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Ancient Monuments Laboratory  
Report 83/90

DORCHESTER BY-PASS, DORSET: REPORT  
ON GEOPHYSICAL SURVEY, 1987.

P Linford

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### Summary

Magnetometer surveys were carried out at five points along the proposed route of the Southern Dorchester bypass, in conjunction with excavation by the Trust for Wessex Archaeology, to assess the extent of the threat to buried archaeological remains. In all areas response to the technique was poor and little information about the location of possible features was recovered. Soil samples were also taken for magnetic susceptibility analysis but these results were unremarkable.

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# Dorchester Bypass, Dorset: Report on geophysical survey, 1987.

## Introduction

The survey was carried out at the request of the Trust for Wessex Archaeology, in advance of the construction of a bypass to the south of Dorchester. Cropmark and field-walking evidence indicated that the proposed route of the road would pass through areas known to contain archaeological remains. The geophysical survey was commissioned to contribute to the archaeological assessment being conducted along the route.

## Method

Five areas were surveyed in detail. The location of each is marked on the location plan; the grid references and field numbers were:

Area	Grid Reference	Field Number
1	SY 6768 8945	7448
2	SY 6780 8934	7625
3	SY 6790 8927	9326
4	SY 6727 8998	1891
5	SY 6720 9009	2613

At each, a baseline was established which ran along the centre of the proposed road, and a grid of 30m squares was then laid out on this alignment. Each square was surveyed using a Philpot DM02 fluxgate gradiometer with traverses 1m apart. Readings were taken at intervals of 0.3m along each traverse. In addition, two other areas along the proposed route, which could not be surveyed within the allowed time, were scanned with the gradiometer. These areas were at grid references SY 704 899 and SY 710 913.

Soil samples were collected at the intersections of the grid squares and magnetic susceptibility measurements were made on these in the laboratory, using a Bartington Instruments MS1 susceptibility meter. In the case of area 1, additional samples were taken from the centre of each square.

## Results

### Magnetic Susceptibility Measurements

The position from which each sample was collected is indicated on the location plan and the results of the measurements are tabulated in the appendix. In general the results from all five areas were about average for chalkland sites, typically around  $60 \times 10^{-8}$  SI/Kg. The variation between samples seems to be random and no overall trends are apparent in any of the areas.

Area 5 was adjacent to a trial trench and a sample was taken from within a possible ditch fill, visible in the section; a second sample taken at the same depth but outside the ditch fill. There is little difference between the magnetic susceptibilities of these two samples, suggesting that magnetic survey techniques may be unlikely to detect such archaeological remains in the area.

### Magnetometer Survey

Greyscale computer plots of the results from each of the five areas are included (plots 1 to 5), all are at 1:1000 scale. In each case values greater than 3.5nT are shown as white, values less than -3.5nT as black. Shades of grey are assigned to values within this range, lighter shades representing the highest values.

It is clear from these plots that the magnetic response was poor; the few features which are visible are swamped by measurement noise. Hence, any conclusions drawn from the results are, at best, tentative.

#### *Area 1 (Field 7448)*

A strip 208m long by 60m wide was covered in this field. None of features seen to cross the area in air photographs of cropmarks were detected. However, an arc-shaped anomaly, about 15m long, is visible running through the centre of square 8. It is possible that this represents part of a circular ditch, associated with the complex observed in the cropmark evidence.

At the southeastern end of square 4 a small localised patch of magnetic enhancement is visible and a second less obvious anomaly of the same type is discernible at the northwestern end of this square. Whilst these anomalies may be caused by modern features, it is also possible that they represent areas of burning or hearths; this conclusion is supported by the higher level of background noise in square 4, suggesting a spread of magnetically enhanced soil.

Two concentric arc-shaped features may also be visible running through the northern end of square 3 and into square 4 near the first of the two anomalies described above. However, these are extremely faint and show up principally as areas of reduced susceptibility, so their existence is uncertain.

The faint parallel linear striations running across the whole area are probably caused by modern agriculture. Also, the very disturbed area at the southern end of square 1 is caused by the proximity of a steel fence at this point.

#### *Area 2 (field 7625)*

A strip 150m long by 30m wide was surveyed with an additional 30m square offset in the centre of the northeastern side, to check for any features running towards the corner of the field.

Two localised areas of enhanced magnetic response, both about 2m across, are visible on the plot, one at the northwestern corner of square 1, the second on the western side of square 6. These may well be caused by modern agricultural activity but it is

possible that they represent buried hearths. The only potential other features visible are a circular arc in square three, and an apparent alignment running to the south of it, through square 4 and into square 6. Curiously, these are present as reduced susceptibility anomalies and it is not clear how they could be formed, if they do indeed represent archaeological remains.

#### *Area 3 (field 9326)*

No interesting anomalies could be discerned in the 60m by 30m strip surveyed in this field.

#### *Area 4 (field 1891)*

A trial trench had already been excavated along the line of the proposed road in this field, so a 145m by 30m strip was surveyed alongside this. A second smaller area (squares 6 and 7) was investigated on the other side of the trench, to follow features thought to run through it. The central square of the longer strip, square 3, had to be offset by 5 metres to avoid the spoil heap.

The most striking anomaly is the very strong linear feature running approximately east-west through the area. This is certainly a recent feature, probably a pipe or field drain.

In the centre of square 5 a small circular patch of enhanced magnetic response, may represent an area of burning, although of unknown age. The linear feature running away from it to the eastern edge of the square is almost certainly caused by an instrument error as it is exactly parallel with the survey traverses.

Another possible archaeological anomaly appears in square 4, an arc-shaped line of enhanced susceptibility. Also, several patches of high magnetic response are present in square 3. However, owing to the obscuring effect of the strong linear feature mentioned above, it is not certain what they may represent.

#### *Area 5 (field 2613)*

The proposed route of the road passed through the corner of this field and a trial trench had already been excavated along its line, hence it was only possible to survey a small strip, 60m by 15m, in this field. The plot of the results from this area shows little except background noise, certainly no obvious archaeological remains can be discerned.

#### *Scanned Areas*

Owing to the generally poor response throughout the survey, no major archaeological anomalies were identified in any of the areas scanned. Smaller or sparsely distributed features may have been missed.

## Conclusions

Whilst a few possible archaeological remains have been identified the general magnetic response was poor. This is particularly striking since both cropmark evidence and excavation have shown that such remains were present in the areas surveyed. Several causes can be postulated to account for these disappointing results:

- 1) The magnetometer in use at the time, a Philpot DM02, was capable of resolving field gradients only to the nearest nanotesla. Hence, on a site where changes in magnetic susceptibility were gradual, the resulting subtle changes in field gradient may have been too small to be detected.
- 2) At several places where trial trenches had been excavated, archaeological remains were observed to be covered by up to two metres of soil. It is therefore quite possible that many features were buried too deep to be detected with a magnetometer.
- 3) It is also possible that the nature of the occupation was such that little enhancement of the local magnetic susceptibility had taken place. Certainly, the soil samples taken from within a possible ditch fill and outside it, showed almost no difference in susceptibility, supporting this conclusion.

It is likely that the improved magnetometers now available would have more success in the conditions described above.

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Plans by: A Payne.

## Appendix: Magnetic Susceptibility results

In all cases magnetic susceptibility is measured in SI/Kg x 10<sup>-8</sup>.

### Area 1 (field 7448)

<u>Sample</u>	<u>weight (g)</u>	<u>Mag. Susc.</u>	<u>Normalised (100g)</u>
1	70.43	35	49.69
2	71.83	338	470.56
3	84.00	40	47.62
4	100.80	63	62.50
5	80.00	65	81.25
6	68.80	48	69.77
7	65.86	52	78.96
8	95.43	42	44.01
9	101.80	8	7.86
10	71.52	25	34.96
11	82.06	83	101.15
12	69.30	59	85.14
13	81.01	60	74.06
14	92.10	95	103.15
15	84.40	60	71.09
16	67.10	71	105.81
17	75.20	58	77.13
18	62.20	76	122.19
19	84.20	80	95.01
20	48.10	40	83.16
21	57.40	50	87.11
22	85.60	81	94.63
23	67.60	76	112.43
24	58.30	51	87.48
25	50.80	48	94.49
26	56.00	47	83.93
27	48.50	33	68.04
28	86.40	46	53.24
29	76.40	42	54.97
30	57.70	29	50.26
31	87.30	39	44.67
32	80.50	53	65.84
33	72.70	29	39.89
34	77.90	39	50.06
35	37.50	24	64.00

### Area 2 (field 7625)

<u>Sample</u>	<u>weight (g)</u>	<u>Mag. Susc.</u>	<u>Normalised (100g)</u>
1	67.60	40	59.17
2	98.30	46	46.80
3	71.70	66	92.05
4	70.30	39	55.48
5	67.70	40	59.08
6	76.70	38	49.54
7	63.00	44	69.84
8	72.60	41	56.47
9	70.40	37	52.56
10	77.80	38	48.84
11	89.30	47	52.63
12	73.70	45	61.06
13	73.90	44	59.54

*Area 3 (field 9326)*

<u>Sample</u>	<u>weight (g)</u>	<u>Mag. Susc.</u>	<u>Normalised (100g)</u>
14	72.70	27	37.14
15	53.20	33	62.03
16	87.80	35	39.86
17	76.00	43	56.58
18	69.60	30	43.10
19	75.90	30	39.53
20	70.70	36	50.92
21	75.40	35	46.42

*Area 4 (field 1891)*

<u>Sample</u>	<u>weight (g)</u>	<u>Mag. Susc.</u>	<u>Normalised (100g)</u>
1	49.20	33	67.07
2	47.80	31	64.85
3	50.50	31	61.39
4	55.00	34	61.82
5	47.90	33	68.89
6	49.70	32	64.39
7	51.60	37	71.71
8	47.40	33	69.62
9	51.30	66	128.65
10	39.60	26	65.66
11	50.50	23	45.54
12	46.00	29	63.04
13	42.60	25	58.69
14	39.00	26	66.67
15	46.20	30	64.94
16	60.70	25	41.19
17	43.70	27	61.78
18	47.60	25	52.52

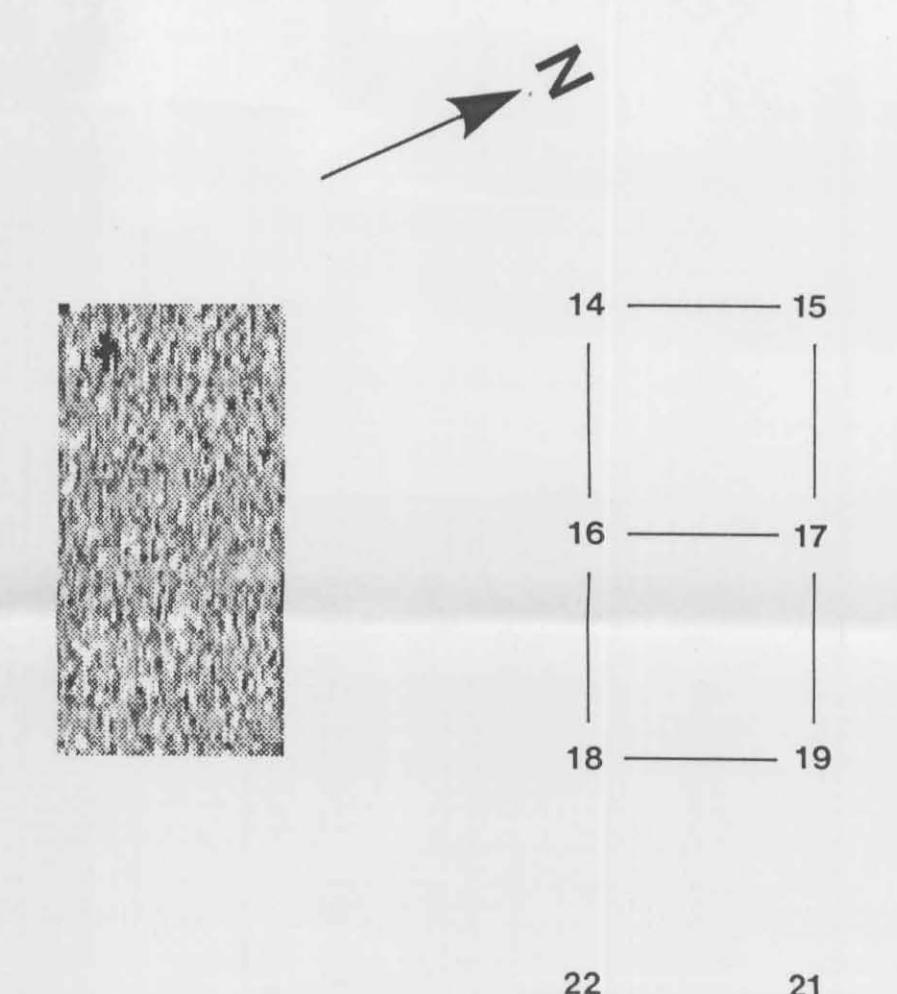
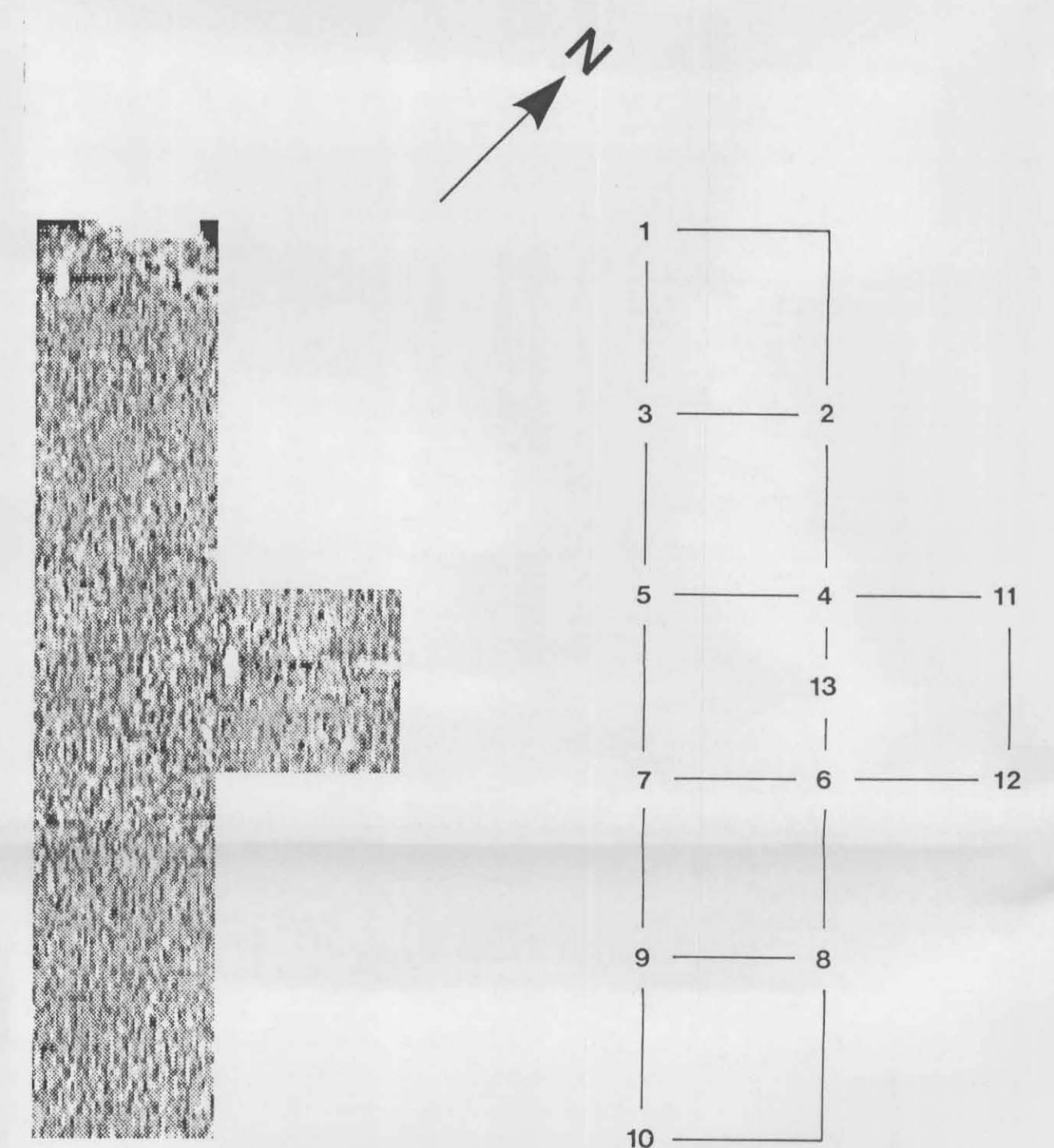
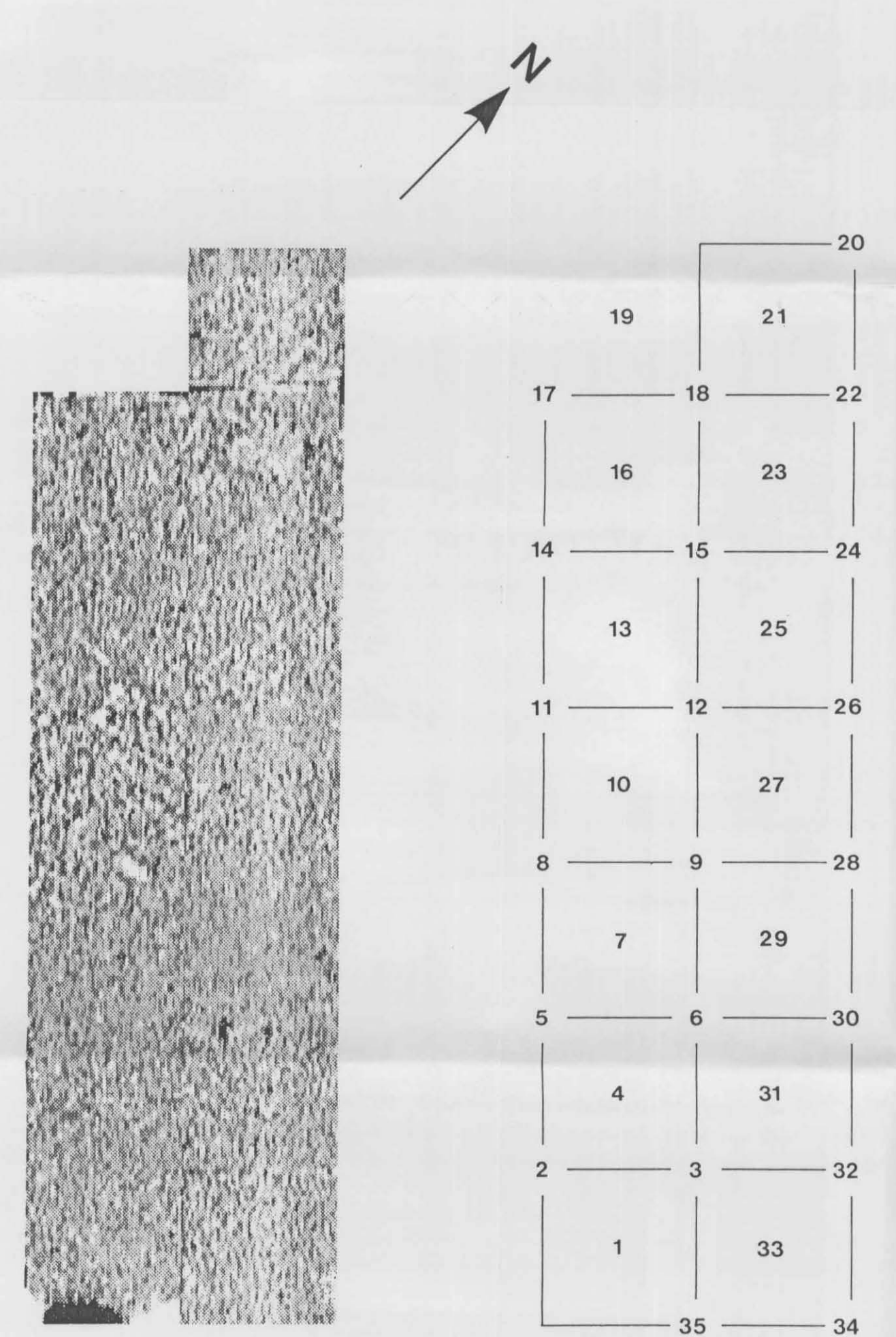
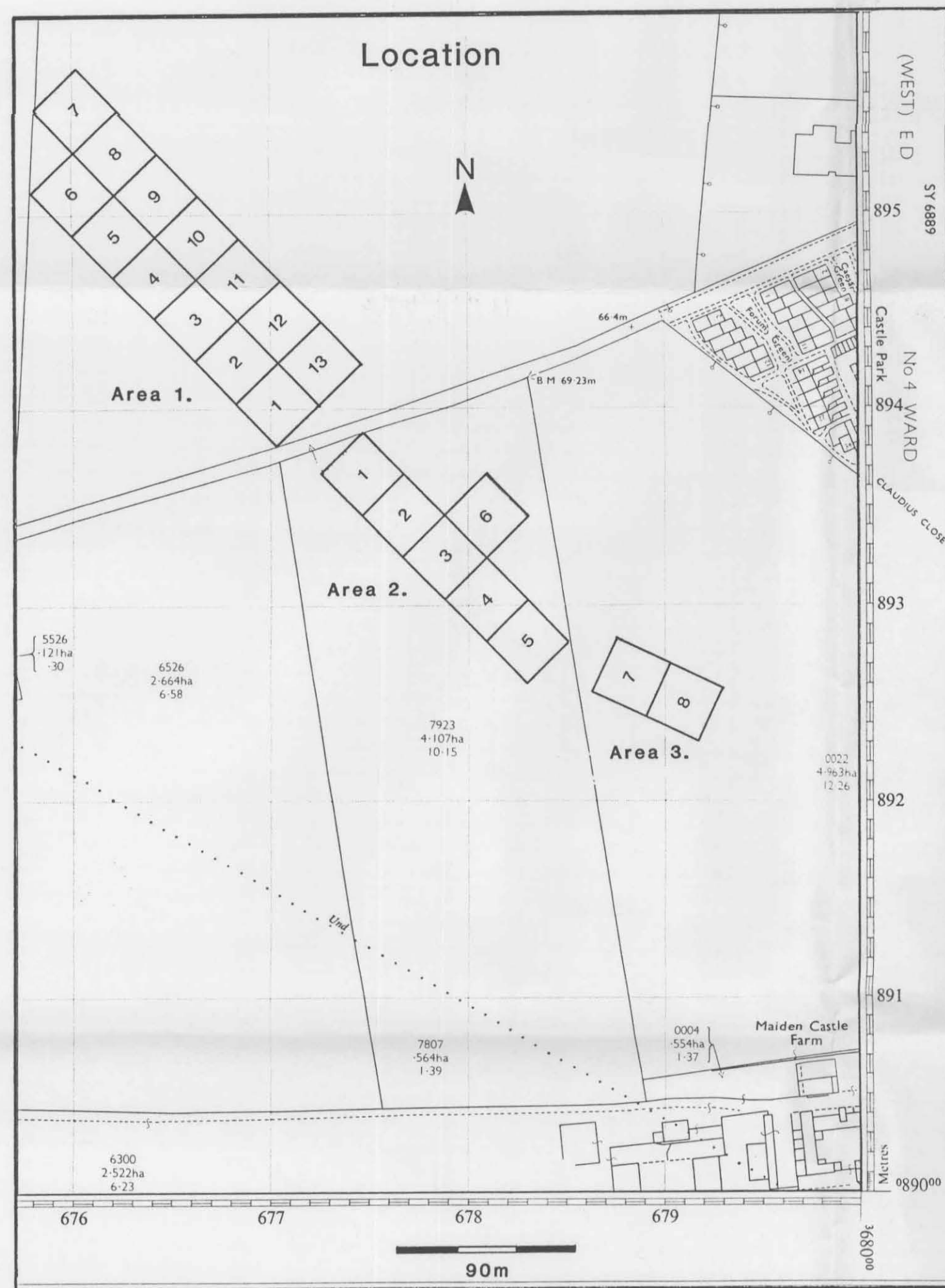
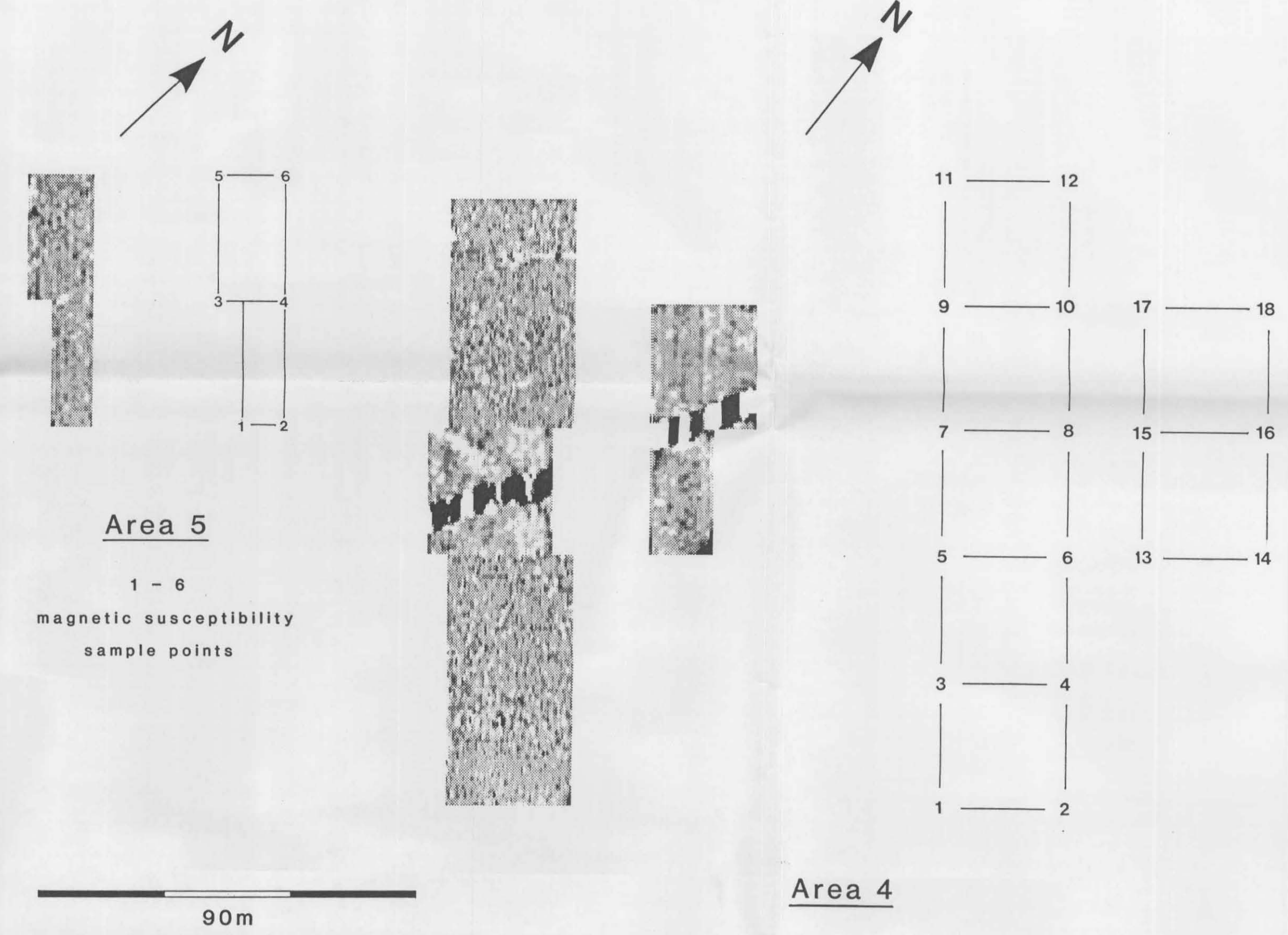
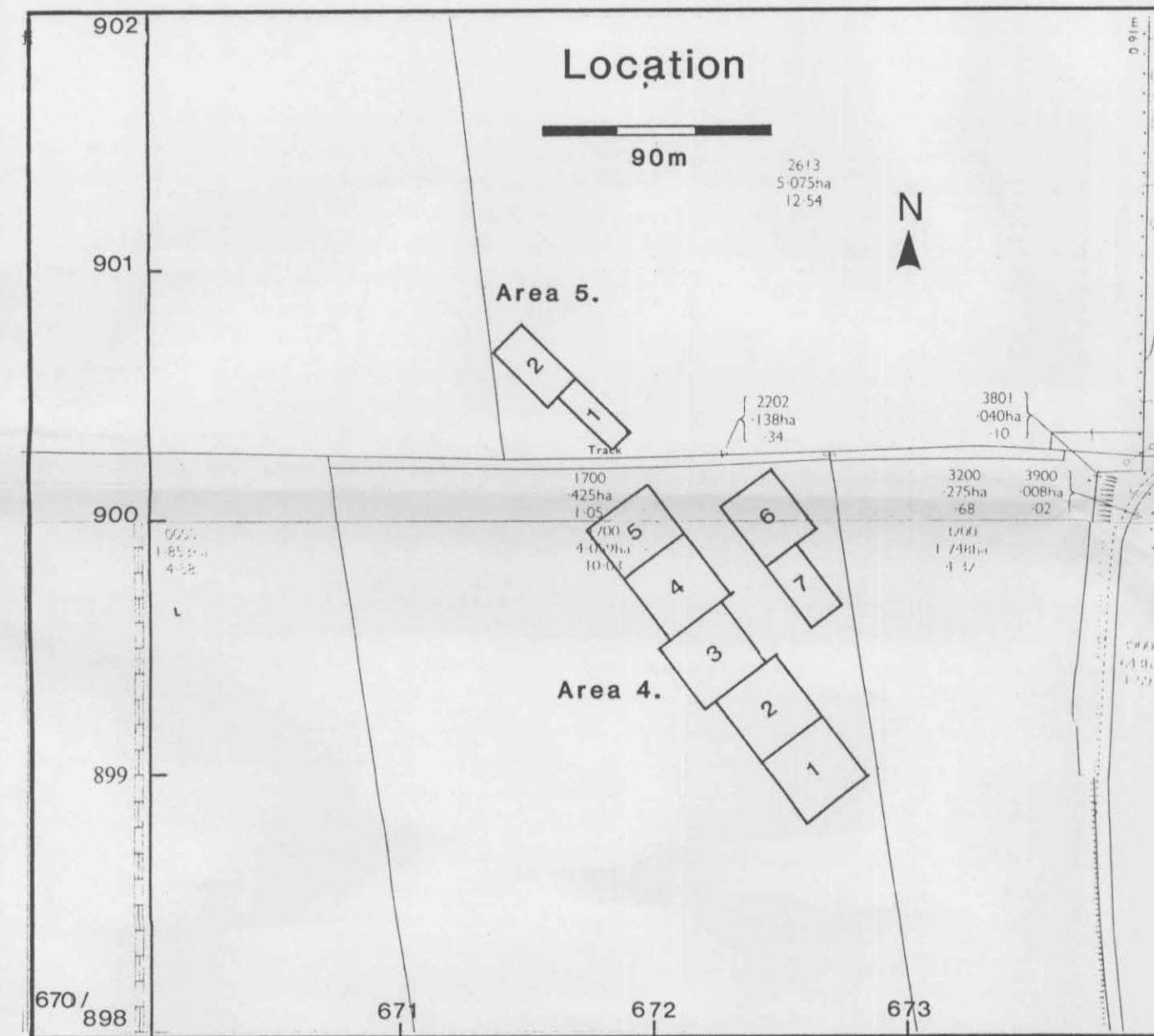
*Area 5 (field 2613)*

<u>Sample</u>	<u>weight (g)</u>	<u>Mag. Susc.</u>	<u>Normalised (100g)</u>
1	53.10	17	32.02
2	58.30	23	39.45
3	48.40	20	41.32
4	57.60	24	41.67
5	37.40	14	37.43
6	52.20	35	67.05
7	57.80	15	25.95*
8	60.40	15	24.83*

\*Sample 7 taken from possible feature in section, sample 8 from surrounding soil at same depth.



# DORCHESTER BY-PASS Geophysical Survey 1987



**Area 1**  
1 - 35 : magnetic susceptibility sample points

**Area 2**  
1 - 13 : magnetic susceptibility sample points.

**Area 3**  
14 - 22 : magnetic susceptibility sample points.