

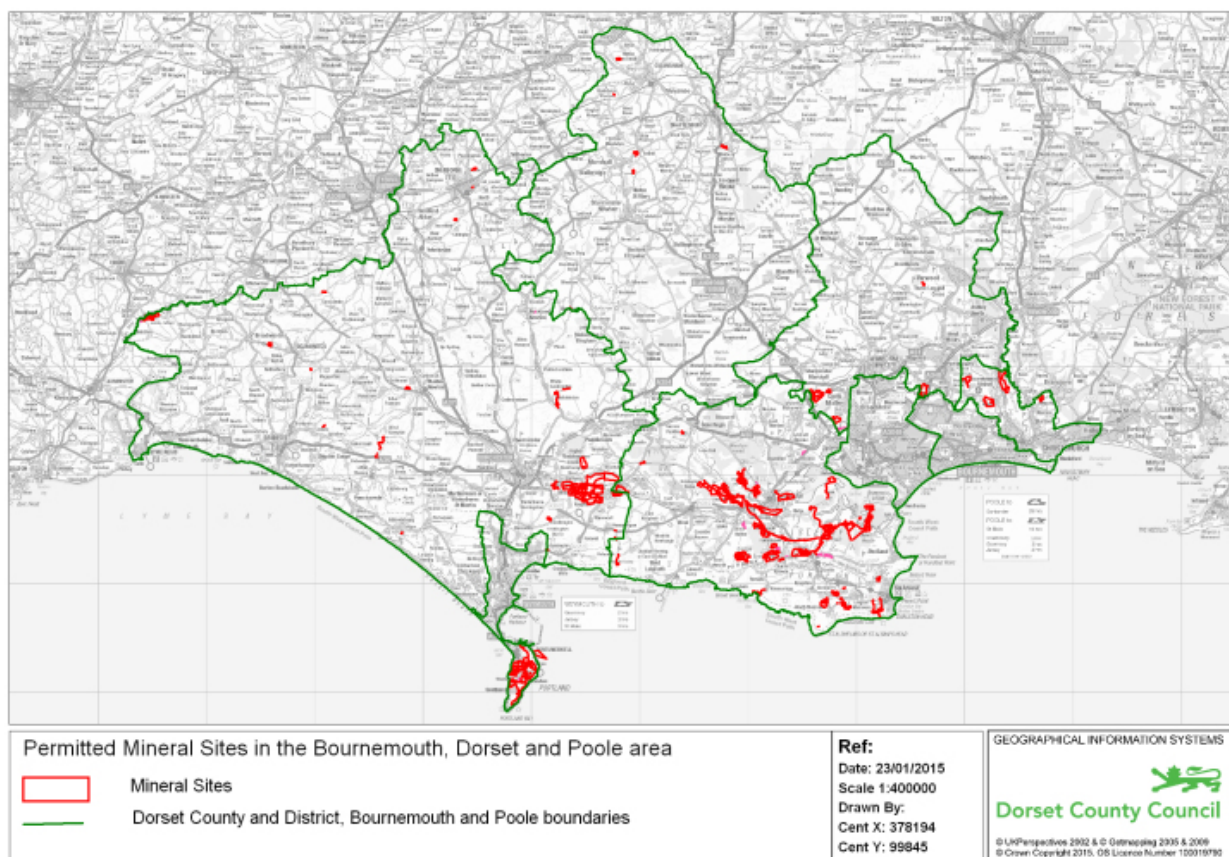
Topic Paper 2 - Minerals

Minerals

Baseline

1 Dorset has a range of mineral resources: Purbeck and Portland stone, other building stone, ball clay, sands and gravels, common clays, chalk and hydrocarbons. Figure 1 shows the distribution of active mineral sites. The Bournemouth, Dorset and Poole Minerals Strategy 2014 sets out a strategy for the provision of each of these minerals.

Figure 1 Permitted Mineral Sites



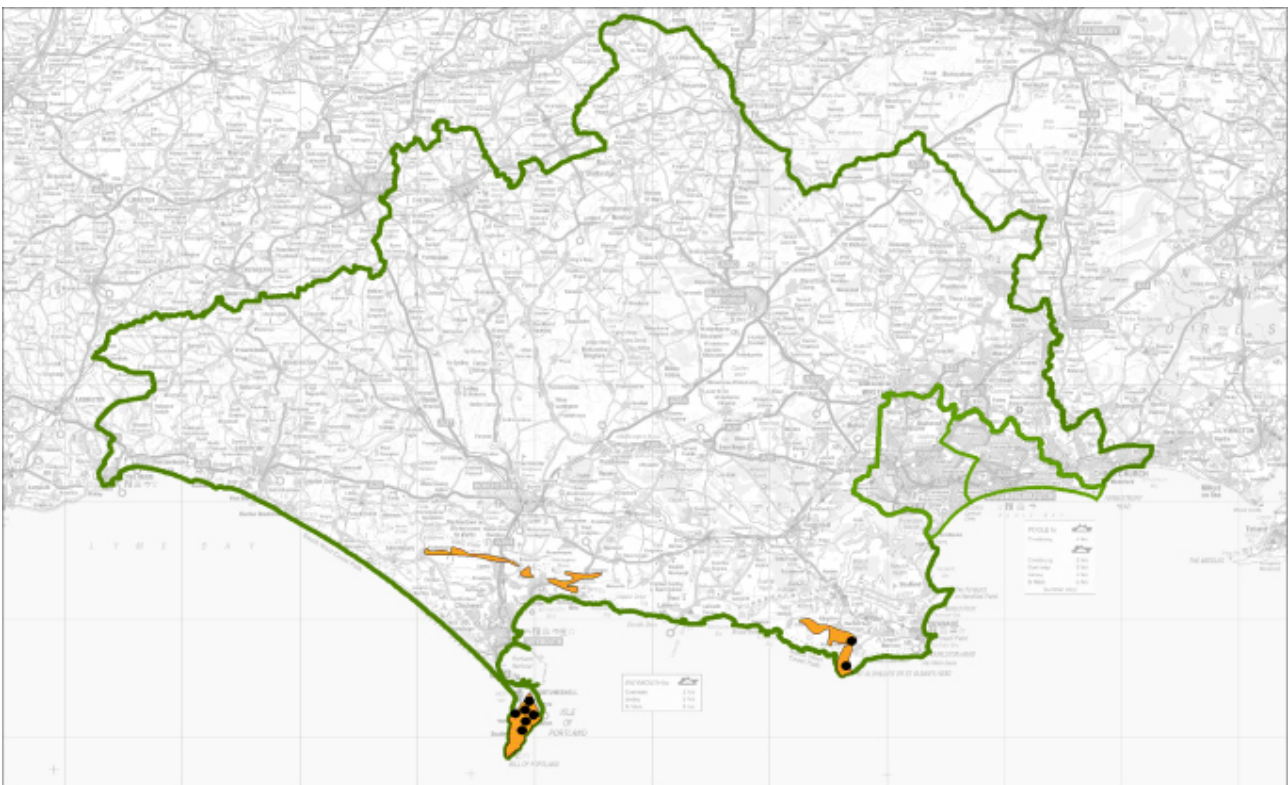
2 **Portland Stone:** This is derived principally from a 9m thick bed known as the Freestone which occurs within the Portland Limestone Group. It is overlain in most places by several metres of thinly bedded limestones and clays ("the Caps") and is underlain by 20-30 metres of limestone known as the Cherty Series. This is unsuitable for building stone because of its high chert (a type of silica) content. However, the Cherty Series and the Caps can be crushed for use as aggregate.

3 There are a number of quarries or mines working blockstone on Portland, although some areas are not worked on a regular basis. These include Bowers, Coombefield, Inmosthay, Broadcroft and Perryfield quarries and Bowers and Jordans mines. Stonehills Mine is permitted but not yet worked. The total output of stone from these sites is in the region of 10,000 cubic metres per annum, most of which is used for building and the remainder for rock armour. However, in terms of just output levels, the stone extraction is overshadowed by the associated crushed rock aggregate operations, which was around 80,000 tonnes in 2013.

4 Almost 40% of the top of Portland is covered by planning permission for quarrying. Nearly all this permitted area is the subject of two permissions granted in the early 1950s. These old permissions were not based on modern standards of environmental control and have led to very extensive quarrying with, to date, little planned restoration. This has a major impact on the landscape, and has led to noise and blast vibration problems in the past. A substantial portion of the permitted area has site of special scientific interest (SSSI - both geological and ecological) status. Planning permission has been granted for the mining of building stone at Bowers Quarry. Production commenced in 2004, becoming Dorset's first operational mine since 1999. More recently, permission was granted in 2009 for Jordans Mine. Extensions to these mines have also recently been permitted.

5 The Minerals Strategy 2014 sets out a supply strategy for Portland Stone that secures more environmentally acceptable ways of working while minimising the impacts of quarrying. This includes: i) encouraging mining as an alternative to surface quarrying; ii) seeking improvements to the old planning permission and directing working away from sensitive areas where possible, through identifying areas within the old permission where it is considered that surface quarrying would create a significant impact on the environment and/or amenity.

Figure 2 Portland Stone



6 Purbeck Stone: Quarrying of Purbeck Stone is a long-established industry. The material is used locally, nationally and, to a limited degree, internationally, as a building and monumental stone, and for paving, walling, cladding and in garden rockeries.

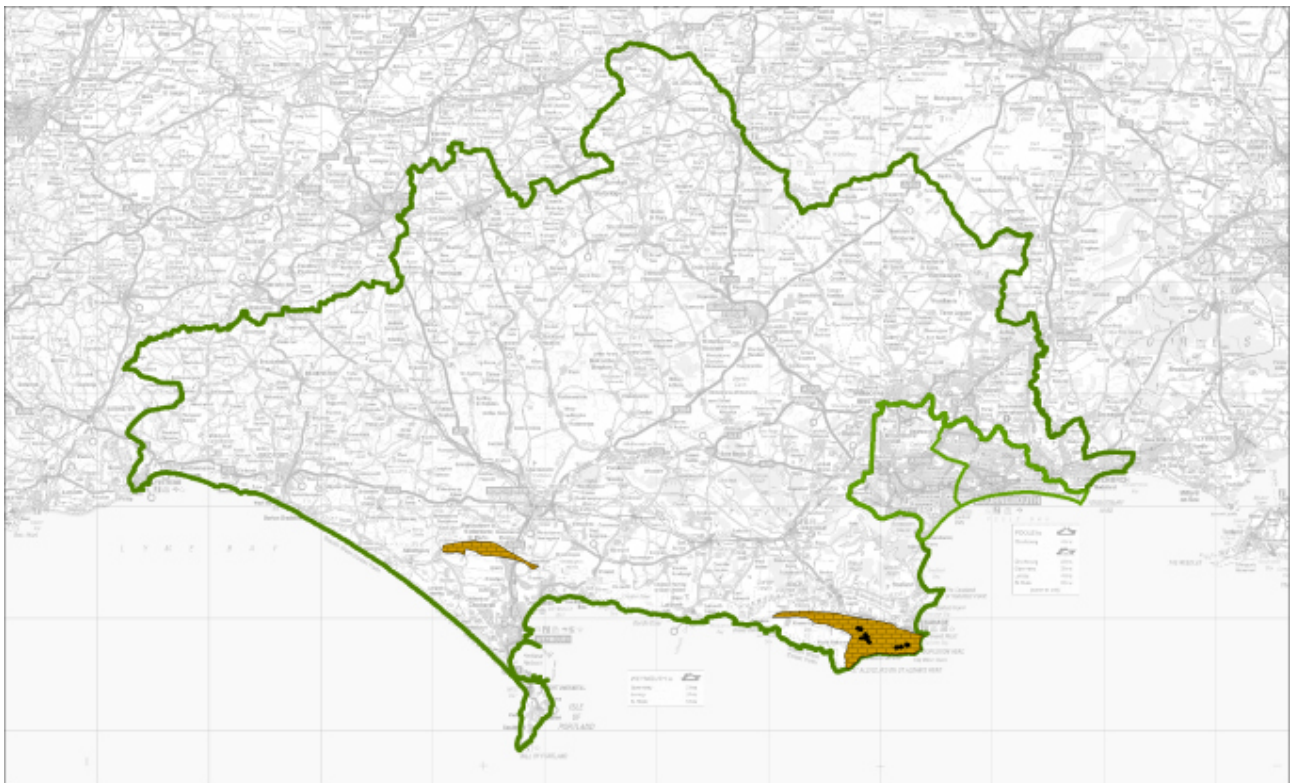
7 Purbeck stone is confined largely to an area of about 10 square kilometres within the coastal zone south and west of Swanage. It geologically overlies the Portland Beds previously described. The valued stone is found in the "Middle Purbeck Beds" and consists of two sequences, the "Upper" and "Lower Building Stones", separated by the "Cinder Bed". A total of about a dozen different seams of stone have been worked at various times. There are currently around a dozen operational stone quarries on Purbeck, generally working on a small-scale traditional basis, some only involving one

or two operatives. These are located in four general areas: south of Swanage, north of the Kingston Road, to the west and south of Acton and at St Aldhelms Head (this last producing stone from Portland Beds). Total production in recent years has been in the order of 20,000 tonnes per annum. In addition, the large quarry at Swanworth, Worth Matravers, produces crushed rock from the Portland Beds and is currently the only source of crushed rock on Purbeck.

8 The Purbeck area, as well as being renowned for its stone working, is one of considerable environmental quality. The stone resource is wholly within the Dorset Area of Outstanding Natural Beauty and partially within the Heritage Coast. The latter highlights the importance of the area historically and culturally, as well as in landscape terms. The area is therefore of value to a wide variety of interests, being well used for recreational and leisure activities by local people and tourists. Although the quarrying of stone on Purbeck enjoys wide acceptance, its operations are prominent in the open coastal landscape, particularly around Acton. There are also considerable nature conservation interests in the area.

9 Many local settlements are designated as conservation areas where Purbeck stone is the principal building material. Since much of the charm of Purbeck villages is their traditional construction in local stone, it follows that the continued supply of stone will be necessary for restoration and new building. The Minerals Strategy [2014](#) sets out a supply strategy for Purbeck Stone that provides for at least 20,000 tonnes of saleable Purbeck Stone per year, through the identification of sites in the Mineral Sites Plan and through a criteria-based approach within a defined area of search.

Figure 3 Purbeck Stone



10 Ball Clay: Ball clay has been regarded for many years as a mineral of national and international importance because of its special qualities and rare occurrence. Within the UK, ball clay only occurs commercially in the Wareham Basin of Purbeck and at two sites in Devon. It is used primarily in the

ceramics industry for the production of wall and floor tiles (about three quarters of output), tableware, sanitary ware and electrical insulators. It is also used as a filler in certain rubber and plastic products such as windscreen wipers, spark plugs and garden hoses.

11 It is a highly plastic material composed largely of clay minerals, of which kaolinite is the most important, together with quartz, metal oxides and carbonaceous matter. The inherent properties for which it is valued are high plasticity and dry strength - characteristics which are of particular importance in the ceramic manufacturing industries. Its white-firing characteristics are also important for some applications. Because of the demanding technical specifications of the ceramics industry and the natural variations in the raw mineral deposits, it is necessary for the industry to blend clays from several sources to produce consistent marketable products.

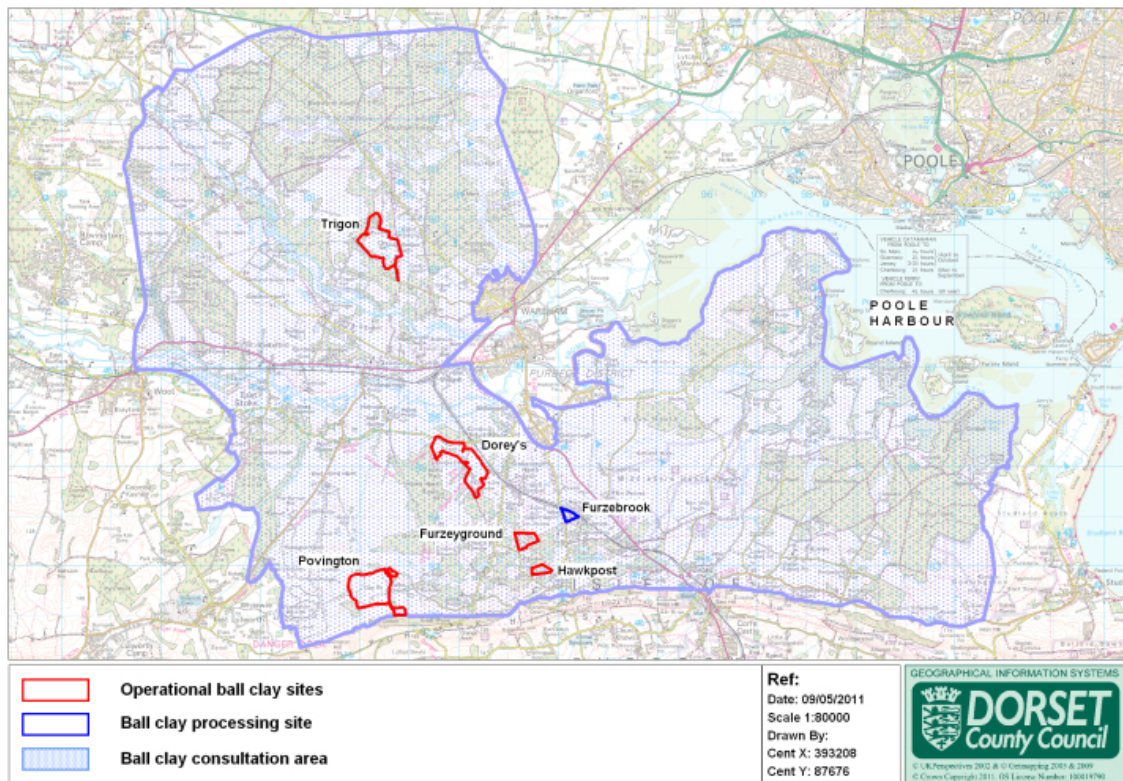
12 Furthermore, unlike, for example, aggregates where a supply contract may be for one specific project lasting only a few weeks or months, the ball clay industry has to supply ceramic manufacturers with a consistent blend of material over a period of many years. This calls for long-term security of reserves. Currently, sites extract over twenty different types of clay to produce saleable products. These sites are Trigon, Doreys, Povington, Hawkpost, and Furzeyground. All processing of the clay takes place at the works at Furzebrook.

13 The area within which ball clay is found extends over some 160 square kilometres and is centred on Wareham. The southern and eastern part of the area lies within the Dorset Area of Outstanding Natural Beauty. Currently about 70% of production is from within the AONB. In addition, there are many areas of national or international nature conservation interest within the area of ball clay deposits. Consequently, Dorset's ball clay reserves are becoming increasingly constrained by environmental designations.

14 The overburden at many ball clay pits includes large amounts of sand and some gravel which has potential to be used as mineral. In recent years some of this mineral has been utilised, but doing so can have an impact on the restoration of clay pits, and generates additional lorry traffic. Annual UK production of ball clay is just over one million tonnes, of which about 20% comes from Dorset. Over 80% of this output, both from Dorset and nationally, is exported. Exports are mainly to Italy and Spain and other European countries.

15 The Minerals Strategy [2014](#) sets out a supply strategy for ball clay which supports a steady supply to ensure provision of the range of grades demanded by the industry. However, this is in the context of the environmental constraints. The Mineral Planning Authority will work with and encourage the ball clay industry to identify and bring forward sites for allocation in the Mineral Sites Plan to ensure that provision can be maintained. Significant investment will be needed to undertake the complex geological investigation and environmental assessments required to allocate sites and it is accepted that the Mineral Sites Plan will be unlikely to identify sufficient sites to allow provision to be maintained at a level of 250,000 tpa throughout the plan period. However, the Minerals Strategy [2014](#) contains a suite of policies to assess planning applications as they come forward. This flexibility should allow ball clay to be delivered throughout the plan period, subject to sites meeting rigorous testing requirements set out within the relevant policies. If the industry is unable to come forward with sustainable sites then there will be a need to review the Strategy and the level of provision being planned for.

Figure 4 Ball Clay Consultation Area



16 Aggregates: Three naturally occurring types of aggregate are produced in Dorset: land-won sand and gravel, marine-dredged sand and gravel (dredged off the Isle of Wight and landed at Poole) and crushed limestone rock.

17 Plateau gravels are found capping many of the hills and ridges north of Dorchester to Wareham and around the fringes of Poole, Bournemouth and Wimborne. These gravels are thought to be the remnants of gravel deposited by river systems which flowed through the Wessex Basin area during the Quaternary period. Today, as a result of subsequent erosion, fragmented outcrops are all that remain of these deposits which, in the past, have been the main source of gravel in Dorset. Now, however, only isolated pockets remain available for the industry, the rest having been worked out or built upon.

18 Valley gravels are found in the valleys of the Frome, Piddle, Stour and Avon. There has been only limited working of these deposits in the past in Dorset. These gravels have been deposited by more recent river systems (within the last 10,000 years) which have reworked older deposits, including the plateau gravels. They now remain as terraces lining existing valley sides and underlying recent river alluvium. In addition to the main areas of gravel working in South East Dorset, there is also one active sand and gravel site on the county boundary at Chard Junction.

19 Another important source of aggregate, the sands of the Poole Formation, were deposited much earlier in Tertiary times. These sands comprise a series of upward fining sequences, becoming finer grained with increasing silt content towards the south east. The large variations in particle size enable a wide range of products to be produced, but their unpredictable distribution presents difficulties. They form by far the most important source of sand in Dorset.

20 Aggregates are also produced in Dorset from crushed Upper Jurassic limestone which outcrops on Portland and Purbeck. Some beds of Portland Limestone, for example, have a high proportion of cherty material, and have no value as building stone but have been extensively quarried and crushed for use as aggregate.

21 Data on primary aggregate production is collected for each calendar year. In 2013, there were 9 sand and gravel quarries in production, which produced approximately 1.6 million tonnes (mt) of sand/gravel. Approximately 0.16 mt of crushed rock were produced also, from 3 quarries (two on Portland and one in Purbeck).

22 A landbank is the total remaining quantity of mineral reserves with planning permission for extraction. This is expressed both in years and in million tonnes. The NPPF states that landbanks of permitted reserves should be used in order to indicate when new permissions for extraction are likely to be needed. It states for sand and gravel that Mineral Planning Authorities should endeavour to maintain a landbank that will last for at least 7 years at current level of provision and at least 10 years for crushed rock. To calculate the landbank in years, the tonnage of permitted reserves is divided by the annualised apportionment figures.

23 The Minerals Strategy 2014 sets out a supply strategy for aggregates based on a rolling average of the past 10 years production⁽¹⁾. The apportionment figures are derived from the annual Local Aggregates Assessment (LAA)⁽²⁾. The apportionment figure for both sand and gravel and crushed rock is currently taken as the rolling 10 year average, average production over the past 10 years. The figure from the 2014 LAA for sand and gravel was 1.56 million tonnes per annum (mtpa) and for crushed rock was 0.22 million tonnes per annum. For sand and gravel, specific solid sand and superficial sand and gravel resource blocks are identified within which future quarries will be located. Industrial sand will also be provided from the Poole Formation beds.

24 At the end of 2013 there were over 16.4 million tonnes of permitted sand and gravel reserves in Dorset. This landbank would last for approximately 10.5 years if no further permissions were granted based on the figure of 1.56 mtpa, the average of the last 10 years of production. Although it is difficult to estimate the remaining crushed rock reserve, it has been estimated that at the end of 2013, the landbank for crushed rock was -approximately 50 years based on a supply figure of 0.22 million tonnes, the average of the last 10 years of crushed rock production.

1 See: Guidance on the Managed Aggregate Supply System (Communities and Local Government, 2012)
2 See <https://www.dorsetforyou.com/416990>

Figure 5 Superficial Deposits Resource Block

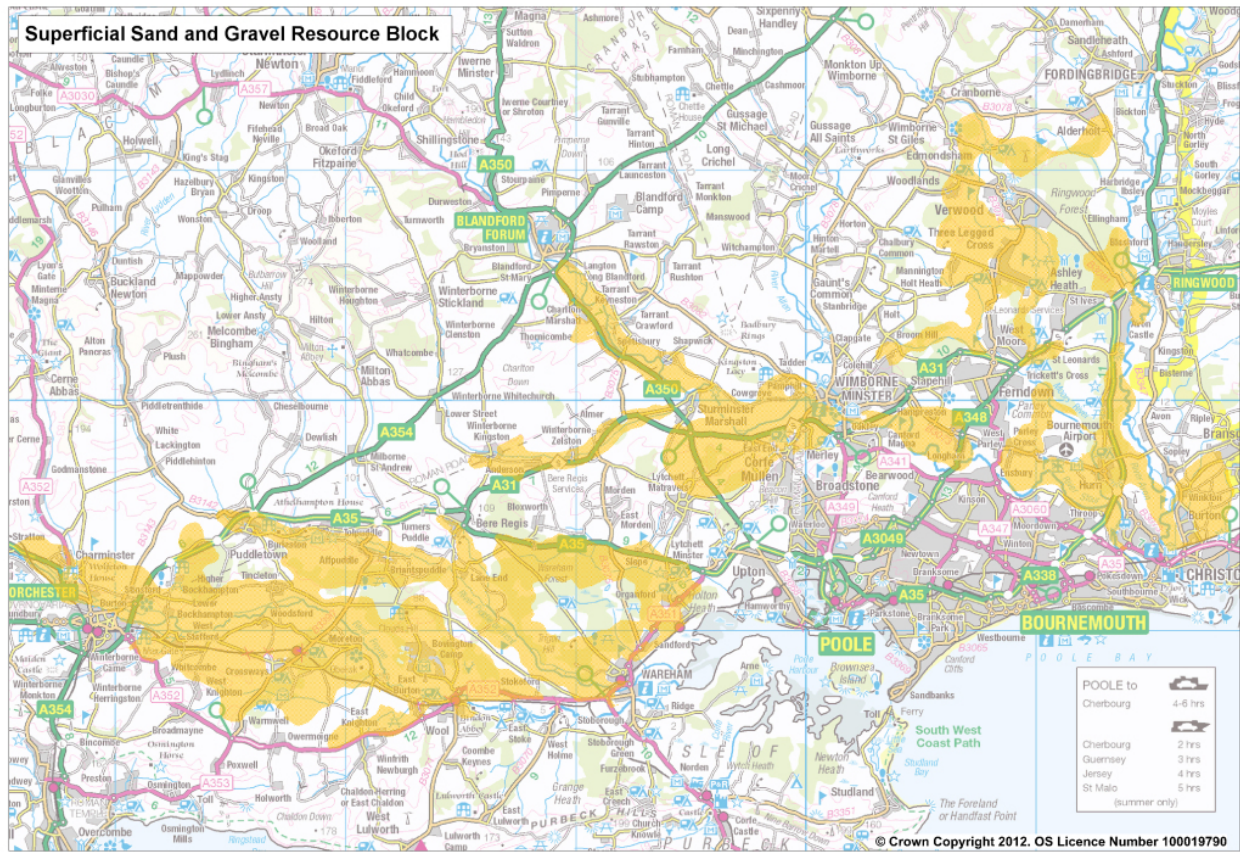
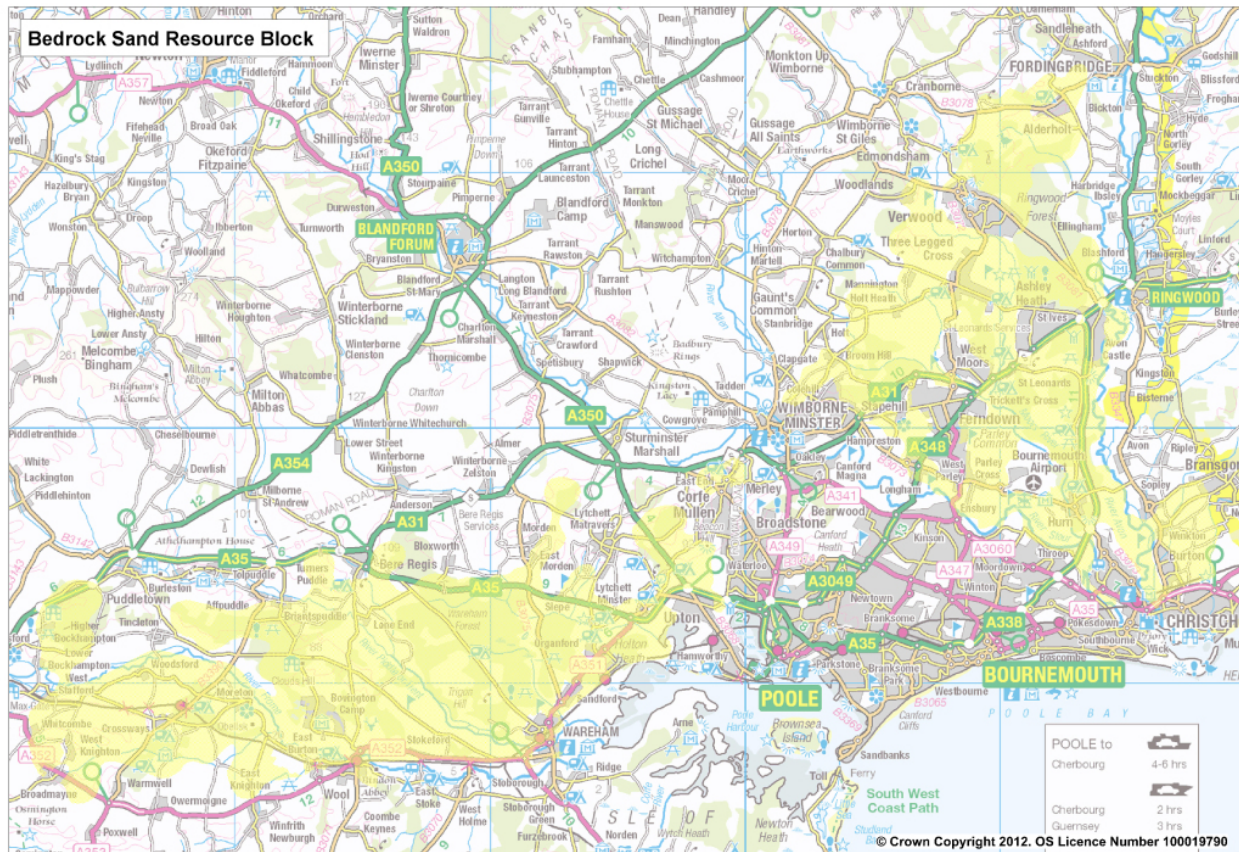


Figure 6 Bedrock Deposits Resource Block



25 Hydrocarbons: Dorset has a long association with oil and gas exploration and production, with initial searches in the 1930s and the first commercial discovery at Kimmeridge in 1959. The discovery of a significant oilfield in the Bridport reservoir at Wytch Farm in the early 1970s put Dorset in the forefront of oilfield development and intensified the search for oil throughout southern England. The discovery of further commercial reserves, including those under Poole Bay, led to the Wytch Farm development becoming the most productive onshore field in Europe, reaching output levels of 100,000 barrels per day (bpd). This has since fallen to a current level of around 10-20,000 bpd. By comparison, Kimmeridge produces about 80 bpd. There remains interest in further exploration in south Dorset, including the Dorchester area, with the current licenced areas in the county mainly covering south and south east Dorset, including Purbeck.

26 Extraction of hydrocarbons in Dorset has historically been undertaken in sensitive areas, with Wytch Farm being located in the Dorset AONB and the well sites being dispersed amongst European and nationally protected habitats. The designation of the European wildlife sites largely postdates the oilfield development. Land management has been important in keeping the development unobtrusive within the forest and heathland landscape. The nature of the operations themselves are fundamentally different from conventional mineral workings and less intrusive in their generally smaller limited land-take and more flexible locational requirements.

27 Exploration of unconventional gas, which is natural gas trapped deep underground by impermeable rocks, such as shale rock or coal beds, attracts high levels of controversy and objection - Extraction of shale gas does not currently take place in Dorset and it is unknown whether there is potential for this activity in Dorset or if the geology is suitable.

28 Common Clays: The “common” clays worked in Dorset are used locally in the manufacture of bricks and tiles. The common clays are a relatively abundant resource being found predominantly in the south east of Dorset. In the past the clays were worked both more intensively and extensively. Both Tertiary (Reading Formation and London Clay) and Cretaceous (Wealden) clays have in the past been exploited. Currently, only Wealden Clays are worked - at Godlingston, north of Swanage. The clays are extracted from the site and used to produce hand made bricks in the site for a specialist market. The clays at this site are valued for their variable colouration.

29 Chalk: Chalk is found widely throughout Dorset extending in a broad swathe from Ashmore and Cranborne in the north east, across the rural county in a south westerly direction towards Eggardon Hill. There are currently no sites operational in Dorset.

30 Other Building Stones: Most of the limestones of the Lower and Middle Jurassic which outcrop in North and West Dorset have been quarried for use as a building material locally and in adjoining parts of Devon, Somerset and Wiltshire. The quarries are small scale and work on a casual basis, as and when the stone was required. The use of such stone has made a substantial contribution to the richness, diversity and charm of small towns and villages in these areas. At present there are five quarries, all in North and West Dorset, producing stone on a traditional, often part time, basis.

Summary of relevant policy documents - Minerals

N.B. More detail on these and other policy documents is included at the end of this topic paper.

Table 1

Policy Documents	Relevance to Mineral Sites Plan
<p>Key International Policy</p> <ul style="list-style-type: none"> Directive 2006/21/EC of the European Parliament and of the Council on the management of waste from extractive industries (March 2009) 	<ul style="list-style-type: none"> The policy guidance identifies the various ways that minerals development can affect the environment and local communities. It also identifies the issues regarding to restoration and further development of worked mineral sites.
<p>Key National/Regional Policy</p> <ul style="list-style-type: none"> National Planning Policy Framework 2012 	<ul style="list-style-type: none"> The emerging Mineral Sites Plan is intended to deliver the Minerals Strategy 2014 for Bournemouth, Dorset and Poole through identifying the necessary specific sites as needed for each mineral type
<p>Key Local Policy</p> <ul style="list-style-type: none"> Bournemouth, Dorset and Poole Minerals Strategy 2014 Bournemouth, Dorset and Poole Minerals and Waste Local Plan 1999 (five policies still current). 	<ul style="list-style-type: none"> In delivering the Minerals Strategy 2014 the Mineral Sites Plan should maintain an adequate supply of minerals and seek to make the most efficient use of minerals while minimising impacts of minerals development.

Potential impacts relating to mineral extraction

- visual intrusion
- de-watering
- surface and ground water pollution
- noise
- dust and fine particulates

- blasting
- traffic and transport
- landscape
- agricultural land
- soil resources
- ecology and wildlife, including severance of landscape and habitat loss and displacement of recreational pressure
- impacts on sites of nature conservation, archaeological and cultural heritage value.

31 However, while many of these impacts (particularly social and economic) will vary little between different mineral types, there are a number of environmental factors (such as hydrology, noise and landscape) where the degree of impact will vary considerably between mineral types. Table 2 below identifies the activities associated with the extraction of different types of minerals, together with the production of secondary and recycled materials, and the resulting environmental impacts. For marine-won sand and gravel, the extraction operation is controlled by the Crown Estate and not by the County Council; consideration of the environmental effects of working of this material is therefore limited to its landing at a wharf. Currently the only operational aggregates wharf is in Poole.

32 Since all materials will need to be transported from their site of production to their market, the environmental impacts associated with transportation apply to all types of mineral and have not been included. Similarly, all mineral sites will be subject to activities such as soil stripping prior to extraction and restoration work.

Table 2 Varying Impacts of Mineral Extraction

Land-won Sand and Gravel	
Extraction and Processing	Potential Impacts
<ul style="list-style-type: none"> • Preparation of site, landscape and other mitigation (bunds) • Extraction by hydraulic excavators • Washing of material, disposal of silt • Screening, crushing • Minimal waste to be disposed of (other than silt) 	<ul style="list-style-type: none"> • Noise of plant and excavators • Dust from extraction, internal movement, processing and stockpiling • Landscape impact (minimise through phased working and restoration) • Impacts on groundwater particularly where the mineral operations would be below the highest winter water table. • Impact on the volume, timing and quality of recharge to underlying aquifers (where mineral is removed from the unsaturated zone). • Silt disposal facilities may deposit sediment in watercourses, or have stability issues

Table 3

Marine-won Sand and Gravel	
Extraction and Processing	Potential Impacts

Marine-won Sand and Gravel	
<ul style="list-style-type: none"> • Marine dredging • Unloading and processing at wharf 	<ul style="list-style-type: none"> • Marine impacts - impacts on fisheries, environment, marine archaeology, turbidity of water • Noise from plant - washing, screening • Dust from unloading, stockpiling and transfer to road vehicles

Table 4

Portland Stone/Purbeck Stone/ Building Stone	
Extraction and Processing	Potential Impacts
<ul style="list-style-type: none"> • Preparation of site, landscape and other mitigation (bunds) • Extraction by hydraulic excavators, some blasting • Crushing/dressing/sawing of rock • Storage/disposal of waste rock, overburden 	<ul style="list-style-type: none"> • Noise of plant and excavators, blasting • Dust from blasting, extraction, processing • Vibration/flyrock from blasting • Landscape impact • Impacts on hydrology and hydrogeology • Silt disposal facilities may deposit sediment in watercourses, or have stability issues

Issues

- Striking a balance between meeting current needs for mineral resources (social progress and economic growth) while ensuring they are also conserved for the future generations (prudent use of natural resources and environmental protection).
- Some ball clay reserves are located within the international designated areas.
- Sterilisation of mineral resources by other forms of development.
- The provision for the supply of sand and gravel at the appropriate rate if any shortfall occurs in the provision of the required supply in neighbouring authorities. This may require joint working with neighbouring authorities to secure the required supply of sand and gravel.
- Selection of sites and formulation of policy to minimise or remove all negative impacts.
- The need to safeguard mineral resources, including through increased use of secondary and recycled materials.
- Ensuring Dorset makes an appropriate and justified contribution to local and national requirements - however this must take into account the quality of Dorset’s environment and the implication of international and national biodiversity, landscape and cultural heritage designations.
- The need to integrate minerals and waste planning (including waste infrastructure) to promote more sustainable development
- Protection and, where possible, enhancement of the environment both during mineral working and through high quality restoration and after-care.
- Address past impacts of mineral operations.
- Promote more sustainable transportation of minerals by rail and water and reduced mileage.
- Encourage movement of aggregates by rail and/or water.

Suggested Sustainability Objectives

To conserve and safeguard mineral resources.

To promote the use of alternative materials.

To provide an adequate supply of minerals to meet society's needs.

...and Broad Indicators

"To what extent does the strategic option, objective, strategy or policy..."

- Safeguard mineral resources from loss by permanent sterilisation?
- Encourage/promote the most efficient use of mineral resources?
- Encourage/promote the production and/or use of recycled and/or secondary aggregates?
- Contribute, in a sustainable way, to the supply of materials for new built development, or the repair of existing built development, or meet other needs for the mineral concerned?
- Contribute to the provision of a sustainable supply of minerals?

Relevant Policy/Guidance Documents: Minerals

Table 5

<p>Directive 2006/21/EC of the European Parliament and of the Council on the management of waste from extractive industries (March 2009)</p> <p>The Directive’s overall objective is to prevent or reduce as far as possible any adverse effects on the environment as well as any resultant risk to human health from the management of waste from mineral extraction industries.</p> <p>Almost all of the Directive is transposed through the environmental permitting system by amendments to the Environmental Permitting Regulations. The exception to this is the Article 6 requirements which apply to Category A mining waste facilities, on competent authorities drawing up an external emergency plan.</p> <p>Waste which falls within the scope of the Mining Waste Directive is not subject to the Landfill Directive (Article 2(4) of the Mining Waste Directive). This means that there is no overlap between the two Directives. If the Mining Waste Directive applies then the Landfill Directive does not.</p> <p>However, Article 10(2) of the Mining Waste Directive explicitly states that the Landfill Directive will apply, where appropriate, to waste other than extractive waste that is used for filling excavation voids.</p> <p>Where waste is generated at a prospecting, extraction or treatment site and then is transported to a location that is not a mining waste facility, it falls outside the scope of the Mining Waste Directive and is subject to the Waste Framework Directive and, where relevant, the Landfill Directive.</p> <p>A mining waste facility is defined as an area designated for the accumulation or deposit of extractive waste for the time periods specified in that definition.</p> <p>Implications:</p> <p>The Mineral Sites Plan will take into account the requirements of this Directive.</p>
<p>National Planning Policy Framework (CLG, 2012)</p> <p>The National Planning Policy Framework sets out the Government’s planning policies for England and how these are expected to be applied. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:</p> <ul style="list-style-type: none"> • an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure; • a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and

- an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

Paragraphs 142 to 149 deal specifically with the mining and working of minerals, set within the overall context of the NPPF.

Implications:

The preparation of the Mineral Sites Plan will comply with the requirements of the NPPF.

National Planning Practice Guidance. CLG, 6 March, 2014.

See: <http://planningguidance.planningportal.gov.uk/>

National planning practice guidance, available via the internet (see above), has been updated following the external review of planning practice guidance to support the National Planning Policy Framework and make it more accessible. The planning practice guidance complements the National Planning Policy Framework and provides advice on how to deliver its policies. It includes a section on minerals and plan making.

Implications:

The preparation of the Mineral Sites Plan will take into account the additional guidance.