

West Sussex Joint Minerals Local Plan

**Assessment of Need for Aggregates:
Local Aggregate Assessment 2020**

April 2022



Working in Partnership



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Contents

Executive Summary	1
West Sussex LAA Dashboard 2021	2
1. Introduction	3
1.1. The Managed Aggregate Supply System.....	3
1.2. What is a Local Aggregate Assessment	3
1.3. West Sussex Joint Minerals Local Plan.....	4
1.4. National and Regional Context.....	4
National and Regional Guidelines for Aggregates Provision.....	4
Policy on National Parks.....	5
1.5. Consultation Arrangements	5
2. Aggregates in West Sussex	6
2.1. Supply Options.....	6
Geology and landscape	6
2.2. Land-won sand and gravel	7
Other Relevant Local Information Affecting Aggregate Supply and Demand	9
Sharp Sand and Gravel.....	10
Soft Sand	11
Imports and exports of land-won sand and gravel	12
Current supply of land-won sand and gravel	13
Potential constraints to future land-won supply	16
Land-Won Sand and Gravel Summary	17
2.3. Marine-Won Sand and Gravel	18
Use of marine-won aggregate.....	18
Pattern of previous landings and sales and current demand for marine-won aggregate	19
Future Demand for Marine-won Sand and Gravel.....	21
Other Relevant Local Information	21
Imports and exports	21
Current supply of marine-won sand and gravel	22
Marine-Won Sand and Gravel Summary	22
2.4. Sand and gravel imported by rail	23
Pattern of previous sales and current demand for sand and gravel imported by rail.....	23
Future Demand for Sand and Gravel Imported by Rail.....	25
Current supply of rail imported sand and gravel	25
Rail Imported Sand and Gravel Summary	26
2.5. Crushed rock.....	26
Pattern of previous and current demand for crushed rock	26
Future Demand for Crushed Rock Imports from Wharves.....	28
Future Demand for Crushed Rock Imports to Railheads	30
Imports and exports of crushed rock	30
Current supply of crushed rock	31
Crushed Rock Summary	31
2.6. Secondary/Recycled Aggregates	32

Pattern of previous and current demand for recycled and secondary aggregate.....	32
Recycled and Secondary Aggregates Summary:	35
3. Balance Between Demand and Supply	36
3.1. Estimating Demand.....	36
3.2. Proposed Monitoring Arrangements	36
Appendix A: LAA Map	38
Appendix B: Effect of Housing and Road Construction on Aggregate Supply and Demand	40
Housing.....	40
Planned Highway Improvement (Crushed Rock)	42
Non-trunk Roads	42
Trunk Roads	44
Future demand for aggregates use in roads	45
References	46

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 JMLP which has been prepared jointly by WSCC and the SDNPA. The LAA incorporates the findings from the latest round of evidence gathering during 2019 and 2020. 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 provide a landbank of between 5.9-7.9 years based on forecasted demand values, which is based on the three-year average and the 10-year average sales (taking account of other local relevant information) for the plan period, respectively.
- Soft sand resources are constrained by being situated in the South Downs National Park (and its setting). Existing reserves are sufficient to supply soft sand at levels equivalent to the 10-year average sales for 6.1 years, and, taking account of relevant local information, for 4.8 years. The JMLP allocates three sites for future soft sand extraction, two of which are in the South Downs National Park.
- 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.

¹ See para 207(a).

West Sussex LAA Dashboard 2021

Source	2020 Sales (mt) (2019 sales)	Trend (previous year sales)	10-year Avg Sales (mtpa) (2011-2020)	3-year Avg Sales (mt) (2018-2020)	Annual Provision Rate (mtpa) ²	Reserves (mt)	Landbank (years) (based on APR)	Capacity (mtpa)	Comments
Sharp Sand & Gravel (SS&G)	0.109 (0.100)	↑ Up	0.056	0.111	0.083/0.111 ³	Confidential	7.9 / 5.9	0.250	There is only one dedicated SS&G site (permitted reserve) at which operations commenced in 2017. Incidental sales from soft sand sites account for 60% of total SS&G sales during the 10-year period 2011-20, and 34% of total SS&G sales during the three-year period 2018-20.
Soft Sand	0.289 (0.303)	↓ Down	0.282	0.299	0.365	1.736	4.8	0.502	There are three allocations for soft sand in the Joint Minerals Local Plan.
Recycled/ Secondary Aggregates	0.236 (0.388)	↓ Down	0.381	0.346	0.381	-	-	0.613 ⁴	Data derived from EA WDIs, and reporting on 2019/20. Survey response rates too low for accurate figures.
Marine Sand & Gravel (landings)	1.023 (1.213)	↓ Down	1.152	1.167	1.719	-	-	2.070 ⁵	Headroom capacity of 0.203mtpa (using updated APR). Crown Estate landings data used for 2019 marine sand and gravel.
Rock Imports by Sea	0.110 (0.123)	↓ Down	0.099	0.108	0.148	-	-		Headroom capacity of 0.203mtpa (using updated APR).
Rail Depot Sales (sand and gravel)	0.076 (0.103)	↓ Down	0.093	0.095	0.137	-	-	1.380 ⁶	Headroom capacity of 0.296mtpa (using updated APR).
Rail Depot Sales (crushed rock)	0.587 (0.618)	↓ Down	0.643	0.627	0.948	-	-		Headroom capacity of 0.296mtpa (using updated APR).

² The Annual Provision Rate (APR) is an indicator for aggregates demand. The rates applied are those which show the highest theoretical requirement per annum (i.e., the 10-year average + the highest demand scenario).

³ Both the 10-year average derived APR (high growth scenario) and three-year average derived APR of are presented. The landbanks are 7.9 and 5.9 years respectively. There are three soft sand quarries in West Sussex that have produced incidental SS&G during the previous six years. In assessing any proposals for sharp sand and gravel extraction, both the 10- and 3-year average derived APRs and landbanks will be considered.

⁴ Total permitted capacity.

⁵ Total wharf capacity.

⁶ Total rail capacity.

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 of the PPG states that LAA should cover the following⁷:
- "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 64⁸, 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.
- 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

⁷ Paragraph: 062 Reference ID: 27-062-20140306

⁸ Paragraph: 064 Reference ID: 27-064-20140306

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. A Soft Sand Review of the JMLP was required following adoption of the Plan in July 2018. The partial review resulted in revisions to Policies M2 and M10 of the JMLP, in relation to the supply strategy for soft sand and the allocation of three sites for future extraction. The formal changes to the Plan were adopted in March 2021.
- 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 Plan includes a vision; strategic objectives; a suite of strategic policies; strategic site allocations and development management policies.
- 1.3.3. Previous versions of the LAA, dating back to 2014, informed the preparation of the Plan (and the subsequent soft sand review) 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.
- 1.3.4. In 2020, due to the impacts of the Covid-19 pandemic, there were delays in receiving data, including the results of the 4-yearly national aggregates survey (AM2019 Survey). It was not therefore possible to prepare a full LAA for 2020, and instead an "LAA Dashboard" was prepared making use of the best available data. This LAA now takes account of the results of the 4-yearly national aggregates survey (for 2019) as well as data for 2020.

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 Managed Aggregate Supply System (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 Surveys carried out for the years 2014 and 2019. A further national survey is expected to take place in 2024, reporting data for 2023.

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, and so national policy on development in National Parks needs to be taken into account⁹.

1.5. Consultation Arrangements

- 1.5.1. In accordance with the NPPF and PPG, this LAA will be subject to consideration and scrutiny by the South East England Aggregate Working Party (SEEAWP).

⁹ NPPF Paragraph 172.

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 and 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.

Geology and landscape

- 2.1.3. 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**.
- 2.1.4. **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.
- 2.1.5. 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.
- 2.1.6. 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 AONB designation includes a small area which contains potential sharp sand and gravel. The extent of these landscape designations is shown in **Appendix A**.
- 2.1.7. There are no indigenous sources of crushed rock in West Sussex, therefore, this aggregate is imported into West Sussex by rail or sea.
- 2.1.8. 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.

- 2.1.9. 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.
- 2.1.10. 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.

2.2. Land-won sand and gravel

- 2.2.1. Past sales figures for land-won sand and gravel provides an indication of the contribution that the land-won sources of supply has made to the total supply of aggregates in West Sussex.
- 2.2.2. Annual land-won sales data over the past 10 years is presented in Table 1 and Figure 1. This shows that sales had fluctuated, with sales as low as 238,577 tonnes (2014), and as high as 430,478 tonnes in 2016 during the 10-year period since 2011. The average annual sales figure over the 10-year period for sand and gravel is 323,818 tonnes and the average for the past three years is higher (410,707 tonnes).
- 2.2.3. 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 83% soft sand and 17% sharp sand and gravel. This equates to 282,187 tonnes of soft sand and 56,444 tonnes for sharp sand and gravel (10-year annual averages).
- 2.2.4. 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 rose from a low of 2,400 in 2012/13 to a high of 4,784 in 2015/16. During the same period, total sand and gravel sales also increased, from 1.30mt (2013) up to 1.67mt (2016). Housing completions have remained relatively steady since 2015/16, as have sales of all sand and gravel. In 2018, housing completions were almost back at the levels seen in 2015 (up to 4,675), however have fallen in 2019, as did aggregate sales. 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.
- 2.2.5. Figure 1 shows that there is some correlation between aggregate sales and housing completions in West Sussex.

Table 1: Sales of Land Won Sand and Gravel in West Sussex 2011-2020

Year	Sales (tonnes)
2011	284,000
2012	284,000
2013	276,692
2014	238,577
2015	244,594
2016	420,000
2017	348,196
2018	430,478
2019	403,689
2020	397,954
3-Year Average (2018-2010)	410,707
10-Year Average	338,631 (282,187 tonnes soft sand 56,444 tonnes sharp sand and gravel¹⁰)

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.

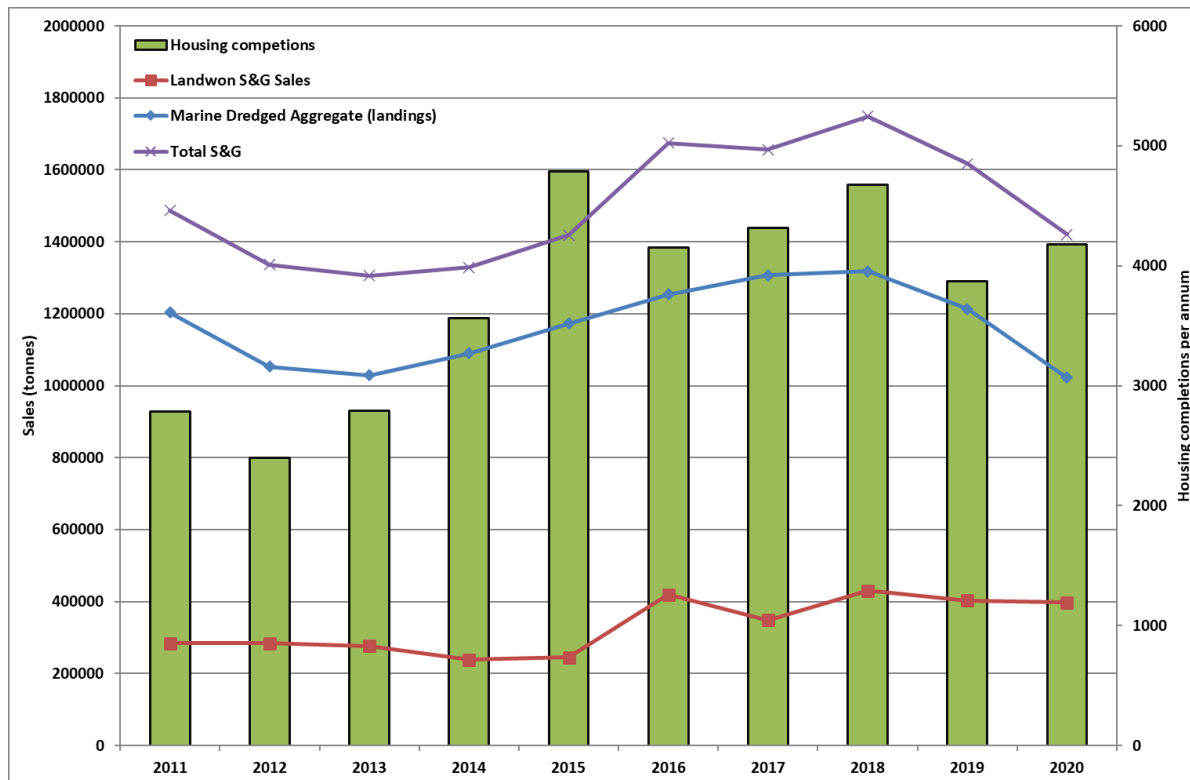


Figure 1: Sales of Sand and Gravel in West Sussex, compared to housing completions 2011-2020

¹⁰ Figures may not add up to 83% and 17% exactly due to rounding.

2.2.6. In the Southeast, the overall trend of sales is similar to that seen in West Sussex, as can be seen in Figure 2, that presents sales between 2010 and 2019. There was a general decline in sales during the period 2010-2014, before a steady increase of sales until 2018. Sales in 2019 and 2020 fell across both West Sussex and the wider South East.

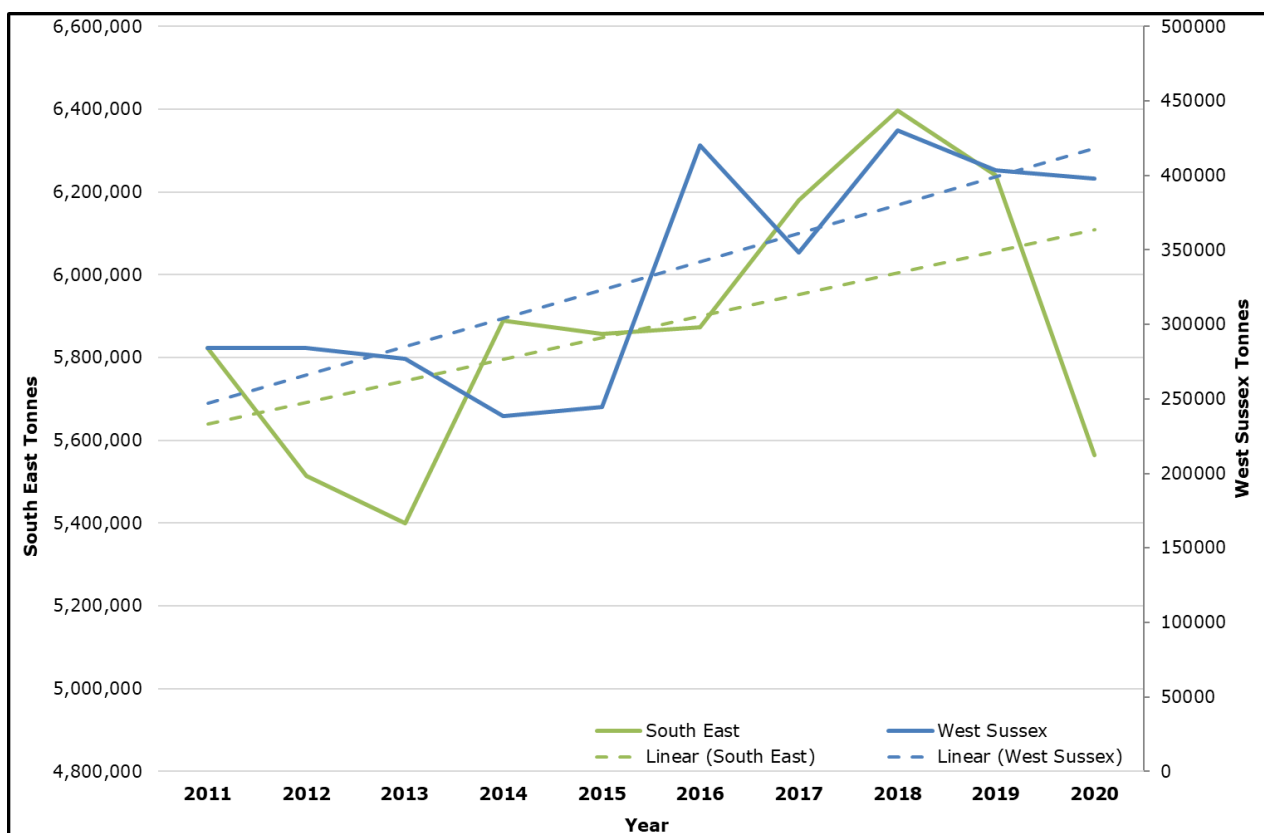


Figure 2: Land-won sand and gravel sales – South East England and West Sussex (2011-2020)

Other Relevant Local Information Affecting Aggregate Supply and Demand

- 2.2.7. 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. Scenarios were developed taking into account two growth factors (Housing = 29.4%, Construction of roads = 18%). Appendix B explains how these factors have been derived. This includes assumptions regarding the level of different aggregate supply related to these uses.
- 2.2.8. 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”.
- 2.2.9. Further other relevant local information includes the fact that mineral resources, including soft sand, are constrained by the South Downs National Park designation and AONBs in West Sussex.

Sharp Sand and Gravel

- 2.2.10. Based on the 10-year average split of sales (83% soft sand and 17% sharp sand and gravel), the 10 years annual sales data for sharp sand and gravel is 56,444 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 111,335 tonnes. It must be noted that sales of sharp sand and gravel includes incidental sales from soft sand quarries (which accounts for 60% of the 10-year average, and in 2020, accounted for 44% of total sales).
- 2.2.11. Existing reserves are provided by a single existing permission at Kingsham gravel site which has an estimated remaining yield of circa 650,000 tonnes.
- 2.2.12. Forecast demand scenarios have been established below based on the following assumptions using the data presented in Appendix B.
- Assumption 1: Housing is projected to grow by 29.4%.
 - Assumption 2: Spending on road maintenance/improvements is expected to increase by 18% in West Sussex.
 - Assumption 3: Up to 88% of sand and gravel may be used in homes.
 - Assumption 4: Up to 37% of sand and gravel may be used on road maintenance/improvements.
- 2.2.13. The annual demand values associated with each of these scenarios is set out in Table 2. The table also shows the extent of any predicted shortfall having regard to the existing reserves.

Table 2: Sharp sand and gravel demand scenarios 2021-2033 (tonnes)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10-year average	56,444	56,444	56,444
Additional demand for housing	n/a	14,603	16,595
Additional demand for roads	n/a	3,759	10,160
Total Annual requirement	56,444	74,807	83,199
Total requirement over Plan period (2021-2033)	733,778	972,491	1,081,589
Current reserves	653,470	653,470	653,470
Shortfall (+ve)/surplus (-ve)	80,308	319,021	428,119

- 2.2.14. The calculated maximum average annual demand (demand forecast scenario 3) is 83,199 tonnes, which suggests that a total of 1.08mt 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 8 years (calculated by dividing the reserve figure by the annual maximum demand figure). **Therefore, using the 10-year average (demand**

forecast 3), there is a theoretical shortfall of land-won sharp sand and gravel reserves in West Sussex over the remaining plan period to 2033.

- 2.2.15. However, National Planning Practice Guidance (PPG paragraph 064) states that, in addition to considering the 10-year average, MPAs should also consider average annual sales over the previous three years when identifying the general trend of demand. Using the three-year sales average of 111,335 tonnes per annum, the landbank for land-won sharp sand and gravel would be 5.9 years (that is, the reserve figure divided by the three-year average tonnes). **Therefore, using a three-year average, the requirement would be 1,447,359 tonnes (three-year average x 13 years) resulting in a theoretical shortfall of 793,889 tonnes over the remaining plan period to 2033.**
- 2.2.16. The adopted Joint Minerals Local Plan contains a criteria-based policy (Policy M1) that allows windfall sites to come forward to meet identified needs and to maintain a steady and adequate supply. Any proposals that do come forward will be judged on their merits against the policies of the Plan and all other material considerations. In determining the need for such proposals, consideration will be given by the County Council to both the 10-year and three-year average calculations of demand.

Soft Sand

- 2.2.17. Based on the 10-year average split of sales (83% soft sand and 17% sharp sand and gravel), the 10 years annual sales data for soft sand is 282,187 tonnes. The three-year average for annual soft sand sales in West Sussex is 297,005 tonnes.
- 2.2.18. Existing reserves are provided by several sites (see Table 6) and currently amount to 1,736,128 tonnes.
- 2.2.19. Forecast demand scenarios for land-won soft sand have been established using the following key assumptions based on data presented in Appendix B:
- Assumption 1: Housing is projected to grow by 29.4%
 - Assumption 2: Up to 88% of sand and gravel may be used in the construction of residential dwellings
- 2.2.20. 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 282,187 tonnes, which are set out in Table 4.
- 2.2.21. 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.

Table 3: Soft sand demand forecasts 2021-2033 (tonnes)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1 and 2	1
10-year average	282,187	282,187	282,187
Additional demand for housing	n/a	73,007	82,963
Total Annual requirement	282,187	355,194	365,150
Total requirement over Plan period (2019-2033)	3,668,429	4,617,525	4,746,947
Current reserves	1,736,128	1,736,128	1,736,128
Shortfall	1,932,301	2,881,397	3,010,819

- 2.2.22. Table 3 suggests that additional supplies of between 1.93-3.01mt 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 6.2 years (calculated by dividing the reserve figure of 1,736,128 tonnes by the 10-year average of 282,187). The landbank based on the highest forecast annual demand (demand forecast option 3) is 4.8 years (1,736,128 tonnes divided by 365,150).
- 2.2.23. 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 (299,372 tonnes), and current reserves, the landbank is currently 5.8 years. The requirement over the plan period would theoretically be 3,891,832 tonnes (three-year average x 13), and therefore the shortfall would be 2.15mt tonnes.
- 2.2.24. At present, there are seven permitted soft sand sites in the Plan Area, as set out in Table 5. These sites have a total reserve of 1,736,128 tonnes.
- 2.2.25. The JMLP contains a criteria-based policy for soft sand extraction (Policy M2) and allocates three sites for future soft sand extraction, that have a potential yield of 2.68 million tonnes.

Imports and exports of land-won sand and gravel

- 2.2.26. 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.
- 2.2.27. 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 undertaken in 2020, reporting on sales from 2019 – see [Aggregate minerals survey for England and Wales 2019](#). The data presented below comes from the 2019 survey obtained from the BGS.
- 2.2.28. Due to confidentiality restrictions, import and export data figures were provided by BGS as a percentage range of total consumption for each Mineral Planning Authority, to provide an indication of the relative importance of each supplying Mineral Planning Authority. Table 4 shows that in 2019 up to 125,000 tonnes of sand and gravel was

imported into West Sussex, whilst up to 97,000 tonnes of sand and gravel was exported from West Sussex. Therefore, for land-won sand and gravel, West Sussex was likely a net-importer in 2019 (of up to 28,000 tonnes).

Current supply of land-won sand and gravel

- 2.2.29. 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 5 and shown in **Appendix A**. The total permitted reserve of land won sand and gravel in West Sussex was 3,095,437 tonnes.

Table 4: Origin/Destination of Land won Sand and Gravel Imported/Exported to/from West Sussex, 2019

Origin/Destination	Imports to West Sussex (tonnes)	Exports from West Sussex (tonnes)
Buckinghamshire & Milton Keynes	0	1-13,759
East Sussex and Brighton and Hove	0	18,400-36,800
Hampshire and Isle of Wight	1-3,059	1-9,469
Kent and Medway	3,060-30,600	0
Surrey	30,600-61,200	3,700-37,000
South East Region Subtotal	33,661-94,859	22,102-97,028
Essex	3,060-30,600	0
Outside South East Region Subtotal	3,060-30,600	0
Overall Total imports/exports (excluding West Sussex consumption)	36,721-125,459	22,102-97,028

Source: Data obtained from the British Geological Survey and was based on the 2019 Aggregate Minerals Survey.

Note: Ranges are provided due to confidentiality restrictions.

Table 5: Permitted Sand and Gravel Quarries in West Sussex (2020)

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	Dudman Group Ltd	Active – Sand extraction
SDNP	Minsted Sandpit, Minsted Lane, Stedham	Dudman Group Ltd	Inactive
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, West Sussex	Dudman Group Ltd	Active – Sand & gravel extraction

NB: 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.

Potential constraints to future land-won supply

- 2.2.30. 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 was considered through the soft sand review of the JMLP.
- 2.2.31. 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.
- 2.2.32. 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.
- 2.2.33. 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.
- 2.2.34. 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 was 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 was sold from South East wharves (Table 8). Evidence collated via the annual Aggregate Monitoring Surveys shows that during the three-year period 2016-2018, an annual average of around 39,773 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 soft sands being 23,278 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 20).

Land–Won Sand and Gravel Summary

Past to Current Demand

- Sales of land won sand and gravel have generally fallen during the last 15 years, from a high of 784,000 tonnes in 2004 to as low as 238,577 tonnes in 2014. Sales had fluctuated since, with 420,000 tonnes sold in 2016, but only 348,196 tonnes sold in 2017, and an increase in 2018, up to 430,478 tonnes. Sales have fallen in 2019 and 2020.
- Average sales of land won sand and gravel over the last 10 years is **332,818 tonnes**.
- Average sales of soft sand over the last 10 years is **282,187 tonnes**.
- Average sales of sharp sand and gravel over the last 10 years are **56,444 tonnes** whilst the average sales over the last three years is 111,335 tonnes.

Other Relevant Local Information

- For sharp sand and gravel, based on the calculated maximum annual demand (demand forecast scenario 3), there may be insufficient levels of permitted reserves to 2033, with a potential shortfall of up to 0.428mt.
- For soft sand, when applying a rolling ten-year average and other relevant local information, an additional **1.93–3.01mt** are needed over the Plan period (to 2033). For soft sand, when applying the three-year average, shortfalls would be lower, at an additional 2.15mt being required over the plan period.

Imports and Exports (of land-won and marine-won sand and gravel)

- in 2019 up to 0.125mt of sand and gravel was imported into West Sussex.
- In 2019, up to 0.097mt of sand and gravel was exported from West Sussex.
- As such, West Sussex is likely a **net importer** of sand and gravel.

Supply

- In 2020, the total permitted reserve of land-won sand and gravel was 2,389,598 tonnes.
- There are no allocations and a criteria-based policy (M1) for sharp sand and gravel in the Joint Minerals Local Plan.
- There are three allocations, two of which are in the SDNP, and a criteria-based policy (M2) for soft sand in the Joint Minerals Local Plan.

2.3. Marine-Won Sand and Gravel

- 2.3.1. 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.
- 2.3.2. The Joint Minerals Local Plan safeguards wharves from development which may prevent or prejudice their operation, and to ensure that a steady and adequate supply of minerals can be maintained.
- 2.3.3. 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.
- 2.3.4. 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 129.72 square km¹¹. 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.
- 2.3.5. 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 largest dredging region in terms of permitted tonnages. There are currently 14 production licences allowing the extraction of 7.83 million tonnes per year, and an estimate of 23 years of production permitted¹².

Use of marine-won aggregate

- 2.3.6. Marine-won aggregates from the 'South Coast' 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 countries¹³. As marine and land won aggregates are geologically similar, they can be easily substituted for one another in many uses.
- 2.3.7. 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 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

¹¹ Crown Estate (2021). Marine Aggregates Extraction 2020 – 23rd Annual Report

¹² Crown Estate (2021). Marine Aggregates Capability & Portfolio 2020

¹³ Crown Estate (2018). Marine Aggregates Extraction 2017 – 20th Annual Report

levels of chlorides but concludes that marine sands show no aesthetic problems associated with sand source¹⁴.

- 2.3.8. 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.¹⁵ 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 programme¹⁶.
- 2.3.9. 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

- 2.3.10. Landings of marine-won aggregate at wharves in West Sussex have stayed relatively steady over the last 10 years, peaking at 1.32 million tonnes in 2018. There has been a fall in sales in 2020 (down to 1.02 million tonnes), which may be attributed to the Covid pandemic.
- 2.3.11. 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 and Hove).

¹⁴ British Marine Aggregate Producers Association

¹⁵ [Offshore Mineral Resource Maps](#).

¹⁶ British Geological Survey (2013) The Mineral Resources of the English Channel and Thames Estuary

Table 6: Landings and sales of marine-won sand and gravel at West Sussex Wharves 2011-2020 (tonnes)

Year	Landings of marine-won sand and gravel (tonnes)	Sales of marine-won sand and gravel from wharves (tonnes)
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
2018	1,318,508	1,347,922
2019	1,213,456	1,295,248
2020	1,022,627	1,466,938
3-Year Average	1,184,864	1,370,036
10-Year Average	1,166,539	1,482,518

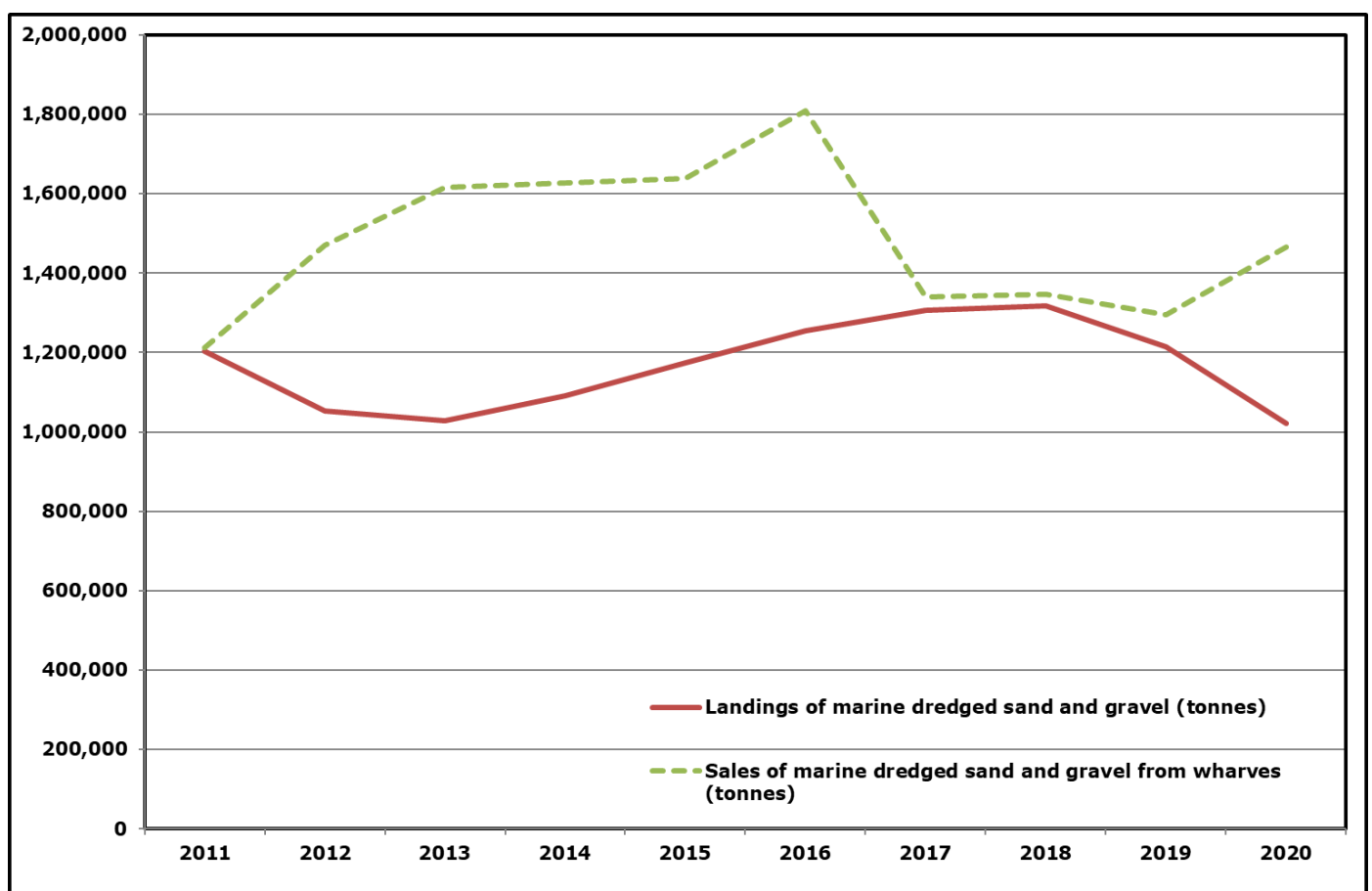


Figure 3: Landings and sales of marine-won sand and gravel at West Sussex Wharves 2011-2020 (tonnes)

Future Demand for Marine-won Sand and Gravel

- 2.3.12. 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.
- 2.3.13. Different scenarios on future demand have been derived based on different mixes of the following assumptions:
- Assumption 1: Housing is projected to grow by 29.4%;
 - Assumption 2: Spending on road maintenance/improvements is expected to increase by 18% in West Sussex;
 - Assumption 3: Up to 88% of sand and gravel may be used in homes;
 - Assumption 4: Up to 37% of sand and gravel may be used on road maintenance/improvements.

Other Relevant Local Information

- 2.3.14. A large amount of marine-won sand and gravel is exported to Brighton & Hove and East Sussex, where housing growth is predicted to grow significantly. For the purposes of forecasting demand, the projected growth of housing figure for West Sussex and neighbouring areas is applied (29.4%) has been used because it is considered a fair reflection, particularly as the actual number of homes is considerably higher on other areas. These forecasts build on the 10-year average of annual landings (1,166,539 tonnes) and are set out below in Table 7.

Table 7: Demand forecast scenarios for marine-won sand and gravel based on landings 2021-2033 (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 yr. avg. only)	1, 2, 3, and 4	1 and 2
10-year average	1,166,539	1,166,539	1,166,539
Additional demand for housing	n/a	301,807	342,963
Additional demand for roads	n/a	77,692	209,977
Total Annual requirement	1,166,539	1,546,038	1,719,479

- 2.3.15. The demand forecast based on landings data shows that demand could be as high as 1,719,479 tonnes per annum. If this is compared to the estimated capacity at wharves in West Sussex, there would be additional capacity available. The wharves do however also import crushed rock, therefore total annual capacity requirements for wharves are discussed later in this report.

Imports and exports

- 2.3.16. Shoreham Harbour in West Sussex supplies large amounts of marine-won sand and gravel (expected to be around 50%) to East Sussex and Brighton & Hove, 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, Hampshire, and Kent. In 2019, West Sussex imported materials from Portsmouth, London (namely the Borough of Barking & Dagenham), and Cardiff. West Sussex also exported materials to Surrey.

Current supply of marine-won sand and gravel

2.3.17. 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. The JMLP safeguards a number of wharves, including one for its potential capacity. Capacity of West Sussex wharves is 2,070,000tpa, a reduction in capacity following the closure of one wharf which relocated from the Western Harbour Arm in Shoreham to the Eastern Harbour Arm (to Britannia 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.
- 7.83mt 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 between 2012 (1.05mt) and 2018 (1.32mt), after which there has been a small reduction, particularly in 2020, that is likely to do with the impacts of Covid-19 between.
- The 10-year average of annual marine-won sales is 1,908,118 tonnes and 1,151,997 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 1,719,479 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 and 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 since the adoption of the JMLP. This is following the close on 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 2011 and 2020 (1,318,508 tonnes in 2018), there would be a theoretical minimum surplus capacity of 751,492 tonnes.
- Marine-won landings ceased in Littlehampton in 2005, although crushed rock landed at the wharf continues to serve the adjacent coated roadstone plant.

2.4. Sand and gravel imported by rail

- 2.4.1. 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 builder's 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

- 2.4.2. Table 8 and Figure 4 show that sales of sand and gravel from railheads within West Sussex have fluctuated over the last 10-year period, peaking at 146,585 in 2012 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 92,782 tonnes and the three-year average is 95,492 tonnes.

Table 8: Imports of sand and gravel to West Sussex Railheads 2009-2018 (tonnes)

Year	Sales of Sand and Gravel from Railheads
2011	88,845
2012	140,466
2013	146,585
2014	41,521 ¹⁷
2015	63,019
2016	76,961
2017	83,947
2018	107,678
2019	103,084
2020	75,715
3-Year Average	95,492
10-Year Average	92,782

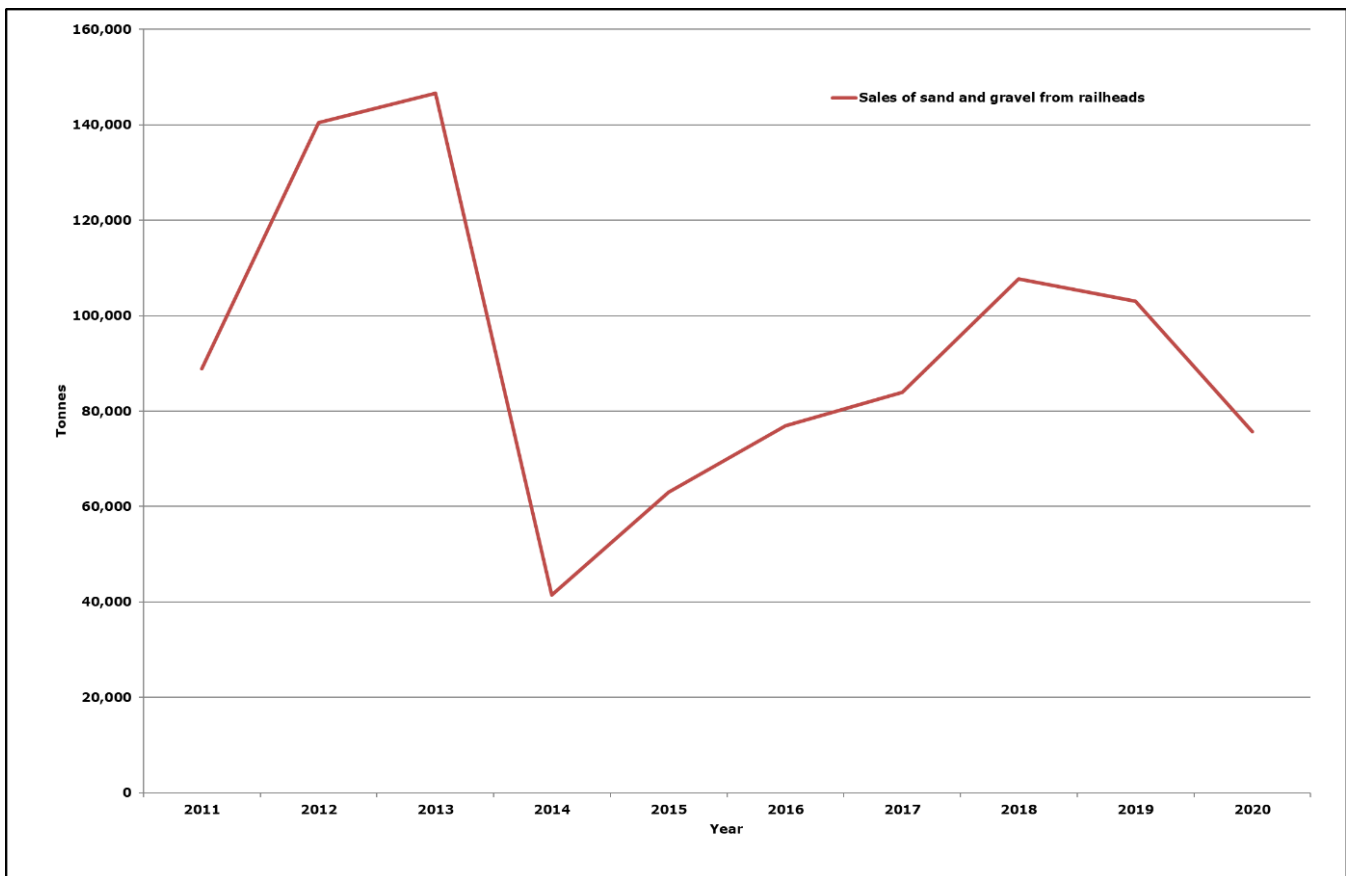


Figure 4: Imports of sand and gravel to West Sussex Railheads 2011–2020 (tonnes)

¹⁷ 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

2.4.3. Two demand forecasts have been created taking account of the 10-year average of sales (92,782) and other relevant local information set out in the following assumptions:

- Assumption 1: Housing is projected to grow by 29.4% in West Sussex;
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 18% in West Sussex;
- Assumption 3: Up to 88% of sand and gravel may be used in homes;
- Assumption 4: Up to 37% of sand and gravel may be used on road maintenance/improvements.

2.4.4. The demand forecast scenarios are set out in Table 9.

Table 9: Demand forecasts for rail imported sand and gravel 2020–2033 (tonnes per annum)

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10-year average	92,782	92,782	92,782
Additional demand for housing	n/a	24,005	27,278
Additional demand for roads	n/a	6,179	16,701
Total Annual requirement	92,782	122,966	136,761

2.4.5. Table 9 indicates that future demand for sand and gravel being imported by rail to West Sussex railheads may be as high at 136,761 tonnes per annum.

Current supply of rail imported sand and gravel

2.4.6. There are five 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.

2.4.7. The West Sussex Wharves and Railheads Study (2014) states a total maximum capacity of 1,380,000 tonnes¹⁸. All but one of the railheads could probably improve throughput if more train pathways were available. The Rail Freight Strategy¹⁹ 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.

¹⁸ Based on Scenario R1 in the West Sussex Wharves and Railheads Study (2014) which safeguards all five railheads.

¹⁹ Department for Transport (2016) Rail Freight Strategy: Moving Britain Ahead.

Rail Imported Sand and Gravel Summary

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

- Relatively small amounts of sand and gravel were imported into West Sussex by rail in 2019 and 2020 (103,084 tonnes and 75,715 tonnes respectively). Rail imports peaked at 225,303 tonnes in 2009.
- The 10-year average sales of sand and gravel from railheads is 92,782 tonnes.

Future Demand

- The likely demand for sand and gravel being imported by rail to West Sussex railheads to 2033 may be as high as 136,761 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.

2.5. Crushed rock

- 2.5.1. 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.
- 2.5.2. There are three sites within West Sussex where crushed rock is used to make coated roadstone. These are strategically located close to rail and wharf infrastructure: Ardingly Rail Depot, EWS Goods Yard in Crawley and Littlehampton Wharf, Littlehampton.

Pattern of previous and current demand for crushed rock

- 2.5.3. Sales of crushed rock from wharves have been more variable over the 10-year period than those from railheads (Table 10) with a sudden drop experienced in 2013. The 10-year average annual sales (2011-2020) of crushed rock from wharves is 99,968 tonnes.
- 2.5.4. Crushed rock sales from railheads have been steadily increasing since 2009 (Table 10 and Figure 5). The 10-year average sales of crushed rock from railheads is 533,528 tonnes but the three-year annual sales is substantially greater at 683,069 tonnes.

Table 10: Sales of Crushed Rock at West Sussex Wharves and Railheads 2011-2020 (tonnes)

Year	Crushed Rock Aggregate sales from wharves (tonnes)	Sales of Crushed Rock from Railheads (tonnes)	Total
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
2018	89,986	674,770	764,756
2019	123,393	618,346	741,739
2020	110,558	587,310	697,868
3-Year Average	107,979	626,809	734,788
10-Year Average	99,968	642,929	742,897



Figure 5: Sales of Crushed Rock at West Sussex Wharves and Railheads 2011-2020 (tonnes)

Future Demand for Crushed Rock Imports from Wharves

- 2.5.5. Four demand forecast scenarios have been created which take account of the 10-year average of sales (105,621), and other relevant local information:
- Assumption 1: Housing is projected to grow by 29.4% in West Sussex;
 - Assumption 2: Spending on road maintenance/improvements is expected to increase by 18% in West Sussex;
 - Assumption 3: Up to 36% of crushed rock may be used in homes;
 - Assumption 4: Up to 81% 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).
- 2.5.6. The calculations of demand are set out in Table 11, which shows that the likely demand for crushed rock being landed at West Sussex wharves may be as high as 147,869 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.

Table 11: Demand forecast scenarios for marine landed crushed rock 2019-2033

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 yr. avg. only)	1-4	1 and 2	1-5	1, 2 and 5
10-year average	99,968	99,968	99,968	99,968	99,968
Additional demand for housing	n/a	10,581	29,391	10,581	29,391
Additional demand for roads	n/a	14,575	17,994	15,092	18,511
Total Annual requirement	99,968	125,124	147,353	125,641	147,869

Future Demand for Crushed Rock Imports to Railheads

- 2.5.7. Two demand forecasts have been created for rail imports of crushed rock, taking account of the 10-year average of sales (642,929 tonnes) and other relevant local information set out in the following assumptions:
- Assumption 1: Housing is projected to grow by 29.4% in West Sussex;
 - Assumption 2: Spending on road maintenance/improvements is expected to increase by 18% in West Sussex;
 - Assumption 3: Up to 36% of crushed rock may be used in homes;
 - Assumption 4: Up to 81% of crushed rock may be used on road maintenance/improvements.
- 2.5.8. Table 12 shows the calculations of demand and indicates that the likely demand for crushed rock import to West Sussex railheads may be as high as 937,678 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 forecasts for rail imported crushed rock 2020-2033

Annual Demand Value	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10-year average	642,929	642,929	642,929
Additional demand for housing	n/a	68,048	189,021
Additional demand for roads	n/a	93,739	115,727
Total Annual requirement	642,929	804,716	947,678

Imports and exports of crushed rock

- 2.5.9. The sources of crushed rock being imported into West Sussex are set out in Table 13, and are based on Aggregate Minerals Survey (2019) 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 consumed in 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 have remained relatively steady between 2011 and 2020, with a peak of sales in 2013, after which there was a decline from 877,401 tonnes, down to as low as 550,536 tonnes in 2015. Sales in 2020 were 587,310 tonnes.

Table 13: Crushed Rock imports to West Sussex (2019)

Origin/Destination	Imports to West Sussex (tonnes)
Outside England and Wales	5,560-55,600 (10-20%)
Gloucestershire County Council	Up to 5,559 (<1%)
North Somerset Council	Up to 5,559 (<1%)
Somerset County Council	389,200-444,800 (70-80%)
Cambridgeshire County Council	Up to 5,559 (<1%)
Leicestershire County Council	5,560-55,600 (1-10%)
North Yorkshire County Council	5,560-55,600 (1-10%)
Shropshire Council	5,560-55,600 (1-10%)
Northumberland County Council	Up to 5,559 (<1%)
Northumberland National Park	Up to 5,559 (<1%)
Powys	Up to 5,559 (<1%)
Total	556,000 (tonnes consumed)

Current supply of crushed rock

2.5.10. 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** peaked in 2013 (814,401 tonnes) after which there was a steady decline in sales (to 550,536 tonnes) up until 2015. Sales have increased slightly since, with sales of 674,770 tonnes in 2018, however sales fell again in 2019 and 2020 (down to 587,310 tonnes). The 10-year annual sales average is currently 642,929 tonnes and the three-year average is 626,809 tonnes.
- Sales of crushed rock from **wharves** in West Sussex were steady between 2013-2016, after which they increase to a 10-year high of 164,017 tonnes. Sales

fell to 89,986 tonnes in 2018, and were 110,558 in 2020. The 10-year annual sales average is currently 99,968 tonnes and the three-year average is 107,979 tonnes.

Future Demand

- Demand for crushed rock being landed at West Sussex wharves may be as high at 147,869 tonnes per annum.
- Demand for crushed rock being imported by rail to West Sussex railheads may be as high at 947,678 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.

2.6. Secondary/Recycled Aggregates

2.6.1. 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.

2.6.2. 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).

2.6.3. 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

2.6.4. The recorded sales figures between 2011 and 2020 for recycled aggregates in West Sussex are set out in Table 14. This shows that sales of recycled aggregates have been relatively stable with a peak in 2016 (456,000 tonnes) and an apparent decline since. There was a significant reduction of recycled aggregate production in 2020, that may be attributed to the Covid-19 pandemic.

Table 14: Sales of Recycled Aggregates in West Sussex 2011-2020

Year	Sales (tonnes)
2011	446,000 ²⁰
2012	446,000 ²¹
2013	261,000 ²²
2014	377,000 ²²
2015	393,000 ²²
2016	456,000 ²³
2017	391,000 ²³
2018	415,000
2019	388,000
2020	236,000
3-Year Average (2018-2020)	346,333
10-Year Average (2011-2020)	380,900

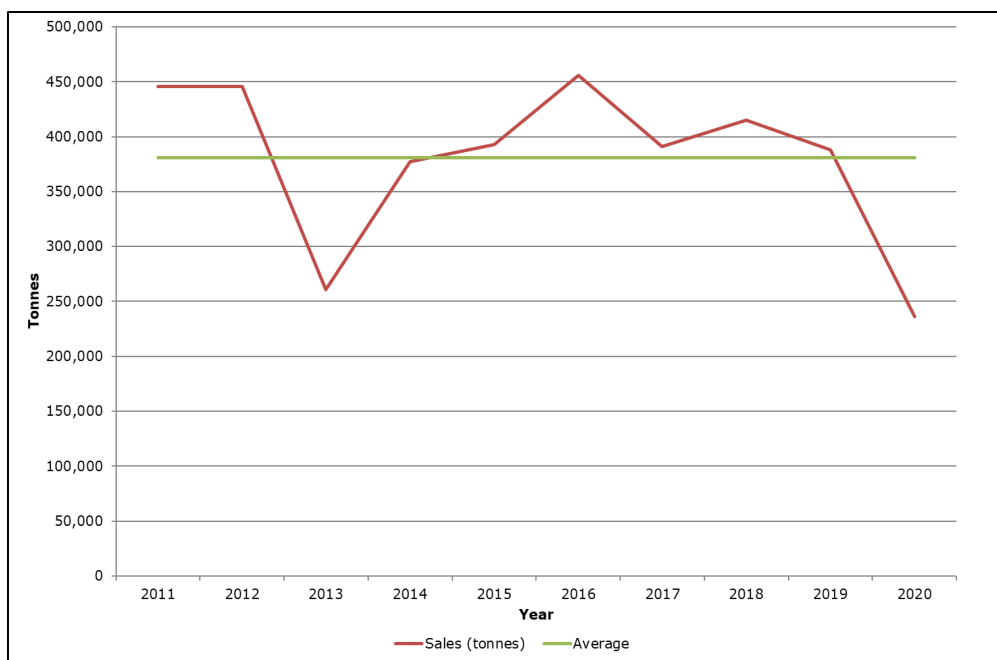


Figure 6: Sales of Recycled Aggregates in West Sussex 2011 2020

²⁰ 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.

²¹ Due to the lack of information from 2012 data, this is a rolled forward estimate in 2011. All the sites at the time were active and thus it is expected that recycling continued at similar levels to the previous year.

²² 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).

²³ Figures derived using a revised methodology prepared as part of the Baseline for C&I & CDEW waste generated in West Sussex from 2017 onwards.

Current capacity for production of recycled aggregates

- 2.6.5. Recycled aggregate can be produced on sites at which demolition waste is produced by either using a mobile crusher and supplied directly, at intermediate temporary sites using a mobile crusher, or at a static site usually a mineral working or a waste management site. In 2020 there were estimated to be 19 static sites within West Sussex that have permission to produce recycled aggregates – capacity is provided by either dedicated CDEW recycling sites or at transfer stations. Table 15 shows that a total capacity of 613,000tpa for recycled aggregate production is permitted in West Sussex. Details of the sites can be found in the latest Annual Monitoring Report. 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.

Table 15: Permitted sites able to produce recycled aggregates

Site type	Capacity (tpa)
Dedicated Aggregate recycling sites	346,000
Aggregate recycling at transfer stations	267,000
Total Capacity	613,000

- 2.6.6. Comparison between the difference of the 10-year average of sales (381ktpa) and estimated capacity (613ktpa) 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

- 2.6.7. 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) (not operational). 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 Energy from Waste plant at Lancing is processed into Incinerator Bottom Ash Aggregates (IBAA).
 - Former Wealden Brickworks, Langhurstwood Road, Horsham (WSCC/015/18/NH) (not operational). Recycling, recovery and renewable energy facility and ancillary infrastructure.
- 2.6.8. An estimate of the likely capacity for production of secondary aggregates has been calculated and is estimated to be around 11,000tpa presented in Table 16. It presents the current capacity that exists within the County and a further scenario that includes the permitted sites at Ford and Horsham. Table 16 shows that there

could be capacity for producing an estimated 72,000tpa of secondary aggregates in the County.

Table 16: 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 + Horsham 3Rs) Figures in tonnes
Lancing Energy from Waste	11,000	11,000
Ford Energy from Waste	-	21,000
Horsham 3Rs Energy from Waste	-	40,000
Total	11,000	72,000

Recycled and Secondary Aggregates Summary:

- Sales of recycled aggregates peaked at 456,000 tonnes in 2016. Data indicates that supply has been relatively steady since 2014. Sales fell significantly in 2020 compared to previous years;
- The 10-year average production of recycled aggregate is **380,900 tonnes**;
- There is one site in West Sussex producing 11,000 tonnes of bottom ash used as a secondary aggregate;
- A total of 613,000tpa of capacity for recycled aggregates production is likely to be available within the County which indicates that **capacity within the county is underutilised**;
- There could be between **11,000tpa and 72,000tpa** of additional secondary aggregates production capacity in the County.

3. Balance Between Demand and Supply

3.1. Estimating Demand

- 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 (or Annual Provision Rates (APR)) are shown in Table 17. The APRs that are applied are those based on the highest levels of demand (i.e., 10-year average + the demand scenarios that result in largest theoretical increase in demand). Table 17 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 17).
- 3.1.3. There are falling reserves of sharp sand and gravel, and to meet forecasted demand for this aggregate type to 2033, there may be need to permit additional sites for extraction. The JMLP contains a criteria-based policy for sharp sand and gravel extraction (Policy M1).
- 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 17, the demand for soft sand (based on average 10-year annual sales and other local relevant information) could be as high as 4,746,947 tonnes and current permitted reserves are 1,736,128. Therefore, there may be a shortfall of up to 3.01 million tonnes of soft sand to 2033. The JMLP contains three allocations for future soft sand extraction, that have a combined potential yield of up to 2.68mt.
- 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 380,900 tonnes, whilst the capacity is 613,000 tonnes per annum.

3.2. Proposed Monitoring Arrangements

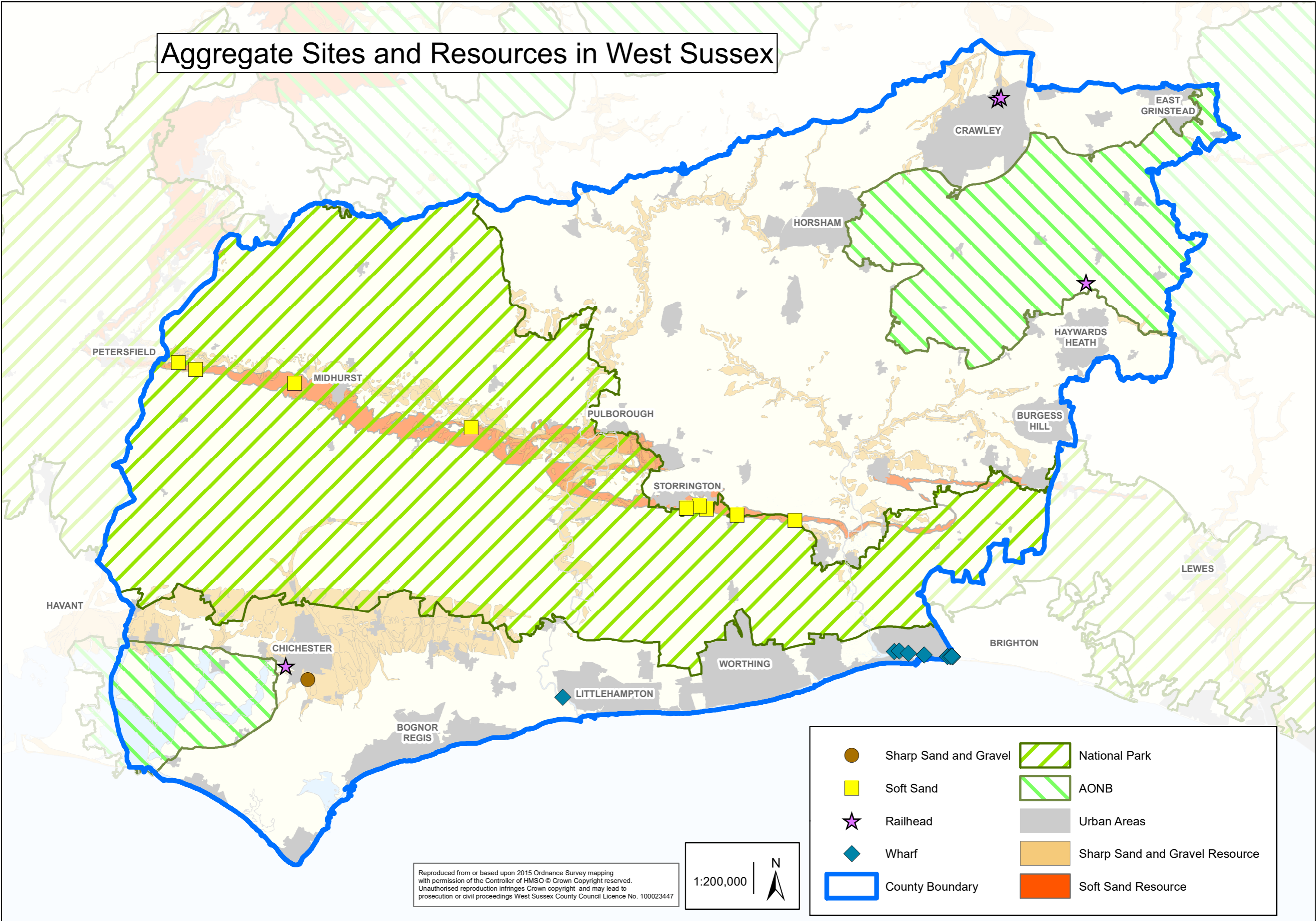
- 3.2.1. Provision to meet demand for aggregate, as set out in this LAA is considered in the JMLP which was prepared jointly with the South Downs National Park Authority, and adopted in July 2018 and partially reviewed in March 2021. The LAA will be updated on an annual basis as part of the Annual Monitoring Report.

Table 17: Total demand for all sources of aggregate over the JMLP period (2019-2033)

Aggregate	10-year average sales/landings (2011-2020) (tonnes)	Total Requirement to 2033 based on 10-year average sales/landings (tonnes)	APR (maximum estimated annual requirement based on highest demand forecasts)	Total maximum requirement to 2033 (based on APR)	Total Estimated Supply (tonnes) or capacity	Net Additional Requirement (tonnes) (-ve values = surplus)
Sharp Sand and Gravel	56,444	733,778	83,199	1,081,589	Confidential (Permitted Reserves)	428,119
Soft Sand	282,187	3,668,429	365,150	4,746,947	1,736,128 (Permitted Reserves)	3,010,819
Marine-won Sand and Gravel	1,166,539 (landings)	-	1,719,479	-	Total annual operational capacity – 2,070,000	Annual capacity surplus – 202,652
Crushed Rock (landed at wharves)	99,968 (sales)	-	147,869	-		
Crushed Rock (rail imported)	642,929	-	947,678	-	Total annual capacity – 1,380,000	Annual capacity surplus – 295,561
Sand and Gravel (rail imported)	92,782	-	136,761	-		
Secondary and Recycled Aggregates	380,900	-	-	-	613,000	Annual capacity surplus – 232,100











Appendix A: LAA Map

Aggregate Sites and Resources in West Sussex



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	Sharp Sand and Gravel		National Park
	Soft Sand		AONB
	Railhead		Urban Areas
	Wharf		Sharp Sand and Gravel Resource
	County Boundary		Soft Sand Resource

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

B1. The CLG/BGS (June 2019) "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 2014. 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:

- 88% of total sand and gravel (including soft sand) sold may be used in the construction of homes;
- 36% of total crushed rock sold may be used in the construction of homes;
- 37% of total sand and gravel (including soft sand) may be used in the construction and maintenance of roads;
- 81% 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 3,517 dwellings have been built annually in West Sussex over the 10-year period of 2010/11-2019/20. 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 16.98% 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.

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 16.98% increase in housing completions will occur in West Sussex, and for other neighbouring authorities, this number may be as high as 29.44%, which has been factored into the demand scenarios. During the previous five years, the West Sussex figure has been applied, however the average of the neighbouring authorities is considered suitable as West Sussex requirements have fallen. This is because it is known that West Sussex is a net-exporter of aggregates, therefore applying the higher figure is prudent, and has been, set out within this LAA, against the 10-year average of sales of for aggregates (where relevant).

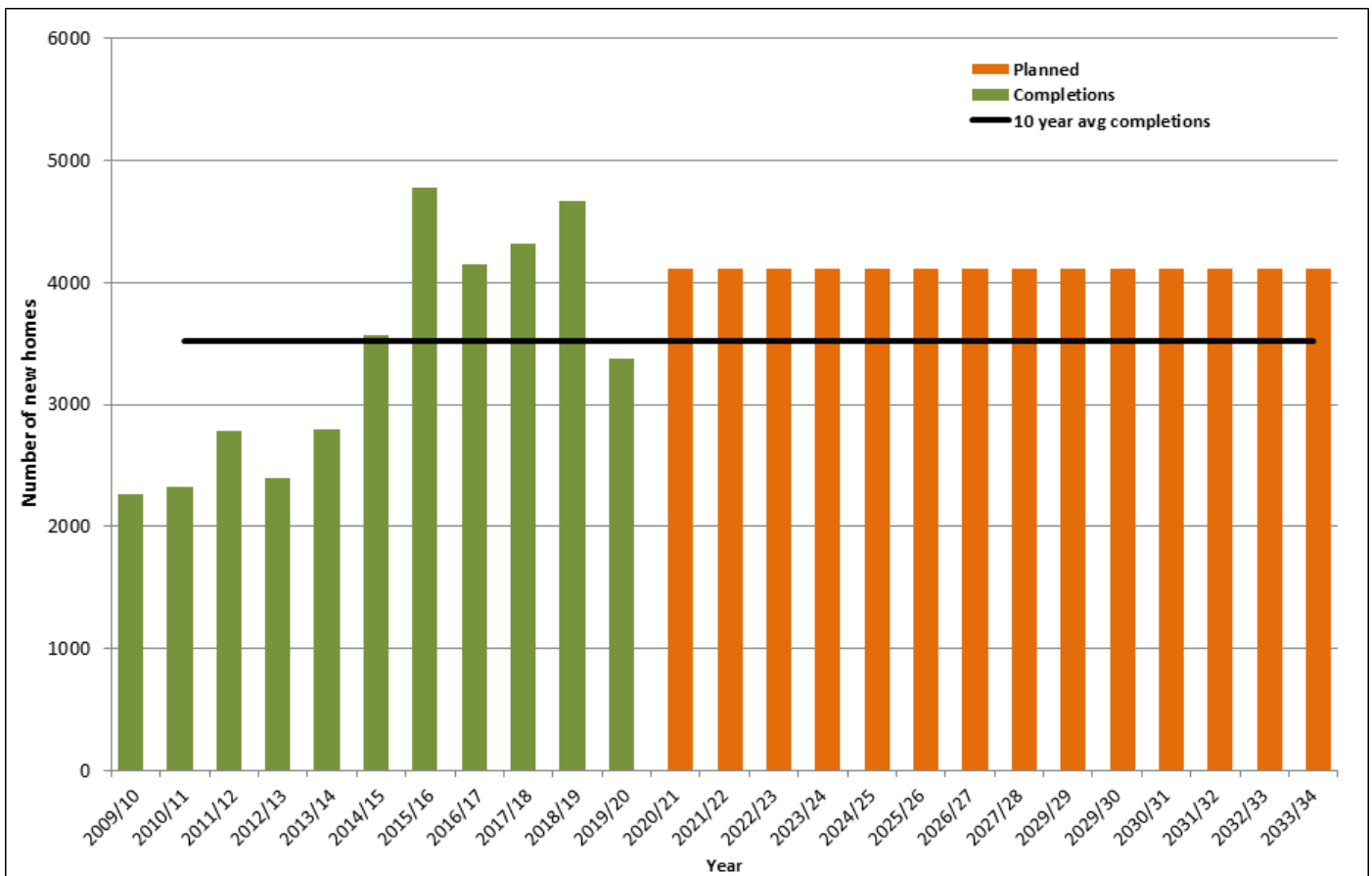


Figure B1: Planned and completed housing in West Sussex (2009/10-2033/34)

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

Area	Average completions per annum (2010/11-2019/20)	Average planned housing per annum (2020-2034) ²⁴	Percentage Change
Brighton & Hove	439 ²⁵	881	100.64%
East Sussex	1,353 ²⁶	2,069	52.95%
Hampshire	5,740 ²⁷	7,008	22.08%
Surrey	2,885 ²⁸	3,118	8.09%
West Sussex	3,517	4,114	16.98%
Average for West Sussex, East Sussex, Brighton & Hove, Surrey, and Hampshire	13,934	18,036	29.44%

²⁴ 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.

²⁵ Brighton and Hove City Council, Authority Monitoring Report (2019-20) covering the 10-year period 2010/11-2019/20.

²⁶ East Sussex County Council, East Sussex Figures website, and MCLG Housing Live Tables accessed August 2021.

²⁷ Hampshire County Council, Land Availability Monitoring System, and MCLG Housing Live Tables accessed August 2021.

²⁸ Surrey County Council, Surrey-I website, and MCLG Housing Live Tables accessed August 2021.

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 £44.0M during the period 2010/11-2019/20 (see Figure B2).

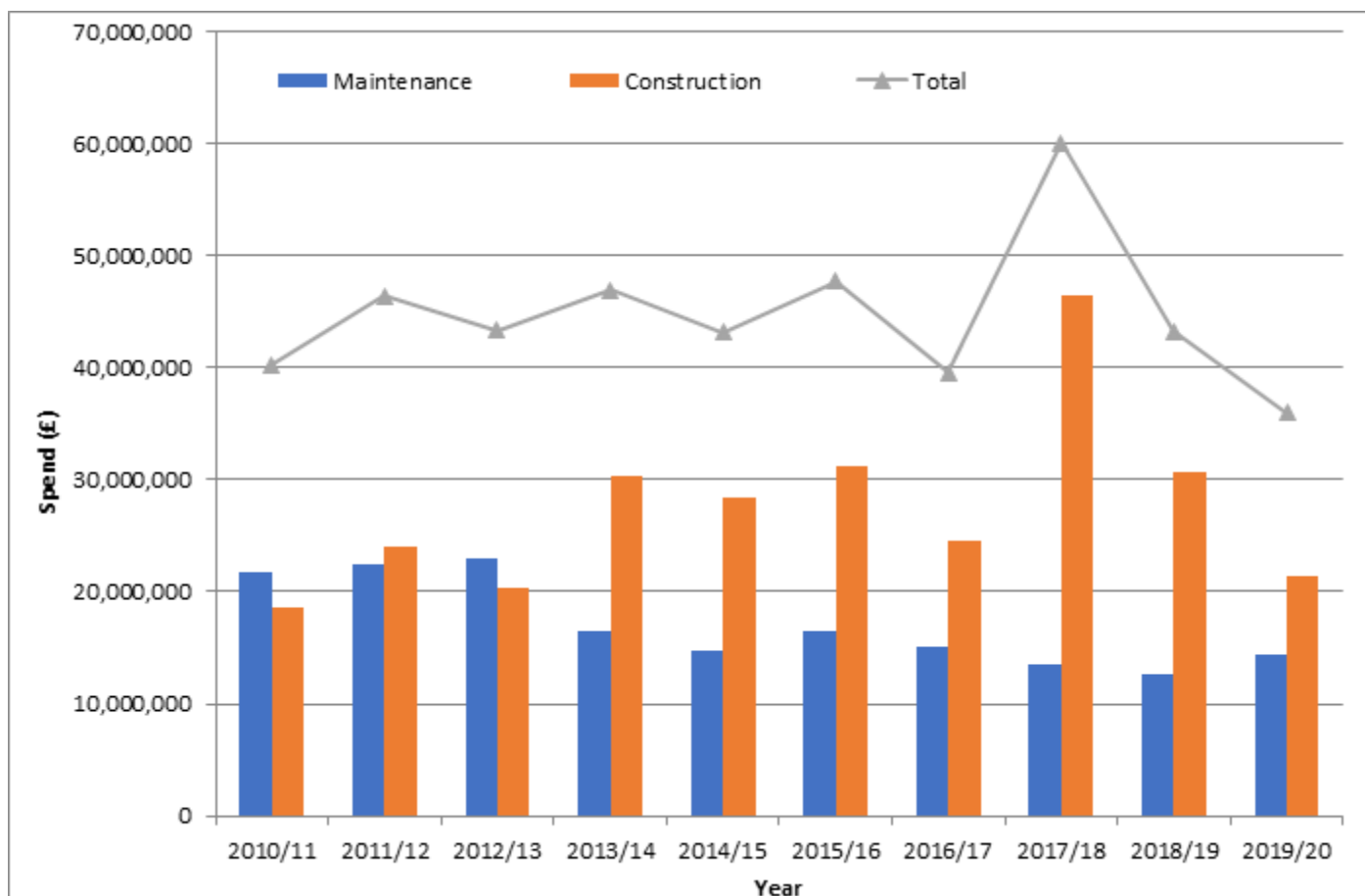


Figure B2: West Sussex highways and transport capital and revenue expenditure (2010/11-2019/20)

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 below in Table B2.

Table B2: West Sussex Local Transport Funding

Year	Funding Source: Construction (£m) ²⁹	Funding Source: Maintenance (£m) ³⁰	Funding Source: Local Growth Funding (£m) ³¹	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	1,524	18,981
2016/17	3,734	12,581	606	16,921
2017/18	3,743	12,200	2,172	18,106
2018/19	3,734	11,043	15,065	29,842
2019/20	3,734	8,773	13,940	26,447
2020/21	4,944	8,773	31,086	44,803
2021/22 ³²	4,944	8,773	20,030	33,747
2022/23 ³²	4,944	8,773	20,030	33,747

B10. Evidence from the Local Growth Funding, which is expected in West Sussex, suggests an average increase of £12.5M per annum³³. Between 2015/16 and 2020/21, the average local transport spending per annum was £25.8M, whilst the average spending between 2021/22 and 2023/24 is expected to be £33.7M per annum. This is a total increase of £7.8M during the period 2021/22-2023/24 when compared to 2015/16-2020/21. **This equates to an increase of 18%³⁴ when compared to previous spending levels.**

²⁹ DfT – Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2015/16-2020/21.

³⁰ DfT – Highways maintenance funding allocations: 2015/16 to 2020/21 (Dec 2014).

³¹ 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.

³² The data used for construction and maintenance have been rolled forward, and are therefore a best guess.

³³ The average between 2015/16 and 2022/23 from Growth Funding.

³⁴ £9.9M equates to 28.2% of the 10-year average spending on highways construction and maintenance.

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).

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

Year	Funding Source: Construction (£m) ³⁵	Funding Source: Maintenance (£m) ³⁶	Funding Source: Local Growth Funding (£m) ³⁷	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 was 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 11).

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

³⁵ DfT – Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2018/19-2020/21.

³⁶ DfT – Highways maintenance funding allocations: 2015/16 to 2020/21 (Dec 2014).

³⁷ Named and committed schemes, as set out in the Coast to Capital Growth Deal (July 2014).

will be dependent on future Government budget allocations, which have 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. A number of major transport schemes are approved within the West Sussex County Council Business Plan which have been taken into account with regards to future demands for aggregates. These include:

- A2300 Corridor Enhancement Capacity, Burgess Hill;
- A259 Corridor Enhancement Capacity, East Arun;
- A284 Lyminster Bypass;
- Crawley Transport Package Phase 1;
- National Cycle Network 2;
- A29 Re-alignment.

B16. 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 18% (in West Sussex), the demand for aggregates will also increase by 18%. 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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