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30 SAN & SRAVE! Series is series in the main in the data is in the main in the main in the main is in the main in the main in the main is in the main in the main in the main is in t	80	Compiled by R.A. Smith, T. Bide, E.K. Hyslop, N.J.P. Sm Project Leaders: E.J. Bee and J.M. Mankelow. Digital cartography by N.A. Spencer, British Geological S Published 2008. This map is one in a series of four maps commission Levy Fund and co-funded by the BGS Sustainable GA/06F/144). A "guide to mineral information in the OR/08/011) has also been published to compliment th BGS map reference: Smith, R A, Bide, T, Hyslop, E K , Smith, N J P , Col Mineral Resource map for Inverciyde, West Du Refrewshire, East Renfrewshire, North Lanarkshire, Sc OR/08/15.	Aith, T. Coleman and A.A. McMillan. Survey. ned Scottish Government Aggregate Mineral Solutions project (contract central belt of Scotland" (BGS ref: is map series. eman, T, and McMillan, A A. (2008). nbartonshire, East Dunbartonshire, uth Lanarkshire and City of Glasgow.	Cost northing is a second seco	the second secon
30 Image: Second Se	70	SAND & GRAVEL Superficial deposits Sub-alluvial and river terrace deposits: Inferred resources Glaciofluvial deposits Glaciofluvial deposits Raised Beach deposits PEAT Peat CRUSHED ROCK AGGREGATE Igneous rocks Quartz-Dolerite sills and dykes	Quaternary	Very se Port (Very s	
30 Control while for Units or Control Control while for Units or Control 30 Subject or Control while for Units or Control Control while for Units or Control 30 UNITS TONE Control while for Units or Control 30 UNITS TONE Control while for Units or Control 30 UNITS TONE Control while for Units or Control 30 Control while for Units or Control Control while for Units or Control 30 UNITS TONE Control while for Units or Control 30 Control while for Units or Control Control while for Units or Control 30 Control while for Units or Control Control while for Units or Control 30 Control while for Units or Control Control while for Units on Control 30 Control while for Units on Control Control while for Units on Control 30 Control while for Units on Control Control while for Units on Control 30 Control while for Units on Control Control while for Units on Control 30 Control while for Units on Control Control while for Units on Control 30 Control while for Units on Control Control while for Units on Control 30 Control while for Units on	60	 Guartz-Dolerite sills and dykes (Midland Valley Sill-Complex) Olivine-Dolerite sills and felsic intrusions (Midland Valley Felsic Intrusion and Basic Sill Suite) Other igneous rocks, including basalts, andesites, dolerites and associated intrusions Sedimentary rocks Quartz conglomerate, coincident with silica sand (Douglas Muir Quartz Conglomerate Member) BRICK CLAY Superficial deposits Lake deposits 	Carboniferous to Early Permian igneous intrusions Devonian to Early Permian igneous intrusions and volcanic rocks Carboniferous: Lawmuir Formation Quaternary		
Image: Section of Section Secti	50	Common shale for brick Common shale for brick coincident with areas of shallow coal BUILDING STONE Important former quarries in Carboniferous sandstones LIMESTONE Limestone SILICA SAND Resource coincident with fireclay Quartz conglomerate (Douglas Muir Conglomerate Member), coincident with Crushed Rock (Sedimentary	 Carboniferous: Lower Limestone Formation Carboniferous: mainly Lower and Middle Scottish Coal Measures and Limestone Coal Formation Carboniferous: Lower and Upper Limestone formations Carboniferous: Passage Formation Carboniferous: Lawmuir Formation 	BUILDING STONE Although no active building stone quarries currently of The abundance of suitable sandstones in Carboniferd coloured or white (referred to in Glasgow as 'blond coloured sandstone was obtained from Devonian a whilst larger quarries generally provided higher qua supplied stone to meet development needs in Glasgo The building stone needs of Glasgow were originally city limits, these have long since been filled and built The most important building stone quarries in the G the Clyde and Giffnock to the south. At Huntershill qu 20th century, fine-grained white freestone (known as suppliers of building stone for Glasgow and the Clyde South Africa. In South Lanarkshire, Overwood quarry near Stoneho did smaller quarries near Carluke and Braidwood. throughout the area. In North Lanarkshire white sa Netherwood. The stone was used locally and in Glasgo In the eastern part of Glasgow, quarries in Lower Coa Baillieston provided white sandstone for use locally Bellside quarries exploited similar sandstones, used to	exist in the area, the diverse geology provided a range of s bus sedimentary rocks provides the most common source. e'), was worked from all parts of the Carboniferous seque nd Upper Coal Measures rocks. In the past, small quarr ality stone for use throughout the area and beyond. Ma ow and surrounding areas, including Lanarkshire. r met by numerous Carboniferous sandstone quarries activ on. lasgow area were in the Upper Limestone Formation, Bisl uarry (Bishopbriggs) and Braidbar quarries (Giffnock), both s 'liver rock') was obtained in underground mines. These le valley, and stone was shipped far and wide, to Belfast a puse supplied large amounts of sandstone from the Upper West of Lanark a large quarry at Auchenheath supplie ndstone in the Limestone Formation was quarried at Du gow, as well as exported to other parts of Scotland. al Measures near Cambuslang (Kirkburn, Holmehills quarrie and in Glasgow. In North Lanarkshire east of Motherwell, throughout the Central Belt, including Glasgow and Edinbu
 An and an and a set of a s	40 —	rocks) SHALLOW COAL Image: Area of shallow coal coincident with brick clay and fireclay Image: Discrete clay and fireclay	Carboniferous: mainly Lower and Middle Scottish Coal Measures and Limestone Coal Formation	Building stone from the Upper Coal Measures was ty was quarried at Eastfield near Cambuslang and at Br SAND AND GRAVEL Sand and gravel are defined on the basis of part introduction of new European standards from 1st Jau used for general and concrete applications to define mm, but coarser than 0.063 mm. For use in asphalt gravel is composed of particles that are rich in silica may occur locally. The principal uses of sand are as aggregate in concrete. Substantial quantities of sand and gravel has been defined, although suballuvial infe Resources tend to be scattered over the area, but si the main towns are favoured. The principal resource the White Cart, Glazert, Endrick, South Calder and B below the water table. Glaciofluvial deposits The Quaternary glaciofluvial deposits of the Upper	pically a more variable and reddish sandstone and was we edisholm Quarry near Uddingston.
20 10 10 10 10 10 10 10 10 10 10 10 10 10	30	National landscape designations (National Parks, National Nature Reserve of Special Scientific Interest and National Areas) International landscape designations (Special Areas of Conservation, Special F Areas and Ramsar sites) + Scheduled Monuments ADMINISTRATIVE AREAS Local Authority boundary Uncoloured areas on the map indicate undivided bedrock and superficial sur present locally at surface or at depth.	es, Sites I Scenic Protection	 producing graded sand and gravel but also concern shown on the map. Other areas of possible extra deposits occur near Glassford and Chapelton and the The resources in the Lower Clyde valley, such as Fet are either too thin and of poor quality or have been showever, some resources have been identified near formerly revealed 7.6 m of sand and gravel with some Other resources remain in the Townhead, Dullatur and The deposits along the valley sides of the South Cald small pits. The thickness of sand and gravel is consider mainly of local Carboniferous sandstones which easile Around Glasgow the most exploited deposits are the sediments associated with the buried channel of the worked and previous workings around Cadder have be are being used for cell construction at nearby land? Formation, which were commonly originally in contact south-west of Coatbridge, which has a long history and gravel also occur on the northern side of Strathke Alluvium and river terrace deposits In the north west of the Clyde valley the most extens and gravel capping glaciomarine clay. However, the plant remains within it. There is also potential for sand and gravel productior the map may include gravel bars associated with, an River terrace deposits usually form a more attractive extract. Some of the resource lies in buried channels, 	e and nonticulular sand. There are seven active quarkes i ction around the Upper Clyde include the Glengavel an ere may be some potential in the Douglas Valley near Gless miegair, are not currently worked as deposits have either a sterilised by population centres such as Motherwell. Most ar Cambusnethan and Garrionhaugh. A disused sand pit e coal fragments. In pits around Kelvinhead 3 m of mainly fi d Nethercroy areas. der Water between Bonkle and Stane have only been work derable; more than 25 m in places, but the quality is indiffe y disaggregate. nose of the Quaternary Cadder Formation; this consists o River Kelvin. Much of the formation is buried by till overbu- been converted to landfill. However, silt and clay from a fo fill sites. Moundy sand and gravel deposits of the Broor et with glacier ice have also been worked. The largest quar of sand and gravel extraction and subsequently landfill. I elvin around Kilsyth.
10 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 consisting 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 the collation and interpretation of mineral resources data principally held by the British Geological Survey. Location information on alional planning designations are shown on the map. 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 exaces defined on the map defined the surface areas within which potentially worksibe minerals may cocur. These areas are not of uniform potential and also take no account of planning onstraints that may limit their working. The economic potential of specific sites can only be proved by a detailed evaluation programme. Such an investigation is an essential precursor to submitting a planning application for mineral working. Extensive areas are shown as having no mineral resource bother may correct the mark area are shown as having no mineral resources of these oncenter form.	20			CRUSHED ROCK AGGREGATE A variety of hard rocks are, when crushed, suitable for their physical characteristics, such as crushing strem for coating with bitumen for road surfacing, or for m and drainage media, with less demanding specification Igneous rock Igneous rock tend to produce strong aggregates a applications as well as for use in the lower parts of th The crushed igneous rock quarried in the Clyde vall other constructional uses such as rock armour and g mainly in basic (quartz-dolerite) sills of late Carbod reasonably consistent quality which can be crushed the sills; these provide economy of scale and ease of wo The highest specification resource in the region is th Often their usefulness is restricted by their small size the past. The active quarries are concentrated in M Smaller quarries include Duntilland and Hillend near setts and kerbs were formerly sourced.	or use as aggregates. Their technical suitability for different ogth and resistance to impact and abrasion. Higher quality inxing with cement to produce concrete. For applications so ons, lower quality materials are acceptable. with a degree of skid resistance and are hence suitable he road pavement. ley is used for roadstone, (either coated or uncoated), co abions. This resource is relatively abundant in the area. The oniferous to early Permian age. The basic rock produce to various sizes with little waste. Production has tended to rking. he Midland Valley Sill Complex, a series of Carboniferous of but almost all the many quartz-dolerite sills have been qua North Lanarkshire the largest being Croy, Beltmoss and I Shotts and Airdrie respectively where quartz-dolerite block
generally reflect very local or specific situations. The locations of those quarries active in 2007 are shown. In addition former important building stone quarries are also shown. These have been extracted from the British Geological Survey's Britpits database in February 2008. While the compilers have tried to ensure that the site details are as accurate as possible, any map of active quarries is a snapshot in time. Moving the extraction location as reserves become exhausted or a new extension starts production, and renaming of sites are regular occurrences. Also sites may cease to be active at any time. Greywacke sandstone 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. The post of these operations	10	Aims and Limitations The purpose of the maps in this series is to show the broad distribution of those economic interest and to relate these to selected nationally-recognised planning, decision making in respect of mineral extraction and the protection of import together a wide range of information, much of which is scattered and not always as the maps have been produced by the collation and interpretation of mineral resourcey. Location information on national planning designations has been obtained Heritage, Scottish Government, Joint Nature Conservation Committee and Histor should be contacted. Note that designated local biodiversity and geodiversity areas shown on the map. The mineral resource data presented are based on the best available information, The inferred boundaries shown are, therefore, approximate. Mineral resources which potentially workable minerals may occur. These areas are not of unif constraints that may limit their working. The economic potential of specific sites of such an investigation is an essential precursor to submitting a planning application and workings may or generally reflect very local or specific situations. The locations of those quarries active in 2007 are shown. In addition former im have been extracted from the British Geological Survey's Britpits database in Fr that the site details are as accurate as possible, any map of active quarries is reserves become exhausted or a new extension starts production, and renaming to be active at any time. The maps are intended for general consideration of mineral issues and not as maps should not be used to determine individual planning applications or in particular piece of land, although they may give useful background information were applicated or an extended or an	mineral resources which may be of current or potential designations. The maps are intended to assist strategic ant mineral resources against sterilisation. They bring available in a convenient form. esource data principally held by the British Geological do from the appropriate statutory body (Scottish Natural ric Scotland). For further information the relevant body sites are not included in the environmental designation but are not comprehensive and their quality is variable. defined on the map delineate the surface areas within orm potential and also take no account of planning an only be proved by a detailed evaluation programme. tion for mineral working. Extensive areas are shown as poccur in these areas. The presence of these operations apportant building stone quarries are also shown. These ebruary 2008. While the compilers have tried to ensure a snapshot in time. Moving the extraction location as no f sites are regular occurrences. Also sites may cease a source of detailed information on specific sites. The taking other decisions on the acquisition or use of a nich sets a specific proposal within context.	Other smaller intrusions also constitute an importance of the Midland Valley Siluro-Devonian Intrusive Suited ballast, and concreting sand. Most of the stone is a Polished Stone Value (PSV) of the rock is not now of within an environmentally sensitive area. The quart Permian Alkaline Basic Sill Suite) works a range of Laggregate along with sandstone from the Lawmuir Formation andesite crushed rock resource in this region commandesite and a variety of plugs. The lavas, although quality and often heavily weathered restricting their existed aggregate for concreting. Basalt and dyke root often higher quality resources because they are more Dumbuckhill and an andesite intrusion at Bannerband Formation occurring in the Carron valley are a poten of basalts in the south of the region, these have only source of aggregate due to their remoteness. Sedimentary rock Marte-conglomerate The Douglas Muir Quartz-Conglomerate occurs in the It is a coarse conglomerate comprising clasts of almaggregate with good skid resistant surfacing proper quarry is at Douglas Muir.	Int resource in the Clyde valley. At Kilbarchan in Renfre roadstone. At Cloburn near Lanark a sill of felsite (rhyolitic e) is used in concrete aggregate, coated roadstone, decc distinctive reddish brown colour and is commonly used a considered to be of sufficient quality for road surfacing. St ry at Dunduff near Kirkmuirhill (part of the Midland Valle ower Devonian felsitic and Carboniferous doleritic intrusiv pormation which has been hardened due to thermal alteration es from the Clyde Plateau Volcanic Formation; this compri- considerable in area, provide low quality rock for aggregated and use to road bottoming and fill or, with processing, gran- ticks are currently being exploited at Reilly. The plugs and e homogeneous; volcanic agglomerate and dyke-like intrus k. In the north of North Lanarkshire the basaltic lavas of th tial resource but they are variable in nature and remote. The been extracted on a small scale mainly for fill and are unli- e of greywacke type rocks. However, none is presently qu e lower Lawmuir Formation and forms an important resource oost entirely vein quartz which, when disaggregated, produ- rties and good clean sand suitable for glass and foundry

