

DEESIDE THEMATIC GEOLOGICAL MAPPING

MAP 1 : BEDROCK GEOLOGY

Rock Types

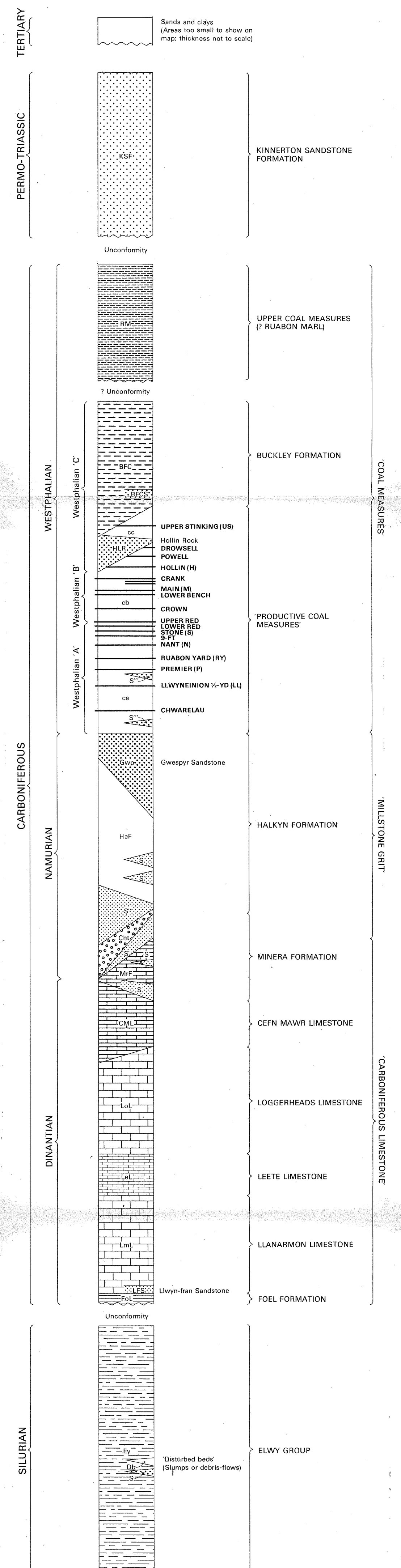
Sandstone	Mudstone
Fine- to medium-grained sandstone	Purplish-grey mudstone with interbedded sandstones
Fine- to medium-grained feldspathic sandstone	Purple, yellow and grey silty mudstones and siltstones with subordinate feldspathic sandstones
Fine- to coarse-grained quartzitic sandstone with variably calcareous lower in sequence	Mudstone and silty mudstone with subordinate sandstones, siltstones and coal seams
Limestone	Miscellaneous
Thin-bedded argillaceous limestones with mudstones, interbedded with massive shelly limestones	Laminated silty mudstone, commonly cleaved
Coarse-grained rubbly-bedded shelly limestone	Chert, laminated and glassy cherts and siliceous mudstones
Porcellanous limestone with subordinate shelly limestone	Dolomitic and argillaceous limestones, calcareous sandstones and siltstones

Symbols

Scale 1:25,000

DIAGRAMMATIC VERTICAL SECTION OF STRATA

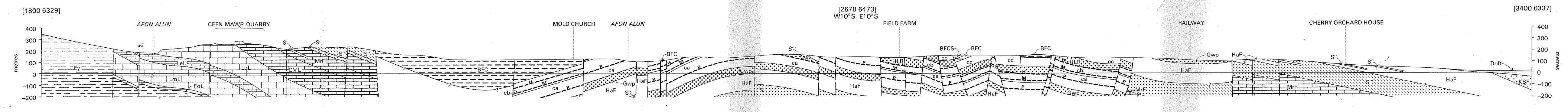
Scale 1:25 000 (Scale 1 cm to 50m approximately)



COMMENTS
 This map shows the rock type most likely to occur at the surface or immediately beneath the cover of unconsolidated deposits. It has been compiled from the component 1:10 000 and 1:10 500 BGS maps.
 Coal seam names are those used by British Coal for the whole of the North Wales Coalfield. More detailed comparative sections of the Carboniferous rocks are included in the report accompanying the Thematic Maps.

GENERALIZED CROSS SECTION ALONG LINE DRAWN ON THE MAP

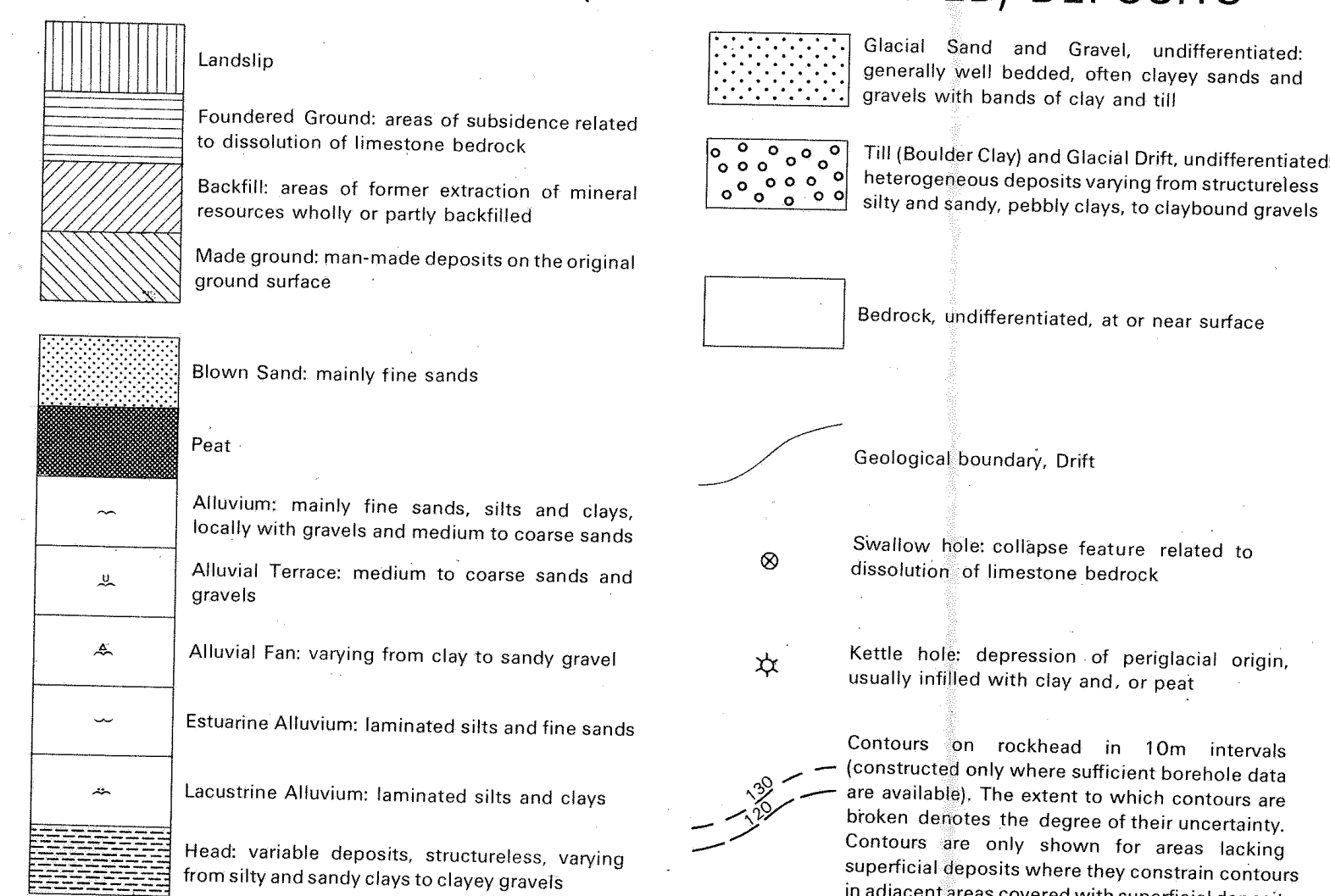
Horizontal Scale 1:25 000, Vertical Scale twice the horizontal



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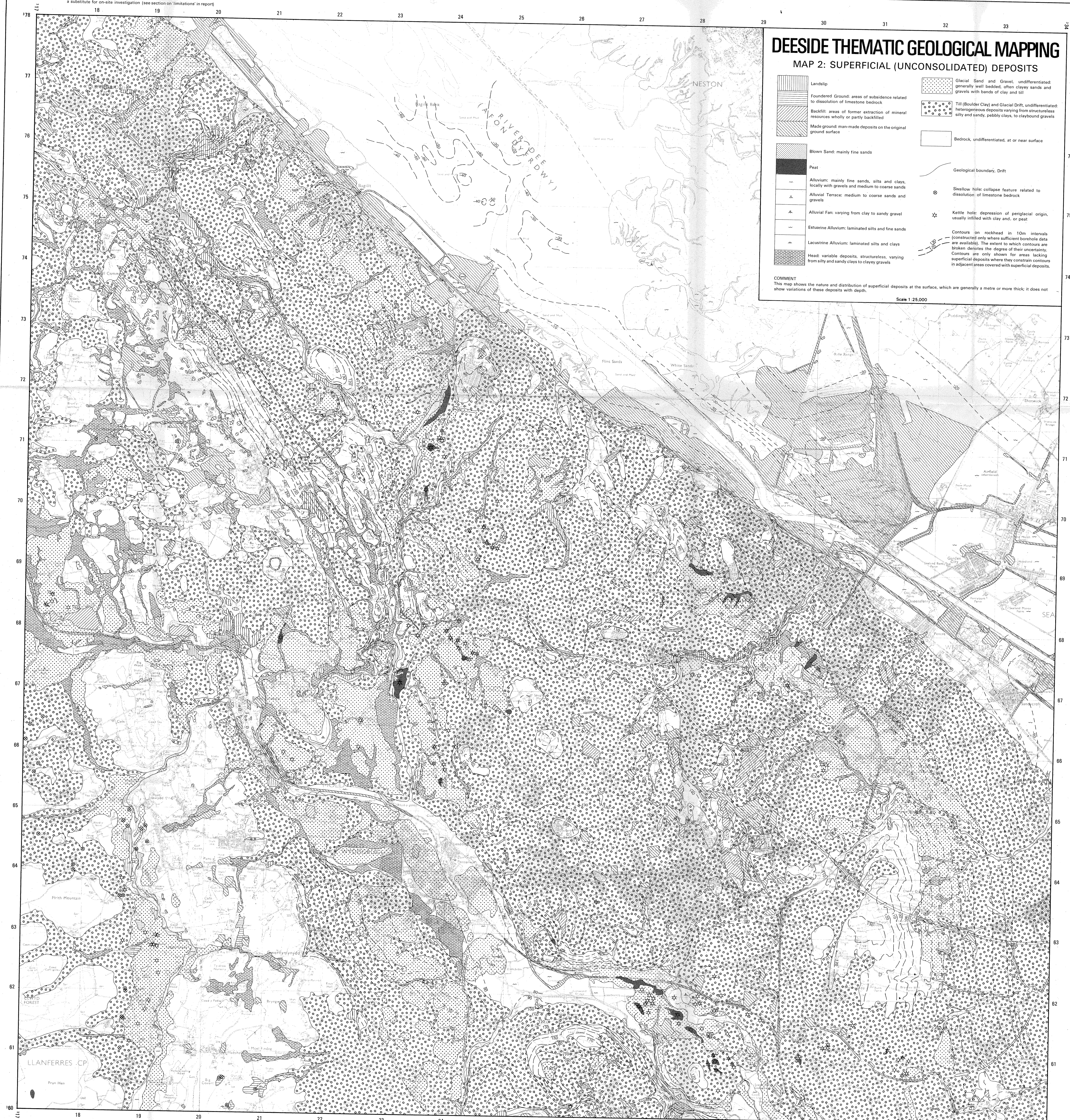
DEESIDE THEMATIC GEOLOGICAL MAPPING

MAP 2: SUPERFICIAL (UNCONSOLIDATED) DEPOSITS



COMMENT
This map shows the nature and distribution of superficial deposits at the surface, which are generally a metre or more thick; it does not show variations of these deposits with depth.

Scale 1:25,000



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This map is only to be used for preliminary studies and is not intended as a substitute for on-site investigation (see section on 'limitations' in report)

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MAP 3: BOREHOLES, ROCKHEAD AND THICKNESS OF SUPERFICIAL DEPOSITS

Borehole: superscript indicates height of drift/ solid interface (rockhead) above Ordnance Datum, subscript in brackets indicates total drift thickness. Where the borehole did not penetrate to rockhead, the depth to rockhead is indicated as being lower than the stated figure (eg. ^{3.96} and the drift thickness is indicated as being greater than the stated figure (eg. ₈).

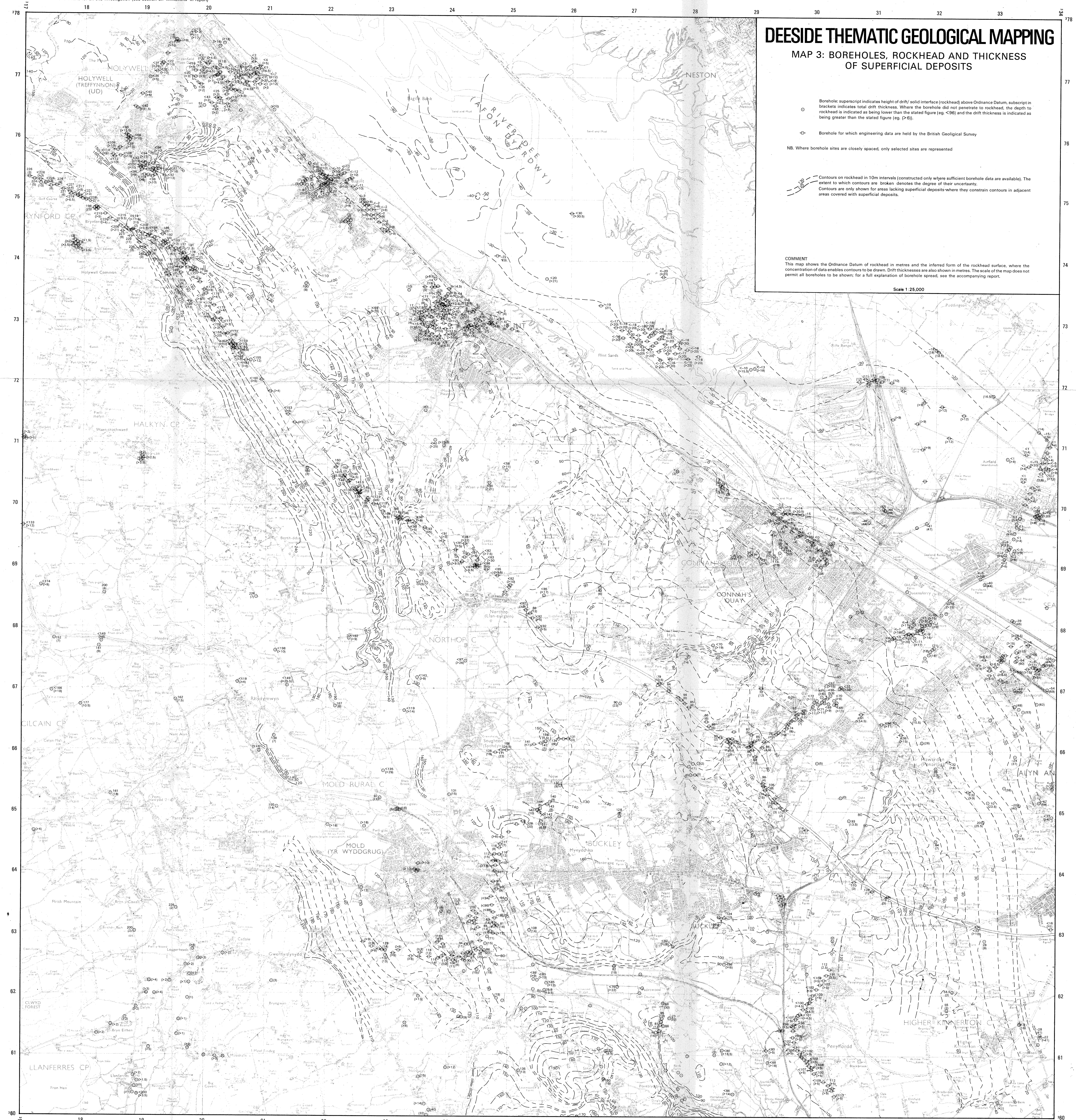
○ Borehole for which engineering data are held by the British Geological Survey

NB. Where borehole sites are closely spaced, only selected sites are represented

Contours on rockhead in 10m intervals (constructed only where sufficient borehole data are available). The extent to which contours are broken denotes the degree of their uncertainty. Contours are only shown for areas lacking superficial deposits where they constrain contours in adjacent areas covered with superficial deposits.

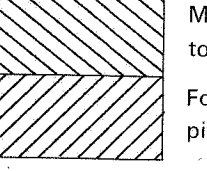
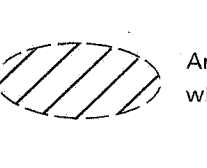
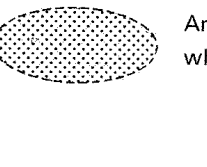
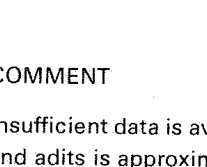
COMMENT
This map shows the Ordnance Datum of rockhead in metres and the inferred form of the rockhead surface, where the concentration of data enables contours to be drawn. Drift thicknesses are also shown in metres. The scale of the map does not permit all boreholes to be shown, for a full explanation of borehole spread, see the accompanying report.

Scale 1:25,000



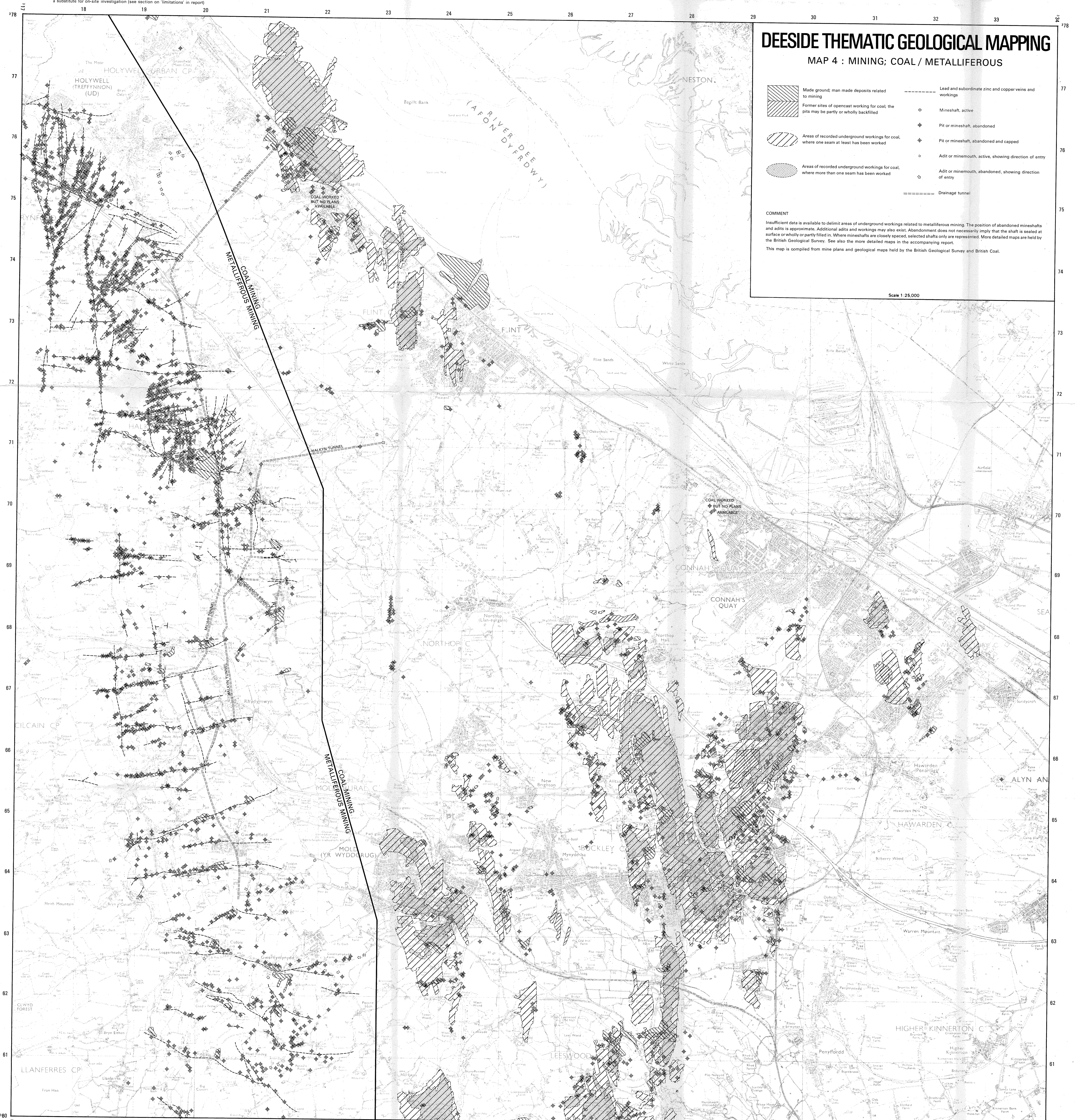
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MAP 4 : MINING; COAL / METALLIFEROUS

- | | | | |
|---|---|---|--|
|  | Made ground: man made deposits related to mining | | Lead and subordinate zinc and copper veins and workings |
|  | Former sites of opencast working for coal: the pits may be partly or wholly backfilled | | Mineshaft, active |
|  | Areas of recorded underground workings for coal, where one seam at least has been worked | | Pit or mineshaft, abandoned |
|  | Areas of recorded underground workings for coal, where more than one seam has been worked | | Pit or mineshaft, abandoned and capped |
| | | | Adit or minemouth, active, showing direction of entry |
| | | | Adit or minemouth, abandoned, showing direction of entry |
| | | | Drainage tunnel |

COMMENT
 Insufficient data is available to delimit areas of underground workings related to metalliferous mining. The position of abandoned mineshafts and adits is approximate. Additional adits and workings may also exist. Abandonment does not necessarily imply that the shaft is sealed at surface or wholly or partly filled in. Where mineshafts are closely spaced, selected shafts only are represented. More detailed maps are held by the British Geological Survey. See also the more detailed maps in the accompanying report.
 This map is compiled from mine plans and geological maps held by the British Geological Survey and British Coal.

Scale 1:25,000



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DEESIDE THEMATIC GEOLOGICAL MAPPING

MAP 5: RESOURCES (BEDROCK) - EXCEPT COAL/METALLIFEROUS

Limestone Resources

- Limestones of Cefn Mawr and Minera Formations
- Loggerheads and Llanarmon Limestones
- Leete Limestone

Other Resources

- Buckley Formation (clays)
- Chert

Sandstone Resources

- Quartzitic Sandstones
- Feldspathic Sandstones

COMMENTS

The limestones of the Cefn Mawr Formation (particularly in its upper part) and of the Minera Formation are interbedded with mudstones. The limestones themselves are of high purity and aggregate quality (see report). The limestone/mudstone mixture is utilised in the manufacture of cement. The Loggerheads and Llanarmon Limestones are of high purity and aggregate quality. The Leete Limestone is of variable quality and is not utilised.

The quartzitic sandstones are generally hard and locally may be of good aggregate quality. In the lower part of the sequence they commonly have a high carbonate content and in places have weathered to a silica sand. Moulding sand has been obtained from disaggregated sandstone at Kinnerton. The feldspathic sandstones are variable but locally may be of reasonable aggregate quality.

Main quarries and pits

- Active quarry or pit at time of survey
- Disused quarry or pit at time of survey
- Quarry or pit, completely backfilled
- Outline of major active quarries at time of survey
- Area of backfill (major quarries and pits only)

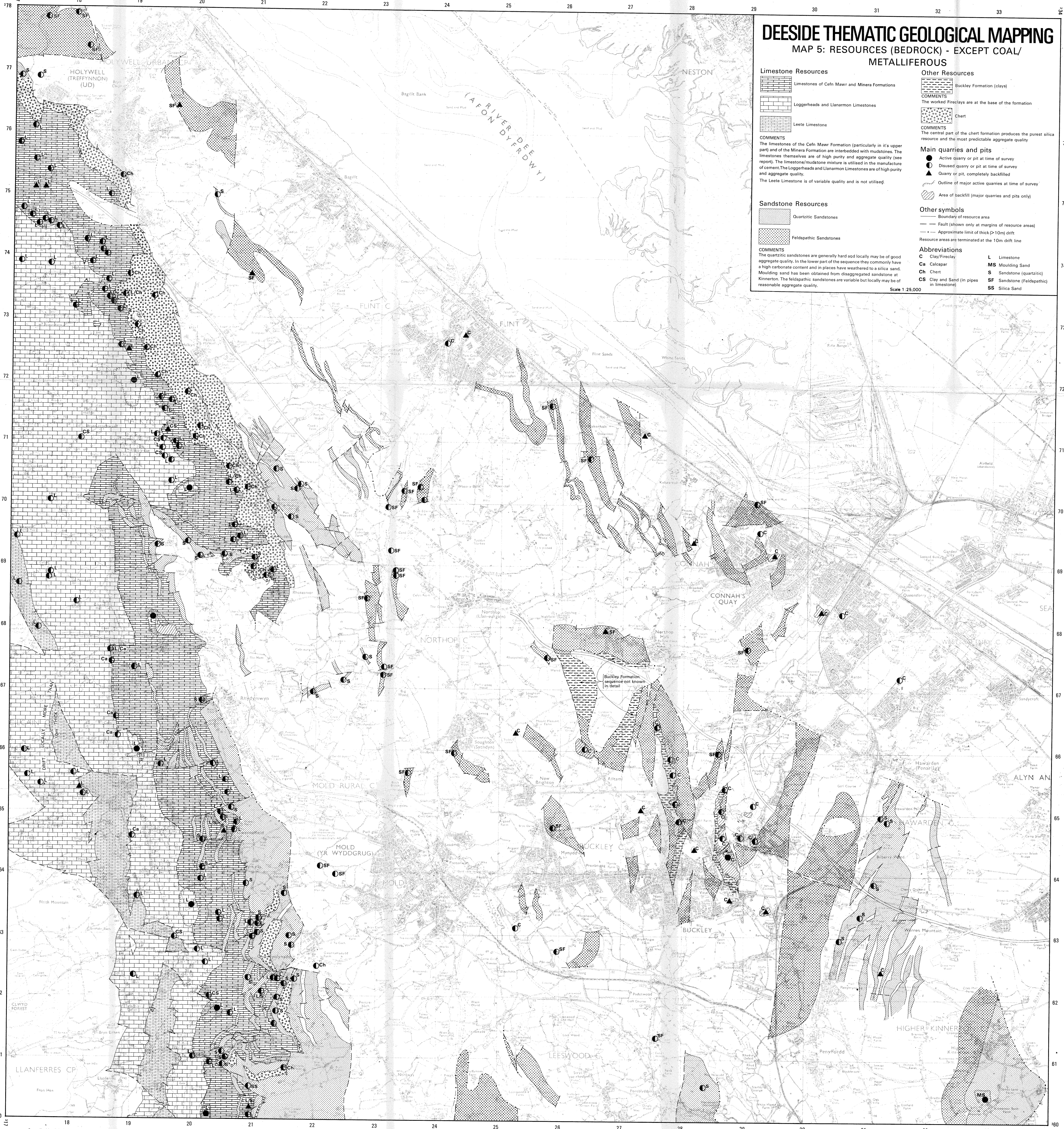
Other symbols

- Boundary of resource area
- Fault (shown only at margins of resource areas)
- Approximate limit of thick (>10m) drift
- Resource areas are terminated at the 10m drift line

Abbreviations

C	Clay/Fireclay	L	Limestone
Ca	Calcepar	MS	Moulding Sand
Ch	Chert	S	Sandstone (quartzitic)
CS	Clay and Sand (in pipes in limestone)	SF	Sandstone (feldspathic)
		SS	Silica Sand

Scale 1:25,000



Compiled by S.D.G. Campbell and B.A. Hains, British Geological Survey, Aberystwyth. F.G. Lamine, OBE, Director, British Geological Survey.

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Base map reproduced from the Ordnance Survey maps

The production of this map was partly funded by the Department of the Environment on behalf of the Welsh Office.

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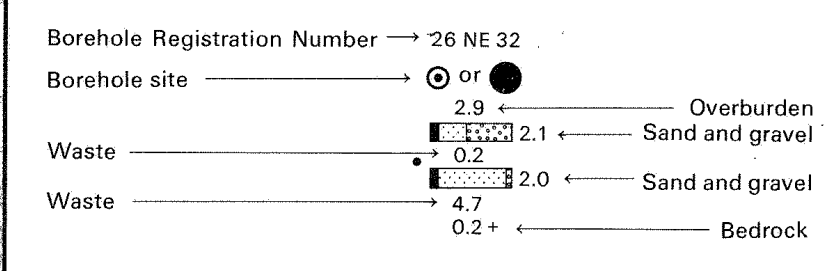
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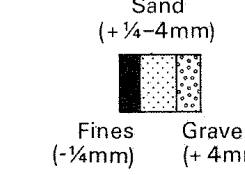
MAP 6: RESOURCES - SAND AND GRAVEL

- Area of potentially workable sand and gravel at surface, generally exceeding 1m in thickness
- Approximate extent of potentially workable sand and gravel beneath overburden
- Sand and gravel either not potentially workable or absent
- Probable limit of potentially workable sand and gravel beneath overburden
- Borehole drilled under contract PECD/1/187 (Deeside)
- Industrial Minerals Assessment Unit borehole (Ball and Adlam 1982)
- Other borehole (thickness of sand and gravel shown)
- Pit, active at time of survey
- Pit, disused at time of survey
- Pit, completely backfilled
- Area of backfill, major pits only

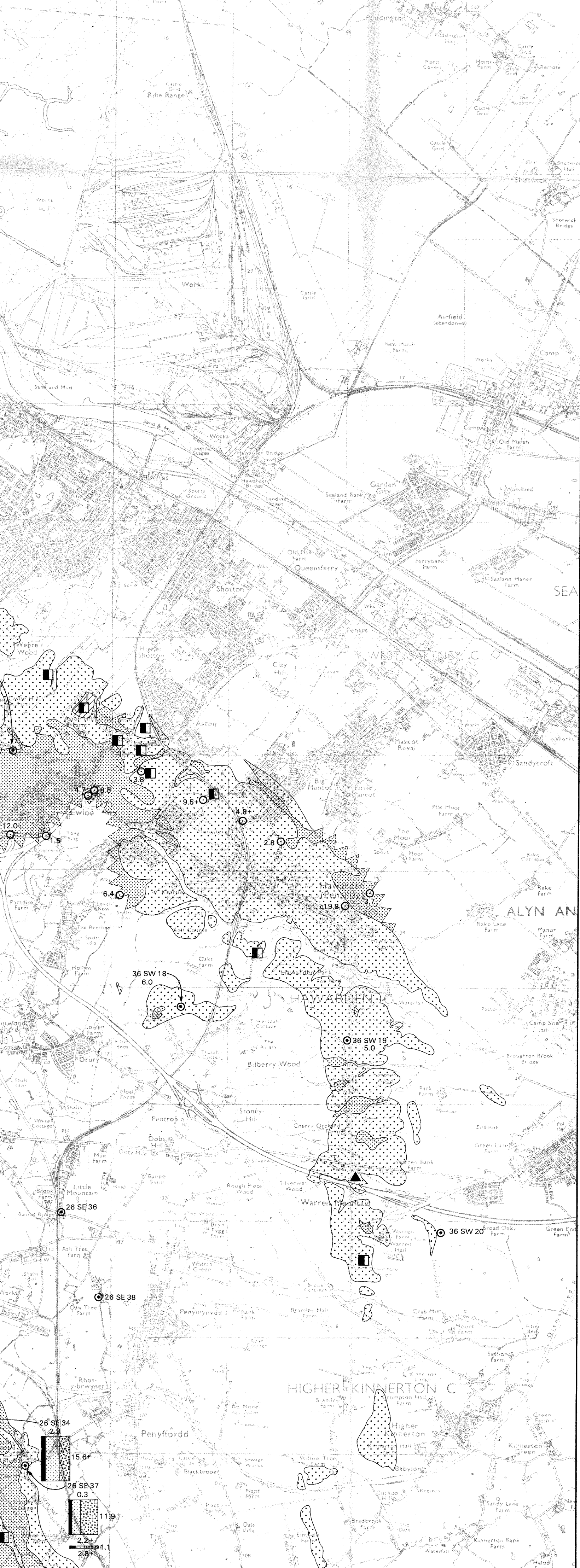
Grading Diagram for Contract and IMAU Boreholes



The height of the diagram is proportional to the thickness of sand and gravel. The + sign indicates that the base of the deposit was not reached. The widths of the divisions show the proportions of Fines, Sand and Gravel, but small amounts of gravel may be omitted or exaggerated.



Scale 1:25,000



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MAP 7 : HYDROGEOLOGY AND WATER SUPPLY

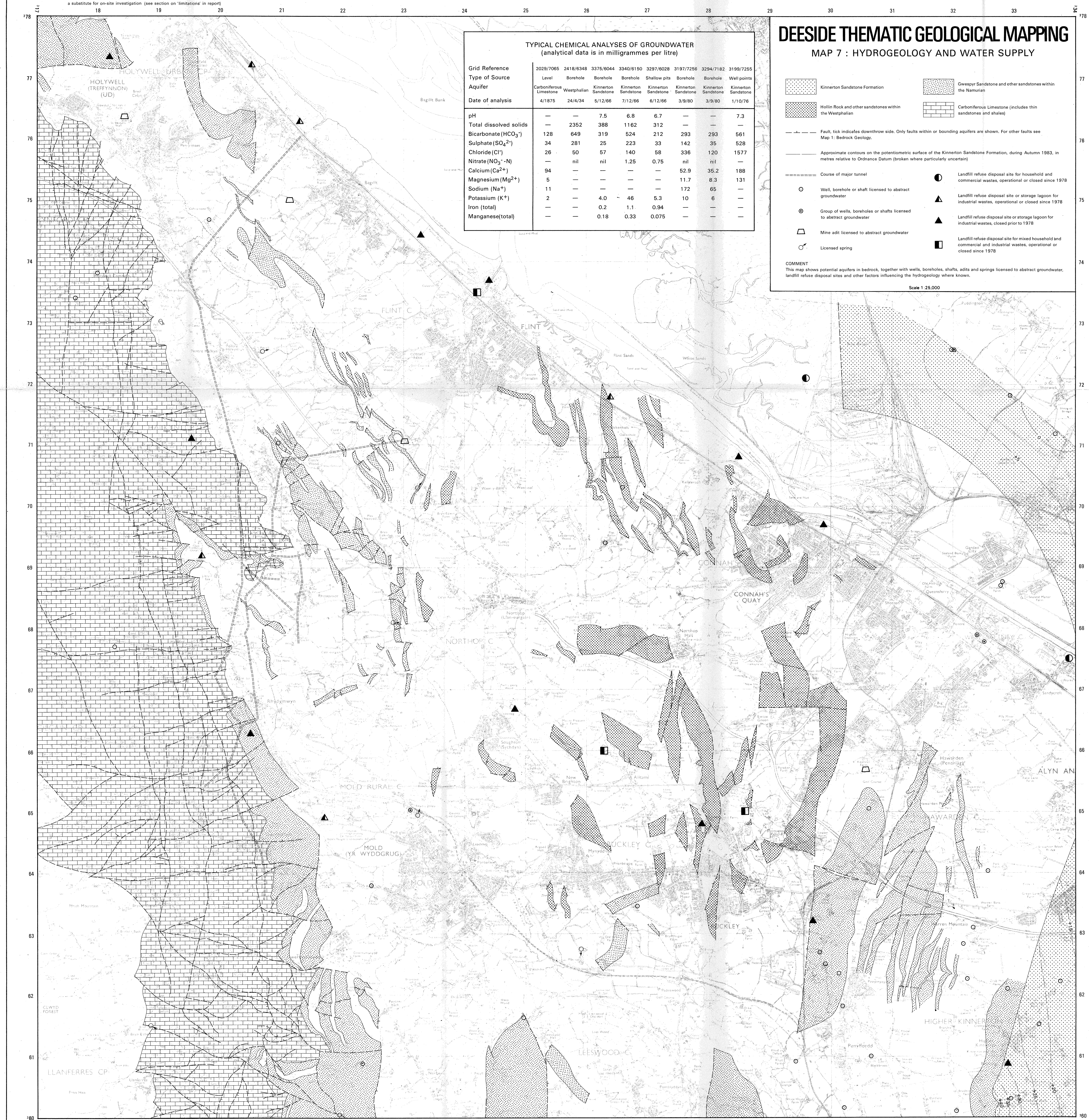
TYPICAL CHEMICAL ANALYSES OF GROUNDWATER (analytical data is in milligrammes per litre)

Grid Reference	2029/7065	2418/6348	3375/6044	3340/6150	3297/6028	3197/7256	3294/7182	3198/7255
Type of Source	Level	Borehole	Borehole	Borehole	Shallow pits	Borehole	Borehole	Well points
Aquifer	Carboniferous Limestone	Westphalian	Kinnerton Sandstone	Kinnerton Sandstone	Kinnerton Sandstone	Kinnerton Sandstone	Kinnerton Sandstone	Kinnerton Sandstone
Date of analysis	4/1875	24/4/34	5/12/66	7/12/66	6/12/66	3/9/80	3/9/80	1/10/76
pH	—	—	7.5	6.8	6.7	—	—	7.3
Total dissolved solids	—	2352	388	1162	312	—	—	—
Bicarbonate (HCO ₃ ⁻)	128	649	319	524	212	293	293	561
Sulphate (SO ₄ ²⁻)	34	281	25	223	33	142	35	528
Chloride (Cl ⁻)	26	50	57	140	58	336	120	1577
Nitrate (NO ₃ ⁻ -N)	—	nil	nil	1.25	0.75	nil	nil	—
Calcium (Ca ²⁺)	94	—	—	—	—	52.9	35.2	188
Magnesium (Mg ²⁺)	5	—	—	—	—	11.7	8.3	131
Sodium (Na ⁺)	11	—	—	—	—	172	65	—
Potassium (K ⁺)	2	—	4.0	46	5.3	10	6	—
Iron (total)	—	—	0.2	1.1	0.94	—	—	—
Manganese (total)	—	—	0.18	0.33	0.075	—	—	—

- Kinnerton Sandstone Formation
- Gwespys Sandstone and other sandstones within the Namurian
- Hollin Rock and other sandstones within the Westphalian
- Carboniferous Limestone (includes thin sandstones and shales)
- Fault, tick indicates downthrow side. Only faults within or bounding aquifers are shown. For other faults see Map 1: Bedrock Geology.
- Approximate contours on the potentiometric surface of the Kinnerton Sandstone Formation, during Autumn 1983, in metres relative to Ordnance Datum (broken where particularly uncertain)
- Course of major tunnel
- Well, borehole or shaft licensed to abstract groundwater
- Group of wells, boreholes or shafts licensed to abstract groundwater
- Mine adit licensed to abstract groundwater
- Licensed spring
- Landfill refuse disposal site for household and commercial wastes, operational or closed since 1978
- Landfill refuse disposal site or storage lagoon for industrial wastes, operational or closed since 1978
- Landfill refuse disposal site or storage lagoon for industrial wastes, closed prior to 1978
- Landfill refuse disposal site for mixed household and commercial and industrial wastes, operational or closed since 1978

COMMENT
This map shows potential aquifers in bedrock, together with wells, boreholes, shafts, adits and springs licensed to abstract groundwater, landfill refuse disposal sites and other factors influencing the hydrogeology where known.

Scale 1:25,000



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