Birmingham University Field Archaeology Unit

Report No. 255

July 1993

An Archaeological Evaluation at Gnosall, Staffordshire

by
Laurence Jones and Lucie Dingwall

For further information please contact:
Simon Buteux (Manager), Peter Leach or Iain Ferris (Assistant Directors)
Birmingham University Field Archaeology Unit
The University of Birmingham
Edgbaston
Birmingham B15 2TT
Tel: 021 414 5513
Fax: 021 414 5516

An Archaeological Evaluation at Gnosall, Staffordshire

CONTENTS

ILLUSTRATIONS

An Archaeological Evaluation at the Site of the Former St. Lawrence C.E. Junior School, Gnosall, Staffordshire

1.0 Introduction

In June, 1993 Birmingham University Field Archaeology Unit undertook an archaeological evaluation of land on the site of the former St. Lawrence C.E. Primary School, Gnosall (Fig. 1). The evaluation was commissioned by Staffordshire County Council prior to the release of the site for redevelopment. The evaluation comprised a survey of the documentary evidence relating to the site, geophysical prospection, and the excavation of trial trenches.

2.0 Documentary Evidence (by Lucie Dingwall)

The following documentary research was based on a review of primary and secondary sources held at the Staffordshire County Records Office and the William Salt Library, Stafford.

The site of the former St. Lawrence C.E. Junior School lies to the south of St. Lawrence's Church, in the Parish of Gnosall. The site, bought by the County Council from the Ecclesiastical Commissioners in 1928 (Midgley 1958, 116), has been identified as having been formerly occupied by 'Sukars Hall' (Meeson 1993).

St. Lawrence's church was probably founded before the conquest, and has been recognised as one of the 'Minsters' of English Mercia, with a community of 'secular' priests. A special category of living is formed by those appropriated to a 'secular' or 'collegiate' foundation. Although Gnosall never became strictly collegiate, by 1193 it had become a church with four portioners or 'prebendaries', who held individual portions formed out of the manor of Gnosall. These four portions or prebends each formed a small manor, consisting of holdings intermingled with each other throughout Gnosall Manor (Midgley 1958, 128). The four prebendal houses were later known as Moorhall, Bendley Hall, Chilterne Hall and Sukershall (Gnosall Survey, 1646/7, Hinckley and Birch) and had separate courts until at least the mid-fifteenth century. After this date, joint courts were held and the Court Rolls refer to the 'late prebends of Morehall, Chilternhall, Beverley Hall and Sucarshall' (Hone, Manor and Manorial records).

A Lawsuit from 1395 contains a list of prebendaries of Sukershall from 1278 to 1541 (A Gnosall Lawsuit of 1395. Collections of Historical Staffs. 1927). The earliest named is William de Seukysworth (oc. 1278), from whom the prebendial manor probably took its name. The succession of the prebendaries seems to have been fairly rapid. One such succession is listed in the Lichfield Episcopal registers of 1369 as an 'exchange between Master John de Swynesheued, Canon of the collegiate church of Gnoueshale, and prebendary of Seukesworth in the same, and ds. Bartholomew de Bourne, Canon of Lincoln, and prebendary of Langeford Manor in the same' (Collections of Historical Staffs. X N.S. II 126-7). Most of the prebendaries probably had preferment elsewhere and did not reside at Gnosall, hence the lack of reference to prebends residences in the documentary sources.

There do not appear to be any specific references to the site of Sukars Hall itself before the seventeenth century; a few of the sources deal with transactions concerning the prebend, but there is no cartographic evidence before 1837. A document lists the value of the prebendial manor of Sukerhall in the time of the prebend 'Galfr'us Blythe' (Geoffrey Blithe) in 1535 as £11 6s 8d (Valor Ecclesiasticus iii 99). A survey of Gnosall in the seventeenth century lists tenants renting land from the prebend but again there is no cartographic evidence to locate the properties (Gnosall Survey, 1646/7, Hinckley and Birch).

Although common land in Gnosall was being enclosed from at least 1580 (Midgley 1958, 113), there is no enclosure map covering Gnosall. Church records held in Lichfield Joint Records Office seem to be the most likely source of information regarding the occupation of land on the site of the school (CH. Comm. MS 1233886, 123896-8). In 1677, Roger Fowke held the Sukar's Croft, adjoining land and a house then standing by the churchyard. It would appear that Sukar's Hall was no longer standing by this date (Midgley 1958 115).

There is a reference to 'Sukars Croft in Court Rolls of Gnosall from the time of Henry VII concerning a judgement where 'a pain is placed upon William Hugson and Anne More to make their enclosures by Sukars Croft by the feast of the Purification of Blessed Mary, under pain each one 12d' (Hone, Manor and Manorial Records).

The earliest map source available, from 1837, showed the parish of Gnosall divided into four quarters unrelated to the prebendial manor divisions (Tithe maps and apportionment, Gnosall Qtr 1837). The tithe map shows buildings in the south east of the site now occupied by the school. The buildings are shown on the tithe apportionment to be held by Thomas Skellnor, although no name is given to the buildings or the land in that portion (Tithe Appt, Gnosall Qtr no 415). The surrounding land to the west and north is held by Abraham Anston (Tithe Appt, Gnosall Qtr nos 410, 413, 414). The portion described as 'House and Garden' (Tithe Appt, Gnosall Qtr no 413), containing one extremely small building, is the area now occupied by the main school building. The portion listed as 'barn and stackyard' (Tithe Appt, Gnosall Qtr no 414), is in the area presently occupied by the school playground, and several local people remember a building in the area of the present playground. The portion to the west is described as 'Middle Croft' (Tithe Appt, Gnosall Qtr no 410) and no buildings are marked. The low resistance anomaly produced by the Geophysical survey in the north west of the site may possibly be the remains of the boundary between tithe apportionments 410 and 414.

Midgley identifies the buildings in the south east as Thomas Belcher's house, who is listed in 1851 as holding 'The Manor' (White 1851). His gravestone, which lies in the churchyard, lists him as Thomas Belcher 'of Manor House', who died in 1871 at the age of 42. The Ordnance Survey 6" map of 1902 shows buildings of the same shape, occupying the same positions (therefore presumably the same buildings) in the southeast of the site, with additional buildings to the west. It is now marked as 'Manor Farm', and incorporates all the land to the north up to the churchyard, with orchards adjoining the churchyard (Fig.3). These buildings remained standing until the land was levelled and landscaped for construction of the school in the 1960's. Part of the farm was used as an egg-packing station in the 1950's and ancient stonework was observed in parts of the farm outbuildings (Midgley 1958 116). Oral evidence indicates that one of the outbuildings may have been older than the farmhouse itself (Meeson 1993), possibly the barn marked on the Tithe map (Tithe Appt, Gnosall Qtr no 414).

The lack of earlier cartographic evidence has made it difficult to trace locations of former buildings. Although presumably there was a manor house known as 'Sukars Hall' in the medieval period, none of the sources available in the County Record Office referred to a specific site or building called 'Sukars Hall', and there is no map of Gnosall earlier than the Tithe map of 1837. The sparse evidence indicates that the medieval manor house was demolished at a relatively early date, and the only traces that remained were patches of stonework and re-used stone in farm buildings near the church. The farm buildings remembered by local people must have been a mixture of those shown on the Tithe map and later Victorian additions.

3.0 Geophysical Prospection

The geophysical survey was carried out by Geophysical Surveys of Bradford on behalf of B.U.F.A.U. using both gradiometry and resistance surveys.

The gradiometer survey failed to locate any archaeological features. This may have been due

to strong magnetic interference caused by modern features. The resistance survey, however, did locate some anomalies possibly indicating the presence of archaeological features such as house platforms and wall lines obscured by modern services and trees (Appendix 1).

4.0 Trial Trenching

The excavation of eight trial trenches was undertaken to complement the information obtained through documentary research and the geophysical survey, and they were sited to assess the archaeological potential of the site (Fig. 2). A JCB mechanical excavator was used to remove modern overburden in a series of trenches averaging 1.5m wide and totalling approximately 286 square metres. The trenches were then cleaned manually and any archaeological features were excavated and recorded by means of pro-forma record cards, scale drawings and both monochrome and colour photographs.

Trench 1

Trench 1 measured 15m x 1.5m and was situated in the north east corner of the site, parallel with the churchyard wall. Modern topsoil (1000) 0.3m in depth and a yellowish-brown sandy silt (1001) 0.45m deep in the east and 1.3m deep in the west, was removed by machine. Natural orange sand (1002) was contacted in the centre of the trench, 1m below the present ground surface (104.34m A.O.D.) sloping down steeply to the east and west.

The only feature present in this trench was a negative linear feature (F8) with a 'U' shaped profile. It was cut through 1001 and was 1.6m wide and 0.84m deep and was filled with a greyish-brown sandy silt (1003), pebbles and several sherds of 18th-century pottery.

Trench 2

This trench measured 25m x 1.5m and was located north of the former school playground, aligned north west - south east to avoid mature trees in this area. Here, 0.2m of modern topsoil (2000) together with several layers of sandy silts containing 18th/19th-century pottery (2001-2005) were removed by machine to a depth of 1m (104.87m A.O.D.) below the present ground surface. Here the natural orange sand and sandstone bedrock (2003) were contacted. At the south east end of the trench a brick-lined well (F1) was located. This feature had a diameter of 0.8m and was capped by a slab of concrete directly beneath the topsoil.

Towards the middle of the trench, east of an outcrop of natural bedrock, was a linear negative feature (F2), which was 1m wide and 0.5m deep and orientated north - south. This feature had steep sides and a flat bottom and was filled with a dark-brown sandy silt and small pebbles (2009). The natural bedrock to the west of this feature was cut by an irregular circular feature (F10), 0.5m in diameter and 0.3m deep. It was filled with a dark brown sandy silt (2013) containing a single lump of fused bottle glass and was heavily disturbed by tree roots.

Further west was another negative linear feature (F15) orientated north - south, 2.5m wide and 0.5m deep, with gently sloping sides. Filling this feature was a dark brown sandy silt with small pebbles (2008). Immediately to the west of F15 was another negative linear feature (F16) aligned north-south, 0.8m wide and 0.28m deep. This shallow cut had gently sloping sides and was filled with a reddish brown sandy silt with a few pebbles (2007). Another linear feature at the north west end of Trench 2 (F19) proved to be the cut for a modern service pipe.

Trench 3

Trench 3, measuring 30m x 1.5m, was situated immediately south of the former school playground, and aligned east - west. Here, 0.2m of modern topsoil (3000), together with 0.3 - 0.55m of greyish-brown sandy silt with brick fragments and pebbles (3001) were removed by machine. Below 3001 the natural orange sand (3002) was contacted at 103.66m A.O.D.

At the eastern end of the trench was a 19th-century brick wall (F3) aligned north - south, 0.4m wide and 0.6m deep. To the west, in the centre of the trench, was a negative linear feature (F4) measuring 2.3m wide and 0.5m deep with gently sloping sides and a north-south orientation. This trench was filled with a mid-brown sandy silt (3003), sandstone fragments, charcoal and sherds of 18th-century pottery. Also within this feature was a concentration of large river cobbles

(3007) which seemed to form a rough wall foundation (F24) running parallel to F4.

Further west was a small ovoid feature (F9), measuring 0.5m x 0.42m and 0.16m deep, filled with greyish brown sandy silt (3005). At the western end of the trench was a cut for a modern drain (F5).

Trench 4

Situated in the south east corner of the site, this trench was aligned east-west and measured 30m x 1.5m. Here, 0.3 - 0.4m of topsoil (4000) was removed by machine together with 0.4 - 0.6m of yellowish-brown sandy silt (4001) containing modern demolition material. Natural orange sand (4002) was contacted 1m below the present ground surface at 104.8m A.O.D.

Towards the centre of the trench was a negative linear feature (F11), aligned north east - south west. This feature had steeply sloping sides and a flat bottom and measured 1.28m wide, 0.5m deep and was filled with an orange brown sandy silt (4004). Further west was a segment of wall foundation (F6) orientated north - south and consisting of one course of large, rectangular, dressed green sandstone blocks built on brick foundations (4003). Towards the west end of the trench was a rectangular feature (F13), measuring 0.8m x 0.9m and 0.36m deep. This cut was straight-sided and flat-bottomed and extended beyond the northern edge of the trench; it contained a brown sandy silt with fragments of brick (4005).

Trench 5

Located near the southern boundary of the site, Trench 5 measured 16m x 1.5m and was aligned north - south. 0.2m of topsoil (5000) was removed by machine to reveal the natural orange sand (5001) at 104.5m A.O.D. At the southern end of the trench was a shallow rectangular pit (F19), 0.6m x 0.6m and 0.4m deep, extending beyond the eastern end of the trench. The fill of this feature was a dark brown sandy silt incorporating large quantities of cow bones (5002). Further north was a similar feature (F20), again, a rectangular pit extending into the western section and measuring 0.6m x 0.6m and 0.5m deep. This pit was also filled with a dark brown sandy silt and large quantities of cow bones (5003).

At the northern end of the trench was a negative linear feature orientated east - west, 2.1m wide and 0.5m deep. This steep-sided and flat-bottomed cut was filled with a dark brown sandy silt with some flecks of charcoal and a few pebbles (5004).

Trench 6

Trench 6 was located in the south western corner of the site, orientated east - west and measured 30m x 1.5m. Removal of 0.3m of topsoil (6000) by machine, revealed beneath the natural orange sand (6001) at 104.17m A.O.D. At the eastern end of the trench was a brick-built sunken room or cellar filled with rubble, with a brick floor 1.4m beneath the modern ground surface.

To the west of the cellar was a 3m - wide band of dark brown silty sand 0.15m deep. Beneath this was a negative linear feature (F18) orientated north - south and measuring 0.75m wide and 0.45m deep, with steep sides and a flat bottom. The fill of this feature was a dark brown silty sand (6004) containing brick fragments and sherds of 18th-century pottery. Towards the western end of the trench was an 8m long, 0.15m deep deposit of dark brown sandy silt (6002) and brick fragments, beneath which was the natural sand (6001).

Trench 7

Trench 7 was situated just south of the former school, aligned north - south and measured 30m x 1.5m. Here, 0.2 - 0.3m of topsoil (7000) was removed by machine to reveal the natural orange sand (7001) at 104.74m A.O.D. At the northern end of the trench the natural had been terraced to provide a platform for the construction of the school.

To the south was a linear negative feature (F12) aligned east-west, with steep sides and a flattish bottom 1.0m wide and 0.35m deep. This ditch was filled with a very sandy silt (7002), greyish brown in colour, together with brick fragments and pebbles. Further south was a wide linear negative feature (F21), 2.6m wide and 0.6m deep. The northern side of this cut was

steeply sloping while the southern side sloped gently. Filling F21 was an orange-brown sandy silt (7003), containing pebbles and a fragment of modern bottle glass.

Trench 8

This trench was situated on the western side of the site and was orientated east - west, measuring 15m x 1.5m. Approximately 0.2m of topsoil (8000) together with 0.25m of yellowish-brown sandy silt (8001) were removed by machine to a depth of 103.15m A.O.D. The sole feature in this trench was the bottom course of a poorly constructed sandstone wall (F7) 0.24m wide. This was orientated north - south and made of rough unmortared sandstone blocks (8003).

5.0 Discussion

Despite the earlier documentary evidence apparently relating to this site and the proximity of the medieval and pre-Conquest Church of St. Lawrence, the evaluation suggested that no features earlier in date than the 18th century now survive here.

The slight resistance anomalies identified in the geophysical survey can be explained by the presence of mainly 19th-century features belonging to Manor Farm (Fig. 3), some of which were encountered during the evaluation. All the features located during the successive stages of evaluation can thus either be directly related to the structures appearing on the 1837 Tithe map and the 1902 edition 25" Ordnance Survey map, or must be associated with these structures. No sherds of medieval pottery or other artefacts were recovered during the excavation, nor any deposit or feature suspected to have been of that period or earlier. In these circumstances it appears that the documentary evidence for the location of Sukars Hall on this site must now be in some doubt. However, there remains the possibility that some earlier structural remains were incorporated into the Manor Farm but were not encountered in this evaluation, or that a major terracing of the site has destroyed any earlier remains, and thus the hypothesis cannot be entirely discounted.

6.0 Recommendations

In the absence of any medieval or earlier evidence located by the evaluation techniques applied to the site there is no justification for further archaeological evaluation, nor for strategies to mitigate the effects of future development here upon a significant resource.

Despite the exclusively post-medieval character of evidence recovered, the proximity of the medieval church of St. Lawrence and documentary evidence which may relate to this site justifies a recommendation that major earthmoving in the early phases of development should be archaeologically monitored.

7.0 Acknowledgments

The project was arranged through Staffordshire County Council and we are grateful to the County Archaeological Officer, Mr Bob Meeson, for discussion and advice throughout. The geophysical surveys were undertaken by Dan Shiel, Geophysical Surveys of Bradford. Trial trenching was directed by Laurence Jones, with the assistance of Lucie Dingwall (who also undertook the documentary research), Hafeez Khan, Ed Newton, Marianne Ridgeway and Hal Roberts; and further participation from Andrew Whincup, Alex Horton, Anna Morgan and Imogen Smith. The project was monitored by Peter Leach, who also edited the report, which is illustrated by Nigel Dodds and produced by Liz Hooper.

8.0 References

Midgley, L.M.	1958	L. M. Midgley (ed.) Victoria History of the County of Stafford
White	1851	Directory of Staffordshire
Hone	(no date)	Manor and Manorial Records
Meeson, R.	1993	Site of the former St. Lawrence C.E. (C) Junior School, Gnosall, Stafford

'A Gnosall Lawsuit of 1395'. Staffordshire Historical collections (1927)
Staffordshire Historical Collections (1939)
Staffordshire Historical Collections (New Series). Volume X Part 2
Valor Ecclesiasticus Henry VIII (iii) 1535

Gnosall Survey, Mar 1646/7. Messrs Hinckley and Birch Solicitors, Lichfield.
Tithe Map and Apportionments, Gnosall Quarter 1837
Ordnance Survey Second Edition (1902) 25" map sheet XLIII.3
Ordnance Survey 1924 25" map sheet XLIII.3

REPORT ON GEOPHYSICAL SURVEY

GNOSALL

Report number 93/62

Work commissioned by :

B.U.F.A.U.

GEOPHYSICAL SURVEYS
Bradford

The Old Sunday School, Kipping Lane,
Thornton, Bradford BD13 3EL
Telephone (0274) 835016
Fax (0274) 830212

SITE SUMMARY SHEET

93 / 62 Gnosall

NGR: SJ 82 20

Location, topography and geology

The survey area lies approximately 10km west of Stafford and immediately to the north of the A518 Stafford-Newport road in the centre of Gnosall, Staffordshire. The survey occupied level playing fields and grounds of the former St Lawrence's C of E First School. The geology comprises sands and gravels.

Archaeology

The site is located in the centre of the village and adjacent to the medieval church of St Lawrence. It is therefore considered likely to contain the remains of medieval settlement including building foundations and/or possibly earlier archaeological activity.

Aims of Survey

A geophysical survey was undertaken in advance of proposed development following the closure of St Lawrence's School. The survey is part of a wider archaeological assessment being carried out by **Birmingham University Field Archaeology Unit (BUFAU)**. The purpose of the survey was to identify areas of archaeological potential for subsequent trial trenching.

Summary of Results *

The survey located a number of anomalies suggesting rubble scatters and possible wall lines of one or more buildings. Interpretation was complicated by responses from several trees, service pipe trenches and disturbance due to landscaping.

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

SURVEY RESULTS

93 / 62 Gnosall

1. Survey Areas

1.1 Two survey areas (labelled 1 and 2 on the location diagram, Figure 1), consisting of an area of approximately 0.36ha and a single 0.04ha grid, separated by a tarmac playground, were surveyed with both gradiometer and resistance methods.

1.2 The survey grid was set out by **Geophysical Surveys of Bradford (GSB)**. Detailed tie-in information has been lodged with the client.

2. Display

2.1 The results are displayed in three formats:- X-Y trace, dot density plot and grey scale image. These display formats are discussed in the *Technical Information* section, at the end of the text.

2.2 Data plots and interpretation diagrams (Figures 2, 3, 4 and 6) are produced at a scale of 1:500.

2.3 Figure 5 displays three plots of filtered resistance data from Area 1, at a scale of 1:625.

3. General Considerations - Complicating factors

3.1 The results of the gradiometer survey were found to be magnetically disturbed due to a scatter of ferrous debris, buildings and anomalies generated by at least four drain covers. However, it was hoped that strong responses associated with industrial activity and/or domestic hearths might be recognisable within the data sets.

3.2 Disturbance caused by pipe trenches and landscaping to produce level playing areas has complicated interpretation of the results.

4. Survey Results (Figures 2 to 4)

4.1Gradiometry Survey

4.1.1 The site was found to be affected by strong magnetic interference from a number of sources which included drains, fences and adjacent buildings. No anomalies were recorded that could be considered to have been generated by archaeological features.

4.1.2 It is possible that some of the disturbance is due to ferrous rubble scatters which are the remains of previous buildings. However, these responses may be the product of levelling and landscaping activity, in particular on the eastern edge of the survey where ballast has been laid for a car park.

4.2 Resistance Survey

4.2.1 The high resistance anomalies at (B) are responses from two trees growing on substantial mounds. Two linear, low resistance anomalies running down the centre of the main survey area and divided by a band of high resistance are produced by two parallel drains.

4.2.2 Figure 4 shows two main areas of high resistance, and these are labelled (C) and (D) on the interpretation diagram, Figure 6. Although no wall lines are apparent in the data in these two areas, they are 'framed' by more obvious, low resistance linear anomalies which may be ditches or gullies. The results suggest possible building platforms, although this interpretation is complicated by the responses from a tree and the service trenches. It is possible that the linear low resistance anomaly on the eastern side is a response from a third drain.

4.2.3 The filtered data plots (Figure 5) hint at wall lines within the high resistance areas described above, interrupted by the service pipes. Excavation trenches placed here would best determine the accuracy of this interpretation.

4.2.4 The high resistance readings recorded in the eastern corner of Area 2 are due to a steep bank sloping northwards down to an entrance drive. In general, low resistance responses were encountered in this area, where it may be that shade from trees has resulted in differential drying out of the topsoil.

---

5. Conclusions

5.1 The gradiometer survey failed to locate any anomalies consistent with industrial and/or domestic archaeological activity. However, the site was found to be magnetically disturbed to such an extent that weaker responses from smaller archaeological features would have been hidden if present.

5.2 The resistance results have identified several areas of archaeological significance which are potential targets for trial excavation. There are suggestions of house platforms and possible wall lines, although they are obscured by responses from service pipe trenches and trees.

Project Co-ordinator: D Shiel
Project Assistants: S Lancaster, N Nemcek & A Shields

28th May 1993
Geophysical Surveys of Bradford

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GEOPHYSICAL SURVEYS OF BRADFORD** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GEOPHYSICAL SURVEYS OF BRADFORD.**

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

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

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT) or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method.

(b) Resistance Meter - Geoscan RM4 or RM15

This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections".

(c) Magnetic Susceptibility

Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. For the latter 50g soil samples are collected in the field.

Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.

(a) X-Y Plot

This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. Advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the indivíual anomalies. Results are produced on a flatbed plotter.

(b) Dot-Density

In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum cut-off value will appear white, whilst any value above the maximum cut-off value will appear black. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). Usually the C.F. = 1, producing a linear scale between the cut-off levels. Assessing a lower than normal reading involves the use of an inverse plot, This plot simply reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. This display is much favoured for producing plans of sites, where positioning of the anomalies and features is important.

(c) Contour

This display joins data points of an equal value by a contour line. Displays are generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer.

(d) 3-D Mesh

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

(e) Grey-Scale

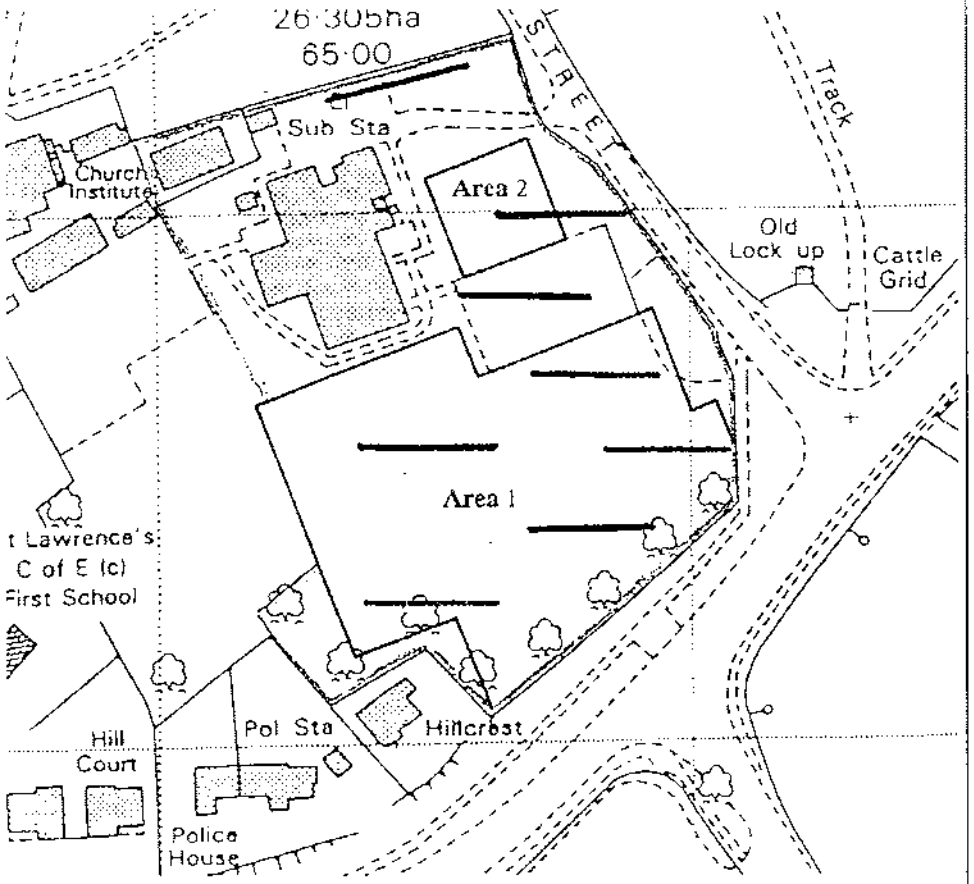
This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey scale.

Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, grey-scales tend to be more informative.

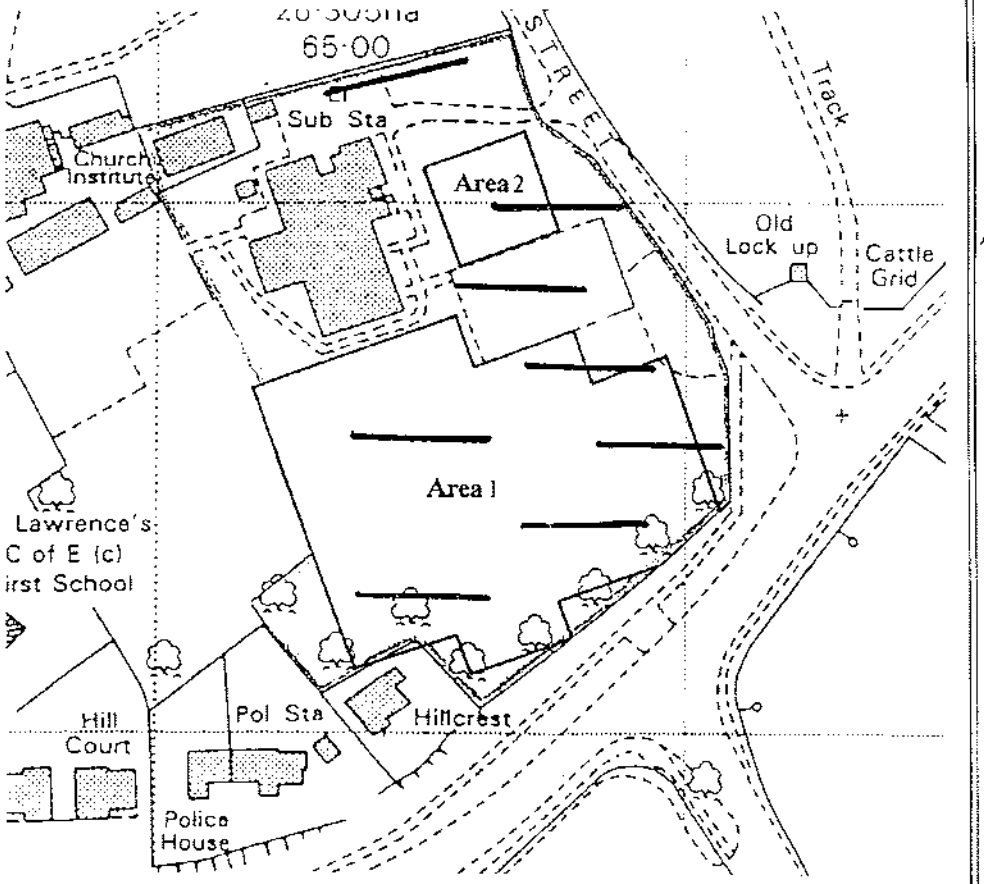
GNOSALL

Location of Survey Areas

Resistance Survey



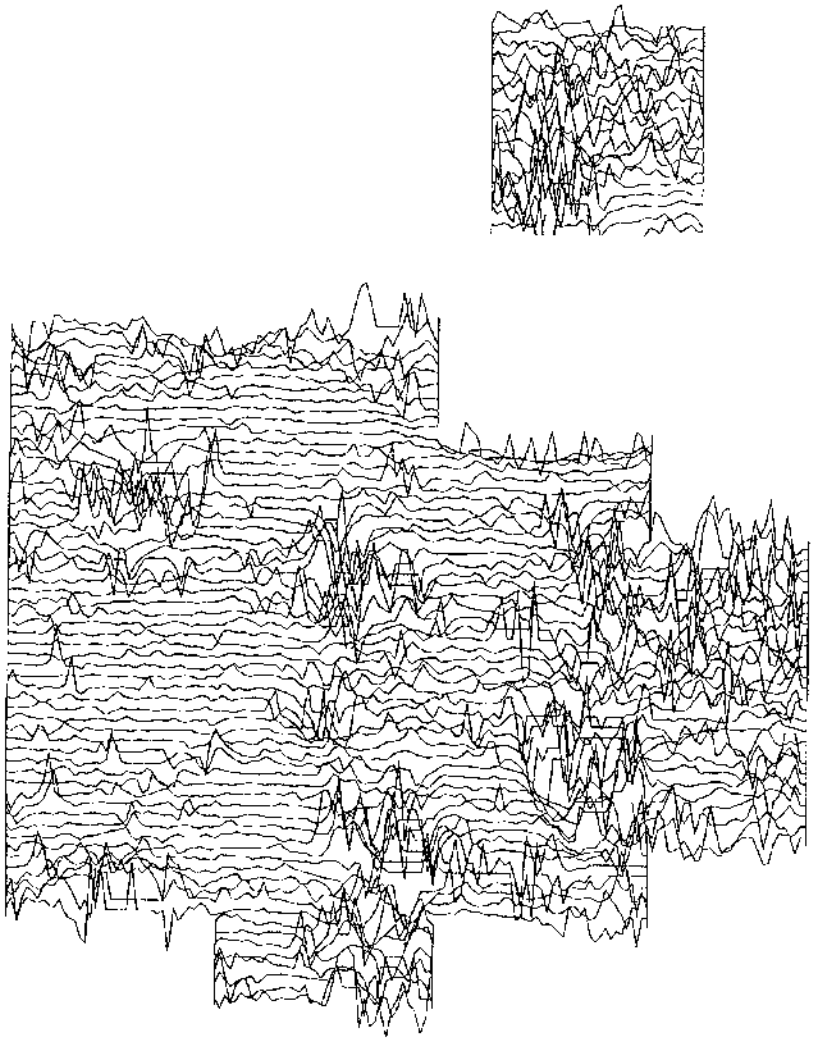
Gradiometer Survey

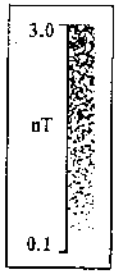


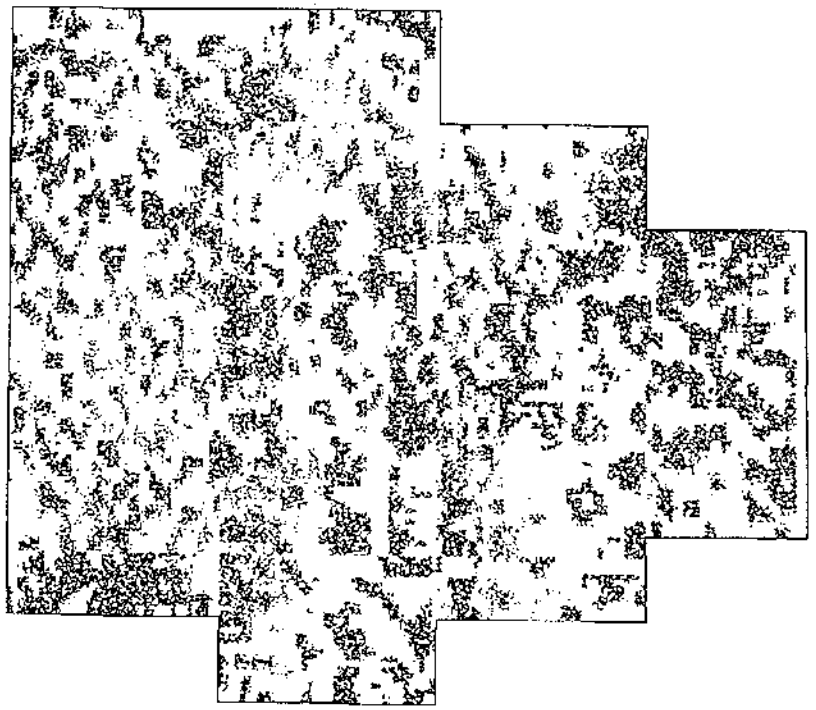
1:1000

Figure 1

GNOSALL
Magnetometry Data



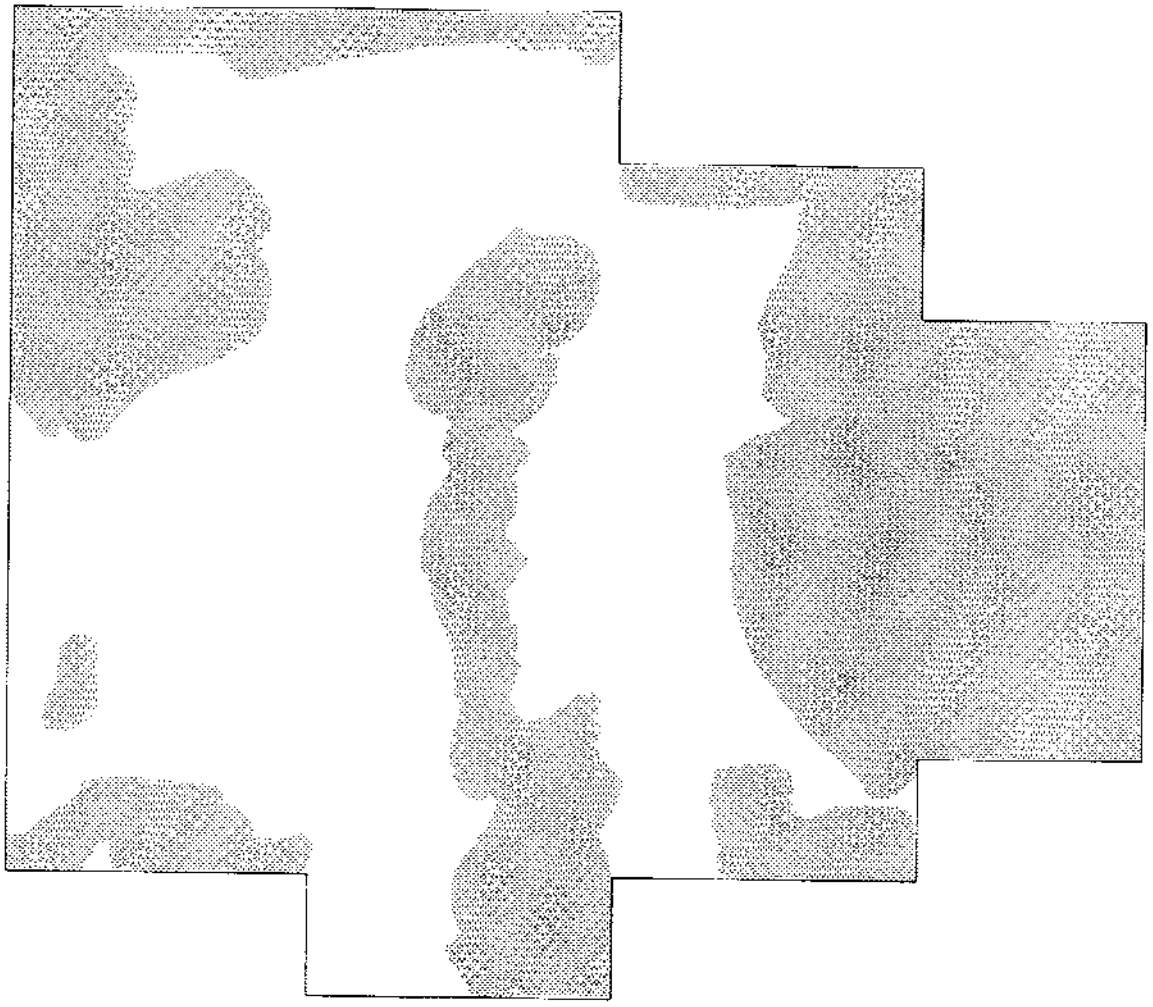




1:500

Figure 2

1:500



Disturbed

GEOPHYSICAL SURVEYS OF BRADFORD
PROJECT: GNOSALL
TITLE: Gradiometry Data

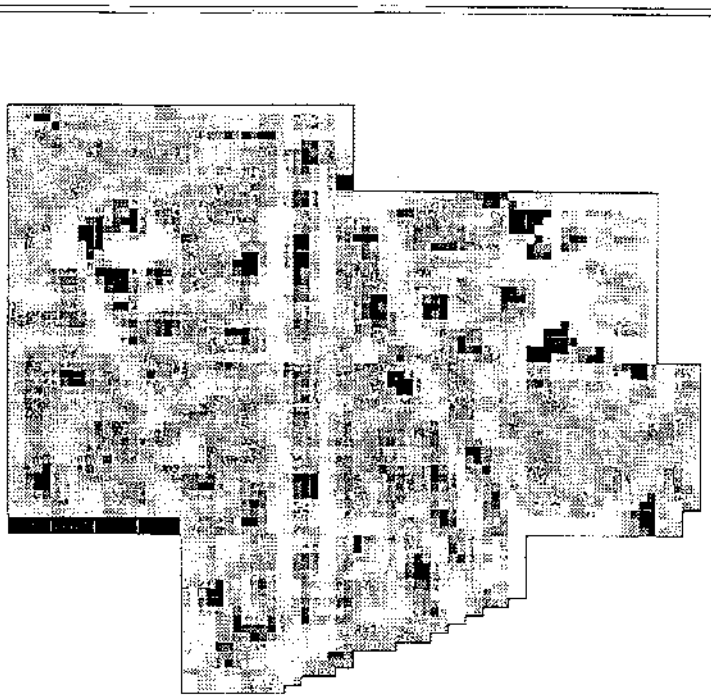
Figure 3

GNOSALL
Resistance Data

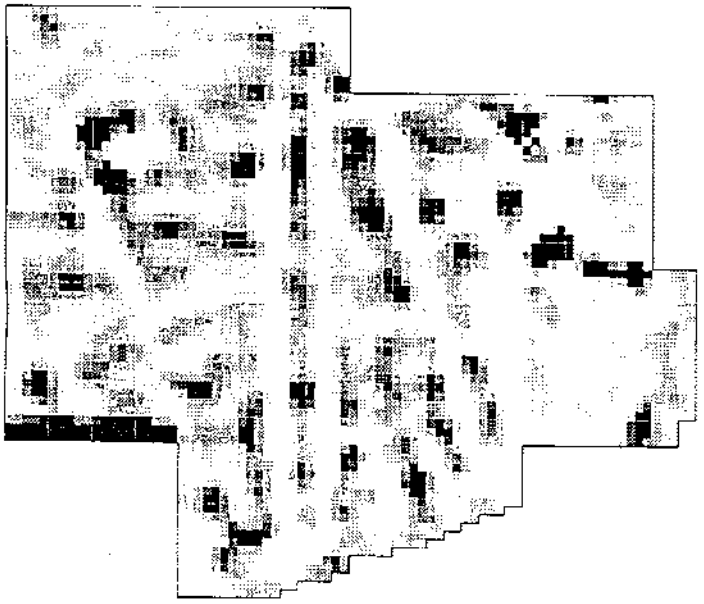
1:500

Figure 4

GNOSALL
Filtered Resistance Data



Box Width 3

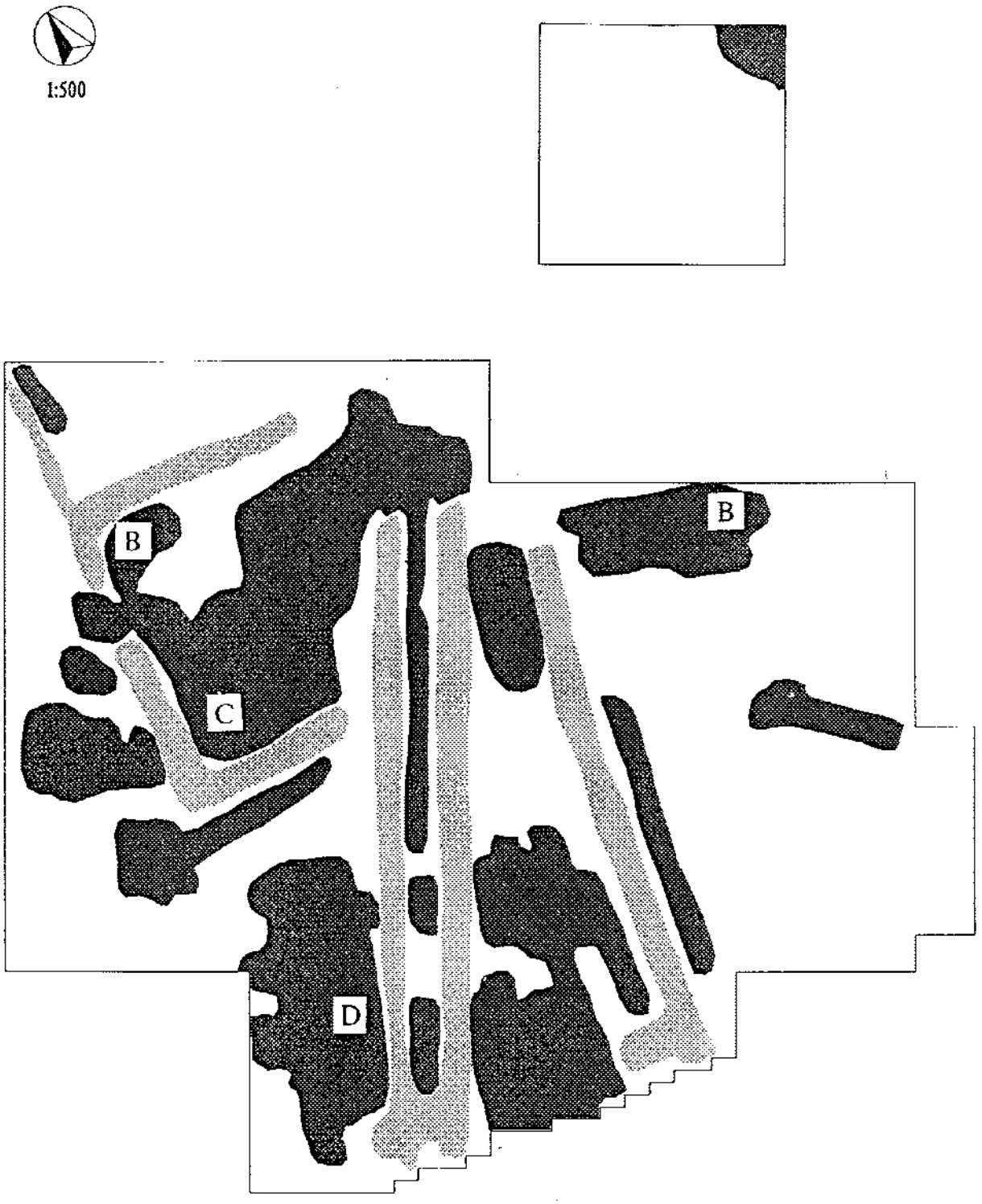


Box Width 5

Box Width 7

1:625

Figure 5



High resistance

Low resistance

GEOPHYSICAL SURVEYS OF BRADFORD
PROJECT: GNOSALL
TITLE: Resistance Interpretation

Figure 6

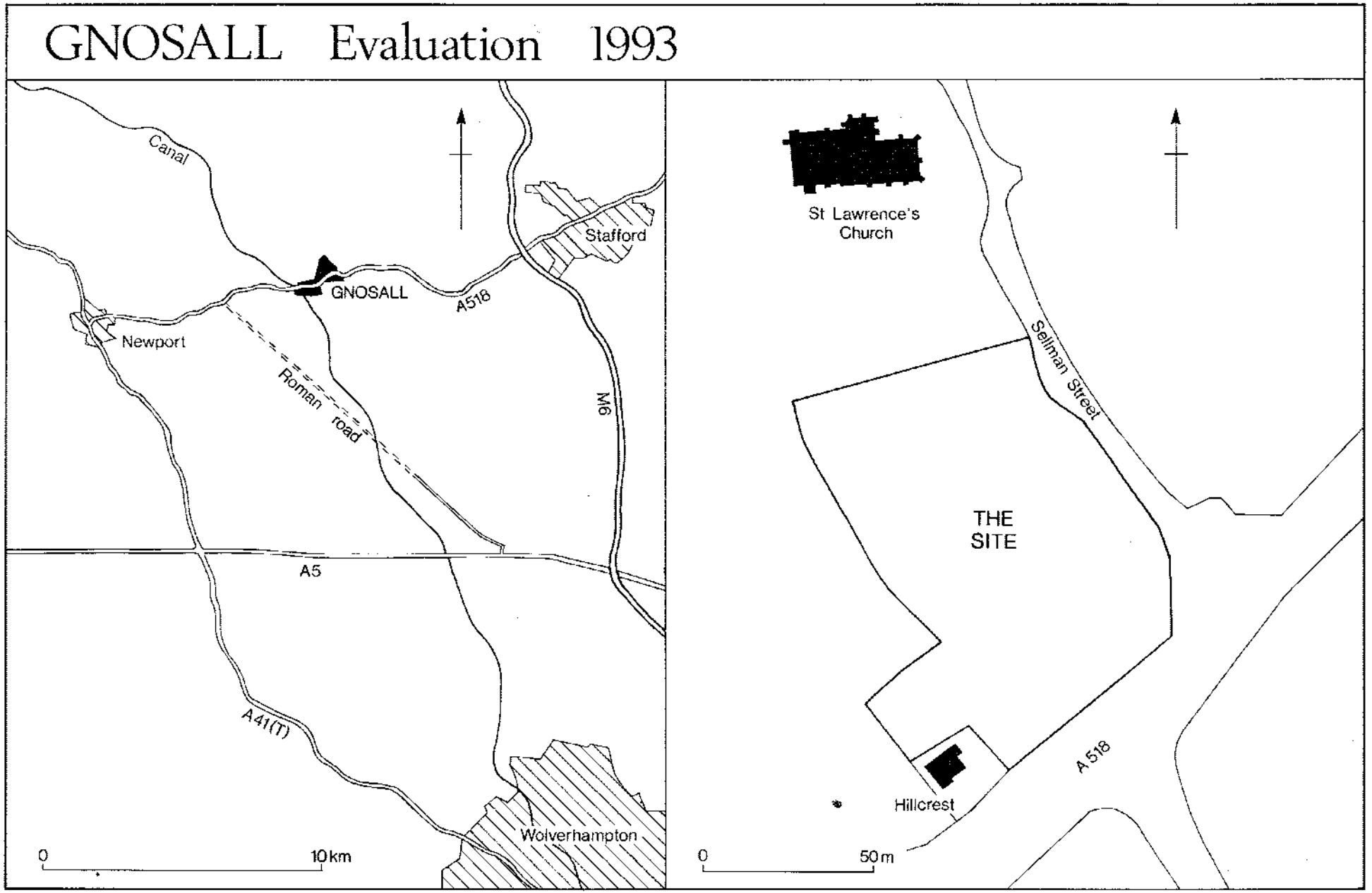

GNOSALL Evaluation 1993
Canal
Stafford
GNOSALL
A518
Newport
Roman road
M6
A5
A41(T)
Wolverhampton
0
10km
St Lawrence's Church
Sellman Street
THE SITE
A518
Hillcrest
0
50m

Figure 1

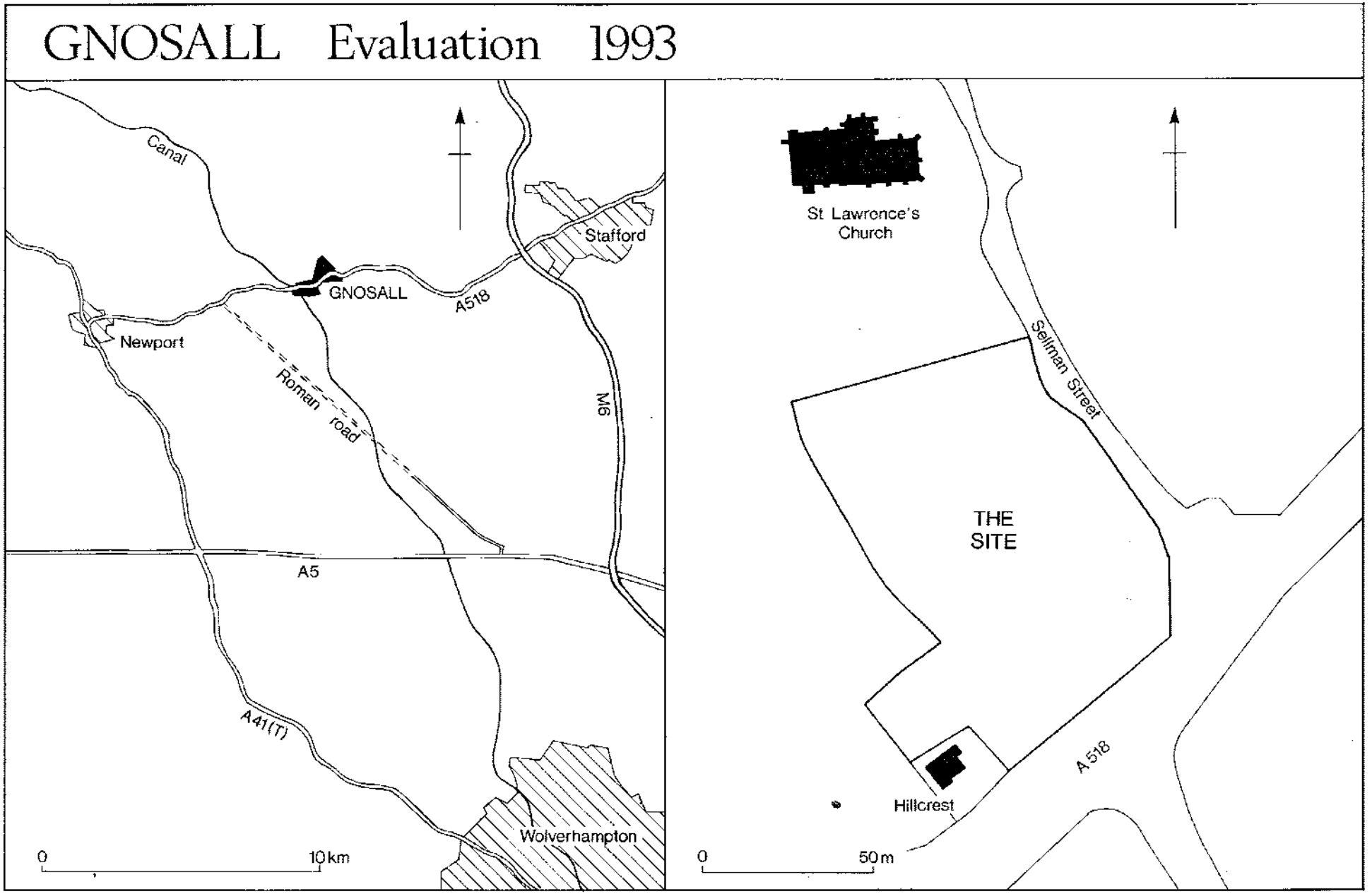

GNOSALL Evaluation 1993
Canal
Stafford
GNOSALL
A518
Newport
Roman road
M6
A5
A41(T)
Wolverhampton
0
10km
St Lawrence's Church
Sellman Street
THE SITE
A518
Hillcrest
0
50m

Figure 1

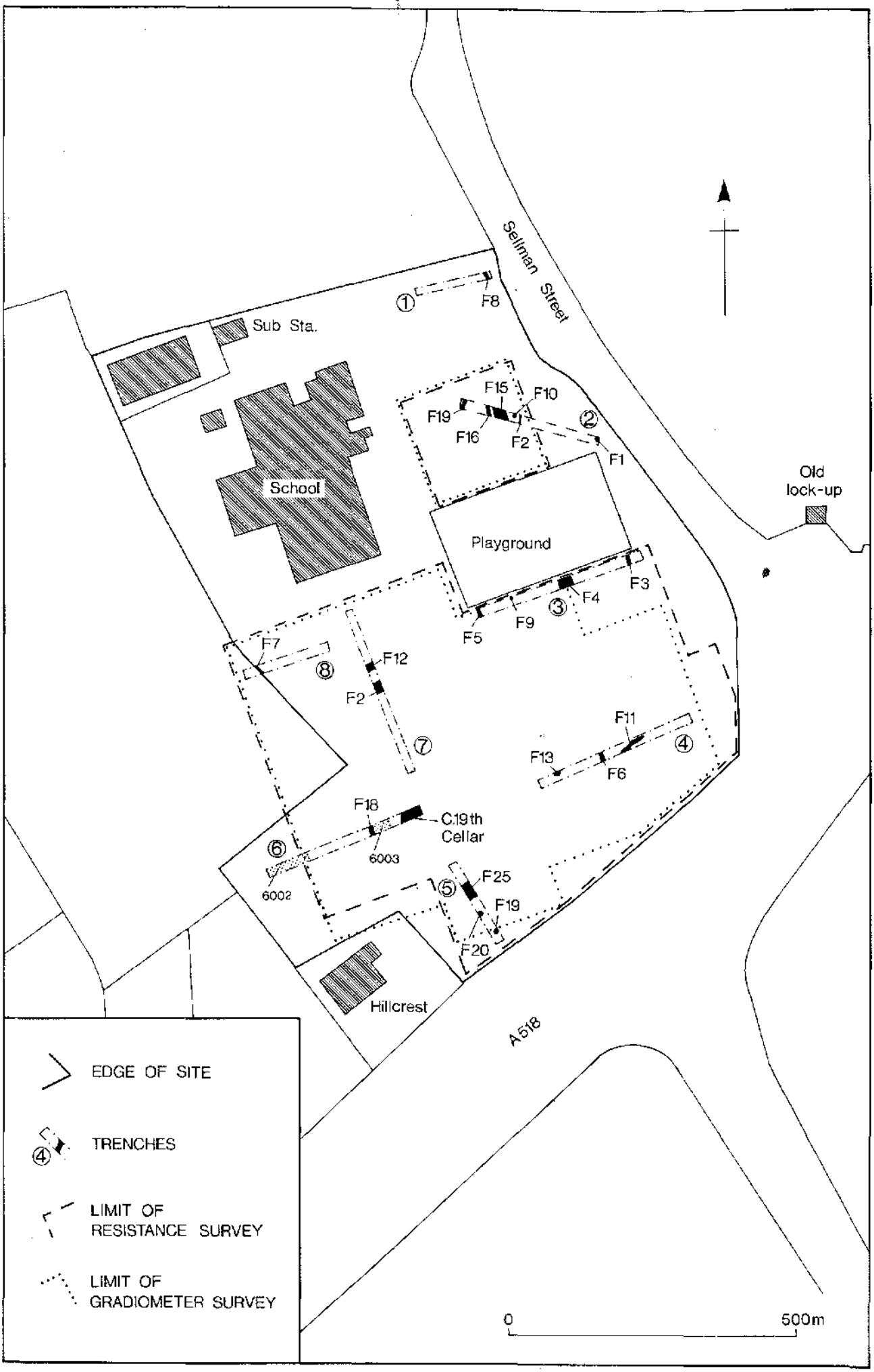

Sellman Street
Sub Sta.
School
Playground
Old lock-up
Hillcrest
A518
C.19th Cellar
6002
6003
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
F13
F15
F16
F18
F19
F20
F25
EDGE OF SITE
TRENCHES
LIMIT OF RESISTANCE SURVEY
LIMIT OF GRADIOMETER SURVEY
0
500m

Figure 2