

## The Contribution of Recycled and Secondary Materials to Total Aggregates Supply in Great Britain

# Overview



## Introduction

**The Mineral Products Association (MPA) is the sectoral trade association for the UK aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries. These industries are essential to the UK economy and our quality of life. The sector is the largest supplier to the construction industry and many other industries including manufacturing and agriculture. Mineral products represent the largest material flow in the UK economy, at 1 million tonnes per day, predominantly from indigenous sources. A healthy domestic mineral products industry is vital for future economic growth and our quality of life.**

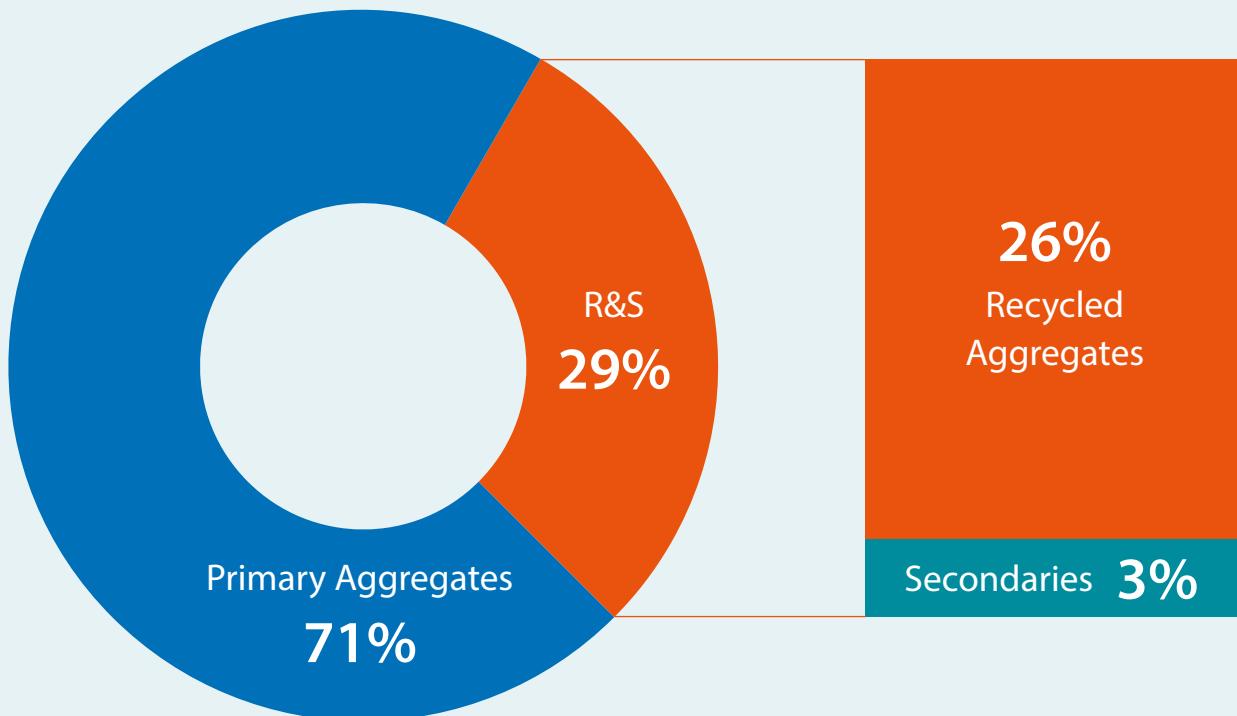
Mineral products are essential for housing, infrastructure including transport and energy networks, commercial and industrial buildings, utilities, schools and hospitals. Other non-construction uses include iron and steel manufacture, glass making, agriculture, cleaning power station emissions, chemicals and pharmaceuticals.

The main components of aggregates supply are primary aggregates, meaning quarried crushed rock and both land-won and marine dredged sand & gravel. Aggregates can also be obtained from the recycling of Construction, Demolition and Excavation Wastes (CDEW), or derived from other industrial, production or extractive processes, referred to as secondary aggregates. Secondary aggregates can include furnace ash

and slag from iron and steel production, and are defined as 'manufactured aggregates' within the BS EN aggregate product standards.

In 2017, a total of 176 million tonnes of primary aggregates were produced by the industry in Great Britain, which, together with an estimated 72 million tonnes from recycled and secondary sources, supplied demand. Recycled and secondary materials accounted for 29% of the total aggregates supply, which has put Great Britain in a leading position internationally in the use of recycled and secondary aggregates for many years, well ahead of the European average.

**Figure 1. Share of total aggregates supply in GB, 2017**



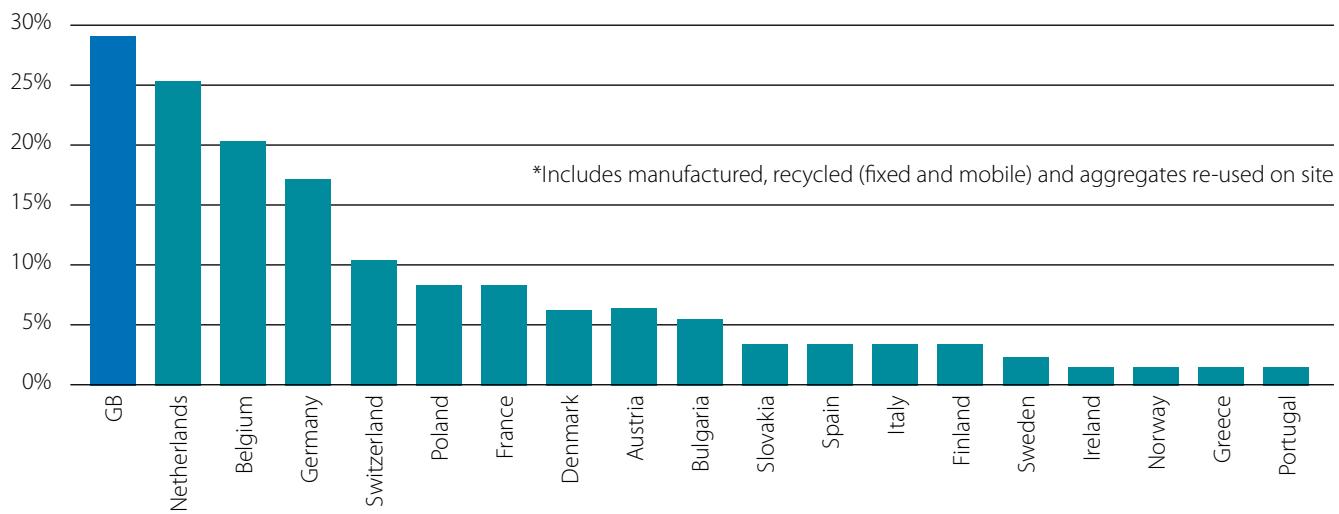
Front cover: Total aggregates supply in GB, 2017 (million tonnes)



# Overview



**Figure 2. Share of recycled and secondary materials in total aggregates sales, 2016. Source: UEPG (2017), MPA**



Despite this strong performance, the general paucity of regularly collected and compiled statistics, especially regarding recycled and secondary aggregate use at a GB scale, can make it challenging to track the industry's continuing progress. In response, MPA has developed a methodology to track the contribution of recycled

and secondary aggregates to the overall aggregates supply, with the aim of addressing this data gap. The methodology used is based on published statistics from third parties whenever possible, combined with a number of tried and tested material-specific assumptions.

**Table 1. Total aggregates supply in GB (million tonnes)**

	2015	2016	2017
Crushed rock	108.2	113.9	114.5
Sand & gravel	61.8	63.0	61.8
<b>Total Primary Sources (P)</b>	<b>170.0</b>	<b>176.8</b>	<b>176.3</b>
CDEW (incl. railway ballasts)	52.4	54.6	58.5
Asphalt planings	5.8	6.0	6.1
<b>Total Recycled Sources (R)</b>	<b>58.3</b>	<b>60.6</b>	<b>64.6</b>
China & ball clay waste <sup>(1)</sup>	2.0	2.0	2.5
Colliery spoil	0.3	0.0	0.0
Furnace bottom ash (FBA)	0.7	0.8	0.1
Incinerator bottom ash (IBA) <sup>(2)</sup>	1.6	1.9	1.8
Fly ash	1.0	1.1	0.2
Iron & steel slag	1.4	0.9	0.9
Slate waste	0.5	0.6	0.6
Clay & shale	0.7	0.7	0.8
Chalk	0.4	0.5	0.5
<b>Total Secondary Sources (S)</b>	<b>8.6</b>	<b>8.4</b>	<b>7.4</b>
<b>Total Aggregates (AGGS)</b>	<b>236.9</b>	<b>245.9</b>	<b>248.2</b>
<b>Share of R&amp;S in AGGS</b>	<b>28%</b>	<b>28%</b>	<b>29%</b>

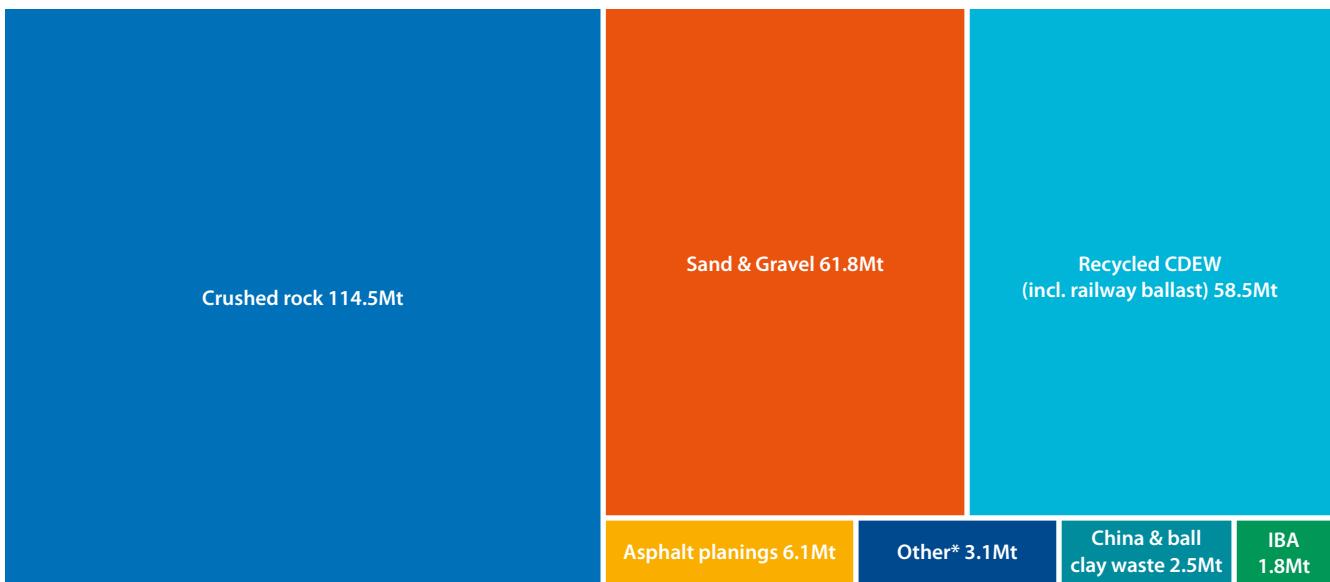
Note: Totals may not add up due to individual rounding. <sup>(1)</sup> Devon and Cornwall. <sup>(2)</sup> England and Wales.



# Overview

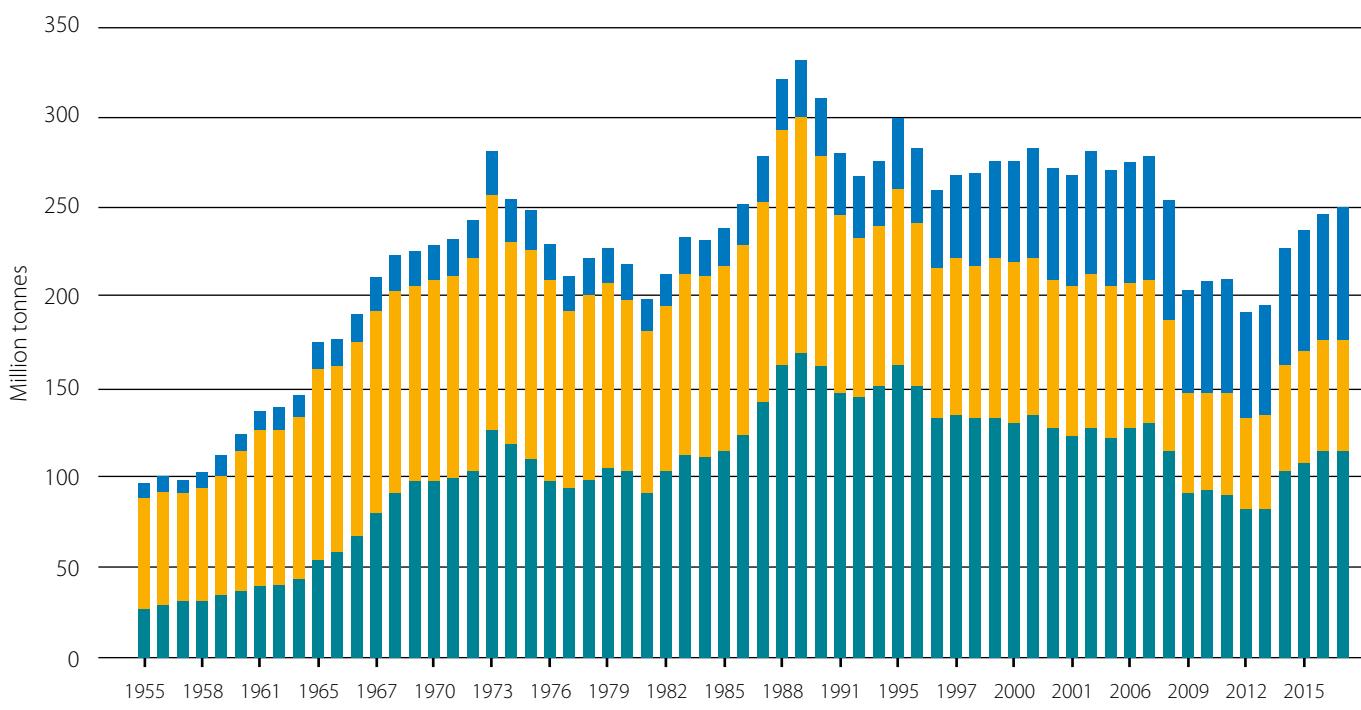


**Figure 3. Total aggregates supply in GB, 2017 (million tonnes)**



\* Includes iron & steel slag, clay & shale, slate waste, chalk, fly ash, furnace bottom ash and colliery spoils. Source: MPA.

**Figure 4. GB aggregates market by sources of supply, 1955-2017**



\* Source: ONS (1999-2014), BGS (2016b), MPA. ■ Recycled and secondary materials ■ Sand & gravel ■ Crushed rock



# Definitions & Methodology



## Definitions and terminology

**Primary aggregates** are minerals that are extracted for aggregates use. Minerals can only be dug where they lie. Crushed rock represents the major tonnage with significant contributions from sand and gravel quarries and marine dredged sand & gravel.

This broad breakdown disguises the fact that local and regional markets may be highly dependent on a particular type or source of aggregate as a consequence of the geographic availability or the market demand for particular products. The market is largely supplied from UK sources and aggregates exports and imports account for less than 5% of the domestic market.

**Recycled aggregates** are materials derived from construction, demolition and excavation activities which are reprocessed and/or re-used as an aggregate for construction purposes whenever possible.

The MPA definition focusses solely on comparatively 'hard' inert materials, meaning the non-hazardous materials which would generally be suitable for recycling into aggregates. This definition includes railway ballast but excludes asphalt planings, which we account for separately. The 'soft' non-hazardous CDEW recovered as recycled soils are entirely excluded. WRAP (2010) identified 43.5 million tonnes of hard inert CDEW recycled in England in 2008 alongside a further 9.2 million tonnes of soils.

Further information on the wider CDEW waste stream and how this is incorporated back into the chain of utility has been published by MPA earlier in 2019. Please refer to:

MPA (2019). *From waste to resource: a UK Mineral Products industry success story*. Available at: [https://mineralproducts.org/documents/MPA\\_Inert\\_Waste\\_Feb2019.pdf](https://mineralproducts.org/documents/MPA_Inert_Waste_Feb2019.pdf)

**Secondary aggregates** are materials which are the by-products of other industrial, production or extractive processes, and which are able to be used as an aggregate for construction purposes. These include blast furnace iron and steel slags, incinerator bottom ash (IBA), fly ash, furnace bottom ash (FBA), china clay, slate and chalk waste, as well as colliery spoils. Collectively, these materials make an important contribution to total aggregates supply and depending on their quality and composition can be used as replacement construction aggregates, in the manufacture of concrete and concrete products and a range of other construction applications.

It should be noted that secondary aggregates are defined as 'manufactured aggregates' within the BS EN aggregate product standards.

## Methodology and assumptions

All estimates for CDEW and secondary materials are based on historical data resulting from research commissioned by the Ministry of Housing, Communities & Local Government (MHCLG, formerly DCLG, 2007a, 2007b) and WRAP (2010), which provided data for the years 2005 and 2008.

It is generally assumed that all CDEW which can be recycled as aggregates is being used, with limited opportunity for a significantly higher share of CDEW in aggregates markets. Research by MHCLG into CDEW markets suggests that this was already the case in 2005, indicating that "*very little evidence was found of hard C&D waste which could be recycled into aggregate being landfilled as waste*".

Using the information available, MPA has been estimating market sizes from 2009 onward, based on a range of material-specific assumptions and data sources.

It should be noted that the devolved administrations may publish recycling data based on activities in their own jurisdictions. As a consequence, locally reported recycling rates may differ from the GB figures presented in this document.



# Constituents of Supply - Primary Sources



## Primary aggregates (crushed rock and sand & gravel, including marine)

The 'Annual Mineral Raised Inquiry' (AMRI) surveys, previously carried out by the Office for National Statistics (ONS), provided data on non-energy mineral production in GB. In particular, this included data on extracted sales of chalk, clays, crushed rock, dolomite, granite, limestone, peat, ore minerals, salt, sandstone, sand & gravel, slate and other minerals, together with employment for each quarry type.

The last annual survey available covers data for the year 2014 when government withdrew funding for this survey, and no further annual surveys are currently planned.

The 4-yearly Aggregate Mineral (AM) survey is prepared by the British Geological Survey (BGS) for MHCLG. This survey provides national and regional sales patterns, inter-regional flows, transportation, consumption and permitted reserves for primary aggregates in England and Wales published in 2016, providing 2014 market data.

Given the lack of more recent data, MPA estimates primary aggregates sales post-2014 using the trend in its members'

aggregates sales volumes. The MPA sales volumes survey is carried out on a quarterly basis, providing volumes of primary aggregates sales in GB, based on a consistent sample of MPA members which together represent in excess of an estimated 80% of the total aggregates market. Given the significant representation of the MPA survey in the overall GB primary aggregates market, trends in MPA sales should be a reasonably representative indicator of overall aggregates sales in GB.

Overall, in order to build a times series, MPA used the total primary aggregates sales as published in the AMRI surveys up to 2013 (GB), a combination of the AM (England & Wales) and AMRI (Scotland) surveys for the transitional year in 2014, and, as the AMRI survey has now ceased, the trend in MPA members' aggregates sales over 2015-17 (GB). A reconciliation of the MPA members' trends and the AM survey data will be carried out as and when the next 4-yearly survey is made available.

**Table 2. Primary aggregates in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Crushed rock	122.0	115.0	91.1	92.7	90.0	82.9	82.4	102.3	108.2	113.9	114.5
Sand & Gravel	82.4	72.1	55.7	54.3	55.0	50.0	51.9	59.6	61.8	63.0	61.8
MPA: Crushed rock sales									5.8%	5.3%	0.5%
MPA: Sand & gravel sales									3.7%	1.9%	-1.8%
<b>Total</b>	<b>204.3</b>	<b>187.2</b>	<b>146.8</b>	<b>136.6</b>	<b>145.9</b>	<b>132.9</b>	<b>134.4</b>	<b>161.9</b>	<b>170.0</b>	<b>176.8</b>	<b>176.3</b>

Source: ONS (1999-2014), BGS (2016b), MPA calculations.



# Constituents of Supply - Recycled Sources



## CDEW (incl. railway ballast)

Estimates for England for the years 2005 and 2008 are provided by MHCLG (DCLG, 2007a) and WRAP (2010). According to these two reports, the total production of recycled aggregates in England reached 42.07Mt in 2005 and 43.52Mt in 2008. These tonnages

include hard inert CDEW, i.e. materials which would generally be suitable for processing into aggregates. This definition includes railway ballast, but excludes asphalt planings (which are accounted for separately) and recycled soils.

**Table 3. EWC codes included in the definition of hard inert CDEW**

EWC code 1	EWC code 2	EWC code 3	Description
12.1	12.11	17.01.01	Concrete
12.1	12.11	17.01.02	Bricks
12.1	12.11	17.01.03	Tiles & ceramics
12.1	12.11	17.01.07	Mixture of concrete, bricks, tiles & ceramics
12.1	12.11	17.05.08	Track ballast
12.5	12.51	10.12.08	Waste ceramics, bricks, tiles and construction products (after thermal processing)
7.1	7.12	17.02.02	Glass waste
12.8	12.81	19.12.09	Minerals (e.g. example sand, stones from waste treatment)

Source: WRAP (2010).

To build a GB estimate for CDEW in 2005, MPA used the England data (42.07Mt) and scaled it up assuming that 4Mt of recycled aggregates produced in Scotland and 3Mt in Wales, resulting in a total of 49.1Mt for GB.

For the year 2008, we assume that total production of recycled aggregates in GB followed the trend seen in England, therefore applying a 3.4% increase between 2005 and 2008, resulting in a total production of recycled aggregates of 50.8Mt.

To our knowledge, there has been no further information published on recycled aggregates at national level since the WRAP (2010) report. As a proxy to project 'hard' inert CDEW from 2009 onward, MPA assumes it will follow the trend in general construction activity, as measured by ONS. The logic for this assumption is that changes in construction output should be a reasonable proxy for changes in the amount of demolition work and therefore of the generation of CDEW.

**Table 4. Hard inert CDEW in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Construction output			-13.2%	8.5%	2.2%	-6.9%	1.5%	8.8%	4.4%	4.1%	7.2%
'Hard inert' CDEW	49.1	50.8	44.1	47.8	48.9	45.5	46.2	50.2	52.4	54.6	58.5

Source: WRAP (2010), ONS (2018), MPA calculations.

## Asphalt planings

According to the European Asphalt Pavement Association (EAPA), '*Asphalt materials are almost unique among construction products in that they can be 100% recycled, and in many cases re-used directly back into the application and even the site from which they have been extracted*'. The availability of asphalt planings is therefore closely linked to general road maintenance.

The MHCLG (DCLG, 2007b) report estimated that 8Mt of asphalt arisings were available in the UK in 2005, 70% of which occurred in

England (5.6Mt). To obtain a GB total, MPA assumed an equal split of the difference between the UK and England to represent Scotland, Wales and Northern Ireland (0.8Mt each), meaning total arisings of 7.2Mt in GB in 2005.

No further direct sources of information on the size of the asphalt planings market at national level could be identified. As a result, from 2008 onward, MPA assumed total asphalt planings to follow the trend in MPA asphalt sales, a proxy for general road maintenance activity.

**Table 5. Asphalt planings in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
MPA Asphalt sales		-11.2% (vs. 05)	-17.5%	6.0%	4.2%	-16.9%	3.9%	8.8%	6.5%	3.5%	0.2%
Asphalt planings	7.2	6.4	5.3	5.6	5.8	4.8	5.0	5.5	5.8	6.0	6.1

Source: DCLG (2007b), MPA calculations.



# Constituents of Supply - Secondary Sources



## China & Ball Clay waste

A major source of secondary aggregates are the by-products derived from the extraction and processing of china and ball clay. To obtain one tonne of saleable china clay, up to nine tonnes of other materials are generated. Most of this waste can be used as general fill for both engineering purposes or to recycle land, or as other aggregate uses after crushing and screening, such as in concrete and as building sand. MHCLG (DCLG, 2007b) provided an estimate of 2.6Mt of china clay and ball waste used as aggregate in England in 2005, 13.4% of total arisings (19.6Mt).

BGS (2016a) provides data on total china and ball clay production in the UK for each year covering 2005-2015. There are no china or ball clay workings in Northern Ireland, so these total production numbers are representative of GB. However, this data is for total production, not waste; an estimation of china and ball clay waste is therefore needed.

The Kaolin and Ball Clay Association (KABC) indicates that the ratio of waste to ball clay production is variable, but generally in the order of 1 to 1.5 , whilst each tonne of china clay typically produces up to 9 tonnes of waste arisings . Using this information, it appears possible to estimate the size of china and ball clay waste between 2005 and 2015, using an average 'waste to ball clay ratio' of 1.25:1 and a 'waste to china clay' ratio of 9:1. However, the production of secondary aggregates from clay waste also involves the processing of historic stockpiles. Consequently, a direct relationship between the rates of primary clay production at any one time and the production of

secondary aggregates cannot be assumed. Furthermore, not all of the waste will necessarily be suitable for use as secondary aggregate.

An alternative basis for the estimation of china and ball clay waste used as aggregates is therefore needed. The majority of clay arisings in England occur in two counties, Devon and Cornwall. In addition, in their latest yearbook, BGS (2016a) indicated no ball or china clay workings exist in Wales, Scotland or Northern Ireland. As a result, we reviewed the annual Local Aggregate Assessments reports for Devon and Cornwall and used the published sales data to estimate the total tonnage of re-processed clay waste that enters the market as a secondary aggregate each year.

In Devon, 0.58 million tonnes of secondary aggregates were sold in 2017, of which 90% originated from china clay workings, the remaining 10% from ball clay and slate waste . No specific share was provided for slate waste, but volumes are indicated to be on a small scale. For the purpose of estimating the share of secondary aggregates sales from clay waste only, an assumption of 5% slate waste has been made. This assumption is aligned with a similar representational share in Cornwall, where, in 2017, 2.02 million tonnes of secondary aggregates were sold, 95% of which were derived from clay waste. Overall, this indicates that, in 2017, approximately 2.5 million tonnes of clay waste were used as aggregates in GB, a level not seen in 9 years.

**Table 6. China & ball clay waste used as aggregate in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Clay waste used as aggregate</b>	<b>2.6</b>	<b>2.8</b>	<b>1.7</b>	<b>1.6</b>	<b>2.1</b>	<b>2.0</b>	<b>2.1</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.5</b>

Source: DCLG (2007b), Devon County Council (2013-19), Cornwall Council (2014-18), MPA calculations.

## Colliery Spoil

Historically, colliery spoil has been used as a source of secondary aggregates, mostly fill for engineering purposes or to recycle land. It is generally obtained from deep coal mining. MHCLG (DCLG, 2007b) provided an estimate of 1Mt of colliery spoil used as aggregates in England in 2005.

There is no other information available on which to form a view of the size of the market at GB level rather than in England. Nonetheless, BGS (2016a) indicated the majority of deep coal mining

operations are based in England, with one site in Wales and none in Scotland and Northern Ireland. Therefore, a conservative baseline is to use the England estimate and apply it to GB for 2005, whilst projecting the volumes forward to 2017 using the trends in deep mined coal production, as published by BEIS.

Looking at more recent years, the BEIS data indicates that production of deep mining coal ceased in 2015.

**Table 7. Colliery spoil used as aggregate in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Deep mined coal output		-15.3% (vs.05)	-7.1%	-1.7%	-1.1%	-15.9%	-33.6%	-9.9%	-24.5%	-99.2%	-7.8%
<b>Colliery spoil used as aggregate</b>	<b>1.0</b>	<b>0.8</b>	<b>0.8</b>	<b>0.8</b>	<b>0.8</b>	<b>0.6</b>	<b>0.4</b>	<b>0.4</b>	<b>0.3</b>	<b>0.0</b>	<b>0.0</b>

Source: DCLG (2007b), BEIS (2018a), MPA calculations.



# Constituents of Supply - Secondary Sources



## Furnace Bottom Ash

Furnace bottom ash (FBA) originates from the combustion process at coal-fired power stations. It can be used as a lightweight aggregate in the manufacture of building blocks and structural lightweight fill material.

Annual data for total FBA arisings is provided by the UK Quality Ash Association (UKQAA). Whilst their data is for the UK as a whole, the survey does not identify any operational coal-fired power stations based in Northern Ireland, so the actual coverage is GB alone.

According to the UKQAA, there were approximately 1.2Mt of total FBA arisings in GB in 2005. MHCLG (DCLG, 2007b) also reported that

90% of total arisings are used as aggregates, resulting in 1.1Mt of FBA used as aggregates in GB in 2005. The same ratio is applied to the UKQAA annual sales statistics up to 2017. Where annual data is missing (e.g. 2015 and 2016), MPA provided an estimate based on the assumption that FBA for construction uses follows the general trend in construction activity. It is noted however that there is likely to be a continual decline in the production of FBA in GB in line with coal power station closures, with low output offset by some imports. For the year 2017, the UKQAA estimated that 0.1Mt of FBA was produced in GB and used as aggregates, down from the 0.7Mt used in 2014.

**Table 8. FBA used as aggregates in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
FBA: arisings (UKQAA)	1.2	0.9	0.7	0.7	0.8	1.0	1.0	0.8	na	na	0.1
Used as Aggregates (90%)	1.1	0.8	0.6	0.6	0.7	0.9	0.9	0.7	na	na	0.1
Construction output									4.4%	4.1%	
<b>Total FBA used as aggregates</b>	<b>1.1</b>	<b>0.8</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.9</b>	<b>0.9</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>	<b>0.1</b>

Source: DCLG (2007b), UKQAA (2006-15), UKQAA (2016), ONS (2018), MPA calculations.

## Incinerator Bottom Ash

Incinerator bottom ash (IBA) is the output of municipal solid waste incineration. It may contain glass, ceramic, brick, concrete, grit and stone in addition to clinker, ash and metals. It is generally recycled in a number of construction applications to replace primary aggregates, including as fill material or for road paving, cement or construction blocks.

The Environmental Services Association (ESA) indicates that approximately 1 million tonnes of IBA are produced in England and Wales each year. In 2011, about 86% of IBA was reused as aggregate, with the remainder including the recovery of metals and hazardous materials. This means that there were approximately 0.9Mt of IBA

arisings in England and Wales reused as an aggregate in 2011. With no further information available, this estimate is used for the years 2005-12.

From 2013, it is possible to use information published as part of the Environment Agency's Pollution Inventory reports for England and Wales. Focussing on 'wastes transferred off-site for disposal or recovery', and consolidating data available for non-hazardous bottom ash and slag results in about 1.2Mt of IBA produced in 2013, 86% of which (1.1Mt) is assumed to have been reused as aggregates. This methodology is applied up to 2017.

**Table 9. IBA used as aggregate in England & Wales (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
IBA (ESA)	1.0	1.0	1.0	1.0	1.0	1.0					
Non-hazardous bottom ash & slag (EA)*							1.2	1.6	1.8	2.2	2.1
<b>IBA used as aggregates</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>1.1</b>	<b>1.3</b>	<b>1.6</b>	<b>1.9</b>	<b>1.8</b>

\*Incl. European Waste Codes 10 01 01, 10 01 15 and 19 01 12.

Source: ESA, EA (2016-18), MPA calculations.



# Constituents of Supply - Secondary Sources



## Fly Ash

Fly ash is the output from the combustion process at coal-fired power stations. As a fine material, fly ash can be used in the manufacture of concrete and cement, as well as an unbound secondary fill material, such as for the construction of embankments.

The production of fly ash is linked to the UK's energy mix, increasing when more coal is burnt, and levelling off or decreasing when other energy sources take primacy, such as gas. Between 4 and 7 million tonnes of fly ash were produced each year between 1999 and 2014 and there are believed to be significant deposits of this material located adjacent to traditional coal-fired power station sites.

Annual data for ash production and utilisation in the UK is provided by the UKQAA. As for furnace bottom ash, the UKQAA surveys do not identify any operational coal power stations based in Northern Ireland, so volumes are for GB. Out of the total ash production, the aggregate use is defined as fill material or construction blocks.

Data from UKQAA is currently publicly available up to 2014. For the years 2015 and 2016, it is assumed that arisings of fly ash used as an aggregate followed general construction trends. For 2017, unpublished information was provided directly by the UKQAA.

**Table 10. Fly ash used as aggregates in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total fly ash production	6.2	5.5	4.5	5.0	5.3	6.0	5.8	4.6	na	na	1.0
Used as aggregates*	29.0%	17.9%	22.0%	26.3%	11.7%	13.8%	17.3%	21.2%	na	na	21.2%
Construction output									4.4%	4.1%	
<b>Fly ash used as aggregates</b>	<b>1.8</b>	<b>1.0</b>	<b>1.0</b>	<b>1.3</b>	<b>0.6</b>	<b>0.8</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.1</b>	<b>0.2</b>

Note: For blocks or fill materials. Due to data availability, the 2014 share of aggregates use in total fly ash production was applied to compute the 2017 share.

Source: UKQAA (2005-15), UKQAA (2016), ONS (2018), MPA calculations.

## Iron and Steel Slag

MHCLG (DCLG, 2007b) indicated that 1Mt of iron and steel slag were used as aggregates in England in 2005. Total production in England accounts for two thirds of the UK production, leading to an estimated 1.5Mt of material used as aggregates in the UK in 2005.

For more recent years, some data is available as part of a survey carried out by Euroslag every two years, for which the MPA collects UK numbers from its members. These surveys are available for the years 2008, 2010, 2012, 2014 and 2016, and provide information on the total production of iron and steel slag as well as on end uses. This analysis focuses on the slag used as aggregates for road construction; other end uses include cement production, hydraulic

engineering, fertilisers, uses in metallurgy and other uses such as for glass making.

For the missing years (2009, 2011, 2013 and 2015), it is assumed the volumes to be equal to the average of the previous and following year. An estimate for 2017 is also derived using the trend in total MPA asphalt sales, used as an indicator for road activity.

All numbers provided are for the UK but there are no significant steel making works in Northern Ireland, so MPA assumed that this can be used to estimate GB volumes.

**Table 11. Iron and steel slag used as aggregate in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Iron & steel slag used as aggregate	1.5	1.8		0.9		1.3		1.8		0.9	
MPA asphalt sales											0.2%
<b>Iron &amp; Steel Slag used as aggregate</b>	<b>1.5</b>	<b>1.8</b>	<b>1.4</b>	<b>0.9</b>	<b>1.1</b>	<b>1.3</b>	<b>1.6</b>	<b>1.8</b>	<b>1.4</b>	<b>0.9</b>	<b>0.9</b>

Source: DCLG (2007b), Euroslag (2000-16), MPA calculations.



# Constituents of Supply - Secondary Sources



## Slate waste

Information is available on slate deliveries for fill and other construction uses in GB, as published by the Department for Business, Energy & Industrial Strategy (BEIS).

**Table 12. Slate waste for fill and other uses in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Slate waste for fill &amp; other uses</b>	<b>0.9</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>0.5</b>	<b>0.6</b>	<b>0.6</b>

Source: BEIS (2018b).

## Clay & Shale

Information is available up to 2014 from the AMRI surveys and includes clays and shale for constructional & other uses.

For the year 2015, whilst an estimate of clay and shale for constructional and other uses is not directly available, BGS

(2016a) provided information on total clay and shale production in GB which is used to estimate it. For 2016-17, given the lack of further information, it is assumed volumes of clay and shale for constructional and other uses follow general trends in construction activity.

**Table 13. Clay and shale for constructional and other uses in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Clay & shale for constructional & other uses	1.2	1.5	1.1	0.8	0.7	0.5	0.9	0.6			
Total clay & shale production									5.8%		
Construction output										4.1%	7.2%
<b>Clay &amp; shale for construction &amp; other uses</b>	<b>1.2</b>	<b>1.5</b>	<b>1.1</b>	<b>0.8</b>	<b>0.7</b>	<b>0.5</b>	<b>0.9</b>	<b>0.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>

Source: ONS (1999-2014), ONS (2018), BGS (2016a), MPA calculations.

## Chalk

Tonnages are provided up to 2014 in the AMRI surveys and include chalk for constructional use in England, excluding cement uses.

Information on the origin of these sales volumes show that only the parts of GB that actually produce chalk were identified, so that the England volumes are in fact a GB total.

Post-2014, BGS (2016a) provided information on the total chalk production in GB in 2015, which is used to estimate the 2015 construction end-use. For 2016-17 however, as no other information is available, it is assumed that volumes follow the trend in general construction activity.

**Table 14. Chalk for constructional use in GB (million tonnes)**

	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chalk for constructional use	0.8	0.5	0.5	0.3	0.3	0.3	0.3	0.4			
Total chalk production									5.7%		
Construction output										4.1%	7.2%
<b>Chalk for constructional use</b>	<b>0.8</b>	<b>0.5</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>

Source: ONS (1999-2014), ONS (2018), BGS (2016a), MPA calculations.



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## The mineral products and quarrying industry contribution to the UK:



The Mineral Products Association is the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries.

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