



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Construction Raw Materials Policy and Supply Practices in Northwestern Europe

Facts and Figures – England, Scotland and
Wales (Great Britain)

Economic Minerals and Geochemical Baseline Programme

Commissioned Report CR/02/082N



BRITISH GEOLOGICAL SURVEY

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Facts and Figures – England, Scotland and
Wales (Great Britain)

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Key words

*Raw materials, aggregates,
mineral planning, secondary
materials, renewable materials.*

Front cover

*Marine aggregates make an
important contribution to
aggregates demand in Britain.
Substantial amounts of marine
sand and gravel are also
exported to the Netherlands,
France and Belgium.*

Bibliographical reference

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FOREWORD

This report is the published product of a study by the British Geological Survey (BGS) and the Building Research Establishment (BRE) carried out on behalf of the Road and Hydraulic Engineering Institute (DWW) of the Ministry of Public Works and Water Management, The Netherlands. It provides facts and figures on raw materials and mineral planning in Great Britain. Information of the overall policy and supply practices for construction raw materials in Northwestern Europe is given in the Main Report, detailed below:

Construction Raw Materials Policy and Supply Practices in Northwestern Europe: Facts and Figures – Main Report.

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Mrs Sue Martin, The National Assembly for Wales

Mr Duncan Pollock, Quarry Products Association

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SUMMARY

This report describes the mineral planning policies and the market aspects of raw building materials in Great Britain. The research has been funded by the Dutch government (Ministry of Transport, Public Works and Water Management of The Netherlands) to improve their knowledge of raw material supply and minerals planning issues in the North Sea Region. Similar studies have also been carried out by other national institutes in the Netherlands, Belgium, Germany, Denmark and Norway.

The study focuses exclusively on the main raw building materials; sand, gravel, crushed rock aggregates, industrial limestone, silica sand, clay (excluding china clay, ball clay and other speciality clays) and fill. It also considers the potential for substitution of primary raw materials by secondary raw materials and renewable materials. Raw material definitions and other background information are given in the introductory chapter.

The mineral planning policy in England, Wales and Scotland is summarised in Section B, which also includes a general description of the mineral planning system in Great Britain.

A series of factsheets are used to summarise the statistical data for each primary, secondary and recycled material. These include data (where available) on exports and imports and on methods of transportation. The structure of the raw materials market is also reviewed and recent and foreseeable market trends are assessed. The report also lists the major organisations involved in this sector and the data sources consulted for this research.

INTRODUCTION

For future planning of raw building materials in the Netherlands it is important for the Dutch government to improve its knowledge of minerals planning policy and raw materials supply in its bordering countries, notably those countries in the North Sea Region. Present Dutch knowledge on raw building materials and Government policy with respect to mineral planning in Europe is largely based on the DOE study 'Minerals planning policy and supply practice in Europe' (London, 1995). The DOE study (Anon., 1995) included all industrial minerals as well as coal, salt and some metalliferous minerals. It also concentrated its attention on planning and legal issues.

In 2001 the Dutch Government started a project to provide an overview of the facts and figures on mineral supply practices in several North West European countries. The project deals exclusively with the main constructional raw materials (clay, sand, gravel, crushed rock, limestone and silica sand) and focuses on market aspects and the potential for substitution of primary raw materials by secondary or renewable materials. Planning and legal issues are given less attention.

The British Geological Survey assisted by the Building Research Establishment was commissioned by the Dutch Ministry of Transport, Public Works and Water Management to review data for Great Britain. This report presents the results of the research for England, Scotland and Wales. It includes reviews of national and regional policy for land use planning and market statistics for seven mineral commodities (sand, gravel, crushed rock aggregates, silica sand, clay, industrial limestone and fill) as well as for secondary and recycled materials and renewable raw materials.

The investigative work has been led by a team at the British Geological Survey comprising David Harrison, Greg Chapman, Janice Hillier, David Highley and Ellie Steadman in collaboration with Rod Collins of the Building Research Establishment. Raw material statistical information has been obtained from official published sources such as the Annual Minerals Raised Inquiry and the Aggregates Monitoring Survey. Policy information has been obtained from published sources but has also been informed by interviews with Brian Marker, at the DTLR, England; Brian Spiers at the Scottish Executive and Sue Martin at the National Assembly for Wales. Further background information has been obtained by interviews and informal contacts with numerous professionals throughout the minerals planning, minerals extraction and minerals research sectors.

GENERAL INFORMATION

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Building Research Establishment – Rod Collins.

A2 Date

November 2001 – May 2002.

A3 Country/State

Great Britain (England, Scotland and Wales)

A4 Great Britain - administration, geography, and demography

The United Kingdom (UK) consists of the island of Great Britain, (comprising England, Wales and Scotland), and Northern Ireland. 'Britain' is an accepted abbreviation for the whole UK. The UK Parliament is the legislature and the highest authority in the land. The *executive* comprises the Government (members of the Cabinet and other ministers responsible for policies), government departments and agencies and local authorities such as the counties and unitary authorities. Ministers of the Crown govern in the name of the Sovereign, who is both head of state and head of the government. The *judiciary* determines common law and interprets statutes. The Scottish Parliament, the Welsh Assembly and the Northern Ireland Assembly have responsibility for day-to-day administration of domestic affairs in those parts of the UK. England has no separate elected national body exclusively responsible for its central administration. A number of government departments look after England's day-to-day administrative affairs and nine Government Offices for the Regions are responsible for carrying out a number of government programmes regionally.

Of the total population of Great Britain, 45 per cent live in London and the East, South East and South West regions of England. Since 1981 the population of these three regions has increased by more than 12 per cent in each case. In Scotland and the North East and North West regions of England the population has decreased in this period. These figures relate directly to the demand for aggregates for construction in the southern and eastern parts of England and hence to the pressure on land-use in these areas.

A5 Geology

A5.1 Geological framework of Great Britain's industrial minerals

The type and distribution of economic minerals in the UK is closely related to the geological history of the British Isles which, being varied and complex, and particularly so in relation to the country's relatively small surface area, has endowed it with a wide variety of industrial and construction minerals. These range in age from Precambrian metamorphic rocks in Scotland to Quaternary sand and gravel in southern England.

Metamorphic rocks are largely confined to the Scottish Highlands and islands, with scattered outcrops in England and Wales (Figure 1). Lower Palaeozoic slates, volcanic

rocks and greywackes underlie large areas of Wales, the Lake District and the Southern Uplands of Scotland. The Upper Palaeozoic Devonian to Permian successions consist predominantly of clastic and carbonate sediments which crop out extensively in parts of central, western and northern Britain. Post-Palaeozoic formations consist mainly of shallow-water, marine clastics and limestones. The whole country, apart from the extreme south-west, was affected by Quaternary glaciation. This has left widespread superficial deposits of sand and gravel which are exploited in many areas, particularly in south-east England which is devoid of hard rock resources.

Most of the industrial and construction minerals produced in Great Britain are of sedimentary origin, for example limestone, chalk, silica sand, clay, sandstone and fluvial and glaciofluvial sand and gravel. Certain bodies of igneous rock are, however, intensively quarried for crushed rock aggregates.

A5.2 Resources and reserves of aggregates in Great Britain

Aggregate **resources** are natural concentrations of sands and gravel, or bodies of hard rock, that are or may become of potential economic interest as a basis for the extraction of aggregate minerals. In the context of land-use planning in Great Britain, the term **reserve** means that part of a mineral resource which has been fully evaluated and is commercially viable to work, and which also has a valid planning permission for extraction (i.e. it is a **permitted reserve**). In Great Britain without a valid planning consent, no mineral working can legally take place.

Very broad estimates of inferred resources of sand and gravel (land-based and marine) and hard rock (for crushed rock aggregate) in England and Wales, and Scotland are given in Table 1.

Table 1. Estimated resources of sand and gravel and hard rock in Great Britain

	England and Wales	Scotland
Sand and gravel (land based) ¹	270,000 million tonnes	20,000 million tonnes
Sand and gravel (marine) ²	26,000 million tonnes	not known, but small
Hard rock (lmst, igneous rock, sst) ¹	2,100,000 million tonnes	5,200,000 million tonnes

¹ from Aggregates: The way ahead. Advisory Committee on Aggregates, 1975.

² from Beach recharge materials – demand and resources, 1996.

Data on permitted reserves of aggregate materials are collected by Aggregate Minerals Surveys (AM) and are published for England and Wales every four years. The latest published data for England and Wales are for 1997 (BGS, 2000). The latest data for Scotland are for 1993. Data for 2001 will be available for England and Wales in the autumn of 2002. National data do not exist for fully evaluated and commercially viable aggregate resources which do not yet have planning permission.

No survey of permitted clay reserves has been carried out. It is not possible to determine reserve data separately for fill material and it is also not possible to reliably separate sand and gravel and hence the figures are combined in Table 2.

Table 2. Permitted reserves of some bulk minerals in England and Wales, and Scotland

	England and Wales¹	Scotland²
Silica sand (a)	22 million tonnes	---
Sand and gravel (land based)	899 million tonnes	99 million tonnes
Industrial limestone	925 million tonnes	---
Crushed rock aggregate	5,458 million tonnes	842 million tonnes

¹ AM97 data

² AM93 data

(a) Data for silica sand are incomplete

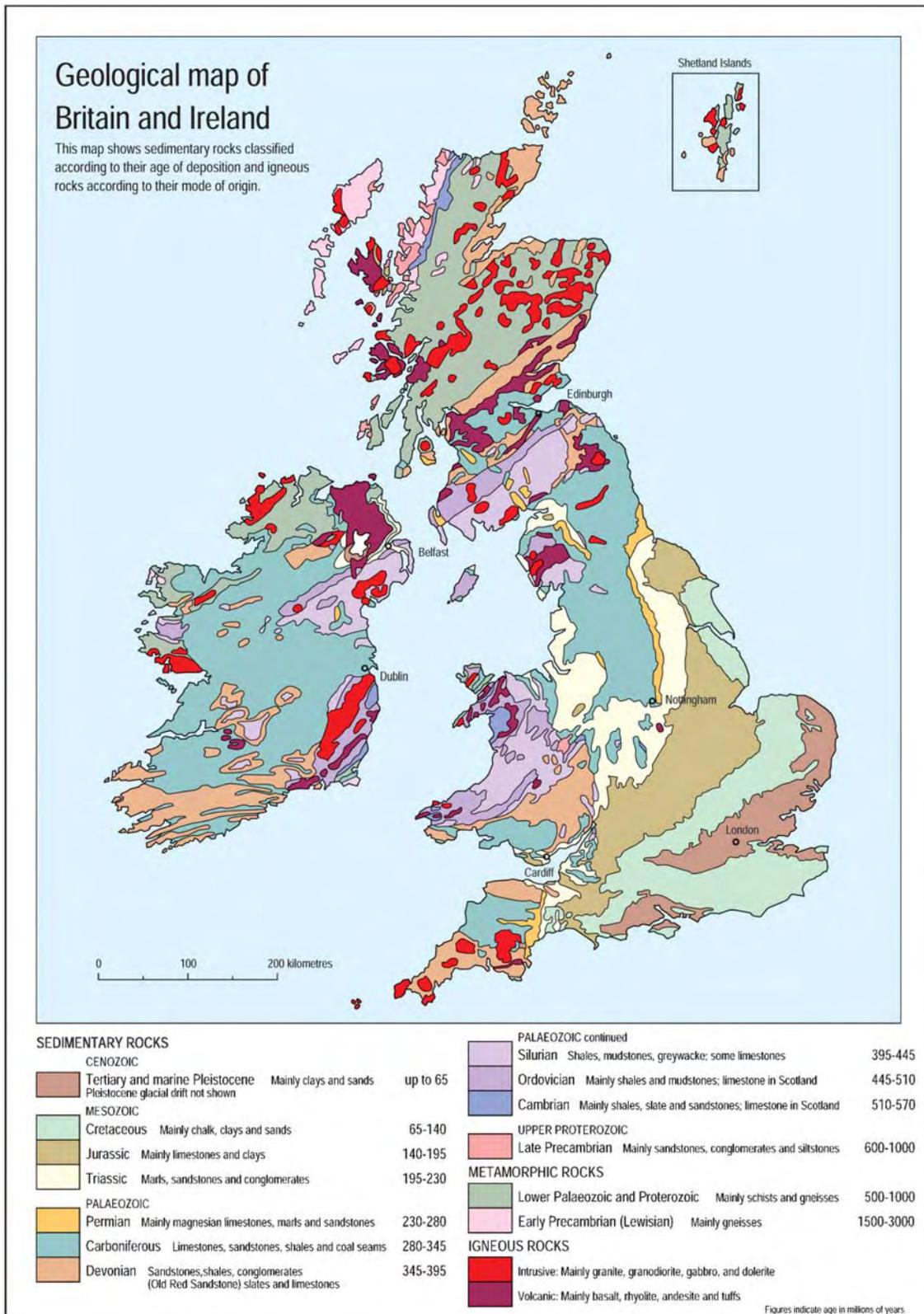


Figure 1. Simplified geological map of Britain and Ireland

A6 Definitions of the raw materials described in this study

Aggregates are defined in British Standards as granular material used in construction. The term 'aggregate' includes a wide variety of materials. These are predominantly natural sands and gravel or crushed rocks (primary aggregates), although industrial by-products (such as slag, colliery wastes, fly ash) and recycled waste materials (such as brick, concrete, asphalt) may be used as substitutes (secondary aggregates) for primary materials.

There is no single accepted system for the classification of aggregate materials based on particle size limits, although there is inevitably a need to use the terms 'sand', 'gravel', 'fines', etc. Gravel, for example, may be defined as sediment greater than 2 mm (Wentworth sediment classification), or greater than 4 mm (BS 1377, BS 5930), or greater than 5 mm (BS 882). Specifications used to define a sediment do not, however, use terms such as 'sand' or 'gravel', but instead specify the sediment gradings, based on the grain size distribution.

The primary raw materials described in this report are defined by their end use (sale/production statistics given in the AMRI and AM surveys) rather than by their geological or technical definitions. The secondary and recycled materials described in this report are also simply defined below (Source: BRE).

Coarse sand - includes land- and marine-won sand used as concreting sand ('sharp sand') and building sand ('soft sand' – sand for mortars, asphalt etc.), but excludes sand for filling material and for non-aggregate purposes (silica sand).

Gravel - includes land- and marine-won gravel used as concreting aggregate, coated gravel, drainage media etc., but excluding gravel for fill.

Limestone for industrial use - includes limestone, dolomite and chalk for non-aggregate uses (iron and steel, cement, glass making, chemicals, FGD, fillers, etc).

Silica sand - industrial sand for foundry uses, glass manufacture and for other non-aggregate uses.

Clay - clay, shale and fireclay for constructional uses (bricks, pipes and tiles, cement, etc), but excluding china clay and ball clay.

Crushed rock - limestone, igneous rock and sandstone used for aggregates (roadstone, concreting aggregate), but excluding fill/ballast/armourstone/building stone.

Fill material - includes sand and gravel, crushed rock and clay/shale for fill uses.

Construction and demolition waste - any material arising from the processes of construction and demolition. In Table D for England and Wales, this does not include "clean" soil.

Asphalt waste - bitumen-coated material derived from roads and other pavements.

Dredged material - silt from port maintenance / deepening of shipping channels.

Clean soil - soil not contaminated with construction and demolition waste, chemicals, or any other material.

MSWI bottom ash - ash falling to the bottom of the burning chamber in incinerators burning municipal solid waste.

MSWI fly ash - ash precipitated from the off-gases in incinerators burning municipal solid waste.

Coal bottom ash - ash falling to the bottom of the burning chamber in power stations burning pulverised coal.

Coal fly ash - ash precipitated from the off-gases in power stations burning pulverised coal.

Blast furnace slag - slag from the production of iron from iron ore.

Steel slag - slag from the production of steel from iron and scrap iron/steel

BOS slag - steel slag from a basic oxygen furnace

EAF slag - steel slag from an electric arc furnace

Stabilised stainless slag - slag from the production of stainless steel from iron and scrap iron/steel and stabilised with borax.

Colliery spoil - waste rock from the mining and processing of coal

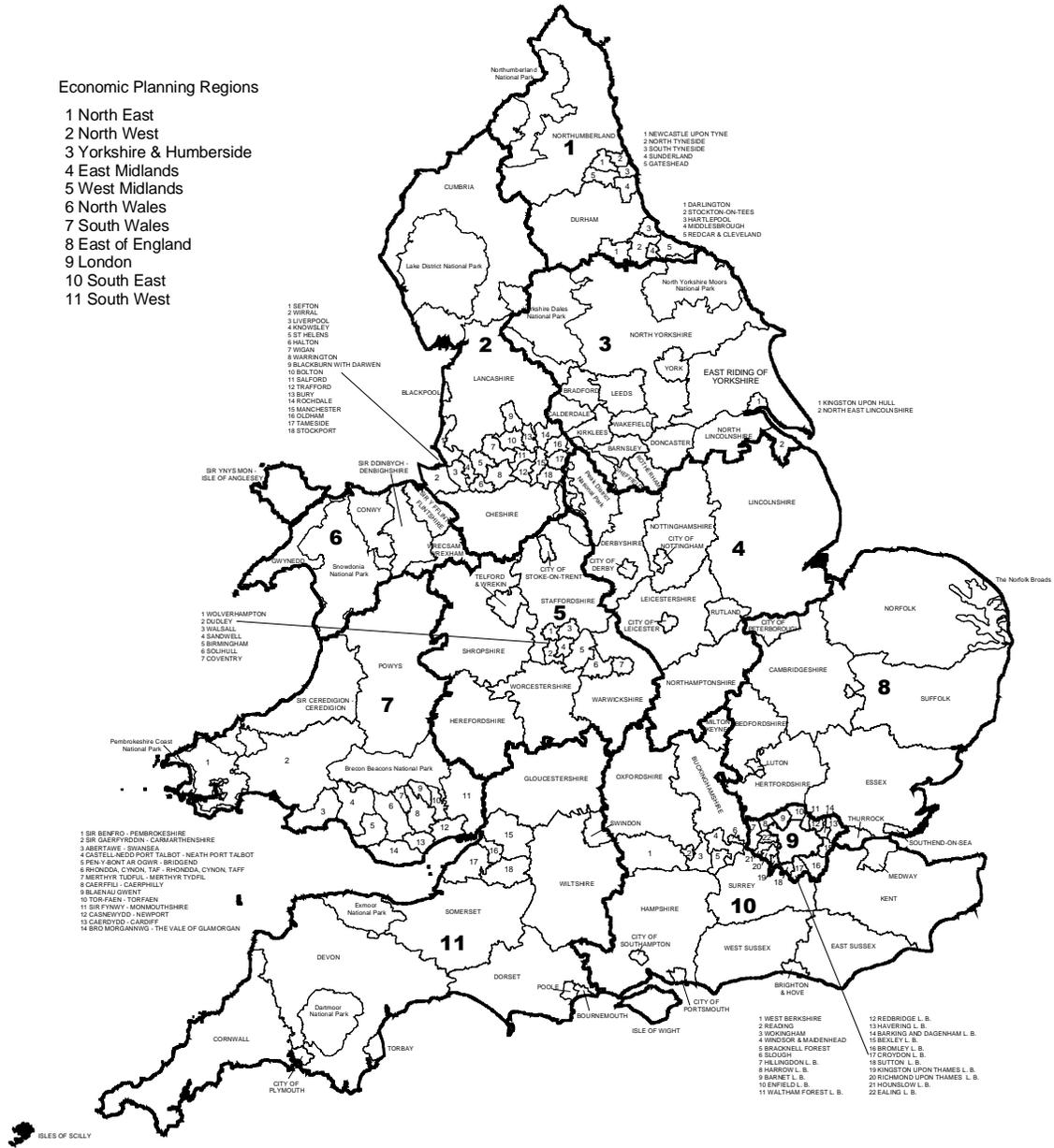
Slate waste - waste rock from the quarrying and production of natural slate products (mainly as roofing slates)

China clay waste - waste from the quarrying and processing of china clay (kaolin)

Spent foundry sand - sand used for the moulding of metals and containing small quantities of binder such as clay, resin or sodium silicate.

Economic Planning Regions

- 1 North East
- 2 North West
- 3 Yorkshire & Humberside
- 4 East Midlands
- 5 West Midlands
- 6 North Wales
- 7 South Wales
- 8 East of England
- 9 London
- 10 South East
- 11 South West



This map is based upon the OS Boundary-Line Map by British Geological Survey with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright. All rights reserved. Licence Number: GD272191/2002.

Figure 2 England and Wales Mineral Planning Authorities and Economic Planning Regions.

B POLICY - ENGLAND

The control of mineral working in Great Britain is carried out primarily under Town and Country Planning Legislation, which makes provision for the preparation of various types of development plans and for dealing with planning applications. However, some aspects of environmental regulation are used to control some types of pollution and emissions. Regulations that implement EU legislation (e.g. environmental assessment and habitats issues) are also relevant. In addition, there is a body of health and safety legislation that safeguards employees at, and visitors to, mineral extraction sites.

There are significant differences in the procedures and frameworks used in England, Wales and Scotland. This paper makes references to all of these, but emphasises, in particular, the approach used in England. The position is complicated further because much of the legal framework deals with planning, environmental and safety issues at a generic level, rather than concentrating specifically on topics such as minerals. It is only possible, therefore, to mention the more important amongst many provisions in this report.

An important point is that the ownership of most minerals in Great Britain rests with the owner of the land. State ownership is limited to energy minerals. Some minerals (precious metals and minerals on and under the seabed) are largely owned by the Crown. The implementation of planning legislation is, therefore, quite closely bound up with private property rights.

A review of the planning system in England is being undertaken at present with a view to speeding up its operation. A public consultation on proposed new approaches is to be held shortly. This report, therefore, sets out information on current approaches that may be subject to some changes over the next few years.

B1 Actors in mineral planning and their role

B1.1 Government at national, regional and local level

National

England: Department for Transport, Local Government and the Regions (DTLR)

Wales : National Assembly for Wales

Scotland: Scottish Executive

Each of these bodies is responsible for developing national planning policy guidance, including that for mineral development, within which local authorities are required to operate.

Other Government Departments such as the Department of Trade and Industry (DTI), Department for the Environment, Food and Rural Affairs (DEFRA), contribute:

- views on Regional Planning Guidance
- views on Development Plans
- views on planning applications.

Regional

The division of responsibilities between England, Scotland and Wales is a form of regionalisation. Within England, however, nine economic planning regions (Figure 2) are defined (North West, North East, Yorkshire and the Humber, East of England, East Midlands, West Midlands, South West, South East and London). In each of these there is a regional development agency (responsible for a sustainable development strategy) and a regional planning body which is responsible for preparing regional planning guidance. The planning guidance is prepared in liaison with the Government Office for the Region (an office that represents the regional interests of all Departments of State). The guidance is prepared with full public participation.

Local

England, Wales and Scotland are governed at local level by either County Councils or Unitary Authorities, which do not overlap geographically. Where County Councils exist (chiefly in rural areas) there is a lower tier of District Councils. These deal only with other types of planning issues but their decisions may have implications for minerals if, for example, decisions that they take might sterilise valuable mineral deposits. Unitary Authorities do not have this second, lower, tier - hence 'unitary'. They are chiefly urban areas but many large rural areas in Wales and Scotland are also Unitary Authorities. The County Councils, Unitary Authorities and National Parks are responsible for minerals and waste planning and are known as Mineral Planning Authorities (MPA). National Parks commonly overlap geographically with the other two authorities but do not overlap in respect of their responsibilities as MPAs.

Mineral development plans

In the counties of England, two levels of development plan affect minerals:

- **Structure plans** — set out general principles and policies for all forms of development
- **Minerals local plans** — set out detailed policies governing mineral extraction

Unitary development plans cover both these functions. The key elements of a minerals local plan, or of the mineral policies of a unitary development plan, are:

- to balance through its policies the essential need for minerals against protection of the environment and local amenity
- to make an appropriate provision for the supply of minerals and provide an effective framework within which the minerals industry may make planning applications

- to set policies for the control of mineral working and associated development
- to identify areas of possible future mineral working
- to prevent unnecessary sterilisation of resources by the use of safeguarding policies, including defining mineral consultation areas where appropriate.

Minerals local plans usually indicate areas in which mineral extraction might be acceptable and where proposals will normally be resisted. Applications that are in conformity with the local development plan, and that are acceptable in other respects, will normally be permitted, unless material considerations indicate otherwise. The planning system is, therefore, plan led. This helps to give certainty to both the minerals industry and local residents in respect of proposals for extraction.

Mineral development control involves taking decisions on planning applications submitted to planning authorities by prospective mineral developers. If a planning permission is approved it will be subject to a number of conditions such as measures to mitigate environmental impacts, restoration and aftercare, and the date for ending extraction and management of the restored site. Monitoring and enforcing these conditions is part of development control. If an application is refused the applicant may choose to appeal to the relevant Secretary of State and a public inquiry usually takes place. Some cases may be called in for decision by the Secretary of State rather than the MPA.

Mineral permissions can last for many years. All modern planning permissions have operating and restoration conditions attached so that the costs of meeting environmental standards are met by the operator. Operating conditions are imposed to control the environmental impacts of mineral working, and restoration and aftercare conditions are imposed to ensure that land worked for minerals is suitable for a beneficial after-use. Most old permissions have inadequate operating and restoration conditions and recent legislation requires that mineral permissions be periodically reviewed and updated every 15 years to ensure conditions remain up to date.

Minerals development plans may in some cases be prepared on a joint basis between two or more authorities (e.g. a county with a unitary authority or a National Park).

B1.2 Environmental organisations

This topic needs to be considered in terms of statutory environmental bodies and the voluntary conservation sector:

a) statutory environmental bodies - these are agencies that operate independently of Government although funded through a "parent" government department. They are the Government's statutory advisers on the issues that they are responsible for:

- Environment Agency (a non-departmental public body whose main sponsor in the Government is the Department for the Environment, Food and Rural Affairs (DEFRA). Environment Wales is a partnership of organisations in the voluntary sector, sponsored by the National Assembly for Wales. Scotland has the separate Scottish Environmental Protection Agency.
- English Heritage (National, parliament-mandated organization charged with the protection of English historic environment) and separate equivalents in Wales (Cadw) and Scotland
- English Nature (responsible for conserving England's habitats and biodiversity) with equivalents in Scotland (Scottish Natural Heritage) and Wales (Countryside Council for Wales).

These organisations are statutory consultees and have an official input to all levels in the planning process.

b) voluntary conservation interests

There are a large number of such bodies, many of which have quite limited sectoral interests. Some of the more important in respect of making representations on minerals issues are:

- Council for the Preservation of Rural England (CPRE), with 57,000 supporters. In Wales: CPRW (Registered charities independent of government.)
- National Trust, with more than 250,000 members. This preserves places of historic interest or natural beauty in the UK . (Registered charity independent of government)
- Royal Society for the Protection of Birds, with more than 1,000,000 members and supporters (Europe's largest voluntary conservation group)
- County Wildlife Trusts with more than 366,300 members (co-ordinated by the Royal Society for Nature Conservation)

Voluntary organisations can make representations in respect of Government consultations, planning guidance, development plans and planning applications and lobby Government about their specific interests

B1.3 Industry associations

- Quarry Products Association (QPA). Formed in 1997 by the merger of BACMI (British Aggregates Construction Materials Industries) and SAGA (Sand and Gravel Association), this trade association represents the aggregates industry. Its members account for about 90% of total aggregates production in Great Britain
- The British Aggregates Association, (BAA) represents smaller, independent aggregate producers and accounts for about 10% of total aggregates production
- British Marine Aggregates Association (BMAPA) – part of the QPA, representing the British marine aggregates dredging industry
- Silica and Moulding Sands Association (part of the QPA)
- Kaolin and Ball Clay Association UK
- British Ceramics Confederation
- Confederation of UK Coal Producers

These organisations act in a similar way to the voluntary environmental organisations (above) in terms of their own sector interests.

B2 Main societal issues related to mineral planning

B2.1 Issues that determine the current policy

There are two key policy issues in terms of minerals extraction in the UK

- the very large scale of the construction aggregates industry with consequent impacts on the environment and
- strong political opposition to extraction of coal by opencast methods in some regions.

The more significant of these is the concern about securing more sustainable approaches to the supply of **aggregate minerals** for the construction industry to support economic growth and maintain standards of living. Important issues associated with this are:

- **uneven distribution of resources** - transportation problems
- **amenity and environmental impact** - extraction is constrained by 'landscape, amenity, nature conservation, agriculture, cultural heritage and water interests' which are the subject of both National and International conservation designations

There is perceived to be a lack of appreciation by the public at large of the link between development (which is needed to maintain economic prosperity and the quality of life) and use of natural resources (which is widely opposed both by "green" organisations and people who live near proposed quarry sites).

B2.2 Recent developments

EU legislation is having a major and increasing impact. In particular, the Habitats and Birds Directives whereby member states are required to designate sites for the conservation of natural habitats and of wild flora and fauna are significantly constraining the options for supply of minerals.

B3 List of relevant actual policy documents and laws

The situation is complicated because different systems of laws and documents exist in England, Scotland, Wales and Northern Ireland. Many of the key documents are listed in Annex EW.2 of 'Mineral Planning Policy and Supply etc.' (1995).

- One of the most important pieces of guidance in England is Mineral Planning Guidance Note 6 (MPG6) "Guidelines for Aggregates Provision in England" (HMSO, April 1994).
- In 2001, a document entitled "Planning for the supply of aggregates in England" was published for public comment as a basis for review and revision of MPG6
- Aggregates Levy : has been introduced in April 2002. The levy was legislated for in Finance Act 2001, and received Royal Assent on 11 May 2001. The levy came into effect on 1 April 2002. Its objectives are to address, by taxation, the environmental costs associated with quarrying operations (noise, dust, visual intrusion, loss of amenity and damage to biodiversity), to reduce demand for virgin aggregate and to encourage the use of re-cycled materials.

Scope and structure:

- Will apply to sand, gravel and crushed rock subjected to commercial exploitation in the UK. This includes aggregate dredged from the seabed and on the UK Continental Shelf which will be taxed at the point of landing within the UK.
- one stage, non-deductible
- specific tax charged at £1.60 (€2.50) per tonne.
- Regulations that implement the EC Environmental Impact Assessment (EIA) Directive. In the case of mineral workings, all applications for sites of over 25 ha (150 ha for peat workings), and for any that might significantly affect a European site of conservation, **must** be accompanied by an Environmental Statement. Where applications are for sites with smaller areas, the MPA must consider whether the proposed development seems likely to have significant environmental effects. In cases of dispute these regulations are at present considered only by the courts, not the DTLR.
- Secondary legislation (i.e. regulations) is in draft on marine minerals dredging. This will come into force in 2002 and will provide a statutory framework for marine aggregates dredging. To date there has been only a voluntary framework, since 1968.
- In Wales the policy documents are Mineral Planning Policy Wales (MPPW) issued in 2000 and an Aggregates Technical Advice Note (TAN) which supports the MPPW and gives detailed advice on aggregates. It was issued early in 2002.

B4 General policy lines on raw materials

B4.1 Goals, qualitative

These can be summarised in the words of the Department for the Environment, Food and Rural Affairs (DEFRA) paper [A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom](#): 'Social, environmental and resource issues are increasingly strategic issues for business: growth based on environmental damage, or unfairness and division in society, is not sustainable. Continued improvements in resource efficiency are essential for the UK's future prosperity and competitiveness, as well as the health of the environment.'

The government believes that for the economic well-being of the country it is essential that the construction industry continues to receive an adequate supply of aggregates so that it can meet the needs of the community and foster economic growth.

The recent MPG6 consultation document speaks of the maximisation of the use of alternatives to primary aggregates.

B4.2 Goals, quantitative

Quantitative goals in England apply only to aggregate minerals since these dominate the quarrying industry. MPG6 set out guidelines for the provision of aggregates from each English region based on econometric projections of future demand. Methods of estimating demand are currently being reviewed. In Wales, the aggregates TAN does not include this type of demand estimate.

In respect of secondary/recycled materials, MPG6 of 1994 (para.41) suggested indicative figures for use of these materials by the years 2001 and 2006. These are very difficult to measure and are regarded as broad estimates. It can be shown that the indicative figure of 40 Mt per annum by 2001 has been achieved, probably mainly due to the imposition of a Landfill tax, but it is believed that 55 Mt by 2006 may be more difficult. The effect of the Aggregates Levy in closing the gap remains to be seen.

B5 Meeting demand by primary raw materials

B5.1 Current Policy

This is covered, in England, by Minerals Planning Guidance note 1 "General considerations and the development plan system" Please refer back to 4.1.

B5.2 Policy under development

- An MPG6 'consultation document' is currently being circulated for comment, with a view towards producing a revised document
- Guidance is in preparation on marine dredging of minerals. After consultation it will be published in 2002. It will contain a new policy for the consideration of marine dredging applications. Under the existing system, applications are made to the DTLR (or its predecessor Departments) accompanied by an environmental statement. The DTLR undertakes consultation on the application and then issues a decision on whether the proposal is acceptable or not in environmental terms. If, and only if, the DTLR states that the proposal is acceptable then the Crown Estate (as owner of the seabed) issues a licence and dredging may commence. The new statutory system will

introduce a procedure for lodging dredging applications with the DTLR and for public inquiries in respect of such applications. Dredging Permissions will be issued by DTLR thus taking the Crown Estate out of the implementation process. Licences will then become wholly commercial arrangements separate from Dredging Permissions.

B6 Substitution

B6.1, B6.2 By secondary and recycled raw materials, current policy and policy under development

The present MPG6 consultation document speaks of the maximisation of the use of alternatives to primary aggregates. It suggested (para.41) indicative figures for these materials for the years 2001 and 2006. These are very difficult to measure and are regarded as broad estimates. It can be shown that the estimates of 40 Mt per annum by 2001 has been achieved but it is believed that 55 Mt by 2006 may be more difficult. The effect of the Aggregates Levy remains to be seen.

The DETR published a *Statutory Waste Strategy for England and Wales* in May 2000 (HMSO, Waste Strategy 2000: England and Wales: parts 1 and 2). This strategy describes the Government's vision for managing waste and resources better. The strategy also sets out the changes needed to deliver more sustainable development. It stresses that the quantity of waste produced must be tackled by breaking the link between economic growth and increased waste. The main theme of the strategy is where waste is created we must increasingly put it to good use – through recycling, composting or using it as a fuel. The strategy also recognises the need to develop new and stronger markets for recycled materials, To address this, a major new Waste and Resources Action Programme has been set up. This Programme is intended to deliver more recycling and reuse, help develop markets and end-uses for secondary materials and promote an integrated approach to resource use.

The need to reduce waste at all stages of construction was central to the message of '*Rethinking Construction*' the 1998 report of the Construction Task Force (HMSO, London, 1998) on the scope for improving the quality and efficiency of UK construction. Improving the efficiency of the construction industry is a key objective for the Government, as set out in its strategy for more sustainable construction '*Building a Better Quality of Life*' (DETR, London 2000). The Strategy identifies priority areas for action, and suggests indicators and targets to measure progress. It sets out action that the Government has already taken, further initiatives that are planned, and highlights what others can do. The Government will use the Strategy as a framework to guide its policies towards construction, and will encourage people involved in construction to do the same.

The Sustainable Construction Strategy emphasises the importance of reducing waste at all stages of construction by focusing on the need to consider long term impacts of design, construction and disposal decisions so that materials and other resource use is optimised. The Strategy encourages the industry (including clients) to consider refurbishment or renovation as an alternative to new buildings and structures. It highlights the need to avoid over-specification in materials and the scope for standardisation of components.

B6.3, 6.4 By renewable raw materials, current policy and policy under development

There is no national policy aimed solely at the substitution of non-renewable raw materials with renewables, although the new aggregates tax will have some effect. The UK is a net importer of timber and thus a policy to replace local non-renewables would worsen the balance of payments situation and could possibly also lead to increased transport impacts.

B7 Other relevant policy

EU Landfill Directive. The chief aim of this is to minimise landfill and more closely regulate the types of waste disposed of at sites.

The Directive places strict regulatory controls on the operation, monitoring and after-care of landfill sites and, although many of these controls are similar to those already in place in the UK, the Directive will nevertheless require some significant changes to current landfill practice. The relevance of this measure is that some inert materials that are disposed of to landfill could be recycled as alternatives to new extraction of aggregates. However, it has to be recognised that daily cover and restoration fill will still be required at landfills and that some inert materials will have to be supplied for those purposes. ('Daily cover' is mineral-based material used to cover and stabilise the daily increment of waste. 'Restoration fill' is material used to complete a landfill or restore a disused quarry to acceptable landscape standards).

B8 Mineral (demand) planning system

This section is applied only to aggregates and only in England and, to some extent, in Wales.

B8.1 Projection method for future demand

For the projections currently in use (1992 -2011) the (precursor of) the DTLR employed independent consultants. This was based on a detailed examination of long-term trends in economic activity combined with analyses of specific major factors influencing construction activity, including consideration of the national house building and road building programme. Three scenarios were produced involving different policy assumptions. These were then used, in combination with new information on intensity of use of aggregates, to produce the projections of 1991. (In 1992 the consultants were asked to provide new projections taking into account the continued downturn in the UK economy).

The 1991 figures were broken down into regional figures, based on each region's proportional share of total consumption of primary aggregates in England and Wales in 1989. From these were derived the Regional Guidelines for output in the individual regions. Regional guideline amounts were then broken down further and apportioned within each region so that individual MPAs could use the data to advise development plans. Broadly the same apportionment method, i.e. based on recent production, was used as with the regions, but with adjustments for local circumstances.

Detailed information and advice on the regions, including data on production and reserves, is provided by the Regional Aggregates Working Parties (RAWPs), which produce annual reports. In addition a national 'Aggregate Minerals Survey' (AMS) is

undertaken every four years. The latest of these (AM97) can be downloaded from www.mineralsUK.com The 2001 survey (AM2001) commenced in October 2001. It will present comparable data to AM97, although the Regions have changed in some cases. The Survey is compiling data on regional and national sales, consumption, distribution and permitted reserves of natural aggregates. The information is collected from aggregates producers for collation at MPA, regional and national levels. The national collation of this survey is being undertaken by the British Geological Survey for the DTLR and the National Assembly for Wales (NAW). To simplify the Survey the questions have been harmonised with the statutory Annual Minerals Raised Inquiry (AMRI) undertaken on behalf of DTLR by the Office for National Statistics.

Also available on www.mineralsUK.com is the document 'MPG6: Guidelines for Aggregate provision in England - Analysis of data for 1996-97'. - This assesses actual production against reserves and apportionment.

Details of the methodology summarised above are at annexes B,C,D and E of MPG6.

Landbanks: Included in the guidance of MPG6 are recommendations on landbanks. A landbank is defined by MPG6 as a stock of planning permissions for the winning and working of minerals. It is thus equivalent to the total **tonnage** of reserves with planning permission (permitted reserves). However, the landbank situation in any one MPA is commonly expressed by dividing the total landbank by either (i) the local apportionment of output in the Regional Guidelines, on an annual basis or (ii) the average of the last three years' production. This gives a result expressed in terms of the number of **years** that the permitted reserves would last if the supply assumptions that have been made prove to be correct. MPG6 recommends that for sand and gravel MPAs should aim to maintain a landbank sufficient for at least 7 years extraction. A longer period (unspecified) was deemed appropriate for crushed rock aggregates, but some MPAs have temporal landbanks of permitted reserves for much longer periods.

B8.2 Geological Survey System

Neither DTLR nor DTI have plans for any systematic field survey or assessment of construction minerals. (A survey of aggregate resources - mainly sand and gravel - was carried out in selected areas by BGS for the DTLR's precursor department in the 1970s and early 1980s).

The British Geological Survey (BGS) undertakes commissions for both DTLR and DTI on a customer/contractor basis. Details of recent contracts are available at www.mineralsuk.com.

They include the production of a series of [mineral resource maps](#) with an associated Geographical Information System. These are designed to assist the functioning of the planning system by providing information on the extent of mineral resources. They identify areas of possible future mineral working and assist the longer-term objective of protecting important mineral resources against sterilisation as well as basic information for consideration in environmental assessment of plans and programmes.

B8.3 Spatial planning system (recent developments)

The approach towards spatial planning is being considered as part of the current review of the planning system in England. Spatial planning has been generally low-key in the past but has gained in significance with the introduction of regional planning guidance. Consideration of regional devolution within England could create a stronger emphasis on this issue.

B8.4 Permission and legal aspects (recent developments)

There have been no fundamental changes in the system of applying for or granting of planning permissions in recent years but case law has effects on practices from time to time.

The Environment Act 1995 established the Environment Agency and the Scottish Environment Protection Agency. These agencies are concerned with matters pertaining to pollution and emissions. Much of the control of mineral workings is effected through conditions to planning permissions. However, water discharge consents and control of other nuisance such as dust may come under the environmental regulation measures.

The Environment Act 1995 also introduced measures for regular review and updating of conditions attached to minerals permissions to ensure that these are in line with current best practice. This step was taken because old mineral permissions (some of which go back to the 1940s) may have few conditions for environmental protection or site restoration. Many reviews of sites have been undertaken and new conditions have been introduced. While EIA was required in respect of most of these, it was not requested in respect of some. A recent Court ruling indicated that all of these reviews should be accompanied by EIA thus decisions that were taken in the absence of an EIA have now been overturned and the sites have, therefore, reverted to the former inadequate conditions pending new applications for review of these.

B9 Taxes, legal dues, fees

- *Aggregates Levy* : this was introduced in April 2002. The levy was legislated for in Finance Act 2001, and received Royal Assent on 11 May 2001. The levy came into effect on 1 April 2002. Its objective is to address, by taxation, the environmental costs associated with quarrying operations (noise, dust, visual intrusion, loss of amenity and damage to biodiversity) in line with the Government's statement of intent on environmental taxation. To reduce demand for virgin aggregate and encourage the use of re-cycled materials.

Scope and structure:

- Will apply to sand, gravel and crushed rock subjected to commercial exploitation in the UK. This includes aggregate dredged from the seabed within UK territorial waters (12 mile limit) and on the UK Continental Shelf.
 - one stage, non-deductible
 - specific tax charged at £1.60 (€2.50) per tonne.
- *Landfill Tax*: on 1 October 1996 a tax on waste disposal in landfill sites was introduced into the UK. The purpose of the tax is to encourage business and

consumers to produce less waste, to dispose of less waste in landfill sites, and to recover value from more of the waste that is produced, for example through recycling.

There are two rates of tax;

- £2 (€3.12) a tonne for inactive or inert wastes listed in the Landfill Tax (Qualifying Material) Order 1996. These are all wastes which do not give off gases when landfilled and have no potential for polluting ground water.
- £12 (€18.75) a tonne applying to all other taxable waste rising to £13 (€20.31) in 2002.

B10 Enforcement

Responsibility for enforcement of conditions attached to planning permissions rests with the MPAs. They should do this by routine inspection but since they are under-resourced most enforcement arises as a result of complaints from third parties. To close this funding gap, it has been suggested that a 'minerals application fee' should be paid by minerals operators and this is now being considered. Responsibility for monitoring (water) discharge consents rests with the Environment Agency. Responsibility for dealing with some other forms of nuisance rests with the Environmental Health Officers of the Local Authorities.

B11 Restoration practices, use of former extraction sites

Minerals Planning Guidance Note 7 "Rehabilitation of mineral workings" (MPG7) contains comprehensive provisions - a long-term view to return all sites to appropriate use in keeping with surroundings. Phased restoration is encouraged wherever possible. Mineral Planning Authorities are required to ensure compliance. Problems may arise where sites become inactive before extraction is completed. Where a site is registered as dormant, however, it cannot re-open until a new scheme of restoration has been agreed.

MPG7 is underpinned by a number of research reports on good practice for restoration of both extraction sites and mineral waste tips to a variety of subsequent uses including nature conservation, amenity uses, agriculture and forestry.

B POLICY - SCOTLAND

B1 Actors in mineral planning and their role

B1.1 Government at national, regional and local level

Scottish Executive

The Executive is responsible for developing planning guidance, which is published as National Planning Policy Guidelines (NPPGs). Circulars can also provide statements of Government policy and contain guidance on policy implementation through procedural or legislative change. Planning Advice Notes (PANs) convey advice on good practice and other relevant information. NPPG4 (1994 - amended, May 2001) is 'Land for mineral working'. This covers all types of mineral extraction with the exception of Open Cast Coal and Related Minerals which is now covered by NPPG 16 (March 1999).

Consultants are currently assessing NPPG4 to determine whether it needs revision.

Regional

There is no regional government tier (see also 5.2)

Local

Local government is effected by 32 local authorities, each of which may deal with minerals. There are few mineral specialists in this level of government. These planning authorities are required to produce a Development Plan which consists of a structure plan that sets out general principles and policies for all forms of development and local plan(s) which express these policies in more detail. Planning authorities may also prepare subject local plans and where appropriate these can cover mineral working.

Legislation is now in place to establish the first National Parks in Scotland. Planning responsibilities will be exercised by the Park Authority in Loch Lomond and Trossachs. It has yet to be announced what planning responsibilities will be given to the Cairngorm National Park Authority. An announcement on this is due shortly.

B1.2 Environmental organisations

- Scottish Environment Protection Agency (SEPA) (a public body responsible for environmental protection in Scotland. It was established under the Environment Act 1995)
- Scottish Natural Heritage (SNH) (a public body responsible for safeguarding and enhancing Scotland's natural heritage - analogous to English Nature) It was established in 1992 from a merger of the Nature Conservancy Council for Scotland and the Countryside Commission for Scotland under the Natural Heritage (Scotland) Act 1991.
- Association for the Protection of Rural Scotland (a charity that seeks to protect Scotland's countryside)
- Historic Scotland (an Agency within the Scottish Executive Education Department. It protects and conserves Scotland's built heritage)

- Royal Society for the Protection of Birds (Europe's largest voluntary conservation group)
- National Trust for Scotland (Preserves places of historic interest or natural beauty in Scotland - a registered charity independent of government)

Environment organisations (non-government) may be consulted at public planning enquiries.

B1.3 Industry associations

- Quarry Products Association (QPA). Formed in 1997 by the merger of BACMI (British Aggregates Construction Materials Industries) and SAGA (Sand and Gravel Association), this trade association represents the aggregates industry. Its members account for about 90% of total aggregates production in Great Britain
- Silica and Moulding Sands Association (SAMSA) – part of the QPA.
- British Aggregates Association (BAA) which represents Britain's independent quarry companies.

These organisations can also act in the same way as the NGO environmental organisations (above) and also lobby government in their own interests.

B2 Main societal issues related to mineral planning

B2.1 Issues that determine the current policy

There are three dominant factors:

- supply of aggregate minerals for the construction industry - to support economic growth and maintain standards of living
- uneven distribution of resources - transportation problems
- environmental impact - extraction is constrained by 'landscape, amenity, nature conservation, agriculture, cultural heritage and water interests'

In Scotland the issues are local to a much greater degree than in England. There is considerable concern in some areas about opencast coal operations (NPPG16)

B2.2 Recent developments

There is said to be a general lack of detailed information on mineral extraction in Scotland. The most recent Scottish Aggregates Survey (1997) failed in Scotland due, it is said, to a lack of response from the industry.

B3 List of relevant actual policy documents and laws

The most important guidance document is NPPG4 (1994 - amended, May 2001) is 'Land for mineral working'. Others are listed in NPPG4 which may be downloaded from www.scotland.gov.uk/library/nppg . The most relevant legislation is the Town and Country Planning (Scotland) Act 1997.

- At present consultants are examining NPPG4 to see if it needs revision.

- Aggregates Levy : this has been introduced in April 2002. The levy was legislated for in Finance Act 2001, and received Royal Assent on 11 May 2001. The levy came into effect on 1 April 2002. Its objective is to address, by taxation, the environmental costs associated with quarrying operations (noise, dust, visual intrusion, loss of amenity and damage to biodiversity) in line with the Government's statement of intent on environmental taxation. To reduce demand for virgin aggregate and encourage the use of re-cycled materials.

Scope and structure:

- Will apply to sand, gravel and crushed rock subjected to commercial exploitation in the UK. This includes aggregate dredged from the seabed within UK territorial waters (12 mile limit)
- one stage, non-deductible
- specific tax charged at £1.60 (€2.50) per tonne.

Note that this measure will apply to the whole of the UK, although it is to be phased in in Northern Ireland.

Regulations that implement the EC Environmental Impact Assessment (EIA) Directive (See Environmental Impact Assessment Regulations (Scotland) 1999). In the case of mineral workings, all applications for sites of over 25 ha (150 ha for peat workings) must be accompanied by an Environmental Statement. Where applications are for sites with smaller areas, the planning authority must consider whether the proposed development seems likely to have significant environmental effects.

B4 General policy lines on raw materials

B4.1 Goals, qualitative

These can be summarised in the words of the government White Paper 'This Common Inheritance' (Cmmd 1200) as 'combining economic growth with care for the environment in order to attain sustainable development.' Specifically on aggregate minerals, the government believes that for the economic well-being of the country it is essential that the construction industry continues to receive an adequate supply of aggregates so that it can meet the needs of the community and foster economic growth.

B4.2 Goals, quantitative

Apart from affirming that a 10-year 'life' is a desirable target for construction mineral landbanks, Scotland has no quantitative goals for mineral production.

B5 Meeting demand by primary raw materials

B5.1 Current policy

This is covered by NPPG4

B5.2 Policy under development

- Procedure for regulating marine dredging of minerals is under review by the Government (UK). It is not clear how this will affect the position in Scotland (where at present there is little aggregates dredging). At present, if the Scottish Executive/Scottish Ministers were to give a favourable view on an application, a licence would be granted by the Crown Estates, as in England.
- There is currently a revision of the 'strategic' planning system in Scotland. The new system will be based on 5 city regions: Aberdeen, Edinburgh, Dundee, Glasgow and Inverness. It has been decided that minerals should not be included in this system.

B6 Substitution

B6.1, B6.2 By secondary and recycled raw materials, current policy and policy under development

NPPG4 recommends simply that 'planning policies should provide for the reworking of mineral waste deposits and the recycling of demolition and construction wastes.' No production targets are set.

The effect of the Aggregates Levy remains to be seen.

B6.3, B6.4 By renewable raw materials, current policy and policy under development

There is no national policy aimed solely at the substitution of non-renewable raw materials with renewables, although the new aggregates tax will have some effect. The UK is a net importer of timber and thus a policy to replace local non-renewables would worsen the balance of payments situation and could possibly also lead to increased transport impacts.

B7 Other relevant policy

- *Coastal superquarries* In NPPG4, 16 paragraphs out of a total of 104 deal with this subject. At present one such operation, Glensanda, exists, on the west coast of Scotland. It produces about 5 Mt/year but has permission to increase production to 15 Mt. A further proposal, for a quarry on the Isle of Harris, has been refused.

NPPG4 assumes that the chief market for the output from Scottish coastal superquarries would be in England but could also be in the rest of Europe, although competition from Norway and Spain could place limits on this. NPPG 4 indicates that 'the Government believes that it would be reasonable to constrain superquarry numbers (including Glensanda) to 4 in the period up to 2009. This constitutes a limit rather than a target conferring any presumption in favour of proposals up to that number.' NPPG4 therefore supports the concept of coastal superquarries, while having due regard to protection of the environment - consideration of which is discussed at some length.

- *EU Landfill Directive*. The chief aim of this is to minimise landfill and more closely regulate the types of waste disposed at sites. It will take time to show its effect.

The Directive places strict regulatory controls on the operation, monitoring and after-care of landfill sites and, although many of these controls are similar to those already in place in the UK, the Directive will nevertheless require some significant changes to current landfill practice.

B8 Mineral planning system

B8.1 Projection method for future demand

There is no such methodology in Scotland

The concept of the landbank is valid in Scotland, as in England. A landbank is a stock of planning permissions for the winning and working of minerals. It is thus equivalent to the total tonnage of reserves with planning permission. In Scotland it is accepted that 10 years is a desirable 'life' for a landbank (derived by dividing reserves with planning permission by annual production)

B8.2 Geological Survey System

The Scottish Executive has no plans for any systematic field survey or assessment of construction minerals. It claims that it does not use the maps produced by the British Geological Survey (BGS) 'to any great extent.' However, local authorities have commissioned work from the BGS from time to time.

The BGS has a major office in Edinburgh

B8.3 Spatial planning system (recent developments)

Apparently not of any great concern in Scotland

B8.4 Permission and legal aspects (recent developments)

There have been no changes in the system of applying for or granting of permissions - but these could be affected by case law from time to time.

The Environment Act 1995 established the Environment Agency and the Scottish Environment Protection Agency. As in England there is also provision for an on-going review of older planning consents under the provisions of this Act which have now been incorporated within the 1997 Planning Act.

Some legal aspects may become crucial with the implementation of the EU Environment Impact Assessment (EIA) Directive. EIA is presently a requirement in the case of some permissions but not in others. Courts have found that EIA should be undertaken. Where permissions have been reviewed under the Environment Act, as described above, but no EIA was carried out, the review of conditions is not legal. Some earlier decisions are now overturned and these sites thus revert to the earlier conditions.

B9 Taxes, legal dues, fees

- *Royalties*
- *Aggregates Levy* : this was introduced in April 2002. The levy was legislated for in Finance Act 2001, and received Royal Assent on 11 May 2001. The levy came into effect on 1 April 2002. Its objective is to address, by taxation, the environmental costs associated with quarrying operations (noise, dust, visual

intrusion, loss of amenity and damage to biodiversity) in line with the Government's statement of intent on environmental taxation. To reduce demand for virgin aggregate and encourage the use of re-cycled materials.

Scope and structure:

- Will apply to sand, gravel and crushed rock subjected to commercial exploitation in the UK. This includes aggregate dredged from the seabed within UK territorial waters (12 mile limit)
 - one stage, non-deductible
 - specific tax charged at £1.60 (€2.50) per tonne.
- *Landfill Tax*: on 1 October 1996 a tax on waste disposal in landfill sites (Landfill Tax) was introduced into the UK. The purpose of the tax is to encourage business and consumers to produce less waste, to dispose of less waste in landfill sites, and to recover value from more of the waste which is produced, for example through recycling.

There are two rates of tax;

- £2 (€3.12) a tonne for inactive or inert wastes listed in the Landfill Tax (Qualifying Material) Order 1996. These are all wastes which do not give off gases when landfilled and have no potential for polluting ground water
- £12 (€18.75) a tonne applying to all other taxable waste rising to £13 (€20.31) in 2002.

B10 Enforcement

Responsibility for enforcement of conditions attached to planning permissions rests with the planning authorities. They should do this by routine inspection but since they are under-resourced most enforcement arises as a result of complaints from third parties. To close this funding gap, it has been suggested that a 'minerals application fee' should be paid by minerals operators and this is now being considered.

B11 Restoration practices, use of former extraction sites

These are discussed in NPPG4 which states that 'Once mineral working has ceased, the land should be made suitable for other uses at the earliest opportunity and this can be facilitated by progressive restoration over the life of the operation.' It continues with recommendations and identifies the government agencies and voluntary organisations that can give advice.

C MARKET FOR PRIMARY RAW MATERIALS IN GREAT BRITAIN

C1 Statistical Sources

Information on the production (sales) of aggregates from individual quarries in Great Britain is collected by two different surveys; the **Annual Minerals Raised Inquiry** and **Aggregate Monitoring** surveys.

The Annual Minerals Raised Inquiry (AMRI) is a statutory survey of extractor's sales of aggregates within Great Britain carried out by the Office for National Statistics (ONS). The survey is mandatory and the results are published annually in the Business Monitor PA 1007, Minerals Extraction in Great Britain (Anon, 2001). Individual returns from quarries are confidential to ONS and the data are aggregated and published on the basis of geographical areas – England, Wales, Scotland, Regions in England and counties. **Production data shown in this report** are principally based on data from this source.

In addition, Aggregates Monitoring (AM) surveys based at four-yearly intervals since 1973, provide more detailed information on regional and national sales, consumption, distribution and permitted reserves of natural aggregates. The most recent survey was for the base year 1997-AM97, (BGS, 2000). However, the BGS is currently carrying out the AM survey for 2001 and it is hoped that the results will be available later in 2002. The primary data for the AM surveys are collected from aggregates producers by Mineral Planning Authorities (MPAs) for the Regional Aggregates Working Parties (RAWPs). The survey is voluntary. The results will be collated at national level by the BGS. However, as with AMRI, the data from individual quarries will not be made available to the BGS for confidential reasons. Only collated data will be published, again principally by geographical area, although this will also include selected environmental designations such as National Parks and AONBs (Areas of Outstanding Natural Beauty).

The prime purpose of the two surveys is different. AMRI is designed to provide a consistent time series of commodity data for economic/market analysis mainly by central government, but also industry and market analysts. The AM Surveys aim to provide comprehensive data for monitoring and facilitating aggregates provision at local, regional and national level. The output is used mainly by Government (DTLR), mineral planning authorities, industry and environmental interest groups. Only AMRI collects information on employment and value of sales and only AM collects data on the destination of sales by transport mode (i.e. road, rail and water), permitted reserves and information for environmentally designated areas. The data presented in this report are mainly derived from AMRI.

Comments on presentation of statistical data

Some difficulties have been experienced in the presentation of the statistical data because of the way that official data are combined for Great Britain. The main problems relate to 'Fill'. Large quantities of both crushed rock and sand and gravel are used for 'Fill'. However, figures for 'Fill' for sand and gravel do not separately distinguish between 'sand' and 'gravel'. In addition, the heading 'Fill' in official statistics also includes other unbound uses of both crushed rock and sand and gravel. For example, railway track

ballast is included with fill for crushed rock. It should also be understood that whilst companies completing returns of production will know what tonnage of a product such as concrete aggregate or mortar sand they sell, this does not always mean that the material is used for that application.

Symbols: The following symbols are used throughout the tables in Sections C and D.

blank = not available

**** = confidential

0 = zero, non-existent

<< = not known exactly, but relatively small

<... = not known exactly, but smaller than...

>... = not known exactly, but greater than...

~... = data based on assumption (see footnote)

?...? = about... (authors guess)

C2 Market for primary raw materials; sand, England & Wales

#	SAND England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- unbound applications (production)	<< 1)
	- aggregate for e.g. concrete (production) a)	40.29 2)
	- industrial purposes	(see silica sand table)
	- beach nourishment (production) b)	~1.30 3)
2.	Exported from England TOTAL c)	~4.39 3)
	- to country A: Netherlands.....	~2.27
	- to country B: Belgium.....	~1.48
	- to country C: France.....	~0.65
	- to country D:	
	- to country E:	
3.	Supply by import into the UK 4) TOTAL	0.11
	- from country A: Denmark.....	0.08
	- from country B: Norway.....	0.02
	- from country C:	
	- from country D:	
	- from country E:	
4.	Total annual production	45.98 5)
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
6.	Extraction from large-scale sites (on land, inland waters)	(Data only available for 1997, from AM 97) (see C6 sand and gravel table)
	- transported by truck	78.11
	- transported by rail	0.63
	- transported by inland vessel	0.53
	- transported by sea vessel	
7.	Marine dredged TOTAL	~13.83 3) 6) 7)

- 1) Not separately recorded but believed to be small. Most unbound sand is used as fill.
- 2) Includes concreting, mortar and asphaltting sand.
- 3) Calculated from total marine dredged sand and gravel figure assuming 60% sand.
- 4) HM Customs and Excise trade code no. 25059000.
- 5) Comprises a) + b) + c).
- 6) Includes marine dredged sand landed at British ports.
- 7) Includes marine dredged sand landed at foreign ports (exports) plus material used for beach nourishment.

C3 Market for primary raw materials; sand, Scotland

#	SAND Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	<< 1)
	- <i>aggregate for e.g. concrete (production)</i>	4.89 2)
	- <i>industrial purposes</i>	(see silica sand table)
	- <i>beach nourishment</i>	
2.	Exported	
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import	
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	4.89
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	4.89
	- transported by truck	100%
	- transported by rail	
	- transported by inland vessel	
	- transported by sea vessel	
7.	Marine dredged	0

1. Not separately recorded but believed to be small. Most unbound sand is used as fill.
2. Includes concreting, mortar and asphaltting sand.

C4 Market for primary raw materials; gravel, England & Wales

#	GRAVEL England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- unbound applications (production) a)	0.76 6)
	- aggregate for e.g. concrete (production) b)	29.14
	- industrial purposes	
	- beach nourishment (production) c)	~0.86 1)
2.	Exported from England TOTAL d)	~2.93 1)
	- to country A: Netherlands.....	~1.51
	- to country B: Belgium.....	~0.98
	- to country C: France.....	~0.43
	- to country D:	
	- to country E:	
3.	Supply by import into the UK 2) TOTAL	0.06
	- from country A: France.....	0.03
	- from country B: Denmark.....	0.02
	- from country C:	
	- from country D:	
	- from country E:	
4.	Total annual production	33.69 3)
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
6.	Extraction from large-scale sites (on land, inland waters)	(see C6 sand and gravel table)
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
	- transported by sea vessel	
7.	Marine dredged TOTAL	~9.22 1) 4) 5)

1. Calculated from total marine dredged sand and gravel figure assuming 40% gravel.
2. HM Customs and Excise trade code no. 25171010.
3. Comprises a) + b) + c) + d).
4. Includes marine dredged gravel landed at British ports.
5. Includes marine dredged gravel landed at foreign ports (exports) plus gravel used for beach nourishment.
6. Most unbound gravel is used as fill.

C5 Market for primary raw materials; gravel, Scotland

#	GRAVEL Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	0.29 1)
	- <i>aggregate for e.g. concrete (production)</i>	1.82
	- <i>industrial purposes</i>	
	- <i>beach nourishment</i>	
2.	Exported	
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import	
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	2.10
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	2.10
	- <i>transported by truck</i>	100%
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged	0

1. Most unbound gravel is used as fill.

C6 Market for primary raw materials; sand and gravel, England & Wales

#	SAND AND GRAVEL England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- unbound applications (production) a)	0.76 1)
	- aggregate for e.g. concrete (production) b)	69.43 2)
	- industrial purposes	(see silica sand table)
	- beach nourishment (production) c)	2.16
2.	Exported from England TOTAL d)	7.32
	- to country A: Netherlands.....	3.78
	- to country B: Belgium.....	2.46
	- to country C: France.....	1.08
	- to country D:	
	- to country E:	
3.	Supply by import into the UK 3) TOTAL	0.17
	- from country A: Denmark.....	0.11
	- from country B: France.....	0.03
	- from country C: Norway.....	0.02
	- from country D:	
	- from country E:	
4.	Total annual production	79.67 4)
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
6.	Extraction from large-scale sites (on land, inland waters) SAND & GRAVEL ALL SITES TOTAL	(Data only available for 1997, from AM 97) 79.27 5)
	- transported by truck	78.11
	- transported by rail	0.63
	- transported by inland vessel	0.53
	- transported by sea vessel	
7.	Marine dredged TOTAL	23.06 5) 6)

- 1) Gravel only. Most unbound sand and gravel is used as fill.
- 2) Includes concreting, mortar and asphaltting sand.
- 3) HM Customs and Excise trade code no.s 25059000 and 25171010.
- 4) Comprises a) + b) + c) + d).
- 5) Includes marine dredged sand and gravel landed at British ports.
- 6) Includes marine dredged sand and gravel landed at foreign ports (exports) plus sand and gravel used for beach nourishment.

C7 Market for primary raw materials; sand and gravel, Scotland

#	SAND AND GRAVEL Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- unbound applications (production)	0.29 1)
	- aggregate for e.g. concrete (production)	6.71 2)
	- industrial purposes	(see silica sand table)
	- beach nourishment	
2.	Exported	
	- to country A:	
	- to country B:	
	- to country C:	
	- to country D:	
	- to country E:	
3.	Supply by import	
	- from country A:	
	- from country B:	
	- from country C:	
	- from country D:	
	- from country E:	
4.	Total annual production	6.99
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- transported by truck	
	- transported by rail	
	- transported by inland vessel	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	6.99
	- transported by truck	100%
	- transported by rail	
	- transported by inland vessel	
	- transported by sea vessel	
7.	Marine dredged	0

1. Gravel only. Most unbound sand and gravel is used as fill.
2. Includes concreting, mortar and asphaltting sand.

C8 Market for primary raw materials; crushed rock, England & Wales

#	CRUSHED ROCK England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	26.84
	- <i>aggregate for e.g. concrete (production)</i>	35.20
	- <i>industrial purposes</i>	
	- <i>beach nourishment</i>	
2.	Exported from England and Wales	
	- <i>to country A: Scotland.....</i>	0.10 (Data only available for 1997, from AM 97)
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import into England	
	- <i>from country A: Scotland.....</i>	2.20 (Data only available for 1997, from AM 97)
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	62.04
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	(Data only available for 1997, from AM 97) 115.63 1)
	- <i>transported by truck</i>	105.98
	- <i>transported by rail</i>	9.13
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	0.52 2)
7.	Marine dredged	

- 1) Includes an estimated 44 million tonnes of crushed rock used for fill.
- 2) Transported by water, but mainly sea vessel.

C9 Market for primary raw materials; crushed rock, Scotland

#	CRUSHED ROCK Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	9.67
	- <i>aggregate for e.g. concrete (production)</i>	5.18
	- <i>industrial purposes</i>	
	- <i>beach nourishment</i>	
2.	Exported from the UK 1) 2) TOTAL	2.40 3)
	- <i>to country A: Netherlands.....</i>	1.05
	- <i>to country B: Germany.....</i>	1.04
	- <i>to country C: Irish Republic.....</i>	0.19
	- <i>to country D: Poland.....</i>	0.08
	- <i>to country E: Trinidad and Tobago.</i>	0.04
3.	Supply by import into the UK 2)	0.36
	- <i>from country A: Italy.....</i>	0.11
	- <i>from country B: Irish Republic.....</i>	0.10
	- <i>from country C: Norway.....</i>	0.07
	- <i>from country D: Denmark.....</i>	0.05
	- <i>from country E: Spain.....</i>	0.01
4.	Total annual production	14.85
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	14.85
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	4)
7.	Marine dredged	

1) Mainly exported from Scotland.

2) HM Customs and Excise trade code no.s 25171020 + 25171080 + 25174100 + 25174900.

3) In addition, Scotland exports crushed rock to England. In 1997, this amounted to 2.20 million tonnes.

4) In 1997, 2.20 million tonnes of crushed rock were transported by sea vessel to England.

C10 Market for primary raw materials; industrial limestone, England, Wales & Scotland

#	INDUSTRIAL LIMESTONE Great Britain (England, Wales and Scotland) 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications</i>	
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes (production)</i>	27.73 2)
	- <i>beach nourishment</i>	
2.	Exported from the UK 1) TOTAL	0.23
	- <i>to country A: Irish Republic.....</i>	0.07
	- <i>to country B: Sweden.....</i>	0.07
	- <i>to country C: Denmark.....</i>	0.03
	- <i>to country D: Netherlands.....</i>	0.03
	- <i>to country E: Germany.....</i>	0.02
3.	Supply by import into the UK 1) TOTAL	0.004
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	27.73 2)
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	27.73 2) 3)
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged	

- 1) HM Customs and Excise trade code no. 25210000.
- 2) Includes limestone, dolomite and chalk for agricultural use.
- 3) Significant quantities moved by rail; small quantities by slurry pipeline.

C11 Market for primary raw materials; silica sand, England and Wales

#	SILICA SAND England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications</i>	
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes (production)</i>	3.65
	- <i>beach nourishment</i>	
2.	Exported from the UK 1) TOTAL	0.03
	- <i>to country A: Norway.....</i>	0.02
	- <i>to country B: Irish Republic.....</i>	0.01
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import into the UK 1) TOTAL	0.03
	- <i>from country A: Belgium.....</i>	0.01
	- <i>from country B: Germany.....</i>	0.01
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	3.65
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	3.65
	- <i>transported by truck</i>	95%
	- <i>transported by rail</i>	5%
	- <i>transported by inland vessel</i>	0%
	- <i>transported by sea vessel</i>	0%
7.	Marine dredged	0

1) HM Customs and Excise trade code no. 25051000.

C12 Market for primary raw materials; silica sand, Scotland

#	SILICA SAND Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications</i>	
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes (production)</i>	0.45
	- <i>beach nourishment</i>	
2.	Exported	
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import	
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	0.45
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	0.45
	- <i>transported by truck</i>	75%
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	25%
7.	Marine dredged	0

C13 Market for primary raw materials; clay, England & Wales

#	CLAY England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications</i>	
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes (production)</i>	10.34 1)
	- <i>beach nourishment</i>	
2.	Exported from the UK 2) TOTAL	0.01
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import into the UK 2) TOTAL	0.04
	- <i>from country A: USA.....</i>	0.01
	- <i>from country B: Germany.....</i>	0.01
	- <i>from country C: Belgium.....</i>	0.01
	- <i>from country D: Turkey.....</i>	0.01
	- <i>from country E:</i>	
4.	Total annual production	10.34
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	10.34 3)
	- <i>transported by truck</i>	95%
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged	

- 1) For bricks, pipes, tiles and cement manufacture.
- 2) HM Customs and Excise trade code no.s 25083000 + 25084000.
- 3) Some clay is transported by slurry pipeline.

C14 Market for primary raw materials; clay, Scotland

#	CLAY Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications</i>	
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes (production)</i>	0.53 1)
	- <i>beach nourishment</i>	
2.	Exported	
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import	
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	0.53
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	0.53
	- <i>transported by truck</i>	100%
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged	

1. For bricks, pipes, tiles and cement manufacture.

C15 Market for primary raw materials; fill, England & Wales

#	FILL England and Wales 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	54.40 1)
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes</i>	
	- <i>beach nourishment</i>	
2.	Exported from the UK 2)	<<
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import into the UK 2)	<<
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	54.40
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	54.19
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged TOTAL	0.21 3)

- 1) Includes sand, gravel and hoggin used for fill (9.02 million tonnes), crushed rock used for fill and ballast (45.03 million tonnes), and clay and shale for constructional use (0.14 million tonnes).
- 2) Trade figures for fill are not separately identified by HM Customs and Excise but are believed to be small.
- 3) Sand, gravel and hoggin only

C16 Market for primary raw materials; fill, Scotland

#	FILL Scotland 2000	Figures in 10 ⁶ tonnes/year
1.	Yearly demand in the country/state	
	- <i>unbound applications (production)</i>	11.85 1)
	- <i>aggregate for e.g. concrete</i>	
	- <i>industrial purposes</i>	
	- <i>beach nourishment</i>	
2.	Exported	
	- <i>to country A:</i>	
	- <i>to country B:</i>	
	- <i>to country C:</i>	
	- <i>to country D:</i>	
	- <i>to country E:</i>	
3.	Supply by import	
	- <i>from country A:</i>	
	- <i>from country B:</i>	
	- <i>from country C:</i>	
	- <i>from country D:</i>	
	- <i>from country E:</i>	
4.	Total annual production	11.85
5.	Extraction from small-scale, regional sites (on land, inland waters)	
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
6.	Extraction from large-scale sites (on land, inland waters) ALL SITES TOTAL	11.85
	- <i>transported by truck</i>	
	- <i>transported by rail</i>	
	- <i>transported by inland vessel</i>	
	- <i>transported by sea vessel</i>	
7.	Marine dredged	0

1. Includes sand, gravel and hoggin used for fill (3.03 million tonnes), crushed rock used for fill and ballast (8.39 million tonnes), and clay and shale for constructional use (0.43 million tonnes).

C17 Trends on primary raw materials in Great Britain

C17.1 Sand and Gravel

Production statistics in Great Britain are generally collated for sand and gravel as combined raw materials. In general, the figures represent a production of around 52% sand and 48% gravel (BGS estimate).

Sand and gravel production (*including land-won, marine dredged, and sand and gravel used for fill*) in Great Britain in the last decade (1990 – 2000) has ranged from 116 million tonnes (1990) to 82 million tonnes (1996). In England, production has ranged from 99 to 69 million tonnes; in Scotland from 13 to 10 million tonnes and in Wales from 4 to 3 million tonnes. In the last five years (since 1996) there has been little variation in production and England has produced 69 to 76 million tonnes annually of sand and gravel, Scotland 10 million tonnes and Wales 3 million tonnes. For Great Britain, recent annual production has been between 82 to 89 million tonnes of sand and gravel.

It is considered likely that production will continue at these levels in the foreseeable future (ie at around 75 to 76 million tonnes in England, 10 million tonnes in Scotland and 3 million tonnes in Wales).

Production of *marine sand and gravel* in Great Britain in recent years has been consistent at around 23 million tonnes per year. Around 7 million tonnes a year are exported to the Netherlands, Belgium and France and just over 2 million tonnes are used for beach replenishment in Britain. Demand for marine aggregates for use in construction remain steady at around 13 million tonnes per year. **It is expected that this level of production will continue in the foreseeable future.**

C17.2 Crushed Rock

Production of crushed rock (*including material used for fill*) in Great Britain during the last decade has ranged from 161 million tonnes (in 1990 and 1995) to 130 million tonnes (in 2000). In England, production has ranged from a high of 118 million tonnes in 1990 to around 88 million tonnes in recent years. In Scotland, production rose from 21 million tonnes in 1990 to 24 million tonnes in 1995 and around 23 million tonnes in recent years (due in part to the increased output from the coastal quarry at Glensanda). Production in Wales during the first half of the decade was around 22 to 24 million tonnes annually, but this has fallen in recent years to less than 20 million tonnes annually. In 2000, annual production in Wales fell to 19 million tonnes.

Production of crushed rock in Britain has been relatively flat for the last five years (at around 130 to 133 million tonnes) and it is considered likely that this trend will continue in the foreseeable future.

Considerable amounts of crushed rock are imported into England from Scotland (from the Glensanda coastal quarry) and also from Wales (particularly from North Wales). In recent years significant quantities of crushed rock aggregates have also been imported into southern England from the coastal quarry in Bantry Bay, Ireland.

C17.3 Industrial Limestone (limestone, dolomite and chalk for non-aggregate purposes)

Annual production of industrial limestone (limestone for non-aggregate uses, including cement and agricultural use) in Great Britain has ranged between 34 and 28 million tonnes in the last decade. Cement production is the largest end-use, and this has ranged from 20 million tonnes in 1990 to around 16 million tonnes annually in recent years. Large amounts of industrial limestone are also used in iron and steel making, chemicals, fillers, glass making etc., and annual production for these end-uses has ranged from 9 to 11 million tonnes over the last decade. Great Britain production of industrial limestone for agricultural use over the same period has ranged between 2 and 4 million tonnes per year and between 2 and 3 million tonnes annually in the last five years.

During the last five years industrial limestone production in Great Britain has been around 28 to 30 million tonnes per annum. Cement production is currently relatively flat and any increase in demand for cement may well be made up from imports. **It is therefore considered likely that demand for industrial limestone in the next decade will be relatively modest at around current rates of production or somewhat less (i.e. at around 28 million tonnes per year).**

C17.4 Silica Sand

Silica sand production in Great Britain over the last decade has varied between 3.6 and 4.8 million tonnes per year. Most production is from England (3.6 million tonnes in 2000), with only relatively small amounts (0.5 million tonnes) sourced from Scotland and Wales. **It is perceived that the production rate of around 4 million tonnes per year will continue in the foreseeable future.**

C17.5 Clay

In Great Britain, brick manufacture is the largest tonnage use of clay for construction purposes. It accounts for over 90% of the clay extracted in this sector. There has been a decline in brick production since the mid 1960s (due mainly to the demise of the 'common' brick and its replacement by concrete blocks; the decline in house building has also had an effect) but nevertheless large amounts of clay are extracted in Great Britain. In the past decade clay production ranged between around 8 million to 11 million tonnes per annum. Most production (over 90%) is in England.

The future demand for clay will probably be dominated by the demand for bricks, which will continue to primarily reflect activity in the housing building sector. The brick industry anticipates that brick production is likely to stabilise at around 3,000 million bricks a year, **equivalent to some 9 million tonnes a year of brick clay.**

C17.6 Fill (sand and gravel, crushed rock and clay/shale for fill uses)

Production figures of fill material generally reflect the variation in demand for aggregate materials in construction in Britain. **It is therefore considered that production at current levels (66 million tonnes in Great Britain) is likely to continue in the foreseeable future.**

C18 Market structure

C18.1. Sand and Gravel and Crushed Rock Aggregates (including fill)

Sand and gravel and crushed rock aggregates (limestone, including dolomite, igneous rock and sandstone) are the principal sources of aggregate in Great Britain. Small amounts of chalk, and clay and shale may be used for low-grade constructional fill but the amounts involved are small. Most crushed rock aggregate, and sand and gravel quarries will produce some material for construction fill and this material is not considered as a separate commodity in the UK. In addition to conventional crushed rock producers, some quarries, for example, those mainly producing building stone or clay and shale, may also produce small quantities of crushed rock aggregates as a by-product. It is difficult to say, therefore, with any precision how many sites actually produce crushed rock aggregate in a given year. The numbers of active quarries by mineral commodity are shown on the following table (Table 3). These figures are mainly aggregate producers but will also include building stone quarries, some of which may also produce aggregate. The number of true building stone producers will be greatest for sandstone.

Table 3 Active quarries by mineral commodity in Great Britain

Mineral Commodity	England	Wales	Scotland
Limestone/Dolomite	247	48	13
Igneous and metamorphic rock	45	15	93
Sandstone	178	27	40
TOTAL	470	90	146

There are some 701 active sand and gravel sites in Great Britain of which 78% are in England and 18% in Scotland. The majority will produce both sand and gravel, but a small proportion will produce just sand. This proportion is not known but might be about 15%.

The number of companies producing sand and gravel in Great Britain is 267 and the number producing limestone/dolomite, igneous rock and sandstone is 339. However, these figures include subsidiary companies of the major producers and the total number of separate producers will be significantly less.

The five largest producers of aggregates (sand and gravel and crushed rock) account for around 70% of total production. These companies with their estimated market share are shown below.

Tarmac	24%
Hanson Aggregates	17%
RMC	11%
Aggregate Industries	10%
Lafarge Aggregates	9%
Foster Yeoman	4%
Others	25%

Source: Industry sources (confidential)

The market share for sand and gravel and crushed rock will be different but figures are not available.

C18.2. Industrial Limestone

In the UK the term ‘industrial limestone’ generally excludes limestone used for cement manufacture and for agricultural use. In its broadest sense it should include dolomite and chalk used for industrial applications and total production of industrial limestone on this basis was some 9 million tonnes in 2000. A further 16 million tonnes of limestone, including chalk, was used in cement manufacture in 2000.

Quarries extracting limestone for cement manufacture rarely produce rock for aggregate purposes. In contrast quarries producing limestone and dolomite for industrial applications, such as lime making, flux for iron and steel manufacture, chemical feedstock and filler applications, almost always also produce crushed rock aggregate.

The dominant cement manufacturer in the UK is Lafarge Cement (formerly Blue Circle) with about 50% of the market. The other producers are Castle Cement, Rugby Cement (part of RMC), and a smaller producer, Tarmac, that produces cement in conjunction with industrial limestone and aggregate at one site.

The main industrial limestone (including dolomite) producers are; Tarmac, Lafarge Aggregates and Hanson Aggregates. Medium-sized producers include OMYA UK, Corus Steel, Longcliffe Quarries, Ben Bennett and Lhoist UK.

The main concentration of industrial limestone production in the UK is in Derbyshire, including the Peak District National Park.

C18.3. Silica Sand

Silica (industrial) sands are marketed for a wide range of industrial uses rather than for direct application in the construction industry. They are essential raw materials for glassmaking and foundry casting, as well as a wide range of other products, such as ceramics, chemicals and water filtration.

The distinction between silica sand and construction sand is based principally on application and market specifications, rather than a fundamental difference between the

two raw materials. Silica sands are valued for their physical and/or chemical properties on which their industrial applications are based.

In Great Britain it is quite common for silica sand quarries to produce sand that is also used in construction and some construction sand quarries may also sell small quantities of silica sand.

There are 50 silica sand quarries in Great Britain, of which 38 are in England, 10 in Scotland and 2 in Wales. About 88% of total production of just over 4 million tonnes in 2000 was produced in England.

There are some 26 companies recording some production of silica sand. However, output is dominated by WBB Minerals Ltd, which accounts for over 50% of total output and an even greater proportion of the higher grades of silica sand used in glass manufacture and for foundry purposes. Other significant producers are Tarmac, Hanson Aggregates and Bathgate Silica Sands Ltd.

C18.4 Clay

Clay and shale, including small quantities of fireclay, are used in the manufacture of structural clay products (bricks, pipes and tiles), in cement making, for lining and sealing landfill sites, and for constructional fill. Of the total output of some 11.4 million tonnes for these purposes in 2000 some 75% was used in the manufacture of structural clay products of which brick production accounted for by far the major proportion. Clay and shale production is principally confined to England reflecting the location of brick manufacturing plant.

There are 180 clay and shale sites in Great Britain of which 142 are for brick manufacture. Most brick manufacturers control their own sources of clay and shale. In contrast, fireclay is almost exclusively a by-product of opencast coal production and thus output is by the main coal mining companies. However, only a small proportion of opencast coal sites produce fireclay and four sites accounted for over 50% of total production of 595,000 tonnes in 2000. Most fireclays are used in the manufacture of buff or cream coloured facing bricks.

Brick manufacture and, therefore, the extraction of clay and shale, is dominated by two companies, Ibstock Building Products and Hanson Brick who account for about two-thirds of total output. Four other companies (Ambion Brick, Baggeridge Brick, Chelwood Brick and Marshalls Clay Products) are also significant producers and these six companies account for almost 90% of total brick production. In early 2002 it was announced that Ambion Brick and Chelwood Brick are to merge to form the third largest brick manufacturer in Great Britain. In addition, there are a further 30 brick producers most of whom produce their own clay raw materials. There are two main clay pipe producers, the largest being Hepworth Building Products.

C19 Exporting quarries

There are very few quarries in Great Britain which export the seven raw materials considered in this report, although it should be noted that large volumes of marine sand and gravel dredged from off the east and south coasts of England are exported to mainland Europe.

The quarries which do export the raw materials include:

1. **Glensanda quarry**, Highlands, Scotland. Grid Reference NM 823 487.
Owned by Foster Yeoman Ltd.
Producing crushed rock (granite) aggregates for sea transport to England, the Netherlands, Germany etc. Currently producing 6 million tonnes/year with capacity to increase to 15 million tonnes annually.
2. **Lochaline mine**, Highlands, Scotland. Grid Reference NM 668 466.
Owned by Tarmac Ltd.
Producing silica sand for glass and industrial uses. Currently producing approximately 120,000 tonnes annually.
3. **Raynes quarry**, Colwyn Bay, North Wales. Grid Reference SH 890 780.
Owned by RMC Roadstone Ltd.
Producing crushed rock (limestone) aggregates, partly for sea transport. Around 65,000 tonnes/year is exported.
4. **Brindister quarry**, Shetland, Scotland. Grid Reference HU 438 368
Owned by Hewden Quarries Ltd.
Producing high specification (skid resistant) aggregates. May export relatively small amounts.
5. **Cruicks quarry**, Fife, Scotland. Grid Reference NT 133 817
Owned by Tarmac Northern Ltd.
Produces crushed rock (dolerite) aggregates. It has a marine wharf which will take vessels up to 2,500 tonnes.
6. **Dean quarry**, St. Keverne, Cornwall. Grid Reference SW 802 208
Owned by Lafarge Aggregates
Produces crushed rock (gabbro) aggregates and has the capacity for export.
7. **West of England quarry**, Portoustock, Cornwall. Grid Reference SW 808 216
Owned by Aram Resources plc
Produces crushed rock (gabbro) aggregates and has the capacity for export.
8. **Cloburn quarry**, Lanark, Scotland. Grid Reference NS 945 414
Owned by Cloburn Quarry Company Ltd.
Produces crushed rock (granite) red-coloured aggregates. It is rail linked and can export to other parts of Great Britain.

D MARKET FOR SECONDARY AND RECYCLED RAW MATERIALS – ENGLAND AND WALES

(all numbers in 10⁶ ton/year)

		Production	Usage	Landfilled	Import (from ...)	Export (to ...)
1.	Construction and demolition waste (1999)	72.5	25.1	47.4 ¹	0	0
2.	Asphalt waste (2000)	11	11	<<	0	0
3.	Dredged material (1997)	21.2	<<	21.2 ²	0	0
4.	Cleaned soil	0	0	0 ¹	0	0
5.	MSWI bottom ash (2000)	0.7	0.3	0.4	0	0
6.	MSWI fly ash (2000)	0.1	0	0.1	0	0
7.	Coal bottom ash (1999)	1.3	1.3	0	0	0
8.	Coal fly ash (1999)	4.2	1.6	2.6	0	0
9.	Blast furnace slag (1999)	4.0	4.0	0	0.25 ⁴	0
10.	Steel slag (1999)	1.9	0.8	1.1	0	0
11.	Colliery spoil (2000)	11	0.2	11 ³	0	0
12.A	Other: Slate waste (2000)	6	0.3	5.7 ³	0	0
B	Other: China clay waste (1999)	25	1.7	23.8 ³	0	<<
C	Other: Spent foundry sand(1998)	1.0	0.2	0.8	0	0

¹ Includes clean soil. Also, includes material beneficially reused on landfill sites (engineering and restoration) and material deposited on registered exempt sites (landscaping, e.g. for golf courses, restoration of old quarry workings)

² Mostly discharged at sea

³ Mostly as tips

⁴ Granulated blast furnace slag mainly from France and Belgium. Ground for cementitious use (pers. comm. D Higgins, Northeast Slag)

Notes on statistics and trends

D1 Construction and demolition waste and excavated soils

According to work prepared for the Environment Agency, C&D waste and excavated soils in 1999 totalled 72.5 million tonnes. Where indicated as not being mixed with C&D material, soil has been quoted separately in Table D. This information and more detailed breakdowns are available on the internet (web site of Environment Agency). The 47.4 million tonnes under the “landfill” category includes 9.5 million tonnes of material beneficially reused on landfill sites (engineering and restoration) and 20.3 million tonnes of material deposited on registered exempt sites (landscaping eg for golf courses, restoration of old quarry workings). The remaining 17.5 million tonnes going to landfill without beneficial reuse is made up almost entirely of soil and mixed C&D (containing only small proportions of “core” C&D concrete and masonry). The 48.8 million tonnes of C&D contains 33.8million tonnes of “core” C&D and 15.0 million tonnes of mixed C&D.

These figures are thought to exclude “core” C&D on unregistered sites. In addition, other Environment Agency reports (1999, 2000) indicate that 1 million tonnes per annum of “core” C&D is disposed of in Special Waste arisings and 2 million tonnes per annum in Industrial and Commercial Waste.

In the past 5-10 years there has been a major increase in the production and use of recycled aggregates. Future gains in this market will be small due to the lack of additional source material of good quality.

D2 Asphalt waste

Data from Highways Agency (pers. comm. Robert Dudgeon, Highways Agency).

D3 Dredged material

Most recent published data is from 1997 (pers. comm. Tim Hanham, Marine Consents & Environment Division, Department for Environment, Food & Rural Affairs,). A wet tonnage of 38.6 million is translated as a dry tonnage of 21.2 million (ie a moisture content of 45%). In a survey over 20 years ago (R Collins, 1980) a wet tonnage of 36.5 million was estimated with a moisture content of around 60% giving a dry tonnage of 14.6 million.

D4 MSWI bottom ash and MSWI fly ash

Information obtained from the Environmental Services Association (pers. comm. Debbie Dorkin, ESA,) planning has been granted for a 50% increase in incineration capacity and at least as many again being submitted for planning consent.

D5 Coal bottom ash and coal fly ash

Information for 1999 taken from the internet (web site of Environment Agency). Production has reduced in recent years but is probably now relatively steady.

D6 Blast furnace slag and steel slag

Information for 1999 taken from the internet (web site of Environment Agency) plus 0.3 million tonnes per annum of steel slag fully recycled outside South Wales (mainly Rotherham) - figure for the year 2000 from SteelPhalt (pers. comm. Nick Jones, SteelPhalt,). The full figures from SteelPhalt are:

120,000 tonnes electric arc furnace slag (Sheffield area)

40,000 tonnes electric arc furnace slag (Sheerness, Kent)

100,000 tonnes stabilised stainless slag

100,000 tonnes debris from steelworks including refractory bricks from knock-outs

One of the four remaining blast furnace sites closed (at Llanwern) in 2001 – annual production of blast furnace slag is expected to be down to 3 million tonnes. Tarmac hopes to maintain the current level of slag utilisation through a large increase in the utilisation of the basic oxygen steel slags (pers. comm. Howard Robinson, Tarmac)

There are many old slag tips around the UK, now mostly landscaped, but discouraging development because of the unstable nature of the slag (decades or even centuries after deposition)

D7 Colliery spoil

All that remains of a once massive nationalised industry is a company owning 13 mines (UK Coal, formerly RJB Mining) and a few independent mines. UK Coal production of spoil is currently running at just under 10 million tonnes per year (pers. comm. Martin Brumby,) and he estimates the remaining independents to produce another million tonnes per year. Usage of the spoil depends on the proximity of large road construction projects eg 0.2 million tonnes have just been agreed for the new Selby by-pass. Tower Colliery, S. Wales produces approx. 0.5-0.6 million tonnes of spoil per year (pers. comm. Tower Colliery surveyors dept.). Hatfield Colliery, Doncaster produces approx. 0.2-0.3 million tonnes of spoil per year (pers. comm. Hatfield Colliery). Together with a few small operations, this produces a total of around 11 million tonnes per year for England and Wales.

Stockpiles approaching 4,000 million tonnes are now mostly landscaped. No account has been taken of arisings from opencast sites which are reused for restoration.

D8 Slate Waste

The figures come from a survey carried out for the National Assembly for Wales, 2001 and are summarised on the internet (web site of The National Assembly for Wales). 730 million tonnes of slate waste are already tipped in North Wales. 270-370 million tonnes is potentially available as a resource; the remaining 360-460 million tonnes is constrained by a range of environmental factors or by distance from any possible bulk transport option. In comparison with these figures, slate wastes in SW England and Cumbria (production and stockpile) are negligible. There is now renewed interest in Wales for the development of an increased market for slate waste.

D9 China clay wastes

Data from the SW Region Aggregates Working Party and Imerys (pers. comm. Clive Kessell, Imerys). About a third of the waste stream is aggregate (sand + some coarse) suitable for use in concrete or bituminous mixes. The remainder is a mix of low grade sand, rock and mica residue. Production of the waste remains relatively steady and the stockpile is now around 650 million tonnes. Imerys are investing in port facilities and are expecting to expand annual sales from 1.3 to 1.6 million tonnes in 2002. Exports totalling 53,000 tonnes in 2001 went predominantly to the South East, Thames, along the South Coast and to the Channel Islands. Some shipments have been made as far afield as Germany (insufficient quantity for record in Table D).

D10 Foundry sand

Information from “Beneficial Reuse Opportunities” (A Fraser-Dale et al.1999).

D MARKET FOR SECONDARY AND RECYCLED RAW MATERIALS – SCOTLAND

(all numbers in 10⁶ ton/year)

		Production	Usage	Landfilled	Import (from ...)	Export (to ...)
1.	Construction and demolition waste (1998)	7.5	2.4	5.1	0	0
2.	Asphalt waste (2000)	? 1 ?	? 1 ?	<<	0	0
3.	Dredged material (1997)	1.0	<<	1.0 ¹	0	0
4.	Cleaned soil ²				0	0
5.	MSWI bottom ash (2000)	0.03	0	0.03	0	0
6.	MSWI fly ash (2000)	0.004	0	0.004	0	0
7.	Coal bottom ash (2000)	~ 0.2 ****	~ 0.2	<<	0	0
8.	Coal fly ash (2000)	~ 0.6 ****	? 0.2 ?	? 0.4 ?	0	0
9.	Blast furnace slag (2000)	0	0	0	0	0
10.	Steel slag (2000)	0	0	0	0	0
11.	Colliery spoil (2000)	< 0.1	< 0.1	<<	0	0
12.A	Other:					
B	Other:					
C	Other:					

¹ Discharged at sea

² Probably included in C&D waste

Notes on statistics and trends

D1 Construction and demolition waste

Surveys have indicated that C&D waste going to landfill reached a maximum of 7.8 million tonnes in 1994. “Scottish Waste Statistics for 1997 and 1998” (Scottish Executive Central Research Unit, 2000) indicate that in 1997, landfill was 7.0 million tonnes, with recycling 0.5 million tonnes. The figure given for landfill 1998 in “Waste Data Digest 2001” (web site of Scottish Environment Protection Agency) is only 5.1 million tonnes. For a similar level of construction activity, it might be assumed that approximately 2.4 million tonnes was recycled or deposited on exempt sites.

D2 Asphalt Waste

This is a rough estimate based on the data for England and Wales.

D3 Dredged Material

Most recent published data is from 1997 (pers. comm. Tim Hanham, Marine Consents & Environment Division, Department for Environment, Food & Rural Affairs).

D4 Cleaned Soil

No information; excavated soil probably included in C&D waste.

D5 MSWI bottom ash and MSWI fly ash

Information obtained from the Environmental Services Association (pers. comm. Debbie Dorkin, ESA).

D6 Coal bottom ash and coal fly ash

Data is confidential. An estimate has been made based on the electricity generation capacity in Scotland

D7 Blast furnace slag and steel slag

No production in Scotland for some years. Many old slag tips, now mostly landscaped.

D8 Colliery spoil

Longannet Mine produces relatively little waste; used for lagoon construction at Longannet Power Station run by Scottish Power (pers. comm. Scottish Coal.)

Stockpile approximately 150 million tonnes now mostly landscaped. No account has been taken of arisings from opencast sites which are reused for landscaping.

D9 Slate Waste

No significant production; stockpile is assumed to be 70 million tonnes

D10 Spent oil shale

No production; stockpile is assumed to be 200 million tonnes

E MARKET FOR RENEWABLE RAW MATERIALS

E1 Total amount of new houses per year and percentage of timber-framed houses on total number of new houses

The following figures have been obtained from Government websites:

English Housing statistics 1999: starts – 147,000; completions – 140,000.

English Housing statistics 2000: starts – 144,000; completions – 137,000.

(web site of Department of Transport, Local Government and the Regions)

Welsh Housing statistics 1999: starts – 9,300; completions – 8,000.

(web site of The National Assembly for Wales)

Scottish Housing statistics 1999: starts – 22,863; completions – 22,959.

Scottish Housing statistics 2000: starts – 24,269; completions – 23,769.

(web site of The Scottish Executive)

With regard to the proportion of timber frame in new housing, no statistics are collected giving a direct measure of this, as far as can be ascertained. BRE estimates that for England and Wales the figure is about 10% and for Scotland about 50%.

E2 Volume of timber per timber-framed house (m³)

The standard form of wall construction for UK housing incorporates a load-bearing inner leaf, insulation, air gap and a decorative outer leaf normally composed of bricks and mortar. In Scotland, there is also considerable use of rendered blockwork for the outer leaf. Thus in the UK “timber frame” refers to the structural use of timber on the inner leaf. Apart from occasional use of decorative weatherboarding, timber is rarely used for the outer leaf of housing in the UK.

A volume calculation for a detached house of plan 8x8m is given below (pers. comm. T Reynolds, BRE Centre for Timber Technology):

Structural timber:

Suspended ground floor typical 225 x 47mm at 600 spacings = $0.225 \times 0.047 \times 8 \times 14 = 1.2 \text{ m}^3$

Same with intermediate floor 1.2 m^3 ; allow 10% for noggings etc = 2.64 m^3 for the floors.

Roof: Fink Trussed Rafter at 600mm spacings:

Ceiling tie $8\text{m} \times 35\text{mm} \times 97\text{mm} = 0.0272 \text{ m}^3$

Rafters $9.24\text{m} \times 35\text{mm} \times 97\text{mm} = 0.0313 \text{ m}^3$

Webs $7.6\text{m} \times 35\text{mm} \times 72\text{mm} = 0.01915 \text{ m}^3$

Bracing 7 (ridge, dia x 2, binders x 4) $\times 0.6\text{m} \times 22\text{mm} \times 97\text{mm} = 0.009 \text{ m}^3$

Truss Total = 0.087 m^3 of timber per 600mm; $14 \times 0.087 = 1.2 \text{ m}^3$

Wall panels: 89 mm depth of studs = 0.06 m³ per panel. Might be 24 panels per typical house = 1.44m³

TOTAL = 5.3m³ of structural timber,

Panel products:

4 walls 2.4m high x 2 x 8 = 154m² of plywood thickness 8mm = 1.2 m³ of OSB or ply.

Floors 8m x 8m x 2 x 22m chipboard for the floors 2.8m³ of chipboard

This excludes windows stairs etc and assumes cladding is brick

GRAND TOTAL 9.3 m³, but only 8m³ if ground floor is concrete slab.

E3 Volume of timber per non-timber-framed house (m³)

This is derived from the calculation above less wall panels. The total is reduced by 2.6m³, ie to 6.7m³ (or to 5.4m³ if ground floor is concrete slab).

E4 Other significant constructions in timber (e.g. bridges, harbour constructions); estimates of total amount of timber in these constructions (m³)

There is essentially no use of timber in major structures apart from fitting out – flooring, furniture, panelling etc. Other than in housing, timber is used for fencing, outhouses (sheds, summerhouses, sports pavilions etc) shuttering, panelling, furniture etc.

E5 Trends with respect to timber use versus other raw materials:

- 5.1 during the last decade – overall there has been a gradual trend towards timber frame, but also to concrete floors (ground floors and higher)
- 5.2 for the next decade – UK timber production is expected to double in the next decade, so there will be increased pressure to use timber in construction, including new areas such as timber framed multi-storey construction.
- 5.3 in the long term – increasing pressure on the UK minerals extraction industry is likely to continue to encourage increases in the use of timber in construction.

E6 Other renewable materials used as raw building material

Other renewable materials are of little significance in comparison with timber. There is an ongoing market for straw and reed thatch roofing material for the restoration of historic buildings. Hemp and also straw bale have been used in housing demonstration projects. Other material which may be considered as renewable (or partially so) are rubber tyres and biocomposites. Apart from the burning of rubber tyres in the manufacture of cement. the use of these materials in UK construction has not progressed beyond the research stage.

F KNOW-HOW AND RESEARCH

F1 Key players in research

The British Geological Survey (BGS) is a government research organisation and is part of the Natural Environment Research Council. It provides comprehensive, objective, impartial and up-to-date geoscientific information, advice and services to a wide range of customers in the industrial, engineering, governmental and scientific communities.

The Economic Minerals and Geochemical Baseline (EMGB) Programme of BGS manages, markets and develops a range of science- and commercial-facing expertise, services and products with the aim of increasing the knowledge and understanding of metallic, non-metallic and industrial mineral resources within the UK and overseas. EMGB applies its expertise to a range of issues including:

- Provision of information systems backed by high-level expertise to support decision makers and policy development
- Minerals and planning
- Provision of statistics on mineral production and trade for the UK and the world
- Developing new scientific research programmes related to mineral resources
- Advising government at local, regional, national and international levels
- Sustainable minerals development, commodity life-cycle analysis, the environment and mineral extraction

BRE is a company limited by guarantee (non-profit making) formerly a government research establishment. Research on construction and related areas: materials, structures, fire, environment, sustainability etc. (More information is available if required on www.bre.co.uk)

There is also a wide range of consultancy companies in Great Britain who act as contractors for research work in the minerals and land-use planning sector including;

- Symonds Travers Morgan, Symonds House, Wood Street, East Grinstead. West Sussex, RH19 1UU.
- Arup, 4 Pierhead Street, Capital Waterside, Cardiff, CF 10 4QP.
- Ecotech Research and Consultancy Ltd, Priestly House, 28-34 Albert Street, Birmingham B4 7UD.
- Scott Wilson, Avalon House, Marcham Road, Abingdon, Oxfordshire, OX14 1UG.
- Mott MacDonald, Demeter House, Station Road, Cambridge, CB1 2RS.

F2 Major research projects

- AM2001 – Aggregate Minerals Survey (AM2001). National collation of this Survey being undertaken by BGS for the Department of Transport, Local Government and the Regions (DTLR).
- Mineral Resource Information in Support of National, Regional and Local Planning – county maps in England of mineral resources and planning constraints suitable for use in a GIS – being undertaken by BGS for DTLR.
- Summaries of United Kingdom Mineral Statistics – project being carried out by BGS for DTLR.
- Sustainable Development Issues for Mineral Extraction – the Wareham Basin of East Dorset. Project recently completed (2002) by BGS for DTLR.
- Brick Clay – Issues for Planning . Project recently completed (2001) by BGS for DTLR.
- Review of Planning Issues Relevant to Minerals other than Aggregates in England – project at Tender Stage to be let in 2002 by DTLR.
- Planning for the Supply of Building and Roofing Minerals – project at Tender Stage to be let in 2002 by DTLR.
- Specification for Establishing the Methodology for Assessing Aggregates Demand and Supply – project at Tender Stage to be let in 2002 by the National Assembly for Wales.

There is a wide and varied number of research projects: the trend in the UK is for there to be a large number of medium-to-small projects which it would be inappropriate to list here. Information on projects can be obtained on the internet (web site of Department of Trade and Industry; web site of Department of Transport, Local Government and the Regions, web site of Network for the Exploitation of Science and Technology) The latter site can be searched for research funded by the UK Research Councils which is the main source of research funding for the universities.

F3 Quality control measures for secondary and recycled raw materials

Technical: BRE have published a quality control document for recycled aggregates (ref. BR392) which is widely used in the industry and has been adopted by the Highways Agency in their Specification. A similar document for MSWI bottom ash is in draft form. With regard to other secondary aggregates, some producers have used third party schemes to promote their materials. Environmental Quality is overseen in England and Wales by the Environment Agency and in Scotland by SEPA.

F4 Renewable materials

Timber Research in the UK is conducted mainly by two independent research companies (BRE and TRADA) and by various university departments. The Timber Research and Development Association (TRADA) is an internationally recognised centre of excellence on the specification and use of timber and wood products. TRADA's mission is to build markets for timber and wood-based products and increase sales in the UK. TRADA

maintains active programmes of research and information. Information on projects may be accessed over the internet (web site of Building Research Establishment; web site of Timber Research and Development Association; web site of Network for the Exploitation of Science and Technology).

In strategic terms mention may be made of one project started in 1992 and completed in 1996 with the publication “Aggregates in Construction - Current Practice, Scope for Substitution and Intensity of Use” published by the Department of the Environment (see web site of Department of Transport, Local Government and the Regions). The project examined the scope for substitution of primary aggregates in the UK by secondary and renewable resources using a limited number of building specifications to represent construction activities. The main limitation to such substitution was availability, and perhaps also resistance to the import of even greater quantities of timber from Nordic countries. As the availability of home-grown timber is expected to double in the next ten years, there is the prospect of a significant rise in the use of timber in construction.

The above publication also suggests that as a renewable substitute for roofing materials, but this seems at present unlikely to be the subject of serious research or market development beyond the historic renewals market. With regard to the use of hemp, BRE has made a comparison with more traditional construction on a site in Suffolk, England. For research on hemp and biocomposites see for example www.materials.qmul.ac.uk/ecocomp/prog.htm (Ecocomp Conference, Queen Mary College, University of London).

G SOURCES

G1 List of key players

G1.1 Governmental organisations

Department of Transport, Local Government and the Regions (DTLR) (www.dtlr.gov.uk)

Minerals and Waste Planning Division (Contact: Brian Marker)

Zone 4/A2

Eland House

Bressenden Place

London SW1E 5DU

Tel: 020 7944 3851

Scottish Executive (www.scotland.gov.uk)

Development Department (Contact: Brian Spears)

Room 2-H91

Victoria Quay

Edinburgh EH6 6QQ

Tel: 0131 244 7546

The National Assembly for Wales (www.wales.gov.uk)

Planning Division (Contact: Sue Martin/Chris Morgan)

Cathays Park

Cardiff CF10 3NQ

Tel: 029 2082 5731

Department of Trade and Industry (DTI) (www.dti.gov.uk)

Metals, Minerals and Engineering Sponsorship (Contact: Gerry Miles)

151 Buckingham Palace Road

London SW1W 9SS

Tel: 020 7215 1094

Department for Environment, Food and Rural Affairs (DEFRA)

Nobel House

17 Smith Square

London

SW1P 3JR

Tel: 020 7238 6000

Highways Agency (Contact: Robert Dudgeon)

St Christopher House

Southwark Street

London

SE1 0TE

Tel: 08459 556575

Environment Agency (www.environment-agency.gov.uk)

Rio House

Waterside Drive

Aztec West

Almondsbury

Bristol

BS32 4UD

G1.2 Trade associations

Quarry Products Association (QPA)

Planning Officer (Duncan Pollock)

156 Buckingham Palace Road

London SW1W 9TR

Tel: 020 7730 8194

The British Aggregates Association (BAA)

PO Box 99 (Contact: Robert Durward)

Lanark

ML11 8WA

Tel: 01555 663 4444

British Marine Aggregates Producers Association (BMAPA)

Contact: Mark Russell

156 Buckingham Palace Road

London SW1W 9TR

Tel: 020 7730 8194

G1.3 Research organisations

Construction Industries Research and Information Association (CIRIA)

6 Storey' Gate
London SW1P 3AU
Tel: 020 7222 8891

Environmental Services Association (Contact: Debbie Dorkin)

154, Buckingham Palace Road
London
SW1W 9TR
Tel: 020 7824 8882

Waste Resources Action Programme (WRAP) www.wrap.org.uk

The Old Academy
21 Horse Fair
Banbury OX16 0AH

British Geological Survey (BGS) (www.bgs.ac.uk)

Economic Minerals and Geochemical Baseline Programme (Contact: Mike Petterson)
Keyworth
Nottingham NG12 5GG
Tel: 01159 363100

Building Research Establishment (BRE) (www.bre.co.uk)

Aggregates and Recycling Construction Division (Contact: Rod Collins)
Garston
Watford WD2 7JR
Tel: 01923 664676

Transport Research Laboratory (TRL)

(Contact: Dr Murray Read)
Old Wokingham Road
Crowthorne
Berks RG11 6AU
Tel: 01344 773131

G1.4 Industrial organisations

The Crown Estate

Marine Estates (Contact: Tony Murray)
16 Carlton House Terrace
London SW1Y 5AH
Tel: 020 7210 4322

Tarmac Ltd

(Contact: Howard Robinson, Research Manager)
Millfields Road
Ettingshall
Wolverhampton WV4 6JP
Tel: 01902 353522

Hanson Aggregates

The Ridge, Chipping Sodbury
Bristol BS37 6AY

Aggregate Industries

Bardon Hill
Coalville
Leicestershire LE67 1TL

RMC Aggregates Ltd

RMC House
Church Lane
Bromsgrove
Worcestershire B61 8RA
Tel: 01527 575777

Lafarge Aggregates

Bradgate House
Groby, Leicester, LE6 0FA
Tel: 01530 242151

Ibstock Building Products Ltd

Ibstock
Leicestershire LE67 6HS
Tel: 01530 261999

Hanson Brick Ltd

Unicorn House
Wellington Street
Ripley
Derby DE5 3DZ
Tel: 0990 258258

WBB Minerals

Brookside Hall
Sandbach
Cheshire CW11 4T
Tel: 01270 752752

Imerys Ltd (Contact: Clive Kessell)

The Docks,
Fowey,
Cornwall PL23 1AL
Tel: 01726 74482

SteelPhalt (Contact: Nick Jones)

The Ickles
Sheffield Road
Rotherham
South Yorkshire
S60 1DR
Tel: 01709 300500

G2 References

ANONYMOUS 1975 *Aggregates: The Way Ahead*. Advisory Committee of Aggregates.
London: HMSO.

ANONYMOUS 1994 *Minerals Planning Guidance: Guidelines For Aggregates Provision in England*. MPG6. London: Department of the Environment
<http://www.databases.dtlr.gov.uk/planning/npp/PubDetail.asp?thisPub=MPG06>

ANONYMOUS 1995 *Minerals Planning Policy and Supply Practices in Europe*.
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ANONYMOUS 1996 *Minerals Planning Guidance: General Considerations and the Development Plan System. MPG1*. London: Department of the Environment
<http://www.databases.dtlr.gov.uk/planning/npp/PubDetail.asp?thisPub=MPG01>

ANONYMOUS 1996 *Minerals Planning Guidance: The Reclamation of Mineral Workings MPG7*. London: Department of the Environment
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ANONYMOUS 1998 *Rethinking Construction: the report of the Construction Task Force* – July 1998. London: HMSO.

ANONYMOUS 2000 *Minerals Planning Policy Wales*. The National Assembly for Wales.

ANONYMOUS 2000 *Waste Strategy 2000: England and Wales: part 1* – May 2000. London: HMSO.

ANONYMOUS 2000 *Waste Strategy 2000: England and Wales; part 2* – May 2000. London: HMSO.

ANONYMOUS 2000 *Planning for the Supply of Aggregates in England: a Draft Consultation Paper*. London: Department of Transport, Local Government and the Regions.

<http://www.planning.dtlr.gov.uk/consult/aggregates/supply/index.htm>

ANONYMOUS 2000 *Achieving a better quality of life - Review of progress towards a sustainable development*. London: Department of the Environment, Transport and the Regions.

http://www.sustainable-development.gov.uk/ann_rep/index.htm

ANONYMOUS 2001 *Marine Aggregates Dredging Policy* – South Wales. The National Assembly for Wales

ANONYMOUS 2001 *National Planning Policy Guideline: NPPG4(amended) - Land for Mineral Working*. Edinburgh: The Scottish Office

<http://www.scotland.gov.uk/library/nppg/nppg4bcon.htm>

ANONYMOUS 2001 *Draft Marine Minerals Guidance Notes 2: Guidance on the Extraction by Dredging of Sand Gravel and Other Minerals from the English Seabed.*

London: Department of Transport, Local Government and the Regions.

<http://www.planning.dtlr.gov.uk/consult/mmg2/pdf/draftmin.pdf>

BRITISH GEOLOGICAL SURVEY 2000 *Collation of the Results of the 1997 Aggregates Minerals Survey for England and Wales.* Keyworth, Nottingham: British Geological Survey.

<http://www.mineralsuk.com/mineralsuk/britmin/am97.pdf>

BRITISH GEOLOGICAL SURVEY 2001 *Minerals Planning Guidance Note 6 (MPG6): Guidelines for Aggregates Provision in England. Analysis of data for 1996–97* Keyworth, Nottingham: British Geological Survey.

<http://www.mineralsuk.com/mineralsuk/britmin/MPG6%20report.pdf>

BUSINESS and TRADE STATISTICS Ltd, 2001 *Overseas Trade Statistics December 2000* microfiche. (Esher, Surrey, Business and Trade Statistics Ltd)

CROWN ESTATE 2000. *Marine Aggregates Crown Estate Licences Summary of Statistics 1999.*

DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS 2000 *Building a Better Quality of Life: A Strategy for More Sustainable Construction*, April 2000. Copies of this document are available from DETR free literature PO Box 236 Wetherby LS23 7NB.

FRASER-DALE A, 1999. Paper 27, *Sustainable Castings Production Conference Proceedings*, April 1999. The Castings Development Centre, Sheffield.

HUMPHREYS B, COATES T, WATKISS M and HARRISON D, 1996 *Beach Recharge Materials – Demand and Resources*. CIRIA Report 154. London: Construction Industry Research and Information Association.

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G3 Interview briefs

The questions forming the basis of research interviews for the Project are given below. Section B of this report on policy in England, Wales and Scotland has been directly informed by these interviews and has also been critically edited and amended by the interviewees concerned.

G3.1 Questions to B.Marker, Department of Transport, Local Government and the Regions:

- 1) Which central and local/regional government bodies are chiefly concerned with mineral planning in England and Wales and what are the roles and responsibilities of these bodies?
- 2) Which are the chief environmental and commercial organizations with an interest in mineral planning - what are their fields of influence and how do they act?
- 3) What do you see as the main societal issues affecting minerals planning?
- 4) What recent issues are particularly attracting attention?
- 5) What new legislation is forthcoming as a consequence of these issues?
- 6) What is general government policy line on mineral raw materials?
- 7) Which are the main policy guidance documents concerned and what future guidance documents are in preparation?
- 8) Are there production targets for anything other than aggregate minerals?
- 9) What policy/strategy is under development?
- 10) What is current policy for secondary and recycled raw materials? What policy is under development?
- 11) What is current policy on renewable raw materials? [*referred to DTI*]
- 12) Are there likely to be any changes in the method of projecting future demand?
- 13) Are there likely to be any changes in the system for permissions and other legal aspects?

G3.2 Questions to B.Spiers - Development Department of the Scottish Executive:

- 1) How is national/local government organised in Scotland?
- 2) What environmental bodies are specific to Scotland and what is their purpose?
- 3) What are the main societal issues affecting planning?
- 4) Why did the Aggregate Minerals Survey (AM97) 'fail' in Scotland?
- 5) Which are the most important policy documents?
- 6) What are the Scottish policies on raw materials - are there any specific goals and targets?
- 7) What comments do you have on the Scottish 'superquarries' -actual and proposed?

- 8) How will the (UK) government's proposed changes in the regulation of marine dredging affect the position in Scotland?
- 9) What is the outcome of the review of strategic planning in Scotland - is any new minerals policy being developed?
- 10) What is the policy on secondary/recycled raw materials - will the new version of NPPG4 contain any new policies?
- 11) Are there any projections of future demand?
- 12) How does the Executive use the geological survey system (BGS or others)?
- 13) Are there any differences between English and Scottish systems for permissions, and enforcement of these and other regulations?

G3.3 Questions for the Quarry Products Association

Primary raw materials:

1. What are the industries views on current mineral planning policy ?
2. What is the industries vision for policy development ?
3. What is the industries view on demand forecasts ?
4. Is there a need to estimate demand and why ?
5. How would the industry prefer demand to be calculated ?
6. MPG 6 will only apply to England – what about Scotland and Wales ?
7. How does policy account for imports (from Scotland, Wales, Ireland etc)
8. How does policy account for exports (from marine dredged material etc)
9. Are landbanks appropriate, and over what period ?
10. Are there moves to regional mineral planning and what are the industries views ?

Secondary raw materials

1. What are the industries views on current mineral planning policy ?
2. What is the industries vision for policy development.

Trends

1. What are the trends in the raw materials market (for each commodity) ?
 - during the last decade
 - next decade
 - in the long term

G3.4 Questions for the Welsh Assembly

1. Who are the main actors in mineral planning policy
 - Government – national, regional, local
 - Environmental organisations
 - Industry associations
2. What are the main issues relating to mineral planning
 - Issues determining current policy
 - Recent developments
3. What are the policy documents
4. What is the general policy - goals (qualitative), targets (quantitative)
5. What is the policy on meeting demand for primary raw materials
 - Current policy
 - Policy under development
6. What is the policy on meeting demand by substitution
 - By secondary and recycled materials
 - By renewable raw materials
7. How is future demand estimated
8. How does policy account for imports and exports
9. Are landbanks appropriate, and over what period
10. Are there moves to regional planning
11. What does the Assembly see as the trends in the raw material market
 - During the last decade
 - During the next decade
 - In the long term

G3.5 Questions asked by BRE for data on secondary, recycled and renewable raw materials.

1. Most recent figures (by type of material where appropriate) for (a) arisings (b) quantity recycled
2. Where export was known to exist, most recent figures for this were also requested

Where interviewed did not represent whole industry, questions were asked estimating contributions.

BRE contacts included

- Department of the Environment, Food and Rural Affairs, Marine Consents and Environment Division (T.Hanham, pers.comm.)
- Highways Agency (R.Dudgeon, pers.comm.)
- Environmental Services Association (D.Dorkin, pers.comm.)
- Hatfield Colliery, Surveyors Dept.
- Tower Colliery, Surveyors Dept.
- Imerys, (C.Kessell, pers.comm.)
- Quality Ash Association, (L.Sear, pers.comm.)
- SteelPhalt, (N.Jones, pers.comm.)
- Tarmac, (H.Robinson, pers.comm.)
- UK Coal, (M.Brumby, pers.comm.)
- BRE Centre for Timber Technology (T.Reynolds, pers.comm.)
- Northeast Slag (D.Higgins, pers.comm.)