

The sand and gravel resources of the country around Sudbury, Suffolk

Description of 1:25 000 sheet TL 84

P. M. Hopson

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 and subsequent reports appear as Mineral Assessment Reports of the Institute.

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

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PREFACE

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

Sand and gravel, considered together as naturally occurring aggregate, was selected as the bulk mineral demanding the most urgent attention, initially in the 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 Industrial Minerals Assessment Unit (formerly the Mineral Assessment Unit) began systematic surveys in 1968. The work is now being financed by the Department of the Environment and is being undertaken with the cooperation of the Sand and Gravel Association of Great Britain.

This report describes 100 km² of the country north-west of Sudbury, Suffolk, shown on the accompanying 1:25 000 resource sheet (TL 84). The survey was conducted by Mr P. M. Hopson, who was assisted in the drilling and sampling programme by Mr S. J. Mathers and Mr C. W. Thomas. The work is based on geological surveys at the six-inch scale by Mr R. A. Ellison and Dr D. Millward, of the East Anglia and S. E. England Field Unit of the Institute, in 1978.

Mr W. N. Pierce and Mr J. D. Burnell (Land Agent) were responsible for negotiating access to land for drilling. The ready cooperation of landowners and tenants and officials of the Anglian Water Authority, Essex and Suffolk County Councils, is gratefully acknowledged.

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Description of 1:25 000 sheet TL 84

P. M. Hopson

SUMMARY

The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 93 boreholes drilled for the Industrial Minerals Assessment Unit form the basis of the assessment of the sand and gravel resources of the country around Sudbury, Suffolk.

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

The assessed area is divided into six resource blocks, containing between 5.4 and 12.6 km² of sand and gravel. For each block the geology of the deposits is described, and the mineral-bearing area, the mean thickness of overburden and mineral and the mean gradings are stated. Detailed borehole data are also given. The geology, the position of the boreholes and the outlines of the resource blocks are shown on the accompanying map.

Notes

Each borehole registered with the Institute is identified by a four-element code (e.g. TL 84 SW 47). The first two elements define the 10-km square (of the National Grid) in which the borehole is situated; the third element defines a quadrant of that square, and the fourth is the accession number of the borehole. In the text of the report letters TL are normally omitted.

All National Grid references in this publication lie within the 100-km square TL unless otherwise stated. Grid references may be given to eight figures, accurate to within 10 m, or to six figures for more extensive locations, for example farms.

Bibliographical reference

HOPSON, P. M. 1982. The sand and gravel resources of the country around Sudbury, Suffolk: description of 1:25 000 resource sheet TL 84. *Miner. Assess. Rep. Inst. Geol. Sci.*, No 118.

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INTRODUCTION

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

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

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

- a The deposit should average at least 1 m in thickness.
- b The ratio of overburden to sand and gravel should be no more than 3:1.
- c The proportion of fines (particles passing the No. 240-mesh B.S. sieve, about $\frac{1}{16}$ mm) should not exceed 40 per cent.
- d The deposit should lie within 25 m of the surface, this being taken as the likely maximum working depth under most circumstances. It follows from the second criterion that boreholes are drilled no deeper than 18 m if no sand and gravel has been proved.

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

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

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

The volume and other characteristics are assessed within resource blocks, each of which, ideally, contains

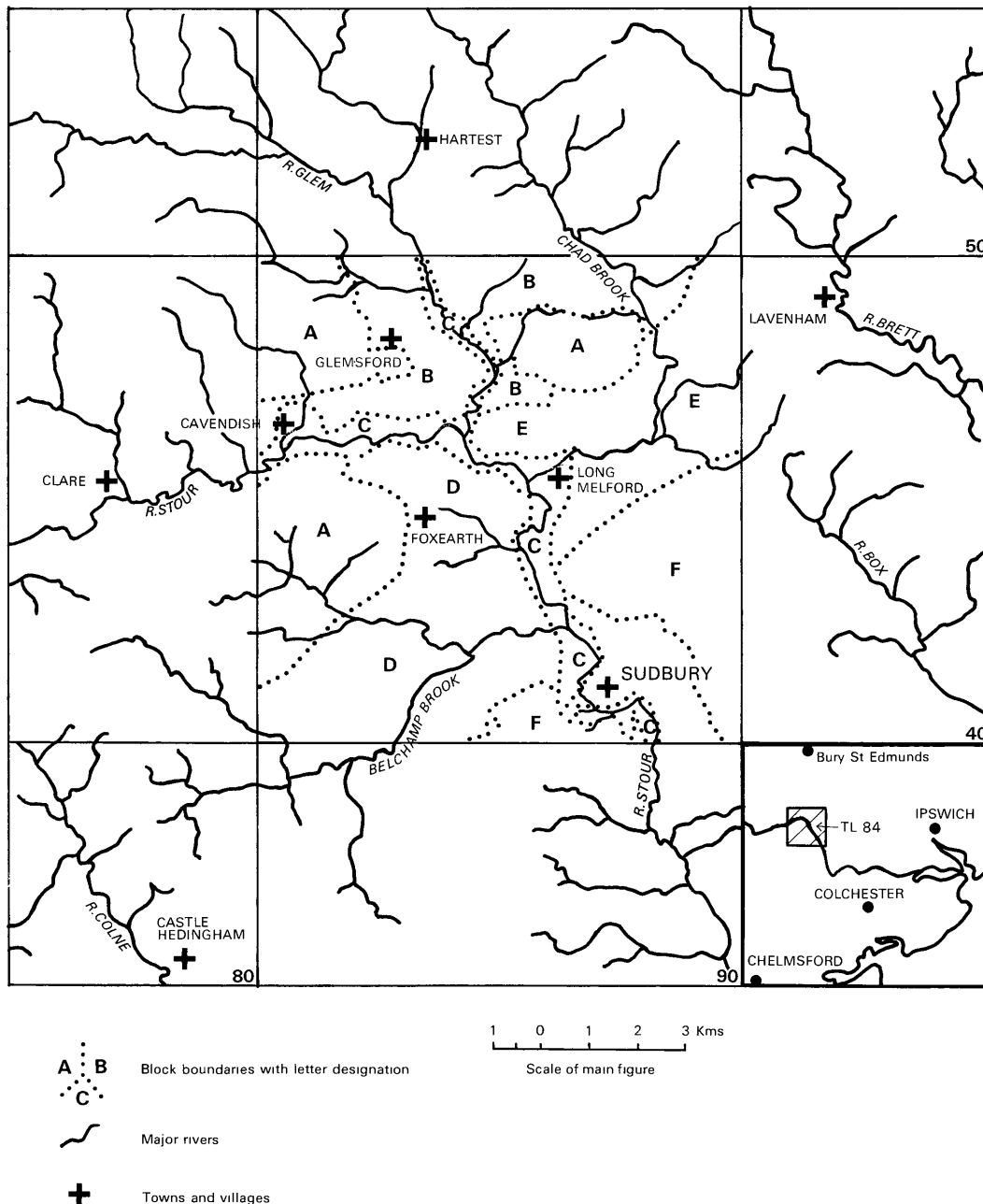


Figure 1 Sketch map showing the location of sheet TL 84 and the position of the resource block boundaries.

approximately 10 km² of sand and gravel. No account is taken of any factors, for example roads, villages or land of high agricultural or landscape value, which might stand in the way of sand and gravel being exploited, although towns are excluded. The estimated total volume therefore bears no simple relationship to the amount that could be extracted in practice.

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

DESCRIPTION OF THE DISTRICT

General

The resource sheet covers 100 km² of country north and west of Sudbury, Suffolk (Figure 1), of which 54.9 km² is mineral-bearing. Sudbury is 30 km west of Ipswich and some 25 km south of Bury St. Edmunds. The resource sheet straddles the Essex/Suffolk border which, in this district, follows the River Stour for much of its length.

The dominant industry is agriculture, with arable land predominating over pasture. Light engineering, textile and food processing are the principal manufacturing industries around the built up areas of Ballingdon, Long Melford, Sudbury and Great Cornard.

Both fluvial and glacial deposits are assessed on this sheet. The fluvial deposits associated with the rivers Glem and Stour are confined to Block C. The urban area of Sudbury, Great Cornard and Ballingdon has not been assessed; it covers an area of 4.9 km² in the south-east of the sheet.

Topography

The topography is dominated by the valley of the River Stour and to a lesser extent by its main tributary valleys of the River Glem, Chad Brook and Belchamp Brook (Figure 2). The Stour flows eastwards from Cavendish in the west to Long Melford, and then turns south-eastwards to flow through Sudbury and Great Cornard. During its 16 km meandering traverse across the sheet it falls from approximately 36 m to 23 m above Ordnance Datum.

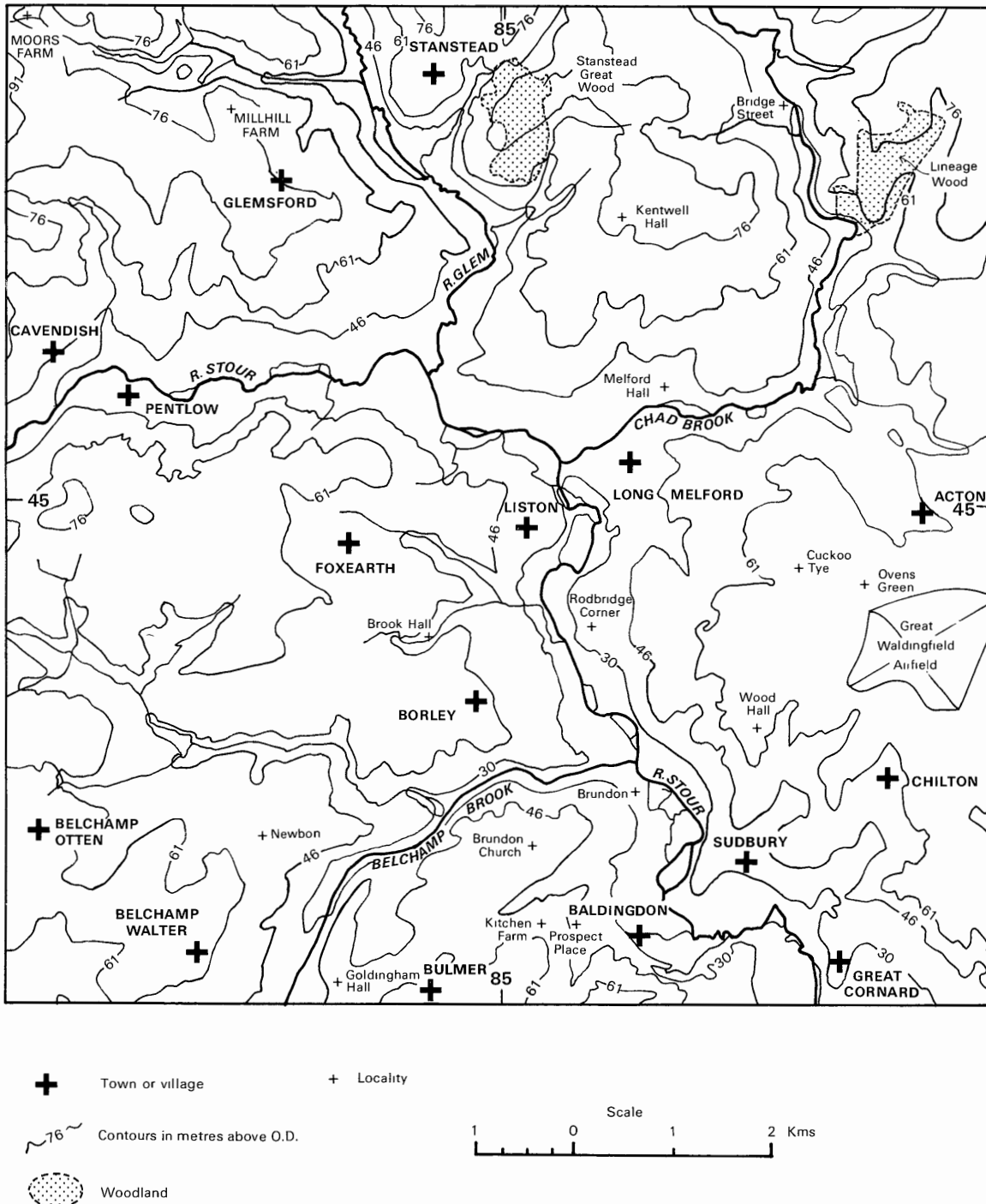


Figure 2 The topography of the area of sheet TL 84 and the locations mentioned in the text.

These four main streams dissect a boulder clay plateau which lies generally between 60 and 76 m OD but rises in the north and west above 76 m OD, and exceptionally, south of Moors Farm [802 499] to 92 m (Figure 2).

Geology

The assessment of resources is based on geological mapping at the six-inch scale by Dr D. Millward and Mr R. A. Ellison in 1978. The geology of the eastern half of the resource sheet, described by Millward (1980), has been incorporated into the following notes. The geological classification of the deposits present on this sheet is given in Table 1.

SOLID

Middle Chalk The Middle Chalk, a greyish white well jointed soft earthy chalk, has been proved only in deep wells in the River Stour valley where it is present underlying glacial deposits that are preserved in a tunnel valley (Woodland 1970) extending from Cavendish to Long Melford (Barker, 1979).

Upper Chalk The Upper Chalk rests conformably on the Middle Chalk and forms the bedrock to the Pleistocene and Recent deposits over much of the sheet. It occupies small outcrops in the valley of Belchamp Brook west of Goldingham Hall [833 403], north of Brundon Church [858 417] and in the River Stour valley in and around

Table 1 Classification of deposits

DRIFT

Recent and

- Pleistocene** Peat
- Alluvium
- River Terrace Deposits
- Head
- Boulder Clay
- Glacial Silt
- Glacial Sand and Gravel
- Barham Sands and Gravels
- Kesgrave Sands and Gravels

SOLID

Pleistocene Crag

Eocene and

- Palaeocene** London Clay
- Lower London Tertiaries:
 - Woolwich and Reading Beds
 - Thanet Beds

Upper Cretaceous

- Upper Chalk
- Middle Chalk (proved in boreholes only)

Sudbury and Ballingdon.

The Upper Chalk is exposed in many quarries in the Sudbury and Ballingdon area where it is a well-jointed soft, white, sparsely fossiliferous limestone with seams of nodular and tabular bluish black flints. In IMAU boreholes, which are generally stopped after drilling a metre into bedrock, the Upper Chalk is commonly highly weathered and typically consists of angular fragments of chalk and flint in a soft putty-like matrix of degraded chalk.

Lower London Tertiaries This formation is represented in the area by two members, the Thanet Beds and the Woolwich and Reading Beds. These beds subcrop and outcrop in the south-east along a partially buried escarpment trending north-east to south-west. North of this escarpment only small patches, buried beneath Pleistocene and Recent deposits, have been proved in IMAU boreholes. In these outliers the deposits have been classified in the borehole logs and on the map as Lower London Tertiaries (LLT, undivided), as their stratigraphic relationship to the deposits on the escarpment cannot readily be determined.

From the regional information, the Lower London Tertiaries are known to rest disconformably on the Upper Chalk and to have a low regional dip estimated to be a few degrees towards the south-east.

The lithostratigraphy of the deposits on the escarpment has been investigated during the survey in boreholes SW 56 [8495 4017] and SE 81 [8552 4090], in the vicinity of Bulmer [845 403] and Kitchen Farm [855 409], respectively. At these localities the basal London Clay and the Lower London Tertiaries were proved, resting on the Upper Chalk.

Thanet Beds: This deposit is a silty very fine sand or very sandy silt with small to large amounts of mica and clay. In boreholes the deposit is greyish green and at its base olive-green in colour; upon exposure it weathers to a buff or pale lilac brown.

The Thanet Beds are exposed in the upper faces of many of the chalk quarries in and around Sudbury and Ballingdon, for example near Prospect Place [859 409], where buff coloured silty fine sands rest on a basal pebble bed of well rounded and nodular green-coated flints.

Woolwich and Reading Beds: This deposit can be divided into two: a lower unit of silty sandy clays and clayey silty fine and medium sands, and an upper unit of stiff waxy clay. These are termed the Woolwich Type and the Reading Type respectively by Hester (1965) in his review paper on the Woolwich and Reading Beds. Both divisions tend to be mottled in colour, the lower one being more subdued greenish grey, dark grey and brick red and the upper one vivid grey, green, brown and red. Both can also contain race nodules, mica and, rarely in this area, thin pebble beds of well rounded flint.

London Clay Only the basal 10 m or so of the London Clay is represented in this area and it always rests on the underlying Lower London Tertiaries. The base of the deposit consists of a bed of well rounded flint pebbles and this is overlain by a very sandy silty bluish grey clay which contains pockets of dark olive green glauconitic fine and medium sand. When weathered the London Clay becomes a dark greyish brown or more characteristically, ochre-brown colour.

Crag The Crag consists typically of fine and medium sand with subordinate coarse quartz sand, giving a strongly bimodal mean particle size distribution curve. A basal bed of well rounded flints and phosphatic nodules is commonly present.

In this area the Crag is divisible into a lower shelly part and an upper shell-free part (see for example the record of borehole NE 39 [8786 4829]). It is not known whether the shell-free crag is *in situ* and was originally shell-free, or whether secondary leaching or reworking has removed the shell debris.

The lower shelly unit has not been proved in all IMAU boreholes penetrating Crag deposits and it appears that the upper unit has a wider distribution, for example between boreholes SW 39 [8058 4317] and SW 40 [8053 4236].

The Crag has been proved between Pentlow and Belchamp Otten in the west, north of Cavendish in the north-west and around Kentwell Hall [863 479] in the north-east. These scattered occurrences have been included in Block A. Other occurrences of Crag are found in the south-east around Sudbury and south of Acton in Block F.

The most notable exposure of Crag is in an abandoned chalk quarry south of the A134 (Newton Road), 1 km east of Sudbury town centre. In this quarry up to 2 m of alternating beds of silty fine and medium sand, and medium and coarse well rounded quartz sands with some mica and thin fine gravel stringers, can be examined. The Crag is dark orange-brown, with poorly developed cross bedding, and heavily ironstained and indurated, with local developments of ironpan. A few poorly preserved, partially decalcified shells and some fossil clasts have been found, but none of the specimens has proved to be identifiable.

DRIFT

Kesgrave Sands and Gravels The Kesgrave Sands and Gravels have been found generally in the same areas as the underlying Crag, but they overstep onto the older solid deposits on all sides, for example, at Ovens Green [887 444] and Bulmer. The deposit as mapped can be divided into a planar bedded 'clayey' sand, the particle size distribution of which is strongly unimodal, and a relatively clay-free pebbly sand or sandy gravel with a high quartz and quartzite content. Only the latter clay-free lithology is considered to be the equivalent of the Kesgrave Sands and Gravels as defined by Rose and Allen (1977). The exact age relationship between the unimodal sands and the quartz-rich pebbly sands cannot readily be determined in this district, but wherever the two units are found together the unimodal sands always occupy the lower and hence older position.

The Kesgrave Sands and Gravels, including the unimodal sands, are considered by Rose and Allen (1977) to be the result of deposition in a braided stream environment by a 'proto'-Thames of Beestonian age. The author, however, considers that the unimodal sands cannot be regarded as braided stream deposits but might well be estuarine or even shallow marine in origin and of an earlier age. Further investigation will be required to substantiate this hypothesis.

In the south-east, in the vicinity of Great Cornard, the top of the Kesgrave Sands and Gravels becomes 'very clayey' and has an enhanced reddening. These deposits are exposed in a pit at SE E7 [8935 4170] where a 'very clayey' orange brown pebbly sand up to 2.5 m thick is seen; they are considered to be the Valley Farm Rubified Sol Lessivé of Rose and Allen (1977).

Barham Sands and Gravels The Barham Sands and Gravels were first defined by Rose and Allen (1977) as glacio-fluvial sands and gravels of Anglian age. On this sheet deposits of 'clayey' sandy gravel containing some chalk have been proved resting on the Kesgrave Sands and Gravels, for example in borehole NE 53 [8947 4532]. These deposits are considered to be the Barham Sands and Gravels but on this sheet they have a thin and patchy distribution.

Glacial Sand and Gravel The Glacial Sand and Gravel is widely distributed. It has been found below, within and above the Boulder Clay with which it is closely associated.

Two distinct lithologies can be recognised in the Glacial Sand and Gravel in the district. In the area around Chad Brook, underlying the Boulder Clay, angular flint gravel with only trace amounts of chalk, quartz and quartzite has been proved in boreholes and this was formerly worked at Bears Pit [885 463]. Most of the Glacial Sand and Gravel however is scattered and more widely distributed as occurrences of 'clayey' and 'very clayey' sandy gravels and gravels which are generally found within or above the Boulder Clay. The composition of these latter beds is diverse and they characteristically contain high proportions of chalk and some sandstone, limestone and fossil debris, as well as angular flint, quartz and quartzite.

Both lithologies are considered to be glacial outwash deposits. The latter type, containing chalk, is considered to be localised and proximal to the ice sheet which deposited the boulder clay, and the former is described as having undergone additional transport, possibly in a glacio-fluvial environment.

Glacial Silt This deposit is the third member of the till sequence in the district. The deposit has been proved in only a few places and outcrops are small and scattered, for example around Glemsford and Liston, with smaller occurrences near Sudbury and Long Melford.

The Glacial Silt is a pale yellowish brown or pale grey fine sandy clayey silt with subordinate clay, and medium and fine sand seams. It is laminated and contains, in places, small pebbles of chalk.

This deposit is a fine glacial outwash, probably deposited in small pools within or on top of a decaying ice sheet. It is considered to contain no potentially workable sand and gravel deposits.

Boulder Clay The Boulder Clay outcrops extensively on all the interfluvies in this district and is found in boreholes in the valleys of the River Stour and Belchamp Brook. It is the most widely distributed and thickest deposit of the till sheet, but is intimately associated with both Glacial Silt and Glacial Sand and Gravel. The relationship between the three deposits is complicated and the glacial silts and the sand and gravel have no preferred level within the Boulder Clay.

The Boulder Clay is a dark bluish grey silty clay

containing pebbles of chalk, with some angular flint and a trace of quartz, quartzite, black shale, limestone and fossil debris. Rafts of chalk up to 1.2 m thick, one of which for example occurs in borehole NE 29 [8537 4764], have been proved. The Boulder Clay infilling the buried channels of the River Stour and Belchamp Brook is generally pale grey and very silty, with fine sand and many chalk pebbles.

As a result of weathering, the Boulder Clay becomes brown, yellowish brown and mottled grey around unleached chalk pebbles. When weathering is complete, a yellowish brown, chalk-free, silty clay with angular flint pebbles remains.

River Terrace Deposits The term River Terrace Deposit includes terraces of varying ages and of differing heights above the present rivers, together with fluvial gravels, of unknown relationship to the terraces, found beneath Alluvium. The terraces are found on the flanks of the River Stour and are less extensive along the River Glem.

The River Terrace Deposits are cross-bedded flint gravels or sandy gravels with subordinate silty sand and silt seams. In places pyritous, carbonaceous, dark greenish black, sandy clayey silts are found (for example, in borehole NW 36 [8215 4649]). They probably represent abandoned distributary channels infilled at a later date.

The exact age relationships of the terraces have not been determined. However, in Terrace 2 at Brundon [853 418] cold-phase mammalian remains are incorporated within the base perhaps tentatively suggesting an early interglacial age (Moir and Tindall, 1939).

These deposits have been extensively worked in the past, principally to build the embankments of the now abandoned railway.

Alluvium Alluvium of silty sandy clay forms sinuous belts which coincide with the floodplains of the present day streams. In the valleys of the River Glem and River Stour, the clayey alluvium is underlain by alluvial sand and gravel which is included for assessment purposes with the River Terrace Deposits.

Peat This deposit occurs in the valleys of the River Stour and Belchamp Brook and is represented by small localised accumulations of decomposed vegetable matter mixed in varying proportions with silt, fine sand and clay.

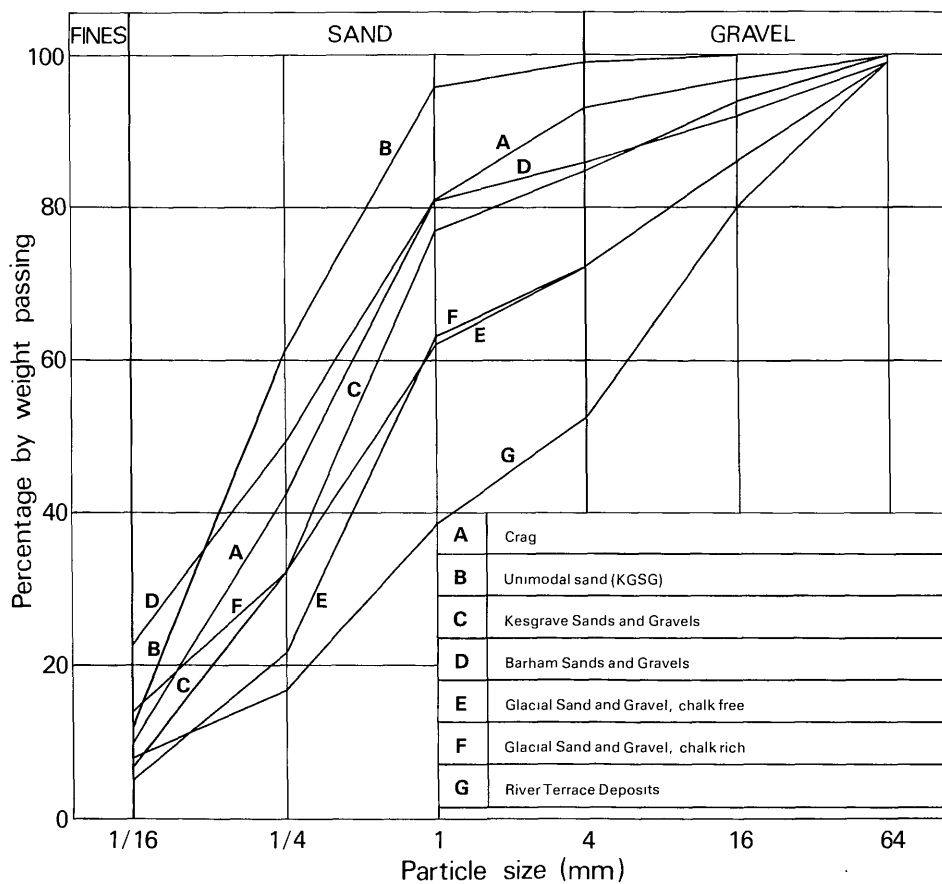
Composition of the sand and gravel deposits

Deposits of Pleistocene and Recent age cover 98 per cent of the resource sheet area. Of the ten formations mapped, five contain potentially workable sand and gravel; they are Crag, Kesgrave Sands and Gravels, Barham Sands and Gravels, Glacial Sand and Gravel and River Terrace Deposits. The Head and Alluvium contain no potentially workable sand and gravel, but these deposits mask sub-alluvial sands and gravels of fluvial origin in the River Stour, River Glem and Belchamp Brook valleys.

The mean grading of these mineral deposits is shown in Figures 3 and 4. The two parts of the latter show the fields within which each deposit falls in relation to the descriptive mineral categories (Appendix C). Figure 5 shows the mean particle size distribution for the assessed thickness of mineral in resource blocks A-F.

The mean composition in the +8-16 mm fraction of borehole samples from the main mineral deposits is shown in Table 2, and the results of mechanical and physical testing in Table 3.

Crag The Crag has been proved in 15 boreholes and at two exposures. It is a sand or pebbly sand with varying amounts of 'clay' and usually has a well-developed pebble bed at its base. Exposure SE E6 [8610 4087] shows only



Deposit and Type	Percentage by weight passing						Overall mineral classification (see Appendix C)
	1/16 mm	1/4 mm	1 mm	4 mm	16 mm	64 mm	
Crag	10	43	82	94	98	100	'Clayey' pebbly sand
Kesgrave Sands and Gravels - unimodal sand	12	62	97	99	100	100	'Clayey' sand
Kesgrave Sands and Gravels - sand and gravel	7	33	78	86	95	100	Pebbly sand
Barham Sands and Gravels	23	50	82	87	93	99	'Very clayey' pebbly sand
Glacial Sand and Gravel: chalk-free	5	22	64	73	87	99	Sandy gravel
Glacial Sand and Gravel: chalk-rich	14	33	63	73	87	99	'Clayey' sandy Gravel
River Terrace Deposits	8	17	39	53	80	99	Gravel

Figure 3 The mean particle size distribution for recognised mineral lithologies.

the basal pebble bed underlying Kesgrave Sands and Gravels. The pebble bed has a mineral classification of 'clayey' gravel.

The gravel fraction is fine, with some coarse material and a trace of cobble grade. Cobbles have been recorded only in the basal pebble bed and are universally dark brown iron-stained nodular flints, for example in borehole SW 39 [8058 4317]. In the gravel fraction, the Crag is composed of tabular ironstone, angular and well rounded flint, with some rounded quartz and quartzite and a trace of chalk, igneous and metamorphic rocks, sandstone and phosphatic nodules. Table 2 shows the

composition of the gravel in the size range +8-16 mm. In the +4-8 mm fraction there is an increase of angular flint at the expense of well rounded flint, and a trace of rolled-shell fragments is apparent in the shelly crag. The sand fraction shows a bimodal distribution within the fine and medium grades sieve sizes (Figure 3). The Crag has roughly equal amounts of medium and fine with some coarse sand and is composed of rounded to subrounded quartz, with some ironstone and phosphatic material, and a trace of angular flint in the coarser grades. Where the Crag is shelly, broken rolled-shell material is found throughout the sand grades and can become a major

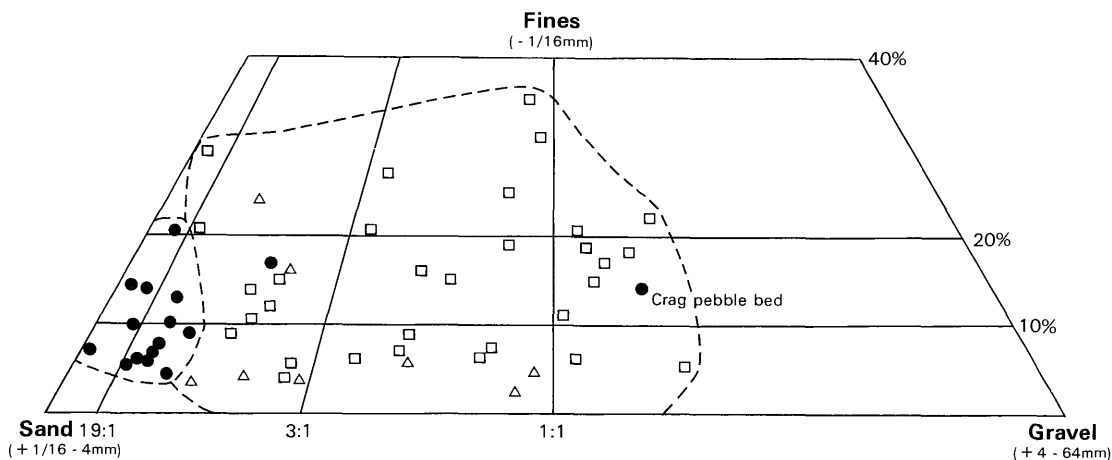
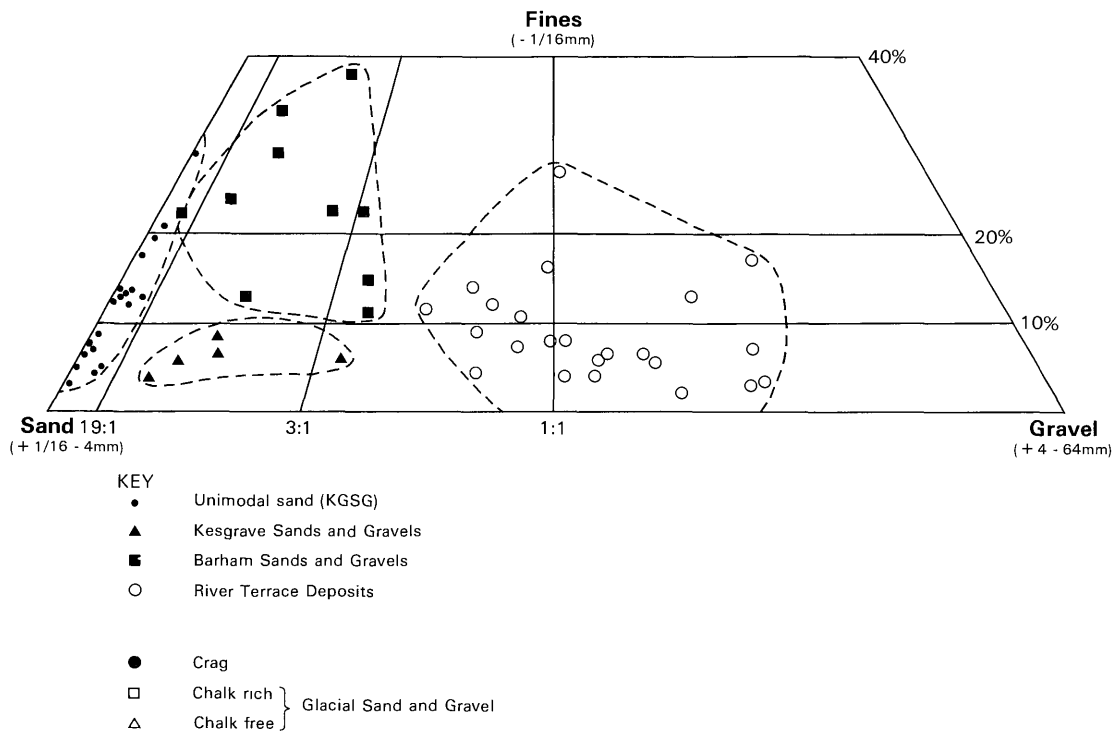


Figure 4 Mean grading of each mineral deposit in boreholes, showing the fields within which each falls in relation to the descriptive mineral categories (Appendix C).

constituent, comprising up to 30 per cent in some samples.

The Crag is heavily ironstained and contains thin ironpan in places: disseminated 'clay' grade iron oxides give rise to its characteristic orange-brown and reddish brown colour. Where the ironstaining becomes excessive the Crag becomes bound into a hard ferrocrete rock.

Kesgrave Sands and Gravels The Kesgrave Sands and Gravels including the unimodal sands have been proved in 21 IMAU boreholes and three exposures. Of these only five boreholes and no exposures proved the sand and gravel facies of the Kesgrave Sands and Gravels of Rose and Allen; the remainder proved the strongly unimodal sand lithology (Figure 4).

The boreholes proving the sand and gravel facies of the Kesgrave Sands and Gravels of Rose and Allen grade as pebbly sand and in one case as sandy gravel. The gravel fraction is fine with coarse, angular with well rounded flint with some quartz and quartzite and a trace of sandstone, ironstone, and igneous and metamorphic rocks. In the +4-8 mm fraction there is a marked increase in the quartz and quartzite content at the expense of flint.

The sand fraction is medium with fine and some coarse grades, subrounded to subangular quartz, with some angular coarse and medium flint, and a trace of ironstone and quartzite.

The unimodal sands proved in 16 of the boreholes and the three exposures contain small amounts of gravel and varying proportions of fines. The fines content is related to the presence or absence of disseminated clay pellets and discrete clay and silt micaceous laminae within individual samples. The gravel is fine with a trace of coarse and rarely cobble grade material. A single flint cobble found at the top of the deposit in borehole SE 90 [8895 4249], appears to have been derived from the overlying Boulder Clay. Amalgamation of all the pebble fractions from these unimodal sands shows a composition of angular flint with well rounded flint and quartz, with some quartzite, sandstone, ironstone, igneous and metamorphic material. However, due to lack of an adequate quantity of material, the figures shown in Table 2 can be regarded only as approximate, and insufficient material was available on which to conduct aggregate index tests (Table 3).

The sand fraction is unimodal and grades almost entirely within the fine and medium categories with only

Table 2 Mean percentage composition by weight in the +8-16 mm size range by type of deposit

Deposit type	Composition in the +8-16 mm size range								
	Angular flint	Well rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Others*
Crag	29	28	4	2	trace	1	-	35	1
Kesgrave Sands and Gravels - unimodal sand†	50	22	15	6	3	-	-	2	2
Kesgrave Sands and Gravels - sand and gravel	63	21	10	4	1	-	-	trace	1
Barham Sands and Gravels	61	10	14	4	5	2	3	trace	1
Glacial Sand and Gravel: chalk-free	81	9	4	3	2	trace	trace	trace	1
Glacial Sand and Gravel: chalk-rich	62	4	3	3	3	20	1	1	3
River Terrace Deposits	82	3	2	2	3	6	1	trace	1

* Others include igneous, metamorphic, phosphatic nodules, shale, mudstone and fossil debris.

† Small sample.

a trace of coarse sand. It is composed of subangular to rounded quartz, with some ironstone and mica, and a trace of coarse angular flint.

The colour varies from brown to white, depending on the presence or absence of fines, but is generally pale yellowish brown.

Barham Sands and Gravels This deposit is variable in both composition and grading. It has been proved in eight IMAU boreholes.

The gravel fraction is fine and coarse with a trace of cobble grade. Its overall composition in the +8-16 mm range is predominantly angular flint with rounded quartz and well rounded flint, some sandstone, quartzite, limestone and chalk, with a trace of igneous and metamorphic rocks, ironstone and fossil debris. In the +4-8 mm fraction the content of chalk and quartz increases at the expense of well rounded flint.

The sand is medium and fine in grade with some coarse subangular to subrounded quartz, angular flint and chalk. Traces of limestone, ironstone and sandstone also occur. The deposit is generally brown in colour but where it rests on the rubified sol lessivé it incorporates some orange-brown material.

Glacial Sand and Gravel The Glacial Sand and Gravel is the most variable of the deposits assessed on this sheet, and two differing lithologies are recognized: relatively chalk-free sandy gravels and pebbly sands which are always found beneath the Boulder Clay, and secondly, sands, pebbly sands and sandy gravels, with appreciable amounts of chalk and fines, which may occur at any level in the till sequence.

The former lithology is well developed in the vicinity of Belchamp Brook and Chad Brook, and the latter is widely distributed across the sheet. Other than the high fines content of the chalk-rich type, the chalky and relatively chalk-free types have similar overall grading.

The overall grading category of the relatively chalk-free type is sandy gravel. The gravel is fine and coarse with a trace of cobble grade and is composed overwhelmingly of angular flint, with some well rounded flint, rounded quartz and quartzite and subangular sandstone; traces of igneous and metamorphic rocks,

chalk, ironstone, fossil debris, limestone and phosphatic nodules are also present.

The chalk-rich type has an overall grading of 'clayey' sandy gravel. The gravel fraction of fine and coarse material with a trace of cobble grade has a composition in the +8-16 mm size range of angular flint with rounded chalk, and rounded flint, rounded quartz and quartzite and subangular sandstone, with a trace of limestone, ironstone, fossil debris, igneous and metamorphic rocks and phosphatic nodules. In the +4-8 mm fraction the chalk content increases at the expense of well rounded flint and quartz.

The sand is medium in grade with fine and some coarse sand and is composed of predominantly angular flint and subrounded chalk with some subangular and angular quartz.

River Terrace Deposits The fluvial deposits described here represent sands and gravels in the third to first terraces, including deposits present beneath Head and Alluvium. They were proved in 22 IMAU boreholes and at two exposures on this sheet. They are generally sandy gravels and gravels with varying proportions of clay and silt.

The gravel fraction is fine, with some coarse material and a trace of cobble grade and is composed, in the +8-16 mm size range, overwhelmingly of angular flint. Some rounded chalk, well rounded flint and rounded quartz, quartzite and sandstone also occur with traces of limestone, igneous and metamorphic rocks, ironstone, fossil debris and phosphatic nodules. In the +4-8 mm fraction the proportion of quartz and chalk increases at the expense of that of angular flint.

The sand is medium with coarse and fine material. It is composed of predominantly angular flint and subangular quartz with a trace of chalk, ironstone and sandstone. Fines are usually in the form of disseminated silt grade material but clay enrichment can occur at the surface above the water table.

The Map

The sand and gravel resource map is folded into the pocket at the end of this report. The base map is the Ordnance Survey 1:25 000 Outline Edition in grey, on

which the geological data are shown in black and the mineral resource information in shades of red.

Geological data The geological boundary lines, symbols, etc., shown are taken from the geological map of this area, which was surveyed at the scale of 1:10 560 and 1:10 000.

The geological boundaries are the best interpretation of the information available at the time of survey. However, it is inevitable that local irregularities and discrepancies will be revealed as new evidence from boreholes and excavations becomes available.

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

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

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

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

Results

The statistical results are summarised in Table 4. Fuller grading particulars are shown in Figure 5.

Accuracy of results For each of the resource blocks, the accuracy of the results at the 95 per cent probability level (that is, on average nineteen out of every twenty sets of limits constructed in this way contain the true value for the volume of mineral) varies between 19 per cent and 50 per cent (Appendix B). However, the true volumes are more likely to be nearer the figure estimated than either of the limits. Moreover, it is probable that roughly the same percentage limits would apply for the statistical estimate of mineral volume within a very much smaller parcel of ground (say 100 hectares) containing similar sand and gravel deposits, if the results from the same number of sample points (as provided by, say, ten boreholes) were used in the calculation. Thus, if closer limits are needed for quotation of reserves, data from more sample points would be required, even if the area were quite small. This point can be illustrated by considering the whole of the potentially workable sand and gravel in Blocks A to F. The total volume (461 million m³) can be estimated to limits of ± 15 per cent at the 95 per cent probability

Table 3 Results of mechanical and physical testing.

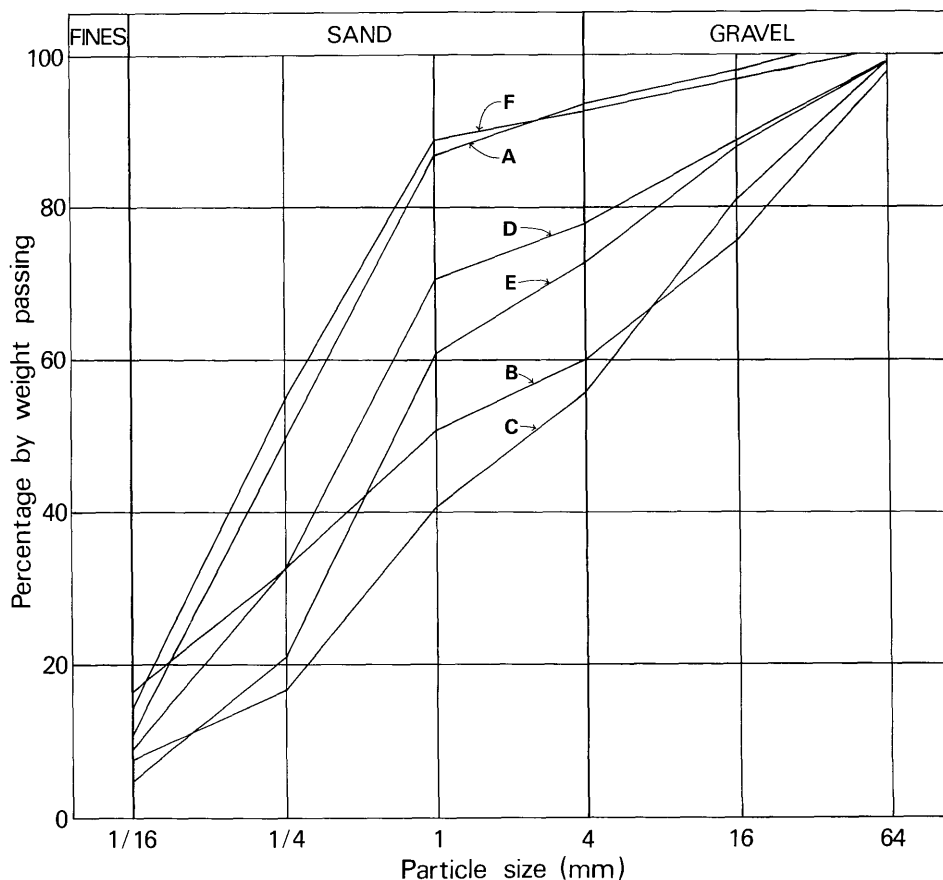
Deposit type	AIV	10 % fines value	Relative density (oven dried)	Relative density (saturated and surface dried)	Apparent relative density	Water absorption % of dry mass
Crag	-	-	2.56	2.64	2.78	3.10
Kesgrave Sands and Gravels	24	-	2.50	2.55	2.63	1.99
Glacial Sand and Gravel: chalk-free	24	270	2.50	2.54	2.61	1.75
Glacial Sand and Gravel: chalk-rich	29	160	2.37	2.46	2.64	4.08
River Terrace Deposits	25	210	2.47	2.53	2.63	2.36

Notes

All tests were conducted in accordance with BS 812; 2 and 3: 1975 on previously oven dried material in the size range +10-14 mm.

High water absorption values are generally attributable to the chalk content (see Table 2) and to the presence of ironstone clasts in the case of the Crag.

Predominantly sandy deposits (eg the unimodal sands of the Kesgrave Sands and Gravels, the Barham Sands and Gravels) provided insufficient material for certain of the tests; amalgamation of material from the relevant deposits proved in a number of boreholes was generally necessary, even for gravelly deposits.



Block	Percentage by weight passing						Overall mineral classification (see Appendix C)
	1/16 mm	1/4 mm	1 mm	4 mm	16 mm	64 mm	
A	11	50	87	94	98	100	'Clayey' pebbly sand
B	17	33	51	60	76	98	'Clayey' sandy gravel
C	8	17	41	56	81	99	Sandy gravel
D	9	33	71	78	89	99	Pebbly sand
E	5	21	61	73	88	99	Sandy gravel
F	15	55	89	93	97	100	'Clayey' pebbly sand

Figure 5 Particle size distribution for the assessed thickness of mineral in resource Blocks A to F.

level by a calculation based on the data from the 93 sample points in blocks A to F.

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

Notes on the resource blocks

The block boundaries (Figure 1) have been drawn to separate the glacial and sub-Boulder Clay sands and gravels (blocks A, B, D, E and F) from the fluvial deposits of the rivers Stour and Glem (Block C). Volume estimates and mean block gradings are shown in Table 4.

Block A

This block comprises three areas in the north and west of the sheet amounting in area to 20.7 km²; of this area 12.6 km² is mineral bearing.

In general the mineral is concealed beneath Boulder Clay, and is represented by the sequence Crag, Kesgrave

Sands and Gravels and Barham Sands and Gravels. However, high level chalk-rich Glacial Sand and Gravel overlying Boulder Clay and the sub-Boulder Clay sequence, outcrop in patches around Kentwell Park [863 480], north-west of Millhill Farm [823 490] and in the tributary valley to Belchamp Brook north-east of Belchamp Otten [805 418].

The sub-Boulder Clay sequence in these three areas represents remnants of a formerly more extensive cover of marine and proto-Thames sands and gravels resting on the Upper Chalk. These sands and gravels may well be present at considerable depth in the vicinity of Lineage Wood [890 485] (Block E) as they have been proved in boreholes to the north and east of the district.

In places the Boulder Clay becomes excessively thick (in terms of the limiting physical criterial p.1) but where it covers mineral deposits in IMAU boreholes it ranges from 1.0 m in SW 39 [8058 4317] to 17.2 m in NW 31 [8183 4802] and has a mean thickness of 10.2 m.

The mineral in IMAU boreholes ranges from 6.3 m in NW 29 [8155 4948] to 20.0 m in SW 39, and has a mean thickness of 12.3 m.

Table 4 The sand and gravel resources of sheet TL 84: summary of statistical results.

Block	Area		Mean thickness		Volume of mineral			Mean grading percentages		
	Block km ²	Mineral km ²	Over- burden m	Mineral m	Million m ³	Limits at the 95% confidence level		Fines	Sand	Gravel
						±%	±Million m ³	- $\frac{1}{16}$ mm	+ $\frac{1}{16}$ -4 mm	+4 mm
A	20.7	12.6	10.2	12.3	155	23	36	11	83	6
B	14.3	5.4	1.7	3.5	19	40	8	17	43	40
C	8.9	8.6	1.3	5.2	45	19	8	8	48	44
D	22.9	10.9	6.1	6.5	71	46	33	9	69	22
E	14.5	6.6	7.6	11.5	76	37	28	5	68	27
F	13.7	10.8	5.5	11.6	125	50	63	15	78	7
A to F	95.1	54.9	5.2	8.4	461	15	69	11	70	19

Block B

Block B comprises two areas east and west of the River Glem and north of the River Stour. It covers 14.3 km² of ground of which only 5.4 km² is mineral bearing.

The block boundary delimits an area of chalk-rich Glacial Sand and Gravel outcropping as patches resting on and within a thick sequence of Boulder Clay. Only in the vicinity of Stanstead [845 493] are these sands and gravels found beneath any considerable thickness of overburden. Here also Kesgrave Sands and Gravels have been found beneath excessive overburden thicknesses and they have therefore, not been included in the assessment. The mineral deposits are very variable both in thickness and grading even within a single patch, due to their origin as proximal outwash dumped from a retreating ice sheet. These gravels are exposed in many small abandoned pits in the Stanstead area and at a presently locally worked pit exposure NW E1 [8210 4945] north-west of Millhill Farm.

The overburden in IMAU boreholes ranges in thickness from 0.2 m in NE 27 [8539 4931] to 6.5 m in NW 34 [8219 4904] and has an overall mean of 1.7 m. The mineral thickness varies in IMAU data points from 0.6 m in borehole NE 27 to 5.8 m+ in exposure NW E1; the mean thickness is 3.5 m.

Block C

This block includes all the deposits of fluvial origin in the valleys of the Rivers Stour and Glem and covers an area of 8.9 km². Of this area 8.6 km² is mineral bearing, the remainder being abandoned worked out and made ground. The mineral deposits are exposed in the terraces and concealed beneath Alluvium and Head; generally the overburden is thin. South of Long Melford near Rodbridge Corner [859 439], Glacial Sand and Gravel has been proved within Boulder Clay beneath a thin non-mineral Terrace 3 deposit. This glacial sand and gravel has been included within this block for convenience.

Much of the sand and gravel extracted in the past from the area between Long Melford and Cavendish was used in the construction of Great Waldingfield Airfield [895 435], and prior to that in embankments along the now abandoned railway line along the River Stour and Chad Brook.

The overburden in IMAU boreholes ranges in thickness from 0.3 m in NW 47 [8452 4596] to 5.7 m in SE 76 [8598 4404] and has an overall mean of 1.3 m. The mineral varies in thickness from 1.9 m in SE 76 to 11.4 m in SE 84 [8646 4204] and has an overall mean of 5.2 m.

Block D

Block D covers 22.9 km² of ground between Liston [853 447] and Belchamp Walter associated with the

valley of Belchamp Brook. Of this area 10.9 km² is mineral bearing. The present stream flows along the foot of the Lower London Tertiaries escarpment and cuts through a complicated sequence of glacial deposits (see contour diagram on the Map) associated with a 'proto' Belchamp Brook.

Deposits of the relatively chalk-free and the chalk-rich Glacial Sand and Gravel types are represented in this block, the former being found within the area from Brook Hall [843 437] to Newbon [826 418] under the Boulder Clay cover. The latter type is found more widely in patches resting on the Boulder Clay. Numerous small exposures occur in these patches and on the evidence of a heavily overgrown exposure south of borehole SW 46 [8264 4250] considerable thicknesses of Glacial Sand and Gravel of both types are thought to occur.

The overburden ranges at IMAU sample points from 0.3 m, for example, exposure SW E2 [8416 4110] to 19.0 m+ in borehole SE 77 [8518 4348] and has a mean thickness of 6.1 m. The mineral in IMAU boreholes varies from zero in SE 79 [8522 4259] to 17.9 m in SW 47 [8294 4163] and has an overall mean thickness of 6.5 m.

Block E

This block, centred around Bears Pit Acton north-east of Long Melford, covers 14.5 km² of ground of which 6.6 km² is mineral bearing.

In general the mineral deposit assessed is of the chalk free Glacial Sand and Gravel type associated with the Chad Brook Channel; however, some small patches of the chalk-rich Glacial Sand and Gravel are found at Bears Pit and on the flanks of the valley. These deposits are generally concealed beneath Boulder Clay overburden.

Bears Pit shows an upper complex sequence of chalk-rich Glacial Sand and Gravel, Glacial Silt and Boulder Clay resting on a lower relatively chalk-free Glacial Sand and Gravel. The upper sequence shows small scale faulting, flow lamination and ice push structures demonstrating its origin as outwash proximal to the ice sheet. Towards the south, Boulder Clay rests on a thick sequence of Glacial Silts, as shown in borehole NE 48 [8857 4554].

In the extreme north-west around Lineage Wood it is thought that a sequence of Kesgrave Sands and Gravels and Crag lies buried at depth (Block A). This is an extension of the depositional basin of Crag deposits proved in Hydrogeology Unit borehole records to the east and north around Lavenham in the area of 1:25 000 sheet TL 94.

The overburden in IMAU boreholes ranges in thickness from 20.3 m in borehole NE 41 [8754 4664] to 1.5 m in borehole NE 54 [8803 4612] and has a mean of 7.6 m. The mineral ranges in thickness in IMAU

boreholes from 4.9 m in NE 41 to 20.5 m in NE 54 and has a mean thickness of 11.5 m.

Block F

Block F is divided into two parts by the River Stour and the urban area of Sudbury. It contains all the mineral deposits of Kesgrave Sands and Gravels and Crag which rest on the Lower London Tertiaries in the south-east of the sheet. The block covers 13.7 km² of ground of which 10.8 km² is mineral bearing. In the north around Cuckoo Tye [880 444] the Boulder Clay cuts through the mineral deposits and rests directly on the Upper Chalk. The part of Block F south-west of Sudbury contains only thin but extensive remnants of a once thick cover of Kesgrave Sands and Gravels.

Elsewhere in the block, small outcrops of Kesgrave Sands and Gravels and Crag are seen around Great Cornard [895 410] and Wood Hall [877 428].

In the vicinity of Great Waldingfield airfield [895 435] a large area of Glacial Sand and Gravel has been mapped. It has been proved in borehole SE 92 [8987 4352] where 4.0 m of 'very clayey' gravel were found resting on Boulder Clay.

The overburden in IMAU boreholes ranges in thickness from 0.3 m, for example, in SE 81 [8552 4090] to 15.3 m in SE 89 [8831 4341] and has a mean of 5.5 m. The mineral ranges in thickness in IMAU boreholes from 1.2 m in SE 81 to a total of 22.2 m in SE 93 [8963 4216] and has a mean of 11.6 m.

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APPENDIX A

FIELD AND LABORATORY PROCEDURES

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

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

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

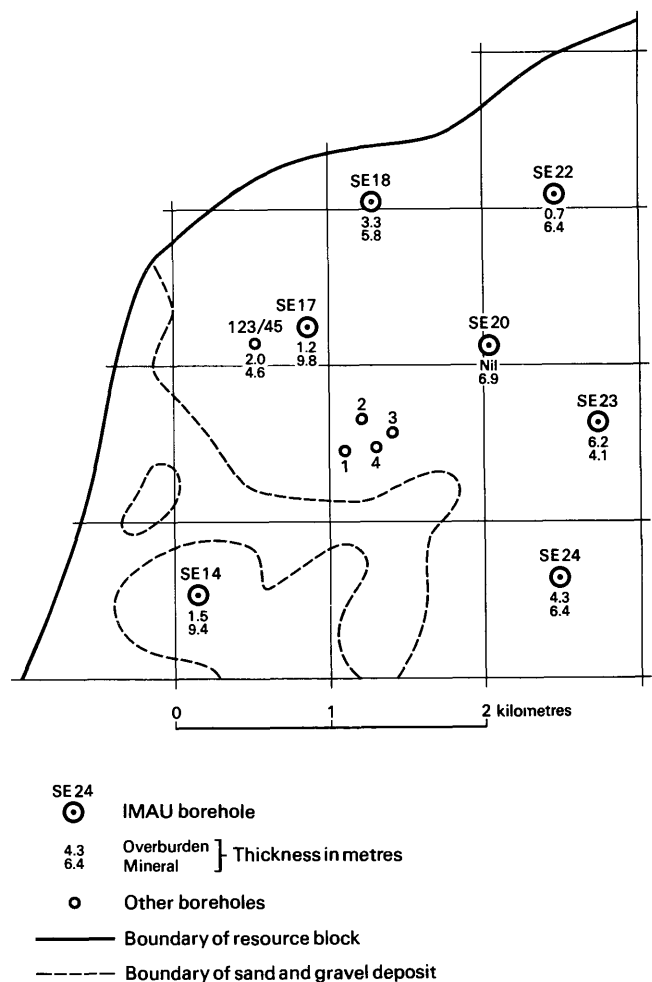
The drilling machine employed should be capable of providing a continuous sample representative of all unconsolidated deposits, so that the in-situ grading can be determined, if necessary, to a depth of 30 m (100 ft) at a diameter of about 200 mm (8 in), beneath different types of overburden. It should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

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

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

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

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



Example of resource block assessment: map of a fictitious block

APPENDIX B

STATISTICAL PROCEDURE

Statistical assessment

1 A statistical assessment is made of an area of mineral greater than 2 km², if there are at least five evenly spaced boreholes in the resource block (for smaller areas, see Paragraph 12 below).

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

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

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

4 The above relationship may be transposed such that

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

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

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

5 Given that the number of approximately evenly spaced sample points in the sampled area is *n* with mineral thickness measurements $l_{m1}, l_{m2}, \dots, l_{mn}$, then the best estimate of mean thickness, \bar{l}_m , is given by

$$\Sigma (l_{m1} + l_{m2} \dots l_{mn}) / n.$$

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

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

where l_m is any value in the series l_{m1} to l_{mn} .

6 The sampled area in each resource block is coloured pink on the map. Wherever possible, calculations relate to the mineral within mapped geological boundaries (which may not necessarily correspond to the limits of a deposit). Where the area is not defined by a mapped boundary, that is, where the boundary is inferred, a distinctive symbol is used. Experience suggests that the errors in determining area are small relative to those in thickness. The relationship $S_A / S_{\bar{l}_m} \leq 0.3$ is assumed in all cases. It follows from Equation [2] that

$$S_{\bar{l}_m} \leq S_V \leq 1.05 S_{\bar{l}_m} \quad [3]$$

7 The limits on the estimate of mean thickness of mineral, $L_{\bar{l}_m}$, may be expressed in absolute units $\pm (t/\sqrt{n}) \times S_{\bar{l}_m}$ or as a percentage $\pm (t/\sqrt{n}) \times S_{\bar{l}_m} \times (100/\bar{l}_m)$ per cent, where *t* is Student's *t* at the 95 per cent probability level for (*n* - 1) degrees of freedom, evaluated by reference to statistical tables. (In applying Student's *t* it is assumed that the measurements are distributed normally).

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

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

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

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

$$L_{\bar{l}_m} \leq L_V \leq 1.05 L_{\bar{l}_m}.$$

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

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

per cent,

and when *n* is greater than 20, as

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

per cent.

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

Inferred assessment

12 If the sampled area of mineral in a resource block is between 0.25 km² and 2 km², an assessment is inferred on the basis of geological and topographical information, usually supported by the data from one or two boreholes. The volume of mineral is calculated as the product of the area, measured from field data, and the estimated thickness. Confidence limits are not calculated.

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

14 No assessment is attempted for an isolated area of mineral less than 0.25 km².

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 needs to be only approximately regular and in estimating the mean thickness only simple weighting is necessary. In practice, equal weighting can often be applied to thicknesses at all sample points. If, however, there is a distinctly unequal distribution of points, bias is avoided by dividing the sampled area into broad zones, to each of which a value roughly proportional to its area is assigned. This value is then shared between the data points with the zone as the weighting factor.

Block calculation

Scale: 1:25 000
Block: Fictitious

Area
Block: 11.08 km²
Mineral: 8.32 km²

Mean thickness
Overburden: 2.5 m
Mineral: 6.5 m

Volume
Overburden: 21 million m³
Mineral: 54 million m³

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

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

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

Calculation of confidence limits

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

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

$$n = 8$$

$$t = 2.365$$

L_V is calculated as

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

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

$$= 20.3$$

$$\approx 20 \text{ per cent.}$$

APPENDIX C

CLASSIFICATION AND DESCRIPTION OF SAND AND GRAVEL

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

The terminology commonly used by geologists when describing sedimentary rocks (Wentworth, 1922) is not entirely satisfactory for this purpose. For example, Wentworth proposed that a deposit should be described as a 'gravelly sand' when it contains more sand than gravel and there is at least 10 per cent of gravel, provided that there is less than 10 per cent of material finer than sand ($< \frac{1}{8}$ mm) and coarser than pebbles (> 64 mm in diameter). Because deposits containing more than 10 per cent fines are not embraced by this system, a modified binary classification based on Willman (1942) has been adopted.

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

The term 'clay' (as written, with single quote marks) is used to describe all material passing $\frac{1}{8}$ mm. Thus it has no mineralogical significance and includes particles falling within the size range of silt. The normal meaning applies to the term clay where it does not appear in single quotation marks.

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

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

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

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

Many differing proposals have been made for the classification of the grain size of sediments (Atterberg, 1905; Udden, 1914; Wentworth, 1922; Wentworth, 1935; Allen, 1936; Twenhofel, 1937; Lane and others, 1947). As Archer (1970a, b) has emphasised, there is a pressing need for a simple metric scale acceptable to both scientific and engineering interests, for which the class limit sizes correspond closely with certain marked changes in the natural properties of mineral particles. For example, there is an important change in the degree of cohesion between particles at about the $\frac{1}{8}$ -mm size, which approximates to the generally accepted boundary between silt and sand. These and other requirements are met by a system based on Udden's geometric scale and a simplified form of Wentworth's terminology (see the accompanying table), which is used in the Report.

The fairly wide intervals in the scale are consistent with the general level of accuracy of the qualitative assessments of the resource blocks. Three sizes of sand are recognised, fine ($+\frac{1}{8}$ - $-\frac{1}{4}$ mm), medium ($+\frac{1}{4}$ - 1 mm) and coarse (+1 - 4 mm). The boundary at 16 mm distinguishes a range of finer gravel (+4 - 16 mm), often characterised by abundance of worn tough pebbles of vein quartz, from larger pebbles, often of notably different materials. The boundary at 64 mm distinguishes pebbles from cobbles. The term 'gravel' is used loosely to denote both pebble-sized and cobble-sized material.

The size distribution of borehole samples is determined by sieve analysis, which is presented by the laboratory as logarithmic cumulative curves (see, for example, British Standards Institution, 1967). In this report the grading is tabulated on the borehole record sheets (Appendix E), the intercepts corresponding with the simple geometric scale $\frac{1}{8}$ mm, $\frac{1}{4}$ mm, 1 mm, 4 mm, 16 mm and so on as required. Original sample grading curves are available for reference at the appropriate office of the Institute.

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

The relative proportions of the rock types present in the gravel fraction are indicated by the use of the words 'and' or 'with'. For example, 'flint and quartz' indicates roughly equal proportions with neither constituent accounting for less than about 25 per cent of the whole; 'flint with quartz' indicates that flint is dominant and quartz, the principal accessory rock type, comprises 5 to 25 per cent of the whole. Where the accessory material accounts for less than 5 per cent of the whole, but is still readily apparent, the phrase 'with some' has been used. Rare 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, 1975), are as follows.

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

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

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

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

Well rounded: not original faces, edges or corners left. The entire surface consists of broad curves; flat areas are absent. The original shape is suggested by the present form of the grain.

Classification of gravel, sand and fines

Size limits	Grain-size description	Qualification	Primary classification
64 mm	Cobble		
16 mm	Pebble	Coarse	Gravel
4 mm		Fine	
1 mm		Coarse	
$\frac{1}{4}$ mm	Sand	Medium	Sand
$\frac{1}{8}$ mm		Fine	
	Fines (silt and clay)		Fines

I Gravel

II 'Clayey' gravel

III 'Very clayey' gravel

IV Sandy gravel

V 'Clayey' sandy gravel

VI 'Very clayey' sandy gravel

VII Pebbly sand

VIII 'Clayey' pebbly sand

IX 'Very clayey' pebbly sand

X Sand

XI 'Clayey' sand

XII 'Very clayey' sand

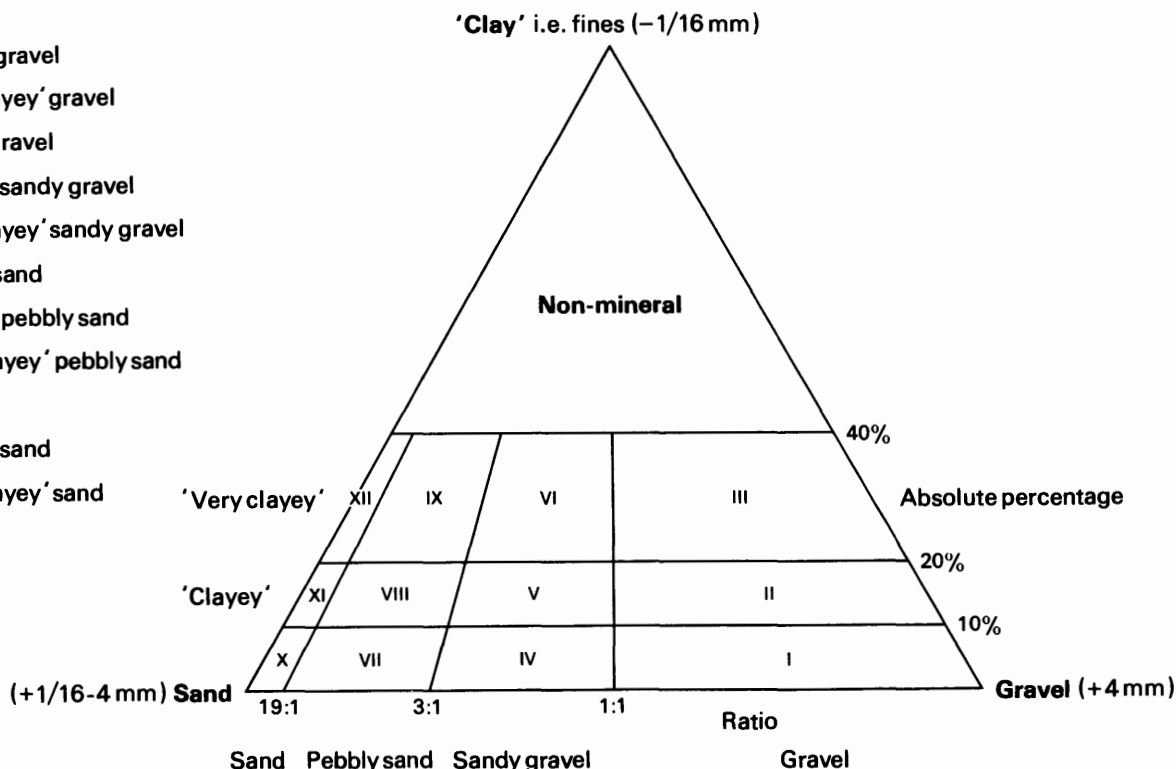


Diagram showing the descriptive categories used in the classification of sand and gravel

APPENDIX D

EXPLANATION OF THE BOREHOLE RECORDS

Annotated fictitious example

CK 66 NW 5¹ 6191 6962² Northfields³

Block B

Surface level +49.7 m⁴
 Water struck at +45.9 m⁵
 October 1972⁶

Overburden ⁷ 2.8 m
 Mineral 5.4 m
 Waste 1.1 m
 Mineral 1.4 m
 Bedrock 0.7 m+⁸

LOG

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

GRADING¹⁰

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

COMPOSITION¹¹

Depth below surface (m)	percentages by weight in the +8-16 mm fraction				
	Flint	Quartz	Limestone	Chalk	Ironstone
3.8-4.8	41	5	50	1	3
4.8-5.8	39	3	45	5	8
5.8-6.8	45	2	42	5	6
6.8-8.2	19	6	61	3	11
Mean	35	4	51	3	7

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

1 Borehole Registration Number

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

- a The number of the 1:25 000 sheet on which the borehole lies, here CK 66.
- b The quarter of the 1:25 000 sheet on which the borehole lies and the number of the borehole in a series for that quarter, here NW 5.

Thus the full Registration Number is CK 66 NW 5.

2 National Grid Reference

Grid references are given to eight figures, accurate to within 10 m.

3 Location

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

4 Surface level

The surface level at the borehole site is given in metres and feet above Ordnance Datum.

5 Groundwater conditions

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

6 Type of drill and date of drilling

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

7 Overburden, mineral, waste and bedrock

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

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

9 Lithological description

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

10 Grading data

A continuous series of bulk samples is taken throughout the thickness of sand and gravel. A new sample is commenced whenever there is an appreciable lithological change or at every 1 m of depth. Samples obtained by bailing are indicated by an asterisk.

For each bulk sample the percentages of fines ($-\frac{1}{8}$ mm), fine sand ($+\frac{1}{8}-\frac{1}{4}$ mm), medium sand ($+\frac{1}{4}-1$ mm), coarse sand ($+1-4$ mm), fine gravel ($+4-16$ mm) and coarse and cobble gravel ($+16$ mm) are stated.

The mean grading of groups of samples making up an identified bed of mineral are also given in detail and in summary. Where more than one bed is recognised the mean grading for the whole of the mineral in the borehole may be given. Where necessary, in calculating mean gradings, data for individual samples are weighted by the thickness represented.

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

11 Composition

Details of the composition of selected samples or groups of samples may be given. Where appropriate the calculated weighted mean composition of groups of samples may be quoted.

The 8 to 16 mm part of the gravel fraction is divided into nine major rock types in this area. Other rock types occur in minor quantities and are included under 'others'; these include metamorphic, igneous and mudstone pebbles.

**APPENDIX E
INDUSTRIAL MINERALS ASSESSMENT UNIT BOREHOLE AND SECTION RECORDS**

TL 84 NW 24 8023 4994 Moors Farm, Cavendish Block A

Surface level +68.4 m
Water not struck
Shell 152 mm diameter
December 1979

Overburden 9.2 m
Mineral 11.3 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Head	Silt, clayey, with subangular brown flints and rootlets, pale orange brown	0.9	1.6
Boulder Clay	Clay, silty, with pebbles of rounded chalk and some flint, brown mottled grey	1.9	3.5
	Clay, silty, with pebbles and pellets of chalk and some flint, grey becoming dark grey	5.0	8.5
	Clay, silty, sandy, with flint pebbles, brown	0.7	9.2
Kesgrave Sands and Gravels	a 'Clayey' sand, with discrete clay laminae throughout and a trace of pebbles in uppermost 3.0 m Gravel: a trace of fine angular and well rounded flint, rounded quartz and quartzite, some chalk and ironstone in uppermost 1.0 m Sand: fine and medium with a trace of coarse, predominantly medium with fine at top becoming fine with medium; overwhelmingly subangular to rounded quartz with some flint and a trace of mica flakes, pale yellow and orange-brown	8.0	17.2
Red Crag	b 'Clayey' pebbly sand, becomes more pebbly with depth Gravel: fine and coarse, angular flint with some well rounded flint and rounded quartz, quartzite and sandstone with a trace of igneous metamorphic and ironstone. Some chalk in lowermost 1.0 m Sand: medium with fine and some coarse, predominantly rounded quartz with some flint and ironstone, orange-brown	3.3	20.5
Upper Chalk	Chalk, soft, white with some nodular flint	1.5+	22.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand			Gravel	
					-16	+16-4	+4-1	+1-4	+4-16	+16-64	+64 mm
a	18	82	0	9.2-10.2	29	63	6	1	1	0	0
				10.2-11.2	14	28	57	1	0	0	0
				11.2-12.2	2	21	74	2	1	0	0
				12.2-13.2	19	50	30	1	0	0	0
				13.2-14.2	24	52	24	0	0	0	0
				14.2-15.2	22	74	4	0	0	0	0
				15.2-16.2	19	62	18	1	0	0	0
				16.2-17.2	14	37	47	1	1	0	0
		Mean		18	48	33	1	trace	0	0	
b	13	81	6	17.2-18.5	15	28	53	4	0	0	0
				18.5-19.5	12	22	56	8	2	0	0
				19.5-20.5	11	23	35	12	9	10	0
				Mean	13	25	48	8	3	3	0
a+b	16	82	2	Mean	16	42	37	3	1	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	9.2-17.2	Insufficient material									
b	17.2-20.5	74	16	5	3	trace	1	0	0	0	1

TL 84 NW 25 8023 4808 West of Ducks Hall, Cavendish Block A

Surface level +65.5 m
Water struck at +46.5 m
Shell 152 mm diameter
November 1979

Overburden 6.0 m
Mineral 13.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy becoming very sandy with pebbles and pellets of chalk and some flint, yellowish brown firm becoming soft from 1.4 m	2.0	2.3
	Clay, silty with pebbles and pellets of chalk and some flint, yellowish brown mottled pale grey becoming blue-grey from 3.6 m. Thin yellow fine sand at base	2.9	5.2
	Clay, very sandy, silty with pebbles of flint and some chalk, olive-brown	0.8	6.0
Barham Sands and Gravels	a 'Very clayey' pebbly sand Gravel: some fine and coarse angular flint, rounded quartz and well rounded flint, with some quartzite, and a trace of sandstone, igneous, metamorphic, chalk, limestone, ironstone and fossil debris. Sand: medium with fine and some coarse, predominantly subangular quartz with angular flint and a trace of chalk and ironstone, yellowish brown	1.0	7.0
Kesgrave Sands and Gravels	b 'Clayey' sand, clayey pebbly sand between 11.0-12.0 m, discrete clay laminae throughout Gravel: a trace of fine with coarse, angular flint with rounded quartz and quartzite and some well rounded flint and sandstone, with a trace of igneous and metamorphic Sand: fine with medium and a trace of coarse, predominantly medium with some fine at top becoming fine with some medium with depth, subangular to rounded quartz with a trace of angular flint, ironstone and mica, pale yellowish brown	8.0	15.0
Red Crag	c Pebbly sand Gravel: a trace of fine with some coarse, angular with some well rounded flint, quartz and quartzite, with ironstone increasing with depth, and a trace of igneous and metamorphic Sand: medium with fine and coarse, well rounded and rounded quartz with some angular flint and ironstone, orange-brown	4.0	19.0
Upper Chalk	Chalk, white, soft, puggy	1.0+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand			Gravel		
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	29	63	8	6.0-7.0	29	15	42	6	5	3	0	
b	13	83	4	7.0-8.0	14	26	60	0	0	0	0	
				8.0-9.0	13	20	67	0	0	0		
				9.0-10.0	20	45	34	1	0	0		
				10.0-11.0	26	67	6	1	0	0		
				11.0-12.0	11	43	13	9	20	4		
				12.0-13.0	4	57	29	8	2	0		
				13.0-14.0	5	65	26	4	0	0		
				14.0-15.0	10	64	23	3	0	0		
			Mean	13	48	32	3	3	1	0		
c	6	89	5	15.0-16.0	5	26	47	19	3	0	0	
				16.0-17.0	6	31	42	18	3	0	0	
				17.0-18.0	4	26	47	20	3	0	0	
				18.0-19.0	7	28	37	17	7	4	0	
							Mean	6	28	43	18	4
a+b+c	12	84	4	Mean	12	40	36	8	3	1	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	6.0-7.0	Insufficient material									
b	7.0-15.0	Insufficient material									
c	15.0-19.0	Insufficient material									

21

TL 84 NW 26 8070 4690

Blacklands Hall, Cavendish

Block C

Surface level +45.8 m
Water struck at +42.3 m
Shell 152 mm diameter
November 1979

Overburden 0.9 m
Mineral 0.7 m
Waste 1.4 m
Mineral 1.9 m
Waste 15.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Second Terrace	Clay, silty with rootlets, brown	0.7	0.9
	a 'Very clayey' gravel Gravel: coarse with fine, angular flint with some subangular sandstone, and a trace of chalk, quartz, ironstone, quartzite, well rounded flint, limestone, phosphatic nodules and fossil debris Sand: fine and medium with coarse, predominantly angular flint and subangular quartz with some chalk and ironstone, brown	0.7	1.6
	Clay, very silty, sandy becoming very sandy from 2.0 m with pebbles of flint and some chalk and some organic traces, laminated in parts, brown streaked pale grey	1.4	3.0
	b Gravel Gravel: fine and coarse with cobbles, angular and nodular flint, with some chalk and subangular sandstone and a trace of quartzite, quartz, limestone, well rounded flint, ironstone, phosphatic nodules, igneous, metamorphic and fossil debris Sand: coarse and medium with some fine, overwhelmingly angular flint with some quartz, chalk and ironstone, greyish brown	1.9	4.9
Boulder Clay	Clay, silty with pebbles and pellets of chalk and some flint and a trace of sandstone, dark grey	15.1+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand			Gravel		
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	27	36	37	0.9-1.6	27	15	13	8	16	21	0	
b	4	27	69	*3.0-4.0	3	3	9	9	24	16	36	
				*4.0-4.9	4	4	15	15	33	29	0	
				Mean	4	3	12	12	28	22	19	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.9-1.6	83	1	2	1	7	3	trace	2	trace	1
b	3.0-4.9	70	1	2	2	3	18	1	1	1	1

TL 84 NW 27 8077 4625 Pentlow Mill, Pentlow

Block C

Surface level +39.4 m
Water struck at +36.0 m
Shell 152 mm diameter
November 1979

Overburden 1.4 m
Mineral 3.7 m
Waste 14.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
First Terrace	Clay, silty, with pebbles of flint throughout and some chalk from 0.8 m, brown, firm becoming hard	1.1	1.4
	Gravel, sandy gravel in uppermost 2.0 m Gravel: coarse with fine becoming coarser with depth, angular flint, with some rounded chalk, quartzite and quartz, well rounded flint, subangular sandstone and angular ironstone, with a trace of igneous, metamorphic, phosphatic nodules and fossil debris Sand: medium with coarse and fine in uppermost 2.0 m becomes medium and coarse with some fine, predominantly angular flint and subangular chalk with some subrounded quartz and a trace of ironstone	3.7	5.1
Boulder Clay	Clay, silty, sandy and brown in uppermost 0.3 m with pebbles of flint and chalk and some black paper shale debris, grey becoming dark grey	14.9+	20.0

GRADING

Mean for deposit percentages	Depth below surface (m)	Percentages								
		Fines			Sand			Gravel		
		- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm		
6	41	53	1.4-2.4	9	13	29	20	18	11	0
			2.4-3.4	7	10	24	15	22	22	0
			*3.4-4.4	3	3	12	12	31	39	0
			*4.4-5.1	3	4	10	8	22	53	0
			Mean	6	8	19	14	23	30	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.4-5.1	77	3	2	4	3	7	1	3	trace	trace

TL 84 NW 28 8106 4605 Pentlowhall Farm, Pentlow

Block C

Surface level +41.9 m
Water struck at +36.9 m
Shell 152 mm diameter
November 1979

Overburden 0.9 m
Mineral 3.0 m
Waste 0.9 m
Mineral 1.0 m
Waste 16.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil and made ground	0.5	0.5
Head	Clay, silty, fine sandy with pebbles of flint and some chalk, brown, firm	0.4	0.9
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine with coarse, angular flint and well rounded chalk, with some subangular limestone and sandstone, and a trace of ironstone, fossil debris and quartz Sand: fine and medium with coarse, predominantly subangular and angular chalk and flint with some fine and medium subangular quartz, yellowish brown	3.0	3.9
Glacial Silt	Silt, very clayey, fine sandy, with some chalk pellets and fine flint pebbles, becomes extremely chalky and sandy at base, yellowish brown, soft	0.9	4.8
Glacial Sand and Gravel	b Sandy gravel Gravel: fine with coarse, angular flint with some well-rounded flint and chalk, with a trace of quartz, limestone, sandstone, quartzite, igneous, metamorphic, fossil debris and phosphatic nodules Sand: medium with coarse and some fine, predominantly subangular and angular flint with some subangular quartz and chalk, pale brown	1.0	5.8
Boulder Clay	Clay, silty, with chalk and flint pebbles, very silty in parts with thin silty chalky sand seams at 12.2 m, 21.0 m and 21.3 m, grey becoming pale grey with depth	16.9+	22.7

GRADING

	Mean for deposit percentages	Depth below surface (m)	Percentages								
			Fines			Sand			Gravel		
			- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm		
a	27	53	20	0.9-1.9	18	35	21	9	13	4	0
				1.9-2.9	29	21	16	10	17	7	0
				2.9-3.9	35	16	18	11	16	4	0
				Mean	27	24	19	10	15	5	0
b	9	60	31	*4.8-5.8	9	7	34	19	20	11	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.9-3.9	50	0	1	0	4	39	0	1	1	trace
b	4.8-5.8	83	5	2	1	2	4	2	0	trace	1

TL 84 NW 29 8155 4948 Lower Barn, Glemsford Block A
 Surface level +54.5 m Overburden 4.3 m
 Water not struck Mineral 6.3 m
 Shell 152 mm diameter Bedrock 1.4 m+
 December 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Head	Silt, clayey, fine sandy, with some flint pebbles and rootlets, pale brown mottled and streaked orange-brown	2.9	3.4
Boulder Clay	Clay, sandy, silty, with some chalk and flint pebbles, brown, hard	0.9	4.3
Kesgrave Sands and Gravels	a 'Clayey' sand Gravel: a trace of fine and coarse, angular flint, quartz, sandstone, well rounded flint and ironstone Sand: medium and fine with a trace of coarse, subangular to rounded quartz, with a trace of angular flint and ironstone, pale yellow becoming orange-brown	2.0	6.3
Red Crag	b 'Clayey' sand Gravel: a trace of fine with coarse, angular flint and ironstone with well rounded flint, quartz and subangular sandstone Sand: medium with fine and some coarse, rounded quartz with some angular ironstone and a trace of angular flint, deep reddish brown	4.3	10.6
Upper Chalk	Chalk white, soft	1.4+	12.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages									
	Fines	Sand	Gravel		Fines			Sand			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm			
a	14	85	1	4.3-5.3	14	32	52	1	1	0	0			
				5.3-6.3	13	47	33	5	1	1	0			
				Mean	14	40	42	3	1	trace	0			
b	14	83	3	6.3-8.3	14	22	43	18	2	1	0			
				8.3-9.3	15	27	51	5	2	0	0			
				9.3-10.6	13	44	37	3	3	0	0			
				Mean	14	30	43	10	2	1	0			
a+b	14	84	2	Mean	14	33	43	8	2	trace	0			

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
a	4.3-6.3	Insufficient material									
b	6.3-10.6	Insufficient material									

TL 84 NW 30 8167 4860 Newstreet Farm, Glemsford Block A
 Surface level +79.2 m Waste 19.0 m+
 Water not struck
 Shell 152 mm diameter
 December 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with pellets and pebbles of chalk and some flint, brown mottled grey at base	7.0	7.2
	Clay, silty with pellets and pebbles of chalk and some flint and black shale, grey becoming dark grey, stiff	11.8+	19.0

TL 84 NW 31 8183 4802 Cavendish Road, Glemsford Block A

Surface level +67.1 m Overburden 17.2 m
 Water not struck Mineral 7.8 m+
 Shell 152 mm diameter
 November 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clayey silt passing down into silty clay at 1.4 m with pellets and pebbles of chalk and some flint, decalcified in uppermost 0.4 m, brown mottled pale brown becoming mottled pale grey from 1.4 m	3.2	3.5
	Clay, silty, with pellets and pebbles of chalk and some flint with a trace of black paper shale and ironstone, grey becoming dark grey, stiff	13.7	17.2
Barham Sands and Gravels	a 'Very clayey' sand, pebbly in uppermost 1.3 m Gravel: a trace of fine angular and well rounded flint, with quartz, and some sandstone, chalk, fossil debris quartzite and ironstone, and a trace of igneous, metamorphic and pyrite Sand: medium with fine and some coarse, predominantly angular flint and subrounded quartz with a trace of chalk and ironstone, olive green becoming paler with depth	2.0	19.2
Kesgrave Sands and Gravels	b 'Very clayey' sand with discrete thin laminated silty clay seams throughout Gravel: a trace of fine angular and well rounded flint, quartz, quartzite and sandstone Sand: fine and medium with a trace of coarse, predominantly subrounded quartz with a trace of ironstone, pale green and brown becoming orange and red-brown with depth	5.8+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	22	76	2	17.2-19.2	22	28	44	4	2	0	0
b	20	79	1	19.2-20.2	18	38	43	1	0	0	0
				20.2-21.2	22	48	27	2	1	0	0
				21.2-22.2	15	25	56	3	1	0	0
				22.2-23.2	17	28	52	2	1	0	0
				23.2-25.0	23	53	21	2	1	0	0
			Mean	20	40	37	2	1	0	0	
a+b	20	79	1	Mean	20	37	39	3	1	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	17.2-19.2	Insufficient material									
b	19.2-25.0	Insufficient material									

TL 84 NW 32 8118 4675 Blacklands Hall, Cavendish

Block C

Surface level +45.1 m
Water struck at +39.3 m
Shell 152 mm diameter
November 1979

Overburden 2.5 m
Mineral 4.8 m
Waste 13.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Second Terrace	Clay, silty, becomes pebbly with flints from 1.6 m, brown	2.3	2.5
	'Clayey' sandy gravel, becomes gravel with some cobble grade in lowermost 1.8 m, laminated sandy silt from 4.3-4.4 m	4.8	7.3
	Gravel: fine with some coarse becoming fine and coarse with a trace of cobble, angular flint with some rounded chalk, igneous, metamorphic, well rounded flint, fossil debris, limestone, ironstone and phosphatic nodules		
	Sand: medium fine and coarse becoming coarse and medium with some fine, predominantly angular flint with some subangular quartz and chalk, brown		
Boulder Clay	Clay, silty, with chalk and flint pebbles, brown, soft	0.2	7.5
	Clay, silty, with pellets and pebbles of chalk, with some flint and a trace of black paper shale, grey becoming dark grey, stiff	13.0+	20.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
	16	44	40	2.5-3.5	23	18	19	13	22	5	0
				3.5-4.5	24	21	18	14	20	3	0
				4.5-5.5	20	12	18	16	29	5	0
				*5.5-6.5	8	6	14	11	33	26	2
				*6.5-7.3	3	2	16	20	35	24	0
				Mean	16	12	17	15	28	12	trace

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
2.5-7.3	74	1	2	2	2	15	1	1	1	1

TL 84 NW 33 8164 4521 School Barn, Pentlow

Block A

Surface level +62.9 m
Water struck at +36.9 m
Shell 152 mm diameter
November 1979

Overburden 12.0 m
Mineral 18.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.9	0.9
Boulder Clay	Clay, sandy, silty, becoming less sandy from 1.6 m with pebbles and pellets of chalk and some angular flint, orange brown becoming pale grey mottled brown and stiff from 1.6 m	4.1	5.0
	Clay, silty, with pebbles and pellets of chalk and some flint and a trace of black paper shale, ironstone and belemnite fragments, pale becoming dark grey	6.5	11.5
	Clay, silty, sandy with pebbles of flint and some chalk, dark brown, heavily ironstained	0.5	12.0
Barham Sands and Gravels	a 'Clayey' pebbly sand Gravel: fine and coarse, predominantly angular flint with some rounded quartz and quartzite, well rounded flint and subangular sandstone and a trace of chalk and ironstone Sand: medium and fine with a trace of coarse, subangular quartz with some angular flint and a trace of ironstone and chalk, dark orange brown	2.0	14.0

Kesgrave Sands and Gravels	b Sandy gravel	3.0	17.0
	Gravel: fine with coarse, angular flint with well-rounded flint, rounded quartz and sub-rounded sandstone and a trace of igneous and metamorphic Sand: medium with fine and some coarse, predominantly subrounded to subangular quartz with some angular flint, pale yellowish brown		
Red Crag	c Sand with a trace of fine gravel at base	8.0	25.0
	Sand: fine with some medium and a trace of coarse, overwhelmingly subrounded quartz with a trace of angular flint, ironstone and mica		
Red Crag	d Pebbly sand, heavily ironstained with many thin ironpan layers	5.0+	30.0
	Gravel: fine with some coarse, angular ironstone with well rounded and angular flint, and some quartz quartzite and sandstone with a trace of chalk, igneous and metamorphic in the 4 - 8 mm fraction Sand: fine medium and coarse, strongly bimodal in parts, predominantly well rounded with some subrounded quartz with ironstone and a trace of angular flint, dark orange brown becoming vivid orange with depth		

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	12.0-14.0	85	5	7	2	trace	1	0	trace	0	0
b	14.0-17.0	64	18	11	4	2	0	0	0	0	1
c	17.0-25.0	Sand: no pebbles retained									
d	25.0-30.0	16	23	7	6	1	trace	0	43	0	4

TL 84 NW 34 8219 4904 Millhill Farm, Glemsford Block B

Surface level +77.6 m
Water struck at +65.1 m
Shell 152 mm diameter
December 1979

Waste 19.0 m+

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages										
	Fines	Sand	Gravel		Percentages										
					Fines			Gravel							
	-10	+10 -1	+1 -1		+1 -4	+4 -16	+16 -64	+64 mm							
a	13	81	6	12.0-13.0	14	37	39	3	4	3	0				
				13.0-14.0	12	41	39	3	3	2	0				
				Mean	13	39	39	3	4	2	0				
b	6	68	26	14.0-15.0	5	12	47	8	20	8	0				
				15.0-16.0	4	11	41	9	19	16	0				
				16.0-17.0	8	43	30	4	11	4	0				
				Mean	6	22	39	7	17	9	0				
c	6	94	0	17.0-18.0	3	75	22	0	0	0	0				
				18.0-19.0	5	73	22	trace	0	0	0				
				19.0-20.0	5	87	8	trace	0	0	0				
				20.0-21.0	8	91	1	trace	0	0	0				
				21.0-22.0	7	91	2	trace	0	0	0				
				22.0-23.0	4	82	14	trace	0	0	0				
				23.0-24.0	8	81	11	trace	0	0	0				
				24.0-25.0	10	71	16	3	trace	0	0				
				Mean	6	81	12	1	trace	0	0				
d	6	88	6	25.0-26.0	12	47	27	7	6	1	0				
				*26.0-27.0	9	50	23	14	4	0	0				
				*27.0-28.0	3	21	36	30	9	1	0				
				*28.0-29.0	4	21	29	43	3	trace	0				
				*29.0-30.0	4	20	30	41	5	0	0				
				Mean	6	32	29	27	5	1	0				
a+b+c	7	86	7	Mean	7	53	24	9	5	2	0				

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Glacial Sand and Gravel	Clay, extremely pebbly, sandy pebbles of angular flint packed in a sandy clay matrix, brown	3.2	3.7
Boulder Clay	Clay, silty, sandy, with pellets and pebbles of chalk and some angular flint, pale brown	2.8	6.5
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine with coarse, angular flint and rounded chalk with some rounded quartzite and subrounded sandstone with a trace of ironstone, igneous, metamorphic, quartz, limestone, fossil debris, well rounded flint and phosphatic nodules Sand: medium with fine and coarse, predominantly angular flint with subangular chalk and some subangular quartz, pale brown	1.0	7.5
Boulder Clay	Clay, silty, sandy, with pellets and pebbles of chalk and some angular flint, pale brown	2.5	10.0
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine and coarse with a trace of cobble grade in uppermost 1.0 m, angular flint and rounded chalk, with some rounded quartzite and subrounded sandstone, with a trace of limestone, fossil debris, quartz, igneous, metamorphic, phosphatic nodules, well rounded flint and ironstone Sand: medium and coarse with fine, predominantly angular flint with subangular chalk and quartz, pale brown	2.3	12.3
Boulder Clay	Clay, silty, passing into silt at 12.5 m with pellets of chalk and some angular flint, pale brown	0.7	13.0
	Clay, silty, with some pellets and pebbles of chalk and some angular flint, with a trace of black paper shales and fossil debris, grey becoming dark grey	6.0+	19.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	$+\frac{1}{16}$ - $\frac{1}{4}$	$+\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	19	45	36	6.5-7.5	19	13	20	12	21	15	0
b	25	41	34	10.0-11.0	32	11	18	17	10	9	3
				11.0-12.3	19	10	16	12	24	19	0
				Mean	25	10	17	14	18	15	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	6.5-7.5	49	1	2	3	3	36	1	2	1	2
b	10.0-12.3	43	1	1	3	3	42	2	trace	3	2

TL 84 NW 35 8267 4714 Skateshill Farm, Glemsford Block B

Surface level +66.4 m
 Water not struck
 Shell 152 mm diameter
 November 1979

Overburden 0.4 m
 Mineral 1.0 m
 Waste 18.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: coarse and fine, angular flint, with some rounded quartz and quartzite, and a trace of sandstone, well rounded flint, ironstone, igneous, metamorphic, chalk and fossil debris Sand: medium and fine with coarse, predominantly angular flint and subangular quartz with a trace of chalk	1.0	1.4
Boulder Clay	Clay, silty, with pellets and pebbles of chalk and some flint, from 3.0-3.2 m a layer of puggy chalk in a clay matrix, pale brown	4.6	6.0
	Clay, silty, with pellets and pebbles of chalk with some angular flint, grey becoming dark grey, stiff	14.0+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	$+\frac{1}{16}$ - $\frac{1}{4}$	$+\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
	35	35	30	0.4-1.4	35	13	15	7	14	16	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.4-1.4	89	1	3	3	1	1	0	1	trace	1

TL 84 NW 36 8215 4649 Gravelpit Hall, Glemsford Block C

Surface level +38.0 m
 Water struck at +21.2 m
 Shell 152 mm diameter
 November 1979

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.5	0.5
First and Second Terrace	Clay, very silty and sandy, with many flint pebbles pyriteous, carbonaceous, black mottled dark green, very soft, damp	1.6	2.1
Boulder Clay	Clay, silty with some chalk pellets and angular flint pebbles, pale brown	0.6	2.7
	Clay, silty with pellets and pebbles of chalk and some flint, grey mottled and streaked brown	1.3	4.0
	Clay, silty, with pebbles and some pellets of chalk and some flint with a trace of black paper shale, puggy chalk in clay matrix at 7.0-7.3 m, 13.3-13.6 m and 16.8-17.3 m, grey	15.0+	19.0

TL 84 NW 37 8220 4593 Pentlow Street, Pentlow Block C

Surface level +36.2 m
 Water struck at +33.5 m
 Shell 152 mm diameter
 November 1979

Overburden 2.7 m
 Mineral 4.0 m
 Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Peat	Peat, silty in lowermost 0.4 m dark brown dry, becoming black and damp at base	2.3	2.7
River Terrace Deposits	Gravel, 'very clayey' with much carbonaceous debris in uppermost 1.0 m Gravel: fine with coarse, angular flint, with some rounded chalk, quartzite and quartz, subrounded sandstone and well rounded flint, with a trace of limestone, fossil debris, igneous, metamorphic, ironstone and phosphatic nodules Sand: coarse and medium with fine, angular flint with subrounded quartz and some chalk, pale yellowish brown	4.0	6.7
Upper Chalk	Chalk, soft, white	2.0+	8.7

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
				- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
8	44	48	*2.7-3.7	20	33	17	14	13	3	0
			*3.7-4.7	5	8	14	15	38	20	0
			*4.7-5.7	4	4	16	22	40	14	0
			*5.7-6.7	3	3	16	15	29	34	0
			Mean	8	12	16	16	30	18	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
2.7-6.7	86	2	2	3	2	5	trace	trace	trace	trace

TL 84 NW 38 8340 4977 East of Braggons Farm, Boxted

Block C

Surface level +39.0 m
Water struck at +36.2 m
Shell 152 mm diameter
December 1979

Waste 3.8 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Peat	Peat, silty, with well preserved plant remains, black	2.8	2.8
Alluvium	Clay, silty, sandy in last 30 cms, with a few angular flint pebbles, brown	1.0	3.8
Upper Chalk	Chalk, soft, white	1.2+	5.0

TL 84 NW 39 8348 4892 Place Farm, Glemsford

Block B

Surface level +49.9 m
Water not struck
Shell 152 mm diameter
December 1979

Waste 9.2 m
Bedrock 2.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Head	Silt, clayey, with some angular flints and rootlets, brown becoming orange brown	1.5	1.7
Boulder Clay	Clay, silty, sandy in uppermost 2.7 m, with pebbles and pellets of chalk, and angular flint, brown	7.5	9.2
Upper Chalk	Chalk, soft, white, with some black nodular flint	2.8+	12.0

TL 84 NW 40 8360 4746 Court Farm, Glemsford

Block B

Surface level +57.3 m
Water struck at +45.9 m
Shell 152 mm diameter
November 1979

Waste 25.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, plastic	0.3	0.6
	Clay, silty, friable, with pellets and pebbles of chalk and some angular flints, brown	4.4	5.0
	Clay, silty, with pebbles and pellets of chalk and some angular flint, with a trace of black paper shales, grey	3.6	8.6
Glacial Silt	Silt, with thin clay seams throughout, pebbly and sandy from 11.4-12.8 m, grey	6.7	15.3
Boulder Clay	Clay, silty, with pellets and pebbles of chalk, and some angular flint, stiff, grey becoming dark grey	9.7+	25.0

TL 84 NW 41 8338 4650 Near Glemsford Station, Glemsford

Block C

Surface level +35.7 m
Water struck at +32.3 m
Shell 152 mm diameter
November 1979

Overburden 2.6 m
Mineral 8.4 m
Waste 10.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.1	0.1
First and Second Terrace	Clay, silty, faintly laminated, with rootlets and carbonaceous debris, orange brown	1.7	1.8
	Silt, clayey, becomes sandy and pebbly with depth, pyriteous, carbonaceous, black mottled and streaked green	0.8	2.6
Glacial Sand and Gravel	'Clayey' pebbly sand, 'very clayey' in uppermost 1.0 m where gravel has a green/black coating Gravel: fine with coarse, angular flint with rounded chalk, with some subrounded sandstone, rounded quartzite and well rounded flint with a trace of limestone, quartz, ironstone, fossil debris, igneous, metamorphic and phosphatic nodules Sand: medium with fine and coarse, predominantly angular flint with subangular quartz and chalk, brown brown becoming orange brown	8.4	11.0
Boulder Clay	Clay, silty, with pebbles and pellets of chalk and some angular flints, brown in uppermost 0.1 m becomes grey	10.5+	21.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
10	75	15	2.6-3.6	23	23	24	9	14	7	0
			*3.6-4.6	13	19	45	13	9	1	0
			*4.6-5.6	9	28	59	3	1	0	0
			*5.6-6.6	13	28	45	6	7	1	0
			*6.6-7.6	2	20	40	12	17	9	0
			*7.6-8.6	5	14	45	11	16	9	0
			*8.6-9.6	6	15	49	15	12	3	0
			*9.6-10.6	5	13	45	20	10	3	0
			*10.6-11.0	9	13	45	24	9	0	0
			Mean	9	19	44	12	11	4	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
2.6-11.0	66	2	1	2	3	22	1	1	1	1

TL 84 NW 42 8321 4503 Foxearth Hall, Foxearth

Block D

Surface level +56.1 m
 Water struck at +52.1 m, +48.7 and +39.4 m
 Shell 152 mm diameter
 November 1979
 Waste 20.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, sandy, with some flint pebbles, quartz and ironstone, brown, firm to stiff	0.3	0.5
	Clay, silty, thin fine chalky sand seen at base, with pebbles and pellets of chalk, and some flint, quartz and ironstone, brown becoming mottled grey, stiff becoming soft	3.5	4.0
	Clay, silty, with pellets and pebbles of chalk with some flint, quartz and a trace of black paper shale, chalky flint gravel between 7.4-7.5 m, pale grey becoming greyish brown, firm	5.5	9.5
	Clay, silty, with pebbles of chalk and some flint, with a trace of pyrite, black paper shale, quartz, limestone and fossil debris, very dark bluish grey, stiff. Thin chalky gravel at 16.7 m	7.5	17.0
Glacial Silt	Silt, clayey, fine sandy, micaceous with a trace of chalk pellets soft, grey	1.9	18.9
Boulder Clay	Clay, silty, sandy, with chalk and flint pebbles, grey-brown, firm to stiff	1.1+	20.0

TL 84 NW 43 8430 4967 Near Stanstead House, Stanstead

Block B

Surface level +71.6 m
 Water struck at +61.7 m
 Shell 152 mm diameter
 December 1979
 Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with some flint pebbles, grey	0.5	0.7
	Clay, silty, with pebbles and pellets of chalk and some flint, becomes very silty at base, grey	9.2	9.9
Glacial Silt	Interlaminated silt and clay, sandy, with some flint pebbles in uppermost 0.7 m, grey, soft	2.1	12.0
Boulder Clay	Clay, silty, with chalk and flint pebbles, grey, stiff	7.0+	19.0

TL 84 NW 44 8419 4751 Lumpit Wood, Glemsford

Block B

Surface level +52.8 m
 Water not struck
 Shell 152 mm diameter
 November 1979
 Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, very silty, laminated in basal 0.1 m, with pellets and pebbles of chalk, and some flint, pale brown becoming yellowish-brown, stiff	5.2	5.5
Glacial Sand and Gravel	Clay, silty, extremely sandy, with a trace of chalk, flint, quartz, sandstone, limestone, ironstone and fossil pebbles. Sand, fine with medium and a trace of coarse, predominantly subangular quartz with some chalk, yellowish brown	2.0	7.5
Boulder Clay	Clay, silty, becomes more silty with depth, with pellets and pebbles of chalk, and some black flint and paper shale, grey, stiff	11.5+	19.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
42	56	2	5.5-6.5	40	37	17	3	2	1	0
			6.5-7.5	44	42	12	1	1	0	0
			Mean	42	40	14	2	1	1	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
5.5-7.5	Insufficient Material									

TL 84 NW 45 8438 4667 Martins Nest, Long Melford

Block C

Surface level +34.0 m
Water struck at +32.0 m
Shell 152 mm diameter
November 1979

Overburden 0.4 m
Mineral 2.6 m
Waste 17.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
First Terrace	Gravel, decalcified in uppermost 1.0 m Gravel: coarse with fine and a trace of cobble grade, predominantly angular flint with some well rounded flint, rounded quartz, quartzite and chalk, and subrounded sandstone, with a trace of ironstone, igneous, metamorphic, limestone, fossil debris and phosphatic nodules Sand: coarse and medium with some fine, predominantly angular flint, with some subangular quartz and chalk, brown	2.6	3.0
Boulder Clay	Clay, silty, with pellets and pebbles of chalk, with some flint, and a trace of black shale, dark grey	17.0+	20.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
			- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
7	27	66	0.4-1.4	6	5	13	12	27	37	0
			1.4-2.4	10	5	11	13	24	34	3
			*2.4-3.0	5	1	7	10	27	49	0
			Mean	7	4	11	12	26	39	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
0.4-3.0	85	4	3	2	2	2	trace	1	trace	1

TL 84 NW 46 8488 4657 Burtons Farm, Long Melford

Block E

Surface level +45.2 m
Water struck at +50.7 m
Shell 152 mm diameter
November 1979

Waste 21.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, pebbly at top becoming sandy with depth, firm becoming stiff, pale orange-brown	0.7	1.0
	Clay, silty becoming very sandy from 1.6 m with pebbles of chalk and some flint, pale orange brown mottled grey	2.0	3.0
Glacial Sand and Gravel	Clay, silty, extremely sandy, with pebbles of chalk, angular flint, quartzite and sandstone with a trace of well rounded flint, quartz, limestone, ironstone, fossil debris, igneous and metamorphic, yellowish brown	2.2	5.2
Boulder Clay	Clay, silty, with pellets and pebbles of chalk, and some flint, chalk rich layer from 19.8-20.7 m, very sandy from 10.4-12.3 m, blue grey mottled brown in uppermost 2.8, becomes dark grey and pale grey from 16.0 m	15.9+	21.1

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
			- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
43	43	14	3.0-5.2	43	22	13	8	9	5	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
3.0-5.2	37	2	1	5	4	46	trace	1	2	2

TL 84 NW 47 8452 4596 Near Cranfield, Long Melford

Block C

Surface level +33.7 m
Water struck at +31.4 m
Shell 152 mm diameter
November 1979

Overburden 0.3 m
Mineral 3.9 m
Waste 15.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil and made ground	0.3	0.3
First Terrace	Gravel Gravel: fine and coarse with a trace of cobble grade, angular flint, with some sandstone, quartzite, well rounded flint, quartz and chalk, with a trace of limestone, igneous, metamorphic ironstone, fossil debris and phosphatic nodules Sand: medium with some coarse and some fine, predominantly angular flint, with some subangular quartz and chalk, dark brown becoming pale yellowish brown	3.9	4.2
Boulder Clay	Clay, silty, with pellets and pebbles of chalk, and some flint, with a trace of black paper shale, dark grey	15.8+	20.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
6	48	51	8	7	18	12	26	29	0	
			5	8	17	11	25	30	4	
			5	7	31	13	30	14	0	
			5	6	25	16	30	18	0	
			6	7	23	13	27	23	1	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-42	86	2	2	3	3	2	1	trace	trace	1

TL 84 NW 48 8449 4531 Listonhall Farm, Liston

Block D

Surface level +43.9 m
Water struck at +41.0 m
Shell 152 mm diameter
November 1979

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, sandy, silty with flint pebbles, pale brown becoming pale brown mottled pale grey from 1.4 m Clay, sandy, silty with pellets and pebbles of chalk and some flint, thin chalk gravel at 2.9 m, pale brown mottled grey Clay, silty, with pellets and pebbles of chalk and some flint, some silt seams towards base, grey becoming dark grey	1.9 2.4 14.5+	2.1 4.5 19.0

TL 84 NW E1 8210 4925 Exposure north of Millhill Farm, Glemsford

Block B

Surface level c +72.5 m
Water not struck

Overburden 0.2 m
Mineral 5.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Glacial Sand and Gravel	Gravel, open framework, cross stratified gravel with cross bedded, channelled and lensoid sands at 2.0-2.3 m and 3.3-36 m below the surface Gravel: coarse with fine and some cobble grade, rounded chalk, with angular flint, with some fossil debris, ironstone and sandstone, and a trace of quartzite, limestone, quartz, well rounded flint, phosphatic nodules and igneous Sand: medium with fine and some coarse, predominantly subangular quartz and angular flint with some chalk and ironstone, brown and yellowish brown	5.8+	6.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
5	34	61	6	4	12	6	14	48	10	
			6	26	64	3	1	0	0	
			4	9	20	6	25	36	0	
			6	26	64	3	1	0	0	
			4	9	20	6	25	36	0	
			6	4	12	6	14	48	10	
			5	8	20	6	16	39	6	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.2-6.0	29	1	2	2	4	48	2	6	5	1

TL 84 NE 27 8539 4931 Stanstead Great Wood, Stanstead Block B

Surface level +75.8 m
 Water struck at +68.8 m
 Shell 152 mm diameter
 September 1979
 Waste 7.0 m
 ?Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Glacial Sand and Gravel	Clay, gravelly, sandy, silty, predominantly angular flint, sandstone, ironstone, quartz, igneous and metamorphic. Sand generally fine with some medium and coarse, yellowish brown	0.6	0.8
Boulder Clay	Clay, silty, sandy to 2.8 m, with some flint pebbles and some chalk from 2.8 m, yellowish brown becomes mottled grey and grey from 3.7 m	6.2	7.0
Upper Chalk (?)	Chalk, soft, white, gritty with some angular flint	1.5+	8.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				-16	+16-4	+4-1	+1-4	+4-16	+16-64	+64 mm
43	27	30	0.2-0.8	43	17	6	4	9	21	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.2-0.8	90	2	1	4	2	0	0	1	0	trace

TL 84 NE 28 8530 4854 Stanstead Great Wood, Stanstead Block A

Surface level +66.2 m
 Water not struck
 Shell 152 mm diameter
 September 1979
 Overburden 16.1 m
 Mineral 8.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty with pellets and pebbles of chalk, with some flint, and a trace of ironstone, brown mottled pale grey	4.3	4.5
Glacial Sand and Gravel	a Pebbly sand Gravel: coarse with fine and cobble grade, angular flint, with some sandstone and chalk and a trace of well rounded flint, quartzite, fossil debris, phosphatic nodules and fine quartz, igneous and metamorphic Sand: medium with fine and some coarse, predominantly angular to subangular flint and quartz with a trace of chalk, yellowish brown	0.5	5.0
Boulder Clay	Clay, silty, sandy in uppermost 0.5 m with pellets and pebbles of chalk with some flint, brown becoming dark grey from 5.5 m	10.3	15.3
Kesgrave Sands and Gravels	b 'Clayey' sand, with discrete thin laminated clayey silt seams throughout Sand: fine with medium and with a trace of coarse, deposit exhibits a marked coarsening upwards sequence, predominantly subrounded to rounded quartz with some mica, pale brown	0.8 5.0	16.1 21.1
Red Crag	c 'Clayey' sand, strongly bimodal with a trace of fine gravel Gravel: fine, angular ironstone and flint with some well rounded flint and quartz Sand: fine with medium and some coarse, rounded quartz, dark yellowish brown and reddish brown	3.9+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand	Gravel				
					-16	+16-4	+4-1	+1-4	+4-16	+16-64	+64 mm
a	4	75	21	4.5-5.0	4	15	52	8	6	10	5
b	12	88	0	16.1-17.1	21	34	44	1	0	0	0
				17.1-18.1	9	20	70	1	0	0	0
				18.1-19.1	9	77	13	1	0	0	0
				19.1-20.1	14	78	8	trace	0	0	0
				20.1-21.1	8	91	1	trace	0	0	0
				Mean	12	60	27	1	0	0	0
c	15	84	1	21.1-22.1	6	40	38	15	1	0	0
				22.1-23.1	10	52	31	6	1	0	0
				23.1-24.1	24	48	23	4	1	0	0
				24.1-25.0	18	41	37	3	1	0	0
								Mean	15	45	32
b+c	13	86	1	Mean	13	54	29	3	1	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	4.5-5.0	84	3	0	2	5	3	0	0	3	0
b	16.1-21.1	all sand, no pebbles retained									
c	21.1-25.0	Insufficient material									

TL 84 NE 29 8537 4764 Cranmore Green Farm, Long Melford

Surface level +63.2 m
Water struck at +57.0 m
Shell 152 mm diameter
October 1979

Block B

Overburden 1.2 m
Mineral 1.0 m
Waste 0.3 m
Mineral 1.9 m
Waste 15.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	1.2	1.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine with a trace of coarse, rounded chalk and angular flint, with some sandstone and quartzite and a trace of limestone, fossil debris, quartz, phosphatic nodules, well rounded flint, igneous, metamorphic and ironstone Sand: medium with fine and some coarse predominantly angular flint and subrounded quartz and chalk, brown	1.0	2.2
	Silt, sandy, brown	0.3	2.5
	b 'Very clayey' gravel Gravel: coarse and fine with a trace of cobble grade, rounded chalk and angular flint with some sandstone and quartzite, and a trace of limestone, fossil debris, quartz, phosphatic nodules, well rounded flint, igneous, metamorphic and ironstone Sand: medium, fine and coarse, angular flint with some subrounded quartz and chalk, brown	1.9	4.4
Boulder Clay	Clay, silty, with pebbles of flint to 6.8, with chalk and flint pebbles from 8.0. Chalk raft from 6.8-8.0 m, brown becoming dark grey between 8.0 m and 16.8 m then brown	13.2	17.6
	Clay, silty, sandy, with pellets and pebbles of chalk and some angular flint, orange brown	2.4+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	20	76	4	1.2-2.2	20	25	47	4	4	trace	0
b	23	29	48	2.5-3.5	24	11	10	7	20	25	3
				3.5-4.4	21	7	13	11	25	23	0
				Mean	23	9	11	9	22	24	2

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	1.2-2.2	37	trace	2	3	3	49	2	trace	3	1
b	2.5-4.4										

TL 84 NE 30 8593 4658 Near Windmill Farm, Long Melford

Surface level +53.0 m
Water struck at +42.7 m
Shell 152 mm diameter
September 1979

Block E

Overburden 9.3 m
Mineral 3.4 m
Waste 0.6 m
Mineral 3.7 m
Waste 6.5 m

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Silt, very clayey, dry, friable, with some flint pebbles, pale yellowish brown	0.9	1.1
	Clay, very sandy and pebbly, brown	0.3	1.4
	Clay, silty, very silty and fine sand in parts, with pebbles of chalk and flint, with some fossil debris, quartz and quartzite, yellow brown becoming mid brown and mottled grey from 3.8 m	7.9	9.3
Glacial Sand and Gravel	a Sandy gravel, 'clayey' in uppermost 1.0 m Gravel: fine and coarse, angular flint and rounded chalk, with some quartzite, sandstone and quartz, and a trace of fossil debris, limestone, igneous, metamorphic and phosphatic nodules Sand: medium with fine and some coarse, predominantly angular flint with subangular quartz and chalk, yellowish brown	3.4	12.7
	Silt, laminated, with fine chalk sand, pale greyish brown	0.6	13.3
	b Pebbly sand Gravel: fine with coarse, angular flint with rounded chalk, with some sandstone, quartzite, quartz, limestone and phosphatic nodules, and a trace of fossil debris, ironstone, igneous, metamorphic and well rounded flint Sand: medium with coarse and fine, predominantly angular flint with subangular quartz and chalk, yellowish brown	3.7	17.0
Boulder Clay	Clay, silty, sandy, with chalk and flint pebbles, yellowish brown becoming mottled brown	1.0	18.0
Glacial Silt	Silt, fine sandy, laminated, chalk putty at base, grey and greyish brown	2.7	20.7
Boulder Clay	Clay, silty, with chalk and flint pebbles, dark bluish grey, hard	2.8+	23.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages											
	Fines	Sand	Gravel													
					Fines		Sand			Gravel						
-1/16	+1/8 - 1/4	+1/4 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm										
a	7	61	32	9.3-10.3	15	26	34	5	12	8	0					
				*10.3-11.3	1	8	35	10	24	22	0					
				*11.3-12.7	5	15	42	9	15	14	0					
				Mean	7	16	37	8	17	15	0					
b	5	73	22	*13.3-14.6	8	22	45	11	12	2	0					
				*14.6-15.6	4	11	45	19	17	4	0					
				*15.6-16.6	2	5	48	13	19	13	0					
				*16.6-17.0	9	11	43	13	18	6	0					
				Mean	5	13	46	14	16	6	0					

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	9.3-12.7	56	0	2	4	3	31	1	trace	2	1
b	13.3-17.0	57	trace	2	3	6	25	2	1	3	1

TL 84 NE 31 8598 4573 River Stour, Long Melford

Block C

Surface level +32.3 m
Water struck at +28.7 m, +20.8 m and +16.1 m
Shell 152 mm diameter
September/October 1979

Overburden 1.1 m
Mineral 3.2 m
Waste 1.2 m
Mineral 1.0 m
Waste 10.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
First Terrace	Clay, silty, fine sandy, with flint pebbles, yellowish brown, firm	0.8	1.1
	a Sandy gravel, 'clayey' gravel in uppermost 1.0 m Gravel: fine with coarse, angular flint, with some chalk, sandstone and quartz, with a trace of quartzite, well rounded flint, igneous, metamorphic, limestone, ironstone and fossil debris Sand: medium and coarse with fine, angular flint with subangular quartz and chalk, yellowish brown	3.2	4.3
	Silt, clayey, fine chalk sandy, yellowish brown	1.2	5.5
	b Gravel Gravel: fine and coarse, angular flint, with some chalk, sandstone, quartzite and quartz, with a trace of igneous, metamorphic, well rounded flint, fossil debris and ironstone Sand: medium with coarse and some fine, angular flint with subangular quartz and chalk, yellowish brown	1.0	6.5

Glacial Silt	Silt, laminated, fine sandy and clayey in seams with some chalk pellets and angular flints, pyriteous, pale bluish grey	5.0	11.5
Glacial Sand and Gravel	c 'Clayey' gravel Gravel: fine with some coarse, rounded chalk, with angular flint, and some quartzite, mudstone and fossil debris, with a trace of limestone, igneous, metamorphic and fossil debris Sand: coarse with medium and some fine, angular flint, with some subangular chalk and quartz, pale grey	0.5	12.0
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, brown	0.5	12.5
	Gravel, very chalky, with some flint, pale grey	0.4	12.9
	Clay, silty becoming very silty, with pellets and pebbles of chalk and some flint, greyish brown becoming olive-grey	3.3	16.2
	Gravel, very chalky, with some flint, pale grey	0.1	16.3
	Clay, silty, with pellets and pebbles of chalk and some flint, olive-grey, firm	1.0+	17.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages											
	Fines	Sand	Gravel													
					Fines		Sand			Gravel						
-1/16	+1/8 - 1/4	+1/4 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm										
a	8	46	46	1.1-2.1	12	10	15	15	27	21	0					
				2.1-3.1	8	3	25	17	27	10	0					
				3.1-3.6	8	6	20	20	36	10	0					
				*3.6-4.3	3	9	15	16	39	18	0					
				Mean	8	10	19	17	31	15	0					
b	4	47	49	*5.5-6.5	4	7	24	16	25	24	0					
c	11	34	55	*11.5-12.0	11	4	13	17	44	11	0					

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	1.1-4.3	89	1	2	1	2	3	1	trace	trace	1
b	5.5-6.5	87	1	2	2	3	4	0	trace	trace	1
c	11.5-12.0	34	0	0	3	3	54	2	trace	3	1

TL 84 NE 32 8583 4542 River Stour, Long Melford

Surface level +30.9 m
Water struck at +28.6 m
Shell 152 mm diameter
October 1979

Block C

Overburden 0.3 m
Mineral 4.8 m
Waste 13.9 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
First Terrace	'Clayey' sandy gravel, 'clayey' and 'very clayey' in uppermost 2.0 m Gravel: fine with coarse, angular flint, with some chalk, sandstone, quartzite and quartz, and a trace of well rounded flint, fossil debris, phosphatic nodules, igneous and metamorphic Sand: medium with coarse and fine, angular flint and subangular quartz with a trace of chalk, yellowish brown	4.8	5.1
Glacial Silt	Silt, laminated, fine chalk sandy, pale grey	8.4	13.5
Boulder Clay	Clay, silty, with pellets and pebbles of chalk and some flint, some thin sand layers throughout, grey	5.5	19.0
Upper Chalk	Chalk, soft becoming harder with depth, white	2.0+	21.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
11	47	42	0.3-1.3	17	25	15	7	14	22	0
			1.3-2.3	22	12	17	16	16	17	0
			*2.3-3.3	6	8	18	15	34	19	0
			*3.3-4.3	1	6	27	16	36	14	0
			*4.3-5.1	7	11	30	17	26	9	0
			Mean	11	12	21	14	25	17	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-5.1	88	1	2	2	2	3	1	0	1	trace

TL 84 NE 33 8642 4933

Surface level +73.4 m
Water not struck
Shell 152 mm diameter
October 1979

Ashen Grove, Long Melford

Block B

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made Ground	0.6	0.6
Boulder Clay	Clay, silty, sandy, with some angular flint, brown mottled grey Clay, silty, with pellets and pebbles of chalk, with some flint, brown mottled grey becoming predominantly grey with some brown mottling from 3.0 m Clay, silty, with pellets and pebbles of chalk, and some flint, grey becoming dark grey	1.1 5.3 12.0+	1.7 7.0 19.0

TL 84 NE 34 8632 4855

Surface level +77.5 m
Water struck at +76.5 m
Shell 152 mm diameter
September 1979

Paddock Plantation, Long Melford

Block A

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.4	0.4
	Topsoil	0.4	0.8
Boulder Clay	Clay, silty, with pellets and pebbles of chalk, with some flint, and a trace of ironstone, pale brown mottled pale grey Clay, silty, with pellets and pebbles of chalk, and some flint, stiff grey clay with no pebbles from 18.2-18.4 m, grey becoming dark grey	10.2 8.0+	11.0 19.0

TL 84 NE 35 **8664 4695** **Kentwell Park, Long Melford** **Block B**

Surface level +60.0 m
Water struck at +55.5 m and +36.1 m
Shell 152 mm diameter
September 1979

Waste 24.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, sandy, becomes silt, clayey laminated from 1.5 m, with some flint pebbles, orange-brown	4.3	4.5
	'Clayey' gravel, very chalky with some flint; sand predominantly angular medium and coarse flint, with some medium and fine quartz and chalk, pale brown	0.4	4.9
	Clay, silty, with pellets and pebbles of chalk, and some flint, and a trace of ironstone, pale becoming dark grey	19.0	23.9
Glacial Sand and Gravel	'Very clayey' sand, predominantly fine subrounded quartz, grey	0.2+	24.1

TL 84 NE 36 **8617 4608** **Near Brook House, Long Melford** **Block E**

Surface level +40.3 m
Water struck at +36.3 m,+30.7 m and +18.9 m
Shell 152 mm diameter
September 1979

Overburden 8.4 m
Mineral 4.6 m
Waste 8.4 m
Mineral 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy in uppermost 1.4 m, with pellets and pebbles of chalk, with some flint, thin sand seam at 4.0 m, dark yellowish brown	5.6	5.9
	Clay, silty, sandy with pebbles of chalk, flint and some quartz, dark greyish brown becoming bluish grey, stiff	2.5	8.4
Glacial Sand and Gravel	a Pebbly sand, becomes gravel in basal 0.4 m Gravel: fine with some coarse, angular flint, with rounded chalk and sandstone with some quartzite, limestone, quartz and fossil debris, and a trace of well rounded flint, igneous, metamorphic, ironstone, and phosphatic nodules Sand: medium, with coarse and fine, angular flint with subangular quartz and chalk, yellowish brown	4.6	13.0
Boulder Clay	Clay, silty, with pebbles of chalk and flint, dark bluish black becoming grey, stiff, waxy	2.5	15.5
Glacial Silt	Silt, fine sandy, laminated, with chalk pellets, pale grey	1.0	16.5

Boulder Clay	Clay, silty, with pebbles of chalk, flint and quartz with a trace of black shale, dark greyish brown, stiff	1.0	17.5
Glacial Silt	Interlaminated silt and fine chalky sands, pale grey,	3.9	21.4
Glacial Sand and Gravel	b 'Clayey' pebbly sand Gravel: coarse, fine and cobble grade, angular flint with some well rounded quartzite, flint and chalk, with a trace of limestone, sandstone and quartz Sand: medium with fine and a trace of coarse, subrounded quartz with angular flint and chalk, yellowish brown	1.6+	23.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Sand		Gravel	
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	4	79	17	8.4-9.6 *9.6-10.6 *10.6-11.6 *11.6-12.6 *12.6-13.0 Mean	6 4 3 2 2 4	21 9 13 10 6 13	55 48 62 49 21 51	9 21 18 18 11 15	8 15 4 19 41 14	1 3 0 2 19 3	0 0 0 0 0 0
b	12	72	16	*21.4-23.0	12	27	43	2	5	6	5

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	8.4-13.0	59	1	2	3	8	20	3	1	2	1
b	21.4-23.0	82	4	1	8	1	3	1	0	0	0

TL 84 NE 37 8692 4522 West of Kings Lane, Long Melford

Surface level +52.0 m
Water not struck
Shell 152 mm diameter
October 1979

Block E

Waste 18.9 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy and chalk free in uppermost 0.3 m, with pellets and pebbles of chalk, and some flint, yellow brown streaked pale yellow brown, becoming mid brown from 5.0 m	6.0	6.3
	Clay, silty, with pebbles of chalk and flint, with a trace black shale, greyish blue with ochdre brown fissures becomes greyish blue from 9.0 m	3.7	10.0
	Clay, silty, with silt and sand seams throughout, with some chalk, flint, black shale and fossil debris, pale grey and blue grey	2.5	12.5
Glacial Silt	Interlaminated, silt, fine chalky sand and some silty chalky clay, chalk pellets throughout, pale grey becoming greyish green and ochdre brown, soft	4.4	16.9
Boulder Clay	Clay, silty, sandy, becoming very sandy at base, with chalk and flint pebbles, and some black paper shale, brown streaked bluish grey	2.0	18.9
Upper Chalk	Chalk, angular chalk fragments, in a cream chalk putty, rare flints	1.2+	20.1

TL 84 NE 38 8704 4955 Rowhedge Farm, Shimpling

Surface level +78.1 m
Water struck at +73.1 m
Shell 152 mm diameter
October 1979

Block B

Overburden 2.0 m
Mineral 3.4 m
Waste 17.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.9	0.9
Boulder Clay	Clay, silty, sandy, with flint and chalk pebbles, yellowish brown	0.6	1.5
	Silt, sandy, with some flint pebbles, brown	0.5	2.0
Glacial Sand and Gravel	'Very clayey' sandy gravel, 'very clayey' sand in uppermost 1.0 m Gravel: fine with coarse, angular flint and rounded chalk, with some sandstone fossil debris, quartzite and limestone, with a trace of igneous, metamorphic, quartz, phosphatic nodules and well rounded flint Sand: fine with medium and a trace of coarse at top becoming coarse and fine with medium towards base, subrounded to subangular quartz, with angular flint and chalk, yellowish brown grading down into a deep orange-brown	3.4	5.4
Boulder Clay	Clay, silty, sandy at top, with chalk and some flint pebbles, grey becoming dark grey, stiff	17.6+	23.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{8}$ -1	+1-4	+4-16	+16-64	+64 mm	
22	56	22	2.0-3.0	21	62	16	1	trace	0	0
			3.0-4.0	32	35	12	6	13	2	0
			4.0-5.4	16	16	9	17	24	17	0
			Mean	22	35	12	9	14	8	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
2.0-5.4	47	1	1	3	4	32	3	1	4	4

TL 84 NE 39 8786 4829 Spelthorn Wood, Long Melford

Surface level +54.5 m
Water struck at +45.0 m, +41.4 m and +38.1 m
Shell 152 mm diameter
September 1979

Block A

Overburden 16.4 m
Mineral 10.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy, some thin laminated silty clay and sandy silt seams throughout, with pebbles of chalk and flint, yellowish brown, mottled and streaked orange-brown and grey, firm	1.2	1.5
	Clay, silty, sandy with pellets and pellets of chalk, and some flint and quartz, dark yellowish brown mottled and streaked grey, firm	2.5	4.0
	Clay, silty, 'clayey' pebbly sand between 9.5-9.7 m, sandy at base, with chalk and flint pebbles, some quartz and black paper shale, dark grey fissured brown from 9.7 m and brown from 12.7 m	9.1	13.1
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular flint, with rounded quartz and quartzite, well rounded flint and subangular sandstone with a trace of ironstone, igneous and metamorphic, and very fine chalk, limestone and phosphatic nodules Sand: medium and fine with some coarse, subangular to subrounded quartz with some angular flint, pale yellowish brown	1.4	14.5
Boulder Clay	Clay, silty, very sandy at base, with pellets and pebbles of chalk and some flint, brown becoming grey mottled brown and yellowish brown	1.9	16.4

Kesgrave Sands and Gravels	b	Pebbly sand Gravel: fine with a trace of coarse, angular flint, with rounded quartz, well rounded flint and rounded quartzite, with some ironstone, sandstone, igneous and metamorphic Sand: medium with fine and coarse, subrounded to rounded quartz, with some subangular flint and some rounded ironstone, yellow	3.0	19.4
	c	Sand, with a trace of angular and well rounded flint, and rounded quartz and quartzite pebbles Sand: medium with fine and some coarse, predominantly subrounded to rounded quartz with some angular flint, yellowish brown	2.0	21.4
Red Crag	d	Pebbly sand, with a seam of indurated silt, micaceous from 22.0-22.5 m Gravel: fine with a trace of coarse, angular ironstone, with some angular and well rounded flint and rounded quartz, with a trace of quartzite, igneous and metamorphic, fossil debris and indurated indivated worm tubes in basal 1.0 m Sand: fine, with medium and coarse, well rounded quartz with some ironstone, and comminuted coarse and medium shell debris at base, micaceous throughout, dark olive brown oxidizing quickly to dark brown	5.5+	26.9

TL 84 NE 40	8763 4764	High Street Farm, Long Melford	Block A
		Surface level +66.5 m Water struck at +46.3 m Shell 152 mm diameter September 1979	Waste 20.2 m+
LOG			
Geological classification		Lithology	Thickness m Depth m
		Topsoil	0.4 0.4
Boulder Clay		Clay, silty, with pellets and pebbles of chalk, and some angular flint, brown, stiff	3.6 4.0
		Clay, silty, with pellets and pebbles of chalk, and some angular flint and black paper shale, thin pebble free grey silt from 18.8-19.0 m, grey becoming very dark grey between 11.0-14.8 m, stiff	16.2+ 20.2

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
						- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64
a	24	68	8	*13.1-14.5	24	29	35	4	5	3	0
b	5	87	8	*16.4-17.4	4	27	46	10	11	2	0
				*17.4-18.4	4	24	55	12	3	2	0
				*18.4-19.4	6	19	48	19	8	0	0
				Mean	5	23	50	14	7	1	0
c	5	93	2	*19.4-20.4	3	25	53	18	1	0	0
				*20.4-21.4	6	22	47	21	4	0	0
				Mean	5	24	50	19	2	0	0
				d	8	85	7	*21.4-22.0	4	23	49
*22.0-22.5	Silt rock seam										
*22.5-23.5	10	57	20					8	4	1	0
*23.5-24.9	9	49	23					13	6	trace	0
*24.9-25.9	10	43	28					13	5	1	0
*25.9-26.9	7	46	31	11	4	1	0				
Mean	8	46	28	11	6	1	0				
b+c+d	6	88	6	Mean	6	35	39	14	5	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	13.1-14.5	58	10	15	11	4	0	0	1	0	1
b	16.4-19.4	47	13	18	10	4	0	0	5	0	3
c	19.4-21.4	Insufficient material									
d	21.4-26.9	9	8	6	1	0	0	0	75	0	1

TL 84 NE 41 8754 4664 Lodge Farm, Long Melford Block E

		Surface level +58.8 m Water struck at +38.5 m Shell 152 mm diameter October 1979	Waste 26.0 m+
LOG			
Geological classification		Lithology	Thickness m Depth m
		Topsoil	0.3 0.3
Boulder Clay		Clay, silty, extremely silty in uppermost 0.7 m, with pellets and pebbles of chalk and some flint, thin sandy and silty seams throughout, brown becoming mottled grey with depth	8.2 8.5
		Clay, silty, with pellets and pebbles of chalk and some flint, thin puggy chalk seam at 16.0-16.3 m, grey becoming dark grey, stiff	11.8 20.3
Glacial Sand and Gravel		'Clayey' pebbly sand, gravel in uppermost 1.0 m, 'clayey' sand from 21.3 m Gravel: fine and coarse, angular flint, with a trace of quartzite, quartz, well rounded flint, sandstone, chalk, phosphatic nodules, igneous, metamorphic, fossil debris and limestone Sand: medium with fine and some coarse, subangular quartz with some angular flint and chalk	4.9 25.2
Boulder Clay		Clay, silty, with pebbles of chalk and flint, thin sandy seams throughout, grey	0.8+ 26.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
						- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64
	14	73	13	*20.3-21.3	7	8	27	5	22	31	0
				*21.3-25.2	16	32	41	8	3	0	0
				Mean	14	27	38	8	7	6	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
20.3-25.2	89	2	2	2	1	1	trace	0	2	1

TL 84 NE 42 8747 4534 Kings Lane, Long Melford Block E

Surface level +52.9 m
 Water struck at +44.2 m
 Shell 152 mm diameter
 October 1979
 Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with flint and some chalk pebbles, mid-brown, firm	1.1	1.4
	Clay, silty, with pebbles of chalk and some flint, becomes soft and very sandy at base, yellowish brown mottled pale grey becomes pale grey from 6.5 m, stiff	7.3	8.7
	Clay, silty, with pebbles of chalk and flint, with some black shale, thin silt seams throughout, very silty from 16.0 m and faintly laminated from 17.0 m, blue grey, stiff becoming firm with a brown tinge from 16.0 m	8.7	17.4
	Clay, very silty and sandy with chalk, flint and black paper shale pebbles, dark brownish grey becoming dark brown, soft	1.5	18.9
Glacial Sand and Gravel	Sand, angular to subrounded fine to medium quartz sand, dark brown	0.1+	19.0

TL 84 NE 43 8805 4983 A134 north of Bridge Street, Alpheton Block B

Surface level +70.6 m
 Water struck at 57.8 m and 51.6 m
 Shell 152 mm diameter
 September 1979
 Waste 20.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
	Made ground, tarmac and concrete base	0.5	0.7
Boulder Clay	Clay, silty, with pebbles of chalk and flint and a trace of black paper shale, limestone, fossil debris and quartz, brown becoming greyish brown and pale grey, stiff	4.3	5.0
	Clay, silty, with pebbles of chalk and flint, and a trace of black paper shale, fossil debris and quartz, becomes faintly laminated and wet at base, grey, stiff	7.8	12.8
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, angular flint and rounded chalk with subangular sandstone, with some igneous, metamorphic, limestone, quartz and fossil debris, and a trace of ironstone Sand: medium with coarse and fine, angular flint and subangular quartz and chalk, grey	0.7	13.5
Boulder Clay	Clay, silty, with pebbles of chalk and flint, with some black paper shale, greyish blue, firm	6.8+	20.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{3}{4}$	+ $\frac{3}{4}$ - $\frac{1}{2}$	+ $\frac{1}{2}$ -1	+1-4	+4-16	+16-64	+64 mm
16	55	29	12.8-13.5*	16	11	29	15	16	13	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
12.8-13.5	38	0	3	1	14	36	3	trace	2	3

TL 84 NE 44 8867 4863

Lineage Wood, Long Melford

Block E

Surface level +72.1 m
Water struck at +65.1 m
Shell 152 mm diameter
September 1979

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.1	0.1
Boulder Clay	Clay, silty with pebbles of chalk and flint, brown mottled grey	0.8	0.9
	Clay, silty, with pebbles of chalk and flint, and some fossil debris, grey, stiff	6.1	7.0
Glacial Sand and Gravel	'Clayey' gravel, flint and chalk gravel, with some flint, chalk and quartz sand, grey	0.3	7.3
Boulder Clay	Clay, silty, with pebbles of chalk and flint, grey becoming dark grey, stiff	11.7+	19.0

TL 84 NE 45 8847 4788

Crabree Wood, Long Melford

Block E

Surface level +40.8 m
Water struck at +37.8 m
Shell 152 mm diameter
September 1979

Overburden 3.0 m
Mineral 1.0 m
Waste 1.1 m
Mineral 12.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Alluvium	Clay, silty, with carbonaceous debris, orange-brown becoming grey, soft	2.7	3.0
	a 'Clayey' sandy gravel, with discrete thin clay and silt seams Gravel: fine and coarse, angular flint, with some well rounded flint, quartz, quartzite, igneous and metamorphic, with a trace of sandstone, chalk, limestone, ironstone and fossil debris Sand: medium with fine and coarse, angular flint, with subrounded quartz and a trace of chalk, yellowish brown	1.0	4.0
	Clay, silty in parts, dark grey, soft, carbonaceous	1.1	5.1
Glacial Sand and Gravel	b Pebbly sand Gravel: coarse and fine, angular with well rounded flint, with rounded quartz and quartzite, with some sandstone, igneous and metamorphic, and a trace of ironstone and phosphatic nodules Sand: medium with fine and some coarse, predominantly subangular quartz, with a trace of angular flint, and subangular chalk at base, yellowish brown becoming pale yellowish brown	12.9	18.0
Upper Chalk	Chalk, greyish white, with nodular fresh flint	0.5+	18.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand	Gravel				
							- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16
a	14	51	35	3.0-4.0*	14	12	32	7	18	17	0
b	3	84	13	5.1-8.0*	5	39	28	6	13	9	0
				8.0-13.0*	3	29	62	2	1	3	0
				13.0-15.0*	2	30	59	4	4	1	0
				15.0-18.0*	1	8	49	18	10	14	0
				Mean	3	26	51	7	6	7	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
3.0-4.0	78	7	5	3	1	1	1	trace	1	3
5.1-18.0	59	17	11	7	2	0	0	1	1	2

TL 84 NE 46 8811 4690

East of Lodge Farm, Long Melford

Block E

Surface level +41.8 m
Water struck at +37.2 m
Shell 152 mm diameter
October 1979

Overburden 1.7 m
Mineral 9.3 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Glacial Silt	Silt, sandy, pale orange-brown	1.5	1.7
Glacial Sand and Gravel	Sandy gravel, 'clayey' gravel in uppermost 1.9 m Gravel: coarse and fine with a trace of cobble grade, angular flint, with well rounded flint, and some quartz, quartzite and sandstone, with a trace of ironstone, igneous, metamorphic and chalk Sand: medium with fine and coarse, subangular to subrounded quartz with angular flint, brown becoming pale brown	9.3	11.0
Upper Chalk	Chalk, soft, puggy, white	1.6+	12.6

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages									
Fines	Sand	Gravel		Fines			Sand			Gravel			
				-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm			
6	62	32	1.7-2.7	19	9	11	6	25	27	3			
			2.7-3.6	13	6	13	12	26	30	0			
			3.6-4.6	5	12	59	9	11	4	0			
			*4.6-5.6	3	11	51	7	15	13	0			
			*5.6-6.6	1	16	37	8	18	20	0			
			*6.6-7.6	1	26	25	7	14	27	0			
			*7.6-8.6	1	15	46	10	15	13	0			
			*8.6-9.6	11	18	56	9	5	1	0			
			*9.6-11.0	1	19	43	12	13	12	0			
			Mean	6	15	38	9	16	16	trace			

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.7-11.0	82	8	5	2	2	trace	0	1	0	trace

TL 84 NE 47 8872 4657 Bassetts Farm, Acton

Block E

Surface level +53.7 m
Water struck at +51.2 m and +39.8 m
Shell 152 mm diameter
October 1979

Overburden 13.9 m
Mineral 10.6 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with flint pebbles, brown mottled grey	1.7	2.0
	Clay, silty, sandy, with flint and chalk pebbles, brown becoming mottled grey from 6.8 m	5.4	7.4
	Clay, silty, with flint and chalk pebbles, base heavily iron stained, grey	6.5	13.9
Glacial Sand and Gravel	Sandy gravel, with two thin pebbly grey clays at 14.5-14.7 m and 15.5-15.7 m Gravel: coarse with fine and some cobble grade, angular with some well rounded flint, with some quartzite, quartz and sandstone, and a trace of fossil debris, ironstone, igneous, metamorphic, limestone, chalk and phosphatic nodules Sands: medium with coarse and some fine, angular flint, with some subangular quartz, yellowish brown	10.6	24.5
Upper chalk	Chalk, soft, puggy, white	1.5+	26.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages									
Fines	Sand	Gravel		Fines			Sand			Gravel			
				-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm			
3	55	42	*13.9-14.5	7	8	22	25	20	18	0			
			*14.5-14.7	Clay seam									
			*14.7-15.5	4	9	17	5	25	38	2			
			*15.5-15.7	Clay seam									
			*15.7-16.7	2	18	38	6	9	22	5			
			*16.7-17.7	2	6	36	11	21	20	4			
			*17.7-18.7	3	9	59	21	8	trace	0			
			*18.7-19.7	1	2	19	15	28	31	4			
			*19.7-20.7	1	2	22	15	23	24	3			
			*20.7-21.7	1	2	42	28	11	14	2			
			*21.7-22.7	2	2	31	30	9	22	4			
			*22.7-23.7	2	1	20	20	22	33	2			
			*23.7-24.5	6	3	30	17	19	25	0			
			Mean	3	6	31	18	17	22	3			

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
13.9-24.5	84	6	2	3	2	trace	trace	1	1	1

TL 84 NE 48 8857 4554 Acton Place, Acton

Block E

Surface level +51.4 m
Water struck at +45.0 m
Shell 152 mm diameter
October 1979

Waste 26.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.4	0.4
Boulder Clay	Clay, silty, with chalk and flint pebbles, brown becoming mottled grey	4.6	5.0
	Clay, silty, with chalk and flint pebbles, grey, stiff	1.4	6.4
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with cobble and coarse grade, angular flint and rounded chalk, with some sandstone and limestone, and a trace of quartzite, igneous, metamorphic, well rounded flint, fossil debris, quartz and ironstone Sand: medium with fine and coarse, angular flint, and subangular chalk and quartz, grey	0.5	6.9
Glacial Silt	Silt, clayey, laminated in parts, with thin chalky sand seams, some fine chalk pellets, pale grey	17.1	24.0
Boulder Clay	Clay, silty, waxy, with some chalk pebbles, dark grey, stiff	2.0+	26.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages							
Fines	Sand	Gravel		Fines		Sand			Gravel		
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
31	36	33	*6.4-6.9	31	11	16	9	16	8	9	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
6.4-6.9	44	1	1	1	6	43	2	trace	1	1

TL 84 NE 49 8922 4901 Lineage Wood, Long Melford Block E
 Surface level +77.8 m
 Water not struck
 Shell 152 mm diameter
 September 1979
 Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with flint pebbles, pale yellowish brown	0.5	0.7
	Clay, silty, with chalk and flint pebbles, brown becoming brown mottled grey from 5.0 m	6.8	7.5
	Clay, silty, with pellets and pebbles of chalk and some flint and ironstone, grey becoming dark grey, stiff	11.5+	19.0

TL 84 NE 50 8901 4817 Crabtree Wood, Long Melford Block E
 Surface level +57.4 m
 Water struck at +38.4 m, +37.4 m and 36.9 m
 Shell 152 mm diameter
 September 1979
 Waste 20.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with pellets and pebbles of chalk and some flint and ironstone, pale yellowish brown mottled pale grey from 2.0 m, stiff	3.3	3.5
	Clay, silty, very silty in parts, with pellets and pebbles chalk and some flint, with three thin sandy chalk gravel seams at 19.0 m, 20.0 m and 20.5 m, grey becoming dark grey and with a brownish tinge from 16.2 m, stiff	17.3+	20.8

TL 84 NE 51 8935 4732 Rookery Farm, Acton Block E
 Surface level +60.0 m
 Water struck at +43.0 m
 Shell 152 mm diameter
 October 1979
 Waste 22.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Head	Clay, sandy, silty, with flint pebbles and organic debris, grey mottled brown	1.2	1.5
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, brown mottled grey from 3.5 m	2.5	4.0
	Clay, silty, with pellets and pebbles of chalk and some flint, grey	7.0	11.0
	Interlaminated silty clay and thin sandy silt seams, with pellets of chalk, grey	6.0	17.0
Glacial Sand or Gravel	Gravel 'very clayey' predominantly chalk and flint and a little quartz sand, pale grey	0.4	17.4
Glacial Silt	Silt, sandy, very soft, brown	4.6+	22.0

TL 84 NE 52 8938 4645 East-south-east of Rookery Farm, Acton Block E
 Surface level +61.0 m
 Water struck at +45.8 m and +44.5 m
 Shell 152 mm diameter
 October 1979
 Waste 23.0 m
 Bedrock 2.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with pebbles of flint and some quartz and chalk from 0.6 m, with black paper shale, brown, firm becoming stiff	6.7	7.0
	Clay, silty, with pebbles of flint and chalk, with some black paper shale and quartz, bluish grey, stiff	5.5	12.5
	Silt, faintly laminated, very soft, pale yellow	0.3	12.8
Glacial Sand and Gravel	a Sandy gravel, pebbly 'clayey' sand at base Gravel: coarse and fine, angular flint, with well rounded flint and rounded quartz, with some quartzite and a trace of sandstone, ironstone, igneous, metamorphic, fossil debris, ironstone, chalk and limestone Sand: medium with fine and coarse, angular flint with some quartz and ironstone and a trace of chalk, yellowish brown	2.6	15.4

Boulder Clay	Clay, silty, sandy in basal 0.5 m with pebbles of chalk and some flint, brown becoming yellowish brown	2.1	17.5
Glacial Sand and Gravel	b Pebbly sand, 'clayey' and 'very clayey' sand in basal 1.5 m Gravel: fine and coarse, angular with well rounded flint and quartz, with some ironstone, sandstone and quartzite and a trace of igneous and metamorphic Sand: medium with coarse and fine, subrounded quartz with some angular flint and ironstone, yellowish brown	5.5	23.0
(?) Upper Chalk	Cream chalk and yellow silt putty, very soft	2.3	25.3
Upper Chalk	Chalk, puggy, with angular chalk fragments, creamish white	0.3+	25.6

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	6	54	40	12.8-13.8	7	7	20	19	24	23	0
				13.8-14.8	3	14	18	11	24	30	0
				14.8-15.4	12	26	54	5	1	2	0
				Mean	6	14	27	13	19	21	0
b	9	79	12	*17.5-18.5	1	12	64	5	9	6	3
				*18.5-19.5	4	27	53	5	7	4	0
				*19.5-20.5	5	17	45	11	7	15	0
				*20.5-21.5	3	6	38	41	6	6	0
				*21.5-22.0	14	16	40	28	2	0	0
				*22.0-23.0	30	14	31	24	1	0	0
				Mean	9	15	46	18	6	5	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	12.8-15.4	70	15	10	3	1	trace	trace	1	trace	trace
b	17.5-23.0	51	32	9	2	2	0	0	3	0	1

TL 84 NE 53	8947 4532	Barrow Hill, Acton	Block E
Surface level +67.0 m Water not struck Shell 152 mm diameter November 1979			Overburden 3.6 m Mineral 16.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Silt, sandy, with flint and chalk pebbles, orange-brown	0.5	0.8
	Clay, silty with pebbles of chalk and some flint, brown, stiff	2.8	3.6
Barham Sands and Gravels	a 'Clayey' sandy gravel Gravel: coarse and fine, angular flint, with well rounded flint, and some quartz and quartzite, with a trace of ironstone and chalk and very fine igneous, metamorphic and fossil debris Sand: medium with fine and coarse, subrounded quartz with some angular flint, brown	2.0	5.6
Kesgrave Sands and Gravels	b 'Very clayey' sand, with a trace of flint, quartz and quartzite pebbles in uppermost 4.0 m, thin laminated clayey silt seams throughout and particularly from 18.5-19.0 m Sand: fine with medium and a trace of coarse, subrounded quartz, with some mica and a trace of angular flint, yellowish brown becoming orange brown	14.4+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	11	63	26	3.6-4.6	11	17	33	9	15	15	0
				4.6-5.6	11	11	47	9	10	12	0
				Mean	11	14	40	9	12	4	0
b	21	78	1	5.6-6.6	16	29	50	3	1	1	0
				6.6-7.6	22	28	42	2	2	2	0
				7.6-8.6	36	56	6	1	1	0	0
				8.6-9.6	27	48	16	3	3	3	0
				9.6-10.6	21	49	27	3	0	0	0
				10.6-11.6	2	73	24	1	trace	0	0
				11.6-12.6	16	59	24	1	trace	0	0
				12.6-13.6	15	41	43	1	trace	0	0
				13.6-14.6	13	54	32	1	trace	0	0
				14.6-15.6	15	76	9	trace	trace	0	0
				15.6-16.6	33	51	15	1	trace	0	0
				16.6-17.6	33	56	10	1	trace	0	0
				17.6-18.5	21	42	36	1	0	0	0
				18.5-19.0	Clay seam						
				19.0-20.0	19	34	46	1	trace	0	0
				Mean	21	50	27	1	1	trace	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	3.6-5.6	81	13	3	2	1	trace	0	trace	trace	trace
b	5.6-20.0	64	23	12	1	trace	0	0	trace	0	0

TL 84 NE 54 8803 4612 Acton Pumping Station, Acton

Surface level c+40.0 m
Water struck at c+38.5 m
Shell 254 mm diameter
January 1980

Block E

Overburden 1.5 m
Mineral 20.5 m
Bedrock 57.0 m+

TL 84 SW 39 8058 4317

Surface level +60.0 m
Water struck at +43.0 m
Shell 152 mm diameter
November 1979

Belchamp Otten

Block A

Overburden 1.0 m
Mineral 4.8 m
Waste 7.0 m
Mineral 15.2 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	1.1	1.1
	Clay, with pebbles, brown	0.4	1.5
Glacial Sand and Gravel	Sandy gravel Gravel: fine with coarse and a trace of cobble grade, overwhelmingly angular flint with some well rounded flint and a trace of quartzite, sandstone, chalk, quartz, fossil debris, igneous and metamorphic Sand: medium with coarse and fine, angular flint, with some subangular quartz and a trace of chalk, brown	20.5	22.0
Upper Chalk	Chalk, with some flint, white	1.0	23.0
	Chalk, hard angular fragments and nodular flint, white	56.0+	79.0

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with pellets of chalk, and some flint, brown, soft	0.8	1.0
Glacial Sand and Gravel	a 'Clayey' pebbly sand, 'very clayey' in uppermost 1.0 m Gravel: fine with coarse, angular flint with rounded chalk, with some sandstone and quartzite, and a trace of well rounded flint, limestone, quartz, igneous, metamorphic, ironstone, fossil debris and phosphatic nodules Sand: medium with fine and coarse, subangular quartz with angular flint and subangular chalk, pale brown	4.8	5.8
Boulder Clay	Clay, silty, with pebbles and pellets of chalk and some flint, medium sand in pockets, dark grey	3.0	8.8
Glacial Silt	Silt, clayey, laminated, with a trace of chalk and flint pebbles, orange brown and grey	0.7	9.5
	Interlaminated, sand, silt and clay, with a trace of flint pebbles, orange brown and grey	2.7	12.2
	Silt, sandy, some fine flint and quartz pebbles, pale grey	0.6	12.8
Kesgrave Sands and Gravels	b Pebbly sand 'very clayey' in uppermost 1.0 m, clay laminae Gravel: fine and coarse, angular with well rounded flint, with some quartz and quartzite, and a trace of sandstone, igneous, metamorphic and ironstone Sand: medium with fine and some coarse, subrounded quartz with some mica and angular flint, pale greyish brown	7.0	19.8
Red Crag	c Pebbly sand, 'clayey' with depth, trace of cobble grade at base Gravel: fine with coarse and a trace of cobble grade, angular platy ironstone, with angular and well rounded flint with a trace of quartz, phosphatic nodules, sandstone and chalk at base Sand: medium with fine and some coarse, predominantly rounded quartz with some ironstone and angular flint, orange-brown becoming brown	8.2	28.0
Upper Chalk	Chalk, blocky, white	1.2+	29.2

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
4	49	47	*4.0-6.0	10	9	12	10	30	29	0
			*6.0-7.0	1	3	11	18	60	7	0
			*7.0-8.0	5	5	18	9	30	27	6
			*8.0-9.0	4	8	24	13	43	8	0
			*9.0-10.0	4	9	33	4	31	19	0
			*10.0-11.0	4	10	38	18	29	1	0
			*11.0-12.0	1	5	22	25	45	2	0
			*12.0-22.0	4	12	58	18	7	1	0
			Mean	4	8	27	14	34	12	1

Note: These depths represent the range from within which spot samples were taken; equal weighting has therefore been given to each sample in calculating the mean

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
4.0-22.0	92	4	1	1	1	1	0	0	trace	trace

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+- $\frac{1}{16}$ - $\frac{1}{4}$	+- $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	16	68	16	1.0-2.0	26	21	44	3	6	0	0
				2.0-3.0	16	18	49	9	7	1	0
				3.0-4.0	13	16	50	11	9	1	0
				4.0-5.0	14	10	38	18	18	2	0
				5.0-5.8	11	9	26	16	22	16	0
				Mean	16	15	42	11	12	4	0
b	7	80	13	12.8-13.8	25	28	42	1	2	2	0
				13.8-14.8	5	48	42	1	2	2	0
				14.8-15.8	5	42	50	2	1	0	0
				15.8-16.8	3	22	54	6	10	5	0
				*16.8-17.8	1	6	62	15	11	5	0
				*17.8-18.8	8	22	37	11	8	14	0
				*18.8-19.8	2	8	44	16	15	15	0
				Mean	7	25	47	8	7	6	0
c	9	81	10	*19.8-20.8	4	22	37	19	14	4	0
				*20.8-21.8	7	21	55	11	5	1	0
				*21.8-22.8	12	16	67	4	1	0	0
				*22.8-23.8	11	17	66	5	1	0	0
				*23.8-24.8	11	18	55	6	9	1	0
				*24.8-25.8	12	24	56	3	4	1	0
				*25.8-26.8	10	26	62	2	0	0	0
				26.8-28.0	6	21	34	5	10	18	6
				Mean	9	21	53	7	6	3	1
b+c	8	81	11	Mean	8	23	51	7	6	5	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
a	1.0-5.8	51	1	1	2	5	36	1	1	1	1
b	12.8-19.8	60	25	9	3	1	0	0	1	0	1
c	19.8-28.0	14	11	1	0	trace	2	0	71	1	0

TL 84 SW 40 8053 4236 Coles Farm, Belchamp Otten

Block A

Surface level +61.0 m
Water struck at +43.5 m
Shell 152 mm diameter
November 1979

Overburden 11.6 m
Mineral 13.2 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with pebbles of flint and some chalk, brown	0.3	0.6
	Clay, silty with pebbles of chalk and flint brown, becoming greyish brown	2.4	3.0
	Clay, silty with pebbles and pellets of chalk and some flint and quartz, grey becoming dark grey	7.4	10.4
Glacial Silt	Silt, very clayey, fine sandy, with some flint pebbles, orange-brown	1.2	11.6
Kesgrave Sands and Gravels	a Pebbly sand, 'very clayey' in uppermost 1.0 m Gravel: fine with coarse, angular with well rounded flint, with some rounded quartz and quartzite, and a trace of igneous, metamorphic and ironstone Sand: medium and fine with some coarse, rounded quartz with a trace of angular flint, greyish brown and whitish	6.0	17.6
Red Crag	b Pebbly sand, less pebbly with depth Gravel: fine with a trace of coarse, well rounded and angular flint, with some angular platy ironstone and rounded quartz, with a trace of igneous, metamorphic, sandstone and quartzite Sand: medium with fine and coarse, rounded quartz with some angular flint and ironstone and coarse to medium shell debris below 22.6 m, dark orange-brown olive-green at base	7.2	24.8
Upper Chalk	Chalk, blocky, off-white	0.6+	25.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+- $\frac{1}{16}$ - $\frac{1}{4}$	+- $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	9	79	12	11.6-12.6	24	29	30	5	7	5	0
				12.6-13.6	8	30	33	8	17	4	0
				13.6-14.6	5	23	66	2	4	0	0
				14.6-15.6	10	16	46	12	14	2	0
				15.6-16.6	3	34	51	3	3	6	0
				16.6-17.6	3	63	20	3	8	3	0
				Mean	9	32	41	6	9	3	0
b	6	87	7	*17.6-18.6	4	11	40	24	15	6	0
				*18.6-19.6	8	21	32	30	9	0	0
				*19.6-20.6	10	20	44	24	2	0	0
				*20.6-21.6	7	19	45	20	9	1	0
				*21.6-22.6	7	26	53	10	4	0	0
				*22.6-23.6	4	35	57	3	1	0	0
				*23.6-24.8	3	22	74	1	0	0	0
				Mean	6	22	50	15	6	1	0
a+b	7	84	9	Mean	7	27	46	11	7	2	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
a	11.6-17.6	65	19	10	3	0	0	0	1	0	2
b	17.6-24.8	36	39	7	1	1	0	0	15	0	1

TL 84 SW 41 8090 4092 Larrents Farm, Belchamp Walter

Surface level +64.0 m
Water not struck
Shell 152 mm diameter
November 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, yellowish brown mottled grey with depth, firm	3.8	4.0
	Clay, silty, with pebbles and cobbles of chalk and flint with some black paper shale, pale grey mottled ochre brown along fissures to 6.0 m, becomes bluish grey and dark grey, firm to stiff	7.0	11.0
	Clay, silty, fine sandy, with pellets and pebbles of chalk and a trace of brown flint, black paper shale and red marl, very dark brown, with black shaley patches, soft	0.8	11.8
	Clay, silty with pebbles and cobbles of chalk and flint with some black paper shale, quartz and red marl, dark bluish grey, stiff to hard	5.8	17.6
	Clay, silty, sandy with pellets and pebbles of chalk and flint, dark greyish brown becoming olive brown	3.2	20.8
Glacial Sand and Gravel	Sand, fine and medium with some coarse flint and quartz, with a trace of pebbles, brown	0.7+	21.5

Block D

Waste 21.5 m+

TL 84 SW 42 8090 4424 Skilletts Farm, Pentlow

Surface level +68.4 m
Water struck at +41.8 m
Shell 152 mm diameter
November 1979

Block A

Overburden 12.6 m
Mineral 17.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with pellets and pebbles of chalk and some flint, pale grey mottled olive brown	3.7	4.0
	Clay, silty, with pellets and pebbles of chalk and a trace of flint, grey becoming dark grey, and brown from 11.4 m	8.6	12.6
Barham Sands and Gravels	a 'Very clayey' pebbly sand Gravel: fine with coarse, angular flint with rounded quartz, with some rounded quartzite and well rounded flint, with a trace of chalk and sandstone Sand: fine with medium and a trace of coarse, angular flint and subangular quartz with some chalk, reddish brown	1.0	13.6
Kesgrave Sands and Gravels	b Sand with discrete clay laminae throughout, trace of fine quartz pebbles Sand: fine and medium with a trace of coarse, subrounded to rounded quartz with some mica, yellowish brown banded orange brown	11.0	24.6
Red Crag	c Pebbly sand Gravel: fine with coarse, overwhelmingly angular platy ironstone, with a trace of angular and well rounded flint and quartz, and some very fine quartzite, sandstone, igneous and metamorphic Sand: fine with medium and some coarse, rounded quartz, with some ironstone, buff becoming reddish brown	5.4+	30.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	24	70	6	12.6-13.6	24	41	27	2	4	2	0
b	8	92	0	13.6-14.6	16	53	29	1	1	0	0
				14.6-15.6	14	58	27	1	0	0	0
				15.6-16.6	4	37	59	trace	0	0	0
				16.6-17.6	8	47	45	trace	trace	0	0
				17.6-18.6	14	65	21	trace	0	0	0
				18.6-19.6	7	60	33	trace	0	0	0
				19.6-20.6	7	42	51	0	0	0	0
				20.6-21.6	4	43	52	1	trace	0	0
				21.6-22.6	6	69	25	trace	0	0	0
				22.6-23.6	5	47	46	2	0	0	0
				23.6-24.6	9	70	21	trace	0	0	0
				Mean	8	54	37	1	trace	0	0
c	7	86	7	24.6-25.6	7	47	41	5	0	0	0
				25.6-26.6	3	64	31	2	trace	0	0
				*26.6-27.6	11	47	30	6	6	trace	0
				*27.6-28.6	9	33	32	13	8	5	0
				*28.6-30.0	6	51	16	15	8	4	0
				Mean	7	48	29	9	5	2	0
a+b+c	9	88	3	Mean	9	51	34	3	2	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	12.6-13.6	79	2	10	3	1	1	0	0	0	4
b	13.6-24.6	Insufficient material									
c	24.6-30.0	2	2	1	0	0	0	0	95	0	0

TL 84 SW 43 8158 4238 Bevingdon House, Belchamp Otten Block D

Surface level +46.8 m	Overburden 0.9 m
Water struck at +43.6 m	Mineral 1.9 m
Shell 152 mm diameter	Waste 1.0 m
November 1979	Mineral 2.2 m
	Waste 1.6 m
	Bedrock 3.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Head	Clay, silty, very sandy, becomes 'very clayey' medium and fine sand at base, yellowish brown, soft	0.6	0.9
Glacial Sand and Gravel	a 'Very clayey' sand, with a trace of chalk pebbles Sand: fine with some medium and a trace of coarse, subrounded quartz with some chalk, yellowish brown	1.9	2.8
	Silt, clayey, with fine and coarse chalk and flint gravel, and fine, medium with some coarse quartz and chalk sand, yellowish brown, soft	1.0	3.8
	b 'Clayey' gravel Gravel: coarse with fine, angular flint, with well rounded flint and rounded chalk, with some quartz sandstone, ironstone, quartzite, fossil debris, phosphatic nodules, igneous, metamorphic and limestone Sand: fine with medium and some coarse, subrounded quartz with some chalk and ironstone and a trace of angular flint, yellowish brown	2.2	6.0
Glacial Silt	Silt, clayey, fine sandy, well laminated, pale grey, soft becoming firm	1.6	7.6
Upper Chalk	Chalk, puggy, with angular chalk fragments at depth, white	3.3+	10.9

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Gravel							
					-½	+½ - 1	+1 - 1.5	+1.5 - 2	+2 - 4	+4 - 16	+16 - 64	+64 mm
a	29	70	1	0.9-1.9	32	61	5	1	1	0	0	0
				1.9-2.8	26	66	7	trace	1	0	0	0
				Mean	29	63	6	1	1	0	0	0
	Waste parting			2.8-3.8	66	13	9	3	5	4	0	
b	17	38	45	*3.8-4.8	10	18	15	11	18	28	0	
				*4.8-5.0	22	16	8	9	19	26	0	
				Mean	17	17	11	10	18	27	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.9-2.8	Insufficient material									
b	3.8-6.0	43	17	7	3	4	17	trace	4	4	1

TL 84 SW 44 8171 4113 Crows Farm, Belchamp Walter Block D

Surface level +61.7 m	Waste 21.0 m+
Water struck at +50.7 m	
Shell 152 mm diameter	
October 1979	

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with flint pebbles	0.5	0.8
	Clay, silty, with chalk and flint pebbles, brown becoming mottled grey from 1.1 m	4.2	5.0
	Clay, silty, with chalk and flint, with a trace of siltstone and black paper shale, grey becoming dark grey	16.0+	21.0

TL 84 SW 45 8244 4375 Near Bellybones, Foxearth Block A

Surface level +65.1 m	Waste 25.0 m+
Water struck at 40.6 m	
Shell 152 mm diameter	
November 1979	

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with a seam of fine and medium sand from 1.1-1.3 m, with pebbles of flint and from 1.0 m chalk, dark yellowish brown mottled pale grey from 1.3 m, firm	4.7	5.0
	Clay, silty, with pebbles of chalk and flint, with some quartz, black paper shale and limestone, bluish grey becoming dark bluish grey, stiff to hard	17.8	22.8
	Clay, silty, with pebbles of chalk and flint, and a trace of black paper shale, olive brown, stiff	1.7	24.5
? Red Crag	'Clayey pebbly' sand, some chalk contamination from boulder clay Gravel: coarse and fine, angular flint, with well rounded flint and angular platy ironstone, with some quartz and quartzite and a trace of igneous and metamorphic Sand: medium and fine with some coarse, subrounded to rounded quartz, with some ironstone, pale orange brown	0.5+	25.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
17	69	14	24.5-25.0	17	30	34	5	6	8	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
24.5-25.0	58	18	4	4	0	0	0	15	0	1

TL 84 SW 46 8264 4250 Eyston Smyths Farm, Belchamp Walter

Block D

Surface level +41.3 m
Water struck at +28.9 m
Shell 152 mm diameter
October 1979

Waste 12.4 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Silt, with some flint and chalk pebbles, pale brown	0.4	0.6
	Clay, silty, with pebbles of chalk and flint, pale brown mottled grey, septarian nodule boulder at 5.2 m	5.4	6.0
	Clay, silty, with pebbles of chalk and flint, with a trace of black paper shale, ironstone, quartzite and green sandstone	6.4	12.4
Upper Chalk	Chalk, soft, white	1.8+	14.2

TL 84 SW 47 8294 4163

New Newbon, Belchamp Walter

Block D

Surface level +57.0 m
Water struck at +33.0 m
Shell 152 mm diameter
November 1979

Overburden 0.4 m
Mineral 8.8 m
Waste 8.3 m
Mineral 9.1 m
Waste 1.4 m
?Bedrock 0.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Glacial Sand and Gravel	a 'Clayey' sand, with some pebbles Gravel: fine with a trace of coarse, angular flint with subangular sandstone, and some chalk, well rounded flint, quartzite, quartz, igneous, metamorphic and ironstone Sand: fine and medium with some coarse, subrounded quartz with subangular flint and subrounded chalk, pale yellowish brown	8.8	9.2
Glacial Silt	Silt, fine sandy, laminated, brown and buff, soft	0.4	9.6
Boulder Clay	Clay, silty, with chalk and flint pebbles, stiff, brown	5.3	14.9
	Clay, silty, with chalk and flint pebbles, stiff, dark grey	1.3	16.2
	Clay, silty, with chalk and flint pebbles, brown	1.3	17.5
Glacial Sand and Gravel	b Pebbly sand, becoming very pebbly towards base Gravel: fine and coarse with a trace of cobble, angular with well rounded flint, with some quartz, quartzite and sandstone, and a trace of chalk, metamorphic, ironstone and phosphatic nodules Sand: medium with some fine and coarse, subangular to subrounded quartz with some angular flint, and angular chalk towards base, yellowish brown becoming pale yellowish brown	9.1	26.6
Glacial Silt	Silt, laminated, brown and buff, chalky	1.4	28.0
?Upper Chalk	Chalk, touched by sample tube, white	0.1+	28.1

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand	Gravel				
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	16	82	2	0.4-1.4	21	16	44	15	4	trace	0
				1.4-2.4	24	20	44	10	2	trace	0
				2.4-3.1	8	1	65	14	2	0	0
				3.1-4.1	10	54	35	1	0	0	0
				4.1-5.1	19	65	16	trace	0	0	0
				5.1-6.1	13	39	45	2	1	0	0
				6.1-7.1	10	25	56	7	2	0	0
				7.1-8.1	17	54	22	4	3	0	0
				8.1-9.2	18	74	8	trace	trace	0	0
				Mean	16	41	36	5	2	trace	0
b	3	81	16	17.5-18.5	6	33	56	2	3	0	0
				18.5-19.5	3	15	77	2	3	1	0
				19.5-20.5	1	19	71	3	4	2	0
				20.5-21.5	1	21	63	3	6	6	0
				21.5-22.5	1	11	50	8	15	15	0
				*22.5-23.5	1	6	83	8	2	trace	0
				*23.5-24.5	6	6	61	15	10	2	0
				*24.5-25.5	2	4	33	18	23	20	0
				*25.5-26.6	7	15	33	8	15	19	3
				Mean	3	15	58	8	9	7	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sand-stone	Chalk	Lime-stone	Iron-stone	Fossil debris and phosphate	Others
a	0.4-9.2	55	7	5	6	11	7	0	4	0	5
b	17.5-26.6	67	19	7	3	2	1	0	trace	trace	1

TL 84 SW 48 8250 4023 New Barns, Belchamp Walter Block D

Surface level +47.0 m
 Water not struck
 Shell 152 mm diameter
 November 1979

Waste 11.3 m
 Bedrock 3.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Boulder Clay,	Clay, silty, with pellets and pebbles of chalk and some firm flint, brown becoming pale yellowish brown from 0.9 m, becoming stiff	4.9	5.3
	Clay, silty, with some chalk pellets, dark greyish brown	0.7	6.0
	Clay, silty, with pebbles of chalk and some flint, becomes sandy from 8.7 m, pale brown becoming grey and brown	5.3	11.3
Lower London Tertiaries	Clay, very silty, in parts fine sandy, clayey silt, micaceous, race nodules, olive greyish brown to 13.2 m, then mottled green and red, stiff	2.5	13.8
Upper Chalk	Chalk, fissured, dirty, creamish white putty	1.0+	14.8

48

TL 84 SW 49 8372 4432 Foxearth Block D

Surface level +58.0 m
 Water struck at +52.0 m and +49.3 m
 Shell 152 mm diameter
 November 1979

Waste 15.6 m
 Bedrock 2.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with pebbles of flint and quartz, brown, soft	0.3	0.6
	Clay, silty, becomes very silty from 6.0 m, with pebbles of chalk and flint, with some quartz, brown, firm becoming very soft	6.5	7.1
	Clay, silty, with pebbles of chalk and flint, and some quartz and black paper shale, bluish grey, firm to stiff	1.6	8.7
	Clay, very sandy, silty, with pebbles of chalk and flint, very soft, brown	0.6	9.3
	Clay, silty, with pebbles of chalk and flint with some black paper shale and quartz, firm becoming stiff to hard, dark bluish grey	6.3	15.6
Lower London Tertiaries	Sand, becomes clayey and silty below 16.2 m, with some chalk stringers, trace of rounded black flints and white quartz, green becoming lilac grey and grey green from 16.2 m and dark grey green from 16.6 m	2.0	17.6
Upper Chalk	Chalk, putty, with angular chalk fragments, white	0.7+	18.3

TL 84 SW 50 8371 4306 Purkis Farm, Borley Block D

Surface level +53.0 m
 Water struck at +32.4 m
 Shell 152 mm diameter
 October 1979

Overburden 10.6 m
 Mineral 15.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, with some thin sand seams throughout, with pebbles of chalk and some flint and quartz, greyish brown	10.3	10.6
Glacial Sand and Gravel	Pebbly sand Gravel: coarse and fine, angular with well rounded flint, with some quartz and quartzite, and a trace of igneous, metamorphic, sandstone and chalk Sand: medium with fine and some coarse, subangular to rounded quartz, with some angular flint and subangular chalk at base, orange brown becoming greyish yellow	15.0+	25.6

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages							
Fines	Sand	Gravel		Fines		Sand			Gravel		
				-1/4	+1/4 - 1/2	+1/2 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm	
4	73	23	10.6-11.6	15	43	33	1	2	6	0	
			11.6-12.6	2	30	51	3	8	6	0	
			12.6-13.6	2	29	48	4	10	7	0	
			13.6-14.6	2	24	51	7	6	10	0	
			14.6-15.6	3	19	48	7	14	9	0	
			15.6-16.6	3	15	34	9	24	15	0	
			16.6-17.6	1	23	54	7	10	5	0	
			17.6-18.6	4	12	37	10	21	16	0	
			18.6-19.6	4	25	41	8	9	13	0	
			19.6-20.6	2	25	66	3	1	3	0	
			*20.6-21.6	1	7	21	6	19	46	0	
			*21.6-22.6	3	15	33	7	17	25	0	
			*22.6-23.6	4	26	46	4	12	8	0	
			*23.6-24.6	4	37	36	5	9	9	0	
			*24.6-25.6	8	38	47	3	4	0	0	
			Mean	4	24	43	6	11	12	0	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction										
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others	
10.6-25.6	77	14	5	2	1	trace	0	0	0	1	

TL 84 SW 51 8318 4136 Near Forty Acres, Belchamp Walter

Block D

Surface level +31.4 m
Water struck at +29.3m, +20.6 m and +19.5 m
Shell 152 mm diameter
November 1979

Overburden 2.3 m
Mineral 1.4 m
Waste 9.2 m
Mineral 3.2 m
Waste 3.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Head	Clay, very silty and sandy becomes very sandy silt, with pebbles of flint and patches of carbonaceous debris, pale brown becoming pale greyish brown and bluish grey	2.1	2.3
River Terrace Deposits	a Clayey sand, with a trace of fine flint and ironstone pebbles Sand: medium with fine and a trace of coarse, subrounded quartz, with some ironstone, yellowish brown	1.4	3.7
	Silt, clayey and fine sandy to 5.4 m, with carbonaceous debris and gasteropod debris, brown to pale yellowish brown	3.3	7.0
Peat	Peat, silty, laminated in parts, with seeds and some gasteropod debris, dark brown	1.5	8.5
Glacial Silt	Silt, with carbonaceous debris, silty chalk sand between 10.5-10.8 m, grey	3.4	11.9

Glacial Sand and Gravel

b Gravel
Gravel: fine with coarse, angular flint, with chalk, with some quartz, quartzite, sandstone and well rounded flint, and a trace of limestone, igneous, metamorphic fossil debris and phosphatic nodules
Sand: medium with coarse and fine, angular flint, chalk and subangular quartz, grey

0.4 12.3

Glacial Silt

Silt, sandy, clayey, gravelly at base, carbonaceous, pale greyish brown

0.6 12.9

Glacial Sand and Gravel

c 'Clayey' sandy gravel, with some laminated silty sand seams

3.2 16.1

Gravel: fine and coarse, angular with well rounded flint, with some quartz, sandstone, chalk and quartzite, with a trace of limestone, ironstone, igneous, metamorphic, fossil debris and phosphatic nodules
Sand: medium, fine and coarse, angular flint and subangular chalk and quartz, grey to brown

Glacial Silt

Silt, clayey, fine sandy, with chalk pellets and fragments from 18.9, pale grey

3.9+ 20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand			Gravel		
					-1/4	+1/4 - 1/2	+1/2 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm	
a	12	88	0	*2.3-3.7	12	18	68	2	trace	0	0	
b	4	29	67	*11.9-12.3	4	5	16	8	40	27	0	
c	13	45	42	*12.9-13.9	16	9	15	9	24	27	0	
				*13.9-14.9	11	11	14	17	28	19	0	
				*14.9-16.1	12	22	22	15	19	10	0	
				Mean	13	14	17	14	24	18	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	2.3-3.7	Insufficient material									
b	11.9-12.3	72	2	4	3	3	11	1	0	2	2
c	12.9-16.1	74	8	5	2	3	4	1	1	1	1

TL 84 SW 52 8397 4102 Smeetham Hall, Bulmer
Block D

 Surface level +41.4 m
 Water not struck
 Shell 152 mm diameter
 October 1979

 Waste 3.8 m
 Bedrock 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Boulder Clay	Clay, silty, with pebbles of chalk and flint, brown, soft	3.3	3.8
Upper Chalk	Chalk, soft, puggy, white	3.0+	6.8

TL 84 SW 53 8496 4400 Red Cottages, Foxearth
Block D

 Surface level +33.0 m
 Water struck at +29.0 m
 Shell 152 mm diameter
 October 1979

 Waste 17.7 m
 Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Head	Clay, silty, sandy, laminated in parts, pebbles of chalk and flint, greyish brown	0.5	1.0
Boulder Clay	Clay, silty, with pellets of chalk and some pebbles of chalk and flint, brown	3.0	4.0
	Clay, silty with pebbles of chalk and flint, grey	1.0	5.0
Glacial Silt	Silt, clayey, with pellets of chalk, grey, soft	9.0	14.0
Boulder Clay	Clay, silty, sandy, with pellets and pebbles of chalk and some flint, grey	3.7	17.7
Upper Chalk	Chalk, hard angular fragments, in soft white matrix	1.6+	19.3

TL 84 SW 54 8482 4226 Near Bardfield Bridge, Borley
Block D

 Surface level +28.3 m
 Water struck at +26.9 m
 Shell 152 mm diameter
 October 1979

 Overburden 1.4 m
 Mineral 1.0 m
 Waste 1.9 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Alluvium	Clay, silty, with rootlets, brown mottled orange	1.1	1.4
	'Clayey' gravel, with thin laminated silty clay seams Gravel: coarse with fine, angular flint, with some rounded quartz, quartzite, well rounded flint and subangular sandstone, with a trace of chalk, igneous metamorphic, limestone, fossil debris and ironstone Sand: medium with coarse and fine, angular flint and subangular quartz with a trace of chalk, brown	1.0	2.4
Glacial Silt	Silt and clay interlaminated, with a trace of angular flint, brown	1.9	4.3
Upper Chalk	Chalk, silty, pale brown becoming white	1.0+	5.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{8}$	$+\frac{1}{8}-1$	$+1-4$	$+4-16$	$+16-64$	$+64$ mm
17	22	61	*1.4-2.4	17	5	11	6	23	38	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.4-2.4	86	2	5	3	2	1	trace	trace	trace	1

TL 84 SW 55 8454 4135 Smeetham Hall, Bulmer Block D

Surface level +53.8 m
Water not struck
Shell 152 mm diameter
October 1979

Waste 14.2 m
Bedrock 1.8 m+

LOG		Thickness	Depth
Geological classification	Lithology	m	m
	Topsoil	0.4	0.4
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, orange brown becoming pale yellowish brown mottled grey from 1.0 m	4.6	5.0
	Clay, silty, with pebbles of chalk and some flint, grey becoming dark grey	7.0	12.0
	Clay, silty, sandy, with chalk and flint pebbles, brown	2.2	14.2
Upper Chalk	Chalk, soft, small angular fragments in a puggy matrix, white	1.8+	16.0

TL 84 SW 56 8495 4017 East of Bulmer Church, Bulmer Block F

Surface level +73.8 m
Water struck at +65.2 m
Shell 152 mm diameter
October 1979

Overburden 1.1 m
Mineral 8.0 m
Bedrock 26.1 m+

LOG		Thickness	Depth
Geological classification	Lithology	m	m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with some sand, with pebbles of angular flint, reddish brown, stiff	0.9	1.1
Kesgrave Sands and Gravels	'Clayey' sand, with discrete clay laminae throughout Gravel: a trace of fine flint, quartz, quartzite sandstone and ironstone Sand: medium with fine and a trace of coarse, predominantly subrounded quartz, with a trace of mica and ironstone, orange-brown becoming pale yellowish brown	8.0	9.1
London Clay	Clay, silty, becomes very clayey fine sandy silt with depth, micaceous, orange brown and laminated in uppermost 0.3 m, becoming greyish brown and from 11.2 m, dark grey. Basal pebble bed of well rounded black and angular white and black flints, with a trace of rounded quartz from 18.5 m	9.9	19.0
Woolwich and Reading Beds	Clay, stiff, waxy, silty and fine sandy in parts, with some race nodules, green strikingly mottled in red and olive green becoming dark grey mottled red from 25.7 m	10.4	29.4
Thanet Beds	Silt, fine sandy, silty fine sand in parts, dark greyish green becoming bright olive green	4.4	33.8
Upper Chalk	Chalk, soft, puggy, white	1.4+	35.2

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{3}{8}$	+ $\frac{3}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
13	87	0	1.1-2.1	15	15	69	1	trace	0	0
			2.1-3.1	9	8	80	3	0	0	0
			3.1-4.1	12	53	35	0	0	0	0
			4.1-5.1	9	14	76	1	0	0	0
			5.1-6.1	16	15	67	2	trace	0	0
			6.1-7.1	30	38	31	1	trace	0	0
			7.1-8.1	8	28	71	1	0	0	0
			*8.1-9.1	10	19	69	1	1	0	0
			Mean	13	24	62	1	trace	0	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.1-9.1	Insufficient material									

TL 84 SW E1 8100 4325 1 km North-east of Whitehouse Farm, Belchamp's Block A

Surface level c+50.0 m
Water not struck

Overburden 0.2 m
Mineral 2.3 m+

LOG

LOG		Thickness	Depth
Geological classification	Lithology	m	m
	Topsoil	0.2	0.2
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine with coarse, rounded chalk and angular flint, with some quartz, quartzite and sandstone, with a trace of ironstone, limestone, fossil debris, igneous and metamorphic Sand: medium and coarse with fine, angular flint and subangular chalk with some subangular quartz, dark yellowish brown	2.3+	2.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{3}{8}$	+ $\frac{3}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
16	52	32	0.2-2.5	16	9	24	19	24	8	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.2-2.5	No data available									

TL 84 SW E2 8416 4110 West of Smeetham Hall, Bulmer Block D
 Surface level c+46.0 m Overburden 0.3 m
 Water not struck Mineral 3.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Glacial Sand and Gravel	Gravel, with a seam of very sandy laminated chalky silt grading into clayey sand in parts at 2.5-2.9 m, involuted and cross bedded Gravel: coarse and fine with cobble grade, cobbles entirely nodular flint, angular flint with well rounded flint, chalk and quartz, with some quartzite and sandstone, with a trace of ironstone, igneous, metamorphic, phosphatic nodules and fossil debris Sand: medium and fine with coarse and fine, angular flint and subangular chalk, with subangular quartz, yellowish brown	3.4+	3.7

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
6	45	49	0.3-1.3	5	4	24	12	18	30	7
			1.3-2.1	9	23	34	19	15	trace	0
			2.1-2.5	3	2	22	22	23	28	0
			2.5-2.9	Very sandy silt seam						
			2.9-3.7	6	4	7	9	18	32	24
			Mean	6	9	22	14	18	22	9

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-3.7	67	12	7	2	2	6	0	1	trace	1

TL 84 SW E3 8335 4245 Near Eyston Hall, Belchamp Walter Block D
 Surface level c+38.0 m Overburden 0.3 m
 Water not struck Mineral 2.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Glacial Sand and Gravel	Sandy gravel Gravel: fine with some coarse, angular flint, with well rounded flint and rounded quartz, with some quartzite, and a trace of sandstone, ironstone and fossil debris Sand: medium and fine with coarse, angular flint and subangular quartz, with a trace of chalk, yellowish brown	2.2+	2.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
6	68	26	0.3-2.5	6	23	37	8	21	5	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-2.5	69	16	11	2	1	0	0	1	trace	trace

TL 84 SE 73 8582 4497 Bridge House, Liston

Block C

Surface level +28.9 m
Water struck at +27.9 m
Shell 152 mm diameter
October 1979

Overburden 3.0 m
Mineral 6.2 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Alluvium	Clay, silty, with some flint pebbles, brown becoming greyish blue from 1.3 m	2.6	3.0
	Gravel, with a thin peaty silt between 4.6 and 5.0 m Gravel: coarse and fine, with a trace of cobble grade in basal 2.2 m, angular flint, with some quartzite, sandstone, well rounded flint, chalk and quartz, with a trace of limestone, fossil debris, phosphatic nodules, igneous, metamorphic and ironstone Sand: coarse and medium with a trace of fine, angular flint, with some subangular chalk and quartz, greyish brown	6.2	9.2
Upper Chalk	Chalk, soft, puggy, white	0.3+	9.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
3	36	61	*3.0-4.0	2	2	18	21	30	17	0
			*4.0-4.6	3	1	17	19	30	30	0
			*4.6-5.0	Peaty silt seam						
			*5.0-6.0	2	4	23	18	28	25	0
			*6.0-7.0	1	2	11	24	41	31	0
			*7.0-8.0	7	1	6	8	21	55	2
			*8.0-9.2	1	2	22	20	15	37	3
			Mean	3	2	16	18	27	33	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
3.0-9.2	80	4	2	4	4	3	1	trace	1	1

TL 84 SE 74 8519 4487 Highfield, Liston

Block D

Surface level +40.1 m
Water struck at +33.1 m
Shell 152 mm diameter
October 1979

Overburden 2.3 m
Mineral 1.0 m
Waste 15.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Head	Silt, sandy, clayey, with flint pebbles and organic debris, pale brown	0.9	1.3
Boulder Clay	Clay, silty, sandy, with pebbles of chalk, flint and quartz, laminated in parts	1.0	2.3
Glacial Sand and Gravel	'Very clayey' gravel Gravel: fine with coarse, angular flint and rounded chalk, with some limestone, sandstone, quartzite and quartz, with a trace of phosphatic nodules, fossil debris, igneous, metamorphic, well rounded flint and ironstone Sand: medium, coarse and fine, angular flint and subangular quartz and chalk, brown	1.0	3.3
Boulder Clay	Clay, silty, with chalk and flint pebbles, brown	2.7	6.0
Glacial Silt	Interlaminated clayey sandy silt and silt clay with pellets of chalk and a trace of flint, pale grey	11.1	17.1
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, grey	1.9+	19.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
20	38	43	2.3-3.3	20	10	16	12	27	15	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
2.3-3.3	48	1	2	3	3	36	4	trace	2	1

TL 84 SE 75 8581 4431 Near Long Melford Station, Long Melford

Block C

Surface level +33.4 m
Water struck at +27.9 m
Shell 152 mm diameter
October 1979

Overburden 0.9 m
Mineral 5.6 m
Waste 7.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.9	0.9
Second Terrace	'Clayey' sandy gravel Gravel: fine with coarse, angular flint with rounded chalk, with some quartz, quartzite, well rounded flint and sandstone, and a trace of fossil debris, igneous, metamorphic, limestone and ironstone Sand: medium with coarse and fine, angular flint and subangular quartz with some chalk, yellowish brown	5.6	6.5
Glacial Silt	Silt, fine sandy, finely laminated, grey becoming bluish grey	7.4+	13.9

GRADING

Mean for deposit percentages	Depth below surface (m)	Percentages								
		Fines		Sand		Gravel				
		- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm		
12	57	31	0.9-1.9	15	13	31	20	18	3	0
			1.9-2.9	13	13	28	19	25	2	0
			2.9-3.9	18	25	45	7	5	0	0
			3.9-4.9	12	11	26	15	26	10	0
			*4.9-5.9	6	5	23	14	27	25	0
			*5.9-6.5	3	2	23	13	35	21	3
			Mean	12	12	30	15	22	9	trace

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.9-6.5	80	2	3	3	2	7	1	trace	1	1

TL 84 SE 76 8598 4404 Rodbridge Corner, Long Melford

Block C

Surface level +38.4 m
Water struck at +32.7 m, +27.8 m and +19.2 m
Shell 152 mm diameter
October 1979

Overburden 5.7 m
Mineral 1.9 m
Waste 11.6 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
Third Terrace	a 'Clayey' gravel Gravel: fine and coarse, angular flint, with some sandstone, quartz, quartzite and well rounded flint, with a trace of igneous, metamorphic, ironstone and limestone Sand: medium, coarse and fine, angular flint with subangular quartz, brown	0.6	1.1
Glacial Silt	Silt, fine sandy, laminated becomes, very sandy and silty clay from 5.0 m, with chalk pellets, yellowish brown to brown	4.6	5.7
Glacial Sand and Gravel	b 'Clayey' gravel Gravel: fine with coarse, rounded chalk and angular flint with some sandstone, limestone and quartzite, with a trace of fossil debris, igneous, metamorphic and ironstone Sand: medium, coarse and fine, angular flint and subangular quartz with chalk, yellowish brown	1.9	7.6
Boulder Clay	Clay, silty with pebbles of chalk and flint, dark brown becomes dark bluish grey from 8.5 m, and greyish brown and chalk free from 18.8 m	11.6	19.2
Upper Chalk	Chalk, angular fragments in a puggy matrix, white	1.8+	21.0

GRADING

	Mean for deposit percentages	Depth below surface (m)	Percentages								
			Fines		Sand		Gravel				
			- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm		
a	13	30	57	0.5-1.1	13	9	11	10	30	27	0
b	18	38	44	*5.7-6.6	8	7	16	16	29	24	0
			*6.6-7.6	28	12	14	11	21	14	0	0
			Mean	18	10	15	13	25	19	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.5-1.1	85	2	3	3	4	0	trace	1	0	2
b	5.7-7.6	43	0	1	2	4	44	3	trace	1	2

TL 84 SE 77 **8518 4348** **Northeast of Borley Place, Borley** **Block D**

Surface level +34.6 m
Water not struck
Shell 152 mm diameter
October 1979

Waste 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Glacial Sand and Gravel	Clay, silty, with flint pebbles, brown mottled red, black and yellowish brown	0.6	0.8
	'Clayey' gravel Gravel: fine and coarse with some cobble grade, angular flint, with some chalk Sand: coarse and medium with some fine, angular flint and subangular flint and subangular quartz, orange-brown	0.3	1.1
	Clay, silty, extremely sandy and pebbly, flint with increasing chalk, brown becoming yellowish brown	0.5	1.6
Boulder Clay	Clay, silty, becomes very silty from 3.7-4.2 m and grey, with some chalk and flint pebbles, brown	4.1	5.7
	Clay, silty, with chalk pebbles, grey becoming dark grey	13.3+	19.0

TL 84 SE 78 **8575 4297** **Borley Hall, Borley** **Block C**

Surface level +29.0 m
Water struck at +25.6 m
Shell 152 mm diameter
October 1979

Overburden 1.6 m
Mineral 3.1 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.8	0.8
First Terrace	Clay, silty, peaty, with some chalk and flint pebbles, dark brown mottled black	0.8	1.6
	Gravel, 'clayey' in uppermost 1.0 m Gravel: fine and coarse, angular flint, with some chalk, well rounded flint, sandstone and quartzite, and a trace of quartz, igneous, metamorphic, limestone, fossil debris, ironstone and phosphatic nodules Sand: coarse and medium with fine, angular flint with subangular chalk and quartz, brown	3.1	4.7
Upper Chalk	Chalk, soft, puggy, white	1.0+	5.7

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages					
Fines	Sand	Gravel		Fines		Sand		Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
6	38	56	11	11	16	17	34	11	0
			4	4	15	16	31	30	0
			6	6	16	16	32	24	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.6-4.7	84	3	1	2	3	4	1	trace	1	1

TL 84 SE 79 **8522 4259** **South-east of Borley Place, Borley** **Block D**

Surface level +42.4 m
Water not struck
Shell 152 mm diameter
October 1979

Waste 8.8 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, with pebbles of chalk and some flint, brown soft	5.0	5.2
	Clay, silty, sandy, with pebbles of flint, brown	1.8	7.0
Glacial Sand and Gravel	'Clayey' pebbly sand, 'very clayey' in uppermost 1.0 m Gravel: fine with coarse, angular flint, with well rounded flint and rounded quartz, a trace of igneous, metamorphic and chalk Sand: medium with fine and some coarse, subrounded quartz with some angular flint, brown	1.8	8.8
Upper Chalk	Chalk, soft, puggy, white	1.5+	10.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages					
Fines	Sand	Gravel		Fines		Sand		Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
16	68	16	25	31	28	4	10	2	0
			4	6	58	10	13	9	0
			16	20	41	7	11	5	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
7.0-8.8	70	13	11	2	3	trace	0	0	0	1

TL 84 SE 80 8540 4172 Brunton Church, Ballingdon

Block D

Surface level +54.9 m
Water not struck
Shell 152 mm diameter
October 1979

Waste 12.6 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.6	0.6
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, angular flint with some sandstone, quartz, quartzite, limestone and well rounded flint, and a trace of igneous and metamorphic Sand: medium with coarse and fine, angular flint and subangular quartz, dark brown	0.7	1.3
Boulder Clay	Clay, silty, with pebbles of flint, brown	0.5	1.8
	Clay, silty, with pebbles of chalk and flint, brown	6.6	8.4
	Clay, silty, with pebbles of chalk and flint, grey becoming dark grey	3.4	11.8
	Clay, silty, sandy, with angular flint, brown	0.8	12.6
Upper Chalk	Chalk, silty and disturbed at top, greyish brown, passing down into white putty chalk	2.0+	14.6

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
17	43	40	0.6-1.3	17	10	23	10	20	20	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.6-1.3	88	2	2	2	3	0	2	0	0	1

TL 84 SE 81 8552 4090 Kitchen Farm, Bulmer

Block F

Surface level +56.5 m
Water not struck
Shell 152 mm diameter
October 1979

Overburden 0.3 m
Mineral 1.2 m
Bedrock 17.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Kesgrave Sands and Gravel	'Very clayey' sand, with pellets and laminae of silty clay Sand: fine with a trace of medium and coarse, rounded quartz with a trace of mica	1.2	1.5
London Clay	Clay, silty, fine sandy, pockets of sand at base, faintly laminated in parts, brown becoming dark grey from 3.7 m with pockets of yellowish brown and olive green	4.1	5.6
Woolwich and Reading Beds	Clay, silty, stiff, waxy, dark grey mottled in vivid red	2.7	8.3
	Clay, silty, becoming very sandy and silty from 9.5 m, greenish grey becoming olive greenish grey, mottled red and yellowish brown	4.2	12.5
Thanet Beds	Silt, fine sandy, clayey, pale yellowish brown becoming greyish brown, micaceous	1.6	14.1
	Silt, fine sandy, clayey, bioturbated, micaceous, olive-brown	2.6	16.7
	Sand, fine, very silty, hard, fragmented rock, olive brown and greyish green	0.5	17.2
Upper Chalk	Chalk, puggy, white	2.0+	19.2

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
29	71	0	0.3-1.5	29	70	1	trace	0	0	0

TL 84 SE 82 8689 4363 Near Hospital Farm, Long Melford

Surface level +57.1 m
Water struck at +52.1 m and +37.8 m
Shell 152 mm diameter
October 1979

Block F

Waste 17.0 m
Bedrock 5.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, fine sandy, with pebbles of flint and ironstone, brown, firm to stiff	0.6	0.8
	Clay, silty, fine sandy, with pebbles of chalk and flint, brown mottled pale grey	6.0	6.8
	Clay, silty, with pellets and pebbles of chalk and some flint and black paper shale, dark bluish grey, stiff to hard	9.2	16.0
	Clay, silty and white puggy chalk, soft	0.7	16.7
	Clay, silty, with flint pebbles, brown, firm	0.3	17.0
Upper Chalk	Chalk, puggy, with angular chalk fragments, pale yellowish white, very soft	5.3+	22.3

TL 84 SE 83 8619 4278 Borley Hall, Borley

Block C

Surface level +26.3 m
water struck at +24.7 m
Shell 152 mm diameter
October 1979

Overburden 1.6 m
Mineral 3.9 m
Bedrock 1.5 m

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Alluvium	Clay, silty, becoming very silty from 1.0 m, very soft and peaty from 1.5 m, brown becoming grey	1.3	1.6
	Gravel, decalcified in uppermost 1.0 m Gravel: coarse and fine, angular flint, with some well rounded flint, quartzite, chalk, quartz and sandstone, and a trace of ironstone, fossil debris, igneous, metamorphic and phosphatic nodules Sand: medium and coarse with some fine, subangular quartz and angular flint, with some subangular chalk, brown	3.9	5.5
Upper Chalk	Chalk, soft, puggy, white	1.5+	7.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
3	30	67	*1.6-2.6	4	2	11	7	30	46	0
			*2.6-3.6	3	1	5	11	32	48	0
			*3.6-4.6	2	4	33	12	26	23	0
			*4.6-5.5	2	4	13	14	43	24	0
			Mean	3	3	16	11	32	35	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.6-5.5	81	5	3	4	2	3	1	trace	1	trace

TL 84 SE 84 8646 4204 Brunton Hall, Ballingdon

Block C

Surface level +25.1 m
Water struck at +23.9 m
Shell 152 mm diameter
October 1979

Overburden 1.2 m
Mineral 11.4 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
First Terrace	Clay, silty, very pebbly and sandy, angular flint, brown	1.0	1.2
	Sandy gravel Gravel: fine with coarse, angular flint with rounded chalk, and some sandstone, limestone, quartzite and well rounded flint, with a trace of quartz, fossil debris, ironstone, phosphatic nodules, igneous and metamorphic Sand: coarse and medium with some fine, angular flint, with some subangular quartz and chalk, yellowish brown	11.4	12.6
Upper Chalk	Chalk fragments in a soft, puggy matrix, white	1.0+	13.6

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
4	56	40	*1.2-2.2	2	15	17	16	30	20	0
			*2.2-3.2	3	4	21	26	36	10	0
			*3.2-4.2	3	16	21	12	37	11	0
			*4.2-5.2	4	13	20	32	29	2	0
			*5.2-6.2	5	12	16	19	38	10	0
			*6.2-7.2	2	11	26	24	30	7	0
			*7.2-8.2	4	10	20	30	33	3	0
			*8.2-9.2	8	4	12	25	35	16	0
			*9.2-11.5	5	7	34	25	25	4	0
			*11.5-12.6	4	6	18	30	35	7	0
			Mean	4	10	22	24	32	8	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.2-12.6	77	2	1	2	3	12	2	trace	1	trace

TL 84 SE 85 8658 4115 River Stour, Ballingdon Block C

Surface level +23.1 m
 Water struck at +21.4 m
 Shell 152 mm diameter
 October 1979

Overburden 1.7 m
 Mineral 4.0 m
 Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.6	0.6
Alluvium	Clay, silty, dark brown	1.1	1.7
	Gravel Gravel: fine and coarse with a trace of cobble grade, angular flint with rounded chalk, some well rounded flint, quartz, quartzite and sandstone, a trace of limestone, fossil debris, phosphatic nodules, ironstone and igneous and metamorphic rocks Sand: medium and coarse with some fine, angular flint with subangular chalk and quartz, yellowish brown	4.0	5.7
Upper Chalk	Chalk fragments in a soft, puggy matrix, white	2.0+	7.7

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
2	36	62								
			*1.7-2.7	2	5	30	12	35	16	0
			*2.7-3.7	1	3	13	13	39	28	3
			*3.7-4.7	2	2	20	20	30	23	3
			*4.7-5.7	3	2	11	15	19	47	3
			Mean	2	3	18	15	31	29	2

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.7-5.7	75	5	3	3	3	8	1	trace	1	1

TL 84 SE 86 8788 4427 Cuckoo Tye Farm, Long Melford Block F

Surface level +62.9 m
 Water Struck at +51.4 m
 Shell 152 mm diameter
 October 1979

Waste 12.0 m
 Bedrock 8.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy, with flint and chalk pebbles, yellowish brown, firm becoming stiff	3.7	4.0
	Clay, silty, with pebbles of chalk, and some flint with a trace of black paper shale, thin brown sand seams throughout, dark bluish grey mottled brown in uppermost 1.0 m	5.8	9.8
	Clay, very silty, and very sandy at base with pebbles of flint and chalk, some thin sand seams throughout, brown	2.2	12.0
Lower London Tertiaries	Silt, clayey, very fine sandy, some ironpan interbedded with very silty fine sand, glauconitic, drab olive green and greyish green	6.1	18.1
Upper Chalk	Chalk fragments in a soft puggy matrix, white	2.0+	20.1

TL 84 SE 87 8753 4052 Ballingdon Grove, Ballingdon Block C

Surface level +31.5 m
 Water not struck
 Shell 152 mm diameter
 October 1979

Overburden 0.4 m
 Mineral 7.4 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Second and Third Terrace	'Clayey' sandy gravel, some thin clay seams throughout Gravel: fine with coarse, angular flint with some well rounded flint, quartz, sandstone, quartzite and chalk, with a trace of igneous, metamorphic, phosphatic nodules, fossil debris and ironstone Sand: medium with fine and coarse, subangular quartz and angular flint, brown	7.4	7.8
Upper Chalk	Chalk, soft, puggy, white	0.2+	8.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
12	50	38								
			0.4-1.5	18	20	24	6	16	16	0
			1.5-2.5	9	10	27	12	27	15	0
			2.5-3.5	9	10	22	10	27	22	0
			3.5-4.5	10	8	25	12	30	15	0
			4.5-5.5	11	17	41	9	13	9	0
			5.5-6.5	14	21	33	10	14	8	0
			6.5-7.5	11	6	20	12	26	25	0
			7.5-7.8	10	6	29	14	32	19	0
			Mean	12	13	27	10	22	16	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.4-7.8	86	4	3	2	3	2	0	trace	trace	trace

TL 84 SE 88 8798 4028 East-north-east of Middleton Hall, Middleton Block C

Surface level +22.4 m Overburden 1.3 m
 Water struck at +21.1 m Mineral 4.3 m
 Shell 152 mm diameter Bedrock 2.2 m+
 October 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
First Terrace	Clay, silty, with some flint pebbles, brown	0.9	1.3
	Gravel	4.3	5.6
	Gravel: fine with coarse and a trace of cobble grade, angular flint with some well rounded flint, chalk, quartzite and sandstone, with a trace of quartz igneous, metamorphic, limestone and fossil debris Sand: medium with coarse and fine, angular flint with subangular quartz, greyish brown		
Upper Chalk	Chalk, puggy, soft, white	2.2+	7.8

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages							
Fines	Sand	Gravel		Fines	Sand			Gravel			
				-1/16	+1/16 - 1/4	+1/4 - 1/2	+1/2 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
4	44	52	*1.3-2.3	4	9	26	17	31	13	0	
			*2.3-3.3	1	7	27	14	29	16	6	
			*3.3-4.3	3	4	19	8	35	31	0	
			*4.3-5.6	7	8	25	11	32	17	0	
			Mean	4	7	24	13	32	19	1	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
1.3-5.6	88	3	1	2	2	3	trace	0	trace	1

TL 84 SE 89 8831 4341 South of Newmans Green, Acton Block F

Surface level +69.6 m Overburden 15.3 m
 Water struck at +61.6 m Mineral 13.1 m
 Shell 152 mm diameter Bedrock 2.0 m+
 October 1979

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Boulder Clay	Clay, silty, sandy, with flint pebbles, brown	0.5	0.7
	Clay, silty, with pebbles of chalk and some flint, brown	7.3	8.0
	Interlaminated silty clay and fine sand, very soft, with chalk and flint pebbles, greyish brown	1.0	9.0
	Clay, silty, with pebbles of chalk and flint, brown, firm becoming bluish grey and stiff from 10.6 m	4.8	13.8
	Clay, very sandy and silty, with thin seams of medium and fine orange quartz sand, pellets of chalk and some flint pebbles, brown, firm	1.5	15.3
Barham Sands and Gravels	a 'Very clayey' pebbly sand Gravel: fine with coarse, angular flint, with rounded chalk, well rounded flint, and rounded quartz and quartzite, with some sandstone, limestone, ironstone and fossil debris Sand: fine and medium with a trace of coarse, rounded quartz and some angular flint and chalk, brown	1.0	16.3
Kesgrave Sands and Gravels	b Sand, with a trace of flint and quartz fine pebbles Sand: medium and fine with a trace of coarse, rounded quartz with some angular flint and mica, yellowish brown Gravel: fine and coarse, well rounded flint with some angular flint and a trace of quartz, quartzite and ironstone	9.0	25.3
Red Crag	c 'Clayey' pebbly sand Gravel: fine and coarse, well rounded flint with some angular flint and a trace of quartz, quartzite and ironstone Sand: medium and fine with some coarse, rounded quartz with some ironstone and a trace of mica, orange brown	3.1	28.4
Lower London Tertiaries	Silt, very fine sandy, pale olive grey with orange streaks	0.6	29.0
Upper Chalk	Chalk fragments in a soft puggy matrix, white	1.4+	30.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Sand			
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	35	59	6	15.3-16.3	35	34	24	1	4	2	0
b	7	93	0	16.3-17.3	8	78	13	1	0	0	0
				17.3-18.3	9	63	28	trace	0	0	0
				18.3-19.3	7	54	39	trace	0	0	0
				19.3-20.3	8	46	45	1	0	0	0
				20.3-21.3	8	31	59	2	trace	0	0
				21.3-22.3	8	16	74	2	trace	0	0
				22.3-23.3	4	21	74	1	0	0	0
				23.3-24.3	5	33	59	3	0	0	0
				24.3-25.3	9	34	55	2	trace	0	0
				Mean	7	42	50	1	trace	0	0
c	10	83	7	25.3-26.3	8	27	47	8	56	4	0
				26.3-27.3	8	35	41	9	3	4	0
				27.3-28.4	13	35	44	4	2	2	0
				Mean	10	32	44	7	4	3	0
a+b+c	10	88	2	Mean	10	39	46	3	1	1	0

TL 84 SE 90 8895 4249 Chilton Hall Farm, Chilton

Surface level +56.9 m
Water not struck
Shell 152 mm diameter
October 1979

Block F

Overburden 10.6 m
Mineral 4.7 m
Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy, with pebbles of chalk and flint, brown	1.1	1.4
Glacial Sand and Gravel	a 'Clayey' gravel Gravel: fine and coarse, angular flint with rounded chalk, with some quartz, quartzite, well rounded flint, sandstone, limestone and ironstone, and a trace of phosphatic nodules, fossil debris, igneous and metamorphic Sand: fine and medium with coarse, subangular quartz with angular flint and chalk, yellow	0.6	2.0
Boulder Clay	Clay, silty, sandy, with chalk and flint pebbles, brown mottled grey	2.4	4.4
	Clay, silty, with chalk and flint pebbles, dark grey	5.7	10.1
	Clay, very sandy, silty, pale orange brown mottled orange	0.5	10.6
Kesgrave Sands and Gravel	b Sand, cobble of flint at top and a trace of fine flint pebbles Sand: medium and fine with a trace of coarse, subrounded to rounded quartz, with some angular flint and a trace of mica, reddish brown	2.7	13.3
Red Crag	c Sand, with a trace of fine flint, quartz and ironstone pebbles Sand: fine with medium with some coarse, strongly bimodal, rounded quartz with some ironstone, orange to reddish brown	2.0	15.3
Thanet Beds	Sand, fine, silty, micaceous dark greyish green	1.4	16.7
Upper Chalk	Chalk, soft, puggy, white	0.3+	17.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Sand			
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	15	39	46	1.4-2.0	15	15	15	9	24	22	0
b	7	92	1	10.6-11.3	8	48	37	2	0	0	5
				11.3-12.1	6	25	66	3	0	0	0
				12.1-13.3	7	41	51	1	trace	0	0
				Mean	7	38	52	2	trace	0	1
				c	7	93	0	13.3-14.3	7	62	24
				14.3-15.3	7	50	30	13	trace	0	0
				Mean	7	56	27	10	trace	0	0
b+c	7	92	1	Mean	7	46	41	5	trace	0	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	1.4-2.0	54	4	5	5	3	23	2	2	1	1
b	10.6-13.3	Insufficient material									
c	13.3-15.3	Insufficient material									

TL 84 SE 91 8897 4454 North-east of Ovens Green, Acton

Surface level +62.9 m
Water not Struck
Shell 152 mm diameter
October 1979

Block F

Overburden 8.4 m
Mineral 8.0 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Boulder Clay	Clay, silty, sandy, with pebbles of flint and chalk, brown	3.4	3.8
	Clay, silty, with pebbles of chalk and flint, grey	4.6	8.4
Barham Sands and Gravels	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular flint, with limestone sandstone and quartz, and some quartzite, chalk, well rounded flint and ironstone, with a trace of fossil debris and igneous Sand: fine with medium and some coarse, subrounded quartz with some angular flint and chalk, yellowish brown	2.0	10.4
Kesgrave Sands and Gravels	b 'Clayey' sand, with discrete clay laminae Gravel: a trace of fine and coarse angular flint, rounded quartz and well rounded flint, with quartzite, and some ironstone, igneous and metamorphic Sand: fine and medium with some coarse, rounded quartz with a trace of angular flint and mica, yellowish brown and orange-brown	6.0	16.4
Lower London Tertiaries	Clay, very silty, fine sandy with well rounded flint pebbles at base, brown mottled red	0.5	16.9
Upper Chalk	Chalk, soft, white	0.6+	17.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	23	58	19	8.4-9.4	34	20	15	5	11	15	0
				9.4-10.4	12	43	28	4	9	4	0
				Mean	23	32	21	5	10	9	0
b	12	85	3	10.4-11.4	11	55	26	2	4	2	0
				11.4-12.4	9	42	43	4	1	1	0
				12.4-13.4	12	39	44	4	1	0	0
				13.4-14.4	12	30	52	5	1	0	0
				14.4-15.4	12	34	44	8	2	0	0
				15.4-16.4	18	42	32	6	1	1	0
				Mean	12	40	40	5	2	1	0
a+b	15	79	6	Mean	15	39	35	5	3	3	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	8.4-10.4	59	2	6	5	8	5	11	2	1	1
b	10.4-16.4	37	22	26	10	0	0	0	3	0	2

TL 84 SE 92 8987 4352 Great Woldingfield Airfield, Chilton

Block F

Surface level +62.6 m
Water struck at +57.6 m and +49.8 m
Shell 152 mm diameter
October 1979

Overburden 1.0 m
Mineral 6.0 m
Waste 5.1 m
Mineral 4.7 m
Bedrock 2.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil and subsoil	1.0	1.0
Glacial Sand and Gravel	a 'Clayey' gravel, 'very clayey' in uppermost 2.0 m Gravel: coarse and fine, becoming coarse with fine, angular flint, with some sandstone, quartz, quartzite and well rounded flint, with a trace of igneous, metamorphic, chalk, ironstone, limestone, phosphatic nodules and fossil debris Sand: medium with fine and coarse, subangular quartz and angular flint with a trace of subangular chalk, dark yellowish brown	6.0	7.0
Boulder Clay	Clay, silty, with chalk and flint pebbles, brown	1.0	8.0
	Clay, silty, with chalk and flint pebbles, with some quartz and black paper shale, dark bluish grey	3.9	11.9
	Clay, silty, sandy, with chalk pellets, reddish brown	0.2	12.1
Kesgrave Sands and Gravels	b Pebbly sand Gravel: fine with coarse, angular flint with well rounded quartz, with some quartzite and sandstone, and a trace of igneous, metamorphic and fossil debris Sand: medium with fine and some coarse, subrounded quartz with some angular flint, yellowish brown	2.0	14.1

Red Crag

c Pebbly sand
Gravel: fine and coarse, angular and well rounded flint with some quartzite and quartz, and a trace of igneous, metamorphic, phosphatic nodules, ironstone and sandstone
Sand: medium with coarse and fine, rounded quartz and some ironstone, orange brown

2.7 16.8

Thanet Beds

Clay, silty, fine sandy, dark greyish green

1.2 18.0

Upper Chalk

Chalk fragments in a soft puggy matrix, white

1.0+ 19.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	17	36	47	1.0-2.0	33	10	12	14	25	6	0
				2.0-3.0	27	16	25	9	16	7	0
				3.0-4.0	16	20	31	7	17	9	0
				4.0-5.0	14	14	28	9	19	16	0
				*5.0-7.0	6	3	3	5	28	55	0
				Mean	17	11	17	8	22	25	0
b	6	84	10	*12.1-13.1	8	18	53	7	9	5	0
				*13.1-14.1	4	31	53	6	4	2	0
				Mean	6	25	53	6	7	3	0
c	4	85	11	*14.1-15.1	2	17	56	13	8	4	0
				*15.1-16.1	2	12	55	19	3	9	0
				*16.1-16.8	10	18	50	16	3	3	0
				Mean	4	15	54	16	5	6	0
b+c	5	85	10	Mean	5	19	54	12	5	5	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	1.0-7.0	87	2	4	2	4	trace	trace	trace	trace	1
b	12.1-14.1	56	16	14	7	6	0	0	0	trace	1
c	14.1-16.8	58	32	3	6	trace	0	0	trace	trace	1

TL 84 SE 93 8968 4216

Near Chilton Grange, Chilton

Block F

Surface level +66.5 m
Water struck at +48.2 m
Shell 152 mm diameter
October 1979

Overburden 0.3 m
Mineral 2.7 m
Waste 1.6m
Mineral 19.5 m
Bedrock 10.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Glacial Sand and Gravel	a 'Clayey' gravel Gravel: fine and coarse with a trace of cobble grade, angular flint, with some quartz, sandstone, quartzite well rounded flint, with a trace of igneous, metamorphic and ironstone Sand: medium and coarse with fine, angular flint with subangular quartz, dark brown	2.7	3.0
Boulder Clay	Clay, silty becomes sandy and chalky from 4.0 m, with pebbles of flint and some quartz, brown becoming yellowish brown	1.6	4.6
Kesgrave Sands and Gravels	b 'Clayey' sand, very clayey at base, with a trace of fine flint and quartz pebbles in upper 2.0 m, silt laminae throughout Sand: fine with medium and a trace of coarse, subrounded quartz and a trace of mica, angular flint and ironstone	12.2	16.8
Red Crag	c 'Very clayey' sand, with some ironstone and a trace of flint and quartz fine gravel, very clayey in uppermost 3.0 m becoming 'clayey' with depth Sand: fine with medium and some coarse, rounded quartz with subrounded ironstone, orange brown	7.3	24.1
Thanet Beds	Silt, very fine sandy, clayey in parts, micaceous with pyrite and some limonitic nodules, orange brown to 24.6 m becoming lilac grey, with olive green fine sand bioturbation	3.7	27.8
	Sand, fine, silty, with cemented emerald green sandstone, drab olive green with pockets of greyish green, becomes mottled pale greyish blue and yellowish brown at base	0.5	28.3
Upper Chalk	Chalk, soft and puggy becoming fragmentary chalk in puggy matrix with depth, creamy white	6.7+	35.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{4}$	+- $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	18	33	49	0.3-1.3	23	14	10	10	24	19	0
				1.3-2.3	15	5	12	14	26	22	6
				2.3-3.0	16	6	16	13	28	21	0
				Mean	18	9	12	12	26	21	2
b	13	87	0	4.6-5.6	13	25	57	2	2	1	0
				5.6-6.6	13	18	67	1	1	0	0
				6.6-7.8	9	69	22	trace	0	0	0
				7.8-8.8	13	60	26	1	0	0	0
				8.8-9.8	17	65	17	1	0	0	0
				9.8-10.8	18	68	13	1	0	0	0
				10.8-11.8	6	89	4	1	0	0	0
				11.8-12.8	9	86	5	0	0	0	0
				12.8-13.8	7	86	7	0	0	0	0
				13.8-14.8	8	56	35	1	0	0	0
				14.8-15.8	9	47	37	7	0	0	0
				15.8-16.8	35	47	16	2	0	0	0
				Mean	13	60	26	1	trace	trace	0
c	21	77	2	16.8-17.8	26	44	28	1	1	0	0
				17.8-18.8	37	56	7	trace	0	0	0
				18.8-19.8	25	54	16	3	2	trace	0
				19.8-20.8	18	35	32	8	6	1	0
				20.8-21.8	9	37	40	13	1	0	0
				21.8-22.8	13	45	22	17	3	0	0
				22.8-23.8	11	49	24	13	3	0	0
				23.8-24.1	36	38	14	10	2	0	0
				Mean	21	45	24	8	2	trace	0
b+c	16	83	1	Mean	16	54	25	4	1	trace	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.3-3.0	86	2	5	3	3	0	0	trace	0	1
b	4.6-16.8	Insufficient material									
c	16.8-24.1	11	35	3	0	0	0	0	51	0	0

TL 84 SE 94 8941 4110 West of Tye Farm, Great Cornard

Block F

Surface level +74.2 m
Water not struck
Shell 152 mm diameter
October 1979

Overburden 6.0 m
Mineral 19.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Boulder Clay	Clay, silty, sandy, with chalk and flint pebbles, brown mottled pale grey	5.4	5.7
	Clay, silty, sandy, with flint pebbles, brown	0.3	6.0
Barham Sands and Gravels	a 'Very clayey' pebbly sand, with thin grey and orange red clay seams between 8.0-8.4 m and 9.4-9.8 m Gravel: fine and coarse with a trace of cobble grade, angular flint and rounded quartz with well rounded flint, with some quartzite, sandstone, igneous and metamorphic Sand: medium and fine with some coarse, subrounded quartz with a trace of angular flint, orange brown and reddish brown mottled grey	4.8	10.8
Kesgrave Sands and Gravels	b 'Clayey' sand, with a trace of fine and coarse flint and quartz pebbles at top and base, thin clay laminae Sand: fine and medium with a trace of coarse, subrounded quartz, with a trace of angular flint and mica, orange-brown becoming yellowish brown	11.0	21.8
Red Crag	c 'Clayey' sand, with a trace of flint, quartz and predominantly ironstone pebbles Sand: medium with fine and some coarse, rounded quartz and some ironstone, orange-brown	3.2+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages																																																																																														
	Fines	Sand	Gravel		Fines			Sand			Gravel																																																																																								
					-1/16	+1/16 - 1/8	+1/8 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+4 - 16	+16 - 64	+64 mm																																																																																						
a	23	60	17	6.0-7.0	19	41	37	1	2	0	0	7.0-8.0	24	23	39	5	6	3	0	8.0-8.4	Clay seam	8.4-9.4	27	7	14	12	19	18	3	9.4-9.8	Clay seam	9.8-10.8	23	15	44	2	4	12	0	Mean	23	21	34	5	8	8	1																																																				
b	14	85	1	10.8-11.8	24	41	33	1	1	0	0	11.8-12.8	11	52	35	trace	1	1	0	12.8-13.8	12	51	34	0	0	3	0	13.8-14.8	22	66	12	0	0	0	0	14.8-15.8	20	77	3	0	0	0	0	15.8-16.8	13	47	39	1	0	0	0	16.8-17.8	8	23	68	1	0	0	0	17.8-18.8	5	21	72	2	0	0	0	18.8-19.8	9	29	57	5	0	0	0	19.8-20.8	15	53	28	3	1	0	0	20.8-21.8	10	73	12	3	2	0	0	Mean	14	48	36	1	1	trace	0
c	10	87	3	21.8-22.8	9	16	62	10	3	0	0	22.8-23.8	11	26	50	11	2	0	0	23.8-25.0	11	24	47	13	5	0	0	Mean	10	22	53	12	3	0	0																																																																
a+b+c	15	80	5	Mean	15	38	38	4	3	2	trace																																																																																								

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	6.0-10.8	35	18	33	6	5	0	0	0	0	3
b	10.8-21.8	Insufficient material									
c	21.8-25.0	Insufficient material									

TL 84 SE E1 8555 4340 Tanglewood North, Borley Block D

Surface level c+31.0 m Mineral 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Glacial Sand and Gravel	'Very clayey' sandy gravel, becomes less clayey with depth Gravel: fine and coarse with a trace of cobble grade, angular flint with rounded chalk and subrounded quartz with a trace of ironstone Sand: fine and medium with some coarse, predominantly subangular to subrounded quartz with some angular flint, rounded chalk and a trace of ironstone, pale yellowish brown	3.0+	3.0

TL 84 SE E2 8558 4316 Tanglewood South, Borley Block D

Surface level c+31.0 m Mineral 4.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Glacial Sand and Gravel	Sandy gravel, with some gravel stringers throughout Gravel: fine with some coarse, angular flint and subrounded chalk, with some quartz, quartzite and a trace of fossil debris Sand: coarse and medium with some fine, subangular to rounded quartz, with angular flint and rounded chalk, pale yellowish brown	4.0+	4.0

TL 84 SE E3 8557 4098 Kitchen Hill, Bulmer

Block F

Surface level c+52.0 m

Overburden 0.2 m
Mineral 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.2	0.2
Barham Sands and Gravels	a 'Clayey' sandy gravel Gravel: fine with coarse and cobble grade, angular flint, with some well rounded flint, quartz, sandstone and quartzite Sand: medium and fine with some coarse, subangular quartz with some subangular chalk and a trace of flint, reddish brown	0.4	0.6
Kesgrave Sands and Gravels	b Sand, fine with a trace of medium and coarse, rounded quartz and a trace of mica	0.4+	1.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	$+\frac{1}{8}$ - $\frac{1}{2}$	$+\frac{1}{2}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	15	61	24	0.2-0.6	15	26	29	6	12	5	7
b	3	97	0	0.6-1.0	3	96	1	trace	0	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
a	0.2-0.6	86	5	4	2	3	0	0	0	0	0
b	0.6-1.0	No +4 mm material									

TL 84 SE E4 8633 4178

Brundon Pit North, Ballingdon

Block C

Surface level c+31.0 m

Overburden 0.3 m
Mineral 5.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Second Terrace	Sandy gravel, open framework cross bedded gravels with lenses of cross bedded and pebbly sand at 1.4-2.4m and 4.0-4.6 m, mammoth tusk and femur present in lowermost unit Gravel: fine and coarse, angular flint with rounded chalk, with some well rounded flint, quartz and sandstone, and a trace of quartzite, ironstone, fossil debris igneous, metamorphic and limestone Sand: medium with fine and coarse, angular flint and subangular chalk, orange-brown becoming yellowish brown	5.7	6.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	$+\frac{1}{8}$ - $\frac{1}{2}$	$+\frac{1}{2}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
	9	52	39	0.3-1.4	7	6	21	6	21	39	0
				1.4-2.4	16	15	58	5	6	0	0
				2.4-4.0	4	7	25	14	33	17	0
				4.0-4.6	23	39	31	4	2	1	0
				4.6-6.0	4	6	32	12	28	18	0
				Mean	9	11	52	9	22	17	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
		Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
	0.3-6.0	83	2	2	1	2	8	trace	1	1	trace

TL 84 SE E5 8622 4165 Brunton Pit West, Ballingdon Block C
 Surface level c+31.0 m Overburden 0.3 m
 Mineral 4.5 m
 Waste 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Second Terrace	Sandy gravel Gravel: fine with coarse, angular flint with some chalk, well rounded flint, sandstone, quartz and quartzite, with a trace of igneous, metamorphic, limestone and ironstone Sand: medium with coarse and some fine, subangular quartz and angular flint, with some subangular chalk, yellowish brown	4.5	4.8
Boulder Clay	Clay, silty, with fine sandy seams and pebbles of chalk and flint, grey	0.5+	5.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
7	49	44	6	2	33	12	27	20	0	
			10	19	32	10	16	13	0	
			7	5	33	11	25	19	0	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-4.8	88	3	2	2	2	3	trace	trace	0	trace

TL 84 SE E6 8610 4087 Gypsy Lane, Ballingdon Block F
 Surface level c+38.0 m Overburden 0.3 m
 Mineral 2.5 m
 Bedrock 3.7 m

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Kesgrave Sands and Gravel	Pebbly sand, with a clayey basal pebble bed from 2.3-2.8 m Gravel: coarse with fine and some cobble grade, well rounded flint with some angular flint, quartz and ironstone Sand: fine and medium with coarse, subrounded becoming rounded quartz with some ironstone and mica, yellowish brown becoming dark orange-brown at base	2.5	2.8
Thanet Beds	Silt, fine sandy with green glauconitic specks, orange-brown with a lilac tinge Sand, fine, silty, green speckled dark olive green Silt, fine sandy, very dark greenish black with white flecks	3.0	5.8
		0.3	6.1
		0.4+	6.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
7	79	14	5	42	32	18	3	0	0	
			15	10	14	4	10	39	8	
			7	36	28	15	4	8	2	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction									
	Angular flint	Rounded flint	Quartz	Quartzite	Sandstone	Chalk	Limestone	Ironstone	Fossil debris and phosphate	Others
0.3-2.8	11	77	5	0	0	0	0	5	0	2

TL 84 SE E7 8935 4170 Newton Road, Chilton

Block F

Surface level c+61.0 m

Mineral 5.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Barham Sands and Gravels	a 'Very clayey' pebbly sand Gravel: coarse and fine, angular flint, with rounded quartz and sandstone, with some well rounded flint and quartzite and a trace of fine fossil debris Sand: fine and medium with some coarse, subrounded quartz with a trace of angular flint, orange-brown	2.5	2.5
Kesgrave Sands and Gravels	b Sand, fine and medium with a trace of coarse, rounded quartz with some mica, pale yellowish brown	3.0+	5.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Sand			
					-16	+16 -4	+4 -1	+1 -4	+4 -16	+16 -64	+64 mm
a	38	51	11	0.0-2.5	38	27	21	3	3	8	0
b	5	95	0	2.5-5.5	5	66	29	trace	trace	0	0

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CORRECTION

In borehole NE 53, the Kesgrave Sands and Gravels are composed overwhelmingly of sand, not gravel as shown on the resource map (see Appendix E).

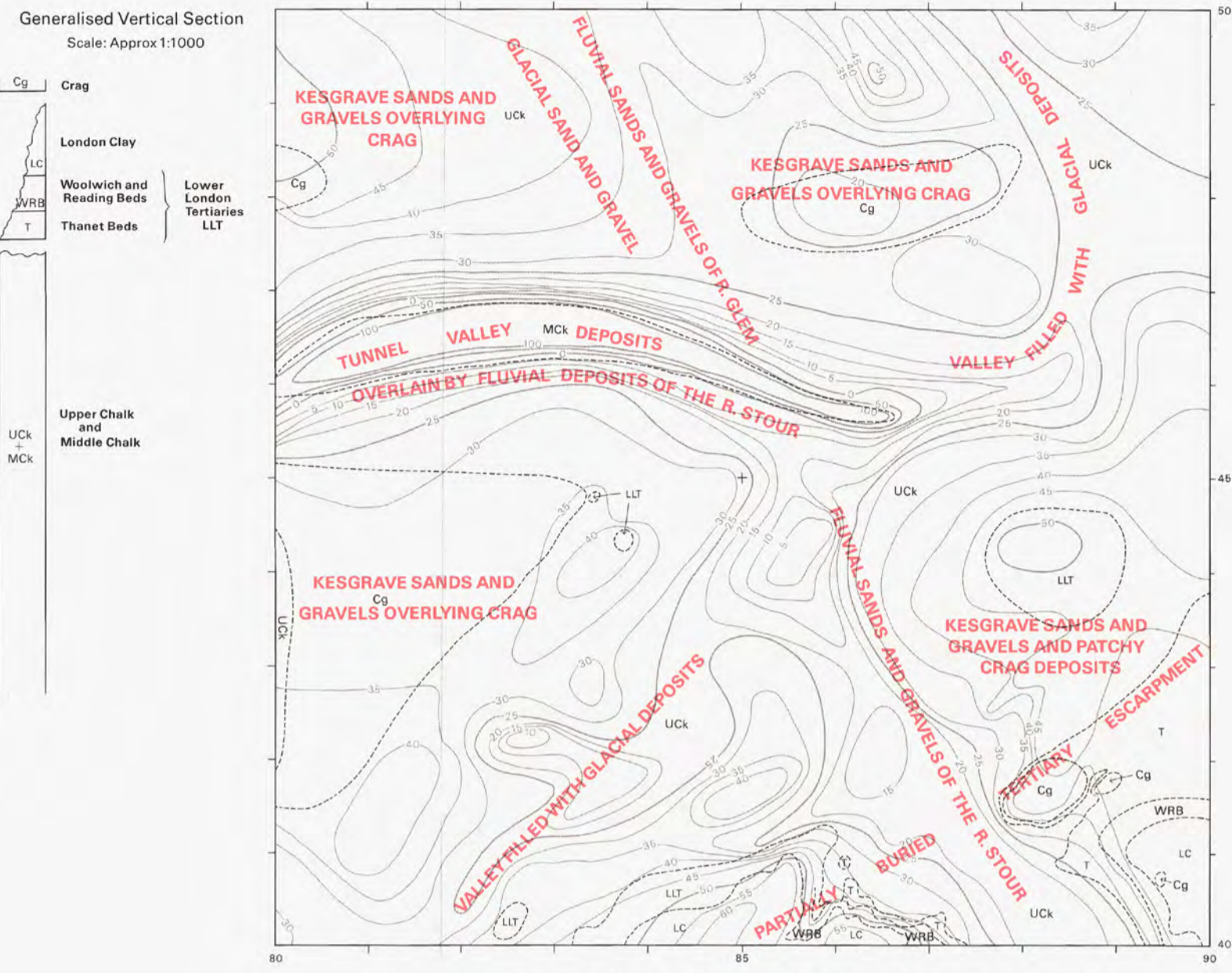
THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND SUDBURY, SUFFOLK

Scale 1:25 000 or about 2 1/2 Inches to 1 Mile

ORDNANCE SURVEY
SHEET TL84
PROVISIONAL EDITION

118

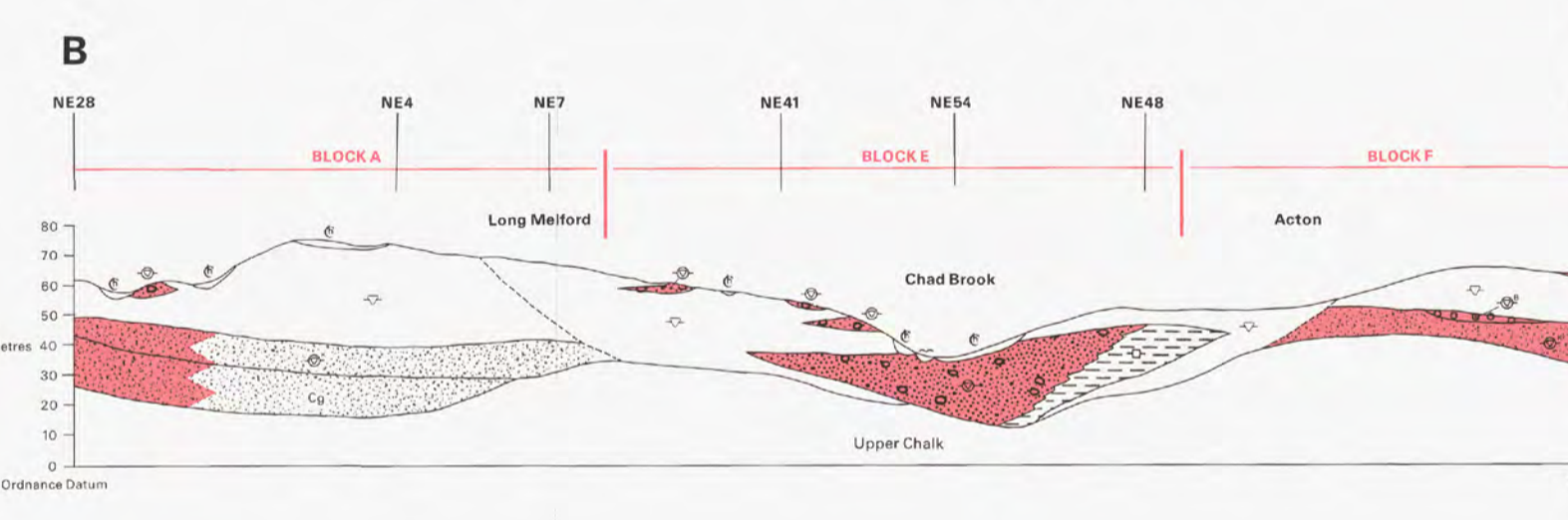
This map should be read in conjunction with the accompanying Report which contains details of the assessment of resources.



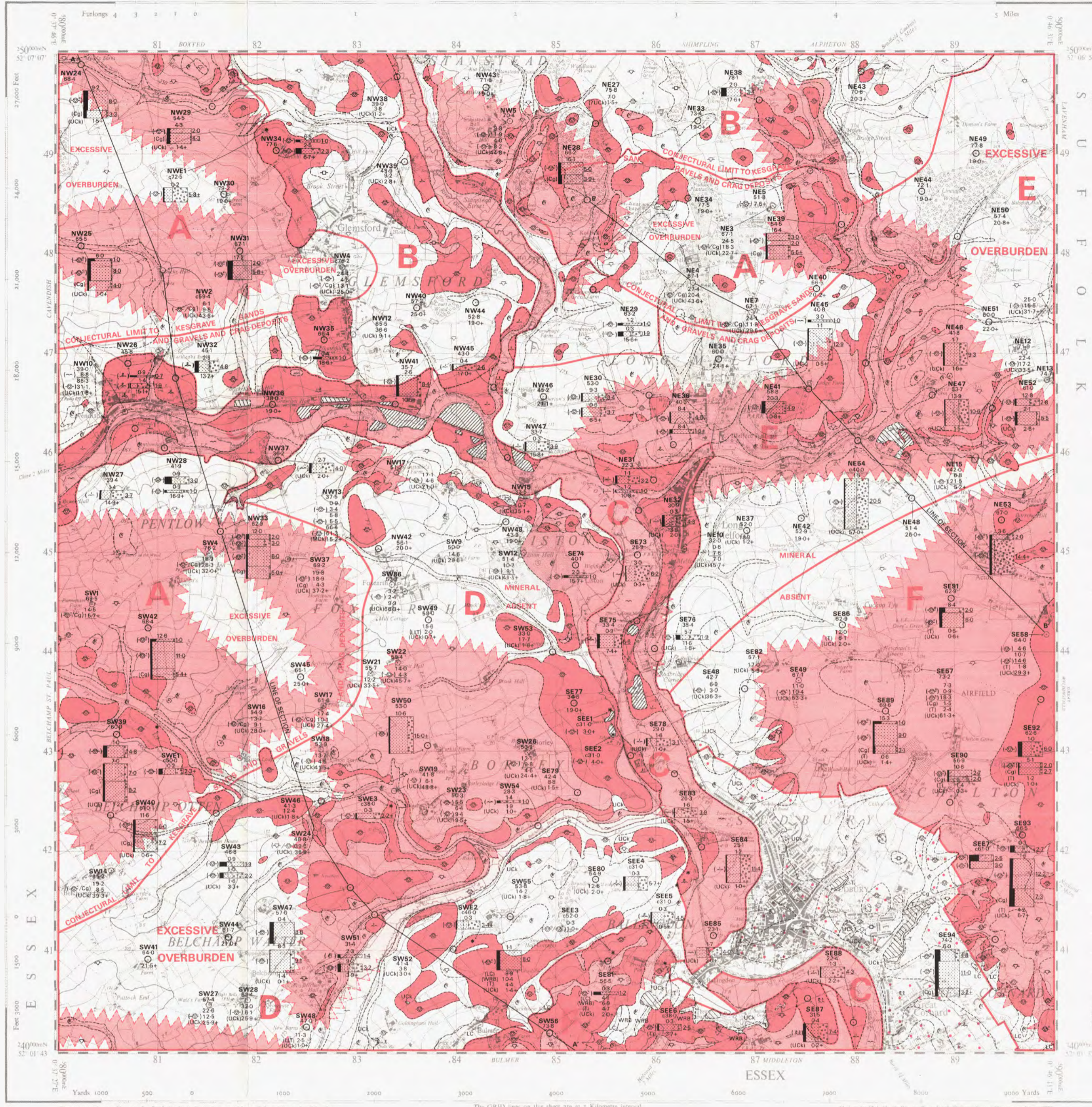
Contours on the Tertiary/Cretaceous bedrock surface, with notes on the overlying deposits



HORIZONTAL SECTIONS SHOWING THE RELATIONS OF THE DRIFT DEPOSITS



KEY TO SECTIONS

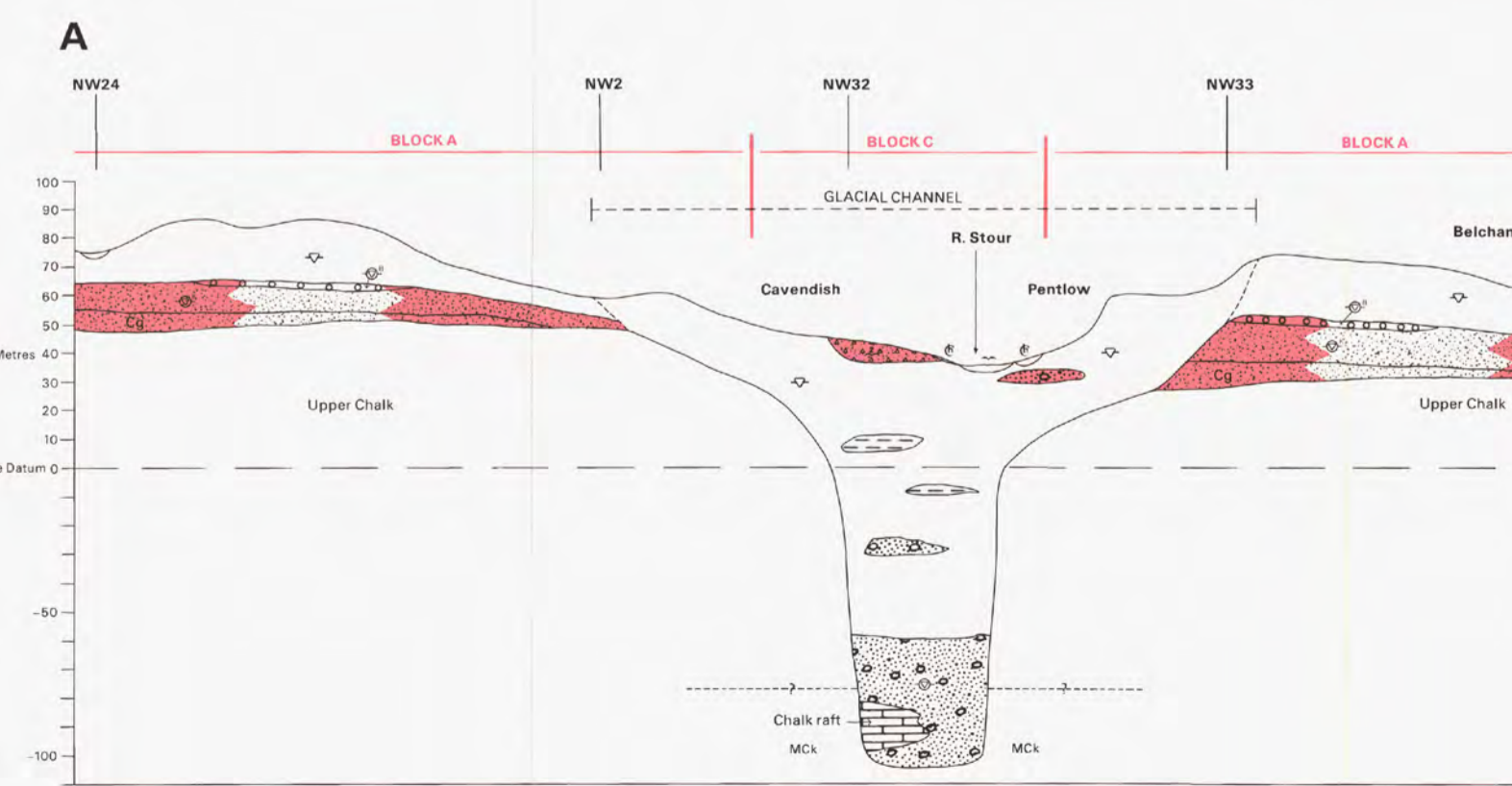


Geological data from a six-inch to the mile survey by D. Milward and R. A. Ellison in 1976. R. A. Bailey District Geologist. Sand and Gravel survey by P. M. Hooper, S. J. Mulvey and C. W. Thomas 1979. R. C. Thomas Head, Industrial Minerals Assessment Unit. 1:25000 Sand and Gravel Resource Sheet published in 1982. G. M. Brown, G.S.G., F.R.S., Director, Institute of Geological Sciences.

Data quoted for an individual borehole refer strictly to that site. Available information cannot be drawn about the thickness and grading elsewhere of the deposit, particularly in respect of variable sand and gravel. However, estimates of the volume and mean grading of the mineral as a whole for each Resource Block are given in the Report.

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119	119	119
117	118	118
117	118	118
117	118	118



Scale for Horizontal Sections
Horizontal scale 1:25000
Vertical scale 1:2000

- EXPLANATION OF SYMBOLS AND ABBREVIATIONS**
- DRIFT**
- Peat - soft black and brown organic debris, often silty and fine sandy. P-12
 - Alluvium - soft brown and grey fine sandy silt and silty clay overlying flint gravel. A-71
 - River Terrace Deposits - gravel and sandy gravel, predominantly angular flint. RT-27
 - Head - predominantly brown silty clay with silty and sandy clay and subordinate 'clayey' sandy gravel. H-49
 - Boulder Clay - dark grey silty clay with chalk and flint pebbles, weathering to yellowish brown chalk-free stoney silty clay. BC-46
 - Glacial Silt - buff and pale grey silt and clayey silt, with some fine sand, laminated in parts. GSI-11
 - Glacial Sand and Gravel - 'clayey' sandy gravel and pebbly sand, predominantly angular flint and chalk with traces of exotic rock type. CS-77
 - Barham Sands and Gravels - variable deposit, 'clayey' and 'very clayey' pebbly sand and sand often red and grey mottled. BS-4
 - Kesgrave Sands and Gravels - generally pale yellowish brown micaceous fine and medium 'clayey' sand, with subordinate pebbly sand, predominantly flint with some quartz and quartzite. K-10
- SOLID**
- Cg - Crag - dark reddish brown medium with coarse and fine sand, pebbly in parts.
 - LC - London Clay - dark grey silty, fine sandy clay, micaceous, with a basal well rounded flint bed, weathering to ochre brown.
 - WRB - Woolwich and Reading Beds - red, green, grey and brown mottled, stiff easy clay with subordinate 'clayey' greenish grey sand.
 - T - Thanet Beds - pale greyish green and green silty very fine sand with a basal well rounded flint bed.
 - UC - Upper Chalk - soft, white, well jointed chalk with seams of nodular flint.
 - MCK - Middle Chalk - hard, greyish white jointed chalk (proved in boreholes only).
- BOUNDARY LINES**
- Geological boundary: Solid (Solid geological boundary line shown on marginal map).
 - Inferred boundary between recognised categories of deposits.
 - Resource Block boundary.
- Broken lines denote uncertainty.
- BOREHOLE DATA**
- SITE LOCATIONS**
- Industrial Minerals Assessment Unit (I.M.A.U.) boreholes.
 - Other boreholes.
 - Exposure site.
- I.M.A.U. BOREHOLES**
- Borehole Registration Number: SW47
- Borehole site: 27.0
- Waste: 0.8
- Geological Classification: (U.C.) 01-1
- Grading diagram: Thickness in metres.
- 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 Geological Classification is given only for sand and gravel and bedrock.
- Borehole Registration Number**
- Each I.M.A.U. borehole is identified by a Registration Number, e.g. SW47. The letters refer to the quarter sheet and the figure to the I.C.S. serial number for that quarter. All but serial 125,000 Sheet TL84, a unique designation for this borehole is therefore TL84 SW47.
- Grading Diagrams**
- Each grading diagram shows the mean particle size distribution of a deposit of mineral.
- Sand (4.75-4.75mm)
- Fines Gravel (1-1.75mm) (4.4mm)
- The height of the diagram is proportional to the mineral thickness. The width of the divisions show the proportions of Fines, Sand and Gravel.

- MADE GROUND**
- MG-2
 - WO-9
- BOUNDARY LINES**
- Geological boundary: Solid (Solid geological boundary line shown on marginal map).
 - Inferred boundary between recognised categories of deposits.
 - Resource Block boundary.
- Broken lines denote uncertainty.
- BOREHOLE DATA**
- SITE LOCATIONS**
- Industrial Minerals Assessment Unit (I.M.A.U.) boreholes.
 - Other boreholes.
 - Exposure site.
- I.M.A.U. BOREHOLES**
- Borehole Registration Number: SW47
- Borehole site: 27.0
- Waste: 0.8
- Geological Classification: (U.C.) 01-1
- Grading diagram: Thickness in metres.
- 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 Geological Classification is given only for sand and gravel and bedrock.
- Borehole Registration Number**
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- Grading Diagrams**
- Each grading diagram shows the mean particle size distribution of a deposit of mineral.
- Sand (4.75-4.75mm)
- Fines Gravel (1-1.75mm) (4.4mm)
- The height of the diagram is proportional to the mineral thickness. The width of the divisions show the proportions of Fines, Sand and Gravel.

- OTHER BOREHOLES**
- The layout of information is the same as for I.M.A.U. boreholes, although data available may not be as comprehensive. They are registered in the same series. Where heights are approximations from available data they are denoted by C, and quoted to the nearest metre. Exposures are numbered sequentially and denoted by an E prefix following the quarter sheet letters, e.g. SW12E. They are not registered.

- CATEGORIES OF DEPOSITS**
- Exposed mineral. CAT-E6
 - Continuous or almost continuous spreads of mineral beneath overburden, assessed. CAT-C1
 - Discontinuous spreads of mineral beneath overburden, assessed. CAT-D1
 - Sand and gravel either not potentially workable (see Report) or absent. CAT-A2
 - Exposed sand and gravel not assessed. CAT-N5

- RESOURCE BLOCKS**
- For assessment purposes the mineral-bearing land is divided into Resource Blocks (see Report). Each is designated by a letter.
- Detailed records may be consulted on application to the Head, Industrial Minerals Assessment Unit, Institute of Geological Sciences, Keyworth, Nottingham, NG12 5GG.
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