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Ancient Monuments Laboratory  
Report 89/93

LEES REST ENCLOSURE,  
NEAR CHARLBURY, OXFORDSHIRE.  
REPORT ON GEOPHYSICAL SURVEY  
NOVEMBER 1992

Andrew Payne BSc PIFA

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Summary

The purpose of this survey was to trace the continuation of a triple-ditched enclosure partly visible as a cropmark, but of unknown southward extent owing to a covering of trees. Tree felling in November 1992 provided the opportunity to map the uncertain boundaries of the enclosure within the wood using magnetometry in order to assist the future management of the site. The results indicate that the enclosure is roughly square in form with rounded corners and that the wood contains about 50% of the site. The enclosure is defined by a series of three ditches around the majority of its perimeter, which is broken on the south-east side by a probable entrance. The entrance and a variation in the layout of the ditches was not previously recognisable from the aerial photo evidence.

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## LEE'S REST ENCLOSURE, NEAR CHARLBURY, OXFORDSHIRE

Report on Geophysical Survey, November 1992.

### INTRODUCTION

A geophysical survey was carried out within an area of recently felled woodland in order to trace the continuation of a triple-ditched enclosure (County Monument N<sup>o</sup> 27) partly identified from cropmarks in an adjacent field. It was clearly desirable to better define the scheduled area to reflect the actual boundary of the archaeological site within the wooded area. For this reason, when clearance and replanting of the woodland took place in November 1992 it was decided to undertake a geophysical survey within the plantation. The site is situated on clayey soil over the Great Oolite limestone brash of the Oxfordshire Cotswolds at NGR SP 378 193.

Limited excavations in 1960, undertaken by Linington, investigated a small part of the interior of the enclosure (outside the plantation) together with the three ditches. Also at this time, the line of the ditches in the plantation was roughly traced using a proton magnetometer. Unfortunately only brief notes on the excavations and magnetometer scan have ever been published (Linington 1962).

The excavations showed that the enclosure originally possessed two ditches, constructed in the first century AD, while the outer of the three was a later third century addition, when the character of the site appears to have altered. The inner ditch was 1.8m wide and 1.8m deep in profile and a bank may have existed along its inner edge. The inner ditch was open as indicated by deposits of domestic rubbish, while the middle ditch was dug as a pallsade trench and filled with packing material. Excavation evidence suggests that during the 1st to 3rd C. AD, the site functioned as a farmstead; however towards the end of the C. 3rd the site was radically altered by the removal of soil from the interior of the enclosure, which was replaced by a layer of stone cobbling. The third and outer ditch was dug during this period -perhaps to obtain the stones. Features were cut through the cobble layer and roof tiles were found on top of it, but no clear structures survived above the cobble surface. Finds from this period including a stone head from a statue (thought to represent the god Mercury) suggest a later Roman building with a religious association occupying the site until it appears to have been abandoned in the 4th C. AD.

### METHOD

#### *i) Magnetometry*

Magnetometry was selected as the most appropriate survey technique given the favourable geology and a proven record of locating Iron Age occupation features. Resistivity was considered to be unsuitable due to tree-root disturbance and the waterlogged condition of the site.

The survey was carried out in two areas divided by the boundary between woodland and farmland (see plans 1 & 6). These were then each divided into a grid of 30m squares. Each square was surveyed using a Geoscan FM36 fluxgate gradiometer to record the vertical magnetic field gradient at intervals of 25cm along successive parallel traverses 30m

long and 1m apart. Readings were recorded at 0.1 nanotesla (nT) sensitivity and the traverses were orientated north-south and walked by the zig-zag method. The data was recorded in the internal memory of the FM36 and periodically transferred in the field to diskette on a portable micro-computer, providing facilities for viewing the results. The data was subsequently transferred in the laboratory to a Tektronics XD88 workstation, where data assembly and advanced processing was carried out using a range of display options and mathematical enhancement treatments. The plots supplied on plan 2 represent a selection from the full range of these options.

### *ii) Magnetic Susceptibility (MS)*

The magnetometer survey was supplemented by MS readings obtained in the laboratory from samples of topsoil collected at 15m intervals along a 135m traverse crossing the enclosure from east to west. It was hoped that this data would give an indication of the intensity and distribution of any past settlement activity associated with the enclosure. The values were derived from soil dried at room temperature, ground up and sieved through a 2.8mm mesh to remove unwanted inclusions. Dual frequency susceptibility measurements (expressed as mass specific values [ $\chi_{lf}$  and  $\chi_{hf}$ ] for a 100g sample weight) were then obtained using a Bartington MS2 susceptibility meter and MS2-B sensor. The results are presented in plan 5 and the appendix.

## **RESULTS**

### *i) Magnetometry (Plans 2-4)*

#### Extent and form of the enclosure

Magnetic anomalies ranging from 8-10 nT in strength were registered over the ditches in the north field. This response allowed the extent of the enclosure to be mapped successfully within the wooded area. It is now apparent that the enclosure is roughly symmetrical and square in form, and that the ditches are interrupted on the south-east side by a probable entrance causeway. It is also evident that there is some variation in the construction of the ditches, with the corners of the innermost circuit being more sharply angled than the outer more rounded two. The outer ditch on the north west side has not been detected: this may be due to local factors or, indeed, the ditch circuit may be incomplete here. Elsewhere the signal from the ditch has been obscured in two areas of the wood by the response to strongly magnetic clearance bonfires which included some ferrous metal debris.

#### The interior of the enclosure

Obvious anomalies compatible with occupation features, such as pits, are absent in the magnetometer response from the interior, although other types of archaeological features such as the timber or stone structures suspected by Linington may be present, but not detectable. Despite the lack of evidence for features inside the enclosure there is some tenuous evidence for their existence outside it in the form of occasional scattered and isolated anomalies.

## *ii) Magnetic Susceptibility (Plan 5)*

The MS values obtained from within the enclosure are moderately higher ( $\chi_{if} = 54-68 \times 10^{-8}$  SI/Kg) in comparison to the samples from outside ( $\chi_{if} = 36-46 \times 10^{-8}$  SI/Kg; discounting a reading of 102 from a sample taken from near a modern field boundary on the east of the site). This slight enhancement in the susceptibility of the topsoil coinciding with the interior of the enclosure probably results from processes linked to past human occupation such as burning, which can convert naturally occurring iron minerals in the topsoil to more strongly magnetised forms (Le Borgne 1955, 1960, Tite and Mullins 1971). However the contrast is not pronounced, perhaps reflecting the specialised nature of the utilisation of the enclosure suggested by the excavations.

## **CONCLUSIONS**

The geophysical survey has succeeded in locating the cropmarks and has delineated the previously hidden triple circuit of ditches defining the southern portion of the enclosure within the wood.

It is now evident that the enclosure is roughly square in form with rounded corners, and that it is divided into almost two equal parts by the field boundary. The survey also shows that the ditches are interrupted by a probable entrance causeway (6 metres wide) mid-way through the eastern side of the enclosure within the wooded part of the site. Evidence for activity within the enclosure is inconclusive, reflecting the insubstantial evidence of occupation found during excavation.

The plan of the enclosure revealed by the survey, shares many features in common with sites interpreted as Iron Age/Romano-Celtic shrines (eg. Fison Way, Thetford, Norfolk (Gregory, T, 1991)), supporting Linington's suggestion of a religious function. The salient features are the arrangement and alignment of the simple, easterly facing entrance combined with the shape of the enclosure. Perhaps of further significance is the association of the site with a spring and the linear earthwork system of Grims Ditch, which is thought to be an Iron Age political or territorial boundary (see Woodward, A, 1992, chapters 2 and 3 and Cunliffe, B, 1974, 88).

Surveyed by : M Cole  
                  A Payne

16-18 November 1992

Report by : Andrew Payne

May 1993  
Revised October 1993

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## **ACKNOWLEDGEMENTS**

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## PLANS ENCLOSED

- i) Plan showing location of survey based on 1:2500 OS map.
- ii) X-Y traceplot and greytone plot of the enhanced magnetometer data (1:1000 scale).
- iii) Greytone plot of magnetometer data in locational setting (1:1250 scale)
- iv) Interpretation of survey results (1:2500 scale)
- v) Magnetic susceptibility results related to magnetometer survey interpretation (1:1250 scale)
- vi) Survey relocation information (1:1000 scale)

A P P E N D I X

**1. Dual Frequency Magnetic Susceptibility Results**

Measurements obtained using a Bartington MS2-B Dual Frequency Bench type sensor with internal diameter of 36mm, calibrated for a 10g sample mass.

**KEY**

K = Readings before correction for sample weight  
 X = Mass specific readings for a 10g standard sample weight  
 lf = Low frequency (0.43 KHz) readings  
 hf = High frequency (4.3 KHz) readings  
 fd = The frequency dependence of the susceptibility readings

Sample No.	Weight (g)	Klf	Xlf	Khf	Xhf	Xfd
1	9.9	94	95	77	78	17.89
2	11.3	55	48	48	42.5	11.46
3	11.4	61	53.5	56	49	8.41
4	11.0	67	61	61	55.5	9.02
5	10.0	45	45	44	44	2.22
6	12.5	70	56	63	50.5	9.82
7	10.9	46	42	44	40	4.76
8	9.0	32	35.5	30	33	7.81
9	11.3	46	41	41	36	12.20
10	10.8	36	33	35	32.5	1.52

**2. Standard Low Frequency Magnetic Susceptibility Results**

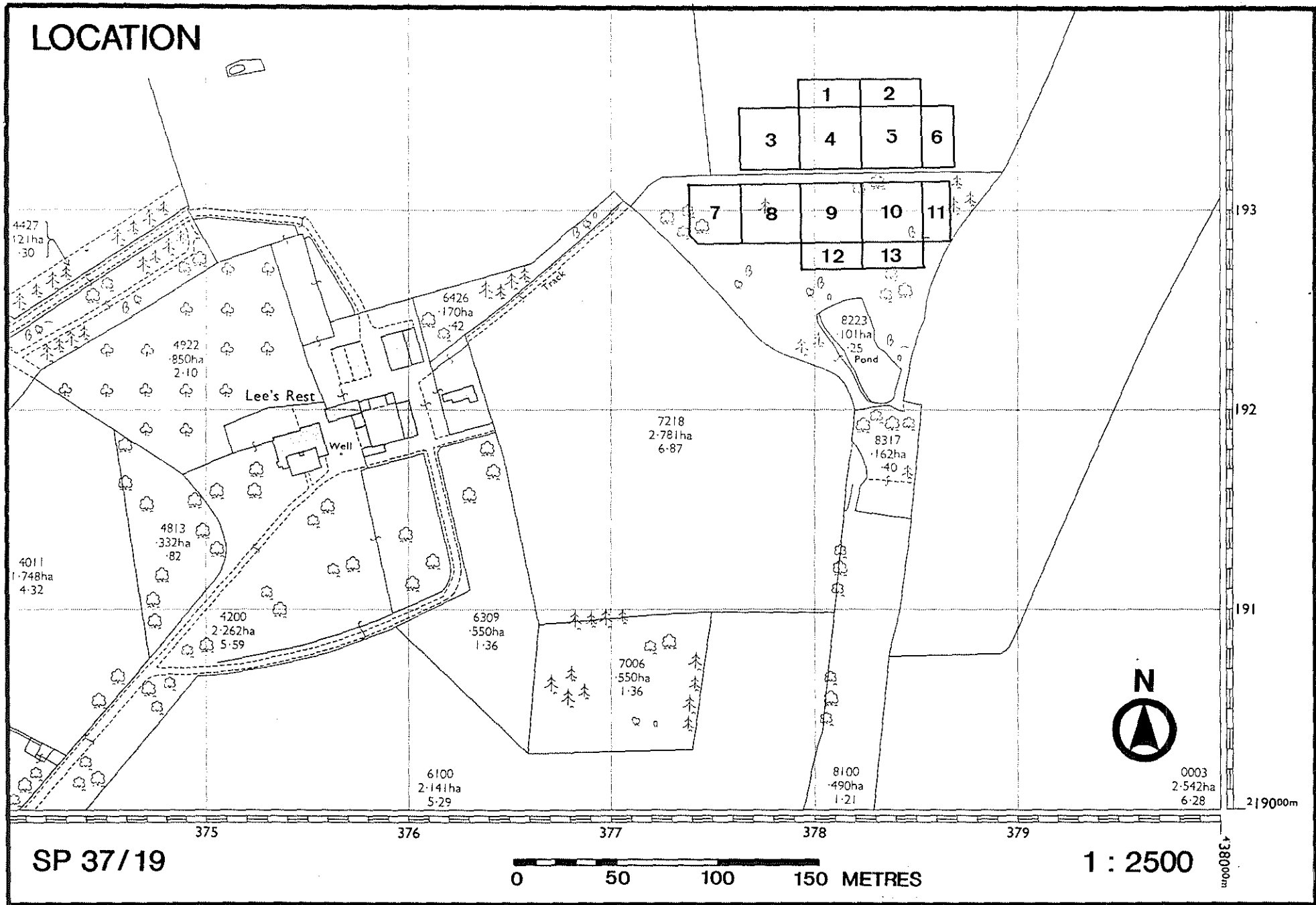
Measurements obtained from a Bartington MS2-B single frequency laboratory sensor with an internal diameter of 62mm calibrated for a 100g sample mass.

**KEY**

K = Readings before correction for sample weight  
 X = Mass specific readings for a 100g standard sample weight.

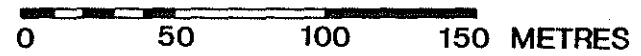
Sample No.	Weight (g)	Klf	Xlf
1	89.4	91	102
2	112.1	51	45.5
3	85.5	48	56
4	73.2	50	68
5	113.2	61	54
6	108.1	66	61
7	80.5	37	46
8	113.0	48	42.5
9	111.3	51	46
10	110.0	40	36

# LOCATION



SP 37/19

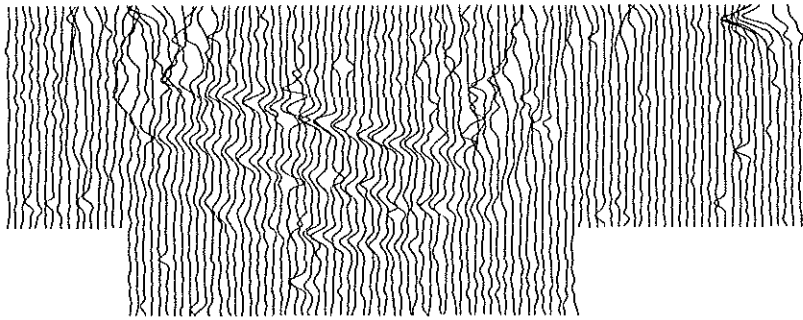
1 : 2500



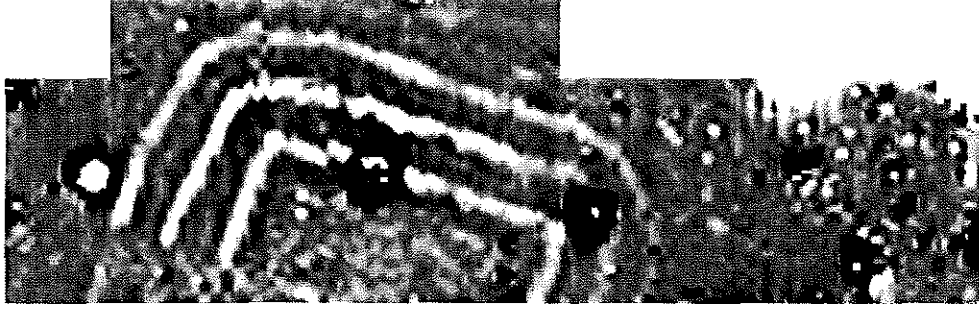
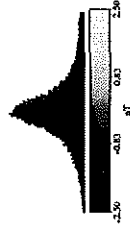
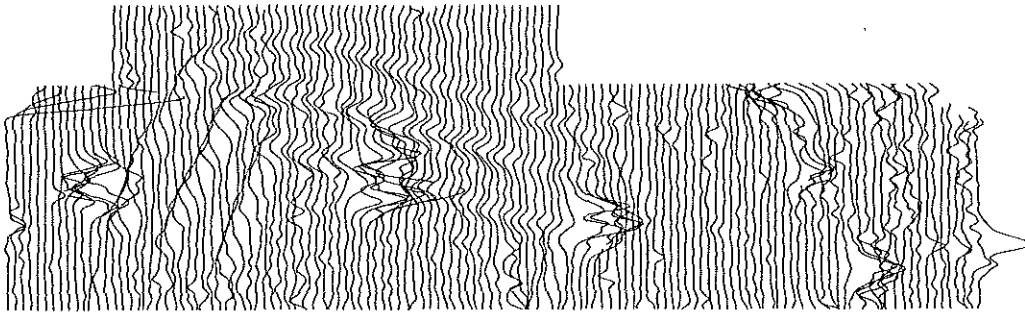
Plan (1)



Plan (2)



22.5 nT/cm

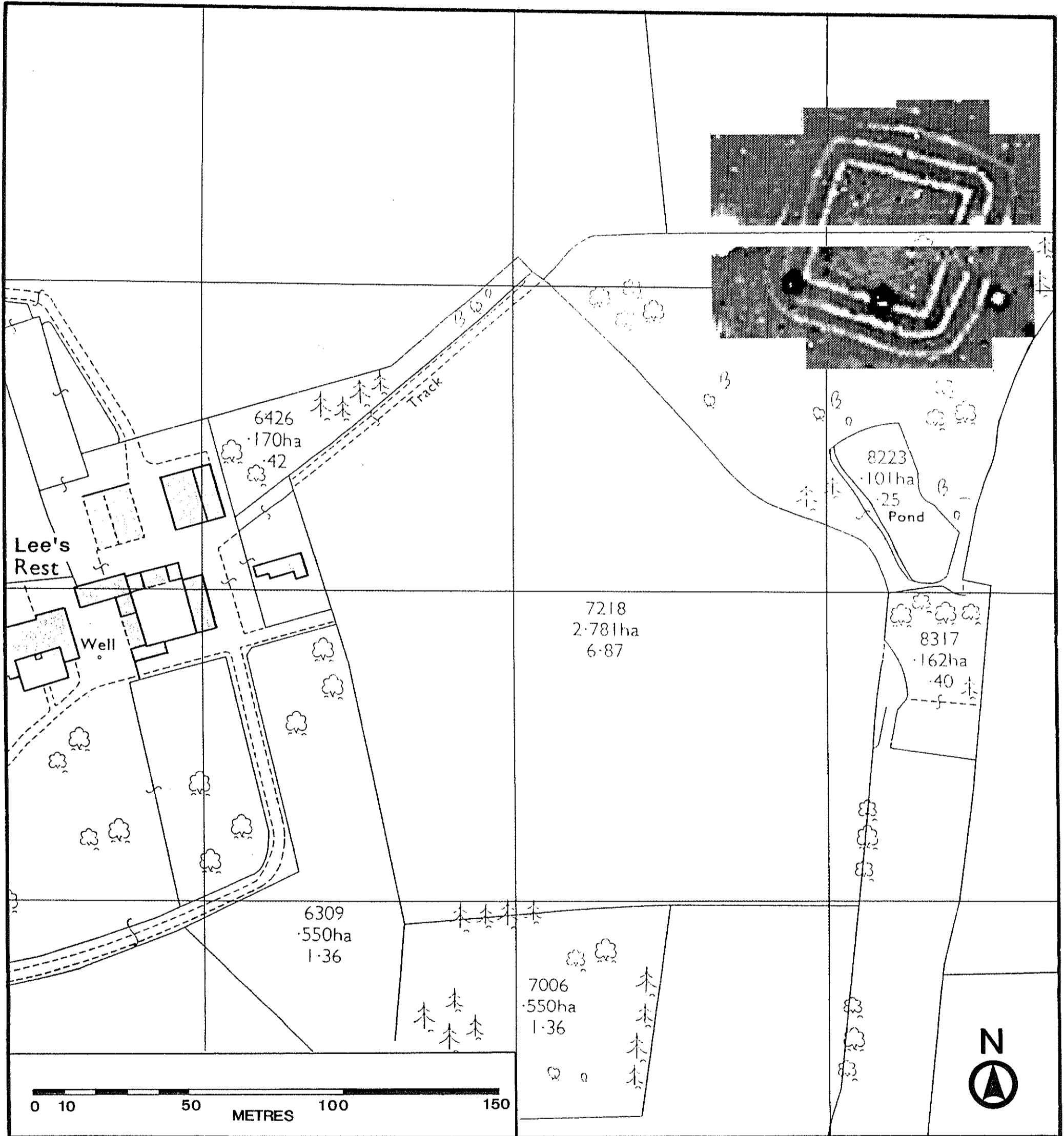


English Heritage

LEE'S REST



# LEE'S REST

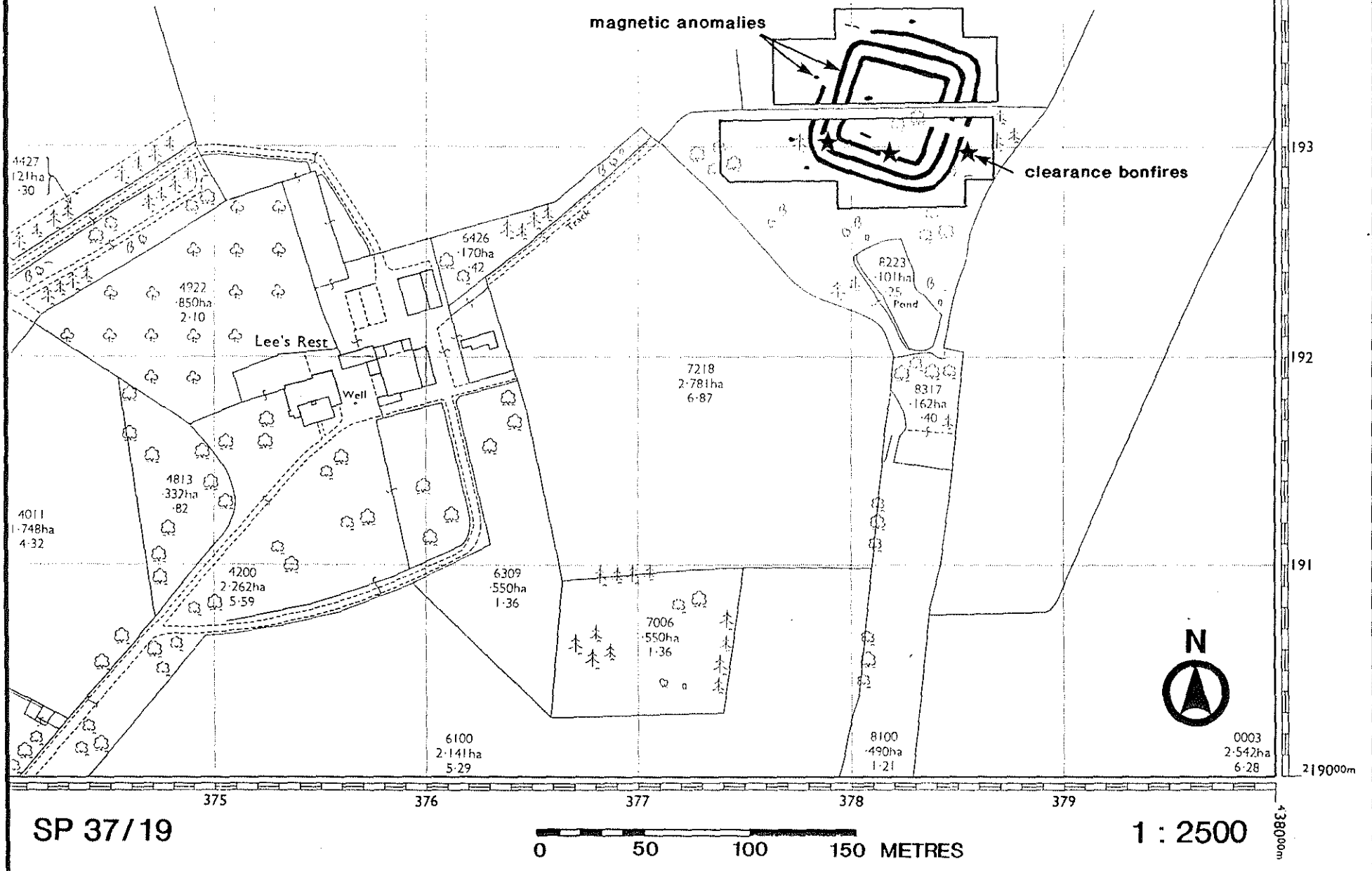


## Magnetometer Survey

Plan (3)

# LEE'S REST ENCLOSURE

# Interpretation



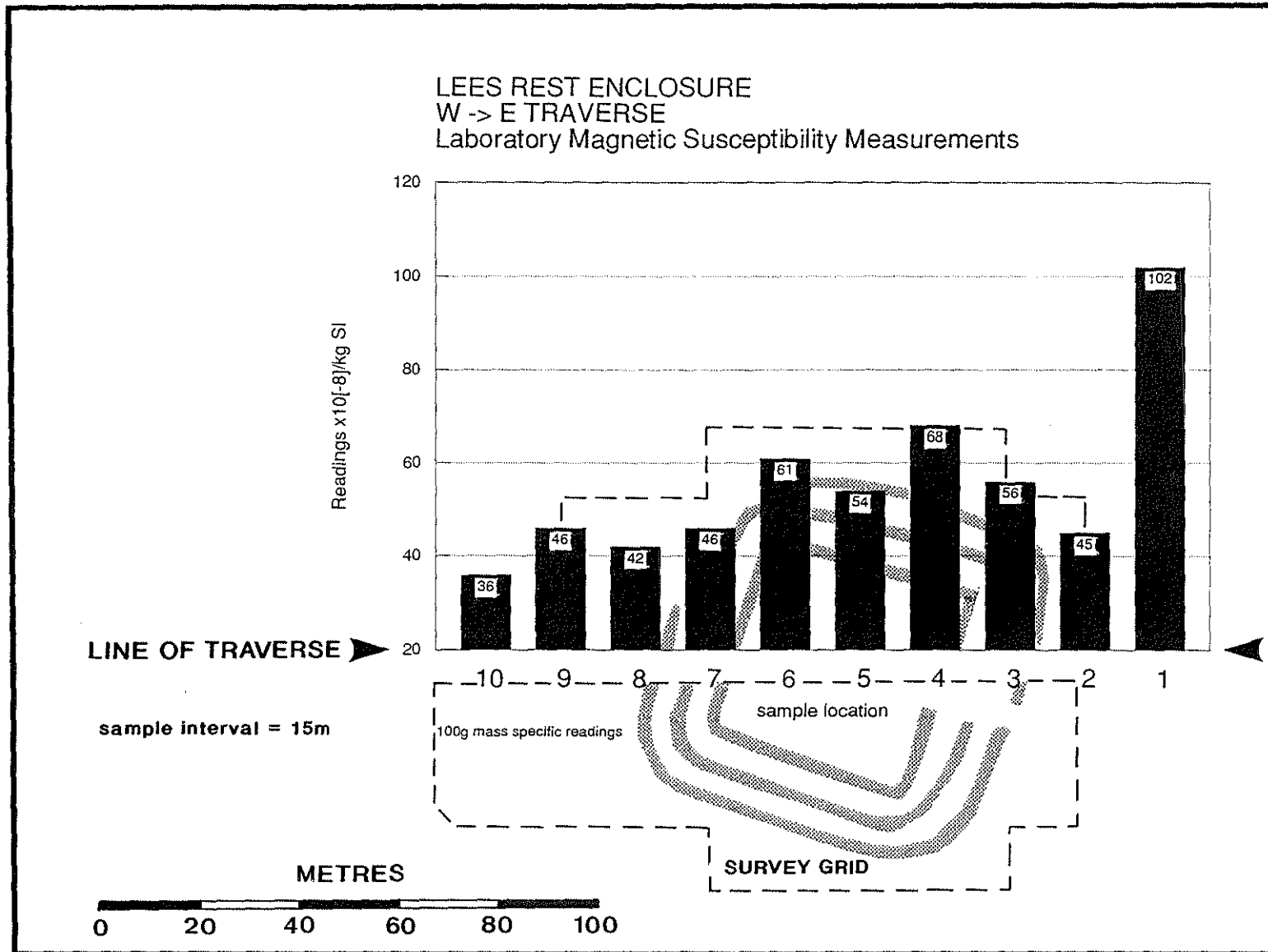
SP 37/19

0 50 100 150 METRES

1 : 2500

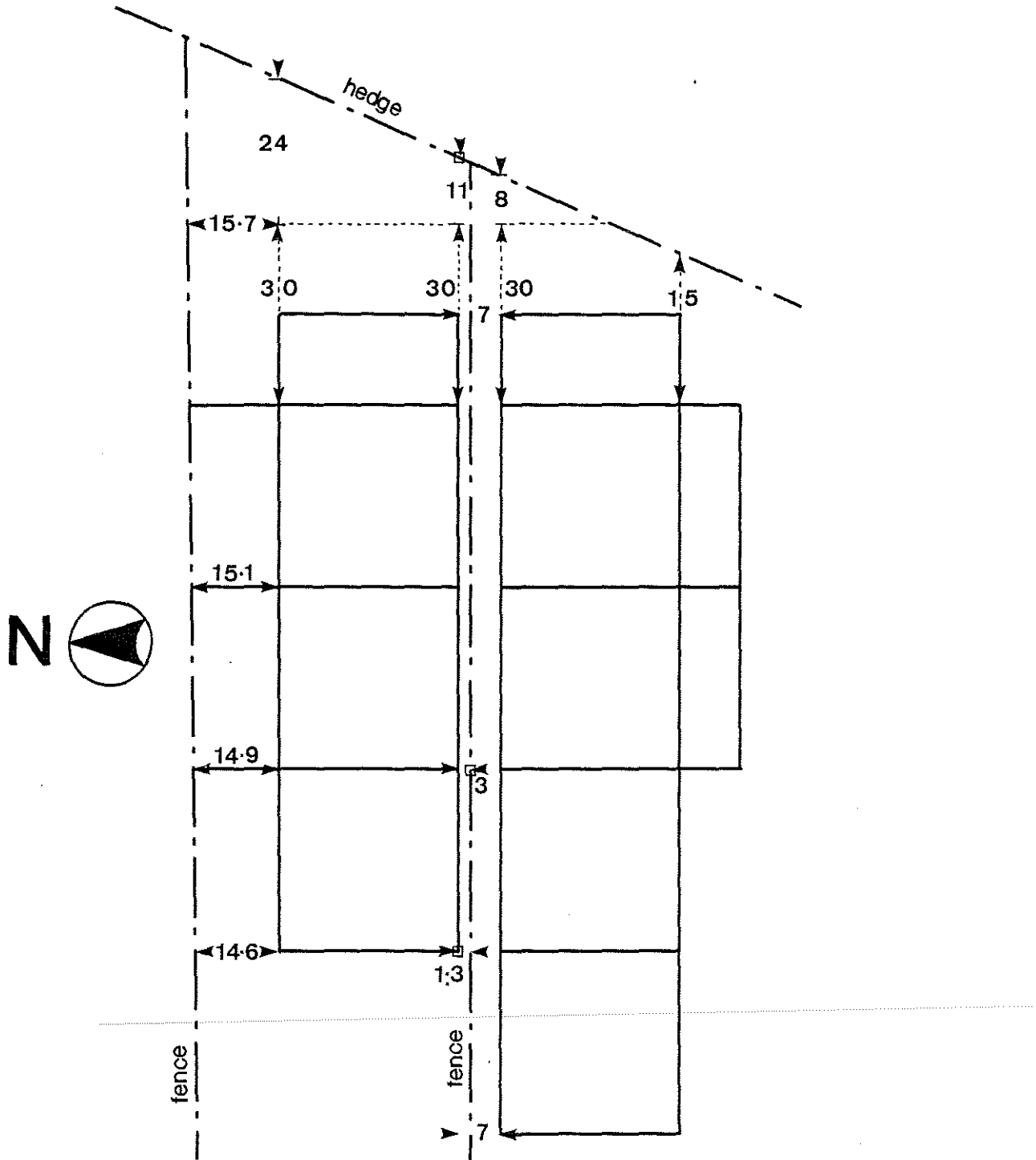
Plan (4)

# LEE'S REST



## Magnetic Susceptibility Results

# LEE'S REST Magnetometer Survey



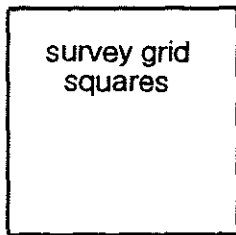
**KEY**



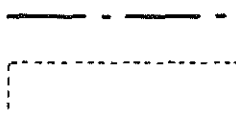
wooden marker peg



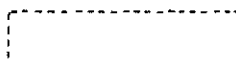
distance measurement



survey grid squares



field boundaries



partially surveyed squares

LOCATION OF SURVEY

