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MINERALS NEED ASSESSMENT

HEREFORDSHIRE MINERALS AND WASTE LOCAL PLAN

FEBRUARY 2017

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Contents

1. Introduction

1.1 Background and purpose of document

1.1.1 Herefordshire Council has commenced preparation of the Minerals and Waste Local Plan to guide development related to minerals and waste within Herefordshire up to 2031.

1.1.2 A first step in preparing the Local Plan is to understand key factors such as the amount and type of mineral within the county and future demands for it - this is achieved through an assessment of the need for minerals arising within Herefordshire set out within this report. A comparable report has also been prepared for waste.

1.1.3 The National Planning Policy Framework (published March 2012, the NPPF) requires mineral planning authorities to plan for a steady and adequate supply of aggregates, not least by making provision for the maintenance of landbanks of: at least 7 years for sand and gravel; and at least 10 years for crushed rock. These minerals are found in Herefordshire and are being actively quarried; they are addressed within this report.

1.1.4 The NPPF also seeks a steady and adequate supply of industrial minerals, including: silica sand; cement primary (chalk and limestone) and secondary (clay and shale) materials; and brick clay. These minerals are not currently understood to be readily available or actively worked within the county; they are not considered further within this report.

1.1.5 The Minerals and Waste Local Plan will be applicable across all of Herefordshire and is intended to have a plan period to 2031. Once adopted, it will sit with the Herefordshire Core Strategy[1] and be part of the development plan.

1.1.6 This assessment has been undertaken to gain an understanding of current mineral resource within Herefordshire and to consider both potential future demand and supply to prepare comprehensive, compelling and long-lasting policy.

Structure

1.1.7 This report is structured as follows:

- Introduction
- Section 2 - Minerals in Herefordshire: an overview of the geology and mineral resources within the county
- Section 3 - Aggregate: an assessment of current permitted reserve and its ability to meet potential future demand; considers sand and gravel, crushed rock, and recycled aggregates
- Section 4 - Other Minerals: building stone; and hydrocarbons.
- Section 5 - Conclusions - presenting the key conclusions made from the information available.

[1] Herefordshire Local Plan Core Strategy 2011 – 2031, Herefordshire Council, October 2015

1.2 Data sources

1.2.1 Herefordshire as a county is not a significant producer of minerals, with only a small number of operational quarries. Because there are few operators in the sector, much of the data on sales is restricted for reasons of commercial confidentiality. In some instances, data for Herefordshire is aggregated with data for other counties, and in some instances the data for Herefordshire is simply withheld.

1.2.2 This is not a position unique to Herefordshire, but is exacerbated by the very limited information available. It is consequently difficult to obtain a complete and accurate understanding of the supply of minerals from Herefordshire. This is complicated by the fact that, over time, Herefordshire's data has been aggregated with different combinations of counties, resulting in inconsistent data over time.

1.2.3 The supply of minerals is usually assessed in terms of the tonnages of materials sold. A number of data sources have been researched in order to obtain the best available data on minerals sales and reserves in Herefordshire. These are set out in the following paragraphs.

Annual Minerals Survey

1.2.4 Herefordshire Council undertakes an Annual Minerals Survey of operators in the county to obtain data on: permitted reserves of aggregates at the end of the calendar year; sales of minerals during the year; and the destination point of those sales. This data is collated so that figures for individual operators cannot be identified.

1.2.5 The most recent year for which this data exists is 2015.

1.2.6 This report is hereafter referred to as the Herefordshire AMS 2015.

Local Aggregates Assessment

1.2.7 The results of the Annual Minerals Survey are used to compile the Local Aggregate Assessment (LAA). Mineral planning authorities (MPA) are required to prepare a LAA and to update it annually. The LAA is required to:

- forecast the demand for aggregates based on average 10-years sales data and other relevant supply information;
- analyse supply options through the consideration of current planning permissions and minerals safeguarding areas.

1.2.8 The most recent LAA for Herefordshire[2] was published in 2014 as an appendix to the Core Strategy 2013-2014 Annual Monitoring Report.

This report is hereafter referred to as the LAA 2014.

West Midlands Aggregate Working Party Annual Monitoring Report

1.2.9 The West Midlands Aggregate Working Party (WMAWP) is a technical group concerned with data collection, collation and monitoring. It also provides advice on future trends in and affecting the area, together with the environmental and other implications of meeting Government aggregate demand forecasts.

[2] Herefordshire Local Aggregates Assessment v1.3 Draft, Herefordshire Council, December 2014

1.2.10 The WMAWP draws its members from the MPA in the region[3] together with representatives from the minerals industry through its trade associations, the Mineral Products Association (MPA) and the British Aggregates Association (BAA), plus the Department for Communities and Local Government (DCLG), the National Federation of Demolition Contractors (NFDC) and the Environment Agency (EA).

1.2.11 Data from the Annual Minerals Survey undertaken by each relevant MPA is collated by the WMAWP, which produces a regional Annual Monitoring Report.

1.2.12 The most recent WMAWP Annual Monitoring Report is for 2014[4] and is currently in draft form. This provides sales and reserves data for the 2014 calendar year as well as data for earlier years.

1.2.13 This report is hereafter referred to as the West Midlands AMR 2014.

Aggregate Minerals Survey

1.2.14 The Department for Communities and Local Government (DCLG) publishes the Aggregate Minerals Survey[5], a collation of data from the Annual Minerals Surveys undertaken by each MPA in England and Wales, ostensibly every four years although the most recent available version is for 2009.

1.2.15 The report presents sales of aggregates produced in Herefordshire and also the destination for those sales, either within Herefordshire, in the West Midlands or elsewhere. The report also shows movement of materials, setting out information on the inter-regional flow of aggregates.

1.2.16 The two most recent Aggregate Minerals Surveys are used within this report, those published for 2009 and 2005. It is recognised that this data is now quite old, but it is considered to provide useful and relevant context information for policy preparation.

1.2.17 These reports are hereafter referred to as the DCLG AMS 2009 and DCLG AMS 2005.

Annual Raised Enquiry

1.2.18 The Office for National Statistics (ONS) carries out an Annual Raised Enquiry of the sales of all minerals, except coal, for the DCLG and the former Department for Business, Innovation and Skills. The data is presented in an annual report, Mineral Extraction in Great Britain, the latest available version of which is for 2014[6].

1.2.19 Data is available at county level. However, for Herefordshire figures are only available for building stone. The figures for sand and gravel and for crushed rock within Herefordshire are confidential.

3 Herefordshire, Worcestershire, Shropshire, Staffordshire, Warwickshire, and the West Midlands Conurbations.
4 West Midlands Aggregate Working Party Annual Monitoring Report 2014, Urban Vision Partnership Ltd, undated
5 http://webarchive.nationalarchives.gov.uk/20121030202828/http://www.communities.gov.uk/planningandbuilding/planningbuilding/planningresearch/researchreports/mineralswasteresearch/aggregatemineralssurveys [27.10.2016@11.25]
6 Mineral Extraction in Great Britain 2014, DCLG, March 2016. https://www.gov.uk/government/statistics/mineral-extraction-in-great-britain-2014 [27.10.2016@11.26]

Construction, Demolition and Excavation Waste Survey

1.2.20 In February 2007, DCLG published the Survey of Arisings and Use of Alternatives to Primary Aggregates in England[7]. This report was generated by information gained from operators of crushers and screens and of licensed landfill sites for the year 2005. Its purpose was to generate estimates for the amount of recycled aggregates and soil used and disposed of at licensed landfill facilities and for construction, demolition and excavation waste (CD&E waste) spread on registered exempt sites.

1.2.21 This was the third in a series of surveys undertaken every two years and provides figures for Herefordshire and Worcestershire combined. However, it is quite an old data source and is used for background context only.

Waste Need Assessment 2017

1.2.22 Alongside this assessment of need for minerals, Herefordshire has commissioned preparation of a waste need assessment. This study uses the current method for estimating the amount of CD&E waste available for use as a recycled aggregate and provides data relevant to Herefordshire only, for year 2015.

1.2.23 This report is hereafter referred to as the Herefordshire WNA 2017.

[7] Survey of Arisings and Use of Alternatives to Primary Aggregates in England 2005: Final Report, DCLG, February 2007

2. Minerals within Herefordshire

2.1 Overview

2.1.1 Herefordshire's bedrock geology is almost entirely sedimentary in origin. It is dominated by the Old Red Sandstone but fringed by older rocks and covered in a mantle of ice age deposits.

2.1.2 The predominant underlying geology of Herefordshire consists of Devonian Old Red Sandstone, comprising mudstones and sandstone. However, there are some older outcrops occurring in the north-west of the county around Brampton Bryan consisting of mudstones, sandstones and volcanic rocks. Silurian mudstones and siltstones also occur in this area. Significant outcrops of limestone also occur in the north-west of the county, in the areas around Aymestrey, Leintwardine and towards the Welsh border near Presteigne.

2.1.3 Silurian limestone and mudstones also outcrop in the Woolhope area, surrounded by the younger Old Red Sandstone rocks. Similar aged hard rocks also occur on the western flanks of the Malvern Hills, on the border with Worcestershire.

2.1.4 Throughout Herefordshire, there are superficial sedimentary deposits of glacial tills, sand and gravels.

2.2 Mineral resources

2.2.1 Known mineral resources in Herefordshire are relatively limited in range, primarily consisting of aggregates for use in construction but also a small amount of building stone. Aggregates comprise: sand and gravel; crushed rock; and secondary or recycled materials gained from quarry and waste operations.

2.2.2 The British Geological Survey (BGS) has been commissioned to provide further detail on the mineral resource within Herefordshire and its viability for use. This information is expected to be available from early 2017 and will be used in the ongoing work of preparing minerals policy of the Minerals and Waste Local Plan.

2.2.3 Using currently available information, the commercially exploitable minerals available for extraction from within Herefordshire include sand, gravel, crushed rock and sandstone.

- Sand and gravel:
    - River terrace deposits are mainly found in the river valleys of the Wye, Lugg and Arrow; and
    - Glacial deposits are present in the north and west of Herefordshire.
- Crushed rock:
    - Silurian limestone is found on the western side of the Malvern Hills and Ledbury, the Woolhope dome and in the north-west of the county in the Presteigne/Aymestrey areas;
    - Carboniferous limestone is present to the south-west of Ross-on-Wye in the northern flanks of the Forest of Dean; and
    - Igneous and metamorphic rock occurs in the Malvern Hills.

- Sandstone occurs extensively throughout much of Herefordshire and several operational quarries exist in the north, west and south of the county. The output is of particular importance for heritage restoration and in creating authentic character for new-build properties.

2.2.4 Secondary and recycled materials have an important role to play in the overall supply of aggregates. Secondary aggregates are minerals that are produced as a by-product of other mining or quarrying activities or as a by-product of an industrial process. Recycled aggregates arise from several sources, notably from the demolition of buildings or from civil engineering works such as asphalt planings from road resurfacing and railway track ballast. Recycling aggregates usually involves the removal of unwanted or inappropriate material such as fines, wood, plastic and metal, and some form of treatment (crushing, washing and/or screening) to reach industry standards for its re-use.

2.2.5 Coal was formerly worked in two locations:

- the southern tip of the Wyre Forest Coalfield, which extended into the north of the county, near the boundary with Worcestershire and Shropshire; and
- a small outlier site of the Forest of Dean Coalfield which extends into southern Herefordshire.

2.2.6 In 1999, the British Geological Survey reported[8] that the hydrocarbon prospectivity of the county was low. Wells drilled to test the oil and gas potential of sandstones in the Worcestershire Basin and rocks in the Woolhope Inlier had failed to discover hydrocarbons.

2.3 Quarrying in Herefordshire

2.3.1 There are currently six, known, active quarries in Herefordshire:

- Wellington Quarry - sand and gravel
- Leinthall Quarry - crushed rock
- Perton Quarry – crushed rock
- Llandraw Quarry - building stone
- Callow Quarry - building stone
- Tybubach Quarry - building stone
- Westonhill Wood Quarry - building stone

2.3.2 There are a number of quarries that are known to be inactive, closed or mothballed, and some for which the activity status is unknown.

2.3.3 Table 2.1 presents the currently known information about quarries in Herefordshire, these are presented graphically in Figure 2.1. This data has been collated for information and should not be relied upon for commercial purposes.

[8] Mineral Resource Information for Development Plans: Phase One Herefordshire and Worcestershire: Resources and Constraints, British Geological Survey and the Department of the Environment Transport and the Regions, 1999

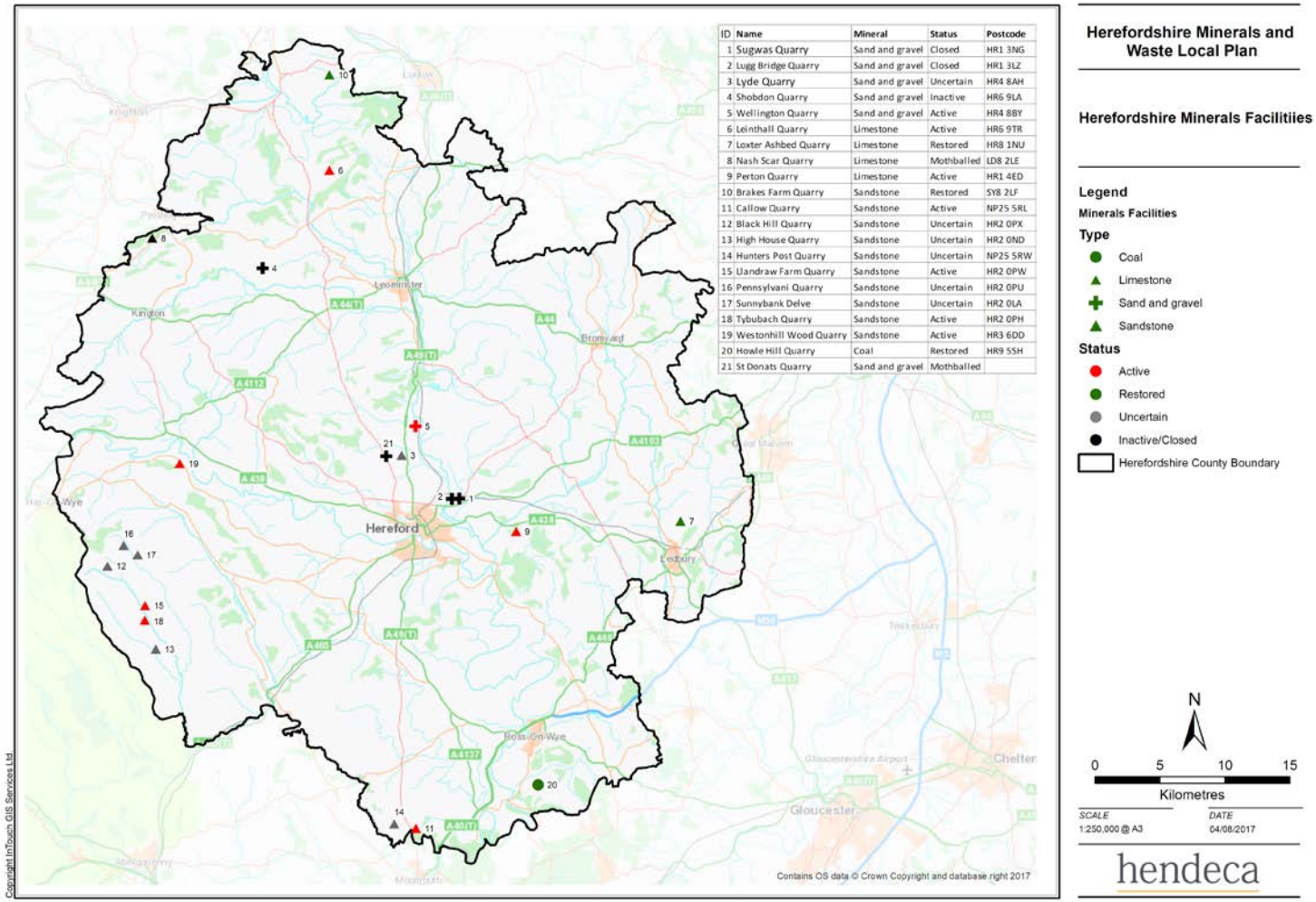
Table 2.1: Quarrying in Herefordshire

Facility	Status	Planning history	Operational requirements
Sand and gravel			
Stretton Sugwas quarry (Hereford Quarry)	Closed	Approval in June 2004 for extraction of sand and gravel.	
Lugg Bridge Quarry	Closed	Approval in 2005 for restoration of redundant sand and gravel quarry. Permission in October 2013 for change of use from sand and gravel and ancillary ready mixed concrete plant to stand alone ready mixed concrete plant.	
Lyde Quarry	Uncertain		
Shobdon Quarry	Inactive	ROMP approved July 2005	
Wellington Quarry	Active	Permission in February 2013 to extend operational area for sand and gravel extraction	Winning and working to cease by 31 December 2026
St Donat's Quarry	Mothballed	Approval in January 1997 for extraction of sand and gravel. Permission granted in September 2004 to vary condition 1, required works to commence within 5 years. Consent not implemented and now lapsed.	
Limestone			
Leinthall Quarry	Active	Permission in November 2009 for continuation of operations	Reclamation by August 2027
Loxter Ashbed Quarry	Restored	Permission in January 2000 for restoration of part of quarry to woodland. Permission in July 2001 for temporary haul road for quarry.	
Nash Scar Quarry	Mothballed	Permission in January 2011 to extend deadline for scheme submission to August 2026	
Perton Quarry	Active	Permission in May 2000 for continued extraction and processing of limestone. Refusal in January 2002 for extension of hours for lorry movements.	All extraction and restoration to cease by Feb 2042
Sandstone			
Brakes Farm Quarry	Restored	Permission given in October 2008 for the winning, working and preparation of Downton Castle stone	Maximum of 4 vehicle movements in 24 hrs Development, including restoration, will cease no more than 15 years from commencement date. Commencement must begin within 3 years of the permission date

Facility	Status	Planning history	Operational requirements
Callow Quarry	Active	Permission given in August 2013 for extension of existing approved mineral extraction to excavate area of 0.075 hectares. Officer report describes sand and gravel quarry as ceased.	The maximum volume of aggregate to be exported from the site shall not exceed 15% of the total export of building stone from the site, averaged over a 3-year period. Sufficient building stone for hand working shall be made available during the life of the quarry to supply the reasonable demand for such stone in the local area.
Black Hill Quarry (formerly Coed Major Quarry)	Uncertain	Planning approval given in October 1999 for extension to small sandstone quarry	
High House Quarry	Uncertain	Approval in August 2002 for extraction of sandstone using low tech tools and limited use of farm size machinery	
Hunters Post Quarry	Uncertain	Listed by the British Geological Survey and Historic Englandish Heritage's Strategic Stone Study[9] as active in 2014	
Llandraw Farm Quarry	Active	Permission in January 2014 for reopening of disused delve	Maximum of 3 vehicle outbound movements per day and maximum of 12 per week Cessation of workings by 7 years from permission (Jan 2014)
Pennsylvani Quarry	Uncertain	Approval in July 2000 for surface quarrying of flagstones, roofing tiles and building stone	
Sunnybank Delve	Uncertain	Permission in August 2002 for extraction of building stone using chisels, hammer and limited use of farm size machinery	
Tybubach Quarry	Active	Permission in December 2010 for time extension	Maximum of 3 vehicle movements in a day and maximum of 12 per week All development, including restoration, is to take place within 15 years of commencement of activity. Activity is to commence within 5 years of the permission.
Westonhill Wood Quarry	Active	Permission in March 2014 to extend life of existing quarry and alter site areas for good access to quality stone	Maximum of 6 outbound vehicles per day and maximum of 25 per week Development, including restoration, to cease not later than 25 years from date of permission (March 2014)
Coal			
Howle Hill Quarry	Restored	Permission refused in October 2004 for infill with inert material and restoration to agricultural use	

[9] http://www.bgs.ac.uk/mineralsuk/buildingStones/StrategicStoneStudy/EH_atlases.html

Figure 2.1: Map of known quarries in Herefordshire



ID	Name	Mineral	Status	Postcode
1	Sugwas Quarry	Sand and gravel	Closed	HR1 3NG
2	Lugg Bridge Quarry	Sand and gravel	Closed	HR1 3LZ
3	Lyde Quarry	Sand and gravel	Uncertain	HR4 8AH
4	Shobdon Quarry	Sand and gravel	Inactive	HR6 9LA
5	Wellington Quarry	Sand and gravel	Active	HR4 8BY
6	Leinthall Quarry	Limestone	Active	HR6 9TR
7	Loxter Ashbed Quarry	Limestone	Restored	HR8 1NU
8	Nash Scar Quarry	Limestone	Mothballed	LD8 2LE
9	Perton Quarry	Limestone	Active	HR1 4ED
10	Brakes Farm Quarry	Sandstone	Restored	SY8 2LF
11	Callow Quarry	Sandstone	Active	NP25 5RL
12	Black Hill Quarry	Sandstone	Uncertain	HR2 0PX
13	High House Quarry	Sandstone	Uncertain	HR2 0ND
14	Hunters Post Quarry	Sandstone	Uncertain	NP25 5RW
15	Llandraw Farm Quarry	Sandstone	Active	HR2 0PW
16	Pennsylvani Quarry	Sandstone	Uncertain	HR2 0PU
17	Sunnybank Delve	Sandstone	Uncertain	HR2 0LA
18	Tybubach Quarry	Sandstone	Active	HR2 0PH
19	Westonhill Wood Quarry	Sandstone	Active	HR3 6DD
20	Howle Hill Quarry	Coal	Restored	HR9 5SH
21	St Donats Quarry	Sand and gravel	Mothballed	

3. Aggregates

3.1 Introduction

3.1.1 This section of the Need Assessment deals with aggregrates, consisting of sand and gravel, crushed rock, marine aggregates and secondary and recycled aggregates. It aims to identify the current level of supply of aggregates, assessed in terms of sales, and compare this with the existing and likely future demand for aggregates over the lifetime of the Core Strategy.

3.2 Supply of sand and gravel

3.2.1 There is one significant sand and gravel quarry operating in Herefordshire. Due, in part, to the openness of that operator, it is possible to understand a reasonable level of detail about sand and gravel reserves, supply and potential demand within Herefordshire

Annual Minerals Survey

3.2.2 Despite the fact that there is only one producer of sand and gravel in the county, the operator has agreed that the data can be made public.

3.2.3 The Herefordshire AMS 2015 reports that there was 2,660,000 tonnes of permitted reserves of sand and gravel in the county at 31 December 2015 and 102,432 tonnes sold during that year.

West Midlands Aggregate Working Party Annual Monitoring Report

3.2.4 The West Midlands AMR 2014 provides information on sand and gravel permitted reserves and sales from 2005 to 2014. However, there is not a complete time series for Herefordshire on its own as data was combined with Worcestershire in 2012 and 2013. Table 3.1 sets out the sand and gravel sales and reserves data for Herefordshire and Worcestershire.

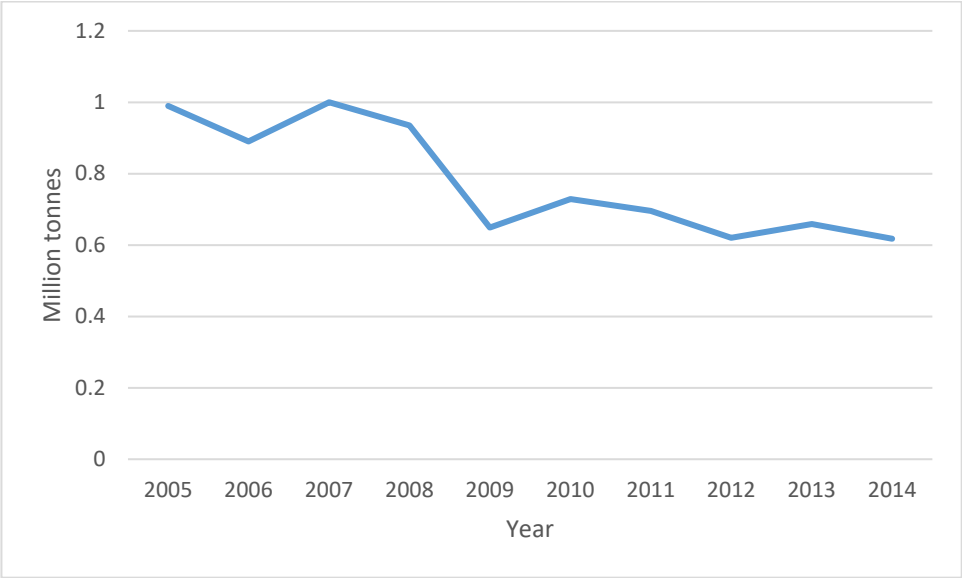
Table 3.1: Sand and gravel sales for Herefordshire and Worcestershire; permitted reserves for Herefordshire

	Sales		Permitted reserves	
	Herefordshire	Worcestershire	Herefordshire	Worcestershire
Year	Million tonnes			
2005	0.24	0.75	5.1	4.3
2006	0.19	0.7	5.3	3.6
2007	0.19	0.81	5.1	4.1
2008	0.177	0.758	6.148	3.021
2009	0.125	0.524	5.152	3.65
2010	0.111	0.618	2.921	4.490
2011	0.07	0.626	2.871	3.849
2012	0.62*		6.567*	
2013	0.659*		6.013*	
2014	0.098	0.5197	2.761	2.495

* Figures are for Herefordshire and Worcestershire combined

3.2.5 Figure 3.1 shows the combined sales data for Herefordshire and Worcestershire graphically; there is not a complete ten year time series for Herefordshire separately from Worcestershire.

Figure 3.1: Sand and gravel sales in Herefordshire and Worcestershire



3.2.6 The West Midlands AMR 2014 indicates that sales of sand and gravel fell significantly in 2008-09 and had not fully recovered from this fall by 2014.

3.2.7 A complete time series for Herefordshire separately is not available; however, the West Midlands AMR 2014 indicates that this was probably also the case in Herefordshire.

Aggregate Minerals Survey

3.2.8 The supply and destination of sand and gravel from Herefordshire is documented in the DCLG AMS 2009 and 2005. Sales of aggregates from Herefordshire in each year and their principal destinations are set out in Table 3.2.

Table 3.2: Sales and principal destination of land-won sand and gravel from Herefordshire

	2005	2009
	Tonnes	
Herefordshire	156,000	111,000
Elsewhere in West Midlands	49,000	5,000
Elsewhere	11,000	6,000
Unknown	19,000	0

3.2.9 The DCLG AMS 2009 and 2005 also provide data on the level of import of sand and gravel into the county and consumption within Herefordshire in 2009, reproduced in Table 3.3.

Table 3.3: Import and consumption of sand and gravel in Herefordshire, tonnes

	2005	2009
	Tonnes	
Imports		
Land-won sand and gravel	121,000	63,000
Marine sand and gravel	12,000	4,000
Consumption		
Land-won sand and gravel	603,000	174,000
Marine sand and gravel	12,000	4,000

3.2.10 Table 3.2 and Table 3.3 show a significant drop in sales, import and consumption in 2009 compared to 2005. This can be explained by the economic recession which began around 2008 and led to a significant reduction in construction and other economic activity.

3.2.11 The figures show that Herefordshire relies to a degree on imports of sand and gravel from outside of the county. The need for mineral operators to obtain the correct specification for market products, such as ready-mix concrete, can dictate some of this movement where such materials are not available from local deposits.

3.2.12 However, as both sales and import have declined it is reasonable to assume the effect is as a result of the downturn in the economy, rather than solely a lack of product availability within Herefordshire.

3.2.13 Herefordshire has no marine reserves but a small amount is imported into the county, constituting about 2% of total sand and gravel consumption in 2009. Marine aggregates can have special qualities which meet particular specifications.

Historic ten year average sales

3.2.14 Referring to the West Midlands AMR 2014, it is possible to calculate the percentage split of sand and gravel sales between Herefordshire and Worcestershire for most of a ten year period. Table 3.4 shows that the proportion coming from Herefordshire has, generally, declined over the ten year period 2005 to 2014. More recent data is not yet available to consider years 2015 or 2016.

Table 3.4: Split of sand and gravel sales between Herefordshire and Worcestershire

Year	Herefordshire	Worcestershire
2005	24%	76%
2006	21%	79%
2007	19%	81%
2008	19%	81%
2009	19%	81%
2010	15%	85%
2011	10%	90%
2012	n/a	n/a
2013	n/a	n/a
2014	16%	85%

3.2.15 There is a reported rise in the percentage of sand and gravel arising in Herefordshire in 2014 from 2011. Therefore, to complete years 2012 and 2013, when separate figures for the two counties are not available, it seems reasonable to apply an average percentage (13%) gained from the two years either side of that gap (2011 and 2014).

3.2.16 This gives the current ten years' worth of sales and ten year annual average sales for Herefordshire as set out in Table 3.5.

Table 3.5: Ten year sales of sand and gravel in Herefordshire, calculated

Year	Sales in mt
2006	0.19
2007	0.19
2008	0.177
2009	0.125
2010	0.111
2011	0.07
2012	0.08
2013	0.086
2014	0.098
2015	0.102
Ten year average	**0.123**

3.2.17 The NPPF seeks a minimum landbank of seven years for sand and gravel provision. With permitted reserves in Herefordshire standing at 2,660,000 tonnes in 2015, a ten year average annual sales figure of 123,000 tonnes gives a landbank of 21.6 years for sand and gravel.

3.3 Supply of crushed rock

3.3.1 The picture for crushed rock permitted reserve and sales is unclear due to commercial sensitivities and because of a sequence of discontinuities in the time series data for sales. This is due to changes in the amalgamation of sales data across several different groupings of counties over the ten year period.

Annual Minerals Survey

3.3.2 There are only two producers of crushed rock in the county. Data for reserves and sales of crushed rock therefore remains confidential.

West Midlands Aggregate Working Party Annual Monitoring Report

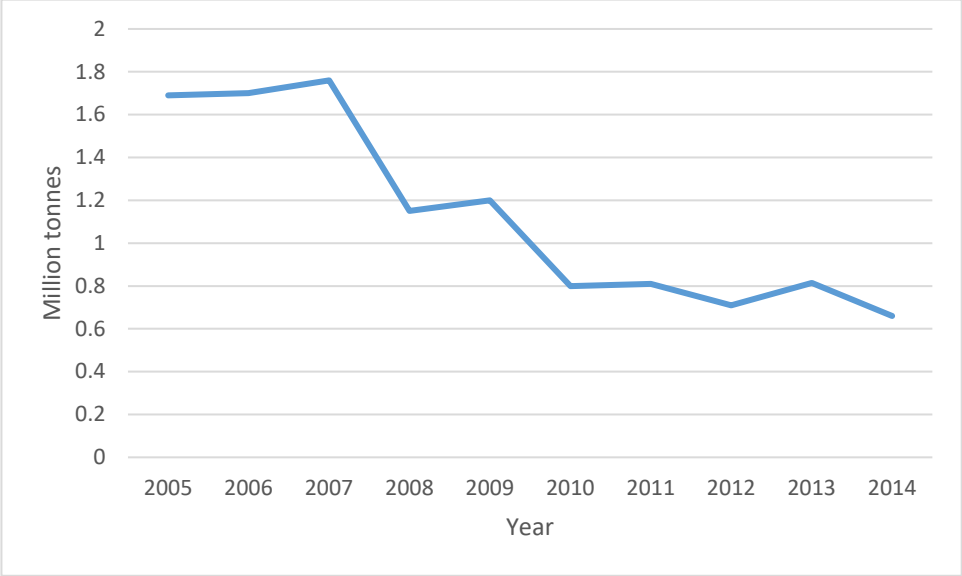
3.3.3 The West Midlands AMR 2014 provides information on crushed rock permitted reserves and sales from 2005 to 2014. Table 3.6 sets out the crushed rock sales and reserves data for Herefordshire. Data is not available separately from other counties, except in 2010 and 2011. In order to get a time series for sales across a consistent grouping of counties, figures have been combined for Herefordshire, Worcestershire, Staffordshire and Warwickshire, and these are presented graphically in Figure 3.2.

Table 3.6: Crushed rock sales and permitted reserves in Worcestershire, Herefordshire, Staffordshire and Warwickshire

Year	Sales				Total 4 counties	Permitted reserves Herefordshire
	Worc'shire	Herefordshire	Staff'shire	Warwickshire		
	Million tonnes					
2005	0.29		1.4		1.69	15.90
2006	0.30		1.40		1.70	15.10
2007	0.37		1.39		1.76	14.60
2008	0.22		0.93		1.15	14.4
2009	0.2		1.0		1.2	15.00
2010	-	0.2	0.6		0.8	12.20
2011	-	0.33	0.48		0.81	11.00
2012	-	0.71			0.71	11.79
2013	-	0.815			0.815	11.54
2014	-	0.660			0.660	197.92*

* Figures are for Worcestershire, Herefordshire, Staffordshire and Warwickshire combined

Figure 3.2: Crushed rock sales in Worcestershire, Herefordshire, Staffordshire and Warwickshire



3.3.4 Figure 3.2 shows a decline in sales in 2008, which could be attributed to the economic recession, and a second decline in 2010. Although there was a slight recovery in 2013, which could indicate some economic growth, sales fell again in 2014 to their lowest level in over the previous ten years.

3.3.5 Although there is not a complete time series for Herefordshire and Worcestershire combined, the available data seem to suggest that sales from the two counties combined also fell in 2008 but picked up slightly in 2011. Due to the lack of a consistent time series for Herefordshire separately from other counties, this data has to be used for context setting only, rather than placing confidence on sales trends for Herefordshire.

3.3.6 The NPPF seeks a minimum landbank of ten years for crushed rock provision. Due to the unavailability of data on current sales and permitted reserves for Herefordshire, it is not possible to calculate the landbank solely within the county.

3.3.7 The West Midlands AMR 2014 gives a landbank figure for Herefordshire, Staffordshire and Warwickshire combined of 175.3 years in 2014. While the figure for Herefordshire separately is unknown, when we examine data for the latest year that figures were available, Table 3.6 shows that permitted reserves in Herefordshire (2011) could have sustained the level of 2011 sales for a total of 33.3 years. All the available data therefore suggests that the landbank of permitted reserves in Herefordshire is likely to be significantly over the minimum level required by the NPPF.

3.3.8 Worcestershire, Staffordshire and Warwickshire County Councils have all used data on crushed rock for combined groupings of counties in their respective Local Aggregate Assessments[10]. In Staffordshire, figures are presented for the landbank for Worcestershire, Herefordshire, Staffordshire and Warwickshire combined, while in Warwickshire, figures are presented for the landbank for Warwickshire and Staffordshire combined[11]. In Worcestershire, sales figures for Worcestershire and Herefordshire combined are used, and then sales in Worcestershire are derived from those figures based on known proportions in earlier years.

3.3.9 The approach used in this report to consider Herefordshire's landbank for crushed rock is consequently felt to be robust and consistent with relevant nearby authorities.

Aggregate Minerals Survey

3.3.10 Sales of crushed rock from Herefordshire are confidential due to the small number of operators in the county. However, the DCLG AMS 2005 and 2009 do provide data for imports and consumption of crushed rock for Herefordshire. These are reproduced in Table 3.7.

Table 3.7: Imports and consumption of crushed rock in Herefordshire

	2005	2009
	Tonnes	
Import of crushed rock	1,522,000	421,000
Consumption of crushed rock	1,691,000	435,000

3.3.11 The data shows a significant drop in both imports and consumption in 2009 compared to 2005. This can be accounted for by the economic recession which began around 2008 and led to a significant reduction in construction activity.

3.3.12 The data also shows that Herefordshire is a significant net importer of crushed rock. The need for mineral operators to obtain the correct specification for market products such as ready-mix concrete can dictate some of this movement where such materials are not available from local deposits.

[10] Local Aggregate Assessment, Staffordshire County Council, June 2015
[11] Warwickshire Draft Local Aggregate Assessment 2014, Warwickshire County Council

3.4 Demand for aggregate

3.4.1 Section 3.3 above indicates strongly that there is an appropriate landbank of both sand and gravel and crushed rock within Herefordshire.

3.4.2 Looking forward, demand for aggregates can be estimated in a number of different ways. The methods most commonly used are:

- Gross Value Added forecasts
- Population projections
- Household or housing projections
- Core Strategy infrastructure requirements

3.4.3 Each of these methods are considered for sand and gravel. It should be remembered that aggregate is more than just sand and gravel, but current information does not enable the calculation to consider crushed rock.

3.4.4 National policy seeks to promote the use of alternatives to primary aggregates by encouraging the use of recycled aggregates as a substitute. The principal source of recycled aggregates is waste arising from construction and demolition activities. In parallel with this Minerals Need Assessment, an assessment of the need for waste infrastructure has been undertaken. The WNA 2017 has, *inter alia*, made forecast estimates for the amount of construction and demolition waste arising in Herefordshire annually up to 2031 and these forecasts are reproduced in section 3.7.

Gross Value Added forecasts

3.4.5 Overall growth in the economy can be measured through projected growth in Gross Value Added (GVA). Projected change in GVA could be applied to the most recent sand and gravel annual sales data in order to estimate the potential change in demand for sand and gravel on the basis that it is changes in levels of economic wealth that drive demand for construction of buildings and infrastructure.

3.4.6 Herefordshire's GVA in 2012 was £2,825 million (provisional figure)[12]. However, there is little data available on projected GVA for Herefordshire over the timeframe of the Minerals and Waste Local Plan.

3.4.7 Discussions with the Marches Local Enterprise Partnership (LEP)[13] revealed that, at the time of writing, the LEP had recently commissioned some work to produce GVA forecasts for the Marches area. It is currently expected that this work will draw some conclusions on GVA forecasts in spring 2017. When data becomes available, it will be reviewed and, if appropriate, incorporated into the forecasting of changes in demand for minerals in Herefordshire.

3.4.8 A briefing paper[14] on regional and country economic indicators produced by the House of Commons Library shows the GVA of the West Midlands region in 2014 to be £115 billion. It forecasts that this will grow at an annual average of 2.4% over the period 2015-2025. It also shows the percentage change from 2010 to 2014 to be 7.3%, an annual growth rate very close

[12] https://factsandfigures.herefordshire.gov.uk/about-a-topic/economy/productivity-and-gross-value-added.aspx
[13] Jacqui Casey, Marches LEP Partnership Manager, 20 January 2017
[14] Regional and Country Economic Indicators: Briefing Paper number 06924, House of Commons Library, September 2016

to the 2015-2025 growth rate. This percentage growth rate could be applied to 2014 aggregate sales to estimate the potential demand for aggregates arising from growth in the economy.

3.4.9 The Office for Budget Responsibility (OBR) publishes an economic and fiscal outlook at the national level, the most recent of which[15] was published in March 2016. This produces a range of forecasts for real Gross Domestic Product (GDP) growth from 2014 to 2020.

3.4.10 The OBR outlook reports a central forecast and four higher and four lower forecasts, representing probability bands based on past official forecast errors. Risks to the central forecast include: greater volatility in financial and commodity markets; slower growth in China; the possibility of a significant fall in the exchange rate and the impact of the (then) upcoming EU referendum on business and consumer confidence; and the behaviour of asset and financial markets. No assessment was made of the potential long-term impact of 'Brexit' on the economy and the public finances, as Parliament requires the Office for Budget Responsibility to base its forecasts on current Government policy and not to consider alternatives.

3.4.11 Table 3.8 shows the central GDP growth forecast (50% column) and also a range of eight other growth forecasts for each year, four higher and four lower than the central forecast, to allow for differing degrees of uncertainty in the forecasting.

Table 3.8: Projected annual percentage change in GDP by probability bands

Year	Percentage probability bands								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
2014					2.9				
2015	1.1	1.5	1.7	2.0	2.2	2.5	2.8	3.1	3.6
2016	-0.3	0.5	1.1	1.6	2.0	2.4	2.8	3.3	3.9
2017	-0.4	0.6	1.2	1.7	2.2	2.7	3.1	3.6	4.3
2018	-0.5	0.4	1.1	1.6	2.1	2.6	3.1	3.6	4.2
2019	-0.7	0.2	0.9	1.5	2.1	2.6	3.1	3.6	4.3
2020	-0.8	0.2	1.0	1.6	2.1	2.6	3.2	3.7	4.5

3.4.12 There are other forecasts of economic growth available, notably those produced independently by the information services company Experian. Experian has produced national, regional and county-level forecasts which show projected growth in the whole economy and the construction sector to 2036, which fully incorporate the Minerals and Waste Local Plan plan period. Unfortunately, data for Herefordshire is combined with Worcestershire and is not available separately.

3.4.13 Experian's latest forecasts are more recent than those by the OBR and take into account the impact of Brexit on the economy. The most recent forecast shows projected national GVA over the same period to be lower than compared to their pre-referendum outlook given post-Brexit uncertainties.

3.4.14 Table 3.9 shows the Experian annual forecast growth for Herefordshire and Worcestershire up to 2036, for the whole economy and for the construction sector separately. It also gives five year average growth forecasts for each.

[15] Economic and Fiscal Outlook, Office for Budget Responsibility, March 2016 http://cdn.budgetresponsibility.org.uk/March2016EFO.pdf

3.4.15 The Experian forecasts to 2025 for the West Midlands are slightly lower than that forecast by the House of Commons Library briefing paper and the central forecast of the Office for Budget Responsibility for national growth to 2020.

Table 3.9: Experian forecasts of economic growth for Herefordshire and Worcestershire

Year	Whole economy	Construction sector
2016	1.4%	-1.5%
2017	0.8%	-0.4%
2018	1.3%	0.0%
2019	1.5%	1.0%
2020	1.9%	1.7%
2021	2.0%	1.9%
2017-21 avg	1.5%	0.9%
2022	2.2%	2.0%
2023	2.4%	2.0%
2024	2.2%	1.9%
2025	2.0%	2.0%
2026	1.9%	1.8%
2022-26 avg	2.2%	2.0%
2027	1.8%	1.6%
2028	1.7%	1.4%
2029	1.6%	1.2%
2030	1.7%	1.2%
2031	1.7%	1.2%
2027-31 avg	1.8%	1.4%
2032	1.7%	1.2%
2033	1.7%	1.2%
2034	1.6%	1.2%
2035	1.6%	1.2%
2036	1.6%	1.3%
2032-36 avg	1.7%	1.2%

3.4.16 The latest forecast from the Construction Products Association[16] is that construction output nationally is forecast to rise 3.0% in 2016 and 3.6% in 2017. These figures are much more optimistic than the Experian short-term forecast for the sector in Herefordshire and Worcestershire.

3.4.17 There is a relatively wide range of GVA growth forecasts which may be used to calculate future sand and gravel demand.

3.4.18 The OBR outlook is not considered appropriate for two reasons. First, the forecast is for the UK as a whole and therefore gives no localised definition to growth forecasts. Second, the forecast is to 2020 only and provides no indication of how this could be extrapolated up to 2031.

3.4.19 The Construction Products Association forecast is also not pursued further. Compared to all the other growth rates considered, it is a very high forecast. This may be reflective of the fact

[16] http://www.constructionproducts.org.uk/news-media-events/news/2016/april/cpa-forecasts-slowdown-in-construction-growth-as-risks-continue-to-rise/

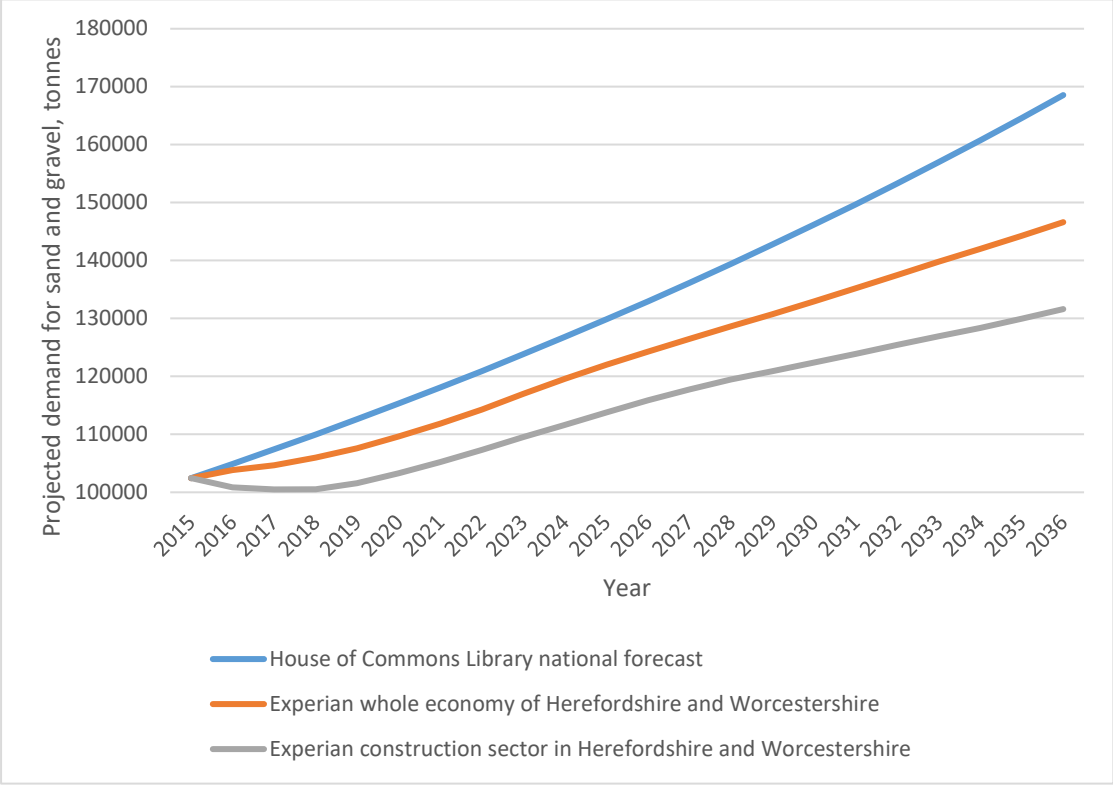
that it has been predicted by the industry's representative body, which may have an interest in over-forecasting future demand. In any event, there is no indication of how to extrapolate it beyond 2017; to continue the growth forecast predicted between 2016 and 2017 is considered to result in a very exaggerated prediction of future demand.

3.4.20 The three most relevant forecast of GVA on which to derive a range of scenarios for future demand for aggregates are:

- The House of Commons Library briefing paper forecast of 2.4% per annum, extrapolated at the same annual growth rate from 2025 to 2036;
- The Experian forecast for the whole economy of Herefordshire and Worcestershire to 2036;
- The Experian forecast for the construction sector in Herefordshire and Worcestershire to 2036.

3.4.21 These growth rates have the benefit of being independent of any one industry, locally focused, but also providing a national comparator. The demand calculated from these GVA forecasts is shown in Figure 3.3.

Figure 3.3: Projected demand for sand and gravel in Herefordshire based on selected GVA forecasts



3.4.22 Using this method, it is calculated that, at 2031, demand for sand and gravel would be between 124,000 to 150,000 tonnes per annum, equating to a ten year annual average in 2031 of between 116,000 and 135,000 tonnes. With permitted reserves in Herefordshire standing at 2,660,000 tonnes in 2015, the current landbank is 21.6 years for sand and gravel, which would ensure sufficient supply up to 2037 if demand were to stay at current levels.

3.4.23 However, if demand for sand and gravel should rise in line with forecasts for GVA and no additional reserves are permitted, reserves will have fallen to 643,000 tonnes in 2031 if the House of Commons Library national forecast is used. A predicted ten year average annual sales figure of 135,000 tonnes in 2031 using this forecast gives a landbank of 4.8 years for sand and gravel.

3.4.24 It is not possible to generate a forecast for crushed rock using GVA forecasts, because data is not available on current sales to which to apply the GVA multipliers from paragraph 3.4.6 and Table 3.8.

Population projections

3.4.25 The (undated) publication Planning 4 Minerals: A Guide on Aggregates, published by the Quarry Products Association, the British Marine Aggregate Producers Association, the British Geological Survey and Entec UK Ltd (hereafter referred to as Planning 4 Minerals) suggests that demand for aggregates in the UK is equivalent to a little under 4 tonnes per head per annum. Population projections data can therefore be used to assess the possible implications of population changes for future demand for aggregate.

3.4.26 The latest sub-national population projections were published by the Office for National Statistics (ONS) in May 2016. However, the most recent consumption data is gained from the DCLG AMS 2005 and 2009. Applying the consumption data provided in these data sets and mid-year population estimates from the ONS for 2005 and 2009 gives the per capita consumption of aggregates as 13.1 tonnes and 3.4 tonnes respectively. This calls into question the reliability of applying such multipliers regardless of geography or levels of economic activity.

3.4.27 Table 3.10 presents the population projections for Herefordshire by year and the calculated consequent demand for aggregates using each of the rates identified. The assumptions of 4 tonnes and 3.4 tonnes per head per annum are reasonably consistent; consequently, Table 3.9 includes demand based on 13.1 tonnes per head per annum, as derived from the DCLG AMS 2005. These multipliers have limitations in that the 2009 figure takes no account of the possibility of an increase in economic vitality in Herefordshire over the period to 2039, while the 2005 figure may overestimate economic vitality in the short to medium term. For both, their long-term accuracy is very unclear.

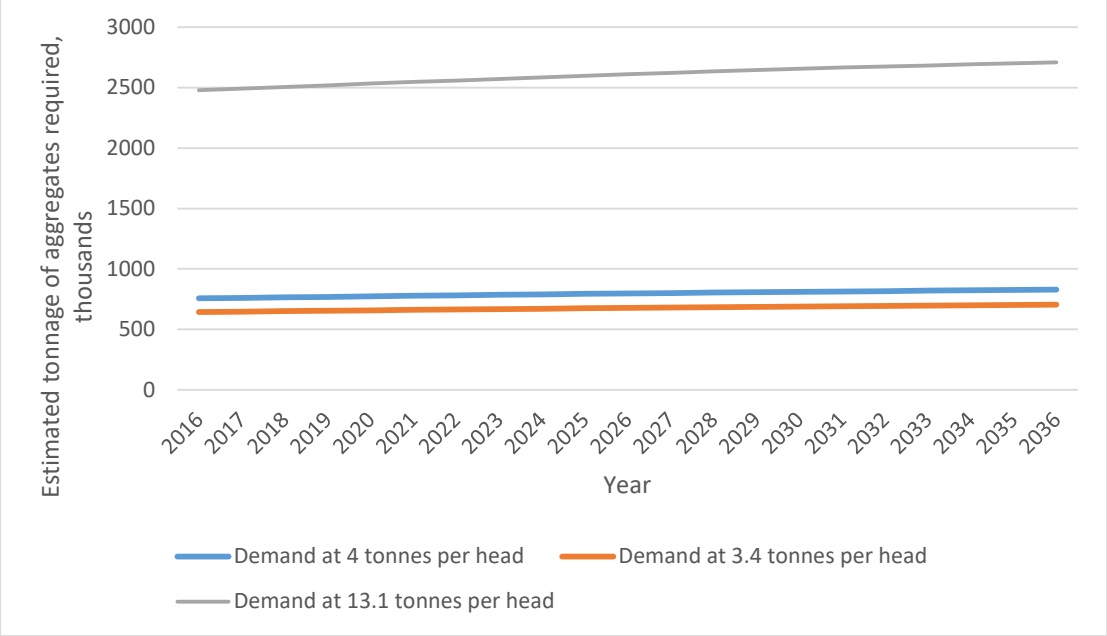
Table 3.10: Projected population and associated demand

Year	Population (thousands)	Demand at		
		4 tonnes per head	3.4 tonnes per head	13.1 tonnes per head
2016	189.2	756.8	643.3	2478.5
2017	190.3	761.2	647.0	2492.9
2018	191.3	765.2	650.4	2506.0
2019	192.3	769.2	653.8	2519.1
2020	193.4	773.6	657.6	2533.5
2021	194.4	773.6	661.0	2546.6
2022	195.4	781.6	664.4	2559.7
2023	196.4	785.6	667.8	2572.8
2024	197.4	789.6	671.2	2585.9
2025	198.4	793.6	674.6	2599.0
2026	199.3	797.2	677.6	2610.8
2027	200.2	800.8	680.7	2622.6

Year	Population (thousands)	Demand at		
		4 tonnes per head	3.4 tonnes per head	13.1 tonnes per head
2028	201.1	804.4	683.7	2634.4
2029	201.9	807.6	686.8	2644.9
2030	202.7	810.8	689.2	2655.4
2031	203.5	814.0	691.9	2665.9
2032	204.2	816.8	694.3	2675.0
2033	204.9	819.6	696.7	2684.2
2034	205.6	822.4	699.0	2693.4
2035	206.3	825.2	701.4	2702.5
2036	206.9	827.6	703.5	2710.4
2037	207.5	830.0	705.5	2718.3
2038	208.1	832.4	707.5	2726.1
2039	208.7	834.8	709.6	2734.0

3.4.28 Figure 3.4 presents the three population based forecasts for aggregate demand. It should be noted that this is total aggregate demand arising from population growth within Herefordshire. This can be met through supply of sand and gravel, crushed rock, and secondary, recycled and marine aggregates, and, continuing a long running trend, this could be from supply outside the county. Herefordshire is a significant net importer of primary aggregates (see Table 3.3 and Table 3.7).

Figure 3.4: Estimated tonnages of aggregates required in Herefordshire based on population projections



3.4.29 Using this method, it is calculated that at 2031 an aggregate demand of between 692,000 and 2,666,000 tonnes per annum would be sought, equating to a ten year annual average in 2031 of between 679,000 and 2,615,000 tonnes.

3.4.30 It is considered that the forecast on the basis of 13.1 tonnes of aggregate per head is unrealistically high. The forecast is derived on the basis of pre-recession levels of per capita

demand, a time when national GDP growth was as high as 6.7% per annum in the fourth quarter of 2005[17]. Current forecasts indicate that growth over the lifetime of the Minerals and Waste Local Plan is unlikely to return to such high levels (see paragraph 3.4.6 and Table 3.8) and therefore this forecast has been ruled out of further consideration.

3.4.31 Using the forecast on the basis of 4 tonnes per head of aggregate, being the higher of the two remaining forecasts, the annual aggregate demand in 2031 would be 814,000 tonnes. Assuming 28% of this demand would be met by secondary and recycled aggregates (see paragraph 3.7.1) 586,000 tonnes of primary aggregate would be required to meet this level of demand.

3.4.32 Taking the most recent (2009) data for the proportion of demand met by land-won sand and gravel (28%) and by crushed rock (71%) (see Tables 3.3 and 3.6) 164,000 tonnes of this would be demand for land-won sand and gravel and 416,000 would be demand for crushed rock. Tables 3.3 and 3.6 further show that 64% of land-won sand and gravel demand and 3% of crushed rock demand was met by production within Herefordshire, which suggests 105,000 tonnes of sand and gravel and 12,500 tonnes of crushed rock would need to be mined within Herefordshire to meet demand.

3.4.33 With permitted reserves for sand and gravel in Herefordshire standing at 2,660,000 tonnes in 2015 and sales in 2015 of 102,432 tonnes, the current landbank is 21.6 years for sand and gravel, which would ensure sufficient supply up to 2037 if demand were to stay at current levels. If demand rose in line with population projections to 105,000 tonnes per annum as estimated in the above paragraph, and no additional reserves are permitted, reserves will have fallen to 1,036,000 tonnes in 2031 if the forecast based on 4 tonnes per head of aggregate demand is used. A predicted ten year average annual sales figure of 105,000 tonnes in 2031 using this forecast gives a landbank of 9.9 years for sand and gravel.

3.4.34 Although the current level of supply of crushed rock within Herefordshire is unknown, the total forecast demand for 2016-2031 on the basis of 4 tonnes of aggregate demand per head is 193,000 tonnes. This is significantly below the 11.54 million tonnes of permitted reserves data for 2013, the most recent year for which figures were available for Herefordshire separately from other counties (see Table 3.6).

Household projections

3.4.35 Planning 4 Minerals indicates that 60 tonnes of aggregate is required to build a typical house, with around 400 tonnes in total being required when associated infrastructure is taken into account. Household projections data can therefore be used to assess the possible implications of household changes for future demand for aggregate.

3.4.36 The ONS predicts household projections at local authority level, with the most recent published in May 2016. Table 3.10 shows estimated demand on the basis of 400 tonnes of aggregate required for both housing and associated infrastructure for the increase in households predicted by ONS.

[17] https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/ihyo/ukea

Table 3.11: Household projections and associated demand for aggregates

Year	ONS household projections	Tonnage of aggregates required (thousands)
2016	81.961	286.8
2017	82.653	276.8
2018	83.388	294.0
2019	84.122	293.6
2020	84.827	282.0
2021	85.510	273.2
2022	86.173	265.2
2023	86.845	268.8
2024	87.518	269.2
2025	88.168	260.0
2026	88.813	258.0
2027	89.431	247.2
2028	90.035	241.6
2029	90.617	232.8
2030	91.182	226.0
2031	91.731	219.6
2032	92.226	198.0
2033	92.717	196.4
2034	93.182	186.0
2035	93.635	181.2
2036	94.090	182.0
2037	94.528	175.2
2038	94.950	168.8
2039	95.332	152.8

3.4.37 However, this approach has limitations, in that it takes no account of variations in household type, either between local authority area or over time in one authority, both of which can affect the type of housing required, the associated infrastructure and the consequent level of demand for aggregates. Furthermore, it does not allow for changes in construction practices and materials or improvements in resource efficiency in house construction.

3.4.38 An alternative approach would be to look at the housing trajectory set out in the Herefordshire Local Plan Core Strategy 2011 - 2031 (the Core Strategy) and compare this to historic housing completion rates, available from DCLG statistical tables[18] and Herefordshire's Annual Monitoring Reports[19]. This comparison can be used to derive a percentage multiplier that can then be applied to the most recent ten year average annual aggregates sales figure in order to project aggregate requirements over the period of the Core Strategy.

3.4.39 This approach is also problematic in Herefordshire, primarily because the past housing completion figures from both Herefordshire and DCLG which correspond to the ten year average annual sales figure are incomplete. Also, this forecast again predicts demand for all aggregates, not just sand and gravel; as is explained in Section 3.3, it has not been possible to derive a figure for the ten year average annual sales for crushed rock.

[18] https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building
[19] https://www.herefordshire.gov.uk/planning-and-building-control/planning-policy/monitoring

Table 3.12: Past housing completions

Year	DCLG statistical tables	Herefordshire AMR
	Number of houses	
2006-07	550	840
2007-08	470	829
2008-09	510	689
2009-10	n/a	547
2010-11	n/a	547
2011-12	260	341
2012-13	160	202
2013-14	280	331
2014-15	310	n/a
2015-16	250	n/a

3.4.40 In the absence of a percentage multiplier for historic sales data, the Planning 4 Minerals figure of 400 tonnes of aggregate needed for a typical house and associated infrastructure can be applied to the Core Strategy housing trajectory, shown in Table 3.13.

3.4.41 Construction accounts for a relatively small percentage of aggregate consumption overall, estimated to be 15% by the Construction Products Association[20]. Consequently, Table 3.12 has been prepared to present an estimate for 100% of aggregate demand on the basis of construction accounting for 15% of requirements.

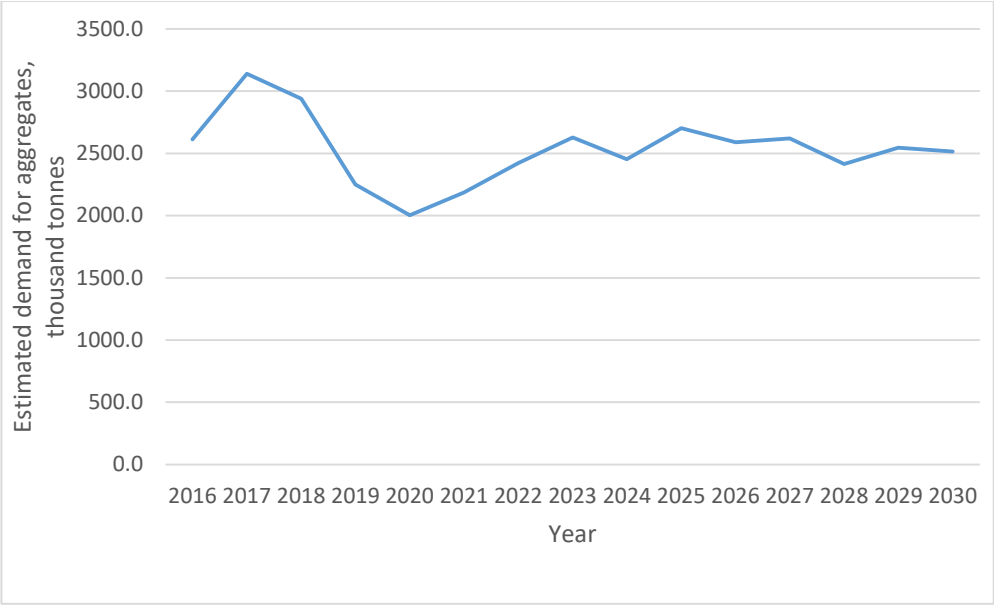
Table 3.13: Herefordshire Core Strategy housing trajectory and associated aggregates required

Year	Core Strategy housing trajectory	Construction aggregates demand (15%)	Total aggregates demand (100%)
		Thousand tonnes	
2016/17	980	392.0	2,613.3
2017/18	1177	470.8	3,138.7
2018/19	1102	440.8	2,938.7
2019/20	844	337.6	2,250.7
2020/21	751	300.4	2,002.7
2021/22	820	328.0	2,186.7
2022/23	908	363.2	2,421.3
2023/24	985	394.0	2,626.7
2024/25	920	368.0	2,453.3
2025/26	1013	405.2	2,701.3
2026/27	971	388.4	2,589.3
2027/28	983	393.2	2,621.3
2028/29	905	362.0	2,413.3
2029/30	955	382.0	2,546.7
2030/31	943	377.2	2,514.7

3.4.42 Figure 3.5 shows the projected total aggregate demand in Herefordshire calculated on the basis of the Core Strategy housing trajectory.

[20] Construction Products Association Press Release 14 April 2014.

Figure 3.5: Estimated demand for aggregates in Herefordshire based on Core Strategy housing trajectory



3.4.43 Using this method, it is calculated that in 2030/31 an aggregate demand of 2,515,000 tonnes per annum would be sought, equating to a ten year annual average in 2030/31 of 2,870,000 tonnes.

3.4.44 Assuming 28% of this demand would be met by secondary and recycled aggregates (see paragraph 3.7.1) 1,811,000 tonnes of primary aggregate would be required to meet this level of demand. Taking the most recent (2009) data for the proportion of demand met by land-won sand and gravel (28%) and by crushed rock (71%) (see Table 3.3 and Table 3.6) 507,000 tonnes of this would be demand for land-won sand and gravel and 1,285,000 would be demand for crushed rock.

3.4.45 Table 3.3 and Table 3.6 further show that 64% of land-won sand and gravel demand and 3% of crushed rock demand was met by production within Herefordshire, which suggests 324,000 tonnes of sand and gravel and 39,000 tonnes of crushed rock would need to be mined within Herefordshire to meet demand.

3.4.46 With permitted reserves for sand and gravel in Herefordshire standing at 2,660,000 tonnes in 2015 and sales in 2015 of 102,432 tonnes, the current landbank is 21.6 years for sand and gravel, which would ensure sufficient supply up to 2037 if demand were to stay at current levels. If demand rose in line with the Core Strategy housing trajectory projections to 324,000 tonnes per annum as estimated in the above paragraph, and no additional reserves are permitted, reserves will be exhausted in 2024/25.

3.4.47 Although the current level of supply of crushed rock within Herefordshire is unknown, the total forecast demand for 2016/17-2030/31 on the basis of the Core Strategy housing trajectory is 3,091,000 tonnes, significantly below the 11.54 million tonnes of permitted reserves data for 2013, the most recent year for which figures were available for Herefordshire separately from other counties (see Table 3.6).

Core Strategy Infrastructure Requirements

3.4.48 The infrastructure requirements arising from policies in the Core Strategy have been examined, with reference to Appendix 5, which lists the necessary infrastructure for strategic sites, as well as to the text of the Core Strategy itself. The main infrastructure proposals which could have a significant demand for aggregates within the period of the Minerals and Waste Local Plan have been identified and these are listed in Table 3.14.

3.4.49 Table 3.14 also shows the main infrastructure proposals that were planned by the earlier Herefordshire Unitary Development Plan[21] for comparative purposes.

Table 3.14: Planned infrastructure in Herefordshire with a potentially significant aggregate requirement

Unitary Development Plan 1996-2011	Core Strategy 2011-2031
12,200 dwellings over plan period (813 dpa) 800 dpa 2001-2007 600 dpa from 2008 onwards	16,500 dwellings over plan period (825 dpa) 600 dpa 2011-2016 850 dpa 2016-2021 900 dpa 2021-2026 950 dpa 2026-2031
100 ha of Part B employment land	148 ha of employment land
14-16,000m^2 of retail floorspace	
11-15,000m^2 of retail warehouse floorspace	
12-14,000m^2 of office floorspace	
Edgar Street Grid: A new canal basin (residential, commercial, leisure, bars, hotel) A new civic quarter (public offices, library, retail, leisure, visitor amenities) Modernisation and relocation of Hereford United FC Multiplex cinema	New urban village in Eign Gate and Edgar Street regeneration areas including: canal basin leisure and recreation facilities Redevelopment of Hereford United FC New police headquarters Divisional Fire Brigade headquarters
Public transport interchange	Purpose-built transport hub
New road link between Edgar Street and Commercial Road Extension of Canal Road to provide a new route between the station and city centre Downgrade inner ring road New road link A49 to B4399 Extending Roman Road improvements from A480 to A438 Improvements to eastern section of Roman Road New road link across northern half of Edgar Street regeneration area Leominster Enterprise Park access roads Ledbury bypass extension	Western Hereford Relief Road with second river crossing Upgrade to inner ring road Leominster southern link road New road infrastructure for lower Bullingham New roundabout for Rotherwas Access Road Road link in Leominster linking B4361 to A44 New roundabout and road link on periphery of development at Bromyard
Park and ride schemes will be permitted	3 park and ride facilities
Land for enhancing capacity of rail network will be safeguarded	Additional capacity on rail through passing loops or double track on Hereford to Great Malvern section
Cycling and pedestrian links	Cycling and pedestrian links

[21] Herefordshire Unitary Development Plan, Herefordshire Council, March 2007

3.4.50 No data is available to enable estimates to be made of the likely demand for aggregates arising from the construction of the development. However, Table 3.14 shows that the infrastructure needs arising from the Core Strategy are similar in nature and scale to those arising from the Unitary Development Plan. There is therefore no indication to suppose that there will be a significant change in the demand for aggregates over the life of the Core Strategy when compared to the period since the adoption of the Unitary Development Plan.

3.5 Conclusions for sand and gravel

3.5.1 Section 3.4 sets out a number of forecasts for future sand and gravel demand using a range of forecasts based on GVA growth, on population projections and on the Core Strategy housing trajectory. Table 3.15 summarises the estimates calculated on the basis of a selection of these forecasts.

Table 3.15: Main findings from selected forecasts of future sand and gravel demand

	Demand in 2031	Ten-year annual average in 2031	Permitted reserves in 2031	Landbank in 2031
GVA growth (highest)	150,000	135,000	643,000	4.8 years
Population growth, demand at 4 tonnes of aggregate per head	105,000	103,000	1,036,000	9.9 years
Core Strategy housing trajectory	324,000	324,000	0	0 years

3.5.2 Table 3.15 shows that, depending on the forecast method used, there may be sufficient permitted reserves of sand and gravel remaining for the lifetime of the Minerals and Waste Local Plan, or there may be an insufficient landbank remaining at the end of the plan period, or permitted reserves may have been exhausted before the end of the plan period.

3.5.3 It is acknowledged that these forecasts have been produced using a number of assumptions, some based on data for single years and some on data now seven years old. However, if during the course of the development of the Minerals and Waste Local Plan better data becomes available, this can be used to improve the forecasts produced wherever appropriate.

3.5.4 There is only one active sand and gravel quarry in Herefordshire, and current planning conditions require that the winning and working of minerals must cease by 31 December 2026. Therefore, regardless of which forecast most closely represents the real outcome for sand and gravel over the lifetime of the Minerals and Waste Local Plan there will be a need for additional reserves of sand and gravel to be permitted to meet demand from 2027 onwards.

3.6 Conclusions for crushed rock

3.6.1 There is, generally, a lack of data in relation to crushed rock within Herefordshire.

3.6.2 Two methods have been considered for forecasting the potential future demand. These have produced widely varying forecasts of demand for 2016-2031, from 193,000 tonnes to 3,091,000 tonnes. However, in both cases the forecast is significantly below the 11.54 million tonnes of permitted reserves data for 2013, the most recent year for which figures were available for Herefordshire separately from other counties (see Table 3.6).

3.6.3 It is acknowledged that these forecasts have been produced using a number of assumptions, some based on data for single years and some on data now seven years old. However, if during the course of the development of the Minerals and Waste Local Plan better data becomes available, this can be used to improve the forecasts produced wherever appropriate.

3.6.4 Of the two operational quarries for crushed rock in Herefordshire, one is required to cease operations by 2027, and therefore could not, currently, contribute to meeting demand after that date. The other can continue operations until 2042. There may therefore be a need for additional reserves of crushed rock to be permitted during the lifetime of the Minerals and Waste Local Plan.

3.7 Secondary and recycled aggregates

3.7.1 The Mineral Products Association estimates[22] that secondary and recycled aggregates constitute 28% of total aggregate consumption in GB in 2015.

3.7.2 There are currently no industrial processes in Herefordshire which are known to produce secondary aggregates.[23] With technical improvements, there may be potential for some provision of secondary aggregates from existing quarrying operations. Although technology is moving apace in this field, at present however, none is proposed.

3.7.3 The WNA 2017 has produced two forecasts for arisings of CD&E waste in Herefordshire based on the forecast change in GVA for the construction sector in Herefordshire and Worcestershire produced by Experian (see Table 3.9). the two forecasts are:

- Scenario 1: Growth based on Herefordshire and Worcestershire construction sector GVA growth and a baseline figure of 357,000 tonnes in 2015 (calculated as per capita arisings using an UK per capita multiplier); and
- Scenario 2: Growth based on Herefordshire and Worcestershire construction sector GVA growth and a baseline figure of 379,000 tonnes in 2015 (calculated as per capita arisings using an England waste per capita multiplier).

3.7.4 The forecasts were broken down into the key elements of the CD&E waste stream (non-hazardous construction and demolition waste, hazardous construction and demolition waste and dredging and excavation spoils) based on relative proportions estimated in 2014 and assuming that these remain constant. In this way, two forecasts for arisings of non-hazardous construction and demolition waste have been made, this being the particular element of the CD&E waste stream likely to be a source of recycled aggregates.

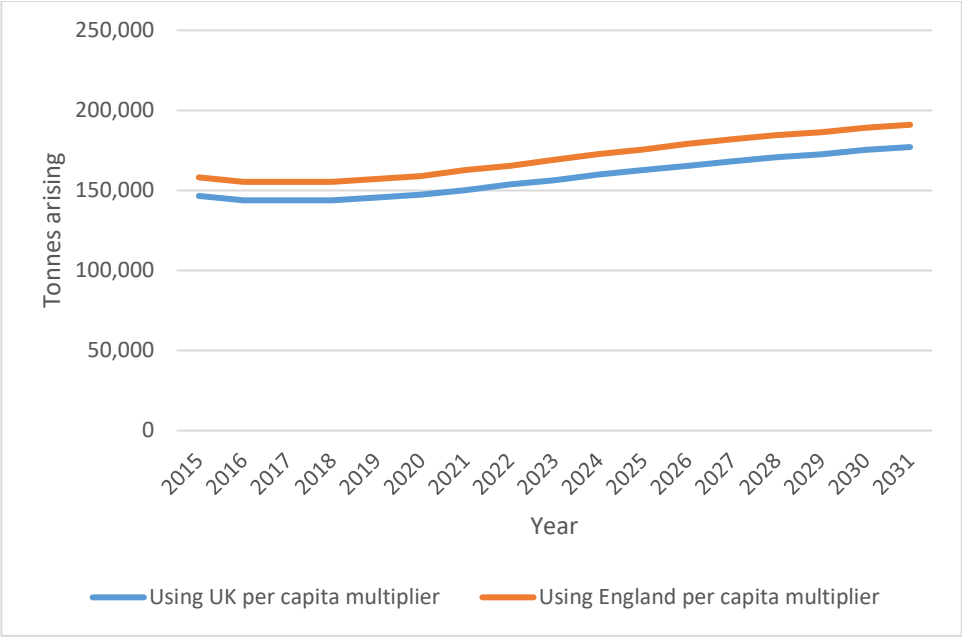
3.7.5 However, not all of the arisings will be recovered for recycling. The latest figures from Defra[24] shows that 91.4% of non-hazardous construction and demolition waste was recovered in England in 2014, therefore the arisings forecast by the WNA 2017 have been reduced by 8.6% to reflect this. The adjusted forecasts are set out in Table 3.16 and Figure 3.6.

[22] The Mineral Products Industry At A Glance: 2016 Edition, Mineral Products Association, 2016, http://www.mineralproducts.org/documents/Mineral_Products_Industry_At_A_Glance_2016.pdf
[23] Herefordshire Local Aggregates Assessment December 2014 v.1.3 draft, Herefordshire Council, December 2014
[24] Statistics on Waste Notice: Non-Hazardous Construction and Demolition Waste UK and England 2010-2014, Defra, December 2016

Table 3.16: Forecasts for arisings of recovered non-hazardous construction and demolition waste in Herefordshire

Year	Using an UK per capita multiplier	Using an England per capita multiplier
2015	146,537	158,122
2016	143,840	155,380
2017	143,840	155,380
2018	143,840	155,380
2019	145,638	157,208
2020	147,436	159,036
2021	150,133	162,692
2022	153,729	165,434
2023	156,426	169,090
2024	160,022	172,746
2025	162,719	175,488
2026	165,416	179,144
2027	168,113	181,886
2028	170,810	184,628
2029	172,608	186,456
2030	175,305	189,198
2031	177,103	191,026
2015	146,537	158,122

Figure 3.6: Forecast arisings of recycled aggregates in Herefordshire



4. Other minerals

4.1 Building stone

4.1.1 The Annual Raised Enquiry prepared by the ONS provides data for building stone sales from Herefordshire. The last four years of data are reproduced in Table 4.1. Prior to 2011, data on building stone was only provided at the regional level.

Table 4.1: Sales of building stone from Herefordshire

Year	Building stone sales
2014	2,000
2013	2,000
2012	2,000
2011	2,000*

* Figure for Herefordshire and Worcestershire combined

4.1.2 The figures indicate a small and stable market for the sale of building stone from Herefordshire.

4.1.3 There are several active quarries for building stone within Herefordshire. Some of these have planning conditions imposed which require operations to cease within the lifetime of the Minerals and Waste Local Plan. Llandraw Farm Quarry is required to cease working by 2021 and Tybubach Quarry by 2030 at the latest. Westonhill Wood Quarry is required to cease working by 2039. Therefore, with the closure of some quarries before the end of the plan period, there may be a need to facilitate new permissions for the winning and working of building stone.

4.2 Conventional and unconventional hydrocarbons

4.2.1 Herefordshire has two areas that have been worked in the past for coal. However, such conventional extraction of hydrocarbons has ceased in Herefordshire and shows little sign of recommencing. In 1999, the BGS reported that the hydrocarbon prospectivity of the area was low. New data is due from the BGS in early 2017 and will be reviewed.

4.2.2 Recently, new technologies have been developed for extracting hydrocarbons in an unconventional way, which may allow the extraction of resources from deposits which were previously considered uneconomic.

4.2.3 The UK has a long history of onshore gas exploration, and has developed a robust regulatory system to ensure that any such operations will be carried out to the highest standards of safety and environmental protection. The 14th Onshore Oil and Gas Licensing Round was launched on 28 July 2014 and applications were received from 47 companies covering 295 Ordnance Survey Blocks.

4.2.4 A Petroleum Exploration and Development Licence (PEDL) does not itself give any direct permission for operations to begin, but grants the licensee exclusivity over an area of land for onshore hydrocarbon exploration, appraisal and extraction. The exclusivity applies to both conventional and unconventional operations.

4.2.5 In December 2015, the Government announced a licensing round whereby 159 blocks of land were offered to applicants for onshore hydrocarbon exploration, appraisal and extraction, following scrutiny of the applicant's: competency; financial viability; environmental awareness; and geotechnical analysis.

4.2.6 One of these blocks, referred to as SO51a, included a small part of the south of Herefordshire around Whitchurch, Welsh Newton, Goodrich, Kerne Bridge, Hope Mansell and Marstow. The licence for block SO51a was offered to South West Energy Limited and is classified as coalbed methane, although the licence is for any hydrocarbon and is not limited to this classification. It is possible therefore that in the future hydrocarbon extraction may take place within Herefordshire.

4.2.7 However, an article[25] was published in the Hereford Times on 16 September 2016 which reported that South West Energy Limited had declined the offer of a licence for block SO51a. This was confirmed by the Oil and Gas Authority, which stated that a licence pertaining to this block, among others, will not be awarded. It is not known why the offer was declined.

Conclusion

4.2.8 Activities related to hydrocarbon exploration or extraction will therefore not take place in Herefordshire, at least in the short term.

4.2.9 The Hereford Times reported that it is unclear if and when the land in Herefordshire would be next involved in any licensing process. The 13th onshore licensing round took place in 2007-08 and the 12th in 2004. It is therefore still possible, although unlikely, that hydrocarbon operations will take place in Herefordshire in the foreseeable future, although this may depend on future developments in technology that could make the deposits more attractive.

[25] http://www.herefordtimes.com/news/14744861.Company_declines_licence_to_frack_in_Herefordshire/

5. Conclusions

5.1.1 The previous sections have collated and analysed all the available data on supply of and demand for minerals in Herefordshire. In many instances, data is unavailable and estimates have had to be made using assumptions based on information from other sources or from several years ago. While every attempt has been made to use reliable data, the figures derived can only be an indication of the actual position regarding supply of minerals, except in the cases of sand and gravel and building stone where actual figures are available.

5.1.2 When making projections of future demand, especially over a 15 to 20 year time-frame, estimates are by their nature uncertain and the true outcome is uncertain. A range of forecasts have been made to show the possible variation in outcome

5.1.3 On the basis of the estimates derived for supply and demand, it is possible to draw some conclusions about the balance between supply and demand for minerals.

5.2 Sand and gravel

5.2.1 Clear data is held on the supply of sand and gravel and permitted reserves remaining.

5.2.2 Depending on the forecast of future demand, this may be sufficient to meet demand over the plan period, or, in perhaps extreme circumstances, it may not. With a high forecast of demand, reserves will be exhausted before the end of the Minerals and Waste Local Plan.

5.2.3 Regardless of the demand forecast used, the active quarry must cease operations by the end of 2026 under current planning conditions. There is therefore a need for additional reserves of sand and gravel to be permitted before the end of the Minerals and Waste Local Plan.

5.3 Crushed rock

5.3.1 Poor data is held on the supply of crushed rock and permitted reserves remaining.

5.3.2 Two methods have been provided for forecasting the potential future demand for crushed rock. These have produced widely varying forecasts of demand for 2016-2031, from 193,000 tonnes to 3,091,000 tonnes. However, in both cases the forecast is significantly below the 11.54 million tonnes of permitted reserves data for 2013, the most recent year for which figures were available for Herefordshire separately from other counties.

5.3.3 Of the two operational quarries for crushed rock in Herefordshire, one is required to cease operations by 2027. There may therefore be a need for additional reserves of crushed rock to be permitted during the lifetime of the Minerals and Waste Local Plan, but as the picture on reserves and sales within the county is unclear, it is not possible to know with any degree of certainty how important it will be to secure additional permitted reserves through new policy.

5.4 Recycled aggregates

5.4.1 Herefordshire is a net importer of aggregates, and overwhelmingly so for crushed rock. As discussed above, there may be a need to secure more permitted reserves for sand and gravel, whereas already permitted crushed rock reserves are more than ample to meet future forecast

levels of sales. Recycled aggregates could have an increasingly important role to play in reducing the reliance on imports of aggregates.

5.4.2 Forecasts have been made for the potential arisings of recycled aggregates over the Plan period. These have been calculated using a baseline of per capita arisings in Herefordshire and assumed to change over the Plan period in line with forecasts for the change in GVA for the construction sector in Herefordshire and Worcestershire.

5.4.3 This gives a baseline for arisings of recycled aggregates in 2015 of between 147,000 tonnes and 158,000 tonnes, rising to between 177,000 tonnes and 191,000 tonnes by 2031. While a useful contribution to the supply of aggregates, these figures fall well short of the assumed 803,600 tonnes required to meet the estimated demand calculated by reference to the Core Strategy housing trajectory (see paragraphs 3.4.43 and 3.4.44).

5.5 Building stone

5.5.1 Clear data is held on the supply of building stone and permitted reserves remaining.

5.5.2 There is a small and stable market for the sale of building stone from Herefordshire. This is important for retaining the local character of buildings and also has a market for quality construction in other parts of the country.

5.5.3 Some of the active quarries for building stone within Herefordshire are required to cease operations within the lifetime of the Minerals and Waste Local Plan. Therefore there may be a need for policy to address the winning and working of building stone to enable supply to continue to meet demand.

5.6 Hydrocarbons

5.6.1 There will not be any activities relating to the exploration or extraction of hydrocarbons within Herefordshire in the short term.

5.6.2 In the medium to long term, it is possible that this situation may change but there is no information to indicate how likely this is. There may be a need for policy to address hydrocarbon extraction if it appears that a licence may be taken up for block SO51a in the future, or it may be sufficient to leave this matter for a future review of the Minerals and Waste Local Plan.

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