M3/27

CAENBY CORNER TO GAINSBOROUGH PIPELINE

ARCHAEOLOGICAL WATCHING BRIEF AND GEOPHYSICAL SURVEY REPORT

Site code	CCGP 03
NGR:	SK 8425 8855- SK 9424 8909
LCCM Acc No:	2003.337

Report prepared for Transco plc

by

R. D. Gardner and P. Masters

December 2003

PRE-CONSTRUCT ARCHAEOLOGY
LINCOLN

Pre-Construct Archaeology (Lincoln)
Unit G
William Street Business Park
Saxilby
Lincoln
LN1 2LP
Tel. & Fax. 01522 703800

EVENT LI 5070
LI 5072
LI 5075

SOURCES LI 9472
LI 9473

PRN - 54980 - PREHISTORIC
ROMAN
PRN - 54981 - Medieval

Contents

Illustrations

List of plates

Summary

- *An archaeological watching brief and a geophysical survey were undertaken during the construction of a replacement gas main between Caenby Corner and Sturgate Airfield, Lincolnshire.*

- *Construction work was undertaken in two stages, with topsoil removal across the width of an easement followed by trenching: both stages were carried out under archaeological supervision.*

- *One area of moderate archaeological interest was identified, apparently the edge of a Romano-British settlement. This part of the pipeline course was otherwise of minor significance.*

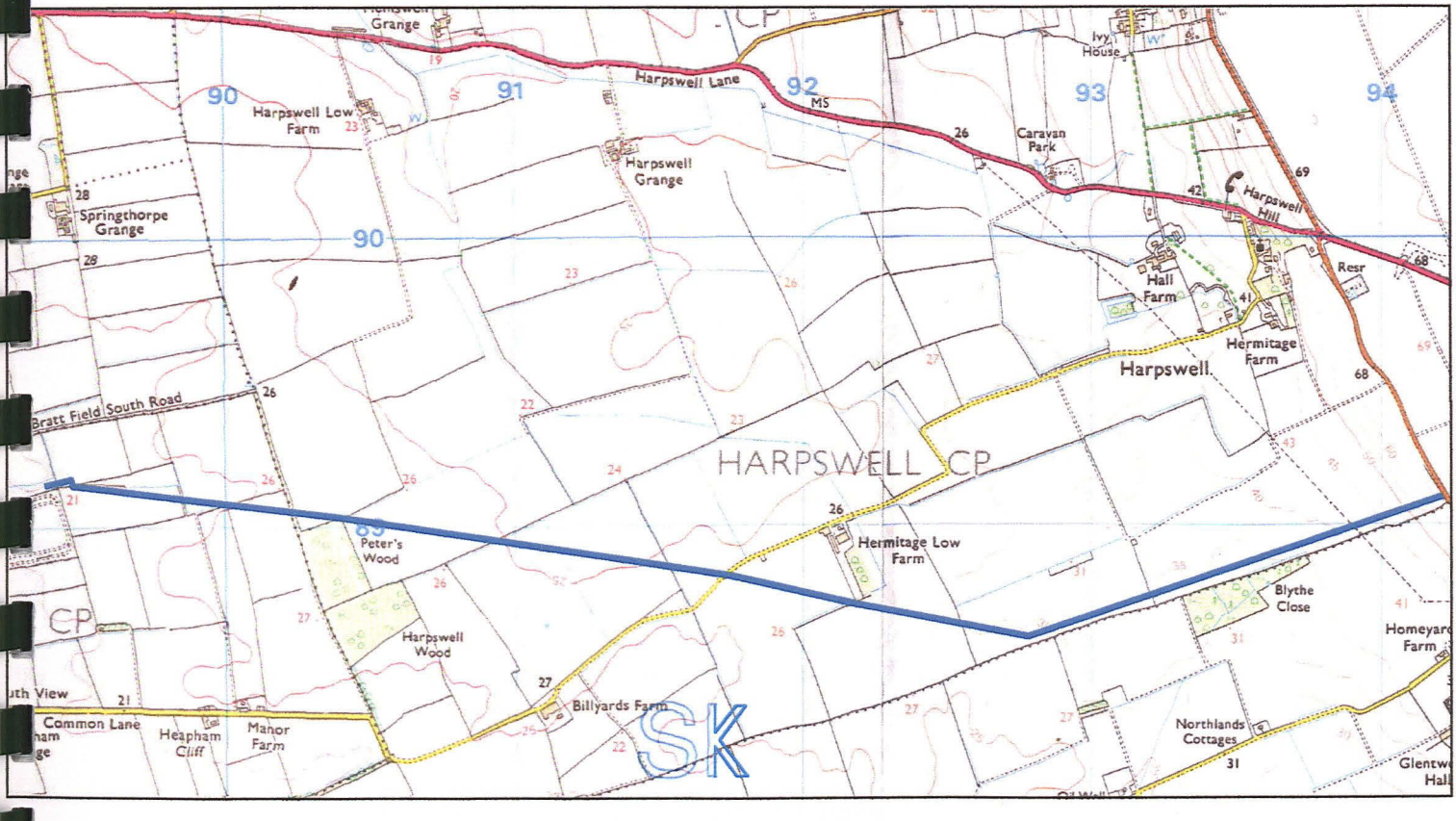


Fig. 1: Location plan. The pipeline corridor is shown in blue. Scale 1:25 000. (OS licence no AL 515 21 A 0001)

1.0 Introduction

Subsequent to a desk-based assessment compiled by Archaeological Project Services, Transco plc commissioned Pre-Construct Archaeology (Lincoln) and Pre-Construct Geophysics to undertake an archaeological watching brief and geophysical survey on the course of the easterly part of the Caenby Corner to Gainsborough gas main, which spanned the area from Caenby Corner at the east end of the project to the north side of the former Sturgate Airfield, where it linked up with the previously laid western section (fig. 2).

This report documents the results of a programme of archaeological observation, excavation and recording and geophysical survey, which took place prior to and during preliminary construction procedures. It was carried out in accordance with the requirements of the Institute of Field Archaeologists' *'Standard and Guidance for archaeological field evaluations'* (revised 1999) and the English Heritage document *'Management of Archaeological Projects – 2nd Edition (1991)*; a formal project brief issued by the Lincolnshire county Council SMR office, and a project specification prepared by this company.

Copies of this report will be deposited with Transco plc and the County Sites and Monuments Record for Lincolnshire. A summary will be submitted to the county journal *Lincolnshire History and Archaeology*, which will feature as a short note in due course. Reports will also be deposited at Lincoln Museum, accompanied by an ordered project archive for long term storage and curation.

2.0 Location and Description

The pipeline route is located within the Trent valley, in the West Lindsey district of Lincolnshire (figs. 1 and 2). The complete pipeline is approximately 10km long, running from the Gainsborough parish boundary (NGR SK 8425 8855) to the west side of the B1398 road between Glentworth and Harpswell (SK 9424 8909): the part of the project covered in this report runs from the B1398 to the north-east corner of the old Sturgate Airfield on the east edge of the parish of Heapham.

The drift geology of most of the current section of pipeline is Wragby Till, overlying Charmouth Mudstone. At the east end of the project, where it crosses the west edge of the Lincoln Edge, are successive bands of (west to east) Marlstone Rock, Whitby Mudstone, Grantham Formation and Lincolnshire Limestone, with drift glaciofluvial deposits of sand and gravel in some areas above.

3.0 Archaeological and Historical Background

The village of Glentworth, to the south of the east end of the pipeline route, first appears in the historical record in the Domesday Survey of 1086 as *Glentewrde* (an enclosure frequented by kites). It was divided between four landowners – 'Jocelyn son of Lambert', 'Martin', 'Restold', and the Bishop of Bayeux – and the royal estate of Kirton in Lindsey also had land in jurisdiction here. With a total recorded population of 47, the village was moderately large, and was flourishing:

almost all the land holdings had increased significantly in value between the Norman Conquest and the compounding of the survey. The Domesday Survey does not mention a church, but the tower of St. Michael's Church probably dates from the late 11th century (Pevsner, 1989).

The population declined sharply in the late 14th century, while the construction of grounds and gardens for Glentworth Hall may have been the cause of further depopulation in the late 17th century, as it was in Harpswell (it was not uncommon at that time for landowners to evict cottagers to improve the aspect of their estates). Glentworth Hall itself was built in the mid- to late 16th century and redesigned in the 18th, and has recently been restored.

Between Glentworth Hall and the village itself is the site of a Roman villa, first discovered in the mid-18th century, and recently dated by fieldwalking to the 3rd-4th century AD. Two coins of the emperor Constantius II (337-361 AD) have also been found in the village (another is known from Harpswell).

The current section of the pipeline route lies within the southern edge of Harpswell parish; the village of Harpswell is north of the east end of the project, on the B1398, which runs along the Lincoln Edge, and forms a crossroads with the Roman Ermine Street at Caenby Corner, 3km east of the village. It may have been a significant route for many centuries, although there is no current evidence for its age: the prehistoric trackway known as the Jurassic Way runs parallel to it along this stretch of the Lincoln Edge and a burial with associated Iron Age pottery was found next to the road at the junction north of the development site.

At the time of the Domesday Survey, Harpswell was divided between the King, the Archbishop of York and Jocelyn, son of Lambert. Like Glentworth, there was a mixture of ploughland and meadow in all the holdings, although it was a smaller settlement, with a recorded population of only 25. Jocelyn held a half share in Harpswell church (St. Chad), which still has its Anglo-Saxon tower (Pevsner, 1989). The king's land was part of the royal estate of Kirton in Lindsey, which remained Crown land until the 19th century; the other holdings continued as separate manors until both were acquired by the Whichcote family in the 16th century.

In 1607, Sir Hamond Whichcote enclosed most of the village, converting 500 acres of arable land to pasture and evicting many of the inhabitants, thus creating gardens and a park for Harpswell Hall (now demolished). Earthwork remains associated with the depopulated medieval settlement form part of Scheduled Ancient Monument 33122, while the remains of the hall and its gardens comprise SAM 22773.

The second edition Ordnance Survey map (1907) shows a 'Brick Kiln Holt' directly north of the pipeline route, with several associated ponds, which were probably clay-pits for a brick kiln in the area.
The woodland now known as 'Peter's Wood', near the west end of the current stretch of pipeline, is on the parish boundary of Heapham and Harpswell, and was first documented on an 1828 map of Lincolnshire.

Heapham, at the west end of the current project, is recorded as *Iopeham* (homestead where rose-hips grow) in the Domesday Survey. It was the smallest of the three villages, with a recorded population of only 18. The greater part of it also belonged to the royal estate of Kirton in Lindsey; a smaller part was then attached to Count Alan's manorial holdings at Lea, but appears to have been detached later, as a 'manor of Heapham' is recorded in the mid-15th century, linked with the manor of Ingleby (Everson et al, 1991). A moated site north of the village (Scheduled Ancient Monument 31612) may be the last vestige of this manor. The village itself, whose church also has a Saxo-Norman tower (Pevsner, 1989), lies well to the west of the area dealt with in this report.

The current project ends in the west at the former RAF Sturgate, which was opened as a training airfield in 1944 and closed for military use in 1964. The main part of the airfield is still in civilian use, but the small detached area adjacent to the pipeline, which may have been used to store explosive materials, is now in use as a vehicle dismantling centre.

4.0 Geophysical Survey

4.1 Methodologies

The original specification for geophysical survey recommended a fluxgate gradiometer survey along the entire route. However, the close proximity of an existing pipeline resulted in gross distortion of the data (Fig. 3). Consequently, it was felt that a topsoil magnetic susceptibility survey would be more appropriate This technique is not as comprehensive as gradiometry, but can be used to identify areas of general archaeological interest.

Gradiometer survey

Magnetic variation that is detectable within soils can often determine the nature and extent of past human activity. At British latitudes, the earth's magnetic field is approximately 50,000 nanoteslas (The nanotesla is the unit of magnetic flux, used in gradiometry to measure magnetic variation in relation to the Earth's magnetic field). Against this background, most archaeological features produce an enhancement of around 5-30 nanoteslas (nT). The strength of this magnetic variation depends largely on the composition of the geology. For example, limestone and chalk exhibits low magnetic susceptibility, and contrasts well against soils: conversely, strongly magnetic igneous rocks can mask subtle anomalies completely.

For the most part, soils tend to be more responsive to magnetic remote sensing than the geologies over which they lie. Ferrous oxides occur naturally in many drift deposits, particularly those derived from, or containing elements of, igneous rocks. Organic decomposition within topsoils can supplement the level of ferrous compounds, a process amplified by agricultural activities.

The fills of ditches and pits tend to increase soil depths, and hence magnetic strengths, relative to surrounding soils. The converse also applies.

Ferromagnetic substances such as iron induce a very high response to magnetic surveys, and are thus easier to identify. Perhaps of more significance to the archaeological prospector are the weaker ferrous oxides; the randomly orientated magnetic fields of these materials produce minimal magnetic variation in their natural state. Geology and soil type can determine this variance (see above). Specifically, clay soils are ferrous oxide rich, hence their characteristic red colouration. Clay has literally been a fundamental building block in human social development: firing increases its versatility, but also enhances the magnetic properties of its ferrous content. For kilns, this may be in the order of 1000-5000 nT. Similar processes occur during the formation of igneous rocks.

Invariably, most surveys detect discrete anomalies, either in groups, or randomly scattered across a site. In the absence of intrusive investigation, the nature and origin of these anomalies is often difficult to establish. Strongly magnetic dipolar anomalies usually reflect ferrous objects, such as ploughshares and horseshoes. Weaker examples may indicate ceramic materials such as brick and tile, often introduced onto the site during manure spreading. The strength of the magnetic variation derives from permutations of the size and depth of the feature/object and the magnetic susceptibility of the surrounding soil. Pit-like anomalies, usually positive, can be identical to naturally occurring depressions, and the potential of these can only be estimated when they are examined in context with other factors, such as the proximity of definite, or suspected archaeological remains.

The use of magnetic surveys to locate sub-surface ceramic materials and areas of burning, as well as magnetically weaker features, is well established, particularly on large green field sites. The detection of magnetic anomalies requires the use of highly sensitive instruments, in this instance the Bartington 601 Dual Fluxgate Gradiometer. This must be accurately calibrated to the mean magnetic value of each survey area. Two sensors, mounted vertically and separated by 1m, measure slight localised distortions of the earth's magnetic field. Cumulative readings can be stored, processed and displayed as graphic images.

The gradiometer survey was undertaken using a Bartington Grad-01 Dual Fluxgate Gradiometer. The zigzag traverse method of survey was used across 20m x 20m grids, at 0.25 m sample intervals along 1.0m wide traverses.

The survey data was analysed using Geoplot v.3.0 (Geoscan 2000). The data was processed using algorithm to remove magnetic spikes, thereby reducing extreme readings sometimes caused by stray iron fragments. It was then clipped to enhance the magnetic response of potentially significant remains.

The results are presented as greyscale and traceplot images, along with an interpretative plan (Figure 8).

Magnetic Susceptibility Survey

Although the gradiometer can be used for rapid scanning on large sites, its effectiveness is limited, and detailed area surveys always produce less subjective results. Additionally, the gradiometer is a 'passive' instrument, measuring magnetic susceptibility by its effect on the earth's magnetic field. Only

magnetically *anomalous* features will be detectable. For example, the local magnetic distortion induced by thin archaeological horizons may not be sufficient to produce anomalous readings. This problem can exist within topsoils subjected to generations of disturbance (e.g. ploughing). Magnetic discontinuities in the topsoil are often more readily identified by an 'active' instrument, such as the Bartington Magnetic Susceptibility Meter. This instrument temporarily magnetises the ground by creating a low intensity, alternating magnetic field. It then measures the response. The susceptibility is measured in SI volume susceptibility units (x 10^{-5}). The usefulness of this system is confined to the top few centimetres of topsoil, but its wider range (measurement intervals of up to 30m) enables rapid coverage of large areas. This is, of course, at the expense of detailed resolution, and is recommended primarily as a preliminary prospecting technique used to highlight areas for detailed gradiometry. However, on sites where archaeological features have been completely ploughed out, magnetic susceptibility measurement may produce the only clear evidence of earlier activity. On this site, the close proximity of an existing gas pipeline predisposed the effectiveness of a gradiometer survey.

The level of topsoil magnetic susceptibility was measured at 10m intervals along the centre line of the route, and 5 m to either side. Restricted widths of some sections necessitated narrower survey.

The data was recorded by hand and subsequently inputted into Geoplot v.3.0 for analysis and plotting. The data was despiked and processed using a median filter in order to remove noise and create a smoother appearance. The field loop survey revealed values of MS varying between a minimum of 2 SI x 10-5 (shown as blue) and a maximum of 44 SI x 10-5 (shown as red). The results are presented as a colour scale plots (Figs. 4-7).

4.2 Analysis and Interpretation of Results

Pipe laying in fields 1 and 2 was completed prior to the survey start date and, as such, they were not included in the survey.

4.2.1 Field 3 (Figs 4, 5 and 9)

Magnetic susceptibility values are low to medium (range 8-44, mean 16 x 10-5 SI Units - volume specific) but the distribution appears to show little patterning. The results indicate a general spread of magnetic susceptibility values with lower readings towards the east end of the survey. These lower readings probably indicate an area of alluvial deposits and colluvium.

The gradiometer survey did not detect any potentially significant archaeological remains. If present, such features may be magnetically masked by an existing pipeline.

4.2.2 Field 4 (Figs 4, 5 and 9)

Magnetic susceptibility values are low to medium (range 2-64, mean 15.69 x 10-*5* SI Units - volume specific) with potentially significant levels in the mid part of the survey (shown as red/orange); an area where Roman pottery was noted. Due to the distorting effects of the existing pipe, the gradiometer survey was unable to substantiate the magnetic susceptibility results. During the subsequent watching brief, two linear ditches were identified (see section 6.2 – Site 1 below).

4.2.3 Field 5 (Figs 4 and 5)

Magnetic susceptibility values are low (range 5-34, mean 14 x 10-*5* SI Units - volume specific) but the distribution appears to show some discrete patterning. The highest readings appear at the west end adjacent to the field boundary. This suggests some form of topsoil magnetic enhancement, possibly indicating human activity of recent origin. The subsequent watching brief did not reveal any archaeological features in this area, therefore it can be suggested that the high MS readings reflect modern activity. Beyond these zones of high readings the variation in MS is more subdued, with the lowest values occurring towards the east at the edge of the field, close to an existing field boundary ditch This zone of low readings (shown in blue) may denote an area of alluvium; dredged from the dyke.

4.2.4 Fields 6 –7 (Fig 6)

Magnetic susceptibility values are relatively low (range 5-34, mean 14 x 10-*5* SI Units - volume specific) but the distribution appears to show some patterning close to the east end of the survey. A linear trend of relatively high magnetic susceptibility readings (shown as yellow-orange/red) suggests some form of topsoil magnetic enhancement. The subsequent archaeological watching brief recovered evidence of medieval plough furrows and smaller features of unknown date (see section 6.4 Site 2 and fig 13).

Between Fields 6 and 7, an area of low magnetic susceptibility readings (shown as blue) possibly denote a former field boundary ditch, as depicted on the 1st edition Ordnance survey map of 1891.

4.2.5 Field 8 (Fig 6)

Magnetic susceptibility values are low (range 5-34, mean 14 x 10-*5* SI Units - volume specific) but the distribution shows a disrete area of high magnetic readings towards the centre of the field covering an area of approximately 20m x 10m. This suggests some form of topsoil magnetic enhancement. Beyond this zone of high readings, the variation in MS is more subdued, with the lowest values occurring towards the west. This zone of low readings (shown in blue) may not represent any archaeological remains but merely denote the accumulation of alluvium.

A linear ditch was revealed during the watching brief as wells as medieval plough furrows (see section 6.4 Site 3 below and fig 13).

4.2.6 Field 9 (Fig 7)

Magnetic susceptibility values are low (range 7-17, mean 15 x 10-*5* SI Units - volume specific). The survey identified a band of higher susceptibility values (shown as red/orange) at the west end of the field, extending into field 10. In this zone of enhancement, a single pit was subsequently recorded during the watching brief (see below, feature [011]). However, due to the linear trend of the zone of high MS, it is also possible that this may reflect the presence of a former field boundary, as depicted on the first edition Ordnance Survey map of 1891. Beyond this zone of high readings the variation in MS is more subdued, with the lowest values occurring at the east end of the field close to the field boundary (shown as blue).

4.2.7 Field 10 (Fig 7)

Magnetic susceptibility values are low (range 6-19, mean 12 x 10-*5* SI Units - volume specific), excluding the east end of the field. The magnetic susceptibility survey indicates a zone of low readings, which appear to indicate that no archaeological remains are present over most of the area surveyed.

4.2.8 Field 11 (Fig 7)

Magnetic susceptibility values are generally low (range 7-20, mean 12 x 10-*5* SI Units - volume specific). The magnetic susceptibility survey indicates a band of higher susceptibility values trending in a north-east to south-west direction shown in red in the eastern half of the field. A small pit (feature [15] see below) was recorded during the watching brief. This suggests some form of topsoil magnetic enhancement, possibly from either settlement activity or from modern enhancement. Beyond this zone of high readings the variation in MS is more subdued, with the lowest values occurring to the west.

4.2.9 Field 12 (Fig 8)

Magnetic susceptibility values are low (range 10-20, mean 14 x 10-*5* SI Units - volume specific). The magnetic susceptibility survey indicates low readings, which appear to indicate that no significant archaeological remains are present.

4.2.10 Field 13 (Fig 8)

Magnetic susceptibility values are low (range 10-18, mean 13 x 10-*5* SI Units - volume specific). The magnetic susceptibility survey indicates no significant susceptibility values in this field.

4.2.11 Field 14 (Fig 8)

Magnetic susceptibility values are low (range 7-27, mean 14 x 10-*5* SI Units - volume specific). The magnetic susceptibility survey indicates a band of low susceptibility values at the west end of the field This zone of low readings (shown in blue) may not represent any archaeological remains but merely denote

the natural accumulation of alluvium, or dredging from the field boundary ditch. A small area of high susceptibility readings towards the eastern field boundary may merely reflect some form of differential land use and presumably represents a relatively recent episode of topsoil magnetic enhancement.

4.2.12 Field 15 (Fig 8)

Magnetic susceptibility values are low (range 8-22, mean 16 x 10-5 SI Units - volume specific). The magnetic susceptibility survey indicates a linear band of low susceptibility values shown in blue on the north side and west end of the field. It is possible that the readings reflect the closeness to the field boundary ditch and probable dredging from it. Higher readings can be seen towards the centre and eastern end, which probably represents some form of differential land use an. No features of archaeological origin were subsequently recorded during the watching brief.

4.2.13 Field 16 (Fig 8)

Magnetic susceptibility values are low (range 9-16, mean 13 x 10-5 SI Units - volume specific). The magnetic susceptibility survey indicates a few high susceptibility values shown in red/orange at the west end of the field. This may reflect soil enhancement from the nearby field boundary ditch. Again, due to the limited number of readings taken and area surveyed, the likelihood is that these readings do not reflect any significant remains.

4.2.14 Field 17 (Fig 8)

Magnetic susceptibility values are low (range 9-13, mean 12 x 10-5 SI Units - volume specific). The magnetic susceptibility survey was limited at the end of the pipeline and therefore the readings do not indicate any significant magnetic responses.

Gradiometer Survey Results (Fig 9)

Throughout both fields 3 and 4, the existing pipe was detected (shown as blue line), which cancelled out any possibility of detecting weaker magnetic anomalies of an archaeological nature. In Field 3, a short linear anomaly set at right-angles to the existing pipe may denote a feeder pipe. A linear positive anomaly (shown as brown) was detected in the eastern half of field 4, adjacent to the existing pipe, denoting the presence of a ceramic land drain. At the western end of Field 4, five parallel linear anomalies running at right-angles to the existing pipe also indicate the presence of land drains, as these could in places be seen on the ground; partially exposed following topsoil stripping of the easement corridor.

5.0 Methodology (watching brief)

Work on the eastern section of the pipeline took place in two stages. The pipeline easement was first topsoil-stripped, using a tracked 360° excavator with a 2.0m

wide ditching bucket and a D6 bulldozer with a blade: the 360° excavator stripped one side of the easement (normally the south side), side-casting to the centre, while the blade followed behind, pushing the spoil heap and the topsoil underlying it to the edge of the easement. Since keeping the topsoil heap uncontaminated by subsoil was of paramount importance, very little of the underlying subsoil or natural was actually exposed. Trenching and laying the pipe followed several days later. At the beginning of the project, trenching was done by a 360° excavator using a 0.5m wide ditching bucket (later replaced by a toothed bucket due to the hardness of the natural clay); when work was restarted in September, a specialised trenching machine was used. The trench was typically 1.8m deep including topsoil, and 0.6m wide where the trenching machine was used, increasing to 1.0m where the trench was dug by 360° excavator. The joined pipe sections were manoeuvred into the trench by slinging from the excavator bucket, and the trench back-filled immediately; a stretch between 30m and 50m long was normally open at any time. The contractors – Murphy and T. K. Lynskey – worked from 6 a.m. to 7 p.m., but where safety considerations allowed, the trench was left open while no archaeologist was present.

Construction work began in July 2003, at the east end of the project on Lincoln Edge adjacent to the B1398, and moved westward to join up with the already completed western section north of Sturgate Airfield. Topsoil stripping had already taken place in the first stretch to which the contractors had access (area coloured blue, fig. 10) and trenching had just begun when PCA was informed that the works had started. The easement through Fields 1, 3 and 4 had been stripped: no stripping was to take place in Field 2, where the permitted access was not wide enough to accommodate a topsoil bund. The stripped area was dried out; the topsoil had not been removed cleanly, and in many places not to its full depth, and the method of stripping left the entire easement an indecipherable mass of track marks.

The trenching process was observed, apart from c. 140m at the east end of the easement, which had already been back-filled, and both the spoil heap and the topsoil bund were checked for stray finds. The already stripped easement in Field 4 – a stretch of c. 700m at the west end of the first phase – was fieldwalked: this was done informally and in a hurry, but a quantity of Roman pottery was recovered. In the light of this, a small excavation was proposed in the area of greatest concentration. The most westerly 250m of the easement was cleaned and remaining topsoil (a layer up to 100mm thick) removed by a 360° excavator provided by the contractors, using a 2.0m ditching bucket. Several archaeological features were seen, and a small team was brought in to excavate and record them (figs. 11 and 12). The excavation took place on the 29th and 30th of July, under the supervision of the author; the excavators were S. Matthewson and T. McCarthy. After its completion, trenching continued to the west edge of Field 4, where work was halted until access to the remaining fields was arranged.

Topsoil stripping began again on 19th August: the easement in Fields 5, 6, 7 and 8 was stripped under archaeological supervision (area coloured orange, fig. 10). A short stretch of ridge-and-furrow was seen south of Hermitage Low Farm in Field 6; no other features were seen, but the geophysical survey had identified two areas of potential interest (Sites 2 and 3, fig. 10). These were stripped to archaeological

standard with a machine provided by the contractors, and the features seen excavated and recorded: the work was carried out on August 21st by S. A. Savage. The project was then halted until access was granted to fields further west; no trenching took place.

Work restarted on September 2nd (area coloured purple, fig. 10), continuing the topsoil strip into Field 9; on this stretch of the project, fieldwalking was possible before the topsoil stripping began in each field, and the topsoil was then stripped under archaeological observation. Trenching began in Field 5 two days later. A specialised trenching machine was used, which cut the trench with a moving blade of chainsaw type and cast spoil to one side on a short conveyor belt. Observation was made easier, as the cut sections were much cleaner and there was less danger from moving plant, but retrieval of finds and identification of contexts from the spoilheap became virtually impossible, as the cast spoil was finely ground up and well mixed. A 360° excavator was used to cross ditches and existing pipelines, and was also used for the last two days of trenching (Fields 16 and 17) after the trenching machine broke down. Work was completed on 19th September, reaching the end of the western pipeline section at the east end of Field 17.

Contexts in Site 1 were recorded on standard context recording sheets, while those in Sites 2 and 3 were recorded on the site drawing sheets, and features seen during the general watching brief were recorded on standard watching brief recording sheets. Ridge-and-furrow, where seen, was drawn but not recorded. A drawn record at appropriate scales (chiefly 1:20) was maintained, and a photographic record on colour slide film. A selection of the photographs is reproduced in Appendix 1.

6.0 Results

6.1: General watching brief (figs. 14-15)

Very few features were seen during the general watching brief. During topsoil stripping, two small pit-like features were observed: [011], a sub-rectangular, steep-sided feature in Field 9, and irregular, curved pit [015] in Field 11. Pit [011] was filled by sandy clay 010, dark grey mottled light brown, mid reddish-brown and black, which had a burnt appearance, although no charcoal was visible in the fill (plate 14). Pit [015] was filled by fine-sandy clay 014, which was mottled light and dark grey, and contained streaks and patches of charcoal making up c. 10% of the fill (plate 16). Neither feature produced any finds, and both bore similarities to the smaller features [205] and [207] in Site 2.

One linear feature, ditch [013], was seen in the trench section between Fields 6 and 7 (fig. 16, plate 15). The ditch had a V-shaped section, steeper on the east side than on the west, and contained a single fill, mid brownish-grey sandy clay 012; a fragment of tile, visible in plate 15, was seen in the fill but could not be retrieved, as the trench was too deep and narrow to enter. It ran roughly N-S, parallel to and about 2m east of the current field boundary, which is represented only by a change in crop, and presumably represents a previous field boundary. The present

landowner remembers this ditch being filled in by his predecessor, using waste soil from sugar beet processing (Mr. Morris, *pers. comm.*).

6.2: Site 1 (figs. 12 and 13)

Site 1 was situated in Field 4, and contained two linear features: ditch [104], running NE-SW, and smaller ditch or gully [103], running NNW-SSE from the SE side of [104]. The NNW end of [103] was truncated by a large field drain cut, and it is not known whether it connected to [104], although it did not reappear on the NW side of it. Ditch [104] was 2.3m wide with a U-shaped section 0.70m deep (plate 5), and was filled with very compact silty clay 107, which produced 61 sherds of Iron Age and Romano-British pottery (appendix 2) from the machined surface and a relatively narrow section (due to pressure of time and the extreme hardness of the fill, the width of the excavated section had to be reduced from 1.25m to 0.6m) Fill 107 also produced poorly preserved teeth from cattle, sheep and horse (appendix 3); no other bone was found. Ditch [103] was only 0.13m deep, with a flat base (plate 4), and contained compact sandy clay 102, which produced 5 sherds of pottery.

The site also contained four smaller features. The short, shallow feature [108] may have been the truncated end of a ditch or gully similar to [103]. It ran 1.25m NNW from the NW side of ditch [104], but was so shallow at the interface (0.10m) that in the very dry conditions it was impossible to ascertain a relationship. It contained two fills: a very dark grey clay 109 overlying compact mid brownish-grey clay 114. Neither produced any finds. Pit [106], on the northern edge of the stripped area, was a rectangle 2.0m long and 0.6m wide with a very dark grey clay fill, which at first appeared likely to be a grave (plates 3 and 6). On excavation, no human bone was found: fill 105 produced only eight sherds of pottery, including one fragment of Samian ware (appendix 2), and a number of long bone fragments from cattle and sheep (appendix 3). Directly NW of [106] was a small, sub-oval pit, [111], and a similar pit, [113], was situated outside the main area of excavation, 43m from the west end of the field. Pit [111] proved to be a truncated base, 0.54m long but only 0.03m deep, and contained a mid-grey sandy clay fill, 110, which was mottled dark grey and light red but did not appear burnt: it produced 3 fragments of pottery (appendix 2). Pit [113] was sub-circular, 0.5m in diameter and 0.2m deep, containing silty clay fill 112: it produced no finds.

6.3: Site 2 (fig. 13)

Site 2 was situated in Field 6. The archaeologically stripped area showed six medieval plough-furrows running NNW-SSE, each of which was cut by a modern field-drain (plate 7). Two very small features, [205] and [207], were seen (although it is possible that both were parts of one feature of very irregular depth). [205] was roughly sub-oval, 0.6m long and 0.06m deep with a concave profile, filled by very dark grey sandy clay 204, while [207] was 0.44m long and 0.17m deep and very irregular; its fill, 206, was similar to 204 (plates 8 and 9). Neither contained finds.

6.4: Site 3 (fig. 13)

Site 3 was situated in Field 8, on the other side of the main site access road from Site 2. Two medieval plough furrows were seen on the east side of the site, running NNW-SSE; both were cut by modern field drains. Further to the west, also running NNW-SSE, was a narrow linear feature, ditch [305]. The ditch was 1.32m wide and 0.28m deep, with a shallow, concave profile (plate 11). It contained light greyish-brown sandy clay 304, which produced no finds. Although no furrows were seen within 18m of ditch [305], it is possible that it represents a field boundary, as it runs parallel to the furrows, and no further furrows were seen to the west of it (conditions throughout the project were very dry and visibility frequently poor, and it is possible that not all the furrows in the area were seen).

7.0 Discussion and Conclusions

The gradiometer survey produced no significant results due to the presence of the existing pipe and therefore this methodology was abandoned in favour of magnetic susceptibility. The magnetic susceptibility results appear to show some correlation with the subsequent watching brief where features were identified and recorded Fields 4, 6, 8, 9 and 11). However, in other fields that did not reveal any archaeological remains but where high magnetic susceptibility readings were recorded these probably indicate a relatively recent episode of topsoil magnetic enhancement from modern agricultural practices.

Most of the features seen during this project appear to refer to medieval and post-medieval land use. The bases of ploughed-out furrows in Sites 2 and 3 show the presence of medieval strip-farmed communal fields, while ditches [013] and [305] may be of similar date, or may represent the smaller field systems into which the large village fields were divided following enclosure. The recent date for the back-filling of ditch [013] is typical, as small fields are now frequently amalgamated to accommodate large modern agricultural machinery. It cannot be ruled out that furrows were present in Site 1 – the pattern of truncation of features [103] and [108] is commensurate with the existence of furrows running NE-SW parallel to one of the modern field drainage grids – but that due to the very dry conditions and the disturbance caused by the intensive field drainage, they were not recognised.

Features [011], [015], [205] and [207], all of which were irregular in shape, with very dark fills and no finds, have no obvious purpose and may well not be man-made at all: it is possible that they are natural disturbances caused by root action or animal burrowing, and that the dark colour of the fills is due to the decay of organic material within them.

Site 1 in Field 4 appears to be an area of some archaeological significance, with evidence for considerable Romano-British activity, although the area sampled was too small to determine what activity was taking place. If feature [108] is the truncated end of a shallow ditch running into larger ditch [104], as feature [103] appears to be, this suggests that the area was being drained and/or enclosed as farmland. However, the quantities of pottery recovered from this area are much in

excess of those that would normally be expected on agricultural land, suggesting that there must have been a settlement nearby; the bone assemblage is entirely from large domestic animals, but its condition is too poor to ascertain any information beyond identifying their species (e.g. there is no indication whether or not the animals had been butchered and eaten). The pottery from Site 1 dates chiefly to the 1st and 2nd centuries AD. Three sherds from pit [106] are similar to vessels associated with the Roman fortress and defences at Lincoln, which, with the early date of the majority of the material, may indicate a military presence during the early years of Roman rule in Lincolnshire (appendix 2).

8.0 Effectiveness of Methodology

The methodology applied was broadly appropriate to the situation of the project, as the archaeological remains were widely, and for the most part singly, scattered throughout the pipeline route, requiring little archaeological intervention. However, this methodology relied for full effectiveness on monitoring and evaluation being done well in advance of, as well as simultaneously with, the construction works. Due to repeated communication failures with the contractors, the advance monitoring (fieldwalking, geophysical survey and trial excavation) was at best done in haste, barely ahead of the works, and in some areas was done in very unfavourable conditions or not done at all. Consequently, it cannot be ruled out that the archaeological representation of this area may not be as complete as it might have been in optimum conditions.

9.0 Acknowledgements

Pre-Construct Archaeology (Lincoln) and Pre-Construct Geophysics would like to thank Transco plc for this commission.

10.0 Bibliography

Albone, J. 2002, *Desk-based assessment of the archaeological implications of a proposed pipeline between Gainsborough and Caenby Corner, Lincolnshire.* APS Report no. 211/02.

British Geological Survey, 1999. *Market Rasen.* England and Wales Sheet 102. Solid and Drift Geology. 1:50 000 Provisional Series. Keyworth, Nottingham: British Geological Survey.

Cameron K., 1998, *A Dictionary of Lincolnshire Place-Names*. English Place-Name Society, Nottingham.

Clark, A 1990 *Seeing Beneath The Soil*, Batsford, London

English Heritage 1995 *Geophysical Survey in Archaeological Field Evaluation, Research and Professional Services Guideline No. 1*

Everson, P.L., Taylor, C.C. and Dunn, C.J., 1991, *Change and Continuity: Rural Settlement in North-West Lincolnshire*. HMSO, London.

IFA, 1999, *Standard Guidance for Archaeological Excavations.* Birmingham, Institute of Field Archaeologists.

LCC, 1998, *Lincolnshire Archaeological Handbook: A Manual of Archaeological Practice.* Lincoln, Built Environment Section, Lincolnshire County Council.

Morgan P. & Thorne C., (eds.), 1986, *Domesday Book: vol. 31: Lincolnshire.* Phillimore & Co. Ltd, Chichester.

Pevsner N. & Harris J., 1989, *The Buildings of England, Lincolnshire*. Butler & Tanner Ltd, Frome & London.

11.0 Site Archive

The documentary and physical archive is currently in the possession of Pre-Construct Archaeology (Lincoln). This will be deposited at Lincoln City and County Museum within six months. Access to the archive may be gained by quoting the global accession number 2003.337

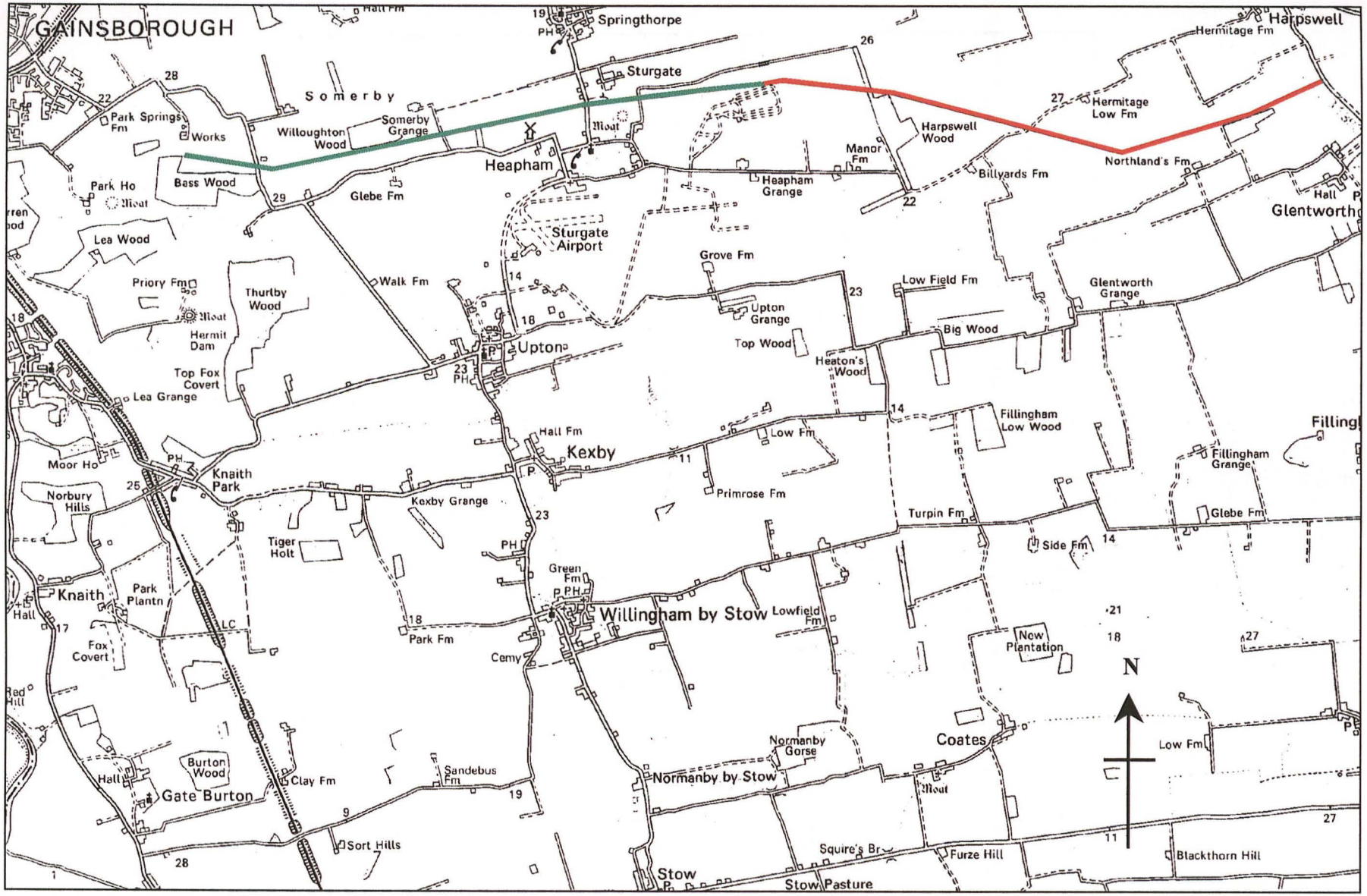


Fig. 2: Map of the pipeline route, showing the previous year's section in green and the section covered by this report in red. Scale 1:50 000.
O.S. Copyright licence No. AL 515 21 A0001

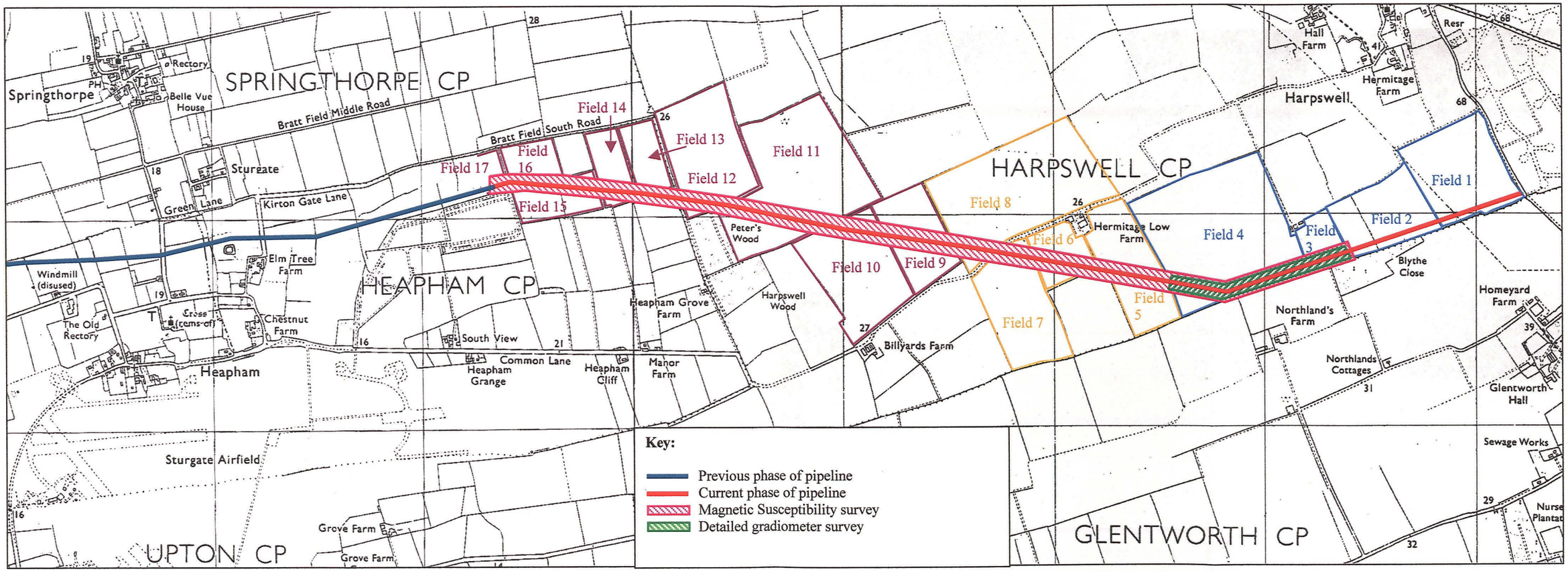


Fig. 3: Map showing the location of magnetic susceptibility and gradiometer survey areas. Scale 1:20 000.
O.S. Copyright licence no. AL 515 21 A0001.

Caenby Corner

Field 3

5 SI 18

turn

Field 4

7 SI 19

N

60m

SI Units = $x10^{-5}$
Volume Suscepibility

Field-5

7 SI 19

Fields 6 and 7

7 SI 19

Field 8

7 SI 19

Field 9

7 SI 17

Field 10

6 SI 19

Field 11

7 SI 20

Field 12

10 SI 20

Field 13

10 SI 18

Field 14

7 SI 27

Field 15

8 SI 22

Field 16

9 SI 16

Field 17

9 SI 13

Fig. 4 – Magnetic Susceptibility survey plots, scale 1:2000

Gainsborough

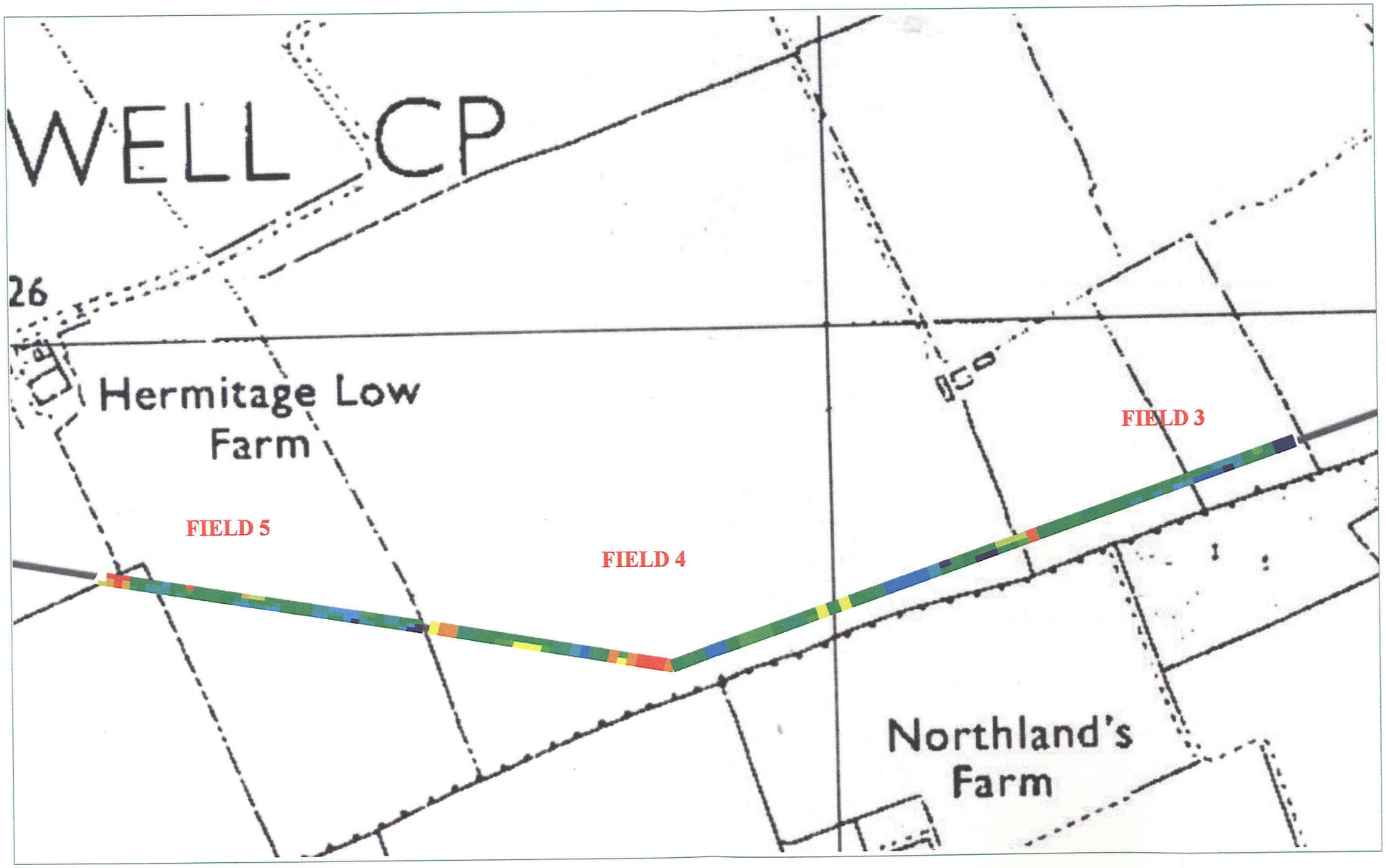


Fig. 5 - Magnetic Susceptibility survey results for fields 3-5, scale - 1:5000

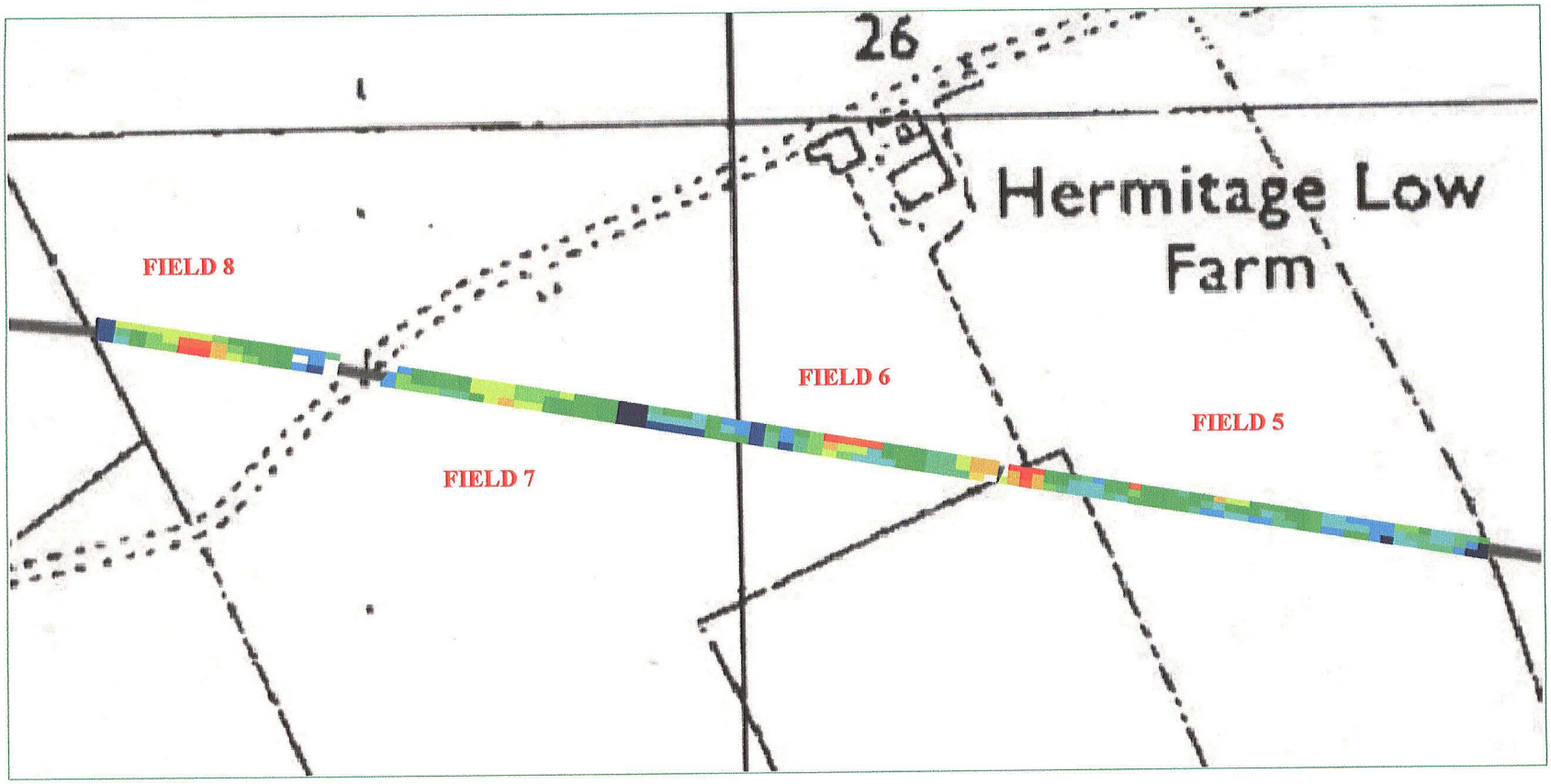


Fig. 6 - Magnetic susceptibility survey results for Fields 6-8, scale 1:5000

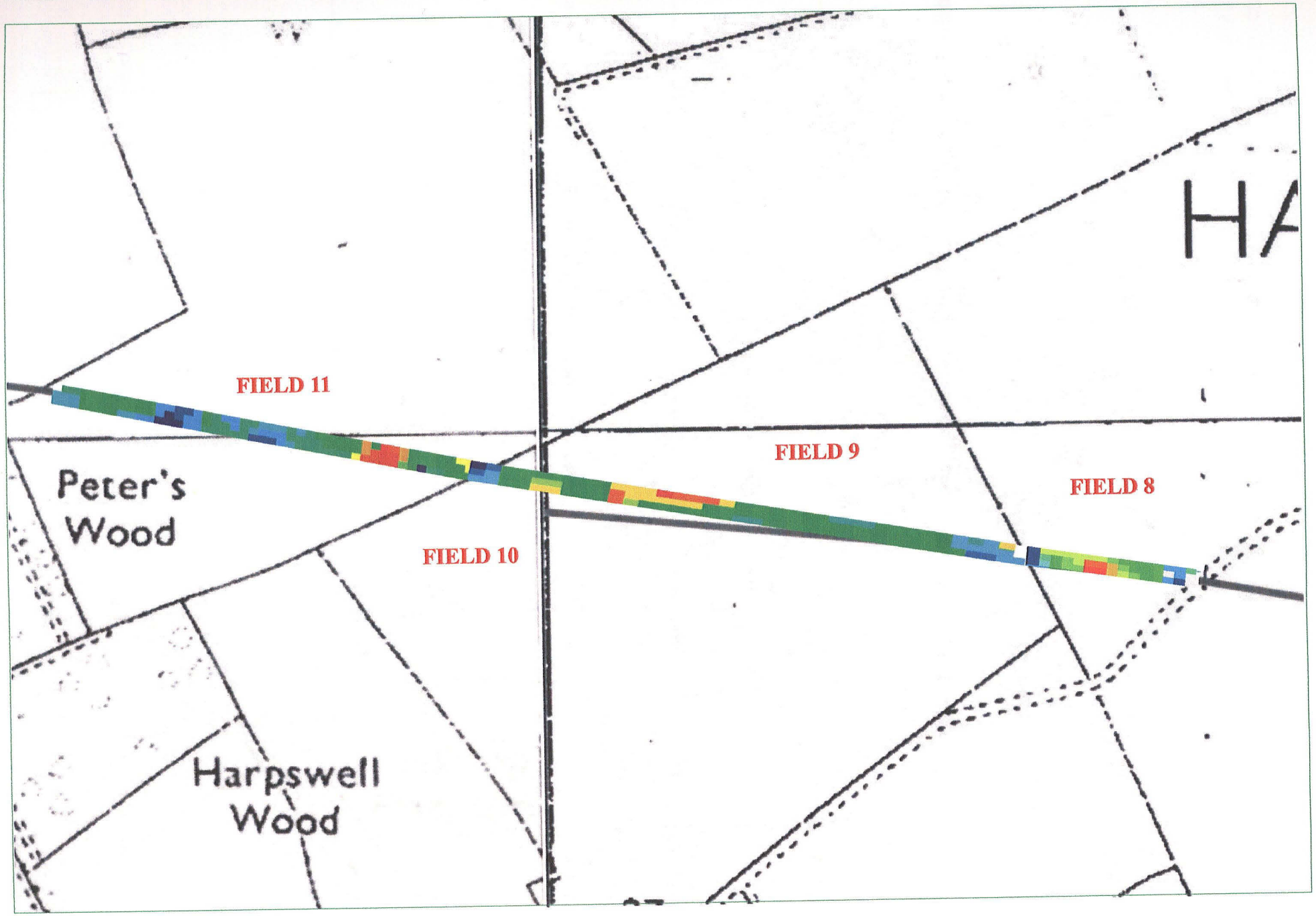


Fig. 7 - Magentic Susceptibility survey results - Fields 8-11, scale 1:5000

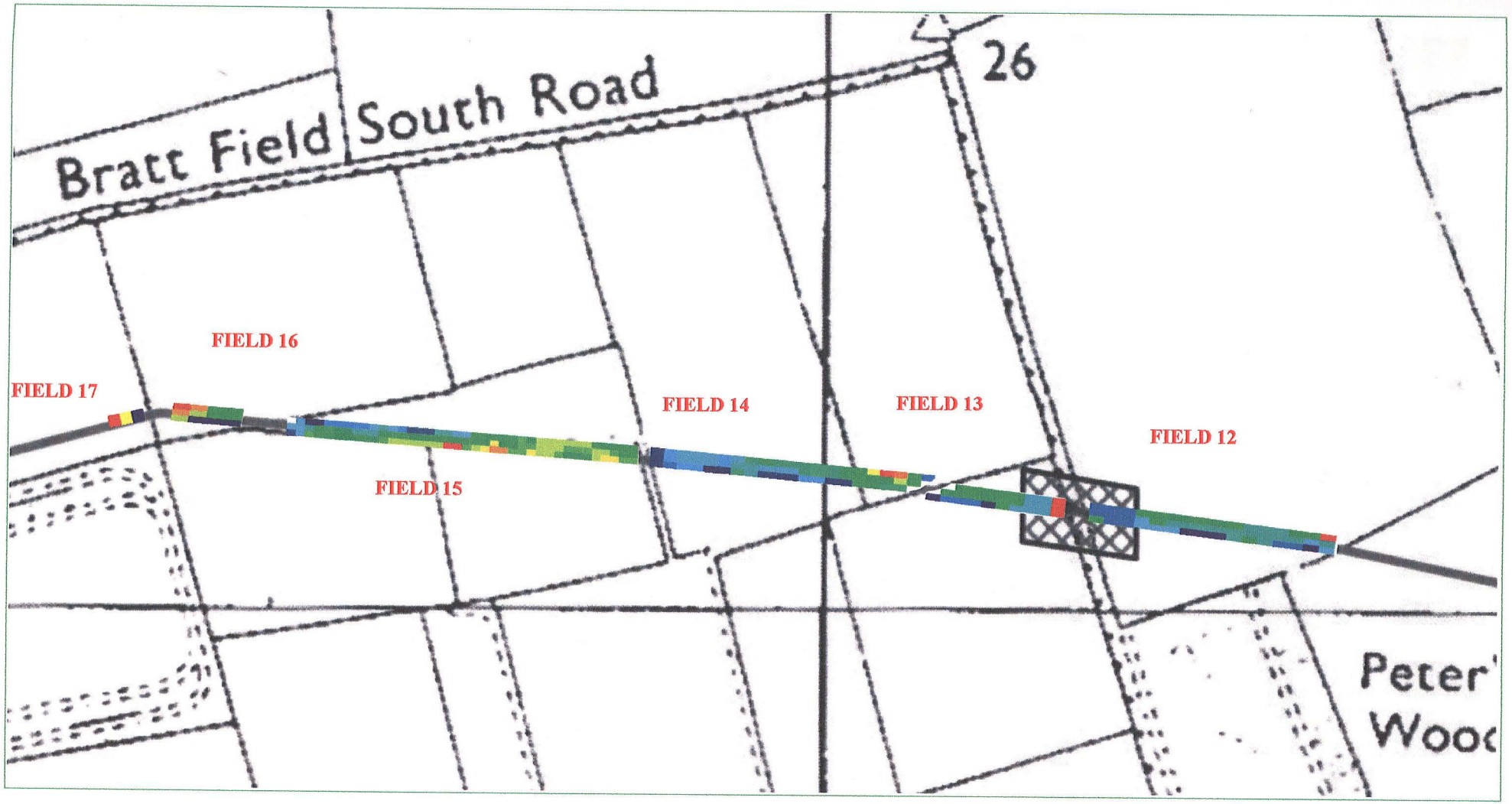


Fig. 8 - Magnetic Susceptibility survey results - Fields 12-17, scale 1:5000

Gainsborough

Field 4 - West

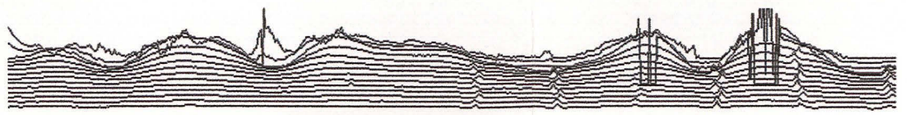
GREYSCALE IMAGE OF RAW DATA

-83.61 nT 105.09

GREYSCALE IMAGE OF ENHANCED DATA

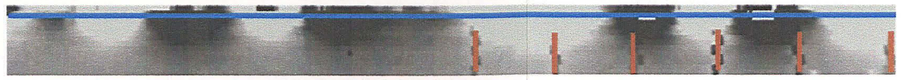
-30 nT 38

TRACE PLOT OF UNCLIPPED DATA



377.41nT

INTERPRETIVE IMAGE



N

Field 4 - East

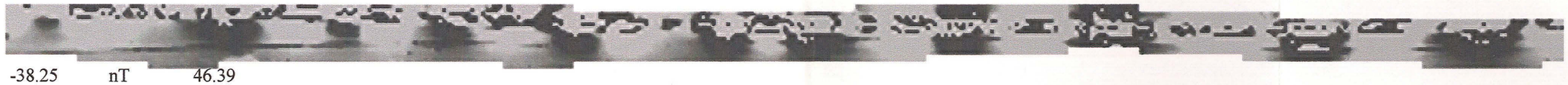
GREYSCALE IMAGE OF RAW DATA

-195 nT 256.14

TRACE PLOT OF UNCLIPPED DATA

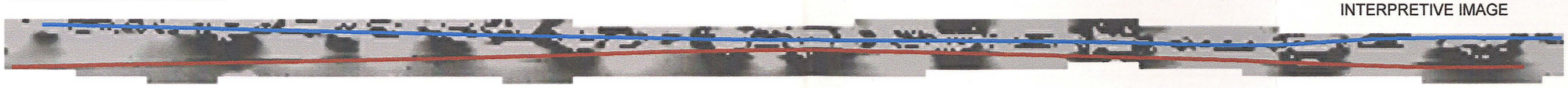
903.28nT

GREYSCALE IMAGE OF ENHANCED DATA



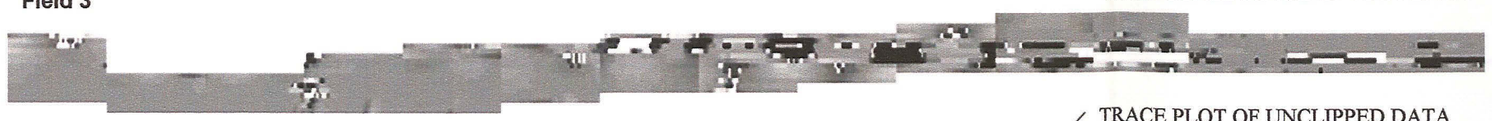
-38.25 nT 46.39

INTERPRETIVE IMAGE



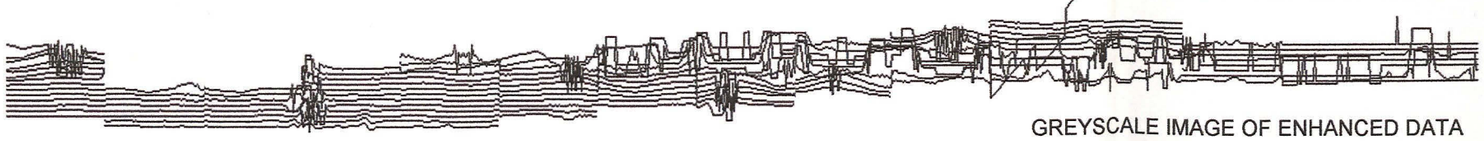
Field 3

GREYSCALE IMAGE OF RAW DATA



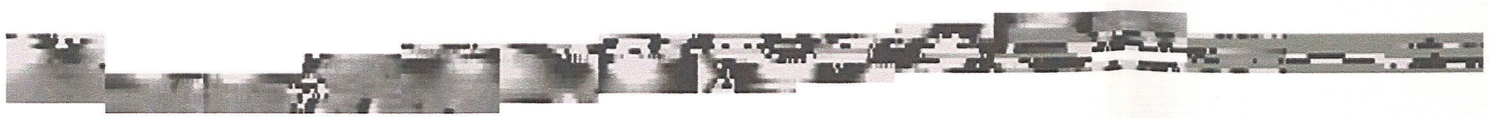
-184 nT 303

TRACE PLOT OF UNCLIPPED DATA



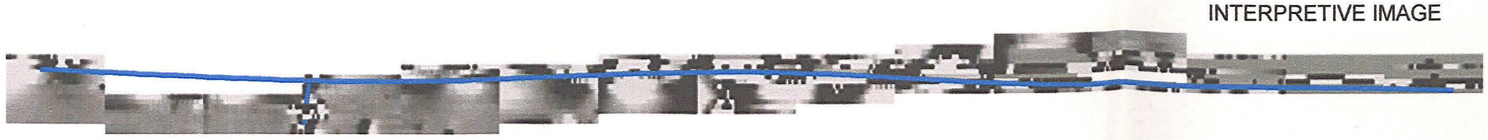
780.62nT

GREYSCALE IMAGE OF ENHANCED DATA



-26.87 nT 40

INTERPRETIVE IMAGE



Exiting pipe

Land drains

N

60m

Caenby Corner

FIG 9:Grey scale and trace plots of unclipped data **1:1250**

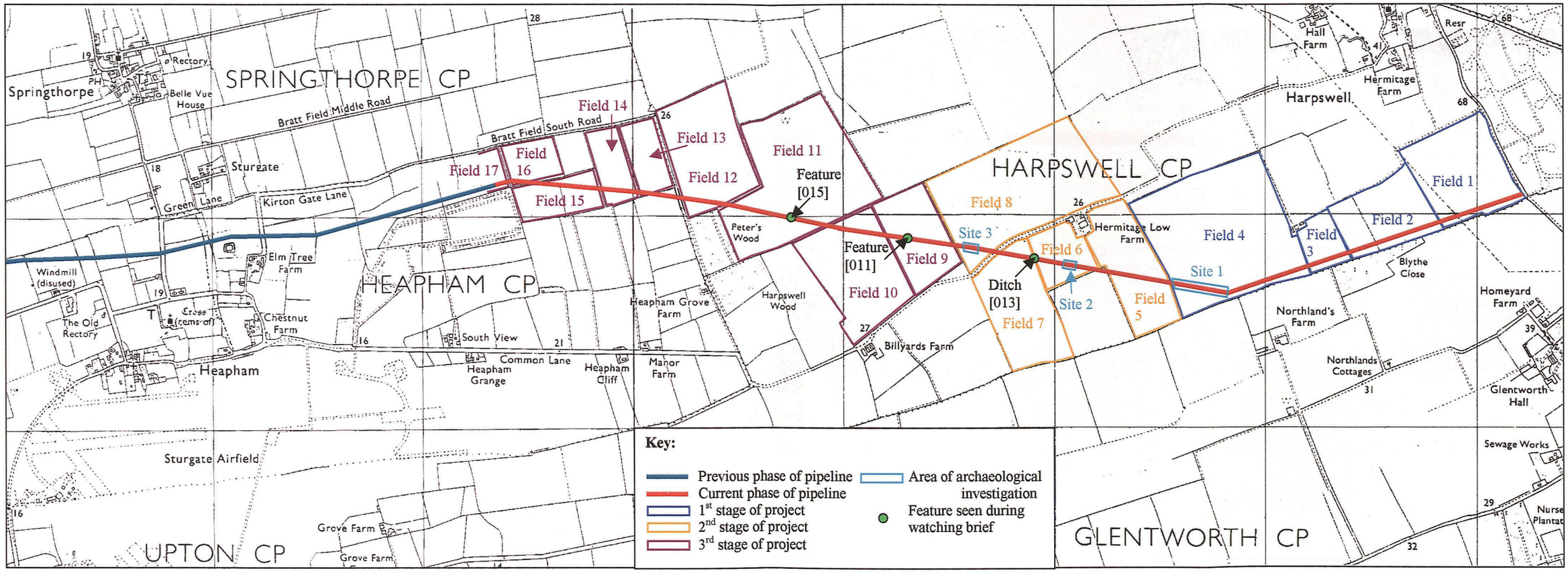


Fig. 10: Map of the current phase of the pipeline route, showing the phases of work and the locations of archaeological features. Scale 1:20 000.

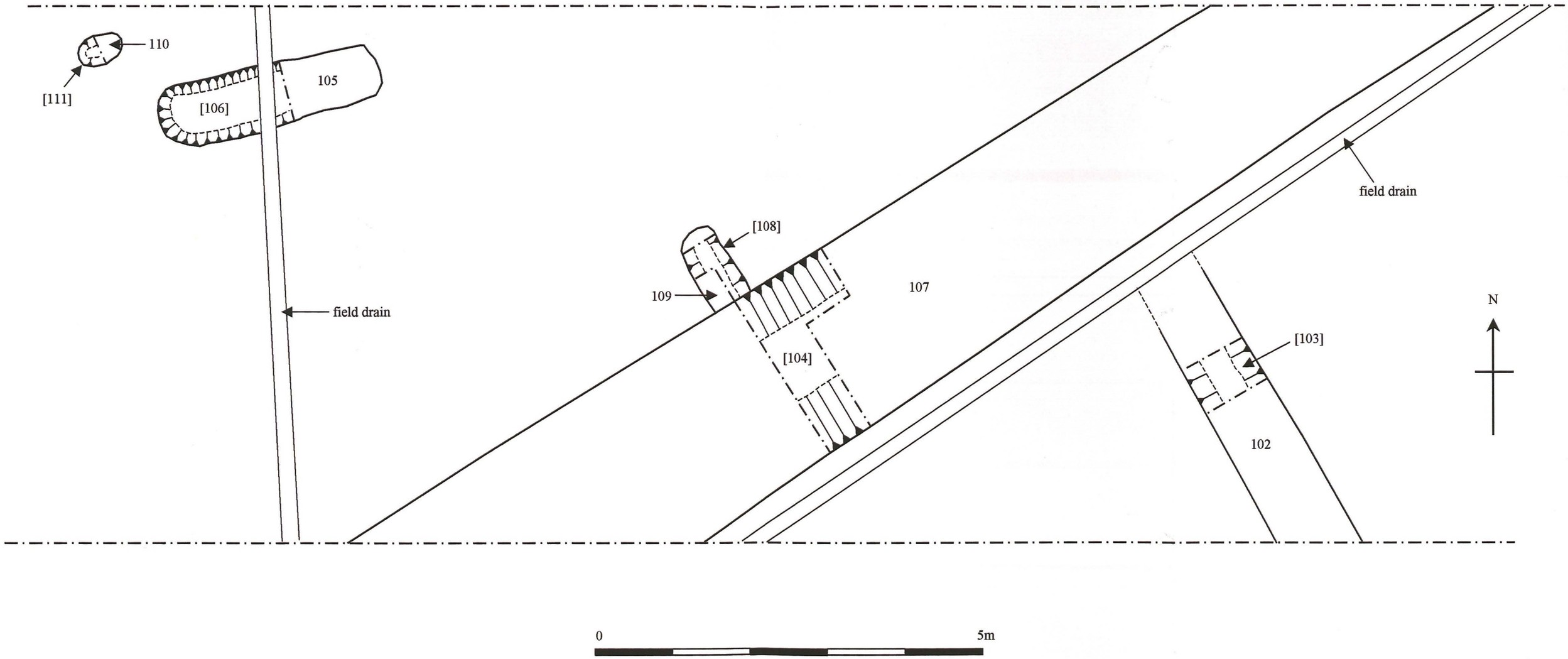


Fig. 11: Plan of Site 1 (outlying feature [113] does not appear). Field drains are shown only where they intersect the archaeology. Scale 1:50.

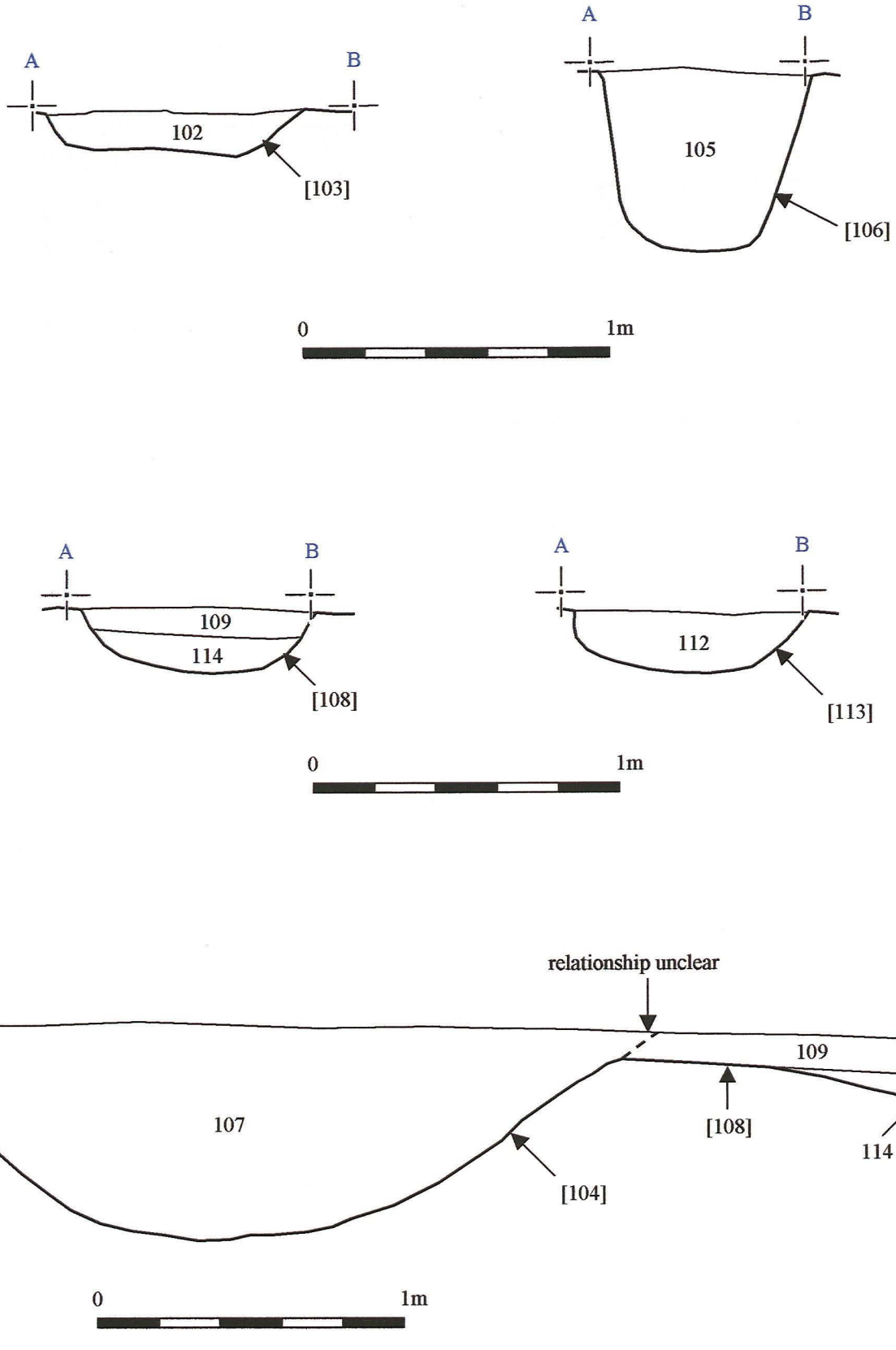
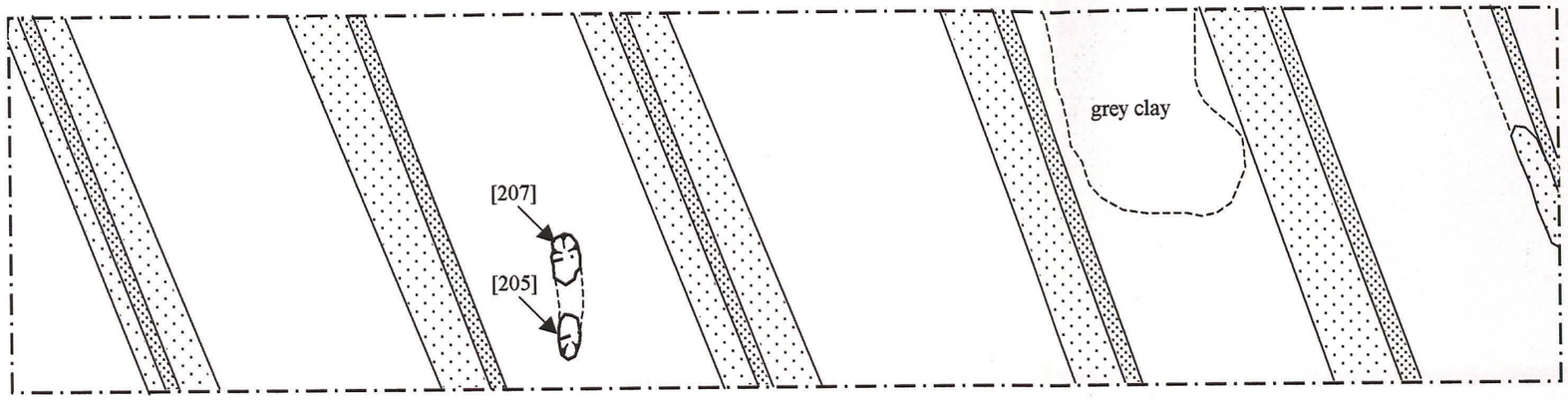
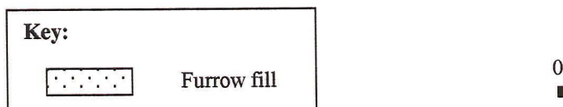
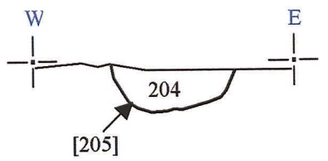
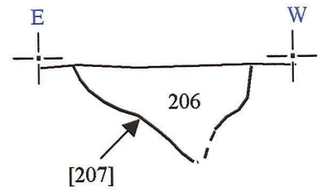


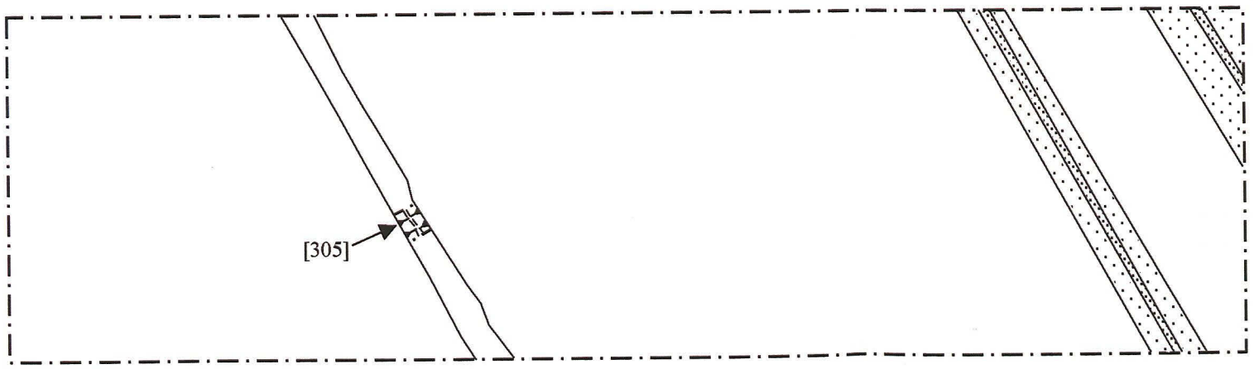
Fig. 12: section drawings of features in Site 1, scale 1:20











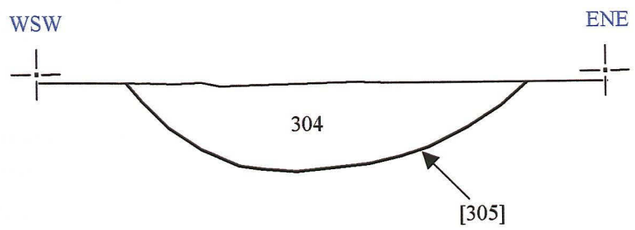


Fig. 13: plan and section drawings of Sites 2 and 3. Plans at scale 1:200, sections at scale 1:10.

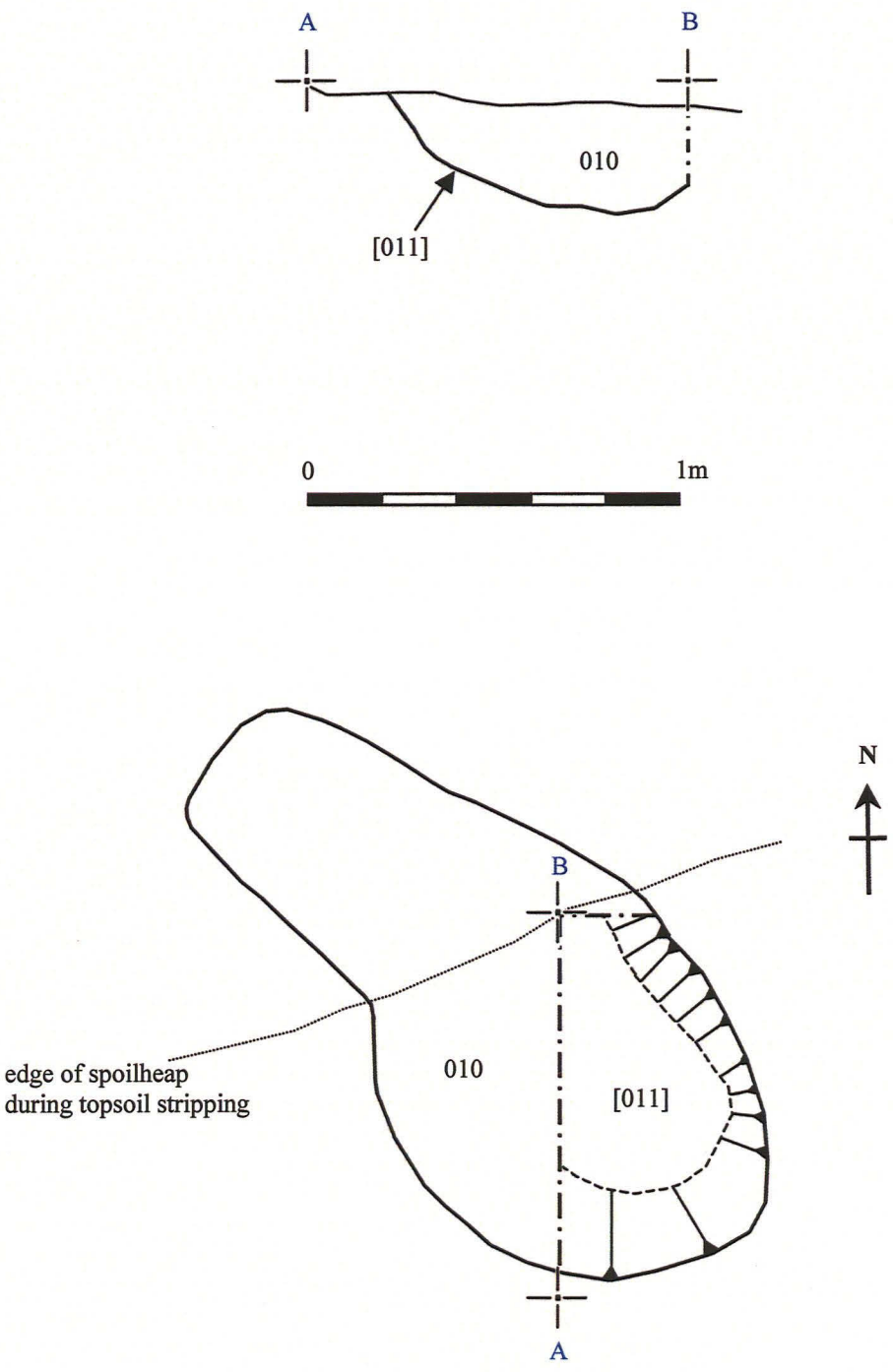


Fig. 14: Section and plan of small feature [011] in field 9. Scale 1:20.

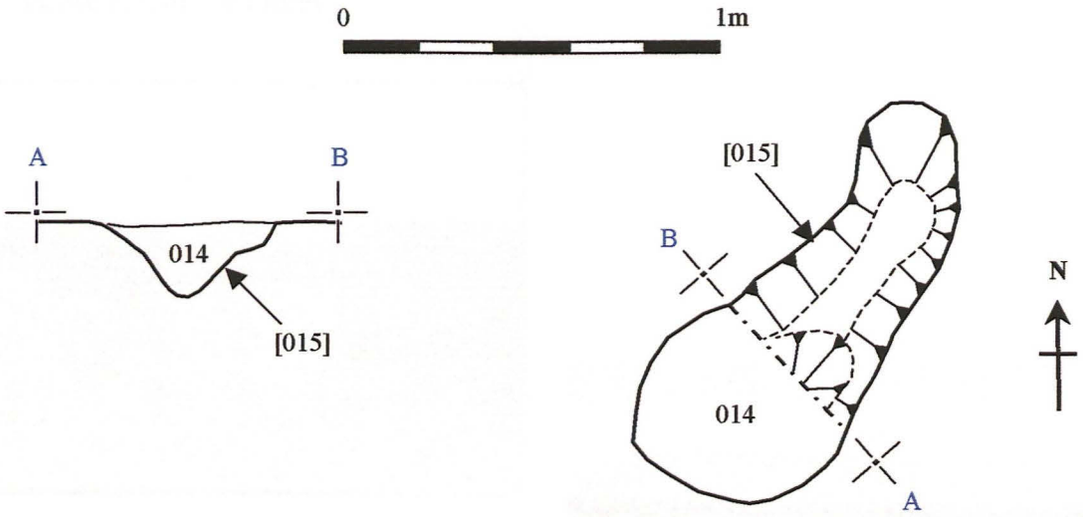


Fig. 15: section and plan of small feature [015] in field 11. Scale 1:20.

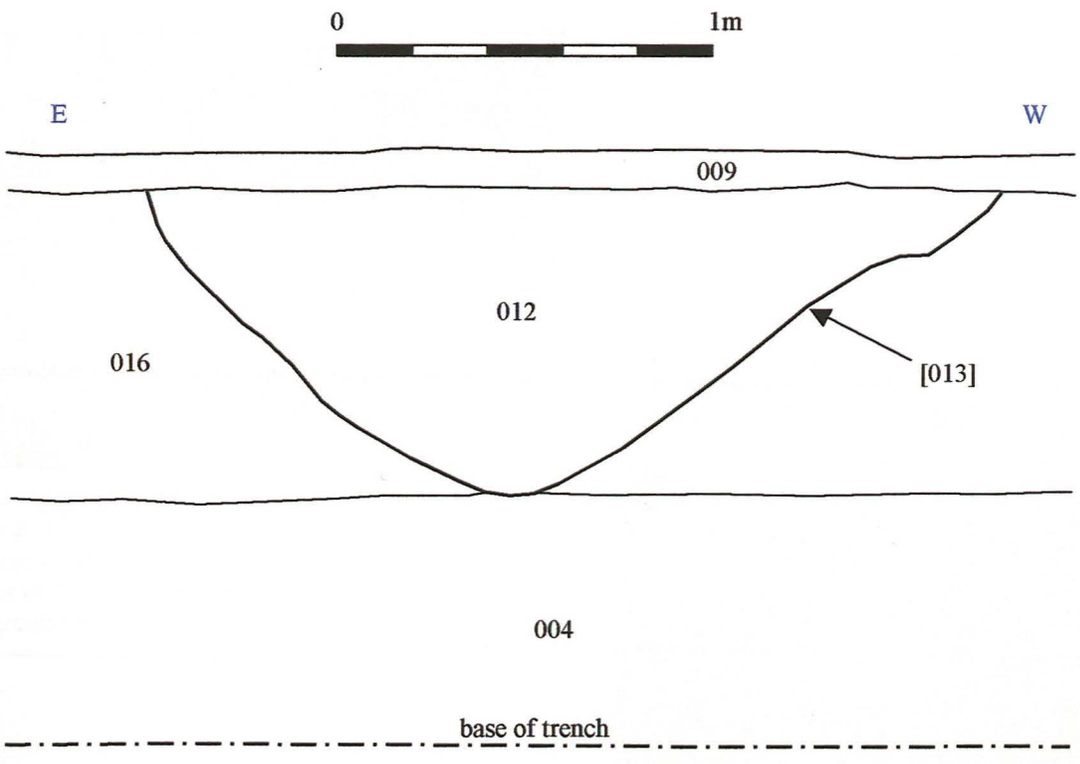


Fig. 15: N facing section of field boundary ditch [013] in the side of the pipe trench. Scale 1:20.

Appendix 1: Colour Plates

Plate 1: General shot of the pipeline route from the E end, showing the extent of the Phase 1 topsoil strip, and trenching in progress at the W end of Field 1.

Plate 2: Fieldwalking being carried out on the previously topsoiled easement in Field 4, showing the rutted and weathered condition of the strip.

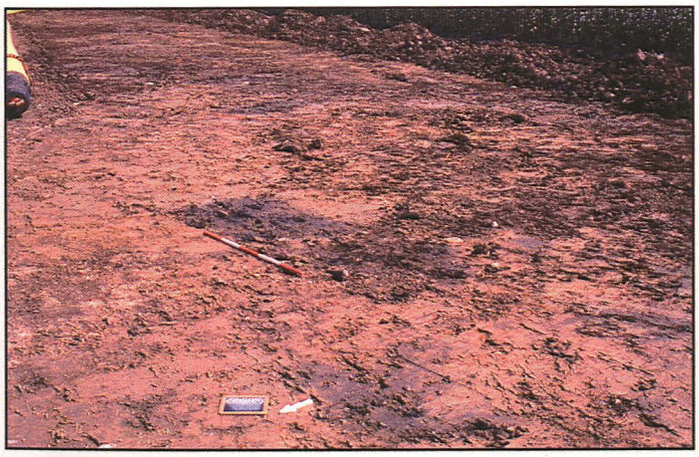


Plate 3: The concentration of archaeological features in Site 1 after machining, from the NW corner of the site. Feature [111] is in the foreground, with pit [106] near the scale bar.

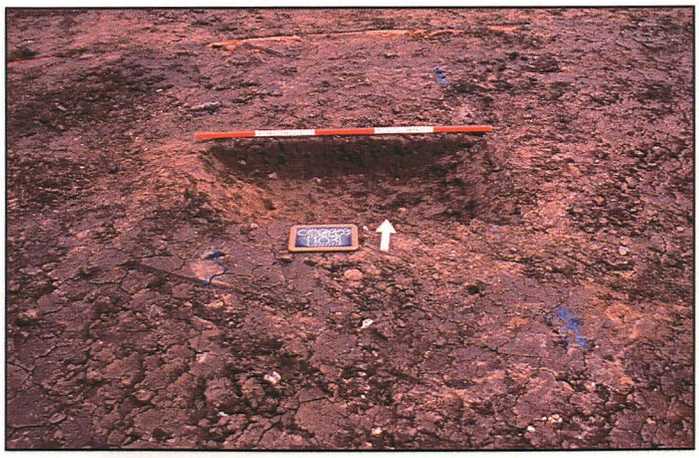


Plate 4: Linear feature [103] in section. The ditch does not continue beyond the field drain in the background.

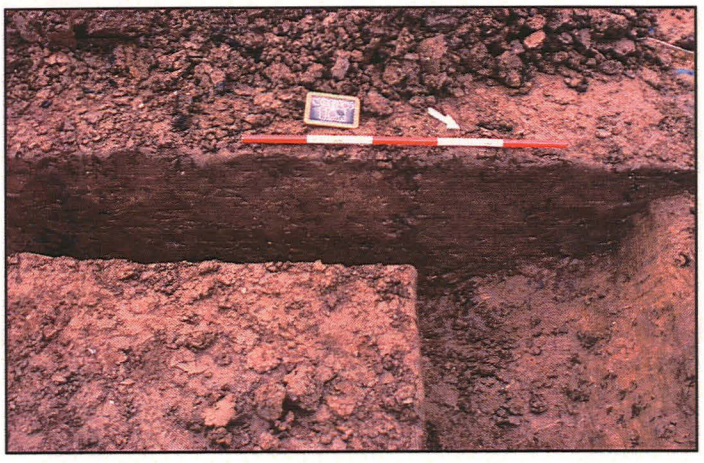


Plate 5: Section through ditch [104]. The original width of the section (on the right of the photo) had to be reduced, due to the very compact fill.

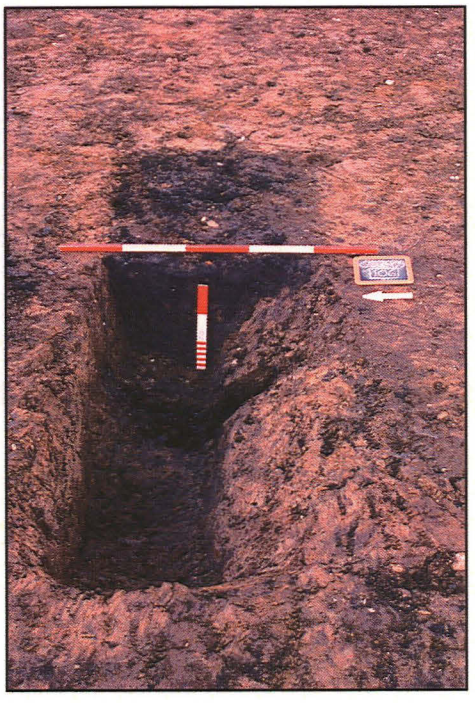


Plate 6: Pit [106] after excavation. The pit is bisected N-S by a deep field drain.

Plate 7: General shot of Site 2 during archaeological machining, looking NW. Medieval plough-furrows can be seen running across the stripped area.

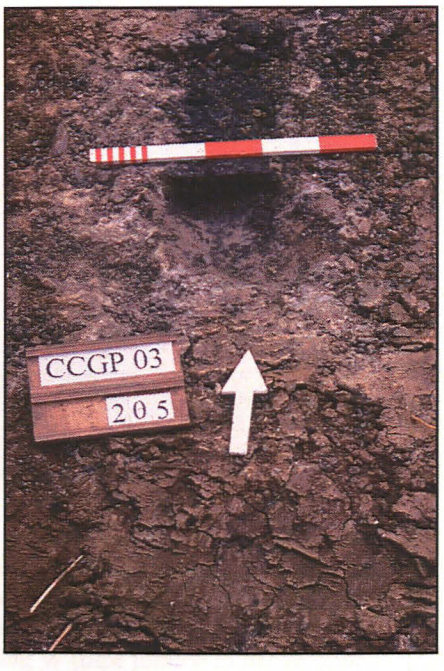


Plate 8: Small feature [205] in Site 2 after excavation, looking N.

Plate 9: Small feature [207] after excavation, looking S.

Plate 10: General shot of Site 3 after machining, looking E.

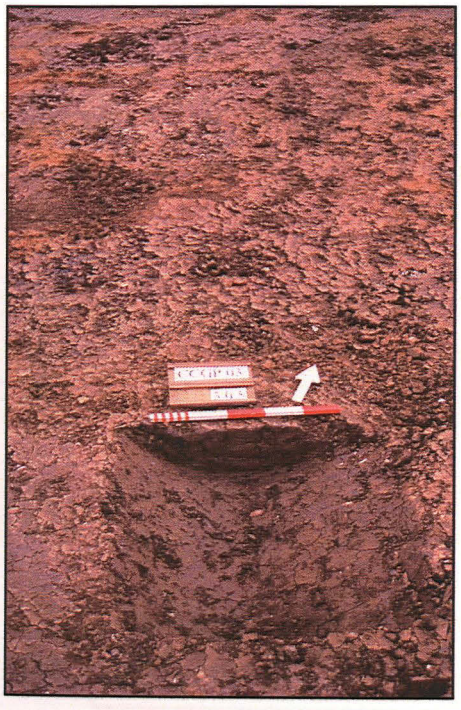


Plate 11: Section through ditch [305], looking NW.

Plate 12: Working shot: trenching, pipe laying and back-filling in Field 14, looking W (pipe joining in background).

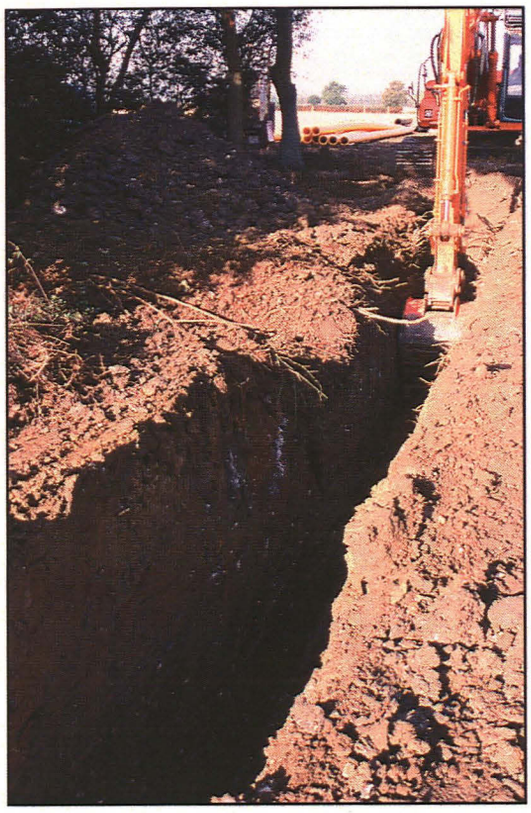


Plate 13: Section of the pipe trench passing through Peter's Wood, looking W.

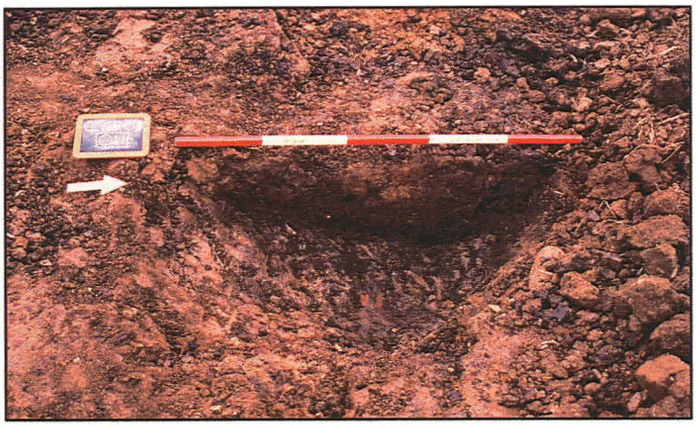


Plate 14: Pit [011] after excavation; the feature is not completely exposed on the north side, as topsoil stripping is still in progress.

Plate 15: Field boundary ditch [013] exposed in the pipe trench section.

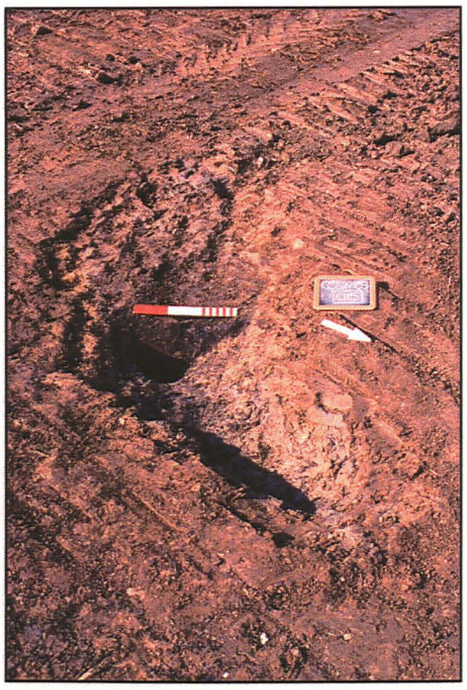


Plate 16: Pit [015] after excavation, looking SW.

Appendix 2

REPORT 149 ON POTTERY FROM THE CAENBY CORNER-GAINSBOROUGH PIPELINE, LINCOLNSHIRE, CCGP03

for PRE-CONSTRUCT ARCHAEOLOGY

by Margaret J. Darling, M.Phil., F.S.A., M.I.F.A.

25 November 2003

The Roman pottery amounted to 106 sherds, weighing 1.198kg from nine deposits, including five relating to topsoil and field walking. The pottery is fairly fragmented and abraded, the average sherd weight overall being only 11.3g sherd; the group from the field walking on Site 1 is in particularly poor very abraded condition. No problems are anticipated for long term storage. The pottery has been archived using count and weight as measures according to the guidelines laid down for the minimum archive by *The Study Group for Roman Pottery*. The archive record (below Appendix 3, and available on disk) will be curated for future study. The archive codes are in Appendix 4.

INTRODUCTION

Apart from four sherds from fields 3, 9 and 11, all the pottery came from field 4. Details of the pottery quantities and dating are in Table 1.

Table 1 Quantities and dating

Field	Cut	Deposit	Cxt	Sherds	Weight	Date	Comments
4	103	N-S ditch	102	5	49	ML2?	Mixed dates; no strong date
4	106	Pit	105	8	99	1-EM2?	No strong date
4	104	Ditch NE-SW	107	61	777	ML2?	Abraded;mixed dates
4	111	Pit	110	3	11	L2-3?	
4	-	Fwalk Site 1	FW1	24	235	2C?	Abraded; no good dating
3	-	Topsoil	TS3	2	7	3C?	
9	-	Topsoil	TS9	1	4	ROM	
11	-	Topsoil	TS11	1	4	ROM	
4	-	Unstrat	US4	1	12	ROM	from end strip to 68m.
			Total	106	1198		

No sherd links were noted between contexts. Of the stratified deposits, only the ditch 104 contained any quantity of pottery, and this was not only abraded but of mixed dates, as also occurred with the few sherds from ditch 103.

OVERVIEW OF FABRICS AND VESSEL FORMS

The fabrics are detailed on Table 2 below.

Table 2 Fabrics

Fabric	Code	Sherds	%	Weight	%
Colour-coated	CC	2	1.89	4	0.33
Cream	CR	3	2.83	29	2.42
Grey quartz-gritted	GREY	71	66.98	594	49.58
Grog-tempered	GROG	18	16.98	303	25.29
Grey sandy	GRSA	1	0.94	51	4.26
IA tradition gritty	IAGR	2	1.89	57	4.76
Shell-gritted IA tradition?	IASH?	2	1.89	76	6.34
Lincoln 'Legionary' grey	LEG?	1	0.94	15	1.25
Oxidized quartz-gritted	OX	1	0.94	9	0.75
Oxidized light	OXL	2	1.89	15	1.25
Parisian ware	PART	1	0.94	5	0.42
Samian South Gaulish	SAMSG	1	0.94	4	0.33
Shell-gritted common medium	SHCM	1	0.94	36	3.01
Total		106	100	1198	100

The bulk of the sherds are in common grey quartz-gritted fabrics (GREY), but a notable quantity representing over 25% on weight is in grog-tempered fabrics (GROG), which usually tend to overlap with the late Iron Age tradition gritty fabrics (IAGR). Contemporary with these fabrics are the two shell-gritted vessels (IASH, SHCM). Together these coarser early fabrics account for 22% on count and over 39% on weight.

Moreover the single samian sherd (from pit 106) is from a decorated bowl, probably of form 29, from South Gaul, of 1st century date. There are also two vessels with parallels in the deposits relating to the legionary fortress at Lincoln: a cream flagon, no 1, is of a type common at the early Rhineland fort of Hofheim (Ritterling 1913, Abb 62, no 1, variant of type 50), similar to vessels seen in Lincoln, and a body sherd in an early finer grey fabric (LEG) from a jar decorated with probably nodular rustication. Taken with the early coarser vessels, nos 5-7, also common in the earliest deposits in Lincoln, this is a notable collection of early 1st century vessels from such a small mixed assemblage. While the coarser vessels, cooking pots and bowls in late Iron Age tradition, are likely to have had a fairly long life, continuing into the 2nd century, these early sherds all appear to be residual in the deposits in which they occur. The pit 106 also contains a lid-seated jar in a harsh grey fabric (similar in form to no 4 from Ditch 104) which resembles a particular type seen in a large deposit on the defences in Lincoln (Darling 1984, fig 15, no 58) which contained legionary period sherds and later wares, with a *terminus post quem* of *c.* AD140. The type is one of the main products of the Roxby kilns in North Lincolnshire (Rigby & Stead 1976, 138-147, type A), also of Antonine date. There is also the base of a Parisian (PART) beaker from the ditch 104, no 2, likely to date to the latter part of the 2nd century.

The only sherds for which a date after the 2nd century seem likely are the two colour-coated sherds, the coarser texture fabric (from field 3) being not certainly from the Nene Valley potteries; these came from the topsoil in field 3 and from pit 111 on site 1. A rim fragment from a jar with a

curved rim from the field walking on site 1 is a type that could also occur in the 3rd century, but the dating is inconclusive on this fragment.

CONCLUSIONS

This small assemblage therefore has many problems of interpretation, with evidence for very early Roman activity, possibly connected with the Roman army, sparse abraded and fragmentary pottery of 2nd century date, not closely datable, and only the occasional sherd likely to date to the 3rd century. The main evidence is from site 1 in field 4. The occurrence of native tradition cooking vessels in this area would occasion little surprise. It is the association of these vessels, known to have been used extensively by the Roman army in the legionary fortress at Lincoln, with South Gaulish decorated samian, a cream flagon of early type and sherd from a rusticated jar in a fabric known from the legionary fortress deposits that is extremely unusual. Occasional sherds of similar pottery have been found at Old Winteringham on the Humber estuary (Rigby & Stead 1976, figs 74, 75, no 28) but a military establishment is more likely in that location. Without further evidence from the area, it is impossible to speculate as to how this pottery arrived on this site, too close to the legionary fortress at Lincoln for a military site. Soldiers on exercises or duty from the fortress might make a temporary camp, but pottery vessels would be highly unlikely. Moreover, these earlier sherds are associated with 2nd century pottery, so some interaction between military and civilian may be considered.

CATALOGUE

Illus	Fabric	Details	Cxt	DNo
1	CR	Flagon with collared rim of Hofheim type, fine fabric	105	02
2	PART	Probably a beaker, footring base, ribbed above, in typical dark grey silty fabric, burnished.	107	07
3	GREY	Cooking pot	107	05
4	GRSA	Slightly lid-seated jar in a rounded pebbley fabric, burnt rim.	107	06
5	GROG	Cooking pot of traditional late Iron Age type, abraded grey vesicular fabric with light-brown surfaces, probably wheel-made.	102	01
6	GROG	Bowl, late Iron Age type, light grey fabric with grey grog inclusions, wheel-made.	107	04
7	SHCM	Bowl, late Iron Age type, dark grey vesicular fabric with grey-brown surfaces, sooted externally, possibly wheel-made.	105	03

FABRIC DEFINITION

Publication of *The National Roman Fabric Reference Collection*, abbreviated NRFRC (Tomber and Dore 1998), obviate the need to describe the major imported and widely traded Romano-British wares in detail.

CR Cream, miscellaneous cream wares. Fairly fine fabric typical of flagons, including an early rim, no 1 from Pit 106 and a body sherd in the same fabric from Ditch 104..

CC	Colour-coated, source unknown. Dark cream fabric, dark grey colour-coat, coarser fabric than normally seen in Nene Valley colour-coated ware, from TS Field 3 and Pit 111.
GREY	Grey, undifferentiated quartz-gritted grey fabrics, hard wares with sparse to common quartz inclusions.
GROG	Grog-tempered. Miscellaneous grog-tempered fabrics, mostly similar grey fabrics, mixed inclusions, with grey-brown surfaces. Most from Ditch 104, one from Ditch 103, bowls and cooking pots in late IA tradition, apparently wheel-made or wheel-finished, nos 5-6.
GRSA	Grey, with common to abundant quartz sand inclusions. Lid-seated jar from Ditch 104 only, rounded pebbly fabric, no 4.
IAGR	Coarse tempered, often pimply with grog and other inclusions, IA tradition fabric, which continues in use into the Roman period. Sometimes known as Trent Valley ware. Only two sherds from Ditch 104, one with occasional shell.
IASH	IA tradition shell-gritted. Only a single example, a late IA type bowl, probably wheel-made or -finished, from Ditch 104.
LEG	Early very pale grey fairly fine fabric, often fairly common mica content, usually with darker exterior surfaces on closed forms. Known from deposits of the legionary period in the fortress at Lincoln. A single body sherd from a rusticated jar, Ditch 104.
OX	Oxidized, miscellaneous oxidized wares. This coding comprises all miscellaneous oxidized sherds, usually in varying red-brown shades and degrees of grittiness, for which no significant fabric groupings are evident. Single very abraded vesicular sherd, probably from a closed form.
OXL	Oxidized lighter red-brown. Fabrics in light cream-brown shades, usually relatively fine-textured, often used for flagons.
PART	Parisian type, a very fine silty grey fabric, often with a sandwich fracture, usually with a fine black or grey polished external surface. Parisan ware is decorated with stamps or rouletting, and can be dated to the 2nd century (Elsdon 1982), although the fabric continues to be used in the later Roman period for different vessel forms (Darling 1984, 77-80). Parisian ware is known to have been made at the Market Rasen, Lincs. kilns (Darling forthcoming; **NRFRC: LMR FR**), and also at Doncaster (Buckland et al., 2001; **NRFRC: ROS FR**). A beaker base from Ditch 104, no 2.
SAMSG	Samian South Gaulish, from La Graufesenque. **NRFRC: LGF SA**
SHCM	Shell-gritted, common medium shell inclusions. Single bowl of late IA type, no 7, from Pit 106, probably wheel-made.

BIBLIOGRAPHY

Buckland, P., et al., 2001 P.C. Buckland, K.F. Hartley and V. Rigby, The Roman Pottery Kilns at Rossington Bridge Excavations 1956-1961, *Journ Roman Pottery Studies* 9.

Darling, M.J., 1984 Roman Pottery from the Upper Defences, *Archaeology of Lincoln*, 16/2.

Darling, M.J., forthcoming The Roman pottery kilns at Market Rasen

Elsdon, S.M., 1982 *Parisian ware: a study of stamped wares of the Roman period in Lincolnshire, Humberside and South Yorkshire*, Vorda research series, 4, Vorda, Highworth.

Rigby, V. & Stead, I.M., 1976 Coarse pottery, in Stead, I M, 1976, *Excavations at Winterton Roman Villa and other Roman sites in North Lincolnshire, 1958-1967,* 136-190.

Ritterling, E., 1913 'Das frührömische Lager bei Hofheim im Taunus', *Annalen des Vereins für Nassauische Altertumskunde und Geschichtsforschung*, 40.

Tomber, R. & Dore, J., 1998 *The National Roman FabricReference Collection: A Handbook,* MoLAS Monograph 2.

APPENDIX 3
ARCHIVE DATABASE

Cxt	Fabric	Form	Manuf+	Ves	D?	DNo	Details	Link	Shs	Wt	Field
102	GROG	CPN	WM?	-	D	01	RIM/SHLDR ?GROOVE;ABR GRY;LTBN SURFS;DIAM18	-	1	30	4
102	GREY	JEV	-	-	-	-	RIM FR ONLY;DKGRY	-	1	7	4
102	GREY	BDFL?	-	-	-	-	RIM FRAG ONLY	-	1	4	4
102	GREY	-	-	-	-	-	BS	-	1	7	4
102	GREY	BK	-	-	-	-	BS THIN WALL;SM.DIAM;NECK OR BKFO?;ABR	-	1	1	4
102	ZDATE	-	-	-	-	-	ML2?	-	-	-	4
102	ZZZ	-	-	-	-	-	MIXED DATES;NO STRONG DATE	-	-	-	4
105	CR	FHOF	-	1	D	02	RIM/PT NECK;DIAM11;FINE CR;RED INCLS;NONJ BS	-	2	16	4
105	SAMSG	29?	-	-	-	-	BS VABR;MOST SURF LOST	-	1	4	4
105	SHCM	BNAT	WM?	-	D	03	RIM ONLY;DIAM 32;DKGRY;GY/BN SURFS	-	1	36	4
105	GREY	JLS	-	-	-	-	RIM FRAG ONLY;CF DARLING84;NO58;F.HARSH FAB	-	1	14	4
105	GREY	CLSD	-	1	-	-	BSS J;DKGRY;BN SURFS;2 GROOVES;?BOWL	-	2	17	4
105	GREY	-	-	-	-	-	BS LTGRY	-	1	12	4
105	ZDATE	-	-	-	-	-	1-EM2?	-	-	-	4
105	ZZZ	-	-	-	-	-	DIFFICULT DATING	-	-	-	4
107	GROG	BNAT	WM	1	D	04	RIM/PT WALL;DIAM 24?;LTGRY;GRY GROG	-	5	54	4
107	GROG	BNAT	WM?	-	D?	-	RIM/PT WALL;DIAM 25?;GRY FB;LTBN-GY SURFS	-	1	43	4
107	IAGR	-	WM?	-	-	-	BS ABR;GRY FB;GYBN SURFS;OCC SHEL	-	1	46	4
107	IAGR	-	WM?	-	-	-	BS;DKGRY;POOR CONDITION	-	1	11	4
107	IASH?	BNAT	WM?	1	D?	-	RIMS J;DIAM23;DKGRY;GRYBN SURFS;VESIC	-	2	76	4
107	CR	F?	-	-	-	-	BS FINE CR	-	1	13	4
107	LEG?	JRUST	RNOD?	-	-	-	BS;LTGRY;DK EXT	-	1	15	4
107	OXL	CLSD	-	-	-	-	BS;LTRB F&S	-	1	13	4
107	GREY	CP	-	1	D	05	RIM/SHLDR;CURVED;DIAM14;NONJ BSS	-	4	97	4
107	GREY	JB	-	1	-	-	BSS ABR J;GROOVED	-	2	38	4
107	GREY	-	-	-	-	-	BSS	-	3	28	4
107	GREY	CLSD	-	-	-	-	BS ABR;RB INT SURF	-	1	15	4
107	GREY?	-	-	-	-	-	BS RB EXT;GRY INT	-	1	4	4
107	GRSA	JLS	-	-	D	06	RIM/SHLDR;RND PEBBLY FAB;CR DARL84/58;BURNT RIM;DIAM19	-	1	51	4
107	GROG	JB?	?	1	-	-	BSS J;PIERCED RND HOLE 5-6MM IN WALL;NOT BASE	-	2	13	4
107	GROG	CLSD	?	2	-	`-	BSS GRY FB;RB EXT;GRY GROG;ABR;MANUF?	-	2	29	4
107	GROG	CLSD?	?	2	-	-	BSS GRY;LTBN SURFS;THINNER WALLS	-	2	27	4

107	GROG	CLSD?	WM?	-	-	-	BS LTGRY;LIGHTER GROG	-	1	33	4
107	GROG	BNAT?	WM?	-	-	-	RIM FRAG;DKGRY;GROG & PEBBLE INCLS	-	1	15	4
107	PART	BK	-	-	D	07	BASE FTRG RIBBED ABOVE;DKGRY SILT FAB	-	1	5	4
107	GREY	JEV?	-	-	-	-	RIM FR ONLY;DKGRY;LTER FAB	-	1	5	4
107	GREY	JBK?	-	1	-	-	BASE FRAG;FTM;LTGRY	-	2	10	4
107	GREY	BK?	-	-	-	-	BASE FRAG;FTM GROOVE UNDER;ABR	-	1	5	4
107	GREY	BD	-	-	-	-	BASE FRAG;LTGRY F.SANDY	-	1	10	4
107	GREY	-	-	-	-	-	BSS DKGRY;RB CORT ON SOME;1 GROOVED	-	4	15	4
107	GREY	-	-	-	-	-	BSS LTGRY	-	16	95	4
107	OXL	-	-	-	-	-	BS THIN WALL;VABR;LTRB	-	1	2	4
107	OX	-	-	-	-	-	BS LTRB;VESIC;9MM THICK;VABR	-	1	9	4
107	ZDATE	-	-	-	-	-	ML2?	-	-	-		4
107	ZZZ	-	-	-	-	-	ABR;MIXED DATES	-	-	-		4
110	GREY	CLSD	-	1	-	-	BSS;GRY FB/INT;LTRB EXT;?SURF LOSS	-	2	9	4
110	CC	BK?	-	-	-	-	BS DKCR FB;OCC WHITE;DKGRY CC;VABR;POSS NVCC	-	1	2	4
110	ZDATE	-	-	-	-	-	L2-3?	-	-	-		4
TS3	CC	BK	-	-	-	-	BS DKCR FB;DKGRY CC;COARSER THAN NORM	-	1	2	3
TS3	GREY	-	-	-	-	-	BS;ABR	-	1	5	3
TS3	ZDATE	-	-	-	-	-	3C?	-	-	-		3
US4	GREY	-	-	-	-	-	BS	-	1	12	4
US4	ZDATE	-	-	-	-	-	ROM	-	-	-		4
US4	ZZZ	-	-	-	-	-	X END STRIP TO 68M	-	-	-		4
TS9	GREY	-	-	-	-	-	BS	-	1	4	9
TS9	ZDATE	-	-	-	-	-	ROM	-	-	-		9
TS11	GREY	-	-	-	-	-	BS;GROOVED	-	1	4	11
TS11	ZDATE	-	-	-	-	-	ROM	-	-	-		11
FW1	GROG	BNAT	WM?	-	-	-	RIM FR;DKGRY;ABR;LTGRY GROG	-	1	22	4
FW1	GREY	JCUR	-	-	-	-	RIM FR	-	1	5	4
FW1	GREY	D?	-	-	-	-	RIM FR;POSS IMIT FM36?	-	1	9	4
FW1	GREY	B?	-	-	-	-	RIM FR ONLY;TYPE UNCERTAIN	-	1	9	4
FW1	GROG	B?	WM?	-	-	-	RIM FR;LTRB SURFS;LTGRY FB;VABR	-	1	20	4
FW1	GREY	BK	-	-	-	-	BASE 45MM DIAM;CF RPNV63 RE TYPE	-	1	32	4
FW1	GROG	-	?	-	-	-	BS 12MM THICK	-	1	17	4
FW1	GREY	-	-	-	-	-	BSS;ABR	-	17	121	4
FW1	ZDATE	-	-	-	-	-	2C?	-	-	-		4
FW1	ZZZ	-	-	-	-	-	ABRADED;NO GOOD DATING	-	-	-		4

APPENDIX 4

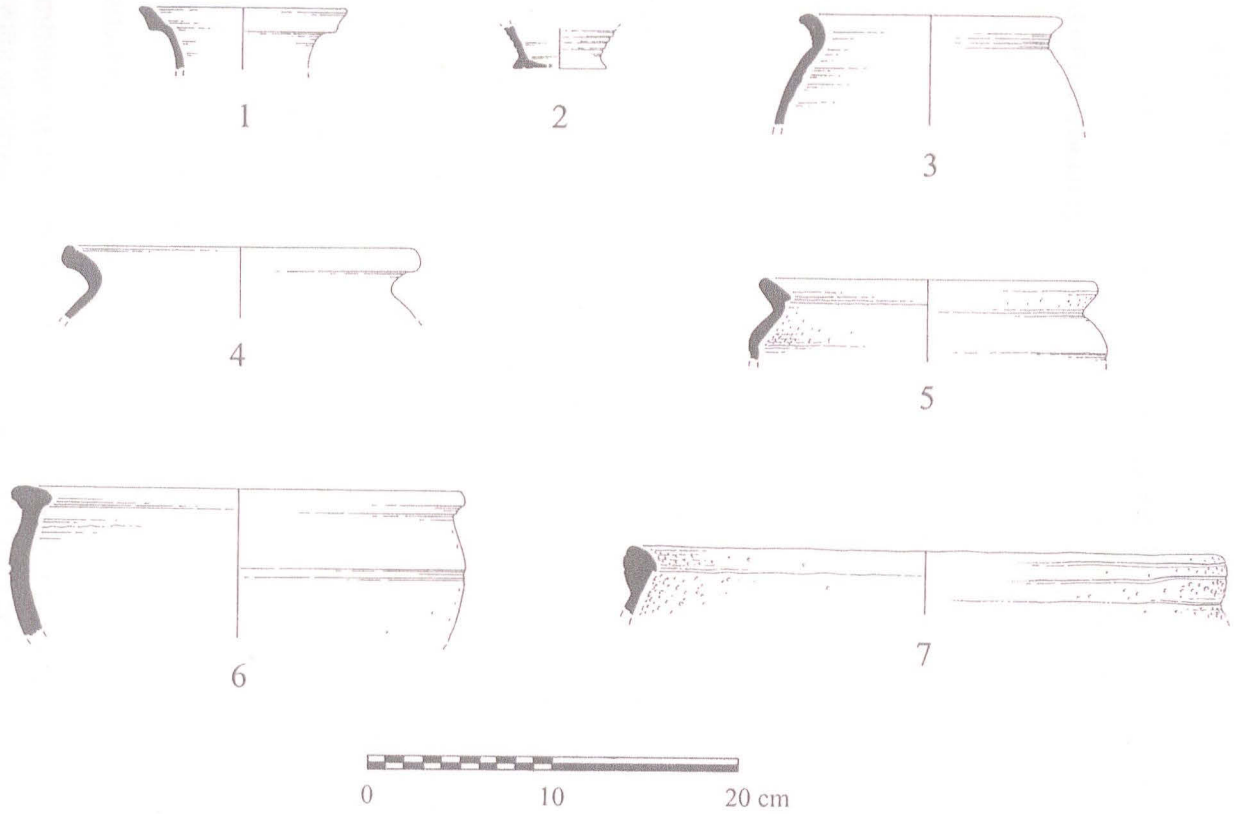
ARCHIVE CODES

VESSEL FORMS

Code	Expansion
B	Bowl
BD	Bowl or dish
BDFL	Bowl or dish flanged
BK	Beaker
BNAT	Bowl native IA type
CLSD	Closed form
CPN	Cooking pot native type
D	Dish
F	Flagon
FHOF	Flagon of Hofheim type
JB	Jar or bowl
JBK	Jar or beaker
JCUR	Jar curved rim
JEV	Jar everted rim
JLS	Jar lid-seated rim
JRUST	Jar rusticated

MANUFACTURE ETC

Code	Expansion
RNOD	Rusticated nodular
WM	Wheel-made



Drawings of vessels from contexts 102, 105, and 107 (see catalogue). Scale 1:4.

Appendix 3

Faunal Remains Report from an Archaeological Watching Brief during the Caenby Corner to Gainsborough Gas Pipeline (CCGP 03)

Mark Ward BA (Hons) MSc.

INTRODUCTION

Faunal remains were recovered by hand during the course of an archaeological watching brief on the Caenby Corner to Gainsburgh Gas Pipeline (CCGP03). The bones were from a total of two contexts.
Preservation was generally poor and quite fragmented making the total number of identifiable fragments low.

METHODOLOGY

Recording

The mammal bones were recorded following a modified version of the method described by Albarella & Davis (1994) and Davis (1992). This system considers a selected suite of anatomical elements as 'countable' (diagnostic zones); it does NOT include every bone fragment that is identifiable. The skeletal elements considered are all teeth (mandibular and maxillary); the skull (zygomaticus); scapula (glenoid articulation/cavity); distal humerus; distal radius; proximal ulna; carpals 2-3; distal metacarpal; pelvis (ischial part of the acetabulum); distal femur, distal tibia, calcaneum (sustentaculum), astragalus (lateral part), naviculo-cuboid/scafocuboid; distal metatarsal; proximal phalanges 1-3. At least 50% of the specified area has to be present for a fragment to be 'countable'. Additional elements that were of particular interest, such as unusual species, pathological or neonatal/very young specimens, were recorded as 'non-countable'.

Mandibular fragments were considered to be 'ageable', and 'countable', when there were two or more teeth present with recognisable wear. Mandibular teeth, both in *situ* and isolated, were aged using tooth eruption and wear patterns. Cattle and pig teeth were recorded using the system devised by Grant (1982), whereas sheep and goat teeth were recorded according to Payne (1973 & 1987).

Taxonomic identification

The differentiation of sheep (*Ovis aries*) and goat (*Capra hircus*) was attempted on the following elements: deciduous lower premolars (dP_3 and dP_4); horn-core; humerus; metacarpal; tibia; calcaneum; metatarsal. The morphological criteria defined by Boessneck (1969) were used for all elements except the teeth (Payne 1985).

Species distinction of horse (*Equus caballus*) and donkey (*E.asinus*) could not be made because the morphological criteria (e.g. Baxter (1998), Davis (1980) and Eisenmann (1981) requires that the teeth are *insitu* whereas all the teeth in this assemblage are isolated.

TAPHONOMY

Preservation

The condition of the bone was very poor with frequent fragmentation. The assemblage was abraded and decayed probably due to a low pH in the burial environment.

Fragmentation

Fragmentation was gauged by determining the proportion of material that consisted of isolated maxillary and mandibular teeth. This obviously summarizes both pre- and post-depositional taphonomic processes, such as butchery and mechanical destruction within the burial environment respectively.

ARCHIVE

Pre-Construct Archaeology is currently housing the studied material.

RESULTS

Context 105 (Pit fill)

There were no countable fragments from context 105. The preservation of the material from this context was considered poor to moderate with heavy fragmentation. In light of this, an effort was made to assess the material to establish species and possible reasons for the poor preservation.
Identified were cattle proximal right radius and femur mid shaft, and sheep distal humerus shaft, radius mid shaft and distal radius. These samples are all from larger domestic stock, are all long bone fragments and probably from adult individuals. No smaller bones are present, such as phalanges, nor are there particularly fragile elements, such as skull fragments.
Considering that these body parts are meat bearing, preferential preservation due to deliberate selection of elements may be a contributing factor to the bone survival. However, it is often the more robust bones that survive in favour of smaller, weaker elements. It is also the case that the more robust bones are derived from adults particularly the larger domestic species.

Context 107 (Ditch fill)

This context produced a number of countable samples despite being considered of poor preservation but moderately fragmented. All of these elements were teeth, and cranial or post-cranial parts were not present which suggests poor preservational conditions.
The countable elements were two isolated cattle left maxillary M1 / M2 probably from the same individual; one isolated cow mandibular M3 displaying wear stage of an old adult; two isolated right horse maxillary M1 / M2 probably from the same individual; one isolated sheep left M3.
Not enough data was available for full aging analysis.
No positive differentiation between equids could be made. In all likelihood, the equid remains denote horse (*E.caballus*) because donkey (*E.asinus*) is exceptionally rare in British assemblages from any period (Baxter 1998: 5).

CONCLUSION AND RECOMMENDATIONS

Not enough material was present for the opportunity to present mortality patterns and possible economy. Only the species present can be identified.
The assemblage is both fragmented and poorly preserved probably reflecting the burial environment. Preferential selection of body parts and deliberate deposition could be considered as taphonomic factors but the assemblage is too small, poorly preserved and heavily fragmented to expand further.

REFERENCES

Albarella, U. & Davis, S. (1994) *The Saxon and Medieval bones excavated 1985-1989 from West Cotton, Northamptonshire.* London: English Heritage. Ancient Monuments Laboratory Report 17/94.

Baxter, I.L. (1998) Species identification of equids from western European archaeological deposits: Methodologies, techniques and problems. In Anderson, S. & Boyle, K. (eds) *Current and recent research in osteoarchaeology: proceedings of the third meeting of the Osteoarchaeological Research Group held in Leicester on 18th November 1995.* Oxford: Oxbow Books. 3-17.

Boessneck, J. (1969) Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné). In Brothwell, D.R. & Higgs, E.S. (eds) *Science in archaeology: a comprehensive survey of progress and research.* London: Thames & Hudson. 331-358.

Davis, S.J.M. (1980) Late Pleistocene and Holocene equid remains from Israel. *Zoological Journal of the Linnéan Society,* 70, 289-312.

Davis, S.J.M. (1992) *A rapid method for recording information about mammal bones from archaeological sites.* London: English Heritage. Ancient Monuments Laboratory Report 19/92.

Dobney, K., Kenward, H. & Roskams, S. (1997) All mixed up and somewhere to go? Confronting residuality in bioarchaeology. In De Boe, G. & Verhaeghe, F. (eds) *Method and theory in historical archaeology: papers of the "Medieval Europe Brugge 1997" conference.* Zellike: Instituut voor het Archeologisch Patrimonium. IAP Rapporten 9. 81-87.

Eisenmann, V. (1981) Etudes des dents inferieures des *Equus* (Mammalia, Perissodactyl) actuels et fossiles. *Palaeovertebrata,* 10, 127-226.

Grant, A. (1982) The use of tooth wear as a guide to the age of domestic ungulates. In Wilson, B., Grigson, C. & Payne, S. (eds) *Ageing and sexing animal bones from archaeological sites.* Oxford: British Archaeological Reports. British Series 109. 91-108.

Payne, S. (1973) Kill-off patterns in sheep and goats: the mandibles from Asvan Kale. *Anatolian Studies: Journal of the British Institute of Archaeology at Ankara,* 23, 281-303.

Payne, S. (1985) Morphological distinctions between the mandibular teeth of young sheep, *Ovis*, and goats, *Capra*. *Journal of Archaeological Science,* 12(2), 139-147.

Payne, S. (1987) Reference codes for the wear states in the mandibular cheek teeth of sheep and goats. *Journal of Archaeological Science,* 14, 609-614.

Appendix 4: List of contexts

Watching brief:

001 brown clayey sand topsoil in Fields 1-3
002 mid-brown clayey sand subsoil in Field 1
003 varicoloured clayey sand natural in Field 1
004 compact bluish-grey clay natural at base of trench throughout project
005 mid-brown clayey coarse sand natural in Field 2
006 friable coarse sand natural in Fields 2 and 3
007 brownish-grey sand subsoil in Fields 2 and 3
008 varicoloured clayey sand natural in Fields 3 and 4
009 greyish-brown sandy clay topsoil in Fields 4-8
010 varicoloured sandy clay fill in pit [011]
011 small sub-rectangular pit in Field 9
012 mid brownish-grey sandy clay fill in ditch [013]
013 field boundary ditch between Fields 6 and 7
014 grey sandy clay fill in pit [015]
015 small irregular pit in Field 11
016 light brown sandy clay natural in Fields 4-10
017 greyish-brown sandy clay topsoil in Field 9
018 very dark sandy clay topsoil in Fields 10 and 11
019 brownish-grey sandy clay topsoil in Fields 12-15
020 varicoloured sandy clay natural in Field 11
021 clay natural with sand and chalk patches, in Field 11 W of 020
022 varicoloured sandy clay natural in Field 11 W of 021
023 light brown clay natural in Field 12
024 compact purplish-brown clay natural in Field 13
025 light brown clay natural in Fields 13-15
026 dark brownish-grey clay topsoil in Field 16
027 dark brownish-grey clay topsoil in Field 17
028 light brown sandy clay subsoil in Fields 16 and 17
029 mottled clay natural with sand patches in Fields 15-17

Site 1:

100 dark brownish-grey sandy clay topsoil sealing Site 1
101 light greyish-brown sandy clay natural
102 compact mid-grey sandy clay fill in ditch 103
103 N-S linear feature at E side of Site 1
104 large ditch aligned NE-SW
105 very dark silty clay fill in pit 106
106 E-W aligned pit on NW side of Site 1
107 compact mid greyish-brown silty clay fill in ditch 104
108 shallow pit on NW side of ditch 104
109 very dark clay fill in pit 108
110 mid-grey sandy clay fill in pit 111
111 small pit to NW of pit 106

112 mid greyish-brown silty clay fill in pit 113
113 small isolated pit to W of Site 1

Site 2

201 mid brownish-grey sandy clay topsoil sealing Site 2
202 light greyish-brown sandy clay subsoil, also filling furrows
203 natural deposit: mixture of mid-brown clayey sand and mid reddish-brown chalky clay
204 very dark grey sandy clay filling feature 205
205 small cut feature on S edge of Site 2
206 very dark grey sandy clay filling feature 207
207 small cut feature associated with 205

Site 3

301 mid brownish-grey sandy clay topsoil sealing Site 3
302 light greyish-brown sandy clay subsoil, also filling furrows
303 natural deposit: mixture of mid-brown clayey sand and mid reddish-brown chalky clay
304 light greyish-brown sandy clay filling feature 305
305 linear feature running NNW-SSE across Site 3