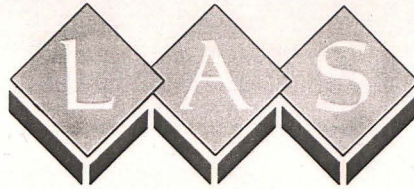


SMR No.: 34835 34946 34947 34949 34134 34754

SLI 3488

94/2



ELI 396
334

LINDSEY ARCHAEOLOGICAL SERVICES

FRANCIS HOUSE SILVER BIRCH PARK GREAT NORTHERN TERRACE LINCOLN LN5 8LG

Land at Mill Drove, Bourne: An Archaeological Assessment
(NGR: TF 1030 2125)

Land at Mill Drove, Bourne: An Archaeological Assessment
(NGR: TF 1030 2125)

Introduction

Lindsey Archaeological Services (LAS) was commissioned by M. Parker and Sons Ltd to investigate the archaeological potential of a proposed residential development immediately east of the former railway line north of Mill Drove on the eastern outskirts of Bourne, Lincs. (Fig.1). This was carried out in accordance with the requirements of the brief prepared by the South Kesteven Community Archaeologist in December 1993.

The preliminary evaluation comprised three phases of investigation: a 'desktop' study of the available archaeological and historical documentation, a geophysical survey to identify the extent of archaeological remains beneath the ground surface, and a fieldwalking exercise to locate material on the surface of the cultivated field. All the fieldwork was completed during the period 21-25th January 1993 in good weather.

Site Location

The area of the present planning proposal consists of a single 4ha. field, located immediately north of Mill Drove on the eastern limits of the town development. Mill Drove takes its name from a windmill which stood at its west end at the junction with North Road (Fig. 1). The assessment area was formerly bounded on the western side by the Bourne-Sleaford branch railway line which was opened in 1860 but is now removed (Birkbeck 1970, 94). Recent housing development has encroached onto the route.

The field is crossed by the 7.5m OD contour, with land to the east dropping towards Bourne Fen and the Car Dyke. The higher land to the north, south and west contains deposits of gravel which have been quarried to a limited extent. Ordnance survey maps indicate a succession of small quarries close to Mill Drove, including one located in the SW corner of the field, beside the railway line (OS map 1906, Fig. 2). Two buildings next to the road on this map probably mark the position of a signal box or other railway buildings.

Method

Records from Bourne parish lodged at the Lincoln Sites and Monuments Record (SMR) were examined and sites plotted onto a 1:25,000 map (Fig.3). Records from the same parish were then examined at the offices of Heritage Lincolnshire and cross-referenced (see Appendix 1). Records at the Lincolnshire Archives Office were searched for cartographic and other documentary information.

The aerial photographic libraries at Swindon and Cambridge were asked for information about sites in Bourne but the proposed development area has no specialist coverage.

Background

The town of Bourne and its environs have produced numerous archaeological finds and settlement remains. The prevalence of these reported finds may partly reflect increased awareness in the town prompted by the visible earthwork of the Roman Car Dyke canal which survives to the east and the line of the Roman road (King Street) which passes through the town centre. A high proportion of the casual finds were reported in the 1960s due to the keenness of one schoolboy.

Since 1949 Bourne has also been included in a series of studies of the Fenland by Fenland Research Committee (Phillips 1970), the South Lincolnshire Archaeological Unit, and the Fenland Project Committee (Hayes and Lane 1992).

The Fenland Project's collation of data for the area describes the prehistoric landscape as wooded to the west of the present town where few finds have been reported from the boulder-clay. To the east of Bourne, the rising sea level disrupted surface drainage and prompted freshwater flooding and peat formation. The peat caused oak, yew and beech woodland to die and then preserved the fallen timbers in Bourne Fen and Thurlby Fen. A small number of Neolithic flint scatters and flint axes have been found, as have isolated sherds of early Bronze Age pottery and an arrowhead. Findspots in the vicinity include a Late Bronze Age settlement site (SMR 34114) 0.5km east of the assessment plot.

A small pottery bowl, 0.10m diameter and supported on 3 legs, was found in a gravel pit 20yds (18.3m) west of the railway line crossing Mill Drove in 1921 (SMR 34156; Birkbeck 1976, vi). The SMR findspot lies about 100m west of the assessment plot but the provenance may have been from the gravel workings marked on OS 1906, south-west of the site. No gravel pit has been located on Ordnance Survey maps at the recorded findspot although a small copse immediately beside the track at that spot may be on a former quarry (OS 1955). The bowl was identified as a food vessel and was reportedly found close to a metal object identified as a spearhead. Birkbeck (1976, 4) places this within the Early Bronze Age but from their proximity to a known Early Saxon settlement site they may better be attributed to a later period (Hayes and Lane 1992, 130).

During the Middle Bronze Age, alder replaced the earlier woodland east of Bourne as a species tolerant to high freshwater levels (Shennan 1986, 122-34). This was followed by reed swamp and a salt-water regime as marine influence approached during the second millennium BC and eventually

deposited clay over the earlier peat. A second phase of peat growth above the clay suggests that a freshwater regime became re-established fairly rapidly along the marsh edge. This vegetation change coincided with the development of a small Late Bronze Age-Early Iron Age settlement (SMR 34114) on the drier land beside the marsh, 0.5km east of the assessment plot. An isolated surface find in the field NE of the current plot was plotted but not described (Fenland Project code A16; Hayes and Lane 1992, 134).

The Fenland Project was unable to investigate the centre of modern Bourne and probably omits major settlements associated with the Roman road network which diverged north of the present centre. Whilst it is strongly suspected that there was a major Roman settlement at Bourne it has yet to be located.

The Site

The Fenland Project, undertaken between 1981 and 1987, included a fieldwalking survey of suitable available land. This located Romano-British ribbon development and activity close to the Bourne-Morton Roman canal, but the most extensive area of Romano-British settlement was found immediately north of the assessment plot. This complex, on ground rising west of the Car Dyke Roman canal, was walked on several occasions when ground conditions were suitable. This resulted in a number of different site codes for a single but substantial scatter of material (Fenland Project codes BOU 11, 25, 26, 30 and UA2; SMR 34115-7, 34134-7, 34142-3 and 34158-9) (Fig.4).

The site was described as being littered with clusters of limestone building rubble and tiles, including some hypocaust fragments from an indoor underfloor heating system. Buildings incorporating such a 'central heating' facility are usually considered to have been of high status. The pottery date range suggested that occupation continued throughout the Romano-British period and may have survived into the Early Saxon period as 'numerous' handmade sherds assigned to that date were also found on the site. The researchers were unable to determine whether this site represented the fringes of a single large, urban development linked with finds covered by the modern town, or whether it was another focus associated with Car Dyke. Part of the identified extent of this site (BOU 25) lies within the plot being considered for possible development.

The Roman canal now known as the Car Dyke passes 110m east of the plot although this section of the canal survives as a field boundary drain and footpath. This feature presumably served for both drainage and communications and contemporary activity along much of its course is likely.

North-south aligned ridge and furrow earthworks of medieval arable farming have been identified in the fields east and north of the assessed plot (Hayes and Lane 1992, 139). It is likely that the plot was originally part of the same arable area and that medieval ploughing may have disturbed earlier archaeological features. Observation of the field surface identified slight traces of possible ridge and furrow aligned west-east. If this is the case, it represents a small medieval land parcel cultivated separately from the surrounding land.

FIELDWORK

In order to establish the extent of the archaeological remains over the proposed development area a programme of fieldwork was devised.

The Geophysical Survey

The Geophysical Survey

In the absence of any information about the site from aerial photographs a magnetometer survey of the total development area was carried out to determine the extent and character of the settlement remains. The results from this survey were so clear that the provision for resistivity survey was not taken up. Results of the survey are given in detail in the accompanying report. In summary a complex of sub-rectangular enclosures and associated driveway was identified in the northern third of the field. The middle zone of the field was relatively free of archaeological features. Another group of enclosures and driveway, on a different alignment to the features at the north end of the field were found in the southern third of the field, close to the road.

The Fieldwalking Survey

Immediately after completion of the geophysical survey a fieldwalking survey of the plot was carried out. Weather and ground conditions were good. There was a sprouting cereal crop over the field but this did not obscure visibility on the ground surface. The field was walked over in transects at 10m intervals, parallel to the western field boundary. Archaeological finds, consisting of pottery sherds and a few worked flints were individually plotted using a Geodimeter 1" total station theodolite (Fig. 5). Although there were pieces of flint scattered across the field only four worked flakes were recovered. Some post-medieval artefacts and building materials were recovered but not plotted. Animal bone was present in very small quantities across the field but not picked up because it cannot be assigned to any datable period. Pottery was later identified by staff at City of Lincoln Archaeology Unit.

Thirty-eight pieces of Romano-British pottery were found the majority of which were small in size and badly abraded but those which could be dated were assigned to the late 3rd-4th centuries. There were too few finds to provide a meaningful distribution but there was a denser scatter across the known

enclosure areas. Many of the pieces were small and badly abraded by exposure to weather and plough activity. This suggested that they had been in the ploughsoil for some time. The finds were compared with the material found in the field to the north and found to be quite different in character. Whereas building materials had been present in that field hardly any tile was found during the present survey. The size of the pottery fragments had been larger to the north.

106 medieval and post-medieval pottery sherds were scattered thinly over most of the area, probably a result of medieval 'muck-spreading', a phenomenon recognized on numerous sites in England.

Discussion

Magnetic anomalies corresponding to two distinct areas of rectangular enclosures surrounded by ditches were recorded. A single west-east enclosure lay close to the SW corner of the field, with an associated defined droveway on its north side. The variation in the clarity of these ditches may reflect recutting of the enclosure ditches during more than one phase of activity. The NW corner may have been damaged or removed by late 19th/early 20th century gravel quarrying.

A more complex enclosure system was located in the centre of the north end of the field, extending beyond the present field boundary. It consisted of a similar sized clearly defined ditched enclosure, aligned SW-NE, with two other adjoining ditched enclosures, possibly of more than one phase. There was a possible droveway along the southern side, again aligned NW-SE and defined by a ditch, possibly not of the same phase as all the visible enclosure ditches. There was a suggestion of a further small rectangular enclosure beyond the eastern side of the clearest feature.

A regularly segmented linear feature, running SW-NE approximately diagonally across the plot and producing a high magnetic anomaly, was interpreted as a modern service pipe but has not yet been identified. This has bisected the southern enclosure and may have removed part of the enclosure on the north-eastern side of the field.

The lack of Roman pottery in association with these enclosure complexes is puzzling. Ploughing may not have reached the top of archaeological remains in this field. Alternatively, the enclosures identified in this area may be of a different date to the remains in the field to the north. Their character, as revealed on the geophysical survey is similar to others recorded on the Fen Edge which may be Iron Age in date.

It is proposed that a series of evaluation trenches should be dug to determine the date and level of preservation of the archaeological remains. The precise location of these trenches is to be agreed with the client and the S. Kesteven Community Archaeologist but the programme of work will be undertaken within the guidelines already agreed in the proposal prepared by LAS and dated December 13th 1993.

Naomi Field
February 16th 1994

Acknowledgments

The desktop assessment included a search of the County Sites and Monuments Record, with the co-operation of the SMR Officer and Assistant. Further records at the Sleaford offices of Heritage Lincolnshire were consulted with help from the Community Archaeologist. Staff at the Lincolnshire Libraries Local Collection (temporarily based at The Castle, Lincoln) were especially helpful. Further records and Ordnance Survey maps were studied at the Lincolnshire Archives Office. The geophysical survey was conducted by Geophysical Surveys of Bradford and plotting of all finds by Midland Surveying and Engineering. Preliminary identification of the pottery was undertaken by Barbara Davies at the City of Lincoln Archaeology Unit.

References

- Birkbeck, J.D. 1970 *History of Bourne* 1st edn.
" " 1976 *History of Bourne* 2nd edn.
Hayes, P.P. and Lane, T.W. 1992 *The Fenland Project 5: Lincolnshire Survey, The South-West Fens*, East Anglian Archaeology 55.
Phillips, C.W. (ed) 1970 *The Fenland in Roman Times*.
Shennan, I. 1986a 'Flandrian sea-level changes in the Fenland: 1. The geographical setting and evidence of relative sea-level changes', 119-154.

Maps

- OS 1906 Ordnance Survey 1:10560 sheet 14ONE, 2nd edition, revised 1903.
OS 1955 Ordnance Survey 1:25,000 sheet TF12, fully revised 1903-29, partial revision 1938-50, 1960 reprint.

Summary of Sites and Monuments Information

SMR = unique number assigned by the Lincolnshire Sites and Monuments Record. Old Museum letter codes are shown in brackets

NGR = National Grid Reference

FP = Fenland Project code

HL = Heritage Lincolnshire. Bourne parish code is 12. Each find or site is allocated a number which is suffixed to 12

OS sheet TF 12SW

SMR	NGR	FP	Description (with HL code 12.-)
30044(P)	105 216-		Roman Car Dyke canal earthwork
	106 21-		
33244	100 214		Romano-British greyware and colour-coated pottery. (12.30)
33246(L)	107 210		Medieval (14th cent.) pottery, large quantities from Grey's Field, 1966
33247	103 213		Farthing token (1656), 1982
33248	102 204	UA5	Neolithic flint arrowhead and scraper found on disused railway track, 1967
34114	1085 2114	BOU10	Late neolithic/early bronze age flints; much middle-late bronze age pottery; dark soilmark and fired clay spread (?hearth); bone, slag, daub and cobbles. Settlement site, 1986
34115	1045 2150	BOU11	Romano-British settlement; pottery kiln producing calcite-gritted wares (probably 2nd century AD) bone, tile, building rubble, 1986
34116	" "	BOU11	Bronze age pottery (1 sherd) 1986
34117	" "	BOU11	Early saxon pottery (1 sherd) 1986
34134	1032 2134	BOU25	Romano-British settlement site; pottery (36 sherds, late 3rd-4th century AD) bone, tile, quern and some stone, 1986
34135	" "	BOU25	Early saxon pottery (2 sherds), 1986
34136	1019 2155	BOU26	Romano-British settlement, western limit. Pottery, tile, bone and slag. 1986
34137	" "	BOU26	Early saxon settlement; 62 sherds of pottery, along stream course, 1986
34142	1031 2145	BOU30	Romano-British settlement; extensive spreads of limestone rubble, also tile (incl. hypocaust); numerous sherds of pottery, bone and fired clay, 1986
34143	" "	BOU30	Early saxon pottery, 1986
34156	1019 2114	UA8	?Early bronze age/early saxon pottery vessel and metal spearhead; in gravel pit west of railway line, 1921

OS sheet TF 12SW continued

SMR	NGR	FP	Description (with HL code 12.-)
34157	101	217	A14 Early saxon pottery, 1986
34158	1019	2155	BOU26 Prehistoric flints, 1986
34159	1031	2145	BOU30 Prehistoric flints (6), 1986
---	1040	2151	A16 Plotted isolated find, Middle Bronze Age

OS sheet TF 12SE

34144	171	217	BOU32 Cropmark of ?Roman peat cuttings, 1986
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OS sheet TF 02SE

33225(K)099	211	UA2	Roman glass vessel and pottery, 1966 (12.20)
33226(K)	"	"	Medieval pottery, house garden 1966
33234(Y)100	208		Medieval pottery, school garden 1967 (12.29)

OS sheet TF 02NE

34155	0964	2172	UA6 Romano-British ?cremation; sherds from single vessel and fragments of burnt human bone. Also sherds of second vessel 15m away. 1984
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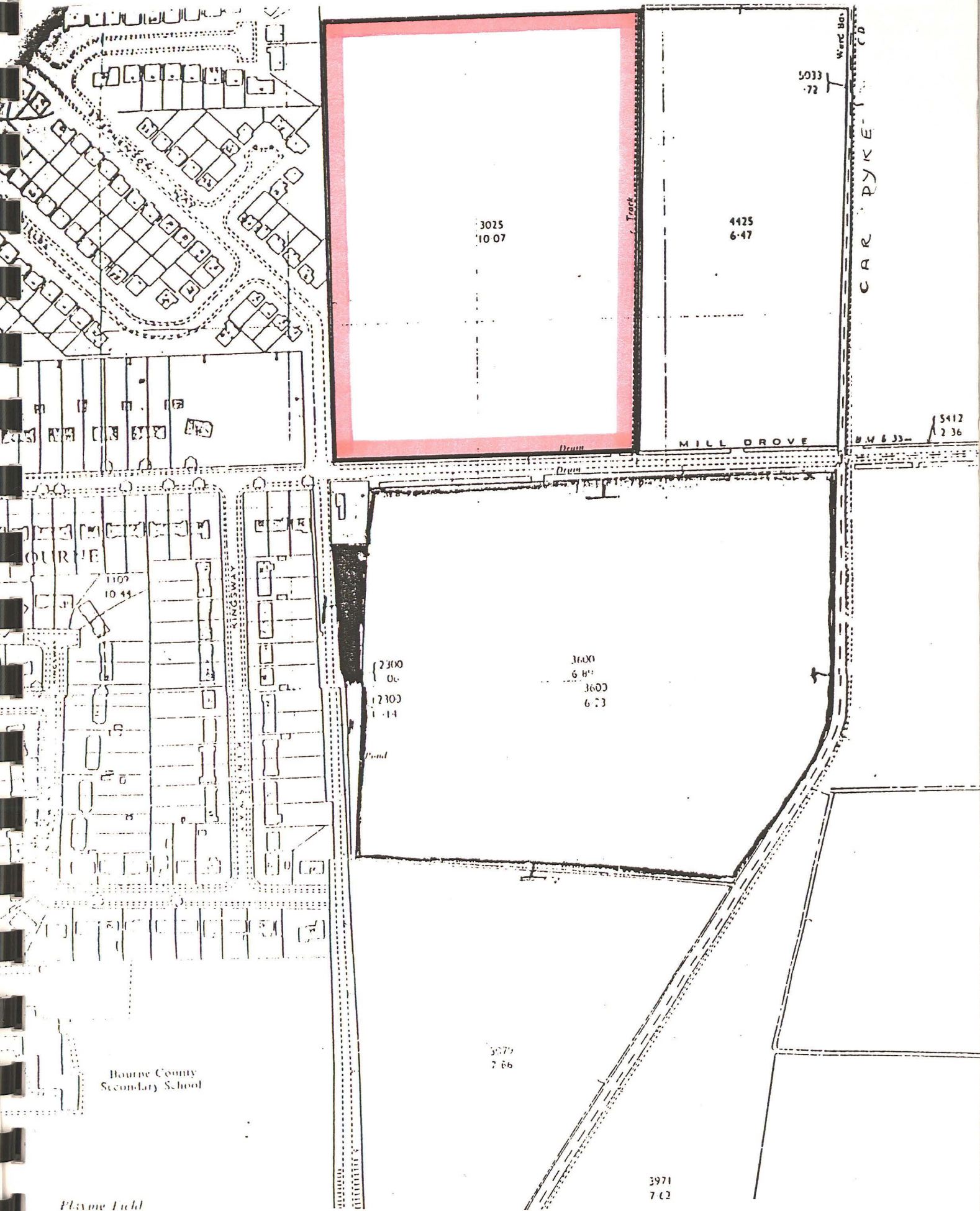


Fig. 1 Location map reproduced from the 1:2500 scale Ordnance Survey map with permission of the Controller of HMSO, Crown copyright. Licence no. AL50424A.

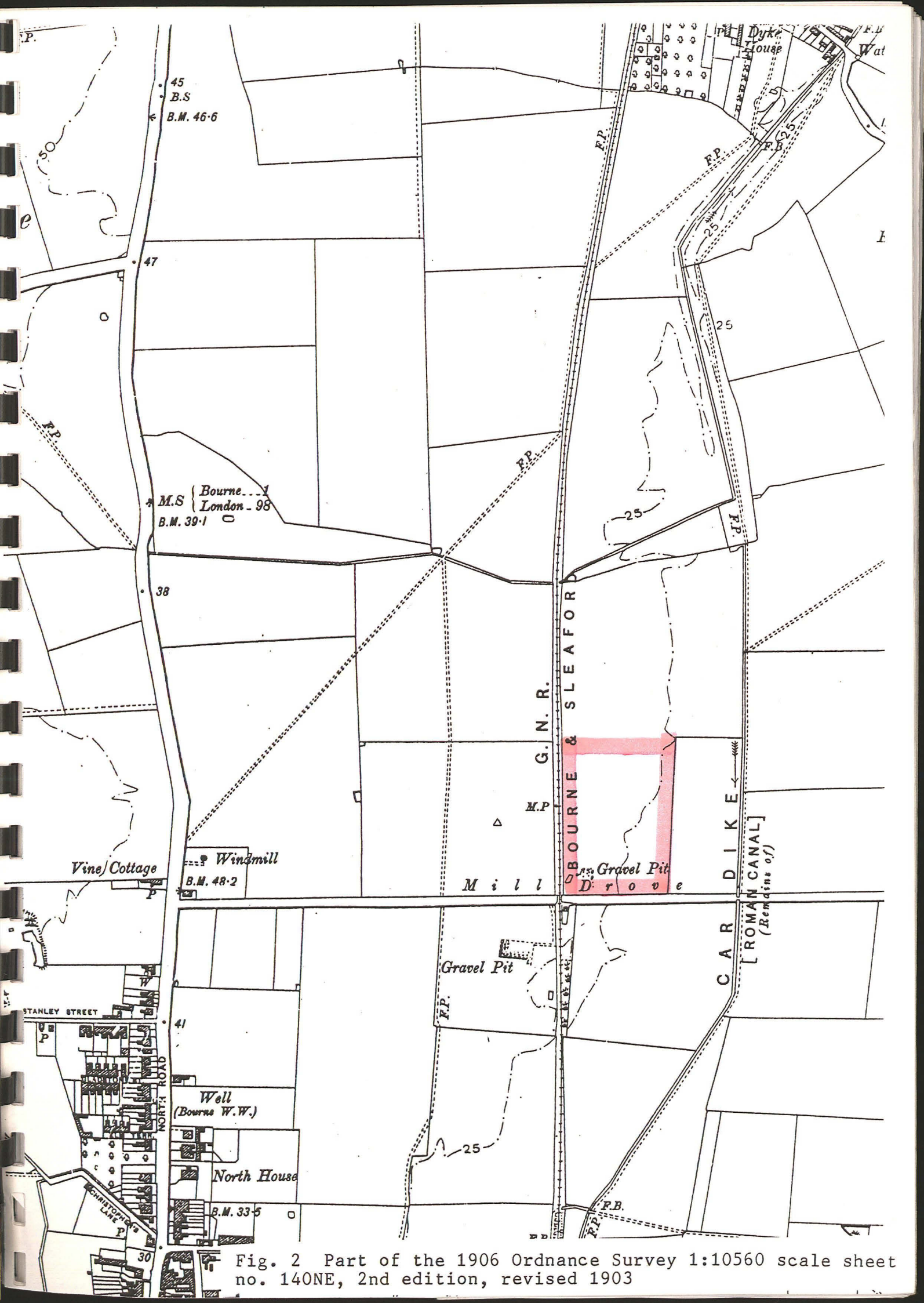


Fig. 2 Part of the 1906 Ordnance Survey 1:10560 scale sheet no. 140NE, 2nd edition, revised 1903

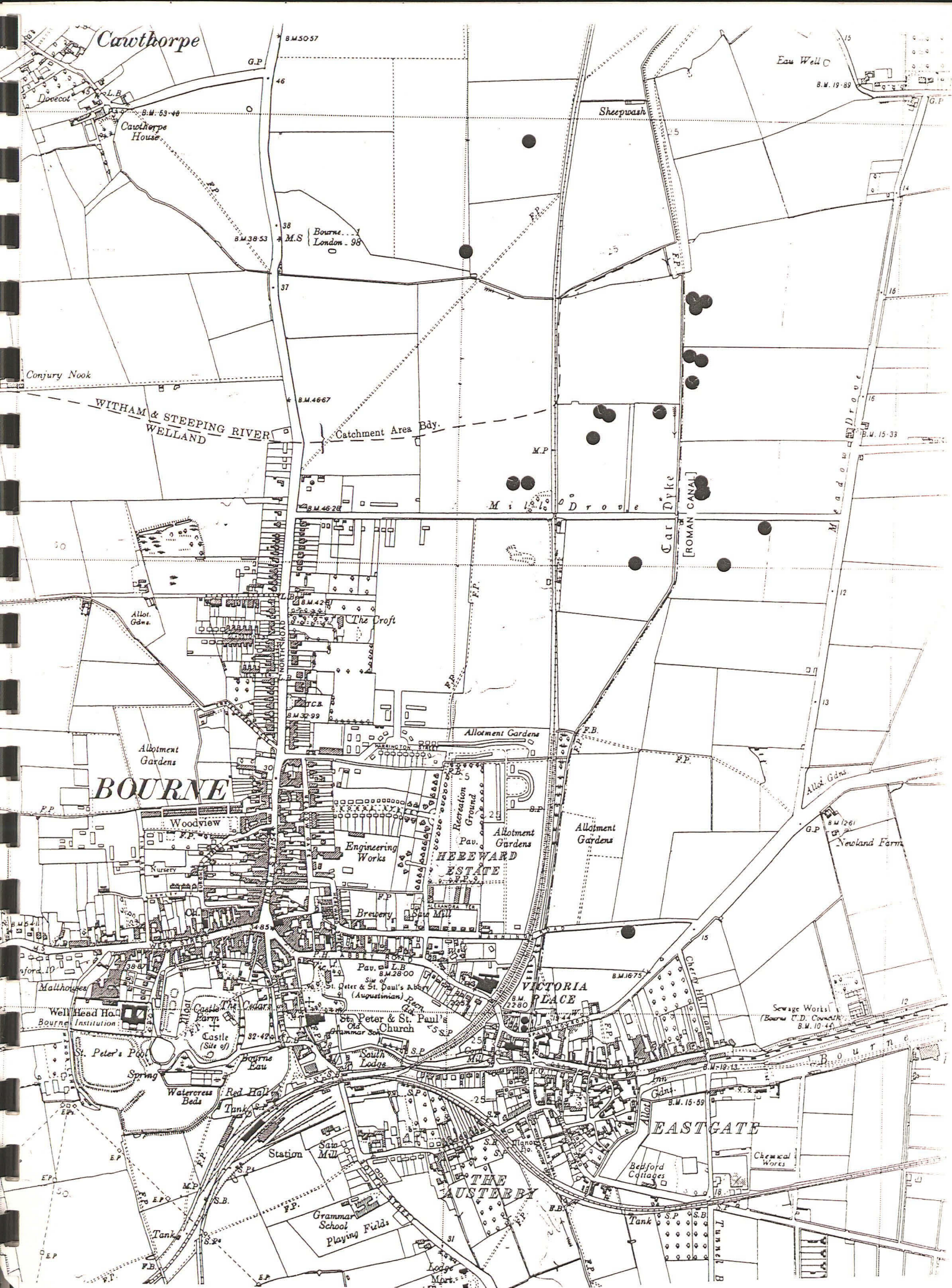
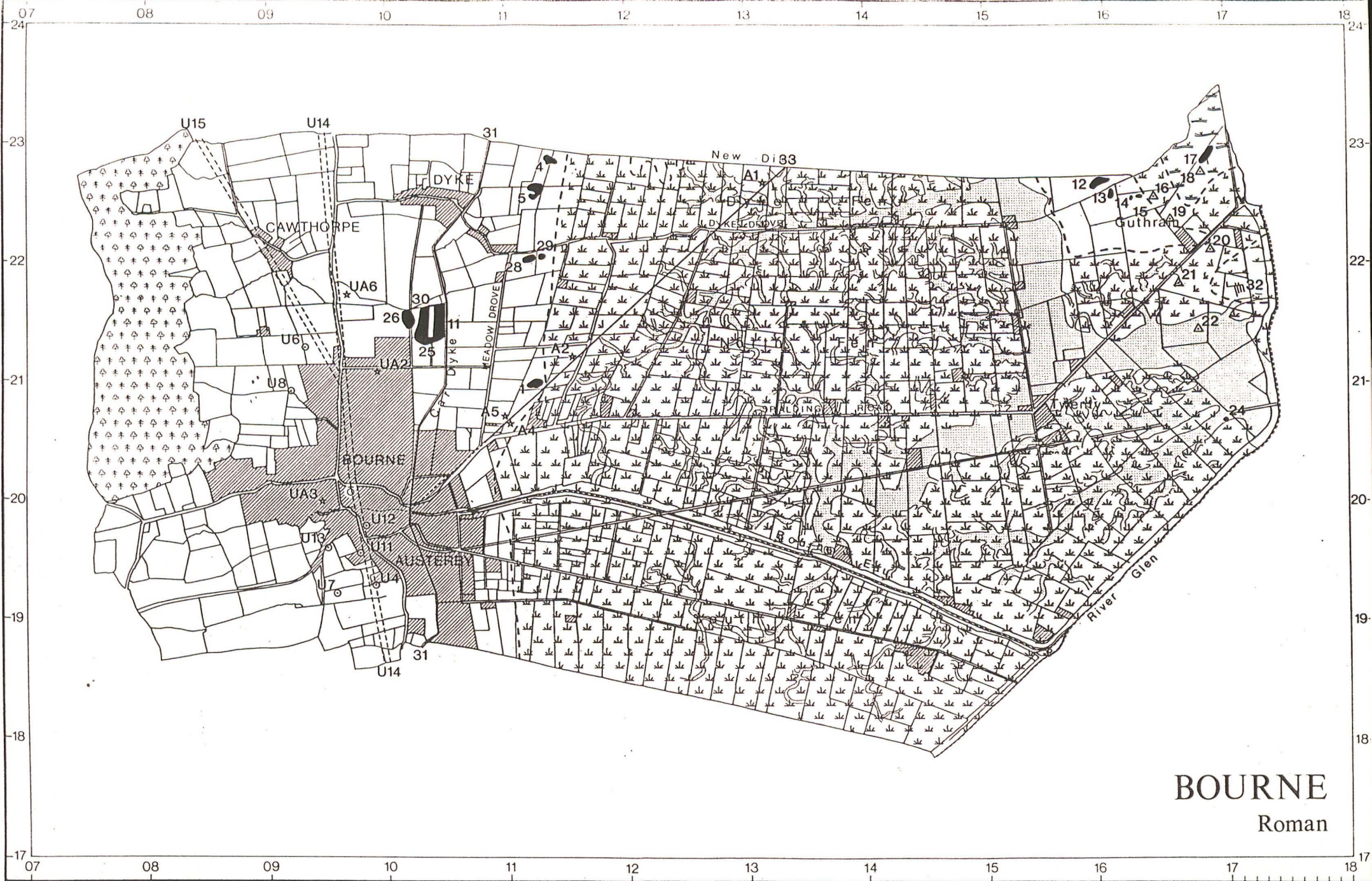


Fig. 3 Location of known archaeological remains. Reproduced from the 1951 Ordnance Survey 1:10560 scale map with permission of the Controller of HMSO, Crown copyright. Licence no. AL50424A.



BOURNE
Roman

Fig. 4 Sites and finds recorded by the Fenland Survey
(Development site = site 25)

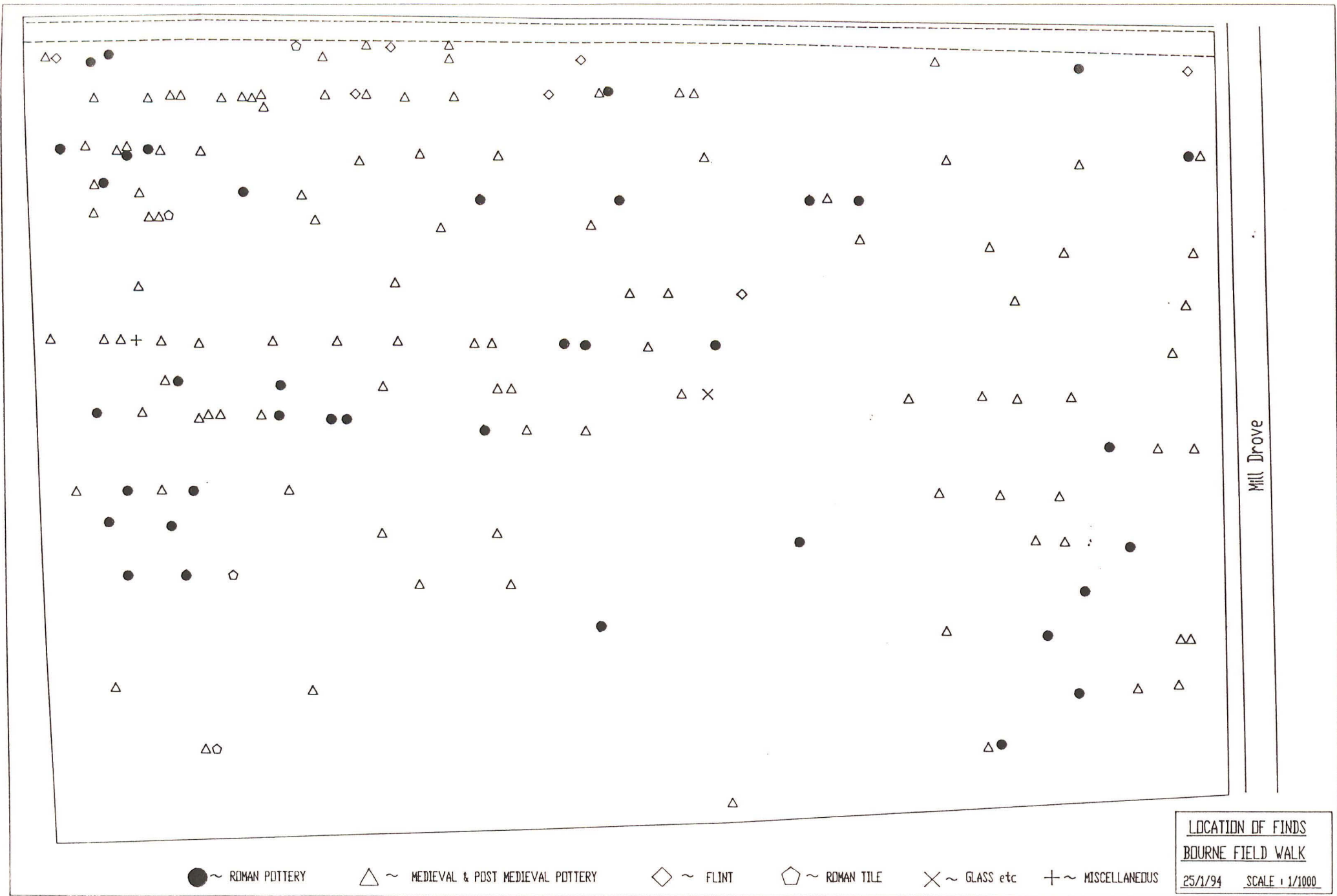


Fig. 5 Computer plot of finds recorded during fieldwalking survey.



Pl. 1. View of development site on higher ground in front of housing, Car Dyke in the foreground.

Pl. 2. Development site. Setting out grid for geophysical survey.





Pl. 3. Fieldwalking and plotting.

SITE SUMMARY SHEET

94/09 Mill Drove, Bourne

NGR: TF 103 213

Location, topography and geology

The proposed development site lies on the north eastern limit of the town of Bourne, Lincolnshire. The field under investigation is relatively flat, with a small gradient increasing toward the north east corner.

Archaeology

The proposed development site lies approximately 100m to the west of the Roman Carr Dyke. Fieldwalking undertaken by the Fenland Survey during the 1980's indicated a spread of artefacts which partially covered the northern extremity of the proposed development area. The majority of the artefactual evidence was identified in the field to the north of the development.

Aims of Survey

It was hoped that a detailed gradiometer survey of the proposed development area would identify anomalies associated with the artefact scatter, as well as assessing the archaeological potential of the remaining area of the field. The survey forms part of a wider archaeological evaluation being undertaken by **Lindsey Archaeological Services (LAS)**.

Summary of Results *

The results of the gradiometer survey clearly indicate anomalies associated with settlement type features situated in the northern part of the survey area. Of further archaeological interest is a series of anomalies in the southern portion of the survey, which again appear to represent enclosures and other related features. A ferrous pipe was found to cross the proposed development, and its presence has obscured the archaeology in its vicinity.

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

SURVEY RESULTS

94/09 Mill Drove, Bourne

1. Survey Areas (Figure 1)

1.1 A gradiometer survey of c. 4ha was undertaken over the proposed development area, and the grid location is shown in Figure 1.

1.2 The grid was positioned and tied-in by **Geophysical Surveys of Bradford**, with a copy of the tie-in measurements being lodged with the client.

2. Display

2.1 The results are displayed as dot-density plots, X-Y traces and grey scale images. These display formats are discussed in the *Technical Information* section, at the end of the text.

2.2 Summary plots of the data, Figures 2-4, are reproduced at 1:1000. An interpretation at the same scale is also provided, Figure 5. Letters in parenthesis in the text refer to anomalies highlighted on the 1:1000 interpretation.

2.3 Archive plots and interpretations are presented at a scale of 1:500. For ease of display the data have been divided into three parts, A - C, for the archive plots.

2.4 Figure 6 shows the summary interpretation and location of the former building and gravel pit, relative to the field boundaries, at a scale of 1:1250.

3. General Considerations - Complicating factors

3.1 Ground conditions were good at the site, with the field generally being level and recently seeded. The field was free of obstacles.

3.2 A ferrous pipe running diagonally across the site has reduced the clarity of the archaeological anomalies in its immediate vicinity.

4. Results - Summary diagrams Figures 2-6

The results will be discussed with reference to the three Areas A, B, and C (see Figure 1).

4.1 Area A (Figures A1-A3)

4.1.1 Area A approximately covers the southern third of the proposed development area. Cartographic evidence noted by LAS has indicated that a building and a former quarry pit was shown on a 1906 map, in the south-west corner of Area A (see Figure 1 for their approximate positions).

4.1.2 The data are dominated by the strong response from a ferrous pipe that runs from the south-west corner of the survey toward the north-east corner of the field.

4.1.3 There are a number of other ferrous type responses in the data. The majority of these anomalies indicate individual scraps of metal of unknown date. Some larger areas of disturbance, notably on the edge of the field are likely to represent small areas of modern dumping. Manhole covers seen on the ground also suggest a pipe running along the western limit of the site.

4.1.4 There are clear indications of linear and sub-linear anomalies that are likely to represent ditched features. It is possible that these anomalies form part of an enclosure, although the presence of the pipe makes it impossible to define a western limit to the enclosure.

4.1.5 A number of very strong anomalies, possibly of archaeological interest are noted on the interpretation. A single anomaly, near the centre of the supposed enclosure has produced a significantly stronger anomaly as has a group of anomalies to the west of the pipe (A). The latter are unusual because their strength and form indicate a possible industrial origin. However, the closeness of the pipe and the known modern buildings and quarry must add some caution to this interpretation.

4.2 Area B (Figures B1-B3)

4.2.1 Area B covers the central portion of the survey area.

4.2.2 As in Area A the most obvious anomalies are the product of the ferrous pipe and disturbance at the western edge of the survey.

4.2.3 Away from the disturbed areas the data set is relatively quiet. However a few pit type anomalies and some weak linears were noted.

4.2.5 Also identified in the data are a number of diffuse negative anomalies and these are best seen in the summary greyscale in Figure 4. It is thought that these are likely to be non-archaeological in origin, and possibly related to former stream channels.

4.3 Area C (Figures C1-C3)

4.3.1 This area covers the northern portion of the survey. It was in this general area that the Fenland Survey had found a spread of Romano-British pottery.

4.3.2 The majority of Area C contains archaeological type anomalies. The anomalies form patterns that indicate the presence of enclosures and the strength would appear indicative of settlement features. Although some of the responses are relatively strong only one anomaly (B) may be the product of an industrial feature, possibly indicating a kiln/hearth.

4.3.3 The weakest of the positive linear anomalies (C) appears to represent the southern limit of the settlement. It is not certain if the weakness of the anomalies is due to an increase in the depth of topsoil at this position, or a result of less enhanced fills.

4.3.5 The weak negative anomalies, similar to those found in Area B, are also present in this area.

5. Conclusions

5.1 The gradiometer survey has identified a great number of archaeological type anomalies. The distribution of anomalies suggest that buried archaeology may be found in both the southern and northern sections of the survey area. By comparison the central section was found to be relatively free of archaeological type anomalies.

5.2 The presence of a ferrous pipe running diagonally across the site has confused interpretation of some of the anomalies

Project Co-ordinator: Dr C Gaffney

Project Assistants: N Nemcek, Dr S Ovenden, A Shields and A Wilson

10th February 1994

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GEOPHYSICAL SURVEYS OF BRADFORD** 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 **GEOPHYSICAL SURVEYS OF BRADFORD**.

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.

Magnetic readings are logged at 0.5m intervals along one axis in 1m traverses giving 800 readings per 20m x 20m grid, unless otherwise stated. Resistance readings are logged at 1m intervals giving 400 readings per 20m x 20m grid. The data are then transferred to portable computers and stored on 3.5" floppy discs. Field plots are produced on a portable Hewlett Packard Thinkjet. Further processing is carried out back at base on computers linked to appropriate printers and plotters.

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is 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.

(b) Resistance Meter - Geoscan RM4 or 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 pairing 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".

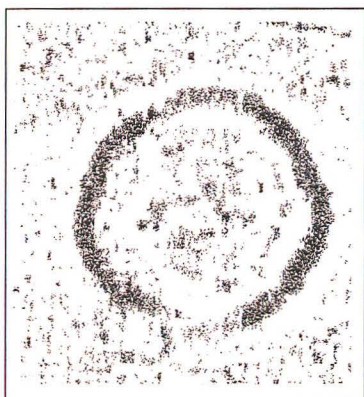
(c) Magnetic Susceptibility

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. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. For the latter 50g soil samples are collected in the field.

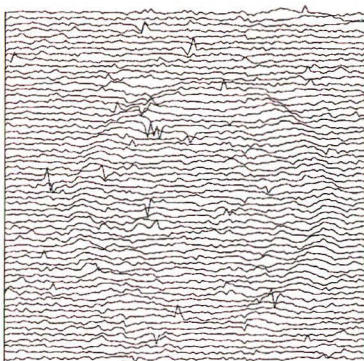
Display Options

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



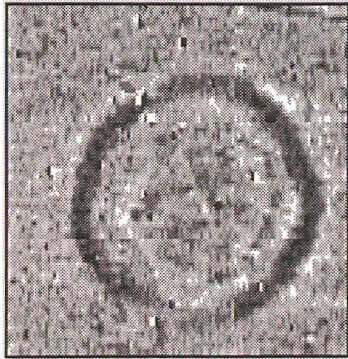
In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum cut-off value will appear white, whilst any value above the maximum cut-off value will appear black. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). Usually the C.F. = 1, producing a linear scale between the cut-off levels. Assessing a lower than normal reading involves the use of an inverse plot. This plot simply 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. This display is much favoured for producing plans of sites, where positioning of the anomalies and features is important.



(b) X-Y 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. 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. Results are produced on a flatbed plotter.

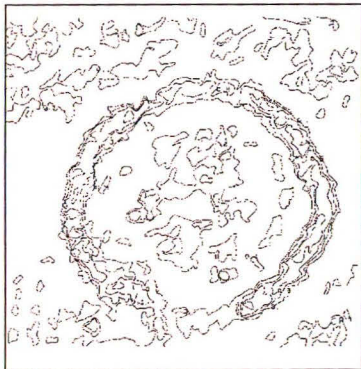
Display Options cont'd



(c) Grey-Scale

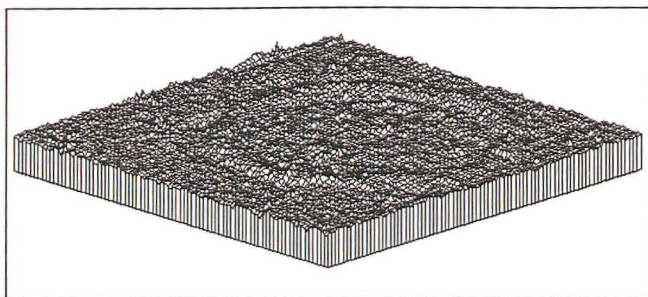
This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey scale.

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, grey-scales tend to be more informative.



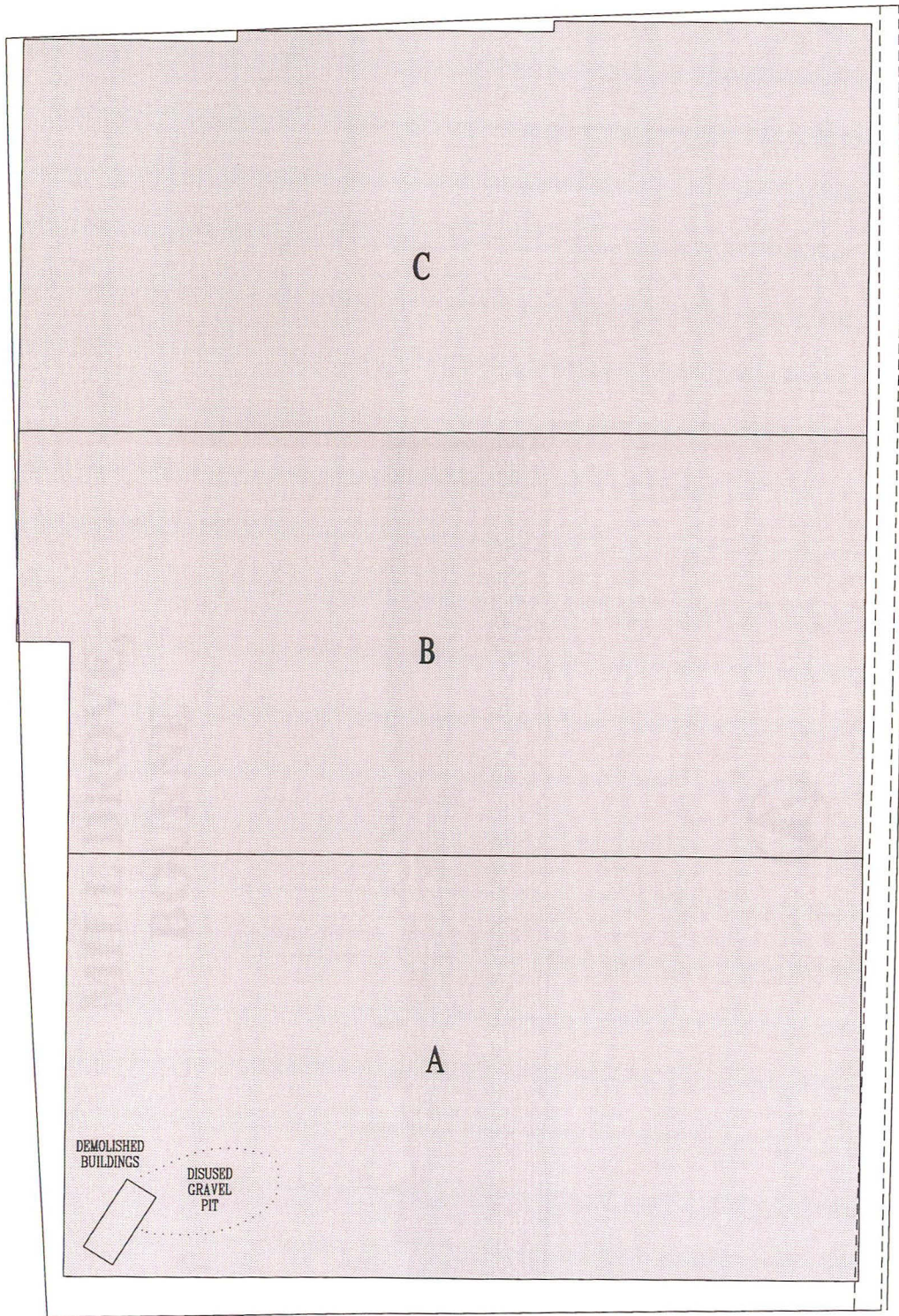
(d) Contour

This display format is commonly used in cartographic displays. Data points of equal value are joined by a contour line. Closely packed contours indicate a sharp gradient. The contours therefore highlight an anomalous region. The range of contours and contour interval are selected manually and the display is then generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer.



(e) 3-D Mesh

This display joins the data values in both the X and Y axis. The display may be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white. A hidden line option is occasionally used (see (b) above).



Gradiometer Survey



1:1250

GEOPHYSICAL SURVEYS OF BRADFORD

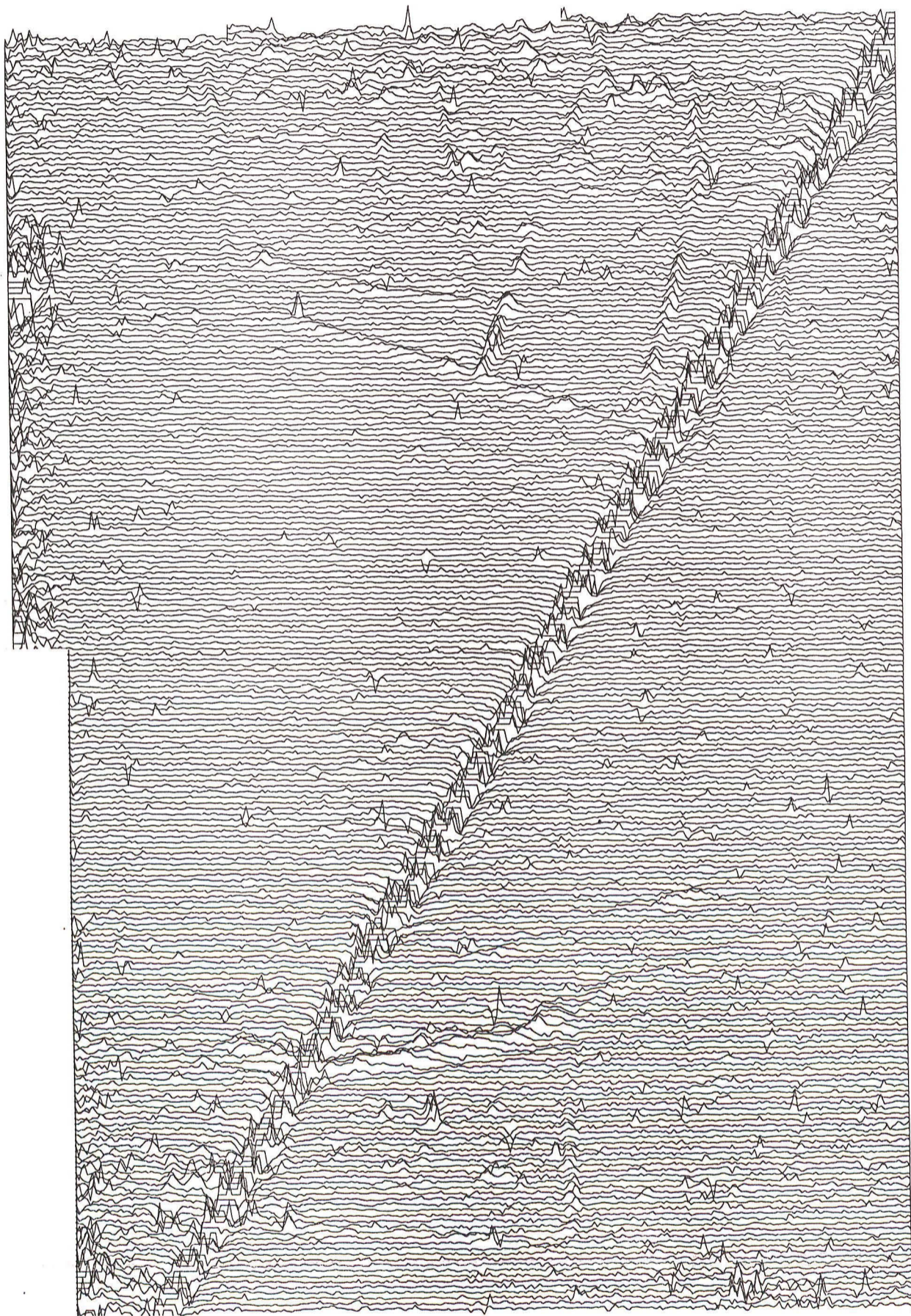
PROJECT: MILL DROVE, BOURNE

TITLE: Location Diagram

Based on a plan supplied by
LAS

Figure 1

MILL DROVE, BOURNE



30 nT

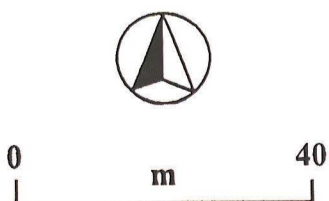


Figure 2

MILL DROVE, BOURNE

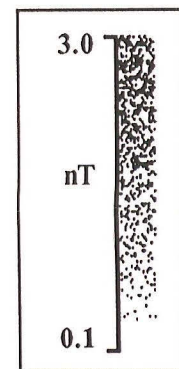


Figure 3

MILL DROVE, BOURNE

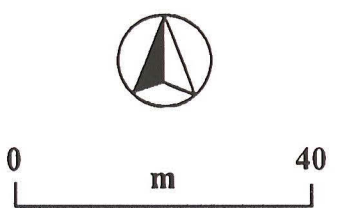
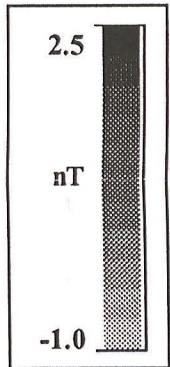
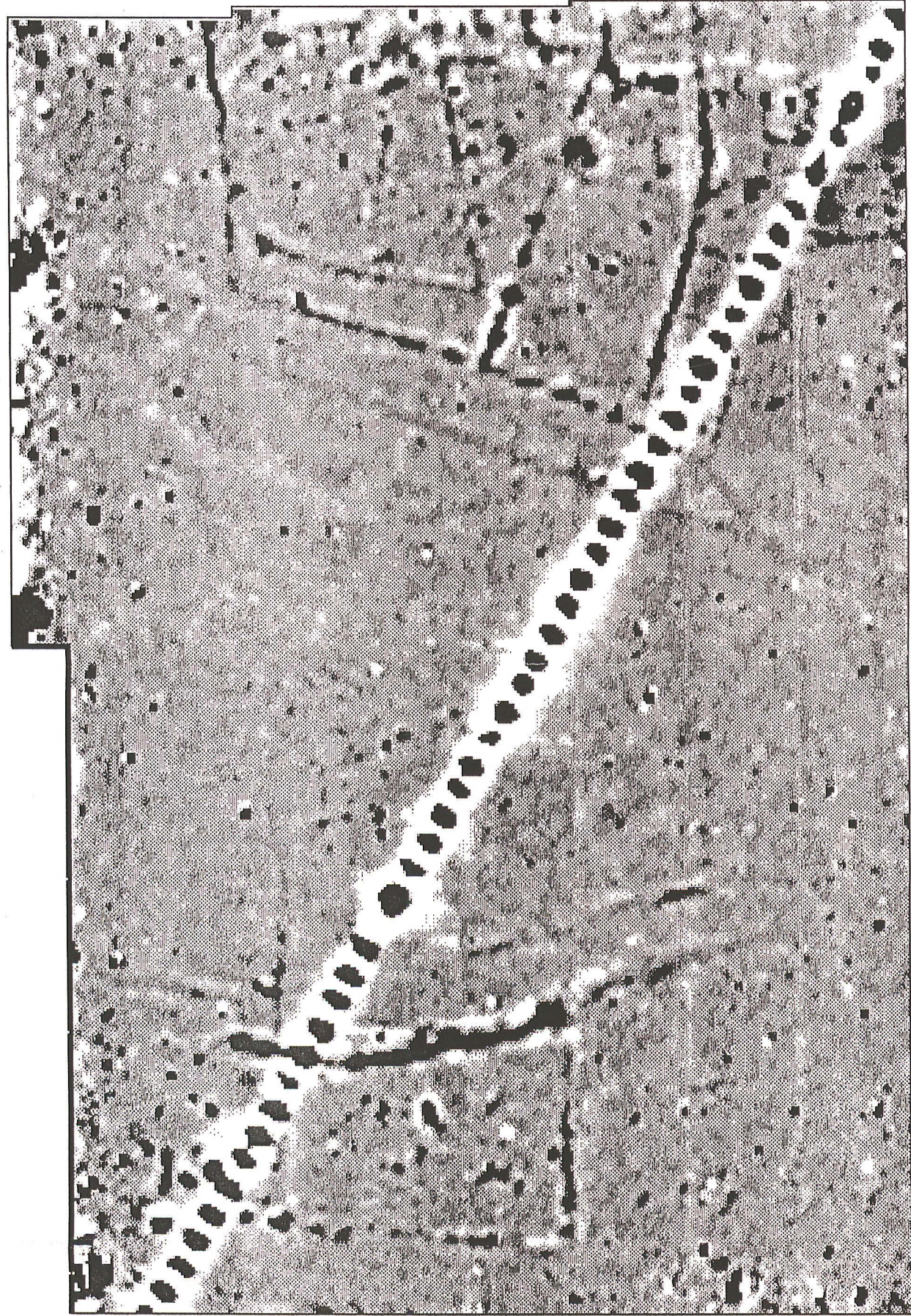


Figure 4

MILL DROVE, BOURNE



- ?Archaeology
- ▨ ?Stream
- Ferrous

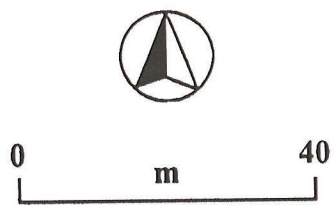
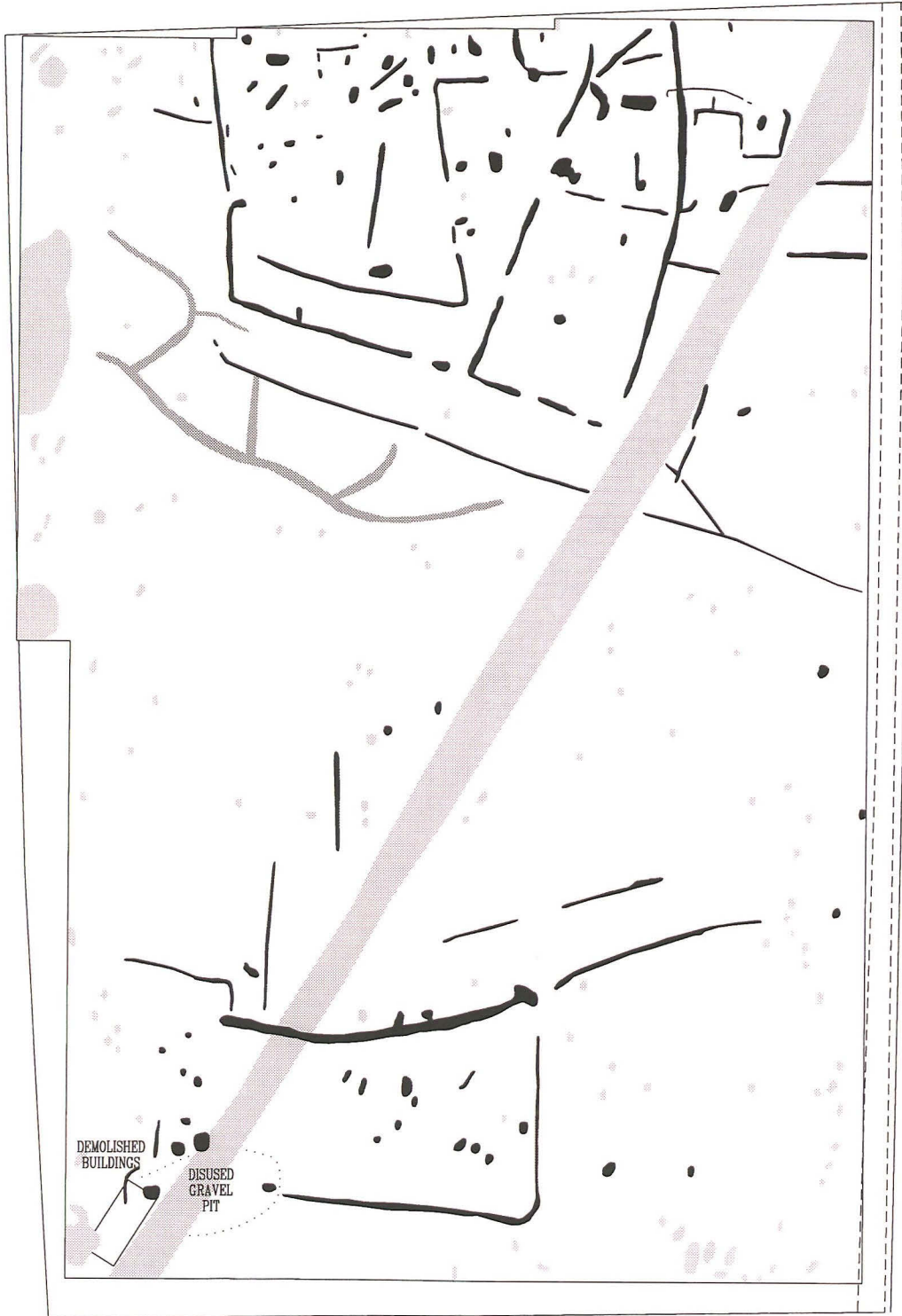


Figure 5



?Archaeology



Ferrous



?Stream



1:1250

GEOPHYSICAL SURVEYS OF BRADFORD

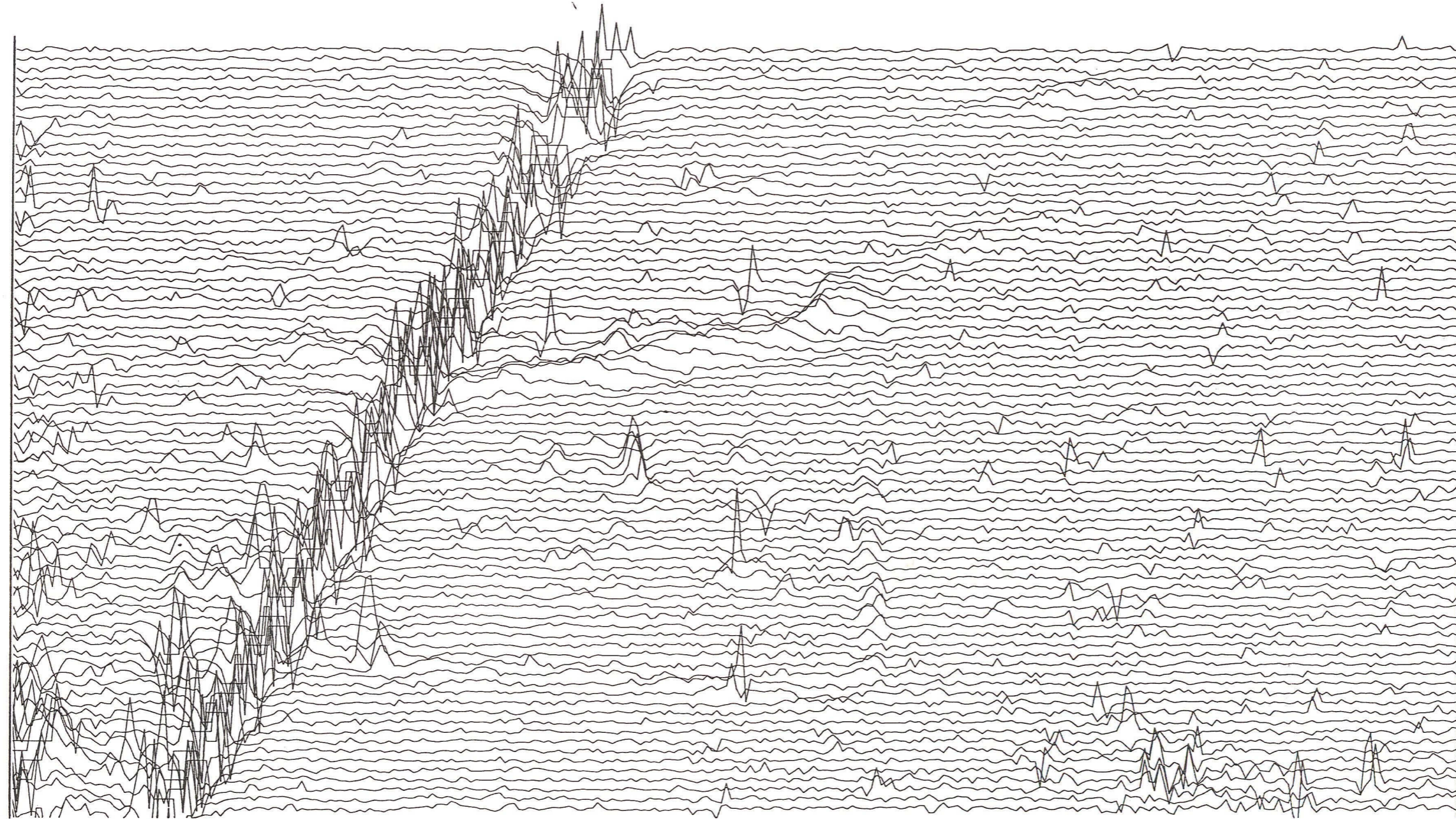
PROJECT: MILL DROVE, BOURNE

TITLE: Summary Interpretation

Based on a plan supplied by
LAS

Figure 6

**MILL DROVE,
BOURNE
Area A**



15 nT

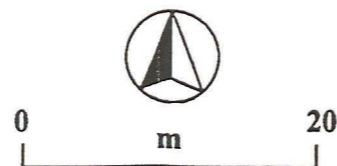


Figure A1

MILL DROVE,
BOURNE
Area A

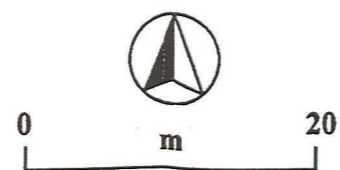
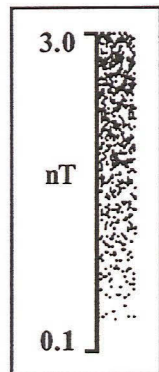
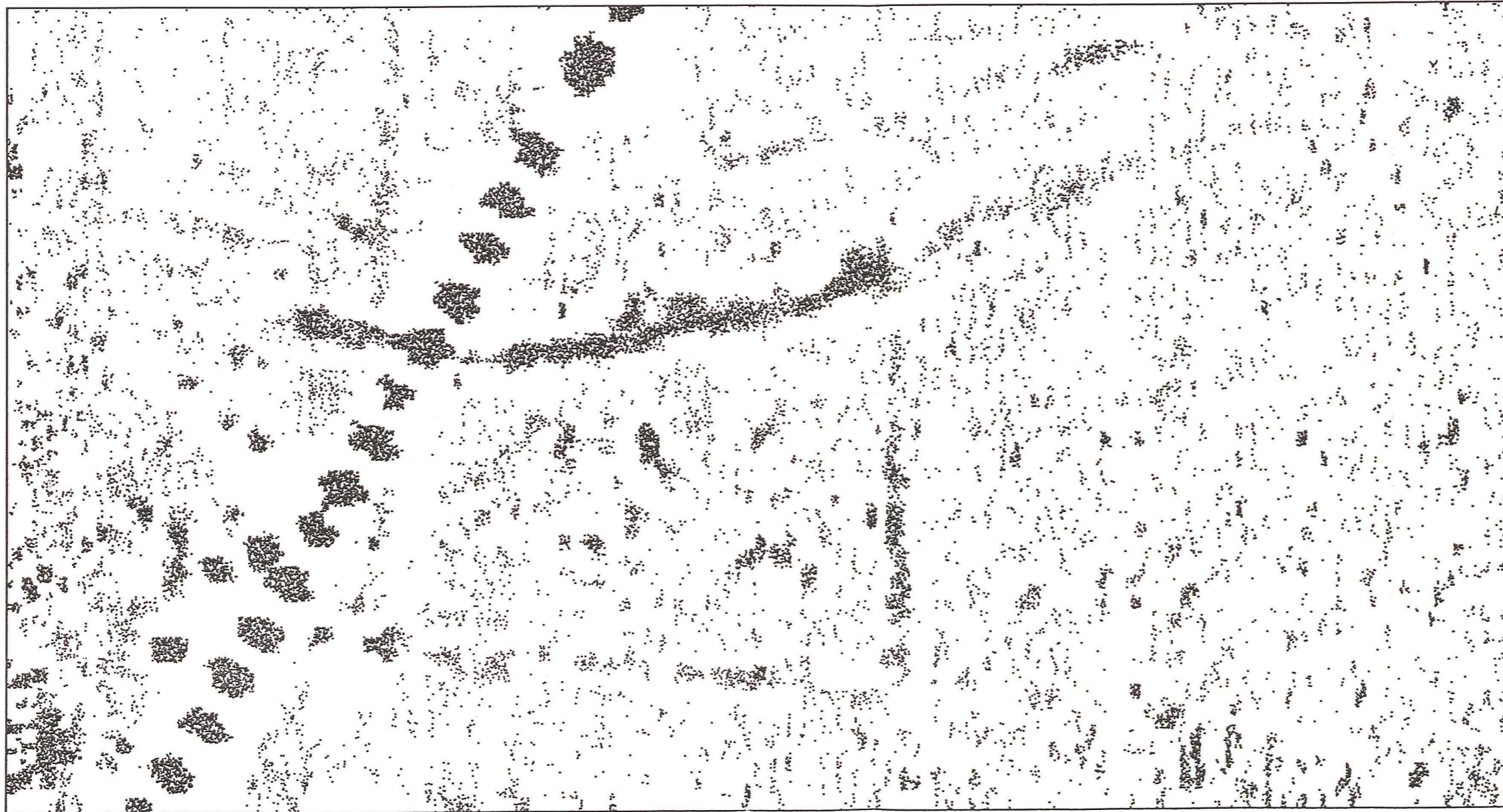
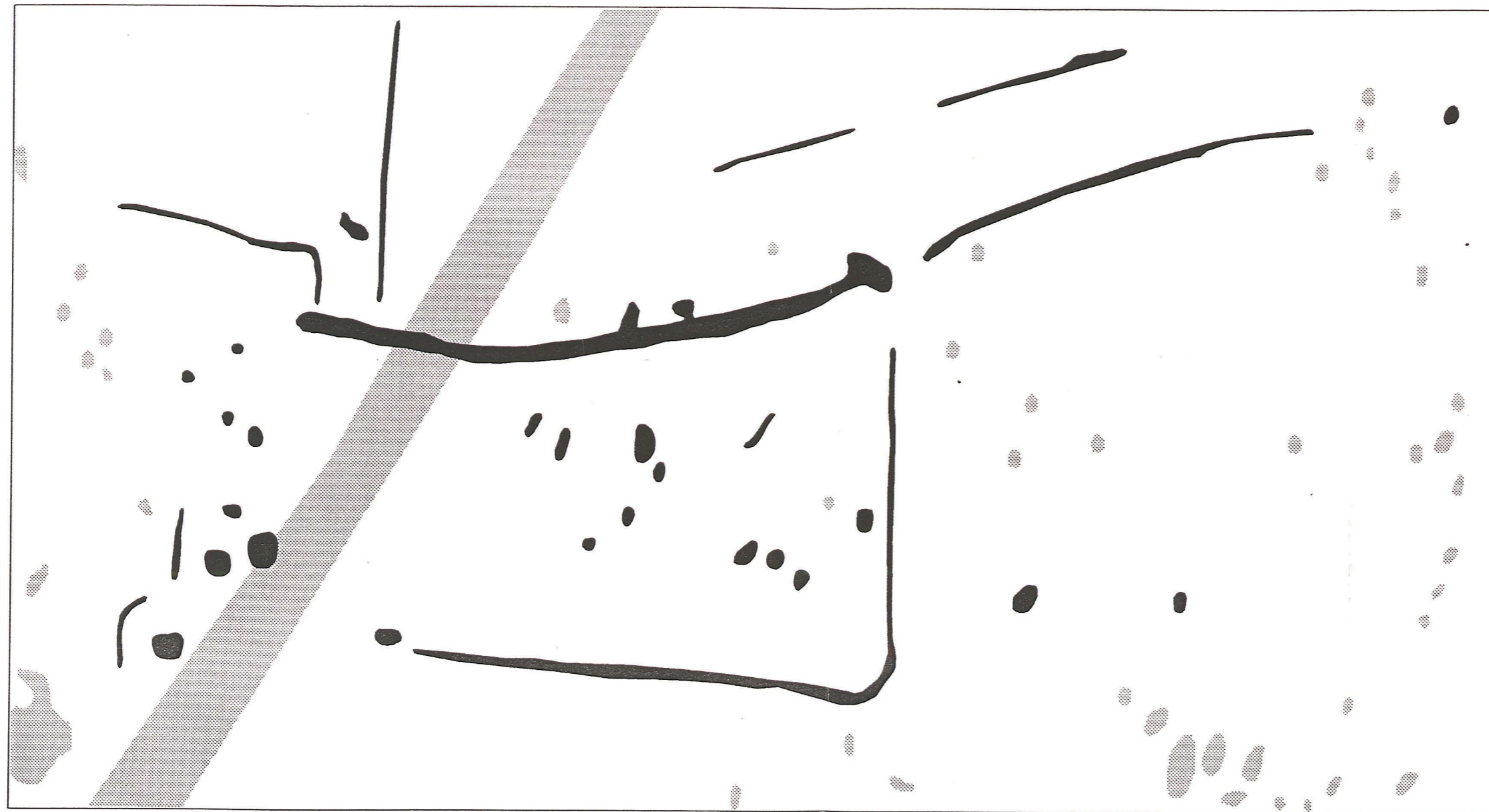


Figure A2

MILL DROVE,
BOURNE
Area A



- ?Archaeology
- ▨ Ferrous

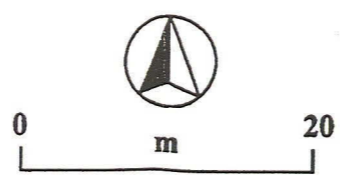
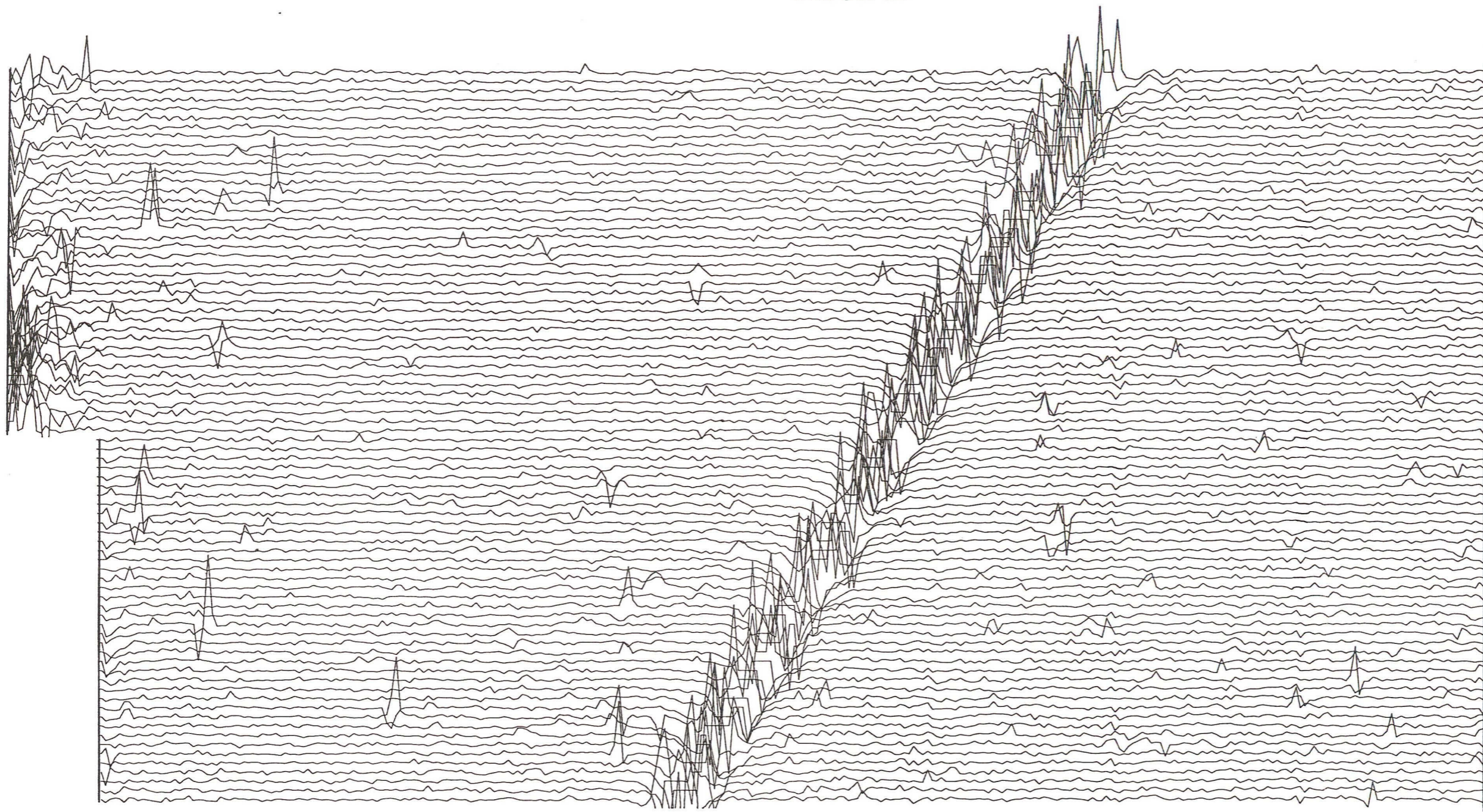


Figure A3

**MILL DROVE,
BOURNE
Area B**



15 nT

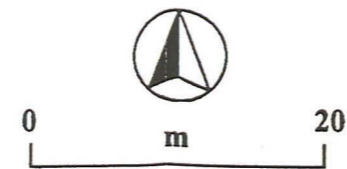


Figure B1

**MILL DROVE,
BOURNE
Area B**

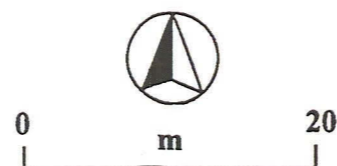
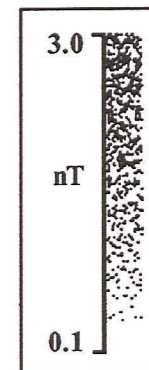
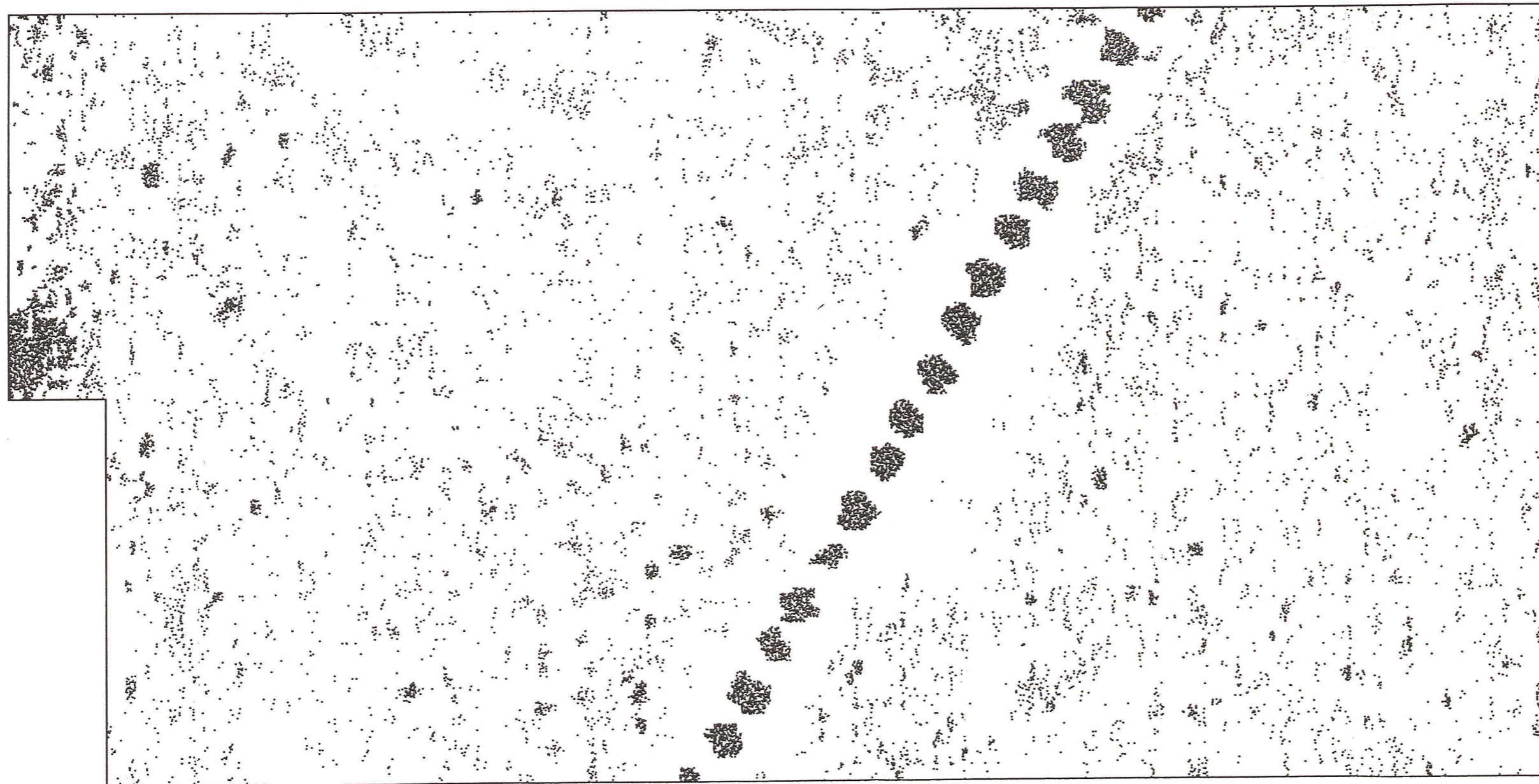
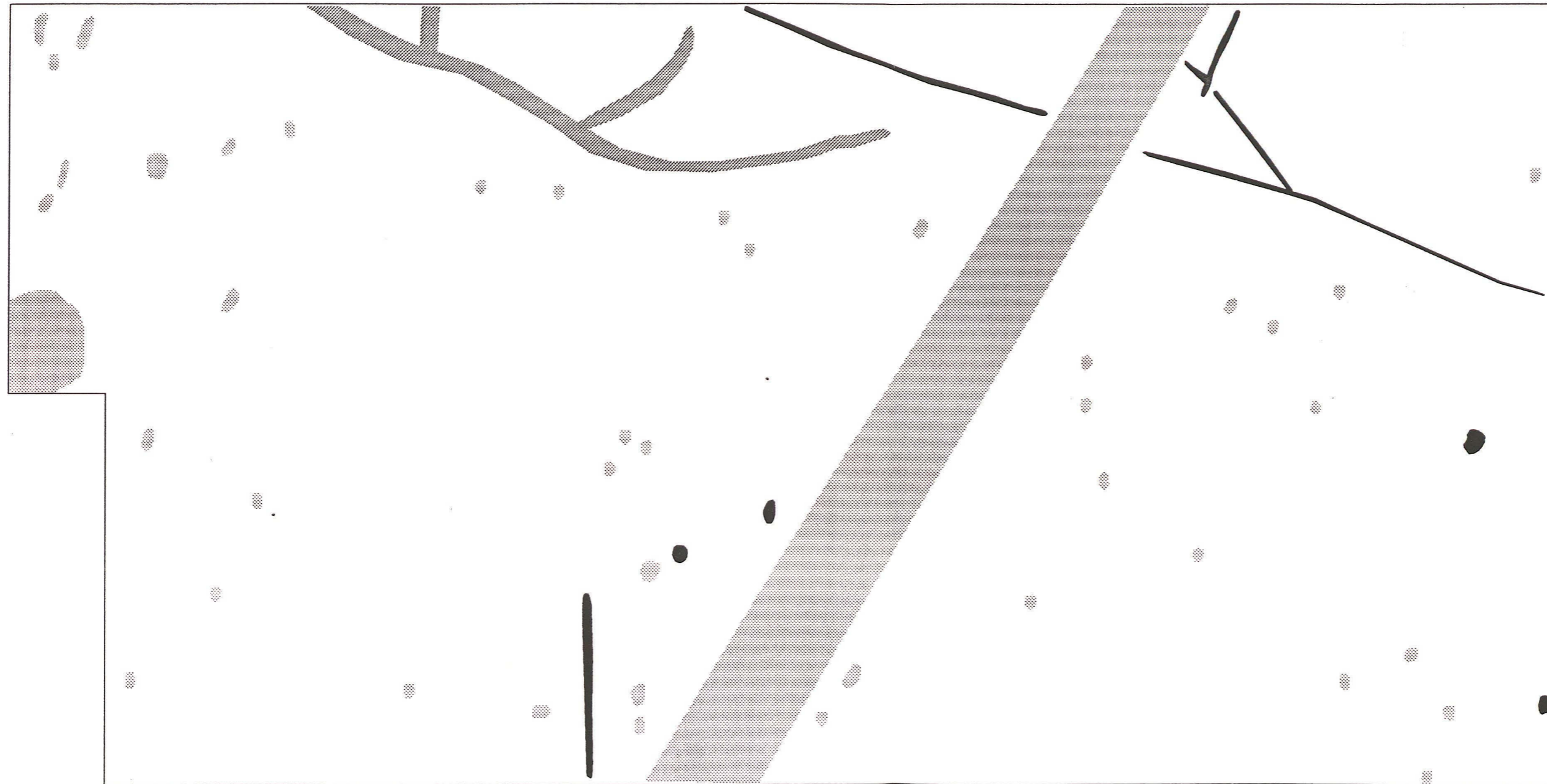





Figure B2

MILL DROVE,
BOURNE
Area B



-  ?Archaeology
-  ?Stream
-  Ferrous

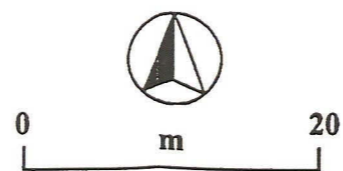
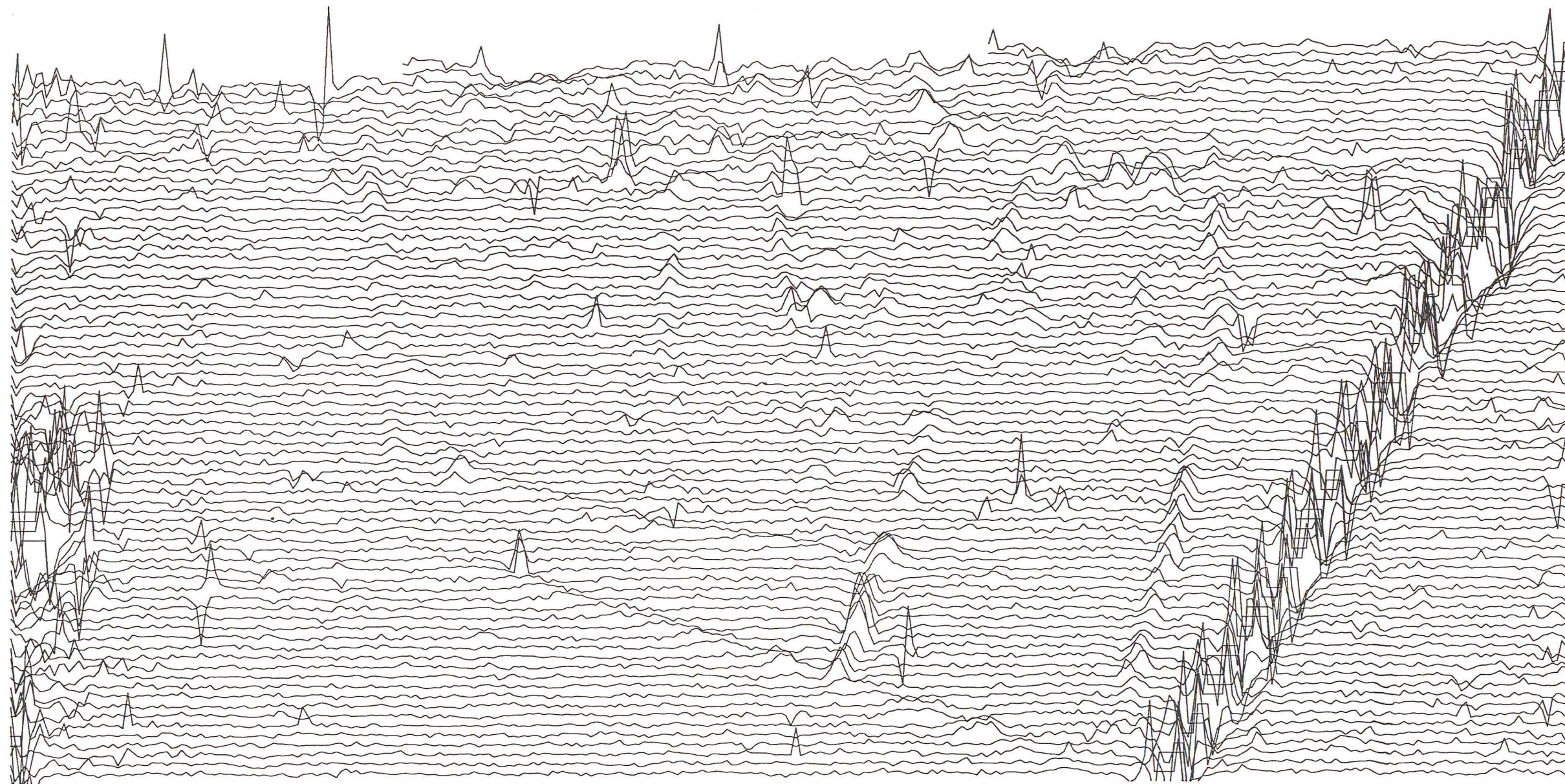


Figure B3

MILL DROVE,
BOURNE
Area C



15 nT

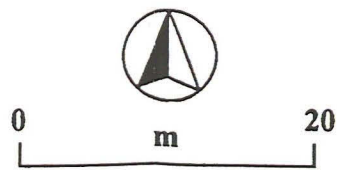


Figure C1

MILL DROVE,
BOURNE
Area C

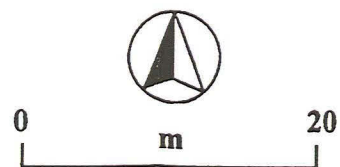
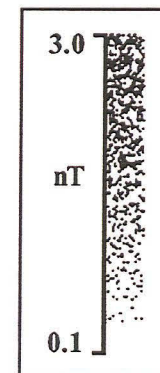
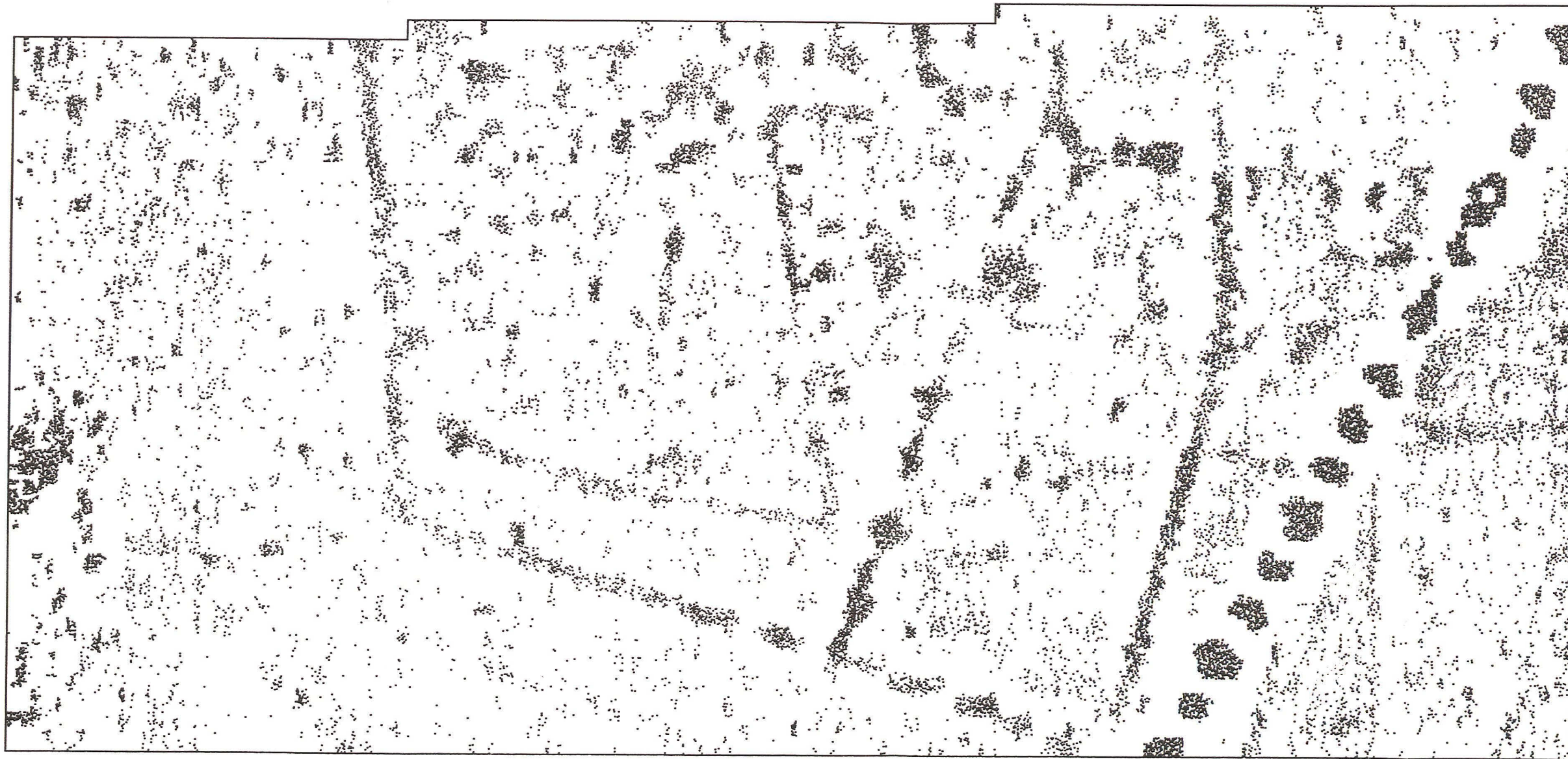


Figure C2

MILL DROVE,
BOURNE
Area C

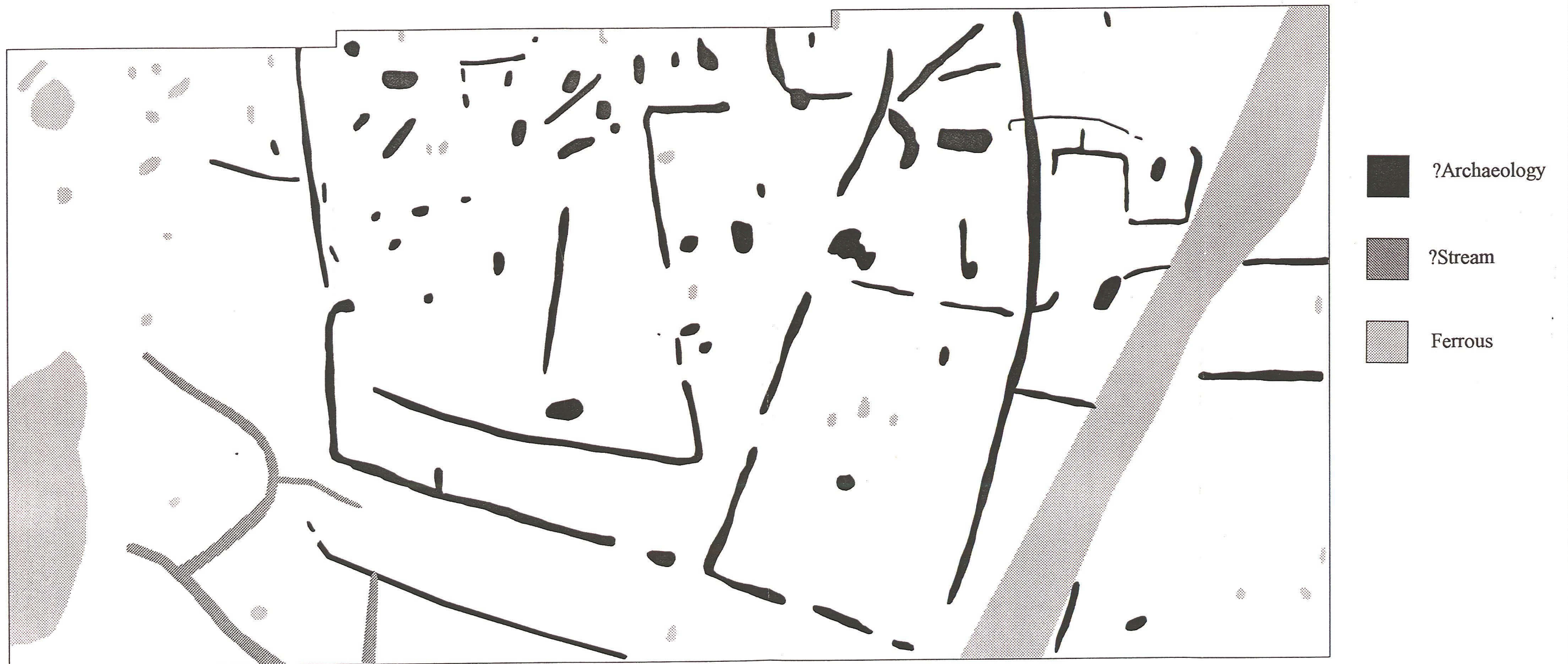


Figure C3