Mineral Assessment Report 17



# The sand and gravel resources of the country around Besthorpe, Nottinghamshire
Description of 1:25 000 resource sheet SK 86 and part of SK 76

J. R. Gozzard, BSc

The Institute of Geological Sciences was formed by the
incorporation of the Geological Survey of Great Britain
and the Museum of Practical Geology with
Overseas Geological Surveys and is a constituent body
of the Natural Environment Research Council.

*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. Report No. 13 onward will
appear in the Mineral Assessment Report Series of the Institute.
Details of published reports appear at the end of this report.*

# PREFACE

National resources of many of the bulk or industrial minerals may seem so large that stock-taking 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 the 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 south-east 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 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 cooperation of the Sand and Gravel Association of Great Britain.

The survey was conducted by Mr J. R. Gozzard assisted by Mr J. H. Lovell under the supervision of Mr D. Price. The work, which was controlled from the sub-unit based in Leeds (J. H. Hull, Officer-in-Charge), is based on a one-inch scale geological survey published in 1886 on Old Series Sheet 83 (Lincoln), republished with minor amendments on the 1:50 000 scale in 1973, and a six-inch scale geological survey carried out in 1907-1908 and published on New Series one-inch Sheet 113 (Ollerton). The geological lines, now presented at the 1:25 000 scale, incorporate minor amendments resulting from the present work.

Mr J. W. Gardner, CBE (Land Agent) has been responsible for negotiating access to land for drilling. The ready cooperation of land owners and tenants in this work is gratefully acknowledged.

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The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 91 boreholes drilled for the Mineral Assessment Unit, form the basis of the assessment of sand and gravel resources in the Besthorpe area of Nottinghamshire and Lincolnshire.

All deposits in the area which 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 1:25 000 map is divided into eight resource blocks, containing between 8.2 and 20.8 $km^2$ of sand and gravel. For each block the geology of the deposits is described and the mineral-bearing area, the mean thicknesses of overburden and mineral and the mean gradings are stated. Detailed borehole data are also given. The geology, the position of the boreholes and the outlines of the resource blocks are shown on the accompanying map.

## Sommaire

Les sources des renseignements qui constituent la base de l'évaluation des ressources en sable et en gravier dans la région de Besthorpe, Nottinghamshire et Lincolnshire comprennent les cartes géologiques de l'Institute of Geological Sciences, des données obtenues de trous de sonde déjà en existence et 91 trous de sonde forés pour le Mineral Assessment Unit.

Tous les dépôts dans la région qui pourraient être exploités pour le sable et le gravier ont été etudiés et on s'est servi d'une methode statistique simple pour en evaluer le volume. Les évaluations de volume ont été tenues d'etre à 95 pour cent exactes.

La carte 1:25 000 est divisée en huit blocs de ressources avec d'entre 8.2 et 20.8 $km^2$ de sable et de gravier. Pour chaque bloc on décrit la géologie des dépôts et on donne l'étendue du terrain minéralise, l'épaisseur moyenne de recouvrement et de minéral et les triages moyens. Des données detaillees des trous de sonde aussi présentées. La géologie, la situation des trous de sonde et les profils des blocs de ressources sont montrées sur la carte.

## Zusammenfassung

Die geologischen Karten vom Institute of Geological Sciences, vorher-existierende Information, und 91 für die Mineral Assessment Unit gebohrten Bohrlöcher, bilden den Grund der Einschätzung von Sand- und Schottermittel im Besthorpe, Nottinghamshire und Lincolnshire.

Alle Ablagerungen im Gebiet, die möglich bearbeitbar für Sand und Schotter sind, wurden untersucht, und eine einfache statistische Methode wurde benutzt, um den Volumen zu schätzen. Man gibt die Zuverlässigkeit der Volumenschätzungen mit symmetrischen 95 Prozent Vertrauens-werten.

Man teilt die 1:25 000 Karte in 8 Mittelsblocke, die zwischen 8.2 und 20.8 $km^2$ von Sand und Schotter umfassen. Für jeden Block beschreibt man die Geologie der Ablagerungen, und das mineralhaltige Gebiet, die mittleren Dicken von Überlastung und Mineral und die mittleren Klassifizierungen werden erklärt. Ausführliche Bohrlöcherdaten werden auch gegeben. Die Geologie die Lage der Bohrlöcher und die Skizzen der Mittelsblöcke werden auf der Begleitkarte gezeigt.

# The sand and gravel resources of the country around Besthorpe, Nottinghamshire

Description of 1:25 000 resource sheet SK 86 and part of SK 76

J. R. Gozzard[1], BSc

## 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, both the economic and the social factors used to decide whether a deposit may be workable in the future cannot 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).

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 geological evidence. The sites available for inspection, measurement and sampling are too widely spaced to permit the mineral bodies to be outlined completely or the grade established throughout" (Anon., 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 BS sieve, about 1/16 mm should not exceed 40 per cent,
d. The deposit must 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.

If a deposit of sand and gravel broadly meets these criteria, it 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.

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

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 and 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 the mineral in parts of a block, except in the immediate vicinity of the actual sample points.

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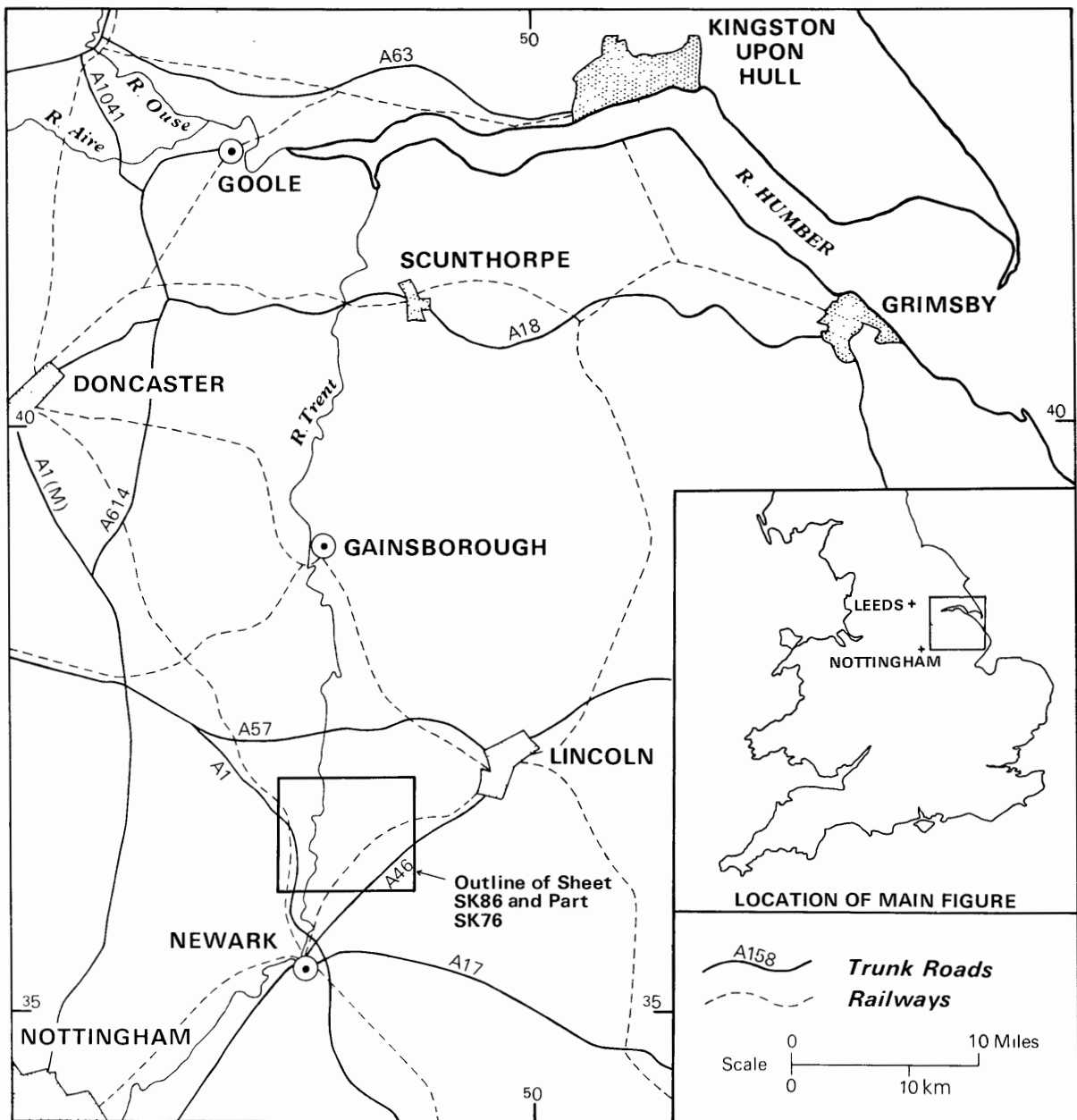
Fig. 1. Map showing the location of sheet SK 86 and part of SK 76

# Description of Resource Sheet SK 86 and Part of SK 76

## GENERAL

The area lies within the drainage basin of the River Trent which flows as a navigable stream in a broad shallow valley through the western part of the district (Fig. 1). The Trent is tidal as far upstream as Cromwell Lock [807 612] and is joined by a few small streams, which flow eastward on the Keuper Marl dip slope.

For the most part the area is a gently undulating plateau rising slightly from the River Trent at 25 ft O.D. (8 m) to 119 ft O.D. (36 m) at Potter Hill 853 612 in the south and to 114 ft (35 m) at Slack's Hill 870 665 near Eagle in the north.

The area is almost entirely agricultural, but the extraction of sand and gravel is important between Besthorpe and Girton.

## GEOLOGY

The geological sequence is summarised in Table 1 where deposits are listed as far as possible in order of increasing age. The relationship of the deposits is illustrated in the schematic cross-section, Fig. 2, which is drawn at right angles to the strike of the solid rocks. The deposits occurring in the western part of the area are also described in the Ollerton memoir (Edwards, 1967).

### Keuper Marl

Keuper Marl occupies the western half of the area, where the uppermost 400 ft (122 m) outcrops. It consists of reddish brown and greenish grey mudstones with thin beds of dolomitic sandstone ('skerries'). Except for the western margin of the district it is largely concealed by superficial deposits.

### Rhaetic

Conformably overlying the Keuper Marl, the Rhaetic beds average about 30 ft (9.0 m) in thickness. They comprise the black Pteria contorta Shales overlain by pale bluish grey and greenish grey marls interbedded with sporadic beds of compact argillaceous limestone.

### Lower Lias

Lower Lias is found in the eastern half of the area where it conformably overlies the Rhaetic. It comprises dark blue and grey shales and mudstones intercalated with thin argillaceous limestones. The lowest subdivision (the Hydraulic Limestone) attains its maximum thickness (9 m) just to the south of the district. Fossils are abundant and include bivalves and crinoids.

### Boulder Clay

Boulder clay is found in a small patch near North Scarle. Exposure is poor but the deposit is a stiff brown stony clay.

### Glacial Sand and Gravel

The deposits, which cap Potter Hill [857 610][867 610] and Eagle Moor [885 677], are shown as Glacial Sand and Gravel on the geological map, although a fluvioglacial origin for the deposits has been suggested (Stevenson and Mitchell, 1955): river deposition is preferred by other authors (Clayton, 1953a, b, Pocock, 1929). More recently (Posnansky, 1960; Straw, 1963), these high-level gravels have been correlated with the Hilton Terrace of the Trent and are thought to have been formed when the Trent flowed eastward through the Lincoln Gap, its former course through the Ancaster Gap and the country north of Newark having been blocked by ice.

### Older River Sands and Gravels

The older river sands and gravels, which include the plateau gravels of the original

## Table 1. Stratigraphy.

DRIFT
Recent and Pleistocene

    Blown sand
    Alluvium
    Older river sands and gravels: Floodplain Terrace
                                   Beeston Terrace
    Glacial Sand and Gravel: Hilton Terrace
    Boulder clay

SOLID
Jurassic
Permo-Triassic

    Lias, Lower
    Rhaetic
    Keuper
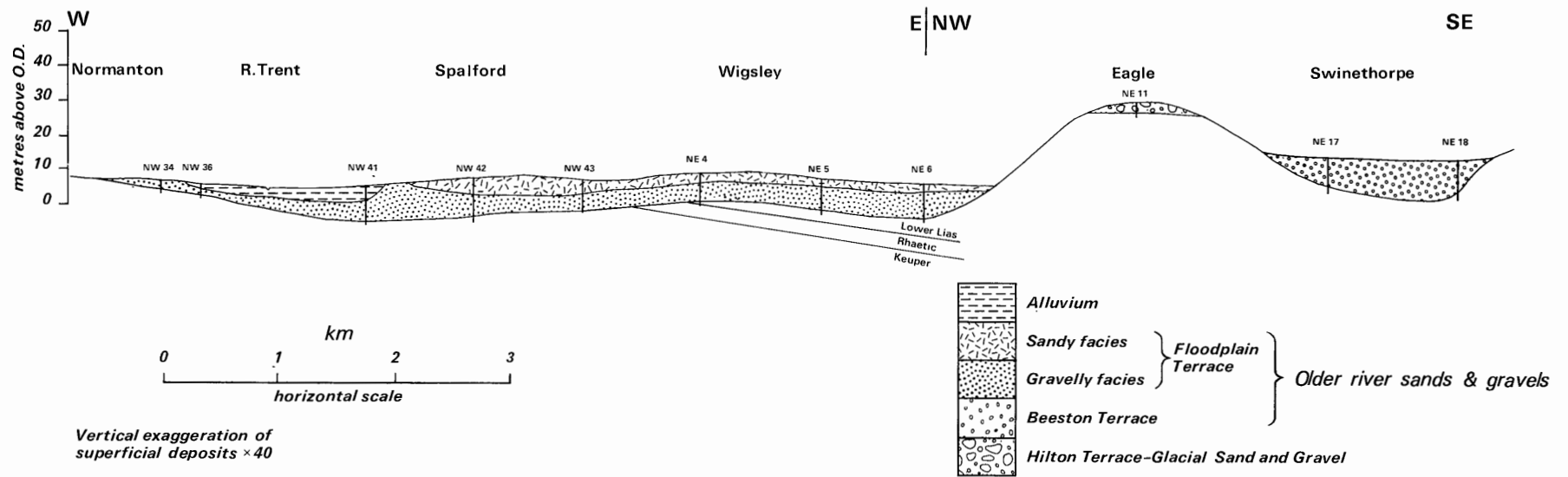
Fig. 2. Schematic cross-section across the district

one-inch survey and the older river sands and gravels of subsequent surveys, have been cor- related (Straw, 1963) with the Beeston and Floodplain terraces which are well developed to the south.

The Beeston Terrace deposits are gravels and sandy gravels which occupy a 2 km wide strip of ground between Eagle and Thurlby at a general height of about 50 ft (15 m) O.D.

Gravels and sandy gravels of the younger Floodplain Terrace cover nearly the whole of the central and western parts of the district and range in height between 17 ft (5 m) O.D. and 35 ft (11 m) O.D. Along the present course of the Trent the Floodplain Terrace is largely covered by alluvium.

The aggradation of the Beeston Terrace is assigned to a period when ice caused the diver- sion of the Trent through the Lincoln Gap and the Floodplain Terrace gravels are considered to have been laid down subsequently when north- ward drainage was again impeded by ice (Straw, 1963). Fig. 3 shows the relative heights of the terraces in the district.

*Alluvium*
Alluvium is found mainly along the Trent Valley where it is up to 6.0 m (19.5 ft) thick near North Collingham. It consists of inter- bedded clays, silts and sands; peaty horizons are developed locally and plant and tree remains are common throughout. Some tributary valleys contain narrow strips of thin alluvium.

*Blown Sand*
Small patches of blown sand occur in the western part of the area along the outcrop of the Keuper Marl and within the alluvial tract of the River Trent, where they mantle older super- ficial deposits. East of the river, especially north of North Collingham, considerable spreads of sand have been mapped as blown sand and dunes up to 15 ft (4.6 m) high have been recorded in the Besthorpe-Girton area (Edwards, 1967, p. 165). However the results of the resource survey suggests that the blown sand is commonly less than 1 m (3.3 ft) thick. The blown sand is thought (Edwards, 1967) to have originated from gravel flats west of the Trent and to have been transported eastward by the prevailing wind.

## COMPOSITION OF THE SAND AND GRAVEL
Within the district the Glacial Sand and Gravel (Hilton Terrace) and older river sands and gravels (Beeston and Floodplain terraces) contain potentially workable sand and gravel.

*Glacial Sand and Gravel*
These deposits, which include 'clayey' sands and gravels, have a mean grading of fines 8 per cent, sand 49 per cent and gravel 43 per cent. Rounded pebbles of quartz and quartzite with subangular flint and chert dom- inate the gravel fraction; subordinate amounts of siltstone, limestone and igneous rock are also present (Table 2). The sand fraction is usually medium grained and comprises grains of quartz with subordinate amounts of quartzite, flint and chert.

*Older River Sands and Gravels*
The Beeston Terrace consists mainly of gravels and sandy gravels; the mean grading is fines 6 per cent, sand 30 per cent and gravel 64 per cent. The gravel consists mainly of well rounded quartz and quartzite together with subangular cherts and flints and sporadic igneous and siltstone pebbles. Pebbles of Liassic limestone and mudstone bedrock are confined to the basal layers (Table 2). The sand fraction is medium grained and comprises subangular to rounded grains of quartz, quart- zite and flint with chert. These deposits lie entirely within resource block G.

The mineral of the Floodplain Terrace has an approximate mean grading of fines 2 per cent, sand 54 per cent and gravel 44 per cent. Beneath and to the west of the present flood- plain of the Trent, and in an area around South Scarle and South Collingham (resource blocks A, B, C, and F), the mineral is more gravelly and has a mean grading of fines 2 per cent, sand 46 per cent and gravel 52 per cent. Around Spalford, North Scarle and Besthorpe (resource blocks D and E) the upper part of the deposit is generally sandier and the mineral has a mean gravel content of 31 per cent. The composition of the sand and gravel fractions is similar to that of the Beeston Terrace.

*Blown Sand*
Thicknesses of up to only 1.0 m (3.5 ft) were proved in the assessment boreholes. The deposit consists mainly of fine grained well- rounded quartz grains and is locally 'clayey'; the approximate mean grading is fines 3 per cent and sand 97 per cent.

## 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 topography is shown by contours in green, the geological data in black and the mineral resource inform- ation in shades of red.

S

N

North Collingham          South Scarle                    North Scarle        Eagle          Spalford
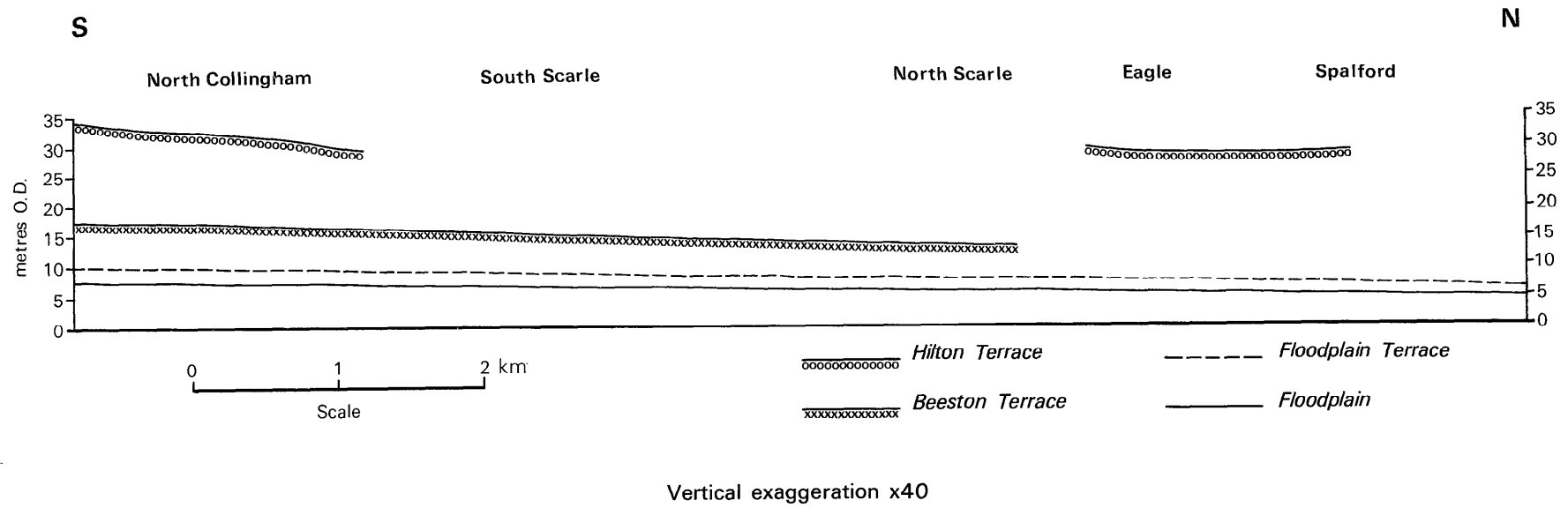


Fig. 3. The vertical relationships of the terraces of the River Trent

Table 2. Pebble count analyses (per cent by number and weight).

| HILTON TERRACE BH No. | Depth (m) | | Quartzite | Quartz | Flint & chert | Sandstone | Limestone | Igneous | Mudstone & siltstone |
|---|---|---|---|---|---|---|---|---|---|
| 86 SE 12 | 3.1 - 4.1 | No.% | 57 | 27 | 5 | 5 | 1 | 3 | 2 |
| | | Wt.% | 59 | 28 | 3 | 3 | 1 | 4 | 2 |

| BEESTON TERRACE BH No. | Depth (m) | | Quartzite | Quartz | Flint & chert | Sandstone | Limestone | Igneous | Mudstone & siltstone |
|---|---|---|---|---|---|---|---|---|---|
| 86 NE 18 | 9.4 - 10.8 | No.% | 75 | 15 | 7 | 2 | - | - | 1 |
| | | Wt.% | 79 | 14 | 5 | 1 | - | - | 1 |
| 86 NE 20 | 7.5 - 9.2 | No.% | 41 | 15 | 4 | trace | 38 | 1 | trace |
| | | Wt.% | 44 | 10 | 4 | trace | 39 | 2 | 1 |
| 86 SE 5 | 2.1 - 3.1 | No.% | 61 | 18 | 14 | 7 | - | - | - |
| | | Wt.% | 63 | 19 | 13 | 5 | - | - | - |
| 86 SE 15 | 6.7 - 7.7 | No.% | 55 | 24 | 13 | 4 | 2 | 2 | trace |
| | | Wt.% | 60 | 23 | 10 | 2 | 1 | 4 | trace |

| FLOODPLAIN TERRACE BH No. | Depth (m) | | Quartzite | Quartz | Flint & chert | Sandstone | Limestone | Igneous | Mudstone & siltstone |
|---|---|---|---|---|---|---|---|---|---|
| 76 NE 69 | 4.4 - 5.4 | No.% | 69 | 19 | 6 | 4 | - | 1 | 1 |
| | | Wt.% | 73 | 18 | 4 | 3 | - | 1 | 1 |
| 76 SE 19 | 7.3 - 8.6 | No.% | 59 | 17 | 14 | 1 | 2 | 7 | trace |
| | | Wt.% | 60 | 19 | 9 | trace | 1 | 11 | trace |
| 76 SE 21 | 3.4 - 4.4 | No.% | 55 | 33 | 10 | 1 | trace | 1 | trace |
| | | Wt.% | 57 | 32 | 8 | 1 | 1 | 1 | trace |
| 86 SW 49 | 3.3 - 4.9 | No.% | 72 | 14 | 10 | 2 | 2 | - | - |
| | | Wt.% | 71 | 16 | 11 | 1 | 1 | - | - |
| 86 SW 52 | 5.1 - 6.1 | No.% | 59 | 33 | 7 | - | - | - | 1 |
| | | Wt.% | 58 | 35 | 6 | - | - | - | 1 |
| 86 SW 57 | 8.6 - 9.6 | No.% | 66 | 27 | 4 | 1 | 1 | - | 1 |
| | | Wt.% | 66 | 29 | 3 | 1 | 1 | - | trace |
| 86 NE 5 | 6.7 - 7.7 | No.% | 60 | 28 | 8 | - | 1 | 3 | - |
| | | Wt.% | 66 | 24 | 6 | - | 1 | 3 | - |

*Geological Data*

The geological boundary lines are derived from the sources indicated on the diagram at the foot of the map. The plateau gravels of the primary survey of the east of the area were classified as river gravel or older river gravel by Smith working in the west; they were renamed older river sands and gravels on the 1973 edition of the Lincoln map and are so called on the resource map.

The geological boundaries are the best interpretation of the information available at the time of survey, but discrepancies may be revealed by future investigations.

Borehole data, including the stratigraphical relations and mean particle size analysis of the sand and gravel, are summarised on the map.

*Mineral Resource Information*

For assessment purposes the map is divided into areas of mineral and areas where sand and gravel is either not potentially workable or is absent (for definition of 'mineral' and 'potentially workable' see p. 1).

The mineral is subdivided into areas where it outcrops (except for thin soil) and areas where it is present in continuous (or almost continuous) spreads beneath overburden. However, within these areas there may be small patches where sand and gravel is absent or not potentially workable, for example, around boreholes 86 NE 14 and 86 SW 53. Areas where bedrock outcrops and where superficial deposits (including sand and gravel) are classified as non-mineral are shown uncoloured.

For the most part the limits of the different
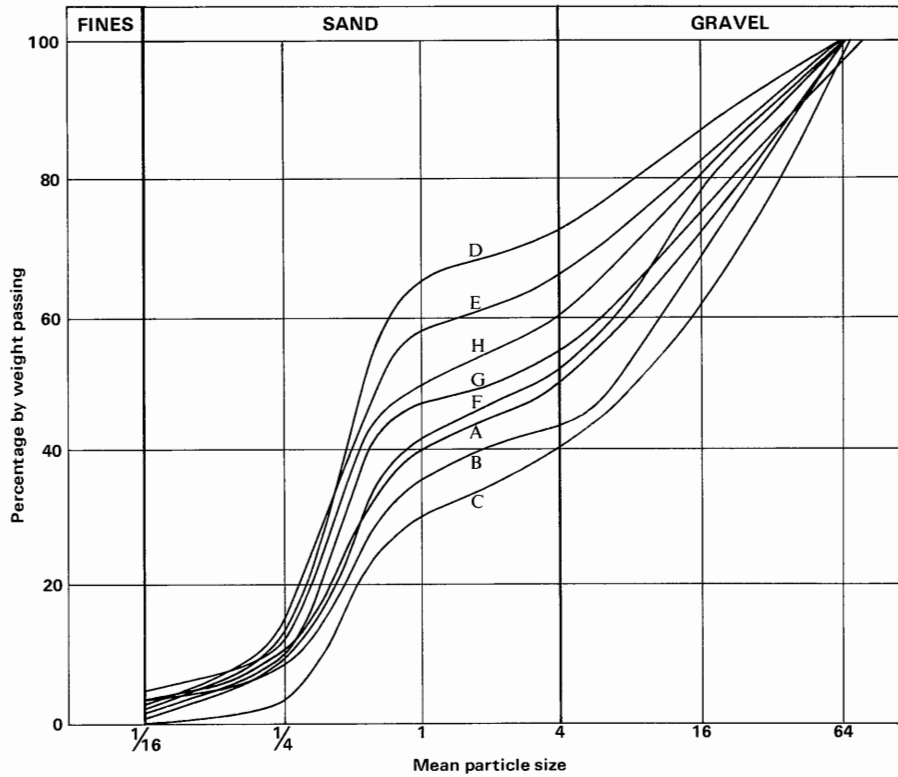
| Resource Block | Percentage by weight passing | | | | |
|---|---|---|---|---|---|
| | $\frac{1}{16}$mm | $\frac{1}{4}$mm | 1mm | 4mm | 16mm |
| A | 2 | 11 | 47 | 53 | 77 |
| B | 5 | 9 | 37 | 44 | 71 |
| C | 1 | 4 | 31 | 40 | 72 |
| D | 2 | 14 | 67 | 72 | 88 |
| E | 3 | 15 | 58 | 66 | 83 |
| F | 4 | 11 | 40 | 50 | 74 |
| G | 4 | 10 | 42 | 52 | 79 |
| H | 7 | 13 | 50 | 59 | 82 |

Fig. 4. Mean particle size distribution for the assessed thickness of sand and gravel in resource blocks A to H of sheet SK 86 and part of SK 76

categories of deposits are based on the mapped geological boundaries. Where there is a transition from one category to another which is independent of the geological lines and which could not be accurately delineated during this survey, inferred boundaries have been inserted. Such boundaries are shown by a distinctive symbol. The symbol is intended to convey an approximate location within a likely zone of occurrence, rather than to represent the breadth of the zone, its size being limited only by cartographic considerations. For the purpose of measuring area the centre-line of the symbol is used.

## RESULTS

The statistical results are summarised in Table 3. Fuller grading particulars are shown in Fig. 4.

### Accuracy of Results

For the mineral in the eight resource blocks the accuracy of the results at the 95 per cent probability level (that is, that in nineteen cases out of twenty the true volume present will be within the stated limits) ranges from 21 to 41 per cent. It should be remembered, however that the true values are more likely to be nearer the figure estimated than either of the extreme limits. Moreover, it is likely that approximately the same percentage limits would apply to the estimate of volume for a much smaller parcel of ground (say 1 km$^2$) containing similar sand and gravel deposits if the results from the same number of sample points were used in the calculation. Irrespective of area, therefore if closer limits are needed for quotation of reserves, data from an increased number of sample points will be required. This point can be illustrated by considering the whole of the potentially workable sand and gravel occuring within the sheet. The volume (454 million m$^3$) can be estimated to limits of $\pm 10$ per cent at the 95 per cent probability level, by a calculation based on data from 90 sample points spread across the eight resource blocks. However, it must be emphasised that the quoted volume of sand and gravel 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 land for mineral working.

## NOTES ON RESOURCE BLOCKS

### Block A

This block (Fig. 5) includes all the potentially workable sand and gravel deposits lying west of the Trent floodplain. The deposits are almost entirely assigned to the older river sands and gravels of the Floodplain Terrace. Alluvium of small streams covers more than one quarter of the block but otherwise overburden is limited to a thin, sandy soil.

Table 3. The sand and gravel resources of sheet SK 86 and part of SK 76.

| Resource block | Area | | Mean Thickness | | | | Volume of mineral | | | | Mean grading percentage | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Block | Mineral | Overburden | | Mineral | | | | Limits at the 95% probability level | | Fines | Sand | Gravel |
| | km$^2$ | km$^2$ | m | ft | m | ft | million m$^3$ | million yd$^3$ | $\pm\%$ | $\pm$ Vol million m$^3$ | -1/16 mm | -4 +1/16 mm | +4 mm |
| A | 13.8 | 13.6 | 0.7 | 2 | 5.9 | 19 | 80 | 105 | 27 | 22 | 2 | 51 | 47 |
| B | 9.1 | 7.9 | 3.4 | 11 | 4.1 | 13 | 32 | 42 | 41 | 13 | 5 | 39 | 56 |
| C | 11.6 | 11.3 | 2.7 | 9 | 4.8 | 16 | 54 | 71 | 31 | 17 | 1 | 39 | 60 |
| D | 8.2 | 7.9 | 0.3 | 1 | 8.3 | 27 | 66 | 86 | 21 | 13 | 2 | 70 | 28 |
| E | 14.4 | 13.4 | 0.5 | 2 | 5.3 | 17 | 71 | 93 | 28 | 20 | 3 | 63 | 34 |
| F | 10.9 | 8.9 | 0.4 | 1 | 5.0 | 16 | 44 | 58 | 28 | 12 | 4 | 46 | 50 |
| G | 15.5 | 15.4 | 0.5 | 2 | 5.7 | 19 | 88 | 115 | 29 | 26 | 4 | 48 | 48 |
| H | 20.8 | 5.0 | 0.4 | 1 | 3.8 | 13 | 19 | 25 | 29 | 6 | 7 | 52 | 41 |
| | 15.7 | Barren areas | | | | | | | | | | | |
| Total | 120.0 | 83.4 | | | 5.4 | 18 | 454 | 595 | 10 | 45 | | | |
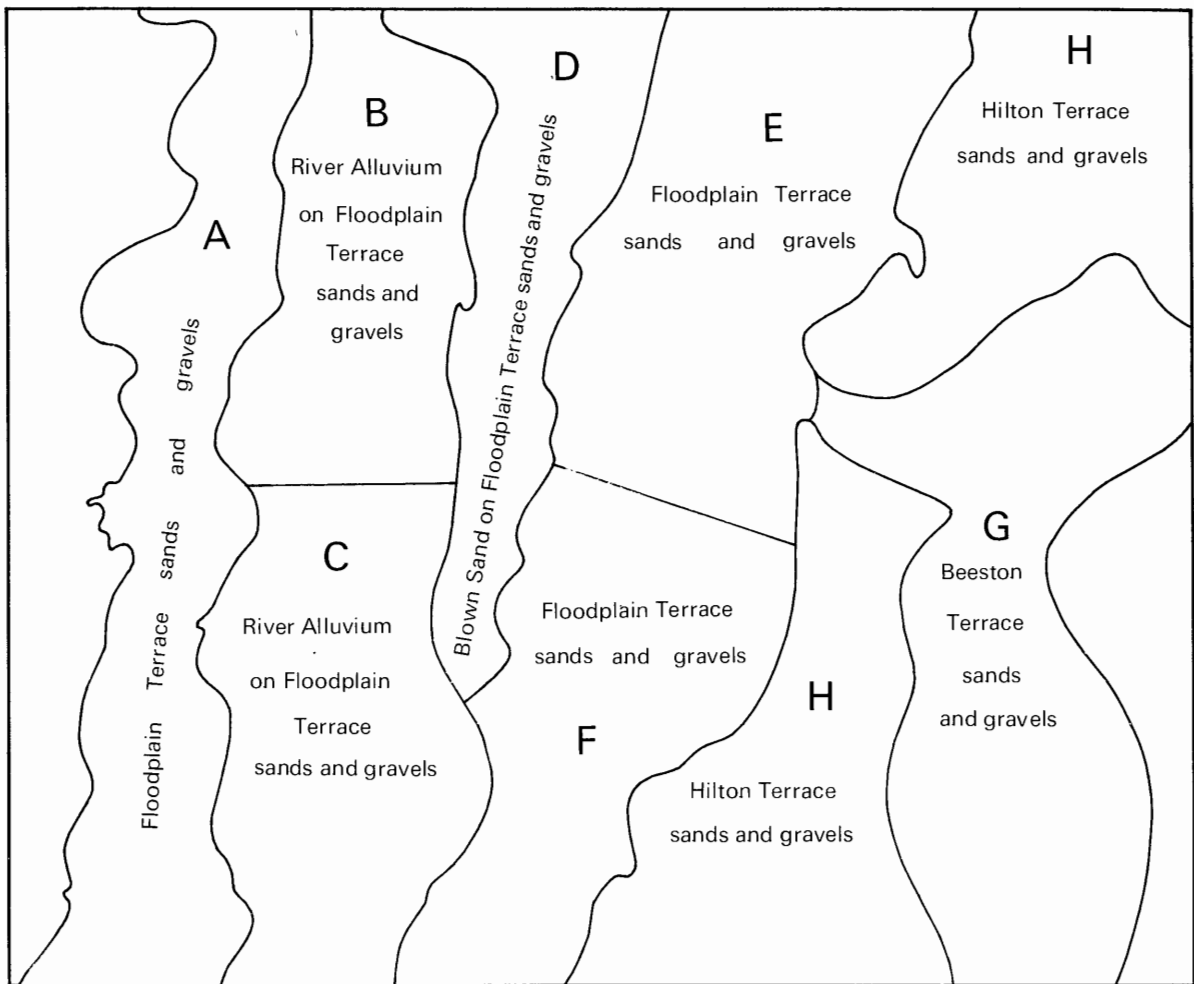
Fig. 5. The drift geology of sheet SK 86 and part of SK 76 summarised in relation to the resource block boundaries

Proved thicknesses of mineral encountered in the twelve boreholes range from 9.2 m (30.0 ft) in borehole 76 SE 21 to 3.7 m (12.0 ft) in borehole 86 NW 34; the mean thickness proved, calculated from 12 sample points, is 5.9 m (19.5 ft).

The mineral in boreholes 76 NE 68 and 86 NW 35 contained only 3 per cent and 7 per cent of gravel respectively but the gravel content of the other holes ranged from 23 to 65 per cent. The mean grading of the mineral in the block is fines 2 per cent, sand 51 per cent and gravel 47 per cent. The estimate of volume is 80 million m³ ±22 million m³.

*Block B*
The extent of this block is defined by the floodplain of the River Trent north of Besthorpe. The mineral, comprising Floodplain Terrace deposits, is almost entirely concealed beneath overburden which ranges in thickness from 1.8 m (6.0 ft) at 86 NW 36 to 5.3 m (17.5 ft) at 86 NW 57 and has a weighted mean thickness of 3.4 m (11.0 ft), calculated from nine sample points. The area of mineral is assumed to be the same as that of the block, less the area known to have been excavated. Mineral thicknesses proved range from 1.2 m (4.0 ft) in borehole 86 NW 36 to 8.0 m (26.0 ft) in borehole 86 NW 47 giving a mean of 4.1 m (13.5 ft). The mineral is predominantly gravelly, the mean gravel content ranging from 41 (borehole 86 NW 36) to 81 per cent (borehole 86 NW 38). Boreholes 86 NW 41, 47 and 56 proved about 1 m (3.5 ft) of clayey sand capping the gravels; these holes lie close to resource block D where the sandy capping is ubiquitous.

The mean grading of the block is fines 5 per cent, sand 39 per cent and gravel 56 per cent. The estimated volume is 32 million m³ ±13 million m³.

*Block C*
The block is defined by the extent of the Trent floodplain south of Besthorpe and is essentially similar in geology to block B. Borehole 86 SW 53 proved the overburden:mineral ratio to be greater than 3:1 but since the extent of the thinning cannot be determined from the data available, no attempt has been made to indicate it on the resource map and the entire outcrop is shown as potentially workable. The thickness of mineral proved in the ten boreholes ranges from 2.0 m (6.5 ft) in borehole 86 SW 50 to 9.0 m (29.5 ft) in borehole 86 SW 57, the mean thickness being 4.8 m (16.0 ft). The overburden is in general thinner, having a mean thickness of 2.7 m (9.0 ft) and is somewhat less extensive than in block B although covering 85 per cent of the block.

The block has a mean grading of fines 1 per cent, sand 39 per cent and gravel 60 per cent which is a slightly higher proportion of gravel than in block B. The estimated volume is 54 million m³ ±17 million m³.

*Block D*
Although much of this block has been mapped as blown sand it was found in only three boreholes (86 NW 45, 46 and 50) and its mean thickness is only about 1.0 m (3.5 ft). The sand, with some gravel, in some places 'clayey', which either underlies the blown sand or was found at the surface in all the boreholes in the block, is considered to be a part of the Floodplain Terrace. This sandy deposit ranges in thickness from 3.0 m (10.0 ft) at 86 NW 49 to 5.4 m (18.0 ft) at 86 NW 55, the mean being 4.4 m (14.5 ft), calculated from nine sample points. The approximate mean grading is fines 3 per cent, sand 84 per cent and gravel 13 per cent. In most boreholes this sandy facies rests on a more gravelly development of the Floodplain Terrace. However in borehole 86 NW 55 it lies immediately above bedrock while in 86 SW 44 the two facies are separated by a 0.2 m (0.5 ft) clay parting. The more gravelly deposit has a mean thickness of 4.4 m (14.5 ft) based on seven sample points; its mean grading is fines trace, sand 45 per cent, gravel 55 per cent. The mean grading of all the mineral is fines 2 per cent, sand 70 per cent and gravel 28 per cent and the mean thickness is 8.3 m (27 ft). The estimated volume is 66 million m³ ±13 million m³.

Throughout the block overburden is restricted to thin sandy soil except at Girton where there is a small patch of alluvium.

*Block E*
The Floodplain Terrace has been mapped over all but 1.0 km² of this block and is the sole source of mineral. Exceptionally, borehole 86 NE 14 proved sand and gravel too thin to be potentially workable, but there is insufficient information available to permit the area affected to be indicated on the resource map. Elsewhere proved thicknesses range from 2.9 m (9.5 ft) in borehole 86 NW 51 to 9.2 m (30.0 ft) in 86 NE 6 with a mean of 5.3 m (17.5 ft) calculated from 13 sample points. Several boreholes, as in block D, proved a sandier facies with a mean grading of fines 6 per cent, sand 91 per cent, gravel 3 per cent, at the surface resting on more gravelly material. In three boreholes in the northern part of the block a clay parting of 1.3 m (4.5 ft) mean thickness is present.

The mean grading of this block, fines 3 per cent, sand 63 per cent, gravel 34 per cent, differs only slightly from that of block D. The estimated volume is 71 million m$^3$ $\pm$20 million m$^3$.

*Block F*

The mineral in this block consists exclusively of sand and gravel of the Floodplain Terrace. The mean thickness of mineral is 5.0 m (16.5 ft), calculated from 10 sample points, and the thicknesses proved range from 2.0 m (6.5 ft) at 86 SW 46 to 7.8 m (25.5 ft) at 86 SW 61. Borehole 86 SW 45 in the north-west of the block proved sand with only 5 per cent gravel but the gravel content of the other boreholes ranges from 39 to 62 per cent. The mean grading of the block is fines 4 per cent, sand 46 per cent and gravel 50 per cent. A 3.2 m (10.5 ft) parting of red and grey silt was found in borehole 86 SW 62. The estimated volume of mineral is 44 million m$^3$ $\pm$12 million m$^3$.

*Block G*

This block comprises older river sands and gravels of the Beeston Terrace. The deposit fills a valley which runs south to north as far as Eagle Barnsdale [882 654] where it turns eastward and continues towards the Lincoln Gap, probably marking a former course of the River Trent. The mineral is predominantly gravelly but the upper parts are generally 'clayey' or 'very clayey'. The mean fines content ranges from a trace to 12 per cent and exceptionally to 26 per cent as in borehole 86 SE 14. The mean gravel content ranges from 25 to 63 per cent. The grading of the block as a whole is fines 4 per cent, sand 48 per cent and gravel 48 per cent. The estimated volume is 88 million m$^3$ $\pm$26 million m$^3$.

*Block H*

The potentially workable deposit, classified as Glacial Sand and Gravel, caps a number of flat-topped hills, in two areas, around Eagle and south of Swinderby. Only about 25 per cent of the block is occupied by mineral, the remaining 75 per cent by bedrock and sand and gravel too thin to be potentially workable. The mineral has a mean thickness, based on nine sample points, of 3.8 m (12.5 ft), although the range of thicknesses proved is from 2.5 m (8.0 ft) to 5.4 m (18.0 ft). The deposit is rather variable in composition: the proportion of gravel generally lies between 21 per cent (86 NE 10) and 58 per cent (86 NE 12) but the part of the deposit sufficiently low in fines to be classified as mineral at borehole 86 NE 9 contained only 4 per cent of gravel. The mineral is generally 'clayey' near the top and at borehole 86 NE 9 is 'very clayey' throughout. The mean grading

of the block is fines 7 per cent, sand 52 per cent, gravel 41 per cent, and the estimate of volume is 19 million m$^3$ $\pm$6 million m$^3$.

# Appendix A: Field Procedure

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, 10 km$^2$, 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 British Standard 1377 (Anon., 1967). Random checks on 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 F.

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

# Appendix B: Statistical Procedure

## STATISTICAL ASSESSMENT

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

2.  The simple methods used in the calculations are consistent with the amount of data provided by the survey. Conventional symmetrical confidence limits are calculated for the 95 per cent probability level. That is there is a 5 per cent or one in twenty

chance of a result falling outside the stated limits.

3. The volume estimate (V) for the mineral in a given block is the product of the 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

$$S_V = \sqrt{S_A^2 + S_{\bar{l}_m}^2} \quad \ldots\ldots(1)$$

4. The above relationship may be transposed such that

$$S_V = S_{\bar{l}_m} \sqrt{1 + \frac{S_A^2}{S_{\bar{l}_m}^2}} \quad \ldots\ldots(2)$$

From this it can be seen that as $\dfrac{S_A^2}{S_{\bar{l}_m}^2}$ 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 mean 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 $l_{m_1}$, $l_{m_2}$, .... $l_{m_n}$, then the best estimate of mean thickness, $\bar{l}_m$ =

$$\frac{\sum (l_{m_1} + l_{m_2} \ldots\ldots l_{m_n})}{n}$$

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, $S_{\bar{l}}$ expressed as a proportion of the mean thickness is given by

$$S_{\bar{l}} = \frac{1}{\bar{l}_m} \sqrt{\frac{(l_m - \bar{l}_m)^2}{(n - 1)}}$$

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

$$\frac{S_A}{S_{\bar{l}_m}} \leqslant 1/3 \text{ is assumed in all cases}$$

It follows from equation (2) that

$$S_{\bar{l}_m} \leqslant S_V \leqslant 1.05 \ S_{\bar{l}_m} \quad \ldots\ldots(3)$$

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

$$\pm \frac{t}{\sqrt{n}} \times S_{\bar{l}_m}$$

or as a percentage

$$\pm \frac{t}{\sqrt{n}} \times S_{\bar{l}_m} \times \frac{100}{\bar{l}_m} \text{ per cent}$$

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 | ∞ | 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, Biometrika Tables for Statisticians, Volume 1, Second Ed. 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:

$$L_{\bar{l}_m} \leqslant L_V \leqslant 1.05 \ L_{\bar{l}_m}$$

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Block Calculation       1:25 000 }  Fictitious
                              Block }

Area
     Block:      11.08 $km^2$
     Mineral:     8.32 $km^2$

Volume
     Overburden:    21 million $m^3$
     Mineral:        54 million $m^3$

Mean Thickness
     Overburden:   2.5 m
     Mineral:        6.5 m

Confidence limits of the estimate of mineral volume at the 95 per cent probability level: $\pm$ 20 per cent
That is, the volume of mineral (with 95 per cent probability): $54 \pm 11$ million $m^3$

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

| Sample point | Weighting $w$ | Overburden | | Mineral | | Remarks |
|---|---|---|---|---|---|---|
| | | $l_o$ | $wl_o$ | $l_m$ | $wl_m$ | |
| 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 | ⎬ MAU boreholes |
| SE 22 | 1 | 0.7 | 0.7 | 6.4 | 6.4 | ⎪ |
| SE 23 | 1 | 6.2 | 6.2 | 4.1 | 4.1 | ⎪ |
| SE 24 | 1 | 4.3 | 4.3 | 6.4 | 6.4 | ⎭ |
| SE 17 | $\frac{1}{2}$ | 1.2 ⎱ | 1.6 | 9.8 ⎱ | 7.2 | Hydrogeological Dept record |
| 123/45 | $\frac{1}{2}$ | 2.0 ⎰ | | 4.6 ⎰ | | |
| 1 | $\frac{1}{4}$ | 2.7 ⎱ | | 7.3 ⎱ | | |
| 2 | $\frac{1}{4}$ | 4.5 ⎰ | 2.5 | 3.2 ⎰ | 5.8 | Close group of four boreholes (commercial) |
| 3 | $\frac{1}{4}$ | 0.4 ⎱ | | 6.8 ⎱ | | |
| 4 | $\frac{1}{4}$ | 2.8 ⎰ | | 5.9 ⎰ | | |
| Totals | $\Sigma w = 8$ | $\Sigma wl_o = 20.1$ | | $\Sigma wl_m = 52.0$ | | |
| Means | | $\bar{l}_o = 2.5$ | | $\bar{l}_m = 6.5$ | | |

Calculation of confidence limits

| $l_m$ | $(l_m - \bar{l}_m)$ | $(l_m - \bar{l}_m)^2$ |
|---|---|---|
| 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 |

$\Sigma(l_m - \bar{l}_m)^2 = 15.82$

$n = 8$

$t = 2.365$

$L_V$ is calculated as

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

$$= \frac{1.05 \times 2.365}{6.5} \sqrt{\frac{15.82}{8 \times 7}} \times 100$$

$$= 20.3$$

$$\simeq 20 \text{ per cent}$$

Fig. 6. Example of resource block assessment: calculation and results

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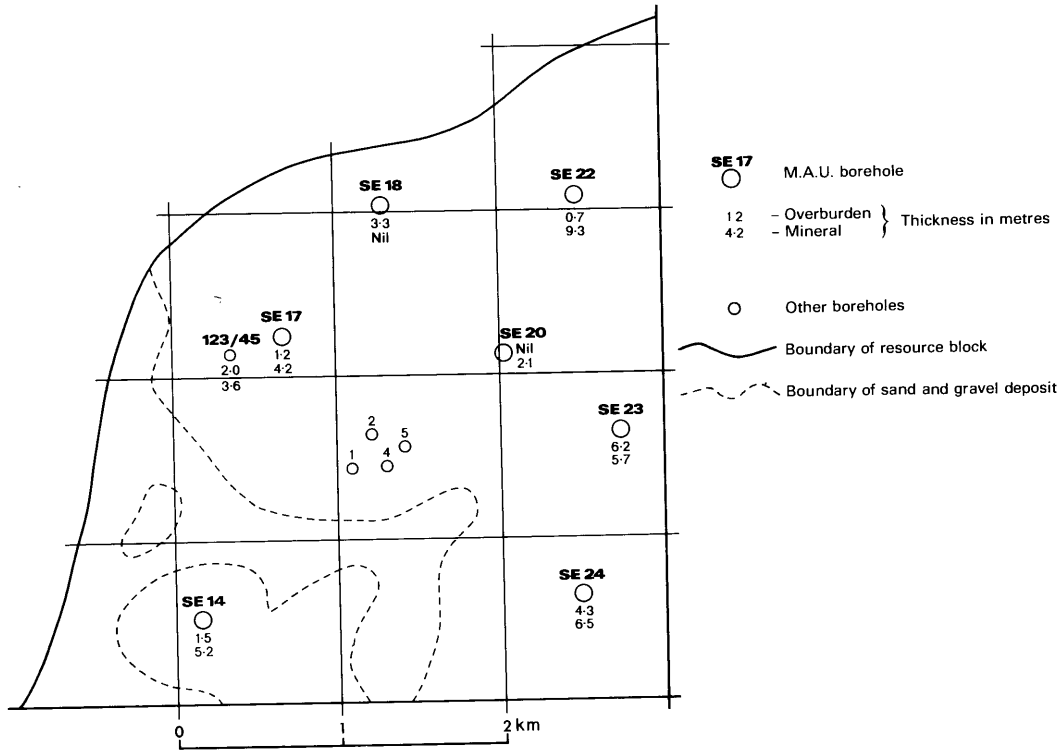
Fig. 7. Example of resource block assessment map of fictitious block



| I | Gravel | IV | Sandy gravel | VII | Pebbly sand | X | Sand |
|---|--------|----|--------------|-----|-------------|---|------|
| II | 'Clayey' gravel | V | 'Clayey' sandy gravel | VIII | 'Clayey' pebbly sand | XI | 'Clayey' sand |
| III | 'Very clayey' gravel | VI | 'Very clayey' sandy gravel | IX | 'Very clayey' pebbly sand | XII | 'Very clayey' sand |
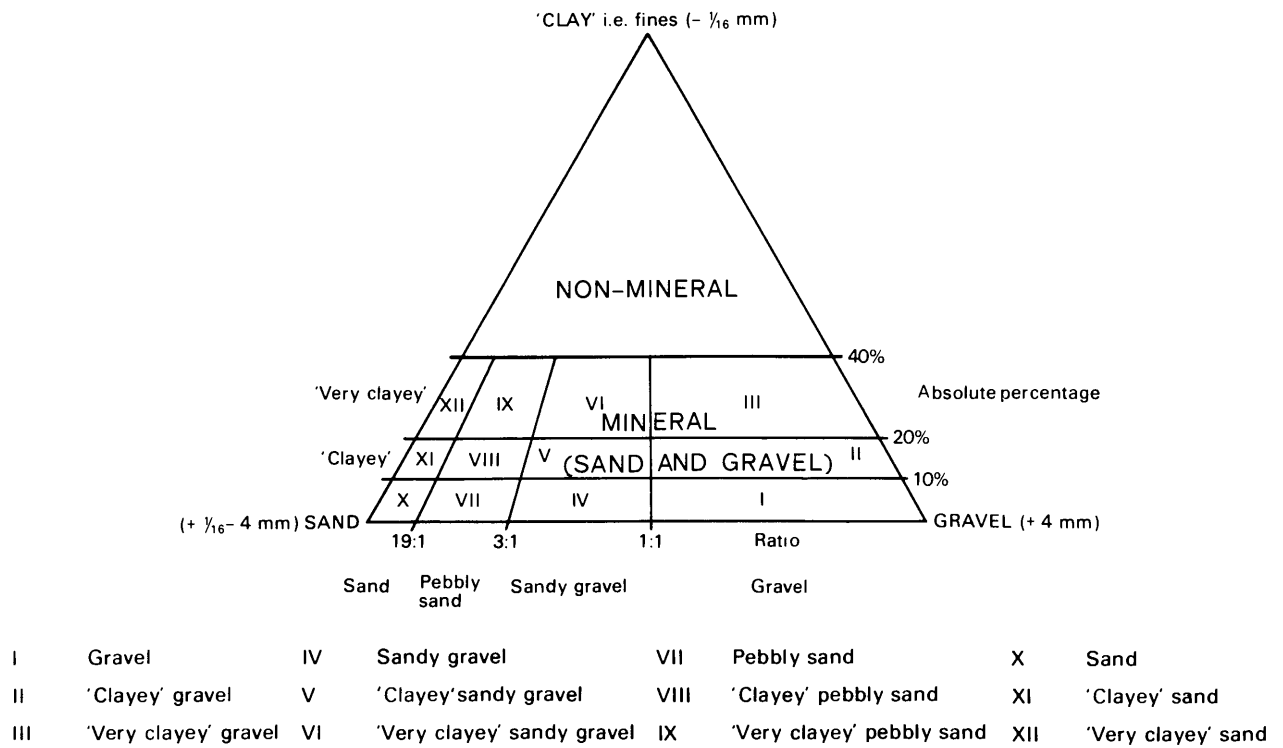
Fig. 8. Diagram to show the descriptive categories used in the classification of sand and gravel.

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

$$\frac{1.05 \times t}{\bar{l}_m} \times \sqrt{\frac{\Sigma(l_m - \bar{l}_m)^2}{n(n-1)}} \times 100 \text{ per cent}$$

and when n is greater than 20, as

$$\frac{1.05 \times 1.96}{\bar{l}_m} \times \sqrt{\frac{\Sigma(l_m - \bar{l}_m)^2}{n(n-1)}} \times 100 \text{ per cent}$$

11. The application of this procedure to a fictitious area is illustrated in Figs. 7 and 8.

*INFERRED ASSESSMENT*

12. If the sampled area of mineral in a resource block is between 0.25 km$^2$ and 2 km$^2$ an assessment is inferred, based on 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. No assessment is attempted for an isolated area of mineral less than 0.25 km$^2$.

15. 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 need 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 within the zone as the weighting factor.

# 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 (less than 1/16 mm) and coarser than pebbles (more than 64 mm 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 not considered to be 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 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 Fig. 8). The procedure is as follows:

1. Classify according to ratio of sand to gravel;
2. Describe 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 Note 11, p. 36).

Many differing proposals exist 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 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 (Table 4), which is used in this 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 ($-\frac{1}{4}$ +1/16 mm), medium (-1 +$\frac{1}{4}$ mm) and coarse (-4 +1 mm). The boundary at 16 mm distinguishes a range of finer gravel (-16 +4 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 Standard 1377 (Anon., 1967). In this report the grading is tabulated on the borehole record sheets (Appendix F), the intercepts corresponding with the simple geometric scale 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 very approximate 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 constituents 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, 1957), 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.

Table 4. Classification of gravel, sand and fines

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

# Appendix D: Explanation of the Borehole Records

*ANNOTATED EXAMPLE*

SK 86 NW 46[1]        8279 6828[2]        Girton Grange[3]       Block D

Surface level (+6.7 m) +22 ft[4]               Overburden[7] 0.3 m (1.0 ft)
Water level (+3.7 m) +12 ft[5]                 Mineral 10.0 m (33.0 ft)
March 1972[6]                                        Bedrock 1.0 m+ (3.5 ft+) [9]

|  |  | Thickness | | Depth[8] | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Blown sand on[10] older river sands and gravels (Flood-plain Terrace) | (a) Sand[11] 'very clayey' at top, fine subrounded chert and some rounded rock fragments, with rare fine, rounded quartz and flint pebbles |  |  |  |  |
|  | (b) Sandy gravel Gravel: coarse, subrounded to well rounded quartz and quartzite, with subangular chert, and some rounded igneous pebbles. Sand: medium, subangular to rounded quartz and rock fragments | 6.0 | (19.5) | 10.3 | (34.0) |
| Keuper Marl | Mudstone, red and green | 1.0+ | (3.5+) | 11.3 | (37.0) |

| | | % | mm | % | Depth below[12] surface (m) | Percentages[13] Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) | Gravel[14] | 1 | +16 | 0 | 0.3 - 1.3 | 29 | 71 | trace |
|  |  |  | -16+4 | 1 | 1.3 - 2.3 | 7 | 92 | 1 |
|  |  |  | -4+1 | 1 | 2.3 - 3.3 | trace | 99 | 1 |
|  | Sand | 89 | $-1+\frac{1}{4}$ | 62 | 3.3 - 4.3 | 4 | 95 | 1 |
|  |  |  | $-\frac{1}{4}+1/16$ | 25 | 4.3 - 5.3 | trace | 77 | 23 |
|  | Fines | 10 | -1/16 | 10 | 5.3 - 6.3 | trace | 73 | 27 |
|  |  |  |  |  | 6.3 - 7.3 | trace | 85 | 15 |
|  | Gravel | 39 | +16 | 31 | 7.3 - 8.3 | trace | 74 | 26 |
|  |  |  | -16+4 | 8 | 8.3 - 9.3 | trace | 33 | 67 |
|  |  |  | -4+1 | 8 | 9.3 - 10.3 | trace | 26 | 74 |
|  | Sand | 61 | $-1+\frac{1}{4}$ | 45 |  |  |  |  |
|  |  |  | $-\frac{1}{4}+1/16$ | 8 |  |  |  |  |
|  | Fines | trace | -1/16 | trace |  |  |  |  |

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

1.  Borehole Registration Number.
Each Mineral Assessment Unit (MAU) borehole is identified by a Registration Number. This consists of two statements.
    1) The number of the 1:25 000 sheet on which the borehole lies, for example SK 86.
    2) 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, for example NW 46.
Thus the full Registration Number is SK 86 NW 46. Usually this is abbreviated to 86 NW 46 in the text.

2.  The National Grid Reference
All National Grid References in this publication lie within the 100 km square SK unless otherwise stated. Grid references are given to eight figures, accurate to within 10 m for borehole locations. (In the text, six-figure grid references are used for more approximate locations, for example, for farms).

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 it 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 feet; approximate conversions to metres are given in brackets.

5.  Groundwater conditions
Four kinds of entry are made: the record indicates that the level at which groundwater stood on completion of drilling (in metres and feet above or below O.D.); or that water was encountered but its level not recorded; or that water was not encountered; or that no note of groundwater conditions was made.

6.  Type of Drill and Date of Drilling
Unless otherwise stated, all boreholes were drilled by a Pilcon shell and auger rig using 8-inch casing. The month and year of completion of the hole 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.  Thickness and Depth
All measurements were made in metres. Conversions from metres to feet (shown in brackets) have been rounded off to the nearest 0.5 ft. Where figures have been rounded in this way there may be a discrepancy between the sum of the thicknesses and the recorded depths.

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

10.  Geological Classification
The geological classification (p. 3) is given whenever possible.

11.  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. The description of other rocks is based on visual examination, in the field.

12.  Sampling
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 within the sand and gravel or at every 3 ft or 1 m of depth.

13.  Grading Results
The limits are as follows: gravel, +4 mm; sand, -4+1/16 mm; fines, -1/16 mm.

14.  Mean Grading
The grading of the full thickness of the mineral horizon identified in the log is the mean of the individual sample gradings weighted by the thicknesses represented, if these vary. The classification used is shown in Table 4.

Fully representative sample of sand and gravel is difficult to achieve particularly where groundwater levels are high. Comparison between boreholes and adjacent exposures suggests that in borehole samples the proportion of sand may be higher and the proportions of fines and coarse gravel (+16 mm) may be lower.

# Appendix E: List of Boreholes Used in the Assessment of Resources

*MINERAL ASSESSMENT UNIT BOREHOLES*

| Borehole No. by sheet quadrant | Grid ref. (all fall within the 100 km square SK) | Borehole No. by sheet quadrant | Grid ref. (all fall within the 100 km square SK) |
|---|---|---|---|
| SK 76 NE | | | |
| 67 | 7930 6745 | 14 | 8668 6762 |
| 68 | 7940 6672 | 15 | 8578 6726 |
| 69 | 7960 6524 | 16 | 8542 6655 |
| | | 17 | 8932 6701 |
| SK 76 SE | | 18 | 9000 6600 |
| | | 19 | 8855 6655 |
| 18 | 7942 6357 | 20 | 8772 6603 |
| 19 | 7931 6158 | 21 | 8521 6531 |
| 20 | 7862 6034 | 22 | 8709 6556 |
| 21 | 7930 6025 | 23 | 8803 6502 |
| | | 24 | 8872 6555 |
| SK 86 NW | | | |
| | | SK 86 SW | |
| 34 | 8070 6954 | | |
| 35 | 8022 6892 | 41 | 8017 6492 |
| 36 | 8124 6925 | 42 | 8098 6492 |
| 37 | 8146 6853 | 43 | 8215 6469 |
| 38 | 8093 6753 | 44 | 8268 6467 |
| 39 | 8039 6762 | 45 | 8394 6448 |
| 40 | 8050 6628 | 46 | 8360 6363 |
| 41 | 8250 6915 | 47 | 8181 6400 |
| 42 | 8351 6922 | 48 | 8479 6475 |
| 43 | 8447 6929 | 49 | 8492 6302 |
| 44 | 8436 6847 | 50 | 8071 6389 |
| 45 | 8342 6825 | 51 | 8001 6298 |
| 46 | 8279 6828 | 52 | 8071 6241 |
| 47 | 8211 6806 | 53 | 8139 6297 |
| 48 | 8434 6757 | 54 | 8325 6258 |
| 49 | 8343 6743 | 55 | 8321 6163 |
| 50 | 8270 6677 | 56 | 8141 6174 |
| 51 | 8447 6651 | 57 | 8040 6141 |
| 52 | 8349 6639 | 58 | 8214 6217 |
| 53 | 8169 6655 | 59 | 8230 6132 |
| 54 | 8400 6558 | 60 | 8133 6033 |
| 55 | 8305 6545 | 61 | 8264 6050 |
| 56 | 8236 6576 | 62 | 8344 6170 |
| 57 | 8090 6562 | 63 | 8410 6222 |
| SK 86 NE | | SK 86 SE | |
| 4 | 8545 6951 | 3 | 8572 6377 |
| 5 | 8647 6945 | 4 | 8553 6411 |
| 6 | 8742 6946 | 5 | 8748 6403 |
| 7 | 8539 6843 | 6 | 8696 6351 |
| 8 | 8645 6864 | 7 | 8841 6406 |
| 9 | 8988 6814 | 8 | 8867 6301 |
| 10 | 8932 6826 | 9 | 8736 6183 |
| 11 | 8850 6814 | 10 | 8656 6127 |
| 12 | 8833 6770 | 11 | 8582 6108 |
| 13 | 8793 6737 | 12 | 8583 6015 |
| | | 13 | 8668 6038 |

| Borehole No. by sheet quadrant | Grid ref. (all fall within the 100 km square SK) |
|---|---|
| 14 | 8777 6072 |
| 15 | 8828 6169 |
| 16 | 8924 6150 |
| 17 | 8900 6066 |
| 18 | 8767 6315 |

*OTHER BOREHOLES*

Information from 71 boreholes generously supplied by Hoveringham Gravels Ltd., Redland-Inns Gravel Ltd. and the Trent River Authority has been used. This information is held in confidence by the Institute.

# Appendix F: Mineral Assessment Unit Borehole Records

SK 76 NE 67    7930 6745    Grassthorpe Lane, Grassthorpe    Block A

Surface level (+8.5 m) +28ft
Water not encountered
December 1971

Overburden 2.0 m (6.5 ft)
Mineral 2.5 m (8.0 ft)
Bedrock 1.0 m +(3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Alluvium | Clay, brown, with scattered pockets of sand and gravel. | 1.7 | (5.5) | 2.0 | (6.5) |
| Older river sands and gravels (Floodplain Terrace) | 'Clayey' sandy gravel.<br>Gravel: fine, subangular to rounded quartzite, with subrounded quartz and angular to subrounded chert.<br>Sand: fine to medium, subrounded quartz and lithic grains. | 2.5 | (8.0) | 4.5 | (15.0) |
| Keuper Marl | Mudstone, red and green. | 1.0+ | (3.5+) | 5.5 | (18.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 23 | +16 | : | 7 |
| | | −16+4 | : | 16 |
| | | −4+1 | : | 12 |
| Sand | 58 | −1+¼ | : | 35 |
| | | −¼+1/16 | : | 11 |
| Fines | 19 | −1/16 | : | 19 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 2.0–3.0 | 14 | 51 | 35 |
| 3.0–4.5 | 22 | 63 | 15 |

23

SK 76 NE 68    7940 6672    Dunstall Lodge, Sutton-on-Trent    Block A

Surface level (+9.7 m) +32ft                    Overburden 0.4 m (1.5 ft)
Water not encountered                           Mineral 3.1 m (10.0 ft)
December 1971                                    Bedrock 1.5 m +(5.0 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | 'Clayey' sand, with a little gravel.<br><br>Sand: fine to medium, subrounded quartz and rock fragments.<br>Gravel: fine, subangular to rounded quartz, sandstone and chert. | 3.1 | (10.0) | 3.5 | (11.5) |
| Keuper Marl | Mudstone, hard, red and green. | 1.5+ | (5.0+) | 5.0 | (16.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 3 | +16 | : | 0 |
|  |  | -16+4 | : | 3 |
|  |  | -4+1 | : | 3 |
| Sand | 86 | -1+¼ | : | 43 |
|  |  | -¼+1/16 | : | 40 |
| Fines | 11 | -1/16 | : | 11 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 0.4 - 1.4 | 15 | 81 | 4 |
| 1.4 - 2.4 | 12 | 86 | 2 |
| 2.4 - 3.5 | 6 | 91 | 3 |

SK 76 NE 69    7960 6524    The Elms, Sutton-on-Trent    Block A

Surface level (+8.2 m) +27 ft                   Overburden 1.4 m (4.5 ft)
Water level (+6.3 m) +21 ft                     Mineral 4.9 m (16.0 ft)
January 1972                                     Bedrock 1.2 m+ (4.0 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
|  | Clay, light brown. | 1.2 | (4.0) | 1.4 | (4.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subrounded quartzite, with subangular to rounded quartz and angular to subrounded chert.<br>Sand: medium, angular to subrounded quartz and rock fragments with chert. | 4.9 | (16.0) | 6.3 | (20.5) |
| Keuper Marl | Mudstone, red. | 1.2+ | (4.0+) | 7.5 | (24.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 63 | +16 | : | 32 |
|  |  | -16+4 | : | 31 |
|  |  | -4+1 | : | 8 |
| Sand | 37 | -1+¼ | : | 27 |
|  |  | -¼+1/16 | : | 2 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 1.4 - 2.4 | trace | 20 | 80 |
| 2.4 - 3.4 | 1 | 14 | 85 |
| 3.4 - 4.4 | trace | 54 | 46 |
| 4.4 - 5.4 | trace | 60 | 40 |
| 5.4 - 6.3 | trace | 40 | 60 |

SK 76 SE 18    7942 6357    Carlton-on-Trent    Block A

Surface level (+7.9 m) +26 ft
Water level not recorded
January 1972

Overburden 0.3 m (1.0 ft)
Mineral 7.8 m (25.5 ft)
Bedrock 1.4 m +(4.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.3 | (1.0) | 0.3 | (1.0) |

Older river sands and gravels (Floodplain Terrace)

Gravel, sandy at top and from 3.3 to 5.3 m.
   Gravel: fine to coarse, subrounded to well rounded quartzite, with rounded quartz and angular to rounded chert.
   Sand: medium, angular to rounded quartz and chert with lithic grains.

| | | | | |
|---|---|---|---|---|
| | 7.8 | (25.5) | 8.1 | (26.5) |

Keuper Marl    Mudstone, red.

| | | | | |
|---|---|---|---|---|
| | 1.4+ | (4.5+) | 9.5 | (31.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 50 | +16 | : | 26 |
| | | -16+4 | : | 24 |
| | | -4+1 | : | 8 |
| Sand | 50 | -1+¼ | : | 39 |
| | | -¼+1/16 | : | 3 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | trace | 53 | 47 |
| 1.3 - 2.3 | trace | 48 | 52 |
| 2.3 - 3.3 | trace | 34 | 66 |
| 3.3 - 4.3 | 1 | 71 | 28 |
| 4.3 - 5.3 | trace | 88 | 12 |
| 5.3 - 6.3 | trace | 33 | 67 |
| 6.3 - 7.3 | trace | 26 | 74 |
| 7.3 - 8.1 | trace | 44 | 56 |

SK 76 SE 19    7931 6158    Cromwell    Block A

Surface level (+8.5 m) +28 ft
Water level not recorded
December 1971

Overburden 0.3 m (1.0 ft)
Mineral 8.3 m (27.0 ft)
Bedrock 1.0 m +(3.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.3 | (1.0) | 0.3 | (1.0) |

Older river sands and gravels (Floodplain Terrace)

Gravel and sandy gravel
   Gravel: fine to coarse, subrounded to well rounded quartzite, with rounded quartz and subangular chert and some rounded sandstone and igneous pebbles.
   Sand: medium, subangular to rounded quartz and rock fragments.

| | | | | |
|---|---|---|---|---|
| | 8.3 | (27.0) | 8.6 | (28.0) |

Keuper Marl    Mudstone, green and red.

| | | | | |
|---|---|---|---|---|
| | 1.0+ | (3.5+) | 9.6 | (31.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 54 | +64 | : | 2 |
| | | +16 | : | 27 |
| | | -16+4 | : | 25 |
| | | -4+1 | : | 7 |
| Sand | 44 | -1+¼ | : | 28 |
| | | -¼+1/16 | : | 9 |
| Fines | 2 | -1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | 11 | 47 | 42 |
| 1.3 - 2.3 | 3 | 63 | 34 |
| 2.3 - 3.3 | trace | 47 | 53 |
| 3.3 - 4.3 | trace | 3 | 97 |
| 4.3 - 5.3 | trace | 10 | 90 |
| 5.3 - 6.3 | trace | 27 | 73 |
| 6.3 - 7.3 | 1 | 60 | 39 |
| 7.3 - 8.6 | trace | 80 | 20 |

SK 76 SE 20      7862 6034      Foxholes Farm, Cromwell      Block A

Surface level (+11.0 m) +36 ft

Overburden 0.4 m (1.5 ft)

Water level not recorded

Mineral 8.0 m (26.0 ft)

December 1971

Bedrock 1.1 m +(3.5ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel, sandy at top and base. Gravel: fine, subangular to well rounded sandstone and igneous rock and some subangular chert and flint. Sand: medium, subrounded to rounded quartz and rock fragments. | 8.0 | (26.0) | 8.4 | (27.5) |
| Keuper Marl | Mudstone, red and green. | 1.1+ | (3.5+) | 9.5 | (31.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 53 | +64 | : | 4 |
| | | +16 | : | 23 |
| | | −16+4 | : | 26 |
| | | −4+1 | : | 9 |
| Sand | 45 | −1+¼ | : | 31 |
| | | −¼+1/16 | : | 5 |
| Fines | 2 | −1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 – 1.4 | 9 | 69 | 22 |
| 1.4 – 2.4 | 3 | 56 | 41 |
| 2.4 – 3.4 | 2 | 44 | 54 |
| 3.4 – 4.4 | 1 | 31 | 68 |
| 4.4 – 5.4 | trace | 42 | 58 |
| 5.4 – 6.4 | trace | 34 | 66 |
| 6.4 – 7.4 | trace | 26 | 74 |
| 7.4 – 8.4 | 1 | 60 | 39 |

SK 76 SE 21      7930 6025      Lodge Farm, Cromwell      Block A

Surface level (+9.7 m) +32 ft

Overburden 0.4 m (1.5 ft)

Water level not recorded

Mineral 9.2 m (30.0 ft)

December 1971

Bedrock 1.1 m +(3.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel, sandy near top. Gravel: coarse, subangular to well rounded quartzite, with rounded quartz, and some subrounded sandstone and igneous rock and subangular to rounded chert and flint. Sand: medium, subangular to rounded quartz and rock fragments. | 9.2 | (30.0) | 9.6 | (31.5) |
| Keuper Marl | Mudstone, red with some green. | 1.1+ | (3.5+) | 10.7 | (35.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 65 | +64 | : | 5 |
| | | +16 | : | 31 |
| | | −16+4 | : | 29 |
| | | −4+1 | : | 7 |
| Sand | 34 | −1+¼ | : | 23 |
| | | −¼+1/16 | : | 4 |
| Fines | 1 | −1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 – 1.4 | 1 | 70 | 29 |
| 1.4 – 2.4 | 2 | 61 | 37 |
| 2.4 – 3.4 | trace | 19 | 81 |
| 3.4 – 4.4 | 1 | 31 | 68 |
| 4.4 – 5.4 | trace | 17 | 83 |
| 5.4 – 6.4 | trace | 32 | 68 |
| 6.4 – 7.4 | trace | 30 | 70 |
| 7.4 – 8.4 | trace | 22 | 78 |
| 8.4 – 9.6 | trace | 34 | 66 |

SK 86 NW 34     8070 6954     Low Marnham     Block A

Surface level (+7.6 m) +25 ft
Water level not recorded
December 1971

Overburden 0.4 m (1.5 ft)
Mineral 3.7 m (12.0 ft)
Bedrock 1.4 m +(4.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.4 | (1.5) | 0.4 | (1.5) |

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel, 'clayey' at top.<br>    Gravel: fine, subrounded quartzite, with rounded quartz, subangular chert and some subrounded sandstone.<br>    Sand: fine to medium, subangular to rounded, quartz and rock fragments. | 3.7 | (12.0) | 4.1 | (13.5) |
| Keuper Marl | Mudstone, red and green. | 1.4+ | (4.5+) | 5.5 | (18.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 28 | +16 | : | 9 |
| | | −16+4 | : | 19 |
| | | −4+1 | : | 7 |
| Sand | 67 | −1+¼ | : | 48 |
| | | −¼+1/16 | : | 12 |
| Fines | 5 | −1/16 | : | 5 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 - 0.9 | 13 | 70 | 17 |
| 0.9 - 1.8 | 1 | 69 | 30 |
| 1.8 - 2.7 | 3 | 67 | 30 |
| 2.7 - 4.1 | 5 | 67 | 28 |

---

SK 86 NW 35     8022 6892     Normanton     Block A

Surface level (+8.2 m) +27 ft
Water level not recorded
December 1971

Overburden 0.4 m (1.5 ft)
Mineral 3.9 m (13.0 ft)
Bedrock 1.7 m +(5.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.4 | (1.5) | 0.4 | (1.5) |

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| Older river sands and gravels (Floodplain Terrace) | Pebbly sand.<br>    Gravel: fine, subrounded to well rounded quartz, and quartzite with subangular chert.<br>    Sand: medium, subangular to rounded quartz and rock fragments, with subangular chert. | 3.9 | (13.0) | 4.3 | (14.0) |
| Keuper Marl | Mudstone, red. | 1.7+ | (5.5+) | 6.0 | (19.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 7 | +16 | : | 0 |
| | | −16+4 | : | 7 |
| | | −4+1 | : | 7 |
| Sand | 92 | −1+¼ | : | 62 |
| | | −¼+1/16 | : | 23 |
| Fines | 1 | −1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 - 1.4 | 1 | 83 | 16 |
| 1.4 - 2.4 | trace | 93 | 7 |
| 2.4 - 3.4 | 1 | 97 | 2 |
| 3.4 - 4.4 | 1 | 97 | 2 |

27

SK 86 NW 36     8124 6925     Marnham Holme     Block B

Surface level (+5.5 m) + 18 ft

Water not encountered

December 1971

Overburden 1.8 m (6.0 ft)

Mineral 1.2 m (4.0 ft)

Bedrock 2.0 m +(6.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Clay, light brown, sandy at base. | 1.8 | (6.0) | 1.8 | (6.0) |
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel.<br>    Gravel: fine, subrounded to well rounded quartzite, with rounded quartz and some subangular chert.<br>    Sand: medium, subangular to rounded quartz and rock fragments. | 1.2 | (4.0) | 3.0 | (10.0) |
| Keuper Marl | Mudstone, red. | 2.0+ | (6.5+) | 5.0 | (16.5) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 41 | +16 | : | 10 | | 1.8 – 3.0 | 3 | 56 | 41 |
| | | -16+4 | : | 31 | | | | | |
| | | -4+1 | : | 15 | | | | | |
| Sand | 56 | -1+¼ | : | 38 | | | | | |
| | | -¼+1/16 | : | 3 | | | | | |
| Fines | 3 | -1/16 | : | 3 | | | | | |


SK 86 NW 37     8146 6853     Meadow Lane, Low Marnham     Block B

Surface level (+5.2 m) +17 ft

Water level (+4.3 m) +14 ft

February 1972

Overburden 4.5 m (15.0 ft)

Mineral 2.5 m (8.0 ft)

Bedrock 1.0 m +(3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Alluvium | Silt, brown to 1.0 m, dark grey below. | 4.3 | (14.0) | 4.5 | (15.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>    Gravel: fine to coarse, subrounded to well rounded quartzite, with rounded quartz and subangular chert, and some rounded sandstone and igneous pebbles.<br>    Sand: medium, subrounded quartz, chert and rock fragments. | 2.5 | (8.0) | 7.0 | (23.0) |
| Keuper Marl | Mudstone, greenish-grey. | 1.0+ | (3.5+) | 8.0 | (26.5) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 66 | +16 | : | 34 | | 4.5 – 5.5 | 3 | 38 | 59 |
| | | -16+4 | : | 32 | | 5.5– 6.5 | trace | 19 | 81 |
| | | -4+1 | : | 7 | | 6.5 – 7.0 | trace | 52 | 48 |
| Sand | 33 | -1+¼ | : | 24 | | | | | |
| | | -¼+1/16 | : | 2 | | | | | |
| Fines | 1 | -1/16 | : | 1 | | | | | |

SK 86 NW 38    8093 6753    Grassthorpe Holme    Block B

Surface level (+5.5 m) +18 ft
Water level not recorded
December 1971

Overburden 3.5 m (11.5 ft)
Mineral 6.3 m (20.5 ft)
Bedrock 1.2 m +(4.0 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Alluvium — Silt, brown to 2.0 m, black and micaceous below; gravelly at base. | 3.1 | (10.0) | 3.5 | (11.5) |
| Older river sands and gravels (Floodplain Terrace) — Gravel: Gravel: medium to coarse, subrounded to well rounded quartz, and subangular chert and flint, with some subrounded sandstone and igneous pebbles. Sand: medium to coarse subangular to rounded quartz and rock fragments. | 6.3 | (20.5) | 9.8 | (32.0) |
| Keuper Marl — Mudstone, red with some green. | 1.2+ | (4.0+) | 11.0 | (36.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 81 | +16 | : | 53 |
| | | −16+4 | : | 28 |
| | | −4+1 | : | 4 |
| Sand | 19 | −1+¼ | : | 13 |
| | | −¼+1/16 | : | 2 |
| Fines trace | | −1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 3.5 − 4.5 | trace | 31 | 69 |
| 4.5 − 5.5 | trace | 41 | 59 |
| 5.5 − 6.5 | trace | 18 | 82 |
| 6.5 − 7.5 | trace | 8 | 92 |
| 7.5 − 8.5 | trace | 8 | 92 |
| 8.5 − 9.8 | trace | 8 | 92 |


SK 86 NW 39    8039 6762    Grassthorpe    Block A

Surface level (+7.3 m) +24 ft
Water level not recorded
December 1971

Overburden 0.4 m (1.5 ft)
Mineral 8.2 m (27.0 ft)
Bedrock 1.4 m +(4.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravel (Floodplain Terrace) — Sandy gravel. Gravel: coarse, subrounded to well rounded quartzite and quartz, with subangular chert and flint, and some subrounded to rounded sandstone and igneous rock. Sand: medium, subangular to rounded quartz and rock fragments. | 8.2 | (27.0) | 8.6 | (28.0) |
| Keuper Marl — Mudstone, red and grey. | 1.4+ | (4.5+) | 10.0 | (33.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 44 | +16 | : | 19 |
| | | −16+4 | : | 25 |
| | | −4+1 | : | 6 |
| Sand | 55 | −1+¼ | : | 43 |
| | | −¼+1/16 | : | 6 |
| Fines | 1 | −1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 − 1.4 | 2 | 67 | 31 |
| 1.4 − 2.4 | 1 | 67 | 32 |
| 2.4 − 3.4 | 1 | 99 | 0 |
| 3.4 − 4.4 | trace | 30 | 70 |
| 4.4 − 5.4 | 4 | 38 | 58 |
| 5.4 − 6.4 | 2 | 51 | 47 |
| 6.4 − 7.4 | trace | 57 | 43 |
| 7.4 − 8.6 | 1 | 36 | 63 |

29

SK 86 NW 40        8050 6628        North Holme, Sutton-on-Trent        Block B

Surface level (+6.4 m) +21 ft                          Overburden 4.0 m (13.0 ft)
Water level not recorded                               Mineral 1.7 m (5.5 ft)
February 1972                                          Bedrock 1.3 m +(4.5 ft+)

|  |  | Thickness | | Depth | |
| --- | --- | --- | --- | --- | --- |
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Alluvium | Silt, 2.7 m brown silt with plant remains on 1.0 m grey and black laminated micaceous silt. | 3.7 | (12.0) | 4.0 | (13.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subangular to rounded quartzite and quartz, with subangular chert and some rounded sandstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 1.7 | (5.5) | 5.7 | (18.5) |
| Keuper Marl | Mudstone, red and green. | 1.3+ | (4.5+) | 7.0 | (23.0) |

|  | % | mm |  | % |
| --- | --- | --- | --- | --- |
| Gravel | 57 | +16 | : | 29 |
|  |  | -16+4 | : | 28 |
|  |  | -4+1 | : | 10 |
| Sand | 43 | -1+$\frac{1}{4}$ | : | 30 |
|  |  | -$\frac{1}{4}$+1/16 | : | 3 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
| --- | --- | --- | --- |
| 4.0 - 5.0 | trace | 46 | 54 |
| 5.0 - 5.7 | trace | 38 | 62 |

SK 86 NW 41     8250 6915     Clifton Hill, South Clifton     Block B

Surface level (+5.2 m) +17 ft             Overburden 3.7 m (12.0 ft)
Water level (+3.7 m) +12 ft               Mineral 4.5 m (15.0 ft)
January 1972                              Bedrock 1.3 m + (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Alluvium | Clay, light brown, silty at base | 3.5 | (11.5) | 3.7 | (12.0) |
| Older river sands and gravels (Floodplain Terrace) | (a)  'Clayey' Sand, with a little gravel<br>Gravel: fine, subrounded quartz.<br>Sand: medium, subangular to subrounded quartz and rock fragments. | 1.1 | (3.5) | 4.8 | (16.0) |
| | (b)  Gravel<br>Gravel: fine to coarse, subrounded to well rounded quartzite, with rounded quartz and subangular chert and flint.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 3.4 | (11.0) | 8.2 | (27.0) |
| Keuper Marl | Mudstone, grey | 1.3+ | (4.5 +) | 9.5 | (31.0) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| (a)  Gravel | 2 | +16 | : | 0 | | 3.7 – 4.8 | 12 | 86 | 2 |
| | | −16+4 | : | 2 | | | | | |
| | | −4+1 | : | 2 | | | | | |
| Sand | 86 | −1+¼ | : | 60 | | | | | |
| | | −¼+1/16 | : | 24 | | | | | |
| Fines | 12 | −1/16 | : | 12 | | | | | |
| | | | | | | | | | |
| (b)  Gravel | 65 | +16 | : | 31 | | 4.8 – 5.5 | trace | 35 | 65 |
| | | −16+4 | : | 34 | | 5.5 – 6.5 | trace | 26 | 74 |
| | | | | | | 6.5 – 7.5 | trace | 40 | 60 |
| | | −4+1 | : | 8 | | 7.5 – 8.2 | trace | 34 | 66 |
| Sand | 35 | −1+¼ | : | 25 | | | | | |
| | | −¼+1/16 | : | 2 | | | | | |
| Fines | trace | −1/16 | : | trace | | | | | |

31

SK 86 NW 42     8351 6922     Moor Farm, Spalford     Block D

Surface level (+7.6 m) +25 ft
Water level not recorded
January 1972

Overburden 0.2 m (0.5 ft)
Mineral 8.9 m (29.0 ft)
Bedrock 1.4 m +(4.5 ft+)

|  |  | Thickness | | | Depth | |
|---|---|---|---|---|---|---|
|  |  | m | (ft) |  | m | (ft) |
|  | Soil | 0.2 | (0.5) |  | 0.2 | (0.5) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a)  Sand, pebbly in places. Medium subrounded to well rounded quartz and rock fragments, with occasional subrounded quartzite and subangular chert pebbles. | 5.2 | (17.0) |  | 5.4 | (18.0) |
|  | (b)  Gravel Gravel: fine, subangular to rounded quartz and quartzite, with subangular chert and flint and some rounded mudstone. Sand: medium, angular to rounded quartz and rock fragments. | 3.7 | (12.0) |  | 9.1 | (30.0) |
| Keuper Marl | Mudstone, red. | 1.4+ | (4.5+) |  | 10.5 | (34.5) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 7 | +16 | : | 1 | 0.2 – 1.2 | trace | 97 | 3 |
|  |  | −16+4 | : | 6 | 1.2 – 2.2 | trace | 98 | 2 |
|  |  |  |  |  | 2.2 – 3.2 | trace | 85 | 15 |
|  |  | −4+1 | : | 3 | 3.2 – 4.2 | trace | 98 | 2 |
| Sand | 93 | −1+$\frac{1}{4}$ | : | 72 | 4.2 – 5.4 | trace | 88 | 12 |
|  |  | −$\frac{1}{4}$+1/16 | : | 18 |  |  |  |  |
| Fines | trace | −1/16 | : | trace |  |  |  |  |
| (b) Gravel | 70 | +16 | : | 35 | 5.4 – 6.4 | trace | 25 | 75 |
|  |  | −16+4 | : | 35 | 6.4 – 7.4 | trace | 22 | 78 |
|  |  |  |  |  | 7.4 – 8.4 | trace | 34 | 66 |
|  |  | −4+1 | : | 6 |  |  |  |  |
| Sand | 30 | −1+$\frac{1}{4}$ | : | 22 |  |  |  |  |
|  |  | −$\frac{1}{4}$+1/16 | : | 2 |  |  |  |  |
| Fines | trace | −1/16 | : | trace |  |  |  |  |

32

SK 86 NW 43     8447 6929     Wigsley Airfield     Block D

Surface level (+5. 8 m) +19 ft                    Overburden 0. 5 m (1.5 ft)
Water level (+3. 8 m) +13 ft                      Mineral 6. 0 m +(19. 5 ft+)
January 1972

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a) Pebbly sand<br>Gravel: fine, well rounded quartz and quartzite with rounded chert.<br>Sand: medium, angular to rounded quartz chert and rock fragments. | 4.0 | (13.0) | 4.5 | (14.5) |
|  | (b) Sandy gravel<br>Gravel: coarse, subrounded to well rounded quartz and quartzite with subangular chert.<br>Sand: medium, subrounded quartz and rock fragments. | 2.0+ | (6.5+) | 6.5 | (21.5) |

Hole abandoned due to rising sand and gravel.

|  | % | mm | | % | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 12 | +16 | : | 2 | 0.5 - 1.5 | trace | 78 | 22 |
|  |  | -16+4 | : | 10 | 1.5 - 2.5 | trace | 90 | 10 |
|  |  |  |  |  | 2.5 - 3.5 | trace | 90 | 10 |
|  |  | -4+1 | : | 7 | 3.5 - 4.5 | 1 | 93 | 6 |
| Sand | 87 | $-1+\frac{1}{4}$ | : | 68 |  |  |  |  |
|  |  | $-\frac{1}{4}+1/16$ | : | 12 |  |  |  |  |
| Fines | 1 | -1/16 | : | 1 |  |  |  |  |
| (b) Gravel | 41 | +16 | : | 27 | 4.5 - 5.5 | trace | 45 | 55 |
|  |  | -16+4 | : | 14 | 5.5 - 6.5 | trace | 74 | 26 |
|  |  | -4+1 | : | 6 |  |  |  |  |
| Sand | 59 | $-1+\frac{1}{4}$ | : | 46 |  |  |  |  |
|  |  | $-\frac{1}{4}+1/16$ | : | 7 |  |  |  |  |
| Fines | trace | -1/16 | : | trace |  |  |  |  |

33

SK 86 NW 44    8436 6847    Indies Farm, Spalford    Block  D

Surface level (+5.5 m) +18 ft                              Overburden 0.3 m (1.0 ft)
Water level (+4.6 m) +15 ft                                Mineral 7.9 m (26.0 ft)
February 1972                                              Bedrock 1.1 m+ (3.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a) Pebbly sand<br>Gravel: fine , subangular to rounded quartz, and subangular chert, with some rounded sandstone.<br>Sand: medium subrounded to well rounded quartz and rock fragments. | 5.0 | (16.5) | 5.3 | (17.5) |
|  | (b) Gravel<br>Gravel: fine to coarse, rounded quartz and quartzite with subangular chert, rounded sandstone, and some rounded igneous and siltstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 2.9 | (9.5) | 8.2 | (27.0) |
| Keuper Marl | Mudstone, red and green. | 1.1+ | (3.5+) | 9.3 | (30.5) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 16 | +16 | : | 4 |
|  |  | -16+4 | : | 12 |
|  |  | -4+1 | : | 5 |
| Sand | 80 | -1+¼ | : | 61 |
|  |  | -¼+1/16 | : | 14 |
| Fines | 4 | -1/16 | : | 4 |
| (b) Gravel | 65 | +16 | : | 32 |
|  |  | -16+4 | : | 33 |
|  |  | -4+1 | : | 9 |
| Sand | 35 | -1+¼ | : | 24 |
|  |  | -¼+1/16 | : | 2 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 0.3 - 1.3 | 10 | 82 | 8 |
| 1.3 - 2.3 | 5 | 86 | 9 |
| 2.3 - 3.3 | trace | 84 | 16 |
| 3.3 - 4.3 | 6 | 69 | 25 |
| 4.3 - 5.3 | trace | 77 | 23 |
| 5.3 - 6.3 | trace | 39 | 61 |
| 6.3 - 7.3 | trace | 28 | 72 |
| 7.3 - 8.2 | trace | 37 | 63 |

SK 86 NW 45    8342 6825    Rabbithill Lane, Spalford    Block  D

Surface level (+7.3 m) +24 ft                    Mineral 12.0 m (39.5 ft)
Water level (+4.6 m) +15 ft                      Bedrock 1.0 m+ (3.5 ft+)
March 1972

|  |  | Thickness | | Depth | |
| --- | --- | --- | --- | --- | --- |
|  |  | m | (ft) | m | (ft) |
| Blown sand on Older river sands and gravels | (a) Sand , medium, subrounded to well rounded quartz and rock fragments with a little fine gravel. | 5.0 | (16.5) | 5.0 | (16.5) |
| (Floodplain Terrace) | (b) Sandy gravel, sandy in upper part. Gravel, fine to coarse, subangular to rounded quartz and quartzite with subangular chert, and some subrounded coal and sandstone. Sand: medium, subangular to rounded quartz and rock fragments. | 7.0 | (23.0) | 12.0 | (39.5) |
| Keuper Marl | Mudstone, red. | 1.0+ | (3.5+) | 13.0 | (42.5) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (a) Gravel | 3 | +16 | : | 0 | 0 – 1.0 | 1 | 99 | 0 |
|  |  | –16+4 | : | 3 | 1.0 – 2.0 | 15 | 84 | 1 |
|  |  |  |  |  | 2.0 – 3.0 | 1 | 97 | 2 |
|  |  | –4+1 | : | 4 | 3.0 – 4.0 | trace | 93 | 7 |
| Sand | 93 | –1+¼ | : | 72 | 4.0 – 5.0 | trace | 96 | 4 |
|  |  | –¼+1/16 | : | 17 |  |  |  |  |
| Fines | 4 | –1/16 | : | 4 |  |  |  |  |
| (b) Gravel | 45 | +16 | : | 21 | 5.0 – 6.0 | trace | 81 | 19 |
|  |  | –16+4 | : | 24 | 6.0 – 7.0 | trace | 74 | 26 |
|  |  |  |  |  | 7.0 – 8.0 | trace | 58 | 42 |
|  |  | –4+1 | : | 7 | 8.0 – 9.0 | trace | 50 | 50 |
| Sand | 55 | –1+¼ | : | 43 | 9.0 – 10.0 | trace | 42 | 58 |
|  |  | –¼+1/16 | : | 5 | 10.0 – 11.0 | trace | 35 | 65 |
|  |  |  |  |  | 11.0 – 12.0 | trace | 42 | 58 |
| Fines | trace | –1/16 | : | trace |  |  |  |  |

SK 86 NW 46     8279 6828     Girton Grange     Block D

Surface level (+6.7 m) +22 ft
Water level (+3.7 m) +12 ft
March 1972

Overburden 0.3 m (1.0 ft)
Mineral 10.0 m (33.0 ft)
Bedrock 1.0 m + (3.5 ft+)

| | | | Thickness | | Depth | |
|---|---|---|---|---|---|---|
| | | | m | (ft) | m | (ft) |
| | Soil | | 0.3 | (1.0) | 0.3 | (1.0) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a) Sand, 'very clayey' at top. Fine, subrounded chert and some rounded rock fragments, with rare fine, rounded quartz and flint pebbles. | | 4.0 | (13.0) | 4.3 | (14.0) |
| | (b) Sandy gravel Gravel: coarse, subrounded to well rounded quartz and quartzite, with subangular chert, and some rounded igneous pebbles. Sand: medium, subangular to rounded quartz and rock fragments. | | 6.0 | (19.5) | 10.3 | (34.0) |
| Keuper Marl | Mudstone, red and green. | | 1.0+ | (3.5+) | 11.3 | (37.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 1 | +16 | : | 0 |
| | | -16+4 | : | 1 |
| | | -4+1 | : | 1 |
| Sand | 89 | -1+¼ | : | 63 |
| | | -¼+1/16 | : | 25 |
| Fines | 10 | -1/16 | : | 10 |
| (b) Gravel | 39 | +16 | : | 31 |
| | | -16+4 | : | 8 |
| | | -4+1 | : | 8 |
| Sand | 61 | -1+¼ | : | 45 |
| | | -¼+1/16 | : | 8 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Fines | Percentage Sand | Gravels |
|---|---|---|---|
| 0.3 - 1.3 | 29 | 71 | trace |
| 1.3 - 2.3 | 7 | 92 | 1 |
| 2.3 - 3.3 | trace | 99 | 1 |
| 3.3 - 4.3 | 4 | 95 | 1 |
| 4.3 - 5.3 | trace | 77 | 23 |
| 5.3 - 6.3 | trace | 73 | 27 |
| 6.3 - 7.3 | trace | 85 | 15 |
| 7.3 - 8.3 | trace | 74 | 26 |
| 8.3 - 9.3 | trace | 33 | 67 |
| 9.3 - 10.3 | trace | 26 | 74 |

36

SK 86 NW 47    8211 6806.    Girton Grange    Block B

Surface level (+6.4 m) +21 ft
Water level not recorded
February 1972

Overburden 0.5 m (1.5 ft)
Mineral 8.0 m (26.0 ft)
Bedrock 1.5 m+ (5.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Blown sand | (a) 'Clayey' sand<br>Medium, subangular to well rounded quartz and rock fragments with few fine, subrounded sandstone and flint pebbles. | 1.0 | (3.5) | 1.5 | (5.0) |
| Older river sands and gravels (flood plain Terrace) | (b) Gravel, sandy gravel at top<br>Gravel: fine to coarse, subangular to well rounded quartz and subangular flint and chert, with rounded sandstone and igneous pebbles.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 7.0 | (23.0) | 8.5 | (28.0) |
| Keuper Marl | Mudstone, red with some green. | 1.5+ | (5.0+) | 10.0 | (33.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 1 | +16 | : | 0 |
| | | -16+4 | : | 1 |
| | | -4+1 | : | 1 |
| Sand | 82 | -1+¼ | : | 61 |
| | | -¼+1/16 | : | 20 |
| Fines | 17 | -1/16 | : | 17 |
| (b) Gravel | 60 | +16 | : | 29 |
| | | -16+4 | : | 31 |
| | | -4+1 | : | 8 |
| Sand | 38 | -1+¼ | : | 26 |
| | | -¼+1/16 | : | 4 |
| Fines | 2 | -1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.5 - 1.5 | 17 | 82 | 1 |
| 1.5 - 2.5 | 8 | 52 | 40 |
| 2.5 - 3.5 | 1 | 30 | 69 |
| 3.5 - 4.5 | 2 | 51 | 47 |
| 4.5 - 5.5 | trace | 39 | 61 |
| 5.5 - 6.5 | trace | 38 | 62 |
| 6.5 - 7.5 | trace | 30 | 70 |
| 7.5 - 8.5 | trace | 31 | 69 |

SK 86 NW 48     8434 6757     Houcham Hill, North Scarle     Block E

Surface level (+6.4 m) +21 ft
Water level (+5.2 m) +17 ft
February 1972

Overburden 0.3 m (1.0 ft)
Mineral 6.9 m (22.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sand Medium, subangular to rounded quartz and rock fragments with a little flint quartz and coal gravel. | 2.0 | (6.5) | 2.3 | (7.5) |
| | (b) Gravel, sandy at top. Gravel: fine to coarse, subrounded to well rounded quartz, with rounded sandstone and subangular chert, and some rounded igneous. Sand: medium, subangular to rounded quartz and rock fragments. | 4.9 | (16.0) | 7.2 | (23.5) |
| Keuper Marl | Mudstone, red and green. | 1.3+ | (4.5+) | 8.5 | (28.0) |

| | % | mm | | % | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 2 | +16 | : | 0 | 0.3 - 1.3 | 4 | 95 | 1 |
| | | -16+4 | : | 2 | 1.3 - 2.3 | 3 | 95 | 2 |
| | | -4+1 | : | 2 | | | | |
| Sand | 95 | -1+¼ | : | 65 | | | | |
| | | -¼+1/16 | : | 28 | | | | |
| Fines | 3 | -1/16 | : | 3 | | | | |
| (b) Gravel | 50 | +16 | : | 23 | 2.3 - 3.3 | trace | 74 | 26 |
| | | -16+4 | : | 27 | 3.3 - 4.3 | trace | 53 | 47 |
| | | | | | 4.3 - 5.3 | 2 | 39 | 59 |
| | | -4+1 | : | 8 | 5.3 - 6.3 | trace | 46 | 54 |
| Sand | 49 | -1+¼ | : | 38 | 6.3 - 7.2 | trace | 32 | 68 |
| | | -¼+1/16 | : | 3 | | | | |
| Fines | 1 | -1/16 | : | 1 | | | | |

SK 86 NW 49     8343 6743     New Lane, Girton     Block D

Surface level     (+7.6 m) +25 ft
Water level (+6.0 m) +20 ft
February 1972

Overburden 0.4 m (1.5 ft)
Mineral 10.0 m+ (33.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a) Pebbly sand, 'clayey' at top. Gravel: fine, rounded quartz and sandstone with subangular chert. Sand: medium, subangular to well rounded quartz and rock fragments. | 3.0 | (10.0) | 3.4 | (11.0) |
| | (b) Gravel Gravel: fine to coarse, subrounded to well rounded quartz and quartzite; with subangular chert and some rounded sandstone and igneous rock. Sand: medium, subangular to rounded quartz and rock fragments. | 7.0+ | (23.0+) | 10.4 | (34.0) |

Hole abandoned due to rising sand.

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 13 | +16 | : | 4 |
| | | -16+4 | : | 9 |
| | | -4+1 | : | 4 |
| Sand | 83 | -1+¼ | : | 62 |
| | | -¼+1/16 | : | 17 |
| Fines | 4 | -1/16 | : | 4 |
| (b) Gravel | 54 | +16 | : | 23 |
| | | -16+4 | : | 31 |
| | | -4+1 | : | 9 |
| Sand | 45 | -1+¼ | : | 31 |
| | | -¼+1/16 | : | 5 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 - 1.4 | 11 | 88 | 1 |
| 1.4 - 2.4 | trace | 77 | 23 |
| 2.4 - 3.4 | trace | 84 | 16 |
| 3.4 - 4.4 | 4 | 44 | 52 |
| 4.4 - 5.4 | trace | 69 | 31 |
| 5.4 - 6.4 | trace | 46 | 54 |
| 6.4 - 7.4 | trace | 45 | 55 |
| 7.4 - 8.4 | trace | 31 | 69 |
| 8.4 - 9.4 | trace | 58 | 42 |
| 9.4 - 10.4 | trace | 22 | 78 |

SK 86 NW 50      8270 6677      Weecar, Girton      Block D

Surface level (+7.0 m) +23 ft                    Overburden 0.3 m (1.0 ft)
Water level (+4.9 m) +16 ft                      Mineral 8.5 m (28.0 ft)
February 1972                                     Bedrock 1.2 m+ (4.0 ft+)

| | | | | Thickness | | Depth | |
|---|---|---|---|---|---|---|---|
| | | | | m | (ft) | m | (ft) |
| | Soil | | | 0.3 | (1.0) | 0.3 | (1.0) |
| Blown sand | (a) Sand<br>Medium, subrounded to well rounded<br>quartz and rock fragments, with rare<br>fine quartz and coal pebbles. | | | 3.0 | (10.0) | 3.3 | (11.0) |
| Older river<br>sands and<br>gravels<br>(Floodplain<br>Terrace) | (b) Sandy gravel, sandier in places.<br>Gravel: fine to coarse subangular to<br>rounded quartz and quartzite, with<br>subangular chert; and some rounded<br>sandstone and siltstone.<br>Sand: medium, subangular to rounded<br>quartz and rock fragments. | | | 5.5 | (18.0) | 8.8 | (29.0) |
| Keuper Marl | Mudstone, hard, red. | | | 1.2+ | (4.0+) | 10.0 | (33.0) |

| | % | mm | | % | Depth below<br>surface (m) | Fines | Percentage<br>Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 1 | +16 | : | 0 | 0.3 – 1.3 | 3 | 95 | 2 |
| | | −16+4 | : | 1 | 1.3 – 2.3 | 2 | 98 | 0 |
| | | | | | 2.3 – 3.3 | 10 | 90 | 0 |
| | | −4+1 | : | 3 | | | | |
| Sand | 94 | −1+¼ | : | 65 | | | | |
| | | −¼+1/16 | : | 26 | | | | |
| Fines | 5 | −1/16 | : | 5 | | | | |
| (b) Gravel | 47 | +16 | : | 21 | 3.3 – 4.3 | 3 | 75 | 22 |
| | | −16+4 | : | 26 | 4.3 – 5.3 | trace | 55 | 45 |
| | | | | | 5.3 – 6.3 | trace | 48 | 52 |
| | | −4+1 | : | 10 | 6.3 – 7.3 | trace | 45 | 55 |
| Sand | 52 | −1+¼ | : | 35 | 7.3 – 8.3 | 2 | 37 | 61 |
| | | −¼+1/16 | : | 7 | 8.3 – 8.8 | 4 | 50 | 46 |
| Fines | 1 | −1/16 | : | 1 | | | | |

40

SK 86 NW 51     8447 6651     Bridge Farm, North Scarle     Block E

Surface level (+7.0 m) +23 ft          Overburden 0.3 m (1.0 ft)
Water level not recorded               Mineral 2.9 m (9.5 ft)
March 1972                             Bedrock 1.3 m+ (4.5 ft+)

| | | Thickness | | | Depth | |
|---|---|---|---|---|---|---|
| | | m | (ft) | | m | (ft) |
| | Soil | 0.3 | (1.0) | | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | 'Clayey' pebbly sand, 'clayey' at top. Gravel: fine, subrounded to well rounded quartz and quartzite, with subangular chert and some rounded sandstone. Sand: medium, subangular to rounded quartz and rock fragments. | 2.9 | (9.5) | | 3.2 | (10.5) |
| Rhaetic | Mudstone, dark grey, with pyrite cubes. | 1.3+ | (4.5+) | | 4.5 | (15.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 11 | +16 | : | 2 |
| | | -16+4 | : | 9 |
| | | -4+1 | : | 5 |
| Sand | 79 | -1+¼ | : | 58 |
| | | -¼+1/16 | : | 16 |
| Fines | 10 | -1/16 | : | 10 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | 16 | 82 | 2 |
| 1.3 - 2.3 | 9 | 80 | 11 |
| 2.3 - 3.2 | 3 | 76 | 21 |

41

SK 86 NW 52     8349 6639     Mill Dam Dyke, North Scarle     Block E

Surface level (+6.4 m) +21 ft
Water level (+3.4 m) +11 ft
March 1972

Overburden 0.5 m (1.5 ft)
Mineral 6.2 m (20.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sand, medium subrounded to well rounded quartz and rock fragments, with occasional fine quartz and chert pebbles. | 2.0 | (6.5) | 2.5 | (8.0) |
| | (b) Sandy gravel Gravel: fine, subrounded to well rounded quartz and quartzite, with subangular chert, and some rounded sandstone. Sand: medium, subangular to rounded quartz and rock fragments. | 4.2 | (14.0) | 6.7 | (22.0) |
| Keuper Marl | Mudstone, red. | 1.3+ | (4.5+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 3 | +16 | : | 1 |
| | | -16+4 | : | 2 |
| | | -4+1 | : | 3 |
| Sand | 94 | -1+¼ | : | 70 |
| | | -¼+1/16 | : | 21 |
| Fines | 3 | -1/16 | : | 3 |
| (b) Gravel | 43 | +16 | : | 18 |
| | | -16+4 | : | 25 |
| | | -4+1 | : | 5 |
| Sand | 57 | -1+¼ | : | 36 |
| | | -¼+1/16 | : | 16 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.5 - 1.5 | 1 | 96 | 3 |
| 1.5 - 2.5 | 5 | 92 | 3 |
| 2.5 - 3.5 | trace | 58 | 42 |
| 3.5 - 4.5 | trace | 87 | 13 |
| 4.5 - 5.5 | trace | 32 | 68 |

SK 86 NW 53    8169 6655    Oak Doors, Girton    Block B

Surface level (+5.8 m) +19 ft                    Overburden 4.0 m (13.0 ft)
Water level (+1.8 m) +6 ft                       Mineral 6.0 m (19.5 ft)
March 1972                                       Bedrock 1.0 m +(3.5 ft+)

|  |  | Thickness | | | Depth | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | m | (ft) |  | m | (ft) |
| Alluvium | Silt, 2.5 m brown, slightly sandy silt on 1.5 m laminated dark grey silt with small gastropod shells and peat. | 4.0 | (13.0) |  | 4.0 | (13.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel, 'very clayey' and sandy at top. Gravel fine, subrounded to well rounded quartzite and quartz, with subrounded chert and some rounded sandstone. Sand: medium, subrounded to well rounded quartz and rock fragments. | 6.0 | (19.5) |  | 10.0 | (33.0) |
| Keuper Marl | Mudstone, red. | 1.0+ | (3.5+) |  | 11.0 | (36.0) |

| | % | mm | | % |
| --- | --- | --- | --- | --- |
| Gravel | 57 | +16 | : | 25 |
|  |  | -16+4 | : | 32 |
|  |  | -4+1 | : | 9 |
| Sand | 37 | $-1+\frac{1}{4}$ | : | 24 |
|  |  | $-\frac{1}{4}+1/16$ | : | 4 |
| Fines | 6 | -1/16 | : | 6 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
| --- | --- | --- | --- |
| 4.0 - 5.0 | 35 | 38 | 27 |
| 5.0 - 6.0 | trace | 45 | 55 |
| 6.0 - 7.0 | trace | 42 | 58 |
| 7.0 - 8.0 | 2 | 36 | 62 |
| 8.0 - 9.0 | trace | 25 | 75 |
| 9.0 - 10.0 | trace | 36 | 64 |

43

SK 86 NW 54    8400 6558    The Firs, North Scarle    Block E

Surface level (+7.6 m) +25 ft
Water level (+6.1 m) +20 ft
February 1972

Overburden 0.3 m (1.0 ft)
Mineral 3.4 m (11.0 ft)
Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | Pebbly sand. Gravel: fine, subrounded to rounded quartz, with subangular chert and rounded sandstone, and some sub-rounded mudstone. Sand: medium, subangular to rounded quartz and rock fragments. | 3.4 | (11.0) | 3.7 | (12.0) |
| Keuper Marl | Mudstone, red. | 1.0+ | (3.5+) | 4.7 | (15.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 10 | +16 | : | 2 |
| | | -16+4 | : | 8 |
| | | -4+1 | : | 7 |
| Sand | 87 | -1+¼ | : | 66 |
| | | -¼+1/16 | : | 14 |
| Fines | 3 | -1/16 | : | 3 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | 1 | 93 | 6 |
| 1.3 - 2.3 | 7 | 90 | 3 |
| 2.3 - 3.3 | trace | 81 | 19 |
| 3.3 - 3.7 | 1 | 92 | 7 |


SK 86 NW 55    8305 6545    Sand Lane, Besthorpe    Block D

Surface level (+9.1 m) +30 ft
Water level not recorded
March 1972

Overburden 0.4 m (1.5 ft)
Mineral 5.4 m (18.0 ft)
Bedrock 0.7 m+ (2.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | Pebbly sand. Sand: medium subrounded to well rounded quartz and rock fragments. Gravel: fine, rounded quartz and sandstone. | 5.4 | (18.0) | 5.8 | (19.0) |
| Keuper Marl | Mudstone, red and green. | 0.7+ | (2.5+) | 6.5 | (21.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 6 | +16 | : | 2 |
| | | -16+4 | : | 4 |
| | | -4+1 | : | 3 |
| Sand | 91 | -1+¼ | : | 70 |
| | | -¼+1/16 | : | 18 |
| Fines | 3 | -1/16 | : | 3 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 - 1.4 | 10 | 82 | 8 |
| 1.4 - 2.4 | 1 | 81 | 18 |
| 2.4 - 3.4 | trace | 97 | 3 |
| 3.4 - 4.4 | 2 | 94 | 4 |
| 4.4 - 5.0 | 3 | 97 | 0 |

SK 86 N<sup>w</sup> 56    8236 6576    Girton    Block B

Surface level (+5.2 m) +17 ft
Water level not recorded
March 1972

Overburden 2.1 m (7.0 ft)
Mineral 1.0 m (3.5 ft)
Waste 1.0 m (3.5 ft)
Mineral 3.1 m (10.0 ft)
Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown and grey, micaceous. | 2.1 | (7.0) | 2.1 | (7.0) |
| Older river sand and gravels (Floodplain Terrace) | (a) 'Clayey' sand Medium subrounded quartz and rock fragments. | 1.0 | (3.5) | 3.1 | (10.0) |
| | Sandy silt, light brown. | 1.0 | (3.5) | 4.1 | (13.5) |
| | (b) Gravel Gravel: fine to coarse, subrounded to well rounded quartz and quartzite, with subangular chert, and some rounded sandstone and igneous. Sand: medium, subangular to rounded quartz and rock fragments. | 3.1 | (10.0) | 7.2 | (23.5) |
| Keuper Marl | Mudstone, red and green. | 1.0+ | (3.5+) | 8.2 | (27.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | trace | +16 | : | 0 |
| | | –16+4 | : | trace |
| Sand | 89 | –4+1 | : | 1 |
| | | –1+¼ | : | 64 |
| | | –¼+1/16 | : | 24 |
| Fines | 11 | –1/16 | : | 11 |
| (b) Gravel | 55 | +16 | : | 30 |
| | | –16+4 | : | 25 |
| Sand | 45 | –4+1 | : | 8 |
| | | –1+¼ | : | 33 |
| | | –¼+1/16 | : | 4 |
| Fines | trace | –1/16 | : | trace |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 2.1 – 3.1 | 11 | 89 | trace |
| 4.1 – 5.1 | trace | 39 | 61 |
| 5.1 – 6.1 | 1 | 37 | 62 |
| 6.1 – 7.2 | trace | 57 | 43 |

SK 86 NW 57    8090 6562    Spring Head, Meering, Besthorpe    Block B

Surface level (+6.4 m) +21 ft                    Overburden 5.3 m (17.5 ft)
Water level (+3.0 m) +10 ft                      Mineral 2.7 m (9.0 ft)
March 1972                                       Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, 3.0 m of brown, slightly sandy silt on 2.3 m dark grey micaceous silt. | 5.3 | (17.5) | 5.3 | (17.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel, becoming more sandy near base. Gravel: fine to coarse, well rounded quartz and quartzite, with subangular chert and flint, and some rounded sandstone and igneous pebbles. Sand: medium, rounded quartz and rock fragments. | 2.7 | (9.0) | 8.0 | (26.0) |
| Keuper Marl | Mudstone, green and red. | 1.0+ | (3.5+) | 9.0 | (29.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 58 | +16 | : | 28 |
| | | -16+4 | : | 30 |
| | | -4+1 | : | 9 |
| Sand | 42 | -1+¼ | : | 29 |
| | | -¼+1/16 | : | 4 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 5.3 - 6.3 | trace | 37 | 63 |
| 6.3 - 7.3 | trace | 35 | 65 |
| 7.3 - 8.0 | trace | 59 | 41 |

SK 86 NE 4     8545 6951     Wigsley Airfield     Block E

Surface level (+8.5 m) +28 ft
Water level (+5.8 m) +19 ft
January 1972

Overburden 0.4 m (1.5 ft)
Mineral 0.9 m (3.0 ft)
Waste 1.7 m (5.5 ft)
Mineral 4.8 m (16.0 ft)
Bedrock 1.7 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Pebbly sand<br>Gravel: fine to coarse, subrounded to rounded quartz and quartzite, with subangular chert.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 0.9 | (3.0) | 1.3 | (4.5) |
| | Clay, light brown | 1.7 | (5.5) | 3.0 | (10.0) |
| | (b) Pebbly sand<br>Sand: medium, subrounded quartz and rock fragments.<br>Gravel: trace amounts of fine rounded quartz and quartzite and subangular chert. | 3.0 | (10.0) | 6.0 | (19.5) |
| | (c) Gravel, 'clayey' below 7.0 m (23.0 ft)<br>Gravel: fine to coarse angular to well rounded quartz and quartzite; with subangular chert.<br>Sand: medium, subrounded quartz and rock fragments.<br>Fines: brown | 1.8 | (6.0) | 7.8 | (25.5) |
| Lower Lias | Mudstone, dark grey | 1.7+ | (5.5+) | 9.5 | (31.0) |

| | % | mm | | % | | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 8 | +16 | : | 4 | | 0.4 – 1.3 | 8 | 84 | 8 |
| | | –16+4 | : | 4 | | | | | |
| | | –4+1 | : | 4 | | | | | |
| Sand | 84 | –1+¼ | : | 46 | | | | | |
| | | –¼+1/16 | : | 34 | | | | | |
| Fines | 8 | –1/16 | : | 8 | | | | | |
| (b) Gravel | 5 | +16 | : | 3 | | 3.0 – 4.0 | 1 | 97 | 2 |
| | | –16+4 | : | 2 | | 4.0 – 5.0 | 3 | 96 | 1 |
| | | | | | | 5.0 – 6.0 | trace | 88 | 12 |
| | | –4+1 | : | 3 | | | | | |
| Sand | 94 | –1+¼ | : | 66 | | | | | |
| | | –¼+1/16 | : | 25 | | | | | |
| Fines | 1 | –1/16 | : | 1 | | | | | |
| (c) Gravel | 68 | +16 | : | 36 | | 6.0 – 7.0 | trace | 21 | 79 |
| | | –16+4 | : | 32 | | 7.0 – 7.8 | 16 | 30 | 54 |
| | | –4+1 | : | 9 | | | | | |
| Sand | 25 | –1+¼ | : | 12 | | | | | |
| | | –¼+1/16 | : | 4 | | | | | |
| Fines | 7 | –1/16 | : | 7 | | | | | |

47

SK 86 NE 5     8647 6945     Wigsley Airfield     Block E

Surface level (+7.0 m) +23 ft
Water level not recorded
January 1972

Overburden 0.1 m (0.5 ft)
Mineral 8.0 m (26.0 ft)
Bedrock 1.4 m + (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.1 | (0.5) | 0.1 | (0.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sand, 'clayey' at top. Medium, subangular to subrounded quartz and rock fragments, with a little fine gravel. | 2.6 | (8.5) | 2.7 | (9.0) |
| | (b) Gravel, sandy in upper part. Gravel: fine, subangular to rounded quartz and quartzite, with subangular chert. Sand: medium, subangular to rounded quartz chert and rock fragments. | 5.4 | (18.0) | 8.1 | (26.5) |
| Lower Lias | Mudstone, dark grey. | 1.4+ | (4.5+) | 9.5 | (31.0) |

| | % | mm | | % | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 3 | +16 | : | 0 | 0.1 - 1.1 | 12 | 86 | 2 |
| | | -16+4 | : | 3 | 1.1 - 2.1 | 1 | 96 | 3 |
| | | | | | 2.1 - 2.7 | 9 | 87 | 4 |
| | | -4+1 | : | 6 | | | | |
| Sand | 90 | -1+¼ | : | 49 | | | | |
| | | -¼+1/16 | : | 35 | | | | |
| Fines | 7 | -1/16 | : | 7 | | | | |
| (b) Gravel | 54 | +16 | : | 25 | 2.7 - 3.7 | 1 | 67 | 32 |
| | | -16+4 | : | 29 | 3.7 - 4.7 | trace | 71 | 29 |
| | | | | | 4.7 - 5.7 | trace | 30 | 70 |
| | | -4+1 | : | 9 | 5.7 - 6.7 | 2 | 35 | 63 |
| Sand | 45 | -1+¼ | : | 27 | 6.7 - 7.7 | trace | 34 | 66 |
| | | -¼+1/16 | : | 9 | 7.7 - 8.1 | trace | 22 | 78 |
| Fines | 1 | -1/16 | : | 1 | | | | |

SK 86 NE 6    8742 6946    Corner Farm, Swinethorpe    Block E

Surface level (+6.1 m) +20 ft
Water level not recorded
January 1972

Overburden 0.3 m (1.0 ft)
Mineral 1.0 m (3.5 ft)
Waste 1.4 m (4.5 ft)
Mineral 8.2 m (27.0 ft)
Bedrock 1.1 m+(3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sand Fine well rounded quartz chert and rock fragments, with few fine quartz and chert pebbles. | 1.0 | (3.5) | 1.3 | (4.5) |
| | Silty clay, laminated red, brown and grey. | 1.4 | (4.5) | 2.7 | (9.0) |
| | (b) Pebbly sand Gravel: well rounded quartz and sandstone, with subangular chert. Sand: medium, well rounded quartz coal and rock fragments. | 3.0 | (10.0) | 5.7 | (18.5) |
| | (c) Gravel, sandy near base. Gravel: fine to coarse, well rounded quartz and quartzite, with rounded sandstone and subangular chert and flint. Sand: medium, subrounded to well rounded quartz and rock fragments. | 5.2 | (17.0) | 10.9 | (36.0) |
| Lower Lias | Mudstone and shelly limestone; dark grey | 1.1+ | (3.5+) | 12.0 | (39.5) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 2 | +16 | : | 0 | 0.3 - 1.3 | 6 | 92 | 2 |
| | | -16+4 | : | 2 | | | | |
| Sand | 92 | -4+1 | : | 6 | | | | |
| | | -1+¼ | : | 32 | | | | |
| | | -¼+1/16 | : | 54 | | | | |
| Fines | 6 | -1/16 | : | 6 | | | | |
| (b) Gravel | 9 | +16 | : | 2 | 2.7 - 3.7 | 1 | 93 | 6 |
| | | -16+4 | : | 7 | 3.7 - 4.7 | trace | 87 | 13 |
| | | | | | 4.7 - 5.7 | trace | 92 | 8 |
| Sand | 91 | -4+1 | : | 6 | | | | |
| | | -1+¼ | : | 67 | | | | |
| | | -¼+1/16 | : | 18 | | | | |
| Fines | trace | -1/16 | : | trace | | | | |
| (c) Gravel | 54 | +16 | : | 23 | 5.7 - 6.7 | trace | 41 | 59 |
| | | -16+4 | : | 31 | 6.7 - 7.7 | trace | 40 | 60 |
| | | | | | 7.7 - 8.7 | trace | 38 | 62 |
| Sand | 46 | -4+1 | : | 9 | 8.7 - 9.7 | trace | 38 | 62 |
| | | -1+¼ | : | 34 | 9.7 - 10.9 | trace | 67 | 33 |
| | | -¼+1/16 | : | 3 | | | | |
| Fines | trace | -1/16 | : | trace | | | | |

49

SK 86 NE 7    8539 6843    Cotcher Plot, North Scarle    Block E

Surface level (+6.7 m) +22 ft                  Overburden 0.3 m (1.0 ft)
Water level (+5.2 m) +17 ft               Mineral 6.2 m (20.5 ft)
February 1972                           Bedrock 1.5 m+ (5.0 ft+)

|  |  | Thickness | | Depth | |
| --- | --- | --- | --- | --- | --- |
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel<br>   Gravel: fine to coarse subangular to well<br>      rounded quartz and quartzite, with<br>      subangular chert, and some subangular<br>      coal.<br>   Sand: medium, subangular to rounded<br>      quartz, chert and rock fragments. | 6.2 | (20.5) | 6.5 | (21.5) |
| Rhaetic | Mudstone, light grey. | 1.5+ | (5.0+) | 8.0 | (26.0) |

|  | % | mm |  | % | Depth below surface (m) | Percentage | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | Fines | Sand | Gravel |
| Gravel | 39 | +16 | : | 16 | 0.3 – 1.3 | trace | 91 | 9 |
|  |  | −16+4 | : | 23 | 1.3 – 2.3 | trace | 76 | 24 |
|  |  |  |  |  | 2.3 – 3.3 | trace | 65 | 35 |
|  |  | −4+1 | : | 7 | 3.3 – 4.3 | 1 | 57 | 42 |
| Sand | 61 | −1+¼ | : | 47 | 4.3 – 5.3 | 1 | 43 | 56 |
|  |  | −¼+1/16 | : | 7 | 5.3 – 6.5 | trace | 40 | 60 |
| Fines | trace | −1/16 | : | trace |  |  |  |  |

50

SK 86 NE 8    8645 6864    New Farm, North Scarle    Block E

Surface level (+7.3 m) +24 ft  
Water level (+4.6 m) +15 ft  
January 1972

Overburden 0.4 m (1.5 ft)  
Mineral 1.2 m (4.0 ft)  
Waste 1.0 m (3.5 ft)  
Mineral 4.0 m (13.0 ft)  
Bedrock 1.4 m+ (4.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sand Fine, subangular to well rounded quartz and quartzite, with subangular chert and rock fragments, and few rounded quartz pebbles. | 1.2 | (4.0) | 1.6 | (5.0) |
|  | Clay, light brown | 1.0 | (3.5) | 2.6 | (8.5) |
|  | (b) Gravel Gravel: fine to coarse, subrounded to rounded quartz and quartzite, with subangular chert and flint. Sand: medium, subangular to rounded quartz and rock fragments. | 4.0 | (13.0) | 6.6 | (21.5) |
| Lower Lias | Mudstone, dark grey. | 1.4+ | (4.5+) | 8.0 | (26.0) |

|  | % | mm |  | % |
|---|---|---|---|---|
| (a) Gravel | 1 | +16 | : | 0 |
|  |  | -16+4 | : | 1 |
| Sand | 93 | -4+1 | : | 5 |
|  |  | =1+$\frac{1}{4}$ | : | 36 |
|  |  | -$\frac{1}{4}$+1/16 | : | 52 |
| Fines | 6 | -1/16 | : | 6 |
| (b) Gravel | 52 | +16 | : | 23 |
|  |  | -16+4 | : | 29 |
| Sand | 48 | -4+1 | : | 8 |
|  |  | -1+$\frac{1}{4}$ | : | 35 |
|  |  | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.4 – 1.6 | 6 | 93 | 1 |
| 2.6 – 3.6 | trace | 50 | 50 |
| 3.6 – 4.6 | trace | 47 | 53 |
| 4.6 – 5.6 | trace | 39 | 61 |
| 5.6 – 6.6 | trace | 56 | 44 |

SK 86 NE 9     8988 6814     Pickworths Plot, Eagle     Block H

Surface level (+29.0 m) +95 ft
Water not encountered
January 1972

Overburden 0.3 m (1.0 ft)
Mineral 1.0 m (3.0 ft)
Waste 2.5 m (8.0 ft)
Bedrock 1.4 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Glacial Sand and Gravel (Hilton Terrace) | 'Very clayey' sandy gravel<br>Gravel: fine, angular to rounded quartz and quartzite, with subangular flint and chert, and some rounded sandstone.<br>Sand: medium, angular to rounded quartz and rock fragments. | 1.0 | (3.5) | 1.3 | (4.5) |
| | Sandy gravelly silt.<br>Gravel: fine, angular to rounded quartz, quartzite and sandstone.<br>Sand: medium, angular to rounded quartz and rock fragments.<br>Silt: light brown. | 1.0 | (3.5) | 2.3 | (7.5) |
| | 'Very clayey' sandy gravel as above. | 0.5 | (1.5) | 2.8 | (9.0) |
| | Silt, brown, occasionally clayey. | 1.0 | (3.5) | 3.8 | (12.5) |
| Lower Lias | Mudstone, dark grey, fossiliferous. | 1.4+ | (4.5+) | 5.2 | (17.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 4 | +16 | : | 1 |
| | | −16+4 | : | 3 |
| | | −4+1 | : | 3 |
| Sand | 58 | −1+¼ | : | 33 |
| | | −¼+1/16 | : | 22 |
| Fines | 38 | −1/16 | : | 38 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 – 1.3 | 38 | 58 | 4 |

52

SK 86 NE 10     8932 6826     Moor Farm, Eagle Moor     Block H

Surface level (+31.4 m) +103 ft          Overburden 1.7 m (5.5 ft)
Water level not recorded                 Mineral 4.3 m (14.0 ft)
January 1972                             Waste 0.7 m (2.5 ft)
                                         Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.6 | (2.0) | 0.6 | (2.0) |
| Glacial sand and gravel (Hilton Terrace) | (a) 'Clayey' pebbly sand. Gravel: fine to coarse, subrounded to well rounded quartz and quartzite, with subangular flint and rounded sandstone. Sand: medium, subangular to rounded quartz and rock fragments. | 0.7 | (2.5) | 1.3 | (4.5) |
| | Clay, grey. | 0.4 | (1.5) | 1.7 | (5.5) |
| | (b) Pebbly sand Gravel: fine to coarse, subangular to rounded quartz and quartzite, with subangular chert and flint; and some rounded igneous rock. Sand: medium, angular to rounded quartz and rock fragments and subangular chert. | 4.3 | (14.0) | 6.0 | (19.5) |
| | Clay, brown and grey. | 0.7 | (2.5) | 6.7 | (22.0) |
| Lower Lias | Mudstone and limestone, dark grey. | 1.0+ | (3.5+) | 7.7 | (25.5) |

| | % | mm | | % | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 20 | +16 | : | 8 | 0.6 – 1.3 | 10 | 70 | 20 |
| | | –16+4 | : | 12 | | | | |
| | | –4+1 | : | 6 | | | | |
| Sand | 70 | –1+¼ | : | 55 | | | | |
| | | –¼+1/16 | : | 9 | | | | |
| Fines | 10 | –1/16 | : | 10 | | | | |
| (b) Gravel | 21 | +16 | : | 8 | 1.7 – 2.7 | 11 | 78 | 11 |
| | | –16+4 | : | 13 | 2.7 – 3.7 | 6 | 72 | 22 |
| | | | | | 3.7 – 4.7 | 1 | 71 | 28 |
| | | –4+1 | : | 10 | 4.7 – 5.7 | trace | 81 | 19 |
| Sand | 75 | –1+¼ | : | 59 | 5.7 – 6.0 | trace | 57 | 43 |
| | | –¼+1/16 | : | 6 | | | | |
| Fines | 4 | –1/16 | : | 4 | | | | |

SK 86 NE 11    8850 6814    The Jungle, Eagle    Block H

Surface level (+31.4 m)  +103 ft
Water level not recorded
February 1972

Overburden 0.3 m (1.0 ft)
Mineral 3.0 m (10.0 ft)
Waste 1.6 m (5.5 ft)
Bedrock 1.6 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Glacial sand and gravel (Hilton Terrace) | Sandy gravel<br>Gravel: fine, subangular to rounded quartz and quartzite, with subangular to rounded chert.<br>Sand: medium, subangular to surrounded quartz, chert and rock fragments. | 3.0 | (10.0) | 3.3 | (11.0) |
| | Clay, light brown. | 1.6 | (5.5) | 4.9 | (16.0) |
| Lower Lias | Mudstone, grey | 1.6+ | (5.5+) | 6.5 | (21.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 30 | +16 | : | 9 |
| | | -16+4 | : | 21 |
| | | -4+1 | : | 10 |
| Sand | 69 | -1+$\frac{1}{4}$ | : | 52 |
| | | -$\frac{1}{4}$+1/16 | : | 7 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | trace | 60 | 40 |
| 1.3 - 2.3 | 1 | 83 | 16 |
| 2.3 - 3.3 | 1 | 67 | 32 |

SK 86 NE 12　　8833 6770　　Eagle Moor　　Block H

Surface level (+31.4 m) +103 ft
Water level not recorded
January 1972

Overburden 0.7 m (2.5 ft)
Mineral 5.0 m (16.5 ft)
Bedrock 2.3 m+(7.5 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | Soil | 0.7 | (2.5) | 0.7 | (2.5) |
| Glacial sand and gravel (Hilton Terrace) | Gravel, 'clayey' andsandy at top.　Gravel: fine to coarse, subrounded to well rounded quartz and subangular flint and chert with rounded igneous rock, sandstone and mudstone.　Sand: medium, subangular to rounded quartz and rock fragments. | 5.0 | (16.5) | 5.7 | (18.5) |
| Keuper Marl | Mudstone, dark grey. | 2.3+ | (7.5+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 58 | +16 | : | 28 |
| | | −16+4 | : | 30 |
| | | −4+1 | : | 10 |
| Sand | 38 | −1+¼ | : | 24 |
| | | −¼+1/16 | : | 4 |
| Fines | 4 | −1/16 | : | 4 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.7 − 1.7 | 12 | 46 | 42 |
| 1.7 − 2.7 | 2 | 25 | 73 |
| 2.7 − 3.7 | 2 | 30 | 68 |
| 3.7 − 4.7 | 3 | 41 | 56 |
| 4.7 − 5.7 | trace | 47 | 53 |


SK 86 NE 13　　8793 6737　　Eagle　　Block H

Surface level (+30.8 m) +101 ft
Water level not recorded
January 1972

Overburden 0.3 m (1.0 ft)
Mineral 4.1 m (13.5 ft)
Bedrock 3.1 m+ (10.0 ft+)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Glacial sand and gravel (Hilton Terrace) | Gravel 'clayey' and sandier at top.　Gravel: coarse, subrounded to well rounded quartz and quartzite, with subangular flint and chert.　Sand: medium, subangular to well rounded quartz and rock fragments.　Fines: brown. | 4.1 | (13.5) | 4.4 | (14.5) |
| Lower Lias | Mudstone, dark grey, silty at first. | 3.1+ | (10.0+) | 7.5 | (24.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 52 | +16 | : | 33 |
| | | −16+4 | : | 19 |
| | | −4+1 | : | 7 |
| Sand | 43 | −1+¼ | : | 30 |
| | | −¼+1/16 | : | 6 |
| Fines | 5 | −1/16 | : | 5 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 − 1.7 | 13 | 81 | 6 |
| 1.7 − 2.7 | trace | 23 | 77 |
| 2.7 − 3.7 | 2 | 23 | 75 |
| 3.7 − 4.4 | trace | 25 | 75 |

55

SK 86 NE 14     8668 6762     The Poplars, Eagle     Block E

Surface level (+8.5 m) +28 ft                    Waste 2.5 m (8.0 ft)
Water not encountered                            Bedrock 1.5 m+ (5.0 ft+)
January 1972

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| | Clay, light brown | 1.9 | (6.0) | 2.2 | (7.0) |
| Older river sands and gravels (Floodplain Terrace) | 'Clayey' sandy gravel<br>  Gravel: coarse, subrounded to well<br>    rounded quartz and quartzite, with<br>    subangular chert.<br>  Sand: medium, subangular to rounded<br>    quartz and rock fragments, with<br>    subangular chert. | 0.3 | (1.0) | 2.5 | (8.0) |
| Lower Lias | Mudstone, grey. | 1.5+ | (5.0+) | 4.0 | (13.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 22 | +16 | : | 14 |
| | | -16+4 | : | 8 |
| | | -4+1 | : | 5 |
| Sand | 61 | -1+$\frac{1}{4}$ | : | 30 |
| | | -$\frac{1}{4}$+1/16 | : | 26 |
| Fines | 17 | -1/16 | : | 17 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 2.2 - 2.5 | 17 | 61 | 22 |

SK 86 NE 15     8578 6726     North Scarle     Block E

Surface level (+9.5 m) +31 ft
Water level (+6.7 m) +22 ft
January 1972

Overburden 0.1 m (0.5 ft)
Mineral 4.0 m (13.0 ft)
Bedrock 1.4 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.1 | (0.5) | 0.1 | (0.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sandy gravel<br>  Gravel: fine, subangular to rounded quartz and quartzite, with subangular chert.<br>  Sand: medium, subangular to rounded quartz and rock fragments. | 1.9 | (6.0) | 2.0 | (6.5) |
| | (b) Gravel<br>  Gravel: coarse, subangular to rounded quartz and quartzite, with angular to rounded chert and flint.<br>  Sand: medium, angular to subrounded quartz and rock fragments. | 2.1 | (7.0) | 4.1 | (13.5) |
| Lower Lias | Mudstone, grey. | 1.4+ | (4.5+) | 5.5 | (18.0) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| (a) Gravel | 26 | +16 | : | 9 | 0.1 – 1.1 | trace | 76 | 24 |
| | | −16+4 | : | 17 | 1.1 – 2.0 | trace | 72 | 28 |
| | | −4+1 | : | 10 | | | | |
| Sand | 74 | −1+¼ | : | 61 | | | | |
| | | −¼+1/16 | : | 3 | | | | |
| Fines | trace | −1/16 | : | trace | | | | |
| (b) Gravel | 61 | +16 | : | 37 | 2.0 – 3.0 | 4 | 38 | 58 |
| | | −16+4 | : | 24 | 3.0 – 4.1 | 4 | 32 | 64 |
| | | −4+1 | : | 7 | | | | |
| Sand | 35 | −1+¼ | : | 24 | | | | |
| | | −¼+1/16 | : | 4 | | | | |
| Fines | 4 | −1/16 | : | 4 | | | | |

SK 86 NE 16     8542 6655     Clog Bridge, North Scarle     Block E

Surface level (+10.1 m) +33 ft                     Overburden 0.6 m (2.0 ft)
Water level variable                               Mineral 6.0 m (19.5 ft)
February 1972                                      Bedrock 1.4 m+ (4.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.6 | (2.0) | 0.6 | (2.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subangular to rounded quartz and quartzite, with subangular to rounded chert and flint. Sand: medium, angular to subrounded quartz, chert and rock fragments. | 6.0 | (19.5) | 6.6 | (21.5) |
| Lower Lias | Mudstone, dark grey. | 1.4+ | (4.5+) | 8.0 | (26.0) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| Gravel | 57 | +16 | : | 30 | 0.6 - 1.6 | 5 | 46 | 49 |
|  |  | -16+4 | : | 27 | 1.6 - 2.6 | 3 | 50 | 47 |
|  |  |  |  |  | 2.6 - 4.0 | 4 | 58 | 38 |
|  |  | -4+1 | : | 9 | 4.0 - 5.0 | trace | 32 | 68 |
| Sand | 40 | -1+$\frac{1}{4}$ | : | 28 | 5.0 - 6.0 | trace | 18 | 82 |
|  |  | -$\frac{1}{4}$+1/16 | : | 3 | 6.0 - 6.6 | 2 | 32 | 66 |
| Fines | 3 | -1/16 | : | 3 |  |  |  |  |

58

SK 86 NE 17    8932 6701    Aspen House, Eagle    Block G

Surface level (+14.6 m) + 48 ft          Overburden 3.0 m (10.0 ft)
Water level (+12.5 m) +41 ft             Mineral 6.6 m (21.5 ft)
January 1972                             Bedrock 1.4 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Older river sands and gravels (Beeston Terrace) | (a) Sandy gravel<br>Gravel: fine, subangular to rounded quartz and quartzite, with subangular to rounded chert.<br>Sand: medium, subangular to rounded quartz and rock fragments, with subangular chert. | 0.8 | (2.5) | 1.0 | (3.5) |
| | Gravelly silt, brown mottled, with scattered rounded quartz pebbles. | 2.0 | (6.5) | 3.0 | (10.0) |
| | (b) Gravel<br>Gravel: fine to coarse, subangular to rounded quartz and quartzite, with subangular to rounded chert.<br>Sand: medium, angular to subrounded quartz, chert and rock fragments. | 6.6 | (21.5) | 9.6 | (31.5) |
| Lower Lias | Mudstone, dark grey. | 1.4+ | (4.5+) | 11.0 | (36.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 46 | +16 | : | 14 |
| | | -16+4 | : | 32 |
| | | -4+1 | : | 15 |
| Sand | 49 | -1+$\frac{1}{4}$ | : | 23 |
| | | -$\frac{1}{4}$+1/16 | : | 11 |
| Fines | 5 | -1/16 | : | 5 |
| (b) Gravel | 57 | +16 | : | 27 |
| | | -16+4 | : | 30 |
| | | -4+1 | : | 11 |
| Sand | 42 | -1+$\frac{1}{4}$ | : | 26 |
| | | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.2 - 1.0 | 5 | 49 | 46 |
| 3.0 - 4.0 | trace | 37 | 63 |
| 4.0 - 5.0 | trace | 44 | 56 |
| 5.0 - 6.0 | trace | 38 | 62 |
| 6.0 - 7.0 | trace | 32 | 68 |
| 7.0 - 8.0 | trace | 24 | 76 |
| 8.0 - 9.0 | trace | 66 | 34 |
| 9.0 - 9.6 | trace | 33 | 67 |

SK 86 NE 18     9000 6600     Eagle Lane, Thorpe     Block G

Surface level (+ 14.3 m) +47 ft
Water level (+13.1 m) +43 ft
January 1972

Overburden 0.4 m (1.5 ft)
Mineral 8.6 m (28.0 ft)
Waste 0.4 m (1.5 ft)
Mineral 1.4 m (4.5 ft)
Bedrock 1.7 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Beeston Terrace) | (a) Gravel, sandier at top. Gravel: fine to coarse, subangular to well rounded quartz and quartzite with subangular to rounded chert. Sand: medium, subangular to rounded quartz, chert and rock fragments. | 8.6 | (28.0) | 9.0 | (29.5) |
| | Clay, dark and light grey, laminated. | 0.4 | (1.5) | 9.4 | (31.0) |
| | (b) Gravel Gravel: coarse, angular to well rounded quartz and quartzite, with subangular chert. Sand: medium, subangular to rounded quartz and rock fragments, with subangular chert. | 1.4 | (4.5) | 10.8 | (35.5) |
| Lower Lias | Mudstone, dark grey. | 1.7+ | (5.5+) | 12.5 | (41.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 55 | +16 | : | 28 |
| | | –16+4 | : | 27 |
| | | –4+1 | : | 9 |
| Sand | 44 | –1+¼ | : | 31 |
| | | –¼+1/16 | : | 4 |
| Fines | 1 | –1/16 | : | 1 |
| (b) Gravel | 62 | +16 | : | 36 |
| | | –16+4 | : | 26 |
| | | –4+1 | : | 8 |
| Sand | 37 | –1+¼ | : | 26 |
| | | –¼+1/16 | : | 3 |
| Fines | 1 | –1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 – 1.4 | trace | 58 | 42 |
| 1.4 – 2.4 | 2 | 50 | 48 |
| 2.4 – 3.4 | 1 | 47 | 52 |
| 3.4 – 4.4 | trace | 73 | 27 |
| 4.4 – 5.4 | 2 | 48 | 50 |
| 5.4 – 6.4 | 1 | 33 | 66 |
| 6.4 – 7.4 | trace | 30 | 70 |
| 7.4 – 8.4 | trace | 30 | 70 |
| 8.4 – 9.0 | trace | 29 | 71 |
| 9.4 – 10.8 | 1 | 37 | 62 |

SK 86 NE 19    8855 6655    Aspen House, Eagle    Block  G

Surface level (+13.1 m) +43 ft          Overburden 1.6 m (5.5 ft)
Water level  (+12.2 m) +40 ft           Mineral 6.1 m (20.0 ft)
January 1972                            Bedrock 1.8 m+ (6.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and | Silt, light grey, mottled yellow and black. | 1.3 | (4.5) | 1.6 | (5.5) |
| gravels (Beeston Terrace) | Gravel, sandier in upper part.  Gravel: fine to coarse subangular to well rounded quartz and quartzite, with subangular to rounded chert.  Sand: medium, subangular to rounded quartz chert and rock fragments. | 6.1 | (20.0) | 7.7 | (25.5) |
| Lower Lias | Mudstone, dark grey. | 1.8+ | (6.0+) | 9.5 | (31.0) |

| | % | mm | | % | Depth below surface (m) | Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| Gravel | 50 | +16 | : | 29 | 1.6 – 2.6 | trace | 54 | 46 |
| | | −16+4 | : | 21 | 2.6 – 3.6 | trace | 59 | 41 |
| | | | | | 3.6 – 4.9 | trace | 90 | 10 |
| | | −4+1 | : | 8 | 4.9 – 5.9 | trace | 26 | 74 |
| Sand | 50 | −1+¼ | : | 40 | 5.9 – 6.9 | trace | 26 | 74 |
| | | −¼+1/16 | : | 2 | 6.9 – 7.7 | 0 | 51 | 49 |
| Fines | trace | −1/16 | : | trace | | | | |

*(The "Percentage" heading spans the Fines, Sand, and Gravel columns.)*

61

SK 86 NE 20    8772 6603    Durham Castle, Eagle    Block  G

Surface level (+14. 3 m) +47 ft
Water level (+12.5 m) +41 ft
January 1972

Overburden 0.5 m (1.5 ft)
Mineral 8.7 m (28.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

|  | | Thickness | | Depth | |
|---|---|---|---|---|---|
|  | | m | (ft) | m | (ft) |
|  | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Older river sands and gravels (Beeston Terrace) | Gravel<br>Gravel: fine to coarse, subangular to well rounded quartz and quartzite, with subangular to rounded chert.<br>Sand: medium, subangular to rounded quartz, chert and rockfragments. | 8.7 | (28.5) | 9.2 | (30.0) |
| Lower Lias | Mudstone and Limestone, grey, with Pecten, Gryphaea and Ostrea. | 1.3+ | (4.5+) | 10.5 | (34.5) |

|  | % | mm | | % | Depth below surface (m) | Percentage | | |
|---|---|---|---|---|---|---|---|---|
|  | | | | | | Fines | Sand | Gravel |
| Gravel | 57 | +16 | : | 26 | 0.5 - 1.5 | trace | 58 | 42 |
|  | | -16+4 | : | 31 | 1.5 - 2.5 | trace | 50 | 50 |
|  | | | | | 2.5 - 3.5 | trace | 29 | 71 |
|  | | -4+1 | : | 10 | 3.5 - 4.5 | trace | 40 | 60 |
| Sand | 42 | -1+¼ | : | 28 | 4.5 - 5.5 | trace | 36 | 64 |
|  | | -¼+1/16 | : | 4 | 5.5 - 6.5 | trace | 46 | 54 |
|  | | | | | 6.5 - 7.5 | trace | 53 | 47 |
| Fines | 1 | -1/16 | : | 1 | 7.5 - 9.2 | 3 | 33 | 64 |

SK 86 NE 21      8521  6531      Clay Farm, North Scarle      Block E

Surface level (+10.7 m) +35 ft                    Overburden 0.3 m (1.0 ft)
Water level (+8.8 m) +29 ft                       Mineral 4.9 m (16.0 ft)
February 1972                                     Bedrock 1.3 m+ (4.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel<br>　　Gravel: fine, subangular to well rounded<br>　　　quartz and quartzite, with subangular<br>　　　to rounded chert and rounded sandstone.<br>　　Sand: medium, angular to subrounded<br>　　　quartz and rock fragments. | 4.9 | (16.0) | 5.2 | (17.0) |
| Lower Lias | Mudstone, dark grey. | 1.3+ | (4.5+) | 6.5 | (21.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 33 | +16 | : | 12 |
|  |  | −16+4 | : | 21 |
|  |  | −4+1 | : | 14 |
| Sand | 62 | −1+¼ | : | 40 |
|  |  | −¼+1/16 | : | 8 |
| Fines | 5 | −1/16 | : | 5 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 0.3 − 1.3 | 7 | 68 | 25 |
| 1.3 − 2.3 | 3 | 63 | 34 |
| 2.3 − 3.5 | 10 | 74 | 16 |
| 3.5 − 4.5 | trace | 52 | 48 |
| 4.5 − 5.2 | trace | 44 | 56 |

SK 86 NE 22      8709 6556      Eagle Hall, Eagle      Block G

Surface level (+12.5 m) +41 ft

Water level not recorded

March 1972

Overburden 0.9 m (3.0 ft)

Mineral 4.0 m (13.0 ft)

Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Made ground | 0.2 | (0.5) | 0.2 | (0.5) |
| Older river sands and gravels (Beeston Terrace) | Silt, brown | 0.7 | (2.5) | 0.9 | (3.0) |
| | 'Clayey' gravel, less gravelly above 2.9 m (9.5 ft) Gravel: fine to coarse, rounded quartz and quartzite, with subangular flint and chert, and some rounded igneous and siltstone. Sand: medium, subrounded to rounded quartz and rock fragments. | 4.0 | (13.0) | 4.9 | (16.0) |
| Lower Lias | Mudstone, grey, fossiliferous. | 1.0+ | (3.5+) | 5.9 | (19.5) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| Gravel | 49 | +16 | : | 22 | 0.9 - 1.9 | 17 | 51 | 32 |
| | | -16+4 | : | 27 | 1.9 - 2.9 | 21 | 51 | 28 |
| | | | | | 2.9 - 3.9 | 2 | 32 | 66 |
| | | -4+1 | : | 7 | 3.9 - 4.9 | 2 | 26 | 72 |
| Sand | 40 | -1+$\frac{1}{4}$ | : | 27 | | | | |
| | | -$\frac{1}{4}$+1/16 | : | 6 | | | | |
| Fines | 11 | -1/16 | : | 11 | | | | |

SK 86 NE 23     8803 6502     Southern Lane, Eagle Barnsdale     Block G

Surface level (+12.8 m) +42 ft                          Overburden 0.3 m (1.0 ft)
Water level (+11.3 m) +37 ft                            Mineral 4.7 m (15.5 ft)
February 1972                                           Bedrock 2.0 m+ (6.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Beeston Terrace) | Gravel 'clayey' at top. Gravel: coarse, subangular to well rounded quartz and quartzite, with subangular chert and flint, and some rounded siltstone and angular fossil shell fragments. Sand: medium, subangular to rounded quartz and rock fragments. | 4.7 | (15.5) | 5.0 | (16.5) |
| Lower Lias | Limestone and Mudstone, dark grey. | 2.0+ | (6.5+) | 7.0 | (23.0) |

| | % | mm | | % | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| | | +64 | : | 4 | 0.3 - 0.6 | 11 | 65 | 24 |
| Gravel | 63 | -64+16 | : | 22 | 0.6 - 1.6 | 2 | 31 | 67 |
| | | -16+4 | : | 37 | 1.6 - 2.6 | 2 | 29 | 69 |
| | | | | | 2.6 - 3.2 | 1 | 45 | 54 |
| | | -4+1 | : | 10 | 3.2 - 4.2 | 2 | 34 | 74 |
| Sand | 34 | $-1+\frac{1}{4}$ | : | 20 | 4.2 - 5.0 | 3 | 35 | 62 |
| | | $-\frac{1}{4}+1/16$ | : | 4 | | | | |
| Fines | 3 | -1/16 | : | 3 | | | | |

SK 86 NE 24    8872 6555    Whitewell Farm, Eagle Barnsdale    Block G

Surface level (+16.5 m) +54 ft                 Overburden 0.4 m (1.5 ft)
Water level (+15.5 m) +51 ft                   Mineral 2.0 m (6.5 ft)
March 1972                                      Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older sands and gravels (Beeston Terrace) | 'Clayey' gravel<br>Gravel: fine, subrounded to well rounded quartz and quartzite, with subangular chert and some rounded sandstone.<br>Sand: medium, subrounded to well rounded quartz and rock fragments. | 2.0 | (6.5) | 2.4 | (8.0) |
| Lower Lias | Mudstone, dark grey. | 1.0+ | (3.5+) | 3.4 | (11.0) |

| | % | mm | | % | Depth below surface (m) | Percentage | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Fines | Sand | Gravel |
| Gravel | 52 | +16 | : | 22 | 0.4 - 1.4 | 19 | 35 | 46 |
| | | -16+4 | : | 30 | 1.4 - 2.4 | 6 | 37 | 57 |
| | | -4+1 | : | 8 | | | | |
| Sand | 36 | -1+¼ | : | 20 | | | | |
| | | -¼+1/16 | : | 8 | | | | |
| Fines | 12 | -1/16 | : | 12 | | | | |

SK 86 SW 41     8017 6492     The Rhymes, Sutton-on-Trent     Block A

Surface level (+7.6 m) +25 ft                    Overburden 0.3 m (1.0 ft)
Water level (+6.4 m) +21 ft                      Mineral 5.6 m (18.5 ft)
January 1972                                      Bedrock 1.6 m+ (5.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel. More sandy at top and base. Gravel: fine to coarse, subrounded to rounded quartz and quartzite, with subangular chert. Sand: medium, subangular to rounded quartz and rockfragments. | 5.6 | (18.5) | 5.9 | (19.5) |
| Keuper Marl | Mudstone, red. | 1.6+ | (5.5+) | 7.5 | (24.5) |

|  | % | mm | | % |  | Depth below surface (m) | Percentage | | |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | Fines | Sand | Gravel |
| Gravel | 45 | +16 | : | 21 |  | 0.3 - 1.3 | trace | 72 | 28 |
|  |  | -16+4 | : | 24 |  | 1.3 - 2.3 | 1 | 50 | 49 |
|  |  |  |  |  |  | 2.3 - 3.3 | 1 | 44 | 55 |
|  |  | -4+1 | : | 6 |  | 3.3 - 4.3 | trace | 40 | 60 |
| Sand | 54 | $-1+\frac{1}{4}$ | : | 37 |  | 4.3 - 5.3 | trace | 41 | 59 |
|  |  | $-\frac{1}{4}+1/16$ | : | 11 |  | 5.3 - 5.9 | 11 | 89 | trace |
| Fines | 1 | -1/16 | : | 1 |  |  |  |  |  |

SK 86 SW 42    8098 6492    The Rhymes, Sutton-on-Trent    Block C

Surface level (+5.8 m) +19 ft                     Overburden 1.8 m (6.0 ft)
Water level (+4.9 m) +16 ft                       Mineral 4.7 m (15.5 ft)
February 1972                                     Bedrock 1.0 m+ (3.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Alluvium | Clayey silt, brown and grey, slightly sandy in places. | 1.6 | (5.5) | 1.8 | (6.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subrounded to well rounded quartz and quartzite with subangular flint and chert and some rounded igneous rock and siltstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 4.7 | (15.5) | 6.5 | (21.5) |
| Keuper Marl | Mudstone, red and green. | 1.0+ | (3.5+) | 7.5 | (24.5) |

| | % | mm | | % |
|---|---|---|---|---|
| | | +64 | : | 4 |
| Gravel | 58 | -64+16 | : | 23 |
| | | -16+4 | : | 31 |
| | | -4+1 | : | 9 |
| Sand | 42 | -1+$\frac{1}{4}$ | : | 30 |
| | | -$\frac{1}{4}$+1/16 | : | 3 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 1.8 - 2.8 | trace | 49 | 51 |
| 2.8 - 3.8 | trace | 21 | 79 |
| 3.8 - 4.8 | trace | 37 | 63 |

SK 86 SW 43     8215 6469     Besthorpe     Block  C

Surface level (+5.2 m) +17 ft

Water level (+4.3 m) +14 ft

March 1972

Overburden 3.5 m (11.5 ft)

Mineral 4.5 m (15.0 ft)

Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Alluvium | Silt, reddish brown and greyish-blue | 3.3 | (11.0) | 3.5 | (11.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine, subrounded to well rounded quartz and quartzite, with subangular flint and chert and rounded siltstone and igneous.<br>Sand: medium, subrounded to rounded quartz and rock fragments. | 4.5 | (15.0) | 8.0 | (26.0) |
| Keuper Marl | Mudstone, red with green. | 1.0+ | (3.5+) | 9.0 | (29.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 66 | +16 | : | 29 |
| | | -16+4 | : | 37 |
| | | -4+1 | : | 11 |
| Sand | 33 | -1+$\frac{1}{4}$ | : | 20 |
| | | -$\frac{1}{4}$+1/16 | : | 2 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 3.5 – 4.5 | trace | 34 | 66 |
| 4.5 – 5.5 | trace | 27 | 73 |
| 5.5 – 6.5 | trace | 31 | 69 |
| 6.5 – 7.5 | trace | 25 | 75 |
| 7.5 – 8.0 | 1 | 68 | 31 |

SK 86 SW 44    8268 6467    Besthorpe School    Block D

Surface level (+8.8 m) +29 ft

Water level (+5.8 m) +19 ft

March 1972

Overburden 0.3 m (1.0 ft)

Mineral 5.0 m (16.5 ft)

Waste 0.2 m (0.5 ft)

Mineral 1.4 m (4.5 ft)

Bedrock 1.1 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Blown sand on Older river sands and gravels (Floodplain Terrace) | (a) Pebbly sand 'very clayey' at top. Gravel: fine, subrounded to well rounded quartz and sandstone. Sand: fine to medium, subrounded to well rounded quartz and rock fragments. | 5.0 | (16.5) | 5.3 | (17.5) |
| | Clay, reddish-brown, laminated. | 0.2 | (0.5) | 5.5 | (18.0) |
| | (b) Gravel Gravel: fine, subrounded to rounded quartz and quartzite, with subangular chert, and some rounded igneous and sandstone. Sand: medium, subangular to rounded quartz and rock fragments. | 1.4 | (4.5) | 6.9 | (22.5) |
| Keuper Marl | Mudstone, red with green. | 1.1+ | (3.5+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 5 | +16 | : | 1 |
| | | -16+4 | : | 4 |
| | | -4+1 | : | 4 |
| Sand | 88 | -1+$\frac{1}{4}$ | : | 62 |
| | | -$\frac{1}{4}$+1/16 | : | 22 |
| Fines | 7 | -1/16 | : | 7 |
| (b) Gravel | 60 | +16 | : | 26 |
| | | -16+4 | : | 34 |
| | | -4+1 | : | 8 |
| Sand | 40 | -1+$\frac{1}{4}$ | : | 28 |
| | | -$\frac{1}{4}$+1/16 | : | 4 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 - 1.3 | 30 | 69 | 1 |
| 1.3 - 2.3 | 4 | 92 | 4 |
| 2.3 - 3.3 | trace | 92 | 8 |
| 3.3 - 4.3 | trace | 95 | 5 |
| 4.3 - 5.3 | trace | 95 | 5 |
| 5.5 - 6.5 | trace | 40 | 60 |
| 6.5 - 6.9 | trace | 40 | 60 |

SK 86 SW 49     8492 6302     Plot Lane, South Scarle     Block F

Surface level (+10.4 m) +34 ft          Overburden 0.3 m (1.0 ft)
Water level (+9.5 m) +31 ft             Mineral 4.6 m (15.0 ft)
February 1972                           Bedrock 1.6 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and Gravels (Floodplain Terrace) | Gravel<br>  Gravel: fine to coarse, subangular to<br>    well rounded quartz and quartzite, with<br>    subangular flint and chert.<br>  Sand: medium, subangular to rounded<br>    quartz and rock fragments. | 4.6 | (15.0) | 4.9 | (16.0) |
| Lower Lias | Mudstone and Limestone, grey and brown. | 1.6+ | (5.5+) | 6.5 | (21.5) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 54 | +16 | : | 29 | | 0.3 - 0.9 | 6 | 60 | 34 |
| | | -16+4 | : | 25 | | 0.9 - 1.3 | trace | 39 | 61 |
| | | | | | | 1.3 - 2.3 | trace | 52 | 48 |
| | | -4+1 | : | 9 | | 2.3 - 3.3 | trace | 50 | 50 |
| Sand | 44 | -1+¼ | : | 30 | | 3.3 - 4.9 | 3 | 31 | 66 |
| | | -¼+1/16 | : | 5 | | | | | |
| Fines | 2 | -1/16 | : | 2 | | | | | |


SK 86 SW 46     8360 6363     South Scarle     Block F

Surface level (+7.6 m) +25 ft           Overburden 0.3 m (1.0 ft)
Water level (+7.0 m) +23 ft             Mineral 2.0 m (6.5 ft)
March 1972                              Bedrock 1.7 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel and sandy gravel<br>  Gravel: fine to coarse, subrounded<br>    to well rounded quartz, with<br>    subangular flint and chert and rounded<br>    sandstone and some rounded siltstone.<br>  Sand: medium, subangular to rounded<br>    quartz and rock fragments. | 2.0 | (6.5) | 2.3 | (7.5) |
| Keuper Marl | Mudstone, red and green. | 1.7+ | (5.5+) | 4.0 | (13.0) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 54 | +16 | : | 26 | | 0.3 - 1.3 | trace | 24 | 76 |
| | | -16+4 | : | 28 | | 1.3 - 2.3 | 2 | 65 | 33 |
| | | -4+1 | : | 10 | | | | | |
| Sand | 45 | -1+¼ | : | 31 | | | | | |
| | | -¼+1/16 | : | 4 | | | | | |
| Fines | 1 | -1/16 | : | 1 | | | | | |

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SK 86 SW 47    8181 6400    Black Pool, Besthorpe    Block  C

Surface level (+7.3 m) +24 ft
Water level not recorded
March 1972

Overburden 2.7 m (9.0 ft)
Mineral 5.1 m (17.0 ft)
Bedrock 1.2 m+ (4.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown and grey, clayey in parts. | 2.7 | (9.0) | 2.7 | (9.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>  Gravel: fine to coarse, well rounded<br>    quartz and subangular flint and chert;<br>    with rounded igneous sandstone and<br>    siltstone pebbles.<br>  Sand: medium, subrounded to well rounded<br>    quartz and rock fragments. | 5.1 | (17.0) | 7.8 | (25.5) |
| Keuper Marl | Mudstone, green | 1.2+ | (4.0+) | 9.0 | (29.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 67 | +64 | : | 3 |
| | | −64+16 | : | 30 |
| | | −16+4 | : | 34 |
| | | −4+1 | : | 8 |
| Sand | 33 | −1+¼ | : | 21 |
| | | −¼+1/16 | : | 4 |
| Fines | trace | −1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 2.7 − 3.7 | trace | 43 | 57 |
| 3.7 − 4.7 | trace | 33 | 67 |
| 4.7 − 5.7 | trace | 41 | 59 |
| 5.7 − 6.7 | trace | 29 | 71 |
| 6.7 − 7.8 | trace | 22 | 78 |

SK 86 SW 48    8479 6475    South Scarle    Block  F

Surface level (+13.7 m) +45 ft
Water not encountered
February 1972

Waste 0.3 m (1.0 ft)
Bedrock 5.7 m+ (18.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Lower Lias | Silty clay, light grey mottled yellow and black. | 1.6 | (5.5) | 1.9 | (6.0) |
| | Mudstone, dark grey finely laminated. | 4.1+ | (13.5+) | 6.0 | (19.5) |

SK 86 SW 45    8394 6448    Folly Farm, South Scarle    Block F

Surface level (+7.9 m) +26 ft
Water not encountered
March 1972

Overburden 0.2 m (0.5 ft)
Mineral 2.8 m (9.0 ft)
Bedrock 2.0 m+ (6.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Older river sands and gravels (Floodplain Terrace) | Sand, part pebbly<br>Sand: medium, subangular to rounded quartz and rock fragments.<br>Gravel: scattered fine, subrounded quartz, sandstone and flint. | 2.8 | (9.0) | 3.0 | (10.0) |
| Keuper Marl | Mudstone, grey, green and red. | 2.0+ | (6.5+) | 5.0 | (16.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 5 | +16 | : | 1 |
| | | −16+4 | : | 4 |
| Sand | 91 | −4+1 | : | 1 |
| | | −1+¼ | : | 73 |
| | | −¼+1/16 | : | 16 |
| Fines | 4 | −1/16 | : | 4 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.2 − 1.2 | 7 | 90 | 3 |
| 1.2 − 2.2 | 4 | 88 | 8 |
| 2.2 − 3.0 | trace | 97 | 3 |

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SK 86 SW 50    8071 6389    Carlton Holme, North Collingham    Block C

Surface level (+6.4 m) +21 ft
Water level (+5.2 m) +17 ft
March 1972

Overburden 4.5 m (15.0 ft)
Mineral 2.0 m (6.5 ft)
Bedrock 1.5 m+ (5.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown and grey. | 4.5 | (15.0) | 4.5 | (15.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subrounded to well rounded quartz, with subangular chert and flint, and some rounded igneous and sandstone.<br>Sand: medium, angular to subrounded quartz and rock fragments. | 2.0 | (6.5) | 6.5 | (21.5) |
| Keuper Marl | Mudstone, red with green. | 1.5+ | (5.0+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 61 | +16 | : | 29 |
| | | −16+4 | : | 32 |
| Sand | 37 | −4+1 | : | 7 |
| | | −1+¼ | : | 27 |
| | | −¼+1/16 | : | 3 |
| Fines | 2 | −1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 4.5 − 5.5 | 3 | 32 | 65 |
| 5.5 − 6.5 | 1 | 43 | 56 |

SK 86 SW 51     8001 6298     Carlton-on-Trent     Block A

Surface level (+7.9 m) +26 ft
Water level not recorded
January 1972

Overburden 1.1 m (3.5 ft)
Mineral 5.3 m (17.5 ft)
Bedrock 1.6 m+ (5.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Made ground | 1.1 | (3.5) | 1.1 | (3.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel and sandy gravel. Gravel: medium subangular to rounded quartz and quartzite, with angular to rounded chert. Sand: medium subangular to rounded quartz and rock fragments. | 5.3 | (17.5) | 6.4 | (21.0) |
| Keuper Marl | Mudstone, red. | 1.6+ | (5.5 +) | 8.0 | (26.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 52 | +64 | : | 7 |
|  |  | -64+16 | : | 23 |
|  |  | -16+4 | : | 22 |
|  |  | -4+1 | : | 6 |
| Sand | 48 | -1+$\frac{1}{4}$ | : | 37 |
|  |  | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 1.1 - 2.1 | trace | 34 | 66 |
| 2.1 - 3.1 | 1 | 31 | 68 |
| 3.1 - 4.1 | trace | 67 | 33 |
| 4.1- 5.1 | trace | 78 | 22 |
| 5.1 - 6.4 | trace | 32 | 68 |

SK 86 SW 52     8071 6241     River Trent, Cromwell     Block C

Surface level (+7.6 m) +25 ft
Water level (+3.7 m) +12 ft
January 1972

Overburden 2.1 m (7.0 ft)
Mineral 6.3 m (20.5 ft)
Bedrock 1.6 m+ (5.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
| Alluvium | Clay, light brown | 2.1 | (7.0) | 2.1 | (7.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel. Gravel: fine to coarse, subrounded to well rounded quartz and quartzite, with subangular chert. Sand: medium, subrounded quartz and rock fragments. | 6.3 | (20.5) | 8.4 | (27.5) |
| Keuper Marl | Mudstone, grey | 1.6+ | (5.5+) | 10.0 | (33.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 68 | +16 | : | 33 |
|  |  | -16+4 | : | 35 |
|  |  | -4+1 | : | 8 |
| Sand | 32 | -1+$\frac{1}{4}$ | : | 22 |
|  |  | -$\frac{1}{4}$+1/16 | : | 2 |
| Fines | trace | -1/16 | : | trace |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 2.1 - 3.1 | trace | 47 | 53 |
| 3.1 - 4.1 | trace | 42 | 5£ |
| 4.1 - 5.1 | trace | 45 | 55 |
| 5.1 - 6.1 | trace | 25 | 75 |
| 6.1 - 7.1 | trace | 17 | 83 |
| 7.1 - 8.4 | trace | 21 | 79 |

SK 86 SW 53    8139 6297    Collingham Wharf    Block C

Surface level (+7. 3 m) +24 ft
Water level not recorded
March 1972

Waste 7.5 m (24.5 ft)
Bedrock 1.0 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown and grey, contains wood debris. | 6.0 | (19.5) | 6.0 | (19.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, well rounded quartz and sandstone; with subangular flint and chert.<br>Sand: medium, well rounded quartz and rock fragments. | 1.5 | (5.0) | 7.5 | (24.5) |
| Keuper Marl | Mudstone, hard, green. | 1.0+ | (3.5+) | 8.5 | (28.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 58 | +16 | : | 29 |
| | | -16+4 | : | 29 |
| | | -4+1 | : | 8 |
| Sand | 38 | -1+$\frac{1}{4}$ | : | 25 |
| | | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | 4 | -1/16 | : | 4 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 6.0 - 7.0 | 2 | 35 | 63 |
| 7.0 - 7.5 | 8 | 43 | 49 |


SK 86 SW 54    8325 6258    North Collingham    Block F

Surface level (+7. 3 m) +24 ft
Water level (+6. 1 m) +20 ft
March 1972

Overburden 0.2 m (0.5 ft)
Mineral 5.6 m (18.5 ft)
Bedrock 1.2 m+ (4.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse well rounded quartz and quartzite; with subangular chert and rounded sandstone, and some rounded igneous.<br>Sand: medium, subrounded to rounded quartz and rock fragments. | 5.6 | (18.5) | 5.8 | (19.0) |
| Keuper Marl | Mudstone; red and green. | 1.2+ | (4.0+) | 7.0 | (23.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 50 | +64 | : | 5 |
| | | -64+16 | : | 20 |
| | | -16+4 | : | 25 |
| | | -4+1 | : | 9 |
| Sand | 46 | -1+$\frac{1}{4}$ | : | 32 |
| | | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | 4 | -1/16 | : | 4 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.2 - 1.2 | 8 | 53 | 39 |
| 1.2 - 2.2 | 1 | 88 | 11 |
| 2.2 - 3.2 | 1 | 52 | 47 |
| 3.2 - 4.2 | 1 | 18 | 81 |
| 4.2 - 5.2 | 2 | 25 | 73 |
| 5.2 - 5.8 | 12 | 41 | 47 |

75

SK 86 SW 55    8321 6163    Station Road, Collingham    Block F

Surface level (+10.1 m) +33 ft
Water level not recorded
March 1972

Overburden 0.5 m (1.5 ft)
Mineral 6.0 m (19.5 ft)
Bedrock 1.5 m+ (5.0 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Sandy gravel, more gravelly at base. Gravel: fine to coarse, subrounded to well rounded quartz and quartzite, with subangular flint and chert; and some rounded siltstone and coal. Sand: medium, subrounded to well rounded quartz and rock fragments. | 6.0 | (19.5) | 6.5 | (21.5) |
| Keuper Marl | Mudstone, red and green. | 1.5+ | (5.0+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 45 | +16 | : | 16 |
|  |  | −16+4 | : | 29 |
|  |  | −4+1 | : | 12 |
| Sand | 52 | −1+¼ | : | 36 |
|  |  | −¼+1/16 | : | 4 |
| Fines | 3 | −1/16 | : | 3 |

| Depth below surface (m) | Fines | Sand | Gravel |
|---|---|---|---|
| 0.5 – 1.5 | 10 | 71 | 19 |
| 1.5 – 2.5 | 1 | 53 | 46 |
| 2.5 – 3.5 | 1 | 85 | 14 |
| 3.5 – 4.5 | trace | 53 | 47 |
| 4.5 – 5.5 | 2 | 27 | 71 |
| 5.5 – 6.5 | 2 | 17 | 81 |

SK 86 SW 56    8141 6174    Westfield Lane, South Collingham    Block C

Surface level (+5.8 m) +19 ft
Water level not recorded
March 1972

Overburden 0.9 m (3.0 ft)
Mineral 6.6 m (21.5 ft)
Bedrock 1.0 m+ (3.5 ft+)

|  |  | Thickness | | Depth | |
|---|---|---|---|---|---|
|  |  | m | (ft) | m | (ft) |
| Alluvium | Silt, brown and grey, slightly sandy | 0.9 | (3.0) | 0.9 | (3.0) |
| Older river sands and gravels (Floodplain Terrace) | Gravel Gravel: fine to coarse, subrounded to well rounded quartz and quartzite, with subangular to rounded chert and flint, and some igneous and sandstone. Sand: medium, subrounded to rounded quartz and rock fragments. | 6.6 | (21.5) | 7.5 | (24.5) |
| Keuper Marl | Mudstone, green and red. | 1.0+ | (3.5+) | 8.5 | (28.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 64 | +64 | : | 4 |
|  |  | −64+16 | : | 31 |
|  |  | −16+4 | : | 29 |
|  |  | −4+1 | : | 9 |
| Sand | 35 | −1+¼ | : | 24 |
|  |  | −¼+1/16 | : | 2 |
| Fines | 1 | −1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
|  | Fines | Sand | Gravel |
| 0.9 – 1.9 | 3 | 32 | 65 |
| 1.9 – 2.9 | trace | 27 | 73 |
| 2.9 – 3.9 | trace | 30 | 70 |
| 3.9 – 4.9 | trace | 39 | 61 |
| 4.9 – 5.9 | trace | 52 | 48 |
| 5.9 – 6.9 | trace | 39 | 61 |
| 6.9 – 7.5 | 1 | 22 | 77 |

SK 86 SW 57     8040 614 1     Cromwell     Block C

Surface level (+7.0 m) +23 ft
Water level not recorded
December 1971

Overburden 1.6 m    (5.5 ft)
Mineral 9.0 m    (29.5 ft)
Bedrock 1.1 m+ (3.5ft)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown with roots. | 1.6 | (5.5) | 1.6 | (5.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subrounded to well rounded quartz and quartzite with subangular to rounded chert, and some rounded igneous rock and sandstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 9.0 | (29.5) | 10.6 | (35.0) |
| Keuper Marl | Mudstone, green. | 1.1+ | (3.5+) | 11.7 | (38.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 59 | +16 | : | 27 |
| | | -16+4 | : | 32 |
| | | -4+1 | : | 7 |
| Sand | 41 | -1+$\frac{1}{4}$ | : | 31 |
| | | -$\frac{1}{4}$+1/16 | : | 3 |
| Fines | trace | -1/16 | : | trace |

| Depth below Surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 1.6 - 2.6 | 2 | 48 | 50 |
| 2.6 - 3.6 | trace | 26 | 74 |
| 3.6 - 4.6 | trace | 47 | 53 |
| 4.6 - 5.6 | trace | 29 | 71 |
| 5.6 - 6.6 | trace | 42 | 58 |
| 6.6 - 7.6 | trace | 33 | 67 |
| 7.6 - 8.6 | trace | 51 | 49 |
| 8.6 - 9.6 | trace | 44 | 56 |
| 9.6 - 10.6 | trace | 43 | 57 |

SK 86 SW 58     8214 6217     Carlton Ferry Lane, North Collingham     Block C

Surface level (+7.9 m) +26 ft
Water level not recorded
March 1972

Overburden 1.1 m (3.5 ft)
Mineral 7.0 m (23.0 ft)
Bedrock 1.1 m+ (3.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Made ground | 0.3 | (1.0) | 0.3 | (1.0) |
| | Silt, brown | 0.8 | (2.5) | 1.1 | (3.5) |
| Older river Sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subrounded to well rounded quartz and sandstone, with subangular chert and flint and and some rounded igneous rock.<br>Sand: medium, subangular to rounded quartz and rock fragments. | 7.0 | (23.0) | 8.1 | (26.5) |
| Keuper Marl | Mudstone, red. | 1.1+ | (3.5+) | 9.2 | (30.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 51 | +16 | : | 21 |
| | | -16+4 | : | 30 |
| | | -4+1 | : | 10 |
| Sand | 48 | -1+$\frac{1}{4}$ | : | 33 |
| | | -$\frac{1}{4}$+1/16 | : | 5 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 1.1 - 2.1 | trace | 42 | 58 |
| 2.1 - 3.1 | trace | 63 | 37 |
| 3.1 - 4.1 | trace | 38 | 62 |
| 4.1 - 5.1 | trace | 36 | 64 |
| 5.1 - 6.1 | 2 | 59 | 39 |
| 6.1 - 7.1 | trace | 61 | 39 |
| 7.1 - 8.1 | trace | 48 | 52 |

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SK 86 SW 59    82 30   61 32    Westfield, South Collingham    Block C

Surface level (+6.1 m) +20 ft
Water level (+5.5 m) +18 ft
March 1972

Overburden 2.0 m (6.5 ft)
Mineral 3.8 m (12.5 ft)
Bedrock 1.2 m+ (4.0 ft+)

| | | | Thickness | | Depth | |
|---|---|---|---|---|---|---|
| | | | m | (ft) | m | (ft) |
| Alluvium | Clay, brown and dark grey. | | 2.0 | (6.5) | 2.0 | (6.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, subangular to well rounded quartz and quartzite, with subangular chert, and some rounded sandstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | | 3.8 | (12.5) | 5.8 | (19.0) |
| Keuper Marl | Mudstone, brown and greyish-green. | | 1.2+ | (4.0+) | 7.0 | (23.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 61 | +16 | : | 26 |
| | | -16+4 | : | 35 |
| | | -4+1 | : | 10 |
| Sand | 38 | -1+¼ | : | 26 |
| | | -¼+1/16 | : | 2 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 2.0 - 3.0 | 1 | 36 | 63 |
| 3.0 - 4.0 | trace | 44 | 56 |
| 4.0 - 5.0 | trace | 52 | 48 |
| 5.0 - 5.8 | trace | 18 | 82 |

SK 86 SW 60    81 33 6033    South Collingham    Block C

Surface level (+7.6 m) +25 ft
Water level (+5.5 m) +18 ft
March 1972

Overburden 3.5 m (11.5 ft)
Mineral 4.7 m (15.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

| | | | Thickness | | Depth | |
|---|---|---|---|---|---|---|
| | | | m | (ft) | m | (ft) |
| Alluvium | Silt, brown, peaty at base | | 3.5 | (11.5) | 3.5 | (11.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel and sandy gravel<br>Gravel: fine, subrounded to well rounded quartz and quartzite, with subangular chert and flint, and some rounded igneous rock and siltstone.<br>Sand: medium, subangular to rounded quartz and rock fragments. | | 4.7 | (15.5) | 8.2 | (27.0) |
| Keuper Marl | Mudstone, red and green. | | 1.3+ | (4.5+) | 9.5 | (31.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 48 | +16 | : | 18 |
| | | -16+4 | : | 30 |
| | | -4+1 | : | 11 |
| Sand | 51 | -1+¼ | : | 35 |
| | | -¼+1/16 | : | 5 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 3.5 - 4.5 | trace | 35 | 65 |
| 4.5 - 5.5 | trace | 52 | 48 |
| 5.5 - 6.5 | 1 | 76 | 23 |
| 6.5 - 7.5 | 1 | 51 | 48 |
| 7.5 - 8.2 | 3 | 38 | 59 |

SK 86 SW 61    8264  6050    Cottage Lane, South Collingham    Block F

Surface level (+10.4 m)  +34 ft                    Overburden 0.4 m (1.5 ft)
Water level not recorded                           Mineral 7.8 m (25.5 ft)
March 1972                                         Bedrock 0.8 m+ (2.5 ft+)

| | | | Thickness | | | Depth | |
|---|---|---|---|---|---|---|---|
| | | | m | (ft) | | m | (ft) |
| | Soil | | 0.4 | (1.5) | | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | 'Clayey' sandy gravel<br>   Gravel: fine to coarse, subrounded to<br>     well rounded quartz and quartzite, with<br>     subangular chert;  and some rounded<br>     sandstone.<br>   Sand:  medium, subrounded to rounded<br>     quartz and rock fragments. | | 7.8 | (25.5) | | 8.2 | (27.0) |
| Keuper Marl | Mudstone, red, laminated | | 0.8+ | (2.5+) | | 9.0 | (29.5) |

| | % | mm | | % | Depth below surface (m) | Percentage Fines | Sand | Gravel |
|---|---|---|---|---|---|---|---|---|
| Gravel | 39 | +16 | : | 22 | 0.4 – 1.4 | 10 | 89 | 1 |
| | | −16+4 | : | 17 | 1.4 – 2.4 | 12 | 56 | 32 |
| | | | | | 2.4 – 3.4 | 26 | 58 | 16 |
| | | −4+1 | : | 6 | 3.4 – 4.4. | 37 | 54 | 9 |
| Sand | 46 | −1+$\frac{1}{4}$ | : | 29 | 4.4 – 5.4 | 11 | 48 | 41 |
| | | −$\frac{1}{4}$+1/16 | : | 11 | 5.4 – 6.4 | 14 | 21 | 65 |
| | | | | | 6.4 – 7.4 | 2 | 15 | 83 |
| Fines | 15 | −1/16 | : | 15 | 7.4 – 8.2 | 3 | 24 | 73 |

SK 86 SW 62     8344 6170     Westbrook Lane,  South Collingham     Block F

Surface level (+10.4 m) +34 ft                    Overburden 0.5 m (1.5 ft)
Water level not recorded                          Mineral 1.9 m (6.0 ft)
March 1972                                        Waste 3.2 m (10.5 ft)
                                                  Mineral 1.1 m (3.5 ft)
                                                  Bedrock 1.3 m+ (4.5 ft+)

|  |  | Thickness | | Depth | |
| --- | --- | --- | --- | --- | --- |
|  |  | m | (ft) | m | (ft) |
|  | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | (a) Sandy gravel<br>Gravel: fine, well rounded quartz and quartzite, with subangular chert, and some rounded igneous rock, siltstone and coal.<br>Sand: medium, rounded quartz and rock fragments. | 1.9 | (6.0) | 2.4 | (8.0) |
|  | Silt, reddish-brown and dark grey micaceous silt. | 3.2 | (10.5) | 5.6 | (18.5) |
|  | (b) Gravel<br>Gravel: coarse, well rounded quartz and sandstone, with subangular chert and flint.<br>Sand: medium, subrounded to rounded quartz and rock fragments. | 1.1 | (3.5) | 6.7 | (22.0) |
| Keuper Marl | Mudstone, red and green. | 1.3+ | (4.5+) | 8.0 | (26.0) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (a) Gravel | 38 | +16 | : | 16 | | 0.5 - 1.5 | trace | 32 | 68 |
|  |  | -16+4 | : | 22 | | 1.5 - 2.4 | 4 | 93 | 3 |
|  |  | -4+1 | : | 10 | | | | | |
| Sand | 60 | -1+¼ | : | 45 | | | | | |
|  |  | -¼+1/16 | : | 5 | | | | | |
| Fines | 2 | -1/16 | : | 2 | | | | | |
| (b) Gravel | 72 | +16 | : | 52 | | 5.6 - 6.7 | 5 | 23 | 72 |
|  |  | -16+4 | : | 20 | | | | | |
|  |  | -4+1 | : | 6 | | | | | |
| Sand | 23 | -1+¼ | : | 14 | | | | | |
|  |  | -¼+1/16 | : | 3 | | | | | |
| Fines | 5 | -1/16 | : | 5 | | | | | |

SK 86 SW 63    8410 6222    North Collingham    Block F

Surface level (c +10.1 m) c +33 ft
Water level (c +9.1 m) c +30 ft
Shell and auger 6 inch
October 1972

Overburden 0.4 m (1.5 ft)
Mineral 6.4 m (21.0 ft)
Bedrock 1.2 m+ (4.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse, angular to well rounded quartz and quartzite, with subangular chert and flint, and some rounded sandstone.<br>Sand: medium, angular to rounded quartz and rock fragments. | 6.4 | (21.0) | 6.8 | (22.5) |
| Rhaetic | Mudstone, greyish green. | 1.2+ | (4.0+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 57 | +16 | : | 27 |
| | | −16+4 | : | 30 |
| | | −4+1 | : | 14 |
| Sand | 42 | −1+$\frac{1}{4}$ | : | 18 |
| | | −$\frac{1}{4}$+1/16 | : | 10 |
| Fines | 1 | −1/16 | : | 1 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.4 – 1.4 | 2 | 71 | 27 |
| 1.4 – 2.4 | 1 | 27 | 72 |
| 2.4 – 3.4 | 1 | 65 | 34 |
| 3.4 – 4.4 | 1 | 27 | 72 |
| 4.4 – 5.4 | 1 | 24 | 75 |
| 5.4 – 6.4 | 0 | 35 | 65 |
| 6.4 – 6.8 | 1 | 43 | 56 |

SK 86 SE 3    8572 6377    Brown's Plantation, South Scarle    Block F

Surface level (+10.7 m) +35 ft
Water level (+10.1 m) +33 ft
February 1972

Overburden 0.4 m (1.5 ft)
Mineral 6.3 m (20.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: coarse, subrounded to well rounded quartz and quartzite, with subangular to rounded chert.<br>Sand: medium, angular to subrounded quartz and rock fragments. | 6.3 | (20.5) | 6.7 | (22.0) |
| Lower Lias | Mudstone, light grey. | 1.3+ | (4.5+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 61 | +16 | : | 32 |
| | | -16+4 | : | 29 |
| | | -4+1 | : | 9 |
| Sand | 38 | -1+¼ | : | 25 |
| | | -¼+1/16 | : | 4 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 – 1.4 | trace | 50 | 50 |
| 1.4 – 2.4 | 1 | 51 | 48 |
| 2.4 – 2.7 | 2 | 51 | 47 |
| 2.7 – 3.7 | trace | 22 | 78 |
| 3.7 – 4.7 | trace | 56 | 44 |
| 4.7 – 5.7 | 3 | 29 | 68 |
| 5.7 – 6.7 | 2 | 20 | 78 |

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SK 86 SE 4    8553 6411    South Scarle    Block F

Surface level (+10.4 m) +34 ft
Water level (+9.5 m) +31 ft
February 1972

Overburden 0.4 m (1.5 ft)
Mineral 6.0 m (19.5 ft)
Bedrock 1.6 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Floodplain Terrace) | Gravel<br>Gravel: fine to coarse subangular to rounded quartz and quartzite; with subangular chert.<br>Sand: medium subangular to rounded quartz, chert and rock fragments. | 6.0 | (19.5) | 6.4 | (21.0) |
| Lower Lias | Mudstone, light grey. | 1.6+ | (5.5+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 62 | +64 | : | 6 |
| | | -64+16 | : | 26 |
| | | -16+4 | : | 30 |
| | | -4+1 | : | 10 |
| Sand | 37 | -1+¼ | : | 23 |
| | | -¼+1/16 | : | 4 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.4 – 1.4 | 3 | 49 | 48 |
| 1.4 – 2.3 | 3 | 49 | 48 |
| 2.3 – 3.3 | trace | 24 | 76 |
| 3.3 – 4.6 | trace | 33 | 67 |
| 4.6 – 5.6 | trace | 36 | 64 |
| 5.6 – 6.4 | trace | 25 | 75 |

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SK 86 SE 5    8748 6403    Compton's Holt, Swinderby    Block G

Surface level (+14.0 m) +46 ft
Water level (+12.5 m) +41 ft
February  1972

Overburden 0.3 m (1.0 ft)
Mineral 6.3 m (20.5 ft)
Waste 0.3 m (1.0 ft)
Mineral 1.4 m (4.5 ft)
Bedrock 1.7 m+ (5.5 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Beeston Terrace) | (a) Sandy gravel 'clayey' at top  Gravel: fine, subangular to rounded quartz and quartzite; with angular to subrounded chert.  Sand: medium, angular to subrounded quartz and rock fragments. | 6.3 | (20.5) | 6.6 | (21.5) |
| | Silt, dark grey and brown | 0.3 | (1.0) | 6.9 | (22.5) |
| | (b) Gravel  Gravel: fine to coarse subrounded to well rounded quartz and quartzite with subangular chert, and some rounded igneous rock and sandstone.  Sand: coarse, angular to subrounded quartz and rock fragments. | 1.4 | (4.5) | 8.3 | (27.0) |
| Lower Lias | Mudstone, dark grey. | 1.7+ | (5.5+) | 10.0 | (33.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 34 | +16 | : | 8 |
| | | -16+4 | : | 26 |
| | | -4+1 | : | 12 |
| Sand | 64 | -1+¼ | : | 43 |
| | | -¼+1/16 | : | 9 |
| Fines | 2 | -1/16 | : | 2 |
| (b) Gravel | 93 | +16 | : | 45 |
| | | -16+4 | : | 48 |
| | | -4+1 | : | 6 |
| Sand | 7 | -1+¼ | : | 1 |
| | | -¼+1/16 | : | trace |
| Fines | 0 | -1/16 | : | 0 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.3 - 1.1 | 15 | 56 | 29 |
| 1.1 - 2.1 | trace | 73 | 27 |
| 2.1 - 3.1 | trace | 47 | 53 |
| 3.1 - 4.1 | 1 | 73 | 26 |
| 4.1 - 5.1 | 2 | 37 | 61 |
| 5.1 - 6.6 | trace | 85 | 15 |
| 6.9 - 8.3 | 0 | 7 | 93 |

SK 86 SE 6     8696 6351     Rose Cottage, Swinderby     Block H

Surface level (+17.7 m) +58 ft                    Waste 4.2 m (14.0 ft)
Water not encountered                             Bedrock 1.3m+ (4.5 ft+)
February 1972

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Glacial Sand and gravel | Silt, brown, with scattered pockets medium subrounded sand. | 2.2 | (7.0) | 2.7 | (9.0) |
| | Gravel | 0.2 | (0.5) | 2.9 | (9.5) |
| | Gravel: fine, subangular to rounded quartz and quartzite, with subangular chert. Sand: medium, angular to subrounded quartz and rock fragments. | | | | |
| | Clay, light and dark grey. | 1.3 | (4.5) | 4.2 | (14.0) |
| Lower Lias | Limestone, light grey. | 1.3+ | (4.5+) | 5.5 | (18.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 57 | +16 | : | 18 |
| | | -16+4 | : | 39 |
| | | -4+1 | : | 7 |
| Sand | 42 | -1+$\frac{1}{4}$ | : | 31 |
| | | -$\frac{1}{4}$+1/16 | : | 4 |
| Fines | 1 | -1/16 | : | 1 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 2.7 - 2.9 | 1 | 42 | 57 |

SK 86 SE 7    8841 6406    Morton Manor, Swinderby    Block G

Surface level (+15.9 m) +52 ft
Water level not recorded
February 1972

Overburden 0.2 m (0.5 ft)
Mineral 2.5 m (8.0 ft)
Waste 3.2 m (10.5 ft)
Bedrock 2.1 m+(7.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.2 | (0.5) | 0.2 | (0.5) |
| Older river sands and gravels (Beeston Terrace) | (a) Pebbly sand, 'very clayey' to 1.2m (3.9ft)  Gravel: fine, subangular to rounded quartz and quartzite, with subangular chert.  Sand: medium, angular to rounded quartz and rock fragments. | 2.5 | (8.0) | 2.7 | (9.0) |
| | Clay, dark brown, silty. | 2.4 | (8.0) | 5.1 | (17.0) |
| | (b) Sandy gravel.  Gravel: fine subangular to rounded quartz and quartzite with subangular chert.  Sand: medium, angular to subrounded quartz and rock fragments. | 0.8 | (2.5) | 5.9 | (19.5) |
| Lower Lias | Mudstone, dark grey laminated | 2.1 + | (7.0+) | 8.0 | (26.0) |

| | % | mm | | % |
|---|---|---|---|---|
| (a) Gravel | 13 | +16 | : | 3 |
| | | -16 + 4 | : | 10 |
| Sand | 75 | - 4 + 1 | : | 7 |
| | | - 1 + ¼ | : | 40 |
| | | - ¼ + 1/16 | : | 28 |
| Fines | 12 | -1/16 | : | 12 |
| (b) Gravel | 40 | + 16 | : | 18 |
| | | - 16 + 4 | : | 22 |
| Sand | 58 | - 4 + 1 | : | 7 |
| | | - 1 + ¼ | : | 47 |
| | | - ¼ + 1/16 | : | 4 |
| Fines | 2 | - 1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.2 - 1.2 | 26 | 56 | 18 |
| 1.2 - 2.4 | 3 | 91 | 6 |
| 2.4 - 2.7 | 2 | 72 | 26 |
| 5.1 - 5.9 | 2 | 58 | 40 |

SK 86 SE 8    8867 6301    Halfway House, Swinderby    Block G

Surface level (+14.6 m) + 48 ft
Water level not recorded
February 1972

Overburden 0.3 m (1.0 ft)
Mineral 6.2 m (20.5 ft)
Bedrock 2.0 m + (6.5 ft +)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Beeston Terrace) | Gravel and sandy gravel. Gravel: subangular to well rounded quartz and quartzite, with subangular chert, and some rounded sandstone. Sand: medium, angular to subrounded quartz and rock fragments. | 6.2 | (20.5) | 6.5 | (21.5) |
| Lower Lias | Mudstone, dark grey, finely laminated. | 2.0+ | (6.5+) | 8.5 | (28.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 42 | + 16 | : | 19 |
| | | – 16 + 4 | : | 23 |
| | | – 4 + 1 | : | 9 |
| Sand | 56 | – 1 + $\frac{1}{4}$ | : | 40 |
| | | – $\frac{1}{4}$ + 1/16 | : | 7 |
| Fines | 2 | – 1/16 | : | 2 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 – 1.9 | 8 | 86 | 6 |
| 1.9 – 2.9 | trace | 15 | 85 |
| 2.9 – 3.9 | trace | 37 | 63 |
| 3.9 – 4.9 | 1 | 58 | 41 |
| 4.9 – 5.9 | trace | 73 | 27 |
| 5.9 – 6.5 | trace | 46 | 54 |

SK 86 SE 9    8736 6183    Foss Way, Swinderby    Block G

Surface level (+18.9 m) +62 ft
Water level not recorded
March 1972

Overburden 0.3 m (1.0 ft)
Mineral 2.1 m (7.0 ft)
Waste 1.4 m (4.5 ft)
Bedrock 1.2 m +(4.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Beeston Terrace) | 'Clayey' sandy gravel. Gravel: fine, subangular to well rounded quartz and quartzite, with subangular chert, and some rounded sandstone. Sand: medium, angular to subrounded quartz, chert and rock fragments. | 2.1 | (7.0) | 2.4 | (8.0) |
| | Clay, light brown and dark grey. | 1.4 | (4.5) | 3.8 | (12.5) |
| Lower Lias | Mudstone, light yellowish-brown, finely laminated, with Gryphaea. | 1.2+ | (4.0+) | 5.0 | (16.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 34 | + 16 | : | 7 |
| | | – 16 + 4 | : | 27 |
| | | – 4 + 1 | : | 18 |
| Sand | 54 | – 1 + $\frac{1}{4}$ | : | 29 |
| | | – $\frac{1}{4}$ + 1/16 | : | 7 |
| Fines | 12 | – 1/16 | : | 12 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.3 – 0.9 | 13 | 43 | 44 |
| 0.9 – 1.9 | 14 | 55 | 31 |
| 1.9 – 2.4 | 6 | 63 | 31 |

SK 86 SE 10    8656 6127    Potter Hill, Swinderby        Block H

Surface level (+ 32.9 m) + 108 ft                     Overburden 0.3 m (1.0 ft)
Water level   (+ 31.6 m) + 104 ft                     Mineral 3.0 m (10.0 ft)
February 1972                                         Waste 1.4 m (4.5 ft)
                                                      Bedrock 1.3 m + (4.5 ft +)

| | | | Thickness | | Depth | |
|---|---|---|---|---|---|---|
| | | | m | (ft) | m | (ft) |
| | Soil | | 0.3 | (1.0) | 0.3 | (1.0) |
| Glacial sand and gravel (Hilton Terrace) | Pebbly sand and gravel, 'clayey' at top. Gravel: fine, subrounded to rounded quartz and quartzite, with subangular flint and chert, and some rounded sandstone. Sand: medium, angular to subrounded quartz and rock fragments. | | 3.0 | (10.0) | 3.3 | (11.0) |
| | Clay, light brown. | | 1.4 | (4.5) | 4.7 | (15.5) |
| Lower Lias | Mudstone, dark grey. | | 1.3+ | (4.5+) | 6.0 | (19.5) |

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 46 | + 16 | : | 18 | | 0.3 – 0.7 | 12 | 73 | 15 |
| | | – 16 + 4 | : | 28 | | 0.7 – 1.7 | 4 | 44 | 52 |
| | | – 4 + 1 | : | 13 | | 1.7 – 2.7 | 3 | 41 | 56 |
| Sand | 50 | – 1 + $\frac{1}{4}$ | : | 36 | | 2.7 – 3.3 | 4 | 54 | 42 |
| | | – $\frac{1}{4}$ + 1/16 | : | 1 | | | | | |
| Fines | 4 | – 1/16 | : | 4 | | | | | |

SK 86 SE 11     8582 6108     Potter Hill, Swinderby     Block H

Surface level (+ 32.6 m)  + 107 ft
Water level not recorded
February 1972

Overburden 0.5 m (1.5 ft)
Mineral  4.7 m (15.5 ft)
Bedrock 1.8 m+ (6.0 ft+)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Glacial sand and gravel (Hilton Terrace) | Sandy gravel.<br>  Gravel: fine, subrounded to well rounded<br>    quartz and quartzite, with subangular<br>    flint and chert.<br>  Sand: medium, angular to subrounded<br>    quartz and rock fragments. | 4.7 | (15.5) | 5.2 | (17.0) |
| Lower Lias | Mudstone, dark grey. | 1.8+ | (6.0+) | 7.0 | (23.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 43 | + 16 | : | 16 |
| | | − 16 + 4 | : | 27 |
| Sand | 53 | − 4 + 1 | : | 8 |
| | | − 1 + ¼ | : | 40 |
| | | − ¼ + 1/16 | : | 5 |
| Fines | 4 | − 1/16 | : | 4 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.5 − 0.9 | 1 | 73 | 26 |
| 0.9 − 1.3 | 16 | 56 | 28 |
| 1.3 − 2.3 | 4 | 63 | 33 |
| 2.3 − 3.3 | 3 | 44 | 53 |
| 3.3 − 4.3 | 4 | 51 | 45 |
| 4.3 − 5.2 | 3 | 44 | 53 |


SK 86 SE 12     8583 6015     Folly Lane, Norton Disney     Block H

Surface level (+ 36.6 m) + 120 ft
Water level not recorded
February 1972

Overburden 0.5 m (1.5 ft)
Mineral  5.4 m (18.0 ft)
Waste  0.3 m (1.0 ft)
Bedrock 2.3 m+ (7.5 ft +)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.5 | (1.5) | 0.5 | (1.5) |
| Glacial Sand and Gravel (Hilton Terrace) | Gravel, sandier at top of deposit.<br>  Gravel: fine, subangular to rounded<br>    quartz and quartzite, with subangular<br>    chert.<br>  Sand: medium, angular to subrounded<br>    quartz and rock fragments. | 5.4 | (18.0) | 5.9 | (19.5) |
| | Clay, light grey | 0.3 | (1.0) | 6.2 | (20.5) |
| Lower Lias | Mudstone, dark grey | 2.3+ | (7.5+) | 8.5 | (28.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 50 | + 16 | : | 23 |
| | | − 16 + 4 | : | 27 |
| Sand | 47 | − 4 + 1 | : | 9 |
| | | − 1 + ¼ | : | 33 |
| | | − ¼ + 1/16 | : | 5 |
| Fines | 3 | − 1/16 | : | 3 |

| Depth below surface (m) | Percentage | | |
|---|---|---|---|
| | Fines | Sand | Gravel |
| 0.5 − 1.1 | 2 | 81 | 17 |
| 1.1 − 2.1 | 3 | 40 | 57 |
| 2.1 − 3.1 | 5 | 43 | 52 |
| 3.1 − 4.1 | 3 | 37 | 60 |
| 4.1 − 5.1 | 3 | 36 | 61 |
| 5.1 − 5.9 | trace | 57 | 43 |

SK 86 SE 13     8668 6038     Home Farm, Norton Disney     Block H

Surface level (+34.7 m) +114 ft           Overburden  0.5 m (1.5 ft)
Water level not recorded                 Mineral    3.4 m  (11.0 ft)
March 1972                         Waste  0.5 m (1.5 ft)
                                 Bedrock 1.6 m+ (5.5 ft +)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil and fill | 0.5 | (1.5) | 0.5 | (1.5) |
| Glacial sand and gravel (Hilton Terrace) | Sandy gravel, 'clayey' at top. Gravel : fine, subangular to well rounded quartz and quartzite, with subangular chert and flint. Sand : medium, subrounded quartz and rock fragments. | 3.4 | (11.0) | 3.9 | (13.0) |
| | Clay, light brown. | 0.5 | (1.5) | 4.4 | (14.5) |
| Lower Lias | Mudstone, dark grey, fossiliferous. | 1.6+ | (5.5+) | 6.0 | (19.5) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 35 | + 16 | : | 13 |
| | | - 16 + 4 | : | 22 |
| Sand | 58 | - 4 + 1 | : | 10 |
| | | - 1 + $\frac{1}{4}$ | : | 35 |
| | | - $\frac{1}{4}$ + 1/16 | : | 13 |
| Fines | 7 | - 1/16 | : | 7 |

| Depth below | | Percentage | |
|---|---|---|---|
| surface (m) | Fines | Sand | Gravel |
| 0.5 - 0.9 | 15 | 73 | 12 |
| 0.9 - 1.9 | 7 | 62 | 31 |
| 1.9 - 2.9 | 7 | 71 | 22 |
| 2.9 - 3.9 | 3 | 37 | 60 |

SK 86 SE 14     8777 6072     Norton Bigwood, Swinderby     Block G

Surface level (+20.1 m) +66 ft
Water level not recorded
March 1972

Overburden 0.4 m (1.5 ft)
Mineral 1.7 m (5.5 ft)
Bedrock 1.9 m + (6.0 ft +)

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) |
| | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Beeston Terrace) | 'Very clayey' sandy gravel. Gravel : fine, subrounded to well rounded quartz and quartzite, with subangular chert. Sand : medium, angular to subrounded quartz and rock fragments. Fines : brown. | 1.7 | (5.5) | 2.1 | (7.0) |
| Lower Lias | Mudstone, dark grey, finely laminated. | 1.9+ | (6.0+) | 4.0 | (13.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 25 | + 16 | : | 14 |
| | | - 16 + 4 | : | 11 |
| Sand | 49 | - 4 + 1 | : | 4 |
| | | - 1 + ¼ | : | 30 |
| | | - ¼ + 1/16 | : | 15 |
| Fines | 26 | - 1/16 | : | 26 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.4 - 0.9 | 26 | 56 | 18 |
| 0.9 - 1.9 | 30 | 40 | 30 |
| 1.9 - 2.1 | 3 | 79 | 18 |

SK 86 SE 15    8828 6169    Airfield, Swinderby    Block G

Surface level (+ 14.9 m)  + 49 ft
Water level ( + 13.4 m)  + 44 ft
March 1972

Overburden 0.3 m ( 1.0 ft)
Mineral 8.5 m (28.0 ft)
Bedrock 1.7 m+ ( 5.5 ft +)

| | Thickness | | Depth | |
|---|---|---|---|---|
| | m | (ft) | m | (ft) |
| Soil | 0.3 | (1.0) | 0.3 | (1.0) |
| Older river sands and gravels (Beeston Terrace) | 8.5 | (28.0) | 8.8 | (29.0) |

Older river sands and gravels (Beeston Terrace)

Gravel and sandy gravel, 'very clayey' and sandier to 2.2 m.
Gravel : fine subangular to well rounded quartz and quartzite, with subangular chert.
Sand : medium, subangular to rounded quartz and rock fragments.
Fines : brown.

Lower Lias    Mudstone, dark grey, finely laminated, with _Pentacrinus_, _Gryphaea_, _Ostrea_, ammonites.    1.7 +    (5.5+)    10.5    (34.5)

| | % | mm | | % | | Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|---|---|---|---|---|---|
| Gravel | 43 | + 16 | : | 15 | | 0.3 - 1.3 | 25 | 62 | 13 |
| | | - 16 + 4 | : | 28 | | 1.3 - 1.7 | 33 | 60 | 7 |
| | | | | | | 1.7 - 2.2 | 25 | 59 | 16 |
| | | - 4 + 1 | : | 7 | | 2.2 - 3.2 | 1 | 40 | 59 |
| Sand | 51 | - 1 + ¼ | : | 36 | | 3.2 - 4.0 | trace | 38 | 62 |
| | | - ¼ + 1/16 | : | 8 | | 4.0 - 4.7 | 1 | 88 | 11 |
| | | | | | | 4.7 - 5.7 | trace | 42 | 58 |
| Fines | 6 | - 1/16 | : | 6 | | 5.7 - 6.7 | trace | 30 | 70 |
| | | | | | | 6.7 - 7.7 | trace | 35 | 65 |
| | | | | | | 7.7 - 8.7 | trace | 69 | 31 |
| | | | | | | 8.7 - 8.8 | trace | 57 | 43 |

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SK 86 SE 16  8924 6150  Green Gate Farm, Thurlby  Block G

Surface level (+14.6 m) +48 ft       Overburden 0.5 m (1.5 ft)
Water level not recorded        Mineral 2.0 m (6.5 ft)
February 1972           Bedrock 2.0 m+ (6.5 ft+)

|  | | Thickness | | Depth | |
|---|---|---|---|---|---|
|  | | m | (ft) | m | (ft) |
|  | Soil. | 0.5 | (1.5) | 0.5 | (1.5) |
| Older river sands and gravels (Beeston Terrace) | Gravel. Gravel : fine, subrounded to well rounded quartz and quartzite, with subangular chert, and some rounded igneous rock. Sand : medium, angular to subrounded quartz, chert and rock fragments. | 2.0 | (6.5) | 2.5 | (8.0) |
| Lower Lias | Limestone, dark grey fossiliferous. | 2.0+ | (6.5+) | 4.5 | (15.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 49 | - 16 | : | 21 |
| | | - 16 + 4 | : | 28 |
| | | - 4 + 1 | : | 9 |
| Sand | 47 | - 1 + ¼ | : | 31 |
| | | - ¼ + 1/16 | : | 7 |
| Fines | 4 | - 1/16 | : | 4 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.5 - 1.5 | 8 | 50 | 42 |
| 1.5 - 2.5 | trace | 45 | 55 |

SK 86 SE 17  8900 6066  Killbeck Plantation, Thurlby  Block G

Surface level (+15.5 m) +51 ft       Overburden 0.4 m (1.5 ft)
Water level (+14.3 m) +47 ft       Mineral 6.5 m (21.5 ft)
March 1972           Bedrock 1.6 m + (5.5 ft +)

|  | | Thickness | | Depth | |
|---|---|---|---|---|---|
|  | | m | (ft) | m | (ft) |
|  | Soil | 0.4 | (1.5) | 0.4 | (1.5) |
| Older river sands and gravels (Beeston Terrace) | Gravel, 'very clayey' and sandier at top. Gravel : fine, subangular to well rounded quartz and quartzite, with subangular chert and flint, and some rounded lime-stone. Sand : medium, subrounded to rounded quartz and rock fragments. Fines : brown. | 6.5 | (21.5) | 6.9 | (22.5) |
| Lower Lias | Mudstone, dark grey, finely laminated. | 1.6+ | (5.5+) | 8.5 | (28.0) |

| | % | mm | | % |
|---|---|---|---|---|
| Gravel | 55 | + 16 | : | 22 |
| | | - 16 + 4 | : | 33 |
| | | - 4 + 1 | : | 8 |
| Sand | 41 | - 1 + ¼ | : | 26 |
| | | - ¼ + 1/16 | : | 7 |
| Fines | 4 | - 1/16 | : | 4 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.4 - 1.2 | 27 | 62 | 11 |
| 1.2 - 2.2 | 3 | 34 | 63 |
| 2.2 - 3.2 | trace | 38 | 62 |
| 3.2 - 4.2 | trace | 42 | 58 |
| 4.2 - 5.2 | trace | 23 | 77 |
| 5.2 - 6.2 | trace | 43 | 57 |
| 6.2 - 6.9 | 1 | 52 | 47 |

SK 86 SE 18     8767 6315     Moor Lane, Swinderby     Block G

Surface level (c.+15.5 m) c.+51 ft
Water level variable
Shell and auger 6-inch
October 1972

Overburden 0.4 m (1.5 ft)
Mineral 10.4 m (34.0 ft)
Bedrock 1.7 m+ (5.5 ft +)

|  | Thickness | | Depth | |
|  | m | (ft) | m | (ft) |
| Soil | 0.4 | (1.5) | 0.4 | (1.5) |

| | | Thickness | | Depth | |
|---|---|---|---|---|---|
| Older river sands and gravels (Beeston Terrace) | Sandy gravel, more gravelly in lower part. Gravel : fine subangular to well rounded quartz and quartzite, with subangular chert and flint, and some rounded sandstone. Sand : medium, subrounded quartz and rock fragments. | 10.4 | (34.0) | 10.8 | (35.5) |
| Lower Lias | Mudstone, grey, laminated. | 1.7+ | (5.5+) | 12.5 | (41.0) |

|  | % | mm | | % |
|---|---|---|---|---|
|  |  | + 16 | : | 13 |
| Gravel | 45 | - 16 + 4 | : | 32 |
| Sand | 53 | - 4 + 1 | : | 12 |
|  |  | - 1 + $\frac{1}{4}$ | : | 34 |
|  |  | - $\frac{1}{4}$ + 1/16 | : | 7 |
| Fines | 2 | - 1/16 | : | 2 |

| Depth below surface (m) | Fines | Percentage Sand | Gravel |
|---|---|---|---|
| 0.4 - 1.4 | 16 | 67 | 17 |
| 1.4 - 2.4 | 3 | 54 | 43 |
| 2.4 - 3.4 | 1 | 83 | 16 |
| 3.4 - 4.4 | 1 | 60 | 39 |
| 4.4 - 5.4 | 1 | 54 | 45 |
| 5.4 - 6.4 | 1 | 56 | 43 |
| 6.4 - 7.4 | 1 | 58 | 41 |
| 7.4 - 8.4 | trace | 37 | 63 |
| 8.4 - 9.4 | trace | 38 | 62 |
| 9.4 - 10.4 | trace | 27 | 73 |
| 10.4 - 10.8 | 1 | 49 | 50 |

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# Appendix G: List of Workings

There are four active workings in the area. All are 'wet' pits and are listed below. There are numerous small disused sand and gravel workings scattered throughout the area.

| Working | Horizons worked | Grid Reference |
|---|---|---|
| Hoveringham Gravels Ltd., Girton | Floodplain Terrace | 822 674 |
| Redland-Inns, Besthorpe | Floodplain Terrace | 815 655 |
| Redland-Inns, North Scarle | Floodplain Terrace | 848 687 |
| Butterley Aggregates Ltd., Thurlby | Beeston Terrace | 866 611 |

# Appendix H: Conversion Table, Metres to Feet (to nearest 0.5 ft)

| m | ft | m | ft | m | ft | m | ft | m | ft | m | ft |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1 | 0.5 | 6.1 | 20 | 12.1 | 39.5 | 18.1 | 59.5 | 24.1 | 79 | | |
| 0.2 | 0.5 | 6.2 | 20.5 | 12.2 | 40 | 18.2 | 59.5 | 24.2 | 79.5 | | |
| 0.3 | 1 | 6.3 | 20.5 | 12.3 | 40.5 | 18.3 | 60 | 24.3 | 79.5 | | |
| 0.4 | 1.5 | 6.4 | 21 | 12.4 | 40.5 | 18.4 | 60.5 | 24.4 | 80 | | |
| 0.5 | 1.5 | 6.5 | 21.5 | 12.5 | 41 | 18.5 | 60.5 | 24.5 | 80.5 | | |
| 0.6 | 2 | 6.6 | 21.5 | 12.6 | 41.5 | 18.6 | 61 | 24.6 | 80.5 | | |
| 0.7 | 2.5 | 6.7 | 22 | 12.7 | 41.5 | 18.7 | 61.5 | 24.7 | 81 | | |
| 0.8 | 2.5 | 6.8 | 22.5 | 12.8 | 42 | 18.8 | 61.5 | 24.8 | 81.5 | | |
| 0.9 | 3 | 6.9 | 22.5 | 12.9 | 42.5 | 18.9 | 62 | 24.9 | 81.5 | | |
| 1.0 | 3.5 | 7.0 | 23 | 13.0 | 42.5 | 19.0 | 62.5 | 25.0 | 82 | | |
| 1.1 | 3.5 | 7.1 | 23.5 | 13.1 | 43 | 19.1 | 62.5 | 25.1 | 82.5 | | |
| 1.2 | 4 | 7.2 | 23.5 | 13.2 | 43.5 | 19.2 | 63 | 25.2 | 82.5 | | |
| 1.3 | 4.5 | 7.3 | 24 | 13.3 | 43.5 | 19.3 | 63.5 | 25.3 | 83 | | |
| 1.4 | 4.5 | 7.4 | 24.5 | 13.4 | 44 | 19.4 | 63.5 | 25.4 | 83.5 | | |
| 1.5 | 5 | 7.5 | 24.5 | 13.5 | 44.5 | 19.5 | 64 | 25.5 | 83.5 | | |
| 1.6 | 5 | 7.6 | 25 | 13.6 | 44.5 | 19.6 | 64.5 | 25.6 | 84 | | |
| 1.7 | 5.5 | 7.7 | 25.5 | 13.7 | 45 | 19.7 | 64.5 | 25.7 | 84.5 | | |
| 1.8 | 6 | 7.8 | 25.5 | 13.8 | 45.5 | 19.8 | 65 | 25.8 | 84.5 | | |
| 1.9 | 6 | 7.9 | 26 | 13.9 | 45.5 | 19.9 | 65.5 | 25.9 | 85 | | |
| 2.0 | 6.5 | 8.0 | 26 | 14.0 | 46 | 20.0 | 65.5 | 26.0 | 85.5 | | |
| 2.1 | 7 | 8.1 | 26.5 | 14.1 | 46.5 | 20.1 | 66 | 26.1 | 85.5 | | |
| 2.2 | 7 | 8.2 | 27 | 14.2 | 46.5 | 20.2 | 66.5 | 26.2 | 86 | | |
| 2.3 | 7.5 | 8.3 | 27 | 14.3 | 47 | 20.3 | 66.5 | 26.3 | 86.5 | | |
| 2.4 | 8 | 8.4 | 27.5 | 14.4 | 47 | 20.4 | 67 | 26.4 | 86.5 | | |
| 2.5 | 8 | 8.5 | 28 | 14.5 | 47.5 | 20.5 | 67.5 | 26.5 | 87 | | |
| 2.6 | 8.5 | 8.6 | 28 | 14.6 | 48 | 20.6 | 67.5 | 26.6 | 87.5 | | |
| 2.7 | 9 | 8.7 | 28.5 | 14.7 | 48 | 20.7 | 68 | 26.7 | 87.5 | | |
| 2.8 | 9 | 8.8 | 29 | 14.8 | 48.5 | 20.8 | 68 | 26.8 | 88 | | |
| 2.9 | 9.5 | 8.9 | 29 | 14.9 | 49 | 20.9 | 68.5 | 26.9 | 88.5 | | |
| 3.0 | 10 | 9.0 | 29.5 | 15.0 | 49 | 21.0 | 69 | 27.0 | 88.5 | | |
| 3.1 | 10 | 9.1 | 30 | 15.1 | 49.5 | 21.1 | 69 | 27.1 | 89 | | |
| 3.2 | 10.5 | 9.2 | 30 | 15.2 | 50 | 21.2 | 69.5 | 27.2 | 89 | | |
| 3.3 | 11 | 9.3 | 30.5 | 15.3 | 50 | 21.3 | 70 | 27.3 | 89.5 | | |
| 3.4 | 11 | 9.4 | 31 | 15.4 | 50.5 | 21.4 | 70 | 27.4 | 90 | | |
| 3.5 | 11.5 | 9.5 | 31 | 15.5 | 51 | 21.5 | 70.5 | 27.5 | 90 | | |
| 3.6 | 12 | 9.6 | 31.5 | 15.6 | 51 | 21.6 | 71 | 27.6 | 90.5 | | |
| 3.7 | 12 | 9.7 | 32 | 15.7 | 51.5 | 21.7 | 71 | 27.7 | 91 | | |
| 3.8 | 12.5 | 9.8 | 32 | 15.8 | 52 | 21.8 | 71.5 | 27.8 | 91 | | |
| 3.9 | 13 | 9.9 | 32.5 | 15.9 | 52 | 21.9 | 72 | 27.9 | 91.5 | | |
| 4.0 | 13 | 10.0 | 33 | 16.0 | 52.5 | 22.0 | 72 | 28.0 | 92 | | |
| 4.1 | 13.5 | 10.1 | 33 | 16.1 | 53 | 22.1 | 72.5 | 28.1 | 92 | | |
| 4.2 | 14 | 10.2 | 33.5 | 16.2 | 53 | 22.2 | 73 | 28.2 | 92.5 | | |
| 4.3 | 14 | 10.3 | 34 | 16.3 | 53.5 | 22.3 | 73 | 28.3 | 93 | | |
| 4.4 | 14.5 | 10.4 | 34 | 16.4 | 54 | 22.4 | 73.5 | 28.4 | 93 | | |
| 4.5 | 15 | 10.5 | 34.5 | 16.5 | 54 | 22.5 | 74 | 28.5 | 93.5 | | |
| 4.6 | 15 | 10.6 | 35 | 16.6 | 54.5 | 22.6 | 74 | 28.6 | 94 | | |
| 4.7 | 15.5 | 10.7 | 35 | 16.7 | 55 | 22.7 | 74.5 | 28.7 | 94 | | |
| 4.8 | 15.5 | 10.8 | 35.5 | 16.8 | 55 | 22.8 | 75 | 28.8 | 94.5 | | |
| 4.9 | 16 | 10.9 | 36 | 16.9 | 55.5 | 22.9 | 75 | 28.9 | 95 | | |
| 5.0 | 16.5 | 11.0 | 36 | 17.0 | 56 | 23.0 | 75.5 | 29.0 | 95 | | |
| 5.1 | 17 | 11.1 | 36.5 | 17.1 | 56 | 23.1 | 76 | 29.1 | 95.5 | | |
| 5.2 | 17 | 11.2 | 36.5 | 17.2 | 56.5 | 23.2 | 76 | 29.2 | 96 | | |
| 5.3 | 17.5 | 11.3 | 37 | 17.3 | 57 | 23.3 | 76.5 | 29.3 | 96 | | |
| 5.4 | 17.5 | 11.4 | 37.5 | 17.4 | 57 | 23.4 | 77 | 29.4 | 96.5 | | |
| 5.5 | 18 | 11.5 | 37.5 | 17.5 | 57.5 | 23.5 | 77 | 29.5 | 97 | | |
| 5.6 | 18.5 | 11.6 | 38 | 17.6 | 57.5 | 23.6 | 77.5 | 29.6 | 97 | | |
| 5.7 | 18.5 | 11.7 | 38.5 | 17.7 | 58 | 23.7 | 78 | 29.7 | 97.5 | | |
| 5.8 | 19 | 11.8 | 38.5 | 17.8 | 58.5 | 23.8 | 78 | 29.8 | 98 | | |
| 5.9 | 19.5 | 11.9 | 39 | 17.9 | 58.5 | 23.9 | 78.5 | 29.9 | 98 | | |
| 6.0 | 19.5 | 12.0 | 39.5 | 18.0 | 59 | 24.0 | 78.5 | 30.0 | 98.5 | | |

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## REPORTS OF THE INSTITUTE OF GEOLOGICAL SCIENCES

*Assessment of British Sand and Gravel Resources*

No. 1    The sand and gravel resources of the country south-east of Norwich, Norfolk : Description of 1 : 25 000 resource sheet TG 20. By E. F. P. Nickless. Price £1.15.    Report No. 71/20

No. 2    The sand and gravel resources of the country around Witham, Essex: Description of 1 : 25 000 resource sheet TL 81. By H. J. E. Haggard. Price £1.20.    Report No. 72/6

No. 3    The sand and gravel resources of the area south and west of Woodbridge, Suffolk: Description of 1 : 25 000 resource sheet TM 24. By R. Allender and S. E. Hollyer. Price £1.70.
Report No. 72/9

No. 4    The sand and gravel resources of the country around Maldon, Essex: Description of 1 : 25 000 resource sheet TL 80. By J. D. Ambrose. Price £1.20.    Report No. 73/1

No. 5    The sand and gravel resources of the country around Hethersett, Norfolk: Description of 1 : 25 000 resource sheet TG 10. By E. F. P. Nickless. Price £1.60.    Report No. 73/4

No. 6    The sand and gravel resources of the country around Terling, Essex: Description of 1 : 25 000 resource sheet TL 71. By C. H. Eaton. Price £1.20.    Report No. 73/5

No. 7    The sand and gravel resources of the country around Layer Breton and Tolleshunt D'Arcy, Essex: Description of 1 : 25 000 resource sheet TL 91 and part of TL 90. By J. D. Ambrose. Price £1.30.    Report No. 73/8

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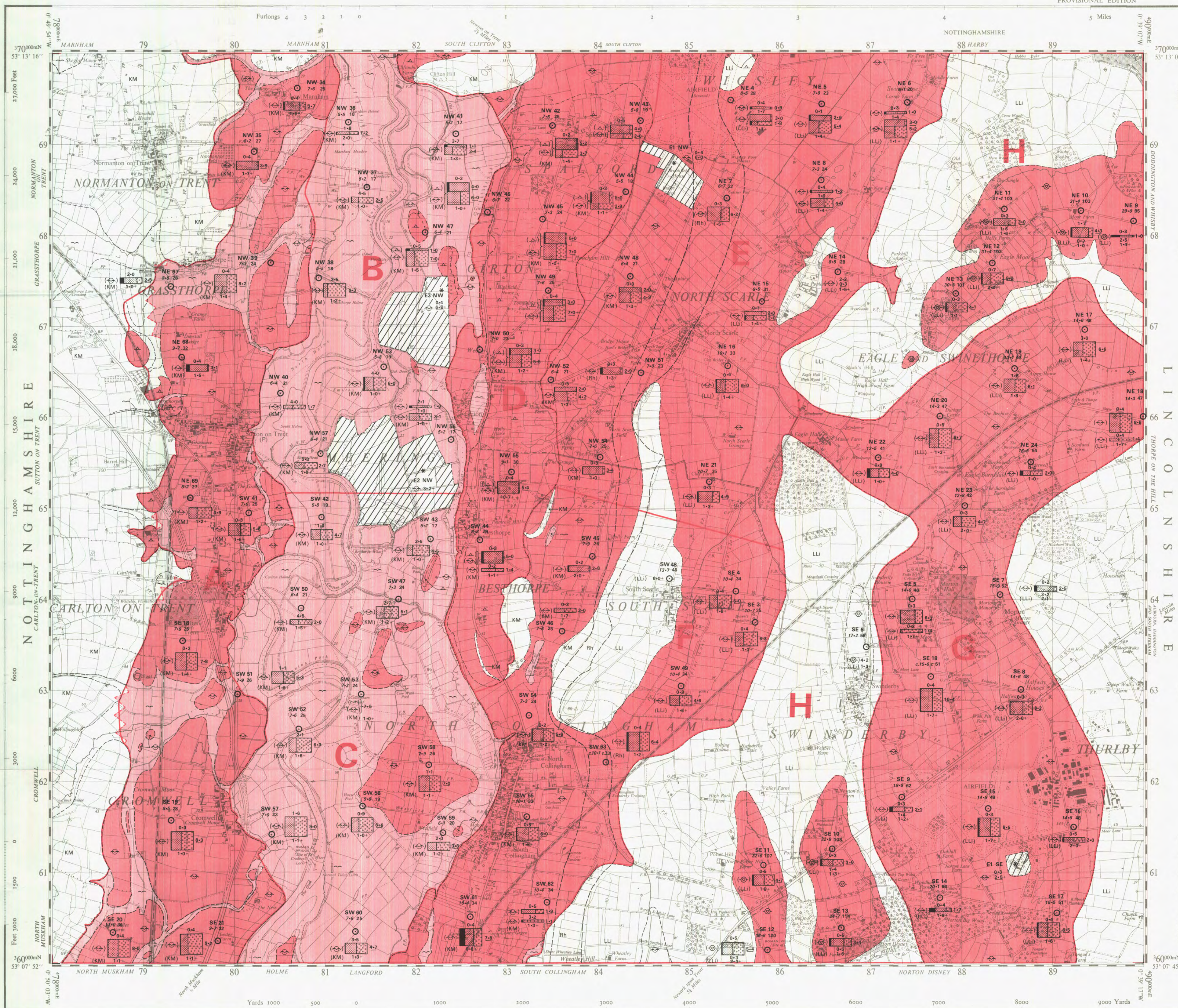
INSTITUTE OF GEOLOGICAL SCIENCES

MINERAL ASSESSMENT UNIT

# THE SAND & GRAVEL RESOURCES of SHEET SK 86 & Pt SK 76 (BESTHORPE, NOTTS)

Scale 1:25,000 or about 2½ Inches to 1 Mile

ORDNANCE SURVEY
SHEET SK86 & Pt SK76
PROVISIONAL EDITION

This map should be read in conjunction with the accompanying Report which contains details of the assessment of resources.
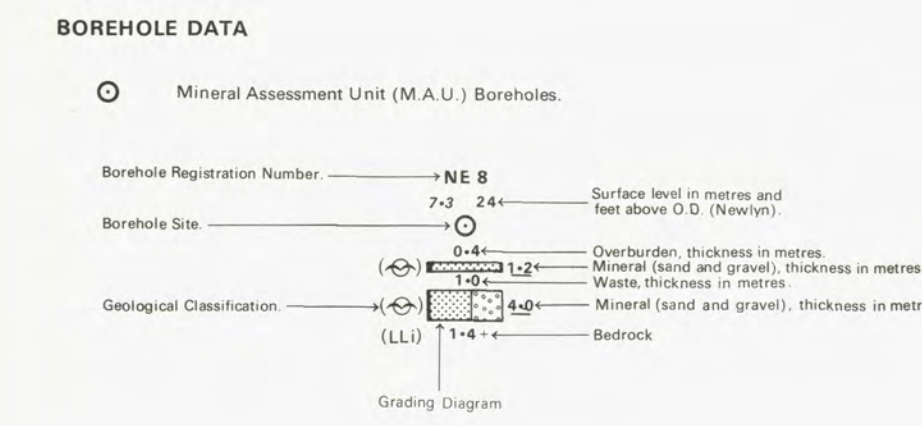
## EXPLANATION OF SYMBOLS AND ABBREVIATIONS

### DRIFT

| | | |
|---|---|---|
| BS-2 | | Blown Sand- fine-grained, well-rounded sands |
| A-8 | | Alluvium- clays, silts and peat. |
| OR-5 | | Older River Sands and Gravel - medium sands and gravels |
| GS-7 | | Glacial Sand and Gravel- sand with sporadic pebbles. |
| BC-3 | | Boulder Clay- stiff brown stony clay |

**RECENT AND PLEISTOCENE**

### SOLID

| | | |
|---|---|---|
| LLi | | Lower Lias- dark impure limestones and mudstones. |
| Rh | | Rhaetic- grey and green mudstones. |
| KM | | Keuper Marl- red and green mudstones with gypsum in places. |

**JURASSIC AND PERMO-TRIASSIC**

WO-5 — Worked out areas of sand and gravel

### BOUNDARY LINES

– – – – Geological boundary. Drift.

———— Geological boundary. Solid. Broken line denotes uncertainty.

~~~~~ Inferred boundary between recognised categories of deposits.

———— Resource Block boundary.

### BOREHOLE DATA

○ Mineral Assessment Unit (M.A.U.) Boreholes.

Borehole Registration Number — NE 8

Borehole Site

Geological Classification

Grading Diagram

Note
(i) Figures underlined denote thicknesses used in the assessment of resources.
(ii) The + sign indicates that the base of the deposit was not reached.
(iii) The figures in italics are the metric conversions of measurements recorded in feet.
(iv) The Geological Classification is given only for mineral and bedrock.

#### Borehole Registration Number

Each M.A.U. borehole is identified by a Registration Number, eg. NE 8. The letters refer to the quarter sheet and the figures to the I.G.S. serial number for that quarter. The unique designation for borehole NE 8 is SK 86 NE 8. Note that the western part of this sheet is SK 76.

#### Grading Diagrams

Each grading diagram shows the mean particle size distribution of a distinct deposit of mineral.

Sand
(+1/16-4mm)

The height of the diagram is proportional to the mineral thickness.

Fines    Gravel
(-1/16mm)(+4mm)

The width of the divisions show the proportions of, Fines, Sand and Gravel.

### EXPOSURE RECORDS

Information from the inspection of exposures is shown in the same way as for boreholes, but they are located by an asterisk, thus ✳. Reference number and details of thickness are shown.

### CATEGORIES OF DEPOSITS

| | |
|---|---|
| Exposed mineral. | CAT-E6 |
| Continuous or almost continuous spreads of mineral beneath overburden. | CAT-C1 |
| Sand and gravel either not potentially workable (see Report) or absent. | CAT-A2 |

Where appropriate on other sheets a fourth category, 'Discontinuous spreads of sand and gravel beneath overburden' is recognised.

### RESOURCE BLOCKS

For the purpose of assessment the mineral is divided into Resource Blocks (see Report). Each is designated by a letter.

Detailed records may be consulted, on application to the Director, at the appropriate offices of the Institute of Geological Sciences.
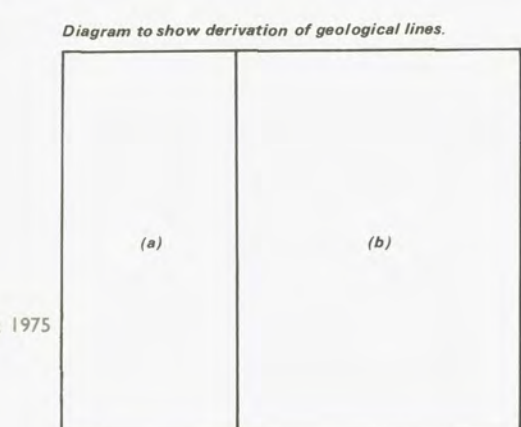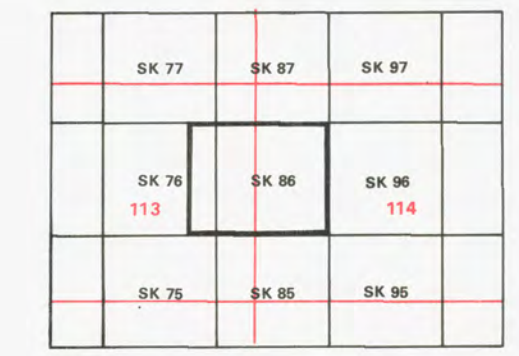
Sand and gravel Survey by J.R.Gozzard and J.H.Lovell in 1971-72 under the supervision of D. Price.
R.G. Thurrell, Head, Mineral Assessment Unit.

1:25 000 Sand and Gravel Resource Sheet published 1975.
Sir Kingsley Dunham, D.Sc., F.R.S., Director, Institute of Geological Sciences, incorporating the Geological Survey of Great Britain, the Museum of Practical Geology and Overseas Geological Surveys.
1330/75

The GRID lines on this sheet are at 1 Kilometre interval.
Heights are in feet above Mean Sea Level at Newlyn.

Contour values are in feet

1 square inch in this map represents
99.636 acres on the ground.

Diagram to show derivation of geological lines

(a) Geological survey on six-inch scale by B. Smith in 1907-08 G.W. Lamplugh, District Geologist.
(b) Original geological survey on one-inch scale published in 1885, partially revised on six-inch scale by D.Price in 1972.

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Compiled from 6" sheets last fully revised 1903-16.
Other partial systematic revision 1947-53 has been incorporated. Airfields and tidal changes revised 1962.
Major roads partially revised 1969.

Diagram showing the relation of the National Grid 1:25,000 sheets with the New Series One-inch Geological sheets 113 and 114

| | | |
|---|---|---|
| SK 77 | SK 87 | SK 97 |
| SK 76 113 | SK 86 | SK 96 114 |
| SK 75 | SK 85 | SK 95 |

Data quoted for an individual borehole 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.

Made and printed for the Institute of Geological Sciences by the Director General of the Ordnance Survey, Southampton.

The representation on this map of a Road, Track, or Footpath, is no evidence of the existence of a right of way.