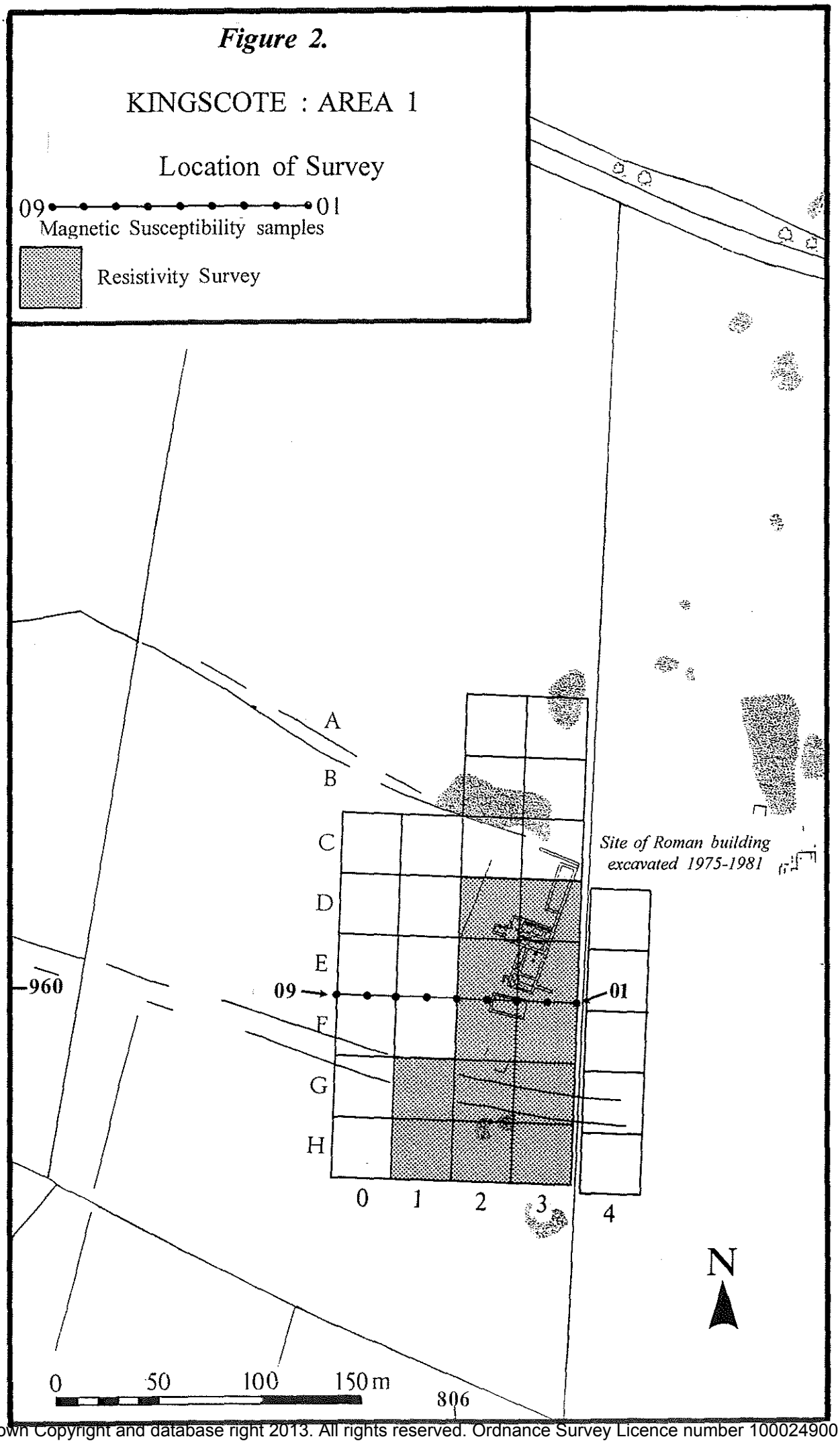


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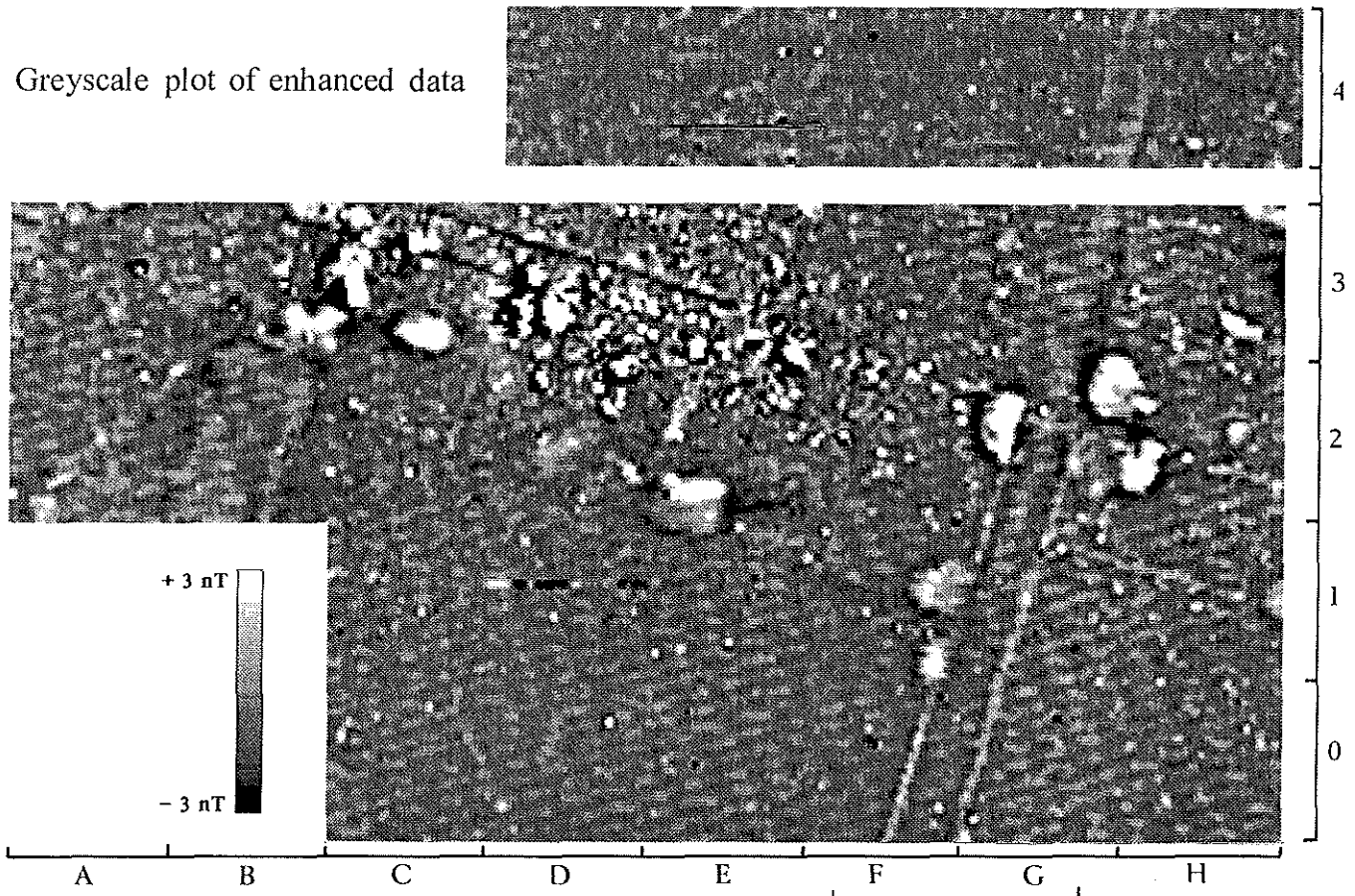
# KINGSCOTE, GLOUCESTERSHIRE (NGR ST 806950)

## AREA 1. – MIDDLE CHESSALLS

## Magnetometer Survey, Sept 93.

i) Greyscale plot of enhanced data




ii) X-Y traceplot of raw data

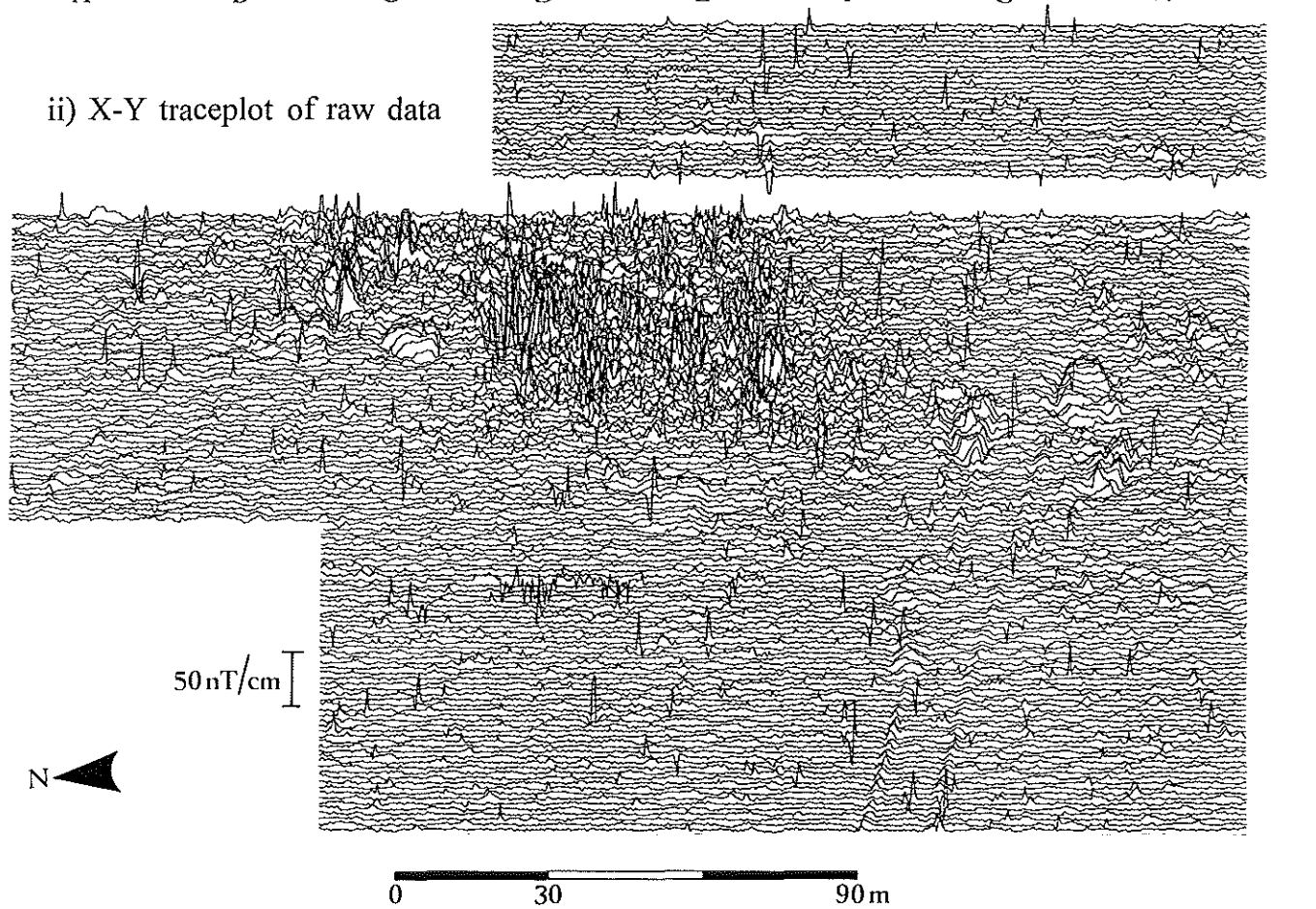
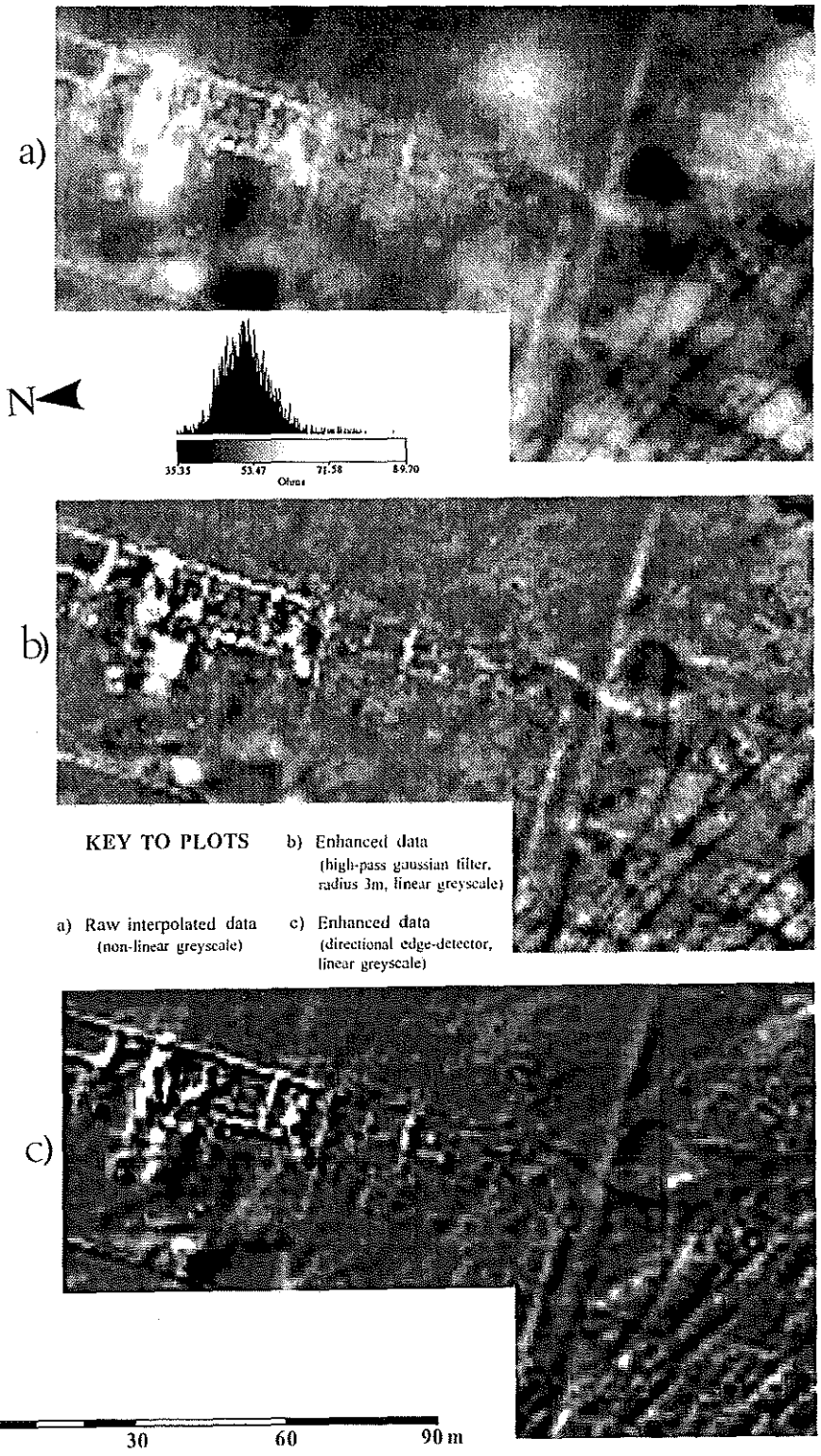



***Figure 3.***

AMLab

*Figure 4*

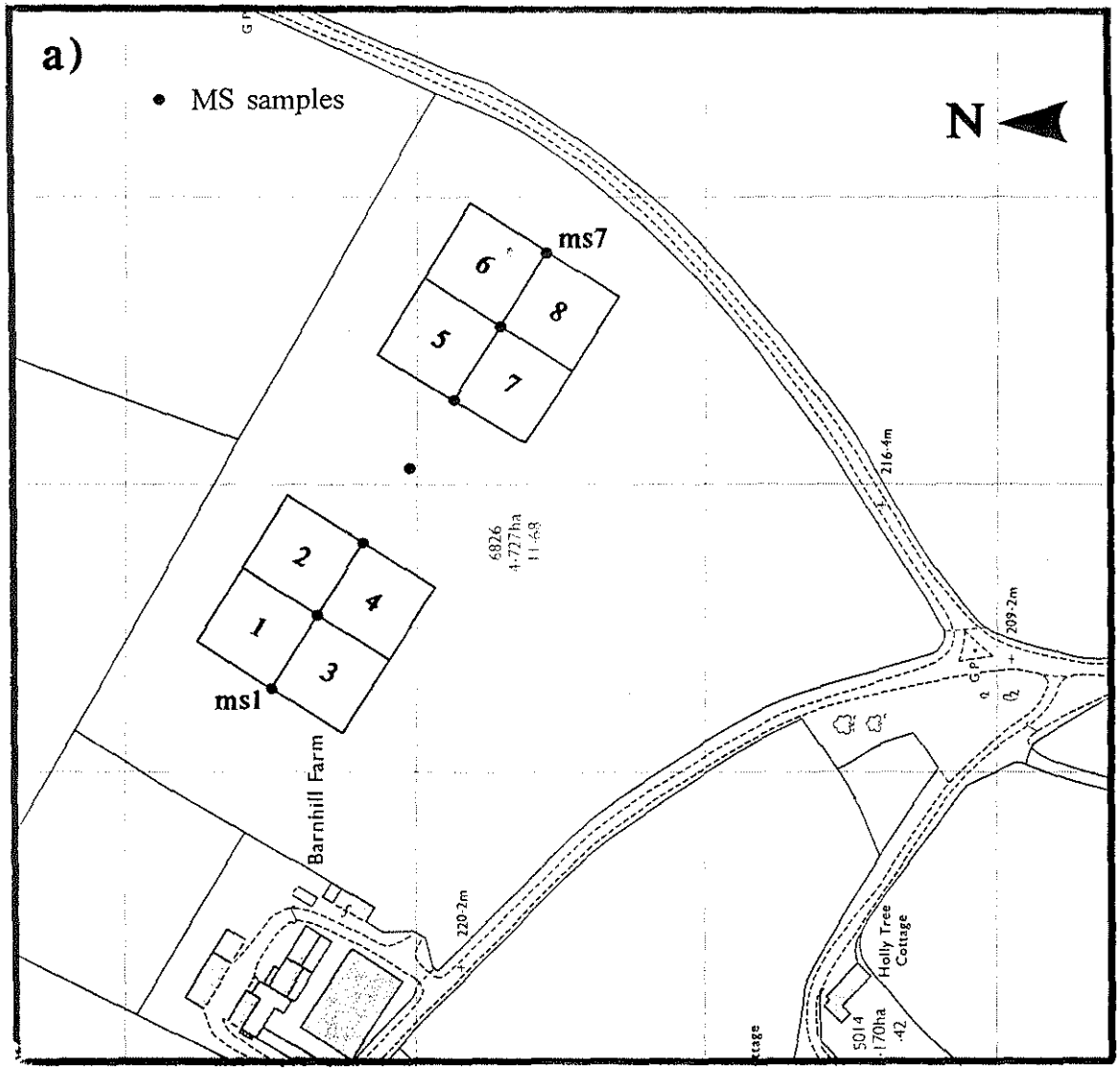


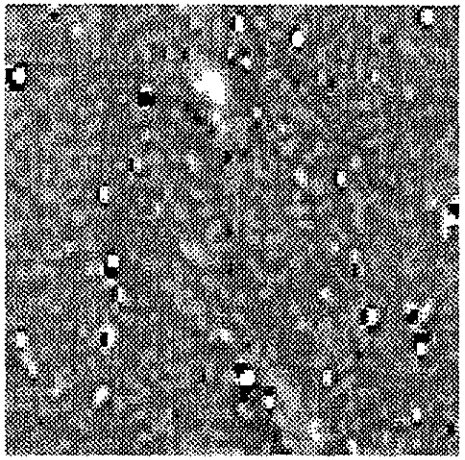

# KINGSCOTE : AREA 1

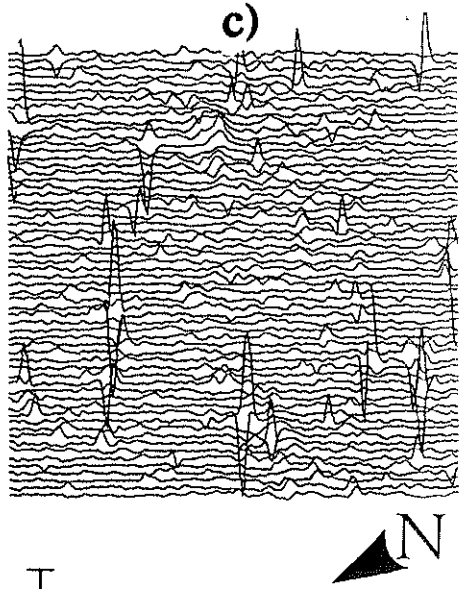
## Resistivity Survey 1993

***Figure 5***. KINGSCOTE : AREA 2 - Pilot Magnetometer Survey

a) Location b) Greyscale plot c) X-Y traceplot

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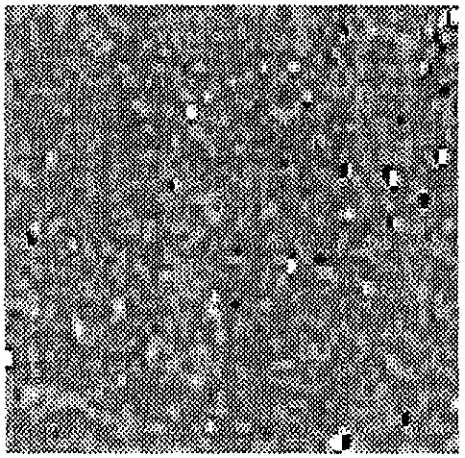
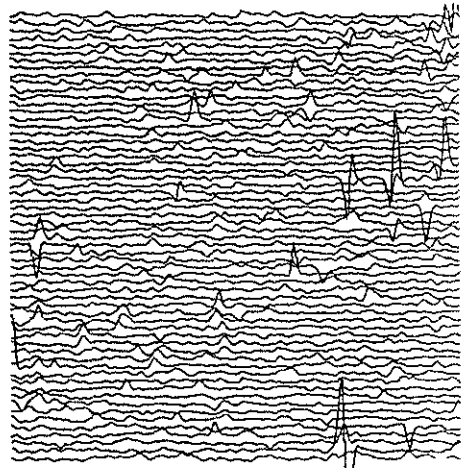
min value (black) -2.0 nT

21 nT/cm





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150 metres

0 30 90m

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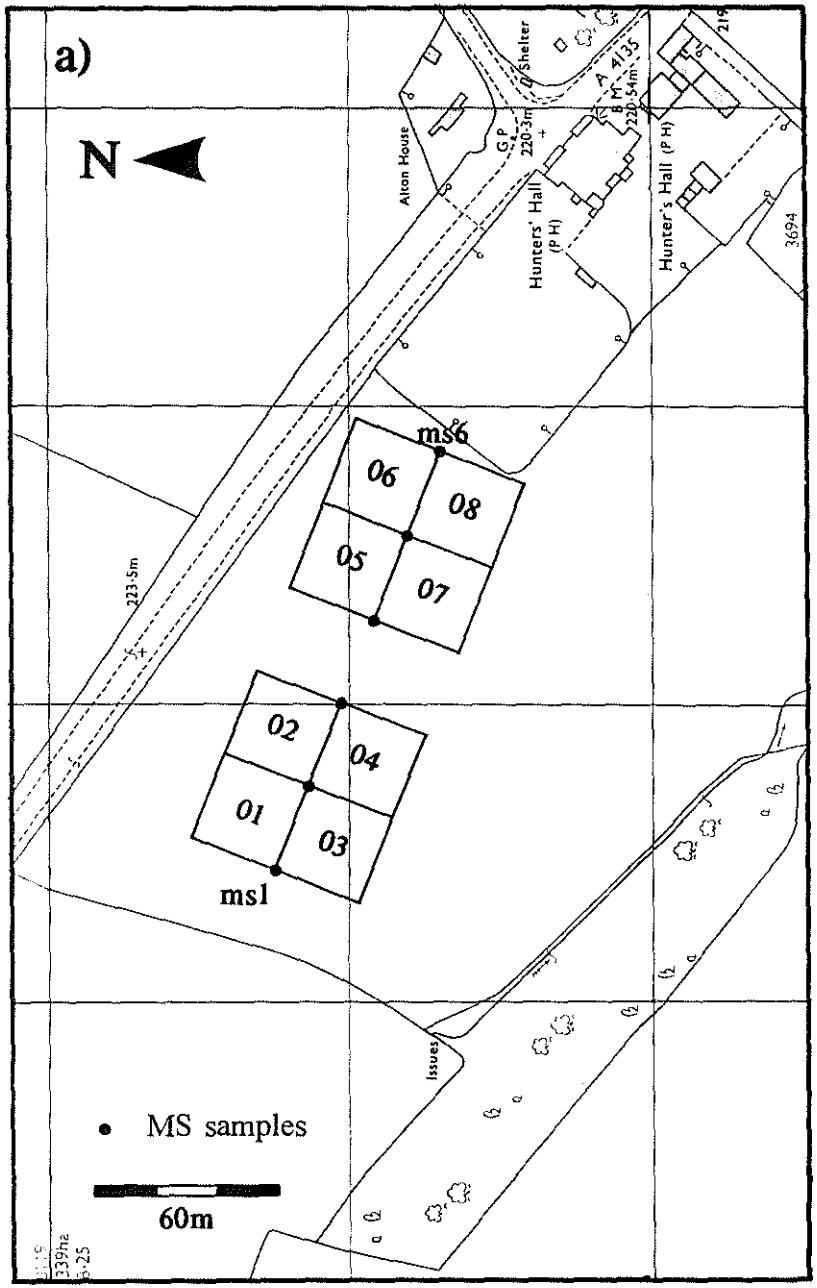
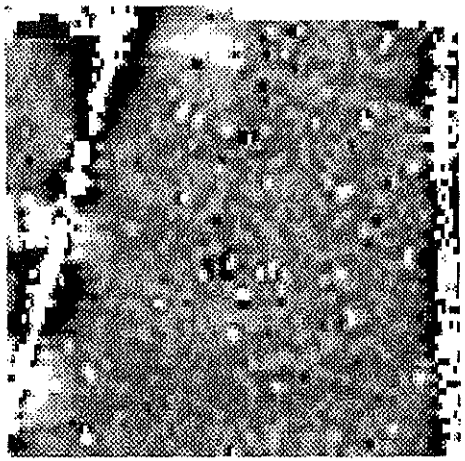
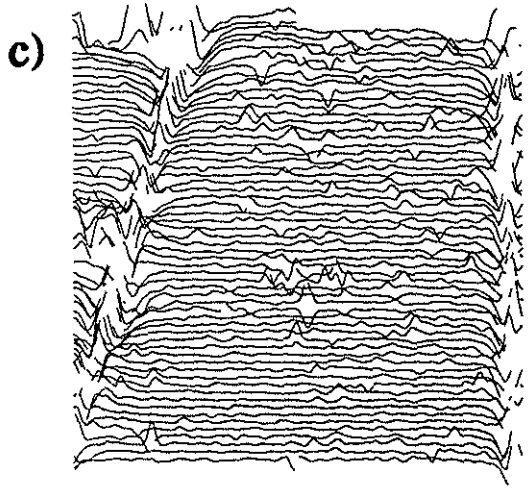
***Figure 6.*** KINGSCOTE : AREA 3 - Pilot Magnetometer Survey

a) Location b) Greyscale plot c) X-Y traceplot

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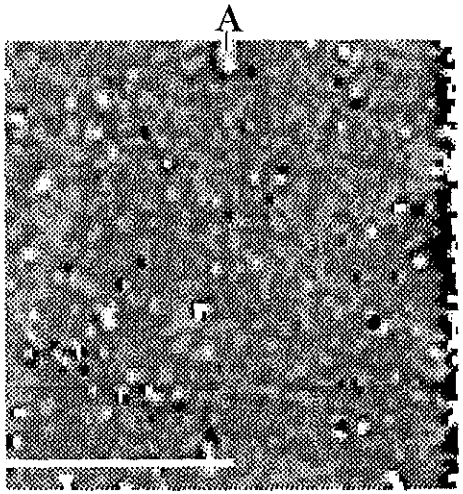
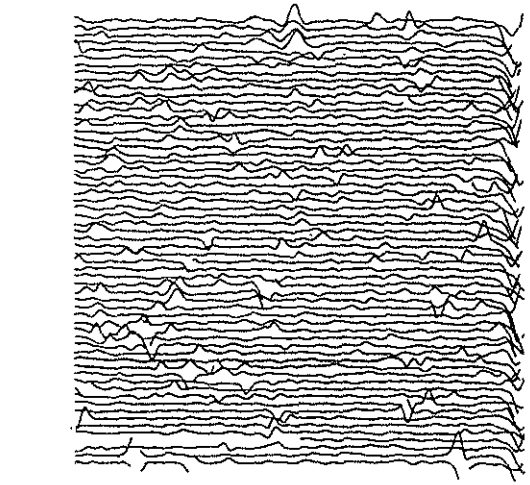
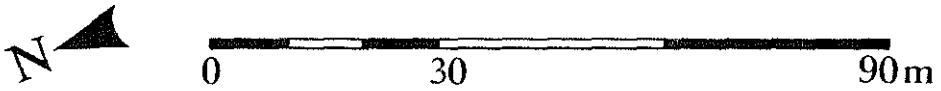
min value (black) -5 nT

37.5 nT/cm



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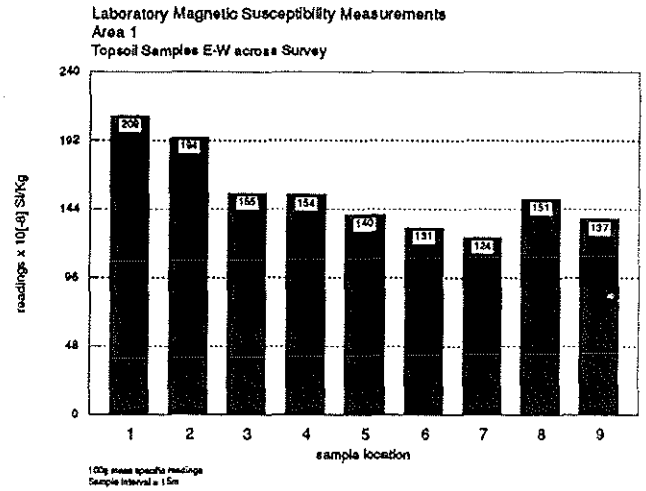


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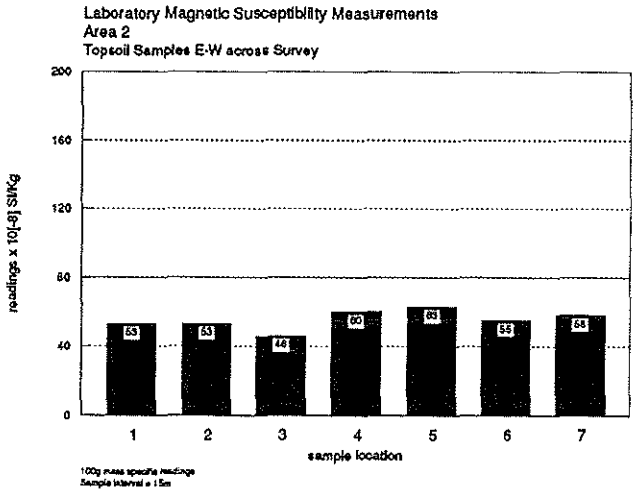


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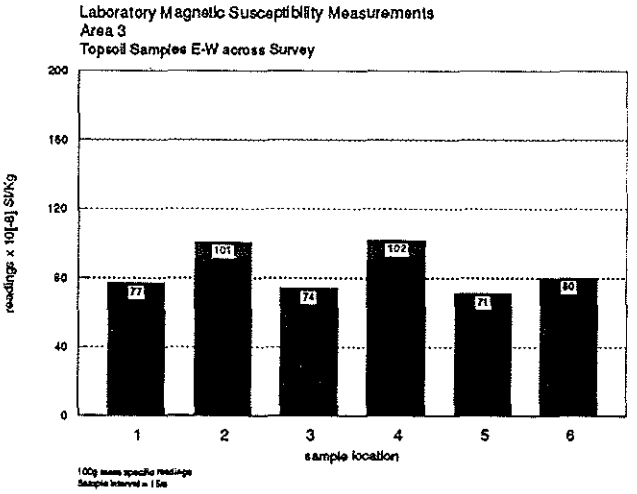


Mean = 84.2

*Figure 7: Magnetic susceptibility results.*