ARCHAEOLOGICAL EVALUATION AND WATCHING BRIEF REPORT

LAND OFF CHURCH STREET/NORTH STREET, MIDDLE RASEN

LINCOLNSHIRE

PRE-CONSTRUCT ARCHAEOLOGY (Lincoln)

Site Code: CHM 95
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LAND OFF CHURCH STREET/NORTH STREET, MIDDLE RASEN

AN ARCHAEOLOGICAL EVALUATION AND WATCHING BRIEF REPORT

for

MIDDLE RASEN CHURCH COUNCIL

by

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CONTENTS

1.0 Non-Technical Summary

A planning application was accepted by West Lindsey District Council for the construction of a single-storey Church Hall on land set within the angle of Church Street and North Street, Middle Rasen, Lincolnshire (Fig. 1). A condition, initially requiring a full site evaluation, was issued in advance of development. A magnetometer survey was undertaken by GeoQuest Associates and, based on the results of that survey, a standard archaeological watching brief was carried out during development.

The four-day recording brief resulted in the exposure of several Saxo-Norman 'earth-cut' features, including two substantial ditches. Other features were inevitably missed, given the constraints under which the standard watching brief operates, and it is regretted that the site was not responsive to the geophysical survey; which was undertaken in advance of development.

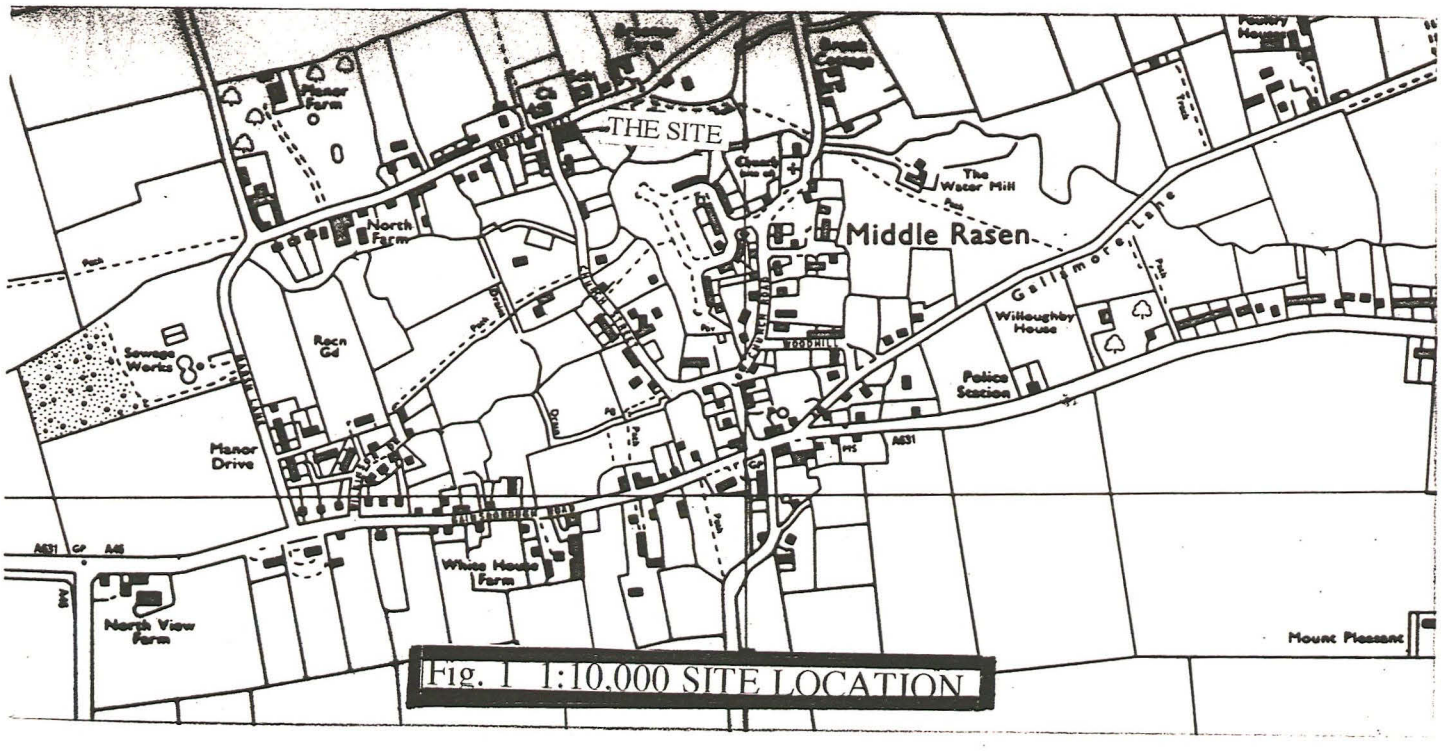


Fig. 1 1:10,000 SITE LOCATION

2.0 Introduction

The watching brief took place between November 2nd and November 7th, 1995. Archaeological works were commissioned by Mr S Grant (Building Surveyor), acting on behalf of Middle Rasen Parochial Church Council; and were centred on a project specification submitted to the Client and the County Archaeological Officer.

On the basis of its topographical siting, the development area was deemed to be of moderately high archaeological potential, though there are few entries covering the general vicinity which form part of the County Sites and Monuments Record (SMR).

The central national grid reference is TF 0874 8948.

3.0 Planning background

An application was submitted to West Lindsey District Council for consent to construct a replacement Church Hall for Middle Rasen; on a vacant area of land situated in the angle of Church Street and North Street (application W/063/0063/95) (Fig. 1): an existing building, located on an alternative site, was of timber construction and was therefore deemed unsuitable as a public meeting place, largely on grounds of health and safety. Planning permission was granted, subject to the undertaking of an archaeological field evaluation. A project brief, outlining the scope of the archaeological requirement, was issued by the County Archaeological Officer (May 1995), and a project specification was subsequently submitted by Pre-Construct Archaeology (Lincoln) (June 1995).

Prior to development, the east side of the site was occupied by a timber hut, belonging to the Boy Scouts. This was removed in advance of evaluation. The remainder of the site was grassed.

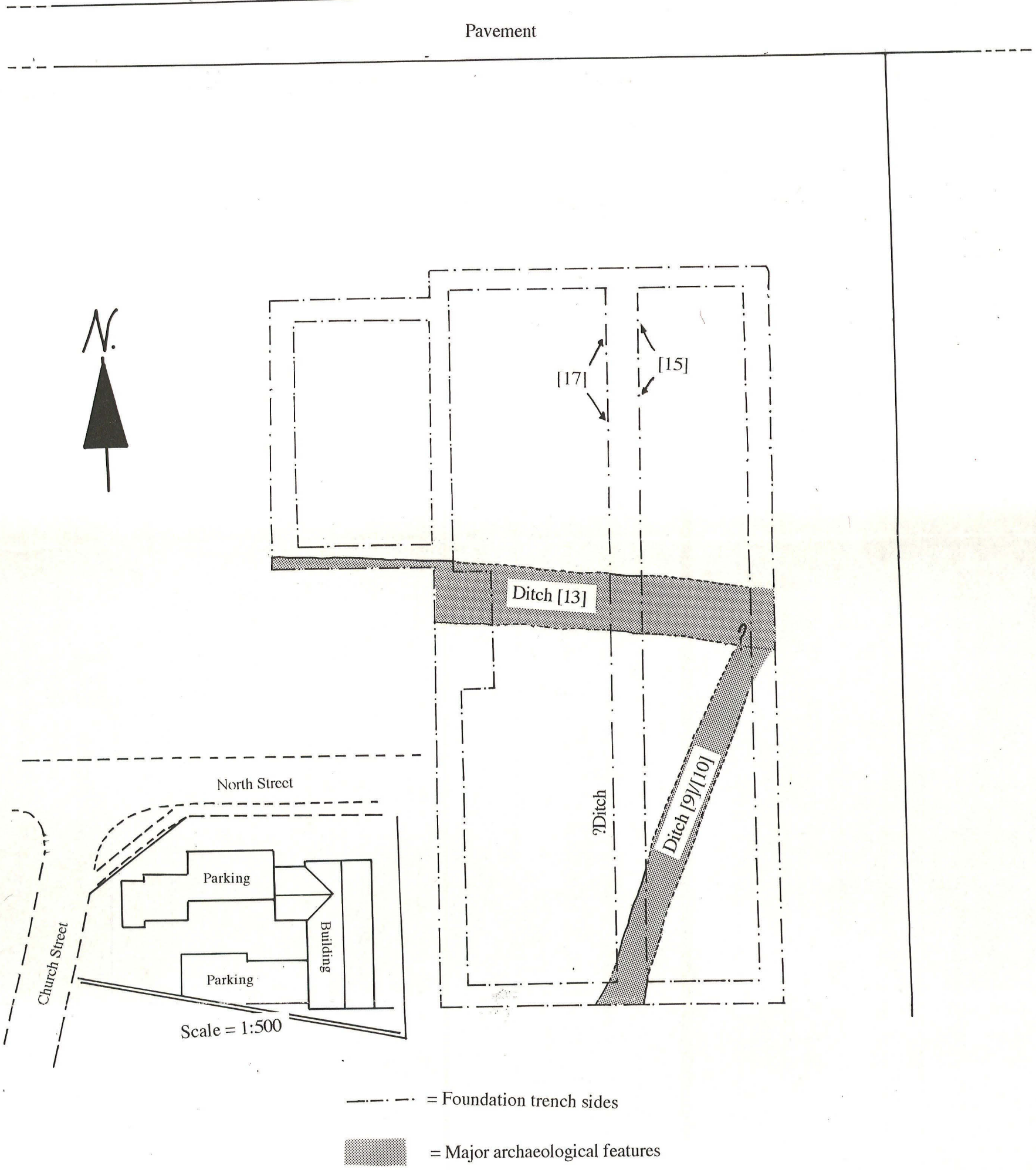
4.0 Geology and topography

Middle Rasen lies in north Lincolnshire, approximately 20km west of Louth. Immediately to its east is the larger settlement (though smaller parish) of Market Rasen. It is approached from the west via the A631 and from Lincoln via the A46 road to Grimsby. The modern village covers an area of approximately 1.0km^2, and lies at a height approximately 20.0m OD. The site is situated approximately 20.0m south-east of the parish church.

The surface geology is characterised by podzolised Cover sands, overlying calcareous gleys on glacial till (Straw 1969).

Fig. 2 Plan of excavated foundation trenches for new Church Hall, incorporating major archaeological features exposed in section faces (projected)

Scale = 1:100



5.0 Archaeological and historical background

The writer is unaware of any previous intrusive archaeological investigations in Middle Rasen.

In the Middle Ages, Middle Rasen was shared between Tupholme Abbey and Drax Priory (N Yorks). The River Rase separated Middle Rasen Tupholme to the north from Middle Rasen Drax to the south. The date of amalgamation between the parishes is not known, though many planned additions occurred during the C12th (Everson 1991, 17). Each parish had its own church: the present church, St Peter's, belonged to Middle Rasen Tupholme; St Paul's to Middle Rasen Drax. Only one church was recorded at the time of the Domesday Survey in 1086 (Morris 1986).

By the mid-C19th, St Peter's Church was ruinous, though St Paul's was in good repair: curiously, however, the former was restored, whilst the latter was demolished in 1860 (Pevsner and Harris 1988, 563).

There are few entries for Middle Rasen in the County SMR; none whatsoever, excluding the Church of St Peter, within the immediate site vicinity. However, lying close as it does to the parish church (and hence the heart of the medieval settlement), there was a reasonable to high probability that traces of early occupation would be retrieved from the development site. A recent watching brief on the east side of St Peter's Church, Navenby, for example, identified a series of settlement remains dating between the early/middle to late Saxon period (C5th/C6th - C9th) (Palmer-Brown 1995, unpublished). Clearly, many of our village cores will have a similar potential: until these settlements become the subjects of archaeological scrutiny, however, there may be few chances to push the record any further back than 1066.

6.0 Aims

The principal aim of the field evaluation phase of work was to establish the presence/absence of archaeological remains in advance of development: to be used as a basis from which to devise a post-evaluation mitigation strategy.

The primary aim of the subsequent watching brief was to identify and record archaeological or ecofactual remains disturbed as a result of development.

7.0 Methodology

For the site evaluation, the project specification centred (initially) on the use of two modes of geophysical survey (magnetometry and resistivity). By employing contrasting, but complementary, techniques, it was suggested that it should be possible to establish the presence/absence of archaeological remains. The surveys did indeed suggest that there were potentially significant deposits present, though these appeared either to be modern or confined to areas where the impact from development would be minimal (see Appendix 11.1).

Following an assessment of the geophysical data, a condition requiring a standard watching brief to take place was attached to the planning permission. This involved the monitoring of all soil stripping and trenching and the recording of archaeological deposits, when exposed as part of the development.

All finds recovered during the brief were washed and/or processed and were subsequently presented to specialists at the City of Lincoln Archaeology Unit for appraisal. For the pottery, a written appraisal will be submitted as part of the documentary archive, though it has not been possible to include this document as an appendix to this report, due to on-going computer problems at the City of Lincoln Archaeology Unit.

8.0 Results

8.1 Geophysical survey

The results of the combined geophysical surveys are presented in Appendix 11.1 and are summarised as follows:

> the resistivity survey detected the (known) site of a previously-removed scout hut and path on the east side of the site; it also detected a diffuse, low resistivity, linear anomaly (?ditch) on the west side of the site, aligned north-south. Towards the middle of the south edge of the survey area, a low resistivity circular anomaly was also detected - possibly a pit.
>
> The magnetometer survey detected a number of substantial, intense, dipolar anomalies which were interpreted as large metal objects in the soil.

No (significant) features were positively identified on the east side of the site in the area where the new Church Hall was to be sited. However, given that a number of substantial archaeological features were identified in this area during the subsequent watching brief, this apparent failure of identification is considered in greater detail below in section 9.0.

8.2 The watching brief

All soil stripping was monitored during the brief. Archaeological recording was undertaken by the writer and by Mr R Schofield.

A JCB was used to remove small trees and shrubs on the south-west part of the site, prior to cutting an access, extending eastwards off Church Street. The entire development site, excluding the area of the new building, was truncated by 40 - 60cm, prior to the deposition c. 30cm of limestone rubble hardcore. Archaeological recording was made difficult at this time by the (necessary) movement of the JCB and lorries, which were removing spoil from the site, as well as depositing hardcore.

No significant archaeological deposits were exposed during preliminary ground reduction, though unstratified sherds of medieval pottery were recovered and, in one area, sherds of Saxo-Norman pottery (late C10th/early C11th) were removed from the top of a straight-sided, linear trench, [2]/[3], which measured 45cm in width and was orientated north-east to south-west. A section of its backfill was removed by hand; whereupon it was determined that the trench was modern - its fill contained fragments of grass and other vegetation, suggesting that it had been excavated and backfilled in very recent times. Its steep, regular, sides suggested it had been cut mechanically.

On the north and north-west sides of the development site, relatively modern-looking building remains (large areas of compact sandy clay, brick rubble, fragments of mortar flooring etc) were disturbed during general ground reduction: possibly the remains of mud and stud cottages, which had been demolished within living memory (below, section 9.0).

Prior to cutting the principal building trenches on the east side of the site, it was established that the build-up of dirty sand deposits which overlay the natural strata was considerable (ie in excess of 60cm).

The building plot was cleared of remaining vegetation and the foundation lines were marked-out with spray paint. Trenching commenced with the east wall construction trench and moved progressively westwards. Trenches were excavated to a depth approximately 1.6m below the top of the modern ground surface. The exercise exposed a complex of natural strata, archaeological features and an overlying, substantial, build-up of dirty sand.

8.2.1 General cultural and non-cultural deposit formation

Excluding discreet areas of archaeological activity, which are discussed in detail below, deep trenching exposed a vertical sequence which was common to each of the building trenches and may be summarised thus:

Topsoil/overburden. All archaeological remains and natural strata lay beneath a substantial body of dark greyish-brown humic silty sand. The depth of this was 1.0m+ in places and there was no clear interface between topsoil and 'overburden'. It was not determined whether or not the accumulation had developed primarily as a result of wind action, or whether it reflected the gradual erosion of material from higher ground: there is indeed higher ground north of North Street itself.

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Layer [5]. Lying beneath the above, was c. 20cm of clean, white, sharp sand. The interface between deposits was wavy, with much evidence of earthworm activity. There was no evidence of a silt or clay component, rendering the deposit unstable and liable to erosion, if exposed.

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Layer [6]. Layer [5] merged with an underlying matrix of clean, mixed, orange/white sand which measured c. 13cm in thickness. Excluding its colour, this was identical to layer [5] and it is suggested the two contexts were, in fact, part of the same cumulative deposit: the colour differentiation in [6] is more likely to have been a result of soil leaching and iron-panning above a semi-permeable horizon, layer [7].

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Layer [7]. A well-defined, thin (rarely exceeding 5cm in thickness) layer of organic mud lay beneath the deposits described above. It consisted of dark brown/black silty clay, with an organic feel. It incorporated occasional lenses of clean sand and was observed in each of the building construction trenches. An ultimate interpretation of this deposit would require controlled sampling by a suitably qualified environmental specialist, though it is suggested here that it was probably a buried soil which developed in a marshy environment, subsequent to the deposition of sand deposits, possibly in the late glacial period (ie early post-glacial land regeneration).

/

Layer 8. The lowest deposit disturbed by the building operation was 15cm+ of very clean white/grey, soft sand. The cleanness of this deposit and total absence of organic/cultural inclusion suggested that it was a primary drift deposit which may have developed in the late glacial period (c. 10,000 years ago).

8.2.2 Archaeological features

On the east side of the south wall construction trench, the JCB cut through a well-defined ditch, [10]. which was orientated north-east to south-west. It was possible to make a useful profile-drawing of the ditch in the south section face (Fig. 3), and its course was traced obliquely/longitudinally as it was destroyed in the central construction trench (Fig. 2). A corresponding feature was noted on the north side of the east wall construction trench, though it is possible that, in this location, there were in fact two distinct features (below). The ditch, which had a U-shaped profile, measured more than 50cm in depth, though the top of its cut could not be distinguished from the upper overburden. In its base were interleaving dirty and clean sand lenses, though the bulk fill consisted of an homogenous greyish-brown, firm, silty sand, [9], which contained flecks of charcoal and occasional fragile daub-like fragments. Shell-tempered pottery was recovered from the fill of the ditch: which has been dated to the late C10th/C11th.

In the south wall construction trench, immediately east of the above, a small bowl-shaped feature was exposed, [11]/[12] (Fig. 3). Its fill resembled material within the ditch, though it contained a higher proportion of charcoal. A functional diagnosis was not possible and no dating evidence was recovered.

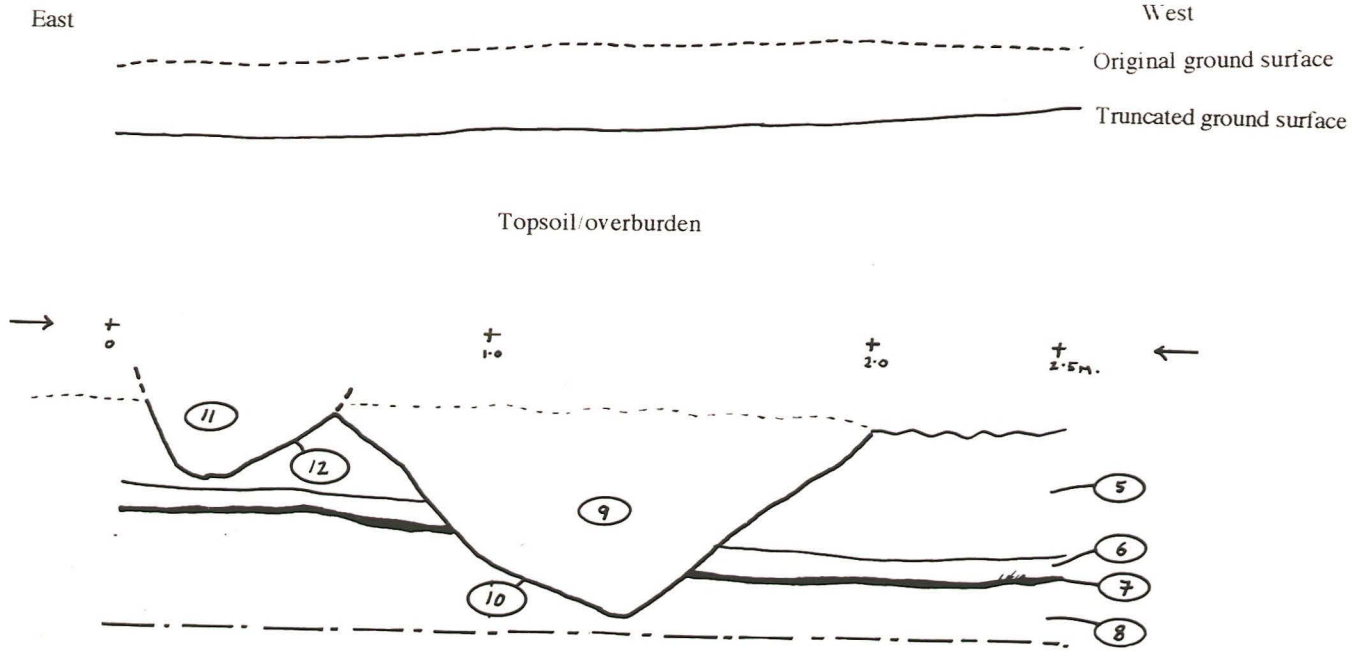


Fig. 3 Section through ditch [10] and ?pit [12], as exposed in south construction trench

A second ditch-like feature, [13], was first identified in the central north-south construction trench (Fig. 2). It was less substantial than [10]; its maximum recorded depth being c. 40cm, its width c.

1.6m. It course was recorded in the west wall construction trenches, though it was not possible to decide whether or not a feature exposed in the east construction trench was ditch [13] or ditch [9]/[10], as both features could be projected to this location (and there simply was not the time available to determine the relationship conclusively). Ditch 13 had a shallow U-shaped profile and was filled with deposits of light and mid-grey sand. Sherds of Saxo-Norman pottery were again recovered.

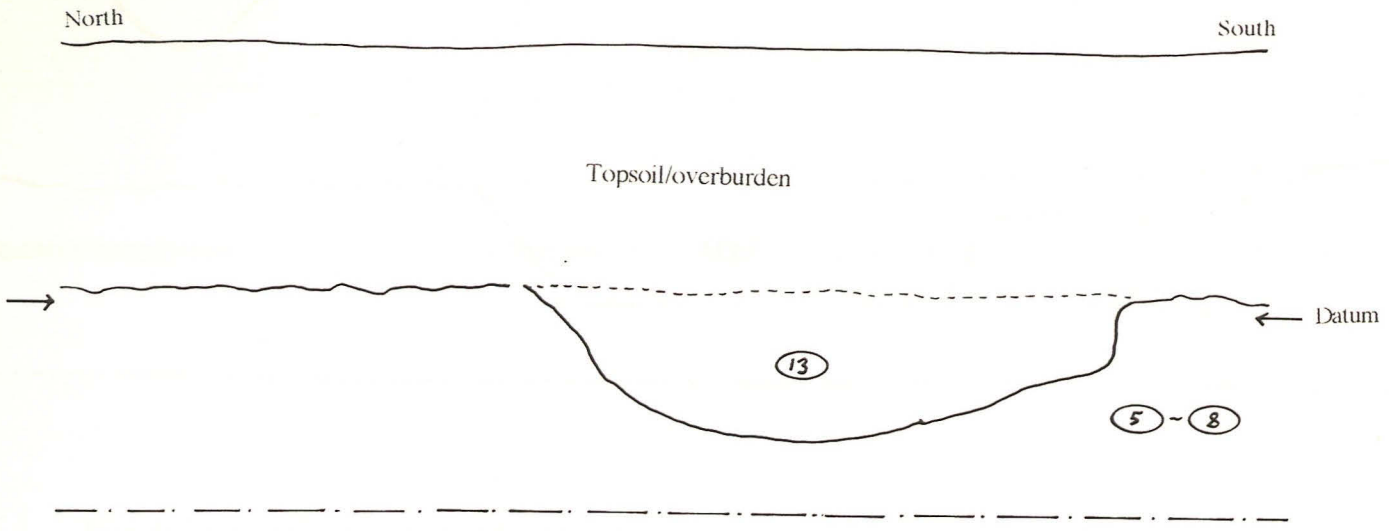


Fig. 4 North-south section through ditch [13], as exposed in central construction trench

On the north side of the central construction trench, approximately 3.5m north of ditch [13], two pit-like features were exposed in either section face. In the east face was a shallow scooped depression, [15], which measured almost 2.0m, north-south, 30cm in depth (Fig. 5, location on Fig. 2). It was filled with light and grey sand deposits, mixed with a considerable quantity of charcoal, slag and iron fragments (see Appendix 11.2)

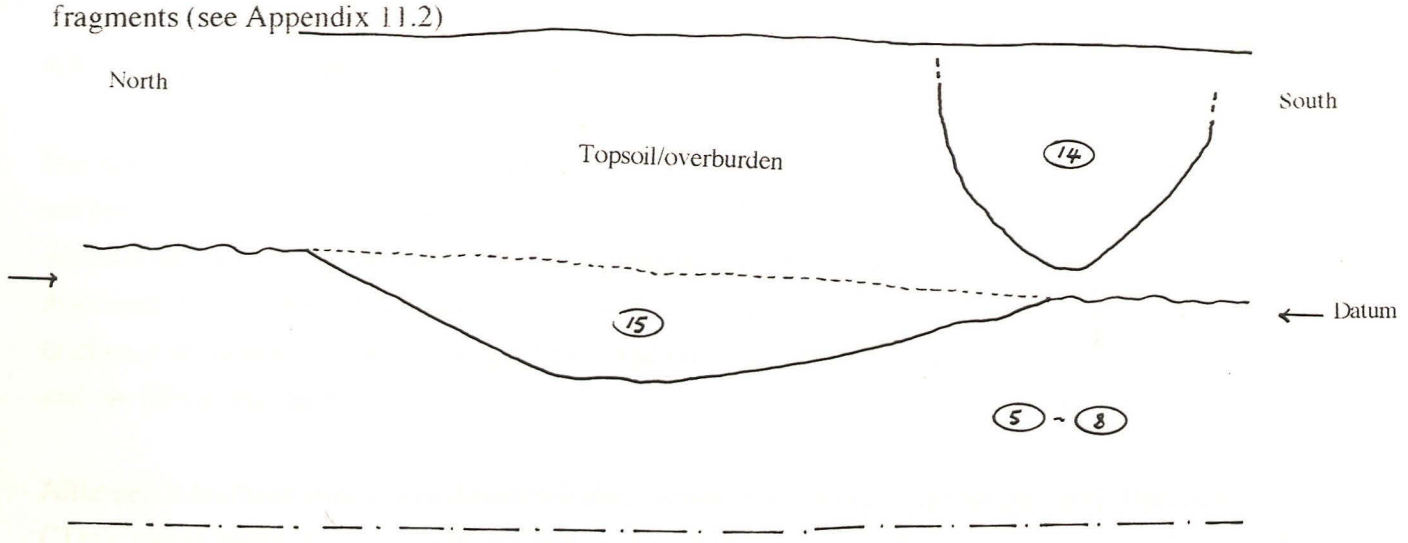


Fig. 5 Features exposed in east face of central construction trench (north side)

Almost opposite the above, in the west face of the same construction trench, was a second feature, [17]. It had an irregular, almost stepped, profile (Fig. 6) and its base was flat. It contained dirty sandy soil with a relatively large proportion of charcoal, as well as fragments of fired clay and burnt stone.

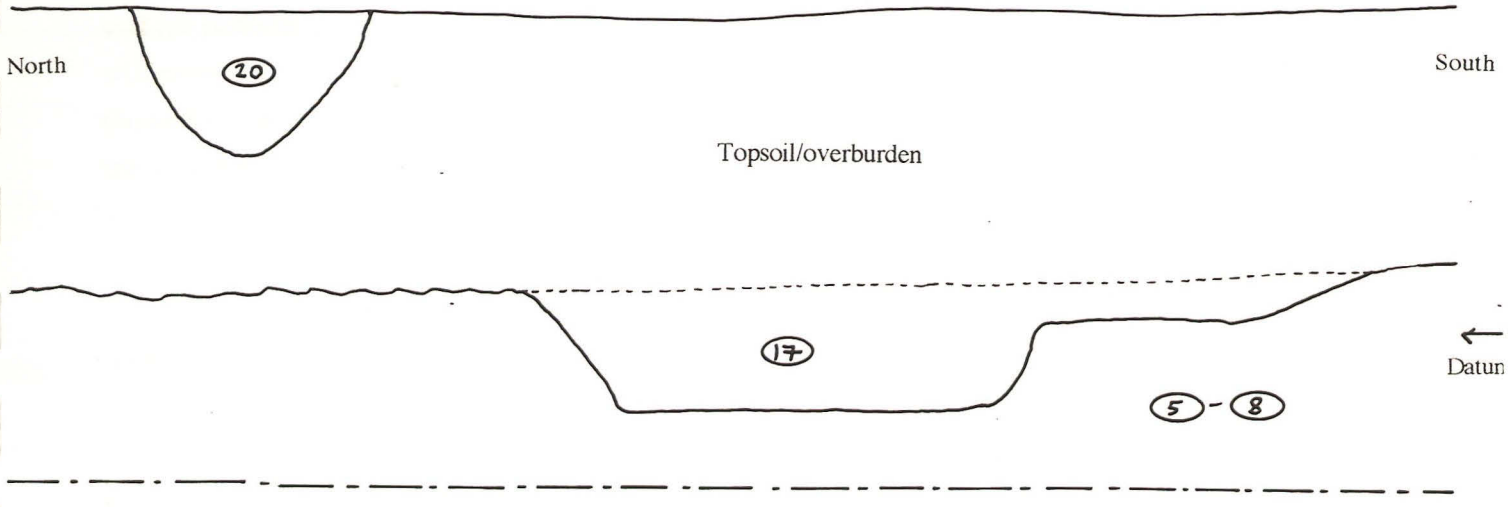


Fig. 6 Features exposed in west face of central construction trench (north side)

There was further evidence of archaeological disturbance in the north-west corner of the building plot, though there was insufficient time available, within the scheme of development, to allow a satisfactory assessment to be made. Furthermore, it is acknowledged that some subtle features/remains may not have been recognised during the brief.

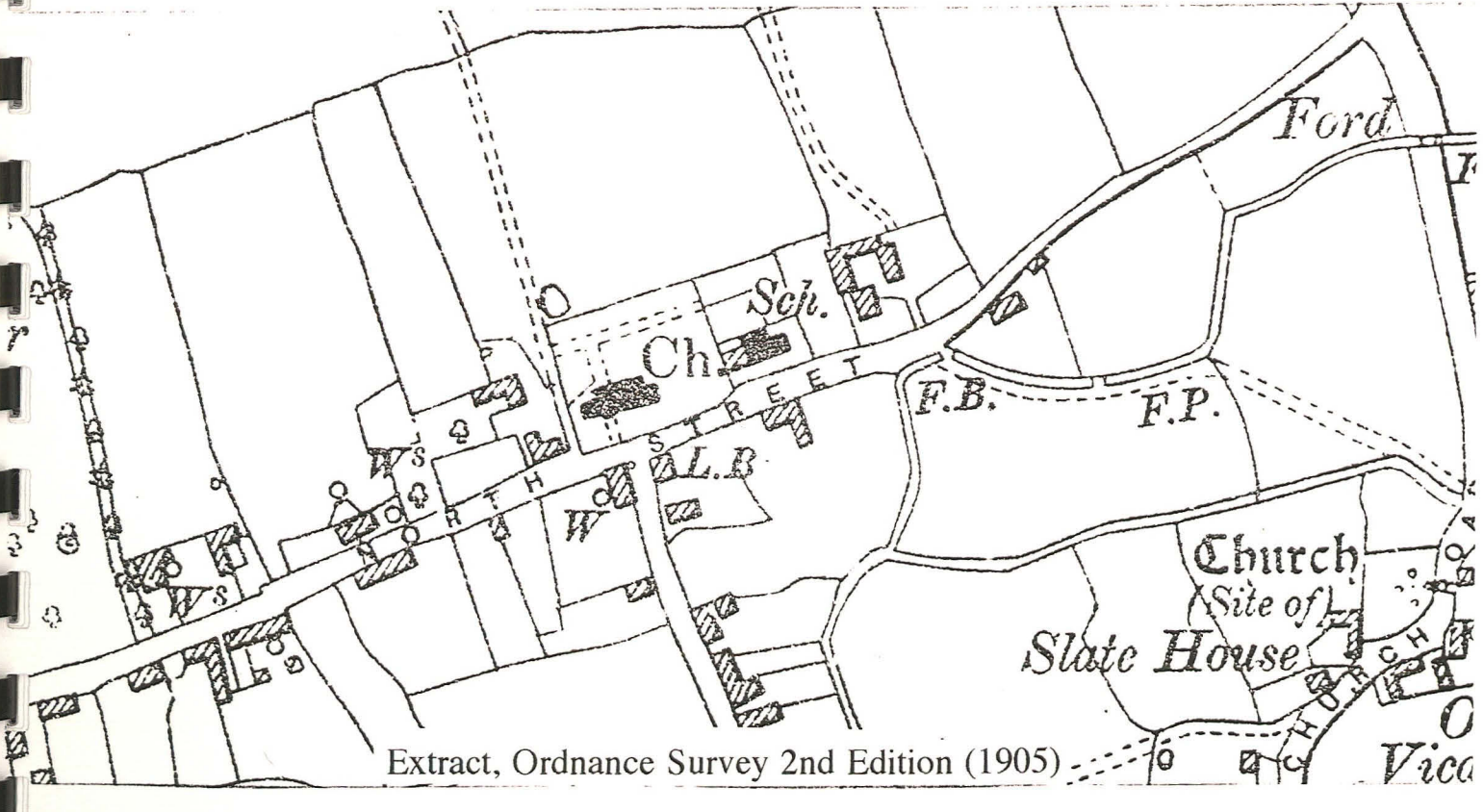
9.0 Conclusions and recommendations

It is noted that, on this occasion, the chosen archaeological methodology, viewed retrospectively, has not been completely successful: both the magnetometer and resistivity surveys failed to identify deposits on the east side of the site (including two substantial ditches). The position has been discussed with GeoQuest Associates, who have reasoned that low responses may be put down to the thickness of overburden on the site (c. 1.0m) and the physical similarities between the overburden and the fills of the ditches.

Although it has been possible to determine that the site was occupied during the late C10th/early C11th, one is inevitably left pondering the question of how much information has been missed and/or destroyed and, of course, how much more information could have been gathered under alternative conditions of evaluation. The archaeological contractor has learned from the experience and, on future

occasions, geophysical surveys of the type used at Middle Rasen may not be an appropriate evaluation tool in this area, given that the thick sandy overburden may be a widespread feature. That said, it is suggested that impacts on this site to the archaeological resource have been lessened as a result of the thick overburden which prevails: on the west side of the site, for example (where archaeological features were detected during geophysical survey), widespread truncation for access and car parking did not affect the buried resource greatly and it is anticipated that features in this area will remain *in situ*; protected beneath the new access and car parking areas. Similarly, trenching for the new Church Hall has not involved the total removal of archaeological remains and, in theory, these could be left in a reasonable condition for future assessment.

One assumes, in the absence of contrary data, that the two principal ditches on the site functioned as property boundaries (of at least two phases). Ditch [13] appeared to respect the line of North Street, though ditch [10] lay almost at right angles to it. Most of the stratified artefacts recovered from the site date to the late Saxon/early Norman periods, though unstratified medieval sherds suggest continuity of occupation. In living memory, parts of the site were occupied by mud and stud cottages, and these are probably the two buildings which are depicted on the first and second editions of the Ordnance Survey.



Extract, Ordnance Survey 2nd Edition (1905)

10.0 Acknowledgements

On behalf of Pre-Construct Archaeology (Lincoln), sincere thanks are expressed to the commissioning client, Mr S Grant, acting on behalf of the Parochial Church Council. Thanks go also to Mr Ian George, the County Archaeological Officer for providing support and assistance, where necessary. Thanks are due to Jane Young (City of Lincoln Archaeology Unit) for pottery assessment.

11.0 Appendices

11.1 Geophysical Survey report (by GeoQuest Associates)

11.2 Fired clay and slag catalogue (by J Cowgill, CLAU)

11.3 Colour photographs

11.4 Site Archive

11.5 References

Appendix 11.1

GEOPHYSICAL SURVEYS AT MIDDLE RASEN, LINCOLNSHIRE.

A programme of research carried out on behalf of

J. S. GRANT

and

PRE-CONSTRUCT ARCHAEOLOGY (LINCOLN)

by

GeoQuest Associates

INTRODUCTION

This report presents the results of geophysical surveys on an area of land in the village of Middle Rasen, about 3 km west of Market Rasen in Lincolnshire. The surveyed area is on North Street, opposite the Church of St. Peter and St. Paul and is shown yellow in Figure 1. The research was carried out on behalf of J. S. Grant and Pre-Construct Archaeology (Lincoln) in accordance with instructions supplied by Colin Palmer-Brown of Pre-Construct Archaeology (Lincoln).

The aim of the study was to detect subsoil features of archaeological and geotechnical interest within an area measuring approximately 30 x 20 metres, on which there are plans to build a new church hall. Pottery and lithic finds in the vicinity of the site suggest that it may contain sub-soil evidence of prehistoric, Romano-British and medieval activity which might comprise ditches and structural remains in stone. A combination of geomagnetic and electrical resistivity survey was employed in order to provide the best opportunity for detecting probable archaeological features.

GEOLOGY, TOPOGRAPHY AND LANDUSE

The study area consists of grass and is enclosed by fences and hedges on all sides. In the eastern corner of the site there is a rectangular trench where the foundations of a wooden scout hut have been removed.

The local solid geology comprises Jurassic Ampthill and Kimmeridge Clay, covered by drift deposits.

THE GEOPHYSICAL SURVEY

Geophysical surveying provides a rapid method for the detection of subsoil features within archaeological landscapes. Two methods are most frequently used: *geomagnetic* surveying employs a portable magnetometer to detect small perturbations in the Earth's magnetic field caused by changes in soil magnetic susceptibility or permanent magnetisation; the *resistivity* method, on the other hand, maps differences in soil electrical resistance which mainly reflect variations in water content.

Measurements of vertical geomagnetic field gradient were made over a regular grid using an enhanced Geoscan FM36 fluxgate gradiometer with ST1 sample trigger. A zig-zag traverse scheme was employed and data were logged in units of 20 x 20 metres at 0.5 x 0.5 metre intervals. (Appendix A provides further information about the technique employed.)

Measurements of soil electrical resistance were made over the same grid using a Geoscan RM15 resistivity meter with 0.5 metre spacing of the mobile electrodes. A zig-

zag traverse scheme was employed and data were again logged in units of 20 x 20 metres at 0.5 x 0.5 metre intervals. (Appendix B provides further information about this technique.)

The GeoQuest *InSite* Windows program was used to process the geophysical data and produce grey-scale images at a scale of 1:250 showing the residual soil electrical resistance and geomagnetic anomalies on base-maps digitised from plans supplied by J. S. Grant (Figures 2 and 3). Conventions are used that show positive magnetic anomalies as dark grey and negative magnetic anomalies as light grey, and high electrical resistance anomalies as dark grey and low resistance anomalies as light grey.

RESULTS AND DISCUSSION

The first stage in the interpretation has been to extract significant anomalies in the geomagnetic and resistivity data and present them on a single plan using coded colours and patterns (Figure 4). An archaeological interpretation is shown in Figure 5. The classes of anomalies which have been distinguished are as follows:

1 **Red:** Strong *dipolar anomalies* (paired positive-negative) which, in this context, mostly reflect *ferrous surface litter* or *fired materials* such as clay brick/tile.

2 **Green:** Areas of anomalously *low electrical resistivity* reflecting a relative increase in soil moisture content. In appropriate contexts these can be interpreted as *pits or ditches*.

The following features have been identified:

1 The soil resistivity survey results show a sub-rectangular low resistivity anomaly in the eastern corner of the survey area and an ajoining linear anomaly with a north-west alignment. The position of these anomalies coincides with the position of the old scout hut and the pathway leading to it from the road.

2 The resistivity survey has also detected a diffuse, low resistivity linear anomaly on the western side of the site. This anomaly is aligned north-south and is approximately 1.5 metres wide. The geophysical character of this anomaly suggests that it may be caused by a ditch.

3 Towards the middle of the southern edge of the surveyed area there is a diffuse, low resistivity circular anomaly. Geophysical anomalies of this type usually reflect soil-filled features such as a pits.

4 The magnetometer survey results contain a number of substantial, intense dipolar anomalies which are probably due to the presence of large metal objects.

CONCLUSIONS

The main results of this research are summarised below:

1 Geomagnetic and soil electrical resistivity surveys were carried out on an area of land designated for building work in Middle Rasen, Lincolnshire.

2 The geomagnetic survey did not detect any archaeological features.

3 The results of the resistivity survey show low resistivity anomalies attributed to the pathway and scout hut site visible on the ground.

4 The resistivity survey detected a possible ditch in the western half of the site and a possible pit near the southern limit of the survey area. These features may warrant further investigation by trial trenching.

CREDITS

Field survey: D. N. Hale, R. Grove
Report and graphics: R. Grove

Date: 28th September 1995

Note: Whilst every effort has been taken in the preparation and submission of this report in order to provide as complete an assessment as possible within the terms of the brief, GeoQuest Associates cannot accept any responsibility for consequences arising as a result of unknown and undiscovered sites or artifacts.

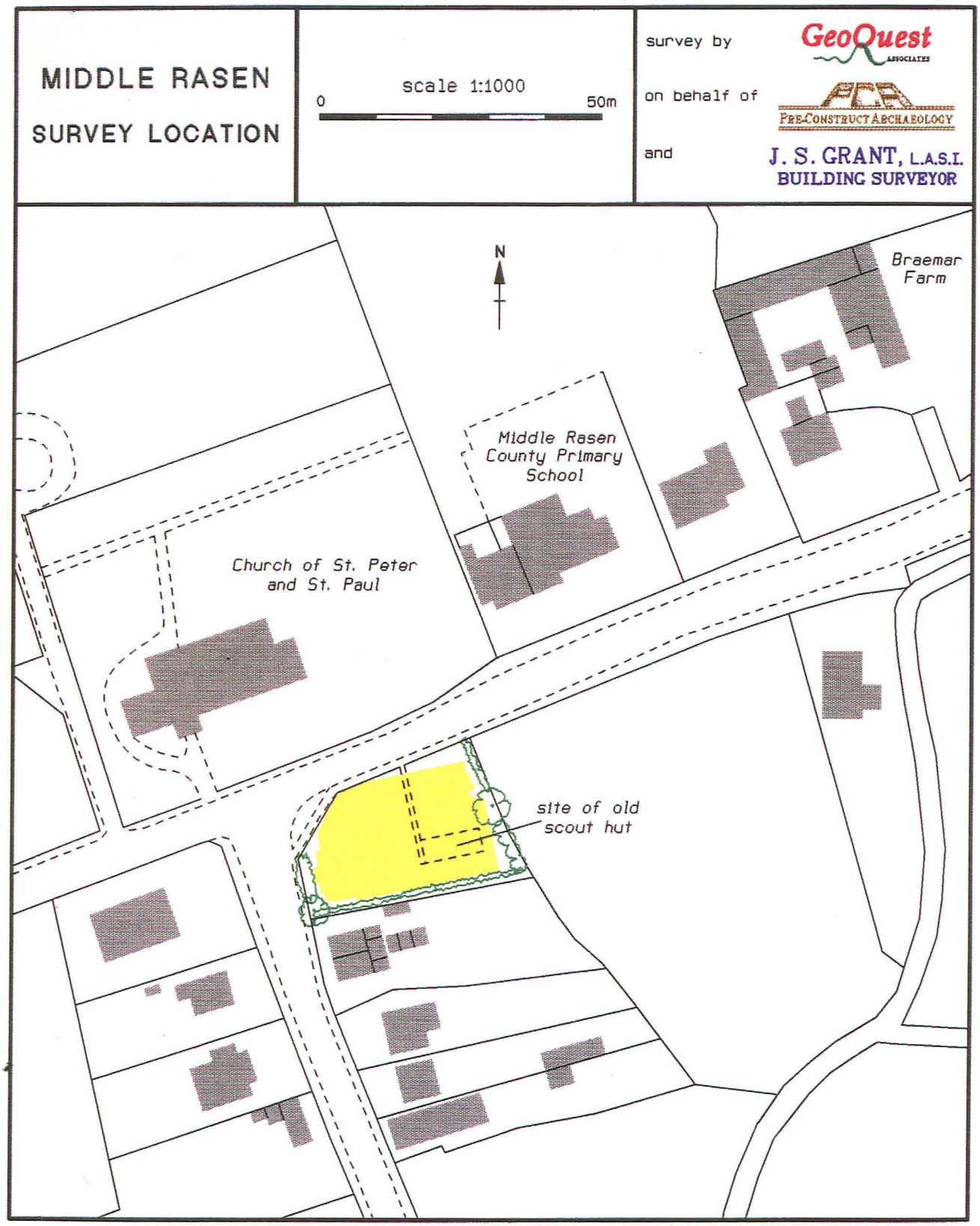

MIDDLE RASEN
SURVEY LOCATION
scale 1:1000
0
50m
survey by
GeoQuest
ASSOCIATES
on behalf of
PCA
PRE-CONSTRUCT ARCHAEOLOGY
and
J. S. GRANT, L.A.S.I.
BUILDING SURVEYOR
N
Braemar Farm
Middle Rasen County Primary School
Church of St. Peter and St. Paul
site of old scout hut

FIGURE 1

MIDDLE RASEN

RESISTIVITY SURVEY RESULTS

survey by GeoQuest Associates

on behalf of PCA Pre-Construct Archaeology

and J. S. GRANT, L.A.S.I. BUILDING SURVEYOR

scale 1:250 0 10m

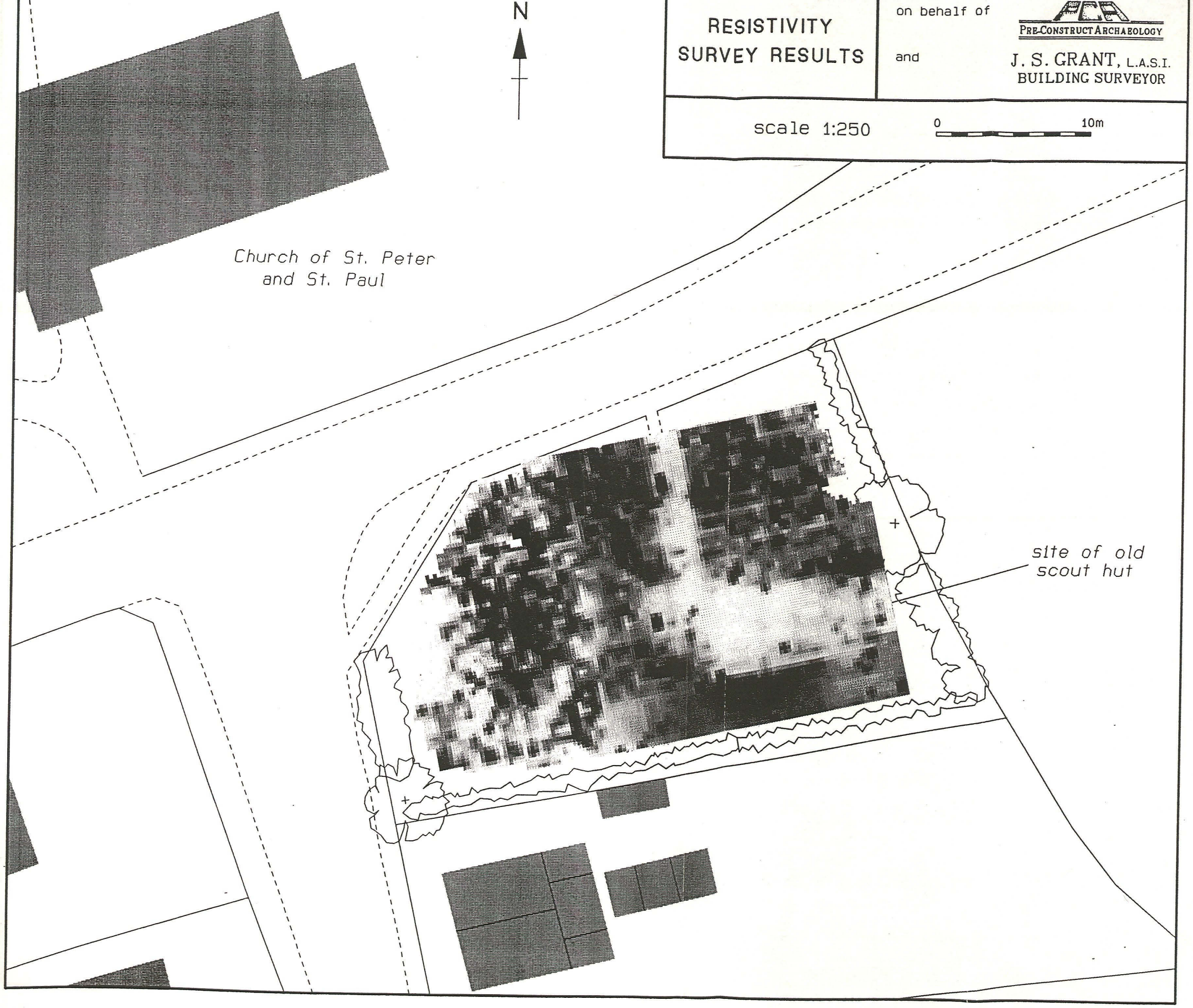


FIGURE 2

MIDDLE RASEN

MAGNETOMETER SURVEY RESULTS

survey by GeoQuest Associates

on behalf of PCA Pre-Construct Archaeology

and J. S. GRANT, L.A.S.I. BUILDING SURVEYOR

scale 1:250 0 10m

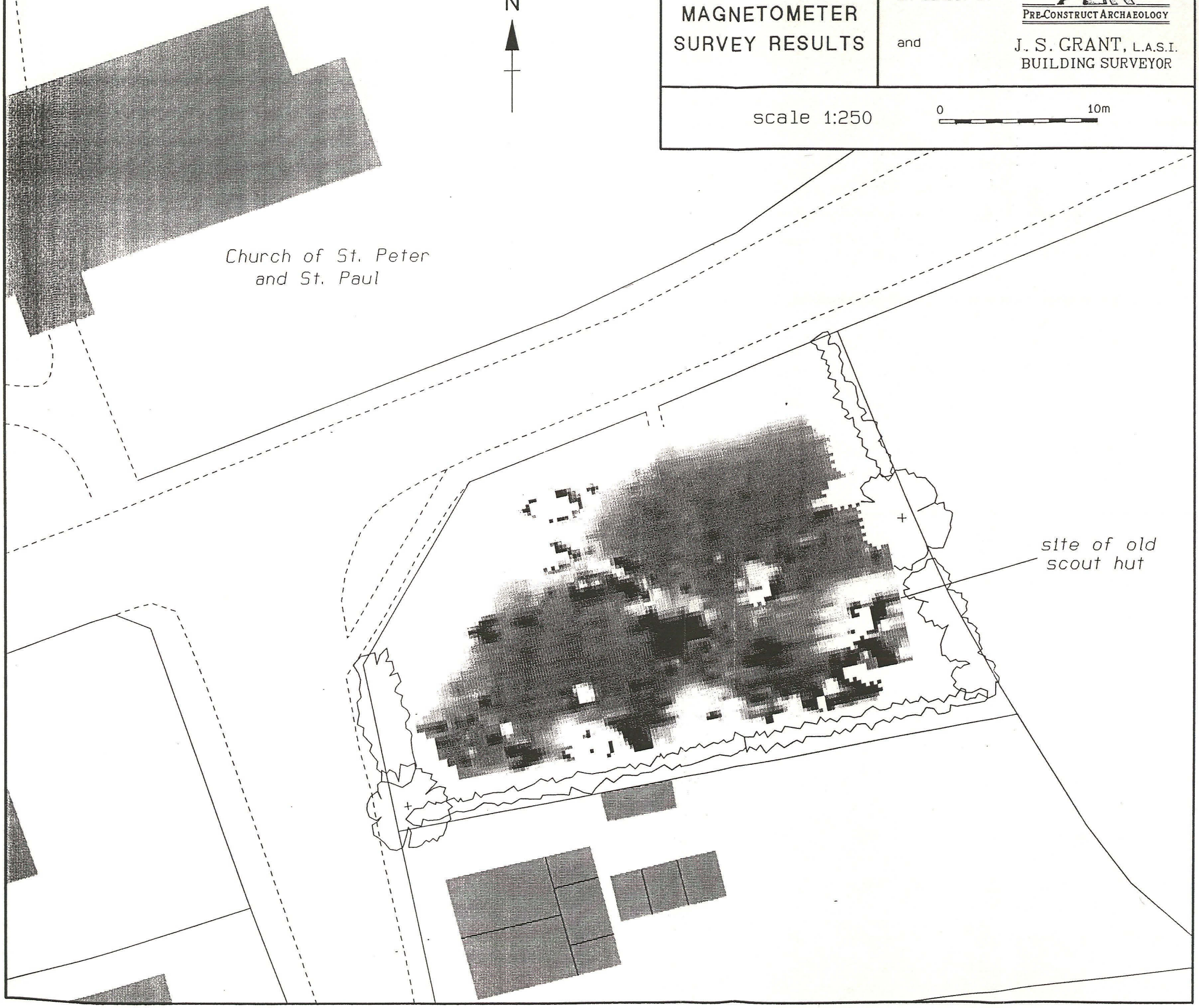


FIGURE 3

MIDDLE RASEN

GEOPHYSICAL INTERPRETATION

survey by GeoQuest Associates

on behalf of PCA Pre-Construct Archaeology

and J. S. GRANT, L.A.S.I. BUILDING SURVEYOR

KEY
dipolar
low resistivity

scale 1:250
0 10m

N

Church of St. Peter and St. Paul

site of old scout hut

FIGURE 4

MIDDLE RASEN

ARCHAEOLOGICAL INTERPRETATION

survey by GeoQuest Associates

on behalf of PCA Pre-Construct Archaeology

and J. S. GRANT, L.A.S.I. BUILDING SURVEYOR

KEY
- possible ditch
- possible ditch

scale 1:250

0 10m

N

Church of St. Peter and St. Paul

site of old scout hut

FIGURE 5

MIDDLE RASEN

ARCHAEOLOGICAL INTERPRETATION

survey by GeoQuest Associates

on behalf of PCA Pre-Construct Archaeology

and J. S. GRANT, L.A.S.I. BUILDING SURVEYOR

KEY
- possible ditch
- possible ditch

scale 1:250

0 10m

N

Church of St. Peter and St. Paul

site of old scout hut

FIGURE 5

APPENDIX A

Principles of Geomagnetic Surveying

Geomagnetic prospecting detects subsurface features in terms of the perturbations or 'anomalies' that they induce in the Earth's magnetic field. In contrast to resistivity, seismic or electromagnetic surveying, no energy is injected into the subsoil and hence this is one of a class of *passive* geophysical techniques that includes gravity and thermal surveying. In an archaeological setting two types of magnetic anomalies can be distinguished:

1 Anomalies arising from variations in *magnetic susceptibility* which will modulate the component of magnetisation *induced* in the subsurface by the Earth's magnetic field. For most archaeological sites, this is the dominant factor giving rise to geomagnetic anomalies. In general, susceptibility is relatively weak in sediments, such as sandstones and enhanced in ingeous rocks and soils, especially those which have been burnt or stratified with organic material.

2 Anomalies due to large, *permanently magnetised* structures. Such permanent magnetisation or 'remanence' arises when earth materials are heated to above ~600°C and cooled in the geomagnetic field. Thus kilns and hearths are often detected as strong permanent magnets causing highly localised anomalies that dominate effects due to background susceptibility variations. Remanence can result from other physical and chemical processes but these give rise to anomalies that are usually unimportant for geophysical prospecting.

There are several approaches towards the practical measurement of geomagnetic anomalies. In this study measurements were made using a Geoscan FM36 fluxgate gradiometer which records the change with height in the vertical component of the Earth's magnetic field, as shown overleaf. This method has the advantage of being insensitive to diurnal variations while the Geoscan instrument also benefits from an integrated data logger. Note that in mid northern latitudes the magnetic anomaly will be asymmetric with the main peak displaced to the south of the archaeological feature. Thus, a ditch filled with a soil of enhanced susceptibility, for example, will generate a positive anomaly to the south, mirrored by a weak negative anomaly north of the feature. When portrayed as an area map of grey tones this gives rise to a 'shadowing' or pseudo relief effect which must be borne in mind when making an archaeological interpretation.

Two techniques can be used to survey gridded areas using the fluxgate magnetometer. In the parallel method the instrument is used to scan the area along traverses which are always in the same direction. This method minimises 'heading errors' due to operator and instrument magnetisation but is time consuming. The alternative zig-zag method is significantly faster and suitable for areas where anomalies are large compared to these and other sources of error.

APPENDIX B

Principles of Electrical Resistivity Surveying

This is an *active* geophysical prospecting technique which detects subsurface features in terms of the resistance they present to the passage of an artificially induced electric current. In the dry state, most soils and rocks are insulators but, when they become moist, electric currents are able to flow through the movement of ions which are always dissolved in the porewater. As the soil or rock absorbs more water the conductivity increases since more ions become available for conduction and their mobility is enhanced. Hence electrical resistivity surveying primarily maps the volume concentration of ground moisture which varies according to lithology, porosity and time of year. Temperature fluctuations can also be important although in mid-latitudes this effect is insignificant.

To record the soil electrical resistivity an alternating current is injected into the ground through a pair of metal electrodes and the surface potential detected between a second pair. This arrangement is needed to minimise errors arising from contact effects, earth currents (usually of mains origin) and polarisation potentials. Several configurations have been evaluated for archaeological use but the 'twin electrode' scheme shown overleaf has proved popular for this purpose. A mobile frame is used to carry one potential and one current electrode (**p2** and **c2**) which are connected, via the meter, to their respective **p1** and **c1** soil electrodes. Alternating current is passed between **c1** and **c2** and the potential measured between **p1** and **p2**. The presence of a zone of anomalous resistivity modifies the distribution of current flow (dotted streamlines) and also the contours of constant potential (curved solid lines) and is depicted for the case of a high resistivity structure such as a wall. The instrument thus senses a maximum (or minimum) in the apparent soil resistance which is centred over the feature.

Through good instrument design, resistivity surveying is now a rapid technique although the need for soil contact and cables makes this a slower method than magnetometry. Our surveys employed a Geoscan RM15 instrument with variable spacing between the mobile electrodes which enables the sensing depth to be optimised.

Measurements are generally taken at regular intervals on a grid. Both parallel and zig-zag traverse schemes are used; the first method is slower but minimises systematic errors in the resulting data.

NOTES

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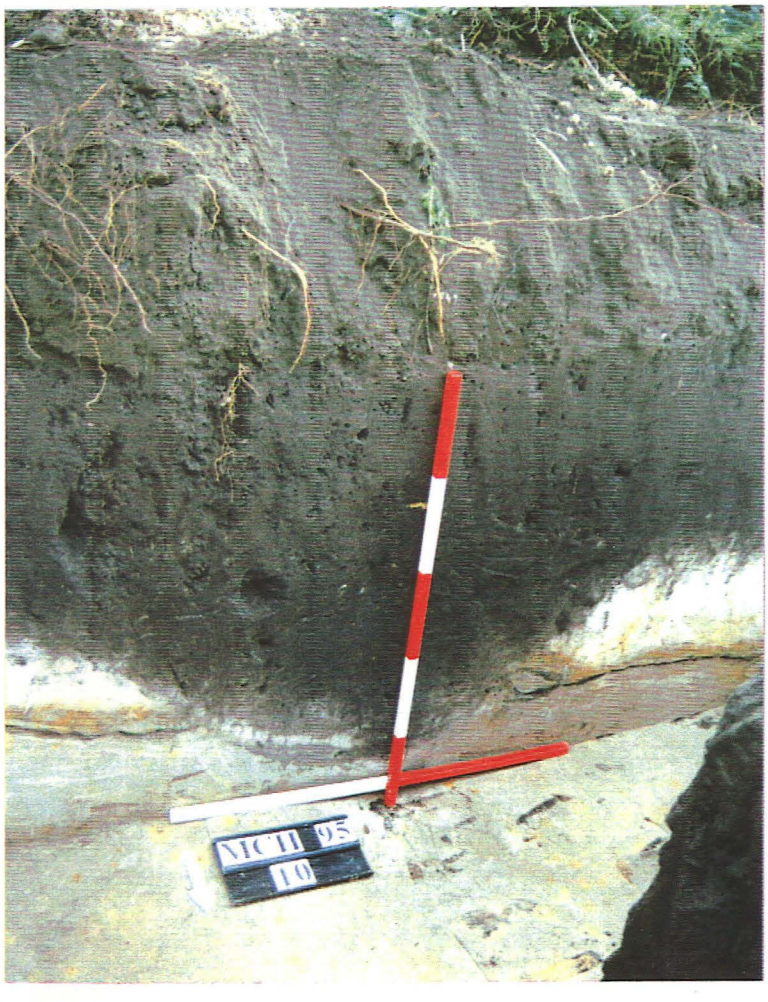
Appendix 11.2 Fired clay and slag catalogue (J Cowgill, CLAU)

FIRED CLAY AND SLAG CATALOGUE FOR THE WATCHING BRIEF CHURCH STREET/NORTH STREET, MIDDLE RASEN (CHM95; LCCM 180.95).

Context	Type	No.	Weight	Comments
9	Slag PCB	1	137g	+charcoal: leached: abraded
15	Iron frags	3	6g	panning?
15	Slag PCB	1	115g	some white/light grey: abraded
17	Wood	1	2g	mineralised
17	Fired clay	1	6g	oxidised: 1xsurface
18	Fired clay	1	52g	oxidised sandy wedged fabric: brick?
18	Fired clay	7	146g	oxidised: same matrix as above but poorly wedged: angled edge

The assemblage from the site is too small to enable any interpretation of activities occurring associated with the recorded features. The condition of the slag suggests that it has been redeposited and that at some point it may have been buried in an environment that was either waterlogged or seasonally flooded.

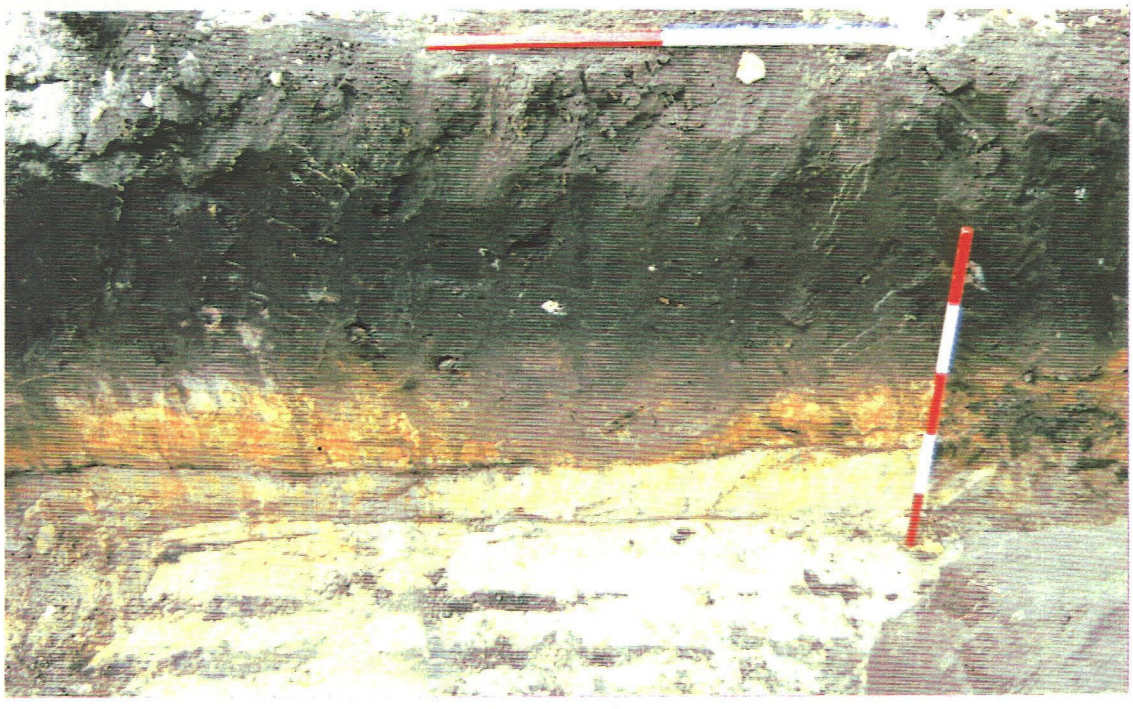
P1. General view of area west of building plot after excavation and during infilling of site access/parking area; looking west towards Church Street



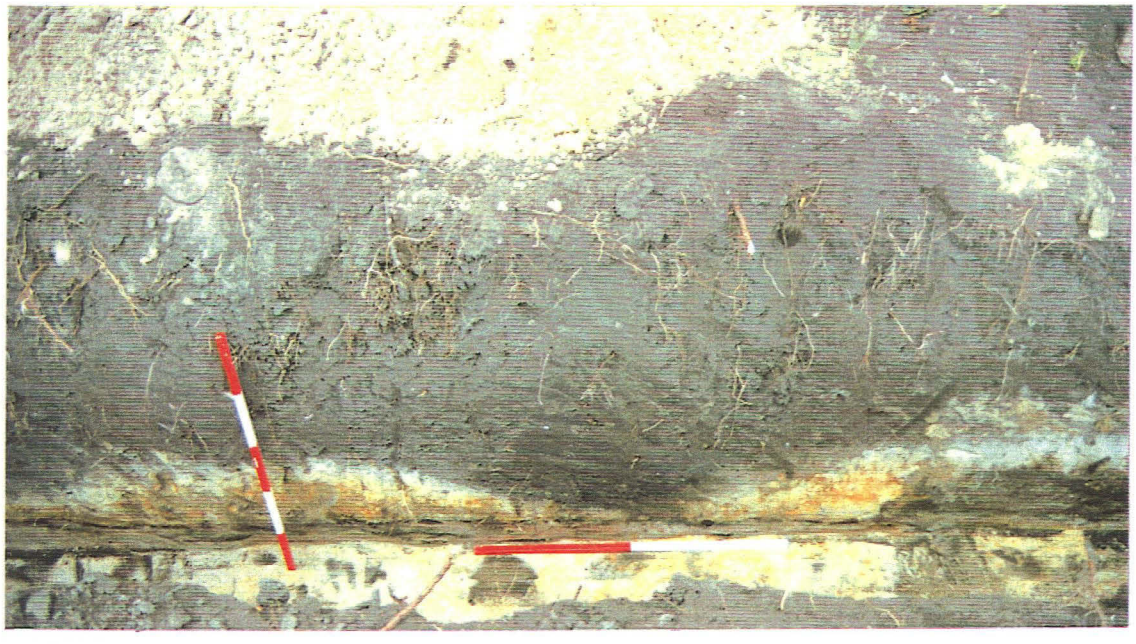
P2. Ditch [10], as exposed in south section of south building trench

11.3 Colour Photographs

P3. East face of section of east foundation trench, showing typical vertical sequence. The ?buried land/marsh surface is the dark band near the base of the photograph



P4. Feature [17], as exposed in west face of central construction trench (in centre of photograph)



P5. Ditch [13], exposed in west face of central construction trench

11.4 Site Archives

The basic site archive comprises the following:

x1 1:100 site plan (architectural drawing)

x6 watching brief record sheets/notes

x6 (A4) pages of site drawings (scale 1:20)

x2 colour print films

x1 bag of finds

Misc. notes and correspondence.

Primary records are currently with Pre-Construct Archaeology (Lincoln), though the paper archive will be deposited with the City and County Museum within 1 year of completion of this report, together with a more detailed archive list. Middle Rasen Church Council have expressed their desire to retain some of the finds and exhibit them in the new Church Hall.

11.5 References

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