

Technical Paper M 7
Mineral Safeguarding Areas

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1 Introduction

The principles of government policy to safeguard proven mineral resources from needless sterilisation and to safeguard existing, planned and potential rail heads, wharfage and associated storage, handling and processing facilities for the bulk transport by rail and sea are of direct relevance to planning policy formulation in Cornwall. The Government recognises the important contribution minerals make to economic growth and also that mineral resources are finite and require best use and conservation.

A mineral resource is a natural concentration of minerals in or on the Earth's crust that are or may become of economic interest because they are present in such a form, quality and quantity that there is the potential for economic extraction (British Geological Survey, 2011).

A mineral reserve is that part of the mineral resource which is deemed to be economically extractable.

This technical report considers the policy requirements for mineral safeguarding and the current situation in Cornwall. Detailed consideration of the areas for mineral safeguarding will be undertaken during the preparation of the Minerals Plan and this technical report will be part of the evidence base for that Plan.

2 Requirements of the NPPF

The National Planning Policy Framework (NPPF), published in March 2012, sets out the Government's planning policies for England and replaces the suite of Planning Policy Statements and Mineral Planning Guidance Notes.

The NPPF defines Mineral Safeguarding Areas (MSAs) as those "areas designated by Mineral Planning Authorities which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development" (Annex 2, page 54). It requires MSAs to be defined for local and nationally important resources as well as;

- Existing, planned and potential rail heads, rail links to quarries, wharfage and associated storage, handling and processing facilities for the bulk transport by rail, sea or inland waterways of minerals including recycled, secondary and marine-dredged materials, and
- Existing, planned and potential sites for concrete batching, the manufacture of coated materials, other concrete products and the handling, processing and distribution of substitute, recycled and secondary aggregate material.

The NPPF does, however, make it clear that designated Mineral Safeguarding Areas do not create a presumption in favour of mineral working in those areas.

3 'Mineral safeguarding in England: good practice advice' (British Geological Survey, 2011)

In 2011 the British Geological Survey published a guide to safeguarding mineral resources in England which complements national planning policy. The document aims to provide guidance on how to implement national policy regarding safeguarding of mineral resources and infrastructure.

The document includes a step-by-step safeguarding methodology¹, although it should be noted that this was prepared in advance of the National Planning Policy Framework, which includes the following steps;

- Step 1. identify the best geological and mineral resource information,
- Step 2. decide which mineral resources to safeguard and the physical extent of the Mineral Safeguarding Areas,
- Step 3. undertake consultation of the draft Mineral Safeguarding Areas,
- Step 4. decide on the approach to safeguarding in the Core Strategy,
- Step 5. include development management policies in a Development Plan Document,
- Step 6. include safeguarding in district level Development Plan Documents,
- Step 7. include mineral assessments in the local list of information requirements.

Not all steps are appropriate to Cornwall, in particular step 6 as there are no district level plans in the county.

4 Current policy in Cornwall

Adopted planning policy for minerals in Cornwall is contained in the Cornwall Structure Plan, adopted in 2004 and the Cornwall Minerals Local Plan, which was adopted in 1998. The Minerals Local Plan sets out the current mineral safeguarding policy and identifies mineral consultation areas.

Mineral Consultation Areas are identified around the safeguarded resources as when the Minerals Local Plan was adopted in 1998 Cornwall was a two-tier authority and therefore was required to define MCAs to enable consultation between the District Councils and the Mineral Planning Authority on development proposals within safeguarded areas.

4.1 Policy S1 CMLP – provisions

The adopted safeguarding policy sets out the criteria to protect mineral resources and lists 82 mineral consultation areas relating to specific minerals.

Policy S1

Planning permission will not be granted for development which would sterilise important mineral deposits, or be incompatible with extraction, associated mineral waste disposal or ancillary operations within Mineral Consultation Areas, unless, following consultation with the MPA, the determining authority accepts that: -

¹ BGS Mineral Safeguarding in England: Good Practice Advice, 2011
<http://www.bgs.ac.uk/mineralsuk/planning/legislation/home.html#safeguarding>

- a) the minerals reserve is recovered before development commences;
- b) there is an overriding need for the development and prior extraction, or tipping cannot be reasonably undertaken; or
- c) extraction of the mineral or associated development is impracticable.

The policy has two main objectives; to avoid sterilisations of workable resources by built development and to maintain a degree of separation between types of development whose interests could conflict.

5 Emerging Local Plan Policy

Draft policy contained in the pre-submission stage sets out the strategic principles for safeguarding important mineral resources and reserves.

Policy 19 – Mineral Safeguarding

1. Important mineral resources and reserves and associated bulk transport, storage, handling and processing facilities and sites shall be safeguarded from sterilisation by other forms of development.
2. Mineral Safeguarding Areas will be identified for the following mineral resources and reserves;
 - a. Aggregates (both primary and secondary);
 - b. China clay;
 - c. Building and ornamental stone (including roofing and heritage materials);
 - d. Metals.
3. Mineral Safeguarding Areas will be identified for the following mineral infrastructure:
 - a. For key concrete batching and other products and roadstone coating;
 - b. For handling, processing and distribution of substitute, recycled and secondary aggregate; and
 - c. For the bulk transport of minerals by rail, sea (ports) or haul roads.

The Cornwall Minerals Plan will develop detailed policy and identify sites for safeguarding minerals: mineral resources and associated facilities for transport, storage, handling and processing for onward transport by rail or sea. Key sites used for the batching/manufacture of concrete products and coated materials will also be identified for safeguarding as well as sites for processing and distribution of substitute recycled and secondary aggregate materials. Policy will also be developed to encourage prior extraction where appropriate.

Detailed policy and sites for safeguarding will be contained in the forthcoming Minerals Plan, which will follow the adoption of the Cornwall Local Plan – Strategic Policies. The information set out in the remainder of this document presents the current research into mineral safeguarding areas for the different mineral sectors. It also sets out the current mineral safeguarding areas, as adopted in the Cornwall Minerals Local Plan 1998. This information will form the basis of discussions in the forthcoming Minerals Plan.

6 Aggregate Mineral Safeguarding Areas

6.1 Background

6.1.1 Aggregate resources

Igneous rock and sandstone are worked for primary aggregate in Cornwall. China clay by-products and other mineral by-products are used as secondary aggregates. There are very limited resources of natural sand and gravel from naturally occurring resources. Further information on aggregate resources in Cornwall is available in technical report M2 'Local Aggregate Assessment'.

There are a large number of aggregate quarries with extant planning permissions for extraction. At present, only those which are currently or were recently worked (predominantly those with larger reserves) are safeguarded.

In addition, a level of safeguarding is afforded to secondary aggregate reserves within existing china clay waste tips, by virtue of the fact that they fall within the extensive St Austell China Clay Mineral Consultation Area.

6.1.2 Evidence provided by the British Geological Survey (BGS)

The British Geological Survey has produced a series of factsheets on different minerals, for aggregates this is titled 'Construction Aggregates'² and sets out the differing uses of aggregates. It defines aggregates as being "hard, granular materials which are suitable for use either on their own or with the addition of cement, lime or a bituminous binder in construction". Natural aggregates occur from mineral deposits and the most important sources include igneous rock, sandstone and limestone (including dolerite) as well as sand and gravel (from land-won and marine-dredged deposits).

The suitability of an aggregate for a particular purpose depends on its physical, mechanical and in some instances the chemical and mineralogical properties. For general purpose uses high strength and durability along with low porosity are required. For road pavement uses the aggregates used need to be resistant to crushing and impact loads as well as chemical and physical weathering. For concrete aggregate some of the most important parameters are particle-size distribution, resistance to impact, volume stability, relative density and water absorption, as well as the absence of deleterious materials such as mudstone or chalk.

The BGS has also produced a series of reports to describe and delineate mineral resources throughout the country. This information is used to inform the development of mineral policy. 'Mineral Resource Information for Development Plans Cornwall: Resources and Constraints' provides information on mineral resources in Cornwall.

The report identifies a number of mineral resources used as aggregates. Granite is the most extensively found resource in Cornwall and accounts for a major proportion of primary crushed rock output. Granite aggregates

² <http://www.bgs.ac.uk/mineralsuk/planning/mineralPlanningFactsheets.html>

are used for coarse and fine concreting products, asphalt materials and unbound road materials. In some cases they are also used for less demanding road surfacing. There is considerable variation in strength and other properties between sites as well as polished stone value; therefore it is difficult to identify any high quality resources.

A variety of igneous rocks are also used for aggregates including basalt, dolerite, gabbro and picrite. There is considerable variation in lithology from coarse crystalline gabbros of Lizard to fine grained lavas in East Cornwall. Igneous rock are used for coarse and fine concreting aggregate, asphalt materials and unbound road aggregate. The resources vary in strength and technical properties.

Sandstones are also extracted for aggregate purposes; some have high polished stone value although these are often interbedded with slate, shale and siltstone.

There are limited deposits of naturally occurring sand and gravel in Cornwall; there are small outcrops of Tertiary and quaternary sediments such as those on the Lizard and around St Agnes which have been worked in the past. A small deposit of alluvial sand was worked at Trewint Marsh until recently when the site closed. A major source of sand is china clay waste.

6.1.3 Additional information provided by the industry or mineral planning authority direct research

Further investigations are required, working with the aggregate operator, to review the areas safeguarded for aggregate resources, including potentially identifying areas of high specification aggregate, for inclusion in the forthcoming Minerals Plan.

6.2 Adopted inset maps

The Cornwall Minerals Local Plan identified 22 aggregate mineral consultation areas; these are available at <http://www.cornwall.gov.uk/default.aspx?page=15721>

7 Building Stone Mineral Safeguarding Areas

7.1 Background

7.1.1 Building stone resources

Granite is found in extensive areas within Cornwall and the South West region. Although it used as a building stone it is not considered to be a scarce resource and safeguarding could be focused on existing quarries and those used for 'heritage' purposes. Within or associated with the granite areas are minerals of notable and distinctive characteristics, such as luxullianite and elvan. These are considered to be scarce as they occur in limited areas within the County and should be safeguarded where possible.

There are relatively limited deposits throughout Cornwall of Greenstone (basic igneous rocks such as basalt, dolerite and gabbro) which can be

used as a building material. Serpentine and picrite are quite scarce and are predominantly used now as an ornamental stone.

As sandstone is interbedded with shale, slate and siltstone, the opportunities to exploit it as a building stone are limited, therefore a sandstone quarry with beds of sufficient depth and frequency to be worked as a building stone could be considered to be scarce.

Quality slate for roofing and architecture is more restricted and can therefore be considered to be scarce.

Further information on building stone resources in Cornwall is contained in technical report M3 'Building Stone'.

7.1.2 Evidence provided by the British Geological Survey (BGS)

The British Geological Survey has produced a series of factsheets on different minerals, for building stone this information is contained in 'Building and Roofing Stone'³. This factsheet sets out the potential uses and types of building stone available throughout the UK. It defines building and roofing stone as naturally occurring rocks that are sufficiently consolidated to enable them to be cut, shaped or split into blocks or slabs for use as walling, paving or roofing materials in the construction of buildings or other structures.

The suitability of a stone for building purposes depends not only upon factors such as strength and durability but importantly on its aesthetic qualities such as colour and texture. Other factors include suitability to polish, ease of carving or sawing and moulding.

The BGS has also produced a series of reports to describe and delineate mineral resources throughout the country. This information is used to inform the development of mineral policy. 'Mineral Resource Information for Development Plans Cornwall: Resources and Constraints' provides information on mineral resources in Cornwall.

The report identifies a number of mineral resources used as building stones. Granites are the most extensive igneous rock occurring in Cornwall which have been worked for building stone in the past. There is considerable variation in appearance from one locality to another. Granites have provided an attractive source of dimension stone and their historical importance as a building material is reflected by the large number of disused quarries spread throughout the county. Granite dimension stone has also been exported for use in buildings and important feature elsewhere. Key considerations in selecting quarries include spacing and attitude of joints as well as the extent and intensity of secondary alteration (weathering, iron oxide staining and kaolinisation). Although granite is fairly extensive throughout Cornwall, certain types such as elvans and luxullianite are scarcer as outcrops areas are limited.

³ <http://www.bgs.ac.uk/mineralsuk/planning/mineralPlanningFactsheets.html>

There are limited outcrops of basic igneous rocks such as basalt, dolerite, gabbro and picrite which have been worked as a building material in the past, although there are no sites currently working these resources for building materials.

Small amounts of serpentine and picrite are worked for ornamental purposes; the deposits are limited and scarce.

Sandstone has been worked as a local building stone from many small scale quarries scattered throughout the sandstone outcrop in the past. Sandstones are often interbedded with shales, siltstone and slate which can reduce the opportunity for quarry development. A sandstone quarry with beds of sufficient depth and frequency to be worked as a building stone could be considered as scarce.

Slates in Cornwall are variably fissile mudstones and siltstones that comprise the greatest volume of sedimentary rocks in the peninsula. Slate is worked for general building purposes, the nature of the material is variable and colours range from dark to light grey with green and red hues, brown iron oxide staining is commonly present. Slate which can be readily split into thin sheets or slabs occur on a more restricted basis, therefore these could be considered scarce.

7.1.3 Additional information provided by the industry or mineral planning authority direct research

A study was commissioned by the former Cornwall County Council to consider important sources of building stone and those buildings which were constructed using that stone. Consideration of the findings from that study and the need for separate mineral safeguarding areas for particular building or heritage materials will be given during the preparation of the forthcoming Minerals Plan.

7.2 Adopted inset maps

The Cornwall Minerals Local Plan included 25 safeguarded building stone quarries, these are available at <http://www.cornwall.gov.uk/default.aspx?page=15721>

8 China Clay Mineral Safeguarding Areas

8.1 Background

8.1.1 China clay resources

China clay resources are of very limited distribution nationally and internationally. Currently an extensive area, the St Austell China Clay mineral consultation area, is safeguarded and includes areas believed to contain china clay reserves, associated areas identified for china clay plant, and intervening areas, incorporating areas with potential for future china clay waste tipping and ancillary uses. Further information on china clay resources is contained in technical report 'M1 China Clay'.

8.1.2 Evidence provided by the British Geological Survey (BGS)

The British Geological Survey has produced a series of factsheets on different minerals, for china clay this information is contained in 'Kaolin'⁴. China clay or kaolin has key properties which distinguish it from other clay's produced in the country; these include fluidity, plasticity, strength, colour and abrasiveness. The distribution of kaolin affects the qualities and properties of the clay. Kaolin has a range of industrial uses in three main areas; ceramics, paper or other speciality uses. The paper industry accounts for the majority of kaolin use, with ceramics being the second most important sector. Specialist uses include paint, adhesives and sealants. The UK is the world's third largest producer of kaolin; sales peaked in the late 1980's and have been declining ever since. The kaolin resources found in south-west England are a significant economic asset.

The BGS has also produced a series of reports to describe and delineate mineral resources throughout the country. This information is used to inform the development of mineral policy. 'Mineral Resource Information for Development Plans Cornwall: Resources and Constraints' provides information on mineral resources in Cornwall.

The BGS Cornwall Report and Map identifies areas of measured/indicated china clay resources and inferred china clay resources (based upon china clay industry exploration and evaluation). This information is consistent with that contained in the St Austell China Clay Long Term Strategy 1970 and broadly carried forward into the Cornwall Minerals Local Plan 1997.

Kaolinisation has a very uneven distribution; St Austell Granite is the most important resource and contains the brightest and speciality paper coating grade clays. Other sources include Bodmin Moor Granite and at Land's End. The St Austell Granite is extensively kaolinised in its central and western parts. Western parts traditionally supplied ceramic clay, the central part predominately paper coating clays and the eastern part as filler clays. However, blending and improved processing technology now make this somewhat of an oversimplification. Production from Bodmin Moor Granite was mostly for paper filler and abandoned pits are widespread in the western part of this area.

The china clay resources within the St Austell area are measured and indicated and this resource is relatively well linked to infrastructure for production and transport. There are also two areas of measured and indicated resources on Bodmin Moor, there are also some areas of inferred resources which appear to be relatively large deposits. The inferred resources in West Penwith and Tregonning/Godolphin deposits are small scale and there is no history of extensive working in this area.

Kaolinisation is also found in numerous small areas elsewhere including Land's End granite, Belowda Beacon and the Carnmenellis granite. None of these areas has produced significant amounts in the past and future production in Cornwall is likely to be confined to St Austell and potentially Bodmin Moor granites.

⁴ <http://www.bgs.ac.uk/mineralsuk/planning/mineralPlanningFactsheets.html>

Additional resources of china clay occur in the micaceous residue dams which contain variable amounts and qualities of kaolinite. China stone (unkaolinised granite) production is incidental to kaolin production.

8.1.3 Additional information provided by the industry or mineral planning authority direct research

Since 2004, Goonvean and Imerys, individually, have recommended amendments to the china clay resource areas shown in the development plan, suggesting some areas of marginal expansion on the boundaries of clay resources, and, in the case of Imerys, some large previously worked areas which they wish to be deleted from the resource maps. The latter areas are generally co-incident with their proposals, as joint venture partners in Eco-bos, for regeneration in the Eco-communities development in the St Austell China Clay Area. However, the resource assessment information providing evidence for these proposed changes is held by the china clay industry and is commercially confidential. Therefore, Cornwall Council is progressively procuring independent geological and viability assessments of currently identified china clay resources falling in areas which the industry is proposing to delete. These will inform the council on any amendments to the china clay resource map information underpinning safeguarding policy in the Cornwall Local Plan. (It will also inform decision making on future planning applications for Eco-communities development).

8.2 Adopted inset maps

The Cornwall Minerals Local Plan included 20 safeguarded areas containing china clay and china clay related infrastructure, these are available at <http://www.cornwall.gov.uk/default.aspx?page=15721>.

9 Metalliferous Mineral Safeguarding Areas

9.1 Background

Most of Cornwall's metalliferous deposits occur as veins with a close spatial relationship to granite outcrops or to unexposed granite bodies present at shallow depths. Veins within and close to the granites mostly carry tin, in places with tungsten and arsenic. In the rocks immediately around the granites, copper and arsenic may be found with tin, which further out tin diminishes and zinc may be present. Veins carrying lead, zinc and silver together with spar minerals such as fluorite and barite can be found at some distance from the granite outcrops; many of these trend north-south in contrast to the predominant east-west trend of tin-copper-arsenic structures. In some areas veins are polymetallic containing a range of metals.

Metalliferous minerals have been worked by underground methods and (less significantly) from placer deposits; for example in the case of tin ore this has been extracted by tin streaming in the past. Historically, larger tonnages of both copper and iron have been produced and in total, Cornwall has produced more copper than tin but tin has however been the more valuable commodity in terms of price.

Further information on metals in Cornwall is available in technical report 'M4 Metals'.

9.1.1 Evidence provided by the British Geological Survey (BGS)

The British Geological Survey has produced a series of factsheets on different minerals, for metals this information is contained in 'Metals'⁵. This report states that metalliferous minerals were extensively mined in the past, mainly from vein deposits which occur as linear, sub-vertical deposits infilling faults and fissures that cut rocks of various geological ages. It identifies gold, silver, iron, manganese, copper, lead, zinc, tin, tungsten, arsenic and antimony as being mined in the UK at some point. The metal industry has gradually declined as a result of high working costs and competition from overseas.

The BGS has also produced a series of reports to describe and delineate mineral resources throughout the country. This information is used to inform the development of mineral policy. 'Mineral Resource Information for Development Plans Cornwall: Resources and Constraints' provides information on mineral resources in Cornwall. This report has identified zones of intense hydrothermal vein mineralisation and zones of scattered stratiform vein and stratiform mineralisation. These cover broad areas across the county and do not appear give an indication of whether there is a quality of resource of such form, quality and quantity that there are reasonable prospect for eventual economic extraction.

Metal resources are not scarce nationally; however resources in Cornwall and Devon are notable for their concentration of tin.

9.1.2 Additional information provided by the industry or mineral planning authority direct research

From the broad resource areas the mineral planning authority in conjunction with the Cornish Chamber of Mines and Minerals identified areas thought to contain metallic ore resources; these are delineated in the Cornwall Minerals Local Plan 1998 and are much smaller and more localised than the areas identified by the BGS report. The Metalliferous Mining Consultation Areas were reviewed in 2006 and remain under consideration working with the Cornish Chamber of Mines and Minerals.

An MSc student from Camborne School of Mines, University of Exeter was employed to obtain data from the British Geological Survey on behalf of the Council to supplement the current information on metalliferous minerals available. This involved scanning data from the Minerals Reconnaissance Programme and the Mineral and Investment Grant Act 1972 (MEIGA), held at BGS Keyworth. This resulted in the development of a GIS database as well as a summarising document.

9.2 Adopted inset maps

The Cornwall Minerals Local Plan included 21 safeguarded areas for metalliferous minerals, these are available at <http://www.cornwall.gov.uk/default.aspx?page=15721>.

⁵ <http://www.bgs.ac.uk/mineralsuk/planning/mineralPlanningFactsheets.html>

10 Infrastructure Mineral Safeguarding Areas

10.3 Background

10.3.1 Infrastructure for bulk transport of minerals

National policy is to safeguard existing, planned and potential rail heads, wharfage and associated storage, handling and processing facilities for the bulk transport by rail, sea or inland waterways of minerals, particularly coal and aggregates, including recycled, secondary and marine-dredged materials.

Currently land at and near the ports of Par and Fowey, the mineral railway line between Lostwithiel and Fowey, the private haul road which connects the processing works at Par and the (now closed) Port of Par with the Port of Fowey, and linking china clay pipelines are safeguarded through saved Policy S1 of the Cornwall Minerals Local Plan.

The Council commissioned an independent assessment, relating to the bulk transport of minerals and the Ports of Fowey and Par which was completed in 2009.⁶ This provided evidence to inform future development framework policy concerning the ongoing need for safeguarding at these ports. (The former Cornwall County commissioned this study following objections by Imerys to Council's Preferred Option to continue to safeguard land at both ports, despite Imerys' closure the Port of Par). The study indicated that there is sufficient capacity at the Port of Fowey to accommodate forecasted exports of secondary aggregates from Cornwall alongside china clay exports.

10.4 Adopted inset maps

The Cornwall Minerals Local Plan included 6 safeguarded areas for mineral-related infrastructure, these are available at <http://www.cornwall.gov.uk/default.aspx?page=15721>.

10.5 Future considerations

Subject to consultation, it is anticipated that china clay and related secondary aggregate infrastructure for bulk transport and associated handling, storage and processing areas will continue to be safeguarded at the Port of Fowey (including the associated mineral railway line, sidings and railheads and private haul road, identified, pipelines and processing and handling/storage areas at East Par).

⁶ MDS Transmodal "Fowey par Bulk Transport Study" 2009
<http://www.cornwall.gov.uk/default.aspx?page=15721>