LOCAL AGGREGATE ASSESSMENT FOR LONDON 2018

JULY 2018
GREATER LONDON AUTHORITY FOR THE LONDON BOROUGHS

EXECUTIVE SUMMARY

- London consumed over 11.4mt of primary (land-won and marine-dredged) aggregates in 2016, an increase on earlier years.

- Only a small percentage of London's aggregate needs (3%-4%) are currently met from primary production sourced within London due to the very limited nature of this resource.

- Over 80% of primary aggregate supply is by imports of crushed rock and marine-dredged sand and gravel.

- London is thought to rely on a high percentage of non-primary aggregates, principally re-used Construction, Demolition and Excavation Waste.

- The supply patterns identified above are likely to continue.

    - London will remain largely dependent on imports of rock, and to a lesser extent sand and gravel, with implications for supply for areas outside of London.

- Given the high level of imports, London's wharves and rail depots are increasingly important.

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1 INTRODUCTION

1.1 Aggregates (sand and gravel, and crushed rock) are the raw materials used to make construction products. They are an essential part of everyday life and can be found in our roads, houses and offices.

1.2 There are three main sources of aggregates in the UK: land-won; marine-dredged (both classed as primary aggregates); and non-primary aggregates. Land-won aggregates (includes sand and gravel and rock) are materials extracted directly from the ground via quarries. Marine-dredged aggregates comprise sand and gravel dredged from the sea-floor in licensed areas of the UK continental shelf. Non-primary aggregates are a by-product of mineral/industrial processes and recycled aggregates are materials produced by treatment of construction, demolition and excavation waste (CD&E).

1.3 The National Planning Policy Framework (introduced March 2012) placed a new requirement on all mineral planning authorities. NPPF paragraph 145 states: *"Minerals planning authorities should plan for a steady and adequate supply of aggregates by preparing an annual Local Aggregate Assessment, either individually or jointly by agreement with another or other mineral planning authorities, based on a rolling average of 10 years sales data and other relevant local information, and an assessment of all supply options (including marine dredged, secondary and recycled aggregates)…."* This is part of the monitoring arrangements for the Managed Aggregates Supply System (MASS) as set out in Government Guidance.

1.4 The Greater London Authority Act (1999) (as amended) is clear that the Mayor is not a mineral planning authority, and as such, is not required to produce a Local Aggregate Assessment (LAA). This duty lies with the 33 London boroughs and 2 Mayoral Development Corporations – London's mineral planning authorities. However, the picture in London is complicated by the fact that only four boroughs have land-won aggregates – Havering and Redbridge in East London, and Hillingdon and Hounslow in West London. The Mayor does not believe it is reasonable or proportionate to expect the boroughs to produce a number of LAAs between them which would largely duplicate each other on aggregates landed at wharves and rail depots, together with data on CD&E waste. Therefore, in an effort to promote a good working relationship with the boroughs, the Mayor has produced this LAA.

1.5 Tables 1, 1A and 1B clearly show that London is a significant importer of aggregates. Figure 1 (at the end of this report) shows the location of the railheads that receive crushed rock (principally from the South West and the East Midlands),

the wharves in London at which marine-dredged aggregates are landed from the Thames Estuary/North Sea/East English Channel, and the location of active quarries (these are also listed in Appendix A). It is vital for those boroughs with wharves and/or railheads to safeguard them for the future (as para 143 of the NPPF requires) as they handle so much of London's primary aggregate supply.

Table 1 The Overall Picture for Aggregates in London (mt)

type of aggregate	consumption 2013	consumption 2016
Total (All Sources)	11.0-15.6	12.8-17.4
Non-primary*	1.4-6.0	1.4 - 6.0
Total (Primary)	9.6	11.4
marine-dredged	3.9 (41%)	5.4 (47%)
crushed rock	3.9 (41%)	4.0 (35%)
land won beyond London	1.6 (17%)	1.6 (14%)
land won within London	0.3 (3%)	0.4 (4%)

Source: LAWP Annual Aggregates Monitoring Report - various years
** See section 2 for calculation of non-primary figure*

Table 1A Imports of Aggregates into London 2014 (mt)

	SW	SE	EM	EE	WM	South Wales	Rest of World	London	Total
Land-won S&G	0.09	0.5		1.0					1.59
Marine S&G		0.39		0.07				4.7	5.14
Crushed Rock	1.51		0.89	0.01	0.07	0.17	1.24		3.89
Total	1.6	0.89	0.89	1.08	0.07	0.17	1.24	4.7	10.6

Table 1B Exports of Aggregates from London 2014 (mt)

	South East	East of England	Total
Land won S&G	0.13		0.13
Marine Dredged	0.33	0.96	1.29
Total	0.46	0.96	1.42

Source: AM 2014

1.6 In this report, each type of aggregate is discussed in individual chapters.

2 NON-PRIMARY AGGREGATES

2.1 There is no single definitive source of data on non-primary sources of aggregates. In London, the bulk of non-primary material is thought to be the re-use of construction, demolition and excavation waste (CD&E). There are different ways to estimate a figure for CD&E waste.

2.2 A 2005 survey undertaken for DCLG[i] estimated London had just over 8mt of CD&E waste – 9% of the national total of c.89mt. In March 2012 Defra produced a revised methodology for forecasting CD&E waste[ii], and this estimated an England-wide figure for 2010 of just over 77mt of CD&E waste. Assuming that London still generated 9% of the national total, this equated to 6.9mt. In updating the London Plan with Further Alterations (January 2014), the Mayor commissioned work on updating figures on all three waste streams (Household, Commercial as well as CD&E).

2.3 The work by SLR Consulting takes the 6.9mt figure, divides it by the 2010 Population for London 8.1m from GLA Demographics to give a CD&E per person figure of 0.9mt. This figure is then held constant and multiplied by population figures forecast by GLA Demographics to give future projections of CD&E waste. These are shown, at borough-level, in Figure 2. If London is achieving an 80% re-use rate (in line with London Plan objectives) then 5.5 mt was being reused in 2010. Table 2 provides a London level summary of this data to give projections of possible amounts of CD&E waste that will be reused as alternative aggregates. The 2010 figure is around about the average for 2005-2016.

Table 2 Policy Position for CD&E Waste in London (mt)

	2005	2010	2016	2021	2026	2031
CD&E total	8.0	6.9	7.5	7.9	8.2	8.4
@ 80% CD&E reuse	6.4	5.5	6.0	6.3	6.6	6.7

2.4 The 2016 Annual Aggregates Monitoring Report includes estimated figures for CD&E waste. These are much lower, in a range of 1.4mt to 2mt. These figures also need to be treated with caution as they were derived in the following way. For recent Annual Monitoring Reports a desk top study was undertaken of available Environment Agency data on CD&E waste processed in London. For a number of reasons, the data from the Environment Agency does not capture all CD&E processing activities.

2.5 The work estimates that c. 11.1mt of CD&E material arrives at permitted sites. Of this, it is estimated that 2.8mt is suitable for recycled aggregate processing, around half of this (1.4mt) could be used as aggregate, depending on the capacity of the operator. However, work by other Aggregate Working Parties and the Mineral Products Association suggests that if an allowance is made for the processing and use of material at temporary construction sites, which is not covered by Environment Agency data, this estimate maybe almost doubled.

3 MARINE DREDGED SAND AND GRAVEL

3.1 Table 1 shows that London is highly dependent on marine-dredged sand and gravel and Figure 1 shows the wharves in London where this material was landed in 2016. Data from the Crown Estate[iii], summarised in Table 3 below, shows for 2016 the amounts of marine-dredged sand and gravel by licensed area delivered into the Thames Estuary. This totalled approaching 10mt in 2016. The Thames Estuary includes wharves in Thurrock and Kent as well as Greater London. Table 3 also shows the small area (10%) that was actually dredged in comparison to the area licensed for dredging.

Table 3 Dredging Licensed by Crown Estate delivered to Thames Estuary 2016*

Region	Total Area Licensed (km^2)	Total Area Dredged (km^2)	Total Construction Aggregate (mt)	Total Delivered to Thames Estuary (mt)
Humber	230.3	18.3	1.4	0.04
East Coast	212.9	23.0	4.3	3.7
Thames	78.1	10.3	1.9	1.8
East English Channel	113.5	14.2	4.7	3.1
South Coast	111.3	6.0	3.1	1.1
Total	746.1	71.8	15.4	9.7

- Crown estate data for 2017 unavailable.

3.2 The AMR 2017 provides data not only on marine dredged sand and gravel landed at wharves in London but on the small amounts of crushed rock and land-won sand and gravel landed at wharves as well. This data is shown in Table 4. The 2016 figure of 5.4mt for marine dredged sand continues a rising trend found over the last five years.

3.3 The Crown Estate produces a Marine Aggregates Capability & Portfolio document[iv] showing that the five regions that supply London had reserves of some 178mt in 2016. At the current extraction rate, the reserve would be able to maintain such supplies to London markets for some 21 years. However, the delivery of the material to London is dependent on wharf capacity in the Capital being maintained.

Table 4 Wharves: Sales of Marine Dredged Sand Gravel, Crushed Rock and Land-won Sand and Gravel 2008-2017 (000s tonnes)

	Marine Dredged		Crushed Rock		Land Won		All Sources	
Year	**Sales**	**%**	**Sales**	**%**	**Sales**	**%**	**Sales**	**% Change**
2008	4,350	89.0%	360	7.0%	202	4.0%	4,912	5.0
2009*	3,516	87.0%	359	9.0%	146	4.0%	4,021	-18.0
2010	3,007	85.0%	379	11.0%	135	4.0%	3,521	-12.0
2011	3,638	82.0%	655	15.0%	160	3.0%	4,453	26.0
2012	3,775	83.0%	629	14.0%	144	3.0%	4,548	2.0
2013	4,357	86.0%	581	14.0%	118	0.0%	5,056	14.0
2014	4,596	86.0%	666	12.0%	107	2.0%	5,369	6.0
2015	4,959	93.0%	381	7.0%	0	0.0%	5,340	-1.0
2016	5,394	95.0%	308	5.0%	0	0.0%	5,702	7.0
2017**	5,023	98.0%	123	2.0%	0	0.0%	5,146	-10%
10 yr Av.	4,262		444		101		5,146	
3 yr Av.	5,125		271		0		5,396	

Source : AM Surveys 2008-2017
**AM2009 did not distinguish land-won from marine, so 4% applied for land-won*
*** Preliminary data*

3.4 The London Plan, including the London Plan Review, includes wharf safeguarding policies. Furthermore Peruvian Wharf (Newham) is being recommissioned and expected to commence operation later in 2018

4 CRUSHED ROCK

4.1 London has no suitable rock of its own so Table 1 above shows London's dependence on crushed rock imports to meet its needs and Figure 1 shows the location of the active railheads where material can be brought into London by train (also listed in Appendix 1). Table 5 shows the trends in the last decade in crushed rock imports, as well the small amounts of both marine and land won sand and gravel imported to London by rail.

Table 5 Rail Depots: Sales of Crushed Rock, Marine and Land-won Sand and Gravel 2008-2017 (000s tonnes)

	Crushed Rock		Marine Dredged		Land Won		Total
Year	**Sales**	**%**	**Sales**	**%**	**Sales**	**%**	**Sales**
2008	3,391	69%	1165	23%	372	8%	4,928
2009	2,370	67%	953	27%	192	6%	3,515
2010	2,608	71%	938	25%	147	4%	3,693
2011	3,580	72%	1258	25%	117	3%	4,955
2012	2,777	71%	1,021	26%	115	3%	3,913
2013	3,100	70%	1,199	27%	122	3%	4,421
2014	2,464	67%	1,111	30%	127	3%	3,702
2015	2,747	63%	1,496	34%	96	2%	4,339
2016	3,953	71%	1,564	28%	50	1%	5,567
2017	3,668	69%	1,561	29%	104	2%	5,333
10 yr Av.	3,066		1,227		144		4,437
3 yr Av,	3,456		1,540		83		5,080

Source: AM Surveys 2008-2017

4.2 The main source of crushed rock comes from the South West. The Somerset Local Aggregate Assessment 2015[v] contains data on crushed rock. It shows that the 10year average of sales up to 2015 was 10.85mt, with permitted reserves of 380mt their current land bank will last 28 years at their 10 year sales average.

4.3 Material from the East Midlands, principally Leicestershire[vi] is also important to London. The joint Leicestershire/Rutland LAA shows 10 year average sales of

13.4mt, so the current land bank of 409mt will last approximately 30 years at their 10 year sales average.

4.4 The delivery of crushed rock is dependent on aggregate rail depot capacity being maintained. It is noted that the London Plan, including the London Plan Review, safeguards rail aggregate depots within the Capital. While the Borough local plans, notably Hillingdon and Hounslow, reflect this policy stance. Moreover, an application for a new aggregate depot in Barnet is under consideration.

4.5 On-going and increasing supply into London from these areas is expected to continue, with resultant implications for ensuring that a steady and adequate supply is maintained. This will require adequate reserves continuing to be permitted, transport infrastructure and routes being maintained and safeguarded.

5 LAND-WON SAND AND GRAVEL

5.1 The locations of active quarries in London are shown on Figure 1 and listed in Appendix A. In the London Plan (latest edition published March 2016) Policy 5.20 sets out the Mayor's approach to land-won sand and gravel in London. The review of the London Plan rolls forward this policy.

5.2 London Plan Policy 5.20 Part D states:

> *LDFs should make provision for the maintenance of a landbank (i.e. seven years' supply) of at least 5 million tonnes of land won aggregates throughout the plan period to 2031 by a landbank apportionment of:*
>
> *a at least 1.75 million tonnes to LB Havering*
> *b at least 0.7 million tonnes to LB Redbridge*
> *c at least 1.75 million tonnes to LB Hillingdon*
> *d at least 0.7 million tonnes to LB Hounslow*

5.3 This figure of at least 700,000 tpa was accepted by the London Plan EiP Panel and, in turn, by the Secretary of State as a figure London could realistically deliver. This is below the National Guideline figure for London of 1.1mtpa (18mt over the 2005-2020 period) and below the previous London Plan Apportionment of 1.0mt. In London Plan paragraph 5.93 boroughs with potential supply are encouraged to bring it forward, as doing so would help improve London's performance. It is also a critical element, along with aggregate import infrastructure (wharves and rail depots), of London's contribution to MASS.

5.4 Table 6 below shows London's progress over the last decade on land-won sand and gravel. It shows the current 10 year average to be below the current apportionment despite the higher levels of production in the earlier part of the decade. It is worth noting that in London's best year 2008, the figure of 0.8mt would only equate to c.7% of consumption (see Table 1 above) so even if London were to achieve comparable levels to 2008 in future London would still be a massive importer of aggregates.

5.5 Policy 5.20 makes reference to a landbank, seven years for sand and gravel. Aggregate landbanks are principally a monitoring tool to indicate possible shortages in the provision of an adequate and steady supply of land-won aggregates in an area. Table 7 below shows that London has almost no landbank of permitted reserves remaining – as current reserves are being worked out they have not, until recently, been replaced with new permissions.

Table 6 Quarries: Sales of Sand and Gravel 2008-2017 (000s tonnes)

Year	Total Sales	% change from last year
2008	826	-28
2009	577	-30
2010	679	18
2011	658	-3
2012	320	-51
2013	379	18
2014	375	-19
2015	302	-2
2016	350	16
2017	262	-25
10 yr Average	473	
3 yr Average	305	

Source: AM Surveys 2008-2017

Table 7 Sand and Gravel Land bank 2008-2017

Year	Apportionment (mt)	Reserves (000s tonnes)	Landbank remaining (Years)
2008	1.0	1,512	1.5
2009	1.0	1,981	2.0
2010	0.7	1,380	2.0
2011	0.7	1,120	1.6
2012	0.7	1.180	1.7
2013	0.7	1,376	2.0
2014	0.7	702	1.0
2015	0.7	1,406	2.0
2016	0.7	1,321	1.9
2017	0.7	2,212	3.2
% Change		+46%	

Source: AM Surveys 2008-2017

5.6 However, it is noted there has been a recent increase in the landbank as a permission of 1.35mt of sand and gravel extraction was granted in Havering in 2017. While in 2018 a permission for 1.0mt was granted in Redbridge. Further to this an application for 3.0mt of sand and gravel extraction was approved in principle in Hounslow.

5.7 Further to this the aggregate producing boroughs identified in the London Plan have adopted or emerging local plans that commit to further sand and gravel extraction:

a) **Havering** - commitment to meet London Plan requirement within the Mineral Safeguarding Area;

b) **Hillingdon** – allocates sites estimated to produce 4.75mt of sand and gravel plus and 'Area of Search';

c) **Hounslow** – allocates a site (see above) for 3mt;

d) **Redbridge** – commitment to meet London Plan apportionment within the Mineral Safeguarding Area.

5.8 The local plan commitments with the recent (or emerging) planning permissions indicate the London Plan requirements could be met

6 CONCLUSIONS

6.1 Table 8 below takes the 10 year sales averages for marine dredged sand and gravel (Table 4), crushed rock (Table 5), and land-won sand and gravel (Table 6). It includes a range of estimates for CD&E waste.

Table 8 – Ten Year Average Sales 2008-2017 (mt)

	10 yr Average Sales
Primary	
Marine Dredged Sand & Gravel	4.3
Crushed Rock	3.0
Land won Sand & Gravel	0.5
Primary - Total	7.8
Non-Primary	
Re-use CD&E	1.4 – 6.0
Total (All Sources)	9.2 – 13.8

6.2 The data in this report shows that prospects for maintaining an adequate supply of aggregates to London are mixed. There are high levels of reserves of marine dredged sand and gravel and crushed rock being sufficient to maintain or increase supplies to 2031. In addition, a rising population and high levels of construction activity will produce increasing amounts of CD&E waste for re-use as aggregate by 2031 (see Tables 9 and 10 below). However, the main concern relates to land-won sand and gravel where the average sales 2008-2017 are below the adopted London Plan apportionment.

6.3 London's land bank of permitted reserves has approximately 3 years to run. On the other hand, recent permissions will augment this although the landbank will still fall short of the London Plan requirement. The land bank shortfall will not be overcome until further applications for sand and gravel extraction are submitted and permitted. However, local plan allocations and policy commitments demonstrate a significant potential for meeting the landbank requirement. It will depend on the aggregate companies submitting appropriate planning applications to realise this.

6.4 London's imports of marine dredged sand and gravel and crushed rock rely on wharves and railheads remaining available to allow supplies into London. In addition, London's reliance on crushed rock depends on local planning authorities in other parts of the country accepting disturbance to their residents to allow minerals operators to continue to exploit material for London's benefit.

6.5 The London Plan (December 2017) estimates that London's population will continue to grow from c.8.9 million to c.10.8 million by 2041. It anticipates that employment will grow by c.49,000 jobs per year to reach c.6.9m by 2041. Wharves and railheads are coming under increasing pressure to be released for residential development if the dwelling targets in the Plan of c.64,900 dwellings pa 2019/20-2028/9 are to be achieved. Table 9 below shows possible major construction schemes that could occur in London and Table 10 shows housing delivery. These are discussed in greater detail below.

6.6 There are a number of major construction schemes that could be delivered in London (and beyond) in the near future. These are;

- TfL are proposing a **Bakerloo line extension** (BLE), south-east from the Elephant & Castle to Lewisham via the Old Kent Road, in two 7.5km tunnels. Work would begin in the 2020's and be finished by 2030.

- TfL are working with the Department for Transport on **Crossrail 2**, a train service proposed to run from Surrey through SW London to Hertfordshire via NE London, via 37kms of twin bore tunnels under central London. TfL hope to have consent by late 2018 with construction beginning in 2021 and the scheme operational by 2030. There are multiple tunnelling options for the scheme providing a range of possible levels of CD&E waste.

- The Government is proposing **HS2** to improve connectivity between London and Birmingham, initially. The scheme will be in a tunnel under London to/from Euston. It will involve the redevelopment of Euston itself and c.20 km of twin tunnels under London. Initial construction work is due to begin in 2017 and tunnelling in late 2019. The Environmental Statement for HS2 indicates that the peak period for construction activity will be from 2017-2025.

- TfL is in the process of delivering a **Northern Line extension** (NLE) from Kennington via an intermediate station at Nine Elms and a terminal at Battersea. The Transport and Works Act order was granted in November 2014 with tunnelling due to begin in 2016. The extension would become operational in 2020. The Environmental Statement puts forward two options, Option A generates a total of 905,280 tonnes and Option B 915,260 tonnes of CD&E waste.

- TfL are promoting an additional road based river crossing between north Greenwich and Silvertown to relieve congestion in the Blackwell tunnel and improve connectivity in east London. TfL hope to begin construction of the **Silvertown Tunnel** in 2018 with the scheme completed by 2023. The Preliminary Environmental Information Report (Oct 2015) (PEIR) estimates there would be a total of 807,600 tonnes of CD&E waste generated from 2 tunnels, each 1 km long.

- Thames Water has a Development Consent Order for the **Thames Tideway Tunnel**, to upgrade the capacity of London's sewer network. The new sewer will have 25 kilometres of tunnel, taking the waste from across London to Abbey Mills pumping station. Preliminary construction is due to start in 2016 with tunnelling taking place 2017-2021. In addition to the tunnel there will be 5 shafts, varying in depth from 30m to 66m. The Environmental Statement sets out data on expected totals of CD&E waste at 4,890Kt, with peak years of waste generation being 2018 and 2019.

- The Government recently announced the **Heathrow Expansion,** including the development of an additional runway. The amount of CDE waste and aggregate demand arising from this scheme will be significant although the quantities are currently unknown

6.7 Table 9 below shows a possible range of CD&E waste all of these schemes could generate if they are progressed. They show a range from 53.1mt – 57mt over the 13 year period or 4.1-4.4 mt pa. However, the potential for realising this as recycled aggregate is unknown. The aggregate industry view is it may be limited as the material will largely be silts and clays, which have a recycling potential but mostly not for aggregate. Most of these will demand large amounts of concrete and graded material meeting aggregate specifications, thus generating significant demand for aggregates. Table 10 below shows the level of housing completions in London over the last decade, sourced from the London Database Development system–monitored by the GLA but taking approvals and completions data from the boroughs. The 10 year average runs at 26,645 units p.a.

6.8 If these population and employment projections are correct, London will continue to need large quantities of aggregates to build infrastructure, homes and offices. It is quite possible the demand will be more than that of recent years and this eventuality should be planned for. The vast majority of this material is not going to be sourced from quarries within London – hence the continued need to protect the wharves and railheads. Nevertheless, local land won material has a role of providing a local sourced alternative aggregate supply. More importantly it represents London's contribution to the national Managed Aggregate Supply System.

Table 9 Possible CD&E Waste generated by future schemes 2016-2028 (kt tonnes)

Scheme	Est. tunnel length (kms)	CD & E waste	CD & E waste
HS2	40	21,656	
Northern Line Extension	6.4	915	
Silvertown Tunnel	2	808	
Thames Tideway Tunnel	25	4,890	
a) Total from Environmental Statements		**28,271**	
Possible Estimates			
		@143t/km*	
Bakerloo Line Extension*	15	2,145*	
b) Total a) plus BLE		**30,416***	
		Low	High
c) Crossrail 2~	74	22,728~	26,568~
Overall Total (a+b+c)		**53,144**	**56,984**

** Estimated based on Environmental Statement for Northern Line Extension*
~ Estimated based on discussion with Crossrail 2 team

Table 10 – Net Housing supply in London 2006/7 to 2015/6

Year(s)	Net dwellings
2006/07	26,645
2007/08	27,739
2008/09	29,527
2009/10	25,096
2010/11	19,914
2011/12	23,582
2012/13	23,903
2013/14	26,581
2014/15	30,495
2015/16	32,919
Ten year average	26,640

Source London Plan AMR 13 Table 3.5

APPENDIX A

Active and *Inactive* Aggregate Quarries, Wharves and Rail Depots at end 2016

SAND AND GRAVEL QUARRIES

LB Bromley		
Bourne Wood	Bournewood S&G Ltd	soft sand
LB Havering		
East Hall Farm	Havering Aggregates Ltd	sharp sand & gravel
LB Hillingdon		
Sipson (including Wall Garden Farm)	Henry Streeter Ltd	sharp sand & gravel
LB Redbridge		
Fairlop Quarry	*Brett Lafarge Ltd*	*sharp sand & gravel*

AGGREGATE WHARVES

LB Barking & Dagenham		
Dagenham Dock	Hanson Aggregates	marine
Dagenham Dock	CEMEX	crushed rock
Eurovia (No1 Western Extension)	Eurovia Roadstone	crushed rock
LB Bexley		
Erith/Pioneer Wharf	Lafarge/Tarmac Ltd	marine
Conway Wharf, Erith	FM Conway	crushed rock
RB Greenwich		
Murphy's Greenwich Wharf, Charlton	Lafarge/Tarmac Ltd	marine
Riverside	Lafarge/Tarmac Ltd	crushed rock
Victoria Deep	Hanson Aggregates	crushed rock, marine*
Angerstein	CEMEX	marine
Brewery	JJ Prior	sand & gravel
LB Newham		
Dock Entrance	Euromix	marine*
LB Wandsworth		
Battersea	CEMEX	crushed rock, marine*
Pier	Hanson Aggregates	marine*

AGGREGATE RAIL DEPOTS

LB Barking & Dagenham		
Dagenham	Hanson Aggregates	crushed Rock
LB Brent		
Wembley	Aggregate Industries	crushed rock, sand
Park Royal	Lafarge Tarmac Ltd	sand & gravel
LB Camden		
Kings Cross	Lafarge/Tarmac Ltd	crushed rock, marine*
Kings Cross	Hanson Aggregates	marine*

LB Croydon		
Purley	Day Aggregates	crushed rock & marine*
LB Ealing		
Acton	Aggregate Industries	sand and gravel & crushed rock
RB Greenwich		
Angerstein	Aggregate Industries	crushed rock
LB Hillingdon		
West Drayton	Hanson Aggregates	crushed rock
West Ruislip	Yeoman Aggregates	crushed rock
Hayes	Lafarge/Tarmac Ltd	crushed rock
LB Hounslow		
Brentford	Day Aggregates	crushed rock & sand & gravel
LB Kingston upon Thames		
Tolworth	Day Aggregates	crushed rock & marine
LB Tower Hamlets		
Bow	Aggregates Industries	crushed rock & marine
LB Wandsworth		
Battersea	Day Aggregates	crushed rock & marine*
Battersea	Lafarge/ Tarmac Ltd	marine*

** transported from another wharf*

Figure 1: Active Quarries, Railheads and Wharves in London 2016

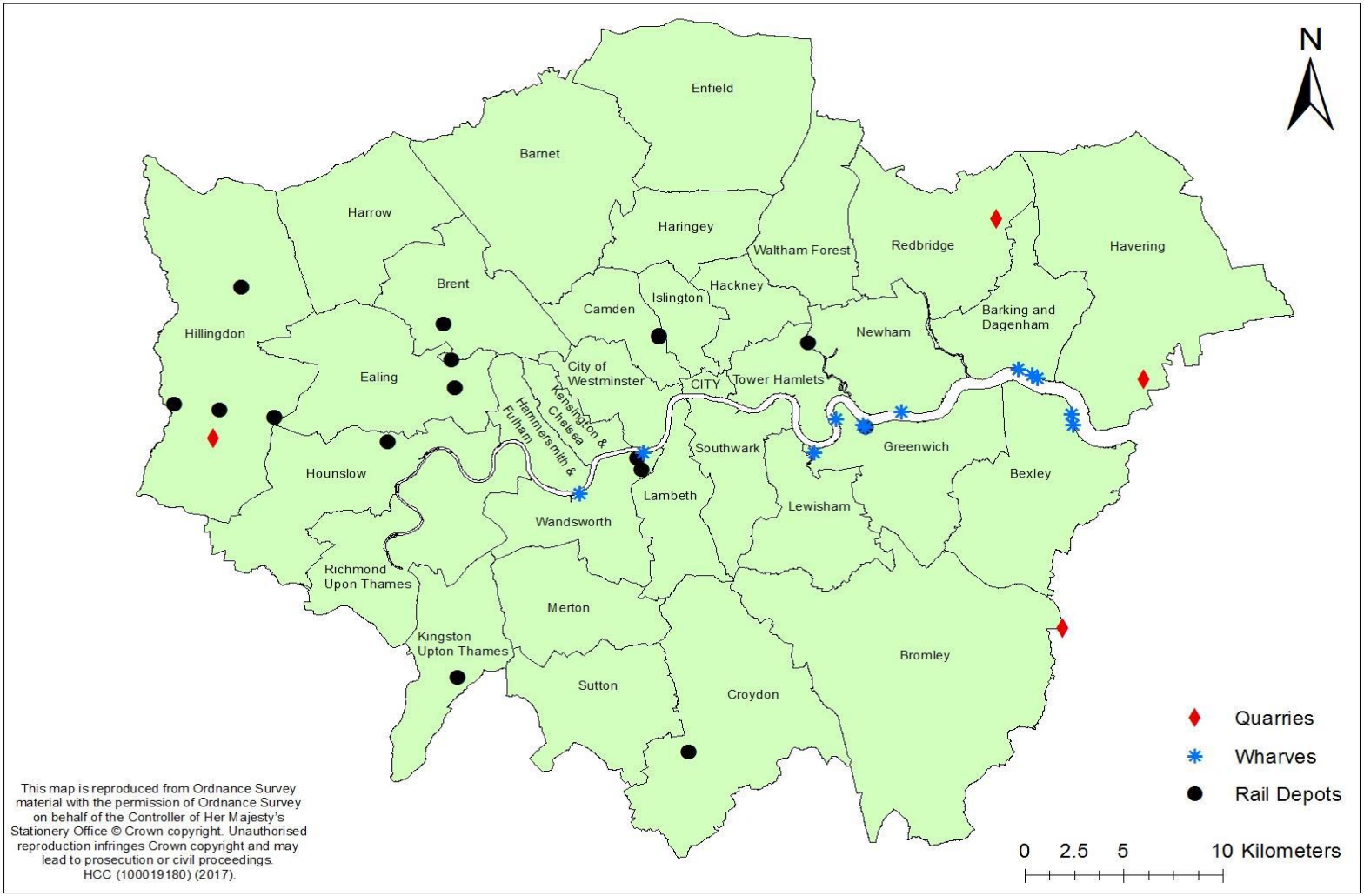

Figure 2 Forecasts of CD&E Waste in London (000s tonnes)

Borough	2021	2026	2031	2036
Barking & Dagenham	194	207	218	227
Barnet	352	368	382	395
Bexley	214	221	226	232
Brent	301	313	324	333
Bromley	288	297	305	312
Camden	209	215	220	225
City*	7	7	8	8
Croydon	343	355	364	373
Ealing	317	327	335	343
Enfield	305	319	331	342
Greenwich	244	253	261	268
Hackney	243	253	262	271
Hammersmith & Fulham	159	161	163	165
Haringey	244	251	258	265
Harrow	228	236	243	250
Havering	224	234	243	251
Hillingdon	273	285	296	305
Hounslow	251	262	270	278
Islington	205	212	218	224
Kensington & Chelsea	133	133	134	136

Borough	**2021**	**2026**	**2031**	**2036**
Kingston	154	159	163	167
Lambeth	290	297	304	312
Lewisham	267	277	285	293
Merton	191	198	203	208
Newham	316	333	347	359
Redbridge	278	294	307	318
Richmond	174	179	182	185
Southwark	277	285	293	300
Sutton	183	190	195	201
Tower Hamlets	268	281	293	303
Waltham Forest	254	267	277	286
Wandsworth	282	287	292	297
Westminster	205	210	214	219
LONDON TOTAL	**7,873**	**8,164**	**8,417**	**8,649**

**Due to unique characteristics of the City, this figure is likely to be an underestimate*

ENDNOTES

[i] http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/publications/planningandbuilding/surveyconstruction2005

[ii] https://www.gov.uk/government/publications/construction-and-demolition-waste

[iii] http://www.thecrownestate.co.uk/media/458910/marine_aggregates_area_involved_15th_report.pdf

[iv] *Marine Aggregates Capability & Portfolio 2013. The Crown Estate March 2014*

[v] www.somerset.gov.uk/mineralsandwaste

[vi] http://www.leics.gov.uk/leicestershire_and_rutland_local_aggregate_assessment.pdf