

Soil and Geology

1.1 Introduction Soil and Geology

Policy context

Draft MPS1 Consultation Paper on Minerals Policy Statement Planning and Minerals *and associated Good Practice Guidance (ODPM, 2004)*

Draft MPS 1 sets out the core policies and principles of mineral planning in England. MPS 1 has gone through stakeholder consultation (ending February 28th 2005). Once the draft MPS 1 has been amended based on comments from the consultation and published MPS 1 will completely replace MPG 1 and the residual elements of MPG6 (see below). The associated Good Practice Guidance will provide advice on how these core policies and principles may be implemented. The Government has recently issued a series of Annexes to MPS1. These form of specific guidance on certain mineral types and will be reviewed before the publication of the sustainability report.

Objectives, Targets and Indicators

The draft objectives of MPS 1 are

- To conserve and safeguard mineral resources as far as possible;
- To protect nationally and internationally designated areas of landscape and sites of nature conservation value from minerals development, other than in exceptional circumstances where it has been demonstrated that the proposed development is in the public interest;
- To secure supplies of the material needed by society and the economy from environmentally acceptable sources;
- To ensure, so far as practicable, that outcomes for the minerals industry are consistent with the Government's aims for productivity growth and strong economic performance;
- To secure sound working practices so that the environmental impacts of extraction and the transportation of minerals are kept to a minimum, unless there are exceptional overriding reasons to the contrary;
- To minimise production of mineral waste;
- To promote efficient use and recycling of suitable materials, thereby minimising the net requirement for new primary extraction;
- To protect, and where possible, to enhance the overall quality of the environment once extraction has ceased through high standards of restoration and to safeguard the long-term potential of land for a wide range of after uses.

Note: These objectives are similar to those published in MPS 2 (see below)

MPG 1: General Considerations

MPG1 sets out the principles and the key planning policy objectives against which plans for minerals and decisions on individual applications should be made. The guidance makes it clear that the winning and working of minerals has a number of special characteristics:

- Minerals can only be worked where they naturally occur - extraction sites are limited;
- Although working often takes place over a long period of time, it should not be regarded as a permanent land use;
- Working often has adverse effects, eg, local disruption to the community. all costs and benefits need to be considered and adverse environmental impacts mitigated or controlled during the process of extraction; and,
- When work stops at a site, the land requires treatment to make it suitable for beneficial after-use and to avoid dereliction.

Objectives, Targets and Indicators

In particular the objectives for sustainable development for minerals planning are:

- To conserve minerals as far as possible, whilst ensuring an adequate supply to meet needs;
- To ensure that the environmental impacts caused by mineral operations and the transport of minerals are kept, as far as possible, to an acceptable minimum;

To minimise production of waste and to encourage efficient use of materials, including appropriate use of high quality materials, and recycling of wastes;
 To encourage sensitive working, restoration and aftercare practices so as to preserve or enhance the overall quality of the environment;
 To protect areas of designated landscape or nature conservation value from development, other than in exceptional circumstances and where it has been demonstrated that development is in the public interest,(see paragraphs 47-49 below); and,
 To prevent the unnecessary sterilisation of mineral resources.

MPG 2: Applications, Permissions and Conditions (July 1998)

MPG2 provides advice on those aspects of the development control system of particular relevance to minerals and on the preparation and determination of individual planning applications.

Objectives, Targets and Indicators

When considering the environmental aspects of minerals developments. MPAs should consult MPG2 and decide whether or not they will warrant Environmental Assessment. This will depend upon the 'sensitivity of the location, size, working methods, proposals for disposing of waste, the nature and extent of processing and ancillary operations, and the arrangements for transporting products away from the site and proposals for restoration and aftercare'.

MPS 2: Controlling and mitigating the environmental effects of mineral extraction in England

Sets out the policies and considerations that Mineral Planning Authorities in England are expected to follow when preparing development plans and considering applications for minerals development. This MPS supersedes MPG11.

Objectives, Targets and Indicators

MPAs should incorporate the objectives of sustainable development in minerals planning. These objectives recognise the potential conflict between the exploitation of resources and environmental aims. In order to reconcile such conflicts, MPAs should aim to:

- Conserve minerals as far as possible, whilst ensuring an adequate supply to meet the needs of society;
- Ensure that the environmental impacts caused by mineral operations and the transport of minerals are kept to an acceptable minimum;
- Minimise production of waste and to encourage efficient use of materials, including appropriate use of high-quality materials, and recycling of waste;
- Encourage sensitive working, restoration and aftercare practices during minerals extraction and to conserve or enhance the overall quality of the environment once extraction has ceased;
- Safeguard the long-term capability of best and most versatile agricultural land, and conserve soil resources for use in a sustainable way; and
- Protect areas of nationally-designated landscape or archaeological value, cultural heritage or nature conservation from mineral development, other than in exceptional circumstances where it has been demonstrated that the proposed development is in the public interest.

Development plan policies and proposals for minerals extraction and associated development should take into account:

- The impacts of mineral working, such as visual intrusion, dewatering, water pollution, noise, dust and fine particulates, blasting and traffic;
- The impacts on landscape, agricultural land, soil resources, ecology and wildlife, including severance of landscape and habitat loss, and impacts on sites of nature conservation, archaeological and cultural heritage value;
- The benefits such as providing an adequate supply of minerals to the economy and hence for society (including construction materials needed for the development of national infrastructure and the creation of sustainable communities), creating job opportunities, and the scope for landscape, biodiversity and amenity improvements through mineral working and subsequent restoration; and
- The methods of control through planning conditions or agreements to ensure that impacts are kept to an acceptable minimum.

Policies and proposals should take into account the level of existing activity and impacts, the duration and nature of proposals for new or further working, and the extent of impacts which a particular site, locality, community, environment or wider area of mineral working can reasonably be expected to tolerate over a particular or proposed period. MPAs should also have regard where relevant to cumulative impacts of simultaneous and/or successive working of a number of sites in a wider area of commercially-viable deposits. These may affect communities and localities over an extended period, depending on the nature, age and size of the site(s).

MPG 5 – Stability in Surface Mineral Workings and Tips

Instability at minerals workings disrupts extraction, poses a health and safety risk to people in and around the quarry and can interfere with restoration schemes. The beneficial and sustainable extraction of minerals, therefore, requires particular attention to stability matters.

Objectives, Targets and Indicators

This guidance is aimed at local authorities, landowners, mineral operators and other developers, and attempts to ensure that:

The operation and restoration of surface mineral workings is not detrimentally affected by instability;
Instability does not impact on neighbouring land;
On cessation of active working, surface mineral workings are left in a safe and stable condition; and
Development in, on or near disused and abandoned workings takes due account of potential instability.

Revised MPG 6 - National and Regional guidelines for aggregates provision in England, 2001-2016 (2003)

MPG6 provides advice to mineral planning authorities and the minerals industry on how to ensure that the construction industry receives an adequate and steady supply of material at the best balance, of social, environmental and economic cost, whilst ensuring that extraction and development are consistent with the principles of sustainable development.

Objectives, Targets and Indicators

Ensure that mineral extraction and provision is informed by the principles of sustainable development, in particular with the objectives of:
Conserving minerals as far as possible, whilst ensuring an adequate supply to meet the needs of society for minerals;
Minimising production of waste and to encourage efficient use of materials, including appropriate use of high quality materials, and recycling of wastes;
Encouraging sensitive working practices during minerals extraction and to preserve or enhance the overall quality of the environment once extraction has ceased; and
Protecting areas of designated landscape or nature conservation from development, other than in exceptional circumstances where it has been demonstrated that development is in the public interest.

The revision sets out sub-regional apportionments of mineral provision.

Minerals Policy Guidance 7: Reclamation of Mineral Workings

MPG 7 deals with policies, consultations and conditions which are relevant to achieving effective reclamation of mineral workings. The guidance:
Sets out the contribution which reclaimed mineral sites can make to the Government's policies for sustainable development and mineral working, and for land use and other policies in the wider countryside;
Advises on the scope of information which should be provided with applications for new mineral developments, to enable relevant planning conditions to be drawn up and resulting site reclamation to be achieved;

Provides some advice on preparation of schemes of conditions for restoration, aftercare and after-use which owners/operators of older mineral sites may need to draw up for future reviews of such sites;
Emphasises the importance of the roles played by the management of site activities by mineral operators and by development control monitoring and enforcement by local authorities, in achieving successful site reclamation;
Advises on financial provision in relation to securing restoration of mineral workings; and
Contains more detailed advice, in Annexes, on soils, reclamation, aftercare and after-use.

Objectives, Targets and Indicators

Key objectives will be to minimise the adverse impacts, and to utilise opportunities for positive contributions which a reclaimed site can make to the landscape.

Mineral Policy Guidance 10: Provision of Raw Material for the Cement Industry

MPG 10 provides advice to mineral planning authorities (MPAs) on the exercise of planning control over the provision of raw material for the cement industry. It indicates the national policy considerations which need to be taken into account in drawing up minerals policies for the industry in their development plans and some of the other factors that need to be taken into account when determining applications for planning permission.

Objectives, Targets and Indicators

It is important that short term gains should not be achieved by creating environmental debts for future generations. The encouragement of cement production must therefore be balanced against important environmental and conservation interests;
Ensure that any environmental damage or loss of amenity caused by mineral working is kept to an acceptable level; and
The cement industry can make a contribution to the objective of sustainable development necessary to have an adequate and continuous supply of raw material to maintain production of cement.

MPG 12 – Treatment of Disused Mine Openings and Availability of Information on Mined Ground

This MPG outlines problems which may occur due to disused mine openings and the uses to which they can be put after abandonment, including underground storage and maintenance for pumping or ventilation purposes. The use of planning controls in these cases are explored.

Objectives, Targets and Indicators

Key objectives not available online.

MPG 14 – Environment Act 1995: Review of Mineral Planning Permissions

The Environment Act 1995 requires regular and review and update of mineral planning permissions, particularly in the light of evolving environmental legislation.

Objectives, Targets and Indicators

Mineral workings are restricted in location (by source of minerals), therefore mineral working sites are often found in environmentally sensitive areas. The temporary nature of mineral workings provides opportunity for environmental enhancement by effective restoration. Hence mineral workings are likely to have significant environmental consequences and permissions for these developments need to be regularly reviewed so as to ensure all legislative requirements are being met.

Regional Planning Guidance for the South East (RPG9)

Bedfordshire and Luton have recently moved from the South East and become part of the East of England Region, but RSS14 is still a draft document and will not be published until late 2006. Bedfordshire and Luton now neighbour the South east, therefore, it is useful to understand their policies and plans to prevent cumulative impacts across the region from occurring.

Objectives, Targets and Indicators

Development should be located and designed to enable more sustainable use of the Region's natural resources.
Ensure there is an adequate supply whilst regarding the objectives of sustainable development by: The provision for the supply of minerals and where ever possible the contribution made by substituting materials should be maximised.

Bedfordshire and Luton Minerals and Waste Local Plan First Review

The Plan sets the detailed land use policy framework for the extraction of minerals and management of waste. This is expected to be superseded by the Minerals and Waste Development Framework.

Objectives, Targets and Indicators

To balance the allocation of minerals sites with environmental and public amenity constraints in the County.
To encourage reduction in the use of raw materials and greater recovery of waste products.

Regional Spatial Strategy (RSS14) of the East of England (Draft Revision)

Bedford now lies within the East of England region for planning purposes. RSS14 is based on the principles of the UK's Strategy for Sustainable Development and sets out a strategy to guide planning and development in the East of England to the year 2021. It aims to improve the quality of life and sets out proposals which will influence where people choose to work and live and how to move about the region. The final RSS14 is due to be published in late 2006.

Objectives, Targets and Indicators

Minimise demand for use of resources such as minerals, aggregates and other natural resources by encouraging efficient re-use or recycled alternatives and meeting the needs with minimum impact. Policy ENV3 aims for the regions natural resources to be protected and enriched through conservation, restoration and re-establishment.
ENV15 aims to identify and safeguard minerals resources for current and future use in accordance with Government Guidance.
ENV16 aims to identify minerals recycling and reprocessing site.

Baseline Review

- 1.1.1 This section addresses baseline Soils and Geology of Bedfordshire and Luton.

Geology

- 1.1.2 Mid-Bedfordshire has a gentle, undulating countryside. It is dominated, by Greensand Ridge, which runs from the northeast to southwest across the area.

1.1.3 To the south is chalk escarpment, part of the Chilterns which runs from the south coast to Norfolk. Clay to the north of the county has been used for many years for brick making.

1.1.4 Most of the rock types in Bedfordshire were formed during the Jurassic or Cretaceous geological Periods.

Jurassic - 208 million years ago

Cornbrash - Lower period
Oxford Clay - Middle Period
Amphill Clay - Upper Period

Cretaceous- 145 million years ago

Gault Clay - Lower Period
Woburn Sands - Lower Period
Chalk - Upper Period

Cornbrash (Limestone)

1.1.5 The Cornbrash is a Jurassic limestone, which often has an orange colour due to iron staining.

Oxford Clay

1.1.6 Oxford Clay was formed 160 million years and has been extensively used by the Bedfordshire brick industry to make Fletton bricks. Some layers of the clay contain hard limestone nodules. The clay also contains shell beds these beds often contain the golden coloured mineral iron pyrites.

Amphill Clay

1.1.7 The Amphill Clay was deposited about 155 million years ago. It was named after the village of Amphill in Bedfordshire. In many areas it was weathered away completely during the late Jurassic and early Cretaceous periods.

Woburn Sands (Lower Greensand)

1.1.8 The Lower Greensand forms a prominent ridge across Bedfordshire and has long been a source of sand. The sands contain iron and are often yellow, orange or brown with the purer sands being white. Some layers are cemented with iron to form nodules and sandstone.

1.1.9 Within the sands are layers of fuller's earth which are the product of a volcanic explosion. This material was used to extract grease from wool, a process called fulling. Fuller's earth is now used for a variety of chemical processes.

1.1.10 At the base of the sands is a module bed, derived from earlier Jurassic rocks. The nodules used to be quarried as a source of phosphate, formerly a flourishing industry.

Gault Clay

- 1.1.11 The Gault Clay was formed about 100 million years ago. It rests on top of the Lower Greensand and so can be seen in Bedfordshire in the numerous sand quarries on the Greensand Ridge.

Chalk Deposits

- 1.1.12 The chalk found in Bedfordshire is an Upper Cretaceous deposit found in the south of Bedfordshire from an extremely pure limestone. The chalk also contains flint deposits and fine clay particles - Chalk Marl, which is found in the lower levels of the chalk
- 1.1.13 During the ice age the chalk was eroded by glaciers. The fine mud formed was swept away but the hard flint nodules were left behind as gravel. This has been quarried for building purposes.
- 1.1.14 The Lakes at Priory Country Park, Wyboston and Felmersham are former gravel pits.
- 1.1.15 Restoration of mineral sites should reflect the nature of the local soils and geology involved and opportunities for using both active and restored minerals sites for furthering local landscape, historical and geological education should be explored.
- 1.1.16 The data in the following table is taken from the British Geological Survey document "Mineral Resource information plans Bedfordshire Resources and Constraints".

Mineral Resources of Bedfordshire

Geological Unit	Commodity/Use
River Gravels	Sand & Gravel for Aggregate
Glacial Sand & Gravel	Sand & Gravel for Aggregate
Middle and Upper Chalk	Chalk for Cement manufacture
Lower Chalk	Chalk for lime Chalk for cement manufacture (no active workings)
Totternhoe Stone	Building stone (no active workings?)
Gault	Clay for Brick manufacture
Woburn Sands Formation	Sands (for Building, asphaltting and concreting) Silica Sands for industrial use Fullers Earth (no active workings) Phosphate (no active workings)
Lower Oxford Clay	Clay for Brick manufacture

Land Classifications

- 1.1.17 Only 1.2% of Bedfordshire's land area warrants protection as Sites of Special Scientific Interest (SSSI) (Average in South East is 6.7%)
- 1.1.18 7.1% of Bedfordshire is recognised as semi-natural habitat – the lowest figures for any South East County (Average in South East is 18.5%)

- 1.1.19 74% of the total land use in Bedfordshire is for agriculture. The quality of agricultural land is very high in Bedfordshire, with 44% in the top two grades (Grades 1 Excellent and Grade 2 Very Good); this is the highest of any South East County and nearly double the Rest of the South East (ROSE) average.
- 1.1.20 Around 2% of Bedfordshire's land use is for mineral workings, water and waste facilities.

Sources of data

- www.magic.gov.uk/website/magic/ (GIS mapping data for Bedford)
- www.environment-agency.gov.uk Groundwater Source Protection Zone Maps
- www.bgs.ac.uk
- www.bedfordmuseum.org
- www.community-plan.com/PDF/CSAppendixA1.pdf
- Bedfordshire RIGGS group
- Datasets At Bedfordshire County Council

Trends

- There will be continuing commercial extraction of chalk, clay and sand and silica sand which will put increasing pressure on environmental resources.

Data Gaps

- 1.1.21 None identified.

Implications for minerals planning and SA in Bedfordshire

Key issues from the policy context:

How the minerals local plan should address soils and geology

- 1.1.22 Alternative options need to be tested as part of the plan considering efficient resource use and use of recycled / secondary materials. The Plan needs to consider the potential minerals resource requirements needed to pursue the objectives of the Regional Economic Strategy and the Regional Spatial Strategy.

Relevant objectives for the SA

- Ensure the objectives and targets set out in the MPGs and MPSs are addressed within the plan policies and proposals
- To minimise production of waste and to encourage efficient use of materials
- To prevent the unnecessary sterilisation of mineral resources whilst protecting areas of designated landscape or nature conservation value from development.

Key issues arising from the baseline review:

- Balance extraction for current needs and conserve resource for future generations.
- There are groundwater bearing strata “at risk” or “likely to be at risk” in Luton and in parts of Bedfordshire. Soil and groundwater must be protected from damage by mineral activities.

Key issues arising from the scoping consultation:

Are these the key sustainability issues under this topic area? or are there others?

- Need to add consideration of restoration potential
- May be issues related to education/awareness – social inclusion?
- Protection of environment from transport operations, properly maintained vehicles
- Geological and geomorphological feature conservation and enhancement: exposure/ retention of outcrops; opportunities for fossil search/ examination; links with Beds RIGGS group – education and research

What are the main implications of these issues for minerals and waste planning?

- None identified.

What sustainability objectives do you think should be set for each of these topic areas?

- Increase recycling.