West Sussex Joint Minerals Local Plan
Assessment of Need for Aggregates
Local Aggregate Assessment 2018 (January 2019)

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Executive Summary

The National Planning Policy Framework (NPPF) requires Mineral Planning Authorities (MPAs) to prepare an annual Local Aggregates Assessment (LAA)[1] which is an evidence base document that sets out the potential demand, and assessment of potential supply, of aggregates within their area. This joint LAA has been prepared by West Sussex County Council (WSCC) and the South Downs National Park Authority (SDNPA), and provides evidence to support the West Sussex Joint Minerals Local Plan (JMLP).

Chapter 1: Introduction

This chapter explains the background to the Managed Aggregate Supply System (MASS) and the requirement for Mineral Planning Authorities to prepare an LAA. It explains how the LAA informs and supports the West Sussex Joint Minerals Local Plan which is being prepared jointly by WSCC and the SDNPA. It also set out the consultation arrangements for the West Sussex LAA. The LAA incorporates the findings from the latest round of evidence gathering in 2018. This evidence includes that which shows how 'other relevant local information' influences the estimated demand and supply of aggregates through the life of the JMLP (to 2033).

Chapter 2: Aggregates in West Sussex

This chapter sets out the past to current demand for, and supply of, aggregates in West Sussex from each different source in turn; the key findings are set out within the 'Dashboard' below.

Chapter 3: Balance between Demand and Supply

This chapter summarises the supply of aggregates from different sources and allows for a comparison of the different supply options based on relevant local information. It concludes that:

- Existing permitted reserves of land won sharp sand and gravel exceed a forecasted demand value which is based on 10-year average sales and local relevant information for the plan period.
- Safeguarded wharves, railheads and recycled aggregate sites will continue to be the majority sources of supplies for sharp sand and gravel.
- Safeguarded wharves and railheads will continue to provide the importation infrastructure through which the supplies of crushed rock are imported.
- Soft sand resources are constrained by being situated in the South Downs National Park (or its setting). Existing reserves are sufficient to supply soft sand at levels equivalent to the 10-year average sales for 9.4 years, and, taking account of relevant local information, for 7.4 years.

[1] See paragraph 207(a) of the NPPF.

West Sussex LAA Dashboard 2018

For land-won sand and gravel, there have been increases in sales, and planned housing growth, therefore the updated LAA rates have increased

Source	2017 Sales (mt) (2016 in brackets)	Trend (previous year sales)	10-year Avg Sales (mtpa) (2008-2017)	3-year Avg Sales (mt) (2015-2017)	LAA Rate (mtpa) Updated Figures	Reserves (mt)	Landbank (years) (based on LAA Rate)	Capacity (mtpa)	Comments
Sharp Sand and Gravel	Confidential (Confidential)	⇧ Up	0.015	0.042	0.023	0.900	39		Incidental sales from two soft sand quarries in 2017.
Soft Sand	Confidential (0.359)	⇩ Down	0.294	0.295	0.372	2.754	7.4		
Recycled/ Secondary Aggregates		⇧ Up	0.465	0.413	0.465			0.848	
Marine Sand and Gravel (landings)		⇧ Up	1.053	1.245	1.570			2.070[2]	Headroom capacity of 0.337mtpa (using updated LAA rate).
Rock Imports by Sea		⇧ Up	0.109	0.097	0.163			2.070[2]	Headroom capacity of 0.337mtpa (using updated LAA rate).
Rail Depot Sales (sand and gravel)		⇧ Up	0.123	0.075	0.184			1.380[3]	Headroom capacity of 0.339mtpa (using updated LAA rate).
Rail Depot Sales (crushed rock)		⇧ Up	0.575	0.558	0.857			1.380[3]	Headroom capacity of 0.339mtpa (using updated LAA rate).

[2] Maximum capacity of wharves in West Sussex.

[3] Maximum capacity of railheads in West Sussex.

1. Introduction

1.1 The Managed Aggregate Supply System

1.1.1 Aggregates are used for the construction of homes, commercial development, and infrastructure (such as roads). It is therefore important that nationally there is an adequate and steady supply to ensure economic development and quality of life. The Managed Aggregate Supply System (MASS) has been the mechanism to ensure there has been an adequate supply of aggregates (sand, gravel, and crushed rock) in England for over 35 years.

1.1.2 Minerals can only be worked where they occur, and their extraction can potentially cause conflict through loss or changes to valued landscapes. The MASS system was developed due to the geographical imbalance of aggregates and ensure Mineral Planning Authorities (MPAs) make an appropriate contribution to the national need for aggregates as well as local supply. As part of the MASS system, each MPA is required to prepare a Local Aggregate Assessment (LAA) which assesses the demand and supply of aggregates in its area on an annual basis. LAAs can be prepared jointly by more than one authority.

1.2 What is a Local Aggregate Assessment?

1.2.1 The requirement for MPAs to prepare a LAA is set out in the National Planning Policy Framework (NPPF) and the national Planning Practice Guidance (PPG). Paragraph 62[4] of the PPG states that LAA should cover the following:

- "A forecast of the demand for aggregates based on both the rolling average 10-year sales data and other relevant local information;
- An analysis of all aggregate supply options, as indicated by landbanks, mineral plan allocations, and capacity data, e.g. marine licences for marine aggregate extraction, recycled aggregates, and the potential throughput from wharves. This analysis should be informed by planning information, the aggregate industry, and other bodies such as local enterprise partnerships; and
- An assessment of the balance between demand and supply, and the economic and environmental opportunities and constraints that might influence the situation. It should conclude if there is a shortage or surplus of supply and, if the former, how this is being addressed."

1.2.2 The national PPG, Paragraph 64[5], states that the LAA "must also consider other relevant local information in addition to the 10-year rolling supply", and this information may include "levels of planned construction and house building", as well as considering average sales over the last three years to identify general trend of demand.

[4] PPG Paragraph: 062. Reference ID: 27-062-20140306.

[5] PPG Paragraph: 064. Reference ID: 27-064-20140306.

1.2.3 This LAA incorporates the findings from further evidence gathering that has considered 'other relevant local information' that may influence the demand of aggregates through the life of the Joint Minerals Local Plan (to 2033). This information, including anticipated levels of construction of homes and the maintenance and construction of roads, has been used to underpin a number of differing aggregate demand scenarios.

1.2.4 While there are many end users of aggregates, many of these can be related to housing growth which are partially driven by demographic trends. Therefore, housing trends are considered to provide a useful indicator for trends in demand for other users of aggregates. Data and evidence on the future construction of homes therefore provide a sound baseline from which to assess possible future demand scenarios. Furthermore, information on planned highways works (maintenance and improvement) have also been considered as they consume aggregates (generally crushed rock).

1.3 West Sussex Joint Minerals Local Plan

1.3.1 The West Sussex Joint Minerals Local Plan (JMLP) was adopted in July 2018. During the examination of the JMLP, the Planning Inspector indicated that modifications were required to the submitted Plan to address issues of 'soundness' related to the supply of soft sand. The adopted Plan includes a commitment to prepare a formal single issue review of soft sand to be begun within six months of adoption of the JMLP, and to be submitted for examination within two years of commencement of the review.

1.3.2 The JMLP takes account of evidence such as changes in relation to the demand and supply of minerals in West Sussex as well as government minerals planning policies (included in the NPPF), the establishment of the South Downs National Park Authority in 2011. The Plan includes a vision; strategic objectives; a suite of strategic policies; a strategic site and development management policies.

1.3.3 Previous versions of the LAA, dating back to 2014, informed the preparation of the Plan by setting out a forecast for the demand for aggregates over the Plan period and indicated what other local issues are likely to influence the ability of needs for aggregates to be met from minerals resources and facilities in West Sussex. The LAA is updated annually and provides the latest aggregates situation, to support the determination of planning applications for aggregate proposals.

1.4 National and Regional Context

National and Regional Guidelines for Aggregates Provision

1.4.1 LAAs, are used by MPAs, including National Park Authorities, to help them plan for a steady and adequate supply of aggregates. In doing so MPAs participate in, and take the advice of an Aggregate Working Party (AWP), a technical advisory group of MPAs and relevant organisations that has the following role:

- to consider, scrutinise, and provide advice on the LAAs of MPAs;

- to provide an assessment of the overall demand and supply for the AWP area, including whether the area is making a full contribution towards meeting national and local aggregate needs;
- to obtain, collect, and report in data on minerals activity in their area, including annual data collected by the MPAs on sales, permissions, and reserves of aggregates (including recycled and secondary sources).

1.4.2 West Sussex and the South Downs National Park Authority fall within the South East England Aggregate Working Party (SEEAWP) area.

1.4.3 As part of the MASS, the amount of land-won aggregates to be provided by each region was set out in the National and Regional Guidelines for Aggregates Provision in England 2005-2020 (June 2009). MPAs may decide, collectively, to plan for more or less than set out in the Guidelines based on their LAA but this must be supported by robust evidence and be properly justified, having regard to the local and national need.

1.4.4 The data used in this LAA includes that from the National Aggregate Minerals Survey, which was carried out for the year 2015.

Policy on National Parks

1.4.5 In West Sussex a significant proportion of the sand and gravel resources are within, or in the setting of, the South Downs National Park (SDNP), and so national policy on development in National Parks needs to be taken into account[6].

1.5 Consultation Arrangements

1.5.1 In accordance with the NPPF and PPG, this LAA was subject to consideration and scrutiny by the SEEAWP. Other bodies invited to comment on its contents include the following:

- counties that receive or provide aggregates to West Sussex;
- the Coast to Capital Local Economic Partnership;
- the Crown Estate;
- the Marine Management Organisation;
- the Local Nature Partnership;
- Natural England.

[6] See Paragraph 172 of the NPPF.

2. Aggregates in West Sussex

2.1 Supply Options

2.1.1 When planning for a steady and adequate supply of minerals, Mineral Planning Authorities have to consider all supply options. West Sussex currently supplies aggregates from a number of sources including:

- soft sand, sharp sand, and gravel extracted at quarries in West Sussex;
- recycled and secondary aggregate production;
- imported aggregate (e.g. crushed rock and sand and gravel) by road, rail, and sea; and
- sand and gravel dredged from the seabed (marine-won)

2.1.2 Each supply option is considered separately below including the economic and environmental opportunities and constraints that might influence the situation. This information is then used to consider the total aggregate supply picture and the balance between supply and demand.

2.2 Geology and Landscape

2.2.1 In broad terms, the county has a sequence of broad geological bands which run across the County from the west to east; see 'Appendix A: LAA Map'.

2.2.2 Soft Sand is won from the Sandgate Formation and the Folkestone Formation (also known as the Folkestone Beds) which is worked in a number of locations in West Sussex. The variable grain size and low clay content mean that little or no processing is required to produce high quality construction and mortar sands.

2.2.3 Coarser, sharp sand and gravels lie over the chalk to the north of a line approximating to the route of the A27 and have been exploited in dry workings. Overlying the clay to the south, cleaner, better-sorted gravels have been exploited through wet working as evidenced by lakes around the eastern and southern fringes of Chichester. Sand and gravel resources are clustered around Chichester, and south of the SDNP from the Funtington area in the west to Slindon in the east. The sharp sand and gravel deposits are primarily used to make concrete, concrete products, or cement.

2.2.4 The SDNP covers almost half the Folkestone Formation in West Sussex, and part of the sharp sand and gravel resource north of Chichester. The Chichester Harbour Area of Outstanding Natural Beauty (AONB) designation includes a small area which contains potential sharp sand and gravel. The extent of these landscape designations is shown in 'Appendix A: LAA Map'.

2.2.5 There are no indigenous sources of crushed rock in West Sussex, therefore, this aggregate is imported into West Sussex by rail or sea.

2.2.6 Much of the soft sand outside the SDNP in West Sussex has been worked or is currently being worked. The majority of the remaining

land-won soft sand resources lie within the SDNP. Stakeholder engagement carried out in 2008/09 provided some information about the quality of sand and gravel resources outside the National Park. One operator advised that after some limited investigation (drilling boreholes, etc.) of unconsolidated sand deposits, anything east of Steyning was found to be finer and 'dirtier' deposits which may make extraction uneconomic on any significant scale. There has also been no significant interest in any areas outside of the SDNP, including through the 'call for sites' processes in 2014, and more recently, for the soft sand review, during 2018.

2.2.7 With regard to sharp sand gravel deposits, operators commented that it becomes much thinner to the south east and therefore uneconomic to work. At the western end, it was felt that any deposit south of the A27 would also be uneconomic.

2.2.8 Soft sand from the Sandgate Formation and the Folkestone Formation is worked in a number of locations in West Sussex. The variable grain size and low clay content mean that little or no processing is required to produce high quality building sands for plaster and mortar. Gravel of varying quality and some sharp sand is used for concrete products, which cannot be used as a building sand for mortar.

2.3 Land-won Sand and Gravel

2.3.1 Past sales figures for land-won sand and gravel provide an indication of the contribution that the land-won sources of supply have made to the total supply of aggregates in West Sussex.

2.3.2 Annual land-won sales data over the past 10 years is presented in Table 1 and Figure 1.

- This shows that sales had fallen from 408,000 tonnes in 2008 to as low as 238,577 tonnes (2014) during the 10-year period since 2007.
- There was an increase in sales in 2016, up to 420,000 tonnes.
- The average annual sales figure over the 10-year period for sand and gravel is 309,206 tonnes and the average for the past three years is higher (337,597 tonnes).

2.3.3 It is not possible to provide sales figures for individual mineral types but the average split between the two land-won aggregate types in West Sussex over the last 10 years is 95% soft sand and 5% sharp sand and gravel. This equates to 293,737 tonnes of soft sand and 15,468 tonnes for sharp sand and gravel (10-year annual averages).

2.3.4 As aggregates are used in the building of homes, it is worth considering housing completion data when considering trends in aggregate sales.

- Gross dwelling completions within West Sussex fell from 3,060 in 2008/09 down to 2,400 in 2012/13 (a 22% reduction) and there was a 32% drop in land-won sand and gravel sales over the same period.
- Housing completions have recovered since 2012/13 (2,400), up to as high as 4,784 completions in 2015/16, an increase of circa 50%.

- Land-won sand and gravel sales increased from 0.28mt in 2012, up to a high of 0.42mt in 2016, an increase of circa 32%. The data suggests a link between housing completions and aggregate sales, whereby as completions have risen and fallen in West Sussex, sales of land-won sand and gravel have also risen and fallen.

2.3.5 As sand and gravel is won from both land-won and marine-won sources, it is relevant to consider all sand and gravel sales in comparison to completions. Figure 1 shows that there is some correlation between aggregate sales and housing completions in West Sussex.

- Total sand and gravel sales (land-won and marine-won) were falling during 2008 and 2009, recovering in 2010 and 2011, which was also the case in housing completions.
- In later years (2014 to 2017) housing completions have steadily increased, as have sales of aggregates.
- There is not a perfect correlation, likely due to the fact that West Sussex exports significant amounts of both land-won sand and gravel extracted in West Sussex, and marine sand and gravel landed in West Sussex.

2.3.6 The general fall in land-won aggregate sales has been replicated in neighbouring authorities, with Hampshire and Surrey also showing a downward trend in sales up until 2012; however there have been increases since. See Table 2 and Figure 2.

- In the South East, the overall trend of sales is a year on year general decline in sales, so that by 2017 they were 46% less than in 2007[7]. Despite the increasing levels of economic growth recorded between 2004 and 2007, sales in the South East fell 18% during the same period. This indicates that the link between sales of aggregates and economic growth is not clear cut or straightforward. Sales have increased since 2015, and in 2017 a total of 6.18mt of land won sand and gravel were sold, the highest since 2008, and 15% higher than the 10-year average of sales.
- With regard to East Sussex, due to the very small number of sand and gravel sites, there are zero returns for over half of the 10-year period and the rest of the figures are confidential; therefore, no figures are reported.

[7] SEEAWP (2017) South East Aggregates Monitoring Report 2017.

Table 1: Sales of land-won sand and gravel in West Sussex 2008-2017

Year	Sales (tonnes)
2008	408,000
2009	287,000
2010	301,000
2011	284,000
2012	284,000
2013	276,692
2014	238,577
2015	244,594
2016	420,000
2017	348,196
3-year average (2015-2017)	**337,597**
10-year average	**309,206** **(293,737 soft sand;** **15,468 sharp sand and gravel[8])**

Note: Sales data is based on estimates using operator returns, supplemented, where necessary, by estimates based on past rates and information from site visits. The figures for soft sand and sharp sand and gravel have been amalgamated due to reasons of confidentiality.

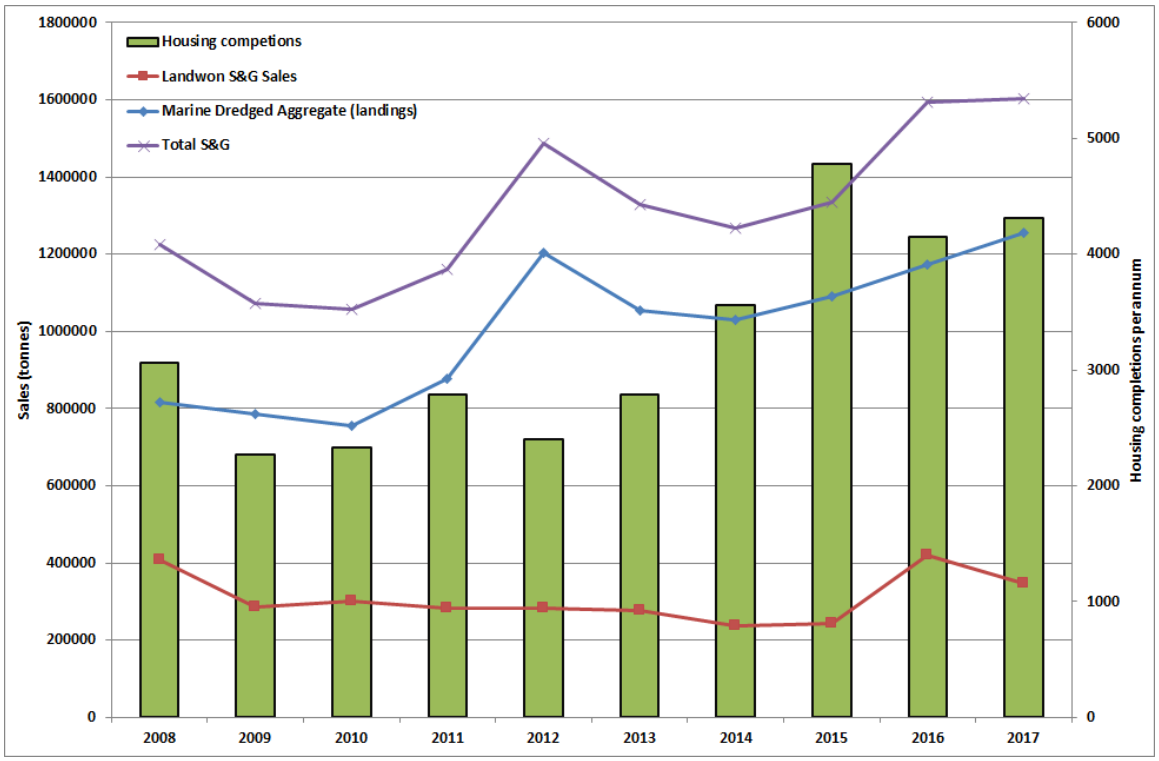


Figure 1: Sales of sand and gravel in West Sussex compared to housing completions 2008-2017

[8] Figures may not add up to 95% and 5% exactly due to rounding.

Table 2: Sales of land-won sand and gravel in adjoining authorities 2008-2017

Year	Hampshire	Surrey
2008	1,270,000	1,360,000
2009	1,050,000	850,000
2010	980,000	880,000
2011	830,000	660,000
2012	750,000	620,000
2013	850,000	790,000
2014	880,000	978,000
2015	830,000	740,000
2016	918,000	730,000
2017	963,000	799,000
3-year average (2015-2017)	**904,000**	**756,000**
10-year average (2008-2017)	**932,000**	**841,000**

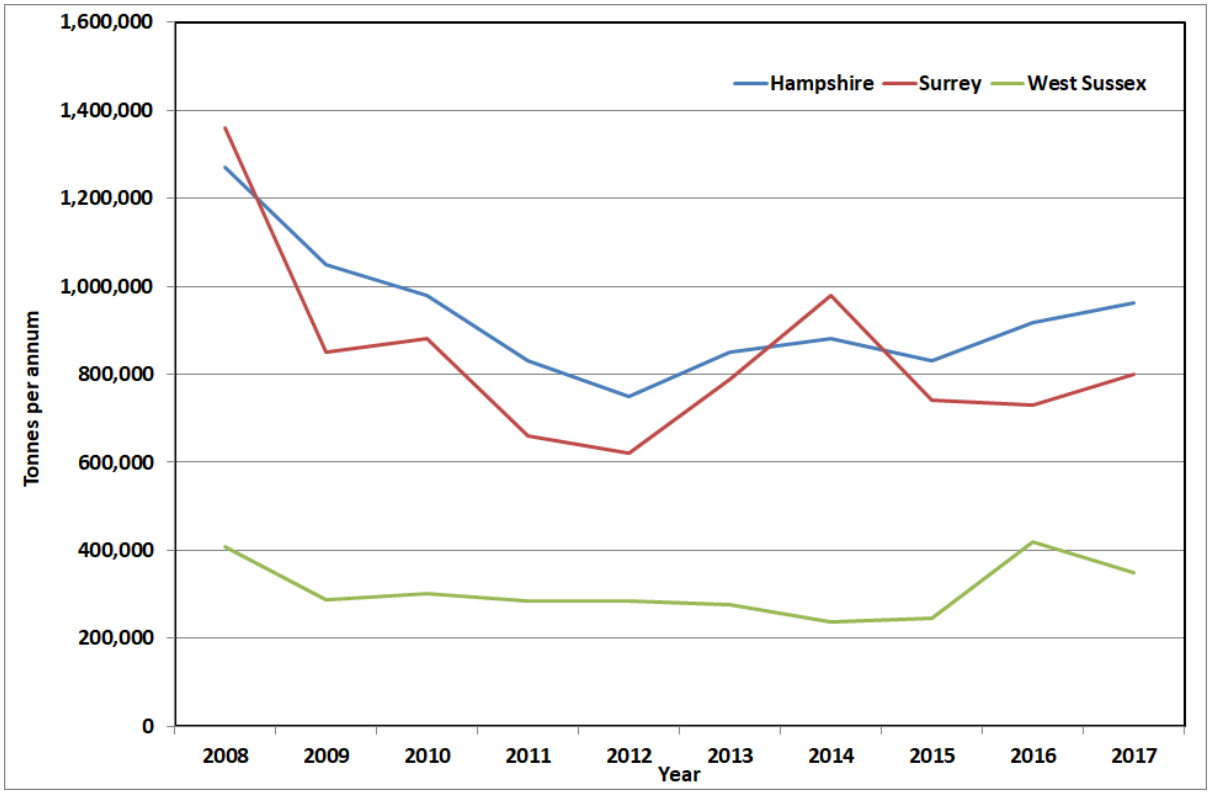


Figure 2: Sales of land-won sand and gravel in adjoining authorities 2008-2017

Other Relevant Information affecting Aggregate Supply and Demand

2.3.7 The Authorities have carried out an assessment of the likely demand for aggregates over the JMLP plan period based on anticipated levels of construction of homes and the maintenance and construction of roads. No other major infrastructure projects are anticipated in or near West Sussex that might influence the demand for aggregate. Scenarios were therefore developed taking into account two growth factors (Housing = 26.8%, Construction of roads = 22.3%). 'Appendix B: Effect of Housing and Road Construction on Aggregate Supply and Demand' explains how these factors have been derived. This includes assumptions regarding the level of different aggregate supply related to these uses.

2.3.8 Sharp sand and gravel, soft sand, and crushed rock are considered separately as they are used for different purposes. This is consistent with paragraph 207 of the NPPF which states that "Minerals planning authorities should plan for a steady and adequate supply of aggregates by … calculating and maintaining separate landbanks for any aggregate materials of a specific type or quality which have a distinct and separate market".

2.3.9 Further other relevant local information includes the fact that mineral resources, including soft sand, are constrained by the SDNP designation.

Sharp Sand and Gravel

2.3.10 Based on the 10-year average split of sales (95% soft sand and 5% sharp sand and gravel), the 10 years annual sales data for sharp sand and gravel is 15,468 tonnes. The national PPG states that a three-year average annual sales should also be factored into consideration of a sales trend. The three-year average annual sales figure for sharp sand and gravel in West Sussex is 48,482 tonnes. It must be noted that sales of sharp sand and gravel in 2016 and 2017 includes incidental sales from a soft sand site.

2.3.11 Existing reserves are provided by a single existing permission at Kingsham gravel site which has an estimated remaining yield of 900,000 tonnes.

2.3.12 Forecast demand scenarios have been established below based on the following assumptions using the data presented in 'Appendix B: Effect of Housing and Road Construction on Aggregate Supply and Demand'.

- Assumption 1: Housing is projected to grow by 26.8% in West Sussex.
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 22.3% in West Sussex.
- Assumption 3: Up to 91% of sand and gravel may be used in homes.
- Assumption 4: Up to 33% of sand and gravel may be used on road maintenance/improvements.

2.3.13 The annual demand values associated with each of these scenarios is set out in Table 3. The table also shows the extent of any predicted shortfall having regard to the existing reserves.

2.3.14 The calculated maximum average annual demand (demand forecast scenario 3) is 23,063 tonnes, which suggests that a total of 345,951 tonnes of land won sharp sand and gravel would need to be supplied to 2033.

- The minimum calculated landbank for sharp sand and gravel, based on the current reserves against demand forecast scenario 3, is 39 years (calculated by dividing the reserve figure of 900,000 tonnes by the annual demand figure of 23,063).
- Therefore there is no shortfall of land won sharp sand and gravel reserves in West Sussex.

Table 3: Sharp sand and gravel demand forecast scenarios 2018-2033 (tonnes)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10-year average only)	1, 2, 3, and 4	1 and 2
10-year average	15,468	15,468	15,468
Additional demand for housing	n/a	3,772	4,146
Additional demand for roads	n/a	1,138	3,449
Total annual requirement	15,468	20,379	23,063
Total requirement over Plan period (2018-2033)	232,026	305,688	345,951
Current reserves (at Kingsham Quarry)	900,000	900,000	900,000
Shortfall (positive)/surplus (negative)	-667,974	-594,312	-554,049

Soft Sand

2.3.15 Based on the 10-year average split of sales (95% soft sand and 5% sharp sand and gravel), the 10 years annual sales data for soft sand is 293,737 tonnes. The three-year average for annual soft sand sales in West Sussex is 295,115 tonnes.

2.3.16 Existing reserves are provided by several sites (see Table 6) and currently amount to 2,754,000 tonnes.

2.3.17 Forecast demand scenarios for land-won soft sand have been established using the following key assumptions based on data presented in 'Appendix B: Effect of Housing and Road Construction on Aggregate Supply and Demand':

- Assumption 1: Housing is projected to grow by 26.8% in West Sussex;
- Assumption 2: Up to 91% of sand and gravel may be used in the construction of residential dwellings.

2.3.18 As road maintenance or improvement works do not involve the use of soft sand, these activities have been excluded from calculations of demand forecasts for soft sand. These demand forecasts build on the 10-year average of 293,737 tonnes, which are set out in Table 4.

2.3.19 The annual demand values associated with each of these scenarios is set out in Table 4. The table also shows the extent of any predicted shortfall having regard to the existing reserves.

2.3.20 Table 4 suggests that additional supplies of between 1.66 and 2.83mt of soft sand are needed over the JMLP plan period (to 2033). The maximum landbank, based on the current reserves against the 10-year average, is 9.4 years (calculated by dividing the reserve figure of 2,754,000 tonnes by the 10-year average of 293,737). The landbank based on the highest forecast annual demand (demand forecast option 3) is 7.4 years (2,754,000 divided by 372,459).

2.3.21 National Planning Practice Guidance (PPG paragraph 064) states that MPAs should also consider average annual sales over the previous three years, to identify the general trend of demand. Based on the three-year average of soft sand sales (295,115 tonnes), and current reserves, the landbank is currently 9.3 years. The requirement over the plan period would theoretically be 4,426,720 tonnes (three-year average x 15), and therefore the shortfall would be 1,672,720 tonnes.

2.3.22 At present, there are six permitted soft sand sites in the Plan Area, as set out in Table 6. These sites have a total reserve of 2,754,000 tonnes.

2.3.23 In light of the estimated shortfalls in soft sand supplies it is considered appropriate to consider the possibility of permitting further reserves of soft sand if proposals come forward. Furthermore, there will be a requirement to consider potential allocations for soft sand reserves through the forthcoming single issue soft sand review of the Joint Minerals Local Plan. Any future LAAs will replace this LAA as the latest position in terms of supply and demand of soft sand.

Table 4: Soft sand demand scenarios 2018-2033 (tonnes)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10-year average only)	1 and 2	1
10-year average	293,737	293,737	293,737
Additional demand for housing	n/a	71,637	78,722
Total annual requirement	293,737	365,374	372,459
Total requirement over Plan period (2018-2033)	4,406,062	5,480,613	5,586,887
Current reserves	2,754,000	2,754,000	2,754,000
Shortfall	1,652,062	2,726,613	2,832,887

Imports and Exports of Land-won Sand and Gravel

2.3.24 West Sussex imports and exports land–won aggregates from/to surrounding MPAs, as well as further afield, and it is important to understand the current and potential future issues affecting cross-boundary movements of land–won sand and gravel between West Sussex and other neighbouring and more distant mineral planning authorities.

2.3.25 A national four-yearly aggregate minerals survey is conducted by the Department of Communities and Local Government (CLG) and the British Geological Survey (BGS) which includes analysis of the movements (imports and exports) of aggregates for each MPA in England and Wales. A survey was not undertaken in 2013, and instead took place in 2014 – see Aggregate Minerals Survey for England and Wales 2014. The data presented below comes from the latest national survey (2014) and from data obtained from the BGS.

2.3.26 Due to confidentiality restrictions, import and export data figures were provided by BGS as a percentage range of total supply to each MPA, to provide an indication of the relative importance of each supplying MPA. Table 5 shows that in 2014 up to 55,000 tonnes of sand and gravel was imported into West Sussex, whilst up to 275,600 tonnes of sand and gravel was exported from West Sussex. Therefore, for land-won sand and gravel, West Sussex is a net-exporter. Table 5 also shows that aggregate may be transported considerable distances to and from West Sussex.

Current Supply of Land-Won Sand and Gravel

2.3.27 Land-won sand and gravel is currently supplied from seven sites in West Sussex, six of which were operating before the designation of the South Downs National Park, which now forms part of the plan area and covers a substantial part of the sand and gravel mineral resource. These sites are presented in Table 6 and shown in Appendix A: LAA Map. The total permitted reserve of land-won sand and gravel in West Sussex was 3,654,000 tonnes.

Table 5: Origin/destination of land-won sand and gravel imported/exported to/from West Sussex, 2014

Origin/Destination	Imports to West Sussex (tonnes)	Exports from West Sussex (tonnes)
Berkshire	Up to 1,000	Up to 12,000
Buckinghamshire and Milton Keynes	0	7,900-79,000
East Sussex and Brighton & Hove	0	2,600-29,000
Hampshire and Isle of Wight	1,000-10,000	Up to 17,600
Oxfordshire	Up to 1,000	0
Kent and Medway	Up to 1,000	0
Surrey	10,000-20,000	7,600-84,000
South East Region Sub-total	**11,000-33,000**	**18,100-221,600**
Cambridgeshire	Up to 1,000	0
Dorset	Up to 1,000	0
Essex	30,000-40,000	0
Wilshire and Swindon	0	Up to 5,400
Unknown, in the South West	Unknown	24,300-48,600
Outside South East Region Sub-Total	**30,000-42,000**	**24,300-54,000**
Overall Total Imports/Exports (excluding West Sussex consumption)[9]	**41,000-55,000**	**42,400-275,600**

Source: Data obtained from the British Geological Survey and was based on the 2014 Aggregate Minerals Survey.

Note: Ranges are provided due to confidentiality restrictions.

[9] There is also some (between 15,400 and 154,000 tonnes) of land-won sand and gravel that was consumed in the South East, however the final destination for its consumption is recorded as "unknown". It is presumed that some of this would have been consumed in West Sussex, whilst some consumed in other areas around the South East.

Table 6: Permitted sand and gravel quarries in West Sussex (2018)

Soft Sand

Location	Site	Operator	Status
SDNP	West Heath Quarry, West Harting, Petersfield	CEMEX UK Operations	Active – Sand extraction
SDNP	Heath End Quarry, Station Road, Heath End, Petworth[10]	Dudman Group Ltd.	Active – Sand extraction.
West Sussex	Rock Common Sandpit, Washington, Pulborough	Dudman Group Ltd.	Active – Sand extraction.
West Sussex	Sandgate Park Quarry, Water Lane, Sullington, Storrington	CEMEX UK Operations	Active – Sand extraction.
West Sussex	Washington Sand Pit, Hampers Lane, Sullington	Britaniacrest Recycling Ltd.	Active – Sand extraction.
West Sussex	Chantry Sand Pit, Chantry Lane, Storrington	Dudman Group Ltd.	Inactive

Sharp Sand and Gravel

Location	Site	Operator	Status
West Sussex	Land at Kingsham, South of Chichester, Chichester	Dudman Group Ltd.	Active – Sand and gravel extraction.

Note: In accordance with the PPG, mineral sites that are subject to a stalled review of their planning conditions have not been included in the assessment of existing reserves.

[10] Continued extraction permitted on appeal – 6 September 2016.

Potential Constraints to Future Land-won Supply

2.3.28 West Sussex has a number of environmental and landscape designations, including the South Downs National Park (SDNP) which is afforded the highest level of protection by national policy. These designations can restrict, and may continue to restrict, opportunities for future minerals development, particularly in regard to land-won extraction. Consideration of future supply from within the SDNP will be considered through the soft sand review of the JMLP.

2.3.29 In accordance with the national PPG, it is important that the effects of environmental constraints are taken into account, as 'other relevant local information', when considering options for meeting aggregate demand through the Plan period. This is especially pertinent to consideration of the future supply of soft sand as the majority of the resource in West Sussex is located within the SDNP

2.3.30 Floodplains, Source Protection Zones (SPZs), secondary and principal aquifers, groundwater depth, geology and smaller abstractions are also constraints which need to be taken into consideration when identifying suitable sites for mineral extraction.

2.3.31 Minerals development should not have a significant impact on communities if they are designed, managed, and located appropriately. However, concerns may still be raised about the potential impacts of noise and dust, as well as associated lorry movements, particularly at the planning application stage. Such issues need to be addressed to ensure that minerals development does not significantly impact the amenity of local communities.

2.3.32 Soft sand has specific applications for which concreting and other aggregate materials are unsuitable and is most commonly used in mortar. The South Downs Soft Sand Study (2012) states that the Crown Estate "believe that there is potential for marine sources to provide viable 'soft' sand as an alternative to land-based quarrying". There are sources of marine-won aggregate being used, as a replacement, or through blending, to create mortar.

- In 2014, in England and Wales, 1.05mt of marine-won aggregate was used in mortar. Of this, 72,000 tonnes were sold in the South East.
- The SEEAWP South-East England Aggregates Monitoring Report 2017 sets out that some 50,710 tonnes of marine soft sand were sold from South East wharves (Table 8).
- Evidence collated via the annual Aggregate Monitoring Surveys shows that during the three-year period 2015-2017, an annual average of around 51,118 tonnes of aggregate sold from West Sussex wharves was sold as soft sand. Not all of this was recorded as marine won however, with the three-year average of marine won sands being 21,846 tonnes per annum, and remainder being land won sands.
- Historically the aggregate available on the South Coast have not been considered to be suitable for soft sand. The West Sussex Joint

Minerals Local Plan safeguards sufficient wharf capacity in West Sussex (see Table 21).

Land–Won Sand and Gravel Summary

Past to current demand:

- Sales of land won sand and gravel fell from 495,000 tonnes in 2007 to as low as 238,577 tonnes in 2014. Sales had increased, with 420,000 tonnes sold in 2016, but only 348,196 tonnes sold in 2017.
- Average sales of land-won sand and gravel over the last 10 years is **309,206 tonnes**.
- Average sales of soft sand over the last 10 years is **293,737 tonnes**.
- Average sales of sharp sand and gravel over the last 10 years are **15,468 tonnes**.

Other relevant local information:

- For sharp sand and gravel, based on the calculated maximum annual demand (demand forecast scenario 3), there are sufficient levels of permitted reserves to 2033.
- For soft sand, when applying a rolling 10-year average and other relevant local information, an additional **1.66mt to 2.83mt** are needed over the Plan period (to 2033). For soft sand, when applying the three-year average, shortfalls would be lower, at an additional 1.67mt being required over the plan period.

Imports and exports (of land-won and marine-won sand and gravel):

- In 2014 up to 0.23mt of sand and gravel was imported into West Sussex.
- In 2014, up to 1.82mt of sand and gravel was exported from West Sussex.
- As such, West Sussex is a **net exporter** of sand and gravel.

Supply:

- In 2017, the total permitted reserve of land-won sand and gravel was 3,654,000 tonnes.
- There are no allocations for sand and gravel in the Joint Minerals Local Plan (2018).
- The soft sand review of the Joint Minerals Local Plan will consider allocating soft sand sites to meet any identified shortfall

2.4 Marine-Won Sand and Gravel

2.4.1 A steady and significant supply of marine won sand and gravel is landed at wharves in West Sussex. This is a major source of primary aggregate and also a principal alternative source to land-won aggregate. Marine won sand and gravel landed in the South East of England is primarily used as a replacement for sharp sand and gravel, and is not considered a viable substitute for soft/building sand at this time.

2.4.2 The Joint Minerals Local Plan (2018) safeguards six wharves from development which may prevent or prejudice their operation, and to ensure that a steady and adequate supply of minerals can be maintained.

2.4.3 Although marine won aggregates were landed at Littlehampton in the past, this activity ceased in 2004 when the aggregate processing plant was removed. The full potential of Railway Wharf, Littlehampton would only be realised if the operator re-established a marine aggregate processing plant, and if navigation/silting problems on the River Arun were resolved to allow continued access for small dredgers. The wharf at Littlehampton is currently used to import crushed rock by sea, for use in the adjacent Coated Roadstone Plant. This leaves Shoreham as the only port used for landing marine won sand and gravel in the County.

2.4.4 National marine policy is contained within the Marine Policy Statement (MPS) which sets out a framework for preparing marine plans and taking decisions affecting the marine environment. The South Marine Plan (SMP) was adopted in July 2018 and covers an area which is the second busiest in England for marine aggregate extraction, with a total area that is licensed for aggregate extraction of 155.47km^2. The SMP contains policies to ensure that aggregate extraction licensed areas are protected for that use, whilst those areas with high aggregate potential are also protected.

2.4.5 Mineral rights for marine won sand and gravel are owned by the Crown Estate, who issue licences for dredging activity. Marine-won sand and gravel landed in West Sussex is dredged from the channel in the 'South Coast' region which is the second largest dredging region in terms of permitted tonnages. There are currently 16 production licences allowing the extraction of 7.17 million tonnes per year. In 2017, a total of 3.77 million tonnes of aggregates were dredged in the licence areas.

Use of Marine-Won Aggregate

2.4.6 Marine-won aggregates from the SMP areas are predominantly of a similar nature of sharp sand and gravel. They are used for producing concrete, transport infrastructure, replenishing beaches, and improving coastal defences, as well as being exported to neighbouring European countries[11]. As marine- and land-won aggregates are geologically similar, they can be easily substituted for one another in many uses.

2.4.7 A publication on marine sands in mortars and screeds from the British Marine Aggregate Producers Association (BMAPA) states that the main difference between the majority of land-based sands and marine sands

[11] Crown Estate (2018). Marine Aggregates Extraction 2017 – 20th Annual Report

are the presence of chloride and shell. The publication states that there is occasionally resistance by specifiers and purchasers to resist the use of marine won sands due to their potential to include low levels of chlorides but concludes that marine sands show no aesthetic problems associated with sand source[12].

2.4.8 The Marine Sand and Gravel Resources map produced by BGS and the Crown Estate shows the current and potential marine sand and gravel resources, as well as current licensed areas; see Offshore Mineral Resource Maps on BGS' website. This indicates that there are some areas of 'fine sand' within the South marine plan onshore and offshore areas, but that the currently licensed areas are in areas of coarse sand and coarse aggregate. The accompanying report states that the map delineates areas within which potentially workable minerals may occur but that this takes no account of planning constraints that may limit their working and that the economic potential of individual sites can only be proved by a detailed evaluation programme[13].

2.4.9 Research undertaken provided the Authorities anecdotal evidence that suggests mortar manufacturers in the south east may be using marine-won sand in their mortar products in place of land-won soft sand. The use of marine-won sand in mortar is commonplace in other parts of England, however there is no detailed evidence of this taking place in the south east.

Pattern of Previous Landings and Sales and Current Demand for Marine-won Aggregate

2.4.10 Landings of marine-won aggregate at wharves in West Sussex have increased steadily over the last 10 years with a particularly marked increase observed since 2010 (Table 7).

2.4.11 Landings of marine-won aggregate at wharves in West Sussex make a significant contribution to overall aggregate supplies in West Sussex and neighbouring authorities (particularly East Sussex and Brighton & Hove).

[12] British Marine Aggregate Producers Association

[13] British Geological Survey (2013) The Mineral Resources of the English Channel and Thames Estuary

Table 7: Landings and sales of marine-won sand and gravel at West Sussex wharves 2008-2017

Year	Landings of marine-won sand and gravel (tonnes)	Sales of marine-won sand and gravel from wharves (tonnes)
2008	784,688	826,252
2009	755,018	872,267
2010	877,799	899,944
2011	1,203,574	1,213,356
2012	1,052,976	1,470,023
2013	1,029,108	1,616,136
2014	1,090,138	1,626,551
2015	1,173,304	1,639,146
2016	1,254,255	1,809,675
2017	1,307,447	1,340,189
3-year average	**1,245,002**	**1,596,337**
10-year average	**1,052,771**	**1,331,354**

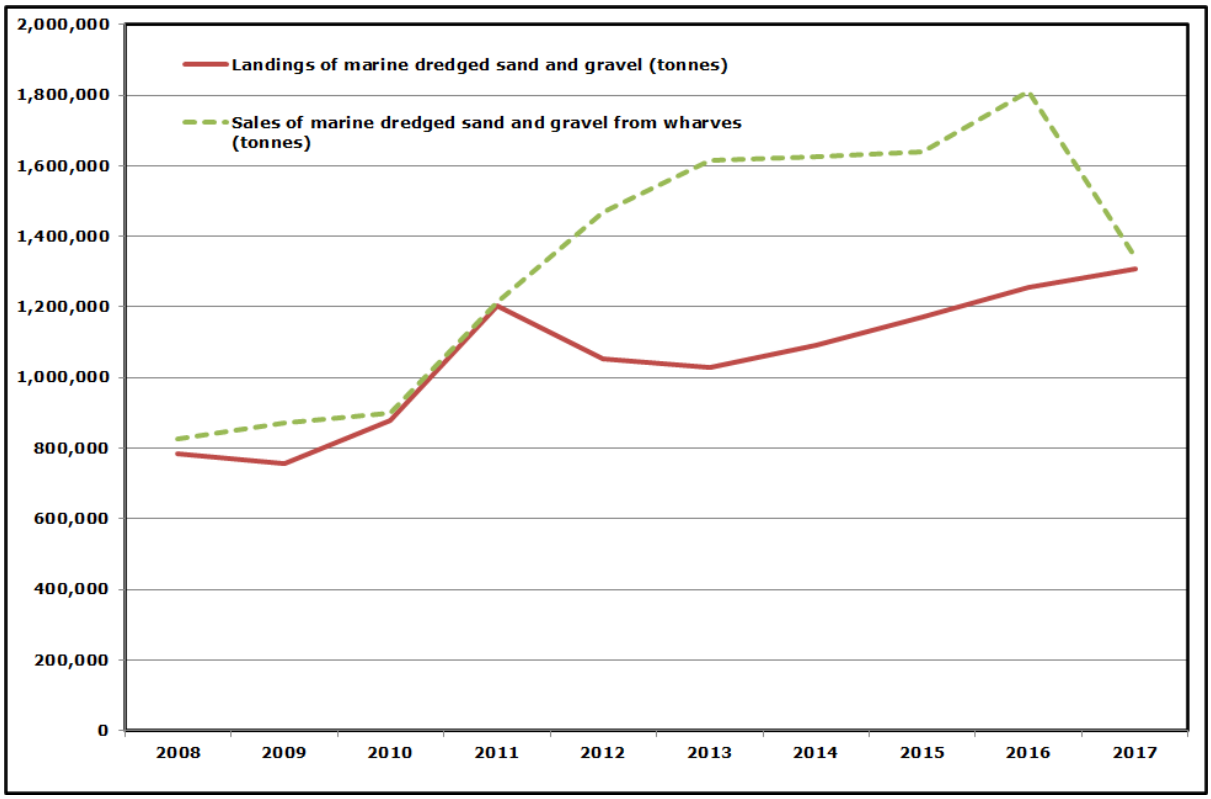


Figure 3: Landings and sales of marine-won sand and gravel at West Sussex 2008-2017 (tonnes)

Future Demand for Marine-Won Sand and Gravel

2.4.12 Forecasts of future demand for marine-won aggregate are based on landings data (provided by the Crown Estate) as this removes the element of double counting, whereby some operators of wharves are buying aggregate from other wharf operators and reporting their sales. Landings data therefore provides a more accurate picture of future demand.

2.4.13 Different scenarios on future demand have been derived based on different mixes of the following assumptions:

- Assumption 1: Housing is projected to grow by 26.8% in West Sussex;
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 22.3% in West Sussex;
- Assumption 3: Up to 91% of sand and gravel may be used in homes;
- Assumption 4: Up to 33% of sand and gravel may be used on road maintenance/improvements.

Other Relevant Local Information

2.4.14 A large amount of marine-won sand and gravel is exported to Brighton & Hove and East Sussex, where housing growth is predicted to grow by an estimated 61.75%. However, for the purposes of forecasting demand, the projected growth of housing figure for West Sussex (26.8%) has been used because it is considered more relevant, particularly when compared to other neighbouring areas, where the average is less than 30%, but the actual number of homes is considerably higher. These forecasts build on the 10-year average of annual landings (1,003,747 tonnes) and are set out in Table 8.

2.4.15 The demand forecast based on landings data shows that demand could be as high as 1,569,681 tonnes per annum. If this is compared to the estimated capacity at wharves in West Sussex, there would significant additional capacity available. The wharves do however also import crushed rock, therefore total annual capacity requirements for wharves are discussed later in this report.

Table 8: Demand forecast scenarios for marine-won sand and gravel based on landings 2017–2033 (tonnes per annum)

Annual Demand Value	Demand Forecast: Scenario 1(B)	Demand Forecast: Scenario 2(B)	Demand Forecast: Scenario 3(B)
Assumptions applied	None (10-year average only)	1, 2, 3, and 4	1 and 2
10-year average	1,052,771	1,052,771	1,052,771
Additional demand for housing	n/a	256,750	282,143
Additional demand for roads	n/a	77,473	234,768
Total annual requirement	1,052,771	1,386,994	1,569,681

Imports and Exports

2.4.16 The East Sussex Brighton and Hove LAA (2017) states that some 60% of the total marine sand and gravel consumed in East Sussex and Brighton & Hove in 2011 was supplied from wharves at Shoreham Harbour in West Sussex which means development in these areas is heavily dependent on landings of marine-won sand and gravel at these wharves. Imports and exports of marine-won sand and gravel also occur between West Sussex and Hampshire.

Current Supply of Marine-Won Sand and Gravel

2.4.17 The mineral wharves in West Sussex are primarily used for landing marine-won sand and gravel; however, they also land a modest proportion of crushed rock. The number of wharves within Shoreham Harbour have reduced in number in recent years, and the JMLP seeks to safeguard a number of these. Capacity of West Sussex wharves is 2,070,000tpa, a reduction in capacity following the closure of one wharf which has relocated from the Western Harbour Arm in Shoreham to the Eastern Harbour Arm (to Brittania Wharf), which falls within the Brighton & Hove authority area.

Marine-Won Sand and Gravel Summary

- The South Marine Plan areas are the busiest in England for marine aggregate extraction.
- 7.17mt of material is permitted for extraction per annum from licences within the 'South Coast Region'.

Pattern of previous landings and sales and current demand for marine-won aggregate:

- Landings and sales on marine-won sand and gravel in West Sussex have increased steadily over the last 10 years with a marked increase since 2011.
- The 10-year average of annual marine-won sales is 1,331,354 tonnes and 1,052,771 tonnes of landings.
- For the purposes of assessing demand, landings data has been used because this eliminates an element of double counting that has been identified.

Other relevant local information:

- The demand forecast based on landings data shows that demand could be as high as 1,569,681 tonnes per annum.

Imports and exports:

- Marine-won aggregates make a significant contribution to aggregate supply in West Sussex and neighbouring authorities (particularly East Sussex and Brighton & Hove) due to declining supplies from land-won sources in the area.

Wharf capacity:

- The capacity at wharves in West Sussex has fallen from 2,274,000 tonnes per annum down to 2,070,000 tonnes per annum

following the closure of one wharf, which has relocated to another part of Shoreham Harbour (in Brighton & Hove);

- Based on maximum landings of marine-won sand and gravel from West Sussex wharves between 2008 and 2017 (1,307,447 tonnes), there would be a theoretical minimum surplus capacity of 762,553 tonnes;
- Marine-won landings ceased in Littlehampton in 2005, although crushed rock landed at the wharf continues to serve the adjacent coated roadstone plant.

2.5 Sand and Gravel Imported by Rail

2.5.1 A relatively small amount of sand and gravel is imported into West Sussex by rail which could be either from marine-won or land-won sources (sharp sand and gravel, or soft sand). Evidence from stakeholder engagement in 2008/09 showed that most of the sand and gravel that came into one of the Crawley depots was bagged for builders' merchants or collected from the depot by building contractors. The vast majority of materials are delivered to fairly local destinations within a 20-mile radius due to the haulage costs.

Pattern of Previous Sales and Current Demand for Sand and Gravel Imported by Rail

2.5.2 Table 9 and Figure 4 that sales of sand and gravel from railheads within West Sussex have fluctuated over the last 10-year period, peaking at 225,303 in 2009 and generally declining thereafter. There has been a steady increase since 2014, from 41,521 tonnes to 83,947 in 2017. The 10-year average annual sales of sand and gravel from railheads is 123,322 tonnes and the three-year average is 74,642 tonnes.

Table 9: Imports of sand and gravel to West Sussex railheads 2008-2017

Year	Sales of sand and gravel from railheads (tonnes)
2008	170,91
2009	225,303
2010	195,599
2011	88,845
2012	140,466
2013	146,585
2014	41,521[14]
2015	63,019
2016	76,961
2017	83,947
3-year average	**74,642**
10-year average	**123,322**

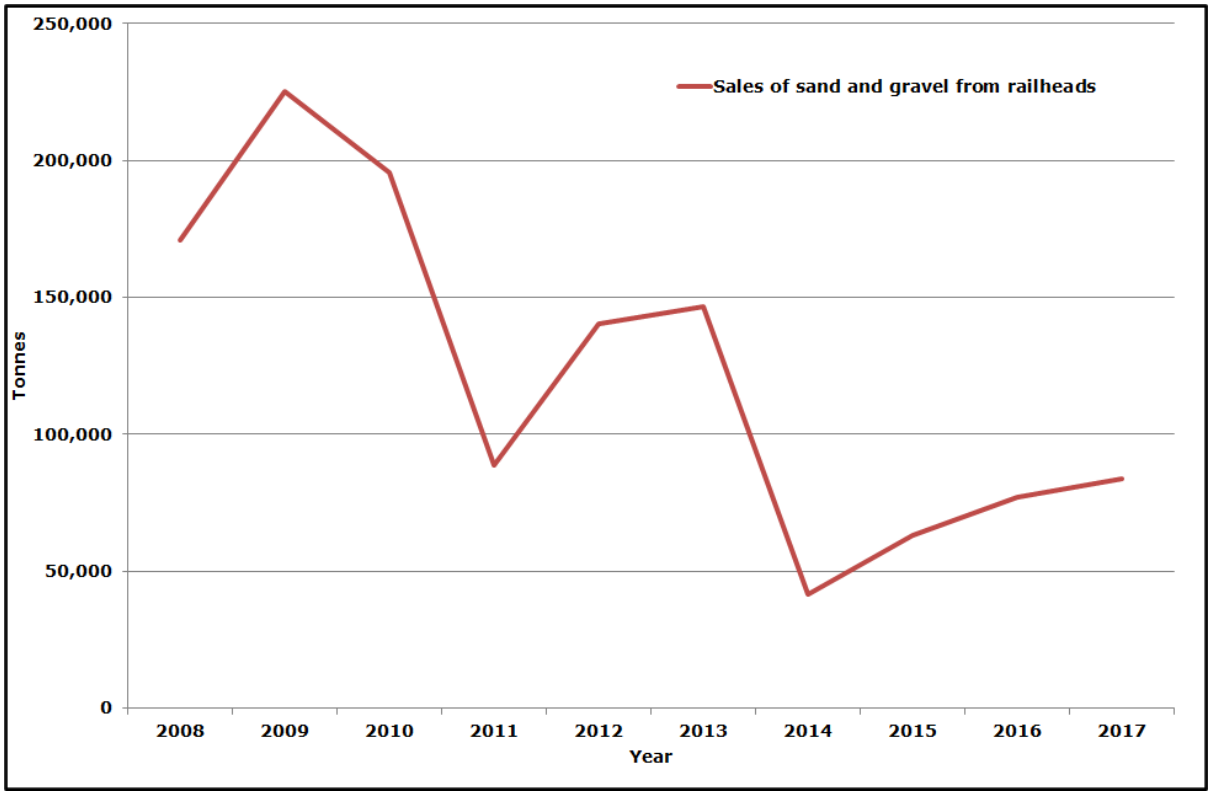


Figure 4: Imports of sand and gravel to West Sussex Railheads 2008-2017 (tonnes)

[14] The fall in imports of sand and gravel in 2014 can be attributed to the fact that one railhead became inactive during 2014 and therefore reported nil returns. The imports to Chichester rail sidings were also previously reported as being sand and gravel but information provided the operator shows imports of both sand and gravel and crushed rock.

Future Demand for Sand and Gravel Imported by Rail

2.5.3 Two demand forecasts have been created taking account of the 10-year average of sales (123,322) and other relevant local information set out in the following assumptions.

- Assumption 1: Housing is projected to grow by 26.8% in West Sussex.
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 22.3% in West Sussex.
- Assumption 3: Up to 91% of sand and gravel may be used in homes.
- Assumption 4: Up to 33% of sand and gravel may be used on road maintenance/improvements.

2.5.4 The demand forecast scenarios are set out in Table 10.

2.5.5 Table 10 indicates that future demand for sand and gravel being imported by rail to West Sussex railheads may be as high at 183,873 tonnes per annum.

Table 10: Demand forecast scenarios for rail-imported sand and gravel 2018–2033 (tonnes per annum)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10-year average only)	1, 2, 3, and 4	1 and 2
10-year average	123,322	123,322	123,322
Additional demand for housing	n/a	30,076	33,050
Additional demand for roads	n/a	9,075	27,501
Total annual requirement	123,322	162,473	183,873

Current Supply of Rail-Imported Sand and Gravel

2.5.6 There are five operational railheads in West Sussex, one in Chichester, one in Ardingly, and three in Crawley, all of which are safeguarded in the Joint Mineral Local Plan (2018).

2.5.7 The West Sussex Wharves and Railheads Study (2014) states that a total maximum capacity of 1,380,000 tonnes[15]. All but one of the railheads could probably improve throughput if more train pathways were available. The Rail Freight Strategy[16] predicts long-term growth potential in bulk aggregate movements, reflecting new building developments (e.g. housebuilding), and large infrastructure projects (e.g. High Speed 2, road building, Crossrail 2, and new nuclear power stations). The strategy identifies that the constraint to rail freight movement will include the availability of rail freight terminals for handling bulk materials, in appropriate locations, highlighting the importance of protecting rail terminals.

Rail-Imported Sand and Gravel Summary

Pattern of previous and current demand for rail-imported sand and gravel:

- A relatively small amount (83,947 tonnes) of sand and gravel was imported into West Sussex by rail in 2017. Rail imports peaked at 225,303 tonnes in 2009.
- The 10-year average sales of sand and gravel from railheads is 123,322 tonnes.

Future demand:

- The likely demand for sand and gravel being imported by rail to West Sussex railheads to 2033 may be as high at 183,678 tonnes per annum.

Railhead capacity:

- West Sussex has five railheads with a potential total capacity of 1,380,000 tonnes.
- There is a sufficient capacity to allow for an increase in rail imports of sand and gravel, however this is addressed further in this report as crushed rock is also imported by rail.

2.6 Crushed Rock

2.6.1 Crushed rock is generally used for roadstone and rail ballast. West Sussex does not have any natural hard rock resources and relies on rail and sea imports of hard rock, such as limestone and granite, in order to meet local demand for this material.

2.6.2 There are three sites within West Sussex where crushed rock is used to make coated roadstone. These are strategically located close to rail and

[15] Based on Scenario R1 in the West Sussex Wharves and Railheads Study (2014) which safeguards all five railheads.

[16] Department for Transport (2016) Rail Freight Strategy: Moving Britain Ahead.

wharf infrastructure: Ardingly Rail Depot, EWS Goods Yard in Crawley, and Littlehampton Wharf, Littlehampton.

Pattern of Previous and Current Demand for Crushed Rock

2.6.3 Sales of crushed rock from wharves have been more variable over the 10-year period than those from railheads (Table 11) with a sudden drop experienced in 2013. The 10-year average annual sales of crushed rock from wharves is 98,532 tonnes.

2.6.4 Crushed rock sales from railheads have been steadily increasing since 2009 (Table 11 and Figure 5). The 10-year average sales of crushed rock from railheads is 533,528 tonnes but the three-year annual sales are substantially greater at 683,069 tonnes.

Table 11: Sales of crushed rock at West Sussex wharves and railheads 2008-2017

Year	Sales of Crushed Rock Aggregate from Wharves (tonnes)	Sales of Crushed Rock from Railheads (tonnes)	Total
2008	123,109	322,008	445,117
2009	151,556	304,481	456,037
2010	138,927	573,222	712,149
2011	120,428	674,140	794,568
2012	123,457	702,396	825,853
2013	63,000	814,401	877,401
2014	76,670	684,271	760,941
2015	66,422	550,536	616,958
2016	61,747	555,539	617,286
2017	164,017	567,584	731,601
3-year average	**97,395**	**557,886**	**655,282**
10-year average	**108,933**	**574,858**	**683,791**

Figure 5: Sales of crushed rock at West Sussex wharves and railheads 2008-2017 (tonnes)

Future Demand for Crushed Rock Imports from Wharves

2.6.5 Four demand forecast scenarios have been created which take account of the 10-year average of sales (108,933), and other relevant local information.

- Assumption 1: Housing is projected to grow by 26.8% in West Sussex.
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 22.3% in West Sussex.
- Assumption 3: Up to 35% of crushed rock may be used in homes.
- Assumption 4: Up to 78% of crushed rock may be used on road maintenance/improvements.
- Assumption 5: Spending on road construction/maintenance in Brighton & Hove and East Sussex is projected to increase by 51.7% (applied to 1% of total sales to account for exports in previous years).

2.6.6 The calculations of demand are set out in Table 12, which shows that the likely demand for crushed rock being landed at West Sussex wharves may be as high as 145,942 tonnes per annum. The capacity of wharves in West Sussex is 2,070,000 tonnes per annum, therefore there is sufficient capacity to accommodate further demand for imports, however this is addressed further in this report wharves are also used for landing marine-won sand and gravel.

Future Demand for Crushed Rock Imports to Railheads

2.6.7 Two demand forecasts have been created for rail imports of crushed rock, taking account of the 10-year average of sales (574,858 tonnes) and other relevant local information set out in the following assumptions.

- Assumption 1: Housing is projected to grow by 28.8% in West Sussex.
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 22.3% in West Sussex.
- Assumption 3: Up to 35% of crushed rock may be used in homes.
- Assumption 4: Up to 78% of crushed rock may be used on road maintenance/improvements.

2.6.8 Table 13 shows the calculations of demand and indicates that the likely demand for crushed rock import to West Sussex railheads may be as high at 857,113 tonnes per annum. The capacity of railheads in West Sussex is 1,380,000 tonnes per annum. As railheads are used to import both crushed rock and sand and gravel, total capacity is discussed later in this report.

Table 12: Demand forecast scenarios for marine-landed crushed rock 2018-2033 (tonnes per annum)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3	Demand Forecast Scenario 4	Demand Forecast Scenario 5
Assumptions applied	None (10-year average only)	1-4	1 and 2	1-5	1, 2, and 5
10-year average	108,933	108,933	108,933	108,933	108,933
Additional demand for housing	n/a	10,218	29,194	10,898	29,194
Additional demand for roads	n/a	18,948	24,292	19,511	24,855
Total annual requirement	108,933	138,099	162,420	138,662	162,983

Table 13: Demand forecasts for rail-imported crushed rock 2018-2033

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10-year average only)	1, 2, 3, and 4	1 and 2
10-year average	574,858	574,858	574,858
Additional demand for housing	n/a	53,922	154,062
Additional demand for roads	n/a	99,991	128,193
Total annual requirement	574,858	728,770	857,113

Imports and Exports of Crushed Rock

2.6.9 The sources of crushed rock being imported into West Sussex are set out in Table 14, and are based on Aggregate Minerals Survey (2014) data provided by BGS. This is in the form of percentage ranges, due to confidentiality restrictions. The data shows that that Somerset (70-80%) is the main source of crushed rock being imported into West Sussex. Crushed rock is imported by sea to Littlehampton Port to service the adjacent coated roadstone plant. Total imports of crushed rock into West Sussex steadily rose between 2007 and 2013, after which there has been a decline from 877,401 tonnes, down to 617,286 tonnes in 2016. Sales in 2017 increased to 731,601 tonnes.

Table 14: Origin/destination of crushed rock landed in West Sussex (2014)

Origin/Destination	Imports to West Sussex (tonnes)
Outside England and Wales	76,100 to 152,200 (10-20%)
Cornwall Council	7,610 to 76,100 (1-10%)
Devon County Council	Up to 7,610 (<1%)
Dorset County Council	Up to 7,610 (<1%)
Gloucestershire County Council	Up to 7,610 (<1%)
North Somerset Council	Up to 7,610 (<1%)
Somerset County Council	532,700 to 608,800 (15-20%)
South Gloucestershire Council	Up to 7,610 (<1%)
Leicestershire County Council	7,610 to 76,100 (1-10%)
Shropshire Council	Up to 7,610 (<1%)
Northumberland National Park	Up to 7,610 (<1%)
Powys	Up to 7,610 (<1%)
Total	**761,000**

Current Supply of Crushed Rock

2.6.10 As set out earlier the wharves have a potential capacity to land 2,070,000 tonnes of aggregate imports. With regard to railheads, the West Sussex Wharves and Railheads Study (2014) states that they could have a total maximum capacity of 1,380,000 tonnes. As railheads are also used for importing sand and gravel, the total capacity requirements are considered later in this document.

Crushed Rock Summary

Pattern of previous and current demand for crushed rock:

- The vast majority of crushed rock used in West Sussex is imported via railheads, with some imports via wharves.
- Sales of crushed rock from railheads have been steady over the 10 years, peaking in 2014 at 814,401 tonnes. Sales have fallen to 567,584 tonnes in 2017. The 10- year annual sales average is currently 574,858 tonnes and the three-year average is 557,886 tonnes.

- Sales of crushed rock from wharves in West Sussex were steady between 2008 and 2012, after which they have fallen to between 61,000 and 76,000 tonnes, until 2017, when sales increased to 164,017 tonnes. The 10-year annual sales average is currently 108,933 tonnes and the three-year average is 97,39 tonnes.

Future demand:

- The likely demand for crushed rock being landed at West Sussex wharves may be as high at 162,983 tonnes per annum;
- The demand for crushed rock being imported by rail to West Sussex railheads may be as high at 857,113 tonnes per annum.

Capacity for importing crushed rock:

- West Sussex railheads have a potential capacity of 1,380,000 tonnes, indicating that there is sufficient capacity to meet future demand for imports of crushed rock.
- West Sussex wharves also have capacity to land future demand for imports of crushed rock.

2.7 Secondary/Recycled Aggregates

2.7.1 Aggregates sourced from waste materials can be used to substitute primary aggregates in a range of applications such as base layers for new developments and road construction. Higher quality recycled aggregates can also be used in the production of concrete for use in non-load bearing applications. Secondary and recycled aggregates can therefore reduce the demand for primary aggregates and so this LAA provides an assessment of the contribution that these materials may make to the overall supply of aggregates in the area.

2.7.2 Sources of secondary and recycled aggregates are provided below.

Secondary Aggregates

These come from by-products of industrial or mineral extraction processes and may be used either in raw condition or require processing. Secondary aggregates can be further sub-divided into manufactured and natural, depending on their source. Examples of manufactured secondary aggregates from industrial by-products are Incinerator Bottom Ash (IBA) which can be crushed to produce aggregate. Naturally occurring secondary aggregates generally come from mineral extraction and include china clay sand and slate aggregate. (Source: WRAP.)

Recycled Aggregates

These usually comprise material derived from construction and demolition wastes, such as builders' rubble, bricks and tiles, excavation waste (such as stone and rock). These materials generally require processing (crushing and screening) but also include material recovered from surface dressing of highways (road planings).

2.7.3 While these materials come from distinct and discrete sources they are generally counted together being from non-primary sources.

Pattern of Previous and Current Demand for Recycled and Secondary Aggregate

Recycled Aggregate

2.7.4 The recorded sales figures between 2008 and 2017 for recycled aggregates in West Sussex are set out in Table 15. This shows that sales of recycled aggregates have been relatively stable with a peak in 2010 (630,000 tonnes) and an apparent decline since.

Table 15: Sales of Recycled Aggregates in West Sussex 2008-2017

Year	Sales (tonnes)
2008	622,000
2009	629,000
2010	630,000
2011	446,000[17]
2012	446,000[18]
2013	261,000[19]
2014	377,000[19]
2015	393,000[19]
2016	456,000[20]
2017	391,000[20]
3-year average (2014-2016)	**413,333**
10-year average (2007-2016)	**469,100**

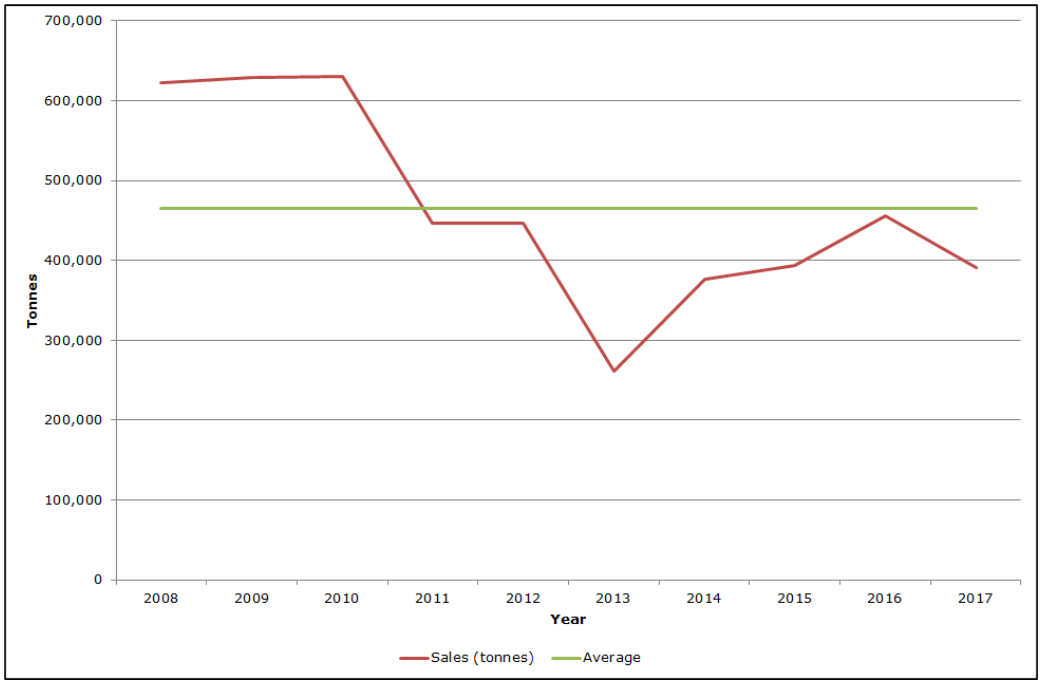


Figure 6: Sales of recycled aggregates in West Sussex 2008-2017

[17] This figure was estimated as part of the work with the Waste Forecast Report (2012) for the Waste Local Plan. It provided a further breakdown of C&D waste to recycling and other management.

[18] Due to the lack of information from 2012 data, this is a rolled forward estimate on 2011. All the sites at the time were active and thus it is expected that recycling continued at similar levels to the previous year.

[19] Figure was derived using a revised methodology prepared as part of the 'Review and Refresh of C&I and C&D Waste and CDEW Arisings and Projections in West Sussex' (BPP Consulting, 2016).

[20] Figures derived using a revised methodology prepared as part of the Baseline for C&I and CDEW waste generated in West Sussex.

Current Capacity for Production of Recycled Aggregates

2.7.5 Recycled aggregate can be produced on the site at which demolition waste is produced using a mobile crusher and supplied directly, at an intermediate temporary site using a mobile crusher or at a static site usually a mineral working or a waste management site. In 2018 there were estimated to be 18 static sites within West Sussex that have permission to produce recycled aggregates – capacity is provided by either dedicated CDEW recycling sites (Table 16), or at transfer stations (Table 17). These tables show that in 2018, the 18 sites provided a total capacity of 848,000tpa for recycled aggregate production. It is important to note that since the assessment of capacity relates to consented static sites only the actual overall capacity for aggregate recycling in the County is likely to be significantly higher than that indicated above due to the contribution mobile and temporary production capacity might make.

2.7.6 Comparison between the difference of the 10-year average of sales (465ktpa) and estimated capacity (848ktpa) shows that **capacity for producing recycled aggregate in the county appears to be underutilised**. Demand scenarios have not been applied to this source of aggregate supply because the future availability of recycled aggregates may be constrained by availability of feedstock which is reliant on construction and demolition activity. In addition, the use of mobile processing facilities at development sites means that supply may respond to demand relatively quickly without express consent being required. Aggregate recycling sites within West Sussex are safeguarded through the Waste Local Plan (2014) to ensure continuity of supply.

Secondary Aggregates

2.7.7 In West Sussex, the by-products from chalk and sandstone have been used as secondary aggregates. Other sources of secondary aggregate extraction include bottom ash from thermal treatment facilities at the following sites.

- Planning permission has been granted for a waste treatment facility at Ford which includes a 140,000tpa gasification plant generating energy from waste (Ref: WSCC/096/13/F). The gasification process is estimated to produce 21,000 tonnes of residue ash each year which is to be transported off-site for recycling or concrete product manufacture.
- The bottom ash from the 50,000tpa Energy from Waste plant at Lancing is processed into Incinerator Bottom Ash Aggregates (IBAA). In 2014, this amounted to 11,031 tonnes.

2.7.8 An estimate of the likely capacity for production of secondary aggregates has been calculated and is presented in Table 18. It presents the current capacity that exists within the County and two further scenarios that include the permitted site at Ford and a theoretical capacity which may arise if further thermal treatment plants are developed to meet the waste recovery requirements in the adopted Waste Local Plan (2014). Table 18 shows that there could be capacity

for producing an estimated 56,000tpa of secondary aggregates in the County.

Recycled and Secondary Aggregates Summary

- Sales of recycled aggregates peaked at 630,000 tonnes in 2010. Data indicates that supply has been relatively steady since 2014, with sales in 2017 totalling 391,000 tonnes.
- The 10-year average production of recycled aggregate is **465,100 tonnes**.
- There is one site in West Sussex producing **11,000 tonnes** of bottom ash used as a secondary aggregate.
- A total of **848,000tpa** of capacity for recycled aggregates production is likely to be available within the County (2018 estimate) which indicates that **capacity within the county is underutilised**.
- There could be between **11,000tpa and 56,000tpa** of additional secondary aggregates production capacity in the County.

Table 16: Permitted C&D waste recycling sites

Authority	Site Name	Temporary/Permanent	Estimated Capacity (tonnes per annum)
WSCC	Brookhurst Wood Landfill site[21]	Permanent	17,500
WSCC	Crawley Goods Yard, Gatwick Road, Crawley (Day Group)	Permanent	75,000
WSCC	Eastlands, Lewes Road, Scaynes Hill	Permanent	5,000
WSCC	EWS Goods Yard, Crawley	Permanent	30,000
WSCC	Hurstpierpoint Wastewater Treatment Works	Permanent	21,000
SDNP	Newtimber Chalk Works	Temporary (until 2022)	35,000
WSCC	Portfield Quarry, Chichester (TJ Waste)[22]	Temporary	250,000
WSCC	Thistleworth Farm, Lowfield Heath, Crawley[23]		30,000
SDNP	Upper Beeding Cement Works, Dudman Aggregates Ltd	Temporary	50,000
Total estimated capacity:			**513,500**

[21] Planning permission was granted at Brookhurst Wood landfill site (Ref: WSCC/00314/14/NH) for the recycling of 25,000tpa of street cleaning residues into a recycled aggregate. 70% of the input is estimated to be converted into aggregate giving a production capacity of approximately 17,500tpa.

[22] The operator has provided a revised estimate of the capacity of this site which has increased from the previous year.

[23] Additional site not recorded in previous years.

Table 17: Transfer stations at which aggregate production is expressly consented

Authority	Site Name (all permanent sites)	Status	Estimated C&D Recycling Capacity (tonnes per annum)
WSCC	Bognor Road Distribution Centre	Inactive	17,500
WSCC	Ford Waste Management Facility, South Coast Skips Ltd		100,000
WSCC	Cox Skips, Burleigh Oaks Farm		35,000
WSCC	Sussex Waste Recycling (Rabbit Skips)		75,000
WSCC	Elbridge Farm, Chichester Road, Bersted		15,000
WSCC	North Barn Farm (Eurogreen)		15,000
WSCC	Northwood Farm (TJ Group)		24,500
WSCC	Former Brickworks, Langhurstwood Road		115,000[24]
WSCC	Hobbs Barn, Climping		50,000
Total estimated C&D recycling capacity:			**447,000**
Total estimated recycling capacity at sites			**335,250[25]**

[24] Based on operator estimates (August 2018).

[25] Based on 75% of the total capacity at CD&E sites which is an average of the estimated recycling rate achieved at each site. Stakeholder engagement carried out during 2008/09 also revealed that overall CD&E recycling rates are between 70 and 80%.

Table 18: Secondary Aggregate Capacity Scenarios

Secondary Aggregate Recycling Capacity	Capacity Scenario 1 (Current Situation – Lancing Energy from Waste Plant) Figures in tonnes	Capacity Scenario 2 (Energy from Waste Plant + Ford Site) Figures in tonnes	Capacity Scenario 3 (Lancing Energy from Waste Plant + Ford Site + remaining capacity in WLP[26]) Figures in tonnes
Lancing Energy from Waste	11,000	11,000	11,000
Ford Energy from Waste		21,000	21,000
Remaining sites in WLP			24,000[27]
Total	**11,000**	**32,000**	**56,000**

[26] To meet the shortfall of non-inert recovery capacity of 270,000 as set out in Policy W1 of the Waste Local Plan 2014. The remaining capacity is calculated to be 130,000tpa (270,000 – 140,000 = 130,000tpa).

[27] An estimate of the amount of bottom ash that could be generated from the remaining WLP sites has been calculated using a conversion factor of 5.5. This is an average of the conversion factors of the Lancing and Ford Sites (4.5 and 6.6 respectively).

3. Balance between Demand and Supply

3.1.1 As previously stated, to be consistent with the NPPF the starting point for estimating future demand is information on sales over the previous 10 years and 'other relevant local information' (such as future demand for housing and other infrastructure). The authorities have considered 'other relevant local information' to calculate a figure for aggregate demand that factors in likely local changes in use of aggregate over the JMLP plan period, to 2033. A summary of the resulting forecasted demand is shown in Table 19. Table 19 also presents the total estimated likely available supplies for aggregates and the net supply requirements.

3.1.2 West Sussex, and neighbouring authorities, are heavily reliant on imports to its wharves and railheads for crushed rock and marine sand and gravel. Indeed, imports of marine won sand and gravel to the county appear to have compensated for reduced land-won sharp sand and gravel extraction. Historically soft sand in West Sussex has largely been met from land-won sources though data suggests that marine won sand could possibly provide a source of supply in future (AM15, AM16, AM17). There is sufficient capacity in wharves and railheads to meet future demands for the importation of crushed rock and sand and gravel (see Table 19).

3.1.3 There are sufficient reserves of sharp sand and gravel to meet forecasted demand for this aggregate type and therefore no requirement for additional facilities are planned for through the JMLP (quarries, wharves, or railheads).

3.1.4 Soft sand has particular uses which are related to its particular qualities and so this is considered separately from sharp sand and gravel. As shown in Table 19, the demand for soft sand (based on average 10-year annual sales and other local relevant information) could be as high as 5,596,887 tonnes and current permitted reserves are 2,745,000. Therefore, there may be a shortfall of up to 2,832,887 tonnes of soft sand to 2033. This shortfall is being address through the single issue soft sand review of the JMLP.

3.1.5 There is significant capacity for increasing levels of recycled and secondary aggregate production, with the 10- year annual average of production currently 465,100 tonnes, whilst the capacity is 848,000 tonnes per annum.

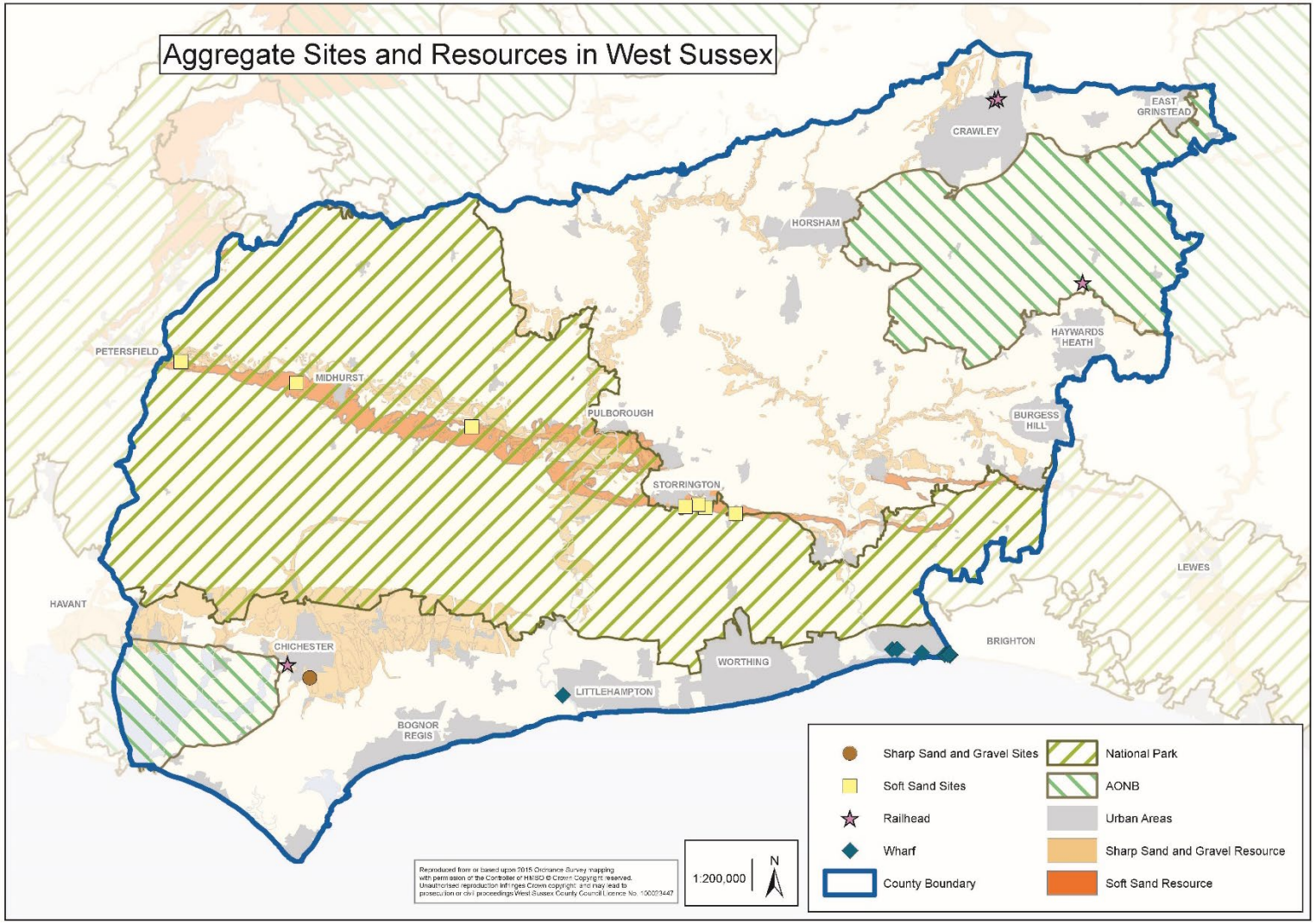
3.2 Proposed Monitoring Arrangements

3.2.1 Provision to meet demand for aggregate, as set out in this LAA is considered in the JMLP which was prepared jointly with the South Downs National Park Authority and adopted in July 2018. The LAA will be updated on an annual basis as part of the Annual Monitoring Report.

Table 19: Total demand for all sources of aggregate over the JMLP period (2018-2033)

Aggregate	10-year Average Sales/Landings (2008-2017) (tonnes)	Total Requirement to 2033 based on 10-year Average Sales/Landings (tonnes)	Annual Requirement taking into account other relevant local information	Total Requirement to 2033 (including relevant local information) (tonnes)	Total Estimated Supply (tonnes) or Capacity	Net Additional Requirement (tonnes) (-ve values = surplus)
Sharp Sand and Gravel	15,468	232,026	23,063	345,951	900,000 (permitted reserves)	-554,049
Soft Sand	293,737	4,406,062	372,459	5,586,887	2,754,000	+2,832,887
Marine-won Sand and Gravel	1,052,771		1,569,681		Total annual operational capacity: 2,070,000	Annual capacity surplus: 337,336
Crushed Rock (landed at wharves)	108,933 (sales)		162,983			
Crushed Rock (rail imported)	574,858		857,113		Total annual capacity: 1,380,000	Annual capacity surplus: 339,014
Sand and Gravel (rail imported)	123,322		183,873			
Secondary and Recycled Aggregates	465,100				848,000	Annual capacity surplus: 382,900

Appendix A: LAA Map



Appendix B: Effect of Housing and Road Construction on Aggregate Supply and Demand

B1. The CLG/BGS (June 2013) Mineral Planning Factsheet: Construction Aggregates sets out an overview of aggregate supply in the UK, and its main purpose is to inform the land use planning process. Table 1 of the factsheet sets out the principal uses of primary aggregates in Great Britain, based on sales in 2011. This has been used to calculate the amounts of sand and gravel (including soft sand) and crushed rock that may be used in both housing and highways maintenance/improvements. The data indicates that:

- 91% of total sand and gravel (including soft sand) sold may be used in the construction of homes;
- 35% of total crushed rock sold may be used in the construction of homes;
- 33% of total sand and gravel (including soft sand) may be used in the construction and maintenance of roads;
- 78% of total crushed rock sold may be used in the construction and maintenance of roads.

B2. In light of this, when assessing the future demand for aggregate it is considered reasonable to assume that changes to the construction and maintenance of housing and roads will have an important effect.

B3. The LAA sets out how this has been factored into various demand scenarios for different aggregate types and this appendix shows how the relevant percentage factors applied have been derived.

Housing

B4. Housing completion data indicates that an average of 3,245 dwellings have been built annually in West Sussex over the 10-year period of 2008/09 – 2017/18. Meanwhile, planned housing, based on an analysis of existing or emerging local plans of local planning authorities within West Sussex, suggests that 4,114 dwellings will be built per annum up until 2033. This represents an increase of 26.8% when compared to the 10-year average.

B5. As aggregates are transported across administrative boundaries, future housing development in neighbouring areas may also influence the demand for aggregate and so needs to be considered. Table B1 therefore sets out planned housing in West Sussex as well as all neighbouring areas and shows the percentage change when compared to actual housing completions.

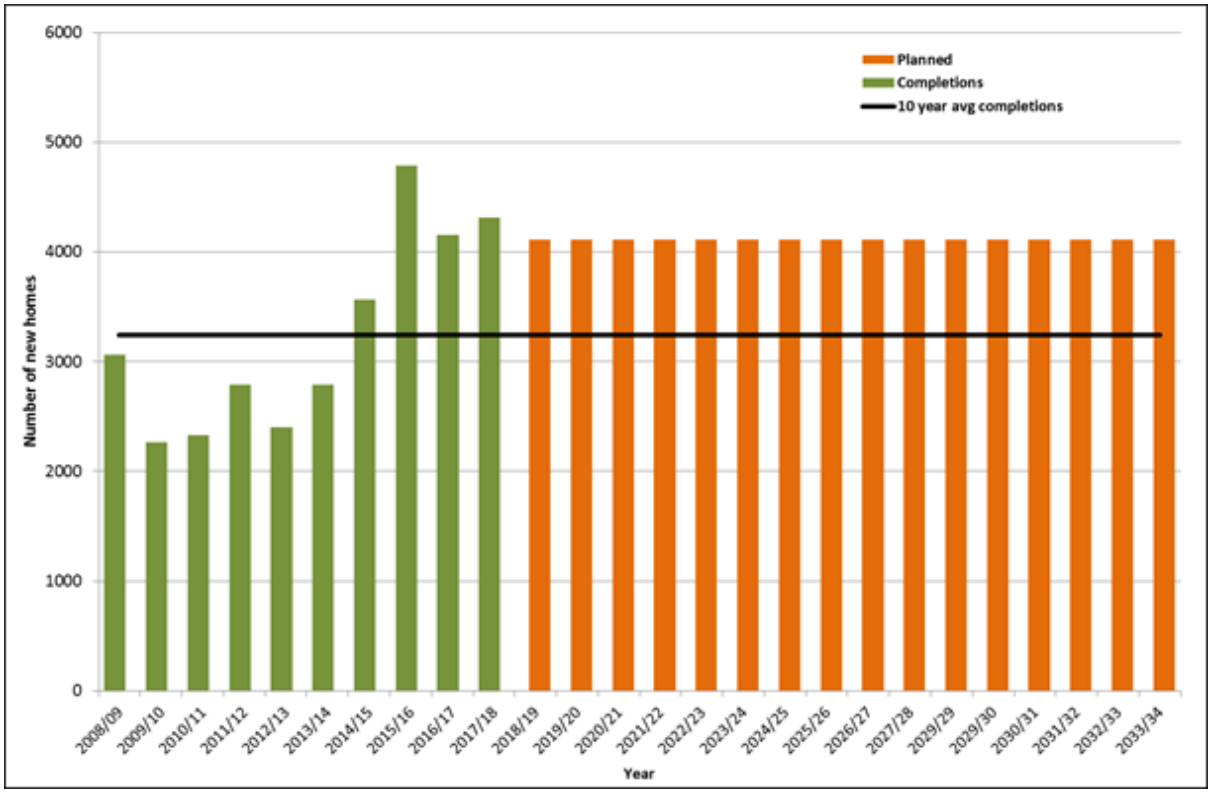


Figure B1: Planned and completed housing in West Sussex (2008/09-2033/34)

Table B1: Planned housing growth in West Sussex and Neighbouring Areas

Area	Average Completions per annum (2008/09-2017/18)	Average Planned Housing per annum (2018-2033)[28]	% Change
Brighton & Hove	485[29]	784	61.8%
East Sussex	1,308[30]	2,069	52.2%
Hampshire	5,486[31]	7,008	27.8%
Surrey	2,646[32]	3,118	17.8%
West Sussex	3,245	4,114	26.8%
Average for West Sussex, East Sussex, Brighton & Hove, Surrey, and Hampshire	13,169	17,093	29.8%

[28] Planned housing data is based on various D&B Local Plans, with data rolled forward to match JMLP plan period to give estimates of average planned housing per annum.

[29] Brighton & Hove City Council, Authority Monitoring Report (2016/17) covering the 10-year period 2007/0–2016/17.

[30] East Sussex County Council, East Sussex Figures website, accessed September 2018.

[31] Hampshire County Council, Land Availability Monitoring System, accessed September 2018.

[32] Surrey County Council, Surrey-I website, accessed September 2018.

B6. If the number of housing completions are to increase, then it might be reasonable to assume that the demand for aggregates needed to build this housing will also increase. Table B1 shows that a 26.8% increase in housing completions will occur in West Sussex, which has been factored into the demand scenarios (as with the previous four years), set out within this LAA, against the 10-year average of sales of for aggregates (where relevant).

Planned Highway Improvement (Crushed Rock)

B7. Evidence has been gathered on planned highway improvement and maintenance works, which require aggregate (generally crushed rock) use. Trunk roads are managed by Highways England, and non-trunk roads are managed by the Highways Authority (WSCC).

Non-Trunk Roads

B8. An indication of the level of non-trunk road construction and maintenance for the previous 10 years in West Sussex is provided by an analysis of the highways & transport revenue & capital expenditure. This shows an annual average spend of £45.3M during the period 2006/07 to 2015/16 (see Figure B2).

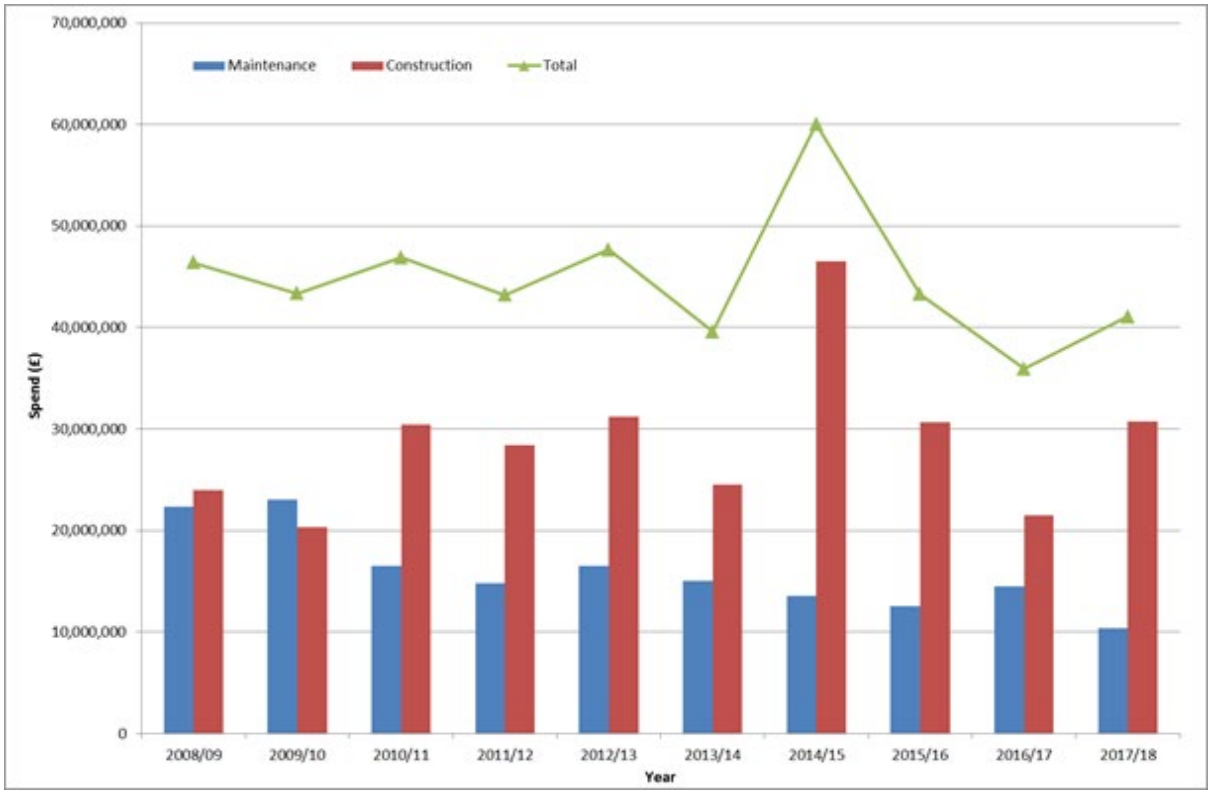


Figure B2: West Sussex highways and transport capital and revenue expenditure (2008/09-2017/18)

B9. There is limited information available on anticipated long-term highways spending, with the only information readily available relating to grants from the Local Growth Fund for the period 2015-2021. This relates to those schemes which are named and committed, as set out in the Coast to Capital Growth Deal. West Sussex local transport funding is set out in Table B2.

Table B2: West Sussex Local Transport Funding Sources

Year	Construction (£m)[33]	Maintenance (£m)[34]	Local Growth Funding (£m)[35]	Total (£m)
2011/12	4,292	10,519	n/a	14,811
2012/13	4,578	10,447	n/a	15,025
2013/14	4,578	10,610	n/a	15,188
2014/15	6,348	10,043	n/a	16,481
2015/16	3,734	13,723	945	18,399
2016/17	3,734	12,581	706	17,021
2017/18	3,743	12,200	3,387	19,321
2018/19	3,734	11,043	10,817	25,594
2019/20	3,734	11,043	14,617	29,394
2020/21	3,734	11,043	17,432	32,209
2021/22[36]	3,734	11,043	29,780	44,557
2022/23[37]	3,734	11,043	6,205	20,989

B10. Evidence from the Local Growth Funding, which is expected in West Sussex, suggests an average increase of £9.9M per annum[38]. Between 2011 and 2015, the average local transport spending per annum was £15.4M, whilst the average spending between 2016 and 2023 is expected to be £25.9M per annum. This is a total increase of £9.9M during the period 2016-2023 when compared to 2011-2015. **This equates to an increase of 22.3%[39] when compared to previous spending levels.**

B11. Due to the fact that East Sussex and Brighton & Hove rely on crushed rock landed at wharves at Shoreham to meet demands for aggregates in highways works, an assessment of spending was considered for those areas also (Table B3).

[33] DfT – Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2015/16 to 2020/21.

[34] DfT – Highways maintenance funding allocations: 2015/16 to 2020/21 (December 2014).

[35] Named and committed schemes, as set out in the Coast to Capital Growth Deal, taking account of updated information on the schemes on total spending planned.

[36] The data used for construction and maintenance have been rolled forward and are therefore a best guess.

[37] The data used for construction and maintenance have been rolled forward and are therefore a best guess.

[38] The average between 2015/16 and 2022/23 from Growth Funding.

[39] £9.9M equates to 22.3% of the 10-year average spending on highways construction and maintenance.

Table B3: East Sussex and Brighton & Hove Local Transport Funding Sources

Year	Construction (£m)[40]	Maintenance (£m)[41]	Local Growth Funding (£m)[42]	Total (£m)
2011/12	12,664	6,324	n/a	18,988
2012/13	12,233	6,971	n/a	19,204
2013/14	11,318	6,744	n/a	18,062
2014/15	12,221	8,034	n/a	20,255
2015/16	5,978	12,254	13,500	32,732
2016/17	5,978	12,150	19,000	37,128
2017/18	5,978	11,783	20,000	37,761
2018/19	5,978	10,665	8,000	24,643
2019/20	5,978	10,665	8,000	24,643
2020/21	5,978	10,665	8,000	24,643

B12. The local growth funding for East Sussex and Brighton & Hove is estimated to be on average £12.75M per annum during the period 2015-2021. When compared to previous spending, it is calculated that the increase in Local Growth Funding equates to **51.7%** during at least the first five years of the Joint Minerals Local Plan's Plan period, when compared to the 10-year average spend (£21.5M).

B13. For the purposes of establishing possible future aggregate demand scenarios that may result from an increase in highways maintenance and construction, a growth factor has been applied to crushed rock sales as crushed rock is the type of aggregate used in this activity. In 2009, 199,000 tonnes of crushed rock were sold in East Sussex and Brighton & Hove of which, 1%, was imported from West Sussex. Although imports of crushed rock at East Sussex have begun at Newhaven Depot, importation of crushed rock from West Sussex is expected to continue, although there were no obtainable records from the 2014 National survey. To take account of the exports of crushed rock to East Sussex, the proportion of crushed rock coming from West Sussex (1%) has been forecast to grow by 51.7% (i.e. to 1.52%). (See marine landed crushed rock demand scenarios 4 and 5, Table 12).

Trunk Roads

B14. The average annual spend on the improvement and maintenance of trunk roads in West Sussex is difficult to ascertain due to the short term and commercial nature of the contracts between Highways England and the Area contractors. Highways England has confirmed that there will be a requirement for surfacing materials, and hence aggregates, over the lifetime of the new contract. The amount of aggregate required for trunk road improvement schemes will be dependent on future Government budget allocations, which have

[40] DfT – Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2018/19 to 2020/21.

[41] DfT – Highways maintenance funding allocations: 2015/16 to 2020/21 (December 2014).

[42] Named and committed schemes, as set out in the Coast to Capital Growth Deal (July 2014)

not yet been announced. The following trunk road improvement schemes are proposed in West Sussex:

- A27 Chichester improvement;
- A27 Worthing to Lancing improvements;
- A27 Arundel bypass.

B14. As these kinds of improvement works have been undertaken in the past and are therefore reflected in data on past demand, it is considered reasonable to assume that aggregate demand for trunk road maintenance and improvements in future will not increase future demand.

Future Demand for Aggregates Use in Roads

B15. For the purposes of forecasting future demand for aggregates use in roads, the assumption being made is that, if spending on the construction and maintenance of roads is to increase by 22.3% (in West Sussex), the demand for aggregates will also increase by 22.3%. This factor has therefore been used in the demand scenarios, set out within this LAA, against the 10-year average of sales of Crushed Rock. A further two demand scenarios for marine landed crushed rock have been prepared to account for demand from East Sussex and Brighton & Hove.

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