Figure A1 Warwickshire Mineral Resources map (published 1999)

British Geological Survey

DETR Environment Transport Regions

WARWICKSHIRE / WEST MIDLANDS

(comprising Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton)

A Summary of Mineral Resource Information for Development Plans

Mineral Resources

Scale 1:100 000

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AIMS AND LIMITATIONS

The purpose of the maps and associated reports in this series is to show the broad distribution of those mineral resources which may be of current or potential economic interest and to relate these to selected nationally-recognised planning designations. The maps are intended to assist in the consideration and preparation of development plan policies in respect of mineral extraction and the protection of important mineral resources against sterilisation. They bring together a wide range of information, much of which is scattered and not always available in a convenient form.

The maps have been produced by collation and interpretation of mineral resource data principally held by the British Geological Survey. Information on the extent of mineral planning permissions has been obtained from the relevant Mineral Planning Authority (MPA). Some of these permissions may have been granted for areas of land which are unlikely to be worked because of other planning factors. Further information on national planning designations has been obtained from the appropriate statutory body (Countryside Commission, English Nature and English Heritage). For further information the relevant body should be contacted.

The mineral resource data presented are based on the best available information, but are not comprehensive and their quality is variable. The inferred boundaries shown are, therefore, approximate. Mineral resources defined on the map delineate areas within which potentially workable minerals may occur. These areas are not of uniform potential and also take no account of planning constraints that may limit their working. The economic potential of specific sites can only be proved by a detailed evaluation. Mineral resources in areas of existing or proposed development are unlikely to be available for future working. Extensive areas are shown as having no mineral resource potential, but some isolated mineral workings may occur in these areas. The presence of these operations generally reflect very local or specific situations which are referred to in the accompanying report.

The maps are intended for general consideration of mineral issues and not as a source of detailed information on specific sites. The maps should not be used to determine individual planning applications or in taking other decisions on the acquisition or use of a particular piece of land, although they may give useful background information which sets a specific proposal within context.

SAND AND GRAVEL

Superficial deposits

- River sand and gravel resources
- Concealed river sand and gravel resources (only within areas assessed by BGS)
- Glacial sand and gravel resources
- Concealed glacial sand and gravel resources (only within areas assessed by BGS)

Bedrock deposits

- Outcrop of Kidderminster Formation (formerly 'Bunter Pebble Beds') } Triassic, Sherwood Sandstone Group
- Boundaries of areas assessed for sand and gravel at the indicated resource level

LIMESTONE

- Ironstone (Marlstone Rock Bed) } Jurassic
- Much Wenlock Limestone } Silurian

SANDSTONE

- Hartshill Sandstone } Cambrian

IGNEOUS ROCK

- Dolerite } Carboniferous
- Diorite (hosted by Stockingford Shale) } Ordovician
- Charnian volcanics and minor intrusives } Precambrian

COAL

- Areas of shallow coal (Warwickshire and South Staffordshire Coalfield)
- Opencast coal: Worked area

COAL LICENCE AREAS (as at July 1997)

Source: The Coal Authority

- Underground mine and Opencast coal site (producing sites)

CLAY

- Etruria Formation: principal brick clay resource

MINERAL PLANNING PERMISSIONS (as at 1.11.98)

Source: Mineral Planning Authorities

- Mineral planning permission (valid and expired)

MINERAL WORKINGS

- ▲ Daw Mill — Active underground mine site
- Marsh Farm — Active mineral site
- *Darby's Hill* — Inactive, worked-out and/or restored site

Mineral commodity

Lst	Limestone	**Sg**	Sand and Gravel
Sst	Sandstone	**Si**	Silica Rock
Ig	Igneous Rock	**SiS**	Silica Sand
Istn	Ironstone	**Fr**	Fireclay
Co	Coal		
Cl	Common clay and shale		

ENVIRONMENTAL DESIGNATIONS

- Area of Outstanding Natural Beauty (Cotswolds)
- Site of Special Scientific Interest
- National Nature Reserve
- \+ Scheduled Monument

ADMINISTRATIVE AREAS

- Mineral Planning Authority
- District

Limestone

Limestone of Silurian age was worked extensively in the Walsall and Dudley areas as an important source of metallurgical flux, agricultural lime and hydraulic lime. Workings were both at outcrop and underground, and reached their peak in the 19th Century.
Depletion and sterilisation by urbanisation has meant that working of this material has ceased. This limestone is shown on the map because it is still worked as a source of aggregate in adjacent areas and because of its historical importance.

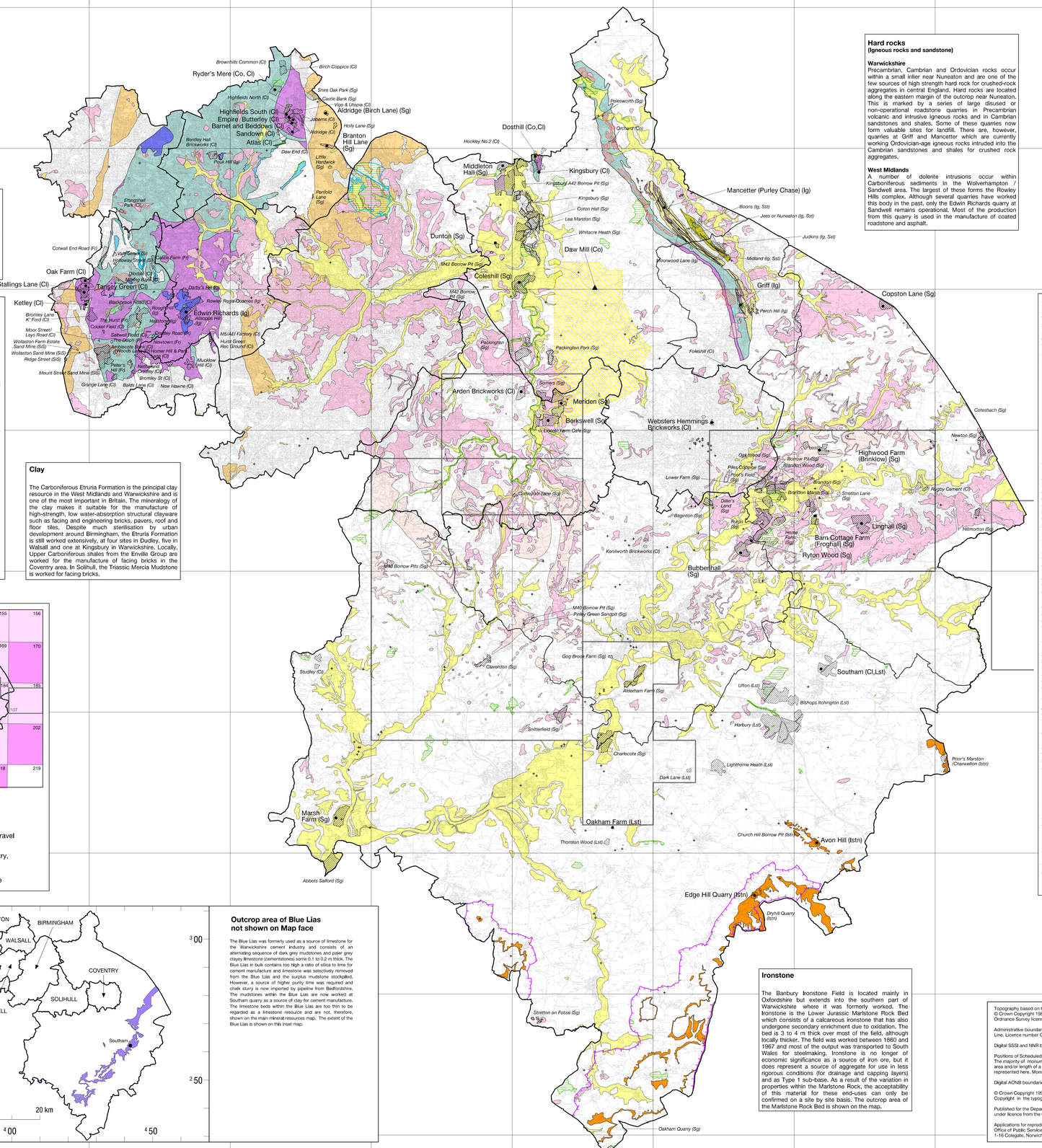
Coal

Warwickshire Coalfield
The Coal Measures of the Warwickshire Coalfield are preserved in a north-south trending syncline, that extends from Tamworth south to beyond Kenilworth. The coalfield is bounded to the west by the Western Boundary Fault System, to the north-east by outcrop and to the south-east by incrop below the Trias. The outcrop of the exposed coalfield follows the northern and north-eastern perimeter of the syncline forming a narrow belt, typically no more than a kilometer wide. The succession includes coal seams in the Lower Coal Measures, and the important Thick Coal group in the Middle Coal Measures. Output from the coalfield reached its highest level in 1939 when 5.8 million tonnes were produced from 20 mines. The only deep mine which remains in production in the coalfield is the pit at Daw Mill (Coleshill), Coventry Colliery, which worked the Thick Coal to the north-west of Coventry, closed in 1996. Opencast mining was undertaken along much of the length of the outcrop, mainly in the post-war period. The only remaining opencast coal site in the coalfield is at Dosthill near Tamworth. The opencast resource envelope is defined as the outcrop of the Lower and Middle Coal Measures. The overburden ratio increases rapidly downdip and is likely to preclude significant workings beneath younger cover rocks.

South Staffordshire Coalfield
Coal-bearing strata of the South Staffordshire Coalfield underlie much of Walsall, Dudley and Wolverhampton. Peak production was reached in the 19th Century from both deep and opencast mining and was the basis of the economic prosperity of the Black Country. Mining has declined with urbanisation and only one opencast site now remains in the area (Walsall), although some other sites have been worked in the recent past as part of land reclamation schemes. Coal has generally been worked from the Thick Coal or immediately above and below it.

Clay

The Carboniferous Etruria Formation is the principal clay resource in the West Midlands and Warwickshire and is one of the most important in Britain. The mineralogy of the clay makes it suitable for the manufacture of high-strength, low water-absorption structural clayware such as facing and engineering bricks, pavers, roof and floor tiles. Despite much sterilisation by urban development around Birmingham, the Etruria Formation is still worked extensively, at four sites in Dudley, five in Walsall and one at Kingsbury in Warwickshire. Locally, Upper Carboniferous shales from the Enville Group are worked for the manufacture of facing bricks in the Coventry area. In Solihull, the Triassic Mercia Mudstone is worked for facing bricks.



Hard rocks
(Igneous rocks and sandstone)

Warwickshire
Precambrian, Cambrian and Ordovician rocks occur within a small inlier near Nuneaton and are one of the few sources of high strength hard rock for crushed-rock aggregates in central England. Hard rocks are located along the eastern margin of the outcrop near Nuneaton. This is marked by a series of large disused or non-operational roadstone quarries in Precambrian volcanic and intrusive igneous rocks and in Cambrian sandstones and shales. Some of these quarries now form valuable sites for landfill. There are, however, quarries at Griff and Mancetter which are currently working Ordovician-age igneous rocks intruded into the Cambrian sandstones and shales for crushed rock aggregates.

West Midlands
A number of dolerite intrusions occur within Carboniferous sediments in the Wolverhampton / Sandwell area. The largest of these forms the Rowley Hills complex. Although several quarries have worked this body in the past, only the Edwin Richards quarry at Sandwell remains operational. Most of the production from this quarry is used in the manufacture of coated roadstone and asphalt.

Sand and gravel

Two main categories of sand and gravel are defined: (i) Superficial (drift) deposits, subdivided into river sand and gravel, and glacial sand and gravel and (ii) Bedrock (solid) deposits represented by pebbly sandstones of the Triassic Sherwood Sandstone Group.

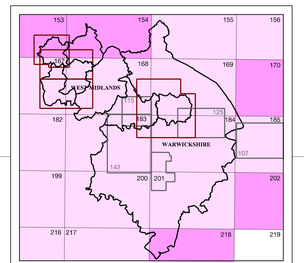
Superficial deposits:
Parts of the area assessed for sand and gravel by BGS and other resource surveys are identified on the map. Resources shown here are taken from these maps. In these areas, the possible extent of glacial sand and gravel concealed beneath till is shown. These areas were defined by overburden to mineral ratios. Outside these areas, available data are more limited. Only exposed sand and gravel is defined, although resources concealed beneath till may be extensive in some places. In addition, narrow (<200 m) spreads of alluvial deposits are mainly excluded from the map unless associated with glacial sand and gravel. Their limited width is likely to preclude economic working of any sand and gravel present.

Warwickshire
Post-glacial river terrace and alluvial deposits are developed along major river valleys. They are mainly associated with the rivers Avon and Tame. The deposits comprise relatively gravel-rich sand and gravel. Narrow (<200 m) spreads of alluvial deposits are generally excluded from the map unless associated with glacial sand and gravel. In some areas in the east of the County, around Warwick and Coventry, terrace like spreads of sand and gravel occur and have been mapped as glacial sand and gravel (the Hillmorton Sand and Gravel and the Baginton Sand and Gravel). It seems likely that both of these have been deposited by river action and thus they are included in this report and on the map, with the river gravels. Extensive extraction has occurred where the terrace gravels are located close to urban areas. Not all the spreads of river gravels shown on the accompanying map are likely to be of commercial value, some being too limited in extent, thickness or quality.

Glacial sand and gravel deposits occur in several parts of the county in association with spreads of till (boulder clay) and other glacial deposits. These deposits are typically very variable in extent, thickness and lithology but such accumulations may represent valuable sand and gravel resources. In general, glacial deposits are likely to be less than 10 m thick but may locally exceed 20 m thickness where they infill hollows and channels scoured into the underlying rock surface. The Wolston Sand and Gravel, Shawell Sand and Gravel, Anker Sand and Gravel and the Dunsmore Gravel in the east of the county are sheet-like deposits of sand and gravel, commonly 3–4 m thick.

West Midlands
As in Warwickshire, post-glacial river terrace and alluvial deposits are developed along the major river valleys in the West Midlands. These include the Tame, Rea and Blythe. Urban development along these valleys in the west of the area has sterilised much of the resource. River sand and gravel is worked from the Blythe valley at Berkswell and is blended with glacial sand and gravel worked on the same site. Urban development has also sterilised much of the glacial sand and gravel in this area. The Baginton Sand and Gravel is worked at Berkswell and at Meriden, both in the east of the area between Solihull and Coventry.

Bedrock deposits:
Bedrock resources are confined to the pebble-bearing parts of the Sherwood Sandstone Group (formerly termed the 'Bunter Pebble Beds'). In the West Midlands this comprises the Kidderminster Formation. Although urban development has sterilised much of this resource in the West Midlands area, it is currently worked at two locations near Walsall. Quantitative data on the thickness, extent and pebble content of conglomerate horizons within these formations are not available. Where devoid of pebbles, the Sherwood Sandstone is generally of limited value as an aggregate resource because of its fine particle-size. However, locally it may provide an important source of building sand.



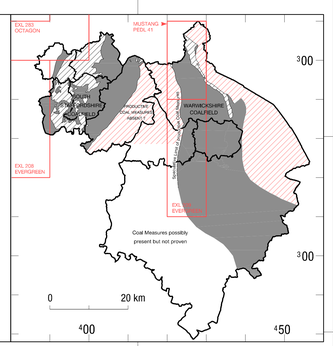
- 1:50 000 map published
- 1:63 360 map published
- 1:25 000 map published (Sand and Gravel Resource Map)
- 1:25 000 map published (Black Country, Wolverhampton and Coventry Maps)
- Modern geological maps not available

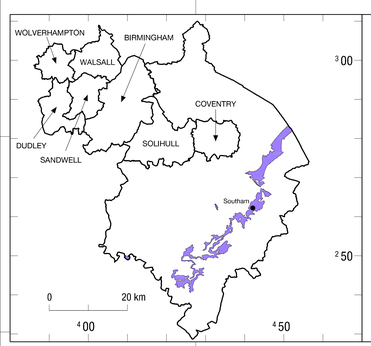
HYDROCARBONS

Although the overall potential for the discovery of oil and gas fields in Warwickshire and West Midlands is low, the Coal Measures have the highest potential as source rocks. Despite this, extensive drilling for coal in the north has not revealed any significant oil and gas finds. The best prospects are likely to be in concealed Coal Measures in south-west Warwickshire. No exploration wells specifically targeted at gas and oil have been drilled in Warwickshire or the West Midlands. The exposed part of the Warwickshire Coalfield can probably be ruled out as a coalbed methane prospect, as methane values are too low to be of commercial interest. It seems probable that the methane content of any coals in the concealed part of this coalfield will also be too low for commercial exploitation. The South Staffordshire coalfield also has low coalbed methane prospectivity, largely because it has been extensively mined. Despite this low potential, three areas within the Warwickshire and West Midlands are licenced to coalbed methane companies.

- County boundary
- Exposed Productive Coal Measures
- Concealed Productive Coal Measures
- Productive Coal Measures absent
- PEDL Petroleum Development and Exploration Licence issued under the Petroleum (Production) Act 1934 (as at November, 1998)
- EXL Exploration Licence issued under the Petroleum (Production) Act 1934 (as at November, 1998)

OCTAGON: Octagon (CBM) Ltd
EVERGREEN: Evergreen Resources (UK) Ltd
MUSTANG: Mustang Oil Ltd





Outcrop area of Blue Lias not shown on Map face

The Blue Lias was formerly used as a source of limestone for the Warwickshire cement industry and consists of an alternating sequence of dark grey mudstones and paler grey clayey limestone (cementstones) some 0.1 to 0.2 m thick. The Blue Lias in bulk contains too high a ratio of silica to lime for cement manufacture and limestone was selectively removed from the Blue Lias and the surplus mudstone stockpiled. However, a source of higher purity lime was required and chalk slurry is now imported by pipeline from Bedfordshire. The mudstones within the Blue Lias are now worked at Southam quarry as a source of clay for cement manufacture. The limestone beds within the Blue Lias are too thin to be regarded as a limestone resource and are not, therefore, shown on the main mineral resources map. The extent of the Blue Lias is shown on this inset map.

Ironstone

The Banbury Ironstone Field is located mainly in Oxfordshire but extends into the southern part of Warwickshire where it was formerly worked. The Ironstone is the Lower Jurassic Marlstone Rock Bed which consists of a calcareous ironstone that has also undergone secondary enrichment due to oxidation. The bed is 3 to 4 m thick over most of the field, although locally thicker. The field was worked between 1860 and 1967 and most of the output was transported to South Wales for steelmaking. Ironstone is no longer of economic significance as a source of iron ore, but it does represent a source of aggregate for use in less rigorous conditions (for drainage and capping layers) and as Type 1 sub-base. As a result of the variation in properties within the Marlstone Rock, the acceptability of this material for these end-uses can only be confirmed on a site by site basis. The outcrop area of the Marlstone Rock Bed is shown on the map.

Topography based on the Ordnance Survey 1:100 000 scale County maps.
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Digital SSSI and NNR boundaries © English Nature 1998

Positions of Scheduled Monuments at 1st April 1996 as supplied by English Heritage. The majority of monuments are plotted using a centred NGR symbol. Consequently the actual area and/or length of a monument protected by the legal constraints of scheduling cannot be represented here. Monuments scheduled since that date are not accounted for.

Digital AONB boundaries © Countryside Commission 1986

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