

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Office of the Deputy Prime Minister
Creating sustainable communities

WEST YORKSHIRE

(comprising Metropolitan Boroughs of Bradford, Calderdale, Kirklees and Wakefield and City of Leeds)

Mineral Resource Information in Support of National, Regional and Local Planning

Mineral Resources

Scale 1:100 000

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Digital cartography by N.A. Spencer, British Geological Survey, Published 2006.

This map comprises part of a summary of the 'Mineral Resources of Yorkshire and the Humber Region'.

For more information see www.mineraluk.com

BIBLIOGRAPHIC REFERENCE

McEvoy, F.M. and others. 2006. Mineral Resource Information for National, Regional and Local Planning: West Yorkshire comprising Metropolitan Boroughs of Bradford, Calderdale, Kirklees and Wakefield and City of Leeds. British Geological Survey Commissioned Report CR04172N.

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SAND & GRAVEL

Superficial deposits

- Sub-alluvial: Inferred resources
- River Terrace deposits
- Glacioluvial deposits
- Glaciolacustrine deposits

BRICK CLAY

- Brickclay and freeclay (coincident with areas of shallow coal)

LIMESTONE

- Dolomite and dolomitic limestone

SANDSTONE

- Carboniferous: selected sandstone units within the Millstone Grit and Pennine Coal Measures

COAL

- Area of shallow coal
- Opencast coal: worked area

COAL LICENCE AREAS (as at 01.02.06)

Source: The Coal Authority

- Deep mine

MINERAL PLANNING PERMISSION (as at 31.12.05)

Source: Mineral Planning Authorities

- Surface planning permission (valid and expired)
- Underground planning permission other than coal (valid and expired)

MINERAL WORKINGS

- Methley Active site
- Olley/Bridge Inactive (including yet to be worked), worked-out and/or restored site

Mineral commodity

AMM Abandoned Mine Methane	Lst Limestone, including dolomite
Cl Clay & Shale	Min Mineral unspecified
Co Coal	San Sand
CR Crushed Rock	Sg Sand and Gravel
Fr Fireclay	SIR Silica Rock
Gan Ganister	Sst Sandstone
Active rail aggregate depot	Active underground mine

ENVIRONMENTAL DESIGNATIONS (as at 01.01.06)

- National nature conservation designations (SSSIs and NNfEs)
- International nature conservation designations (SACs, SPAs and Ramsar sites)
- National Parks and Peak District (part)
- Scheduled Monument

ADMINISTRATIVE AREAS

- Mineral Planning Authority

Aims and Limitations

The purpose of the maps 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-registered planning designations. The maps are intended to assist in the consideration and preparation of development site plans in respect of mineral extraction and the protection of important mineral resources against deterioration. 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 the collection 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 lapsed or expired. The status of individual areas can be ascertained from the appropriate MPA. Locations of national planning designations have been obtained from the appropriate Natural Resources Agency, 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 mineral resources shown are therefore approximate. Mineral resources defined on the maps do not constitute an endorsement or approval of mineral extraction. The economic potential of specific sites can only be assessed by a detailed evaluation programme. Such an investigation is essential prior to submitting a planning application for mineral working. Extensive areas are shown as having no mineral resource potential, but some isolated resource workings may occur in these areas. The presence of these operations generally reflect very local specific situations.

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 to bring other decisions on the acquisition or use of a particular piece of land, although they may give useful background information which aids a specific proposal under consideration.

BRICK CLAY, including freeclay

Brick clay is the term used to describe clay used predominantly in the manufacture of bricks and, to a lesser extent, roof tiles, clay pipes and decorative stoneware. These clays are sometimes also used in cement manufacture as a source of construction fill for filling and leveling landfill sites. The suitability of a clay for the manufacture of bricks depends principally on its behaviour during shaping, drying and firing. They will collapse if pressed to the brick shape as strength and frost resistance are, respectively, an architectural requirement.

Most firing bricks, engineering bricks and related clay-based building products are manufactured in large automated factories. These require a high capital investment and are increasingly dependent on the availability of raw materials with predictable and consistent firing characteristics in order to achieve high yields of salable products. Blending different clays is achieved in order to produce a wide range of fired clays and textures in an increasingly common feature in the brick industry. Consistency of product is essential to permit importation.

Brick clay has been worked extensively in the past, mostly from a number of mudstone horizons in the Pennine Coal Measures, and today the Pennine Coal Measures remain the principal brick clay resource in northern England. Resources of brick clay are extensive in West Yorkshire and there are several large production units for facing bricks, near Elstall, Leeds, Dewsbury, Normanton and Wakefield. Several quarries in the vicinity of Garsy, Dale and Harthill within the Pennine Coal Measures mudstone are used for the manufacture of vitrified clay pipes at a plant in South Yorkshire. The suitability of Carboniferous mudstones for brick manufacture depends, in part, on their carbon and sulphur contents. Both may lead to firing problems and sulphur may also give unsatisfactory emission levels. Blending of clays may reduce these problems. The location of brick clay is, principally, the result of groundwaters in the Pennine Coal Measures, rather than on factors simply of resource quality. Some 257,000 tonnes of brick clay was produced in West Yorkshire in 2004.

Freeclays typically occur beneath coal seams and resources are confined to coal-bearing strata. The close association of freeclay and coal means that opencast coal sites are often one of the few viable sources. Resources of freeclay are thus coincident with opencast coal resources. Although originally valued as an refractory raw material, freeclay is now valued by the brick industry for a combination of good mechanical characteristics allied to its cream-buff-firing characteristics. However, not all freeclays are suitable for buff brick production because of the presence of impurities.

In the Halifax-Bradford-Leeds area all the freeclays from the Soft Bed to the Better Bed have been worked in the past by shallow mining and surface extraction. Today the only freeclay of economic importance is that associated with the Hard Bed Coal. The Hard Bed freeclay is a fine-grained clay which, despite a relatively low alumina content, is unusual in having high silica and iron contents. The Hard Bed freeclay is extensively worked on a small scale from both the Shiden No.2 Mine in the Halifax area and the Dog and Gun Quarry at Garsy. It is layered and used for the production of vitrified clay pipes at a plant in South Yorkshire. The advantage of siliceous clay with a low iron content is its ability to derive silica from the glass without causing contamination. Freeclay is also produced in association with brick clay sites near Harthill, Dale and Normanton for use in pipe manufacture. In 2003, the total production of freeclay in West Yorkshire was 10,000 tonnes.

BUILDING STONE

Historically the area has been the UK's most prolific source of Carboniferous building sandstones and has also produced a number of other building stones for local use. The sandstones are generally marketed under the generic term 'York Stone'.

The oldest rocks that have been used for building are the hard, quartzite sandstones of the Millstone Grit Group. They have been worked for rock stone, sub-stone, flagstone and roofing stone throughout the area. Extensive quarrying of the main sandstone beds has taken place since the late 19th century, but is now confined to the quarrying of the Pennine Coal Measures. The sandstone of the Pennine Coal Measures is a fine-grained, micaceous sandstone, which has been worked in the area since the late 19th century. The sandstone of the Pennine Coal Measures is a fine-grained, micaceous sandstone, which has been worked in the area since the late 19th century.

PLANNING PERMISSIONS FOR MINERAL EXTRACTION

The extent of all known active and former planning permissions for mineral working is shown on the map, irrespective of their current planning or operational status. The polygons were supplied as digital files by Calderdale, Kirklees and Wakefield Metropolitan Borough Councils and by Leeds City Council, and also were digitised by BGS from Planning Designations, which were provided by City of Bradford Metropolitan Borough Council. In addition, planning permission information was digitised from Ministry of Housing and Local Government maps for the area and incorporated in the data. This data has been checked and amended by the local authorities shown below. Any queries regarding the data shown should be directed to those authorities at the addresses given below. The polygons cover active, former and restored mineral workings and, occasionally, unworked deposits.

Contact addresses:
City of Bradford Metropolitan Borough Council, Planning Division, Transportation & Planning Service, 3rd Floor, Jacob's Well, Manchester Road, Bradford BD1 3JW, Tel: 01274 753776, Fax: 01274 722846, www.bradford.gov.uk
Calderdale Metropolitan Borough Council, Environmental Services Department, Northgate House, Northgate, Halifax HX11 1UN, Tel: 01422 872717, Fax: 01422 882828, www.calderdale.gov.uk
Kirklees Metropolitan Borough Council, Planning Services Department, PO Box 893, Civic Centre, Huddersfield HD1 2JR, Tel: 01484 221951, Fax: 01484 221885, www.kirklees.gov.uk
Leeds City Council, Department of Planning, Merrion House, 110 Merrion Street, Leeds LS2 8BQ, Tel: 011 2347 8230, www.leeds.gov.uk
Wakefield Metropolitan Borough Council, Registration Department, Newby Bus, Wakefield WF1 2TA, Tel: 01924 206900, Fax: 01924 206950, www.wakefield.gov.uk

Planning Permissions in the Halifax area

1 Hatfield (Howards Freeclay Works) (Fr)
2 Wood Top (Upper Pule) (Sst)
3 Shiden No. 2 Mine (Fr)
4 Shiden Dale (Fr)
5 Springfield Mine (Black Hill) (Fr)
6 Black Hill Freeclay Mine (Fr)
7 Northwarren Hills (Top o' th' Hill) (Sst)
8 Shiden Park (Fr)
9 Mytholme Freeclay Mine (New Mytholme) (Fr)
10 New Mytholme (Fr)
11 Southwarren (Beacon Hill) (Fr)
12 Sunnydale (Fr)
13 South Edge (Sst, Fr)
14 Crosswell (Sst)
15 Halifax Freeclay Mine (Hill Top Brickworks) (Fr)
16 Sunnybank Farm (Sst)
17 Pond (Sst)
18 Waterbury (Shaking Dale) (Sst)
19 Pasture House (Sst)
20 Sunny Vale Freeclay Mine (Sst, Fr)
21 Birk Road (Home View) (Sst)
22 Watson (Sst)
23 Squire Hill (Sst)
24 Cromwell Works (Grove House) (Sst)
25 Cromwell (Sst)

26 Achday Freeclay Mine (Sst)
27 Calder Brickworks (Sangstrey Wood) (Cl)
28 Gooor Lane (Brooks Ltd, Brighouse Brick, Stone & Tiles Works) (Cl, Sst)
29 Elford Edge (Lower Edge) (Sst)
30 Elford Edge (New Delight) (Sst)
31 Southages (Sst)
32 Middle Dale (Five Acres) (Sst)
33 Calder (Victoria Freeclay Mine) (Fr, Cl)
34 Elford & Batters (Cl, Fr)
35 New Hall Freeclay Mine (Elford Mine) (Fr, St, Gar)
36 Calder Brickworks South (Cl)
37 Calder Brickworks (Cl)

38 Achday (Fr, Cl)
39 Elford Road (Sst)
40 Ashgrove Clay Works (Ashgrove Freeclay Mine) (Fr)
41 New Farm (Grove) (Sst)
42 Park Hook Freeclay Mine (Park Hook Farm) (Fr)
43 West Lane (Grange House) (Sst)
44 Sidsal Top (Cl)
45 Tinner's Lane (Fr)
46 Carver Hill (Fire Clay Works (Sidsal & Southwarren) (SR))
47 Pongate (Sst)
48 Stoney Brook (Fr)
49 Brighouse (Marsh Lane) (Fr)

50 Church Lane (Marsh Lane) (Sst)
51 Thumpas (Thumpas North) (Sst)
52 Long Lane (Slaten, Beacon Lodge) (Sst)
53 Hapworthine and Shiden Fire Clay Works (Shiden Hill Colliery) (Fr)
54 Shiden Valley Mine (Honey Green Works) (Fr)
55 Springfield (Fr)
56 Secot (Sst)
57 Ringby Park Spring (Sst)

Production of natural aggregates, 1979 - 2004

Sand and gravel total permitted reserves - not available (unworked)
Crushed rock total permitted reserves - 95.2 million tonnes (as at 31.12.05)

Year	Sand and gravel (Thousand tonnes)	Crushed rock (Thousand tonnes)
1979	1000	200
1980	1100	250
1981	1200	300
1982	1300	350
1983	1400	400
1984	1500	450
1985	1600	500
1986	1700	550
1987	1800	600
1988	1900	650
1989	2000	700
1990	2100	750
1991	2200	800
1992	2300	850
1993	2400	900
1994	2500	950
1995	2600	1000
1996	2700	1050
1997	2800	1100
1998	2900	1150
1999	3000	1200
2000	3100	1250
2001	3200	1300
2002	3300	1350
2003	3400	1400
2004	3500	1450

COAL

Part of the East Pennine Coalfield is covered by the central and north-eastern parts of West Yorkshire. The coal-bearing strata are of the Pennine Lower and Middle Coal Measures (Eppor Carboniferous) and generally dip to the east or south. Coal seams occur out of this basin, situated in the extreme east of the county where they are controlled by geologic folds, down to depths of 1000 m below Oldham Datum. Coal seams are numerous and many are developed at a regional scale. They vary laterally in both thickness and composition, chiefly by variation in the number of detrital layers present within the seams. Twenty-four seams are shown in the Lower Coal Measures and nine in the Middle Coal Measures. The seams are nearly continuous and the carboniferous value and rank of the coals locally remains substantial. Seams are generally of moderate thickness, with the most satisfactory part of the coalfield recorded as consistently high in sulphur. In recent years, underground production in Yorkshire has been concentrated in the Barnsley seam complex, a thick, relatively uniform seam with lower values of sulphur (1.0 per cent). In West Yorkshire, the Barnsley seam occurs along the south-eastern margin.

Following the closure of the Prince of Wales Mine near Pontefract in 2002, West Yorkshire is now only a modest producer of coal. From 1999 to 2004, total coal production in West Yorkshire has been 2.3 Mt to 0.3 Mt. The small Hay Royds Colliery, south of Shearwater, was the only operational underground coal seam producing at the end of 2005 and at opencast coal mining ceased during 2006. However, prospects for opencast coal remain.

Production of natural aggregates, 1999 - 2005

Year	Sand and gravel (Thousand tonnes)	Crushed rock (Thousand tonnes)
1999	1000	200
2000	1100	250
2001	1200	300
2002	1300	350
2003	1400	400
2004	1500	450
2005	1600	500

BGS maps covering West Yorkshire

1:25,000 maps published (Detailed Urban Assessment Sand and Gravel Resource Map)

1:63,000 or 1:50,000 maps published

Current digital availability of these sheets can be found on the British Geological Survey website www.bgs.ac.uk