Oxfordshire Minerals and Waste Local Plan

OXFORDSHIRE LOCAL AGGREGATE ASSESSMENT 2014

November 2014

Oxfordshire Local Aggregate Assessment 2014

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List of Definitions and Acronyms

The Local Aggregate Assessment uses the following terminology throughout this report:

- **Alternative aggregates** - A general term which can be used to refer to anything other than primary, land-won aggregates. It can include secondary, recycled and sometimes marine aggregates.
- **Apportionment** - the quantity of aggregate for which provision needs to made in plans within each Mineral Planning Authority in order both to satisfy local needs and to contribute fairly towards National (and former Regional) expectations of future demand.
- **Landbank** - Landbank is a measure of the stock of permitted reserves expressed in terms of the number of years that these would allow production for at a given average rate of extraction. It is a theoretical measure of the life of the reserves if these were to be worked at a consistent annual rate.
- **Land-won aggregates** - Primary aggregates extracted from land.
- **Marine aggregates** - Primary aggregates dredged from the sea, almost exclusively sand and gravel.
- **MCDHW Volume 1 SHW Series 800 Type 1 aggregate** – Are unbound mixtures of aggregate that are used in the sub-base of roads. Materials include crushed rock, crushed slag, crushed concrete and well-burnt, non-plastic shale - but sand and gravels are excluded.
- **Primary aggregates** - These are aggregates produced from naturally occurring mineral deposits, extracted specifically for use as aggregate and used for the first time. They are produced either from rock formations that are crushed to produce 'crushed rock' aggregates, from naturally occurring sand and gravel deposits, or solid formations to produce soft sand.
- **Recycled aggregates** - Aggregate materials recovered from construction and demolition processes and from excavation waste on construction sites.
- **Secondary aggregates** - Aggregates derived as a by-product of other quarrying and mining operations or industrial processes, including colliery spoil, china clay waste, slate waste; power station ashes, incinerator bottom ashes and similar products.
- **Sharp sand and gravel -** Sharp sand tends to be relatively coarse and the component grains are more angular than soft sand (see below). Such sands are typically deposited within river channels, rather than in oceans, and are generally found, as part of a sequence of mixed sand & gravel, within river floodplains, river terraces, and (in areas which have been glaciated) within other types of deposit. As the name implies they have a sharper texture than soft sands and, although they can be used as building sand, they are generally not preferred for that purpose because they produce less 'workable' mortars, unless special additives are included in the mix, adding to the cost. They are better

suited to use within concrete products, not least because they usually occur in conjunction with gravels which provide the coarse aggregate component of the concrete mix.

- **Soft Sand** - Soft sand is generally fine-grained sand in which the individual grains are well-rounded, imparting a relatively soft texture and free-flowing nature to the sand. Such sands are commonly deposited in marine environments, where constant movement by the sea results in the rounding, polishing and sorting of the grains. The characteristics of such sands lend themselves especially to products which are required to 'flow' or be easily 'workable' by hand when they are being used - particularly mortars, but also plaster, in the case of very fine grained sand. These are collectively known as 'building sand'. Soft sand may also be used in asphalt products where it is used to stiffen the bitumen binder, and in concrete products - although sharp sand is more commonly used for that purpose.

The Local Aggregates Assessment uses the following acronyms throughout this report:

- **AMRI** – Annual Minerals Raised Inquiry Surveys
- **AWP** – Aggregate Working Party
- **BGS** – British Geological Survey
- **CLG –** Communities and Local Government
- **GDP –** Gross Domestic Product
- **LAA** – Local Aggregates Assessment
- **MASS** – Managed Aggregates Supply System
- **MPAs** – Mineral Planning Authorities
- **Mt** – Million tonnes
- **mtpa** – Million tonnes per annum
- **MWLP** – Minerals and Waste Local Plan
- **NPPF** – National Planning Policy Framework
- **OCC** – Oxfordshire County Council
- **PPG** – Planning Practice Guidance
- **RAWP** – Regional Aggregate Working Parties
- **ROMP** – Review of Old Mineral Permissions
- **SEEAWP** – South East of England Aggregate Working Party
- **SHMA** – Strategic Housing Market Assessment

1 Introduction

Project Brief

1.1 LUC and Cuesta Consulting were commissioned in August 2014 by Oxfordshire County Council (OCC) to prepare the Oxfordshire Local Aggregate Assessment (LAA) 2014. OCC are required to prepare an annual LAA as prescribed by paragraph 145 of the National Planning Policy Framework (NPPF)1. A pre-NPPF Local Assessment of Aggregate Supply Requirements was prepared by consultants (Atkins) for OCC and was published in 2011. The same consultants prepared a draft LAA in 2013 but this was not finalised and published.

1.2 OCC is currently preparing the Core Strategy element of the Minerals and Waste Local Plan (MWLP), which will cover the period to 2031. The Oxfordshire LAA is a key part of the evidence base for the MWLP, informing the levels of provision to be made for aggregate minerals supply.

1.3 This report reviews and updates previous work and data that has informed previous versions of the LAA, and thoroughly reviews national and local information which has informed the analysis and approach undertaken to forecasting the demand for aggregates in Oxfordshire. The work undertaken by LUC and Cuesta Consulting has resulted in the production of the Oxfordshire LAA 2014 that has a strong evidence base, meets the requirements of the NPPF and the national online Planning Practice Guidance[2] (PPG), and provides a robust basis for the provision to be made for aggregates supply in the Oxfordshire MWLP, such that the MWLP is found sound in this regard.

Background to Managed Aggregate Supply System

1.4 The Managed Aggregate Supply System is a process which was initially introduced following the recommendations in the 1976 report of the Advisory Committee on Aggregates chaired by Sir Ralph Verney.

1.5 Paragraph 060 of the PPG defines the Managed Aggregates Supply System (MASS) as seeking to *"ensure a steady and adequate supply of aggregate mineral, to handle the significant geographical imbalances in the occurrence of suitable natural aggregate resources, and the areas where they are most needed"*[3].

1.6 The national online PPG requires Mineral Planning Authorities (MPAs) which have adequate resources of aggregates to make an appropriate contribution to national as well as local supply, while making due allowance for the need to control any environmental damage to an acceptable level. It also ensures that areas with

[1] DCLG. National Planning Policy Framework, March 2012.

[2] Available at: http://planningguidance.planningportal.gov.uk/

[3] Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/planning-for-aggregate-minerals/the-managed-aggregate-supply-system/

smaller amounts of aggregate make some contribution towards meeting local and national need, where that can be done sustainably.[4]

1.7 MASS works through national, sub-national and local partners working together to deliver a steady and adequate supply of aggregates, as follows:

- At local level, MPAs are expected to prepare LAAs, to assess the demand for and supply of aggregates;
- at sub-national level, MPAs belong to and are supported by Aggregate Working Parties, who produce fit-for-purpose and comprehensive data on aggregates covering specific geographical areas; and
- at national level, there exists the National Aggregate Co-ordinating Group, who monitor the overall provision of aggregates in England.

Background and Purpose of the Local Aggregate Assessment

1.8 The requirement to produce an annual LAA was introduced through the publication of the NPPF, which states in paragraph 145 that *"minerals planning authorities should plan for a steady and adequate supply of aggregates by preparing an annual LAA, either individually or jointly by agreement with another or other mineral planning authorities, based on a rolling average of 10 years sales data and other relevant local information, and an assessment of all supply options (including marine-dredged, secondary and recycled sources)."*[5].

1.9 The NPPF also requires that the LAA should take account of the advice of the relevant Aggregates Working Party (AWP) - in this case the South East England AWP.

1.10 Paragraph 061 of the PPG (revision date 06/03/2014) defines the LAA as *"an annual assessment of the demand for and supply of aggregates in a MPAs area"*[6]. It is important to note the annual nature of the LAA, which allows the information that informs the assessment to be updated regularly throughout the plan period, ensuring that changing local factors can be taken into account.

1.11 The Oxfordshire LAA includes the following three elements as outlined in paragraph 062 of the PPG[7]:

- Forecast of the demand for aggregates based on both the rolling average of 10-years sales data and other relevant local information;
- an analysis of all aggregate supply options, as indicated by landbanks, mineral plan allocations and capacity data e.g. marine licences for marine aggregate extraction, recycled aggregates and the potential throughputs from wharves. This analysis should be informed by planning information, the aggregate industry and other bodies such as local enterprise partnerships; and

[4] Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/planning-for-aggregate-minerals/the-managed-aggregate-supply-system/

[5] DCLG. National Planning Policy Framework, March 2012.

[6] Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/planning-for-aggregate-minerals/local-aggregate-assessments/

[7] Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/planning-for-aggregate-minerals/local-aggregate-assessments/

- an assessment of the balance between demand and supply, and the economic and environmental opportunities and constraints that might influence the situation. It should conclude if there is a shortage or a surplus of supply and, if the former, how this is being addressed.

1.12 As advised by paragraph 063 of the PPG, Oxfordshire's LAA considers all relevant aggregate supply options, including:

- Recycled aggregates;
- secondary aggregates;
- marine aggregates;
- imports into and exports out of the MPA area; and
- land won resources.

1.13 Reference has been made to the sources of information listed in paragraph 065 of the PPG, which are relevant to the preparation of LAAs. This includes, but is not limited to:

- The Annual Minerals Raised Inquiry Survey, which sets out sales of each type of mineral in Great Britain;
- the four-yearly Aggregate Minerals Surveys on the sales, movement, consumption and permitted reserves of aggregate minerals;
- local data on the arisings of and recovery/disposal routes of Construction and Demolition waste, including inert waste used to restore mineral sites. This includes data available from the Environment Agency;
- the Annual Report of the Aggregate Working Party, which sets out sales of aggregates, aggregate mineral reserves, local information on Construction and Demolition waste, secondary aggregates, and planning permissions;
- any Annual Monitoring Reports prepared by mineral planning authorities setting out the effectiveness of mineral policy and providing information to be used in reviewing and preparing new policies;
- published National and Sub National Guidelines on future aggregates provision (DCLG Guidelines); and
- data and information on mineral resources held by the British Geological Survey and the Crown Estate.

1.14 Other sources of information include:

- Construction forecasts and other national economic forecasts.
- Past and anticipated rates of development in the County, including housing market projections.
- Oxfordshire Economic Assessments and Strategic Economic Plans.
- National Infrastructure Plans.
- National and Local population forecasts.
- Other public sources of information e.g. Minerals UK, and MPA web sites.
- Direct information from Oxfordshire County Council, including duty-to-cooperate information.

Approach to the LAA

1.15 This assessment has been carried out fully in accordance with the above-mentioned requirements and guidance. Sales data for the preceding 10 year period (2004 to 2013, inclusive) have been used to provide a 'baseline' assessment. Consideration has then been given to the various sources of 'relevant local information', other supply options and DCLG Guidelines, in order to determine whether or not future provision may need to be higher or lower than that indicated by the historical sales data.

1.16 Given that the historical sales represent clear, factual information, a key aspect of the assessment has been that any departure from this baseline would need to be justified by clear and robust evidence, in order to underpin the soundness of the resulting recommendations for future provision (and thus the soundness of the Plan itself).

1.17 Where supporting data is absent, incomplete or unreliable, it has been discussed but has not been used to influence the final recommendations.

LAA Structure

1.18 The remainder of this report is structured as follows:

Chapter 2: Aggregates in Oxfordshire including geological resource, existing sites and permitted reserves.

Chapter 3: Past supplies of aggregates including sales, landbank, exports, imports and consumption.

Chapter 4: Factors affecting supply and demand including local supply and local demand factors, and import and export factors.

Chapter 5: Future Provision.

Chapter 6: Conclusions.

2 Aggregates in Oxfordshire

Geology of Oxfordshire

2.1 Oxfordshire is rich in mineral resources. Those which are used for primary aggregate production comprise extensive alluvial sand and gravel resources along the River Thames and its tributaries, smaller deposits of glacio-fluvial sand and gravels in the north east of the county, deposits of soft sand mainly in the south west, and extensive areas of limestone in the north west and of ironstone in the north. The latter are utilised for the production of relatively low grade crushed rock aggregates, and form an important part of the supply of these materials within the South East of England as a whole, but are significantly weaker than the harder crushed rocks in areas such as Somerset, South Gloucestershire and Leicestershire, which have to be imported for more demanding applications.

2.2 Oxfordshire also produces some secondary aggregates and a wide range of recycled aggregate materials

Sand and Gravel

Geological Resource

2.3 Natural sand and gravel resources within Oxfordshire can be sub-divided into fluvial (river terrace) and glacio-fluvial resources; **Figure 2.1** at the end of this chapter shows the location of sand and gravel resources in Oxfordshire.

2.4 River terraces occur at several levels above the modern floodplains within the Thames, Evenlode, Windrush and Thame valleys and their minor tributaries. The sands and gravels within these terraces comprise unconsolidated materials laid down by rivers and streams since the end of the last ice age about 10,000 years ago. River terrace deposits are an important resource in the county since they generally have a lower content of fines (silt & clay), compared to the older glacio-fluvial sediments. The oldest terraces are higher above the present course of the rivers and much of their deposits are above the water table, whereas younger terraces at a lower elevation generally extend below the water table and can therefore be more costly to extract because of the need for dewatering and associated management of environmental impacts. In each case, the deposits comprise sequences of well-sorted and bedded sands and gravels with thicknesses of up to a few metres.

2.5 Deposits of glacio-fluvial sand and gravel are located in the north east of the county and in an area to the east of Wallingford, along the foothills of the Chiltern Hills. These were deposited by glacial melt-waters during the ice ages, the last of which ended around 10,000 years ago.

2.6 Glacio-fluvial sand and gravels are normally of poorer quality and much more variable than the more recent terrace deposits. This is because they are less well sorted and the proportion of fines tends to be higher. However, in Oxfordshire they

contain flint and quartzite gravels which can be of higher quality (harder and more durable) than those found elsewhere in the country.

2.7 To date, sand and gravel working has been concentrated within the Thames Valley and its major tributaries, to the west and south of Oxford and this has had a profound and lasting impact on the landscape in some areas such as the Lower Windrush Valley. There are, however, still significant, economically viable unworked resources in the Thames, Lower Windrush, Lower Evenlode and Lower Thame valleys.

2.8 In the far west of the county along the Thames Valley there are further significant resources but vehicular access to this rural area is relatively poor, distances from markets are greater and no working has hitherto taken place.

2.9 Sand and gravel resources associated with minor tributaries of the Thames such as the River Cherwell in the north of the county and the River Ock in the south west are incidental in nature and of no strategic importance. They are either limited in spatial extent, are thin and/or may have a high silt content.

2.10 A much older (Cretaceous) deposit known as the Faringdon Sponge Gravel Formation outcrops within a small area near Faringdon. This is quite different to the Quaternary deposits referred to above and comprises red and yellow gravels with fossils and fossil fragments most of which are sponges, overlain by clayey sands and capped by ferruginous sands and sandstones. It is quarried to the south of Faringdon.

Existing Sites (sharp sand and gravel)

2.11 In Oxfordshire there are currently ten sites with planning permission for sharp sand and gravel extraction. Information on these sites is summarised in **Table 2.1** using public information to estimate figures such as the permitted reserves of sites (more detailed information on these sites is presented in **Table 1** in **Appendix 1**). The table includes information on the estimated available reserves in each quarry and the current status. However, production capacity is also relevant, as a large amount of reserve in a quarry with only a low production rate will make smaller contribution to annual supply than equivalent reserves in a high producing quarry.

Table 2.1: Active and Permitted Sharp Sand and Gravel Extraction Sites in Oxfordshire, including Current Status and Reserves (tonnes) at 31 December 2013 estimated using public information (Source: OCC)

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13
Cassington	Hanson Aggregates	Inactive: reserve remaining under plant site.	380,000
Caversham	Lafarge Tarmac	Inactive: existing quarry areas worked out; permission granted on 20.08.14 for 1.86 million tonnes extension.	0 (1,860,000 permitted in 2014)
Finmere	Opes Industries	Active: intermittent small scale working.	490,000

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13
Gill Mill, Ducklington	Smiths Bletchington	Active: biggest quarry in county; large reserve remaining; OCC Planning and Regulation Committee resolved on 13.02.14 to permit 5.0 million tonnes extension, to be worked by 2040.	2,350,000 (5,000,000 permitted in 2014)
Moorend Fam, Thame	David Einig Contracting	Inactive: very small site; not yet commenced.	20,000
Stanton Harcourt (Stonehenge Farm)	Hanson Aggregates	Inactive: original quarry worked out; extension of 1.55 million tonnes permitted on appeal 08.10.10; permission commenced but reserve remains.	1,550,000
Sutton Courtenay (Bridge Farm)	Hanson Aggregates	Active: fully operational after periods of mothballing and spasmodic working.	730,000
Sutton Wick	Curtis & Sons	Active: small output site with small reserve remaining; there is a current planning application to extend the end period to 30.09.15; also current planning application for a 0.35 million tonne extension	55,000
Thrupp Lane, Radley	Tuckwell & Sons	Inactive: available permitted reserves worked out; plant site remains; there is a dormant reserve of 0.925 million tonnes subject to ROMP[8] procedure.	0 (925,000 confirmed in 2015 as permitted)
Wicklesham, Faringdon	Grundon Sand & Gravel	Active: mainly a sharp sand & gravel quarry with small scale ancillary production of soft sand; original quarry area virtually worked out, permitted reserves in extension.	850,000
Total, as at 31st December 2013 (excluding new permission at Caversham – 1.86 mt, granted in 2014, and resolution to grant permission at Gill Mill – 5.0 mt, also in 2014; and excluding reserves at Thrupp Lane Radley confirmed in 2015 through the ROMP process as permitted – 0.925 mt)			**6,425,000**

[8] Review of Old Mineral Permissions

Permitted Reserves

2.12 Total permitted reserves of sharp sand and gravel in Oxfordshire, as estimated using public information, are shown above in **Table 2.1** and total 6.425 million tonnes. This figure differs to the total permitted reserves figure shown in **Table 2.2** below, which is taken from the South East of England Aggregate Working Part (SEEAWP) Aggregates Monitoring Survey 2013 calculated using annual operator returns. The figure in **Table 2.1** differs as actual operator returns cannot be presented due to confidentiality, and have therefore been calculated by OCC from public information to provide site specific details regarding their current operation and status. However, the total permitted reserves included in **Table 2.2**, are used as the total figure throughout the report as they are deemed more accurate.

2.13 Over 35% of permitted reserves are held in one quarry (Gill Mill), which can limit overall output from the County due to a large proportion of reserves being held in one site. It is important to add that approximately 30% of the sharp sand and gravel reserves are held in two quarries (Cassington, and Stanton Harcourt) that were mothballed during the recession and are currently inactive. This has reduced the quantity of available reserves that can contribute to Oxfordshire's supply, thereby reducing sales from the County due to commercial decisions by operators. However, the OCC have been informed by operators that extraction may recommence at these sites in the future. It is also important to bear in mind that the totals in **Tables 2.1 and Table 2.2** are for 2013, and therefore do not include the 5.0 million tonnes resolved to be permitted in February 2014 at the Gill Mill site or the 1.86 million tonnes that were permitted in August 2014 at the Caversham site. The Caversham site is currently inactive, and was also inactive in 2013, which contributed to lower sales figures that year.

Table 2.2: Sharp Sand and Gravel Permitted Reserves at 31/12/13 (million tonnes) (Source: SEEAWP Aggregates Monitoring Survey 2013)

Sharp Sand and Gravel Permitted Reserves at 31/12/13 (million tonnes)
6.619 mt

Soft Sand

Geological Resource

2.14 There are several formations of weak (poorly consolidated) sandstone of Lower Cretaceous to Jurassic age in Oxfordshire which are worked for building sand. **Figure 2.2** at the end of this chapter shows the soft sands in the county. The Horsehay Sand Formation within the Great Ooolite Group (Middle Jurassic) outcrops in a limited area in the north of the county and is quarried near Duns Tew. It consists of a medium to fine grained quartzose sand up to 7m thick.

2.15 The Kingston formation of the Corallian Group (Upper Jurassic) outcrops in the southern and central part of Oxfordshire and runs west-south-west to east-north-east from Faringdon to the north east of Oxford. The whole formation is up to 30m thick, although the principal resource, the Highworth Grit, is only part of the

formation and probably has a maximum thickness of 10-20m. The Highworth Grit consists mainly of medium-grained quartzose sand and is currently quarried in the Hatford/Shellingford & Tubney areas.

2.16 Some building sand is also extracted from the Faringdon Sponge Gravel Formation, referred to earlier.

Existing Sites

2.17 In Oxfordshire there are currently six sites with planning permission for soft sand extraction. Information on these sites is summarised in **Table 2.3** using public information to estimate figures such as the permitted reserves of sites (more detailed information on these sites is presented in **Table 2** in **Appendix 1**). The table includes information on the available reserves in each quarry and the current status. However, production capacity is also relevant, as a large amount of reserve in a quarry with only a low production rate will make smaller contribution to annual supply than equivalent reserves in a high producing quarry.

Table 2.3: Active and Permitted Soft Sand Extraction Sites in Oxfordshire, including Current Status and Reserves (tonnes) at 31 December 2013 estimated using public information (Source: OCC)

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13
Chinham Fm / Chinham Hill	Hills Quarry Products	Active: Chinham Fm (sand & limestone) and Chinham Hill (sand) to be worked in tandem. Chinham Fm permission granted 26.03.07; working started towards end of 2007. Chinham Hill permission granted 26.05.11; working had not started by end 2013.	300,000
Duns Tew	Smiths Bletchington	Active: small reserve remaining in West Quarry; East Quarry worked out; current planning application for 0.415 million tonnes extension to East Quarry; small scale ancillary extraction of crushed rock (limestone) also takes place.	50,000
Hatford	Hatford Quarry Ltd (Earthline)	Active: sand & limestone.	205,000 (not including sand in phases E & F of the site, due to lack of information and uncertainty over future working)
Shellingford	Multi-Agg Ltd (Earthline)	Active: sand and limestone; Permissions granted 28.04.11	840,000

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13	
		for deepening and eastern extension, total 1.05 million tonnes sand & 1.225 million tonnes limestone, requires extraction to end by 31.12.20 in eastern extension area and 31.12.28 in existing quarry area.		
Upwood	Hills Quarry Products	Active: large remaining reserve – c. 50% of total Oxfordshire soft sand permitted reserve; ancillary extraction of crushed rock (limestone).	1,145,000	
Wicklesham	Grundon Sand & Gravel	Active: mainly a sharp sand & gravel quarry with small scale ancillary production of soft sand; original quarry area virtually worked out; reserves in extension recorded as sharp sand and gravel (see Table 2.2).	0	
			Total	**2,540,000**

Permitted Reserves

2.18 Total permitted reserves of soft sand in Oxfordshire, as estimated using public information, are shown above in **Table 2.3** and total 2.540 million tonnes. This figure differs to the total permitted reserves figure shown in **Table 2.4** below, which is taken from the SEEAWP Aggregates Monitoring Survey 2013 calculated using annual operator returns. The figure in **Table 2.3** differs as actual operator returns cannot be presented due to confidentiality, and have therefore been calculated by OCC from public information to provide site specific details regarding their current operation and status. However, the total permitted reserves included in **Table 2.4** are used as the total figure throughout the report as they are deemed more accurate.

2.19 It is important to bear in mind that approximately 45% of Oxfordshire's soft sand reserves are contained in one site (Upwood), which can limit overall output from the County due to a large proportion of reserves being held in one site.

Table 2.4: Soft Sand Permitted Reserves at 31/12/13 (million tonnes) (Source: SEEAWP Aggregates Monitoring Survey 2013)

Soft Sand Permitted Reserves at 31/12/13 (million tonnes)
2.164 mt

Crushed Rock

Geological Resource

2.20 **Figure 2.3** at the end of this chapter shows the limestone and ironstone resources in Oxfordshire. The Great Oolite Group runs north east to south west across northern Oxfordshire. It includes the Chipping Norton limestone, a medium to coarse grained oolitic limestone which forms an extensive plateau, which is up to 10.7m thick near Chipping Norton. It thins towards the north east and east.

2.21 The Great Oolite Group also includes the White Limestone Formation which is a pale grey to off- white or yellowish fine grained limestone, which outcrops extensively across Oxfordshire. It is currently worked in quarries in the north east of the county at Ardley, and in the far west of the county near Burford, primarily for aggregate use.

2.22 The Corallian Group is a complex succession of interdigitating limestones, marls, sandstones, sands, siltstones, silts, spiculites, and mudstones, which outcrops in the southern/central part of Oxfordshire. Within it, the Stanford Formation comprises limestones interbedded with marls and mudstone, which lies above the sand at Bowling Green and Shellingford. The limestones have historically been considered as overburden to the soft sand beneath; they are different to those in the White Limestone Formation. At Hatford, a harder limestone, the Highworth Limestone Member, is quarried from below the sand and can be used to produce MCDHW Volume 1 SHW Series 800 Type 1 aggregate[9].

2.23 Ironstone, which is a high iron content ooidal limestone, occurs in the Marlstone Rock Formation, which comprises limestones inter-bedded with ferruginous calcareous sandstone and ferruginous mudstone beds. It outcrops extensively in the far north of the county, and is worked to the west of Banbury.

Existing Sites

2.24 In Oxfordshire there are currently 12 sites with planning permission for crushed rock extraction. The operator and current status of each site is provided in **Table 2.5**. Information on the available reserves or production capacity in each quarry is not readily available from public sources of data, therefore has not been included here.

Table 2.5: Crushed Rock Sites in Oxfordshire

Site	Operator	Current Status
Alkerton	Peter Bennie	Active
Ardley / Dewars Farm	Smiths Bletchington	Active
Burford	Smiths Bletchington	Active
Chinham Fm / Chinham Hill	Hills Quarry Products	Active
Hatford	Hatford Quarry Ltd (Earthline)	Active

[9] Unbound mixtures of aggregate that are used in the sub-base of roads. Materials include crushed rock, crushed slag, crushed concrete and well-burnt, non-plastic shale - but sand and gravels are excluded.

Site	Operator	Current Status
Rollright Quarry Phase 1	Hanson Aggregates	Inactive
Rollright Quarry Phase 2	Smiths Bletchington	Active
Shellingford	Multi-Agg Ltd (Earthline)	Active
Shipton on Cherwell	Earthline	Active
Upwood	Hills Quarry Products	Active
Whitehill	Smiths Bletchington	Inactive
Wroxton Fields	Peter Bennie	Active

Permitted Reserves

2.25 Permitted reserves of crushed rock in Oxfordshire, as reported in the SEEAWP Aggregates Monitoring Survey 2013, are shown in **Table 2.6** below.

Table 2.6: Crushed Rock Permitted Reserves at 31/12/13 (million tonnes) (Source: SEEAWP Aggregates Monitoring Survey 2013)

Crushed Rock Permitted Reserves at 31/12/13 (million tonnes)
10.819 mt

Secondary and Recycled Aggregates

2.26 Until it ceased operation in March 2013, the only source of secondary aggregate within Oxfordshire was power station ash from Didcot A power station. In August 2014, incinerator bottom ash began to be produced from the recently built energy from waste facility at Ardley; providing approximately 75,000 tonnes per year of secondary aggregates. However, the two types of secondary aggregate have different end uses: power station ash is used for block making and incinerator bottom ash is used for the sub-base in road construction.

2.27 In terms of recycled aggregates, Oxfordshire is witnessing the creation of an increasing number of sites/facilities and an increasing number of operators using washing plants. Whilst this is perhaps indicative of a rising trend in the production of recycled aggregates, and an increasing level of sophistication in producing higher quality recycled products, only limited information is available to confirm the quantities actually being produced (this is considered in **Chapter 3**, below). The following data relates only to the level of recycling capacity, which is likely to be greater than the actual level of production. In 2013, Oxfordshire's recycling capacity was approximately 973,000 tonnes per annum[10][11]. This compares with approximately 931,000 tonnes per annum in 2012, indicating the recent growth in capacity.

[10] SEEAWP Aggregates Monitoring Survey 2013.

2.28 **Table 2.7** below shows the capacity for the production of recycled aggregates in 2013, divided between operational and non-operational sites. Of a total capacity of approximately 1,120,000 tonnes per annum, 173,000 tonnes per annum is currently non-operational, whereas 947,000 tonnes per annum is operational. Of the operational capacity, the capacity of permanent sites is 400,500 tonnes per annum, whereas the capacity of temporary sites is 546,500 tonnes per annum.

Table 2.7: Capacity for the Production of Recycled Aggregates in Oxfordshire 2013 (Source: OCC)

Facility Name	Operational Status	Planning Status	Recycling Capacity (tpa)	Comments
Shipton Hill, Fulbrook	Operational	Permanent	9,000	
Prospect Farm, Chilton	Operational	2022	35,000	
Playhatch Quarry, Playhatch	Operational	Permanent	65,000	
New Wintles Farm, Eynsham	Operational	Permanent	110,000	
Worton Farm, Cassington	Operational	Permanent	48,000	
Ewelme No.2 Landfill	Operational	2031	20,000	Current application seeks permission to continue to 2031.
Gill Mill Quarry, Ducklington	Operational	2020	120,000	Committee resolution 13.02.14 to permit application for quarry extension, includes extension of existing quarry including recycling plant to 2040.
Lakeside Park, Standlake (ETHOS)	Non-Operational	Permanent	25,000	
Appleford Sidings	Non-Operational*	Permanent	100,000	Rail Ballast.
Tubney Wood, Tubney	Operational	2015	8,000	Will be replaced by Upwood Quarry.
Old Brickworks Farm, Bletchington	Non-Operational	2017	40,000	
Newlands Farm, Milton Road, Bloxham	Operational	Permanent	32,000	
Sandfields Farm, Over Norton	Operational	Permanent	9,500	
Ferris Hill Farm, Hook Norton	Operational	Permanent	20,000	Certificate of lawful existing use or development (CLUED) limits throughput)
Rumbold's Pit,	Operational	Permanent	20,000	Believed to be an underestimate

[11] The total capacity of 973,000 tpa is lower than that included in Table 2.7 (1,120,000tpa) as the total of 973,000 tpa is based on operator returns to the 2013 South East Aggregates Monitoring Survey; whereas the total in Table 2.7 has been calculated by OCC using information from planning applications and permissions.

Facility Name	Operational Status	Planning Status	Recycling Capacity (tpa)	Comments
Ewelme				but no alternative available.
Shellingford Quarry	Operational	2021	30,000	
Dix Pit Complex	Operational	2029	98,000	
Lakeside, Standlake (Micks Skips)	Operational	Permanent	2,000	
Upwood Quarry, Besselsleigh	Non-Operational	2029	8,000	Will replace Tubney Wood Quarry.
Hundridge Farm, Ipsden, Wallingford	Operational	Permanent	5,000	
Rear of CEMEX batching plant, Hardwick	Operational	Permanent	40,000	
Burford Quarry	Operational	2024	500	
Drayton Depot	Operational	Permanent	20,000	OCC Road plannings.
Sutton Courtenay	Operational	2030	85,000	Reject building blocks & concrete making materials and furnace bottom ash, used in concrete block making.
Thames Water Depot, Kidlington	Operational	Permanent	20,000	
Shipton on Cherwell Quarry	Operational	2025	150,000	Permission granted in 2015 but operational prior to that

Notes

* Appleford Sidings is included as a non-operational permitted facility pending clarification of function.

** Figures include operational facilities only.

Sub-Totals	**Operational**	**947,000**
	Non-Operational	**173,000**
	Total	**1,120,000**
Sub-Totals**	**Permanent**	**400,500**
	Temporary	**546,500**

Figure 2.1: Sand and gravel deposits in Oxfordshire

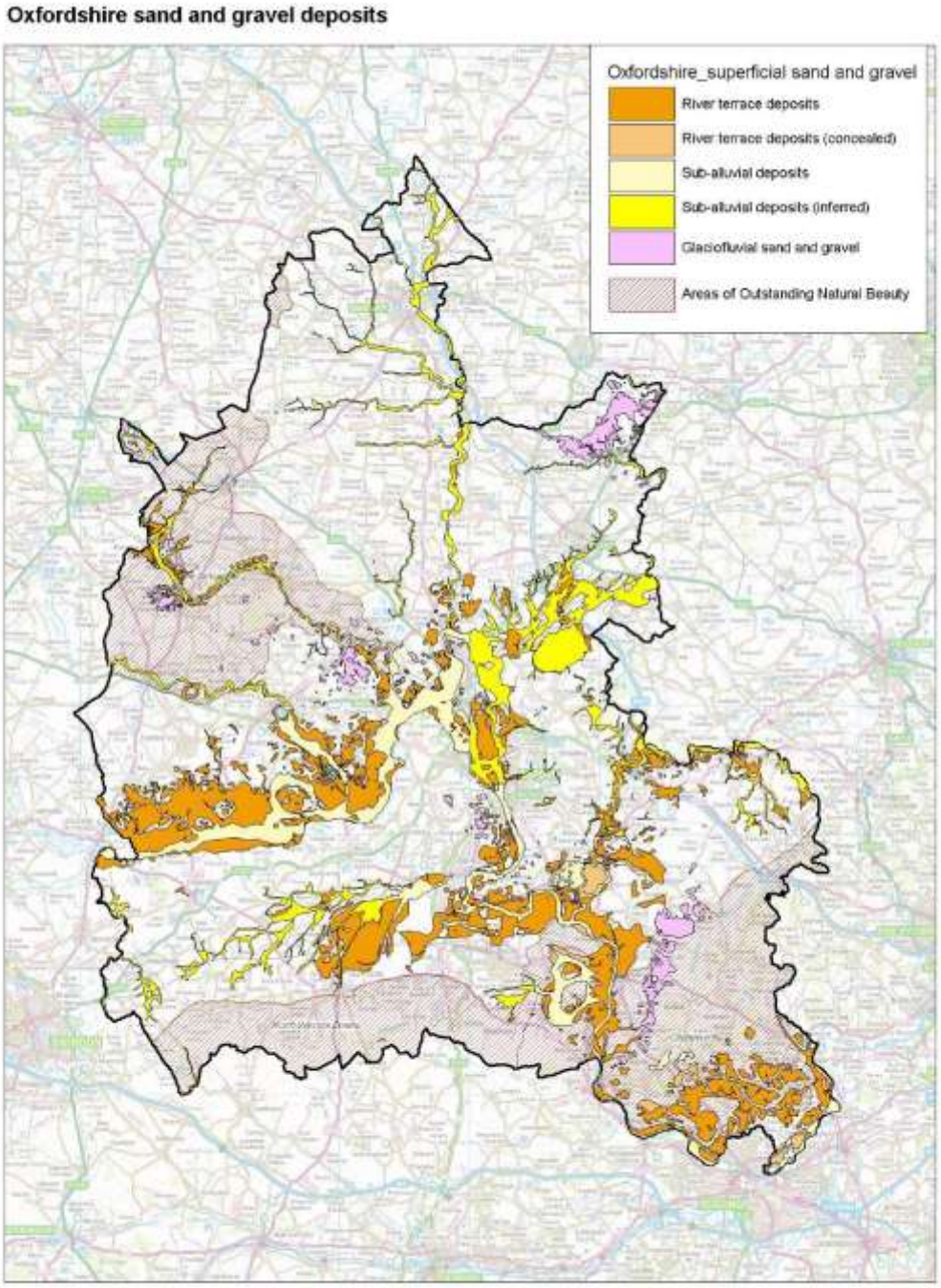


Figure 2.2: Bedrock (soft) sand deposits in Oxfordshire

Oxfordshire bedrock sand deposits

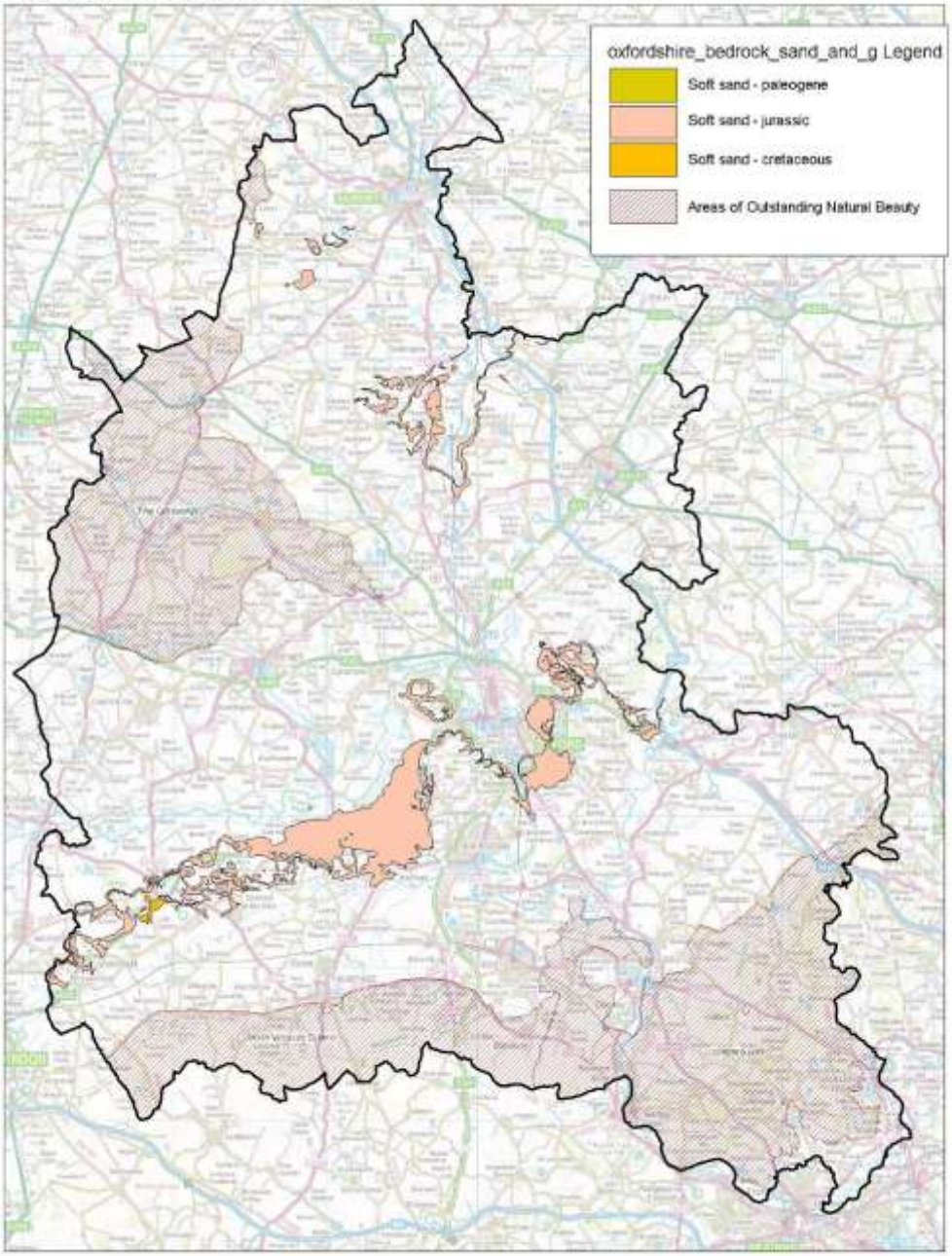
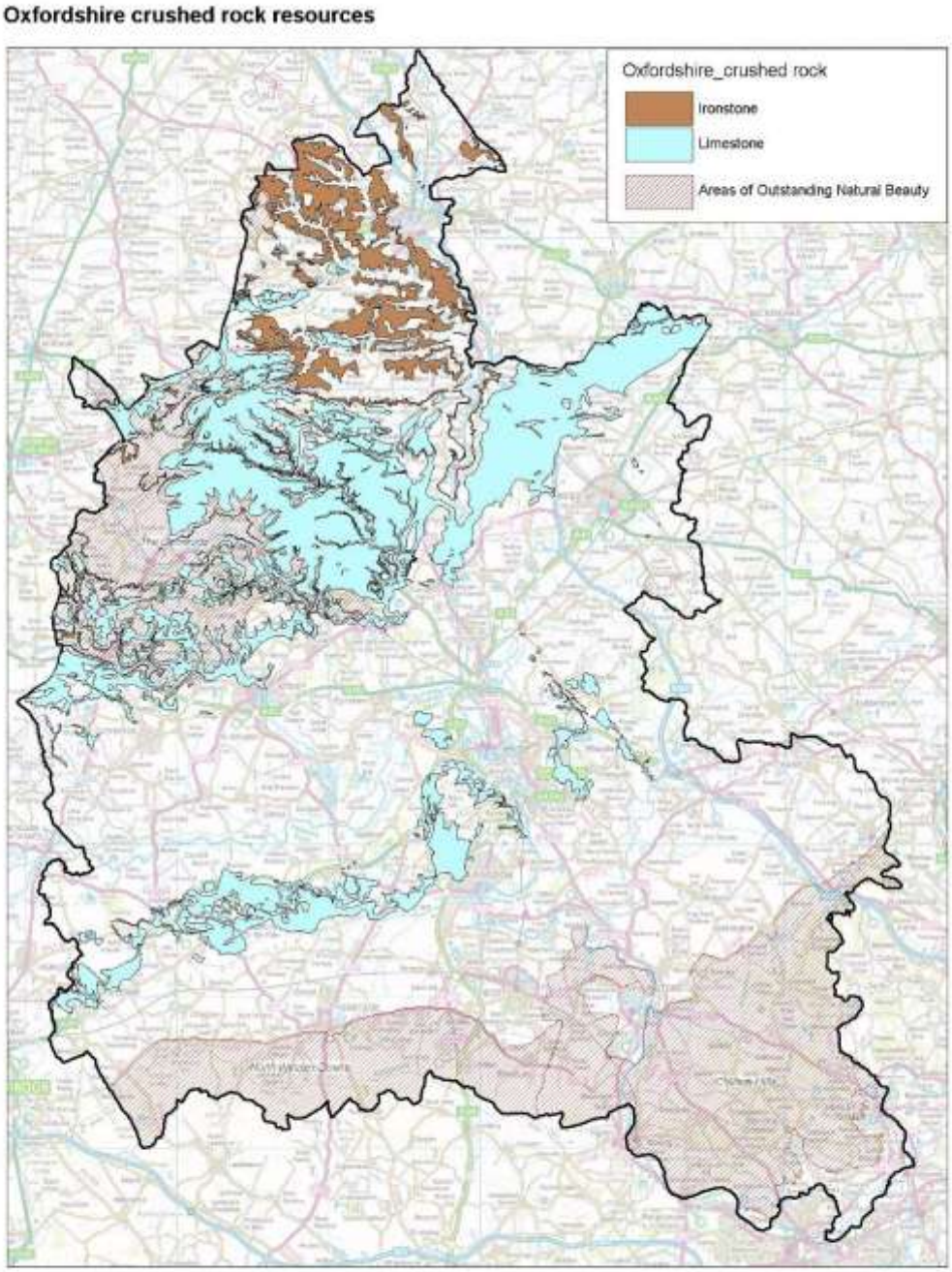


Figure 2.3: Crushed rock (limestone and ironstone) deposits in Oxfordshire



3 Past Supplies of Aggregates

Introduction

3.1 This section of the LAA describes the past supply patterns of aggregates in Oxfordshire. For each of the types of primary aggregate (sharp sand and gravel; soft sand; and crushed rock) and for secondary and recycled aggregate, data on past sales from within, and imports to and exports from, Oxfordshire are provided. Information presented in this Chapter has been derived from the SEEAWP Aggregates Monitoring Surveys collected by OCC, and from the Annual Minerals Raised Inquiry Surveys (AMRI)[12].

3.2 Comparisons are also made with the levels of 'apportionment' for aggregate production in Oxfordshire as identified in the former South East Plan (also known as the Regional Spatial Strategy for the South East). Apportionments are the quantities of aggregate for which provision needs to made in plans within each MPA in order both to satisfy local needs and to contribute fairly towards National (and former Regional) expectations of future demand.

3.3 Prior to the introduction of LAAs though the NPPF in March 2012, the guidance on the provision for aggregates that each region should plan for was issued by Central Government, which was subsequently sub-apportioned at the Regional level to Mineral Planning Authorities through the Regional Spatial Strategy. The apportionment figures were for total sand and gravel sales, and therefore related to sharp sand and gravel and soft sand combined.

3.4 Under the NPPF the apportionments indicated by the relevant Aggregates Working Party, and the current National and Sub-National Guidelines, as published by CLG can be used as sources of information to assist the preparation of LAAs[13]. The sub-regional apportionment figures for the South East were included in Policy M3 of the South East Plan, which was revoked in March 2013. Prior to that, when in 2010 the government announced the revocation of regional strategies, MPAs were advised that they can choose to use alternative figures for their planning purposes if they have new or different information supported by a robust evidence base (letter from CLG Chief Planning Officer dated 6th July 2010[14]).

3.5 In Oxfordshire there are two conflicting sources for the 'top-down' apportionment figures:

- Policy M3 of the South East Plan (published in May 2009 but subsequently abolished in March 2013) required Oxfordshire to provide for 1.82 million tonnes per annum (mtpa) of sand & gravel (including soft sand), and 1.0 mtpa of crushed rock.

[12] DCLG. Minerals Extraction in Great Britain, Business Monitor PA1007. Available at: https://www.gov.uk/government/collections/minerals

[13] As stated in paragraph 065 of the PPG - http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/planning-for-aggregate-minerals/local-aggregate-assessments/

[14] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7995/100706-Letter_to_Chief_Planning_Officers-_Revocation_of_Regional_Strategies.pdf

- The Secretary of State's proposed changes to policy M3 (in March 2010) proposed the apportionment figures for Oxfordshire should be revised to 2.1 mtpa for sand & gravel and 0.66 mtpa for crushed rock: a net reduction overall and a shift in the balance between the two different types of aggregate. Although the South East Plan itself was subsequently revoked, along with all other Regional Spatial Strategies in England, it is those revised figures which were proposed for use by South East planning authorities in the CLG Chief Planning Officers letter of 6th July 2010.

3.6 However, the proposed changes were never formally adopted in the South East Plan before it was abolished and therefore did not become policy. For this reason, the original apportionments in Policy M3 of the South East Plan are used for the purpose of information and comparison within this assessment, as agreed with OCC.

Sharp Sand and Gravel

Past Sales

3.7 Sales of sharp sand and gravel from quarries in Oxfordshire and England for the period 2003 – 2013, and the percentage difference in sales, are shown in **Table 3.1**. These figures are from aggregates monitoring surveys undertaken annually by the County Council on behalf of the SEEAWP, and AMRI Surveys.

Table 3.1: Sales of Sharp Sand and Gravel 2003 – 2013 (million tonnes) (Sources: SEEAWP Aggregates Monitoring Surveys, and AMRI Surveys)

	Oxfordshire Sharp Sand & Gravel Sales (million tonnes)	England Sharp Sand & Gravel Sales (million tonnes)	Oxfordshire's sales as a percentage of England's sales.
2003	1.372	48.674	2.82%
2004	1.184	51.591	2.29%
2005	1.090	48.109	2.27%
2006	0.983	46.316	2.12%
2007	0.893	44.52	2.01%
2008	0.629	41.527	1.51%
2009	0.462	31.705	1.46%
2010	0.455	31.794	1.43%
2011	0.489	31.392	1.56%
2012	0.559	28.702	1.95%
2013	0.401	*2013 figures not yet published (Nov 2014)*	n/a

	Oxfordshire Sharp Sand & Gravel Sales (million tonnes)	England Sharp Sand & Gravel Sales (million tonnes)	Oxfordshire's sales as a percentage of England's sales.
Rolling 10 year annual average, 2003 - 2012	0.812	40.433	2.01%
Rolling 10 year annual average, 2004 - 2013*	0.715	n/a	n/a

* The 10 year annual average for Oxfordshire's sharp sand & gravel sales from 2004 to 2013 has been used as the 'baseline' for historical sales, as this is the 10 year period of most recent sales data available for Oxfordshire. The rolling average for 2003 to 2012 is included for comparison.

3.8 Sales of sharp sand and gravel in Oxfordshire fell year on year from 2003 to 2010, with a slight resurgence in 2011 and 2012, before falling again in 2013. Based on linear trend analysis (provided in **Appendix 2**), the average rate of decline over the period 2003 to 2012 was 0.104 mtpa, giving a total decline of 1.04mt over the 10 year period[15]. This represents a decline of 76% of the 2003 sales figure. By way of comparison, the average rate of decline in England over the same period was 2.725 mtpa, giving a total decline of 27.25mt. This represents a decline of 56% from the 2003 sales figure.

3.9 Comparison between the two sets of figures can only be made up to 2012, because national figures are not yet available for 2013 (as at November 2014).

3.10 The figures demonstrate that the decline in Oxfordshire's sales of sharp sand and gravel was more acute than was the case for England as a whole. This would seem to be explained primarily by the reduction/suspension of operations at three sharp sand and gravel quarries operated by Oxfordshire's previous largest producer (Hanson). The quarries in question were Sutton Courtenay, Cassington and Stanton Harcourt. Production stopped in Sutton Courtenay in 2004 and in Cassington and Stanton Harcourt Quarries in 2008/2009. As well as contributing to the overall steeper decline of sales in Oxfordshire, compared with England, these changes are also likely to account for the particularly marked reductions from 2003 to 2004, and from 2007 to 2008 as shown in **Table 3.1**. Intermittent working recommenced at Sutton Courtenay Quarry from 2007, however, its sales were well below capacity until it became fully operational again towards the end of 2013. The closure of Caversham Quarry during 2013 due to exhaustion of reserves in 2012, pending grant of permission for an extension, is also likely to have affected the total sales in 2013.

3.11 Other local factors that may have influenced the overall decline in sharp sand and gravel include the time taken to determine planning applications (although this is not thought to have been a significant factor in more recent years), and potential operational constraints. However, it is more difficult to identify the extent to which or if and when these factors affected past sales in Oxfordshire.

3.12 Irrespective of the precise reasons, the fact that Oxfordshire's sales of sharp sand and gravel declined far more steeply than for England as a whole is an important

[15] This is a more reliable measure of the trend than simply comparing the individual figures for 2003 and 2012

feature which needs to be taken into account when considering the implications of the historic sales data for the level of future provision required. This is considered further in **Chapter 4**, below.

Soft Sand

Past Sales

3.13 Sales of soft sand from quarries in Oxfordshire and England for the period 2003–2013, and the percentage difference in sales, are shown in **Table 3.2**. These figures are from aggregates monitoring surveys undertaken annually by the County Council on behalf of the SEEAWP, and AMRI surveys.

Table 3.2: Sales of Soft Sand 2003–2013 (million tonnes) (Sources: SEEAWP Aggregates Monitoring Surveys, and AMRI Surveys)

	Oxfordshire Soft Sand Sales (million tonnes)	England Soft Sand Sales (million tonnes)	Oxfordshire's sales as a percentage of England's sales.
2003	0.234	11.300	**2.07%**
2004	0.295	11.144	**2.65%**
2005	0.199	10.817	**1.84%**
2006	0.183	9.832	**1.86%**
2007	0.166	9.992	**1.66%**
2008	0.151	8.607	**1.75%**
2009	0.165	6.105	**2.70%**
2010	0.142	4.929	**2.88%**
2011	0.201	5.197	**3.87%**
2012	0.155	4.527	**3.42%**
2013	0.165	*2013 figures not yet published (Nov 2014)*	n/a
Rolling 10 year annual average (2003 - 2012)	0.189	8.246	**2.34%**
Rolling 10 year annual average (2004 - 2013)*	0.182	n/a	n/a

* The 10 year annual average for Oxfordshire's soft sand sales from 2004 to 2013 has been used as the 'baseline' for historical sales, as this is the 10 year period of most recent sales data available for Oxfordshire. The rolling average for 2003 to 2012 is included for comparison.

3.14 Although there has been an overall reduction in the annual sales of soft sand in Oxfordshire, the fall is not as steep as that for sharp sand and gravel, and it is not year on year. Linear trend analysis (provided in **Appendix 2**) over the period 2003 to 2012 reveals an average rate of decline of 0.01 mtpa for Oxfordshire. The resulting overall decline over 10 years (i.e. 0.1 mt) represents a 43% reduction from the 2003 sales figure. The average rate of decline in England over the same period was 0.876 mtpa, giving a total decline of 8.76 mt over the 10 years, which represents a very substantial reduction of 78% from the 2003 sales figure.

3.15 It is not clear why the national figures declined so markedly, but the fact that the decline for soft sand in Oxfordshire was significantly less steep than for sharp sand & gravel demonstrates that the local commercial factors which affected the latter did not affect the local supply of soft sand.

All Sand and Gravel

Comparison between Past Sales and Sub-Regional Apportionment

3.16 **Table 3.3** compares combined sales of sand and gravel against the apportionment that applied for each year over the 'baseline' period - 2004 to 2013. The apportionment was not a production target, but a guide to the level of provision required, based on a 'top-down' analysis from central Government and the Aggregate Working Parties. Since 2004, sales have fallen from being 74% of the apportionment amount, with the rate of decline accelerating from 2007, even though the apportionment itself was reduced in 2006.

3.17 Over the baseline period as a whole (2004 - 2013), the average annual production of all sand & gravel in Oxfordshire was 0.897 mtpa. This represents only 49% of the apportionment for the County in the former South East Plan.

Table 3.3: Comparison of Oxfordshire's Sales of Sand and Gravel and Apportionment 2004 – 2013 (million tonnes) (Source: SEEAWP Aggregates Monitoring Surveys)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Sand & Gravel Sales	1.479	1.289	1.166	1.059	0.780	0.627	0.597	0.690	0.714	0.566
Oxfordshire Apportionment (million tonnes per annum)	2.0	2.0	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Sales as a percentage of Apportionment	74%	65%	64%	58%	43%	34%	33%	38%	39%	31%

3.18 The decline in Oxfordshire's sand and gravel sales as a percentage of the apportionment, as shown in **Table 3.3**, is likely to be due to a number of reasons. Clearly, the recent prolonged recession has played a major part, but this does not explain the continued decline since 2010, when the economy in general began to recover. As noted earlier, this may be because of the commercial decisions by quarry operators to mothball certain sites and delay the commencement of

production at others, focusing instead on importing aggregates from larger and more efficient quarries in other counties.

3.19 As discussed more fully in **Chapter 4**, these effects appear to have influenced the supply pattern beyond the end of the recession (up to at least 2013), but do not necessarily represent a permanent 'step-change' and cannot be relied upon as a guide to the requirements for future provision. Any such reliance would be likely to create a high risk of under-provision in future years, which in turn could impede Oxfordshire's plans for economic growth.

Reserves and Landbank

3.20 A landbank, with respect to land-based primary aggregate production, is simply a stock of mineral reserves with planning permission for extraction.

3.21 Permitted reserves of sand and gravel in Oxfordshire, as at the end of 2013, are shown in **Table 3.4** below.

Table 3.4: Permitted reserves of sand and gravel in Oxfordshire at 31.12.2013 (Source: SEEAWP Aggregates Monitoring Survey 2013)

	Permitted Reserves at 31.12.2013 (million tonnes)
Sharp Sand and Gravel	6.619 mt
Soft Sand	2.164 mt
Total Sand and Gravel	8.783 mt

3.22 The landbank is a measure of the stock of permitted reserves expressed in terms of the number of years that these would allow production for at a given average rate of extraction. It is a theoretical measure of the life of the reserves if these were to be worked at a consistent annual rate. The rate that is assumed for this purpose has, in the past, usually been the annualised level of apportionment for each MPA, as advised by the former Regional Aggregate Working Parties (RAWPs) and/or included in the former Regional Strategies, based on sub-division of the Regional totals given in CLG's Guidelines. Since the introduction of the NPPF, the rate should reflect the likely future level of demand as determined by the LAA process, subject to advice from the AWP.

3.23 In practice, rates of production are variable from year to year. Apparent landbanks will be effectively reduced during periods of rising production and lengthened during times of recession. In planning for future provision it is therefore important to take account of the likely pattern of economic activity over a long period of time, rather than relying on short term trends. In the analysis which follows, the current landbanks for each type of primary aggregate are therefore provisionally calculated on the basis of three different rates: the average of the most recent 10 years of production (i.e. the 'baseline' period for the LAA), the average of the 3 most recent years, and the former South East Plan level of 'top-down' apportionment.

Table 3.5: Oxfordshire Sand and Gravel Landbank at 31 December 2013 (million tonnes)

Permitted Reserves at 31 December 2013 by Aggregate	Landbank based on average sales of last 10 years	Landbank based on average sales of last 3 years	Landbank based on Oxfordshire Apportionment in former South East Plan
Sharp Sand and Gravel - 6.619 mt	9.3 years at 0.715 mtpa	13.7 years at 0.483 mtpa	N/A (the sand & gravel apportionment does not distinguish between sharp sand & gravel and soft sand)
Soft Sand - 2.164 mt	11.9 years at 0.182 mtpa	12.4 years at 0.174 mtpa	
Total sand & gravel - 8.783 mt	9.8 years at 0.897 mtpa	13.4 years at 0.657 mtpa	4.8 years at 1.82 mtpa

3.24 The NPPF requires MPAs to make provision for the maintenance of a landbank of at least seven years for sand and gravel. The figures in **Table 3.5** show that the Oxfordshire landbank is currently above this minimum level based on recent sales figures, but well below the minimum when calculated using the apportionment. The implications of this are discussed in **Chapter 5.**

Crushed Rock

Past Sales

3.25 Sales of crushed rock from quarries in Oxfordshire and England for the period 2003 – 2013, and the percentage difference in sales, are shown in **Table 3.6**. These figures are from aggregates monitoring surveys undertaken annually by the County Council on behalf of the SEEAWP, and AMRI surveys.

Table 3.6: Sales of Crushed Rock 2003 – 2013 (million tonnes) (Sources: SEEAWP Aggregates Monitoring Surveys, and AMRI Surveys)

	Oxfordshire Crushed Rock Sales (million tonnes)	England Crushed Rock Sales (million tonnes)	Oxfordshire's sales as a percentage of England's sales.
2003	0.629	83.957	**0.75%**
2004	0.557	85.653	**0.65%**
2005	0.564	80.593	**0.70%**

	Oxfordshire Crushed Rock Sales (million tonnes)	England Crushed Rock Sales (million tonnes)	Oxfordshire's sales as a percentage of England's sales.
2006	0.495	83.722	**0.59%**
2007	0.717	82.922	**0.86%**
2008	0.543	75.179	**0.72%**
2009	0.363	59.666	**0.61%**
2010	0.272	50.115	**0.54%**
2011	0.322	57.744	**0.56%**
2012	0.242	52.980	**0.46%**
2013	0.502	*2013 figures not yet published (Nov 2014)*	n/a
Rolling 10 year annual average 2003 - 2012	0.470	71.253	0.66%
Rolling 10 year annual average 2004 - 2013*	0.458	n/a	n/a

* The 10 year annual average for Oxfordshire's crushed rock sales from 2004 to 2013 has been used as the 'baseline' for historical sales, as this is the 10 year period of most recent sales data available for Oxfordshire. The rolling average for 2003 to 2012 is included for comparison.

3.26 Linear trend analysis (provided in **Appendix 2**) over the period 2003 to 2012 reveals an average rate of decline of 0.043 mtpa for Oxfordshire. The resulting overall decline over those 10 years (i.e. 0.43 mt) represents a substantial (69%) reduction from the 2003 sales figure. The average rate of decline for crushed rock in England over the same period was 4.282 mtpa, giving a total decline of 42.82 mt, which represents a more modest reduction of 51% from the 2003 sales figure. As noted above for sharp sand & gravel, the rate of decline in Oxfordshire was thus steeper than in England as a whole.

3.27 The increased impact of the prolonged recession on crushed rock sales in Oxfordshire compared with that in England as a whole may partially be explained by the fact that (as noted in Chapter 2), Oxfordshire's crushed rock is generally suitable only for relatively low specification works, and might therefore have been less resilient to the economic downturn than the higher specification rocks found in other parts of the country. The increased use of imported crushed rock from the Mendips during the recession, whilst some Oxfordshire sand and gravel quarries were mothballed, may also have had some influence, at least until 2012.

Comparison between Past Sales and Sub-Regional Apportionment

3.28 **Table 3.7** compares Oxfordshire's sales of crushed rock against the apportionment that applied for each year from 2006 to 2013. There was no apportionment of crushed rock before 2006.

Table 3.7: Comparison of Oxfordshire's Sales of Crushed Rock and Apportionment 2004 – 2013 (million tonnes) (Source: SEEAWP Aggregates Monitoring Surveys)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Crushed Rock Sales	0.557	0.564	0.495	0.717	0.543	0.363	0.272	0.322	0.242	0.502
Oxfordshire Apportionment (million tonnes per annum)	There was no crushed rock apportionment before 2006		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sales as a percentage of Apportionment			50%	72%	54%	36%	27%	32%	24%	50%

3.29 The apportionment was not a production target but a guide to the level of provision required, based on a 'top-down' analysis from central Government and the Aggregate Working Parties. Nevertheless, **Table 3.7** shows that Oxfordshire's crushed rock sales have been consistently below the level of apportionment. The percentages were clearly lower during the latter part of the recession and beyond, prior to the resurgence of sales in 2013. Over the baseline period as a whole, Oxfordshire's crushed rock production averaged 0.458 mtpa, which represents only 46% of the apportionment.

3.30 However, as noted earlier with regard to the even steeper decline in local sand & gravel production, any reliance on the reduced level of sales as a guide to future production requirements would be likely to risk under-provision in future years, which in turn could impede Oxfordshire's plans for economic growth.

3.31 The risk is probably less with regard to crushed rock, however, because the sales have been consistently below the apportionment throughout the baseline period, whereas the sand & gravel sales declined progressively, having been close to the apportionment level at the start of that period. These points are considered further in **Chapter 4**.

Reserves and Landbank

3.32 Permitted reserves of crushed rock in Oxfordshire are shown in **Table 3.8** below.

Table 3.8: Permitted reserves of crushed rock in Oxfordshire at 31.12.2013 (Source: SEEAWP Aggregates Monitoring Survey 2013)

	Permitted Reserves at 31.12.2013 (million tonnes)
Crushed Rock	10.819 mt

3.33 As explained in the foregoing section on sand & gravel, a landbank is a measure of the stock of permitted reserves expressed in terms of the number of years that these would allow production for at a given average rate of extraction. The Oxfordshire crushed rock landbank at the end of 2013 is set out in **Table 3.9** based on the average of the last 10 years, and 3 years of sales and the former South East Plan apportionment level.

Table 3.9: Oxfordshire Crushed Rock Landbank at 31 December 2013 (million tonnes)

Permitted Reserves at 31 December 2013 by Aggregate	Landbank based on average sales of last 10 years	Landbank based on average sales of last 3 years	Landbank based on Oxfordshire Apportionment
Crushed Rock – 10.819 mt	23.6 years at 0.458 mtpa	30.5 years at 0.355 mtpa	10.8 years at 1.0 mtpa

3.34 The NPPF requires MPAs to make provision for the maintenance of a landbank of at least ten years for crushed rock. In Oxfordshire, this minimum level is currently achieved under all three types of measurement, but only just when using the apportionment.

Exports, Imports and Consumption of Primary Aggregates

3.35 Every county in the UK has to import aggregates from elsewhere because the geology means that no single county area produces exactly the profile of different types of aggregate in the exact amounts or proportions consumed therein. This is what MASS seeks to address.

3.36 All sales of aggregate are the result of commercial decisions by both buyers and sellers and the resulting movements reflect the relative locations of supply and demand. Where these movements cross a county boundary, they are tracked in the four yearly aggregates monitoring surveys, the latest of which were in 2005 and 2009. The 2005 survey report is generally referred to as AM2005, and the 2009 equivalent as AM2009.

3.37 However overall information about aggregate cross boundary movements is crude, because:-

- The survey is only undertaken at four yearly intervals, at best it can only be regarded as a snapshot of a dynamic picture.
- The results from the different surveys are reported differently.
- Only direct sales from quarries are tracked and not subsequent movements after processing elsewhere or from merchants.
- Sales of soft sand and of sharp sand and gravel are combined.
- In some cases the figures are reported in groups of areas which are generally larger than individual MPAs.

3.38 Therefore, any conclusions from these AM surveys need to be treated with caution, particularly as the AM survey has not yet been undertaken for 2013. It has now been over four years since the last survey took place in 2009.

3.39 The reports provide information on sales of aggregates from MPA areas or groups of MPAs together with the destinations of those sales. The reports also show consumption of aggregates by MPA areas or groups of MPAs. Consumption of aggregates relates to all aggregates used in the subject area, a figure derived from collating the stated destinations of movements of aggregates between all areas.

Consumption

3.40 According to AM2009, Oxfordshire was a net importer of primary aggregates in 2009, particularly of crushed rock but also of sand and gravel, as shown in **Table 3.10**. Total consumption of sand and gravel in Oxfordshire in 2009 was 0.757 million tonnes, compared with sales in Oxfordshire of 0.627 million tonnes (83%). This shows that in 2009 there was a net importation of sand and gravel into Oxfordshire, even though Oxfordshire has its own supplies of both sharp sand and gravel and soft sand.

3.41 For crushed rock, total Oxfordshire consumption in 2009 was 0.625 million tonnes, compared with sales in Oxfordshire of 0.363 million tonnes (58%). This shows that in 2009 Oxfordshire was a net importer of crushed rock. Some types of crushed rock, e.g. higher specification (harder) rock types needed for higher strength concrete, road construction and maintenance, are not available in Oxfordshire (apart from the limited deposits at Hatford), so there will always be a need for some supplies to be brought into the county from elsewhere. The net balance therefore depends on the demand for the predominantly lower grade type of crushed rock produced in Oxfordshire from within the county and from surrounding counties and elsewhere.

Table 3.10: Imports, Exports and Consumption of Primary Aggregates in Oxfordshire 2009 (millions of tonnes) (Source: Collation of the Results of the 2009 Aggregates Minerals Survey for England and Wales, DCLG, October 2011)

	Sand and Gravel	Crushed Rock	All Primary Aggregates
A. Production in Oxfordshire	0.628	0.363	0.991
B. Exported out of Oxfordshire	0.140	0.179	0.319
C. Produced and consumed in Oxfordshire (A – B)	0.487	0.184	0.672
D. Imported into Oxfordshire	0.270	0.441	0.711
E. Total Consumption in Oxfordshire (C + D)	0.757	0.625	1.383

3.42 The equivalent figures for 2005 are not available because Oxfordshire was grouped with Buckinghamshire and Berkshire in the AM2005 Report. For Berkshire, Oxfordshire and Buckinghamshire combined (BOB), Table 11 of the AM2005 shows that total consumption of sand and gravel was 2.171 million tonnes, indicating that net exports of sand and gravel from these three counties was 1.328 million tonnes.

3.43 For crushed rock, Table 11 of AM2005 shows that total consumption of crushed rock in the combined areas of BOB in 2005 was 2.462 million tonnes, indicating that between them net imports of crushed rock into the three counties was 1.898 million tonnes.

3.44 No equivalent information can be derived from the AM2001 Survey report, because all results are presented on a regional basis and there are no local figures at all.

Marine Sand and Gravel

3.45 Marine sand and gravel is principally used for the same purposes as sharp sand and gravel. Information on sales of marine sand and gravel is available from AMRI, and also from the AM surveys. The AM2005 and AM2009 reports show that Oxfordshire's consumption of marine sand was just 1,000 tonnes in 2005 (shared with Buckinghamshire and Berkshire) and 16,000 tonnes in 2009. Although the increase is notable, the overall amount represents less than 3% of sales of sand and gravel overall and is not considered significant.

Destinations

3.46 **Table 3.11** below shows where the primary aggregates produced in Oxfordshire in 2009 were distributed. These figures are from the information collected by OCC as part of the AM 2009 survey. Most sand and gravel (78%) was used locally within Oxfordshire. Relatively small quantities were exported to adjoining counties, in particular Wiltshire and Gloucestershire, with very little going further afield.

3.47 Approximately half of the crushed rock produced in Oxfordshire was used in the county. The main recipient counties were Northamptonshire and Warwickshire, with lesser quantities going to other adjoining counties and very little going further afield.

Table 3.11: Destinations of Primary Aggregates Produced in Oxfordshire 2009 (Source: Oxfordshire County Council Aggregates Monitoring Survey 2009)

Destination	Sand and Gravel (including soft sand)		Crushed Rock	
	Tonnes	%	Tonnes	%
Oxfordshire	487,260	77.6	180,867	49.8
Berkshire	20,785	3.3	23,081	6.4
Buckinghamshire & Milton Keynes	13,663	2.2		
Rest of South East & London	15,565	2.5	0	0
Wiltshire & Gloucestershire	68,203	10.9	29,694	8.2
Northamptonshire & Warwickshire	4,993	0.8	118,788	32.7
Elsewhere	17,188	2.7	10,409	2.9
TOTAL	627,783	100	362,839	100

3.48 The AM2005 survey report combined figures for the destinations of aggregates sold in Oxfordshire with the destinations of sales in Berkshire and Buckinghamshire. It is therefore not possible to derive equivalent figures to those in **Table 3.11** for 2005.

3.49 However, it is possible to recognise, that in 2009 significantly more (60% more) of Oxfordshire's sand and gravel (0.4872mt) was used within Oxfordshire than that supplied to Oxfordshire together with Berkshire and Buckinghamshire in 2005 (0.304mt), as shown by **Table 3.12**. This indicates that the main effects of the reduction of sand and gravel sales, principally sharp sand and gravel, between 2005 and 2009, was a significant reduction in exports to neighbouring counties and/or lower production.

Table 3.12: Destinations of Sand and Gravel Produced in Oxfordshire 2005 and 2009 (Source: AM2005 and AM2009)

Source MPA	Destination	Sand and gravel (millions of tonnes) 2005	Sand and gravel (millions of tonnes) 2009
Oxfordshire	Berkshire, Oxfordshire and Buckinghamshire	0.304	0.520 of which 0.4872 in Oxfordshire
	Elsewhere in South East	0.418	0.0155
	Elsewhere	0.550	0.0903
	Unallocated	0.017	0
TOTAL		1.289	0.6277*

*May not match sub totals due to varying categories

3.50 There was also a shift in the destinations of crushed rock produced in Oxfordshire between 2005 and 2009, as shown in **Table 3.13** below. The overall total amount of crushed rock produced fell from 0.564 million tonnes in 2005 to 0.363 million tonnes in 2009, a fall of 35%. Whilst the amount that went 'elsewhere' remained about the same, the amount that went elsewhere within the South East fell significantly. This indicates that the main effect of the reduction of crushed rock sales between 2005 and 2009 was a significant reduction in exports to neighbouring counties in the South East, which presumably will have had to rely on imports of crushed rock from elsewhere, or substitution by other materials (sand and gravel or secondary/recycled aggregates) to make up for the reduction in sales from Oxfordshire.

Table 3.13: Destinations of Crushed Rock Produced in Oxfordshire 2005 and 2009 (Source: AM2005 and AM2009)

Source MPA	Destination	Sand and gravel (millions of tonnes) 2005	Sand and gravel (millions of tonnes) 2009
Oxfordshire	Berkshire, Oxfordshire and Buckinghamshire	0.277	0.184 all in Oxfordshire
	Elsewhere in South East	0.134	0.025 incl. Berkshire & Buckinghamshire
	Elsewhere	0.152	0.154
TOTAL		0.564*	0.363

*May not match sub totals due to varying categories.

Sources

3.51 It is not possible to discern the sources of the aggregate imported into Oxfordshire from the information in AM2005 or AM2009. However, the British Geological Survey (BGS) provided some further information about the sources of aggregates consumed in Oxfordshire in 2009 which is set out in **Tables 3.14 and 3.15**.

Table 3.14: Sources of sand and gravel consumed in Oxfordshire 2009 (Source: BGS)

Source	Proportion	Tonnage where known (millions of tonnes)
Oxfordshire	64%	0.474
Gloucestershire	25%-20%	0.145- 0.185
Warwickshire, Bristol (marine), Hampshire, Berkshire and Leicestershire (in descending order)	Between 5% and 1% from each area	n/a
Milton Keynes, Central Bedfordshire (includes Bedford Borough), Kent, Cambridgeshire, Staffordshire, Buckinghamshire, Dorset, Wiltshire, Solihull (includes Walsall) and Hertfordshire (in descending order)	Less than 1% from each area	n/a

Table 3.15: Sources of crushed rock consumed in Oxfordshire 2009 (Source: BGS)

Source	Proportion	Tonnage where known (millions of tonnes)
Oxfordshire	29%	0.181
South Gloucestershire	30%-25%	0.187- 0.156
Somerset	25% - 20%	0.156- 0.125
Leicestershire	15%-10%	0.093- 0.063
Rhondda, Cynon, Taf (Taff), Gloucestershire and Powys (in descending order)	Between 5% and 1% from each area	n/a
Shropshire, North Somerset and Caerphilly/Merthyr Tydfil (merged for confidentiality) and Derbyshire (in descending order)	Less than 1% from each area	n/a

3.52 It is clear that in 2009 Gloucestershire was the main source of sand and gravel and South Gloucestershire, Somerset and (to a lesser extent) Leicestershire were the main sources of crushed rock imported into Oxfordshire.

Imports of Crushed Rock by Rail

3.53 There are three railhead depots in Oxfordshire used for importing aggregates, namely at Banbury, Kidlington and Sutton Courtenay and these are safeguarded in the Minerals and Waste Local Plan. That plan records two depots at Banbury, but those have been amalgamated. These depots import crushed rock aggregates from the South West (Somerset) and the East Midlands (Leicestershire). Capacity figures are not available for these depots. There is planning permission for a further railhead aggregate depot at Shipton on Cherwell, but this has not yet been developed. There is also a rail depot at Hinksey Sidings, Oxford, but this only handles ballast for the rail network, with all movements in and out by rail, although this depot is not currently being used for transhipment of rail ballast.

3.54 Figures for imports of crushed rock by rail collected by OCC are only available from 2007 onwards. Prior to that year only the regional totals are available. The Oxfordshire figures are confidential because they are derived from returns for only two companies. The figures incorporate imports by rail from Somerset, Leicestershire and elsewhere, but also include significant quantities (from South Wales and South Gloucestershire) that are delivered to the rail depots by road, thus distorting the true picture for rail transportation (but at least providing quantification of those road imports). The figures do not include imports of crushed rock to Hinksey Sidings, Oxford, which was brought in by rail and despatched by rail for use as rail ballast on the rail network (over a wider area than just Oxfordshire).

3.55 Although the raw data is confidential, it is possible to report the variations over time (from 2007 onwards) in overall sales from the rail depots from the two reporting companies. **Table 3.16**, below, thus expresses the annual imports as proportions of the sales figure for 2007.

Table 3.16: Pattern of sales from Oxfordshire rail depots 2007-2012 (Source: Oxfordshire County Council Aggregates Monitoring Survey)

	2007	2008	2009	2010	2011	2012	2013
Proportion of 2007 sales of subsequent sales	1.0	1.1	0.7	0.9	1.2	1.0	1.0

3.56 **Table 3.16** shows that the figures vary from one year to another but that the fluctuation is less marked than those for domestic sales of sand & gravel. In part, at least, this probably reflects the fact that rail imports were used during the recession to compensate for the loss of output from some of the mothballed sites within Oxfordshire.

Secondary and Recycled Aggregates

Past Sales

3.57 Although reasonable data on recycling capacity is available for Oxfordshire, as discussed in **Chapter 2**, and whilst that may be indicative of increasing production and sophistication, there is only partial information on the actual levels of production and use of these materials. Past aggregates monitoring surveys, for example, have not produced a full response from secondary and recycled aggregates site operators. As a result, recorded sales of secondary and recycled aggregates in Oxfordshire for particular years (notably 2010 and 2011), are believed to be significantly less than the total actual production.

3.58 **Table 3.17** shows the secondary and recycled aggregate sales since 2008. The 2013 survey produced a better response than some previous years with total sales of 422,000 tonnes, this comprised recycled construction and demolition waste produced at fixed recycling sites and ash from Didcot Power Station. However, even the 2013 survey only had a 70% response rate, and OCC estimate that sales in 2013 were actually around 470,000 tonnes.

Table 3.17: Secondary and Recycled Aggregates Sales in Oxfordshire (Source: SEEAWP Aggregates Monitoring Surveys)

Year	Sales (tonnes)
2008	503,000
2009	286,000
2010	152,000
2011	236,000
2012	466,000
2013	422,000

3.59 Power station ash from Didcot A power station was, until recently, the only source of secondary aggregates within the county. Some of the output from Didcot was formerly utilised within Oxfordshire, but some was also exported by rail (e.g. to Hampshire). However, Didcot ceased operation in March 2013, thereby temporarily reducing the production of secondary aggregates within Oxfordshire from approximately 125,000 tonnes per year to zero. From August 2014, approximately 75,000 tonnes per annum of incinerator bottom ash from the new energy from waste at Ardley will be available for use as secondary aggregates; although due to different end uses will not replace the Didcot source.

Imports of Secondary Aggregates

3.60 Elsewhere in the UK, other types of secondary aggregate are produced as by-products from a range of industrial, manufacturing and extractive industries. They include products such as China Clay sand, colliery spoil, blast furnace, steel and other metallurgical slag materials, and spent foundry sand. In most cases the

quantities produced are relatively small and (with the exception of higher specification road surfacing aggregates produced from some steel works) the bulk value of the material is low. This is compounded by the fact that the exemptions from the aggregates levy, which used to give secondary aggregates a price advantage over primary aggregates, were withdrawn in April 2014. The financial and environmental costs of transporting such material are the same as for other bulk materials and long distance transportation cannot generally be justified for such low value products. This largely explains why no secondary aggregates are currently transported into Oxfordshire.

3.61 One potential exception to this is China Clay sand, produced as a by-product of China Clay (Kaolin) extraction in Cornwall and Devon. The exception results from the ability of this material to be transported by sea (and increasingly by rail) directly into areas which have high levels of demand and little if any indigenous resources of land-based primary aggregate. In such areas (particularly London and some other parts of south east England), prices are high enough to justify the long-distance transport costs.

3.62 These conditions do not currently apply to Oxfordshire, however. A recent unpublished draft report for the County Council concluded that[16]: "*The opportunity to import China Clay waste into Oxfordshire within the plan period is limited by a combination of the distance it would have to travel and geographical constraints prohibiting direct delivery by ship. The cost of importing the material by road is prohibitive. Import by rail would also be costly and would involve the need to 'double handle' the material. This, combined with the current shortage of rail network capacity and the logistics of finding a rail head willing to accept and store the material prior to use, most likely make import by rail an unrealistic option*".

3.63 That report also noted that *"Even if it were economical to import China Clay waste sand to Oxfordshire, due to the distances involved and the resultant carbon emissions, it would be difficult to argue that importing China Clay waste is more sustainable than using locally won material"*.

[16] China Clay Waste: Assessment of Potential for use in Oxfordshire. (Oxfordshire County Council, unpublished report, 2013)

4 Factors Affecting Supply and Demand

Introduction

4.1 Although the NPPF requires that the level of future provision within the LAA should be based, in part, on the rolling average of 10 years' sales figures, as discussed in the previous chapter, it also requires "***other relevant local information"*** to be taken into account, including (*inter-alia*) the contributions likely to be available from marine, secondary and recycled aggregate sources.

4.2 It is a question of deciding whether or not the historical 10 year average for land-won primary aggregate production can be relied upon as a guide to future levels of provision, or whether this needs to be modified in order to reflect other factors which may influence either the ***supply*** (availability) and/or the ***demand*** for aggregates produced within Oxfordshire, in future years. This, in turn, requires consideration to be given to both local supply and demand factors and to external factors relating to the potential supply to, or demands from, other MPAs.

4.3 Some neighbouring MPAs with limited indigenous resources of their own (particularly Northamptonshire and Warwickshire for crushed rock and - to a lesser extent - Wiltshire, Gloucestershire & Berkshire for sand & gravel) rely on Oxfordshire to supply some of their needs, whilst others (notably Somerset, South Gloucestershire and Leicestershire) have traditionally supplied crushed rock aggregates (in particular) into Oxfordshire, to supplement the County's own production and to cater for higher specification requirements from harder rock resources.

4.4 This chapter considers each group of factors in turn:

- Local Supply Factors.
- Local Demand Factors.
- External (Import / Export) Factors.

Local Supply Factors

4.5 Local factors with respect to the supply of aggregates from sources within Oxfordshire relate primarily to:

- The continued availability of primary, land-based resources and permitted reserves within the County, and the extent to which these are constrained by planning or environmental factors;
- the ongoing availability of secondary and recycled materials within the County;
- the effects of commercial decisions within aggregate producing companies which operate both within and outside Oxfordshire; and
- overall trends in supply, compared with apportionment figures.

4.6 Each of these factors is considered in turn, below.

Continued availability of Primary, Land-Based Resources and Reserves

4.7 As explained in Chapter 2, Oxfordshire has abundant natural resources of land-based primary aggregates, including both sand & gravel and crushed rock. That availability has not significantly changed over the baseline period. Although they are finite resources, the amount extracted over the 10-year period is only a very small proportion of the total resource available.

4.8 A more critical consideration is the availability of Permitted Reserves, i.e. those parts of the available resources which have the benefit of planning permission for the winning and working of the materials concerned. The amounts extracted over the baseline period represent much higher proportions of these materials.

4.9 For crushed rock, a total of **4.577 mt** were extracted between January 2004 and December 2013, equivalent to **42.3%** of the permitted reserves remaining at the end of that period (i.e. **10.819 mt**). As noted in Chapter 3, if extraction were to continue at the same average rate, the current reserves would represent a crushed rock 'landbank' of 23.6 years.

4.10 For land-won sand & gravel, a total of **8.967 mt** were extracted over the same 10 year baseline period, equivalent to **102%** of the permitted reserves remaining at 31st December 2013 (i.e. **8.783 mt**). In this case, as noted in Chapter 3, if extraction were to continue at the same average rate, the current reserves would represent a 'landbank' for sand & gravel of 9.8 years.

4.11 In both cases, although the landbanks are currently greater than the minimum of 10 years (for crushed rock) and the minimum of 7 years (for sand & gravel), they are not sufficient for such landbanks to be maintained throughout the Plan Period.

4.12 In order to comply with the NPPF, additional planning permissions for mineral extraction will therefore be required for both types of primary aggregate. Whilst there are adequate resources to allow this, consideration also needs to be given to the likelihood of obtaining planning permission which, in turn, will be influenced in part by the extent to which the resources are constrained by various planning and/or environmental designations.

4.13 Balancing the need for environmental protection against the need for future aggregate production is, however, a matter to be tested by the Local Plan process and through the determination of individual planning applications. The presence of environmental constraints is not, in itself, a *prima facie* reason for modifying the level of future provision.

4.14 Environmental and other constraints might become a factor if it could be conclusively demonstrated that Oxfordshire's resources are substantially more (or substantially less) constrained than those in neighbouring authorities; or if the resources are likely to be significantly more constrained in future than they were during the 10-year baseline period.

4.15 A report by the BGS for SEERA (South East Plan - Review of Minerals Supply and Demand. BGS report CR/06/147) found that, for sharp sand & gravel, Oxfordshire has a much greater estimated quantity of unworked resources which are free of environmental designations than is the case in other parts of the South East; although, only international or national designations (SSSI, NNR, National Park, AONB, SPA or SAC) were taken into account. This does not apply, however, for soft sand resources: whilst the majority of Oxfordshire's soft sand is unconstrained by environmental considerations, other MPAs, i.e. Berkshire, Hampshire, and Kent

and Medway have more unconstrained soft sand resources than Oxfordshire. No comparable information is available regarding crushed rock resources, although here, the only other MPA with such resources in the South East is Kent.

4.16 If anything, this data might suggest that Oxfordshire should be seeking to increase its share of future sand & gravel production within the South East. That, however, would be open to considerable challenge, since the presence or absence of designations does not automatically preclude mineral working. Moreover, the BGS assessment does not take account of other environmental factors such as access, proximity to existing development or sensitive land uses, local nature conservation interests, protected species, water interests, landscape impacts, etc.

4.17 Equally, however, given that plentiful unconstrained resources exist within Oxfordshire, there is no reason to suppose that additional permitted reserves will not be able to be found within the Plan Period.

4.18 It can therefore be concluded that neither resource availability nor environmental constraints would justify a departure from the notion of using historical sales averages as the basis for future provision.

Factor: Continued availability of Primary, Land-Based Resources and Reserves.

Justification for Departure from Historical Sales Average: No.

Ongoing availability of secondary and recycled materials

4.19 As noted in Chapter 3, there is only limited data on the production and use of secondary and recycled aggregates within Oxfordshire. Partial information is recorded within the annual Aggregates Monitoring surveys, but the figures obtained are believed to be somewhat less than the total actual production of secondary and recycled aggregates within the County. In particular, they do not include construction and demolition waste recycled *in-situ* using mobile plant.

4.20 The figures available indicate a reduction during the recent economic downturn, followed by a recovery since 2011, paralleling the pattern seen for the production of primary aggregates and for construction activity as a whole.

4.21 Capacity for recycling within Oxfordshire does not appear to be a limiting factor, although the supply of materials for recycling probably is. It likely that recycled materials will become increasingly available as construction activity increases and, in the absence of any clear evidence to the contrary, it seems reasonable to assume that recycled aggregates will continue to provide a similar proportional contribution to the overall supply as they have done in the recent past.

4.22 The closure of Didcot A power station in 2013 has removed the only previous source of secondary aggregates production within the county. The annual capacity of this site in recent years was approximately 125,000 tonnes per annum. This represents nearly 20% of the estimated total of secondary and recycled aggregates capacity within the county in 2012. As noted earlier, however, approximately 75,000 tonnes per annum of new secondary aggregates production capacity has become available in 2014 (producing aggregate from ash at the recently completed energy from waste facility at Ardley). This equates to 60% of the capacity lost at Didcot, although it is noted that the two sources provide for different markets: power station ash is used for block making, whilst incinerator bottom ash is used for sub-base in road construction.

4.23 As previously noted, there is currently no importation of secondary aggregates such as China Clay waste into Oxfordshire and no realistic prospects of this happening within the foreseeable future.

4.24 Overall, there is therefore no information to suggest that the balance of supply will change significantly in future years and therefore no justification for a departure from using historical sales averages for primary aggregates as the basis for future provision.

Factor: Ongoing availability of secondary and recycled materials.

Justification for Departure from Historical Sales Average: No.

Commercial Decisions by Quarry Operators

4.25 A feature of the recent, prolonged economic downturn and recession was that a number of major quarry operators 'mothballed' some of their operations and focussed their much reduced levels of production on other (generally larger and more efficient) sites in other counties. These commercial decisions introduced temporary but significant market distortions. In Oxfordshire, Hanson Aggregates mothballed three of its sand and gravel operations (one of which has since recommenced production) and delayed the commencement of working a new permission at one of these operations. Instead, the company supplied sand and gravel from operations in Gloucestershire, and crushed rock aggregate, by rail, from Whatley Quarry in Somerset. This exacerbated the effect of the recession on Oxfordshire's sand & gravel output figures which, as shown in **Table 3.1** demonstrated a much steeper decline during the recession than was the case for England as a whole.

4.26 As explained in Chapter 3, a similar knock-on effect was seen for crushed rock production within Oxfordshire, although sales recovered in 2013, suggesting that the effect is likely to have been temporary, rather than a permanent step-change. Sales of soft sand within Oxfordshire were not affected - presumably because these materials cannot easily be substituted by crushed rock products and opportunities for importing soft sand into Oxfordshire from adjoining counties are limited.

4.27 The impact on sand & gravel and crushed rock sales within Oxfordshire has been to significantly reduce the rolling 10-year average for these materials, compared with the figures which might have been seen if Hanson had not switched its sources of supply. It would be prudent, however, to assume that this will prove to be only a temporary market distortion and that, as economic growth returns, production will recommence at sites which were either mothballed or delayed.

4.28 For this reason, the 10-year average of historical sales is likely to underestimate the true level of future provision required within Oxfordshire for both sharp sand & gravel and crushed rock.

4.29 Quantification of this effect can be approached by considering how Oxfordshire's sales have reduced, over the baseline period, in proportion to those for England as a whole. The varying percentages are shown in Tables 3.1, 3.2 and 3.6 in **Chapter 3**. Given that both the Oxfordshire and England figures were affected by the same recession, it is reasonable to deduce that the changes in these percentages must reflect specific local factors within Oxfordshire. Moreover, and as noted in **Chapter 3**, the timing of the most obvious changes (between 2003 and 2004, and between

2007 and 2008) coincided with the mothballing of specific quarries, which suggests that this is likely to have been the main local factor involved.

4.30 Immediately prior to the baseline period (i.e. before the end of 2003), Oxfordshire's sharp sand & gravel production was in the order of 3% of that in England (see **Table 4.1** below). Thereafter, that proportion began to fall, slowly at first but then far more dramatically after 2007, when the recession began, and when the effects of mothballing certain sites became very clearly evident in Oxfordshire's sales figures. If it had not been for those effects, it is reasonable to suppose that Oxfordshire's earlier proportion of the total sales in England would have been maintained throughout the baseline period. The average 'pre-recession' proportion of Oxfordshire's production compared to England, if calculated over the period 2001 to 2007 inclusive was 2.51%. It is our judgement that the period 2001 to 2007 is reasonably representative of conditions in Oxfordshire prior to the period when average sales became most obviously distorted by the effects of commercial decisions. If that proportion, 2.51%, had been maintained throughout this period, the corresponding annual figures, and thus the 10-year average would have been higher. This is illustrated in **Table 4.1** below, from which it can be seen that the adjusted 10-year average would have been 1.015 mtpa, rather than 0.812mtpa. The implication is that the higher figure of 1.015 mtpa is a more reliable indicator of current demand within Oxfordshire and should be used in place of the actual 10 year average.

Table 4.1: Sharp sand & gravel: Average percentage of pre-recession years (2001-2007)

Year	Oxfordshire	England	Ox/Eng	2001 - 2007 Average
2001	1.612	51.225	**3.15%**	
2002	1.436	49.003	**2.93%**	
2003	1.372	48.674	**2.82%**	
2004	1.184	51.591	**2.29%**	
2005	1.09	48.109	**2.27%**	
2006	0.983	46.316	**2.12%**	
2007	0.893	44.520	**2.01%**	**2.51%**
2008	0.629	41.527	**1.51%**	
2009	0.462	31.705	**1.46%**	
2010	0.455	31.794	**1.43%**	
2011	0.489	31.392	**1.56%**	
2012	0.559	28.702	**1.95%**	
2013	0.401	n/a	n/a	

Year	Oxfordshire	England	Ox/Eng	2001 - 2007 Average
10 year Sales Average (2003-2012):	**0.812 mtpa**	**40.433 mtpa**	**Adjusted Oxon Sales Average:**	**1.015 mtpa**

4.31 **Table 4.2**, below, presents similar data in respect of crushed rock sales. Here again, as noted in **Chapter 3**, some local factors appear to have influenced the levels of production in Oxfordshire, compared with those in England as a whole. Again, the most likely explanation relates to the commercial decisions taken by Hanson to bring in crushed rock aggregates by rail from Somerset. Although no crushed rock sites in Oxfordshire were mothballed, the availability of higher quality stone from the Mendips, during this period, may have displaced some of the local suppliers from the market. In this case the adjusted figure for the 10 year average of crushed rock production is 0.584 mtpa.

Table 4.2: Crushed rock: Average percentage of pre-recession years (2001-2007)

Year	Oxfordshire	England	Ox/Eng	2001 - 2007 Average
2001	1.05	94.630	**1.11%**	
2002	0.923	87.647	**1.05%**	
2003	0.629	83.957	**0.75%**	
2004	0.557	85.653	**0.65%**	
2005	0.564	80.593	**0.70%**	
2006	0.495	83.722	**0.59%**	
2007	0.717	82.922	**0.86%**	**0.82%**
2008	0.543	75.179	**0.72%**	
2009	0.363	59.666	**0.61%**	
2010	0.272	50.115	**0.54%**	
2011	0.322	57.744	**0.56%**	
2012	0.242	52.980	**0.46%**	
2013	0.502	n/a	n/a	
10 year Sales Average (2003-2012):	**0.470 mtpa**	**71.253 mtpa**	**Adjusted Oxon Sales Average:**	**0.584 mtpa**

Factor: Commercial Decisions by Quarry Operators.

Justification for Departure from Historical Sales Average: YES (for sharp & gravel and also for crushed rock): it would be prudent to compensate for the temporary market distortion by making provision for more sharp sand & gravel and crushed rock production in Oxfordshire than is indicated by the 10-year average. Adjusted figures of 1.015mtpa for sharp sand & gravel, and 0.584 mtpa for crushed rock are indicated. In relation to soft sand, there is no available evidence to suggest similar circumstances, therefore no justification for departure from the historical sales average.

Overall Trends in Supply compared with Apportionments

4.32 Data presented in **Tables 3.3** and **3.7** in **Chapter 3** clearly show that the supply of primary aggregates within Oxfordshire has declined substantially compared with the apportionments in the former South East Plan.

4.33 The decline was most abrupt for sand & gravel, which fell from being 74% of the apportionment level at the start of the baseline period, to only 31% of the apportionment by 2013 (and that was despite the apportionment itself being reduced in 2006). The reason for this, and for the similar decline in Oxfordshire's production compared with England as a whole, appears to have been attributable to the prolonged recession which, in Oxfordshire, led to the commercial decisions outlined above. These are both likely to have been temporary factors, however and cannot be used to sustain an argument in favour of reducing the level of future provision: to do so would be to create a serious risk of under-provision in future years which, in turn, could impede Oxfordshire's plans for economic growth.

4.34 Over the baseline period as a whole (2004 - 2013), the average annual production of all sand & gravel in Oxfordshire (0.897 mtpa) represented only 49% of the apportionment given in the SE Plan. This does not necessarily imply that future provision needs to be doubled, since the apportionment itself may have been too high (as Oxfordshire has consistently argued for many years), not least because it was derived from much older National & Regional Guideline figures, published in 2003, when demand was generally much higher, but it does indicate that there probably needs to be some degree of upward adjustment. This logic applies even if there were to be no additional economic growth beyond the recent recovery.

4.35 For crushed rock, over the baseline period as a whole, Oxfordshire's production averaged 0.458 mtpa, which represents only 46% of the crushed rock apportionment given in the SE Plan. In this case, however, although sales have fluctuated, and were clearly affected by the recession and other factors between 2008 and 2012, they were consistently below the apportionment throughout the baseline period. Again, Oxfordshire has consistently argued that the apportionment in the SE Plan was too high, not least because it was derived from much older National & Regional Guideline figures, published in 2003, when demand was generally much higher. The Guidelines were subsequently reduced to reflect this when they were revised in 2009, and the Secretary of State's proposed changes to the SE Plan suggested that the Oxfordshire apportionment should, accordingly, be reduced from 1.0 to 0.66 mtpa. Whilst those changes were never formally adopted as policy before the SEP was abolished, they would seem to be a more realistic expectation. This indicated that it would probably be justified to make future provision at a level that is higher than the historical sales average and closer to a figure of 0.66 mtpa.

Factor: Overall Trends in Supply compared with Apportionments

Justification for Departure from Historical Sales Average: YES, to some extent: the supply of primary aggregates in Oxfordshire has fallen far below the apportionments given in the former South East Plan, although this has to be balanced against the notion that the Oxfordshire apportionments themselves may have been too high. The net effect is that future provision probably needs to be somewhat higher than the 10 year sales averages, although the actual level of uplift required will need to be underpinned by other evidence.

Local Demand Factors

4.36 The main factors which directly influence local demand for construction aggregate are those which control the rate of local construction activity. The main 'drivers' for this are likely to be the rate of economic growth, the rate of local population growth (which affects the rate of construction of new housing and associated infrastructure) and the extent of major infrastructure projects and other key development within the area. In each case, consideration needs to be given to the extent to which these drivers are likely to change during the Plan Period, compared with the 10-year baseline period. This can never be an exact science, and forecasts have to be considered.

Economic Growth

4.37 The overall rate of economic growth is generally measured in terms of Gross Domestic Product (GDP). Figures are available only for the UK as a whole, and therefore mask important differences from one part of the country to another, but they nevertheless provide at least a background indicator as to the relative changes in economic activity likely to be experienced in Oxfordshire over time. Consideration then needs to be given to more local factors in order to assess how relevant these indicators are to projections of future economic growth in Oxfordshire itself.

4.38 **Table 4.3**, below shows the annual out-turn Real GDP figures for the UK as a whole for the 10-year baseline period. These clearly show the sharp onset of the recession in 2008, the deepening of this in 2009 and the prolonged period of limited economic growth thereafter. These were very clearly national factors but they are closely reflected in the steep decline of construction aggregates in Oxfordshire (and in most if not all other Counties). The average rate of growth in the UK over the whole 10-year period was just 1.14%

Table 4.3: Changes in UK Real GDP over the baseline period (SOURCE: Eurostat Website)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10 year annual average
UK GDP	3.2%	3.2%	2.8%	3.4%	-0.8%	-5.2%	1.7%	1.1%	0.3%	1.7%	**1.14%**

4.39 **Table 4.4**, below, provides similar details for the subsequent 5-year period, in terms of the most recent forecasts published by the Office of Budget Responsibility (OBR) in March 2014. Similar forecasts are not yet available beyond 2018. Although the annual average for the period 2014 to 2018 (2.54%) is more than double the average for the previous 10 years, this figure can only be used with considerable caution. As demonstrated very clearly by the data for the previous decade, the first five years cannot be relied upon as a predictor of subsequent economic growth.

Table 4.4: Forecast future changes in UK GDP (OBR Economic and Fiscal Outlook Report, March 2014)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	annual average
UK GDP	2.7%	2.3%	2.6%	2.6%	2.5%	---------- (not yet forecast) ---------					**2.54%**

4.40 That said, it is perhaps unlikely that another deep and prolonged recession will be experienced so soon after the last one and may therefore be prudent to assume that the average rate of UK growth over the period from 2014 to 2023 will be somewhat higher that seen in the preceding decade.

4.41 Consideration then needs to be given to any indicators of more local economic growth. Unfortunately, no quantitative information is available on this, but Oxfordshire clearly has a very positive growth agenda, as set out in the current Oxfordshire Strategic Economic Plan, and it therefore seems reasonable to assume that growth will be at least in line with the indications given by National GDP projections.

Factor: Economic Growth.

Justification for Departure from Historical Sales Average: YES: it would seem prudent to assume that future levels of economic activity, and thus demand for construction aggregate, are likely to be higher during at least the first part of the Plan Period than was the case during the baseline period. Unfortunately, no evidence is available to quantify the level of increase likely to be experienced, but it seems reasonable to assume that at least a modest level of increase will be needed.

Population Growth and House Construction

4.42 Other potential sources of information that have been considered regarding the likely future demand for construction aggregates include population growth forecasts and local authority housing forecasts. It is important to note that this section considers population growth and housing construction together when considering the justification for a departure from the historical sales average, and not as separate indicators of increasing demand.

4.43 Population figures are published by Oxfordshire Insight[17] and show a steady increase over the baseline period (see **Table 1** in **Appendix 3**). The demand for aggregates, which has declined over the same period, as shown in **Chapter 3**,

[17] Available at: http://insight.oxfordshire.gov.uk/cms/population-0

therefore has no direct correlation with population totals - at least not on the scale associated with year-on-year variations.

4.44 A more useful measure, however, may be the average rate of population growth over a period of time. For the 10 year baseline period (2004 to 2013) the population grew by 7.36% from 620,412 to 666,100 (i.e. an average of 0.74% per year)[18]. For the population forecast data (see **Table 2** in **Appendix 3**), the average annual growth rate is 0.95% per year for the period from 2014 to 2026 (the furthest date for which figures are currently forecast). Whilst there is no statistical justification for assuming that rates of population growth will correlate with changes in demand for aggregates, they do at least provide a mechanism for looking further ahead than the current economic forecasts. If anything they suggest that the pressure for new housing and associated infrastructure development may be higher in future than it was over the baseline period, with a consequential increase in the demand for construction aggregates. This suggestion is echoed in the Oxfordshire Strategic Economic Plan which notes (on page viii) that "*Oxfordshire is successful. Our employment and housing growth is above the national trend*". This supports the earlier observation that Oxfordshire is likely to experience future growth at least in line with National projections.

4.45 This can be examined further by considering data on rates of house construction (see **Table 3** and data shown in **Figure 1** in **Appendix 3**). For the 10 year baseline period (2004-2013) the average housing completion rate in Oxfordshire was 2,334.3 homes per year[19]. Looking forwards, the Oxfordshire Strategic Housing Market Assessment (SHMA) has identified that 93,560 to 106,560 additional homes are needed across Oxfordshire over the period 2011-2031[20]. This equates to an average construction rate of between 4,678 and 5,328 homes per annum. Whilst there is considerable uncertainty in Oxfordshire about the deliverability of these figures, taken at face value they suggest a markedly upward trend in the associated demand for construction aggregates (with an implied doubling, at least, of the rate experienced over the baseline period). This is consistent with the fact that Oxford remains a world class centre for education, research and innovation, and currently has insufficient housing supply, which is acting as a barrier to growth.

4.46 Information provided to Oxfordshire County Council by the Mineral Products Association during the course of this work suggests that new housing construction (including estate roads and services) tend to account for roughly 20% of all aggregate sales, with a further 15% being related to major road construction or improvements, some of which may be directly linked to major housing developments. It may therefore be deduced that something between 20% and 35% of the overall annual aggregate demand within Oxfordshire could be significantly increased - perhaps even doubled over the Plan Period, compared with the baseline period. Whilst the quantification of this increase would need to be tempered by the questions that remain over deliverability, the suggestion of a rising trend is consistent with the wider indications suggested above regarding overall economic growth.

[18] Available at: http://www.neighbourhood.statistics.gov.uk/dissemination/Info.do?m=0&s=1409751624769&enc=1&page=analysisandguidance/analysisarticles/local-authority-profiles.htm&nsjs=true&nsck=false&nssvg=false&nswid=1280

[19] Oxfordshire County Council 2014.

[20] GL Hearn (2014) Oxfordshire SHMA. Available at: https://www.oxfordshire.gov.uk/cms/content/spatial-planning-and-infrastructure-partnership

Factor: Population and Housing Growth.

Justification for Departure from Historical Sales Average: YES: although the evidence is somewhat indirect, the indications are that demand relating to population growth and new house construction could be significantly higher during the Plan Period than it was during the baseline period. Quantification of this effect is hampered, however by questions regarding the deliverability of the housing figures in the SHMA.

Major Infrastructure Projects/Key Development

4.47 Major infrastructure projects, including those at the national scale, and key development throughout Oxfordshire have been and need to be considered alongside housing and associated infrastructure development in terms of their likely influence on the future demand for construction aggregates. It should be noted that in assessing the overall impact of major infrastructure projects/key development and the justification for departure from the historical sales average, that the number of new homes to be developed in Oxfordshire, as outlined below, have not been taken into account here, as they have already been considered in the previous section relating to Oxfordshire's SHMA figures. Housing figures have been included here solely for completeness.

4.48 The National Infrastructure Plan (2013)[21] includes details of nationally significant infrastructure projects in Oxfordshire, these include:

- Super-Connected Cities (to be completed 2015): The government has announced 22 Super-Connected Cities which will benefit from faster and better broadband as well as wireless connectivity in city centres and Wi-Fi in public buildings; Oxford was in the first wave of cities selected.
- Research Partnerships Investment Funds (RPIF) - £301 million has now been allocated to 22 projects which has levered £826 million in private co-investment. The Big Data Institute (a health research centre) was announced for Oxford in 2013.
- Electrification works have started on the Great Western Line, with sections to Oxford, Newbury, Basingstoke and Bristol to be completed by 2016.

4.49 Of the three projects, the first (super-connected cities) has little aggregate demand, and the third (electrification works of the Great Western Line) has limited civil engineering works within Oxfordshire. As such, it is considered that only the second, RPIFs, may influence the future demand for construction aggregates, albeit this is likely to be limited.

4.50 The National Infrastructure Pipeline outlines that the East West Rail Project, which involves linking the Great Western Main Line, Oxford, Bicester, Milton Keynes, Bedford, Cambridge, Ipswich and Norwich, involves £309.69m of funding, and will be completed by 2049. However, as most of these works lie outside Oxfordshire and the Oxford to Bicester section is already under construction, this project will not influence future aggregate demand in the County.

[21] Available at: https://www.gov.uk/government/publications/national-infrastructure-plan-2013

4.51 At a more local scale, priority locations for development in Oxfordshire make up the Oxfordshire Knowledge Spine, which includes Science Vale Oxford[22], Bicester and Oxford[23].

4.52 **Science Vale Oxford** is an area in the southern part of Central Oxfordshire, between the city of Oxford to the north and the M4 to the south. It is the largest concentration of research and development in Europe:

- There are plans to deliver 20,000 new jobs and around 20,000 new homes in the area, with designated land provided for both.
- Didcot is planned to accommodate the majority of new homes in the Science Vale – with a projected population of about 50,000 by 2031. Current plans provide for at least 15,000 new homes in the Science Vale Oxford area by 2029 and 20,000 by 2031. This includes major sites in Didcot and Harwell, and Wantage and Grove.

4.53 **Bicester** has major ambitions for growth, including through the development of the internationally recognised Bicester Village Shopping Centre, the recently completed £70m town centre redevelopment, and the proposed North West Bicester Eco-town.

- The proposed eco development will take place on a site approximately 345 hectares (800 acres) north west of the existing town. It will deliver up to 6,000 homes and it is estimated that over £1 billion of investment could be attracted to the town through proposed developments. In August 2014, Developer A2Dominion submitted the first series of planning applications to Cherwell District Council for consideration for the eco development, the outline planning application includes plans for:
  - Up to 2,600 zero-carbon homes;
  - up to 4,700 square metres of commercial/business space;
  - up to 2,500 square metres of community space;
  - up to 1,250 square metres of retail and leisure space; and
  - a primary school.

4.54 More generally, both Banbury and Bicester are identified for key development, including 155 hectares of land for employment uses (B use class) and land to provide approximately 15,000 jobs (including retail jobs on town centre sites). Development plans for Carterton also include 1,850 new homes.

4.55 Road traffic has grown rapidly in Oxfordshire, particularly on the M40 and A34, with congestion being a significant problem. Growth in traffic on Oxfordshire roads is predicted to be 25% over the period to 2026. The predicted spend on highway schemes in the Local Investment Plan is £56.6 million.

4.56 It is difficult to assess the overall impact of the various infrastructure and major development proposals outlined above, in terms of their demand for construction aggregates, without being able to compare this information with equivalent data for the baseline period (2004 - 2013). At the very least, however, there appears to be no evidence to suggest that this element of demand is likely to reduce and, if anything, it seems likely that there will be increased activity. This notion is supported by the Oxford and Oxfordshire City Deal[24], which sets out the actions the

[22] A global hot spot for enterprise and innovation in science, high technology and the application of knowledge - http://www.sciencevale.com/.
[23] Oxfordshire LEP (2014) Strategic Economic Plan: Driving Economic Growth Through Innovation.
[24] Available at: https://www.gov.uk/government/publications/city-deal-oxford-and-oxfordshire

region will take to create new jobs, support research and businesses, to speed up the development of 7,500 homes across the County, and to encourage improvements to local roads and transport.

Factor: Major infrastructure projects/ key development.

Justification for Departure from Historical Sales Average: YES: whilst it is difficult to quantify, there are some indications that planned infrastructure and major development within the County may be greater during the Plan Period than was the case during the baseline period, and would therefore be prudent to anticipate at least a modest increase in demand for construction aggregates from this sector, in addition to that associated with population and housing growth.

Import and Export Factors

4.57 Reliable information relating to imports and exports of construction aggregates between individual MPAs is generally limited to that provided by the four-yearly Aggregate Minerals (AM) surveys, carried out for DCLG and collated by the BGS. Data is available from the AM2005 and AM2009 surveys but the AM2013 survey has not yet taken place. In its absence it is very difficult to build up a clear picture of the nature and extent of aggregate imports and exports over the whole of the baseline period.

4.58 Comparison of the AM2005 and AM2009 results revealed that there were significant reductions over that period in exports from Oxfordshire to neighbouring South East MPAs. This trend seems likely to have continued through to 2013, but there is no factual evidence to confirm this, other than the lack of significant increase in overall sales since 2009 (apart from 2012 for sharp sand & gravel, 2011 for soft sand and 2013 for crushed rock).

4.59 As noted earlier, in **Chapter 3**, there is evidence that one of the major suppliers (Hanson) replaced production from some of its sites in Oxfordshire with supply from Somerset and Gloucestershire during the recent recession, thereby increasing imports into the county for a number of years. That seems to have been only a temporary arrangement, however, and it is considered likely that the previous balance of supply will be restored in future years.

4.60 Whilst the increased level of crushed rock imports from Somerset could theoretically continue for many years, in terms of the availability of permitted reserves at Hanson's Whatley Quarry (and Somerset's response to Oxfordshire in respect of their 'Duty to Cooperate'), a continued economic recovery would probably encourage Hanson to increase local production within Oxfordshire, back to at least pre-recession levels. The situation is perhaps more straightforward in terms of sand & gravel imports from Gloucestershire, since the more limited permitted reserves in that area would not be able to support continued exports to Oxfordshire. In particular, the sand & gravel quarry near Fairford that was supplying into Oxfordshire is understood to be now exhausted (or nearing exhaustion) – which is one of the reasons why supply has switched back to Sutton Courtenay Quarry. Other potential sources of supply in Gloucestershire are further away from Oxfordshire. Imports from Gloucestershire are therefore likely to decline, irrespective of what happens in Oxfordshire.

Factor: Imports and Exports

Justification for Departure from Historical Sales Average: YES: reduced reliance upon imports from Somerset and Gloucestershire in future years will increase the pressure for domestic production, particularly of sharp sand & gravel. This would be additional to the suggested increases in more general levels of demand within the county, but is largely a repetition of the earlier point relating to commercial decisions by quarry operators.

Summary

4.61 Bringing together all of the points identified above, it seems very likely that the overall demand for construction aggregates for use within Oxfordshire will be higher over the Plan Period (or at least the first part of that period), than it was during the baseline period.

4.62 The evidence for this is as follows:

- There is likely to be a continued availability of unconstrained primary, land-based resources and reserves (i.e. resource availability does not provide any justification for reducing future provision).
- There is also likely to be a continued availability of secondary and recycled materials (i.e. this factor does not provide any justification for either increasing or reducing the supply of primary aggregates).
- The effects of the recent prolonged recession were exacerbated in Oxfordshire by commercial decisions to mothball certain quarries and to delay the commencement of production at others. Those effects seem likely to be reversed as the economy recovers and it would be prudent to compensate for the temporary market distortion by making provision for more sharp sand & gravel production in Oxfordshire than is indicated by the 10-year average over the baseline period. This also applies in the case of crushed rock production, albeit to a lesser extent. Adjusted figures of 1.015mtpa for sharp sand & gravel, and 0.584 mtpa for crushed rock are indicated. In relation to soft sand, there is no available evidence to suggest similar circumstances, therefore no justification for departure from the historical sales average.
- More generally, the supply of primary aggregates in Oxfordshire has fallen far below the apportionments in the former South East Plan, although this has to be balanced against the notion that the Oxfordshire apportionments themselves may have been too high. The net effect is that future provision probably needs to be somewhat higher than the 10 year sales averages - particularly for sharp sand & gravel and to a lesser extent for crushed rock.
- Future levels of general economic activity, and thus demand for construction aggregate within Oxfordshire, are likely to be higher during at least the first part of the Plan Period than was the case during the baseline period. This is supported by the published requirements for future house building, although there are known concerns over the deliverability of those figures.
- Whilst it is difficult to quantify, there are some indications that planned infrastructure and major development within Oxfordshire may be greater during the Plan Period than was the case during the baseline period, and it would therefore be prudent to anticipate at least a modest increase in demand for construction aggregates from this sector, in addition to that associated with population and housing growth.

- Reduced reliance upon imports from Somerset and Gloucestershire in future years will increase the pressure for domestic production, particularly of sharp sand & gravel. This would be additional to the suggested increases in more general levels of demand within the county, but is largely a repetition of the earlier point relating to commercial decisions by quarry operators.

4.63 The implications of these trends for the future provision of aggregates in Oxfordshire are considered in the next Chapter.

5 Future Provision

5.1 The previous chapter has concluded that, for a number of reasons, it would be unwise to rely on the 10 year average sales over the baseline period as a guide to future provision in Oxfordshire. Although the concept of using a 10-year average is intended to overcome the effects of short term variations, the recent recession has been especially prolonged and has been compounded, in Oxfordshire, by temporary commercial decisions to transfer some production to other counties. This has affected sharp sand & gravel and also crushed rock production, but not soft sand production.

5.2 Evidence has been presented to suggest that the 10 year baseline figure for sharp sand & gravel production should be adjusted upwards to 1.015 mtpa to compensate for this effect, and that the 10 year baseline for crushed rock production should also be adjusted upwards, to 0.584 mtpa, but that no adjustment to the 10-year average for soft sand is necessary.

5.3 Evidence relating to both economic growth and projected housing and associated infrastructure requirements all points to a need for future provision to be higher than the baseline sales figures, but the effects cannot be quantified. To some extent, the expected growth will be accommodated by the adjustments outlined above, but it is very possible that future demand could exceed these adjustments after a few years. It is therefore recommended, in line with the general concept of 'Plan, Monitor and Manage', that future levels of provision are originally set at the levels indicated above (and in line with the actual 10-year average, in the case of soft sand), but that actual sales are monitored against these expectations on an annual basis. If and when new evidence is obtained which indicates increased demand, these levels of provision will need to be reviewed.

Sand and Gravel

5.4 Although separate landbanks are not required for the two different categories of sand & gravel (i.e. sharp sand & gravel, used primarily for concreting, and soft sand (building sand) used primarily for mortar), the evidence outlined in **Chapter 3** suggests that each of these markets was affected quite differently by the recession and by the resulting commercial decisions.

5.5 Sharp sand & gravel is capable of being substituted by crushed rock products in most end use applications, and was therefore particularly affected by the commercial decisions to mothball local production and to import crushed rock material from outside the county. This had the effect of exacerbating the impact of the recession on supplies of sharp sand & gravel within Oxfordshire, and the adjustment needed to restore an adequate level of future provision is therefore greater than for soft sand. The adjustments required for determining the requirements for future provision are therefore different in each case.

Sharp Sand and Gravel

5.6 Based on the logic outlined above, it is recommended that the future provision for sharp sand & gravel production in Oxfordshire should be set, initially, at 1.015 mtpa, but kept under review with respect to new evidence on actual sales, and adjusted further if necessary at each periodic review of the minerals plan.

Soft Sand

5.7 It is recommended that the future provision for soft sand production in Oxfordshire should be set, initially, at 0.189 mtpa, but again kept under review with respect to new evidence on actual sales.

Crushed Rock

5.8 As indicated above, it is suggested that the future provision of crushed rock production in Oxfordshire should be set, initially, at 0.584 mtpa, but that this, again, should be kept under review in relation to the monitoring of actual sales.

Shortfalls and Allocations

5.9 The recommended average annual levels of provision outlined above would need to be maintained for the whole of the Plan Period (i.e. 18 years from 2014 to 2031, inclusive.

5.10 In the text which follows, these requirements are compared with the stocks of permitted reserves as of 31st December 2013 in order to quantify any shortfalls or surpluses. Where shortfalls are identified, this means that corresponding new permissions or at least land allocations for potential new reserves will need to be identified and recorded within the Plan. In some cases, these requirements may already have been at least partially fulfilled by new permissions granted since 1st January 2014.

Sharp Sand and Gravel

5.11 The recommended average figure of 1.015 mtpa multiplied by 18 years, would give a total provision requirement of 18.27 million tonnes.

5.12 The permitted reserves of sharp sand & gravel at 31st December 2013 (from **Table 3.4**) amount to 6.619 million tonnes.

5.13 This would leave a shortfall of 11.651 million tonnes.

Soft Sand

5.14 The recommended average figure of 0.189 mtpa multiplied by 18 years, would give a total provision requirement of 3.402 million tonnes.

5.15 The permitted reserves of soft sand at 31st December 2013 (from **Table 3.4**) amount to 2.164 million tonnes.

5.16 This would leave a shortfall of 1.238 million tonnes.

Crushed Rock

5.17 The recommended average figure of 0.584 mtpa multiplied by 18 years, would give a total provision requirement of 10.512 million tonnes.

5.18 The permitted reserves of crushed rock at 31st December 2013 (from **Table 3.8**) amount to 10.819 million tonnes.

5.19 This would leave a surplus of 0.307 million tonnes.

6 Conclusions

6.1 This Local Aggregates Assessment has reviewed the likely requirements for the future provision of land-won primary aggregates in Oxfordshire over the period to be covered by the emerging Minerals Local Plan, in accordance with the requirements of the National Planning Policy Framework and current Planning Practice Guidance.

6.2 Focusing separately on the different categories of primary aggregates (sharp sand & gravel, soft sand and crushed rock), it has established a ten-year baseline of recent production, using an average of sales figures over the period from 2004 to 2013 inclusive. It has then examined a range of supply and demand and import/export factors which might justify a departure from these historical averages.

6.3 It has concluded that, because of the recent prolonged economic recession, and the consequential actions of certain aggregate producers to change their sources of supply, and also because of clear indications of future growth in economic and construction activity, the historical baseline figures and recent trends cannot be relied upon as a guide to future demand without potentially impacting on Oxfordshire's plans for economic growth.

6.4 Future levels of aggregate provision in Oxfordshire therefore need to be higher than might otherwise have been supposed on the basis of recent trends.

6.5 More specifically, it is recommended that:

- The future provision for sharp sand & gravel production in Oxfordshire should be set at 1.015 mtpa;
- the future provision for soft sand production in Oxfordshire should be set at 0.189 mtpa; and
- the future provision for crushed rock production in Oxfordshire is set at 0.584 mtpa.

6.6 Based on the permitted reserves at the end of 2013, this would leave shortfalls of:

- 11.651 million tonnes for sharp sand & gravel; and,
- 1.238 million tonnes for soft sand.

6.7 In relation to crushed rock, this leaves a surplus of 0.307 million tonnes.

6.8 In each case, corresponding provision will need to be made in the Plan to enable sufficient new permissions to be granted for the plan period. In some cases, these requirements may already have been at least partially fulfilled by new permissions granted since 1st January 2014.

Appendix 1
Sand and Gravel, and Crushed Rock Sites in Oxfordshire

Table 1: Active and Permitted Sharp Sand and Gravel Extraction Sites in Oxfordshire, including Current Status and Reserves (tonnes) at 31 December 2013 estimated using public information (Source: OCC)

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13	Information Sources
Cassington	Hanson Aggregates	Inactive: reserve remaining under plant site.	380,000	Planning application MW.0175/10 (22.11.10) & report to Planning & Regulation Committee 07.03.11 – reserve remaining under plant site; no working since then.
Caversham	Lafarge Tarmac	Inactive: existing quarry areas worked out; permission granted on 20.08.14 for 1.86 million tonnes extension.	0 (1,860,000 permitted in 2014)	Working of reserves at existing permitted quarry area completed in 2012. Extension application MW.0158/11 (11.11.11), permitted 20.08.14: 1.86 million tonnes, to be worked at average 155,000 tpa over 12 years; assume working will commence in 2015.
Finmere	Opes Industries	Active: intermittent small scale working.	490,000	Planning application 05/02518/CM (07.12.05) & Appeal Decision/Inspector's Report 11.10.07 – no significant working since permission granted.
Gill Mill, Ducklington	Smiths Bletchington	Active: biggest quarry in county; large reserve remaining; OCC Planning and Regulation Committee resolved on 13.02.14 to permit 5.0 million tonnes extension, to be worked by 2040.	2,350,000 (5,000,000 permitted in 2014)	Planning application MW.0050/13 (20.03.13) – remaining reserve c.2.8million tonnes at June 2012; average rate of working stated as 300,000tpa; assume 450,000t worked June 2012 to Dec 2013.
Moorend Fam, Thame	David Einig Contracting	Inactive: very small site; not yet commenced.	20,000	Planning application MW.0101/12 (20.06.12) – no working since permission granted 31.01.13.

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13	Information Sources
Stanton Harcourt (Stonehenge Farm)	Hanson Aggregates	Inactive: original quarry worked out; extension of 1.55 million tonnes permitted on appeal 08.10.10; permission commenced but reserve remains.	1,550,000	Planning application MW.0159/09 (06.07.09) & Appeal Decision/Inspector's Report 08.10.10; 1.55mt to be worked at 200,000 tpa over about 8.5 years – no significant working since permission granted.
Sutton Courtenay (Bridge Farm)	Hanson Aggregates	Active: fully operational after periods of mothballing and spasmodic working.	730,000	Planning application MW.0126/12 (19.07.12) – remaining reserve 800,000t; proposed rate of working 140,000tpa, but output levels stated to be modest (at July 2012); quarry mothballed at end 2012 (email from Hanson 21.11.12); some working recommenced in 2013 (email from Hanson 01.08.13); assume 70,000t worked July 2012 to Dec 2013.
Sutton Wick	Curtis & Sons	Active: small output site with small reserve remaining; there is a current planning application to extend the end period to 30.09.15; also current planning application for a 0.35 million tonne extension	55,000	Planning application MW.0150/13 (15.11.13) – remaining reserve 50-60,000t
Thrupp Lane, Radley	Tuckwell & Sons	Inactive: available permitted reserves worked out; plant site remains; there is a dormant reserve of 0.925 million tonnes subject to ROMP[25] procedure.	0 (925,000 confirmed in 2015 as permitted)	Application MW.0045/08 (01.11.12) for new conditions for an old mineral working permission.

[25] Review of Old Mineral Permissions

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13		Information Sources
Wicklesham, Faringdon	Grundon Sand & Gravel	Active: mainly a sharp sand & gravel quarry with small scale ancillary production of soft sand; original quarry area virtually worked out; permitted reserves in extension.	850,000		Application MW.0126/10 (13.07.10), extension 0.85 million tonnes, permitted 24.06.13, to be worked at 50–60,000 tpa; application refers to the resource comprising predominantly self-binding 'sponge' gravels but also soft sand, but it is not clear how much is soft sand; assume the whole resource is sharp sand & gravel; assume previously permitted quarry area worked out in 2013; assume extension did not commence until after end 2013
			Total	**6,425,000**	

Table 2: Active and Permitted Soft Sand Extraction Sites in Oxfordshire, including Current Status and Reserves (tonnes) at 31 December 2013 estimated using public information (Source: OCC)

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13	Information Sources
Chinham Fm / Chinham Hill	Hills Quarry Products	Active: Chinham Fm (sand & limestone) and Chinham Hill (sand) to be worked in tandem. Chinham Fm permission granted 26.03.07; working started towards end of 2007. Chinham Hill permission granted 26.05.11; working had not started by end 2013.	300,000	Chinham Hill application MW.0132/10 (31.08.10) states 0.3 million tonnes of sand to be worked at 50,000 tpa over 6 years, in tandem with working of Chinham Fm; transportation information indicates overall working rates of 60,000 tpa sand and 30,000 tpa limestone; From application details and permission end dates, assume 5 years more working at the above rates from end 2013.
Duns Tew	Smiths Bletchington	Active: small reserve remaining in West Quarry; East Quarry worked out; current planning application for 0.415 million tonnes extension to East Quarry; small scale ancillary extraction of crushed rock (limestone) also takes place.	50,000	Application MW.0036/14 (18.03.14) states: rate of working 25,000 tpa; West Quarry will be completed by 2016; permission expires in 2016; East Quarry already exhausted; proposed extension to East Quarry 415,000 tonnes sand, worked at 25,000 tpa over 16/17 years from 2016. Assume West Quarry will be worked out at end 2015.
Hatford	Hatford Quarry Ltd (Earthline)	Active: sand & limestone.	205,000 (not including sand in phases E & F of the site, due to lack of information and uncertainty over future working)	Application MW.0153/12 (31.08.12) states: existing working area will be completed early 2013; sand reserves remain in phases E & F closest to Hatford, but preferable to extend westwards, away from village; working of western extension to follow existing

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13	Information Sources
				working area; total 0.684 million tonnes to be worked over 5-6 years, 2013 – 2019, at max. rate 120,000 tpa. Assume extension did not commence until after end 2013.
Shellingford	Multi-Agg Ltd (Earthline)	Active: sand and limestone; Permissions granted 28.04.11 for deepening and eastern extension, total 1.05 million tonnes sand & 1.225 million tonnes limestone, requires extraction to end by 31.12.20 in eastern extension area and 31.12.28 in existing quarry area.	840,000	Applications MW.0020/11 & MW.0021/11 (20.01.11) both permitted 28.04.11, for deepening of quarry and eastern extension, giving total reserves in existing quarry 0.49 million tonnes sand & 0.85 million tonnes limestone plus in extension area 0.56 million tonnes sand & 0.375 million tonnes limestone, to be worked at average 70,000 tpa sand & 80,000 tpa limestone, total 150,000 tpa, over approx. 15 years. Assume 3 years working 2011 to 2013.
Upwood	Hills Quarry Products	Active: large remaining reserve – c. 50% of total Oxfordshire soft sand permitted reserve; ancillary extraction of crushed rock (limestone).	1,145,000	Application MW.017/08 (21.08.08) for extraction of soft sand & intermittently occurring limestone at new quarry, permitted 14.01.10, for 1.4 million tonnes to be worked at average of 85,000 tpa over 15 to 18 years, 2011 to 2028. Assume 3 years working 2011 to 2013.
Wicklesham	Grundon Sand & Gravel	Active: mainly a sharp sand & gravel quarry with small scale ancillary production of soft sand; original quarry area virtually worked out; reserves in extension recorded as sharp	0	Application MW.0126/10 (13.07.10), extension 0.85 million tonnes, permitted 24.06.13, to be worked at 50–60,000 tpa; application refers to the resource comprising predominantly self-binding 'sponge' gravels but also soft sand, but it

Site	Operator	Current Status	Estimated Permitted Reserves (tonnes) at 31/12/13		Information Sources
		sand and gravel (see Table 1).			is not clear how much is soft sand; assume the whole resource is sharp sand & gravel; assume previously permitted quarry area worked out in 2013; assume extension did not commence until after end 2013.
			Total	**2,540,000**	

Appendix 2
Linear Trend Analysis

Sharp Sand & Gravel

Table 1: Sales data for sharp sand & gravel in Oxfordshire and England

Year	Oxfordshire Sales, mtpa	England Sales, mtpa
2003	1.372	48.674
2004	1.184	51.591
2005	1.09	48.109
2006	0.983	46.316
2007	0.893	44.52
2008	0.629	41.527
2009	0.462	31.705
2010	0.455	31.794
2011	0.489	31.392
2012	0.559	28.702

Figure 1: Linear trend analysis for Oxfordshire sales of sharp sand & gravel (mtpa)

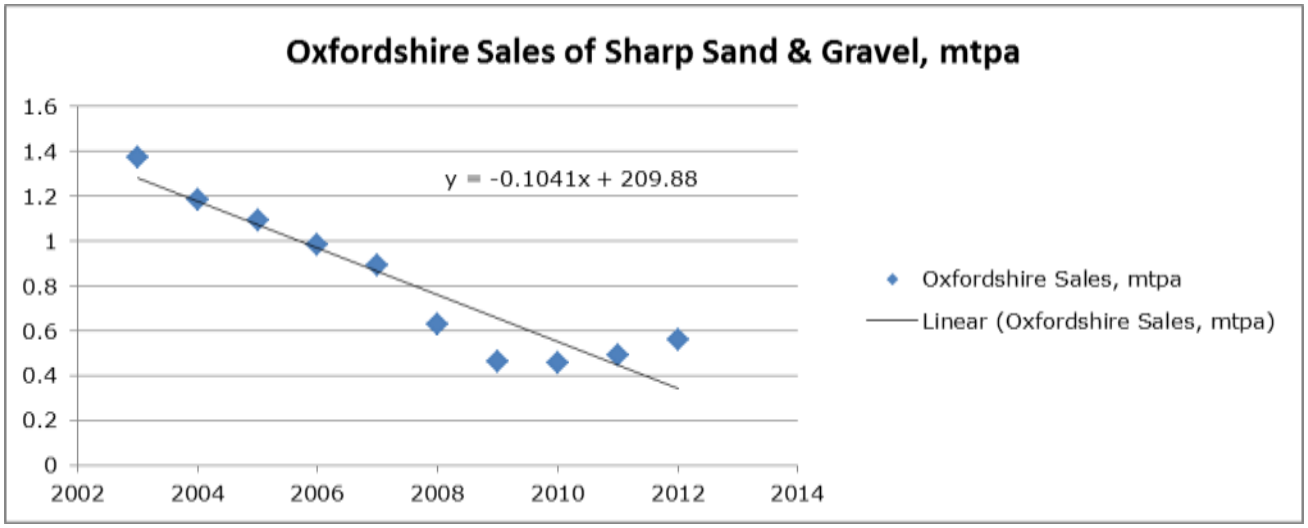
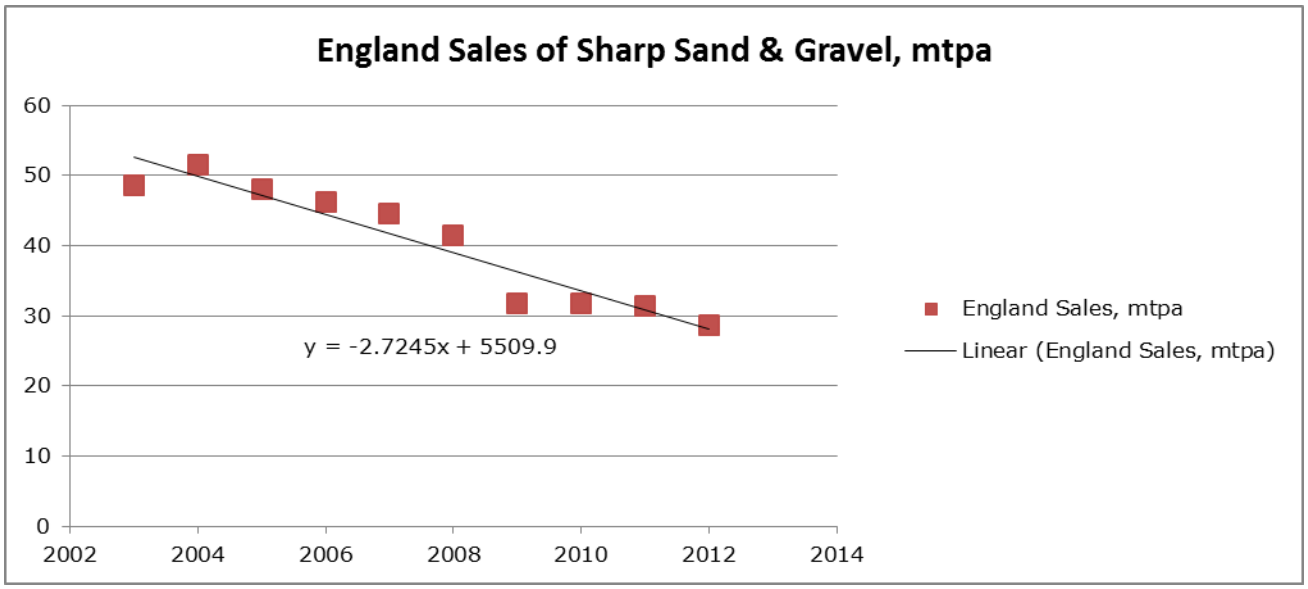


Figure 2: Linear trend analysis for England sales of sharp sand & gravel (mtpa)



Soft Sand

Table 2: Sales data for soft sand in Oxfordshire and England

Year	Oxfordshire Sales, mtpa	England Sales, mtpa
2003	0.234	11.3
2004	0.295	11.144
2005	0.199	10.817
2006	0.183	9.832
2007	0.166	9.992
2008	0.151	8.607
2009	0.165	6.105
2010	0.142	4.929
2011	0.201	5.197
2012	0.155	4.527

Figure 3: Linear trend analysis for Oxfordshire sales of soft sand (mtpa)

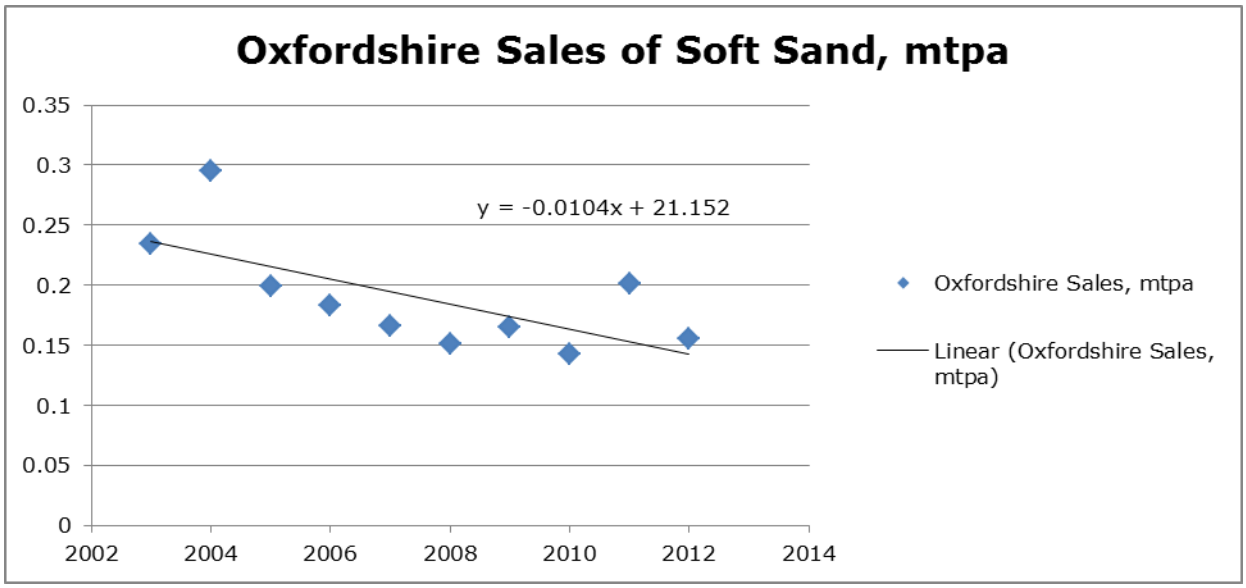
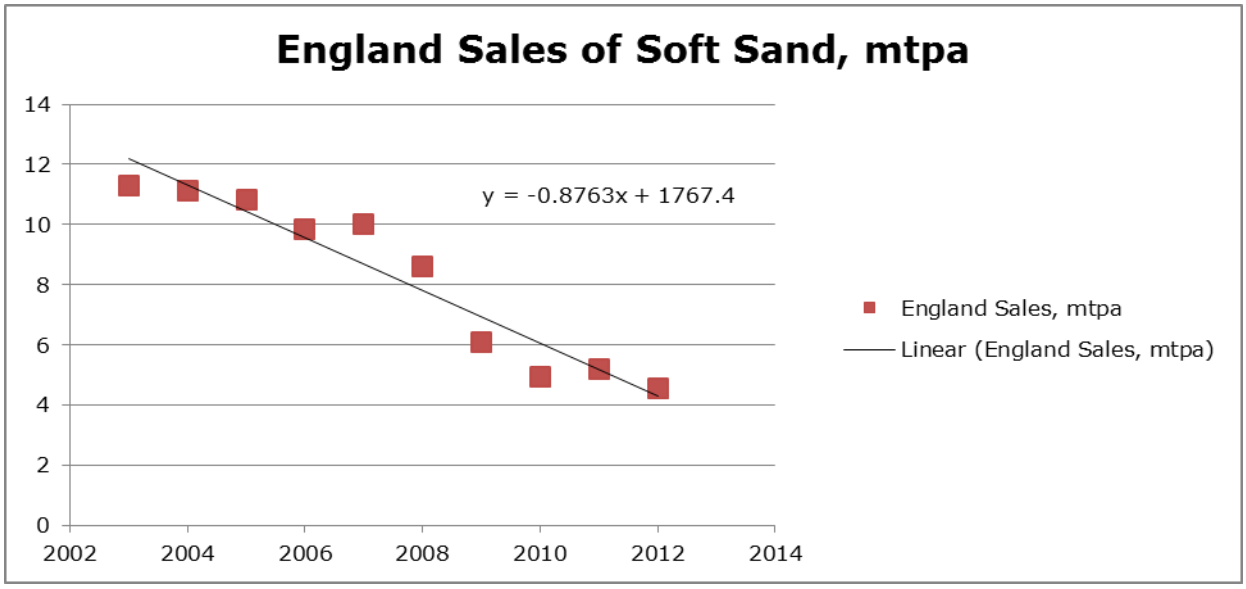


Figure 4: Linear trend analysis for England sales of soft sand (mtpa)



Crushed Rock

Table 3: Sales data for crushed rock in Oxfordshire and England

Year	Oxfordshire Sales, mtpa	England Sales, mtpa
2003	2003	0.629
2004	2004	0.557
2005	2005	0.564
2006	2006	0.495
2007	2007	0.717
2008	2008	0.543
2009	2009	0.363
2010	2010	0.272
2011	2011	0.322
2012	2012	0.242

Figure 5: Linear trend analysis for Oxfordshire sales of crushed rock (mtpa)

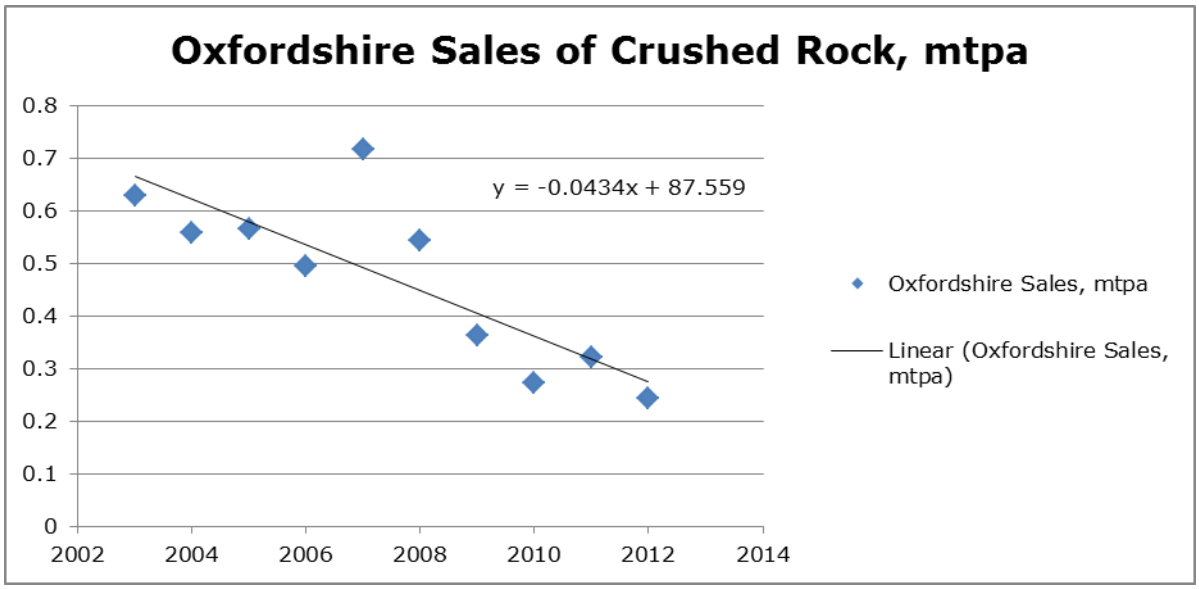
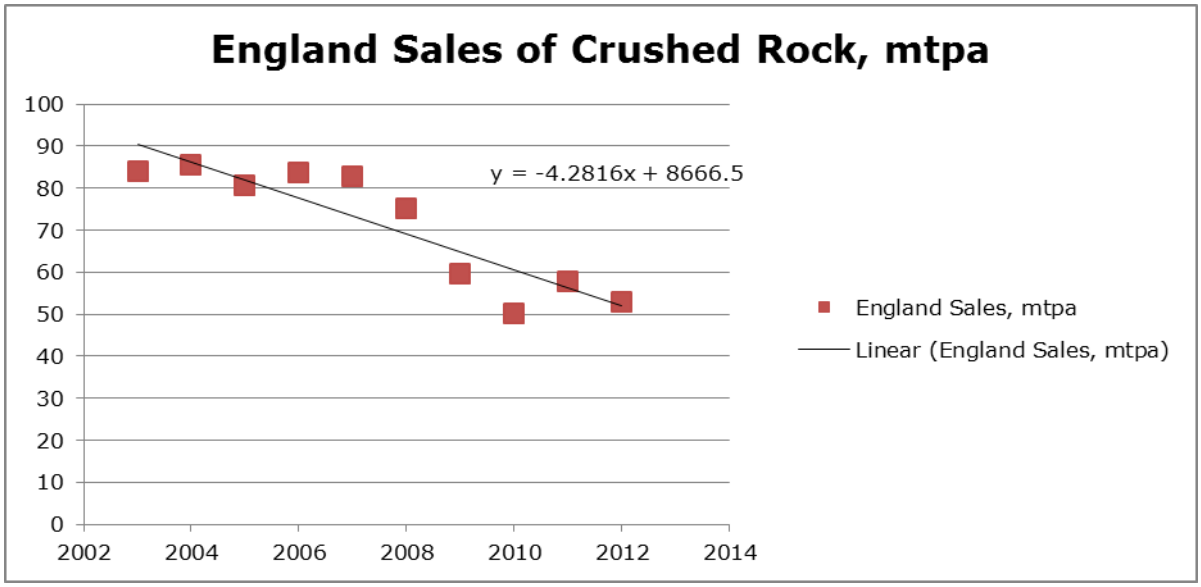


Figure 6: Linear trend analysis for England sales of crushed rock (mtpa)



Appendix 3
Population and Housing Figures

Population Figures

Table 1 below presents the population figures for Oxfordshire for the 10 year baseline period (2004 to 2013).

Table 1: Oxfordshire population figures for the 10 year baseline period (2004 to 2013) (Source: http://www.neighbourhood.statistics.gov.uk)

Year	Population
2004	620,412
2005	627,568
2006	630,873
2007	635,094
2008	638,784
2009	643,095
2010	648,688
2011	654,791
2012	660,772
2013	666,100

Table 2 below presents the population forecast data for Oxfordshire up to 2026.

Table 2: Population forecasts for Oxfordshire up to 2026 (Source: http://insight.oxfordshire.gov.uk/cms/)

Year	Population Forecast
2014	667,594.5
2015	677,192.9
2016	687,947.4
2017	697,541
2018	705,347.6
2019	714,327.3
2020	721,824
2021	727,716.8

Year	Population Forecast
2022	732,999
2023	737,235.9
2024	741,234.2
2025	744,892.9
2026	748,085.3

Housing Completion Figures

Table 3 below presents the housing completion figures for Oxfordshire for the 10 year baseline period (2004 to 2013).

Table 3: Housing completions by year in Oxfordshire (Source: Oxfordshire County Council)

Year	Housing Completions
2003/04	2010
2004/05	2845
2005/06	3534
2006/07	3194
2007/08	2807
2008/09	2246
2009/10	1708
2010/11	1539
2011/12	1799
2012/13	1661

Figure 1: Housing completion data for Oxfordshire