

**Seven Barrow Plantation
Penn Hill, Bradford Peverell, West Dorset
Report on Archaeological Geophysical Survey 2013**

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**for
English Heritage**

**on behalf of
Mr Peter Shaw and Natural England**

Monument number DO349

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Introduction

This report describes a geophysical survey carried out to investigate the condition of a group of barrows located at Lower Skippet Farm, Penn Hill near Bradford Peverell in West Dorset (NGR SY 648250).

The survey was commissioned through English Heritage on behalf of the owner of the site and Natural England, and was done under the terms of an English Heritage Section 42 Licence (issued on 14 January 2013), as is required for geophysical work at a Scheduled site (SAM DO349). Fieldwork for the survey was done between 29 January and 8 February 2013.

Background

The following notes on the survey objectives and site conditions incorporate information contained in the project brief, as issued by English Heritage in November 2012.

It is stated in the brief that there is a need to improve the protection of the barrows in the group, some of which have been disturbed by badgers. Damage is visible particularly in barrows E and K (as labelled in figures 4-7). It is intended that the survey findings should assist in the management and interpretation of the site, which is to be protected through a Higher Level Stewardship Agreement with Natural England.

The evaluation area (as indicated by a rectangle in the location plan, figure 1, is about 3.5ha in area (210 x 166m), but it is mentioned in the brief that this lies partly within dense woodland (Seven Barrow Plantation). This is unsuitable for detailed geophysical investigation, and it was therefore specified that the survey should cover as much as possible of the remainder of the site. Some of the barrows are located on the northern boundary of the plantation, and their accessibility for surveying purposes is variable. Some of the barrows (E, F, J, L, N) are relatively free of trees, but others (C, G, H, K, I, M, P) are more wooded, and in some cases could not be fully surveyed. (Undergrowth was cleared from some of the barrows in advance of the survey.)

There are arable fields to the west and north east of the site, but the remainder is rough grassland subdivided by fences and a track, in addition to the trees. The site is also obstructed in places by piles of wood, horse jumps and a fallen metal tower. The area therefore had to be surveyed in numerous small sections, and the survey plots assembled from a highly fragmented data set. [We regret therefore that the report has remained rather longer than intended in our work queue.]

Archaeology

It is stated in the brief that the barrow group is thought to comprise three long barrows (F, H, P) and 12 bowl barrows. (Barrows A and B are outside the evaluation area.) The largest long barrow (F) is described as partially levelled for its northern 30m by previous agricultural activity. The surviving section is contiguous with a bowl barrow (E), and is difficult to define clearly on the ground.

Site Conditions

The geology of the site is stated to be Tarrant Chalk, and there are no drift deposits. Ground conditions should therefore be favourable for geophysical investigation, and features containing earth fill cut into chalk often respond strongly to a magnetometer survey. The suitability of soil conditions at the site for a magnetometer survey was confirmed by magnetic susceptibility readings taken during the survey. The readings (as plotted in figure 6iv) have a mean value of 18×10^{-5} SI, but substantially higher values (30-40) were obtained from the arable land to the west of the site. (These may be more representative of soil conditions than readings taken on grass.) The readings are therefore well within a range for which productive magnetic surveying should be possible.

Survey Procedure

The two geophysical techniques which were specified for use in this investigation were magnetometer and earth resistance surveying. These together should offer a more complete representation of subsurface conditions than would be provided by a single survey method. A magnetometer survey detects silted or earth-filled features, but will not necessarily detect the stony fill of a mound. This, together with the ditch, should usually be visible in an earth resistance survey.

Magnetometer Survey

The magnetometer readings were collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and are plotted at 25cm intervals along each transect. The results of the survey are presented as a grey scale plot in figure 2i and as a graphical (x-y trace) plot in figure 2ii.

The graphical plot shows the magnetometer readings after minimal pre-processing which includes adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and slight linear smoothing. Additional weak 2D low pass filtering has been applied to the grey scale plot to reduce background noise levels.

Earth Resistance Survey

This survey was done with a Geoscan RM15 meter with a four probe array. Probes were switched to provide two readings at 0.5m probe spacing at each array location. All readings were recorded at 1m separation on the ground.

The resistance plots are similar to those for the magnetometer survey, but with the addition of a colour image plot in figure 4. Grey scale and graphical plots of the initial (unfiltered) resistance data are shown in figures 3i and 3ii. (The unfiltered grey scale plot 3i is not interpolated, and so shows the resolution of the initial survey data. Other plots are interpolated before plotting to provide a more continuous representation of the data.) Figures 4i and 4ii are based on resistance readings after filtering (in which the mean of surrounding values is subtracted from each reading in turn). A wide high pass filter (radius 6) was used here because this should not suppress broad earthwork features, but allows them to be represented (in grey scale and image plots) in relation to a uniform background.

The interpretative plan (figure 5) includes separate plots of the magnetic and resistance anomalies. Plot 5i shows magnetic anomalies from various sources, and both positive and negative resistance anomalies are outlined in plot 5ii. A final summary plan (figure 7) is a simplified presentation showing anomalies which may be of archaeological relevance from both surveys. The two sets of selected features are superimposed for comparison.

Survey Location

The background mapping in the survey plans is based on OS digital data supplied to us by English Heritage. The survey grid was set out and tied to the OS grid (to c. 10cm accuracy) using a differential (Omnistar) GPS system. The enclosed plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans which can be supplied with this report. These coordinates could be used if required to re-establish locations on the ground by GPS.

It was stated also in the brief that the survey should additionally be located by measurements to fixed landmarks. These measurements are shown in figures 6i – 6iii. The enlarged plan extracts show measurements to extant fences which could be used if necessary to re-establish a baseline through the 30m survey grid.

Results

The overall extent of the magnetometer and resistance surveys is indicated by cross hatching in figure 1. It was possible to cover rather more of the wooded and obstructed parts of the site using resistance surveying (which is based on individual readings) rather than magnetic surveying (which records continuous transects).

Both surveys have produced findings which clearly relate to the barrows, as well as various background effects and disturbances. Resistance survey findings include a number of strong positive anomalies (red in colour plot 4ii), some of which correspond to barrow mounds. Others (e.g. to the north west of barrow J) are located outside the barrows, and so may be unrelated ground disturbances (possibly including badger diggings), or other irregularities in the ground surface.

The magnetometer survey has also detected numerous disturbances, particularly within the grassed and wooded areas of the site. Individual strong magnetic anomalies representing

pieces of ferrous debris are outlined in light blue in figure 5i, and other more extended disturbances are shown in a blue/purple colour. These are most concentrated near to fence lines, and may be caused in part by ferrous material such as fence wire. The overall level of (partly natural) background magnetic activity is otherwise moderate (as indicated by small magnetic anomalies outlined in light brown). A few (slightly larger) individual magnetic anomalies of dimensions or amplitude which could indicate silted pits are outlined in red. Not all of these are conclusively distinguishable from the background activity, and they are widely dispersed across the site. There are not therefore any groups or clusters of such features which would suggest a concentration of archaeological findings, other than those which relate to the barrows.

We comment on the findings from the barrows (as labelled) in turn. The barrow labels (B-P as indicated on the interpretative plans), are taken from figure 1 in the EH brief.

Barrow C

This barrow, in the south west corner of the survey, was too irregular and overgrown for magnetometer coverage. The resistance survey shows high readings from much of the mound, with low readings (blue outlines in figure 7) which may indicate the central hollow in the bowl barrow, and from parts of the ditch.

Barrow D

This small barrow at the edge of the woodland was only partly surveyed. Various disturbances are visible in the data plots, but no clear plan was obtained.

Barrows E, F

The side ditches of the long barrow F are indicated by both magnetic and resistance anomalies, and there may be weak magnetic evidence for the ditch of the round barrow E (as indicated by red broken lines in figure 7). The long barrow ditches appear not to align closely with the recorded earthwork as shown on the site plan. The survey has not produced any evidence that the long barrow ditches previously extended further to the north (although it may be the case that detectable traces of earthworks can be entirely removed by cultivation: see barrow O.)

Barrow G

Ground conditions here may be disturbed by the track, but there is a positive resistance anomaly which could relate to part of the mound.

Barrows H, K

The long barrow ditches (which are not apparent on the ground) are clearly visible in the resistance data (as negative anomalies), and there are also magnetic disturbances on the line of the western ditch of barrow H. There are positive resistance anomalies at the north of long barrow H, and from much of the mound of the round barrow, K.

Barrow I

There are positive and negative resistance anomalies which could correspond to parts of the mound and ditch.

Barrow J

Negative resistance anomalies correspond to parts of the ditch, but there is no clear response to the mound (although there is a strong positive response immediately to the north west).

Barrow L

Both the magnetic and resistance surveys have responded clearly to the circular barrow ditch, and there are distinct positive resistance anomalies within the mound.

Barrow M

The resistance anomalies suggest the barrow ditch is present, but slightly to the west of the recorded location. There is a particularly strong positive response from part of the mound.

Barrow N

The circular negative resistance anomaly (labelled N? and extending to the west from barrow K) suggests that barrow N is located about 10m to the east of its recorded position.

Barrow O (not numbered on EH plan)

The survey has not produced any findings to confirm the survival of this barrow in the arable field to the east of the site.

Barrow P

This long barrow in woodland was partly cleared, but could only be incompletely covered by the resistance survey. The ditch was detected where it lies within the survey area, and there are high readings from parts of the mound.

Conclusions

The survey has produced findings which confirm the presence and survival of at least eight of the barrows (C, E, F, H, I, K, L, M, P), and which represent their plan in variable degrees of detail. Barrow L provided the most clear and complete response to both the resistance and magnetic surveys, but there was magnetic evidence for ditches also at barrows E, F and H. The remaining barrows responded more clearly to the resistance rather than the magnetic surveys. (This may suggest the ditches are either partially extant, or eroded, and so in either case contain only a shallow depth of magnetically responsive fill.)

The stony fill of barrow mounds is unlikely to respond magnetically, and was observed (at each of the barrows above) only in the resistance survey. There are particularly strong resistance anomalies at a number of locations within and near to the barrow mounds. These include barrows E and K (where badger activity is visible), as well as parts of C, L, M, I, K, H, P, and also to the north west of J. It is difficult to determine from the survey evidence alone whether badger setts contribute to these results. Voids within the soil could increase the resistance readings, but volumes of chalk rubble fill could produce a similar effect. It remains possible, however, that positive resistance anomalies (as indicated by cross hatching in figure 7) indicate locations where badger activity may be present.

The survey produced incomplete or fragmentary responses to the small barrow G (which is intersected by the track), and to barrow J (where part of the ditch was detected). There was also no clear response to the small (and incompletely surveyed) barrow at D. There are no findings to indicate the presence of detectable remains at barrow O, which is on arable land to the east of the survey. Barrow N appears to have been detected 10m to the east of its recorded location.

Report by:

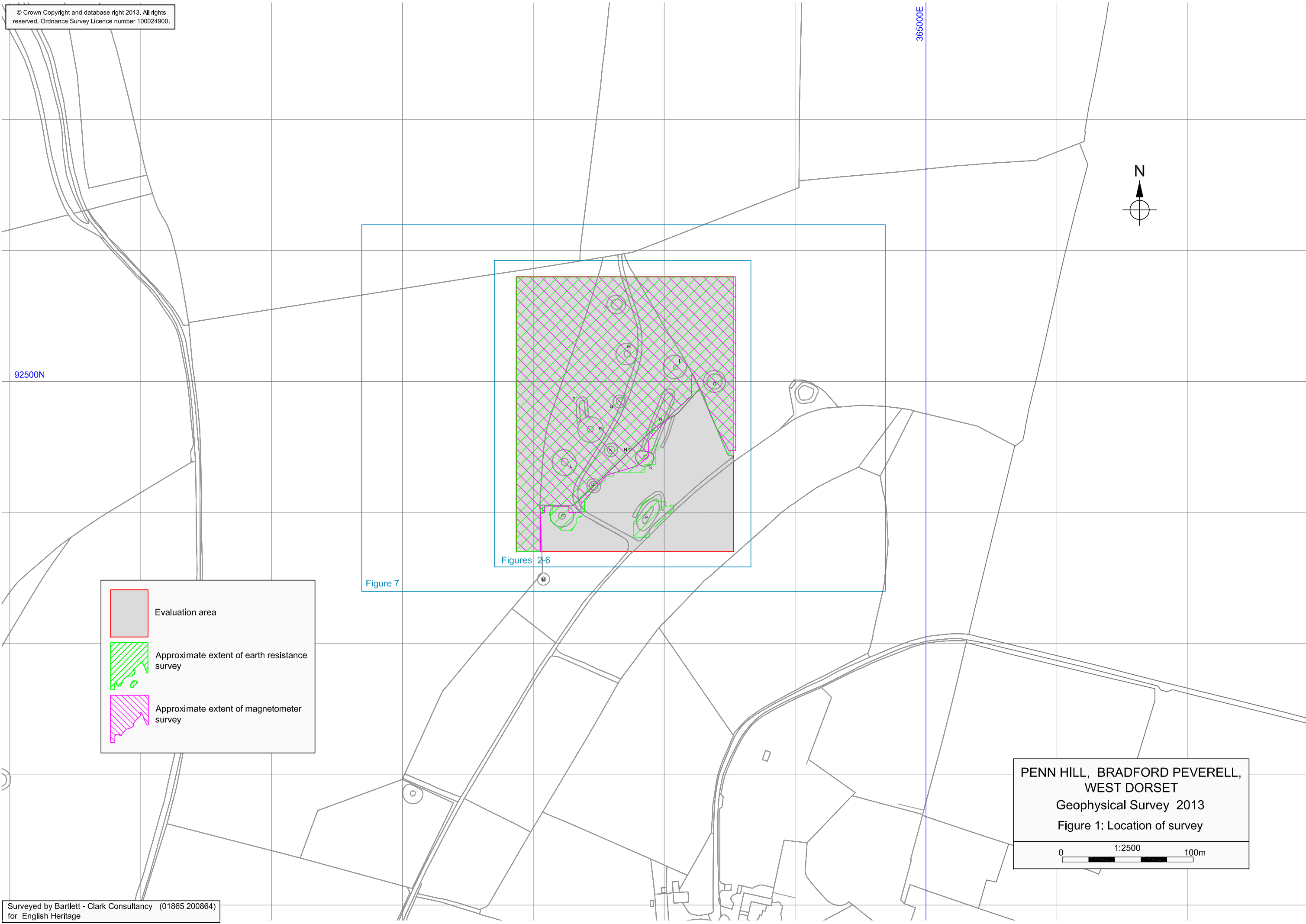
A. D. H. Bartlett BSc MPhil


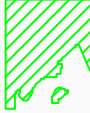

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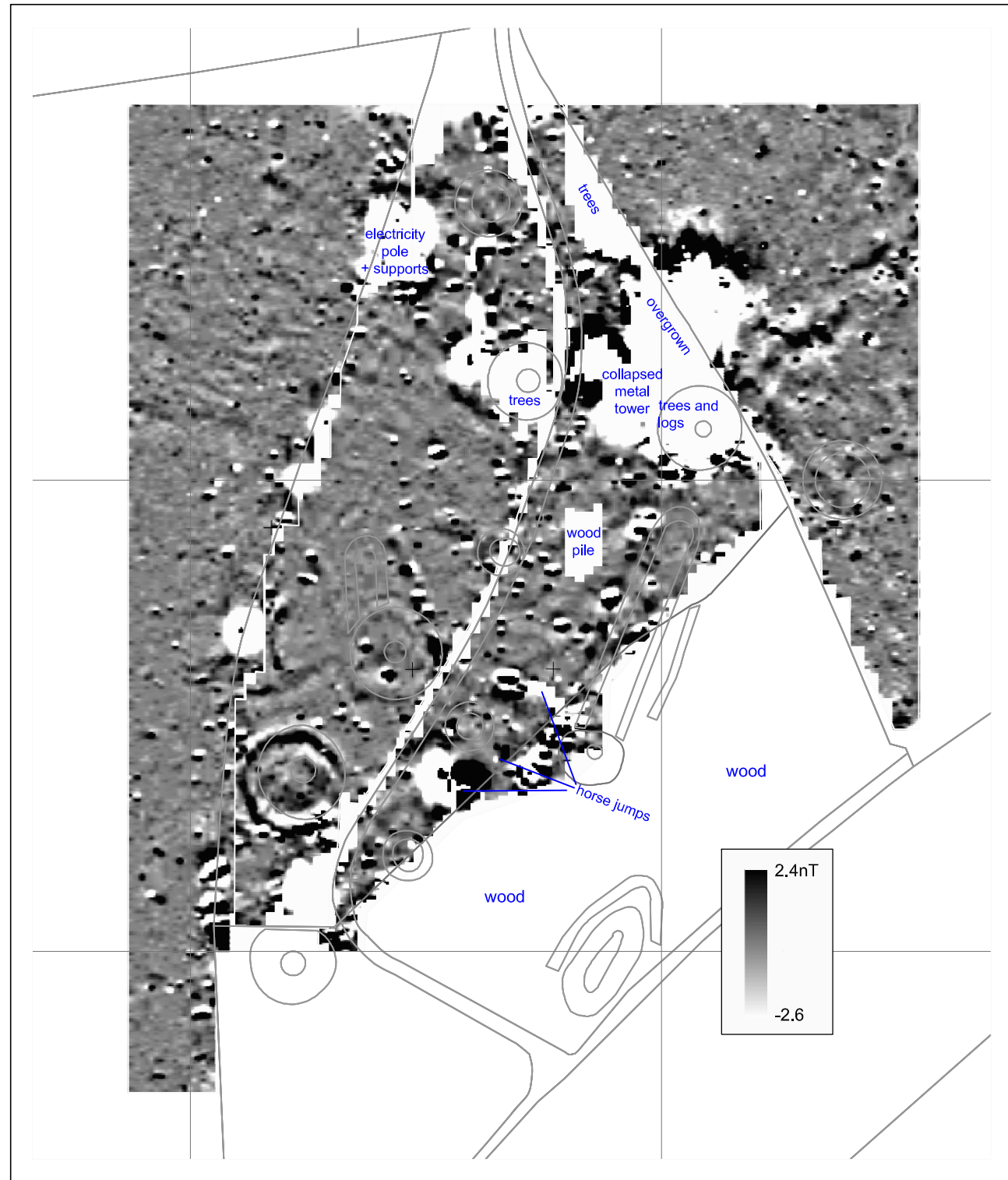
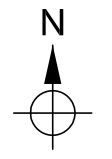
The fieldwork for this project was done by P. Cottrell and S. Brown.



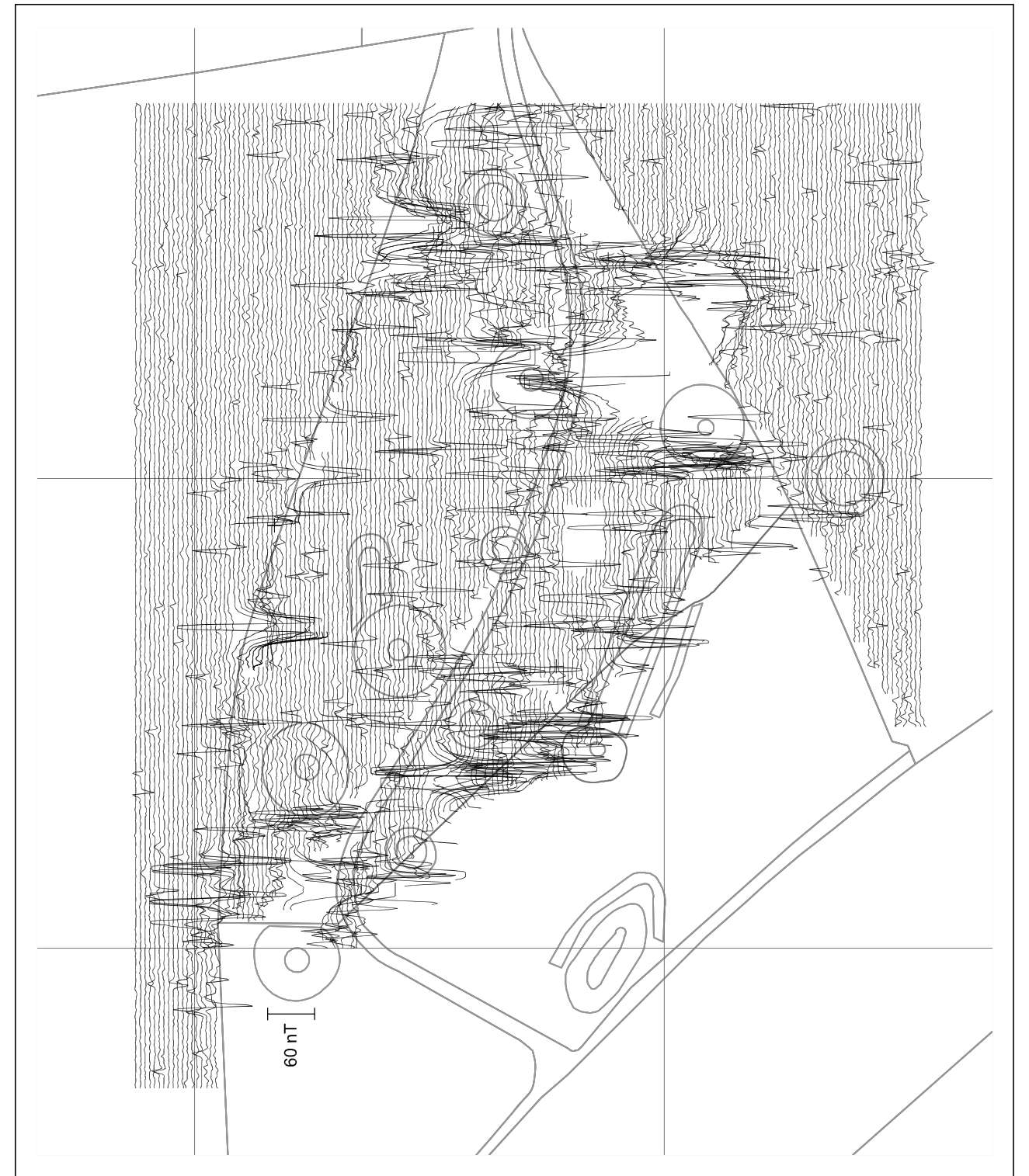
	Evaluation area
	Approximate extent of earth resistance survey
	Approximate extent of magnetometer survey

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Figure 1: Location of survey

0 1:2500 100m



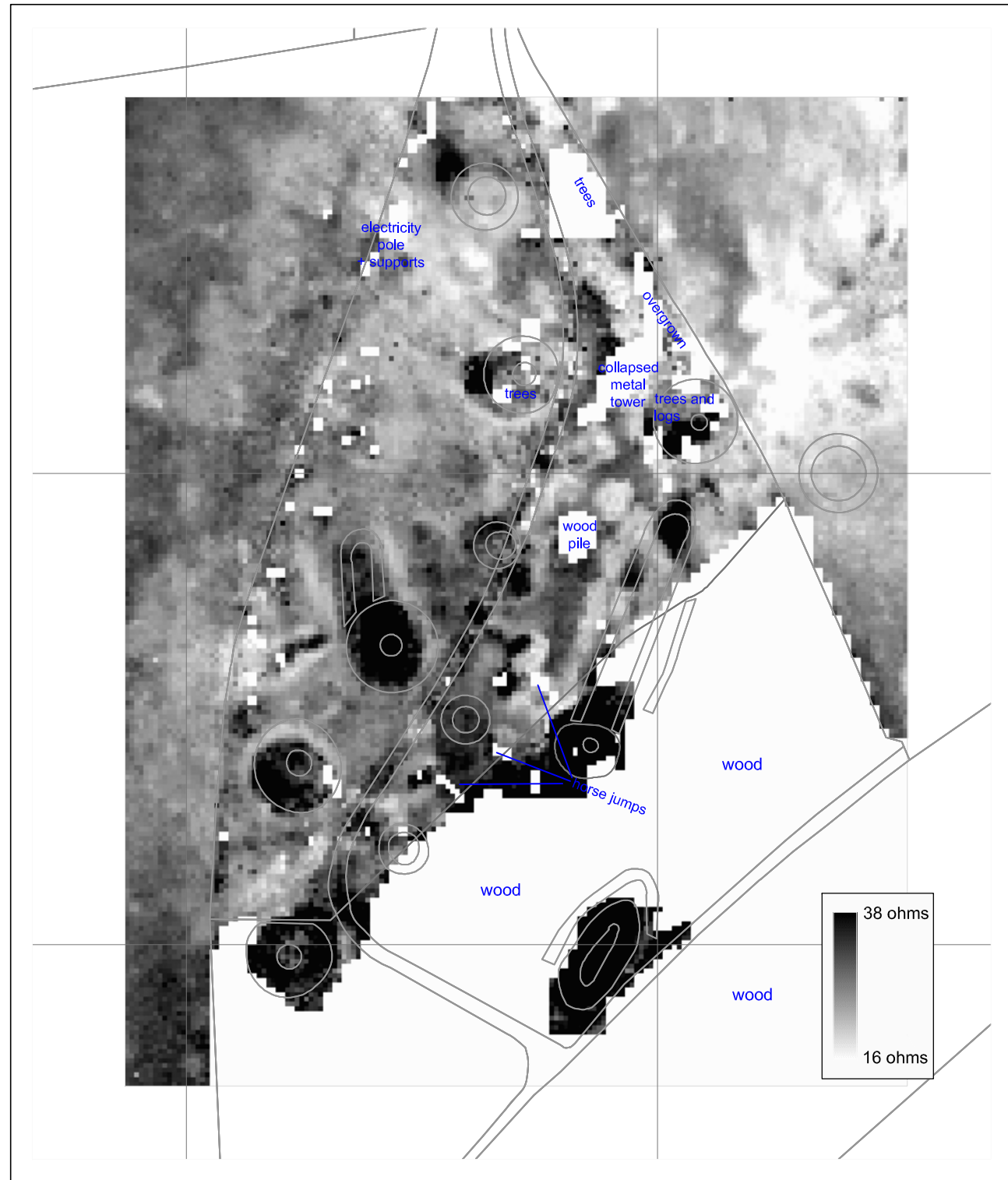
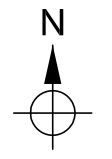
2i Magnetometer survey (grey scale plot)



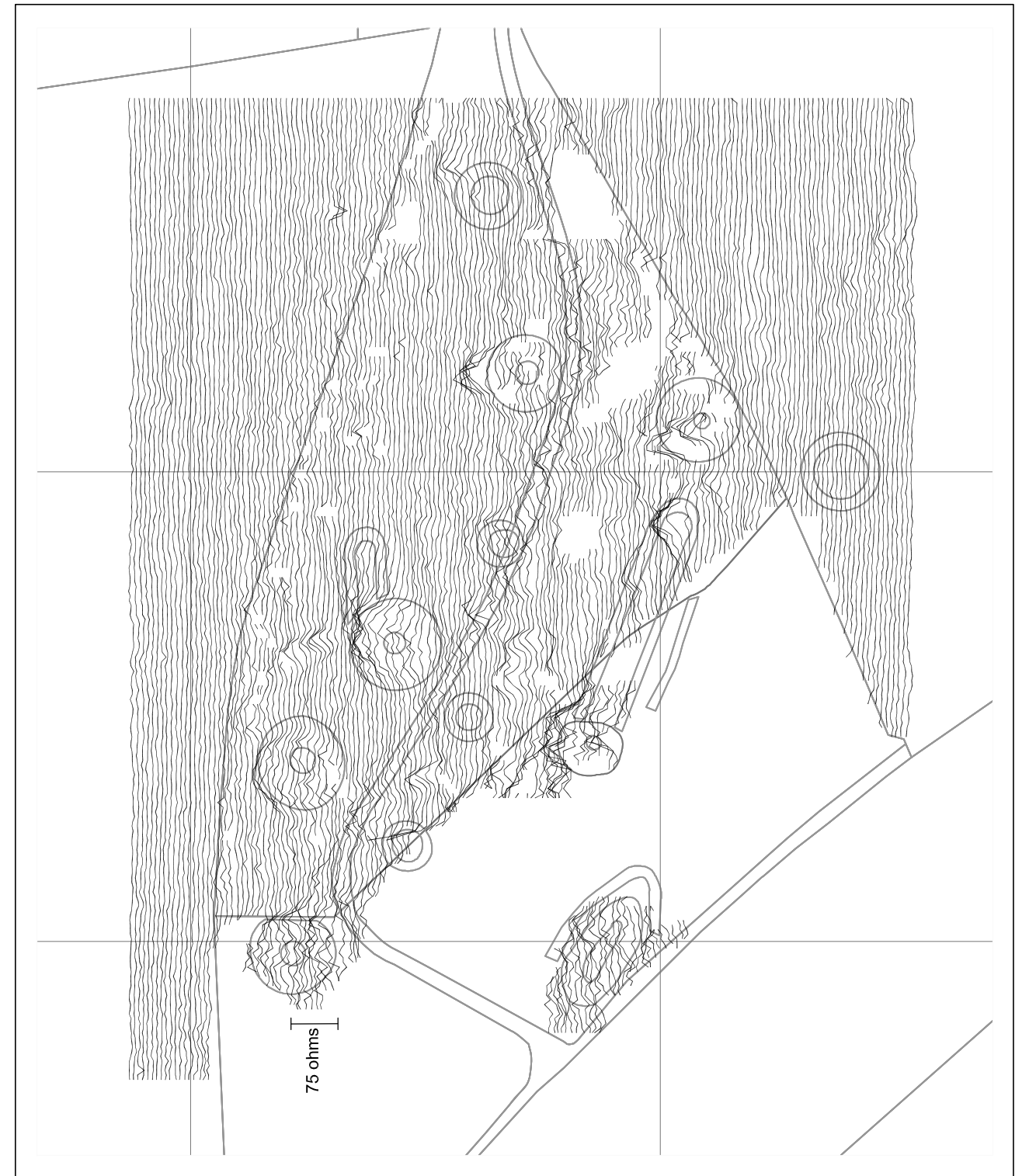
2ii Magnetometer survey (graphical plot)

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Figure 2: Magnetometer survey

0 1:1250 50m



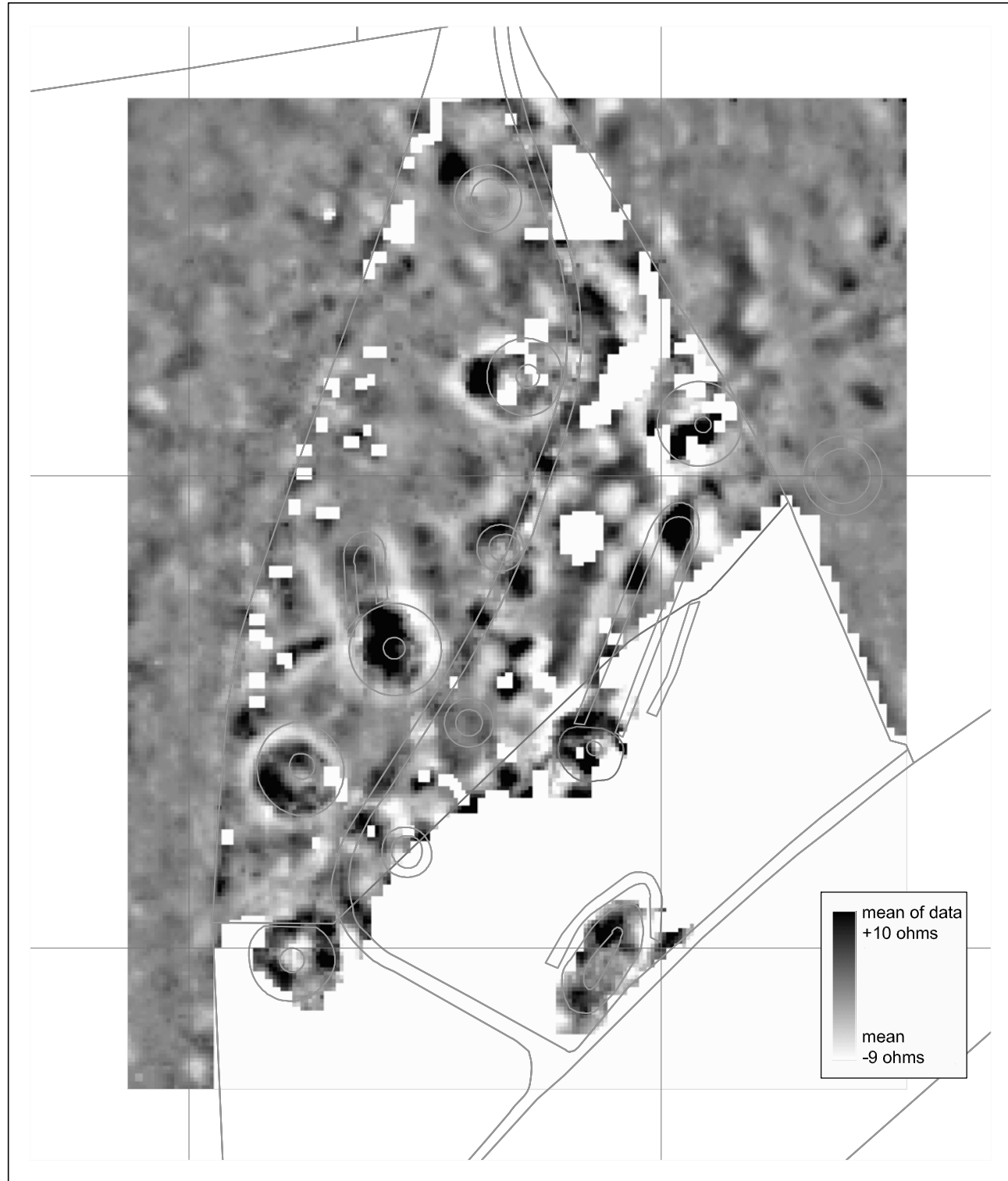
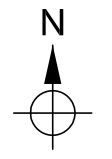
3i Unfiltered data (readings not interpolated)



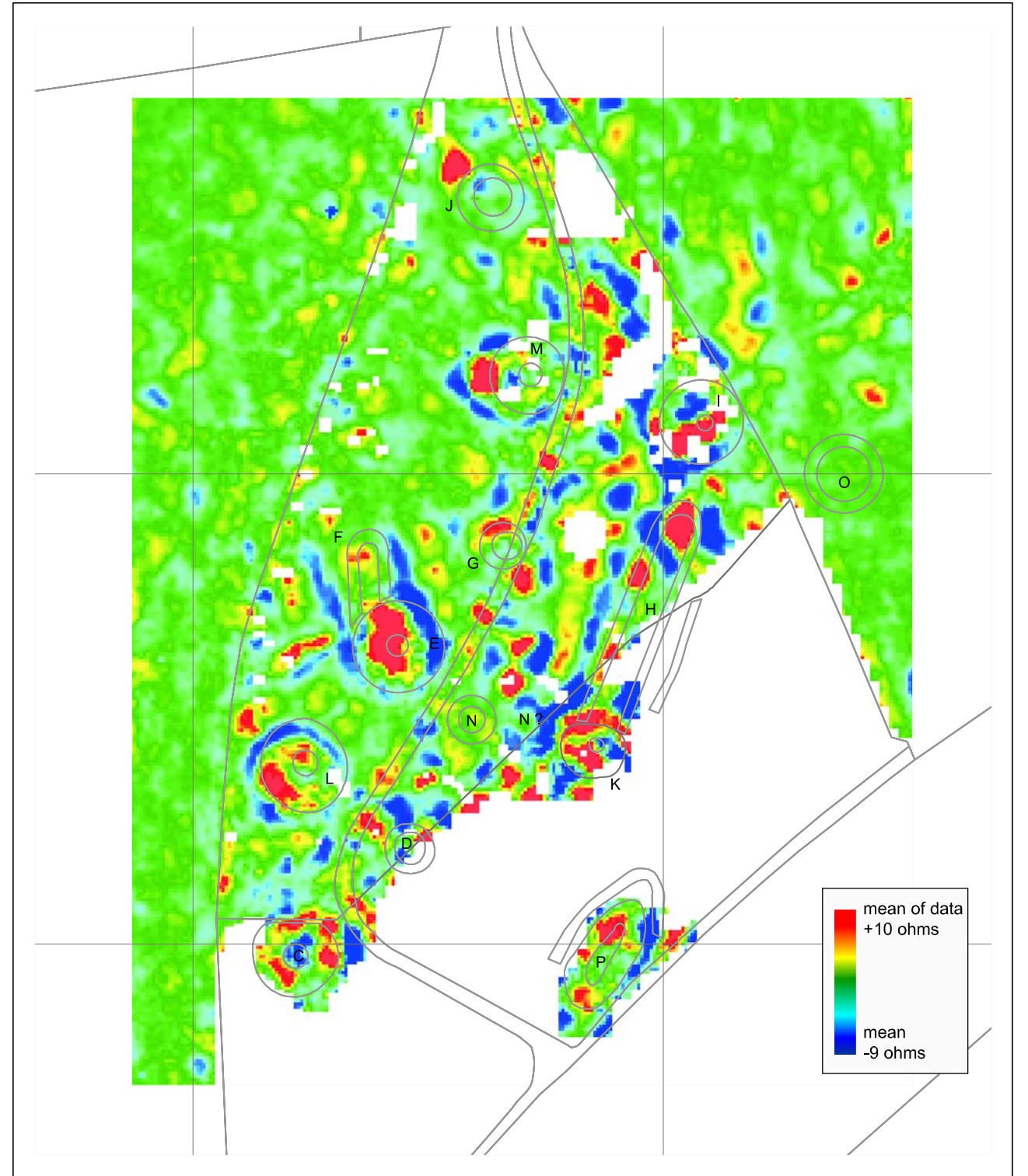
3ii Unfiltered data (graphical plot)

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Figure 3: Earth resistance survey

0 1:1250 50m



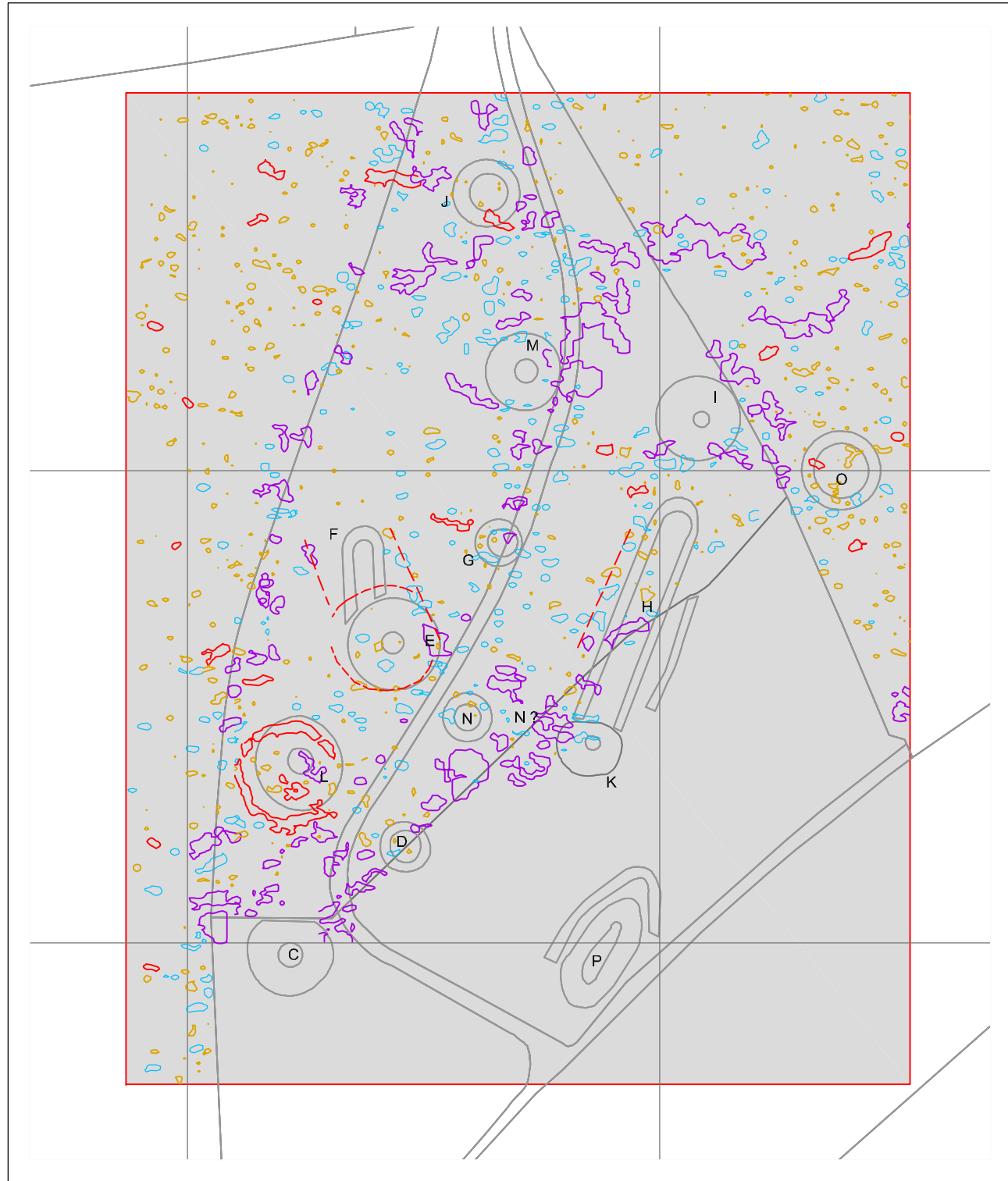
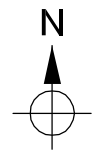
4i Filtered resistance data (grey scale plot)







4ii Filtered resistance data

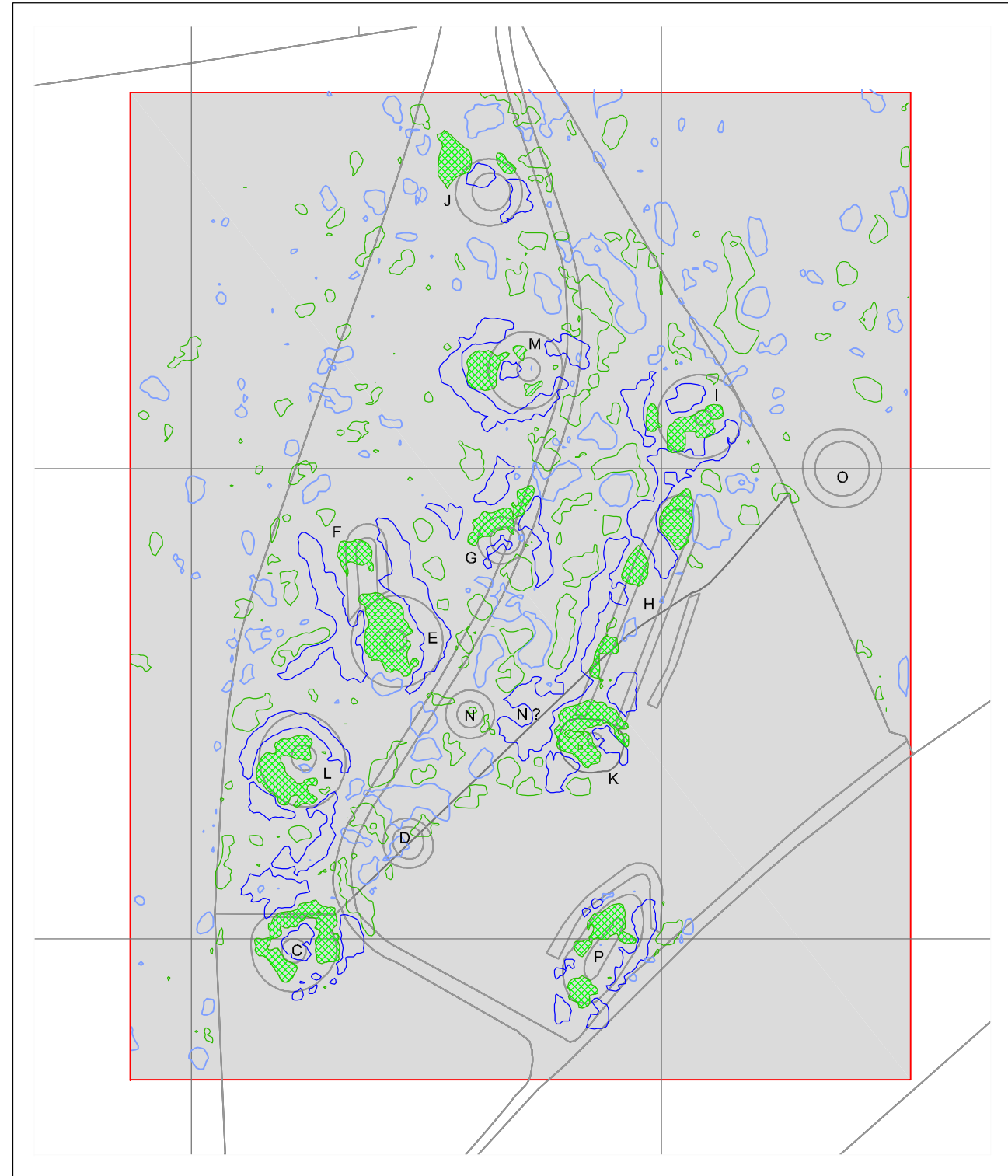
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Figure 4: Earth resistance survey
(filtered data)

0 1:1250 50m







5i Magnetometer survey: interpretation

-  magnetic anomalies (archaeological ?)
-  magnetic anomalies (natural / non-archaeological ?)
-  strong magnetic disturbances (recent ?)
-  strong magnetic anomalies (mainly ferrous)

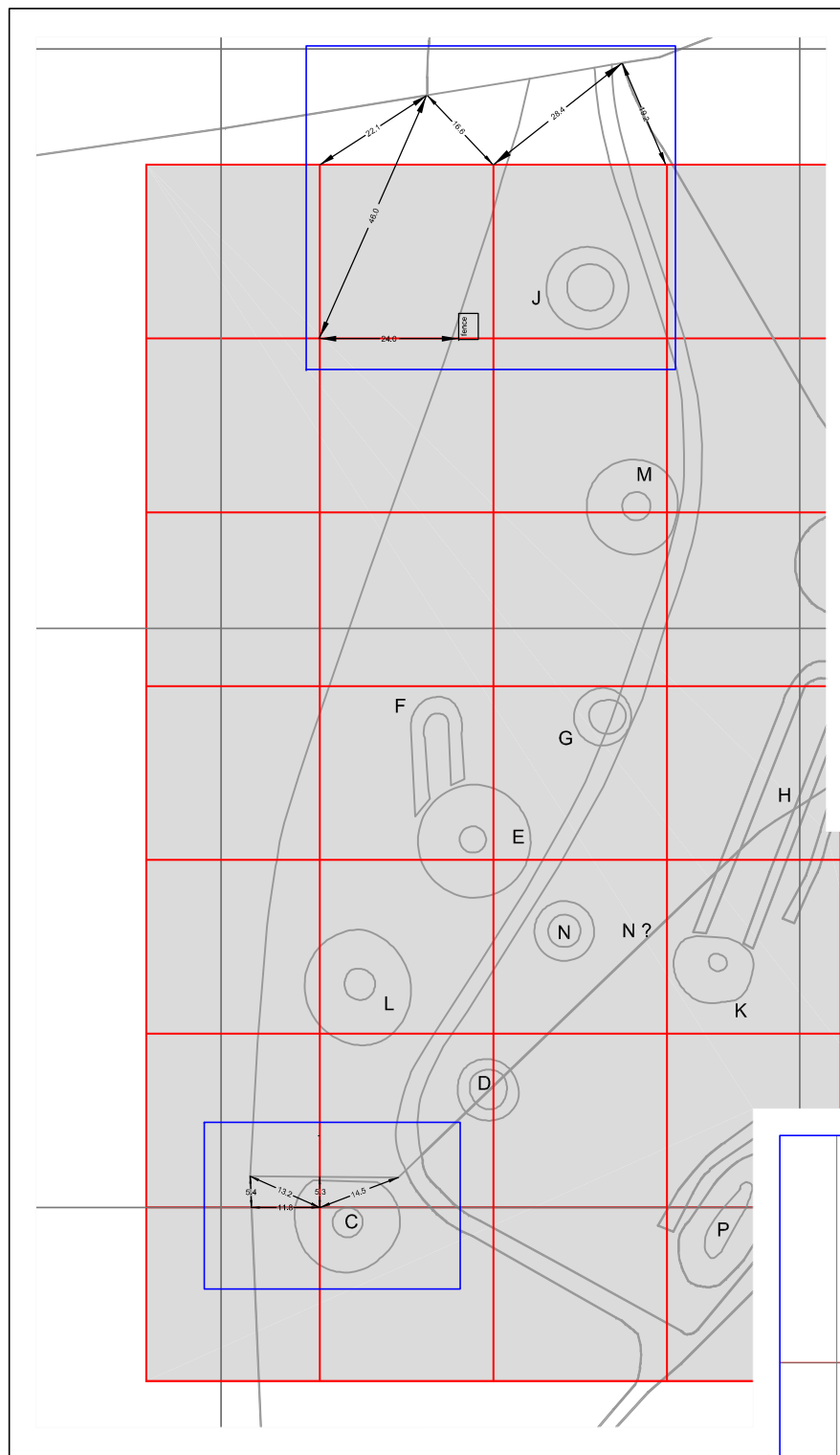


5ii Resistance survey: interpretation

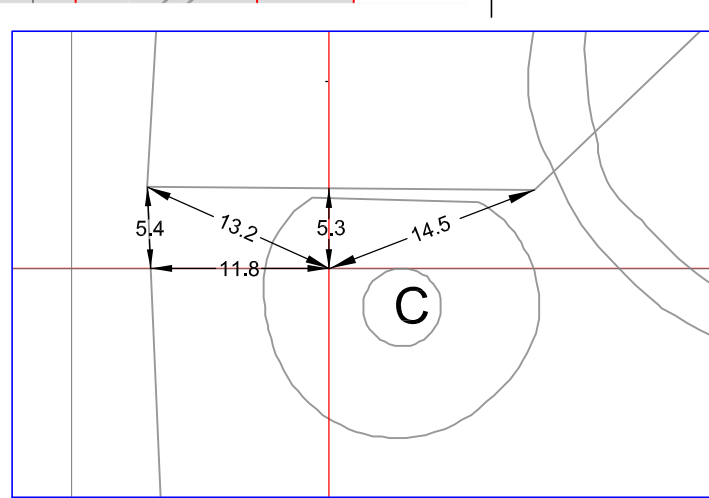
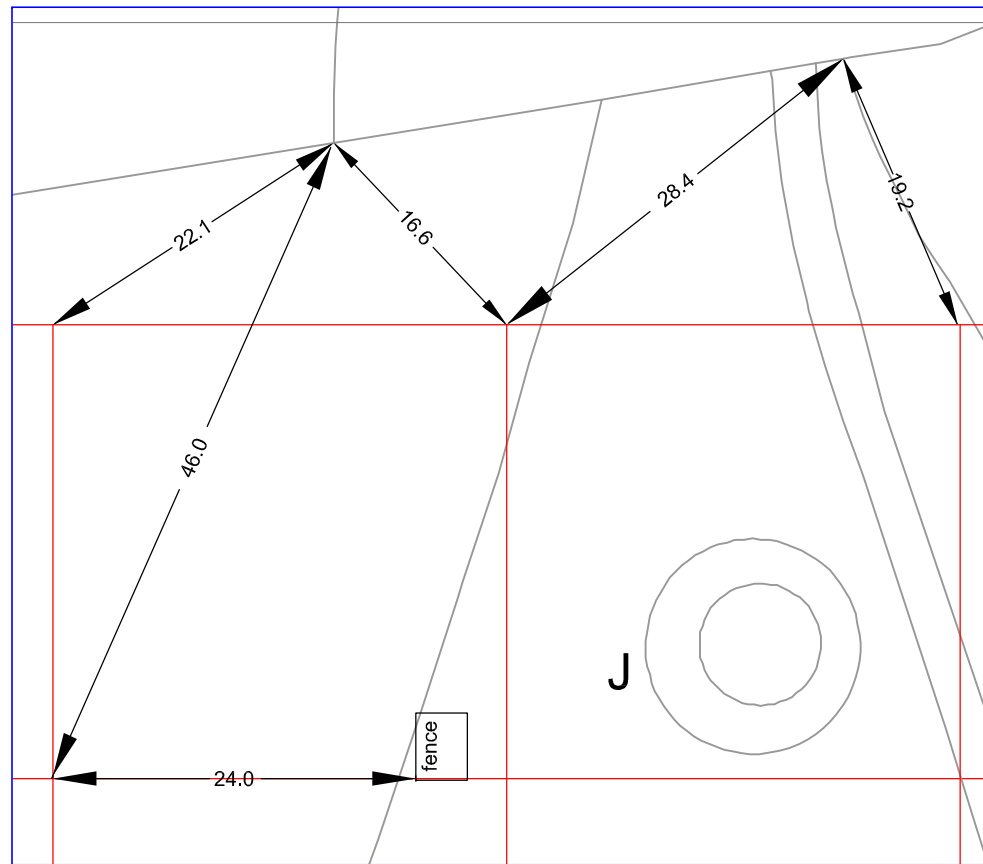
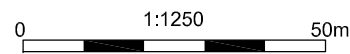
-  negative resistance anomalies
-  negative resistance anomalies (archaeological ?)
-  positive resistance anomalies
-  positive resistance anomalies (archaeological ?)

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Figure 5: Magnetometer and resistance
surveys: interpretation

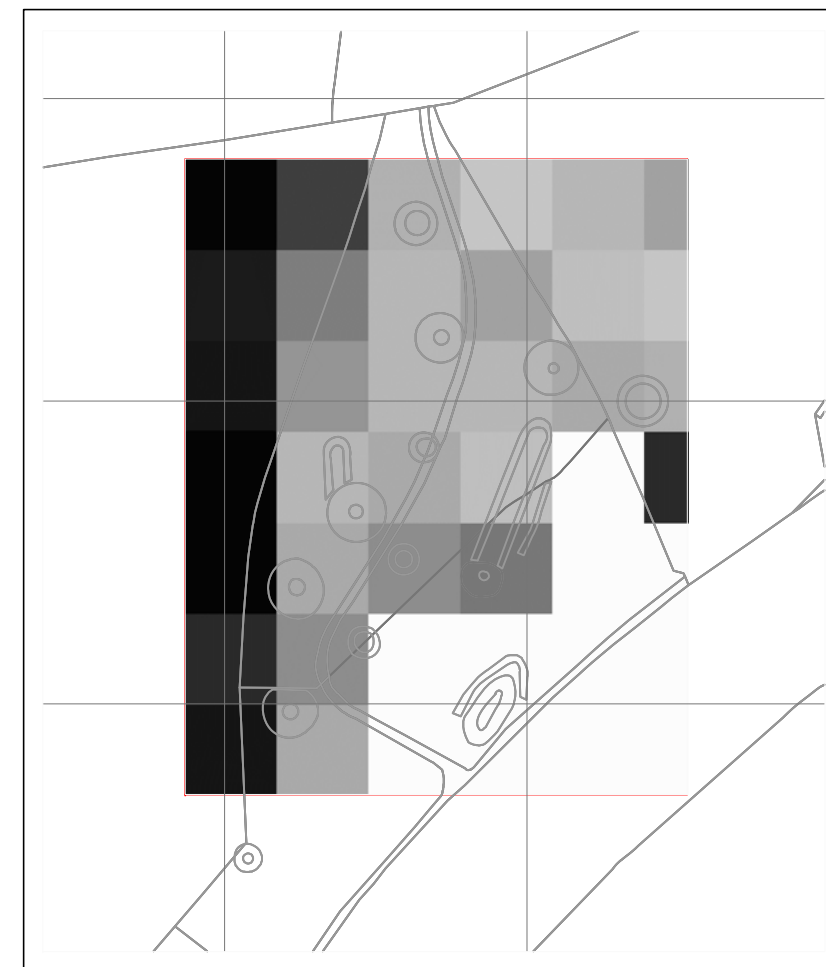
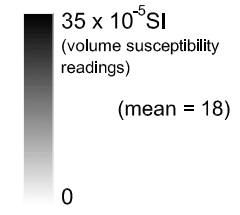
0 1:1250 50m



6i Location of 30m survey grid



6ii, 6iii Measurements to fences 1:500

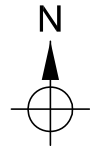





6iv Magnetic susceptibility readings 1:2500

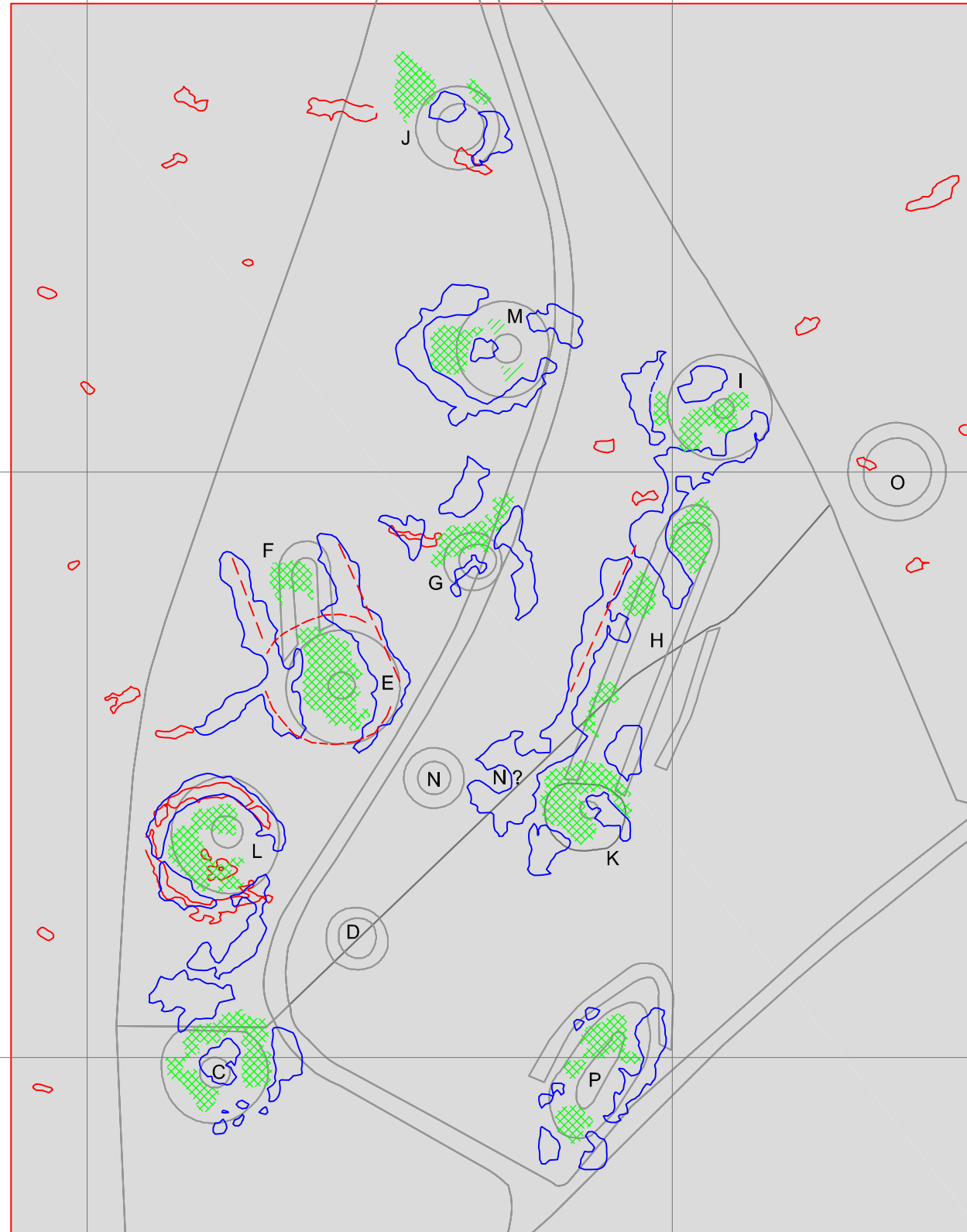
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Figure 6: Survey location
(and magnetic susceptibility readings)

364800E

92500N



-  magnetic anomalies (archaeological ?)
-  negative resistance anomalies (archaeological ?)
-  positive resistance anomalies (archaeological ?)
- B - P: barrows



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Figure 7: Summary of findings

0 1:1000 50m