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Report on an Archaeological Evaluation

Proposed Route of the A19 Easingwold By-pass

York Archaeological Trust
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ARCHAEOLOGICAL SURVEY
OF THE PROPOSED ROUTE OF THE
A19 EASINGWOLD BY-PASS

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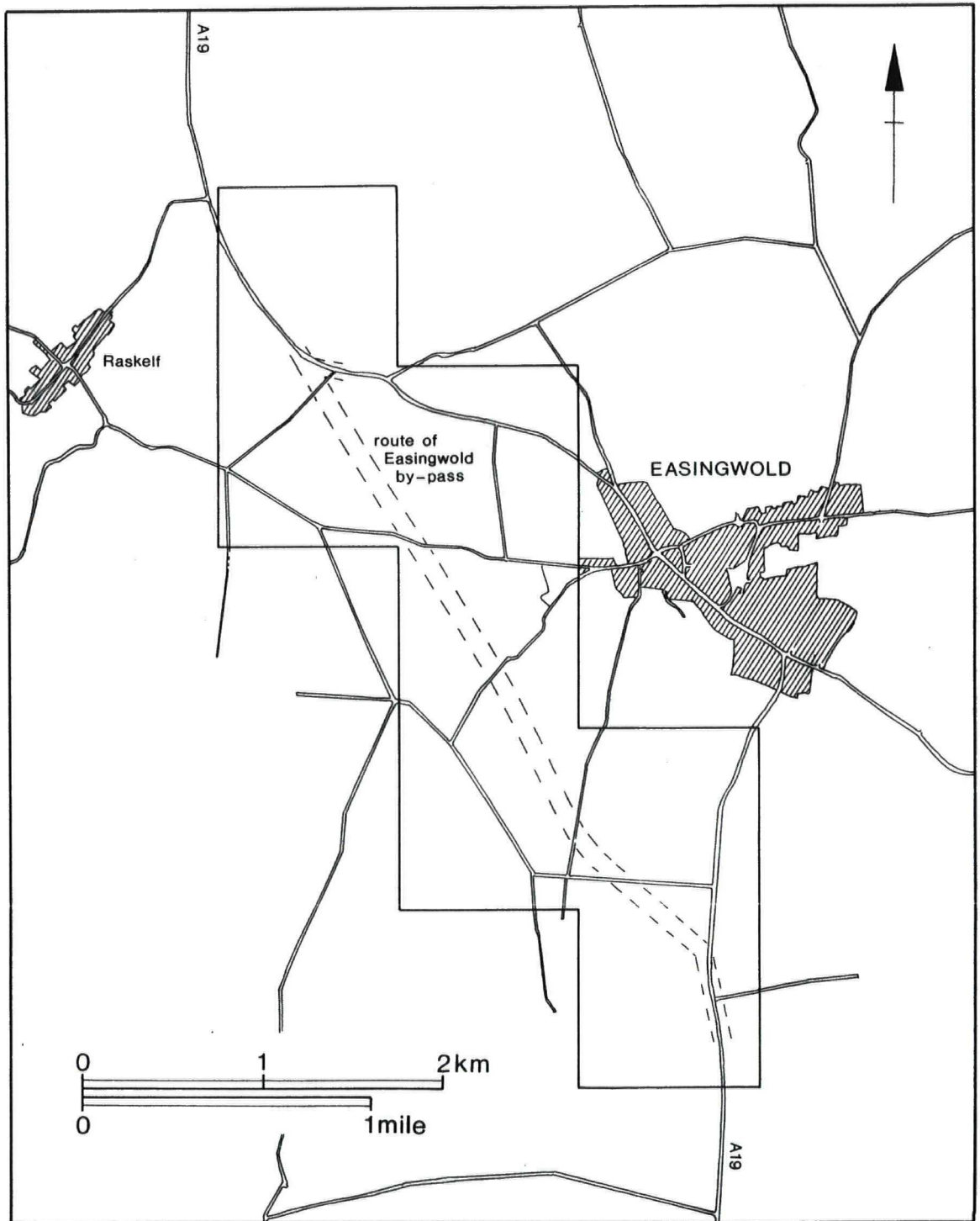


Fig.1 Location of study area

1. Introduction

1.1.1 - The proposed route of the by-pass lies to the south-west of Easingwold, its junctions with the existing course of the A19 being located at Raskelf Bridge (SE50627107) and Shires Bridge (SE52726758). The route is approximately 4.30 kms in length, the carriageway being scheduled for construction in Autumn 1993. North Yorkshire County Council recognised the need for a survey of the area which would be affected by the building of the new road and, through the offices of the Archaeology Section of the Planning Department, requested that the York Archaeological Trust conduct such a survey. The specification required the definition of the extent of archaeological deposits within a 100 metres wide 'corridor' along the line of the route; the area to be examined thus covered c.430,000 square metres.

1.2.1 - The low-lying (c.20-25m. Above Ordnance Datum), gently undulating terrain traversed by the route is typical of the Vale of York north of the city, and largely comprises lacustrine clays, sandy silts and gravelly beach deposits laid down by the periglacial Lake Humber c.14000 years ago (see Appendix 1 for a more detailed discussion of the drift geology). Topographical variation is restricted, but is nonetheless likely to have played a significant role in determining past land-use and settlement patterns. In field 6369, near the junction of the proposed route with the existing course of the A19 at Shires Bridge, a marginally elevated plateau with an area of approximately 1 hectare stands c.2.0m. proud of the surrounding landscape; the route runs north-westwards from here across largely level ground, before rising slightly over the broad, low, north-south ridge of sands and gravels in field 0025. North-west of Alne Road it skirts the southern limit and south-western edge of a low, north-west/ south-east aligned ridge, and then, crossing the slight east-west moraine which carries Raskelf Road, continues to Raskelf Bridge along the foot of a shallow south-west/north-east slope. The proposed route thus, for the most part, follows the 'grain' of the landscape.

1.3.1 - Prior to the present survey the amount of archaeological evidence from the proposed route, and indeed from the area as a whole, was slight. A number of discrete, albeit quite extensive, clusters of apparently ditched enclosures have been identified from aerial photographs in the area around Easingwold; one of these, recorded on the NYCC Sites and Monuments Record as an 'extensive earlier field system' (SMR no.3288, SE517689), is located in field 0025 and is bisected by the proposed route. In the same field, although clear of the route (SE517684), two rectilinear enclosures arranged on either side of what appears to be a trackway are listed under the same SMR number; these may represent settlement enclosures (see Fig.4). Although never investigated archaeologically, the form of these groups of enclosures has led to the suggestion that they are late Iron Age or Roman in date. An isolated length of double ditch, running east-west close to the northern limit of the study area (SE505709), extends from field 3300 as a single ditch into field 4900, where it is crossed by the route; this seems likely to have formed part of a similar complex. Apart from these sites, the

only recognisable evidence for habitation in the distant past takes the form of possibly medieval ridge and furrow, evident in field 6543 (Fig 2). No ground-based fieldwork appears to have been previously conducted on any of the land affected by the bypass. The recent report of the discovery of a ninth or tenth century silver ingot, along with a coin of Aethelred II, from '...a ploughed field near Easingwold...' (Blackburn and Bonser, 1990) may or may not be of relevance; the provenance of the finds is not disclosed for reasons of security. The publication of such information would appear to be against the wishes of the landowner, but the authors of the report should be approached before further work begins in order to confirm that the field concerned is not affected by the route.

1.3.2 - Against this background an outline programme of fieldwork was formulated and agreed with the Archaeological Officer of NYCC. Its stated aims were to map the extent of the visible archaeology, to investigate its character and to try to assess how representative that visible component is likely to be of the study area as a whole. The final aim thus addresses the question of whether archaeological phenomena are more or less susceptible to recognition in different parts of the study area for reasons which are unconnected with their original extent and/or distribution. These aims were to be addressed through fieldwalking, geophysical prospection and excavation. The evaluative proposals are incorporated in this report as Appendix 1 (below).

2. Fieldwalking

2.1.1 - Apart from the study of aerial photographs (see 1.3.1, above), the initial location of archaeological sites (or 'areas of intensive activity') relied on fieldwalking. This was subject to two constraints, most notably the amount of the study area under pasture, and thus impervious to the technique, at the time the survey was conducted. Although between Shires Bridge and Alne Road arable predominated, the fields either having recently been ploughed or carrying crops in the early stages of growth, and between Alne Road and Raskelf Road arable and pasture were evident in approximately equal proportion, the northern third of the route, between Raskelf Road and Raskelf Bridge, was entirely under grass. This undesirable situation was exacerbated by the timing of the survey; most of the fields given over to arable cultivation had already been planted, the crops often having come through, in some cases to the extent that the surface of the ground was almost completely obscured and fieldwalking therefore impossible.

2.2.1 - As a result of these constraints eight fields were selected as being in a condition appropriate for fieldwalking. All were at least partly impinged on by the route of the by-pass. The decision was taken to extend fieldwalking across the whole of any field through which the route passed, rather than restrict it to the 100m 'corridor' itself, in order to allow for the recognition of artefact concentrations close to but not actually in the path of the road (but which may relate to sites which are), and also to ensure that a significant part of the landscape through which it is to run was examined in this way; this would not have been the case had the 'corridor' been strictly adhered to. The exception to this policy was field 0025, the size of which (c.39ha) prohibited this expansive approach, and over which fieldwalking was therefore restricted to the route itself (see Fig.2).

2.2.2 - The fields chosen for walking displayed considerable variation in their state of cultivation, ranging from those which had been recently ploughed and weathered through to examples in which the crop was through to c.10 cms (Fig.3). This variation clearly affects the visibility of surface artefacts, and must obviously have implications for their recognition and retrieval, and therefore for the patterns of material shown in Fig.4. The distortions these biases may have introduced are discussed in 2.4.1.

2.2.3 - In order to cover as substantial an area as possible of the proposed route, whilst minimising the likelihood of missing artefact concentrations altogether, fields were walked on pre-surveyed grids at intervals of 50 metres (Fig.2), artefacts being attributed to longitudinal sectors 50 metres in length. All artefacts, modern or pre-modern, were collected, and the resulting data quantified, but the published distributions have, for the sake of clarity, been restricted to definitely pre-modern material. Records were also made of ground conditions and any distinctive topographical features evident in each sector. Field by field the results are summarised as follows, and should be examined in conjunction with Fig.4:

2.3.1 - Field 6369: sown and crop well through : surface artefacts extremely sparse, comprising a single sherd of Roman mortaria and a flint scraper. A slight plateau (natural, formed by a discrete deposit of lacustrine clay), raised approximately 2 metres above the surrounding landscape and with a surface area of c. 1 ha. recognisable in the south-eastern area of the field. The location of this feature adjacent to Shires Beck suggests a likely site for early settlement, in spite of the virtual absence of artefacts (see 5.5.2).

2.3.2 - Field 3900: sown and crop through : surface artefacts extremely sparse, comprising one Roman and one Medieval sherd.

2.3.3 - Field 0027: ploughed and weathered : a concentration of hand-made coarse-tempered pottery (15 sherds) from the south-western quarter, and an iron object - possibly a spearhead, bent back on itself - from the north-western corner : additionally a single Roman sherd and piece of worked flint. A slight plateau, demarcated on the west and north sides by a broad, shallow, curving depression (see Fig.5) is clearly recognisable in the central area of the field (see 2.5.1 for more detailed discussion).

2.3.4 - Field 0025: various states of cultivation (south-east to north-west); first 180m. sown and crop through; next 180m. harrowed & sown; next 180m. fallow (stubble); final 100m. sown and crop well through : surface artefacts sparse, single sherds of Roman (Huntcliff) and hand-made coarse-tempered pottery from the south-eastern part of the 'corridor', three pieces of worked flint and an unidentifiable sherd of pottery from the central/north-western area, and a single possible Roman and two post-medieval sherds from the north-western limit of the field. The artefacts thus do not cluster in any particular cultivation zone. Topographically, the field forms a broad, low, north-south aligned ridge of sands and gravels (see Fig.4), across which extends the system of ditched enclosures of SMR 3288 (see 1.3.1 and Fig.4).

2.3.5 - Field 3800a: ploughed and weathered : an even distribution of surface artefacts across the field, although apparently not extending into the south-eastern corner - primarily Roman pottery (8 sherds definitely or likely Roman, 1st-3rd centuries AD, 4 sherds possibly Roman or Medieval), also 2 Medieval, 1 post-Medieval and 1 unattributed sherd(s), as well as a single piece of worked flint. Ditches of the SMR 3288 field system cross the land unit north-south.

2.3.6 - Field 3800b: ploughed and harrowed : a complete absence of pre-modern artefacts. A marked contrast to 3800a, which is adjacent to the north. This is likely to be the result of the use of the land for market gardening, and the consequent use of a Rotavator rather than a plough for cultivation. The restricted depth to which this machine penetrates the soil means that material in the lower horizon, or in features cut into the subsoil, is not brought to the surface as it is when a conventional plough is used. Repeated use exacerbates the situation by creating a compacted lower horizon which further

inhibits the movement of artefacts towards the surface. The contrast between fields 3800a and 3800b may well, therefore, be the result of contemporary farming practice rather than any genuine difference in artefact density. Ditches of the SMR 3288 field system cross the land unit north-south.

2.3.7 - Field 5547: sown and crop through : fairly even distribution of post-Medieval sherds (8) across the field, as well as 4 Medieval, and 2 unattributable; a single piece of worked flint.

2.3.8 - Field 4373: sown and crop through : fairly even and dense distribution of Medieval sherds (46), a similarly even but less dense (18 sherds) spread of post-Medieval pottery, 2 Roman sherds near the north-eastern limit of the field and 4 unattributable sherds. Additionally a single piece of worked flint from near the north-eastern corner. This field is also the likely provenance of a Neolithic stone axe, found several years ago by the landowner, Mr R N Padget of Dawney Farm, and kindly loaned to the York Archaeological Trust for study and recording.

2.4.1 - Against a background of sparse artefact distributions three concentrations stand out. The first, and arguably by virtue of its intense localisation the most significant of these, the cluster of hand-made coarse-tempered sherds from field 0027, is discussed in more detail in 2.5.1. Additionally, however, a marked increase in the quantity of Roman pottery can be recognised in field 3800a, as well as a massive preponderance of Medieval pottery in field 4373. The possible significance of these concentrations is discussed in section 6; at this point, however, notice needs to be taken of the possible effects of differential visibility of artefacts due to crop conditions. It may not be coincidental that the first two of these concentrations were observed in fields where ground conditions most closely approximated the ideal for fieldwalking, i.e. had been ploughed relatively recently but had been exposed for a sufficiently long time for artefacts contained in the soil to 'weather out' (see Fig.3). The question of whether the relatively large numbers of artefacts from fields 0027 and 3800a are a true reflection of patterns of ancient land use, or simply testify to greater visibility, cannot at this stage be answered but must be borne in mind.

2.5.1 - The localised concentration of hand-made coarse-tempered ware in the south-eastern quarter of field 0027 led to further field walking, covering the eastern half of the field at 10 metre intervals in order to determine more precisely the limits of the pottery scatter. The results of this work are summarised on Fig.5. This secondary walking augmented the original total of 15 sherds to 58, including 8 substantial body and rim sherds. The western limit of the scatter was successfully defined, although the southern part of this edge was obscured by debris from a building demolished within the last two decades. Additionally, further pieces of worked flint were recovered, forming a distribution distinct from and in some ways complementary to that of the pottery. The amount and concentration of the material, and the size and lack of abrasion of some of the sherds, suggested

strongly that it derived from a settlement, rather than being,
for example, the result of ancient manuring.

Fig.3 State of crop in fields walked

Field	fallow	ploughed and weathered	harrowed /drilled	crop barely through	crop well through
6369					●
3900				●	
0027		●			
0025	●		●	●	●
3800a		●			
3800b			●		
4373				●	
5547				●	

3. Geophysical Prospection

3.1.1 - The role of geophysical prospection at this stage in the project was threefold; to investigate concentrations of artefacts in an effort to locate in advance of excavation the archaeological features from which they may have originated; to investigate, as a control on the surface visibility of artefacts, 'blank' areas which nonetheless appeared from a topographical point of view to be likely settlement sites; and to locate accurately elements of the already-known field system SMR 3288. This final task was considered necessary in view of the fact that the aerial photographs of 3288, themselves taken from oblique angles, were plotted at a scale of 1:10000, and that the mapped locations of the enclosures would therefore be subject to a substantial degree of error. It was therefore hoped to pinpoint the ditches to maximise the effectiveness of excavation.

3.1.2 - The work was conducted by Geophysical Surveys, whose report 91/13 is included here as Appendix 2. Magnetometer survey was adopted in order to maximise the area covered, being substantially less time-consuming than the alternative, resistivity survey. A total of 6800 square metres, that is 17 squares each measuring 20m.x 20m., was surveyed.

3.1.3 - The sites chosen for geophysical survey were the pottery scatter in 0027 (see 2.3.3 and 2.5.1 : geophysical area A), an apparent focus of SMR 3288 ditches in the centre of 0025 (see 1.3.1 : geophysical area B) and the raised plateau in 6369 (see 2.3.1 : geophysical area C). This followed closely the approach outlined in the evaluative report (see Appendix 1) and summarised in 3.1.1.

3.2.1 - The results of the magnetometer survey were largely disappointing. In 0027 the traverse, dog-legged to incorporate parts of the area of the pottery scatter (2.5.1) and the low plateau and encircling depression (2.3.3), revealed only a metal pipe (running from an iron drain cover visible in the middle of the field) and a possible east-west aligned field drain. Anomalies in the south-eastern area of the traverse, the vicinity of the pottery scatter, were caused by debris from a demolished building (2.5.1; Fig.5 : Appendix 2, A1/2).

3.2.2 - In 0025 attempts to locate components of the 3288 ditch system resulted in the traverse being extended beyond the limit of the 100m. 'corridor' (Figs 2, 10). This was due to the appearance, in the extreme south-eastern corner of the original 60m.x 20m. survey, of a clearly recognisable anomaly. Expanding the coverage around this revealed an apparently subcircular formation with a contiguous element extending away towards the south-east (Appendix 2, B1/2). This pattern did not correspond closely with the arrangement of any of the ditch intersections which were anticipated as falling within the area of the magnetometer survey (Fig.10), and was c.40 metres to the south-west of their plotted positions. However, it was felt to be likely that the anomaly did represent part of the field system, the fact that it was incongruent with the aerial photographic plots being due to the magnetometer detecting more than was visible from the air, and its unexpected position simply testifying to the inevitable inaccuracy caused by the plotting of

oblique aerial photographs onto small scale maps (see 3.1.1).

3.2.3 - A 100m.x 20m. traverse across the low plateau in 6369 detected a small number of discrete anomalies. Although the geophysical survey report (Appendix 2) suggests that these may be responses to magnetic stone or deeply buried ferrous metal, their linear distribution suggests that they may be features (for example shrub- or post-holes) associated with a former field boundary.

3.3.1 - Although apparently successful in isolating a component of the SMR 3288 field system in field 0025, the absence of any features in 0027 which might be associated with the pottery scatter was puzzling, and made evaluation of the results (or lack of them) from 6369 impossible at this stage.

4. Excavation

4.1.1 - It was originally intended that excavation strategy would be guided largely by the results of the geophysical survey, characterising and recovering artefacts from features recognised in this way, with the possibility of using small sondages to compare ploughsoil artefact densities within and between sites in a way not subject to the vagaries of the state of cultivation and recognition of surface objects (see Appendix 1, 3.3, and above, 2.4.1). The latter, it was hoped, would provide some indication of how intensive activity on any given site had been.

4.1.2 - With the exception of the anomaly in 0025 (3.2.2), however, geophysical survey had failed to locate any features. The marked concentration of pottery in 0027 clearly merited investigation, notwithstanding the blank drawn by the magnetometer, but this fact meant that excavation was not only required to characterise and recover artefacts from features, but to locate those features in the first place. Tactics, therefore, had to be altered, resulting in larger single units of excavation than was originally envisaged (Fig.5). It was intended to excavate both within the area of the pottery scatter and beyond it to the west, in particular to investigate the very slight plateau, a seemingly likely site for the location of structures, and to see whether the curving depression which delimited it was a natural feature or an enclosing ditch. A possible 'model' for the site was tentatively borne in mind. This saw the pottery scatter indicating areas used for rubbish disposal (including pits and ditches), with the slight plateau to the west, largely devoid of material, carrying the structures of the inhabited area, the whole being enclosed by a substantial curving ditch to the west and north.

4.2.1 - Work in 0027 began with the excavation of two 2m.x 2m. squares, Areas 38 and 39 (Fig.5). In the process of excavating these it became clear that the tiny quantities of artefacts retrievable from the ploughsoil in such small units rendered any thoughts of quantitative comparability redundant. Whilst Area 38 revealed nothing other than plough-scarred natural below a depth of c.40 cms of ploughsoil, Area 39, having been extended to the east by 1 metre, proved to straddle a north-south aligned ditch (3910), approximately 1 metre wide and 25 centimetres in depth (Fig.6 : Plate 1), from the fill of which were retrieved four small sherds of hand-made coarse-tempered pottery.

4.2.2 - Areas 40 and 43 (Fig.5) were respectively located on the rim of the low plateau and in the base of the curving linear depression immediately to the west. The former was intended to test for any structure (for example a palisade) on the edge of the level ground, the latter to see whether the depression was the result of an infilled ditch. Both results were negative, although a narrow east-west aligned field drain was located in Area 40. On present evidence, therefore, the subtle but distinct topographical variation within field 0027 would appear to be entirely natural.

4.2.3 - The discovery of 3910 seemed to provide a possible explanation for the apparently narrow and linear distribution of the

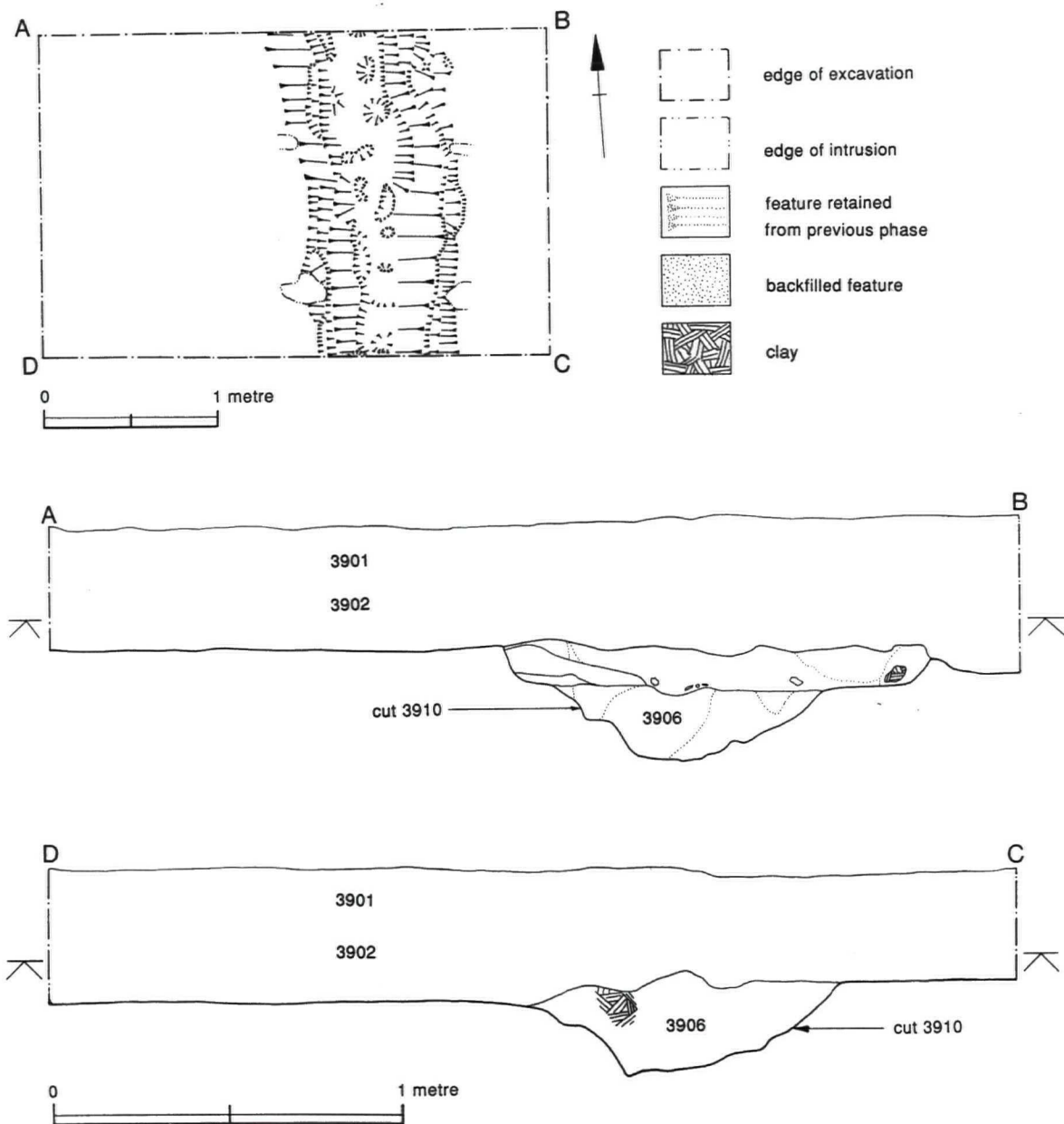


Fig.6 Area 39: plan and north and south facing sections

pottery scatter in field 0027, namely that all or most of the surface material had been disturbed from that single ditch fill by the plough, much of the original depth of the feature having been denuded by subsequent cultivation. This, of course, presupposed that 3910 extended over a considerable distance. In order to test this suggestion two 10m.x 1m. excavations (Areas 41 and 42, Fig.5) were located across the extended line of 3910, with most of the length of Area 41 lying to the east of that line and most of that of Area 42 to the west. It was hoped that, if 3910 did prove to be an extensive boundary, it would be possible to determine on which side of that division the activity which produced the pottery found on the surface had taken place. In the event this hypothesis proved to have no subsequent value, and the respective sequences in Areas 41 and 42 are discussed separately, but it was instrumental in determining the locations of these two excavations.

4.2.4 - It became clear as soon as the ploughsoil had been removed from areas 41 and 42 that no ditches on the line of 3910 were in evidence, and that the feature was less extensive than had been anticipated. Areas 41 and 42 nevertheless provided unambiguous indications of the source and context of the pottery. The evidence from the excavations will be discussed in turn. It should be noted that the phase numbers (I,II,III) relate only to individual trenches, and do not imply any site-wide correlation.

4.3.1 - The earliest feature in Area 41 was a north north-east/south south-west aligned 'U'-profiled ditch 4118 (Figs 7/I & 9a : Plate 2), approximately 0.80 metres wide and 0.40 metres deep, located towards the eastern limit of the excavation. Comparable to 3910 (4.2.1) in profile and dimensions, it probably simply defined an area of land, and possibly also served to improve drainage; like 3910 its fill contained a few small sherds of hand-made coarse-tempered ware. The rather amorphous feature 4127 has been attributed to this phase on the basis of its stratigraphic relationship with 4121, which is analogous to that of 4118 with 4114.

4.3.2 - After 4118 had been backfilled (largely the result of silting), a north-east/south-west aligned steep-sided slot (4114) with post-impressions in its base and sides was cut through the backfill 4117 (Figs 7/II and 9a : Plate 3). The alignment of this feature betrays a slight curve, bowing outwards slightly to the south-east. Some 3.5 metres to the west a feature of similar characteristics and dimensions, 4121 (Figs 7/II & 9a), was excavated, this being aligned north-west/south-east and bowing outwards to the south-west. Viewed together (Fig.7/II : Plate 4) the two features can be seen as arcs of a circle with a diameter of c.4.5 metres, its central point being approximately 0.60m. north of the excavation. They therefore appear to be segments of the wall-trench of a roundhouse, a structure which was clearly erected after the ditch 4118 had ceased to function.

4.3.3 - Modifications to 4114, the eastern segment of the wall, are clearly evident. The original wall posts appear to have been removed, 4114 backfilled (4110), and new posts inserted with their bases at a slightly higher level (4111 : Fig.9a). The post-impressions, however, extend only c.0.40m. north-eastwards

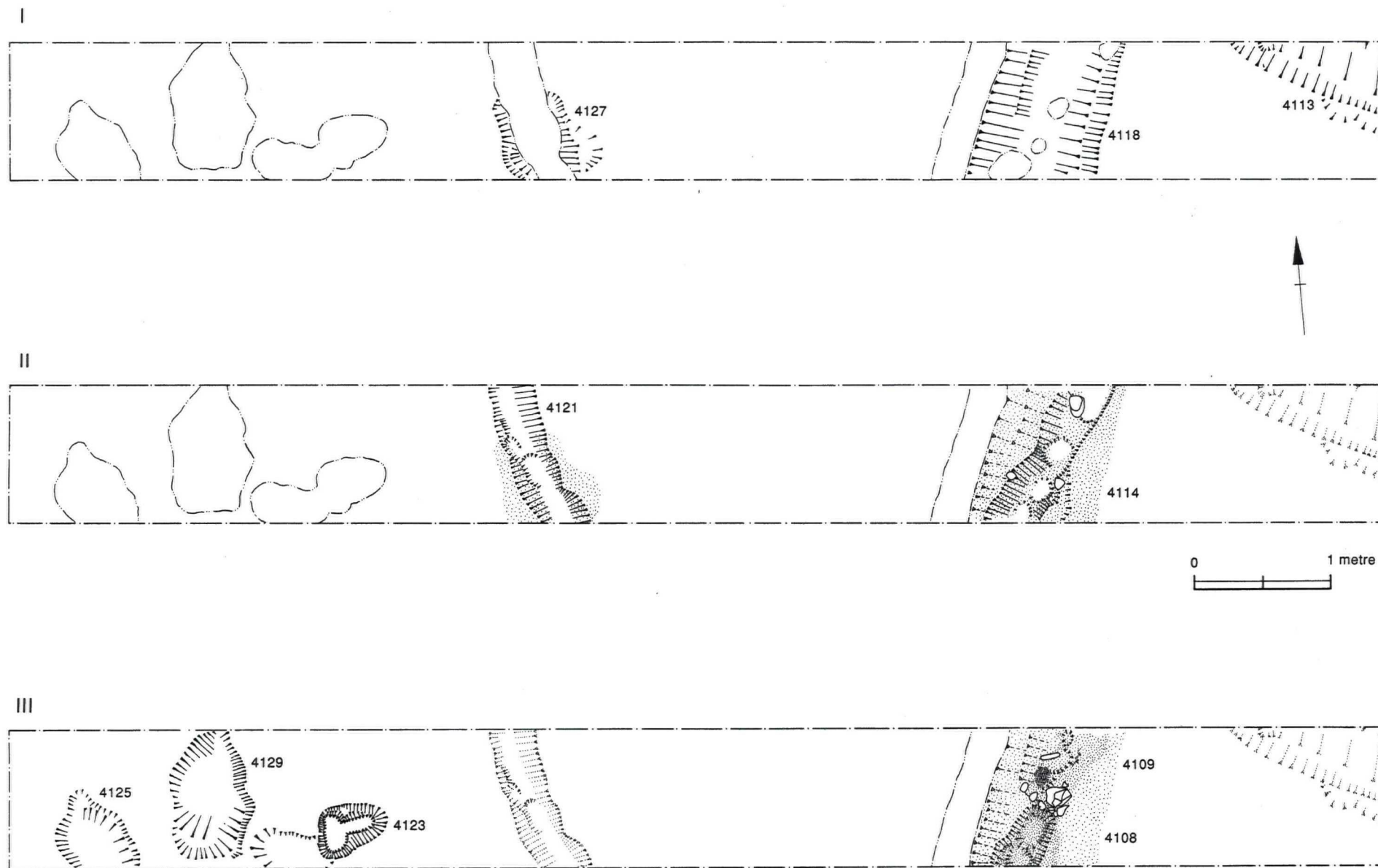


Fig.7 Area 41: north-south aligned ditch (I) succeeded by construction (II) and subsequent modification (III) of round-house

from the southern section of the excavation before terminating against tightly-packed cobbles and fragments of sandstone (Fig.7/III). From this point this secondary wall ceases and the base of the modified feature is formed by the top of the backfill of 4114 (Plate 5). It is suggested, therefore, that the wall is interrupted at this point, and that the area between the north-eastern limit of 4111 and the northern edge of Area 41 (Fig. 7/III) formed part of a small 'causeway', inserted over the former line of the wall-slot 4118, and thus indicating the creation of a new entrance to the structure.

4.3.4 - To the west of 4121 three features, 4123, 4125 and 4129 (Fig.7/III) were excavated. Of these 4123 seems certain to have been a post-socket and to represent part of a structure; the other two are amorphous and their function is unclear. Although stratigraphically disconnected with the ditch/roundhouse sequence, and thus potentially contemporary with any of the phases, they have been attributed to the end of the sequence due to the fact that their respective fills, 4122, 4124 and 4128, largely consist of re-deposited natural. This links them with the dumped deposits 4103, 4104 and 4105 (Fig.9a) which, together with 4120 and 4107, post-date the roundhouse. The three features seem most likely, therefore, to be contemporary with the latest phase or later than it altogether. The dumping episode which succeeds them is in itself significant, in that it implies a phase of activity otherwise unrepresented in Area 41, and one which suggests major and deliberate modifications to the site.

4.4.1 - Area 42 proved to have been located so as to cross obliquely the line of a north-east/south-west aligned ditch (4235 : Figs 8/I & 9b : Plates 6 & 7) of substantial proportions; about 2 metres wide at the top, with a depth of c.0.70, and with a deeper, rectilinear component at the base of the south-eastern edge (Fig 8/I). Its purpose is unclear, but it can hardly have been anything less than a major land division, possibly in some respects defensive and certainly defensible. After having been partially filled (4232), probably in large part the result of natural accumulation, it appears to have been re-cut along a similar alignment (4231 : Figs 8/II & 9b : Plate 8). 4222 (Figs 8/III & 9b : Plate 9) may be another re-cut; however, the shift in the axis of the ditch closer to true north-south suggests that it may be a later and quite distinct feature, indicating a change in the layout of the site at this point. The fills of these various phases of ditch produced a number of sherds of hand-made coarse-tempered pottery, including a near complete profile.

4.4.2 - To the west of the 4235 ditch complex a north-east/south-west aligned slot, slightly curved and bowing outwards to the south-east (4207 : Fig.8/I : Plate 10), was excavated. Approximately 0.70m. wide and 0.20m. in depth, and with a shallow 'U'-shaped profile (Fig.9b : Plate 11), it is suggested that, although differing in a number of ways from 4114 and 4121 (compare Plates 3 and 10), the curving plan form and the possible faint traces of post-impressions in the side of the feature (Fig.8/I and Plate 9; these are analogous to characteristics of 4114, see Fig.7/I, Plate 3 and 4.3.2) indicate that 4207 is also a segment of the wall trench of a roundhouse. The uppermost fill of this feature (4202 : Fig.9b) contained a



Fig.8 Area 42: substantial north-east/south-west aligned ditch and associated structure (I) and subsequent re-cuttings of major ditch (II, III)

Fig 9 North facing sections of (a) Area 41 and (b) Area 42.

Figure bigger than A3, removed for scanning. See original report.

number of sizeable sherds of hand-made coarse-tempered pottery.

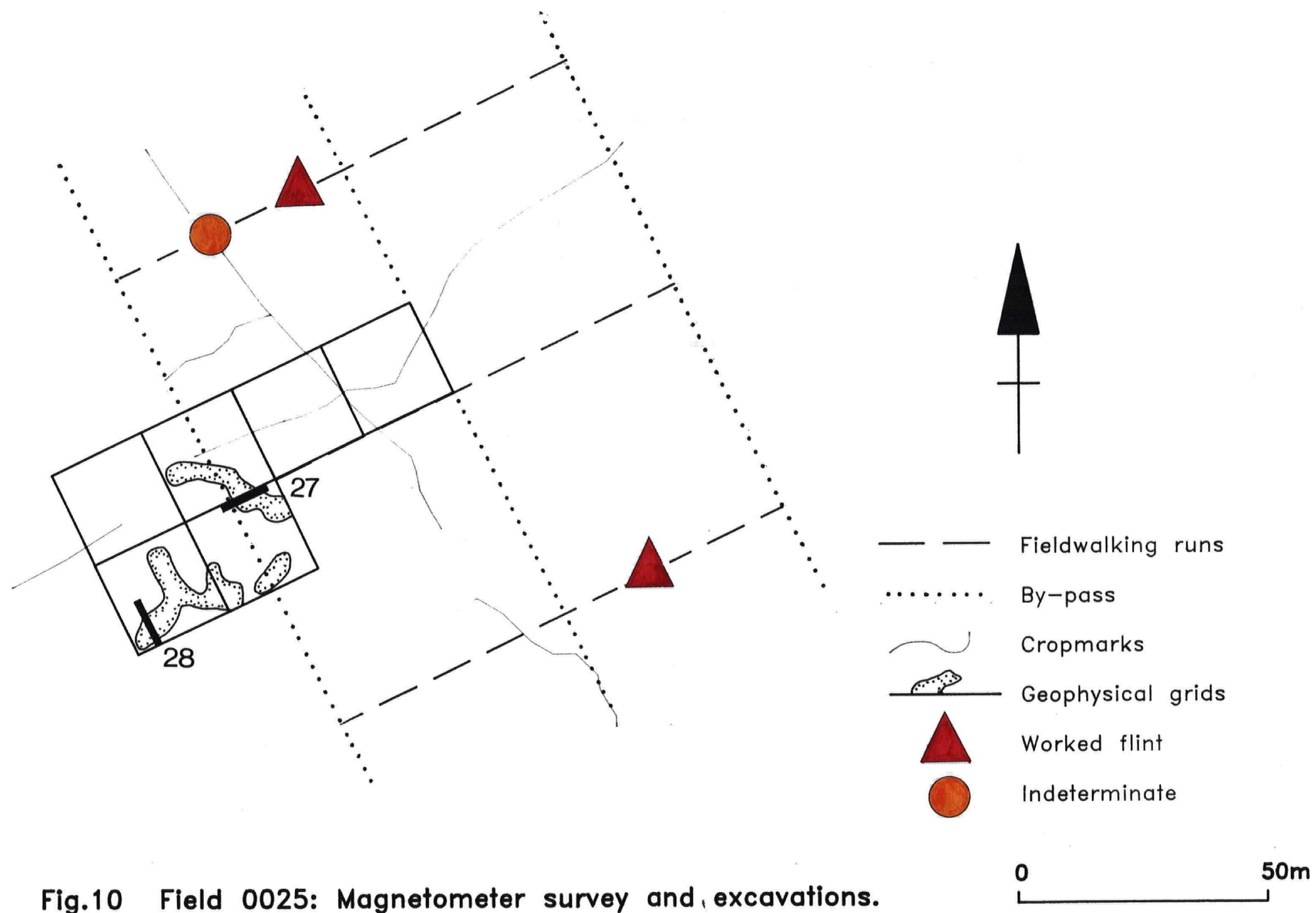
4.5.1 - It is clear from the evidence presented above that the western part of field 0027 contains traces of former land divisions and structures, falling into at least two recognisable phases. The pottery which is spatially and stratigraphically associated with these features indicates the considerable antiquity of this activity (see 4.5.2). Although it is not known whether the settlement (and the evidence of at least one and possibly two roundhouses clearly justifies the term) is limited in extent to the area of the surface finds (Fig.5), even if this is the case the site would appear to extend over c.1 hectare (10,000 square metres), all lying directly on the proposed route of the by-pass.

4.5.2 - The hand-made coarse-tempered pottery found in some quantity in 0027 (c.100 sherds from fieldwalking and excavation) has been examined by Terry Manby of Doncaster Museum. He comments that the fabrics and forms recognisable in the assemblage as a whole are consistent with an Iron Age date, possibly extending back into the late Bronze Age. The roundhouse(s) certainly rest comfortably within an Iron Age context.

4.5.3 - Comparison of the excavated features (Figs 5, 6, 7 and 8) with the results of the magnetometer survey (3.2.1 : Appendix 2 A1) clearly indicates that the technique was in this particular case ineffective. This casts some doubt on the status of the largely negative results obtained in field 6369 (3.2.2). The outcome of the field 0025 survey is discussed below (4.7.1).

4.6.1 - Excavation in field 0025 was intended to locate and characterise part of SMR 3288, the system of ditches recognisable from aerial photographs (1.3.1). To this end excavations (Areas 27 and 28) were carried out across the geophysical anomalies located by the magnetometer, thought to represent a part of that system (3.2.2 : Fig.10 : Appendix 2 B1/2). The results from Area 27 are summarised in Plate 12. The only 'archaeological' features encountered were two modern field drains (Fig.11). As can be seen from Plate 12, however, the natural subsoil in this area is extremely variable, ranging from loose, relatively coarse white sand to finer, more compact, dark brown sand apparently incorporating a substantial amount of iron pan, the former overlying and filling hollows in the latter. Although exact correlation between the anomaly and the varying configurations of the natural subsoil is not obvious (not least because of the narrowness of the excavated area) this does seem to be the most likely explanation. What is clear is that the anomaly was not caused by ditches or the result of any other human activity. It is worth noting that the more northerly of the two modern field drains (Fig.11) can be recognised on the geophysical plot B1 (Appendix 2) in the appropriate position, indicating that Area 27 was accurately located and did indeed cross the anomaly.

4.6.2 - Area 28 (Fig.10) was excavated to the level of the natural subsoil, revealing a similar picture to that encountered in Area 27. It was, however, impossible to investigate this in more detail due to overwhelming problems with groundwater following snow-melt and heavy rain (Plate 13).



4.7.1 - The absence in Area 27 of any features corresponding with the geophysical anomaly (Fig.10 : Appendix 2 B2) requires explanation. Three possibilities present themselves. Firstly, it is possible that the plotted positions of the cropmarks are inaccurate (see 3.1.1) to the extent that the geophysical survey, the grid for which was laid out across them, actually missed the features on the ground altogether. Secondly, it may be argued that the cropmarks themselves represent not systems of ditches but variations in the natural subsoil similar to that in Area 27. This can on the whole be discounted, the apparent regularity of the cropmark, as well as the lack of congruence between any part of it with the geophysical anomaly, suggesting that the two are separate phenomena. The favoured explanation is that, as in field 0027 (4.5.3), the subsoil was largely unresponsive to the technique.

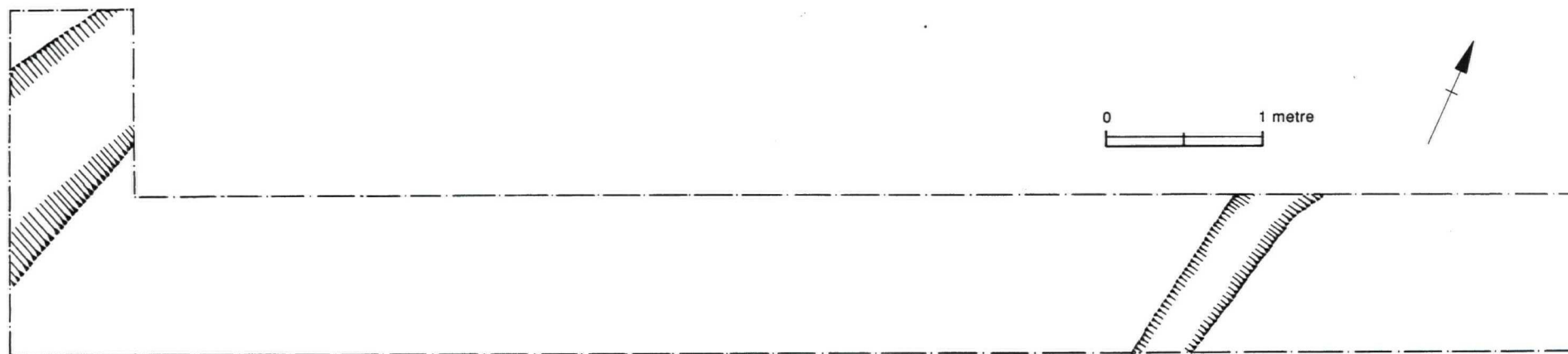


Fig.11 Area 27: modern field drains

5. Conclusions

5.1.1 - The evidence for ancient settlement and land use along the proposed route now comprises aerial photographs and material recovered from fieldwalking and excavation. The latter will be discussed in greater detail below (5.4.1), being prefaced by consideration of the likely significance of patterns which can be recognised in the aerial and field survey data.

5.2.1 - Although this remains unconfirmed by excavation (4.6.1), the formal characteristics of the cropmark SMR 3288 (1.3.1) are strongly reminiscent of a ditched field system. No features which obviously indicate habitation can be discerned in this complex, although it is possible that traces of structures (likely to be similar to those encountered in field 0027; see 4.3.2) may be too slight to form cropmarks. More definite conclusions can be reached concerning the extent of this land organisation. Examination of the distribution of cropmarks indicates that they are restricted to subsoil described by the Geological Survey as 'sands and gravels', distinct from the surrounding till and lacustrine clay and silts. The correlation between the cropmarks and this type of subsoil is so exact (Fig.5) as to indicate a direct relationship between the two. This may be the result of preferential use of land, enclosure being restricted to possibly better drained, more gravelly subsoil. Alternatively, and arguably more likely, the correspondence may reflect the fact that cropmarks form more readily on such subsoil than on the surrounding sand and clay. This interpretation is favoured for two reasons. Firstly, working in field 0025 provided no indication that, in the present day at least, this type of subsoil is particularly well drained (Plate 13). More significantly, the features excavated in 0027 (4.3.1 - 4.4.2), a field which lies off the edge of the sands and gravels (Figs 4 and 5), appear never to have been recognised and photographed from the air, although the field has been under grain crop on a number of occasions over the last fifteen years (*pers. comm.* Mr R N Padget). It would appear, then, that the restriction of cropmark field systems to a particular type of subsoil reflects not their original distribution and extent, but the effects of that subsoil in rendering features visible from the air. This has significant implications when considering the archaeological effects of road construction, as it indicates that such land divisions almost certainly cover a greater area than that over which they are at present visible.

5.3.1 - The distribution of artefacts recovered from fieldwalking is presented in Section 2, in particular 2.4.1, and in Fig.4. Before discussing the recognisable concentrations, however, it is necessary to mention the characteristics of the background distribution. This comprises, in fields 6369, 3900, and 0025, very sparse sherds of pottery of all periods, and in these fields and 0027, 3800a, 5547 and 4373 similarly infrequent pieces of worked flint. In neither of these cases can the distributions be seen as indicators of concentrated activity, most probably owing their provenance to re-deposition through manuring. This can perhaps be said with less certainty in the case of the flintwork than the pottery, given that earlier prehistoric 'sites' are

likely to have covered smaller areas and may thus be less susceptible to recognition at 50m. spacings (see 5.5.2). Also of relevance to the discussion of flint and earlier prehistoric material is the Neolithic stone axe (2.3.8) provenanced to 4373. This is of fine-grained sandstone, linking it with a small group of similar axes known from the western edge of the Vale of York and Nidderdale (Keen & Radley, 1971). A number of axes of different materials is recorded from an area about 1.5kms to the west (SE496702) (Radley, 1974). Whether these are indicative of settlement is however debatable, the context of deposition of such objects being far from clear, and not necessarily being directly associated with areas of habitation (Bradley, 1984).

5.3.2 - The most striking feature of the overall distribution is the concentration of post-prehistoric material in fields 3800a, 5547 and 4373 (Fig.4). In the first of these the pottery is primarily Roman; in the other two preponderantly Medieval and post-Medieval. In spite of the reservations expressed in 2.4.1, the clustering may provisionally be seen as indicative of a concentration of activity in the locale. The likely focus for this is provided by the natural, sulphurous spring known as Spa Well (SE51476955). Whether the respective concentrations of Roman and Medieval pottery are direct indicators of the positions of former settlements or, as is more probable, they reflect material introduced into the fields around such sites, it is likely that the slight eminence in the lee of which Spa Well is situated attracted settlement in both periods. Although the route skirts this higher ground (1.2.1), it is possible that outlying inhabited areas may be affected by the road construction in this vicinity. Around Spa Well itself (now a muddy patch in field 5358, c.60m. north-west of the north-western boundary of 5547), digging carried out to clear the spring has in the past revealed stone-surfaced hardstandings (*pers.comm* Mr L A Judson), although these may of course be of relatively recent date. As the by-pass 'corridor' passes within 30m. of the spring, traces of past activity which may have occurred around and been associated with it could be impinged upon at this point.

5.4.1 - The quantity, extent and character of the pottery scatter in 0027 have been discussed (2.5.1, 4.5.1/2), and excavation has proved that the material derives from a settlement (4.2.1 - 4.4.2). Judging from the scale of the ditch 4235 (4.4.1 : Fig.8/I), some of it at least was enclosed for at least part of its duration. More detail as to its precise character is contingent upon further work, but enough has been identified to indicate the potential and the possible significance of the site. Most striking is its location, on the lacustrine deposits which form the base of the northern part of the Vale of York. The known distribution of prehistoric material in the area, including that of the Iron Age, the period to which this site probably belongs, is very largely peripheral to the Vale, favouring the rising ground around the edge of the basin with its lighter, better drained soils (Radley, 1974, Figs 1-3 : Challis & Harding, 1975, Figs 93/4, 98). A habitation site at c.25m. AOD, close to the centre of the Vale, represents an aspect of Iron Age settlement never previously investigated. Understanding the character and extent of such activity in this lowland area is crucial, in order to complement the far more widely recognised evidence from the

surrounding uplands of the Pennines and the North York Moors.

5.5.1 - Although little tangible evidence for activity beyond the Iron Age and Roman periods was recognised, a brief resume of the factors (other than the absence of such activity) which may account for this is required.

5.5.2 - The earlier (pre-Iron Age) prehistoric. It has been suggested that the sparse distributions of worked flint (Fig.4) are unlikely to be indicative of settlement or other intensive activity (5.3.1). However, the absence of sources of flint local to the Vale, and the consequent scarcity of the substance, may lend a greater significance to the find-spots than would be the case in areas where it was more immediately available. Other indicators of settlement may, for different reasons, be similarly elusive. Amongst the pottery retrieved from the excavations in 0027 were a number of sherds of coarse, untempered pottery, apparently fired at a very low temperature and thus extremely fragile. It is clear that, in ploughsoil, this material would be degraded to such an extent that the recognition of the tiny surviving fragments on the surface, especially in less than ideal conditions, would be difficult if not impossible. This may be of particular relevance to the slight plateau in field 6369 (2.3.1). There are, then, extreme difficulties in interpreting the apparent absence of earlier prehistoric material. However, as field 0027 produced both a low density flint scatter and the kind of fragile pottery described, as well as the more substantial Iron Age material, excavation here (6.2.1) would allow these problems to be addressed.

5.5.3 - Anglo-Saxon and Anglo-Scandinavian. No material whatsoever attributable to this period was recovered during the survey.

5.5.4 - Medieval. Apart from the concentration of material in 4373 (Fig.4 : 2.3.8), and the ridge and furrow in 6543 (1.3.1) no tangible traces of Medieval settlement were encountered. In particular the absence of earthwork sites suggests that no structural components of the Medieval landscape will be affected. The 4373 concentration is considered most likely to be the result of re-deposition through manuring, from a settlement on the slight ridge above Spa Well, than to be a direct indication of an inhabited site (5.3.2).

5.6.1 - Attempts to address changes in local settlement pattern using evidence from such a restricted study area are, inevitably, prey to the absence of comparable data from beyond its arbitrarily defined limits. Nonetheless, certain basic trends may be recognisable. The distributions of Iron Age and Roman material appear largely complementary rather than coterminous (Fig.4), possibly indicating a shift in settlement focus. The (undated) rectilinear enclosure close to the southern edge of 0025 (Fig.4), and less than 500m. from the site in 0027, may be of relevance here, its form suggesting a possible Romano-British date. If this is confirmed, the conformity of its alignment with the adjacent stretch of modern Crankley Lane may suggest that the origins of that road are of comparable antiquity. The enclosure is, however, beyond the limit of the 100m. 'corridor' to be affected by road

construction.

6.Recommendations

6.1.1 - The results of the survey thus raise five issues which should be investigated through further fieldwork;

- a) the character and extent of the Iron Age settlement in field 0027
- b) more detailed understanding of the field system indicated by SMR 3288
- c) the possibility of a focus of Roman activity in the vicinity of Spa Well
- d) the full extent of the land organisation represented by SMR 3288
- e) the relationship, temporal and spatial, of settlement foci to that land organisation.

It is proposed that the first three of these be examined through work conducted prior to the road's construction, the other two by integrating data from that work with the results of a continuous watching brief conducted whilst road construction is in progress.

6.2.1 - The Iron Age pottery scatter in field 0027 covers an area of c.1 ha. (10,000 square metres). It is uncertain, however, whether this can be equated with the full extent of the settled area within that field. Initially, therefore, it is proposed to machine excavate a number of 50m.x 2m. strips to the level of the natural subsoil, cleaning these by hand to determine whether archaeological features are in evidence. Twelve such strips are envisaged, located in the area of the pottery scatter, to the north-west where the route continues across 0027, and in the field(s) immediately to the south of Crankley Lane on which the route impinges. It should in this way be possible to determine the extent of the settled area threatened by road construction. From this position a more informed strategy of excavation can be implemented, and areas machine-cleared accordingly. Provision should be made for the excavation (including the preliminary trenching) of a total area slightly greater than that of the pottery scatter - about 12,000 square metres - if satisfactory conclusions as to the extent, form, character and development of the settlement are to be drawn.

6.2.2 - Examination of the field system SMR 3288 first requires that the plotted pattern be located accurately on the ground. The failure of the magnetometer survey to detect these features suggests that this may best be achieved by a similar operation to the preliminary trenching outlined for 0027 (6.2.1), using 3-4 similar units. Once this is established, the selective excavation of ditch junctions, and the sampling of the internal areas of selected enclosures (in units of 10-20 square metres) should recover data to address the questions of date, possible changing

morphology and the function(s) of the enclosures (see 5.2.1). A total excavated area of c.3000 square metres is envisaged.

6.2.3 - Although the nearest concentration of Roman pottery to Spa Well is in field 3800a (see Fig.4), it is thought likely (5.3.2) that this represents material re-deposited through manuring, and that the likely source for this is a settlement focus around Spa Well itself. As the route passes close to the spring (5.3.2), trial excavations should be conducted along this stretch. Initial small (c.2m.x 2m.), hand-dug units, followed by machine trenching if appropriate (most of the fields in the vicinity appear to have been permanently under pasture, with the consequent possibility that they contain relatively undisturbed stratification). Up to c.100 square metres (including machining, if any). Contingency in case Spa Well does prove to be a settlement focus c.400 square metres.

6.2.4 - In order to examine the full extent of the land division indicated by SMR 3288 (5.2.1), and the relationship of the recognised settlement foci to those divisions, a watching brief to be conducted in conjunction with the construction of the road is proposed. This should involve the clearance of sections of the route by the main contractors sufficiently in advance of construction to allow a small archaeological team to survey and record the positions of any major, clearly pre-modern land boundaries. Excavation would be minimal, the main purpose being to monitor the extent of the field systems free from the biases caused by heterogeneous subsoils, pasture and crop variation. This should be conducted over the entire route.

7. Costings

7.1.1 - It is estimated that the excavation detailed under 6.2.1 would require a team of fifteen excavators plus support staff and supervision. About two weeks would be required to complete the investigatory trenching, with a further eight weeks for area excavation if structures are located as predicted. The estimated weekly cost of keeping a team of this size in the field is £9500, to which should be added the once only total cost of £3000 to cover both clearance and reinstatement.

7.1.2 - Excavation proposed under 6.2.2 and 6.2.3 could proceed in tandem with 6.2.1, in which case the additional costs incurred could be kept to a minimum and would be significantly less than the £23750 and £3200 suggested by a simple calculation based on the area involved. The weekly cost of a watching brief team of four (6.2.4) would be of the order of £2000 plus expenses.

7.1.3 - Precise costings for the production of a report up to but not including publication are most difficult to predict in advance of excavation. However, the types of material identified during evaluation suggest that analysis will largely be confined to stratigraphy, pottery and environmental samples, and that this could be completed within approximately six months at a cost of £30000 - £40000. All estimates have assumed that complex archaeological stratification will be found; if significantly less than has been predicted is encountered a commensurate reduction in the cost of work can be expected.

No allowance has been made for compensation or VAT in the above estimates.

7.2.1 - The primary significance of this survey lies in the fact that it is the first on-the-ground examination of the archaeology of the northern part of the Vale of York. Its results thus indicate an opportunity to research a major lacuna in our knowledge of prehistoric and Roman settlement in northern England. Additionally, the proposed programme of fieldwork would provide a far more secure basis for evaluation of the archaeological potential of areas of this lowland zone which may be threatened in the future. It is an opportunity which should be taken.

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PLATES

Scale = 0.50m in all cases.

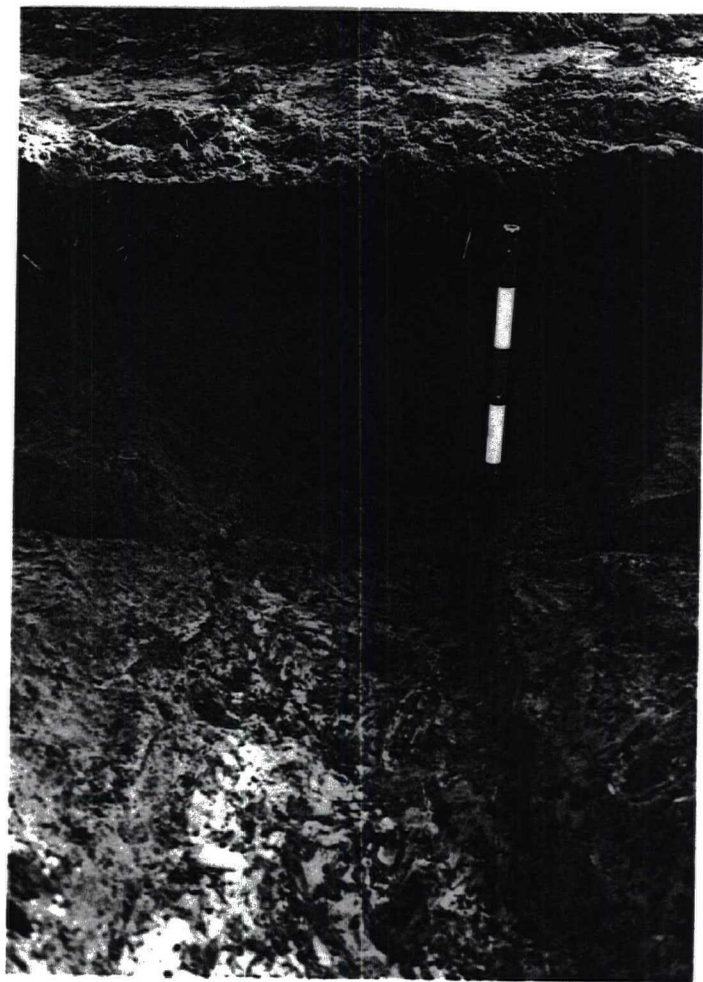


Plate 1 Area 39: profile of ditch 3910

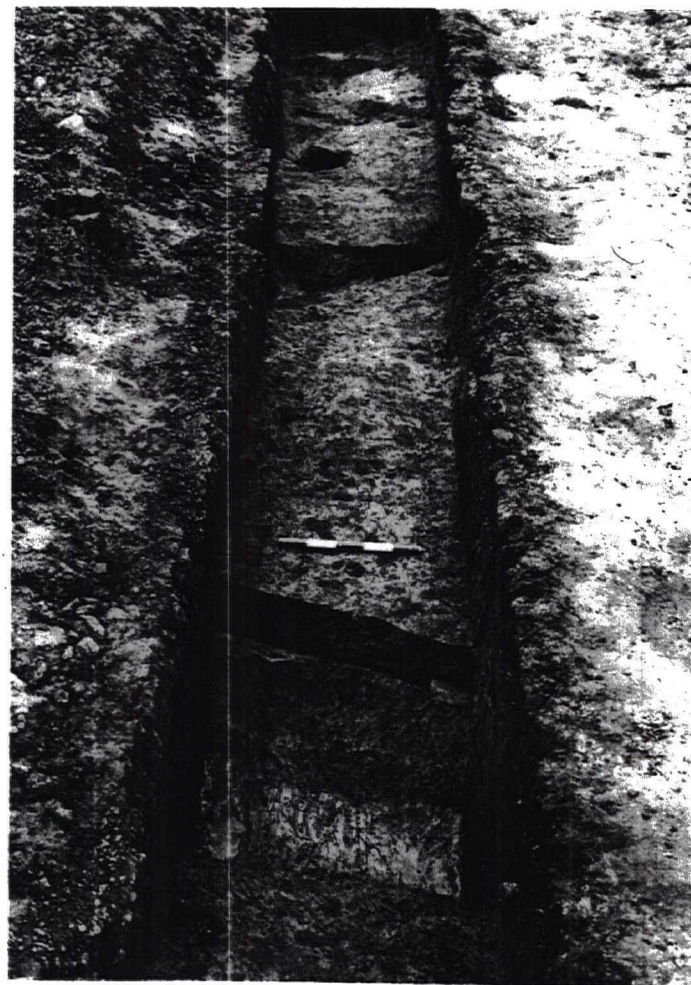


Plate 2 Area 41 from the east: original ditch 4118 in foreground

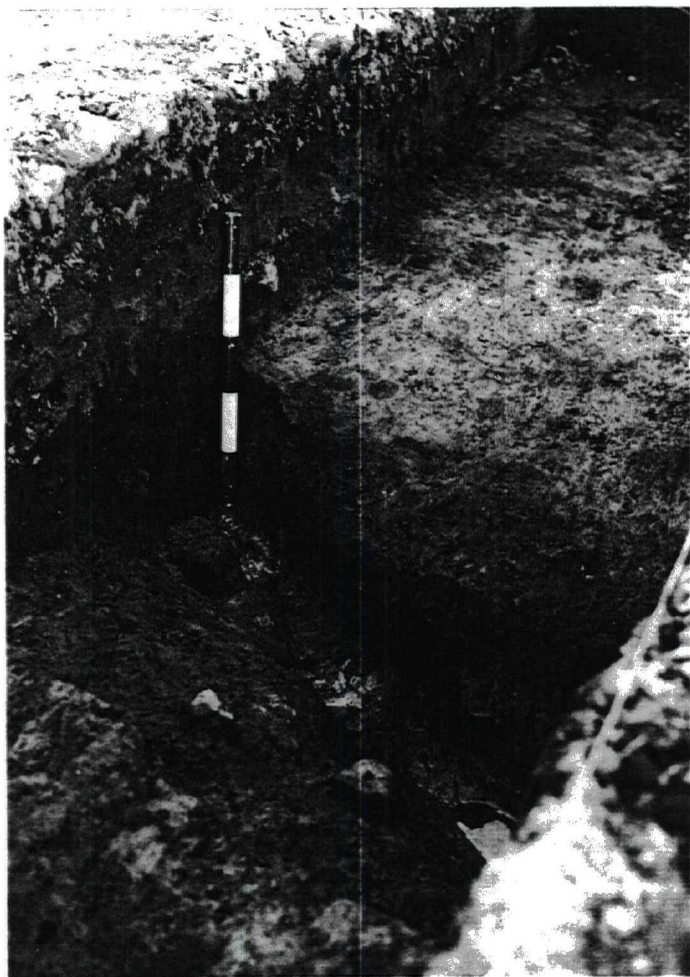


Plate 3 Area 41: profile of post-in-trench slot 4114



Plate 4 Area 41 from the east: post-in-trench slots 4114 (foreground) and 4121

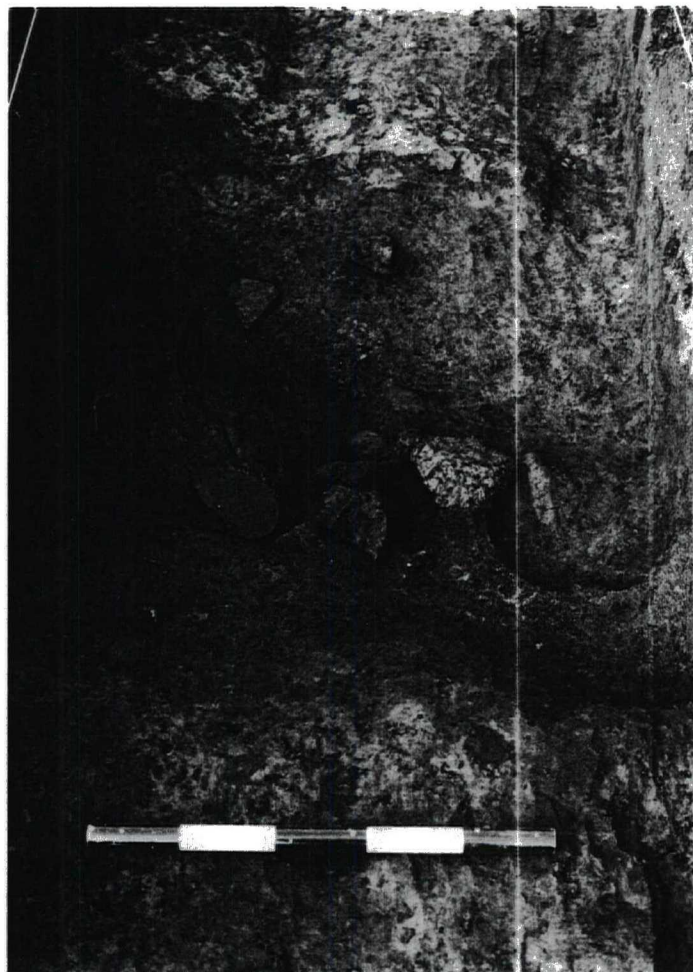


Plate 5 Area 41: re-modelling of 4114, involving the interruption of the post-in-trench wall by an ?entrance 'causeway'

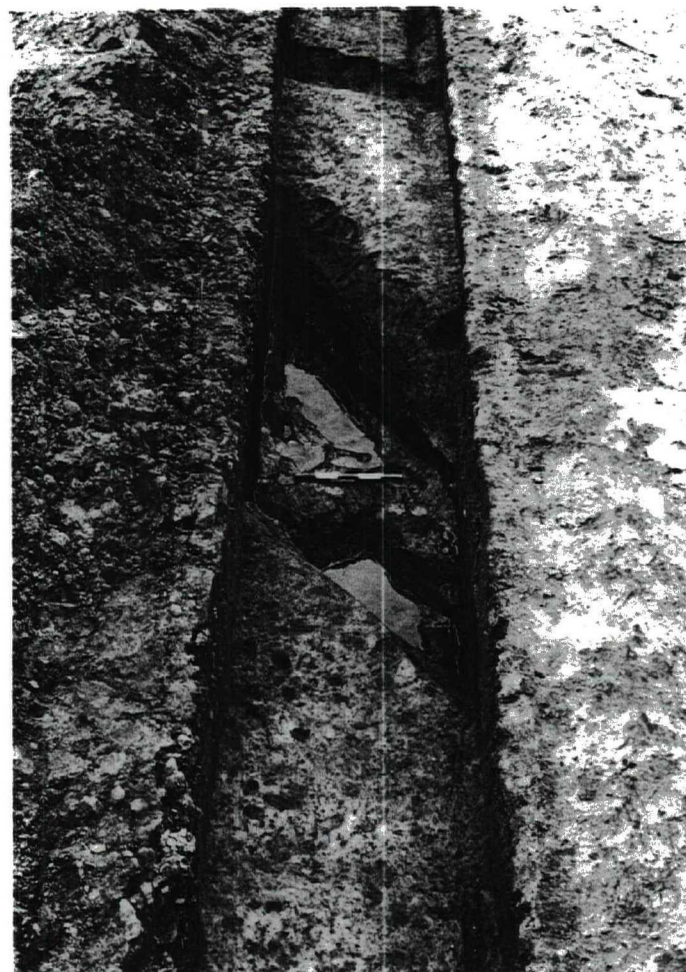


Plate 6 Area 42 from the east: major ditch 4235



Plate 7 Area 42: profile of 4235

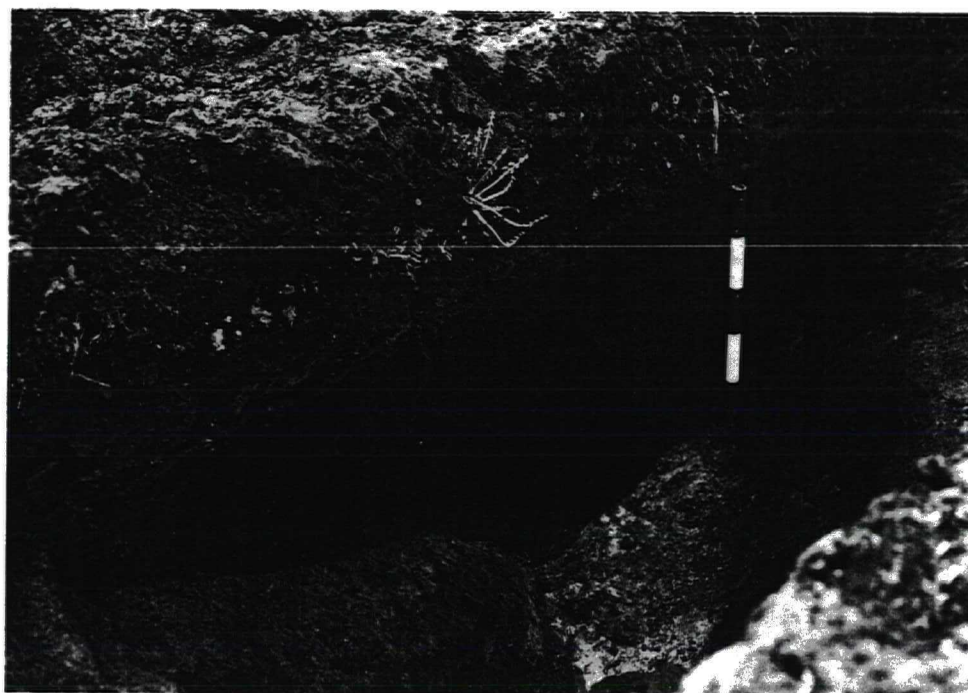


Plate 8 Area 42: profile of first re-cut 4231



Plate 9 Area 42: profile of second re-cut 4223

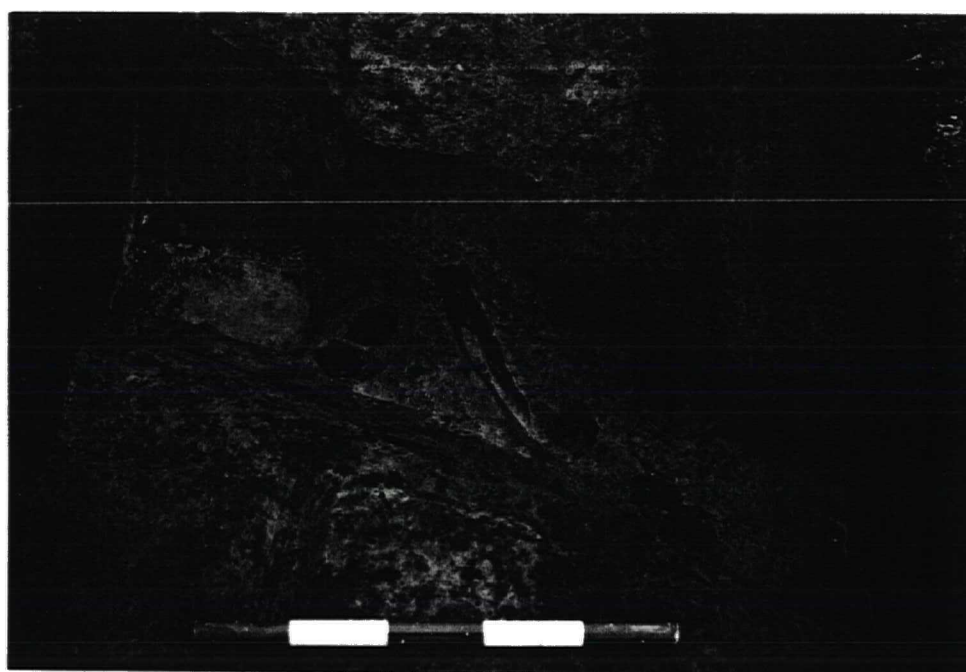


Plate 10 Area 42: ?wall slot 4207

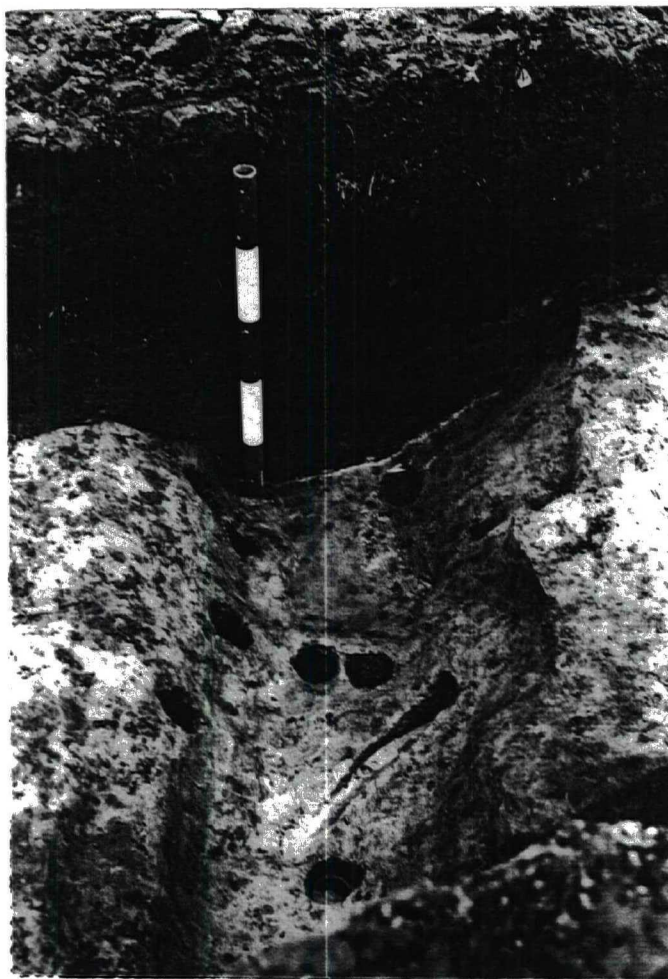


Plate 11 Area 42: profile of 4207



Plate 12 Area 27: natural subsoil



Plate 13 Area 28: 15/03/91

APPENDIX 1

EVALUATIVE ARCHAEOLOGICAL FIELDWORK ALONG THE PROPOSED ROUTE OF THE A19 EASINGWOLD BY-PASS

1. Introduction

1.1 - The proposed route of the Easingwold by-pass lies to the south-west of the town, its junctions with the existing course of the A19 being located at Raskelf Bridge (SE50627107) and Shires Bridge (SE52726758). The route is approximately 4.30 kms in length. The specification requires the definition of the extent of archaeological deposits within a 100 metres wide 'corridor' along the line of the route, the area to be examined thus covering c.430000 square metres.

1.2.1 - The drift geology of the route comprises glacial clayey tills partly overlain by beach deposits and laminated clays deposited by the former Lake Humber c.14000 years ago. Blown sand deposits, originating in the period 11-10000 b.p. but probably re-mobilised within the last four millenia, have been recorded from the vicinity of Spa House (SE51606958), although marginally outside the immediate area of study. Of particular interest is the existence of very gravelly subsoil resulting from the beach deposits between Brickyard Farm (SE52006855) and Spa House (SE51606958), (see below, 2.3.1). Initial inspection suggests that large, irregular but recognisably linear features, aligned broadly on a north-west/south-easterly axis, may represent dunes formed by sand blow in the dry, cold conditions which prevailed in the area about 10000 years ago; they are very similar to such features described in the vicinity of Sutton-on-the-Forest, only 8 kms to the south-east (Matthews, 1970). However, this attribution is uncertain, and as there is, beyond that already stated, little recorded evidence for blown sand in the vicinity, it may prove incorrect.

1.2.2 - The soil in the study area varies correspondingly between clayey and sandy loams, a band of brown soil occupying the central zone of the study area. A broad tri-partite division of current land-use can be recognised on the proposed route; between Raskelf Bridge and Raskelf Road fields are present, the fields either recently ploughed or carrying crops in the early stages of growth; between Alne Road and Raskelf Road arable and pasture are evident in approximately equal proportion, and between Raskelf Road and Raskelf Bridge all land is at present under grass.

1.3.1 - The area to the west of Easingwold, of which the proposed route forms a part, has, as a result of aerial photography, displayed traces of a number of discrete groups of enclosures and linear features visible as cropmarks. These are interpreted, on the basis of formal similarities with more fully investigated sites elsewhere in the north, as the structures and boundary ditches of Late Iron Age or Roman farms and their fields. One of these groups (SMR no.3288, SE517689, AP no.6, described as 'extensive earlier field system') lies directly in the path of the proposed by-pass. A nearby group, listed under the same SMR no. (SE517684, AP no.11, described as 'field system, trackway') is located just outside the 100m. 'corridor' but within a field which is traversed by it. The only other cropmark recorded from

the air which is at all close to the route is at SE505709 (SMR no. not obtained, AP no.14, described as 'crop mark - double ditch? - natural?'), and this also lies marginally beyond the limit of the study area.

1.3.2 - Apart from the evidence of aerial photography, indications of archaeological material in the vicinity are desultory. Sherds of Roman Samian ware are recorded from SE520690 (SMR no.6040), slightly to the north-east of the 'corridor', but their exact provenance is unknown. The sulphurous spring at Spa House (SE515696) may have formed a focus for earlier settlement. To the west, and more remote, Thomas Gill's Vallis Eboracensis of 1852 records the recovery of three lidded stone coffins from the edge of woodland near Spring House Farm (SE491688), as well as human skeletal material from the Raskelf area. Such references are tantalising, but of little help in determining strategy. Tangible traces of medieval agriculture are restricted to occasional fields of ridge and furrow in the north-western part of the study area.

Aims of further fieldwork

2.1 - The aims of the proposed fieldwork can be simply classified as follows; to map the extent of the visible archaeology, to determine its character, and to try to assess how representative that visible component is of the total archaeology of the study area. The term 'visible' refers to that which is observable by the unaided human eye, whether from a height of 6 feet or 600 feet, in the form of artefacts or cropmarks.

2.2.1 - Mapping of the extent of the visible archaeology - simply, over how much of the study area can it be recognised - will consist of the observation and recording, through fieldwalking and, should it be necessary, earthwork survey, of artefact concentrations and surviving traces of former land use. This information will be integrated with the existing record of aerial photographs.

2.2.2 - Determination of the character - primarily date and function - of the visible component adduced from 2.2.1 may in part be achieved simply by examination of the material recovered. However, limited excavation will be carried out to characterise more closely both cropmarks and artefact concentrations.

2.2.3 - It is hoped to go some way to assessing how representative the visible component is of the total archaeology of the study area - in other words, are we seeing traces of all sites which exist as either crop marks or artefact concentrations, or is such visibility selective as a result of variable geological, soil and drainage conditions? This will be attempted by the examination of superficially 'blank' areas between zones of activity indicated by crop marks or artefacts.

2.3.1 - The aim of this approach is to establish, as it were, the dimensions of the archaeology of the study area - how much is visible, and is that likely to be everything - in order to make

broad statements about the potential implications of the construction of the by-pass. This approach will, however, clearly incorporate more specific questions about the character of that archaeology. The exact nature of these questions is largely dependent on the results of the first stages of fieldwork, but some can be posed at this stage on the basis of existing knowledge. The full extent of the ?ditched enclosures (see 1.3.1) within the landscape is of great significance both in terms of this particular project and, more generally, in the north as a whole; it has been suggested that where discrete clusters of cropmarks are observed they may in fact represent only the visible fragments of far more extensive field systems (Addyman, 1984). This question is obviously closely related to 2.2.3, especially when it is considered that SMR 3288 (see 1.3.1) appears to be located on a band of gravel subsoil (Dr G.Gaunt, pers. comm.), material particularly favourable for the recognition of cropmarks, which contrasts with the surrounding, and less favourable, sands and clays. Additionally, closer characterisation of the form and, if possible, the date of these enclosures can be recognised as a priority at this stage. Further specific questions can only be formulated on the basis of data from the initial survey.

Methodology

3.1 - Fieldwalking. c.55% of the study area is currently being used for arable farming, about three-quarters of which is suitable for walking. It is proposed to walk substantial parts of all suitable fields crossed by the 100m. 'corridor', not restricting walking to the route itself. The exception to this is the large field between Knott Lane and the dismantled railway, the sheer size of which demands that quite close limits be observed. Walking will be conducted at intervals of 50 metres, artefacts being separately bagged within 50 metre lengths along these lines. It is felt that such spacing represents the optimum compromise between site recognition and extensive coverage. Assuming that a field walker can effectively observe a width of c.1.50m., it is hoped to cover c.11625 square metres of ground - about 2.7% of the total study area.

3.2 - Remote Sensing. Primarily magnetometer survey, but possibly some resistivity. A total coverage of 0.4ha. (i.e. 10 x 25 metre squares) will be used to accurately locate crop mark features on the ground prior to excavation, to try to identify sites indicated by artefact concentrations, and possibly to try and examine 'blank' areas for control data. The crop mark sites at SE517689 and SE505709 are obvious initial subjects.

3.3 - Excavation. Is unlikely to exceed 100 square metres in total. How this figure is divided up will depend on the survey results, but it is envisaged that small 'area' excavations (i.e. up to c.5m.x 2m.!) will be employed to excavate sample areas of features identified by remote sensing, and also to test at least one 'blank' area as a control. It is possible that artefact concentrations may be investigated by means of numbers of 1m.x 1m. sondages in order to try and determine their density, limits

and possibly locate features beyond the limits of geophysical coverage.

3.4 - Survey. In addition to the implicit survey requirements of 3.1 - 3.3, contour and/or earthwork surveys may be conducted as a form of data recovery in their own right. If close examination does not confirm the natural origin of the surface irregularities referred to above (see 1.2.1) these are candidates for such treatment; more probably, much slighter traces, in particular if associated with artefact concentrations (or to a lesser extent cropmarks) will receive attention. Locations already recognised which may be fruitful in this respect include a slightly raised platform (SE527676), to the north of the watercourse Shires Beck, and a linear feature visible from ground level in the vicinity of SMR 3288 (this, however, is quite possibly a relatively recent field boundary).

Concluding remarks

4.1 - The structure of the fieldwork programme is such as to attempt to evaluate the archaeology of the route as a whole, rather than to concentrate resources on what little is already known, whilst at the same time avoiding the dissipation of resources through excessively speculative 'hit-and-miss' tactics. It is hoped to provide a broad outline of the extent and character of the archaeology and to be able to assess this critically against factors affecting visibility such as the underlying geology, masking by sand blow* etc.. One bias which is already obvious is the extent of pasture - almost total coverage - to the north-west of Raskelf Road, which reduces archaeological visibility (as defined above, 2.1) in this zone to virtually nothing. The potential for earthwork survey is unlikely to significantly reduce this disparity, although the zone will hopefully be subject to limited investigation based on aerial photographic information (see 1.3.1) obtained when parts of this zone were under crop. Conclusions based on this survey will need to take this into account.

* - Although the Geological Survey minimises the amount of blown sand in the area, Dr G.Gaunt informs me that this does not take account of deposits less than 12 inches (30.5cms) in thickness, which may be significant in terms of archaeological considerations.

References

- Addyman, P.V., 1984: York in its Archaeological Setting in
Addyman, P.V and Black, V.E (ed.),
Archaeological Papers from York presented
to M.W.Barley, York.
- Matthews, B., 1970 : Age and Origin of Aeolian Sand in the Vale
York, in Nature Vol.227.

APPENDIX 2

NYS. 8102
NYE 1682
-1684

REPORT ON GEOPHYSICAL SURVEY

Site : Easingwold Bypass

Report : 91 / 13

February 1991

Client : York Archaeological Trust

GEOPHYSICAL SURVEYS

12 Reservoir View Thornton Bradford BD13 3NT England
Telephone (0274) 835016
Fax (0274) 830212

REPORT ON GEOPHYSICAL SURVEY

Survey Number: 91/13
Site: Easingwold Bypass
Date: February 1991

NGR: SE 5269

Location, topography, and geology:

The site is situated south south west of Easingwold, near the A19 trunk road. The areas surveyed are flat, Area A overlies clay, Area B overlies gravels, and Area C overlies gravels sands.

Archaeology:

There is crop mark evidence for archaeological features in the area of the survey.

Aim of Survey:

To accurately locate the features, and identify any further archaeology within the area of the survey.

Instrumentation:

Magnetometer: Geoscan FM36 with ST1 automatic trigger

Survey Method:

Magnetic readings are logged at 0.5m intervals along one axis (in 1.0m traverses, 800 readings per 20m x 20m grid) over the survey area. The data are then transferred to a Compaq SLT/286 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 a Dell 386 linked to appropriate printers.

The location of the survey area is shown in Figure 1.

TECHNICAL AND DISPLAY INFORMATION

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

(1) Instrumentation

(a) Fluxgate Gradiometer

This instrument comprises two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor some 100-300mm from the ground surface. At each survey point, the difference in magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT) or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. If multiple readings are logged, then unless specified elsewhere in the report, it may be assumed that they are taken in the direction of grid north.

(b) Resistance meter

This measures the electrical resistance of the earth, using a system of four electrodes (two current, two potential). Depending on the arrangement of these electrodes, an exact measurement of a similar volume of earth may be acquired. In such a case the amount measured may be used to calculate the earth resistivity. Using a 'Twin-Probe' arrangement the terms 'resistance' and 'resistivity' may be interchanged. This arrangement involves the pairing of electrodes (one current and one potential), with one pair remaining in a fixed position whilst the other measures the resistivity variation across a fixed grid. Resistance is measured in ohms, whilst resistivity is measured in ohm-meters.

(c) Magnetic susceptibility

The instrument employed for measuring this culturally enhanced phenomenon is a laboratory based susceptibility bridge. Standard 50g soil samples are collected in the field.

(2) 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 only one type of display mode may be used, although where necessary a number of the options may be presented.

(a) 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.

TECHNICAL AND DISPLAY INFORMATION (cont)

(b) 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.). When the contrast is equal to 1, then the scale between the two cut-off levels is linear. A C.F. > 1 helps to enhance the higher readings. To assess lower than normal readings involves the use of an inverse plot. This plot simply reverses the minimum and maximum values, resulting in the lower values represented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which the numbers of the dots is randomly placed.

(c) Contour

This display joins data points of an equal value by a contour line. Displays are either generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer. The former will generate either colour or black and white copies depending on the printer used.

(d) 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. Again, the output may be either colour or black and white. A hidden line option is occasionally used (see (a) above).

(e) Grey-Scale

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

(3) Interpretation

This is the most important part of the report and is based on a consideration of not only the display plots, but also a study of the raw data. It should be emphasised that the final interpretation is not based only on the diagrams reproduced in this report.

In some instances geological and pedological anomalies may arise which are impossible to distinguish from those normally associated with archaeological features - in all cases of doubt trial excavation work is recommended to ascertain the nature of the observed anomalies.

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.

Report on the Geophysical Survey at Easingwold Bypass.

Introduction

The survey was commissioned by the York Archaeological Trust (YAT) in advance of the proposed new bypass for Easingwold.

There is crop mark evidence for archaeological features along part of the proposed route, and the survey grids were positioned by YAT personnel, over three areas, to include some of these.

The position of the grids can be seen in Figure 1, which is copied from a plan supplied by YAT.

Results

Area A (Figures A1 - A2)

This area was ploughed at the time of the survey, and a surface scatter of archaeological material had been noted by field walking.

The most obvious anomaly in this area is annotated "A" in Figure A2, and is probably due to a metal pipe. Also to be noted is the area of magnetic disturbance (B), which can be seen from visual observation of the ground surface to be due to modern dumping.

There is a very faint linear anomaly ("C" in Figure A1) which may be due to an eroded field boundary, or other ditched feature.

Area B (Figures B1 - B2)

At the time of the survey this area was under a young crop.

Archaeologically, this is the most interesting of the three areas surveyed, displaying a number of anomalies. The one annotated "A" on Figure B2 is probably due to an old field drain or boundary. "B" is a very faint linear anomaly, which may be the remnants of a field boundary, but which could also be an effect of ploughing. Anomalies "C" form a subcircular shape which may have archaeological significance, however the response, which suggests a ditch feature, is very weak. "D" is a faint linear anomaly, possibly indicating a ditch, but it is so weak that this interpretation must be viewed with caution.

Area C (Figure C1)

There are a few positive magnetic anomalies in this area, which could indicate pits. However, given that there is no known archaeological context an alternative explanation is likely e.g. magnetic stone or deeply buried ferrous material.

Conclusions

The geophysical survey at Easingwold has produced a few anomalies of potential archaeological interest, most notably in Area B. Those in Areas A and C are probably due to recent disturbance.

Project coordinators : C. Gaffney and S. Gaffney

GEOPHYSICAL SURVEYS

5th March 1991

Easingwold Bypass

Grid Location Plan

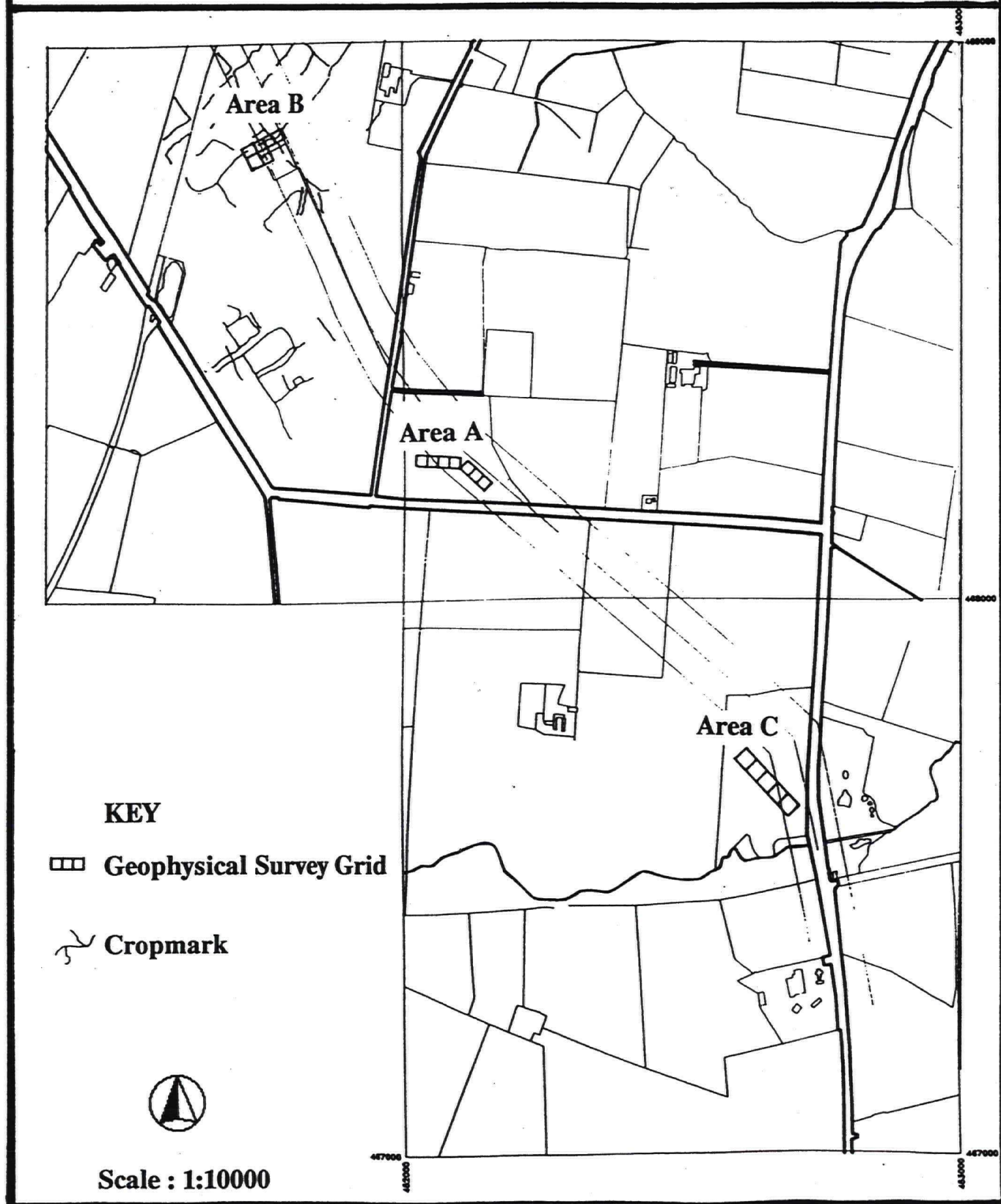
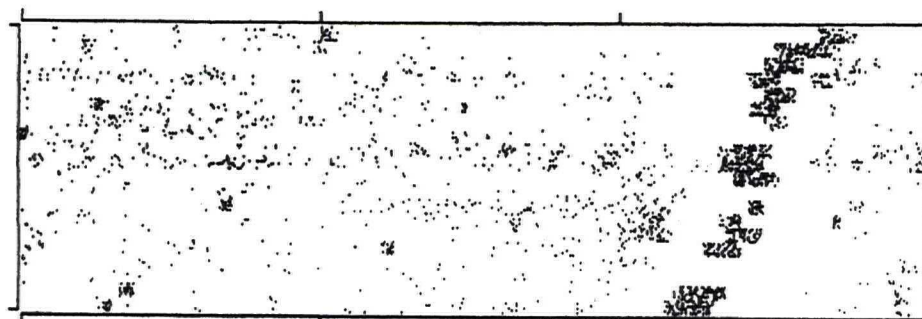
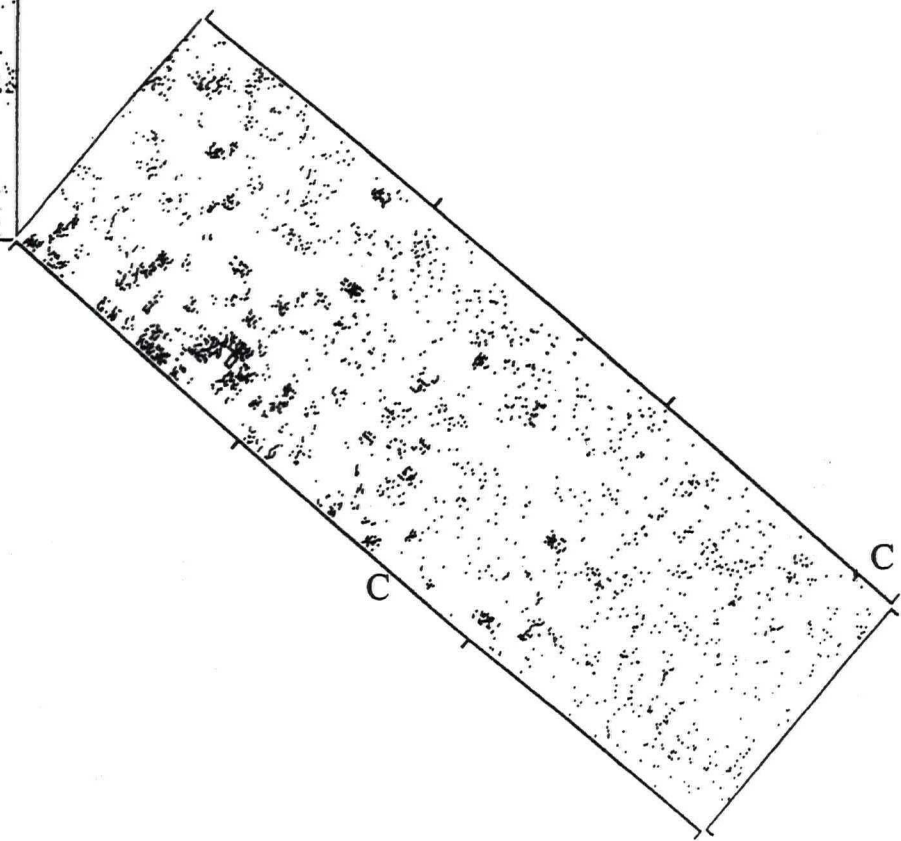


Figure 1



Range : 0 - 3nT



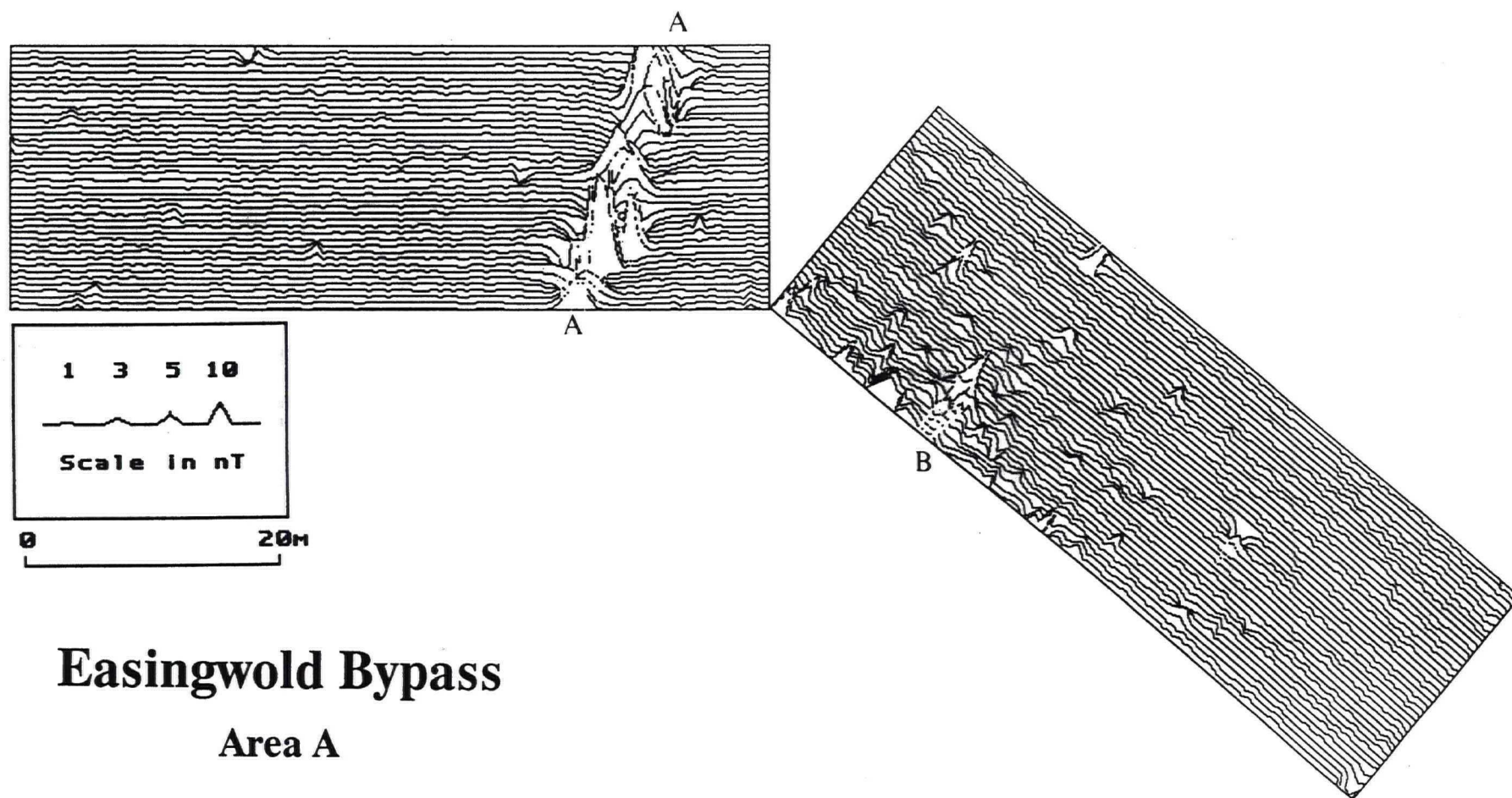
Easingwold Bypass

Area A



1:500

Figure A1



Easingwold Bypass

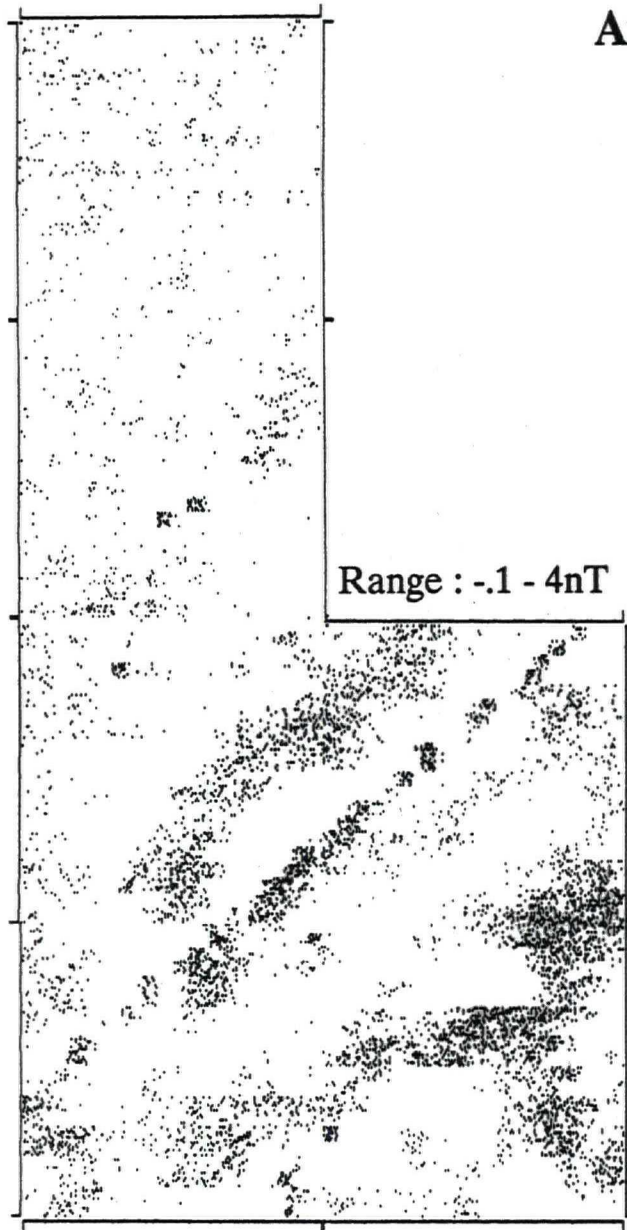
Area A



Figure A2

Easingwold Bypass

Area B



1:500

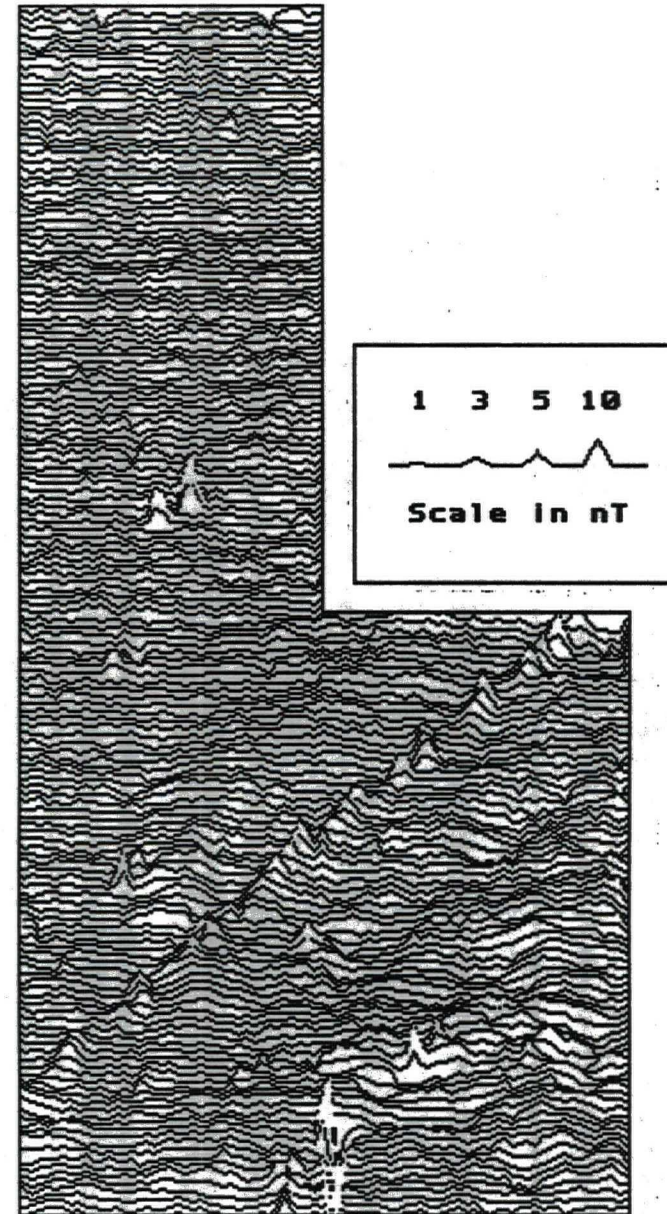
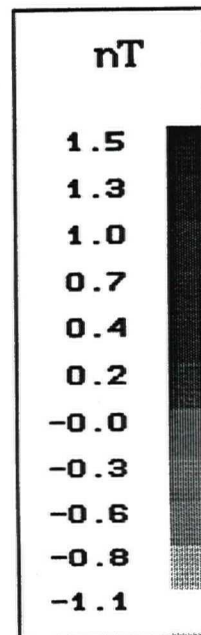
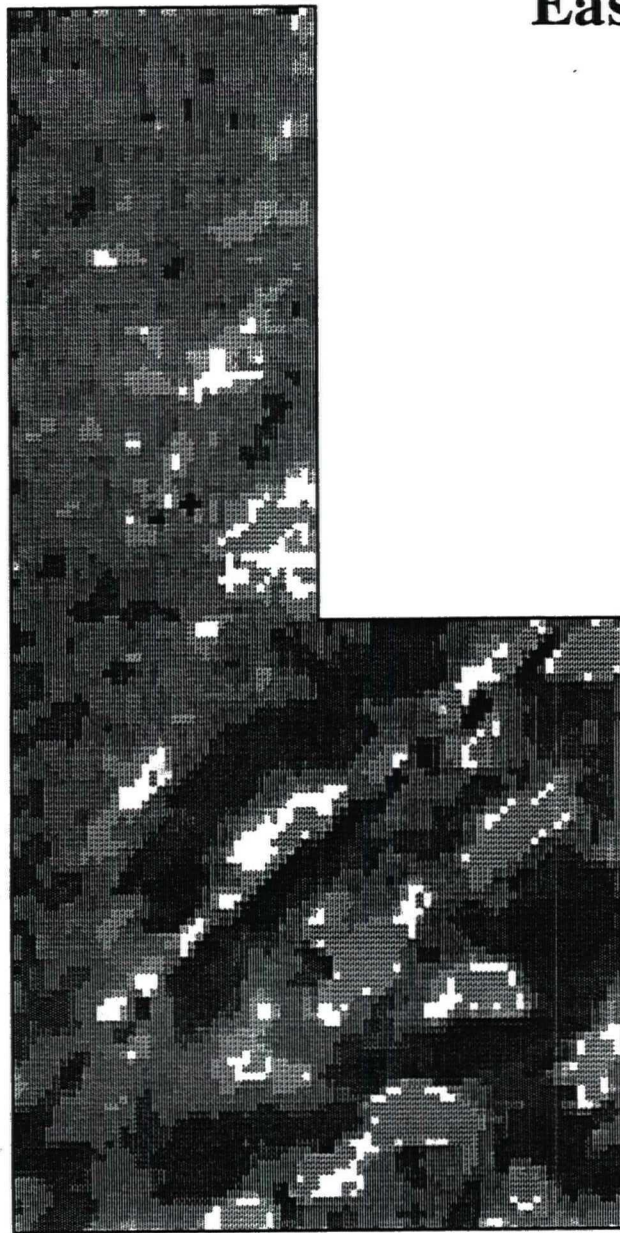


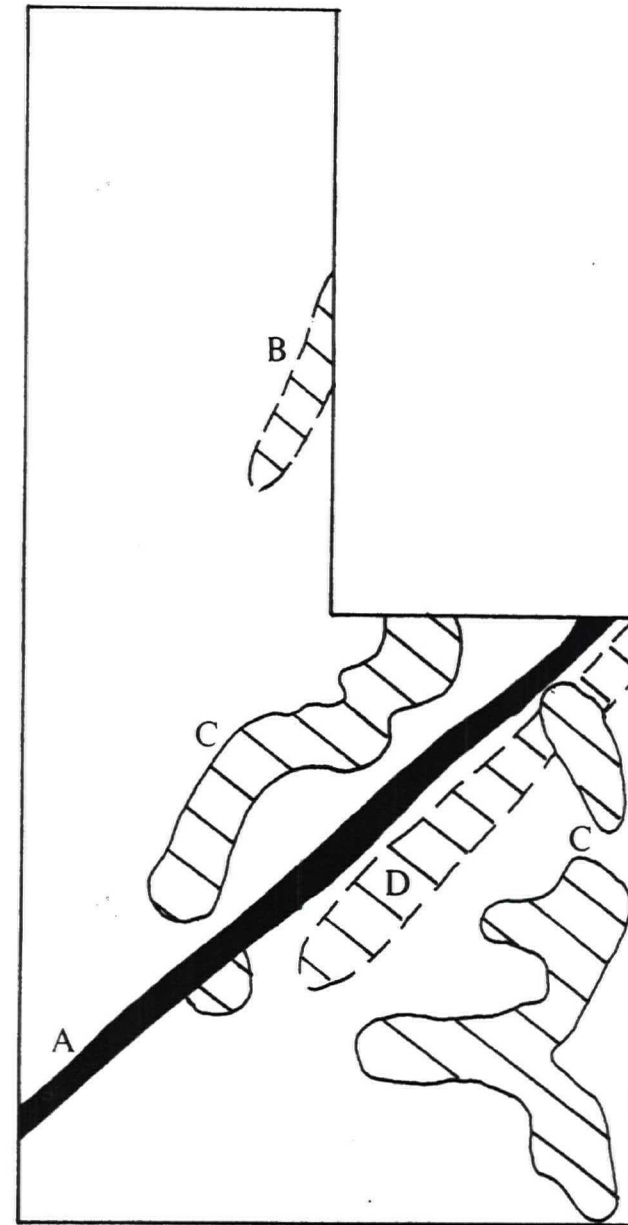
Figure B1

Easingwold Bypass

Area B



1:500

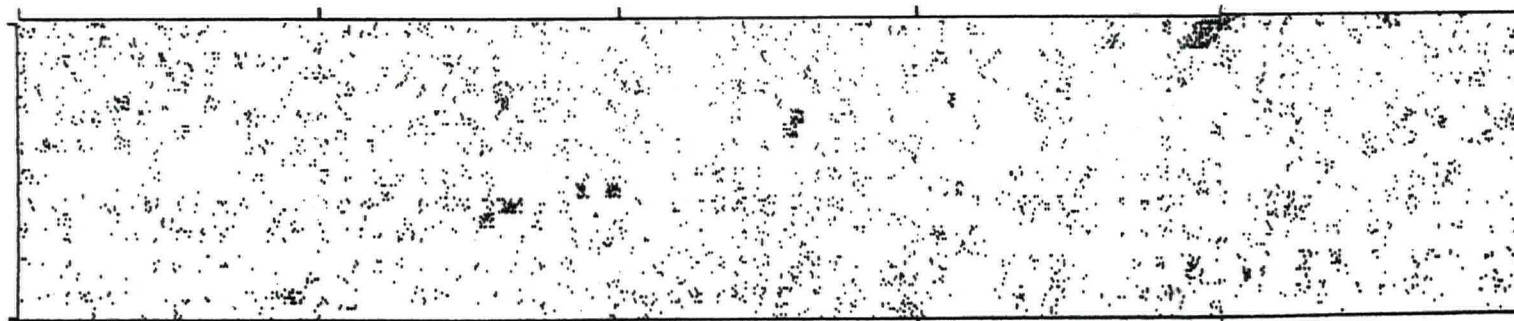


Interpretation Diagram

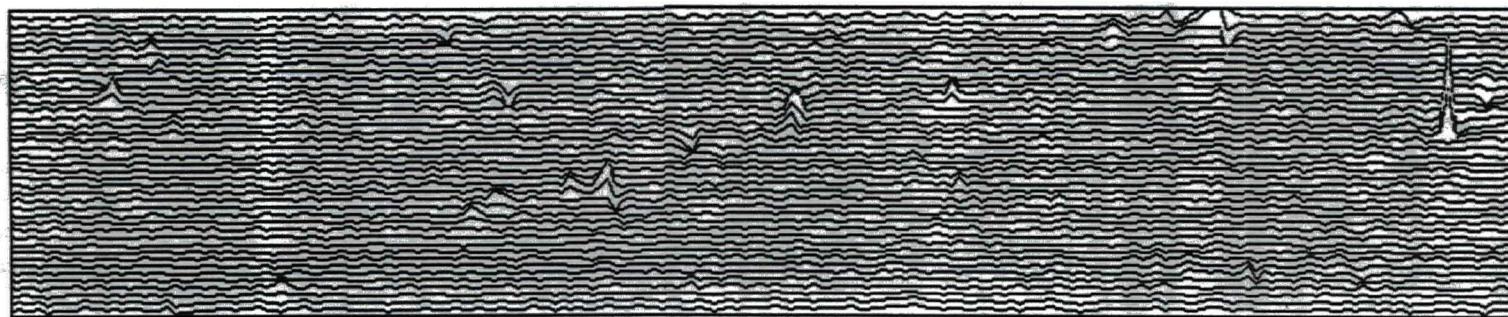
Figure B2

Easingwold Bypass

Area C



Range 0.1 - 4nT



1 3 5 10



Scale in nT



1:500

Figure C1