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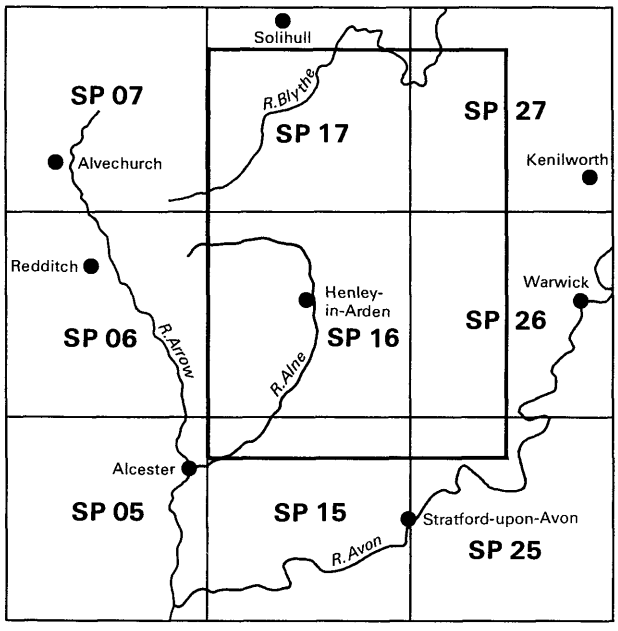


# The sand and gravel resources of the country around Henley-in-Arden, Warwickshire

## Description of 1:25 000 sheet SP 16 and parts of 15, 17, 25, 26 and 27

B. Cannell and R. G. Crofts

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The first twelve reports on the assessment of British sand and gravel resources appeared in the Report Series of the Institute of Geological Sciences as a subseries. Reports numbered 13 to 139 appeared as Mineral Assessment Reports of the Institute; subsequent reports appear as Mineral Assessment Reports of the British Geological Survey.

Details of published reports appear at the end of this Report.

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*The asterisk on the front cover indicates that parts of sheets adjacent to that quoted are described in the report.*

**PREFACE**

National resources of many industrial minerals may seem so large that stocktaking appears unnecessary, but the demand for minerals and for land for all purposes is intensifying and it has become increasingly clear in recent years that regional assessments of the resources of these minerals should be undertaken. The publication of information about the quantity and quality of deposits over large areas is intended to provide a comprehensive factual background against which planning decisions can be made.

Sand and gravel, considered together as naturally occurring aggregate, was selected as the bulk mineral demanding the most urgent attention, initially in the southeast of England, where about half the national output is won and very few sources of alternative aggregates are available. Following a short feasibility project, initiated in 1966 by the Ministry of Land and Natural Resources, the Industrial Minerals Assessment Unit (formerly the Mineral Assessment Unit) began systematic surveys in 1968. The work is now being financed by the Department of the Environment and is being undertaken with the co-operation of the Sand and Gravel Association of Great Britian.

This report describes the sand and gravel resources of 300 $km^2$ of country around Henley-in-Arden, Warwickshire, shown on the accompanying 1:25 000 resource sheet SP 16 and parts of SP 15, 17, 25, 26 and 27. The survey was conducted in 1981 and 1982 by B. Cannell and R. G. Crofts who were assisted in the field by S. J. Booth and A. N. Morigi. B. Cannell and R. G. Crofts compiled the report assisted by R. J. O. Hamblin who contributed the geological account. In addition, invaluable help with software development for interpreting the resistivity depth soundings was provided by K. A. McL. Adlam, M. R. Clarke and J. W. Finch (Institute of Hydrology).

The work is based on 1:10 000 scale geological mapping carried out between 1977 and 1981 by members of the Institute's Field Staff and which is to be published at 1:50 000 scale on New Series Sheet 183 (Redditch).

J. D. Burnell, ISO and G. I. Coleman (Land Agents)were responsible for negociating access to the land for the survey. The ready co-operation of landowners and tenants in this work is gratefully acknowledged.

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# The sand and gravel resources of the country around Henley-in Arden, Warwickshire

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**SUMMARY**

The geological maps of the British Geological Survey, pre-existing borehole information, 90 boreholes drilled for the Industrial Minerals Assessment Unit and 406 resistivity depth soundings form the basis of the assessment of the sand and gravel resources in the area around Henley-in-Arden, Warwickshire.

All the deposits in the district that might be potentially workable for sand and gravel have been investigated and a simple statistical method has been used to estimate the volume. The reliability of the volume estimates is given at the symmetrical 95 per cent probability level.

The assessed area is divided into six resource blocks, containing between 7.8 and 16.1 $km^2$ of sand and gravel. For each block the geology of the deposits is described, and the mineral-bearing area, the mean thickness of overburden and mineral and the mean gradings are stated. Detailed borehole results and data from the interpretation of resistivity depth soundings are also given. The geology, the position of the boreholes and resistivity depth soundings and the outlines of the resouce blocks are shown on the accompanying map.

**Notes**

Each borehole registered with the Institute is identified by a four-element code (e.g. SP 16 NE 66). The first two elements define the 10-km square (of the National Grid) in which the borehole is situated; the third element defines a quadrant of that square, and the fourth is the accession number of the borehole. In the text of the report the borehole is normally referred to by the last three elements alone (e.g. 16 NE 66).

All National Grid references in this publication lie within the 100-km square SP unless otherwise stated. Grid references are given to eight figures, accurate to within 10 m, for borehole locations. (In the text, four- and six-figure grid references are used for more extensive location, for example for farms).

**Bibliographical reference**

CANNELL, B. and CROFTS, R. G. 1984. The sand and gravel resources of the country around Henley-in-Arden, Warwickshire; description of 1:25 000 resource sheet SP 16 and parts of SP 15, 17, 25, 26 and 27. **Miner. Assess. Rep. Br. Geol. Surv.**, No. 142.

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## INTRODUCTION

The survey is concerned with the estimation of resources, which include deposits that are not currently exploitable but have a foreseeable use, rather than reserves, which can only be assessed in the light of current, locally prevailing, economic considerations. Clearly, neither the economic nor the social factors used to decide whether a deposit may be workable in the future can be predicted; they are likely to change with time. Deposits not currently economically workable may be exploited as demand increases, as higher-grade or alternative materials become scarce, or as improved processing techniques are applied to them. The improved knowledge of the main physical properties of the resource and their variability, which this survey seeks to provide, will add significantly to the factual background against which planning policies can be decided (Archer, 1969; Thurrell, 1971, 1981; Harris and others, 1974).

The survey provides information at the 'indicated' level "for which tonnage and grade are computed partly from specific measurements, samples or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade established throughout" (Bureau of Mines and Geological Survey, 1948, p. 15).

It follows that the whereabouts of reserves must still be established and their size and quality proved by the customary detailed exploration and evaluation undertaken by the industry. However, the information provided by this survey should assist in the selection of the best targets for such further work. The following arbitrary physical criteria have been adopted:

a The deposit should average at least 1 m in thickness.
b The ratio of overburden to sand and gravel should be no more than 3:1.
c The proportion of fines (particles passing the No. 240-mesh B.S. sieve, about μ mm) should not exceed 40 per cent.
d The deposit should lie within 25 m of the surface, this being taken as the likely maximum working depth under most circumstances. It follows from the second criterion that boreholes are drilled no deeper than 18 m if no sand and gravel has been proved.

A deposit of sand and gravel that broadly meets these criteria is regarded as 'potentially workable' and is described and assessed as 'mineral' in this report. As the assessment is at the indicated level, parts of such a deposit may not satisfy all the criteria.

Pre-Pleistocene rocks, which are usually consolidated and devoid of potentially workable sand and gravel, are referred to as 'bedrock'; 'waste' is any material other than bedrock or mineral; 'overburden' is waste that occurs between the surface and an underlying body of mineral.

For the particular needs of assessing sand and gravel resources, a grain-size classification based on the geometric scale μ mm, ¼ mm, 1 mm, 4 mm, 16 mm, 64 mm has been adopted. The boundaries between fines (that is, the clay and silt fractions) and sand, and between sand and gravel material, are placed at μ mm and 4 mm respectively (see Appendix C).

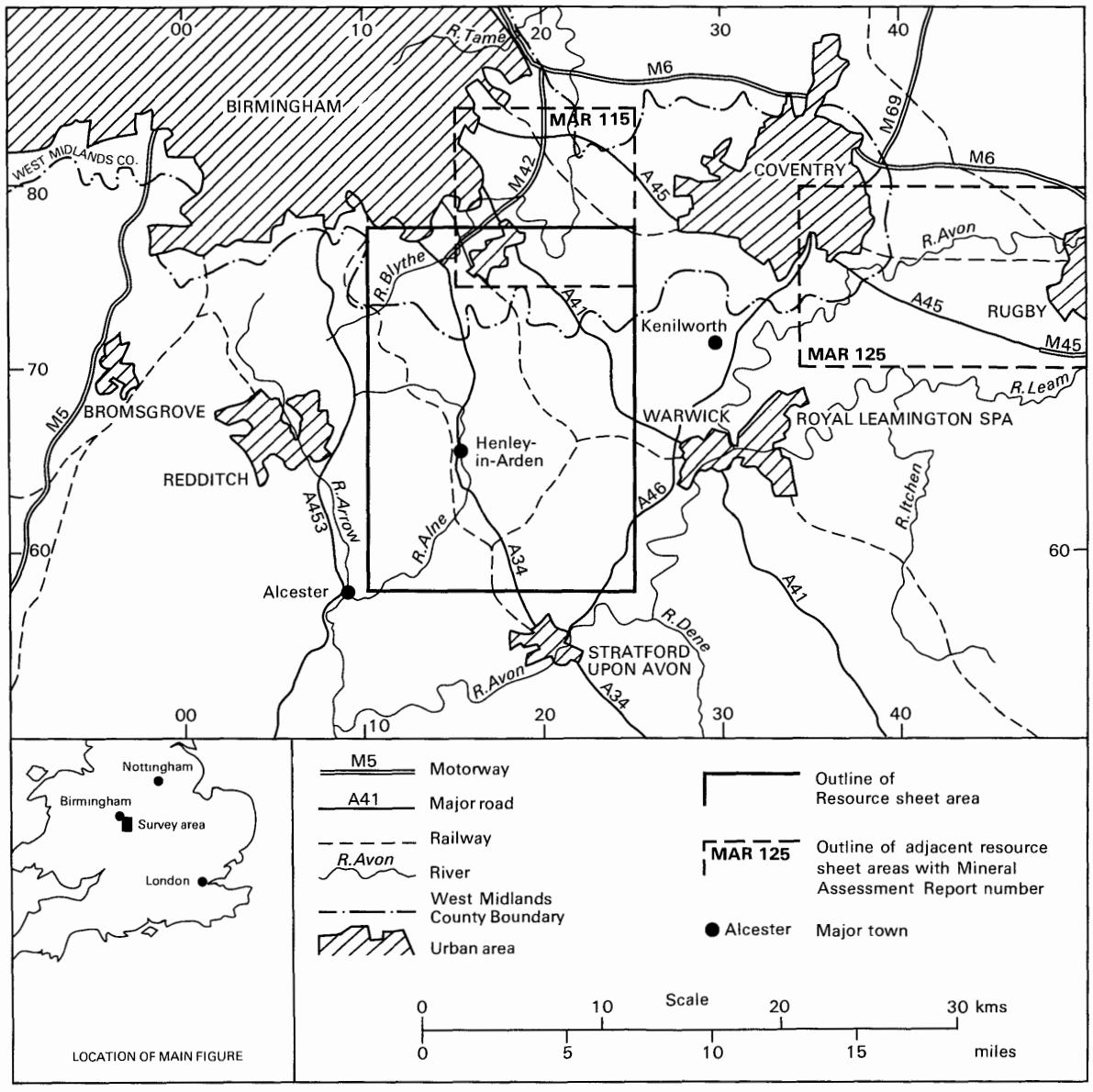



**Figure 1** Map showing the location of the resource sheet area and of adjacent areas described in Mineral Assessment Reports (MARs)

The volume and other characteristics are assessed within resource blocks, each of which, ideally, contains approximately 10 km$^2$ of sand and gravel. No account is taken of any factors, for example roads, villages or land of high agricultural or landscape value, which might stand in the way of sand and gravel being exploited, although towns are excluded. The estimated total volume therefore bears no simple relationship to the amount that could be extracted in practice.

*It must be emphasised that the assessment applies to the resource block as a whole; valid conclusions cannot be drawn about mineral in parts of a block, except in the immediate vicinity of the actual sample points.*

## DESCRIPTION OF THE DISTRICT

### General

The district extends over 300 km$^2$ of Warwickshire and the West Midlands from the edge of the Birmingham conurbation around Shirley Heath, southwards to within 2 km of Stratford-upon-Avon, and lies between the 'new town' of Redditch and the old county town of Warwick (Figure 1). Centred on Henley-in-Arden, a small market town, this rural area supports both dairy and arable farming.

A number of major northsouth roads cross the area and local railways, mainly providing commuter services, link many of the villages with the city of Birmingham. The Grand Union and Stratford-upon-Avon canals, once of commercial significance but now mainly used for leisure activities, also traverse the area.

The sand and gravel deposits of the district consist mainly of Glacial Sand and Gravel with small areas of River Terrace Deposits in the Alne and Blythe valleys. These sand and gravel deposits are mainly concentrated in the northern half of the resource sheet area (see Resource Map in pocket) and are described in resource blocks A to E. Potentially workable sand and gravel in these blocks cover an area of 63.5 km$^2$ and amount to an estimated 254 million m$^3$. The remainder of the district, designated Block F, contains only scattered deposits of sand and gravel, which cover an area of 7.8 km$^2$ and contain an estimated 21 million m$^3$ of mineral.

### Topography

The land surface is generally plateau-like, falling from about 155 m (510 ft) around Terry's Green [104 735] in the northwest, to about 90 m (295 ft) at Fulbrooke [241 606] in the southeast, on the edge of the Avon valley. The two main river systems of the district, the

Blythe and the Alne, dissect this plateau and flow to the north and south respectively, draining away from the main Severn-Trent watershed.

**Geology**

The area falls largely within Geological Sheet 183 (Redditch), for which both the 1:50 000 geological map and the descriptive memoir are currently in preparation. Locality details have been published as open-file reports (Ambrose 1982a, b, Ambrose and Strange 1982, Old 1982a, b, c, d, Strange and Ambrose 1982), and two further reports (Ambrose 1982c, Old 1982e) describe the location and distribution of possible sand and gravel resources. The solid and drift deposits are summarised in Table 1, and schematic cross-sections are included with the resource map in the pocket at the back of this report.

The northern half of the area lies at the edge of the Birmingham Plateau. Here glacial drifts of Wolstonian (Pleistocene) age occupy the high ground and certain of the valley bottoms, while Recent deposits occur in the valley bottoms; solid strata crop out along the valley sides. The southern half of the area is more deeply dissected, the Wolstonian glacial deposits being restricted to isolated outlying hilltops and ridges.

**Table 1** Geological sequence

| | | |
|---|---|---|
| **DRIFT** | | |
| **Recent and Pleistocene** | | |
| | | Peat |
| | | Alluvium |
| | | Alluvial Fan Deposits |
| | | River Terrace Deposits (First, Second, Fourth Terraces) |
| | | Head |
| | | Till |
| | | Till, chalky |
| | | Glacial Lake Deposits |
| | | Glacial Sand and Gravel |
| **SOLID** | | |
| **Jurassic** | | |
| | Lower Lias | Lower Lias, including Blue Lias |
| **Triassic** | | |
| | Penarth Group | Westbury Formation |
| | Mercia Mudstone Group | Mercia Mudstones |
| | | Arden Sandstone |
| | Sherwood Sandstone Group | Bromsgrove Sandstone |
| **Upper Carboniferous** | | |
| | Enville Group | Tile Hill Mudstones |

SOLID

**Upper Carboniferous** The Tile Hill Mudstones of the Enville Group crop out in the northeast corner of the area, where they dip gently to the east. The strata at crop comprise about 40 m of reddish brown mudstones, interbedded with brown sandstones which vary rapidly in thickness and die out locally.

**Triassic** The Bromsgrove Sandstone of the Sherwood Sandstone Group crops out in the northeast corner of the area, comprising buff micaceous sandstones and red-brown mudstones.

The Mercia Mudstone Group underlies the greater part of the area and is divided into an upper and lower part by the Arden Sandstone. The lower part crops out east of the Meriden-Norton Lindsey Fault [2479-2363], and is faulted against the Tile Hill Mudstone in the northeast. West of the Meriden-Norton Lindsey Fault, the Arden Sandstone and both mudstone sequences crop out widely, with variable but gentle dips.

The mudstones below the Arden Sandstone vary in thickness from about 130 m around Hatton [24 67] to 245 m at Rowington [20 69], and comprise brick-red silty mudstones, locally brown or purplish brown, with green spots and patches. They include many 'skerries', laterally impersistent greyish green siltstones and fine sandstones, 0.1 to 1.5 m thick. The Spernall Gypsum lies 20 to 25 m below the Arden Sandstone and has been mined near Spernall. The Arden Sandstone comprises a sequence of interbedded pale grey and green sandstones, siltstones and mudstones with subordinate red mudstones, and varies in thickness from about 1.0 m at Snitterfield [20 60] to 11.7 m in a borehole at Umberslade Park [131 717]. Generally, the proportion of sandstone is greatest where the member is thickest. The thickness of mudstones above the Arden Sandstone increases from about 55 m in the south to an estimated 140 m at Knowle in the north. The bulk of the mudstones are indistinguishable from those below, except that there are fewer skerries, while in the Knowle Borehole [1883 7777], a gypsum horizon was proved 48 m below the top of the group. The highest part of the group is termed the Blue Anchor Formation (formerly the Tea Green Marl) and comprises pale greenish grey silty blocky mudstones, varying in thickness from 6.85 m in the Knowle Borehole to 1.4 m in a trial pit at Round Hill [1427 6179].

The Penarth Group (formerly Rhaetic) is represented in the area at outcrop only by the Westbury Formation. About 6.0 m of dark grey or black fissile mudstones crop out at Waterfield Farm [187 776], and 1.3 m of pale bluish grey mudstone are exposed around the base of the Lias outliers between Morton Bagot [11 64] and Aston Cantlow [15 60].

**Jurassic** The Lower Lias, including the Blue Lias, occurs in a faulted outlier north of Knowle and as a series of outliers between Morton Bagot and Snitterfield. About 25 m at Morton Bagot and 95 m at Snitterfield are preserved, comprising grey mudstones and paper shales, which weather to yellow and grey clay, with interbedded limestones up to 8 to 10 cm in thickness.

DRIFT

The drift deposits of the area were first examined in detail by Tomlinson (1935), and some were re-examined by Shotton (1953, p. 240-242) as part of a study of the Wolstonian type area between Coventry, Rugby and Leamington. However, the conclusions of these authors require revision in the light of recent resurveys of the Warwick (Sumbler, 1983) and Redditch 1:50 000 geological sheets.

During the Wolstonian glaciation, at least two ice-sheets entered the area, one from the east and northeast and one from the north and northwest. A sequence of glacial lake sediments, boulder clays and glacial sands and gravels was formed, with the erratic content of the deposits reflecting the provenance of the ice-sheets. That from the west brought dominantly 'Bunter' quartzite and vein quartz pebbles, as well as Triassic rocks and Upper Carboniferous sandstones and mudstones, coal, and flints. Welsh igneous rocks also came from the west. The ice-sheet moving in from the east brought erratics including fresh flint and chalk, Jurassic limestone, and Leicestershire igneous rocks, as well as 'Bunter' quartzites, Triassic sandstones and coal.

Before the Wolstonian glaciation, the watershed of England ran across the area from Tanworth to Bearley (Figure 2), with rivers draining north to the Trent, east to the Soar and southwest to the Severn. However, as a result of the glaciation, three glacial channels were cut through this watershed (Figures 2 and 3). One of these forms the Kingswood Gap (Tomlinson 1935, p. 425), and

runs from near Chadwick Manor [20 74] past Kingswood to Bushwood [18 68]; it is floored by sand and gravel. The Mere End Channel runs southeastward from Balsall Street [23 76]. The Shrewley buried channel runs from Haseley Knob [23 71] to [22 66] near Pinley, and is connected to the Chadwick End buried valley via the Wroxall col (Figure 3). Both the Mere End and Chadwick End/Shrewley channels are completely filled with a sequence of glacial lake deposits, sands and gravels, and tills. The early history of the channels is not clear, but all must have been at least partly cut before the retreat of the ice, because all contain till.

As ice entered the area from the east, north and west, a pro-glacial lake formed to the north of the area, and apparently overflowed through the Mere End Channel into the proto-Soar to the east. This outlet must have become blocked by ice advancing from the east and the Shrewley channel was then cut, crossing the main pre-glacial watershed and draining into the proto-Alne. Pro-glacial lacustrine deposits at heights up to +116 m OD are, however, found as far south as Snitterfield, partially infilling the Shrewley and Mere End channels and suggesting that the ice advanced to block the outlet of overflow water to the southwest into the Avon and formed a single relatively large lake which drowned the Tanworth-Bearley watershed.

Ultimately, ice covered the whole area of the Henley-in-Arden resource map, and many of the drift deposits are believed to have formed by sub-glacial melting. Thus, as the ice-sheet melted, a considerable pile of pro-glacial and sub-glacial sands, gravels and lacustrine silts and clays was built up over which a sheet of melt-out till was laid down in most of the area. Glacial outwash deposited thick sequences of sands and gravels in the Chadwick End, Shrewley and Mere End channels and the Kingswood Gap, as well as thinner sheets of sand and gravel locally above the till. It is not clear to what extent the channel-fill sequences include sub-glacial deposits, but the Kingswood Gap must have operated as an overflow channel after the Wroxall and Mere End channels became choked with drift, possibly draining a pro-glacial lake to the north during the final retreat phase.

Solifluxion during the later phases of the Wolstonian glaciation and during the subsequent Devensian glaciation have resulted in the deposition of head. Since the end of the Wolstonian there has been extensive fluvial erosion, with the attendant deposition of river terrace and alluvial fan deposits, alluvium and peat.

Glacial Lake Deposits These are soft laminated clays, silts and silty clays, with lenses of reddish brown sand containing some green bands and mottling. East of a line from Knowle to Henley-in-Arden (Figure 2), a suite of lake deposits up to 13 m in recorded thickness with their upper surfaces lying between 101 and 116 m, extends discontinuously from beyond the northern limit of the map area (Cannell, 1982) to near Snitterfield in the south. They are locally the oldest drift deposts, filling valleys in an uneven pre-glacial topography, or else they are locally underlain by or interbedded with glacial sands and gravels. They are rarely underlain in the northeast by deposits interpreted as till, and also pass out laterally into both tills and sands and gravels. It is believed that these lacustrine deposits formed at an early stage of the glaciation in a pro-glacial lake, dammed by ice to the east, west and north and by the Jurassic Uplands to the south. The lake level was at 116 m or higher. Within the area occupied by the sequence, four boreholes sunk between Chessetts Wood [18 73] and Mere End [24 74], revealed lake deposits with their upper surface at 121 to 124 m; these may be part of a larger sequence, as they accord well with the surface level of 125 m given by Shotton (1953) for Lake Harrison, or they may have formed at a later stage than the lake described above, in a small local lake. The lake may have been sub-glacial, or ponded against the northeastern glacier, for the deposits lie close to the western limit of the chalky boulder clay.

West of a line from Knowle to Ullenhall (Figure 2), a further sequence of lake deposits extends northwards from Trap's Green [10 69] to beyond the edge of the area. These appear to form a single continuous sheet up to 5 m or more thick, and rest variously on solid strata, till and sand and gravel. Their top surface levels range between 135 and 154 m, well above any local watershed, so they are likely to have been formed in an ice-locked situation, between the eastern and western ice sheets.

Till Over wide areas, till forms the youngest deposit of the local drift sequence, and hence it crops out widely, capping flat plateau remnants separated by post-glacial river valleys. The till sheet is continuous across the Wroxall buried channel, while in the Kingswood Gap, till mantles the valley sides down to OD +105 m but does not reach the valley bottom. This melt-out till, formed as the stagnant ice sheet melted in place, varies widely in thickness up to recorded maxima of 14 m at Snitterfield Bushes [19 60] and Dickens Heath, [11 76], 17.4 m at Rowington [20 70] and 18.2 m at Shrewley [22 67]. Till found beneath sands, gravels and lake deposits at Earlswood [11 74] and Tanworth [10 70] is likely to be lodgement till formed beneath the advancing ice sheet, as are deposits interpreted as till beneath the lake deposits east of the Kingswood Gap.

Chalky boulder clay occurs east of a line from near Lapworth [15 69] through Baddesley Clinton [20 71] to Holly Grange [23 75]. This comprises greyish brown sandy clay with blocks of white and red chalk, and fresh flint including black tabular blocks, as well as 'Bunter' quartzite pebbles. Near Rowington Coppice [203 706], red flints, generally up to 10 cm and ranging more rarely up to 25 cm in diameter, are scattered across the fields. On the map, chalky boulder clay is only distinguished on constituent quarter sheet SP 26 NW, but throughout its area of outcrop it occurs as patches which commonly overlie flint-free Trias-derived easterly till, the two facies correlating respectively with the Oadby and Thrussington Tills of Sumbler (1983).

Till of northern and western derivation occurs west of the Lapworth-Baddesley Clinton-Holly Grange line, and comprises reddish brown, orange and grey, stiff sandy pebbly clay. The sand fraction is of fine to medium grain-size, while the erratic pebbles are dominated by 'Bunter' quartzite and also include Triassic and Upper Carboniferous sandstones and mudstones. Flints and Welsh igneous rocks are common in the western two-thirds of the area (i.e. west of grid easting 20) but are absent in some areas, notably in the northeast: Shotton (1968) recorded neither in a pipe trench from near Chadwick Manor to Holly Grange Farm.

Glacial Sand and Gravel Glacial sands and gravels are widespread in the north and east of the area, but they occur commonly in beds too thin or too clayey to be classified as mineral. They were formed by deposition from glacial meltwater during the advance or retreat of the northwestern and eastern glaciers. During the advance phase many of the deposits must have formed in pro-glacial lakes and are associated with the finer glacial lake sediments described above. These early sands and gravels are generally sheet-like in form and overlain by till, and individual beds are not more than 7 m thick. In the northeast, sands and gravels formed during the advance of the ice-sheets are interbedded with or overlie the glacial lake deposits, overstepping onto solid where the lake deposits occupy depressions in the sub-glacial topography. In the northwest (SP 17 NW), there are distinct suites of sand and gravel up to 5 m thick below and above the lake deposits, while on SP 17 SW, sand and gravel occupies a northwest orientated channel in the pre-glacial topography, and is

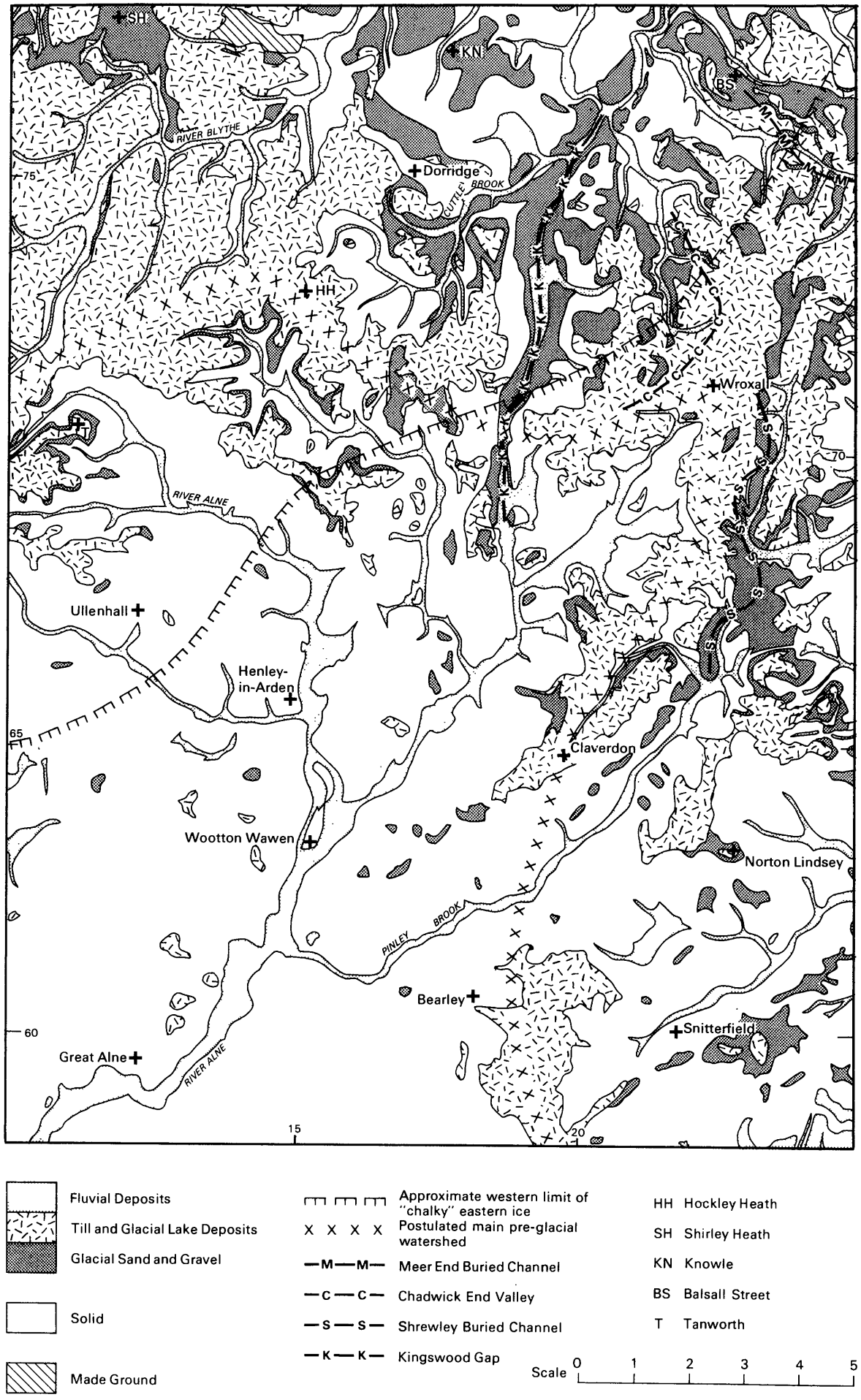
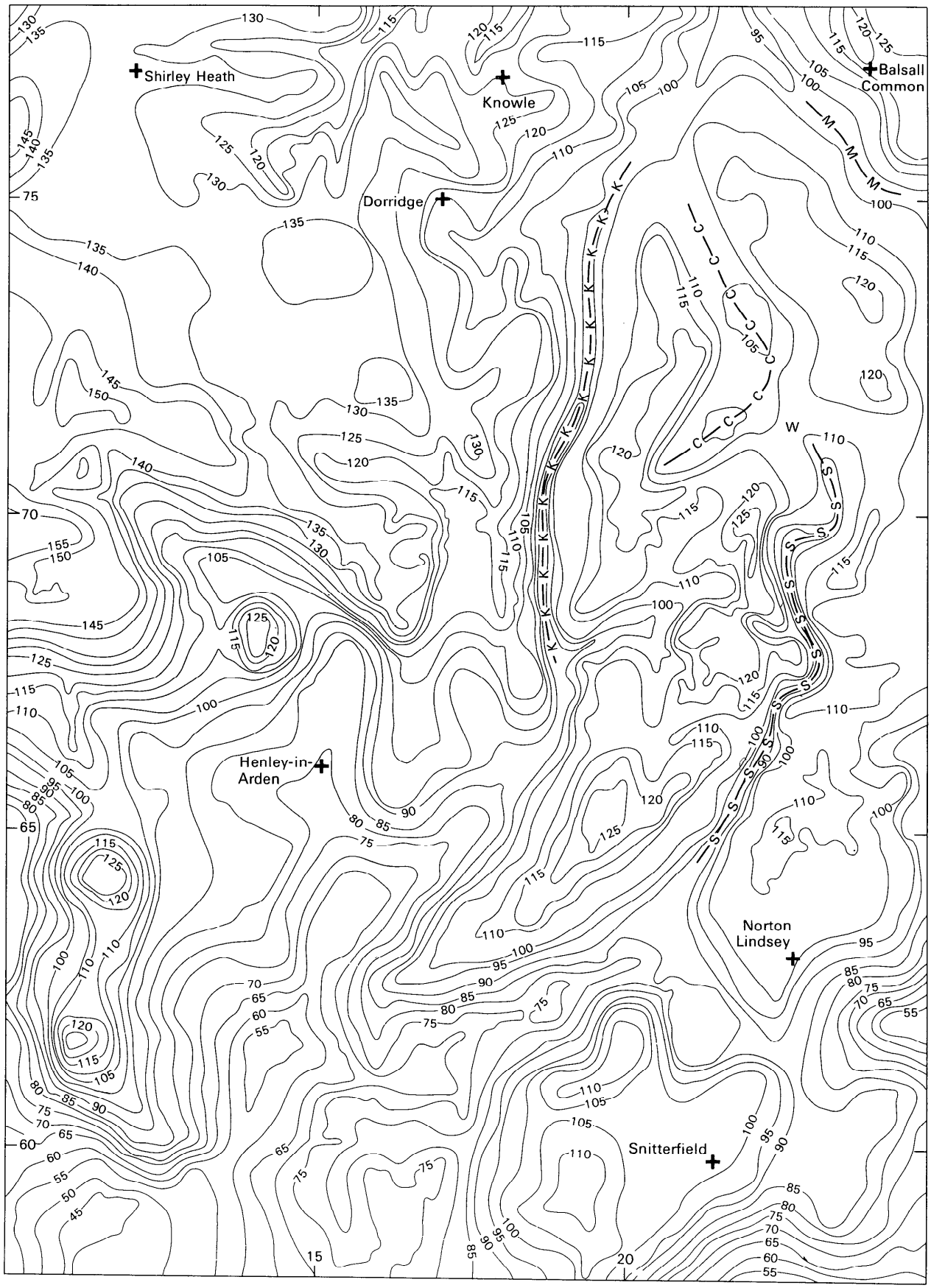



**Figure 2** Drift geology of the resource sheet area




Major towns and villages

—100— Contours in metres above O.D.

W Wroxall Col

0 1 Scale in kilometres

— K — K — Kingswood Gap

— M — M — Mere End Buried Channel

— S — S — Shrewley Buried Channel

— C — C — Chadwick End Valley

N

overlain by glacial lake deposits and melt-out till. Deposits dating from the retreat and melting of the ice sheet are largely confined to the linear channel-fills in the Kingswood Gap and the Wroxall Channel, although isolated patches of sand and gravel also occur resting on the boulder clay plateau, in particular between Haseley [23 69] and Honiley [24 72]. Although less widespread in area than the earlier deposits, these are generally thicker, reaching 13.7 m in borehole SP 17 SE 79 in the Kingswood Gap, 16.7 m at a non-IMAU borehole at Five Ways [22 69] and 31.3 m similarly at Haseley in the Shrewley Channel, and 10.3 m at Balsall Street (borehole SP 27 NW 31) in the northeast.

The proportions of clay, sand and gravel in these deposits are very varied, but in general the channel-fill deposits include a higher proportion of sand than the sheet-like deposits. The deposits within the Kingswood Gap are dominantly of gravel in the north but of sand and clay in the south. The patches of sand and gravel that locally overlie the melt-out till on quarter-sheet SP 27 SW are lithologically indistinguishable from those that underlie the till. The erratic content of all the deposits reflects that of the ice-sheet from which they were derived, and well rounded 'Bunter' quartzite and quartz pebbles are dominant throughout the area. Upper Carboniferous and Triassic sandstones and mudstones occur widely, and Welsh igneous rocks are found in the western part of the area. Flints occur everywhere except in the northeast, but large flints are restricted to the area of the chalky boulder clay, southeast of a line from the vicinity [15 69] of Pinks Farm through Baddesley Clinton [20 71] to Holly Grange [23 75], where they are associated with clasts of soft white and red chalk. In the southeast of the area, southeastwards from Norton Lindsey, the gravels contain up to 32 per cent of Jurassic limestone pebbles, associated with quartzite, quartz, sandstone, ironstone, flint and mudstone; limestone does not occur elsewhere in the resource sheet area, and apparently this local deposit has been derived from south of the district. It correlates with the Lillington Facies of the Baginton Lillington Gravels of Shotton (1953).

There are not many major exposures in the area. At Cuttle Pool [2015 7535] in the northeast, Tomlinson (1935, p. 429) recorded about 2 m of unstratified gravel overlying 6.1 m (seen) of current-bedded sharp sand and gravel, filling a channel and banked against a steep bluff of mudstone of the Mercia Mudstone Group. Working pits at Pinley Green [209 662] reveal, in a face 70 m long, 1 m of pale brown pebbly sand overlying about 5 m of gravel with pebbles of quartzite, flint, Triassic sandstone and mudstone in a matrix of red medium to coarse sand; pebbles are up to 10 cm in diameter and some show imbrication (Ambrose 1982c). An old quarry [1392 7136] in Umberslade Park exposes about 1 m of poorly sorted gravel, with clasts, up to 200 mm in diameter, of quartzite, dolerite and Triassic sandstone, in a poorly sorted medium to coarse sand matrix. At Tattle Bank [177 634], Tomlinson (1935, p. 432-433) recorded 8.8 m of drift deposits in a channel, banked against Mercia Mudstone to the northwest, and including 4.1 m of clay, sand and loam overlying 4.7 m of current-bedded sandy gravel with large boulders of Triassic sandstone as well as flints, Carboniferous sandstone, Chalk and igneous rocks from Wales and Leicestershire. Finally, 2.2 m of gravels exposed [2356 5964] near High Close Farm are fine-grained, crudely bedded, and contain fossiliferous pebbles of Jurassic limestone as well as 'Bunter' quartzite, the dominant clast material.

Head Small patches of head up to 1.7 m in recorded thickness are shown on the map throughout the area, mainly on the sides and bottoms of valleys. They were derived from the glacial drifts upslope by solifluxion during periglacial freeze-thaw, and probably include deposits of both late Wolstonian and Devensian ages. Their composition reflects the drifts from which they are derived, and includes red and brown sandy pebbly clays and clayey sands.

River Terrace Deposits Fourth Terrace deposits of the River Avon occur in the southeast corner of the district in the parish of Hampton Lucy and also near Hooknell [249 629]. They comprise clayey gravel with quartzite, quartz and flint pebbles.

Small patches of the Second Terrace of the Avon occur in the southeast [241 581, 249 624] in tributary valleys. Second Terrace deposits of the Avon system also occur in the Alne Valley and its tributaries, on uneven slopes 1.5 to 5 m above the alluvium and up to 3.05 m in recorded thickness. The terraces are widest around Aston Cantlow and Wootton Wawen, though east of Wootton Wawen they are probably only 1 to 2 m thick. The deposits of the terrace in those tributaries of the Alne that flow from Bushwood and Rowington, comprise up to about 2 m of orange-brown to grey pebbly clayey sand and sandy clay. Small outcrops occur in Pinley Brook.

First Terrace deposits are associated with all of the significant streams except the Alne and its tributaries, but mostly as small patches. Outcrops in the Inchford Brook on quarter-sheet SP 26 NW comprise gravel dominated by 'Bunter' quartzite pebbles with flints, as exposed for example in river banks near Inchford Brook Farm [250 689]. In the north, insignificant patches of stony clay and clayey gravel flank the Blythe downstream of Monkspath Street [143 757]. These are up to 4.0 m thick and rise to about 1.5 m above the alluvium.

Alluvial Fan Gravels Two small outcrops of sandy gravel up to 1.5 m thick at High Cross [199 672] and north of Bushwood [186 696] are interpreted as alluvial fan deposits, merging respectively into the Second Terrace of the Pinley Brook and the alluvium of the Rowington Brook.

Alluvium Strips of alluvium up to at least 4.4 m thick flank most of the streams of the area, most notably the Alne and its tributary from Rowington. A continuous strip of alluvium joins the Alne and Blythe through the Kingswood Gap. The alluvium is generally composed of soft silty clay, grey to blue when fresh but weathering brown, and often pebbly with 'Bunter' quartzite, quartz and flint pebbles derived from earlier drift deposits. It commonly has a basal bed of gravel or very gravelly clay, up to 2 m thick.

Peat Peat up to a metre thick overlies alluvium northeast of Warren Farm [217 728].

**Composition of the Sand and Gravel Deposits**

Within the resource sheet area, glacial sand and gravel, river terrace and alluvial fan deposits constitute potentially workable sand and gravel.

Glacial Sand and Gravel This deposit is widely distributed over the northern half of the district but occurs only as small scattered patches in the south. It occupies an estimated total area of 60.7 $km^2$. Its composition ranges from gravel to 'very clayey' sand. Most of the more gravelly deposits are concentrated in the northwest (see Blocks A and B) while generally sandy deposits cover the eastern half of the resource sheet area (see Blocks C to E). Overall, the mean grading for glacial sand and gravel is 17 per cent fines, 65 per cent sand and 18 per cent gravel. The fines content ranges from 2 per cent (borehole 27 NW 30) to 33 per cent (borehole 27 SW 20).

The pebbles are dominantly subrounded to well rounded quartzite, quartz and sandstone with minor amounts (usually totalling less than 5 per cent) of

igneous rocks, limestone, flint, ironstone and mudstone. Exceptionally, 8 per cent of flint was recorded in borehole 26 SW 50 while a high concentration, 34 per cent, of Jurassic limestone and ironstone was present in boreholes 25 NW 64 and 26 SW 71. The sand fraction is dominated by fine and medium quartz.

River Terrace Deposits These deposits cover approximately 8 $km^2$, a relatively small area in comparison with that of the glacial sand and gravel. Where samples have been taken, they show that the deposits range from gravel to 'very clayey' gravel. The fines content ranges from 7 to 27 per cent and the percentage of gravel from 49 to 74 per cent.

Subrounded to well rounded quartzite, quartz, sandstone and, locally, flint make up the major part of the gravel fraction. Minor amounts of igneous rocks, mudstone, ironstone and limestone may also be present.

Fine, medium and coarse sand is found in roughly equal amounts in the sand fraction, with quartz dominant in all grades.

Alluvial Fan Deposits
These deposits occur at two localities around Bushwood. Borehole 16 NE 67 proved the deposit to be a 'clayey' sandy gravel comprising rounded to well rounded quartzite, quartz and sandstone in the gravel fraction and fine and medium quartz in the sand fraction.

**The Map**
The sand and gravel resource map is folded into the pocket at the end of this report. The base map is the Ordnance Survey 1:25 000 Outline Edition in grey, on which the geological data are shown in black, the mineral resource information in shades of red and geophysical data in purple.

Geological data The geological lines are from a survey on the 1:10 000 scale by R. A. Old, K. Ambrose and P. J. Stange. Copies of the constituent 1:10 000 geological sheets can be obtained from the Institute's offices at Keyworth, Nottinghamshire. The geological boundaries represent the best interpretation of the information available at the time of survey. However, it is inevitable that local irregularities and discrepancies will be revealed as new evidence from boreholes and excavations becomes available.

Borehole data, which include the stratigraphic relations, thicknesses and mean particle size distribution of the sand and gravel samples collected during the assessment survey, are also shown on the map.

Data on the thickness of the drift deposits derived from resistivity depth soundings (Appendix F), are shown conventionally on the map; deduced thicknesses used in the assessment of the sand and gravel resources are underlined. Detailed comparisons between data derived from depth soundings and from boreholes are included in Appendix H.

Mineral resource information The mineral-bearing ground is divided into resource blocks (see Appendix A). Within a resource block the mineral is subdivided into areas where it is exposed, that is where the overburden averages less than 1 m in thickness, and areas where it is present in continuous, or almost continuous, spreads beneath overburden. The recognition of these categories is dependent upon the importance attached to the proportion of boreholes which did not find potentially workable sand and gravel and the distribution of barren boreholes within a block. The mineral is described as 'almost continuous' if it is present in 75 per cent or more of the boreholes in a resource block.

Areas where bedrock crops out, where boreholes indicate absence of sand and gravel beneath cover and where sand and gravel beneath cover is interpreted to be not potentially workable, are uncoloured on the map; where appropriate, the relevant criterion is noted. In such cases it has been assumed that mineral is absent except in infrequent and relatively minor patches that can neither be outlined nor assessed quantitatively in the context of this survey. Areas of unassessed sand and gravel, for example in built-up areas, are indicated by a red stipple.

The area of the mineral-bearing ground is measured, where possible, from the mapped geological boundary lines. The whole of this area is considered as mineral-bearing, even though it may include small areas where sand and gravel is not present or is not potentially workable. Inferred boundaries have been inserted to delimit areas where sand and gravel beneath cover is interpreted to be not potentially workable or absent. Such boundaries (for which a distinctive zigzag symbol is used) are drawn primarily for the purpose of volume estimation. The symbol is intended to indicate an approximate location within a likely zone of occurrence rather than to represent the breadth of the zone, its size being determined only by cartographic considerations. For the purpose of measuring areas the centre line of the symbol is used.

**Results**
The statistical results are summarised in Table 2. Fuller grading particulars are shown in Figures 5 and 6 and Tables 3 to 8.

Accuracy of results Of the six resource blocks, five, designated A to E, have been assessed statistically and for these the accuracy of the results is indicated by the confidence limits of between 17 and 72 per cent at the 95 per cent probability level (that is, on average nineteen out of every twenty sets of limits constructed in this way contain the true value for the volume of mineral) (Appendix B). However, the true volumes are more likely to be nearer the figure estimated than either of the limits. Moreover, it is probable that roughly the same percentage limits would apply for the statistical estimate of mineral volume within a very much smaller parcel of ground (say 100 hectares) containing similar sand and gravel deposits, if the results from the same number of sample points (as provided by, say, ten boreholes) were used in the calculation. Thus, if closer limits are needed for quotation of reserves, data from more sample points would be required, even if the area were quite small. This point can be illustrated by considering the whole of the potentially workable sand and gravel in blocks A to E. The total volume (254 million $m^3$) can be estimated to limits of $\pm$ 14 per cent at the 95 per cent probability level by a calculation based on the data from the 291 sample points spread across the five resource blocks. A series of inferred assessments is offered for block F.

However, it must be emphasised that the quoted volume of mineral has no simple relationship with the amount that could be extracted in practice, as no allowance has been made in the calculations for any restraints (such as existing buildings and roads) on the use of the land for mineral working.

**Notes on the Resource Blocks**
The district has been divided into five major resource blocks, A to E, for which statistical assessments have been carried out; a sixth resource block, block F, has been divided into six sub-blocks for the purposes of assessment and description (Figure 4). In resource blocks A to E the potentially workable sand and gravel is dominantly glacial sand and gravel, associated mainly with drift-filled channels. The more gravelly deposits are included mainly in blocks A, B and C while mineral in blocks D and E comprises mainly fine sand. Sub-block F2

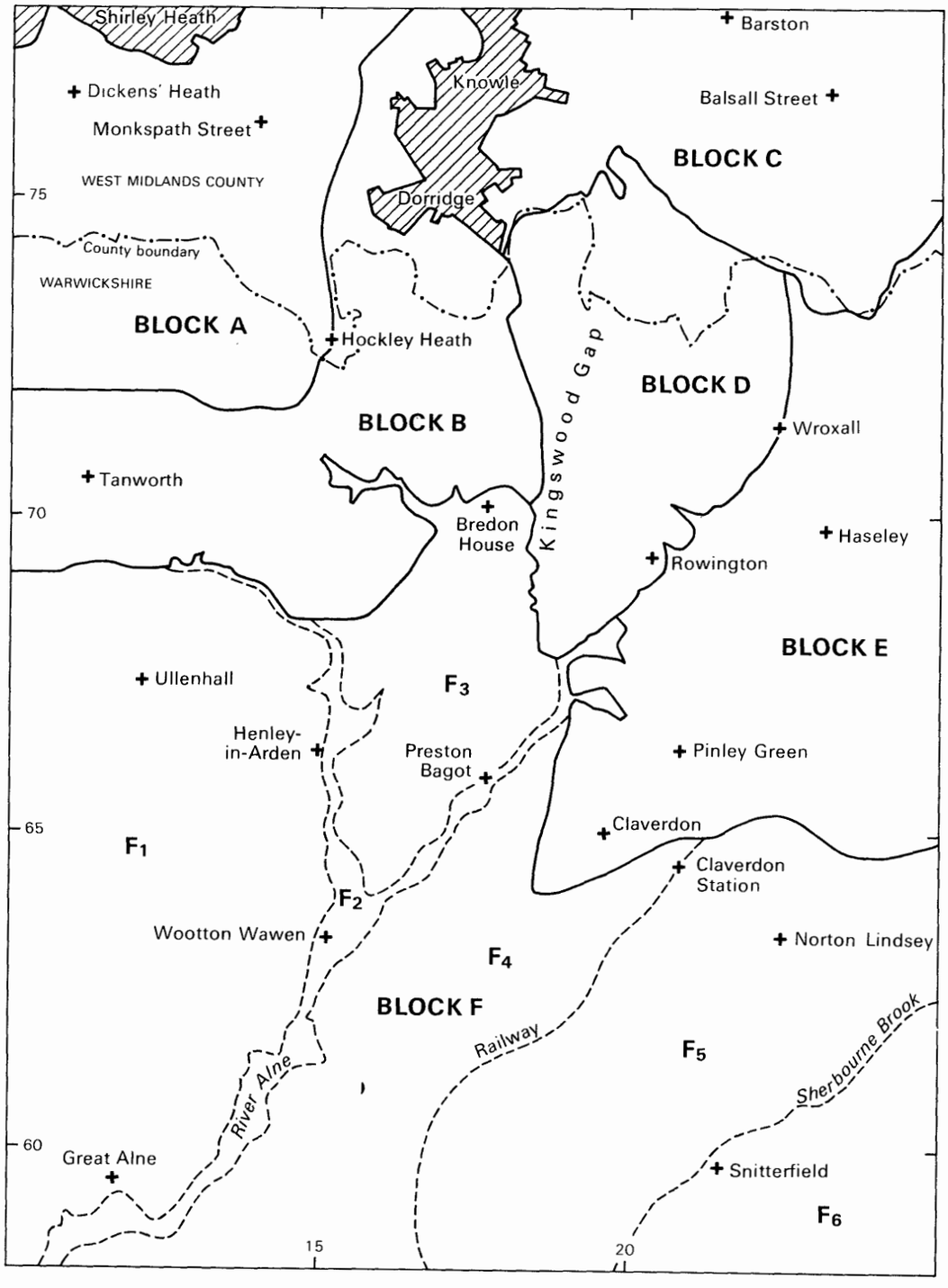



**Figure 4** Locality map with reference to block boundaries (solid lines) and sub-divisions of block F (broken lines). An assessment of the resources in the West Midlands County is given for parts of blocks A, B, D and E in Table 2.

covers river deposits of the River Alne, while the other five sub-blocks contain many small scattered patches of glacial sand and gravel. The assessment of block F relies heavily on thickness data derived from resistivity depth soundings and for each of the sub-blocks an inferred assessment (see Appendix B) is given.

Block A covers an area of 32.8 km$^2$ between the urban area around Shirley Heath [120 778] and Nuthurst [147 719]. Eight IMAU boreholes (Table 3), 131 other boreholes and eight interpreted resistivity values have been used to assess the sand and gravel which comprises 12.5 km$^2$ of glacial sand and gravel and 0.6 km$^2$ of river terrace deposits of the River Blythe.

Much of the glacial mineral is hidden beneath younger glacial deposits and in many places the limits of the potentially workable mineral is delineated by inferred boundaries, for example, between Dicken's Heath [111 761] and Nuthurst. In several places, glacial sand and gravel appears to be limited to narrow drift-filled valleys (Old 1982e, p. 6), for example, at Monkspath Street [142 761] and Shelly Green [145 767]. Locally, the extent of the mineral in these drift-filled channels can be ascertained from the site investigation boreholes sunk for the M42, but in most places the limits of mineral have had to be shown by inferred boundaries.

Although sand and gravel was found to be thin in two of the IMAU boreholes, 1.6 and 0.8 m (in 17 NW 176 and 17 NW 177, respectively), and should be regarded as non-mineral, the recorded values have been included in the volume calculations nevertheless, because it is not possible to delineate the area of non-mineral with any

accuracy, particularly as nearby boreholes or interpreted resistivity values demonstrate the presence of considerable thicknesses of mineral: for example, compare the data from borehole 17 NW 109 with those from 17 NW 177, and from borehole 17 NW 176 with the interpretation of resistivity depth sounding HY 14.

Sandy gravel or pebbly sand were encountered in all the IMAU boreholes proving mineral, with the amounts of fines ranging from 8 per cent (borehole 17 SW 196) to 25 per cent (borehole 17 NE 192). The overall mean grading for this block is 15 per cent fines, 63 per cent sand and 22 per cent gravel (Figures 5, 6). Recorded mineral thicknesses range up to 8.3 m in borehole 17 NE 192, while interpreted resistivity values at site HY 5 (Cleobury Pool [107 752]) indicate that a maximum of 8.5 m of sand and gravel may be present. The mean thickness of glacial sand and gravel is 3.4 m and the estimated volume of 45 million $m^3$ ± 17 per cent.

Overburden covering the glacial sand and gravel has a mean thickness of 3.2 m and ranges from a sandy soil less than 1 m thick where the deposit is exposed, to a maximum recorded thickness of 8.8 m in borehole 17 SW 123, a non-IMAU borehole. Overburden commonly consists of stiff to hard till or glacial lake deposits. A waste parting of 1.4 m was recorded in borehole 17 NE 192.

No IMAU information is available for the river terrace deposits, and the assessment is therefore based entirely on other boreholes from which information on the composition (quality) of the deposits is commonly not available. These boreholes indicate that upstream from Shirley Race Course [136 758], sand and gravel is thin or absent in the Blythe valley and its tributaries. Where present, sand and gravel ranges in thickness from less than 1.0 to 2.2 m (borehole 17 NW 29 and 17 NW 90) and has a mean thickness of 1.2 m. The estimated volume of sand and gravel in this deposit is 0.7 million $m^3$. Overburden is generally thin and consist of silts and clays. The maximum recorded thickness of overburden associated with the river terrace deposits was 2.1 m in borehole 17 NE 149. The mean thickness of the overburden is 0.6 m.

Block B This block covers an area of 32.1 $km^2$, extending from Tanworth [113 705] in the southwest, through Lapworth [164 711] to Knowle [177 767] in the north. The sand and gravel consists of 9.9 $km^2$ of glacial sand and gravel and has been assessed using data from eight IMAU boreholes (Table 4), six other boreholes and 10 interpreted resistivity soundings.

The potentially workable sand and gravel has a patchy distribution. Although much of it is concealed beneath glacial clays, well exposed glacial sand and gravel can be found around Lapworth, northwest of Knowle and south of Dorridge [173 753]. Where concealed mineral has been encountered, its limits have been delineated by inferred boundaries, for example, west of Dorridge and north of Gilbert's Green [102 711].

Boreholes 17 NE 193 and 194, sunk into exposed glacial sand and gravel, proved no potentially workable material. However, since the area of barren ground around these boreholes cannot be delineated, nil thicknesses have been included in the volume calculations. Borehole 17 SW 193 also failed to prove

**Table 2** The sand and gravel resources of the district.

| Resource block/sub-block | Area | | Mean thickness | | Volume of sand and gravel | | | Mean grading percentage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Block | Mineral | Over-burden | Mineral | | Limits at the 95% probability level | | Fines | Sand | Gravel |
| | $km^2$ | $km^2$ | m | m | Million $m^3 \times 10^6$ | ± % | Million ± $m^3 \times 10^6$ | $-\frac{1}{16}$ mm | $+\frac{1}{16}$–4 mm | +4 mm |
| A | 32.8 | 13.1 | 2.9 | 3.4 | 45 | 17 | 8 | 15 | 63 | 22 |
| B | 32.1 | 9.0 | 1.8 | 3.7 | 33 | 42 | 14 | 15 | 55 | 30 |
| C | 24.5 | 12.5 | 1.4 | 2.8 | 35 | 72 | 25 | 18 | 59 | 23 |
| D | 23.5 | 12.8 | 1.7 | 5.7 | 73 | 29 | 21 | 16 | 77 | 7 |
| E | 39.1 | 16.1 | 1.9 | 4.3 | 69 | 28 | 19 | 20 | 73 | 7 |
| A to E | 152.0 | 63.5 | 1.9 | 4.0 | 254 | 14 | 36 | 17 | 65 | 18 |
| **Inferred assessment - Block F** | | | | | | | | | | |
| F1 | 48.0 | 1.0 | * | 3.8 | 4 | | | | | |
| F2 | 6.4 | 2.9 | * | 1.7 | 5 | | | | | |
| F3 | 14.3 | 0.4 | * | 2.9 | 1 | Limits | | | | |
| F4 | 26.8 | 0.5 | * | 1.5 | 1 | speculative | | | | |
| F5 | 32.9 | 1.2 | * | 3.5 | 4 | | | | | |
| F6 | 12.9 | 1.8 | * | 3.6 | 6 | | | | | |
| F1 to F6 | 141.3 | 7.8 | * | 2.8 | 21 | | | | | |
| **The resources of parts of the district lying within the West Midlands county†** | | | | | | | | | | |
| A (part) | 20.6 | 8.7 | 2.7 | 3.5 | 30 | 26 | 8 | 19 | 61 | 20 |
| B (part) | 6.6 | 3.0 | 1.2 | 3.9 | 12 | speculative | | 16 | 53 | 31 |
| C** | 24.5 | 12.5 | 1.4 | 2.8 | 35 | 72 | 25 | 18 | 59 | 23 |
| D (part) | 6.1 | 3.3 | 0.4 | 6.3 | 21 | speculative | | 16 | 66 | 18 |
| E (part) | 0.4 | 0.3 | 1.0 | 2.5 | 0.7 | speculative | | no data | | |
| A to E | 58.2 | 27.8 | 1.3 | 3.8 | 98.7 | speculative | | 17+ | 61+ | 22+ |

* Generally thin

** Resources in block C are, within the limits of error, virtually wholly within the West Midlands County

\+ Grading data for A to D only

† Complementary figures for area and volume of the resources in the parts of blocks A, B, D and E lying in Warwickshire, may be obtained by subtraction

**Table 3** Block A: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | | | | Fine | Medium | Coarse | Fine | Coarse |
| | m | m | $-\frac{1}{16}$ mm | $+\frac{1}{16}-\frac{1}{4}$ mm | $+\frac{1}{4}$ -1 mm | +1 -4 mm | +4 -16 mm | +16 mm |
| 17 NW 176 | Absent | | | | | | | |
| 17 NW 177 | Absent | | | | | | | |
| 17 NW 179 | 2.8 | 2.2 | 14 | 11 | 39 | 6 | 15 | 15 |
| 17 NE 192 | 8.3* | 0.3 | 25 | 17 | 36 | 3 | 9 | 10 |
| 17 SW 186 | 6.9 | 6.6 | 14 | 24 | 43 | 4 | 9 | 6 |
| 17 SW 188 | 3.3 | 5.4 | 15 | 10 | 44 | 7 | 16 | 8 |
| 17 SW 191 | 4.6 | 6.2 | 9 | 12 | 37 | 6 | 18 | 18 |
| 17 SW 196 | 4.9 | 2.4 | 8 | 26 | 47 | 3 | 9 | 7 |

* excluding waste parting of 1.4 m

**Table 4** Block B: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | | | | Fine | Medium | Coarse | Fine | Coarse |
| | m | m | $-\frac{1}{16}$ mm | $+\frac{1}{16}-\frac{1}{4}$ mm | $+\frac{1}{4}$ -1 mm | +1 -4 mm | +4 -16 mm | +16 mm |
| 16 NE 66 | 2.3 | 1.7 | 22 | 17 | 44 | 4 | 10 | 3 |
| 17 NE 193 | Absent | | | | | | | |
| 17 NE 194 | Absent | | | | | | | |
| 17 NE 198 | 6.2* | 1.5 | 12 | 11 | 32 | 4 | 15 | 26 |
| 17 SW 193 | Absent | | | | | | | |
| 17 SW 194 | 2.5 | 3.5 | 15 | 9 | 31 | 5 | 21 | 19 |
| 17 SW 195 | 5.0** | 3.2 | 9 | 8 | 38 | 12 | 20 | 13 |
| 17 SE 74 | 5.8 | 4.0 | 20 | 11 | 44 | 5 | 13 | 7 |

* excluding waste parting of 3.5 m

** excluding waste parting of 0.8 m

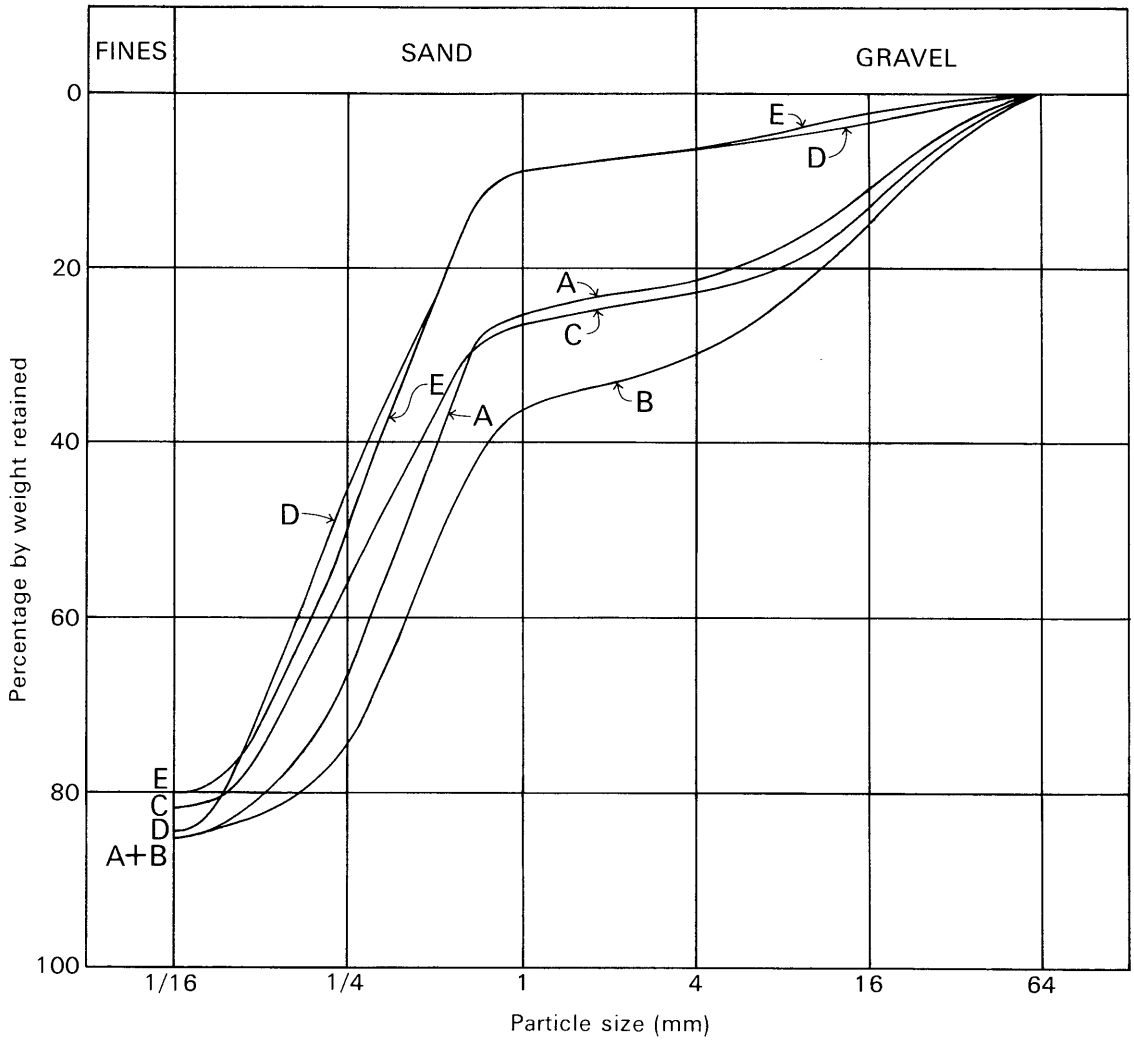
**Table 5** Block C: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | | | | Fine | Medium | Coarse | Fine | Coarse |
| | m | m | $-\frac{1}{16}$ mm | $+\frac{1}{16}-\frac{1}{4}$ mm | $+\frac{1}{4}$ -1 mm | +1 -4 mm | +4 -16 mm | +16 mm |
| 17 NE 195 | 1.5 | 0.5 | 21 | 9 | 18 | 9 | 25 | 18 |
| 17 NE 196 | Absent | | | | | | | |
| 17 NE 197 | Absent | | | | | | | |
| 17 NE 199 | Absent | | | | | | | |
| 27 NW 27 | Absent | | | | | | | |
| 27 NW 28 | 5.3* | 0.4 | 22 | 20 | 32 | 4 | 13 | 9 |
| 27 NW 29 | Absent | | | | | | | |
| 27 NW 30 | 2.5 | 1.0 | 2 | 3 | 14 | 10 | 34 | 37 |
| 27 NW 31 | 10.3 | 0.4 | 18 | 22 | 28 | 5 | 12 | 15 |
| 27 NW 32 | 12.8** | 0.4 | 23 | 27 | 38 | 2 | 3 | 7 |
| 27 NW 33 | Absent | | | | | | | |
| 27 NW 34 | 8.4† | 0.2 | 12 | 33 | 22 | 3 | 12 | 18 |
| 27 NW 35 | 2.6 | 6.0 | 14 | 46 | 39 | 1 | 0 | 0 |
| 27 SW 13 | Absent | | | | | | | |
| 27 SW 15 | Absent | | | | | | | |

* excluding waste parting of 0.6 m

** excluding waste parting of 3.3 m

† excluding waste partings of 1.5 and 1.4 m.




| Block | Percentage by weight passing | | | | | |
|---|---|---|---|---|---|---|
| | $\frac{1}{16}$ mm | $\frac{1}{4}$ mm | 1 mm | 4 mm | 16 mm | 64 mm |
| A | 85 | 67 | 26 | 22 | 10 | 0 |
| B | 85 | 74 | 36 | 30 | 15 | 0 |
| C | 82 | 57 | 27 | 23 | 13 | 0 |
| D | 84 | 46 | 9 | 7 | 4 | 0 |
| E | 80 | 52 | 9 | 7 | 3 | 0 |

**Figure 5** Mean particle size distribution for the mineral in resource blocks A to E

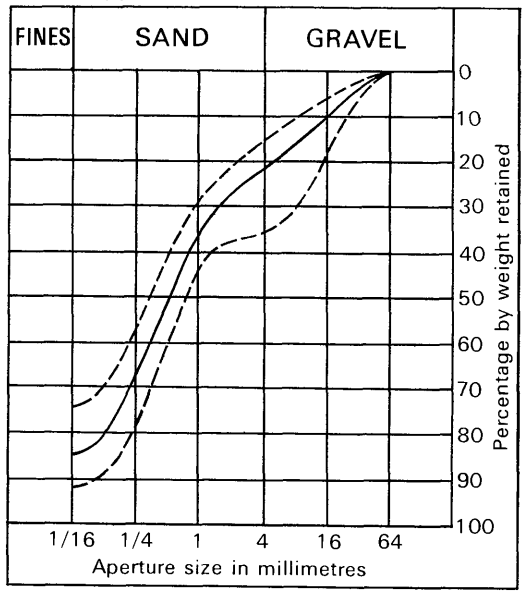
mineral, but the recorded thickness of sand and gravel (0.5 m) has been included in the calculation of resources because the interpretation of resistivity sounding HY 16, indicates that 3.9 m of sand and gravel may be present in Alderhanger Wood [101 699].

All IMAU boreholes encountering mineral contained sandy gravel, except borehole 16 NE 66, the samples from which graded as pebbly sand. The fines content of the mineral ranges from 9 per cent in borehole 17 SW 195 to 22 per cent in borehole 16 NE 66, while the overall mean grading for the block is 15 per cent fines, 55 per cent sand and 30 per cent gravel (Figures 5, 6). Recorded mineral thicknesses range from 1.3 m in borehole 16 NE 17 (a non-IMAU borehole) to 6.2 m in borehole 17 NE 198, while interpreted resistivity values at site HY 43 indicate that a maximum thickness of 7.8 m of sand and gravel may be present. The mean thickness of mineral in this block is 3.7 m and the estimated volume 33 million $m^3$ $\pm$ 42 per cent.

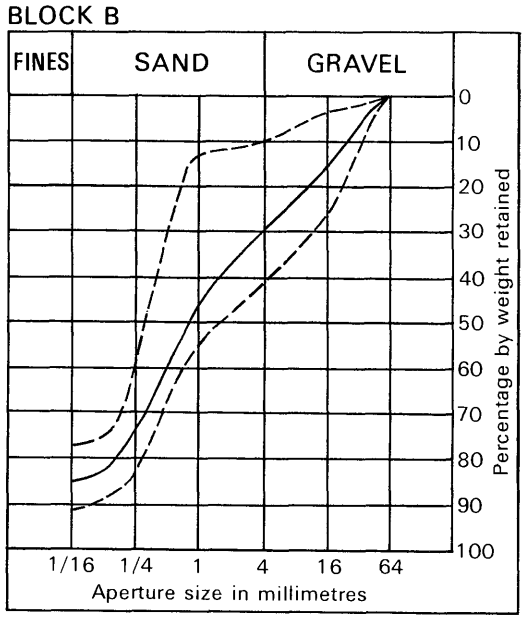
Overburden has a mean thickness of 1.8 m, ranging from thin sandy soil up to a recorded thickness of 4.0 m of glacial lake clays and till in borehole 17 SE 74. However, a maximum of 5.9 m of clayey overburden is indicated from the results of resistivity depth sounding HY 18, at Kemps Green Farm [143 706]. Waste partings of 3.5 and 0.8 m were recorded in boreholes 17 NE 198 and 17 SW 195, respectively.

Block C This block stretches from the eastern outskirts of Knowle and Dorridge to Needlers End [243 768] and

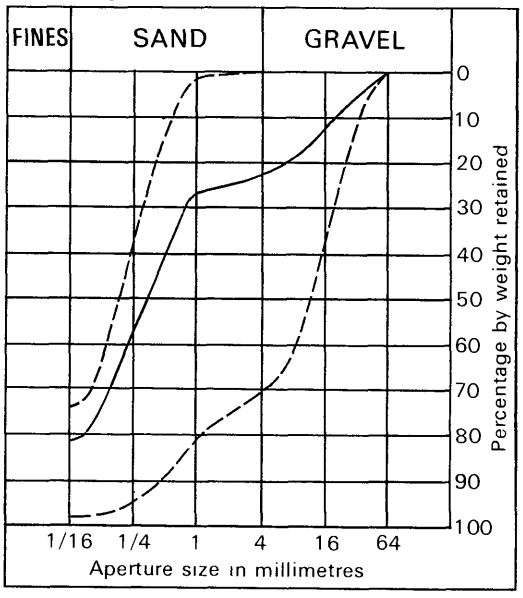
BLOCK A



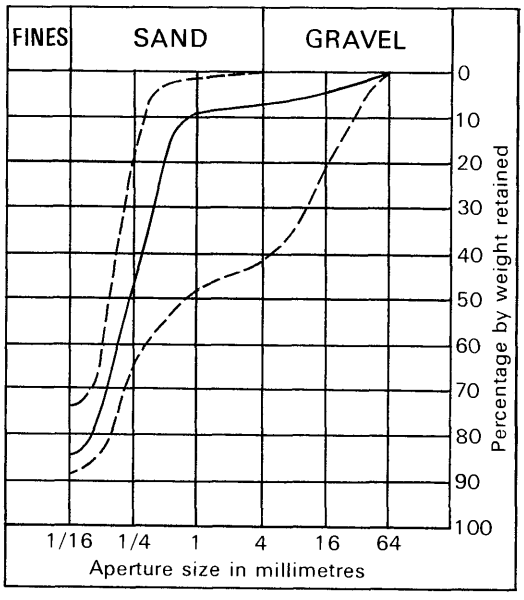

BLOCK B




BLOCK C




BLOCK D




BLOCK E

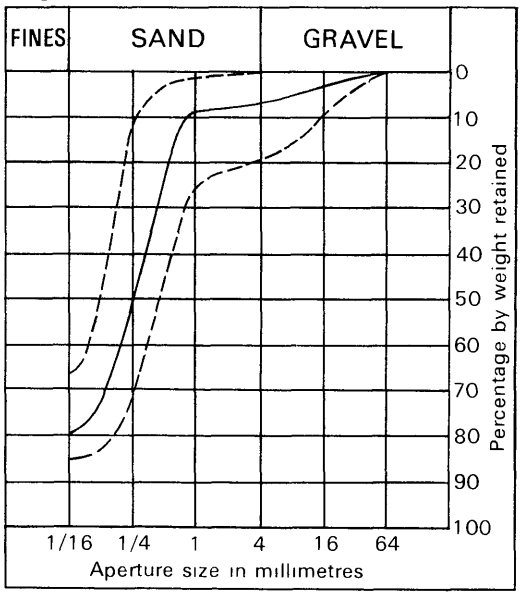



**Figure 6** Particle-size distribution for mineral in blocks A, B, C, D and E. The continuous curve represents the weighted mean grading of the block; the broken lines delimit the envelope within which the mean grading curves for the individual boreholes fall

covers an area of 24.5 $km^2$. The potentially workable sand and gravel consists of 10.3 $km^2$ of glacial sand and gravel and 2.2 $km^2$ of river terrace deposits and alluvium of the River Blyth and its tributary the Cuttle Brook [195 753]. The assessment of sand and gravel resources in this block is based on data from 15 IMAU (Table 5) and three other boreholes. Much of the sand and gravel is associated with the Mere End Buried Channel (Figure 2) which is filled with a complex sequence of sands, gravels and clays. The exact distribution of the mineral in the block is not clear, for much is concealed beneath considerable thicknesses of glacial lake deposits and till. The extent of the mineral is considered to be coincident with the edge of the mapped drift, except around Needlers End, where boreholes proved mineral to be absent beneath much of the till.

Several boreholes (Table 5), for example, 17 NE 199 and 27 NW 27, located in areas mapped as glacial sand and gravel at the surface, proved only thin sequences of sand and gravel or were barren. Only thin sand and gravel was found beneath the glacial lake deposits proved in borehole 27 NW 13. In both the above situations, the area of barren ground cannot be accurately defined on the available information and consequently, nil thicknesses have been used in the assessment of resources, although the areas in question have been coloured by the appropriate shade of pink on the resource map.

The mean grading of the mineral ranges from 'clayey' sand to gravel, with the fines content ranging from 23 per cent in borehole 27 NW 32 to 2 per cent in borehole 27 NW 30. The overall mean grading for this block is 18 per cent fines, 59 per cent sand and 23 per cent gravel (Figures 5, 6). Recorded mineral thicknesses range from 1.5 m (borehole 17 NE 195) to 12.8 m (borehole 27 NW 32) and the mean thickness is 2.8 m. The estimated volume of sand and gravel is 35 million $m^3$ ± 72 per cent at the 95 per cent confidence level.

Overburden ranged in thickness from 0.2 to 6.0 m. The maximum was recorded in borehole 27 NW 35, where the overburden, elsewhere including silt, consisted of stony and laminated clay. The calculated mean thickness is 1.4 m.

Little sub-surface information on the sand and gravel is available from any of the river terrace deposits in this block; borehole 17 NE 197 proved to be barren. However, taking note of information from block A and from boreholes drilled for the Solihull sand and gravel survey (Cannell, 1982), potentially workable sand and gravel may be present in the main valley of the River Blythe and Cuttle Brook. Elsewhere, sand and gravel is either thin or absent from the river terrace deposits.

Block D This block covers an area of 23.5 $km^2$ and contains 12.8 $km^2$ of potentially workable sand and gravel. It stretches from Temple Balsall [208 757] in the north to Finwood [193 683] in the south. The assessment of the sand and gravel resources is based on information from nine IMAU boreholes (Table 6), 16 other boreholes and eight interpreted resistivity soundings.

Much of the sand and gravel is associated with drift-filled channels which may be somewhat less than 1 km wide, as typified by the Kingswood Gap (Figures 2 and 3), or broader, as in the Chadwick End valley. The extent of the sand and gravel in the Kingswood Gap can be easily defined because it is well exposed. In the Chadwick End valley, however, the extent of the potentially workable sand and gravel is not clear and inferred boundaries have been used to separate ground containing mineral from areas with excessive overburden or barren ground.

Sand and gravel was encountered in all the IMAU boreholes except 27 SW 19, which proved only silts and clays in an area mapped as glacial sand and gravel. However, resistivity depth sounding HY 35, sited nearby, proved 4.8 m of mineral and both this figure and the nil thickness proved in the borehole have been taken into account in the assessment of resources.

All of the IMAU boreholes proved either sand or pebbly sand, except borehole 27 SW 11, the mineral from which graded as 'very clayey' gravel. The fines content ranged from 11 per cent in borehole 17 SE 79 to 25 per cent in borehole 27 SW 11; the mean grading for the block as a whole is 16 per cent fines, 77 per cent sand and 7 per cent gravel. Recorded thicknesses of mineral ranged from 1.2 m in borehole 16 NE 36 (a non-IMAU borehole) to 13.2 m in borehole 27 SW 14, while the interpretation of resistivity depth soundings indicates an inferred maximum thickness of 16.0 m of sand and gravel at site HY 29. The mean thickness of mineral for this block is 5.7 m and the estimated volume is 73 million $m^3$ ± 29 per cent.

Overburden thicknesses range from 0.3 m of sandy soil over exposed mineral in the Kingswood Gap (borehole 17 SE 76) to 9.6 m of till and laminated clays in borehole 27 SW 21. Overall, the mean thickness of overburden is 1.7 m. A waste parting of 0.5 m was encountered in borehole 17 SE 75.

Block E This block covers an area of 39.1 $km^2$ and extends from Mere End [245 741] in the north to Claverdon [197 648] in the south. The assessment is based on information from seven IMAU boreholes (Table 7), 24 other boreholes and 14 resistivity depth soundings. As in blocks C and D, much of the mineral is found in drift-filled channels, with the limits of much of the sand and gravel being concealed beneath younger drift deposits. It is estimated that the block includes at least 16.1 $km^2$ of glacial sand and gravel.

**Table 6** Block D: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | m | m | $-\frac{1}{16}$ mm | Fine $+\frac{1}{16}-\frac{1}{4}$ mm | Medium $+\frac{1}{4}$ -1 mm | Coarse +1 -4 mm | Fine +4 -16 mm | Coarse +16 mm |
| 16 NE 67 | 5.6 | 0.7 | 13 | 44 | 34 | 3 | 5 | 1 |
| 17 SE 64 | 6.2 | 1.5 | 13 | 44 | 38 | 1 | 1 | 3 |
| 17 SE 75 | 2.9* | 5.5 | 23 | 58 | 18 | 1 | 0 | 0 |
| 17 SE 76 | 7.6 | 0.3 | 15 | 29 | 35 | 4 | 6 | 11 |
| 17 SE 79 | 11.9 | 2.1 | 11 | 48 | 35 | 2 | 2 | 2 |
| 27 SW 11 | 3.6 | 0.4 | 25 | 10 | 16 | 7 | 20 | 22 |
| 27 SW 14 | 13.2 | 2.8 | 19 | 33 | 45 | 1 | 1 | 1 |
| 27 SW 19 | Absent | | | | | | | |
| 27 SW 21 | 6.8 | 9.6 | 21 | 35 | 43 | 1 | 0 | 0 |

* excluding waste parting of 0.5 m

**Table 7** Block E: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | | | | Fine | Medium | Coarse | Fine | Coarse |
| | m | m | $-\frac{1}{16}$ mm | $+\frac{1}{16}-\frac{1}{4}$ mm | $+\frac{1}{4}-1$ mm | +1 -4 mm | +4 -16 mm | +16 mm |
| 26 NW 85 | 14.3 | 5.7 | 19 | 27 | 52 | 1 | 1 | 0 |
| 26 NW 86 | Absent | | | | | | | |
| 26 NW 87 | Absent | | | | | | | |
| 26 NW 88 | Absent | | | | | | | |
| 26 SW 57 | Absent | | | | | | | |
| 27 SW 20 | 5.0 | 3.0 | 33 | 55 | 11 | 1 | 0 | 0 |
| 27 SW 23* | 7.9 | 1.6 | 15 | 12 | 47 | 6 | 11 | 9 |

* excluding waste parting of 6.8 m.

**Table 8** Block F: data from IMAU boreholes

| Borehole | Recorded thickness | | Mean grading percentage | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mineral | Overburden | Fines | Sand | | | Gravel | |
| | | | | Fine | Medium | Coarse | Fine | Coarse |
| | m | m | $-\frac{1}{16}$ mm | $+\frac{1}{16}-\frac{1}{4}$ mm | $+\frac{1}{4}-1$ mm | +1 -4 mm | +4 -16 mm | +16 mm |
| 16 SW 17 | 1.2 | 0.5 | 7 | 4 | 7 | 7 | 25 | 50 |
| 16 SE 8 | 1.3 | 1.6 | 7 | 4 | 7 | 9 | 40 | 33 |
| 25 NW 64 | 5.0 | 1.2 | 11 | 34 | 29 | 10 | 10 | 6 |
| 26 SW 49 | Absent | | | | | | | |
| 26 SW 50 | 4.7 | 0.3 | 24 | 6 | 33 | 8 | 13 | 16 |
| 26 SW 53 | 1.1 | 0.2 | 11 | 7 | 8 | 10 | 38 | 26 |
| 26 SW 54 | 4.0 | 0.7 | 19 | 14 | 31 | 8 | 18 | 10 |
| 26 SW 58 | 1.1 | 0.6 | 21 | 36 | 38 | 1 | 1 | 3 |
| 26 SW 60 | 3.3 | 2.0 | 11 | 8 | 9 | 13 | 39 | 20 |
| 26 SW 61 | 1.3 | 0.4 | 12 | 7 | 16 | 11 | 29 | 25 |
| 26 SW 62 | 1.2 | 0.6 | 27 | 6 | 10 | 8 | 29 | 20 |
| 26 SW 64 | 3.9 | 0.3 | 14 | 7 | 17 | 14 | 35 | 13 |
| 26 SW 65 | 2.2 | 0.3 | 26 | 20 | 27 | 7 | 12 | 8 |
| 26 SW 66 | 6.0 | 0.4 | 10 | 58 | 29 | 1 | 1 | 1 |
| 26 SW 67 | 2.9 | 4.4 | 27 | 37 | 34 | 1 | 1 | 0 |
| 26 SW 68 | 3.0 | 0.3 | 11 | 10 | 42 | 8 | 19 | 10 |
| 26 SW 69 | 2.5 | 0.3 | 17 | 9 | 25 | 6 | 21 | 22 |
| 26 SW 71 | 2.8 | 0.4 | 12 | 19 | 27 | 14 | 12 | 16 |
| 26 SW 72 | 0.7 | 0.4 | 9 | 7 | 33 | 15 | 19 | 17 |

The distribution of potentially workable sand and gravel beneath overburden is very uncertain, and inferred boundaries have had to be drawn in many places. Three of the seven IMAU boreholes proved mineral. Only clays and silts were present in borehole 28 NW 85 (at Little Shrewley) which was drilled in an area mapped as glacial sand and gravel, while resistivity sounding HY 85, close by, indicated that up to 9.0 m of sand and gravel may be present (see also boreholes 26 NW 57 and 26 NW 88). Where areas of barren ground cannot be delineated or information shows rapid changes in thickness or lithology, nil thicknesses have been taken into account and included in the assessment of resources, and the areas in question have been coloured with the appropriate shade of pink on the map.

Of the three IMAU boreholes encountering mineral, two proved 'clayey' or 'very clayey' sand while the third, 27 SW 23, proved 'clayey' pebbly sand. The overall mean grading for the block is 20 per cent fines, 73 per cent sand and 7 per cent gravel (Table 2, Figures 5, 6). Recorded thicknesses of sand and gravel ranged from 1.2 m in borehole 26 NW 34 (a non-IMAU borehole) to 14.3 m in borehole 26 NW 85; the mean thickness is 4.3 m. The estimated volume of mineral in the block is 69 million $m^3$ $\pm$ 28 per cent, at the 95 per cent confidence level.

The overburden ranges from thin sandy soil to sandy clays and silts up to 5.7 m thick (as proved in borehole 26 NW 85). A waste parting consisting of till and glacial lake deposits 6.8 m thick was encountered in borehole 27 SW 23.

Block F This block covers 141.3 $km^2$ in the south of the resource sheet area and contains some 7.8 $km^2$ of potentially workable sand and gravel. The largest single spread of mineral is around High Close Farm [231 598]; other major deposits are found around Norton Lindsey [225 632], northwest of Ullenhall [124 673] and in the valley of the River Alne. Elsewhere, sand and gravel occurs only as small scattered patches, which vary in area from less than 0.01 $km^2$, to over 0.3 $km^2$ and average 0.02 $km^2$. The assessment is based mainly on 73 resistivity depth soundings of which 44 indicated the presence of sand and gravel; in addition, 19 IMAU boreholes (Table 8), mainly on quarter sheet SP 26 SW, and 26 other boreholes were used.

Because the mineral in this block occurs in small isolated deposits, spread over a large area, inferred assessments are offered for six sub-blocks, designated F1 to F6 (Table 2, Figure 4).

Sub-block F1 To the west of the River Alne, the major deposit of sand and gravel is part of the glacial deposits northwest of Ullenhall. Several smaller deposits have been indentified elsewhere, for example, at Poole's Wood [109 663]. An area of alluvium at Barrells Park [125 664] is also shown to be potentially workable. Till has been mapped northwest of Ullenhall but the interpretation of resistivity depth sounding HY 46 suggests that up to 3.6 m of sand and gravel may lie beneath. Interpreted resistivity values indicate that thicknesses of sand and gravel in this sub-block may range from 1.2 m (site HY 91) to 5.3 m (site HY 48). Potentially workable sand and gravel occupies 1.0 $km^2$, with a mean thickness of 3.8 m, and the estimated volume of the resource is, therefore, 3.8 million $m^3$.

Sub-block F2 The potentially workable deposits of the River Alne include areas of Second Terrace downstream from Henley-in-Arden and in the tributary valley that passes through Preston Bagot [175 658], as well as the alluvium upstream from Henley-in-Arden to Danzey Green [125 695]. Fifteen resistivity depth soundings indicated the presence of sand and gravel, ranging in inferred thickness from 1.0 to 3.6 m. In addition, two IMAU boreholes, 16 SW 17 and 16 SE 8, proved 1.2 and 1.3 m of gravel, respectively. Potentially workable sand and gravel in the fluvial deposits of the River Alne cover an area of 2.9 $km^2$, have a mean thickness of 1.7 m and an estimated volume of 4.9 million $m^3$. Overburden is generally thin.

Sub-block F3 Between Bredon House [178 702] and Preston Bagot, small patches of glacial sand and gravel cover a total area of 0.4 $km^2$. Borehole 17 SE 4 proved 6.0 m of sand and gravel, while resistivity depth soundings suggest that mineral thicknesses may range from 0.4 m (site HY 72 to 4.7 m (site HY 60). The mean thickness of mineral is in the order of 2.9 m and it has an estimated volume of 1.2 million $m^3$.

Sub-block F4 In an area located between the River Alne and the railway line running south from Claverdon Station [208 644], there exist more than 20 isolated patches of glacial sand and gravel. The largest of these, at Mill Mound [205 645], covers no more than 0.06 $km^2$, and the total area of mapped sand and gravel is 0.5 $km^2$. The mineral is very variable in thickness, ranging from 0.7 to 5.1 m, with a calculated mean of 1.5 m. The estimated volume of mineral is 0.8 million $m^3$. Sand and gravel has been worked in the past at Tattle Bank [186 638].

Sub-block F5 Scattered deposits of glacial sand and gravel, including extensive spreads around Norton Lindsey, are found to the north of Sherbourne Brook [242 617]. In addition, three small areas of river terrace deposits are located around New Barn Buildings [246 625]. Fourteen IMAU and four other boreholes proved mineral thicknesses ranging from 1.1 to 6.0 m. The composition of the sand and gravel is very variable, ranging from 'clayey' gravel (borehole 26 SW 53) to 'very clayey' sand (borehole 26 SW 67). Mineral is known to be concealed beneath till at two localities in this sub-block: northwest of Norton Lindsey and at Oak Farm [207 604]. In both cases, the limit of potentially workable sand and gravel is in part delineated by an inferred boundary. The total area of mineral-bearing ground is estimated to be 1.2 $km^2$. The mean mineral thickness of 3.5 m gives an estimated sand and gravel volume of 4.2 million $m^3$.

Sub-block F6 The remaining part of block F covers the southeastern corner of the resource sheet south of Sherbourne Brook. Two-thirds of the total of 1.8 $km^2$ of mineral is found in one continuous deposit around High Close Farm. Here, IMAU boreholes 25 NW 64 and 26 SW 71 proved 5.0 m of 'clayey' pebbly sand and 2.8 m of 'clayey' sandy gravel, respectively. Elsewhere, 12.6 m of sand and gravel were recorded in borehole 25 NW 34 (a non-IMAU borehole), and borehole 26 SW 72 proved only thin sand and gravel. The calculated mean thickness of sand and gravel in this area is 3.6 m and the estimated volume is 5.9 million $m^3$.

**List of workings**

Active and abandoned pits in the district are listed below. All are sited on Glacial Sand and Gravel.

| Location | Grid Reference |
|---|---|
| Active Pits | |
| Brown's Lane | 165 768 |
| Pinley Green | 209 662 |
| Abandoned Pits | |
| Tattle Bank | 180 635 |
| Big Spring Coppice | 145 727 |
| Rileys Pit | 201 753 |

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## APPENDIX A

### FIELD AND LABORATORY PROCEDURES

Trial and error during initial studies of the complex and variable glacial deposits of East Anglia and Essex showed that an absolute minimum of five sample points evenly distributed across the sand and gravel are needed to provide a worthwhile statistical assessment, but that, where possible, there should be not less than ten. Sample points are any points for which adequate information exists about the nature and thickness of the deposit and may include boreholes other than those drilled during the survey and exposures. In particular, the cooperation of sand and gravel operators ensures that boreholes are not drilled where reliable information is already available; although this may be used in the calculations, it is held confidentially by the Institute and cannot be disclosed.

The mineral shown on each 1:25 000 sheet is divided into resource blocks. The arbitrary size selected is a compromise to meet the aims of the survey by providing sufficient sample points in each block. As far as possible the block boundaries are determined by geological boundaries so that, for example, glacial and river terrace gravels are separated. Otherwise division is by arbitrary lines, which may bear no relationship to the geology. The blocks are drawn provisionally before drilling begins.

A reconnaissance of the ground is carried out to record any exposures and inquiries are made to ascertain what borehole information is available. Borehole sites are then selected to provide an even pattern of sample points at a density of approximately one per square kilometre. However, because broad trends are independently overlain by smaller-scale characteristically random variations, it is unnecessary to adhere to a square grid pattern. Thus such factors as ease of access and the need to minimise disturbance to land and the public are taken into account in siting the holes; at the same time it is necessary to guard against the possibility that ease of access (that is, the positions of roads and farms) may reflect particular geological conditions, which may bias the drilling results.

The drilling machine employed should be capable of providing a continuous sample representative of all unconsolidated deposits, so that the in-situ grading can be determined, if necessary, to a depth of 30 m (100 ft) at a diameter of about 200 mm (8 in), beneath different types of overburden. It should be reliable, quiet, mobile and relatively small (so that it can be moved to sites of difficult access). Shell and auger rigs have proved to be almost ideal.

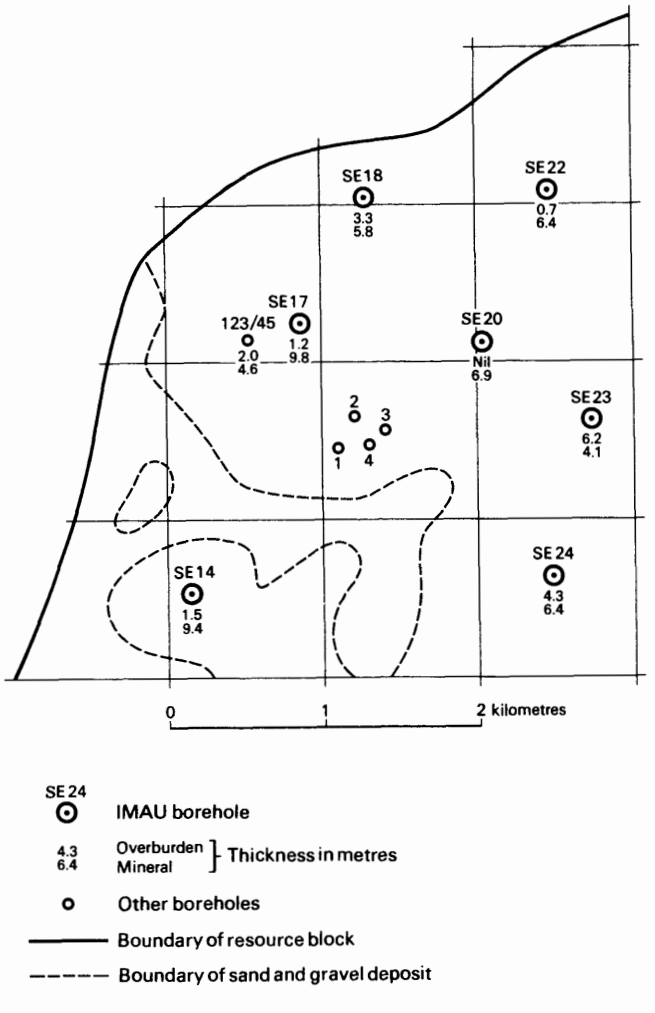
The rigs are modified to enable deposits above the water table to be drilled 'dry', instead of with water added to facilitate the drilling, to minimise the amount of material drawn in from outside the limits of the hole. The samples thus obtained are representative of the in-situ grading, and satisfy one of the most important aims of the survey. Below the water table the rigs are used conventionally, although this may result in the loss of some of the fines fraction and the pumping action of the bailer tends to draw unwanted material into the hole from the sides or the bottom.

A continuous series of bulk samples is taken throughout the sand and gravel. Ideally samples are composed exclusively of the whole of the material encountered in the borehole between stated depths. However, care is taken to discard, as far as possible, material which has caved or has been pumped from the bottom of the hole. A new sample is commenced whenever there is an appreciable lithological change within the sand and gravel, or at every 1 m (3.3 ft) depth. The samples, each weighing between 25 and 45 kg (55 and 100 lb), are despatched in heavy-duty polythene bags to a laboratory for grading. The grading procedure is based on B.S. 1337 (British Standards Institution, 1967). Random checks of the accuracy of the grading are made in the Institute's laboratories.

All data, including mean grading analysis figures calculated for the total thickness of the mineral, are entered on standard record sheets, abbreviated copies of which are reproduced in Appendix E.

Resistivity depth sounding, using the Offset Wenner electrode configuration with multi-core cable and switching box in conjunction with an ABEM SAS 300 Terrameter measuring instrument, was deployed extensively; the data were manipulated using a field-based micro-computer system, which enabled semi-automatic curve fitting to be undertaken, whereby geo-electric models were generated and compared with the field resistivity data. Iterative adjustments of the initial model allowed the best fit with the field data to be achieved, assuming uniform horizontal layering of the deposit. The system also enabled unaccepted or spurious readings to be checked and if necessary repeated without delay.

Detailed records may be consulted at the appropriate offices of the Institute, upon application to the Head, Industrial Minerals Assessment Unit.




Example of resource block assessment: map of a fictitious block

## APPENDIX B

## STATISTICAL PROCEDURE

### Statistical assessment

1 A statistical assessment is made of an area of mineral greater than 2 $km^2$, if there are at least five evenly spaced boreholes in the resource block (for smaller areas, see Paragraph 12 below).

2 The simple methods used in the calculations are consistent with the amount of data provided by the survey (Hull, 1981). Conventional symmetrical confidence limits are calculated for the 95 per cent probability level, that is, on average nineteen out of every twenty sets of limits constructed in this way contain the true value for the volume of mineral.

3 The volume estimate ($V$) for the mineral in a given block is the product of two variables, the sampled areas ($A$) and the mean thickness ($\bar{l}_m$) calculated from the individual thicknesses at the sample points. The standard deviations for these variables are related such that

$$S_V = \sqrt{(S_A^2 + S_{\bar{l}_m}^2)} \qquad [1]$$

4 The above relationship may be transposed such that

$$S_V = S_{\bar{l}_m} \sqrt{(1 + S_A^2 / S_{\bar{l}_m}^2)} \qquad [2]$$

From this it can be seen that as $S_A^2 / S_{\bar{l}_m}^2$ tends to 0, $S_V$ tends to $S_{\bar{l}_m}$.

If, therefore, the standard deviation for area is small with respect to that for thickness, the standard deviation for volume approximates to that for mean thickness.

5 Given that the number of approximately evenly spaced sample points in the sampled area is $n$ with mineral thickness measurements $l_{m_1}, l_{m_2}, \ldots l_{m_n}$, then the best estimate of mean thickness, $\bar{l}_m$, is given by

$$\Sigma\ (l_{m_1} + l_{m_2} \ldots l_{m_n}) / n .$$

For groups of closely spaced boreholes a discretionary weighting factor may be applied to avoid bias (see note on weighting below). The standard deviation for mean thickness $S_{\bar{l}_m}$, expressed as a proportion of the mean thickness, is given by

$$S_{\bar{l}_m} = (1/\bar{l}_m) \sqrt{\ [\Sigma (l_m - \bar{l}_m)^2/(n-1)]}$$

where $l_m$ is any value in the series $l_{m_1}$ to $l_{m_n}$.

6 The sampled area in each resource block is coloured pink on the map. Wherever possible, calculations relate to the mineral within mapped geological boundaries (which may not necessarily correspond to the limits of a deposit). Where the area is not defined by a mapped boundary, that is, where the boundary is inferred, a distinctive symbol is used. Experience suggests that the errors in determining area are small relative to those in thickness. The relationship $S_A / S_{\bar{l}_m} \leqq 0.\dot{3}$ is assumed in all cases. It follows from Equation [2] that

$$S_{\bar{l}_m} \leqq S_V \leqq 1.05\, S_{\bar{l}_m} \qquad [3]$$

7 The limits on the estimate of mean thickness of mineral, $L_{\bar{l}_m}$, may be expressed in absolute units

$\pm (t/\sqrt{n}) \times S_{\bar{l}_m}$ or as a percentage

$\pm (t/\sqrt{n}) \times S_{\bar{l}_m} \times (100/\bar{l}_m)$ per cent, where t is Student's t at the 95 per cent probability level for $(n-1)$ degrees of freedom, evaluated by reference to statistical tables. (In applying Student's t it is assumed that the measurements are distributed normally).

8 Values of t at the 95 per cent probability level for values of $n$ up to 20 are as follows:

| $n$ | t | $n$ | t |
|---|---|---|---|
| 1 | infinity | 11 | 2.228 |
| 2 | 12.706 | 12 | 2.201 |
| 3 | 4.303 | 13 | 2.179 |
| 4 | 3.182 | 14 | 2.160 |
| 5 | 2.776 | 15 | 2.145 |
| 6 | 2.571 | 16 | 2.131 |
| 7 | 2.447 | 17 | 2.120 |
| 8 | 2.365 | 18 | 2.110 |
| 9 | 2.306 | 19 | 2.101 |
| 10 | 2.262 | 20 | 2.093 |

(from Table 12 in *Biometrika Tables for Statisticians*, Volume 1, Second Edition, Cambridge University Press, 1962). When $n$ is greater than 20, 1.96 is used (the value of t when n is infinity).

9 In calculating confidence limits for volume, $L_V$, the following inequality, corresponding to Equation [3], is applied:

$$L_{\bar{l}_m} \leqq L_V \leqq 1.05\, L_{\bar{l}_m}.$$

10 In summary, for values of $n$ between 5 and 20, $L_V$ is calculated as

$$[(1.05 \times t)/\bar{l}_m] \times [\sqrt{\Sigma}(l_m - \bar{l}_m)^2/n\ (n-1)] \times 100$$

per cent,

and when $n$ is greater than 20, as

$$[(1.05 \times 1.96)/\bar{l}_m] \times [\sqrt{\Sigma}(l_m - \bar{l}_m)^2/n\ (n-1)] \times 100$$

per cent.

11 The application of this procedure to a fictitious area is illustrated in the accompanying Figure and example of a block calculation.

### Inferred assessment

12 If the sampled area of mineral in a resource block is in the region of 2 $km^2$, an assessment is inferred on the basis of geological and topographical information, usually supported by the data from one or two boreholes. The volume of mineral is calculated as the product of the area, measured from field data, and the estimated thickness. Confidence limits are not calculated.

13 In some cases a resource block may include an area left uncoloured on the map, within which mineral (as defined) is interpreted to be generally absent. If there is reason to believe that some mineral may be present, an inferred assessment may be made.

14 Note on weighting The thickness of a deposit at any point may be governed solely by the position of the point in relation to a broad trend. However, most sand and gravel deposits also exhibit a random pattern of local, and sometimes considerable, variation in thickness. Thus the distribution of sample points needs to be only approximately regular and in estimating the mean thickness only simple weighting is necessary. In practice, equal weighting can often be applied to thicknesses at all sample points. If, however, there is a distinctly unequal distribution of points, bias is avoided by dividing the sampled area into broad zones, to each of which a value roughly proportional to its area is assigned. This value is then shared between the data points with the zone as the weighting factor.

**Block calculation**

Scale: 1:25 000
Block: Fictitious

Area
Block: 11.08 km²
Mineral: 8.32 km²

Mean thickness
Overburden: 2.5 m
Mineral: 6.5 m

Volume
Overburden: 21 million m³
Mineral: 54 million m³

Confidence limits of the estimate of mineral volume at the 95 per cent probability level: ± 20 per cent
That is, the volume of mineral (with 95 per cent probability): 54 ± 11 million m³

Thickness estimate (measurements in metres)
$l_o$= overburden thickness $l_m$ = mineral thickness

| Sample point | Weighting $w$ | Overburden $l_o$ | Overburden $wl_o$ | Mineral $l_m$ | Mineral $wl_m$ | Remarks |
|---|---|---|---|---|---|---|
| SE 14 | 1 | 1.5 | 1.5 | 9.4 | 9.4 | |
| SE 18 | 1 | 3.3 | 3.3 | 5.8 | 5.8 | |
| SE 20 | 1 | nil | - | 6.9 | 6.9 | |
| SE 22 | 1 | 0.7 | 0.7 | 6.4 | 6.4 | IMAU |
| SE 23 | 1 | 6.2 | 6.2 | 4.1 | 4.1 | boreholes |
| SE 24 | 1 | 4.3 | 4.3 | 6.4 | 6.4 | |
| SE 17 | ½ | 1.2 | 1.6 | 9.8 | 7.2 | |
| 123/45 | ½ | 2.0 | | 4.6 | | Hydrogeology Unit record |
| 1 | ¼ | 2.7 | 2.6 | 7.3 | 5.8 | Close group |
| 2 | ¼ | 4.5 | | 3.2 | | of four |
| 3 | ¼ | 0.4 | | 6.8 | | boreholes |
| 4 | ¼ | 2.8 | | 5.9 | | (commercial) |
| Totals | $\Sigma w = 8$ | $\Sigma wl_o = 20.2$ | | $\Sigma wl_m = 52.0$ | | |
| Means | | $\overline{wl}_o = 2.5$ | | $\overline{wl}_m = 6.5$ | | |

Calculation of confidence limits

| $wl_m$ | $\lvert(wl_m - \overline{wl}_m)\rvert$ | $(wl_m - \overline{wl}_m)^2$ |
|---|---|---|
| 9.4 | 2.9 | 8.41 |
| 5.8 | 0.7 | 0.49 |
| 6.9 | 0.4 | 0.16 |
| 6.4 | 0.1 | 0.01 |
| 4.1 | 2.4 | 5.76 |
| 6.4 | 0.1 | 0.01 |
| 7.2 | 0.7 | 0.49 |
| 5.8 | 0.7 | 0.49 |

$\Sigma(wl_m - \overline{wl}_m)^2 = 15.82$

$n = 8$

t = 2.365

$L_V$ is calculated as

$1.05\ (t/\overline{wl}_m)\ \sqrt{[\Sigma(wl_m - \overline{wl}_m)^2/\ n(n-1)]} \times 100$

$= 1.05 \times (2.365/6.5)\ \sqrt{[15.82/(8 \times 7)]} \times 100$

$= 20.3$

$\simeq$ 20 per cent.

**APPENDIX C**

**CLASSIFICATION AND DESCRIPTION OF SAND AND GRAVEL**

For the purposes of assessing resources of sand and gravel a classification should take account of economically important characteristics of the deposit, in particular the absolute content of fines and the ratio of sand to gravel.

The terminology commonly used by geologists when describing sedimentary rocks (Wentworth, 1922) is not entirely satisfactory for this purpose. For example, Wentworth proposed that a deposit should be described as a 'gravelly sand' when it contains more sand than gravel and there is at least 10 per cent of gravel, provided that there is less than 10 per cent of material finer than sand (< $\frac{1}{16}$ mm) and coarser than pebbles (> 64 mm in diameter). Because deposits containing more than 10 per cent fines are not embraced by this system, a modified binary classification based on Willman (1942) has been adopted.

When the fines content exceeds 40 per cent the material is considered to be not potentially workable and falls outside the definition of mineral. Deposits which contain 40 per cent fines or less are classified primarily on the ratio of sand to gravel but qualified in the light of the fines content, as follows: less than 10 per cent fines - no qualification; 10 per cent or more but less than 20 per cent fines - 'clayey'; 20 to 40 per cent fines - 'very clayey'.

The term 'clay' (as written, with single quote marks) is used to describe all material passing $\frac{1}{16}$ mm. Thus it has no mineralogical significance and includes particles falling within the size range of silt. The normal meaning applies to the term clay where it does not appear in single quotation marks.

The ratio of sand to gravel defines the boundaries between sand, pebbly sand, sandy gravel and gravel (at 19:1, 3:1 and 1:1).

Thus it is possible to classify the mineral into one of twelve descriptive categories (see the accompanying Figure). The procedure is as follows:

1 Classify according to the ratio of sand to gravel.
2 Describe the fines.

For example, a deposit grading 11 per cent gravel, 70 per cent sand and 19 per cent fines is classified as 'clayey' pebbly sand. This short description is included in the borehole log (see Appendix D)

Many differing proposals have been made for the classification of the grain size of sediments (Atterberg, 1905; Udden, 1914; Wentworth, 1922; Wentworth, 1935; Allen, 1936; Twenhofel, 1937; Lane and others, 1947). As Archer (1970a, b) has emphasised, there is a pressing need for a simple metric scale acceptable to both scientific and engineering interests, for which the class limit sizes correspond closely with certain marked changes in the natural properties of mineral particles. For example, there is an important change in the degree of cohesion between particles at about the $\frac{1}{16}$-mm size, which approximates to the generally accepted boundary between silt and sand. These and other requirements are met by a system based on Udden's geometric scale and a simplified form of Wentworth's terminology (see the accompanying table), which is used in the Report.

The fairly wide intervals in the scale are consistent with the general level of accuracy of the qualitative assessments of the resource blocks. Three sizes of sand are recognised, fine (+$\frac{1}{16}$ -$\frac{1}{4}$ mm), medium (+$\frac{1}{4}$ -1 mm) and coarse (+1 -4 mm). The boundary at 16 mm distinguishes a range of finer gravel (+4 -16 mm), often characterised by abundance of worn tough pebbles of vein quartz, from larger pebbles, often of notably different materials. The boundary at 64 mm distinguishes pebbles from cobbles. The term 'gravel' is used loosely to denote both pebble-sized and cobble-sized material.

The size distribution of borehole samples is determined by sieve analysis, which is presented by the laboratory as logarithmic cumulative curves (see, for example, British Standards Institution, 1967). In this report the grading is tabulated on the borehole record sheets (Appendix E), the intercepts corresponding with the simple geometric scale $\frac{1}{16}$ mm, $\frac{1}{4}$ mm, 1 mm, 4 mm, 16 mm and so on as required. Original sample grading curves are available for reference at the appropriate office of the Institute.

Each bulk sample is described, subjectively, by a geologist at the borehole site. Being based on visual examination, the description of the grading is inexact, the accuracy depending on the experience of the observer. The descriptions recorded are modified, as necessary, when the laboratory results become available.

The relative proportions of the rock types present in the gravel fraction are indicated by the use of the words 'and' or 'with'. For example, 'flint and quartz' indicates roughly equal proportions with neither constituent accounting for less than about 25 per cent of the whole; 'flint with quartz' indicates that flint is dominant and quartz, the principal accessory rock type, comprises 5 to 25 per cent of the whole. Where the accessory material accounts for less than 5 per cent of the whole, but is still readily apparent, the phrase 'with some' has been used. Rare constitutents are referred to as 'trace'.

The terms used in the field to describe the degree of rounding of particles, which is concerned with the sharpness of the edges and corners of a clastic fragment and not the shape (after Pettijohn, 1975), are as follows.

Angular: showing little or no evidence of wear; sharp edges and corners.

Subangular: showing definite effects of wear. Fragments still have their original form but edges and corners begin to be rounded off.

Subrounded: showing considerable wear. The edges and corners are rounded off to smooth curves. Original grain shape is still distinct.

Rounded: original faces almost completely destroyed, but some comparatively flat surfaces may still remain. All original edges and corners have been smoothed off to rather broad curves. Original shape is still apparent.

Well rounded: no original faces, edges or corners left. The entire surface consists of broad curves; flat areas are absent. The original shape is suggested by the present form of the grain.

Classification of gravel, sand and fines

| Size limits | Grain-size description | Qualification | Primary classification |
|---|---|---|---|
| | Cobble | | |
| 64 mm | | | |
| | | Coarse | Gravel |
| 16 mm | Pebble | | |
| | | Fine | |
| 4 mm | | | |
| | | Coarse | |
| 1 mm | | | |
| | Sand | Medium | Sand |
| $\frac{1}{4}$ mm | | | |
| | | Fine | |
| $\frac{1}{16}$ mm | | | |
| | Fines (silt and clay) | | Fines |

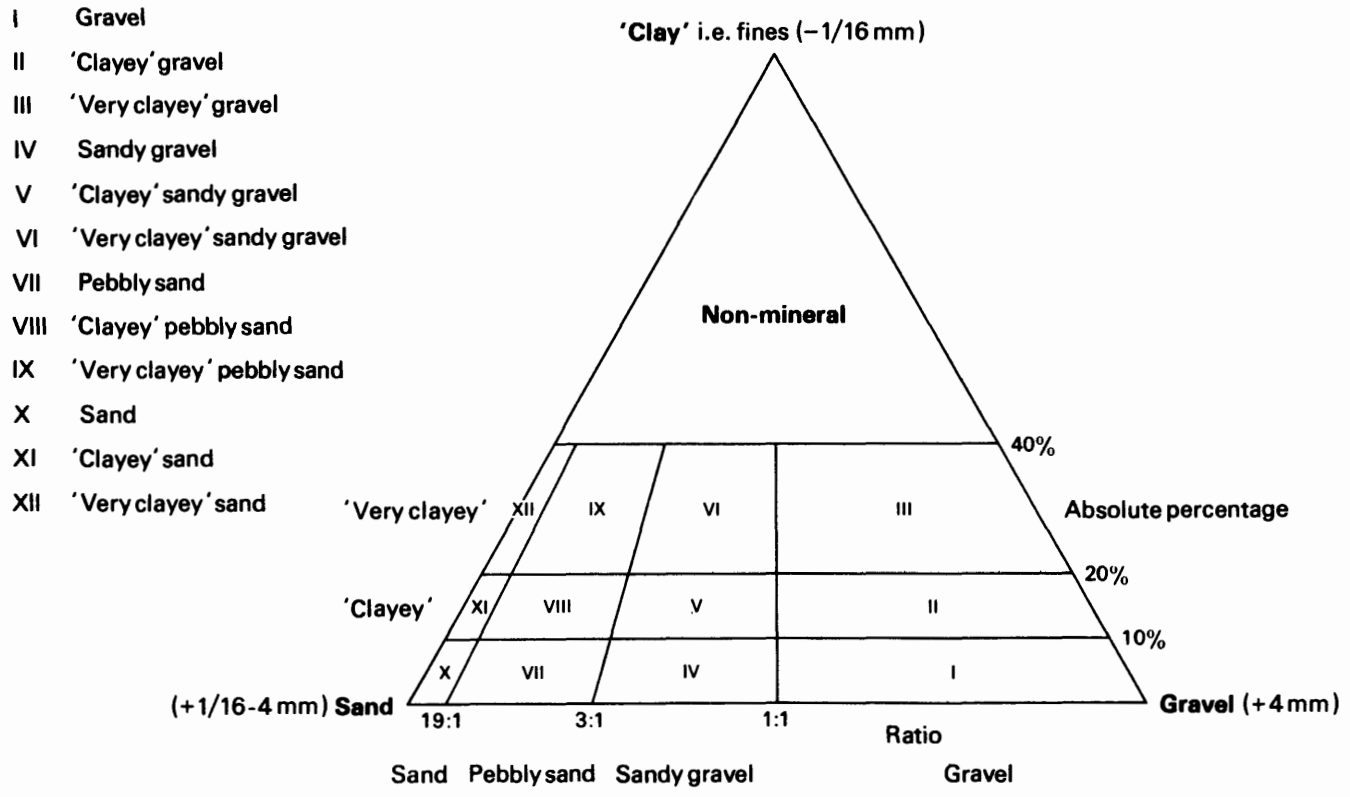



Diagram showing the descriptive categories used in the classification of sand and gravel

Appendix D

## EXPLANATION OF THE BOREHOLE RECORDS

### Annotated fictitious example

**CK 65 NW 5**[1] **6191 6962**[2] **Northfields**[3] **Block B**

Surface level (+49.7m) +163 ft[4]
Water struck at +45.9m[5]
October 1972[6]

| | |
|---|---|
| Overburden[7] | 2.8 m |
| Mineral | 5.4 m |
| Waste | 1.1 m |
| Mineral | 1.4 m |
| Bedrock | 0.7 m+[8] |

### LOG

| Geological classification | Lithology[9] | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Alluvium | Clay, silty, dark brown | 2.6 | 2.8 |
| River Terrace Deposits | **a** Gravel<br>Gravel: fine to coarse, with cobbles towards base, angular to rounded flint and limestone with ironstone and some quartz and chalk<br>Sand: medium with coarse and some fine, quartz and limestone | 5.4 | 8.2 |
| Boulder Clay | Clay, sandy and pebbly, red-brown | 1.1 | 9.3 |
| Glacial Sand and Gravel | **b** Sand, 'clayey' in part: fine, subangular to rounded, with some coal | 1.4 | 10.7 |
| Lias | Mudstone, blue-grey, fossiliferous | 0.7+ | 11.4 |

### GRADING[10]

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| a | 5 | 46 | 49 | 2.8-3.9 | 20 | 14 | 62 | 2 | 2 | 0 | 0 |
| | | | | 3.8-4.8 | 2 | 2 | 12 | 18 | 42 | 24 | 0 |
| | | | | 4.8-5.8 | 1 | 3 | 24 | 13 | 35 | 24 | 0 |
| | | | | 5.8-6.8 | 0 | 4 | 21 | 20 | 26 | 29 | 0 |
| | | | | 6.8-8.2 | 4 | 3 | 23 | 10 | 23 | 30 | 7 |
| | | | | **Mean** | **5** | **5** | **28** | **13** | **25** | **22** | **2** |
| b | 5 | 95 | 0 | 9.3-10.3 | 3 | 73 | 23 | 1 | 0 | 0 | 0 |
| | | | | 10.3-10.7 | 9 | 85 | 5 | 1 | 0 | 0 | 0 |
| | | | | **Mean** | **5** | **77** | **17** | **1** | **0** | **0** | **0** |
| **a+b** | **5** | **56** | **39** | **Mean** | **5** | **20** | **26** | **10** | **20** | **17** | **2** |

### COMPOSITION[11]

| Depth below surface (m) | percentages by weight in the +4-64 mm fraction | | | | |
|---|---|---|---|---|---|
| | Flint | Quartz | Limestone | Chalk | Ironstone |
| 3.8-4.8 | 41 | 5 | 50 | 1 | 3 |
| 4.8-5.8 | 39 | 3 | 45 | 5 | 8 |
| 5.8-6.8 | 45 | 2 | 42 | 5 | 6 |
| 6.8-8.2 | 19 | 6 | 61 | 3 | 11 |
| **Mean** | **35** | **4** | **51** | **3** | **7** |

The numbered paragraphs below correspond with the annotations given on the specimen record opposite.

1 Borehole Registration Number
Each Industrial Minerals Assessment Unit (IMAU) borehole is identified by a Registration Number. This consists of two statements.

a The number of the 1:25 000 sheet on which the borehole lies, here CK 66.

b The quarter of the 1:25 000 sheet on which the borehole lies and the number of the borehole in a series for that quarter, here NW 5.

Thus the full Registration Number is CK 66 NW 5.

2 National Grid Reference
All National Grid Reference fall in the 100 km square identified by the first two letters of the Registration Number. Grid references are given to eight figures, accurate to within 10 m.

3 Location
The position of the borehole is generally referred to the nearest named locality on the 1:25 000 base map and the resource block in which the borehole lies is stated.

4 Surface level
The surface level at the borehole site is given in metres and feet above Ordnance Datum. All measurements were made in metres; approximate conversions to feet are given in brackets.

5 Groundwater conditions
If groundwater was present the level at which it was encountered is normally given (in metres relative to Ordnance Datum).

6 Type of drill and date of drilling
The type of rig used, the diameter of the casing and the month and year of completion of drilling are stated.

7 Overburden, mineral, waste and bedrock
Mineral is sand and gravel which, as part of a deposit, falls within the arbitrary definition of potentially workable material (see p.1). Bedrock is the 'formation', 'country rock' or 'rock head' below which potentially workable sand and gravel will not be found. Waste is any material other than bedrock or mineral. Where waste occurs between the surface and mineral it is classified as overburden.

8 The plus sign (+) indicated that the base of the deposit was not reached during drilling.

9 Lithological description
When sand and gravel is recorded a general description based on the grading characteristics (for details see Appendix C) is followed by more detailed particulars of the gravel and/or sand fraction. Where more than one bed of mineral is recognised each is designated by a letter, e.g. a, b, etc. The description of other deposits is based on visual examination in the field.

10 Grading data
A continuous series of bulk samples is taken throughout the thickness of sand and gravel. A new sample is commenced whenever there is an appreciable lithological change or at every 1 m of depth.

For each bulk sample the percentages of fines (- mm), fine sand (+ -$\frac{1}{4}$ mm), medium sand (+$\frac{1}{4}$ -1 mm), coarse sand (+1 -4 mm), fine gravel (+4 -16 mm), coarse gravel (+16 -64 mm) and cobble gravel (+64 mm) are stated.

The mean grading of groups of samples making up an identified bed of mineral are also given in detail and in summary. Where more than one bed is recognised the mean grading for the whole of the mineral in the borehole may be given. Where necessary, in calculating mean gradings, data for individual samples are weighted by the thickness represented. If, exceptionally, grading results are not available for a sample, an attempt may be made to estimate the grading by comparing the grading and field descriptions of adjacent samples with the sample in question. Such estimates are shown in square brackets. Alternatively, in calculating means, the sample may be allotted the mean grading of other samples in the deposit.

Fully representative sampling of sand and gravel is difficult to achieve, particularly where groundwater levels are high. Comparison between boreholes and adjacent exposures commonly suggests that in borehole samples the proportion of sand may be higher and the proportion of fines and coarse gravel may be lower.

11 Composition
Details of the composition of selected samples or groups of samples may be given.

## APPENDIX E

## INDUSTRIAL MINERALS ASSESSMENT UNIT BOREHOLE RECORDS

**SP 16 NE 66** **1549 6936** **Upland Cottage** **Block B**

Surface level +138.1 m (+453 ft)
Water struck at +134.3 m
September 1982

| | |
|---|---|
| Overburden | 1.7 m |
| Mineral | 2.3 m |
| Bedrock | 0.2 m+ |

### LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Till | Sandy clay, light brown; pebbles of sandstone, quartzite, quartz, flint and chalk | 1.2 | 1.7 |
| Glacial Sand and Gravel | 'Very clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with yellow sandstone and trace igneous rocks<br>Sand: fine and medium, subangular to subrounded quartz<br>Fines: silty clay, strong brown | 2.3 | 4.0 |
| Mercia Mudstone Group | Mudstone, moderate reddish brown with green spots | 0.2+ | 4.2 |

### GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 22 | 65 | 13 | 1.7-2.7 | 22 | 17 | 39 | 4 | 14 | 4 | 0 |
| | | | 2.7-4.0 | 22 | 17 | 47 | 4 | 7 | 3 | 0 |
| | | | **Mean** | **22** | **17** | **44** | **4** | **10** | **3** | **0** |

### COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 2.7-4.0 | 51 | 38 | 10 | - | trace | - | trace | 1 | - |

**SP 16 NE 67** **1861 6957** **High Chimneys** **Block D**

Surface level +95.1 m (+312 ft)
Water struck at +92.1 m
August 1982

| | |
|---|---|
| Overburden | 0.7 m |
| Mineral | 5.6 m |
| Bedrock | 1.2 m+ |

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil and brown sandy pebbly clay | 0.7 | 0.7 |
| Alluvial Fan | **a** 'Clayey' sandy gravel<br>Gravel: fine with coarse, rounded to well rounded quartzite and quartz with sandstone and trace igneous rocks<br>Sand: fine to coarse, subangular to subrounded quartz | 0.6 | 1.3 |
| Glacial Sand and Gravel | **b** 'Clayey' sand<br>Sand: fine and medium, subangular to subrounded quartz; coal fragments from 5.3-6.3 m<br>Fines: silty, light brown | 5.0 | 6.3 |
| Mercia Mudstone Group | Silty clay, soft to firm, reddish brown with green marbling | 1.2+ | 7.5 |

GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 11 | 46 | 43 | 0.7-1.3 | 11 | 21 | 19 | 6 | 32 | 11 | 0 |
| **b** | 13 | 86 | 1 | 1.3-2.3 | 24 | 37 | 38 | 1 | 0 | 0 | 0 |
| | | | | 2.3-3.3 | 15 | 52 | 32 | 1 | 0 | 0 | 0 |
| | | | | 3.3-4.3 | 11 | 57 | 31 | 1 | 0 | 0 | 0 |
| | | | | 4.3-5.3 | 7 | 75 | 17 | 1 | 0 | 0 | 0 |
| | | | | 5.3-6.3 | 8 | 18 | 59 | 7 | 7 | 1 | 0 |
| | | | | **Mean** | **13** | **48** | **36** | **2** | **1** | **trace** | **0** |
| **a+b** | 13 | **81** | **6** | **0.7-6.3** | 13 | **44** | **34** | **3** | **5** | 1 | **0** |

**SP 16 SW 17** **1481 6184** **Pennyford Hall** **Block $F_2$**

Surface level +56.2 m (+185 ft)
Water struck at +54.7 m
January 1983

| | |
|---|---|
| Overburden | 0.5 m |
| Mineral | 1.2 m |
| Bedrock | 1.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| River Terrace Deposits | Gravel<br>Gravel: coarse with fine, well rounded sandstone and quartzite<br>Sand: fine to coarse, angular quartz and quartzite | 1.2 | 1.7 |
| Mercia Mudstone Group | Clay and mudstone, red with green spots | 1.3+ | 3.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 7 | 18 | 75 | 0.5-1.7 | 7 | 4 | 7 | 7 | 25 | 48 | 2 |

**SP 16 SE 6** **1935 6441** **Reddings Farm** **Block E**

Surface level +126.7 m (+416 ft)
Water not encountered
September 1982

Waste 2.0 m
Bedrock 1.0 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, light brown; pebbles of quartzite, quartz, sandstone, flint, chalk and green mudstone | 1.7 | 2.0 |
| Mercia Mudstone Group | Mudstone, reddish brown and yellow-green | 1.0+ | 3.0 |

**SP 16 SE 7** **1927 6064** **Snitterfield Bushes** **Block $F_5$**

Surface level +115.2 m (+378 ft) Waste 16.0 m+
Water struck at +111.7 and +99.7 m
January 1983

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground | 1.3 | 1.3 |
| Till | Clay, reddish brown to brown; pebbles of quartzite, quartz, flint and red marl | 12.7 | 14.0 |
| | Clay, brown with thin pale brown silty partings, laminated | 2.0+ | 16.0 |

**SP 16 SE 8** **1610 6387** **Pettiford Bridge** **Block $F_2$**

Surface level +64.1 m (+210 ft)
Water struck at +62.4 m
January 1983

| | |
|---|---|
| Overburden | 1.6 m |
| Mineral | 1.3 m |
| Bedrock | 1.1 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil and made ground | 1.1 | 1.1 |
| Alluvium | Clay, grey, gravelly | 0.5 | 1.6 |
| River Terrace Deposits | Gravel<br>Gravel: fine and coarse, well rounded quartzite and quartz with sandstone and trace flint<br>Sand: fine to coarse, angular to subrounded, quartz and quartzite | 1.3 | 2.9 |
| Mercia Mudstone Group | Mudstone and siltstone, grey-green | 1.1+ | 4.0 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 7 | 20 | 73 | 1.6-2.9 | 7 | 4 | 7 | 9 | 40 | 31 | 2 |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 1.6-2.9 | 58 | 32 | 9 | - | 1 | - | - | - | - |

**SP 17 NW 176 1105 7763 Whitlock's End Farm Block A**

Surface level +146.0 m (+479 ft)
Water struck at +138.2 m
August 1982

Waste 10.2 m
Bedrock 0.3 m+

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil and fill | 0.3 | 0.3 |
| Till | Clay, reddish brown to moderate brown, pebbly; pebbles of quartzite, quartz, sandstone and grey siltstone | 5.3 | 5.6 |
| | Clay, sandy, yellowish orange, pebbly; pebbles of quartzite, quartz and sandstone with many sand-sized fragments as above | 1.7 | 7.3 |
| Glacial Sand and Gravel | 'Clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite, quartz with sandstone and trace igneous rocks and mudstone<br>Sand: fine to coarse, subangular quartz | 0.8 | 8.1 |
| Glacial Lake Deposits | Clay, reddish brown and brown, with thin bands of quartz sand | 1.3 | 9.4 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace green igneous rocks<br>Sand: medium and coarse, subangular to subrounded quartz and angular quartzite | 0.8 | 10.2 |
| Mercia Mudstone Group | Silty clay, reddish brown with olive banding | 0.3+ | 10.5 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 18 | 53 | 29 | 7.3-7.5 | 19 | 16 | 29 | 5 | 16 | 12 | 3 |
| | | | 7.5-8.1 | 17 | 9 | 39 | 8 | 16 | 11 | 0 |
| | | | **Mean** | **18** | **11** | **35** | **7** | **16** | **12** | **1** |
| 5 | 31 | 64 | 9.4-10.2 | 5 | 3 | 19 | 9 | 28 | 36 | 0 |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 7.5-8.1 | 55 | 28 | 15 | - | - | 1 | - | 1 | - |
| 9.4-10.2 | 50 | 35 | 14 | - | - | 0 | - | 1 | - |

**SP 17 NW 177** **1037 7642** **Whitlock's End** **Block A**

Surface level +148.2 m (+486 ft)
Water struck at +140.2 m
August 1982

Waste 10.0 m
Bedrock 0.5 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Till | Clay, yellowish orange and yellowish grey, sandy and laminated below 2.5 m | 2.8 | 3.0 |
| | Clay, reddish brown, pebbly; pebbles of quartzite, quartz, red and green mudstone and coal | 3.4 | 6.4 |
| | Clay, yellowish orange, pebbly; pebbles of quartzite, quartz and rare flint | 1.8 | 8.2 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace mudstone and igneous rocks<br>Sand: medium and coarse, subangular to subrounded quartz | 0.8 | 9.0 |
| Till | Clay, reddish brown, pebbly; pebbles of quartzite, quartz and coal | 0.5 | 9.5 |
| | Silt, olive grey with coal fragments | 0.5 | 10.0 |
| Mercia Mudstone Group | Silty clay, reddish brown with green spots | 0.5+ | 10.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 5 | 29 | 66 | 8.2-9.0 | 5 | 4 | 13 | 12 | 29 | 37 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 8.2-9.0 | 51 | 31 | 15 | - | - | 1 | - | 2 | - |

**SP 17 NW 178** **1306 7688** **Lodge Farm** **Block A**

Surface level +139.9 m (+459 ft)
Water struck at +137.4 m and +131.4 m
August 1982

| | |
|---|---|
| Waste | 10.5 m |
| Bedrock | 0.5 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Till | Silty clay, yellowish orange with layers of silty sand; pebbly below 3.3 m | 3.7 | 4.2 |
| | Clay, reddish brown, pebbly; pebbles of quartzite, quartz, sandstone, red and green mudstone and coal | 3.8 | 8.0 |
| | Clay, yellowish orange with pebbles as above | 0.5 | 8.5 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite, quartz, sandstone and green igneous rocks<br>Sand: fine to coarse, angular to subrounded quartz | 0.6 | 9.1 |
| Glacial Lake Deposits | Silty clay, moderate brown to reddish brown; laminated below 10.0 m | 1.2 | 10.3 |
| | Silty clay, yellowish brown | 0.2 | 10.5 |
| Mercia Mudstone Group | Silty mudstone, yellowish brown and moderate brown with pale green spots and streaks | 0.5+ | 11.0 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 15 | 25 | 60 | 8.5-9.1 | 15 | 4 | 15 | 6 | 26 | 34 | 0 |

**SP 17 NW 179 1228 7509** **Bedsworth Farm** **Block A**

Surface level +138.4 m (+454 ft)
Water struck at +134.5 m
August 1982

| | |
|---|---|
| Overburden | 2.2 m |
| Mineral | 2.8 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, pebbly; pebbles of quartzite, quartz and red siltstone | 1.9 | 2.2 |
| Glacial Sand and Gravel | **a** 'Clayey' sand<br>Sand: mainly medium, subangular to subrounded quartz<br>Fines: silty, yellowish orange | 0.9 | 3.1 |
| | **b** 'Clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite, quartz with sandstone and angular to subrounded red siltstone<br>Sand: mainly medium, subangular to subrounded quartz | 1.9 | 5.0 |
| Mercia Mudstone Group | Silty clay, red and greenish grey, marbled | 0.3+ | 5.3 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 17 | 81 | 2 | 2.2-3.1 | 17 | 14 | 66 | 1 | 2 | | |
| **b** | 13 | 44 | 43 | 3.1-4.1 | 14 | 13 | 31 | 7 | 19 | 16 | 0 |
| | | | | 4.1-5.0 | 12 | 5 | 22 | 9 | 24 | 25 | 3 |
| | | | | **Mean** | **13** | **9** | **27** | **8** | **21** | **21** | **1** |
| **a+b** | **14** | **56** | **30** | **2.2-5.0** | **14** | **11** | **39** | **6** | **15** | **14** | **1** |

**SP 17 NE 192 1557 7793 Widney Manor Station Block A**

Surface level +133 m (+436 ft)
Water struck at +126 m
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 3.7 m |
| Waste | 1.4 m |
| Mineral | 4.6 m |
| Bedrock | 0.5 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | **a** 'Very clayey' pebbly sand<br>Gravel: fine, subangular to well-rounded, mainly quartzite with quartz<br>Sand: fine and medium | 3.7 | 4.0 |
| | Silt, sandy, stonefree, brown | 1.4 | 5.4 |
| | **b** 'Very clayey' pebbly sand<br>Gravel: fine and coarse, subangular to well-rounded, mainly quartzite with quartz<br>Sand: medium | 3.1 | 8.5 |
| | **c** Gravel<br>Gravel: fine and coarse with cobbles, subangular to well-rounded, quartzite with quartz and some sandstone<br>Sand: medium and coarse | 1.5 | 10.0 |
| Mercia Mudstone Group | Mudstone, reddish brown with green sandstone | 0.5+ | 10.5 |

## GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 29 | 67 | 4 | 0.3-2.0 | 34 | 19 | 42 | 2 | 3 | 0 | 0 |
| | | | | 2.0-3.0 | 23 | 28 | 33 | 4 | 11 | 1 | 0 |
| | | | | 3.0-4.0 | 26 | 39 | 35 | 0 | 0 | 0 | 0 |
| | | | | **Mean** | **29** | **27** | **38** | **2** | **4** | **0** | **0** |
| **b** | 27 | 63 | 10 | 5.4-7.0 | 21 | 9 | 53 | 3 | 9 | 5 | 0 |
| | | | | 7.0-8.5 | 34 | 18 | 42 | 2 | 2 | 2 | 0 |
| | | | | **Mean** | **27** | **13** | **47** | **3** | **6** | **4** | **0** |
| **c** | 8 | 18 | 74 | 8.5-10.0 | 8 | 3 | 8 | 7 | 27 | 34 | 13 |
| **b+c** | **21** | **49** | **30** | **Mean** | **21** | **10** | **35** | **4** | **13** | **13** | **4** |
| **a-c** | **25** | **56** | **19** | **Mean** | **25** | **17** | **36** | **3** | **9** | **8** | **2** |

**SP 17 NE 193** **1706 7767** **Longdon Hall** **Block B**

Surface level +121 m (+397 ft)
Water struck at +120.9 m
203 mm shell
December 1980

Waste 3.3 m
Bedrock 2.2 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.1 | 0.1 |
| Glacial Sand and Gravel | Clay, sandy, yellow-brown with blue-grey gleying; rare subrounded to well-rounded pebbles, mainly quartzite and quartz | 2.7 | 2.8 |
| | 'Very clayey' sand with a few pebbles, brown; mainly medium | 0.5 | 3.3 |
| Mercia Mudstone Group | Mudstone, red-brown with green sandstone | 2.2+ | 5.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 22 | 77 | 1 | 2.8-3.3 | 22 | 27 | 48 | 2 | 1 | 0 | 0 |

**SP 17 NE 194** **1613 7682** **Widney Cottage** **Block B**

Surface level +135.0 m (+443 ft)
Water not encountered
203 mm shell
December 1980

Waste 1.8 m
Bedrock 2.7 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | Clay, sandy, stony, mottled grey to reddish brown; scattered, subangular to well-rounded pebbles, mainly quartzite and quartz | 1.4 | 1.8 |
| Mercia Mudstone Group | Mudstone, red-brown with green sandstone | 2.7+ | 4.5 |

**SP 17 NE 195** **1851 7701** **Kixley Wharf** **Block C**

Surface level +119 m (+390 ft)
Water struck at +117 m
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 0.5 m |
| Mineral | 1.5 m |
| Bedrock | 3.5 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Glacial Sand and Gravel | 'Very clayey' gravel<br>Gravel: fine and coarse, subangular to well-rounded, mainly quartzite with quartz<br>Sand: mainly medium | 1.5 | 2.0 |
| Mercia Mudstone Group | Mudstone, red and green | 3.5+ | 5.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 21 | 36 | 43 | 0.5-1.5 | 24 | 11 | 15 | 11 | 28 | 11 | 0 |
| | | | 1.5-2.0 | 16 | 5 | 24 | 6 | 18 | 31 | 0 |
| | | | **Mean** | **21** | **9** | **18** | **9** | **25** | **18** | **0** |

**SP 17 NE 196 1918 7662 Elvers Green Farm Block C**

Surface level +119 m (+390 ft)
Water not encountered
203 mm shell
December 1980

Waste 2.9 m
Bedrock 1.1 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Glacial Sand and Gravel | Clay, sandy, stony, mottled reddish brown to grey-green; scattered subrounded to well-rounded pebbles, mainly quartzite with quartz | 2.4 | 2.9 |
| Mercia Mudstone Group | Mudstone, red-brown with green sandstone | 1.1+ | 4.0 |

**SP 17 NE 197** **1974 7668** **Hall Farm** **Block C**

Surface level +98 m (+322 ft)
Water not encountered
203 mm shell
December 1980

| | |
|---|---|
| Waste | 3.6 m |
| Bedrock | 0.9 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground | 0.4 | 0.4 |
| River Terrace Deposits | Clay, stony, mottled yellow-brown to grey-brown; scattered subangular to well-rounded pebbles, mainly quartzite and quartz | 0.6 | 1.0 |
| | 'Very clayey' sandy gravel<br>Gravel: fine and coarse with cobbles, subrounded to well-rounded, mainly quartzite with quartz<br>Sand: fine and medium | 0.5 | 1.5 |
| | Clay, silty, blue-grey becoming brown with depth; rare well-rounded quartzite pebbles | 1.5 | 3.0 |
| | Clay, silty, black; scattered subrounded to well-rounded pebbles, mainly quartzite and quartz | 0.6 | 3.6 |
| Arden Sandstone | Mudstone, red-brown with green sandstone | 0.9+ | 4.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 23 | 54 | 23 | 1.0-1.5 | 23 | 21 | 31 | 2 | 6 | 6 | 11 |

**SP 17 NE 198 1596 7543 Four Ash Cottage Block B**

Surface level +133 m (+436 ft)
Water struck at +126.7 m
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 1.5 m |
| Mineral | 1.3 m |
| Waste | 3.5 m |
| Mineral | 4.9 m |
| Bedrock | 1.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Till | Clay, sandy, mottled yellow-brown to reddish brown; scattered subangular to well-rounded pebbles, mainly quartzite | 1.0 | 1.5 |
| Glacial Sand and Gravel | **a** 'Very clayey' sand with a few pebbles, reddish brown; medium | 1.3 | 2.8 |
| Till | Clay, sandy, yellowish brown to brown; rare subangular to well-rounded pebbles, mainly quartzite | 1.3 | 4.1 |
| ?Glacial Lake Deposits | Clay, silty, sand lenses, stonefree, red-brown | 2.2 | 6.3 |
| Glacial Sand and Gravel | **b** Gravel<br>Gravel: fine and coarse, subangular to well-rounded, quartzite with quartz and some mudstone, sandstone and igneous rock<br>Sand: medium | 4.9 | 11.2 |
| Mercia Mudstone Group | Mudstone, red-brown with green sandstone | 1.3+ | 12.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 23 | 75 | 2 | 1.5-2.8 | 23 | 16 | 59 | 0 | 2 | 0 | 0 |
| **b** | 9 | 39 | 52 | 6.3-7.5 | 12 | 5 | 19 | 3 | 18 | 43 | 0 |
| | | | | 7.5-8.5 | 2 | 1 | 6 | 5 | 31 | 55 | 0 |
| | | | | 8.5-11.2 | 11 | 14 | 34 | 5 | 15 | 21 | 0 |
| | | | | **Mean** | **9** | **9** | **25** | **5** | **19** | **33** | **0** |
| **a+b** | **12** | **47** | **41** | **Mean** | **12** | **11** | **32** | **4** | **15** | **26** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Other |
| **b** | 6.3-11.2 | 75 | 21 | 1 | - | - | 2 | 1 | 1 | - |

**SP 17 NE 199** **1900 7529** **Pear Tree Farm** **Block C**

Surface level +104 m (+341 ft)
Water struck at +99.2 m
203 mm shell
December 1980

| | |
|---|---|
| Waste | 3.8 m |
| Bedrock | 4.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground | 2.0 | 2.0 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: mainly fine, subangular to well-rounded, mainly quartzite with quartz<br>Sand: fine to coarse, angular to well-rounded | 0.8 | 2.8 |
| Till | Clay, silty, stony, mottled reddish-brown to grey; scattered subangular to well-rounded pebbles, mainly quartzite | 1.0 | 3.8 |
| Mercia Mudstone Group | Mudstone, sandy to 7.0 m, reddish brown with green sandstone | 4.2+ | 8.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 17 | 33 | 50 | 2.0-2.8 | 17 | 8 | 15 | 10 | 33 | 17 | 0 |

**SP 17 SW 186 1061 7435 Manor Farm** **Block A**

Surface level +147.3 m (+483 ft)
Water struck at +139.3 m
September 1982

| | |
|---|---|
| Overburden | 6.6 m |
| Mineral | 6.9 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, sandy, reddish brown, pebbly; pebbles of quartzite, quartz, red and green mudstone and coal | 6.2 | 6.6 |
| Glacial Sand and Gravel | **a** 'Clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace mudstone<br>Sand: fine and medium, subangular to subrounded quartz | 5.0 | 11.6 |
| | **b** Sandy gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace flint and mudstone<br>Sand: mainly medium, angular to subrounded quartz | 1.9 | 13.5 |
| Mercia Mudstone Group | Mudstone, reddish brown with green spots | 0.3+ | 13.8 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 18 | 73 | 9 | 6.6-7.6 | 24 | 26 | 22 | 7 | 18 | 3 | 0 |
| | | | | 7.6-8.6 | 15 | 26 | 49 | 2 | 5 | 3 | 0 |
| | | | | 8.6-9.6 | 14 | 26 | 58 | 2 | 0 | 0 | 0 |
| | | | | 9.6-11.6 | 18 | 31 | 40 | 3 | 4 | 4 | 0 |
| | | | | **Mean** | **18** | **28** | **42** | **3** | **6** | **3** | 0 |
| **b** | 4 | 63 | 33 | 11.6-12.6 | 3 | 12 | 30 | 8 | 22 | 25 | 0 |
| | | | | 12.6-13.5 | 6 | 14 | 58 | 6 | 10 | 6 | 0 |
| | | | | **Mean** | **4** | **13** | **43** | **7** | **17** | **16** | 0 |
| **a+b** | **14** | **71** | **15** | **6.6-13.5** | **14** | **24** | **43** | **4** | **9** | **6** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| | 9.6-11.6 | 47 | 43 | 8 | - | 0 | 2 | - | - | - |
| | 11.6-12.6 | 49 | 37 | 13 | - | 1 | trace | - | - | - |

**SP 17 SW 187** **1023 7306** **Small Lane** **Block A**

Surface level +154.9 m (+508 ft)
Water struck at +148.0 m
September 1982

| | |
|---|---|
| Waste | 9.9 m |
| Bedrock | 0.8 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, sandy, yellowish orange, laminated below 1.2 m; small quartzite pebbles and coal fragments | 3.7 | 4.0 |
| | Clay, moderate brown to greyish brown, pebbly; small pebbles of quartzite, quartz, red and green siltstones and coal | 2.9 | 6.9 |
| Glacial Sand and Gravel | 'Very clayey' sand<br>Sand: mainly medium, quartz<br>Fines: silty clay, moderate brown | 1.1 | 8.0 |
| Till | Clay, moderate brown, sandy with sporadic small pebbles | 1.9 | 9.9 |
| Mercia Mudstone Group | Mudstone, moderate brown with greenish grey spots | 0.8+ | 10.7 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 21 | 79 | 0 | 6.9-8.0 | 21 | 12 | 63 | 4 | 0 | | |

**SP 17 SW 188 1200 7354 Moat House Farm Block A**

Surface level +145.8 m (+478 ft)
Water struck at +138.0 m
August 1982

| | |
|---|---|
| Overburden | 5.4 m |
| Mineral | 3.3 m |
| Bedrock | 0.3 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Till | Clay, yellowish orange, pebbly; pebbles of quartzite, quartz and sandstone; sandy below 1.5 m | 1.6 | 1.8 |
| | Clay, reddish brown, pebbly; pebbles of quartzite, quartz, red siltstone, sandstone and coal. Below 3.5 m, layers of sand, laminated clay and light brown stony clay | 3.6 | 5.4 |
| Glacial Sand and Gravel | **a** 'Clayey' pebbly sand<br>Gravel: fine, rounded to well rounded quartzite and quartz with sandstone and flint<br>Sand: mainly medium, subangular to subrounded quartz | 1.6 | 7.0 |
| | **b** 'Clayey' sandy gravel<br>Gravel: fine and coarse, as above<br>Sand: fine to coarse, as above | 1.7 | 8.7 |
| Arden Sandstone | Silty clay, olive grey | 0.3+ | 9.0 |

## GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| a | 18 | 73 | 9 | 5.4-6.0 | 22 | 12 | 56 | 2 | 6 | 2 | 0 |
| | | | | 6.0-7.0 | 16 | 12 | 60 | 3 | 8 | 1 | 0 |
| | | | | **Mean** | **18** | **12** | **58** | **3** | **7** | **2** | **0** |
| b | 12 | 50 | 38 | 7.0-8.0 | 14 | 8 | 22 | 9 | 28 | 19 | 0 |
| | | | | 8.0-8.7 | 10 | 10 | 42 | 15 | 17 | 6 | 0 |
| | | | | **Mean** | **12** | **9** | **30** | **11** | **24** | **14** | **0** |
| **a+b** | **15** | **61** | **24** | **5.4-8.7** | **15** | **10** | **44** | **7** | **16** | **8** | **0** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 7.0-8.0 | 60 | 26 | 13 | - | 1 | trace | - | trace | - |

**SP 17 SW 189** **1324 7395** **Waring's Green Farm** **Block A**

Surface level +140.8 m (+462 ft)
Water struck at +135.9 m
August 1982

| | |
|---|---|
| Waste | 10.7 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| Till | Clay, yellowish orange, pebbly; pebbles of quartzite, quartz, red sandstone and siltstone and rare flint | 2.2 | 2.8 |
| | Clay, reddish brown, pebbly; pebbles of quartzite, quartz and red siltstone | 2.1 | 4.9 |
| Glacial Lake Deposits | Sandy silt, fine quartz sand with reddish brown silty clay | 4.0 | 8.9 |
| | Silt, reddish brown alternating with clay which is laminated in parts | 1.3 | 10.2 |
| | Clay, brown, laminated | 0.5 | 10.7 |
| Arden Sandstone | Silty clay, greenish grey | 0.3+ | 11.0 |

**SP 17 SW 190** **1433 7334** **Cheedon** **Block A**

Surface level +139.5 m (+458 ft)
Water struck at +136.1 m
August 1982

Waste 4.7 m
Bedrock 0.3 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish orange, pebbly; pebbles of quartzite, quartz, red sandstone and coal | 2.2 | 2.5 |
| | Clay, reddish brown with pebbles as above, sandy at base | 1.2 | 3.7 |
| Glacial Sand and Gravel | 'Clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite and quartz with some sandstone<br>Sand: mainly medium, subangular to subrounded quartz | 1.0 | 4.7 |
| Arden Sandstone | Mudstone, greenish grey | 0.3+ | 5.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 10 | 65 | 25 | 3.7-4.7 | 10 | 8 | 49 | 8 | 17 | 8 | 0 |

**SP 17 SW 191** **1364 7279** **Heathfield Farm** **Block A**

Surface level +140.4 m (+460 ft)
Water struck at +133.4 m
August 1982

| | |
|---|---|
| Overburden | 6.2 m |
| Mineral | 4.6 m |
| Bedrock | 0.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.7 | 0.7 |
| Till | Clay, yellowish orange with small pebbles of quartzite; weakly laminated | 1.8 | 2.5 |
| | Clay, reddish brown, pebbly; pebbles of quartzite, quartz, red and green siltstone and sandstone | 2.3 | 4.8 |
| | Clay, yellowish brown, stony; pebbles of quartzite and quartz; sandy at base | 1.4 | 6.2 |
| Glacial Sand and Gravel | **a** 'Clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace mudstone, ironstone and igneous rocks<br>Sand: fine and medium, subangular to subrounded quartz | 1.8 | 8.0 |
| | **b** Gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and trace green igneous rocks<br>Sand: fine and medium, angular to subrounded quartz | 2.8 | 10.8 |
| Arden Sandstone | Mudstone, reddish brown with bands of greyish yellow silty clay | 0.2+ | 11.0 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 18 | 66 | 16 | 6.2-7.0 | 21 | 24 | 38 | 2 | 7 | 8 | 0 |
| | | | | 7.0-7.8 | 15 | 13 | 50 | 5 | 9 | 8 | 0 |
| | | | | **Mean** | **18** | **18** | **45** | **3** | **8** | **8** | **0** |
| **b** | 4 | 47 | 49 | 8.0-9.0 | 6 | 9 | 36 | 8 | 18 | 23 | 0 |
| | | | | 9.0-10.0 | 1 | 6 | 30 | 9 | 28 | 25 | 1 |
| | | | | 10.0-10.8 | 4 | 11 | 24 | 8 | 30 | 23 | 0 |
| | | | | **Mean** | **4** | **9** | **30** | **8** | **25** | **24** | **trace** |
| **a+b** | **9** | **55** | **36** | **6.2-10.8** | **9** | **12** | **37** | **6** | **18** | **18** | **trace** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 8.0-9.0 | 57 | 30 | 12 | - | - | 1 | trace | trace | - |
| 10.0-10.8 | 53 | 34 | 13 | - | - | trace | trace | trace | - |

**SP 17 SW 192** **1264 7166** **Brown's Green Wood** **Block B**

Surface level +147.7 m (+485 ft)
Water not encountered
August 1982

Waste 5.5 m
Bedrock 0.8 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, strong brown, silty | 1.7 | 2.0 |
| | Clay, moderate brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green siltstone | 3.5 | 5.5 |
| Mercia Mudstone Group | Silty clay, yellowish green with red streaks | 0.8+ | 6.3 |

**SP 17 SW 193 1038 7001 Alderhanger Wood Block B**

Surface level +155.2 m (+509 ft)
Water struck at +147.9 m
August 1982

| | |
|---|---|
| Waste | 8.2 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz, coal and red and green sandstone | 5.1 | 5.4 |
| | Clay, sandy, greyish green, stony; pebbles of quartz and sandstone | 2.3 | 7.7 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite and quartz with sandstone and some green igneous rocks<br>Sand: fine to coarse, subangular to subrounded, quartz | 0.5 | 8.2 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.3+ | 8.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 6 | 38 | 56 | 7.7-8.2 | 6 | 7 | 25 | 6 | 26 | 30 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 7.7-8.2 | 51 | 32 | 14 | - | - | - | - | 3 | - |

**SP 17 SW 194** **1042 7116** **Gilbert's Green** **Block B**

Surface level +155.5 m (+510 ft)
Water not encountered
January 1983

| | |
|---|---|
| Overburden | 3.5 m |
| Mineral | 2.5 m |
| Waste | 0.2 m |
| Bedrock | 2.8 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground | 0.3 | 0.3 |
| Till | Clay, reddish brown to grey-brown with pebbles of quartzite | 3.2 | 3.5 |
| Glacial Sand and Gravel | **a** 'Clayey' pebbly sand<br>Gravel: fine and coarse, quartzite<br>Sand: mainly medium, subrounded quartz | 0.5 | 4.0 |
| | **b** 'Clayey' gravel<br>Gravel: fine and coarse, well rounded quartzite and quartz with sandstone and trace flint, igneous rocks and mudstone<br>Sand: fine to medium, angular quartz | 2.0 | 6.0 |
| ?Till | Clay, reddish with quartzite pebbles | 0.2 | 6.2 |
| Arden Sandstone | Clay, orangy brown and reddish | 2.8+ | 9.0 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 17 | 78 | 5 | 3.5-4.0 | 17 | 19 | 56 | 3 | 3 | 2 | 0 |
| **b** | 15 | 37 | 48 | 4.0-5.0 | 16 | 6 | 25 | 5 | 23 | 23 | 2 |
| | | | | 5.0-6.0 | 13 | 6 | 23 | 8 | 29 | 21 | 0 |
| | | | | **Mean** | **15** | **6** | **25** | **6** | **25** | **22** | **1** |
| **a+b** | **15** | **45** | **40** | **3.5-6.0** | **15** | **9** | **31** | **5** | **21** | **18** | **1** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| | 4.0-5.0 | 50 | 32 | 13 | - | 1 | 1 | - | 2 | 1 |
| | 5.0-6.0 | 48 | 28 | 19 | - | 1 | 1 | - | 3 | 0 |

**SP 17 SW 195 1394 7103 Umberslade Park Block B**

Surface level +141.4 m (+464 ft)
Water level not recorded
January 1983

| | |
|---|---|
| Overburden | 3.2 m |
| Mineral | 1.0 m |
| Waste | 0.8 m |
| Mineral | 4.0 m |
| Bedrock | 0.1 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, red-brown with pebbles of quartzite | 2.8 | 3.2 |
| Glacial Sand and Gravel | **a** 'Very clayey' gravel<br>Gravel: fine and coarse, well rounded quartzite and quartz with sandstone and some igneous rocks and trace flint<br>Sand: medium with fine, subangular to rounded quartz | 1.0 | 4.2 |
| ?Till | Clay, red and grey with quartzite pebbles | 0.8 | 5.0 |
| Glacial Sand and Gravel | **b** Sandy gravel<br>Gravel: fine with coarse, well rounded quartzite and quartz with sandstone and some ironstone, flint, mudstone and igneous rocks<br>Sand: mainly medium, subangular to subrounded, quartz | 4.0 | 9.0 |
| Arden Sandstone | Mudstone, grey and red | 0.1+ | 9.1 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 20 | 39 | 41 | 3.2-4.2 | 20 | 12 | 21 | 6 | 17 | 24 | 0 |
| **b** | 6 | 63 | 31 | 5.0-6.0 | 14 | 8 | 33 | 12 | 26 | 7 | 0 |
| | | | | 6.0-7.0 | 6 | 5 | 49 | 16 | 19 | 5 | 0 |
| | | | | 7.0-8.0 | 3 | 9 | 55 | 11 | 16 | 6 | 0 |
| | | | | 8.0-9.0 | 2 | 5 | 33 | 13 | 26 | 21 | 0 |
| | | | | **Mean** | **6** | **7** | **43** | **13** | **21** | **10** | **0** |
| **a+b** | **9** | **58** | **33** | **Mean** | **9** | **8** | **38** | **12** | **20** | **13** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 3.2-4.2 | 47 | 32 | 18 | - | 1 | 0 | 0 | 2 | 0 |
| 5.0-6.0 | 52 | 24 | 18 | - | 0 | 1 | 0 | 4 | 1 |
| 6.0-7.0 | 37 | 28 | 17 | - | 4 | 3 | 8 | 3 | 0 |
| 7.0-8.0 | 45 | 31 | 22 | - | 0 | 0 | 1 | 1 | 0 |
| 8.0-9.0 | 47 | 35 | 12 | - | 1 | 1 | 1 | 3 | 0 |

SP 17 SW 196 1478 7217 **Nuthurst** **Block A**

Surface level +137.6 m (+452 ft)
Water struck at +134.1 m
January 1983

| | |
|---|---|
| Overburden | 2.4 m |
| Mineral | 4.9 m |
| Waste | 0.7 m |
| Bedrock | 1.5 m |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Till | Clay, reddish with pebbles of sandstone and quartzite | 2.2 | 2.4 |
| Glacial Sand and Gravel | **a** 'Clayey' sandy gravel<br>Gravel: fine and coarse, well rounded quartzite and quartz with sandstone and igneous rocks<br>Sand: fine and medium, angular to subangular quartz | 1.0 | 3.4 |
| | **b** Pebbly sand<br>Gravel: fine, well rounded quartzite<br>Sand: fine and medium, subrounded to rounded quartz | 3.4 | 6.8 |
| | **c** Gravel<br>Gravel: fine and coarse, rounded quartzite and quartz with sandstone and some igneous rocks<br>Sand: fine and medium, angular to subrounded quartz | 0.5 | 7.3 |
| ?Till | Clay, grey with brown mottling | 0.7 | 8.0 |
| Arden Sandstone | Mudstone, brown and grey, bedded | 1.5+ | 9.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 17 | 51 | 32 | 2.4-3.4 | 17 | 12 | 35 | 4 | 16 | 16 | 0 |
| **b** | 5 | 87 | 8 | 3.4-4.4 | 7 | 28 | 53 | 2 | 7 | 3 | 0 |
| | | | | 4.4-5.4 | 5 | 33 | 59 | 1 | 2 | 0 | 0 |
| | | | | 5.4-6.8 | 5 | 33 | 49 | 3 | 7 | 3 | 0 |
| | | | | **Mean** | **5** | **31** | **54** | **2** | **6** | **2** | **0** |
| **c** | 7 | 43 | 50 | 6.8-7.3 | 7 | 14 | 22 | 7 | 23 | 27 | 0 |
| **a to c** | **8** | **76** | **16** | **2.4-7.3** | **8** | **26** | **47** | **3** | **9** | **7** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 2.4-3.4 | 47 | 30 | 13 | - | - | 1 | - | 6 | 3 |
| 6.8-7.3 | 54 | 31 | 11 | - | - | 0 | - | 3 | 1 |

**SP 17 SE 64** **1974 7444** **Meres Bridge** **Block D**

Surface level +108.6 m (+356 ft)
Water not encountered
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 1.5 m |
| Mineral | 6.2 m |
| Bedrock | 0.8 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Glacial Sand and Gravel | Silt, sandy, pebbly, brown; subangular to well rounded quartzite and quartz clasts | 1.0 | 1.5 |
| | **a** 'Clayey' sand, brown; fine and medium, angular to well rounded | 5.8 | 7.3 |
| | **b** Gravel<br>Gravel: mainly coarse with cobbles, subangular to well rounded, quartzite with quartz<br>Sand: fine | 0.4 | 7.7 |
| Mercia Mudstone Group | Mudstone, red-brown with green sandstone | 0.8+ | 8.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 14 | 86 | 0 | 1.5-3.0 | 17 | 49 | 32 | 1 | 0 | 0 | 0 |
| | | | | 3.0-5.0 | 14 | 45 | 40 | 1 | 0 | 0 | 0 |
| | | | | 5.0-7.3 | 11 | 42 | 46 | 1 | 0 | 0 | 0 |
| | | | | **Mean** | **14** | **45** | **40** | **1** | **0** | **0** | **0** |
| **b** | 7 | 46 | 47 | 7.3-7.7 | 7 | 29 | 9 | 8 | 11 | 28 | 8 |
| **a+b** | **13** | **83** | **4** | **Mean** | **13** | **44** | **38** | **1** | **1** | **2** | **1** |

**SP 17 SE 73 1506 7435 Box Trees Block B**

Surface level +139.2 m (+457 ft)
Water not encountered
September 1982

Waste 0.6 m
Bedrock 2.8 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.1 | 0.1 |
| Till | Clay, yellowish orange, stony; pebbles of red and green mudstone | 0.5 | 0.6 |
| Arden Sandstone | Silty clay, greyish brown | 1.7 | 2.3 |
| | Siltstone, greenish grey | 1.1+ | 3.4 |

SP 17 SE 74 1726 7443 Dorridge Wood Block B

Surface level +123.6 m (+405 ft)
Water struck at +114.9 m
September 1982

| | |
|---|---|
| Overburden | 4.0 m |
| Mineral | 5.8 m |
| Bedrock | 0.8 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, moderate brown, with pebbles of red and green siltstone and quartzite | 3.6 | 4.0 |
| Glacial Sand and Gravel | 'Very clayey' pebbly sand<br>Gravel: fine with coarse, subrounded to rounded, quartzite, quartz with sandstone and some limestone, mudstone and igneous rocks<br>Sand: mainly medium, subangular to subrounded quartz | 5.8 | 9.8 |
| Arden Sandstone | Mudstone/siltstone, greenish grey | 0.8+ | 10.6 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 20 | 60 | 20 | 4.0-5.0 | 14 | 11 | 32 | 8 | 21 | 14 | 0 |
| | | | 5.0-5.3 | 17 | 10 | 34 | 9 | 20 | 10 | 0 |
| | | | 5.3-6.0 | 21 | 8 | 37 | 7 | 20 | 7 | 0 |
| | | | 6.0-7.0 | 19 | 10 | 48 | 5 | 10 | 8 | 0 |
| | | | 7.0-8.0 | 18 | 9 | 56 | 4 | 8 | 5 | 0 |
| | | | 8.0-9.0 | 25 | 17 | 38 | 3 | 10 | 7 | 0 |
| | | | 9.0-9.8 | 24 | 9 | 58 | 2 | 6 | 1 | 0 |
| | | | **Mean** | **20** | **11** | **44** | **5** | **13** | **7** | **0** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 4.0-5.0 | 45 | 36 | 14 | 2 | - | 2 | - | 1 | - |

**SP 17 SE 75** **1840 7324** **Chessetts Wood** **Block D**

Surface level +124.0 m (+407 ft)
Water struck at +116.1 m
September 1982

| | |
|---|---|
| Overburden | 5.5 m |
| Mineral | 1.9 m |
| Waste | 0.5 m |
| Mineral | 1.0 m |
| Waste | 5.4 m |
| Bedrock | 0.2 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Till | Clay, reddish brown, stony | 2.7 | 3.2 |
| Glacial Lake Deposit | Clay, reddish brown, laminated and with fine quartz sandy silt from 3.9-5.5 m | 2.3 | 5.5 |
| Glacial Sand and Gravel | **a** 'Clayey' sand<br>Sand: fine and medium, quartz<br>Fines: light brown, silty clay | 1.9 | 7.4 |
| Glacial Lake Deposit | Clay and silt, moderate brown, laminated | 0.5 | 7.9 |
| Glacial Sand and Gravel? | **b** 'Very clayey' sand<br>Sand: fine quartz<br>Fines: greyish red silt and clay | 1.0 | 8.9 |
| Glacial Lake Deposit | Sandy silt, light brown with fine quartz sand | 0.8 | 9.7 |
| | Clay, moderate brown, laminated | 0.5 | 10.2 |
| | Silt, moderate brown, laminated | 3.4 | 13.6 |
| | 'Very clayey' gravel<br>Gravel: coarse with fine, subangular to subrounded quartzite, quartz and sandstone with mudstone<br>Sand: mainly medium, subangular to subrounded quartz | 0.7 | 14.3 |
| Mercia Mudstone Group | Mudstone, moderate brown with greenish grey spots | 0.2+ | 14.5 |

## GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 18 | 82 | 0 | 5.5-7.4 | 18 | 60 | 21 | 1 | 0 | 0 | 0 |
| **b** | 37 | 63 | 0 | 7.9-8.9 | 37 | 57 | 5 | 1 | 0 | 0 | 0 |
| | 29 | 33 | 38 | 13.6-14.3 | 29 | 5 | 22 | 6 | 12 | 26 | 0 |
| **a+b** | **25** | **75** | **0** | **Mean** | **23** | **58** | **18** | **1** | **0** | **0** | **0** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 13.6-14.3 | 47 | 22 | 28 | trace | - | 3 | - | - | - |

**SP 17 SE 76** **1957 7396** **Meres Farm** **Block D**

Surface level +103.4 m (+339 ft)
Water struck at +99.4 m
September 1982

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 7.6 m |
| Bedrock | 2.5 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | **a** 'Clayey' pebbly sand<br>Gravel: fine and coarse, subrounded to well rounded quartzite and quartz with red sandstone and some mudstone<br>Sand: fine and medium, subangular to subrounded, quartz | 6.2 | 6.5 |
| | **b** Gravel<br>Gravel: coarse and fine, rounded to well rounded, quartzite and quartz with some red sandstone and flint | 1.4 | 7.9 |
| Mercia Mudstone Group | Mudstone, reddish brown and greenish grey, shaley | 2.5+ | 10.4 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 17 | 74 | 9 | 0.3-0.7 | 19 | 17 | 37 | 27 | 0 | 0 | 0 |
| | | | | 0.7-1.7 | 32 | 26 | 34 | 2 | 3 | 3 | 0 |
| | | | | 1.7-2.7 | 18 | 23 | 21 | 7 | 7 | 24 | 0 |
| | | | | 2.7-3.7 | 15 | 39 | 43 | 1 | 1 | 1 | 0 |
| | | | | 3.7-4.7 | 9 | 26 | 60 | 2 | 3 | 0 | 0 |
| | | | | 4.7-5.7 | 13 | 49 | 36 | 1 | 0 | 1 | 0 |
| | | | | 5.7-6.5 | 13 | 35 | 32 | 1 | 8 | 11 | 0 |
| | | | | **Mean** | **17** | **32** | **38** | **4** | **3** | **6** | **0** |
| **b** | 1 | 36 | 63 | 6.5-7.9 | 1 | 8 | 24 | 4 | 24 | 39 | 0 |
| **a+b** | **15** | **68** | **17** | **0.3-7.9** | **15** | **29** | **35** | **4** | **6** | **11** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 5.7-6.7 | 48 | 37 | 12 | - | - | 2 | - | 1 | - |

**SP 17 SE 77** **1547 7167** **Spring Cottage** **Block B**

Surface level +136.9 m (+449 ft)
Water not encountered
August 1982

Waste 1.8 m
Bedrock 0.7 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, silty, yellowish orange, stony; pebbles of quartzite and quartz | 1.5 | 1.8 |
| Arden Sandstone | Clay, reddish brown and pale green | 0.7+ | 2.5 |

**SP 17 SE 78** **1750 7180** **Pool Tail Coppice** **Block B**

Surface level +132.2 m (+434 ft)
Water not encountered
August 1982

Waste 5.6 m
Bedrock 0.4 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Till | Clay, reddish brown, stony and sandy; pebbles of quartz and quartzite | 2.3 | 2.5 |
| | Clay, reddish brown, laminated, stony; pebbles of pale green siltstone and sandstone | 3.1 | 5.6 |
| Mercia Mudstone Group | Mudstone, reddish brown with pale green spots | 0.4+ | 6.0 |

SP 17 SE 79 1913 7123 **Kingswood House** **Block D**

Surface level +102.4 m (+336 ft)
Water struck at +99.4 m
August 1982

| | |
|---|---|
| Overburden | 2.1 m |
| Mineral | 11.9 m |
| Waste | 0.5 m |
| Bedrock | 0.5 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | Clay, yellowish orange, sandy with small quartzite and quartz pebbles | 1.8 | 2.1 |
| | **a** Sand, fine and medium, quartz | 5.0 | 7.1 |
| | **b** 'Clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and ironstone and some igneous rocks and mudstone<br>Sand: fine and medium, subangular to subrounded, quartz | 3.0 | 10.1 |
| | **c** 'Clayey' sand, fine and medium, subangular to subrounded, quartz | 3.9 | 14.0 |
| Glacial Lake Deposit | Clay, brown, weakly laminated | 0.5 | 14.5 |
| Mercia Mudstone Group | Sandstone, greyish green, fine quartz sand | 0.5+ | 15.0 |

## GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 8 | 90 | 2 | 2.1-3.1 | 9 | 39 | 48 | 1 | 2 | 1 | 0 |
| | | | | 3.1-4.1 | 10 | 44 | 43 | 1 | 1 | 1 | 0 |
| | | | | 4.1-5.1 | 5 | 56 | 37 | 1 | 1 | 0 | 0 |
| | | | | 5.1-6.1 | 5 | 46 | 46 | 1 | 1 | 1 | 0 |
| | | | | 6.1-7.1 | 13 | 63 | 22 | 1 | 1 | 0 | 0 |
| | | | | **Mean** | **8** | **50** | **39** | **1** | **1** | **1** | **0** |
| **b** | 14 | 73 | 13 | 7.1-8.1 | 5 | 45 | 31 | 2 | 8 | 9 | 0 |
| | | | | 8.1-9.1 | 17 | 44 | 20 | 3 | 6 | 8 | 2 |
| | | | | 9.1-10.1 | 21 | 45 | 26 | 2 | 1 | 5 | 0 |
| | | | | **Mean** | **14** | **45** | **26** | **2** | 5 | **7** | **1** |
| **c** | 13 | 87 | 0 | 10.1-11.1 | 12 | 54 | 33 | 1 | 0 | 0 | 0 |
| | | | | 11.1-12.1 | 12 | 50 | 36 | 2 | 0 | 0 | 0 |
| | | | | 12.1-14.0 | 14 | 42 | 41 | 3 | 0 | 0 | 0 |
| | | | | **Mean** | **13** | **47** | **38** | **2** | **0** | **0** | **0** |
| **a to c** | 11 | **85** | **4** | **2.1-14.0** | 11 | **48** | **35** | **2** | **2** | **2** | **trace** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 8.1-9.1 | 49 | 29 | 9 | - | - | 2 | 8 | 3 | - |

**SP 25 NW 64** **2344 5955** **North-east of Black Hill** **Block $F_6$**

Surface level +95.4 m (+313 ft)
Water not encountered
January 1983

| | |
|---|---|
| Overburden | 1.2 m |
| Mineral | 5.0 m |
| Bedrock | 0.8 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, sandy at base | 0.9 | 1.2 |
| Glacial Sand and Gravel | a Sand, fine and medium, angular to subrounded quartz | 2.0 | 3.2 |
| | b 'Clayey' pebbly sand<br>Gravel: fine and coarse, well rounded quartzite, quartz and limestone with sandstone and ironstone and trace flint and mudstone<br>Sand: fine to coarse, angular to subrounded, quartz | 3.0 | 6.2 |
| Mercia Mudstone Group | Marl, red | 0.8+ | 7.0 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | -1/16 | +1/16 -1/4 | +1/4 -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| a | 5 | 95 | 0 | 1.2-2.2 | 0 | 80 | 19 | 1 | 0 | 0 | 0 |
| | | | | 2.2-3.2 | 9 | 55 | 36 | 0 | 0 | 0 | 0 |
| | | | | **Mean** | **5** | **67** | **27** | **1** | **0** | **0** | **0** |
| b | 14 | 59 | 27 | 3.2-4.2 | 14 | 8 | 27 | 16 | 20 | 15 | 0 |
| | | | | 4.2-5.2 | 11 | 13 | 28 | 16 | 17 | 15 | 0 |
| | | | | 5.2-6.2 | 17 | 15 | 38 | 17 | 13 | 0 | 0 |
| | | | | **Mean** | **14** | **12** | **30** | **17** | **17** | **10** | **0** |
| a+b | 11 | 73 | 16 | 1.2-6.2 | 11 | 34 | 29 | 10 | 10 | 6 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 3.2-4.2 | 33 | 18 | 10 | 29 | 0 | trace | 10 | trace | - |
| 4.2-5.2 | 30 | 21 | 11 | 32 | 1 | 1 | 4 | 0 | - |

**SP 26 NW 82** **2245 6979** **Five Ways** **Block E**

Surface level +124.3 m (+408 ft)
Water struck at +108.3 m
September 1982

Waste 23.0 m
Bedrock 0.2 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, brown and yellowish brown, stony; pebbles of chalk, quartzite, quartz, flint and sandstone | 2.6 | 2.9 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, red and green mudstone and coal | 1.6 | 4.5 |
| | Silty clay, reddish brown, laminated in parts | 3.0 | 7.5 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, red and green siltstone/ sandstone | 6.3 | 13.8 |
| Glacial Lake Deposits? | Silty clay, silt and sand, reddish brown, laminated | 9.2 | 23.0 |
| Mercia Mudstone Group | Mudstone, reddish brown with green spots | 0.2+ | 23.2 |

**SP 26 NW 83 2152 6887 Oldfield Block E**

Surface level +101.4 m (+333 ft)
Water not encountered
August 1982

Waste 1.8 m
Bedrock 0.8 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| River Terrace Deposits | Silty clay, sandy, grey-brown | 0.3 | 0.9 |
| | Sandy clay, reddish brown, stony; pebbles of quartzite and quartz | 0.9 | 1.8 |
| Mercia Mudstone Group | Mudstone, reddish brown | 0.8+ | 2.6 |

**SP 26 NW 84** **2215 6831** **Highland House** **Block E**

Surface level +125.8 m (+413 ft)
Water struck at +119.0 and +107.6 m

Waste 20.1 m
Bedrock 0.4 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; with pebbles of quartzite, quartz, sandstone, coal and red and green mudstone | 6.5 | 6.8 |
| | Sandy silt, reddish brown, laminated | 0.7 | 7.5 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green siltstone | 10.7 | 18.2 |
| | Silty sand and silty clay, laminated | 0.3 | 18.5 |
| Glacial Sand and Gravel | Pebbly sand<br>Gravel: fine and coarse, rounded quartzite and quartz and some green sandstone<br>Sand: fine and medium, subangular to subrounded, quartz | 1.6 | 20.1 |
| Arden Sandstone | Mudstone, reddish brown with greyish green spots | 0.4+ | 20.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 5 | 86 | 9 | 18.5-20.1 | 9 | 31 | 52 | 3 | 3 | 2 | 0 |

**SP 26 NW 85 2256 6727 Little Shrewley Block E**

Surface level +110.5 m (+363 ft)
Water struck at +102.5 m
September 1982

| | |
|---|---|
| Overburden | 5.7 m |
| Mineral | 14.3 m |
| Waste | 1.0 m |
| Bedrock | 1.0 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Sand and Gravel | Clay, sandy and silty, reddish brown, laminated | 2.3 | 2.5 |
| | Sandy silt, fine quartz sand and reddish brown silty clay, laminated in parts | 3.2 | 5.7 |
| | 'Clayey' sand, fine and medium, subangular to subrounded quartz | 14.3 | 20.0 |
| Glacial Lake Deposits | Clay, reddish brown, silty with rare pebbles in upper part | 1.0 | 21.0 |
| Mercia Mudstone Group | Mudstone, moderate brown with greyish green spots | 1.0+ | 22.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 19 | 80 | 1 | 5.7-6.5 | 19 | 36 | 44 | 1 | 0 | 0 | 0 |
| | | | 6.5-6.7 | 19 | 32 | 49 | 0 | 0 | 0 | 0 |
| | | | 6.7-7.7 | 18 | 29 | 53 | 0 | 0 | 0 | 0 |
| | | | 7.7-8.7 | 21 | 39 | 39 | 1 | 0 | 0 | 0 |
| | | | 8.7-9.7 | 26 | 40 | 34 | 0 | 0 | 0 | 0 |
| | | | 9.7-10.7 | 18 | 35 | 47 | 0 | 0 | 0 | 0 |
| | | | 10.7-12.7 | 20 | 33 | 47 | 0 | 0 | 0 | 0 |
| | | | 12.7-14.7 | 21 | 25 | 51 | 1 | 1 | 1 | 0 |
| | | | 14.7-16.7 | 22 | 18 | 53 | 2 | 3 | 2 | 0 |
| | | | 16.7-18.7 | 17 | 14 | 67 | 2 | 0 | 0 | 0 |
| | | | 18.7-20.0 | 13 | 23 | 63 | 1 | 0 | 0 | 0 |
| | | | **Mean** | **19** | **27** | **52** | **1** | **1** | **trace** | **0** |

**SP 26 NW 86 2344 6759 Haseley** **Block E**

Surface level +116.4 m (+382 ft)
Water struck at +102.4 m
September 1982

Waste 15.1 m
Bedrock 0.2 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| Glacial Sand and Gravel | Clay, sandy and stony; pebbles of quartzite, quartz and red sandstone | 3.6 | 3.6 |
| | 'Very clayey' sand, fine and medium, subangular to subrounded, quartz | 1.1 | 4.7 |
| Glacial Lake Deposits | Silt, sandy, moderate brown, laminated | 9.2 | 13.9 |
| Till? | Clay, silty, sandy, moderate brown, stony; pebbles of quartz, sandstone and coal | 1.2 | 15.1 |
| Mercia Mudstone Group | Mudstone, reddish brown with greyish green spots | 0.2+ | 15.3 |

GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 22 | 78 | 0 | 3.6-4.7 | 22 | 34 | 44 | trace | 0 | | |

**SP 26 NW 87** **2060 6686** **Holly Farm** **Block E**

Surface level +119.7 m (+393 ft)
Water struck at +116.9, 112.2 and 105.9 m
September 1982

Waste 15.6 m
Bedrock 0.1 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| Till | Clay, moderate brown, sandy and silty, stony; pebbles of sandstone, quartz and coal | 2.1 | 2.7 |
| | Sand, fine and medium, quartz | 0.7 | 3.4 |
| | Clay, moderate brown, sandy, silty, stony; pebbles of quartzite, quartz and sandstone | 2.3 | 5.7 |
| Glacial Lake Deposits? | Clay and silt, moderate brown, laminated; sandy at base | 1.8 | 7.5 |
| Glacial Sand and Gravel | 'Very clayey' sand, fine and medium, quartz with bands of laminated silt and clay | 1.2 | 8.7 |
| Glacial Lake Deposits | Clay, moderate brown, with yellowish brown silt, laminated | 5.1 | 13.8 |
| Glacial Sand and Gravel | 'Very clayey' sandy gravel<br>Gravel: fine with coarse, subrounded sandstone and quartzite with quartz and some mudstone<br>Sand: fine to coarse, quartz<br>Fines: silt and clay, moderate brown | 1.2 | 15.0 |
| Glacial Lake Deposits | Clay, moderate brown, laminated; with layers of fine quartz sand | 0.6 | 15.6 |
| Mercia Mudstone Group | Sandstone, greyish green, fine grained quartz | 0.1+ | 15.7 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 24 | 76 | 0 | 7.5-8.7 | 24 | 62 | 14 | trace | 0 | 0 | 0 |
| 39 | 44 | 17 | 13.8-15.0 | 39 | 27 | 11 | 6 | 12 | 5 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 13.8-15.0 | 25 | 10 | 60 | - | - | 4 | - | 1 | - |

**SP 26 NW 88** **2306 6542** **Little Nunhold Farm** **Block E**

Surface level +113.1 m (+371 ft)
Water not encountered
September 1982

Waste 1.6 m
Bedrock 0.4 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, silty and sandy, moderate brown, stony | 0.8 | 1.2 |
| Glacial Sand and Gravel | 'Clayey' sand, medium quartz with reddish brown silty clay | 0.4 | 1.6 |
| Mercia Mudstone Group | Mudstone, reddish brown, shaley | 0.4+ | 2.0 |

**SP 26 NW 89** **2069 6549** **Manor House** **Block E**

Surface level +121.9 m (+400 ft) Waste 2.5 m+
Water not encountered
January 1983

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, moderate brown with pebbles of green siltstone and mudstone | 2.2+ | 2.5 |

**SP 26 NW 90 2044 6534 North of Claverdon Leys Block E**

Surface level +122.8 m (+403 ft)
Water not encountered
January 1983

Waste 3.2 m
Bedrock 0.8 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.8 | 0.8 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz and flint | 2.4 | 3.2 |
| Mercia Mudstone Group | Mudstone, reddish brown with grey mottling | 0.8+ | 4.0 |

**SP 26 SW 49** **2100 6477** **East of Claverdon Leys** **Block $F_4$**

Surface level +99.3 m (+326 ft)
Water not encountered
September 1981

| | |
|---|---|
| Waste | 2.4 m |
| Bedrock | 0.4 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite and quartz with sandstone and some subangular to subrounded flint and igneous rocks<br>Sand: fine to coarse, subangular to subrounded quartz | 0.9 | 1.2 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz and flint | 1.2 | 2.4 |
| Mercia Mudstone Group | Mudstone, reddish brown with pale green spots | 0.4+ | 2.8 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 17 | 24 | 59 | 0.3-1.2 | 17 | 7 | 12 | 5 | 29 | 30 | 0 |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.2 | 62 | 20 | 12 | - | 3 | - | - | 2 | 1 |

**SP 26 SW 50** **2035 6425** **East of Park Farm** **Block $F_4$**

Surface level +104.6 m (+343 ft)
Water not encountered
September 1981

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 4.7 m |
| Bedrock | 0.7 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Very clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite with quartz and sandstone and some subangular flint and igneous rocks<br>Sand: mainly medium, subangular to subrounded, quartz | 4.7 | 5.0 |
| Mercia Mudstone Group | Clay, reddish brown with pale green fisheyes | 0.7+ | 5.7 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 24 | 47 | 29 | 0.3-1.3 | 27 | 8 | 38 | 5 | 11 | 11 | 0 |
| | | | 1.3-2.5 | 27 | 4 | 28 | 12 | 15 | 14 | 0 |
| | | | 2.5-2.9 | 20 | 6 | 71 | 1 | 0 | 2 | 0 |
| | | | 2.9-3.9 | 19 | 8 | 18 | 9 | 21 | 25 | 0 |
| | | | 3.9-5.0 | 26 | 6 | 26 | 9 | 12 | 21 | 0 |
| | | | **Mean** | **24** | **6** | **33** | **8** | **13** | **16** | **0** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.3 | 56 | 18 | 17 | - | 7 | 0 | 2 | 0 | - |
| 1.3-2.5 | 47 | 34 | 11 | - | 7 | 1 | 0 | 0 | - |
| 2.9-3.9 | 62 | 18 | 14 | - | 3 | 1 | 1 | 1 | - |
| 3.9-5.0 | 71 | 5 | 8 | - | 15 | 1 | 0 | 0 | - |
| **Mean** | **60** | **18** | **12** | - | **8** | **1** | **1** | **trace** | - |

**SP 26 SW 51** **2015 6388** **South of Park Farm** **Block $F_4$**

Surface level +99.9 m (+328 ft)
Water not encountered
September 1981

Waste 1.3 m
Bedrock 1.8 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Glacial Sand and Gravel | Clay, reddish brown with yellowish grey mottling | 0.8 | 1.3 |
| Arden Sandstone | Clay, reddish brown with green sandy lenses | 1.8+ | 3.1 |

**SP 26 SW 52** **2160 6455** **Claverdon Lodge** **Block $F_5$**

Surface level +103.7 m (+340 ft)
Water not encountered
September 1981

Waste 2.1 m
Bedrock 1.0 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.5 | 0.5 |
| Glacial Sand and Gravel | Clay, reddish brown to yellowish brown, with layers of medium quartz sand | 1.6 | 2.1 |
| Mercia Mudstone Group | Clay, red-brown with green fisheyes | 1.0+ | 3.1 |

**SP 26 SW 53** **2148 6434** **Cuttshill Farm** **Block $F_5$**

Surface level +103.7 m (+340 ft)
Water not encountered
September 1981

| | |
|---|---|
| Overburden | 0.2 m |
| Mineral | 1.1 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone<br>Sand: fine to coarse, subangular to subrounded, quartz | 1.1 | 1.3 |
| Mercia Mudstone Group | Mudstone, reddish brown | 0.3+ | 1.6 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 11 | 25 | 64 | 0.2-1.3 | 11 | 7 | 8 | 10 | 38 | 26 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.2-1.3 | 60 | 31 | 8 | - | - | trace | - | - | 1 |

**SP 26 SW 54** **2125 6405** **South of Cophill Farm** **Block $F_5$**

Surface level +111.7 m (+366 ft)
Water struck at +107.7 m
September 1981

| | |
|---|---|
| Overburden | 0.7 m |
| Mineral | 4.0 m |
| Bedrock | 1.7 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.7 | 0.7 |
| Glacial Sand and Gravel | **a** 'Very clayey' sand<br>Sand: fine and medium, subangular to subrounded quartz<br>Fines: reddish brown | 0.7 | 1.4 |
| | **b** 'Clayey' sandy gravel<br>Gravel: fine with coarse, rounded to well rounded quartzite with quartz and sandstone and some igneous rocks<br>Sand: fine to coarse, subangular to subrounded, quartz | 3.3 | 4.7 |
| Arden Sandstone | Clay, silty and sandy, red and green | 1.1 | 5.8 |
| | Sand, greenish grey | 0.6+ | 6.4 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | -1/16 | +1/16 -1/4 | +1/4 -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 26 | 71 | 3 | 0.7-1.4 | 26 | 36 | 33 | 2 | 1 | 2 | 0 |
| **b** | 18 | 48 | 34 | 1.4-2.5 | 20 | 13 | 24 | 8 | 19 | 16 | 0 |
| | | | | 2.5-3.5 | 20 | 11 | 36 | 9 | 19 | 5 | 0 |
| | | | | 3.5-4.0 | 17 | 6 | 30 | 11 | 22 | 14 | 0 |
| | | | | 4.0-4.7 | 14 | 5 | 27 | 11 | 28 | 15 | 0 |
| | | | | **Mean** | **18** | **9** | **30** | **9** | **22** | **12** | **0** |
| **a+b** | **19** | **53** | **28** | **0.7-4.7** | **19** | **14** | **31** | **8** | **18** | **10** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| | 1.4-2.5 | 55 | 25 | 18 | - | - | - | - | - | 2 |
| | 2.5-3.5 | 54 | 33 | 8 | - | - | - | - | 5 | - |
| | 3.5-4.0 | 52 | 30 | 17 | - | trace | - | - | - | - |
| | 4.0-4.7 | 67 | 18 | 13 | - | - | - | trace | 2 | trace |

**SP 26 SW 55 2243 6443 West of Curlieu Farm** **Block $F_5$**

Surface level +116.0 m (+381 ft)
Water not encountered
September 1982

Waste 5.4 m
Bedrock 0.5 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; pebbles of quartzite quartz, sandstone, coal and red and green siltstone | 5.1 | 5.4 |
| Mercia Mudstone Group | Sandstone, greyish green | 0.5+ | 5.9 |

**SP 26 SW 56** **2196 6394** **Gannaway Gate** **Block $F_5$**

Surface level +116.2 m (+381 ft)
Water struck at +106.4 m
September 1981

Waste 10.1 m
Bedrock 0.5 m

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal, ironstone and red and green siltstone | 8.1 | 8.4 |
| Glacial Sand and Gravel | 'Clayey' pebbly sand<br>Gravel: fine and coarse, rounded quartzite and quartz with some sandstone<br>Sand: mainly medium, subangular to subrounded, quartz | 1.7 | 10.1 |
| Mercia Mudstone Group | Mudstone, reddish brown with pale green spots | 0.5+ | 10.6 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 19 | 76 | 5 | 8.4-9.4 | 21 | 13 | 57 | 2 | 3 | 4 | 0 |
| | | | 9.4-10.1 | 15 | 14 | 65 | 1 | 2 | 3 | 0 |
| | | | **Mean** | **19** | **13** | **61** | **2** | **2** | **3** | **0** |

**SP 26 SW 57** **2395 6484** **Grove Park** **Block E**

Surface level +111.6 m (+366 ft)
Water not encountered
September 1981

Waste 2.7 m
Bedrock 0.7 m+

LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, yellowish and reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green mudstone | 2.3 | 2.7 |
| Mercia Mudstone Group | Clay, reddish brown with greyish green fisheyes | 0.7+ | 3.4 |

**SP 26 SW 58** **2497 6443** **East of Grove Park** **Block $F_5$**

Surface level +92.4 m (+303 ft)
Water struck at +91.2 m
September 1981

| | |
|---|---|
| Overburden | 0.6 m |
| Mineral | 1.1 m |
| Waste | 0.9 m |
| Bedrock | 0.3 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| Glacial Sand and Gravel | 'Very clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded, quartzite and quartz<br>Sand: fine and medium, subangular to subrounded, quartz | 1.1 | 1.7 |
| Till | Clay, reddish brown with greyish green marbling, stony; pebbles of quartzite, quartz and green siltstone | 0.9 | 2.6 |
| Mercia Mudstone Group | Mudstone, reddish brown and pale green | 0.3+ | 2.9 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 21 | 75 | 4 | 0.6-1.7 | 21 | 36 | 38 | 1 | 1 | 3 | 0 |

**SP 26 SW 59** **2147 6319** **Newlands Farm** **Block $F_5$**

Surface level +117.0 m (+384 ft)
Water struck at +110.0 m and +98.0 m
September 1981

Waste 22.7 m
Bedrock 0.2 m+

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz, flint, chalk, coal, sandstone and ironstone | 1.5 | 1.8 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green mudstone | 1.6 | 3.4 |
| | Silt, reddish brown with layers of medium quartz sand | 1.4 | 4.8 |
| | Clay, reddish brown; rare pebbles of quartzite and coal | 3.2 | 8.0 |
| Glacial Lake Deposits | Clay, brown, laminated | 11.0 | 19.0 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with green sandstone and trace limestone<br>Sand: medium and coarse, angular to subrounded, quartz | 3.7 | 22.7 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 6 | 43 | 51 | 19.0-20.0 | 7 | 3 | 4 | 18 | 30 | 37 | 1 |
| | | | 20.0-21.0 | 5 | 3 | 5 | 21 | 37 | 29 | 0 |
| | | | 21.0-22.0 | 6 | 5 | 36 | 14 | 20 | 19 | 0 |
| | | | 22.0-22.7 | 5 | 6 | 44 | 18 | 17 | 10 | 0 |
| | | | **Mean** | **6** | **4** | **21** | **18** | **26** | **25** | **trace** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 19.0-20.0 | 61 | 26 | 12 | 1 | 0 | trace | trace | 0 | 0 |
| 20.0-21.0 | 49 | 35 | 13 | 1 | 0 | 1 | 0 | 1 | 0 |
| 21.0-22.0 | 52 | 24 | 20 | 0 | 1 | 1 | 0 | 0 | 0 |
| 22.0-22.7 | 48 | 38 | 11 | 1 | 0 | trace | trace | 1 | 1 |

**SP 26 SW 60** **2201 6328** **West of Norton Lindsey** **Block $F_5$**

Surface level +110.0 m (+361 ft)
Water struck at +105.2 m
September 1981

| | |
|---|---|
| Overburden | 2.0 m |
| Mineral | 3.3 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown | 1.7 | 2.0 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite, quartz with sandstone and trace limestone<br>Sand: fine to coarse, angular to subrounded, quartz | 3.3 | 5.3 |
| Mercia Mudstone Group | Mudstone, reddish brown with green spots | 0.4+ | 5.7 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | -1/16 | +1/16 -1/4 | +1/4 -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 11 | 30 | 59 | 2.0-2.6 | 20 | 6 | 8 | 10 | 34 | 22 | 0 |
| | | | 2.6-3.6 | 8 | 13 | 8 | 15 | 39 | 17 | 0 |
| | | | 3.6-4.6 | 9 | 4 | 11 | 13 | 41 | 22 | 0 |
| | | | 4.6-5.3 | 12 | 7 | 9 | 11 | 42 | 19 | 0 |
| | | | **Mean** | **11** | **8** | **9** | **13** | **39** | **20** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 2.0-2.6 | 55 | 32 | 12 | 1 | - | 0 | - | 0 | 0 |
| 2.6-3.6 | 67 | 23 | 8 | 1 | - | 0 | - | 0 | 1 |
| 3.6-4.6 | 58 | 30 | 11 | 0 | - | trace | - | 0 | 1 |
| 4.6-5.3 | 63 | 28 | 8 | 0 | - | 0 | - | 1 | 0 |

**SP 26 SW 61** **2491 6290** **South-east of Hooknell** **Block $F_5$**

Surface level +72.4 m (+238 ft)
Water not encountered
September 1981

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 1.3 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| River Terrace Deposits | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite, quartz with sandstone and some ironstone and subrounded flint<br>Sand: fine to coarse, subangular to subrounded quartz | 1.3 | 1.7 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.4+ | 2.1 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 12 | 34 | 54 | 0.4-1.7 | 12 | 7 | 16 | 11 | 29 | 25 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.4-1.7 | 51 | 32 | 12 | - | 3 | - | 1 | 1 | - |

**SP 26 SW 62** **2499 6242** **New Barn Buildings** **Block $F_5$**

Surface level +54.4 m (+179 ft)
Water struck at +52.8 m
September 1981

| | |
|---|---|
| Overburden | 0.6 m |
| Mineral | 1.2 m |
| Bedrock | 0.6 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| River Terrace Deposits | 'Very clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone, subrounded flint and some ironstone and limestone<br>Sand: fine to coarse, angular to subrounded, quartz<br>Fines: yellow-brown silty clay | 1.2 | 1.8 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.6+ | 2.4 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 27 | 24 | 49 | 0.6-1.8 | 27 | 6 | 10 | 8 | 29 | 20 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.6-1.8 | 47 | 31 | 13 | 1 | 7 | - | 1 | - | - |

**SP 26 SW 63** **2168 6196** **East of Park View** **Block $F_5$**

Surface level +77.1 m (+253 ft)
Water struck at +74.6 m
September 1981

| | |
|---|---|
| Waste | 2.8 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Alluvium | Silty clay, greyish green and reddish brown with plant debris and quartzite and quartz pebbles | 2.0 | 2.3 |
| | Sandy clay with pebbles of quartzite, quartz and sandstone | 0.5 | 2.8 |
| Mercia Mudstone Group | Mudstone, reddish brown with green spots | 0.3+ | 3.1 |

**SP 26 SW 64** **2239 6240** **Blacon Farm** **Block $F_5$**

Surface level +109.9 m (+361 ft)
Water struck at +105.9 m
September 1981

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 3.9 m |
| Waste | 0.8 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine with coarse, rounded to well rounded quartzite and quartz with sandstone and some igneous rocks<br>Sand: fine to coarse, angular to sub-rounded quartz | 3.9 | 4.2 |
| Till? | Clay, reddish brown, stony; pebbles of quartzite, quartz, coal and red and green siltstone and sandstone | 0.8 | 5.0 |
| Mercia Mudstone Group | Clay, reddish brown, with greyish green lenses | 0.4+ | 5.4 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 14 | 38 | 48 | 0.3-1.4 | 14 | 5 | 11 | 17 | 40 | 13 | 0 |
| | | | 1.4-2.5 | 17 | 6 | 10 | 14 | 35 | 18 | 0 |
| | | | 2.5-3.5 | 12 | 11 | 32 | 11 | 24 | 10 | 0 |
| | | | 3.5-4.2 | 10 | 6 | 16 | 15 | 42 | 11 | 0 |
| | | | **Mean** | **14** | **7** | **17** | **14** | **35** | **13** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.4 | 61 | 31 | 5 | - | 1 | - | - | 1 | 1 |
| 1.4-2.5 | 65 | 29 | 4 | - | 0 | - | - | 1 | 1 |
| 2.5-3.5 | 61 | 23 | 13 | - | 0 | - | - | 1 | 2 |

**SP 26 SW 65** **2279 6203** **North of Luscombe Farm** **Block $F_5$**

Surface level +94.5 m (+310 ft)
Water struck at +93.4 m
September 1981

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 2.2 m |
| Waste | 0.7 m |
| Bedrock | 0.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Very clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and some ironstone<br>Sand: fine and medium, angular to subrounded quartz | 2.2 | 2.5 |
| Till? | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone and red-brown mudstone | 0.7 | 3.2 |
| Mercia Mudstone Group | Clay, reddish brown with pale green spots | 0.3 | 3.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 26 | 54 | 20 | 0.3-1.5 | 20 | 18 | 32 | 9 | 13 | 8 | 0 |
| | | | 1.5-2.5 | 32 | 22 | 22 | 5 | 11 | 8 | 0 |
| | | | **Mean** | **26** | **20** | **27** | **7** | **12** | **8** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.5 | 46 | 35 | 17 | - | trace | - | 2 | - | - |
| 1.5-2.5 | 48 | 31 | 21 | - | trace | - | 0 | - | - |

**SP 26 SW 66** **2295 6240** **South of Arles Cottage** **Block $F_5$**

Surface level +95.2 m (+312 ft)
Water struck at +91.2 m
September 1981

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 6.0 m |
| Bedrock | 0.6 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | 'Clayey' sand, fine and medium, subangular to subrounded quartz | 6.0 | 6.4 |
| Mercia Mudstone Group | Clay, reddish brown with green spots and fisheyes | 0.6+ | 7.0 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 10 | 88 | 2 | 0.4-1.5 | 19 | 63 | 15 | 2 | 1 | 0 | 0 |
| | | | 1.5-2.5 | 7 | 78 | 15 | 0 | 0 | 0 | 0 |
| | | | 2.5-3.5 | 8 | 64 | 27 | 1 | 0 | 0 | 0 |
| | | | 3.5-4.5 | 6 | 38 | 54 | 1 | 1 | 0 | 0 |
| | | | 4.5-5.5 | 7 | 41 | 50 | 1 | 1 | 0 | 0 |
| | | | 5.5-6.4 | 10 | 70 | 11 | 1 | 2 | 6 | 0 |
| | | | **Mean** | **10** | **58** | **29** | 1 | 1 | 1 | **0** |

**SP 26 SW 67** **2067 6057** **Oak Farm** **Block $F_5$**

Surface level +112.0 m (+368 ft)
Water struck at +105.0 m
September 1981

| | |
|---|---|
| Overburden | 4.4 m |
| Mineral | 2.9 m |
| Waste | 7.6 m |
| Bedrock | 0.1 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, yellowish brown, stony; pebbles of chalk, flint, yellow sandstone, quartzite, quartz, ironstone and coal | 3.3 | 3.6 |
| Glacial Lake Deposits? | Silty clay, reddish brown and orangy brown, laminated | 0.8 | 4.4 |
| Glacial Sand and Gravel | 'Very clayey' sand, fine and medium, subangular to subrounded, quartz | 2.9 | 7.3 |
| | Sandy silt, fine quartz sand with reddish brown silt | 2.6 | 9.9 |
| Glacial Lake Deposits? | Silty clay, reddish brown; laminated from 13.0 to 14.3 m | 4.4 | 14.3 |
| | Clay, sandy, reddish brown, stony | 0.4 | 14.7 |
| | 'Very clayey' sand, medium, quartz with reddish silty clay | 0.2 | 14.9 |
| Mercia Mudstone Group | Mudstone, reddish brown with green spots | 0.1+ | 15.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 27 | 72 | 1 | 4.4-5.5 | 26 | 26 | 46 | 1 | 1 | 0 | |
| | | | 5.5-6.5 | 28 | 36 | 36 | 0 | 0 | 0 | |
| | | | 6.5-7.3 | 29 | 53 | 16 | 1 | 1 | 0 | |
| | | | **Mean** | **27** | **37** | **34** | **1** | **1** | **0** | |

**SP 26 SW 68** **2124 6045** **Glebe Farm** **Block $F_5$**

Surface level +97.8 m (+321 ft)
Water struck at +95.3 m
September 1981

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 3.0 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Clayey' sandy gravel<br>Gravel: fine with coarse, rounded to well rounded quartzite and quartz with sandstone<br>Sand: mainly medium, subangular to subrounded, quartz | 3.0 | 3.3 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.4+ | 3.7 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 11 | 60 | 29 | 0.3-1.3 | 9 | 10 | 42 | 9 | 23 | 7 | 0 |
| | | | 1.3-2.3 | 14 | 13 | 44 | 6 | 15 | 8 | 0 |
| | | | 2.3-3.3 | 11 | 6 | 41 | 7 | 20 | 15 | 0 |
| | | | **Mean** | **11** | **10** | **42** | **8** | **19** | **10** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.3 | 61 | 26 | 13 | - | - | - | - | - | - |
| 1.3-2.3 | 53 | 32 | 15 | - | - | - | - | - | - |
| 2.3-3.3 | 50 | 32 | 18 | - | - | - | - | - | trace |

**SP 26 SW 69** **2184 6114** **North of Lodge Farm** **Block $F_5$**

Surface level +108.7 m (+357 ft)
Water not encountered
September 1981

| | |
|---|---|
| Overburden | 0.3 m |
| Mineral | 2.5 m |
| Bedrock | 0.5 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Sand and Gravel | 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and some ironstone<br>Sand: mainly medium, subangular to subrounded quartz | 2.5 | 2.8 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.5+ | 3.3 |

## GRADING

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 17 | 40 | 43 | 0.3-1.4 | 19 | 13 | 30 | 5 | 16 | 17 | 0 |
| | | | 1.4-2.4 | 14 | 5 | 12 | 8 | 31 | 30 | 0 |
| | | | 2.4-2.8 | 21 | 9 | 34 | 6 | 12 | 18 | 0 |
| | | | **Mean** | **17** | **9** | **25** | **6** | **21** | **22** | **0** |

## COMPOSITION

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.3-1.4 | 55 | 23 | 15 | - | 0 | - | 6 | 1 | 0 |
| 1.4-2.4 | 52 | 30 | 16 | - | 0 | - | 1 | 0 | 1 |
| 2.4-2.8 | 53 | 28 | 11 | - | 4 | - | 4 | 0 | 0 |

**SP 26 SW 70** **2357 6167** **Briery Land** **Block $F_5$**

Surface level +75.9 m (+249 ft)
Water not encountered
September 1981

Waste 2.1 m
Bedrock 0.6 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.6 | 0.6 |
| Glacial Sand and Gravel | Clay, reddish brown, sandy and stony; pebbles of quartzite, quartz and flint and thin layers of fine quartz sand | 0.8 | 1.4 |
| | 'Clayey' sandy gravel<br>Gravel: fine with coarse, rounded to well rounded quartzite, quartz and subrounded flint with rounded sandstone<br>Sand: mainly medium, subangular to subrounded quartz | 0.2 | 1.6 |
| | Clay, reddish brown with layers of medium quartz sand and rare quartz pebbles | 0.5 | 2.1 |
| Mercia Mudstone Group | Clay, reddish brown with green spots | 0.6+ | 2.7 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 12 | 53 | 35 | 1.4-1.6 | 12 | 8 | 38 | 7 | 30 | 5 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 1.4-1.6 | 43 | 22 | 14 | - | 21 | - | - | - | - |

**SP 26 SW 71** **2322 6010** **Southeast of Red Hill Farm** **Block $F_6$**

Surface level +92.5 m (+303 ft)
Water not encountered
September 1981

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 2.8 m |
| Waste | 0.5 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | 'Clayey' sandy gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite, quartz and limestone with sandstone, ironstone and trace mudstone<br>Sand: fine to coarse, subangular to subrounded, quartz | 2.8 | 3.2 |
| | Clay, reddish brown with pebbles of mudstone; laminated | 0.5 | 3.7 |
| Mercia Mudstone Group | Clay, reddish brown with greyish green spots | 0.4+ | 4.1 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 12 | 60 | 28 | 0.4-1.4 | 16 | 42 | 27 | 9 | 5 | 1 | 0 |
| | | | 1.4-2.4 | 6 | 5 | 35 | 20 | 18 | 26 | 0 |
| | | | 2.4-3.2 | 12 | 10 | 32 | 12 | 12 | 22 | 0 |
| | | | **Mean** | **12** | **19** | **27** | **14** | **12** | **16** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 1.4-2.4 | 17 | 25 | 19 | 28 | - | 1 | 8 | - | 2 |
| 2.4-3.2 | 31 | 32 | 5 | 25 | - | 2 | 5 | - | 0 |

**SP 26 SW 72** **2432 6080** **Fulbrooke Edge** **Block $F_6$**

Surface level +90.1 m (+296 ft)
Water not encountered
September 1981

| | |
|---|---|
| Waste | 0.4 m |
| Mineral | 0.7 m |
| Bedrock | 0.9 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | Sandy Gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz with sandstone and ironstone and some mudstone<br>Sand: mainly medium, subangular to subrounded quartz | 0.7 | 1.1 |
| Mercia Mudstone Group | Clay, reddish brown with green marbling | 0.9+ | 2.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 9 | 55 | 36 | 0.4-1.1 | 9 | 7 | 33 | 15 | 19 | 17 | 0 |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 0.4-1.1 | 43 | 27 | 19 | - | - | 2 | 9 | - | - |

**SP 27 NW 27** **2198 7743** **The Elms** **Block C**

Surface level +107 m (+351 ft)
Water not encountered
January 1981

| | |
|---|---|
| Waste | 2.2 m |
| Bedrock | 1.3 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground | 1.0 | 1.0 |
| Glacial Sand and Gravel | Clay, stony, red-brown; scattered rounded to well rounded quartzite and quartz pebbles | 1.2 | 2.2 |
| Mercia Mudstone Group | Mudstone, red-brown with green spots | 1.3+ | 3.5 |

**SP 27 NW 28** **2246 7716** **The Elms** **Block C**

Surface level +111.4 m (+365 ft)
Water struck at +105.9 m
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 4.2 m |
| Waste | 0.6 m |
| Mineral | 1.1 m |
| Waste | 12.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | **a** 'Very clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded, mainly quartzite with quartz<br>Sand: fine and medium, subangular to subrounded | 4.2 | 4.6 |
| Glacial Lake Deposits | Silt, sandy, red-brown | 0.6 | 5.2 |
| Glacial Sand and Gravel | **b** 'Clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded, mainly quartzite with quartz<br>Sand: mainly medium, subangular to subrounded | 1.1 | 6.3 |
| Glacial Lake Deposits | Clay, sandy, stonefree below 12.5 m, red-brown | 7.4 | 13.7 |
| Glacial Sand and Gravel | **c** Sand with a few pebbles; mainly medium, subangular to subrounded | 1.3 | 15.0 |
| Glacial Lake Deposits | Clay, silty, stonefree below 13.5 m, brown | 0.8 | 15.8 |
| Glacial Sand and Gravel | **d** Sand with a few pebbles; mainly medium, subangular to subrounded | 2.7+ | 18.5 |
| | Hole abandoned due to rising sand | | |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 24 | 65 | 11 | 0.4-1.4 | 24 | 29 | 34 | 3 | 5 | 5 | 0 |
| | | | | 1.4-2.4 | 21 | 19 | 40 | 4 | 8 | 8 | 0 |
| | | | | 2.4-3.4 | 22 | 22 | 43 | 2 | 7 | 4 | 0 |
| | | | | 3.4-4.6 | 29 | 28 | 31 | 3 | 6 | 3 | 0 |
| | | | | **Mean** | **24** | **25** | **37** | **3** | **6** | **5** | **0** |
| **b** | 10 | 29 | 61 | 5.2-6.3 | 10 | 6 | 15 | 8 | 38 | 23 | 0 |
| **a+b** | **22** | **56** | **22** | **Mean** | **22** | **20** | **32** | **4** | **13** | **9** | **0** |
| **c** | 4 | 94 | 2 | 13.7-15.0 | 4 | 32 | 59 | 3 | 2 | 0 | 0 |
| **d** | 2 | 96 | 2 | 15.8-16.8 | 5 | 39 | 55 | 1 | 0 | 0 | 0 |
| | | | | 16.8-18.5 | 1 | 35 | 59 | 2 | 2 | 1 | 0 |
| | | | | **Mean** | **2** | **36** | **58** | **2** | **1** | **1** | **0** |
| **a-d** | **13** | **74** | **13** | **Mean** | **13** | **27** | **44** | **3** | **8** | **5** | **0** |

**SP 27 NW 29** **2330 7784** **Balsall Common** **Block B**

Surface level +117 m (+384 ft)
Water not encountered
December 1980

| | |
|---|---|
| Waste | 3.0 m |
| Bedrock | 1.0 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Made ground and soil | 0.8 | 0.8 |
| Glacial Sand and Gravel | Clay, sandy, stony, yellow-brown becoming red-brown below 1.5 m; scattered rounded to well rounded pebbles, mainly quartzite | 2.2 | 3.0 |
| Mercia Mudstone Group | Mudstone, red-brown with green spots | 1.0+ | 4.0 |

**SP 27 NW 30** **2068 7667** **Piercil End** **Block C**

Surface level +99 m (+325 ft)
Water struck at +97.8 m
January 1981

| | |
|---|---|
| Overburden | 1.0 m |
| Mineral | 2.5 m |
| Bedrock | 2.5 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil and sandy clay | 1.0 | 1.0 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse, rounded to well rounded, quartzite with quartz and some sandstone<br>Sand: medium and coarse, subangular to subrounded | 2.5 | 3.5 |
| Mercia Mudstone Group | Mudstone, red and green | 2.5+ | 6.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | -$\frac{1}{16}$ | +$\frac{1}{16}$ -$\frac{1}{4}$ | +$\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 2 | 27 | 71 | 1.0-2.0 | 2 | 2 | 10 | 9 | 36 | 41 | 0 |
| | | | 2.0-3.5 | 2 | 4 | 16 | 11 | 32 | 35 | 0 |
| | | | **Mean** | **2** | **3** | **14** | **10** | **34** | **37** | **0** |

**COMPOSITION**

| Depth below surface (m) | percentages by weight in +8 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| 1.0-3.5 | 68 | 31 | 1 | - | - | trace | - | - | - |

**SP 27 NW 31** **2297 7666** **Balsall Street** **Block C**

Surface level +117.4 m (+385 ft)
Water struck at +114.2 and +102.8 m
203 mm shell
November 1980

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 10.3 m |
| Waste | 9.6 m |
| Bedrock | 1.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | **a** 'Very clayey' pebbly sand<br>Gravel: fine and coarse, subangular to well rounded, mainly quartzite<br>Sand: fine and medium | 2.1 | 2.5 |
| | **b** 'Clayey' sandy gravel, part gravel<br>Gravel: fine and coarse, subrounded to well rounded, quartzite with quartz and some sandstone and mudstone | 7.0 | 9.5 |
| | **c** 'Very clayey' pebbly sand<br>Gravel: fine, subrounded to well rounded, mainly quartzite<br>Sand: fine | 1.2 | 10.7 |
| Till | Clay, sandy, stony, reddish brown; scattered subangular to well rounded pebbles, mainly quartzite with quartz | 0.8 | 11.5 |
| Glacial Lake Deposits | Clay, silty, laminated, brown; rare subrounded quartzite pebbles | 3.1 | 14.6 |
| Glacial Sand and Gravel | **d** 'Very clayey' sandy gravel<br>Gravel: fine and coarse, subrounded to well rounded, mainly quartzite<br>Sand: fine and medium | 1.0 | 15.6 |
| Till? | Clay, sandy, stony, reddish brown; scattered subangular to well rounded pebbles, mainly quartzite and quartz | 4.7 | 20.3 |
| Mercia Mudstone Group | Clay, silty, red-brown | 1.2+ | 21.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | -1/16 | +1/16 -1/4 | +1/4 -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 27 | 63 | 10 | 0.4-1.3 | 25 | 16 | 44 | 2 | 5 | 8 | 0 |
| | | | | 1.3-2.5 | 28 | 37 | 26 | 2 | 3 | 4 | 0 |
| | | | | **Mean** | **27** | **28** | **33** | **2** | **4** | **6** | **0** |
| **b** | 15 | 49 | 36 | 2.5-3.5 | 16 | 9 | 38 | 5 | 18 | 14 | 0 |
| | | | | 3.5-5.0 | 9 | 7 | 22 | 7 | 20 | 35 | 0 |
| | | | | 5.0-6.5 | 11 | 12 | 30 | 7 | 18 | 22 | 0 |
| | | | | 6.5-8.0 | 25 | 13 | 29 | 5 | 15 | 13 | 0 |
| | | | | 8.0-9.5 | 13 | 22 | 38 | 7 | 8 | 12 | 0 |
| | | | | **Mean** | **15** | **13** | **30** | **6** | **16** | **20** | **0** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **c** | 23 | 73 | 4 | 9.5-10.7 | 23 | 67 | 4 | 2 | 3 | 1 | 0 |
| **d** | 16 | 56 | 28 | 14.6-15.6 | 16 | 29 | 23 | 4 | 11 | 17 | 0 |
| **a+b+c** | **18** | **55** | **27** | **Mean** | **18** | **22** | **28** | **5** | **12** | **15** | **0** |
| **a-d** | **18** | **55** | **27** | **Mean** | **18** | **23** | **27** | **5** | **12** | **15** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in +8mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| | **b** | 3.5-5.0 | 72 | 26 | - | 1 | 1 | - | - | - |

**SP 27 NW 32** **2380 7651** **Yew Tree Farm** **Block C**

Surface level +119.4 m (+392 ft)
Water struck at +116.6 m and +106.4 m
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 9.3 m |
| Waste | 3.3 m |
| Mineral | 3.5 m |
| Waste | 0.5 m |
| Bedrock | 0.5 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | **a** 'Clayey' gravel<br>Gravel: mainly coarse with cobbles, subrounded to well rounded, quartzite with quartz<br>Sand: fine and medium | 2.4 | 2.8 |
| | **b** 'Very clayey' sand with a few pebbles, mainly medium | 6.9 | 9.7 |
| Till | Clay, sandy, stony, brown; scattered subangular to well rounded pebbles, mainly quartzite and quartz | 3.3 | 13.0 |
| Glacial Sand and Gravel | **c** 'Clayey' sand, brown; fine and medium | 3.5 | 16.5 |
| Glacial Lake Deposits | Silt, sand lenses, stonefree, yellow-brown | 0.5 | 17.0 |
| Mercia Mudstone Group | Mudstone, reddish brown | 0.5+ | 17.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 10 | 44 | 46 | 0.4-1.5 | 14 | 13 | 11 | 2 | 4 | 46 | 10 |
| | | | | 1.5-2.8 | 7 | 27 | 26 | 5 | 17 | 18 | 0 |
| | | | | **Mean** | **10** | **21** | **19** | **4** | **11** | **30** | **5** |
| **b** | 31 | 66 | 3 | 2.8-4.5 | 29 | 15 | 47 | 1 | 5 | 3 | 0 |
| | | | | 4.5-6.5 | 26 | 19 | 52 | 2 | 1 | 0 | 0 |
| | | | | 6.5-8.5 | 34 | 28 | 33 | 2 | 2 | 1 | 0 |
| | | | | 8.5-9.7 | 36 | 41 | 22 | 1 | 0 | 0 | 0 |
| | | | | **Mean** | **31** | **24** | **40** | **2** | **2** | **1** | **0** |
| **c** | 15 | 85 | 0 | 13.0-16.5 | 15 | 37 | 46 | 2 | 0 | 0 | 0 |
| **a+b** | **25** | **61** | **14** | **Mean** | **25** | **23** | **36** | **2** | **4** | **9** | **1** |
| **a-c** | **23** | **67** | **10** | **Mean** | **23** | **27** | **38** | **2** | **3** | **6** | **1** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in +8 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| **a** | 0.4-2.8 | 78 | 21 | 1 | - | - | trace | - | - | - |

**SP 27 NW 33** **2165 7532** **Balsall Lodge Farm** **Block C**

Surface level +118 m (+387 ft)
Water not encountered
January 1981

Waste 7.0 m
Bedrock 0.5 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Sand and Gravel | Clay, sandy, red-brown to yellow-brown; rare quartzite and quartz pebbles | 1.6 | 1.8 |
| Glacial Lake Deposits | Clay, stony, red-brown; scattered quartzite, quartz, sandstone and mudstone pebbles | 5.2 | 7.0 |
| Arden Sandstone | Mudstone, greyish green | 0.5+ | 7.5 |

**SP 27 NW 34** **2341 7621** **Balsall Street** **Block C**

Surface level +116 m (+381 ft)
Water struck at +113 m
203 mm shell
November 1980

| | |
|---|---|
| Overburden | 0.2 m |
| Mineral | 1.3 m |
| Waste | 1.5 m |
| Mineral | 2.9 m |
| Waste | 1.4 m |
| Mineral | 4.2 m |
| Waste | 7.0 m+ |

## LOG

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| ?Glacial Sand and Gravel | **a** 'Very clayey' pebbly sand<br>Gravel: fine, subrounded to well rounded, mainly quartzite with quartz<br>Sand: fine and medium | 1.3 | 1.5 |
| Glacial Lake Deposits | Silt, clay lenses, sandy, reddish brown | 1.5 | 3.0 |
| | **b** 'Clayey' sand, reddish brown; mainly fine | 2.9 | 5.9 |
| | Clay, silty, stonefree, laminated, brown | 1.4 | 7.3 |
| Glacial Sand and Gravel | **c** Gravel, part 'clayey', part pebbly sand<br>Gravel: fine and coarse, subangular to well rounded, quartzite with quartz, mudstone and some sandstone<br>Sand: fine and medium, subangular to well rounded | 4.2 | 11.5 |
| ?Till | Clay, stony, reddish brown, scattered subrounded to well rounded pebbles, mainly quartzite and quartz | 0.8 | 12.3 |
| Glacial Lake Deposits | Clay, silty, sandy lenses, stonefree, laminated, brown | 5.6 | 17.9 |
| Glacial Sand and Gravel | **d** Sand, brown; fine | 0.6+ | 18.5 |
| | Hole abandoned due to rising sand | | |

## GRADING

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 24 | 65 | 11 | 0.2-1.5 | 24 | 38 | 25 | 2 | 8 | 3 | 0 |
| **b** | 15 | 85 | 0 | 3.0-4.5 | 15 | 64 | 21 | 0 | 0 | 0 | 0 |
| | | | | 4.5-5.9 | 14 | 52 | 34 | 0 | 0 | 0 | 0 |
| | | | | **Mean** | **15** | **58** | **27** | **0** | **0** | **0** | **0** |
| **c** | 7 | 37 | 56 | 7.3-8.5 | 4 | 5 | 8 | 3 | 26 | 54 | 0 |
| | | | | 8.5-9.5 | 4 | 9 | 13 | 5 | 24 | 45 | 0 |
| | | | | 9.5-10.5 | 10 | 11 | 21 | 7 | 21 | 30 | 0 |
| | | | | 10.5-11.5 | 9 | 30 | 34 | 10 | 11 | 6 | 0 |
| | | | | **Mean** | **7** | **13** | **18** | **6** | **21** | **35** | **0** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **a+b+c** | | | | **Mean** | **12** | **33** | **22** | **3** | **12** | **18** | **0** |
| **d** | 9 | 88 | 3 | 17.9–18.5 | 9 | 62 | 24 | 2 | 3 | 0 | 0 |
| **a–d** | **12** | **60** | **28** | **Mean** | **12** | **35** | **22** | **3** | **11** | **17** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in +8 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| **c** | 7.3–10.5 | 71 | 20 | 4 | - | - | 5 | - | trace | - |

**SP 27 NW 35** **2363 7535** **Holly Grange Farm** **Block C**

Surface level +112 m (+367 ft)
Water struck at +107 m
January 1981

| | |
|---|---|
| Overburden | 6.0 m |
| Mineral | 2.6 m |
| Waste | 7.0 m |
| Bedrock | 0.4 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Glacial Lake Deposits | Clay, sandy, red-brown; rare quartzite, quartz and mudstone pebbles | 2.7 | 3.0 |
| | Clay, silty, laminated, red-brown; rare quartzite and quartz pebbles | 3.0 | 6.0 |
| Glacial Sand and Gravel | 'Clayey' sand, red-brown; fine and medium | 2.6 | 8.6 |
| Glacial Lake Deposits | Clay, silty, sand lenses to 10.3 m, stonefree, laminated, red-brown; intercalations of yellow-brown silt below 11.5 m | 7.0 | 15.6 |
| Mercia Mudstone Group | Mudstone, red-brown and grey-green | 0.4+ | 16.0 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 14 | 86 | 0 | 6.0-7.0 | 18 | 40 | 42 | 0 | 0 | | |
| | | | 7.0-8.6 | 12 | 50 | 37 | 1 | 0 | | |
| | | | **Mean** | **14** | **46** | **39** | **1** | **0** | | |

**SP 27 SW 11** **2124 7412** **Oldwich Lane** **Block D**

Surface level +112.1 m (+368 ft)
Water not encountered
203 mm shell
December 1980

| | |
|---|---|
| Overburden | 0.4 m |
| Mineral | 3.6 m |
| Bedrock | 1.5 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | 'Very clayey' gravel<br>Gravel: fine and coarse, subangular to well rounded, mainly quartzite with quartz<br>Sand: fine and medium | 3.6 | 4.0 |
| Arden Sandstone | Mudstone, red-brown with green sandstone | 1.5+ | 5.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 25 | 33 | 42 | 0.4-1.5 | 24 | 21 | 27 | 2 | 9 | 17 | 0 |
| | | | 1.5-3.0 | 17 | 4 | 13 | 10 | 30 | 26 | 0 |
| | | | 3.0-4.0 | 40 | 6 | 9 | 7 | 18 | 20 | 0 |
| | | | **Mean** | **25** | **10** | **16** | **7** | **20** | **22** | **0** |

**SP 27 SW 12** **2288 7448** **Frogmore Wood** **Block C**

Surface level +127 m (+417 ft)
Water not encountered
January 1981

Waste 11.0 m
Bedrock 0.5 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, silty, stony, red-brown with blue-grey gleying to 2.0m; scattered subangular to well rounded quartzite, quartz, sandstone and mudstone pebbles | 9.9 | 10.2 |
| | Gravel lens; fine and coarse, subrounded to well rounded quartzite, quartz and sandstone clasts | 0.8 | 11.0 |
| Mercia Mudstone Group | Mudstone, greyish green | 0.5+ | 11.5 |

**SP 27 SW 13** **2469 7435** **Mere End Farm** **Block C**

Surface level +121.4 m (+398 ft) Waste 18.6 m+
Water struck at +117.9 m and + 111.8 m
203 mm shell
November 1980

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Lake Deposits | Clay, silty, sandier with depth, reddish brown with white gleying | 3.3 | 3.5 |
| | Silt, sandy, stonefree, brown | 0.5 | 4.0 |
| Till | Clay, stony, reddish brown; scattered subangular to well rounded, quartzite, quartz, sandstone and mudstone pebbles | 5.6 | 9.6 |
| Glacial Lake Deposits | Silt, sandy, stonefree, brown | 2.0 | 11.6 |
| | 'Very clayey' sand with a few pebbles, silt lenses, brown; fine | 2.5 | 14.1 |
| | Silt, clayey, stonefree, brown | 3.2 | 17.3 |
| ?Till | Clay, stony, reddish brown; scattered subrounded to well rounded quartzite, quartz, sandstone and mudstone pebbles | 1.3+ | 18.6 |
| | Hole abandoned - no recovery | | |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 28 | 68 | 4 | 11.6-14.1 | 28 | 63 | 3 | 2 | 2 | 2 | 0 |

**SP 27 SW 14** **2202 7297** **North of Nunley Pit** **Block D**

Surface level +120.0 m (+394 ft)
Water struck at +115.5 m
February 1981

| | |
|---|---|
| Overburden | 2.8 m |
| Mineral | 13.2 m |
| Waste | 0.9 m |
| Bedrock | 0.1 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.3 | 0.3 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz and sandstone | 2.5 | 2.8 |
| Glacial Sand and Gravel | **a** 'Very clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded quartzite and quartz<br>Sand: fine and medium, subangular to subrounded, quartz | 2.0 | 4.8 |
| | **b** 'Clayey' sand, fine and medium, quartz | 11.2 | 16.0 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz and red and green mudstone | 0.9 | 16.9 |
| Mercia Mudstone Group | Mudstone, reddish brown with greyish green marbling | 0.1+ | 17.0 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 20 | 70 | 10 | 2.8-3.8 | 23 | 32 | 39 | 1 | 2 | 3 | 0 |
| | | | | 3.8-4.8 | 18 | 23 | 42 | 2 | 6 | 9 | 0 |
| | | | | **Mean** | **20** | **27** | **41** | **2** | **4** | **6** | **0** |
| **b** | 19 | 80 | 1 | 4.8-5.8 | 25 | 28 | 43 | 2 | 2 | 0 | 0 |
| | | | | 5.8-6.8 | 24 | 26 | 50 | 0 | 0 | 0 | 0 |
| | | | | 6.8-7.8 | 20 | 25 | 55 | 0 | 0 | 0 | 0 |
| | | | | 7.8-8.8 | 22 | 27 | 50 | 0 | 1 | 0 | 0 |
| | | | | 8.8-9.8 | 15 | 20 | 61 | 2 | 2 | 0 | 0 |
| | | | | 9.8-10.8 | 14 | 17 | 68 | 1 | 0 | 0 | 0 |
| | | | | 10.8-11.8 | 11 | 23 | 64 | 1 | 1 | 0 | 0 |
| | | | | 11.8-12.8 | 14 | 43 | 41 | 1 | 1 | 0 | 0 |
| | | | | 12.8-13.8 | 19 | 52 | 28 | 1 | 0 | 0 | 0 |
| | | | | 13.8-14.8 | 17 | 53 | 29 | 1 | 0 | 0 | 0 |
| | | | | 14.8-16.0 | 26 | 56 | 18 | 0 | 0 | 0 | 0 |
| | | | | **Mean** | **19** | **34** | **45** | **1** | **1** | **0** | **0** |
| **a+b** | **19** | **79** | **2** | **2.8-16.0** | **19** | **33** | **45** | **1** | **1** | **1** | **0** |

**SP 27 SW 15** **2306 7408** **South of Frogmore Wood** **Block C**

Surface level +131.7 m (+432 ft)
Water struck at +123.7 m and +120.2 m
January 1981

Waste 14.2 m
Bedrock 0.3 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel? | Clay, sand lenses, red-brown; scattered quartzite and quartz pebbles | 3.8 | 4.2 |
| Till | Clay, stony, brown; scattered subrounded to well rounded quartzite, quartz, sandstone and mudstone pebbles | 3.1 | 7.3 |
| Glacial Lake Deposits | Clay, silt lenses, stonefree, laminated, red-brown | 4.2 | 11.5 |
| Glacial Sand and Gravel | Gravel<br>Gravel: fine and coarse with some cobbles, rounded to well rounded, mainly quartzite with quartz<br>Sand: medium, angular to subrounded | 2.7 | 14.2 |
| Mercia Mudstone Group | Mudstone, red-brown and green | 0.3+ | 14.5 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}$ $-\frac{1}{4}$ | $+\frac{1}{4}$ -1 | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 4 | 29 | 67 | 11.5-12.5 | 3 | 3 | 18 | 11 | 30 | 34 | 1 |
| | | | 12.5-14.2 | 4 | 4 | 16 | 6 | 32 | 38 | 0 |
| | | | **Mean** | **4** | **4** | **17** | **8** | **31** | **36** | **0** |

**SP 27 SW 19** **2053 7240** **Park Farm** **Block D**

Surface level +124.5 m (+408 ft)
Water not encountered
September 1982

| | |
|---|---|
| Waste | 9.3 m |
| Bedrock | 0.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Sand and Gravel | Sandy gravel<br>Gravel: fine with coarse, rounded quartzite and quartz<br>Sand: medium and coarse, angular to subrounded quartz<br>Fines: silty clay, yellowish brown | 0.4 | 0.6 |
| Till | Clay, sandy and silty, reddish brown, stony; pebbles of quartz and quartzite | 3.4 | 4.0 |
| Glacial Lake Deposits | Silt and silty clay, reddish brown; laminated in parts | 5.3 | 9.3 |
| Arden Sandstone | Mudstone, greenish grey | 0.2+ | 9.5 |

**SP 27 SW 20** **2387 7273** **Honiley Boot Public House** **Block E**

Surface level +129.2 m (+424 ft)
Water struck at +124.7 m and 117.2 m
September 1982

| | |
|---|---|
| Overburden | 3.0 m |
| Mineral | 5.0 m |
| Waste | 4.6 m |
| Bedrock | 0.1 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Glacial Sand and Gravel | Clay, yellowish orange, stony and below 2.0 m sandy; pebbles of quartzite, quartz and sandstone | 2.6 | 3.0 |
| | 'Very clayey' sand<br>Sand: mainly fine, quartz<br>Fines: silty clay, reddish brown | 5.0 | 8.0 |
| | Silt, reddish brown, sandy | 0.2 | 8.2 |
| Till | Clay, reddish brown and brown, stony; pebbles of quartzite, quartz, sandstone and red and green siltstone | 4.4 | 12.6 |
| Mercia Mudstone Group | Mudstone, greyish green | 0.1+ | 12.7 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 33 | 67 | 0 | 3.0-4.2 | 29 | 49 | 20 | 2 | 0 | | |
| | | | 4.2-5.2 | 35 | 54 | 10 | 1 | 0 | | |
| | | | 5.2-6.2 | 36 | 56 | 8 | 0 | 0 | | |
| | | | 6.2-7.2 | 32 | 60 | 8 | 0 | 0 | | |
| | | | 7.2-8.0 | 32 | 58 | 9 | 0 | 0 | | |
| | | | **Mean** | **33** | **55** | **11** | **1** | **0** | | |

**SP 27 SW 21** **2152 7154** **Abbey Farm** **Block D**

Surface level +124.0 m (+407 ft)
Water struck at +114.4 m and +105.1 m
September 1982

| | |
|---|---|
| Overburden | 9.6 m |
| Mineral | 6.8 m |
| Waste | 4.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.1 | 0.1 |
| Till | Clay, brown, sandy, stony; pebbles of quartzite and quartz | 0.8 | 0.9 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green mudstone | 2.2 | 3.1 |
| | Clay, yellowish brown, stony; pebbles of chalk, flint, shell fragments, quartz, quartzite and red and green mudstone | 0.7 | 3.8 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone and coal | 5.8 | 9.6 |
| Glacial Sand and Gravel | 'Very clayey' sand<br>Sand: fine and medium, quartz<br>Fines: silty clay, reddish brown | 6.8 | 16.4 |
| Glacial Lake Deposits | Silt and silty clay, reddish brown, laminated; with fine quartz sand below 18.9 m | 4.0 | 20.4 |
| ?Till | Clay, yellowish brown and reddish brown | 0.2+ | 20.6 |

**GRADING**

| Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fines | Sand | | | Gravel | | |
| Fines | Sand | Gravel | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| 21 | 79 | 0 | 9.6-11.6 | 21 | 34 | 44 | 1 | 0 | | |
| | | | 11.6-12.6 | 14 | 28 | 57 | 1 | 0 | | |
| | | | 12.6-13.6 | 17 | 27 | 54 | 2 | 0 | | |
| | | | 13.6-14.6 | 26 | 31 | 40 | 3 | 0 | | |
| | | | 14.6-15.6 | 24 | 46 | 29 | 1 | 0 | | |
| | | | 15.6-16.4 | 24 | 50 | 25 | 1 | 0 | | |
| | | | **Mean** | **21** | **35** | **43** | **1** | **0** | | |

**SP 27 SW 22** **2063 7082** **Rowington Coppice** **Block D**

Surface level +126.1 m (+414 ft)
Water struck at +108.6 m
September 1982

Waste 17.4 m
Bedrock 0.2 m+

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.4 | 0.4 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz, coal and red and green mudstone | 15.6 | 16.0 |
| | Clay, reddish brown, laminated | 0.5 | 16.5 |
| | Sand, medium and coarse, quartz | 0.3 | 16.8 |
| | Clay, reddish brown, stony; pebbles of quartzite, quartz, coal and red and green mudstone | 0.6 | 17.4 |
| Mercia Mudstone Group | Mudstone, reddish brown with greenish bands | 0.2+ | 17.6 |

**SP 27 SW 23** **2336 7030** **Haseleygreen Farm** **Block E**

Surface level +122.1 m (+401 ft)
Water struck at +111.1 m
September 1982

| | |
|---|---|
| Overburden | 1.6 m |
| Mineral | 2.4 m |
| Waste | 6.8 m |
| Mineral | 5.5 m |
| Bedrock | 0.2 m+ |

**LOG**

| Geological classification | Lithology | Thickness m | Depth m |
|---|---|---|---|
| | Soil | 0.2 | 0.2 |
| Glacial Sand and Gravel | Clay, sandy, reddish brown and yellowish orange, stony; pebbles of quartzite and quartz | 1.4 | 1.6 |
| | **a** 'Very clayey' gravel<br>Gravel: fine and coarse, rounded to well rounded quartzite, quartz and sandstone<br>Sand: fine to coarse, angular to subrounded, quartz<br>Fines: silty clay, yellowish orange | 2.4 | 4.0 |
| | Silty clay, yellowish, stony; pebbles of quartzite and quartz | 0.5 | 4.5 |
| Till | Clay, reddish brown, stony; pebbles of quartzite, quartz, sandstone, coal and red and green siltstone | 5.0 | 9.5 |
| Glacial Lake Deposits | Clay, sandy with layers of fine quartz sand; laminated | 1.3 | 10.8 |
| Glacial Sand and Gravel | **b** 'Clayey' pebbly sand<br>Gravel: fine and coarse, rounded to well rounded, quartzite and quartz<br>Sand: mainly medium, subangular to subrounded, quartz<br>Fines: silty clay, reddish brown | 3.0 | 13.8 |
| | **c** Sand, medium, subangular to subrounded quartz | 2.5 | 16.3 |
| Mercia Mudstone Group | Mudstone, reddish brown and greyish green | 0.2+ | 16.5 |

**GRADING**

| | Mean for deposit percentages | | | Depth below surface (m) | Percentages | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fines | Sand | Gravel | | Fines | Sand | | | Gravel | | |
| | | | | | $-\frac{1}{16}$ | $+\frac{1}{16}-\frac{1}{4}$ | $+\frac{1}{4}-1$ | +1 -4 | +4 -16 | +16 -64 | +64 mm |
| **a** | 21 | 35 | 44 | 1.6-2.0 | 26 | 25 | 26 | 3 | 9 | 11 | 0 |
| | | | | 2.0-3.0 | 20 | 8 | 14 | 8 | 25 | 25 | 0 |
| | | | | 3.0-4.0 | 20 | 7 | 13 | 10 | 31 | 19 | 0 |
| | | | | **Mean** | **21** | **11** | **16** | **8** | **24** | **20** | **0** |
| **b** | 19 | 64 | 17 | 10.8-11.8 | 34 | 17 | 29 | 2 | 6 | 12 | 0 |
| | | | | 11.8-12.8 | 13 | 12 | 56 | 4 | 12 | 3 | 0 |
| | | | | 12.8-13.8 | 11 | 9 | 53 | 8 | 13 | 6 | 0 |
| | | | | **Mean** | **19** | **13** | **46** | **5** | **10** | **7** | **0** |
| **c** | 5 | 95 | 0 | 13.8-14.8 | 5 | 11 | 74 | 10 | 0 | 0 | 0 |
| | | | | 14.8-16.3 | 4 | 16 | 78 | 2 | 0 | 0 | 0 |
| | | | | **Mean** | **5** | **14** | **76** | **5** | **0** | **0** | **0** |
| **a+b+c** | **15** | **65** | **20** | **Mean** | **15** | **12** | **47** | **6** | **11** | **9** | **0** |

**COMPOSITION**

| | Depth below surface (m) | percentages by weight in 8-16 mm fraction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Quartzite | Quartz | Sandstone | Limestone | Flint | Mudstone | Ironstone | Igneous | Others |
| | 1.6-2.0 | 47 | 35 | 18 | - | - | - | - | - | - |

## APPENDIX F

### Resistivity Survey

Of the range of geophysical techniques tested during an initial feasibility study conducted in the district during 1981, ground resistivity surveying, and, in particular, the Offset Wenner sounding system was found to be the most cost-effective for obtaining acceptably consistent results rapidly (Clarke and others, 1982: unpublished report).

### Theory

Resistivity is defined as the resistance to electrical flow of a volume of ground of unit length and cross-sectional area. Apparent resistivity (measured in ohm.metres, ohm m) is a weighted combination of the resistivities of sub-surface layers, and is obtained by passing a current (I) (Figure 7) between two current electrodes, C1 and C2, and measuring the potential difference ($\Delta V$) between two potential electrodes, P1 and P2. By changing the positions of the electrodes systematically for a particular configuration, a series of apparent resistivity readings may be obtained in order to resolve the sub-surface layering. For the Wenner electrode configuration (Figure 7a), the apparent resistivity ($\rho a$) is given by:-

$$\rho a = 2\pi \; a \; \frac{\Delta V}{I}$$

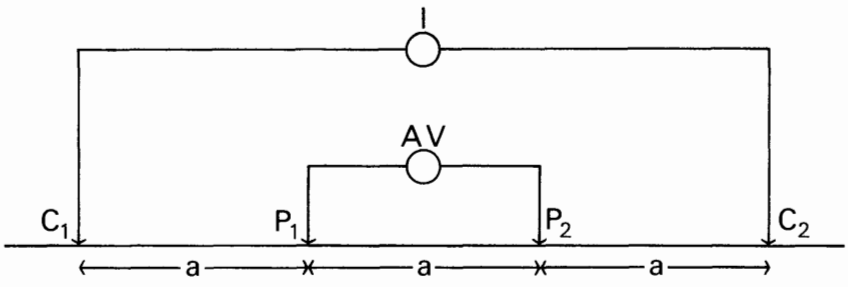
where a is the electrode separation.

At all the sites investigated geophyscially, the Offset Wenner sounding system was used in conjunction with the averaging system for improved accuracy of the results and a digital read-out of the measured resistances. The Offset Wenner system was designed for operation with a multi-core cable containing metal connections for each of the electrode positions, which feeds back to a central switching box. This technique uses a central electrode in addition to the conventional Wenner array electrode positions (Figure 7b). By combining measurements from different electrode configurations (selected by using the switching box), it is possible to check the consistency of the readings, to compensate for the effect of near-surface lateral variations and to reduce the total number of electrode positions occupied. By this means, all the electrodes can be planted and connected at the same time, making the system practical for one-man operation as well as being rapid and cost-effective.

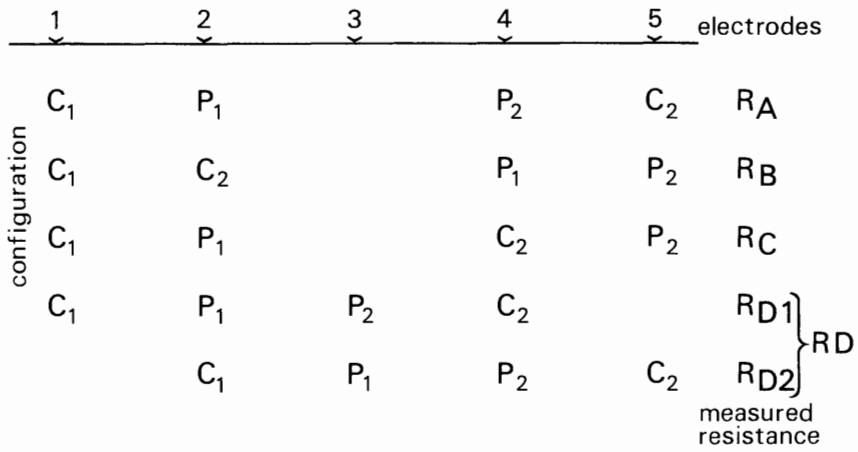
### Results

Using the Offset Wenner sounding system, 406 resistivity depth soundings were taken at 137 sites. In general, three resistivity depth soundings were carried out at each site at approximately 45° to one another, depending on geological conditions and local physical constraints. At two sites (HY 81 and HY 108), 4 depth soundings were taken because of the presence of two distinct geological deposits at the surface.

Control boreholes were drilled at or near to 16 of the geophysical sites to provide calibration of the results obtained at each. Full details are given in Appendix H,




a. Wenner




b. Offset Wenner (five electrode array)

**Figure 7** Electrode configurations of the resitivity arrays

**Table 9** Comparison of the thickness of sand and gravel and the depth to base of the drift proved by boreholes and derived from the interpretation of resistivity depth soundings. (See also Appendix H).

| Borehole Number | Thickness of mineral proved by shell and auger drilling | Depth to base of drift | Resistivity Depth Sounding Identification No. | Mean thickness of sand and gravel interpreted from resistivity soundings | Depth to base of drift |
|---|---|---|---|---|---|
| | (m) | (m) | (m) | (m) | (m) |
| 16 NE 66 | 2.3 | 4.0 | HY 53 | 3.8 | 4.2 |
| 16 SW 17 | 1.2 | 1.7 | HY 99 | 2.0 | 2.2 |
| 16 SE 6 | - | 2.0 | HY 106 | - | 2.8 |
| 16 SE 8 | 1.3 | 2.9 | HY 108 | 1.5 | 2.3 |
| 17 NW 176 | 2.9* | 10.2 | HY 4 | 2.8 | 10.2 |
| 17 NW 177 | 0.8 | 10.0 | HY 7 | - ** | 8.9 |
| 17 NW 178 | 0.6 | 10.5 | HY 3 | - ** | 10.3 |
| 17 SW 191 | 4.6 | 10.8 | HY 12 | 5.8 | 10.0 |
| 17 SW 193 | 0.5 | 8.2 | HY 16 | 3.9 | 9.2 |
| 17 SW 194 | 2.5 | 6.2 | HY 14 | 4.3 | 5.9 |
| 17 SW 195 | 5.8 | 9.0 | HY 15 | 7.1 | 9.4 |
| 17 SW 196 | 4.9 | 8.0 | HY 13 | 5.5 | 7.9 |
| 17 SE 73 | - | 0.6 | HY 19 | - | 0.5 |
| 17 SE 76 | 7.6 | 7.9 | HY 22 | 7.2 | 7.4 |
| 17 SE 77 | - | 1.8 | HY 27 | - | 3.6 |
| 25 NW 64 | 5.0 | 6.2 | HY 134 | 5.5 | 6.8 |
| **Mean thickness** | **3.1** | **6.3** | | **3.8** | **6.4** |

* Includes 1.3 m waste parting; ** Sand and gravel not recognised in resistivity depth soundings.

and a comparison of the mean thicknesses of the sand and gravel and the depths to the base of drift at the borehole and resistivity sites constitute Table 9.

The depth to the base of the drift, as interpreted from the resistivity soundings, compares favourably with the values obtained for the same interval from the control boreholes: the respective mean values are 6.4 m and 6.3 m. For each of the 13 control sites where sand and gravel was proved, the calculated mean thickness of mineral in the boreholes is 3.1 m compared with 3.8 m based on data from the interpretation of the resistivity depth probes. This considerable discrepancy can be attributed largely to the results from three sites (16 NE 66, 17 SW 193 and 17 SW 194) at which the percentage difference between the recorded and interpreted thicknesses is over 40 per cent. Such wide variations arise because the borehole and resistivity traverse, in each case, were unavaoidably sited over 100 m apart: in arable areas, the preferred location for boreholes, from the landowners' point of view and for ease of access, were the edges and corners of fields, whereas the resistivity method requires the multi-core cable to be laid out in a straight line (usually over 64 m in length) and well away from any field boundaries where lateral variations in the resistivity values might arise from the presence of ditches, trees and the like. If the results obtained from these three sites are discounted, the mean thickness of sand and gravel for the remaining sites is 3.5 m calculated from the borehole records compared with 3.7 m interpreted from the resistivity results. Such a difference may be regarded as acceptable in terms of the expected reliability of an extensive survey conducted at the indicated level of assessment.

**Interpretation**

Interpretation of the apparent resistivity values was carried out using a field-based micro-computer and printer which were programmed to produce the listings of field data, interpretation and plots for each depth sounding. The system enabled the operator to enter and interpret the resistivity readings at the end of each day, in order to provide an immediate check on the consistency and reliability of the results. Any unusual or discrepant data were re-run on the ground. The results from each resistivity site are summarised in Appendix G; interpreted resistivity values and the derived thickness of each layer have been collated from up to 4 soundings at each site and the calculated mean thicknesses of sand and gravel and overburden have been used in the assessment of resources.

Frequency distribution plots of the interpreted resistivity values calculated from the field apparent resistivity readings are shown in Figures 8 and 9. High resistivity values (>60 ohm m) can invariably be attributed to sands and gravels, whereas values below about 40 ohm m are indivative of clay (or very clayey deposits). Intermediate value (40 to 60 ohm m) needed careful interpretation and may be attributed to either sandy or clayey deposits. Thus, it can be seen from Figures 8 and 9 that the potentially workable deposits of sand and gravel are to be found mainly in the Glacial Sand and Gravel and also, in some cases, in the Alluvium and First River Terrace Deposits.

Comparision of the interpreted resistivity values with the orientation of each sounding was conducted for Glacial Sand and Gravel, Till and Mercia Mudstone Group, but revealed no evidence that a particular orientation affected the consistency of the results. The nature of the deposits is known to be very variable even over a short distance (of say, 50 m) and such variations may have cancelled out any depositional characteristics that may be present.

**Summary**

The interpretations of the resistivity depth soundings using the Offset Wenner configuration, demonstrate that the method provides a rapid and consistent technique for assessing the nature and thickness of scattered drift deposits. The results, compared with those from control boreholes, generally, but not invariably, show an over-estimation in the interpreted thickness of sand and gravel, of about 20 per cent on average: this may possibly be attributed to the variability of the deposits themselves. However, the average depth to the base of drift derived from the resistivity readings correlates closely with the data from the control boreholes, usually to within ±5 per cent.

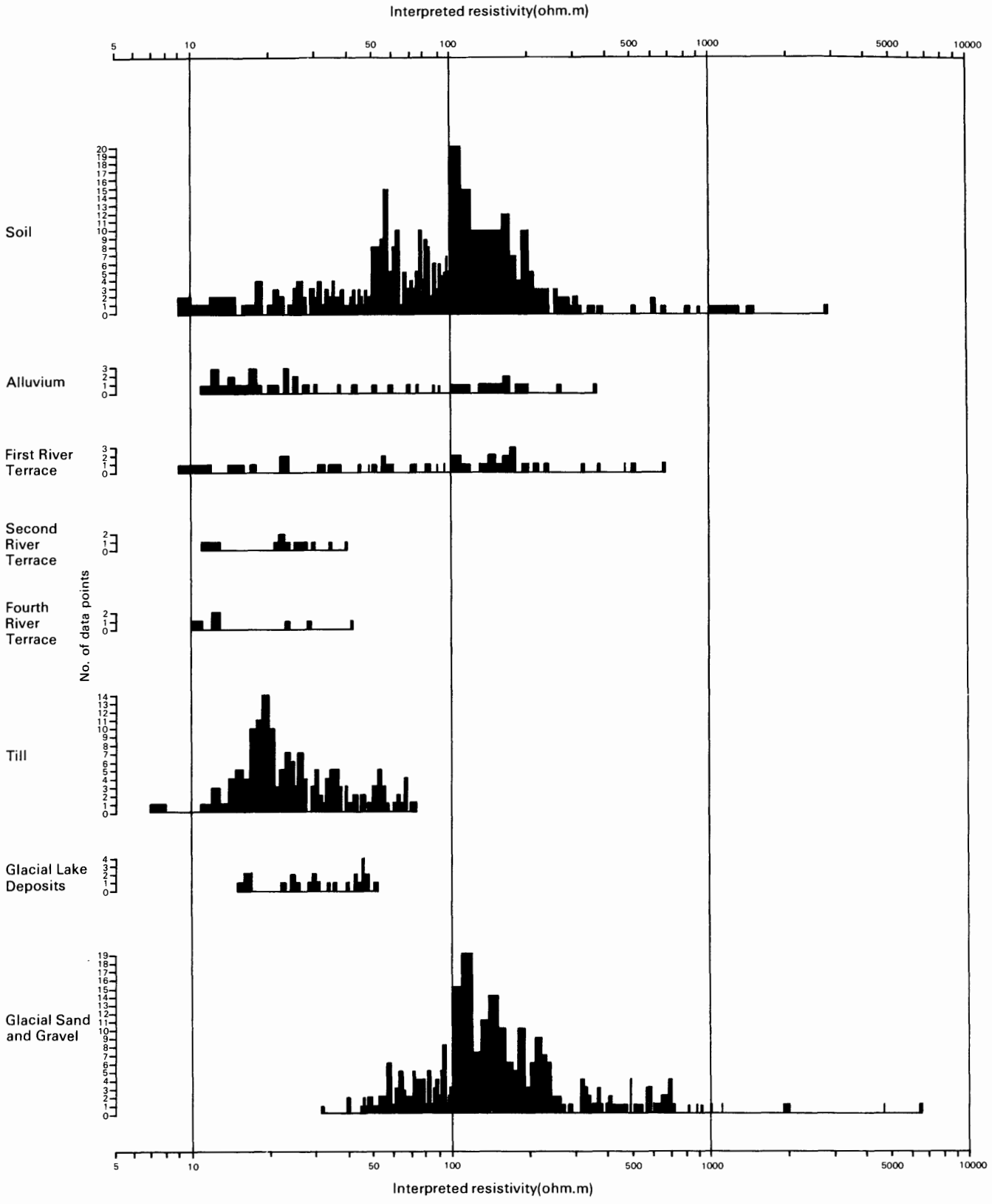



**Figure 8** Frequency distribution of the resistivity results for the Drift deposits

Since the preparation of this diagram, some of the First River Terrace Deposits have been reclassified as Second Terrace.

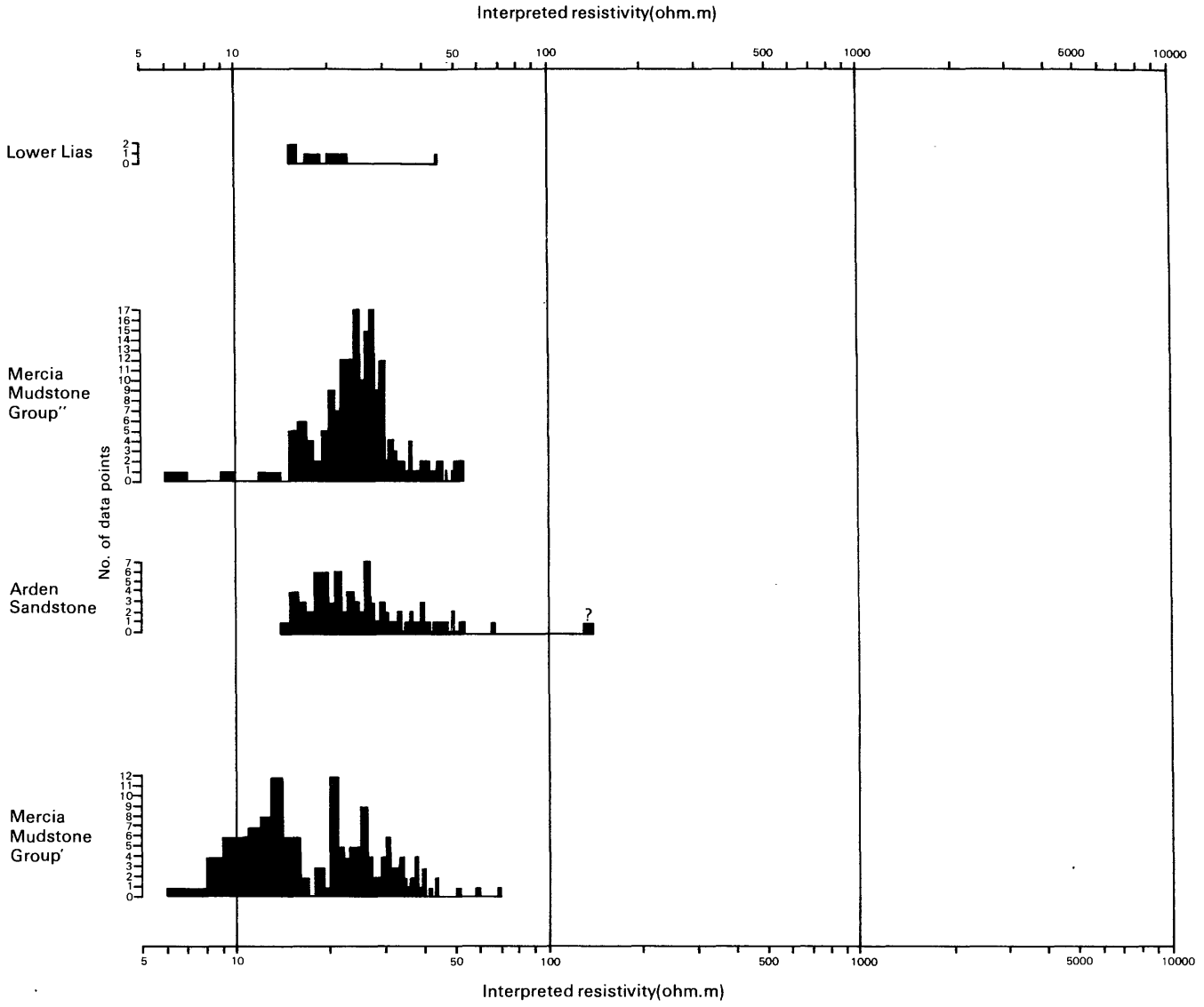



**Figure 9** Frequency distribution of the resistivity results for the Solid deposits

Although the Mercia Mudstone Group has not been differentiated elsewhere in the Report, the mudstones above and below the Arden Sandstone display slightly different resistivities arising from the marginally more silty nature of the upper division.

## APPENDIX G

### Summary of Resistivity Results

In the listings below, the following conventions are used. The Depth Sounding Identification Number, comprising an abbreviation of the sheet name (Hendley-in-Arden) and the accession number for the sheet (e.g. HY 48), is followed by the six-figure National Grid Reference for the site, accurate to 100 m. This location, which is referred to the nearest named locality on the 1:25 000 base map, is the mid-point of an area within which individual depth soundings were taken: one sounding was taken at two sites (HY 4, 101) two soundings were conducted at three of the sites (HY 6, 7, 35), 3 at 130 sites and 4 at the remaining two sites (HY 81, 108). (The location of each sounding is shown by a symbol on the resource map, and further details are presented in Appendix H).

The summary of the resistivity results from the soundings at each site comprises the range of interpreted resistivity values (in ohm metres) and thicknesses (in metres) for each identified layer, together with a lithological interpretation and in brackets, the most likely geological classification.

The resource block within which the site falls and the geology, deduced from the mapping, are also given.

**HY 1** **105 771** **Tyburn Farm** **Block A**

**Mapped geology:** Glacial Sand and Gravel overlying Glacial Lake Deposits

**Resistivity results:** Soil, sandy, 0.4-0.5 m thick, 89-112 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.1-1.3 m thick, 228-356 ohm m overlying sand and gravel interbedded with silt (Glacial Lake Deposits), 1.9-5.7 m thick, 45-85 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.4 m-7.0 m depth, 22-23 ohm m.

**HY 2** **115 764** **Dickens' Heath Farm** **Block A**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.5-0.9 m thick, 69-131 ohm m. Sandy clay (Till), 0.9-2.0 m thick, 53-63 ohm m overlying sand and gravel (Glacial Sand and Gravel), 7.1-8.3 m thick, 153-162 ohm m. Bedrock (Mercia Mudstone Group), clay, 8.9-10.8 m depth, 12-22 ohm m.

**HY 3** **131 769** **Lodge Farm** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 1.1-1.7 m thick, 102-168 ohm m. Clay, part sandy (Till), 6.1-11.7 m thick, 30-52 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.8-12.8 m depth, 20-21 ohm m.

**HY 4** **110 776** **Whitlock's End Farm** **Block A**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Made ground to 1.6 m with a resistivity of 140 ohm m. Clay (Till), 5.9 m thick, 23 ohm m overlying sand and gravel (Glacial Sand and Gravel), 2.7 m thick. Bedrock (Mercia Mudstone Group), clay, 10.2 m depth, 21 ohm m.

**HY 5** **105 755** **Rumbush** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4-0.5 m thick, 132-194 ohm m. Sandy clay (Till), 0.3-0.5 m thick, 67-72 ohm m overlying sand and gravel (Glacial Sand and Gravel), 7.0-9.3 m thick, 113-183 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.8-10.2 m depth, 26-27 ohm m.

**HY 6** **116 752** **Lady Lane Farm** **Block A**

**Mapped geology:** Glacial Lake Deposits

**Resistivity results:** Soil, sandy, 0.3 m thick, 101-102 ohm m. Clay (Glacial Lake Deposits), 1.3-1.4 m thick, 25-29 ohm m overlying sand and gravel (Glacial Sand and Gravel), 4.6-5.1 m thick, 106-132 ohm m. Bedrock (Mercia Mudstone Group), clay, 6.3-6.7 m depth, 9-17 ohm m.

**HY 7** **103 765** **Whitlock's End** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.7-1.4 m thick, 71-114 ohm m. Clay (Till), 6.5-9.2 m thick, 26-35 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 7.2-10.5 m depth, 25-45 ohm m.

**HY 8** **122 744** **Salter Street Farm** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, part sandy, 0.9-1.5 m thick, 38-92 ohm m. Clay (Till), 6.5-8.2 m thick, 27-35 ohm m. Bedrock (Arden Sandstone), clay, 8.0-9.1 m depth, 17-19 ohm m.

**HY 9** **130 744** **Lodge Paddocks** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.6-0.9 m thick, 81-88 ohm m. Clay (Till and Glacial Lake Deposits), 7.4-11.6 m thick, 23-37 ohm m. Bedrock (Arden Sandstone), clay, 8.2-12.2 m depth, 26-32 ohm m.

**HY 10** **106 733** **Springbrook Farm** **Block A**

**Mapped geology:** Till overlying Glacial Lake Deposits

**Resistivity results:** Soil, sandy, 0.6-0.8 m thick, 67-168 ohm m. Clay, part sandy (Till), 5.0-6.5 m thick, 19-43 ohm m overlying clay (Glacial Lake Deposits), 1.5 m thick, 22-40 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.1-7.8 m depth, 17-21 ohm m.

**HY 11** **122 726** **The Beeches** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.5-0.6 m thick, 48-62 ohm m. Clay (Till), 1.5-2.0 m thick, 19-30 ohm m overlying clay (Glacial Lake Deposits), 7.0-7.4 m thick, 16 ohm m. Bedrock (Mercia Mudstone Group, part Arden Sandstone), clay, 9.3-9.5m depth, 23-25 ohm m.

**HY 12** **138 727** **Heathfield Farm** **Block A**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, part clay, 0.3-0.8 m thick, 31-62 ohm m. Clay (Till), 2.5-4.8 m thick, 18-33 ohm m overlying sand and gravel (Glacial Sand and Gravel), 4.6-6.7 m thick, 123-170 ohm m. Bedrock (Arden Sandstone), clay, 9.6-10.2 m depth, 17-21 ohm m.

**HY 13** **147 720** **Nuthurst** **Block A**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.4 m thick, 143-192 ohm m. Sandy clay (Till), 0.5-3.1 m thick, 35-66 ohm m overlying sand and gravel (Glacial Sand and Gravel), 4.1-7.7 m thick, 187-346 ohm m. Bedrock (Arden Sandstone), clay, part sandy, 7.5-8.6 m depth, 23-49 ohm m.

**HY 14** **105 710** **Gilbert's Green** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 56-61 ohm m. Clay, part sandy (Till), 1.2-1.7 m thick, 30-43 ohm m overlying sand and gravel (Glacial Sand and Gravel), 3.8-4.6 m thick, 81-187 ohm m. Bedrock (Arden Sandstone), clay, 5.3-6.3 m depth, 24-28 ohm m.

**HY 15** **139 711** **Umberslade Park** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.6-0.9 m thick, 148-2801 ohm m (poor electrode contact at one sounding). Clay, part sandy (Till), 0.0-8.8 m thick, 18-51 ohm m overlying sand and gravel (Glacial Sand and Gravel), 6.0-8.1 m thick, 105-325 ohm m. Bedrock (Arden Sandstone), clay, 8.8-10.1 m depth, 19-26 ohm m.

**HY 16** **102 701** **Alderhanger Wood** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.8-1.7 m thick, 42-78 ohm m. Clay (Till), 3.8-4.1 m thick, 16-19 ohm m overlying sand and gravel, part clayey (Glacial Sand and Gravel), 3.7-4.2 m thick, 48-84 ohm m. Bedrock (Mercia Mudstone Group), clay, 8.8-9.5 m depth, 21-24 ohm m.

**HY 17** **121 705** **Leasowes** **Block B**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, sandy, part clay, 0.7-1.4 m thick, 27-94 ohm m. Clay (Alluvium), 2.7-3.4 m thick, 13-28 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.4-4.8 m depth, 16-21 ohm m.

**HY 18** **146 706** **Kemps Green Farm** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.5-0.8 m thick, 77-100 ohm m. Clay (Till), 3.8-7.2 m thick, 20-30 ohm m overlying sand and gravel (Glacial Sand and Gravel), 2.2-4.1 m thick, 99-110 ohm m. Bedrock (Arden Sandstone), clay, part sandy, 7.9-10.2 m depth, 27-36 ohm m.

**HY 19** **152 744** **Box Trees** **Block B**

**Mapped geology:** Till

**Resistivity results:** Clay, part sandy (Till), 0.4-0.8 m thick, 32-64 ohm m. Bedrock (Arden Sandstone), clay, 0.4-0.8 m depth, 14-20 ohm m.

**HY 20** **194 748** **Black Boy Bridge** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.5 m thick, 119-233 ohm m. Sand and gravel (Glacial Sand and Gravel), 6.5-9.4 m thick, 116-210 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.0-9.7 m depth, 25-26 ohm m.

**HY 21** **176 737** **Darley Green** **Block B**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3 m thick, 93-118 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 6.0-8.6 m thick, 56-211 ohm m. Bedrock (Arden Sandstone), clay, part sandy, 6.3-8.9 m depth, 19-30 ohm m.

**HY 22** **194 738** **Yew Tree Farm** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.0-0.3 m thick, 46-76 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 6.6-8.3 m thick, 47-111 ohm m. Bedrock (Mercia Mudstone Group), clay, 6.8-8.6 m depth, 21-23 ohm m.

**HY 23** **157 730** **Hockley Heath** **Block B**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.3-1.0 m thick, 50-99 ohm m. Clay, part sandy (Till), 1.1-1.5 m thick, 33-49 ohm m partly underlain by sand and gravel (Glacial Sand and Gravel), 2.6-3.0 m thick, 144-206 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.5-4.5 m depth, 18-23 ohm m.

**HY 24** **178 729** **Packwood Farm** **Block B**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.5 m thick, 57-232 ohm m. Clay (Till), one sounding only, 2.3 m thick, 36 ohm m. Sand and gravel (Glacial Sand and Gravel), 5.0-5.6 m thick, 90-415 ohm m. Bedrock (Mercia Mudstone Group), clay, 5.5-7.1 m depth, 26-38 ohm m.

**HY 25** **182 720** **The Lightwoods** **Block B**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy becoming clayey below c 0.4 m, 1.0-1.2 m thick, 56-256 ohm m. Clay, part sandy (Till), 4.0-4.7 m thick, 15-55 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 5.1-5.9 m depth, 32-50 ohm m.

**HY 26** **195 728** **Netherwood Heath Farm** **Block D**

**Mapped geology:** Alluvium and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.5-0.7 m thick, 99-141 ohm m. Clay (Alluvium), one sounding only, 1.6 m thick, 28 ohm m. Sand and gravel (Glacial Sand and Gravel), 5.6-7.2 m thick, 57-91 ohm m. Bedrock (Arden Sandstone), clay, 6.3-8.2 m depth, 18-20 ohm m.

**HY 27** **155 717** **Spring Cottage** **Block B**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy becoming clayey with depth, 0.6-1.3 m thick, 46-167 ohm m. Clay (Till), 2.4-2.8 m thick, 13-46 ohm m. Bedrock (Arden Sandstone), clay, 3.4-3.7 m depth, 19-23 ohm m.

**HY 28** **170 712** **Bearhouse Farm** **Block B**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.5 m thick, 105-169 ohm m. Sand and gravel (Glacial Sand and Gravel), 3.3-6.2 m thick, 74-107 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.8-6.7 m depth, 24-26 ohm m.

**HY 29** **189 714** **Kingswood House** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.8-1.5 m thick, 155-222 ohm m. Clayey sand and gravel (Glacial Sand and Gravel), 15.4-17.0 m thick, 48 ohm m. Bedrock (Mercia Mudstone Group), clay, 16.2-18.5 m depth, 21-26 ohm m.

**HY 30** **155 706** **Brook House Farm** **Block $F_3$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, sandy clay, 0.4-0.5 m thick, 34-41 ohm m. Sand and gravel (Alluvium), 1.2-1.5 m thick, 88-134 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.6-1.9 m depth, 10-11 ohm m.

**HY 31** **187 701** **Broom Hall Bridge** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.4-1.2 m thick, 50-56 ohm m. Sand and gravel (Glacial Sand and Gravel), 3.2-3.4 m thick, 105-131 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.6-4.5 m depth, 15-17 ohm m.

**HY 32** **199 705** **Weston Hall Farm** **Block D**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4 m thick, 64-72 ohm m. Clay (Till), 1.8 m thick, 24-30 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 2.2 m depth, 31-42 ohm m.

**HY 33** **211 738** **Dadkin Farm** **Block D**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.3-0.5 m thick, 55-151 ohm m. Clay (Till), one sounding only, 1.9 m thick, 24 ohm m. Sand and gravel (Glacial Sand and Gravel), 5.7-7.3 m thick, 89-698 ohm m overlying clay/silt (Glacial Lake Deposits), 1.1-2.0 m thick, 36-46 ohm m. Bedrock (Arden Sandstone), clay, 7.3-10.1 m depth, 21-26 ohm m.

**HY 34** **241 731** **Poors Wood** **Block E**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clay, 0.3-1.4 m thick, 31-86 ohm m. Clay (Till), one sounding only, 4.4 m thick, 19 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.1-4.2 m thick, 77-135 ohm m. Both deposits overlying clay/silt (Glacial Lake Deposits), 2.0-4.0 m thick, 45-48 ohm m. Clay (Till), 5.4-7.8 m depth, 19-27 ohm m.

**HY 35** **202 724** **Park Farm** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.5 m thick, 127 ohm m. Sand and gravel (Glacial Sand and Gravel), 4.8 m thick, 101-221 ohm m. Bedrock (Arden Sandstone), sandy clay, 4.8-5.3 m depth, 45-48 ohm m.

**HY 36** **213 722** **Warren Farm** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.5-0.6 m thick, 102-134 ohm m. Sand and gravel (Glacial Sand and Gravel), 6.0-6.1 m thick, 72-78 ohm m overlying clay/silt (Glacial Lake Deposits), 3.5-3.8 m thick, 45-47 ohm m. Clay (Till), 10.1-10.4 m depth, 26-40 ohm m.

**HY 37** **243 720** **Honiley** **Block E**

**Mapped geology:** Glacial Sand and Gravel overlying Glacial Lake Deposits

**Resistivity results:** Soil, sandy, 0.5-1.5 m thick, 56-60 ohm m. Sand and gravel (Glacial Sand and Gravel), 2.0-2.2 m thick, 75-91 ohm m. Clay and silt (Glacial Lake Deposits), 2.6-3.5 m depth, 25-42 ohm m.

**HY 38** **204 714** **Baddesley Clinton** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.5 m thick, 77-89 ohm m. Sand and gravel, upper part clayey (Glacial Sand and Gravel), 2.8-9.3 m thick, 40-230 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.1-9.8 m depth, 25-27 ohm m.

**HY 39** **231 720** **Manor Farm** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, part clayey, 0.3-0.4 m thick, 44-64 ohm m. Clay (Till), 7.4-10.9 m thick, 17-23 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.7-11.3 m depth, 15-17 ohm m.

**HY 40** **241 709** **Beausale** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4-0.8 m thick, 42-50 ohm m. Clay (Till), 3.8-4.2 m thick, 18-20 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.6-4.8 m depth, 22-25 ohm m.

**HY 41** **227 704** **Five Ways** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.2-0.5 m thick, 54-57 ohm m. Clay, part sandy (Till), 2.4-4.1 m thick, 19-38 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.9-4.5 m depth, 17-22 ohm m.

**HY 42** **103 697** **Trap's Green** **Block B**

**Mapped geology:** Till overlying Glacial Lake Deposits

**Resistivity results:** Soil, clay, part sandy, 0.5-1.1 m thick, 33-50 ohm m. Clay, part sandy (Till), 4.0-4.1 m thick, 22-51 ohm m. Clay and silt (Glacial Lake Deposits), 4.5-5.2 m depth, 29-44 ohm m.

**HY 43** **117 697** **Jennell Wood** **Block B**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 76-100 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 7.4-8.2 m thick, 63-235 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.7-8.5 m depth, 29-33 ohm m.

**HY 44** **131 691** **Hill Farm** **Block $F_2$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, sandy, part clayey, 0.2-0.3 m thick, 35-93 ohm m. Sand and gravel, part clayey (Alluvium), 0.7-1.5 m thick, 76-260 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.9-1.8 m depth, 14-15 ohm m.

**HY 45** **100 687** **Newhouse Farm** **Block $F_1$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 62-107 ohm m. Sand and gravel (Glacial Sand and Gravel), 3.9-6.0 m thick, 68-102 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.2-6.3 m depth, 20-22 ohm m.

**HY 46** **111 682** **Heath Lodge** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 61-83 ohm m. Clay (Till), 1.0-1.4 m thick, 30-40 ohm m overlying sand and gravel (Glacial Sand and Gravel), 3.2-4.1 m thick, 65-93 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.6-5.4 m depth, 30-33 ohm m.

**HY 47** **123 686** **Mockley Wood** **Block $F_1$**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.3-0.4 m thick, 67-144 ohm m. Clay (Till), one sounding only, 2.1 m thick, 18 ohm m. Sand and gravel, upper part clayey (Glacial Sand and Gravel), 3.7-4.0 m thick, 59-151 ohm m. Bedrock (Mercia Mudstone Group), sandy clay, 2.5-4.3 m depth, 40-41 ohm m.

**HY 48** **116 678** **Crowley Farm** **Block $F_1$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.5 m thick, 95-372 ohm m. Sand and gravel (Glacial Sand and Gravel), 5.1-5.7 m thick, 112-317 ohm m. Bedrock (Mercia Mudstone Group), clay, 5.4-5.9 m depth, 24-37 ohm m.

**HY 49** **144 680** **Botley Hill** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, part clayey, 0.3-0.5 m thick, 36-60 ohm m. Clay (Till), 2.5-4.2 m thick, 17-33 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.0-4.5 m depth, 26-28 ohm m.

**HY 50** **148 672** **Impsley Farm** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, clay, 0.2-0.3 m thick, 16-23 ohm m. Clay (Second River Terrace), 1.1-1.2 m thick, 34-37 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.4 m depth, 20-21 ohm m.

**HY 52** **123 662** **Barrells Park** **Block $F_1$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 75 ohm m. Sand and gravel (Alluvium), 0.9-1.5 m thick, 142-188 ohm m. Bedrock (Arden Sandstone), clay, 0.9-1.8 m depth, 15-31 ohm m. Clay (Mercia Mudstone Group), one sounding only, 13.9 m depth, 27 ohm m.

**HY 53** **157 694** **Upland Cottage** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.7 m thick, 103-302 ohm m. Sandy clay (Till), one sounding only, 0.9 m thick, 44 ohm m. Sand and gravel (Glacial Sand and Gravel), 3.0-4.6 m thick, 81-184 ohm m. Bedrock (part Mercia Mudstone Group, part Arden Sandstone), clay, 4.2-5.3 m depth, 21-22 ohm m.

**HY 54** **165 698** **Lapworth Lodge** **Block B**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.3 m thick, 55-111 ohm m. Clay, part sandy (Till), 1.1-1.4 m thick, 35-66 ohm m overlying sand and gravel (Glacial Sand and Gravel), 2.2-2.9 m thick, 146-197 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.7-4.6 m depth, 28-34 ohm m.

**HY 55** **167 692** **Lapworth Park** **Block $F_3$**

**Mapped geology:** Glacial Sand and Gravel and Till

**Resistivity results:** Soil, sandy, 0.0-0.5 m thick, 188 ohm m. Sand and gravel (Glacial Sand and Gravel), 0.7-1.7 m thick, 215-1024 ohm m. Clay (Till), two soundings only, 2.2-2.3 m thick, 15-17 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.2-3.3 m depth, 23-24 ohm m.

**HY 56** **174 697** **Yew Tree Farm** **Block $F_3$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.3-0.4 m thick, 70-162 ohm m. Sand and gravel (Second River Terrace), 1.5-1.9 m thick, 150-508 ohm m. Bedrock (Arden Sandstone), clay, 1.9-2.3 m depth, 17-30 ohm m. Clay (Mercia Mudstone Group), one sounding only, 12.2 m depth, 31 ohm m.

**HY 57** **180 697** **Windmill Hill** **Block $F_3$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4-0.6 m thick, 89-102 ohm m. Clay (Till), 1.5-1.7 m thick, 17-21 ohm m overlying clay (Glacial Lake Deposits), 3.9-5.0 m thick, 25-30 ohm m. Bedrock (Mercia Mudstone Group), clay, 5.8-7.1 m depth, 22-24 ohm m.

**HY 58** **192 694** **Turner's Green** **Block D**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.5-0.7 m thick, 86-147 ohm m. Clay, sandy (Second River Terrace), 1.0-1.6 m thick, 32-48 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-1.9 m depth, 12-13 ohm m.

**HY 59** **177 683** **Bush Wood** **Block $F_3$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3 m thick, 82-167 ohm m. Sand and gravel (Glacial Sand and Gravel), 2.4-5.6 m thick, 177-690 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 2.7-5.9 m depth, 29-47 ohm m.

**HY 60** **182 686** **Bushwood Common Farm Block $F_3$**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.4-0.6 m thick, 62-295 ohm m. Clay (Till), one sounding only, 1.3 m thick, 17 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 3.0-5.2 m thick, 62-363 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.7-5.7 m depth, 22-35 ohm m.

**HY 61** **185 684** **Bushwood Common Farm Block $F_3$**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.6-0.7 m thick, 191-213 ohm m. Clay, sandy (Till), 1.3-1.6 m thick, 32-42 ohm m overlying sand and gravel (Glacial Sand and Gravel), 3.7-4.5 m thick, 316-623 ohm m. Bedrock (Arden Sandstone), clay, sandy, 5.6-6.7 m depth, 33-40 ohm m.

**HY 62** **188 689** **Finwood Lawn** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.4 m thick, 72-110 ohm m. Sand and gravel (Glacial Sand and Gravel), 4.8-6.1 m thick, 93-240 ohm m. Bedrock (Mercia Mudstone Group), clay, 5.2-6.3 m depth, 30-32 ohm m.

**HY 63** **192 682** **Finwood** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.4 m thick, 266 ohm m. Sand and gravel (Glacial Sand and Gravel), 0.7-0.9 m thick, 93-145 ohm m. Bedrock (Mercia Mudstone Group), clay, 7.4-9.6 m thick, 19-21 ohm m. Clay (Arden Sandstone), 8.1-10.7 m depth, 29-31 ohm m.

**HY 64** **155 679** **Camp Hill Farm** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, clay, sandy, 0.4-0.8 m thick, 35-57 ohm m. Clay (Second River Terrace), 4.5-5.6 m thick, 14-17 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.9-6.0 m depth, 9-19 ohm m.

**HY 65** **190 679** **Lowsonford** **Block D**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-1.0 m thick, 172-354 ohm m. Sand and gravel, upper part clayey (Glacial Sand and Gravel), 3.6-5.9 m thick, 58-901 ohm m. Bedrock (Arden Sandstone), clay, sandy, 4.6-6.2 m depth, 37-39 ohm m.

**HY 66** **191 675** **Sandhills** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.4 m thick, 77-200 ohm m. Sand and gravel (Glacial Sand and Gravel), 2.2-6.4 m thick, 145-222 ohm m. Bedrock (Arden Sandstone), clay, 2.6-6.6 m depth, 23-28 ohm m.

**HY 67** **196 678** **Sandall House** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.0-0.4 m thick, 87 ohm m. Sand and gravel (Second River Terrace), 0.7-1.2 m thick, 81-167 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.7-1.6 m depth, 13-14 ohm m.

**HY 68** **199 673** **High Cross** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.4 m thick, 102-166 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.5-3.3 m thick, 108-432 ohm m. Bedrock (Arden Sandstone), clay, sandy, 1.8-3.5 m depth, 44-49 ohm m.

**HY 69** **196 670** **Meadow Croft** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.2-0.4 m thick, 88-107 ohm m. Sand and gravel (Second River Terrace), 1.2-1.5 m thick, 109-177 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-1.9 m depth, 12-13 ohm m.

**HY 70** **154 666** **Mobbs's Farm Block $F_2$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, sandy, part clay, 0.3-0.5 m thick, 19-81 ohm m. Sand and gravel (Alluvium), 1.0-1.3 m thick, 92-193 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-1.6 m depth, 14-15 ohm m.

**HY 71** **176 669** **Malthouse Farm** **Block $F_3$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 70-98 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.2 m thick, 130-153 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.2-1.5 m depth, 24-27 ohm m.

**HY 72** **177 664** **Preston Fields** **Block $F_3$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Sand and gravel (Glacial Sand and Gravel), 0.3-0.7 m thick, 77-119 ohm m. Bedrock (Mercia Mudstone Group), clay becoming sandy with depth, 0.3-0.7 m depth, 20-45 ohm m.

**HY 73** **175 659** **Preston Bagot** **Block $F_3$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.9 m thick, 152-192 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.3-3.0 m thick, 87-233 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-3.8 m depth, 27-30 ohm m.

**HY 74** **184 663** **Yarningale Farm** **Block $F_4$**

**Mapped geology:** Second River Terrace and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clayey, 0.3-0.8 m thick, 63-173 ohm m. Sand and gravel (Second River Terrace), one sounding only, 1.7 m thick, 177 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.5-2.5 m thick, 372-408 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.0-3.3 m depth, 13-39 ohm m. Sand (?Arden Sandstone), one sounding only, 1.8 m depth, 139 ohm m.

**HY 75** **168 653** **Preston Bagot House** **Block $F_3$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.3-0.7 m thick, 54-141 ohm m. Clay, sandy (Till), 2.2-3.3 m thick, 19-63 ohm m. Bedrock (Arden Sandstone), clay, 2.9-3.7 m depth, 20-26 ohm m.

**HY 76** **174 653** **Preston Bagot Farm** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.3-0.6 m thick, 58-78 ohm m. Sand and gravel (Second River Terrace), 0.4-2.7 m thick, 179-237 ohm m. Bedrock (part Mercia Mudstone Group, part Arden Sandstone), clay, 0.7-3.0 m depth, 24-28 ohm m.

**HY 77** **198 657** **Lye Green** **Block E**

**Mapped geology:** Glacial Sand and Gravel overlying Till

**Resistivity results:** Soil, sandy, 0.0-0.2 m thick, 168 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.1-2.1 m thick, 111-162 ohm m overlying clay (Till), 25-31 ohm m. Bedrock (Mercia Mudstone Group), one sounding only, clay, 4.5 m depth, 30 ohm m.

**HY 78** **212 693** **Mousley End** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, part clay, 0.3-1.2 m thick, 9-81 ohm m. Clay, sandy (Till), 1.1-1.3 m thick, 31-45 ohm m. Bedrock (Arden Sandstone), clay becoming sandy below, 1.2-1.6 m depth, 16-68 ohm m.

**HY 79** **233 696** **Haseley Green** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2 m thick, 124-272 ohm m. Sand and gravel (Glacial Sand and Gravel), 6.4-11.0 m thick, 114-814 ohm m. Bedrock (Mercia Mudstone Group), clay, 6.6-11.2 m depth, 33-36 ohm m.

**HY 80** **247 695** **Beausale Cottage** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2 m thick, 69-95 ohm m. Sand and gravel, becoming more clayey with depth, 5.1-5.2 m thick, 64-176 ohm m. Bedrock (Mercia Mudstone Group), clay, 5.3-5.4 m depth, 22-25 ohm m.

**HY 81** **203 684** **Rowington Hill Bridge** **Block E**

**Mapped geology:** Alluvium and Second River Terrace

**Resistivity results:** Soil, sandy, part clay, 0.4-0.9 m thick, 11-340 ohm m. Clay (Alluvium), one sounding only, 2.0 m thick, 26 ohm m. Clay (Second River Terrace), 1.1-2.9 m thick, 9-23 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.9-3.4 m depth, 12-14 ohm m.

**HY 82** **231 683** **Glebe Farm** **Block E**

**Mapped geology:** First River Terrace and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.4 m thick, 137-262 ohm m. Sand and gravel (First River Terrace), one sounding only, 0.5 m thick, 472 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 6.9-8.6 m thick, 53-500 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 7.3-9.4 m depth, 19-59 ohm m.

**HY 83** **241 687** **Waste Green** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2 m thick, 56-78 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 2.9-8.0 m thick, 51-862 ohm m. Bedrock (Mercia Mudstone Group), clay, sandy, 3.1-8.2 m depth, 35-69 ohm m.

**HY 84** **246 682** **Brownley Green** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, part clayey, 0.7-0.9 m thick, 50-97 ohm m. Clay (Till), 3.3-3.7 m thick, 16-19 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.2-4.4 m depth, 23-26 ohm m.

**HY 85** **236 674** **Haseley** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.9 m thick, 52-216 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 8.4-9.2 m thick, 54-154 ohm m. Bedrock (Mercia Mudstone Group), clay, 9.3-9.4 m depth, 25-32 ohm m.

**HY 86** **235 665** **Hatton Farm** **Block E**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.5 m thick, 84-110 ohm m. Clay, part sandy (Till), 2.7-3.7 m thick, 23-45 ohm m overlying sand and gravel (Glacial Sand and Gravel), 5.3-6.4 m thick, 423-683 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 9.1-9.5 m depth, 30-51 ohm m.

**HY 87** **209 661** **Little Pinley Farm** **Block E**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, poor electrode contact, 1.0-1.2 m thick, 605-1298 ohm m. Clay, sandy (Till), 0.4-1.8 m thick, 55-68 ohm m overlying sand and gravel (Glacial Sand and Gravel), 6.4-9.0 m thick, 448-679 ohm m. Bedrock (part Mercia Mudstone Group, part Arden Sandstone), clay, part sandy, 9.0-10.5 m depth, 6-38 ohm m.

**HY 88** **215 656** **Pinley Abbey** **Block E**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.4-1.2 m thick, 217-384 ohm m. Sand and gravel (Glacial Sand and Gravel), 7.8-10.4 m thick, 71-121 ohm m. Bedrock (Mercia Mudstone Group), clay, 8.2-10.8 m depth, 16-18 ohm m.

**HY 89** **244 657** **Budbrooke Farm** **Block E**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, clay, part sandy, 0.3 m thick, 26-45 ohm m. Clay (Till), 2.1-3.2 m thick, 15-16 ohm m overlying sand and gravel (Glacial Sand and Gravel), 6.0-7.9 m thick, 460-658 ohm m. Bedrock (Mercia Mudstone Group), clay, 8.4-11.4 m depth, 24-29 ohm m.

**HY 90** **102 645** **Stapenhill Wood** **Block $F_1$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3-0.9 m thick, 14-17 ohm m. Clay (Alluvium), 2.0-3.4 m thick, 13-24 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.3-3.7 m depth, 21-26 ohm m.

**HY 91** **116 642** **Morton Bagot** **Block $F_1$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 191 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.1-1.3 m thick, 116-147 ohm m. Bedrock (Lower Lias), clay, 1.1-1.4 m depth, 15-18 ohm m.

**HY 92** **143 644** **May's Wood** **Block $F_1$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, poor electrode contact, 0.2-0.3 m thick, 816-1494 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.6-2.4 m thick, 148-6573 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.8-3.0 m depth, 35-37 ohm m.

**HY 93** **145 641** **Wootton Hill Farm** **Block $F_1$**

**Mapped geology:** Head

**Resistivity results:** Soil, clay, sandy, 0.3-0.5 m thick, 48-55 ohm m. Clay (Head), 0.8-2.3 m thick, 14-22 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 1.1-2.8 m depth, 27-44 ohm m.

**HY 94** **131 638** **Merryfield Farm** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, part sandy, 0.4-0.7 m thick, 31-74 ohm m. Clay (Till), 2.0-2.5 m thick, 20-21 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.7-2.9 m depth, 23-24 ohm m.

**HY 95** **100 632** **Spernall Park** **Block $F_1$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3 m thick, 12-21 ohm m. Clay (Alluvium), 2.8-3.3 m thick, 17-18 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.1-3.6 m depth, 10-13 ohm m.

**HY 96** **144 630** **Wootton Park Farm** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, part sandy, 0.3 m thick, 43-61 ohm m. Clay (Till), 2.0 m thick, 24-25 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.3 m depth, 28 ohm m.

**HY 97** **128 614** **Shelfield Green** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.3-0.4 m thick, 57-100 ohm m. Clay (Till), 2.5-3.0 m thick, 21-38 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.9-3.3 m depth, 25-29 ohm m.

**HY 98** **141 613** **Pool's Farm** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, part clayey, 0.7-0.9 m thick, 36-78 ohm m. Sand and gravel, part clayey (Second River Terrace), 2.1-3.0 m thick, 55-82 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.0-3.9 m depth, 23-27 ohm m.

**HY 99** **148 617** **Gray Mill House** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 96-284 ohm m. Sand and gravel (Second River Terrace), 1.3-2.5 m thick, 148-671 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.6-2.7 m depth, 24-28 ohm m.

**HY 100** **135 608** **Little Alne** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4-1.4 m thick, 107-120 ohm m. Clay, part sandy (Till), 1.0-2.4 m thick, 17-53 ohm m. Sand and gravel (Glacial Sand and Gravel), one sounding only, 1.6 m thick, 146 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.2-3.8 m depth, 26-34 ohm m.

**HY 101** **130 601** **Carmore Hill** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4 m thick, 58 ohm m. Clay (Till), 4.4 m thick, 18 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.8 m depth, 38 ohm m.

**HY 102** **130 604** **New Covert** **Block $F_1$**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.5-0.8 m thick, 80-98 ohm m. Clay, part sandy (Till), 2.0-2.5 m thick, 13-55 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.5-3.1 m depth, 33-40 ohm m.

**HY 103** **141 604** **Aston Cantlow** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 75 ohm m. Sand and gravel (Second River Terrace), 1.2-1.6 m thick, 96-219 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.2-1.9 m depth, 19-24 ohm m. Clay (Arden Sandstone), one sounding only, 8.9 m depth, 33 ohm m.

**HY 104** **154 642** **Wootton Pool** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.5-0.7 m thick, 54-84 ohm m. Clay (Second River Terrace), 2.0-3.5 m thick, 22-27 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.5-4.0 m depth, 27-30 ohm m.

**HY 105** **166 642** **Wootton Grange** **Block $F_2$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3-0.8 m thick, 10-32 ohm m. Clay (Alluvium), 1.0-2.8 m thick, 16-24 ohm m. Bedrock (Mercia Mudstone Group), clay becoming sandy with depth, 1.3-3.6 m depth, 6-15 ohm m.

**HY 106** **193 644** **Claverdon** **Block E**

**Mapped geology:** Till

**Resistivity results:** Soil, sandy, 0.4-0.5 m thick, 159-228 ohm m. Clay, part sandy (Till), 1.0-3.2 m thick, 21-42 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-3.6 m depth, 24-28 ohm m.

**HY 107** **152 631** **Wootton Wawen** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.5 m thick, 178-280 ohm m. Sand and gravel, part clayey (Second River Terrace), 2.4-4.4 m thick, 53-73 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.9-4.9 m depth, 20-24 ohm m.

**HY 108** **160 637** **Pettiford Bridge** **Block $F_2$**

**Mapped geology:** Alluvium and Second River Terrace

**Resistivity results:** Soil, sandy, 0.2-0.7 m thick, 98-512 ohm m. Sand and gravel (Alluvium), one sounding only, 1.5 m thick, 362 ohm m. Clay (Second River Terrace), 1.3-2.0 m thick, 23-32 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.7-2.5 m depth, 25-29 ohm m.

**HY 109** **169 635** **Preston Hill Farm** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Sand and gravel (Glacial Sand and Gravel), 0.4-1.0 m thick, 64-78 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.4-1.0 m depth, 22-33 ohm m.

**HY 110** **174 633** **Thistley Wood** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clay, 0.3-0.8 m thick, 19-256 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 1.0-1.5 m thick, 73-488 ohm m. Bedrock (Mercia Mudstone Group), clay, sandy, 1.0-2.0 m depth, 30-54 ohm m.

**HY 111** **180 637** **Kington Farm** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.6 m thick, 114-153 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 0.6-1.1 m thick, 50-243 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.6-1.6 m depth, 16-26 ohm m.

**HY 112** **183 636** **Tattle Bank** **Block $F_4$**

**Mapped geology:** Till and Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.4 m thick, 74-310 ohm m. Clay (Till), one sounding only, 1.6 m thick, 19 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.3-1.8 m thick, 103-221 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-2.2 m depth, 26-32 ohm m.

**HY 113** **194 631** **Langley** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3-0.6 m thick, 110-147 ohm m. Sand and gravel, upper part clayey (Glacial Sand and Gravel), 4.3-6.1 m thick, 57-325 ohm m. Bedrock (Mercia Mudstone Group), clay, 4.6-6.5 m depth, 33-39 ohm m.

**HY 114** **158 624** **Austy Manor Cottages** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Sand and gravel (Glacial Sand and Gravel), 0.4-1.2 m thick, 87-132 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 0.4-1.2 m depth, 25-43 ohm m.

**HY 115** **162 627** **Austy Manor** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Sand and gravel (Glacial Sand and Gravel), 0.7-0.9 m thick, 107-167 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.7-0.9 m depth, 16-25 ohm m.

**HY 117** **192 623** **Langley Green** **Block $F_4$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3 m thick, 27 ohm m. Clay (Alluvium), 0.6-1.0 m thick, 11-14 ohm m. Bedrock (Mercia Mudstone Group), clay, sandy to 3.9 m, 0.9-1.0 m depth, 10-43 ohm m.

**HY 118** **153 614** **Pennyford Hall** **Block $F_4$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, clay, part sandy, 0.3-0.4 m thick, 30-58 ohm m. Clay (Second River Terrace), 2.0-2.2 m thick, 23-26 ohm m. Bedrock (Mercia Mudstone Group), 2.3-2.5 m depth, 28-30 ohm m.

**HY 119** **168 612** **Oakland Farm** **Block $F_4$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, part sand, 0.3 m thick, 28-91 ohm m. Sand and gravel (Alluvium), 1.1-1.6 m thick, 60-119 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.4-1.9 m depth, 20-26 ohm m.

**HY 120** **198 619** **Langley Green** **Block $F_5$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Sand and gravel, part clayey (Glacial Sand and Gravel), 0.3-0.6 m thick, 66-365 ohm m. Bedrock (Mercia Mudstone Group), clay, 0.3-0.6 m depth, 16-24 ohm m. Clay, sandy (Arden Sandstone), 2.0-3.7 m depth, 39-54 ohm m.

**HY 121** **169 606** **Bearley Station** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 111 ohm m. Sand and gravel (Glacial Sand and Gravel), 0.5-4.7 m thick, 61-255 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 0.5-5.0 m depth, 17-51 ohm m.

**HY 122** **193 605** **Snitterfield Bushes** **Block $F_5$**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, 0.3 m thick, 32-42 ohm m. Clay (Till), 8.6 m+, 11-21 ohm m. Base of Till not identified from soundings.

**HY 123** **107 586** **Kinwarton** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.3-0.6 m thick, 63-98 ohm m. Clay (Second River Terrace), 0.7-1.9 m thick, 30-39 ohm m. Bedrock (Mercia Mudstone Group), clay becoming sandy below, 1.0-2.3 m depth, 8-20 ohm m.

**HY 124** **110 588** **Kinwarton** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, part clayey, 0.2-0.5 m thick, 35-67 ohm m. Clay (Second River Terrace), 0.8-2.5 m thick, 11-21 ohm m. Bedrock (Mercia Mudstone Group), clay, part sandy, 1.2-3.0 m depth, 7-38 ohm m.

**HY 125** **115 587** **Kinwarton** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 51-102 ohm m. Sand and gravel, part clayey (Second River Terrace), 1.2-2.1 m thick, 51-108 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.5-2.4 m depth, 10-11 ohm m.

**HY 126** **117 590** **Great Alne** **Block $F_2$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3-1.0 m thick, 18-33 ohm m. Clay, sandy (Alluvium), 1.2-1.8 m thick, 43-52 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.8-2.5 m depth, 9-10 ohm m.

**HY 127** **121 590** **Great Alne** **Block $F_2$**

**Mapped geology:** Second River Terrace

**Resistivity results:** Soil, clay, 0.2-0.3 m thick, 18-29 ohm m. Sand and gravel, part clay (Second River Terrace), 1.2-1.3 m thick, 24-57 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.2-1.5 m depth, 11-13 ohm m.

**HY 128** **131 594** **Aston Cantlow** **Block $F_2$**

**Mapped geology:** Alluvium

**Resistivity results:** Soil, clay, 0.3-0.5 m thick, 25-31 ohm m. Clay, sandy with depth (Alluvium), 2.0-2.2 m thick, 12-38 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.5 m depth, 16-21 ohm m.

**HY 129** **162 599** **Newnham** **Block $F_4$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.2 m thick, 57 ohm m. Sand and gravel, part clay (Glacial Sand and Gravel), 0.3-1.6 m thick, 39-65 ohm m. Bedrock (Lower Lias), clay, sandy, 0.3-1.8 m depth, 17-44 ohm m.

**HY 130** **181 592** **Arden Hill Farm** **Block $F_5$**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, 0.2-0.7 m thick, 27-45 ohm m. Clay, part sandy (Till), 2.3-4.0 m thick, 8-36 ohm m. Bedrock (part Lower Lias, part Mercia Mudstone Group), clay, 3.0-4.2 m depth, 22-29 ohm m.

**HY 131** **193 588** **Comyns Farm** **Block $F_5$**

**Mapped geology:** Till

**Resistivity results:** Soil, clay, 0.3-1.0 m thick, 20-30 ohm m. Clay (Till), 2.2-3.0 m thick, 22-24 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.8-4.0 m depth, 14-26 ohm m.

**HY 132** **218 594** **Snitterfield** **Block $F_6$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.0-0.3 m thick, 53-58 ohm m. Sand and gravel (Glacial Sand and Gravel), 0.6-1.0 m thick, 74-216 ohm m overlying clay (Till), 0.8-1.7 m thick, 31-40 ohm m. Both deposits underlain by sand and gravel (Glacial Sand and Gravel), 2.4 m+ thick, 81-118 ohm m. Bedrock (Mercia Mudstone Group), one sounding only, clay, sandy, 4.1 m depth, 50 ohm m.

**HY 133** **226 597** **Sand Barn Cottages** **Block $F_6$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.7-0.8 m thick, 98-149 ohm m. Sand and gravel (Glacial Sand and Gravel), 2.6-4.6 m thick, 187-389 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.3-5.4 m depth, 36-44 ohm m.

**HY 134** **234 596** **Clump Hill** **Block $F_6$**

**Mapped geology:** Till overlying Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, part clay, 0.2-1.1 m thick, 37-255 ohm m. Clay, part sandy (Till), 0.0-1.2 m thick, 15-46 ohm m overlying sand and gravel (Glacial Sand and Gravel), 4.4-7.0 m thick, 186-615 ohm m. Bedrock (Mercia Mudstone Group), clay, 6.5-7.2 m depth, 26-29 ohm m.

**HY 135** **209 590** **Hollow Meadow** **Block $F_6$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.3 m thick, 102-201 ohm m. Sand and gravel, part clayey (Glacial Sand and Gravel), 2.2-3.3 m thick, 53-563 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.5-3.6 m depth, 26-37 ohm m.

**HY 136** **234 589** **Black Hill** **Block $F_6$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, clay, 0.2-1.5 m thick, 12-23 ohm m. Sand and gravel, part clay (Glacial Sand and Gravel), 1.9-4.9 m thick, 32-314 ohm m. Bedrock (Mercia Mudstone Group), clay, 3.3-5.1 m depth, 25-30 ohm m.

**HY 137** **238 591** **Black Hill** **Block $F_6$**

**Mapped geology:** Glacial Sand and Gravel

**Resistivity results:** Soil, sandy, 0.2-0.3 m thick, 91-162 ohm m. Sand and gravel (Glacial Sand and Gravel), 1.1-3.2 m thick, 99-396 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.3-3.4 m depth, 26-30 ohm m.

**HY 138** **245 587** **Hampton Gorse** **Block $F_6$**

**Mapped geology:** Fourth River Terrace

**Resistivity results:** Soil, clay, sandy, 0.4-0.5 m thick, 39-57 ohm m. Clay (Fourth River Terrace), 1.0-2.0 m thick, 12-24 ohm m. Bedrock (Mercia Mudstone Group), clay, 1.4-2.5 m depth, 23-27 ohm m.

**HY 139** **244 584** **Green Hill** **Block $F_6$**

**Mapped geology:** Fourth River Terrace

**Resistivity results:** Soil, sandy, 0.8-1.2 m thick, 112-139 ohm m. Clay, part sandy (Fourth River Terrace), 1.3-2.0 m thick, 10-42 ohm m. Bedrock (Mercia Mudstone Group), clay, 2.4-2.8 m depth, 14 ohm m.

APPENDIX H

## COMPARISON OF INTERPRETED RESISTIVITY DATA WITH BOREHOLE RECORDS

The interpreted resistivity results at each of sixteen sites (left side of page) are compared with summary records of the control boreholes (right side of page). The records include the grid reference, lithology and (in brackets) the geological classification, together with the thickness of each proven bed or deposit. Where applicable, the position of the control borehole relative to the resistivity soundings is noted.

The comparisons are presented in order of the Depth Sounding Identification Numbers; the cross-reference listing below is in order of the Borehole Registration Numbers:

| Borehole Registration Numbers | Resistivity site number |
|---|---|
| 16 NE 66 | HY 53 |
| 16 SW 17 | HY 99 |
| 16 SE 6 | HY 106 |
| 16 SE 8 | HY 108 |
| 17 NW 176 | HY 4 |
| 17 NW 177 | HY 7 |
| 17 NW 178 | HY 3 |
| 17 SW 191 | HY 12 |
| 17 SW 193 | HY 16 |
| 17 SW 194 | HY 14 |
| 17 SW 195 | HY 15 |
| 17 SW 196 | HY 13 |
| 17 SE 73 | HY 19 |
| 17 SE 76 | HY 22 |
| 17 SE 77 | HY 27 |
| 25 NW 64 | HY 134 |

In the latter part of this Appendix (pp.141 to 164 ), the records of the individual depth soundings conducted at each of the sixteen resistivity check sites are reproduced in full. An annotated record and explanation will be found on pages 140 and 141.

**HY 3**

Grid reference 131 769

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 1.1 - 1.7 |
| Clay, part sandy (Till) | 6.1 - 11.7 |
| Clay (Mercia Mudstone Group) | |

**HY 4**

Grid reference 110 776

| Lithology | Interpreted thickness (m) |
|---|---|
| Made ground | 1.6 |
| Clay (Till) | 5.9 |
| Sand and gravel (Glacial Sand and Gravel) | 2.7 |
| Clay (Mercia Mudstone Group) | |

**HY 7**

Grid reference 103 765

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.7 - 1.4 |
| Clay (Till) | 6.5 - 9.2 |
| Clay, part sandy (Mercia Mudstone Group) | |

**Borehole SP 17 NW 178**

Grid reference 1306 7688

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.5 |
| Clay, silty sand layers, pebbly below 3.3 m (Till) | 8.0 |
| Gravel, 'clayey' (Glacial Sand and Gravel) | 0.6 |
| Clay, silty, laminated (Glacial Lake Deposits) | 1.4 |
| Mudstone, silty (Mercia Mudstone Group) | 0.5+ |

**Borehole SP 17 NW 176**

Grid reference 1105 7763

| Lithology | Proved thickness (m) |
|---|---|
| Soil and Till | 0.3 |
| Clay, sandy below 5.6 m, pebbly (Till) | 7.0 |
| Sandy gravel, 'clayey' (Glacial Sand and Gravel) | 0.8 |
| Clay, sandy bands (Glacial Lake Deposits) | 1.3 |
| Gravel (Glacial Sand and Gravel) | 0.8 |
| Clay, silty (Mercia Mudstone Group) | 0.3+ |

**Borehole SP 17 NW 177**

Grid reference 1037 7642

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.2 |
| Clay, sandy, pebbly below 3.0 m (Till) | 8.0 |
| Gravel (Glacial Sand and Gravel) | 0.8 |
| Clay, pebbly (Till) | 0.5 |
| Silt (Till) | 0.5 |
| Clay, silty (Mercia Mudstone Group) | 0.5+ |

**HY 12**

Resistivity soundings were located more than 160 m from borehole site.

Grid reference 138 727

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy, part clay | 0.3 - 0.8 |
| Clay, (Till) | 2.5 - 4.8 |
| Sand and gravel (Glacial Sand and Gravel) | 4.6 - 6.8 |
| Clay (Arden Sandstone) | |

**Borehole SP 17 SW 191**

Grid reference 1364 7279

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.7 |
| Clay, pebbly (Till) | 5.5 |
| Sand, 'clayey' and pebbly, becoming gravel below (Glacial Sand and Gravel) | 4.6 |
| Mudstone (Arden Sandstone) | 0.2+ |

**HY 13**

Resistivity soundings more than 100 m from borehole site.

Grid reference 147 720

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.4 |
| Clay, sandy (Till) | 0.5 - 3.1 |
| Sand and gravel (Glacial Sand and Gravel) | 4.1 - 7.7 |
| Clay, part sandy (Arden Sandstone) | |

**Borehole SP 17 SW 196**

Grid reference 1478 7217

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.2 |
| Clay, pebbly (Till) | 2.2 |
| Gravel, 'clayey', sandy becoming less clayey below (Glacial Sand and Gravel) | 4.9 |
| Clay (?Till) | 0.7 |
| Mudstone (Arden Sandstone) | 1.5+ |

**HY 14**

Resistivity soundings more than 60 m from borehole site and closer to sand and gravel outcrop.

Grid reference 105 710

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.0 - 0.3 |
| Clay, part sandy (Till) | 1.2 - 1.7 |
| Sand and gravel (Glacial Sand and Gravel) | 3.8 - 4.6 |
| Clay (Arden Sandstone) | |

**Borehole SP 17 SW 194**

Grid reference 1042 7116

| Lithology | Proved thickness (m) |
|---|---|
| Made ground | 0.3 |
| Clay, pebbly (Till) | 3.2 |
| Sand, 'clayey', pebbly becoming 'clayey' gravel below (Glacial Sand and Gravel) | 2.5 |
| Clay, pebbly (?Till) | 0.2 |
| Clay (Arden Sandstone) | 2.8+ |

**HY 15**

Grid reference 139 711

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.6 - 0.9 |
| Clay, part sandy (Till); not recognised in one sounding, but very high resistivity of soil (2800 ohm m) due to poor electrode contact, and high resistivity of sand and gravel below (>104 ohm m) have combined to 'mask' the clay layer | 0.0 - 8.8 |
| Sand and gravel (Glacial Sand and Gravel) | 6.0 - 8.1 |
| Clay (Arden Sandstone) | |

**HY 16**

Resistivity soundings more than 100 m from borehole site.

Grid reference 102 701

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy, part clayey | 0.8 - 1.7 |
| Clay (Till) | 3.8 - 4.1 |
| Sand and gravel, part clayey (Glacial Sand and Gravel) | 3.7 - 4.2 |
| Clay (Mercia Mudstone Group) | |

**HY 19**

Resistivity soundings more than 100 m from borehole site.

Grid reference 152 744

| Lithology | Interpreted thickness (m) |
|---|---|
| Clay, part sandy (Till) | 0.4 - 0.8 |
| Clay (Arden Sandstone) | 1.5 - 2.1 |
| Clay (Arden Sandstone) | |

**Borehole SP 17 SW 195**

Grid reference 1394 7103

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.4 |
| Clay, pebbly (Till) | 2.8 |
| Gravel, 'very clayey' (Glacial Sand and Gravel) | 1.0 |
| Clay, pebbly (?Till) | 0.8 |
| Gravel, sandy (Glacial Sand and Gravel) | 4.0 |
| Mudstone (Arden Sandstone) | 0.1+ |

**Borehole SP 17 SW 193**

Grid reference 1038 7001

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.3 |
| Clay, sandy, pebbly (Till) | 7.4 |
| Gravel (Glacial Sand and Gravel) | 0.5 |
| Clay (Mercia Mudstone Group) | 0.3+ |

**Borehole SP 17 SE 73**

Grid reference 1506 7435

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.1 |
| Clay, pebbly (Till) | 0.5 |
| Clay, silty (Arden Sandstone) | 1.7 |
| Siltstone (Arden Sandstone) | 1.1+ |

**HY 22** — **Borehole SP 17 SE 76**

Resistivity soundings more than 130 m from borehole site. Borehole nearer to bedrock outcrop.

Grid reference 194 738 — Grid reference 1957 7396

| Lithology | Interpreted thickness (m) | Lithology | Proved thickness (m) |
|---|---|---|---|
| Soil, sandy, part clayey | 0.0 - 0.3 | Soil | 0.3 |
| Sand and gravel, part clayey (Glacial Sand and Gravel) | 6.6 - 8.3 | Sand, 'clayey', pebbly; gravel below (Glacial Sand and Gravel) | 7.6 |
| Clay (Mercia Mudstone Group) | | Mudstone (Mercia Mudstone Group) | 2.5+ |

**HY 27** — **Borehole SP 17 SE 77**

Grid reference 155 717 — Grid reference 1547 7167

| Lithology | Interpreted thickness (m) | Lithology | Proved thickness (m) |
|---|---|---|---|
| Soil, sandy becoming clayey with depth | 0.6 - 1.3 | Soil | 0.3 |
| Clay (Till) | 2.4 - 2.8 | Clay, silty, pebbly (Till) | 1.5 |
| Clay (Arden Sandstone) | | Clay (Arden Sandstone) | 0.7+ |

**HY 53** — **Borehole SP 16 NE 66**

Resistivity soundings were centred more than 100 m from the borehole site.

Grid reference 157 694 — Grid reference 1549 6936

| Lithology | Interpreted thickness (m) | Lithology | Proved thickness (m) |
|---|---|---|---|
| Soil, sandy | 0.3 - 0.7 | Soil | 0.5 |
| Clay, sandy (Till); only recognised in one sounding; however, the soil layer and underlying sand and gravel both have high resistivities (>139 ohm m) and probably have combined to 'mask' the clay layer | 0.9 | Clay, sandy, pebbly (Till) | 1.2 |
| Sand and gravel (Glacial Sand and Gravel) | 3.0 - 4.6 | Sand, 'very clayey', pebbly (Glacial Sand and Gravel) | 2.3 |
| Clay (part Mercia Mudstone Group, part Arden Sandstone) | | Mudstone (Mercia Mudstone Group) | 0.2+ |

**HY 99**

Grid reference 148 617

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.2 - 0.3 |
| Sand and gravel (Second River Terrace) | 1.3 - 2.5 |
| Clay (Mercia Mudstone Group) | |

**Borehole SP 16 SW 17**

Grid reference 1481 6184

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.5 |
| Gravel (Second River Terrace) | 1.2 |
| Clay and mudstone (Mercia Mudstone Group) | 1.3+ |

**HY 106**

Grid reference 193 644

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.4 - 0.5 |
| Clay, part sandy (Till) | 1.0 - 3.2 |
| Clay (Mercia Mudstone Group) | |

**Borehole SP 16 SE 6**

Grid reference 1935 6441

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.3 |
| Clay, pebbly (Till) | 1.7 |
| Mudstone (Mercia Mudstone Group) | 1.0+ |

**HY 108**

Resistivity soundings more than 150 m from borehole site. Borehole closer to edge of deposit.

Grid reference 160 637

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy | 0.2 -0.7 |
| Sand and gravel (Alluvium); only one sounding conducted on Alluvium, 180 m from borehole | 1.5 |
| Clay (Second River Terrace) | 1.3 - 2.0 |
| Clay (Mercia Mudstone Group) | |

**Borehole SP 16 SE 8**

Grid reference 1610 6387

| Lithology | Proved thickness (m) |
|---|---|
| Soil and made ground | 1.1 |
| Clay, gravelly (Alluvium) | 0.5 |
| Gravel (Second River Terrace) | 1.3 |
| Mudstone and siltstone (Mercia Mudstone Group) | 1.1+ |

**HY 134**

Grid reference 234 596

| Lithology | Interpreted thickness (m) |
|---|---|
| Soil, sandy, part clay | 0.2 - 1.1 |
| Clay, part sandy (Till) | 0.0 - 1.2 |
| Sand and gravel (Glacial Sand and Gravel) | 4.4 - 7.0 |
| Clay (Mercia Mudstone Group) | |

**Borehole SP 25 NW 64**

Grid reference 2344 5955

| Lithology | Proved thickness (m) |
|---|---|
| Soil | 0.3 |
| Clay (Till) | 0.9 |
| Sand, 'clayey' and pebbly below (Glacial Sand and Gravel) | 5.0 |
| Marl (Mercia Mudstone Group) | 0.8+ |

## EXPLANATION OF THE DETAILED RESISTIVITY RECORDS

Resistivity records of each of the depth soundings used in the comparison with the borehole data are given below. Records of other depth soundings not quoted here may be consulted on application to Programmes Director - B, British Geological Survey, Keyworth, Nottingham NG12 5GG.

The numbered paragraphs which follow, correspond with the annotations given on the first record, below.

1 Resistivity depth sounding identification number

Each resistivity depth sounding is identified by two numbers separated by a decimal point and prefixed by the letters HY (Henley-in-Arden). The first number refers to the resistivity site and the second to the sounding number at that site. Thus, HY 3.1 is the first resistivity sounding taken at site HY 3.

2 National Grid reference

All National Grid references fall in the 100 km square SP. Grid references for each sounding are given to eight figures and are accurate to within 10 m.

3 Azimuth

Azimuth refers to the compass bearing, in degrees, at which the resistivity sounding was conducted (corrected for magnetic variation at September 1982).

4 Input data

The input data are the field resistivity readings (measured in ohm m) taken at different electrode spacings for a particular electrode configuration (see Figure 9).

5 Processing results

The processing results are the apparent resistivities calculated for a given electrode spacing (Wenner configuration) together with an indication of the percentage observed, offset and lateral errors (expressed as a decimal). The root mean square (RMS) percentage errors for the sounding as a whole are also given.

6 Field curve data

The field curve data give the apparent resistivities used in the interpretation, the percentage difference of the theoretical model from the field data (R.M.S. Relative error) and an indication where the maximum deviation from the field data points occurred (Maximum relative error).

7 Interpreted model

The interpreted model shows the thickness, depth (both in metres) and the apparent resistivity (ohm m) for each layer recognised in the interpretation of the sounding. The reflection coefficients are an expression of the percentage difference in the resistivities of two adjacent layers.

8 Plotted results

The graph shows the comparison of the interpreted theoretical model curve to the field data points.

HY 3.1[1] Grid Ref: SP 1308 7694[2] Azimuth: 34[3]

INPUT DATA[4]

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 43.3000 | 40.3000 | 37.1000 | 27.8000 | 3.0100 |
| 1.0 | 18.0300 | 16.9900 | 16.2300 | 12.7900 | 1.0400 |
| 2.0 | 6.8400 | 6.5900 | 5.0800 | 5.0600 | .2630 |
| 4.0 | 1.9770 | 1.8750 | 1.5700 | 1.4820 | .1010 |
| 8.0 | .8730 | .8130 | .6290 | .6690 | .0610 |
| 16.0 | .3680 | .3410 | .2898 | .3160 | .0250 |
| 32.0 | .1500 | .1420 | .1110 | .1120 | .0070 |

PROCESSING RESULTS[5]

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 101.94 | -.0002 | -.2866 | .0407 |
| 1.0 | 91.17 | 0.0000 | -.2371 | -.0108 |
| 1.5 | 73.71 | | | |
| 2.0 | 63.71 | -.0019 | -.0039 | .4920 |
| 3.0 | 47.52 | | | |
| 4.0 | 38.35 | .0005 | -.0577 | .0385 |
| 6.0 | 34.90 | | | |
| 8.0 | 32.62 | -.0011 | .0616 | .0399 |
| 12.0 | 32.87 | | | |
| 16.0 | 30.45 | .0054 | .0865 | -.1500 |
| 24.0 | 25.83 | | | |
| 32.0 | 22.42 | .0067 | .0090 | 0.0000 |
| 48.0 | 20.71 | | | |
| 64.0 | 24.91 | | | |

R.M.S. Observational Error = .0034
R.M.S. Offset Wenner Difference = .1479
R.M.S. Potential Ladder Difference = .2119

FIELD CURVE DATA[6]

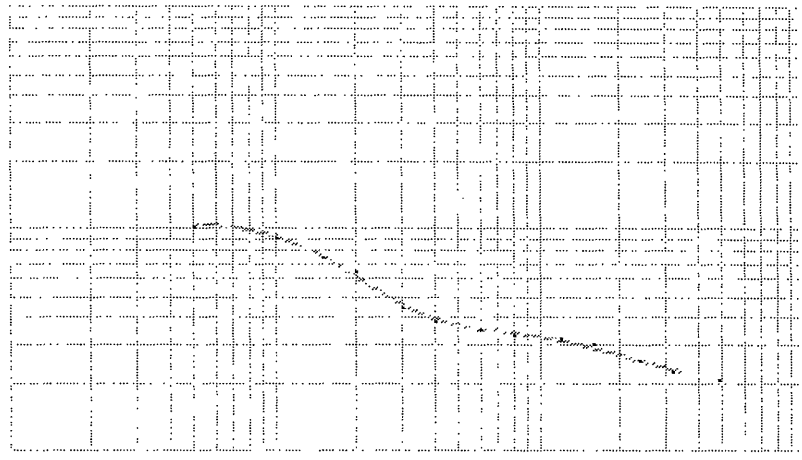
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 101.94 |
| 2 | 1.0 | 91.17 |
| 3 | 1.5 | 73.71 |
| 4 | 2.0 | 63.71 |
| 5 | 3.0 | 44.00 |
| 6 | 4.0 | 38.35 |
| 7 | 6.0 | 34.90 |
| 8 | 8.0 | 32.62 |
| 9 | 12.0 | 32.00 |
| 10 | 16.0 | 30.45 |
| 11 | 24.0 | 25.83 |
| 12 | 32.0 | 22.42 |
| 13 | 48.0 | 20.71 |

R.M.S. Relative error = .0298
Maximum rel. error = -.0516 at sample 10
Number of trials was 0

INTERPRETED MODEL[7]

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 1.11 | | 107.8 | |
| | 1.11 | -------- | -.5205 |
| 11.73 | | 34.0 | |
| | 12.84 | -------- | -.2639 |
| | | 19.8 | |
| | | ******** | |

PLOTTED RESULTS[8]



HY 3.2 Grid Ref: SP 1310 7685 Azimuth: 307

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 46.5000 | 44.7000 | 30.0000 | 33.3000 | 1.7820 |
| 1.0 | 18.8100 | 17.3600 | 14.4600 | 16.7900 | 1.4540 |
| 2.0 | 8.4800 | 8.0000 | 6.2400 | 7.0200 | .4780 |
| 4.0 | 3.2600 | 3.0800 | 2.4900 | 2.7100 | .1720 |
| 8.0 | 1.0070 | .9440 | .8310 | .8310 | .0600 |
| 16.0 | .3520 | .3290 | .2910 | .2710 | .0200 |
| 32.0 | .1550 | .1490 | .1110 | .1130 | .0060 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 99.43 | .0004 | .1043 | .3358 |
| 1.0 | 98.17 | -.0002 | .1491 | -.2386 |
| 1.5 | 101.78 | | | |
| 2.0 | 83.32 | .0002 | .1176 | .0273 |
| 3.0 | 68.60 | | | |
| 4.0 | 65.35 | .0025 | .0846 | .0822 |
| 6.0 | 53.14 | | | |
| 8.0 | 41.77 | .0030 | 0.0000 | -.0929 |
| 12.0 | 33.47 | | | |
| 16.0 | 28.25 | .0086 | -.0712 | -.0589 |
| 24.0 | 23.60 | | | |
| 32.0 | 22.52 | 0.0000 | .0179 | 0.0000 |
| 48.0 | 23.80 | | | |
| 64.0 | 29.76 | | | |

R.M.S. Observational Error = .0036
R.M.S. Offset Wenner Difference = .0922
R.M.S. Potential Ladder Difference = .1776

FIELD CURVE DATA

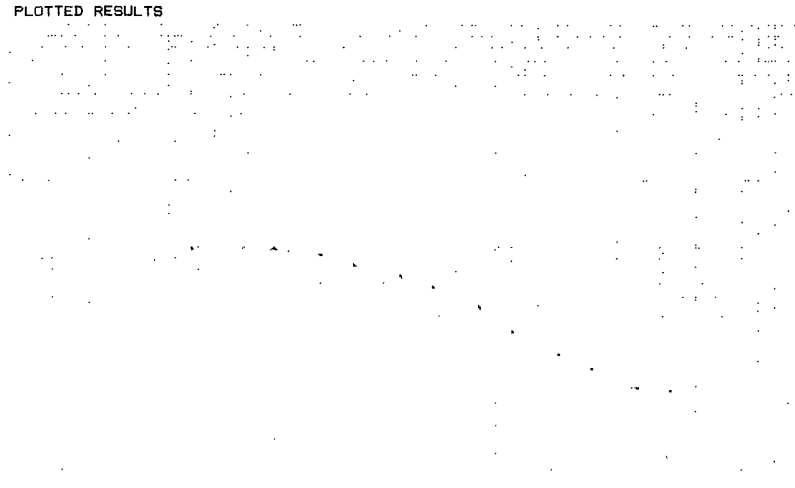
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 99.43 |
| 2 | 1.0 | 98.17 |
| 3 | 1.5 | 92.00 |
| 4 | 2.0 | 83.32 |
| 5 | 3.0 | 74.00 |
| 6 | 4.0 | 65.35 |
| 7 | 6.0 | 53.14 |
| 8 | 8.0 | 41.77 |
| 9 | 12.0 | 33.47 |
| 10 | 16.0 | 28.25 |
| 11 | 24.0 | 23.60 |
| 12 | 32.0 | 22.52 |

R.M.S. Relative error = .0284
Maximum rel. error = -.0529 at sample 7
Number of trials was 0

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 1.67 | | 101.8 | |
| | 1.67 | -------- | -.3272 |
| 6.16 | | 51.6 | |
| | 7.83 | -------- | -.4474 |
| | | 19.7 | |
| | | ******** | |

PLOTTED RESULTS



HY 3.3 Grid Ref: SP 1311 7694 Azimuth: 5

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 63.1000 | 60.1000 | 46.5000 | 44.8000 | 3.0100 |
| 1.0 | 20.2000 | 18.8900 | 18.2600 | 16.9900 | 1.2930 |
| 2.0 | 6.9000 | 6.6400 | 5.3900 | 5.5100 | .2760 |
| 4.0 | 1.9490 | 1.8530 | 1.5500 | 1.5840 | .0960 |
| 8.0 | .7850 | .7350 | .5750 | .5940 | .0500 |
| 16.0 | .3330 | .3150 | .2640 | .2670 | .0200 |
| 32.0 | .1410 | .1320 | .0990 | .1100 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 143.41 | -.0002 | -.0372 | .3196 |
| 1.0 | 110.74 | .0008 | -.0721 | -.2664 |
| 1.5 | 92.56 | | | |
| 2.0 | 68.49 | -.0023 | .0220 | .2545 |
| 3.0 | 46.95 | | | |
| 4.0 | 39.38 | 0.0000 | .0217 | -.0107 |
| 6.0 | 33.78 | | | |
| 8.0 | 29.38 | 0.0000 | .0325 | .0669 |
| 12.0 | 28.58 | | | |
| 16.0 | 26.69 | -.0060 | .0113 | -.0353 |
| 24.0 | 23.36 | | | |
| 32.0 | 21.01 | 0.0000 | .1053 | 0.0000 |
| 48.0 | 20.75 | | | |
| 64.0 | 22.12 | | | |

R.M.S. Observational Error = .0024
R.M.S. Offset Wenner Difference = .0532
R.M.S. Potential Ladder Difference = .2015

FIELD CURVE DATA

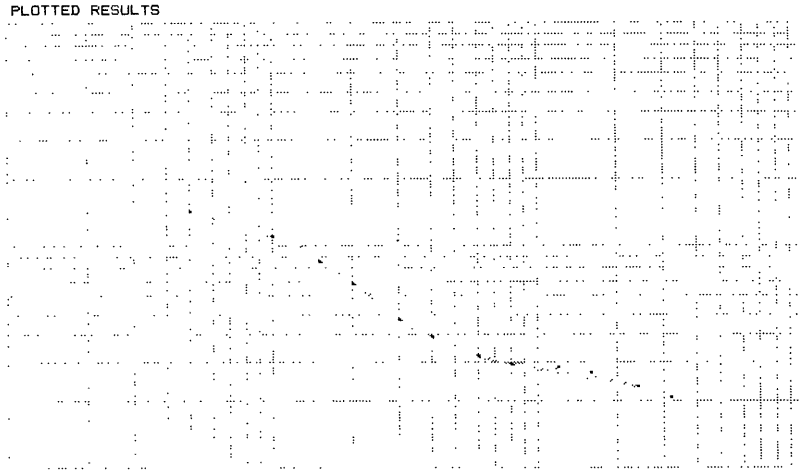
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 143.41 |
| 2 | 1.0 | 110.74 |
| 3 | 1.5 | 86.00 |
| 4 | 2.0 | 68.49 |
| 5 | 3.0 | 46.95 |
| 6 | 4.0 | 39.38 |
| 7 | 6.0 | 32.00 |
| 8 | 8.0 | 29.38 |
| 9 | 12.0 | 28.58 |
| 10 | 16.0 | 26.69 |
| 11 | 24.0 | 23.36 |
| 12 | 32.0 | 21.01 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .30 | | 168.1 | |
| | .30 | -------- | -.1947 |
| 1.09 | | 113.3 | |
| | 1.39 | -------- | -.5868 |
| 8.84 | | 29.5 | |
| | 10.23 | -------- | -.1706 |
| | | 20.9 | |
| | | ******** | |

R.M.S. Relative error = .0287
Maximum rel. error = -.0476 at sample 10
Number of trials was 0

PLOTTED RESULTS



HY 41 Grid Ref: SP 1106 7767 Azimuth: 10

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 184.0000 | 175.3000 | 181.5000 | 153.5000 | 7.8800 |
| 1.0 | 35.1000 | 33.6000 | 35.1000 | 29.0000 | 1.3900 |
| 2.0 | 7.1300 | 6.8900 | 5.7700 | 6.3500 | .2460 |
| 4.0 | 1.8090 | 1.7340 | 1.3870 | 1.2820 | .0730 |
| 8.0 | .7330 | .6790 | .5040 | .5860 | .0520 |
| 16.0 | .4070 | .3810 | .2960 | .3100 | .0210 |
| 32.0 | .1660 | .1540 | .1170 | .1310 | .0070 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 526.22 | .0045 | -.1672 | -.2444 |
| 1.0 | 201.38 | .0031 | -.1903 | -.2355 |
| 1.5 | 118.28 | | | |
| 2.0 | 76.15 | -.0008 | .0957 | .1198 |
| 3.0 | 48.08 | | | |
| 4.0 | 33.54 | .0011 | -.0787 | .2348 |
| 6.0 | 28.91 | | | |
| 8.0 | 27.39 | .0027 | .1505 | -.0547 |
| 12.0 | 30.39 | | | |
| 16.0 | 30.46 | .0124 | .0462 | .1480 |
| 24.0 | 27.53 | | | |
| 32.0 | 24.93 | .0306 | .1129 | 0.0000 |
| 48.0 | 24.23 | | | |
| 64.0 | 25.02 | | | |

R.M.S. Observational Error = .0127
R.M.S. Offset Wenner Difference = .1293
R.M.S. Potential Ladder Difference = .1869

**WARNING:** The observed error for spacing 6 is greater than 1%
There may be an incorrect input data value

**WARNING:** The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 526.22 |
| 2 | 1.0 | 201.38 |
| 3 | 1.5 | 118.28 |
| 4 | 2.0 | 76.15 |
| 5 | 3.0 | 48.08 |
| 6 | 4.0 | 33.54 |
| 7 | 6.0 | 28.91 |
| 8 | 8.0 | 27.39 |
| 9 | 12.0 | 30.39 |
| 10 | 16.0 | 30.46 |
| 11 | 24.0 | 27.53 |
| 12 | 32.0 | 24.93 |
| 13 | 48.0 | 24.23 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .36 | | 904.1 | |
| | .36 | -------- | -.7313 |
| 1.20 | | 140.3 | |
| | 1.56 | -------- | -.7204 |
| 5.88 | | 22.8 | |
| | 7.44 | -------- | .5375 |
| 2.72 | | 75.8 | |
| | 10.16 | -------- | -.5710 |
| | | 20.7 | |
| | | ******** | |

R.M.S. Relative error = .0297
Maximum rel. error = .0684 at sample 2
Number of trials was 0

PLOTTED RESULTS

HY 71 Grid Ref: SP 1035 7627 Azimuth: 45

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 49.6000 | 45.9000 | 35.0000 | 39.3000 | 3.6600 |
| 1.0 | 19.4300 | 18.1700 | 15.9400 | 16.4100 | 1.2500 |
| 2.0 | 7.2300 | 6.9300 | 6.0900 | 5.3900 | .2940 |
| 4.0 | 2.3900 | 2.2700 | 2.0200 | 1.6620 | .0930 |
| 8.0 | .9170 | .8610 | .7420 | .5700 | .0540 |
| 16.0 | .4270 | .3990 | .3390 | .2910 | .0270 |
| 32.0 | .1730 | .1720 | .1580 | .1140 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 116.71 | .0008 | .1157 | .0421 |
| 1.0 | 101.63 | .0005 | .0291 | -.1516 |
| 1.5 | 80.55 | | | |
| 2.0 | 72.13 | .0008 | -.1220 | .1480 |
| 3.0 | 53.43 | | | |
| 4.0 | 46.27 | .0114 | -.1945 | .1736 |
| 6.0 | 39.51 | | | |
| 8.0 | 32.97 | .0022 | -.2622 | .1538 |
| 12.0 | 33.63 | | | |
| 16.0 | 31.67 | .0023 | -.1524 | .1211 |
| 24.0 | 29.93 | | | |
| 32.0 | 27.34 | -.0452 | -.3235 | 0.0000 |
| 48.0 | 24.69 | | | |
| 64.0 | 25.83 | | | |

R.M.S. Observational Error = .0177
R.M.S. Offset Wenner Difference = .1940
R.M.S. Potential Ladder Difference = .1385

**WARNING:** The observed error for spacing 4 is greater than 1%
There may be an incorrect input data value

**WARNING:** The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

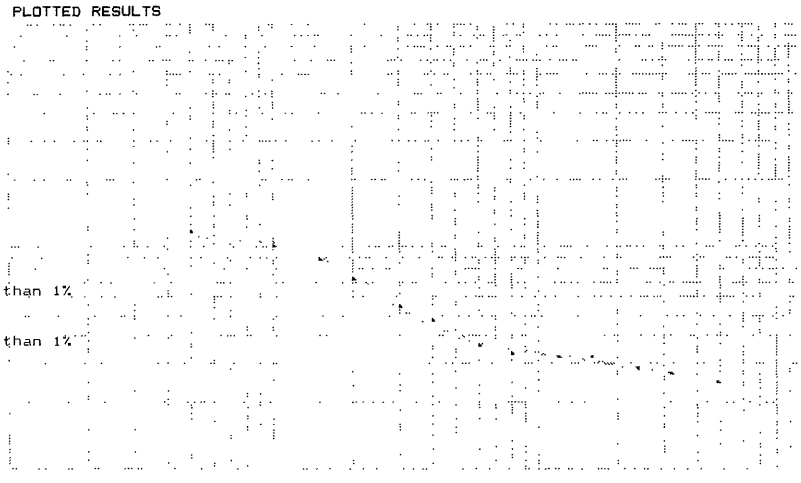
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 116.71 |
| 2 | 1.0 | 101.63 |
| 3 | 1.5 | 88.00 |
| 4 | 2.0 | 72.13 |
| 5 | 3.0 | 53.43 |
| 6 | 4.0 | 46.27 |
| 7 | 6.0 | 36.00 |
| 8 | 8.0 | 32.97 |
| 9 | 12.0 | 32.00 |
| 10 | 16.0 | 31.67 |
| 11 | 24.0 | 28.50 |
| 12 | 32.0 | 27.34 |
| 13 | 48.0 | 24.69 |

R.M.S. Relative error = .0285
Maximum rel. error = .0547 at sample 8
Number of trials was 0

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 1.35 | | 114.3 | |
| | 1.35 | -------- | -.5353 |
| 9.19 | | 34.6 | |
| | 10.54 | -------- | -.1591 |
| | | 25.1 | |
| | | ******** | |

PLOTTED RESULTS



HY 72 Grid Ref: SP 1035 7649 Azimuth: 80

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 27.9000 | 26.2000 | 25.1000 | 17.3400 | 1.6980 |
| 1.0 | 8.9100 | 8.3000 | 8.8700 | 6.6600 | .6060 |
| 2.0 | 3.5500 | 3.4300 | 2.5500 | 2.7700 | .1360 |
| 4.0 | 1.5070 | 1.4250 | 1.0280 | 1.1390 | .0810 |
| 8.0 | .8310 | .7710 | .5720 | .6150 | .0590 |
| 16.0 | .4540 | .4270 | .3390 | .3530 | .0300 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 66.66 | .0001 | -.3657 | .1415 |
| 1.0 | 48.79 | .0004 | -.2846 | -.2982 |
| 1.5 | 38.84 | | | |
| 2.0 | 33.43 | -.0045 | .0827 | .2035 |
| 3.0 | 26.41 | | | |
| 4.0 | 27.23 | .0007 | .1024 | .0762 |
| 6.0 | 29.55 | | | |
| 8.0 | 29.83 | .0012 | .0725 | .0143 |
| 12.0 | 33.76 | | | |
| 16.0 | 34.78 | -.0066 | .0405 | 0.0000 |
| 24.0 | 33.70 | | | |
| 32.0 | 32.01 | | | |

R.M.S. Observational Error = .0033
R.M.S. Offset Wenner Difference = .1996
R.M.S. Potential Ladder Difference = .1768

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 66.66 |
| 2 | 1.0 | 48.79 |
| 3 | 1.5 | 38.84 |
| 4 | 2.0 | 33.43 |
| 5 | 3.0 | 28.00 |
| 6 | 4.0 | 27.23 |
| 7 | 6.0 | 28.00 |
| 8 | 8.0 | 29.83 |
| 9 | 12.0 | 33.76 |
| 10 | 16.0 | 34.78 |

R.M.S. Relative error = .0168
Maximum rel. error = -.0230 at sample 4
Number of trials was 0

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .70 | | 71.4 | |
| | .70 | -------- | -.4737 |
| 6.53 | | 25.5 | |
| | 7.23 | -------- | .2766 |
| | | 45.0 | |
| | | ******** | |

PLOTTED RESULTS

HY 12.1 Grid Ref: SP 1382 7280 Azimuth: 355

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 19.3200 | 18.4500 | 13.6700 | 15.1300 | .8840 |
| 1.0 | 6.9100 | 6.5800 | 5.2300 | 5.2500 | .3310 |
| 2.0 | 3.0300 | 2.8800 | 2.1700 | 2.1800 | .1490 |
| 4.0 | 1.8230 | 1.7130 | 1.2330 | 1.2810 | .1140 |
| 8.0 | 1.2490 | 1.1590 | .8560 | .9260 | .0890 |
| 16.0 | .6710 | .6230 | .5060 | .5440 | .0470 |
| 32.0 | .2320 | .2220 | .1910 | .1960 | .0110 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 45.24 | -.0007 | .1014 | .2716 |
| 1.0 | 32.92 | -.0001 | .0038 | .1159 |
| 1.5 | 29.73 | | | |
| 2.0 | 27.33 | .0003 | .0046 | .0612 |
| 3.0 | 28.92 | | | |
| 4.0 | 31.59 | -.0022 | .0382 | .0097 |
| 6.0 | 39.16 | | | |
| 8.0 | 44.79 | .0008 | .0786 | .0114 |
| 12.0 | 51.51 | | | |
| 16.0 | 52.78 | .0015 | .0724 | .0089 |
| 24.0 | 47.84 | | | |
| 32.0 | 38.91 | -.0043 | .0258 | 0.0000 |
| 48.0 | 26.76 | | | |
| 64.0 | 22.54 | | | |

R.M.S. Observational Error = .0020
R.M.S. Offset Wenner Difference = .0584
R.M.S. Potential Ladder Difference = .1233

FIELD CURVE DATA

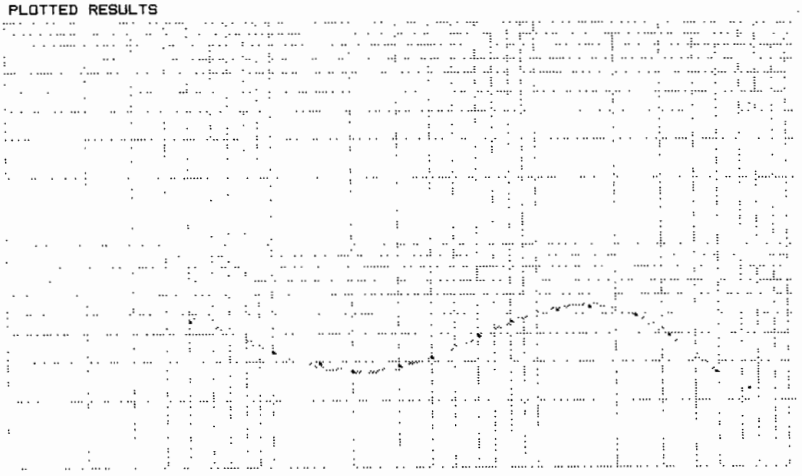
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 45.24 |
| 2 | 1.0 | 32.92 |
| 3 | 1.5 | 29.73 |
| 4 | 2.0 | 27.33 |
| 5 | 3.0 | 28.92 |
| 6 | 4.0 | 31.59 |
| 7 | 6.0 | 39.16 |
| 8 | 8.0 | 44.79 |
| 9 | 12.0 | 51.51 |
| 10 | 16.0 | 52.78 |
| 11 | 24.0 | 47.84 |
| 12 | 32.0 | 38.91 |
| 13 | 48.0 | 26.76 |
| 14 | 64.0 | 22.54 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .47 | | 54.8 | |
| | .47 | -------- | -.3909 |
| 3.86 | | 24.0 | |
| | 4.33 | -------- | .7531 |
| 5.75 | | 170.4 | |
| | 10.08 | -------- | -.8234 |
| | | 16.5 | |
| | | ******** | |

R.M.S. Relative error = .0280
Maximum rel. error = .0861 at sample 2
Number of trials was 0

PLOTTED RESULTS



HY 12.2 Grid Ref: SP 1389 7277 Azimu

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 25.1000 | 23.7000 | 19.4900 | 18.4400 | 1.4880 |
| 1.0 | 10.6200 | 10.0900 | 8.1600 | 7.9100 | .5300 |
| 2.0 | 4.1700 | 3.9500 | 3.2500 | 3.2100 | .2230 |
| 4.0 | 2.0300 | 1.9030 | 1.5310 | 1.4290 | .1330 |
| 8.0 | 1.2150 | 1.1270 | .9330 | .8410 | .0830 |
| 16.0 | .5550 | .5180 | .4650 | .4270 | .0360 |
| 32.0 | .2120 | .2030 | .1750 | .1510 | .0080 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 59.58 | -.0035 | -.0554 | .0841 |
| 1.0 | 50.49 | 0.0000 | -.0311 | .1362 |
| 1.5 | 44.08 | | | |
| 2.0 | 40.59 | -.0007 | -.0124 | -.0145 |
| 3.0 | 38.60 | | | |
| 4.0 | 37.20 | -.0030 | -.0689 | -.0263 |
| 6.0 | 41.22 | | | |
| 8.0 | 44.59 | .0041 | -.1037 | .0433 |
| 12.0 | 46.51 | | | |
| 16.0 | 44.84 | .0018 | -.0852 | -.0554 |
| 24.0 | 38.81 | | | |
| 32.0 | 32.77 | .0047 | -.1472 | 0.0000 |
| 48.0 | 28.34 | | | |
| 64.0 | 32.56 | | | |

R.M.S. Observational Error = .0030
R.M.S. Offset Wenner Difference = .0834
R.M.S. Potential Ladder Difference = .0724

FIELD CURVE DATA

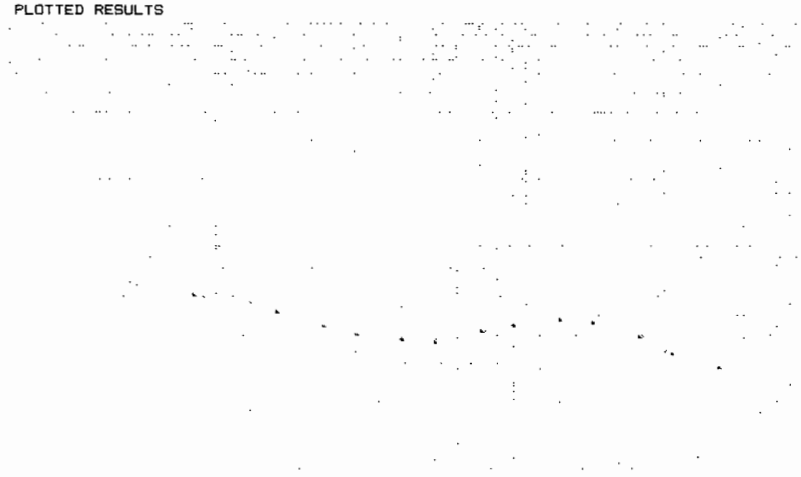
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 59.58 |
| 2 | 1.0 | 50.49 |
| 3 | 1.5 | 44.08 |
| 4 | 2.0 | 40.59 |
| 5 | 3.0 | 38.60 |
| 6 | 4.0 | 37.20 |
| 7 | 6.0 | 41.22 |
| 8 | 8.0 | 44.59 |
| 9 | 12.0 | 46.51 |
| 10 | 16.0 | 44.84 |
| 11 | 24.0 | 38.81 |
| 12 | 32.0 | 32.77 |
| 13 | 48.0 | 28.34 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .80 | | 61.5 | |
| | .80 | -------- | -.3016 |
| 4.83 | | 33.0 | |
| | 5.63 | -------- | .5769 |
| 4.59 | | 123.0 | |
| | 10.22 | -------- | -.7083 |
| | | 21.0 | |
| | | ******** | |

R.M.S. Relative error = .0143
Maximum rel. error = .0306 at sample 10
Number of trials was 0

PLOTTED RESULTS



HY 12.3 Grid Ref: SP 1389 7265 Azimuth: 75

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 11.1400 | 10.5900 | 8.0400 | 8.7900 | .5730 |
| 1.0 | 4.5200 | 4.3200 | 3.2900 | 3.3500 | .1990 |
| 2.0 | 2.5100 | 2.3700 | 1.7410 | 1.6630 | .1330 |
| 4.0 | 1.8860 | 1.7530 | 1.3060 | 1.2570 | .1340 |
| 8.0 | 1.3750 | 1.2690 | 1.0160 | .9490 | .1000 |
| 16.0 | .7290 | .6790 | .5850 | .5530 | .0480 |
| 32.0 | .2490 | .2370 | .2090 | .2010 | .0120 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 26.44 | -.0021 | .0891 | .1518 |
| 1.0 | 20.86 | .0002 | .0181 | .0878 |
| 1.5 | 20.15 | | | |
| 2.0 | 21.39 | .0028 | -.0458 | .0238 |
| 3.0 | 26.88 | | | |
| 4.0 | 32.21 | -.0005 | -.0382 | -.0206 |
| 6.0 | 42.70 | | | |
| 8.0 | 49.39 | .0044 | -.0682 | .0084 |
| 12.0 | 55.95 | | | |
| 16.0 | 57.20 | .0027 | -.0562 | .0411 |
| 24.0 | 50.49 | | | |
| 32.0 | 41.22 | 0.0000 | -.0390 | 0.0000 |
| 48.0 | 29.69 | | | |
| 64.0 | 25.74 | | | |

R.M.S. Observational Error = .0024
R.M.S. Offset Wenner Difference = .0550
R.M.S. Potential Ladder Difference = .0747

FIELD CURVE DATA

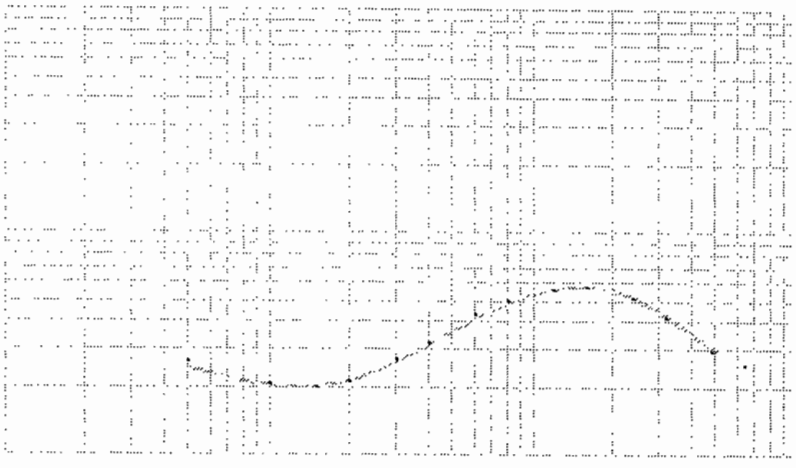
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 26.44 |
| 2 | 1.0 | 20.86 |
| 3 | 1.5 | 20.15 |
| 4 | 2.0 | 21.39 |
| 5 | 3.0 | 26.88 |
| 6 | 4.0 | 32.21 |
| 7 | 6.0 | 42.70 |
| 8 | 8.0 | 49.39 |
| 9 | 12.0 | 55.95 |
| 10 | 16.0 | 57.20 |
| 11 | 24.0 | 50.49 |
| 12 | 32.0 | 41.22 |
| 13 | 48.0 | 29.69 |
| 14 | 64.0 | 25.74 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .30 | | 31.0 | |
| | .30 | -------- | -.2627 |
| 2.53 | | 18.1 | |
| | 2.83 | -------- | .7923 |
| 6.72 | | 156.2 | |
| | 9.55 | -------- | -.7801 |
| | | 19.3 | |
| | | ******** | |

R.M.S. Relative error = .0288
Maximum rel. error = -.0735 at sample 1
Number of trials was 0

PLOTTED RESULTS



HY 13.1 Grid Ref: SP 1472 7207 Azimuth: 26

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 55.1000 | 53.6000 | 37.6000 | 42.5000 | 1.4880 |
| 1.0 | 16.4100 | 15.5600 | 15.1500 | 12.1100 | .8380 |
| 2.0 | 8.8600 | 8.4600 | 7.2200 | 4.9300 | .3930 |
| 4.0 | 4.2500 | 3.8600 | 3.2300 | 3.1000 | .3800 |
| 8.0 | 2.5600 | 2.4000 | 2.0700 | 1.7490 | .1500 |
| 16.0 | 1.0200 | .9730 | .9050 | .7440 | .0450 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 125.82 | .0002 | .1223 | .4946 |
| 1.0 | 85.64 | .0007 | -.2230 | -.1814 |
| 1.5 | 86.73 | | | |
| 2.0 | 76.34 | .0008 | -.3770 | .2546 |
| 3.0 | 78.69 | | | |
| 4.0 | 79.55 | .0024 | -.0411 | -.1336 |
| 6.0 | 95.17 | | | |
| 8.0 | 95.98 | .0039 | -.1681 | .1006 |
| 12.0 | 85.72 | | | |
| 16.0 | 82.89 | .0020 | -.1953 | 0.0000 |
| 24.0 | 68.83 | | | |
| 32.0 | 60.10 | | | |

R.M.S. Observational Error = .0021
R.M.S. Offset Wenner Difference = .2140
R.M.S. Potential Ladder Difference = .2721

FIELD CURVE DATA

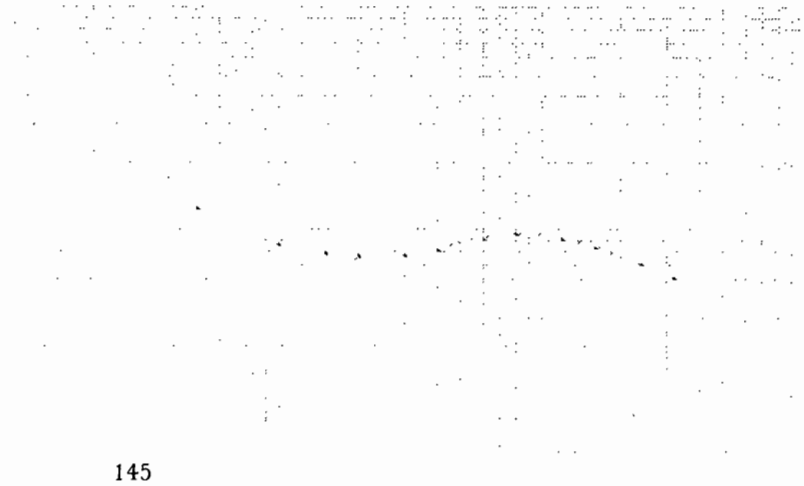
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 125.82 |
| 2 | 1.0 | 85.64 |
| 3 | 1.5 | 79.00 |
| 4 | 2.0 | 76.34 |
| 5 | 3.0 | 77.00 |
| 6 | 4.0 | 79.55 |
| 7 | 6.0 | 90.00 |
| 8 | 8.0 | 95.98 |
| 9 | 12.0 | 90.00 |
| 10 | 16.0 | 82.89 |
| 11 | 24.0 | 68.83 |
| 12 | 32.0 | 60.10 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .38 | | 164.0 | |
| | .38 | -------- | -.4236 |
| 3.10 | | 66.4 | |
| | 3.48 | -------- | .4749 |
| 4.11 | | 186.5 | |
| | 7.59 | -------- | -.5818 |
| | | 49.3 | |
| | | ******** | |

R.M.S. Relative error = .0286
Maximum rel. error = -.0507 at sample 4
Number of trials was 0

PLOTTED RESULTS



HY 13.2 Grid Ref: SP 1474 7201 Azimuth: 298

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 52.3000 | 49.9000 | 40.1000 | 47.9000 | 2.4100 |
| 1.0 | 16.8200 | 16.1100 | 12.7500 | 13.1700 | .7090 |
| 2.0 | 8.7100 | 8.2300 | 5.6100 | 6.1100 | .4730 |
| 4.0 | 6.0700 | 5.6800 | 4.3100 | 4.0700 | .3940 |
| 8.0 | 3.6000 | 3.3400 | 2.7300 | 2.7000 | .2550 |
| 16.0 | 1.3000 | 1.2290 | 1.1110 | 1.1470 | .0710 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 138.23 | -.0002 | .1773 | -.0451 |
| 1.0 | 81.43 | .0001 | .0324 | .0376 |
| 1.5 | 72.66 | | | |
| 2.0 | 73.64 | .0008 | .0853 | .0664 |
| 3.0 | 90.27 | | | |
| 4.0 | 105.31 | -.0007 | -.0573 | .0481 |
| 6.0 | 127.17 | | | |
| 8.0 | 136.47 | .0014 | -.0110 | .0556 |
| 12.0 | 134.46 | | | |
| 16.0 | 113.50 | 0.0000 | .0319 | 0.0000 |
| 24.0 | 72.43 | | | |
| 32.0 | 40.21 | | | |

R.M.S. Observational Error = .0007
R.M.S. Offset Wenner Difference = .0858
R.M.S. Potential Ladder Difference = .0515

FIELD CURVE DATA

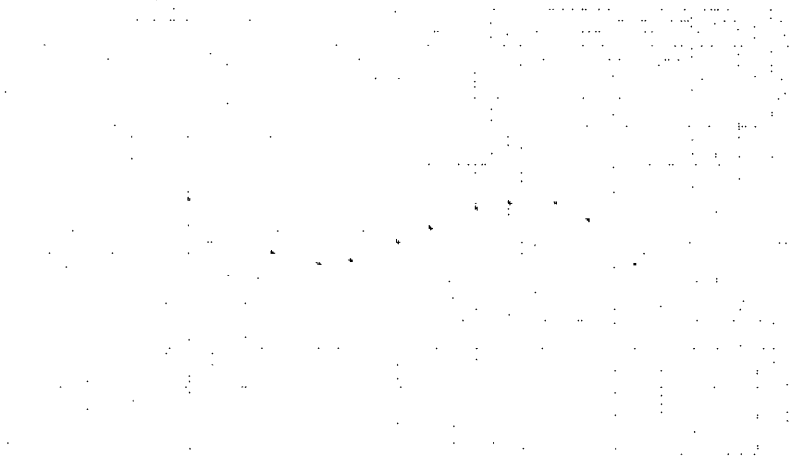
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 138.23 |
| 2 | 1.0 | 81.43 |
| 3 | 1.5 | 72.66 |
| 4 | 2.0 | 73.64 |
| 5 | 3.0 | 90.27 |
| 6 | 4.0 | 105.31 |
| 7 | 6.0 | 127.17 |
| 8 | 8.0 | 136.47 |
| 9 | 12.0 | 134.46 |
| 10 | 16.0 | 113.50 |
| 11 | 24.0 | 72.43 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .36 | | 191.7 | |
| | .36 | -------- | -.5220 |
| 2.29 | | 60.2 | |
| | 2.65 | -------- | .7034 |
| 4.81 | | 345.7 | |
| | 7.46 | -------- | -.8566 |
| | | 26.7 | |
| | | ******** | |

R.M.S. Relative error = .0283
Maximum rel. error = -.0548 at sample 1
Number of trials was 0

PLOTTED RESULTS



HY 13.3 Grid Ref: SP 1473 7195 Azimuth: 325

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 41.0000 | 39.5000 | 29.9000 | 30.8000 | 1.4640 |
| 1.0 | 16.5800 | 15.6300 | 10.8700 | 12.5900 | .9500 |
| 2.0 | 12.0900 | 11.3500 | 8.1800 | 8.0100 | .7450 |
| 4.0 | 7.1100 | 6.4700 | 5.2000 | 5.6400 | .6290 |
| 8.0 | 3.9800 | 3.7700 | 3.0600 | 3.0200 | .2090 |
| 16.0 | 1.2050 | 1.1540 | 1.0120 | 1.0580 | .0490 |
| 32.0 | .2340 | .2240 | .1760 | .2170 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 95.35 | .0009 | .0297 | .2815 |
| 1.0 | 73.70 | 0.0000 | .1466 | -.0182 |
| 1.5 | 88.57 | | | |
| 2.0 | 101.72 | -.0004 | -.0210 | .1001 |
| 3.0 | 123.51 | | | |
| 4.0 | 136.22 | .0015 | .0812 | -.1530 |
| 6.0 | 155.12 | | | |
| 8.0 | 152.81 | .0003 | -.0132 | .2058 |
| 12.0 | 121.92 | | | |
| 16.0 | 104.05 | .0017 | .0444 | .1105 |
| 24.0 | 68.72 | | | |
| 32.0 | 39.51 | .0043 | .2087 | 0.0000 |
| 48.0 | 26.00 | | | |
| 64.0 | 22.50 | | | |

R.M.S. Observational Error = .0019
R.M.S. Offset Wenner Difference = .1036
R.M.S. Potential Ladder Difference = .1671

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 95.35 |
| 2 | 1.0 | 73.70 |
| 3 | 1.5 | 85.00 |
| 4 | 2.0 | 101.72 |
| 5 | 3.0 | 123.51 |
| 6 | 4.0 | 136.22 |
| 7 | 6.0 | 150.00 |
| 8 | 8.0 | 152.81 |
| 9 | 12.0 | 130.00 |
| 10 | 16.0 | 104.05 |
| 11 | 24.0 | 62.00 |
| 12 | 32.0 | 39.51 |
| 13 | 48.0 | 26.00 |
| 14 | 64.0 | 22.50 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .36 | | 142.6 | |
| | .36 | -------- | -.6050 |
| .57 | | 35.1 | |
| | .93 | -------- | .7396 |
| 7.68 | | 234.5 | |
| | 8.61 | -------- | -.8192 |
| | | 23.3 | |
| | | ******** | |

R.M.S. Relative error = .0250
Maximum rel. error = .0378 at sample 7
Number of trials was 0

PLOTTED RESULTS

HY 14.1 Grid Ref: SP 1046 7108 Azimuth: 21

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 18.0700 | 17.4100 | 13.9600 | 12.1700 | .6730 |
| 1.0 | 7.6000 | 7.1500 | 5.9300 | 5.2000 | .4500 |
| 2.0 | 4.8300 | 4.5500 | 3.4500 | 3.2400 | .2730 |
| 4.0 | 2.8000 | 2.6100 | 2.1000 | 2.0500 | .1960 |
| 8.0 | 1.3960 | 1.3110 | 1.0690 | 1.1080 | .0820 |
| 16.0 | .5340 | .5070 | .4080 | .4320 | .0270 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 41.04 | -.0007 | -.1370 | .2796 |
| 1.0 | 34.97 | 0.0000 | -.1312 | -.0262 |
| 1.5 | 39.89 | | | |
| 2.0 | 42.03 | .0015 | -.0628 | .0823 |
| 3.0 | 47.75 | | | |
| 4.0 | 52.15 | -.0021 | -.0241 | -.0111 |
| 6.0 | 56.71 | | | |
| 8.0 | 54.71 | .0022 | .0358 | .0331 |
| 12.0 | 48.30 | | | |
| 16.0 | 42.22 | -.0000 | .0571 | 0.0000 |
| 24.0 | 36.48 | | | |
| 32.0 | 34.98 | | | |

R.M.S. Observational Error = .0014
R.M.S. Offset Wenner Difference = .0867
R.M.S. Potential Ladder Difference = .1318

FIELD CURVE DATA

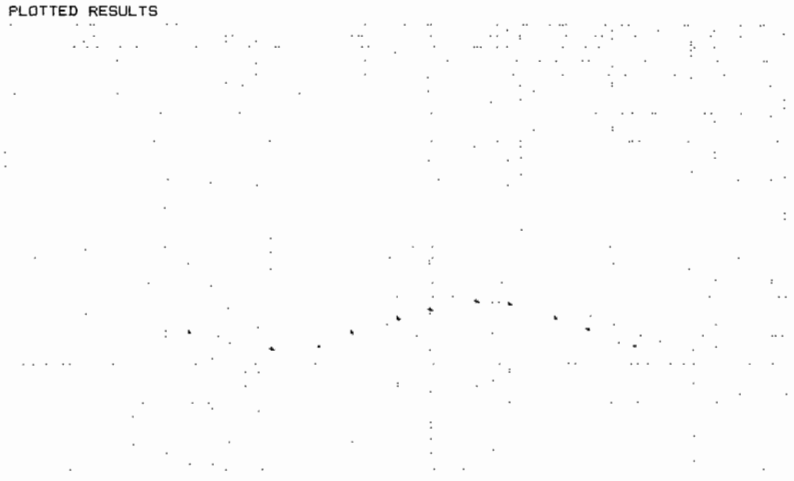
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 41.04 |
| 2 | 1.0 | 34.97 |
| 3 | 1.5 | 36.50 |
| 4 | 2.0 | 42.03 |
| 5 | 3.0 | 47.75 |
| 6 | 4.0 | 52.15 |
| 7 | 6.0 | 56.71 |
| 8 | 8.0 | 54.71 |
| 9 | 12.0 | 48.30 |
| 10 | 16.0 | 42.22 |
| 11 | 24.0 | 36.48 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .27 | | 56.3 | |
| | .27 | -------- | -.3048 |
| 1.47 | | 30.0 | |
| | 1.74 | -------- | .5138 |
| 4.37 | | 93.4 | |
| | 6.11 | -------- | -.5413 |
| | | 27.8 | |
| | | ******** | |

R.M.S. Relative error = .0251
Maximum rel. error = -.0499 at sample 11
Number of trials was 0

PLOTTED RESULTS



HY 14.2 Grid Ref: SP 1048 7100 Azimuth: 69

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 20.5000 | 19.5800 | 15.2200 | 13.8700 | .9290 |
| 1.0 | 9.0500 | 8.5000 | 6.8100 | 6.5300 | .5390 |
| 2.0 | 5.2700 | 4.9000 | 3.9700 | 3.6100 | .3620 |
| 4.0 | 2.9000 | 2.7100 | 2.2000 | 2.1700 | .1880 |
| 8.0 | 1.2170 | 1.1500 | .9560 | .9780 | .0670 |
| 16.0 | .4410 | .4190 | .3450 | .3350 | .0220 |
| 32.0 | .1830 | .1700 | .1310 | .1340 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 45.69 | -.0004 | -.0928 | .2542 |
| 1.0 | 41.91 | .0012 | -.0420 | -.0158 |
| 1.5 | 45.62 | | | |
| 2.0 | 47.63 | .0015 | -.0950 | .0097 |
| 3.0 | 52.98 | | | |
| 4.0 | 54.92 | .0007 | -.0137 | .0429 |
| 6.0 | 52.85 | | | |
| 8.0 | 48.61 | 0.0000 | .0228 | .0382 |
| 12.0 | 40.14 | | | |
| 16.0 | 34.18 | 0.0000 | -.0294 | .0962 |
| 24.0 | 28.84 | | | |
| 32.0 | 26.64 | .0221 | .0226 | 0.0000 |
| 48.0 | 27.97 | | | |
| 64.0 | 31.67 | | | |

R.M.S. Observational Error = .0084
R.M.S. Offset Wenner Difference = .0554
R.M.S. Potential Ladder Difference = .1137

WARNING: The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 45.69 |
| 2 | 1.0 | 41.91 |
| 3 | 1.5 | 45.62 |
| 4 | 2.0 | 47.63 |
| 5 | 3.0 | 52.98 |
| 6 | 4.0 | 54.92 |
| 7 | 6.0 | 52.85 |
| 8 | 8.0 | 48.61 |
| 9 | 12.0 | 40.14 |
| 10 | 16.0 | 34.18 |
| 11 | 24.0 | 28.84 |
| 12 | 32.0 | 26.64 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .25 | | 60.9 | |
| | .25 | -------- | -.2570 |
| 1.23 | | 36.0 | |
| | 1.48 | -------- | .3867 |
| 3.86 | | 81.4 | |
| | 5.34 | -------- | -.5417 |
| | | 24.2 | |
| | | ******** | |

R.M.S. Relative error = .0280
Maximum rel. error = -.0449 at sample 11
Number of trials was 0

PLOTTED RESULTS

HY 14.3 Grid Ref: SP 1054 7108 Azimuth: 305

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 20.0000 | 19.2600 | 15.1500 | 11.7500 | .7800 |
| 1.0 | 10.5900 | 9.9700 | 7.7000 | 6.8800 | .6250 |
| 2.0 | 7.2000 | 6.7300 | 5.5200 | 4.5200 | .4520 |
| 4.0 | 4.4300 | 4.1300 | 3.3400 | 3.1500 | .3020 |
| 8.0 | 2.2900 | 2.1200 | 1.9110 | 1.6850 | .1500 |
| 16.0 | .7060 | .6680 | .6120 | .6390 | .0380 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 42.25 | -.0020 | -.2528 | .2943 |
| 1.0 | 45.80 | -.0005 | -.1125 | .0334 |
| 1.5 | 56.55 | | | |
| 2.0 | 63.08 | .0025 | -.1992 | .0296 |
| 3.0 | 74.65 | | | |
| 4.0 | 81.56 | -.0005 | -.0586 | -.0083 |
| 6.0 | 89.38 | | | |
| 8.0 | 90.38 | .0088 | -.1257 | .0297 |
| 12.0 | 79.96 | | | |
| 16.0 | 62.88 | 0.0000 | .0432 | 0.0000 |
| 24.0 | 36.58 | | | |
| 32.0 | 17.09 | | | |

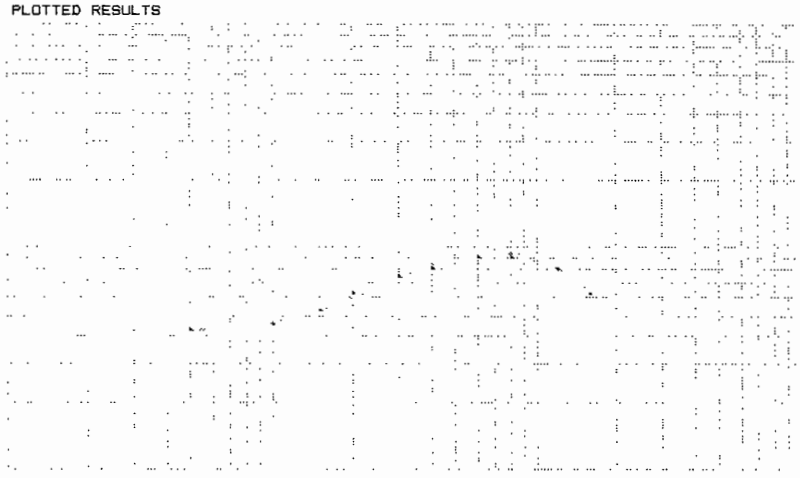
R.M.S. Observational Error = .0038
R.M.S. Offset Wenner Difference = .1513
R.M.S. Potential Ladder Difference = .1338

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity | Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|---|---|---|
| 1 | .5 | 42.25 | 1.65 | | 42.8 | |
| 2 | 1.0 | 45.80 | | | | |
| 3 | 1.5 | 52.00 | | 1.65 | -------- | .6270 |
| 4 | 2.0 | 63.08 | | | | |
| 5 | 3.0 | 74.65 | 4.61 | | 186.7 | |
| 6 | 4.0 | 81.56 | | | | |
| 7 | 6.0 | 89.38 | | 6.26 | -------- | -.7688 |
| 8 | 8.0 | 90.38 | | | | |
| 9 | 12.0 | 79.96 | | | 24.4 | |
| 10 | 16.0 | 62.88 | | | | |
| | | | | | ******** | |

R.M.S. Relative error = .0296
Maximum rel. error = -.0617 at sample 5
Number of trials was 0

PLOTTED RESULTS



HY 15.1 Grid Ref: SP 1396 7114 Azimuth: 328

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 395.0000 | 383.0000 | 255.0000 | 324.0000 | 11.8900 |
| 1.0 | 80.8000 | 78.6000 | 79.0000 | 54.6000 | 2.2900 |
| 2.0 | 14.6400 | 14.0400 | 10.3100 | 12.4800 | .5900 |
| 4.0 | 6.2400 | 5.8300 | 5.1400 | 4.0300 | .3990 |
| 8.0 | 3.0600 | 2.8500 | 2.5000 | 2.2000 | .1990 |
| 16.0 | 1.0040 | .9570 | .9160 | .7900 | .0470 |
| 32.0 | .2660 | .2570 | .2240 | .1880 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 909.49 | .0003 | .2383 | .9005 |
| 1.0 | 419.72 | -.0011 | -.3653 | .5317 |
| 1.5 | 277.98 | | | |
| 2.0 | 143.19 | .0007 | .1904 | .0779 |
| 3.0 | 118.59 | | | |
| 4.0 | 115.23 | .0018 | -.2421 | .0320 |
| 6.0 | 123.53 | | | |
| 8.0 | 118.12 | .0036 | -.1277 | .0922 |
| 12.0 | 105.67 | | | |
| 16.0 | 85.75 | -.0000 | -.1477 | .0049 |
| 24.0 | 56.87 | | | |
| 32.0 | 41.42 | 0.0000 | -.1748 | 0.0000 |
| 48.0 | 34.98 | | | |
| 64.0 | 41.02 | | | |

R.M.S. Observational Error = .0016
R.M.S. Offset Wenner Difference = .2248
R.M.S. Potential Ladder Difference = .4300

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity | Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|---|---|---|
| 1 | .5 | 909.49 | .18 | | 2800.5 | |
| 2 | 1.0 | 419.72 | | | | |
| 3 | 1.5 | 210.00 | | .18 | -------- | -.5415 |
| 4 | 2.0 | 143.19 | | | | |
| 5 | 3.0 | 118.59 | .54 | | 832.9 | |
| 6 | 4.0 | 115.23 | | | | |
| 7 | 6.0 | 116.00 | | .72 | -------- | -.7769 |
| 8 | 8.0 | 118.12 | | | | |
| 9 | 12.0 | 105.67 | 5.34 | | 104.6 | |
| 10 | 16.0 | 85.75 | | | | |
| 11 | 24.0 | 56.87 | | 6.06 | -------- | .5133 |
| 12 | 32.0 | 41.42 | | | | |
| 13 | 48.0 | 34.98 | 2.70 | | 325.2 | |
| | | | | 8.76 | -------- | -.8509 |
| | | | | | 26.2 | |
| | | | | | ******** | |

R.M.S. Relative error = .0297
Maximum rel. error = .0682 at sample 1
Number of trials was 0

PLOTTED RESULTS

HY 15.2 Grid Ref: SP 1397 7099 Azimuth: 52

**INPUT DATA**

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 56.6000 | 53.8000 | 50.6000 | 40.2000 | 2.7200 |
| 1.0 | 21.8000 | 21.2000 | 14.4300 | 16.4900 | .5940 |
| 2.0 | 4.3800 | 4.2100 | 3.1900 | 3.7600 | .1730 |
| 4.0 | 1.6940 | 1.6030 | 1.2300 | 1.1330 | .0910 |
| 8.0 | 1.1400 | 1.0660 | .7960 | .7760 | .0730 |
| 16.0 | .5950 | .5470 | .4570 | .4920 | .0470 |
| 32.0 | .2200 | .2030 | .1700 | .2000 | .0160 |

**PROCESSING RESULTS**

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 142.63 | .0014 | -.2291 | .0458 |
| 1.0 | 97.14 | .0003 | .1332 | 1.1526 |
| 1.5 | 69.17 | | | |
| 2.0 | 43.67 | -.0007 | .1640 | .1209 |
| 3.0 | 35.95 | | | |
| 4.0 | 29.69 | 0.0000 | -.0821 | .0363 |
| 6.0 | 24.00 | | | |
| 8.0 | 19.51 | .0009 | -.0254 | .0911 |
| 12.0 | 16.16 | | | |
| 16.0 | 17.70 | .0017 | .0738 | -.1056 |
| 24.0 | 15.81 | | | |
| 32.0 | 17.20 | .0046 | .1622 | 0.0000 |
| 48.0 | 24.12 | | | |
| 64.0 | 14.85 | | | |

R.M.S. Observational Error = .0020
R.M.S. Offset Wenner Difference = .1395
R.M.S. Potential Ladder Difference = .4772

**FIELD CURVE DATA**

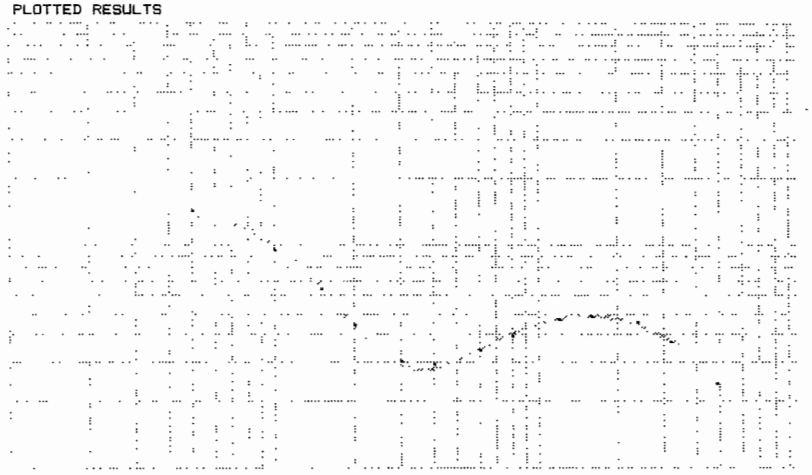
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 142.63 |
| 2 | 1.0 | 97.14 |
| 3 | 1.5 | 64.00 |
| 4 | 2.0 | 43.67 |
| 5 | 3.0 | 30.00 |
| 6 | 4.0 | 29.69 |
| 7 | 6.0 | 24.00 |
| 8 | 8.0 | 19.51 |
| 9 | 12.0 | 46.16 |
| 10 | 16.0 | 47.70 |
| 11 | 24.0 | 45.81 |
| 12 | 32.0 | 37.20 |
| 13 | 48.0 | 24.12 |

**INTERPRETED MODEL**

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .90 | | 147.5 | |
| | .90 | -------- | -.7825 |
| 3.16 | | 18.0 | |
| | 4.06 | -------- | .7700 |
| 5.98 | | 138.5 | |
| | 10.04 | -------- | -.7554 |
| | | 19.3 | |
| | | ******** | |

R.M.S. Relative error = .0287
Maximum rel. error = -.0498 at sample 6
Number of trials was 0

**PLOTTED RESULTS**



HY 15.3 Grid Ref: SP 1389 7105 Azimuth: 357

**INPUT DATA**

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 84.8000 | 82.1000 | 63.4000 | 68.6000 | 2.6200 |
| 1.0 | 24.3000 | 23.2000 | 19.8100 | 17.8600 | .9890 |
| 2.0 | 6.3100 | 5.9200 | 4.6300 | 5.4100 | .3830 |
| 4.0 | 2.1900 | 2.0600 | 1.6700 | 1.8340 | .1350 |
| 8.0 | .9370 | .8920 | .7700 | .6540 | .0400 |
| 16.0 | .3970 | .3810 | .3130 | .2530 | .0130 |
| 32.0 | .2000 | .1890 | .1450 | .1240 | .0090 |

**PROCESSING RESULTS**

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 207.35 | .0009 | .0788 | .3568 |
| 1.0 | 118.34 | .0046 | -.1035 | .3801 |
| 1.5 | 97.05 | | | |
| 2.0 | 63.08 | .0011 | .1554 | .0156 |
| 3.0 | 52.36 | | | |
| 4.0 | 44.03 | -.0023 | .0936 | -.0707 |
| 6.0 | 37.08 | | | |
| 8.0 | 35.79 | .0054 | -.1629 | .1445 |
| 12.0 | 30.37 | | | |
| 16.0 | 28.45 | .0076 | -.2120 | .2394 |
| 24.0 | 27.40 | | | |
| 32.0 | 27.04 | .0101 | -.1561 | 0.0000 |
| 48.0 | 35.80 | | | |
| 64.0 | 44.60 | | | |

R.M.S. Observational Error = .0055
R.M.S. Offset Wenner Difference = .1443
R.M.S. Potential Ladder Difference = .2435

**WARNING:** The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

**FIELD CURVE DATA**

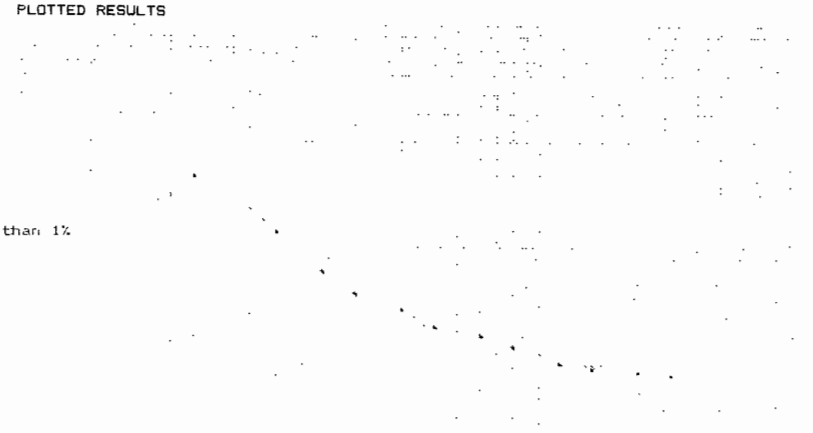
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 207.35 |
| 2 | 1.0 | 118.34 |
| 3 | 1.5 | 78.00 |
| 4 | 2.0 | 63.08 |
| 5 | 3.0 | 52.36 |
| 6 | 4.0 | 44.03 |
| 7 | 6.0 | 40.00 |
| 8 | 8.0 | 35.79 |
| 9 | 12.0 | 30.37 |
| 10 | 16.0 | 28.45 |
| 11 | 24.0 | 27.40 |
| 12 | 32.0 | 27.04 |

**INTERPRETED MODEL**

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .58 | | 236.4 | |
| | .58 | -------- | -.6428 |
| 2.35 | | 51.4 | |
| | 2.93 | -------- | -.2108 |
| 6.46 | | 33.5 | |
| | 9.39 | -------- | -.1532 |
| | | 24.6 | |
| | | ******** | |

R.M.S. Relative error = .0309
Maximum rel. error = -.0622 at sample 5
Number of trials was 0

**PLOTTED RESULTS**



HY 16.1 Grid Ref: SP 1019 7011 Azimuth: 50

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 29.1000 | 26.2000 | 25.9000 | 26.7000 | 2.9700 |
| 1.0 | 10.1700 | 9.7200 | 8.9900 | 8.9200 | .4450 |
| 2.0 | 2.8000 | 2.6800 | 2.4100 | 2.2200 | .1200 |
| 4.0 | 1.2100 | 1.1410 | .8600 | .8760 | .0690 |
| 8.0 | .7830 | .7210 | .5670 | .5490 | .0580 |
| 16.0 | .4130 | .3850 | .3340 | .3120 | .0280 |
| 32.0 | .1960 | .1830 | .1400 | .1510 | .0110 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 82.62 | -.0024 | .0304 | -.5147 |
| 1.0 | 56.27 | .0005 | -.0078 | -.1685 |
| 1.5 | 39.35 | | | |
| 2.0 | 29.09 | 0.0000 | -.0821 | -.0795 |
| 3.0 | 23.87 | | | |
| 4.0 | 21.82 | 0.0000 | .0184 | -.0108 |
| 6.0 | 24.96 | | | |
| 8.0 | 28.05 | .0051 | -.0323 | .0104 |
| 12.0 | 32.39 | | | |
| 16.0 | 32.47 | 0.0000 | -.0681 | -.0739 |
| 24.0 | 30.78 | | | |
| 32.0 | 29.25 | .0103 | .0756 | 0.0000 |
| 48.0 | 28.42 | | | |
| 64.0 | 30.91 | | | |

R.M.S. Observational Error = .0044
R.M.S. Offset Wenner Difference = .0527
R.M.S. Potential Ladder Difference = .2256

**WARNING:** The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 82.62 |
| 2 | 1.0 | 56.27 |
| 3 | 1.5 | 39.00 |
| 4 | 2.0 | 29.09 |
| 5 | 3.0 | 23.87 |
| 6 | 4.0 | 21.82 |
| 7 | 6.0 | 24.96 |
| 8 | 8.0 | 28.05 |
| 9 | 12.0 | 32.39 |
| 10 | 16.0 | 32.47 |
| 11 | 24.0 | 30.78 |
| 12 | 32.0 | 29.25 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .84 | | 85.5 | |
| | .84 | -------- | -.6765 |
| 3.77 | | 16.5 | |
| | 4.61 | -------- | .6710 |
| 4.21 | | 83.8 | |
| | 8.82 | -------- | -.5901 |
| | | 21.6 | |
| | | ******** | |

R.M.S. Relative error = .0285
Maximum rel. error = -.0405 at sample 6
Number of trials was 0

PLOTTED RESULTS

HY 16.2 Grid Ref: SP 1023 7006 Azimuth: 360

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 21.4000 | 20.6000 | 15.9400 | 13.8000 | .8470 |
| 1.0 | 10.3000 | 9.6400 | 8.0400 | 7.6000 | .6680 |
| 2.0 | 4.1900 | 3.9000 | 3.7200 | 3.3200 | .2850 |
| 4.0 | 1.6540 | 1.5780 | 1.2720 | 1.2250 | .0740 |
| 8.0 | .6830 | .6240 | .4970 | .5150 | .0450 |
| 16.0 | .3580 | .3330 | .2680 | .2800 | .0230 |
| 32.0 | .1760 | .1670 | .1310 | .1270 | .0080 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 46.72 | -.0022 | -.1439 | .2298 |
| 1.0 | 49.13 | -.0008 | -.0563 | .0160 |
| 1.5 | 51.76 | | | |
| 2.0 | 44.23 | .0012 | -.1136 | -.1938 |
| 3.0 | 37.73 | | | |
| 4.0 | 31.38 | .0012 | -.0376 | .1531 |
| 6.0 | 25.11 | | | |
| 8.0 | 25.43 | .0059 | .0356 | -.0261 |
| 12.0 | 27.23 | | | |
| 16.0 | 27.55 | .0056 | .0438 | -.0354 |
| 24.0 | 27.06 | | | |
| 32.0 | 25.94 | .0057 | -.0310 | 0.0000 |
| 48.0 | 26.52 | | | |
| 64.0 | 30.94 | | | |

R.M.S. Observational Error = .0039
R.M.S. Offset Wenner Difference = .0778
R.M.S. Potential Ladder Difference = .1390

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 46.72 |
| 2 | 1.0 | 49.13 |
| 3 | 1.5 | 48.50 |
| 4 | 2.0 | 44.23 |
| 5 | 3.0 | 37.73 |
| 6 | 4.0 | 31.38 |
| 7 | 6.0 | 25.50 |
| 8 | 8.0 | 25.43 |
| 9 | 12.0 | 27.23 |
| 10 | 16.0 | 27.55 |
| 11 | 24.0 | 27.06 |
| 12 | 32.0 | 25.94 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .39 | | 42.1 | |
| | .39 | -------- | .1833 |
| 1.25 | | 61.0 | |
| | 1.64 | -------- | -.5307 |
| 4.07 | | 18.7 | |
| | 5.71 | -------- | .4410 |
| 3.71 | | 48.2 | |
| | 9.42 | -------- | -.3408 |
| | | 23.7 | |
| | | ******** | |

R.M.S. Relative error = .0284
Maximum rel. error = -.0685 at sample 6
Number of trials was 0

PLOTTED RESULTS

HY 16.3 Grid Ref: SP 1026 7012 Azimuth: 320

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 34.7000 | 32.9000 | 24.1000 | 24.4000 | 1.8080 |
| 1.0 | 13.3600 | 12.3200 | 11.4900 | 11.0500 | 1.0350 |
| 2.0 | 6.3800 | 6.2000 | 4.3700 | 4.8100 | .1800 |
| 4.0 | 1.6790 | 1.6110 | 1.0560 | 1.3050 | .0700 |
| 8.0 | .6550 | .6080 | .4680 | .4760 | .0440 |
| 16.0 | .3570 | .3340 | .2600 | .2740 | .0220 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 76.18 | -.0002 | .0124 | .2672 |
| 1.0 | 70.81 | .0004 | -.0390 | -.2707 |
| 1.5 | 67.46 | | | |
| 2.0 | 57.68 | .0000 | .0959 | .8638 |
| 3.0 | 38.27 | | | |
| 4.0 | 29.67 | -.0012 | .2109 | .4100 |
| 6.0 | 27.00 | | | |
| 8.0 | 23.73 | .0046 | .0169 | .0146 |
| 12.0 | 25.91 | | | |
| 16.0 | 26.84 | .0028 | .0524 | 0.0000 |
| 24.0 | 26.98 | | | |
| 32.0 | 27.13 | | | |

R.M.S. Observational Error = .0023
R.M.S. Offset Wenner Difference = .0987
R.M.S. Potential Ladder Difference = .4603

FIELD CURVE DATA

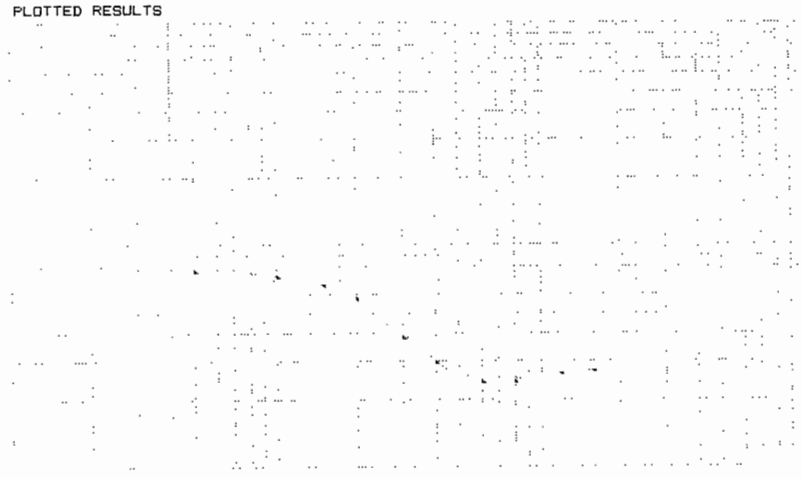
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 76.18 |
| 2 | 1.0 | 70.81 |
| 3 | 1.5 | 65.00 |
| 4 | 2.0 | 57.68 |
| 5 | 3.0 | 38.27 |
| 6 | 4.0 | 29.67 |
| 7 | 6.0 | 24.00 |
| 8 | 8.0 | 23.73 |
| 9 | 12.0 | 25.91 |
| 10 | 16.0 | 26.84 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 1.73 | | 77.5 | |
| | 1.73 | -------- | -.6667 |
| 3.84 | | 15.5 | |
| | 5.57 | -------- | .5700 |
| 3.91 | | 56.6 | |
| | 9.48 | -------- | -.4682 |
| | | 20.5 | |
| | | ******** | |

R.M.S. Relative error = .0235
Maximum rel. error = .0404 at sample 8
Number of trials was 0

PLOTTED RESULTS



HY 19.1 Grid Ref: SP 1515 7443 Azimuth: 44

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 14.2400 | 13.6500 | 10.0200 | 9.9800 | .5860 |
| 1.0 | 5.4500 | 5.1700 | 3.9600 | 4.2600 | .2800 |
| 2.0 | 1.8980 | 1.8010 | 1.3920 | 1.5010 | .0970 |
| 4.0 | .8390 | .7890 | .6290 | .6120 | .0500 |
| 8.0 | .4250 | .4000 | .3140 | .3070 | .0240 |
| 16.0 | .2210 | .2070 | .1610 | .1620 | .0140 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 31.42 | .0003 | -.0040 | .3885 |
| 1.0 | 25.82 | -.0000 | .0730 | .2328 |
| 1.5 | 23.30 | | | |
| 2.0 | 18.18 | 0.0000 | .0754 | .0713 |
| 3.0 | 16.03 | | | |
| 4.0 | 15.59 | 0.0000 | -.0274 | .0427 |
| 6.0 | 15.78 | | | |
| 8.0 | 15.61 | .0024 | -.0225 | .0571 |
| 12.0 | 15.84 | | | |
| 16.0 | 16.24 | 0.0000 | .0062 | 0.0000 |
| 24.0 | 17.53 | | | |
| 32.0 | 18.30 | | | |

R.M.S. Observational Error = .0010
R.M.S. Offset Wenner Difference = .0453
R.M.S. Potential Ladder Difference = .2075

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 31.42 |
| 2 | 1.0 | 25.82 |
| 3 | 1.5 | 21.00 |
| 4 | 2.0 | 18.18 |
| 5 | 3.0 | 16.03 |
| 6 | 4.0 | 15.59 |
| 7 | 6.0 | 15.78 |
| 8 | 8.0 | 15.61 |
| 9 | 12.0 | 15.84 |
| 10 | 16.0 | 16.24 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .82 | | 31.5 | |
| | .82 | -------- | -.3816 |
| 1.50 | | 14.1 | |
| | 2.32 | -------- | .0505 |
| | | 15.6 | |
| | | ******** | |

R.M.S. Relative error = .0239
Maximum rel. error = -.0419 at sample 1
Number of trials was 0

PLOTTED RESULTS

HY 19.2 Grid Ref: SP 1520 7430 Azimuth: 321

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 21.7000 | 21.0000 | 16.5000 | 14.8700 | .7260 |
| 1.0 | 5.6700 | 5.4000 | 4.3800 | 4.6800 | .2690 |
| 2.0 | 2.1300 | 2.0200 | 1.5620 | 1.6470 | .1160 |
| 4.0 | .8950 | .8450 | .6960 | .6480 | .0520 |
| 8.0 | .4250 | .3980 | .3130 | .3170 | .0270 |
| 16.0 | .2300 | .2170 | .1730 | .1630 | .0110 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 49.28 | -.0012 | -.1039 | .6705 |
| 1.0 | 28.46 | .0002 | .0662 | .0425 |
| 1.5 | 24.61 | | | |
| 2.0 | 20.16 | -.0028 | .0530 | .1141 |
| 3.0 | 18.57 | | | |
| 4.0 | 16.89 | -.0022 | -.0714 | .0462 |
| 6.0 | 16.20 | | | |
| 8.0 | 15.83 | 0.0000 | .0127 | -.0060 |
| 12.0 | 16.33 | | | |
| 16.0 | 16.89 | .0087 | -.0595 | 0.0000 |
| 24.0 | 17.79 | | | |
| 32.0 | 20.09 | | | |

R.M.S. Observational Error = .0039
R.M.S. Offset Wenner Difference = .0668
R.M.S. Potential Ladder Difference = .3055

FIELD CURVE DATA

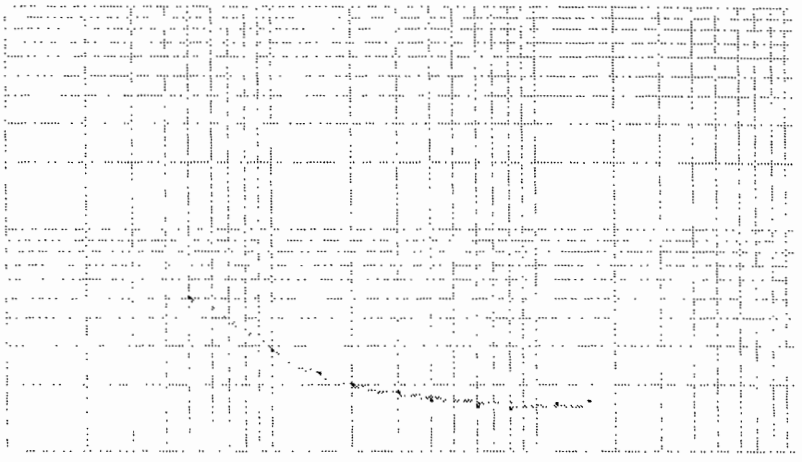
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 49.28 |
| 2 | 1.0 | 28.46 |
| 3 | 1.5 | 22.50 |
| 4 | 2.0 | 20.16 |
| 5 | 3.0 | 18.57 |
| 6 | 4.0 | 16.89 |
| 7 | 6.0 | 16.20 |
| 8 | 8.0 | 15.83 |
| 9 | 12.0 | 16.33 |
| 10 | 16.0 | 16.89 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .44 | | 64.2 | |
| | .44 | -------- | -.5489 |
| 1.98 | | 18.7 | |
| | 2.42 | -------- | -.0841 |
| | | 15.8 | |
| | | ******** | |

R.M.S. Relative error = .0287
Maximum rel. error = -.0529 at sample 10
Number of trials was 0

PLOTTED RESULTS



HY 19.3 Grid Ref: SP 1527 7435 Azimuth: 11

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 13.7500 | 12.9100 | 12.3900 | 11.2500 | .8530 |
| 1.0 | 5.0800 | 4.8600 | 3.9100 | 3.7900 | .2230 |
| 2.0 | 2.2300 | 2.1100 | 1.5750 | 1.6950 | .1260 |
| 4.0 | 1.0490 | .9780 | .7750 | .7960 | .0680 |
| 8.0 | .4930 | .4620 | .3750 | .3640 | .0290 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 37.13 | -.0009 | -.0964 | -.2185 |
| 1.0 | 24.19 | -.0006 | -.0312 | .1169 |
| 1.5 | 19.91 | | | |
| 2.0 | 20.55 | -.0027 | .0734 | .1011 |
| 3.0 | 20.98 | | | |
| 4.0 | 19.74 | .0029 | .0267 | .0248 |
| 6.0 | 19.59 | | | |
| 8.0 | 18.57 | .0041 | -.0298 | 0.0000 |
| 12.0 | 18.03 | | | |
| 16.0 | 18.79 | | | |

R.M.S. Observational Error = .0026
R.M.S. Offset Wenner Difference = .0588
R.M.S. Potential Ladder Difference = .1344

FIELD CURVE DATA

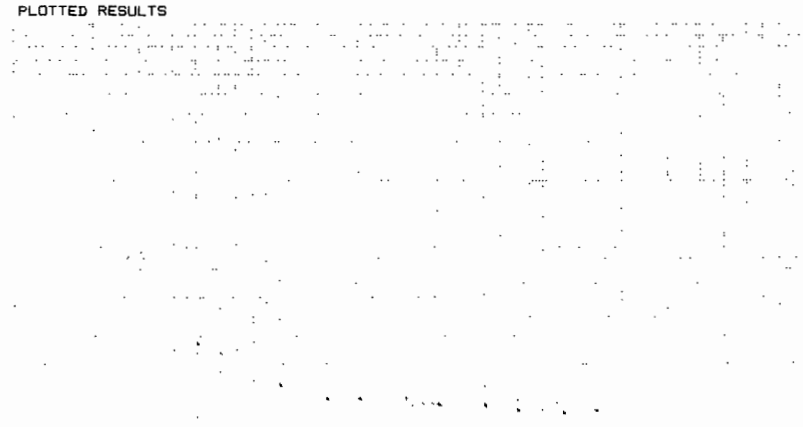
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 37.13 |
| 2 | 1.0 | 24.19 |
| 3 | 1.5 | 21.00 |
| 4 | 2.0 | 20.55 |
| 5 | 3.0 | 20.98 |
| 6 | 4.0 | 19.74 |
| 7 | 6.0 | 19.59 |
| 8 | 8.0 | 18.57 |
| 9 | 12.0 | 18.03 |
| 10 | 16.0 | 18.79 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .39 | | 46.1 | |
| | .39 | -------- | -.4012 |
| 2.09 | | 19.7 | |
| | 2.48 | -------- | -.0287 |
| | | 18.6 | |
| | | ******** | |

R.M.S. Relative error = .0301
Maximum rel. error = .0429 at sample 9
Number of trials was 0

PLOTTED RESULTS



HY 22.1 Grid Ref: SP 1938 7381 Azimuth: 7

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 27.9000 | 26.4000 | 23.3000 | 15.4000 | 1.5010 |
| 1.0 | 14.9500 | 14.0400 | 12.8700 | 9.4300 | .9130 |
| 2.0 | 6.8800 | 6.4300 | 5.6200 | 5.0300 | .4530 |
| 4.0 | 3.0500 | 2.8700 | 2.5000 | 2.2300 | .1800 |
| 8.0 | 1.0910 | 1.0340 | .9370 | .8180 | .0570 |
| 16.0 | .3670 | .3500 | .2890 | .2810 | .0180 |
| 32.0 | .1770 | .1670 | .1260 | .1180 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 60.79 | -.0000 | -.4083 | .1322 |
| 1.0 | 70.06 | -.0002 | -.3085 | .0425 |
| 1.5 | 72.09 | | | |
| 2.0 | 66.92 | -.0004 | -.1108 | -.0334 |
| 3.0 | 63.81 | | | |
| 4.0 | 59.44 | 0.0000 | -.1142 | .0755 |
| 6.0 | 50.83 | | | |
| 8.0 | 44.11 | -.0000 | -.1356 | .0491 |
| 12.0 | 34.55 | | | |
| 16.0 | 28.65 | -.0027 | -.0281 | .0289 |
| 24.0 | 24.80 | | | |
| 32.0 | 24.53 | .0057 | -.0656 | 0.0000 |
| 48.0 | 29.41 | | | |
| 64.0 | 36.57 | | | |

R.M.S. Observational Error = .0024
R.M.S. Offset Wenner Difference = .2107
R.M.S. Potential Ladder Difference = .0699

FIELD CURVE DATA

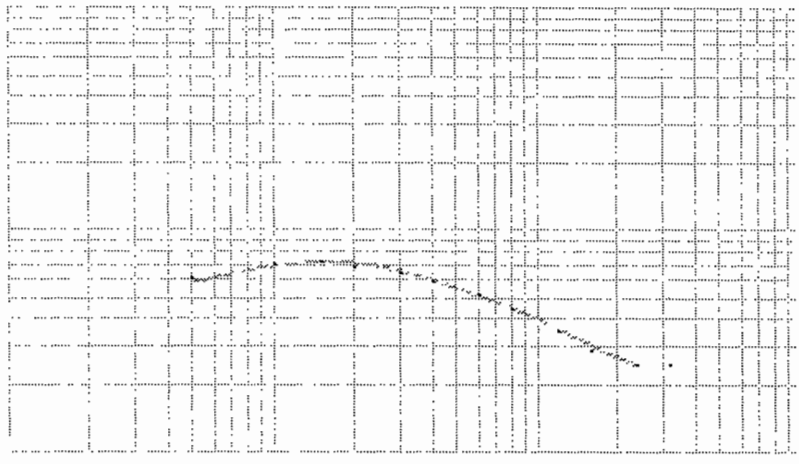
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 60.79 |
| 2 | 1.0 | 70.06 |
| 3 | 1.5 | 72.09 |
| 4 | 2.0 | 66.92 |
| 5 | 3.0 | 63.81 |
| 6 | 4.0 | 59.44 |
| 7 | 6.0 | 50.83 |
| 8 | 8.0 | 44.11 |
| 9 | 12.0 | 34.55 |
| 10 | 16.0 | 28.65 |
| 11 | 24.0 | 24.80 |
| 12 | 32.0 | 24.53 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .31 | | 45.7 | |
| | .31 | -------- | .2980 |
| 1.58 | | 84.5 | |
| | 1.89 | -------- | -.2891 |
| 6.70 | | 46.6 | |
| | 8.59 | -------- | -.3869 |
| | | 20.6 | |
| | | ******** | |

R.M.S. Relative error = .0285
Maximum rel. error = .0567 at sample 5
Number of trials was 0

PLOTTED RESULTS



HY 22.2 Grid Ref: SP 1948 7390 Azimuth: 330

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 40.0000 | 37.8000 | 29.6000 | 25.0000 | 2.1600 |
| 1.0 | 19.2100 | 17.8800 | 15.5600 | 14.4900 | 1.3290 |
| 2.0 | 9.6800 | 9.1800 | 7.2500 | 6.9000 | .4980 |
| 4.0 | 4.3300 | 4.0100 | 3.4100 | 3.2900 | .3180 |
| 8.0 | 1.5660 | 1.4760 | 1.2550 | 1.3930 | .0940 |
| 16.0 | .4710 | .4530 | .3870 | .3490 | .0180 |
| 32.0 | .1710 | .1590 | .1210 | .1250 | .0110 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 85.77 | .0010 | -.1685 | .2001 |
| 1.0 | 94.40 | .0001 | -.0712 | -.0964 |
| 1.5 | 96.30 | | | |
| 2.0 | 88.91 | .0002 | -.0495 | .1286 |
| 3.0 | 82.59 | | | |
| 4.0 | 84.19 | .0005 | -.0358 | -.0008 |
| 6.0 | 81.32 | | | |
| 8.0 | 66.55 | -.0026 | .1042 | -.0921 |
| 12.0 | 46.88 | | | |
| 16.0 | 37.00 | -.0000 | -.1033 | .1911 |
| 24.0 | 25.58 | | | |
| 32.0 | 24.73 | .0059 | .0325 | 0.0000 |
| 48.0 | 27.44 | | | |
| 64.0 | 29.33 | | | |

R.M.S. Observational Error = .0025
R.M.S. Offset Wenner Difference = .0924
R.M.S. Potential Ladder Difference = .1359

FIELD CURVE DATA

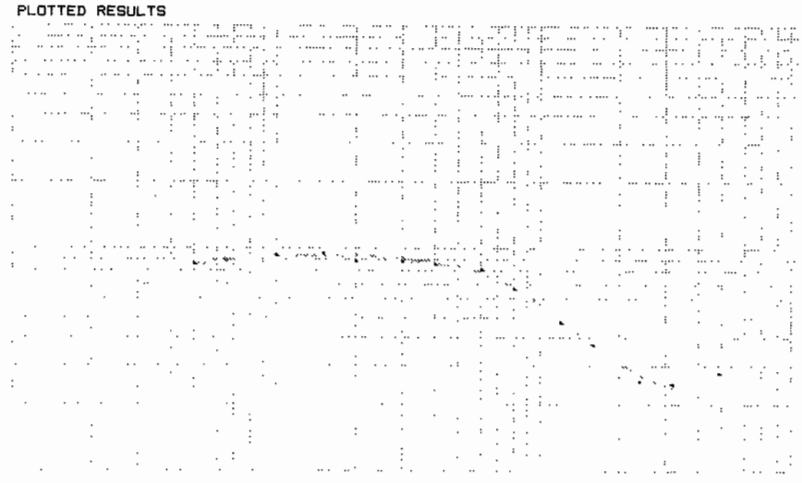
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 85.77 |
| 2 | 1.0 | 94.40 |
| 3 | 1.5 | 96.30 |
| 4 | 2.0 | 88.91 |
| 5 | 3.0 | 87.00 |
| 6 | 4.0 | 84.19 |
| 7 | 6.0 | 81.32 |
| 8 | 8.0 | 66.55 |
| 9 | 12.0 | 46.88 |
| 10 | 16.0 | 37.00 |
| 11 | 24.0 | 25.58 |
| 12 | 32.0 | 24.73 |
| 13 | 48.0 | 27.44 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .30 | | 76.3 | |
| | .30 | -------- | .1315 |
| .96 | | 99.4 | |
| | 1.26 | -------- | -.0496 |
| 5.67 | | 90.0 | |
| | 6.93 | -------- | -.6000 |
| | | 22.5 | |
| | | ******** | |

R.M.S. Relative error = .0322
Maximum rel. error = .0535 at sample 11
Number of trials was 0

PLOTTED RESULTS



HY 22.3 Grid Ref: SP 1947 7370 Azimuth: 77

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 48.7000 | 46.1000 | 34.2000 | 35.6000 | 2.6300 |
| 1.0 | 22.2000 | 21.0000 | 17.1300 | 17.0000 | 1.1900 |
| 2.0 | 9.1600 | 8.7000 | 6.8600 | 7.0700 | .4620 |
| 4.0 | 3.5000 | 3.2800 | 2.6000 | 2.8300 | .2100 |
| 8.0 | 1.2320 | 1.1750 | .9730 | 1.0040 | .0560 |
| 16.0 | .3470 | .3290 | .2590 | .2810 | .0180 |
| 32.0 | .1650 | .1560 | .1150 | .1120 | .0080 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 109.64 | -.0006 | .0401 | .1555 |
| 1.0 | 107.22 | .0005 | -.0076 | .0656 |
| 1.5 | 99.68 | | | |
| 2.0 | 87.52 | -.0002 | .0302 | .1387 |
| 3.0 | 77.50 | | | |
| 4.0 | 68.24 | .0029 | .0847 | .0763 |
| 6.0 | 60.32 | | | |
| 8.0 | 49.69 | .0008 | .0314 | .1925 |
| 12.0 | 35.81 | | | |
| 16.0 | 27.14 | 0.0000 | .0815 | .0198 |
| 24.0 | 23.18 | | | |
| 32.0 | 22.82 | .0061 | -.0264 | 0.0000 |
| 48.0 | 27.07 | | | |
| 64.0 | 34.56 | | | |

R.M.S. Observational Error = .0026
R.M.S. Offset Wenner Difference = .0508
R.M.S. Potential Ladder Difference = .1232

FIELD CURVE DATA

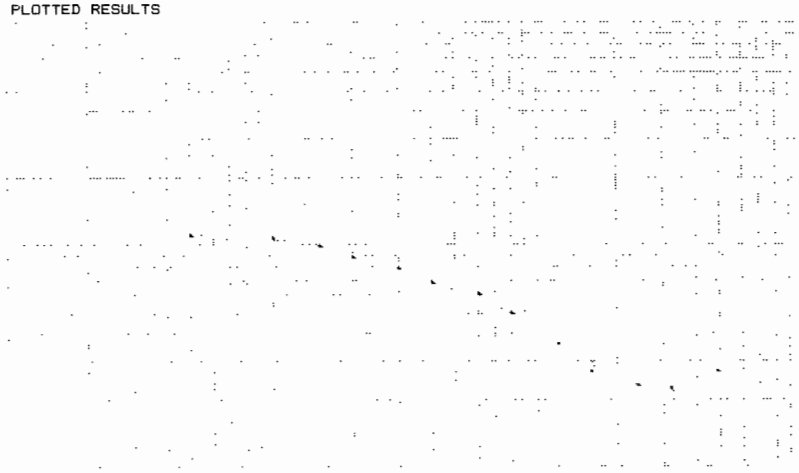
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 109.64 |
| 2 | 1.0 | 107.22 |
| 3 | 1.5 | 99.68 |
| 4 | 2.0 | 87.52 |
| 5 | 3.0 | 77.50 |
| 6 | 4.0 | 68.24 |
| 7 | 6.0 | 60.32 |
| 8 | 8.0 | 49.69 |
| 9 | 12.0 | 35.81 |
| 10 | 16.0 | 27.14 |
| 11 | 24.0 | 23.18 |
| 12 | 32.0 | 22.82 |
| 13 | 48.0 | 27.07 |

R.M.S. Relative error = .0284
Maximum rel. error = .0617 at sample 10
Number of trials was 0

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 1.37 | | 111.1 | |
| | 1.37 | -------- | -.2647 |
| 5.46 | | 64.6 | |
| | 6.83 | -------- | -.5182 |
| | | 20.5 | |
| | | ******** | |

PLOTTED RESULTS



HY 27.1 Grid Ref: SP 1551 7165 Azimuth: 320

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 26.0000 | 24.8000 | 21.7000 | 21.3000 | 1.2820 |
| 1.0 | 6.6400 | 6.3700 | 5.6500 | 5.2500 | .2660 |
| 2.0 | 1.8460 | 1.7540 | 1.3670 | 1.4940 | .0900 |
| 4.0 | .8970 | .8440 | .6260 | .6590 | .0510 |
| 8.0 | .5120 | .4770 | .3680 | .3710 | .0350 |
| 16.0 | .2830 | .2650 | .2110 | .2090 | .0170 |
| 32.0 | .1520 | .1470 | .1080 | .1120 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 67.54 | -.0031 | -.0186 | .0983 |
| 1.0 | 34.24 | .0006 | -.0734 | .1445 |
| 1.5 | 22.87 | | | |
| 2.0 | 17.98 | .0011 | .0888 | .0050 |
| 3.0 | 16.22 | | | |
| 4.0 | 16.15 | .0022 | .0514 | .0479 |
| 6.0 | 17.61 | | | |
| 8.0 | 18.57 | 0.0000 | .0081 | .0119 |
| 12.0 | 20.64 | | | |
| 16.0 | 21.11 | .0035 | -.0095 | .0043 |
| 24.0 | 21.42 | | | |
| 32.0 | 22.12 | -.0000 | .0364 | 0.0000 |
| 48.0 | 24.12 | | | |
| 64.0 | 26.54 | | | |

R.M.S. Observational Error = .0020
R.M.S. Offset Wenner Difference = .0503
R.M.S. Potential Ladder Difference = .0742

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 67.54 |
| 2 | 1.0 | 34.24 |
| 3 | 1.5 | 22.87 |
| 4 | 2.0 | 17.98 |
| 5 | 3.0 | 16.22 |
| 6 | 4.0 | 16.15 |
| 7 | 6.0 | 17.61 |
| 8 | 8.0 | 18.57 |
| 9 | 12.0 | 20.64 |
| 10 | 16.0 | 21.11 |
| 11 | 24.0 | 21.42 |
| 12 | 32.0 | 22.12 |

R.M.S. Relative error = .0284
Maximum rel. error = .0504 at sample 2
Number of trials was 0

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .55 | | 81.0 | |
| | .55 | -------- | -.7053 |
| 2.85 | | 14.0 | |
| | 3.40 | -------- | .3222 |
| | | 22.0 | |
| | | ******** | |

PLOTTED RESULTS

HY 27.2 Grid Ref: SP 1546 7164 Azimuth: 44

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 40.4000 | 38.1000 | 28.0000 | 34.5000 | 2.3100 |
| 1.0 | 15.1000 | 14.6500 | 9.3800 | 13.7700 | .4440 |
| 2.0 | 6.9500 | 6.8200 | 2.9200 | 6.1300 | .1250 |
| 4.0 | 2.1400 | 2.0700 | .7860 | 1.9870 | .0710 |
| 8.0 | .8720 | .8520 | .3790 | .7490 | .0400 |
| 16.0 | .3160 | .2960 | .1940 | .2650 | .0190 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 98.17 | -.0002 | .2080 | .0914 |
| 1.0 | 72.73 | .0004 | .3793 | .1802 |
| 1.5 | 58.29 | | | |
| 2.0 | 56.86 | .0007 | .7094 | 1.1570 |
| 3.0 | 49.70 | | | |
| 4.0 | 34.85 | -.0005 | .8662 | .7110 |
| 6.0 | 34.73 | | | |
| 8.0 | 28.35 | -.0000 | .6560 | .6678 |
| 12.0 | 27.58 | | | |
| 16.0 | 23.07 | .0032 | .3094 | 0.0000 |
| 24.0 | 24.24 | | | |
| 32.0 | 26.93 | | | |

R.M.S. Observational Error = .0014
R.M.S. Offset Wenner Difference = .5725
R.M.S. Potential Ladder Difference = .6828

FIELD CURVE DATA

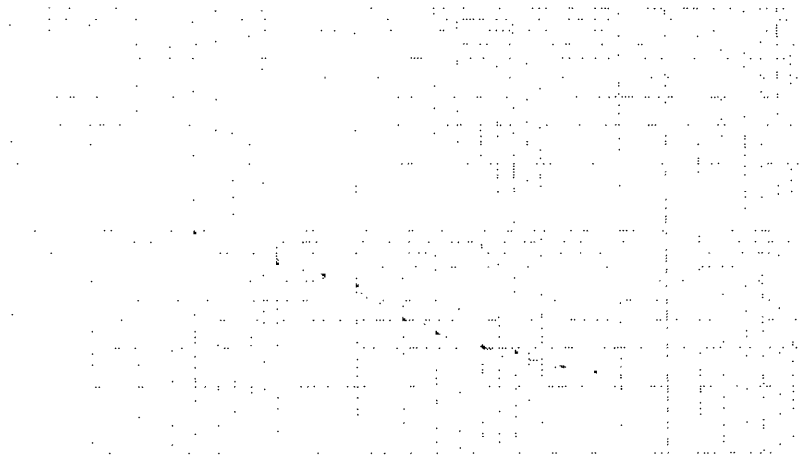
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 98.17 |
| 2 | 1.0 | 72.73 |
| 3 | 1.5 | 64.00 |
| 4 | 2.0 | 56.86 |
| 5 | 3.0 | 40.00 |
| 6 | 4.0 | 34.85 |
| 7 | 6.0 | 30.00 |
| 8 | 8.0 | 28.35 |
| 9 | 12.0 | 25.00 |
| 10 | 16.0 | 23.07 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .22 | | 151.4 | |
| | .22 | -------- | -.3211 |
| 1.00 | | 77.8 | |
| | 1.22 | -------- | -.3661 |
| 2.39 | | 36.1 | |
| | 3.61 | -------- | -.2217 |
| | | 23.0 | |
| | | ******** | |

R.M.S. Relative error = .0306
Maximum rel. error = .0474 at sample 6
Number of trials was 0

PLOTTED RESULTS



HY 27.3 Grid Ref: SP 1552 7472 Azimuth: 80

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 34.1000 | 32.4000 | 29.2000 | 27.0000 | 1.7750 |
| 1.0 | 8.6900 | 8.2800 | 7.7600 | 7.3200 | .4060 |
| 2.0 | 2.7300 | 2.6200 | 2.2100 | 2.1700 | .1100 |
| 4.0 | .8930 | .8390 | .6950 | .7160 | .0530 |
| 8.0 | .4640 | .4340 | .3290 | .3410 | .0270 |
| 16.0 | .2590 | .2430 | .1850 | .1930 | .0150 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 88.28 | -.0022 | -.0783 | .0656 |
| 1.0 | 47.38 | .0005 | -.0584 | -.1612 |
| 1.5 | 32.97 | | | |
| 2.0 | 27.52 | .0000 | -.0183 | .1095 |
| 3.0 | 21.71 | | | |
| 4.0 | 17.73 | .0011 | .0298 | -.1001 |
| 6.0 | 17.47 | | | |
| 8.0 | 16.84 | .0065 | .0358 | .0313 |
| 12.0 | 17.80 | | | |
| 16.0 | 19.00 | .0039 | .0423 | 0.0000 |
| 24.0 | 20.65 | | | |
| 32.0 | 21.90 | | | |

R.M.S. Observational Error = .0032
R.M.S. Offset Wenner Difference = .0480
R.M.S. Potential Ladder Difference = .1032

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 88.28 |
| 2 | 1.0 | 47.38 |
| 3 | 1.5 | 35.00 |
| 4 | 2.0 | 27.52 |
| 5 | 3.0 | 20.00 |
| 6 | 4.0 | 17.73 |
| 7 | 6.0 | 16.50 |
| 8 | 8.0 | 16.84 |
| 9 | 12.0 | 17.80 |
| 10 | 16.0 | 19.00 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .28 | | 166.9 | |
| | .28 | -------- | -.5679 |
| 1.01 | | 46.0 | |
| | 1.29 | -------- | -.5620 |
| 2.43 | | 12.9 | |
| | 3.72 | -------- | .1912 |
| | | 19.0 | |
| | | ******** | |

R.M.S. Relative error = .0281
Maximum rel. error = -.0449 at sample 6
Number of trials was 0

PLOTTED RESULTS

HY 35.1 Grid Ref: SP 2025 7237 Azimuth: 71

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 73.2000 | 68.7000 | 55.4000 | 52.7000 | 4.4900 |
| 1.0 | 35.0000 | 33.0000 | 25.6000 | 27.5000 | 2.0700 |
| 2.0 | 17.7300 | 16.7400 | 13.5300 | 12.4800 | .9790 |
| 4.0 | 7.2700 | 6.8100 | 5.6900 | 5.9400 | .4530 |
| 8.0 | 2.2400 | 2.1200 | 1.9840 | 1.7640 | .1230 |
| 16.0 | .7480 | .7180 | .5850 | .5650 | .0280 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 169.80 | .0001 | -.0500 | .0520 |
| 1.0 | 166.82 | -.0020 | .0716 | -.0066 |
| 1.5 | 163.57 | | | |
| 2.0 | 163.43 | .0006 | -.0807 | .1432 |
| 3.0 | 156.85 | | | |
| 4.0 | 146.15 | .0010 | .0430 | .0327 |
| 6.0 | 125.10 | | | |
| 8.0 | 94.20 | -.0013 | -.1174 | -.0746 |
| 12.0 | 67.42 | | | |
| 16.0 | 57.81 | .0027 | -.0348 | 0.0000 |
| 24.0 | 50.76 | | | |
| 32.0 | 57.89 | | | |

R.M.S. Observational Error = .0015
R.M.S. Offset Wenner Difference = .0719
R.M.S. Potential Ladder Difference = .0773

FIELD CURVE DATA

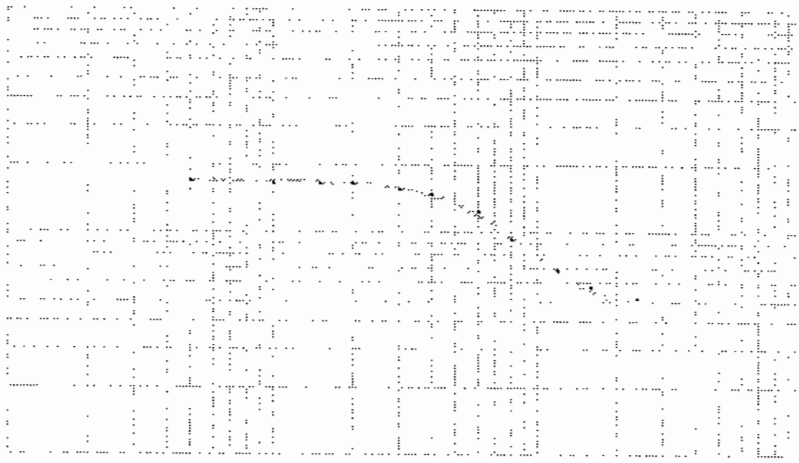
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 169.80 |
| 2 | 1.0 | 166.82 |
| 3 | 1.5 | 163.57 |
| 4 | 2.0 | 163.43 |
| 5 | 3.0 | 156.85 |
| 6 | 4.0 | 146.15 |
| 7 | 6.0 | 125.10 |
| 8 | 8.0 | 94.20 |
| 9 | 12.0 | 67.42 |
| 10 | 16.0 | 57.81 |
| 11 | 24.0 | 50.76 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| 4.76 | | 170.1 | |
| | 4.76 | -------- | -.5809 |
| | | 45.1 | |
| | | ******** | |

R.M.S. Relative error = .0281
Maximum rel. error = -.0527 at sample 11
Number of trials was 0

PLOTTED RESULTS



HY 35.2 Grid Ref: SP 2024 7242 Azimuth: 350

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 52.9000 | 50.4000 | 40.4000 | 37.3000 | 2.5600 |
| 1.0 | 24.2000 | 22.9000 | 19.0900 | 16.5300 | 1.2820 |
| 2.0 | 12.1500 | 11.4000 | 9.5000 | 7.9900 | .7530 |
| 4.0 | 6.7300 | 6.3100 | 5.0900 | 4.9000 | .4150 |
| 8.0 | 2.7300 | 2.5500 | 2.2300 | 2.1400 | .1780 |
| 16.0 | .8160 | .7640 | .7250 | .6980 | .0500 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 122.05 | -.0011 | -.0798 | .1469 |
| 1.0 | 111.90 | .0007 | -.1437 | .0830 |
| 1.5 | 113.11 | | | |
| 2.0 | 109.89 | -.0002 | -.1727 | .0312 |
| 3.0 | 119.51 | | | |
| 4.0 | 125.54 | .0007 | -.0380 | .1029 |
| 6.0 | 122.61 | | | |
| 8.0 | 109.83 | .0007 | -.0412 | .0143 |
| 12.0 | 91.32 | | | |
| 16.0 | 71.53 | .0025 | -.0379 | 0.0000 |
| 24.0 | 42.40 | | | |
| 32.0 | 21.49 | | | |

R.M.S. Observational Error = .0012
R.M.S. Offset Wenner Difference = .1012
R.M.S. Potential Ladder Difference = .0897

FIELD CURVE DATA

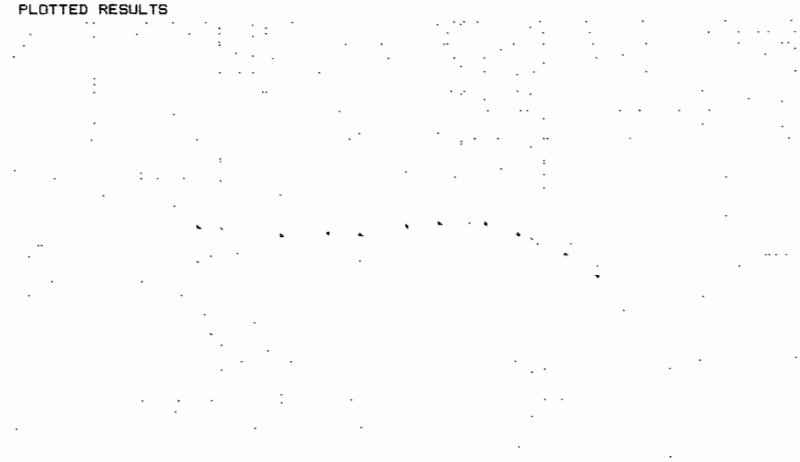
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 122.05 |
| 2 | 1.0 | 111.90 |
| 3 | 1.5 | 113.11 |
| 4 | 2.0 | 109.89 |
| 5 | 3.0 | 119.51 |
| 6 | 4.0 | 125.54 |
| 7 | 6.0 | 122.61 |
| 8 | 8.0 | 109.83 |
| 9 | 12.0 | 91.32 |
| 10 | 16.0 | 71.53 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .48 | | 126.8 | |
| | .48 | -------- | -.1142 |
| 2.01 | | 100.8 | |
| | 2.49 | -------- | .3731 |
| 2.76 | | 220.8 | |
| | 5.25 | -------- | -.6447 |
| | | 47.7 | |
| | | ******** | |

R.M.S. Relative error = .0276
Maximum rel. error = .0482 at sample 2
Number of trials was 0

PLOTTED RESULTS



HY 53.1 Grid Ref: SP 1564 6947 Azimuth: 82

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 29.2000 | 27.8000 | 28.0000 | 19.0300 | 1.3800 |
| 1.0 | 12.7500 | 12.0500 | 10.5900 | 7.3600 | .6840 |
| 2.0 | 6.4100 | 6.0500 | 5.6200 | 4.0200 | .3720 |
| 4.0 | 2.8700 | 2.7300 | 2.5800 | 2.0000 | .1330 |
| 8.0 | .9130 | .8620 | .9010 | .6840 | .0500 |
| 16.0 | .3270 | .3060 | .2730 | .2370 | .0180 |
| 32.0 | .1520 | .1450 | .1150 | .1040 | .0070 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 73.87 | .0007 | -.3815 | -.0215 |
| 1.0 | 56.39 | .0013 | -.3599 | .1395 |
| 1.5 | 58.45 | | | |
| 2.0 | 60.57 | -.0019 | -.3320 | .0346 |
| 3.0 | 61.11 | | | |
| 4.0 | 57.55 | .0024 | -.2533 | .0594 |
| 6.0 | 49.11 | | | |
| 8.0 | 39.84 | .0011 | -.2738 | -.2256 |
| 12.0 | 33.22 | | | |
| 16.0 | 25.64 | .0092 | -.1412 | -.0214 |
| 24.0 | 22.67 | | | |
| 32.0 | 22.02 | 0.0000 | -.1005 | 0.0000 |
| 48.0 | 23.88 | | | |
| 64.0 | 28.55 | | | |

R.M.S. Observational Error = .0037
R.M.S. Offset Wenner Difference = .2814
R.M.S. Potential Ladder Difference = .1126

FIELD CURVE DATA

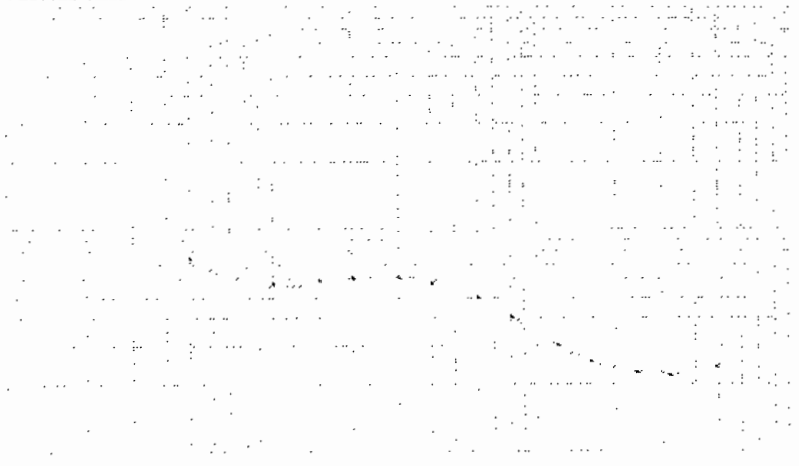
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 73.87 |
| 2 | 1.0 | 56.39 |
| 3 | 1.5 | 58.45 |
| 4 | 2.0 | 60.57 |
| 5 | 3.0 | 61.11 |
| 6 | 4.0 | 57.55 |
| 7 | 6.0 | 49.11 |
| 8 | 8.0 | 39.84 |
| 9 | 12.0 | 30.00 |
| 10 | 16.0 | 25.64 |
| 11 | 24.0 | 22.67 |
| 12 | 32.0 | 22.02 |
| 13 | 48.0 | 23.88 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .30 | | 102.7 | |
| | .30 | -------- | -.4020 |
| .85 | | 43.8 | |
| | 1.15 | -------- | .2975 |
| 3.00 | | 80.9 | |
| | 4.15 | -------- | -.5801 |
| | | 21.5 | |
| | | ******** | |

R.M.S. Relative error = .0220
Maximum rel. error = -.0441 at sample 1
Number of trials was 0

PLOTTED RESULTS



HY 53.2 Grid Ref: SP 1577 6928 Azimuth: 5

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 124.8000 | 118.3000 | 94.6000 | 92.3000 | 6.5000 |
| 1.0 | 46.1000 | 43.6000 | 30.6000 | 39.0000 | 2.5200 |
| 2.0 | 15.9700 | 14.8900 | 12.9100 | 12.0100 | 1.0600 |
| 4.0 | 5.6700 | 5.3800 | 4.5400 | 4.9800 | .2750 |
| 8.0 | 1.2810 | 1.2240 | 1.0890 | 1.1140 | .0520 |
| 16.0 | .3410 | .3240 | .2560 | .2580 | .0130 |
| 32.0 | .1520 | .1400 | .1110 | .1100 | .0090 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 293.58 | 0.0000 | -.0246 | .2141 |
| 1.0 | 218.65 | -.0004 | .2414 | .2055 |
| 1.5 | 185.19 | | | |
| 2.0 | 156.58 | .0013 | -.0722 | .0135 |
| 3.0 | 134.80 | | | |
| 4.0 | 119.63 | .0026 | .0924 | .0693 |
| 6.0 | 80.88 | | | |
| 8.0 | 55.37 | .0039 | .0227 | -.0140 |
| 12.0 | 34.38 | | | |
| 16.0 | 25.84 | .0118 | .0078 | .1236 |
| 24.0 | 21.82 | | | |
| 32.0 | 22.22 | .0199 | -.0090 | 0.0000 |
| 48.0 | 24.78 | | | |
| 64.0 | 24.85 | | | |

R.M.S. Observational Error = .0090
R.M.S. Offset Wenner Difference = .1023
R.M.S. Potential Ladder Difference = .1345

**WARNING:** The observed error for spacing 6 is greater than 1%
There may be an incorrect input data value

**WARNING:** The observed error for spacing 7 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

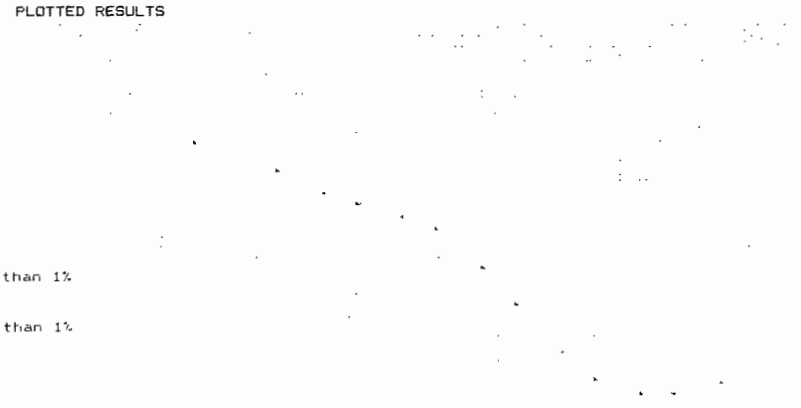
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 293.58 |
| 2 | 1.0 | 218.65 |
| 3 | 1.5 | 175.00 |
| 4 | 2.0 | 156.58 |
| 5 | 3.0 | 134.80 |
| 6 | 4.0 | 119.63 |
| 7 | 6.0 | 80.88 |
| 8 | 8.0 | 55.37 |
| 9 | 12.0 | 34.38 |
| 10 | 16.0 | 25.84 |
| 11 | 24.0 | 21.82 |
| 12 | 32.0 | 22.22 |
| 13 | 48.0 | 24.78 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .68 | | 301.5 | |
| | .68 | -------- | -.3673 |
| 3.95 | | 139.5 | |
| | 4.63 | -------- | -.7351 |
| | | 21.3 | |
| | | ******** | |

R.M.S. Relative error = .0285
Maximum rel. error = -.0443 at sample 1
Number of trials was 0

PLOTTED RESULTS



HY 53.3 Grid Ref: SP 1561 6926 Azimuth: 328

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 86.6000 | 81.8000 | 62.7000 | 63.6000 | 4.7400 |
| 1.0 | 40.5000 | 38.3000 | 31.1000 | 29.5000 | 2.2400 |
| 2.0 | 18.0800 | 16.7400 | 14.2200 | 13.7600 | 1.3270 |
| 4.0 | 8.2500 | 7.8400 | 6.4100 | 6.8200 | .4070 |
| 8.0 | 1.9620 | 1.8890 | 1.7230 | 1.7470 | .0700 |
| 16.0 | .3780 | .3570 | .3070 | .3110 | .0180 |
| 32.0 | .1610 | .1530 | .1140 | .1130 | .0070 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 198.39 | .0007 | .0143 | .1164 |
| 1.0 | 190.38 | -.0010 | -.0528 | .0705 |
| 1.5 | 185.12 | | | |
| 2.0 | 175.80 | .0007 | -.0329 | -.0834 |
| 3.0 | 177.02 | | | |
| 4.0 | 166.25 | .0004 | .0620 | .2069 |
| 6.0 | 122.70 | | | |
| 8.0 | 87.21 | .0015 | .0138 | .0031 |
| 12.0 | 51.65 | | | |
| 16.0 | 31.06 | .0080 | .0129 | -.0646 |
| 24.0 | 24.02 | | | |
| 32.0 | 22.82 | .0062 | -.0088 | 0.0000 |
| 48.0 | 25.84 | | | |
| 64.0 | 32.15 | | | |

R.M.S. Observational Error = .0039
R.M.S. Offset Wenner Difference = .0345
R.M.S. Potential Ladder Difference = .1099

FIELD CURVE DATA

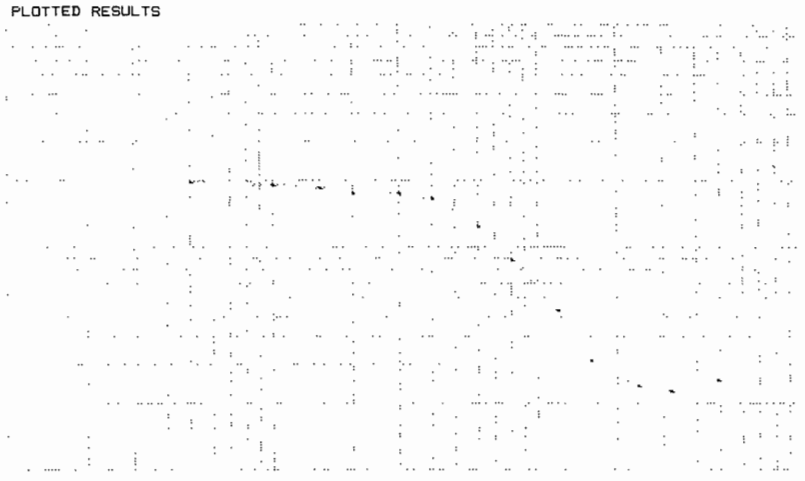
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 198.39 |
| 2 | 1.0 | 190.38 |
| 3 | 1.5 | 185.12 |
| 4 | 2.0 | 175.80 |
| 5 | 3.0 | 177.02 |
| 6 | 4.0 | 166.25 |
| 7 | 6.0 | 122.70 |
| 8 | 8.0 | 87.21 |
| 9 | 12.0 | 51.65 |
| 10 | 16.0 | 31.06 |
| 11 | 24.0 | 24.02 |
| 12 | 32.0 | 22.82 |
| 13 | 48.0 | 25.84 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .70 | | 198.3 | |
| | .70 | -------- | -.0366 |
| 4.60 | | 184.3 | |
| | 5.30 | -------- | -.7876 |
| | | 21.9 | |
| | | ******** | |

R.M.S. Relative error = .0286
Maximum rel. error = .0475 at sample 10
Number of trials was 0

PLOTTED RESULTS



HY 99.1 Grid Ref: SP 1477 6179 Azimuth: 31

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 135.0000 | 126.2000 | 99.3000 | 91.1000 | 8.7700 |
| 1.0 | 68.2000 | 64.6000 | 51.6000 | 52.7000 | 3.5700 |
| 2.0 | 19.5200 | 18.8000 | 17.6000 | 16.1500 | .7080 |
| 4.0 | 3.4900 | 3.3800 | 2.8300 | 2.8500 | .1090 |
| 8.0 | .7950 | .7470 | .6000 | .6140 | .0470 |
| 16.0 | .3420 | .3220 | .2580 | .2610 | .0190 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 299.08 | .0002 | -.0861 | .0947 |
| 1.0 | 327.67 | .0004 | .0211 | .2386 |
| 1.5 | 276.26 | | | |
| 2.0 | 212.06 | .0006 | -.0859 | .1799 |
| 3.0 | 131.85 | | | |
| 4.0 | 71.38 | .0003 | .0070 | .3904 |
| 6.0 | 42.39 | | | |
| 8.0 | 30.51 | .0013 | .0231 | .0413 |
| 12.0 | 27.99 | | | |
| 16.0 | 26.09 | .0029 | .0116 | 0.0000 |
| 24.0 | 24.84 | | | |
| 32.0 | 25.32 | | | |

R.M.S. Observational Error = .0013
R.M.S. Offset Wenner Difference = .0516
R.M.S. Potential Ladder Difference = .2247

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 299.08 |
| 2 | 1.0 | 327.67 |
| 3 | 1.5 | 276.26 |
| 4 | 2.0 | 212.06 |
| 5 | 3.0 | 131.85 |
| 6 | 4.0 | 71.38 |
| 7 | 6.0 | 38.00 |
| 8 | 8.0 | 30.51 |
| 9 | 12.0 | 27.99 |
| 10 | 16.0 | 26.09 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .34 | | 284.0 | |
| | .34 | -------- | .1400 |
| 1.27 | | 376.5 | |
| | 1.61 | -------- | -.8676 |
| | | 26.7 | |
| | | ******** | |

R.M.S. Relative error = .0302
Maximum rel. error = .0521 at sample 10
Number of trials was 0

PLOTTED RESULTS

HY 99.2 Grid Ref: SP 1483 6177 Azimuth: 294

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 56.9000 | 54.2000 | 42.3000 | 39.6000 | 2.7400 |
| 1.0 | 28.5000 | 26.9000 | 21.3000 | 20.3000 | 1.5920 |
| 2.0 | 12.6600 | 11.9000 | 10.3400 | 9.4000 | .7550 |
| 4.0 | 3.8900 | 3.6800 | 3.3400 | 3.3100 | .1990 |
| 8.0 | .9610 | .9080 | .8000 | .7820 | .0540 |
| 16.0 | .3890 | .3690 | .2940 | .2920 | .0200 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 128.65 | -.0007 | -.0659 | .1361 |
| 1.0 | 130.69 | .0003 | -.0481 | .1184 |
| 1.5 | 133.72 | | | |
| 2.0 | 124.03 | .0004 | -.0952 | .1112 |
| 3.0 | 108.58 | | | |
| 4.0 | 83.57 | .0028 | -.0090 | -.0446 |
| 6.0 | 56.63 | | | |
| 8.0 | 39.76 | -.0010 | -.0228 | -.1023 |
| 12.0 | 29.91 | | | |
| 16.0 | 29.46 | 0.0000 | -.0068 | 0.0000 |
| 24.0 | 28.43 | | | |
| 32.0 | 30.56 | | | |

R.M.S. Observational Error = .0013
R.M.S. Offset Wenner Difference = .0522
R.M.S. Potential Ladder Difference = .1071

FIELD CURVE DATA

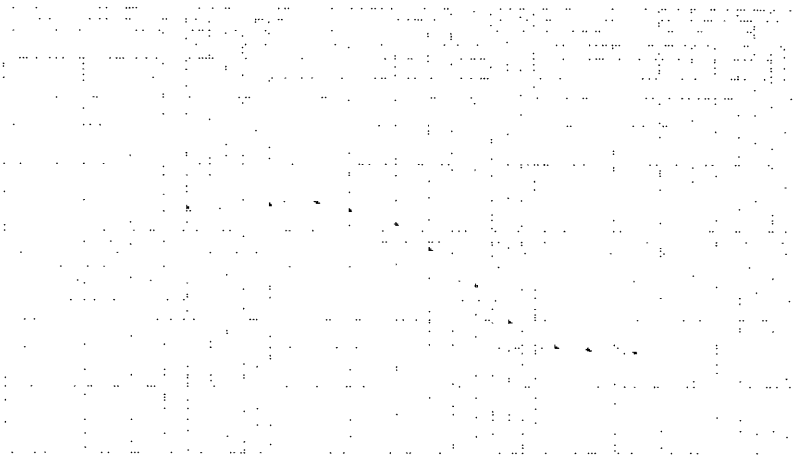
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 128.65 |
| 2 | 1.0 | 130.69 |
| 3 | 1.5 | 133.72 |
| 4 | 2.0 | 124.03 |
| 5 | 3.0 | 108.58 |
| 6 | 4.0 | 83.57 |
| 7 | 6.0 | 56.63 |
| 8 | 8.0 | 39.76 |
| 9 | 12.0 | 29.91 |
| 10 | 16.0 | 29.46 |
| 11 | 24.0 | 28.43 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .22 | | 95.9 | |
| | .22 | -------- | .2130 |
| 2.44 | | 147.8 | |
| | 2.66 | -------- | -.6805 |
| | | 28.1 | |
| | | ******** | |

R.M.S. Relative error = .0288
Maximum rel. error = .0567 at sample 2
Number of trials was 0

PLOTTED RESULTS



HY 99.3 Grid Ref: SP 1483 6177 Azimuth: 322

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 173.9000 | 163.3000 | 112.5000 | 128.4000 | 10.4700 |
| 1.0 | 100.1000 | 94.8000 | 71.2000 | 76.2000 | 5.2800 |
| 2.0 | 34.2000 | 32.6000 | 28.0000 | 29.9000 | 1.5080 |
| 4.0 | 4.1900 | 4.0600 | 4.5000 | 4.1700 | .1370 |
| 8.0 | .7560 | .7130 | .6000 | .6060 | .0430 |
| 16.0 | .3230 | .3040 | .2400 | .2320 | .0160 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 378.40 | .0007 | .1320 | .0822 |
| 1.0 | 463.07 | .0002 | .0678 | .2292 |
| 1.5 | 434.78 | | | |
| 2.0 | 363.80 | .0027 | .0656 | .3521 |
| 3.0 | 242.63 | | | |
| 4.0 | 108.95 | -.0017 | -.0761 | -.9617 |
| 6.0 | 41.31 | | | |
| 8.0 | 30.31 | 0.0000 | .0100 | -.0339 |
| 12.0 | 24.55 | | | |
| 16.0 | 23.73 | .0093 | -.0339 | 0.0000 |
| 24.0 | 24.20 | | | |
| 32.0 | 27.91 | | | |

R.M.S. Observational Error = .0040
R.M.S. Offset Wenner Difference = .0746
R.M.S. Potential Ladder Difference = .4710

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 378.40 |
| 2 | 1.0 | 463.07 |
| 3 | 1.5 | 434.78 |
| 4 | 2.0 | 363.80 |
| 5 | 3.0 | 200.00 |
| 6 | 4.0 | 108.95 |
| 7 | 6.0 | 47.00 |
| 8 | 8.0 | 30.31 |
| 9 | 12.0 | 24.55 |
| 10 | 16.0 | 23.73 |
| 11 | 24.0 | 24.20 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .19 | | 206.6 | |
| | .19 | -------- | .5293 |
| .98 | | 671.3 | |
| | 1.17 | -------- | -.6052 |
| 1.20 | | 165.1 | |
| | 2.37 | -------- | -.7508 |
| | | 23.5 | |
| | | ******** | |

R.M.S. Relative error = .0318
Maximum rel. error = -.0481 at sample 8
Number of trials was 0

PLOTTED RESULTS

HY 106.1 Grid Ref: SP 1931 6440 Azimuth: 301

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 39.2000 | 37.0000 | 36.7000 | 33.5000 | 2.1900 |
| 1.0 | 11.4500 | 11.0400 | 7.3600 | 9.8300 | .4030 |
| 2.0 | 3.3000 | 3.1300 | 2.5100 | 2.6100 | .1720 |
| 4.0 | 1.3420 | 1.2750 | 1.0320 | 1.0150 | .0820 |
| 8.0 | .7000 | .6540 | .5130 | .5040 | .0420 |
| 16.0 | .3780 | .3540 | .2760 | .2760 | .0230 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 110.27 | .0003 | -.0912 | -.2784 |
| 1.0 | 54.00 | .0006 | .2874 | .4564 |
| 1.5 | 35.72 | | | |
| 2.0 | 32.17 | -.0006 | .0391 | .0560 |
| 3.0 | 29.42 | | | |
| 4.0 | 25.72 | -.0111 | -.0166 | -.0193 |
| 6.0 | 25.47 | | | |
| 8.0 | 25.56 | .0057 | -.0177 | .0340 |
| 12.0 | 26.60 | | | |
| 16.0 | 27.75 | .0026 | 0.0000 | 0.0000 |
| 24.0 | 29.76 | | | |
| 32.0 | 31.55 | | | |

R.M.S. Observational Error = .0052
R.M.S. Offset Wenner Difference = .1245
R.M.S. Potential Ladder Difference = .2410

**WARNING:** The observed error for spacing 4 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

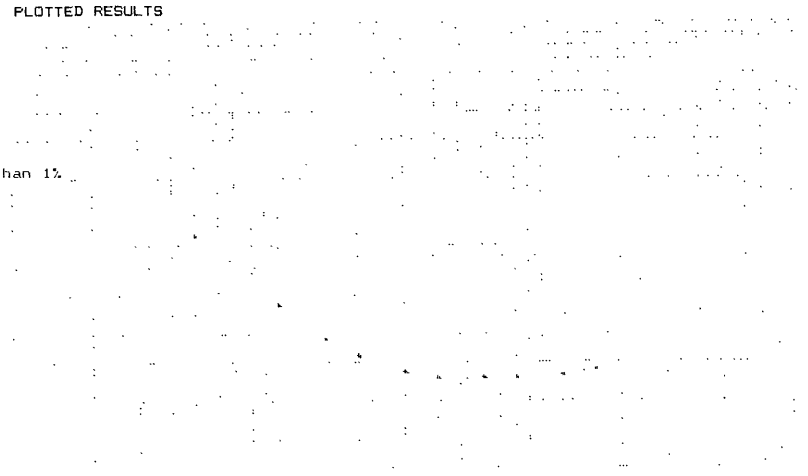
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 110.27 |
| 2 | 1.0 | 54.00 |
| 3 | 1.5 | 38.00 |
| 4 | 2.0 | 32.17 |
| 5 | 3.0 | 27.00 |
| 6 | 4.0 | 25.72 |
| 7 | 6.0 | 25.47 |
| 8 | 8.0 | 25.56 |
| 9 | 12.0 | 26.60 |
| 10 | 16.0 | 27.75 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .39 | | 158.5 | |
| | .39 | -------- | -.5826 |
| .73 | | 41.8 | |
| | 1.12 | -------- | -.2921 |
| 2.47 | | 22.9 | |
| | 3.59 | -------- | .0840 |
| | | 27.1 | |
| | | ******** | |

R.M.S. Relative error = .0199
Maximum rel. error = -.0310 at sample 10
Number of trials was 0

PLOTTED RESULTS



HY 106.2 Grid Ref: SP 1926 6441 Azimuth: 33

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 37.4000 | 36.3000 | 31.8000 | 26.8000 | 1.1030 |
| 1.0 | 7.5200 | 7.0300 | 6.0000 | 5.7300 | .3060 |
| 2.0 | 2.3900 | 2.2500 | 1.7870 | 1.8110 | .1300 |
| 4.0 | 1.2060 | 1.1340 | .8960 | .8520 | .0710 |
| 8.0 | .6690 | .6260 | .4900 | .4870 | .0400 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 92.05 | -.0001 | -.1706 | .6933 |
| 1.0 | 36.85 | -.0022 | -.0460 | .1433 |
| 1.5 | 28.60 | | | |
| 2.0 | 22.61 | .0042 | .0133 | .0214 |
| 3.0 | 21.89 | | | |
| 4.0 | 21.97 | .0008 | -.0503 | .0339 |
| 6.0 | 23.45 | | | |
| 8.0 | 24.55 | .0045 | -.0061 | 0.0000 |
| 12.0 | 26.56 | | | |
| 16.0 | 27.93 | | | |

R.M.S. Observational Error = .0029
R.M.S. Offset Wenner Difference = .0825
R.M.S. Potential Ladder Difference = .3545

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 92.05 |
| 2 | 1.0 | 36.85 |
| 3 | 1.5 | 24.00 |
| 4 | 2.0 | 22.61 |
| 5 | 3.0 | 21.89 |
| 6 | 4.0 | 21.97 |
| 7 | 6.0 | 23.45 |
| 8 | 8.0 | 24.55 |
| 9 | 12.0 | 26.56 |
| 10 | 16.0 | 27.93 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .37 | | 170.6 | |
| | .37 | -------- | -.7836 |
| 3.03 | | 20.7 | |
| | 3.40 | -------- | .1411 |
| | | 27.5 | |
| | | ******** | |

R.M.S. Relative error = .0282
Maximum rel. error = -.0412 at sample 10
Number of trials was 0

PLOTTED RESULTS

HY 106.3 Grid Ref: SP 1934 6435 Azimuth: 48

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 62.7000 | 58.8000 | 52.6000 | 59.1000 | 3.9600 |
| 1.0 | 13.9700 | 13.4200 | 10.3500 | 13.9600 | .5310 |
| 2.0 | 3.3800 | 3.2100 | 2.7000 | 2.6600 | .1730 |
| 4.0 | 1.3130 | 1.2240 | .9750 | 1.0320 | .0860 |
| 8.0 | .7010 | .6610 | .4930 | .5180 | .0420 |

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 175.46 |
| 2 | 1.0 | 76.37 |
| 3 | 1.5 | 46.00 |
| 4 | 2.0 | 33.68 |
| 5 | 3.0 | 27.00 |
| 6 | 4.0 | 25.22 |
| 7 | 6.0 | 25.17 |
| 8 | 8.0 | 25.41 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .49 | | 227.5 | |
| | .49 | -------- | -.7340 |
| .96 | | 34.9 | |
| | 1.45 | -------- | -.1911 |
| | | 23.7 | |
| | | ******** | |

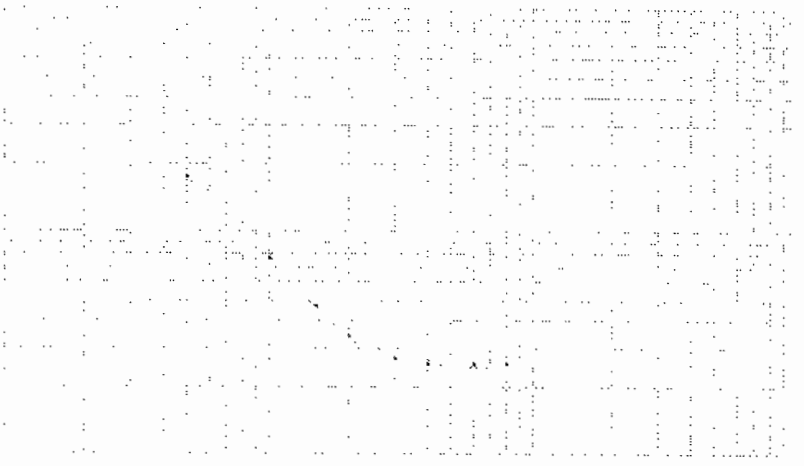
PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 175.46 | -.0010 | .1164 | -.2596 |
| 1.0 | 76.37 | .0014 | .2970 | -.0246 |
| 1.5 | 37.61 | | | |
| 2.0 | 33.68 | -.0009 | -.0149 | .0267 |
| 3.0 | 27.96 | | | |
| 4.0 | 25.22 | .0023 | .0568 | -.0610 |
| 6.0 | 25.17 | | | |
| 8.0 | 25.41 | -.0028 | .0495 | 0.0000 |
| 12.0 | 27.38 | | | |
| 16.0 | 31.08 | | | |

R.M.S. Observational Error = .0018
R.M.S. Offset Wenner Difference = .1467
R.M.S. Potential Ladder Difference = .1346

R.M.S. Relative error = .0326
Maximum rel. error = .0495 at sample 2
Number of trials was 0

PLOTTED RESULTS



HY 108.1 Grid Ref: SP 1593 6381 Azimuth: 28

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 173.0000 | 163.3000 | 137.1000 | 122.6000 | 9.7700 |
| 1.0 | 65.7000 | 63.2000 | 53.4000 | 50.7000 | 2.5100 |
| 2.0 | 20.8000 | 20.0000 | 16.8900 | 18.2000 | .7430 |
| 4.0 | 2.3100 | 2.1700 | 2.4600 | 2.4100 | .1220 |
| 8.0 | .7190 | .6850 | .5290 | .5620 | .0360 |

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 407.94 |
| 2 | 1.0 | 327.04 |
| 3 | 1.5 | 275.00 |
| 4 | 2.0 | 220.48 |
| 5 | 3.0 | 110.00 |
| 6 | 4.0 | 61.20 |
| 7 | 6.0 | 32.75 |
| 8 | 8.0 | 27.42 |
| 9 | 12.0 | 24.49 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .24 | | 511.8 | |
| | .24 | -------- | -.1721 |
| 1.42 | | 361.5 | |
| | 1.66 | -------- | -.8721 |
| | | 24.7 | |
| | | ******** | |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 407.94 | -.0004 | -.1117 | .1420 |
| 1.0 | 327.04 | -.0002 | -.0519 | .1352 |
| 1.5 | 259.55 | | | |
| 2.0 | 220.48 | .0027 | .0747 | .5195 |
| 3.0 | 155.02 | | | |
| 4.0 | 61.20 | .0078 | -.0205 | -.9702 |
| 6.0 | 32.75 | | | |
| 8.0 | 27.42 | -.0028 | .0605 | 0.0000 |
| 12.0 | 24.49 | | | |
| 16.0 | 27.86 | | | |

R.M.S. Observational Error = .0029
R.M.S. Offset Wenner Difference = .0705
R.M.S. Potential Ladder Difference = .5589

R.M.S. Relative error = .0289
Maximum rel. error = .0418 at sample 3
Number of trials was 0

PLOTTED RESULTS

HY 108.2 Grid Ref: SP 1601 6374 Azimuth: 46

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 35.2000 | 34.1000 | 30.0000 | 22.2000 | 1.0780 |
| 1.0 | 8.8200 | 8.3400 | 7.5500 | 7.9600 | .4900 |
| 2.0 | 3.1700 | 3.0200 | 2.3500 | 2.3600 | .1470 |
| 4.0 | 1.4270 | 1.3320 | 1.1480 | .9840 | .0910 |
| 8.0 | .7220 | .6810 | .5410 | .5450 | .0430 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 82.00 | .0006 | -.2989 | .5330 |
| 1.0 | 48.73 | -.0011 | .0529 | -.2536 |
| 1.5 | 42.09 | | | |
| 2.0 | 29.59 | .0009 | .0042 | .1252 |
| 3.0 | 25.78 | | | |
| 4.0 | 26.79 | .0028 | -.1538 | -.0067 |
| 6.0 | 28.22 | | | |
| 8.0 | 27.29 | -.0028 | .0074 | 0.0000 |
| 12.0 | 27.17 | | | |
| 16.0 | 27.56 | | | |

R.M.S. Observational Error = .0019
R.M.S. Offset Wenner Difference = .1522
R.M.S. Potential Ladder Difference = .3017

FIELD CURVE DATA

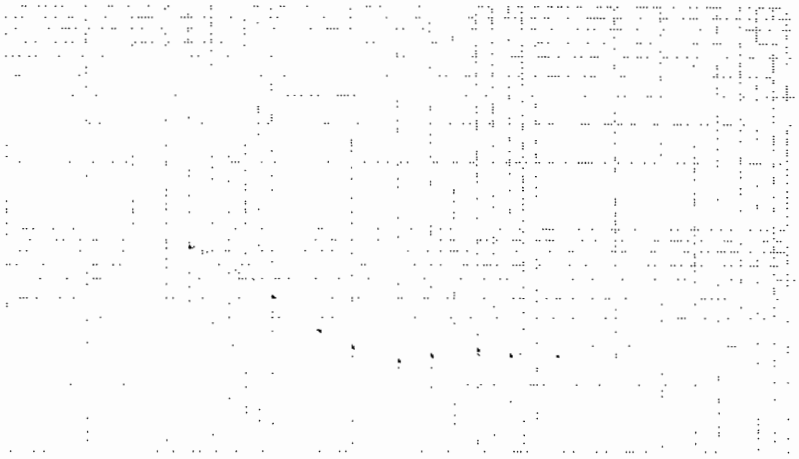
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 82.00 |
| 2 | 1.0 | 48.73 |
| 3 | 1.5 | 35.00 |
| 4 | 2.0 | 29.59 |
| 5 | 3.0 | 25.78 |
| 6 | 4.0 | 26.79 |
| 7 | 6.0 | 28.22 |
| 8 | 8.0 | 27.29 |
| 9 | 12.0 | 27.17 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .57 | | 98.1 | |
| | .57 | -------- | -.6242 |
| 1.96 | | 22.7 | |
| | 2.53 | -------- | .1202 |
| | | 28.9 | |
| | | ******** | |

R.M.S. Relative error = .0285
Maximum rel. error = .0550 at sample 9
Number of trials was 0

PLOTTED RESULTS



HY 108.3 Grid Ref: SP 1599 6360 Azimuth: 8

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 32.7000 | 31.7000 | 23.8000 | 23.0000 | 1.0150 |
| 1.0 | 8.5600 | 8.0900 | 6.9600 | 6.9700 | .4800 |
| 2.0 | 3.0400 | 2.8900 | 2.2700 | 2.3600 | .1560 |
| 4.0 | 1.4070 | 1.3230 | 1.0000 | 1.0520 | .0840 |
| 8.0 | .7330 | .6870 | .5280 | .5650 | .0460 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 73.51 | -.0005 | -.0342 | .6906 |
| 1.0 | 43.76 | -.0012 | .0014 | -.0161 |
| 1.5 | 38.69 | | | |
| 2.0 | 29.09 | -.0020 | .0389 | .0577 |
| 3.0 | 25.38 | | | |
| 4.0 | 25.79 | 0.0000 | .0507 | .0435 |
| 6.0 | 26.93 | | | |
| 8.0 | 27.47 | 0.0000 | .0677 | 0.0000 |
| 12.0 | 28.33 | | | |
| 16.0 | 28.25 | | | |

R.M.S. Observational Error = .0010
R.M.S. Offset Wenner Difference = .0444
R.M.S. Potential Ladder Difference = .3473

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 73.51 |
| 2 | 1.0 | 43.76 |
| 3 | 1.5 | 34.00 |
| 4 | 2.0 | 29.09 |
| 5 | 3.0 | 25.38 |
| 6 | 4.0 | 25.79 |
| 7 | 6.0 | 26.93 |
| 8 | 8.0 | 27.47 |
| 9 | 12.0 | 28.33 |
| 10 | 16.0 | 28.25 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .53 | | 86.6 | |
| | .53 | -------- | -.5674 |
| 2.01 | | 23.9 | |
| | 2.54 | -------- | .0825 |
| | | 28.2 | |
| | | ******** | |

R.M.S. Relative error = .0291
Maximum rel. error = -.0543 at sample 4
Number of trials was 0

PLOTTED RESULTS

HY 108.4 Grid Ref: SP 1594 6355 Azimuth: 279

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 47.0000 | 45.1000 | 31.4000 | 36.4000 | 1.9320 |
| 1.0 | 12.1900 | 11.3300 | 9.6600 | 14.1000 | .8510 |
| 2.0 | 3.8500 | 3.6500 | 3.4600 | 2.8500 | .2000 |
| 4.0 | 1.5580 | 1.4670 | 1.2170 | 1.1270 | .0880 |
| 8.0 | .7160 | .6760 | .5370 | .5280 | .0400 |

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 106.50 |
| 2 | 1.0 | 74.64 |
| 3 | 1.5 | 49.00 |
| 4 | 2.0 | 39.65 |
| 5 | 3.0 | 31.00 |
| 6 | 4.0 | 29.46 |
| 7 | 6.0 | 27.91 |
| 8 | 8.0 | 26.77 |
| 9 | 12.0 | 27.27 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .68 | | 121.2 | |
| | .68 | -------- | -.5864 |
| 1.29 | | 31.6 | |
| | 1.97 | -------- | -.0934 |
| | | 26.2 | |
| | | ******** | |

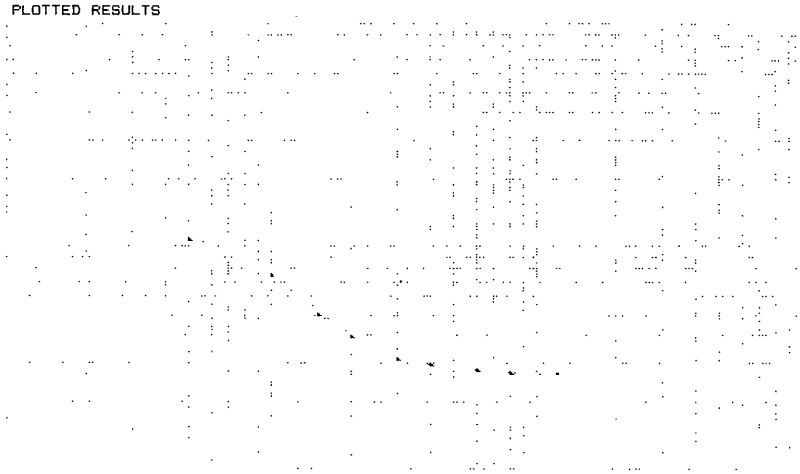
PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 106.50 | -.0007 | .1475 | .4415 |
| 1.0 | 74.64 | .0007 | .3737 | -.6730 |
| 1.5 | 60.67 | | | |
| 2.0 | 39.65 | -.0000 | -.1933 | -.0776 |
| 3.0 | 28.50 | | | |
| 4.0 | 29.46 | .0019 | -.0768 | .0566 |
| 6.0 | 27.91 | | | |
| 8.0 | 26.77 | 0.0000 | -.0169 | 0.0000 |
| 12.0 | 27.27 | | | |
| 16.0 | 28.85 | | | |

R.M.S. Relative error = .0286
Maximum rel. error = -.0691 at sample 2
Number of trials was 0

R.M.S. Observational Error = .0010
R.M.S. Offset Wenner Difference = .2025
R.M.S. Potential Ladder Difference = .4053

PLOTTED RESULTS



HY 134.1 Grid Ref: SP 2349 5962 Azimuth: 88

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 137.3000 | 130.7000 | 92.5000 | 94.5000 | 6.5500 |
| 1.0 | 65.6000 | 61.5000 | 51.2000 | 47.7000 | 4.1200 |
| 2.0 | 26.7000 | 25.1000 | 22.0000 | 20.9000 | 1.5730 |
| 4.0 | 9.9700 | 9.4600 | 8.2700 | 7.5500 | .4970 |
| 8.0 | 3.4000 | 3.2500 | 3.1200 | 2.3800 | .1400 |
| 16.0 | .5540 | .5290 | .5750 | .4750 | .0220 |

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 293.74 |
| 2 | 1.0 | 310.70 |
| 3 | 1.5 | 295.00 |
| 4 | 2.0 | 269.55 |
| 5 | 3.0 | 228.73 |
| 6 | 4.0 | 198.80 |
| 7 | 6.0 | 160.35 |
| 8 | 8.0 | 138.23 |
| 9 | 12.0 | 80.00 |
| 10 | 16.0 | 52.78 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .21 | | 255.2 | |
| | .21 | -------- | .1410 |
| 1.14 | | 339.0 | |
| | 1.35 | -------- | -.2919 |
| 5.83 | | 185.8 | |
| | 7.18 | -------- | -.7520 |
| | | 26.3 | |
| | | ******** | |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 293.74 | .0004 | .0214 | .2528 |
| 1.0 | 310.70 | -.0003 | -.0708 | .0613 |
| 1.5 | 311.19 | | | |
| 2.0 | 269.55 | .0010 | -.0513 | -.0370 |
| 3.0 | 228.73 | | | |
| 4.0 | 178.80 | .0013 | -.0910 | .0659 |
| 6.0 | 160.35 | | | |
| 8.0 | 138.23 | .0029 | -.2691 | .4615 |
| 12.0 | 96.54 | | | |
| 16.0 | 52.78 | .0054 | -.1905 | 0.0000 |
| 24.0 | 22.59 | | | |
| 32.0 | 2.19 | | | |

R.M.S. Relative error = .0276
Maximum rel. error = -.0626 at sample 8
Number of trials was 0

R.M.S. Observational Error = .0026
R.M.S. Offset Wenner Difference = .1444
R.M.S. Potential Ladder Difference = .2393

PLOTTED RESULTS

HY 134.2 Grid Ref: SP 2345 5956 Azimuth: 77

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 57.8000 | 54.8000 | 41.6000 | 40.6000 | 3.0000 |
| 1.0 | 29.0000 | 27.4000 | 24.0000 | 19.0800 | 1.5830 |
| 2.0 | 12.8400 | 12.2000 | 10.2700 | 8.6100 | .6320 |
| 4.0 | 7.5200 | 7.1400 | 5.5100 | 4.7900 | .3780 |
| 8.0 | 4.0400 | 3.6800 | 3.4600 | 2.9100 | .3570 |
| 16.0 | 1.3820 | 1.3030 | 1.2600 | 1.2470 | .0760 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 129.12 | 0.0000 | -.0243 | .1360 |
| 1.0 | 135.34 | .0006 | -.2284 | .1216 |
| 1.5 | 132.64 | | | |
| 2.0 | 118.63 | .0006 | -.1758 | .0367 |
| 3.0 | 119.58 | | | |
| 4.0 | 129.43 | .0003 | -.1398 | .1251 |
| 6.0 | 147.53 | | | |
| 8.0 | 160.10 | .0007 | -.1727 | -.1040 |
| 12.0 | 165.75 | | | |
| 16.0 | 126.02 | .0022 | -.0104 | 0.0000 |
| 24.0 | 59.81 | | | |
| 32.0 | 20.47 | | | |

R.M.S. Observational Error = .0010
R.M.S. Offset Wenner Difference = .1490
R.M.S. Potential Ladder Difference = .1106

FIELD CURVE DATA

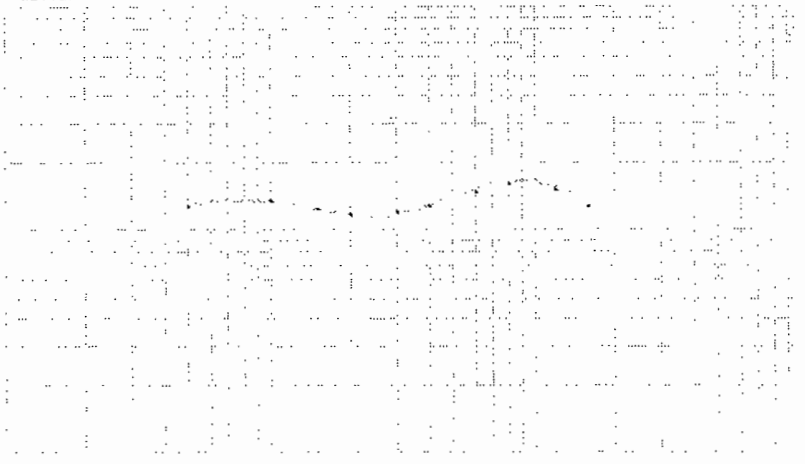
| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 129.12 |
| 2 | 1.0 | 135.34 |
| 3 | 1.5 | 125.00 |
| 4 | 2.0 | 118.63 |
| 5 | 3.0 | 119.58 |
| 6 | 4.0 | 129.43 |
| 7 | 6.0 | 147.53 |
| 8 | 8.0 | 160.10 |
| 9 | 12.0 | 150.00 |
| 10 | 16.0 | 126.02 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .22 | | 97.0 | |
| | .22 | -------- | .2761 |
| .86 | | 171.0 | |
| | 1.08 | -------- | -.5739 |
| 1.12 | | 46.3 | |
| | 2.20 | -------- | .8183 |
| 4.44 | | 463.3 | |
| | 6.64 | -------- | -.8941 |
| | | 25.9 | |
| | | ******** | |

R.M.S. Relative error = .0231
Maximum rel. error = .0357 at sample 8
Number of trials was 0

PLOTTED RESULTS



HY 134.3 Grid Ref: SP 2337 5949 Azimuth: 19

INPUT DATA

| Electrode Spacing | A | C | D1 | D2 | B |
|---|---|---|---|---|---|
| .5 | 12.1200 | 11.6800 | 8.8100 | 8.8400 | .4380 |
| 1.0 | 5.0500 | 4.8500 | 3.4300 | 3.4700 | .2090 |
| 2.0 | 3.6800 | 3.4700 | 2.4100 | 2.3100 | .1990 |
| 4.0 | 3.1900 | 3.0000 | 2.1500 | 2.0400 | .1900 |
| 8.0 | 2.4000 | 2.2300 | 1.7510 | 1.6060 | .1690 |
| 16.0 | 1.5730 | 1.4750 | 1.2470 | 1.0400 | .0810 |
| 32.0 | .6150 | .5770 | .5150 | .4980 | .0350 |

PROCESSING RESULTS

| Electrode Spacing | Wenner Resistivity | Observed Error | Offset Error | Lateral Error |
|---|---|---|---|---|
| .5 | 27.72 | .0002 | .0034 | .3278 |
| 1.0 | 21.68 | -.0018 | .0116 | .0914 |
| 1.5 | 25.22 | | | |
| 2.0 | 29.66 | .0030 | -.0424 | .0323 |
| 3.0 | 41.81 | | | |
| 4.0 | 52.65 | 0.0000 | -.0525 | .0392 |
| 6.0 | 70.78 | | | |
| 8.0 | 84.37 | .0004 | -.0864 | -.0173 |
| 12.0 | 104.81 | | | |
| 16.0 | 114.96 | .0109 | -.1810 | .1703 |
| 24.0 | 111.20 | | | |
| 32.0 | 101.84 | .0049 | -.0336 | 0.0000 |
| 48.0 | 84.09 | | | |
| 64.0 | 57.83 | | | |

R.M.S. Observational Error = .0047
R.M.S. Offset Wenner Difference = .0811
R.M.S. Potential Ladder Difference = .1569

WARNING: The observed error for spacing 6 is greater than 1%
There may be an incorrect input data value

FIELD CURVE DATA

| | Electrode Separation | Apparent Resistivity |
|---|---|---|
| 1 | .5 | 27.72 |
| 2 | 1.0 | 21.68 |
| 3 | 1.5 | 24.00 |
| 4 | 2.0 | 29.66 |
| 5 | 3.0 | 41.81 |
| 6 | 4.0 | 52.65 |
| 7 | 6.0 | 70.78 |
| 8 | 8.0 | 84.37 |
| 9 | 12.0 | 104.81 |
| 10 | 16.0 | 114.96 |
| 11 | 24.0 | 113.00 |
| 12 | 32.0 | 101.84 |
| 13 | 48.0 | 84.09 |

INTERPRETED MODEL

| Thickness | Depth | Rho | Reflection Coeffts. |
|---|---|---|---|
| .36 | | 36.9 | |
| | .36 | -------- | -.4330 |
| 1.26 | | 14.6 | |
| | 1.62 | -------- | .9536 |
| 4.83 | | 614.7 | |
| | 6.45 | -------- | -.9087 |
| | | 29.4 | |
| | | ******** | |

R.M.S. Relative error = .0285
Maximum rel. error = -.0459 at sample 12
Number of trials was 0

PLOTTED RESULTS

The following reports relate particularly to bulk mineral resources

**Reports of the Institute of Geological Sciences**

*Assessment of British Sand and Gravel Resources*

1 The sand and gravel resources of the country south-east of Norwich, Norfolk: Resource sheet TG 20.
E. F. P. Nickless.
Report 71/20 ISBN 0 11 880216 X £1.15

2 The sand and gravel resources of the country around Witham, Essex: Resource sheet TL 81. H. J. E. Haggard.
Report 72/6 ISBN 0 11 880588 6 £1.20

3 The sand and gravel resources of the country south and west of Woodbridge, Suffolk: Resource sheet TM 24.
R. Allender and S. E.Hollyer.
Report 72/9 ISBN 0 11 880596 7 £1.70

4 The sand and gravel resources of the country around Maldon, Essex: Resource sheet TL 80. J. D. Ambrose
Report 73/1 ISBN 0 11 880600 9 £1.20

5 The sand and gravel resources of the country around Hethersett, Norfolk: Resource sheet TG 10.
E. F. P. Nickless.
Report 73/4 ISBN 0 11 880606 8 £1.60

6 The sand and gravel resources of the country around Terling, Essex: Resource sheet TL 71. C. H. Eaton.
Report 73/5 ISBN 0 11 880608 4 £1.20

7 The sand and gravel resources of the country around Layer Breton and Tolleshunt D'Arcy, Essex: Resource sheet TL 91 and part 90. J. D. Ambrose.
Report 73/8 ISBN 0 11 880614 9 £1.30

8 The sand and gravel resources of the country around Shotley and Felixstowe, Suffolk: Resource sheet TM 23.
R. Allender and S. E. Hollyer.
Report 73/13 ISBN 0 11 880625 4 £1.60

9 The sand and gravel resources of the country around Attlebridge, Norfolk: Resource sheet TG 11.
E. F. P. Nickless.
Report 73/15 ISBN 0 11 880658 0 £1.85

10 The sand and gravel resources of the country west of Colchester, Essex: Resource sheet TL 92. J. D. Ambrose.
Report 74/6 ISBN 0 11 880671 8 £1.45

11 The sand and gravel resources of the country around Tattingstone, Suffolk: Resource sheet TM 13. S. E. Hollyer.
Report 74/9 ISBN 0 11 880675 0 £1.95

12 The sand and gravel resources of the country around Gerrards Cross, Buckinghamshire: Resource sheet SU 99, TQ 08, 09. H. C. Squirrell.
Report 74/14 ISBN 0 11 880710 2 £2.20

**Mineral Assessment Reports (Institute of Geological Sciences)**

13 The sand and gravel resources of the country east of Chelmsford, Essex: Resource sheet TL 70. M. R. Clarke.
ISBN 0 11 880744 7 £3.50

14 The sand and gravel resources of the country east of Colchester, Essex: Resource sheet TM 02. J. D. Ambrose.
ISBN 0 11 880745 5 £3.25

15 The sand and gravel resources of the country around Newton on Trent, Lincolnshire: Resource sheet SK 87.
D. Price.
ISBN 0 11 880746 3 £3.00

16 The sand and gravel resources of the country around Braintree, Essex: Resource sheet TL 72. M. R. Clarke.
ISBN 0 11 880747 1 £3.50

17 The sand and gravel resources of the country around Besthorpe, Nottinghamshire: Resource sheet SK 86 and part 76. J. R. Gozzard.
ISBN 0 11 880748 X £3.00

18 The sand and gravel resources of the Thames Valley, the country around Cricklade, Wiltshire: Resource sheet SU 09, 19 and parts SP 00, 10. P R. Robson.
ISBN 0 11 880749 8 £3.00

19 The sand and gravel resources of the country south of Gainsborough, Lincolnshire: Resource sheet SK 88 and part 78. J .H. Lovell.
ISBN 0 11 880750 1 £2.50

20 The sand and gravel resources of the country east of Newark upon Trent, Nottinghamshire: Resource sheet SK 85.
J. R. Gozzard.
ISBN 0 11 880751 X £2.75

21 The sand and gravel resources of the Thames and Kennet Valleys, the country around Pangbourne, Berkshire: Resource sheet SU 67. H. C. Squirrell.
ISBN 0 11 880752 8 £3.25

22 The sand and gravel resources of the country north-west of Scunthorpe, Humberside: Resource sheet SE 81.
J. W. C. James.
ISBN 0 11 880753 6 £3.00

23 The sand and gravel resources of the Thames Valley, the country between Lechlade and Standlake: Resource sheet SP 30 and parts SP 20, SU 29, 39. P. Robson.
ISBN 0 11 881252 1 £7.25

24 The sand and gravel resources of the country around Aldermaston, Berkshire: Resource sheet SU 56, 66.
H. C. Squirrell.
ISBN 0 11 881253 X £5.00

25 The celestite resources of the area north-east of Bristol: Resource sheet ST 68 and parts 59, 69, 79, 58, 68, 78, 77.
E. F. P. Nickless, S. J. Booth and P. N. Mosley.
ISBN 0 11 881262 9 £5.00

26 The sand and gravel resources of the country around Monyash, Derbyshire: Resource sheet SK 16. F. C. Cox and D. McC. Bridge.
ISBN 0 11 881263 7 £7.00

27 The sand and gravel resources of the country west and south of Lincoln, Lincolnshire: Resource sheets SK 95 and part 96, and SK 97 and part 96. I. Jackson.
ISBN 0 11 884003 7 £6.00

28 The sand and gravel resources of the country around Eynsham, Oxfordshire: Resource sheet SP 40 and part 41.
W. J. R. Harries.
ISBN 0 11 884012 6 £3.00

29 The sand and gravel resources of the country south-west of Scunthorpe, Humberside: Resource sheet SE 80.
J. H. Lovell.
ISBN 0 11 884013 4 £3.50

30 Procedure for the assessment of limestone resources.
F. C. Cox, D. McC. Bridge and J. H. Hull.
ISBN 0 11 884030 4 £1.25

31 The sand and gravel resources of the country west of Newark upon Trent, Nottinghamshire: Resource sheet SK 75.
D. Price and P. J. Rogers.
ISBN 0 11 884031 2 £3.50

32 The sand and gravel resources of the country around Sonning and Henley, Berkshire, Oxfordshire and Buckinghamshire: Resource sheet SU 77, 78.
H. C. Squirrell.
ISBN 0 11 884032 0 £5.25

33 The sand and gravel resources of the country north of Gainsborough, Lincolnshire: Resource sheet SK 89.
J. R. Gozzard and D. Price.
ISBN 0 11 884033 9 £4.50

34 The sand and gravel resources of the Dengie Peninsula, Essex: Resource sheet TL 90 and parts 80, TM 00, TQ 89, 99, TR 09. M. B. Simmons.
ISBN 0 11 884081 9 £5.00

35 The sand and gravel resources of the country around Darvel, Strathclyde: Resource sheet comprising parts of NS 53, 54, 63, 64. E. F. P. Nickless, A. M. Aitken and A. A. McMillan.
ISBN 0 11 884082 7 £7.00

36 The sand and gravel resources of the country around Southend-on-Sea, Essex: Resource sheets comprising parts of TQ 88, 89, 98, 99, TR 08, 09; and TQ 78, 79 and parts of 88, 89. S. E. Hollyer and M. B. Simmons.
ISBN 0 11 884083 5 £7.50

37 The sand and gravel resources of the country around Bawtry, South Yorkshire: Resource sheet SK 69.
A. R. Clayton.
ISBN 0 11 884053 3 £5.75

38 The sand and gravel resources of the country around Abingdon, Oxfordshire: Resource sheet SU 49, 59, SP 40, 50.
C. E. Corser.
ISBN 0 11 884084 5 £5.50

39 The sand and gravel resources of the Blackwater Valley (Aldershot) area: Resource sheet SU 85, 86 and parts 84, 94, 95, 96. M. R. Clarke, A. J. Dixon and M. Kubala.
ISBN 0 11 884085 1 £7.00

40 The sand and gravel resources of the country west of Darlington, County Durham: Resource sheet NZ 11, 21.
A. Smith.
ISBN 0 11 884086 X £5.00

41 The sand and gravel resources of the country around Garmouth, Grampian Region: Resource sheet NJ 36.
A. M. Aitken, J. W. Merritt and A. J. Shaw.
ISBN 0 11 884090 8 £8.75

42 The sand and gravel resources of the country around Maidenhead and Marlow: Resource sheet SU 88 and parts 87, 97, 98. P. N. Dunkley.
ISBN 0 11 884091 6 £5.00

43 The sand and gravel resources of the country around Misterton, Nottinghamshire: Resource sheet SK 79.
D. Thomas and D. Price.
ISBN 0 11 884092 4 £5.25

44 The sand and gravel resources of the country around Sedgefield, Durham: Resource sheet NZ 32. M. D. A. Samuel.
ISBN 0 11 884093 2 £5.75

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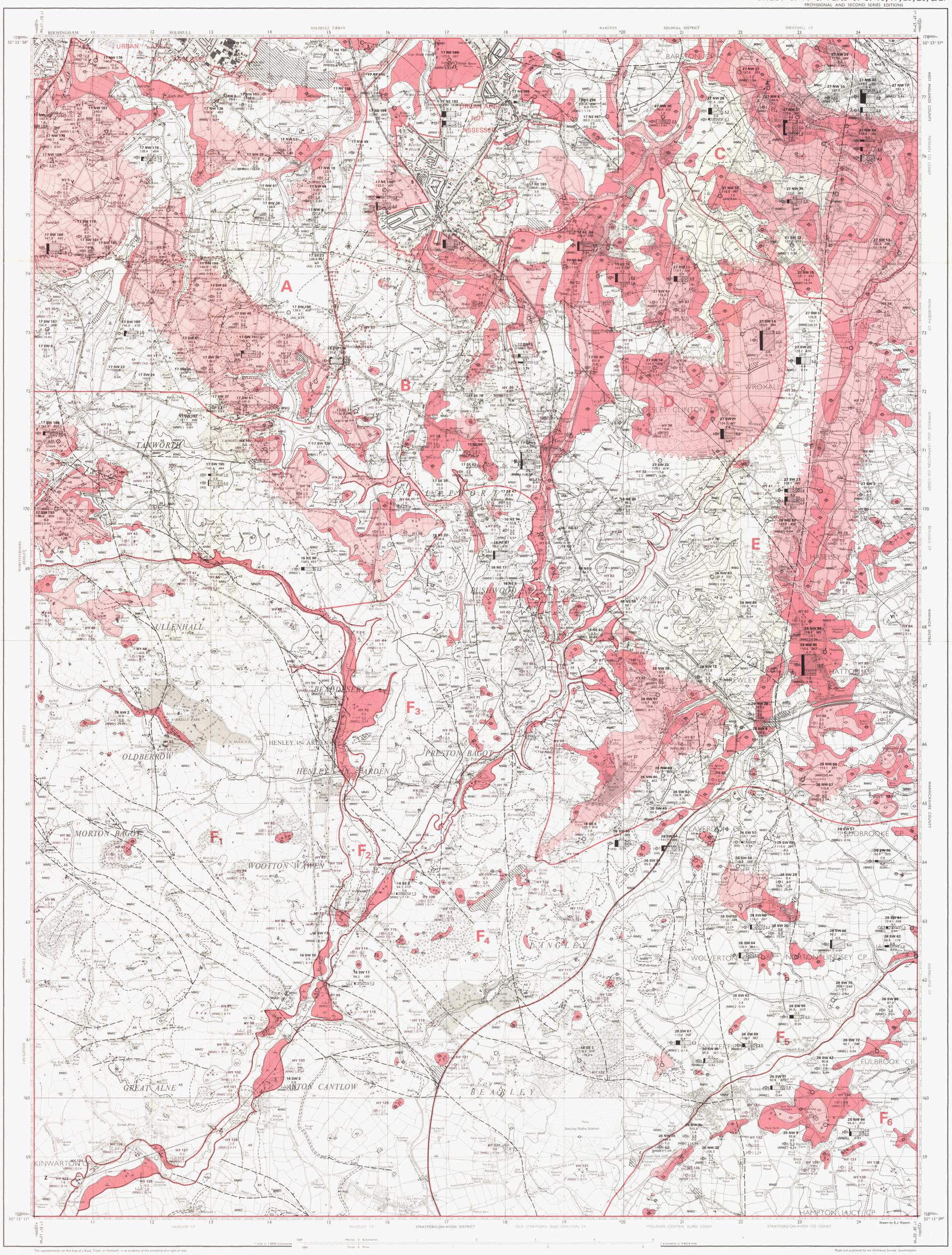
INSTITUTE OF GEOLOGICAL SCIENCES

INDUSTRIAL MINERALS ASSESSMENT UNIT

# THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND HENLEY-IN-ARDEN, WARWICKSHIRE

Scale 1:25 000 or about 2½ Inches to 1 Mile

ORDNANCE SURVEY
SHEET SP16 & Parts of SP15, 17, 25, 26, & 27
PROVISIONAL AND SECOND SERIES EDITIONS




The representation on this map of a Road, Track, or Footpath, is no evidence of the existence of a right of way.

1 mile = 1·6093 kilometres

1 kilometre = 0·6214 mile

Drawn by S.J. Rippon.

Made and published by the Ordnance Survey, Southampton.

*Geological survey on the 1:10 000 scale by*
*R.A. Old, K. Ambrose and P.J. Strange in 1977-81.*
*G.W. Green, District Geologist.*

*Sand and gravel survey by B. Cannell and R.G. Crofts in 1981-2.*
*R.G. Thurrell, Head, Industrial Minerals Assessment Unit.*

*1:25 000 Sand and Gravel Resource Sheet published 1984.*
G.M. Brown, D.Sc., F.R.S., *Director, Institute of Geological Sciences.*

*Data quoted for an individual borehole or resistivity sounding refer strictly to that site; reliable conclusions cannot be drawn about the thickness and grading elsewhere in the deposit, particularly in material as variable as sand and gravel. However, estimates of the volume and mean grading of the mineral as a whole in each Resource Block are given in the Report.*



Compiled from 1:10 560 or 1:10 000 scale sheets last fully revised 1903-76.
Other systematic revision 1938-80 has been incorporated.
Major roads revised 1965-82.
Some selected revision 1966-82.
Forestry Commission information 1978.

This map and the accompanying report were commissioned and financed by the Department of the Environment.

| | | | |
|---|---|---|---|
| SP 08 | SP 18 | SP 28 | SP 38 |
| | | 168 169 | |
| SP 07 | SP 17 | SP 27 | SP 37 |
| SP 06 | SP 16 | SP 26 | SP 36 |
| | | 183 184 | |
| SP 05 | SP 15 | SP 25 | SP 35 |
| | | 200 201 | |

*Diagram showing the relation of the National Grid 1:25 000 sheets with One-inch and 1:50 000 Geological sheets 168, 169, 183, 184, 200 and 201.*

## THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND HENLEY-IN-ARDEN, WAWICKSHIRE
## MINERAL ASSESSMENT REPORT No.142

142

*This map should be read in conjunction with the accompanying Report which contains details of the assessment of resources*

### EXPLANATION OF SYMBOLS AND ABBREVIATIONS

DRIFT

- **Peat** - soft dark brown decomposed organic material with some silt and clay — P-14
- **Alluvium** - soft silty clay, locally pebbly, commonly with a basal bed of gravel — A-82
- **Alluvial Fan Deposits** - sandy gravel — AF-9
- **First River Terrace Deposits** - pebbly clayey sand, sandy clay and clayey gravel — 1T-43
- **Second River Terrace Deposits** - pebbly clayey sand, sandy clay and clayey gravel — 2T-28
- **Fourth River Terrace Deposits** - pebbly clayey sand, sandy clay and clayey gravel — 4T-13
- **Head** - reddish brown sandy clay and clayey sand — H-58
- **Till** - reddish brown sandy, silty, pebbly clay; pebbles dominantly of quartzite, vein quartz, sandstone and mudstone — TL-22
- **Till, chalky** - greyish brown sandy clay with fresh flints, quartzite pebbles and fragments of chalk — TL-23
- **Glacial Lake Deposits** - soft laminated clays and silts, with lenses of sand — GL-14
- **Glacial Sand and Gravel** - varied deposits of sand and gravel, sheet-like or infilling channels, the gravels dominated by quartzite, quartz, and sandstone pebbles — GS-92

QUATERNARY

SOLID

- LLi **Lower Lias** - grey mudstones interbedded with pale grey limestones
- PnG **Penarth Group** - pale bluish grey to black mudstones

JURASSIC

TRIASSIC

- MMG **Mercia Mudstone** - red mudstones, overlain by pale greenish grey silty blocky mudstones (Blue Anchor Formation)
- AS **Arden Sandstone** - pale grey sandstones and siltstones and green and red mudstones
- MMG **Mercia Mudstone** - buff silty mudstones with impersistent siltstones and fine sandstones

Mercia Mudstone Group

- BmS **Bromsgrove Sandstone** - red micaceous sandstones and reddish brown mudstones
- TLM **Tile Hill Mudstone** - reddish brown mudstones with brown sandstones

Sherwood Sandstone Group / Enville Group

UPPER CARBONIFEROUS

- **Made ground** — MG-2
- **Worked out sand and gravel** — WO-3

BOUNDARY LINES

- Geological boundary, Drift
- Geological boundary, Solid
- Fault at surface, crossmark indicates downthrow side
- Inferred boundary between recognised categories of deposits
- Resource block and sub-block boundary
- County boundary; limit for assessment of resources in West Midlands County (see Report, Table 2).

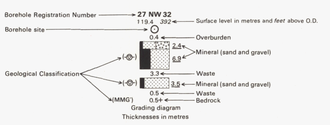
Broken lines denote uncertainty

BOREHOLE DATA

SITE LOCATIONS

- Industrial Minerals Assessment Unit (I.M.A.U.) borehole
- Other borehole

I.M.A.U. BOREHOLES




Note:
(i) The figures in *italics* are the imperial conversions of measurements recorded in metres
(ii) Figures underlined denote thicknesses used in the assessment of resources
(iii) The + sign indicates that the base of the deposit was not reached
(iv) The Geological Classification is given only for mineral and bedrock

**Borehole Registration Number**
Each I.M.A.U. borehole is identified by a Registration Number, e.g. **27 NW 32**. The initial letters and numbers refer to the quarter sheet, and the second to the I.G.S. serial number of that quarter. The unique designation for borehole **27 NW 32** is **SP 27 NW 32**.

**Grading Diagrams**
Each grading diagram shows the mean particle-size distribution of a distinct deposit of mineral




The height of the diagram is proportional to the mineral thickness. The widths of the divisions show the proportions of **Fines**, **Sand** and **Gravel**, but small amounts of gravel may be omitted or exaggerated.

OTHER BOREHOLES
The layout of information is the same as for I.M.A.U. boreholes, although data available may not be as comprehensive. They are registered in the same series.

GEOPHYSICAL DATA

SITE LOCATIONS

- × Resistivity Depth Sounding

RESISTIVITY DEPTH SOUNDINGS




Note:
(i) The information given here represents the mean thickness of each deposit, derived from the interpretation of resistivity soundings clustered at each site. A summary of the results is given in Appendix G in chronological order of the Depth Sounding Identification Numbers.
(ii) Other conventions are the same as for I.M.A.U. boreholes.

CATEGORIES OF DEPOSITS

- **Exposed mineral** — CAT-E6
- **Continuous or almost continuous spreads of mineral beneath overburden** — CAT-C1
- **Sand and gravel at the surface not assessed** — CAT-N4
- **Sand and gravel either not potentially workable (see Report) or absent** — CAT-A2

RESOURCE BLOCKS
For the purpose of assessment, the map is divided into resource blocks and sub-blocks (see Report). Each block is designated by a letter and each sub-block by a letter and subscript number.

Detailed records may be consulted on application to the Programmes Director (PD-B), Institute of Geological Sciences, Keyworth, Nottingham, NG12 5GG.

Generalized horizontal sections along the lines Y-Y' and Z-Z' shown on this map are printed on a folded sheet which is in the pocket at the back of the report.