

## 3: Transport in London and beyond

### 3.1 Key points

- London's radial public transport network helps support its economy. It allows a lot of people to be brought into a very small area enabling the exploitation of agglomeration economies which underpin the international competitiveness of London's economy.
- This is shown by the number of commuters that come into London from the wider Greater South East. In some parts of the Greater South East London accounts for the place of work for over 40 per cent of that area's total workforce.
- Commuting for work is also high within London with over 600,000 in-commuters commuting to work in Westminster and the City in 2011.
- The efficient transport system means that large sections of London are within 45 minutes (public transport travel time) of a significant number of jobs. Thus data from Transport for London (TfL) shows that typically, for people living in outer London, between 0.25 and 0.5 million jobs are potentially available from their home location within 45 minutes travel time. However, this rises to typically around 2.5 million jobs potentially available to a resident of central London.
- Public transport has become increasingly important over the past 20 years with the percentage share of journey stages of private transport in London having declined while that of public transport has increased.
- London's transport system is also important for the UK as a whole with Heathrow Airport being the sixth biggest in the world in terms of passenger numbers, although its position in global rankings has declined over time as other global airports grew passenger numbers more quickly. Still it remains the second biggest in terms of international passengers (ie not including domestic passengers) with Gatwick coming in at number 12.

## 3.2 Introduction

In Chapter 2 the different geographies that can be used to define London were examined and the concentration of economic activity within the centre of the city due to agglomeration economies was outlined. This geographical spread and concentration of activity can only be supported by an efficient transport network to allow a significant flow of people into and around London. This chapter examines the flow of commuters into London before looking at the transport network that allows these flows in some detail. It then briefly examines some of the transport infrastructure in the wider South East. The strains due to congestion and other issues faced by the transport system are also of great importance to London's economy and people and are covered in detail in Chapter 6 of this Evidence Base.

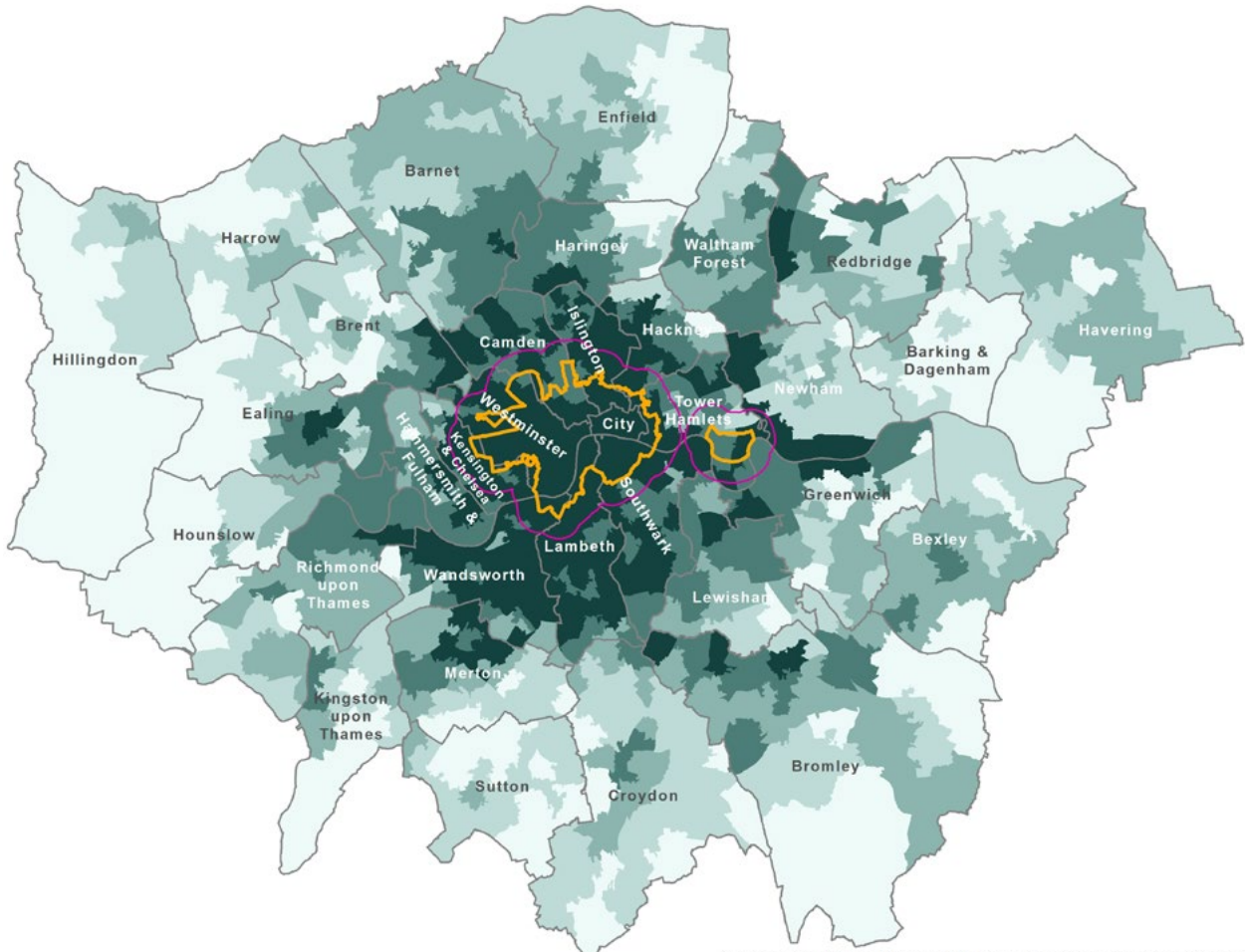
## 3.3 London's commuter geography

This section begins to examine the links to London of those areas economically tied to the capital by looking at commuter flows into London. While London sees commuters flowing into it from the wider Greater South East and beyond, it also sees much internal travel between different areas of the capital as well. Further details on commuters are given in Chapter 8 of this Evidence Base.

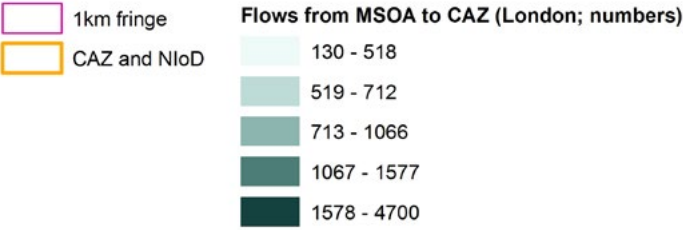
### 3.3.1 Commuters into the Central Activities Zone

A large number of people both within London and the wider Greater South East work in the Central Activities Zone (CAZ) and need to commute into it every work day. Maps 3.1 and 3.3 shows data on the residence origin of workers in the CAZ on a map of London and the wider Greater South East respectively at the Middle Layer Super Output Area (MSOA) level; they thus indicate the greater importance of certain geographies for workers into the CAZ. In addition, Maps 3.2 and 3.4 show the number of workers coming from different MSOAs as a percentage of each area's workforce indicating the importance of the CAZ as an employment destination for these areas. The patterns shown in these maps are consistent with the travel to work area (TTWA) for London analysed in Chapter 2 of this Evidence Base, which showed less reliance of West London on the CAZ, with a separate TTWA for Heathrow and West London compared to the rest of the capital.

**Map 3.1: Workers in CAZ only based workplaces by residence origin in London, 2011, absolute numbers**

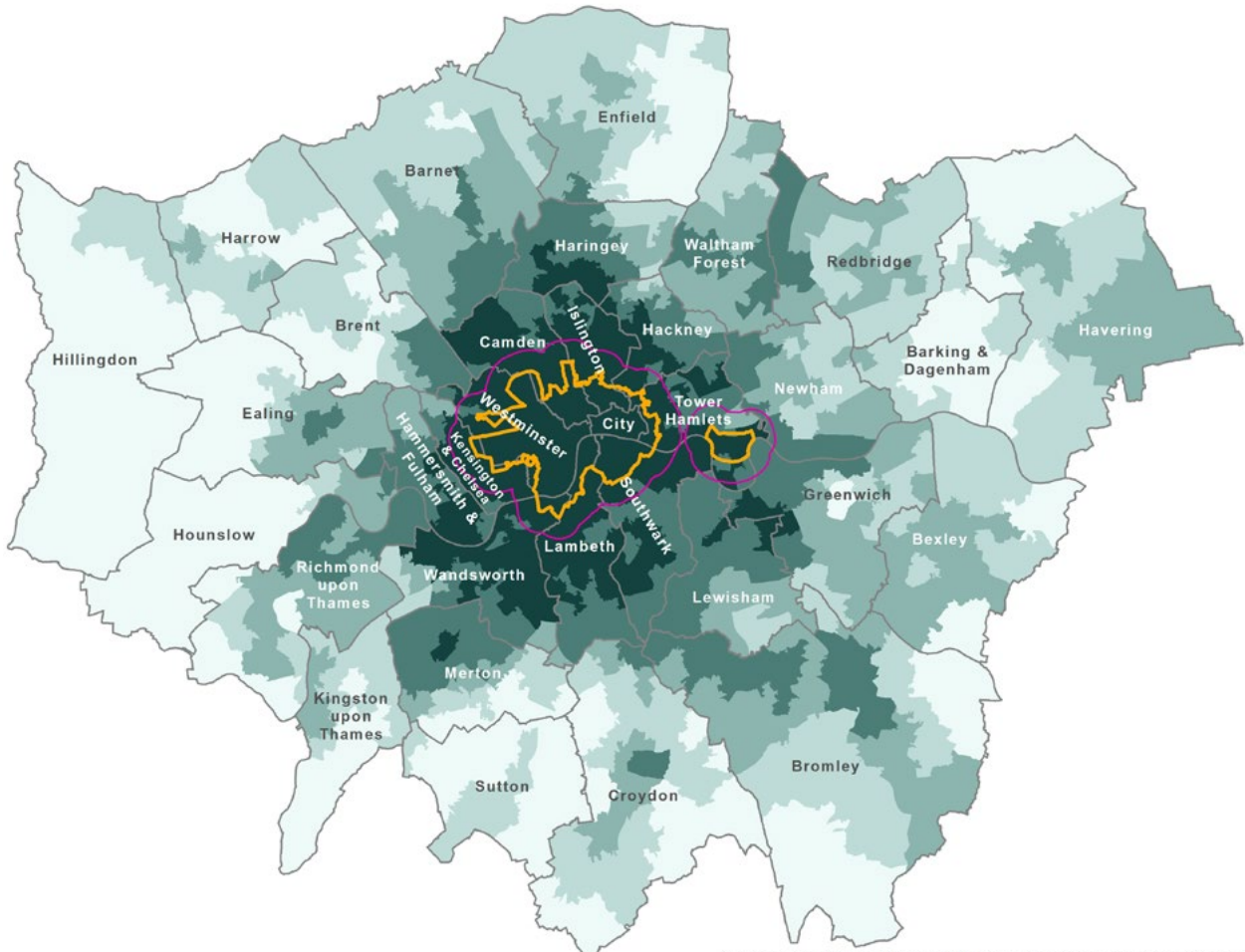


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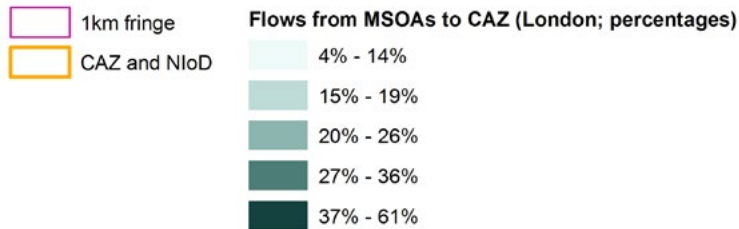


Source: Census and GLA Intelligence Unit analysis

**Map 3.2: Workers in CAZ only based workplaces by residence origin in London, 2011, as percentage of an areas workforce**

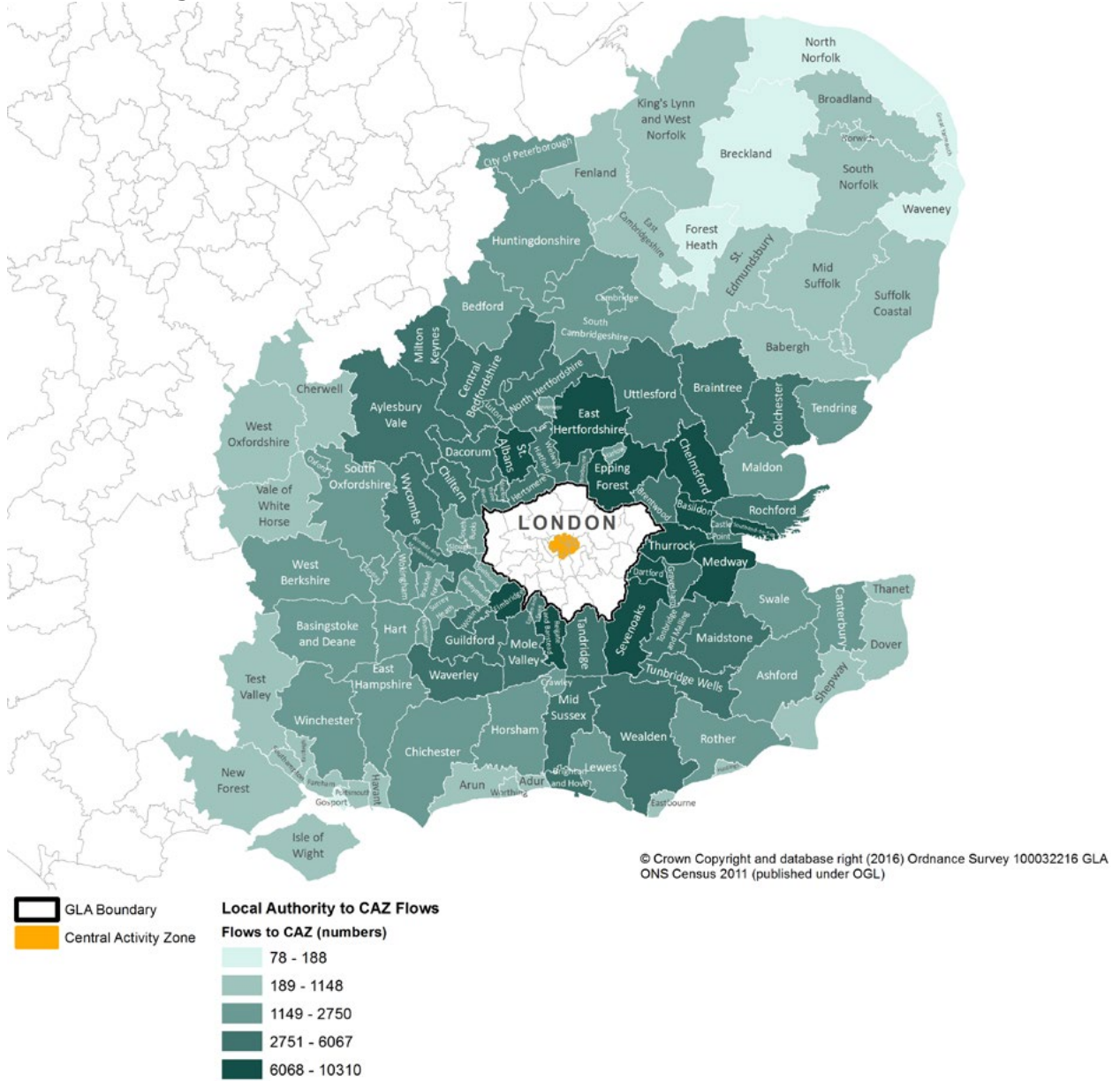


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Source: Census and GLA Intelligence Unit analysis

**Map 3.3: Workers in CAZ only based workplaces by residence origin in the Greater South East (excluding London), 2011, absolute numbers**

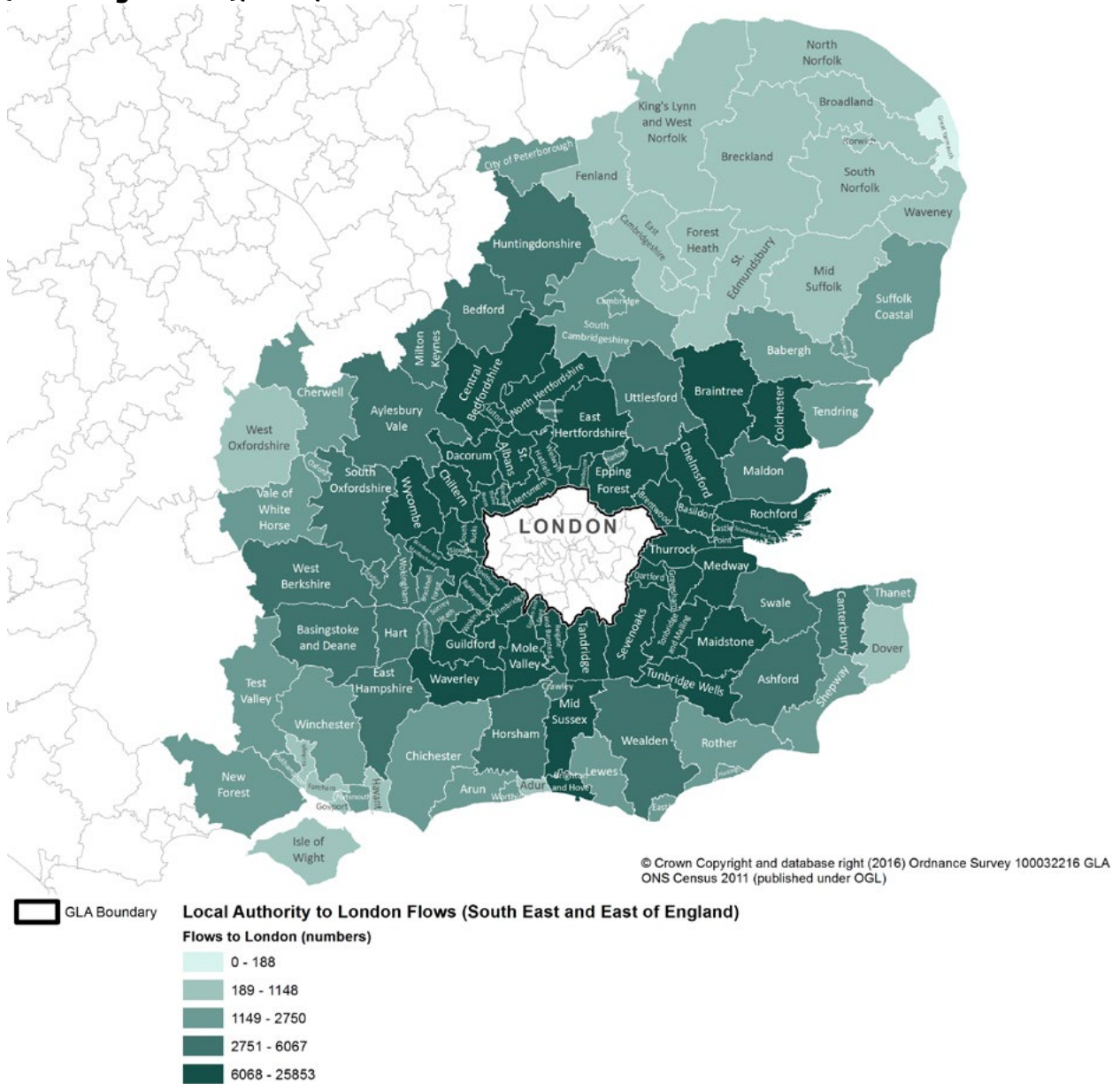


Source: Census and GLA Intelligence Unit analysis



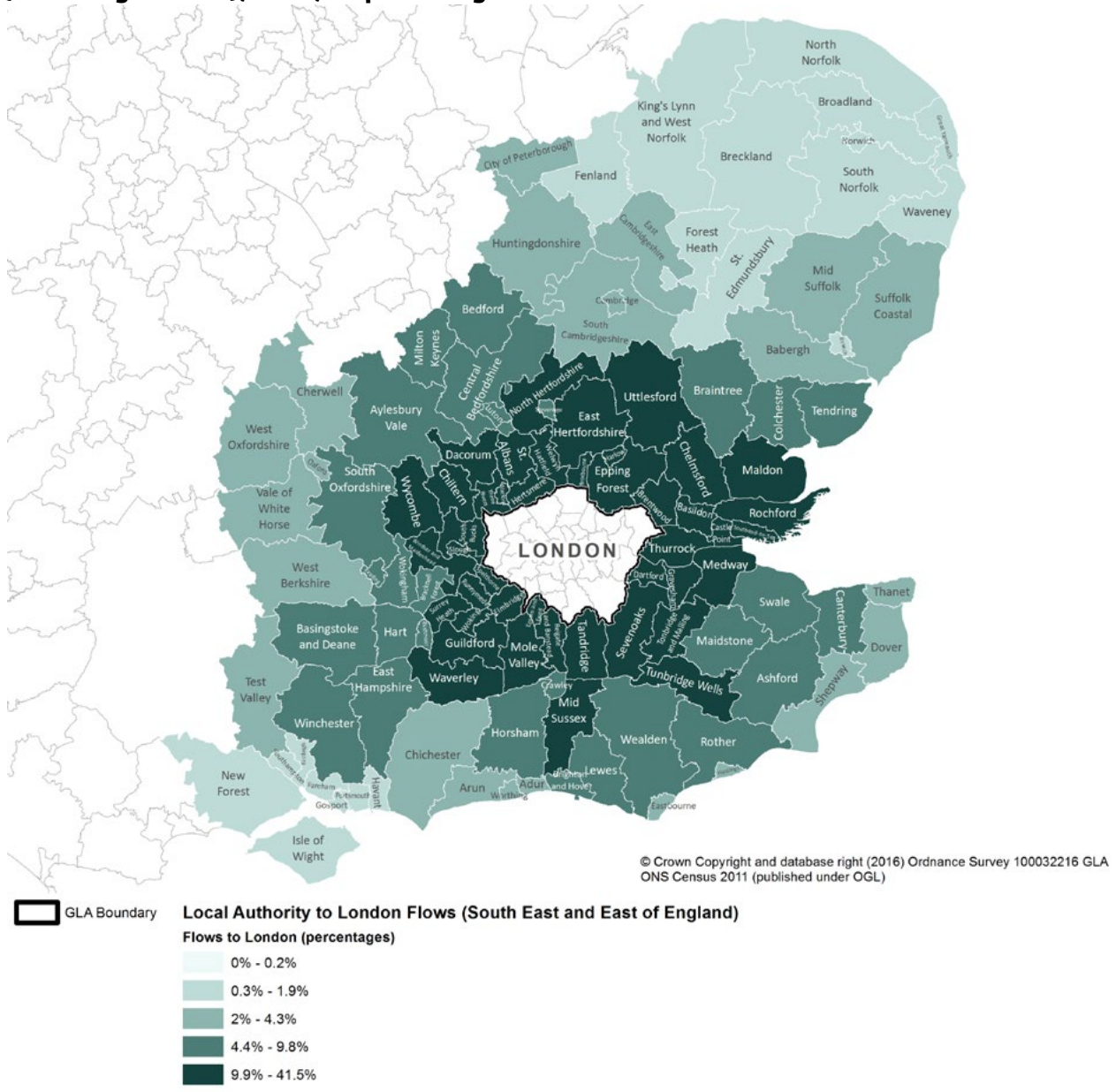


**Map 3.5: Workers in London based workplaces by residence origin in the Greater South East (excluding London), 2011, absolute numbers**



Source: Census and GLA Intelligence Unit analysis

**Map 3.6: Workers in London based workplaces by residence origin in the Greater South East (excluding London), 2011, as percentage of an areas workforce**

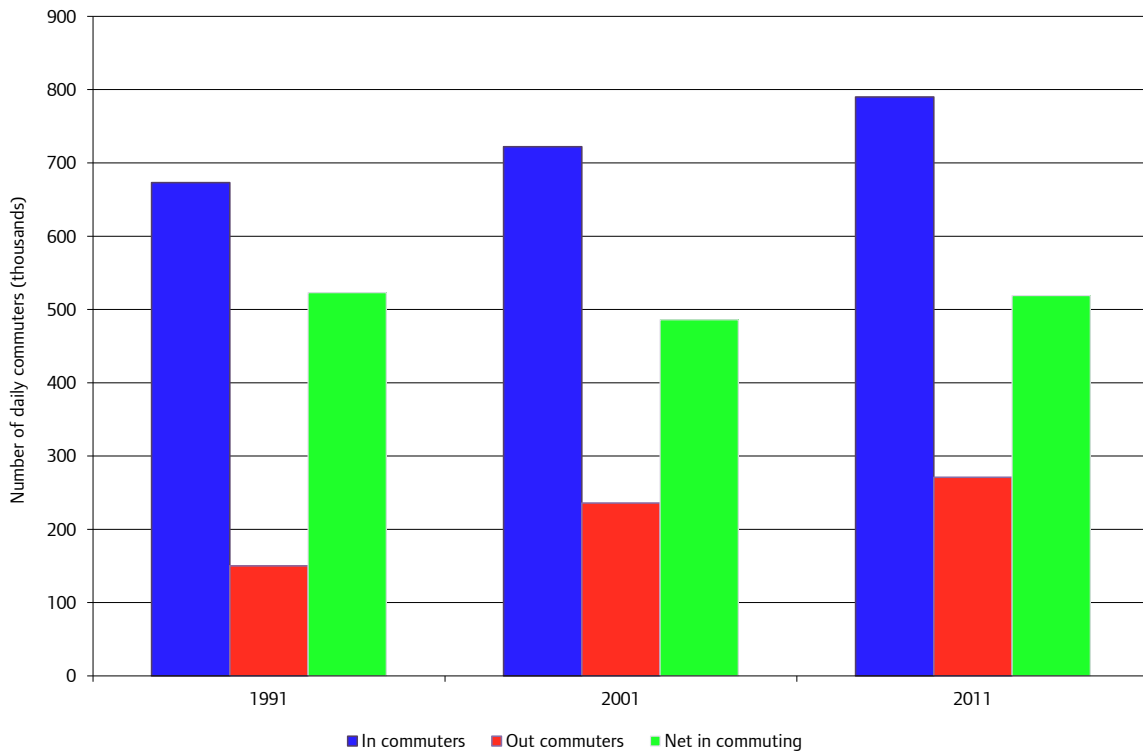


Source: Census and GLA Intelligence Unit analysis

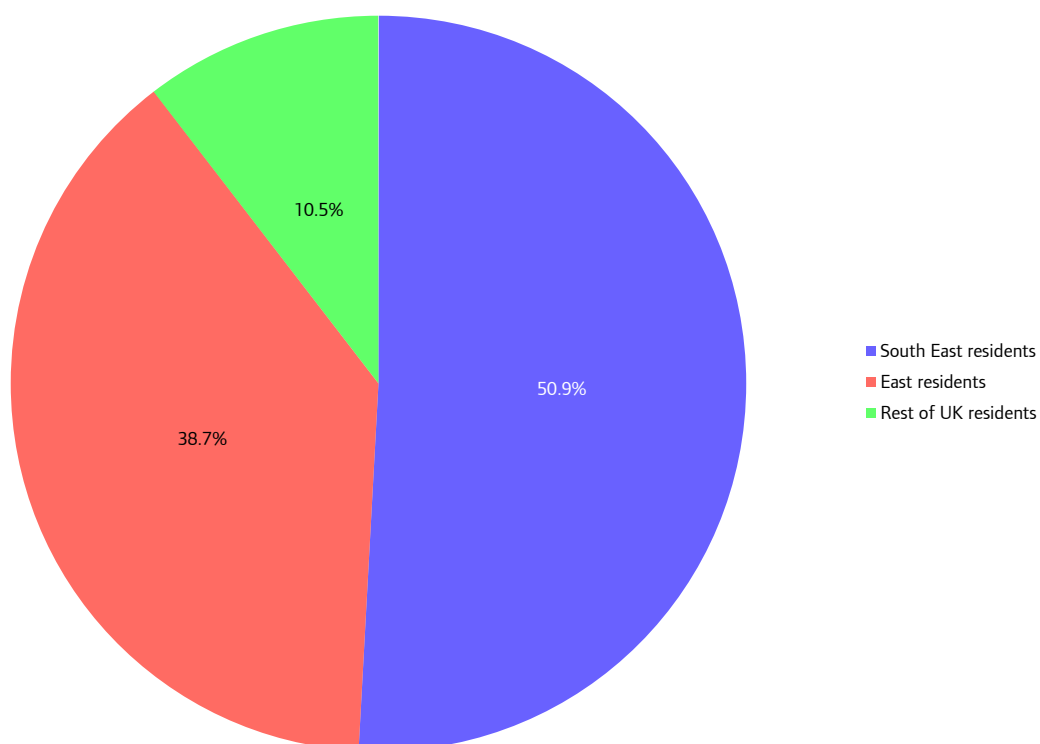


Figures 3.1 to 3.3 examine London’s commuters in more detail. Figure 3.1 shows the steady increase in out-commuting and in-commuting that has occurred since 1991, while Figure 3.2 shows that most but not all commuters in London come from the wider Greater South East. In looking at the source and characteristics of commuters in to London, TfL observes that “unsurprisingly, the local authorities hosting the largest numbers of commuters into London are those closest to the London boundary, such as Epping Forest, Thurrock, and St Albans. Outside of the South East and East regions, Wiltshire was the local authority with the highest number of commuters to London”. TfL further notes that “commuters from outside London tend to be older on average than London workers – 44 per cent are aged 35 to 49 and more than 20 per cent are aged over 50. The vast majority also use one of two modes of transport to travel to London, with 45 per cent travelling by rail and 40 per cent by car. Commuting into London by train is much more common if the workplace is in inner (including central) London, whereas car dominates in outer London workplaces. For example, 85 per cent of (non-resident) commuters to the London borough of Hillingdon travel by car”<sup>1</sup>. A breakdown of the travel mode of commuters into London from outside of the capital is given later in this chapter in Figure 3.7.

**Figure 3.1: Long term trend in commuting to and from London**



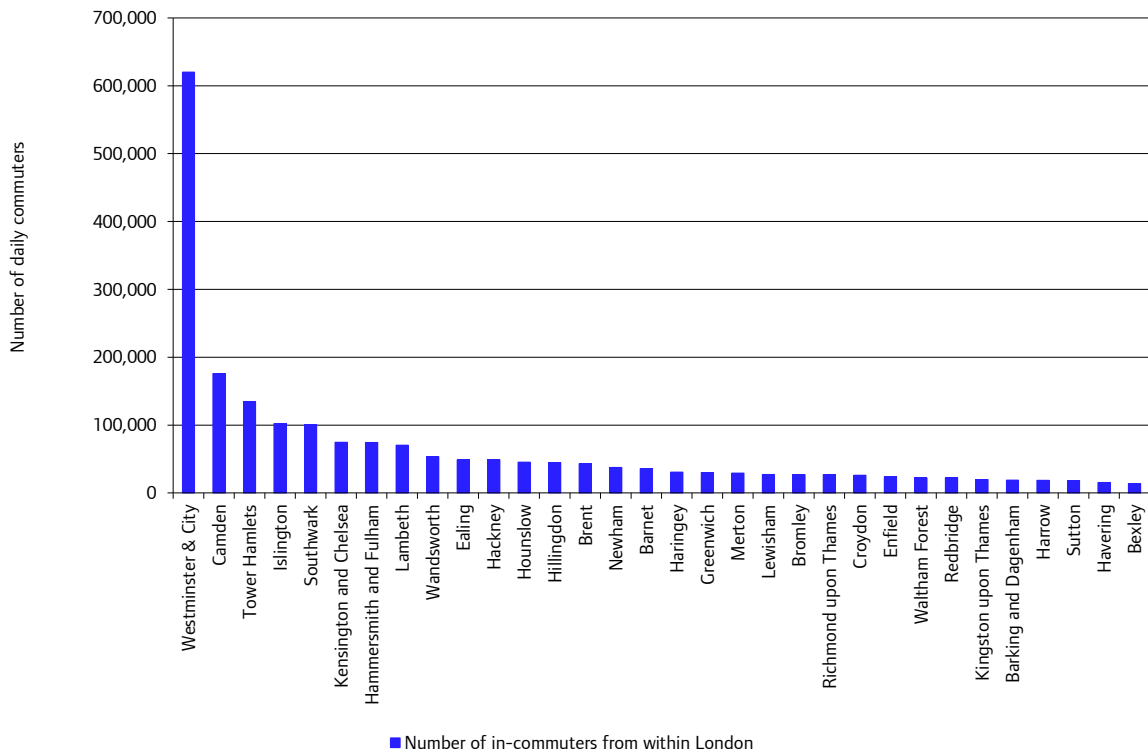
Source: Census via TfL – Travel in London 7<sup>2</sup>

**Figure 3.2: Proportion of commuters into London by region of residence, 2011**

Source: Census via TfL – Travel in London 7

Looking at commuters within London itself TfL observe that “the majority of London residents that work in London are employed in a different borough to where they live – just over 71 per cent”<sup>3</sup>. However, as can be seen from Figure 3.3, inner London boroughs dominate as a destination for commuters from within London with nearly 30 per cent of total commuters in London commuting to Westminster and the City.

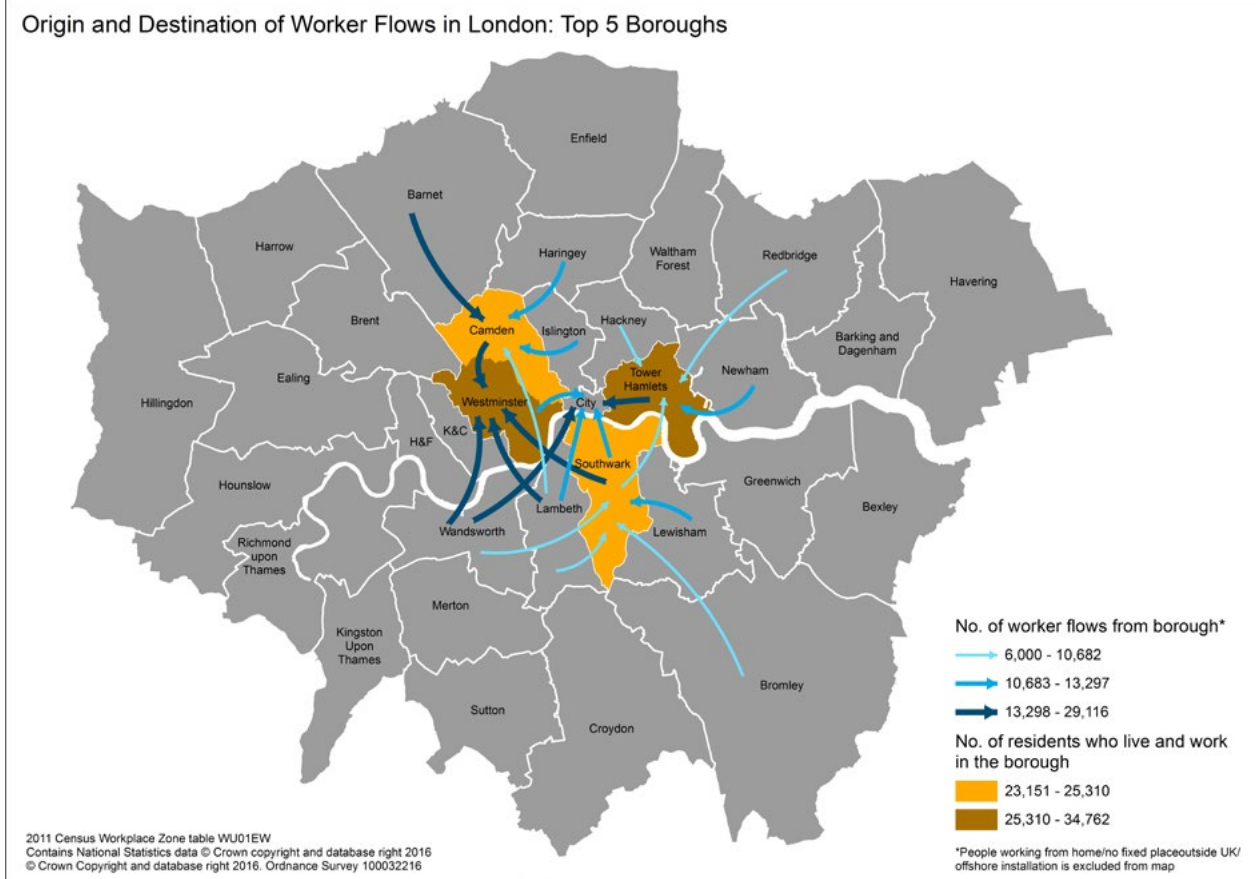
**Figure 3.3: Commuting inflows from within London by borough, 2011, London residents only**



Source: Census via TfL – Travel in London 7

Map 3.7 examines these London based commuter flows in more depth and shows the most important source local authorities for commuters into the top five commuter destinations in London (these being Camden, the City of London, Southwark, Tower Hamlets and Westminster). It should however be noted that these are not the only important commuter destinations in London and the South East with for instance substantial commuter flows going to businesses along the M4 corridor. Still, as can be seen from Map 3.7, inner London local authorities attract significant flows of people from across London with a large percentage of them relying on London’s public transport system to get them swiftly to work.

**Map 3.7: Top five London local authorities by origin and destination of worker flows**



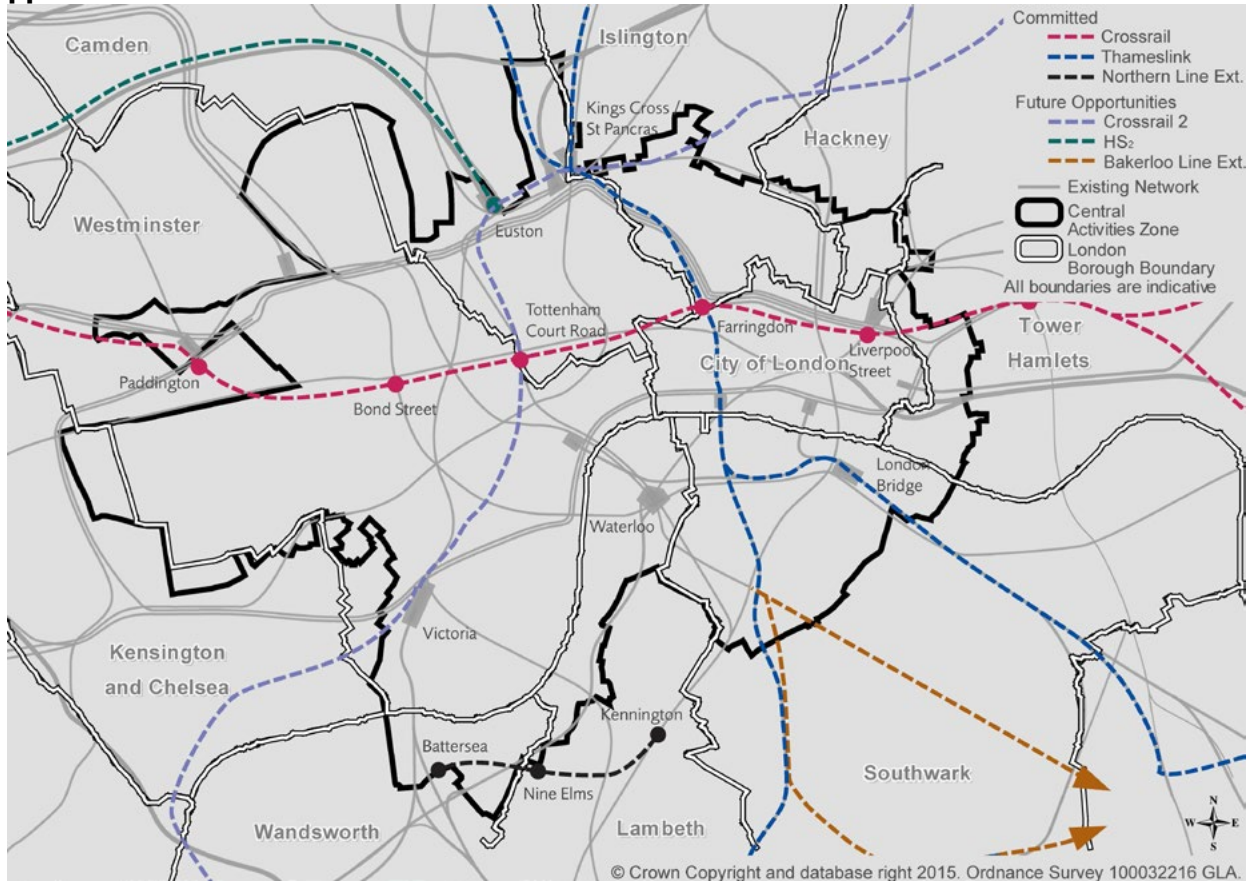
Source: Census and GLA Intelligence Unit Analysis

**3.4 Transport in the CAZ**

As highlighted by the commuters flows shown above, public transport is vital for the functioning of the CAZ, it being the only realistic way in which to get a significant part of its large workforce into such a confined area. Thus the CAZ is well serviced by public transport, with this likely to improve in the future as a number of public transport schemes are in the process of being built, have been committed to or proposed as shown by Map 3.8.



**Map 3.8: Major public transport infrastructure including schemes committed and future opportunities**

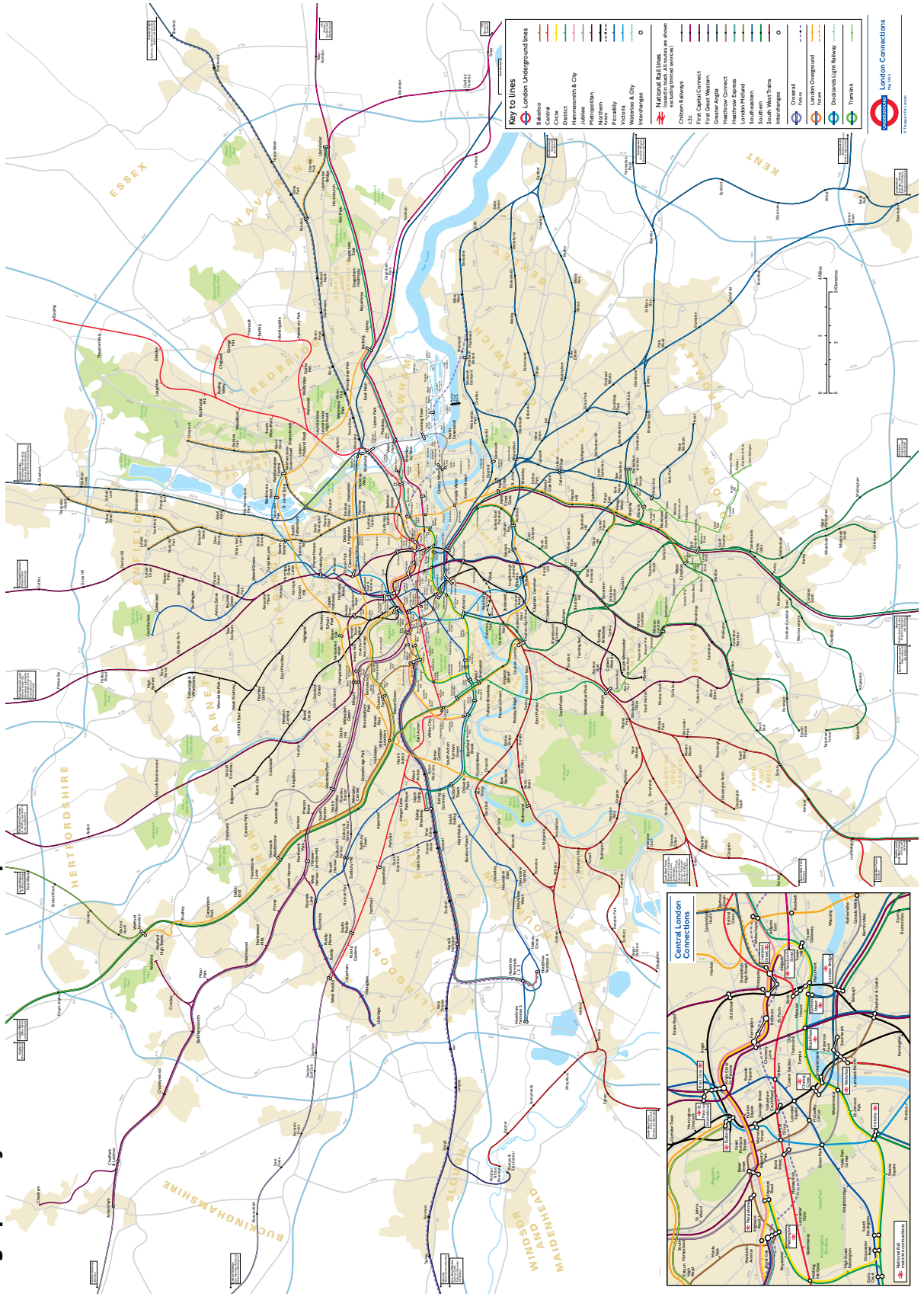


Source: GLA & TfL

### 3.5 Transport in London as a whole

To get to the CAZ but also around the wider London area requires an extensive transport system and the transport connections in London as a whole are extensive and snake into the wider South East as highlighted by Map 3.9, which shows the rail and tube routes in London and the surrounding geographies. This section examines how this transport network combines to provide strong public transport accessibility within London, which opens up numerous job opportunities to Londoners.

Map 3.9: Geographically accurate tube and rail map



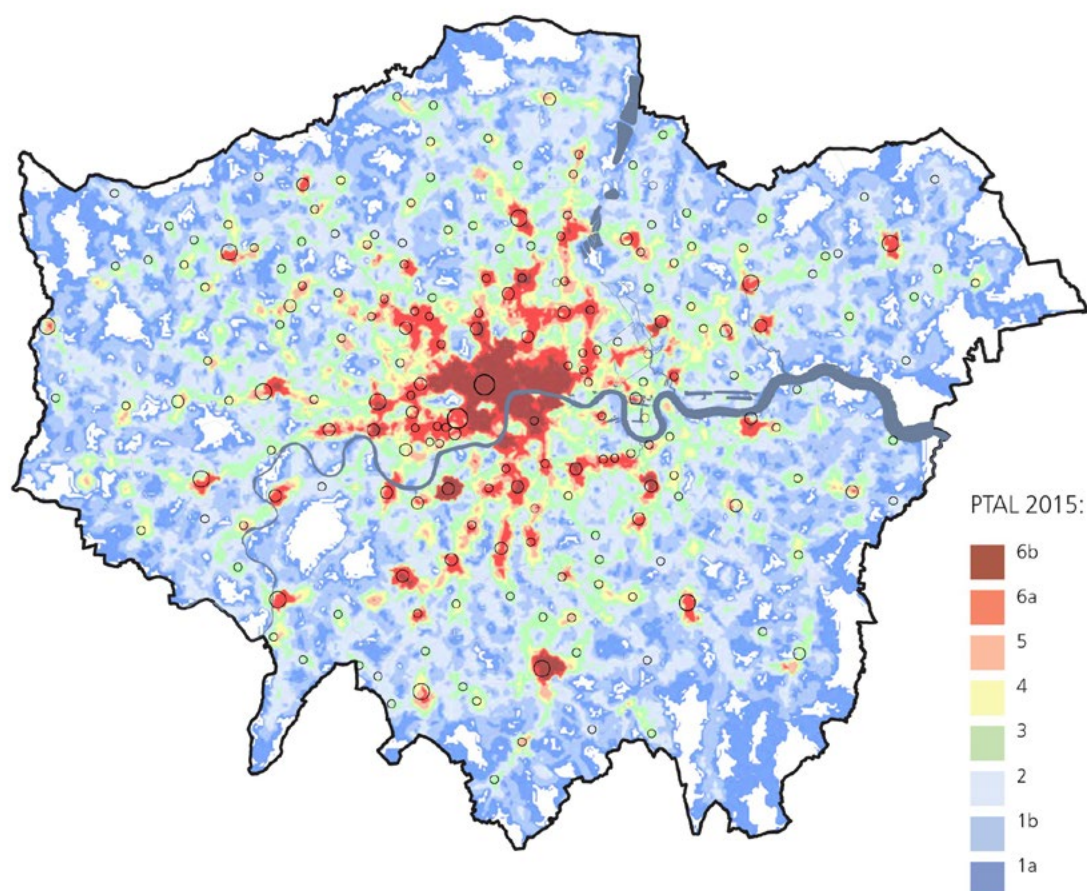


### 3.5.1 Public Transport Accessibility Levels

Public Transport Accessibility Levels (PTALs) indicate relative connectivity to the public transport network for any location in London. The term 'connectivity to the network' indicates that the PTAL measure focuses on the proximity to public transport services, and not on where these services actually take people to or indeed how accessible they are to all members of the population.

Map 3.10 shows Greater London PTALs for 2015. Clearly central London is dominated by high PTAL values, as are other metropolitan town centres, such as Croydon, Kingston and Harrow. The predominantly radial orientation of the main public transport corridors is also visible in the map. Note that PTAL values are on a scale from 1 to 6, with 6 representing the highest connectivity level.

**Map 3.10: PTAL in London with highlighted town centres, 2015**



Source: TFL Planning, Strategic Analysis

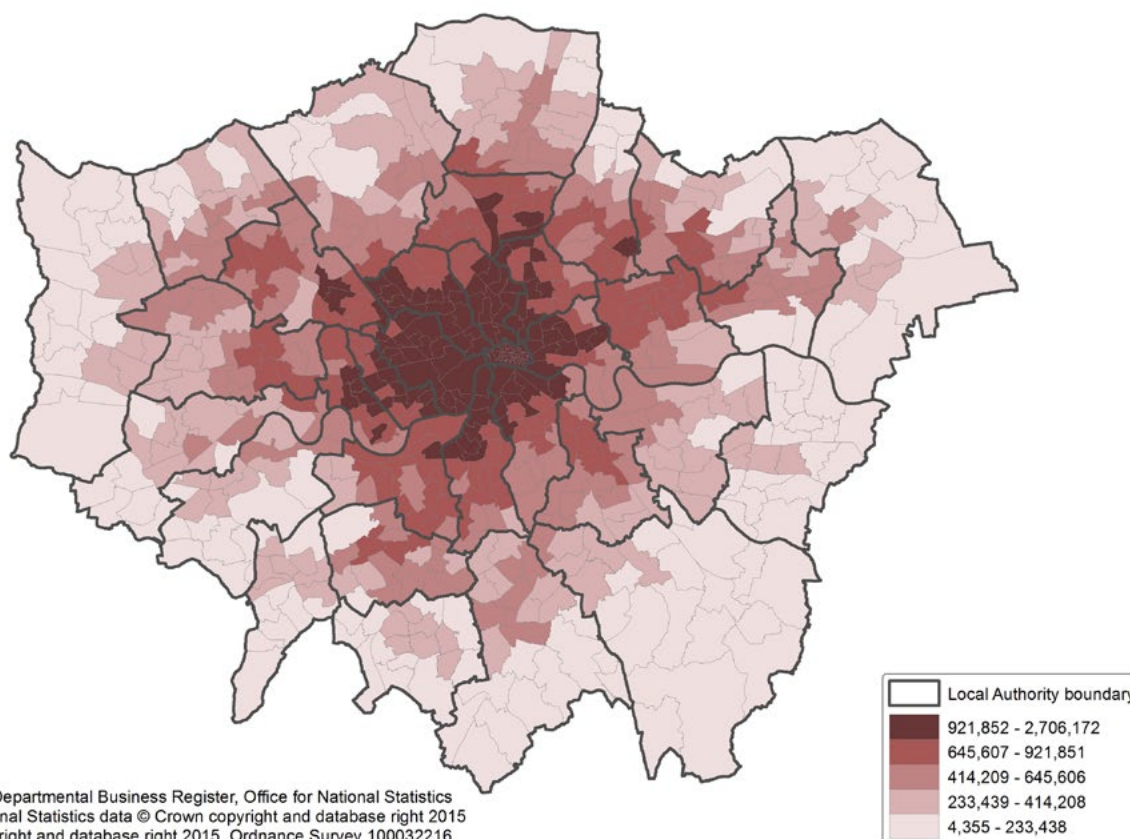
Despite frequent incremental improvements to the public transport networks, the overall pattern of PTAL scores changes only slowly at the Greater London level. However, specific additions to the networks, such as the opening of the East London line, and Games-related improvements around Stratford, can make a substantial difference locally. At the borough level (in terms of average PTAL scores across a borough) the nature of these improvements over time becomes more apparent. Note that the actual PTAL score, on a scale from 1 to 6, is derived from an access index, which is on a linear scale.

Projecting forwards to 2021, post-dating the expected opening date of Crossrail 1/The Elizabeth Line, further improvements are expected, equating to an improvement of 23.6 per cent between 2008 and 2021, although it should be noted that Crossrail 1/The Elizabeth Line will largely use existing infrastructure outside of the central area, and that PTAL values in central London are already very high. Nevertheless the number of boroughs with the highest average PTAL value of 6 will rise from two in 2008 to five in 2021.

### 3.5.2 Worker and employment catchments

One measure that can be used to quantify the support that London's transport network provides to London's economy is the number of people and therefore in many cases workers that are potentially available within a 45 minute travel time by public transport to a particular location. The map should be interpreted in terms of, from any one point, the number of people that can reach a given area in 45 minutes by public transport. Map 3.11 thus shows the large population that is within 45 minutes travel time of central London. This large accessible population is made possible by London's transport system and therefore highlights how the system helps to support the concentration of economic activity seen in the centre of the capital that was highlighted in Chapter 2 of this Evidence Base.

**Map 3.11: Population accessibility by public transport within 45 generalised minutes, by ward in London**



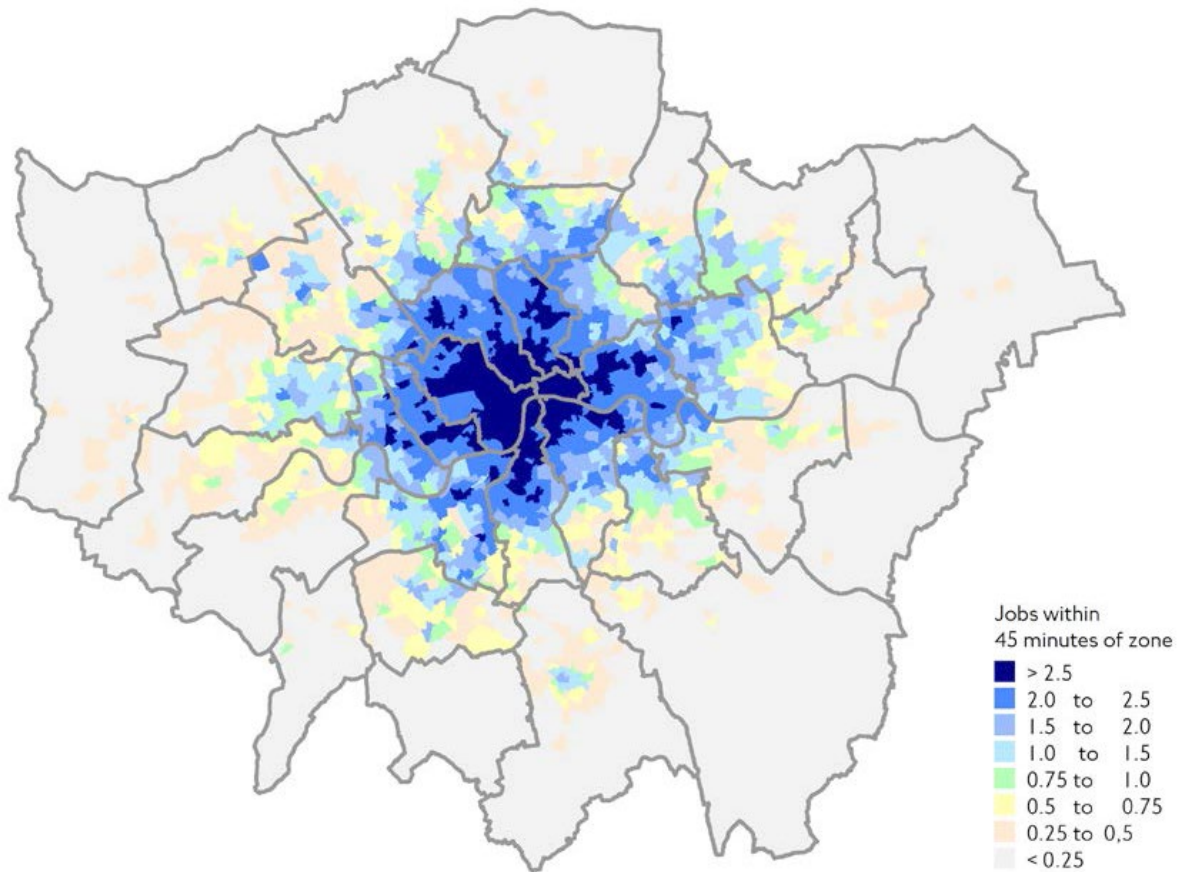
Source: GLA Intelligence Unit

Another way of looking at these benefits (and driven by the above) is the number of jobs (whether filled or currently vacant) that are potentially available within a given travel time from a particular residential location. The basis for assessing this is a travel time contour of 45 minutes by the principal public transport modes, expressed as an aggregate measure across Greater London.

Map 3.12 shows these results for 2015. The map should be interpreted in terms of, from any one point, the number of jobs that are potentially reachable in 45 minutes by public transport. As might be expected, the map reflects the concentric pattern of employment density (driven by the transport networks ability to funnel workers into central London) and the primarily radial orientation of the public transport networks. Typically, for people living in outer London, between 0.25 and 0.5 million jobs are potentially available from their home location within 45 minutes travel time. However, this rises to typically around 2.5 million jobs potentially available to a resident of central London.

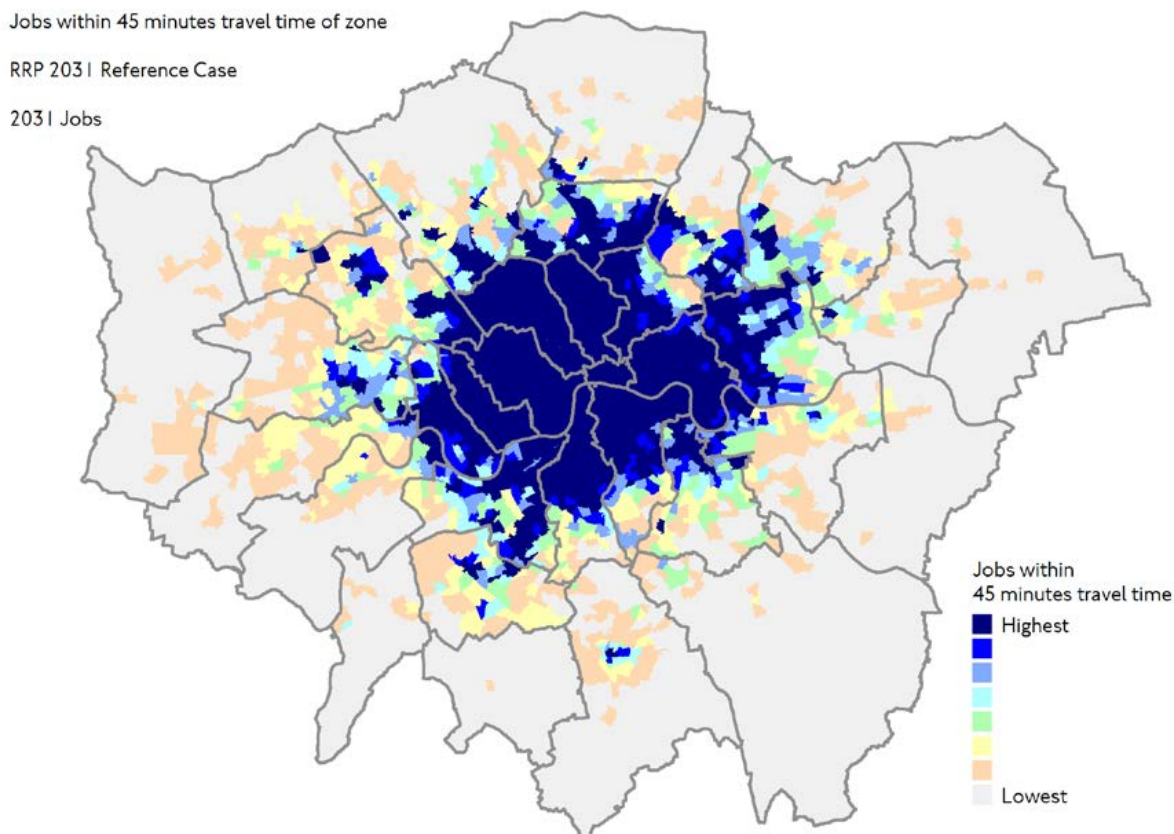


**Map 3.12: Number of jobs available by mass public transport within 45 minutes travel time, 2015**



Source: TfL Planning, Strategic Analysis

Map 3.13 shows these results for 2031. The expansion in job catchment is marked and this is a function of both the expansion of the transport network, reflecting committed capacity increases such as Crossrail 1/The Elizabeth Line, as well as increased number of jobs in the CAZ.

**Map 3.13: Number of jobs available by mass public transport within 45 minutes. 2031**

Source: TfL Planning, Strategic Analysis

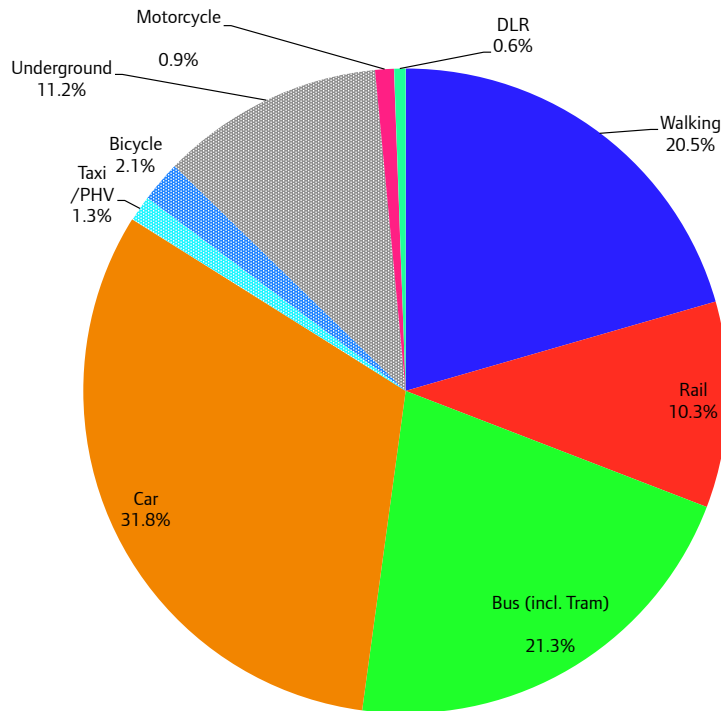
### 3.6 Transport mode in London

Building on the commuter flows and public transport accessibility highlighted above, this section examines the popularity and growth of the various transport modes that are used to move around the capital.

#### 3.6.1 Transport modal shares

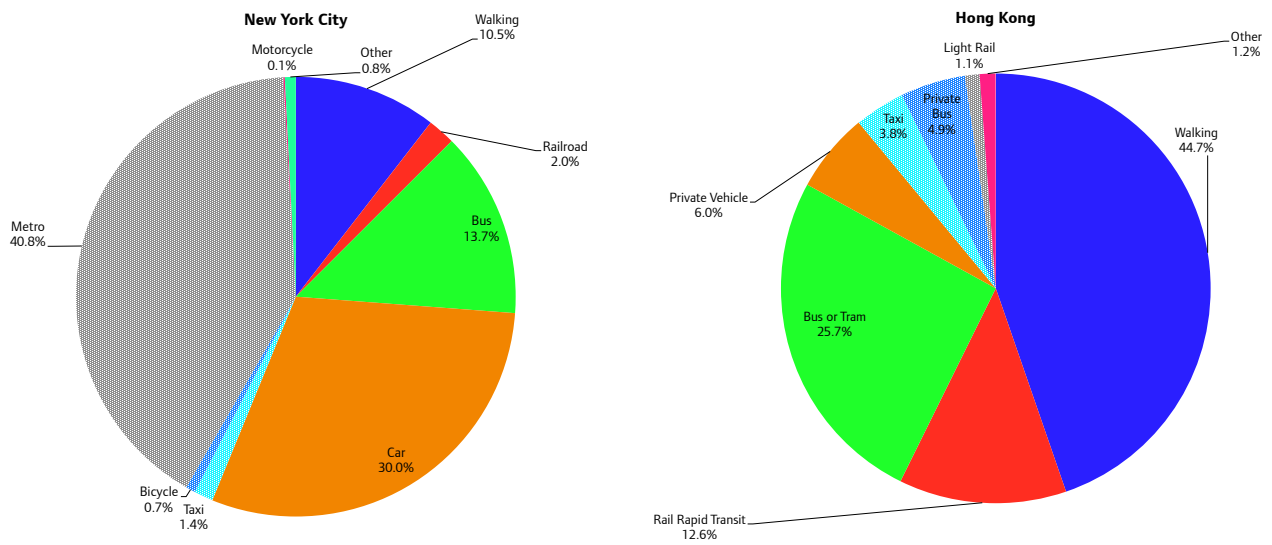
Looking at the mode of transport used in London as a whole it can be seen from Figure 3.4 that private vehicle transport only accounts for around a third of daily journeys, with its share having declined significantly over recent years as shown in Table 3.1. This is perhaps unsurprising given that low average traffic speeds in London have been consistent for some time and would suggest that the road system is at near capacity thus limiting the ability of car use to meet the increase in travel demand that has been seen in London. Placing this into an international context, Figure 3.5 shows how London's transport modes compare to two other global cities, New York and Hong Kong, and shows the differing importance of transport modes between the cities, but also highlighting the importance of public transport in global cities. Of particular interest is the importance of walking in Hong Kong's relatively small but highly densely populated environment.

**Figure 3.4: Transport modal shares of daily journey stages in London, 2014<sup>5</sup>**



Source: TfL – Travel in London 8<sup>6</sup>

**Figure 3.5: Transport modal shares in comparison cities<sup>7</sup>**



Source: LSE, urban age project<sup>8</sup>

**Table 3.1: Percentage shares of journey stages by type of transport, 1993 to 2014**

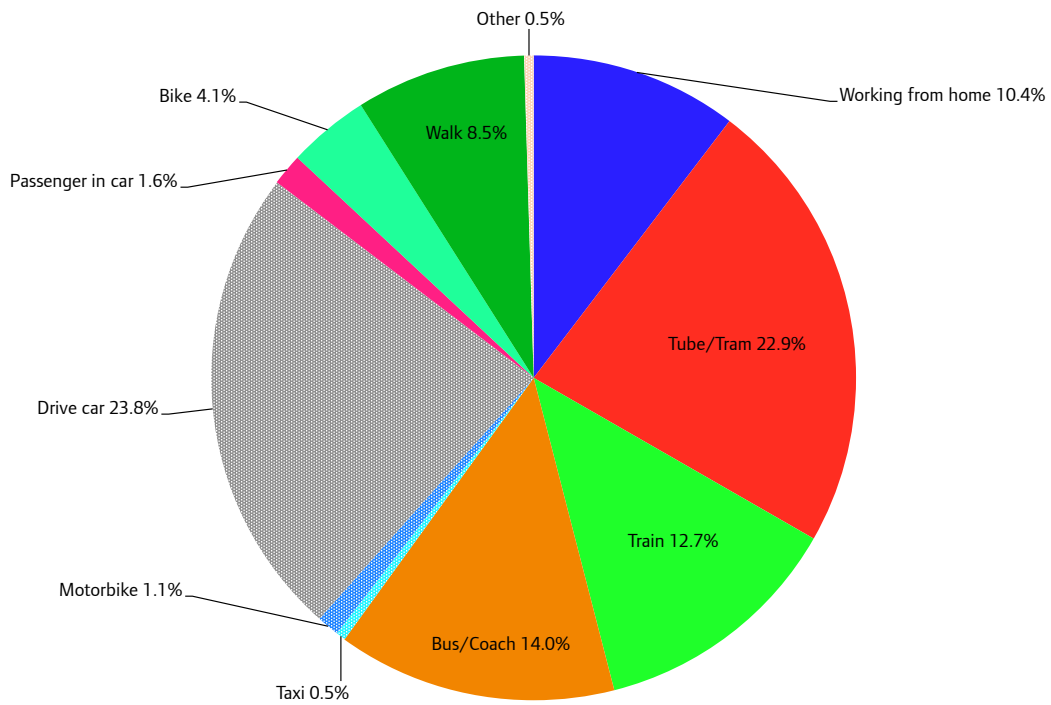
	Public Transport	Private Transport	Cycle	Walk
1993	30%	46%	1%	22%
1994	30%	46%	1%	22%
1995	31%	46%	1%	22%
1996	31%	46%	1%	22%
1997	32%	45%	1%	22%
1998	33%	45%	1%	22%
1999	33%	44%	1%	22%
2000	34%	43%	1%	21%
2001	35%	43%	1%	22%
2002	35%	42%	1%	21%
2003	37%	41%	1%	21%
2004	38%	39%	1%	21%
2005	38%	39%	2%	21%
2006	39%	39%	2%	21%
2007	41%	37%	2%	20%
2008	42%	36%	2%	21%
2009	42%	35%	2%	21%
2010	43%	35%	2%	21%
2011	43%	34%	2%	21%
2012	44%	33%	2%	21%
2013	45%	33%	2%	21%
2014	45%	32%	2%	21%

Source: TFL – Travel in London 8

As was shown in Section 3.3 commuter flows are significant in London both from inside the capital and from the wider South East and public transport is vital in facilitating these flows. This is illustrated by Figure 3.6 which shows that around half of workers from London working in London commute to their job via public transport, over 10 per cent either cycle or walk to work with a further 10 per cent working at home. However, Figure 3.7, which examines commuters from the wider South East that work in London, shows the importance of trains for getting commuters to their job in London and also highlights the importance of the car as well. Finally, Figure 3.8 examines the travel to work patterns of all workers in London whether they live within the capital or not and again shows the importance of public transport for getting workers to work in London with public transport accounting for over 50 per cent of all commuter journeys in 2011.

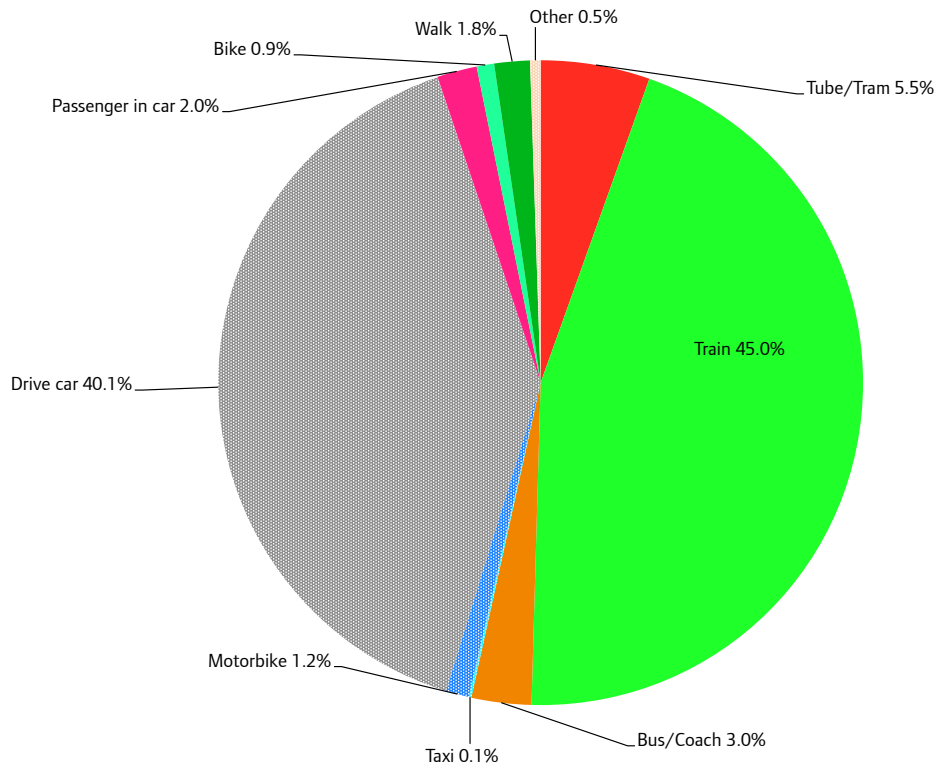


**Figure 3.6: Method of travel to work for workers in London from London in 2011**



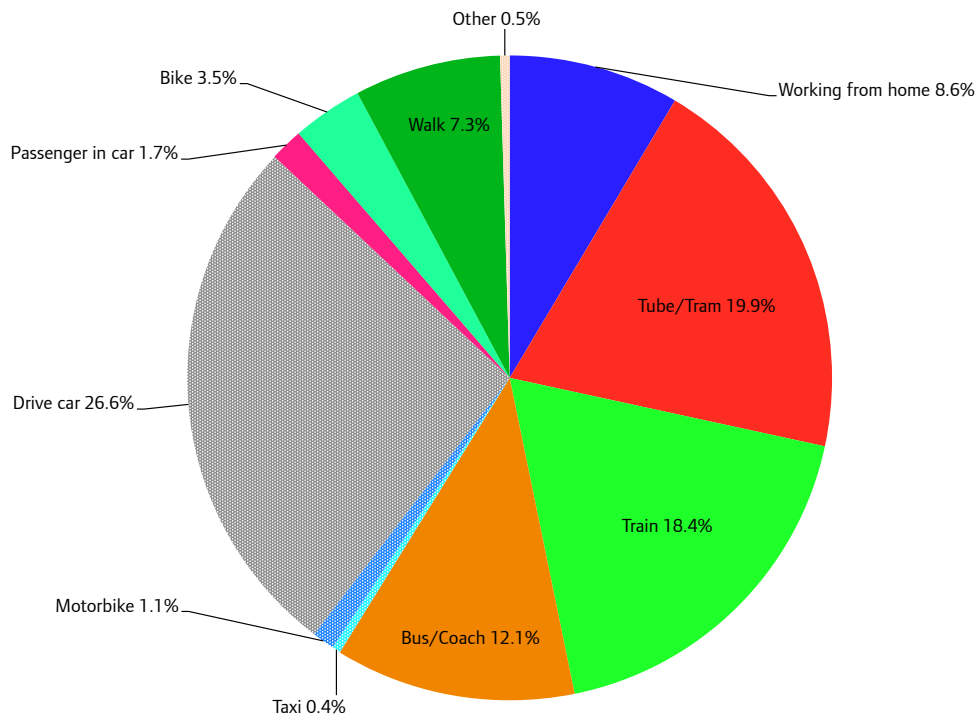
Source: Census and GLA Intelligence Unit Analysis

**Figure 3.7: Method of travel to work for workers into London from the wider South East in 2011**



Source: Census and GLA Intelligence Unit Analysis

**Figure 3.8: Method of travel to work for workers into London from London and the wider South East in 2011**

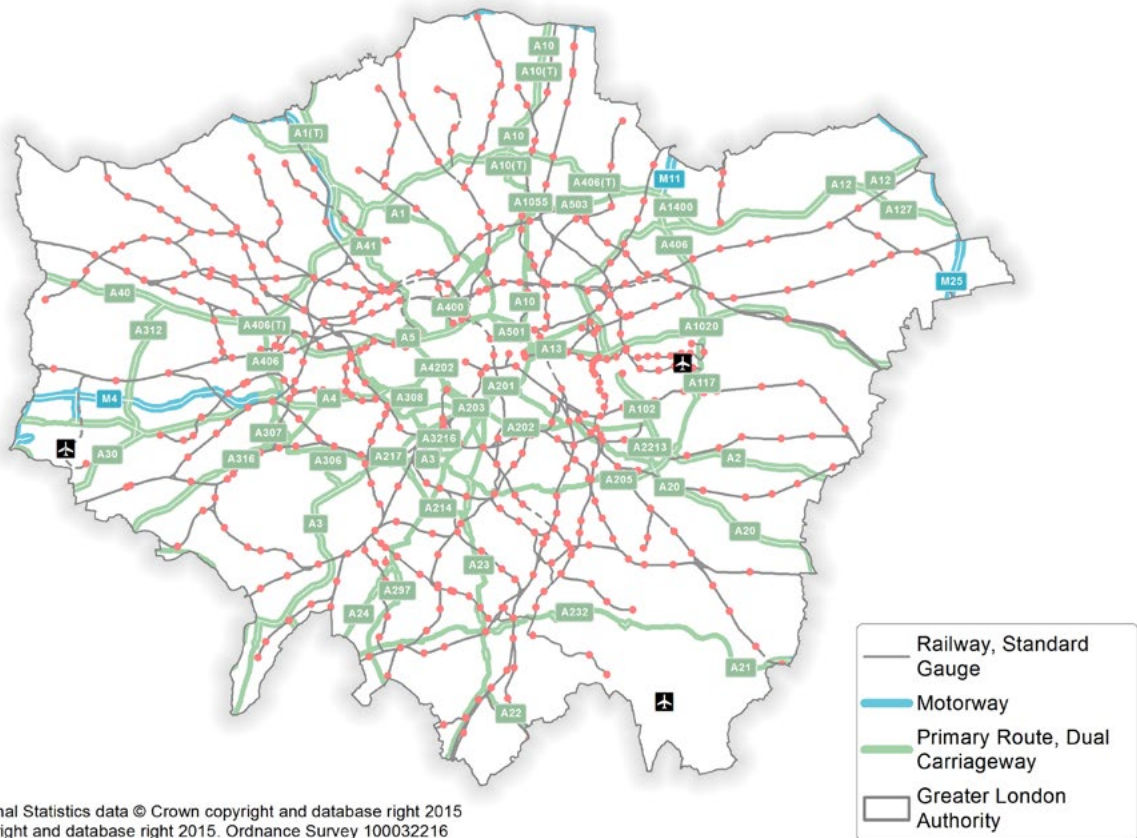


Source: Census and GLA Intelligence Unit Analysis

### 3.6.2 Private transport

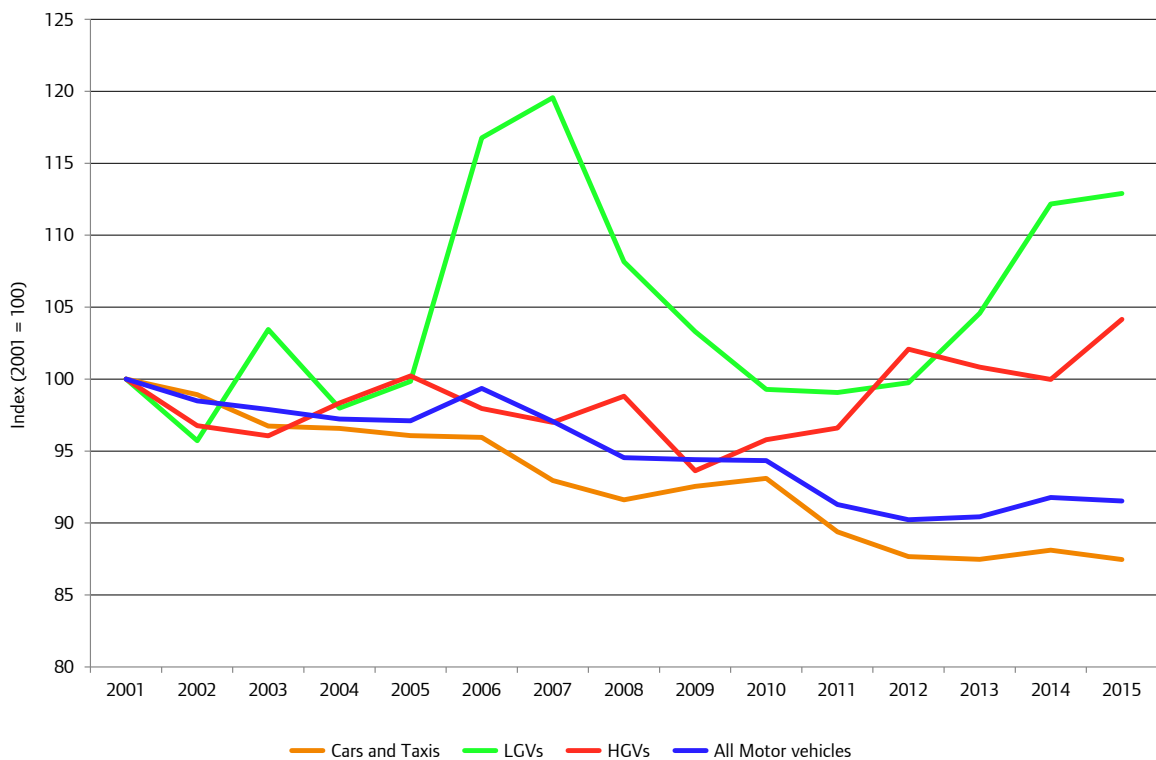
As was highlighted by Figure 3.4 and Table 3.1, although public transport is of vital importance to those wishing to travel around London, journeys by private transport still make up a significant proportion of journeys in the capital. Thus looking at road transport in London, Map 3.14 highlights the major roads, rail lines and airports in London. While, Figure 3.9 shows that even though the general trend in road usage has been downwards, this has not been the case for light goods vehicles which generally saw growth from 2001 until 2007 (the recession); usage has recently picked up again after a couple of years of flat lining with this recent growth also seen in heavy goods vehicles as well. However, as will be highlighted in Chapter 6 of this Evidence Base, London's road network faces significant challenges due to congestion which act as a break on the growth of private transport in the capital. Although as shown by Figure 3.10 the decline in road traffic usage in London has varied depending on which part of London's geography is examined, with road traffic usage in central London having shown the largest decline since 2000.

Map 3.14: Roads, rail and airports in London



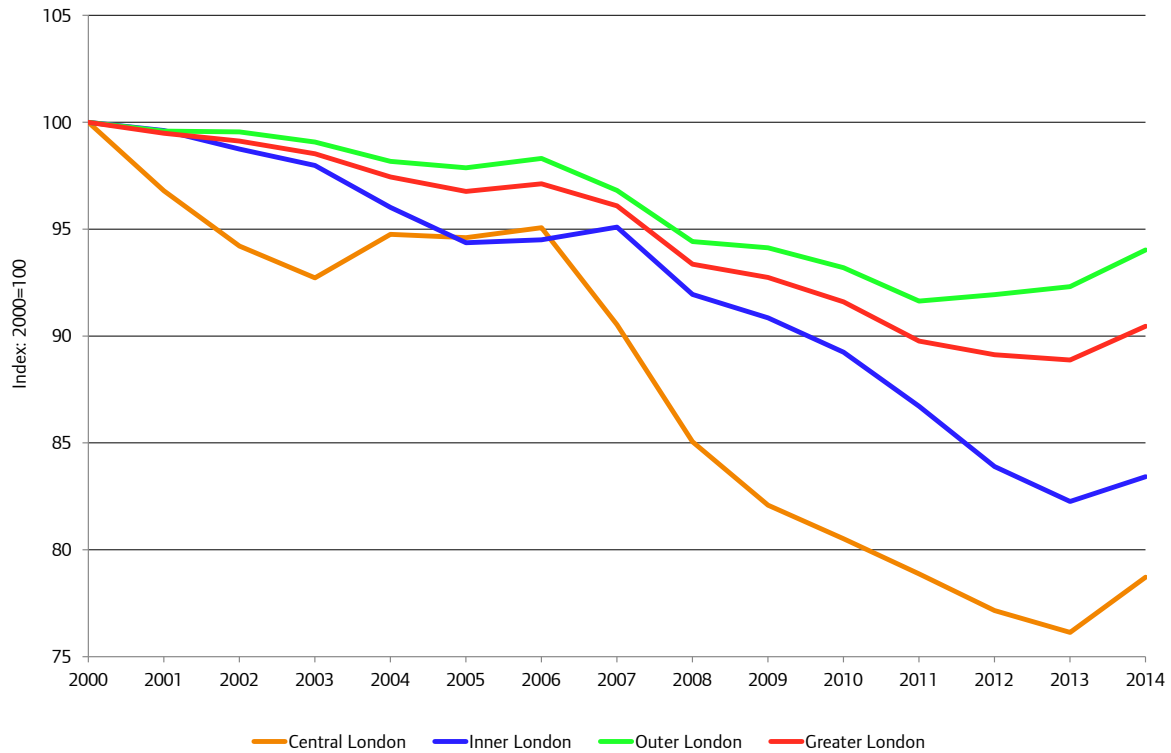
Source: GLA Intelligence Unit

Figure 3.9: Growth in road traffic in London, 2001 to 2015, Index: 2001=100



Source: TfL

**Figure 3.10: Trends in road traffic (vehicle kilometres), all motor vehicles in central, inner London, outer London, and Greater London as a whole, Index: Year 2000=100<sup>9</sup>**



Source: Department for Transport via TfL – Travel in London 8

### 3.6.3 Buses

In part due to the constraints placed on private transport, public transport is of vital importance for moving people around the capital and has become more important over time. This is highlighted by Table 3.2 which shows the strong growth in bus, rail, and Tube usage and in particular emphasises the importance of bus travel in London, with it accounting for more passenger journeys than any other single form of public transport.



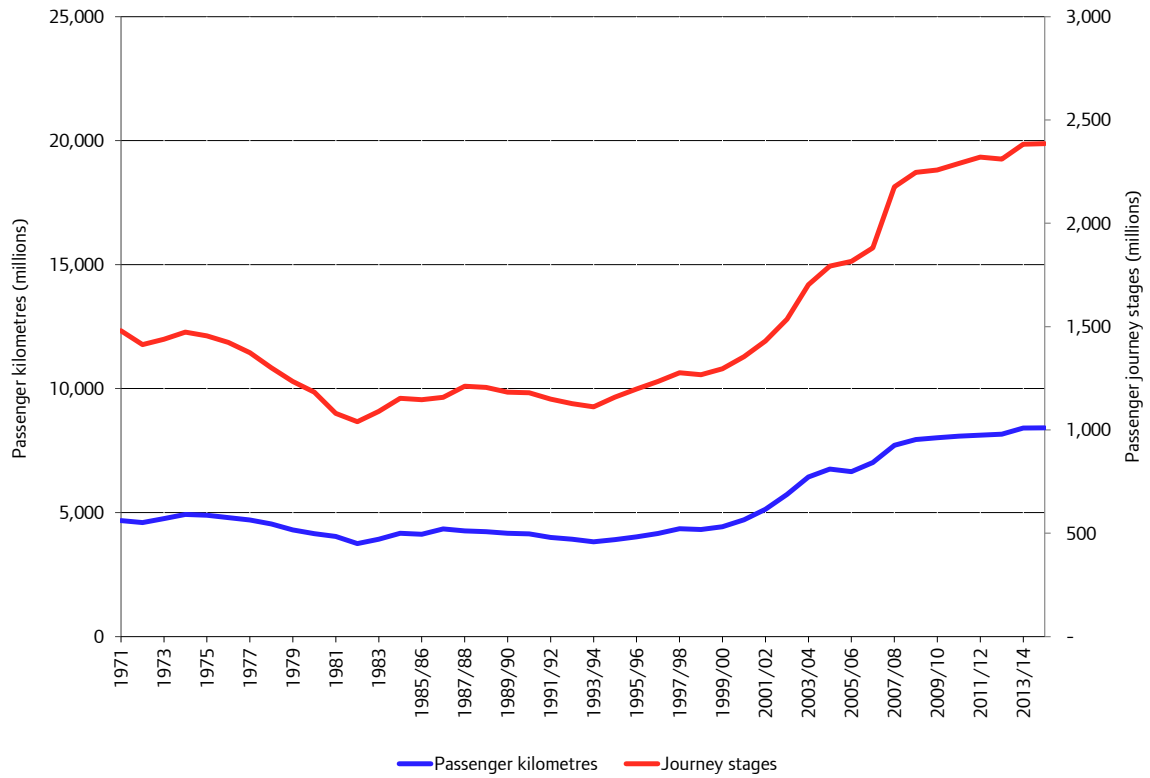
**Table 3.2: Aggregate travel volumes in Greater London, estimated daily average number of trips by main mode of travel, 1993 to 2014, Seven-day week (Millions of trips)**

Year	Rail	Underground/DLR	Bus (including tram)	Taxi/PHV	Car driver	Car passenger	Motor cycle	Cycle	Walk	All modes
1993	1.3	1.4	2.1	0.3	6.6	3.6	0.2	0.3	5.2	20.9
1994	1.3	1.5	2.1	0.3	6.7	3.6	0.2	0.3	5.2	21.1
1995	1.3	1.6	2.2	0.3	6.6	3.6	0.2	0.3	5.2	21.2
1996	1.4	1.5	2.3	0.3	6.7	3.6	0.2	0.3	5.3	21.5
1997	1.5	1.6	2.3	0.3	6.7	3.6	0.2	0.3	5.3	21.8
1998	1.5	1.7	2.3	0.3	6.7	3.6	0.2	0.3	5.3	21.9
1999	1.6	1.8	2.3	0.3	6.9	3.6	0.2	0.3	5.4	22.4
2000	1.7	2	2.4	0.3	6.8	3.6	0.2	0.3	5.5	22.7
2001	1.7	1.9	2.6	0.3	6.8	3.6	0.2	0.3	5.5	22.9
2002	1.7	1.9	2.8	0.3	6.8	3.5	0.2	0.3	5.6	23.2
2003	1.8	1.9	3.2	0.3	6.7	3.5	0.2	0.3	5.6	23.4
2004	1.8	2.0	3.3	0.3	6.6	3.4	0.2	0.3	5.6	23.6
2005	1.8	1.9	3.2	0.3	6.5	3.4	0.2	0.4	5.7	23.4
2006	1.9	2.0	3.1	0.3	6.4	3.5	0.2	0.4	5.7	23.6
2007	2.1	2.0	3.6	0.4	6.3	3.5	0.2	0.4	5.8	24.3
2008	2.2	2.1	3.8	0.3	6.1	3.5	0.2	0.5	5.9	24.6
2009	2.1	2.2	3.9	0.3	6.2	3.5	0.2	0.5	6.0	24.8
2010	2.3	2.1	4.0	0.3	6.1	3.6	0.2	0.5	6.1	25.1
2011	2.4	2.2	4.1	0.3	5.9	3.6	0.2	0.5	6.2	25.3
2012	2.6	2.4	4.1	0.3	5.9	3.6	0.2	0.5	6.3	25.8
2013	2.7	2.5	4.1	0.3	5.8	3.6	0.2	0.5	6.3	26.1
2014	2.8	2.6	4.1	0.3	5.9	3.7	0.2	0.6	6.4	26.6

Source: TFL – Travel in London 8

This growth in bus usage is also marked if other metrics are examined such as passenger kilometres and journey stages as shown by Figure 3.11 which places the strong recent growth in bus usage into a more historic context. This reflects the strong provision of bus services in London as highlighted in Map 3.15 which shows the bus routes in London and those that extend into the surrounding geography and highlights the geographically comprehensive nature of this service.

**Figure 3.11: Passenger kilometres and journey stages travelled by bus**



Source: TfL – Travel in London 8<sup>10</sup>

**Map 3.15: Bus routes in London in 2015**



Source: TfL

In terms of users and reasons for use of London’s bus network, this varies depending on whether the user is using a Day Bus or a Night Bus. Thus TfL survey results have found that “women are more likely (57%) to be day bus passengers than men (43%). Meanwhile, almost two-thirds of night bus passengers are men (64%) - compared to just one third of night bus passengers who are women (36%)”<sup>11</sup>. TfL also found that “although the largest segment, the proportion of bus passengers who are White is around 10 percentage points lower than among the London population in general. Asian bus passengers are also slightly under-represented. Conversely the proportion of Black or other ethnic group passengers is higher than that of Londoners in general”<sup>12</sup>. Table 3.3 shows that perhaps unsurprisingly the reasons for traveling by bus varies by age with those between 16 and 19 years old and those over 60 much less likely to be using the bus to travel for work compared to users aged 20 to 59 years old.

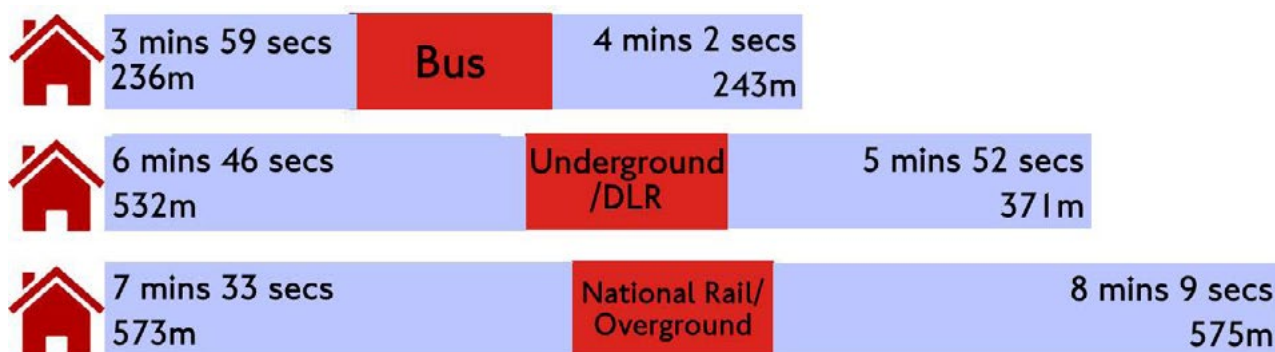
**Table 3.3: Main Journey Purpose by Age (Grouped) – Day and Night Bus Passengers (% of journeys)**

	16-19		20-34		35-59		60+	
	Day Bus	Night Bus	Day Bus	Night Bus	Day Bus	Night Bus	Day Bus	Night Bus
Travelling to/from work	21	27	61	51	60	59	19	37
Employer Business	1	1	2	1	3	3	1	2
To/from school/education	36	13	6	4	3	1	1	2
To/from shopping	8	2	7	1	9	1	33	6
Visiting friends/relatives	13	20	8	13	8	11	12	18
Leisure	9	19	7	19	5	14	13	13
Personal Business	2	3	2	1	2	2	4	2
Healthcare Appointment	1	1	1	-	3	-	7	3
Taking/collecting child	1	1	1	-	1	-	1	1
Picking up/dropping off someone	1	1	1	-	1	-	1	1
Holiday/Sightseeing	2	4	2	3	2	2	3	6
Other	5	10	2	5	3	6	6	9

Source: TfL – Bus User Survey 2014<sup>13</sup>

While bus priority is provided on some key sections of the network, this still amounts to only around 3 per cent of roads served by buses. Bus speeds thus vary significantly by borough (see Map 3.16) with inner London seeing generally slower speeds, most likely indicating the congested nature of a number of roads in inner London.



**Figure 3.12: Average distance walked and time spent to access public transport**

Source: London Travel Demand Survey 2011/12–2013/14, 'A picture of walking in London' Thinkpiece

Over the past eight years, the number of walk trips has increased in line with population, whilst the number of walk stages longer than five minutes has increased at a faster rate; reflecting mode shift from car to public transport. In future, TfL projects that growth in walking will come from an increase of 29 per cent in walk-all-the-way trips (to 8 million per day) reflecting population growth, and also from an increase in walk stages derived from growing public transport demand (reaching 38 million in 2041). The higher the future mode share for public transport, the more walk travel will be generated. The majority of the growth will be in inner London, reflecting the distribution of the growth and also the greater reliance on public transport in inner London.

There is some potential to increase the amount of walk travel by encouraging short journeys made by car in outer London to be made by walking. The design of new places in London will also determine how much walking people do – residents of new developments will be more likely to walk if they are well connected to local services within a comfortable and pleasant walk, and if they are well connected to the public transport network, minimising the need for a car.

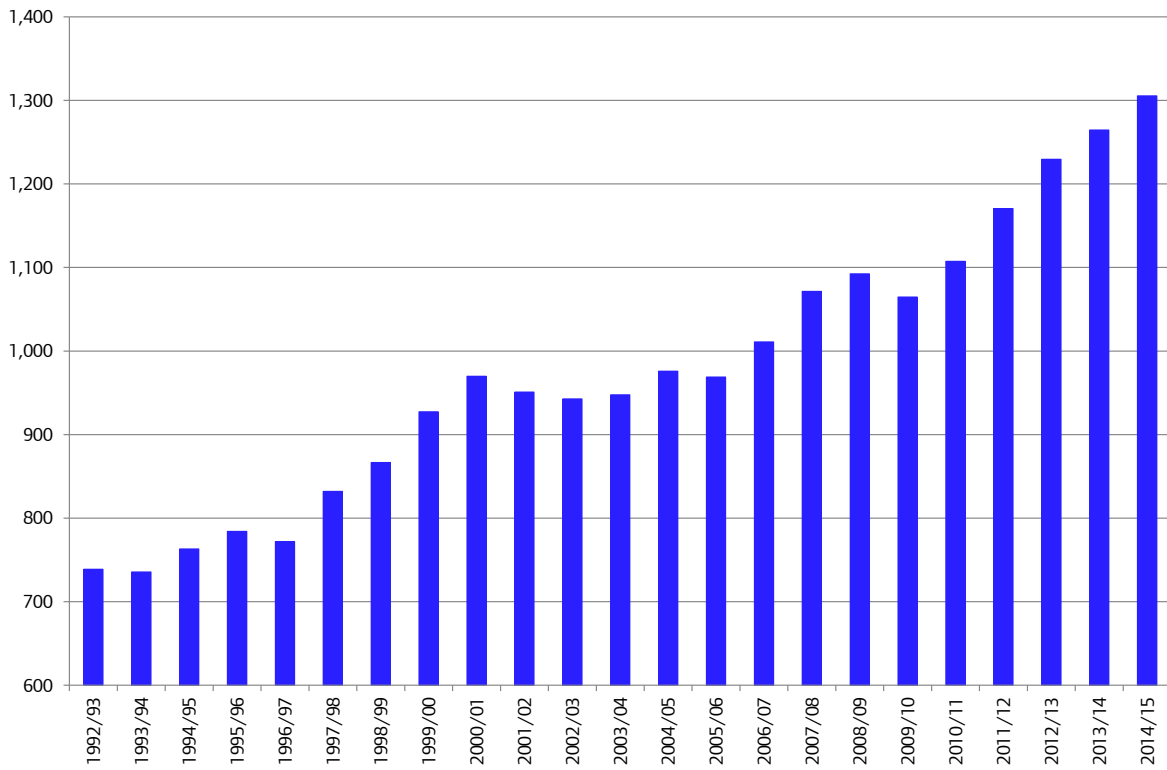
Walking is more than just a mode of transport: as pedestrians, people are at their most engaged with the city and the people around them. The demand for high quality streets and public spaces that support physical, social and economic activity will increase as London's population grows and changes. However, at the same time, the competition for time and space, including space to 'dwell', will intensify as the population and economy grow. Many streets in central and inner London already suffer from pedestrian overcrowding and low levels of pedestrian comfort. Particular challenges arise at major rail termini and on busy high streets on the strategic road network, where the needs of pedestrians conflict with the movement requirements of other modes.

### 3.6.5 The Underground

The Tube is an important part of London's transport provision and there has been a general increase in the number of passenger journeys over time as shown by Figure 3.13. The service has seen an improvement in reliability "with a 43 per cent reduction in the amount of time customers lost to delays in five years" meaning that "in the five years since 2008/09, the total was cut from more than 36 million lost customer hours to less than 21 million if the impact of industrial action is excluded"<sup>16</sup>. Further, the Underground has seen a reduction in average journey time as shown by Figure 3.14, with TfL noting that "across the Tube network as a whole, the average journey is now almost two minutes faster than it was in 2008/09, thanks to faster scheduled journey times and a reduction in delays"<sup>17</sup>. However, the popularity of the Underground also provides it with challenges; these are expanded upon in Chapter 6 of this Evidence Base.

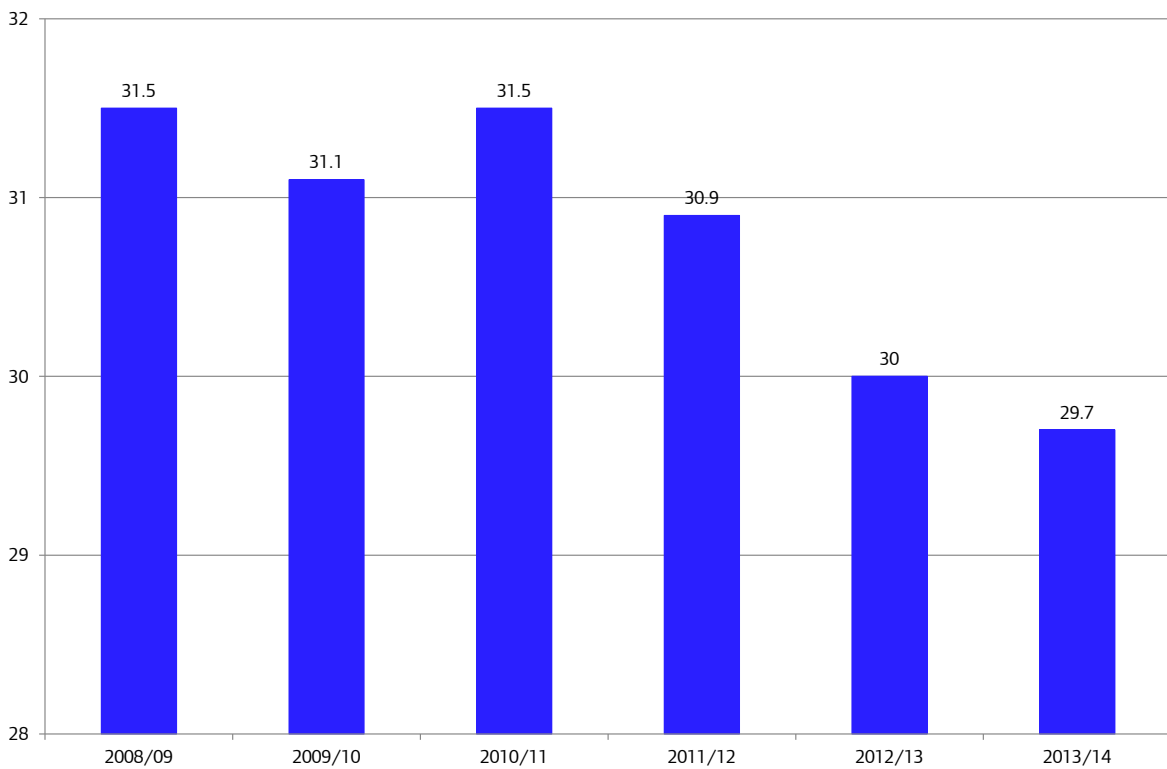


**Figure 3.13: London underground passenger journeys (millions)**



Source: TfL

**Figure 3.14: Average journey times on the London Underground (minutes)**

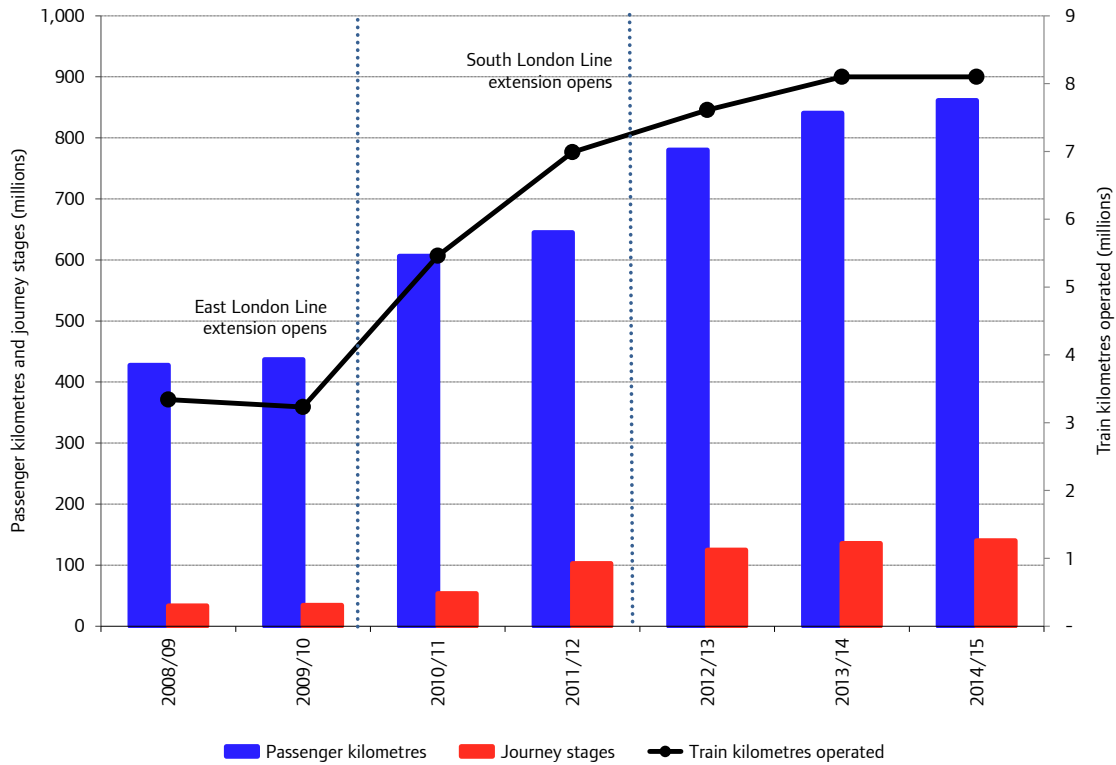


Source: TfL

### 3.6.6 The Overground, National Rail, DLR, and Tramlink

Looking beyond the Underground, Figure 3.15 shows the importance of continued transport innovation as shown by the rapid growth of London Overground journeys since the inception of the service. This highlights the pent-up demand that exists for rail travel within London. This demand is also present in the Greater South East as shown by Table 3.4 which shows passenger journeys on national rail. However, this demand for national rail also leads to challenges due to overcrowding on the rail services. This issue is covered in detail in Chapter 6 of this Evidence Base.

**Figure 3.15: Passenger kilometres and journey stages by London Overground**



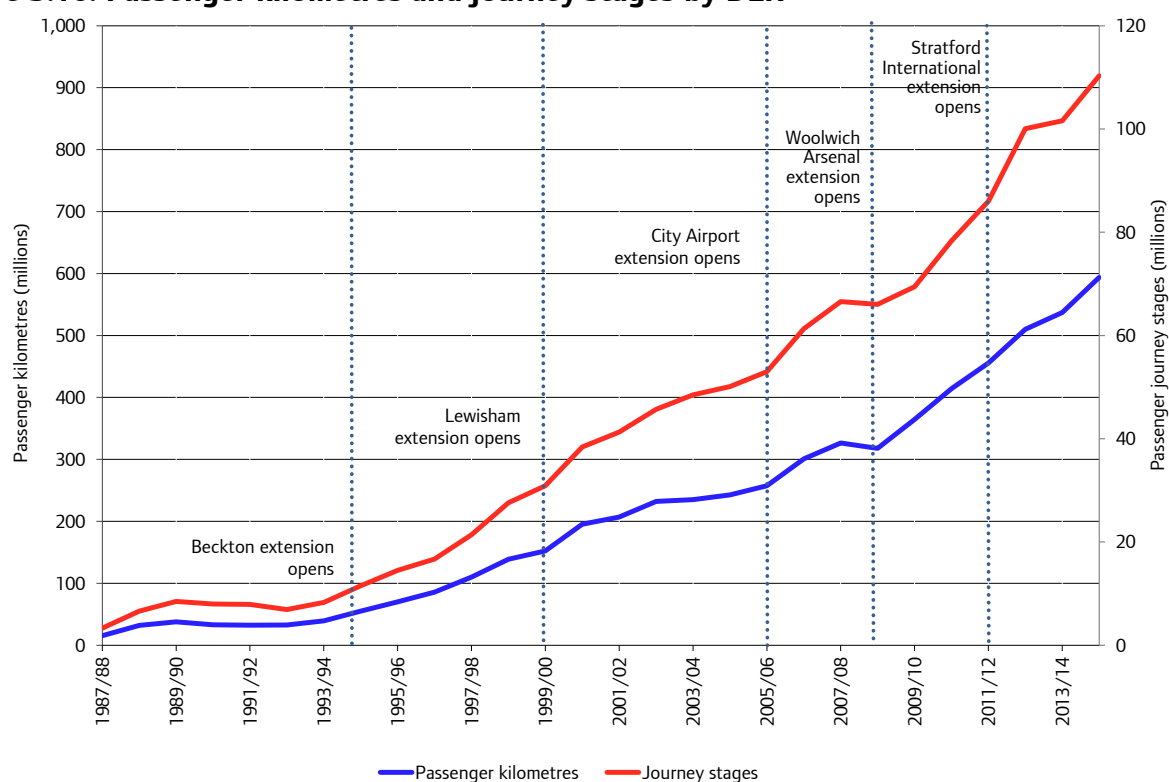
Source: TfL – Travel in London 7 & 8

**Table 3.4: Passenger kilometres and passenger journey stages by National Rail – operators classified by the Office of Rail Regulation as London and South East operators**

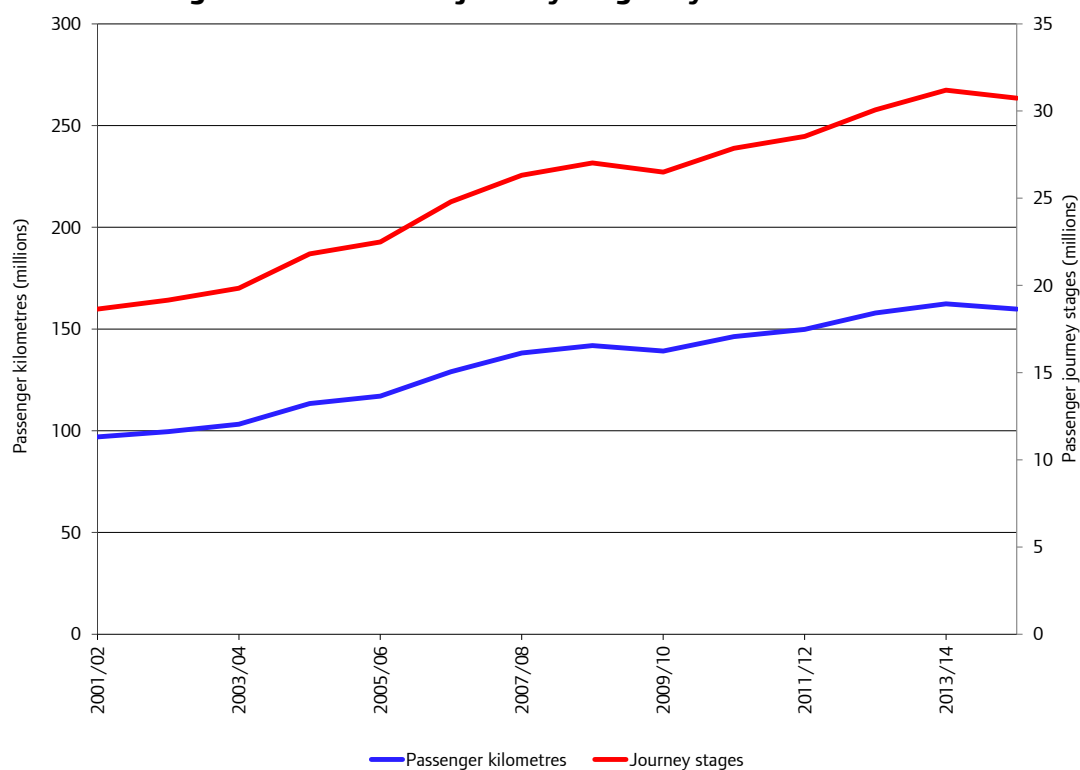
Year	Passenger kilometres (billions)	Year-to- year percentage change	Passenger journeys (millions)	Year-to- year percentage change
1998/99	17.1	..	616	..
1999/00	18.4	7.6%	639	3.6%
2000/01	19.2	4.3%	664	4.0%
2001/02	19.3	0.5%	663	-0.1%
2002/03	19.8	2.6%	679	2.4%
2003/04	20.1	1.7%	690	1.6%
2004/05	20.5	1.9%	704	2.1%
2005/06	20.7	1.1%	720	2.2%
2006/07	22.2	7.1%	769	6.9%
2007/08	23.5	6.1%	828	7.7%
2008/09	24.2	2.9%	854	3.1%
2009/10	23.8	-1.8%	842	-1.4%
2010/11	25	5.2%	918	9.0%
2011/12	26.5	5.7%	994	8.3%
2012/13	27.4	3.4%	1,033	3.9%
2013/14	28.6	4.4%	1,107	7.2%
2014/15	29.6	3.4%	1,155	4.3%

Source: Office of Rail and Road via TfL – Travel in London 8

It should however be noted that growth in demand for the use of public transport is not restricted to those services highlighted already, as shown by Figures 3.16 to 3.17 which illustrate the general recent growth in usage of the DLR and Tramlink services. This growth is also seen in the use of the River Services, as shown later in this chapter of the Evidence Base in Figure 3.20.

**Figure 3.16: Passenger kilometres and journey stages by DLR**

Source: TfL – Travel in London 8

**Figure 3.17: Passenger kilometres and journey stages by London Tramlink**

Source: TfL – *Travel in London 8*

### 3.6.7 Cycling

Cycling is now a major mode of transport in London, with 610,000 journeys made each day by bike in 2014 equating to 10 per cent of bus passenger journeys, a fifth of Tube passenger journeys or 100 per cent of all journeys on the District Line. This is the result of sustained investment by TfL working jointly with the London boroughs to create the London Cycle Network (LCN) and LCN+ as well as the early Cycle Superhighways and more recently the first phases of the Mayor’s Vision for Cycling.

There is potential to grow cycling further to 2041. Analysis of cycling potential carried out in 2010<sup>18</sup> identified 4.3 million trips made by motorised modes which could be cycled but were not cycled at present. Concerns about safety are the key barrier to increasing cycling with ‘safety’ or ‘perception of safety’ the number one deterrent for 75 per cent of those thinking about taking up cycling. Research found that many potential cyclists are not comfortable cycling in traffic and require high quality, segregated routes to begin cycling. Lack of high quality infrastructure is also a barrier. About half of cyclists rate as ‘poor’ or ‘very poor’ the security of their bike when left unattended, the availability of cycle racks near their home and the availability of cycle lanes. To date, cycling has been dominated by white, higher income, men in their thirties and forties and yet TfL analysis shows that – if their barriers were removed – 55 per cent of potential new cyclists would be female, 11 per cent over 55, 14 per cent under 15 and 35 per cent from ethnic minorities.

There has been substantial growth in the number of people choosing to cycle in order to access central London, with flows across the cordon surrounding central London (see the Appendix to this chapter for a map setting out the geography of the central cordon) increasing by more than 200 per cent since 2001. Employment growth in central London will increase demand for cycle travel in central London. The key challenges and barriers to growth in cycling in central London include:

- Improving route connectivity and reducing severance e.g.: crossing the Inner Ring Road.
- Interchange with public transport particularly at mainline rail stations.
- Managing freight-cycle conflict and reducing motorised traffic to free up road space.
- Managing speeds to improve safety.

The greatest increase in trips by cycling made by London residents has been in inner London, up by 133 per cent since 2005/06 (based on trip origin) and houses the population most amenable to cycling. Key challenges will include:

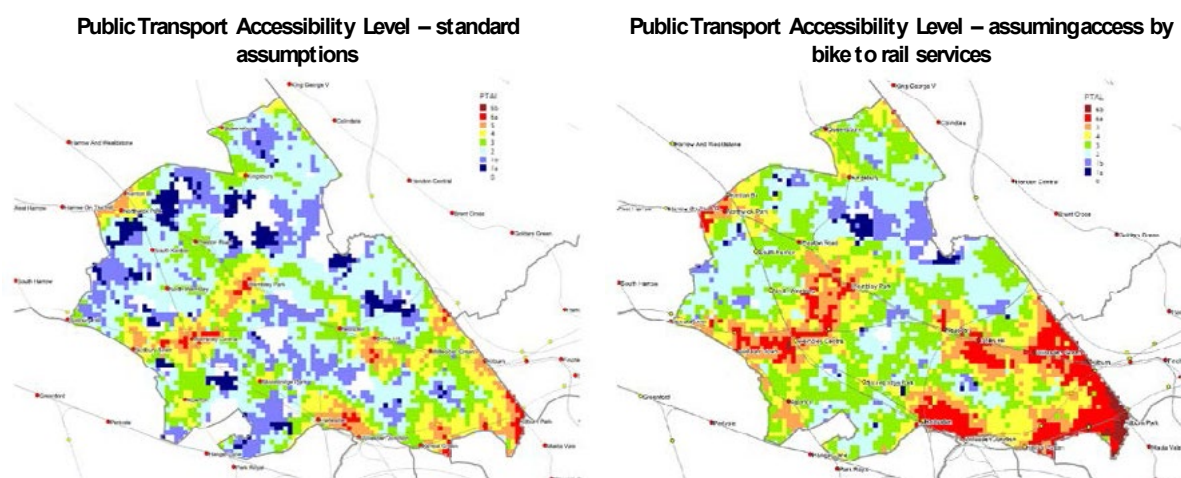
- Providing high quality and safe routes within inner London and from inner to central London, reducing conflict with freight and other road traffic.
- Meeting the need for secure and safe cycle parking at origins and destinations across inner London, including facilitating interchange with public transport.

Cycling has grown the least in outer London, but has the most potential for growth in terms of trip volumes - only 5 per cent of trips that could be cycled are currently cycled. The key challenges will include:

- Providing high quality and safe cycleways designed for use by families and focussed on accessing town centres and local places.
- Meeting the need for secure and safe cycle parking at origins and destinations across outer London, including facilitating interchange with public transport.
- Managing speeds to make cycling feel and be safe.
- Connecting to neighbouring counties through seamless cycle networks.

Further, as shown by Map 3.17 cycling has the potential to integrate into the rest of the transport system increasing an area's PTAL.

### Map 3.17: An example of how cycling can increase connectivity to public transport

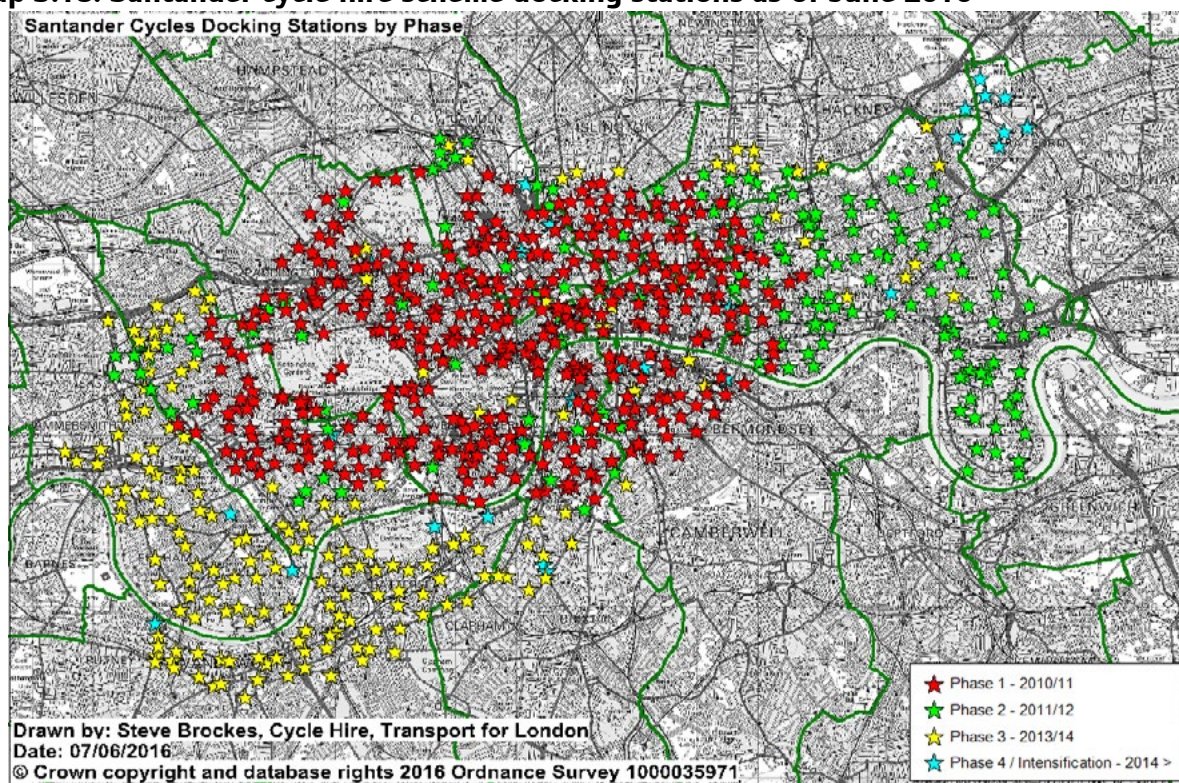


Source: TFL Planning, Strategic Analysis

Across London, a key challenge will be to 'design in' cycling as an appealing choice in growth and opportunity areas. This will require ambitious cycle networks and facilities at all new growth locations and developments.

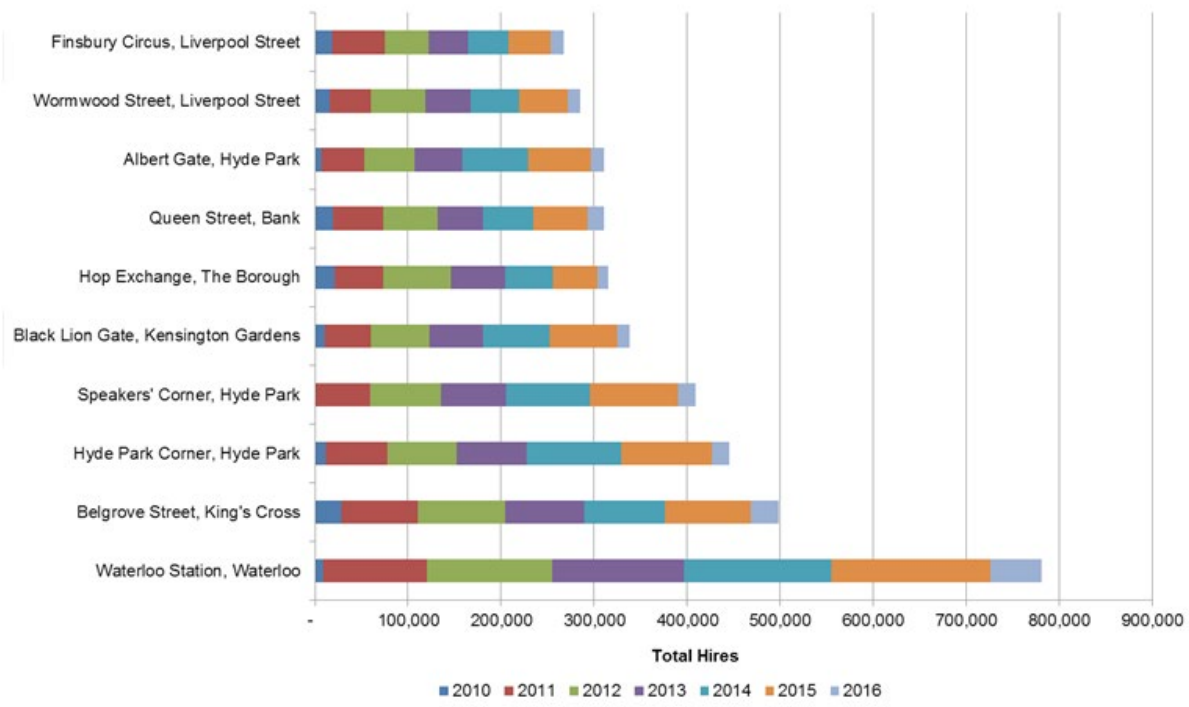
Another cycling innovation in London that has in part driven cycling's growth has been the ongoing investment into the Santander Cycles scheme. Map 3.18 shows the growth of the scheme since its launch in July 2010 to now cover 12 boroughs, 766 docking stations and over 20,000 docking points.



**Map 3.18: Santander cycle hire scheme docking stations as of June 2016**

Source: TfL

In terms of usage of the cycle hire scheme TfL data shows that at the end of May 2016 there had been over 50.4 million hires over its history, but that as would be expected there is a great seasonal variability in hires with summer periods seeing over 1 million hires per month, while winter periods seeing less than half a million hires a month. As would also be expected, docking stations with heavy commuter flows or associated with leisure activities are particularly popular, with six of the ten most popular docking stations located by mainline rail stations and with the other four located in parks. Thus as can be seen from Figure 3.18, Waterloo Station is the most popular docking station in the scheme and has seen an increase in hires each year.

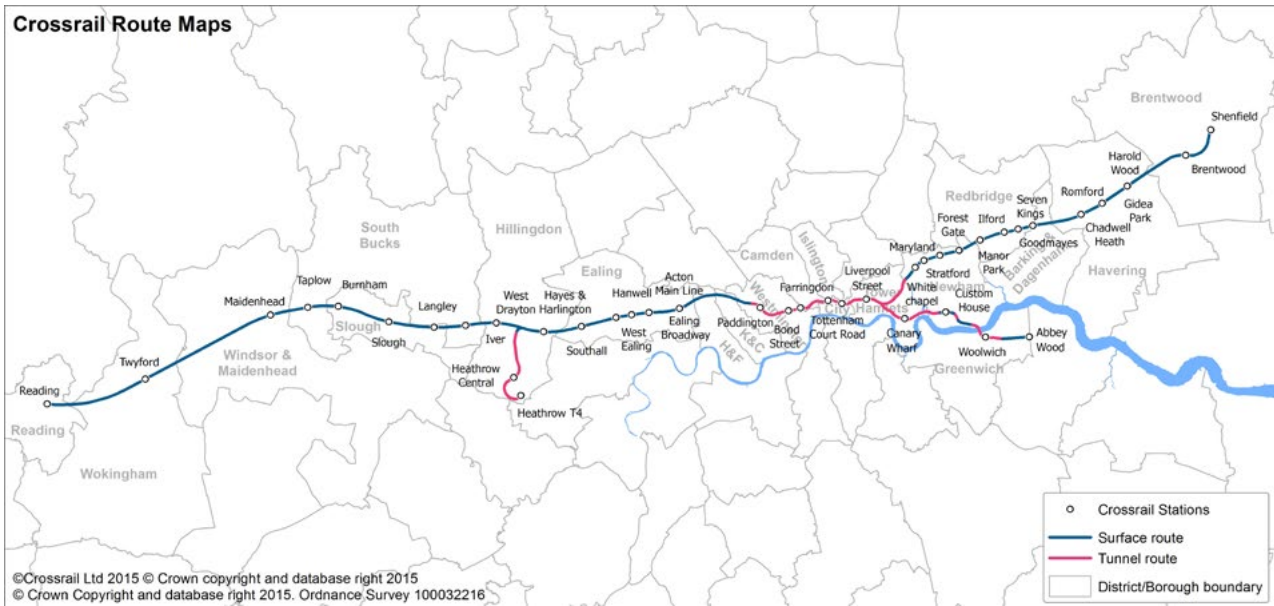
**Figure 3.18: Top 10 most popular Santander cycle hire stations, July 2010 – May 2016**

Source: TfL

### 3.6.8 The continued evolution of London's transport system

As has been highlighted throughout this section London's transport system continues to evolve and provide connections to the wider South East. The next major stage of this transport evolution is shown by Map 3.19 which illustrates the route of Crossrail 1/The Elizabeth Line. It is estimated that this transport investment will provide "better access to the capital for the 750,000 workers who already commute into London", while "overall the benefits of Crossrail are estimated to be at least £42 billion in current prices"<sup>19</sup>.

**Map 3.19: Crossrail 1/The Elizabeth Line route map**



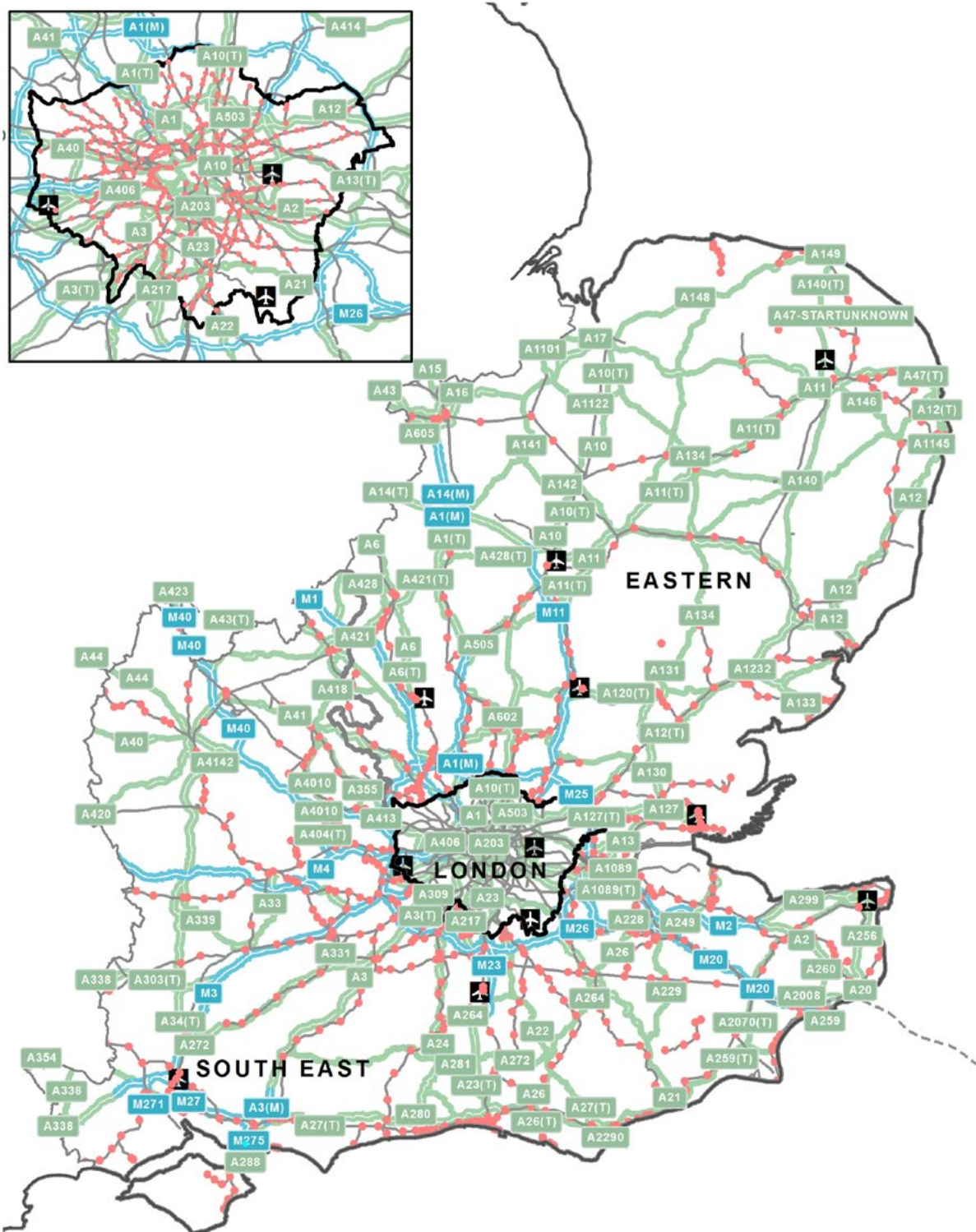
Source: GLA Intelligence Unit mapping

### 3.7 Transport in the Greater South East

As highlighted previously, London is connected to the Greater South East in terms of commuters coming into and out of London. However, significant parts of London’s transport network are also of vital importance to the economies of the Greater South East and the UK as a whole as well as to London such as airport capacity. Map 3.20 shows London’s and the Greater South East’s airport, motorway and rail connections and highlights the links between London and the rest of the UK. This section examines these transport links although it should be noted that the challenges faced by the rail network in the Greater South East are covered in depth in Chapter 6 of this Evidence Base.



Map 3.20: Airport, rail and road infrastructure in the South East region



Note: MSOA denotes Middle-layer Super Output Areas  
 Contains National Statistics data © Crown copyright and database right 2015  
 © Crown Copyright and database right 2015. Ordnance Survey 100032216

Greater London Authority

Source: GLA Intelligence Unit

### 3.7.1 London's Airports

London Heathrow is the pre-eminent UK airport, taking the sixth most passengers globally (see Table 3.5). In the year to December 2015, it is estimated from preliminary data that 75.0 million passengers went through Heathrow; since 2010, passenger numbers have increased by 13.8 per cent.

**Table 3.5: Cities with largest numbers of passenger numbers<sup>20</sup>, and other selected global cities (millions of passengers)**

Rank	Airport	2001	2005	2010	2011	2012	2013	2014	2015
1	Atlanta	75.9	85.9	89.3	92.4	95.5	94.4	96.2	101.5
2	Beijing	..	41.0	73.9	78.7	81.9	83.7	86.5	89.9
3	Dubai	..	..	47.2	51.0	57.7	66.4	70.5	78.0
4	Chicago	67.4	76.5	66.8	66.7	66.6	66.8	70.1	76.9
5	Tokyo	58.7	63.3	64.2	62.6	66.8	68.9	72.8	75.3
6	London Heathrow	60.7	67.9	65.9	69.4	70.0	72.4	73.4	75.0
7	Los Angeles	61.6	61.5	59.1	61.9	63.7	66.7	70.6	74.7
8	Hong Kong	32.5	40.3	50.3	53.3	56.1	59.6	63.1	68.3
9	Paris	48.0	53.8	58.2	61.0	61.6	62.1	63.8	65.8
10	Dallas/Fort Worth	55.1	59.2	56.9	57.8	58.6	60.5	63.5	64.1
15	New York	29.3	41.9	46.5	47.6	49.3	50.4	53.2	56.8

Source: Airports Council International

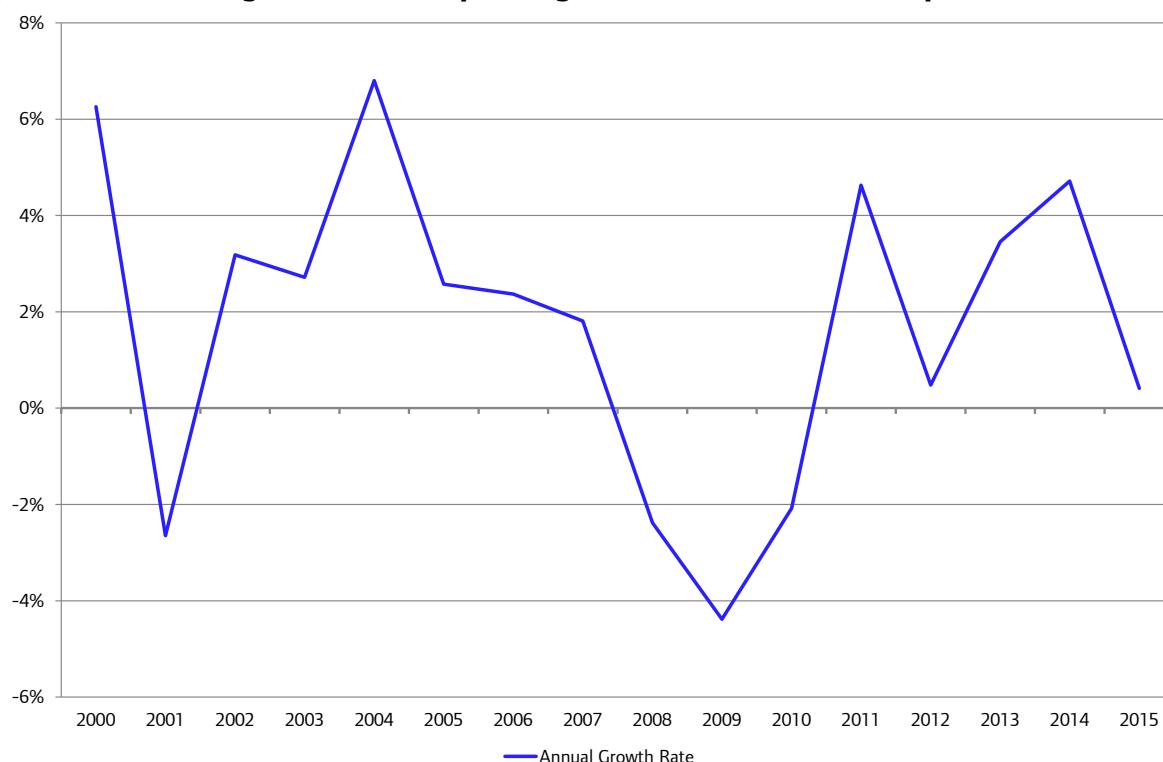
However over the course of the last five years, there has been significant growth in airports across the Middle East and Asia. Table 3.5 shows that back in the year 2001, Beijing and Dubai were not listed amongst the top 30 airports for passenger numbers (Beijing only entered the top 30 in 2004; Dubai in 2007). While, compared with cities like Dubai, Shanghai and Guangzhou which saw average annual growth rates in passenger numbers between 2010 and 2015 of 10.6 per cent, 8.2 per cent, and 6.1 per cent respectively London Heathrow saw average annual growth of just 2.6 per cent highlighting London airport capacity constraints. For more on London's airport capacity constraints, see Chapter 6 of this Evidence Base. However, as seen from Table 3.6, preliminary estimates suggest in terms of international passenger numbers Heathrow still ranks second behind Dubai with Gatwick coming in 12th place.

**Table 3.6: Total international passenger traffic<sup>21</sup> in 2015**

Rank	Airport	International Passengers	Growth between 2014 and 2015
1	Dubai	77,453,466	10.7%
2	London Heathrow	69,816,491	2.5%
3	Hong Kong	68,071,282	8.2%
4	Paris	60,366,933	3.0%
5	Amsterdam	58,245,545	6.0%
6	Singapore	54,836,000	2.9%
7	Frankfurt	53,994,154	2.4%
8	Incheon	48,720,319	8.5%
9	Bangkok	43,251,807	16.3%
10	Istanbul	42,302,859	11.1%
11	Taipei	38,104,007	7.6%
12	Gatwick	36,667,769	6.4%
17	New York	30,020,301	6.5%

Source: Airports Council International

In 2015, there were a total of 135.6 million passengers at London airports (Heathrow, Gatwick, Stansted and City), an increase of 0.4 per cent on the previous year. Figure 3.19 shows that following the 2008/09 Great Recession, there has been a general pick-up in passenger growth from 2011 onwards, leading to record high passenger numbers in 2015. Since the year 2000, total passenger numbers at London airports have increased by nearly 25 per cent, and since 2010, the increase was over 14 per cent.

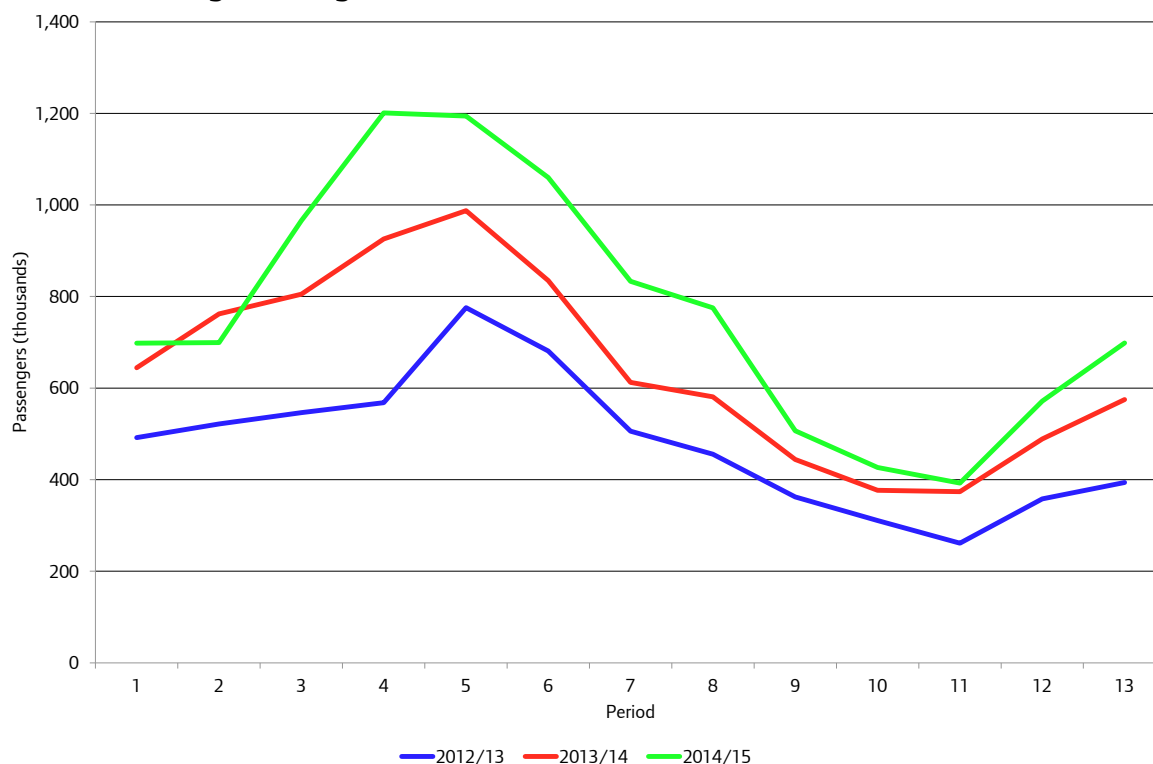
**Figure 3.19: Annual growth in total passenger numbers at London airports, 1999 – 2015**

Source: GLA Economics calculations; Civil Aviation Authority

### 3.7.2 The Thames and Port of London

In recent research for the Port of London Authority, Oxford Economics found that the Thames as a public amenity<sup>22</sup> was responsible for sport/recreation valued at £132 million, while wards adjacent to the Thames generated economic value related to tourism to the value of £2.4 billion. Further, “some 4.7 million people visit Thames or maritime-related attractions annually”, with “at least 23.4 million people visit[ing] the attractions located by the side of the Thames”; while, “in 2014, almost 10 million passenger journeys were made on the River Thames, up from eight million the year before. The trips were by passengers commuting to work, sightseers, on charter boats, high speed RIBs and the Woolwich ferry”. This growth in passenger numbers on the Thames is further highlighted by Figure 3.20, which shows the general growth in the numbers of passengers using TfL’s River Services per period from 2012/13 to 2014/15.



**Figure 3.20: Passengers using TfL's River Services<sup>23</sup>**

Source: TfL – *Travel in London 8*

While, SQW has noted<sup>24</sup> that “the Port of London is the second biggest in the UK. The port handled 44.5 million tonnes of goods and materials in 2014”. Adding that it “is made up of over 70 independently run terminals and wharves along 95 miles of the tidal Thames from Teddington Lock to the North Sea”, with major operations in the port including: “the Port of Tilbury; London Gateway container port; Ford at Dagenham; building materials operations such as Tarmac and Cemex; and the Tate & Lyle Sugars refinery at Silvertown”. They thus find that the overall impact in terms of output of the Thames was over £4 billion with it generating over 43,000 jobs. It should of course be noted that while a number of these facilities are outside of London’s administrative boundaries, they arguably fall within London’s economic geography.

### 3.8 Conclusion

This chapter has outlined the extensive nature of London’s transport infrastructure and how this enables the flows of people either as workers, consumers etc. that keep the capital’s economy running. It has also highlighted the importance of this network to not just London but the UK as a whole. However, there are also significant strains that high demand has placed on the capital’s transport network which will be examined in detail in Chapter 6 of this Evidence Base. These strains derive from the attractive nature of London as a place to live, work and do business. This attractiveness also leads to heavy demand for a finite amount of land within London, with the next chapter of this Evidence Base examining this issue in more detail.

## Chapter 3 endnotes

- 1 TfL, 2014, [‘Travel in London: Report 7’](#).
- 2 Ibid.
- 3 Ibid.
- 4 TfL: [London connections map](#).
- 5 Note that this diagram covers all travel made in London and not just by Londoners.
- 6 TfL, 2015, [‘Travel in London: Report 8’](#).
- 7 Refers to trips to work only.
- 8 [Urban Age Cities Compared: Where People Live](#).
- 9 TfL notes that in interpreting the trend for central London shown by Figure 3.10, “it is important to recognise that this reflects a different area and set of conditions to that previously reported by TfL through the Congestion Charging Impacts Monitoring reports”.
- 10 Note: TfL observes that a “new estimation method for bus [was] introduced in 2007/08”.
- 11 TfL, 2014, [‘TfL Bus User Survey 2014’](#).
- 12 Ibid.
- 13 Ibid.
- 14 TfL, 2015, [‘Travel in London: Report 8’](#).
- 15 Note that this number is higher than the number reported in Figure 3.4 as this figure covers journeys made by Londoners only whereas Figure 3.4 covers all journeys made in London.
- 16 TfL, March 2015, [‘Building our Capital: five years of delivery by London Underground’](#).
- 17 Ibid.
- 18 Details of this analysis can be found at: TfL, December 2010, [‘Analysis of Cycling Potential: Policy Analysis Research Report’](#).
- 19 Crossrail, [‘Delivering substantial economic benefits in London, the South-East and across the UK’](#).
- 20 Covers total passengers enplaned and deplaned, with passengers in transit counted once. Note it thus covers both domestic and international flights.
- 21 International Passengers are defined as traffic performed between the designated airport and an airport in another country/territory ie excluding passengers on domestic flights.
- 22 Oxford Economics, September 2015, [‘Adding Value: The River Thames Public Amenity’](#). Port of London Authority.
- 23 Note data for 2012/13 is based on the previous system of counting passengers.
- 24 SQW Limited, September 2015, [‘River Thames Economic Prosperity’](#). Port of London Authority.