

AGGREGATES, CEMENT AND READY-MIX CONCRETE MARKET INVESTIGATION

Working paper on market definition for aggregates, cement and RMX

Draft CC market investigation guidelines on market definition

1. The draft CC market investigation guidelines¹ (the Guidelines) present the aim of market definition as being to assist:

the CC to identify the market participants and products that might be central to the identification of features that have an adverse effect on competition. It thus provides a framework for the assessment of the effects on competition of features of a market. Market definition brings discipline and structure to the investigation, allowing the CC to identify the sources of market power and its effects on competition.²

2. However, the Guidelines go on to say that:

The identification of the relevant market does not limit the factors the CC must consider in conducting its assessment of whether a feature or combination of features may give rise to an AEC. The CC may also take into account constraints outside the market, segmentation within it, or other ways in which some constraints are more important than others.³

3. In addition, the Guidelines do not necessarily advocate the use of the hypothetical monopolist test (HMT) in market investigations, because the HMT has proved hard to apply rigorously in these situations:⁴

Rather than generally attempting to identify the narrowest possible set of products satisfying the HMT in precise terms when defining markets

¹ We consider that it is appropriate to refer to the [draft market investigation guidelines](#) as these are currently subject to public consultation and are likely to have been formally adopted by the CC by the time we publish our provisional findings.

² [Paragraph 131.](#)

³ [Paragraph 133.](#)

⁴ [Paragraph 137.](#)

in market investigations, therefore, the CC applies pragmatic methods and the degree of precision it judges best suited to the particular investigation.⁵

4. In other words, the Guidelines step away from the strict application of the HMT towards a more pragmatic investigation-by-investigation approach to market definition. In addition, constraints from outside the market can be taken into account, and the relative importance of constraints within the market will also be considered.
5. We therefore interpret the aim of the market definition exercise for all the reference products in this inquiry to be to try to understand, as much as possible, the extent of substitution between different products and how this may vary by customer or application. The outcome of the market definition exercise (ie the relevant markets defined), however, will necessarily involve a degree of judgement and, as explained above, whether a particular product is defined as within the market or outside the market will not necessarily determine the way in which we assess competitive effects. For example, recycled aggregates may be a substitute for primary aggregates for some applications, but not for others. This could be an argument for including recycled aggregates within the market, or treating them as a constraint on the market from outside. Whether they are included in the market or not, however, our competitive assessment will take into account this constraint when it exists (eg for the uses for which recycled aggregates are a substitute for primary aggregates).

Aggregates market definition

6. The main pieces of evidence on market definition available to date are: responses by the Majors to the issues statement,⁶ responses by the Majors to our various

⁵ Paragraph 138.

information requests and the evidence from the Anglo-Lafarge merger inquiry (in particular, the results of a GfK survey commissioned by the CC, as well as evidence from hearings with customers and competitors). We expect to receive further information in relation to aggregates market definition from the case studies (internal document requests and interviews with competitors and customers, including recycled aggregates competitors) and from future hearings.

Views of the Majors on aggregates product market definition

7. Lafarge, Aggregate Industries (AI), Cemex and Tarmac told us, in their replies to the issues statement, that the relevant market for construction aggregates should include all aggregates (whether crushed rock or sand and gravel, and whether primary or recycled and secondary). Hanson did not submit a view on the precise market definition for aggregates, but commented that primary aggregate suppliers were subject to significant constraints from recycled and secondary aggregates suppliers.
8. Tarmac and Cemex commented specifically on specialist aggregates for non-construction uses (for example, rail ballast, high polished stone value (PSV) and high purity limestone (HPL) for flue gas desulphurization). Tarmac and Cemex said that there were separate product markets for each of these specialist aggregates, because of lack of substitutability on the demand side.
9. We now summarize the arguments made by each of the Majors to support their view that all construction aggregates are in the same product market.
10. Hanson told us, in its response to the issues statement, that the OFT Reference Decision and the Anglo-Lafarge provisional findings had underplayed the role of

⁶ We have not received many responses by other parties to our issues statement, and those we did receive rarely commented on market definition.

secondary and recycled aggregates in terms of providing a strong competitive constraint on primary aggregates producers, and that the CC's market investigation should take into account what Hanson considered to be the very significant and increasing constraint imposed by secondary and recycled materials on primary aggregates. Hanson told us that secondary and recycled aggregates had certain substantial inherent advantages over primary aggregates from the producer viewpoint, because they were exempt from the aggregates levy and because they also had certain production cost advantages over primary aggregates.

11. Hanson quoted Mineral Products Association (MPA) estimates that showed that the proportion of aggregates supply accounted for by recycled and secondary aggregates had increased, and it told us that this trend could be expected to continue, in particular in light of the various government initiatives relating to sustainable housing and also due to the National Planning Policy Framework which provides strong support for the development of secondary and recycled aggregates operations. According to Hanson, there were a number of initiatives promoting the use of secondary and recycled aggregates, many of which contributed to the move of secondary and recycled aggregates up the 'quality chain'. Hanson also told us that it had recently begun producing RMX using recycled materials, which it said supported the argument that recycled and secondary aggregates were increasingly viewed as substitutes for primary aggregates in RMX as well. Even where there were end-uses for which secondary and recycled aggregates are not suitable on their own, Hanson told us that a blend of primary and secondary aggregates was increasingly used.
12. Cemex told us, in its response to the issues statement, that there was a single market for the supply of most aggregates, including primary, secondary and recycled aggregates for use in construction applications. Cemex told us that secondary and recycled aggregates' share of all aggregates sold had continued to grow (from 10 per

cent in 2000 to 28 per cent now), as these materials were generally cheaper than primary aggregates due to being derived from waste products, and because they were not subject to the £2 per tonne Aggregate Levy applied to primary aggregates. Cemex told us that the CC survey, undertaken as part of the Anglo-Lafarge merger inquiry, confirmed that nearly half the aggregates used for general construction applications⁷ were made up of secondary and recycled aggregates, and this was supported by the switching data in the CC survey, which illustrated that around half of customers had switched between primary and secondary/recycled aggregates, the majority on the basis of prices.

13. Tarmac told us, in its response to the issues statement, that secondary and recycled aggregates constrained primary aggregates as they were substitutable and customers of primary aggregates were able to, and did, switch purchases from primary to recycled or secondary aggregates. Tarmac told us that it disagreed with the CC approach in the Anglo-Lafarge merger inquiry of looking at competition within segments of the market for primary aggregates (eg looking at sand and gravel and crushed rock separately). Tarmac told us that the CC's approach in this regard was unwarranted as sand and gravel and crushed rock were substitutable. According to Tarmac, different rates of usage in local areas could be explained by geological constraints (eg lack of local availability in certain local areas) and were not evidence of limited substitutability. Tarmac argued that both sand and gravel and crushed rock could be, and were, used interchangeably, eg for RMX and concrete products. Tarmac noted that, from the customer perspective, the choice of aggregate materials for construction purposes was based upon the grade required and not upon the geological composition of the material.

⁷ By 'general construction applications', we refer to aggregates used for construction applications other than the production of RMX, concrete blocks and asphalt.

14. AI told us, in its response to the issues statement, that it considered there to be one market for the supply of aggregates, comprising all grades and sizes of aggregates and secondary and recycled aggregates. It said that the increase in the levy on primary aggregates, the new recycling technology and the changes in product specifications over the last 15 years had supported the growth of secondary and recycled aggregates. AI told us that secondary and recycled aggregates were a substitute for primary aggregates for a significant proportion of UK aggregates consumption. In particular, it considered that:
- (a) Secondary and recycled aggregates were entirely substitutable with primary aggregates for general construction purposes and produced a highly similar product with comparable integrity.
 - (b) For sub-base and fills, [X], all types of aggregates were substitutes.
 - (c) Some secondary aggregates (china clay by-products from Devon and Cornwall) were used as complete substitutes for primary aggregates across all applications.
 - (d) AI used blended recycled aggregates in its concrete block works in the Midlands in place of crushed rock, asphalt waste at Bardon Hill, and glass waste in its concrete products works at Hulland Ward. It also told us that it supplied secondary and recycled aggregates in substitution for crushed rock and sand and gravel.
 - (e) The contract for the development of the 2012 Olympic site specified that a minimum percentage of aggregates used must be recycled aggregates. However, we were told by the British Aggregate Association (BAA) that even though Bardon (AI's downstream RMX operation) had won the contract for the Olympic site based on the use of china clay sand for a large proportion of the concrete, subsequently the structural engineers ruled out the use of china clay sand and it was replaced by primary aggregates.

15. Lafarge told us, in its reply to the issues statement, that the market should include all aggregates. It said that this was because external sales of aggregates for RMX and asphalt production were a small proportion of total aggregates:
- (a) In respect of supply of aggregates to asphalt producers, Lafarge told us that the majority of asphalt producers were backwardly integrated into aggregates and that the estimated market size for aggregates sales to independent asphalt producers was small. It said that this suggested that a separate analysis of the supply of aggregates to asphalt producers was unlikely to be justified given the existing degree of vertical integration.
- (b) In respect of the supply of aggregates to RMX producers, Lafarge told us that according to a recent BDS report, the five largest aggregates suppliers together accounted for only around 30 per cent of sales to independent RMX producers in 2010. Moreover, according to Lafarge, since crushed rock and sand and gravel of the same grades were functionally substitutable for use in RMX, a narrower segmentation by aggregate type was not justified for RMX.
16. Therefore, Lafarge told us that the use of aggregates for RMX and asphalt should not be analysed separately, and given that for the other main use of aggregates (general construction), recycled and secondary were a direct substitute, Lafarge argued that the market should therefore be defined as all aggregates. Lafarge told us that it considered that the important competitive constraint exerted by recycled and secondary aggregates on primary aggregates was due to the considerable degree of substitution between all aggregates, and that this justified its inclusion in an 'all aggregates' market.

Product market definition: our assessment

17. The main questions in relation to product market definition are:

- (a) the extent to which crushed rock and sand and gravel aggregates are demand-side substitutes; and
 - (b) the extent to which recycled and secondary aggregates are a demand-side substitute for primary aggregates.
18. The question of whether different grades (ie particle sizes) of aggregates are substitutable seems uncontentious, because of the high degree of supply-side substitutability between different grades. Indeed, it appears that different grades of primary aggregates can be produced from both crushed rock and sand and gravel and each quarry tends to produce multiple grades. The different grades are produced by screening and, if necessary, crushing and washing the aggregates that have been quarried. There is therefore a high degree of supply-side substitutability between grades including between fine and coarse aggregates.
19. The question of whether specialist aggregates (rail ballast, HPL, etc) are in different markets from each other and from construction aggregates also seems uncontentious, in view of the fact that these are used for different applications, there is no demand-side substitution and there is no supply-side substitution.
20. Therefore in the following, we review the evidence:
- (a) on substitution between crushed rock and sand and gravel aggregates; and
 - (b) on substitution between primary and recycled/secondary aggregates.

Substitution between crushed rock and sand and gravel

21. There was a 'rock line' in Great Britain, above which most of the aggregates produced were crushed rock aggregates, and below which most aggregates produced were sand and gravel, and the availability of product was the main determinant of whether to use crushed rock or sand and gravel.

22. AI explained that RMX could be made out of sand and gravel, or sand and crushed rock. The sand could be either occur naturally, or it could be manufactured by washing crushed rock fines. AI told us that, in areas where sand and gravel was prevalent, sand and gravel would be the exclusive or almost exclusive aggregate used in RMX production, whereas in areas where sand and gravel was scarce or inaccessible, RMX was produced using crushed rock products.
23. Lafarge told us that the levels of regional variation in the use of aggregates in downstream applications indicated the level of substitutability between different types of construction aggregates in the same product market, and that the fact that use could be made of different types of aggregates due to geological availability and the associated transport costs was illustrative of this.
24. All the Majors provided data showing, for their internal businesses (RMX, concrete product production⁸ and asphalt), the proportion of aggregates used by type and by region. We reproduce the data provided by AI and Lafarge in [Annex 1](#) (but the data from all Majors shows very similar patterns). Overall the data provided by the Majors shows that:
- (a) For RMX and concrete products, there is a large variation in the use of sand and gravel and crushed rock depending on the region: for instance, in Wales and the North-West, RMX is produced predominantly with crushed rock as the coarse element of the mix, whereas in the South-East, East Anglia and the East Midlands, it is produced almost solely with sand and gravel.
 - (b) For asphalt production, there is very little use of sand and gravel, whereas crushed rock (including high PSV) appears to be the main aggregate used. The British Aggregates Association (BAA) told us that gravel was not appropriate for

⁸ Lafarge does not operate a concrete product production business.

the production of asphalt, because the aggregates used for asphalt needed to be angular.

25. The Majors do not use aggregates directly themselves for general construction purposes. However, [X] and Tarmac both provided estimates on the types of aggregates used in general construction (see [Annex 2](#)), and this data suggests that there is little use of sand and gravel for general construction (5 to 10 per cent of aggregates used); the main aggregates used being crushed rock and recycled/secondary aggregates mostly as sub-base and structural fill. Although the data on regional use is not reproduced here, [X] also provided estimates on the use of aggregates for general construction by region, and even in regions where sand and gravel is prevalent, crushed rock and recycled aggregates are the main aggregates used.
26. Overall, therefore, it appears that the use of crushed rock and sand and gravel is largely influenced by geology and availability for RMX and concrete production. For asphalt production, it appears that sand and gravel aggregates are generally not suitable. For general construction, it also appears that sand and gravel aggregates are used in relatively small proportions.

Substitution between primary and recycled/secondary aggregates

27. The scope for substitution between primary and recycled/secondary aggregates varies significantly depending on the application. We received estimates from [X] and Tarmac on the extent to which different aggregates were used for different applications in Great Britain. These estimates are presented in the tables in [Annex 2](#). Though the exact numbers differ, in both cases we find that:
- (a) For the manufacture of RMX (which accounts for about 20 per cent of aggregates used in Great Britain), the main aggregates used are sand and gravel (60 to

65 per cent) and crushed rock (25 to 30 per cent). Use of recycled and secondary aggregates is low (5 to 15 per cent).

(b) For the manufacture of concrete products (which accounts for about 10 per cent of aggregates used in Great Britain), the main aggregates used are sand and gravel (50 to 55 per cent) and crushed rock (30 to 40 per cent). Usage of recycled and secondary aggregates is low (5 to 15 per cent).

(c) For the manufacture of asphalt (which accounts for about 12 per cent of aggregates used in Great Britain), the main aggregates used are crushed rock (70 to 75 per cent). Sand and gravel accounts for 5 to 15 per cent of use, and secondary and recycled aggregates account together for 10 to 20 per cent of use. However, we were told during the Anglo-Lafarge merger inquiry that the main driver for recycling ‘asphalt planings’ was the bitumen content of asphalt, because bitumen was much more expensive per tonne than aggregates.⁹ If so, it is possible that a large proportion of the use of recycled aggregates into asphalt is in fact due to recycling of asphalt planings, rather than use of recycled aggregates in the production of asphalt. The data we have at present does not enable us to separate out use of recycled planings and use of recycled aggregates.

(d) For general construction (which accounts for about 50 per cent of aggregates used in Great Britain), the main aggregates used are crushed rock (45 to 50 per cent) and recycled and secondary aggregates (40 to 50 per cent).

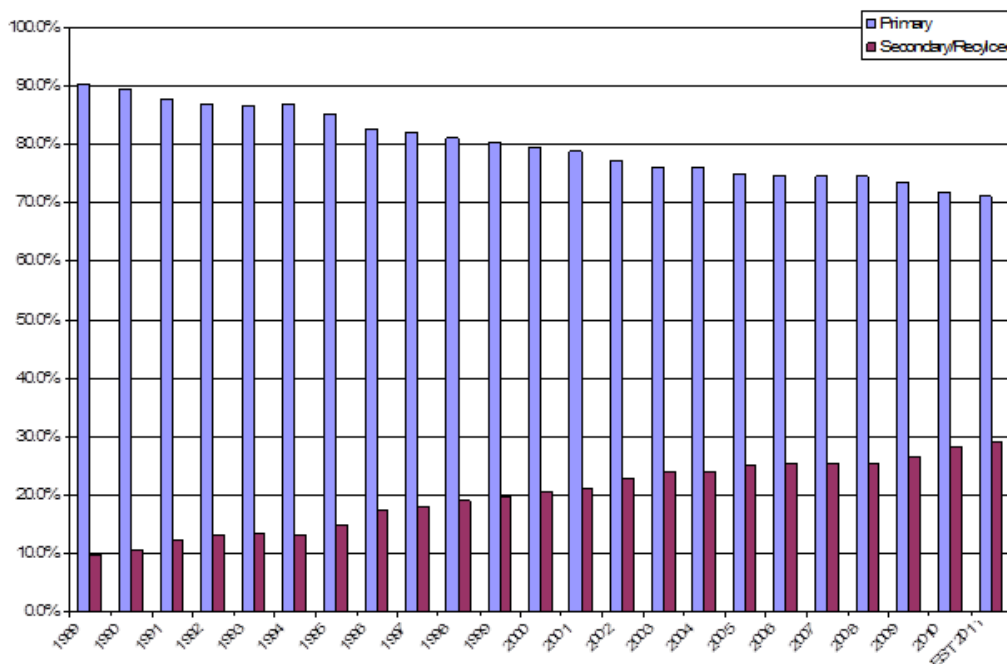
28. These estimates of current aggregates use suggest that there is a wide scope for using secondary and recycled aggregates for general construction uses, whereas there is more limited scope for using recycled and secondary aggregates for other applications (in particular, for RMX and concrete block manufacture—this limitation is less pronounced for asphalt).

⁹ See [Annex 2](#), paragraph 9.

29. The estimates provided by Tarmac (based on BDS data) also show that, between 2008 and 2010, the use of secondary and recycled aggregates does not appear to have grown overall, with proportions of recycled and secondary aggregates used in each application remaining relatively constant (a small reduction in use for concrete, and a small increase for asphalt and general construction).
30. Data on the overall share of aggregates sales held by recycled and secondary aggregates, however, does suggest the increase in their share continuing in 2009 to 2011. See Figure 1.

FIGURE 1

Share of primary and recycled/secondary aggregates, 1989 to 2011



Source: MPA statistics.

31. We also received data from each Major on its own use of aggregates for its downstream activities (RMX, asphalt and concrete block production¹⁰). In general, the Majors used very little, if any, recycled and secondary aggregates for RMX,

¹⁰ Lafarge does not operate a concrete block production business.

asphalt and concrete block production.¹¹ However, Tarmac told us that it had increased the proportion used of secondary and recycled aggregates in asphalt production. Lafarge noted that its own internal use of recycled and secondary aggregates was lower than, and was not representative of, the true levels of substitutability with primary aggregates that were in fact possible, because Lafarge was predominantly already heavily invested as primary aggregates producer with spare capacity and therefore sought to use primary aggregates in its own downstream operations where possible. Similarly, Hanson told us that it was a primary aggregates producer and therefore was disincentivized to use secondary or recycled aggregates in its downstream activities. We noted that the same argument would apply to the other Majors which are also predominantly primary aggregate producers. Lafarge also told us that it did carry out some recycling. Furthermore, Lafarge told us that there were targets for the use of recycled asphalt plantings (RAP) in the production of asphalt. RAP is taken from roads and other surfaces during the process of maintenance and reconstruction. It has additional value since its use reduces the volume of virgin binder (bitumen) needed in the production of asphalt.

32. We also reviewed the views on substitution between primary and recycled/secondary aggregates that were summarized in the final report for the Anglo-Lafarge merger inquiry.¹² In general, this evidence confirms that recycled and secondary aggregates can be used in place of primary aggregates in general construction for low specification applications, but that they are not generally used in high-specification applications. For RMX and concrete blocks, recycled and secondary aggregates do not appear to be a close substitute. For asphalt, there is more scope for using recycled and secondary aggregates.

¹¹ AI told us that it was unable to specify what percentage of secondary and recycled aggregates it used for the production of asphalt, RMX and concrete products. Often the recycled or secondary material would in fact be provided by the customer as part of the supply agreement and therefore was not recorded as a purchase.

¹² *Anglo American PLC and Lafarge S.A.: a report on the anticipated construction materials joint venture between Anglo American PLC and Lafarge S.A.*, Appendix G, paragraphs 53–59, 1 May 2012.

CC/Gfk Survey for the Anglo-Lafarge merger inquiry

33. The CC commissioned GfK, a market research company, to conduct a survey of aggregate, asphalt, RMX and cement customers, as well as aggregate, RMX and asphalt producers, in the context of the Anglo-Lafarge merger inquiry.¹³
34. GfK surveyed three categories of aggregates buyers:
- (a) RMX producers (who purchase aggregates for RMX production);
 - (b) asphalt producers (who purchase aggregates for asphalt production)—however, the sample sizes achieved were too small to report results for this segment; and
 - (c) aggregate customers: all other users of aggregates. The survey results show that these were mainly contractors (66 per cent), but also aggregate distributors (14 per cent), concrete products producers (5 per cent) and local authorities (5 per cent).
35. The survey found that RMX producers purchased mainly primary aggregates, with 81 per cent of RMX producers purchasing only primary aggregates, and 19 per cent purchasing primary and secondary or recycled aggregates. In contrast, 19 per cent of other aggregate customers purchased only primary aggregates, with the remaining 81 per cent purchasing both primary and secondary or recycled aggregates.
36. RMX producers and other aggregate customers were asked questions on past switching and on their ability to switch purchasing between different types of aggregates.
37. 21 per cent of RMX producers had switched some purchases from primary to secondary or recycled in the past three years. In terms of ability to switch, about half

¹³ The presentation by GfK on the survey is available on the CC website:
www.competition-commission.org.uk/assets/competitioncommission/docs/2011/anglo-american-lafarge/gfk_competitor_customer_survey_presentation.pdf.

of RMX producers said that they could switch some of their aggregates purchases from primary to recycled and secondary, but proportions of purchases that could be switched were generally low: overall 83 per cent of RMX producers could either not switch any purchases or only switch up to a quarter of purchases from primary to secondary or recycled.

38. Past switching was larger for other aggregate customers. 49 per cent of other aggregate customers had switched some purchases from primary to secondary/recycled aggregates in the past three years. The main reason for switching was an increase in the price of primary aggregates relative to recycled and secondary aggregates. In terms of ability to switch, 36 per cent of other aggregate customers said that they could switch some of their current primary purchases to recycled and secondary aggregates, and of those that could switch, about 60 per cent could switch one-quarter or more of their purchases to recycled and secondary aggregates, and about 40 per cent less than a quarter. Overall, 73 per cent of aggregate customers could either not switch or switch less than a quarter of purchases from primary to secondary and recycled. However, it should be noted that the most common reason for not being able to switch or being able to switch less than a quarter of purchases was the lack of availability of recycled/secondary aggregates (27 per cent of those who said they could not switch or could switch less than a quarter), which suggests that in some cases, the problem is not suitability of the aggregates but lack of supply.
39. Cemex¹⁴ commented that the CC survey found that a majority of customers did not consider it fairly or very important whether they purchased primary, secondary or recycled aggregates. We did not agree with this interpretation of the results of the GfK survey: GfK found that 47 per cent of customers considered that it was fairly or

¹⁴ [Cemex reply to the issues statement.](#)

very important whether they purchased primary, secondary or recycled aggregates, but only 17 per cent said that it was not important or not at all important. The remaining 35 per cent said that it would depend on the project.

40. Cemex told us that, even if a minority of customers considered it important, this was in fact no more than shorthand for the specific physical properties that customers sought for an aggregate. Cemex submitted that despite the survey data in which a number of respondents noted that they had only been able to switch a quarter or less of their volumes, the proportion by volume that could, on an objective basis, have been switched was significantly higher.
41. Overall, therefore, the results from the Gfk survey suggest that:
 - (a) For RMX production, there has been relatively limited switching to recycled and secondary aggregates and usage of these is low by RMX producers. However, there is some potential for increased usage of recycled and secondary aggregates (17 per cent of RMX producers could switch a quarter or more of their usage to recycled and secondary aggregates).
 - (b) For other construction uses (not including asphalt), usage of recycled and secondary aggregates is much more prevalent, and half of these customers have switched in the past three years. There is some potential for further switching (26 per cent of customers could switch a quarter or more of their usage to recycled and secondary, and 27 per cent said that they could not switch but that this was because of lack of availability rather than for reasons linked to suitability).
42. These results appear consistent with the data from Lafarge on the use of different types of aggregates by application. They are also consistent with submissions from

the BAA, which told us that recycled aggregates were very rarely used on quality work, or, if they were used in such work, they were only used for foundations.

43. The evidence on whether recycled and secondary aggregates are substitutes for primary aggregates is balanced. They are an imperfect substitute in that they could not entirely replace primary aggregates, but there does seem to be scope for substitution at the margin in some applications (low-specification direct construction uses). For the production of asphalt, although the figures provided by Tarmac and Lafarge suggest a relatively large usage of recycled aggregates, this could be due largely to the inclusion of asphalt plantings, rather than the use of recycled/secondary aggregates in the production of asphalt, so the scope for increasing use of recycled/secondary aggregates in asphalt may be less than suggested by the data on usage). For other uses, there seems to be very little scope for substitution (RMX and concrete block production). There is evidence that, for general construction uses, substitution has occurred in the past when prices of primary aggregates increased relative to recycled and secondary aggregates, as evidenced from the survey data and from the increase in the share of recycled aggregates following the increase in the aggregates levy.
44. Table 1 summarizes the scope of substitution between crushed rock and sand and gravel, and between primary and secondary/recycled aggregates, by application.

TABLE 1 **Scope for substitution between aggregates by application**

<i>Uses of aggregates</i>	<i>% of total aggregate usage</i>	<i>Substitutability primary/recycled and secondary</i>	<i>Substitutability crushed rock/sand and gravel</i>
<i>Use in manufacture of construction products</i>			
Manufacture of RMX	20	Very limited	Yes—appear equivalent
Manufacture of concrete products, eg blocks, paving, precast structures, roof tiles	10	Very limited	Yes—appear equivalent
Manufacture of asphalt	11	Some scope for substitution, though this is likely to be mainly due to asphalt plantings being included as recycled aggregates	Very limited
<i>Direct construction uses</i>			
Mainly: non-structural fill, structural fill, capping layer, sub-base	50	Yes	Some scope for substitution
Other (mainly, specialist uses)	8	No use of recycled	

Source: CC, based on data from Tarmac/BDS on proportions used in different applications.

45. Given the evidence to date, there has been a steady growth in the share of the market held by recycled and secondary aggregates, though this share appears to have somewhat stabilized. Recycled and secondary aggregates appear to be a substitute for primary aggregates for a substantial part of the market (direct construction use), but there is limited if no scope for substitution for other uses of aggregates. In light of this evidence, we propose to define a relevant product market for all construction aggregates, including recycled and secondary aggregates. Our competitive assessment of this market will take into account the fact that:

- (a) sand and gravel aggregates are not a good substitute for crushed rock aggregates for use in asphalt applications, and may only be a partial substitute for crushed rock for general construction applications; and
- (b) recycled and secondary aggregates are likely to be a close substitute to primary aggregates for low-specification construction applications, but they are unlikely to be a close substitute for RMX and concrete block production.

46. We note that the relevant product market definition proposed in paragraph 45 is different from the relevant product market definition that was used in the CC's Anglo-Lafarge merger inquiry report of 1 May 2012 (in which recycled and secondary

aggregates were considered to be outside the market for primary aggregates used for construction purposes). In that report, the analysis of the competitive effects in the aggregates markets focused mainly on an assessment of the conditions of competition in the local areas in which the parties to the joint venture both had primary aggregates sites ('overlap areas'). This assessment also took into account the competitive constraint from outside the market resulting from the existence of local sources of recycled and secondary aggregates in the relevant overlap areas.¹⁵

47. For the purposes of this market investigation, we expect that, depending on the evidence we receive as the investigation progresses, our analysis of competition in the aggregates market will examine competition in the sector as a whole rather than examining it in specific overlap areas. Therefore we think it is more appropriate at this stage of this investigation to use a wider market definition which includes recycled and secondary aggregates in the relevant market. It should be noted that our assessment of competition will take into account:
- (a) the constraint from secondary and recycled aggregates when these are present in a given geographic market; and
 - (b) the fact that recycled and secondary aggregates may not be a constraint on primary aggregates for some applications.

Geographic market definition for aggregates

48. In terms of geographic market definition, the general view among parties was that aggregate markets were local, although views varied on the appropriate catchment areas to use. Tarmac told us that, as a starting point for the competitive assessment,

¹⁵ See [Anglo-Lafarge merger inquiry report](#), paragraphs 23 & 24.

30 miles around a quarry was a reasonable catchment area,¹⁶ whereas AI and Cemex told us that the geographical markets tended to be larger than 30 miles.¹⁷

49. Cemex submitted that because of the low value of aggregates per tonne, transport costs were proportionately high, meaning that geographic markets tended to be local-to-regional in scope.¹⁸ Cemex also told us that geographical markets were steadily increasing in size due to the impact of merchant hauliers who were able to transport aggregates more cost-effectively over longer distances. According to Cemex, this was because they purchased aggregates from a variety of sources and were therefore much more likely to be able to take advantage of the cost savings of return loads. Cemex told us that it believed that many local aggregates markets, particularly in the Midlands, would be considerably larger than the indicative 30-mile radius adopted in previous decisions. Cemex told us that local markets would vary in scope and scale due to demographics (different concentration of demand in rural vs urban areas) and topographic features, as a result of which each market must be defined on its own terms.
50. Tarmac told us that competition for aggregates took place at a local level and the relevant geographic market as a starting point for the competitive assessment was 30 miles around the point of production.¹⁹
51. AI told us that, on average, 80 per cent of sales of primary aggregates by AI were made to customers within approximately 30 miles radius for quarries in urban areas, and approximately 50 miles for quarries in rural areas, and therefore catchment areas used should be wider than in the Anglo-Lafarge inquiry.

¹⁶ [Tarmac reply to the issues statement.](#)

¹⁷ [Cemex reply to the issues statement.](#)

¹⁸ [Cemex reply to the issues statement.](#)

¹⁹ [Tarmac reply to the issues statement.](#)

52. We plan to do further analysis to calculate the appropriate size of the catchment areas to use in our competitive assessment. We also note that some aggregates are transported around the UK by rail, and occasionally by ship, and as a consequence catchment areas for rail- and sea-linked quarries are likely to be much larger than catchment areas for quarries that are not rail- or sea-linked. Rail-linked quarries need to be connected to a depot at the other end of the rail link in order to sell aggregates into a local area at the end of that link, and therefore these quarries are likely to be in competition with other quarries located in the catchment area of the depots which they feed. In practice, this means that, in local areas where there are rail depots connected to rail-linked quarries, the competitive assessment in these local areas will take into account the constraint posed by aggregates produced in the rail-linked quarries (and sea-linked depots and quarries will be treated in a similar manner).

Cement market definition

53. In the issues statement, we asked parties for their views on whether the product and geographic markets defined in the Anglo-Lafarge merger report were relevant for this market investigation. In their replies to the issues statement, Lafarge, Tarmac and Cemex told us that they generally agreed with the market definition in the Anglo-Lafarge report for cement.
54. The market definition used in the Anglo-Lafarge inquiry was the following:
- (a) CEM I, CEM II and CEM III are in the same relevant product market. Although different cements have different properties, the Anglo-Lafarge report concluded that there is a degree of demand-side substitution between different cements, and that there is supply-side substitution between different types of cement.
 - (b) Bagged cement and bulk cement can be defined as separate markets because they are bought by different types of customers (no demand-side substitution).

(c) Imported cement and Great-Britain-produced cement are in the same relevant product market.

55. Though the Anglo-Lafarge report did not conclude specifically on geographic markets for cement, the competitive assessment focused on Great Britain but the constraints within Great Britain from imported cement were also assessed.

56. Majors' views on the relevant markets for cement (as set out in their replies to the issues statement) were:

(a) Lafarge submitted that the relevant market was all grey cement;²⁰ it did not comment on whether bagged or bulk should be defined as separate markets (but this was the view they put forward in the Anglo-Lafarge inquiry).

(b) Tarmac told us that all types and grades of cement were in the same market as they were demand- and supply-side substitutes, that bagged and bulk could be considered as separate markets because of lack of any substitution from the demand side, and that imported cement was in the same market as Great-Britain-produced cement. Tarmac submitted that the geographic market was at least national.

(c) Cemex told us that there was a single product market for grey cement, with all available grades and specifications forming a single continuum of customer demand. According to Cemex, there was also extensive supply-side substitution, because most British cement production sites had the necessary milling, blending and storage facilities to be able to flex production between CEM I, II and III. Cemex told us that, regardless of whether or not bulk and bagged cement comprised a single market or two separate markets, the majority of cement

²⁰ We understand that all the cement produced in Great Britain is grey cement.

producers could produce and sell cement in either form after making a relatively inexpensive investment in bagging machinery.

(d) Cemex also told us that pulverized fly ash (PFA) and ground granulated blast furnace slag (GGBS) posed a significant competitive constraint on grey cements, even though they could not be used on a stand-alone basis as a direct substitute for cement. According to Cemex, this was because many RMX and concrete product producers (including sites owned by Cemex) purchased PFA and GGBS directly and 'self-blended' CEM II or III as required.²¹ For example, in relation to Cemex's own RMX production, Cemex told us that purchases of GGBS and PFA comprised [X] per cent and [X] per cent respectively of total purchases of cementitious products. It said that, as a consequence, any assessment of the relevant market for cement would be misleading and incomplete without a full consideration of these products.

(e) Cemex told us that imported and Great-Britain-produced cement were in the same market, and it submitted that the relevant geographic market for the supply of cement comprised at least Great Britain. Cemex noted that Cemex and its competitors were able to serve customers across this territory from only a few plants, from which cement was transported to wherever it was required.

57. Hanson and AI did not comment on cement market definition in their responses to the issues statement.

58. In conclusion, there appears to be broad agreement with the cement market definitions used in the Anglo-Lafarge inquiry (as set out in paragraph 54 above) and therefore we see no reason to depart from those market definitions. We note, however, Cemex's view that, given that GGBS and PFA are inputs to the production

²¹ CEM II comprises a mix of 6–35 per cent of PFA in addition to ground clinker and gypsum; and CEM III contains between 36 and 95 per cent GGBS in addition to ground clinker and gypsum.

of CEM II/III, the analysis of competition in the market for grey cement should also take into account the constraint from GGBS and PFA.

RMX market definition

59. In relation to RMX, the main questions relating to market definition are:
- (a) Is concrete delivered and produced by volumetric trucks a substitute for RMX produced at fixed plants?
 - (b) Is concrete produced at site plants a substitute for RMX produced at fixed plants?
60. Although there are very many different specifications of RMX, corresponding to different mixes of the ingredients, at the same RMX plant the full range of standard RMX mixes will be manufactured on any given day and therefore the switching will take place on a daily basis.²² Therefore, all specifications of RMX are in the same relevant product market.
61. In relation to geographic market definition, given that RMX must be used within 1 to 2 hours of being produced, there is broad consensus that the markets are local (within about 8 to 10 miles of RMX plants).
62. In the Anglo-Lafarge report, the relevant product market for RMX was defined as all RMX produced in fixed and site plants, but not including volumetric trucks. The main reasons for not including volumetric trucks in the relevant market were that volumetric trucks appeared to serve a different segment of the market (small-volume projects) and because the product was perceived to be of a lower quality of specification and strength by the majority of parties that were contacted during the Anglo-

²² With the possible exception of some value-added RMX products (VAPs): the majority of these could be produced at any RMX plant, but some required additional equipment such as a pan mixer or an anhydrite silo.

Lafarge inquiry. For these reasons, the report concluded that volumetric trucks were likely to pose a limited constraint on RMX produced by fixed plants.

63. The Majors did not agree with this product market definition in their reply to the issues statement, and told us that volumetric trucks should be included in the relevant market. We now summarize the Majors' responses to our issues statement in relation to RMX market definition.

Responses by the Majors to the issues statement

64. Tarmac²³ told us that it did not agree with the CC's conclusions in the Anglo-Lafarge report that volumetric trucks were not part of the same relevant market as RMX plants (fixed or site plants). Tarmac told us that according to BDS the RMX supplied by volumetric operators accounted for approximately 9 per cent of the supply of RMX in Great Britain and had grown considerable in the past decade. It said that even though volumetric trucks were originally designed to supply the small-loads market, they were increasingly delivering to customers and jobs that had been traditionally supplied by RMX companies which operated RMX plants.
65. Tarmac told us that fixed and site plants were not in direct competition because once a site plant had been set up for an individual customer for a particular project, that plant did not sell to the external market. However, it said that fixed and site plants were in competition when a job was tendered, as at this point a customer could choose to buy RMX from a fixed RMX plant or set up a site plant (competition for the market, rather than in the market).

²³ [Tarmac response to the issues statement.](#)

66. Tarmac told us that the relevant geographic market for RMX as a starting point for competitive assessment was 10 miles from the point of production, as the distance RMX could travel was limited by the time it took for the product to set.
67. AI²⁴ told us that fixed plants and volumetric trucks should be considered to compete in the same market, as:
- (a) The share of RMX supplied by volumetric trucks had been steadily increasing to 9 per cent.
 - (b) Volumetric trucks significantly reduced waste, they did not have an upper weight limit and were particularly successful at servicing small loads with long waiting times.
 - (c) Some customers were turning to volumetric trucks for the self-supply of RMX. For instance, London FM Conway had purchased its own fleet of volumetric trucks and no longer purchased from RMX plants.
68. Lafarge²⁵ told us that it agreed with the CC's assessment in the Anglo-Lafarge report that there was a single product market for the supply of RMX, but that it disagreed with the CC on two aspects:
- (a) Lafarge told us that volumetric trucks competed directly with other RMX suppliers for both small-scale jobs and high-specification work. It said that it was not aware of any quality issues associated with concrete produced from volumetric trucks, and that the evidence provided by Cemex, Alan Newport and Hillhouse in the Anglo-Lafarge report supports Lafarge's view that volumetric trucks could and did supply RMX to the same specifications as fixed RMX plants.
 - (b) Lafarge told us that it did not regard pre-existing fixed and site plants as being in direct competition with each other due to the different competition processes

²⁴ AI response to the issues statement.

²⁵ Lafarge response to the issues statement.

involved in the decision to use a site plant. Competition for the establishment of an RMX site plants took place at the point when the customer put the job out to tender. Once the customer had decided to use a site plant for a construction project (usually large-scale or long-life projects), the site plant being set up would not compete for other jobs in the local vicinity.

69. Lafarge provided data on the market share of volumetric trucks, based on BDS data (see Table 2). This showed that the volume of RMX produced by volumetric trucks had increased from [REDACTED] m³ in 2006 to [REDACTED] m³ in 2010, and that the Great Britain share of RMX delivered by volumetric trucks had increased from [REDACTED] per cent in 2006 to [REDACTED] per cent in 2010.

TABLE 2 Lafarge estimates of volumetric trucks numbers and shares

	2006	2007	2008	2009	2010	2011
Number of volumetric trucks in operation	[REDACTED]	[REDACTED]	[REDACTED]	474	497	[REDACTED]
Estimated volume ('000 m ³)	[REDACTED]	[REDACTED]	[REDACTED]	1732	1787	[REDACTED]
Market share of volumetric trucks (%)	[0-5]	[0-5]	[0-5]	[5-10]	[5-10]	[REDACTED]

Source: Lafarge; Lafarge estimates, based on BDS data [REDACTED].

70. In relation to RMX, Lafarge also noted that despite there being one single market for the supply of RMX, Lafarge sought to differentiate its product offering through a range of innovative value-added concretes which were used for the same applications as 'generic' concrete and compete with generic concrete by offering specific customer benefits and improved performance. Lafarge told us that it did not consider, however, that the existence of these products warranted any further subdivision of the market for the supply of RMX.

71. Hanson²⁶ told us that the impact of volumetric trucks within the RMX market was understated by the CC in the Anglo-Lafarge report. It told us that, in recent years,

²⁶ Hanson response to the issues statement.

volumetric trucks had become a far greater competitive constraint on RMX production at a fixed or site plant:

(a) Hanson told us that volumetric trucks overlapped in serving similar segments of the market to those served by plant RMX production. Volumetric trucks were not confined to just supplying small projects. Hanson told us that volumetric trucks were supplying large projects in the West Midlands, one example being a large project involving the M42.

(b) The products produced by volumetric trucks were no longer necessarily considered of lower quality, and many volumetric trucks were now BSI accredited.

72. Cemex²⁷ told us that there was a single product market for the supply of RMX and any RMX production facility was able to produce virtually any required RMX specification. It said that RMX should not be segmented by the mode of delivery of RMX. First, there was no distinction between concrete from fixed plants and site plants. Furthermore, RMX concrete supplied by volumetric trucks comprised an integral and expanding part of the market. Approximately 200 volumetric truck operators presently operating in Great Britain had claimed an estimated share of up to 10 per cent of the Great Britain RMX market.

73. Cemex also told us that the survey commissioned by the CC for the Anglo-Lafarge inquiry found that 55 per cent of RMX customers surveyed had purchased RMX from volumetric trucks in the past year. It said that volumetric operators could produce a full range of RMX products and could switch between grades. Whilst they did not tend to be used as often for work where QSRMX or BSI accreditation was required, Cemex told us that all volumetric operators were eligible for this accreditation.

²⁷ [Cemex response to the issues statement.](#)

RMX product market definition: our assessment

74. We asked the Majors, in the market questionnaire, whether they were currently operating volumetric trucks, or had done so in the past. [REDACTED], none of the Majors are currently operating volumetric trucks.²⁸ AI told us that it had historically operated a number of volumetric trucks. [REDACTED] It told us that these volumetric truck operations had now ceased due to an inability by AI to make an acceptable return.
75. Lafarge told us that, given its existing and heavy investment in its own fixed plant network, volumetric trucks did not create for Lafarge any additional capabilities to service new markets or customers, although Lafarge noted that volumetric trucks did remain an attractive option for new entrants. Lafarge told us that it had experimented with operating a volumetric truck between 2005 and 2007, but that volumetric trucks were not a good fit with its business model. It said that it used its network of smaller minimix trucks to compete with volumetrics, the minimix businesses service customers requiring smaller loads. It told us that its minimix business operated small mixer trucks under local branding with RMX produced from Lafarge's fixed RMX plants.
76. Lafarge also told us that historically, volumetric trucks supplied smaller contracts (typically small loads where the ability to deliver to multiple customers had a cost advantage relative to mixer trucks which could only make a single delivery on each journey). During the last two to three years, however, Lafarge said that volumetric trucks had increasingly been used on larger jobs, and that it had lost some large jobs to volumetric truck operators. For example, it told us that [REDACTED].

²⁸ [REDACTED]

77. We reviewed the evidence in the CC/GfK survey for the Anglo-Lafarge inquiry. In the last 12 months, 87 per cent of RMX customers of the main parties had purchased RMX from a fixed plant, 14 per cent from a site plant, and 55 per cent from a volumetric truck. There is therefore substantial overlap in the customer base for volumetric trucks and RMX produced from fixed plants, though we note that the very large majority of RMX customers are construction companies (74 per cent) and therefore could use RMX from different sources for different types of projects (implying that the overlap does not necessarily indicate substitutability). The main reasons for using volumetric trucks were size of project (45 per cent of volumetric truck users) and prices of RMX (30 per cent of volumetric truck users).
78. RMX customers were asked whether they were able to switch some of their RMX purchases from fixed plants to volumetric trucks or site plants. 69 per cent of customers said that they could not switch any purchases to volumetric trucks, and 25 per cent said that they could, though only one-third of these could switch more than a quarter of their purchases to volumetric trucks. Ability to switch from fixed plants to site plants was even less: 81 per cent said that they could not switch, and 15 per cent said that they could—and for the 15 per cent who could, only around a fifth could switch more than a quarter of purchases to site plants.
79. We also reviewed the third-party views on substitution between RMX, volumetric trucks and site plants as summarized in the Anglo-Lafarge report.²⁹
80. We also reviewed evidence from internal business plans and strategy documents provided by the Majors in response to our request for ‘off-the-shelf’ information. We noted that some of the Majors made frequent mention of volumetric trucks as a potential constraint on their RMX businesses in their RMX strategy documents (eg

²⁹ [Anglo-Lafarge report](#), Appendix G, paragraphs 97–101.

Cemex, Hanson, and to a lesser extent AI), whilst others did not (Lafarge). Some extracts from these documents are reproduced below:

- (a) A Cemex strategy document on RMX entitled 'UK Ready Mix', dated April 2010, analyses the attributes of volumetric trucks : 'Convenient and Easy to use; mixed on site, only pay for what you use, Clean / No waste, Price competitive, Increasing their share', and discusses as a counter to volumetrics: 'Ensure our offering is competitive with theirs in terms of service and visibility to the market'. The same slide concludes: 'Volumetrics are now a part of the market'. Another document on the London RMX market notes 'Threats of New entrants including Volumetrics'. Generally, Cemex's regional strategy documents on RMX take into account volumetric trucks in assessing the competitive landscape.
- (b) A Hanson strategy document on RMX, 'RMC business line', dated 2011, contains a SWOT analysis for RMX, which identifies the growth of independent volumetric producers as a threat.
- (c) AI's strategy documents mentioned the growth of volumetric trucks: 'Increasing growth in Volumetrics in Midlands' and 'Opportunity to leverage our compliance for major projects, and also to win work over Volumetrics'. Other AI internal strategy documents downplayed the importance of the threat from volumetric trucks: 'Threat from volumetrics has been greatly reduced (are believed to have lost market share)'; 'Volumetrics have seen a slight increase, but the much bigger impact to competitive behaviour is the competitive environment mentioned above.'
- (d) We also note that none of the RMX strategy documents provided to us by Lafarge mentioned volumetric trucks in their analysis of RMX markets.

81. Overall, the evidence suggests to us that volumetric trucks are a substitute for RMX from fixed plants for relatively small projects, but less so for larger projects. The internal documents provided as part of this inquiry suggest that volumetric trucks are

perceived as a threat by some Majors, and survey evidence shows that many RMX customers have used volumetric trucks in the past (55 per cent). Site plants appear to be suitable only for very large projects and therefore are likely to be a constraint on fixed RMX plants for the largest projects.

82. We will therefore include volumetric trucks and site plants within our definition of the relevant product market for RMX.³⁰ Our competitive assessment will show how strong these constraints are on fixed plants and vice versa. Our initial view is that volumetric trucks and site plants will be more of a competitive constraint for certain types of projects (relatively small projects in the case of volumetric trucks, and very large projects in the case of site plants) than for others.

³⁰ We note that volumetric trucks were not included in the relevant market definition in the Anglo-Lafarge report (where the relevant market included RMX produced at fixed sites, mobile plants and site plants, but not in volumetric trucks). However, the local competition assessment for RMX in that report, which focused on areas where the parties to the joint venture both had RMX sites, took account of possible constraints from local volumetric truck operators (see paragraph 33 of the report). For reasons analogous to those set out in paragraph 47 above, for the purposes of this market investigation, we propose to use a wider market definition which includes volumetric trucks. We also note the additional evidence submitted to us in this market investigation in relation to the constraint from volumetric trucks.

Lafarge and AI data on own use of aggregates for their downstream activities, by region

1. Tables 1 and 2 below show Lafarge data on Lafarge's own use of aggregates for its own downstream activities, by region. Table 1 shows Lafarge's use of aggregates for the production of RMX, and Table 2 shows Lafarge's use of aggregates for the production of asphalt.

TABLE 1 Proportion of aggregate purchases for RMX, average 2008 to 2011

Region	High PSV aggregate	Crushed rock	Sand and gravel	per cent	
				Recycled	Secondary
East Anglia	[X]	[X]	[X]	[X]	[X]
East Midlands	[X]	[X]	[X]	[X]	[X]
North West	[X]	[X]	[X]	[X]	[X]
Northern	[X]	[X]	[X]	[X]	[X]
Scotland	[X]	[X]	[X]	[X]	[X]
South East	[X]	[X]	[X]	[X]	[X]
South West	[X]	[X]	[X]	[X]	[X]
Wales	[X]	[X]	[X]	[X]	[X]
West Midlands	[X]	[X]	[X]	[X]	[X]
Yorks & Humber	[X]	[X]	[X]	[X]	[X]
GB national	[X]	[X]	[X]	[X]	[X]

Source: Lafarge .

TABLE 2 Proportion of aggregate purchases for asphalt, 2008 to 2011

Region	High PSV aggregate	Crushed rock	Sand and gravel	per cent	
				Recycled	Secondary
East Anglia	[X]	[X]	[X]	[X]	[X]
East Midlands	[X]	[X]	[X]	[X]	[X]
North West	[X]	[X]	[X]	[X]	[X]
Northern	[X]	[X]	[X]	[X]	[X]
Scotland	[X]	[X]	[X]	[X]	[X]
South East	[X]	[X]	[X]	[X]	[X]
South West	[X]	[X]	[X]	[X]	[X]
Wales	[X]	[X]	[X]	[X]	[X]
West Midlands	[X]	[X]	[X]	[X]	[X]
Yorks & Humber	[X]	[X]	[X]	[X]	[X]
GB National	[X]	[X]	[X]	[X]	[X]

Source: Lafarge.

2. Tables 3 to 5 show data on AI's own use of aggregates for its asphalt, RMX and concrete block businesses.

TABLE 3 Proportion of aggregate purchases for asphalt, 2009 to 2011

EPR	per cent		
	Crushed rock	Sand and gravel	High PSV
East Anglia	[X]	[X]	[X]
East Midlands	[X]	[X]	[X]
North	[X]	[X]	[X]
North West	[X]	[X]	[X]
Scotland	[X]	[X]	
South East	[X]	[X]	
South West	[X]	[X]	[X]
Wales	[X]	[X]	
West Midlands	[X]	[X]	[X]
Yorkshire & Humberside	[X]	[X]	

Source: AI.

TABLE 4 Proportion of aggregate purchases for concrete products, 2009 to 2011

EPR	per cent	
	Crushed rock	Sand and gravel
East Anglia	[X]	[X]
East Midlands	[X]	[X]
North	[X]	[X]
North West	[X]	[X]
Scotland	[X]	[X]
South East	[X]	[X]
South West	[X]	[X]
Wales	[X]	[X]
West Midlands	[X]	[X]
Yorkshire & Humberside	[X]	[X]

Source: AI.

TABLE 5 Proportion of aggregate purchases for RMX, 2009 to 2011

EPR	per cent	
	Crushed rock	Sand and gravel
East Anglia	[X]	[X]
East Midlands	[X]	[X]
North	[X]	[X]
North West	[X]	[X]
Scotland	[X]	[X]
South East	[X]	[X]
South West	[X]	[X]
West Midlands	[X]	[X]
Yorkshire & Humberside	[X]	[X]

Source: AI.

3. For information, the total shares of production of sand and gravel and crushed rock in the different regions are shown in Table 6. The large majority of aggregates production in East Anglia, the South-East and the West Midlands is sand and gravel; the other regions produce mainly crushed rock.

TABLE 6 Shares of crushed rock and sand and gravel production, by region, 2010

	<i>per cent</i>	
	<i>Share CR production</i>	<i>Share S&G production</i>
South East	6	94
South West	82	18
West Midlands	39	61
East Midlands	83	17
East Anglia	8	92
Yorkshire & Humberside	72	28
North West	67	33
Northern	85	15
Wales	95	5
Scotland	77	23
Total	71	29

Source: BDS.

Estimates provided by Tarmac and [X] on the usage of aggregates in different applications

1. Tables 1 to 4 below show the estimates prepared by BDS on the usage of aggregates in different applications, provided by Tarmac.

TABLE 1 **Aggregates used in 2008**

<i>Application</i>	<i>per cent</i>					
	<i>GB usage</i>	<i>S&G</i>	<i>CR</i>	<i>Secondary</i>	<i>Recycled</i>	<i>Total</i>
RMX production	22	64	29	1	5	100
Concrete products	8	48	35	9	8	100
Asphalt	11	8	77	7	8	100
General construction	52	6	48	14	31	100
Others	7	37	63	0	0	100

Source: BDS.

TABLE 2 **Aggregates used in 2009**

<i>Application</i>	<i>per cent</i>					
	<i>GB usage</i>	<i>S&G</i>	<i>CR</i>	<i>Secondary</i>	<i>Recycled</i>	<i>Total</i>
RMX production	19	66	27	1	6	100
Concrete products	11	46	42	6	5	100
Asphalt	12	7	76	7	10	100
General construction	51	11	42	16	31	100
Others	8	39	61	0	0	100

Source: BDS.

TABLE 3 **Aggregates used in 2010**

<i>Application</i>	<i>per cent</i>					
	<i>GB usage</i>	<i>S&G</i>	<i>CR</i>	<i>Secondary</i>	<i>Recycled</i>	<i>Total</i>
RMX production	20	63	30	1	5	100
Concrete products	11	47	41	7	6	100
Asphalt	13	7	77	6	10	100
General construction	49	10	41	16	33	100
Others	8	40	60	0	0	100

Source: BDS.

TABLE 4 **Aggregates used in 2008 to 2010, average**

<i>Application</i>	<i>per cent</i>					
	<i>GB usage</i>	<i>S&G</i>	<i>CR</i>	<i>Secondary</i>	<i>Recycled</i>	<i>Total</i>
RMX production	20	65	29	1	5	100
Concrete products	10	47	39	7	6	100
Asphalt	12	7	77	7	10	100
General construction	50	9	44	15	32	100
Others	8	38	62	0	0	100

Source: BDS.

2. Table 5 shows the estimates provided by [X] on the current use of aggregates in different applications ([X] own estimates).

TABLE 5 Estimates by [X] on the use of aggregates

		per cent			
		% of aggregate type for application			
Usage		Sand and gravel	Crushed rock	Recycled	Secondary
<i>Use in manufacture of construction products</i>					
Usage in manufacturing of construction products	Manufacture of RMX	[X]	[X]	[X]	[X]
	Manufacture of concrete products, eg blocks, paving, precast structures, roof tiles	[X]	[X]	[X]	[X]
	Manufacture of mortar (RMX, ready to use and dry silo types)	[X]	[X]	[X]	[X]
	Manufacture of asphalt	[X]	[X]	[X]	[X]
<i>Direct construction uses</i>					
Sub-base and structural fill	Non-structural fill, structural fill, capping layer, sub-base	[X]	[X]	[X]	[X]
Other construction uses*	Drainage stone/pipe bedding	[X]	[X]	[X]	[X]
	Bedding sand	[X]	[X]		[X]
	Decorative aggregates	[X]	[X]		[X]
	Aggregates for hand-mixed concrete & mortar	[X]	[X]	[X]	[X]

Source: [X].

*Other construction uses account for a very small proportion of overall aggregate use, the main direct construction use being sub-base and structural fill.