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		BGS maps covering East Riding of Yorkshire, North Lincolnshire, North East Lincolnshire
	British Geological Survey Office of the Deputy Prime Minister	and Kingston upon Hull 54 55
	1835 NATURAL ENVIRONMENT RESEARCH COUNCIL	
		63 64 65
	HUMBERSIDE (comprising East Riding of Yorkshire, North	5
	Lincolnshire, North East Lincolnshire and	
70 -	City of Kingston upon Hull)	71 72 73
	Mineral Resource Information in Support of National, Regional and Local Planning	EAST RIDING OF YORKSHIRE
	Mineral Resources	KINGSTON
	Scale 1:100 000	79 80 5 81
	Compiled by D.J. Harrison, F.M. McEvoy, P.J. Henney, D.G. Cameron, E.J. Steadman, S.F. Hobbs, D.J. Evans, G.K. Lott, E.L. Bartlett, M.H. Shaw and D.E. Highley. Project Leader: D.E. Highley.	most of the second of the seco
	Digital cartography by N.A. Spencer, British Geological Survey. Published 2005.	Report 22 NORTH
	This map comprises part of a summary of the 'Mineral Resources of Yorkshire and the Humber Region'. For more information see www.mineralsUK.com	LINCOLNSHIRE
		Report 92 Report 29
60	BIBLIOGRAPHIC REFERENCE Harrison, D J, and 10 others. 2005. Mineral Resource Information for National, Regional and Local Planning: Humberside (comprising East Riding of Yorkshire, North Lincolnshire, North East Lincolnshire and City of Kingston upon Hull). <i>British Geological Survey Commissioned</i>	Report 43 Report 33
60 -	Production of this map was commissioned and funded by the Office of the	88 6 89
	Deputy Prime Minister (Contract MP0677).	80 1:63 360 and 1:50 000 map published 1:25 000 map published (Industrial Minerals Assessm Sand and Gravel Resource Map)
		Current digital availability of these maps can be found at the British Geological Survey website www.bgs.ac.uk
	SAND & GRAVEL Superficial deposits	BRICK CLAY
	Sub-alluvial: Inferred resources	'Brick clay' is the term used to describe clay and shale used predominantly in the manufacture of bricks and, to a lesser extent, roof tiles, clay pipes and decorative pottery. These clays may sometimes be used in cement manufacture, as a source of
	Sub-alluvial: Indicated resources in areas assessed by BGS	constructional fill and for lining and sealing landfill sites. The suitability of a clay for the manufacture of bricks depends principally on its behaviour during shaping, drying and firing. This will dictate the properties of the fired brick such as strength and frost resistance and, importantly, its architectural appearance.
	River Terrace deposits	Both bedrock and superficial deposits have been used in the past to provide the raw material for brick and tile manufacture, but activities are now scattered and small in scale. The main brick clay resource in the area is the Triassic Mercia Mudstone Group which until recently was exploited on a large scale for brickmaking near Epworth in North Lincolnshire. Production of facing
	Glaciofluvial deposits	bricks used to total about 35 million bricks a year. The brickworks at Belton closed in 2001 but smaller amounts of brick clay are still produced (about 25,000 tonnes per year) and are trucked to the Birtley Works in Gateshead. The outcrop of the Mercia Mudstone is only shown in the Isle of Axholme. North of this it is covered by thick superficial deposits.
50 -	Glaciolacustrine deposits	Several small clay pits on both banks of the Humber, notably at Broomfleet, work alluvium and tidal flat deposits for the manufacture of a range of roofing tiles. These clays are extensive and are only shown in the vicinity of the worked deposits. The clays are approximately 8 m thick and are crushed and blended before use.
	Blown sand (silica sand)	At South Ferriby, large volumes of the Upper Jurassic Ancholme Clay are exploited for cement making. The overlying Chalk is extracted with the clay and mixed in the ratio of 3 parts chalk to 1 part clay to form the raw feed for the kilns which produce
	Head Gravel	750,000 tonnes of cement clinker annually, requiring around 300,000 tonnes of clay raw material. Some laminated glacial lake clays have been worked for fill materials in the area between Newton upon Derwent and Wilberfoss at the northwestern margin of the map. The extent of glaciolacustrine deposits is shown.
	Shore/Beach deposits	
	Sand and gravel deposits of unknown origin         Boundary of area assessed for sand and gravel at the indicated	CRUSHED ROCK AGGREGATES
		A variety of hard rocks are, when crushed, suitable for use as aggregates. Their technical suitability for different applications depends on their physical characteristics, such as crushing strength and resistance to impact and abrasion. Higher quality aggregates are required for coating with bitumen for road surfacing, or for mixing with cement to produce concrete. For applications such as constructional fill and drainage media, with less demanding specifications, lower quality materials are
	BRICK CLAY Alluvium/Tidal Flat Deposits (in areas of workings only) Recent	acceptable. The area has limited resources of rock suitable for use as crushed rock aggregate (see text for Chalk and Limestone). Reported
	Mercia Mudstone Group	production of crushed rock was 52,000 tonnes in 2003 and consists of limestone. Crushed rock is imported by rail to Hull from the UK and also by sea from Norway.
40 —	(Isle of Axholme only)	SILICA SAND
	Higher purity chalk (>97% CaCO <sub>3</sub> )	Silica (industrial) sands contain a high proportion of silica (SiO <sub>2</sub> ) in the form of quartz and are used for purposes other than as construction aggregates. They are essential raw materials for the glass and foundry castings industries, but also have a wide range of other industrial applications, including in ceramics and chemicals manufacture, for water filtration media and in sports
	Lower purity chalk (>93% CaCO <sub>3</sub> )	and horticultural applications. They are produced from both loosely consolidated sand deposits and by crushing weakly cemented sandstones. Unlike construction sands, which are used for their physical properties alone, silica sands are valued for a combination of chemical and physical properties. These include a high silica content in the form of quartz and, more
	Concealed higher purity chalk (>97% CaCO <sub>3</sub> )	importantly, an absence of impurities, particularly clay, iron oxides and refractory minerals such as chromite. Silica sands typically have a narrow grain size distribution, generally in the range 0.5 mm to 0.1 mm, although coarser grades are required for some applications. For most applications, silica sands have to conform to very closely defined specifications and consistency in quality is of critical importance. Particular uses often require different combinations of properties. Consequently, different
	Concealed lower purity chalk (>93% CaCO <sub>3</sub> )	qualities of silica sand are usually not interchangeable in use. Silica sands command a higher price than construction sands. This allows them to serve a wider geographical market.
	Approximate western boundary of thick drift cover over Chalk	Silica sand processing is of varying degrees of complexity and depends on the end use of the sand. It typically requires a high capital investment in plant. Processing is aimed at modifying both the physical and chemical properties of the sand to meet user specifications. The ease with which contaminants (such as iron-bearing impurities and clay) can be removed, together with the level of losses incurred in removing oversize and undersize fractions from a sand, has a major bearing on its potential use.
	LIMESTONE	Within the UK, deposits of silica sand occur in only limited areas and quantities, and the special characteristics of silica sand extraction, in particular the cost of processing, means that the industry has a restricted distribution.
	Lincolnshire Limestone	Silica sand production in North Lincolnshire is based on the Blown Sand deposits of Quaternary age around Messingham in North Lincolnshire. Sand working has taken place in the area since the 1930s, mostly working the full thickness of sand of around 3.5 m, although current working removes only the upper 2 m of sand above the water table. The sand is very uniform in grain size and consists of sub-rounded particles of quartz with a limonite coating. Silica sand is quarried in the Messingham
30 —	PEAT	area for coloured glass manufacture in Yorkshire, which is the major market, and foundry sand which is now a minor market. Other markets include horticultural sand and bagged sand for block paving. The Blown Sand deposits are also worked nearby at Haxey for mortar sand production. Here the Blown Sand is worked in conjunction with underlying River Terrace deposits.
	EVAPORITES	
	Potash Approximate western limit of Boulby Potash	
	Salt Permian	
	Approximate western limit of Boulby Halite	
	MINERAL PLANNING PERMISSION (as at 01.08.05) Source: Mineral Planning Authorities	PLANNING PERMISSION FOR MINERAL EXTRACTION
	Surface planning permission (valid and expired)	The extent of all known extant and former planning permissions for mineral working is shown on the map, irrespective of their current planning or operational status. The polygons were digitised by BGS from Plotting Sheets and other documents supplied by East Riding of Yorkshire and North Lincolnshire councils. In addition, planning permission information was digitally acquired
	Underground planning permission (valid and expired)	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 sites shown should be directed to these authorities at the addresses shown below. The polygons cover active, former and restored mineral workings and, occasionally,
20 —	MINERAL WORKINGS Melton Ross Active site	unworked deposits. Planning Permissions represent areas where a commercial decision to work mineral has been made, a successful application has been dealt with through the provisions of the Town and Country Planning legislation and the permitted reserve will have
20	Burstwick Inactive (including yet to be worked), worked-out	been depleted to a greater or lesser extent. The current planning status is not qualified on the map but is available in the underlying database.
	and/or restored site Mineral commodity	Contact addresses: East Riding of Yorkshire Council, Planning, Environmental & Technical Services, County Hall, Beverley HU17 9BA, Tel: 01482 887700, Fax: 01482 884118, web address: www.eastriding.gov.uk
	Ch Chalk Istn Ironstone Peat Peat Cl Clay & Shale Lst Limestone San Sand	North East Lincolnshire Council, Planning & Transportation Department, Devonshire House, Great Grimsby DN31 1ES, Tel: 01472 300300, Fax: 01472 3245216, web address: www.nelincs.gov.uk
	CR Crushed Rock Oil Oil Sg Sand & Gravel Fi Flint Min Unspecified mineral SiS Silica Sand	North Lincolnshire Council, Development and Environment Department, Church Square House, PO Box 138, Scunthorpe DN15 6XP, Tel: 01724 297579, Fax: 01724 297886, web address: www.northlincs.gov.uk
	Gas Natural Gas MSg Marine sand and gravel	Kingston upon Hull City Council, Technical Services Department, Kingston House, Bond Street, Hull HU1 3ER, Tel: 01482 612222, Fax: 01482 612382, web address: www.hullcc.gov.uk
	<ul> <li>Active rail aggregate depot</li> <li>Active marine wharf</li> <li>ENVIRONMENTAL DESIGNATIONS (as at 03/11/04)</li> </ul>	Topography reproduced from the OS map by British Geological Survey with the permission of Ordnance Survey on behalf of The Control
	National nature conservation designations (SSSIs and NNRs)	Stationery Office, © Crown copyright. All rights reserved. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Licence number: 10
	International nature conservation designations (SACs, SPAs and Ramsar sites)	Digital SSSI, NNR, SAC, SPA and RAMSAR boundaries © English Nature 2004. Contact address: English Nature, Northminster House, Northminster, Peterborough, PE1 1UA, Tel: 01733 455000, Fax: 01733 455103, Web page: www.english-
10	Area of Outstanding Natural Beauty (AONB): Lincolnshire Wolds (part)	Positions of Scheduled Monuments at 25th September 2003 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 pro constraints of scheduling cannot be represented here. Monuments scheduled since that date are not accounted for. © Copyright English Herit
	Heritage Coast	Contact address: English Heritage, 23 Savile Row, London, WS1 2ET, Tel: 020 7973 3132, Web page: www.english-heritage.org.uk Digital AONB boundaries © Countryside Commission 1986 (now Countryside Agency).
	+ Scheduled Monument	Contact address: Countryside Agency, John Dower House, Crescent Place, Cheltenham, Gloucestershire, GL50 3RA, Tel: 01242 521381, Fax: 01242 5 www.countryside.gov.uk
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	District	Applications for reproduction should be made in writing to: The Copyright Unit, Her Majesty's Stationery Office, St Clements House, 1-16 Co 1BQ. Fax 01603 723000 or e-mail: copyright@hmso.gov.uk
		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 eco nationally-recognised planning designations. The maps are intended to assist in the consideration and preparation of development plan pol
400000	<b>EVAPORITE MINERALS</b> Evaporite minerals, including rock salt (halite, NaCl) and, more rarely, potash (potassium chloride, KCl) are precipitated during the evaporation of seawater. The arid conditions that existed in north-east England during Permian times resulted in several cycles of	The maps have been produced by the collation and interpretation of mineral resource data principally held by the British Geological Survey. permissions has been obtained from the relevant Mineral Planning Authority (MPA). Some of these permissions may have lapsed or ex
	evaporation of seawater. The and conditions that existed in north-east England during Permian times resulted in several cycles of evaporite deposition. The most extensive led to the deposition of the Boulby Halite Formation which includes, at the top, the Boulby Potash Member. The sub-surface extent of the Boulby Halite and the Boulby Potash and their conjectured western limits are shown on the map.	ascertained from the appropriate MPA. Location information on national planning designations has been obtained from the appropriate statute and English Heritage). For further information the relevant body should be contacted.
	The Boulby Potash and Boulby Halite are worked at the Boulby Mine in the North York Moors National Park to the north. They are not extracted in East Yorkshire and are unlikely to be so in the foreseeable future. However, at Atwick near Hornsea, cavities in salt-bearing strata have been specifically created for the storage of natural gas. The development of the site started in the mid-1970s and gas is	The mineral resource data presented are based on the best available information, but are not comprehensive and their quality is variable. The approximate. Mineral resources defined on the map delineate areas within which potentially workable minerals may occur. These areas a account of planning constraints that may limit their working. The economic potential of specific sites can only be proved by a detailed evalue essential precursor to submitting a planning application for mineral working. Extensive areas are shown as having no mineral resource poter
	stored in nine teardrop-shaped cavities (in the Fordon Evaporites at a stratigraphically lower level than the Boulby Halite) at depths of around 1800 m. The cavities were leached with seawater and the resulting brine dispersed offshore through a sub-sea pipeline. The total usable space is 3,495 GWh and the cavities can deliver gas at the rate of 193 GWh/day. The high flow capacity of salt cavities makes	occur in these areas. The presence of these operations generally reflect very local or 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
	them ideal for meeting peak demands and daily balancing needs. There may be continuing interest in the salt resources of the area for the development of gas storage facilities.	planning applications or in taking other decisions on the acquisition or use of a particular piece of land, although they may give useful b proposal within context.
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