Minerals Local Plan Background Document

Worcestershire Local Aggregate Assessment

Data covering the period up to 31/12/2017

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This LAA was signed off by the West Midlands Aggregates Working Party via email on 23rd March 2020.

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1. Executive Summary

1.1. There is a lack of data about the contribution that substitute or secondary and recycled materials and minerals waste make to the supply of aggregate materials in Worcestershire. This LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates.

1.2. There are two distinct types of sand and gravel deposits in Worcestershire: the bedrock deposit solid sands of the Kidderminster Formation and Wildmoor Sandstone Formation, and the surface river terrace deposits of the rivers Severn and Avon and glacial deposits found in association with boulder clay. The following bedrock mineral deposits are believed to be the only strata in the county that have been worked to produce crushed rock aggregates: the Precambrian "Malverns Complex" and "Warren House Formation", the Silurian "Woolhope Limestone Formation"[1], the Ordovician "Lickey Quartzite Formation"; and the Jurassic "Inferior Oolite Group".

1.3. There is not sufficient evidence to suggest that the production guideline for primary sand and gravel should vary from the 10 year average shown in the LAA dashboard below. The landbank for sand and gravel does not currently meet the requirement of 7 years. In addition, as of December 2017 there was only 1 remaining site allocation in the adopted Minerals Local Plan, indicating a significant risk that this landbank could diminish significantly before other planning permissions are secured. Work is well underway on a new Minerals Local Plan and Mineral Site Allocations Development Plan Document to address this. Although the minerals industry has previously indicated that there are likely to be significant constraints on finding sites of sufficient size and quality in the county in future, a number of potential sites for sand and gravel extraction have now been proposed and these sites are under consideration as potential sites for allocation in a separate Mineral Site Allocations Development Plan Document (DPD).

1.4. Worcestershire has no permitted reserves, no productive capacity and no landbank for crushed rock and crushed rock resources have significant environmental constraints. Following Duty to Cooperate discussions, this LAA therefore concludes that the production guideline for crushed rock in Worcestershire should be reduced from the 10 year average to 0 tonnes per annum.

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[1] Silurian "Aymestry Limestone Formation" deposits have also been worked in the past, but these are not considered to be a significant resource under the methodology set out in the background document *Analysis of Mineral Resources in Worcestershire* (available at www.worcestershire.gov.uk/mineralsbackground)

LAA Dashboard

🡻 Indicates a decrease in comparison to the figure in the previous year's LAA.
🡹 Indicates an increase in comparison to the figure in the previous year's LAA.
- Indicates no change in comparison to the figure in the previous year's LAA.

		Sand and gravel	Crushed rock
Production (demand)	**2017 sales**	0.455 million tonnes 🡹	0 tonnes -
	3-year average sales (mean)	0.464 million tonnes 🡻	0 tonnes -
	10-year average sales (mean)	0.572 million tonnes 🡻	0.014 million tonnes 🡻
	'Baseline' production guideline identified in adopted Minerals Local Plan	N/A	N/A
	Annual Production Guideline	**0.572 million tonnes** 🡻	**0 tonnes** -
	Informatives	Production guideline based on 10-year average. No other relevant local information which indicates deviation from this average is required.	Significant constraints on delivering crushed rock production, and lack of sites being put forward by industry, indicate deviation from 10 year average is appropriate.
Landbank (Supply)	**Permitted Reserves at 31st December 2017**	3.465 million tonnes 🡻	0 tonnes -
	Number of sites at 31st December 2017	4 sites: 🡻 • 3 "active" sites (permitted extension at one site) • 1 "inactive" site	0 sites -
	Landbank at 31st December 2017 (based on annual production guideline)	**6.06 years** 🡻	**0 years** -
	Landbank requirement	7.00 years ✘	10.00 years -
	Informatives	0% of reserves held in inactive sites. A planning application (09/000085/CM) to extract 430,000 tonnes of sand and gravel from a new quarry at Strensham[2] was withdrawn by the applicant in October 2017. No further mineral planning applications were made, decided or pending decision during 2017.	Discussions with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties concluded that Worcestershire's production guideline for crushed rock should be reduced to 0 tonnes, but with the emerging Minerals Local Plan providing a policy framework which could enable crushed rock development to take place. The Mineral Planning Authorities and Aggregate Working Parties have indicated that supplying Worcestershire's demand for crushed rock can be accommodated.

[2] This site was allocated as a Preferred Area in the adopted County of Hereford and Worcester Minerals Local Plan 1997.

Contents

2. Introduction

> "*It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.*"
> National Planning Policy Framework (2018), paragraph 203

2.1. The National Planning Policy Framework[3] requires Minerals Planning Authorities (MPAs) to plan for a steady and adequate supply of aggregates by:

- preparing an annual Local Aggregate Assessment (LAA) "*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)*",
- "*participating in the operation of an Aggregate Working Party and taking the advice of that Party into account when preparing their Local Aggregate Assessment*", and
- "*maintaining landbanks of at least 7 years for sand and gravel and at least 10 years for crushed rock*".

2.2. The LAA is an assessment of the demand for and supply of aggregates in the county. Its prime purpose is to assist MPAs in their efforts to provide for the steady and adequate supply of local aggregates, where reasonable and practicable to do so. It will inform the Minerals Local Plan and will be a material consideration in the determination of planning applications.

Next steps

2.3. The Local Aggregate Assessment will be updated annually in consultation with the West Midlands Aggregate Working Party (WM AWP) and other AWPs as required, and will be published by the Council alongside the Minerals and Waste Local Development Scheme Authority Monitoring Report (AMR). The current and previous AMRs and LAAs are available on www.worcestershire.gov.uk/AMR. If you would like to be notified when new AMRs are published please contact minerals@worcestershire.gov.uk providing your contact details[4].

[3] Ministry for Housing, Communities and Local Government (July 2018) *National Planning Policy Framework*, paragraph 207
[4] See http://www.worcestershire.gov.uk/info/20014/planning/1156/get_involved_in_planning

3. Secondary and recycled aggregates in Worcestershire

3.1. National policy states that, so far as practicable, planning authorities should "*take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials*".[5]

Substitute materials

3.2. The use of substitutes will vary depending on individual development proposals. Their use is likely to be more strongly influenced by sustainable design and construction policies in Local Plans rather than the Minerals Local Plan.

3.3. There is no data available to indicate the level of contribution made by substitute materials.

Secondary aggregates

3.4. Secondary aggregates is a term often used to describe mineral that is produced as a by-product of other mining or quarrying activities or as a by-product of an industrial process.

3.5. There was one industrial process in Worcestershire in 2017 which was known to produce material suitable for processing into secondary aggregates:

- An Energy from Waste Plant commenced operation in 2017 at Hartlebury, near Kidderminster.[6] This plant is predicted to produce 40,000 tonnes per annum of incinerator bottom ash which may be capable of being used as secondary aggregate, although further processing would be required to enable this.

3.6. In addition, an application for an Incinerator Bottom Ash Processing and Recovery Facility at Hill and Moor Landfill Site was granted in January 2017. This facility is tied to the life of the Hill and Moor Landfill Site and is limited to processing 50,000 tonnes per annum of Incinerator Bottom Ash.

Recycled aggregates

3.7. Recycled aggregates arise from several sources, notably construction and demolition waste (C&D waste) such as the demolition of buildings, asphalt planings from road resurfacing, recycled glass, recycled tyres, and railway track ballast. "Recycling" aggregates involves the processing of waste materials to remove unwanted or inappropriate material such as fines, wood, plastic and metal. It will usually include crushing and screening. The

[5] Ministry of Housing Communities and Local Government (July 2018) *National Planning Policy Framework*, paragraph 204(b)
[6] Further information about the development of the Energy from Waste Plant can be viewed at http://www.severnwaste.com/recovery/envirecover-project/

recycled aggregate is then re-used, usually for a less demanding application.

3.8. The supply of recycled materials will depend on the county's capacity to process these materials. The Waste Core Strategy[7] sets targets for capacity at static plant, but due to data limitations it is not possible to monitor the role of mobile plant.

3.9. There are no reliable assessments of C&D arisings, and there are no set approaches for making estimates about waste arisings or projecting waste growth for C&D waste, either nationally or locally. The method used to establish projections in the Waste Core Strategy assumes that development would initially be concentrated on previously developed (brownfield) land which would generate considerable volumes of C&D waste, and that over time more new development would take place on greenfield sites resulting in the amount of C&D waste decreasing. The projected arisings of C&D waste in Worcestershire based on this approach are set out in Table 1.

Table 1. Projected Arisings of Construction and Demolition Waste (Worcestershire Waste Core Strategy)

	2010	2015	2020	2025	2030
Projected arisings of C&D waste	510,555	419,520	419,520	419,520	419,520

3.10. The Waste Core Strategy makes provision for at least 25% of the capacity to manage this waste to be met from static sites. Static facilities in Worcestershire received approximately 78,000 tonnes of inert waste for treatment in 2017, with a further 93,000 tonnes received for transfer.[8] It is not currently possible to assess the proportion of this which was subsequently sold or used as recycled aggregate.

3.11. Mobile processing and re-use on site is common at construction sites across the county, although no data is available about the volume processed by mobile plant.

3.12. Worcestershire does not have any rail depot for the import or export of minerals (including secondary and recycled materials). Water transportation takes place on the River Severn, but this is limited to moving "as-dug" primary aggregates from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

[7] The Waste Core Strategy for Worcestershire was adopted in November 2012. The relevant documents are available to view on www.worcestershire.gov.uk/wcs.
[8] Environment Agency Waste Data Interrogator 2017, interrogated for treatment and transfer facilities for inert waste received in Worcestershire.

Potential to increase contribution from secondary and recycled materials

3.13. Despite the current lack of information on the level of use of secondary and recycled materials locally, these account for 28% of the total market nationally.[9]

3.14. It is likely that up to 50,000 tonnes of incinerator bottom ash will be processed at the Hill and Moor Facility to recover metals, which can be recycled, and also separate the remaining material into various grades which have the potential to be used as a secondary aggregate in the construction industry. The IBA aggregate can be used in road sub-base, bulk fill, asphalts, foamed concrete, and cement bound materials.

3.15. We are not aware of any other potential drivers that would result in significant increases in arisings or recovery for recycled or secondary aggregate materials. We also have no evidence to indicate whether Worcestershire is likely to produce any more or any less than the national average.

3.16. The Mineral Products Association's evidence to the examination in public of the Staffordshire Minerals Local Plan in 2016 states that:

"*secondary sources benefit from significant fiscal advantages over primary materials in the form of exemptions from the Aggregates Levy and avoidance of the Landfill Tax. As such, they will continue to be much cheaper than primary materials and thus favoured where specifications can accommodate them. Moreover, the [Mineral Products Association]'s members invariably offer a range of products including primary and secondary materials to customers so the [minerals planning authority] can have the assurance that the industry is not needlessly extracting primary materials when secondary materials will do the job just as well.*

Arisings of secondary materials will continue to rise and fall with economic conditions in the same way that demand for primary materials varies. Therefore, the two types of material will parallel each other and we expect the level of use of recycled and secondaries to remain broadly at the current level of 28 - 29% of total consumption. Given this any increase in primary mineral extraction activity will not be at the expense of secondary usage."[10]

3.17. The Minerals Local Plan will give (and the Waste Core Strategy already gives) policy encouragement to increasing the use of secondary and

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[9] Mineral Products Association (2016) *The Mineral Products Industry at a Glance*, page 7, http://www.mineralproducts.org/documents/Mineral_Products_Industry_at_a_Glance_2016.pdf. 63 million tonnes of secondary & recycled material out of a total aggregates supply market of 225 million tonnes (28%).

[10] Mineral Products Association's written statement for day 1 of the Staffordshire Minerals Local Plan examination in public. Response to question 3 in document WS.05 in the examination document library, https://www.staffordshire.gov.uk/environment/planning/policy/thedevelopmentplan/mineralslocalplan/Minerals-Local-Plan-document-library.aspx.

recycled materials. However, the lack of data will make this difficult to monitor at the local level, and the evidence above from the Minerals Products Association indicates that this Local Aggregates Assessment should not rely on any significant alterations to the proportion of supply.

3.18. On this basis, this LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates.

4. Marine sand and gravel

4.1. Sand and gravel deposits occur in many offshore areas around Britain. Most dredging takes place in coastal waters less than 25 km offshore and in water depths of between 18 m and 35 m. Marine aggregates can have special qualities which meet particular specifications.

4.2. Worcestershire is an inland county and as such has no marine resources. There are also no ports that land marine-won aggregate in the county. However, national surveys indicate that a relatively small amount of marine sand and gravel is imported into Worcestershire:

- 2,000 tonnes in 2014[11]
- 13,000 tonnes in 2009[12]
- 12,000 tonnes to Herefordshire and Worcestershire together in 2005[13].

4.3. As an inland county, the Worcestershire Minerals Local Plan cannot make provision for the production of marine sand and gravel. We have no evidence that there is a particular demand for marine-dredged aggregates in Worcestershire, and it is likely that this relatively low level of imports is simply a normal function of the commodities market for aggregates.

4.4. Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is currently limited to moving "as-dug" primary aggregates from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

[11] Department for Communities and Local Government, British Geological Survey, Welsh Assembly Government (2016) *Collation of the results of the 2014 aggregate mineral survey for England and Wales*.
[12] Department for Communities and Local Government, British Geological Survey, Welsh Assembly Government (October 2011) *Collation of the results of the 2009 aggregate mineral survey for England and Wales*.
[13] Department for Communities and Local Government (May 2007) *Collation of the results of the 2005 aggregate mineral survey for England and Wales*.

5. Primary Aggregates: Sand and Gravel

5.1. There are two distinct types of sand and gravel deposits in Worcestershire:

- Bedrock deposits: solid sands of the Kidderminster Formation and Wildmoor Sandstone Formation
- Surface deposits: river terrace deposits of the rivers Severn and Avon and glacial deposits found in association with boulder clay.

5.2. The solid sands, river terrace and glacial deposits will be considered collectively under the term “sand and gravel” in the rest of this report.[14]

Estimating demand

10 years sales average

5.3. The starting point for setting a production guideline for sand and gravel in the LAA is to estimate demand on the basis of a rolling average of 10 years sales data (the 10-year average) before considering other relevant local information.

5.4. Table 2 and Figure 1 show the levels of sand and gravel sales in Worcestershire and Herefordshire over the last 10 years (from 2008 onwards). Worcestershire's data was combined with Herefordshire in 2012 and 2013 due to issues of commercial confidentiality[15]. Permission was given by the affected operator in Herefordshire to enable the data to be shown separately again from 2014.

5.5. The most recent data available is for 2017.

Table 2. Sand and gravel sales 2007 – 2016 (million tonnes)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Worcestershire	0.76*	0.52*	0.62*	0.63*	-	-	0.520*	0.538	0.399	0.455
Herefordshire & Worcestershire Combined					0.62*	0.659*				

Source: West Midlands Aggregate Working Party Annual Reports and West Midlands Aggregate Working Party Annual Monitoring Survey data. Data for sales in 2012-2013 combined for Herefordshire and Worcestershire due to confidentiality requirements.
* Includes estimated sales data for some sites.

5.6. In 2017, sales of sand and gravel in Worcestershire were 0.455 million tonnes.

[14] For further information about the nature, location and potential significance of the deposits see background document *Analysis of Mineral Resources in Worcestershire* at www.worcestershire.gov.uk/mineralsbackground

[15] Long-standing confidentially arrangements agreed between the industry and government to protect operators' commercial interests. This means that sales data will not be released or published where there are fewer than 3 operational sites in an area unless express permission is given by the operators affected. From 2012 onwards there has been fewer than 3 operational sites in Herefordshire.

5.7. The 10 year average of sales from 2008-2017 including combined data for 2012-13 is 0.572 million tonnes. This is 26% higher than the 2017 sales figure.

5.8. The 10-year average has a number of weaknesses that make sole reliance on it undesirable:

- sales will vary depending on both supply and demand factors in the market, and basing a production guideline on this alone could risk following historical trends rather than meeting future demand;
- it incorporates combined data with Herefordshire which could skew the average;[16]
- it includes data from a period of significant economic downturn and therefore may not represent the demand likely to be experienced as the economy recovers; and
- the adopted Minerals Local Plan was beyond its expected implementation period, with a limited number of Preferred Areas and saved policies, which could have limited operator interest in bringing sites forward in Worcestershire during this time, thereby depressing the annual sales figure.

5.9. Therefore, whilst the 10-year average is considered to be the best starting point, it needs to be sense-checked against other indicators, as set out below.

3 year sales average

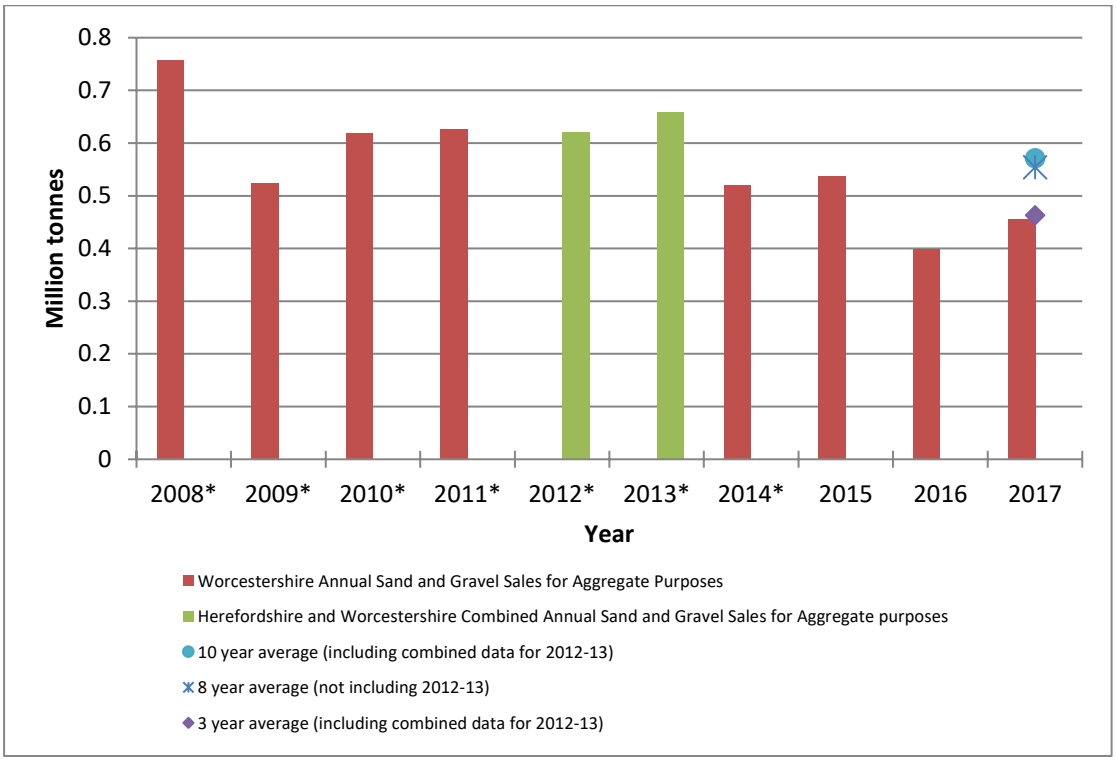
5.10. An average of the last 3 years sales gives an indication of the most recent sales trends to identify the general trend of demand.

5.11. The 3 year average from 2015-2017 is 0.464 million tonnes. This is 19% lower than the 10 year average, but 2% higher than the 2017 sales figure. The difference between this 3 year average and the 10 year average is fairly significant. However it is understood that during 2016 and in to 2017 production was slowed at a number of sites which were coming towards the end of their life to ensure continuity as new planning permissions were being sought and implemented, and the sites which were granted planning permission during 2016 did not commence extraction until some way in to 2017, so would not have been able to operate at full capacity to meet demand throughout the year.

5.12. Due to the reasons outlined above, it is likely that the three year average is an under-representation of the market demand, and therefore it would not be appropriate to reduce the production guideline in this LAA below the 10 year average on the basis of the three year average. However, this is not believed to be sufficient to warrant an increase above the 10 year average.

[16] If we were to discount the combined data for 2012 and 2013, the average over the 8 remaining years between 2008-2017 is 0.555 million tonnes.

Figure 1. Sand and gravel annual and average sales 2008-2017



* Years marked * include estimated sales data for some sites.

Sub regional apportionment

5.13. A further indicator to be taken into account is the sub-regional apportionment derived from the *National and regional guidelines for aggregates provision in England*.[17] These guidelines were produced to cover the period 2001-2016 and updated for the period 2005-2020 and set out the level of provision which should be made by each Region. An annual "sub-regional apportionment" was derived from the 2001-2016 Guidelines, and for Worcestershire this was 0.871 million tonnes of sand and gravel. No sub-regional apportionment based on the 2005-2020 Guidelines has been agreed.

5.14. The sub-regional apportionment was 92% higher than the 2017 sales figure and this level of production has not been achieved in Worcestershire since 2003.

5.15. In the Inspector's Report on the partial review of the Northamptonshire Minerals and Waste Local Plan,[18] the Inspector stated “as they (*the national*

[17] Department for Communities and Local Government https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020

[18] The Planning Inspectorate (August 2014) *Report on the Examination into the Northamptonshire Minerals and Waste Local Plan (Northamptonshire Minerals & Waste Development Framework Partial Review)* http://www3.northamptonshire.gov.uk/councilservices/environment-and-planning/planning/planning-policy/minerals-and-waste-planning-policy/documents/PDF%20Documents/ReportToNorthamptonshireCountyCouncilV3.pdf

guidelines) were based on production before the recession and within a different policy context, it would not be prudent to accord them very significant weight."

5.16. This suggests that it would not be appropriate to increase the production guideline in this LAA above the 10 year average on the basis of the *National and regional guidelines* or the sub-regional apportionment.

Factors which might influence demand

5.17. Considering levels of planned development could provide an indication of whether demand for sand and gravel is likely to significantly increase or decrease, warranting an adjustment in the production guideline.

Housing development

5.18. Figure 2 shows sand and gravel sales against housing completions in the county over the last 10 years. This does not indicate a direct correlation between housing completions and the level of sand and gravel sales.

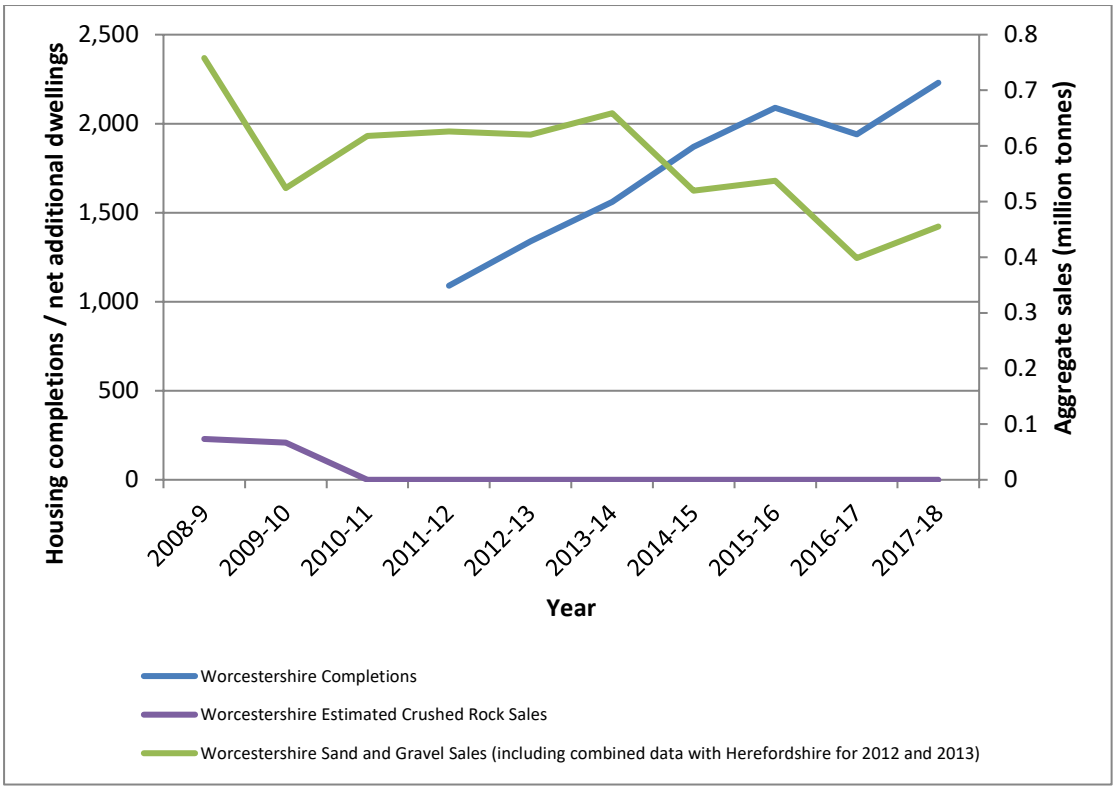
5.19. Figure 2 shows that the level of housing completions has varied annually over the last 10 years (between 1,090 and 2,230), with an average of 1,660 completions per year[19]. Over the next 10 years, the anticipated level of housing provision in adopted Local Plans is approximately 2218 dwellings per year,[20] and this would represent a 34% increase in comparison to the average over the last 10 years. However, a number of Local Plans are currently being reviewed. It is anticipated that these reviews will confirm the continued need for housing growth in the county, with delivery being maintained at an average of 1700 houses per annum[21], plus associated infrastructure including roads and schools. This is broadly similar to the average number of completions seen over the last 10 years. A steady and adequate supply of aggregates, including sand and gravel, will be crucial to enabling the level of planned housing development to be delivered.

[19] Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[20] Based on figures in South Worcestershire Development Plan (2016), Wyre Forest Core Strategy (2010), Bromsgrove District Plan (2017), and Borough of Redditch Local Plan No.4 (2017).

[21] 1693 houses per annum calculated using the Standard Methodology from Government released in autumn 2018.

Figure 2. Sand and gravel sales versus housing completions[22]



5.20. The British Geological Survey states that the construction of a typical new house uses approximately 60 tonnes of aggregates from the foundations through to the roof tiles.[23] This is a generalisation which must be treated with a degree of caution and it does not distinguish between use of sand and gravel and crushed rock. However, multiplying this figure with housing completions indicates that 29.4%[24] of sand and gravel sales in 2017 might be attributable to new houses. This does not include any requirements for infrastructure supporting housing development or the significant amount used in maintaining or refurbishing existing housing stock. Estimates of the amount of mineral resource required per house when supporting infrastructure, such as access roads, is taken into account (averaged per house on the development) ranges between 200 tonnes[25] and 400 tonnes[26]. Alongside other development's mineral requirements, this is likely to account for the rest of Worcestershire's production.

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[22] Housing completions data based on Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[23] British Geological Survey (2008) The need for indigenous aggregates production in England. https://www.bgs.ac.uk/downloads/start.cfm?id=1373

[24] (2230 housing completions x 60 tonnes)/455,000 tonnes of sand and gravel sold in 2017

[25] Mineral Products Association (2016) The Minerals Products Industry at a Glance. http://www.mineralproducts.org/documents/Mineral_Products_Industry_At_A_Glance_2016.pdf

[26] British Geological Survey (2008) The need for indigenous aggregates production in England. https://www.bgs.ac.uk/downloads/start.cfm?id=1373

5.21. Whilst there is a clear ambition in adopted Local Plans for an increased level of housebuilding over the coming years in comparison to previous years, the anticipated level of approximately 2218 dwellings per year is very similar to the number completed in 2017 (2230 dwellings). The likelihood of Local Plan reviews leading to housing development at a similar level to the average over the last 10 years also needs to be considered, and will be monitored as the plan reviews progress.

5.22. Although the current trajectory for housing development indicates a possible increase in demand for aggregates, any increase is unable to be quantified. This potential increase may also not materialise if Local Plan reviews proceed as anticipated. As the 10 year sales average for sand and gravel is above the level of production in any of the last 4 years, the 10 year average is considered to remain an appropriate production guideline. Therefore, it would not be appropriate for the production guideline in this LAA to deviate from the 10 year average on the basis of projected housing numbers.

Other development

5.23. It is recognised that significant levels of commercial and infrastructure development is proposed in the Local Plans and Strategic Economic Plans in and around Worcestershire which will create some demand for aggregate minerals from within Worcestershire. However, there is a lack of data to be able to estimate the level of demand for aggregate resources which commercial and infrastructure developments might create.

5.24. There are no Nationally Significant Infrastructure Projects planned or underway within Worcestershire.[27] However, the West Midlands Aggregate Working Party believes that the HS2 project, which will run through the West Midlands, will result in significant demand for aggregates from Mineral Planning Authority areas in the West Midlands. As aggregates tend not to very travel far from their source, this demand is likely to be met from the Mineral Planning Authority areas closest to the line's route in the first instance. However, the level and urgency of this demand is likely to put significant strain on existing supply options in these areas. Failing to make adequate provision to meet this increased demand could compromise the ability for both HS2 and other developments to be delivered. Additional aggregate extraction in Worcestershire is likely to be needed in order help meet these demands, although it is difficult to quantify the extent of additional requirements at this time. Worcestershire County Council, as part of the West Midlands Aggregate Working Party, is seeking to work closely with HS2 to better understand the implications for minerals supply from the West Midlands.

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[27] The National Infrastructure Planning website shows the "Redditch Branch Enhancement Scheme" as a Nationally Significant Infrastructure Project. This scheme was intended to create capacity along the single track to Redditch through the construction of a dynamic loop, consisting of approximately 3km of double track and 2 connections to the original track, allowing trains to pass one another. Consent for this scheme was granted in 2013, and the project was completed in 2014.

5.25. Overall, this indicates that it would not be appropriate for the production guideline in this LAA to deviate from the 10 year average on the basis of other development.

Supply options / constraints

Indigenous supply

Worcestershire's sand and gravel resources

5.26. There are two estimates of the quantity of sand and gravel resources which exist in Worcestershire.

5.27. The "Sub-Regional Apportionment of Aggregates Provision in the West Midlands Region 2005 – 2020 Consultation paper 17-02-2010" document was prepared for the West Midlands Regional Assembly by Land Use Consultants in February 2010. This used the British Geological Survey (BGS) mineral resource dataset (1:50,000) as the starting point for the distribution of resources in the region in GIS, and then applied the following factors which were considered to sterilise the resource:

- The road network – based on the Primary Road Network with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Railways – based on railway data supplied by WMRA with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Urban areas – based on the 2001 Census Urban Areas dataset; and
- Worked-out sites – based on information provided by mineral planning authorities (no GIS data on historical sites in Worcestershire was available at that time).

5.28. All international nature conservation and heritage designations were also removed to reflect the level of protection that international designations are afforded by the Planning system, and the Malvern Hills Conservators landholdings were also removed due to the restrictions on quarrying imposed by the Malvern Hills Acts.

5.29. A mean working thickness for each deposit type in each sub-region was derived and these were applied to the remaining areas of each mineral deposit to convert the area (ha) to a volume (mt) using a bulk density figure of 1675kg/m^3 for sand and gravel.

5.30. Worcestershire County Council (WCC) has since undertaken its own analysis of the mineral resources in the county.[28] This is also based on the BGS 1:50,000 GIS data, applying minimum size thresholds for the deposits considered (>10ha in area and >200m wide), and analysing BGS memoirs and planning histories to estimate the likely depth of each deposit. A conversion factor of 1.65t/m^3 for sand and gravel was applied following consultation responses, these are considered to be broadly comparable to

[28] Worcestershire County Council (August 2016) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the archive page at www.worcestershire.gov.uk/mineralsbackground.

the bulk density figures used in the LUC report. Some consideration was given to areas sterilised by surface development, and the calculated volume was halved in estimating the available resource volume in order to recognise that some areas are overlain by dispersed development, that information about depth is limited and the quality and depth can vary across a deposit, and that constraints which will be set out in criteria-based policies have not been applied. Further work has since been completed to screen out international and national designations.[29]

5.31. A comparison between the two estimates can be seen in table 3 below.

Table 3. Comparison between LUC and WCC estimates of Worcestershire's sand and gravel resources

Document estimating resource	Area of unsterilised resource (ha)	Volume of unsterilised resource (mt)
LUC	**25,036.34**	**3,222.57**
WCC Analysis of mineral resources (November 2018)	**14,215.00**	**3,871.59**

5.32. The WCC figure for the volume of unsterilised sand and gravel resource appears to be broadly comparable to those in the LUC report. Whilst the unsterilised resource area is less in the WCC analysis, due to a greater number of international and national designations having been screened from the resources, the resource volume remains broadly similar due to the use of specific depth figures for deposits rather than reliance on an average figure applied to all deposits.

Sites and permitted reserves

5.33. Of the 4 sand and gravel sites in Worcestershire shown in Table 4, three were "active" (in production for some time during the year) and one "inactive" (worked in the past and contains permitted reserves) during 2017. As of 31st December 2017, three of these sites had permitted reserves of sand and gravel for aggregate purposes and one of the sites classed its permitted reserves as "non-aggregate uses".[30]

5.34. None of the sites have conditions attached to its planning permission which would restrict the productive capacity of the site. Due to this, the absolute maximum productive capacity for the county's active sites is not able to be determined, however by using the maximum sales recorded by the three active sites in any of the previous 5 years as a proxy, it has been

[29] Worcestershire County Council (November 2018) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the mineral resources page at www.worcestershire.gov.uk/mineralsbackground.

[30] In the 2017 annual survey returns, one of the sites classed its permitted reserves as "non-aggregate" and therefore they have not been included in the figures for permitted reserves below, but it is possible that the material could be reclassified and sold as aggregate in future.

determined that the three sites would be able to produce 96.8% of the production guideline based upon 10 year average sales.

5.35. As this is based upon years where demand may have been depressed due to the challenging economic conditions following the 2008 global financial crisis, this proxy productive capacity should be treated as a known productive capacity baseline. The true maximum productive capacity of each of the sites is likely to exceed this.

Table 4. Sand and gravel sites in 2017

Site name	Company	Location	Planning permission end date	Limits imposed on productive capacity by planning permission
Cinetic Quarry (also known as Wildmoor Quarry)	Wildmoor Quarry Products Ltd	Sandy Lane, Wildmoor, Bromsgrove	None stipulated (therefore 2042)	None
Clifton	Tarmac	Clifton Arles Wood, Severn Stoke	31 December 2030 (stated on planning permission 15/000006/CM which was granted 12 July 2016, consolidating the existing quarry and new extensions into one permission)	None
Pinches 3 Quarry	J & V Kelly Ltd	Wildmoor Lane, Bromsgrove	30 November 2019 (08/000055)	None
Ryall's Court Quarry (extraction) / Ryall House Farm Quarry (processing)	Cemex UK Materials Ltd	Ryall's Court Quarry, Ryall Court Lane, Ryall, Upton-upon-Severn Ryall House Farm, Tewkesbury Road, Ryall, Upton-upon-Severn	31st December 2026 (stated on planning permission 15/000013/CM) Proposals for decommissioning and restoration of Ryall House Farm Quarry[31] required by 31 December 2023, or within 3 months of the permanent cessation of working at Ryall's Court Quarry (stated on planning permission 15/000012/CM)	None

5.36. According to the survey returns submitted by mineral operators in the county, the total permitted reserves for sand and gravel at 31st December 2017 was 3.465 million tonnes.

[31] Planning permission 15/000012/CM granted 23 May 2016 to enable the continued temporary retention of aggregate wharf and aggregates processing plant at Ryall House Farm Quarry.

Applications pending

5.37. A planning application received in 2009 (09/000085/CM) to extract 430,000 tonnes of sand and gravel from a new quarry at Strensham[32] was subject to a holding objection from the Highways Agency. The application was withdrawn by the applicant in October 2017.

5.38. No further mineral planning applications were made, decided or pending decision during 2017.

Site allocations

5.39. The adopted County of Hereford and Worcester Minerals Local Plan (1997) allocated a number of preferred areas for sand and gravel working in Worcestershire.

5.40. The site at Strensham, which was subject to planning application 09/000085/CM as discussed above, is the last remaining allocated site for sand and gravel extraction within Worcestershire in the adopted Minerals Local Plan, other than the extension to Aston Mill, Kemerton, which is understood to have not been worked due to the quality and quantity of the mineral deposit, and part of the wider Ryall North site, which has planning permission (Application Ref: 15/000013/CM) for the majority of the Preferred Area allocation.

5.41. In addition, information received from the minerals industry and Mineral Products Association suggests that some caution should be given to the remaining Preferred Areas in the adopted 1997 Minerals Local Plan: "*if allocations from that Plan are still outstanding it suggests that they are undeliverable and should not be relied on*"[33].

5.42. Three calls for sites had been undertaken in the development of the new Minerals Local Plan by December 2017 and a fourth call for sites was underway. The minerals industry and Mineral Products Association had previously stated that they struggled to find sand and gravel sites of sufficient size to work in Worcestershire, except as isolated satellite operations which were not long term solutions.[34] However, a number of potential sites for sand and gravel extraction have now been proposed and these sites are under consideration as potential sites for allocation in a separate Mineral Site Allocations Development Plan Document (DPD).

5.43. In addition, economic uncertainty and the lack of an up-to date Minerals Local Plan have been expressed as concerns for the industry. The Minerals Local Plan and Mineral Site Allocations DPD are being developed to provide more certainty over mineral working in the county, and are being developed

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[32] This site was allocated as a Preferred Area in the adopted County of Hereford and Worcester Minerals Local Plan 1997.
[33] Mineral Products Association comments on Minerals Local Plan Background Documents consultation, summer 2015 (response reference D024-1899)
[34] Mineral Products Association comments on Minerals Local Plan Background Documents consultation, summer 2015 (response reference D024-1899)

to enable both large sites and/or the satellite working of sites, as this may become the most sustainable way of working Worcestershire's resources in future.

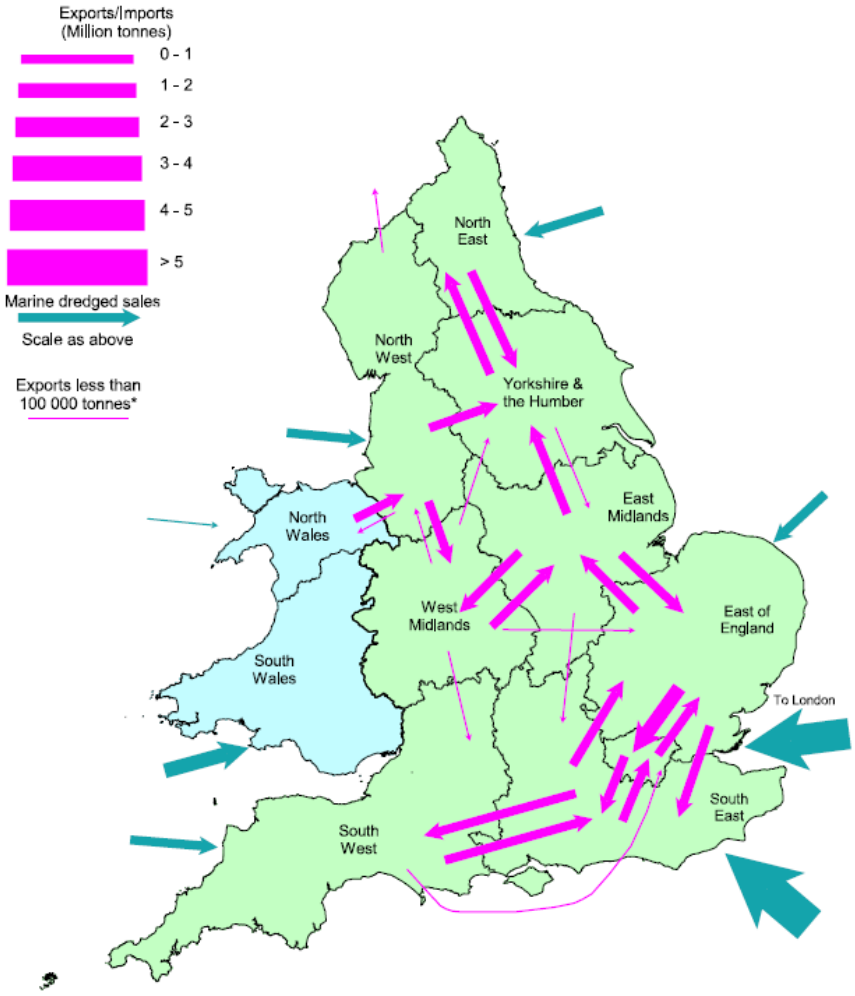
Pre-application discussions

5.44. During 2017, pre-application discussions have been held with regard to five potential sand and gravel sites, including potential changes to existing sites. These discussions are confidential and may not result in planning applications being brought forward, but they indicate that there is interest in developing further sand and gravel workings in Worcestershire.

Imports and exports of primary aggregates

5.45. The only source of information about the flows of imports and exports of sand and gravel is the *Aggregate minerals survey for England and Wales*. This survey is undertaken about every 4 years and one aspect that it considers is the movement of material. It sets out information relating to the inter-regional flow of aggregates. The pattern of movements of sand and gravel is illustrated in Figure 3.

Figure 3. Sand and gravel inter-regional flows, 2014



*For clarity, exports less than 25 000 tonnes are not shown.

Source: "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016)

5.46. The data which is available for Worcestershire in the *Aggregate minerals survey for England and Wales* for 2009 and 2014 is presented in Table 5, Table 6, and Table 7. This data indicates that Worcestershire was a net exporter of sand and gravel in both years, although the proportion of imports was greater in 2014. However, discussion with the authors of the document has revealed that the information does not represent a complete dataset from all mineral operators[35]. It is therefore considered that significant caution must be applied in relying on this data. The sales figures shown in Table 2 should therefore be considered to be more reliable.

[35] Email correspondence with Mr T Bide at the British Geological Survey (7th August 2017) revealed that for 2009 responses were only received for two quarries in Worcestershire, and in 2014 for only 1 quarry.

Table 5. Exports: Sales of primary sand and gravel from Worcestershire by principal destination sub-region

	2009		2014	
Destination of sales from Worcestershire	**Tonnes of land-won sand and gravel**	**MPA %**	**Tonnes of land-won sand and gravel**	**MPA %**
Worcestershire	114,000	52%	51,000	22%
West Midlands	59,000	27%	133,000	57%
Elsewhere	45,000	21%	47,000	21%
Total	218,000	-	231,000	

Source: "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) table 9f and "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) table 9f.

Table 6. Imports of primary sand and gravel in to Worcestershire

	2009	2014
Tonnes of land-won sand and gravel	45,000	146,000
Tonnes of marine sand and gravel	13,000	2,000
Total	58,000	148,000

Source: "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) table 10 and "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) table 10

Table 7. Balance of sand and gravel exports and imports in Worcestershire

	Exports	Imports	Balance
2009	104,000	58,000	Net exporter (46,000)
2014	180,000	148,000	Net exporter (32,000)

Source: Based on data in "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) and "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016)

5.47. Information from Worcestershire's mineral operators indicates that of the sand and gravel produced in Worcestershire in 2016, 45.9% was sold within Worcestershire, 46.8% was exported to the wider West Midlands, 7% to the South West, and 0.2% to South Wales. There is no equivalent information available to indicate the level of imports into Worcestershire in 2017.

5.48. Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is limited to moving "as-dug" material from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

Conclusion: Balancing demand and supply

5.49. Considering each of the issues outlined above, whilst there is no evidence that demand for sand and gravel is likely to decrease, there is also not sufficient evidence to suggest that the production guideline should vary from the 10 year average. **The production guideline for sand and gravel identified by this Local Aggregates Assessment is therefore 0.572 million tonnes.**

5.50. Based on this production guideline and the stock of permitted reserves of 3.465 million tonnes, **Worcestershire had a landbank of 6.06 years at 31st December 2017.**

5.51. This indicates that there is currently a shortfall of permitted reserves in the county. Although pre-application discussions have taken place and this indicates that there is some interest in developing further sand and gravel workings in Worcestershire which may reduce the shortfall of permitted reserves, there is a risk that these may not lead to applications coming forward or planning permissions being granted in the immediate future. With no other remaining site allocations in the adopted Minerals Local Plan and no planning applications pending decision, there is a significant risk that this landbank could diminish significantly before other planning permissions are secured.

5.52. Work is well underway on a new Minerals Local Plan and Mineral Site Allocations DPD which should provide increased certainty and encourage planning applications to be made. Some of the sites which have been submitted for potential allocation may be brought forward as planning applications in the near future. However, the minerals industry has indicated that there are likely to be significant constraints on finding further sites of sufficient size and quality in the county in the longer term.

6. Primary Aggregates: Crushed Rock

6.1. The bedrock geology in Worcestershire includes the following mineral deposits which are believed to be the only strata in the county that have been worked to produce crushed rock aggregates since 1947: [36]

- The Precambrian "Malverns Complex" and "Warren House Formation";
- The Silurian "Woolhope Limestone Formation"[37];
- The Ordovician "Lickey Quartzite Formation"; and
- The Jurassic "Inferior Oolite Group".

6.2. These Precambrian, Silurian, Ordovician and Jurassic deposits will be considered collectively under the term “crushed rock” in the rest of this report.

Estimating demand

10 year sales average

6.3. The starting point for setting a production guideline for crushed rock in the LAA is to estimate demand on the basis of a rolling average of 10 years sales data (the 10-year average) before considering other relevant local information.

6.4. Table 8 and Figure 4 show the levels of crushed rock sales in Worcestershire and Herefordshire over the last 10 years (2008-2017). Worcestershire's data was combined with Herefordshire up to 2009 due to issues of commercial confidentiality[38]. Worcestershire's last crushed rock site ceased working and has been undergoing restoration since 2010.

Table 8. Crushed rock sales 2008 – 2017 (million tonnes)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Worcestershire	-	-	0	0	0	0	0	0	0	0
Herefordshire and Worcestershire Combined	0.22	0.20								

Source: West Midlands Regional Aggregate Working Party Annual Reports. Data for sales up to 2009 combined for Herefordshire and Worcestershire due to confidentiality arrangements.

6.5. In 2017, sales of crushed rock in Worcestershire were 0 tonnes.

[36] For further information about the nature, location and potential significance of the deposits see background document *Analysis of Mineral Resources in Worcestershire* at www.worcestershire.gov.uk/mineralsbackground

[37] Silurian "Aymestry Limestone Formation" deposits have also been worked in the past, but these are not considered to be a significant resource under the methodology set out in the background document *Analysis of Mineral Resources in Worcestershire* (available at www.worcestershire.gov.uk/mineralsbackground)

[38] Long-standing confidentially arrangements agreed between the industry and government to protect operators' commercial interests. This means that sales data will not be released or published where there are fewer than 3 operational sites in an area unless express permission is given by the operators affected.

6.6. Previous versions of the LAA made the assumption that a third of the combined crushed rock sales data was attributable to Worcestershire. In order to calculate the 10 year average, this assumption has been used for the combined data for 2008-2009. On this basis, the 10 year average of sales from 2008-2017 is 0.014 million tonnes.

6.7. The 10-year average has a number of weaknesses that make sole reliance on it undesirable:

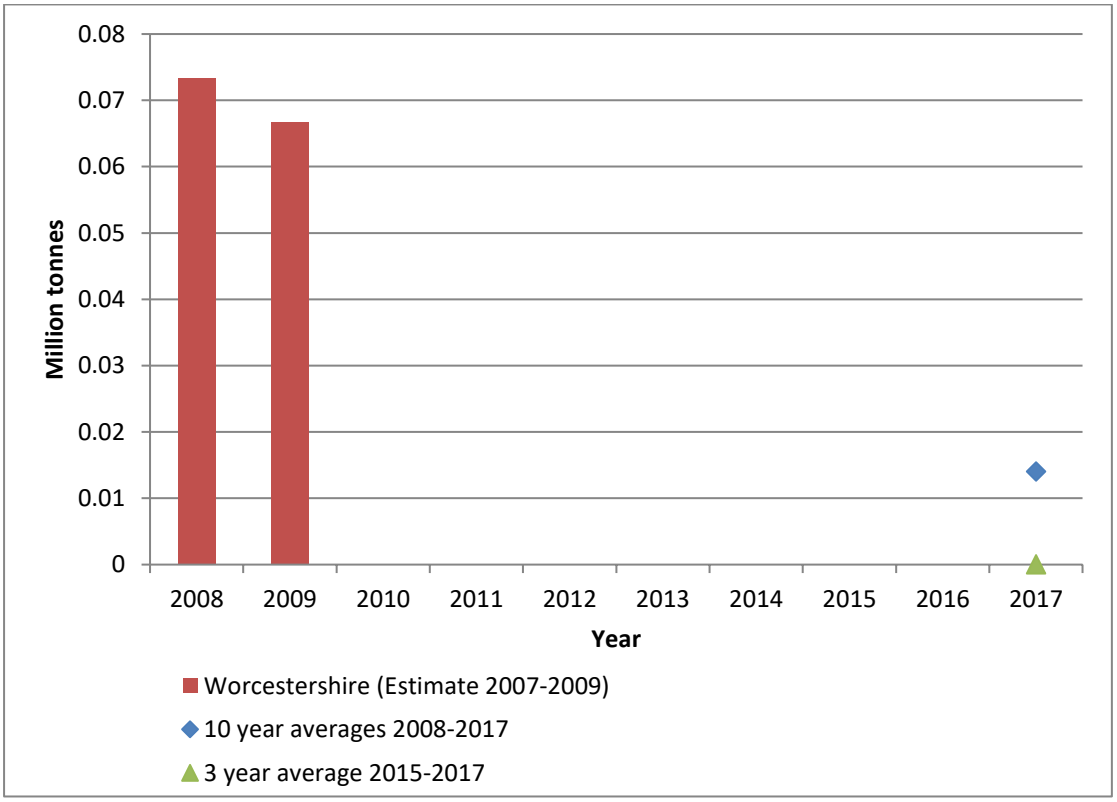
- sales will vary depending on both supply and demand factors in the market, and basing a production guideline on this alone could risk following historical trends rather than meeting future demand;
- it uses assumptions on the proportion Worcestershire contributed to the combined data with Herefordshire which makes the average somewhat unreliable;
- it includes data from a period of significant economic downturn and therefore may not represent the demand likely to be experienced as the economy recovers; and
- the adopted Minerals Local Plan was beyond its expected implementation period, with a limited number of Preferred Areas and saved policies, which could have limited operator interest in bringing sites forward in Worcestershire during this time, thereby depressing the annual sales figure.

6.8. Therefore, whilst it is considered to be the best starting point, it needs to be sense-checked against other indicators.

3 year sales average

6.9. An average of the last 3 years sales gives an indication of the most recent sales trends to identify the general trend of demand. The 3 year average from 2015-2017 is 0 tonnes, as there were no operational crushed rock sites in Worcestershire during this period. This is therefore lower than the 10 year average, but the same as the 2017 sales figure. This indicates that it may be appropriate to decrease the production guideline to less than the 10 year average.

Figure 4. Crushed rock estimated annual and average sales*



* Estimated sales based on the assumption that a third of the combined crushed rock sales from Herefordshire and Worcestershire were attributable to Worcestershire.

Sub regional apportionment

6.10. A further indicator to be taken into account is the sub-regional apportionment derived from the *National and regional guidelines for aggregates provision in England*.[39] These guidelines were produced to cover the period 2001-2016 and updated for the period 2005-2020 and set out the level of provision which should be made by each Region. An annual "sub-regional apportionment" was derived the 2001-2016 Guidelines, and for Worcestershire this was 0.163 million tonnes of crushed rock. No sub-regional apportionment based on the 2005-2020 Guidelines has been agreed.

6.11. This level of production has not been achieved in Worcestershire since 2002.

6.12. In the Inspector's Report on the partial review of the Northamptonshire Minerals and Waste Local Plan,[40] the Inspector stated “as they (*the national*

[39] Department for Communities and Local Government https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020

[40] The Planning Inspectorate (August 2014) *Report on the Examination into the Northamptonshire Minerals and Waste Local Plan (Northamptonshire Minerals & Waste Development Framework Partial Review)* http://www3.northamptonshire.gov.uk/councilservices/environment-and-

guidelines) were based on production before the recession and within a different policy context, it would not be prudent to accord them very significant weight."

6.13. This suggests that it would not be appropriate to vary the production guideline in this LAA from the 10 year average on the basis of the *National and regional guidelines* or the sub-regional apportionment.

Factors which might influence demand

6.14. Considering levels of planned development could provide an indication of whether demand for crushed rock is likely to significantly increase or decrease, warranting an adjustment in the production guideline.

Housing development

6.15. Figure 5 shows crushed rock sales against housing completions in the county over the last 10 years. This does not indicate a direct correlation between housing completions and the level of crushed rock sales.

6.16. Figure 5 shows that the level of housing completions has varied annually over the last 10 years (between 1,090 and 2,230), with an average of 1,660 completions per year[41]. Over the next 10 years, the anticipated level of housing provision in adopted Local Plans is approximately 2218 dwellings per year,[42] and this would represent a 34% increase in comparison to the average over the last 10 years. However, a number of Local Plans are currently being reviewed. It is anticipated that these reviews will confirm the continued need for housing growth in the county, with delivery being maintained at an average of 1700 houses per annum[43], plus associated infrastructure including roads and schools. This is broadly similar to the average number of completions seen over the last 10 years. A steady and adequate supply of aggregates, including sand and gravel, will be crucial to enabling the level of planned housing development to be delivered.

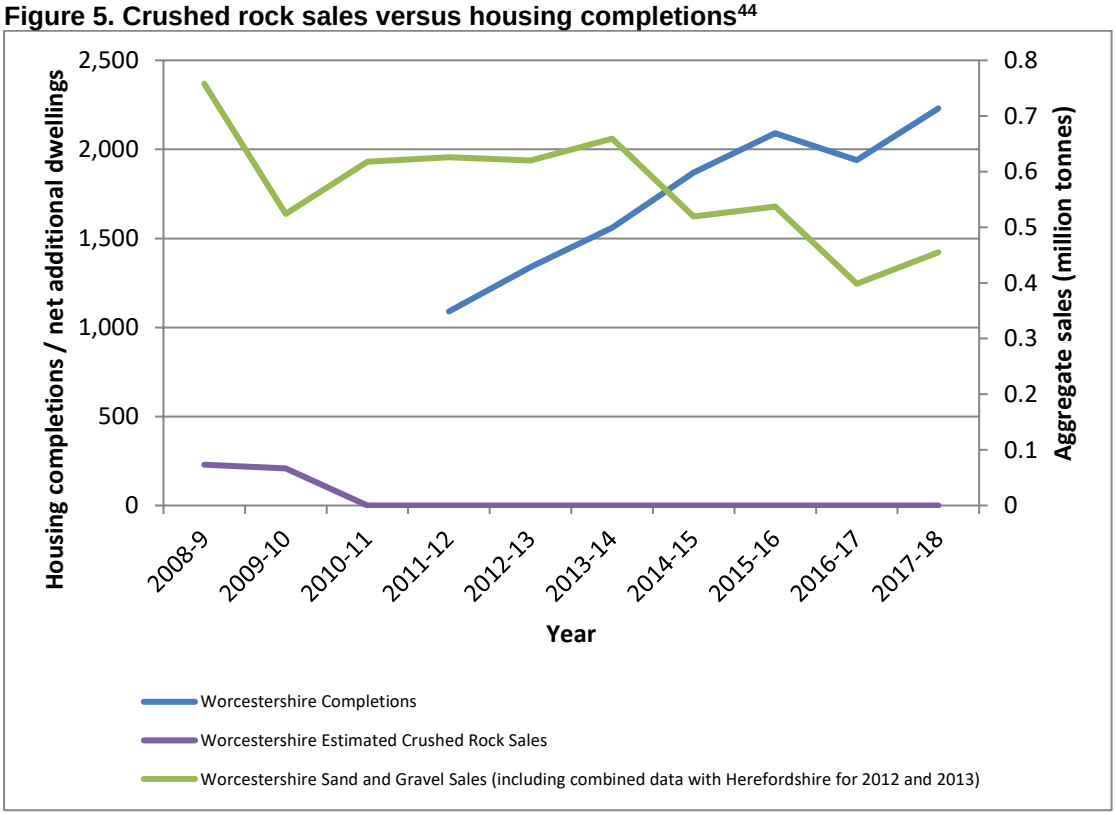
planning/planning/planning-policy/minerals-and-waste-planning-policy/documents/PDF%20Documents/ReportToNorthamptonshireCountyCouncilV3.pdf

[41] Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[42] Based on figures in South Worcestershire Development Plan (2016), Wyre Forest Core Strategy (2010), Bromsgrove District Plan (2017), and Borough of Redditch Local Plan No.4 (2017).

[43] 1693 houses per annum calculated using the Standard Methodology from Government released in autumn 2018.

Figure 5. Crushed rock sales versus housing completions[44]



6.17. The British Geological Survey states that the construction of a typical new house uses approximately 60 tonnes of aggregates from the foundations through to the roof tiles.[45] This is a generalisation which must be treated with a degree of caution and it does not distinguish between use of crushed rock and sand and gravel. This does not include any requirements for infrastructure supporting housing development or the significant amount used in maintaining or refurbishing existing housing stock. Estimates of the amount of mineral resource required per house when supporting infrastructure, such as access roads, is taken into account (averaged per house on the development) ranges between 200 tonnes[46] and 400 tonnes[47].

6.18. Whilst there is a clear ambition in adopted Local Plans for an increased level of housebuilding over the coming years in comparison to previous years, the anticipated level of approximately 2218 dwellings per year is very similar to the number completed in 2017 (2230 dwellings). The likelihood of

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[44] Housing completions data based on Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[45] British Geological Survey (2008) The need for indigenous aggregates production in England. https://www.bgs.ac.uk/downloads/start.cfm?id=1373

[46] Mineral Products Association (2016) The Minerals Products Industry at a Glance. http://www.mineralproducts.org/documents/Mineral_Products_Industry_At_A_Glance_2016.pdf

[47] British Geological Survey (2008) The need for indigenous aggregates production in England. https://www.bgs.ac.uk/downloads/start.cfm?id=1373

Local Plan reviews leading to housing development at a similar level to the average over the last 10 years also needs to be considered, and will be monitored as the plan reviews progress.

6.19. Although the current trajectory for housing development indicates a possible increase in demand for aggregates, any increase is unable to be quantified. This potential increase may also not materialise if Local Plan reviews proceed as anticipated. Therefore, it would not be appropriate for the production guideline in this LAA to deviate from the 10 year average on the basis of projected housing numbers.

Supply options / constraints

Indigenous supply

Worcestershire's crushed rock resources

6.20. There are two estimates of the quantity of crushed rock resources which exist in Worcestershire.

6.21. The "Sub-Regional Apportionment of Aggregates Provision in the West Midlands Region 2005 – 2020 Consultation paper 17-02-2010" document was prepared for the West Midlands Regional Assembly by Land Use Consultants in February 2010. This used the British Geological Survey (BGS) mineral resource dataset (1:50,000) as the starting point for the distribution of resources in the region in GIS, and then applied the following factors which were considered to sterilise the resource:

- The road network – based on the Primary Road Network with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Railways – based on railway data supplied by WMRA with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Urban areas – based on the 2001 Census Urban Areas dataset; and
- Worked-out sites – based on information provided by mineral planning authorities (no GIS data on historical sites in Worcestershire was available at that time).

6.22. All international nature conservation and heritage designations were also removed to reflect the level of protection that international designations are afforded by the Planning system, and the Malvern Hills Conservators landholdings were also removed due to the restrictions on quarrying imposed by the Malvern Hills Acts.

6.23. A mean working thickness for each deposit type in each sub-region was derived and these were applied to the remaining areas of each mineral deposit to convert the area (ha) to a volume (mt) using a bulk density figure of 2600kg/m3 for hard rock.

6.24. Worcestershire County Council (WCC) has since undertaken its own analysis of the mineral resources in the county.[48] This is also based on the BGS 1:50,000 GIS data, applying minimum size thresholds for the deposits considered (>10ha in area and >200m wide), and analysing BGS memoirs and planning histories to estimate the likely depth of each deposit. A conversion factor of 2.45t/m3 for crushed rock was applied following consultation responses, these are considered to be broadly comparable to the bulk density figures used in the LUC report. Some consideration was given to areas sterilised by surface development, and the calculated volume was halved in estimating the available resource volume in order to recognise that some areas are overlain by dispersed development, that information about depth is limited and the quality and depth can vary across a deposit, and that constraints which will be set out in criteria-based policies have not been applied. Further work has since been completed to screen out international and national designations.[49]

6.25. A comparison between the two estimates can be seen in Table 9 below.

Table 9. Comparison between LUC and WCC estimates of Worcestershire's crushed rock resources.

Document estimating resource	Area of unsterilized resource (ha)	Volume of unsterilized resource (mt)
LUC	508.98	427.58
WCC Analysis of mineral resources (November 2018)	61	**1.47**

6.26. The difference in the figures for crushed rock is likely to be explained by differences in the screening methodology between the two assessments. The WCC Analysis of Mineral Resources screens out a number of crushed rock deposits based upon their size, before any screening based on international and national designations is undertaken.

Sites, permitted reserves and applications pending

6.27. There were no sites with permitted reserves of crushed rock at 31st December 2017, and no planning applications for working crushed rock are pending decision. This means that Worcestershire has no permitted reserves, no productive capacity and no landbank for crushed rock.

[48] Worcestershire County Council (August 2016) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the archive page at www.worcestershire.gov.uk/mineralsbackground.
[49] Worcestershire County Council (November 2018) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the mineral resources page at www.worcestershire.gov.uk/mineralsbackground.

Site allocations

6.28. The adopted County of Hereford and Worcester Minerals Local Plan (1997) allocated one preferred area for hard rock working in Worcestershire at Fish Hill near Broadway. This has been worked and the site has been undergoing restoration since 2010. There are therefore no remaining site allocations for crushed rock in Worcestershire in the adopted Minerals Local Plan.

6.29. Three calls for sites had been undertaken in the development of the new Minerals Local Plan by December 2017 and a fourth call for sites was underway, but no sites for crushed rock have been proposed for consideration as site allocations.

Pre-application discussions

6.30. During 2017, no pre-application discussions have been held with regard to potential crushed rock sites. This is a strong indication that there is limited interest in developing crushed rock workings in Worcestershire in the immediate future.

Constraints on resources

6.31. There has been very limited market interest in working crushed rock in Worcestershire[50] for many years. As shown in Table 9, there is only a very small amount of crushed rock resource in Worcestershire which is not constrained by significant viability, environmental or amenity criteria.[51]

6.32. Although these constraints are not in themselves an absolute bar on crushed rock development, the combination of the significant level of environmental protection imposed through legislation and policy tests and the unique responsibility of the Malvern Hills Conservators together mean that crushed rock is unlikely to be commercially attractive for the foreseeable future.

6.33. These constraints and their impact on Worcestershire's likely ability to produce crushed rock for the foreseeable future was recognised as a strategic issue, and was therefore discussed in detail with the Aggregate Working Parties in the West Midlands, South West, East Midlands and South Wales in 2015/16.[52] These discussions led to agreement that Worcestershire's LAA should give significant weight to the local context and reduce the production guideline to zero, but that a positive policy framework should be put in place through the development of the Minerals Local Plan to enable development to come forward.

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[50] Operations on two sites ceased due to the poor quality of the material. The county's last operational site was fully worked and ceased production in 2010.

[51] For further information on these constraints, see Worcestershire County Council (November 2018) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the mineral resources page at www.worcestershire.gov.uk/mineralsbackground.

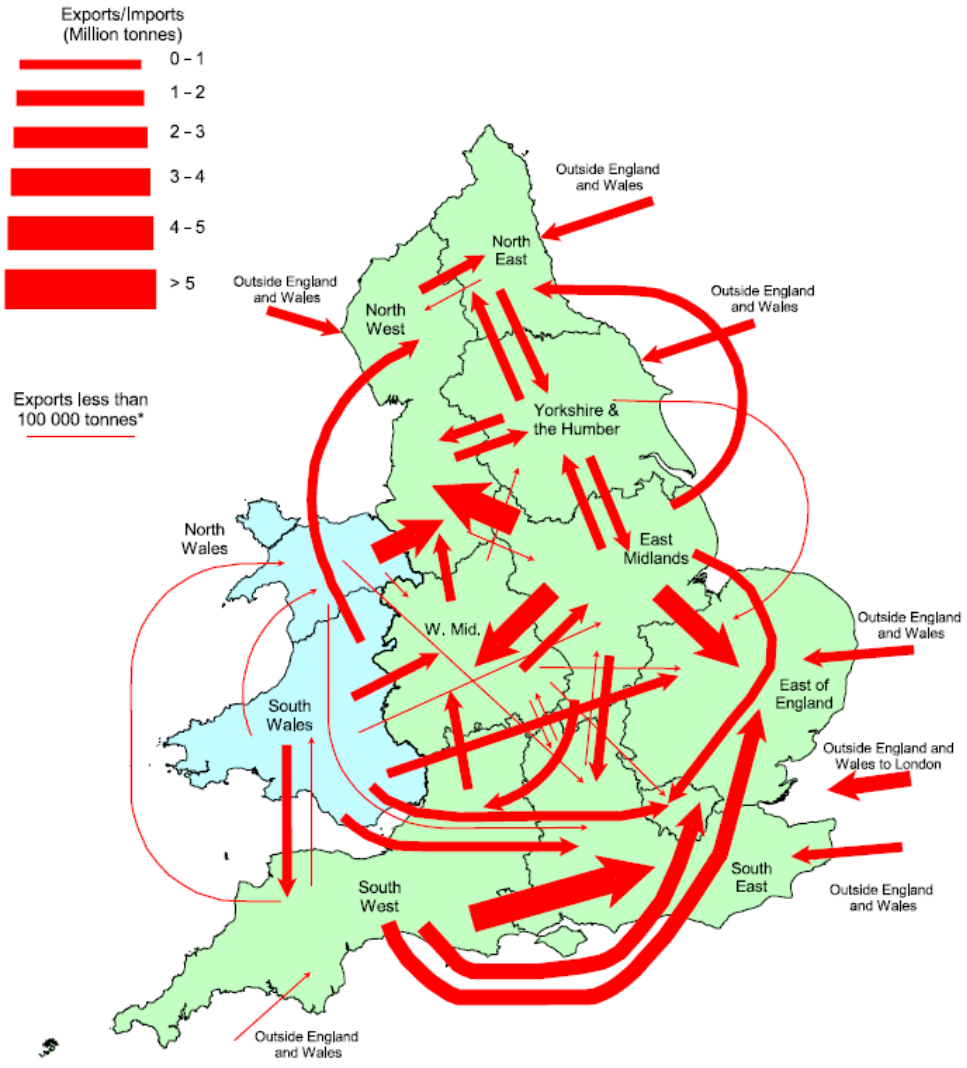
[52] See Background document "Strategic cross boundary issue: Crushed rock supply in Worcestershire. Summary of action undertaken under the duty to cooperate" (July 2016) available at www.worcestershire.gov.uk/mineralsbackground.

6.34. There has been no change in the local context faced by Worcestershire since this time, and surrounding mineral planning authorities continue to support this approach.

Imports and exports of primary aggregates

6.35. The only source of information about the flows of imports and exports of crushed rock is the *Aggregate minerals survey for England and Wales*. This survey is undertaken about every 4 years and one aspect that it considers is the movement of material. It sets out information relating to the inter-regional flow of aggregates. The pattern of movements of crushed rock is illustrated in Figure 6.

Figure 6. Crushed rock inter-regional flows, 2014



*For clarity, exports less than 25 000 tonnes are not shown.

Source: "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016)

6.36. The data which is available for Worcestershire in the *Aggregate minerals survey for England and Wales* for 2009 and 2014 is presented in Table 10 and Table 11. As there were no sales of crushed rock from Worcestershire recorded in either year, Worcestershire was an importer of crushed rock, with more than twice as much crushed rock being imported and consumed in the county in 2014 compared to 2009. However, discussion with the authors of the document[53] has revealed that the information does not represent a complete dataset from all mineral operators. It is therefore considered that significant caution must be applied in relying on this data.

Table 10. Imports of primary crushed rock in to Worcestershire

	2009	2014
Tonnes of crushed rock	192,000	540,000

Source: "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) table 10 and "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) table 10

Table 11. Balance of crushed rock exports and imports in Worcestershire

	Exports	Imports	Balance
2009	0	192,000	Net importer (192,000)
2014	0	540,000	Net importer (540,000)

Source: Based on data in "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) and "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016)

6.37. Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is limited to moving "as-dug" material from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

Conclusion: Balancing supply and demand

6.38. Whilst a 10 year average of crushed rock sales has been calculated as 0.014 million tonnes and there is no evidence that demand for crushed rock is likely to decrease, there has been no production of crushed rock in Worcestershire since 2010.

6.39. The delivery constraints outlined above, the lack of interest in Worcestershire's resources shown by the minerals industry over many years, and the fact that no sites for crushed rock have been proposed in response to four "calls for sites" indicate that it is unlikely that Worcestershire will be able to provide crushed rock for the foreseeable future. These are all strong indicators that the 10 year average does not provide a suitable production guideline. Discussions with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties concluded that Worcestershire's production guideline for crushed rock should be reduced to

[53] Email correspondence with Mr T Bide at the British Geological Survey (7th August 2017) revealed that for 2009 responses were only received for two quarries in Worcestershire, and in 2014 for only 1 quarry.

0 tonnes. However, recognising the National Planning Policy Framework's requirement to maintain at least a 10 year landbank of permitted reserves of crushed rock, the emerging Minerals Local Plan will provide a policy framework which could enable crushed rock development to take place.

6.40. There is no data available to indicate how much of the demand for crushed rock has been met by substitution with either secondary or recycled materials or by sand and gravel. It is likely that the majority of demand has been met by increased imports of crushed rock from outside the county. This has been discussed in detail with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties. The Mineral Planning Authorities and Aggregate Working Parties have indicated that supplying Worcestershire's demand for crushed rock can continue to be accommodated.

6.41. This is therefore the basis on which the emerging Minerals Local Plan has been developed. The emerging Minerals Local Plan puts in place a policy framework which could enable crushed rock development.

6.42. This LAA therefore concludes that the production guideline for crushed rock in Worcestershire should be 0 tonnes per annum.

7. Conclusion

Substitute, secondary and recycled aggregates

7.1. Whilst national policy requires Local Planning Authorities to take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials before considering extraction of primary materials, the lack of data will make this difficult to monitor at the local level, and the evidence above from the Minerals Products Association indicates that this Local Aggregates Assessment should not rely on any significant alterations to the proportion of supply.

7.2. On this basis, this LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates.

Marine aggregates

7.3. As an inland county, the Worcestershire Minerals Local Plan cannot make provision for the production of marine sand and gravel.

Primary aggregates: sand and gravel

7.4. There is not sufficient evidence to suggest that the production guideline for primary sand and gravel should vary from the 10 year average. The production guideline for sand and gravel identified by this Local Aggregates Assessment is therefore 0.572million tonnes.

7.5. Based on this production guideline and the stock of permitted reserves of 3.465 million tonnes, Worcestershire had a landbank for primary sand and gravel of 6.06 years at 31st December 2017, compared to the requirement for a landbank of at least 7 years.

7.6. This indicates that there is currently a shortfall of permitted reserves in the county. However, although pre-application dsicussions may not lead to applications coming forward, they indicate that there is some interest in developing further sand and gravel workings in Worcestershire which may reduce the shortfall of permitted reserves. However, with no other remaining site allocations in the adopted Minerals Local Plan, there is a significant risk that this landbank could diminish significantly before other planning permissions are secured.

7.7. Work is well underway on a new Minerals Local Plan and Mineral Site Allocations DPD which should provide increased certainty and encourage planning applications to be made. Some of the sites which have been submitted for potential allocation may be brought forward as planning applications in the near future. However, the minerals industry has indicated that there are likely to be significant constraints on finding further sites of sufficient size and quality in the county in the longer term.

Primary aggregates: crushed rock

7.8. There has been no production of crushed rock in Worcestershire since 2010. Worcestershire has no permitted reserves, no productive capacity and no landbank for crushed rock. There is very little crushed rock resource in the county which is not affected by significant viability, environmental or amenity constraints.

7.9. This has been discussed in detail with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties. The Mineral Planning Authorities and Aggregate Working Parties have indicated that supplying Worcestershire's demand for crushed rock can be accommodated.

7.10. This LAA therefore concludes that the production guideline for crushed rock in Worcestershire should be 0 tonnes per annum.

Transporting minerals

7.11. Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is limited to moving "as-dug" material from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

7.12. Transportation from any future minerals sites will be considered through the planning process and subject to the policies of the Minerals Local Plan, which will include consideration of the need for transport and air quality assessments.

Appendix 1: Consultation with Aggregate Working Parties

A draft of this Local Aggregates Assessment was sent to the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties for consultation in January 2019. The following comments were received from the AWPs and their members:

West Midlands Aggregate Working Party

Minerals Products Association

- **MPA comment:** The statement in paragraph 5.41 [5.42] that 'the minerals industry and MPA state that they struggle to find sand and gravel sites of sufficient size to work in Worcestershire, except as isolated satellite operations which are not long-term solutions' is not one we accept. This has not been stated by the MPA certainly in the last 3 years and if it was at all was must be considered historical. The 4th call for sites has brought forward several sites thought suitable by industry for working and at 5.42 [5.43] it is indicated that the County is in pre-application discussions on 5 sand and gravel proposals. On this basis it is hard to see justification for the statement quoted above from paragraph 5.41 [5.42].
- **WCC response:** Changes have been made to paragraph 5.41 [5.42] to update the paragraph to recently stated views as given by the industry relating to the factors holding back applications from coming forward at present time.
- **MPA comment:** In addition to 10 years sales data, the LAA needs to articulate the production capacity from operational sites. A reduction in sales is not necessarily a reflection of reduced demand. The increase in sales in 2017 (from that of 2016) appears to show that production capacity has increased following grant of new permissions planning permissions (paragraph 5.11). In paragraph 5.12 the LAA accepts that the 3-year average is under representing the current market demand.
- **WCC response:** Noted. Changes have been made to Table 4 to indicate where sites have a restriction in their productive capacity due to conditions imposed as part of their permission.
- **MPA comment**: The figures identified in paragraph 3.10 clearly show a significant increase in construction activity with in Worcestershire and is double that recorded in the previous years' LAA. This indication of activity does not appear to be reflected in the conclusions of the LAA when considering future mineral requirement. Recycling is clearly linked to economic activity.
- **WCC response**: As stated in paragraph 3.10, due to data limitations it is not currently possible to assess the proportion of this construction related waste dealt with at static recycling plants which was subsequently sold or used as recycled aggregate. Due to this uncertainty no conclusions have been made relating to the meaning of this increase in terms of an increase in economic activity, or likely impacts upon demand for primary extraction, including either an increase in likely demand in primary extraction due to increased economic activity, or a reduction due to increased use of recycled materials. However, the LAA includes a quote from the MPA in paragraph 3.16 which states that arisings will mirror economic conditions

and are likely to remain broadly at the current level of 28-29% of total consumption.

- **MPA comment**: Table 7 of the LAA shows that in 2009 and 2014 Worcestershire was a net exporter of sand and gravel. However, for both imports and exports the numbers increase significantly between 2009 and 2014. The amount of imports (2.5 times increase) is showing that the County is not meeting local demand and is not providing enough resource from existing operations.
- **WCC response:** As stated in footnote 44, discussion with the authors of the documents assessing imports and exports of sand and gravel, where the data in Table 7 is sourced from, has revealed that the information does not represent a complete dataset from all mineral operators (Email correspondence with Mr T Bide at the British Geological Survey (7th August 2017). These discussions revealed that for 2009 responses were only received for two quarries in Worcestershire, and in 2014 for only 1 quarry. We are unsure as to how accurate data from other parts of the country might be. Significant caution must therefore be applied in relying on this data. Both years in Table 7 represent snapshots in time, and although the differences between the two years which you have highlighted are marked, they may not necessarily represent an on-going trend. In addition, the movement of minerals once extracted is a result of market-driven function and not a desire or policy requirement of the mineral planning authority.

  Due to the uncertainties around these datasets, they are not robust enough to lead to a change in the Production Guideline. However the Minerals Local Plan is being developed to be flexible enough to accommodate changes to the balance of demand and supply identified in the Local Aggregate Assessment annually.
- **MPA comment:** While accepting there are currently no operating sites producing crushed rock in Worcestershire it cannot be right that the County is forecasting zero tonnage. Much is made of the landscape designations in the county however, this is not a bar to mineral development The NPPF deals with such developments in areas of designation and this needs to be accepted in the LAA and policy needs to be flexible to allow sites to be considered if brought forward. There is a requirement under the NPPF for at least a 10-year landbank and this cannot be ignored by the LAA.

  This also must be considered in the context of surrounding counties are under pressure for resources themselves and with significant infrastructure projects proposed within the region this situation is not likely to ease and Worcestershire must play their part.

  Considerable weight is given to the fact that surrounding AWPs and mineral planning authorities have agreed this approach. The author does not recall such discussions in the last 3 years at the WM AWP but stands to be corrected. It is certainly time for a review of this stance by the WMAWP.
- **WCC response:** Worcestershire's approach to crushed rock provision was discussed formally through the AWP in 2015/16, details of these discussions can be seen at

http://www.worcestershire.gov.uk/download/downloads/id/7604/crushed_rock_supply_in_worcestershire_dtc_september_2016.pdf. The MPA was involved in these discussions. These discussions led to agreement that the most appropriate approach was for Worcestershire's LAA to give significant weight to the local context and reduce the production guideline to zero, whilst putting in place a positive policy framework to enable development to come forward. The minutes of the meeting of the West Midlands Aggregate Working Party on 30th November 2016 state (paragraph 4.8) "*It was recognised, as part of this group, that there is not likely to be any production in the foreseeable future and that future revisions of the LAA should reflect this but that Worcestershire's plan should provide a policy framework to allow options to come forward in the future.*"

Since then, each LAA produced has been reviewed by all neighbouring authorities, including those in neighbouring AWP areas. This, and ongoing conversations with other mineral planning authorities under the Duty to Cooperate, has provided opportunities for consultees to express any concerns at the continuation of the agreed stance on crushed rock production in Worcestershire. No concerns have been raised, nor has there been any change in the local context faced by Worcestershire to warrant a review at this time. This is therefore the basis on which the emerging Minerals Local Plan has been developed. It recognises that the constraints are not an absolute bar on crushed rock development, whilst also recognising that significant levels of crushed rock production are unlikely in the foreseeable future. The emerging Minerals Local Plan puts in place a policy framework which could enable crushed rock development.

- **MPA comment:** It is accepted that it is difficult to predict the level of aggregate required to meet demand for housing, commercial and infrastructure development. However, the evidence set out above and contained within the LAA itself indicates increasing demand. Relying therefore on the 10-year average is not satisfactory. There is a requirement on Worcestershire to provide a forecast of future demand imposed by the NPPF which is not currently the case.
- **WCC response:** As required by NPPF paragraph 207, this LAA is based on a rolling average of sales data and other relevant local information. Throughout the LAA other local information is assessed, with each chapter concluding whether this warrants a change from using the rolling average of sales data. The LAA seeks to account for demand factors as fully as possible, although the available data makes this difficult. For example, although no statistical correlation has been identified between housing completions and aggregates demand has been identified, logic implies that a rise in the former is likely to lead to a rise in the latter. This LAA therefore assesses whether the expected levels of housing delivery (both in adopted plans, and through the new methodology for assessing housing need) warrant a deviation from the 10 year average to ensure demand can be met. In this case, it has been determined that no deviation is necessary as current completions are at a similar level to the planned for completions in the county's local plans, and the lower figure from the new standard methodology may not result in a drop in completions and therefore no deviation from the 10 year average towards the lower 3 year average has been proposed.

Should more data become available to assess demand factors, this will be considered in future iterations of the LAA.
In addition, the emerging Minerals Local Plan does not use the production guideline as an absolute figure, recognising that it is likely to fluctuate over the life of the plan, and instead seeks to enable mineral development to maintain landbanks and productive capacity. This should ensure that delivery will not be constrained if demand does increase.

Staffordshire County Council

- **SCC comment:** Where reserves are quoted in the exec summary table, the date should be as of 31 -12 -17.
- **WCC response:** Noted, this error has been corrected
- **SCC comment:** With regard to table 2 is it possible to add sand and gravel reserves figures and the number of operational sites for each year alongside the sales data?
- **WCC comment:** We believe we cover productive capacity issues in the "sites and permitted reserves" section (para 5.33-5.36) and Table 4. We also display how much of our reserve is held in inactive sites in the Dashboard.

South West Aggregate Working Party

Gloucestershire County Council

- **GCC comment:** We do not have any comments to make.
- **WCC response:** Noted.

East Midlands Aggregate Working Party

No comments received.

South Wales Aggregate Working Party

No comments received.

Additional comments

In addition, comments relating to the LAA were received from Heaton Planning, on behalf of Tarmac, as part of the representation made to the Publication Version of the Minerals Local Plan in September 2019. In response to these comments, further discussions have been undertaken with Heaton Planning, a summary of the key issues is provided below.

Heaton Planning comment: It is indicated that the Minerals Industry have identified that there are likely to be significant constraints on finding sites of sufficient size and quality in the County (paragraph 1.3). However, the site assessment methodology document is indicating that over 30 sites have been put forward during the various call for sites stages. There are also a number of Screening and Scoping requests for mineral development submitted within the past year. It is more likely that the economic uncertainty coupled with an adopted Minerals Plan which has progressed beyond its expected implementation period and containing a limited number of preferred areas and saved policies has made operators reluctant to commit to progressing planning applications. In addition, sites that were previously

considered more constrained by industry will become more economical and therefore viable to operate once sites without such constraint have been exhausted.
WCC response: Changes have been made to paragraph 5.41 [5.42] to update the paragraph to recently stated views as given by the industry relating to the factors holding back applications from coming forward at present time.

Further discussions have been undertaken on this point to ensure the introduction matches the changes made on this point.

Heaton Planning comment: When monitoring sales as part of the LAA, consideration should be given to the number of active sites and their productive capacity.
WCC response: Changes have been made to paragraph 5.34 and Table 4 to highlight where sites have productive capacity restrictions imposed by planning conditions.
Heaton Planning comment: Tarmac firmly believe that the LAA and the Minerals Plan need to reflect anticipated/forecasted demand. Worcestershire's contribution to aggregate supply is likely to increase to meet demand for reserve from adjacent Counties – primarily those in Staffordshire and the West Midlands who will be making major aggregate supply contributions to infrastructure projects including HS2. This should be considered as part of the LAA and the overall forecast/demand for aggregate within the County.
WCC response: We have included commentary on the possible impact of HS2 in paragraph 5.24.