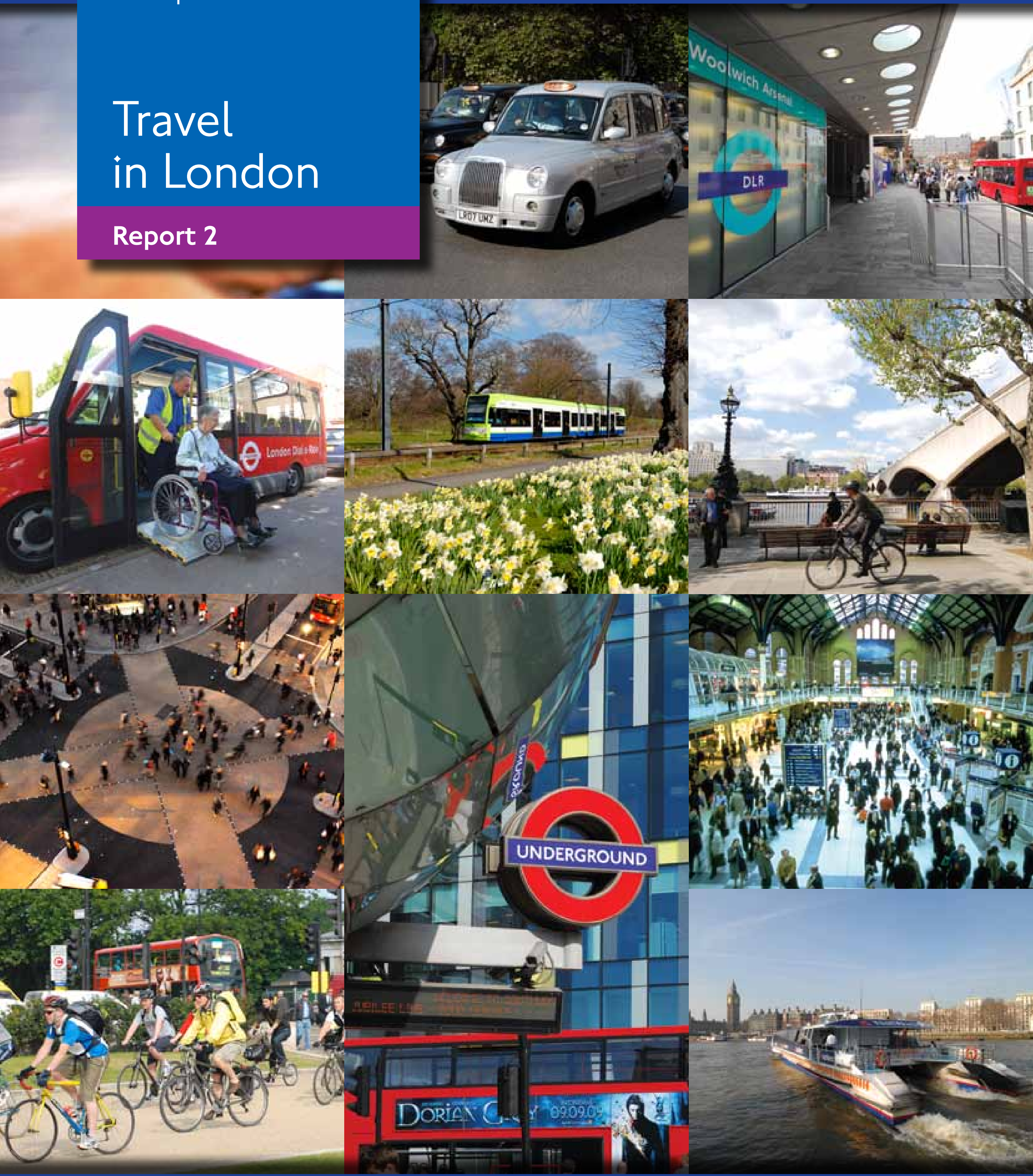
Transport for London

Travel in London

Report 2



MAYOR OF LONDON

Transport for London

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Overview

'Travel in London – Report 2' summarises key trends and developments relating to travel and transport in Greater London.

This report uses the latest available data, usually referring either to the 2008 calendar year or the 2008/09 financial year (April 2008 to March 2009), with historical context where available.

The Overview summarises key highlights from this report.

The Mayor's Transport Strategy (MTS) and certain of his other Strategies were published in draft for public consultation in 2009. The final MTS will be published in spring 2010. It is intended that Travel in London reports will be the vehicle for reporting progress on the MTS. The draft MTS includes indicators for monitoring the MTS, and this year's Travel in London report therefore sets out these indicators with baseline and other information where available.

Indicators used in monitoring the Mayor's Transport Strategy

The structure of this year's Travel in London report reflects the draft MTS – with chapters corresponding to each of the MTS goals.

Mayor's Transport Strategy – The Goals
Support economic development and population growth
Enhance the quality of life for all Londoners
Improve the safety and security of all Londoners
Improve transport opportunities for all Londoners
Reduce transport's contribution to climate change and increase its resilience.
Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy

The top-level, long-term outcomes of the MTS will primarily be monitored through the collection and publication of Strategic Outcome Indicators (SOIs). These will quantify the change in outcomes that are aligned with the Mayoral transport goals, in order to facilitate a broad understanding of the totality of effects of the Mayor's interventions on transport and wider quality of life in London. Where appropriate and possible, findings will be disaggregated on a spatial (borough, network, or London region), modal or temporal basis. Travel in London will report on the MTS indicators. This year's report shows definitions for each indicator, and where available baseline information. The indicators in the draft MTS are shown in Table 0.1 below. In addition to these key indicators, Travel in London will also report on many other, more specific aspects of transport and travel in London that are relevant to the MTS. Travel in London will also provide data in respect of four of the five strategic performance indicators for borough Local Implementation Plans (LIPs).

Table 0.1 Strategic outcome indicators for the Mayor's Transport Strategy.

Theme	Strategic Outcome Indicator	Brief definition	Section of this report	Status for this report and update frequency
Contextual indicators	Travel demand	The number of trips (or journey stages) made to, from or within London per calendar year	2.7	Established time-series (annual)
	Mode share	Proportion of trips (or journey stages) undertaken by each mode to, from or within London per calendar year	2.8	Established time-series (annual)
Supporting economic development and population growth	People's access to jobs	Employment accessibility maps – number of jobs within 45 minute travel time	5.6	2006 baseline (3-yearly)
	Smoothing traffic flow – journey time reliability	For a selection of key routes, percentage of journeys completed within five minutes of a specified typical journey time	4.4	New time-series under development
	Public transport reliability	Existing reliability indicators for each principal public transport mode will be presented separately	4.9	Established time-series (annual)
	Public transport capacity	Calculated using planning capacities for the various train/tram/bus types, multiplied by kilometres operated	4.9	Re-working of established time-series (annual)
	Operating costs per passenger kilometre	Operating cost per passenger kilometre, by principal public transport mode	4.11	New time-series under development
	Asset condition	Composite multi-modal indicator measuring the percentage of in-scope asset that is deemed to be in good condition	4.12	New time series in prototype form
Enhancing the quality of life of all Londoners	NO_x emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of NO_x	9.4	Re-working of established time-series (two-yearly)
	PM_{10} emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of PM_{10}	9.6	Re-working of established time-series (two-yearly)
	Public transport customer satisfaction	Overall satisfaction of those travelling on the network with the operation of the principal public transport modes	9.10	Re-working of established time-series (annual)
	Road user customer satisfaction	Satisfaction of private road users with the maintenance and operation of the road network	9.11	New survey in development – no indicator this year

Table 0.1 Strategic outcome indicators for the Mayor's Transport Strategy (continued)

Theme	Strategic Outcome Indicator	Brief definition	Section of this report	Status for this report and update frequency
	Public transport crowding	Satisfaction of those travelling on the network with the level of crowding inside the vehicle, on the principal public transport modes	4.9	New time-series (annual)
	Perception of journey experience	Perception of London residents of their overall journey experience when travelling in the city	9.12	New time-series (annual), presented this year in prototype form
	Perception of noise	Perception of London residents of noise levels in their local area	9.14	New time-series (annual)
	Perception of the urban realm	Perception of London residents of the quality of the urban realm in their local area	9.13	New time-series (annual)
Improving the safety and security of all Londoners	Volume of road traffic casualties	Number of people killed or seriously injured in road traffic collisions in London per year	6.3	Established time-series (annual)
	Crime rates on public transport	Crimes per million passenger journeys by principal public transport modes	6.5	Established time-series (annual)
	Perception of crime/safety	Perception of London residents of their sense of safety and fear of crime when travelling in the city	6.6	New time-series (annual)
Improving transport opportunities for all Londoners	Access to services	Local area score of average journey time by public transport, walking and cycling to work, education, health services, quality food shopping and open spaces (three-yearly)	8.2	2009 baseline – will be re-benchmarked as required
	Physical accessibility to the transport system	Level of step-free access across the public transport and streets network	8.3	Re-working of established time-series (annual)
	Real fares levels	Cost for a selected, representative 'basket' of trips	8.4	Established time-series (annual)
Reducing transport's contribution to climate change and improving its resilience	CO_2 emissions	Emissions from all identifiable ground-based transport sources in London, expressed as tonnes of CO_2	7.4	Re-working of established time-series (annual)
Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy	The Games themselves will not be measured by this monitoring framework.	The Games themselves will be the subject of appropriate content in future editions of this report.		Not applicable

Travel trends in London – and developments in 2008/09

Total travel in London in 2008/09

- The total number of **trips** made to, from or within London on an average day was effectively unchanged between 2007 and 2008. Before 2008, the number of trips had grown in every year since 1993, except in 2005, reflecting the London bombings of that year. The average annual growth was 1 per cent a year.
- The year 2008 therefore represented a considerable departure from a long-standing trend – occurring as it did in the same year as the beginning of the recent economic recession.
- The number of **journey stages** to, from or within London increased by 0.6 per cent in 2008 relative to 2007, but this growth was significantly less than any year since 1993 (except, again, for a decline in 2005). The annual average growth in journey stages from 2000 to 2007 was 1.5 per cent.
- These aggregate changes comprised increases in the numbers of people travelling by public transport in 2008, offset by decreases in those travelling by private transport.
- Looking over a longer period, there has been substantial growth in demand for travel: 22 per cent more journey stages were made to, from or within London on an average day in 2008 compared to 1993. Much of this increase in travel has been driven by population growth (together with growth in employment and the economy), with only a modest 4 per cent increase in the average number of trips per person over the last 15 years. However, as public transport increases its share of trips, the proportion of trips that involve more than one stage also increases.

Key definitions

Travel can be measured in several different ways. The most commonly-used measures are **trips** and **journey stages**.

A **trip** is a one-way movement from one location to another to achieve a specific purpose (eg to go from home to work). Several forms of transport ('travel modes') may be used in one trip – for example, walking from home to the station, train to central London, onward Underground journey and a further short walk to the place of work. These individual modal components of a trip are referred to as **Journey Stages**, each of which is distinguished by being accomplished on a single mode of transport (in the example above, there are 4 journey stages).

Trips is the preferred measure for overall travel demand. **Journey stages** is the more appropriate measure for looking at modal trends and mode shift.

TfL uses two types of data to measure travel trends in London. **On-mode** data refer to counts of travellers during the course of travel, for example cars on the roads, passengers boarding buses or entering train stations. On-mode data provide the best quantitative estimate of total travel, by both London residents and visitors.

This is complemented by data from household-based **travel diary surveys**, notably Transport for London's (TfL's) London Travel Demand Survey (LTDS). This looks specifically at London residents, and focuses on understanding individual travel behaviour rather than quantification of overall travel trends in the capital. It does however provide aggregate travel trend estimates for London residents, and is thereby essential to assessments of overall travel demand.

Mode shares

- Public transport further increased its mode share in 2008. Its mode share increased by 1 percentage point – to 41 per cent of all **journey stages**. The mode share for private motorised transport, principally car, fell by 1 percentage point to 37 per cent.
- There has been a 7 percentage point shift in the **journey stage-based** mode share between 2000 and 2008. Public and private motorised transport had mode shares of 34 per cent and 43 per cent respectively in 2000.
- The mode share of **trips** (rather than of journey stages) has also changed, by 1 percentage point between 2007 and 2008. The public transport and private motorised transport mode shares in 2008 were 33 per cent and 41 per cent respectively. On this basis, there has been a 5 percentage point shift in **trip-based mode share** in London between year 2000 and 2008.
- In 2008, there were 5.7 million trips involving 'walking all the way' on an average day. This represents 24 per cent of all trips, the same percentage as almost every year since 1996. Walk all the way trips have increased by around 10 per cent since 1993.
- Cycling accounted for around 2 per cent of all journey stages in London in 2008, up from just over 1 per cent in 2000, during a period when the total number of trips by all modes of transport also increased.

The impact of the recession on travel

- The years 2008 and 2009 were notable for the sharp economic recession. This recession will inevitably have affected travel in London. However, 2008 was also a 'year of two halves', with the first quarter of the year characterised by continued economic growth with a slight contraction in the second quarter, followed by sharp falls the second half of 2008 and into 2009. This is reflected in the measurements of aggregate travel for the year, on public transport in particular, with periods of growth and decline tending to 'average out' in terms of the yearly total.
- During the recession, UK Gross Value Added (GVA) fell by 5.9 per cent between the second quarter of 2008 and the third quarter of 2009. By comparison, London GVA shows a decline of 5.5 per cent to the second quarter of 2009 and, on the basis of provisional figures, reverted to growth in the third quarter.
- In terms of the individual travel modes, Underground passenger journeys fell by 5.4 per cent in the first half of 2009/10 compared to a year earlier. Bus passenger journeys fell by 0.2 per cent over the same period. In 2007/08 and the first half of 2008/09, both Underground and bus journeys grew by 4 to 5 per cent per year, putting the recession-related change in context.
- Rail passenger journeys (in London and the south east) fell by an estimated 5 per cent, comparing the first half of 2009/10 against the first half of 2008/09.
- Passenger kilometres fell less than passenger journeys. This was true for rail and Underground (and for buses, journeys fell slightly while passenger kilometres grew). Therefore, the statistics suggest that journeys lengthened on average.

- Road traffic in London was falling before the recession – and the recession has increased the pace of the fall. London's traffic fell by 2 per cent in the 2008 calendar year, 1.7 per cent a year faster than the previous trend. Great Britain traffic (which fell in 2008, after rising in previous years) was 2 per cent lower than a continuation of the previous trend would have implied.
- Trips by taxi and private hire vehicles fell significantly. Numbers of licensed taxis crossing into and out of Central London fell by an estimated 15 per cent between autumn 2007 and autumn 2008. London residents' trips by licensed taxis and private hire vehicles (combined) fell by an estimated 23 per cent between the 2007/08 and 2008/09 financial years, according to the LTDS survey.
- Data on London residents from the LTDS survey provide a further indicator that the recession has reduced travel. Trip rates (ie trips per person per day) by London residents were down by an estimated 8 per cent between 2007/08 and 2008/09, falling from 2.6 to 2.4 trips on an average day. The survey results indicate that this reduction in trip rates started around the autumn of 2008, which is consistent with the timing of the recession.

Public transport patronage

- The recent trend of growth in the numbers of people using the main public transport modes in London continued in 2008. When considering the year as a whole, 2008 saw a new record number of passengers using the Underground and continued growth in the use of the bus network. The year 2008 included periods of economic growth and recession – the impact of the recession in reducing travel demand is clearly apparent in the disaggregate data from the second half of the year onwards.
- The financial year 2008/09 saw continued growth in the use of buses in London – with more than 2 billion journeys in the year. In terms of kilometres travelled, bus patronage in 2008/09 was 93 per cent higher than in 1991/92, and almost 3 per cent higher than in 2007/08.
- More than a billion journeys were made by London Underground (LU) in 2008/09. This amounted to an estimated 8.6 billion passenger kilometres, an increase of 6 per cent on 2007/08 and almost 16 per cent up on 2000/01.
- National Rail travel on trains run by franchises defined as 'London and South East operators' also grew in 2008/09 relative to 2007/08, by about 3 per cent in terms of both passenger kilometres and passenger journeys.

Road traffic trends

- Total road traffic in London fell by an estimated 2 per cent in 2008 relative to 2007. This is a significantly faster fall than the recent trend: traffic in London fell by an estimated 1.4 per cent (net) over the previous seven years.
- The scale of decrease was highest in Inner London, at 3 per cent, coupled with a 1.7 per cent decrease in Outer London, and a 2 per cent decrease in Central London. Traffic on major roads in London decreased by 1.8 per cent and on minor roads by 2.5 per cent.

- Total traffic in Great Britain also fell in 2008, for the first time since the 1970s. In 2008, it fell by an estimated 0.8 per cent; over the previous seven years, it had increased by an average of 1.3 per cent a year.
- The departure from trend – the gap between the change in traffic in 2008 and the previous average annual change – was similar in London and the rest of Great Britain. Both of course experienced the recession. The difference is that London had already had traffic declining (in the context of growing overall demand for travel in London and a substantial net shift in mode share away from private towards public transport), while the GB position was one of growing traffic.

Cycling

- Cycling has grown substantially. It is estimated that cycle trips grew by around 70 per cent between 2001 and 2008, having been broadly unchanged between 1993 and 2001. The same is true of journey stages. There were an estimated 0.5 million journey stages made by bicycle in Greater London on an average day in 2008.
- On the TfL Road Network (TLRN) between 2000/01 and 2008/09, 107 per cent more cyclists were observed passing selected counting points. This figure was 91 per cent up to 2007/08, as shown in last year's Travel in London report. There was a 95 per cent increase between 2000 and 2008 in the number of cyclists entering Central London in the morning peak.
- Around half of all cycle trips made by London residents take place during the morning and evening peaks – almost half are made to travel to or from work or education. Two-thirds of London residents' cycle trips take less than 20 minutes.
- More than a quarter of all cycle trips made by London residents take place within Central London or between Central London and other parts of London. Outer London generates the most cycle trips due to the size of the population, but the mode share for cycling in Outer London, at 1 per cent, is significantly lower than in Central and Inner London (3 per cent).
- Although 4 in 10 London residents have access to a bicycle in their household, surveys suggest that as many as one fifth of the bicycles in London are unused.
- Around 1 in 10 London residents cycles once a week or more, rising by two or three times in some west and south-west London boroughs (Richmond, Kingston upon Thames, Hammersmith & Fulham) and also in Hackney in east London.
- Cycling is safer than it was in the late 1990s. The number of cyclists killed or seriously injured has fallen by 21 per cent between the 1994-1998 average (which is the baseline for Government casualty reduction targets) and 2008. At the same time, cycling in London has grown substantially. However, cyclists are still more likely to be casualties than users of motorised modes: cyclists make up 13 per cent of casualties while making 2 per cent of trips.

Walking

- Every day, 2.5 million Londoners make a trip wholly on foot.
- Around 24 per cent of trips to, from, or in London – and 3 in 10 trips made in London by London residents – are walked all the way.

- There are 5.7 million 'walk all the way' trips in London on an average day. Eighty per cent of these trips are less than a kilometre in length. The destinations of walk trips are clustered in Central and Inner London and around Outer London town centres, particularly Stratford and Ilford in east London.

Other developments during 2008

- The number of taxi drivers licensed in London has remained fairly stable since 2001. However, the number of taxi vehicles licensed increased again in 2008 and is now at historically high levels.
- The amount of road freight lifted in London in 2008 was 2 per cent higher than in 2007, at 142 million tonnes, following an 11 per cent decrease in 2007 compared with the recent peak in 2006.
- Volumes of freight moved by rail, air and through the Port of London and the Thames wharves in 2008 were all broadly comparable to 2007, despite the economic difficulties from the second half of the year.
- Seven per cent more tickets were sold at London River Services (LRS) piers in 2008/09 compared to 2007/08, continuing the recent trend of growth in the use of the Thames for passenger transport.

Travel by London residents – TfL's London Travel Demand Survey

- TfL's annual London Travel Demand Survey (LTDS) provides a unique window on the travel behaviour of London residents and is a major planning resource. Although the survey is better at characterising travel behaviour and aspects of travel demand eg journey purpose, mode and type of travel than at measuring changes in aggregate travel between years, and relates to London residents only, results for the latest (2008/09) survey also suggest that travel by London residents fell sharply.
- LTDS travel diary survey results largely mirror the more aggregate trends for travel by public transport, but suggest proportionally larger falls in car travel among London residents than are reflected in the road traffic count data.
- From LTDS, the estimated total number of trips made by London residents on an average day in 2008/09 was 17 million, down by 7 per cent from 18.3 million, the average of the preceding three years, and by 8 per cent compared with 2007/08.
- This in turn reflected a decline in personal trip rates – the average number of trips made per person per day. This fell to 2.4 in 2008/09 (a decrease of 8 per cent) from an average of 2.6 for the preceding three years.
- Detailed examination of the data shows that these overall trends and directions of change affected all parts of London and all groups of the resident population, albeit with some potentially interesting specific features.
- The data also clearly show a 'recessionary impact' on trip rates during the second half of 2008.
- Distinguishing features of the 2008/09 survey, relative to the average for the previous three survey cycles, are that:

- The fall in rates of travel was greatest among residents of Outer London, and its intensity varied considerably by sub-region of London, being particularly intense among residents of north and east London.
- Much of the decline relates to car trips and car trip rates (both as driver and as passenger). Trips and trip rates by public transport remained relatively stable and in places actually increased. This means that the percentage decline in car trips was higher than the average for all trips – at an indicative 14 per cent overall.
- In terms of journey purposes, shopping and personal business and other/escort trips have fallen by the greatest margin, which is reflected by trips in the inter-peak period falling at a faster rate than other time periods.
- In all age groups, trip rates fell at a similar rate among men and women. Trip rates fell by a greater percentage for those with access to a car compared to those with no car while, in terms of working status, the decline was greatest among part-time workers.
- The distance Londoners travel on an average day also fell in 2008/09, relative to the average for the preceding three years – around 5 per cent for trips wholly within London, a lower rate than for the number of trips.
- Time spent travelling by London residents fell in 2008/09, by 5 per cent relative to the average of the preceding three years (72 minutes per person on an average day). As with the decline in trip rates, this is mainly due to a fall in car trips, with the time spent travelling by car on an average day down by 9 per cent.
- Levels of car ownership in London continue to be much lower than the rest of Great Britain. Forty-three per cent of London households do not own a car, compared to 23 per cent of households in the rest of the country.

- Comparisons with the Department for Transport's (DfT) National Travel Survey show that Londoners make fewer trips and travel less distance than residents of any other region in Great Britain (GB). Londoners averaged 2.31 trips per day in 2007/08 (844 per year), compared to a GB average of 2.69 trips per day (982 per year). In terms of distance travelled, Londoners averaged 23 kilometres per day, only three-quarters of the GB average of 31 kilometres per day.

The following section summarise the changes seen in relation to the MTS goals and indicators.

Supporting economic development and population growth: the performance of the transport networks

Performance of London's roads – traffic speeds and congestion

- Congestion on the road network is a complex phenomenon involving many factors including speed, delay, reliability, extent of disruption, and time spent in 'stop-start' traffic conditions. Historically, average speeds have been used as a proxy for overall congestion levels. Recent work in connection with developing the Mayor's smoothing traffic flow agenda is clarifying this and extending the approach to take account of other factors. However, at the moment in relation to historic trends, speed surveys are still the primary method of measuring congestion.
- There has been a long-term trend of increasing road congestion in London. This has affected all parts of London, but has been particularly intense in Central and Inner London, where it dates back at least two decades, although there is some evidence of reduced congestion during 2009.
- The latest three-year cycle of TfL's strategic speed surveys, covering the period 2007 to 2009, show that this trend has continued to affect all areas of London, with average Greater London traffic speeds in the weekday morning peak of 14.4 miles per hour (23.0 kilometres per hour), average inter-peak speeds of 17.8 miles per hour (28.4 kilometres per hour), and average evening peak speeds of 15.8 miles per hour (25.3 kilometres per hour).
- These most recent values are 3 per cent, 3 per cent and 1 per cent slower, respectively, than the previous survey cycle (covering the period 2003 to 2006), and are 9 per cent, 8 per cent and 7 per cent slower than the 1990-1994 cycle.
- During the 1970s and 1980s, reducing traffic speeds primarily reflected increasing traffic levels. From the late 1990s, however, traffic volumes in Central and Inner London have stabilised and, more recently, have fallen. Recent increases to congestion are therefore thought to reflect a range of planned and unplanned interventions on the road network that have combined to reduce the effective capacity of the network for general traffic. These include an increase in roadworks, a range of other traffic management and road safety initiatives, together with unplanned interventions such as security alerts and emergency utility repairs.
- There has been some recent reduction in congestion, according to the latest monitoring data, perhaps reflecting falling traffic levels described elsewhere in this report. Newly-available Global Positioning System (GPS) data suggest that more than half of boroughs had increased overall traffic speeds and reduced delays in 2008/09 compared to 2007/08. Recent data in relation to the extended central London Congestion Charging scheme also show reduced congestion in 2009 compared to 2008.

Smoother traffic and journey time reliability

- Improving conditions on London's road network is a major Mayoral focus – through new policy and management initiatives to help smooth traffic flow. Journey time reliability is a key concern of road users and this concept has been developed by TfL into a primary indicator of traffic smoothness. These indicators are currently being prototyped using existing number plate recognition cameras across London.

- Journey time reliability is defined, in this metric, as the proportion of traffic which - for a 'typical' 30-minute journey – takes less than 35 minutes (a representative average London journey time of 30 minutes plus a five-minute 'allowance'). On this basis, a prototype indicator suggests that, during the weekday morning peak period and in the inbound direction of travel, between 80 and 90 per cent of measured journeys on monitored routes in London were completed within this time.

Performance of TfL-managed public transport networks

- Reliability of LU services is measured in terms of overall average journey time, and excess journey time. In 2008/09, average overall journey time was 43.9 minutes, a reduction of 0.6 minutes over 2007/08. In 2008/09, excess journey time was 6.6 minutes, 1.2 minutes less than 2007/08.
- In 2008/09, 97 per cent of scheduled bus services were operated, which was 0.5 percentage points less than the previous year. This decrease largely reflected the severe weather during early February 2009. Both actual and excess waiting time for high-frequency bus services in 2008/09 were identical to 2007/08, at best-ever levels, in part reflecting quality incentive contracts for bus operators; 80.8 per cent of low-frequency services ran to time – again the highest recorded level.
- Reliability of Docklands Light Railway (DLR) is measured in terms of the percentage of trains that ran to time. For 2008/09, 94.7 per cent of DLR trains were on time. This compares to 97.2 per cent in 2007/08 – the reduction in performance reflecting the disruptive effect of major project works and the commissioning of new trains during the year.
- Reliability of London Tramlink is measured in terms of the percentage of scheduled service operated. This was 98.5 per cent in 2008/09, compared to 99 per cent in 2007/08.
- Reliability of National Rail services in London is measured through the Office of Rail Regulation's Public Performance Measure (PPM), which is a percentage score combining elements of punctuality and reliability. The all-operators measure at June 2009, expressed as a moving annual average for the preceding four quarters, was 90.8. This compares to an equivalent score of 90.2 for the four quarters to June 2008.
- The PPM measure for London Rail for the four quarters to June 2009 was 92.5, which was above average for London and South East operators.

Public transport kilometres operated in London

- Bus vehicle kilometres operated have increased by 34 per cent over the period since 2000/01. During 2008/09 2.1 per cent more bus kilometres operated than the previous year. This was the highest level since 1957.
- For Underground train kilometres, the equivalent historic increase was 11 per cent, with kilometres operated in 2008/09 being marginally up on the previous year at 70.6 million kilometres, this being the highest ever level.

- Trends for both DLR and London Tramlink reflect the progressive extension of these networks. For example, on the DLR, the extension to London City Airport opened in 2005, and that to Woolwich Arsenal in January 2009.

Public transport capacity and crowding

- The overall trend for bus occupancies is an increase of 19 per cent in the average number of passengers per vehicle since 1991/92 (26 per cent over the period 2000/01 to 2008/09). However, over this period there has been a move towards both larger and smaller capacity buses.
- Train occupancy rates on LU have been broadly constant in recent years, despite substantially increased patronage. This indicates that increased service provision is generally keeping pace with increased demand as well, of course, as contributing to it.
- Both DLR and Tramlink have achieved progressively higher per train/tram occupancy levels, in parallel with the progressive extensions to their respective networks.
- The composite mean score for overall satisfaction of those travelling on the network with the level of crowding inside the vehicle, on the principal public transport modes in London, was 76 out of 100 in 2008/9. This is considered a 'fairly good' score.

Supporting economic development and population growth: London's population and economy

London's population

- The latest year continued the established pattern of year-on-year growth, with London's population growing at an average of 0.6 per cent per year since 2001, and now being 11.6 per cent higher than in 1991.
- The resident population of Greater London at mid-year 2008 was estimated to be 7.62 million, an increase of 51,000 or 0.7 per cent from the previous year.
- The population growth in the most recent year in London was driven mainly by natural change (excess of births over deaths) which added 77,700 to London's population. London contributed 38.5 per cent to the total natural change in England, while accounting for only 14.8 per cent of the total population.

London's economy and employment

- The UK economic recession, beginning in the second quarter of 2008, was remarkable for the suddenness of its onset and its depth. UK economic output, expressed as GVA, contracted for six consecutive quarters. This was longer than any other post-War recession. Over that period, GVA fell by 5.9 per cent (the contractions in the last two recessions were 4.8 per cent in the early 1980s recession and 1.7 per cent in the early 1990s).
- London's GVA fell by 5.5 per cent between the third quarter of 2008 (the start of the recession in London) and the second quarter of 2009. Over the same period, United Kingdom (UK) GVA fell by 5.6 per cent.

- Estimates for the fourth quarter of 2009 suggests UK GVA grew by 0.3 per cent. This signalled the end of the recession. Preliminary data for Q3 2009 London GVA suggests growth of 0.2 per cent compared to Q2 2009.
- Workforce jobs in London were slightly more than 4.6 million in the third quarter of 2009, down 2.1 per cent or 98,000 on a year earlier. In spite of the decline in employment during the current recession, total employment in London in quarter 3, 2009 was still at around 2007 levels.

Safety and security on the transport system

Road traffic casualties

- London's roads have become significantly safer in recent years.
- There were 47 per cent fewer people killed or seriously injured on London's roads in 2008 than the baseline for Government targets (the 1994 to 1998 average). For Great Britain as a whole, the fall was 40 per cent.
- There was a 67 per cent reduction in children killed or seriously injured on London's roads, and a 43 per cent reduction among pedestrians (including both adults and children); and, despite the substantial increase in cycling, 21 per cent fewer cyclists were killed or seriously injured. 'Slight' casualties fell by 37 per cent.
- During 2008, 6.8 per cent fewer people were killed or seriously injured from collisions on London's roads compared to 2007. This substantial reduction continues the trend of recent years, and compares to a 4.1 per cent reduction for 2007 against 2006. The number of people killed fell from 222 to 204 (down 8.1 per cent).
- There were also year-on-year reductions, for casualties either killed or seriously injured, of 6.5 per cent in pedestrian casualties; 3.5 per cent in casualties from collisions involving pedal cycles; 9.9 per cent in casualties from collisions involving powered two-wheeled vehicles; and 6.3 per cent in child casualties.
- In terms of the total number of collisions in London, in 2008 there were 23,116 collisions involving personal injury, a decrease of 0.4 per cent on the 23,210 collisions in 2007. A total of 28,153 people were injured as a result of these collisions – a decrease of 0.7 per cent compared to 2007.
- These figures represent continued substantial improvement in reducing the more significant casualty groups, 2008 being the eighth consecutive year that casualties were the lowest recorded. Despite this progress, the still very high numbers of casualties continue to place a substantial burden on society in terms of social, emotional and economic costs.

Safety on the public transport networks

- London's public transport networks carry more than 10 million passenger journeys every day and overall offer an extremely safe travelling environment, in both absolute terms and in relation to private transport (over 13,000 car occupants were injured in 2008). Nevertheless 127 passengers were injured travelling on the Underground during 2008/09, and there was one fatality (as a

- On buses and coaches during the 2008 calendar year, a total of 1,370 passengers (1,492 vehicle occupants including drivers) were injured, including one fatality. This number of injuries was a 5.9 per cent increase on 2007.

Crime and perception of crime

- Rates of crime on both bus and Underground/DLR networks fell significantly in 2008/09, building on the reductions achieved during 2007/08.
- There were 12.1 reported crimes per million passenger journeys on London's buses and 13.1 per million passenger journeys on LU and DLR during the 2008/09 financial year. These rates are down from 15.2 and 14.4 reported crimes per million passenger journeys respectively in 2007/08.
- The most common causes of concern among London residents while travelling were: the threatening behaviour of other passengers (20 per cent), large groups of school children (17 per cent), and drunken passengers (12 per cent). Residents said they tended to be the most concerned about their personal safety and security when walking after dark (37 per cent) and when waiting at a station or stop after dark (33 per cent).
- Few respondents said that concerns about safety from crime and anti social behaviour affected the frequency with which they travel in London during the day 'a lot'. For most modes, between 20 and 30 per cent of respondents were deterred somewhat from travelling during the day due to fear of crime.

Transport and climate change

- Total CO_2 emissions in London were estimated at 44.7 million tonnes in 2008. Total London emissions were up 7 per cent since 2003, although their peak year (so far) was 2006, since when emissions have fallen by 6 per cent.
- Emissions from ground-based transport have, by contrast, fallen since 2003. These emissions accounted for 22 per cent of London's total CO_2 emission in 2008 at 9.7 million tonnes.
- Emissions of CO_2 from road, rail and shipping fell by 3 per cent between 2006 and 2008.
- Aviation has been growing. Including 'ground-based aviation' (i.e. emissions related to aviation but happening at less than a mile above ground), emissions fell by 2 per cent between 2006 and 2008.
- Compared to 2003, these ground-based transport CO_2 emissions are down 5 per cent (without ground-based aviation) and 2 per cent (with) respectively.
- London's CO_2 emissions from road transport fell 7 per cent between 2003 and 2008.
- Almost half (46 per cent) of CO_2 from ground-based transport arises from cars, and a further 18 per cent from vans and lorries.

- The principal public transport modes (bus, rail and Underground) each accounted for between 6 and 7 per cent of CO_2 from ground-based transport – comparable proportions to 2006.

Transport for all Londoners

- Transport facilitates the development of London's economy by providing access to employment and services. The provision of a more accessible transport system and improved transport connectivity and capacity is an important part of meeting this commitment.

Access to opportunity and services

- A new indicator for access to opportunities and services (ATOS) has been developed which takes into account the location of services as well as the level of public transport provision. ATOS is reflective of the way transport facilitates the economic and social development of London, and will be tracked as part of the strategic performance monitoring of the draft MTS.
- The new ATOS scores can be used alongside Public Transport Accessibility Levels (PTALs), the traditional accessibility measure for London, to provide a more in depth understanding of accessibility.
- Areas in Central and Inner London as well as town centres in Outer London have a relatively high ATOS score. Some Inner suburban areas in London have a relatively low PTAL score while they have a high ATOS score indicating that the density of local services means that people can access them more readily by walking or cycling.
- The average time required for accessing employment and key services in London by public transport or on foot in 2008/09 was 17.4 minutes.

Accessibility to the transport system

- TfL is committed to providing as easy and accessible travel for all members of the community as possible. A substantial proportion of the public transport network is currently accessible, and plans are underway to make further improvements where possible.
- All buses in London are fully accessible (with the exception of a few 'heritage' Routemasters), as are almost half of bus stops (ie meeting TfL Accessible Bus Stop Design guidance). About 20 per cent of LU stations and a third of National Rail stations are accessible from the street to the platform, and the DLR and Tramlink networks are fully accessible from street to carriage.
- LTDS illustrates the importance of accessibility considerations to London's population. Almost 1 in 3 people aged 60 or above considers themselves to have a travel-related disability or other impairment which affects their interaction with the transport system.

Transport affordability

- The average adult composite bus and Underground fare paid rose from 18.8 pence per kilometre in 2008 to 19.6 pence per kilometre in 2009 – an increase of 4.6 per cent.

- Real bus fares in London have decreased in recent years and are currently 23 per cent lower than 1999/2000. This is different to the national trend for bus fares, which have increased by 16 per cent in real terms over the same period.
- Underground fares have been relatively stable over the same period and are currently just below 1999/2000 levels in real terms.
- Motoring costs on the other hand have been declining across the UK and are currently 16 per cent lower in real terms than in 1999/2000.
- When taking London earnings into account bus fares relative to earnings are 60 per cent lower than 1971, while Underground fares are about a third lower than they were in 1971.

Transport and quality of life

The Mayor has made it a priority to improve the quality of Londoners' overall daily travel experiences whether as drivers, pedestrians, cyclists or public transport users. This includes tackling problems such as air pollution (involving the key pollutants of NO_x/NO_2 and fine particles – PM_{10}) and ambient noise from transport.

NO_2 in London – emissions and local air quality

- Emissions of NO_x from transport in London have fallen substantially in recent years. Emissions of NO_x from ground-based transport in London (excluding ground-based aviation) in 2008 were 28,150 tonnes.
- This was down 18 per cent compared to 2006, on a comparable basis, and was 30 per cent lower than 2004.
- In 2008 ground-based transport (excluding ground-based aviation) accounted for 54 per cent of the total NO_x emission. Road traffic accounted for 86 per cent of the ground-based transport contribution, and 47 per cent of the total NO_x emission in London.
- Total NO_x emissions in Greater London in 2008 were 52,130 tonnes. On a comparable basis this was 34 per cent lower than 2006, and 47 per cent lower than 2004.
- Geographical analysis shows that highest emissions of NO_x occur where the urban density of London is highest – with the contribution of major roads also visible.
- Emissions of NO_x are a primary determinant of local NO_2 concentrations, which is the basis for establishing compliance with EU Limit Values. However, reductions in NO_x emissions do not necessarily feed through linearly to equivalent reductions in NO_2 concentrations.
- Currently, much of Central and Inner London exceeds the annual mean objective for NO_2 that applied from the end of 2005. The recent trend in NO_2 shows little sign of improvement, despite sustained reductions in measured concentrations of NO_x. This is thought to be due to several factors including the increasing proportion of diesel-fuelled vehicles in the fleet, technology changes to diesel engines and the emission of NO_2 in 'direct' form as a by-product of oxidation catalysts used to abate PM_{10}.

PM_{10} in London – emissions and local air quality

- As with NO_x, emissions of PM_{10} from ground-based transport in London have fallen in recent years. Emissions of PM_{10} from ground-based transport in London (excluding ground-based aviation) in 2008 were 1,550 tonnes. On a comparable basis this was 12 per cent lower than 2006, and 25 per cent lower than 2004.
- In 2008 ground-based transport (excluding ground-based aviation) accounted for 63 per cent of the total PM_{10} emission. Road traffic accounted for 91 per cent of the ground-based transport contribution, and 57 per cent of the total PM_{10} emission in London.
- Total PM_{10} emissions in Greater London in 2008 were 2,490 tonnes. On a comparable basis this was 16 per cent lower than 2006, and 29 per cent lower than 2004.
- Geographical analysis shows that highest emissions of PM_{10} occur along the major roads and in Central London, primarily reflecting the density of traffic.
- Currently, the EU Limit Values for PM_{10} are exceeded at a small number of specific locations, mainly along busy roads in Central London. The recent trend for concentrations of PM_{10} in the atmosphere suggests significant improvement. However, assessment is complicated by a change in measurement method and, since concentrations of PM_{10} are strongly related to the weather in each year, a further year or two of measurement is necessary to establish whether these improvements will be sustained.

The London Low Emission Zone (LEZ) scheme

- Compliance with the LEZ is very high. Phases 1 and 2 of the scheme were implemented in February and July 2008 respectively. Ninety-eight per cent of vehicles covered by Phase 1, and 96 per cent of vehicles covered by Phase 2, were complying with the Low Emission Zone in September 2009.
- Around 300,000 vehicles enter the zone each day and are compliant with the requirements of the scheme – delivering significant reductions to emissions of PM_{10} and NO_x in London.

Customer satisfaction

- New measures of customer satisfaction across the principal public transport modes have been created as strategic outcome indicators (SOIs) for the draft Mayor's Transport Strategy. These cover aspects such as: general satisfaction with the overall service, satisfaction with the individual modes, and satisfaction with specific aspects of the journey experience such as levels of in-vehicle crowding and safety and security. These indicators, expressed in terms of mean scores (not percentages) are described and baselined for the first time in this report.
- In general, they show mean satisfaction scores in the range 70-80, which is considered by TfL to reflect 'fairly good' or 'good' levels of satisfaction. However, the modal pattern does vary, and these new indicators are providing valuable insights to help better target improvement initiatives.
- A new measure of 'overall journey experience' has been created. This aims to establish levels of satisfaction with journeys in London across all modes and has

been undertaken for the first time in 2009. In comparison with the well-established modal customer satisfaction surveys, findings relating to the new journey experience measure should be considered exploratory and indicative only at this stage. The mean score for satisfaction with travelling in London was 64 out of 100 for London residents in 2009.

- A new measure of satisfaction with the urban realm, in terms of the quality of streets, pavements and public spaces, has been developed by TfL. The mean score for satisfaction of London residents with the quality of streets, pavements and public spaces was 63 out of 100 in 2009. One in 5 respondents thought that the quality of the urban realm had deteriorated over the past year, but most felt that it had improved or remained the same.

Ambient noise

- Noise maps produced by the Department for Environment, Food and Rural Affairs (Defra) show levels of noise emitted by transport infrastructure sources and larger industrial premises. The map of London shows that the highest noise levels are closely associated with major roads, Heathrow airport and Central London in general. This map provides a basis for understanding noise sources and developing amelioration measures.
- TfL has developed a new measure of satisfaction with transport-related noise levels in London. The mean score for satisfaction of London residents with transport-related noise levels in their area was 70 out of 100. In general, levels of satisfaction with transport-related noise in London were broadly equivalent to those with noise levels in general (at 69 out of 100). Responses given by residents make it clear that transport, particularly road and air traffic, is the greatest contributor to unsatisfactory noise levels in the Capital.

The London sub-regions

TfL is working with boroughs and London regional partners to develop sub-regional transport plans for each of the five London sub-regions (north, south, east, west and central). The Spotlight chapter (chapter 10) includes a presentation of some key data by sub-region.

This report looks at the five sub-regions in terms of collections of boroughs. However, the boundaries between the different sub-regions are intended to be flexible and 'fuzzy' as transport challenges do not stop at borough or sub-regional boundaries. TfL's regional plans and engagement therefore reflects this. Engagement with boroughs recognises this: for example, Camden and Islington are involved in both the central and north London transport plans. For the purposes of the tabulation of data in this document, the London sub-regions can be considered to comprise groupings of boroughs, with each borough included once as shown below although in practice the boundaries between the different sub-regions are to be viewed as flexible to meet specific analysis needs.

- **Central sub-region:** primarily consists of the Cities of London and Westminster, the boroughs of Camden, Islington, Southwark, Lambeth and the Royal Borough of Kensington & Chelsea.
- **East sub-region:** primarily consists of the boroughs of Tower Hamlets, Hackney, Newham, Greenwich, Bexley, Barking & Dagenham, Redbridge, Lewisham and Havering. Much of the region lies within the Thames Gateway Growth Area.

- **North sub-region:** primarily consists of the boroughs of Barnet, Enfield, Haringey and Waltham Forest.
- **South sub-region:** primarily consists of the boroughs of Bromley, Croydon, Kingston, Merton, Richmond, Sutton and Wandsworth.
- **West sub-region:** primarily consists of the boroughs of Hillingdon, Harrow, Brent, Ealing, Hounslow and Hammersmith & Fulham.

Population and employment

- Nearly 1 in 3 Londoners was in 2008 resident in the east sub-region. One in 6 London residents lives in the central sub-region, but this sub-region contains 41 per cent of jobs, reflecting the status of Central London as an international business, finance and retail centre, as well as the centre of Government in the UK. The greatest population density is in Inner London just outside the centre.

Car ownership

- Car ownership is lowest in the central sub-region, where only 40 per cent of households own a car, and highest in the south sub-region where 69 per cent of households own one. In total, 26 per cent of car-owning households are situated in the south sub-region, compared to 22 per cent of all households.

Travel by residents of the sub-regions

- Based on the LTDS data for 2006-2009, residents of the south sub-region have the highest trip rate, at 2.8 trips per person per day, compared to a Greater London average of 2.6 trips per person per day. Residents of the east sub-region make the fewest trips per person, at just 2.3 per day, and residents of the central sub-region travel the shortest distance, probably reflecting the co-location of homes, jobs and services in central London.
- For residents of the outer sub-regions of east, north, south and west London, between 4 and 5 in 10 trips were made by car. East London residents were the least likely to travel by car, reflecting lower levels of car ownership, and residents of south London most likely to do so. In comparison, only 23 per cent of trips made by central London residents were by car, and residents of the sub-region were more likely to travel by public transport, walk or cycle.
- The profile of trips by purpose was fairly similar for residents of all sub-regions, although residents of the east sub-region were somewhat more likely to travel for work (24 per cent of trips) and education purposes (15 per cent), and less likely to make discretionary trips for shopping and leisure purposes. This is likely to reflect the high levels of deprivation in the region.

Origin and destination of trips by sub-region

- In total, around 17.8 million trips are made by London residents each day, half a million of which involve travel between the Capital and elsewhere in the UK.
- Three-quarters of trips made by London residents are wholly contained within one sub-region and one sixth are between the outer sub-regions and the central London sub-region, with the remainder taking place between the outer sub-regions and outside London. This is reflected in the average length of journeys by region of origin: 27 per cent of journeys with an origin in the central sub-region

Travel by sub-region of origin

- Between 4 and 5 in 10 trips originating in the four outer sub-regions are made by car, around 3 in 10 by walking or cycling and the remainder by public transport. East London has the lowest car mode share, at 42 per cent, and the highest public transport mode share, at 25 per cent. The mode share for trips originating in the central sub-region is very different, with a far higher proportion of trips made by public transport, particularly Underground, walked or cycled.
- The profile of trips by journey purpose is fairly similar across the sub-regions, although a higher proportion of trips originating in the east sub-region are for education purposes, reflecting the young population, and a higher proportion of trips with an origin in central London are for work purposes. In central London, the profile of trips by origin is quite different to that of trips by residents, reflecting the high volume of inbound commuting to the region by residents of other parts of London.
- Around a third of trips across all sub-regions are less than 1 kilometre in length; in the four outer sub-regions, three quarters of these trips are walked and most of the rest are made by car. Even in central London, 1 in 10 trips shorter than 1 kilometre is made by car. In total, London residents make more than a million car journeys shorter than 1 kilometre every day. The south sub-region has the highest car mode share for very short trips, at 24 per cent.
- On average, more trips are made on a weekday than at the weekend, with the fewest trips made on Sundays. This is particularly pronounced in central London, while in other sub-regions, the difference between trip volumes on an average weekday and Saturday is often quite small. Trips made at the weekend are more likely in all sub-regions to be made by car, although the car mode share in the central sub-region remains around half that of the other sub-regions.
- Across the four outer sub-regions, around a fifth of trips are made during each of the peaks, and around 45 per cent of trips are made during the inter-peak period. In the central sub-region, far more trips originate in the area during the afternoon than morning peak. This reflects the strong 'tidal flow' of commuters travelling into Central London in the morning peak and leaving in the evening peak.
- Across all sub-regions except central London, there are more trips per hour on average during the inter-peak period. Rail trips are far more likely to be made during the peak hours, whilst Underground, car and bus trips are more spread throughout the day.

Conditions on the transport network

- In the morning peak, there are highest levels of crowding on the Underground network in central London and on the Overground and National Rail network in the south, east and north sub-regions.
- The highway network is highly congested across London, particularly in peak hours. In the central sub-region, average speeds are lower than 17 kilometres per hour all day and there is no visible peak. Elsewhere, speeds are typically slowest

during the afternoon peak, with some improvement during the inter-peak period. The slowest speeds outside the centre are found in south London, where average speeds during the afternoon peak are only 24.8 kilometres per hour, compared to 42.3 kilometres per hour in night time free flow conditions.

- National Rail mode share is highest among south Londoners and Underground use is, unsurprisingly, lower, than in north London – where the Underground mode share is much higher than that of National Rail.
- Public transport usage in south London is four-fifths of that in north London, and car use about 10 per cent greater. Residents of south London have a poorer perception of the connectivity of public transport, and road congestion and delays are relatively poor compared to north London.

Future projections

- London's population is expected to grow by around 1.4 million people between 2006 and 2031, with the highest rate of growth expected to be in the east sub-region (an increase of 29 per cent, or 0.6 million additional people). The central sub-region (including Inner north London, such as Camden and Islington) is expected to increase by 18 per cent, and the four north London boroughs listed above by 15 per cent.
- Employment in London is also projected to grow by around 0.8 million jobs by 2031, primarily in the central sub-region (which is due to increase by 24 per cent) and to a lesser extent the east sub-region (up 20 per cent, but from a lower base). Greater numbers of commuters to central London can therefore be expected in future years, particularly from the east sub-region.

Central London

Travel to Central London in the weekday morning peak

- The total number of people entering Central London during the weekday morning peak in TfL's autumn 2008 CAPC surveys was 1.14 million, up by 1 per cent from 2007.
- This number has been relatively stable since the 1950s, varying between 1.0 and 1.2 million, following the economic cycle. The value for 2008, which is the highest since the late 1980s economic boom (the 'Lawson boom'), may therefore have reflected the high point of the previous cycle.
- Within a stable overall number of travellers, however, previously-established trends towards changes in mode share for these (largely) daily commuters continued and intensified. There was a further decrease of 7 per cent in the total number of car travellers. This resulted from a 5 per cent drop in the number of cars and a 2 per cent decline in car occupancy at the central cordon. Rail passengers also decreased by 1.4 per cent while bus and Underground both increased by about 1 per cent, leaving the public transport total almost unchanged from 2007.
- The largest percentage change was recorded for cycling, which increased by 23 per cent between 2007 and 2008. Although cyclists account for just 2 per cent of people entering Central London during the morning peak, their numbers have almost doubled, an increase of 95 per cent, between 2000 and 2008.

Travel to Central London across the working day

- TfL's CAADC survey is a new survey, based on the established CAPC surveys, that measures travel and mode shares for people entering and leaving Central London across the working weekday.
- On a typical 2008 weekday 2.4 million people entered Central London during the working day between 7am and 7pm; half of these enter during the morning peak period (7am to 10am).
- For most of the working day, there are 1.1 million more people in Central London than at the start of the day.
- Public transport accounts for 90 per cent of travel into Central London in the morning peak, and about 80 per cent during the rest of the day.
- National Rail accounts for 43 per cent of incoming people during the morning peak, but this drops sharply to 26 and 22 per cent, respectively, in the interpeak and afternoon peak periods.
- Two million people leave Central London between 7am and 7pm, with substantial numbers (more than 400,000) leaving after 7pm. About a fifth of outbound rail passengers leave after 7pm

Congestion charging in Central London – recent developments

- The draft MTS proposes the removal, subject to consultation, of the Western Extension to the Central London Congestion Charging zone. The draft strategy also proposes to continue operating, subject to regular monitoring and periodic reviews of effectiveness, Congestion Charging in the original Central London charging zone.
- Latest data for 2008/09 show an intensification of the established trend towards falling traffic levels in the extended charging zone, reflecting wider falls in traffic volumes across London during late 2008 and early 2009.
- Latest congestion data for both parts of the extended zone show some recent amelioration of conditions, with small reductions to delays but congestion levels still well above those formerly achieved by the scheme. This probably reflects a combination of reduced demand (ie traffic), but also some recent initiatives to better manage the operation of the road network in Central London.

Traffic and congestion in the original Central London Congestion Charging zone

- Following relative stability since 2003 the numbers of vehicles entering the central zone declined substantially in 2008 and the first half of 2009. There was a drop of 11 per cent in cars (including private hire vehicles (PHV)) entering the zone when comparing annualised flows from 2008 and 2007. The equivalent drop across all vehicle types was 4 per cent with a further drop of 4 per cent observed in 2009.
- Similarly, levels of traffic circulating inside the central zone declined in 2008 compared with 2007, with the estimated number of vehicle kilometres driven in the zone by all vehicle types reducing by 8 per cent.
- Congestion inside the zone appeared to have lessened somewhat in the latter months of 2008 and during 2009. Average excess delay in 2009 was measured at

2.1 minutes per kilometre, 0.2 minutes per kilometre or about 8 per cent lower than the pre-charging level in 2002.

Traffic and congestion in the Western Extension zone

- Traffic entering the Western Extension zone fell by 14 per cent in the first year of the extension in 2007 (based on vehicles with four or more wheels) and dropped by a further 6 per cent during 2008. In the first half of 2009 traffic entering the zone increased relative to 2008. In the second half of 2009, however, declines across most vehicle types led to an overall decline of 3 per cent in vehicles with four or more wheels entering the zone.
- Traffic circulating inside the Western Extension zone measured in vehicle kilometres driven by vehicles with four or more wheels fell by 11 per cent during 2007 and by a further 10 per cent in 2008, in line with the reductions seen in traffic entering the zone over the same period. In 2009 vehicle kilometres driven remained at similar levels to 2008.
- Congestion levels inside the extension zone in 2007 and 2008 were broadly similar to pre-charging levels. In 2009, however, there is an indication of slightly improved conditions, with delay down by 4 per cent compared to 2008 and by 7 per cent compared to pre-charging conditions.

1. Introduction

1.1 Travel in London report 2

Travel in London is TfL's annual publication that summarises trends and developments relating to travel and transport in the Capital. It provides an authoritative source of key transport statistics and tracks developments, trends and progress in relation to the implementation of the transport and other related strategies of the Mayor of London. It provides an interpretative commentary that looks across the immediate impacts of TfL and its delivery partners, as well as external influences and trends, in shaping the contribution of transport to the economic vitality of the Capital and the daily lives of Londoners.

1.2 Role of Travel in London

This second edition of Travel in London builds on the first, published in April 2009, which replaced TfL's previous annual London Travel Reports. While retaining the same overall objectives in relation to the dissemination and interpretation of transport statistics and trends, and having a similar format and level of presentation to the first edition, this second edition benefits from the publication of the Mayor of London's draft Transport Strategy for public consultation in October 2009.

Alongside his draft London Plan, Economic Development Strategy and Air Quality Strategy published at similar times, these strategies map out the policy framework for London over the next few years. They therefore allow the content of this second edition to be more clearly aligned to the main policy priorities. This is reflected in the grouping of material into chapters reflecting the key MTS goals.

Travel in London is the main vehicle through which the implementation of the MTS will be formally monitored, involving among other things the collection and publication of a set of top-level strategic outcome indicators, which are based on 'outcomes' (ie changes in the actual conditions experienced by Londoners). These are generally to be reported annually. Those that are already available are included in this edition with their past trends. Others, some requiring further development, are described and presented to set the baseline for future monitoring.

However, the role of Travel in London is, and needs to be, much wider than this. The travel environment experienced by Londoners and its ability to support London's economy is the product of both planned and unplanned interventions and events; London-specific and wider national and international influences; and relationships and interactions that are complex and not always fully understood. It is quite possible, for example, for a key outcome indicator to remain static or even deteriorate in spite of a policy having a substantial positive impact if the underlying conditions move in an adverse direction. This can happen because London is not insulated from external events, such as macro-economic or demographic change.

Consequently, in tracking and ultimately assessing the impact of any set of policies, there is a vital need for careful interpretation across all of the available evidence. Indeed, it is important that agencies continue to generate this evidence and measure the key dimensions of transport network performance and journey experience. Analysis of such data, trends and relationships can also add to our knowledge of the factors affecting the operation of the transport networks – and over the longer-term it is precisely this 'added value' that will lead to better and more cost-effective policy. Furthermore, any developing adverse trends can quickly be identified, understood, and appropriately dealt with.

1.3 The Mayor of London's transport priorities

The Mayor's draft Transport Strategy for public consultation was published in October 2009. This sets out his vision for transport in London over the next 20 years, and describes how TfL and its partners will deliver that vision.

Since the previous strategy was published in 2001, London has achieved an unprecedented shift in the numbers of people using public transport, walking and cycling instead of using the car. Upgrades to the Underground and bus network, development of the London Overground rail network and the introduction of Oyster cards have all improved travel in London.

Despite these improvements there are major challenges facing the Capital and its transport system. These include: increased crowding and congestion, poor air quality and climate change, maintaining and improving safety and security, and some imbalances in transport provision. The key goals of the draft MTS are:

- Supporting economic development and population growth.
- Enhancing the quality of life for all Londoners.
- Improving the safety and security of all Londoners.
- Improving transport opportunities for all Londoners.
- Reducing the contribution of transport to climate change and improving its resilience to the impacts of climate change.
- Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy.

Each of the first five of these goals is traceable to one or more sections of this report. Other material in this edition provides essential interpretative context, or looks in more detail, through 'Spotlight' chapters, at specific topics of particular contemporary interest.

For each of these goals there is a set of related transport challenges, and various outcomes are sought from the strategy in relation to each of these goals and challenges. The draft strategy itself elaborates how these priorities will be tackled, through 35 policies and 129 proposals. This framework is summarised in Table 1.1.

Table 1.1 Mayor's Transport Strategy: Goals, challenges and outcomes.

Goals	Challenges	Outcomes
Support economic development and population growth	Supporting sustainable population and employment growth	• Balancing capacity and demand for travel through increasing public transport capacity and/or reducing the need to travel
	Improving transport connectivity	• Improving people's access to jobs • Improving access to commercial markets for freight movements and business travel, supporting the needs of business to grow
	Delivering an efficient and effective transport system for people and goods	• Smoothing traffic flow (managing road congestion and improving journey time reliability) • Improving public transport reliability • Reducing operating costs • Bringing and maintaining all assets to a state of good repair • Enhancing the use of the Thames for people and goods
Enhance the quality of life for all Londoners	Improving journey experience	• Improving public transport customer satisfaction • Improving road user satisfaction (drivers, pedestrians, cyclists) • Reducing public transport crowding
	Enhancing the built and natural environment	• Enhancing streetscapes, improving the perception of the urban realm and developing better streets initiatives • Protecting and enhancing the natural environment
	Improving air quality	• Reducing air pollutant emissions from ground-based transport, contributing to EU air quality targets
	Improving noise impacts	• Improving perceptions and reducing impacts of noise
	Improving health impacts	• Facilitating an increase in walking and cycling
Improve the safety and security of all Londoners	Reducing crime, fear of crime and antisocial behaviour	• Reducing crime rates (and improved perceptions of personal safety and security)
	Improving road safety	• Reducing the numbers of road traffic casualties
	Improving public transport safety	• Reducing casualties on public transport networks
Improve transport opportunities for all Londoners	Improving accessibility	• Improving the physical accessibility of the transport system • Improving access to services
	Supporting regeneration and tackling deprivation	• Supporting wider regeneration outcomes
Reduce transport's contribution to climate change, and improve its resilience	Reducing CO_2 emissions	• Reducing CO_2 emissions from ground-based transport, contributing to a London-wide 60 per cent reduction by 2025
	Adapting for climate change	• Maintaining the reliability of transport networks
Support delivery of the London 2012 Olympic and Paralympic Games and its legacy	Contributing to a successful 2012 Games	• Transport infrastructure and services • Physical and behavioural transport legacy

1.4 The monitoring regime for the Mayor's Transport Strategy

The top level, long-term outcomes of the MTS will primarily be monitored through the collection and publication of Strategic Outcome Indicators (SOIs). The strategic indicators quantify progress in the delivery of the Strategy, in order to facilitate a broad understanding of the 'totality of effects' of the strategy's interventions on transport and wider quality of life in London.

These indicators provide a straightforward way of monitoring and reporting progress in delivering his objectives. However, the relationship between strategy goals and change in overall transport outcomes will not be direct or proportional. The Mayoral targets and SOIs are therefore related to, and will be interpreted alongside, appropriate supporting and contextual information about wider trends and developments in transport in London. This includes 'background' factors such as economic and demographic change, as well as the specific actions taken by TfL and delivery partners as part of the implementation of the Strategy. This allows changes, and the relative contribution of specific policies, to be interpreted. Where appropriate and possible, findings will be disaggregated on a spatial (borough, network, or London sub-region), modal or temporal basis.

The 24 SOIs will sit at the head of a more extensive framework of indicators and supporting information designed to measure delivery against the Strategy's goals by TfL, the London boroughs and other delivery partners in London, and to measure the outcomes of that delivery.

This framework of MTS SOI indicators, as illustrated in Figure 1.1, can be envisaged in two dimensions:

- First, a 'reporting' framework, whereby the MTS SOIs are aligned with the more extensive and more specific key performance indicator (KPI) framework for the TfL Business Plan, which are in turn related to performance indicators for the London boroughs through the revised arrangements for Local Implementation Plans (LIPs).
- Second, an 'analysis' framework, where strategic outcome indicators can be broken down – by mode, borough, time of day, etc., and related to other data such as TfL's outputs and wider trends and developments, according to specific policy analysis requirements, to understand how these outcomes are being achieved.

In addition to these key indicators, Travel in London will report on many other, more specific aspects of transport and travel in London that are relevant to the MTS.

Figure 1.1 Framework for monitoring the Mayor's Transport Strategy.

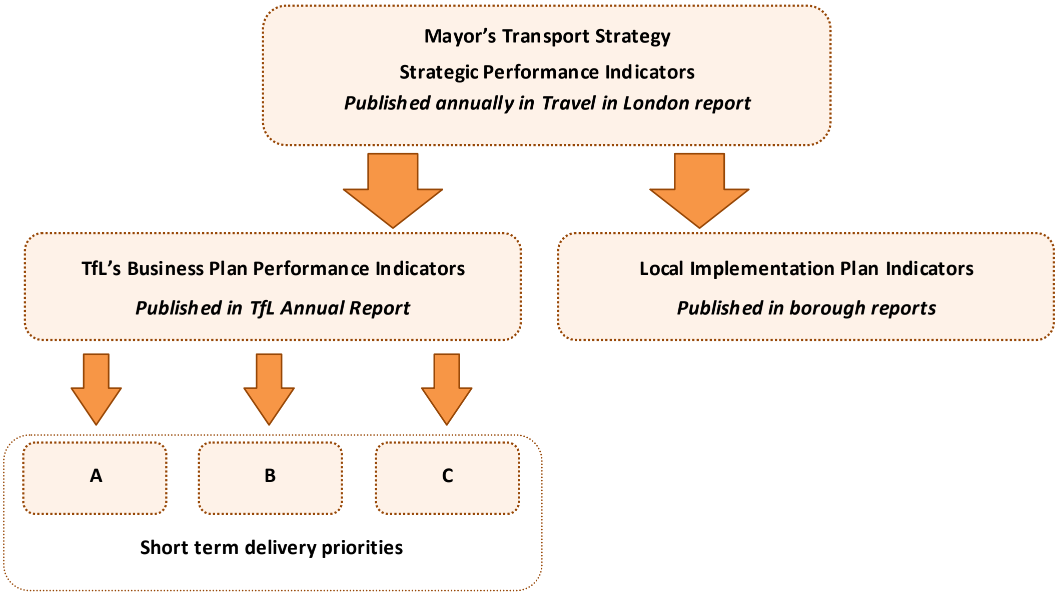


Table 1.2 sets out the 24 Transport Strategy SOIs grouped according to Mayoral transport goals. A brief definition of each is given, as is a cross-reference to the section of this report where information about the indicator can be found. This is the first year of formal SOI reporting for the draft strategy. As such, while many of the indicators are readily available, some having been tracked previously and therefore able to be set in the context of a historic time-series, some are entirely new and require the design and conduct of new surveys. A 'status' column therefore sets out for each indicator the level of treatment that is possible in this report. It is expected that the next edition of Travel in London will be able to offer more consistent coverage across all of the Transport Strategy SOIs.

As part of the process of monitoring borough LIPs, progress will be tracked against five strategic performance indicators on which boroughs are required to set locally specific targets. These five indicators - on mode share, bus service reliability, road traffic casualties, CO_2 emissions and asset (highway) condition - all relate to key priorities within the MTS over which London boroughs have a degree of influence. Data for each of the indicators will be reported directly to boroughs on an annual basis as part of a wider liaison process on LIP delivery. With the exception of asset (highway) condition, the data are also to be reported within TfL's Travel in London reports on an annual basis, subject to availability in the case of data for the indicator on CO_2 emissions.

Table 1.2 Strategic outcome indicators for the Mayor's Transport Strategy.

Theme	Strategic Outcome Indicator	Brief definition	Section of this report	Status for this report and update frequency
Contextual indicators	Travel demand	The number of trips (or journey stages) made to, from or within London per calendar year	2.7	Established time-series (annual)
	Mode share	Proportion of trips (or journey stages) undertaken by each mode to, from or within London per calendar year	2.8	Established time-series (annual)
Supporting economic development and population growth	People's access to jobs	Employment accessibility maps – number of jobs within 45 minute travel time	5.6	2006 baseline (3-yearly)
	Smoothing traffic flow – journey time reliability	For a selection of key routes, percentage of journeys completed within five minutes of a specified typical journey time	4.4	New time-series under development
	Public transport reliability	Existing reliability indicators for each principal public transport mode will be presented separately	4.9	Established time-series (annual)
	Public transport capacity	Calculated using planning capacities for the various train/tram/bus types, multiplied by kilometres operated	4.9	Re-working of established time-series (annual)
	Operating costs per passenger kilometre	Operating cost per passenger kilometre, by principal public transport mode	4.11	New time-series under development
	Asset condition	Composite multi-modal indicator measuring the percentage of in-scope asset that is deemed to be in good condition	4.12	New time series in prototype form
Enhancing the quality of life of all Londoners	NO_x emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of NO_x	9.4	Re-working of established time-series (two-yearly)
	PM_{10} emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of PM_{10}	9.6	Re-working of established time-series (two-yearly)
	Public transport customer satisfaction	Overall satisfaction of those travelling on the network with the operation of the principal public transport modes	9.10	Re-working of established time-series (annual)
	Road user customer satisfaction	Satisfaction of private road users with the maintenance and operation of the road network	9.11	New survey in development – no indicator this year

Table 1.2 Strategic outcome indicators for the Mayor's Transport Strategy (continued).

Theme	Strategic Outcome Indicator	Brief definition	Section of this report	Status for this report and update frequency
	Public transport crowding	Satisfaction of those travelling on the network with the level of crowding inside the vehicle, on the principal public transport modes	4.9	New time-series (annual)
	Perception of journey experience	Perception of London residents of their overall journey experience when travelling in the city	9.12	New time-series (annual), presented this year in prototype form
	Perception of noise	Perception of London residents of noise levels in their local area	9.14	New time-series (annual)
	Perception of the urban realm	Perception of London residents of the quality of the urban realm in their local area	9.13	New time-series (annual)
Improving the safety and security of all Londoners	Volume of road traffic casualties	Number of people killed or seriously injured in road traffic collisions in London per year	6.3	Established time-series (annual)
	Crime rates on public transport	Crimes per million passenger journeys by principal public transport modes	6.5	Established time-series (annual)
	Perception of crime/safety	Perception of London residents of their sense of safety and fear of crime when travelling in the city	6.6	New time-series (annual)
Improving transport opportunities for all Londoners	Access to services	Local area score of average journey time by public transport, walking and cycling to work, education, health services, quality food shopping and open spaces (three-yearly)	8.2	2009 baseline – will be re-benchmarked as required
	Physical accessibility to the transport system	Level of step-free access across the public transport and streets network	8.3	Re-working of established time-series (annual)
	Real fares levels	Cost for a selected, representative 'basket' of trips	8.4	Established time-series (annual)
Reducing transport's contribution to climate change and improving its resilience	CO_2 emissions	Emissions from all identifiable ground-based transport sources in London, expressed as tonnes of CO_2	7.4	Re-working of established time-series (annual)
Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy	The Games themselves will not be measured by this monitoring framework.	The Games themselves will be the subject of appropriate content in future editions of this report.		Not applicable

1.5 Relationship to other TfL/GLA Group publications

Travel in London is one of several regular reports produced by TfL and the GLA Group that deal with transport and related developments in London. Travel in London is distinguished through the provision of:

- An interpretative analysis of trends and developments in relation to the key Mayoral transport priorities on an annual basis.
- The established role of Travel in London, and its predecessor TfL's London Travel Report, in providing, disseminating and analysing key datasets and statistics describing trends in travel and transport in London.
- Provision of more in-depth analysis of specific 'Spotlight' topics, reflecting issues of particular contemporary interest at the leading edge of policy or scientific development.

Other publications related to transport in London, include:

- The Mayoral strategies and their supporting documents.
- TfL's annual Business Plan – which primarily deals with TfL's 'outputs', such as large-scale investment plans and high-profile capital projects, and tracks an extensive range of delivery-focused KPIs for the organisation.
- Specific TfL reports focusing on issues such as traffic trends, the environmental performance of the organisation or the Underground Public–Private Partnership.
- Various other statistical compendia and reference documents produced by the GLA Group or Central Government departments, such as the DfT.

Travel in London draws on this other material as appropriate in providing its assessment – and cross-references with notes on sources are given in the text for readers interested in pursuing specific topics in more detail.

1.6 Contents of this report

This second Travel in London report is organised over 12 further chapters.

- **Chapter 2** looks at key travel trends – aggregate volumes of travel in London, mode shares and trends in these indicators over time.
- **Chapter 3** focuses on travel by Londoners. The travel behaviour of London residents is surveyed annually in depth through TfL's LTDS survey. Results from this survey tell us much about how Londoners use the transport system – the purposes for which they travel; when, where and how – and the ways in which their socio-demographic characteristics are related to the travel choices that they make.
- **Chapter 4** examines the operational performance of the transport networks in London – looking at levels of service provision and at outcomes such as journey times, journey time reliability and crowding across the different travel modes.
- **Chapter 5** looks at developments to the main 'demand drivers' underlying travel patterns – population and economic trends. It also considers ways in which the transport networks support the economy of London – through providing accessibility to jobs for workers, to the labour force for employers, and to essential services for all.

- **Chapter 6** considers aspects of the safety and security of Londoners while using the transport system.
- **Chapter 7** explores trends in climate change (CO_2) emissions from transport.
- **Chapter 8** focuses on how the transport system contributes to Londoners' overall quality of life, considering themes such as accessibility to the transport system, fares and prices, transport and socio-demographic diversity, journey experience and customer satisfaction and perceptions.
- **Chapter 9** looks at quality of life, in terms of how Londoners perceive aspects of the journey experience, and customer satisfaction with the different modes and aspects of the travel environment. It then examines local air quality, setting out trends in emissions of key local air pollutants NO_x and PM_{10}, and ambient noise in London

There are then four 'Spotlight' topics, which are new to this second Travel in London report.

- **Chapter 10** is the first 'Spotlight' topic. It focuses on the London sub-regions, expanding the material presented for the first time last year. It draws on the evidence being produced for the 'Challenges and Opportunities' documents for each of the five London sub-regions, which were shared with the boroughs in February 2010.
- **Chapter 11** considers the Central London and what can be learned from both established and new data on travel to and from this area of London. There has been a new survey in 2009– the Central Area All-Day Count (CAADC), which expands the traditional annual morning peak time survey (CAPC) and gives information across the working day. The chapter then focuses on the impacts of the Congestion Charging scheme – updating established traffic and congestion time-series previously published in TfL's annual Congestion Charging Impact Monitoring Reports. It also presents a new fundamental analysis of the relationship between traffic volumes, road network capacity and congestion in Central London.
- **Chapter 12** looks at the impact of the recession on travel trends in London. The 2008-09 recession was the deepest and most severe for over 70 years. The events of autumn 2008 were unprecedented, at least in recent times, in the suddenness of their onset, their rapid development and their sheer scale. These characteristics give a unique opportunity to examine how travel demand has responded to significantly changed economic conditions, largely in isolation from otherwise confounding 'background' trends.
- **Chapter 13** focuses on cycling and walking, both of which are high-profile Mayoral priorities. The chapter reviews the available evidence in elucidating features that facilitate the choice and use of these modes by Londoners – in this way contributing to the development of policies to further the Mayor's vision for these modes.

There are three Appendices to this report:

- A 'Notes and definitions' section provides supplementary information on definitions and statistical sources (Appendix A).

- Appendix B presents disaggregate borough-level data in respect of key indicators for the monitoring of borough Local Implementation Plans (LIPs), to be updated each year.
- Appendix C provides more information on aspects of travel by London residents, extending the material that is summarised in chapter 3 of this report, based on TfL's annual LTDS survey.

1.7 Further information

For specific technical queries on the contents of this report, readers are directed in the first instance to contact:

TILenquiries@tfl.gov.uk

2. Travel trends in London

2.1 Introduction

This chapter looks at broad travel trends in Greater London, in terms of volumes (typically numbers of people), mode shares (the forms of transport used), and trends for individual travel modes, focusing on developments over more recent years.

2.2 Review of long-term trends in travel in London

Travel in London report number 1 consolidated historic information on travel trends in the Capital over the last 20 years or so, and highlighted some clear long-term developments that have both shaped today's travel patterns, and given rise to challenges to which the Mayor's Transport Strategy responds. Principal among these developments were:

- Sustained growth in demand for travel, reflecting population and employment growth but also wider social and economic factors. For example, on an average day in 2007, 23 per cent more journey stages were made to, from or within London than in 1993.
- A shift in mode share away from the car towards more sustainable public transport, walking and cycling.
- Growth in demand for travel by bus and Underground, with Underground patronage in 2008/09 at an all-time high and strong growth in bus travel.
- A now well-established trend towards declining volumes of road traffic, particularly affecting Central and Inner London, reflecting the wider trends in mode share but also a variety of factors specific to the road network.

The following sections update key statistics for the 2008 calendar year or 2008/09 financial year, as appropriate, and extend the analysis of historic trends previously presented.

2.3 Recent developments

The main developments this year are summarised in the Overview section at the front of this report.

2.4 What is travel and how do we measure it?

Understanding how travel is measured is important as there are several different definitions in general use. Each of these, when subjected to appropriate analysis, is capable of providing different insights into the nature and extent of travel.

At its most basic, travel consists of the movement of people. Travel may be considered from many points of view, ranging from consideration of the behaviour of individual people, or identifiable groups of people, to measuring travel activity in aggregate. In this chapter the focus is mainly on the latter, addressing the questions of how much travel takes place within Greater London (or to and from Greater London), how this has varied in recent years, and how the totality of travel breaks down between the different methods of travel or 'travel modes' (ie mode shares).

A number of different methods are used to compile statistics of travel. Some are simply based on counts, for example the number of vehicles using the road or passengers on public transport, while others are derived from sources related to the provision of transport services, such as ticket sales or Oyster card validations – used for example to determine the number of trips made by bus and Underground. Such on-mode data generally provide the best estimates of aggregate travel demand by all people travelling in London.

Data on complete trips, on the other hand, are best collected by interview surveys such as TfL's LTDS survey (see chapter 3 of this report) asking people about their travel. Such survey data are essential for relating the analysis of travel behaviour to the gross measures of travel demand that are derived from counting people in the course of travel. Each approach therefore contributes to the overall understanding of travel demand.

2.5 Different measurements of travel

Among the different measures of travel in general use, **trips** and **journey stages** are among the most common. Much of the material in the remainder of this chapter is based on these concepts. Chapter 3 of this report, which focuses on London residents through TfL's LTDS survey, additionally discusses travel in terms of distance travelled and time spent on travelling. Further information on different measures of travel is given in the Notes and definitions section of this report (Appendix A).

2.6 Trips in London

Estimates of the daily average number of trips in Greater London (including trips to or from London) are given in Table 2.1 for years 1993 to 2008. They include trips by both London residents and non-residents, such as commuters, visitors and tourists. Trips are classified according to 'main mode' – defined as the mode usually used for the longest distance stage of multi-stage trips.

During 2008 as a whole, the number of trips made to, from or within London was closely comparable to that of 2007, at 24.4 million. This is despite the impacts of the financial turmoil during the second half of the year. The number of trips in London has increased steadily year by year since 1993, interrupted in 2005 as a reflection of the London bombings of that year. At the same time there has been a substantial increase in the share of these trips by public transport and a corresponding decline in trips by private transport, principally the private car. Public transport, which accounted for 24 per cent of London trips in 1993, had increased in share to 33 per cent by 2008 – a 9 per cent net shift in mode share at the trip level since 1993.

The decline in numbers of trips by private transport is deduced from the trends observed in road traffic (see section 2.11). When converted into numbers of trips, main mode car trips (including both drivers and passengers) were 10.2 million per day in 1993, rising gradually to a peak of 10.5 million per day in 1999 and subsequently declining, to 9.8 million per day in 2005 and 9.9 million in 2008. Private transport trips accounted for 50 per cent of London trips in 1993, but only 41 per cent in 2008 (Table 2.2).

However, overall trip rates have been relatively constant at between 2.7 and 2.8 trips per person per day throughout this period. Most of the increase in total numbers of trips is therefore associated with population growth. London's resident population increased by 11 per cent between 1993 and 2008. In addition, there are about an extra one million people a day travelling in London – made up of daily visitors such as commuters from outside London, and longer-term visitors such as tourists. Together with the resident population, they make up the larger 'daytime population' of London. This daytime population increased at a slightly higher rate of 12 per cent between 1993 and 2008. Over the same period, the daily average number of trips increased by 17 per cent, which implies a relatively modest increase of 4 per cent in the number of trips made per person over that 15 year period.

Table 2.1 Daily average number of trips in Greater London, 1993 to 2008, by main mode.

Millions of trips

Year	Rail	Under-ground /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	2.0	2.4	0.3	6.8	3.6	0.2	0.3	5.5	22.6
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	5.5	23.1
2003	1.8	1.9	3.2	0.3	6.7	3.5	0.2	0.3	5.5	23.4
2004	1.8	2.0	3.3	0.3	6.6	3.4	0.2	0.3	5.6	23.5
2005	1.8	1.9	3.2	0.3	6.5	3.4	0.2	0.4	5.6	23.3
2006	1.9	2.0	3.1	0.3	6.5	3.6	0.2	0.4	5.7	23.7
2007	2.1	2.1	3.3	0.4	6.4	3.8	0.2	0.5	5.7	24.4
2008	2.2	2.1	3.5	0.3	6.3	3.6	0.2	0.5	5.7	24.4

Source: TfL Planning
1. Trips are complete one-way movements from one place to another.
2. Trips may include use of several modes of transport and hence be made up of more than one journey stage.
3. In Tables 2.1 and 2.2 trips are classified by the mode that is typically used for the longest distance within the trip.
4. Round trips are counted as two trips, an outward and an inward leg.

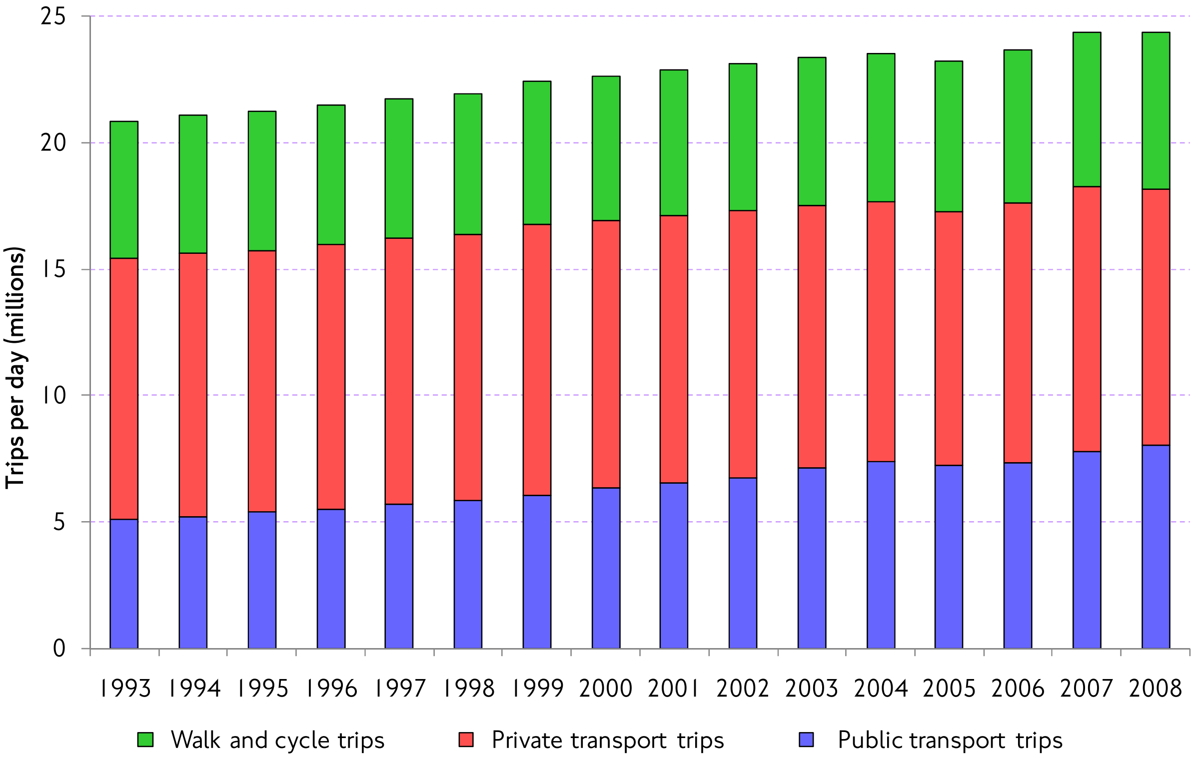
Table 2.2 Trip-based mode shares – public and private transport, 1993 to 2008, by main mode.

Percentage of trips

Year	Public transport	Private transport	Cycle	Walk
1993	24%	50%	1%	25%
1994	25%	49%	1%	25%
1995	25%	49%	1%	25%
1996	26%	49%	1%	24%
1997	26%	48%	1%	24%
1998	27%	48%	1%	24%
1999	27%	48%	1%	24%
2000	28%	47%	1%	24%
2001	28%	46%	1%	24%
2002	29%	46%	1%	24%
2003	31%	44%	1%	24%
2004	31%	43%	1%	24%
2005	31%	43%	2%	24%
2006	31%	43%	2%	24%
2007	32%	43%	2%	23%
2008	33%	41%	2%	24%

Source: TfL Planning

Figure 2.1 Aggregate travel volumes in Greater London. Estimated daily average number of trips, 1993 to 2008.



Source: TfL Planning

2.7 Journey stages in London

Trips may also be broken down into their component 'journey stages'. These are the segments of a trip, with each stage using a single mode of transport. Table 2.3 brings together the available data on average daily numbers of journey stages by all modes of transport in London, between 1993 and 2008. These are consistent with the numbers of trips, by main mode, in Table 2.1.

Given the variety of sources it is not possible to be wholly consistent between the different modes in the derivation of journey stages (some points of definition are noted in the footnotes to the table and Appendix A). Nevertheless, the table (together with Table 2.1) gives the best available estimates of aggregate travel in London, and shows the relative usage of the different modes of transport. This allows trends in mode shares across London at the journey stage level to be tracked over time. **Mode shares based on journey stages** is TfL's preferred measure for the assessment of mode shares.

About 28 million journey stages were made in Greater London on an average day in 2008, an increase of 0.6 per cent compared with 2007. This includes stages of trips with either origin or destination, or both, within the Greater London area. It includes trips by both London residents and non-residents such as commuters, visitors and tourists. The most significant omission is those walk stages that are not complete trips but which are made to access, or link, stages made by other modes of transport – for example, to the Underground after arrival at a National Rail terminal. Most of these 'linking' walks are very short. The only walks included in Table 2.3 are trips undertaken by London residents entirely on foot. The table does not include walk trips by non-London residents within London.

The average daily number of journey stages increased from 23.0 million in 1993 to 28.4 million in 2008, an increase of 24 per cent. Over the same period, the London resident population grew at a lower rate, increasing by 11 per cent, so that the number of journey stages by residents also increased. When commuters and visitors to London are included, the average rate of travel, in terms of journey stages per person per day, is estimated to have increased from 3.0 in 1993 to 3.3 in 2008, an indicative increase of 10 per cent. When set against the equivalent estimated 4 per cent increase in the average number of trips per person (see section 2.6), this indicates that trips in London are tending to become more complex, in terms of their number of component stages.

This growth in the number of journey stages to, from or within London is illustrated by Figure 2.2, which also shows the basic mode split between public and private transport, walking and cycling.

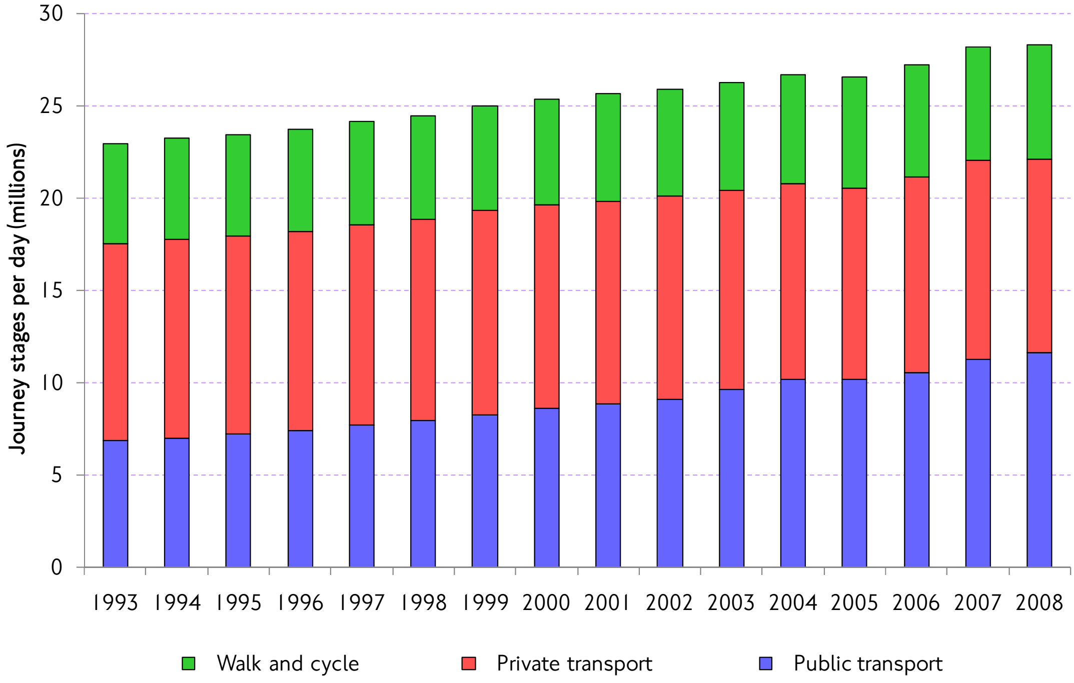
Table 2.3 Aggregate travel volumes in Greater London. Estimated daily average number of journey stages by mode, 1993 to 2008.

Millions of journey stages

Year	Rail	Under-ground	DLR	Bus (incl tram)	Taxi /PHV	Car driver	Car passenger	Motor cycle	Cycle	Walk	All modes
1993	1.4	2.0	-	3.1	0.3	6.8	3.7	0.2	0.3	5.2	23.0
1994	1.4	2.1	-	3.1	0.3	6.8	3.8	0.2	0.3	5.2	23.2
1995	1.5	2.1	-	3.3	0.3	6.8	3.7	0.2	0.3	5.2	23.4
1996	1.5	2.1	-	3.4	0.3	6.9	3.8	0.2	0.3	5.3	23.8
1997	1.6	2.2	0.1	3.5	0.3	6.9	3.8	0.2	0.3	5.3	24.2
1998	1.7	2.4	0.1	3.5	0.4	6.9	3.8	0.2	0.3	5.3	24.4
1999	1.8	2.5	0.1	3.5	0.4	7.1	3.8	0.2	0.3	5.4	25.0
2000	1.8	2.6	0.1	3.7	0.4	7.0	3.8	0.2	0.3	5.5	25.4
2001	1.8	2.6	0.1	3.9	0.4	7.0	3.8	0.2	0.3	5.5	25.7
2002	1.9	2.6	0.1	4.2	0.4	7.0	3.8	0.2	0.3	5.5	26.0
2003	1.9	2.6	0.1	4.6	0.4	6.9	3.7	0.2	0.3	5.5	26.3
2004	2.0	2.7	0.1	5.0	0.4	6.8	3.6	0.2	0.4	5.6	26.7
2005	2.0	2.6	0.1	5.0	0.4	6.6	3.5	0.2	0.4	5.6	26.6
2006	2.1	2.7	0.2	5.2	0.4	6.6	3.7	0.2	0.5	5.7	27.3
2007	2.3	2.9	0.2	5.4	0.4	6.6	4.0	0.2	0.5	5.7	28.2
2008	2.4	3.0	0.2	5.7	0.4	6.5	3.8	0.2	0.5	5.7	28.4

Source: TfL Planning
1. A journey stage is a part of a trip made by a single mode of transport.
2. Rail interchanges between train operating companies start a new journey stage.
3. Bus journey stages are counted by starting a new stage each time a new bus is boarded.
4. Underground journey stages are counted by station entries; interchanges within stations are ignored.
5. Walks are counted only when they form complete trips (ie walking all the way), not when they are part of trips using other modes of transport.

Figure 2.2 Aggregate travel volumes in Greater London. Estimated daily average number of journey stages, 1993 to 2008.



Source: TfL Planning

Note on car occupancy and revisions to estimates

Additional data have enabled changes in vehicle occupancy to be estimated and used to improve the estimates of car trips in Tables 2.1 to 2.4.

The occupancy of cars has been increasing since 2001. The estimated average occupancy was 1.55 in 1991, 1.54 in 2001 and 1.59 in the 3 years to 2008/09. This is an estimated 3 per cent increase in car occupancy since 2001. This implies more 'car passenger' trips, while the number of 'car driver' trips is based on the traffic estimates and is therefore unchanged for years before 2007.

Some other revisions have been made to the estimates of London trips and journey stages by mode of transport, as a result of additional data becoming available from TfL's surveys, including the LTDS survey, revisions to other statistical series used as source data, and some improvements in the estimation methodology made by TfL.

These differ from the methodology change described in the note on bus trips and journey stages in section 2.9 of this report. The former revisions are about improved estimates from existing sources affecting the annual series since 1993, while the latter are from newly available independent data since 2007/08. Changes to method always require careful handling. Travel in London always shows comparable results, and comparisons between years are based on consistent series.

MTS strategic outcome indicator: Travel demand

Why this indicator is important

The number of trips made in London in a calendar year is a measure of the total demand for travel that is accommodated each year by the transport system, its infrastructure, networks and levels of service. It is a key statistic for understanding the context for the Mayor's draft Transport Strategy. Understanding how travel demand changes over time in relation to changes in population and employment, as well as in response to changes in transport supply, is dependent on having a consistent measure of total travel, both for monitoring and as a basis for forecasting future demand. The draft MTS is predicated on stated assumptions and projections concerning future growth in travel demand. This indicator (with the trends and mode share indicators derived from it) provides the means to check at a basic level the continuing validity of these assumptions.

How this indicator is calculated

Statistics of total trips are built up from estimates of journey stages for individual modes of transport. These are from a variety of sources dependent on the modes. For public transport, statistics of passenger journeys are derived from ticket sales or smart card (Oyster) validations supplemented where necessary by station gate counts or by surveys. Private road transport journey stages are estimated from the traffic series (vehicle kilometres) which is based on data from manual and automatic roadside counts of vehicles. Traffic estimates are converted to person journey stages using vehicle occupancy and conversion factors from survey data. Other modes, including walking and cycling, are measured from TfL's continuous survey programme. Estimates for individual modes are in terms of journey stages, and these must be converted to trips, classified by main mode taking account of the incidence of multi-modal trip making and the numbers of stages per trip for each main mode.

Values for 2008 calendar year and comparisons with 2007

Numbers of both trips and journey stages in London have grown consistently over recent years. The values for 2008 were closely comparable to those of 2007, the decline in the rate of growth compared to previous years, in part reflecting the economic situation in the latter half of the year.

There was an average 24.4 million trips per day in calendar year 2008, giving an annual total of 8.9 billion trips to, from or within Greater London.

The number of journey stages was 28.4 million on an average day, and 10.4 billion in the year.

These estimates are from the consistent series shown in Tables 2.1 and 2.3. When the method change explained in section 2.9 is taken into account, the 2008 baseline estimate of daily trips increases to 24.8 million and that of journey stages to 28.9 million.

2.8 Mode shares

From Table 2.3 it is possible to estimate stage-based mode shares. Table 2.4 shows how total travel in London is distributed between the principal modes of transport.

Table 2.4 Percentage shares of journey stages by type of transport, 1993 to 2008.

	Percentage of journey stages			
Year	Public transport	Private transport	Cycle	Walk
1993	30%	46%	1%	22%
1994	30%	46%	1%	22%
1995	31%	46%	1%	22%
1996	31%	45%	1%	22%
1997	32%	45%	1%	22%
1998	33%	44%	1%	22%
1999	33%	44%	1%	22%
2000	34%	43%	1%	21%
2001	34%	43%	1%	21%
2002	35%	42%	1%	21%
2003	37%	41%	1%	21%
2004	38%	40%	1%	21%
2005	38%	39%	2%	21%
2006	39%	39%	2%	21%
2007	40%	38%	2%	20%
2008	41%	37%	2%	20%

In 2008, 41 per cent of all journey stages were made by public transport modes. This compared to 37 per cent made by private transport – principally private cars. Walk all the way trips accounted for just over one fifth of all journey stages, with bicycles accounting for 2 per cent of all journey stages.

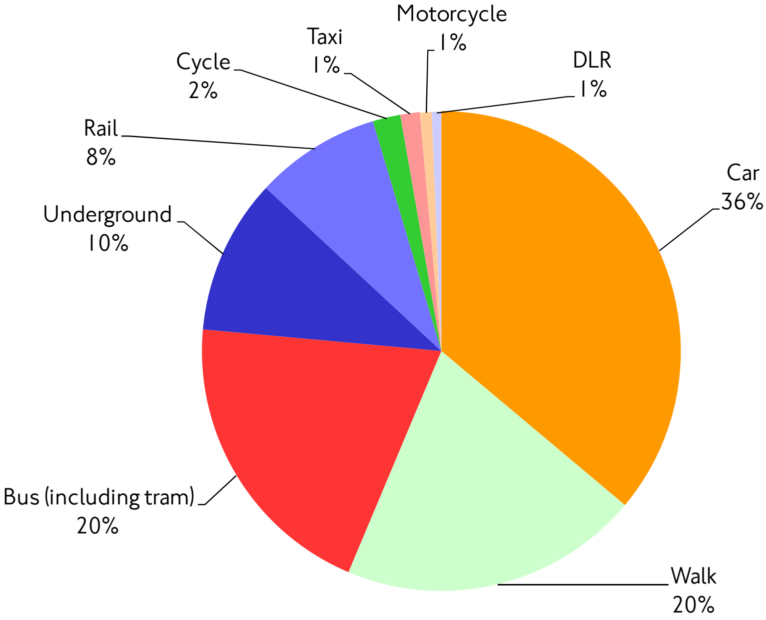
Looking at how these trends have developed over time, and bearing in mind the technical caveats applying to these data (see Table 2.3 footnotes), the basic trend of a substantial net shift away from private transport to the public modes in London is clear. In the early 1990s public transport accounted for just under 30 per cent of all journey stages, and the latest value for 2008 suggests an aggregate net shift of around 11 percentage points. The shares of all journey stages accounted for by private transport and walking have fallen by 9 and 2 percentage points, respectively, over the same period. Cycling has progressively increased its mode share over the period.

Journey stages by public transport modes (defined as bus, Underground, DLR, Rail, taxis and private hire vehicles) increased in share from 30 per cent in 1993 to 34 per cent by 2000, and to 41 per cent by 2008. This 7 percentage point increase in the share of public transport stages between year 2000 and 2008 is equivalent to the 5 percentage point increase in trip-based mode share for public transport in London as highlighted in section 2.6 (see also Table 2.2).

These shifts in stage-based mode share have taken place against a backdrop of increased aggregate travel volumes, reflecting among other things population and employment growth. Thus, within the context of increased overall travel, the net shift in mode share towards public transport simultaneously achieved in London has contributed to travel overall becoming more sustainable.

Figure 2.3 illustrates the journey stage-based mode share for all travel in London in 2008, based on Table 2.3. Chapter 3 of this report looks more specifically at travel trends and mode shares for London residents, drawing on TfL's LTDS survey.

Figure 2.3 Modal shares of daily journey stages in London, 2008.



Source: TfL Planning

MTS strategic outcome indicator: Mode share

Why this indicator is important

Whereas the total numbers of trips and journey stages are measures of the demand for travel, the split between different means of transport shows how the demand is being met and is a starting point for assessing the overall sustainability and economic efficiency of existing transport provision.

How this indicator is calculated

The indicator is derived by calculating percentage shares for each mode of transport from the data which make up the aggregate indicators of travel demand in London. Modes may be classified into the following broad groups: public transport, private transport, cycling and walking.Two measures of mode share may be derived from the statistics of trips and journey stages, respectively. **The journey stage-based measure is used as the primary indicator** because it is the one that may be continuously monitored from modal data and impacted by policies directed at individual modes. The measure based on **trips** (see Table 2.2) reflects the outcomes in terms of people's actual travel behaviour. Both measures are needed for a full understanding.

Values for 2008 calendar year and recent trend

Mode shares in 2008 were: public transport 41 per cent, private transport 37 per cent, walking 20 per cent and cycling 2 per cent. This is based on journey stages.

The journey stage-based mode share of public transport increased by 7 percentage points between 2000 and 2008.

These estimates are from the consistent series shown in Table 2.4. When the method change explained in section 2.9 is taken into account, the 2008 baseline estimate changes slightly. All comparisons over time will be presented on a consistent basis.

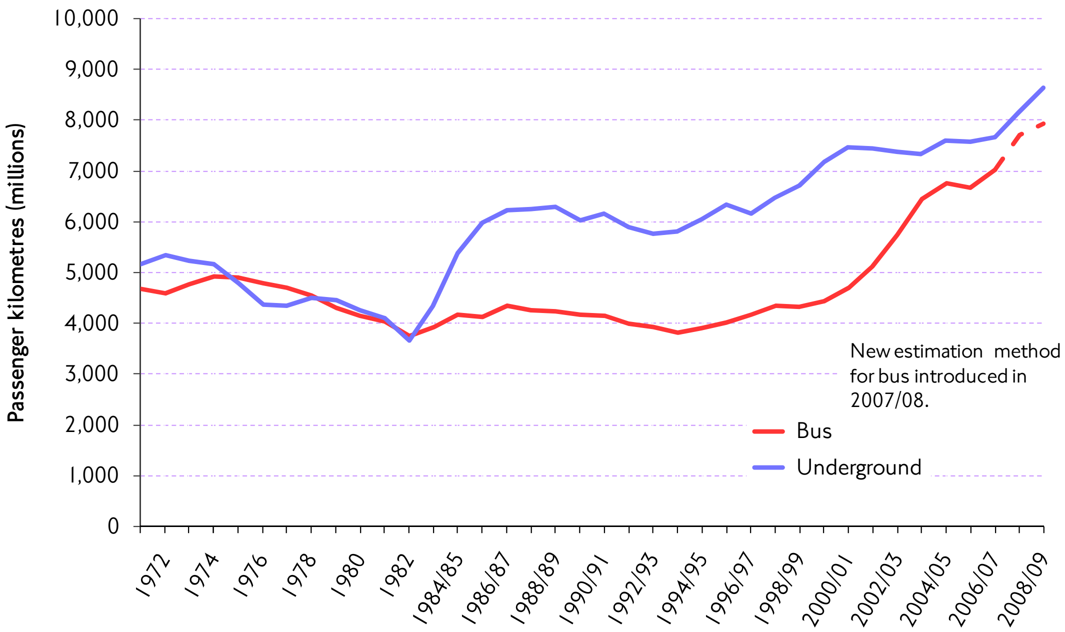
2.9 Trends in travel by public transport

This section considers trends in the use of the mass public transport modes operated by TfL in London, including London Buses, LU, DLR, and London Tramlink. London Overground (also operated by TfL) and National Rail are discussed in section 2.10. River services, licensed taxis and private hire vehicles, which also contribute to public transport in London, are considered in sections 2.14 and 2.13. Note that many of the statistics in this section are based on TfL's financial year (April to March) to accord with TfL's business reporting processes. The estimates for total travel considered in the preceding sections are based on these data, segmented appropriately for calendar years.

Use of mass public transport in London has grown substantially in recent years, and this trend continued in the 2008/09 financial year, despite impacts of the financial turmoil from the second half of 2008. Total passenger kilometres travelled on services operated by TfL were almost 70 per cent higher in 2008/09 than in 1991/92 (Table 2.5). All the individual public transport modes shared in this growth, but it was especially pronounced on the bus network, which has increased patronage by 93 per cent during this period. Between 2000/01 and 2008/09, bus passenger kilometres increased by 64 per cent, compared to 59 per cent up to 2007/08. This is a 'best available' estimate on a consistent basis, taking account of the method change between 2006/07 and 2007/08 – see also the technical note beneath Table 2.6.

The Underground has also seen unprecedented growth in demand, with more than a billion passenger journeys a year. Underground patronage reached its highest ever recorded level in the 2008/09 financial year, with passenger kilometres 16 per cent higher than in 2000/01. LU carries as many passengers as the entire National Rail network, with 3 million passenger journeys made each day on 11 lines serving 270 stations. Figure 2.4 shows the long-term trend for bus and Underground travel in London.

Figure 2.4 Bus and Underground passenger kilometres.



Source: TfL Service Performance data. See note following Table 2.6. The change in the method used to estimate bus passenger kilometres from 2007/08 means that comparisons with earlier years must be treated with caution.

The DLR and London Tramlink have also featured consistent growth since their respective openings, with large year-on-year increases partly reflecting successive extensions to the network and with the most recent value for the DLR reflecting the impact of upgrade work during the course of the year.

Table 2.6 shows trends in public transport patronage in terms of journey stages, as opposed to passenger-kilometres travelled. Substantial and consistent increases are seen across all public transport modes, with the overall number of public transport stages in 2008/09 having increased by more than 70 per cent since the early 1990s, and by almost 40 per cent since 2000/01. These increases reflect a variety of factors, including provision of new infrastructure (DLR and London Tramlink), increased services on existing networks, notably substantial enhancements to the bus network, and wider economic trends affecting travel. Figure 2.5 shows these trends graphically.

Table 2.5 Annual passenger kilometres travelled by public transport (millions), 1991/92 to 2008/09.

	Million passenger kilometres				
Year	Bus	Underground	DLR	Tramlink	Total
1991/92	3,996	5,895	32	-	9,923
1992/93	3,922	5,758	33	-	9,713
1993/94	3,819	5,814	39	-	9,672
1994/95	3,912	6,051	55	-	10,018
1995/96	4,018	6,337	70	-	10,425
1996/97	4,159	6,153	86	-	10,398
1997/98	4,350	6,479	110	-	10,939
1998/99	4,315	6,716	139	-	11,169
1999/00	4,429	7,171	152	-	11,753
2000/01	4,709	7,470	195	-	12,374
2001/02	5,128	7,451	207	97	12,883
2002/03	5,734	7,367	232	100	13,432
2003/04	6,431	7,340	235	103	14,110
2004/05	6,755	7,606	243	113	14,717
2005/06	6,653	7,586	257	117	14,613
2006/07	7,014	7,665	301	129	15,109
2007/08	7,714	8,155	327	138	16,334
2008/09	7,942	8,641	318	142	17,043

Source: TfL Service Performance data.
Note: Figures include travel on bus and Underground services operated by TfL beyond the Greater London boundary. Note also re-estimation of bus data series in 2007/08, affecting quoted change percentages. See also methodological note following Table 2.6.

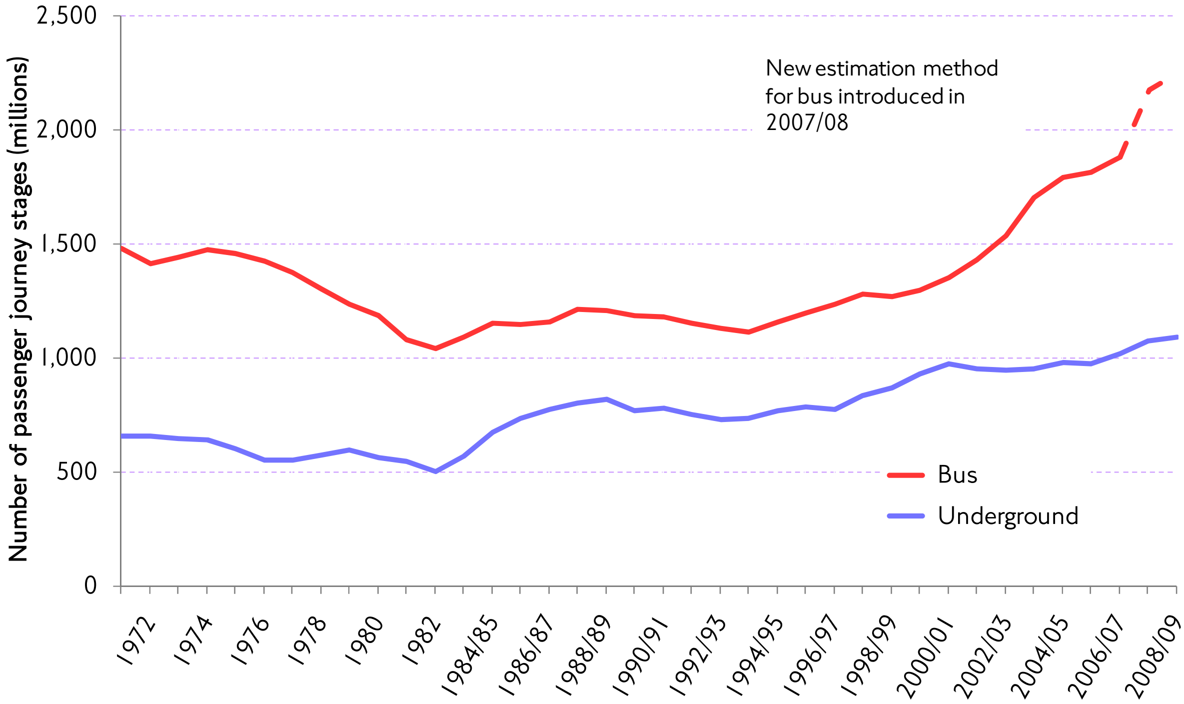
Table 2.6 Annual journey stages by public transport (millions), 1991/92 to 2008/09.

	Million journey stages				
Year	Bus	Underground	DLR	Tramlink	Total
1991/92	1,149	751	8	-	1,908
1992/93	1,127	728	7	-	1,862
1993/94	1,112	735	8	-	1,855
1994/95	1,159	764	12	-	1,935
1995/96	1,198	784	15	-	1,997
1996/97	1,234	772	17	-	2,023
1997/98	1,277	832	21	-	2,130
1998/99	1,267	866	28	-	2,161
1999/00	1,296	927	31	-	2,254
2000/01	1,354	970	38	-	2,362
2001/02	1,430	953	41	19	2,443
2002/03	1,536	942	46	19	2,543
2003/04	1,702	948	49	20	2,718
2004/05	1,793	976	50	22	2,840
2005/06	1,816	971	53	22	2,862
2006/07	1,880	1,014	61	25	2,981
2007/08	2,176	1,072	67	26	3,341
2008/09	2,247	1,089	66	27	3,429

Source: TfL Service Performance data.
Note: From 2007/08 TfL changed the methodology used to estimate annual bus journeys. Before 2007/08 the statistics were based on ticket sales (supplemented by survey data used to estimate the rate of use of period tickets). From 2007/08 onwards the estimates are derived from Oyster card

validations wherever appropriate. The new series also includes some bus journeys not previously counted, including journeys using staff and police passes and bus travel by under five-year-olds. It is estimated that the net effect of these changes was to increase the estimates of bus journey stages by about 10 per cent and passenger kilometres by about 3 per cent. The pre-2007/08 series has not been revised. According to the new methodology, journey stages by bus in 2006/07 are estimated at 2,069 million, with a total distance travelled of 7,215 million passenger kilometres, compared to 1,880 million journey stages using the previous method.

Figure 2.5 Bus and Underground passenger journey stages.



Source: TfL Service Performance data
See note under Table 2.6. The change in the method used to estimate bus passenger kilometres from 2007/08 means that comparisons with earlier years must be treated with caution.

Note on bus trips and journey stages

Estimates of bus trips and journey stages are derived from the statistics of public transport stages by four-week reporting periods that are used by TfL to monitor public transport patronage against performance targets. Before 2007/08 these statistics were derived from ticket sales, supplemented where necessary by surveys to estimate the use of period tickets. From 2007/08 revised estimates have been available using numbers of Oyster card validations as the primary source. This new method provides more robust estimates of total bus and tram use, including (for the first time) children under 5 years of age, and travel by staff and police (see also the note following Table 2.6).

Estimates for calendar years 2007 and 2008 have been made, based on the new method. Table 2.7 shows the daily average numbers of bus (including tram) trips and stages in Greater London from 2005 to 2008 and the effects of the estimation method change in 2007/08, which adds almost 0.4 million bus trips and 0.5 million journey stages to the daily average, and increases the estimate of bus mode shares by 1 percentage point.

It is important to make comparisons on a consistent basis. Travel in London does so. Therefore, Tables 2.1 and 2.3 show the estimates for 2007 and 2008 on the old basis in order to present a consistent series for the whole period from 1993 to 2008. The mode shares shown in Table 2.2 and 2.4, and the associated commentary on trends are all based on this consistent series.

Table 2.7 Effect of method change relating to bus trips and journey stages.

	Million trips			
	bus trips		**total trips (all modes)**	
	old method	new method	old method	new method
2005	3.2		23.3	
2006	3.1		23.7	
2007	3.3	3.6	24.4	24.7
2008	3.5	3.8	24.4	24.8

	Million journey stages			
	bus stages		**total stages (all modes)**	
	old method	new method	old method	new method
2005	5.0		26.6	
2006	5.2		27.3	
2007	5.4	5.9	28.2	28.7
2008	5.7	6.2	28.4	28.9

	Percentage trip based mode share			
	bus trips		**All public transport trips**	
	old method	new method	old method	new method
2005	13.6%		31.1%	
2006	13.2%		31.0%	
2007	13.4%	14.7%	32.0%	33.0%
2008	14.2%	15.5%	33.0%	34.0%

2.10 National Rail travel

Basic statistics of National Rail patronage are compiled by the Office of Rail Regulation (ORR). These do not currently give a clear spatial definition of trips into or within Greater London. However, as is clear from Table 2.8, reflecting patronage on all trains operated by train operating companies defined by the ORR as 'London and the South East operators', the trend has been one of substantial passenger growth. Over the period between 2000/01 and 2008/09, passenger kilometres (all services by these operators, whether in London or outside) grew by 26 per cent. Passenger journeys grew by 29 per cent over the same period. The equivalent year-on-year changes between the 2007 and 2008 calendar years were 4.3 and 4.2 per cent, respectively.

Table 2.8 National Rail: London and the South East operators, passenger kilometres and journeys, 1998/99 to 2008/09.

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	833	8.3
2008/09	24.2	2.9	854	2.5

Source: Office of Rail Regulation, National Rail Trends Yearbook, www.rail-reg.gov.uk .

TfL London Rail operates rail services on the London Overground network within London. The London Overground is currently made up of the following lines: London Euston to Watford Junction (local services only), Richmond to Stratford via Willesden Junction (North London line), Willesden Junction to Clapham Junction via Kensington Olympia (West London line), and Gospel Oak to Barking. Services have been operated by TfL London Rail since November 2007, before which they were operated as Silverlink Metro services.

Passenger journeys by London Overground are included in the totals for London and South East operators in Table 2.8. They amounted to 12.6 million journeys from November 2007 to March 2008 (part year) and 33.1 million in 2008/09. Passenger kilometres on London Overground totalled 162 million in the last five months of 2007/08 and 427 million in 2008/09.

2.11 Road traffic

The amount of traffic in London has fallen in recent years. London traffic fell by over 3 per cent over the period 2000 to 2008, a well-established pattern in London that is now being reflected in other large urban areas in Great Britain. The scale of the decline has been greater in Inner and Central London, partly reflecting policy initiatives such as Congestion Charging in Central London, but also reflecting better public transport and the constraining effect on demand of reductions to the effective capacity of the road network. Road traffic trends in London need to be seen in the context of trends for other modes, and in particular the overall changes in mode share in London, as described in section 2.8 of this report. Within the context of growing demand for travel, there has also been a consistent shift in mode share away from private towards public transport.

Data sources

Road traffic is measured in units of vehicle kilometres, to express the magnitude of total vehicle movements on London roads in a calendar year. The primary sources of data on road traffic are counts of vehicles at points on the network, either from automatic traffic counters (ATC) or by manual enumeration. While ATCs provide a useful source of continuous data at the sites where they are installed, they give only limited breakdown by type of vehicle and therefore need to be supplemented by data from manual counts to give a more complete picture.

Counts measure flows of vehicles at specific points. Count sites may be arranged either to give area coverage to estimate traffic within an area, or along cordons and screenlines to estimate trends in vehicle flows at those locations. Deriving traffic estimates from flows depends on using the count data to estimate average flows over defined sections of the network and converting these to traffic by taking the product of flow and road length. Another way in which counts may be used is to estimate the trends (percentage changes) in flows at a representative set of points and apply these to traffic in a base year to update the traffic estimates.

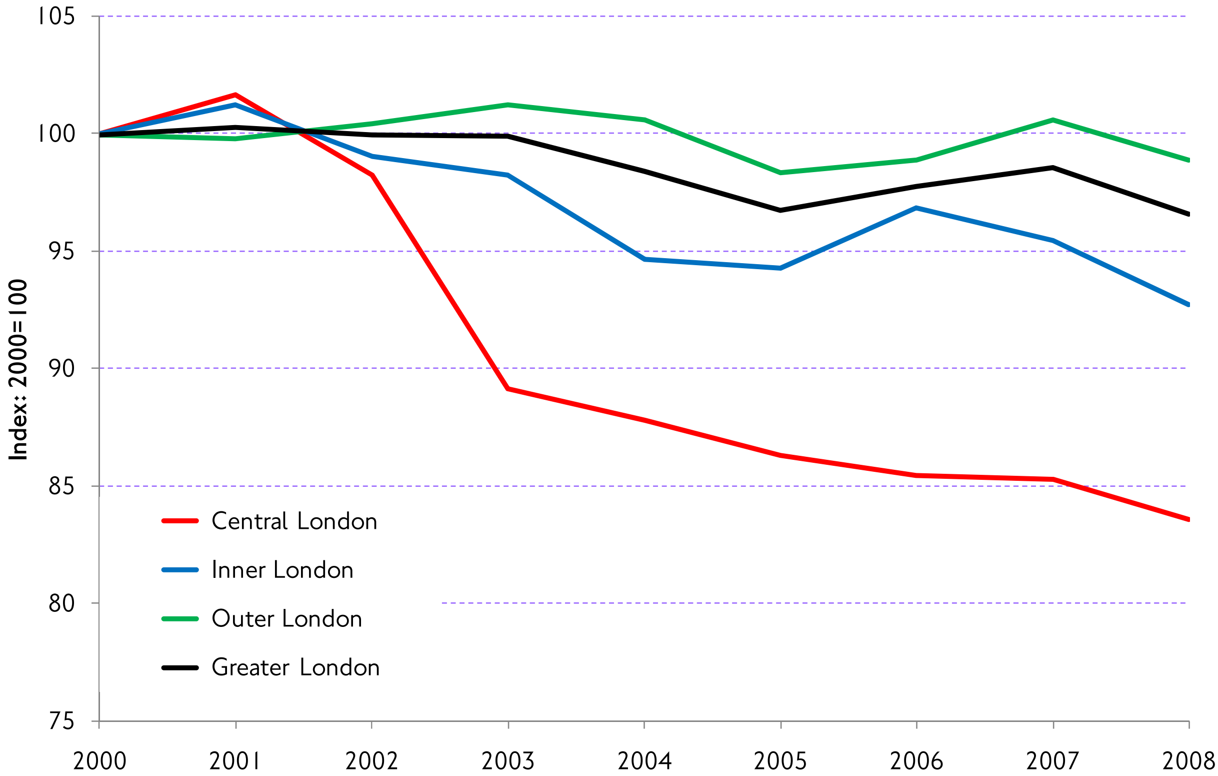
As well as mounting its own programmes of vehicle counts for traffic monitoring, TfL relies on the official statistics of road traffic published by the DfT. The main purpose of DfT's traffic survey is to provide robust estimates for Great Britain as a whole. These estimates are less robust when broken down by area and road type. TfL's analysis for London suggests that the DfT's methodology for estimating minor roads traffic has not reflected minor roads traffic trends in London since 1999 with sufficient accuracy. Therefore TfL produced an alternative set of estimates, which rely heavily on the counts taken in London by the DfT for the national traffic series but are closer to the trends indicated by TfL's own data. The DfT is content for TfL to use these estimates for its own purposes. The results presented in this section, in Tables 2.9 and 2.10, are from this source.

Also shown are results from TfL's programme of annual traffic counts on strategic cordons and screenlines, which continue the series dating back to 1971. These are the primary source for tracking long-term trends for London traffic.

Trends in road traffic in London

Total road traffic in London fell by 2 per cent between 2007 and 2008, having also fallen by 1.4 per cent in the previous seven years between 2000 and 2007. The actual trend (Table 2.9 and Figure 2.6) shows a dip in 2005 to 3 per cent below the 2000 level, recovering slightly in 2006 and 2007 before declining again in 2008. The general decline in London traffic between 2000 and 2007 is in contrast with the trend for traffic in Great Britain as a whole, which increased by 10 per cent between 2000 and 2007. However, GB traffic also fell in 2008, by 0.8 per cent, the first year-on-year decrease recorded since the 1970s.

Figure 2.6 Trends in traffic (vehicle kilometres), all motor vehicles in Central, Inner and Outer London. Index: Year 2000=100.



Source: TfL Planning

Table 2.9 Index of London road traffic (Year 2000=100) in Central, Inner and Outer London: Major and minor roads, all motor vehicles

Year	Central London	Inner London	Outer London	Greater London - major roads	Greater London - minor roads	Greater London - all roads	Great Britain
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2001	101.7	101.2	99.8	100.7	99.5	100.3	101.6
2002	98.2	99.0	100.5	100.3	99.5	100.0	104.2
2003	89.2	98.3	101.3	100.3	99.4	100.0	105.0
2004	87.8	94.6	100.6	99.4	96.8	98.4	106.7
2005	86.3	94.3	98.4	96.0	98.2	96.8	106.9
2006	85.4	96.8	98.9	97.3	98.6	97.8	108.6
2007	85.3	95.4	100.6	99.1	97.6	98.6	109.8
2008	83.6	92.7	98.9	97.4	95.2	96.6	108.9

Source: TfL Planning

In London, the decrease between 2007 and 2008 was highest in Inner London at almost 3 per cent. In Outer London, where there had been a slight increase in traffic between 2006 and 2007, the percentage decrease was lower (1.7 per cent) bringing traffic back to about its 2006 level. Central London traffic fell by 2 per cent in the year to 2008, continuing the steady decline evident since year 2000. Central London traffic in 2008 was 16 per cent less than in 2000. Note that the definition of Central

London used here encloses a larger area than the original Central London Congestion Charging zone, and therefore the impacts of charging in 2003 are only partly reflected (see also chapter 11 of this report).

The decline in traffic between 2007 and 2008 affected both major and minor roads. Minor roads showed the larger percentage decrease, at 2.5 per cent. Major road traffic in London declined by 1.7 per cent, following an increase of similar magnitude in the previous year.

Table 2.10 breaks down the total annual traffic (billion vehicle kilometres) for all motor vehicles by Central, Inner and Outer London. For traffic statistics (in this section and section 12.7), Central London is approximated as the Cities of Westminster and London, and Inner London as all other Inner London boroughs (see Notes and definitions).

Table 2.10 London road traffic (billion vehicle kilometres) by Central, Inner and Outer London, all motor vehicles.

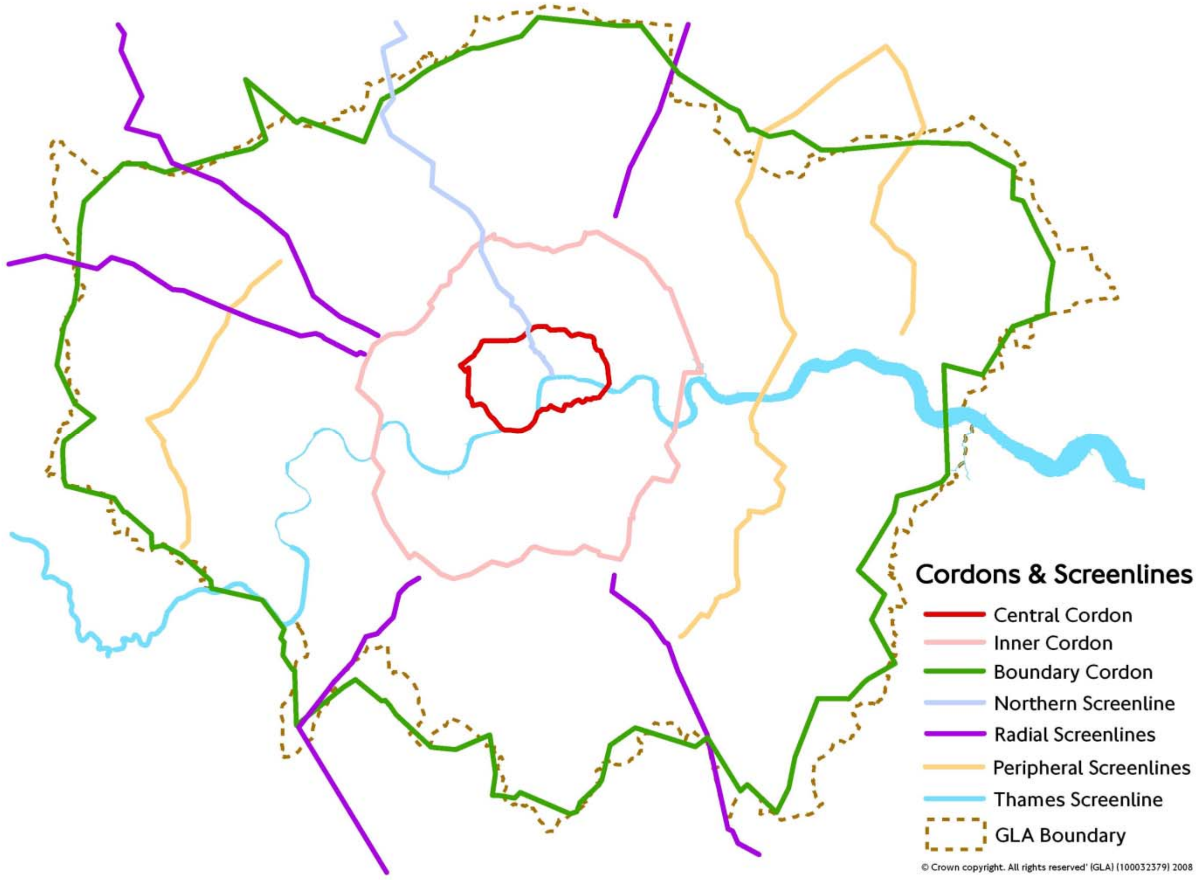
	Billion vehicle kilometres				
Year	**Central London**	**Inner London**	**Outer London**	**Greater London**	**Great Britain**
1993	1.3	8.7	20.7	30.7	412.3
1994	1.3	8.8	21.0	31.1	421.5
1995	1.3	8.9	21.0	31.2	429.7
1996	1.3	8.9	21.3	31.5	441.1
1997	1.3	8.9	21.5	31.7	450.3
1998	1.3	8.9	21.7	31.9	458.5
1999	1.3	9.1	22.3	32.7	467.0
2000	1.3	9.0	22.2	32.5	467.1
2001	1.3	9.1	22.1	32.6	474.4
2002	1.3	8.9	22.3	32.5	486.5
2003	1.1	8.9	22.5	32.5	490.4
2004	1.1	8.6	22.3	32.0	498.6
2005	1.1	8.5	21.8	31.4	499.4
2006	1.1	8.7	21.9	31.8	507.5
2007	1.1	8.6	22.3	32.0	513.0
2008	1.1	8.4	21.9	31.4	508.9

Source: TfL Planning

Traffic trends based on counts across strategic cordons and screenlines

Long-term trends in traffic are also monitored by an annual programme of surveys on strategic cordons and screenlines, shown in Figure 2.7. The main cordons are those around Central London, Inner London and at the Greater London boundary.

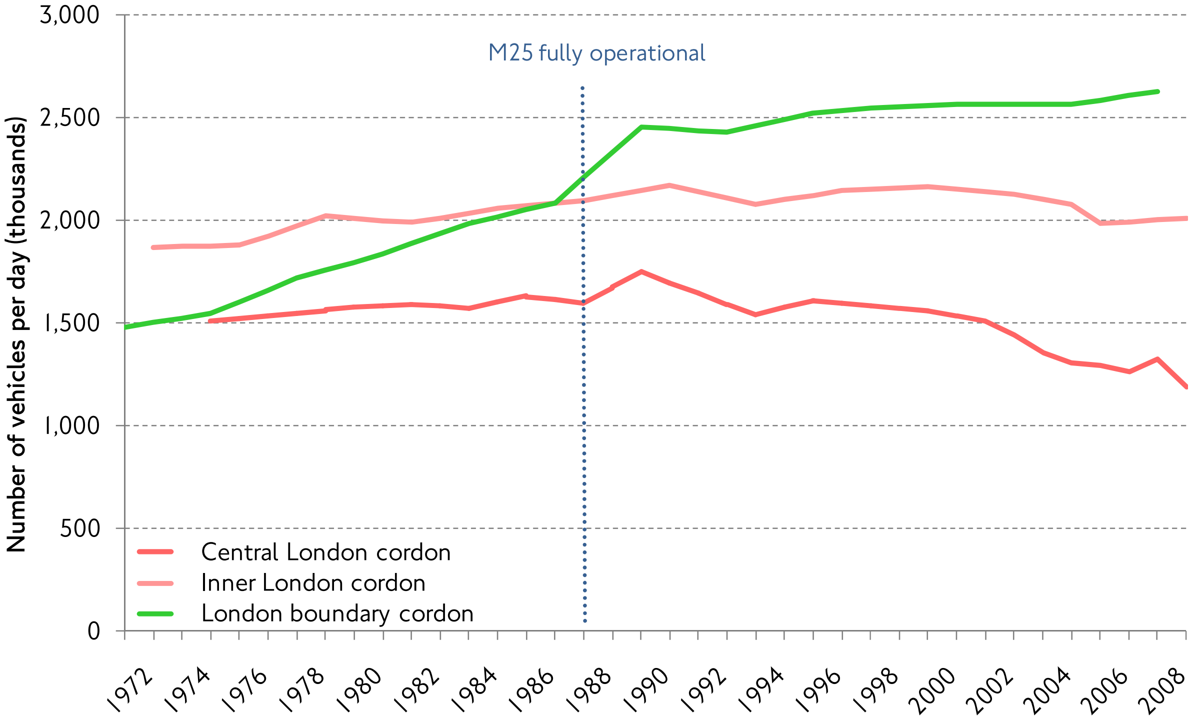
Figure 2.7 Locations of London road traffic cordons and screenlines.



The trends in flows of vehicles crossing the three strategic cordons, in either direction, in a full 24-hour weekday are shown in Figure 2.8.

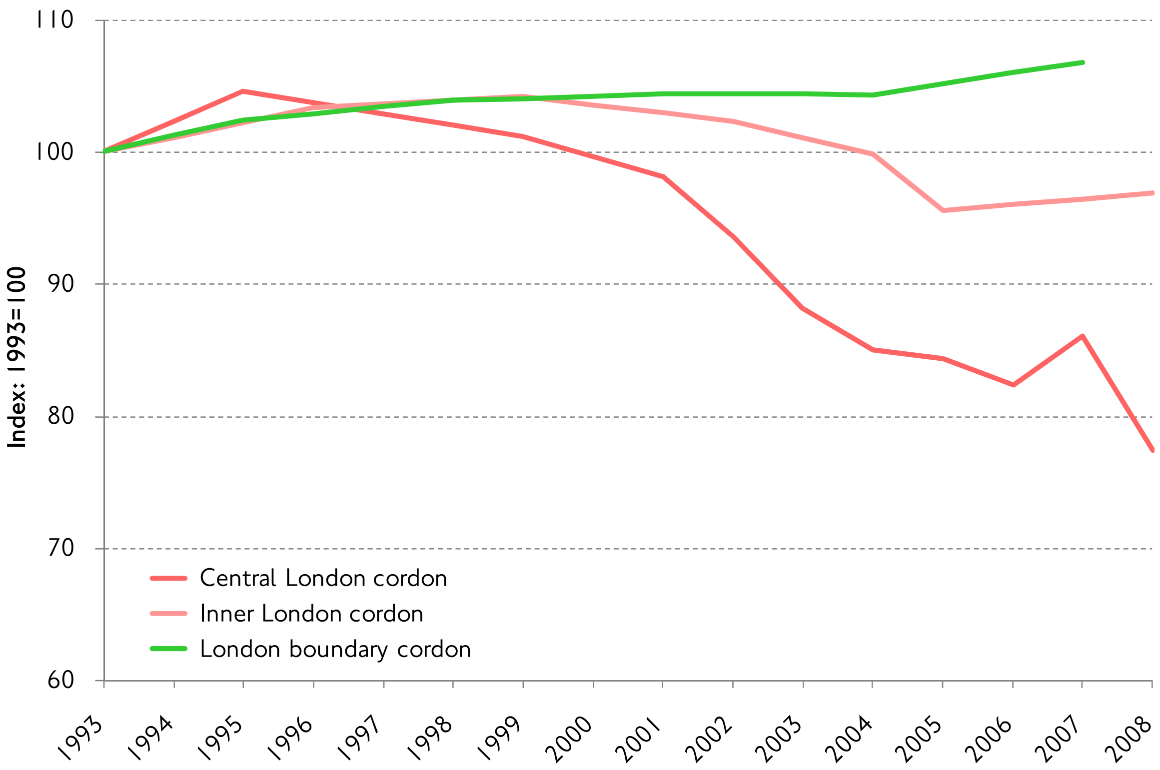
- The volume of traffic crossing into and out of Central London started to reduce during the 1990s and year-on-year decline has been a consistent feature between 1995 and 2008, interrupted only by a small upturn in 2007.
- Similarly there has been a downturn in traffic at the Inner London cordon although this started later and has not been so pronounced as at the central cordon. After increasing between 1993 and 1996, traffic levelled off and began to decline in 2000. The latest survey in 2008 shows a small increase of 1.4 per cent compared with 2005, but traffic flows are still 7 per cent below their peak in 1999.
- Traffic at the London boundary has shown only marginal year-on-year growth throughout most of the 1990s and since year 2000.

Figure 2.8 Long-term trends in vehicle flows across three strategic cordons in London, 24 hour weekdays, both directions, all motor vehicles.



Source: TfL Road Network Performance

Figure 2.9 Trends in vehicle flows across three strategic cordons in London, 24 hour weekdays, both directions, all motor vehicles: Index: Year 1993=100.



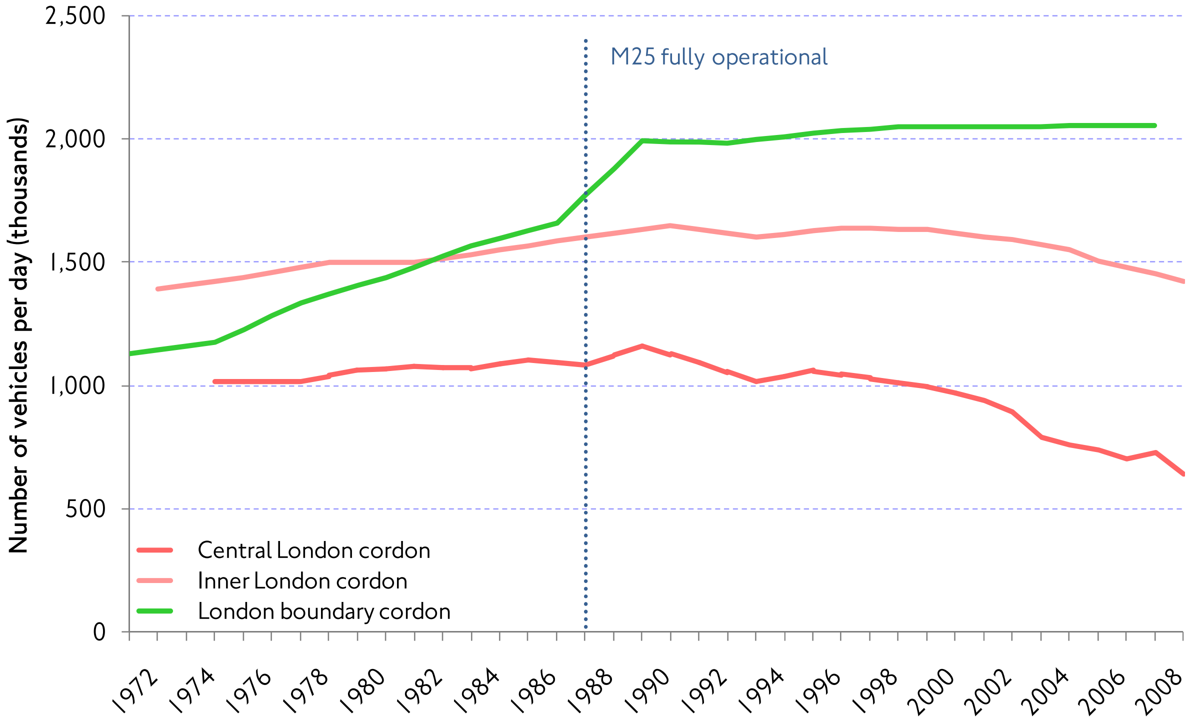
Source: TfL Road Network Performance

Traffic trends by vehicle type – cars

The trends in all motor vehicle flows are dominated by cars, which typically make up about 80 per cent of vehicles at the London boundary, and 75 per cent at the Inner London cordon. For most of the period since the early 1970s when the cordon counts began, cars have accounted for about two-thirds of vehicles crossing the central cordon. However, this percentage, which had been declining since the mid-1990s, decreased further as a result of Central London Congestion Charging introduced in 2003, and in 2008 the car share was only 54 per cent of all motor vehicles at the central cordon. Details of travel volumes and mode shares in relation to Central London are described more fully in chapter 11 of this report.

The flows of cars (Figure 2.10) across the three cordons, therefore, show similar trends to all motor vehicles but with larger decreases at the central and inner cordons, and almost no growth at the London boundary.

Figure 2.10 Long-term trends in vehicle flows across three strategic cordons in London, 24 hour weekdays, both directions, cars, including taxis.



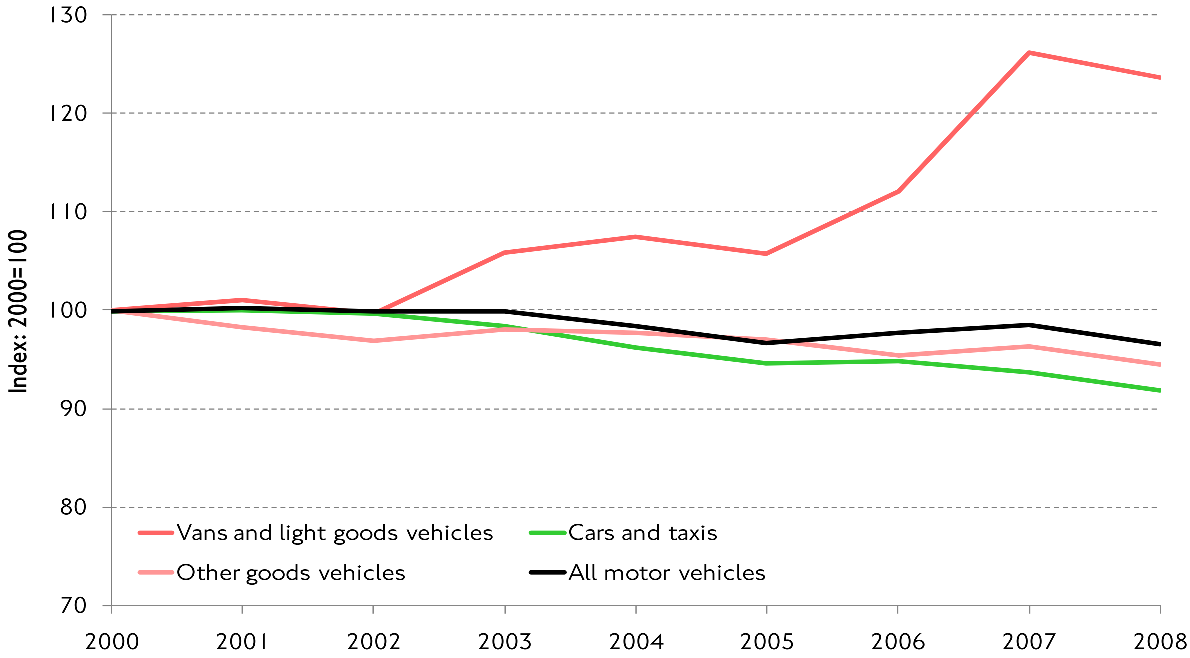
Source: TfL Road Network Performance

Traffic trends by vehicle type – Light goods vehicles and vans

The trends for light goods vehicles (LGVs) and van traffic may be contrasted with that for motor vehicles in general. Alone among the main types of motor vehicle, van traffic has grown substantially in London, increasing by 26 per cent between 2000 and 2007. Over the same period, total traffic fell by about 2 per cent, with car traffic decreasing by 6 per cent and heavy goods vehicles (HGVs) by 4 per cent (Figure 2.11).

Growth in van traffic is also evident at the national level and reflects increased versatility of use of these vehicles. Vans are typically used for a combination of private travel and business use.

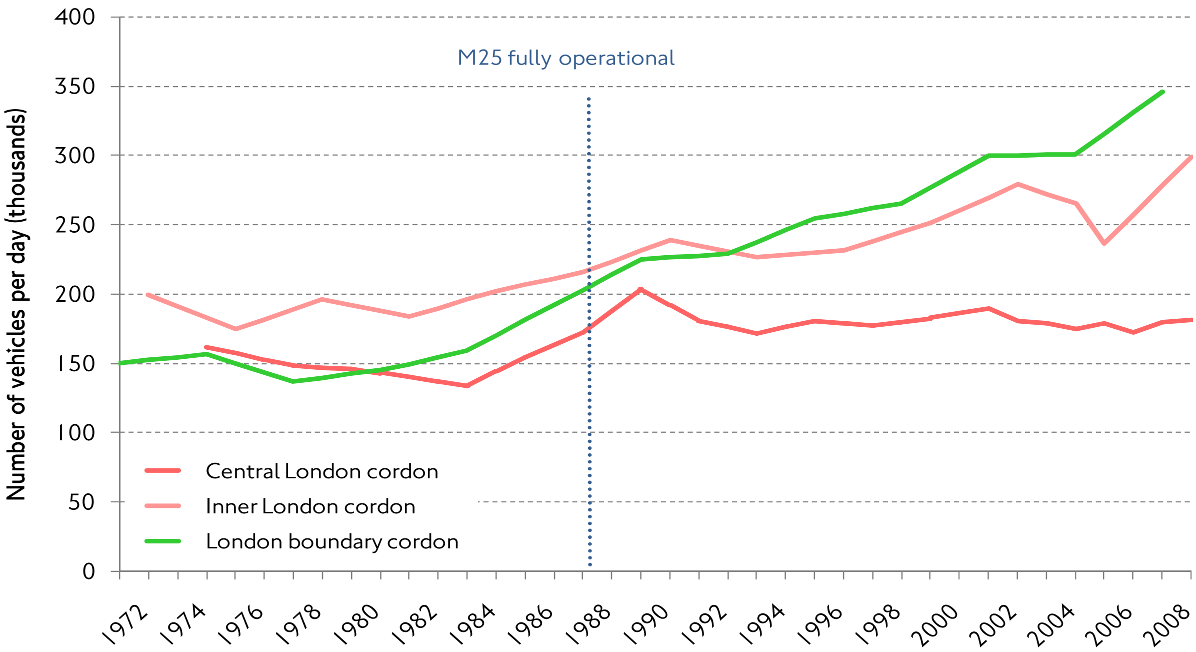
Figure 2.11 Trends in total London road traffic by vehicle type. Motor vehicles only. Index: Year 2000=100.



Source: TfL Road Network Performance

The results from TfL's strategic cordons show vans growing particularly strongly at the London boundary cordon (Figure 2.12). At the Inner London cordon vans have also shown an increasing trend apart from the period 2002 to 2005. At the central cordon, van flows have been almost constant since the early 1990s and have not shown the decline that has affected cars and HGVs.

Figure 2.12 Long-term trends in vehicle flows across three strategic cordons in London, 24-hour weekdays, both directions: Vans.



Source: TfL Road Network Performance

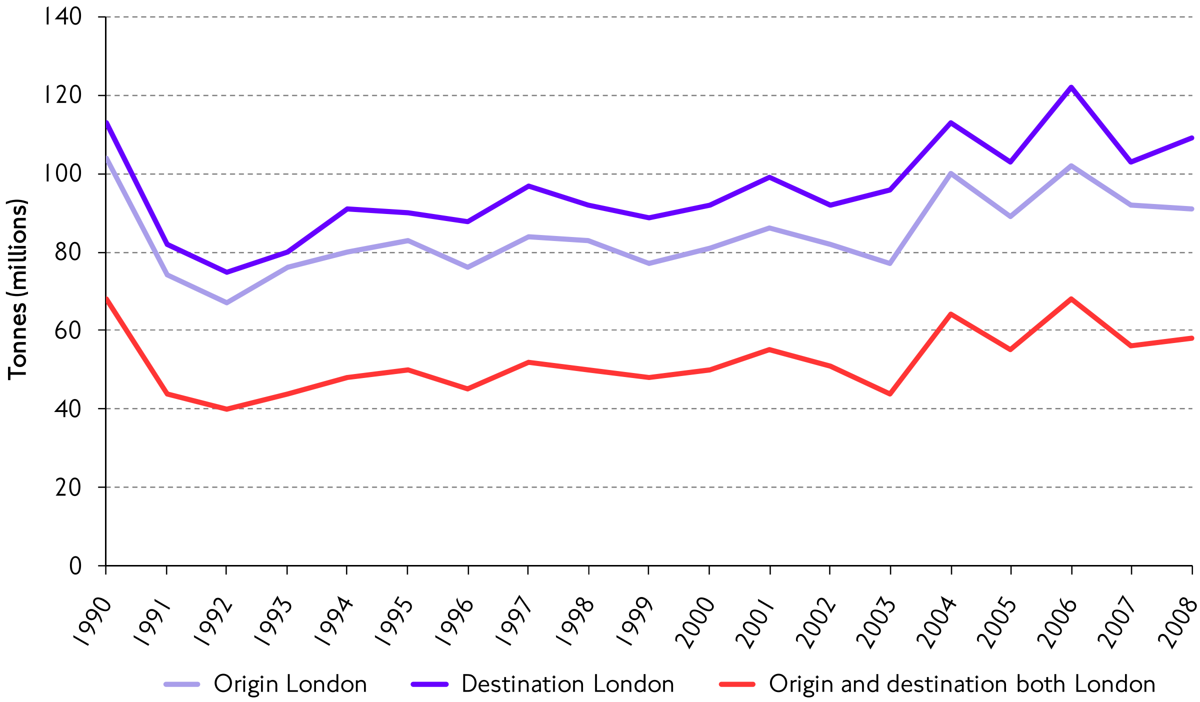
2.12 Freight in London

Freight and servicing is vital to the functioning of London. Road freight accounts for about 90 per cent (by weight) of all freight lifted in London: the rest is carried by rail, water or air.

Freight currently accounts for 17 per cent of all London's road traffic and is the second largest user by mode on London's streets. The London Freight Plan (2007) specifies a number of projects to improve the distribution of freight across London, involving a wide variety of stakeholders such as the London boroughs and rail freight operators.

The amount of road freight lifted in London in 2008 was 2 per cent higher than in 2007, following an 11 per cent decrease over the historic peak of 2006 (Figure 2.13). In total, 142 million tonnes were lifted, with 58 million of this moving wholly within London, 51 million entering from outside and 33 million tonnes originating in London bound for other destinations.

Figure 2.13 London road freight lifted.



Rail freight

Rail freight is carried by privately-owned companies and, to preserve commercial confidentiality, detailed results for freight lifted or moved are not available. Annual rail freight data for London have not been published since 1994. Summary data for selected years on freight lifted in London, provided by Network Rail for independent analysis for TfL, are shown in Figure 2.14.

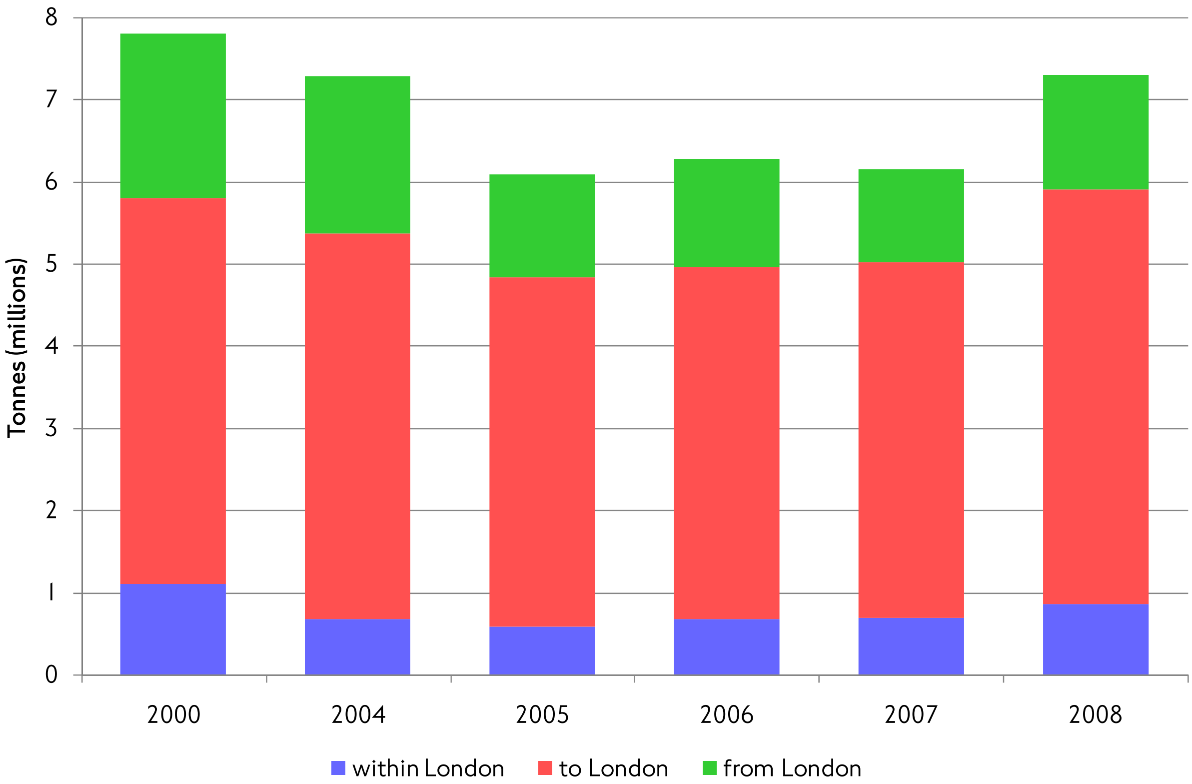
The freight lifted by rail on journeys to, from and within London in 2008 represented 7 per cent of the total rail freight lifted in Britain in 2008. In addition to freight loaded or unloaded in London, considerable quantities of rail freight pass through London to and from other regions.

Total London rail freight lifted exceeded 7 million tonnes in 2008. More than two thirds of tonnage was brought into London from other regions and almost one fifth of the total flowed in the outbound direction. London rail freight had been relatively stable between 2005 and 2007 following a decline between 2000 and 2005. This was largely a result of a reduction in outbound rail freight flows, predominantly domestic waste, moving from London to other regions.

The major flows of rail freight into and within London are aggregates for the construction industry. Construction materials increased their share of total London rail freight lifted from 65 per cent in 2004 to 80 per cent in 2007 and 2008.

Between 2007 and 2008, freight lifted by rail in total increased by about a fifth, with waste materials increasing by about one third, and construction materials by 18 per cent.

Figure 2.14 Rail freight lifted to, from and within Greater London.



Source: Transport for London

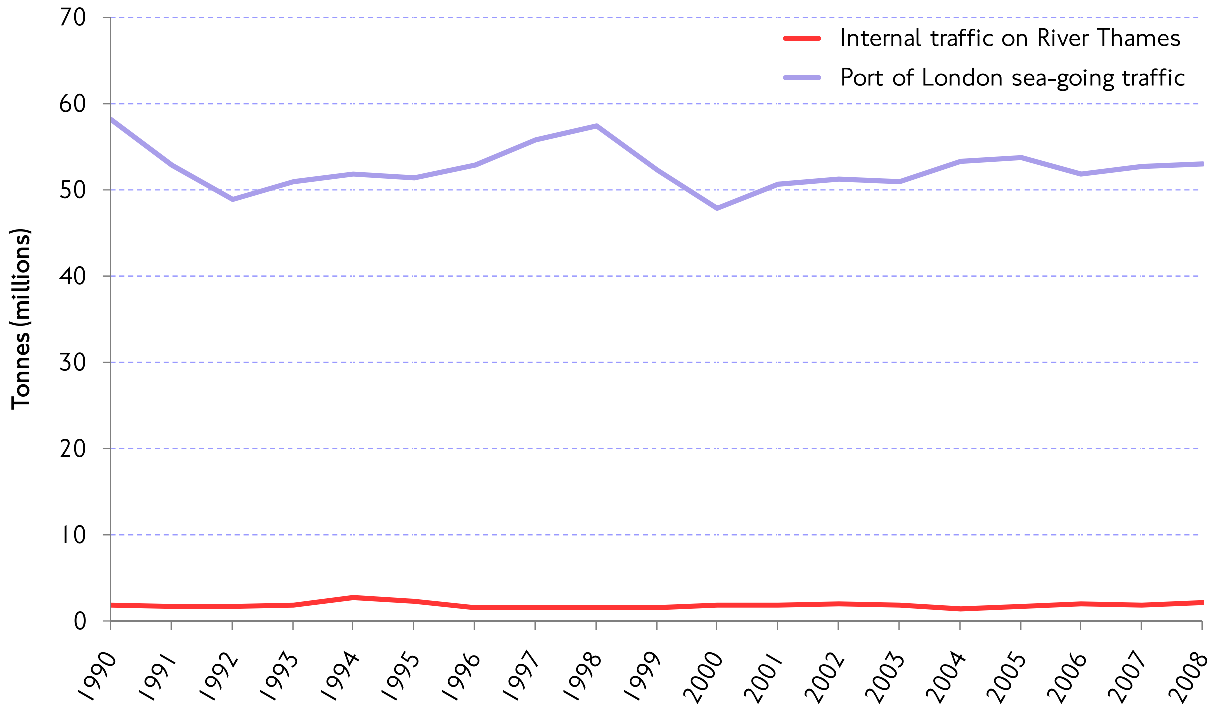
Waterborne freight

Waterborne freight to and from Thames wharves accounts for about 5 per cent of freight lifted in London. The traffic is of two kinds, sea-going cargo and inland waterway movements loaded and unloaded at Thames wharves.

As in 2007, the Port of London ranked second (after Grimsby and Immingham) among GB ports in 2008 in terms of weight of cargo handled. The majority of this freight does not pass through Greater London. Total cargo amounted to 53 million tonnes, of which over two-thirds was liquid or dry bulk cargo, through the port of Tilbury and terminals in Essex along the Thames estuary.

Internal inland waterway freight lifted amounted to 2.2 million tonnes in 2008, an increase of 12 per cent on the previous year (Figure 2.15).

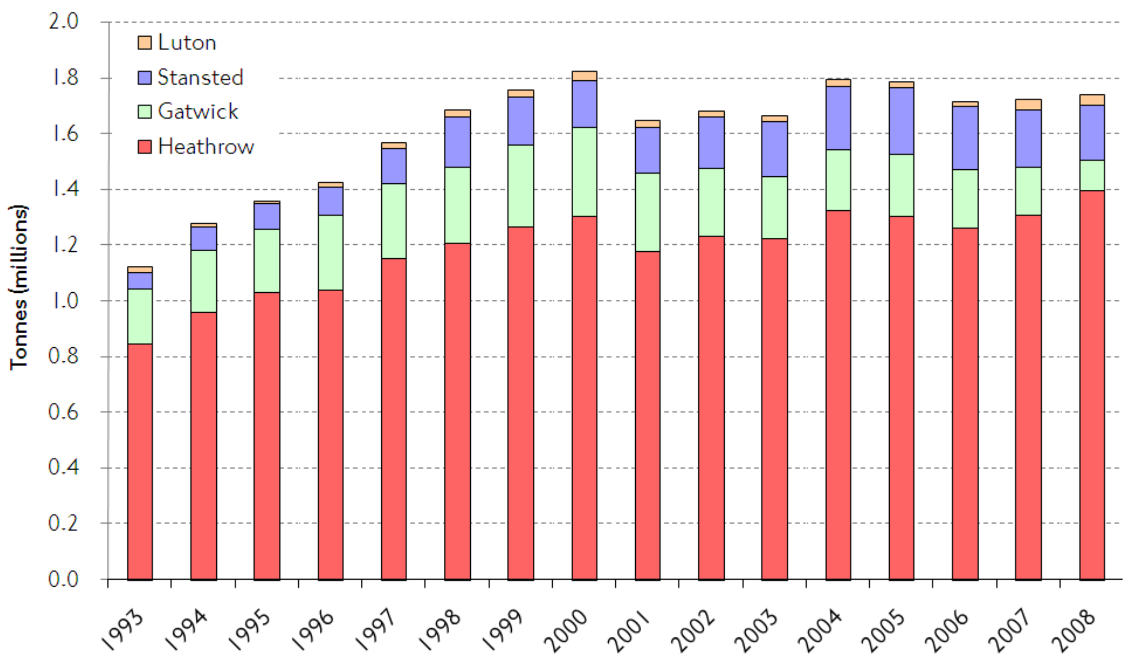
Figure 2.15 London water freight lifted.



Air freight

Air freight handled at London's airports totalled 1.74 million tonnes in 2008, an increase of 1 per cent on 2007. Heathrow increased its share of the total from 76 per cent to 80 per cent, while the shares at Stansted (11 per cent) and Gatwick (six per cent) both decreased.

Figure 2.16 Air freight moved through London's principal airports.

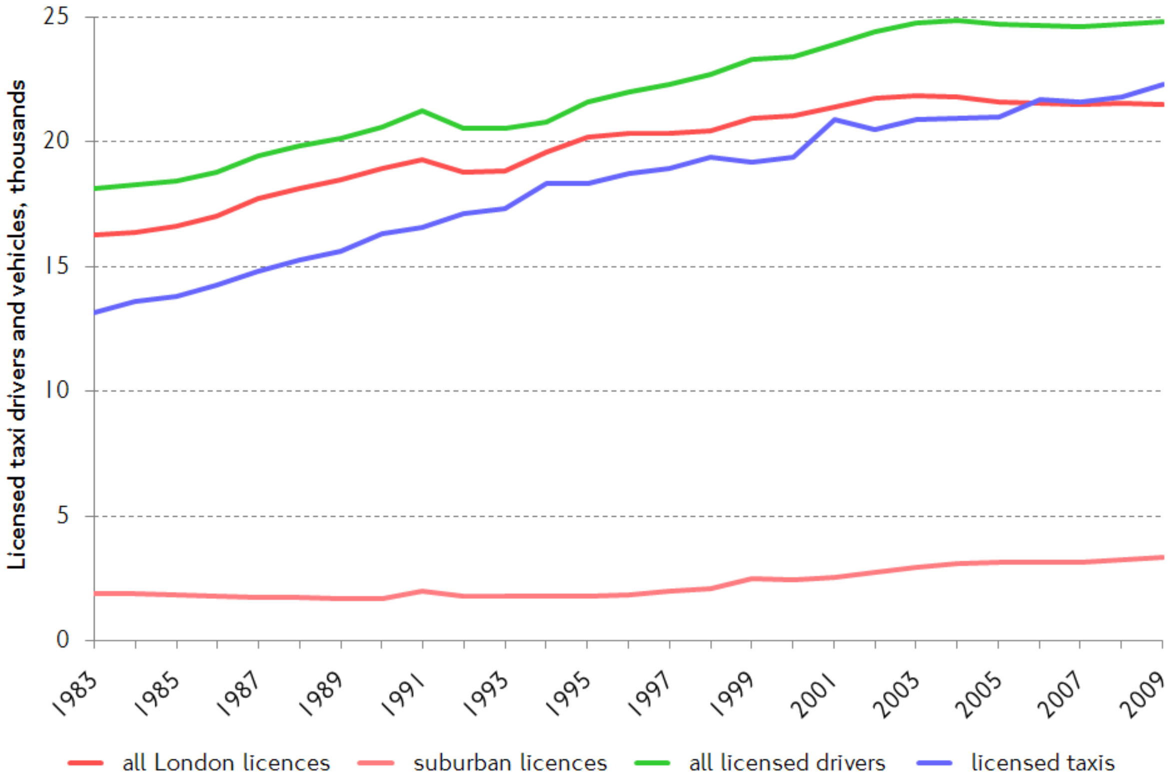


2.13 Licensed taxis and private hire

Licensed taxis

London's 22,000 licensed taxis account for about 200,000 journey stages per day and are a vital part of the transport network, particularly in and around Central London. Figure 2.17 shows the recent trend for numbers of both licensed taxi drivers and vehicles. The number of taxi drivers licensed in London has remained fairly stable at almost 25 thousand since 2003 while the number of licensed taxi vehicles has continued to increase. The ratio of drivers to vehicles was 1.38 in 1983, but has shown a gradually declining trend, reaching a historically low value of 1.11 drivers per vehicle in 2009.

Figure 2.17 Key trends for licensed taxi drivers and vehicles in London.



Note: Taxi drivers' licences are of two kinds. The majority (87 per cent) have an All London licence or 'Green Badge' that allows the driver to ply for hire anywhere within Greater London and at Heathrow airport. The remainder have Yellow Badges that are valid only in suburban sectors for which they are licensed. Outer London is divided into 9 suburban areas and Yellow Badge drivers must apply to be licensed for those areas in which they wish to work. These drivers may accept a fare in their area to go anywhere in Greater London but must return to the area for which they are licensed before they can pick up another hiring.

Private hire

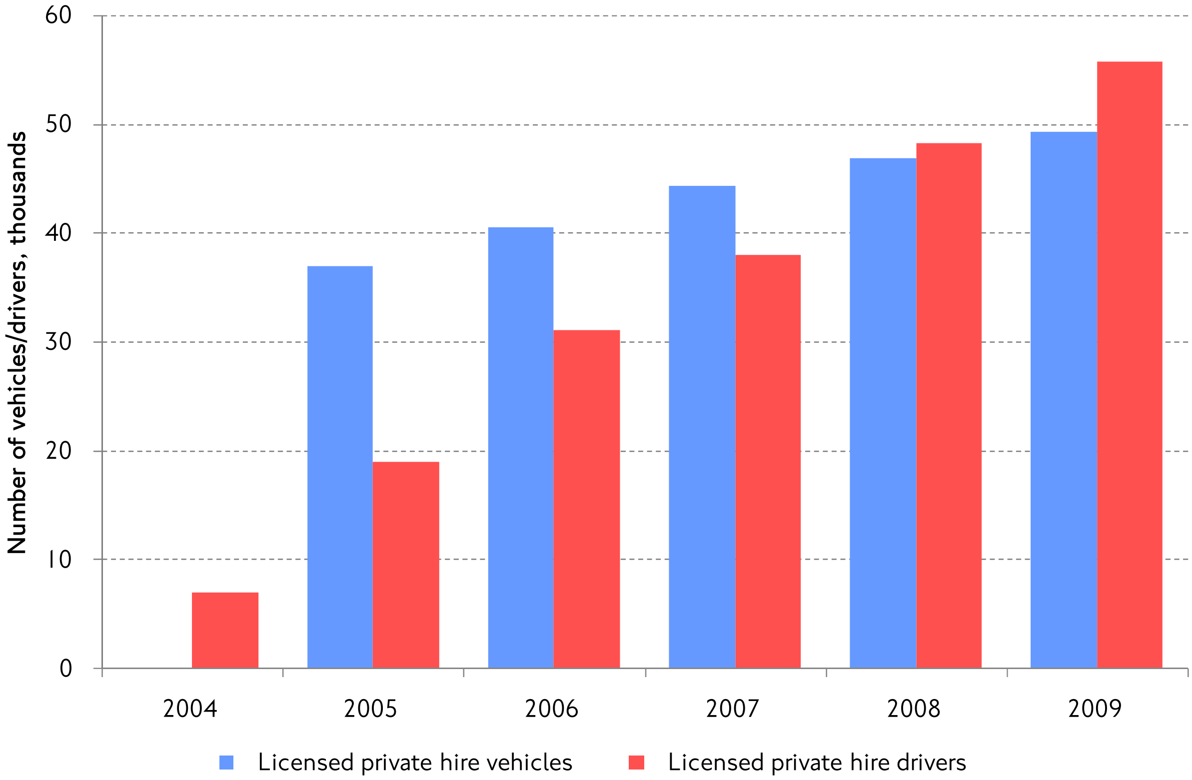
Licensed PHVs also provide a range of valuable transport services across the whole of London, and numbers are continuing to grow. All vehicles offered for hire in London, with driver and for up to 8 passengers, must be licensed by TfL's Taxi and Private Hire directorate which incorporates the Public Carriage Office. They include minicabs and people carriers, chauffeur-driven and executive cars, and a number of luxury limousine and other bespoke services. Unlike taxis, private hire services must be pre-booked and cannot ply for hire in the street or at ranks.

Licensing of private hire operators, vehicles and drivers was introduced by the Private Hire Vehicles (London) Act 1998. Thus, licensing of private hire by TfL in

London is relatively new, with operators licensed from 2001, drivers from 2003 and vehicles from 2004.

The number of vehicles licensed has grown from 37 thousand in 2005 to 49 thousand in 2009. Over the same period, the number of licensed drivers has increased from 19 thousand to 56 thousand, working within 2,600 operator businesses. While this growth largely reflects the progressive nature of the licensing process in the earlier years, the data for more recent years suggests significant year-on-year growth.

Figure 2.18 Licensed public hire vehicles and drivers, 2004 to 2009.



Source: TfL Public Carriage Office

2.14 Passenger travel on the Thames

Operators on the Thames currently provide a variety of freight and passenger services for both commuters and tourists. At present, passenger services operate from 22 piers between Putney and Woolwich, 8 of which are London River Services (LRS) piers under TfL management.

Passenger numbers on river services operating from LRS piers increased by 26 per cent to 3.9 million journeys in 2008/09 from 3.1 million in 2007/08. This is made up of more than 800 thousand passenger journeys on Thames Clipper riverbus services and some 3.1 million journeys on LRS licensed leisure and charter services. Table 2.11 shows the number of tickets sold, by LRS pier, for passenger services on the Thames. Thames Clippers passengers increased by 20 per cent in 2008/09 over the previous year while ticket sales for other services increased by 7 per cent.

Table 2.11 Passengers on the Thames: tickets sold at London River Services' piers.

Piers[1]	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
				Thousands					
Bankside	3	5	45	80	109	114	104	114	119
Blackfriars[2]	25	28	67	13	24	29	-	-	-
Embankment	357	395	345	310	255	190	216	193	168
Festival	15	18	9	10	9	6	8	11	8
Greenwich	177	185	162	197	184	194	209	233	445
Millbank	-	-	-	59	83	75	93	74	53
Tower	237	224	235	207	289	272	332	359	448
Waterloo[3]	291	178	272	171	-	-	-	-	-
Westminster	468	706	634	636	745	721	796	808	675
All Piers	1,574	1,739	1,767	1,682	1,699	1,601	1,759	1,792	1,916
Percentage change									
1 year	-	10.5	1.6	-4.8	1.0	-5.7	9.9	1.9	7.0
Thames Clippers[4]	-	-	-	183	367	525	662	704	848

Source: TfL London River services

Notes:

1. Excludes charter ticket sales.
2. From 2006, Blackfriars pier is served only by Thames Clippers and passenger numbers are included in the Thames Clippers total.
3. Data for Waterloo pier were not collected after July 2003 when it ceased to be managed by LRS.
4. Thames Clippers under contract to LRS; passengers have not been counted in LRS totals

3. Travel by Londoners

3.1 Introduction

London residents account for about three-quarters of all travel in London. The travel behaviour of Londoners is surveyed annually in depth through TfL's London Travel Demand Survey (LTDS). Results from this survey provide essential information about how Londoners use the transport system – the reasons why they travel; when, where and how – and the ways in which their socio-demographic characteristics influence the travel choices they make. Consequently, it can provide a unique window on the travel needs of Londoners, and their likely responses to a range of potential policies.

Travel in London report number 1 summarised the aims and method of the LTDS survey, and exemplified the richness of the LTDS dataset. It also provided part of the 'evidence base' for the draft MTS. Particular themes highlighted were that:

- Travel volumes and origin/destination patterns of Londoners vary considerably by geographical location.
- Mode use by individual Londoners also varies according to London's functional geography and people's trip purposes.
- The amount and characteristics of travel by Londoners vary by time of day and day of week, and also by socio-demographic group and economic status.
- The travel patterns and trends of Londoners show both parallels and important differences with those of other UK urban areas.

This section builds on previous coverage and focuses on topics that are likely to be of general interest. It also provides updated data that reflect results from the 2008/09 round of this survey – which took place against a backdrop of financial turmoil during the second half of 2008, and the subsequent recession. Note that the LTDS results are tabulated on the basis of TfL's financial years.

3.2 Travel by Londoners – developments in 2008/09

- The LTDS survey is better at characterising travel behaviour and features of travel demand (eg journey purpose, mode and type of travel) than quantifying trends in aggregate travel volumes in London. Nevertheless, indications of change can be derived that can be used in conjunction with the sources outlined in chapter 2 of this report to quantify aggregate change more robustly. In this context, results for the latest 2008/09 LTDS survey cycle suggest that travel by London residents fell sharply. LTDS household survey results largely mirror the more aggregate trends for travel by public transport, but suggest a larger decline in car travel for personal travel among London residents than is reflected in the road traffic count data. TfL is investigating this difference to determine to what extent it reflects features of the respective survey methods, or is due to other factors, such as the different periods covered by the surveys.
- From LTDS, the estimated total number of trips made by London residents on an average day in 2008/09 was 17 million, down from 18.3 million as the average of the preceding three years, a drop of 7 per cent, or 8 per cent on the previous year.

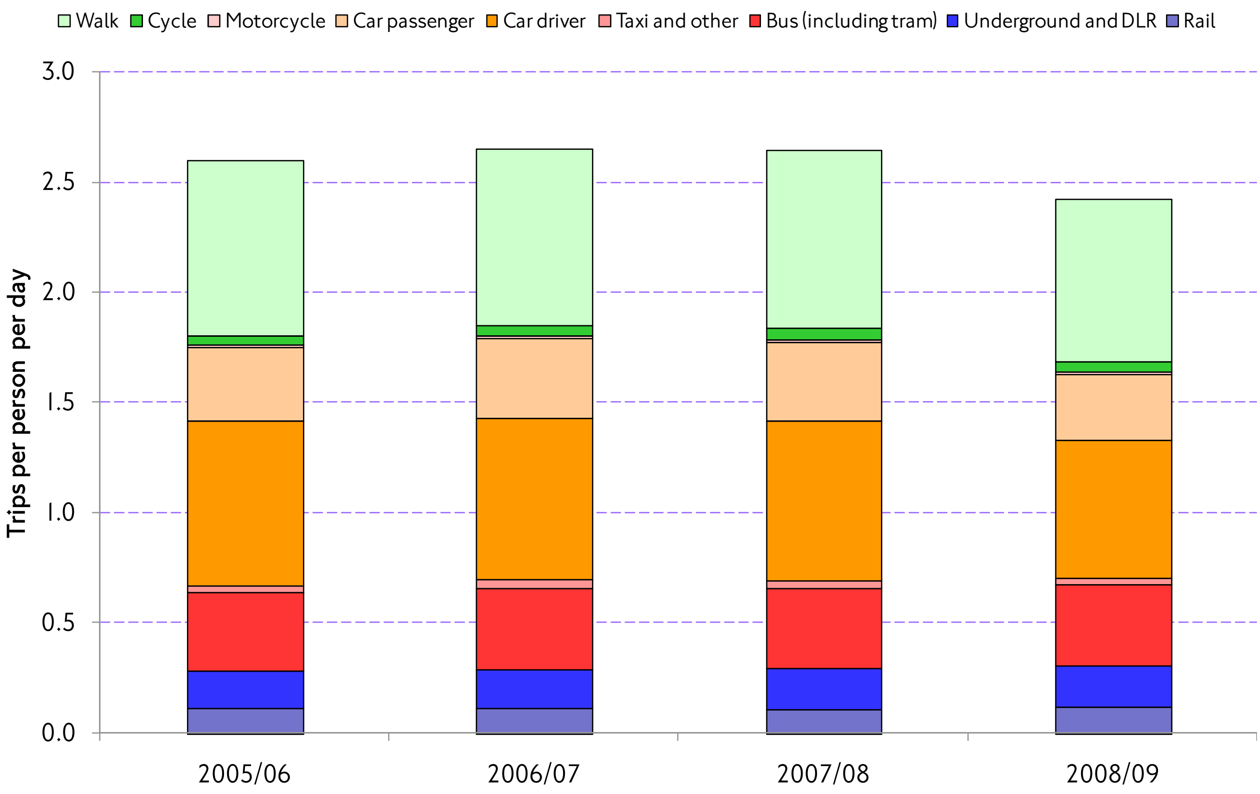
- This in turn reflects a decline in personal trip rates – the average number of trips made per person per day. This fell to 2.4 in 2008/09, down 8 per cent from the average of 2.6 for the preceding three years.
- Examination of the data shows that these overall trends and directions of change affected all parts of London and all groups of the resident population, albeit with some potentially interesting specific features. The data also clearly show a 'recessionary impact' on trip rates during the second half of 2008.

3.3 Travel by Londoners – aggregate trips and trip rates

Average trip rates by London residents have been relatively stable during the period 2005/06 to 2007/08, but had shown a longer-term tendency to increase slightly since the 1990s. On average, between 2005/06 and 2007/08 (three LTDS annual surveys), Londoners made 2.6 trips per person per day.

Data for the most recent LTDS survey in 2008/09 show a clear break with recent years, recording a substantial fall in average trip rates and, consequently, in the total number of trips made by Londoners. Figure 3.1 and Table 3.1 show these trends in overall travel, and also detail changes by individual trip main mode. As previously described, however, LTDS is not optimised to measure changes to aggregate volumes of travel in London, and TfL is investigating the apparent discrepancies between LTDS estimates of total travel and those provided by the 'on-mode' data described in section 2 of this report.

Figure 3.1 Trips per person per day, by main mode. London residents only. Seven-day week.



Source: TfL Planning, LTDS.

Table 3.1 Trips per person per day, by main mode. London residents only. Seven-day week.

	2005/06	2006/07	2007/08	2008/09
National Rail	0.11	0.11	0.11	0.11
Underground/DLR	0.17	0.17	0.19	0.19
Bus/tram	0.35	0.37	0.36	0.37
Taxi/Other	0.03	0.04	0.03	0.03
Car driver	0.75	0.73	0.73	0.63
Car passenger	0.33	0.36	0.35	0.30
Motorcycle	0.01	0.02	0.01	0.01
Cycle	0.04	0.05	0.05	0.05
Walk	0.79	0.80	0.81	0.74
All	**2.59**	**2.65**	**2.64**	**2.42**

Source: TfL Planning, LTDS.

In 2008/09:

- The average number of trips made by London residents per day fell by around 8 per cent against the recent (2005/06 to 2007/08) average.
- On an average day in 2008/09, London residents made 2.42 trips per day compared with an average of 2.63 in the previous three LTDS survey cycles.
- The total number of trips made on an average day in 2008/09 was 17.0 million, down from an average of 18.3 million over the three previous years.
- This mainly reflects falls in car driver and car passenger trip rates, which LTDS suggests fell by 14 and 16 per cent respectively for London residents, and also an apparent 9 per cent fall in the trip rate for walk trips.
- Conversely, and significantly, trip rates for the public transport modes all increased slightly, thus increasing their relative mode share – consistent with the more aggregate travel trends described in chapter 2 of this report.

This significant change in aggregate trip making by Londoners can be explored in several geographic and socio-economic dimensions. The following sections also exemplify some other features of travel by Londoners that can be examined in detail using the LTDS data.

3.4 Travel by Londoners – mode use and mode shares

Overall mode shares

Reflecting specific developments in 2008/09 but also continuing the recent trend, the share of public transport trips by Londoners continued to increase in 2008/09, making up 29 per cent of all London residents' trips compared with 26 per cent in 2007/08. In contrast, the share of trips made by car continued to fall, although car trips still accounted for 38 per cent of all trips (compared with 41 per cent in 2007/08).

Table 3.2 Mode share of trips by London residents, 2005/06 to 2008/09.

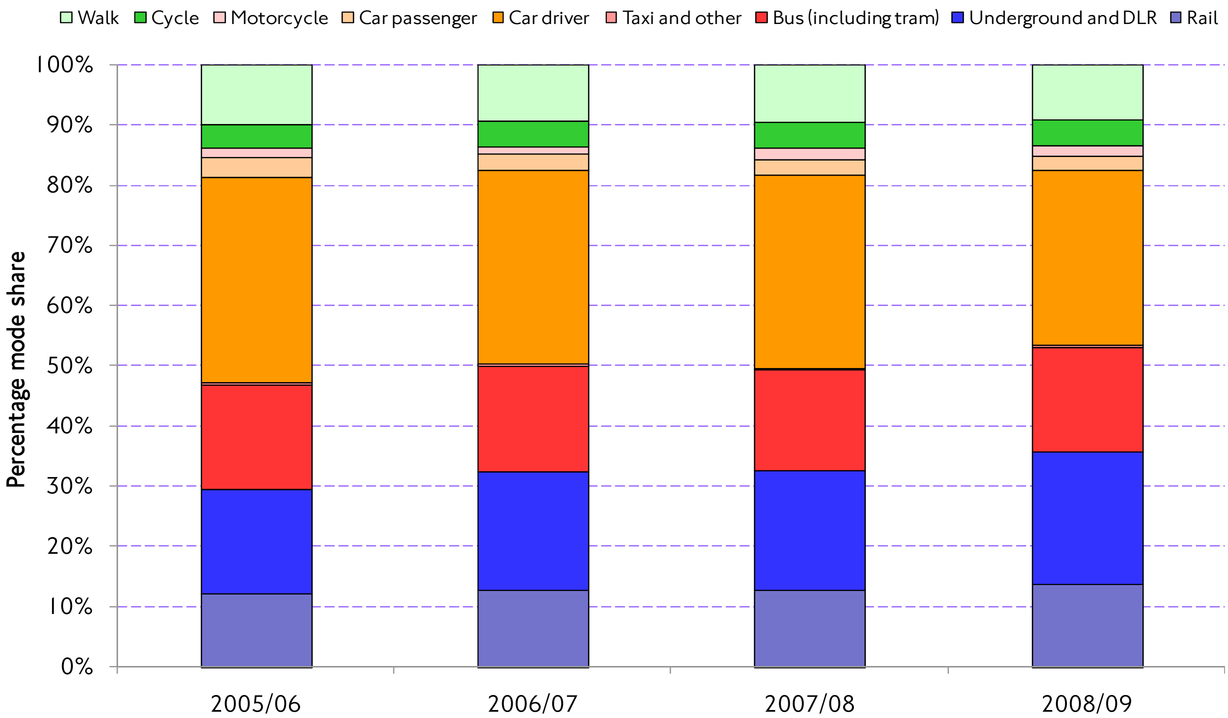
	2005/06	2006/07	2007/08	2008/09
National Rail	*4*	*4*	*4*	*5*
Underground/DLR	*7*	*7*	*7*	*8*
Bus/tram	*14*	*14*	*14*	*15*
Taxi/Other	*1*	*2*	*1*	*1*
Car driver	*29*	*28*	*28*	*26*
Car passenger	*13*	*14*	*13*	*12*
Motorcycle	*1*	*1*	*1*	*1*
Cycle	*2*	*2*	*2*	*2*
Walk	*31*	*30*	*31*	*30*
All	***100***	***100***	***100***	***100***

Source: TfL Planning, LTDS.

Usual mode of travel to work

The main mode used by Londoners to travel to their usual workplace also showed some change in 2008/09 (Figure 3.2).

Figure 3.2 Usual main mode of travel to work. Seven-day week, 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

The predominant mode used to travel to work by Londoners is still the car. However, the proportion of people driving to work fell from 32 per cent to 29 per cent over the review period. The public transport mode most used to travel to work is the Underground, followed by bus. All public transport modes increased their shares in 2008/09. There are fairly clear differences between Inner and Outer

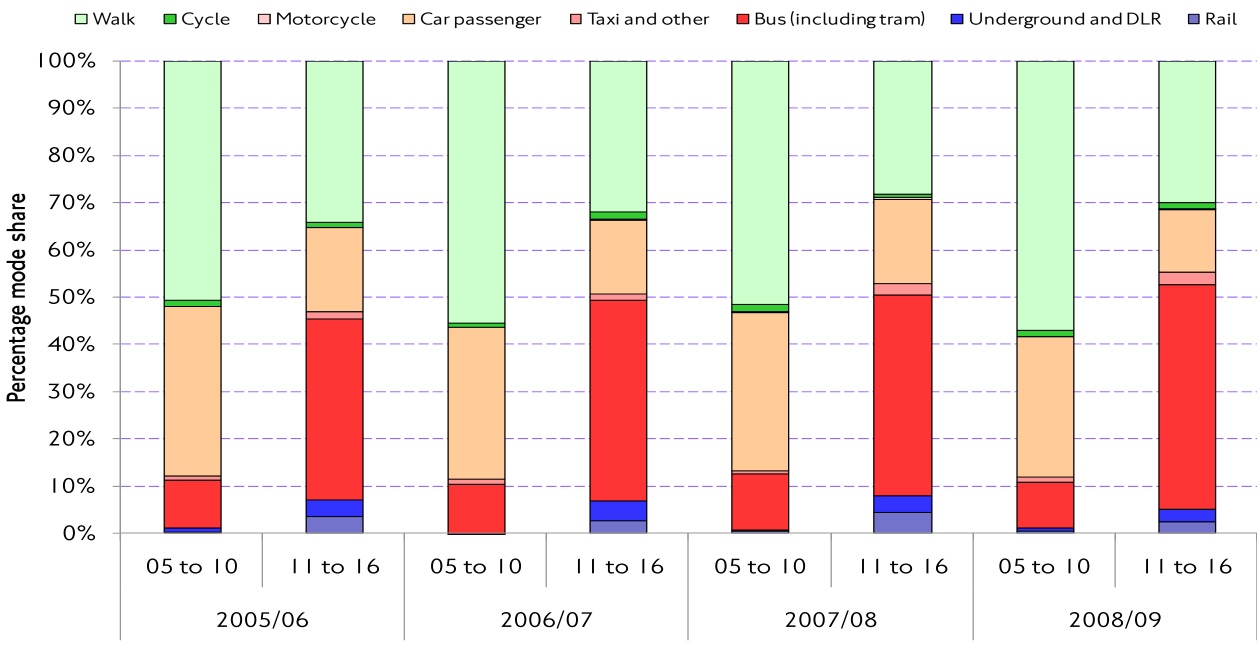
London residents. Outer Londoners are more likely to commute by car, whereas Inner London residents are more likely to use public transport or to walk or cycle.

Usual mode of travel to school

The usual mode of travel to school differs significantly between primary and secondary school children (Figure 3.3). Children of primary school age usually walk or are driven to school. Walking is especially common among Inner London residents, with almost two-thirds of children aged 5 to 10 usually walking to school. The proportion of primary school children who usually walk to school increased by 5 percentage points in 2008/09.

Among children of secondary school age, bus is the dominant mode for travel to school, followed by walking. Again, the proportion of children walking to school in 2008/09 increased, with a corresponding decrease in car passenger trips for children, with car passenger trips declining most rapidly among Inner London children.

Figure 3.3 Usual main mode of travel to school, by age group, 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

Mode use by borough of residence

Table 3.3 shows how the use of different travel modes varies across London, often reflecting transport network provision. Borough-level mode shares show a lot of local variation. For example, 11 per cent of trips by Lewisham residents are made on National Rail, compared with only 1 per cent of trips by residents of Hammersmith & Fulham, Kensington & Chelsea and Tower Hamlets, reflecting the absence of a significant National Rail network in these boroughs and a correspondingly dense LU/DLR and bus network. Tower Hamlets, for example, has 3 National Rail stations in the borough compared with 23 LU and DLR stations. Similarly, car mode share differs significantly; Islington residents make only 17 per cent of their trips by car, compared with 60 per cent of all trips by Bexley residents. Although mode shares differ spatially between the boroughs, they remain relatively stable over time.

Table 3.3 Mode shares (main mode of trip) by borough of residence, 2006/07 to 2008/09 average, Seven-day week.

London borough	Percentage of residents' trips by main mode							
	Rail	Under-ground /DLR	Bus/ tram	Taxi/ other public	Car/ motor-cycle	Cycle	Walk	All modes
Camden	3%	12%	17%	3%	19%	3%	42%	100%
City of London	2%	17%	10%	2%	10%	0%	59%	100%
Hackney	3%	6%	30%	1%	21%	4%	35%	100%
Hammersmith and Fulham	1%	14%	17%	3%	24%	4%	37%	100%
Haringey	3%	14%	19%	1%	31%	2%	31%	100%
Islington	3%	10%	25%	2%	17%	3%	40%	100%
Kensington and Chelsea	1%	13%	12%	3%	25%	4%	42%	100%
Lambeth	6%	9%	21%	1%	31%	3%	28%	100%
Lewisham	11%	4%	17%	1%	38%	2%	28%	100%
Newham	3%	11%	15%	2%	31%	0%	37%	100%
Southwark	5%	5%	28%	1%	27%	3%	31%	100%
Tower Hamlets	1%	16%	16%	1%	20%	2%	42%	100%
Wandsworth	7%	9%	15%	2%	32%	3%	32%	100%
Westminster	2%	11%	15%	3%	19%	3%	48%	100%
Inner London	**4%**	**10%**	**19%**	**2%**	**26%**	**3%**	**36%**	**100%**
Barking and Dagenham	3%	6%	14%	1%	42%	1%	32%	100%
Barnet	2%	7%	11%	1%	50%	1%	29%	100%
Bexley	7%	0%	8%	1%	60%	1%	24%	100%
Brent	2%	9%	16%	1%	40%	1%	31%	100%
Bromley	8%	1%	8%	1%	54%	1%	27%	100%
Croydon	8%	0%	15%	1%	53%	1%	22%	100%
Ealing	2%	11%	15%	1%	45%	1%	26%	100%
Enfield	3%	5%	15%	1%	49%	0%	27%	100%
Greenwich	8%	3%	18%	1%	44%	1%	26%	100%
Harrow	1%	8%	9%	1%	53%	1%	27%	100%
Havering	6%	2%	10%	2%	61%	1%	19%	100%
Hillingdon	1%	4%	12%	1%	56%	1%	25%	100%
Hounslow	3%	6%	14%	0%	47%	3%	26%	100%
Kingston upon Thames	7%	2%	8%	1%	49%	2%	32%	100%
Merton	7%	6%	11%	1%	42%	1%	32%	100%
Redbridge	2%	8%	9%	1%	54%	1%	26%	100%
Richmond upon Thames	8%	4%	10%	2%	43%	4%	30%	100%
Sutton	6%	1%	10%	1%	58%	1%	23%	100%
Waltham Forest	4%	11%	12%	1%	41%	1%	30%	100%
Outer London	**4%**	**5%**	**12%**	**1%**	**50%**	**1%**	**27%**	**100%**
All London boroughs	**4%**	**7%**	**14%**	**1%**	**41%**	**2%**	**31%**	**100%**

Source: TfL Planning, LTDS.

Mode shares for trips originating in London boroughs (London residents)

Table 3.4 shows the mode shares of trips by London residents according to the borough the trips originated in. Again, mode shares differ considerably between boroughs, reflecting to an even greater extent than Table 3.3 the transport network provision in each borough. For example, 20 per cent of all trips by Londoners that originate in City of Westminster are by Underground as the main mode, reflecting the dense nature of the network in this borough. This compares with less than 0.5 per cent of trips commencing in Kingston upon Thames, which has no Underground provision.

Again, cycling and walking are more common in Inner London boroughs, with private transport more common in Outer London. Around 60 per cent of trips originating in Bexley and Havering are by car or motorcycle, compared with 14 per cent of trips originating in Westminster.

Mode share for London residents by borough of trip origin (LIPs 2 performance indicator)

Mode share is a formal LIPs 2 performance indicator. This is defined as percentage mode share, for the principal travel modes, on an average day for trips by London residents that originate in each borough. This is calculated as a rolling mean for each three year period, for comparison on a non-overlapping three-yearly basis. These statistics, for the 3-year period 2006/07 to 2008/09, are provided at Appendix B of this report.

Table 3.4 Londoners' trips by borough of origin: Trips per day and shares by main mode, 2006/07 to 2008/09 average, Seven-day week.

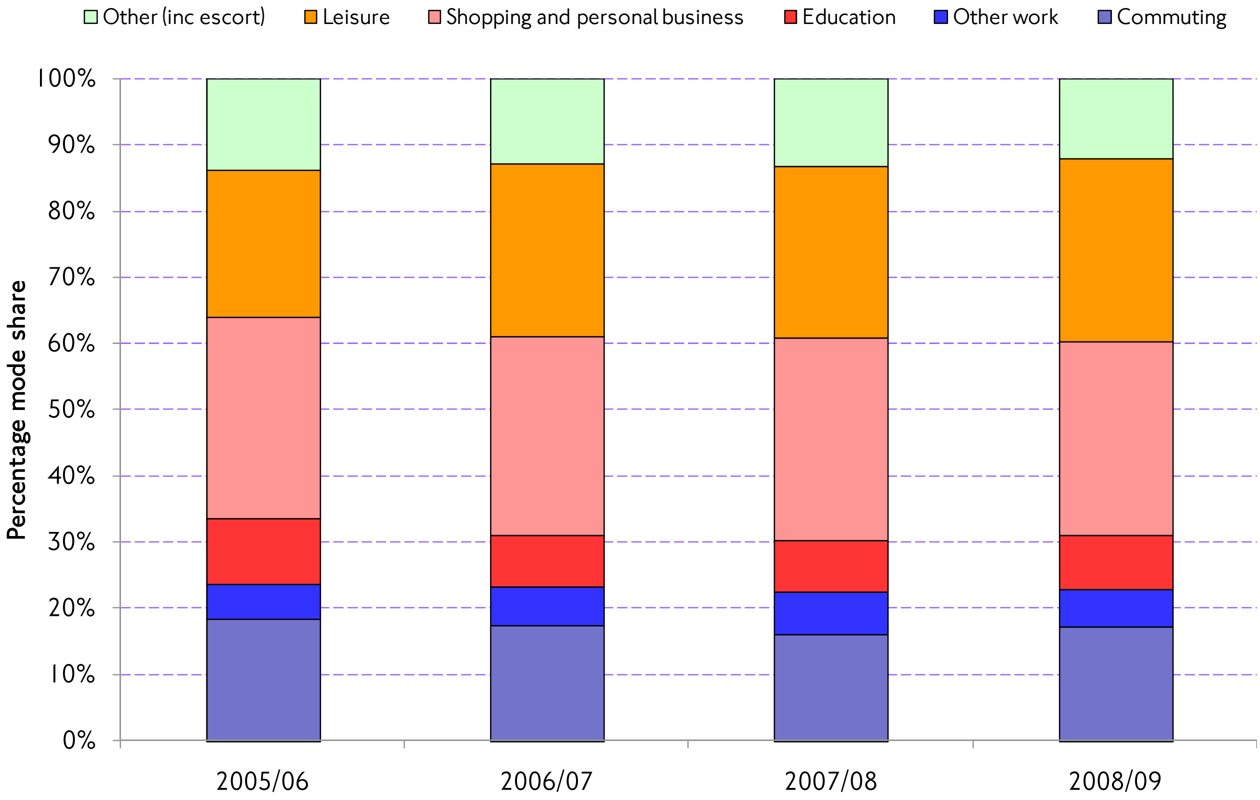
London borough	Trips per day (000s)	Percentage of trips by main mode							
		Rail	Under-ground /DLR	Bus/ tram	Taxi/ Other	Car/ motor -cycle	Cycle	Walk	All modes
Camden	717	5%	16%	15%	2%	19%	3%	39%	100%
City of London	242	19%	27%	7%	3%	6%	3%	35%	100%
Hackney	388	3%	5%	27%	2%	23%	3%	37%	100%
Hammersmith and Fulham	453	2%	15%	16%	2%	24%	4%	37%	100%
Haringey	451	2%	9%	21%	1%	34%	2%	31%	100%
Islington	468	5%	11%	23%	1%	17%	3%	40%	100%
Kensington and Chelsea	521	1%	13%	14%	3%	25%	4%	40%	100%
Lambeth	526	7%	9%	21%	1%	31%	3%	29%	100%
Lewisham	448	7%	2%	20%	1%	39%	2%	30%	100%
Newham	519	2%	8%	15%	2%	34%	1%	38%	100%
Southwark	531	6%	7%	21%	1%	31%	3%	32%	100%
Tower Hamlets	503	4%	17%	15%	1%	21%	2%	40%	100%
Wandsworth	593	6%	6%	16%	2%	36%	3%	31%	100%
Westminster	1,162	7%	20%	15%	3%	14%	3%	38%	100%
Inner London	**7,523**	**5%**	**12%**	**17%**	**2%**	**25%**	**3%**	**36%**	**100%**
Barking and Dagenham	309	2%	5%	15%	1%	40%	1%	37%	100%
Barnet	800	1%	5%	11%	1%	53%	1%	29%	100%
Bexley	369	4%	0%	9%	1%	60%	1%	25%	100%
Brent	596	2%	7%	15%	1%	42%	1%	31%	100%
Bromley	727	5%	0%	9%	1%	56%	1%	28%	100%
Croydon	681	5%	0%	16%	1%	52%	1%	24%	100%
Ealing	628	1%	8%	14%	1%	48%	1%	27%	100%
Enfield	572	2%	3%	15%	1%	50%	0%	28%	100%
Greenwich	393	5%	3%	17%	1%	46%	1%	27%	100%
Harrow	430	1%	6%	10%	0%	52%	1%	30%	100%
Havering	469	4%	2%	12%	1%	60%	1%	20%	100%
Hillingdon	640	1%	5%	12%	2%	54%	2%	25%	100%
Hounslow	508	3%	4%	15%	1%	47%	3%	29%	100%
Kingston upon Thames	415	5%	0%	11%	1%	48%	2%	33%	100%
Merton	445	5%	4%	11%	1%	44%	1%	33%	100%
Redbridge	539	2%	5%	10%	0%	53%	1%	28%	100%
Richmond upon Thames	450	6%	2%	11%	1%	44%	4%	32%	100%
Sutton	370	4%	1%	11%	1%	58%	1%	25%	100%
Waltham Forest	429	2%	7%	13%	1%	43%	1%	32%	100%
Outer London	**9,772**	**3%**	**4%**	**13%**	**1%**	**50%**	**1%**	**28%**	**100%**
All London boroughs	**17,294**	**4%**	**7%**	**15%**	**1%**	**39%**	**2%**	**31%**	**100%**

Source: TfL Planning, LTDS.

3.5 Travel by Londoners – journey purpose

Within the context of reduced overall trip rates, the biggest changes in 2008/09 in terms of journey purposes at the London-wide level for residents (Figure 3.4) has been a 16 per cent fall in the number of other/escort trips, while shopping and personal business trips also fell, by around 12 per cent. The number of commuting and leisure trips fell by less – 2 and 3 per cent respectively.

Figure 3.4 Trips per person per day, by purpose. Seven-day week. LTDS 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

When looking at the change in the share of trips by journey purpose, patterns are less evident. The proportion of commuting trips increased in 2008/09 after a dip in 2007/08, although still remaining below the previous year's level. Shopping and personal business trips have decreased their share, with a corresponding increase in the share of leisure trips. However, the largest decrease was in trips for 'other' purposes including escorting. Shopping, personal business and leisure trips still make up the majority of trips made on an average day – around 57 per cent of all trips in 2008/09 (Table 3.5).

Table 3.5 Purpose share of trips by London residents. 7-day week. LTDS 2005/0600 to 2008/09.

	2005/06	2006/07	2007/08	2008/09
Commuting	18.3	17.3	15.9	17.0
Other work	5.2	5.9	6.4	5.8
Education	10.1	7.8	7.8	8.1
Escort education	5.6	4.9	6.2	5.4
Shopping and personal business	30.4	29.9	30.6	29.4
Leisure	22.1	26.1	26.1	27.5
Other (incl other escort)	8.4	8.0	7.1	6.8
All	100	100	100	100

Source: TfL Planning, LTDS.

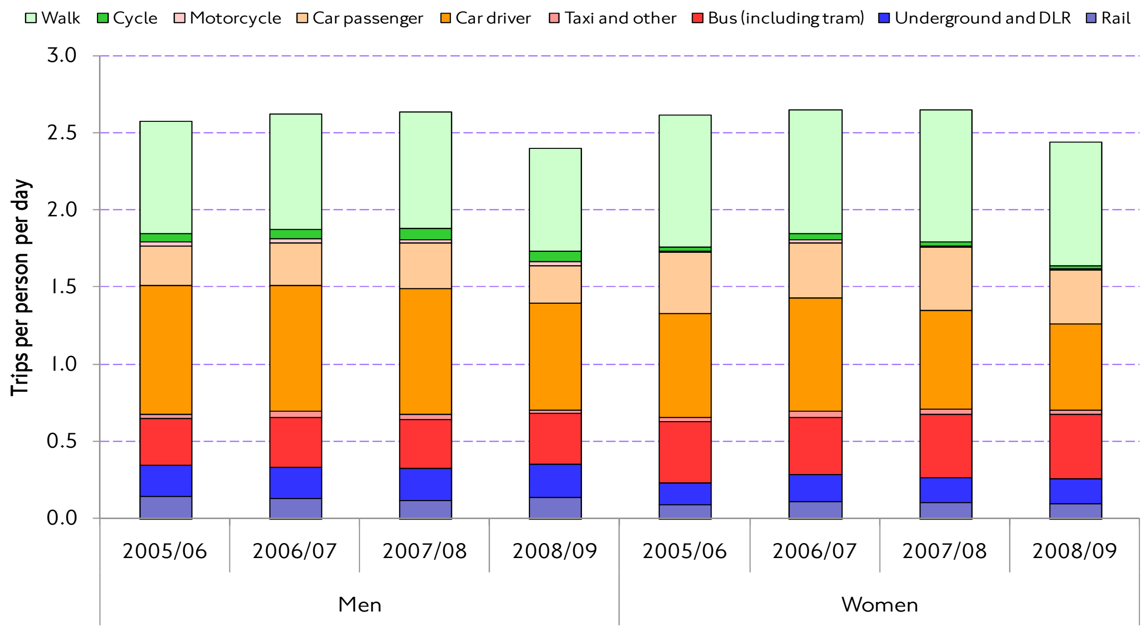
3.6 Travel by Londoners – basic socio-demographic differences and trends

This section looks at the relationship of travel in general – and the changes in 2008/09 in particular – to three basic socio-demographic characteristics – gender, age and working status. LTDS data are used to explore further dimensions of the relationship of socio-demographic factors to travel behaviour in chapter 8 of this report.

Gender

Men and women make broadly similar numbers of trips on an average day (Figure 3.5). In 2008/09 trip rates of men declined by 9 per cent, slightly more than women's which declined by 8 per cent. In general, men tend to make more trips on rail and Underground than women, but fewer trips by bus. They also tend to cycle more, but walk less. Women make fewer car driver trips than men, but more car passenger trips.

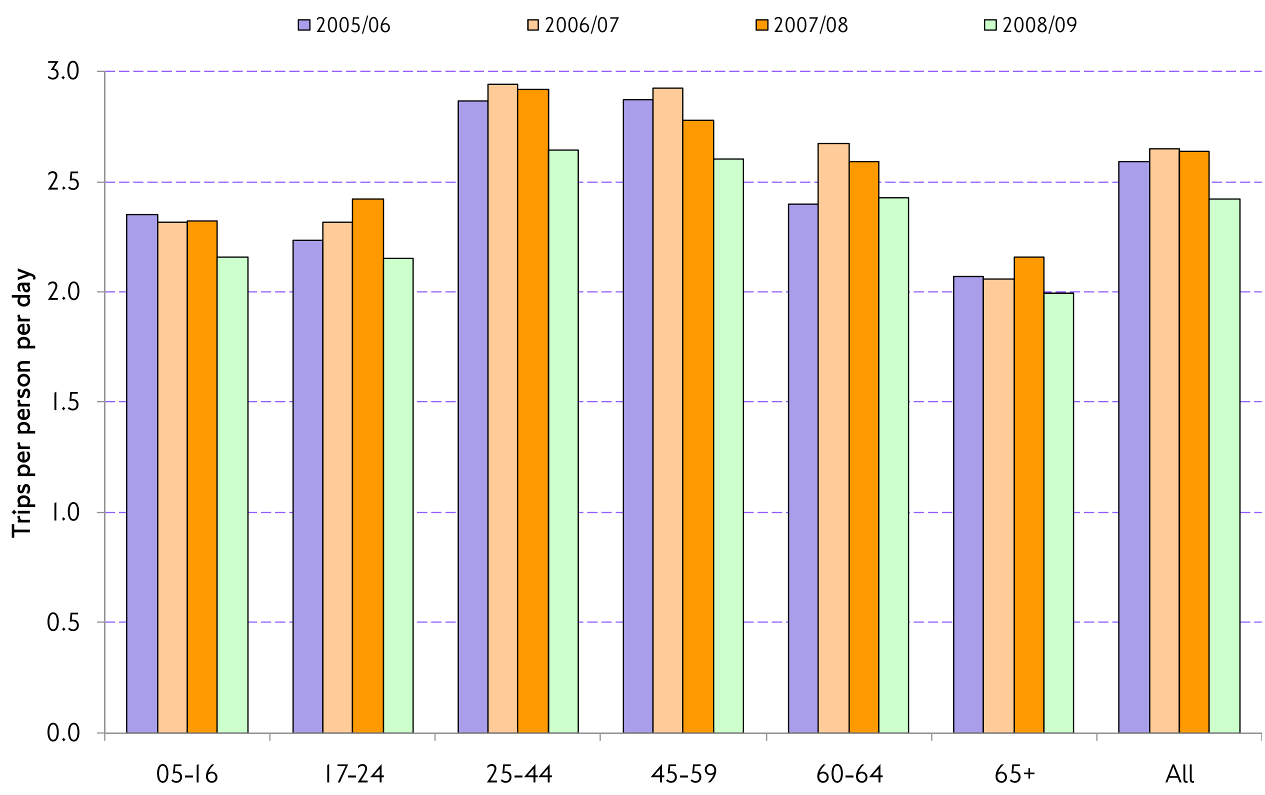
Figure 3.5 Trips per person per day, by main mode and gender. Seven-day week. LTDS 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

Age group

Figure 3.6 Trips per person per day, by age group. Seven-day week. LTDS 2005/06 to 2008/09.



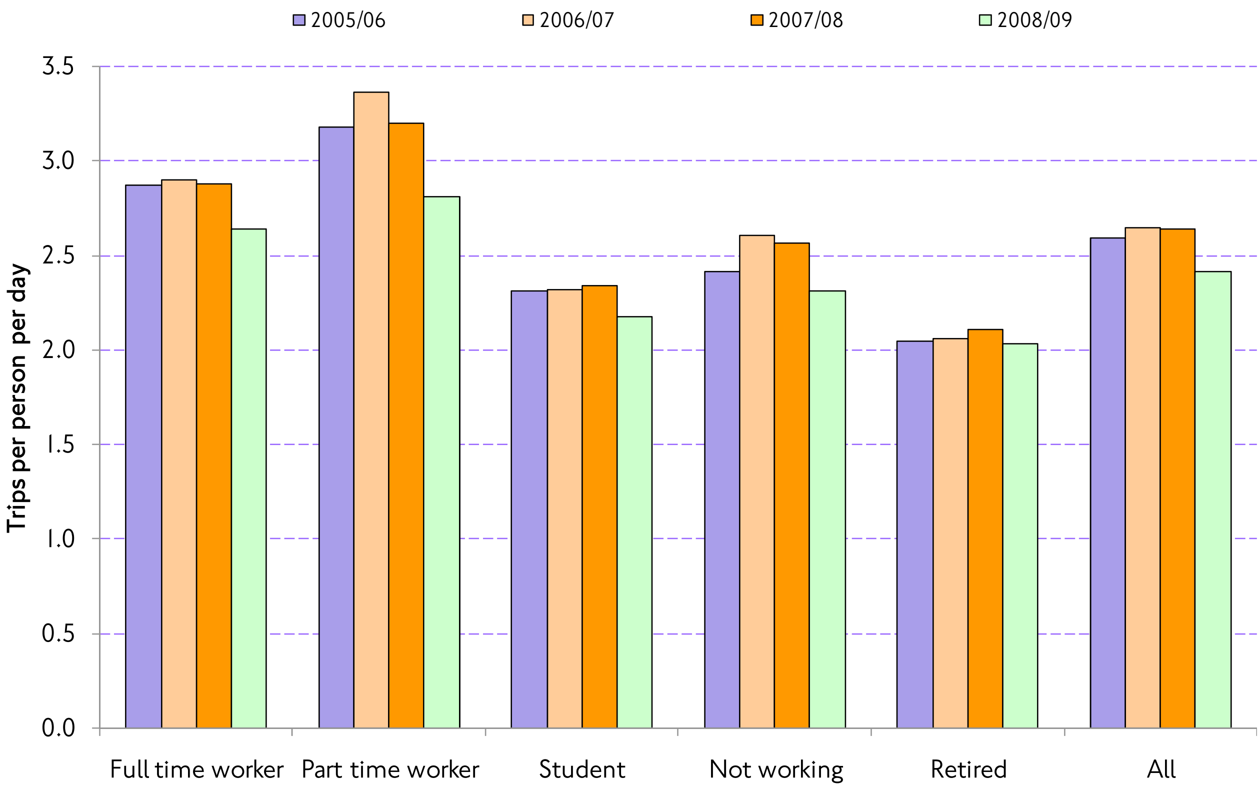
Source: TfL Planning, LTDS.

Trip rates were down across all age groups in 2008/09 (Figure 3.6). The 25 to 59 age group continued to make the highest number of trips, around 2.6 per person per day, reflecting the fact that people in this age group are more likely to be in employment. Londoners aged 65 years and above made the fewest trips, around 2 per day.

Working status

As with gender and age group, the decline in trip making by London residents suggested by LTDS in 2008/09 was seen for people of all working statuses (Figure 3.7). Those in employment continued to make the most trips – 2.6 trips per day for full-time workers, 2.8 for part-time workers. However, these groups were also the ones with the biggest fall in trip rates over the last year – around 8 per cent for full-time workers and 12 per cent for part-time workers. Non-working Londoners made around 10 per cent fewer trips on an average day in 2008/09 than previously. Retired people tend to make fewer trips on an average day than other groups, although the rate of decline this last year was lower than for other groups.

Figure 3.7 Trips per person per day, by working status, Seven-day week. LTDS 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

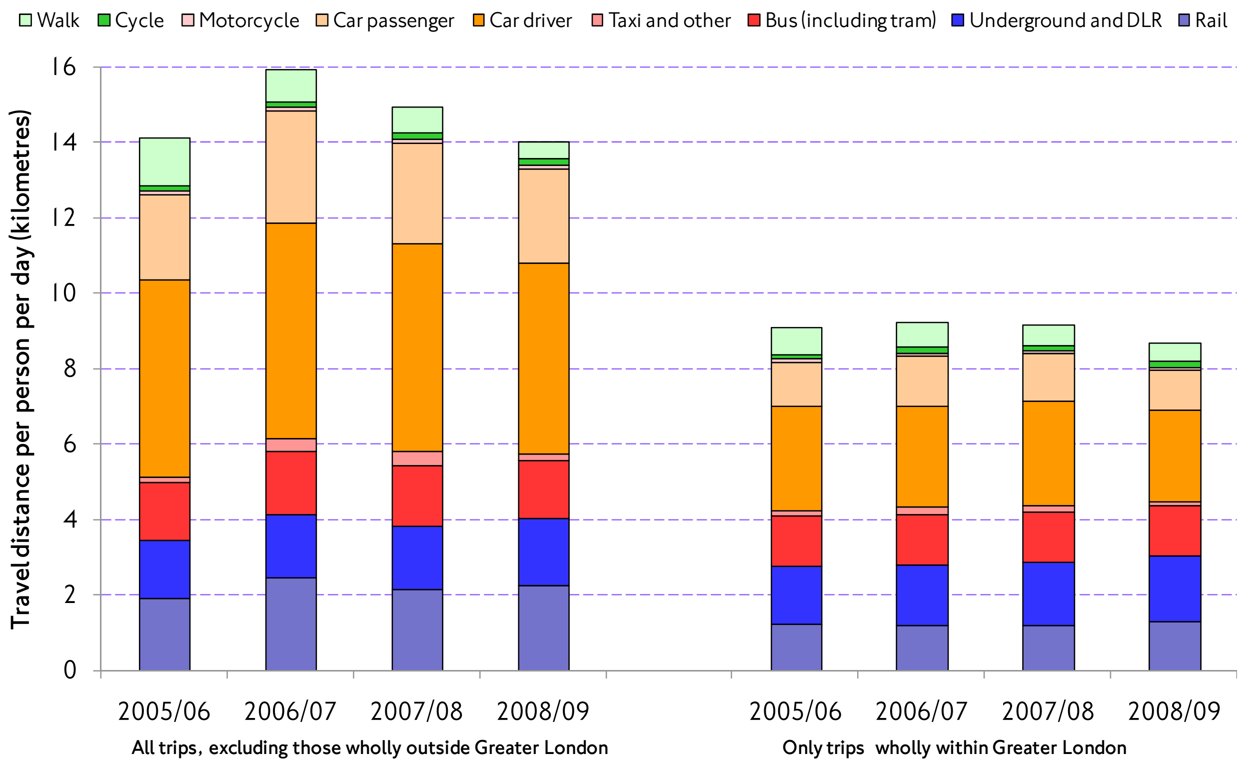
3.7 Travel by Londoners – distance travelled

LTDS records all trips by London residents, including trips with origins or destinations outside Greater London. This means that long-distance trips from or to origins or destinations well outside Greater London are captured, alongside quite local trips within London. However, travel by London residents between origin/destination pairs that are both outside London (for example, Birmingham to Manchester) are not included in the analyses in this report.

Travel distance is measured in LTDS as the straight line distance between the origin and destination of the trip (ie 'crow-fly' distances). Consequently, the results understate the actual distance travelled in the course of a trip, possibly by as much as 30 per cent. However, because this understatement is consistent from one survey year to the next, results can reliably be used to identify trends in travel distance and average trip length and to derive statistics such as distance-based mode shares.

Bearing in mind the above definitions, Figure 3.8 shows the recent trend in total distance travelled per day by London residents. The bars on the left show average per person distance for all trips with either an origin or destination in Greater London. This shows average travel distances for London residents of between 14 and 16 kilometres per day. This includes the whole distance of trips that are only partly in London. The bars on the right show the average distances where only trips that are wholly inside Greater London are included. These show an average distance travelled of around 9 kilometres per day and with much lower variation between years. Using this second definition, there has been a fall of around 5 per cent in the distance travelled by Londoners in London on an average day in 2008/09 against the average of the previous three LTDS survey cycles. Again, this mainly reflects the declining number of car driver and passenger trips.

Figure 3.8 Distance travelled per day (kilometres) by London residents. Seven-day week. LTDS 2006/06 to 2008/09



Source: TfL Planning, LTDS.

Another source of personal travel data is the National Travel Survey (NTS), an annual household survey carried out by the DfT throughout Great Britain – for more detailed information on the NTS, see section 3.9 of this report.

Table 3.6 uses NTS data to show how the average distance travelled by private transport modes by residents of London has changed since 1995-1997. Unlike LTDS, NTS reports actual distance travelled based on respondents' estimates of the length of each trip. Most modes have shown a reduction in travel, particularly car driving, where the distance travelled per person is around 25 per cent lower than in 1995-1997, particularly falling since 2000. In contrast, the distance travelled by bicycle has increased dramatically after a sharp decline up to 2002, according to this DfT survey. The average distance walked has also fallen by around 7 per cent over the period since 1995–1997, although it has been relatively stable since 2000.

Table 3.6 Average distance travelled by selected private modes: 1995/97 to 2008, London residents. DfT National Travel Survey based estimate.

				Index: 1995/97=100
	Walk	**Bicycle**	**Car driver**	**Car passenger**
1995/97	100	100	100	100
1996/98	96	102	102	102
1997/99	104	91	100	106
1998/00	103	97	102	106
1999/01	104	86	97	104
2000/02	97	96	93	100
2002	93	75	91	95
2003	94	106	87	100
2004	95	134	78	90
2005	97	126	79	87
2006	96	152	81	88
2007	96	117	81	88
2008	93	160	74	85

Source: National Travel Survey 2008 (DfT Transport Statistics Bulletin SB(09)20), page 9 (chart 2.6).

3.8 Travel by Londoners – time spent travelling

London residents, on average, spent 77 minutes per day travelling on weekdays. On Saturdays the average duration was 67 minutes per person, and on Sundays 52 minutes per person, albeit that there is a considerable degree of variation about these averages. These values are averages over the three LTDS survey years, 2005/06 to 2007/08.

Trip-based estimates by main mode

Table 3.7 shows the average amount of time spent travelling per person by mode, based on the main mode used for each trip, this time considered on the basis of a seven-day week.

Table 3.7 Time spent travelling per day by London residents (trip-based), minutes. Seven-day week. LTDS 2005/06 to 2008/09.

	2005/06	2006/07	2007/08	2008/09
National Rail	7.1	7.6	7.1	7.8
Underground/DLR	8.6	9.1	9.5	9.7
Bus/tram	14.7	14.4	13.9	14.7
Taxi/Other	0.8	1.4	1.1	0.7
Car driver	18.4	18.5	17.7	16.8
Car passenger	8.0	9.4	8.4	7.5
Motorcycle	0.5	0.5	0.4	0.4
Cycle	0.8	1.0	1.0	1.0
Walk	13.4	11.5	10.5	9.5
All	**72.4**	**73.4**	**69.6**	**68.1**

Source: TfL Planning, LTDS.

The table shows a prevailing downward trend since 2006/07, which continued in the 2008/09 survey cycle but not dramatically so – down 2 per cent overall compared with 2007/08. This decrease is mainly due to a decrease in car driver and passenger trips, where the time spent travelling decreased by 5 and 11 per cent respectively. The time spent walking by Londoners (in 'walk all the way' trips) also decreased, by more than 9 per cent, again reflecting the overall falls in trip-making by Londoners in 2008/09. In contrast, London residents spent longer on public transport trips, especially trips with main mode National Rail (10 per cent more in 2008/09).

Journey-stage based estimates by mode

Table 3.8 Time spent travelling per day by London residents (journey-stage based), minutes. Seven-day week. LTDS 2005/06 to 2008/09.

	2005/06	2006/07	2007/08	2008/09
National Rail	5.1	5.2	4.4	4.3
Underground/DLR	6.9	7.1	6.7	6.6
Bus/tram	13.3	13.0	12.0	12.1
Taxi/Other	1.1	1.4	1.1	0.7
Car driver	18.4	18.3	17.6	16.6
Car passenger	7.5	9.0	8.0	7.0
Motorcycle	0.3	0.3	0.3	0.4
Cycle	0.8	1.0	1.0	1.0
Walk	21.6	19.7	18.4	19.4

Source: TfL Planning, LTDS.

When breaking down travel times by journey stage mode (Table 3.8), the importance of walking becomes clearer. As walking is often a way of accessing other modes, the time spent walking per day is understated when breaking down travel time by the main mode used for a trip. Walking makes up about 29 per cent of the total time spent travelling by Londoners. When broken down by journey stage mode, Londoners show less time travelling on public transport and around the same time travelling by car, suggesting that a large number of public transport trips have significant walk stages as part of the overall trip.

So, whilst Londoners spent less time on 'walk all the way' trips in 2008/09 (around 9 minutes per day), when including walking to access other modes, Londoners spent about 5 per cent more time walking in 2008/09 (more than 19 minutes per day on average). Note that, apart from walking, LTDS does not estimate stage durations directly – these are calculated from the total trip times by allocating trip durations to stages according to the relative speeds of different modes.

3.9 How does travel in London differ from elsewhere in the UK?

This section looks at data for London residents from the DfT's National Travel Survey (NTS), which was briefly introduced in section 3.7. The focus here is on comparing London with the rest of the GB in terms of the travel behaviour of residents. The NTS is a household survey carried out by the DfT, intended to provide data on personal travel across Great Britain. This can be split down to provide data at the London level, albeit with a smaller sample size than is possible with the LTDS and a slightly different measurement basis. Although the sample size is smaller, the NTS commenced in 1995 and so allows this report to look at a longer time series than with the LTDS, which started in 2005. It also allows comparison of London with other parts of Great Britain.

Tables 3.9 and 3.10 show that, on average, Londoners make fewer trips, and travel less distance, than residents of any other region. According to NTS, Londoners averaged 2.31 trips per day (844 trips per year) compared with a GB average of 2.69 trips per day. In terms of travel distance, Londoners averaged 23 kilometres per day, only three-quarters of the Great Britain average (31 kilometres per day).

Table 3.9 Travel distance (kilometres) per person per day by country or region of Great Britain. National Travel Survey 2007/08.

	Kilometres per person per day						
GB Region	Walk	Car driver	Car passenger	Other private vehicles	Local bus	Other public transport	All modes
North East	0.9	14.4	8.0	0.9	1.7	2.4	28.2
North West	0.8	14.8	8.3	0.8	1.3	2.2	28.2
Yorkshire and The Humber	0.8	15.1	8.7	0.9	1.6	2.5	29.6
East Midlands	0.8	18.1	9.5	0.9	1.0	1.9	32.3
West Midlands	0.7	16.8	8.4	0.6	1.2	2.2	30.0
East of England	0.8	19.5	10.6	0.8	0.9	4.0	36.5
London	1.0	7.9	5.1	0.6	2.3	6.5	23.4
South East	0.9	18.8	10.2	0.8	0.8	4.3	35.8
South West	0.9	18.1	10.5	1.3	0.9	2.5	34.1
England	0.8	15.8	8.7	0.8	1.3	3.4	30.9
Wales	0.7	16.3	9.8	0.8	1.2	2.2	31.0
Scotland	0.9	15.0	8.2	0.9	2.1	4.0	31.1
Great Britain	0.8	15.7	8.7	0.8	1.4	3.4	30.9

Source: DfT, National Travel Survey.

NTS travel distances are not comparable with distance estimates from LTDS: NTS distances are actual travel distance as reported for each trip by the respondent whereas LTDS distances are crow-fly values estimated, from the data on locations of trip ends.

Other features of interest include:

- Londoners made the fewest trips by private transport but the most by public transport.
- Residents of south west England make the most trips, despite having the lowest average of public transport trips. They make relatively high numbers of private transport and (especially) walk trips.
- Residents of east and south east England also make high numbers of private transport trips (over 2 per person per day). East of England, followed by the south east, are the GB regions with the highest average travel distances per person, both about 36 kilometres per person per day.

Table 3.10 Trips per person, per day, by country or region of Great Britain. National Travel Survey 2007/08.

	Trips per person per day						
GB Region	Walk	Car driver	Car passenger	Other private vehicles	Local bus	Other public transport	All modes
North East	0.65	1.07	0.63	0.06	0.22	0.09	2.73
North West	0.60	1.14	0.62	0.05	0.18	0.08	2.67
Yorkshire and The Humber	0.61	1.09	0.60	0.07	0.20	0.07	2.64
East Midlands	0.62	1.24	0.65	0.08	0.12	0.05	2.75
West Midlands	0.56	1.26	0.67	0.06	0.17	0.07	2.78
East of England	0.55	1.28	0.68	0.09	0.09	0.09	2.78
London	0.58	0.60	0.36	0.07	0.37	0.34	2.31
South East	0.60	1.28	0.65	0.09	0.12	0.10	2.83
South West	0.70	1.26	0.70	0.10	0.10	0.05	2.90
England	0.60	1.12	0.61	0.07	0.18	0.11	2.70
Wales	0.56	1.16	0.67	0.06	0.13	0.07	2.65
Scotland	0.61	1.08	0.57	0.06	0.22	0.10	2.64
Great Britain	0.60	1.12	0.61	0.07	0.18	0.11	2.69

Source: DfT, National Travel Survey.

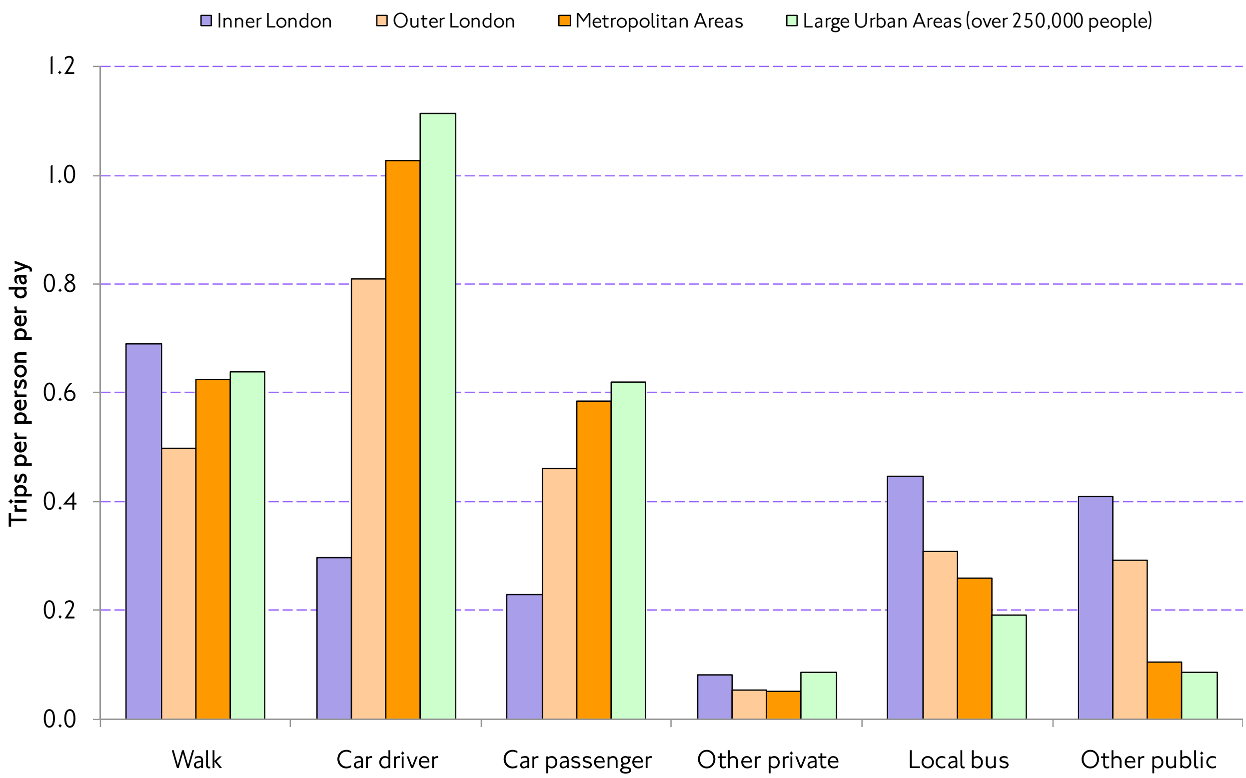
The NTS can be used to look at trends in travel by Londoners since 1995-1997. This gives a longer time series than is available from LTDS, but based on much smaller and more clustered samples. In the early years (before the NTS sample size was increased in 2001) it is necessary to combine at least three years' data before the London sample is large enough to be robust: after 2001 the effective NTS London sample is between 800 and 1,000 households per year, which can give reasonably accurate year-by-year totals. Key insights from the analysis are that:

- NTS indicates a decline in travel distance per London resident by car from about 1999 onwards, implying a fall of 26 per cent by distance as car driver and 15 per cent as car passenger between 1996 and 2008.
- Car driver distance started to decline earlier, and has fallen more, than car passenger distance, implying an increase in average occupancy of about 5 per cent (from 1.52 to 1.59 persons per vehicle) between 1996 and 2008. Passengers accounted for 34 per cent of car travel distance at the start of the period, increasing to 37 per cent by 2008.
- NTS implies a gradual decline in walking per person in London since 1995/1997 but little change since 2001.
- Estimates for cycling are subject to a high degree of random variation but suggest a declining trend between 1995/1997 and 2002, followed by a sharply increasing

trend. The 2008 estimate of cycle distance per person is 67 per cent above the 2000-2002 estimate.

Figures 3.9, 3.10 and 3.11 show key indicators of travel from NTS, and compare Inner (including Central) London with Outer London, other metropolitan areas, and with an average for all large GB urban areas of more than 250,000 people.

Figure 3.9 Trips per person, per day, by main mode of transport: London compared with metropolitan and other large urban areas. National Travel Survey 2007/08 (combined years).



Source: DfT, National Travel Survey.

Figure 3.10 Travel distance per person, per day, by main mode of transport: London compared with metropolitan and other large urban areas. National Travel Survey 2007/08 (combined years).

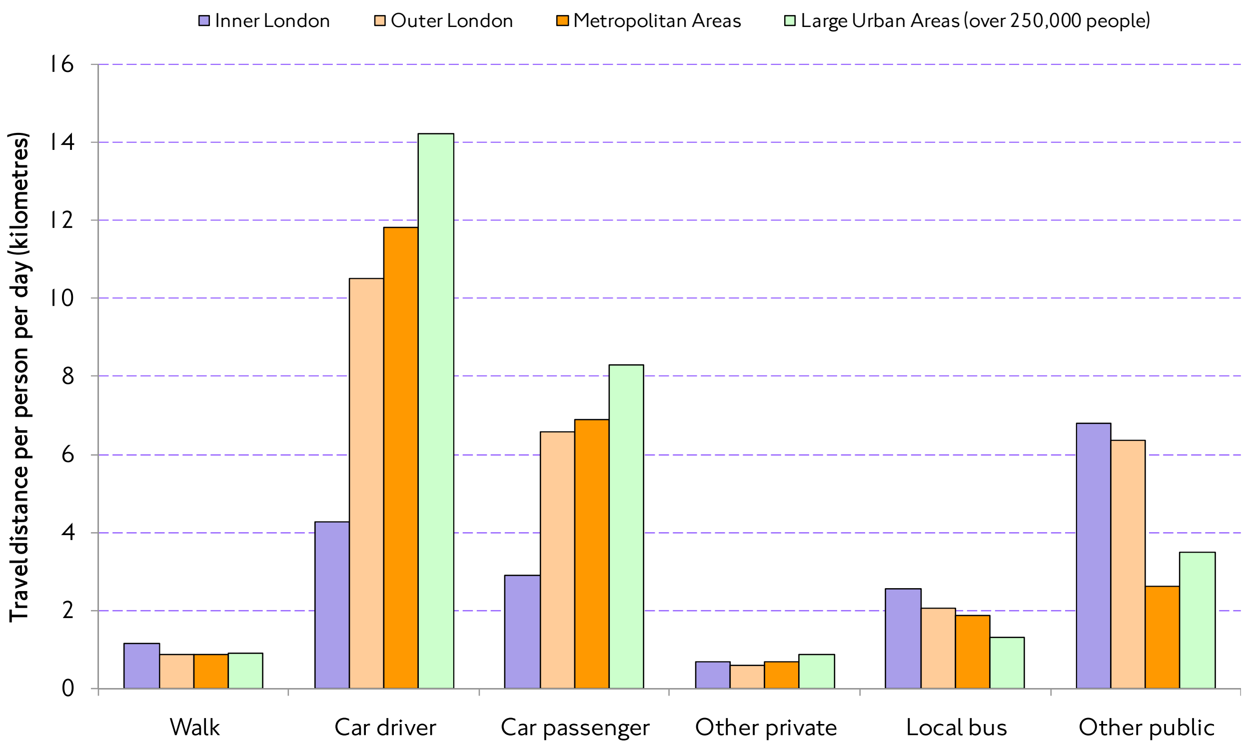
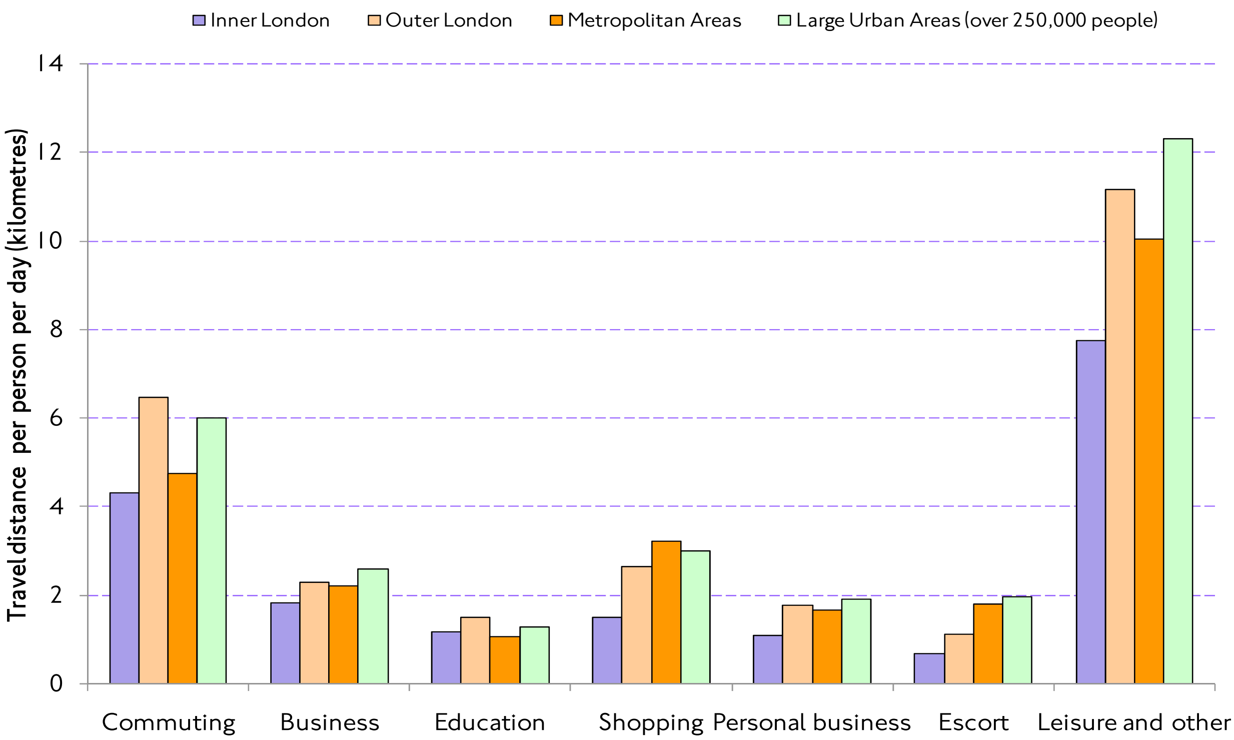


Figure 3.11 Travel distance per person per day by trip purpose: London compared with Metropolitan and other large urban areas. National Travel Survey 2007-2008 (combined years).



Source: DfT, National Travel Survey.

Key points of interest from Figures 3.9 to 3.11 are that:

- In terms of trips per person by main mode, there is a clear difference between residents of Inner and Outer London. This of course largely reflects London's functional geography and the transport networks, but gives a useful comparative baseline for developing policies to influence these mode shares.
- When set against other GB regions, London's comparatively low mode share for car travel is clearly evident in Figure 3.9, as is the relatively higher use of bus and other public transport.
- In terms of travel distance (Figure 3.10), the most striking feature is the much lower distance travelled by residents of Inner London, in comparison with both Outer London and other metropolitan areas.
- Looking at this average distance travelled by trip purpose (Figure 3.11), the picture is more comparable. The distance travelled by Londoners to work is typically further than for residents of other metropolitan areas, but tends to be slightly lower for shopping and leisure – reflecting London's comparatively higher urban density.

4. Supporting economic development and population growth: the performance of the transport networks

4.1 Introduction

This chapter looks at the operational performance of the transport networks in London. It firstly considers congestion, and related management initiatives to help smooth traffic on London's road network, before reviewing and updating trends in service provision and reliability for each of the main public transport modes.

4.2 Key features and trends – performance of the transport networks

Performance of London's roads – traffic speeds and congestion

- Congestion on the road network is a complex phenomenon and is a combination of speed, delay, reliability, extent of disruption and time spent in 'stop-start' traffic conditions. Historically, average speeds and delay have been used as a proxy for overall congestion levels. Recent work in connection with developing the Mayor's smoothing traffic flow agenda is clarifying this. However, at the moment in relation to historic trends, this is still the primary method of measuring congestion.
- There has been a long-term trend of increasing road congestion in London. This has affected all parts of London, but has been particularly intense in Central and Inner London, where it dates back at least two decades. More recently, congestion has been increasing – despite static or falling traffic levels – although there is some evidence of reduced congestion during 2009.
- The latest cycle of TfL's strategic speed surveys, covering the period 2007 to 2009, show that this trend has continued to affect all areas of London, with average Greater London traffic speeds in the weekday morning peak of 14.4 miles per hour (23.0 kilometres per hour); average inter-peak speeds of 17.8 miles per hour (28.4 kilometres per hour); and average evening peak speeds of 15.8 miles per hour (25.3 kilometres per hour).
- These most recent values are 3 per cent, 3 per cent and 1 per cent slower, respectively, than the previous survey cycle (covering the period 2003 to 2006), and are 9 per cent, 8 per cent and 7 per cent down on the 1990-1994 cycle.
- During the 1970s and 1980s, reducing traffic speeds primarily reflected increasing traffic levels. From the late 1990s, however, traffic volumes in Central and Inner London have stabilised and, more recently (since 2003), have fallen. Recent increases to congestion are therefore thought to reflect a range of planned and unplanned interventions on the road network that have combined to reduce the effective capacity of the network for general traffic. These include an increase in roadworks, and a wide range of other traffic management and road safety initiatives, together with unplanned interventions such as security alerts and emergency utility repairs.
- There has been some recent reduction in congestion, according to the latest monitoring data, perhaps reflecting falling traffic levels described elsewhere in this report. Newly-available Global Positioning System (GPS) data suggest that

more than half of boroughs had increased overall traffic speeds and reduced delays in 2008/09 compared to 2007/08. Recent data in relation to the extended central London Congestion Charging scheme also show reduced congestion in 2009 compared to 2008 (see also chapter 11 of this report).

Smoother traffic and journey time reliability

- Improving conditions on London's road network is a major Mayoral focus – through new policy and network management initiatives to help smooth traffic flow. Journey time reliability is a key concern of road users and this concept is being developed by TfL into a primary indicator of traffic smoothness. These indicators are currently being prototyped using existing number plate recognition cameras across London.
- Journey time reliability is defined, in a prototype indicator, as the proportion of traffic which – for a 'typical' 30-minute journey – takes less than 35 minutes (a representative average journey time of 30 minutes plus a five-minute 'allowance'). On this basis, a prototype indicator suggests that, during the weekday morning peak period and in the inbound direction of travel, between 80 and 90 per cent of measured journeys on monitored routes in London were completed within this time.

Performance of TfL-managed public transport networks

- LU had a record year in 2008/09, operating more train-kilometres than ever before. During this time, 70.6 million train-kilometres were operated, marginally up on the 70.5 million operated in 2007/08, despite the long-term closure of the East London line (ELL) for upgrade work. Because of the ELL and other upgrades, fewer train kilometres were scheduled than in the previous year, but a greater proportion of scheduled kilometres were actually operated (96.4 per cent – a new all-time high).
- As well as operating the highest-ever level of service, the Underground also improved this year on two other measures of reliability: average journey time and excess journey time. In 2008/09 overall average journey time (scheduled journey time plus excess) on the Underground was 43.9 minutes, a reduction of 0.6 minutes compared with 2007/08. Excess journey time in 2008/09 averaged 6.6 minutes, an improvement of 1.2 minutes compared to the previous year.
- During 2008/09, 492 million bus kilometres were scheduled, and 477.7 million kilometres were actually operated, an increase of 9.5 million (2 per cent) compared to 2007/08. In 2008/09, 97 per cent of scheduled bus services were operated, which was 0.5 percentage points less than the previous year, largely reflecting the severe weather during early February 2009.
- Both actual and excess waiting time for high-frequency bus services in 2008/09 were identical to 2007/08, at best-ever levels, in part reflecting quality incentive contracts for bus operators; 80.8 per cent of low-frequency services ran to time – again the highest recorded level.
- Reliability of Docklands Light Railway (DLR) is measured in terms of the percentage of trains that ran to time. For 2008/09, 94.7 per cent of DLR trains were on time. This compares to 97.2 per cent in 20097/08 – the reduction in

performance reflecting the disruptive effect of major project works and the commissioning of new trains during the year.

- Reliability of London Tramlink is measured in terms of the percentage of scheduled service operated. This was 98.5 per cent in 2008/09, compared to 99 per cent in 2007/08, the reduction reflecting a range of specific incidents on the network.

Performance of National Rail in London and TfL's London Rail

- Reliability of National Rail services in London is measured through the Office of Rail Regulation's Public Performance Measure (PPM), which is a percentage score combining elements of punctuality and reliability. The all-operators measure at June 2009, expressed as a moving annual average for the preceding four quarters, was 90.8. This compares to an equivalent score of 90.2 for the four quarters to June 2008.
- The best London and South East operators for the period June 2008 to June 2009 – Chiltern Railways and c2c – record PPMs of around 94/95 per cent. At the other extreme, London Midland – which operates some of the former Silverlink County and Central Trains services – recorded a PPM of 86.5 per cent. First Great Western was the most improved operator during the year, while TfL's London Overground services – the former Silverlink Metro services – recorded an above-average PPM of 92.5 per cent for its first year of this measure.

Public transport capacity, operating costs for TfL services and asset condition

The latter sections of this chapter consider the overall performance of public transport in London, as well as aspects of the overall performance of TfL, in terms of SOIs for the MTS. These cover:

- Public transport reliability – benchmark measures for each of the principal public transport modes (section 4.9).
- Public transport capacity – benchmark measures for each of the principal public transport modes (section 4.9).
- Average vehicle occupancies and satisfaction with levels of crowding on the principal public transport modes (section 4.9).
- Operating costs for TfL services (section 4.11).
- The condition of TfL's key assets (section 4.12).

4.3 Performance of London's road network

Delay and disruption on London's road network causes congestion. The poor reliability of journey times means that people have to make allowances for the uncertainty of how long a journey may actually take. Improving the reliability of journey times can result in drivers and other road users being better able to anticipate the actual time required for their journey. This can be particularly important for business travel and deliveries. As the unreliability of journeys is correlated with the 'slowness' of a journey, reducing congestion and improving reliability are both important to road users and the economy, and are a priority for the Mayor and TfL.

The draft MTS seeks to mitigate the potential effects of road congestion through a range of initiatives to smooth traffic flow. The main aim of smoothing traffic flow is to increase the reliability and predictability of journeys, and to reduce 'stop-start' traffic conditions which increase emissions of harmful pollutants. The aim of this work is to improve conditions for existing road users, including cyclists and pedestrians – not to create additional capacity that might increase car journeys.

Measurement of road network performance

Performance of the road network can be measured in terms of average traffic speeds, disruption and journey time reliability – collectively reflecting the concept of congestion. Each of these basic 'objective' measures can be formulated in a number of different ways, some of which are elaborated in this section. Data to inform them potentially arise from three main sources, each of which has relative strengths and weaknesses:

- Traditional moving car observer (or 'floating car') surveys, where an instrumented vehicle is driven over the major roads in a network according to a set of rules designed to emulate general traffic. Much of the historic road network performance dataset in London arises from this source.
- Global Positioning Satellite (GPS) based systems, which make use of the increasing numbers of vehicles fitted with satellite tracking devices. Here, time/distance records for a potentially large sample of 'probe' vehicles can be processed to derive average speed and congestion data for arbitrary road networks.
- Automatic number plate recognition (ANPR) camera-based data. This makes use of increasing numbers of cameras, which can be paired over sections of network where inter-camera distance is known. Large samples of individual vehicles moving between paired cameras can be observed, and statistical distributions (fully–anonymised in a Data Protection compliant way) of journey times compiled and analysed.

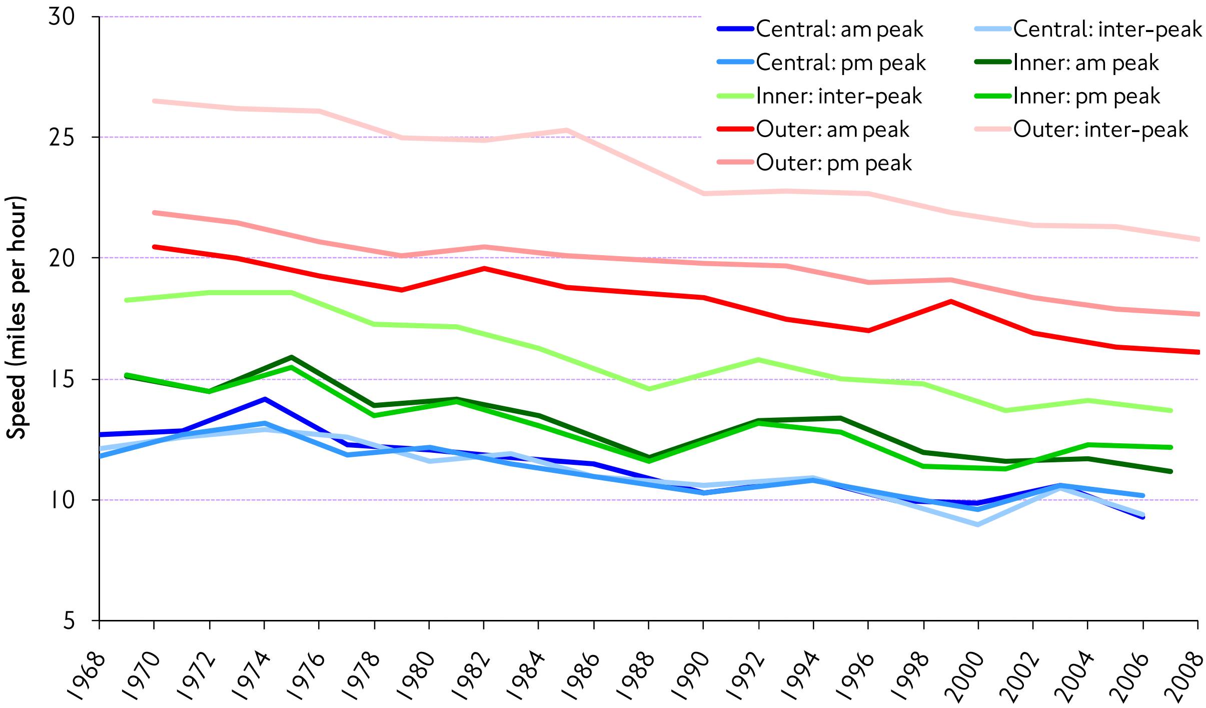
Also important is the perception of congestion by road users. It is possible, for example, for individual road users to experience similar absolute levels of congestion or delay at differing levels of traffic volume, and two journeys accomplished at a similar average overall speed can reflect either relatively smooth progress at consistent, albeit relatively modest, 'driving speeds', or a journey punctuated by frequent stop/start episodes. The latter is likely to be more frustrating for the driver and will be worse for the environment.

Long–term trends in average traffic speeds in London

Long–term trends in average traffic speeds in London, using moving car observer data, are shown in Figure 4.1, from which it is clear that the long-term trend across the whole of the London road network has been towards slower average traffic speeds. This is a consistent trend dating back to the 1970s, albeit that it appears to have accelerated in recent years.

Over the period from 1980 to 1982 to the latest complete survey cycle in 2007 to 2009, average weekday traffic speeds in Greater London fell by 18 per cent in the morning peak period; by 14 per cent in the inter-peak period, and by 12 per cent in the evening peak period. This downwards trend in speeds has affected all parts of London and all times of day, but has been particularly intense in Central London, where weekday morning peak speeds fell by 23 per cent over the period, despite the introduction of Congestion Charging in 2003 (see also chapter 11 of this report). These most recent values are 3 per cent, 3 per cent and 1 per cent slower, respectively, than the previous survey cycle (covering the period 2003 to 2006), and are 9 per cent, 8 per cent and 7 per cent slower than the 1990 to 1994 survey cycle.

Figure 4.1 Long-term trend in road traffic speeds in Greater London. Working weekdays, by time period.

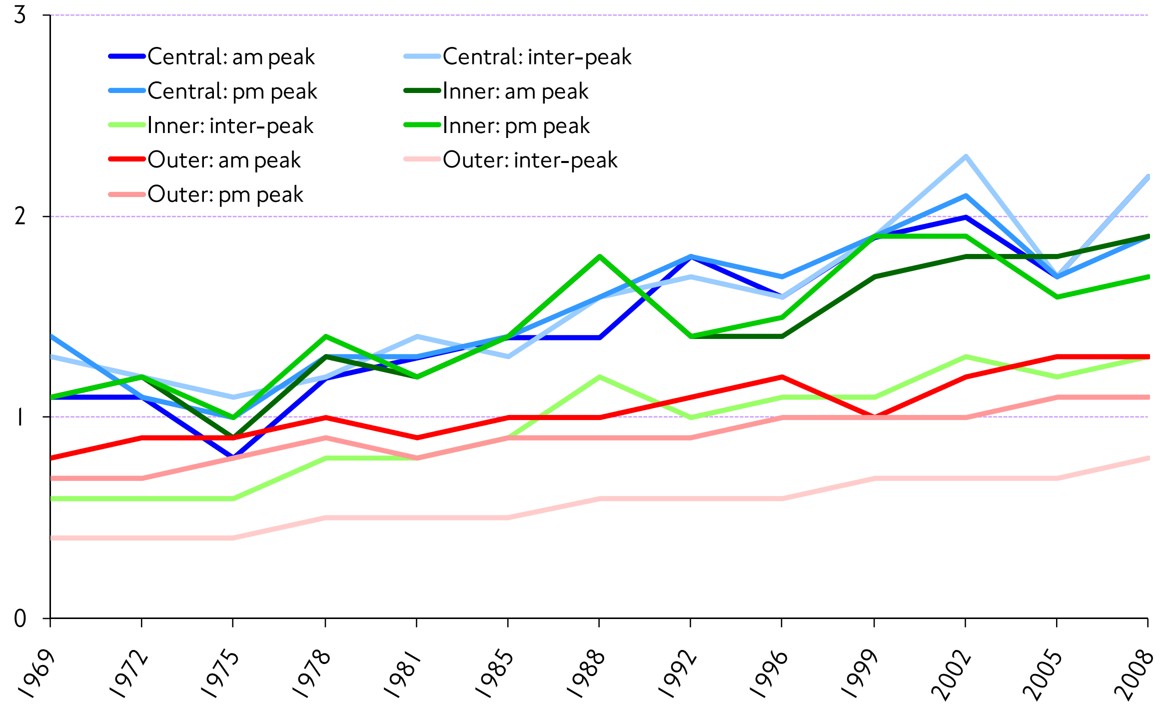


Source: TfL Road Network Performance

Indices of congestion (delay) can be derived from the speed data in Figure 4.1 by converting speeds (in miles per hour) to a 'travel rate' expressed as minutes per kilometre, ie the time taken, on average, to travel 1 kilometre. Values for notionally 'uncongested' conditions, in practice using similar speed survey data collected during the early hours of the morning, can then be subtracted to determine the 'excess delay' component of the total travel rate. This component can be considered to be congestion, in that it expresses how much longer it takes to move around the road network, on average, than would be the case if there were no congestion. The use of overnight speeds in this way provides a 'pragmatic' benchmark against which to assess congestion – it does not imply that zero congestion is an achievable and/or necessarily desirable goal, as this would not be economically optimal.

Figure 4.2 shows the same data as Figure 4.1 expressed in terms of congestion. The trends are inverted, since lower speeds equate to higher travel rates per kilometre, and the intensity of the long-term trend towards increased congestion can be more clearly seen.

Figure 4.2 Long-term trend in road network congestion (delay as minutes per kilometre) in Greater London. Working weekdays, by time period.



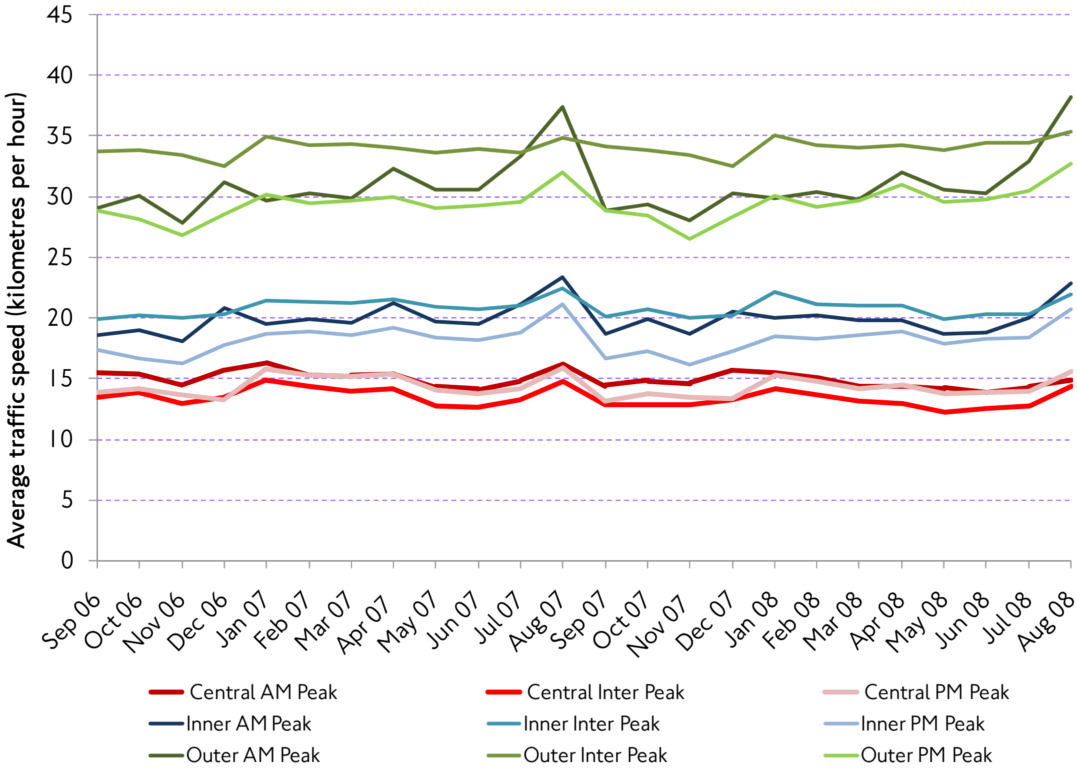
Source: TfL Road Network Performance

During the 1970s and 1980s, reducing traffic speeds primarily reflected increasing traffic levels. From the late 1990s, however, traffic volumes in Central and Inner London have stabilised and, more recently, have fallen. Recent increases to congestion are therefore thought to reflect a range of interventions on the road network that have combined to reduce the effective capacity of the network for general traffic. These have included an increase in the incidence of road and streetworks, reflecting development activity and utility infrastructure replacement, together with other initiatives such as road safety measures, which have contributed to the significant progress against Government casualty reduction targets in London, as described in chapter 6 of this report.

GPS satellite tracking data

TfL has now received an improved and updated GPS tracking dataset for the London road network (TfL's 'network of interest – which includes all major roads and some more significant minor roads) that should facilitate time-series tracking of trends on a consistent basis. Figure 4.3 shows the available time-series, in terms of average vehicle speed, by functional sector of London. With a relatively short-run dataset it is difficult to discern clear trends. However, as with the moving car observer speed data in Figure 4.1, lower speeds characterise Central London, and relatively higher speeds Outer London. There is also evidence of a seasonal pattern, with generally lower average speeds in spring and autumn. Of additional interest is the similarity of speeds across the working day – particularly noticeable in Central London but also reflected in Inner London. Note that GPS data is processed in a different way to moving car observer data – specifically in using a different definition of overnight (notionally-uncongested) speeds. This means that estimates of absolute speeds and delay will differ between the two sources.

Figure 4.3 Estimated average vehicle delay (minutes per kilometre) by functional sector of London, September 2006 to August 2008. GPS satellite tracking data.



Source: TfL Road Network Performance

Table 4.1 shows equivalent delay data for each of the individual London boroughs, comparing two recent years. This comparison is based on 'academic years', reflecting the annual update of the network by the data providers in September each year. The table compares both speeds and delays across three time-periods of the working day (morning peak, inter-peak and afternoon peak), at the borough level.

The overall comparison suggests that there has been a tendency for the balance of average traffic speeds to have increased, and for delays to have correspondingly reduced, in 2008/09 against 2007/08. The 2008/09 dataset extends from late summer 2008 to late summer 2009 – and therefore is more up-to-date than alternative data sources in reflecting a full year of the recent economic recession. As discussed in chapter 2 of this report, traffic volumes have fallen over this period, and it is reasonable to attribute part of this reduced delay to lower traffic volumes. However, increased efforts by TfL in respect of the Mayor's traffic smoothing initiatives will also have played a part. Recent data in relation to the extended central London Congestion Charging scheme also show reduced congestion in 2009 compared to 2008 (see also chapter 11 of this report).

Table 4.1 Estimated average speeds and vehicle delay by borough. 2008/09 with comparison against 2007/08. Working weekdays, GPS satellite data.

Borough	Network length (km)	Mean annual average daily flow ('000 vehicles)	AM peak speed (kph)	AM peak delay (mins per km)	% change y/e Sep 08 to y/e Aug 09 (delay)	Interpeak speed (kph)	Interpeak delay (mins per km)	% change y/e Sep 08 to y/e Aug 09 (delay)	PM peak speed (kph)	PM peak delay (mins per km)	% change y/e Sep 08 to y/e Aug 09 (delay)
Barking & Dagenham	88	4.9	28.7	0.86	0	34.0	0.49	+10	29.6	0.69	+16
Barnet	250	6.3	33.0	0.65	-3	35.9	0.51	-5	31.0	0.75	-1
Bexley	158	5.0	39.4	0.43	+3	40.4	0.40	+1	39.5	0.46	-4
Brent	146	5.2	24.4	0.82	+6	25.7	0.64	+16	21.1	1.13	+11
Bromley	258	4.0	30.6	0.67	+1	31.6	0.58	+6	29.3	0.69	+9
Camden	120	4.7	15.9	1.51	-7	15.6	1.73	-15	15.1	1.61	-1
City of London	37	8.3	13.2	2.07	-10	13.1	2.28	-17	13.1	1.84	+4
Croydon	201	4.5	25.5	0.80	-3	26.1	0.68	+6	23.2	0.96	+5
Ealing	178	6.1	27.0	1.00	-13	29.4	0.73	-5	24.0	1.24	-7
Enfield	209	6.8	36.1	0.61	-7	37.8	0.48	+2	34.5	0.69	-6
Greenwich	181	6.2	27.1	1.19	-24	32.6	0.51	+4	29.0	0.69	+9
Hackney	76	5.2	19.6	1.15	-2	18.8	1.29	-2	17.3	1.57	-3
Hammersmith & Fulham	76	7.0	23.0	1.16	-16	23.0	1.19	-18	18.0	1.83	-7
Haringey	108	4.4	21.1	1.08	-2	21.3	1.04	0	18.2	1.47	+3
Harrow	114	3.6	30.2	0.64	-3	30.7	0.58	+2	27.5	0.82	0
Havering	177	6.5	45.6	0.47	-7	51.2	0.28	+5	45.6	0.45	-2
Hillingdon	255	8.3	44.5	0.41	-11	51.1	0.20	-1	40.3	0.51	0
Hounslow	187	8.7	29.3	0.95	-15	36.1	0.49	-14	29.9	0.76	+1
Islington	76	4.9	16.5	1.54	-3	16.9	1.48	-5	16.7	1.48	-2
Kensington & Chelsea	73	7.0	20.2	0.89	-8	19.2	1.13	-15	19.1	1.14	-14
Kingston upon Thames	104	7.9	34.4	0.70	-18	36.6	0.53	-10	32.8	0.81	-18
Lambeth	130	5.9	18.3	1.20	+5	19.3	1.03	+6	17.8	1.31	+3
Lewisham	112	5.0	19.2	1.63	-14	21.0	1.16	-2	17.4	1.62	+7
Merton	117	4.8	23.4	1.16	-10	24.6	0.99	-8	21.3	1.34	-4
Newham	122	6.3	34.8	0.35	+16	31.7	0.51	+12	23.3	1.12	+12
Redbridge	160	5.4	33.6	0.60	+6	35.7	0.47	+13	31.5	0.64	+16
Richmond upon Thames	142	5.7	24.4	1.13	-12	26.8	0.77	0	22.4	1.30	-7
Southwark	127	5.5	17.8	1.41	0	19.2	1.11	+5	17.3	1.46	+3
Sutton	91	4.4	25.9	0.92	-7	26.7	0.79	-1	24.9	0.98	-4
Tower Hamlets	100	8.5	23.6	0.94	-4	24.6	0.79	+2	18.1	1.68	0
Waltham Forest	131	4.7	33.5	0.61	-8	32.5	0.62	0	28.9	0.80	+6
Wandsworth	131	5.4	20.1	1.47	-10	22.5	1.13	-11	19.8	1.44	-5
Westminster	176	7.1	18.1	0.84	0	16.2	1.36	-10	16.8	1.09	0

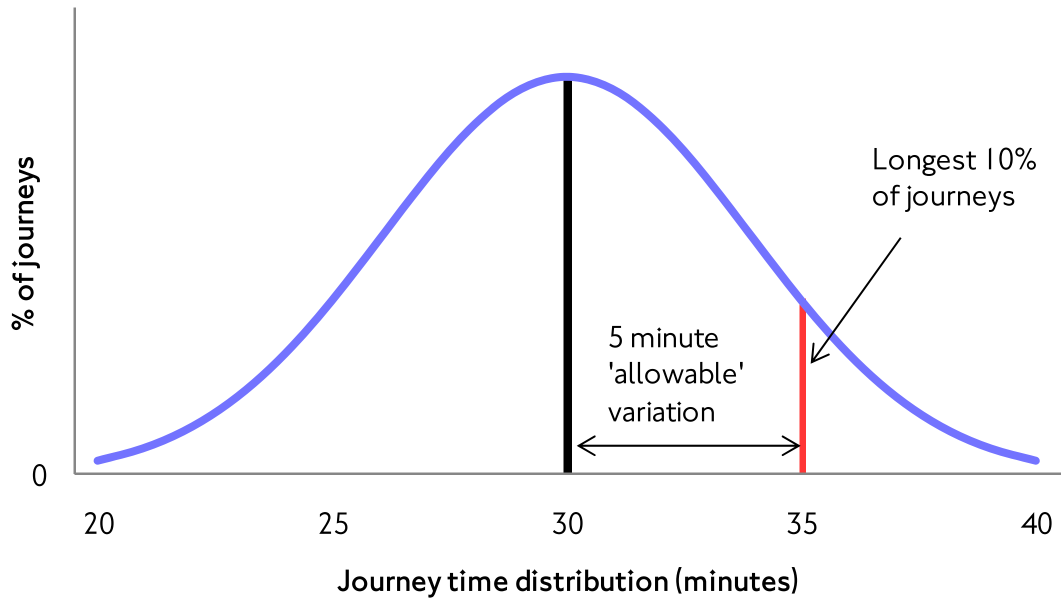
4.4 Measuring the smoothness of traffic

The primary measure adopted by TfL for assessing traffic smoothness is journey time reliability for motor vehicles. The draft MTS identifies the need for such a measure and defines it as:

> ***The percentage of journeys completed within 5 minutes of a specified typical journey time***

This 'specified typical journey time' has been assumed to relate to an average 30 minute journey, which is representative of all road journeys across London. This introduces the concept of an 'allowable' variation around a standard mean journey time for either the network as a whole, or any individual portion of it, allowing a numerical measure of the percentage of journeys completed 'on time' (ie reliably) across the network. Therefore, within an allowable variation in journey time of 5 minutes, journeys completed within 5 minutes of the mean journey time are considered to be 'on time'. For example, if 90 per cent of journeys fall within this range, then we can consider the network to be 90 per cent reliable. This concept is illustrated by Figure 4.4.

Figure 4.4 Conceptual representation of journey time variability around an 'average' time for the same journey.



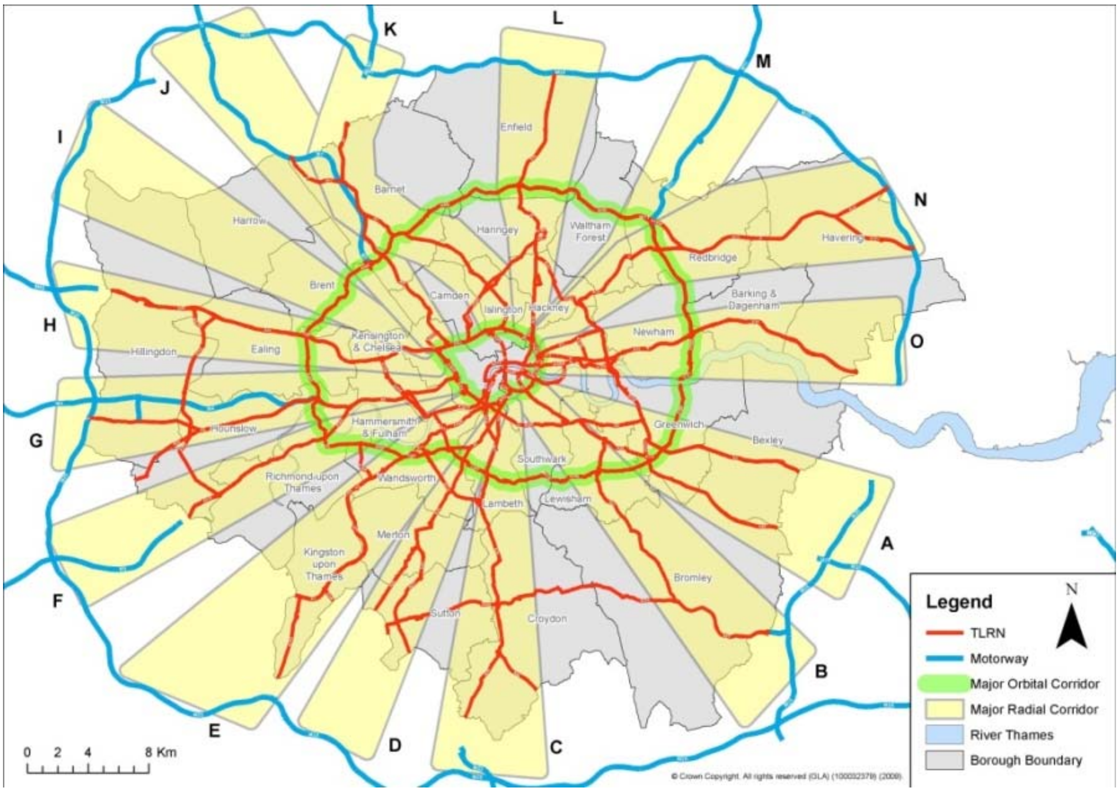
Pedestrians and cyclists experience variability of a different kind – between different users (for example how physically fit or able they are), or how quickly they choose to travel – (these groups of road users are not considered here).

ANPR camera data and the London Congestion Analysis Project (LCAP)

Coverage by ANPR cameras in London is now such as to make feasible the monitoring of journey times and journey time reliability across a skeletal network that approximates to the more major routes (notably the TLRN), and this has been taken forward by TfL through the London Congestion Analysis Project (LCAP).

The LCAP project is now in advanced prototype form and has been used to develop this indicator of road network performance and traffic smoothness. TfL is focusing the development of this indicator on the TLRN – 580 kilometres of the most densely used strategic roads representing about 5 per cent of the overall road length, but carrying more than 30 per cent of the total traffic in London. Figure 4.5 shows the extent of the network being monitored for this purpose, which incidentally is a sub set of the wider network coverage of LCAP. Note how the alignment of the major road links being monitored map on to the 'key radial corridors', as identified in the draft MTS.

Figure 4.5 Network being used to develop TfL's indicator of traffic smoothness.



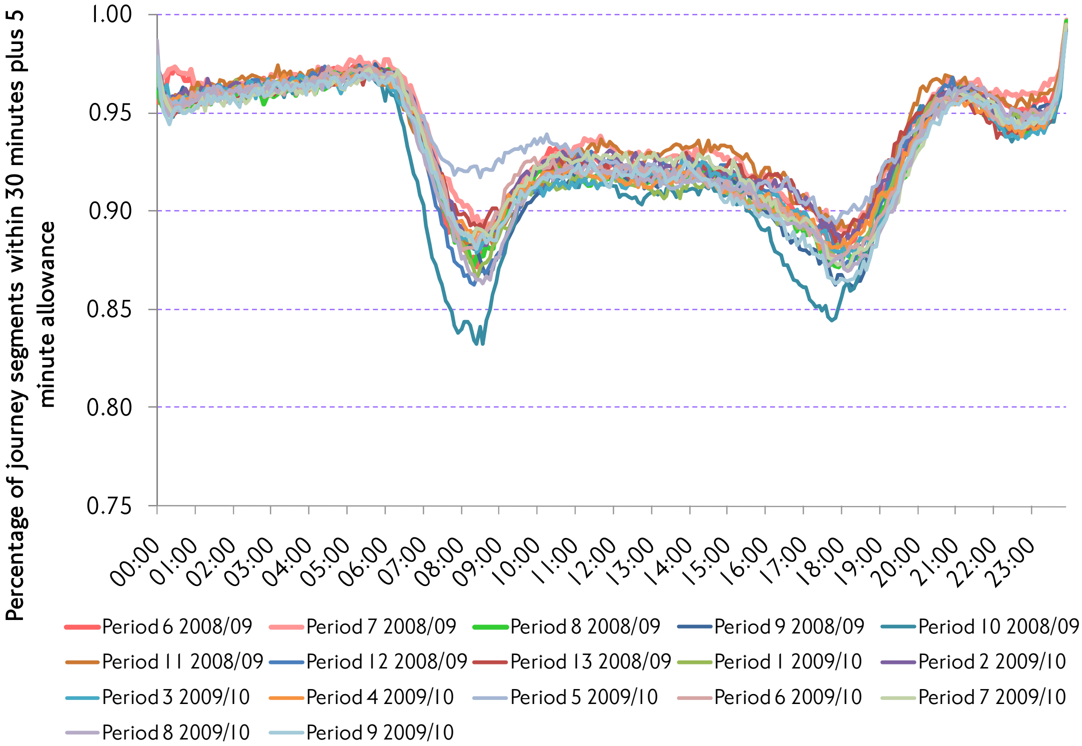
Source: TfL Road Network Performance

Using ANPR camera data across the TLRN, TfL has been working to provide baseline and historic trend data to monitor and to explore journey time reliability both on the TLRN as a whole, and on individual strategic routes across London. This is achieved by measuring the speed of traffic between sets of camera pairs – there are more than 600 of these pairs on the TLRN – and factoring the observed journey times either up or down to a notional 30 minute journey.

Examples of output from LCAP

This gives statistical distributions of journey times, which can then be manipulated in ways such as that shown by Figures 4.6 and 4.7. The former shows how TfL's prototype measure of reliability varies across the hours of the day for each of the most recently-available 17 TfL four-week financial periods. Figure 4.7 illustrates a typical 'link profile' showing 10th and 90th percentiles for journey times across a 24-hour day, distributed about the mean journey time for that link.

Figure 4.6 Percentage of journeys on major routes in London completed reliably. Average diurnal profile, by TfL four-week period. 2008/09 period 6 (August/September) to 2009/10 period 9 (November/December).

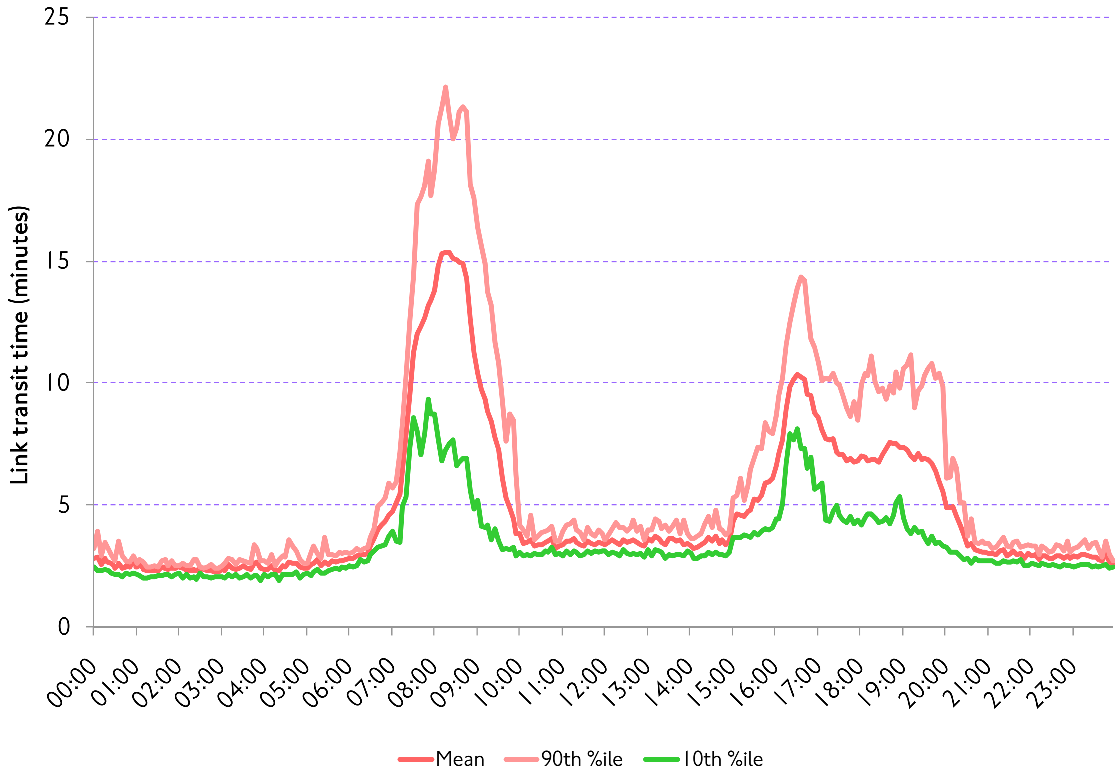


Source: TfL Road Network Performance

Figure 4.6 shows that journey time reliability varies across the working day, being at its most reliable in the early hours of the morning and least reliable in the morning peak period when the network is at its busiest. It also varies by time of year, with periods 10 (December/January) and 5 (August) being the least and most smooth respectively.

Figure 4.7 shows a typical LCAP 'link profile', with mean travel times across the day and 10th and 90th percentiles of journey time. Again, increased journey times during the morning and afternoon weekday peak periods are seen. However, the relationship between the absolute journey time and the 'spread' between the 10th and 90th percentiles is clearly demonstrated, with slower mean journey times being associated with widening percentile bands – indicating less reliable individual journey times in relation to the mean.

Figure 4.7 Typical LCAP 'link profile' showing mean, 10th and 90th percentile journey times. A306 Castelnau, northbound direction, Barnes.



Source: TfL Road Network Performance

Some initial findings from TfL's development of an indicator of traffic smoothness

Prototype indicators from LCAP have now been produced for TLRN routes on all the major strategic radial and orbital corridors highlighted in the draft MTS. Over the review period, considering the weekday AM peak in the inbound direction of travel along key radial corridors, between 80 and 90 per cent of road journeys were achieved within the allowable excess of 5 minutes of the nominal average 30-minute journey time.

Bearing in mind the indicator should at this stage be regarded as a prototype, and that one year is not sufficient to discern long-tem trends, the following patterns are visible in the prototype data:

- Journeys appear to be least reliable on orbital routes in Outer London and in Central London.
- There is a clear seasonal influence, with reliability tending to be higher in summer, and lower in winter (for example, during the run-up to Christmas).
- The relationship between average speed and reliability is not straightforward. The A40 corridor running through north west London, for example, although offering some of the faster journey speeds on the London road network is also one of the less reliable. This corridor also carries the highest volume of traffic of those considered.
- Some strategic corridors are notable for the stability of the indicator over the period under review; others show greater variability.

- As might be expected, the degree of period-by-period variability is less for more aggregate road groupings (for example at the TLRN/Greater London level).

MTS strategic outcome indicator: Journey time reliability for motor vehicles

Why this indicator is important

Delay and disruption on London's road network causes congestion, which is economically inefficient. The poor reliability of journey times means that road users have to plan for the uncertainty of how long a journey may take. Improving the reliability of journey times can result in road users having a better understanding of how long a journey may take that is closer to the actual journey time. Reducing congestion and improving the reliability of journeys in this way is important to the well-being of road users and the economy, and is a priority for the Mayor and TfL. This is being taken forward through a variety of management initiatives to help smooth traffic in London.

How this indicator is calculated

TfL's prototype indicator of traffic smoothness is based on the concept of an 'allowable' variation around a standard mean journey time. The standard mean journey time being used is 30 minutes, which is representative of all journeys by road in London. This 'allowable variation' defined by the draft MTS is 5 minutes, with respect to this standard 30 minute journey time. The indicator can be calculated either for the network as a whole, or for portions of it, and can also be calculated for various time periods, such as the weekday morning peak. Improved traffic smoothness would show as an increasing percentage of measured journey segments that fall within this 5 minute allowance.

Status of indicator

This indicator is under active development by TfL Surface Transport and therefore a formal baseline for MTS strategic outcome monitoring is not yet available. A prototype time-series suggests that, considering the weekday AM peak period in the inbound direction of travel along key radial routes, between 80 and 90 per cent of journeys by road in London are achieved within 5 minutes of the nominal standard 30 minute journey time.

Further development of TfL's traffic smoothness indicator

The data considered above reflect TfL's development and prototyping of the LCAP system to date. They are presented in this report as an indicative, rather than a formal, exploration of a baseline for future MTS strategic performance purposes.

It is also premature, at this stage, to consider what, if any, targets for improvement or specific ambitions could or should be set, before the following are fully understood:

- The behaviour of the indicator, in terms of its stability or variability over the medium-term.
- A comparison of the dataset with other sources, which also provide information related to road network speeds and travel times, to ensure consistency.

- Some piloting work to explore the sensitivity of the prototype measure to the type of interventions that TfL will make to help smooth traffic and improve road network operation – in other words, its ability to detect change in response to management interventions.
- The best and most appropriate measure to produce. The prototype measure can be sub-divided or aggregated spatially and temporally and the level of aggregation will clearly affect the sensitivity of the measure and its ability to detect change.
- Most probably therefore, a suite or hierarchy of indicators – as opposed to a single aggregate number for each year – will be required in order to fully understand the various components of change.
- Engagement with road users – to understand what indicators are most helpful for them.

4.5 Performance of the London Underground

The following section considers the main strategic trends in LU service provision and service reliability, with reference to the most recent financial year – 2008/09.

LU service provision

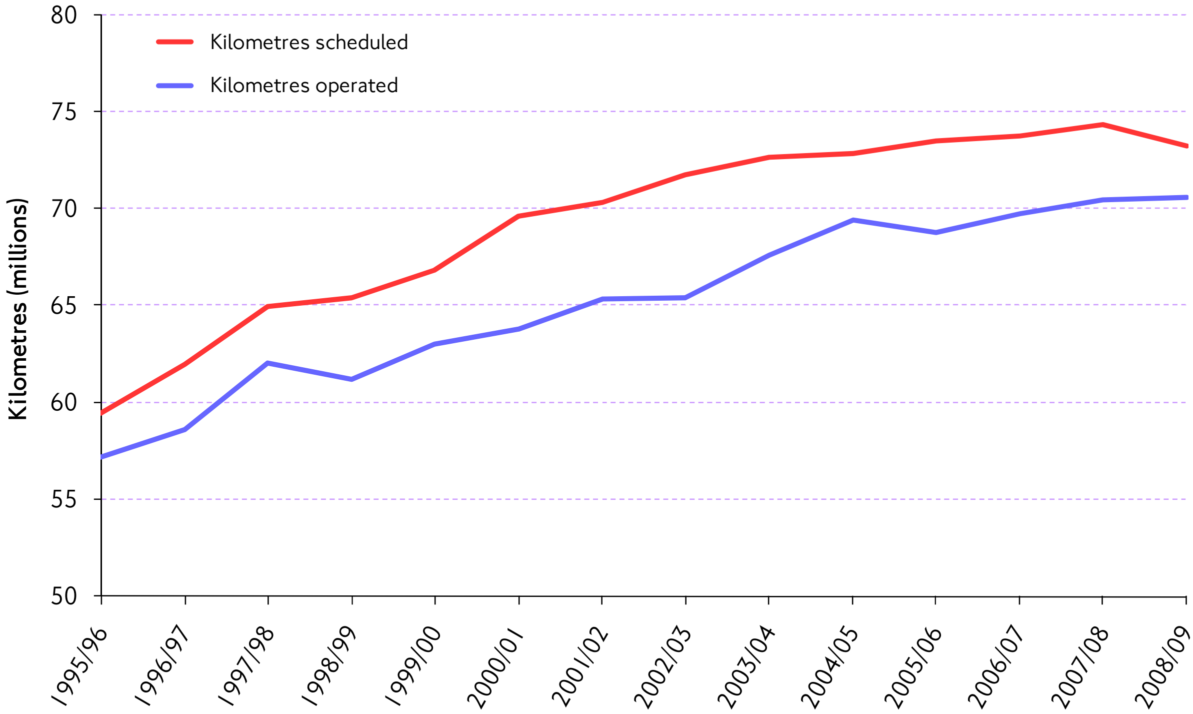
Over the last 10 years, LU has consistently increased its service offering, with general year-on-year increases in train kilometres scheduled (Figure 4.8). During 2008/09, LU operated more train kilometres than ever before – continuing the positive trends of recent years. In 2008/09, 70.6 million train kilometres were operated. This was 0.1 million more than in 2007/08 and is a new all-time high.

However, the network was also affected by the planned closure of the East London line, together with several other temporary closures associated with TfL's upgrade programme. This meant that approximately 1 million fewer train kilometres were scheduled in total across the network compared to the previous year, but a greater proportion of kilometres scheduled were actually operated. The Underground operated 96.4 per cent of scheduled services in 2008/09 – the highest percentage since records began.

LU service reliability

As well as operating the highest ever level of service, the Underground also improved significantly on two other key measures of reliability: average journey time and excess journey time. In 2008/09 overall average journey time (scheduled journey time plus 'excess') averaged 44 minutes, a reduction of 0.6 minutes compared with 2007/08 and the lowest achieved on the network since the introduction of the Jubilee line extension in 1999. This means that Underground journeys, on average, are getting slightly faster.

Figure 4.8 London Underground: Scheduled and operated train kilometres.



Source: London Underground

Excess journey time (EJT) is the average time added to journeys by delays, crowding and queuing, over and above the nominal scheduled time. Excess journey time in 2008/09 averaged 6.6 minutes, an improvement of 1.2 minutes compared to the previous year and the best performance since the measure was introduced 10 years earlier.

The way that excess journey time is calculated was revised in 2006/07, to be weighted to take account of how customers value time. As a percentage of the average journey times the 'excess' component fell from 17.4 per cent to 15.1 per cent for the latest year, the lowest recorded and well below the peak of 20.7 per cent in 2002/03 (Table 4.2).

The main reason for this reduction in excess journey time was a significant improvement in train service reliability, which was driven by a reduction in the impact of train service incidents, particularly infrastructure failures (fleet, signals, track) and staff related incidents (errors and cancellations). Improved reliability, and the subsequent increase in available train capacity, also resulted in a reduction in excess time due to on-train crowding (passengers not being able to board a first train). There was also a reduction in excess ticket purchase times as more customers switched to Oyster and therefore reduced the need to buy tickets at ticket offices. Finally – apart from the adverse weather of early February 2009 – there was no industrial action or significant one-off events during the year.

Table 4.2 London Underground service reliability and journey times.

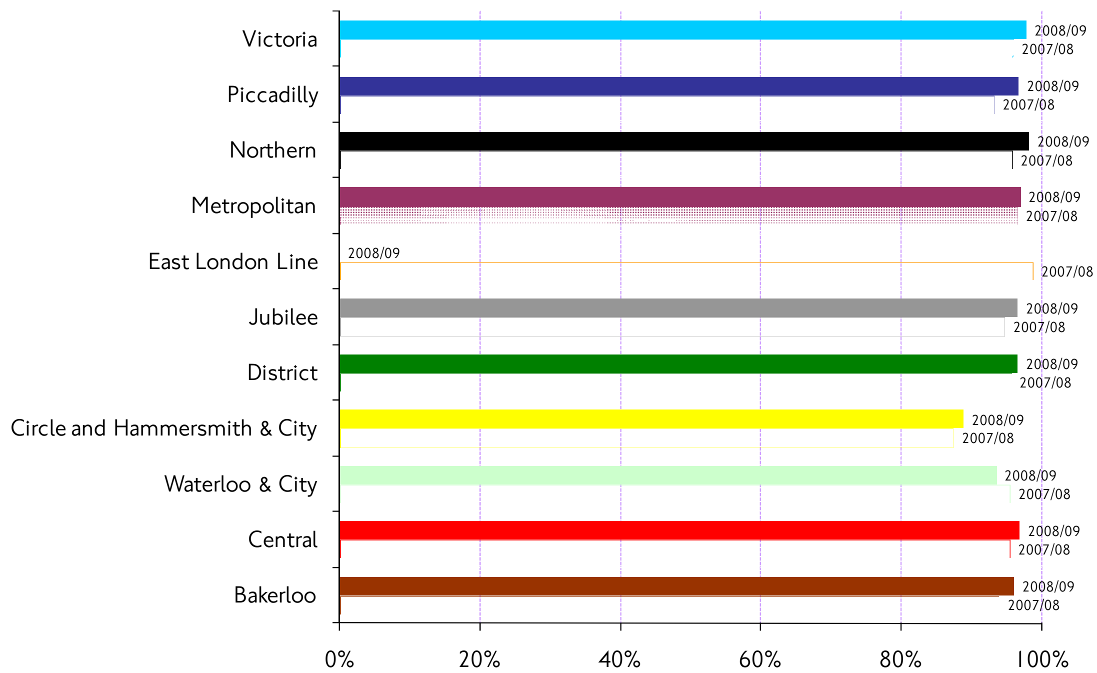
Year	Percentage of scheduled kilometres operated	Average actual journey time (minutes)	Average generalised (weighted) journey time (minutes)	Excess journey time (weighted) (minutes)	Excess as % of generalised journey time
1998/99	93.6	27.7	43.5	7.1	16.4
1999/00	94.3	27.8	43.9	7.5	17.1
2000/01	91.6	28.6	45.7	8.6	18.9
2001/02	92.9	28.3	45.2	8.1	18.0
2002/03	91.1	29.1	46.7	9.7	20.7
2003/04	93.1	27.9	44.3	7.4	16.8
2004/05	95.3	27.7	44.0	7.2	16.4
2005/06	93.6	27.8	44.3	7.5	16.9
2006/07	94.5	28.0	44.7	8.1	18.0
2007/08	94.8	27.8	44.5	7.8	17.4
2008/09	96.4	27.5	43.9	6.6	15.1

Source: Transport for London.

1. *Excess journey time is the difference between actual journey time and that expected if services run to time, and weighted to reflect how customers value time. Data not collected prior to 1998/99.*

Service reliability differs between Underground lines, although Figure 4.9 shows a consistently strong performance and a general improvement over the previous year. The Northern and Victoria lines recorded the highest percentages of scheduled kilometres operated, and the Circle and Hammersmith & City lines the lowest.

Figure 4.9 London Underground service reliability by line. Percentage of scheduled kilometres operated. Financial years 2007/08 and 2008/09 compared.



Source: London Underground

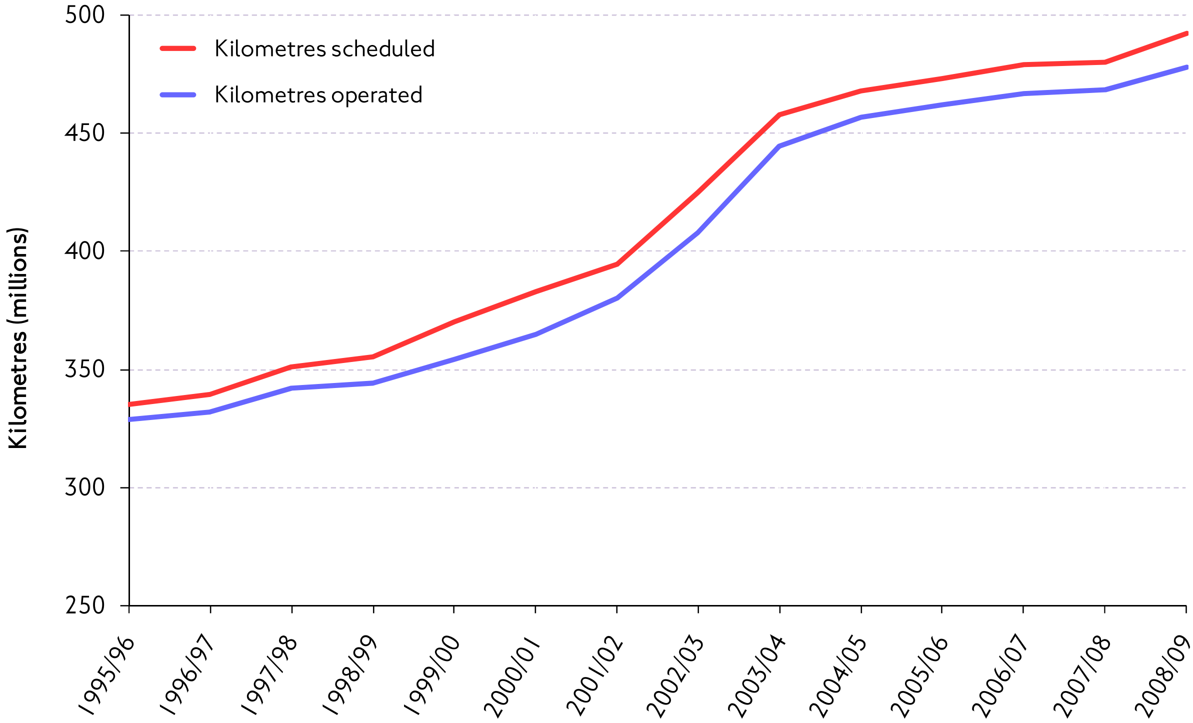
4.6 Performance of London Buses

The bus has become one of London's transport success stories. Buses in London now carry 2.2 billion passengers each year – the highest level since 1962, with service levels at their highest since 1957.

Bus service provision

Figure 4.10 shows the trend for bus service provision in London. Scheduled and operated bus kilometres have both increased by over 45 per cent during the period since 1995/96, with particularly strong growth between 2001 and 2005. This increase reflects substantial enhancements to the bus network made by TfL since 2000. During 2008/09, 492 million bus kilometres were scheduled. In 2008/09, London Buses operated 477.7 million kilometres, an increase of 9.5 million compared to 2007/08, up by 2 per cent.

Figure 4.10 Bus service provision – scheduled and operated bus kilometres.



Source: TfL Surface Transport

Bus service reliability

Key network level bus service reliability statistics are shown in Table 4.3. Two measures of reliability are provided for 'high-frequency' routes (see footnote to table). Both 'actual' and 'excess' waiting times have consistently reduced – reflecting additional buses and significantly improved bus service reliability. A major factor in this improved reliability has been the introduction of quality incentive contracts for bus operators.

The percentage of scheduled kilometres that are operated has generally been above 95 per cent. In 2008/09, 97 per cent of scheduled bus services were operated, which was 0.5 percentage points less than the previous year. This decrease largely reflected the severe weather during early February 2009. Notable is the proportion and increasing trend for 'lost kilometres' due to traffic, superficially reflecting increased congestion, although this does include 'other non-deductible' causes of lost kilometrage.

Table 4.3 Indicators of bus service reliability.

Year	Percentage of scheduled kilometres			High frequency services[1]		Low frequency services[2]
				Average wait time (minutes)		Percentage of timetabled services on time[3]
	Operated	Lost due to traffic congestion[4]	Lost due to other causes	Actual	Excess	
1993/94	96.9	0.8	2.3	6.6	1.9	66.7
1994/95	98.0	1.1	0.9	6.5	1.8	69.7
1995/96	98.2	1.0	0.8	6.5	1.7	71.4
1996/97	97.9	1.2	0.9	6.4	1.8	70.3
1997/98	97.4	1.3	1.3	6.4	1.8	70.0
1998/99	96.9	1.6	1.5	6.6	2.0	69.0
1999/00	95.7	1.8	2.5	6.7	2.1	67.8
2000/01	95.3	2.1	2.6	6.8	2.2	67.7
2001/02	96.4	2.0	1.6	6.6	2.0	69.4
2002/03	96.1	2.6	1.3	6.4	1.8	70.5
2003/04	97.2	1.7	1.1	5.8	1.4	74.6
2004/05	97.7	1.6	0.8	5.6	1.1	77.1
2005/06	97.7	1.7	0.6	5.6	1.1	77.2
2006/07	97.5	1.9	0.6	5.5	1.1	78.1
2007/08	97.5	2.0	0.5	5.5	1.1	79.1
2008/09	97.0	2.3	0.7	5.5	1.1	80.8

Source: Transport for London
1. High frequency services are those operating with a frequency of 5 or more buses per hour.
2. Low frequency services are those operating with a frequency of not more than four buses per hour.
3. Buses are defined as 'on time' if departing between two and a half minutes before and 5 minutes after their scheduled departure times.
4. Also includes other non-deductible lost kilometres

Bus service reliability at borough level (LIPs 2 performance indicator)

Bus service reliability is a formal LIPs 2 performance indicator for individual London boroughs. Data for this indicator are derived using TfL's iBus system, which tracks the progress of buses across the network. The statistic comprises excess wait time for high-frequency routes only, measured at, and averaged across, timing points within each borough. Excess wait time reflects accumulated delays to buses up to the timing point, and may therefore reflect causes of delay outside the borough boundary to which the statistic relates. Values for 2008/09, together with a comparison against 1999/2000, are given at Appendix B of this report.

4.7 Performance of Docklands Light Railway and London Tramlink

Docklands Light Railway

Since opening in 1987, the DLR network has grown to become a vital part of London's transport system, supporting growth and regeneration in the Docklands area. Table 4.4 shows a track record of strong and improving performance over the last 10 years, albeit that performance in 2008/09 fell short of recent years.

In 2008/09, DLR operated 3.9 million train kilometres, 11 per cent less than in 2007/08. In the year, 98.4 per cent of the DLR schedule was operated, and 94.7 per cent of trains were punctual. This was 2.5 percentage points less than the previous year. The values for the latest year, shown in Table 4.4, reflect disruptions caused by major project works, and the commissioning of a new fleet of trains.

Table 4.4 DLR service reliability.

Year	Percentage of scheduled services operated	Percentage of trains on time
1997/98	95.6	89.6
1998/99	97.5	92.0
1999/00	97.8	93.7
2000/01	98.2	96.3
2001/02	98.3	96.6
2002/03	98.1	96.3
2003/04	98.2	96.6
2004/05	98.5	97.1
2005/06	98.7	97.3
2006/07	99.2	97.8
2007/08	99.1	97.2
2008/09	98.4	94.7

Source: Docklands Light Railway.

London Tramlink

Tramlink has also been a success since opening in 2000, providing important links into Croydon and connections to neighbouring Outer London town centres. Kilometres scheduled and operated in 2008/09 were both up slightly on 2007/08, with the percentage of kilometres operated comparable to the previous two years (Table 4.5).

Table 4.5 London Tramlink service reliability.

Year	Scheduled kilometres (millions)	Operated kilometres (millions) [1]	Percentage of scheduled service operated
2001/02	2.44	2.41	99.1
2002/03	2.49	2.46	98.9
2003/04	2.50	2.48	99.0
2004/05	2.49	2.42	97.2
2005/06	2.50	2.44	97.4
2006/07	2.57	2.54	98.7
2007/08	2.60	2.57	99.0
2008/09	2.70	2.66	98.5

Source: London Tramlink.
1. Operated kilometres exclude replacement bus services operated during periods of track repair works.

4.8 Performance of National Rail and London Rail

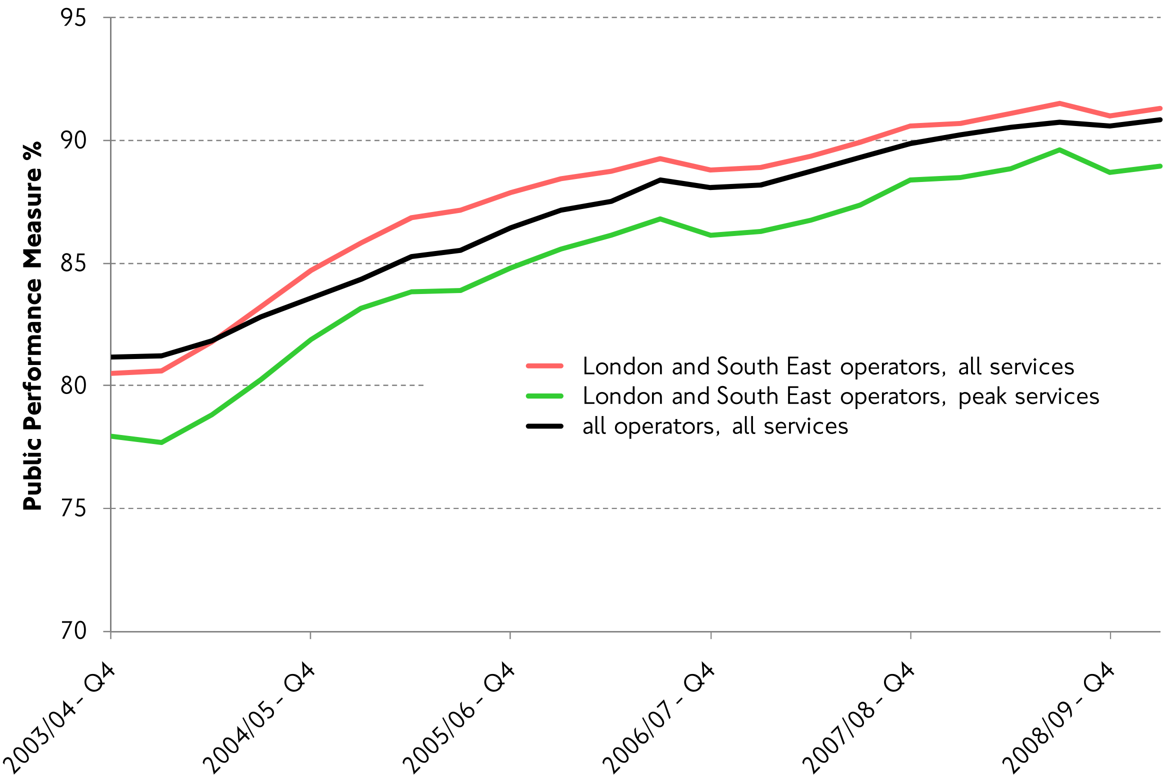
National Rail (including London Overground) is the main mode used for 9 per cent of trips to, from or within Greater London. It has a particular role in carrying commuters to and from Central London in the weekday morning peak, accounting for 43 per cent of people entering Central London at this time (see also section 11.3 of this report).

The punctuality and reliability of National Rail services is measured through a Public Performance Measure (PPM), which combines figures for punctuality and reliability into a single measure. PPM is therefore the percentage of trains 'on time' compared to the total number of trains planned. A train is defined as on time if it arrives within under 5 minutes of the planned destination arrival time for London, South East and regional operators, or 10 minutes for long-distance operators.

Figure 4.11 shows the trend in this measure since the end of 2003, expressed as a moving annual average for each quarter-year. The PPM for train operating companies defined by the Office of Rail Regulation as 'London and South East' operators is shown for weekday peak period services, as well as all services. The equivalent trend for all Train Operating Companies is also shown for comparison.

When interpreting Figure 4.11 and the apparent strong trend towards improvement in punctuality and reliability since 2003, it is important to recall the severe disruption to National Rail services during the early years of the decade caused by safety and infrastructure concerns following several major accidents and the collapse of Railtrack plc. Nevertheless, the trend is clearly an improving one for all service groups considered, albeit that the performance of London and South East operators' peak services consistently lag behind their all-service performance and the National Rail average.

Figure 4.11 National Rail - public performance measure.

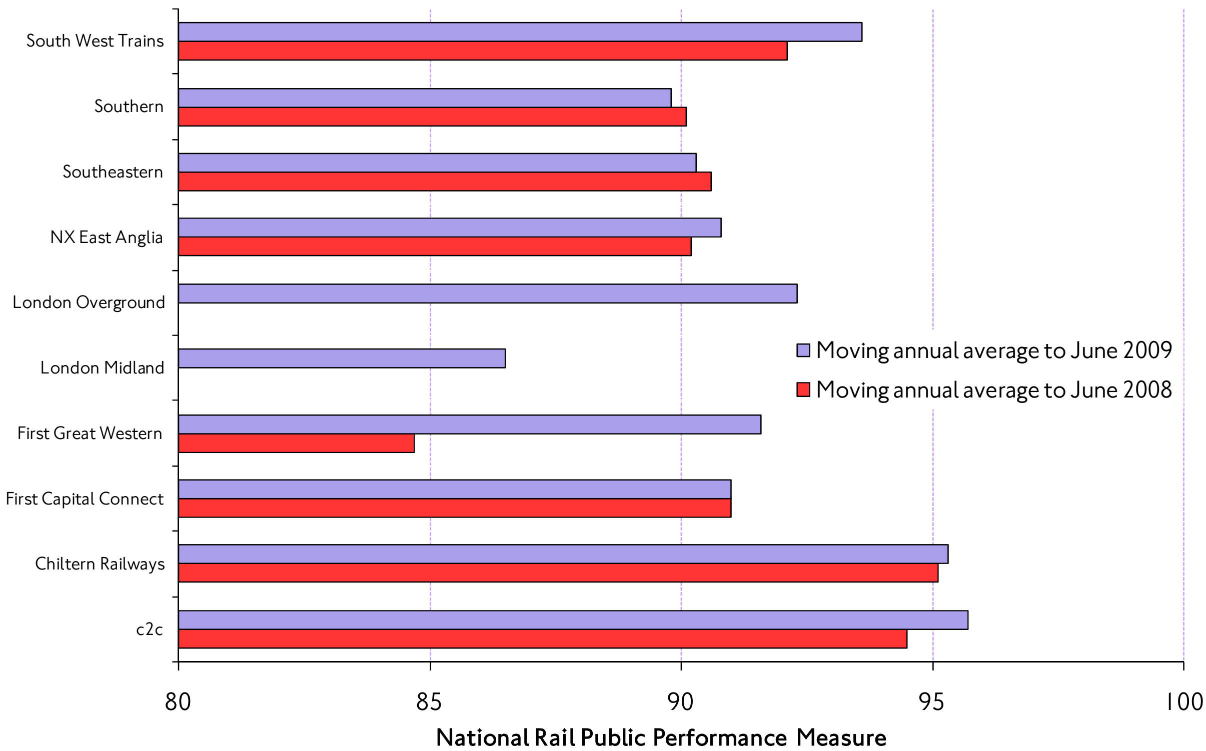


Source: Office of Rail Regulation

PPMs are published for each individual train operating company by the ORR. However, it is not readily possible to compare relative performance over the long term, as the train operating companies themselves and the service groups for which they are responsible change periodically under the franchise regime. Figure 4.12 shows comparative data for the most recent two years, based on a moving annual average to the end of June (Quarter 2) each year, for London and South East commuter services. The most notably improved train operating company over the period is First Great Western, operating into London Paddington. Chiltern Railways from Marylebone, and c2c, operating out of Fenchurch Street station consistently record relatively high PPM measures around 94/95 per cent. At the other extreme, London Midland – which operates some of the former Silverlink County and Central Trains services – records a PPM of 86.5 per cent.

TfL's London Overground, for which the PPM has only been tracked for the last year, records an above average PPM of 92.5 per cent.

Figure 4.12 National Rail public performance measure. London and South-East commuter services only, 2008 and 2009.



Source: Office of Rail Regulation.
Note: Data for London Overground and London Midland are available from 2009 only.

Developing London Rail

TfL London Rail has defined a set of service standards for its own services in London, which the Mayor would like to see applied more widely to National Rail services in London. These standards include:

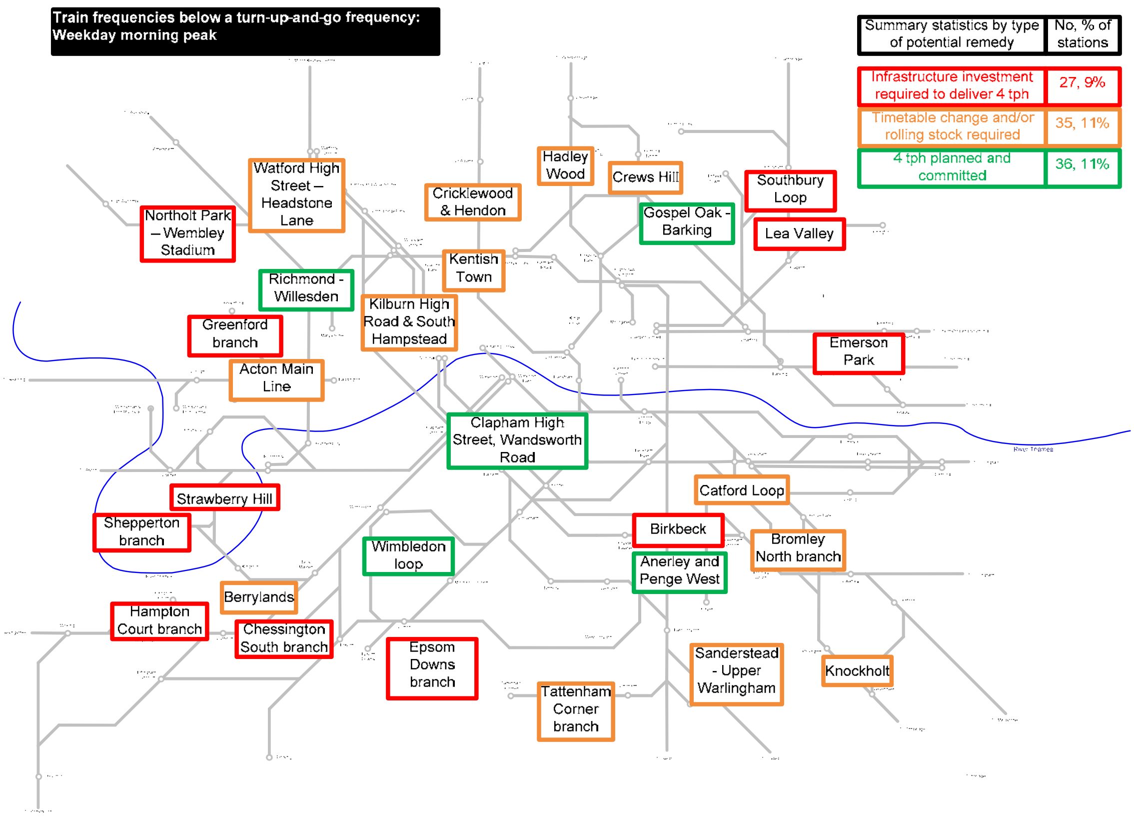
- Station staffing during hours of operation.
- Minimum 4 trains per hour service where possible.
- Last trains at similar times to the Underground.
- Better station cleanliness and maintenance.
- More ticket gating and ticket retailing facilities.
- Improved security, for example help points and CCTV.
- Improved facilities (minimum lighting standards, customer information, waiting facilities, etc).
- Better accessibility and cycle storage.

It is instructive to compare south and north London. National Rail mode share is highest among south Londoners and Underground use is, unsurprisingly, lower, than in north London – where the Underground mode share is much higher than that of National Rail.

Public transport usage in south London is four-fifths of that in north London, and car use about 10 per cent greater. Residents of south London have a poorer perception of the connectivity of public transport, and road congestion and delays are relatively poor compared to north London.

TfL and the Mayor are also looking to extend the role of the National Rail network in south London. Figure 4.13 shows the level of improvement required to current National Rail service frequencies in the weekday morning peak to make them comparable to those of the London Overground network.

Figure 4.13 Improvement required to current National Rail services in London to match London Rail standards, weekday morning peak.



Source: TfL London Rail.

4.9 Overall performance of public transport in London

This section summarises the overall performance of the public transport networks in London for which TfL is responsible, both over the long-term and with specific reference to developments during the most recent (2008/09) financial year. It brings together data for the individual public transport modes, as described in the previous sections. Five aspects are considered, this section also providing four MTS strategic outcome indicators:

- **Public transport reliability** for each of the principal public transport.
- **Public transport kilometres operated** in London – a basic measure of the amount of service provided.

- **Public transport capacity** – the level of service provided by TfL in terms of the number of passengers able to be accommodated.
- Balance between service supply and demand, reflecting factors such as **crowding**.
- Public transport crowding – the **satisfaction of public transport users with the level of crowding** inside the vehicle.

Public transport reliability

This section brings together the individual key reliability statistics for the principal public transport modes in London, in terms of an MTS strategic outcome indicator.

MTS strategic outcome indicator: Public transport reliability

Why this indicator is important
Reliable public transport in London is important to maximising the Mayor's key transport goals. The reliability of mass public transport modes has progressively improved in recent years, and this indicator will demonstrate the extent to which this is maintained or improved.
How this indicator is calculated
This indicator brings together and summarises key reliability statistics for 2008/09 financial year. Further details, including historic trends, are given in appropriate preceding sections.
Values for 2008/09 financial year and comparison with 2007/08

- Reliability of LU services is measured in terms of average overall (generalised) journey time, and excess journey time. In 2008/09, average overall generalised journey time was 43.9 minutes, a reduction of 0.6 minutes over 2007/08. In 2008/09, excess journey time was 6.6 minutes, 1.2 minutes less than 2007/08.
- Reliability of London buses is measured in terms of excess waiting time for high frequency routes. For low frequency routes, the appropriate statistic is the percentage of timetabled services that ran to time. For 2008/09, excess wait time for high-frequency routes was 1.1 minutes, a value identical to that for the preceding 4 years. In 2008/09, 80.8 per cent of low-frequency services were on time, compared to 79.1 per cent in 2007/08.
- Reliability of the DLR is measured in terms of the percentage of trains that ran to time. For 2008/09, 94.7 per cent of DLR trains were on time. This compares to 97.2 per cent in 2007/08 – the reduction in performance reflecting the disruptive effect of major project works and the commissioning of new trains during the year.
- Reliability of London Tramlink is measured in terms of the percentage of scheduled service operated. This was 98.5 per cent in 2008/09, compared to 99 per cent in 2007/08.
- Reliability of National Rail services in London is measured through the Office of Rail Regulation's Public Performance Measure, which is a percentage score combining elements of punctuality and reliability. The all-operators measure at June 2009, expressed as a moving annual average for the preceding 4 quarters, was 90.8. This compares to an equivalent score of 90.2 for the 4 quarters to June 2008.
- The PPM measure for London Overground for the 4 quarters to June 2009 was 92.5 – above average for London and South East operators. This was the first year that a PPM for this operator has been measured.

Public transport kilometres operated in London

Table 4.6 summarises the trend for service provision in terms of public transport vehicle kilometres operated by the major public transport modes. To summarise features considered in more detail in preceding sections:

- Bus vehicle kilometres operated have increased by 34 per cent over the period since 2000/01. The year 2008/09 saw 2.1 per cent more bus kilometres operated than the previous year. This was the highest level since 1957.
- For Underground train kilometres, the equivalent historic increase was 11 per cent, with kilometres operated in 2008/09 being marginally up on the previous year at 70.6 million kilometres – the highest ever level.
- Trends for both DLR and London Tramlink reflect the progressive extension of these networks. For example, on the DLR, the extension to London City Airport opened in 2005, and that to Woolwich Arsenal in January 2009.

Table 4.6 TfL-managed public transport networks - bus and train kilometres operated.

Year	Millions			
	Bus	Underground	DLR	London Tramlink
2000/01	357	64	3	-
2001/02	373	65	3	2
2002/03	397	65	3	3
2003/04	437	68	3	3
2004/05	450	70	3	2
2005/06	454	69	4	2
2006/07	458	70	4	3
2007/08	468	71	4	3
2008/09	478	71	4	3

Source: TfL Service Performance data.
For historic data back to 1991/92, please see Travel in London report number 1, Table 4.9.

Public transport capacity

Public transport capacity for TfL-managed services can be defined in terms of vehicle-kilometres (either scheduled or operated), multiplied by the number of spaces (according to specified vehicle 'planning capacities') for passengers provided by the different vehicle types (buses, trains, trams) involved. It is a basic measure of service offered, although does not, at least without appropriate disaggregation, deal with the adequacy of the service in relation to the passenger demand placed upon it in different locations and at different times of the day – the most obvious example being crowding on services to Central London in the morning peak.

MTS strategic outcome indicator: Public transport capacity

Why this indicator is important

Public transport capacity provides a basic measure of the mass public transport services operated by TfL. Increased public transport both stimulates and accommodates increased passenger demand, contributing in different ways to the Mayor's key transport objectives.

How this indicator is calculated

The indicator is expressed in terms of 'place-kilometres', calculated from established 'planning capacities' for the vehicles used, multiplied by kilometres operated. The modes included are: LU, London Buses, DLR, London Rail and London Tramlink. National Rail services in London are currently excluded from the indicator.

Values for the 2008/09 financial year

- London Underground 2008/09 place kilometres: 56,489 million
- London Buses 2008/09 place kilometres: 28,817 million
- Docklands Light Railway 2008/09 place kilometres: 1,715 million
- London Rail 2008/09 place kilometres: not currently available
- London Tramlink 2008/09 place kilometres: 556.20 million

Balance between public transport supply and demand

The capacity provided by TfL on the public transport networks is more meaningful when looked at in the context of the demand placed on it by passengers. This can be looked at in terms of average vehicle occupancy, as shown in Table 4.7. In interpreting these trends, it is necessary to take account of developments to infrastructure and public transport vehicle technology over the period covered, for example changes to the composition of the London bus fleet. Also, network-wide averages conceal much variation at the more local scale.

Table 4.7 Balance between public transport supply and demand – average number of passengers per bus, train or tram.

Year	Passengers per bus, train or tram			
	Bus	Underground	DLR	London Tramlink
2000/01	13.2	117.1	67.3	-
2001/02	13.7	114.0	71.3	40.2
2002/03	14.4	112.6	72.5	40.4
2003/04	14.7	108.5	69.1	41.7
2004/05	15.0	109.4	74.0	46.9
2005/06	14.7	110.8	71.5	48.0
2006/07	15.8	109.9	69.9	50.9
2007/08	16.5	115.7	74.2	53.7
2008/09	16.6	122.4	81.5	53.3

Source: Transport for London
For historic data back to 1991/92, please see Travel in London report number 1, Table 4.5

To summarise Table 4.7:

- Average bus occupancies have increased by 26 per cent over the period 2000/01 to 2008/09. However, over this period there has been a move towards both larger and smaller capacity buses.
- Train occupancy rates on LU have been broadly constant over the review period, despite substantially increased patronage. This indicates that increased service provision is generally keeping pace with increased demand – as well, of course, as contributing to it.
- Both DLR and Tramlink have achieved progressively higher per-train/tram occupancy levels, in parallel with the progressive extensions to their respective networks.

Perception of crowding on public transport

As part of the wider suite of customer satisfaction/perception-based strategic outcome indicators to be used for monitoring the implementation of the MTS (see chapter 9 of this report, which includes essential interpretative material), a composite measure has been created to quantify customer satisfaction with levels of on-vehicle crowding on the principal public transport modes. The composite mean score for satisfaction with levels of crowding was 76 out of 100 in 2008/09, which is considered to reflect a 'fairly good' level of satisfaction. The measure includes satisfaction scores for bus, Underground, DLR and Tramlink services. Scores for London Overground services are not currently available.

MTS strategic outcome indicator: Satisfaction with levels of crowding on the principal public transport modes

Why this indicator is important

This indicator, alongside individual customer satisfaction measures for each mode, will measure customer satisfaction with crowding on public transport services and indicate areas for future improvement.

How this indicator is calculated

The survey methodology for this indicator shares features with other 'perception/customer satisfaction-based' indicators as more fully described in chapter 9 of this report. Survey respondents were asked to rate their satisfaction with each measure on a scale of 0 to 10, with 10 being extremely satisfied. Responses have been converted to a mean score out of 100. A composite measure is created by combining modal results based on the mode share, as shown in Table 4.9. Data will be sourced from the following TfL customer satisfaction surveys, noting that all services not managed by TfL are excluded, and satisfaction with crowding on London Overground services will be included from 2010/11:
1. London Buses - continuous survey consisting of 9,600 face-to-face interviews each year with passengers alighting from buses between 07:30 and 21:00, seven-days-a-week.
2. London Underground - continuous survey consisting of 8,800 face-to-face interviews each year in stations across the network between 07:00 and 22:00, seven-days-a-week.
3. DLR – first wave carried out in 2008/09 consisting of 1,000 face-to-face interviews with passengers on-board or alighting DLR trains during operational hours, seven-days-a-week.
4. London Overground - quarterly survey consisting of 700 face-to-face interviews carried out over a four week period each quarter (2,800 per year) with passengers on board trains across operational hours, seven days a week.
5. Tramlink – continuous survey consisting of 880 face-to-face interviews carried out each year with passengers alighting from trams between 07:30 and 21:00 at a sample of stops.

Value for 2008/09 financial year

The composite mean score for overall satisfaction of those travelling on the network with the level of crowding inside the vehicle, on the principal public transport modes in London, was 76 out of 100 in 2008/09. This is considered a 'fairly good' score.

Summary of satisfaction with crowding across the principal public transport modes

Table 4.8 summarises satisfaction with the crowding on the principal public transport modes, as included in the new MTS SOI detailed above. The table also shows data on the mode share, used as the basis to produce the composite score.

Table 4.8 Summary of satisfaction with crowding and mode share for principal public transport modes, 2008/09.

Mode	Customer satisfaction with crowding on the vehicle (out of 100)	Annual journey stages (millions)	Relative weight (%)
Bus	78	2,247	66%
Underground	72	1,089	32%
DLR	79	66	2%
Overground	Not available	33	Not included
Tramlink	76	27	1%
Total	76	3,462	100%

Source: TfL modal customer satisfaction surveys; mode share based upon estimates of journey stages as shown in Table 2.6
Note that London Overground data was not included in the production of the composite indicator for satisfaction with crowding and therefore the weighting was adjusted accordingly to exclude these journey stages.

4.10 National Rail and London Rail crowding – passengers in excess of capacity

Crowding on National Rail London commuter services has been measured through the DfT's Passengers in eXcess of Capacity (PiXC) regime. Interim values for 2007 and 2008 are shown in Table 4.9, based on the annual autumn PiXC counts.

The PiXC measure considers the planned capacity of each service arriving into London, and the actual number of passengers on the service at its most crowded point on the journey. PiXC is the difference between the two. PiXC applies to weekday commuter trains arriving in London between 7am and 10am, and those departing between 4pm and 7pm in the outbound direction. Under the historic PiXC regime, DfT set limits on the level of acceptable PiXC at 4.5 per cent on one peak (morning or afternoon) and 3 per cent across both peaks. The PiXC data shows that crowding particularly affects First Great Western services into London Paddington, with 8.9 per cent crowding in the morning peak in 2008 (8.4 per cent in 2007). Three train operating companies (c2c, Chiltern and Southern) saw increased crowding between the 2007 and 2008 autumn counts.

Table 4.9 Crowding on National Rail London commuter services. Passengers in excess of capacity (PiXC), 2007 and 2008 (autumn).

Train Operating Company	AM peak 2007	AM Peak 2008	PM peak 2007	PM peak 2008	Overall 2007	Overall 2008
c2c	1.7	2.7	0.0	0.4	0.9	1.6
Chiltern	1.1	3.9	0.3	0.3	0.7	2.3
First Capital Connect	6.3	4.9	3.3	3.2	4.9	4.2
First Great Western	8.4	8.9	3.5	3.6	6.2	6.5
London Midland	-	6.9	-	2.3	-	4.8
London Overground	-	1.4	-	0.0	-	0.8
National Express East Anglia	5.2	4.8	2.1	2.4	3.7	3.7
Silverlink County	1.9	-	2.6	-	2.3	-
Silverlink Metro	2.4	-	0.0	-	1.3	-
Southeastern	3.3	3.0	1.2	1.6	2.4	2.3
Southern	3.8	4.2	0.4	0.8	2.3	2.7
South West Trains	3.9	2.8	1.4	1.7	2.7	2.3
Total	**4.2**	**4.0**	**1.5**	**1.8**	**3.0**	**3.0**

Source: Office of Rail Regulation
Note: The PiXC measure is derived from the number of passengers travelling in excess of capacity on all services, divided by the total number of people travelling, expressed as a percentage.
Capacity is deemed to be the number of standard class seats on the train for journeys of more than 20 minutes. For journeys of 20 minutes or less, an allowance for standing room is also made. The allowance for standing varies with the type of rolling stock but, for modern sliding door stock, it is typically approximately 35 per cent of the number of seats.
Silverlink County services were transferred to London Midland in 2007. Silverlink Metro services transferred to London Overground Rail Operations Limited (LOROL) in 2007.

4.11 Operating costs for TfL services per passenger kilometre

TfL publishes substantial information on its finances and costs. This can be found, for example, in TfL's Business Plan (2009/10), TfL's Annual Reports and TfL's budget. These are all on TfL's website.

Keeping tight control of operating and other costs is of critical importance to TfL since it contributes to the aim of improving value for money, limits the demands made upon fare payers and tax payers, and ensures that TfL has a budget that balances income (including fares and grant) with spending.

An indication of the importance that TfL and the Mayor set on efficient operations is the commitment in the current Business Plan to find £5 billion of savings over the lifetime of the current Business Plan.

TfL's gross operating costs (excluding exceptional items) in 2008/09 were £5.4 billion. Capital expenditure in the same year was £2.8 billion.

MTS strategic outcome indicator: Operating costs for TfL services per passenger kilometre

Why this indicator is important

Controlling costs is important. Delivering outcomes is important. Operating cost per passenger kilometre is an important measure therefore for transport service provision in London.

How this indicator is calculated

This indicator is being developed and will be included in the next edition of Travel in London. There are a number of relevant factors which need to be taken into account for this calculation. These will be developed over the coming year. These factors include:

- Gross and net operating cost
- Assignment of costs related to privately financed and contracted services
- Further issues around definition of operating spend and comparability across modes
- Inflation
- How best to reflect the passenger kilometres travelled by each mode

Status for 2008/09 financial year

This indicator is currently under development by TfL and will be included in the next edition of Travel in London.

4.12 Asset condition – TfL services

The condition of the assets that TfL owns and uses, is crucial to ensuring that the organisation can meet its objectives in relation to operating a safe, secure and efficient network, while also optimising investment decisions with regard to asset maintenance and replacement.

There is no established standard by which assets in a ‘state of good repair’ can be consistently measured. In particular, there are a number of possible dimensions to the issue, including:

- Reliability – assets in a good state of repair tend not to fail in service.
- Design life – assets have a ‘life expectancy’ when they were designed of a set number of years.
- Safety – state of good repair refers to assets operating safely.
- Cost-effectiveness – good repair means that it is still good value to maintain assets, and that the costs of keeping an asset in service are less than replacing the asset. This is particularly important in terms of the whole life cost of the asset.
- Customer satisfaction – assets in a state of good repair provide a pleasant travelling environment.

In practice, there are a few standard means of assessing good repair, listed below. Safety is not one of these measures, but only because it is assumed that unsafe assets are not in public service:

- Reliability – either mean distance between failures, or 'lost kilometres' from vehicle failure. One is a measure of the asset's reliability, and the other the impact on service levels. London Underground also takes a more customer-focussed measure, 'lost customer hours', which reflects the additional journey times arising from asset failures.
- Design life – a fairly crude measure, since the efficient operational life of an asset is influenced by the operating context, maintenance regimes, and time in service, amongst other things. In particular, new rolling stock often suffers from poor reliability initially, as newer technologies are used, and often product knowledge is weaker. Older rolling stock often has a well established maintenance regime and good knowledge of how the asset performs.
- Availability – a similar concept to reliability, this measure can be applied to non-moving assets such as traffic signals. It measures how much of the time an asset is functioning effectively.

It is notable that none of these measures quite fully captures the customer experience of an asset, or the cost-effectiveness of maintaining older assets, yet these issues are often crucial to decisions about when to invest in new assets. Assets that no longer provide an expected (or mandated) level of performance cannot, in one sense, be seen as in 'good repair', even if they meet other criteria around reliability or design life. Rising maintenance costs (either through the intensity of the maintenance regime, or more frequent asset failures) can be a good signal that investment in replacement assets is needed, but none of the above measures fully captures this component.

The actual decision about when to replace assets is therefore not a simple, single-criterion choice; and therefore a measure of asset condition needs to be fairly complex as well in order to reflect this. A decision to replace an asset is likely to be based on operational performance, cost-effectiveness – in particular in the context of the whole life cost of an asset – and customer experience.

There is a certain amount that can be said, despite all this, on the length of time in service of TfL's assets. Where these exist, they typically reflect 'industry standard' definitions, as follows:

- Underground rolling stock and track condition is measured by the length of time the asset has been in service. Assets are then sub-divided on the basis of time to their next scheduled overhaul, with three groupings: 1-5 years; 6-10 years and 10+ years. Only assets in the latter 2 groups, ie those that will last at least 6 years before their next overhaul, are deemed to be in good condition.
- For DLR, Tramlink and London Overground a nominal 30-year service life is assumed, and assets younger than this are deemed to be in 'good' condition.
- For buses a nominal 10-year service life is assumed and an asset is deemed to be in good condition if it is younger than this benchmark.
- For TfL's Streets-related assets there are a different set of measures. For road condition, it is the percentage of the TLRN where structural maintenance does

not need be considered, and a similar measure is applied for footways on the TLRN.

Table 4.10 illustrates these indices for key assets over the period from 2000. It is seen that:

- For TfL Streets-related assets, the general trend has been one of progressive improvement in both the indicators being tracked.
- The reduction in average age of buses reflects the considerable investment made in buses and the bus network in the early years of the decade. Whereas in 2001, 73 per cent of buses operating in London were less than 10-years-old, this had risen to 99 per cent by 2006, before decreasing to 96 per cent and 90 per cent in 2008 and 2009, respectively.
- The Underground track condition has progressively improved as the investment programme has taken effect.
- Indices for the DLR and Tramlink reflect the age and progressive extensions to these networks, with associated new assets, whilst that for London Overground reflects the recent acquisition of new rolling stock.

Table 4.10 Percentage of TfL's transport-related assets in good condition or not in need of repair.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Streets										
Percentage of carriageway not in need of repair	85.6	..	85.6	88.5	93.0	93.3	94.3	93.7	93.7	93.5
Percentage of footways not in need of repair	92.5	..	..	..	92.5	94.0	93.2	94.4	94.5	94.4
Buses										
Percentage of bus vehicles less than 10 years old	..	72.6	80.9	86.3	91.5	95.8	99.4	99.4	96.5	90.0
Underground										
Percentage of LU rolling stock with 6 years or more before next overhaul	92.8	92.8	95.1	94.1	94.0	93.6	94.2	94.9	94.1	93.2
Percentage of LU track with 6 years or more before next overhaul	65.4	65.4	65.9	67.1	70.7	71.8	69.2	72.6	73.2	69.7
DLR										
Percentage of DLR rolling stock less than 30 years old	100	100	100	100	100	100	100	100	100	100
Tramlink										
Percentage of tram rolling stock less than 30 years old	100	100	100	100	100	100	100	100	100	100
London Overground										
Percentage of Overground rolling stock less than 30 years old	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	23	80

Figure 4.19 New 'S stock' for sub-surface Underground lines from 2010.

MTS strategic outcome indicator: Asset condition for TfL services

Why this indicator is important

Asset condition is a measure of the state of repair of TfL's assets. The condition of TfL's assets can have an impact in several areas, from the efficiency and cost of providing a service to the passenger experience of using it. Understanding the state of repair of TfL's assets is important for the enhancing journey experience for passengers, as well as being a factor in maintenance and investment decisions.

How this indicator is calculated

Current measures only describe the average age of assets, and for the reasons discussed above, this is not necessarily a reliable indicator of the state of repair of the assets. TfL will continue to develop an indicator for its assets, which is likely to focus more on the customer experience and whole life cost of assets as a measure of 'good repair'.

Value for 2008 calendar year

Table 4.10 shows the condition of a number of TfL's assets in the recent past. TfL will work to develop the asset condition indicator more fully for inclusion in the next edition of Travel in London.

Highway asset condition is a formal LIPs 2 performance indicator for individual London boroughs. The indicator monitors the proportion of the principal road network carriageway where maintenance should be considered and is based on Detailed Visual Inspection survey data. Values for the 2008 calendar year, with a time-series back to 2004, are given at Appendix B of this report.

5. Supporting economic development and population growth: London's population and economy

5.1 Introduction

This chapter reviews and updates key trends in the demographic and economic factors underlying transport activity in Greater London. While trends in these 'underlying drivers' of transport demand typically change fairly slowly over long timescales, 2008 and the first half of 2009 were times of substantial economic turmoil – the immediate implications of which on travel patterns are considered in more detail in chapter 12 of this report.

The transport system in London is used by the resident population and by visitors. The latter include those commuters whose place of residence is outside London, visitors on business or for study, and those who come as tourists or for leisure. Visitors may be further subdivided between those who are here as a day visitor and those who stay overnight. It is important, therefore, to consider all these groups that contribute to the demand for transport in London.

Section 5.3 looks at historic and recent trends in the London resident population while trends in employment in London are covered by section 5.4. Visitors to London are considered, in the context of London's interaction with the rest of the world, in section 5.8. Section 5.9 looks at trends in passengers using London's airports. Commuting between London and the rest of the south east is considered in section 5.10.

This chapter also looks at the MTS SOI relating to accessibility to jobs.

5.2 Key features and trends

London's population

- The resident population of Greater London at mid-year 2008 was estimated to be 7.62 million, an increase of 51 thousand or 0.7 per cent from the previous year.
- The latest year continued the established pattern of year-on-year growth, with London's population having grown at an average of 0.6 per cent per year since year 2001, and now being 11.6 per cent higher than in 1991.
- The population growth in the most recent year in London was driven mainly by natural change (excess of births over deaths) which added 77.7 thousand to London's population. London contributed 38.5 per cent to the natural change in England, while accounting for only 14.8 per cent of the total population.

London's economy and employment

- The year 2008 was notable for the global financial crisis that precipitated economic recession affecting the second half of the year, which interrupted a lengthy period of sustained growth in travel in London that had prevailed since the turn of the decade.
- Reflecting the recent economic recession, UK economic output, expressed as GVA, contracted for six consecutive quarters. This was longer than any other post-war recession. The peak of economic activity was the first quarter of 2008; the low point was the third quarter of 2009.
- Over that period, UK GVA fell by 5.9 per cent (the contractions in the last two recessions were 4.8 per cent in the early 1980s recession and 1.7 per cent in the early 1990s). GVA in the third quarter of 2009 was 5 per cent below a year earlier.
- Estimates for the fourth quarter of 2009 suggest UK GVA grew by 0.3 per cent. This can be taken as signalling the end of the recession.
- London's GVA fell by 5.5 per cent between the third quarter of 2008 (the start of the recession in London) and the second quarter of 2009. Over that period, UK GVA fell a little faster, by 5.6 per cent. Provisional data suggest London emerged from recession in the third quarter of 2009, with growth of 0.2 per cent compared to Q2 2009.
- London's economy has grown faster than the rest of the UK for most of the period since 1998 – and total growth from 1993 to 2007 was faster for London (59 per cent) than the UK as a whole (52 per cent). The exception was London's 2001 recession, after the 'dot.com' bubble burst. London's GVA contraction was larger in the early 1990s recession than the rest of the UK.
- The time profile of this recession seems to be similar in London to the UK as a whole. It also seems to be of a similar magnitude, but there are some signs that, while severe, London's recession may have been very slightly milder than the rest of the UK.
- There were just over 4.6 million jobs in London in the third quarter of 2009. Compared to a year earlier this represents a reduction in employment of 98,000 or 2.1 per cent.
- Employment in central London tends to be more volatile than in the rest of London, with stronger growth in the peaks and deeper declines during downturns. In the current recession Central London employee jobs contracted by about 50,000 – a decline of 3.6 per cent – compared to September 2008. In the rest of London by comparison employee jobs have contracted by 2 per cent over the same period.
- In spite of the decline in employment during the current recession, total employment in London in the third quarter of 2009 was still around 2007 levels.

5.3 London's population – developments between 2007 and 2008 and review of long-term trends

The basic source of data on population is the decennial Census of Population, last carried out in 2001. A new census is in preparation for 2011.

Between censuses, annual population estimates are made from statistics of registered births and deaths and of migration, both internal within the UK and international migration into and out of the country. These are the source of the mid-year population estimates published annually by the Office for National Statistics (ONS) and for London by the GLA.

GLA estimates of mid-2008 population for London boroughs show the following key features:

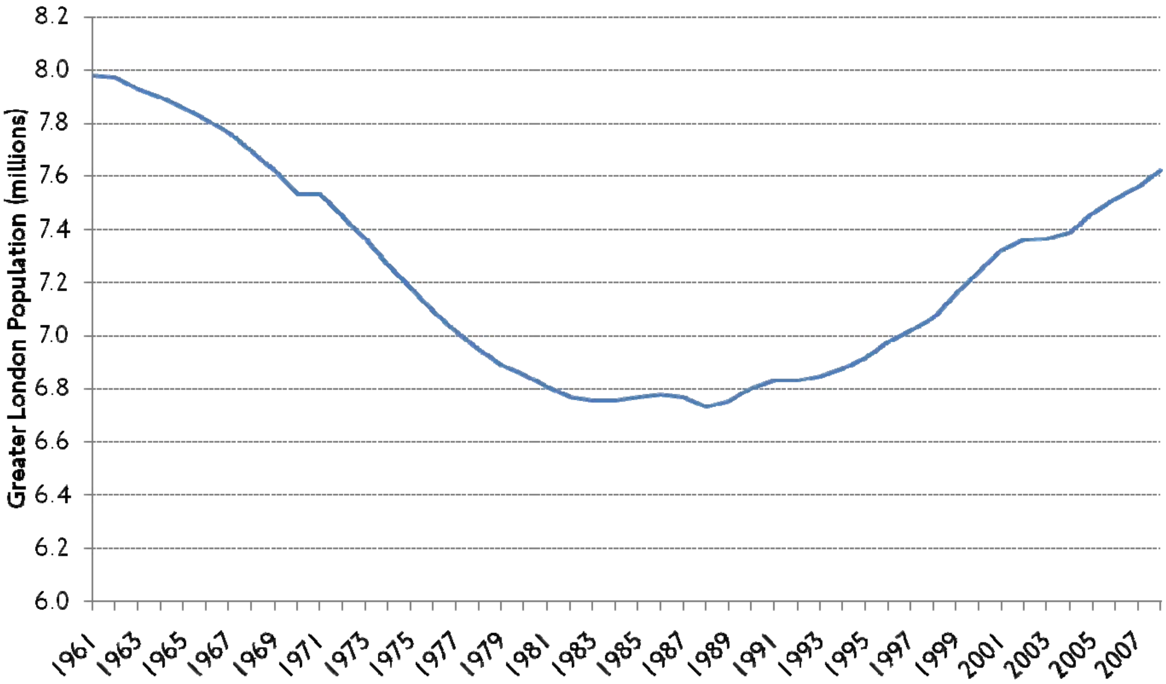
- The resident population of Greater London in mid-2008 was estimated to be 7.62 million, an increase of 51,000 or 0.7 per cent over the previous year.
- Historically, London's highest recorded population was about 8.7 million in the years immediately before the Second World War, following which London entered an extended period of declining population which ended in 1988.
- Since 1988 the population of London has increased consistently year-on-year. The growth of 0.9 million between 1988, when there were 6.73 million Londoners, and 2008 represents a 13 per cent increase, an average increase of 0.6 per cent per year over the 20-year period.
- Whereas in 2006/07 London had the sixth highest growth rate of all English regions, this year the growth rate is 0.83 per cent and London ranks third out of the nine regions. The east region grew at 1.19 per cent and the south east at 0.86 per cent
- The population growth was driven mainly by natural change (excess of births over deaths) which added 77.7 thousand to London's population. London contributed 38.5 per cent to the natural change in England, while accounting for only 14.8 per cent of the total population.
- Among the London boroughs the largest percentage increases since 2007 were Islington (2.8 per cent) and Hounslow (1.9 per cent), with the City of London growing by 2 per cent. Only Greenwich was estimated to have had a small population decrease, of 0.6 per cent.
- Births between 2007 and 2008 mid-years were 127.6 thousand, an increase of 4.3 thousand compared with the previous year. Deaths were 49.9 thousand, a decrease of 0.4 thousand compared with the previous year.
- Between 2007 and 2008 migration together with other changes resulted in a net outflow of 27 thousand people. However, this relatively small net change disguises the considerable population turnover that takes place in London.

- Since 2001 London's population is estimated to have grown by 285,000 people, or 3.9 per cent. Over the seven-year period the consistent trends have been increasing numbers of births (from 104 thousand in 2001-02) and reducing deaths (57 thousand in 2001-02). Hence the rate of natural change has grown considerably – from 47 thousand in 2001-02 to nearly 78 thousand in 2007-08.

Trend in total resident population and change 2007 to 2008

Figure 5.1 shows the long-run trend in the resident population of Greater London. The consistent decline of London's population during the 1960s and 1970s was replaced by a period of stability during the 1980s, albeit at levels of population some 1.2 million lower than at the start of the 1960s. From the start of the 1990s however London's population has grown equally consistently to stand – in 2008 – at 7.6 million people. The forward projection is for continued growth, with around 1.3 million more people and more than 750,000 additional jobs expected to be accommodated in Greater London by 2031. The forthcoming Census of Population in 2011 will update some of these trends, which are currently based on estimates using the 2001 census as a basis.

Figure 5.1 Greater London population, millions.

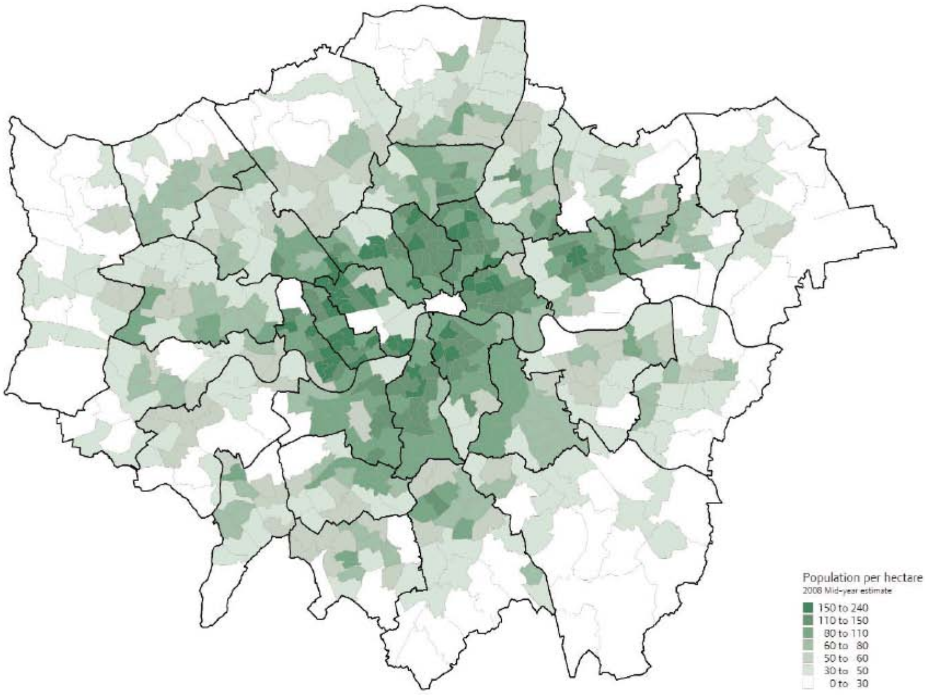


Source: GLA

Local population change and population density

Figure 5.2 shows that the highest population densities are to be found in Inner London outside the centre, with residential densities in both Central and Outer London being correspondingly lower. Reflecting the geographical extent of each area, however, Inner (including Central London) accounts for roundly 40 per cent of the total population of Greater London, the remaining 60 per cent living in Outer London.

Figure 5.2 Population density across Greater London – based on 2008 mid-year population estimates.



Source: GLA

Since 2001, all individual London boroughs have experienced population growth. Table 5.1 shows estimated growth over this period. It is seen that London's population has grown by nearly 300,000 between 2001 and 2008. This growth has been led by Inner London boroughs, with average annual growth of 0.8 per cent, double the Outer London annual rate of increase. Within Inner London, the City of London, Islington and Tower Hamlets have seen annual population growth in excess of 1 per cent. In Outer London, where 6 in 10 Londoners live, Greenwich has seen the largest increase in population, with average annual growth of 0.9 per cent between 2001 and 2008.

Table 5.1 Resident population in London boroughs, 2001 to 2008.

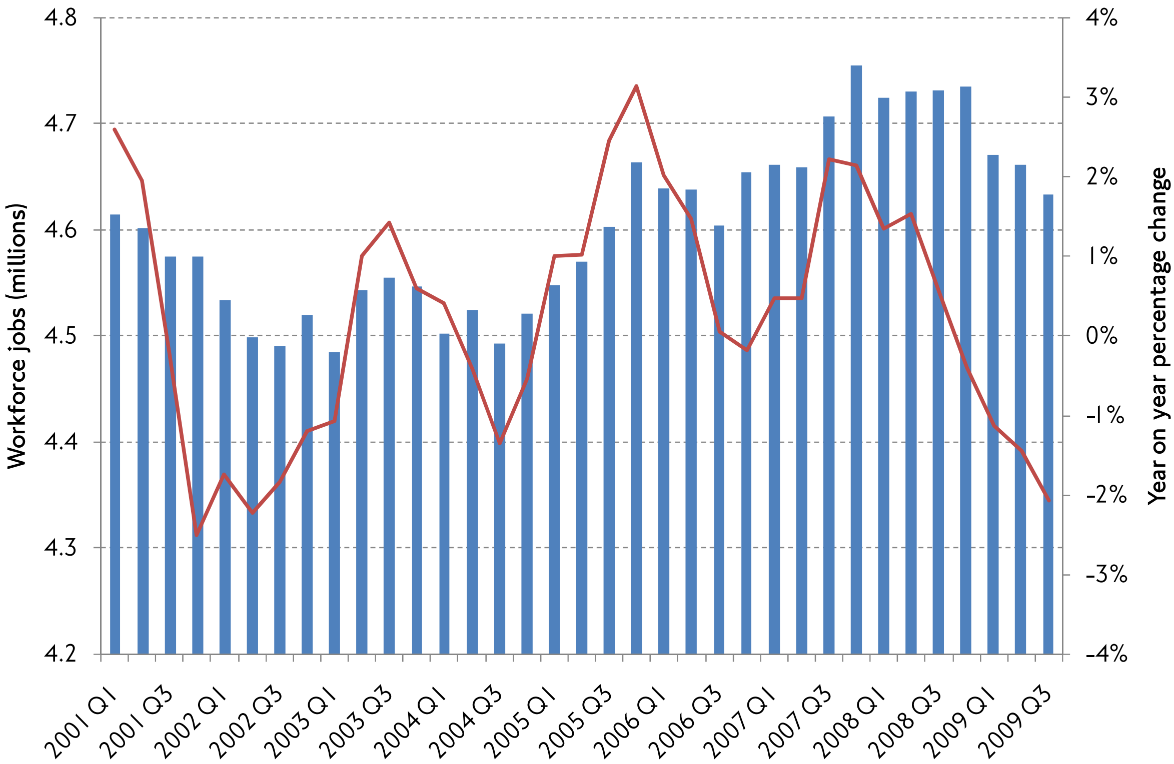
	Thousands			Annual growth rate (%)	
	2001	**2007**	**2008**	**2007 to 2008**	**2001 to 2008**
Camden	203	204	206	*0.7*	*0.2*
City of London	7	9	9	*2.1*	*3.1*
Hackney	208	219	221	*1.1*	*0.9*
Hammersmith & Fulham	169	176	177	*0.2*	*0.6*
Haringey	223	232	234	*0.6*	*0.7*
Islington	180	191	197	*2.8*	*1.3*
Kensington & Chelsea	161	167	167	*0.3*	*0.6*
Lambeth	275	288	290	*0.9*	*0.8*
Lewisham	255	265	266	*0.5*	*0.6*
Newham	251	259	261	*0.7*	*0.6*
Southwark	258	271	275	*1.3*	*0.9*
Tower Hamlets	202	227	230	*1.2*	*1.9*
Wandsworth	272	285	287	*0.7*	*0.8*
Westminster	203	211	213	*0.5*	*0.7*
Barking & Dagenham	165	170	172	*1.1*	*0.6*
Barnet	320	324	325	*0.3*	*0.2*
Bexley	219	218	219	*0.3*	*0.0*
Brent	271	275	276	*0.3*	*0.3*
Bromley	296	300	301	*0.2*	*0.2*
Croydon	335	335	337	*0.5*	*0.1*
Ealing	308	312	314	*0.7*	*0.3*
Enfield	278	289	291	*1.0*	*0.7*
Greenwich	217	233	231	*-0.6*	*0.9*
Harrow	211	217	217	*0.1*	*0.4*
Havering	225	228	229	*0.7*	*0.3*
Hillingdon	246	251	252	*0.2*	*0.3*
Hounslow	217	226	230	*1.9*	*0.8*
Kingston upon Thames	149	153	153	*0.3*	*0.4*
Merton	191	195	196	*0.2*	*0.3*
Redbridge	242	250	252	*0.9*	*0.6*
Richmond upon Thames	174	183	184	*0.6*	*0.8*
Sutton	181	183	184	*0.6*	*0.2*
Waltham Forest	223	224	226	*0.8*	*0.2*
Greater London	**7,337**	7,571	7,622	***0.7***	***0.5***
Inner London	**2,867**	3,007	3,033	***0.9***	***0.8***
Outer London	**4,470**	4,565	4,589	***0.5***	***0.4***

Source: GLA (2009) 2008-round London Plan estimates

5.4 Recent trends in employment in London

Annual workforce jobs growth in London remained negative for the fourth consecutive quarter in Q3 of 2009 at -2.1 per cent, compared to -1.5 per cent in the previous quarter. Workforce jobs totalled more than 4.6 million in Q3 2009 in London (see Figure 5.3). Compared to a year earlier this represents a reduction in employment of 98,000.

Figure 5.3 Trend in London workforce jobs and year-on-year change.



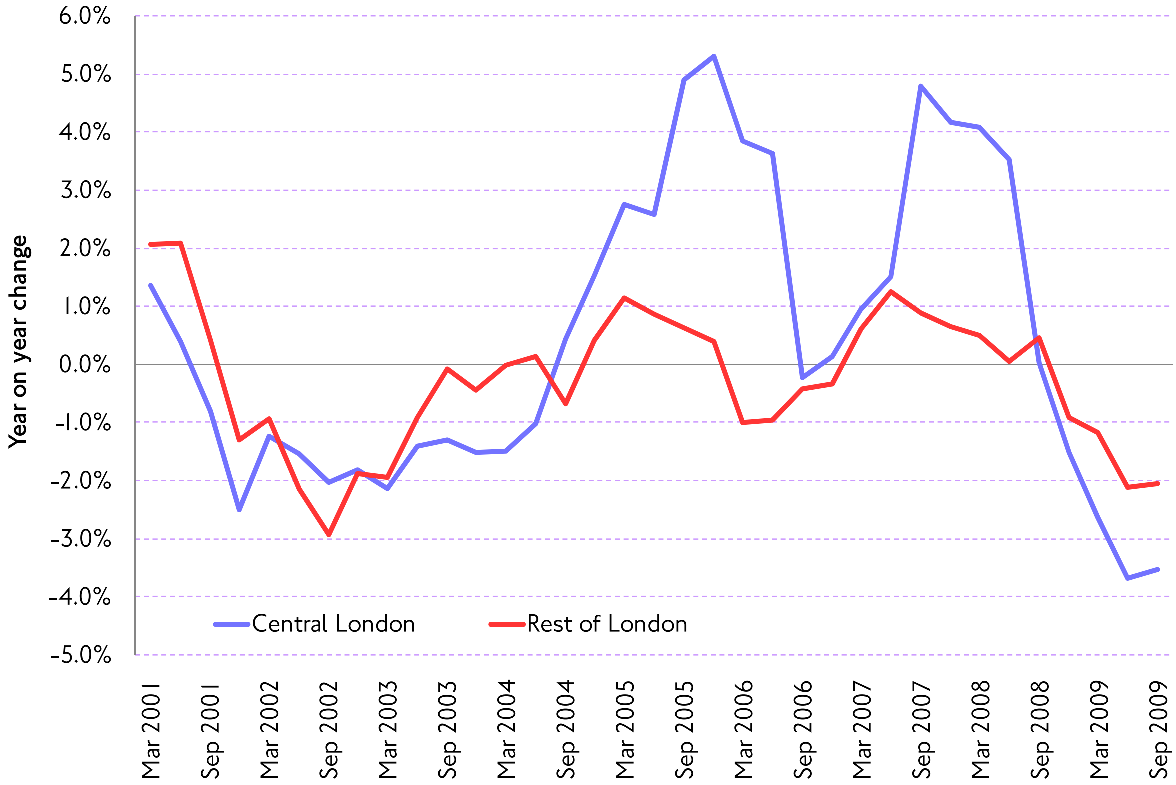
Source: ONS Labour Market Statistics for London and the South East.

The fall in employment in the recent recession is comparable to that experienced during the 'dot.com' downturn in 2001 though actual levels of employment remain higher. In Q3 2009, employment in London was still around 2007 levels, in spite of the declines over the recessionary period.

After benefiting most from the upturn, employment in Central London has contracted more than in the rest of London (see Figure 5.4). Central London employment, measured in terms of employee jobs excluding the self-employed, is estimated to have fallen by about 50,000, representing a decline of 3.6 per cent from a year earlier. Employment in the rest of London, by comparison, has contracted by 2 per cent over the same period.

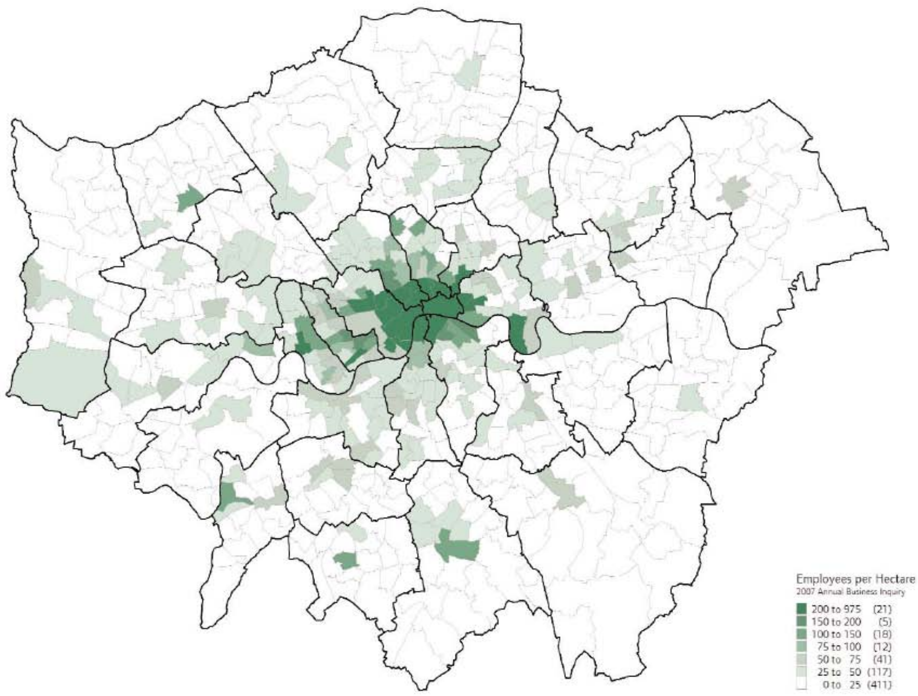
The relatively large fall in Central London employment has contributed to the recent decline in Underground patronage examined further in chapter 12 of this report. By comparison bus travel demand has held up better, reflecting, among other factors, relatively more modest declines, compared to Central London, in employment in the rest of London.

Figure 5.4 Employment growth, central and the rest of London, year on year percentage change.



Source: Derived from ONS Labour Market Statistics for London and the South East and Annual Business Inquiry.

Figure 5.5 Employment density across Greater London.



Source: Annual Business Inquiry, 2007.

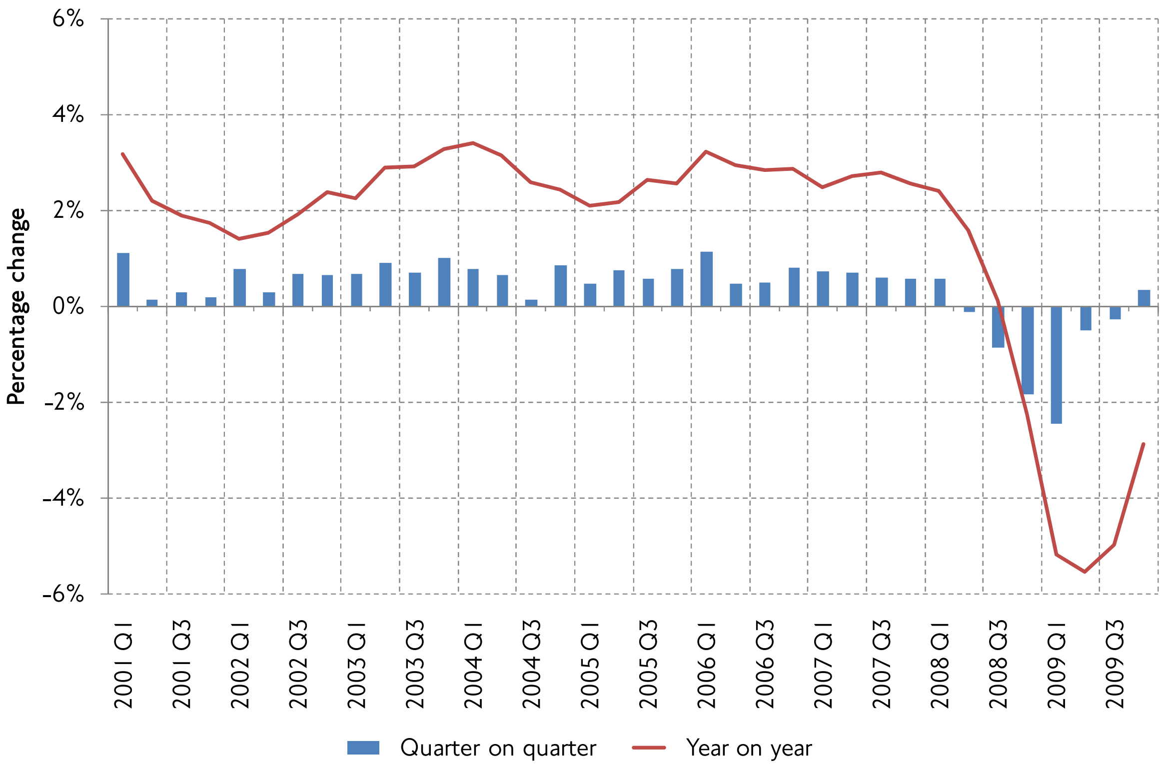
Around one-third of London's jobs are located in Central London, reflecting agglomeration benefits facilitated by the historic radial orientation of London's public transport networks, with typically relatively high densities in Inner London. Employment in Outer London is more widely distributed, at correspondingly lower densities, and to a greater extent draws on the local population for its workforce.

5.5 Economic output – Gross Value Added

The UK has recently experienced the worst recession in more than 70 years. UK economic output or GVA contracted for six consecutive quarters to Q3 2009. In that quarter, GVA fell by 0.3 per cent compared to the previous quarter, falling to 5 per cent below its level a year earlier and 5.9 per cent lower than at the start of negative growth in Q2 2008 (Figure 5.6).

While the recent recession came after a sustained period of economic growth, economic output in the sixth quarter of the recession had fallen more than at the same points in either the 1990s or 1980s recessions. In those two previous major UK-wide recessions, economic output contracted by 4.8 per cent and 1.7 per cent respectively, and in each case recovered to pre-recession levels only after approximately three years.

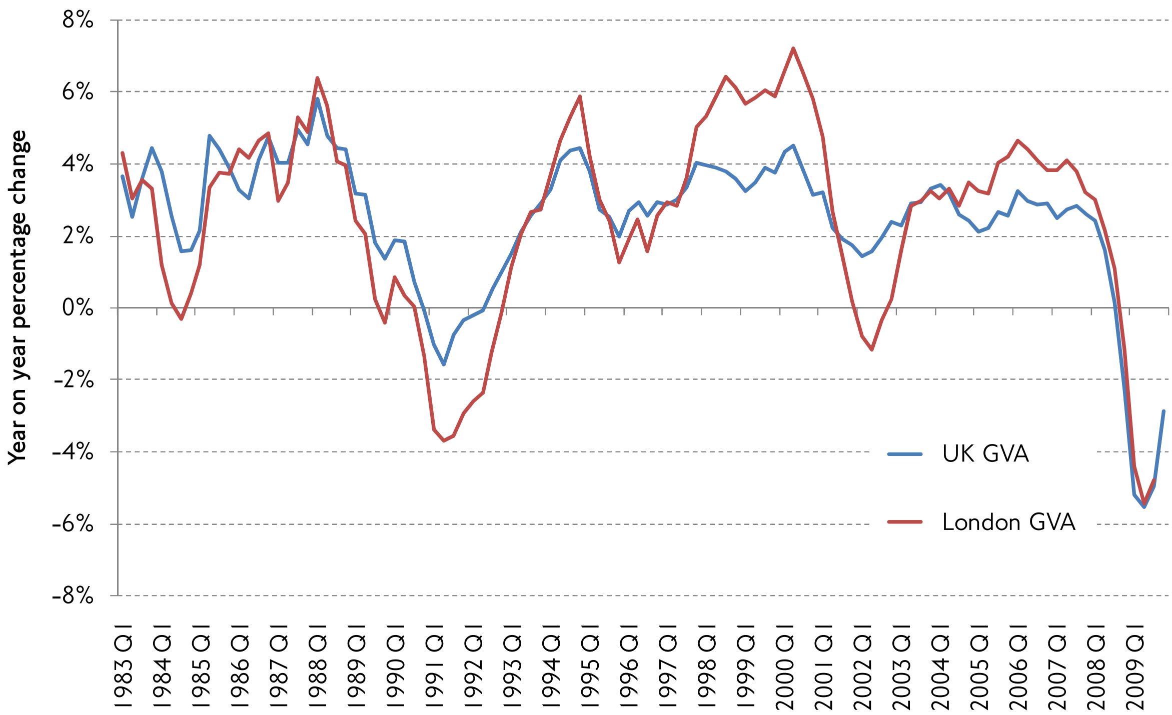
Figure 5.6 UK GVA growth, year-on-year and quarter-on-quarter percentage change.



Source: ONS GVA

Availability of economic output data for London lags the UK's by one quarter. London annual rate of economic growth turned negative in the third quarter of 2008 (compared to Q2 2008 for the UK) and remained so until the second quarter of 2009. Preliminary data for the third quarter of 2009 suggests London's economy grew by 0.2 per cent compared to quarter 2 2009. During the recession, between Q3 2008 and Q2 2009, the period over which comparable data is available for both London and the UK, London GVA contracted by 5.5 per cent while UK GVA fell slightly faster by 5.6 per cent. Four quarters of negative growth in London and six quarters in the UK reduced economic output by 5.5 per cent and 5.9 per cent respectively.

Figure 5.7 Real GVA, percentage annual change, London and UK compared.



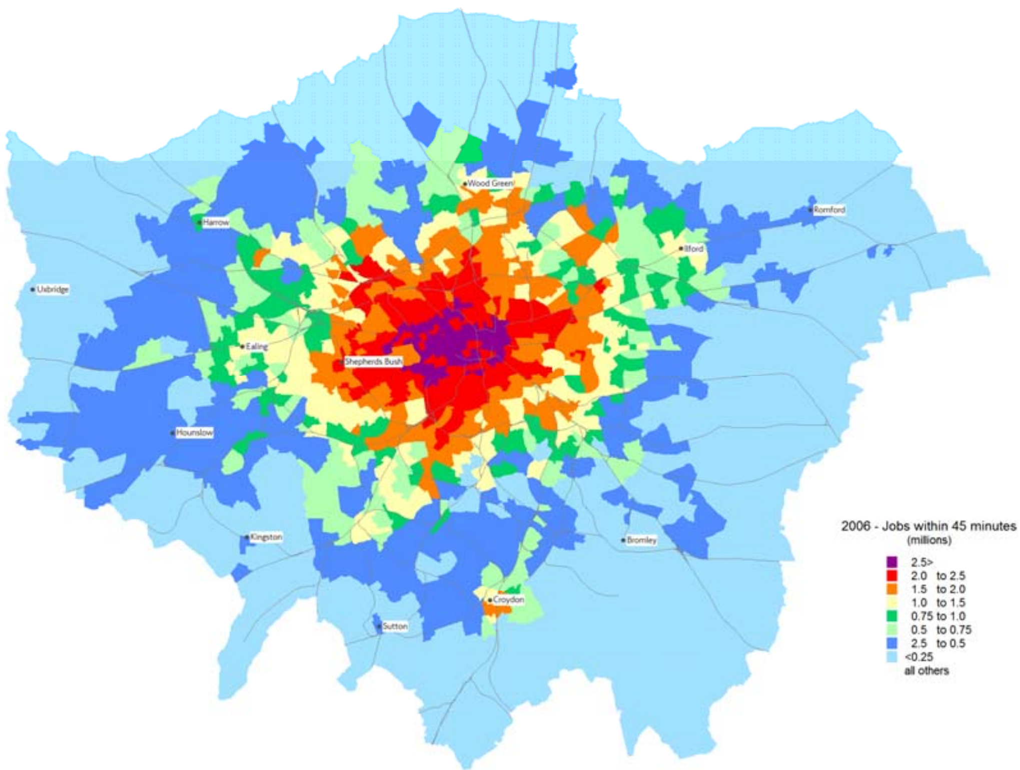
Source: ONS GVA.

5.6 Accessibility to jobs

Good transport links are essential for moving people between their homes and workplaces. Transport contributes to the efficient working of labour markets if people are able to access a wide choice of jobs within reasonable travelling time. A measure of this is provided by the number of jobs that are available within a given travel time from each home location. This is illustrated in Figure 5.8 which maps, for each ward, the number of jobs accessible within 45 minutes travelling time by mass public transport in the morning peak period (7am to 10am).

The results depend on both the availability of transport and the density of workplaces across London. Thus, in much of Central London, where employment density is highest and which is served by a dense network of public transport, more than 2.5 million jobs are accessible within 45 minutes. In general, the accessibility of jobs decreases with increasing distance from the centre of London. Typically, for residences in Outer London, between 0.25 and 0.5 million jobs are accessible within 45 minutes. However, there are islands of higher job accessibility, around major centres of employment in Outer London, such as Croydon, Hounslow, Ealing, Harrow, Ilford and Romford, or Heathrow to the west. These have the effect of stretching the area of relatively high accessibility further out from Inner London, as more residents have the choice of working locally or travelling into Central and Inner London.

Figure 5.8 Number of jobs accessible by mass public transport within 45 minutes travel time, 2006.



MTS strategic outcome indicator: People's access to jobs

Why this indicator is important

The Mayor's goals for his transport strategy include providing transport opportunities for all Londoners and supporting economic development and population growth. An important contribution that public transport makes to both these goals is in linking people with jobs, providing access to a wide choice of accessible workplace locations, and thereby contributing to the efficient operation of job markets within London.

How this indicator is calculated

The number of jobs accessible within a given travel time from a specified location is calculated using TfL's London Transportation Studies (LTS) planning model. LTS uses service information and networks for public transport (except taxi and private hire vehicles) modes in each year to generate a matrix of travel times between small area modelling zones. A travel time of 45 minutes for journeys starting in the morning peak period (7am to 10am) between home and work is taken as indicative of typical commuting times within London. Numbers of jobs within 45 minutes travel time are estimated from employment data, using ONS's Annual Business Inquiry to update small area data from the 2001 Census of Population and to allocate jobs to zones. Weighting by the target population (taken to be the resident population between ages 16 and 74) within each zone gives the number of jobs accessible to the average member of the target population.

Value for 2006 calendar year

This indicator is to be benchmarked on a three-yearly cycle. The latest available data relate to 2006.

The number of jobs accessible within 45 minutes travel time to the average member of the target population was 844,000 in 2006.

5.7 Trends in car ownership and use

Car ownership levels in London continue to be much lower than in the rest of Great Britain. The latest results from the DfT's National Travel Survey show that 43 per cent of London households do not own a car, compared with 23 per cent of households in the rest of Great Britain. However, roughly the same proportion of households own 1 car. Larger households tend to have more cars than smaller households, but almost a quarter of households in London with four or more people have no car, compared with 8 per cent of households in the rest of the country.

Table 5.2 Car ownership in London and Great Britain by household size. National Travel Survey, 2007-2008.

	Number of people in household					
Number of cars (percentage)	One	Two	Three	Four or more	All households	Average household size
Greater London						
No car	66	38	32	24	43	1.9
One car	33	46	43	41	40	2.5
Two or more cars	1	16	25	35	17	3.3
All households	**100**	**100**	**100**	**100**	**100**	**2.4**
Rest of Great Britain						
No car	49	14	14	8	23	1.7
One car	48	48	37	32	43	2.2
Two or more cars	2	38	49	61	34	3.1
All households	**100**	**100**	**100**	**100**	**100**	**2.4**
Great Britain						
No car	52	17	16	10	25	1.7
One car	46	48	38	33	43	2.2
Two or more cars	2	35	46	57	32	3.1
All households	**100**	**100**	**100**	**100**	**100**	**2.4**

Source: DfT, National Travel Survey

TfL's LTDS survey shows similar estimates of car ownership in London to the National Travel Survey. As Table 5.3 shows, these have not changed significantly during the four years of the survey, 2005/06 to 2008/09. Car ownership patterns differ significantly across London and LTDS, because of its larger sample size, allows the estimates to be broken down by area.

Levels of car ownership in Outer London are more similar to the rest of Great Britain than those in Inner London: 32 per cent of households in Outer London have no car, compared with 56 per cent of Inner London households.

Table 5.3 Car ownership in Inner and Outer London. LTDS, 2005/06 to 2008/09.

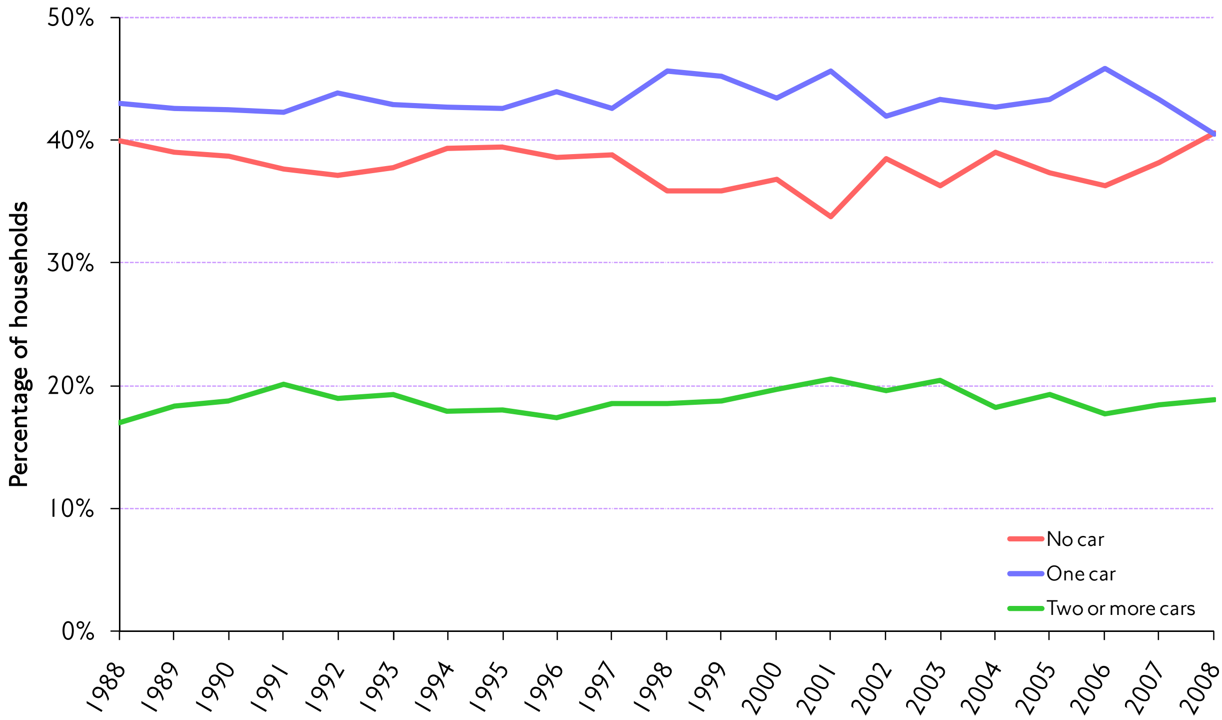
	Number of cars in household (percentage)				
	None	One	Two	Three or more	All households
Greater London					
2005/06	42	41	13	3	100
2006/07	42	43	13	2	100
2007/08	42	42	13	2	100
2008/09	42	43	13	2	100
Inner London					
2005/06	57	36	5	1	100
2006/07	56	36	6	1	100
2007/08	57	36	6	1	100
2008/09	56	37	7	1	100
Outer London					
2005/06	32	45	19	4	100
2006/07	32	47	18	3	100
2007/08	32	47	18	3	100
2008/09	32	48	17	3	100

Source: TfL Planning, LTDS

A longer time series for trends in London-wide car ownership is shown in Figure 5.9, from estimates obtained by combining ONS survey sources. Although results are subject to sampling variation, such that year-to-year changes should be treated with caution, the general trend is of declining car ownership in London in recent years. This is broadly consistent with the decreases in car usage seen in chapter 3 of this report.

According to this series, the proportion of households in London not owning a car increased from 34 per cent in 2001 to 41 per cent in 2008, with a corresponding drop in the proportion of households owning 1 car, which fell from 46 per cent to 40 per cent in 2008. The proportion of households with more than one car has remained stable throughout the decade, at between 18 and 21 per cent. Differences between these estimates and those quoted above from LTDS and NTS may be due to differences in the design and response characteristics of the respective surveys.

Figure 5.9 London households with no car, one car and two or more cars.



Source: National Travel Survey, Expenditure and Food Survey and General Household Survey.

5.8 Wider national and international interactions

London offers an extensive transport network for both domestic and international travel. International transport infrastructure increases the number of markets that can be easily accessed from London, while good domestic links increase the size of the labour pool to which businesses can gain access.

Overnight visitors to London

Table 5.4 sets out basic statistics in relation to non-resident visitors spending at least 1 night in London. In 2008 there were 11.3 million domestic visitors to London (that is, visitors from the rest of the United Kingdom). Taking into account the average length of stay, this equates to about 75,000 people on an average night. The corresponding numbers for overseas visitors were 14.8 million people per year (down from 15.3 million in 2007) and 249,000 people on an average night. In other words, these two categories of non-resident visitors (which do not represent all overnight visitors and do not include day-only visitors) are equivalent to an additional 5 per cent of the total resident population. It is also likely that they use the transport system in different ways to London residents.

Although substantial changes in the relative balance between domestic and overseas visitors are apparent from Table 5.4, these are thought largely to reflect methodological changes with the survey and comparisons between survey years, particularly those for domestic visitors to London, should be regarded as indicative only.

Table 5.4 Number and characteristics of overnight visitors to London.

Year	Number of visitors (millions)	Average number of nights spent	Average spending at 2007 prices(£)
Domestic visitors			
2000	18.5	2.3	166
2001	17.0	2.4	177
2002	16.1	2.2	175
2003	14.3	2.3	225
2004	12.8	2.3	216
2005	10.8	2.2	194
2006	11.0	2.2	207
2007	10.1	2.3	217
2008	11.3	2.4	208
Overseas visitors			
2000	13.1	6.3	525
2001	11.4	6.6	510
2002	11.7	6.5	499
2003	11.6	6.8	502
2004	13.4	6.7	481
2005	13.9	6.6	496
2006	15.6	6.5	502
2007	15.3	6.2	534
2008	14.8	6.2	551

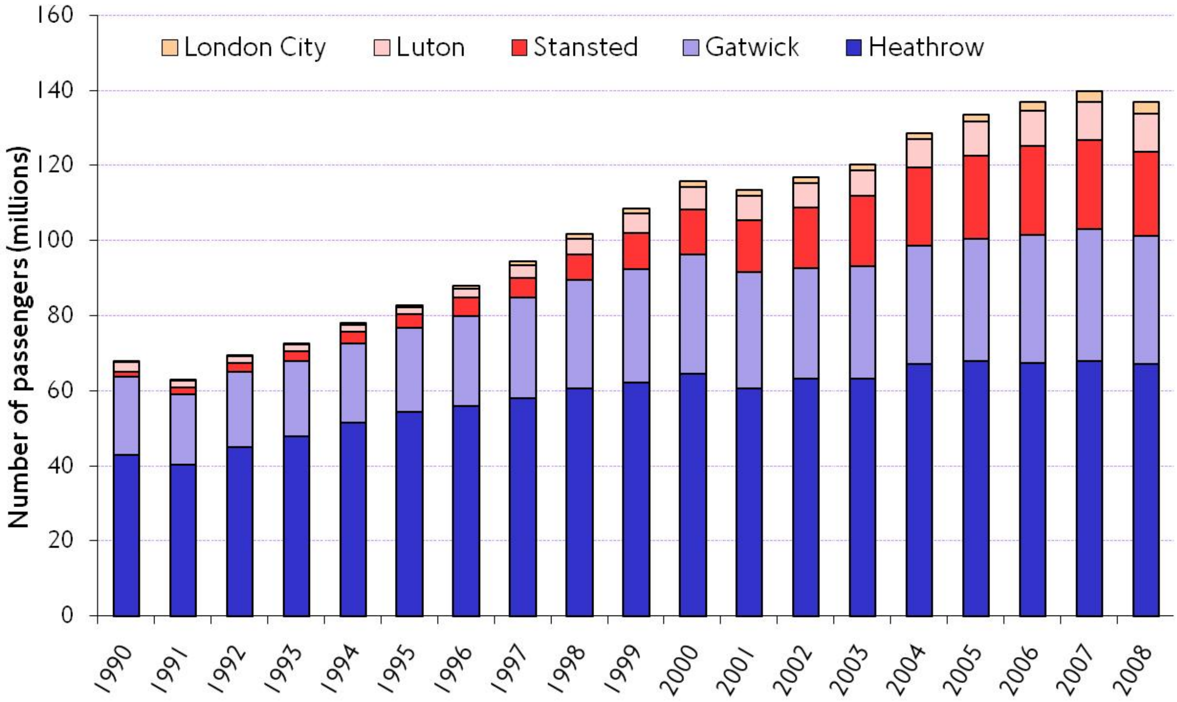
Source: United Kingdom Tourism Survey (UKTS), International Passenger Survey (IPS).
1. Excludes day visits.

5.9 Passengers using London's airports

London has five international airports, of which three are among the 25 most busy in Europe. Heathrow accounts for about 50 per cent of passengers using London's airports, with Gatwick a further 25 per cent, although the proportionate shares of Stansted and Luton continue to grow, reflecting their use by low-cost airlines. London airports account for 58 per cent of the total of passengers at UK airports.

In 2008, 137 million passengers passed through London airports, almost 3 million fewer than in 2007, breaking the trend of steady growth that has been evident since the early 1990s (apart from the dip in 2001 when international tourism was depressed following terrorist attacks in the USA). This decrease of 2 per cent in 2008 primarily reflects the economic difficulties from the second half of the year and the subsequent economic recession (see also chapter 12 of this report).

Figure 5.10 Terminal passengers by London area airport.



Source: Civil Aviation Authority.

Table 5.5 shows the worldwide locations of origins and destinations for those using London's airports. More than half (51 per cent) of all passengers were flying to or from countries within the EU, and just under 14 per cent to or from North America. Domestic passengers, flying to, or from, other UK airports, accounted for about 10 per cent of all passengers at London's airports. Heathrow and Gatwick together accounted for two-thirds of domestic passengers. Almost a fifth of passengers travelling through London City airport were domestic passengers.

Table 5.5 Terminal passengers arriving/departing through London's airports by country of origin or destination, 2008.

Millions of passengers

Country of origin	Heathrow	Gatwick	Stansted	Luton	London City	All London airports
Western Europe - EU	20.9	18.2	16.2	5.8	1.7	62.8
Western Europe - Other	3.4	2.3	1.3	0.7	0.9	8.6
Eastern Europe - EU	1.3	1.5	2.3	2.1	0.0	7.2
Eastern Europe - Other	1.0	0.2	0.0	0.0	-	1.2
North Africa	0.8	1.3	0.0	0.1	-	2.3
East Africa	0.7	0.0	-	-	-	0.7
West Africa	0.7	0.3	-	0.0	-	1.0
Central Africa	0.1	-	-	-	-	0.1
Southern Africa	1.5	0.1	-	-	-	1.6
Canada	2.5	0.5	0.0	0.0	-	3.1
United States of America	12.6	2.9	0.1	0.0	-	15.6
Central America	0.1	0.6	-	-	-	0.7
South America	0.4	0.0	-	-	-	0.4
Caribbean	0.1	1.4	0.0	0.0	-	1.6
Near East	1.0	0.0	0.1	0.1	-	1.2
Middle East	3.8	0.7	-	0.0	-	4.5
Far East	5.6	0.1	-	-	-	5.7
Indian Sub-Continent	2.9	0.1	0.0	-	-	3.0
Australasia	1.6	-	-	-	-	1.6
Other countries	0.3	0.1	0.0	0.0	-	0.4
Total international passengers	**61.3**	**30.4**	**20.0**	**8.8**	**2.6**	**123.2**
Total domestic passengers	**5.6**	**3.7**	**2.3**	**1.3**	**0.7**	**13.6**
Total passengers	**66.9**	**34.2**	**22.3**	**10.2**	**3.3**	**136.8**

Source: Civil Aviation Authority.
1. Terminal passengers include both arrivals and departures (terminating passengers) and passengers transferring between planes, but exclude transit passengers, who do not leave a plane.

International rail travel

High speed rail services connect London to mainland Europe – in 2008 more than 9 million passengers travelled to Europe by train.

5.10 London's interaction with the wider south east of England

People travelling from outside Greater London, particularly daily commuters, contribute significantly to the demands on London's transport networks. The distinction between travel demand generated by London residents and by non-residents is increasingly important for planning purposes – for example, when looking at road traffic levels, congestion and employment catchments for locations in Outer London. The following section sets out some basic indicators that illustrate the scale of these flows, comprising workers who are important to London's continued economic vitality.

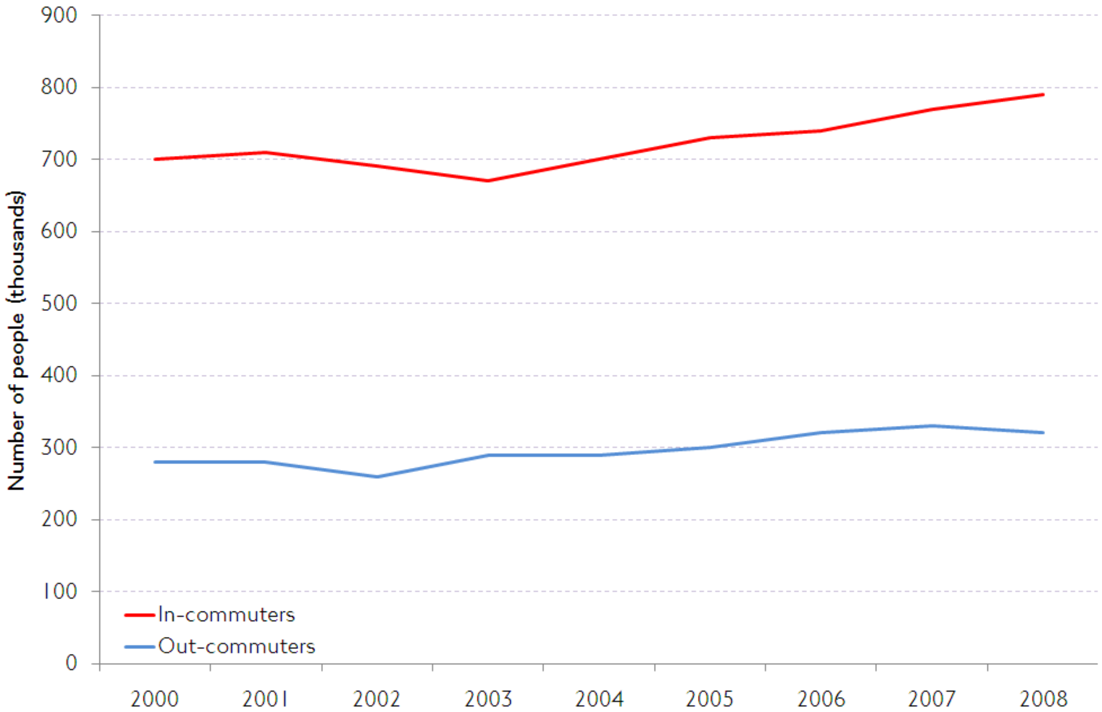
Table 5.6 shows that almost 800,000 people commuted into Greater London from locations outside on a typical weekday by all transport modes in 2008, roughly equivalent to 13 per cent of the adult resident population. This was an increase of 13 per cent above the number in 2000. A slightly larger percentage increase of 17 per cent was seen over the same period in out-commuters (London residents who travel to employment locations outside London), although the net positive daily commuting inflow to Greater London was 470,000 people – equivalent to 7.5 per cent of the adult resident population. These results come from the Labour Force Survey, where respondents, surveyed at their home addresses, state their usual workplaces which allows the commuting estimates to be derived. Individuals do not necessarily make the same commuting journey on every weekday.

Table 5.6 Daily commuters to, and from, Greater London, 2000 to 2008 (thousands).

Year	In-commuters[1]	Out-commuters[2]
2000	700	280
2001	710	280
2002	690	260
2003	670	290
2004	700	290
2005	730	300
2006	740	320
2007	770	330
2008	790	320

Source: Labour Force Survey (ONS) - spring sample
1. Workers in Greater London with residence outside Greater London.
2. Residents in Greater London with workplace outside Greater London.
Technical note: The Labour Force Survey moved from seasonal to calendar quarters in 2005/06. The data has been re-weighted for all years, resulting in some revisions to earlier data.

Figure 5.11 Daily commuters to, and from, Greater London, 2000 to 2008 (thousands).



Source: Labour Force Survey (ONS) - spring sample.

6. Safety and security on the transport system

6.1 Introduction

Being and feeling safe when using transport is an important part of the overall journey experience – whether on the roads or on London's public transport. This chapter looks at trends related to the key Mayoral theme of improving safety and security on the transport networks in London, including casualties from collisions on the roads, passenger safety on public transport, and the incidence and perception of crime and anti social behaviour.

6.2 Key features and trends

Road traffic casualties

- London's roads have become significantly safer in recent years.
- There were 47 per cent fewer people killed or seriously injured on London's roads in 2008 than the baseline for Government targets (the 1994 to 1998 average). For Great Britain as a whole, the fall was 40 per cent.
- There was a 67 per cent reduction in children killed or seriously injured on London's roads, and a 43 per cent reduction among pedestrians (including both adults and children); and, despite the substantial increase in cycling, 21 per cent fewer cyclists were killed or seriously injured. 'Slight' casualties fell by 37 per cent.
- During 2008, 6.8 per cent fewer people were killed or seriously injured from collisions on London's roads compared to 2007. This substantial reduction continues the trend of recent years, and compares to a 4.1 per cent reduction for 2007 against 2006. The number of people killed fell from 222 to 204 (down 8.1 per cent).
- There were also year-on-year reductions, for casualties either killed or seriously injured, of 6.5 per cent in pedestrian casualties; 3.5 per cent in casualties from collisions involving pedal cycles; 9.9 per cent in casualties from collisions involving powered two-wheeled vehicles; and 6.3 per cent in child casualties.
- In terms of the total number of collisions in London, in 2008 there were 23,116 collisions involving personal injury, a decrease of 0.4 per cent on the 23,210 collisions in 2007. A total of 28,153 people were injured as a result of these collisions – a decrease of 0.7 per cent compared to 2007.
- These figures represent continued substantial improvement in reducing the more significant casualty groups, 2008 being the eighth consecutive year that casualties were the lowest recorded. Despite this progress, the still very high number of casualties continues to place a substantial burden on society in terms of social, emotional and economic costs.

Safety on the public transport networks

- London's public transport networks carry more than 10 million passenger journeys on an average day and overall offer an extremely safe travelling environment, in both absolute terms and in comparison with private transport (over 13,000 car occupants were injured in 2008). Nevertheless 127 passengers were injured travelling on the Underground during 2008/09, and there was one fatality (as a result of an accidental fall on stairs at Seven Sisters station). These numbers were similar to 2007/08.

- On buses and coaches during the 2008 calendar year, 1,370 passengers (and in total 1,492 vehicle occupants including drivers) were injured, including one fatality. This number of injuries was a 5.9 per cent increase on 2007.

Crime and perception of crime

- Rates of crime on both bus and Underground/DLR networks fell significantly in 2008/09, building on the reductions achieved during 2007/08.
- There were 12.1 reported crimes per million passenger journeys on London's buses and 13.1 per million passenger journeys on LU and DLR during the 2008/09 financial year. These rates are down from 15.2 and 14.4 reported crimes per million passenger journeys respectively in 2007/08.
- The most common causes of concern among London residents while travelling were: the threatening behaviour of other passengers (20 per cent), large groups of school children (17 per cent), and drunken passengers (12 per cent). Residents said they tended to be the most concerned about their personal safety and security when walking after dark (37 per cent) and when waiting at a station or stop after dark (33 per cent).
- Few respondents said that concerns about safety from crime and anti social behaviour affected the frequency with which they travel in London during the day 'a lot'. For most modes, between 20 and 30 per cent of respondents were deterred somewhat from travelling during the day due to fear of crime.

6.3 Road safety

Background and road safety targets

Recent years have seen significant and sustained reductions to the number of casualties from road traffic collisions in London. By 2004, London had already more than achieved the Government's national casualty reduction targets, relative to the 1994-1998 average and for achievement by 2010. These were for: a 40 per cent reduction in the number of people killed or seriously injured (KSIs) in road collisions; a 50 per cent reduction in the number of children killed or seriously injured, and a 10 per cent reduction in the 'slight' casualty rate, expressed as the number of people slightly injured per 100 million vehicle kilometres travelled.

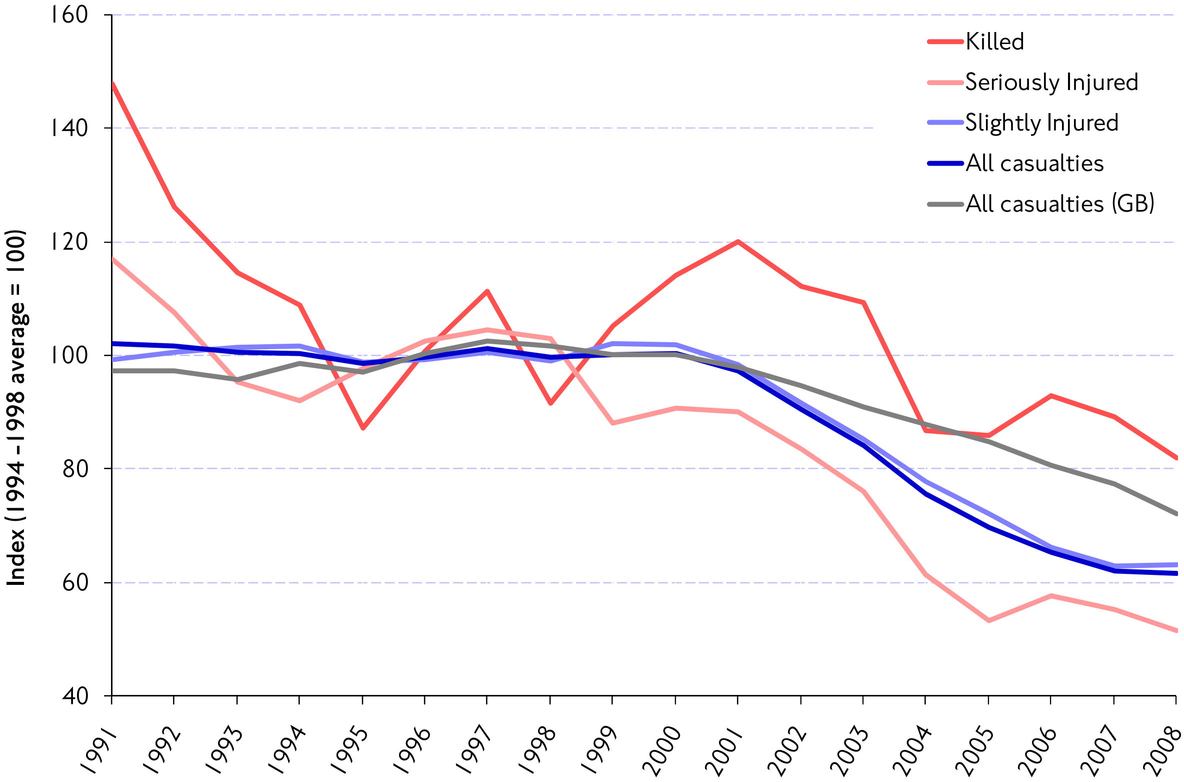
Recently reaffirmed by the Mayor, more challenging targets for London were set in 2006 to be achieved by 2010, these again being relative to a 1994 to 1998 base. These included: a 50 per cent reduction in total KSIs, a 60 per cent reduction in child KSIs, and for the 'slight' injury rate to fall by 25 per cent. New targets were also set for a reduction in pedestrian and cyclist KSIs by 50 per cent. Considerable progress has already been made towards achieving these tougher targets.

Recent trends in road casualties in London

Figure 6.1 shows the long-term trend for road casualties in Greater London, in terms of the severity of personal injury. Values are indexed to the average for 1994 to 1998 (the comparison basis for national targets). The Great Britain trend for all casualties is also shown for comparison.

The trend of consistent year-on-year reductions in numbers of casualties is evident – although rates of reduction applicable to the different injury severity categories do vary considerably. However, 2008 was the eighth consecutive year when the total number of casualties was the lowest recorded, although the rate of reduction to both 'slight' casualties and, in consequence, the total number of casualties, flattened noticeably.

Figure 6.1 Trend in road casualties in Greater London, by personal injury severity.



Source: TfL London Road Safety Unit.

Developments in 2008

In 2008 the recent positive trends of casualty reduction in London continued. For the whole of 2008:

- Total KSI casualties were 47 per cent below the 1994 to 1998 comparison base, following a 7 per cent reduction to 3,526 in 2008.
- Child KSIs were 67 per cent below the 1994 to 1998 average, following a decrease of 6 per cent to 310 in 2008.
- Slight casualties were 37 per cent below the 1994 to 1998 comparison base, following a small increase of 0.2 per cent to 24,627 casualties in 2008.
- The total number of casualties – slight, serious and fatal – was down 0.7 per cent to 28,153 in 2008, 38 per cent below the 1994-1998 average.

In terms of the additional casualty reduction targets applicable to London:

- Pedestrian KSI casualties were 43 per cent below the 1994 to 1998 comparison base, following a decrease of 7 per cent to 1,208 in 2008.

- Pedal cyclist KSI casualties were 21 per cent below the 1994 to 1998 comparison base, following a 3 per cent decrease to 445 in 2008.
- Powered two-wheeler casualties were 21 per cent below the 1994 to 1998 comparison base, following a 10 per cent decrease to 738 in 2007.

Table 6.1 summarises recent progress towards the casualty reduction targets applicable to London.

Table 6.1 Summary of recent progress towards casualty reduction targets applicable to London.

Category	Govt target by 2010 (%)	Target by 2010 (%)	1994 to 1998 average	Casualties 2007	Casualties 2008	% change for 2008 compared to 2007	% change for 2008 against 1994 to 1998 average
Fatal and serious casualties - Total	-40%	-50%	6,684	3,784	3,526	-7%	-47%
Pedestrian	-	-50%	2,137	1,292	1,208	-7%	-43%
Pedal cyclists	-	-50%	567	461	445	-3%	-21%
Powered two-wheelers	-	-40%	933	819	738	-10%	-21%
Children	-50%	-60%	935	331	310	-6%	-67%
Slight casualties – Total	-10%	-25%	38,997	24,577	24,627	0%	-37%
All			45,681	28,361	28,153	-1%	-38%

Source: TfL London Road Safety Unit.

London and Great Britain compared

During 2008, collisions and casualties in Greater London accounted for 14 per cent and 12 per cent respectively of those in Great Britain as a whole. Comparing London's performance towards the year 2010 national targets with that for Great Britain as a whole, London has achieved faster reductions in all major categories of casualty. For the 2008 year and in relation to the 1994-1998 comparison basis:

- Total KSIs in Great Britain had fallen by 40 per cent compared to a fall of 47 per cent in London.
- Child KSIs in Great Britain had fallen by 59 per cent compared to a fall of 67 per cent in London.
- Slight casualties in Great Britain had fallen by 36 per cent compared to a fall of 37 per cent in London.

Trends in sub-modal involvement

Levels of collision and injury risk in London differ considerably between the various types of road vehicle. Table 6.2 sets out some absolute casualty statistics for 2008, and compares them to equivalent numbers for 2007.

Table 6.2 Road casualties by modal involvement, 2008.

Mode of travel	Fatal	Serious	Slight	Total	% of total	% change in total compared to 2007
Pedestrians	94	1,114	3,919	5,127	18.2	-2.4
Pedal cyclists	15	430	2,757	3,202	11.4	+7.8
Powered two wheelers	50	688	3,484	4,222	15.0	-5.1
Car occupants	39	841	12,149	13,029	46.3	-1.4
Taxi occupants	0	27	284	311	1.1	-2.8
Private hire occupants	0	10	64	74	0.3	..
Bus or coach occupants	1	151	1,340	1,492	5.3	+6.0
Goods vehicle occupants	5	40	480	525	1.9	+1.7
Other vehicle occupants	0	21	150	171	0.6	..
Total casualties	204	3,322	24,627	28,153	100	-0.7
% of total	0.7	11.8	87.5	100	n/a	n/a

Source: TfL London Road Safety Unit
1. .. not separately recorded in 2007.

Particular points of interest are that:

- There were 204 fatalities in London during 2008. This is an 18 per cent decrease on the 1994 to 1998 average.
- However, almost half (46 per cent) of these fatalities were pedestrians – underlining the particular risks associated with this 'non-vehicle' mode of travel. Indeed, 77.9 per cent of all fatalities involved people external to vehicles, including pedal cyclists and riders of powered two-wheeled vehicles.
- Total pedal cyclist casualties increased by 7.8 per cent in 2008, following increases of 0.4 per cent in 2007 and 2.2 per cent in 2006. However, these increases should be seen in the context of substantial increases to the levels of cycling in Greater London in recent years. They therefore reflect a substantial reduction in the collision rate or level of collision risk for these road users. Also, pedal cyclist KSIs fell by 3 per cent in absolute terms in 2008 in comparison with 2007.
- Of particular interest are the 1,492 casualties sustained by bus and coach occupants (including drivers) in 2008. This was 6 per cent higher than in 2007, and accounted for 5.3 per cent of all road user casualties. Of the 1,370 bus or coach passengers injured during 2008, 44.3 per cent were standing in the vehicle, 44.1 per cent were seated, 5.9 per cent were alighting and 5.7 were boarding the vehicle.

The overall total of 28,153 road user casualties in 2008 was made up of 17,583 vehicle drivers or riders (62.5 per cent), 5,443 vehicle passengers (19.3 per cent) and 5,127 pedestrians (18.2 per cent). Compared with 2007, driver/rider casualties decreased by 0.2 per cent; vehicle passenger casualties by 0.9 per cent and pedestrian casualties by 2.4 per cent.

MTS strategic outcome indicator: Number of road traffic casualties

Why this indicator is important

More than 28,000 people in London were injured as a result of road traffic collisions in London during 2008. In 204 cases the injuries were fatal, and 3,322 people received serious injuries. Despite considerable progress in recent years, these high numbers of casualties continue to place a substantial burden on society, severe emotional consequences, and an imposed financial cost estimated at £2.2 billion at December 2008 prices. The Mayor has reaffirmed casualty reduction targets for London for the year 2010 that go beyond equivalent national targets, which in most cases were achieved in London several years early. This indicator will track changes to the number of casualties who are either killed or receive serious injuries in London, with progress towards more specific casualty reduction targets described in the main text.

How this indicator is calculated

The indicator is for the number of people killed or seriously injured on roads in Greater London. The collision data on which this indicator is based relate to road traffic collisions involving personal injury that occurred on the public highway and were reported to the police in accordance with the Stats 19 national reporting system. The target specifically relates to casualties – either fatal or categorised as having received a serious injury – as defined by the Stats 19 criteria on all roads within Greater London. There was consideration as to whether the indicator should encompass public transport. Buses and coaches are included within it already, but there is a different reporting system for Underground. However, in context, there are over 200 times more injuries on roads compared to the Underground. While not included in this indicator, Underground casualties will continue to be reported (see section 6.4 below).

Values for 2008 calendar year and comparison with 2007

In Greater London in 2008, 3,526 people received either serious (3,322) or fatal (204) injuries in road traffic collisions. This was a 6.8 per cent reduction compared to 2007, and continues the recent trend towards substantial year-on-year reductions in the number of more serious road traffic collision casualties.

Road casualty trends by borough (LIPs 2 performance indicator)

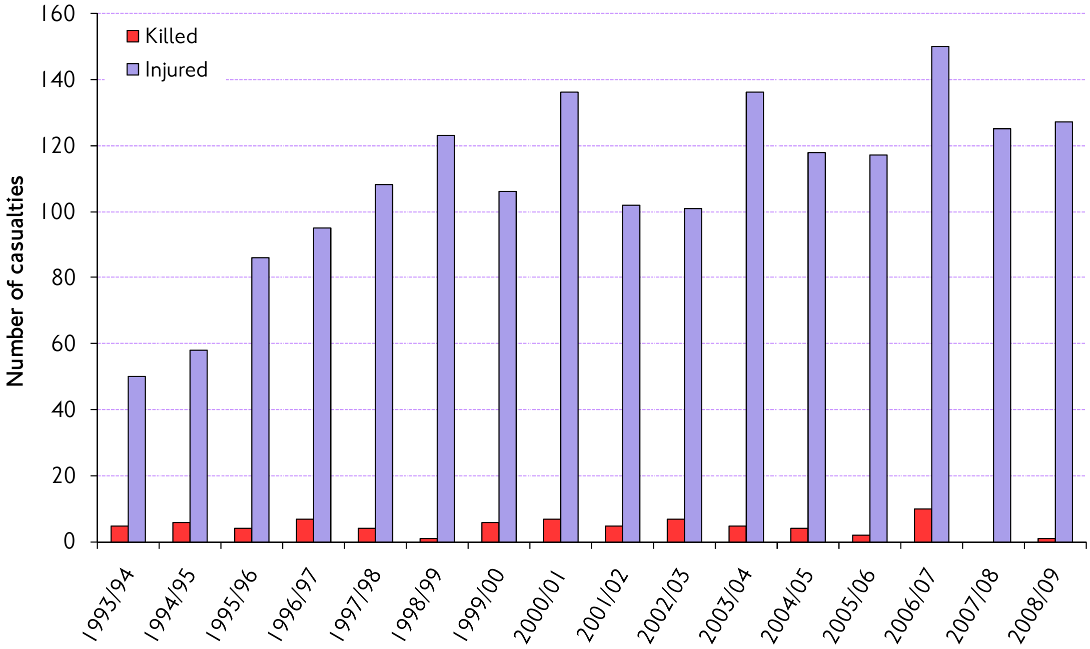
Road traffic casualties are a formal LIPs 2 indicator for individual London boroughs. The indicator covers both total casualties from reported collisions within each borough, and also the number of casualties who receive serious or fatal injuries. These statistics are provided for 2008 as a reference table at Appendix B of this report. A comparison against the equivalent 2007 values is also provided.

6.4 Passenger safety on the public transport networks

Londoners depend on a public transport system that is well maintained and operated so they can travel without fear of injury. Overall, and particularly when viewed in the context of rising service levels and patronage, London's public transport networks continue to offer a safe travelling environment.

On the Underground, passenger injury rates in 2008 were similar to recent years, with one fatality (as a result of an accidental fall on stairs at Seven Sisters station) and 127 other injuries (Figure 6.2). The trends for recent years need to be seen against the backdrop of increased Underground patronage, and shows a small reduction in risk per passenger.

Figure 6.2 Number of people killed or injured while travelling on London Underground.



Source: Transport for London
Excludes suicides and victims of assault and terrorist activity.

Casualties while travelling on buses and coaches are monitored by the London Road Safety Unit through the 'Stats 19' process previously described. In 2008, 151 bus users were injured in London, with one fatality – values not atypical of recent years. These casualty numbers exclude pedestrian and other vehicle users who might have been injured in collisions involving buses. Figure 6.3 shows the trend in these measures since 2000, over which time it should be noted that the number of bus kilometres operated in London increased by 31 per cent, again reflecting a reduced injury risk rate.

Figure 6.3 Number of people killed or injured while travelling on buses or coaches in London.

Source: Transport for London.

6.5 Crime and anti social behaviour on the public transport networks

Crime, fear of crime and anti social behaviour can all put people off using London's public transport system. TfL and the police are working to reduce their incidence through initiatives including improved policing, better design and the use of technology.

Crime on the bus network, the Underground and DLR

Public transport in London offers a low-crime environment and is becoming even safer. There were 12.1 reported crimes per million passenger journeys on London's buses and 13.1 per million passenger journeys on LU and the DLR during 2008/09. These rates are down from 15.2 and 14.4 reported crimes per million passenger journeys respectively in 2007/08.

Table 6.3 shows the recent trends for crime on the bus network, while Table 6.4 shows the equivalent for Underground/DLR. Although the total number and type of reported crimes varies somewhat from year-to-year, the general downwards trend is evident, despite increasing numbers of people using the transport networks. These reductions in crime have been achieved through a combination of investment in visible policing and enforcement and improvements to technology and the wider travel environment. TfL's Community Safety Plan provides more information on TfL's activities to enhance safety and security across the transport system.

Table 6.3 Crime on or near the bus network. Rate per million passenger journeys.

Crime	2005/06		2006/07		2007/08		2008/09	
	Crimes	Rate	Crimes	Rate	Crimes	Rate	Crimes	Rate
Burglary	156	n/a	115	n/a	104	n/a	86	<1
Criminal damage	7,624	4.2	7,710	4.1	5,846	2.7	3,723	1.7
Drugs	504	<1	430	<1	683	<1	779	<1
Fraud/ forgery	549	<1	330	<1	414	<1	387	<1
Other notifiable offences	226	<1	298	<1	233	<1	234	<1
Robbery	5,297	2.9	6,214	3.3	4,266	2.0	2,761	1.2
Sexual offences	521	<1	481	<1	480	<1	535	<1
Theft and handling	15,707	8.6	14,623	7.8	12,699	5.8	10,948	4.9
Violence against the person	8,558	4.7	8,281	4.4	8,400	3.9	7,609	3.4
Total	**39,142**	**21.6**	**38,482**	**20.5**	**33,125**	**15.2**	**27,062**	**12.1**

Source: TfL Community Safety, Enforcement and Policing Directorate based on official crime figures provided by the Metropolitan Police Service Performance Information Bureau and the British Transport Police.

Table 6.4 Crime on LU and the DLR. Rate per million passenger journeys.

Crime Type	2005/06		2006/07		2007/08		2008/09	
	Crimes	Rate	Crimes	Rate	Crimes	Rate	Crimes	Rate
Violence against the person	2,796	2.7	2,494	2.3	2,215	1.9	2,158	1.9
Sexual offences	342	<1	393	<1	332	<1	338	<1
Criminal damage	1,975	1.9	2,704	2.5	1,921	1.7	1,615	1.4
Line of route (eg trespass)	231	<1	135	<1	142	<1	118	<1
Theft of passenger property	7,929	8.5	7,988	7.4	7,481	6.6	6,134	5.3
Motor vehicle / cycle offences	373	<1	390	<1	342	<1	359	<1
Robbery	506	<1	399	<1	192	<1	136	<1
Theft of railway property / burglary	1,295	1.3	8.19	<1	592	<1	381	<1
Serious public order	1,550	1.2	2,050	1.9	1,981	1.7	1,892	1.7
Serious fraud	200	<1	167	<1	264	<1	230	<1
Drugs	824	1	687	<1	881	<1	1,616	<1
Other serious offences	863	<1	260	<1	102	<1	132	<1
Total notifiable offences	**18,884**	**18.4**	**18,486**	**17.2**	**16,445**	**14.4**	**15,109**	**13.1**

Source: TfL Community Safety, Enforcement and Policing Directorate based on official crime figures provided by the Metropolitan Police Service Performance Information Bureau and the British Transport Police.

MTS strategic outcome indicator: Crime per million passenger journeys by the principal public transport modes

Why this indicator is important

Crime, fear of crime and anti social behaviour can all put people off using London's public transport system. Public transport in London offers a low-crime environment and is becoming even safer.

How this indicator is calculated

This indicator is derived by dividing the number of crimes reported in a financial year by mode, by the number of passenger journeys made on that mode in the same financial year, in millions. This gives a rate of crime per million passenger journeys. This is currently available for two modes; the bus network and the Underground/ DLR networks.

Values for 2008/09 financial year and comparison with 2007/08

In 2008/09, there were 12.1 million crimes per million passenger journeys on or near the bus network, and 13.1 million crimes per million passenger journeys on the Underground and the DLR. Both of these rates represent a decrease on the 2007/08 figure, by 20 per cent and 9 per cent respectively. This represents a continuing year-on-year fall in reported crime rates across both modes.

Crime on the London Overground rail network

Table 6.5 shows the absolute number of reported crimes associated with the London Overground Rail network. It is not possible to express these crimes as a rate, as consistent passenger numbers are not yet available. Including the period before November 2007 when TfL London rail began running services on the network, the trend over the three available financial years is mixed: 2008/09 had more crimes than 2007/08, but fewer than 2006/07, and it is not at present possible to discern a clear trend.

Table 6.5 Crime on the London Overground rail network. Absolute numbers of reported crimes.

Crime type	2006/07 crimes	2007/08 crimes	2008/09 crimes
Violence against the person	112	98	103
Sexual offences	11	8	9
Criminal damage	92	67	43
Line of route	2	0	3
Theft of passenger property	100	86	67
Motor vehicle/cycle offences	15	16	13
Robbery	47	20	10
Theft of railway property/burglary	18	25	40
Serious public order	56	67	79
Serious fraud	5	4	3
Drugs	84	52	106
Other serious offences	11	4	16
Total notifiable offences	553	447	492

6.6 Perception of crime

Perceptions of the likelihood of being a victim of crime or anti social behaviour affect travel choices and can act as a barrier to travel. In particular, fear of violent crime discourages travellers from walking, cycling or using public transport, and tends to encourage use of the car or not travelling at all. Feeling fearful also damages the experience of travelling. Some groups in the population tend to be more fearful of crime than others; in particular, women, older people, people from ethnic minority groups and residents of deprived areas tend to be more fearful of crime and this constrains their travel choices accordingly.

Simply measuring crime rates is a poor predictor of fear of crime among the travelling public, and it is largely the perception of safety that governs travel choices. It may well be the case that overall crime rates can drop while fear of crime rises, and different measures are required to reduce fear of crime. For example, some researchers have suggested that one explanation for high levels of fear of crime could be the continuing high visibility of certain forms of anti social behaviour. Graffiti on the railway network might be a good example of this. Similarly, there is some evidence that the visibility of police or security professionals acts to reassure people and reduces fear of crime. Other factors influencing the fear of crime include the media presentation of crime, the quality of the travel environment, and past experiences of the traveller and people known to them.

TfL is monitoring the perception of crime and personal safety as an MTS strategic outcome indicator. In addition to the indicator, supporting information derived from TfL surveys is presented exploring the sense of safety for travellers on each mode, as well as the proportion of London residents deterred from using each mode due to concerns about safety, both during the day and after dark.

MTS strategic outcome indicator: Perception of crime/safety whilst travelling

Why this indicator is important

Perceptions of the likelihood of being a victim of crime or anti social behaviour affect travel choices and can act as a barrier to travel. By measuring perceptions of crime and anti social behaviour on the transport network, TfL can evaluate the success the MTS in helping travellers to feel safe on the transport network.

How this indicator is calculated

The indicator is defined as the 'Perception of London residents of their sense of safety and fear of crime when travelling in the city (a) during the day and (b) after dark'. The indicator provides a 'composite' measure across the modes for each time period, combining modal results based on the number of London residents who use each mode regularly (at least once a week) as reported by the London Travel Demand Survey.

The indicator is derived from an annual TfL survey carried out by the Community Safety, Policing and Enforcement Directorate (CSEP). The survey, entitled 'Safety and Security when travelling around London', is carried out in autumn of each year and has been carried out in this form since 2004. The survey consists of telephone interviews with a representative sample of 1,000 London residents, selected randomly within each household sampled.

Values for 2009 calendar year

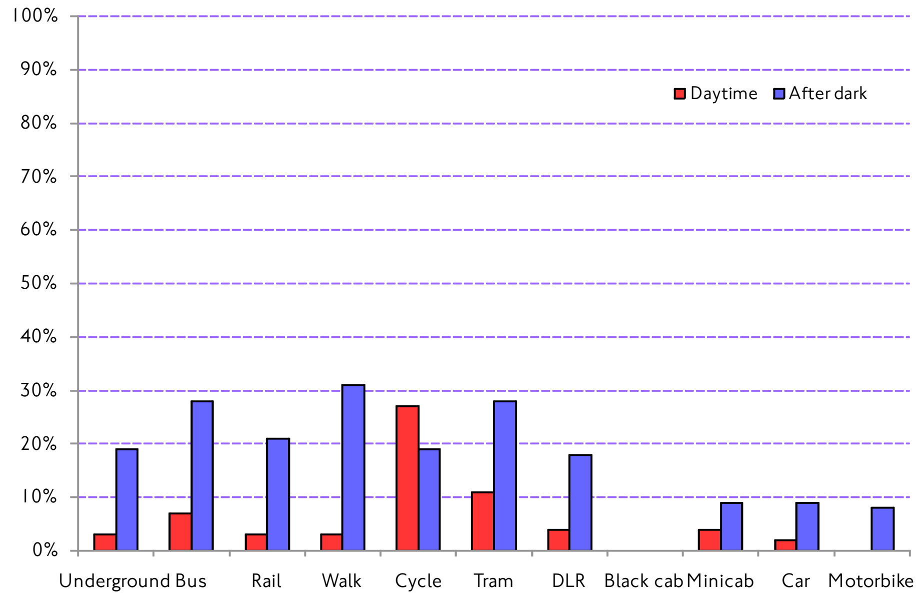
95 per cent of London residents feel safe on the modes they travel on regularly (once a week or more) during the daytime.
78 per cent of London residents feel safe on the modes they travel on regularly (once a week or more) after dark.

For most modes of transport, the majority of users feel safe from crime and anti social behaviour while travelling during the day; cycling and trams were the only modes where more than 1 in 10 survey respondents said they do not feel safe when travelling during the day (Figure 6.4). Few respondents said that concerns about safety from crime and anti social behaviour affected by 'a lot' the frequency with which they travel in London during the day 'a lot', but for most modes between 20 and 30 per cent of respondents were deterred somewhat by fear of crime from travelling during the day (Figure 6.5). Car and black cab were the modes of transport for which London residents were least concerned about safety, and least likely to be deterred by safety concerns from using, during the day.

London residents feel more at risk when travelling at night. In particular, survey respondents were most likely to feel unsafe while walking or travelling by bus or tram after dark (Figure 6.4). Furthermore, a significant proportion of survey respondents said that they were deterred from travelling after dark by fear of crime or anti social behaviour, and particularly from walking and travelling by bus. Respondents felt safest travelling after dark in door-to-door modes such as car, black cab and, to a lesser extent, minicab (Figure 6.6).

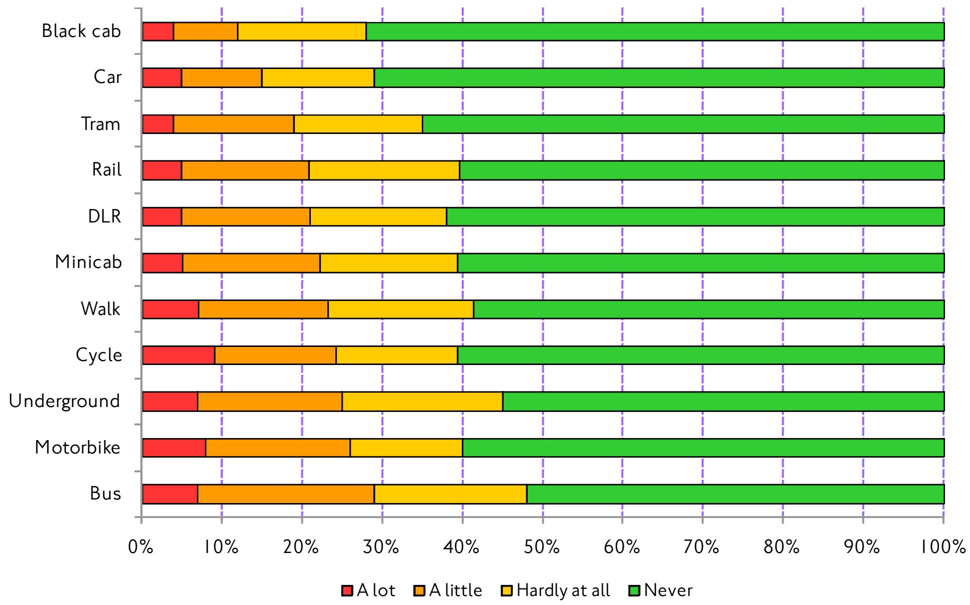
In view of the small base sizes for some modes, particularly for those travelling after dark, appropriate care should be taken in drawing conclusions from these results.

Figure 6.4 Proportion of regular users of each mode who feel unsafe when travelling during the day and after dark, London residents. Safety when Travelling Survey 2009.



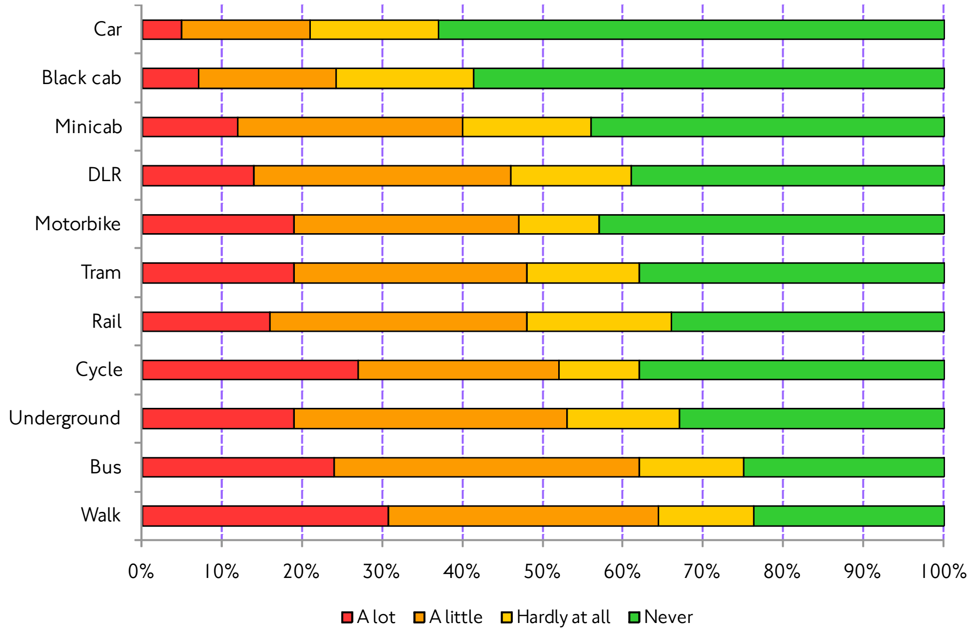
Source: TfL Attitudes to Safety and Security Survey, October 2009
Base (daytime): all who travel during the day using underground (546), bus (637), rail (380), walk (868), cycle (119), tram (45), DLR (86), black cab (93), minicab (96), car (469), and motorbike (18).
Base (after dark): all who travel after dark using underground (361), bus (308), rail (243), walk (432), cycle (53), tram (18), DLR (36), black cab (134), minicab (144), car (393), and motorbike (12).

Figure 6.5 Extent to which London residents are deterred from using modes of transport during the day due to concerns about crime and anti social behaviour. Safety when Travelling Survey 2009.



Source: TfL Attitudes to Safety and Security Survey, October 2009
Base: all who travel at any time using underground (887), bus (932), rail (867), walk (965), cycle (423), tram (414), DLR (544), black cab (674), minicab (678), car (834), and motorbike (364).

Figure 6.6 Extent to which London residents are deterred from using modes of transport after dark due to concerns about crime and anti-social behaviour. Safety when Travelling Survey 2009.



Source: TfL Attitudes to Safety and Security Survey, October 2009
Base: All who travel at any time using Underground (846), bus (863), rail (799), walk (879), cycle (400), tram (379), DLR (487), black cab (697), minicab (681), car (835), and motorbike (363).

London residents were asked what worries them most when travelling by public transport. The most common causes of concern were the threatening behaviour of other passengers (20 per cent), large groups of school children (17 per cent), and drunken passengers (12 per cent). Residents said they tended to be the most concerned about their personal safety and security when walking after dark (37 per cent) and when waiting at a station or stop after dark (33 per cent).

7. Transport and climate change

7.1 Introduction

Carbon Dioxide (CO_2) is London's dominant climate change emission. The Mayor has committed to achieving a 60 per cent reduction in London's CO_2 emissions, measured against 1990 levels, by 2025. As envisaged in both the draft Transport Strategy and the draft Climate Change Mitigation and Energy Strategy (CCMES), the Mayor proposes to structure his approach to achieving the contribution of the transport sector to this target around three key themes:

- Improved operational efficiency – to minimise unnecessary CO_2 emissions.
- Supporting and encouraging the development and use of low carbon vehicles, technology, energy and design principles, including working with third parties.
- Encouraging and facilitating low-carbon travel behaviour. This includes the activities underway and planned to increase cycling, walking and the use of public transport.

This chapter sets out newly-available emissions data for CO_2 in London, and looks at selected trends and mitigating actions for transport sources. The statistics below are on a consistent, comparable basis, using estimates for locally-generated emissions based on the GLA's London Energy and Greenhouse Gas Inventory (LEGGI).

7.2 Key features and trends

- Total CO_2 emissions in London were estimated at 44.7 million tonnes in 2008. Total London emissions were up 7 per cent since 2003, although their peak year (so far) was 2006, since when emissions have fallen by 6 per cent.
- Emissions from ground-based transport have, by contrast, fallen since 2003. These emissions accounted for 22 per cent of London's total CO_2 emission in 2008 at 9.7 million tonnes.
- Emissions of CO_2 from road, rail and shipping fell by 3 per cent between 2006 and 2008.
- Aviation has been growing. Including 'ground-based aviation' (i.e. emissions related to aviation but happening at less than a mile above ground), emissions fell by 2 per cent between 2006 and 2008.
- Compared to 2003, these ground-based transport CO_2 emissions are down 5 per cent (without ground-based aviation) and 2 per cent (with) respectively.
- London's CO_2 emissions from road transport fell 7 per cent between 2003 and 2008.
- Almost half (46 per cent) of CO_2 from ground-based transport arises from cars, and a further 18 per cent from vans and lorries.
- The principal public transport modes (bus, rail and Underground) each accounted for between 6 and 7 per cent of CO_2 from ground-based transport – comparable proportions to 2006.

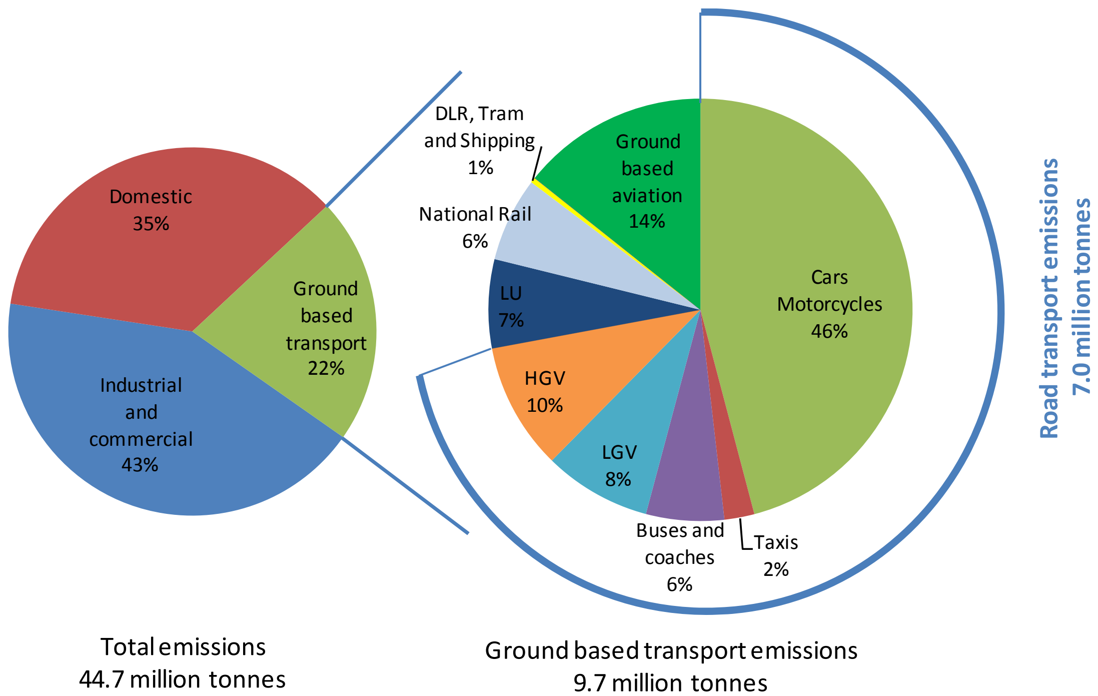
7.3 CO_2 emissions by source

Carbon Dioxide is easily the largest contributor to greenhouse gas emissions. It represents about 85 per cent of total UK greenhouse gas emissions. For road transport, the figure is about 90 per cent. Other greenhouse gases that also have a warming effect in the atmosphere include methane (CH_4), Nitrous Oxide (N_2O) and water vapour (H_2O). All these are emitted to varying degrees by human activity in London, and have differing potency and residency. For transport, CO_2 is overwhelmingly the most significant greenhouse gas emission and is consequently the one primarily targeted by the Mayor.

This section looks at CO_2 emissions from sources in London for 2008, identifying the main source groups, the geographical disposition of CO_2 emissions, and trends in CO_2 emissions over time.

The GLA maintain the LEGGI inventory, which quantifies CO_2 emissions from all identifiable sources in London on an approximately annual basis. According to the recently-updated 2008 version of this inventory, released in spring 2010, total CO_2 emissions from all sources in Greater London were 44.7 million tonnes. This includes all emissions from electricity consumed but not necessarily generated within London. Ground-based transport accounted for 22 per cent of this total, or 9.7 million tonnes. The basic source breakdown for London's CO_2 emissions for 2008 is shown in Figure 7.1.

Figure 7.1 Basic source apportionment for CO_2 emissions in Greater London, percentage contribution to 2008 annual total.



Source: LEGGI for 2008, updated 2010, GLA

Figure 7.1 shows that:

- Ground-based transport accounted for 22 per cent of London's total CO_2 emission in 2008. This includes the electricity consumed by rail inside London but where the electricity may be generated outside London.

- The majority of CO_2 arises from the domestic and industrial and commercial sectors, together accounting for 77 per cent of emissions.
- Of the emissions from ground-based transport, almost half (46 per cent) arise from cars (and motorcycles), reflecting the fact that cars account for about four-fifths of kilometres driven in London. Road freight is the next most significant emitter, contributing 18 per cent, and ground-based aviation accounting for 14 per cent. Bus, National Rail and Underground account for between six and seven per cent each.

7.4 Trends in CO_2 emissions in London

The LEGGI inventory includes estimates for CO_2 emissions for some previous years, on a compatible methodological basis to that used to compile the 2008 estimate, but using data on emitting sources relating to the appropriate years. Figure 7.2 shows London's estimated CO_2 emissions in their recent historic context. Separate historic trends and backwards projections are given for the three main sectors, and these are broken down further in Tables 7.1 to 7.3.

There has been a 6 per cent decrease in CO_2 compared to 2006 total emissions in Greater London (this estimate includes attributable emissions from electricity not generated but consumed within London). However, between 2008 and 2003 emissions have increased by 7 per cent.

Road transport emissions have been consistently falling since 2003, seeing a 7 per cent reduction since 2003 and 5 per cent since 2006.

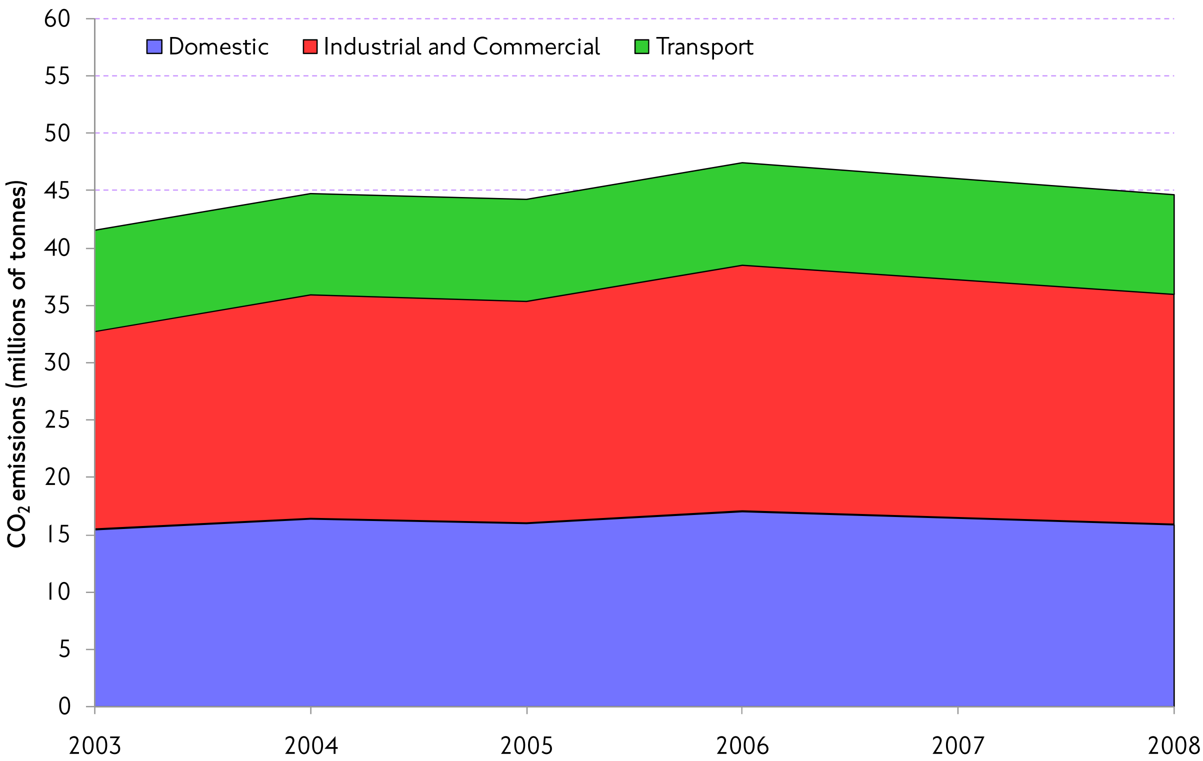
Public transport produces less CO_2 for each kilometre travelled than the equivalent travel in private vehicles. However, as is demonstrated elsewhere in this report, demand for public transport in London has grown over recent years, with a commensurate increase in service provision. This has meant that more fuel and energy has in aggregate been consumed. This leads to an increase in emissions from rail (in this case including Underground) of 2 per cent since 2007 and 6 per cent since 2006. However, this is less than the increase in passenger numbers – of 10 per cent over the period since 2006. Emissions per rail passenger have therefore fallen over this period.

Table 7.1 CO_2 emissions (tonnes) – historical trends for annual emissions.

		CO_2 emissions (tonnes)			% change 2006 to 2008
		2006	2007	2008	
Transport	Road transport	7,320	7,150	6,990	-5%
	Rail	1,240	1,280	1,310	+6%
	Shipping	10	10	10	0%
	Ground-based aviation	1,360	1,370	1,390	+2%
Total road, rail and shipping emissions (including buses and Underground)		**8,570**	**8,440**	**8,310**	**-3%**
Total ground-based transport emissions (including ground-based aviation)		**9,930**	**9,810**	**9,700**	**-2%**
Domestic	Gas	9,360	8,930	8,500	-9%
	Coal	10	10	10	-6%
	Oil	80	80	70	-6%
	Electricity	7,620	7,480	7,340	-4%
Industrial and commercial	Gas	4,720	4,470	4,220	-11%
	Coal	10	10	10	-59%
	Oil	910	790	680	-25%
	Electricity	14,840	14,500	14,160	-5%
	Waste and renewables	20	20	20	1%
Total London emissions		**47,500**	**46,100**	**44,710**	**-6%**

Source: LEGGI for 2008, updated 2010, GLA

Figure 7.2 CO_2 emissions – historical trends for annual total emissions (millions of tonnes).



Source: LEGGI for 2008, updated 2010, GLA

Data on the 'source' of emissions includes electricity as a separate category, in accordance with the methodology in the LEGGI inventory. Figure 7.2 and Tables 7.2 and 7.3 are on this basis.

Data has also been re-worked for the more recent years (2006 to 2008) in a way that enables emissions from electricity generation that is used for transport purposes to be attributed to the appropriate transport mode. Table 7.1 shows the result.

Table 7.2 CO_2 emissions - historical trends for annual total emissions (tonnes), by principal source sector.

		CO_2 emissions (tonnes)					
		2003	2004	2005	2006	2007	2008
Transport	Road transport	7,480	7,410	7,320	7,320	7,150	6,990
	Rail	190	190	190	230	260	280
	Shipping	10	10	10	10	10	10
	Ground-based aviation	1,140	1,200	1,360	1,360	1,370	1,390
Total road, rail and shipping emissions		**7,680**	**7,610**	**7,520**	**7,560**	**7,420**	**7,280**
Total ground-based transport emissions (including ground-based aviation)		**8,820**	**8,810**	**8,880**	**8,920**	**8,790**	**8,670**
Domestic	Gas	9,430	9,420	8,890	9,360	8,930	8,500
	Coal	20	10	0	10	10	10
	Oil	150	70	120	80	80	70
	Electricity	5,890	6,920	7,020	7,620	7,480	7,340
Industrial and commercial	Gas	4,840	4,910	4,670	4,720	4,470	4,220
	Coal	0	10	0	10	10	10
	Oil	690	830	750	910	790	680
	Electricity	11,750	13,800	13,950	15,840	15,520	15,190
	Waste and renewables	30	30	30	20	20	20
Total London emissions		41,620	44,810	44,310	47,490	46,100	44,710

*Unlike Table 7.1, emissions attributable to the generation of electricity for rail modes (National Rail, Underground, DLR and tram) are included within the industrial and commercial sector

Source: LEGGI for 2008, updated 2010, GLA

Table 7.3 CO_2 emissions – percentage changes in annual emissions.

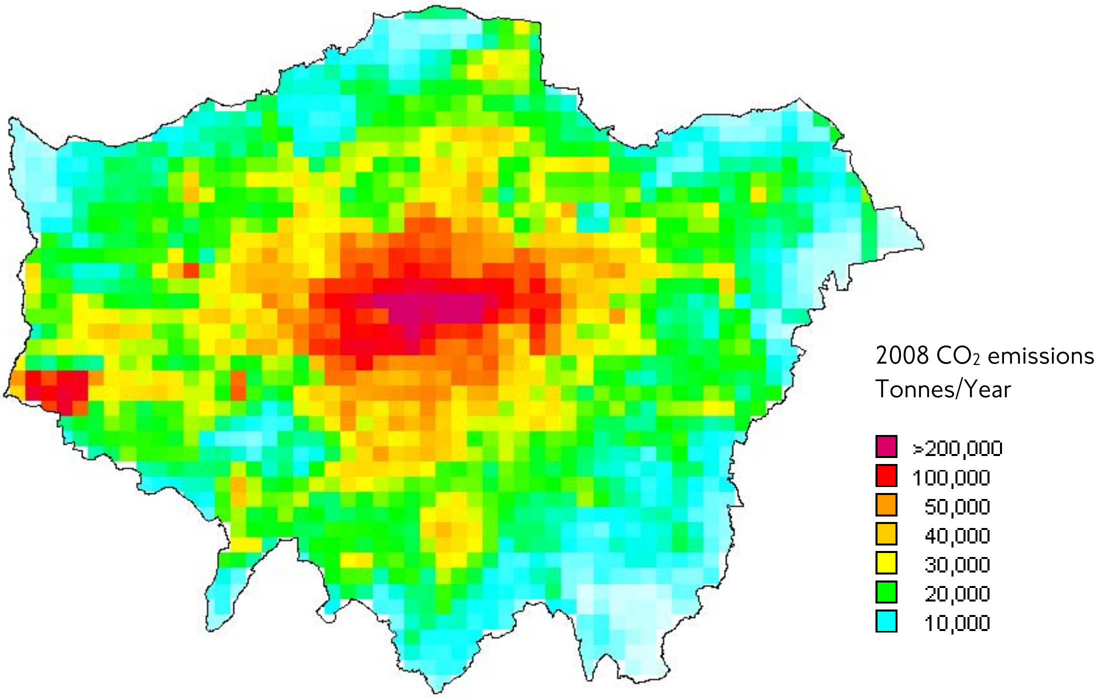
		2003 to 2008	2006 to 2008
Transport	Road transport	-7%	-5%
	Rail	45%	21%
	Shipping	1%	0%
	Ground-based aviation	22%	2%
Total road, rail and shipping emissions		**-5%**	**-4%**
Total ground-based transport emissions (including ground-based aviation)		**-2%**	**-3%**
Domestic	Gas	-10%	-9%
	Coal	-32%	-6%
	Oil	-53%	-6%
	Electricity	25%	-4%
Industrial and commercial	Gas	-13%	-11%
	Coal	64%	-59%
	Oil	-1%	-25%
	Electricity	29%	-4%
	Waste and renewables	-9%	1%
Total London emissions		**+7%**	**-6%**

Unlike Table 7.1 emissions attributable to the generation of electricity for rail modes (National Rail, Underground, DLR and tram) are included within the industrial and commercial sector

Source: LEGGI for 2008, updated 2010, GLA

Figure 7.3 shows the geographical intensity of CO_2 emissions across Greater London. The basic pattern changes little from year-to-year, but clearly pinpoints areas of high CO_2 emissions, which generally reflect variations in urban density and other emitting activities across London.

Figure 7.3 CO_2 emissions in London. Geographical disposition and relative intensity. All sources, annual total (tonnes), 2008.



Source: LEGGI for 2008, updated 2010, GLA

MTS strategic outcome indicator: CO_2 emissions from ground-based transport in London.

Why this indicator is important

Carbon Dioxide (CO_2) is London's principal greenhouse gas emission. Alongside wider national initiatives, the Mayor of London has committed to reducing emissions of CO_2 in London by 60 per cent relative to 1990 levels by 2025.

How this indicator is calculated

Emissions of CO_2 in London are calculated using the GLA's London Energy and Greenhouse Gas Inventory (LEGGI). This is updated on an approximately annual basis. This is an inventory of all identifiable polluting activities in London that give rise to CO_2 emissions, principally those involving the combustion of fossil fuels. It quantifies those emissions and apportions them, both spatially in terms of the source location, and by activity group. For example, emissions by the various types of road vehicle (for example, cars, taxis, vans) are separately identified. Ground-based transport sources include: all on-road and off-road vehicles, diesel trains, river vessels, aircraft in flight operating below 1,000 metres within the Greater London boundary and attributable emissions from electric rail generated outside London.

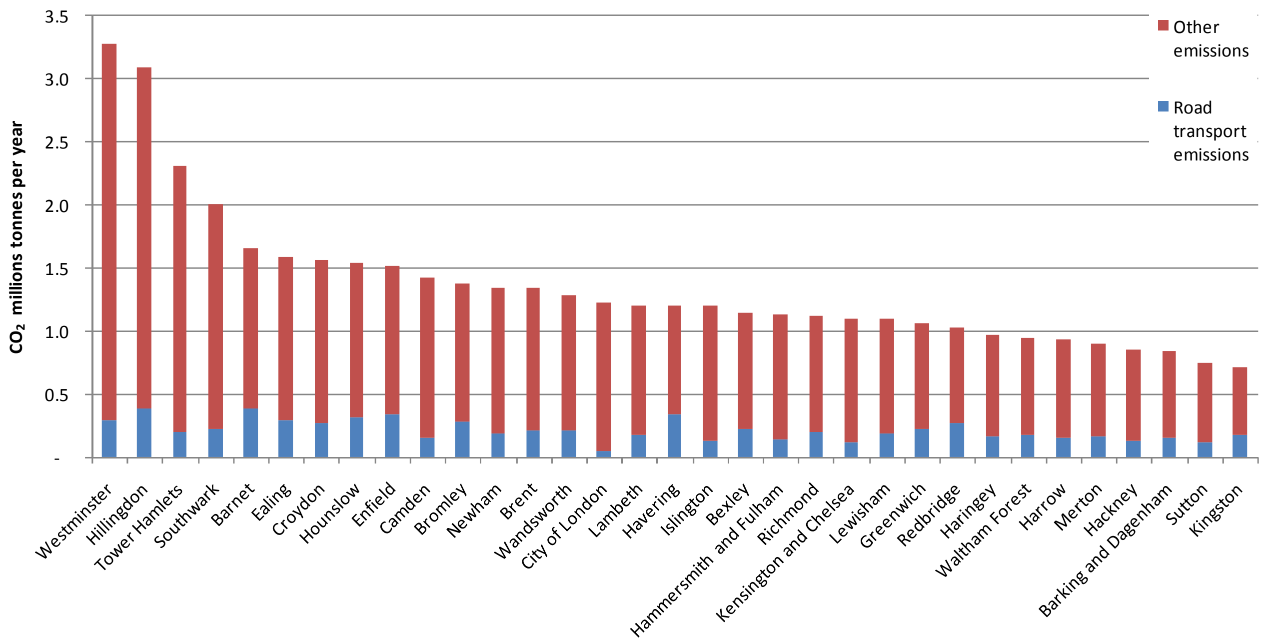
Value for 2008 calendar year and comparison with 2006

Emissions of CO_2 from ground-based transport in London during the 2008 calendar year were estimated at 9.7 million tonnes. This represents 22 per cent of total CO_2 emissions including those attributed to transport in London from electricity generation outside London. On a compatible basis it represents a 2 per cent decrease over estimated emissions in 2006.

CO_2 emissions by London borough (LIPs 2 performance indicator)

The LEGGI inventory allows various breakdowns of the London-wide totals for analysis purposes. One such breakdown is to look at CO_2 emissions for each individual London borough, as well as in terms of the principal emissions sources, as illustrated by Figure 7.4. This shows a considerable range between the borough with the highest emission, and that with the lowest. However, such comparisons need to be made with caution as CO_2 emissions will generally reflect the nature and intensity of emitting activities within each borough, as well as the size, population and employment of the area considered in each case. So, boroughs such as the City of Westminster and Hillingdon are distinguished by high concentrations of commercial activity and Heathrow airport respectively, while boroughs such as Kingston and Sutton have lower density of emitting sources.

Figure 7.4 CO_2 emissions by London borough, showing total and contribution from road transport sources. Million tonnes CO_2, 2008.



Source: LEGGI for 2008, updated 2010, GLA

CO_2 emissions from ground-based transport (LIPs 2 performance indicator)

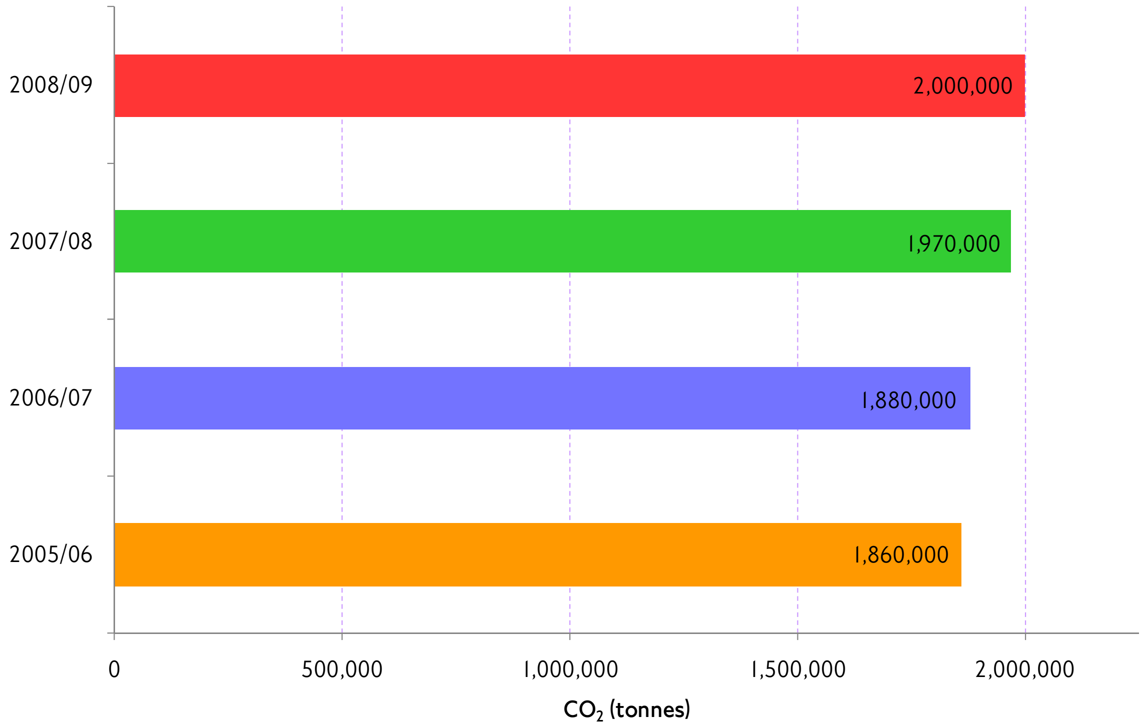
CO_2 emissions from ground-based transport are a formal LIPs 2 indicator for individual London boroughs. These statistics are provided for 2008 as a reference table at Appendix B of this report, including a basic source apportionment and per capita equivalent emission, based on a borough resident population estimate for 2008.

7.5 TfL's operations and CO_2 emissions

London already has one of the lowest transport carbon footprints (per head) in the UK, reflecting its extensive and well-used public transport system, which produces less CO_2 for each kilometre travelled than the equivalent travel in private vehicles. However, as is demonstrated elsewhere in this report, demand for public transport in London has grown over recent years, with a commensurate increase in service provision. This has meant that more fuel and energy has in aggregate been consumed.

In the financial year 2008/09, TfL operations produced 2 million tonnes of CO_2 (Figure 7.5). Of this, 1.35 million tonnes (68 per cent) were from public transport operated or contracted by TfL (Underground and DLR 0.67 million tonnes, buses 0.65 million tonnes, London Overground 0.02 million tonnes, Tramlink 0.01 million tonnes). The latter represents a 2 per cent increase on the equivalent value for 2007/08, as more energy was required to accommodate a 6 per cent rise in passenger kilometres, with a 3 per cent reduction in emissions per passenger kilometre. Taxis and PHVs contributed 0.52 million tonnes, 26 per cent of the total.

Figure 7.5 Total emissions of CO_2 by financial year for TfL operations (tonnes of CO_2).



Source: TfL Environment Report, 2009

An update on the initiatives in TfL's climate change mitigation plan, which supports the delivery of the Mayor's 60 per cent CO_2 reduction target, can be found in TfL's Environment Report for 2009.

7.6 CO_2 reduction policies in action – TfL's hybrid bus programme

Hybrid buses combine a conventional engine with an electric motor which is powered by battery pack. Traditionally energy is lost in the form of heat when braking, but hybrid buses utilise regenerative braking to capture this kinetic energy and store it as electrical energy within the battery pack. This continuous charging of the batteries means the hybrid bus uses less fuel and can achieve a larger operational range than a conventional diesel bus.

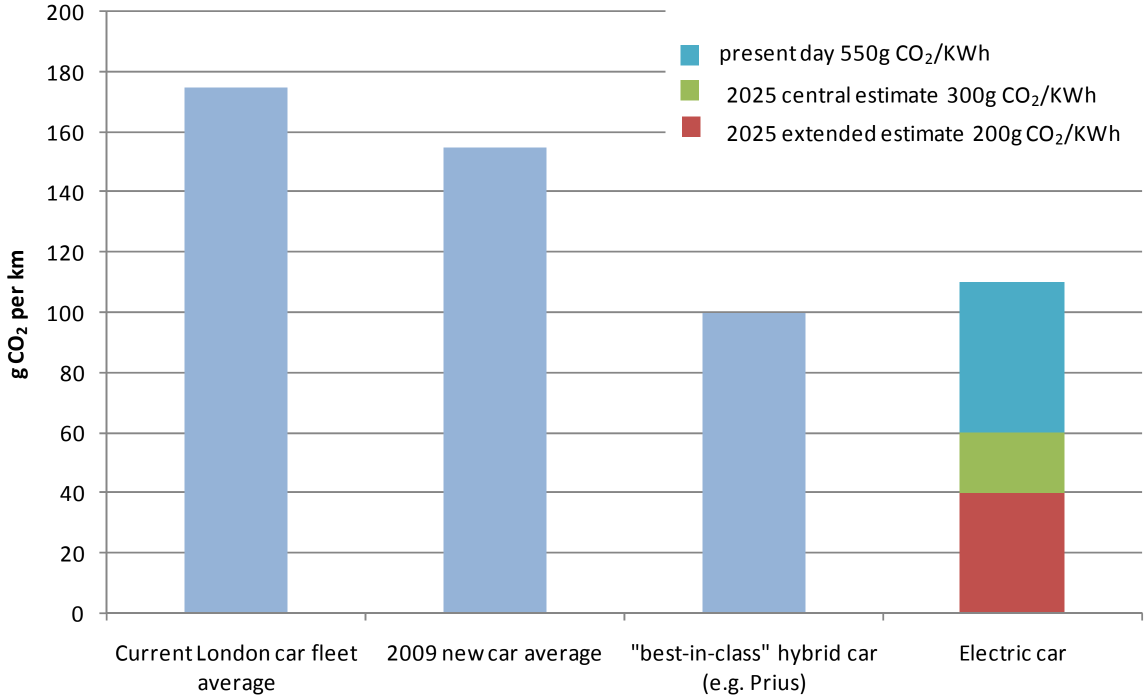
Figure 7.6 A hybrid bus.

The scale of the fuel savings have been assessed through drive cycle tests that replicate typical bus duty cycles in London. This includes calling at bus stops, waiting at traffic lights and the acceleration and braking involved when driving on London's roads. The tests on the latest generation hybrid buses show a 41 per cent reduction in fuel consumption and CO_2 emissions, and a 40 per cent reduction in NO_x, compared to a Euro IV diesel bus.

7.7 Greening the car fleet – CO_2 emissions comparison

Cars and two-wheeled motor vehicles contribute 46 per cent of ground-based transport emissions, or 4.4 million tonnes. A fully electric vehicle has zero tail pipe emissions but true 'well to wheel' emissions depend on how the electricity that powers the vehicle is produced. Figure 7.7 below shows that at the current national electricity supply the well to wheel emissions from an electric vehicle are higher than the current 'best in class' hybrid, but still much cleaner than the current London average fleet and the current new car average. As can be seen in the final column in Figure 7.7, as electricity generation becomes more efficient the well to wheel CO_2 emissions from electric vehicles decreases, increasing the potential savings of electric cars over the current average fleet.

Figure 7.7 Car CO_2 emissions comparison – average London fleet v. best in class and electric cars.



Source: TfL Planning, Delivering London's Energy Future (GLA February 2009), Committee on Climate Change (October 2009)

8. Transport opportunities for all Londoners

8.1 Introduction

This chapter looks at how transport facilitates access to opportunities and services in London and considers physical accessibility to the transport network and the affordability of transport in London. One of the goals of the draft MTS is 'improving transport opportunities for all Londoners'. The MTS states that progress towards this goal will be monitored using the following SOIs: (i) access to services, (ii) physical accessibility to the transport system, and (iii) real fares levels. These are described in detail below.

Access to opportunities and services

- A new indicator for access to opportunities and services (ATOS) has been developed which takes into account the location of services as well as the level of public transport provision. ATOS reflects the way transport facilitates the economic and social development of London, and this will be tracked as part of the monitoring programme for the MTS.
- The new ATOS scores can be used alongside Public Transport Accessibility Levels (PTALs), the traditional transport accessibility measure for London, to provide a more in-depth understanding of accessibility in the Capital.
- Areas in Central and Inner London, as well as town centres in Outer London, have a relatively high ATOS score.
- Some inner suburban areas in London have a relatively low PTAL score while they have a high ATOS score indicating that the density of local services in these areas means that people can access them more readily by walking or cycling.
- The average travel time for accessing employment and key services in London by public transport or walking in 2008/09 was 17.4 minutes.

Accessibility to the transport system

- TfL is committed to providing easy and accessible travel for as many members of the community as possible. Parts of the public transport network are fully accessible and plans are underway to make further improvements where possible.
- All buses in London are fully accessible (with the exception of a small number of 'heritage' Routemasters) as are almost half of bus stops. About 20 per cent of LU stations and a third of National Rail stations are fully accessible from the street to the platform. The DLR and Tramlink networks are fully accessible from street to carriage.
- Efforts are also being made to provide more information to travellers about the level of accessibility to the Underground in particular, in order to assist them to plan their journey effectively.
- A composite physical accessibility indicator, which reflects the current percentage of the transport network in London which is accessible, is calculated to be 36 per cent for 2008.

- TfL's LTDS survey illustrates the importance of accessibility considerations to London's population. Almost 1 in 3 people aged 60 or above consider themselves to have a travel-related disability or other impairment which affects their use of the transport system.

Transport affordability

- The average adult composite bus and Underground fare paid rose from 18.8 pence per kilometre in 2008 to 19.6 pence per kilometre in 2009 – an increase of 4.6 per cent.
- Real bus fares in London have decreased in recent years and in 2008/09 were 23 per cent below real fare levels in 1999/2000. In comparison bus fares nationally have been increasing consistently in the same time period.
- Underground fares have been relatively stable over the same period and in 2008/09 were just below 1999/2000 levels in real terms.
- Motoring costs have been declining across the UK and in 2008/09 were 16 per cent lower in real terms than in 1999/2000.
- When taking London earnings into account, bus fares relative to earnings are 60 per cent lower compared to 1971, while Underground fares are about a third lower than they were in 1971.
- Analysis of LTDS data shows that people with different income levels have different travel behaviour both in terms of the number of trips they make and the modes that they choose. Those with higher incomes tend to travel more. Bus use is greater amongst those with lower incomes while those with higher incomes tend to use the Underground and drive more.

8.2 Access to opportunities and services

Accessibility has been the focus of cross-Government initiatives to improve access to the services with the greatest impact on quality of life. The DfT has developed core accessibility indicators for the whole of England, which look at the levels of access to key services. These indicators are adopted and reported by local authorities outside London as part of their Local Transport Plan process. Apart from using existing indicators local authorities are encouraged to develop their own indicators better to reflect local priorities. In London the local authorities (boroughs) are not obliged to report on accessibility, as TfL is accountable for ensuring good quality access.

TfL's main accessibility measure for London has been PTALs, which measure access to the public transport network for any location in London by combining walk time to the network with service wait time at stops or stations within a specified catchment area. PTALs, although very informative, do not take into account where public transport goes or what services people can access, and do not represent modes other than public transport. A new measure, which measures access to opportunities and services (ATOS), was therefore developed by TfL to address these issues, and to build on the DfT initiatives.

In a dense urban environment accessibility in terms of travel time is not always the main issue, as services tend to be located in close proximity to where the population lives. For example, in large parts of London GP surgeries and primary schools are readily accessible by walking. Issues such as capacity, for example, where a school is already full, quality of service and service specialisation are often the most important issues. To account for these factors ATOS calculates average travel time to the three nearest educational establishments of each type (primary, secondary and further education) and three nearest doctors' surgeries thereby including a degree of choice within the methodology.

MTS strategic outcome indicator: Access to opportunities and services (ATOS)

Why this indicator is important

Access to opportunities and services (ATOS) is a new indicator developed to assist in assessing the level of accessibility to key services which have the greatest impact on life. Access to employment, education, health services, quality food shopping and open spaces by public transport or walking are included in the indicator, which takes into account London's dense urban environment. The indicator provides a useful tool for identifying the most effective location for new facilities as well as planning public transport services.

How this indicator is calculated

ATOS is calculated from the following components:

- access to employment: average journey time to the nearest 10,000 low qualified and high qualified jobs
- access to education: average journey time to the nearest three primary schools, secondary schools and further education colleges
- access to health services: average journey time to the nearest three GP or doctors' surgeries
- access to quality food shopping: journey time to the nearest town centre or supermarket
- access to open spaces: walking time to the nearest publicly accessible open space.

Journey times are derived from TfL's CAPITAL model, except employment for which the journey time matrix from the LTS transportation model is used. Results are calculated for the centroid (population weighted) of each Census Super Output Area or LTS model zone, respectively. For the MTS strategic outcome indicator the average travel time for accessing all five types of service is calculated as the simple average across London of the service-specific mean travel times. This indicator will be updated on a 3 to 5 year cycle.

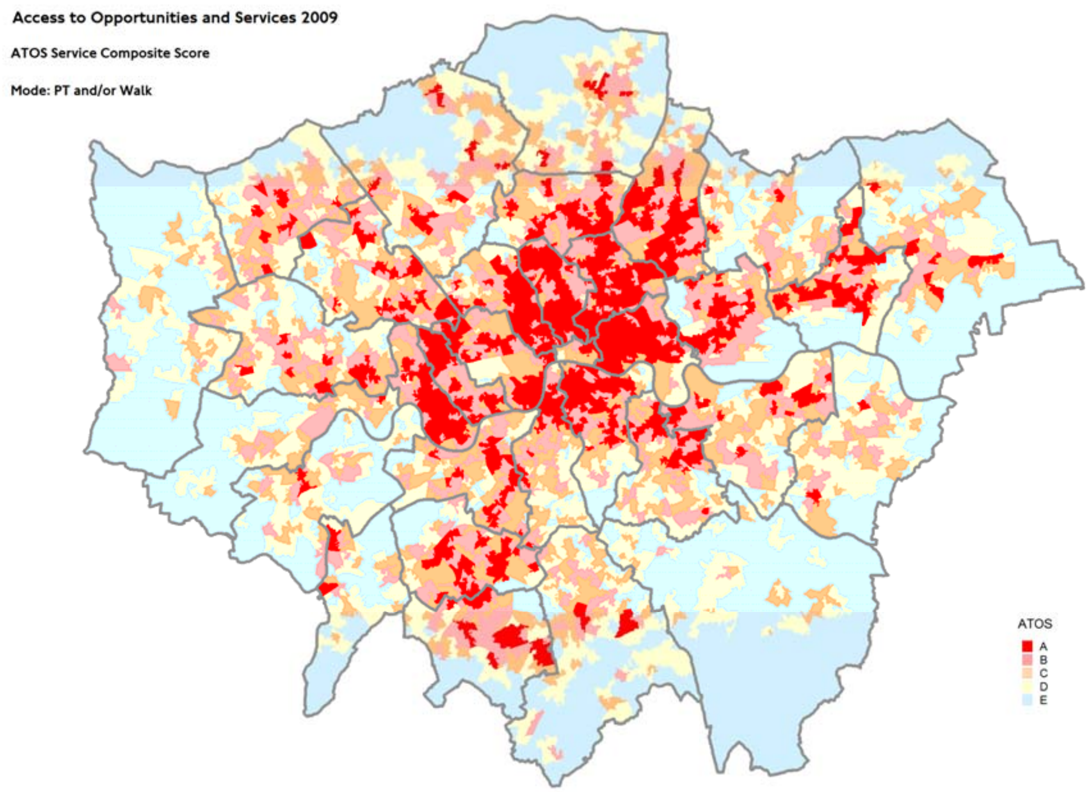
Values for 2008 calendar year

Average travel time (min) for each destination type by public transport or walking in 2008 was:

Employment (nearest 10,000 white collar jobs)	24.7
Employment (nearest 10,000 blue collar jobs)	30.1
Primary schools	9.2
Secondary schools	13.4
FE colleges	31.4
GP surgeries	9.9
Food shopping	10.5
Open space	9.7

The average travel time in 2008 for accessing employment and services by public transport or walking was 17.4 minutes.

Figure 8.1 Access to opportunities and services, public transport and/or walking – composite score, 2009.



Source: TfL Planning

Figure 8.1 shows the composite ATOS score for all areas in London. A composite ATOS level for each area is calculated by ranking areas according to journey times to each service, adding the service specific ranks to generate an overall rank score and finally splitting the total ranks for all areas into five equal groups, A (the 20 per cent highest) to E (the 20 per cent lowest). Services are given equal weighting in this calculation.

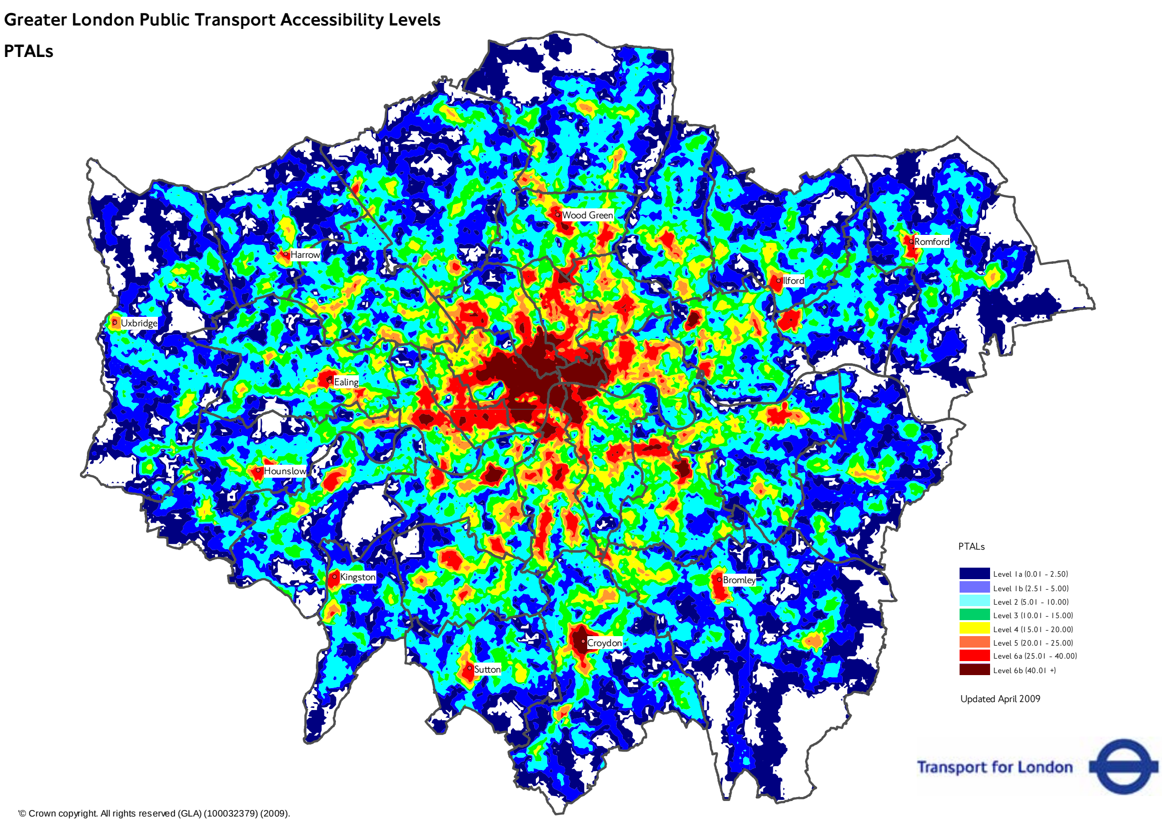
Central and Inner London have the highest level of access to employment and services, which reflects both the high level of public transport provision but also the concentration of services in these areas. Town centres across London also have similarly high levels of access. However, Outer London does have large areas with a relatively low ATOS score. Note that this measure of accessibility does not take into account population density, which in Outer London is significantly lower compared with Central and Inner London.

ATOS has also been adopted as the suitable measure for the National Indicator 175 (access to services and facilities by public transport, walking and cycling) for Greater London – to be reported annually to the DfT. Values are expressed as the percentage of zones with ATOS scores A or B by London borough for each service type.

Access to public transport is measured using PTAL scores. Figure 8.2 shows the levels of public transport accessibility across London. Band 1 (1a and 1b) represents a low level of accessibility, and band 6 (6a and 6b) a high level, while a value of 0 indicates where there is no access to public transport within the specified parameters. As expected, Central and Inner London have higher levels of access to the public transport network. The influence of major radial public transport routes into Central London is also evident from the map.

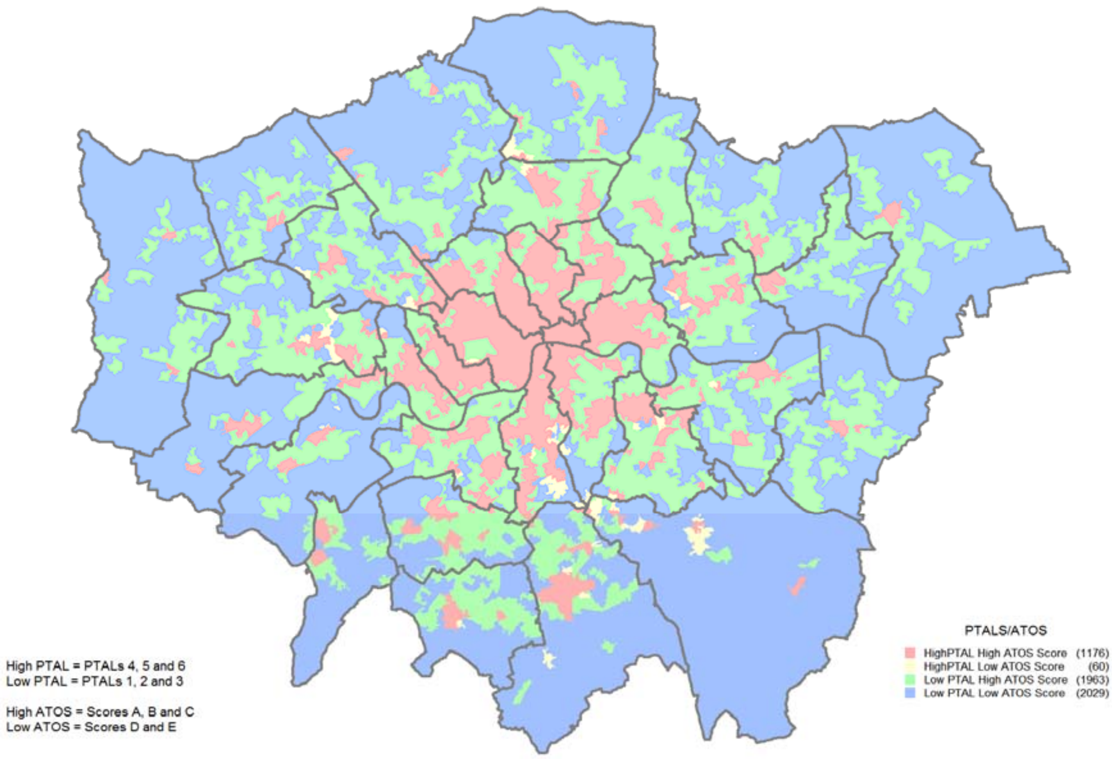
Using ATOS in combination with PTALs provides a fuller picture of the level of accessibility across different areas in London, as demonstrated by Figure 8.3, where high and low ATOS and PTAL scores have been combined together. There is undoubtedly a strong correlation between access to services and access to public transport. As would be expected, Inner London enjoys high PTAL and high ATOS scores, whereas Outer London generally has low PTAL and low ATOS scores. However, poor access to public transport does not necessarily mean poor access to services. Thirty-seven per cent of London has high ATOS scores (A or B) and low PTALs (1, 2 or 3). These are typically inner suburban areas where population density and service provision is relatively high. In such areas accessibility by public transport may be relatively poor, but many essential services are more easily accessible by walking (or cycling).

Figure 8.2 Public transport accessibility – Greater London overview, 2008.



Source: TfL Planning

Figure 8.3 Public transport accessibility combined with access to opportunities and services by public transport and/or walking, 2009.



Source: TfL Planning

8.3 Accessibility to the transport system

It is important to have a transport system which is accessible to all members of the community. Efforts continue to be made to update the transport system in London to achieve that. All buses in London are fully accessible (with the exception of a small number of 'heritage' Routemasters). Almost 50 per cent of bus stops in London meet TfL Accessible Bus Stop Design guidance, with accessible footways. About 20 per cent of LU stations and a third of National Rail stations are accessible from street to platform, and DLR and Tramlink services are fully accessible from street to carriage. Clearly, there is more which needs to be done, and TfL has a programme for improving bus stops as well as stations across the Capital to provide step-free access from street to platform

Figure 8.4 shows the locations of stations with step-free access on the Underground and DLR network. Currently only 10 Underground stations in London provide step free access from platform to train at all platforms. There are, however, more stations where there is step-free access at some of the platforms. Stations with a coloured circle have step-free access, with the colour representing the step between the platform and the train; green represents a step of 0-50mm, amber represents a step of 51-120mm, and red represents a step of 121-323mm. The horizontal gap between the train and the platform is represented by letters; A denotes a gap of 0-85mm, B a gap of 86-180mm, and C a gap of 181-253mm. Also highlighted are step-free interchanges; for example, at Green Park it is possible to interchange between the Piccadilly and Jubilee lines, but not between the Victoria line and other lines.

MTS strategic outcome indicator: Physical accessibility to the transport system

Why this indicator is important

Transport is key in enabling all within the community to benefit from the opportunities and services that a world city such as London has to offer. The Mayor is committed to expanding opportunities for all Londoners, including where appropriate the needs of particular groups, in order to address issues of inequality across the Capital. To that end, TfL is committed to providing as easy and accessible travel for as many members of the community as possible.

How this indicator is calculated

A composite physical accessibility indicator has been developed, which is defined to include a range of measurable characteristics of various modes of travel. The composite physical accessibility indicator is calculated from the following components:

- percentage of accessible bus stops
- percentage of accessible crossings
- measure of footway accessibility (not currently available)
- percentage of London Underground stations step-free from street to platform
- percentage of London Underground stations step-free from platform to train
- percentage of DLR step-free stations (street to platform)
- percentage of Tramlink step-free stops (street to platform)
- percentage of London Overground step-free stations (street to platform)
- percentage of National Rail step-free stations (street to platform)

These are weighted according to journey stage-based mode shares for the relevant modes (taking the actual shares derived from Table 2.3 as the appropriate target shares to be achieved by people with mobility impairment).

Values for 2008 calendar year

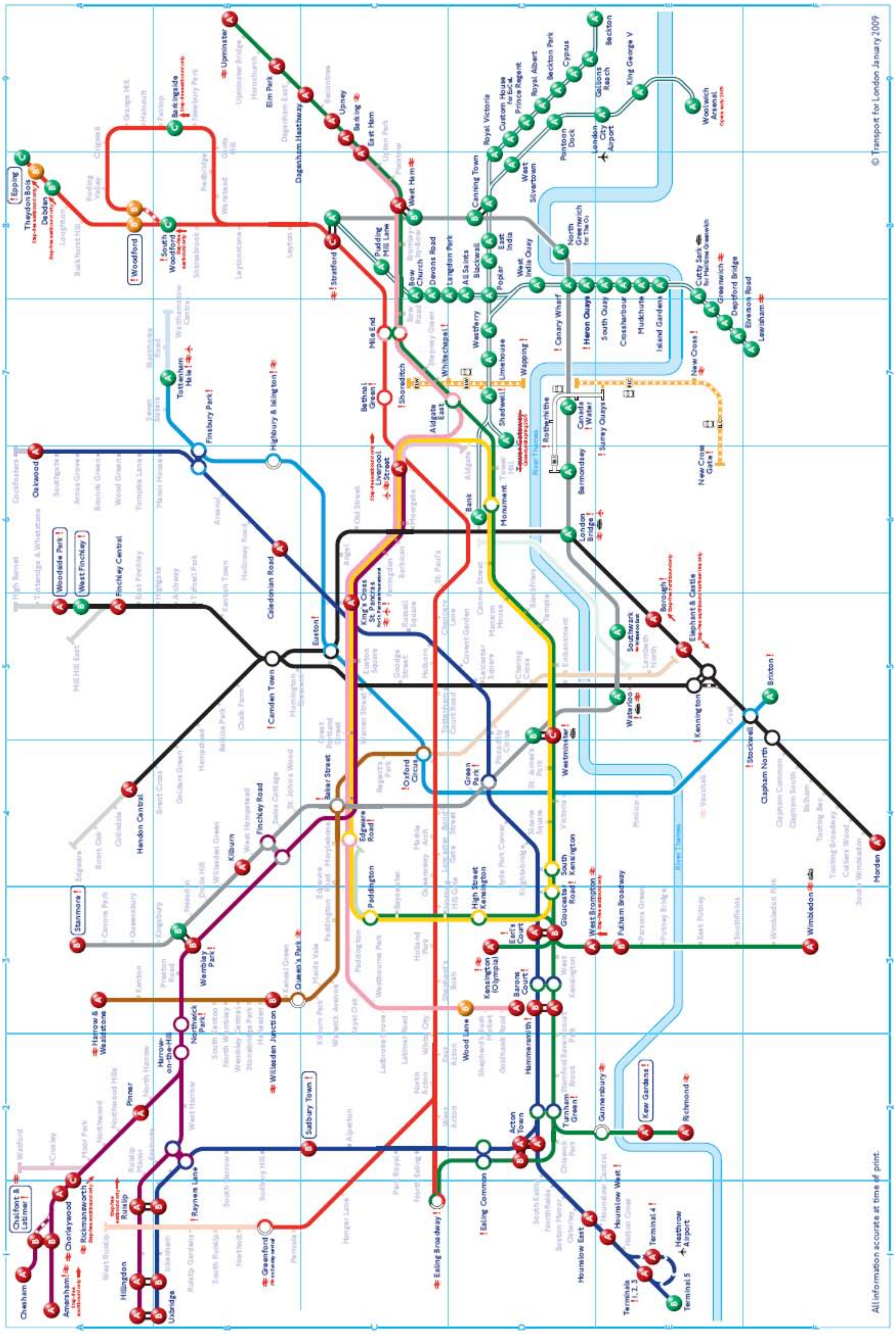
Although baseline data are not currently available for all of the components of this indicator, an indicative baseline has been calculated using the available components. This will be revised as more data become available.

The values for 2008 of the components of the indicator are as follows:

Accessible bus stops	46 per cent
Accessible crossings	35 per cent
LU stations step-free from street to platform	21 per cent
LU stations step-free from platform to train	3.7 per cent
DLR step-free stations (street to platform)	100 per cent
Tramlink step-free (street to platform)	100 per cent
Overground step-free stations (street to platform)	35 per cent
National Rail step-free stations (street to platform)	34 per cent

With the application of modal weights, these give a composite physical accessibility score of 36 per cent across London’s transport network.

Figure 8.4 London Underground map showing stations with step-free access, 2009.



Door-to-door services

There are schemes operating in London which offer a door-to-door service more suitable for people not readily able to use the Capital's public transport system; Dial-a-Ride, operated by TfL, and the Taxicard scheme, administered by the London Councils Transport and Environment Committee. This section looks at trends in relation to the operation and use of these.

TfL operates Dial-a-Ride, a door-to-door service for disabled people who cannot use buses, trains or the Underground. The service is free to registered users. Table 8.1 shows the key trends in the use of Dial-a-Ride. During 2008/09 there was a small increase in the number of journeys made using Dial-a-Ride services compared to the previous year. During the same time there was a small decline in the number of registered passengers, bringing them to 50,000.

Table 8.1 Dial-a-Ride key trends.

Year	Number of journeys (thousands)	Number of buses	Registered passengers (thousands)	Average cost per passenger journey (2008/09 prices) (£)	Total grant (2008/09 prices) (£m)
1990/91	676	160	77	18.52	13.6
1991/92	745	175	82	18.48	15.7
1992/93	750	177	39	20.47	16.0
1993/94	746	193	51	21.20	17.9
1994/95	835	215	61	18.43	18.9
1995/96	961	242	66	15.42	16.2
1996/97	993	244	80	14.37	15.8
1997/98	1,084	245	93	13.40	15.3
1998/99	1,142	262	107	13.17	15.5
1999/00	1,178	287	71	13.14	16.5
2000/01	1,222	292	73	12.76	16.1
2001/02	1,260	302	86	14.21	17.9
2002/03	1,269	317	96	15.08	19.2
2003/04	1,325	316	61	15.70	19.6
2004/05	1,261	316	66	19.43	23.5
2005/06	1,232	336	71	21.28	25.4
2006/07	1,173	342	72	25.11	28.6
2007/08	1,127	355	52	26.66	29.4
2008/09	1,172	352	50	26.14	30.8

Source: Transport for London, Dial-a-Ride

1. Re-registration exercises took place in 1992/93, 1999/2000 and 2003/04. From 2007/08 only passengers active in previous 3 years are included as registered passengers.
2. From 2003/04, cost per passenger journey includes fares paid by passengers. The Dial-a-Ride service became free to users from January 2008.
3. Additional costs in 2005/06 through until end 2008 due to delays and difficulties with the implementation of a new booking system and central call centre.

Taxicard is a door-to-door transport service for Londoners with serious mobility impairments for whom public transport is not usually accessible. It provides subsidised trips in licensed London taxis. Table 8.2 shows key trends in relation to the Taxicard scheme. There has been a sustained increase in the number of members and journeys since 2001/02. At the same time the cost to the individual and to London boroughs and TfL who fund the scheme has declined.

Table 8.2 Taxicard - key trends.

Year[1]	Number of journeys (thousands)	Number of members (thousands)	Average cost per vehicle trip at 2008/09 prices (£)[2]	User contribution at 2008/09 prices (£)[3]	Total joint-funding (TfL and boroughs) at 2008/09 prices (£m)[2]
1990/91	756	35	13.84	-	-
1991/92	760	37	13.36	-	-
1992/93	765	45	13.49	-	-
1993/94	702	40	10.90	-	-
1994/95	741	45	11.50	-	-
1995/96	751	44	10.99	-	-
1996/97	553	36	12.21	-	-
1997/98	500	43	12.59	-	-
1998/99	533	45	12.23	-	-
1999/00	501	44	12.58	-	-
2000/01	478	41	13.06	-	-
2001/02	523	39	13.63	5.21	10.99
2002/03	653	44	13.72	4.61	12.58
2003/04	791	50	14.10	4.32	13.07
2004/05	948	63	13.07	2.90	13.93
2005/06	1,118	74	15.27	2.67	14.35
2006/07	1,275	77	14.69	2.44	16.41
2007/08	1,436	80	13.52	2.33	17.61
2008/09	1,638	83	10.23	2.25	12.90
Percentage change					
1 year	14%	4%	-24%	-3%	-27%
10 years	207%	83%	-16%	-	-

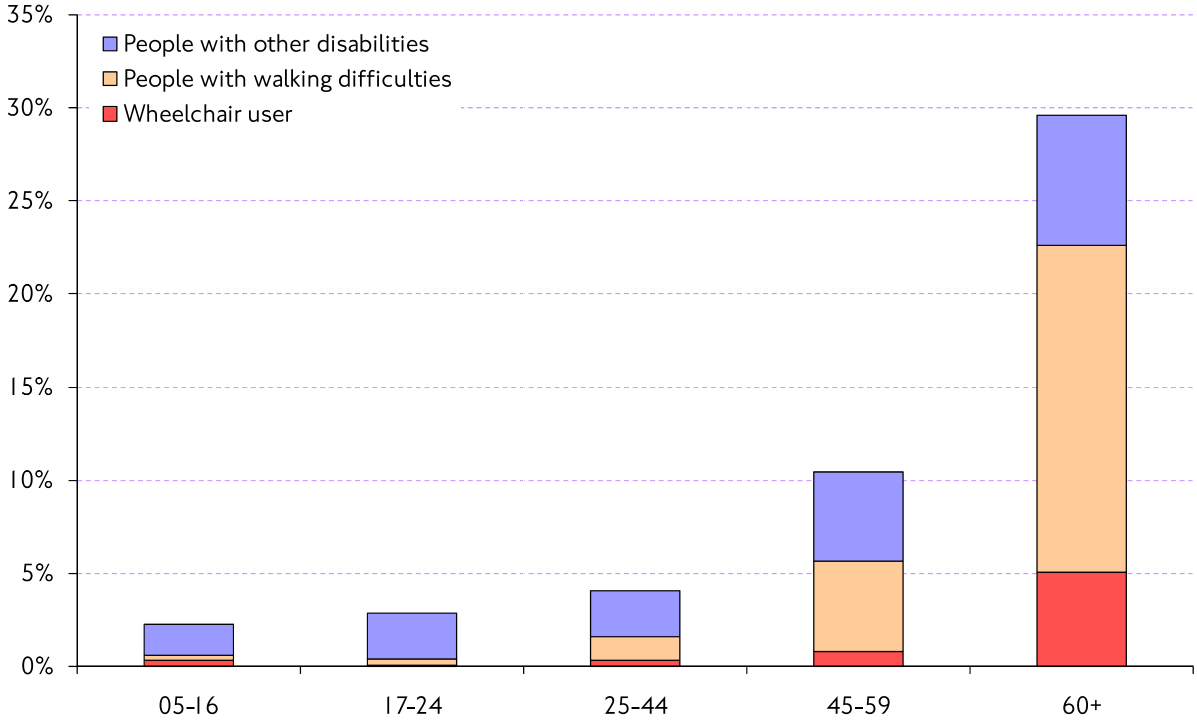
Source: TfL Taxicard Survey

1. Up to 2003/04 excludes Barnet, Greenwich, Redbridge and Westminster, which operated their own Taxicard scheme. From 2004/05, only Westminster is excluded.
2. The average cost per trip comprises the total metered fare, plus an administration fee, before the user's contribution is deducted.
3. The user contribution comprises the user's minimum fare, plus any amount on the meter that is in excess of the borough's subsidy. Data available since TfL funding began in 2001.

Londoners with travel-related disability

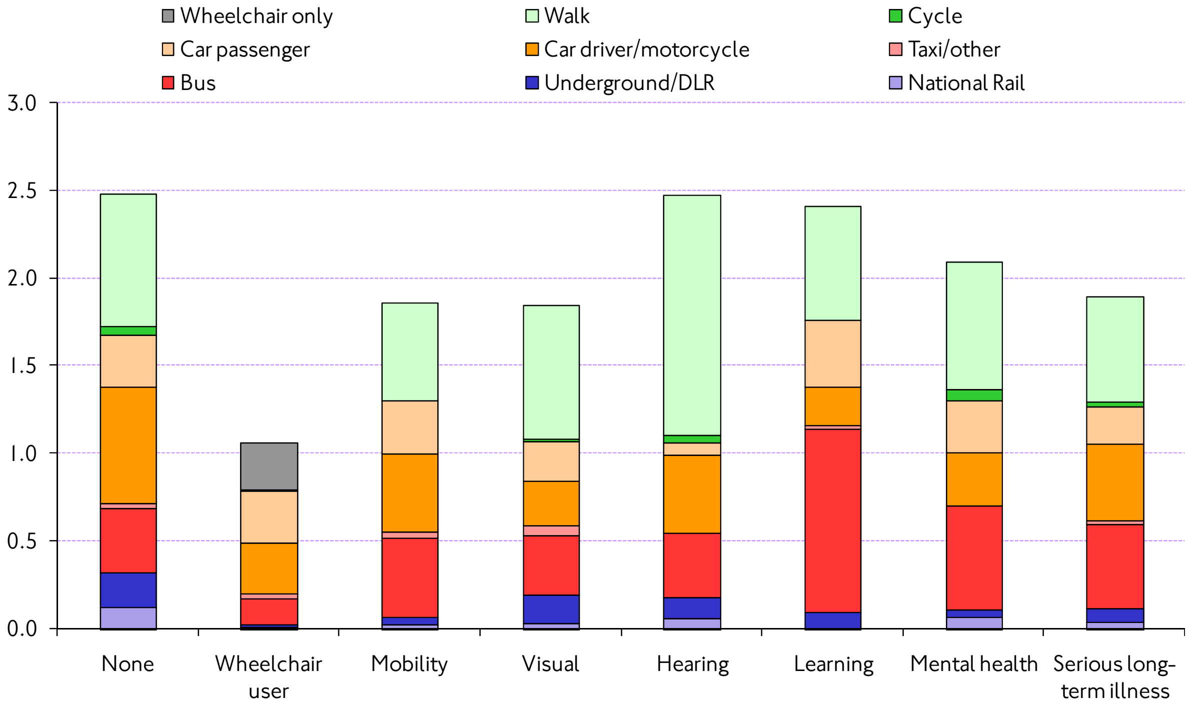
Figure 8.5 shows the percentage of people with a travel-related disability by age group in the LTDS survey (see also chapter 3 of this report). There is often a relationship between disability and age, particularly with regards to walking difficulties. The percentage of people with a travel related disability rises to almost 30 per cent in the over sixty age group. Figure 8.6 shows trip rates by mode and type of impairment. Notably the overall level of travel activity is relatively low for some groups, and in particular wheelchair users make under half of the number of trips that people without impairments make. The use of different modes varies among different groups, with people with hearing impairments making more walk trips, while people with learning disabilities make more use of buses. There is a tendency among people with impairments to use buses as opposed to Underground or rail, most likely reflecting the fact that the bus network is more accessible than Underground and rail services.

Figure 8.5 Percentage of people with a travel-related disability, LTDS 2008/09.



Source: TfL Planning, LTDS

Figure 8.6 Trip rates by mode and type of impairment - 2008/09.



Source: TfL Planning, LTDS

8.4 Transport affordability

Fares on public transport in London are set by the Mayor. Fares policy involves striking a balance between the fare levels charged for public transport to permit operation of and enhancement to services, while maintaining affordability to the maximum possible extent.

The real fares MTS SOI is based on actual ticket sales, fares revenue and passenger journeys. It is simply calculated as total actual fares revenue, adjusted to reference year prices, divided by total journeys or passenger kilometres.

It should be noted, however, that there has been a growth in the scale of discount and free travel schemes in recent years, particularly on buses. This means that the SOI, the overall average real fare including discounted and free travel, will not exactly reflect the level of full adult fares. Full adult fares, which are paid by the largest proportion of fare payers, are calculated by excluding discounted fares and those with free travel.

MTS strategic outcome indicator: Real fares levels

Why this indicator is important

The real fares level measures the actual average fare paid per kilometres travelled. It is an important measure of the affordability of travel on public transport in London, given that fares policy also needs to generate sufficient revenues to operate, maintain and enhance transport services across the Capital.

How this indicator is calculated

Real fares level is the composite average adult fare for a kilometre travelled by bus or Underground. It is calculated as total actual adult fares revenue (bus and Underground) adjusted for inflation and divided by total bus and Underground passenger kilometres.

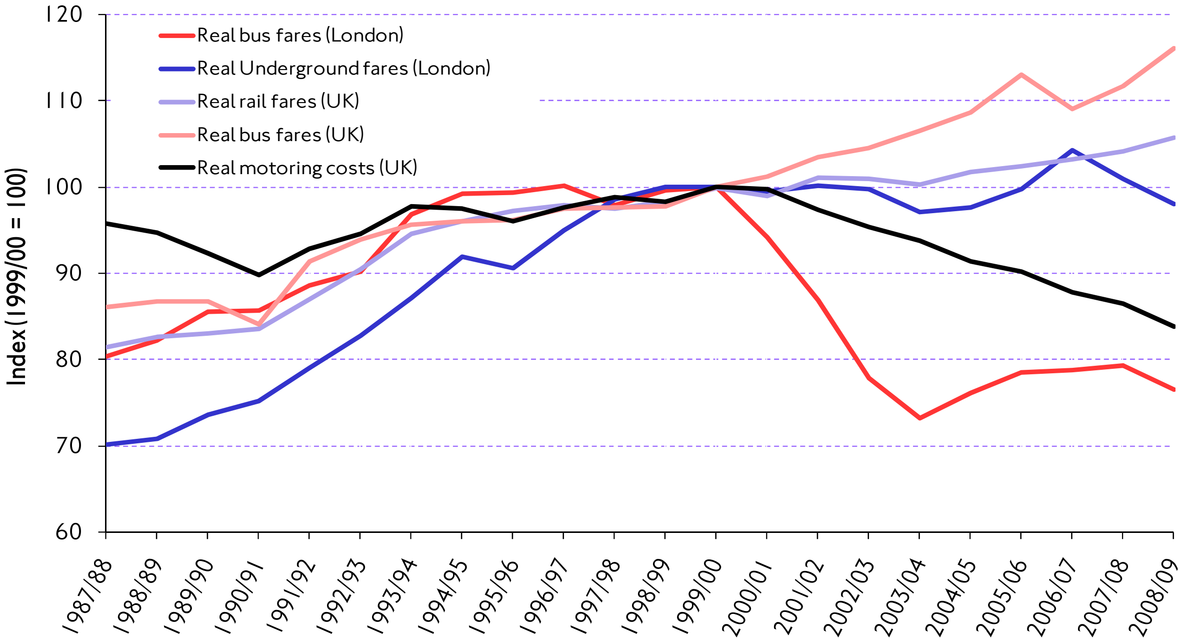
Value for 2009 calendar year and comparison with 2008

The actual average adult composite bus and Underground fare rose from 18.8 pence per kilometre in 2008 to 19.6 pence per kilometre in 2009, representing a real increase of 4.6 per cent.

The trends in fare prices by mode are explored in more detailed below and are compared with trends across the UK and with motoring costs. Note that all data presented here are up to the 2008/09 financial year and do not take into account more recent changes in public transport fares in London.

Figure 8.7 shows indexed real public transport fares in London (deflated by the Retail Prices Index) along with national public transport fares and motoring costs for comparison. Contrary to the national trend, bus fares in London have reduced since 1999/2000, and although they have increased somewhat in more recent years they are still 23 per cent lower than in 1999/2000. Underground fares have been relatively stable over the same period, and are currently just below 1999/2000 fares. Motoring costs, on the other hand, have shown a constant rate of decline, and are currently 16 per cent lower compared to 1999/2000.

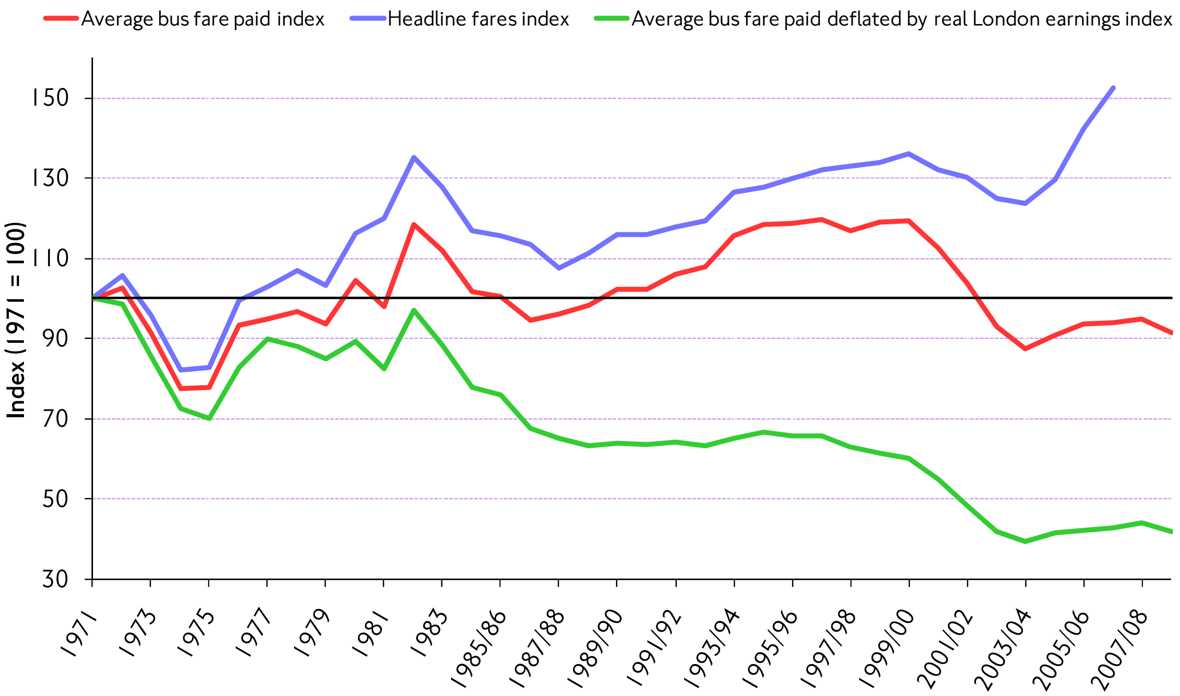
Figure 8.7 Public transport fares.



Source: TfL Fares and Ticketing

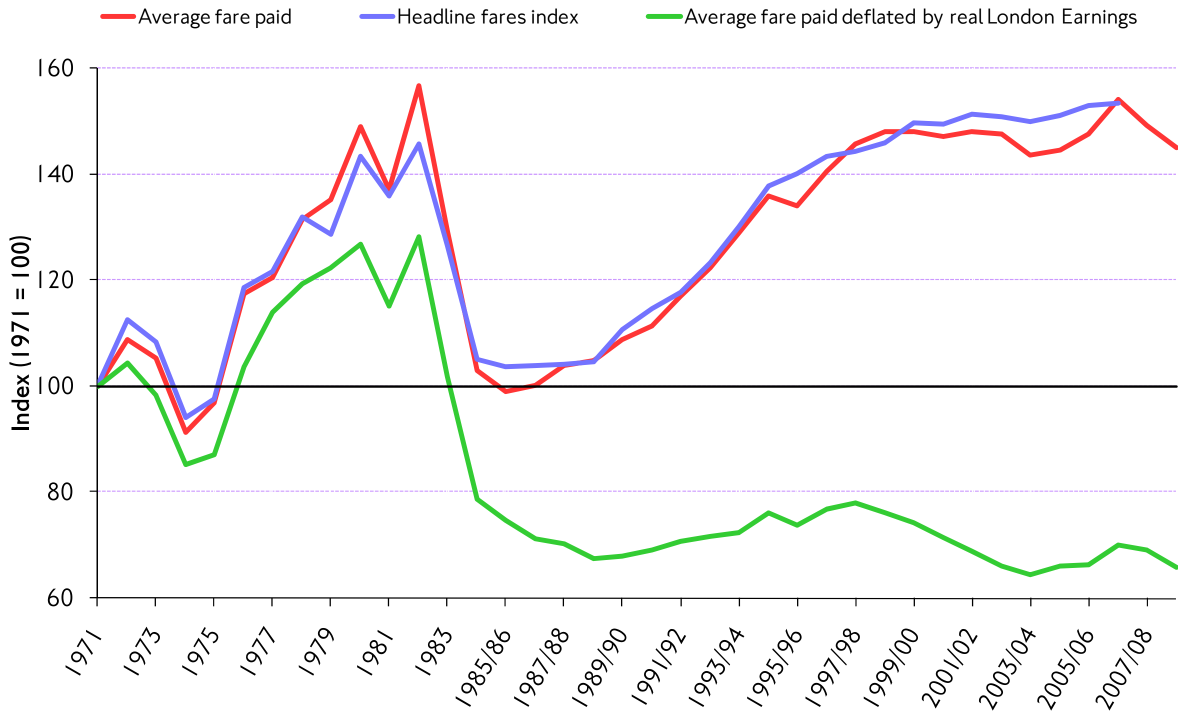
Figures 8.8 and 8.9 show trends in bus and Underground fares respectively. The average bus fare is lower than it was in 1971 by 9 per cent, and when taking the increase in earnings into account the decline is almost 60 per cent. The average Underground fare, on the other hand, has increased by 45 per cent compared to 1971 prices, but when taking into account London earnings fares are about a third lower than in 1971.

Figure 8.8 Bus fare trends.



Source: TfL Fares and Ticketing

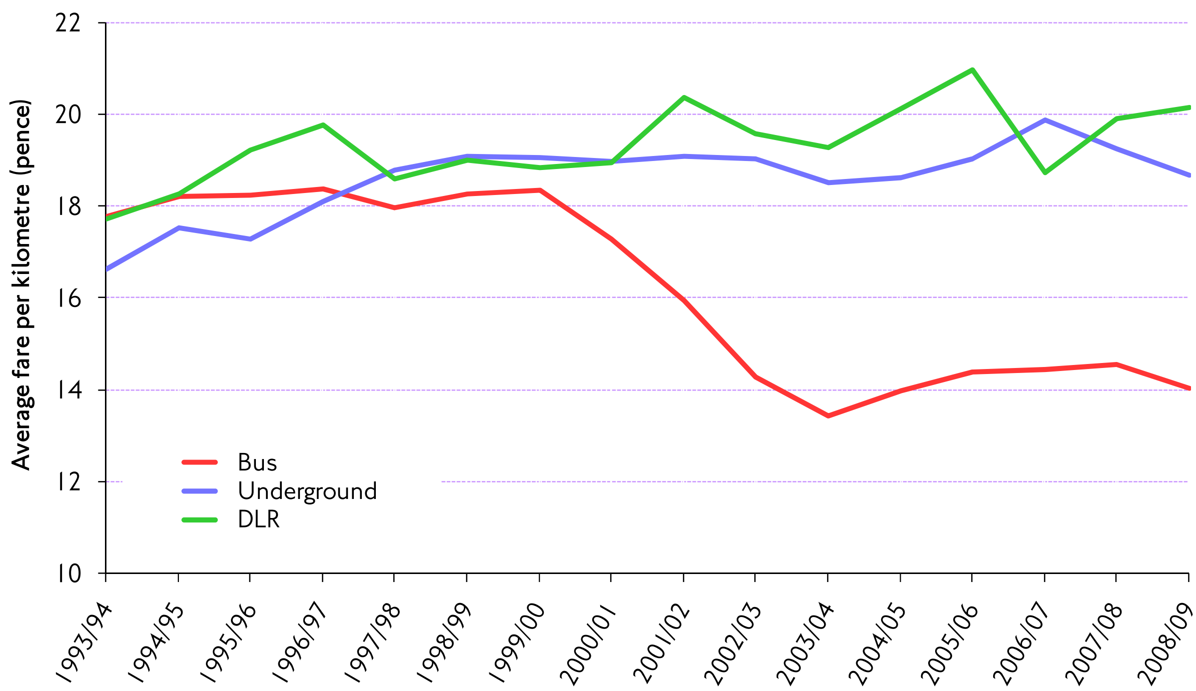
Figure 8.9 LU fare trends.



Source: TfL Fares and Ticketing

Figure 8.10 shows the trend of the average fare per kilometre for the three main public transport modes in London. While fares on the Underground and DLR have been relatively stable over the past 15 years bus fares declined substantially between 1999/2000 and 2003/04, and have remained stable since.

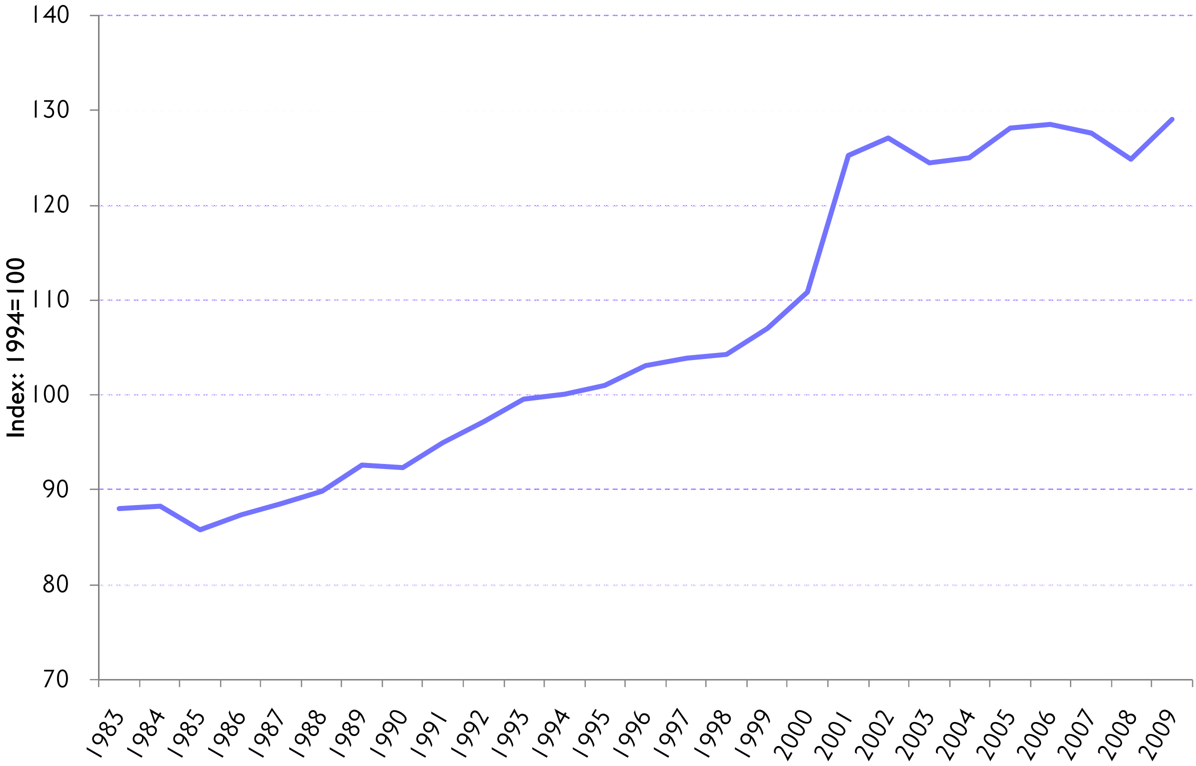
Figure 8.10 Average fare per kilometre by mode.



Source: TfL Fares and Ticketing

Taxi fares are regulated by TfL. Figure 8.11 shows the index of real taxi fares for London taxis since 1983. Fares increased continuously from the mid-1980s until 2002, before broadly levelling off with some year to year variation. In the period between 2000 and 2009, taxi fares increased by 16 per cent in real terms, most of the increase being between 2000 and 2001.

Figure 8.11 Taxi real fares index.



Source: TfL Fares and Ticketing

Expenditure on transport

Table 8.3 shows how much Londoners spend on transport, and compares that with the equivalent figures for the UK as a whole. The data, which come from the Living Costs and Food Survey, have been rebased to 2008 prices using the Retail Price Index. There is an indication of total transport expenditure declining in London, both in absolute terms and as a percentage of the total household expenditure. This is in contrast to a more stable level of expenditure when considering UK as a whole. This is primarily due to the falling trend in spending on motoring in London. The average expenditure on public transport differs substantially between London and the UK as a whole with households in London spending on average almost six times as much on fares as the average UK household – reflecting the higher provision and mode share of public transport in the Capital.

Table 8.3 Expenditure per London household per week on travel and transport.

Type of expenditure	London (pounds, 2008 prices)			United Kingdom (pounds, 2008 prices)		
	2006	2007	2008	2006	2007	2008
Motoring and cycling						
Purchase and repairs[1]	31.80	25.70	22.40	31.80	30.10	27.40
Spares and accessories[1]	1.30	1.90	1.30	2.20	2.00	2.40
Motor vehicle insurance and taxation	11.00	9.60	10.80	11.50	10.50	10.70
Petrol, diesel and other motor oils	15.00	15.00	15.80	19.80	19.00	21.00
Other motoring costs	2.40	2.00	1.90	2.60	2.50	2.10
Total motoring and cycling	**61.50**	**54.20**	**52.20**	**67.90**	**64.10**	**63.60**
Fares and other travel costs						
Rail and Underground fares	4.00	4.50	4.30	2.40	2.60	2.40
Bus and coach fares	2.20	1.10	1.10	1.40	1.20	1.40
Combined fares[2]	7.30	7.90	7.00	1.10	1.40	1.20
Other travel costs[3]	10.00	6.80	7.80	6.00	5.30	5.40
Total fares and other travel costs	**23.50**	**20.30**	**20.20**	**10.90**	**10.50**	**10.40**
Totals						
Transport expenditure per household	**85.00**	**74.50**	**72.40**	**78.80**	**74.60**	**74.00**
Total expenditure per household	**583.30**	**551.30**	**575.60**	**494.30**	**477.60**	**471.00**

Source: Living Costs and Food Survey, National Statistics © Crown Copyright 2010 Published with the permission of the Controller of Her Majesty's Stationery Office (HMSO)

1. Includes cars, vans, motorcycles, cycles and other vehicles.

2. Includes Travelcards to be used on Underground, rail and bus.

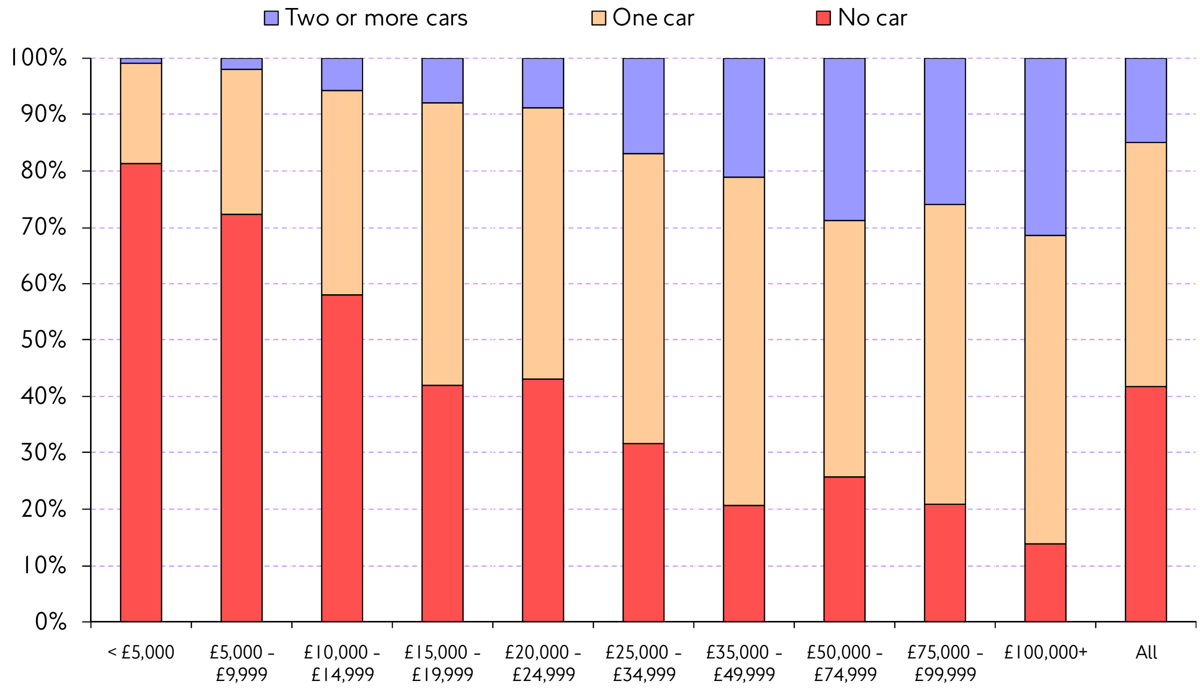
3. Includes air fares, school travel, taxis, hire cars and ferry travel.

Londoners' travel characteristics by household income level

LTDS collects data on gross annual household income, and although that information is not as detailed as the transport elements of the survey, it provides another dimension of interest against which people's travel patterns can be analysed.

Figure 8.12 shows car ownership levels by the LTDS household income bands. It is evident that as household income increases so does the number of cars owned. Interestingly, however, there is a significant proportion of households without access to a car in all income bands in London.

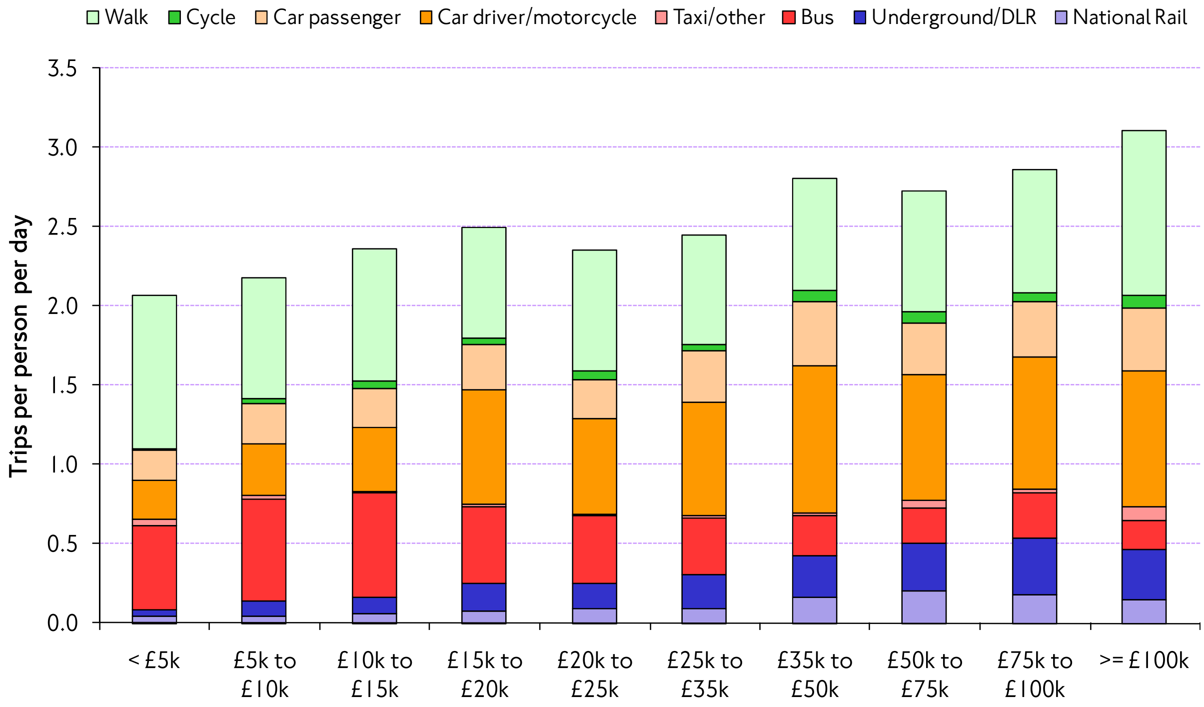
Figure 8.12 Car ownership by household income, 2008/09.



Source: TfL Planning, LTDS 2008/09

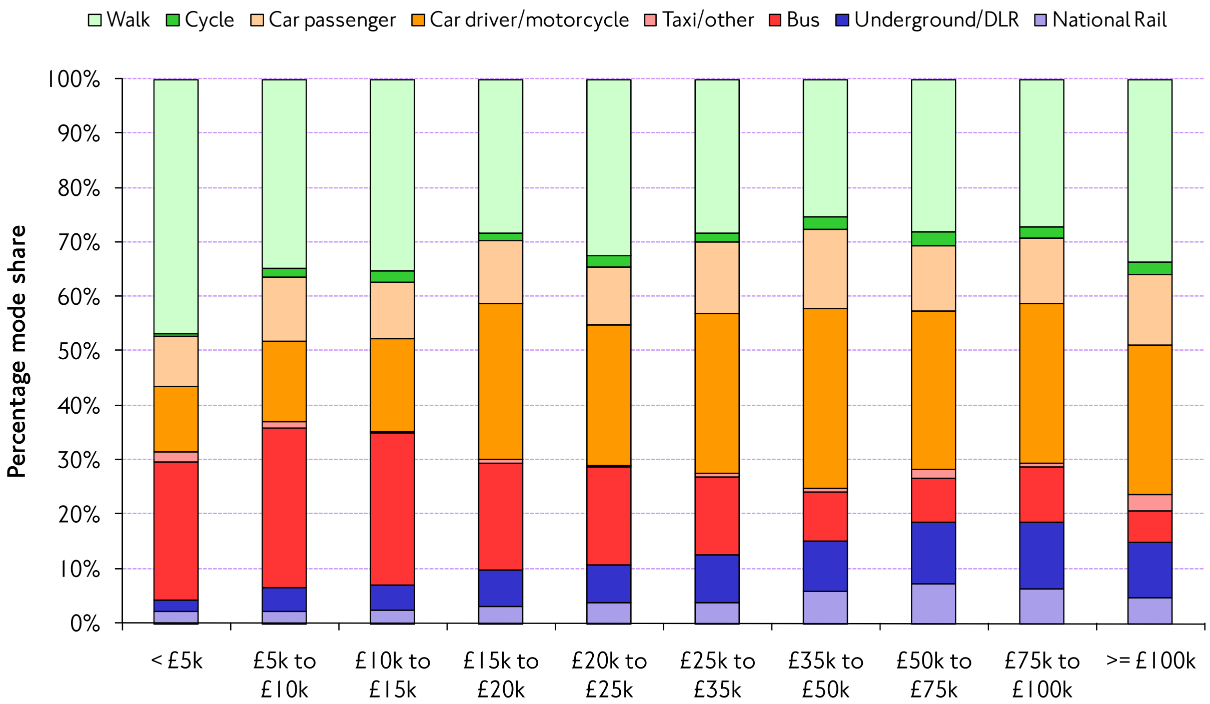
Figure 8.13 shows trip rates per person by main mode and gross annual household income. There is a tendency for people in households with higher incomes to make more trips and use slightly different modes compared to people in households with lower incomes. Car use is more common among people in the higher income groups, which reflects the level of car availability shown in Figure 8.12, while bus is used more by people in the lower income groups. This is clearly shown by Figure 8.14, which shows mode share by household income band.

Figure 8.13 Trip rates per person by main mode and gross annual household income, 2008/09.



Source: TfL Planning, LTDS 2008/09

Figure 8.14 Mode share by household income, 2008/09.



Source: TfL Planning, LTDS 2008/09

9. Transport and quality of life

9.1 Introduction

Transport has a wide-ranging impact on the quality of life of London residents, visitors and workers. The ability to travel opens up opportunities for work, education, shopping and leisure activities and, on occasion, the journey can be a pleasure in itself: perhaps cycling through one of London's parks, or riding a double-decker bus past city landmarks. A high quality streetscape, well-designed and carefully maintained, alongside protection and support for the natural environment, draws people to it, helping to connect communities. Walking and cycling can provide much-needed exercise and bring real health benefits. Improving the journey experience for those travelling on public transport, by bike and on foot can encourage the use of more sustainable modes, bringing a wealth of quality of life benefits to the individual and to London as a whole.

Conversely, increased mobility also brings with it significant negative impacts to the quality of life in London. Safety hazards, noise, poor air quality, and a sedentary lifestyle encouraged by easy access to the car all damage health and wellbeing. Wasted time, stress and frustration caused by poor quality travel experiences also damage quality of life in the Capital. Bad transport planning can marginalise or sever communities, create eyesores or harm the urban landscape. It can also pollute, damage or destroy delicate eco-systems.

9.2 Summary of content and key features and trends

Aspects of transport services themselves, or their impacts, are described throughout this report: most or all have an impact on quality of life. In particular, safety and security; walking and cycling; and greenhouse gas emissions are all covered elsewhere in this report.

This section presents data on particular aspects of quality of life not covered elsewhere, specifically local air quality, customer satisfaction with key public transport services; satisfaction with the operation of the road network; perceptions of journey experience; perceptions of the urban realm; and noise levels and the perception of noise.

Local air quality

The Mayor published his draft Air Quality Strategy (MAQS) for consultation with the London Assembly and Functional Bodies in October 2009. This outlines a range of policies and proposals to help London comply with health-based EU Limit Values for two key pollutants – Nitrogen Dioxide (NO_2) and fine particles (PM_{10}). Despite considerable reductions to emissions in recent years from transport-related sources in London, achievement of Limit Values, expressed in terms of concentrations in the air, remains a challenge.

NO_2 is a gas that has adverse impacts on human health. It is part of a group of gases collectively known as Oxides of Nitrogen (NO_x), which includes both NO_2 and Nitric Oxide (NO). The atmospheric chemistry of NO_x is relatively complex and although emissions are quantified in terms of NO_x, which largely comprises NO, concentrations are assessed for Limit Value compliance purposes in terms of NO_2. Once emitted, a proportion of NO is converted to NO_2 in the atmosphere, and the speed at which this reaction can take place is affected by climate and the presence of other gases necessary for the reaction.

Consequently, it is necessary to consider emissions and concentrations of NO_x in any treatment of NO_2.

The second pollutant of concern in London – fine particles or PM_{10} – is not a gas, but refers to small particles with an aerodynamic diameter of less than 10 microns (millionths of a metre). Like NO_2, PM_{10} also has recognised adverse health impacts. Fine particles are of varied chemical composition, and originate from three main sources: directly from human activity; from long-range transport in the atmosphere from other parts of the country and more widely, and through secondary formation by chemical reaction in the atmosphere. Emissions from activity in London contribute a relatively small proportion to total PM_{10} in the air in London. Across London a whole, it is estimated that only around 15 per cent of PM_{10} in the air originates from local sources – meaning that measures to reduce emissions can only have a proportionately smaller impact on actual concentrations.

NO_2 in London – emissions and local air quality

- Emissions of NO_x from transport in London have fallen substantially in recent years. Emissions of NO_x from ground-based transport in London (excluding ground-based aviation) in 2008 were 28,150 tonnes.
- This was down 18 per cent compared to 2006, on a comparable basis, and was 30 per cent lower than 2004.
- In 2008 ground-based transport (excluding ground-based aviation) accounted for 54 per cent of the total NO_x emission. Road traffic accounted for 86 per cent of the ground-based transport contribution, and 47 per cent of the total NO_x emission in London.
- Total NO_x emissions in Greater London in 2008 were 52,130 tonnes. On a comparable basis this was 34 per cent lower than 2006, and 47 per cent lower than 2004.
- Geographical analysis shows that highest emissions of NO_x occur where the urban density of London is highest – with the contribution from major roads also visible.
- Emissions of NO_x are a primary determinant of local NO_2 concentrations, which is the basis for establishing compliance with EU Limit Values. However, reductions in NO_x emissions do not necessarily feed through linearly to equivalent reductions in NO_2 concentrations.
- Currently, much of Central and Inner London exceeds the annual mean objective for NO_2 that applied from the end of 2005. The recent trend in NO_2 shows little sign of improvement, despite sustained reductions in measured concentrations of NO_x. This is thought to be due to several factors including the increasing proportion of diesel-fuelled vehicles in the fleet, technology changes to diesel engines and the emission of NO_2 in ‘direct’ form as a by-product of oxidation catalysts used to abate PM_{10}.

PM_{10} in London – emissions and local air quality

- As with NO_x, emissions of PM_{10} from ground-based transport in London have fallen in recent years. Emissions of PM_{10} from ground-based transport in London (excluding ground-based aviation) in 2008 were 1,550 tonnes. On a comparable basis this was 12 per cent lower than 2006, and 25 per cent lower than 2004.
- In 2008 ground-based transport (excluding ground-based aviation) accounted for 63 per cent of the total PM_{10} emission. Road traffic accounted for 91 per cent of the ground-based transport contribution, and 57 per cent of the total PM_{10} emission in London.
- Total PM_{10} emissions in Greater London in 2008 were 2,490 tonnes. On a comparable basis this was 16 per cent lower than 2006, and 29 per cent lower than 2004.
- Geographical analysis shows that highest emissions of PM_{10} occur along the major roads and in Central London, primarily reflecting the density of traffic.
- Currently, the EU Limit Values for PM_{10} are exceeded at a small number of specific locations, mainly along busy roads in Central London. The recent trend for concentrations of PM_{10} in the atmosphere suggests significant improvement. However, assessment is complicated by a change in measurement method and, since concentrations of PM_{10} are strongly related to the weather in each year, a further year or two of measurement is necessary to establish whether these improvements will be sustained.

The London Low Emission Zone (LEZ) scheme

- Compliance with the LEZ is very high. Phases 1 and 2 of the scheme were implemented in February and July 2008 respectively. Ninety-eight per cent of vehicles covered by Phase 1, and 96 per cent of vehicles covered by Phase 2, were complying with the Low Emission Zone in September 2009.
- Around 300,000 vehicles enter the zone each day and are compliant with the requirements of the scheme – delivering significant reductions to emissions of PM_{10} and NO_x in London.

Customer satisfaction and perception

Customer satisfaction data in this section are derived from a series of existing TfL surveys exploring satisfaction with modes of public transport and with the road network. In addition, a new survey has been commissioned exploring perceptions of the travel environment in London. Results from this survey are presented below and form the basis of three new MTS SOIs: perception of journey experience, noise and the urban realm. The survey will be carried out in the autumn of each year. Building on the experience of the first survey, it is possible that some changes will be made to the methodology in 2010; these will be described in Travel in London 3.

In all cases, survey respondents have been asked to rate their satisfaction with the measure in question on a scale of 0 to 10, with 10 being extremely satisfied. These scores have been converted to a mean score out of 100. TfL has carried out satisfaction research over a period of many years and has developed an understanding of how to interpret these scores, detailed in Table 9.1. This is, clearly, a subjective interpretation of the scores as different people will interpret the scoring differently: one respondent may, for example, consider a score of 7 out of 10 a good score, yet another that this is quite poor. TfL's interpretation is simply an averaging of such responses and should be treated as indicative only. The main interest lies in comparing the scores over time, and in comparing different aspects with one another.

Table 9.1 Interpretation of customer satisfaction scores.

Score	Interpretation
Under 50	Very poor
50 to 54	Poor
55 to 64	Fairly poor
65 to 69	Fair
70 to 79	Fairly good
80 to 84	Good
85 to 89	Very good
90 or more	Excellent

In summary, the satisfaction of public transport customers was good, providing a mean score for the principal public transport modes of 80 out of 100 in 2008/09. The indicator of road user satisfaction is under development; however, it is clear from surveys of those travelling on the Transport for London Road Network and on London's streets that satisfaction with the speed and reliability of journey times and the management of roadworks is relatively low. Overall, London residents provided a score of 64 out of 100 for satisfaction with the journey experience whilst travelling on all modes in London. This is considered fairly poor and further work will be carried out in 2010 to provide a greater understanding of these findings.

Similarly, the level of satisfaction with the quality of streets, pavements and public spaces was fairly low, at 63 out of 100 in 2008/09. The aspects of the urban realm that respondents were least satisfied with included conditions for cyclists, the attractiveness of the urban realm, and their feeling of safety whilst walking at night. There is a substantial, ongoing programme of work, including the development of the Pedestrian Environment Review System (PERS), designed to improve TfL's understanding of the public experience of the urban realm and identify priorities for improvement.

London residents gave a score of 70 out of 100 in 2008/09 for their satisfaction with the reasonableness of transport-related noise in their local area in London. This is considered fairly good, although it is notable that 1 in 5 London residents said that noise from transport disturbs their sleep at least once a week, and that this noise causes them stress. Traffic noise was the most significant contributor to transport-related noise levels. It is clear that many London residents do not suffer from noise disturbance, but that for some, particularly those living near busy roads or London's airports, transport noise has a detrimental effect on their quality of life.

Public transport customer satisfaction

- A new 'composite measure' of customer satisfaction across the principal public transport modes has been created, weighted by passenger volumes. The composite mean score for customer satisfaction with the principal public transport modes was 80 out of 100 in 2008/09, which is considered to reflect good levels of satisfaction. The measure includes satisfaction scores for bus, Underground, DLR, Overground and Tramlink services.
- The mean score for satisfaction with bus journeys in 2008/09 was 80 out of 100. Customers were the most satisfied with staff behaviour, personal safety and security and the state of repair of the bus, and were the least satisfied with bus stations and the value for money of the bus service.
- The mean score for satisfaction with Underground journeys in 2008/09 was 79 out of 100. Customers were the most satisfied with safety and security and least satisfied with cleanliness and the level of crowding, although scores for these aspects remained fairly good at 74 and 72 out of 100 respectively.
- Satisfaction with DLR services overall and with levels of crowding on the trains stood at 79 out of 100 in 2008/09. Passengers were the most satisfied with their personal safety on the train and at stations.
- Satisfaction with London Overground services was 74 out of 100 in 2008/09. Passengers were the most satisfied with the timeliness of their train and with their personal safety at stations, and least satisfied with the number of staff they saw on the train and the number of trains running per hour on their route.
- Satisfaction with Tramlink services was particularly high, at 86 out of 100 in 2008/09. Tramlink passengers were most satisfied with their journey time, safety and security on the tram and the ease of boarding and alighting.

Road user satisfaction

- A new measure of road user satisfaction is currently under development. Some measures of road user satisfaction are measured in existing surveys and are presented here.
- Satisfaction with the quality of streets and pavements has improved in the past three years and more London residents were satisfied than dissatisfied; those who had made their most recent journey on foot were the most satisfied, and those who had cycled were the least satisfied.
- London residents were most satisfied with street lighting when driving and with the management and maintenance of traffic lights. People surveyed on the street on the TLRN were most satisfied with the maintenance of road surfaces. Both groups were least satisfied with the management and speed of completion of roadworks (around a third were satisfied with these aspects across both surveys).
- London residents consider it highly important to be able to estimate journey times accurately and are satisfied with their ability to do so when walking or cycling; however, only 4 in 10 were satisfied with their ability to estimate journey times by car.

- Similarly, London residents thought it was important that their journeys were fast, but under half were satisfied with the speed of their journeys by car and more than half were very or fairly dissatisfied with the level of traffic congestion on the Capital's roads.

Journey experience

- A new measure of 'overall journey experience' has been created. This aims to establish levels of satisfaction with journeys in London across all modes and has been undertaken for the first time in 2009. In comparison with the well-established modal customer satisfaction surveys, findings relating to the new journey experience measure should be considered exploratory and indicative only. The mean score for satisfaction with travelling in London was 64 out of 100 for London residents in 2009.
- Responses to follow-up questions indicate that respondents are primarily considering their public transport journeys in their responses. TfL's customer satisfaction surveys ask respondents to consider the journey they just made and respond on that basis; this survey, however, asks respondents to balance their experiences across the year, taking into account journeys on all modes. It is typical for respondents to be more positive about specific than general experiences. More research will be conducted to explore the nature of responses to the new journey experience indicator and to understand the most influential aspects of transport services on levels of satisfaction with the journey experience.
- Specific aspects of travel in London that respondents were most satisfied with were the frequency, connectivity and punctuality of services. Respondents were least satisfied with levels of crowding, delays, disruptions, cancellations and closures.

Urban realm

- A new measure of satisfaction with the urban realm, in terms of the quality of streets, pavements and public spaces, has been developed by TfL. The mean score for satisfaction of London residents with the quality of streets, pavements and public spaces was 63 out of 100 in 2009. One in 5 respondents thought that the quality of the urban realm had deteriorated over the past year, but most felt that it had improved or remained the same.
- Aspects of the urban realm in their local area that London residents were most satisfied with included the ease of way finding when walking and personal safety during the day, with a mean satisfaction score of 7.8 out of 10 for both aspects. Even respondents who were less satisfied with the quality of the urban realm overall tended to be more satisfied with these specific aspects.
- London residents were least satisfied with the condition of the streets for cycling and with the attractiveness of streets, pavements and public spaces (mean scores of 5.6 and 6.1 respectively). In particular, respondents who were less satisfied with the quality of the urban realm in their local area were the least satisfied with conditions for cycling and walking, the attractiveness of the area, and personal safety while walking at night.

- Levels of satisfaction with the urban realm were similar across all sub-regions. Residents of the south and central sub-regions were the most consistently satisfied with aspects of the urban realm, while residents of the north sub-region tended to be the least satisfied with aspects of the urban realm.

Noise

- Noise maps produced by the Defra show levels of noise emitted by transport infrastructure sources and larger industrial premises. The map of London shows that the highest noise levels are closely associated with the major roads, Heathrow airport and Central London in general.
- TfL has developed a new measure of satisfaction with transport-related noise levels in London. The mean score for satisfaction of London residents with transport-related noise levels in their area was 70 out of 100. In general, levels of satisfaction with transport-related noise in London were broadly equivalent to those with noise levels in general (at 69 out of 100). Responses make it clear that transport, particularly road and air traffic, is the greatest contributor to unsatisfactory noise levels in the Capital.
- The majority of respondents, 8 in 10, thought that transport noise levels had remained the same over the past year, although more than a quarter of those least satisfied with levels of noise from transport thought that the situation had worsened in the past year.
- Traffic and roadworks caused the greatest noise disturbance, with 37 per cent of London residents saying they have been disturbed by noise from road traffic, and 30 per cent by noise from roadworks to some or a great extent. Nearly one quarter were disturbed by noise from air traffic. Six in 10 of those least satisfied with the level of noise from transport in their local area said that road traffic was the single aspect that disturbed them the most.
- The results suggest that road traffic is the most significant cause of transport noise in London, and that the level of disturbance to those experiencing traffic noise is in general greater than that caused by other aspects of transport noise. This was supported by findings that 1 in 3 of those most disturbed by noise from road traffic said they suffered from disturbed sleep at least once a week and that transport noise caused them stress. In comparison, around 1 in 5 London residents overall said that noise from transport disturbs their sleep at least once a week and causes them stress.
- Residents of the south and east sub-regions were the most satisfied with levels of noise from transport, and residents of the north and west sub-regions were the least satisfied. In particular, residents of the west and, to a lesser extent, south sub-regions were the most likely to be disturbed by noise from air traffic, reflecting the locations of Heathrow and Gatwick airports. Interestingly, although residents of the central sub-region were more likely than average to suffer sleep disturbance as a result of noise from transport, they were not as likely to feel stressed or to be dissatisfied with noise levels. This may reflect different expectations of those choosing to live in the city centre.

9.3 Local air quality: the Mayor of London's Air Quality Strategy

The Mayor published his draft Air Quality Strategy (MAQS) for consultation with the London Assembly and Functional Bodies in October 2009. This outlines a range of policies and proposals to help London reduce pollution and comply with EU Limit Values. These initiatives cover 12 broad themes, which collectively will help London achieve the EU Limit Values for fine particles (PM_{10}) and Nitrogen Dioxide (NO_2). The key draft MAQS themes are:

- Encouraging smarter choices and sustainable travel behaviour.
- Promoting technological change and cleaner vehicles.
- Targeting air quality hot spots through a package of localised measures.
- Reducing emissions from particular sources in the public transport fleet.
- Emissions control schemes, such as the London Low Emission Zone.
- Air quality 'Action Days' and special measures.
- Reducing emissions from construction and demolition sites.
- Better use of the planning process.
- Energy efficient buildings.
- A less polluted public realm.
- Encouraging innovation.
- Raising public awareness and promoting behavioural change.

9.4 NO_x emissions in London

What is NO_x/NO_2 and why is it important ?

All combustion processes produce Oxides of Nitrogen, for which NO_x is the collective term. NO_x primarily comprises Nitric Oxide (NO) and Nitrogen Dioxide (NO_2), the former readily converting to the latter through oxidation in free air. NO_2 is the pollutant of concern due to its impact on health. However, since NO easily converts to NO_2 in the atmosphere, it is necessary to reduce emissions of NO_x to reduce concentrations of NO_2. At high concentrations, NO_2 causes inflammation of the airways and long-term exposure can affect lung function and aggravate respiratory conditions, such as asthma.

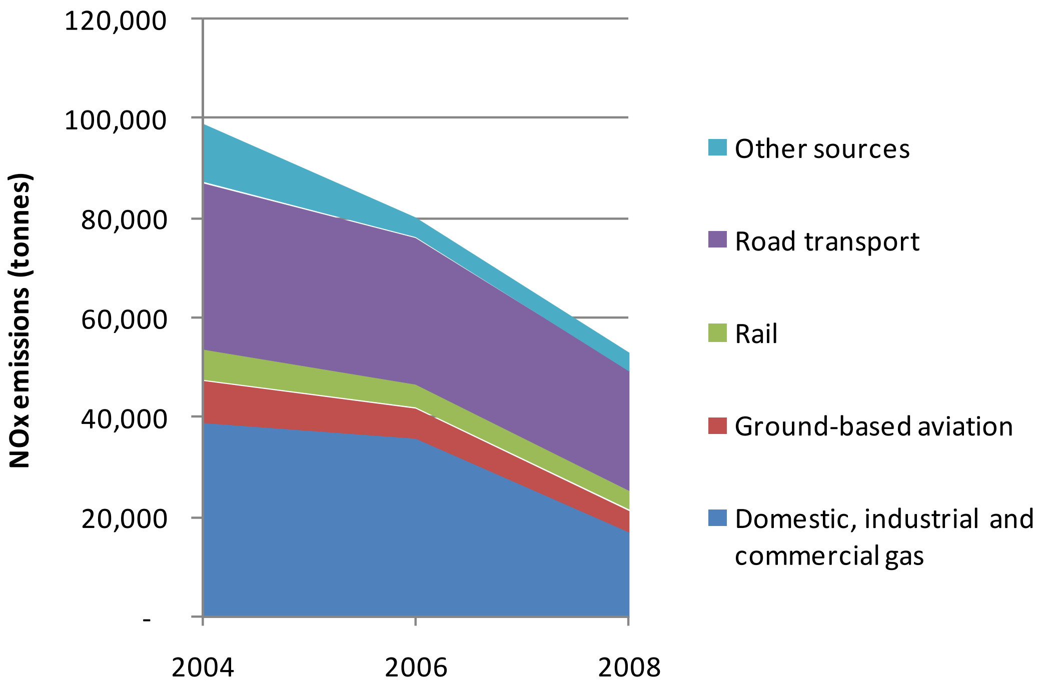
NO_x emissions in 2008 – totals, trends, sources and geographical disposition

Emissions of NO_x in London from transport and more generally have fallen substantially in recent years. In 2008 it was estimated that 52,130 tonnes of NO_x were emitted within the Greater London area. On a comparable basis this was 34 per cent lower than 2006, and 47 per cent lower than 2004.

Ground-based transport (excluding ground-based aviation) accounted for 54 per cent of this total, or 28,150 tonnes in 2008. On a comparable basis this was 18 per cent lower than 2006, and 30 per cent lower than 2004.

Figure 9.1 shows the available time-series, expressed as annual total emissions. This is further disaggregated by principal source sector in Table 9.2.

Figure 9.1 NO_x emissions – historical trends for annual total emissions (tonnes).



Source: LAEI for 2008, updated 2010, GLA

Table 9.2 NO_x emissions – historical trends for annual total emissions (tonnes), by principal source sector.

		NO_x emissions (tonnes)			Percentage change	
		2004	2006	2008	2004 to 2008	2006 to 2008
Mobile sources	Road transport	33,590	29,590	24,340	-28%	-18%
	Rail	6,220	4,680	3,700	-40%	-21%
	Shipping	230	160	110	-50%	-29%
	Ground-based transport (excluding aviation)	40,040	34,430	28,150	-30%	-18%
	Ground Based Aviation	8,470	6,040	4,310	-49%	-29%
Total mobile sources		48,500	40,470	32,460	-33%	-20%
Total area sources		39,500	36,100	17,170	-57%	-52%
Total point sources		9,900	2,550	2,500	-75%	-2%
Total emissions		**97,900**	**79,120**	**52,130**	**-47%**	**-34%**

Source: LAEI for 2008, updated 2010, GLA

The reduction in overall NO_x emissions since 2004 reflects emissions reduction initiatives across all source sectors. For road vehicles, emissions in 2008 were down 18 per cent in comparison with 2006, and by 28 per cent in comparison with 2004. This primarily reflects the adoption of progressively higher 'Euro' emissions standards as older vehicles are replaced with newer ones. Other sectors have also seen significant reductions, including regulatory and technical measures applied to domestic, commercial and industrial combustion.

MTS strategic outcome indicator: NO_x emissions from ground-based transport in London

Why this indicator is important

Emissions of NO_x – Oxides of Nitrogen – are the primary contributor to concentrations of NO_2 – Nitrogen Dioxide – in the atmosphere. Nitrogen Dioxide is a harmful pollutant for which London currently does not meet health-based European Union Limit Values. The draft MAQS proposes a range of measures designed, in conjunction with measures in other Mayoral strategies and wider national-level initiatives, to work towards meeting the Limit Value throughout Greater London at the earliest possible date. In 2008, 54 per cent of the total NO_x emission in Greater London was estimated to come from ground-based transport sources (excluding ground-based aviation) within London. It is this portion that is of principal concern to the Mayor's Transport Strategy.

How this indicator is calculated

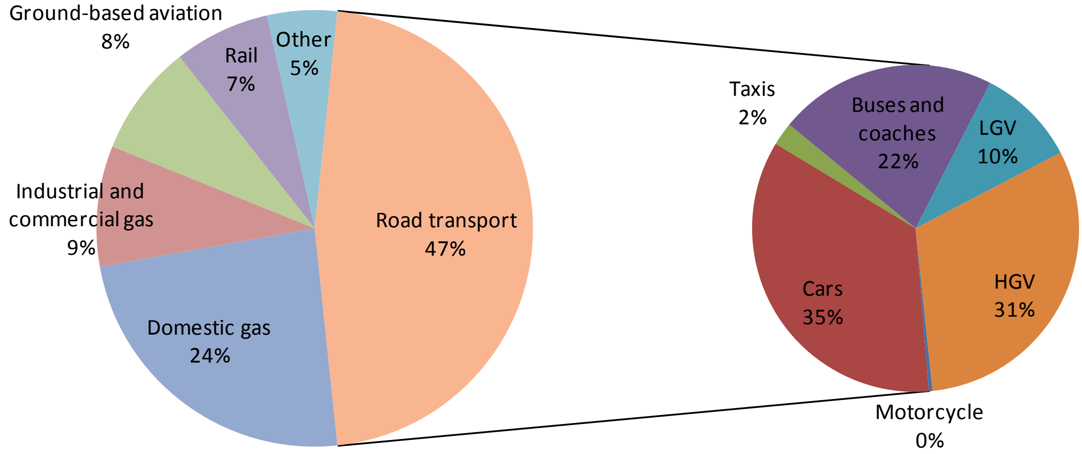
This indicator is compiled using the London Atmospheric Emissions Inventory (LAEI). Ground-based transport sources include: emissions from all types of road vehicle (exhaust and tyre/brake wear); diesel railways (exhaust only), and river vessels. Emissions are expressed on an annual total basis as tonnes of NO_x from all in-scope sources within the Greater London boundary.

Value for 2008 calendar year and comparison with 2006 and 2004

Emissions of NO_x from ground-based transport (excluding ground-based aviation) in London during the 2008 calendar year were estimated at 28,150 tonnes. This represents 54 per cent of total NO_x emissions generated in London. On a comparable basis, this is an 18 per cent decrease over estimated emissions in 2006, and a 30 per cent decrease over emissions in 2004.

The basic source breakdown for NO_x emissions in London is shown by Figure 9.3. Road transport accounts for roughly half the total emission, the split between the main vehicle types reflecting their contribution to the total distance driven (in vehicle kilometres) and differing engine sizes and technologies. There is a relatively even split between the contributions from cars and goods vehicles, despite cars accounting for approximately four-fifths of vehicle kilometres driven in London.

Figure 9.2 Basic source apportionment for NO_x emissions in Greater London, percentage contribution to 2008 annual total.

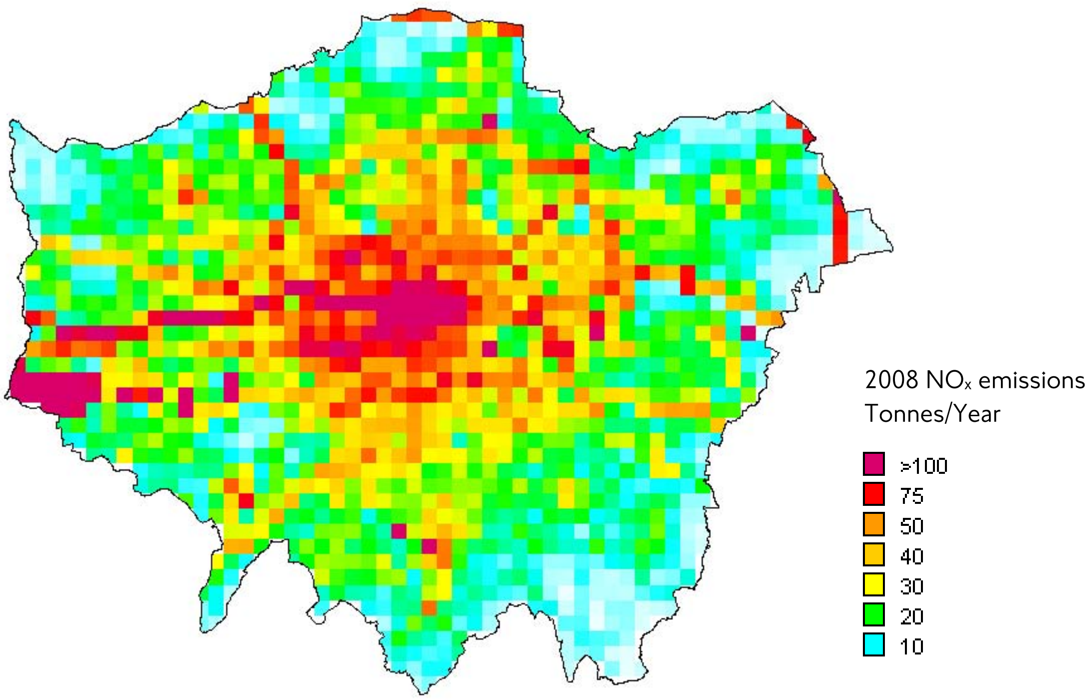


Total emissions: 52,145 tonnes
Total ground-based transport emissions: 32,466 tonnnes
Total road transport emissions: 24,340 tonnes

Source: LAEI for 2008, updated 2010, GLA

Figure 9.3 shows the geographical intensity of NO_x emissions across Greater London. Once again, the basic pattern changes little from year-to-year, but clearly pinpoints areas of high NO_x emissions, which reflect both the road network and broad land-use and urban density patterns.

Figure 9.3 Geographic disposition and intensity of NO_x emissions in London.

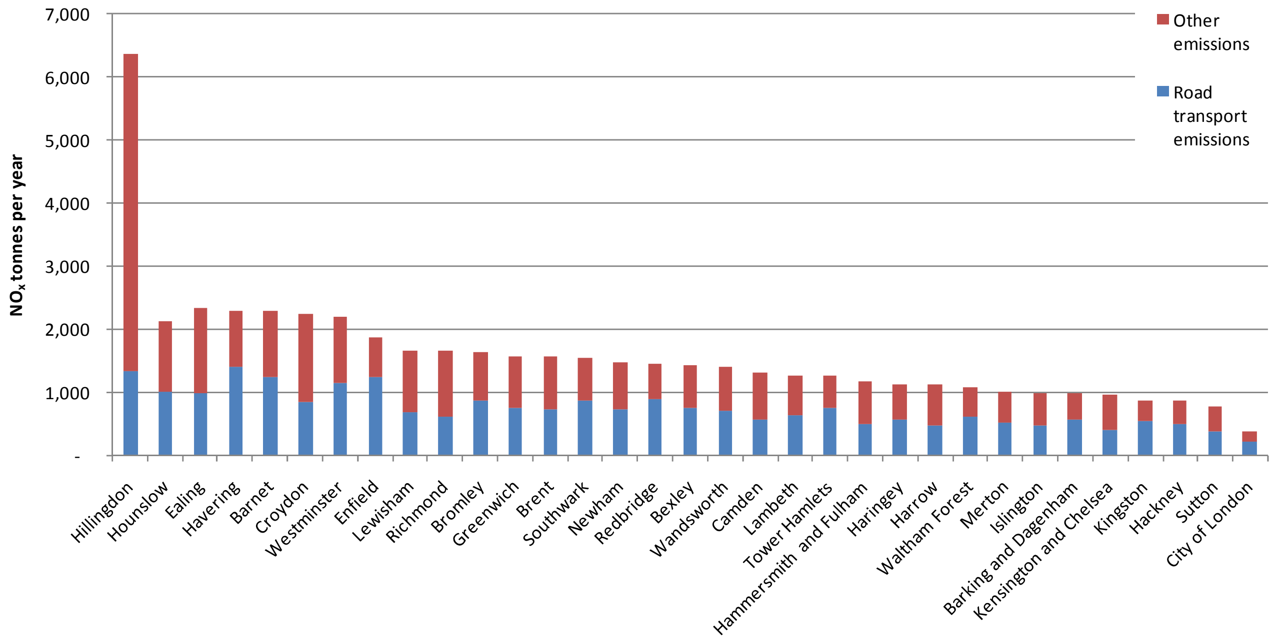


Source: LAEI for 2008, updated 2010, GLA

NO_2 emissions by borough

Figure 9.4 shows the relative distribution of individual boroughs, in terms of total tonnage of NO_x emitted. The overall distribution tends to reflect urban density and road traffic, with Hillingdon reflecting the presence of Heathrow airport, alongside associated parts of the national motorway network.

Figure 9.4 Relative emissions of NO_x for individual London boroughs. 2008, tonnes.



Source: LAEI for 2008, updated 2010, GLA

9.5 Local air quality – NO_2 and NO_x concentrations in London

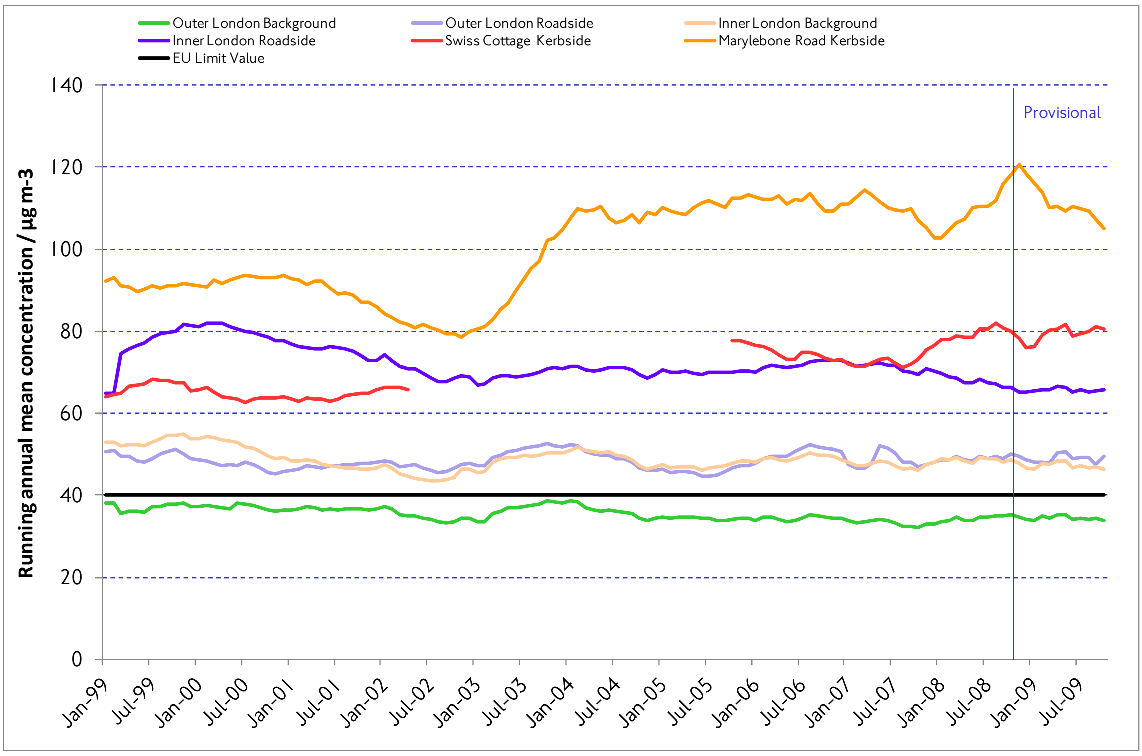
Concentration of pollutants in the air are the basic measure of local air quality, and the measure against which compliance with EU Limit Values is assessed. Concentrations differ fundamentally from emissions, however, in that they are only measured at a limited number of discrete points, selected so as to be representative. Furthermore, local emissions from sources in London only account for a proportion of total pollutant in the air, and this proportion varies considerably according to weather conditions. This means that it is possible to observe widely differing concentrations of pollution on successive days when emissions from sources in London are similar. It also means that – whatever measures are taken to reduce emissions from sources in London – these can only ever have a proportionately smaller impact on pollution concentrations.

London's air quality is continuously monitored at more than 100 different locations, including kerbside, roadside, urban background, suburban and rural sites, co-ordinated through the London Air Quality Network. For NO_2, the EU Limit Value that is most relevant is the running annual mean concentration, which is not to exceed 40 μgm^{-3}. This was initially intended to apply from the end of 2005. Figure 9.5 shows the trend over the past decade at selected, representative air quality monitoring site groupings in London. This figure shows that:

- NO_2 concentrations at urban background sites across London declined up to 2002, and have been relatively stable since.

- Concentrations at roadside sites have generally not changed significantly since 1999, except for an increase of around 30 per cent in concentrations recorded at the kerbside site at Marylebone Road between 2001 and 2004 (and concentrations then staying around this higher level).

Figure 9.5 NO_2 concentrations at representative air quality monitoring site groups. Running annual mean concentrations.

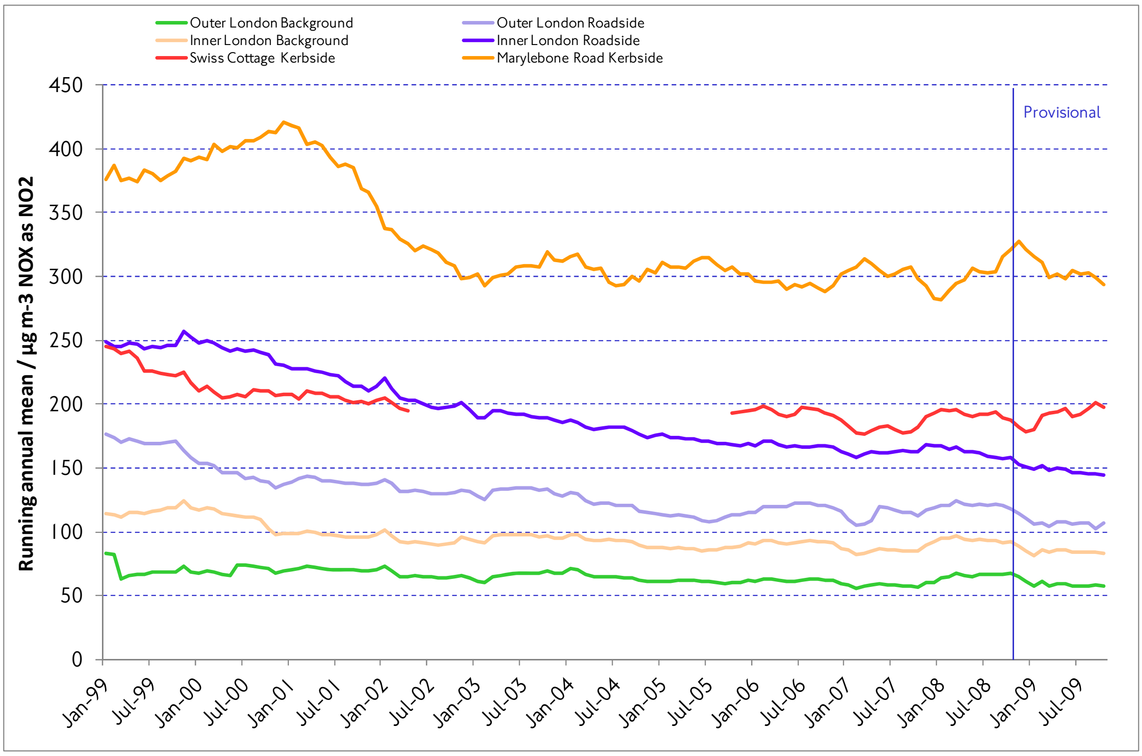


Source: London Air Quality Network

Figure 9.6 shows the trend in NO_x concentrations in London. There is no Limit Value for NO_x per se, although since NO_x readily converts to NO_2 in the atmosphere, it is necessary to understand (and reduce) concentrations of NO_x in order to reduce concentrations of NO_2. The figure shows that, in contrast to NO_2, there is a clear and consistent downwards trend for NO_x concentrations, primarily reflecting successive emissions reduction measures (such as the 'Euro' emissions standards for road vehicles) over recent years. This suggests that other factors appear to be playing a more dominant role in determining concentrations of NO_2 than NO_x reduction itself.

There are a range of possible mechanisms at work here, which are currently the subject of research within the air quality community. A key possibility is an increase in what is known as 'primary NO_2'. This is NO_x that is emitted directly in the form of NO_2, without having to undergo – and therefore be limited by – chemical conversion in the atmosphere. In turn, this is thought to reflect several changes to vehicle technology, primarily an increase in the proportion of small vehicles that are diesel-fuelled, changes to engine technology and, importantly, emissions abatement devices such as oxidising catalysts. These have been widely (and very successfully) used to reduce emissions of fine particulate (PM_{10}), but under certain circumstances can produce a higher proportion of the total NO_x emission in the form of NO_2.

Figure 9.6 NO_x concentrations at representative air quality monitoring site groups. Running annual mean concentrations.



Source: London Air Quality Network

9.6 PM_{10} emissions in London

PM_{10} (fine particles with an aerodynamic diameter of less than 10 microns) has several significant adverse health effects, and compliance with health-based air quality objectives for PM_{10} at a small number of locations in Central London remains a challenge.

PM_{10} emissions in 2008 – totals, trends, sources and geographical disposition

As with NO_x, emissions of PM_{10} from ground-based transport in London have fallen significantly in recent years. Emissions of PM_{10} from ground-based transport in London (excluding ground-based aviation) in 2008 were 1,550 tonnes. On a comparable basis this was 12 per cent lower than 2006, and 25 per cent lower than 2004.

Total PM_{10} emissions in Greater London in 2008 were 2,490 tonnes. On a comparable basis this was 16 per cent lower than 2006, and 29 per cent lower than 2004. Figure 9.7 shows the available time-series, expressed as annual total emissions. This is further disaggregated by principal source sector in Table 9.3.

MTS strategic outcome indicator: PM_{10} emissions from ground-based transport in London.

Why this indicator is important

PM_{10} (fine particulate matter) is a harmful air pollutant. Levels of PM_{10} in the air in London during 2008 continued to exceed EU Limit Values at certain locations.

The draft MAQS proposes a range of measures designed, in conjunction with measures in other Mayoral strategies and wider national-level initiatives – to meet the Limit Value throughout Greater London at the earliest possible date.

How this indicator is calculated

This indicator is compiled using the London Atmospheric Emissions Inventory (LAEI). Ground-based transport sources include: emissions from all types of road vehicle (exhaust and tyre/brake wear); diesel railways (exhaust only), and river vessels. Emissions are expressed on an annual total basis as tonnes of PM_{10} from all in-scope sources within the Greater London boundary.

Value for 2008 calendar year and comparison with 2006

Emissions of PM_{10} from ground-based transport (excluding ground-based aviation) in London during the 2008 calendar year were estimated at 1,550 tonnes. This represents 62 per cent of total PM_{10} emissions generated in London. This is a 16 per cent reduction over estimated emissions in 2006, and is 29 per cent lower than 2004.

Figure 9.7 PM_{10} emissions - historic trends for annual total emissions (tonnes).

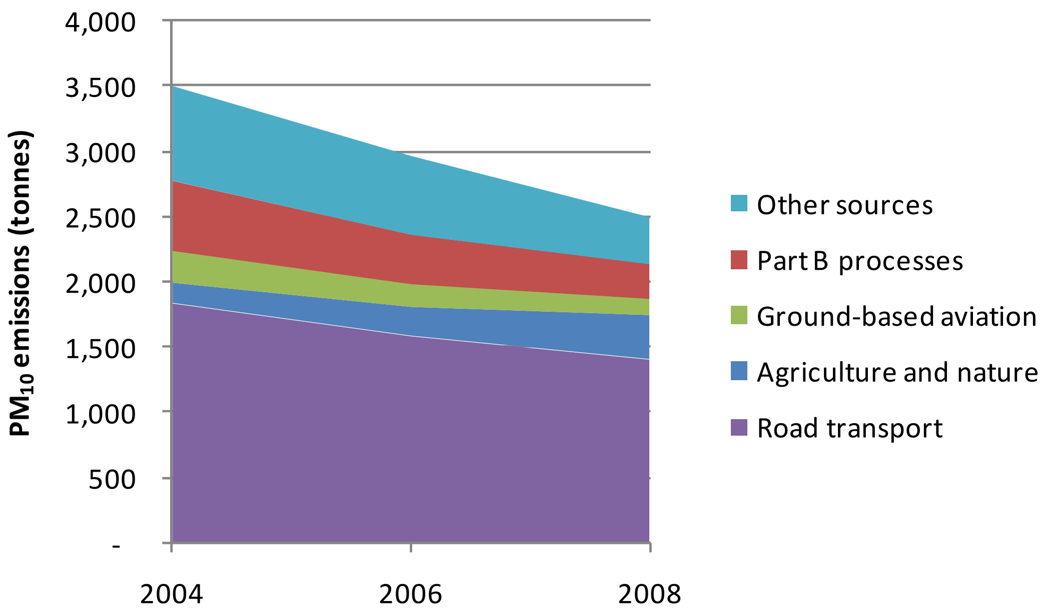


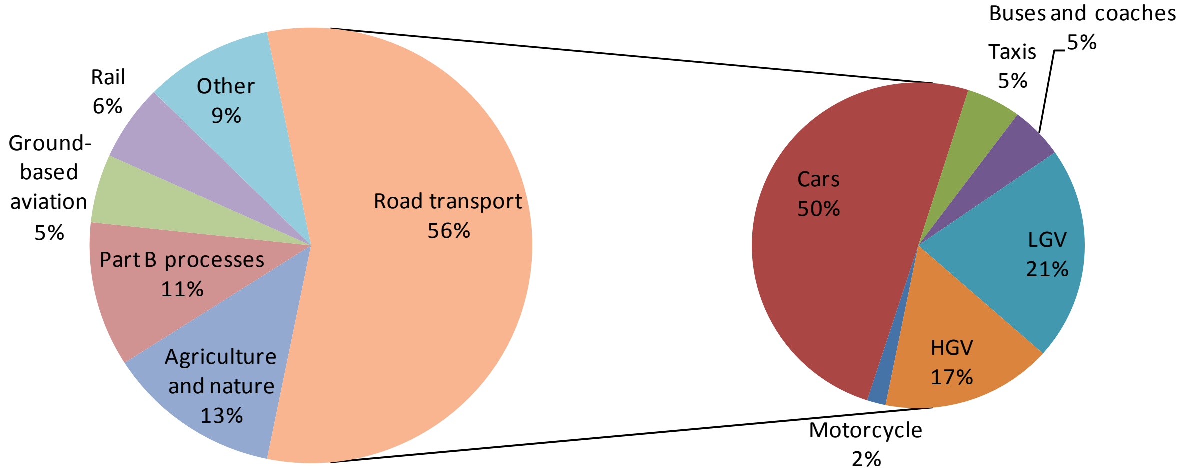
Table 9.3 PM_{10} emissions - historical trends for annual total emissions (tonnes), by principal source sector.

		PM_{10} emissions (tonnes)			Percentage change	
		2004	2006	2008	2004 to 2008	2006 to 2008
Mobile sources	Road transport	1,830	1,580	1,410	-23%	-11%
	Rail	230	180	140	-39%	-20%
	Shipping	2	1	1	-50%	-29%
	Ground-based transport (excluding aviation)	2,070	1,760	1,550	-25%	-12%
	Ground-based aviation	250	180	130	-49%	-28%
Total mobile sources		2,320	1,940	1,670	-28%	-14%
Total area sources		610	620	530	-12%	-14%
Total point sources		570	400	290	-50%	-29%
Total emissions		**3,500**	**2,960**	**2,490**	**-29%**	**-16%**

Source: LAEI for 2008, updated 2010, GLA

The basic source breakdown for London's PM_{10} emissions in 2008 is shown in Figure 9.8. Road transport is the dominant source of locally generated emissions, accounting for 57 per cent in 2008. The main contributors to road transport emissions are cars and goods vehicles, accounting for 50 per cent and 38 per cent of road transport emissions respectively. Cars comprise about four-fifths of the total vehicle kilometrage driven in London. However, each individual vehicle emits only a small amount of PM_{10}. Goods vehicles, on the other hand, are much fewer in number, yet emit a higher amount of PM_{10} per individual vehicle. One consequence of initiatives to reduce exhaust PM_{10} from cars is that 64 per cent of the total emission from these vehicles now comes from tyre and brake wear, as can be seen in Figure 9.9.

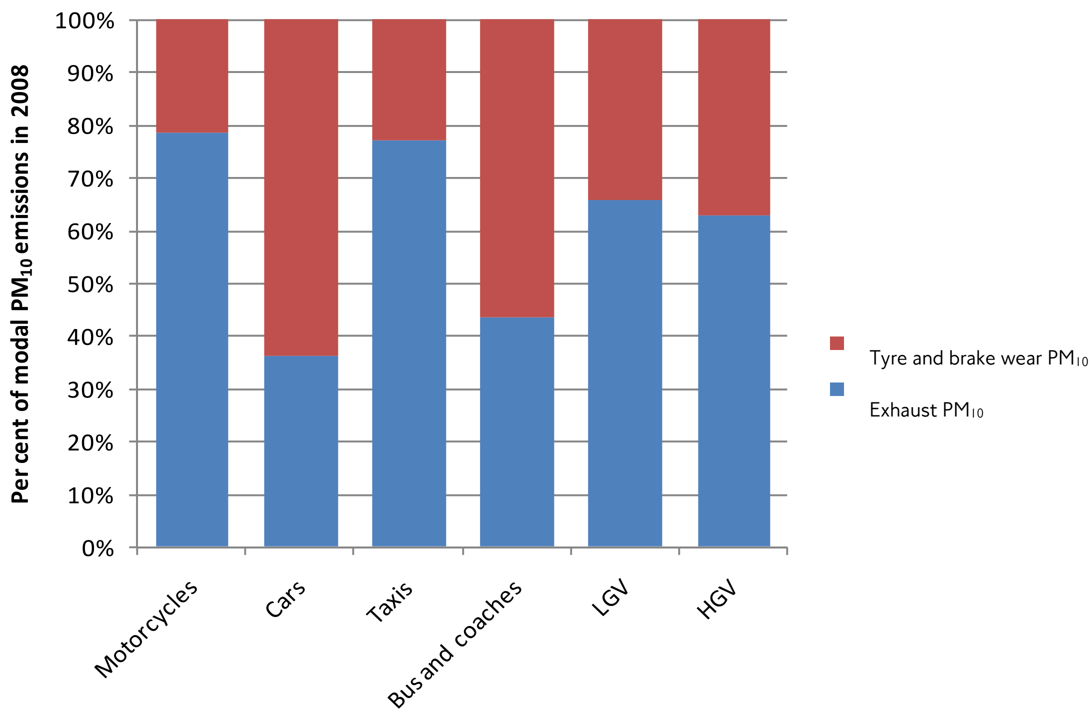
Figure 9.8 Basic source apportionment for PM_{10} emissions in Greater London, percentage contribution to 2008 annual total.



Total emissions: 2,494 tonnes
Total ground-based transport emissions : 1,675 tonnes
Total road transport emissions: 1,406 tonnes

Source: LAEI for 2008, updated 2010, GLA

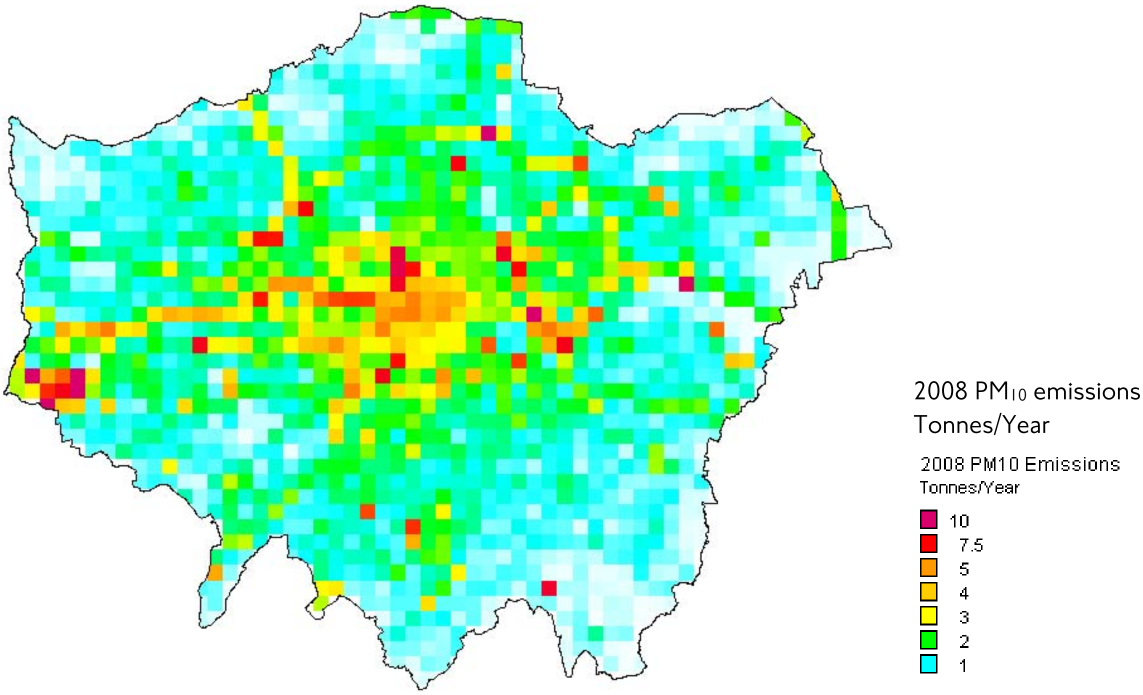
Figure 9.9 Road transport – split between exhaust and tyre and brake wear PM_{10}.



Source: LAEI for 2008, updated 2010, GLA

Figure 9.10 shows the geographical intensity of PM_{10} emissions across Greater London. The basic pattern changes little from year-to-year, but clearly pinpoints areas of high PM_{10} emissions, which in this case primarily reflect Central London and Heathrow airport.

Figure 9.10 PM$_{10}$ emissions in London. Geographical disposition and relative intensity. All sources, annual total (tonnes), 2008.



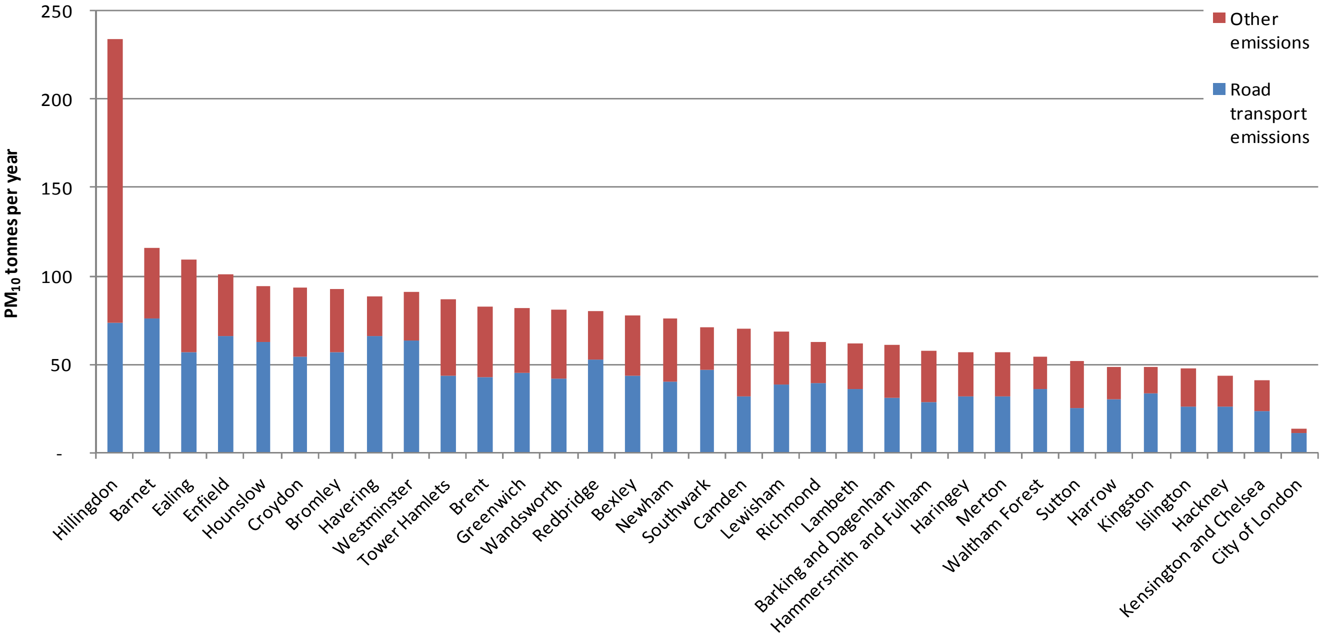
Source: LAEI for 2008, updated 2010, GLA

PM$_{10}$ emissions by borough

The LAEI inventory allows various disaggregations of the London-wide totals for analysis purposes. One such breakdown is to look at PM$_{10}$ emissions arising in each individual London borough, as well as in terms of the principal emissions sources, as illustrated by Figure 9.11.

The relative distribution of individual boroughs reflects the closer relationship of total PM$_{10}$ emissions to transport-related activity. Thus, the total for Hillingdon is particularly influenced by Heathrow airport, and the relatively low values for certain Inner and Central London boroughs tend to reflect relatively low (in comparative terms) vehicle kilometres driven in comparison with major roads in outer London. Total tonnage figures, however, do not reflect issues like differing land area, urban density and residential population/employment. The picture in terms of concentrations of PM$_{10}$ – the quantity most relevant to assessing compliance with air quality Limit Values – is significantly different, as explored in the following section.

Figure 9.11 Emissions of PM_{10} by London borough, showing proportion arising from road transport.



Source: LAEI for 2008, updated 2010, GLA

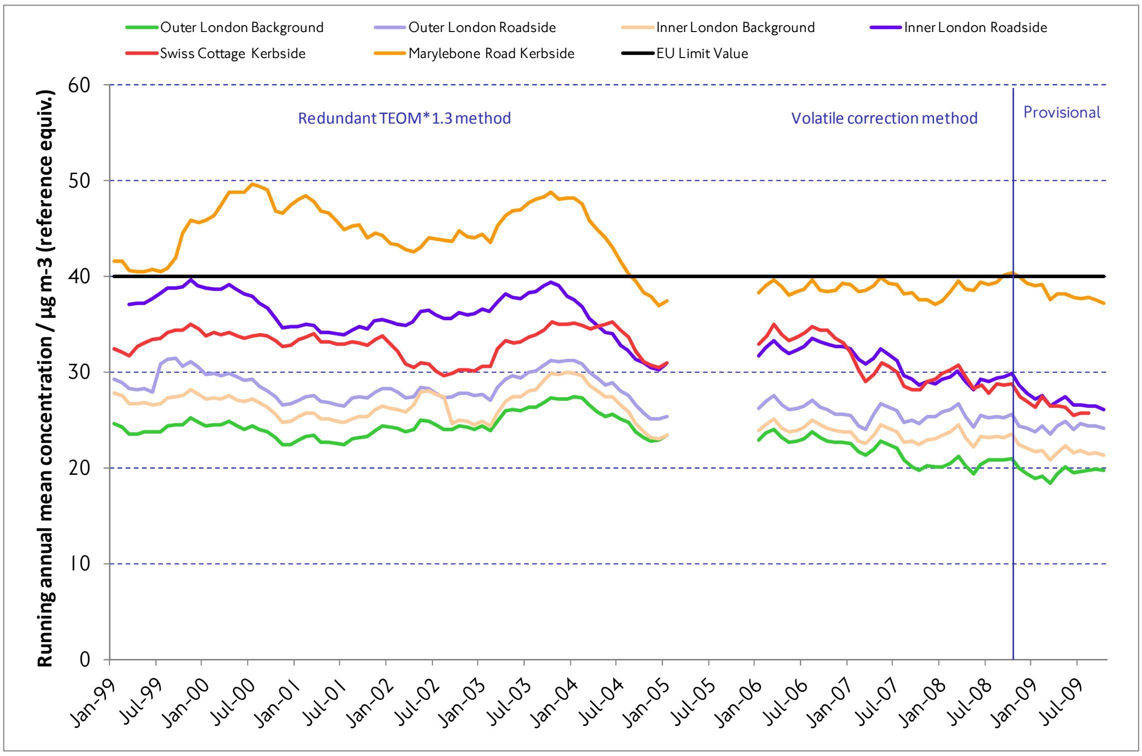
9.7 Local air quality – PM_{10} concentrations in London

Figure 9.12 shows the long-term trend in PM_{10} concentrations for representative monitoring site groups across Greater London. The accepted measurement basis for PM_{10} in London and more widely across Europe has recently changed, and therefore two trends are given, one based on the established (but now largely superseded) TEOM method, and one on the newer FDMS method. No trend is given for the 'overlap' period as TEOM and FDMS methods are not directly comparable.

For PM_{10} there are two EU Limit Values that are relevant. The first is the running annual mean concentration, which is not to exceed 40 μgm^{-3}. The second is the 'exceedence' objective, which specifies that a daily mean concentration of 50 μgm^{-3} is not to be exceeded on more than 35 days in any one calendar year.

The series break caused by the change in measurement method means that it is not possible to evaluate long-term trends, but the trend suggested by recent FDMS measurements from 2007 to 2009 is downwards at all site groupings, with the exception of Marylebone Road – the monitoring site in London that usually records the highest concentrations, given its close proximity to a busy road in Central London. PM_{10} concentrations are very sensitive to weather conditions on an annual scale (for example, a dry, hot spring or a cool, wet one, as this is related to prevailing wind direction and hence the contribution of non-local PM_{10} to concentrations in London), and it is likely that these recent favourable trends, in part, reflect the comparatively more benign weather over the period. In addition, latest data are provisional until ratified against rigorous data quality controls, and there is a degree of variability in the series such that it will require several years of data to determine whether the recent trend is sustained.

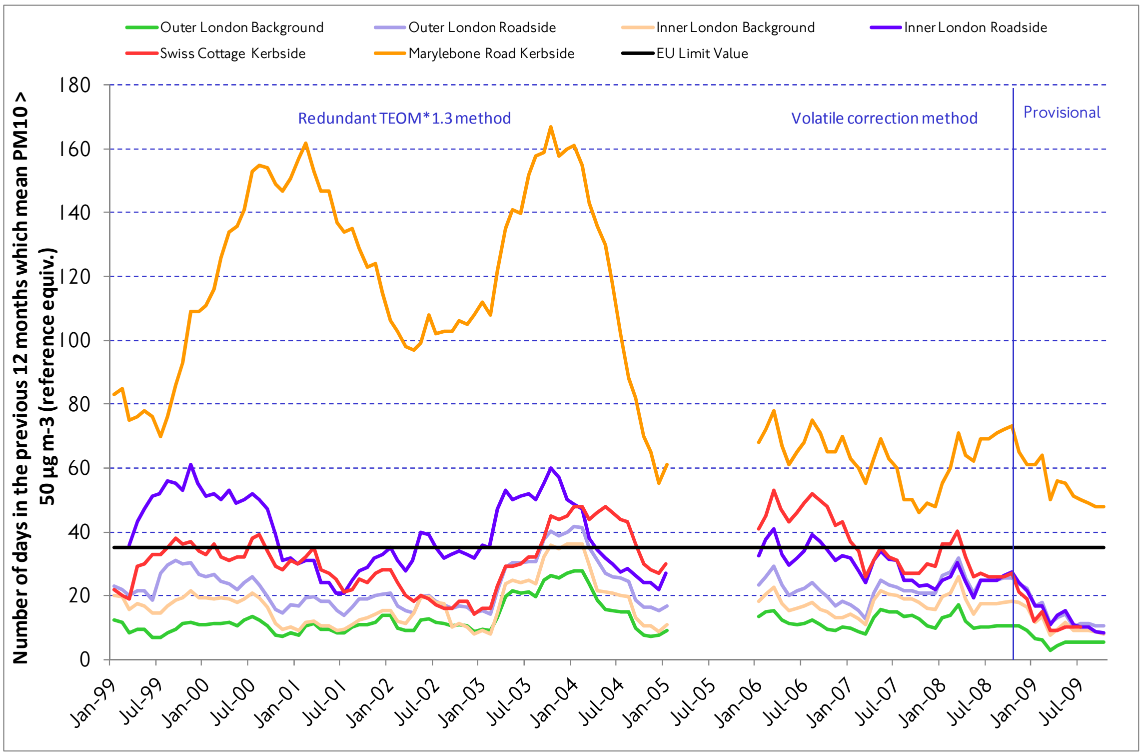
Figure 9.12 PM_{10} concentrations at representative London air quality monitoring site groups. Running annual mean concentration.



Source: London Air Quality Network

The PM_{10} 'exceedence' objective (Figure 9.13) shows a similar picture, the more recent (FDMS) trend being one of improvement. Most site groupings used to assess compliance, representing the large majority of the London land area, readily comply with this objective – only Marylebone Road, and, through air quality modelling rather than direct measurement, a small number of very similar heavily-trafficked sites currently failing to meet the objective.

Figure 9.13 PM_{10} concentrations at representative air quality monitoring site groups. Number of days when concentration exceeded 50µgm^{-3}.



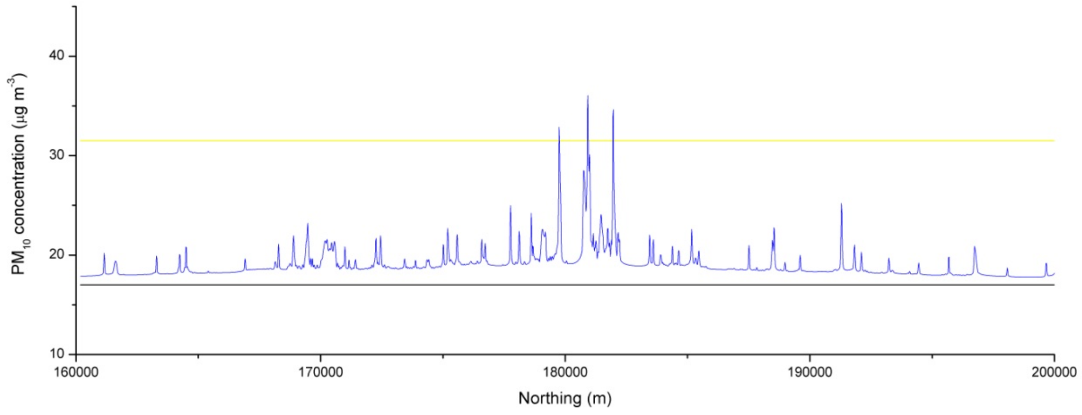
Source: London Air Quality Network

9.8 Relationship between PM_{10} emissions and concentrations in London

In 2008, approximately 15 per cent of PM_{10} in the air in London arose directly from emissions within London itself. The remaining 85 per cent or so was from secondary sources – reflecting short- and long-range transport, and secondary formation of particulate by chemical processes in the atmosphere. This means that the impact of emissions reduction initiatives on actual concentrations will be proportionately much smaller than the magnitude of the actual emissions change. This relationship is illustrated by Figure 9.14 which shows a north-south 'transect' through Greater London. Shown on the graph are, working from bottom to top:

- The estimated contribution to total PM_{10} from sources outside London (this is known as 'regional' or 'background' PM_{10}).
- Modelled annual average PM_{10} concentrations, reflecting the geography of London and with highest concentrations reflecting major roads and Central London.
- The EU Limit Value for daily mean PM_{10}.

Figure 9.14 The contribution of emissions from sources within Greater London to annual average PM_{10} concentrations. North-south transect through Greater London, 2008.



Source: Environmental Research Group, Kings College, London

In simple terms, for much of outer and Inner London, the large majority of PM_{10} in the air comes from sources outside London. In Central London the proportions can reach 50:50 at locations with high concentrations, for example the major roads, but this is the exception rather than the rule. This means that:

- Action to reduce emissions of PM_{10} is best focused on those locations where concentrations are highest.
- At these locations, initiatives to reduce local emissions can only ever have a proportionately smaller impact on local concentrations – meaning there are difficult judgments to be made where the cost and/or other negative implications may be considered to be disproportionate.
- In terms of moving towards general reductions in PM_{10} across London, and in tackling particular hot spots, there is much that could be done by other agencies, particularly central Government – and more widely at the European level – to assist and complement the measures that have been set out in the draft MAQS.

9.9 The London Low Emission Zone scheme

The London Low Emission Zone scheme

The London LEZ scheme seeks to improve air quality in London by requiring vehicle operators to meet minimum emission standards – based on the 'Euro' emissions classification.

TfL implemented the first two phases of the scheme in 2008. Phase 1 of the scheme, from February 2008, required operators of heavy goods vehicles over 12 tonnes gross vehicle weight to comply with a minimum Euro 3 emission standard in respect of particulate matter – PM_{10} – in order to operate within London without charge or penalty. Phase 2 of the scheme, from July 2008, similarly required a minimum Euro 3 emission standard for operators of lorries between 3.5 and 12 tonnes gross vehicle weight, and also for buses and larger coaches having more than 8 seats or weighing more than 5 tonnes.

Key impacts of the scheme – trend in vehicle compliance

The nature and scope of the impacts of the scheme were set out in TfL's Baseline Monitoring Report for the LEZ, published in July 2008. This noted that the trend in vehicle compliance with the requirements of the scheme (ie minimum Euro 3 emission standard for PM_{10}, as measured by number plate-reading cameras) would be the most immediate indicator of scheme impacts. Emissions, air quality and other impacts would follow on from, and be proportionate to, the degree of change achieved in the emissions profile of affected vehicles.

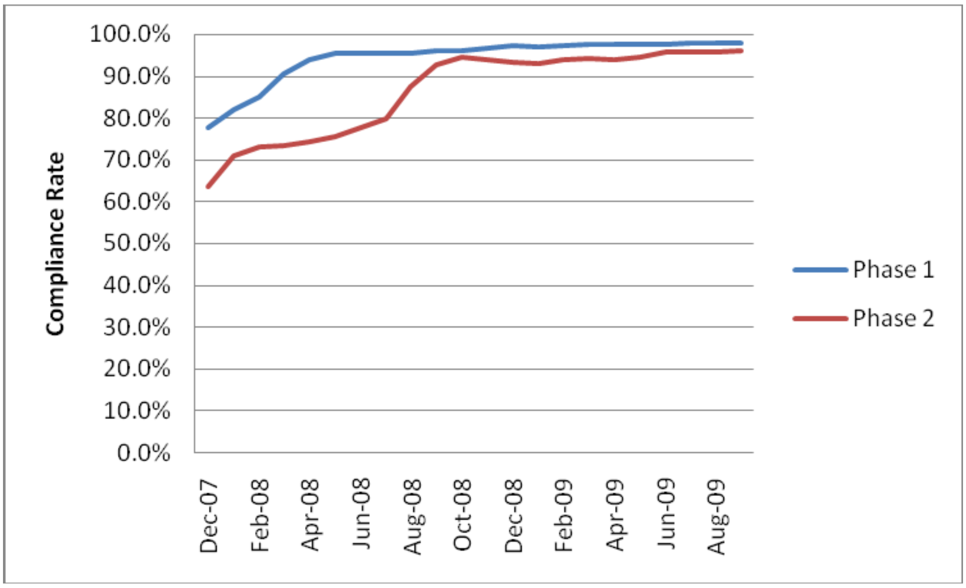
Figure 9.15 shows this indicator of vehicle compliance, in respect of phases 1 and 2 of the scheme and in terms of unique vehicles observed in the zone, up to late spring 2009. Initial rates of compliance were higher than expected and the scheme was implemented with 93 per cent compliance for phase 1 and 89 per cent compliance for phase 2. Following the initial 'bedding in' stage, compliance has continued to improve.

Current compliance rates approach, but do not quite reach, 100 per cent. This is to be expected, as there are various niche exemptions, and a residual number of non-compliant, non-exempt vehicles (daily charge payers and evaders). The most recent compliance figures for September 2009 are 98 per cent for phase 1 vehicles, and 96 per cent for Phase 2 vehicles. The scheme has, therefore, so far achieved its primary aim of improving the emissions performance of heavier vehicles in the Capital, and is delivering emissions and air quality benefits to Londoners.

Other points worth noting are listed below:

- Vehicles that operate more frequently in the zone tend to be more compliant, on average, than occasional visitors. Therefore, looking at compliance rates proportional to kilometres driven will show compliance rates a percentage point or two higher than those for unique vehicle-based compliance.
- A significant degree of 'pre-compliance' can be expected before the actual implementation date of the scheme. Although not based on ideal data, initial estimates suggested that approximately half of the expected emissions reductions attributable to the first phase of the scheme were in fact realised in the months leading up to implementation, as vehicle operators prepared for its introduction.
- This change to vehicles in London, of course, also has wider emissions benefits for the rest of the UK, when vehicles that meet the requirements of the London scheme travel outside Greater London.
- The number of compliant vehicles entering the zone each day is around 180,000 unique vehicles for those in scope for phase 1 of the scheme, and 130,000 unique vehicles for phase 2.

Figure 9.15 London Low Emission Zone. Proportion of affected vehicles that are compliant with the requirements of the scheme (as unique vehicles).



Source: TfL Planning

9.10 Public transport customer satisfaction

TfL strives to provide a high quality public transport service, recognising that where the experience of travelling is unpleasant, this can affect the day-to-day quality of life of London residents, workers and visitors. Making systems easier to use and more comfortable will reduce stress and discomfort and improve health, well being and quality of life. This section describes customer satisfaction with the most used public transport services in London, specifically buses, Underground and Overground rail services, the DLR, and Tramlink. Alongside the presentation of mode-specific data, a new 'composite performance measure' is presented here. This summarises customer satisfaction with principal public transport services overall, with responses weighted to passenger numbers for each mode. All data relate to the financial year 2008/09 and are derived from customer satisfaction surveys conducted throughout this period. Survey methodologies are described for each mode of transport. These measures of public transport customer satisfaction should be understood alongside quantitative measures of the operation of public transport services, as presented in chapter 4 of this report, where results for the MTS Strategic Outcome Indicator relating to satisfaction with crowding levels on public transport can be found.

MTS strategic outcome indicator: Public transport customer satisfaction

Why this indicator is important

This indicator, alongside individual customer satisfaction measures for each mode, will measure customer satisfaction with public transport services 'in the round' and indicate areas for future improvement. The indicator should be considered in the light of the measures of network performance and satisfaction with crowding presented in chapter 4 of this report.

How this indicator is calculated

Survey respondents have been asked to rate their satisfaction with each measure on a scale of 0 to 10, with 10 being extremely satisfied. Responses have been converted to a mean score out of 100. A composite measure is created by combining modal results based on the mode share as shown in Table 9.4. Data will be sourced from the following TfL customer satisfaction surveys, noting that rail services not managed by TfL are excluded:

1. **London Buses** – continuous survey consisting of 9,600 face-to-face interviews each year with passengers alighting from buses between 7.30am and 9pm, seven days a week.
2. **London Underground** – continuous survey consisting of 8,800 face-to-face interviews each year in stations across the network between 7am and 10pm, seven days a week.
3. **DLR** – first wave carried out in 2008/9 consisting of 1,000 face-to-face interviews with passengers on-board or alighting from DLR trains during operational hours, seven days a week.
4. **London Overground** – quarterly survey consisting of 700 face-to-face interviews carried out over a four week period each quarter (2,800 per year) with passengers on board trains across operational hours, seven days a week.
5. **Tramlink** – continuous survey consisting of 880 face to face interviews carried out each year with passengers alighting from trams between 7.30am and 9pm at a sample of stops.

Value for 2008/09 financial year

Public Transport Customer Satisfaction
The composite mean score for overall satisfaction of those travelling on the network with the operation of the principal public transport modes in London was 80 out of 100 in 2008/09. This is considered to be a 'good' score.

Summary of customer satisfaction across the principal public transport modes

Table 9.4 summarises satisfaction with the overall operation of the service and with levels of crowding on the vehicle for the principal public transport modes, as included in the new MTS strategic outcome indicator detailed above. The table also presents data on the mode share, used as the basis to produce the composite score.

Table 9.4 Summary of customer satisfaction scores and mode share for principal public transport modes, 2008/9.

Mode	Overall customer satisfaction score (out of 100)	Annual journey stages (millions)	Relative weight (per cent)
Bus	80	2,247	65%
Underground	79	1,089	31%
DLR	79	66	2%
Overground	74	33	1%
Tramlink	86	27	1%
Total	**80**	**3,462**	**100%**

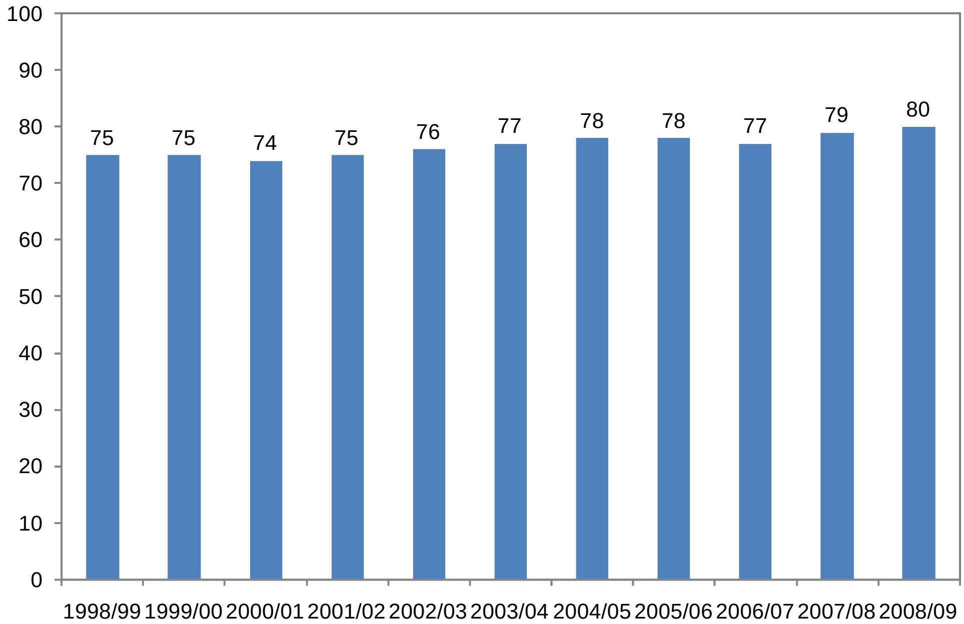
Source: TfL modal customer satisfaction surveys; mode share based upon estimates of journey stages as shown in Table 2.6

Customer satisfaction with London bus services

London Buses carry out a continuous customer satisfaction survey consisting of 9,600 face-to-face interviews each year conducted with passengers alighting from buses between 7.30am and 9pm at a sample of bus stops. Survey data are weighted to match the profile of bus users, as identified in the Bus User Survey, in terms of age and gender, frequency of bus use, and journey purpose. Further weighting is carried out to reflect bus operator mileage, as a proxy for passenger volumes. Survey respondents are asked to rate their satisfaction, on a scale of 0 to 10, with various aspects of the service they received on the journey just made, as well as their overall satisfaction with the journey. Responses are then converted into a mean score out of 100, which is presented here.

The mean score for satisfaction with bus journeys in London was 80 out of 100 in 2008/09. This is considered to be a 'good' score. Figure 9.16 shows that customer satisfaction has increased at a fairly steady rate over the past decade.

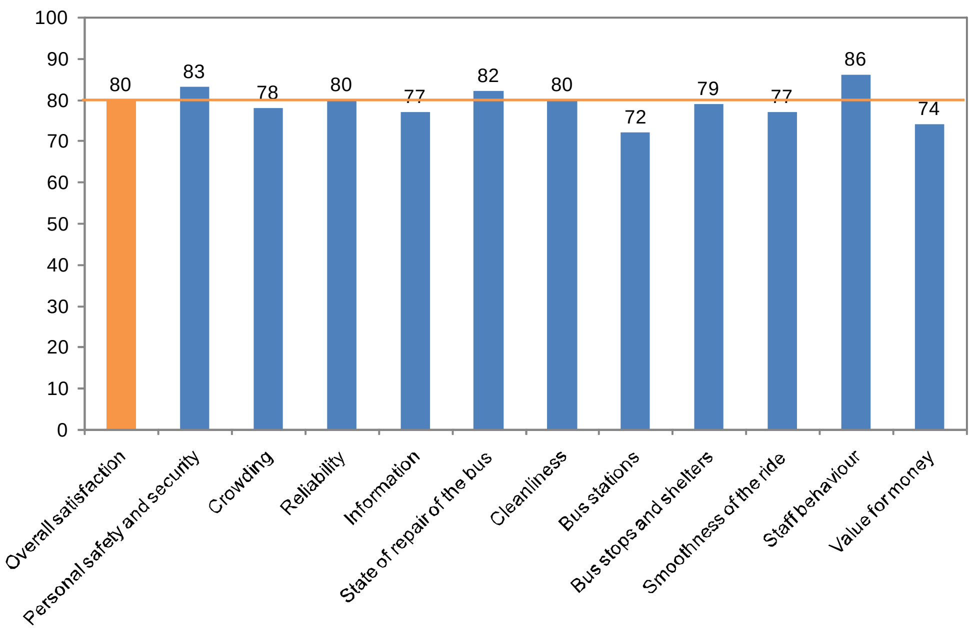
Figure 9.16 Overall satisfaction of bus passengers with their journey, 1998/99 to 2008/09.



Source: TfL London Buses Customer Satisfaction Surveys 1998 - 2009

As shown in Figure 9.17, bus passengers were most satisfied with staff behaviour and personal safety and security and least satisfied with bus stations and the value for money of the service. In particular, bus passengers gave a satisfaction rating of 78 out of 100 for the level of crowding on the bus in 2008/09.

Figure 9.17 Satisfaction of bus passengers with aspects of their bus journey.



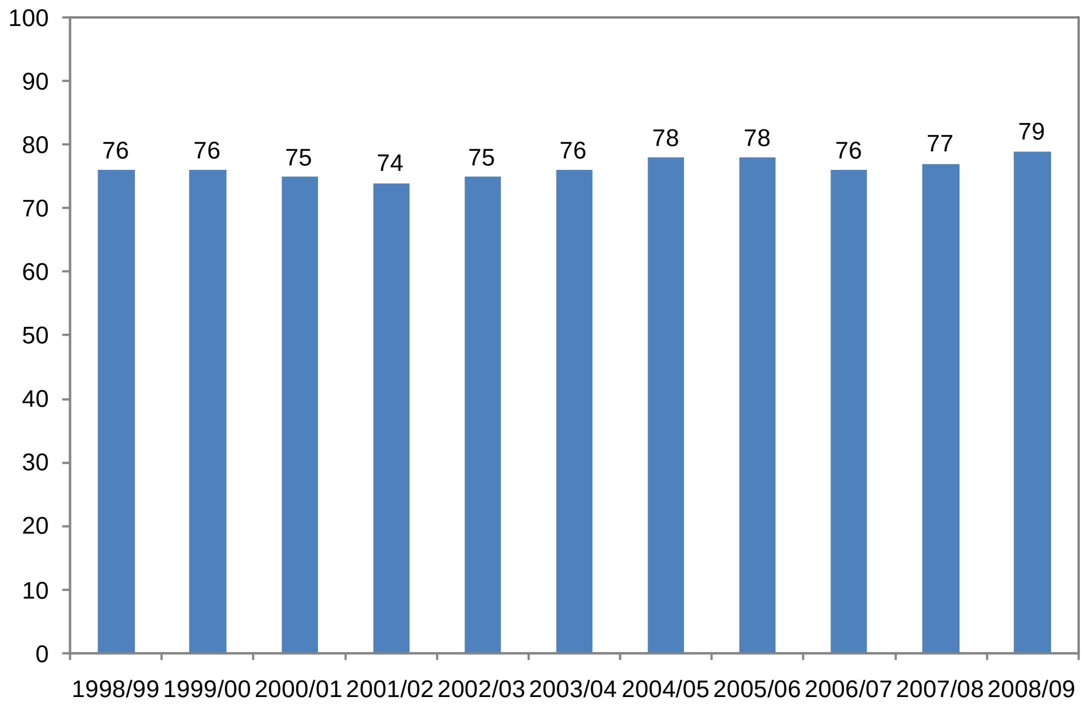
Source: TfL London Buses Customer Satisfaction Survey 2008/09

Customer satisfaction with LU services

LU carries out a continuous customer satisfaction survey consisting of 8,800 face-to- face interviews each year in stations across the network between 7am and 10pm, seven-days-a-week. Survey data are weighted to reflect frequency of use of the Underground, based on data from TfL's Underground Users Survey. Survey respondents are asked to rate their satisfaction, on a scale of 0 to 10, with various aspects of the service they received on the journey just made, including both station and on-train services, as well as their overall satisfaction with the quality of the journey. Responses are then converted into a mean score out of 100, which is presented here.

The mean score for satisfaction with Underground journeys in London was 79 out of 100 in 2008/09. This is the highest score ever achieved for satisfaction with LU, at 2 points higher than the score for the previous year. Figure 9.18 shows overall satisfaction scores for the period 1998/99 to 2008/09.

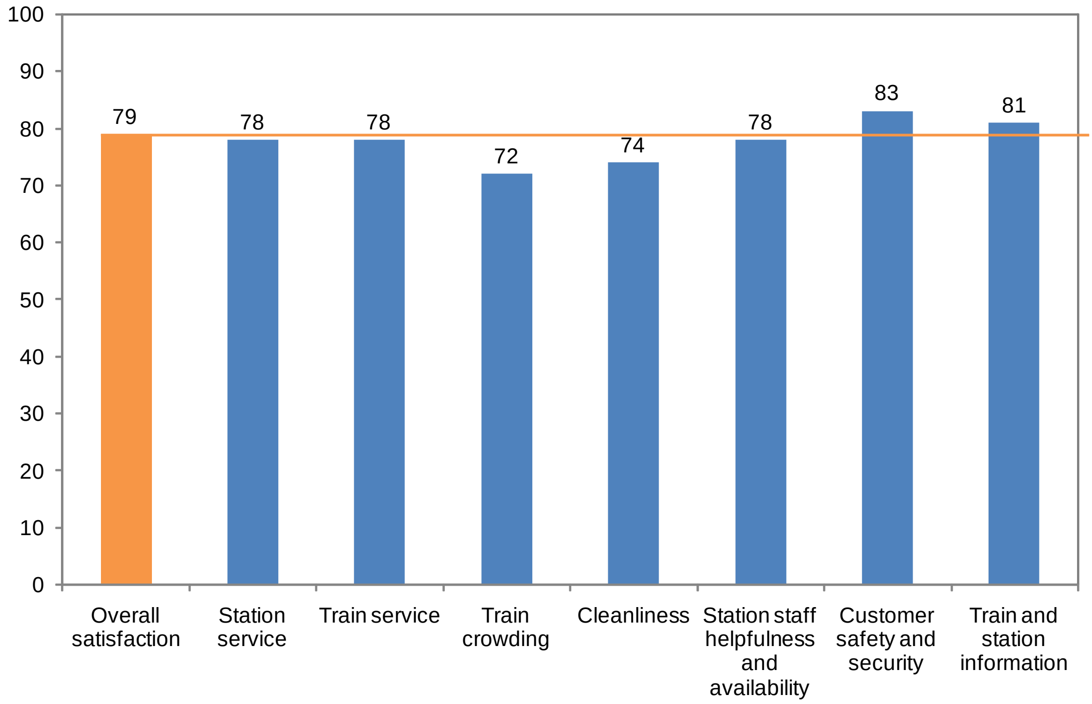
Figure 9.18 Overall satisfaction of Underground passengers with their journey, 1998/99 to 2008/09.



Source: TfL London Underground Customer Satisfaction Surveys 1998-2009

Figure 9.19 shows satisfaction of Underground passengers with aspects of the service. Passengers were most satisfied with safety and security (83 out of 100). This is also the least changeable aspect of customer satisfaction. They were least satisfied with the level of crowding on trains and with levels of cleanliness, although scores for both aspects remained fairly good, at 72 and 74 out of 100 respectively. Newer or newly refurbished train lines such as the Jubilee line tended to score better for cleanliness. As would be expected, passengers travelling on the most crowded lines, such as the Victoria and Central lines, were the least satisfied with the level of crowding experienced on their journey.

Figure 9.19 Satisfaction of LU passengers with aspects of their journey.



Source: TfL London Underground Customer Satisfaction Survey 2008/2009

Customer satisfaction with the DLR

The DLR carried out the first wave of a new customer satisfaction survey in Quarter 2 of 2008/09, consisting of face-to-face interviews with 1,000 passengers on-board DLR trains, or alighting trains at busy times, during operational hours, seven days a week. Survey respondents were asked to rate their satisfaction, on a scale of 0 to 10, with various aspects of the service they received on the journey just made, including both station and on-train services, as well as their overall satisfaction with the quality of the journey. Data are weighted to reflect passenger volumes by time of day and responses are then converted into a mean score out of 100, which is presented here.

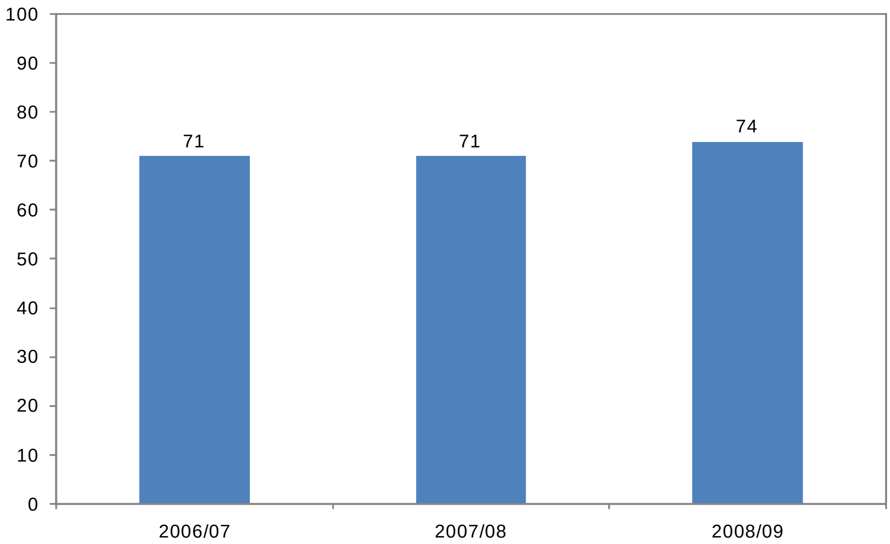
The mean score for satisfaction with DLR journeys was 79 out of 100 in 2008/09 and passengers gave a satisfaction rating of 79 out of 100 with the level of crowding on the train in 2008/09. Both scores are considered to be 'fairly good'. The survey found that, in general, passengers were most satisfied with the freedom from graffiti on the trains and stations, and with their personal safety at stations and during their journey. Note that as this is the first time the survey has been conducted, so results should be considered indicative only.

Customer satisfaction with London Overground services

London Overground carries out a quarterly customer satisfaction survey consisting of 700 face-to-face interviews carried out over a four week period each quarter (2,800 per year) with passengers on board trains across operational hours, seven-days-a-week. Data is weighted to reflect passenger counts on each route. Survey respondents are asked to rate their satisfaction, on a scale of 0 to 10, with various aspects of the service they received on the journey just made, including both station and on-train services, as well as their overall satisfaction with the quality of the journey. Responses are then converted into a mean score out of 100, which is presented here.

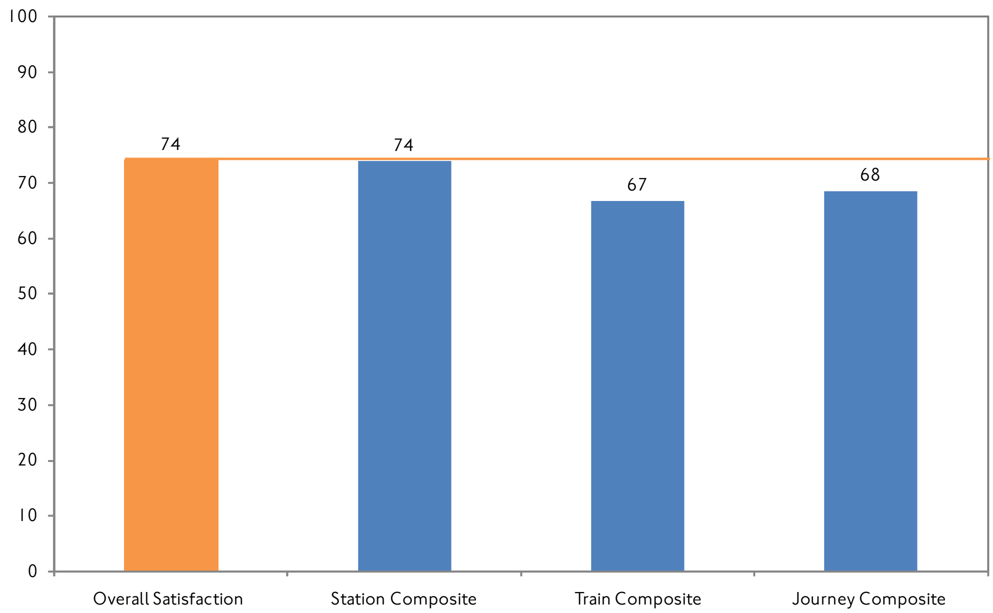
The mean score for satisfaction with London Overground journeys in London was 74 out of 100 in 2008/09; this is considered to be 'fairly good'. Overall satisfaction scores are presented in Figure 9.20, showing an increase between 2006/07 and 2008/09 following the start of the London Overground concession. Customer satisfaction is expected to increase as the current enhancement programme delivers new trains and higher frequency. As shown in Figure 9.21, passengers were more satisfied with the service provided at stations than with services on the train or during their journey.

Figure 9.20 Overall satisfaction of Overground passengers with their journey, 2006/07 to 2008/09.



Source: TfL London Overground Customer Satisfaction Surveys 2006 - 2009

Figure 9.21 Satisfaction of London Overground passengers with aspects of their journey.



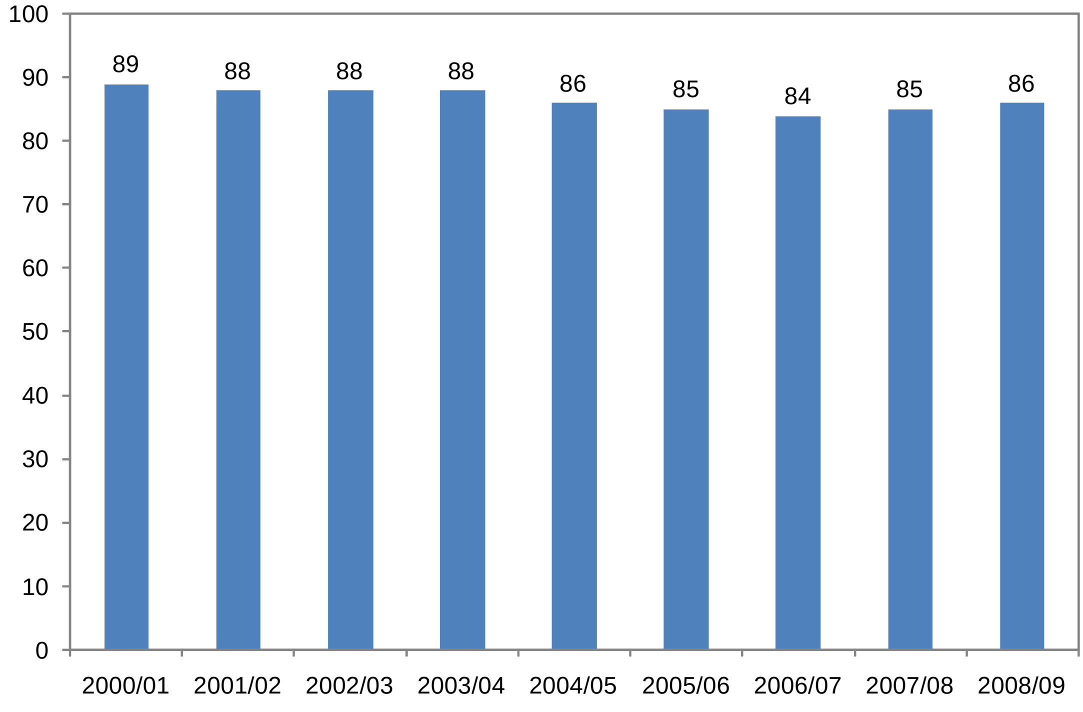
Source: TfL London Overground Customer Satisfaction Survey 2008/09 Note that only respondents who joined their train at a London Overground station are asked their satisfaction with the station

Customer satisfaction with London Tramlink services

Tramlink carries out a continuous customer satisfaction survey consisting of 880 face-to-face interviews carried out each year with passengers alighting from trams between 7.30am and 9pm at a sample of stops. Survey respondents are asked to rate their satisfaction, on a scale of 0 to 10, with various aspects of the service they received on the journey just made, as well as their overall satisfaction with the quality of the journey. Responses are then converted into a mean score out of 100, which is presented here.

The mean score for satisfaction with Tramlink journeys was 86 out of 100 in 2008/09; this is considered to be 'very good'. Overall satisfaction scores for the period 2000/01 to 2008/09 are shown in Figure 9.22. These show that customer satisfaction decreased somewhat in the mid 2000s, while remaining high, and is now showing upward movement. In particular, satisfaction with aspects such as the cleanliness of the travel environment deteriorated more rapidly than service aspects such as journey time reliability, which may simply reflect the fact that the assets were no longer brand new.

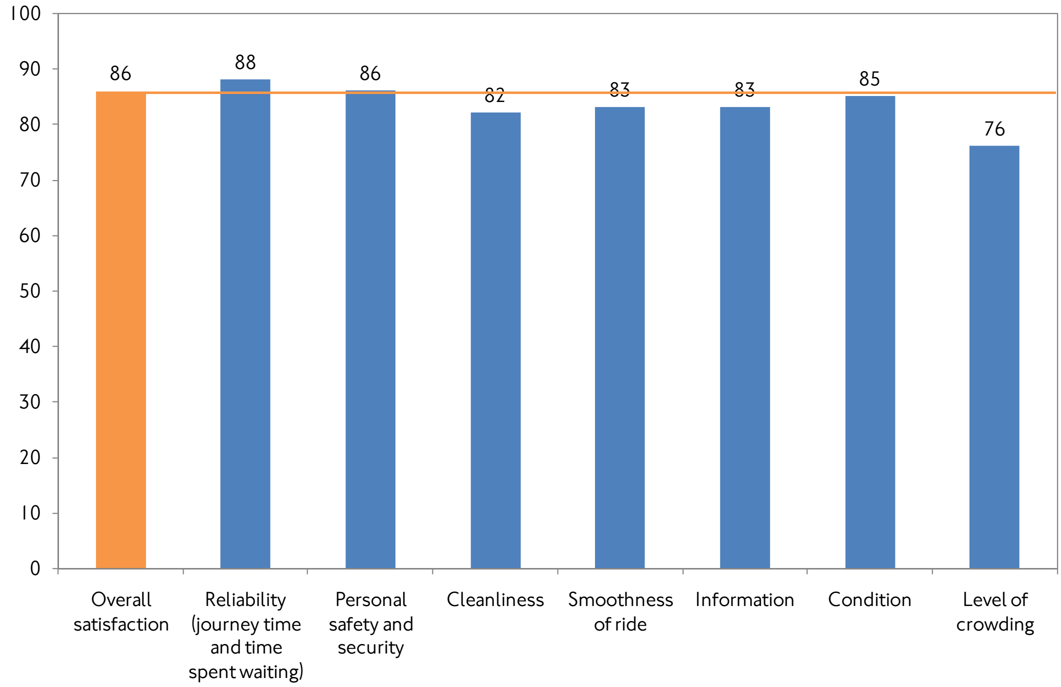
Figure 9.22 Overall satisfaction of Tramlink passengers with their journey, 2000/01 to 2008/09.



Source: TfL Tramlink Customer Satisfaction Surveys 2000-2009

As shown in Figure 9.23, nearly all aspects of the Tramlink service scored more than 80 out of 100 in terms of customer satisfaction, with only satisfaction with crowding consistently falling below this level. Tramlink passengers gave a satisfaction rating of 76 out of 100 with the level of crowding on the train in 2008/09, which was considered to be 'fairly good'. Tramlink passengers were most satisfied with the reliability of their journey (88 out of 100) and their personal safety and security (86 out of 100).

Figure 9.23 Satisfaction of Tramlink passengers with aspects of their journey.



Source: TfL Tramlink Customer Satisfaction Survey 2008/09

9.11 Road user customer satisfaction

Every day, 10.1 million trips are made in London by car or motorbike, accounting for more than 4 in 10 trips made in the Capital. The roads are also used for more than 6 million walk and cycle trips each day, by thousands of buses and are the means by which the vast majority of freight is moved in London. Congested and poorly-maintained roads can be uncomfortable and hazardous for pedestrians, cyclists and motor vehicle occupants, while unreliability and delays waste time and cause frustration amongst those travelling on the roads. An improved journey experience on the roads would reduce stress and discomfort, improving health and wellbeing.

This section describes road user satisfaction with the operation of the road network in London. All data relate to the financial year 2008/09 and are derived from two customer satisfaction surveys conducted during this period. The Street Management Customer Satisfaction Survey is carried out on an annual basis in February. It consists of a telephone survey of a representative sample of 1,000 London residents. The TLRN customer satisfaction survey is carried out on an annual basis in September. It consists of on-street surveys conducted with 2,000 respondents at various locations along the TLRN. These measures of road user attitudes and experiences should be understood alongside quantitative measures of the operation of the road network, as described in chapter 4 of this report.

MTS strategic outcome indicator: Road user satisfaction

Why this indicator is important

This indicator, alongside measures of congestion and journey time reliability presented in chapter 4 of this report, will provide TfL with an understanding of the experience of road users.

How this indicator is calculated

This indicator is defined in broad terms as the satisfaction of road users with the maintenance and operation of the road network. A detailed definition and methodology for collection and calculation are currently under development.

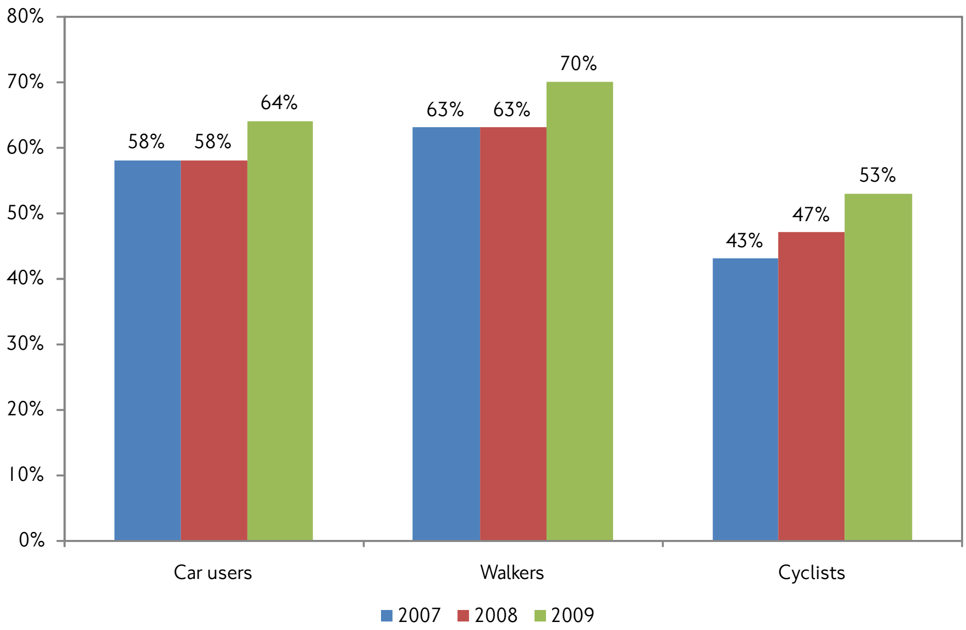
Current status

This indicator is under development. Methodological details will be reported in Travel in London 3.

Satisfaction with the quality of London's streets

Overall, satisfaction with the quality of streets and pavements has improved in the last three years and more residents were satisfied than dissatisfied (see Figure 9.24). In particular, road users who had walked on their most recent journey in London were the most satisfied with the condition of streets and pavements on that trip (70 per cent satisfied), and those who had cycled were the least satisfied (53 per cent satisfied).

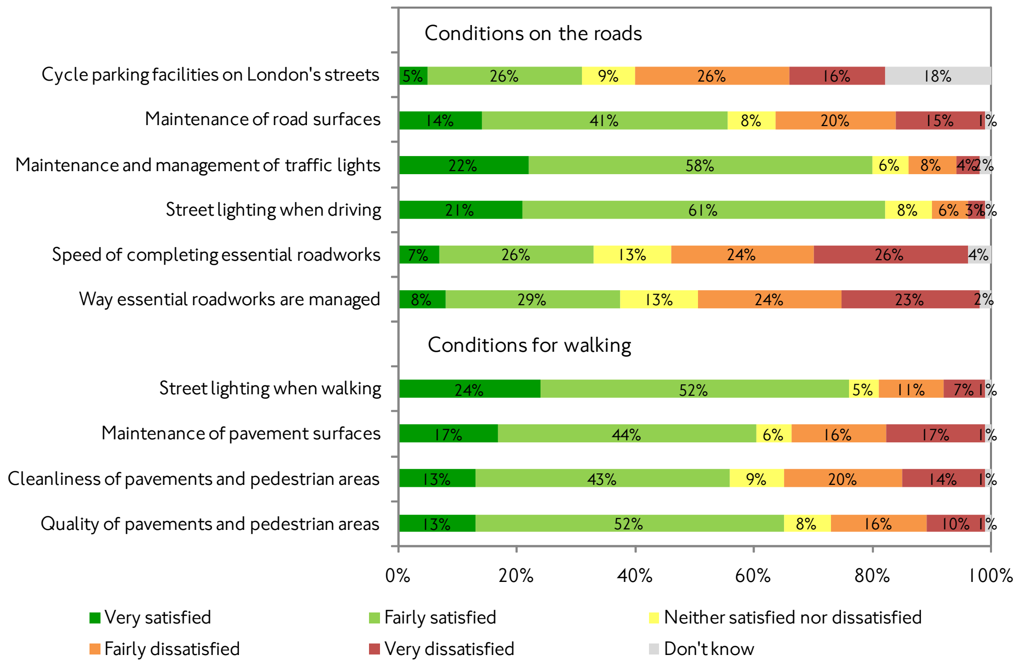
Figure 9.24 Overall satisfaction with streets and pavements, by road user type, London residents.



Source: TfL Streets Management Customer Satisfaction Survey 2009

When asked about specific aspects of the management and maintenance of streets and pavements, respondents were most satisfied with street lighting when driving and the management and maintenance of traffic lights, with more than 8 in 10 respondents satisfied with each (see Figure 9.25). Respondents were the least satisfied with cycle parking facilities on London's streets (31 per cent satisfied), and with both the speed of completing essential roadworks and the way they are managed (33 and 37 per cent satisfied respectively).

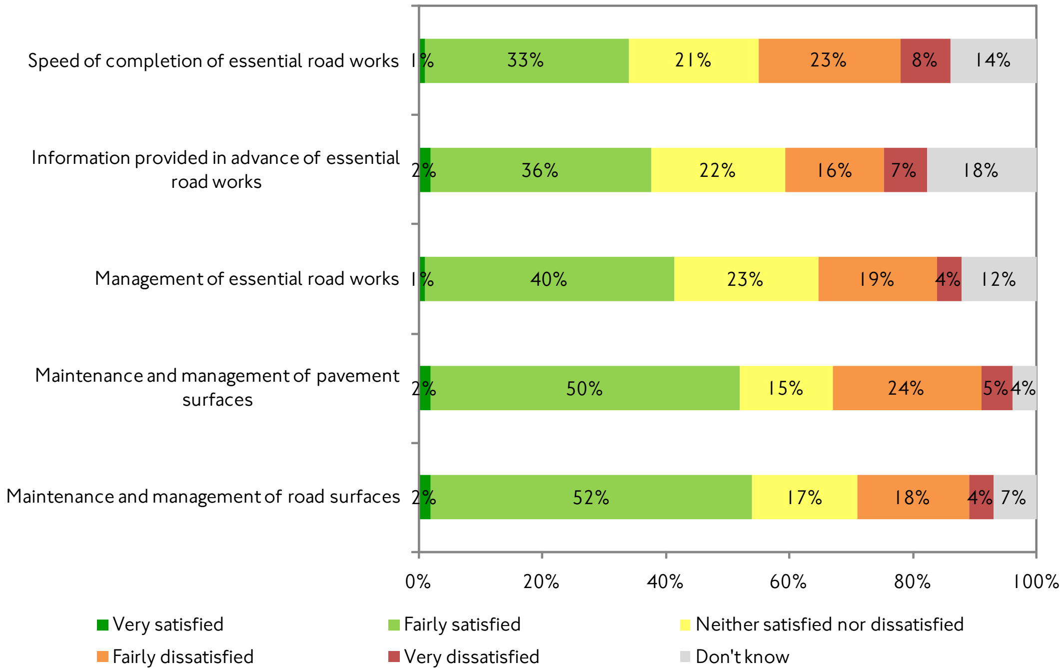
Figure 9.25 London residents' satisfaction with aspects of streets and pavements.



Source: TfL Streets Management Customer Satisfaction Survey 2009

Surveys carried out with people on-street at 24 sites on the TLRN also found the greatest levels of satisfaction with the maintenance and management of road surfaces, and the lowest levels of satisfaction with the speed of completing essential works (34 per cent), as shown in Figure 9.26.

Figure 9.26 Satisfaction with aspects of streets and pavements, people on-street on the TLRN.



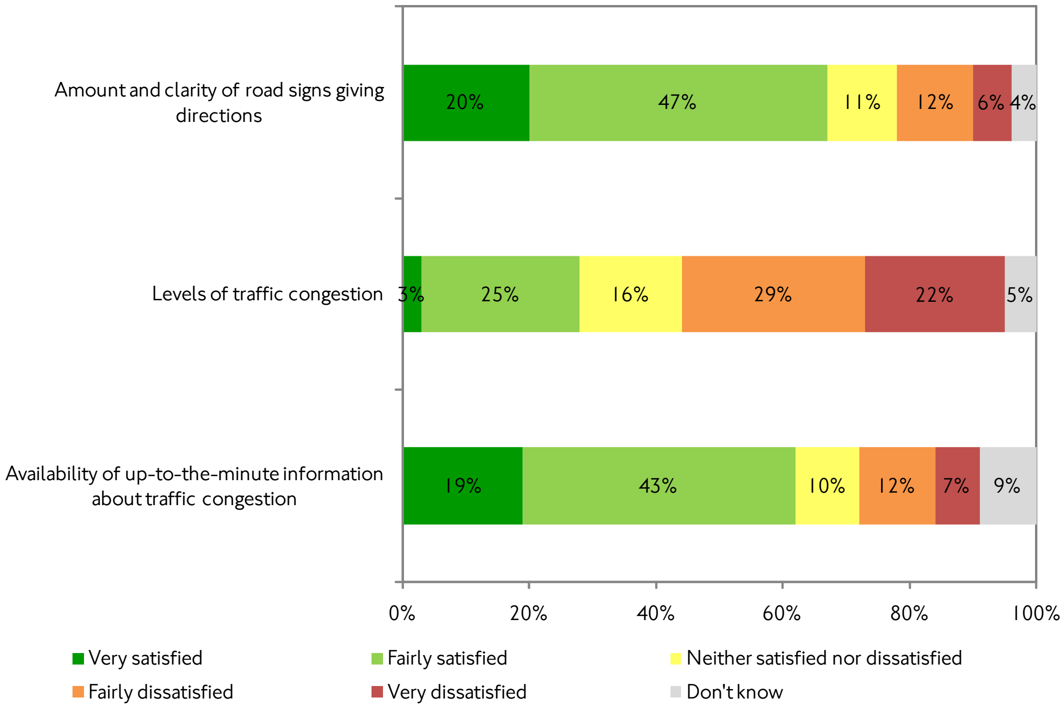
Source: TfL Streets (TLRN) Customer Satisfaction Survey 2009

Satisfaction with the travel experience on London's streets

London residents consider it very important to be able to estimate journey times accurately (88 per cent say this is important, including 60 per cent who say it is very important). Very few Londoners are dissatisfied with their ability to predict journey times for walk and cycle journeys (only 4 and 2 per cent respectively), whereas more than a third are dissatisfied with their ability to predict journey times by car – only 4 in 10 are satisfied. There has been little change over the past three years in satisfaction with the ability to predict journey times.

Similarly, London residents were more satisfied with the speed of their journeys on foot and by bike (88 per cent and 69 per cent respectively) than with the speed of their journeys by car, where less than half of those surveyed were satisfied (47 per cent) and more than 1 in 10 described themselves as 'very dissatisfied'. As around 85 per cent of London residents travelling by all modes felt that it was important that their journeys were fast, it is reasonable to conclude that car users are fairly dissatisfied with the travel experience on London's streets. When asked about particular aspects of the travel experience on London's streets, as shown in Figure 9.27, around two thirds of respondents said they were satisfied with the availability of up-to-the-minute information about traffic congestion (62 per cent) and with the amount and clarity of road signs giving route directions (67 per cent). However, only 28 per cent of respondents were satisfied with the level of traffic congestion on London's roads.

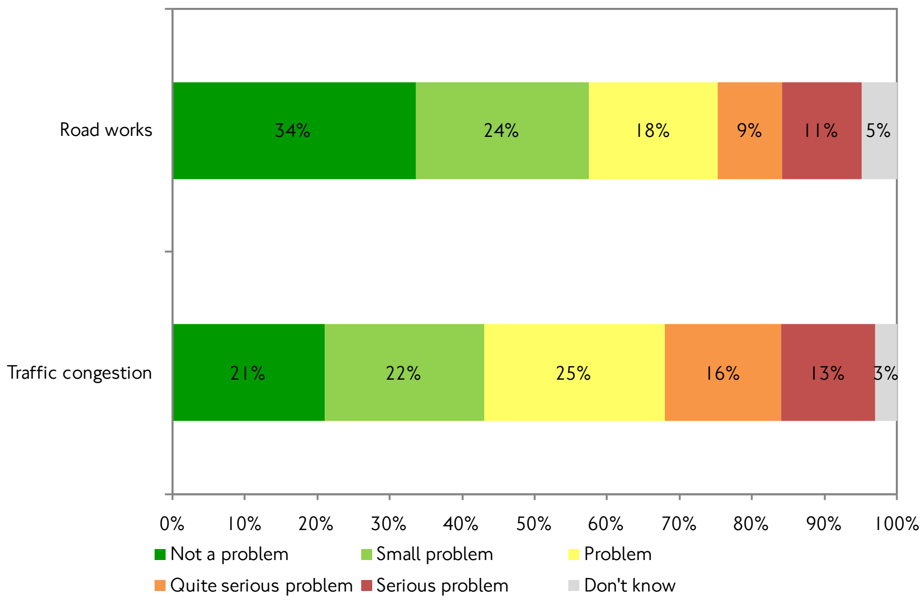
Figure 9.27 London residents' satisfaction with aspects of the travel experience on London's streets.



Source: TfL Streets Management Customer Satisfaction Survey 2009

Surveys carried out on the TLRN found that a quarter of respondents considered traffic congestion a problem, and a further 3 in 10 considered it a quite serious or serious problem. Those using the TLRN were less concerned about roadworks than congestion, but nevertheless 1 in 5 considered roadworks a quite serious or serious problem in the local area. Those travelling on the TLRN were more concerned than those travelling on the road network in general about roadworks (28 per cent compared to 21 per cent said roadworks were not a problem).

Figure 9.28 Satisfaction with aspects of the local area, people on-street on TLRN.



Source: TfL Streets (TLRN) Customer Satisfaction Survey 2009

9.12 Perception of journey experience

There is a tendency for transport professionals to consider the planning and operations of transport services on a modal basis, yet the experience of travellers on the network is of continual interaction and interchange between modes, including public and private transport, walking and cycling. This section explores London residents' perceptions of their overall journey experience while travelling in the city; this is intended to complement data regarding satisfaction with individual modes of transport. In particular, a new strategic outcome indicator has been developed measuring perceptions of journey experience, described below. Background information is presented to describe which aspects of travel in London residents are most satisfied with, as well as whether the experience of travelling in London has got better or worse in the past year, and why. Note that modal customer satisfaction surveys are carried out with travellers on that mode, including both residents and non-residents, so care should be taken in comparing the findings. Results are presented for London as a whole and for each of the London sub-regions.

MTS strategic outcome indicator: Perception of journey experience

Why this indicator is important

This indicator is intended to reflect the overall experience of the London transport network by exploring the journey experience of London residents. It will be complemented by separate indicators measuring satisfaction with individual modes, and with public and road transport overall.

How this indicator is calculated

The indicator is defined as the 'overall level of satisfaction of London residents, on a scale of 0 to 10, with travelling in London'. Responses are converted into a mean score out of 100. The indicator is derived from the new Perceptions of the Travel Environment survey which will be carried out on an annual basis from November 2009. The survey consists of telephone interviews with a representative sample of 1,000 London residents selected randomly within each household sampled.

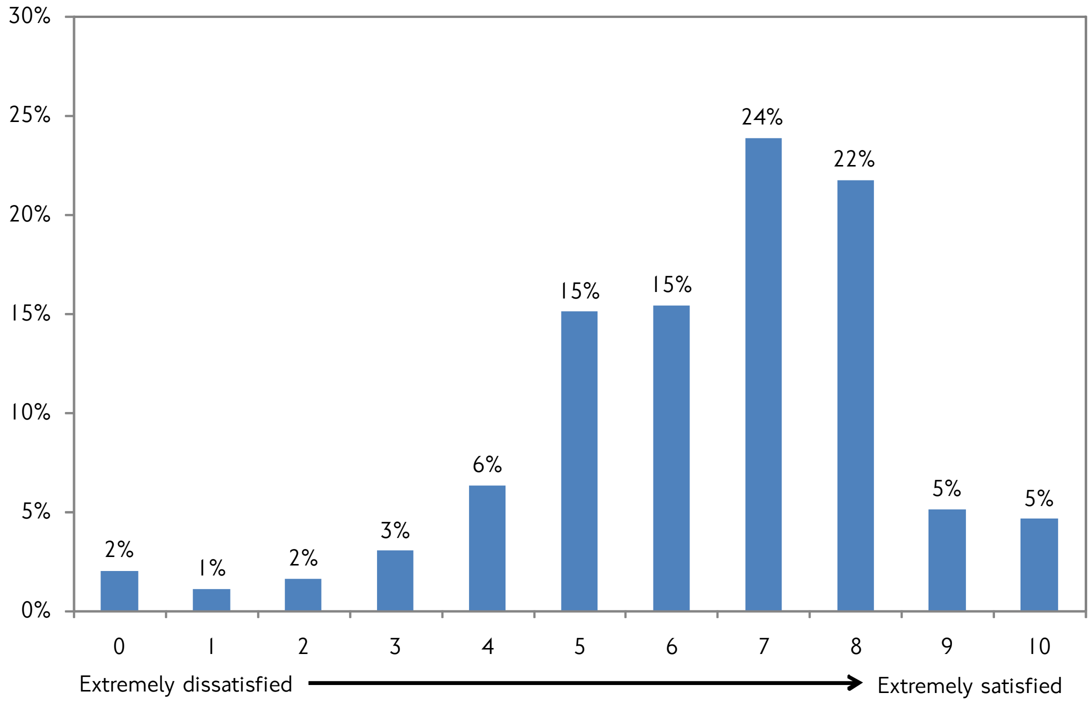
Value for 2009 calendar year

The mean score for satisfaction with travelling in London was 64 out of 100. As this is the first year of the survey, no comparisons are possible. However, in general TfL considers a score of 64 in satisfaction surveys to be 'relatively poor'.

Perception of overall journey experience

The mean score for satisfaction with journey experience while travelling in London was 64 out of 100. This is considered to be a 'relatively poor' score. Figure 9.29 shows the distribution of scores, on a scale of 0 to 10.

Figure 9.29 London residents' satisfaction with journey experience when travelling in London.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

When asked which aspects of travelling in London they were most and least satisfied with, London residents commonly mentioned the main modes of public transport as being both the most and least satisfactory. So, for example, 31 per cent of respondents stated, unprompted, that they were most satisfied with the bus service in London, while 18 per cent said that the bus service was what they were least satisfied with. Other than the main public transport modes, the aspects of travel in London that residents were most satisfied with included the frequency of services (19 per cent), the connectivity and accessibility of services (11 per cent), the punctuality of services (8 per cent) and the ease and convenience of travelling in London (7 per cent). Contrarily, the aspects of travel in London that residents were least satisfied with were crowding (23 per cent), delays and disruptions (16 per cent), engineering works, cancellations and weekend closures (13 per cent), the cost of fares, congestion on the road network and poor frequency of services (all 9 per cent).

People in social class DE (including semi-skilled and unskilled manual workers, the unemployed and those on state benefits) and people with a disability were more likely than other groups to be very satisfied with their journey experience whilst travelling in London. Older people, aged 55 and above, were also more likely to be satisfied with their travel experience. Middle aged people (aged 35 to 54) were the least satisfied with their journey experience whilst travelling in London. Hypothetically, this may relate in part to relatively high levels of satisfaction with the bus service, since these are the groups most likely to use bus as their main mode of transport.

It is striking that most responses relate to the provision of public transport by TfL. This may be more a reflection of public understanding of the role of TfL than of actual journey experiences in London; it seems possible that respondents, when asked this question, have concentrated on their experiences of the public transport network and not given as much consideration to their experiences when travelling by car, walking or cycling.

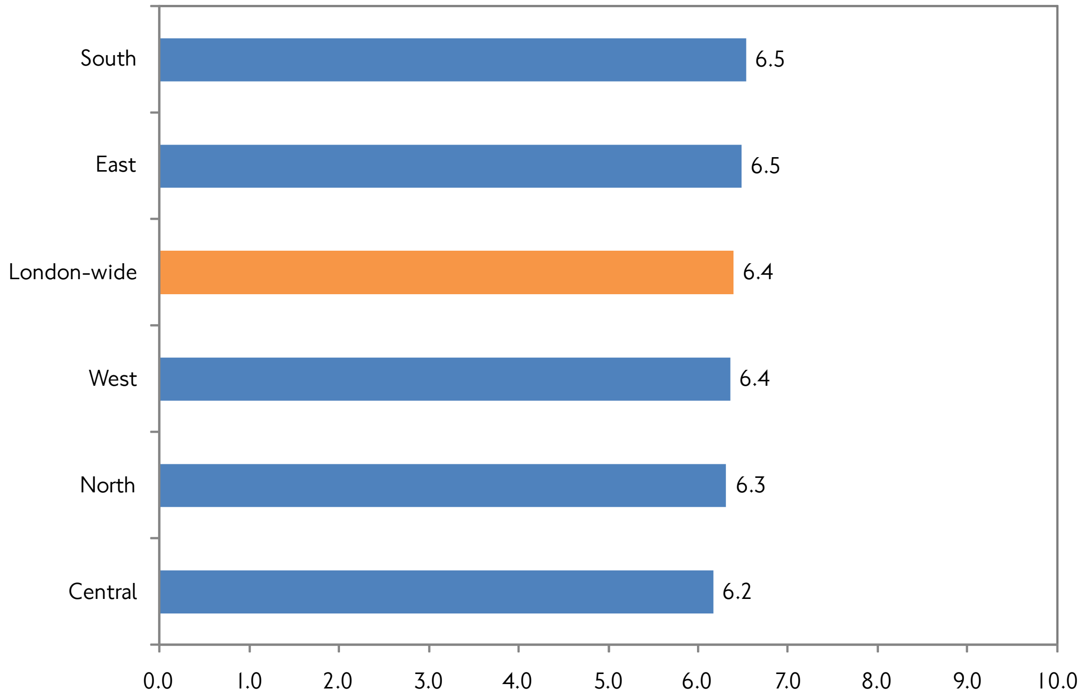
Whether journey experience has got better or worse over the past year

London residents were more likely to say that travelling in London has got better rather than worse over the past year (28 per cent compared to 20 per cent) and nearly half considered that the travel experience had remained the same (47 per cent). In particular, those who considered that travelling in London had improved over the past year were most likely to say this was because of improvements to the bus service (26 per cent), increased frequency of services (23 per cent) or additional services and routes (12 per cent). Those who felt travelling in London had worsened were most likely to say this was because of delays and disruptions to services (26 per cent), overcrowding (25 per cent), increased congestion or traffic on the roads (15 per cent) and the cost of fares and fares increases (13 per cent).

Journey experience across the London sub-regions

As shown in Figure 9.30, levels of satisfaction with journey experience were very similar across the sub-regions, with no significant differences visible. Residents of the central sub-region were more likely than residents of other sub-regions to mention the frequency and connectivity of services (25 per cent compared to between 14 and 21 per cent, and 16 per cent compared to between 7 and 12 per cent) as reasons for satisfaction. Residents of the south and east sub-regions were the most likely to mention train services (26 and 20 per cent compared to between 7 and 16 per cent for residents of other sub-regions) and the punctuality of services (12 and 10 per cent compared to between 2 and 8 per cent) as reasons for satisfaction. Residents of the north and west sub-regions were the most likely to mention Underground services (38 and 32 per cent compared to between 21 and 28 per cent) as reasons for satisfaction.

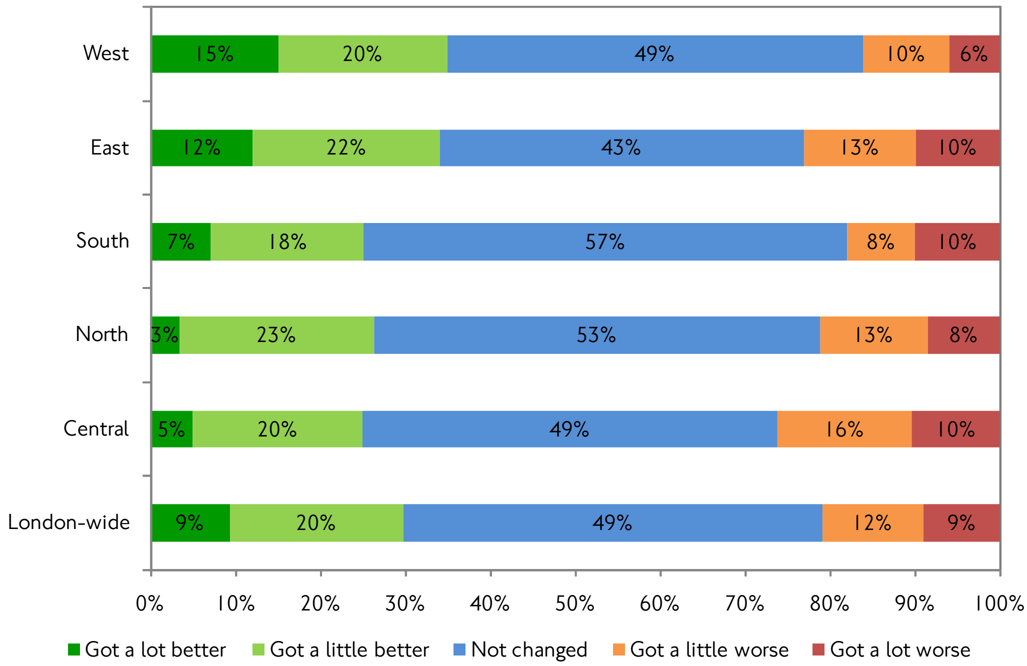
Figure 9.30 Satisfaction with journey experience when travelling in London, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Residents of the central sub-region were the most likely to say that travel in London had worsened over the past year, whereas residents of the east and west sub-regions were the most likely to say it had improved (as shown in Figure 9.31).

Figure 9.31 Whether journey experience when travelling in London has improved or worsened over past year, residents by sub-region.



Note: Total presented excluding 'Don't know' responses
Source: TfL Perceptions of the Travel Environment Survey, November 2009

9.13 Perception of the urban realm

The transport network forms a large part of London's urban realm – roads, streets, and stations are all a part of the urban landscape and their design and maintenance affects the look and feel of the Capital. High quality public spaces can bring communities and people together, encourage physical activity and recreation, restore a sense of pride in an area and attract businesses and jobs. Improving London's street scene is a core Mayoral priority, encompassing major initiatives such as at Exhibition Road in South Kensington, as well as smaller town centre schemes and design and maintenance principles that can be rolled out city-wide. This section explores London residents' perceptions of streets, pavements and public spaces in their local area. In particular, a new strategic outcome indicator has been developed measuring perceptions of the urban realm, described below. The background information is presented to describe which aspects of the urban realm residents are most satisfied with, as well as whether these have got better or worse in the past year, and why. Results are presented for London as a whole and for each of the London sub-regions.

MTS strategic outcome indicator: Perception of the urban realm

Why this indicator is important

This indicator will measure the perceptions of London residents of the quality of the urban realm in their local area, to inform understanding of the impact of the transport network on the urban environment and on the quality of life.

How this indicator is calculated

The indicator is defined as the 'level of satisfaction of London residents, on a scale of 0 to 10, with the quality of streets, pavements and public spaces in the area where they live'. Responses will be converted into a mean score out of 100.

The indicator will be derived from a new annual TfL survey. The survey will be carried out in autumn of each year, from November 2009 and consists of telephone interviews with a representative sample of 1,000 London residents, selected randomly within each household sampled.

In addition to the key indicator, supporting information derived from the survey will be presented exploring perceptions of different aspects of the urban realm, including design, maintenance, cleanliness, safety, and way finding. Survey respondents are asked to consider whether the quality of streets, pavements and public spaces in their local area has got better or worse in the past year, and why. Results will be presented for London as a whole and for each of the London sub-regions.

Value for 2009 calendar year

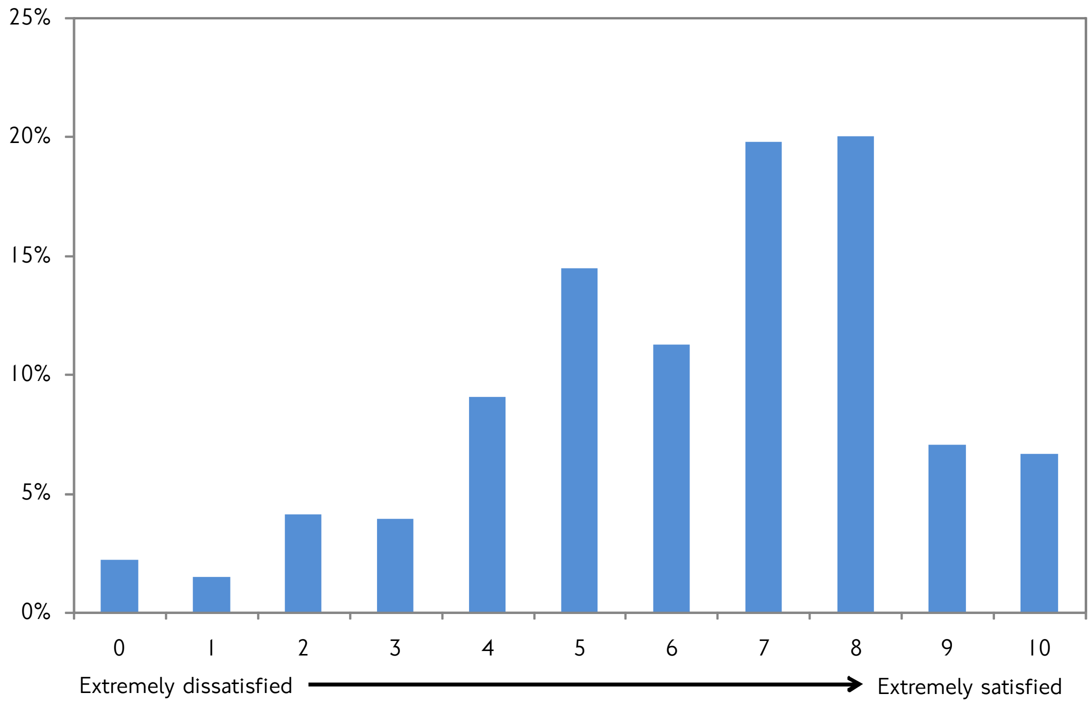
The mean score for satisfaction with the quality of streets, pavements and public spaces in London was 63 out of 100. As this is the first year of the survey, no comparisons are possible. However, in general TfL considers a score of 63 in satisfaction surveys to be 'fairly poor'.

Perception of streets, pavements and public spaces

The mean score for satisfaction with the quality of streets, pavements and public spaces was 63 out of 100. This is considered to be a 'relatively poor' score. Figure 9.32 shows the distribution of scores, on a scale of 0 to 10.

In general, there was little difference in attitudes to the urban realm across most demographic groups. However, women were more likely than men to be dissatisfied with the quality of streets, pavements and public spaces in their local area, with more than half saying they were dissatisfied (51 per cent compared to 42 per cent).

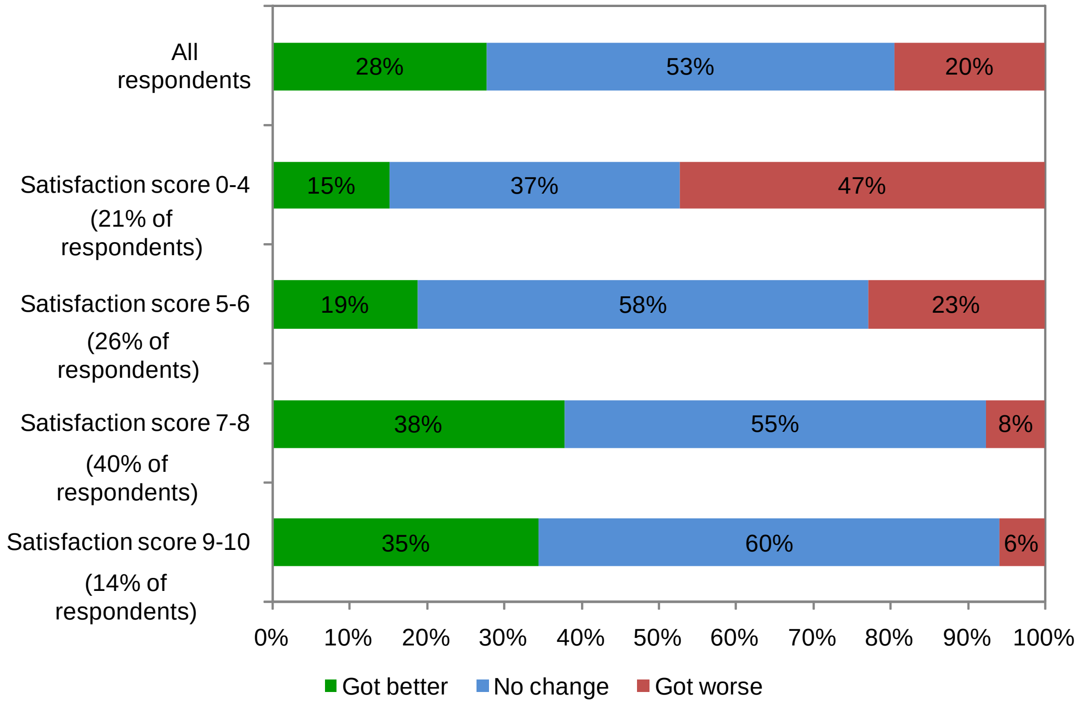
Figure 9.32 London residents' perception of streets, pavements and public spaces in their local area.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

As shown in Figure 9.33, more than 9 in 10 of those who were the most satisfied with the quality of streets, pavements and public spaces in their local area (score of 7 or above, 54 per cent of respondents) thought that things had stayed the same or improved over the past year. However, of the 1 in 5 respondents who were the least satisfied with the quality of the urban realm in their area (score of 0 to 4), nearly half thought that the situation had worsened over the past year. Thus, there is a significant minority who are becoming increasingly dissatisfied with the condition of the streets.

Figure 9.33 London residents' perception of streets, pavements and public spaces in local area by whether have got better or worse.



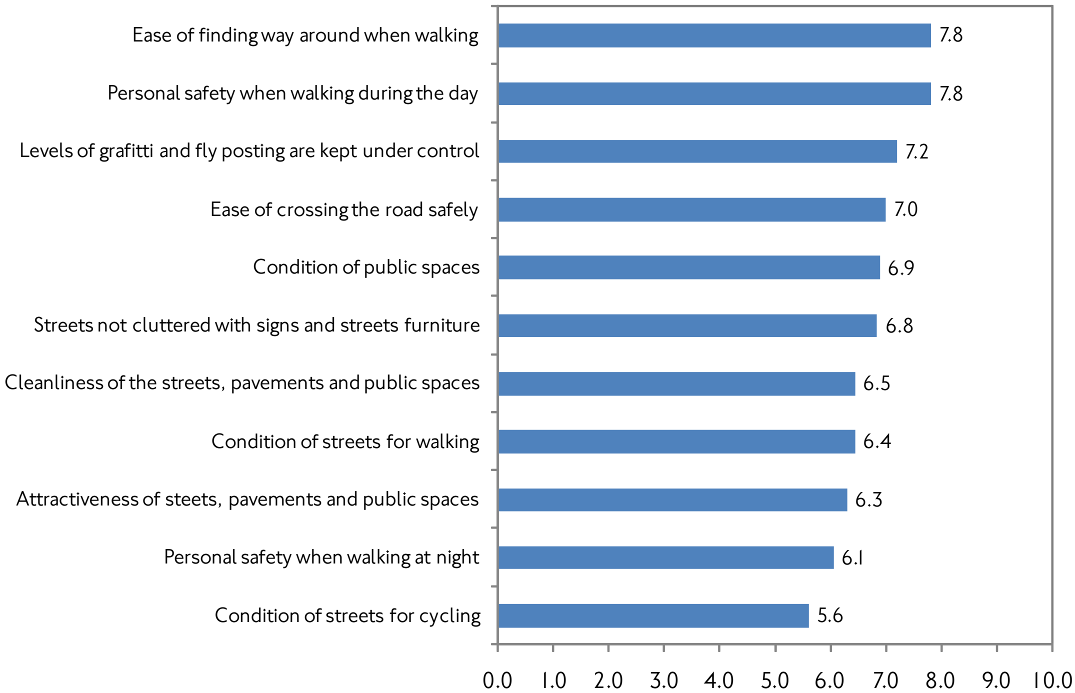
Source: TfL Perceptions of the Travel Environment Survey, November 2009

Reasons commonly given by those who were satisfied with the quality of the urban realm were that the pavements are of good quality or have been repaired (12 per cent), that regular cleaning takes place (11 per cent) and that there are pleasant parks and open spaces in the area (9 per cent). Reasons commonly given by those who were less satisfied with the quality of the urban realm were poor quality pavements (45 per cent), poor quality road surfacing (25 per cent), and dirty streets and pavements, litter and dog mess (23 per cent). Notably, poor pavement and road maintenance and cleaning were the most common complaints, and also the most commonly cited reasons for the quality of the urban realm having been seen to deteriorate over the past year. Respondents who thought that the situation had improved said that pavement repairs (22 per cent), improvements to parks and open spaces (15 per cent), cleaning (11 per cent) and road repairs (11 per cent) had contributed the most to this.

Perception of aspects of the urban realm

As shown in Figure 9.34, the aspects of the urban realm that London residents were most satisfied with in their local area were the ease of way finding when walking (mean score 7.8) and personal safety when walking during the day (mean score 7.8). Conversely, the aspects respondents were least satisfied with were the condition of streets for cycling (mean score 5.6) and the attractiveness of streets, pavements and public spaces (mean score 6.1).

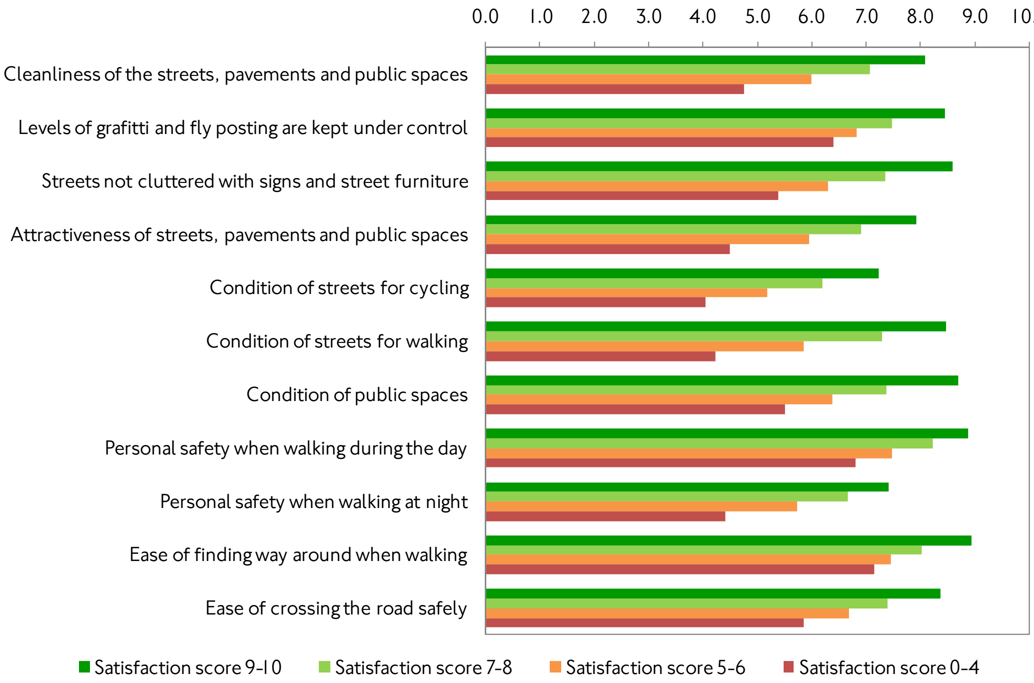
Figure 9.34 London residents' mean satisfaction scores for aspects of the urban realm in local area.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Figure 9.35 shows mean satisfaction scores for aspects of the urban realm, by overall level of satisfaction with the quality of streets, pavements and public spaces. The specific aspects which all respondents, including the least satisfied overall, were the most satisfied with were personal safety when walking during the day and the ease of way finding when walking (with mean scores of 6.8 and 6.4 respectively for those least satisfied overall). The aspect where the satisfaction of those who were most satisfied and least satisfied differed the most was the condition of the streets for walking, where the mean score of those most satisfied (8.5) was more than twice that of those least satisfied (4.2).

Figure 9.35 London residents' mean satisfaction scores for aspects of the urban realm in local area, by overall satisfaction with the quality of streets, pavements and public spaces.

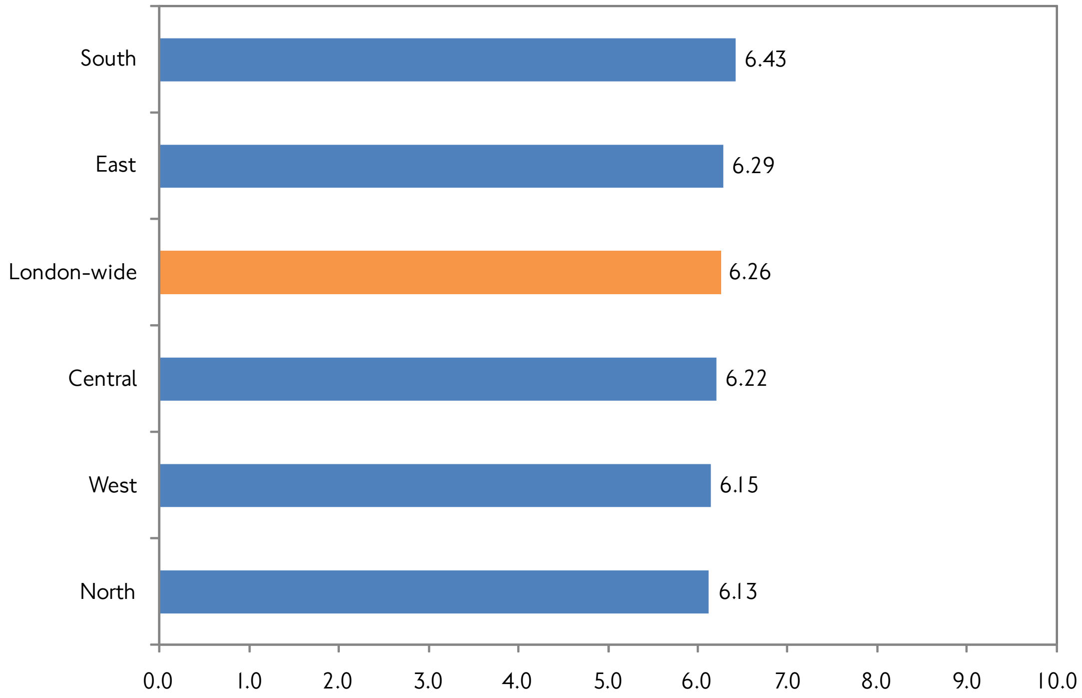


Source: TfL Perceptions of the Travel Environment Survey, November 2009

Perception of the urban realm across the London sub-regions

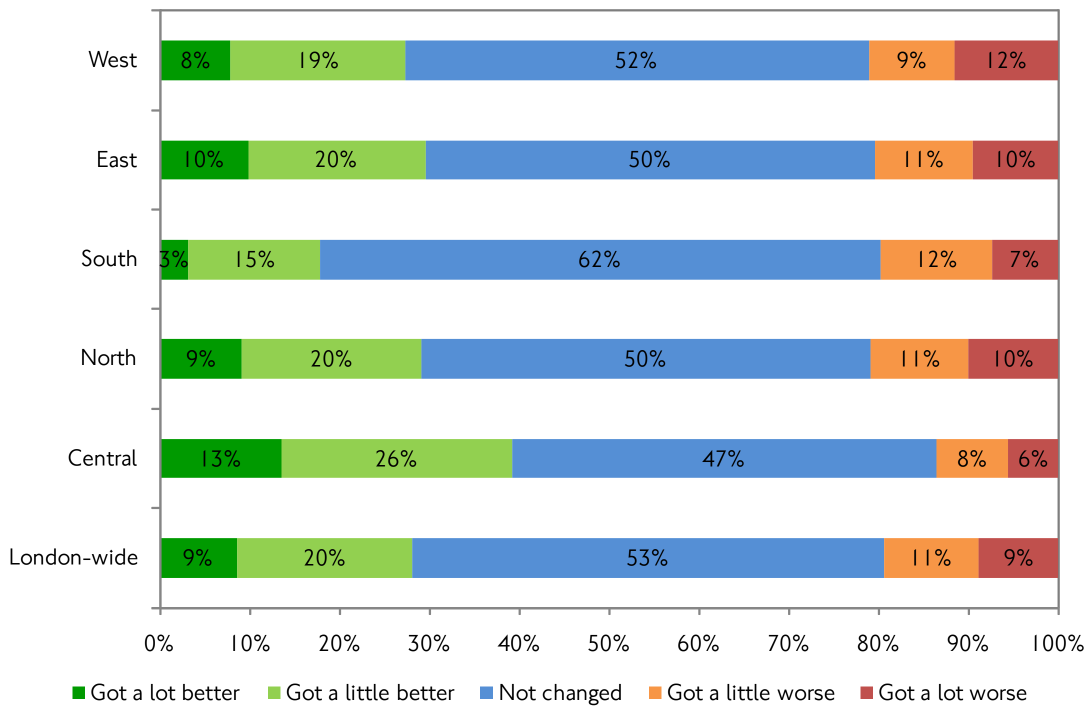
As shown in Figure 9.36, levels of satisfaction with the quality of the urban realm are similar across all sub-regions, with residents of the south sub-region most satisfied (mean score of 6.4) and residents of the north and west sub-regions the least satisfied (mean scores of 6.1 and 6.2 respectively). Similarly, across most sub-regions around 8 in 10 respondents think that the quality of the urban realm has improved or remained the same over the past year (see Figure 9.37). Residents of the central sub-region are more positive, with nearly 1 in 4 stating that the quality of the urban realm has improved over the past year, and nearly half believing it has remained the same.

Figure 9.36 Perception of streets, pavements and public spaces in local area, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Figure 9.37 Whether the quality of streets, pavements and public spaces in local area has improved or worsened, residents by sub-region.

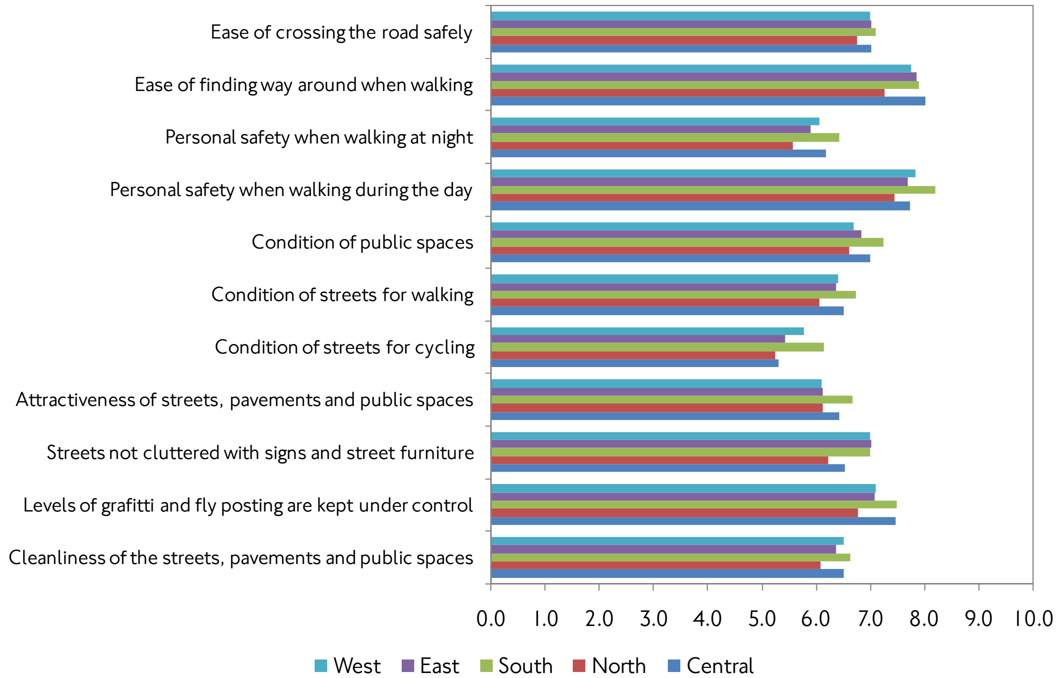


Source: TfL Perceptions of the Travel Environment Survey, November 2009

Figure 9.38 compares the mean satisfaction scores of residents for aspects of the urban realm, by sub-region. Residents of the south sub-region were the most consistently satisfied with aspects of the urban realm and had the highest mean satisfaction scores for 10 out of 11 of the aspects covered in the survey. Residents of the north sub-region were the least satisfied, with the lowest mean scores across all aspects.

The aspects with the biggest differential between the highest and lowest mean satisfaction scores were satisfaction with the condition of streets for cycling, where scores varied from 5.3 in the north and central sub-regions to 6.2 in the south sub-region, and personal safety when walking at night, where scores varied from 5.6 in the north sub-region to 6.4 in the south sub-region. The aspect with the lowest differential between the sub-regions was satisfaction with the ease of crossing the road safely, where mean scores ranged from 6.8 in the north sub-region to 7.1 in the south sub-region.

Figure 9.38 Mean satisfaction scores for aspects of the urban realm in local area, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

9.14 Transport–related noise in London

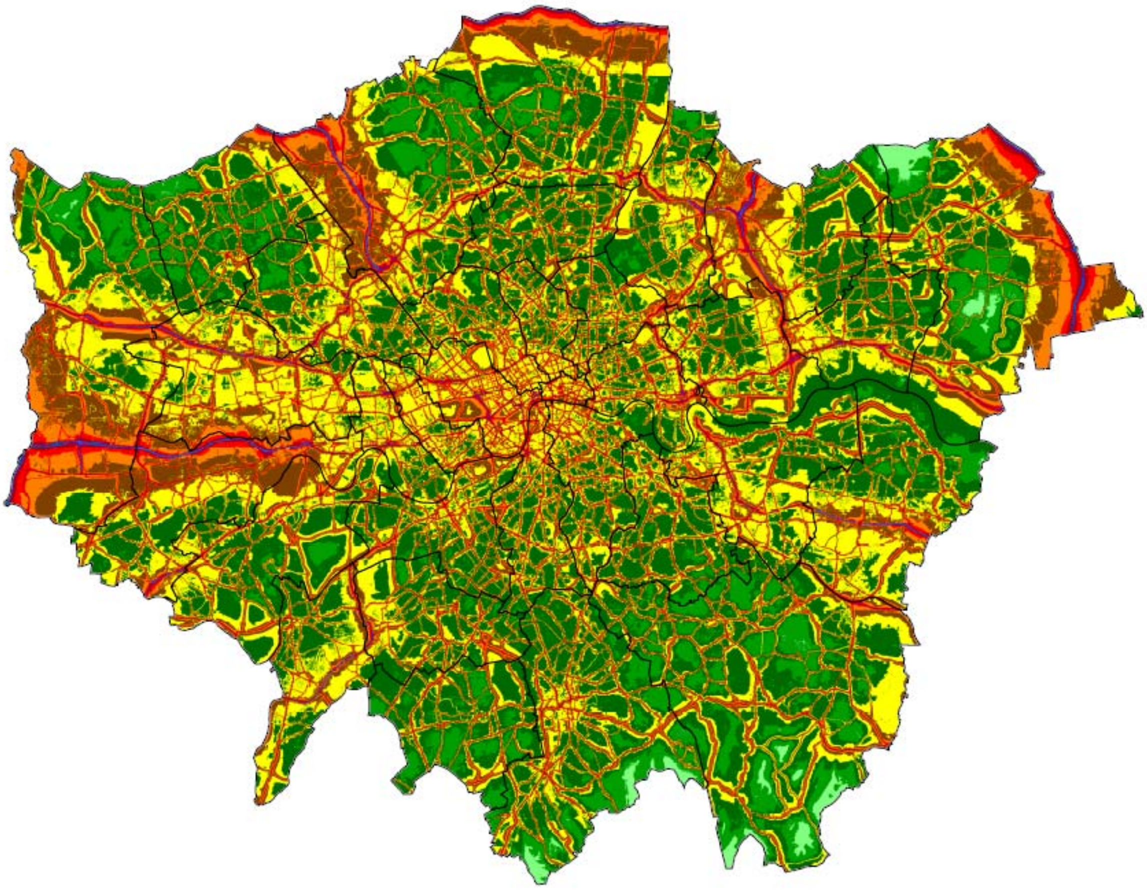
Measuring noise levels in London

Ambient noise is an important facet of quality of life for many Londoners. Ambient noise from transport in London is higher than elsewhere in the country, and this can negatively influence an individual's health and well being, leading to increased anxiety and sleep disruption. The experience of excess noise can be associated with cardiovascular disease, through increased hypertension. A fifth of Londoners are annoyed or disturbed by noise compared with 1 in 10 nationally – and thus minimising noise will have benefits for the quality of life for those who live, visit or work in the Capital.

Noise is a complex subject – for example, there is an important difference between noise that is largely continuous, such as 'background' traffic noise, and noise that is intermittent, such as that from aircraft or roadworks. Furthermore, human perception of noise is conditioned by a range of social and environmental factors, and relatively small changes – although significant in noise measurement terms – are often outside the perceptual range of people. Consequently, measuring and mapping the London noise climate is a developing science.

Defra has recently produced noise maps for large urban agglomerations in England. The map for London is reproduced in Figure 9.39. Note that this only includes noise from transport sources (roads, railways and aircraft in flight), together with noise from larger industrial premises. It does not include noise from domestic sources, such as loud music, or transient events such as roadworks.

Figure 9.39 Ambient noise map for London.



Source: Defra

As would be expected, the highest noise levels are closely associated with the major roads, sections of the M25 motorway being clearly visible where it impinges into Greater London. The easterly approach to Heathrow airport is also clearly visible, together with other major roads within London. Also notable is a general tendency towards higher noise levels towards the centre of London.

Measuring perceptions of the experience of noise

Alongside the measurement and mapping of noise levels in the Capital, it is necessary to understand noise as experienced by London residents. A new MTS SOI has been developed measuring perceptions of noise, described below, and background information is presented to describe perceptions of noise in London. Survey respondents are asked to consider the extent of noise from different modes of transport in their area, the extent to which they are disturbed by noise from transport and the impact of this on their quality of life, and finally whether noise in their local area has got better or worse in the past year. Results are presented for London as a whole and for each of the London sub-regions.

MTS strategic outcome indicator: Perception of noise

Why this indicator is important

This indicator will provide evidence of the extent of disturbance caused to London residents by noise from transport and, over time, will indicate the effectiveness of measures taken to reduce or mitigate this noise.

How this indicator is calculated

The indicator is defined as the 'level of satisfaction of London residents, on a scale of 0 to 10, that transport-related noise levels in the area where they live are reasonable'. Responses will be converted into a mean score out of 100. The indicator is derived from the new Perceptions of the Travel Environment survey, described above, which will be carried out on an annual basis from November 2009.

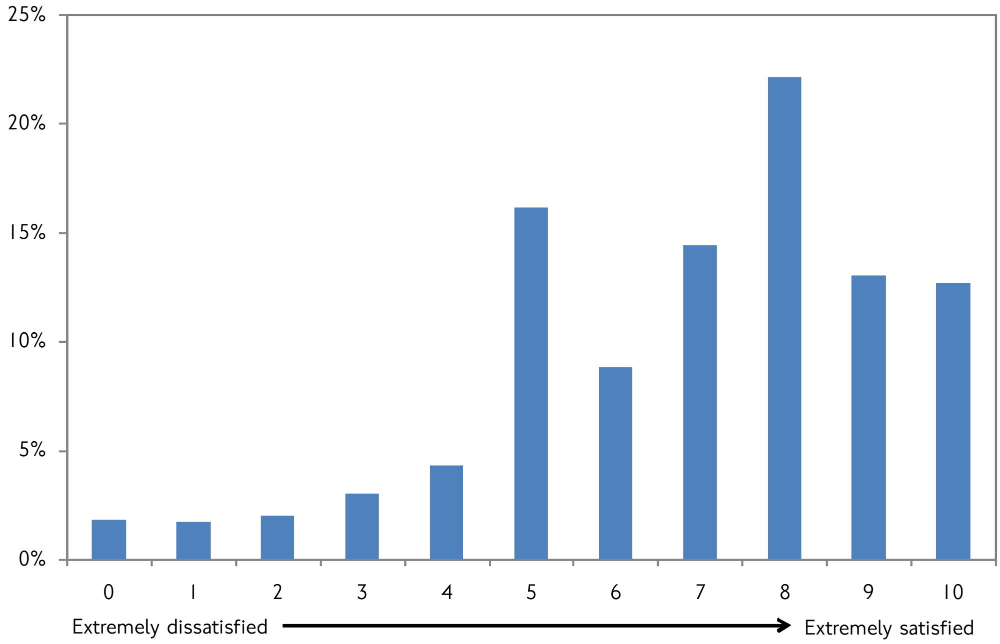
Value for 2009 calendar year

The mean score for satisfaction with transport-related noise levels in London was 70 out of 100. As this is the first year of the survey, no comparisons are possible. However, in general TfL considers a score of 70 in satisfaction surveys to be 'fairly good'.

Perception of general noise levels in London

The mean score for satisfaction with general noise levels in London was 69. This is considered to be a 'fair' score. Figure 9.40 shows the distribution of scores, on a scale of 0 to 10.

Figure 9.40 London residents' perception of general noise levels in London.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

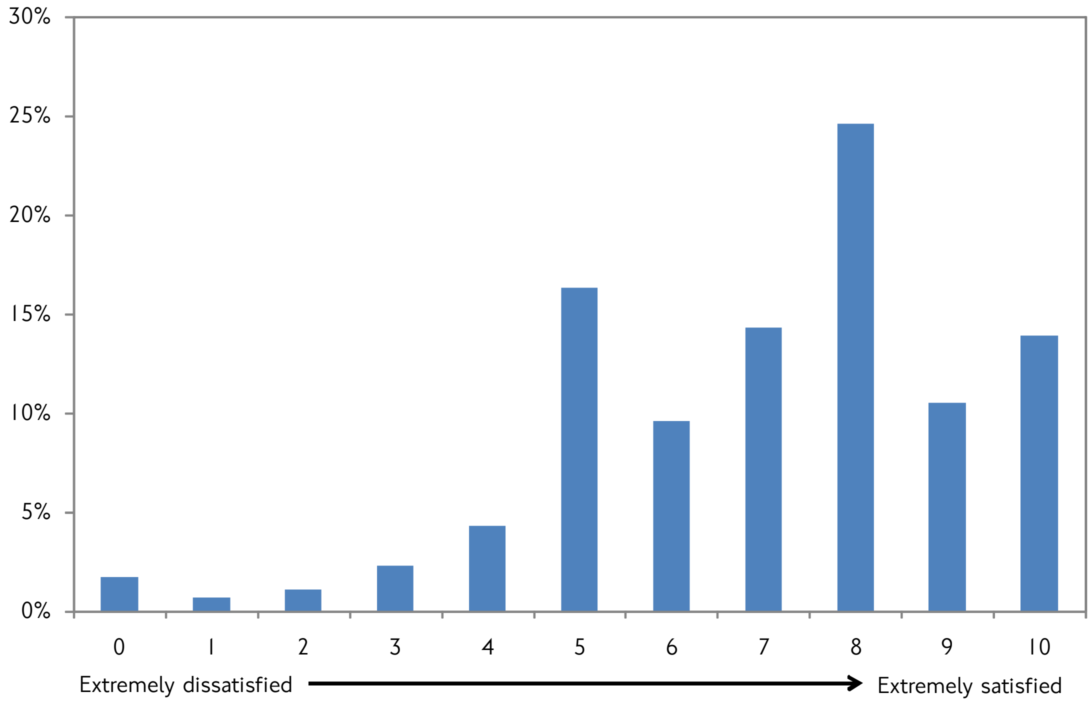
In total, three quarters of respondents thought that general noise levels had remained the same over the past year (76 per cent), around 1 in 10 that they had got better (nine per cent) and 15 per cent that they had got worse. More than 8 in 10 of those who were satisfied that general noise levels in London were reasonable (score of 7 or above) thought that there had been no change over the past year, with broadly equal numbers saying that noise levels had got better and worse. In comparison, those who were the least satisfied with the general level of noise in London (score below seven) were more likely to think that the situation had changed, and twice as likely to think that it had got worse (18 per cent thought so). Only 20 per cent of those who thought that noise levels had got worse over the past year provided a satisfaction score of more than seven.

The main reasons respondents gave for being satisfied that noise levels in their local area are reasonable were because they live on a quiet road or in a quiet area (47 per cent) or because where they live is better than elsewhere (13 per cent). The main reasons respondents gave for being less satisfied with noise levels in their local area were noise from traffic (36 per cent), because they live on a busy or noisy road (34 per cent), noise from air traffic (18 per cent) and noise from people on the street (18 per cent). Only 8 per cent cited noise from neighbours as the main reason they are less satisfied with general noise levels in their local area. Similarly, half of those who thought that noise levels had got worse in the past year ascribed this to increased traffic on the roads. It is clear that transport, particularly road and to a lesser extent air transport, is the greatest contributor to unsatisfactory noise levels in London.

Perception of transport-related noise levels in London

The mean score for satisfaction with the reasonableness of general noise levels in London was 70. This is considered to be a 'fairly good' score. Figure 9.42 shows the distribution of scores, on a scale of 0 to 10. The main reasons respondents gave for being less satisfied with noise from transport in their local area were because of the amount of traffic or congestion (45 per cent) and because they live on a noisy road or next to a bus stop (15 per cent). Seven per cent referenced noise from Underground or train services as the main reason they are not satisfied with levels of noise from transport in their local area.

Figure 9.41 London residents' perception of transport-related noise levels in London.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

More than a third of respondents were fairly dissatisfied with levels of noise from transport in their local area (36 per cent scored less than 7). Comparisons demonstrate that for most London residents, there was a strong correlation between satisfaction with general noise levels and noise from transport.

Eight in 10 respondents thought that noise levels from transport had remained the same over the past year, 13 per cent that they had got worse and 8 per cent that they had improved. Table 9.5 shows that nearly three quarters of those who thought noise from transport had got worse over the past year were fairly dissatisfied (satisfaction score of less than 7), and that more than a quarter of those less satisfied with noise from transport thought the situation had worsened. Even where noise from transport was seen to have improved, the situation was not necessarily satisfactory, with 21 per cent of those who thought noise from transport had lessened providing a satisfaction score of less than 7 for how reasonable levels of noise from transport are in their local area.

Table 9.5 London residents' satisfaction with noise from transport by whether they consider levels of noise have changed over past year.

	Change in levels of noise from transport over past year			
	Got better	Remained the same	Got worse	Total
Column percentages				
Satisfaction score of 7 or above	79%	68%	27%	64%
Satisfaction score of below 7	21%	32%	73%	36%
Total	100%	100%	100%	100%
Row percentages				
Satisfaction score of 7 or above	10%	85%	6%	100%
Satisfaction score of below 7	5%	68%	27%	100%
Total	8%	79%	13%	100%

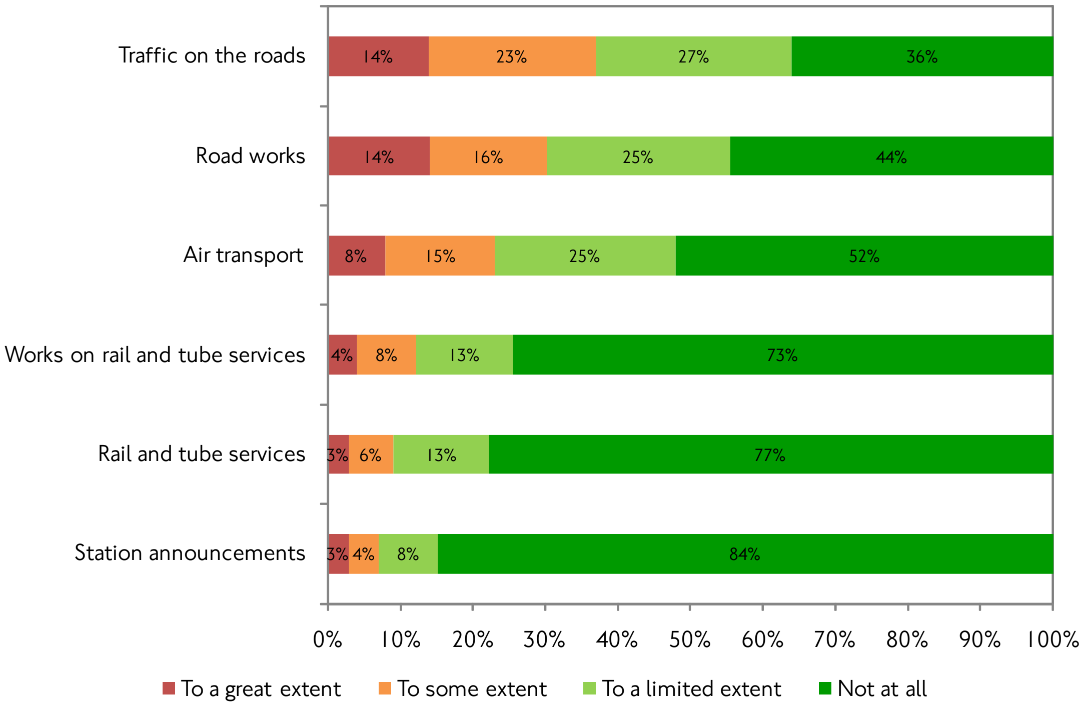
Source: TfL Perceptions of the Travel Environment Survey, November 2009

Those who thought that noise from transport had improved in the past year were most likely to ascribe this to quieter engines and buses (18 per cent) or less traffic in the area (7 per cent), whereas those who thought noise from transport had worsened blamed increased traffic and congestion (60 per cent), increased air traffic or roadworks (both 6 per cent).

Aspects of transport-related noise

As shown in Figure 9.42, 37 per cent of London residents are disturbed to some or a great extent by noise from traffic on the roads, with a further 27 per cent disturbed to a limited extent. Roadworks are also a major cause of disturbance, disturbing 30 per cent of residents to some or a great extent. Nearly a quarter of London residents are disturbed by noise from air transport to some or a great extent. When asked which one aspect disturbs them most, 37 per cent picked noise from traffic, and 20 per cent each chose air transport and noise from roadworks.

Figure 9.42 Level of disturbance caused to London residents by aspects of noise from transport.

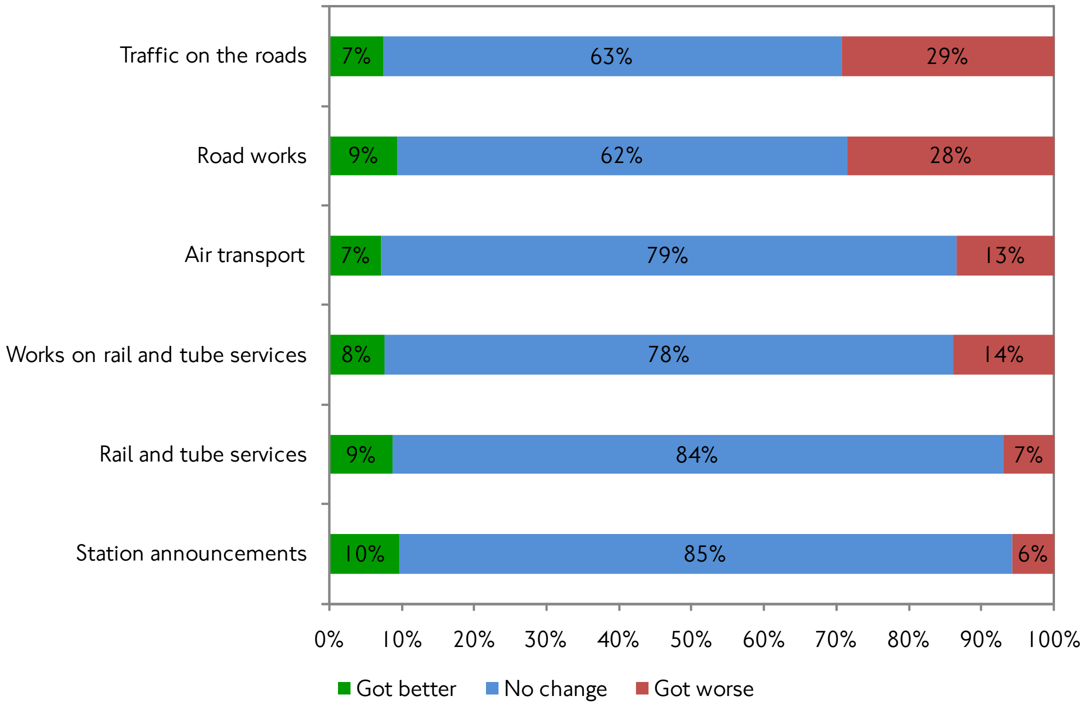


Source: TfL Perceptions of the Travel Environment Survey, November 2009

Those who said they were most disturbed by noise from road traffic were likely to be the least satisfied with levels of noise from transport (51 per cent compared to 36 per cent of London residents gave a score of less than 7) and 6 in 10 of those least satisfied with levels of noise from transport (score of 0 to 4) said that they were most disturbed by traffic noise. This suggests that road traffic is the single most important cause of transport noise in London, and that the level of disturbance to those experiencing traffic noise is in general greater than that caused by other aspects of transport noise.

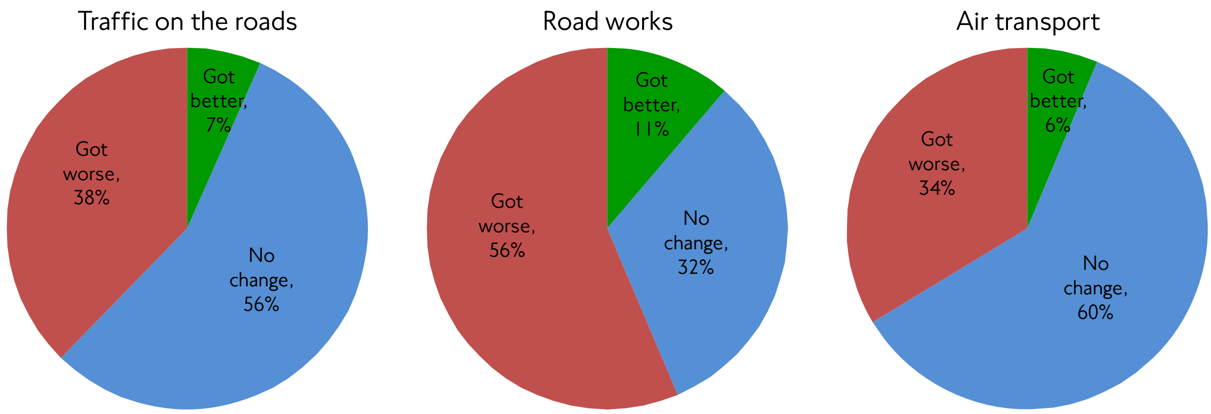
Similarly, Figure 9.43 shows that traffic and roadworks were the sources of transport noise that residents were most likely to think had worsened over the past year. In particular, as shown by Figure 9.44, more than half of those who said that they were most disturbed by noise from roadworks thought that the situation had worsened in the past year, compared to between 3 and 4 in 10 of those most disturbed by noise from road traffic and air transport.

Figure 9.43 Whether levels of noise from aspects transport have got better or worse over past year for London residents.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Figure 9.44 Comparison of changes to noise levels for aspects of travel, where aspects selected as causing greatest disturbance, London residents.

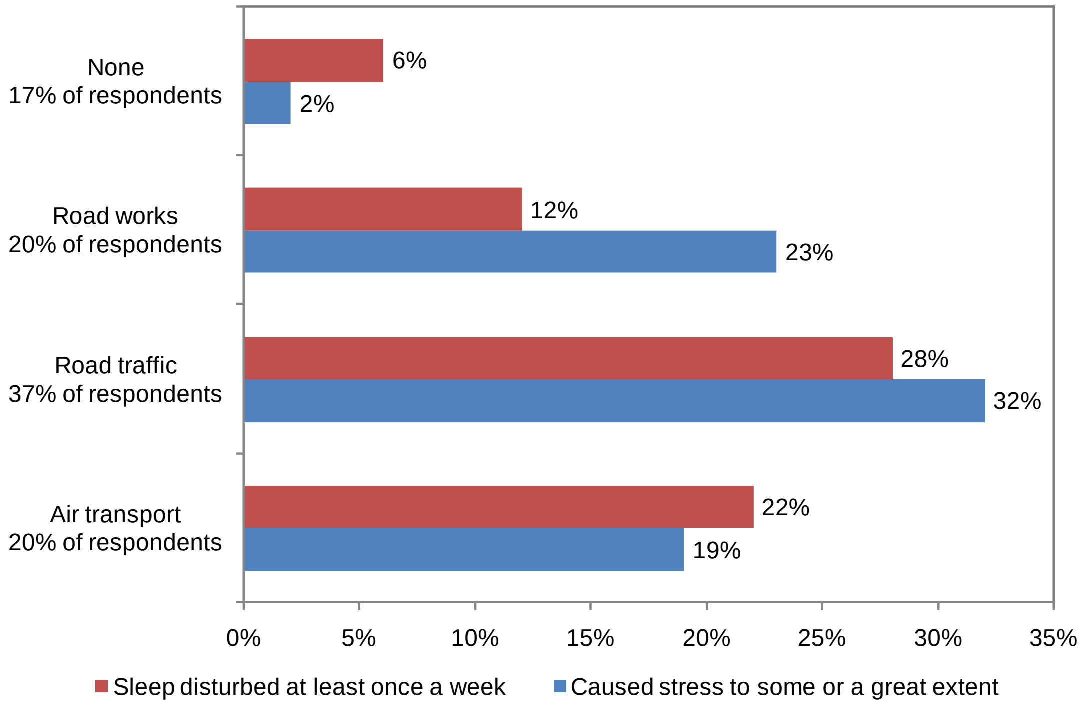


Note: Other aspects of transport noise excluded due to small base sizes
Source: TfL Perceptions of the Travel Environment Survey, November 2009

Extent to which noise from transport causes stress and sleep disturbance

Around 22 per cent of London residents said that noise from transport causes them stress to a great or some extent, rising to nearly two thirds of those who said they were least satisfied with levels of noise from transport in their local area (satisfaction score of 0 to 4). More than half the London residents surveyed said that noise from transport does not cause them any stress at all. As shown in Figure 9.45, those who were most disturbed by noise from traffic were the most likely to say that transport noise caused them stress to a great or some extent (32 per cent). Similarly, those most disturbed by noise from traffic were also more likely to suffer sleep disturbance at least once a week as a result of transport noise (28 per cent). Those who could not select an aspect of transport noise they were most disturbed by were significantly less likely to suffer stress or sleep disturbance as a result of transport noise.

Figure 9.45 Stress and sleep disturbance caused by noise from transport by type of noise most disturbed by, London residents.



Source: TfL Perceptions of the Travel Environment Survey, November 2009
Note: 7 per cent of respondents were most disturbed by other aspects of transport noise – these aspects have been excluded due to small base sizes

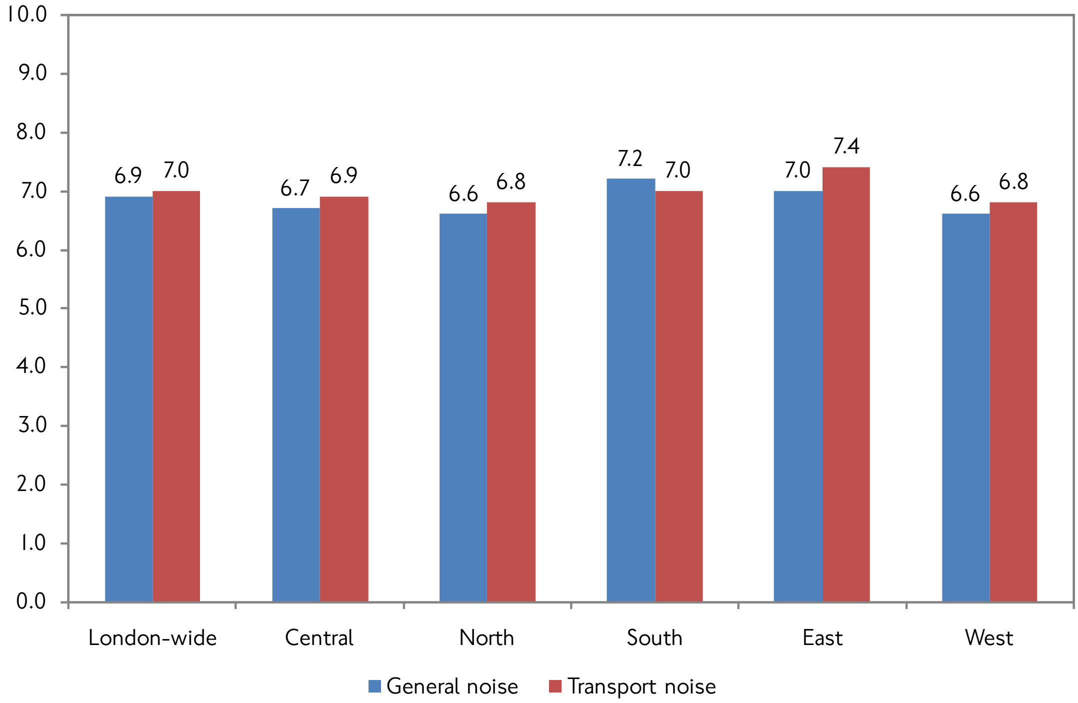
There is a strong correlation between the experience of disturbed sleep and stress as a result of noise from transport, and satisfaction with how reasonable the level of noise from transport is. A similar proportion of respondents, 21 per cent, experience sleep disturbance as a result of noise from transport at least once a week and also say they experience stress as a result of transport noise. One in 8 respondents said that they experienced sleep disturbance at least once a week as a result of noise from transport and that transport noise caused them stress to some or a great extent.

More than half of those least satisfied with levels of noise from transport experienced disturbed sleep as a result of noise at least once a week, and only a quarter of this group say that transport noise has not disturbed their sleep in the past year, compared to 80 per cent of those who are very satisfied with levels of noise from transport.

Perception of noise levels across the London sub-regions

As shown in Figure 9.46, satisfaction with the level of noise is very similar across the five London sub-regions. Residents of the south and east sub-regions are the most satisfied with noise levels in their local area, and residents of the north and west sub-regions are the least satisfied. This reflects the distribution of noise as shown in Figure 9.48, where higher levels of noise are observed in west London, especially near Heathrow, and near the major roads in north London. In general, noise from traffic and congestion was the greatest source of dissatisfaction, particularly for residents of the central and east sub-regions (57 per cent and 52 per cent respectively of those scoring than less than 7 for satisfaction with transport noise levels).

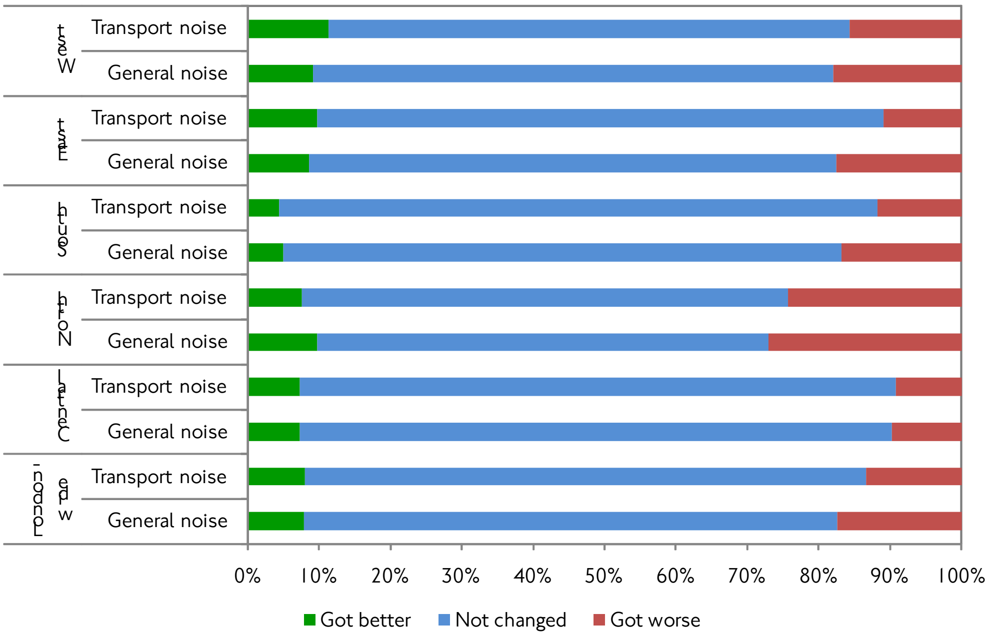
Figure 9.46 Comparison of satisfaction with general noise and noise from transport, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Across all sub-regions, most respondents felt that general and transport-related noise levels had remained the same over the past year. As shown in Figure 9.47, residents of the north sub-region were the most likely to say that general and transport-related noise levels had deteriorated in the past year, with 27 per cent and 24 per cent respectively of residents saying so. Residents of the central and south sub-regions were the most likely to consider that transport-related noise levels in their local area had remained the same.

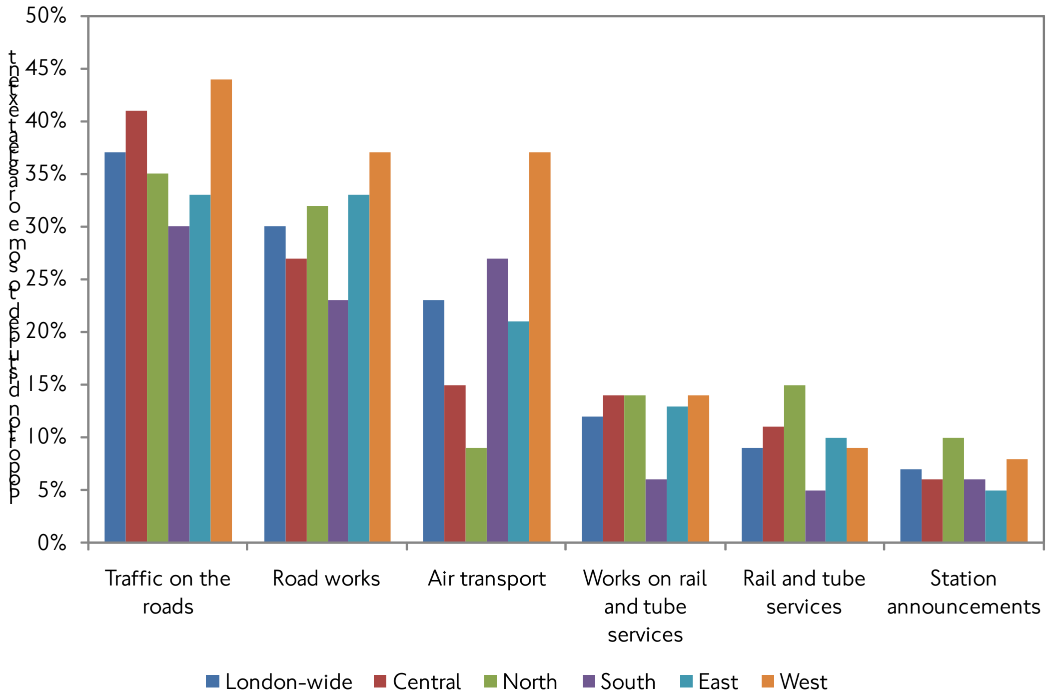
Figure 9.47 Whether general and transport-related noise levels have got better or worse over the past year, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

As shown in Figure 9.48, residents of the west sub-region and to a lesser extent the south sub-region were significantly more likely than residents elsewhere to be disturbed by noise from air transport, reflecting the locations of Heathrow and Gatwick airports. Residents of the central and west sub-regions were also the most likely to be disturbed by traffic on the roads.

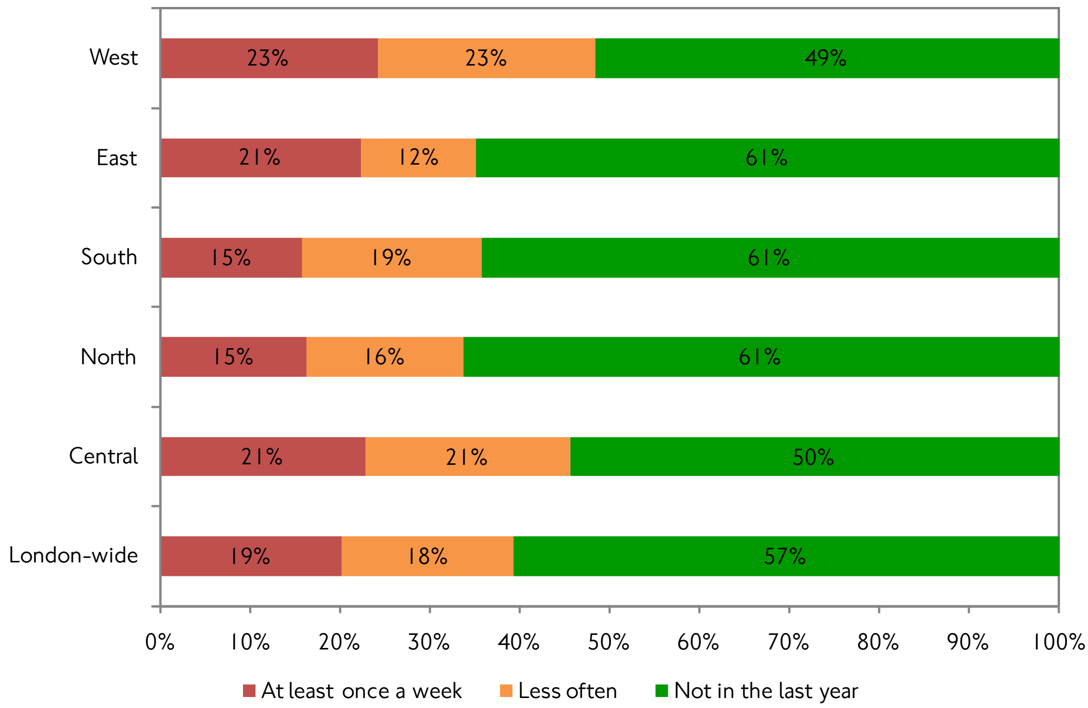
Figure 9.48 Disturbance caused by noise from different aspects of transport, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

Residents of west London were significantly more likely to say that noise from transport causes them stress (30 per cent compared to 22 per cent London-wide) and also to experience sleep disturbance, with more than half of west London residents saying that their sleep has been disturbed by noise from transport in the past year, and 23 per cent experiencing sleep disturbance at least once a week (Figure 9.49). Residents of the central sub-region were also more likely than average to suffer sleep disturbance as a result of noise from transport (41 per cent did so), but were not as likely to feel stressed by this or to provide a low satisfaction score with levels of noise from transport. This may reflect different expectations of those choosing to live in the city centre.

Figure 9.49 Sleep disturbance caused by noise from transport, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, November 2009

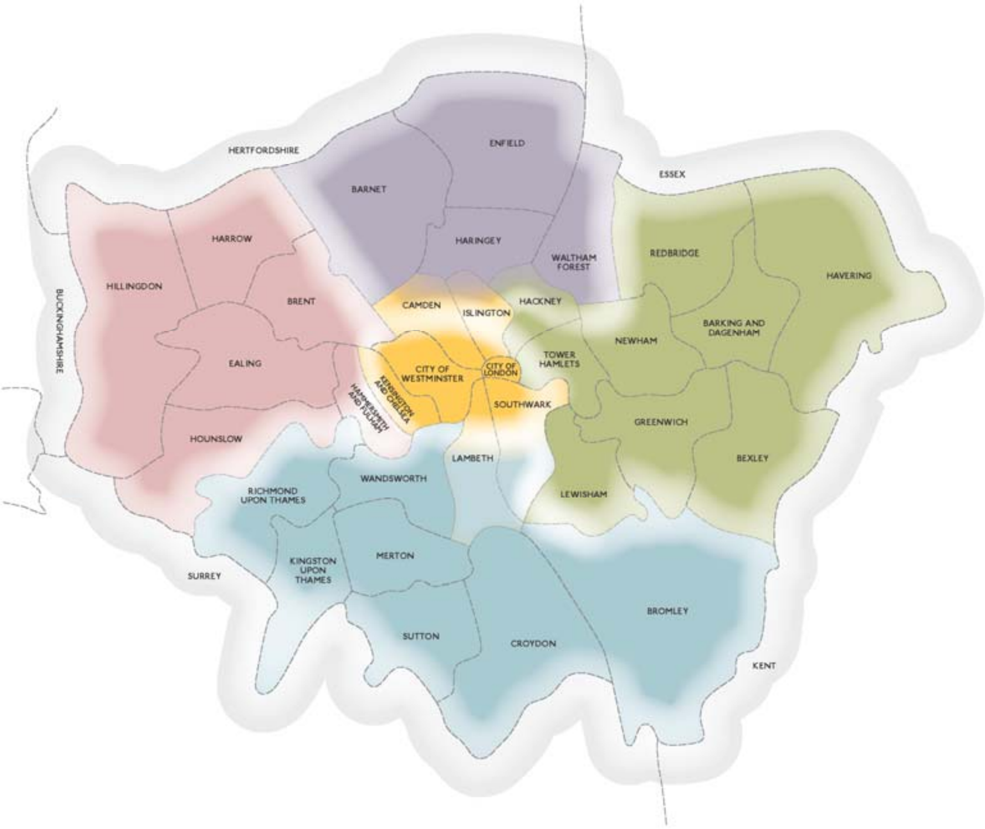
10. Spotlight on – the London sub-regions

10.1 Introduction

The London sub-regions provide a level of London's geography that is not as broad as London-wide, but is wider than a single borough, to facilitate the consideration of transport challenges and solutions on an area basis. A series of sub-regional plans are currently under production and will be published in summer 2010. These will allow the further development of London-wide policies as set out in the draft MTS, exploring how the Mayor's aspirations can be delivered on a local level, recognising the different characteristics and challenges present in each sub-region. The Sub-Regional Plans will also provide an important link between London-wide policies and the boroughs' own priorities, which will be progressed through Local Implementation Plans (LIPs) and other local plans.

This chapter draws together data from a range of sources describing present-day conditions in the sub-regions and providing an insight into projections of future conditions. Further data and analysis, alongside a detailed sub-regional monitoring strategy, will be presented in five sub-regional 'Challenges and Opportunities' documents, published by TfL in February 2010, and in the full plans in spring 2010.

Figure 10.1 Map of the five London sub-regions.



There are five sub-regions: central, east, north, south and west London, shown in Figure 10.1. The sub-regions are considered to have 'fuzzy' boundaries, recognising that any consideration of transport challenges and other issues has cross-boundary impacts. Engagement with boroughs reflects this: for example, the London Boroughs of Camden and Islington are involved in the development of both the central and north London Sub-Regional Plans. For the purposes of the tabulation of data in this document, the London sub-regions comprise groupings of boroughs, with each borough included once as shown below although in practice the boundaries between the different sub-regions are viewed as flexible to meet specific analysis needs.

- Central sub-region: primarily comprises the Cities of London and Westminster, the boroughs of Camden, Islington, Southwark and Lambeth and the Royal Borough of Kensington & Chelsea.
- East sub-region: primarily comprises the boroughs of Tower Hamlets, Hackney, Newham, Greenwich, Bexley, Barking & Dagenham, Redbridge, Lewisham and Havering. Much of the sub-region lies within the Thames Gateway Growth Area.
- North sub-region: primarily comprises the boroughs of Barnet, Enfield, Haringey and Waltham Forest.
- South sub-region: primarily comprises the boroughs of Bromley, Croydon, Merton, Richmond upon Thames, Sutton, Wandsworth and the Royal Borough of Kingston upon Thames.
- West sub-region: primarily comprises the boroughs of Hillingdon, Harrow, Brent, Ealing, Hounslow, and Hammersmith & Fulham.

10.2 Key features and trends

Population and employment

- London's population was 7.6 million in 2008, with nearly 1 in 3 Londoners resident in the east sub-region. One in 6 London residents lives in the central sub-region, but this sub-region contains 41 per cent of jobs, reflecting the status of central London as an international business, finance and retail centre, as well as the centre of Government in the UK.
- The greatest population density is in Inner London just outside the centre, whereas employment is highly concentrated in Central London, the Outer London town centres, particularly in the south and west, and around Heathrow.

Car ownership

- Car ownership is lowest in the central sub-region, where only 40 per cent of households own a car, and highest in the south sub-region where 69 per cent of households own a car. In total, 26 per cent of car owning households are situated in the south sub-region, compared to 22 per cent of all households.

Travel by residents of the sub-regions

- Based on the LTDS data for 2006/07 to 2008/09, residents of the south sub-region have the highest trip rate, at 2.8 trips per person per day, compared to a Greater London average of 2.6 trips. Residents of the east sub-region make the fewest trips per person, at 2.3 per day, and residents of the central sub-region travel the shortest distance, probably reflecting the co-location of homes, jobs and services in central London.

- For residents of the outer sub-regions of east, north, south and west London, between 4 and 5 in 10 trips were made by car. East London residents were the least likely to travel by car, reflecting lower levels of ownership, and residents of south London most likely to do so. In comparison, only 23 per cent of trips made by central London residents were by car, and residents of the sub-region were more likely to travel by public transport, walk or cycle.
- The profile of trips by purpose was fairly similar for residents of all sub-regions, although residents of the east sub-region were somewhat more likely to travel for work (24 per cent) and education purposes (15 per cent), and less likely to make discretionary trips for shopping and leisure purposes. This is likely to reflect the relatively high levels of deprivation in the region.

Origin and destination of trips by sub-region

- In total, around 17.8 million trips are made by London residents each day, of which half a million involve travel between the Capital and elsewhere in the UK.
- Three quarters of trips made by London residents are contained within one sub-region and a sixth are between the outer sub-regions and central London, with the remainder taking place between the outer sub-regions and outside London. This is reflected in the average length of journeys by region of origin: 27 per cent of journeys with an origin in the central sub-region are 5 kilometres or longer, compared to between 22 and 24 per cent in other regions, reflecting the greater attractiveness of destinations in the central sub-region, making longer distance trips worthwhile.

Travel by sub-region of origin

- Between 4 and 5 in 10 trips originating in the four outer sub-regions are made by car, around 3 in 10 by walking or cycling and the remainder by public transport. East London has the lowest car mode share, at 42 per cent, and the highest public transport mode share, at 25 per cent. The mode share for trips originating in the central sub-region is very different, with a far higher proportion of trips made by public transport, particularly Underground, or walked or cycled.
- The profile of trips by journey purpose is fairly similar across the sub-regions, although a higher proportion of trips originating in the east sub-region are for education purposes, reflecting the young population, and a higher proportion of trips with an origin in central London are for work purposes. In central London, the profile of trips by origin is quite different to that of trips by residents, reflecting the high volume of commuting to/from the region by residents of other parts of London.
- For all sub-regions, around a third of originating trips are less than 1kilometre in length; in the four outer sub-regions, three quarters of these trips are walked and most of the rest are made by car. Even in central London, 1 in 10 trips shorter than 1 kilometre are made by car. In total, London residents make more than 1 million car journeys shorter than 1 kilometre every day. The south sub-region has the highest car mode share for very short trips, at 24 per cent.

- On average, more trips are made on a weekday than at the weekend, with the fewest made on Sundays. This is particularly pronounced in central London, whilst in other sub-regions, the difference between trip volumes on an average weekday and Saturday is often quite small. Trips made at the weekend are more likely to be made by car in all sub-regions, although the car mode share in the central sub-region remains around half that of the other regions.
- Across the four outer sub-regions, between a quarter and a fifth of weekday trips are made during the peak periods and around 4 in 10 trips are made in the inter-peak. In the central sub-region, far more trips originate in the area during the afternoon than morning peak on weekdays. This reflects the strong 'tidal flow' of commuters travelling into the sub-region in the morning peak and leaving in the evening peak.
- At the weekend, more trips are made between 10am and 4pm than at any other time. This pattern is strongest in east London, whereas in central London the average number of trips per hour is fairly similar in the inter-peak and afternoon peak periods.

Conditions on the transport network

- In the morning peak, there are high levels of crowding on the Underground network in central London and on the Overground and National Rail network in the south, east and north sub-regions.
- The highway network is highly congested across London, particularly in peak hours. In the central sub-region, average speeds are lower than 17 kilometres per hour all day and there is no visible peak. Elsewhere, speeds are typically slowest during the afternoon peak, with some improvement during the inter-peak period. The slowest speeds outside the centre are found in south London, where average speeds during the afternoon peak are only 24.8 kilometres per hour, compared to 42.3 kilometres per hour in night-time free-flow conditions.

Future projections

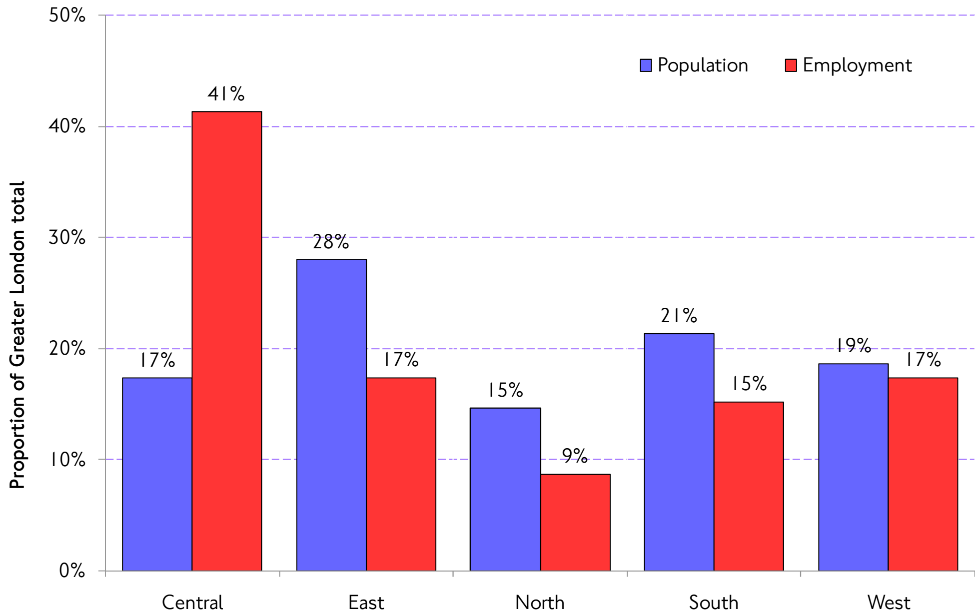
- London's population is expected to grow by around 1.4 million people between 2006 and 2031, with much of that growth in the east sub-region (an increase of 29 per cent, or 0.6 million additional people). The central sub-region (including inner north London, such as Camden and Islington) is expected to increase by 18 per cent, and the four north London boroughs listed above by 15 per cent.
- Employment in London is also projected to grow by around 0.8 million jobs by 2031, primarily in the central sub-region (which is due to increase by 24 per cent) and to a lesser extent the east sub-region (up 20 per cent, but from a lower base). Greater numbers of commuters to central London can be expected in future, particularly from the east sub-region.

10.3 Population and employment

London's population was around 7.6 million in 2008. More than a quarter of London residents live in the east sub-region. The north sub-region is the smallest, with only 15 per cent of the total population (see Figure 10.2). Figure 10.3 shows population density across London. This highlights the high population density across Central and Inner London, with significantly lower densities in Outer London, particularly in the south east of the capital.

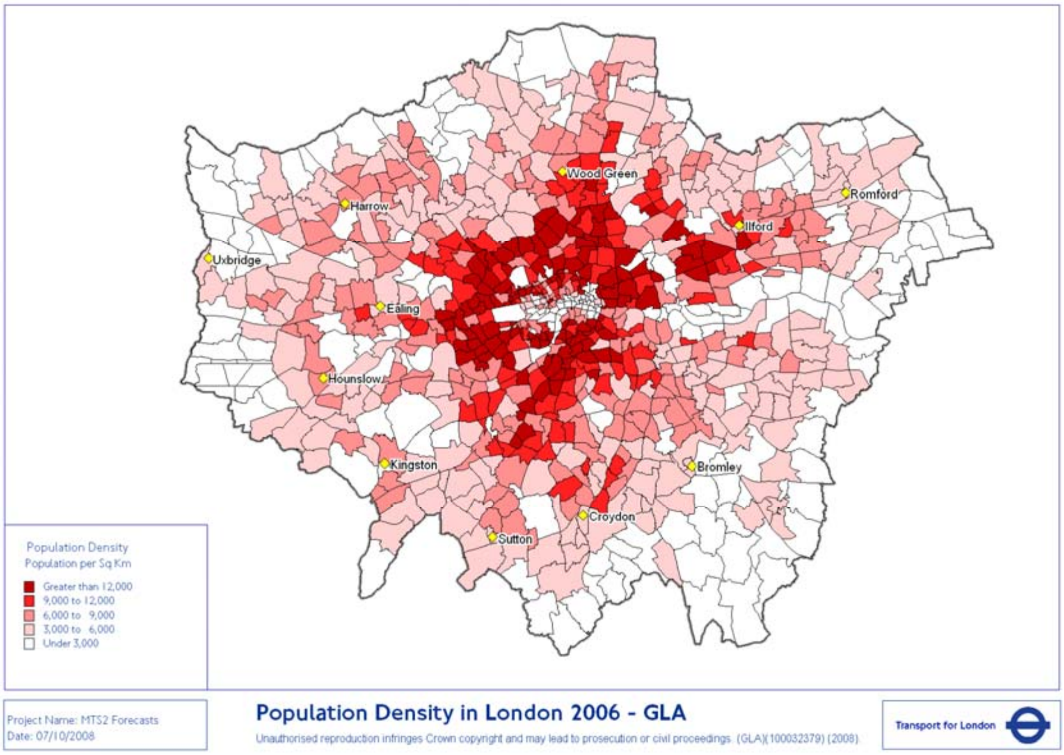
In 2006, there were around 4.6 million jobs in Greater London, 41 per cent of which were within the central sub-region. The east, south and west sub-regions contain around a sixth of the employment each, with only 9 per cent of London's jobs being in north London. Figure 10.2 compares the distribution of population and employment by sub-region. Figure 10.4 shows employment density across the Capital. This clearly shows the importance of central London as an employment hub, as well as the metropolitan town centres of Outer London. In particular, Croydon, Kingston, Sutton, Bromley and Ealing town centres have more than 15,000 jobs per square kilometre, as does Heathrow airport.

Figure 10.2 Population and employment by London sub-region, 2006.



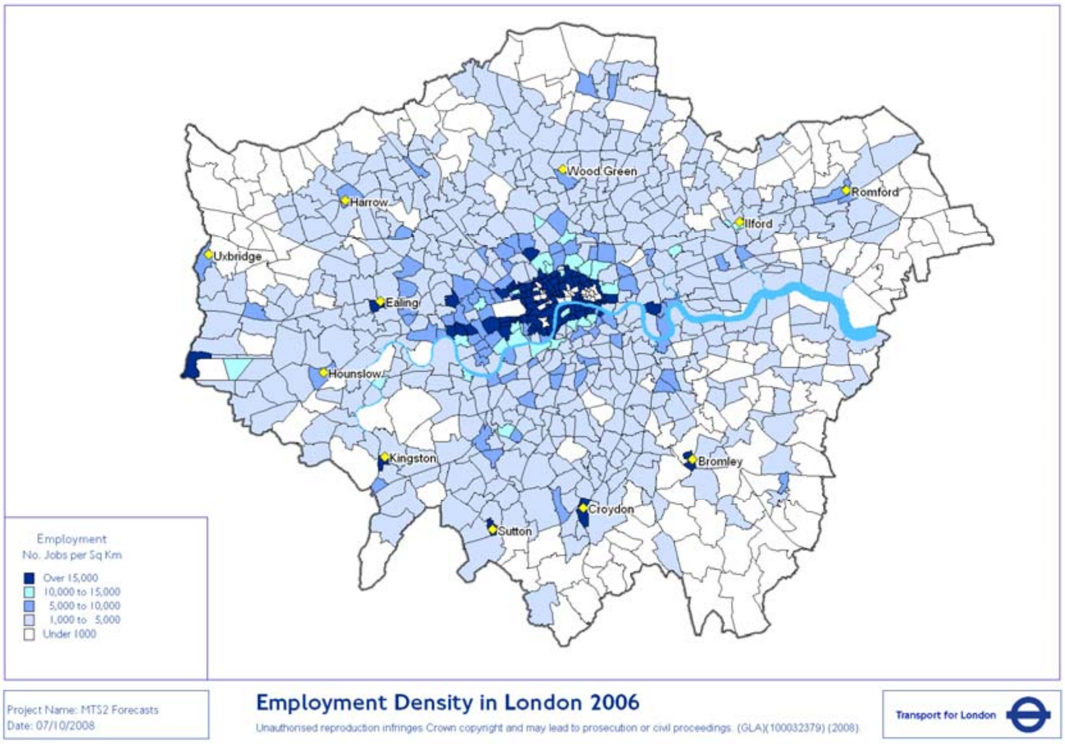
Source: GLA London Plan Forecasts (2009)

Figure 10.3 Map of population density, 2006.



Source: GLA London Plan Forecasts (2009)

Figure 10.4 Map of employment density, 2006.



Source: GLA London Plan Forecasts (2009)

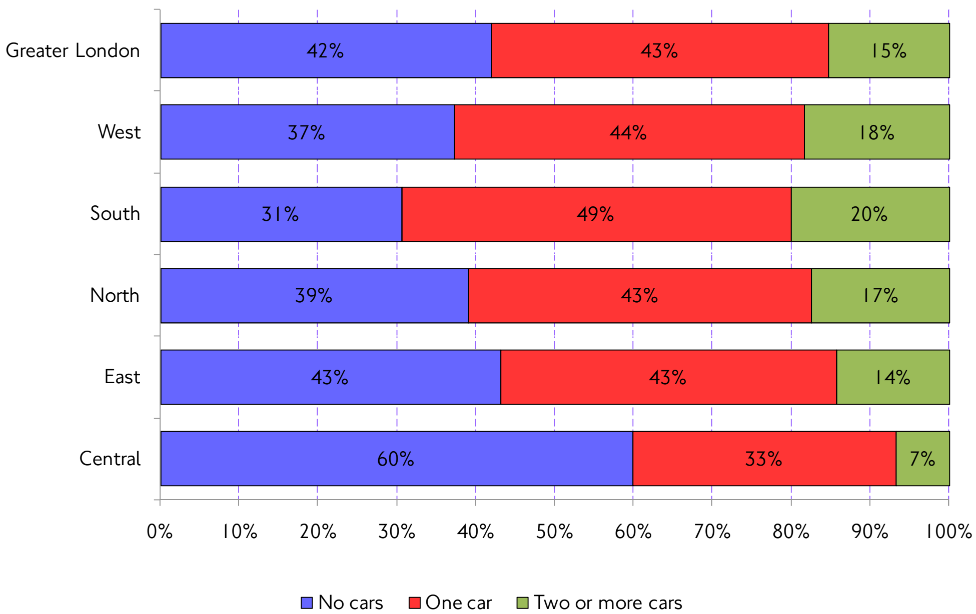
10.4 Car ownership

Figure 10.5 highlights the number of households with no car, one and two or more cars. Households in the central sub-region are the least likely to own a car: 60 per cent of households are without a car. This reflects space for and management of parking, cost considerations, population characteristics and the high public transport accessibility in the sub-region. In the east sub-region, 43 per cent of households have no car. Car ownership is lower towards the Inner London areas of the sub-region, which are also the parts of the sub-region where the highest growth is projected. Therefore if this trend is extended to the projected population then the proportion of households with no car could be the same or higher than in the central sub-region. However, the current low levels of car ownership in this area reflect widespread deprivation; regeneration could be expected to bring higher car ownership rates.

By contrast, between 6 and 7 in 10 household in the north, south and west sub-regions own a car, all above the London average but lower than car ownership levels outside London. Almost twenty per cent of households in these sub-regions have two or more cars, which corresponds to a greater likelihood of the car being used for a high proportion of trips.

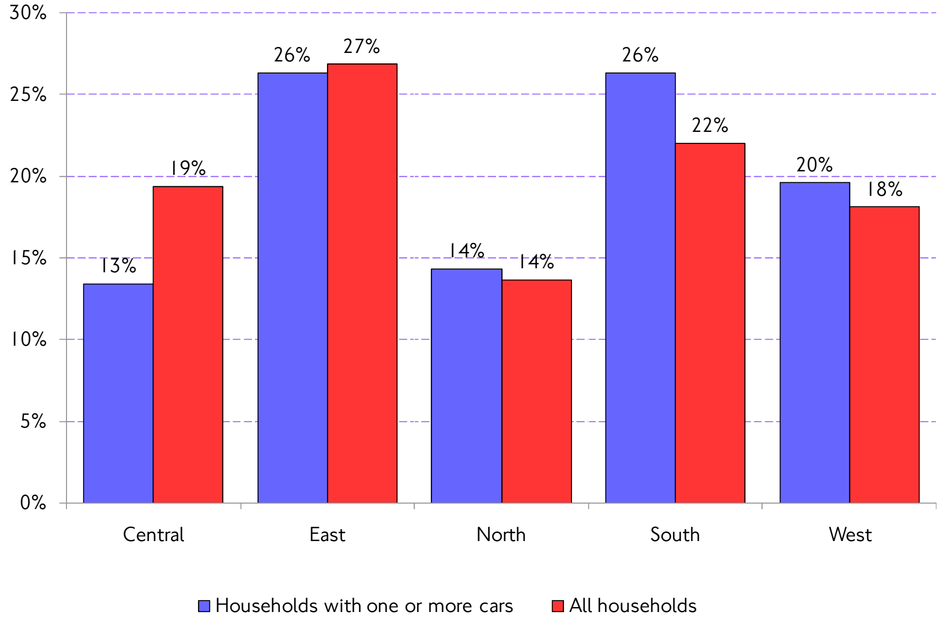
Similarly, Figure 10.6 shows that households in the central sub-region are less likely to own a car, with only 13 per cent of car owning households situated in the sub-region, compared to 19 per cent of all households. The south sub-region contains a disproportionate number of car owning households: 26 per cent of car owning households are located in the sub-region, whereas only 22 per cent of all households are situated in the sub-region.

Figure 10.5 Car ownership by London sub-region, 2006/07-08/09.



Source: London Travel Demand Survey 2006/07-2008/09

Figure 10.6 Comparison of the distribution of all households and car owning households by London sub-region, 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09

10.5 Travel by residents of the sub-regions

Trips and distance travelled per day

The distribution of trips broadly follows that of population across the sub-regions, with the greatest number of trips made by residents of the south and east sub-regions, and the fewest by residents of the north sub-region (see Table 10.1). However, trip rates per person per day show that residents of the south sub-region have an above average trip rate of 2.8 trips per person per day, compared to 2.6 across London as a whole. Residents of the east sub-region have a lower than average trip rate, with only 2.3 trips made per person per day. So, residents of the south sub-region make up 22 per cent of the population but make 24 per cent of the trips and, conversely, residents of the east sub-region make up 27 per cent of the population and make only 24 per cent of the trips. This reflects the high levels of deprivation in the east sub-region, with particularly low trip rates found in the boroughs of Greenwich (1.9 trips per person per day), Hackney (2.1) and Tower Hamlets (2.1). The low distance travelled per person per day in the east sub-region can be explained in part by these low average trip rates, and also by low levels of car ownership and the relatively high mode share for walk and bus, especially in the Inner London boroughs.

The trip rate for residents of central London is as the London average, at 2.6 trips per person per day, and the central sub-region accounts for 18 per cent of the population and trips made. The average distance travelled per person per day is the lowest of any region, at 12.4 kilometres, compared to a London average of 14.9 kilometres. This reflects the extremely high levels of access to jobs, education, shops and services within the region, and also the low levels of car ownership and high mode share for walking and public transport by residents of the sub-region.

Table 10.1 Trips and travel distance, totals and per person per day, by sub-region of residence, 2006/07-2008/09.

Region of residence	Population aged 5 plus ('000s)	Trips per day ('000s)	Total distance travelled ('000km)	Trips per person per day	Distance per person per day (km)
Central	1,242	3,199	15,398	2.6	12.4
East	1,892	4,301	24,875	2.3	13.1
North	980	2,591	14,989	2.6	15.3
South	1,512	4,219	26,760	2.8	17.7
West	1,345	3,571	22,114	2.7	16.4
Greater London	**6,972**	**17,881**	**104,137**	**2.6**	**14.9**

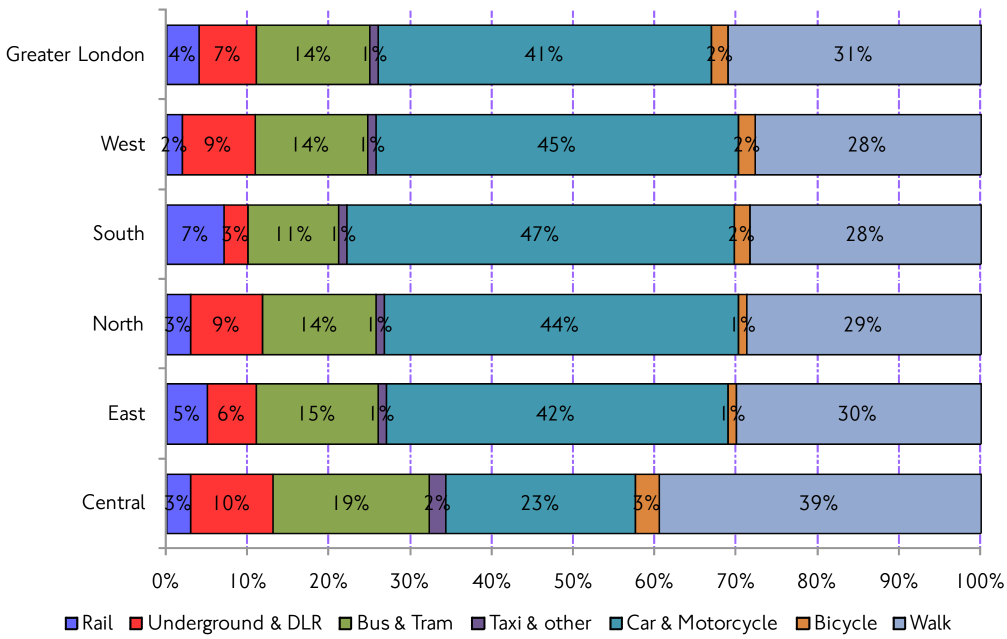
Source: London Travel Demand Survey 2006/07-2008/09

Mode share for trips made by residents of the sub-region

Across all the Outer London sub-regions, more than 4 in 10 trips by residents are made by car (see Figure 10.7). The proportion of trips made by car is highest in the south sub-region, at 47 per cent, and lowest in the east sub-region, at 42 per cent, reflecting lower levels of car ownership in this area. The proportion of trips walked or cycled is also broadly similar at around 3 in 10 trips. There is significant variation in the share for the various public transport modes. The rail mode share is highest in the south (7 per cent) and east (5 per cent) sub-regions.

The pattern is very different in central London. Less than a quarter of trips by residents are made by car, with far more trips walked and cycled (42 per cent) or made by public transport (34 per cent) than in other regions. This reflects low levels of car ownership, good access to local jobs and services as well as differences between the types of people living in the city centre and elsewhere.

Figure 10.7 Mode of trips by sub-region of residence, 2006/07-2008/09.

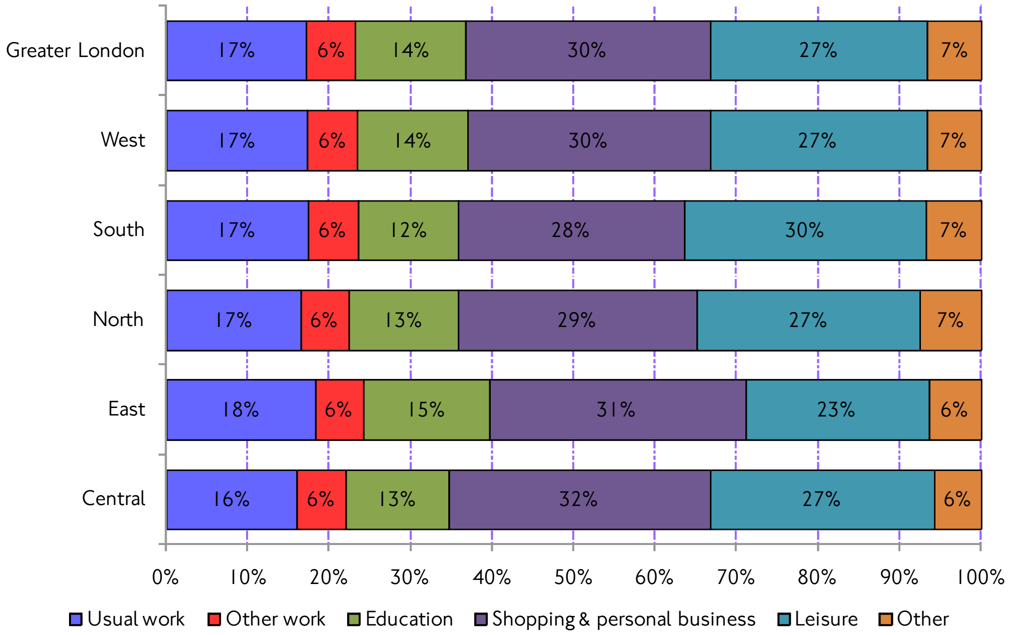


Source: London Travel Demand Survey 2006/07-2008/09

Journey purpose for trips made by residents of the sub-region

Across all regions, just under a quarter of trips by residents are made for work purposes, including commuting and other trips for work, and around 6 in 10 are made for shopping and leisure purposes (Figure 10.8). In the east sub-region, a higher proportion of trips are made for work and education (including escort education) purposes, and a lower proportion for leisure. As overall trip rates per person per day are lower in the east sub-region, this suggests that 'discretionary' trips are more greatly affected than trips required for work and education.

Figure 10.8 Journey purpose of trips by sub-region of residence, 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: Escorting to and from education have been grouped with education trips

10.6 Origin and destination of trips by sub-region

Table 10.2 shows the volume of trips made by sub-region of origin and destination. Nearly a quarter of all trips made by London residents have a destination in the central sub-region, reflecting the importance of the city centre for work, shopping and leisure trips. Around half a million trips are made each day by London residents travelling out of the Capital. Trips are also made by Londoners elsewhere, but these are excluded from the analysis.

Table 10.2 Origin and destination of trips, by sub-region, London residents 2006/07-2008/09.

	Destination ('000s trips)						
Origin	**Central**	**East**	**North**	**South**	**West**	**Outside Greater London**	**All trips**
Central	2,935	362	210	322	296	121	4,245
East	365	3,158	133	121	34	72	3,884
North	213	135	1,714	10	105	103	2,281
South	319	119	11	2,918	139	170	3,676
West	302	38	106	138	2,565	38	3,187
Outside Greater London	129	78	115	187	54	n/a	563
All trips	**4,264**	**3,889**	**2,290**	**3,696**	**3,193**	**504**	**17,837**

Source: London Travel Demand Survey 2006/07-2008/09
Note: 44,000 trips have been excluded due to missing origin and/or destination data); only trips with an origin or destination in Greater London are included in the dataset.

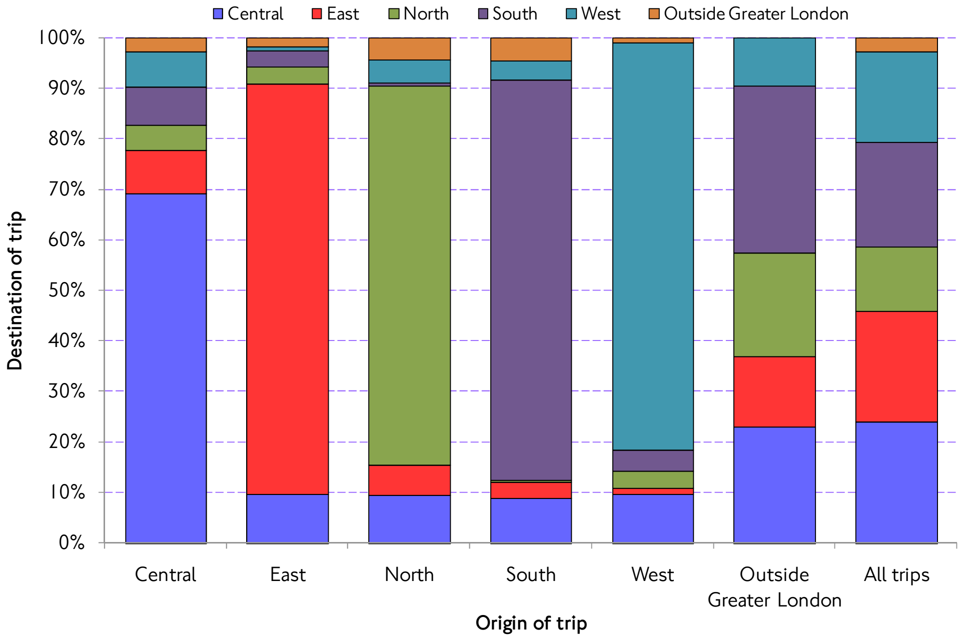
Table 10.3 shows that three quarters of all trips made by London residents are contained within a sub-region. A further 15 per cent of trips take place between the central sub-region and elsewhere, while only 10 per cent of trips take place between the other sub-regions. This is further supported by Figures 10.9 and 10.10, which show the high proportion of trips with an origin and destination wholly within each sub-region, and also the strong relationship between all outer sub-regions and the central sub-region.

Table 10.3 Origin and destination of trips as a proportion of total trips made, by sub-region, London residents 2006/07-2008/09.

	Destination						
Origin	**Central**	**East**	**North**	**South**	**West**	**Outside Greater London**	**All trips**
Central	16%	2%	1%	2%	2%	1%	24%
East	2%	18%	1%	1%	<1%	<1%	22%
North	1%	1%	10%	<1%	1%	1%	13%
South	2%	1%	<1%	16%	1%	1%	21%
West	2%	<1%	1%	1%	14%	<1%	18%
Outside Greater London	1%	<1%	1%	1%	<1%	n/a	3%
All trips	**24%**	**22%**	**13%**	**21%**	**18%**	**3%**	**100%**

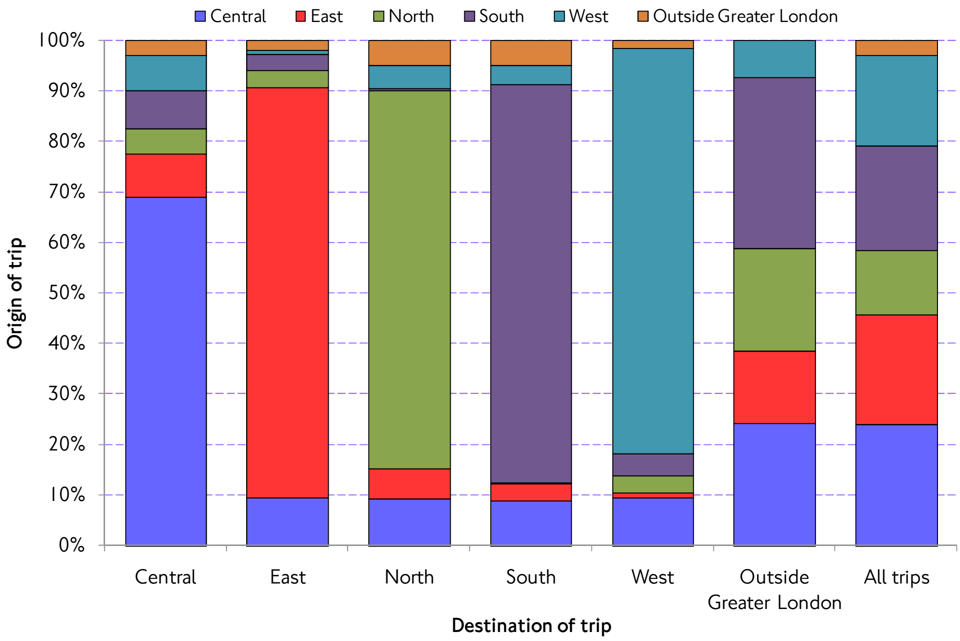
Source: London Travel Demand Survey 2006/07-2008/09
Note: 44,000 trips have been excluded due to missing origin and/or destination data); only trips with an origin or destination in Greater London are included in the dataset.

Figure 10.9 Destination of trips by sub-region of origin, London residents 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: 44,000 trips have been excluded due to missing origin and/or destination data); only trips with an origin or destination in Greater London are included in the dataset.

Figure 10.10 Origin of trips by sub-region of destination, London residents 2006/07-2008/09.

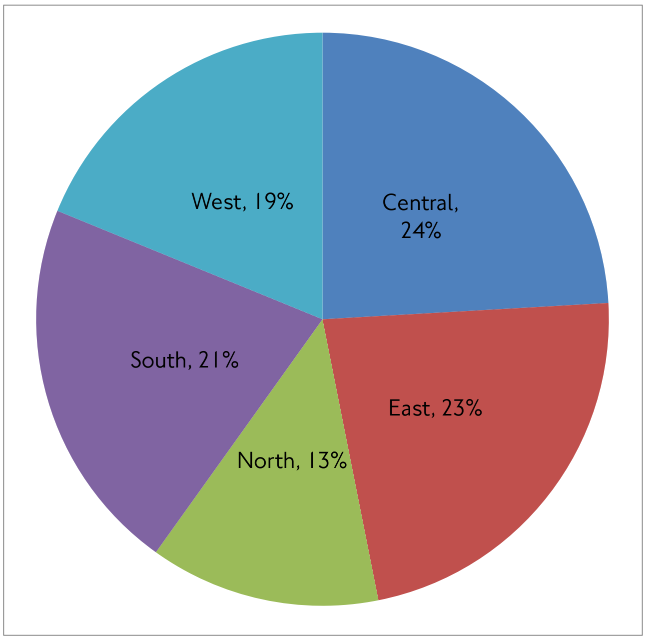


Source: London Travel Demand Survey 2006/07-2008/09
Note: 44,000 trips have been excluded due to missing origin and/or destination data); only trips with an origin or destination in Greater London are included in the dataset.

10.7 Trips by sub-region of origin

In total, London residents made 17.3 million trips a day with an origin in Greater London. Of these, nearly a quarter originated in the central sub-region, 4.2 million trips in total (see Figure 10.11).

Figure 10.11 Sub-region of origin of trips made by London residents 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

This section describes the nature of the trips made by sub-region of origin. The data only include London residents, and so are not representative of all travel in the sub-regions. Analysis of the DfT's National Travel Survey (2002-6) found that, at the national scale:

- Twelve per cent of trips in Great Britain had a destination in Greater London – of these, 92 per cent had originated in London, 5 per cent in the south east and 3 per cent in the eastern region of the UK.
- Only 8 per cent of car (as driver) trips had a destination in Greater London, but 14 per cent of these had an origin elsewhere, primarily the south east (8 per cent) and east (six per cent) regions.
- More than 4 in 10 rail trips made in Great Britain had a destination in Greater London, of which around two thirds were within London, 17 per cent came from the south east, 11 per cent the east and a small proportion from elsewhere in the UK.

These figures suggest that non-Londoners make up a fairly significant proportion of those making trips in London, and particularly for 'longer distance' modes such as car and rail. Note that London residents will make some trips with an origin elsewhere and a destination in London, and that non-Londoners will make trips wholly contained within London, so where the trip is made is not a perfect proxy for where the person is resident.

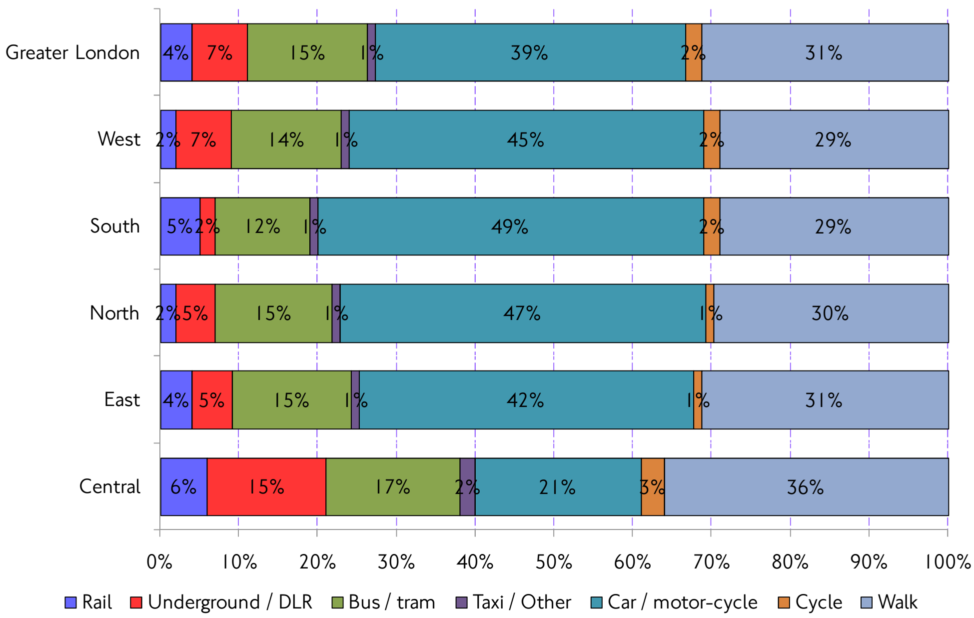
Travel by non-London residents is of particular importance for the Outer London metropolitan centres and for Central London. It is estimated that at any one time, around 20 per cent of people on-street in the Central Activity Zone (CAZ) reside outside Greater London. Moreover, it is estimated that trips into the CAZ from outside the GLA area could account for almost 5 per cent of all travel across London and 30 per cent of all trips into the CAZ during the day. In total, although the majority of trips from outside the GLA area have a destination in Outer London, approximately 25 per cent are destined for Central London.

Mode share for trips by sub-region of origin

The mode share is fairly similar for trips originating across the four outer sub-regions, with between 4 and 5 in 10 trips made by car, around 3 in 10 by walking and cycling, and the remainder by public transport (Figure 10.12). South London has the highest car mode share of the sub-regions, at 49 per cent, and the lowest share for each of the principal public transport modes apart from rail. Trips originating in north and west London tend to follow the London average, whilst trips originating in east London are significantly less likely to be made by car, with only 42 per cent of trips made by car, and more likely to be walked or made by public transport.

For trips originating in the central sub-region, the mode share is very different, with only 1 in 5 trips made by car, half the London average, and a much higher proportion made by public transport or by the active modes of walking and cycling (around 40 per cent each). This pattern is even more pronounced for trips with an origin in the central statistical area, where 52 per cent are made by public transport, 38 per cent are walked or cycled and 10 per cent made by car or motorcycle. The mode share of trips made in the outer reaches of the central sub-region tends to be more similar to the Inner London average.

Figure 10.12 Mode by sub-region of origin, London residents 2006/07-2008/09.

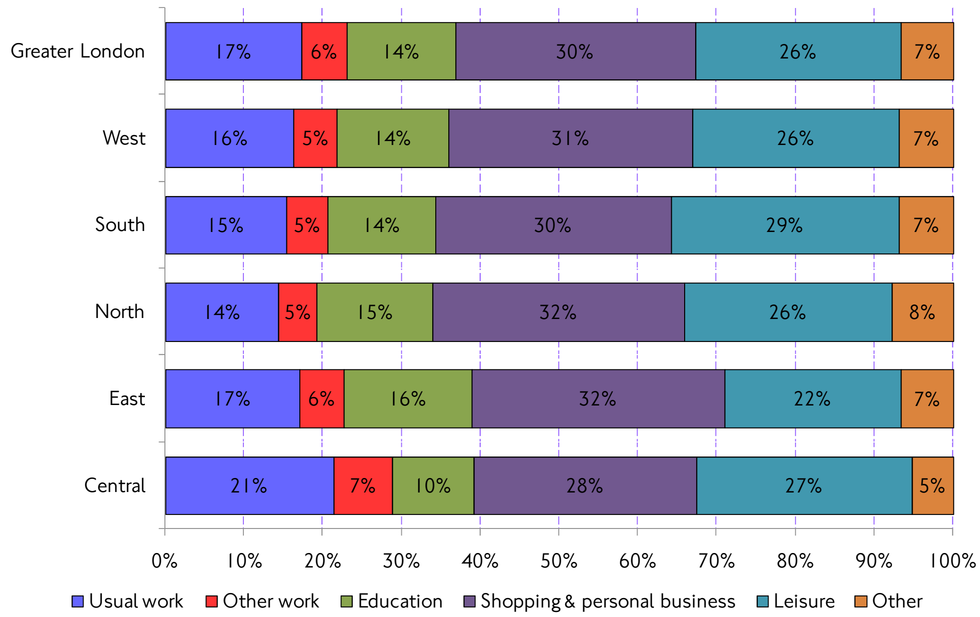


Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Journey purpose for trips by sub-region of origin

The profile of trips by journey purpose is very similar across all regions, with between 5 and 6 in 10 trips made for shopping and leisure purposes, around a sixth for work and slightly fewer for education (including escorting to and from education) (see Figure 10.13). The east sub-region has the highest proportion of trips made for education, reflecting the relatively high proportion of families with children resident in the area. Trips originating in the central sub-region are more likely to be for work purposes than trips made elsewhere, reflecting the large numbers of people who commute in and out of the sub-region to work every day.

Figure 10.13 Journey purpose by sub-region of origin, London residents 2006/07-2008/09.



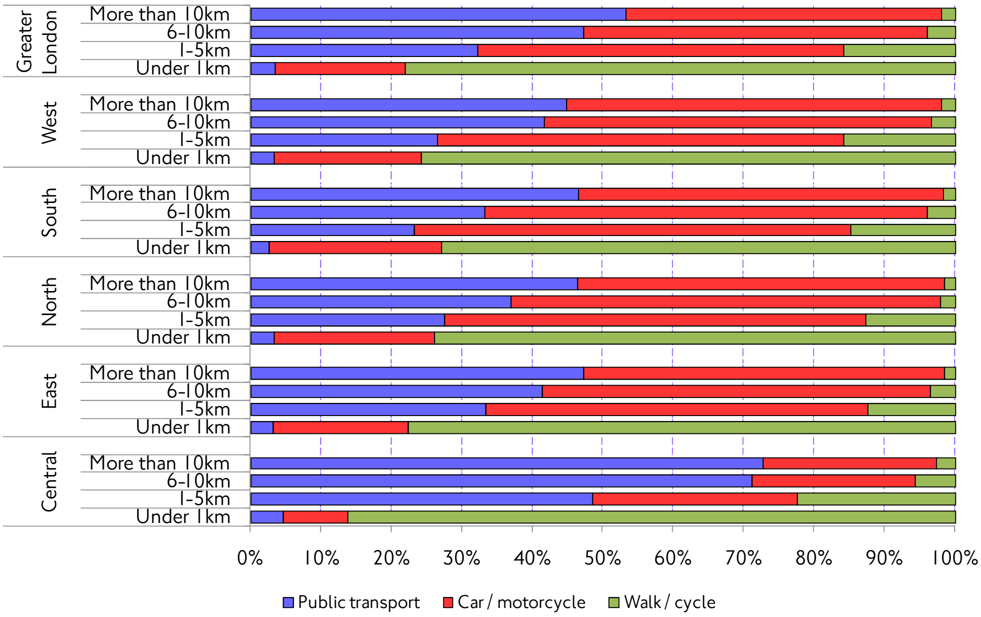
Source: London Travel Demand Survey 2006/07-2008/09
Note: 27,000 trips have been excluded due to missing journey purpose data and; 600,000 trips have been excluded because they do not have an origin in Greater London.
Escorting to and from education have been grouped with education trips

Journey length for trips by sub-region of origin

The profile of trips by journey length is very similar for the outer sub-regions, with around a third of trips less than 1 kilometre, around 40 per cent between 1 kilometre and 5 kilometres, around 15 per cent between 5 kilometres and 10 kilometres, and the remaining 10 per cent or so longer than 10 kilometres. The profile is slightly different in the central sub-region, where a higher proportion of trips involve travel over longer distances and 1 in 3 trips is longer than 5 kilometres. This reflects the status of central London as an employment, shopping, cultural and administrative centre.

The mode share varies significantly by distance of trip and sub-region of origin, as shown in Figure 10.14. Around three quarters of short trips of under 1 kilometre length are walked or cycled, rising to 86 per cent of short trips with an origin in the central sub-region. Nevertheless, a significant minority of very short trips are made by car, between 19 and 24 per cent in the outer sub-regions and 9 per cent in central London. A sixth of all trips by car are less than 1 kilometre long.

Figure 10.14 Journey length by mode and sub-region of origin, London residents 2006/07-2008/09.

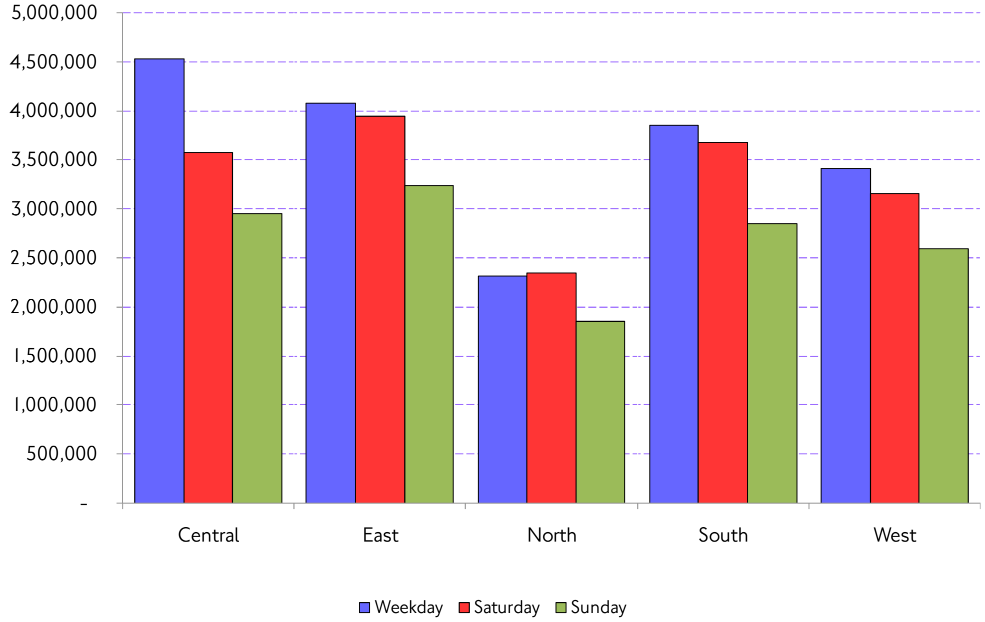


Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Day of the week of trips by sub-region of origin

Figure 10.15 shows that across most regions, more trips are made on an average weekday than at the weekend. This is most pronounced in the central sub-region, where there are 27 per cent more trips on an average weekday than a Saturday and 53 per cent more than a Sunday. On a weekday, there are at least 10 per cent more trips with an origin in central London than any other sub-region, whereas at the weekend, the number of trips in the central sub-region is more in proportion with the population size. Across all other sub-regions, there is a big drop in trip numbers on a Sunday, but the difference between trip volumes on an average weekday and Saturday is slight, and in north London more trips are made on an average Saturday than a weekday. This demonstrates the tendency for people to make radial trips to the city centre during the week and more local shopping and leisure trips at the weekend.

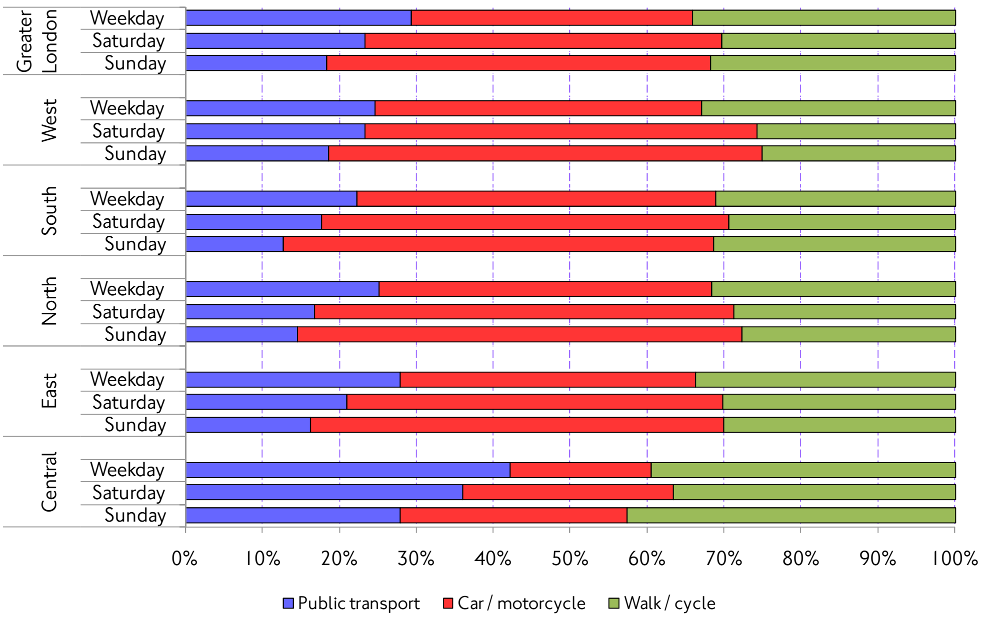
Figure 10.15 Average number of trips per day by sub-region of origin, London residents 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Figure 10.16 shows that, across all sub-regions, the public transport mode share is reduced at the weekend and the car mode share is greater, with more than half of Sunday trips in the four outer sub-regions made by car. The central London car mode share remains low at the weekend, but is significantly higher than during the week. This is likely to reflect factors such as the operation of the Congestion Charging scheme and controlled parking schemes on weekdays only.

Figure 10.16 Average number of trips per day by mode and sub-region of origin, London residents 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

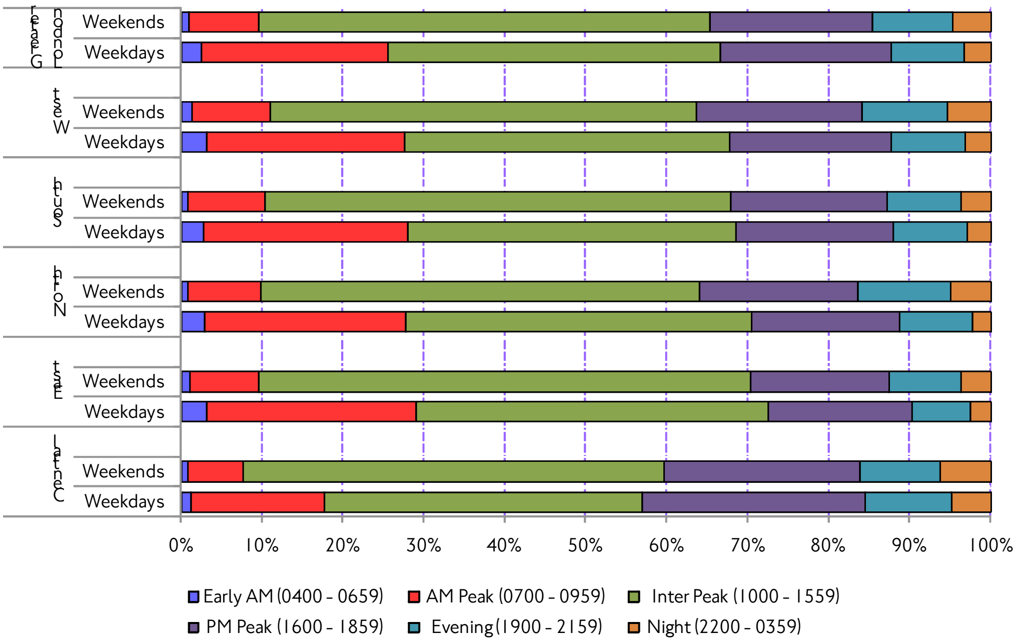
Time of day for trips by sub-region of origin

During the week, trip patterns by time of day are very similar in the four outer sub-regions, as shown in Figure 10.17. Around 1 in 4 trips take place during the morning peak and 1 in 5 during the evening peak, just over 4 in 10 during the inter-peak period and most of the remainder in the evening, with very few trips taking place at night and in the early hours of the morning. In the east sub-region, relatively few trips take place during the evening and a slightly higher than average proportion take place during the inter-peak period, perhaps due in part to the high share of trips made for education purposes.

The profile of trips originating in the central sub-region during the week by time of day is very different, with far more trips taking place in the afternoon than the morning peak. This is because, as shown in Figures 10.9 and 10.10, central London is an important destination for trips originating in all regions, and in particular for work trips. Therefore, there is a strong 'tidal flow' of people entering central London during the morning peak and leaving during the evening one. There is also a relatively large amount of travel in the evening, partly due to the continuing outward flow of commuters and partly due to the significant night-time economy in central London.

At the weekend, relatively few trips are made during the morning peak across all sub-regions, with between 5 and 6 in 10 trips made between 10am and 4pm. There is little difference between the sub-regions, although east has the highest proportion of trips originating during the inter-peak period, at 61 per cent.

Figure 10.17 Time of day by sub-region of origin, weekdays and weekends, London residents 2006/07-2008/09.

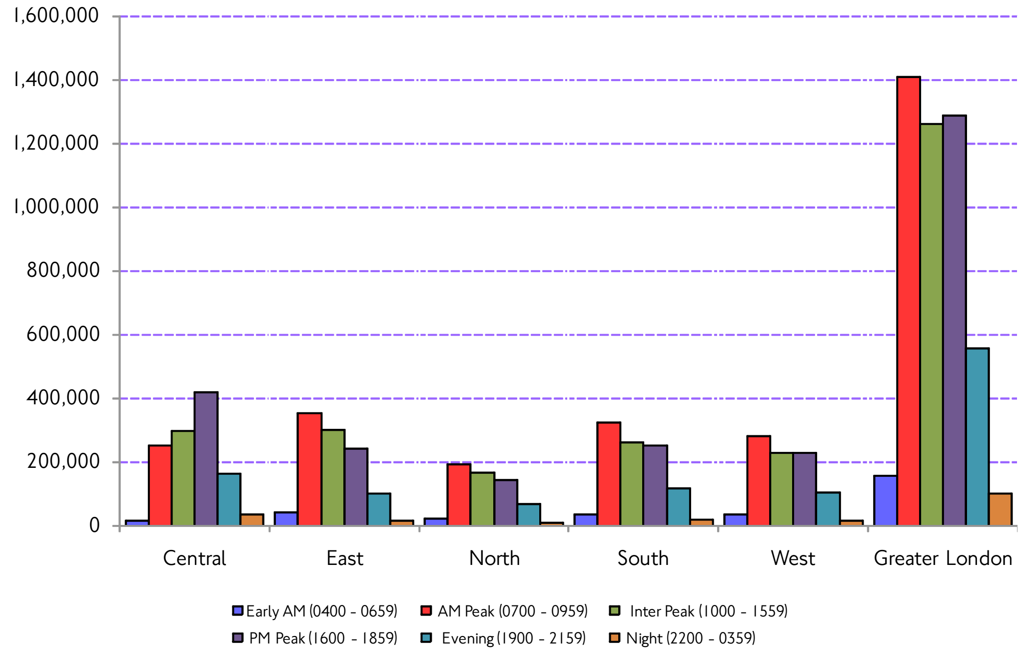


Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Figure 10.18 shows the average number of trips per hour in each of the time periods during the week. This shows that in London as a whole, and in the four outer sub-regions, there are more trips per hour on average in the morning peak period than at any other time. Interestingly, in some sub-regions, there are more trips per hour on average originating in the region during the inter-peak than peak period. This in part reflects the greater amount of inbound commuting to these regions during the afternoon peak – in central London the trend is reversed - as well as the positioning of the school run in the inter-peak period. In general, it is clear that the peaks are 'spreading' into the inter-peak periods as services become more crowded and flexible working patterns more common.

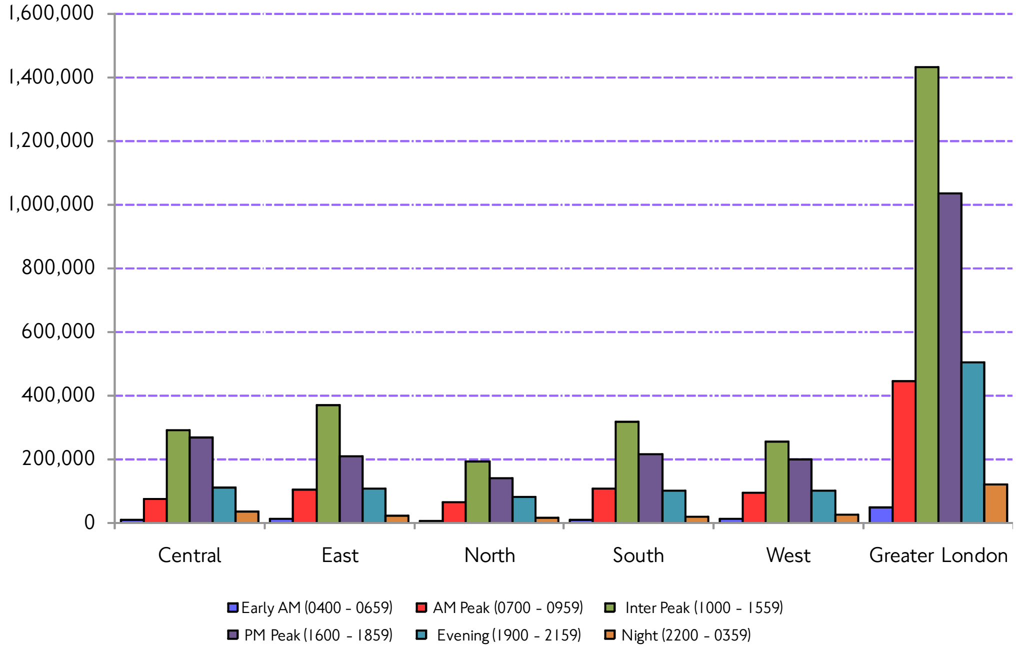
In contrast, as shown in Figure 10.19, at the weekends more trips originate in each of the sub-regions between 10am and 4pm than at any other time. This pattern is most pronounced in the east sub-region, where the average number of trips per hour is around 80 per cent higher than in the next busiest period, and is the least pronounced in the central sub-region.

Figure 10.18 Average number of trips per hour, weekdays by time period and sub-region of origin, London residents 2006/07-2008/09.



Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Figure 10.19 Average number of trips per hour, weekends by time period and sub-region of origin, London residents 2006/07-2008/09.

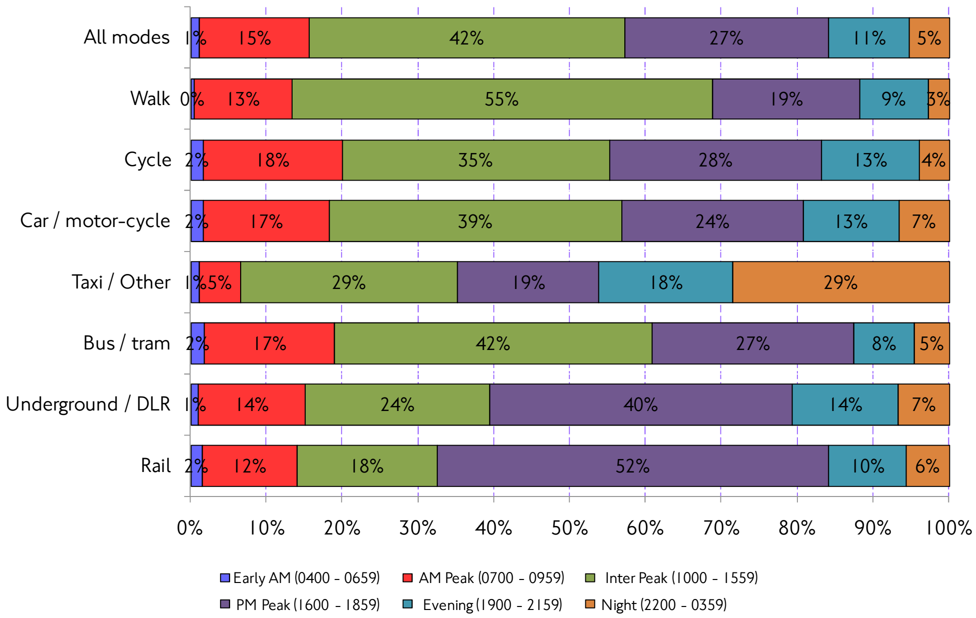


Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

In particular, it is clear that trip patterns by time of day are sharply differentiated by mode. In the four outer sub-regions, rail and Undeground trips were most likely to be made during the peak periods (64 per cent and 55 per cent of trips respectively across a seven day week). Bus and car trips were spread throughout the day, and walk trips tended to be made during the inter-peak period. 45 per cent of taxi trips were made between 7pm and 6am.

Figure 10.20 shows the mode split of trips with an origin in the central sub-region, by time of day for a seven-day week. This shows that half of all rail trips and 40 per cent of Underground trips with an origin in the central sub-region take place during the afternoon peak. The profiles of bus, car and cycle trips are fairly similar, with just over a quarter of trips with an origin in the central sub-region taking place during the evening peak. Walk trips with an origin in central London are more likely to be made during the inter-peak than any other time, and nearly half of all trips by taxi and other modes are made during the evening and at night, reflecting the use of taxis as a safe and convenient door to door mode after dark. These trip patterns are reflected in conditions on the transport network, with high levels of crowding on rail and Underground services during the peak periods, compared with congestion affecting cars and buses throughout the day. Although the majority of walk trips are made during the inter-peak period, high concentrations of passengers entering and emerging from the major rail and Underground destinations during the peak periods also contribute to congested conditions.

Figure 10.20 Mode by time of day for trips with an origin in the central sub-region, London residents 2006/07-2008/09.



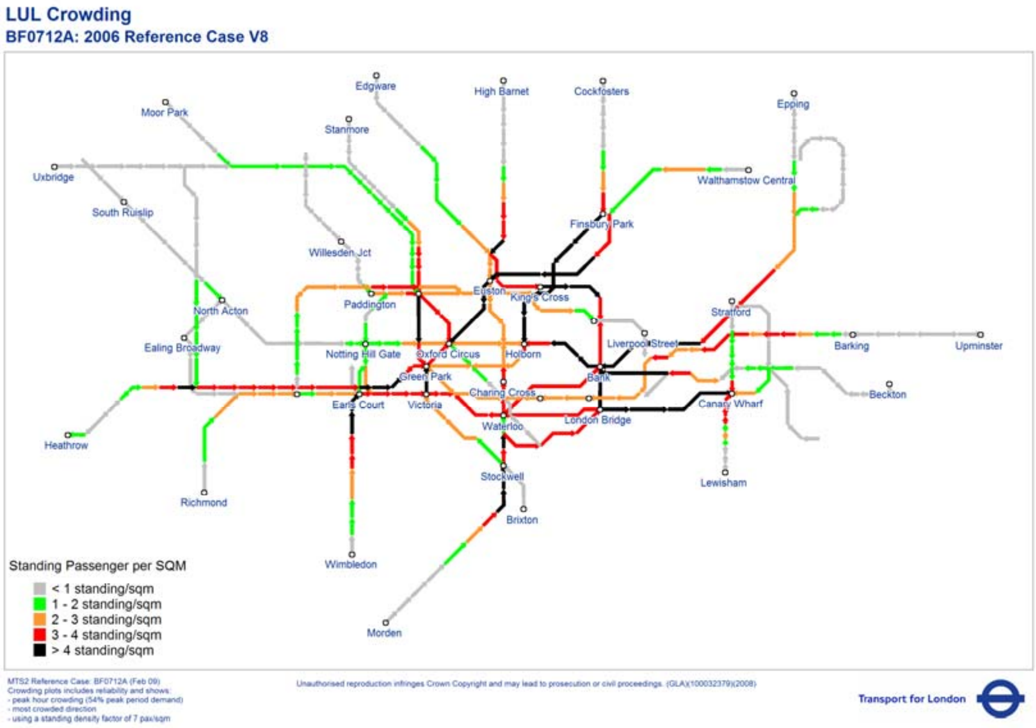
Source: London Travel Demand Survey 2006/07-2008/09

10.8 Conditions on the transport network

Public transport crowding

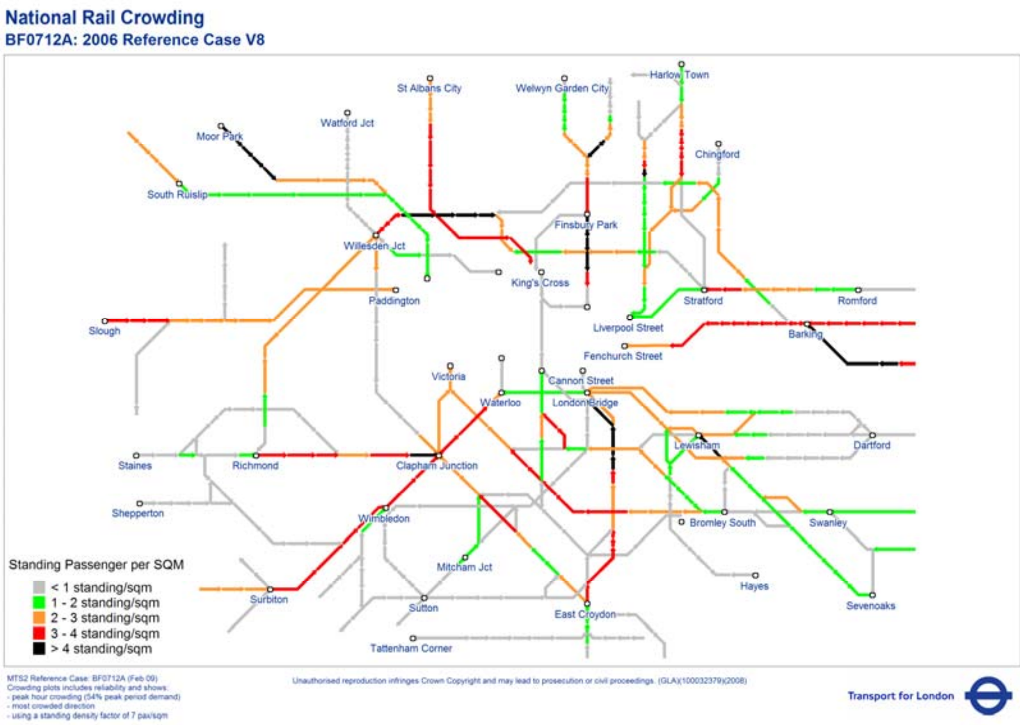
Crowding on the public transport network causes stress and inconvenience to passengers, reducing the quality of their journey experience and in extreme circumstances damaging their health. Severe crowding can also effectively reduce the connectivity of the network, as people are unable to get on to the vehicle and travel to their destination. In the morning peak period, a significant proportion of the LU network suffers from severe crowding, as shown in Figure 10.21. The network is particularly crowded in the central area, affecting those travelling within that sub-region and into the sub-region from elsewhere. As shown in Figure 10.22, there is also significant crowding on the London Overground and National Rail network, particularly in the south, east and north sub-regions. TfL's sub-regional plans will explore the implications of investment and policy options on crowding across the sub-regions and make recommendations for future prioritisation.

Figure 10.21 Modelled estimates of crowding on the London Underground network, am peak, 2006.



Source: LTS model 2006 reference case

Figure 10.22 Modelled estimates of crowding on the National Rail and London Overground network, am peak, 2006.



Source: LTS model 2006 reference case

Highway congestion

The draft MTS shows that highway congestion is a significant issue London-wide. Increased journey times and reduced reliability of car and freight trips have a significant negative economic impact. There are also negative impacts for the environment in terms of poor air quality and increased CO_2 emissions. Highway congestion also has a secondary impact on the reliability and journey times of bus journeys which decreases the efficiency and attractiveness of the service.

Table 10.4 shows average weekday speeds on the highway network by sub-region in a neutral traffic month, May 2009. The lowest speeds are in the central sub-region, where speeds throughout the day are typically around 17 kilometres per hour. There is no improvement in speeds in the central sub-region during the inter-peak period. Elsewhere, speeds were typically nearly double those of the central sub-region. The highest speeds are in the north sub-region, at 33.3 and 33.8 kilometres per hour in the morning peak and inter-peak periods, and the lowest in the south sub-region, where morning peak speeds were only 25.9 kilometres per hour. At a borough level, speeds were lower in Inner London boroughs and highest in the least densely populated Outer London boroughs such as Bexley, Havering and Hillingdon. Speeds were lowest during the afternoon peak across all the outer sub-regions.

Table 10.4 Average weekday speeds in km/h on the highway network by sub-region, May 2009.

	AM peak	Inter-peak	PM peak	Overnight
Central	17.0	16.6	16.6	26.6
East	31.8	32.9	29.0	47.8
North	33.3	33.8	30.4	49.7
South	25.9	27.7	24.8	42.3
West	31.6	34.9	28.8	48.6

Source: Trafficmaster May 2009

10.9 Population and employment projections

London's population was around 7.5 million in 2006 and is projected to grow by 0.6 million people by 2016/17 and a further 0.8 million by 2031, taking the total to 8.9 million people (see Table 10.5). By 2031, it is projected that nearly half of this growth will be in the east sub-region (49 per cent), taking the population of that sub-region from 2.1 million in 2006 to 2.7 million in 2031.

Employment in London is also projected to grow, as shown in Table 10.6, by an estimated 0.3 million jobs in 2016/17 and a further 0.5 million jobs by 2031, taking the total in the Capital from 4.6 to 5.4 million, an increase of 17 per cent. The highest growth is projected in the central sub-region, which is expected to contain around half of the new jobs. Just over a fifth of the new employment is expected to be in the east sub-region. Given the locations of the population and employment growth, significant increases in the volume of commuters to central London can be expected, particularly from the east sub-region.

Table 10.5 Comparison of existing and forecast population, 2006 to 2031.

Millions

	Central	East	North	South	West	Greater London
Existing population, 2006	1.3	2.1	1.1	1.6	1.4	7.5
Projected population, 2016/17	1.4	2.3	1.1	1.7	1.5	8.1
Population growth to 2016/17 (% change)	+8%	+12%	+6%	+4%	+6%	+8%
Projected population 2031	1.6	2.7	1.2	1.8	1.6	8.9
Population growth to 2031 (% change)	+10%	+17%	+9%	+4%	+5%	+10%
Proportion of London-wide growth to 2031	18%	49%	14%	9%	10%	100%

Source: GLA London Plan Forecasts (2009)

Table 10.6 Comparison of existing and forecast employment, 2006 to 2031.

Millions

	Central	East	North	South	West	Greater London
Existing employment, 2006	1.9	0.8	0.4	0.7	0.8	4.6
Projected employment, 2016/17	2.1	0.9	0.4	0.7	0.8	4.9
Employment growth to 2016/17 (% change)	+13%	+7%	+2%	+0%	+2%	+7%
Projected employment, 2031	2.3	1.0	0.4	0.8	0.9	5.4
Employment growth to 2031 (% change)	+11%	+13%	+8%	+6%	+10%	+10%
Proportion of London-wide growth to 2031	45%	22%	7%	9%	16%	100%

Source: GLA London Plan Forecasts (2009)

11. Spotlight on – Central London

11.1 Introduction and objective

This chapter focuses on Central London. It firstly updates for autumn 2008 TfL's long-standing central area peak count (CAPC) of people entering Central London in the weekday morning peak. It then considers new data from an extended CAPC count, TfL's central area all day counts (CAADC) covering the whole of the working day, undertaken for the first time in spring 2009. These data allow close examination of the 'dynamics' of travel to Central London, where demand pressures on transport services are particularly intense. Finally, the chapter considers recent developments and data in relation to the Congestion Charging scheme in Central London, updating some of the key traffic volume and congestion trends formerly covered by TfL's annual Congestion Charging Impacts Monitoring Reports.

11.2 Key features and trends

Travel to Central London in the weekday morning peak

- The total number of people entering Central London during the weekday morning peak in TfL's autumn 2008 CAPC surveys was 1.14 million, up by 1 per cent from 2007.
- This number has been relatively stable since the 1950s, varying between 1.0 and 1.2 million, following the economic cycle. The value for 2008, which is the highest since the late 1980s economic boom (the 'Lawson boom'), may therefore have reflected the high point of the previous cycle.
- Within a stable overall number of travellers, however, previously-established trends towards changes in mode share for these (largely) daily commuters continued and intensified. There was a further decrease of 7 per cent in the total number of car travellers. This resulted from a 5 per cent drop in the number of cars and a 2 per cent decline in car occupancy at the central London cordon. Rail passengers also decreased by 1.4 per cent while bus and Underground both increased by about 1 per cent, leaving the public transport total almost unchanged from 2007.
- The largest percentage change was recorded for cycling, which increased by 23 per cent between 2007 and 2008. Although cyclists account for just 2 per cent of people entering Central London during the morning peak, their numbers have almost doubled, an increase of 95 per cent, between 2000 and 2008.

Travel to Central London across the working day

- TfL's CAADC survey is a new survey, based on the established CAPC surveys, that measures travel and mode shares for people entering and leaving Central London across the working weekday.
- On a typical 2008 weekday 2.4 million people entered Central London during the working day between 7am and 7pm; half of these entered during the morning peak period (7am to 10am).

- For most of the working day, there are 1.1 million more people in Central London than at the start of the day.
- Public transport accounts for 90 per cent of travel into Central London in the morning peak, and about 80 per cent during the rest of the day.
- National Rail accounts for 43 per cent of incoming people during the morning peak, but this drops sharply to 26 and 22 per cent, respectively, in the interpeak and afternoon peak periods.
- Two million people leave Central London between 7am and 7pm, with substantial numbers (more than 400,000) leaving after 7pm. About a fifth of outbound rail passengers leave after 7pm.

Congestion charging in Central London – recent developments

- The draft MTS proposes the removal, subject to consultation, of the Western Extension to the Central London Congestion Charging zone. The draft strategy also proposes to continue operating, subject to regular monitoring and periodic reviews of effectiveness, Congestion Charging in the original Central London charging zone.
- Latest data for 2008/09 show an intensification of the established trend towards falling traffic levels in the extended charging zone, reflecting wider falls in traffic volumes across London during late 2008 and early 2009.
- Latest congestion data for both parts of the extended zone show some recent amelioration of conditions, with small reductions to delays but congestion levels still well above those formerly achieved by the scheme. This probably reflects a combination of reduced demand (ie traffic), but also some recent initiatives to better manage the operation of the road network in Central London.

Traffic and congestion in the original Central London Congestion Charging zone

- Following relative stability since 2003 the numbers of vehicles entering the central charging zone declined substantially in 2008 and the first half of 2009. There was a drop of 11 per cent in cars (including minicabs) entering the zone when comparing annualised flows from 2008 and 2007. The equivalent drop across all vehicle types was 4 per cent with a further drop of 4 per cent observed in 2009.
- Similarly, levels of traffic circulating inside the central zone declined in 2008 compared with 2007, with the estimated number of vehicle kilometres driven in the zone by all vehicle types reducing by 8 per cent.
- Congestion inside the zone appeared to have lessened somewhat in the latter months of 2008 and during 2009. Average excess delay in 2009 was measured at 2.1 minutes per kilometre, 0.2 minutes per kilometre or about 8 per cent lower than the pre-charging level in 2002.

Traffic and congestion in the Western Extension zone

- Traffic entering the Western Extension zone fell by 14 per cent in the first year of the extension in 2007 (based on vehicles with four or more wheels) and dropped by a further 6 per cent during 2008. In the first half of 2009 traffic entering the zone increased relative to 2008. In the second half of 2009, however, declines across most vehicle types led to an overall fall of 3 per cent in vehicles with four or more wheels entering the zone.

- Traffic circulating inside the Western Extension zone measured in vehicle kilometres driven by vehicles with four or more wheels fell by 11 per cent during 2007 and by a further 10 per cent in 2008, in line with the reductions seen in traffic entering the zone over the same period. In 2009 vehicle kilometres driven remained at similar levels to 2008.
- Congestion levels inside the zone in the first two years of the extension were broadly similar to pre-charging levels. In 2009, however, there is an indication of slightly improved conditions, with delay down by 4 per cent compared to 2008 and by 7 per cent compared to pre-charging conditions.

Analysis of the relationship between traffic levels and congestion in the extended Central London Congestion Charging zone

- The monitoring arrangements for Congestion Charging in Central London has provided a long-term data series that allows the relationships between traffic levels and congestion to be quantified in this context.
- Comparisons of both the initial impacts of each part of the extended scheme, when both traffic and congestion fell in proportion, and the longer-term trend towards returning congestion in both parts of the extended charging zone despite static or further-reducing traffic levels, point to significant reductions in the effective capacity of the Central London road network, occurring between 2004 and 2008.
- This loss of capacity may have been as much as 30 per cent in the original Central London zone. Detailed analysis of speed survey data suggests that the effect was mainly focused on junctions, and coincided with an increase of between 15 and 20 per cent in the number of traffic signal installations in Central London, although this was certainly not the only cause.
- The data also suggest that underlying demand for travel on the networks has been effectively static over the period since the introduction of both parts of the scheme – despite traffic levels continuing to show small year-on-year reductions. This implies that continued reductions in traffic volumes in the charging zone primarily reflect the constraining effect of reduced network capacity – a finding with important implications for future policy development.

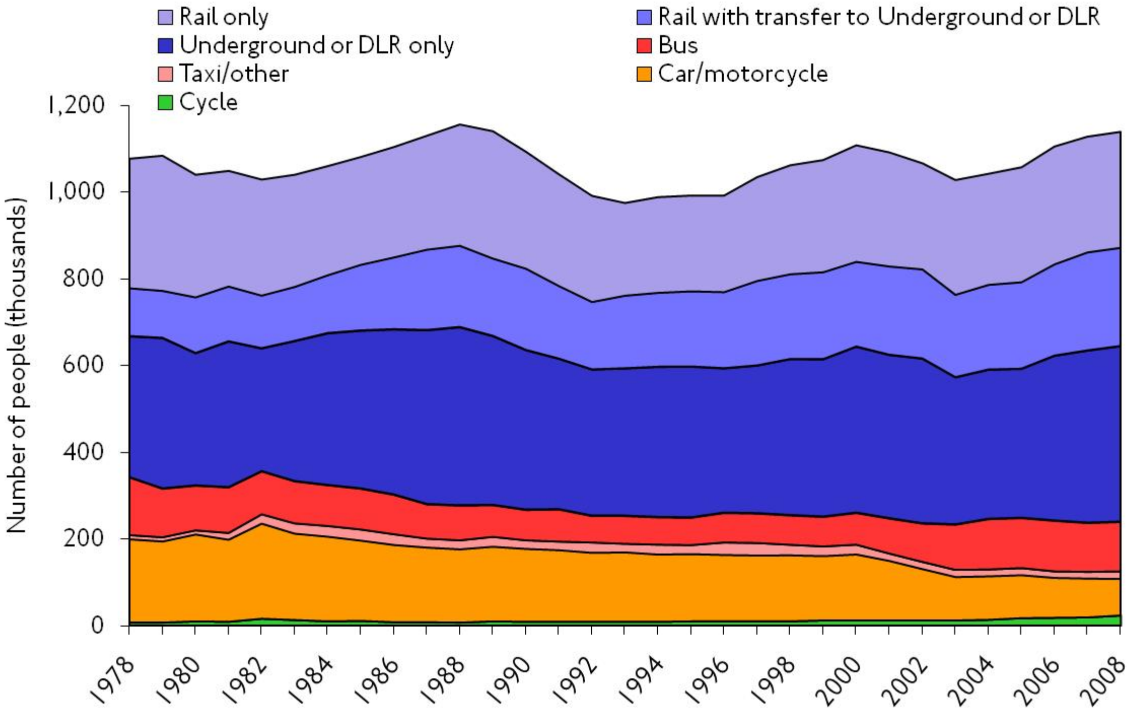
11.3 Travel to Central London in the weekday morning peak

TfL's CAPC survey is a long-established annual count of people entering Central London during the weekday morning peak period (7am to 10am). Most of these people are commuting to work in Central London.

The survey is carried out each autumn with counts spread over several working weekdays (in order to avoid random day-to-day variations). The counts cover all modes of transport apart from walking and people travelling in vans and other commercial vehicles. Road modes are counted at a full set of sites on the Central London cordon (see also section 2.11). The location of counts is such that there is no overlap between counts of bus passengers or occupants of other road vehicles with those counted on rail, Underground or DLR. To avoid double counting people who would otherwise be included in both the rail and Underground totals, an estimate is made (from LU survey data) of the number of rail travellers who transfer to Underground at the central London termini.

In the long run, as shown by Figure 11.1, the daily total number of people entering Central London during the morning peak has been quite stable from year to year, varying between 1.0 and 1.2 million since the survey began in the late 1950s. In recent years the total has increased since 2003. In 2008 it reached 1.14 million, almost unchanged from the previous year. This is above the previous peak in 2000 and almost at the level last reached in 1989. The series historically shows a cyclical pattern following the economic cycle of employment in Central London. It is perhaps surprising that there is no evidence of a downturn in 2008 as a result of the economic troubles that began in autumn of that year. However the changing pattern of modal use seen in the 2008 survey may be partly due to economic factors, and the 2008 figure may reflect the high point of the previous economic cycle.

Figure 11.1 People entering Central London in the weekday morning peak, 1978 to 2008.

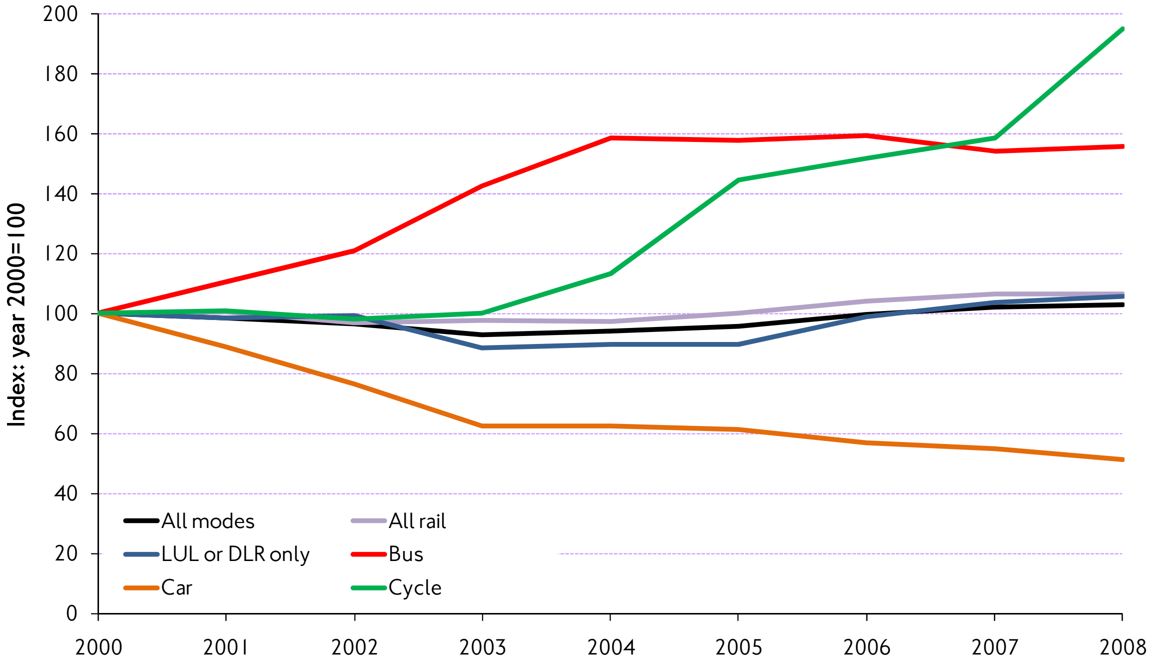


Within a relatively stable overall total, there have been significant shifts in some of the modes of transport used to travel into Central London. Public transport now accounts for 90 per cent of travel into Central London during the morning peak. This share has steadily increased in recent years, rising from 84 per cent in 2000. The number entering by car declined in 2008 to 70,000, about half the number recorded only 10 years earlier. A declining trend in car use is evident from 1999, consistent with the declining trend in Central London road traffic during that period. This trend was reinforced by the introduction of Central London Congestion Charging in 2003.

In the year to autumn 2008, there was a further decrease of 7 per cent in the CAPC total for car commuters. Although of relatively large magnitude for a year-on-year change, it is not inconsistent with recent trends. This resulted from a 5 per cent drop in the number of cars and a 2 per cent decline in car occupancy at the central cordon. Rail passengers also decreased by 1.4 per cent while bus and Underground both increased by about 1 per cent, leaving the public transport total almost unchanged.

The largest percentage change was recorded for cycling, which increased by 23 per cent between 2007 and 2008. Although cyclists account for just 2 per cent of people entering Central London during the morning peak, their numbers have almost doubled, an increase of 95 per cent, between 2000 and 2008.

Figure 11.2 Trends by mode of transport for people entering Central London during the weekday morning peak. Index year 2000=100.



Source: TfL Planning, CAPC survey

Table 11.1 shows the year-by-year CAPC results since 1993, while Table 11.2 gives the corresponding mode shares.

Table 11.1 People entering Central London in the weekday morning peak, by mode of transport, 1991 to 2008.

Thousands of people

Year	All modes	Rail only	Rail with transfer to LUL/DLR	All rail	LUL or DLR only	Bus	Coach/ minibus	Car	Taxi	Two-wheeled motor vehicles	Cycle
1991	1,042	258	168	426	347	74	20	155	-	12	9
1992	992	245	156	401	337	61	24	150	-	11	9
1993	977	214	168	382	340	64	20	150	-	11	9
1994	989	221	171	392	346	63	23	145	-	11	9
1995	993	221	174	395	348	63	21	145	-	11	10
1996	992	223	176	399	333	68	20	143	9	11	10
1997	1,035	240	195	435	341	68	20	142	9	11	10
1998	1,063	252	196	448	360	68	17	140	8	13	10
1999	1,074	259	201	460	363	68	15	135	8	15	12
2000	1,108	269	196	465	383	73	15	137	8	17	12
2001	1,093	263	204	468	377	81	10	122	7	16	12
2002	1,068	245	206	451	380	88	10	105	7	15	12
2003	1,029	265	191	455	339	104	10	86	7	16	12
2004	1,043	256	196	452	344	116	9	86	7	16	14
2005	1,058	265	200	465	344	115	9	84	8	16	17
2006	1,105	271	212	483	379	116	8	78	7	15	18
2007	1,129	267	227	494	397	113	9	75	6	15	19
2008	1,140	268	227	495	405	114	11	70	7	15	23

Source: TfL Planning, CAPC survey

Table 11.2 Mode shares of people entering Central London in the weekday morning peak, 1991 to 2008.

Percentage

Year	All modes	Rail only	Rail with transfer to LUL/DLR	All rail	LUL or DLR only	Bus	Coach/ minibus	Car	Taxi	Two-wheeled motor vehicles	Cycle
1991	100	25	16	41	33	7	2	15	0	1	1
1992	100	25	16	40	34	6	2	15	0	1	1
1993	100	22	17	39	35	7	2	15	0	1	1
1994	100	22	17	40	35	6	2	15	0	1	1
1995	100	22	18	40	35	6	2	15	0	1	1
1996	100	22	18	40	34	7	2	14	1	1	1
1997	100	23	19	42	33	7	2	14	1	1	1
1998	100	24	18	42	34	6	2	13	1	1	1
1999	100	24	19	43	34	6	1	13	1	1	1
2000	100	24	18	42	35	7	1	12	1	2	1
2001	100	24	19	43	34	7	1	11	1	2	1
2002	100	23	19	42	36	8	1	10	1	1	1
2003	100	26	19	44	33	10	1	8	1	2	1
2004	100	25	19	43	33	11	1	8	1	2	1
2005	100	25	19	44	32	11	1	8	1	2	2
2006	100	25	19	44	34	11	1	7	1	1	2
2007	100	24	20	44	35	10	1	7	1	1	2
2008	100	23	20	43	36	10	1	6	1	1	2

Source: TfL Planning, CAPC survey

11.4 Travel to Central London across the working day – TfL's new central area all day counts

In spring 2009, TfL undertook an extended CAPC count to cover the whole of the working day – the first time such information has been available. These new central area all day counts (CAADC) covered the 12-hour period between 7am and 7pm, using the established CAPC methodology and including travel in the reverse direction – out of Central London. The findings from this new survey have many potential uses, such as for transport model calibration. They also provide new insights into the nature of travel and travel demand in Central London. The sections below look at some of the findings from this survey, which are summarised in Tables 11.3 and 11.4.

Table 11.3 People entering and leaving Central London between 07:00 and 19:00 by mode of transport, by time of day (spring 2009).

Thousands of people

Mode of transport	Inbound				Outbound			
	Am peak	Interpeak	Pm peak	All inbound	Am peak	Interpeak	Pm peak	All outbound
Rail including Overground	503	199	101	802	75	157	425	657
Underground only	428	275	190	892	118	214	367	700
DLR	11	11	9	30	8	9	9	25
Bus	111	115	63	289	43	98	109	250
Coach	9	22	10	41	6	16	15	36
Minibus	2	3	1	5	1	2	1	4
All mass public transport	1,063	624	373	2,060	251	496	925	1,672
Car	69	115	74	258	45	105	77	226
Taxi	6	12	7	24	4	13	10	27
PHV	3	4	2	10	1	3	2	6
Motorcycle	15	10	6	31	4	9	13	26
Cycle	26	9	6	41	4	7	20	31
All personal transport	119	150	95	363	58	136	121	315
All transport	1,182	774	467	2,424	309	632	1,046	1,987

Source: TfL Planning, Central Area All Day Counts (spring 2009)
Note: Taxi and private hire vehicles have been grouped with cars as personal transport. Public transport includes coaches and minibuses; the counts are likely to include a small number of privately owned vehicles. No additional Underground counts were carried out in spring 2009; totals for Underground are derived from autumn 2008 data.

Table 11.3 summarises the key totals by direction, mode and time of day, and Table 11.4 presents these in terms of mode share. These data are new and TfL is carefully examining the key features and insights that they provide. The following provides a summary:

- In spring 2009, 2.4 million people entered Central London during the 12 hour working day, half of these during the morning peak.
- However, only 2 million left Central London during the 12 hours. It is therefore clear that there were substantial numbers who left Central London after 7pm, who were not fully counted in this survey.
- While 90 per cent of inbound movements to Central London in the morning peak are by public transport, this percentage declines to about 80 per cent during the rest of the day, with car travel increasing its share from 6 per cent in the morning peak to 15/16 per cent in the inter-peak and pm peak periods.
- Rail counts were extended beyond 7pm to the rest of the day, and these show that more than a fifth of rail passengers leaving Central London each day did so after 7pm, with about 15 per cent leaving in the two hours between 7pm and 9pm.

- The share of inbound movements by National Rail drops sharply from 43 per cent in the morning peak to 26 per cent and 22 per cent, respectively, in the inter-peak and evening peak.
- However, the mode share of inbound movements by Underground is relatively stable, between 35 and 40 per cent throughout the day (excluding passengers transferring from/to National Rail).
- The inbound mode share for bus increased from 10 per cent in the morning peak period to about 15 per cent in the inter-peak and pm peak periods. A similar variation applied, for outbound travel, between the pm peak period and the rest of the day.
- Car occupancy at the central cordon showed little variation during the 12-hour day, ranging between 1.3 and 1.4 occupants per car, apart from outbound movements in the am peak period when average occupancy dropped below 1.3.
- About 40,000 cyclists entered Central London during the 12 hours, almost two thirds (64 per cent) of these during the morning peak period.

Table 11.4 Mode shares of people entering and leaving Central London between 07:00 and 19:00, by time period (spring 2009).

Percentage

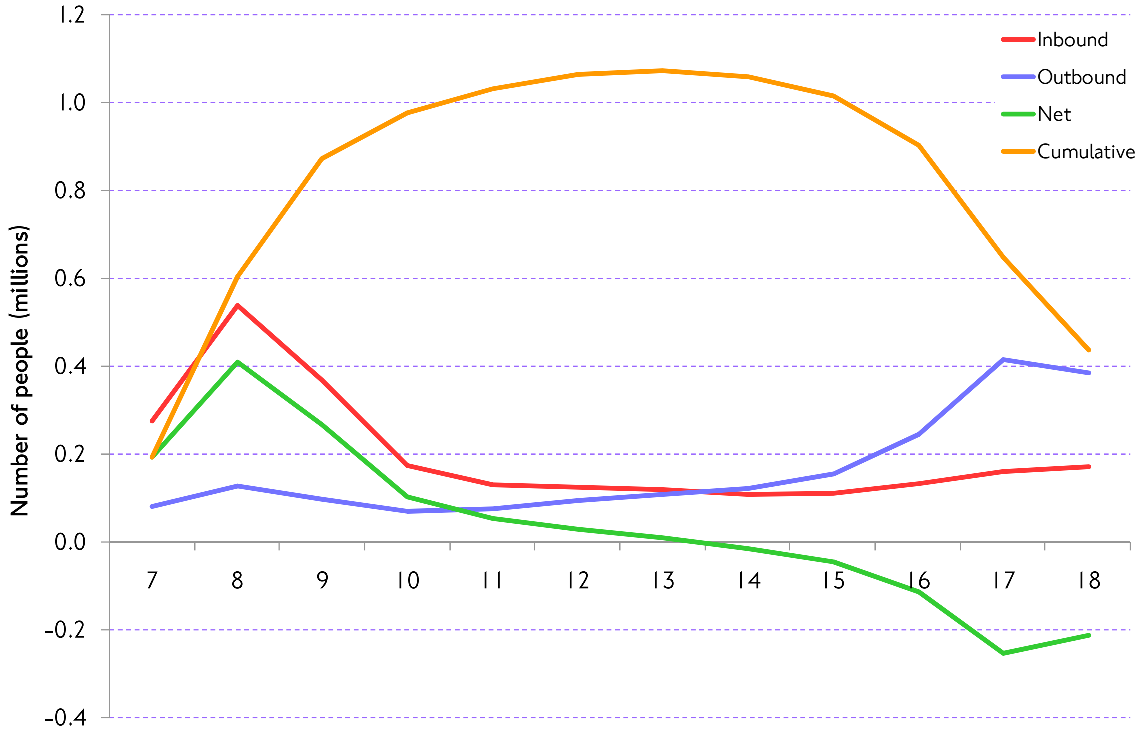
	Inbound				Outbound			
Mode of transport	**Am peak**	**Inter-peak**	**Pm peak**	**All inbound**	**Am peak**	**Inter-peak**	**Pm peak**	**All outbound**
Rail including Overground	43	26	22	33	24	25	41	33
Underground only	36	36	41	37	38	34	35	35
DLR	1	1	2	1	2	1	1	1
Bus	9	15	13	12	14	15	10	13
Coach and minibus	1	3	2	2	2	3	1	2
All public transport	90	81	80	85	81	78	88	84
Car	6	15	16	11	14	17	7	11
Taxi and PHV	1	2	2	1	2	3	1	2
Motorcycle	1	1	1	1	1	1	1	1
Cycle	2	1	1	2	1	1	2	2
All personal transport	10	19	20	15	19	22	12	16
All transport	100	100	100	100	100	100	100	100

Source: TfL Planning, Central Area All DayCounts (spring 2009)
See notes to Table 11.3

Figure 11.3 shows the weekday total inflows and outflows of people to/from Central London by hour of day between 7am and 7pm, and the resulting net inflow. Inflows exceed outflows until 2pm and then the position is reversed, with a gradually increasing net outflow after this time. The highest hourly net inflow is between 8am and 9am when more than 400,000 additional people enter Central London. The figure also shows how the Central London daytime population accumulates during the day, until at its peak there are 1.1 million more people in

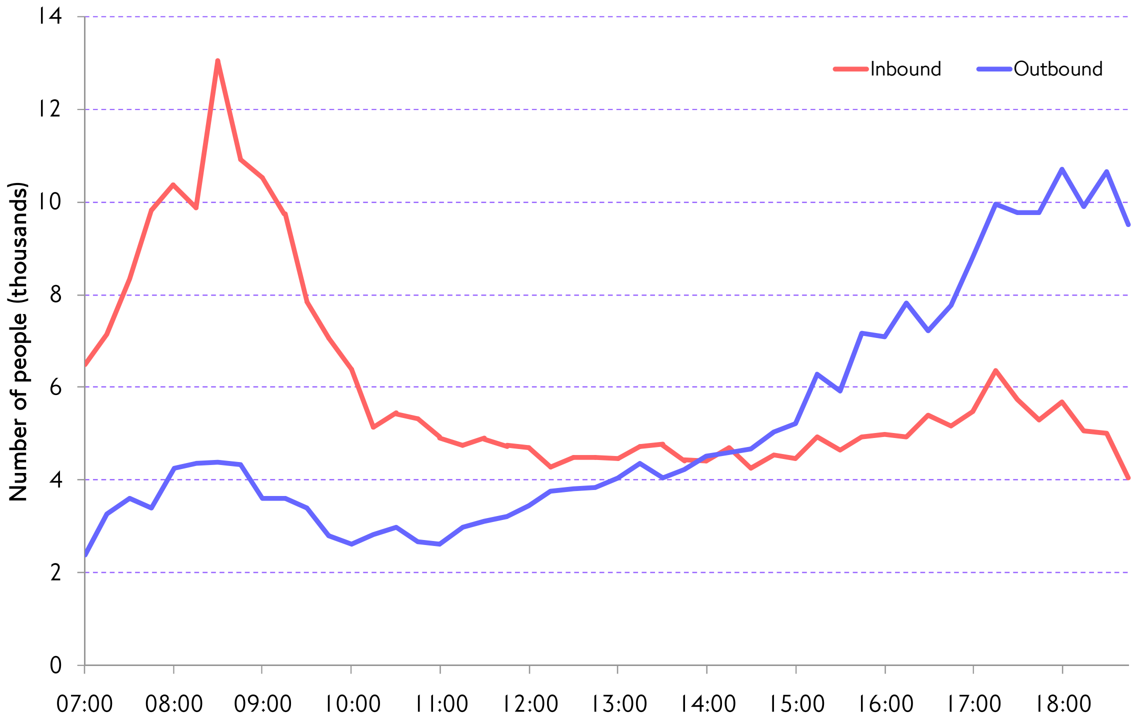
Central London that at the start of the day. This persists until about 5pm when the outflow of workers and day visitors starts to have a noticeable effect in reducing the daytime population. The highest hour for net outflows is between 5pm and 6pm with a net 250,000 people leaving Central London. There is also a gradual increase in the incoming flow in the evening as people come to Central London for entertainment and leisure. These effects combine to make the evening peak period for travel more extended than the morning peak. Even as late as 7pm there remain almost 400,000 extra people in Central London compared with the night-time population.

Figure 11.3 Balance between inflow/outflow of people to/from Central London on a typical weekday. Spring 2009, inflows/outflows, by hour of day.



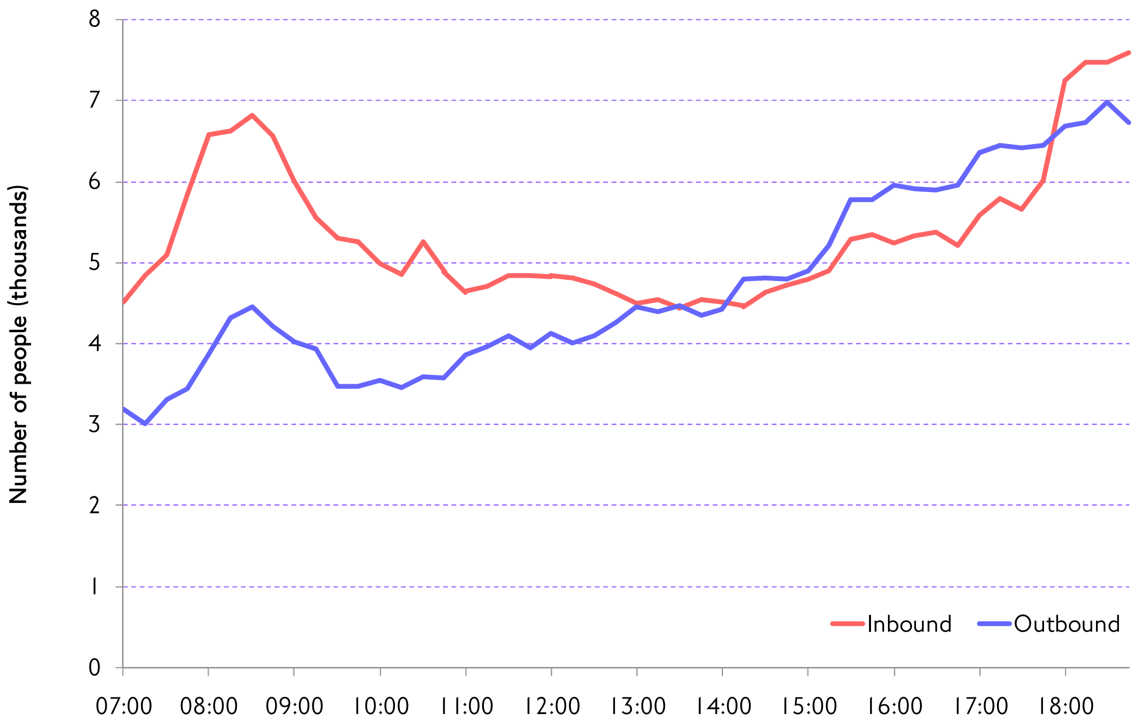
Source: TfL Central Area All Day Counts, spring 2009

Figure 11.4 People entering and leaving Central London by bus by quarter hour, 07:00 to 19:00. Spring 2009.



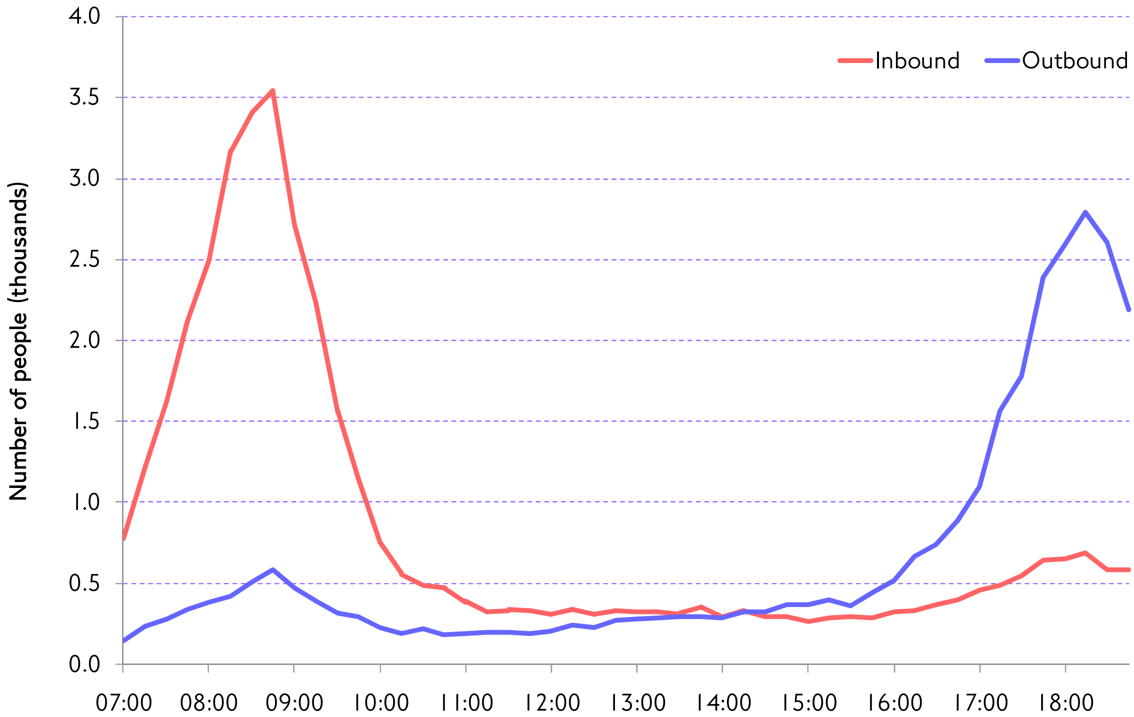
Source: TfL Central Area All Day Counts, spring 2009

Figure 11.5 People entering and leaving Central London by car by quarter hour, 07:00 to 19:00. Spring 2009.



Source: TfL Central Area All Day Counts, spring 2009

Figure 11.6 People entering and leaving Central London by cycle by quarter hour, 07:00 to 19:00. Spring 2009.



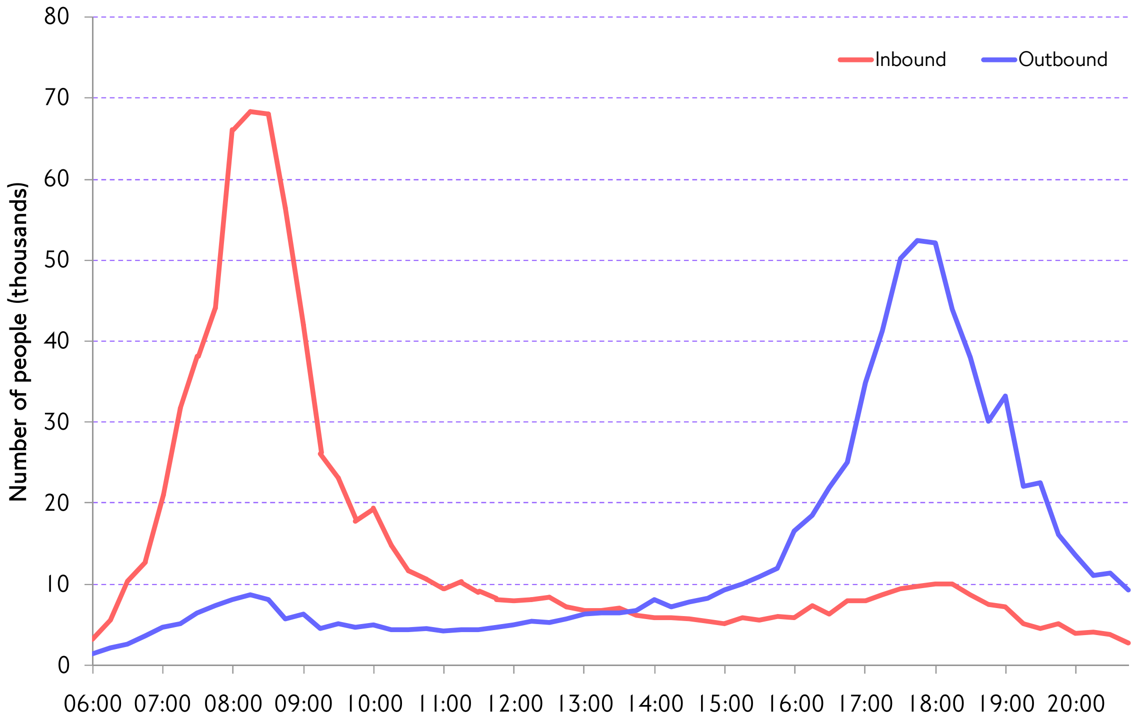
Source: TfL Central Area All Day Counts, spring 2009

Figures 11.4 to 11.6 show the profiles through the day of the number of people entering and leaving Central London every quarter hour by bus, car and pedal cycle, respectively. Bus passengers and cyclists show the characteristic pattern of a sharp peak for inbound movements in the morning and a more extended afternoon peak period for outbound movements. For car occupants, there is a more even spread through the day with less difference between the profiles of inbound and outbound movements. This reflects the complexity of motorists' routing decisions so that cordon crossings in either direction may occur at all times of the day despite trips being predominantly inbound in the morning and outbound in the afternoon.

- Thirty-eight per cent of inbound trips to Central London by bus between 7am and 7pm occur in the am peak, with 15 per cent in the hour between 8am and 9am. In the outbound direction 44 per cent of bus trips between 7am and 7pm are in the evening peak (between 4pm and 7pm) with 15 per cent between 5pm and 6pm.
- For car occupants, 27 per cent of inbound movements are in the morning peak and a similar number, 29 per cent, in the evening peak.
- Almost two thirds (64 per cent) of cyclists entering Central London between 7am and 7pm do so in the morning peak, with half of these (31 per cent) in the hour between 8am and 9am.

National Rail shows (Figure 11.7) a similar pattern of peaks, the morning inbound peak being the more pronounced: 63 per cent of the inbound passengers arrive in the three-hour morning peak with 32 per cent arriving between 8am and 9am. The evening peak for outbound rail movements starts later and continues after 7 pm, later than the corresponding peak for road traffic. For rail, the actual outbound peak occurs just after 6pm.

Figure 11.7 People entering and leaving Central London by National Rail by quarter hour, 06:00 to 22:00. Spring 2009.



Source: TfL Central Area All Day Counts, spring 2009

11.5 Congestion Charging in Central London – recent developments

The draft MTS proposes the removal, subject to consultation, of the Western Extension of the Central London Congestion Charging zone. The draft strategy also proposes to continue operating, subject to regular monitoring and periodic reviews of effectiveness, Congestion Charging in the original Central London charging zone.

From its introduction in 2003 until 2008, TfL produced detailed annual Impacts Monitoring Reports, reflecting a five-year monitoring programme (later extended to cover the introduction of the Western Extension) for the scheme. Key findings from this work were, that:

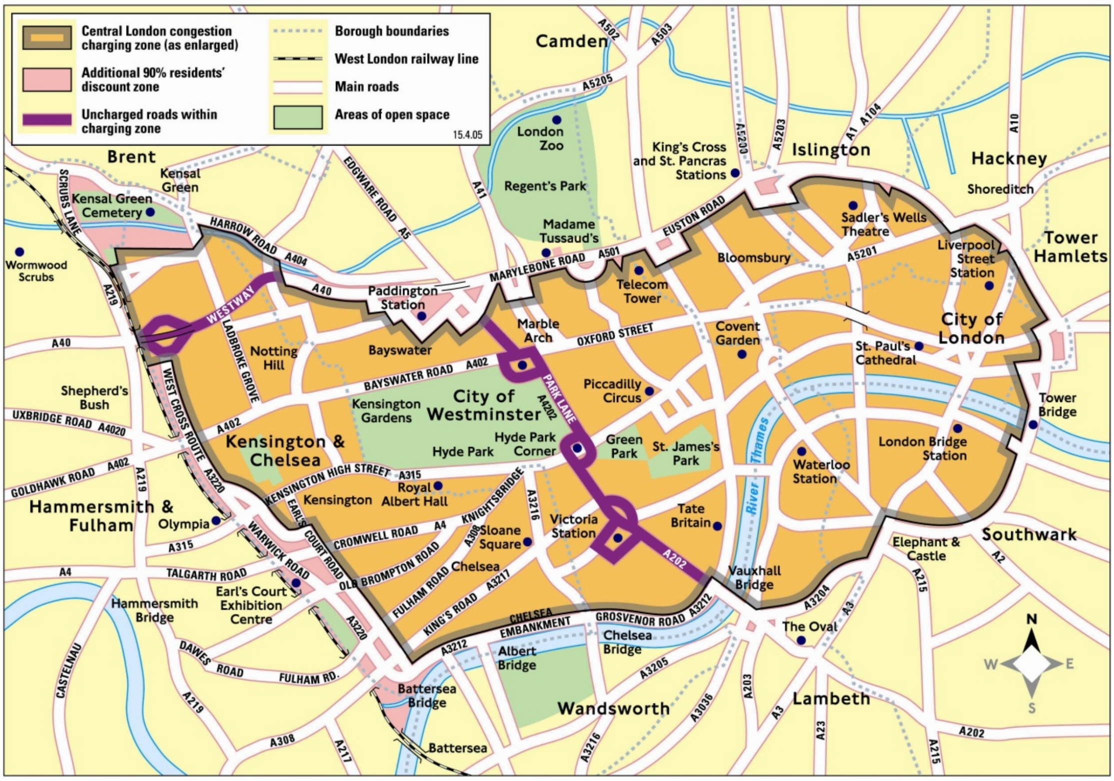
- The initial traffic reduction and decongestion impacts of both parts of scheme were broadly in line with TfL's expectations.
- Over time, the traffic reduction impacts of the scheme have been sustained – and indeed have intensified, reflecting a wider trend towards reduced traffic in Central and Inner London.
- However, congestion has tended to return – reflecting the reallocation of effective road network capacity to other transport priorities, as well as increased roadworks and development activity in Central London.

- There were no significant operational difficulties – on either the road or public transport networks – arising from the introduction of either part of the scheme.
- There were no significant adverse impacts of the scheme on the wider economy of Central London – which in later years has out-performed other parts of London.
- The scheme raises significant net revenues, which, by law, are used to fund other elements of the MTS.

During 2008 and 2009, TfL has continued core elements of traffic and congestion monitoring in relation to the scheme. These have included traffic entering both the original Central and Western Extension zones, as well as congestion levels in both zones. These new data have also allowed TfL to study the relationships between traffic volumes and road network performance in Central London in detail, and derive some fundamental relationships which provide a better understanding of the factors behind recent trends in the performance of the Central London road network.

Sections 11.6 and 11.7 of this report update these trends in relation to the original central zone and western extension respectively, while section 11.8 summarises new insights into road network performance that TfL has derived from analysis of these data.

Figure 11.8 The extended Central London Congestion Charging zone.

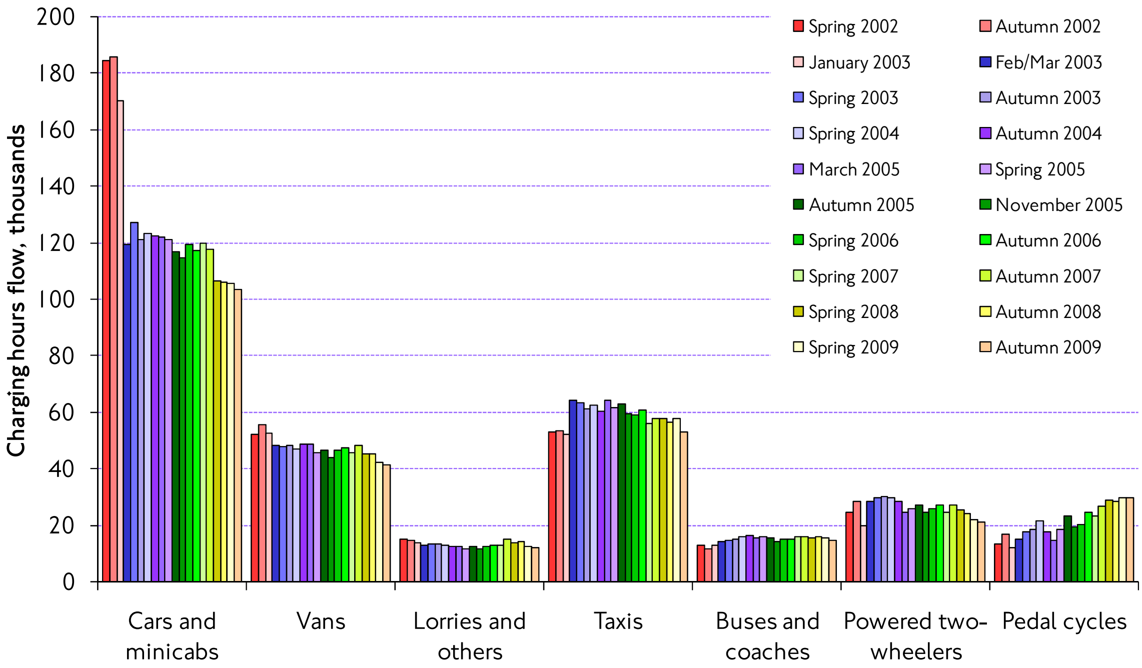


11.6 Traffic and congestion in the original Central London charging zone

Traffic entering the central zone

Since 2002, traffic entering the original charging zone has been monitored through manual classified traffic counts undertaken at least twice-yearly in spring and autumn. Figure 11.9 shows the updated time-series from these surveys.

Figure 11.9 Traffic entering the Central London charging zone (across all inbound roads), charging hours, 07:00-18:00, 2002 to 2009.



Source: TfL Planning

Traffic had been relatively stable for most vehicle types from the introduction of charging in 2003 until 2007. However, in 2008 significant incremental falls were observed for some vehicle types. More specifically, annualised flows for cars (including minicabs) declined by 11 per cent in 2008 compared to 2007, while numbers of vans and powered two-wheelers fell by 4 per cent. In the same period pedal cycle numbers increased by 14 per cent, leading to an overall decline for all vehicles of 4 per cent. This trend continued into 2009, with a 13 per cent decline in powered two-wheelers, and lorries and other vehicles, when comparing annualised results between 2008 and 2009. In addition vans fell by 8 per cent in the same period while buses and coaches fell by 4 per cent, taxis by 3 per cent and cars and minicabs by 2 per cent. The only vehicle type showing consistent increase over the years is pedal cycles, which increased by a further 4 per cent between 2008 and 2009. This had led to an overall decline across all vehicle types of 4 per cent in 2009 compared to 2008. This notable decline is reflected in other traffic data and mirrors the downturn in the economy which will have affected travelling patterns in Central London.

Traffic circulating in the central charging zone

One of the main indicators used to monitor changes to traffic brought about by the original charging zone is an estimate of vehicle kilometres driven in the zone. Table 11.5 shows this by vehicle type since 2005. There has been a decline in 2008 across all vehicle types except lorries and buses/coaches. The greatest fall was observed for powered two-wheelers, at 17 per cent, followed by cars, at 14 per cent. The overall reduction for all vehicles is estimated to be 8 per cent on the basis of this indicator.

Table 11.5 Vehicle-kilometres within the Central London Congestion Charging zone and percentage contribution to total traffic during charging hours, 07:00-18:00. Annualised weekdays for 2005 to 2008.

	Millions							
	2005		2006		2007		2008	
		% of total		% of total		% of total		% of total
All Vehicles	1.33	100%	1.34	100%	1.34	100%	1.23	100%
Four or more wheels	1.11	83%	1.12	84%	1.10	83%	1.01	83%
Potentially chargeable	0.76	57%	0.78	58%	0.77	58%	0.69	57%
Cars	0.44	33%	0.46	34%	0.44	33%	0.38	31%
Vans	0.25	19%	0.25	19%	0.25	19%	0.24	19%
Lorries and other	0.07	5%	0.07	5%	0.07	5%	0.07	6%
Non-chargeable	0.57	43%	0.56	42%	0.57	42%	0.53	43%
Licensed taxis	0.29	22%	0.27	20%	0.27	20%	0.25	21%
Buses and coaches	0.06	5%	0.07	5%	0.06	4%	0.07	5%
Powered two-wheelers	0.13	9%	0.12	9%	0.12	9%	0.10	8%
Pedal cycles	0.09	7%	0.09	7%	0.11	8%	0.11	9%

Traffic on the Inner Ring Road

The Inner Ring Road is the boundary route enclosing the original Central London Congestion Charging zone. It comprises the 'free passage route' between the two parts of the extended charging zone and the remaining 'eastern horseshoe' section around the original Central London charging zone. The main monitoring indicator for the Inner Ring Road is vehicle kilometres driven during charging hours. Table 11.6 shows these estimates between 2005 and 2009. The indicator has been remarkably stable for a number of years; however, in 2008 a decline in overall traffic levels was observed – in accordance with observations inside the central zone. This trend continued in 2009 with vehicle kilometres driven by all vehicles declining by 3 per cent compared to 2008 and 5 per cent compared to 2007. The largest falls were observed across potentially chargeable vehicle types (cars, vans and lorries). Vehicle kilometres by buses/coaches increased in both years while vehicle kilometres by licensed taxis increased in 2008 but then declined by an equal amount in 2009. This led to vehicle kilometres driven by non-chargeable vehicles returning to 2007 levels.

Table 11.6 Vehicle kilometres driven on the Inner Ring Road during charging hours, 07:00-18:00. 2005 to 2009.

	Vehicle kilometres, millions				
	2005	**2006**	**2007**	**2008**	**2009**
All Vehicles	0.62	0.63	0.63	0.62	0.60
Four or more wheels	0.58	0.58	0.58	0.57	0.55
Potentially chargeable	0.48	0.47	0.47	0.45	0.44
Cars	0.34	0.32	0.32	0.31	0.29
Vans	0.11	0.11	0.11	0.11	0.11
Lorries and other	0.03	0.04	0.04	0.03	0.04
Non-chargeable	0.14	0.16	0.16	0.17	0.16
Licensed taxis	0.08	0.08	0.08	0.09	0.08
Buses and coaches	0.03	0.03	0.03	0.03	0.03
Powered two-wheelers	0.03	0.03	0.04	0.03	0.03
Pedal cycles	0.01	0.01	0.01	0.01	0.02

Congestion inside the central zone

Figure 11.10 shows the updated time series of congestion measurements inside the original central charging zone from moving car observer surveys. In the latter months of 2008 and during 2009 congestion in the central zone, measured in terms of a travel rate and expressed as an excess delay over notionally uncongested conditions, appeared to have reduced slightly compared to earlier surveys in equivalent months. The average excess travel rate in 2009 was 2.1 minutes per kilometre – lower than the representative level of 2.3 minutes per kilometre, which applied in 2002 prior to the introduction of charging. Table 11.7 shows the average yearly delay, comparing each year with the representative pre-charging value.

This apparent reduction in congestion coincides broadly with reductions in the level of traffic in the area, as discussed above. These observations may also be an indication that the intensity of roadworks may have lessened in the last year. However, the level of congestion experienced in the central zone is still relatively high and does not compare favourably with the improved conditions prevailing in the zone during the first years of Congestion Charging.

Figure 11.10 Congestion in the original Central London charging zone during charging hours. Moving car observer surveys, 2002 to 2009.

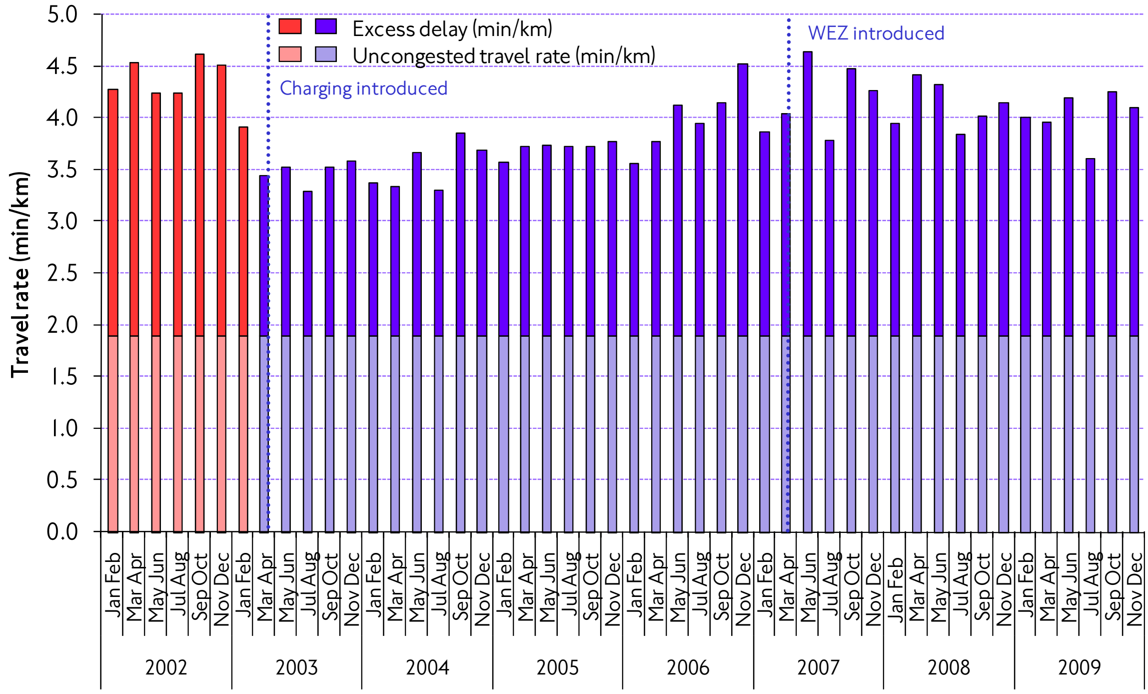


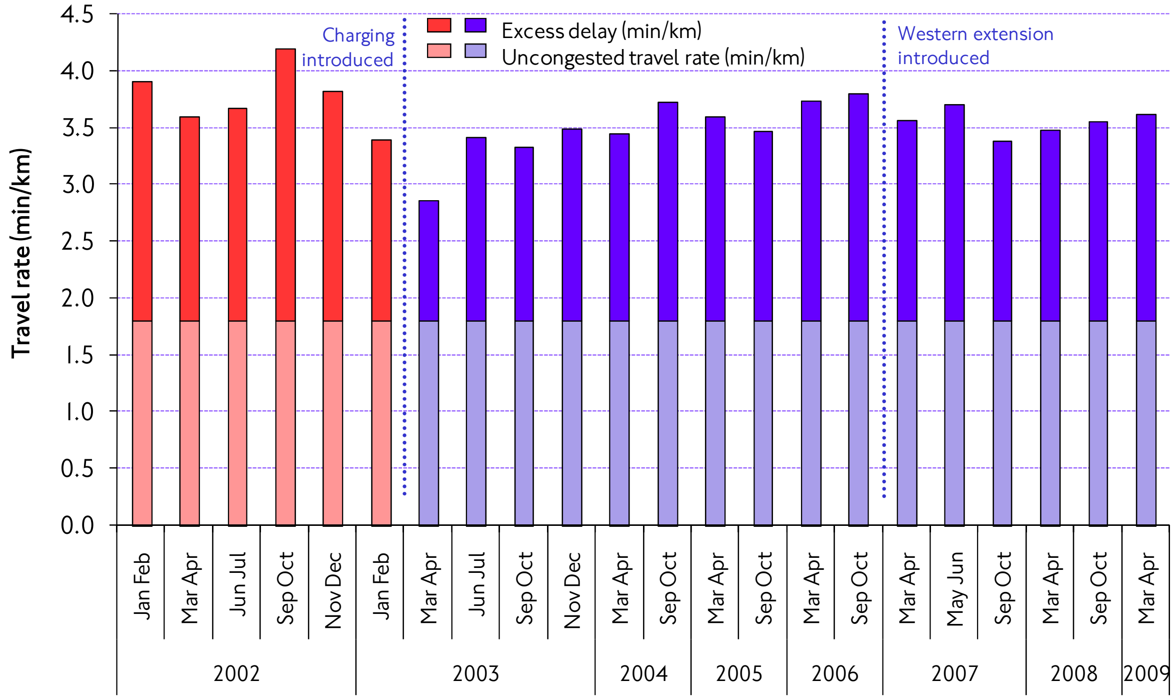
Table 11.7 Comparative congestion statistics for the original Central London charging zone. Charging hours 07:00-18:00.

Averaging period	Number of surveys	Mean excess travel rate (minutes per kilometre)	Difference 2002 representative value (%)
2002 calendar year – observed average	6	2.5	+ 8%
2002 calendar year – representative level	6	2.3	base
2003 post charging	5	1.6	- 30%
2004 post charging	6	1.6	- 30%
2005 post charging	6	1.8	- 22%
2006 post charging	6	2.1	- 8%
2007 post charging	6	2.3	0%
2008 post charging	6	2.2	-4%
2009 post charging	6	2.1	-8%

Congestion on the Inner Ring Road

Figure 11.11 shows the level of congestion on the Inner Ring Road as measured by periodic moving car observer surveys. Conditions on the boundary route of the central zone have been remarkably stable in recent years. It appears that users of this route, which includes the 'free passage route' between the two halves of the extended charging zone, did not experience any deterioration of traffic conditions in the period following the introduction of both parts of the Congestion Charging scheme and continue to benefit from slightly improved congestion levels compared with average pre-charging conditions.

Figure 11.11 Congestion on the Inner Ring Road during charging hours. Moving car observer surveys, 2002 to 2009.



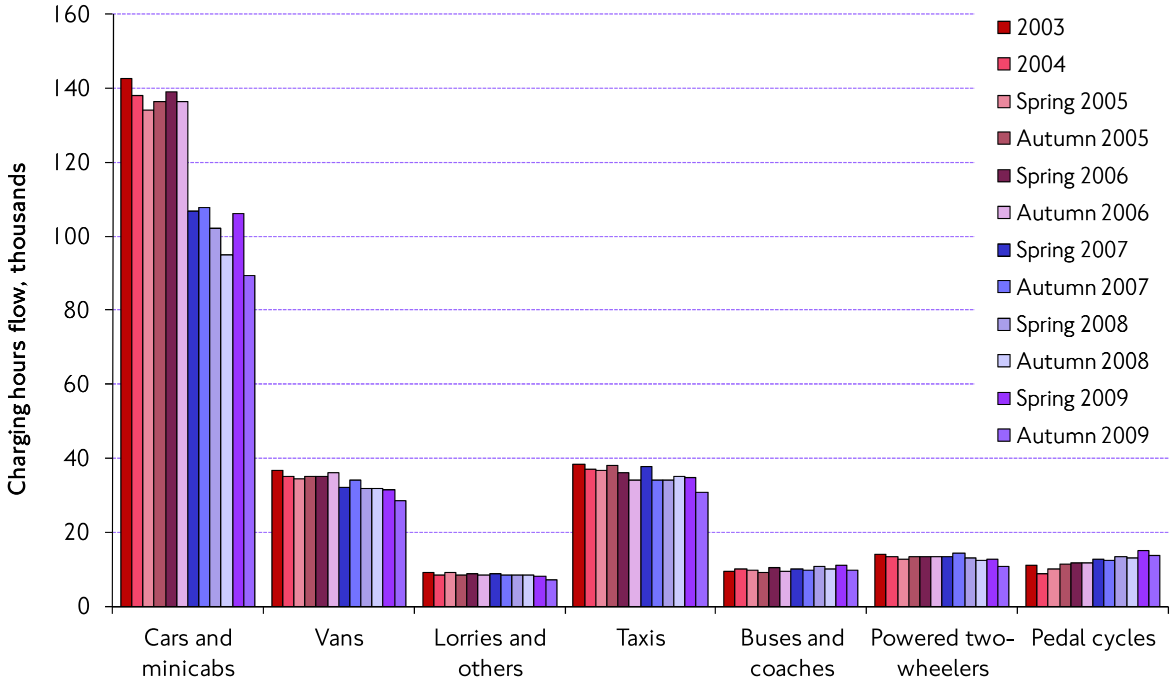
11.7 Traffic and congestion in the Western Extension zone

Traffic entering the Western Extension

Traffic entering the Western Extension to the Central London Congestion Charging zone has been monitored through comprehensive manual classified counts in spring and autumn of each year. Figure 11.12 shows the updated time series from these surveys. Following the introduction of charging in the zone in 2007 approximately 14 per cent fewer vehicles with four or more wheels entered during charging hours compared with 2005/06. This was within the range of reduction TfL had expected. In 2008, vehicles with four or more wheels entering the Western Extension reduced by 6 per cent compared with 2007. The reduction was particularly evident in the autumn surveys and is consistent with observations in the central zone. The greatest falls in 2008 were shown by cars and powered two wheelers at 8 and 7 per cent respectively compared with 2007. The only vehicle types showing an increase in 2008 were buses and coaches, and bicycles.

The increase across most vehicle types in the first half of 2009, which was not observed in the central zone, could be attributed partly to the new Westfield shopping centre located just outside the western boundary of the zone. However, the increase was not sustained and was in fact reversed in the second half of 2009. There was an overall decline of 3 per cent in annualised results for vehicles with four or more wheels entering the zone in 2009 compared with 2008. The greatest decline (10 per cent) was observed for lorries, while vans and taxis declined by 5 per cent. Bicycles were the only vehicle type to increase in 2009.

Figure 11.12 Traffic entering the Western Extension zone across all inbound roads. Charging hours, 07:00-18:00, 2003 to 2009.



Traffic circulating within the Western Extension zone

Traffic circulating inside the Western Extension has been monitored through an estimate of vehicle kilometres driven within the zone during charging hours. Table 11.8 shows these estimates for the years 2006 to 2009. Following the introduction of the Western Extension in 2007 there was a reduction of 11 per cent in the vehicle kilometres driven by vehicles with four or more wheels. The year 2008 saw a further decline of 9 per cent which is consistent with other traffic indicators discussed in this section. The reductions were evident across most vehicle types, with pedal cycles being a notable exception, having increased by 16 per cent. In 2009 vehicle kilometres driven within the zone remained broadly stable. The biggest change was observed in vehicle kilometres by lorries which fell by 5 per cent.

Table 11.8 Vehicle kilometres driven (millions) within the Western Extension zone during charging hours, 07:00-18:00, 2006 to 2009.

Vehicle type	2006 average	% of total 2006	2007 average	% of total 2007	2008 average	% of total 2008	2009 average	% of total 2009
All vehicles	1.12	100%	1.01	100%	0.93	100%	0.92	100%
Four or more wheels	1.00	89%	0.89	88%	0.81	87%	0.80	86%
Potentially chargeable	0.85	76%	0.73	72%	0.66	71%	0.64	70%
- Cars and minicabs	0.67	60%	0.54	54%	0.49	53%	0.47	52%
- Vans	0.15	13%	0.15	15%	0.13	14%	0.13	15%
- Lorries and others	0.04	3%	0.04	4%	0.04	4%	0.03	4%
Non chargeable	0.27	24%	0.28	28%	0.27	29%	0.28	30%
- Licensed taxis	0.12	11%	0.13	13%	0.11	12%	0.12	12%
- Buses and coaches	0.03	3%	0.04	4%	0.03	4%	0.04	4%
- Powered two-wheelers	0.06	5%	0.06	6%	0.06	6%	0.05	6%
- Pedal cycles	0.06	5%	0.06	6%	0.07	7%	0.07	8%

Traffic on the Western Extension boundary route

The boundary route of the Western Extension comprises two sections; the 'free passage route' which is the road running between the original central zone and the Western Extension, and the remainder of the boundary route of the extension zone or 'western boundary'. An estimate of vehicle kilometres driven along each section is used as an indicator of traffic levels on the route.

Table 11.9 shows the estimated vehicle kilometres driven on these two sections of the Western Extension boundary route for the years 2005 to 2009. Following the introduction of the Western Extension scheme in 2007 there was a small increase in the vehicle kilometres driven on the 'free passage route'. The year 2008 however saw reductions across many vehicle types leading to the overall number of vehicle kilometres on this section returning to 2006 pre-charging levels. In 2009 vehicle kilometres on this section of the boundary route declined further. Vehicle kilometres by vehicles with four or more wheels declined by 11 per cent while the greatest declines were observed in vans, lorries and cars. On the other hand vehicle kilometres increased on the western boundary across all vehicle types during 2008. The most notable increase was for buses and coaches, while licensed taxis remained broadly stable compared with 2007. In 2009 however this section of the boundary route followed the trend observed on the 'free passage route'. The decline was observed for all vehicle types apart from licensed taxis leading to vehicle kilometres driven by vehicles with four or more wheels declining by 6 per cent.

Table 11.9 Annualised estimated vehicle kilometres driven on Western Extension boundary route. Charging hours, 07:00-18:00, 2005 to 2009.

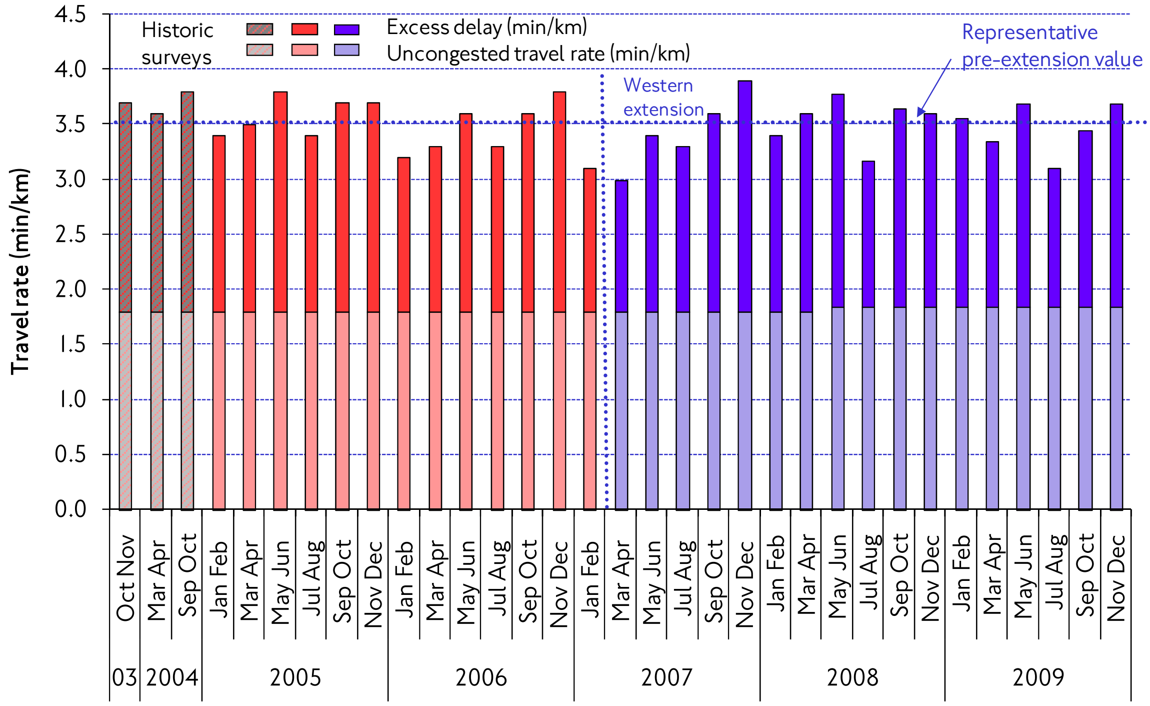
Vehicle type	Estimated vehicle kilometres on the free passage route					Estimated vehicle kilometres on the western boundary				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
All vehicles	151	140	146	139	125	363	361	352	362	339
Four or more wheels	142	130	135	131	116	335	333	325	333	313
Potentially chargeable	108	99	101	97	85	316	311	306	312	293
- Cars and minicabs	77	68	67	65	57	225	222	215	216	208
- Vans	24	25	26	26	22	68	68	70	72	63
- Lorries and other	7	7	7	7	6	23	21	22	24	22
Non chargeable	44	41	46	42	40	48	50	46	50	47
- Licensed taxis	25	22	25	23	21	13	15	13	13	13
- Buses and coaches	10	10	10	10	10	7	7	6	9	8
- Powered two-wheelers	6	6	7	6	6	21	20	19	19	17
- Pedal cycles	2	3	3	2	3	8	9	8	9	10

Congestion inside the Western Extension zone

Figure 11.13 shows the updated time-series from TfL's bi-monthly surveys of congestion in the Western Extension zone. The graph shows that congestion inside the zone can vary seasonally although the overall picture during the first two years of the Western Extension is of congestion levels similar to those prior to the introduction of charging.

During 2009, however, there has been an indication of slightly improved conditions with average delay measured at 1.6 minutes per kilometre. This indicates a reduction of 4 per cent compared to 2008 and a reduction of 7 per cent compared to average pre-charging conditions.

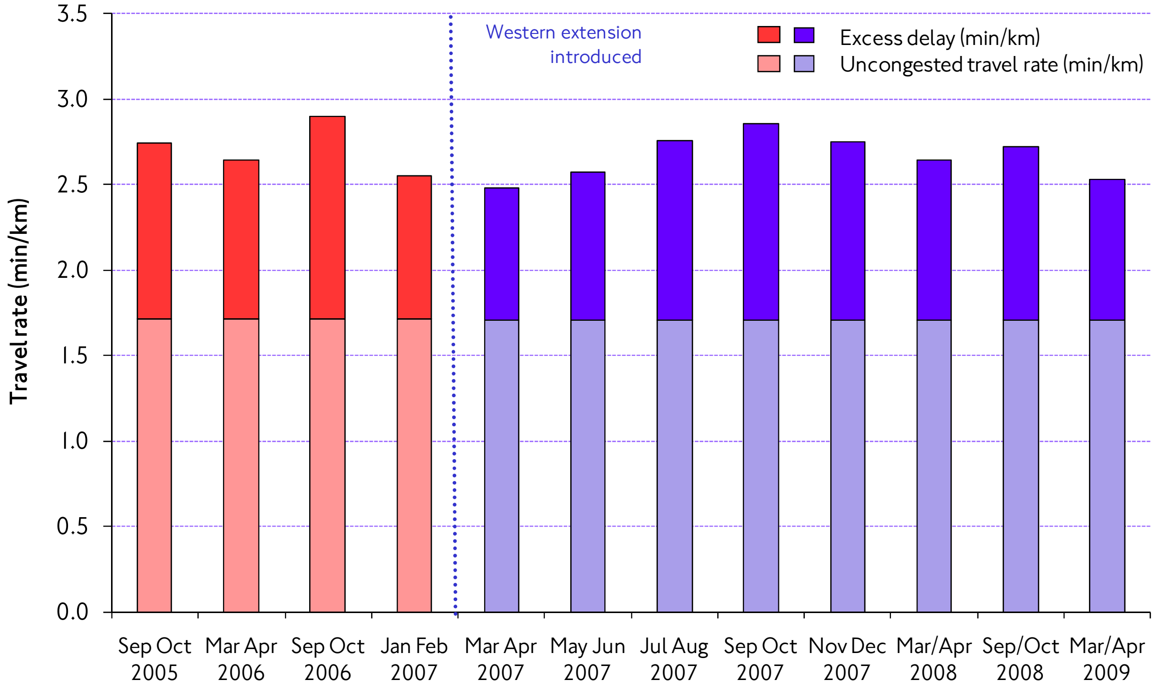
Figure 11.13 Congestion in the Western Extension zone during charging hours. Moving car observer surveys, 2003 to 2009.



Congestion on the Western Extension boundary route

Figure 11.14 shows the updated time-series of congestion measurements on the Western Extension boundary route. Congestion levels on this route have been quite stable during 2008 and 2009 with delay ranging from 0.8 to 1.0 minutes per kilometre. There has been no apparent deterioration in conditions along the route despite some increases in traffic levels as discussed earlier in this chapter. This could be as a result of the enhanced traffic management arrangements which preceded the introduction of the Western Extension designed to optimise the effective functioning of the boundary route around the extension zone.

Figure 11.14 Congestion on the Western Extension boundary route during charging hours. Western Extension boundary route moving car observer surveys, 2005 to 2009.



11.8 Traffic and congestion investigations – longitudinal analysis

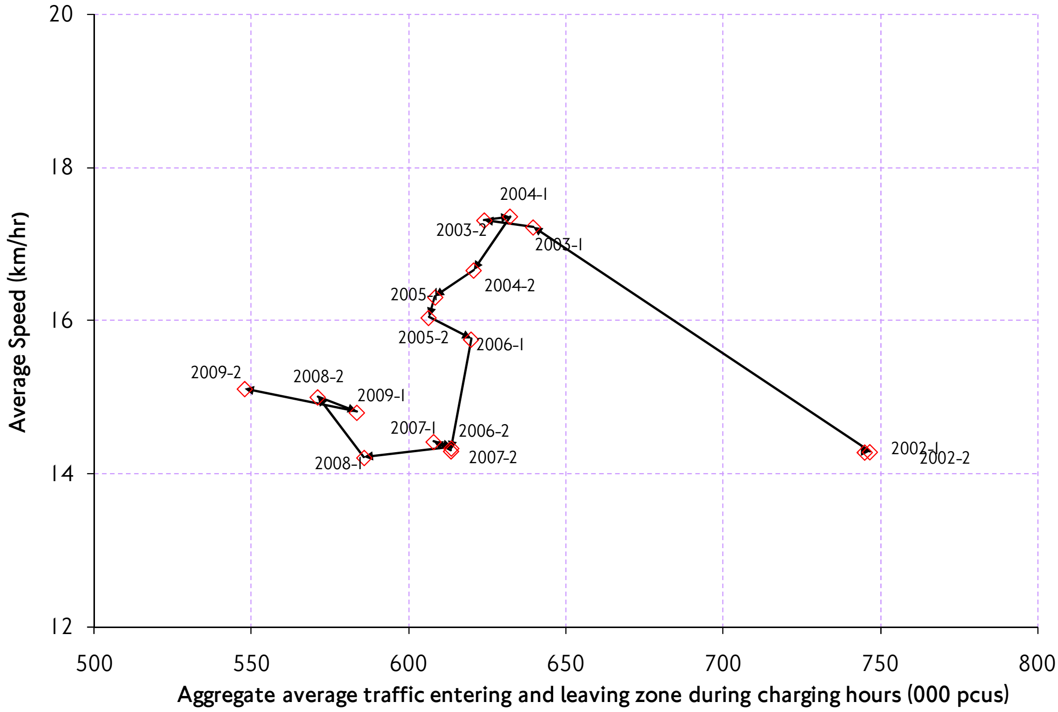
This section presents an assessment of the relationship between the level of traffic and congestion experienced inside the two zones covered by the extended Central London Congestion Charging scheme. The data on traffic and congestion levels presented in the previous sections is used here summarised in six monthly periods so that for each year there are two observation points. For this analysis traffic entering and leaving each of the Congestion Charging zones is used as an indication of traffic activity in that area and is converted to passenger car units (pcus) – a way of expressing the differing road network capacity requirements of the various vehicle types on a consistent basis.

Trends in the original central charging zone

Figure 11.15 shows average network speed in the central zone and total traffic entering and leaving the zone between 2002 (pre-charging) and 2009. The annotation 2002-1 means the conditions observed in the first six months of 2002 (January-June); 2002-2 means the conditions observed in the second half of 2002 (July-December).

It is evident that Congestion Charging, introduced in February 2003, resulted in a reduction of 20 per cent in traffic entering and leaving the zone and a consequent 20 per cent increase in average traffic speeds inside the zone, from 14.3 kilometres per hour to 17.3 kilometres per hour. January and early February 2003 data (immediately pre-scheme) have been ignored in data point 2003-1.

Figure 11.15 Original Congestion Charging zone: Average traffic and congestion during charging hours. 07:00-18:00; 2002 (pre-charging) to 2009.



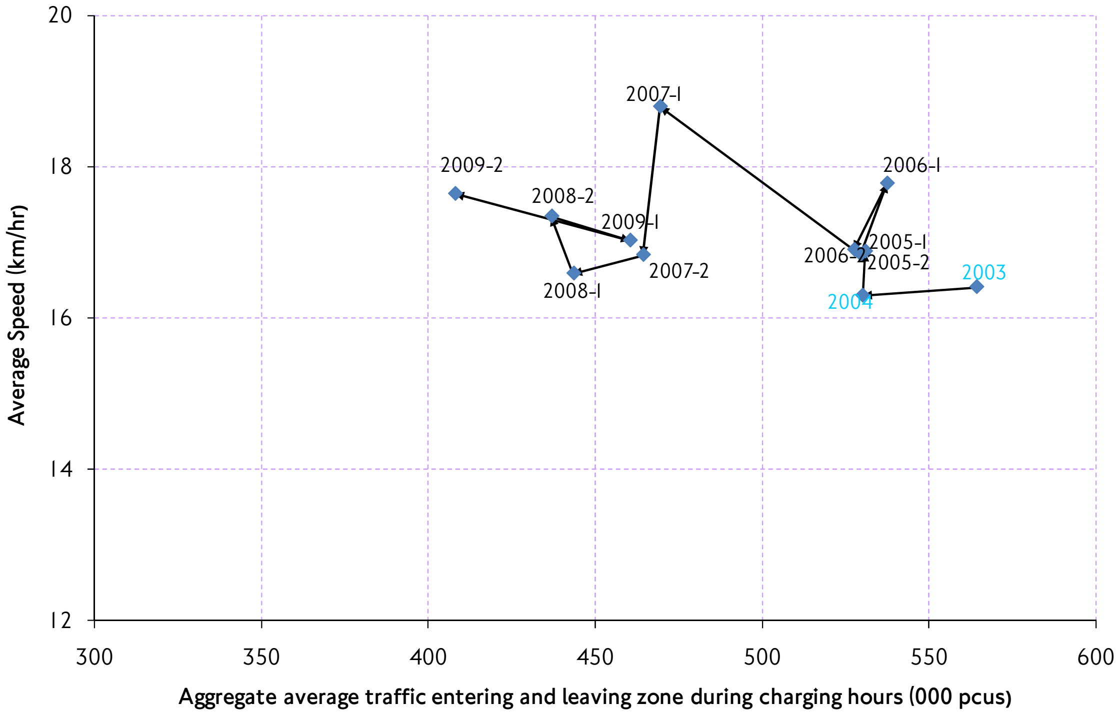
The first effects of charging were followed by a period when congestion inside the zone began to deteriorate once more. Between 2004-1 and 2006-2, while traffic entering and leaving the zone during charging hours remained in the region of 620-650,000 pcus per day, average speeds declined from more than 17 kilometres per hour to almost 14 kilometres per hour, with deteriorating conditions particularly evident during 2006-2. From 2006-2 to 2007-2, average conditions were apparently steady, albeit with speeds having returned to pre-charging levels. Between 2007-2 and 2008-2, average boundary crossing flows declined by around 10 per cent with an indication of significantly improved speeds in 2008-2. In 2009-1 average speed declined slightly, while at the same time flow levels showed an increase. In 2009-2 there was a small increase in speeds while traffic levels declined by 6 per cent compared to the previous six month period.

TfL originally concluded that the reduction in network performance was being caused by a deterioration in effective network capacity as a result of a combination of traffic management measures, such as improved facilities for pedestrians and buses, and an intensification of streetworks, many in association with the renewal of utility infrastructure.

Trends in the Western Extension to the Congestion Charging zone

Figure 11.16 shows the history of average speeds inside the zone and traffic crossing into the Western Extension , starting from observations in the years prior to the extension scheme – although not to the same level of precision for 2003 and 2004.

Figure 11.16 Western Extension: Average traffic and congestion during charging hours 07:00-18:00; 2003 to 2009.



The figure suggests an apparent reduction in effective capacity between 2006-1 and 2006-2, prior to the introduction of charging in the future extension zone, matching a corresponding reduction in the original zone during the same period. The effect of charging in the western zone is evident from the fall in traffic levels from 2006-2 to 2007-1, and the corresponding increase in traffic speeds from around 17 kilometres per hour to around 19 kilometres per hour. In the second half of 2007, however, most of the benefits gained from charging were effectively lost with speeds returning to pre-charging levels even with the reduced level of traffic entering and leaving the zone being maintained.

In 2008-1 and 2008-2 comparable effects to that observed in the central zone are evident. A further fall in the volume of traffic entering and leaving the zone was followed by a small increase in speeds.

In 2009-1 traffic levels increased while speeds declined, similar to the central zone, although the changes here were more pronounced. In particular, traffic increased back to the levels observed in 2007 after the introduction of the extension. A number of things may have influenced this, such as land-use changes in the vicinity to the zone. The Westfield shopping centre, which is located just outside of the Western Extension boundary, could have contributed to this increase. Traffic entering and leaving the Western Extension at Holland Park Avenue (the Western Extension boundary point closest to the shopping centre) increased by 25 per cent and 15 per cent respectively when compared with 2008-2. However, traffic crossing at other locations such as Bishop's Bridge Road and Knightsbridge contributed more to the overall increase, suggesting there are more factors affecting the overall traffic levels than Westfield alone. In 2009-2 there was a small increase in speeds and a significant decline in traffic levels, which were down by 11 per cent compared to 2009-1.

The striking similarity in the patterns for both zones suggests that the underlying trends are being reliably demonstrated: that the initial reduction in traffic flow inside each zone brings about an improvement in speeds; that this improvement gradually deteriorates; and that a period of broad stability was reached around 2007-2, with average speeds back to around pre-charging levels, followed by something of an upturn in speeds with flows declining from 2007-2 to 2008-2. In 2009-1 speeds declined and flows increased while in 2009-2 speeds increased and flows declined in both zones.

11.9 Consideration of night-time conditions inside the charging zones

Figures 11.17 and 11.18 compare average day and night-time travel rates in both parts of the extended zone. Night-time traffic speeds or travel rates are measured between 2am and 5am, when traffic flows are at their lowest. The number of surveys available is relatively limited and consequently apparent small changes need to be interpreted with caution.

The most striking feature of the graphics is the large reductions in average night-time speeds corresponding with similar changes during the daytime. Night-time speeds have tended to be fairly stable over the long-tem, as traffic activity is relatively low and has not changed significantly. However, this appeared to change between 2004 and 2007.

For the original zone, congestion worsened during the day between 2005 and 2007 by about 0.7 minutes per kilometre. At night-time between 2004 and 2007 there was change in travel rates of about 0.4 minutes per kilometre.

In the Western Extension, the data in Figure 11.18 suggest a comparable deterioration in night-time travel rates of around 0.4 minutes per kilometre, much the same as the deterioration in day time conditions inside the extension area.

Figure 11.17 Original Congestion Charging zone: Day and night-time average travel rates.

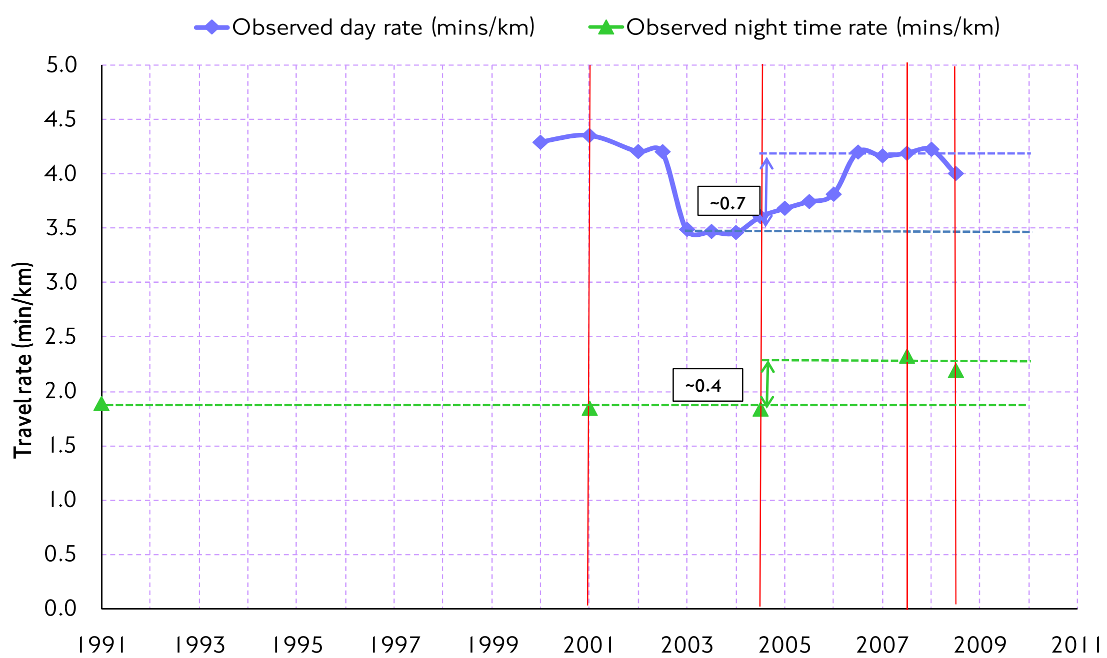
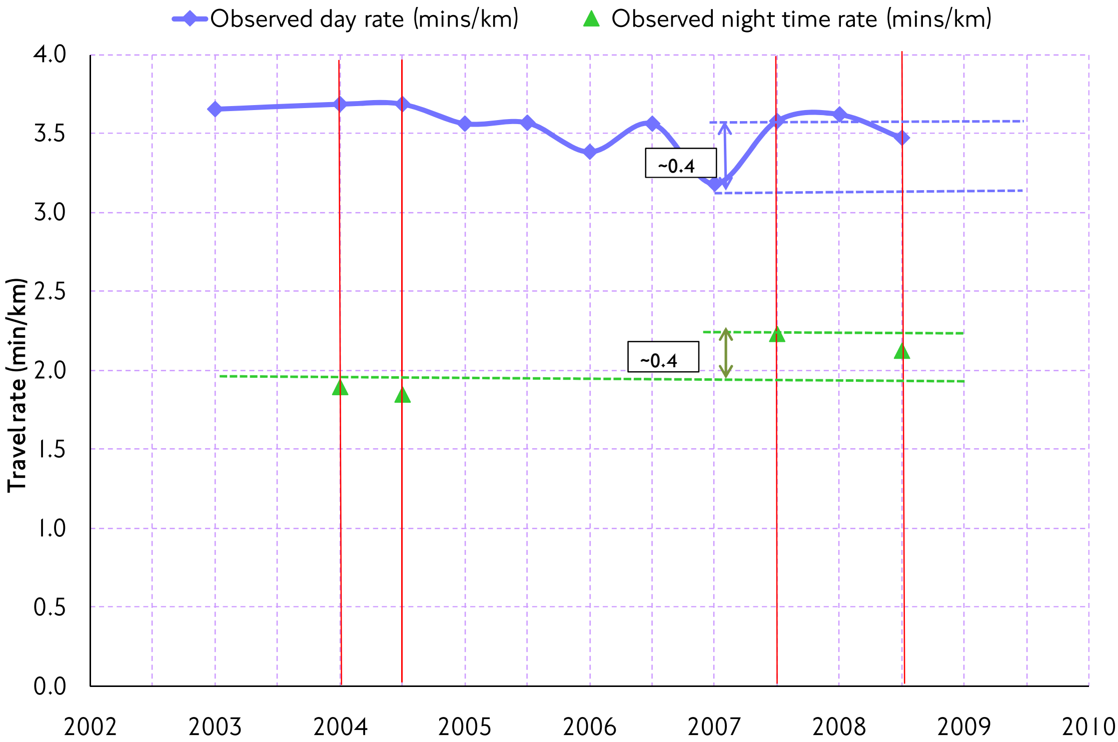


Figure 11.18 Western Extension zone: Day and night-time average travel rates.



The much reduced traffic levels in the middle of the night would be less affected by any delays between junctions. As there is no evidence of changes in night-time traffic flows, the high proportion of additional day time delay in the two networks that is also observed in the reduced average night-time speeds strongly indicates that the additional delay on the network is occurring predominantly at junctions.

The change in night-time conditions can be illustrated further by examining the time spent by vehicles at different speeds. Figure 11.19 shows the proportion of time in different speed bands for traffic, as observed in the night-time surveys of 2004, 2007 and 2008. Figure 11.20 shows the equivalent data for the Western Extension zone night-time surveys of 2004 (two surveys), 2007 and 2008.

Figure 11.19 Original Central London Congestion Charging zone; night-time speeds: percentage of time spent in different speed bands for three survey periods.

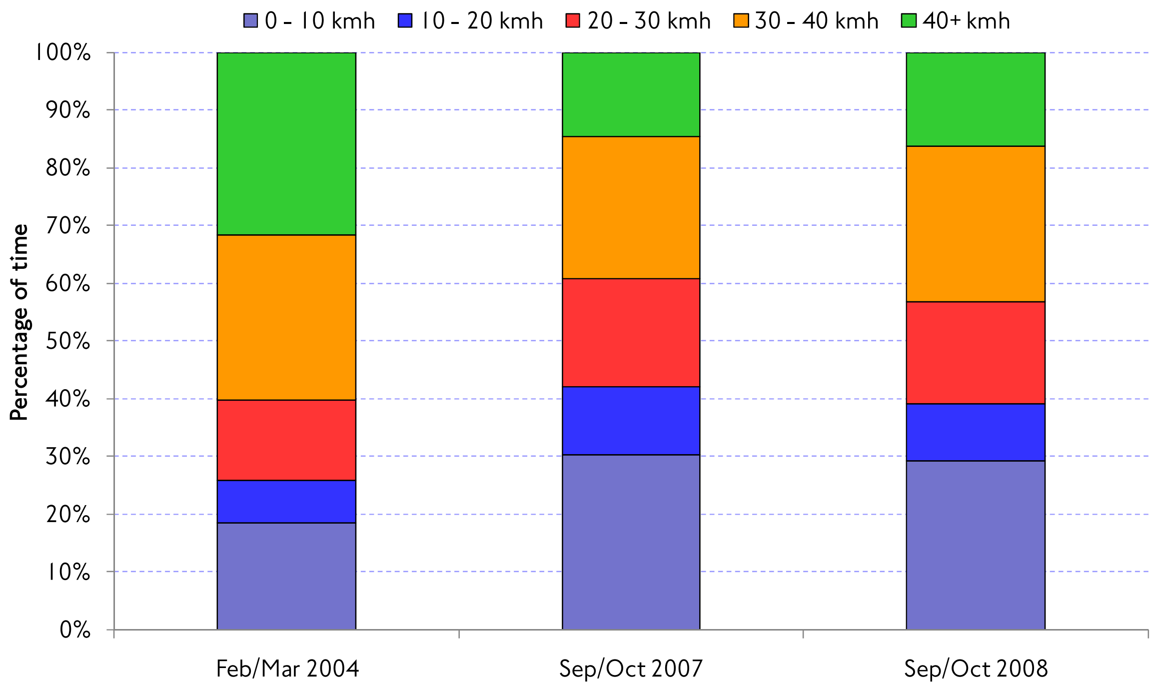
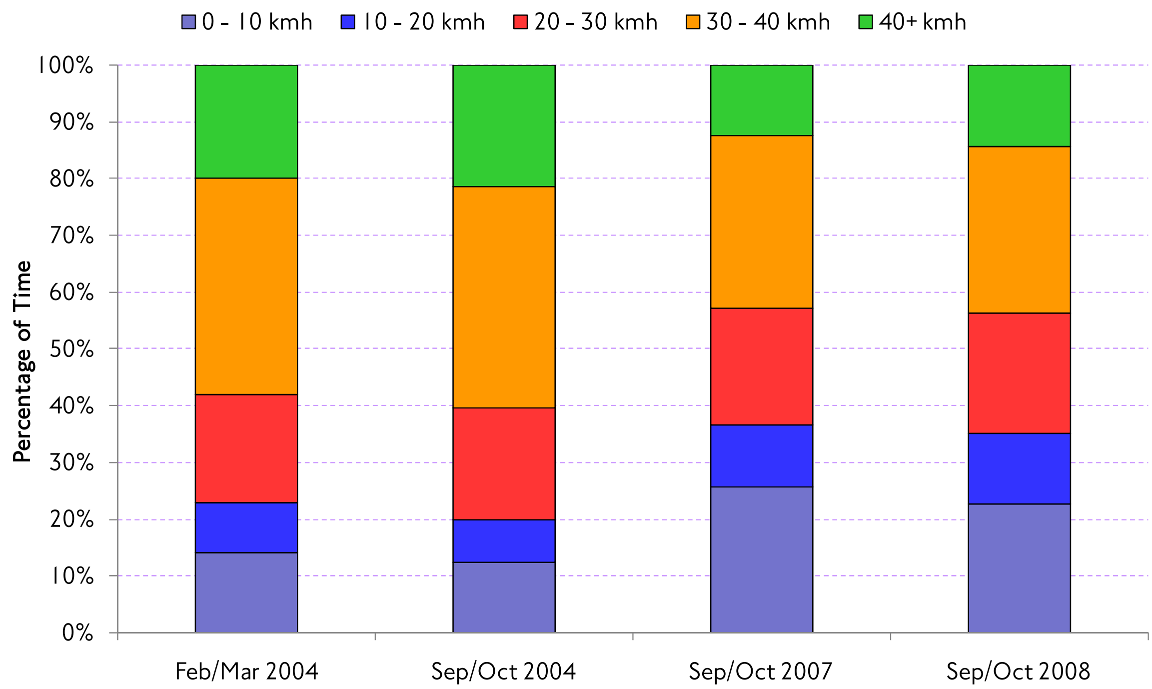


Figure 11.20 Western Extension zone night time speeds; percentage of time spent in different speed bands for four survey periods.



Between the 2004 and 2007/08 night-time survey, the time spent stationary or moving at less than 10 kilometres per hour broadly doubled in both zones: from around 15 per cent to around 30 per cent in the original central zone; and from around 13 per cent to around 24 per cent in the Western Extension. For comparison, the corresponding proportions during daytime charging hours in 2008 were around 45 to 55 per cent in both zones.

The deterioration in average night-time speeds appears to reflect an increase in time spent stationary or moving at very low speeds, again suggesting a change in the time spent queuing at junctions. It is worth noting here that there was an increase of 15 to 20 per cent in the number of traffic signal installations in Central London in the period 2004 to 2006.

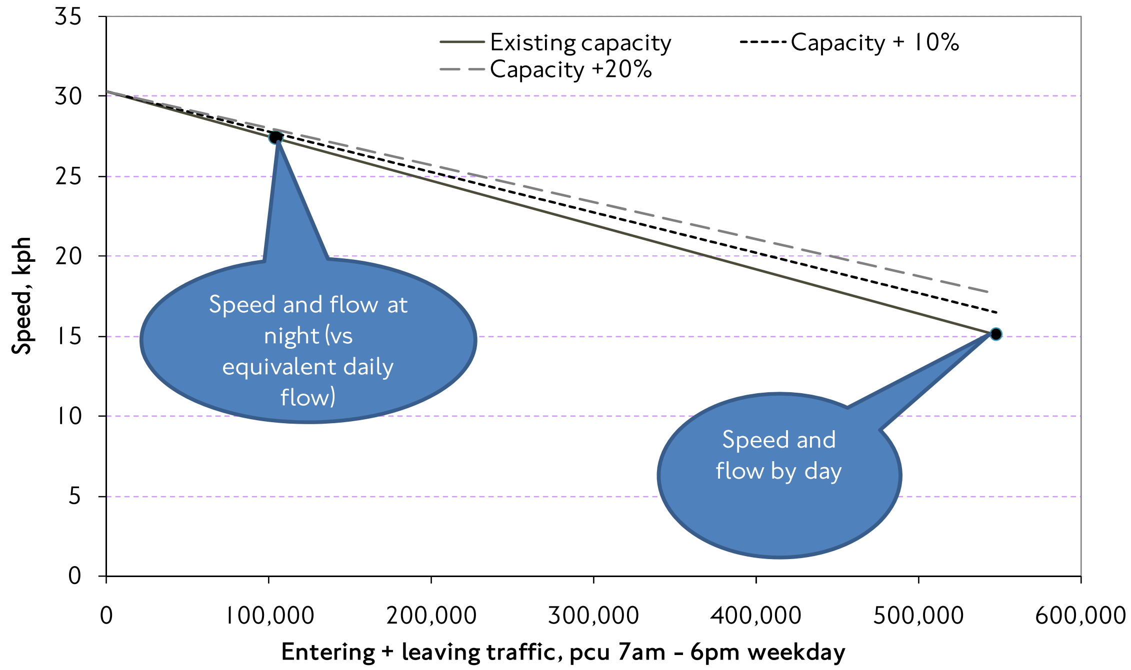
The potential causes of the additional delay on the two networks have been considered in TfL's Congestion Charging Annual Monitoring Reports; they have been attributed to a combination of traffic management measures to improve conditions for pedestrians and other road users and to an intensification of roadworks in connection with utilities replacement or specific land-use developments.

11.10 Implications of longitudinal analysis of traffic and congestion trends

These observations from Congestion Charging in Central London can be developed in the form of a simple model that allows the respective roles of changes to supply (network capacity) and demand (traffic volumes) in the performance of the network to be examined.

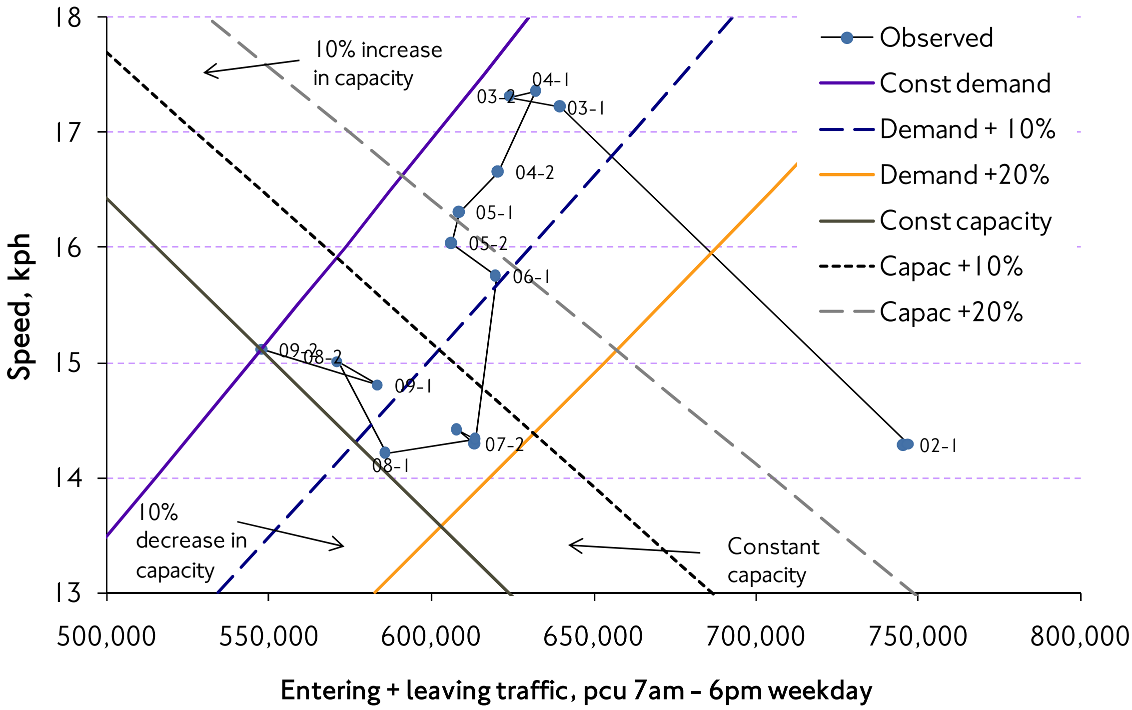
It is helpful to assume that, for a given network, the speed and flow of traffic are linearly related. There is good evidence in London and elsewhere for this. This line can be plotted (Figure 11.21), based on measurement of daytime speeds and speeds at night, when flows are around 25 per cent of daytime values, i.e. the night-time speed is plotted against an equivalent daytime flow. This line shows the change in speed expected if demand changes, assuming the network's capacity is unchanged. Capacity here means the number of vehicles that the network can carry at a given speed.

Figure 11.21 Original Central London Congestion Charging zone speed flow relationship derived from night and daytime observations.



The graph also shows the lines for a 10 per cent increase or 10 per cent decrease in capacity, which are not parallel. The same graph can then be superimposed on the plot shown previously of traffic and speeds in the central zone (Figure 11.15) – see Figure 11.22.

Figure 11.22 Original zone: Average traffic and congestion during charging hours, 07:00-18:00; 2002 (pre-charging) to 2009 shown along capacity lines.



If the network capacity stays constant, then changes in demand will move the observed points parallel to the constant capacity line. So when charging was introduced in 2003, the large movement associated with the reduction in traffic was nearly parallel to the constant capacity line.

Conversely, when the observed points move at right angles to the constant capacity line, the capacity of the network will have changed. Since the constant capacity lines are drawn 10 per cent apart, the extent of any change in capacity can be inferred directly. The graph shows that between spring 2004 and spring 2008 there was a relentless downward trend in capacity, amounting to a total estimated to be about 30 per cent of current capacity, or 25 per cent of previous capacity. After a small recovery in the next two periods, the capacity in autumn 2009 appears to be the same as the low point reached in spring 2008. As the graph shows, the increase in speed between the slowest survey in spring 2008 and the most recent survey in autumn 2009 can entirely be attributed to the reduction in flow between the two periods.

These calculations assume that changes in traffic entering and leaving the charged area represent changes to traffic inside the charged area (which is where speeds are measured). Traffic entering and leaving is more readily measured, since estimating changes of traffic inside the area would require counts on all the roads inside the area. But, when charging was first introduced, the deterrent of the charge acted more on traffic entering than on traffic circulating: once the charge is paid to enter, subsequent movements inside are nominally ‘free’. And in the years since charging was introduced, there has still been a tendency for traffic circulating inside the area to vary a little less than the traffic entering and leaving. So changes in traffic entering and leaving the area are somewhat greater than changes in traffic circulating inside the area. The capacity change inferences above should therefore be reduced, from say 25 per cent of existing capacity (for entering and leaving traffic) to around 20 per cent (for traffic circulating in the charging zone).

Similar reasoning enables lines of constant underlying demand to be drawn – the demand for highway use that would exist if speeds remained constant. In practice a change in network speed will produce a change in traffic flow: if speeds increase, for instance, more people would be attracted to use the network. For constant underlying demand, a ‘demand curve’ can be drawn that shows how network speed and flow are related. This ‘demand curve’ is less apparent than the lines shown above showing speed as a function of flow (the ‘supply curve’). Demand effects of speed changes take time to take effect. Nevertheless, TfL has estimated demand curves and they have been added to the speed-flow plot for Central London.

The basic conclusion from this work is that the fall in network speeds since the introduction in charging has not coincided with a significant change in underlying demand – the fall in speeds accounts for most of the fall in traffic flow seen over the last five years. The most recent data, for autumn 2009, may be an exception: there is some more reduction in flow than might be expected from demand effects of speed reduction alone. From a more detailed study of the data, a smaller reduction has been found in car traffic (which is more responsive to demand effects of speed reduction) than other traffic (which may be more sensitive to changes in the economy).

12. Spotlight on - travel demand and the recession

12.1 Introduction

This chapter looks at the recession and what has happened over this period to demand for the different modes of travel in London.

The first part of the chapter analyses the recession comparing it against past recessions as well as looking specifically at its impact on London. It also looks at employment. Commuter travel and travel on employers' business are important travel demand drivers and are also key economic activities, related to the employment market, which are adversely impacted in recession.

The second half of the chapter investigates demand for different transport modes – bus, Underground, rail and highway demand – in order to assess how these changed during the recession. Demand for each of the modes has either fallen or grown considerably less strongly since the recession started.

12.2 Key features and trends

The economy

- The UK has been in the worst recession in more than 70 years. UK economic output (Gross Value Added or GVA) contracted for the sixth consecutive quarter in Q3 2009. This was a deeper recession than any since the 1930s.
- Estimates for the fourth quarter of 2009 suggest UK GDP grew by 0.3 per cent compared to the previous quarter.
- Unusually for recessions, the decline in output started relatively suddenly. GVA growth had been 2 per cent year-on-year into 2008, before the economy started to contract in Q2 2008. Previous recessions, for London or the UK, have shown a more gradual reduction in growth (while staying positive) before growth turns negative.
- London's economy has grown faster than the rest of the UK for most of the period since 1998. Total growth from 1993 to 2007 was faster for London (59 per cent) than UK as a whole (52 per cent). The exception was London's 2001 recession, after the 'dot.com' bubble burst. London's GVA contraction was larger in the early 1990s recession than the rest of the UK.
- The time profile of this recession seems to be similar in London to the UK as a whole. It also seems to be of a similar magnitude, but there are some signs that, while severe, London's recession may have been slightly milder than the rest of the UK.
- There were slightly more than 4.6 million jobs in London in Q3 2009. Compared to a year earlier this represents a reduction in employment of 98,000 or 2.1 per cent.
- In spite of the decline in employment during the current recession, total employment in London in Q3 2009 was still around 2007 levels.

Travel demand

- Underground passenger journeys fell by 5.4 per cent in the first half of 2009/10 compared to a year earlier, while bus passenger journeys fell by 0.2 per cent. In 2007/08 and the first half of 2008/09, both Underground and bus journeys grew by 4 to 5 per cent a year on average.
- National Rail passenger journeys (in London and the south east) fell by an estimated 5 per cent in the first half of 2009/10, compared with the first half of 2008/09.
- There are some nascent signs of an upturn in Underground journeys towards the end of 2009.
- Fares have risen over the same period, but are of a lesser effect on patronage compared to the economy.

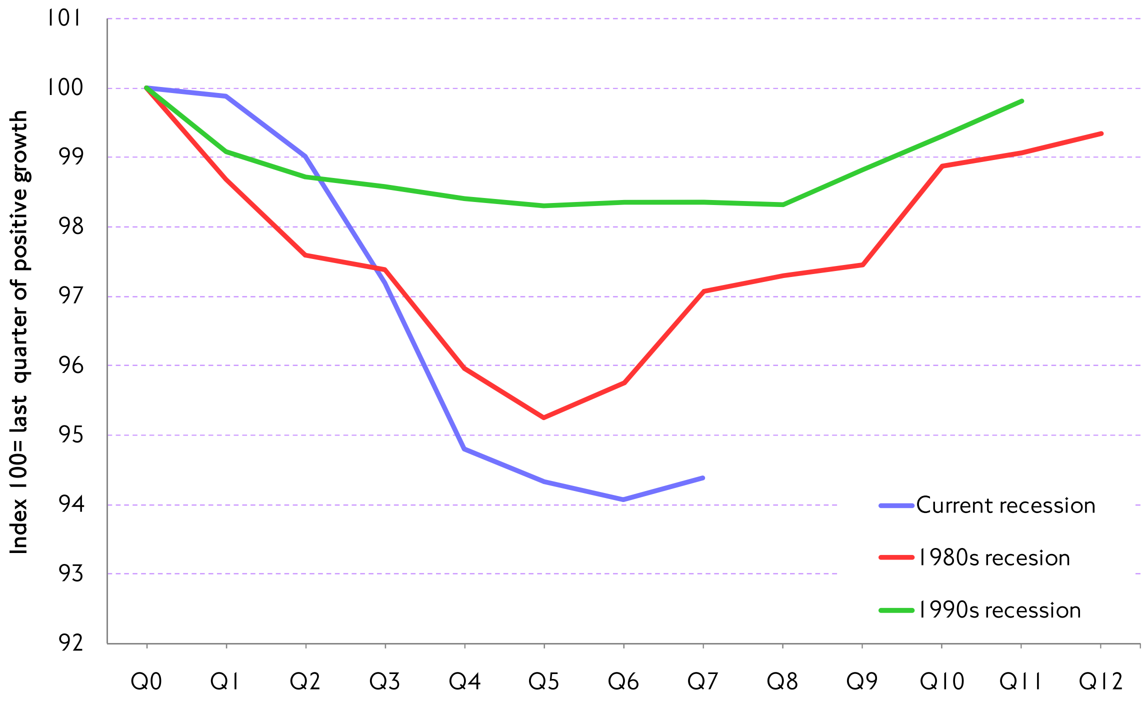
Earlier data, comparing 2007 with 2008 (which include both periods of recession and growth) show that:

- Total travel demand was effectively unchanged in 2008. This was very unusual – trips grew in 13 of the previous 14 years. Previous average growth was 1 per cent a year.
- Public transport patronage was still increasing in 2008, in terms of both trips and passenger kilometres.
- Road traffic in London was falling before the recession – and the recession increased the pace of the fall. London's traffic fell by 1.7 per cent a year faster than the previous rate; GB traffic was 2 per cent less than a continuation of the previous trend would have implied.
- Trips by taxi and private hire vehicles fell by an estimated 18 per cent.
- Disaggregated data show other features consistent with the pattern of the recession. Underground patronage fell more sharply in Canary Wharf than in the City, more sharply in the City than in the West End, and fell more in the West End than in the Outer Zones (Zones 4+).

12.3 The economy – Gross Value Added

The UK has recently experienced the worst recession for more than 70 years. UK economic output or Gross Value Added (GVA) contracted for the sixth consecutive quarter in Q3 2009. GVA in Q4 2009 grew by 0.3 per cent compared to Q3 2009 (Figure 12.3).

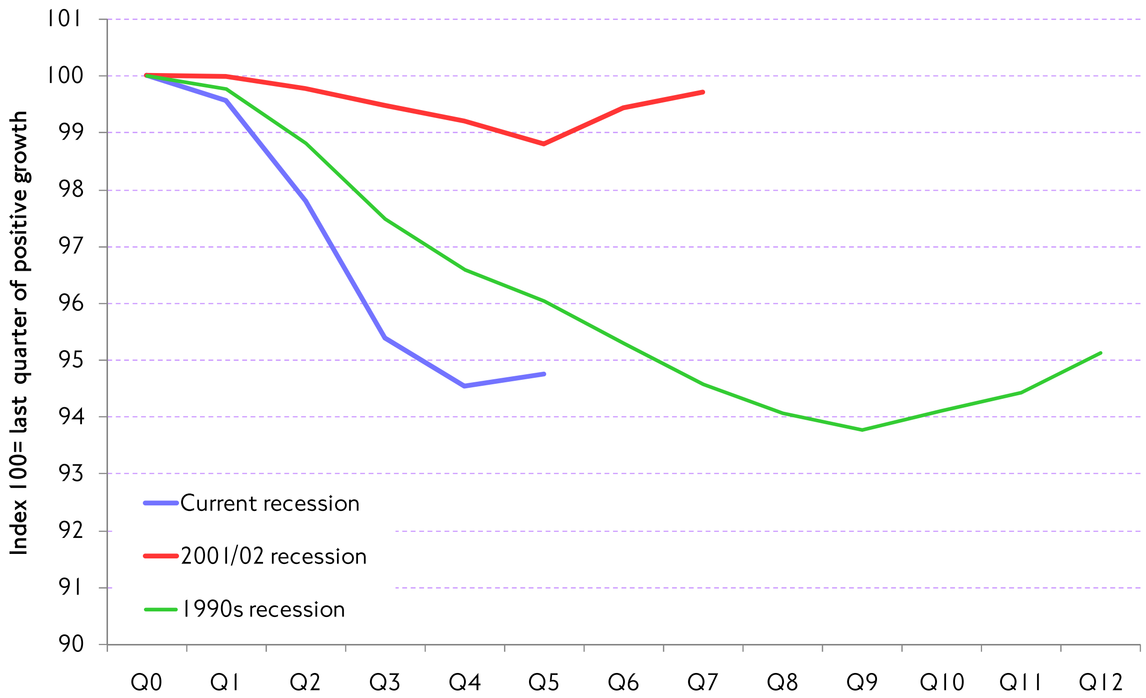
Figure 12.1 Comparison of past recessions in the UK: Quarterly GVA compared to the last quarter before the start of the recession.



Source: ONS GVA

The recent downturn appears to have been more severe than previous ones.

Figure 12.2 Comparison of past recessions in London: Quarterly GVA compared to the last quarter before the start of the recession.

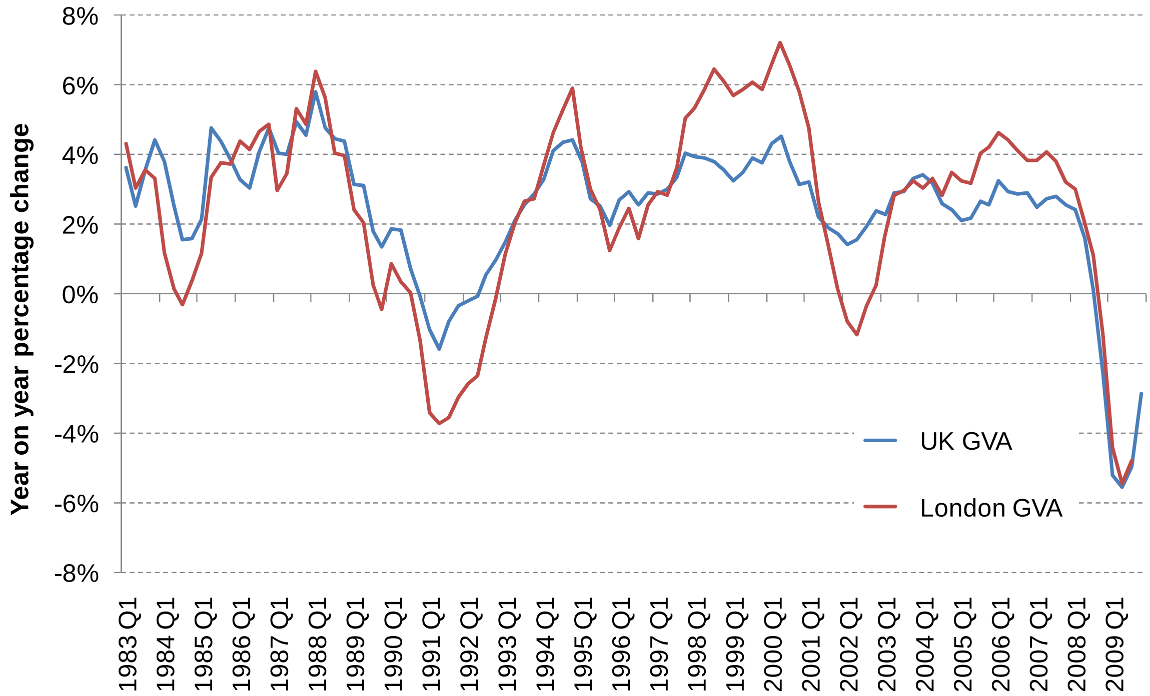


Source: Experian Economics London GVA

This is certainly true for the UK (Figure 12.1) – and the data so far suggest it is true for London too, although at present there are only five quarters of data to compare with (Figure 12.2) and London figures for the 1980s are not available on the same basis. London's recession began one quarter after the UK's (although the UK contracted by only 0.1 per cent in that first quarter of recession) and provisional data suggests London exited recession one quarter earlier.

Figure 12.3 shows real GVA, compared to a year earlier, for London and the UK. Figures 12.4 and 12.5 show quarter on quarter percentage change in London and UK GVA growth.

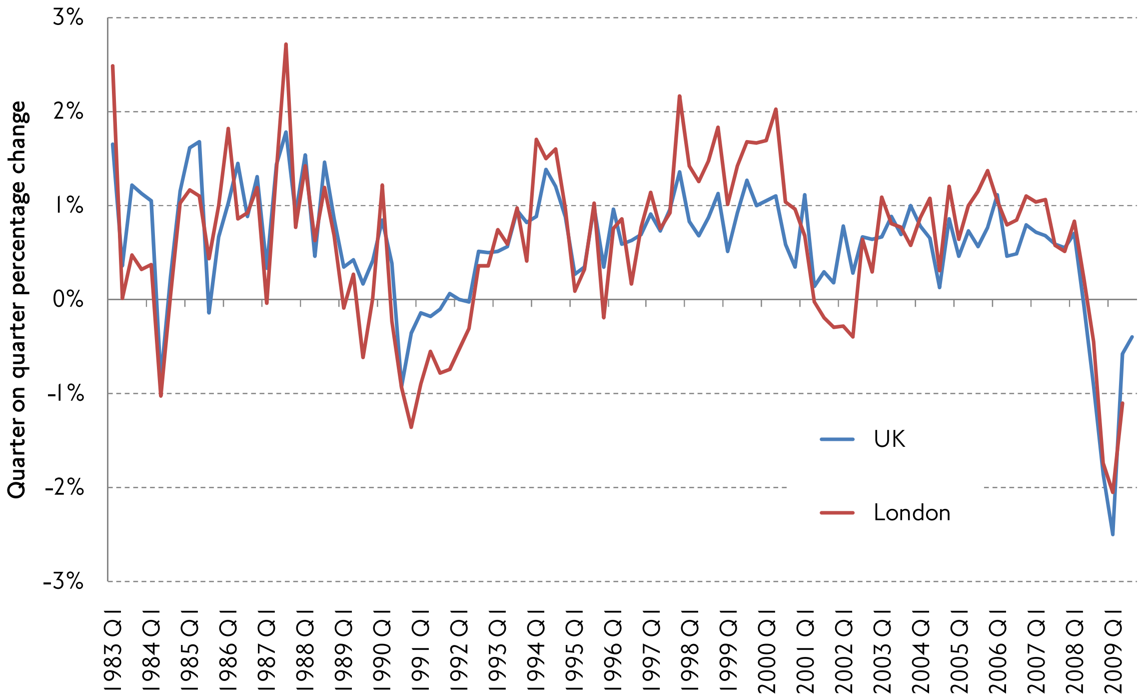
Figure 12.3 Real GVA, percentage annual change, London and UK compared.



Source: ONS UK GVA and Experian Economics London GVA

London has had higher economic growth in total over the last 15 years. London sustained higher economic growth than the UK in the upturn of the 1990s and prior to the current recession. Economic growth in London has also tended to be more volatile than the UK as a whole with higher peaks and lower troughs – London experienced a sharper downturn in the recession of the early 1990s than the UK as a whole and in 2001/02, London suffered a relatively mild and short-lived recession following the collapse of the dot.com sector. At the time the UK was not in recession although growth slowed.

Figure 12.4 Real GVA, quarter on quarter percentage change, London and UK compared.

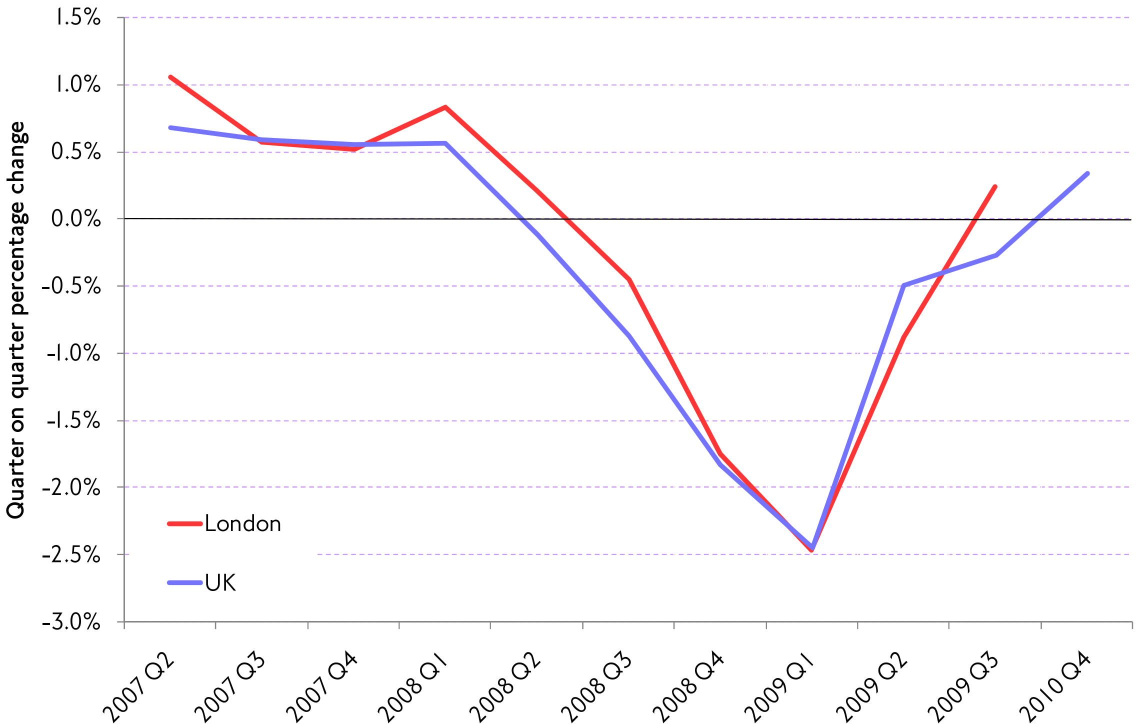


Source: ONS UK GVA and Experian Economics London GVA

The recent recession seems to be of a broadly similar magnitude in London as in the UK as a whole. There are signs that, while severe, London's recession may be very slightly milder than the rest of the UK. During the period London was in recession London GVA contracted by 5.5 per cent while UK GVA fell by 5.6 per cent. Over the period when the UK was in recession (including two quarters when London grew but the UK economy contracted), UK GVA fell by 5.9 per cent, while London GVA fell by 5 per cent.

London experienced its first quarter of negative growth in Q3 2008 while the UK went into recession a quarter earlier (Figure 12.5). The low point of the recession in the UK and London was reached in Q1 2009 with quarter-on-quarter growth of -2.5 per cent. Since then the London economy reverted to growth in Q3 2009 (based on provisional data), while UK economic activity emerged from recession in the fourth quarter of 2009, with GVA growth of 0.3 per cent following six quarters of decline. By comparison, London suffered four quarters of decline. 2009 Q4 GVA data for London is not yet available.

Figure 12.5 Real GVA growth, quarter on quarter percentage change, London and UK compared.



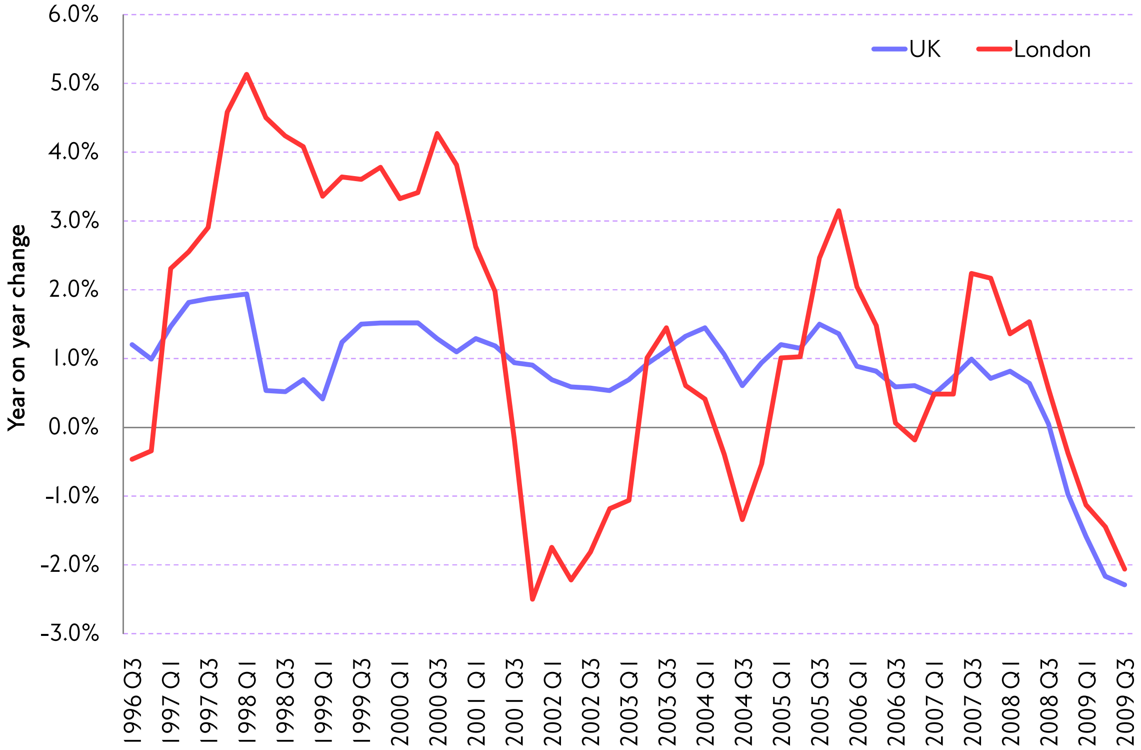
Source: ONS UK GVA and Experian Economics London GVA

12.4 The economy – employment

Employment affects travel demand, particularly personal travel, at least as directly as GVA. While GVA reflects economic activity generally, employment affects journeys to and from places of work – a key determinant of travel. Travel associated with employers' business is also an important component of overall travel demand.

Historical trends in workforce jobs have been more variable in London than the UK, with London having notably higher peaks and lower troughs. In the current recession, the Capital and the UK have seen similar declines in employment, with the contraction in jobs in the UK slightly more pronounced than in London (see Figure 12.6). In both the UK and London, annual growth in workforce jobs fell for the fourth consecutive quarter in Q3 2009, though the rate of contraction was slightly worse in the UK at -2.3 per cent compared to -2.1 per cent in London. Workforce jobs in London totalled slightly more than 4.6 million in Q3 2009, 98,000 lower than a year earlier.

Figure 12.6 Workforce jobs, percentage annual change, London and UK compared.



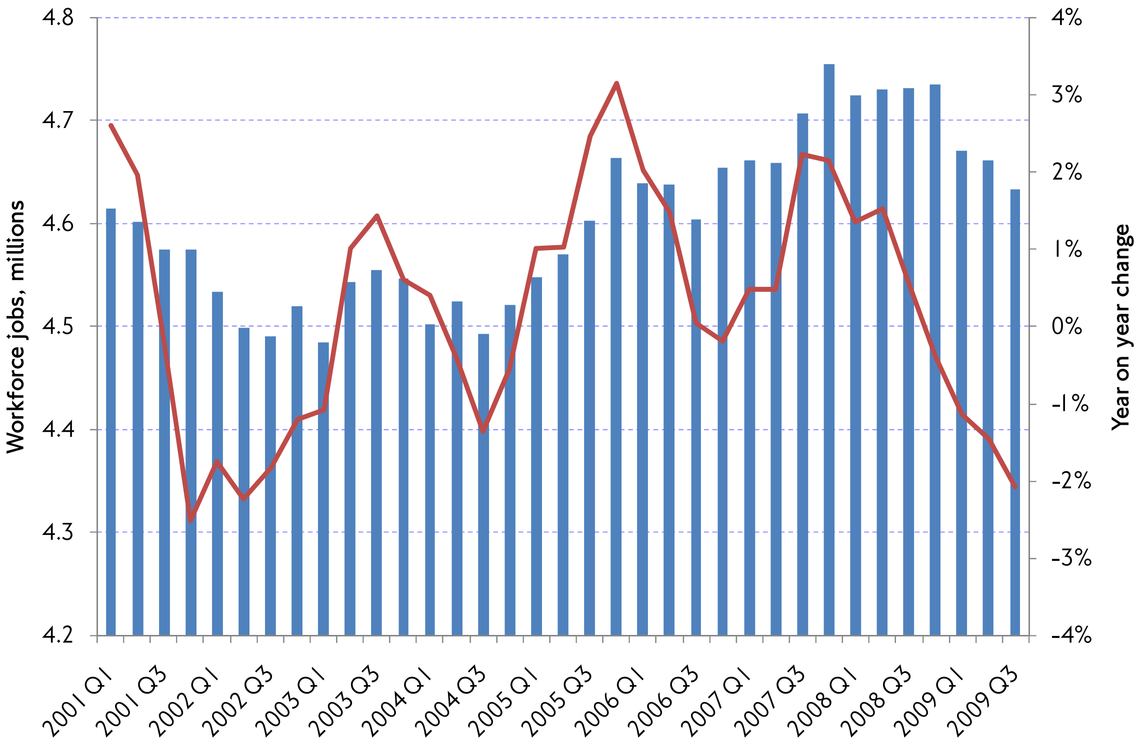
Source: ONS Labour Market Statistics UK and London and the South East

Figure 12.8 shows employee jobs, while Figures 12.6 and 12.7 look at workforce jobs. These measures are related: they differ because of the exclusion of the self-employed in the former. The former allows a comparison of changes in employment between Central and the rest of London, which is shown in Figure 12.8.

It is not surprising therefore that workforce jobs and employee jobs show similar trends. Like workforce jobs, annual employee jobs growth in London remained negative for the fourth consecutive quarter in Q3 2009, although the rate of contraction was slightly worse at 2.6 per cent.

Total employee jobs excluding the self-employed in London were just under 4 million in Q3 2009. Compared to September 2008, this represents a reduction in employment of 104,000.

Figure 12.7 Trend in London employment, millions (blue bars, left-hand scale) and year-on–year growth (red line, right-hand scale).



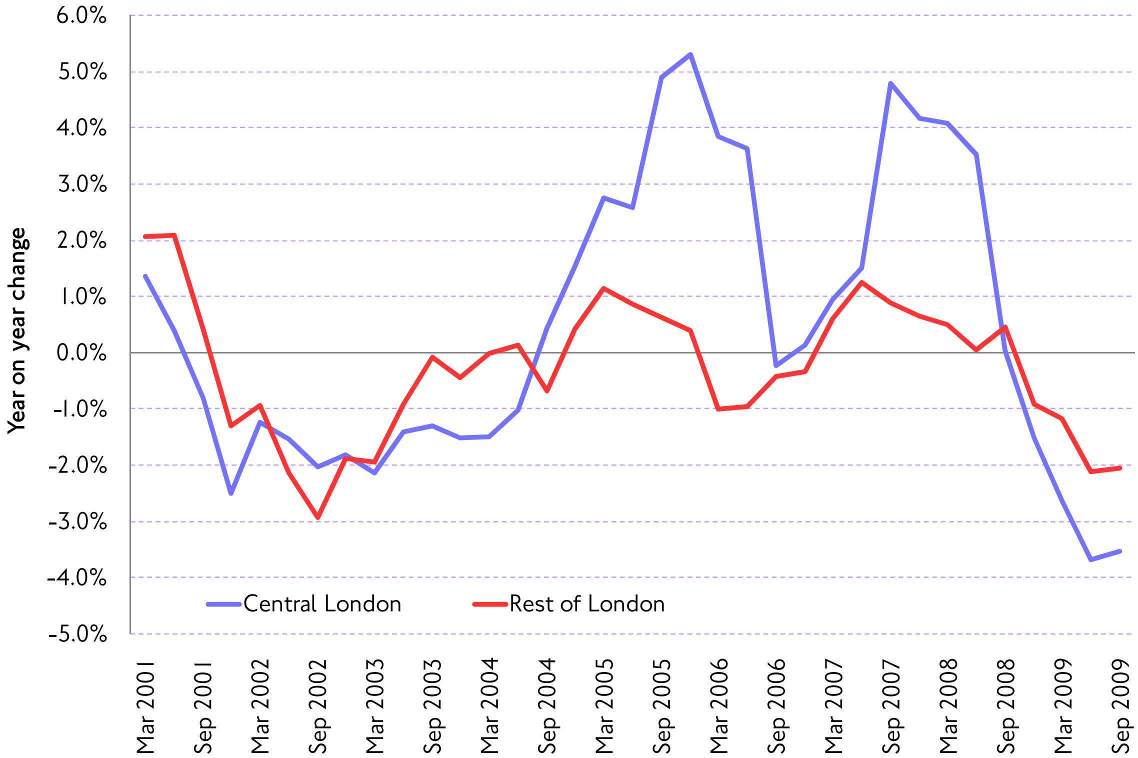
Source: ONS Labour Market Statistics London and the South East

The Greater London employee jobs contraction in the current recession, in terms of year-on-year percentage change, is comparable to the declines during the 2001 dot.com downturn, although actual levels of employed remain higher.

Employment in London in Q3 2009 remains around 2007 levels in spite of the decline in employment during the current recession.

Figure 12.8 shows employment trends for Central and the rest of London. Central London accounts for about a third of London's jobs and the rest of London for two thirds. Central London employment growth is more variable than the rest of the city with stronger growth in the peaks and deeper declines during downturns. After benefiting most from the upturn, employment in Central London has contracted more than the rest of the Capital. Central London employee jobs fell by about 50,000 representing a decline of 3.6 per cent compared to September 2008. In the rest of London, by comparison, employee jobs fell by 2 per cent over the same period. 'Employee jobs' therefore fell 2.6 per cent in London overall. This compares with 2.1 per cent for 'workforce jobs' (which includes self employment, but is not broken down between central and the rest of London).

Figure 12.8 Employee jobs' growth, Central and rest of London, year-on-year, per cent.



Source: ONS Labour Market Statistics London and the South East and Annual Business Inquiry

12.5 Total travel demand

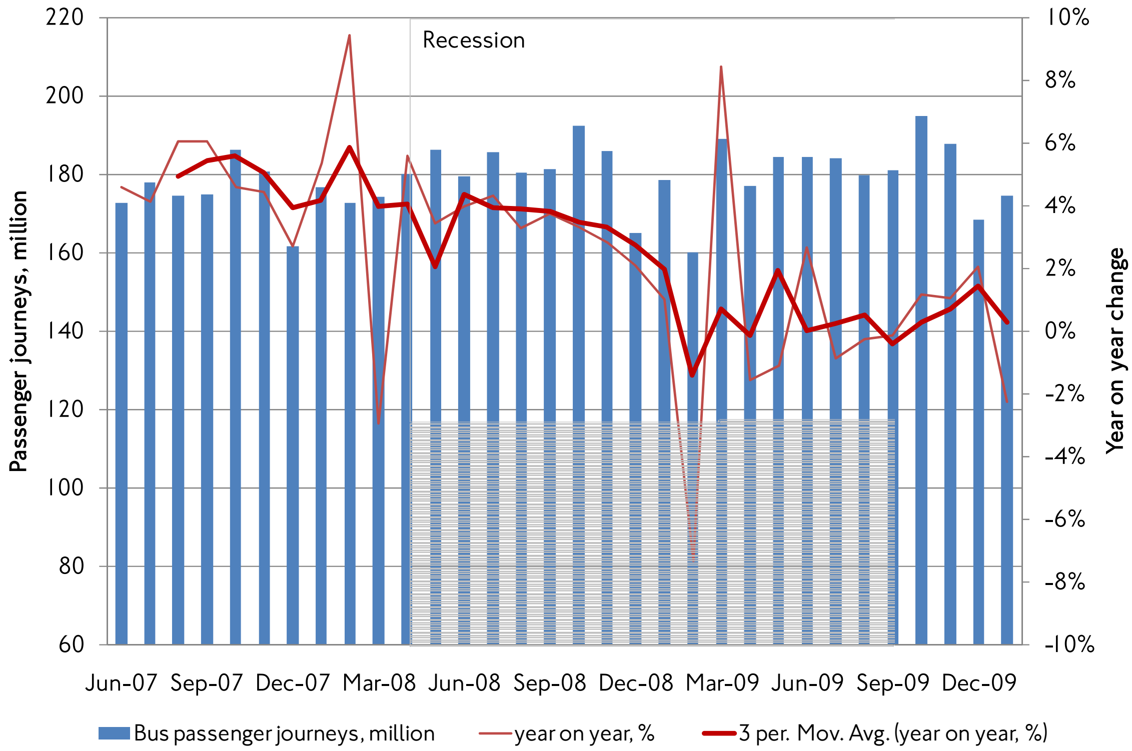
The total number of trips made to, from or within London on an average day was effectively unchanged between 2007 and 2008. Before 2008, the number of trips had grown in every year since 1993 – except in 2005, reflecting the London bombings of that year. The average annual growth over this period was 1 per cent per year. The number of journey stages (parts of trips made on a single mode of transport) to, from or within London increased by 0.6 per cent in 2008, but this was significantly less than any year since 1993 (except, again, for the decline in 2005). The annual average growth from 2000 to 2007 was 1.5 per cent.

The year 2008 therefore represented a considerable departure from a long-standing trend. These aggregate changes comprised increases in the numbers of people travelling by public transport in 2008, offset by decreases in those travelling by private transport.

12.6 Travel demand – bus and Underground

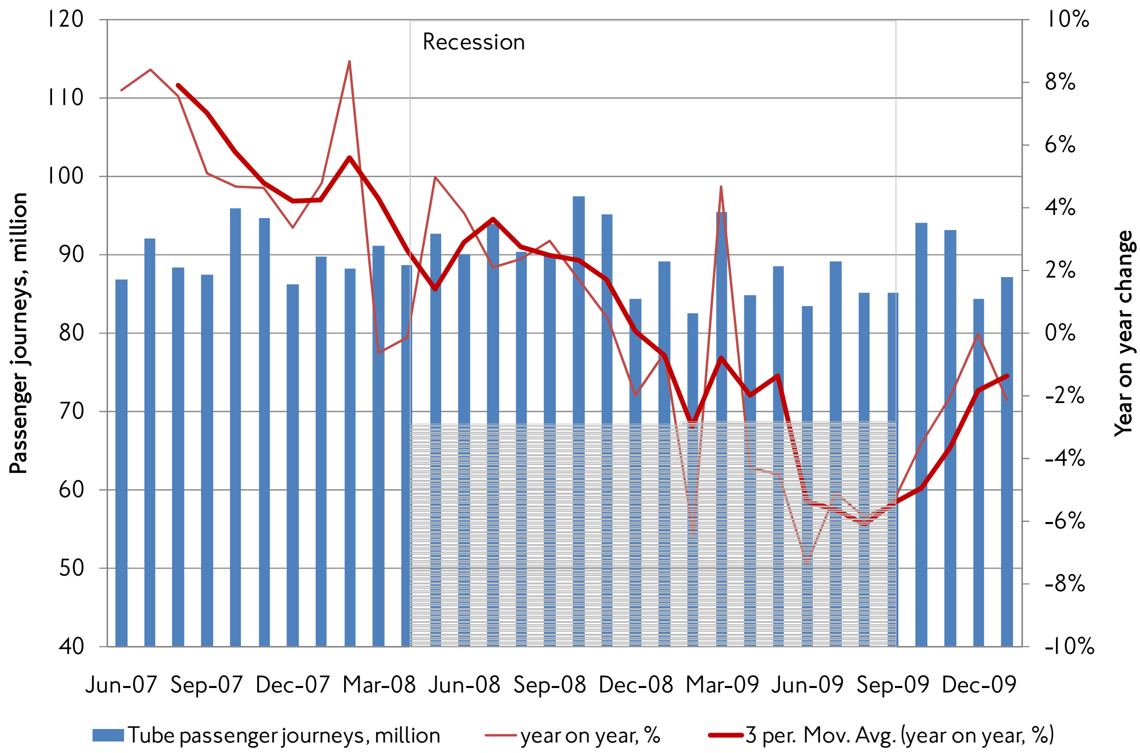
Bus and Underground patronage data is available at a good level of temporal disaggregation. Figures 12.9 and 12.10 show bus and Underground passenger journeys from June 2007, a year before the onset of recession, together with the year-on-year change (comparing four-week periods between one year and the next) and, to reduce volatility, the year-on-year change in the three-period moving average. Note that the thin red line spikes in the charts, due to the timing of Easter, which varies from year-to-year.

Figure 12.9 Bus passenger journeys, million and year-on-year percentage change.



Source: TfL Fares and Ticketing

Figure 12.10 Underground passenger journeys, million and year-on-year percentage change.



Source: TfL Fares and Ticketing

Bus travel recorded consistent growth of about 5 per cent year-on-year growth in the second half of 2007 (Figure 12.9). Bus journeys growth weakened during the recession – to between 3 and 4 per cent for much of the second half of 2008, and then around 0 per cent for much of 2009.

Prior to the onset of recession, Underground travel grew by between 4 per cent and 6 per cent year-on-year in the second half of 2007 (Figure 12.10). This growth fell during the recession; by the end of 2008, journeys were little changed from a year earlier, and during 2009 were significantly lower. In the final three months of 2009 Underground travel recovered robustly coinciding with the end of recessionary conditions more generally. Tube passenger journeys in December 2009 were unchanged on a year earlier.

There are other measures of bus and Underground demand including passenger kilometres and passenger fares revenue. Table 12.1 presents medium-term trends in these as well as passenger journeys together with more detailed changes covering the period of the current recession.

Bus and Underground passenger kilometres have declined less than journeys – implying that journey lengths have increased. However, whether the increase in trip lengths is recession-related or a continuation of past trends, associated with an increasing shift to Oyster tickets, is as yet unclear. Bus and Underground revenues have, as a result of higher fares, been more buoyant than either passenger kilometres or journeys.

Table 12.1 Bus and Underground passenger journeys, kilometres and revenue, year-on-year percentage change.

	2006/07	2007/08	2008/09		2009/10
			H1	H2	H1
Bus					
Passenger journeys	3.6%	5.2%	4.4%	2.2%	-0.2%
Passenger kilometres	5.4%	6.9%	4.1%	1.8%	0.2%
Revenue	6.8%	3.8%	1.8%	2.9%	2.8%
Tube					
Passenger journeys	4.5%	5.6%	3.7%	-0.3%	-5.4%
Passenger kilometres	1.0%	6.4%	9.6%	2.2%	-3.4%
Revenue	9.1%	8.4%	7.4%	3.1%	0.3%
London GVA	4.0%	3.5%	1.6%	-2.8%	-5.1%
UK GVA	2.8%	2.6%	0.8%	-3.7%	-5.3%

Note: Data for 2008/09 and 2009/10 shown as half-years (H1, H2).
Source: TfL Fares and Ticketing, ONS and EBS

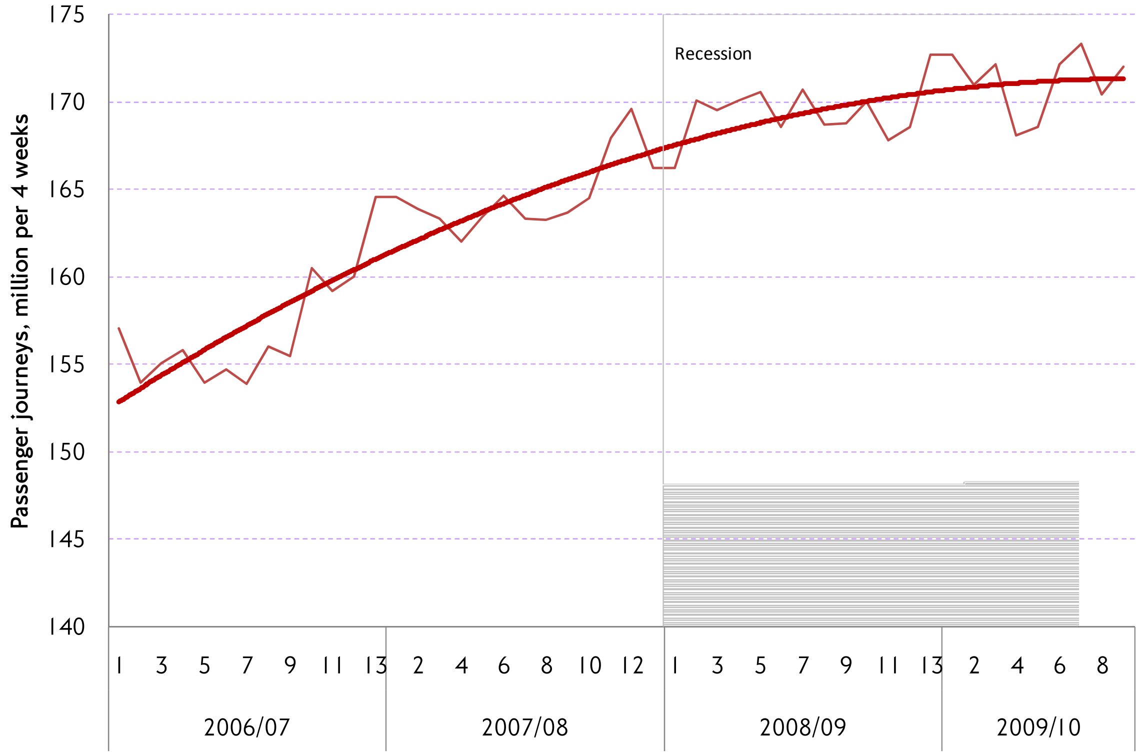
The seasonal nature of travel demand data complicates interpretation of trends. Year on year growth rates deal with this problem, but make comparisons during a year (and of the most recent data) difficult.

Figures 12.11 and 12.12 therefore attempt to 'de-seasonalise' (seasonally-adjust) bus and Underground journeys using data for four-weekly periods. These suggest, tentatively, that:

- The steady growth in bus demand has eased with bus journeys essentially flat since late 2008/09.

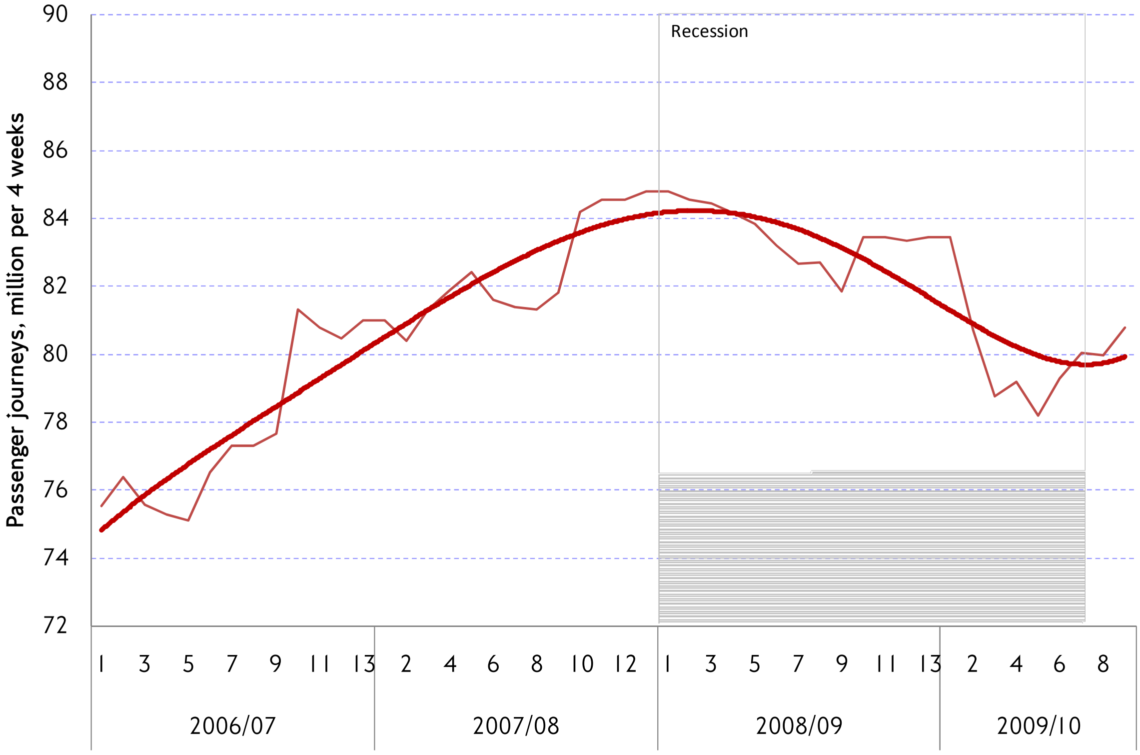
- Underground demand fell by around 5 per cent from its high point in mid-2008 (before the recession). The timing of the high point of (seasonally adjusted) Underground demand and the high point of (seasonally adjusted) GDP is close to simultaneous, which is not a coincidence.
- There are some nascent signs of an upturn in Underground journeys towards the end of 2009.

Figure 12.11 Bus passenger journeys, million, four-weekly period, seasonally adjusted.



Note: The financial year is divided into 13 4-week periods.
Source: TfL Fares and Ticketing

Figure 12.12 Underground passenger journeys, million, four-weekly period, seasonally adjusted.



Note: The financial year is divided into 13 4-week periods.
Source: TfL Fares and Ticketing

Another way to measure Underground demand is gate count data. This enumerates passengers at entry/exit gates at Underground stations during autumn each year (Table 12.2). These are published on an annual basis – and therefore the impact of the recession will not be fully reflected in the 2008 totals. However, a declining trend in growth between 2007 and 2008 is clearly visible across the whole travel week – particularly in the weekday morning peak period. This is the busiest period on the network, due largely to commuter travel - which is directly related to employment trends.

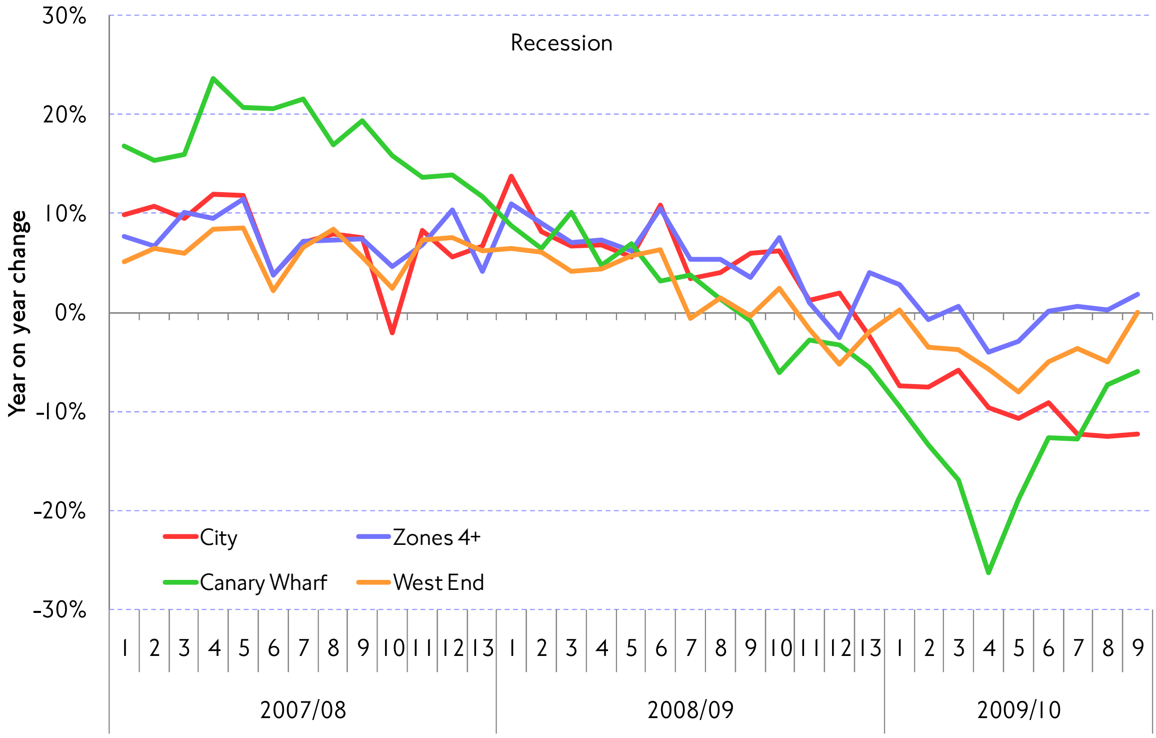
Table 12.2 Underground station gate counts data, year-on-year change.

	2006	2007	2008
Weekday AM peak	9.6%	6.3%	2.4%
Weekday inter-peak	9.2%	7.1%	3.2%
Saturday	12.6%	7.4%	3.9%
Sunday	12.4%	7.7%	5.2%
Annual	10.5%	7.5%	2.9%
AM peak as % of weekday	35.4%	34.8%	34.7%
London GVA	4.2%	3.7%	1.2%
UK GVA	3.0%	2.6%	0.6%

Source: London Underground Strategy and Service Development

The reductions in growth, to varying degrees, in a variety of measures of demand – passenger journeys, passenger kilometres, revenue and station gate counts data – all confirm that there has been a negative impact of the recession on demand for bus and Underground travel.

Figure 12.13 Underground station gate counts, year on year, 4-weekly period.



Source: London Underground Strategy and Service Development

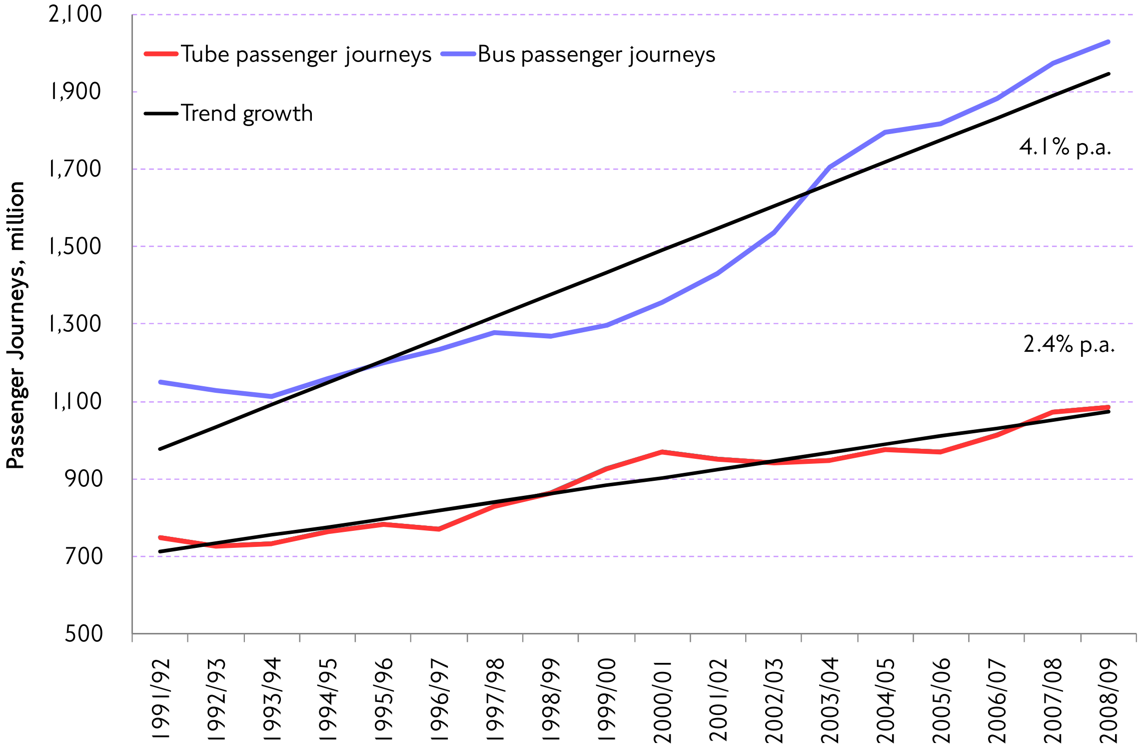
The reduction in Underground journeys has varied across the network. Figure 12.13 shows year-on-year growth in station gate counts since the start of 2007/08 including the recessionary period.

Unsurprisingly, given the nature of the recession, travel to and from Underground stations in the City – and to an even greater extent, Canary Wharf – has fallen faster than total Underground journeys. By contrast, Outer London stations and stations in the West End have experienced smaller reductions in passengers over the recessionary period.

Longer-term trends

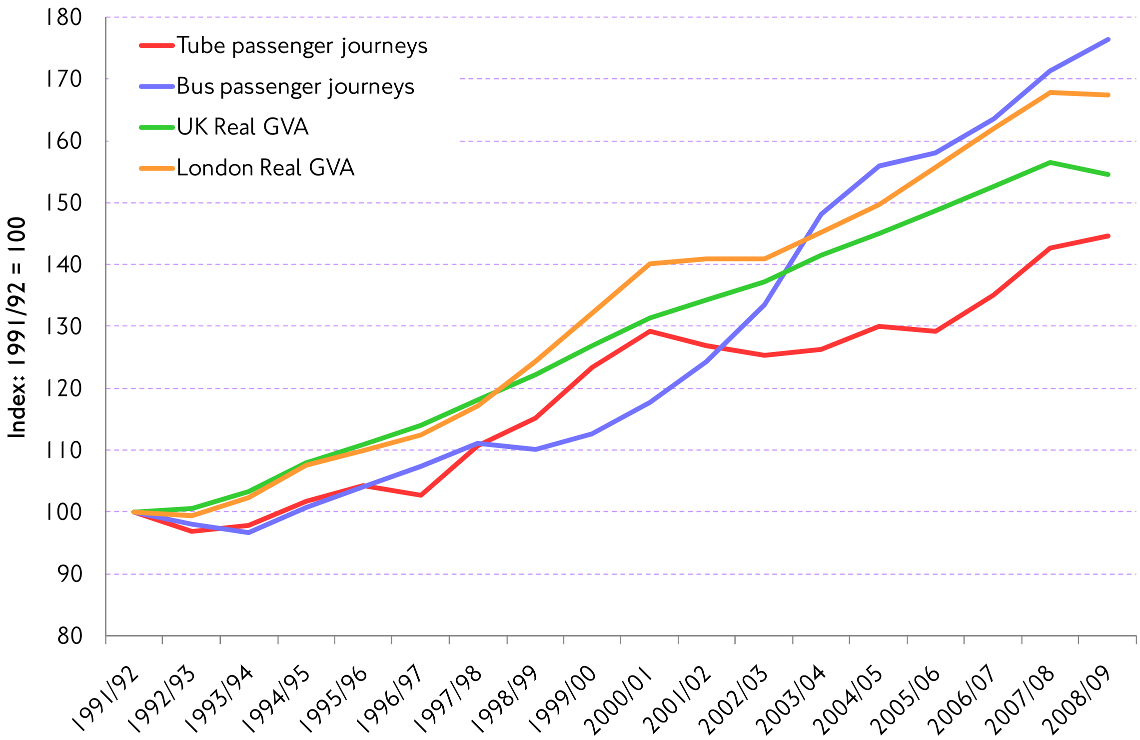
Looking over the long term, bus and Underground journeys have grown substantially. Since the early 1990s bus journeys have increased by nearly 80 per cent while Underground journeys have risen by just over 40 per cent. Between 1991/92 and 2008/09 bus and Underground passenger journeys grew by an average annual rate of 4.1 per cent and 2.4 per cent respectively, notwithstanding annual fluctuations from this trend (Figure 12.14).

Figure 12.14 Bus and Underground, passenger journeys, millions, and trend growth.



Source: TfL Fares and Ticketing

Figure 12.15 Bus and Underground passenger journeys and UK and London real GVA, year-on-year.



Source: TfL Fares and Ticketing, ONS and EBS

Figure 12.15 shows that there is a high degree of correlation between public transport demand and economic activity. This is of course not sufficient on its own to prove a causal relationship – other features are important, such as supply (kilometres operated) and fares. Each of these is shown elsewhere in this report.

Table 12.3 shows recognised Underground and bus demand elasticities with respect to the main demand drivers based on longstanding econometric analysis.

Table 12.3 TfL Underground and bus demand elasticities.

	Employment	Retail sales	Population
Tube	0.7	0.3	0.3
Bus	0.4	0.1	0.5

Source: TfL Fares and Ticketing

12.7 Travel demand – road traffic flows

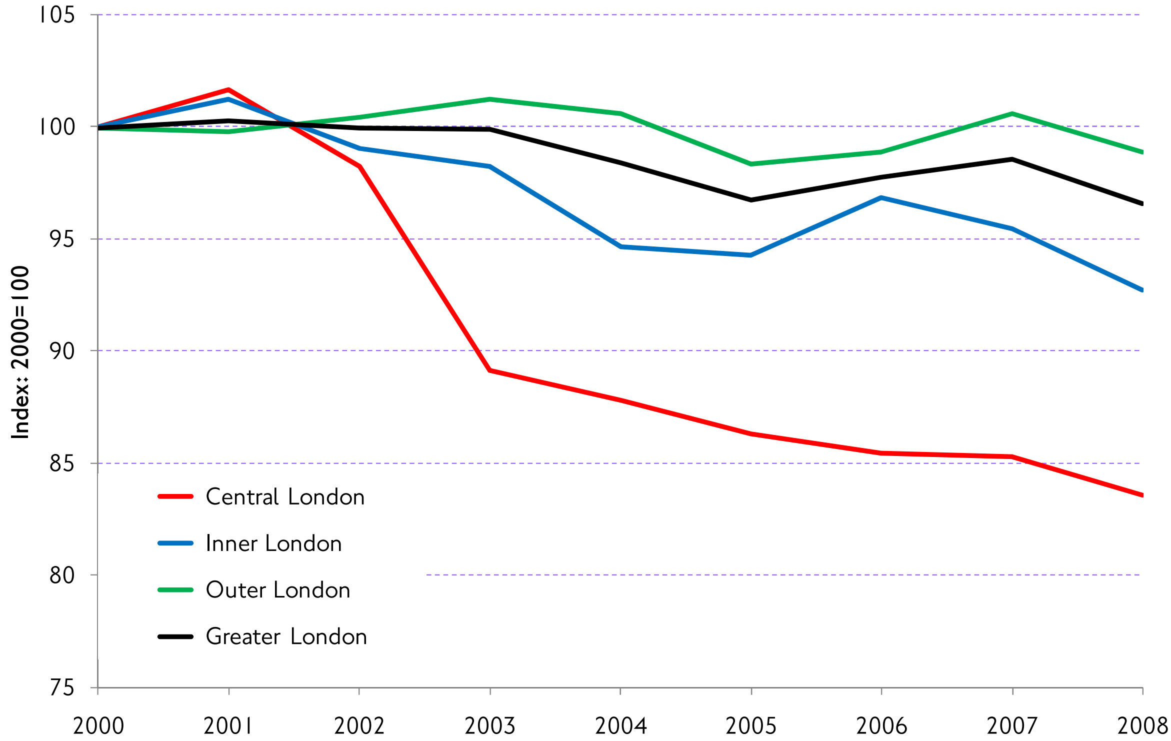
Total road traffic in London fell by 2 per cent between 2007 and 2008. This is a greater reduction in one year than the net 1.4 per cent fall in the previous seven years between 2000 and 2007.

Traffic in Great Britain as a whole has also been affected by the recession. It did so however against different background trends: an increase of 10 per cent between 2000 and 2007, and a fall in 2008 of 0.8 per cent. This is the first year-on-year decrease in GB traffic recorded since the 1970s.

So the differences between 2008 and the 2000-2007 average are:

- London's traffic is 1.7 per cent below what would have been expected from the previous trend.
- For GB traffic, the difference is 2.1 per cent.
- GVA in 2008 was about 2 per cent below its previous trend.

Figure 12.16 Trends in traffic (vehicle kilometres), all motor vehicles in Central, Inner and Outer London (Year 2000=100).



Source: TfL Planning

Table 12.4 Index of London road traffic (2000=100) by Central, Inner and Outer London, all motor vehicles.

Year	Central London	Inner London	Outer London	Greater London	Great Britain
	Index (2000=100)				
2000	100.0	100.0	100.0	100.0	100.0
2001	101.7	101.2	99.8	100.3	101.6
2002	98.2	99.0	100.5	100.0	104.2
2003	89.2	98.3	101.3	100.0	105.0
2004	87.8	94.6	100.6	98.4	106.7
2005	86.3	94.3	98.4	96.8	106.9
2006	85.4	96.8	98.9	97.8	108.6
2007	85.3	95.4	100.6	98.6	109.8
2008	83.6	92.7	98.9	96.6	108.9

The fall in traffic was highest in Inner London at almost 3 per cent. In Outer London, where there had been a slight increase in traffic between 2006 and 2007, the percentage decrease was lower (1.7 per cent) bringing traffic back to about its 2006 level. Central London traffic fell by 2 per cent in the year to 2008, continuing the steady decline evident since year 2000. Central London traffic in 2008 was 16 per cent less than in 2000. Note that the definition of Central London used here encloses a larger area than the Central London Congestion

Charging zone. The trends for Central London shown here are derived from traffic counts in Westminster and the City of London.

Taxis and private hire

Most of the available data sources suggest a significant decline in use of taxis and private hire vehicles in London in late 2008. Counts at the central cordon (see section 2.11) of licensed taxis crossing into and out of Central London fell by an estimated 15 per cent between autumn 2007 and autumn 2008 (following a 10 per cent increase in the previous year). Since most taxi activity is concentrated in Central London this is indicative of a significant fall in taxi use. TfL's Central Area Peak Counts (see section 11.3), however, showed a 1 per cent increase between 2007 and 2008 in taxi passengers entering Central London in the morning peak period. This may suggest that, at that early stage of the recession, the effect was less on peak commuting travel by taxi than on travel for other purposes at other times of the day. The LTDS household survey suggests that London residents' journey stages by taxi or private hire vehicle fell by about a fifth between 2007/08 and 2008/09.

12.8 Travel demand – rail

Passenger kilometres on London and the South East franchised train operations increased 22 per cent in the six years to 2008/09, while London real GVA rose 19 per cent. Most of the growth (16 per cent growth) in rail patronage was in the last three years.

Table 12.5 shows year-on-year changes in London and the South East franchised train operators' passenger journeys and revenue, as well as passenger kilometres with more detailed changes covering the period of the current recession. Figure 12.17 looks at passenger kilometres.

Rail patronage grew strongly in 2007/08 (passenger journeys up by more than 8 per cent, passenger kilometres up 6 per cent) and first stopped growing and then fallen sharply following the start of the recession. In 2008/09, growth had slowed to 2.5 per cent for journeys and 2.9 per cent for kilometres. In the first half of the current financial-year (April to September 2009), journeys were down by an estimated 5 per cent and kilometres down by an estimated 4 per cent on the previous year. The latest quarter of available data (October to December 2009), coinciding with the end of the recession, suggests the downturn in demand may have bottomed-out with the decline in passenger kilometres easing to around -3 per cent year on year.

Table 12.5 London and South East train operation passenger kilometres, journeys and revenue, year-on-year change.

	2006/07	2007/08	2008/09		2009/10
			H1	H2	H1
London & SE train operators					
Passenger journeys	6.9%	8.3%	5.0%	0.2%	-5.0%
Passenger kilometres	7.1%	6.1%	5.9%	0.0%	-4.0%
Fares revenue	10.9%	11.5%	12.0%	5.8%	0.5%
London GVA	4.0%	3.5%	1.6%	-2.8%	-5.1%
UK GVA	2.8%	2.6%	0.8%	-3.7%	-5.3%

Note: the journeys and kms in H1 2009/10 have been adjusted to estimate non LENNON data, which is only officially corrected for at the year-end, and so the comparison between H1 and H2 09/10 year on year change is on a like for like basis.
Source: Office of the Rail Regulator, ONS, EBS

Figure 12.17 London and South East train passenger kilometres, and year-on-year change.

Note: Figure 12.17 shows provisional Q1, Q2and Q3 2009/10 data prior to the annual year-end reconciliation with TOC data systems. Non-LENNON data is included in Q1and Q2 2008/09 but not in the provisional data, and therefore overestimates, to some degree, the year on year decline in Passenger kms at the start of the current financial year.
Source: Office of the Rail Regulator

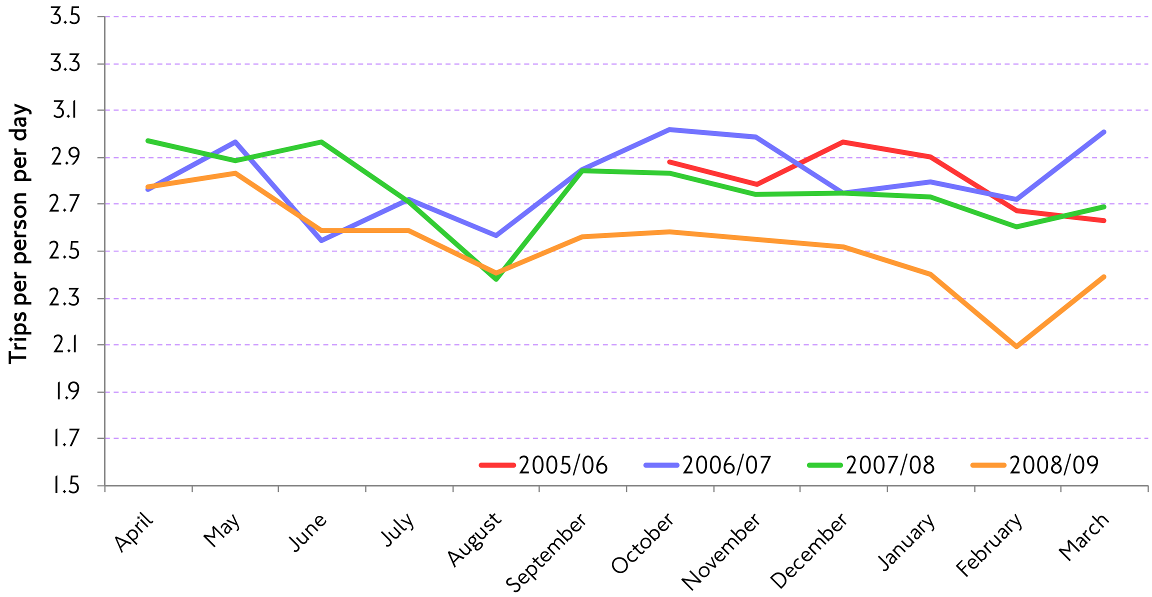
Table 12.5 shows that the declining trend seen in passenger kilometres was also apparent in journeys and in growth in fares revenue, though to varying degrees. Passenger kilometres have held up better than journeys, because passengers may have shifted away from shorter journeys which are relatively more expensive per kilometre. Meanwhile, fares revenue (which is shown in cash terms) has performed better than kilometres, as it has being buoyed by the annual fares increase. These trends, including journey lengthening, are seen on bus and Underground, as well as rail.

12.9 Travel by London residents

TfL's LTDS survey provides a further indicator of the impact of the recession on travel, although the survey is primarily designed to characterise changes in travel behaviour of London residents, and is not optimised in statistical terms to track detailed trends in trip rates by mode within each individual survey year.

As described in chapter 3 of this report, London residents made 7 per cent fewer trips in the 2008/09 cycle of this survey than in 2007/08 (down from an estimated 18.3 million to 17.0 million on an average day). Trip rates (i.e. trips per person per day) were down by an estimated 8 per cent, falling from 2.6 to 2.4 trips. Figure 12.18 compares the most recent LTDS survey for 2008/09 with equivalent surveys for previous years: the chart shows trip rates, for weekdays only, from the raw (unweighted) LTDS survey sample for each month. That gives an indication of the month-by-month change, recognising that the survey is not optimised, and is less reliable, when looking at it on this basis. The figure shows a clear and consistent reduction in trip rates, starting around autumn 2008.

Figure 12.18 Comparison of personal trip rates for London residents. LTDS survey, weekdays only. Trips per person per day.



Source: TfL Planning

These overall trends and directions of change affected all parts of London, and were fairly uniform across all groups of the resident population. However, as is shown by Table 12.5, there was a clear distinction between the apparent impact on the public and private modes. Recorded trips by car (as driver and passenger, also including motorcycle) fell by 14 per cent overall, whereas trips by public transport increased marginally by 1 per cent. This means that the majority of the reduction in overall trip rates shown by Figure 12.18 reflects reduced car trips by London residents. This is a much larger change than is suggested by the traffic-count-based dataset, where total traffic volumes in London were estimated to have reduced by 2 per cent overall, comparing the 2007 and 2008 calendar years. Detailed examination of the data, taking into account the fact that the LTDS survey and sample is not optimised to show detailed trends within each survey year, confirms that public transport trip rates were relatively stable across the 2008/09 financial year, and in aggregate comparable to the 'on-mode' count data described earlier in this chapter (for example, Tables 12.1, 12.2 and 12.4). The disaggregate data also show a consistently lower level of private motorised transport trips, the difference intensifying in the latter half of 2008/09.

Table 12.6 Percentage change in personal trip rates between 2007/08 and 2008/09. LTDS survey, average day.

	Inner London residents	**Outer London residents**	**All Greater London residents**
Underground/DLR	-7%	10%	0%
Bus	0%	5%	2%
Rail	-3%	14%	8%
All public	-3%	2%	1%
Private motorised transport	-10%	-16%	-14%
All modes	-6%	-10%	-8%

Table 12.6 also shows change for Inner and Outer London. Key differences are: an apparent small fall in public transport trip rates by residents of Inner London, balanced by a smaller (but in population terms) more significant increase by residents of Outer London, and a larger proportionate fall in private motorised transport trips by residents of Outer London.

Although TfL would not expect a direct correspondence between year-on-year changes in 'on-mode' aggregate data, such as counts of all Underground users and vehicles on the road, and travel-diary-based data, such as LTDS, of London residents only, the disaggregate LTDS data does on the whole suggest greater change, particularly for private transport trips. TfL will continue to investigate these data sets to further understand the source and nature of any disparities.

13. Spotlight on – cycling and walking

13.1 Introduction

The Mayor has declared his aim of delivering a ‘cycling revolution’ in London by 2025; delivering a 400 per cent increase (from 2000) in the number of cycling trips and a 5 per cent mode share for cycling. Major initiatives in the short- term include the introduction of a Central London Cycle Hire scheme and two Cycle Superhighways in summer 2010. In the medium-term, the Mayor has declared his intention to launch 12 Cycle Superhighways, to develop ‘Biking Boroughs’ in Outer London, and to explore options for expanding the Cycle Hire scheme. Significant investment is also planned for cycle parking, smarter travel and Greenways. In the longer term, TfL must develop policies which can deliver substantial mode shift; current barriers, in terms of infrastructure, information and attitudes, will need to be overcome to achieve this.

The draft MTS also commits TfL to delivering a significant mode shift away from the private car and encouraging walking for short trips. At present, across London a quarter of all trips less than 1 kilometre are made by car. Transferring these short trips to walking would help ease congestion on the road network and crowding on public transport, as well as bringing health and other quality of life benefits to London residents, workers and visitors.

This chapter describes current patterns of walking and cycling behaviour in London, looks at the profile of those who currently walk and cycle, and explores attitudes to walking and cycling and barriers to behavioural change.

13.2 Key features and trends

Cycle trips

- Cycle activity can be measured in several different ways: in terms of flow on the roads; in terms of trips made by residents, or in terms of the number of cyclists. All measures show an increase in cycle activity over time, although the scale of this increase varies between the measures. This is due to the differences in the type of activity measured and also in the precision of the measures themselves.
- Cycling has grown substantially. It is estimated that cycle trips grew by around 70 per cent between 2001 and 2008, having been broadly unchanged between 1993 and 2001.The same is true of journey stages. There were an estimated 0.5 million journey stages made by bicycle in Greater London on an average day in 2008.
- On the TfL road network between 2000/01 and 2008/09, 107 per cent more cyclists were observed passing selected counting points. (This figure was 91 per cent up to 2007/08, as shown in last year’s Travel in London report.) There was a 95 per cent increase between 2000 and 2008 in the number of cyclists entering Central London in the morning peak.
- The mode share for cycling, as considered in chapter 2 of this report, combines cycle flow and trip data to provide an overarching estimate of cycle activity in London. According to this measure, cycling now accounts for

around 2 per cent of trips in London, compared to just over 1 per cent in 2000.

- This overarching estimate is derived from measures of cycle flows on the road and from survey estimates of cycle trips made by London residents. In terms of cycle trips made by London residents, an 18 per cent increase has been observed since 2005, and currently around 2 per cent of trips made by London residents are made by bicycle.
- Cycle trips made by London residents are typically quite short, with two thirds taking less than 20 minutes. Around half take place during the morning and evening peaks and a similar proportion are undertaken for work and education purposes.
- More than a quarter of all cycle trips made by London residents take place within Central London or between Central London and other parts of London. Outer London generates the most cycle trips simply due to the size of the population, as the mode share for cycling in Outer London at 1 per cent is significantly lower than in Central and Inner London where it is 3 per cent.
- The mode share for cycling, based on trips by London residents, is highest in the central sub-region, at around 3 per cent, and lowest in the Outer London boroughs comprising the north sub-region, at 1 per cent. In all other sub-regions, the mode share for cycling is between 1 and 2 per cent.
- Three-quarters of cycle trips had both an origin and destination in the same sub-region. Trips with an origin or destination in the central and east sub-regions were typically longer and more likely to cross into another sub-region.

Profile of London cyclists

- Although 4 in 10 London residents have access to a bicycle in their household, surveys suggest that as many as one fifth of the bicycles in London are unused.
- Around 1 in 10 London residents cycles once a week or more, increasing by a factor of two or three times in some west and south-west London boroughs (Richmond, Kingston-upon-Thames, Hammersmith & Fulham) and also in Hackney in east London.
- People are more likely to cycle if they are male, under 40, white or with medium to high household income. People with the greatest propensity to cycle tend to live in Inner London and in outer south and west London.

Attitudes and barriers to cycling

- Most London residents agree that cycling is convenient, enjoyable and becoming more popular and that attitudes towards cycling are improving over time.
- The most significant barrier to cycling is fear of traffic. Even with significantly increased rates of cycling, pedal cycle casualties have dropped by more than a fifth since the late 1990s. However, cyclists are still relatively more likely to be killed or seriously injured on the roads than users of mechanised modes.

- Despite high degrees of enthusiasm for cycling, with a quarter of non-cyclists stating that they are likely to start cycling over the coming year, evidence suggests that the proportion of London residents who 'ever cycle' has remained fairly stable over the past few years. This suggests that significant barriers to cycling remain, including fear of traffic, apathy, lack of confidence and fitness, and lack of practical infrastructure. To achieve the desired increase in cycle trips, creative solutions will be required to tackle these barriers and encourage people to make the changes they have said they want to make.

Walking

- Almost a quarter of all trips made in Greater London are made entirely on foot and many more trips also include walk stages. The mode share for walking has remained stable at 24 per cent since the mid-1990s.
- Three in 10 trips made by London residents are walked all the way. These trips tend to be very short – 80 per cent are less than 1 kilometre – and made during daylight hours. The destinations of walk trips are clustered in Central and Inner London and around Outer London town centres, such as Stratford and Ilford in east London.
- The most common journey purpose for walk trips is shopping and leisure; 58 per cent of walk trips are made for this purpose. The central sub-region had the highest share of walk trips for work purposes, while the east sub-region had the highest share of walk for education.
- Each day 2.5 million Londoners make a trip on foot. Those most likely to walk include women aged 25 to 54, Bangladeshi people, and those with a low household income.
- Walking is the most popular leisure activity in the UK and nearly all London residents agree that walking is enjoyable and convenient. Despite this, a significant minority of very short trips are made by mechanised modes. In particular 1.7 million trips of less than 1 kilometre are made by car every day.
- Research has identified that barriers to walking include perceptions of time, distance and the convenience of other modes, particularly the car; fear and feelings of vulnerability; and people simply saying that they 'can't be bothered' to walk or have not considered it as an option. In order to increase the proportion of short trips made on foot, the practical barriers to walking and the habitual patterns of decision making that lead people to car use will need to be overcome.

13.3 Travel by bicycle in London

Estimate of cycle trips and journey stages

Estimates of cycle trips and journey stages were shown in chapter 2 of this report.

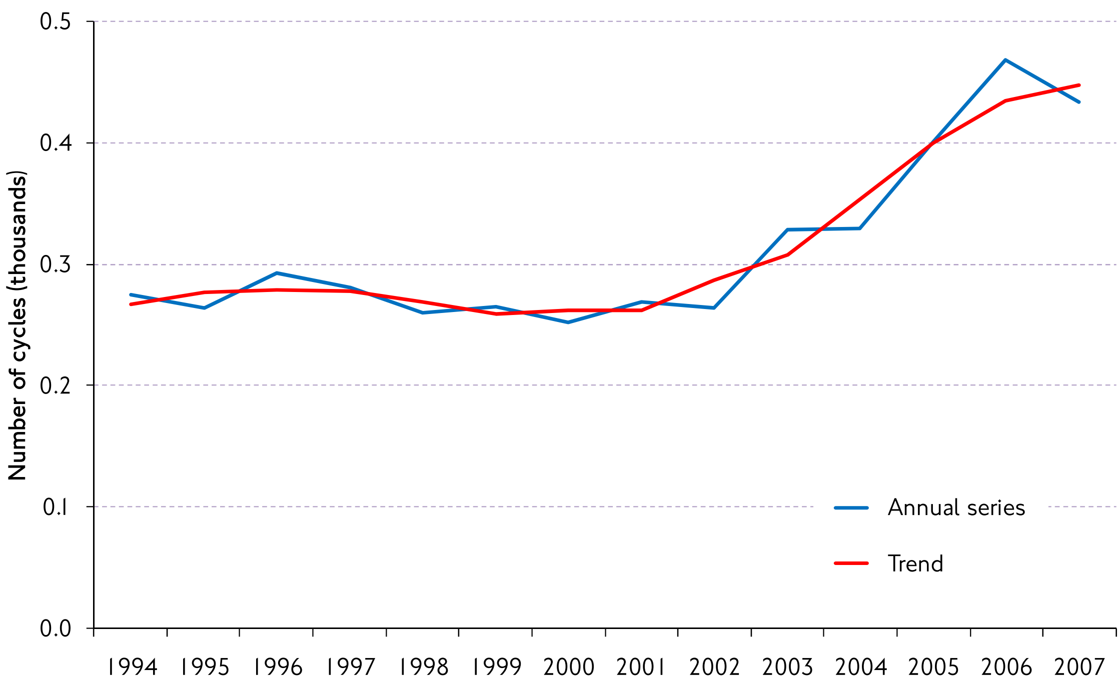
It is estimated that cycle trips grew by around 70 per cent between 2001 and 2008, having been broadly unchanged between 1993 and 2001.The same is true of cycle journey stages.

Cycle flows on the London's major road network

This section looks at data relating to trends in cycle use on the London major road network.

Figure 13.1 shows average daily two-way cycle flows on London's major roads since 1994. The trend was effectively flat between 1994 and 2001, but then increased such that average daily flows have since increased by about 70 per cent. This 70 per cent increase is from a different data source to the 70 per cent growth in trips and journey stages mentioned above.

Figure 13.1 Trends in cycle flows on major roads in London (from DfT data).



Source: National Road Traffic Survey, DfT
1. Major roads include trunk and principal roads.

Higher increases have been recorded by TfL's permanent automatic cycle counters on selected sections of the Transport for London Road Network (TLRN) (see Figure 13.2 for a map of the count sites). Average flows here were 107 per cent higher in 2008/09 than in 2000/01 (Figure 13.3). One feature of these continuous data is that seasonal variations in cycle volumes can be clearly appreciated – cycling choice is clearly influenced by seasonal weather and flows during the winter are typically 25 per cent lower than in spring.

Figure 13.2 Map of cycle count sites on the TLRN.

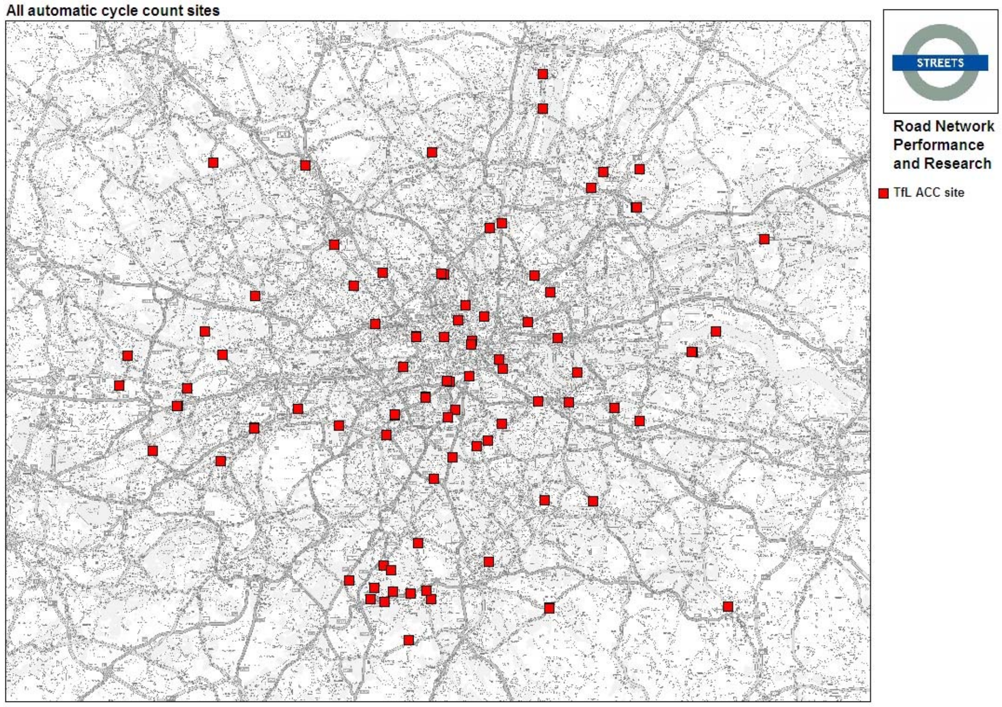
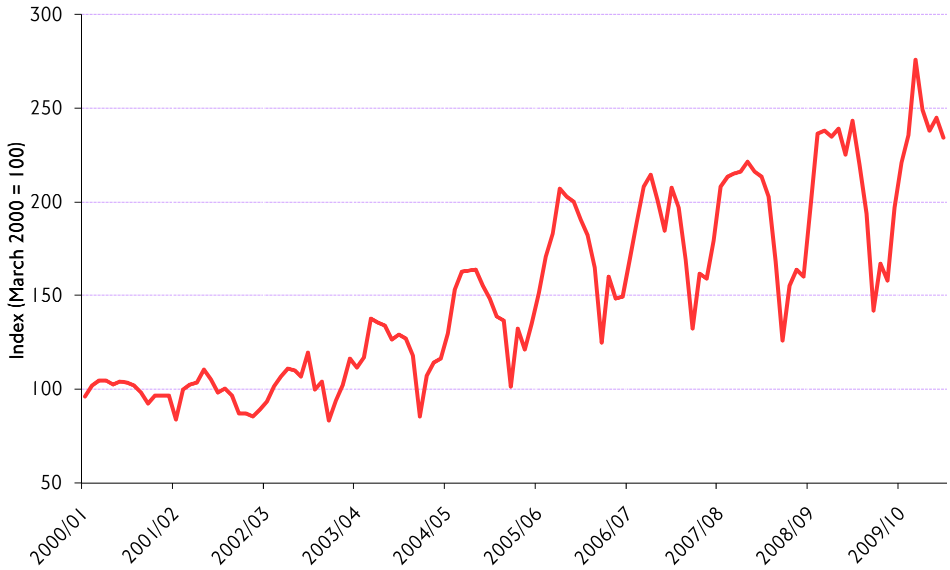


Figure 13.3 Trends in cycle flows on the TLRN.



Source: Transport for London automatic cycle counters

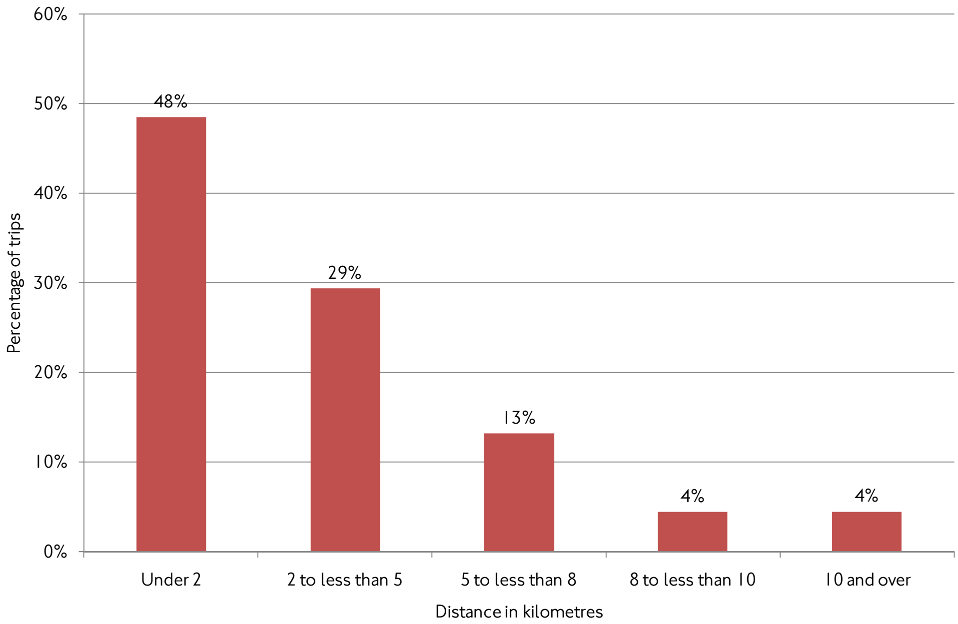
Travel by bicycle by London residents

Currently, a relatively small proportion of the population cycles. Nearly two thirds of London residents say they never cycle, and on any given day about 140,000 make a cycle trip. Between 2005/06 and 2007/08, 2 per cent of trips recorded in the LTDS survey were made by bicycle, equivalent to a trip rate of 0.05 trips by bicycle per person per day. Over the same period, the total trip rate by all modes was 2.6 trips per person per day.

Between 2005/06 and 2008/09, the number of cycle trips made by London residents increased by 18 per cent on an average day. It is evident that the number of trips recorded varies significantly year-on-year, in part reflecting the low mode share for cycling. It is clear, however, that the upward direction of the trend observed on the roadside is also reflected in this data.

Most cycle trips are relatively short, with nearly half being less than 2 kilometres and two thirds being for 20 minutes or less. Figure 13.4 shows the distribution cycle trips by distance travelled.

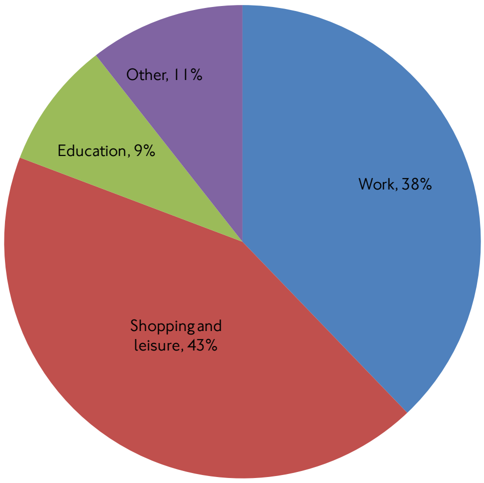
Figure 13.4 Cycle trips by distance, London residents.



Source: London Travel Demand Survey 2005/06-2007/08

Half of all cycle trips are made during the morning and evening peaks, and a similar proportion are made for commuting (38 per cent) or travel to school and college (9 per cent). Overall, around 4 per cent of London residents in employment say that they travel by bicycle as their main mode of travel to work and 1 per cent of London school children say that they travel by bicycle as their main mode of travel to school. Three quarters of all cycle trips are made during the week, with 23 per cent taking place on a Saturday or Sunday.

Figure 13.5 Cycle trips by journey purpose, London residents.



Source: London Travel Demand Survey 2005/06-2007/08

Where are cycle trips being made?

As shown in Table 13.1, 27 per cent of all cycle trips made by London residents take place within Central London or between Central London and other parts of London. Around a third of trips take place within each of Inner (30 per cent) and Outer London (36 per cent). The trips with the highest cycling mode share were those between Central and Inner London, 5 per cent of which were made by bicycle. Although Outer London generates the highest proportion of cycle trips, the mode share for cycling is only 1 per cent, compared to 3 per cent for Inner London (including Central London). The boroughs with the highest mode share for cycling were Hackney (8 per cent) and Richmond upon Thames (4 per cent).

Table 13.1 Cycle trips by origin and destination, London residents.

Origin and destination of trip	Proportion of cycle trips	Cycle mode share
Within Central London	4%	2%
Within Inner London	30%	2%
Between Central & Inner London	20%	5%
Within Outer London	36%	1%
Between Central & Outer London	3%	1%
Between Inner & Outer London	6%	1%
Between Greater London and rest of UK	1%	0%
Total (excluding missing data)	**100%**	**2%**

Source: London Travel Demand Survey 2005/06-2007/08

Cycling in the London sub-regions

Table 13.2 shows how cycling mode share varies between the London sub-regions. It is notable that the cycling mode share is considerably higher in the central London sub-region, at 2.7 per cent, and that 47 per cent of cycle trips made by London residents have an origin or a destination (or both) in the central sub-region. North London, by comparison, has a very low mode share for cycling and under 1 in 10 trips made by bicycle have an origin and/or destination in the north London sub-region. This can be explained at least in part by the composition of the north London sub-region, which is relatively small and includes predominantly Outer London boroughs, which tend to have a lower cycling mode share.

Table 13.2 Cycle trips with an origin and/or destination in each sub-region, London residents.

London sub-region	Mode share	Proportion of total cycle trips
Central	2.7%	47%
South	1.6%	25%
West	1.6%	21%
North	0.9%	9%
East	1.5%	23%

Source: London Travel Demand Survey 2005/06-2007/08
Note that all trips with origins or destinations in each sub-region are included in the sub-regional totals. Trips may be included in both their sub-region of origin and sub-region of destination.

One quarter of cycling trips crossed from one sub-region to another, and three quarters were wholly contained within the sub-region (Table 13.3). The central and east sub-regions had the highest proportion of trips that crossed into another sub-region, reflecting the high degree of interaction between these two sub-regions: 10 per cent of all cycle trips involved travel between the two sub-regions.

Table 13.3 Origin and destination of cycle trips by sub-region, London residents.

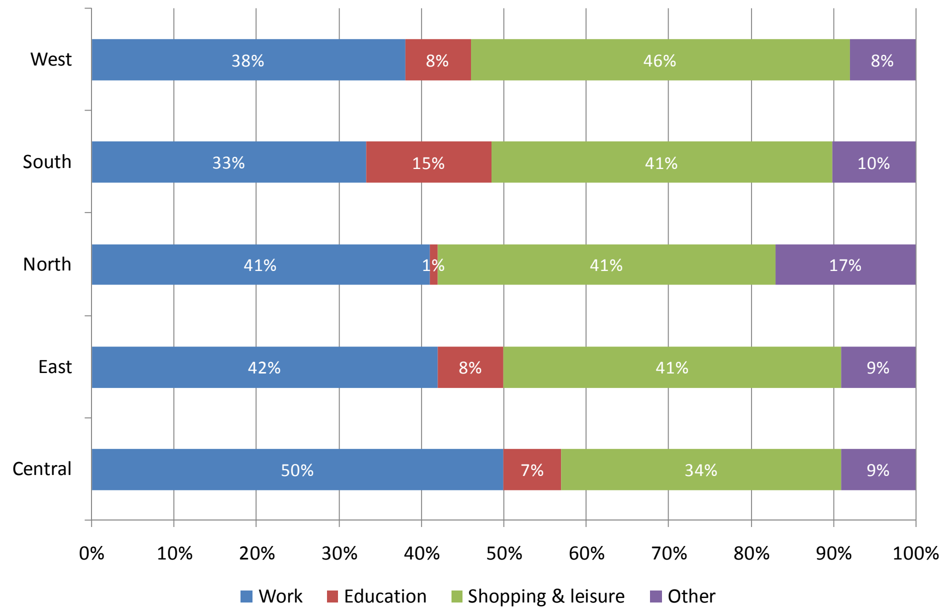
			Destination			
Origin	**Central**	**East**	**North**	**South**	**West**	**All London**
Central	26%	5%	1%	3%	2%	37%
East	5%	13%	0%	0%	0%	19%
North	1%	0%	6%	0%	0%	7%
South	3%	0%	0%	16%	1%	20%
West	2%	0%	0%	1%	14%	17%
All London	37%	18%	7%	20%	17%	100%

Source: London Travel Demand Survey 2005/06-2007/08

Characteristics of cycle trips are fairly similar in all sub-regions. Notable exceptions are that trips with an origin or destination in the central and east sub-regions are typically longer than in other sub-regions. Only 34 per cent of cycle trips in the central London sub-region and 43 per cent of trips in east London were less than 2 kilometres in length, compared to around 60 per cent of trips in all other sub-regions. For all sub-regions, most trips took place during the weekday morning and afternoon peaks.

The journey purpose of cycle trips varies quite substantially between the sub-regions (see Figure 13.6). Cycle trips with an origin or destination in the central London sub-region were less likely to be for shopping and leisure purposes and more likely to be for work. South London had the highest share of cycle trips to education, but the lowest for work purposes. In north London most cycle trips were made for shopping, leisure and other purposes.

Figure 13.6 Cycle trips by journey purpose and London sub-region, London residents.



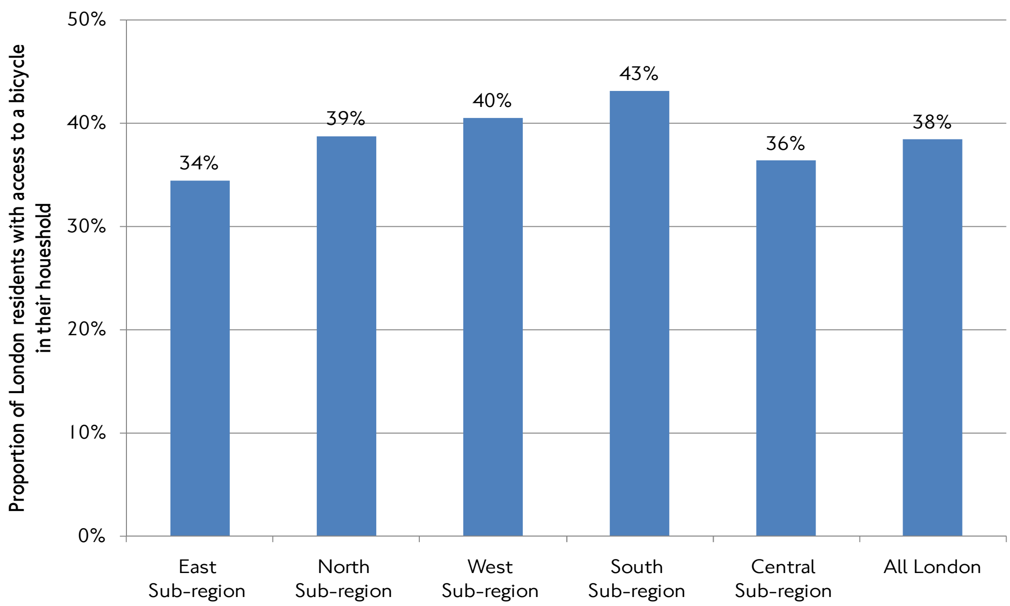
Source: London Travel Demand Survey 2005/06-2007/08

13.4 Profile of London cyclists

Access to a bicycle

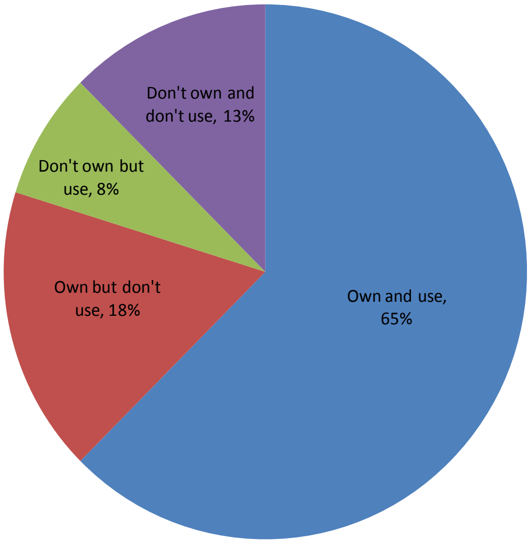
Around 4 in 10 London residents have access to a bicycle in their household (see Figure 13.7). Surveys have shown that around 18 per cent of those with access to a bicycle own one but do not use it (see Figure 13.8). Around one fifth of the bicycles in London are unused, more than a quarter of a million bicycles.

Figure 13.7 Percentage of London residents with access to a bicycle in their household.



Source: London Travel Demand Survey 2008/09

Figure 13.8 Ownership and usage of bicycles London residents have access to.

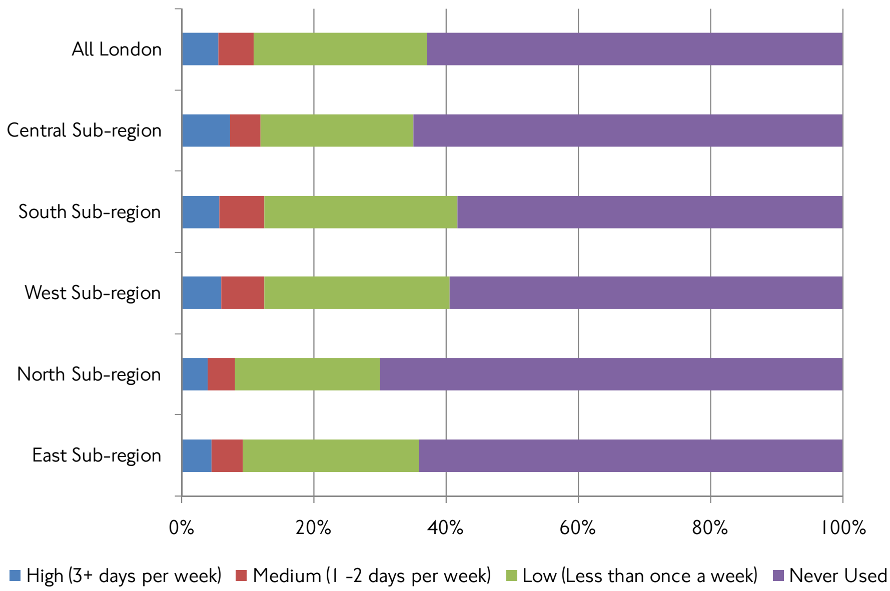


Source: Cycling Attitudes Survey 2009

Frequency of cycling

Across London, around 11 per cent of residents are very or fairly frequent cyclists, that is, they cycle at least once a week (Figure 13.9). Residents of the west and south sub-regions are most likely to cycle frequently (13 per cent), and in particular residents of Richmond (29 per cent) and Kingston-upon-Thames (24 per cent) in the south and Hammersmith & Fulham (20 per cent) and Hounslow (19 per cent) in the west. In Hackney, nearly a quarter of residents cycle at least once a week (24 per cent). These are boroughs which have prioritised investment in cycling measures; the higher rates of cycling also reflect the nature of the population and to some extent the local environment, especially the quality of green spaces.

Figure 13.9 London residents by frequency of travel by bicycle.

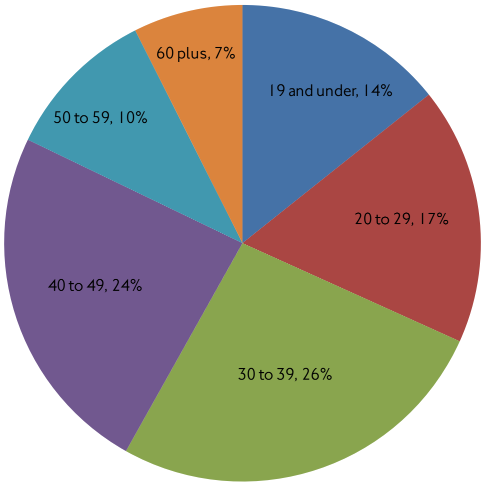


Source: London Travel Demand Survey 2005/06-2007/08

Characteristics of cyclists

Cyclists are more commonly men – 69 per cent of cycle trips are made by men). Younger people are also more likely to make a cycle trip; 58 per cent of cycle trips are made by under-40s (see Figure 13.10). Those who are aged 60 or above make up 15 per cent of the London resident population, but make only 7 per cent of cycle trips. This reflects in part the physical exertion required to cycle.

Figure 13.10 Cycle trips by age of trip-maker, London residents.

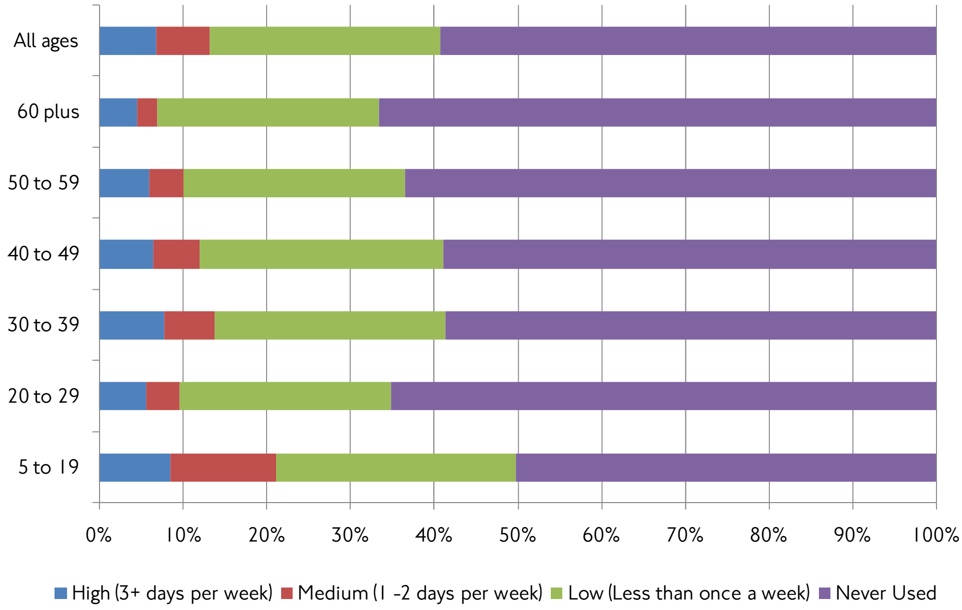


Source: London Travel Demand Survey 2005/06-2007/08

Analysis of cycling frequency by age shows a rather more complicated picture (see Figure 13.11). Clearly, children are the most likely to ever cycle and the most likely to cycle frequently: 21 per cent cycle at least once a week. For adults, the picture is more varied, with those aged 30 to 39 most likely to say they cycle very frequently (8 per cent cycle at least 3 days a week), but otherwise no clear pattern emerges.

Women are more likely than men to say they never cycle, with two thirds doing so. Half as many women as men said they cycle at least once a week (eight per cent and 16 per cent respectively). Evidence on attitudes to cycling shows that women are more likely to say that they find cycling unappealing (58 per cent in TfL's 2009 Attitudes to Cycling Survey) and, if they do cycle, are more likely to avoid cycling after dark or to change their route than male cyclists. Women also tend to express greater concern about 'looking silly' when cycling and about being able to shower and change at their destination.

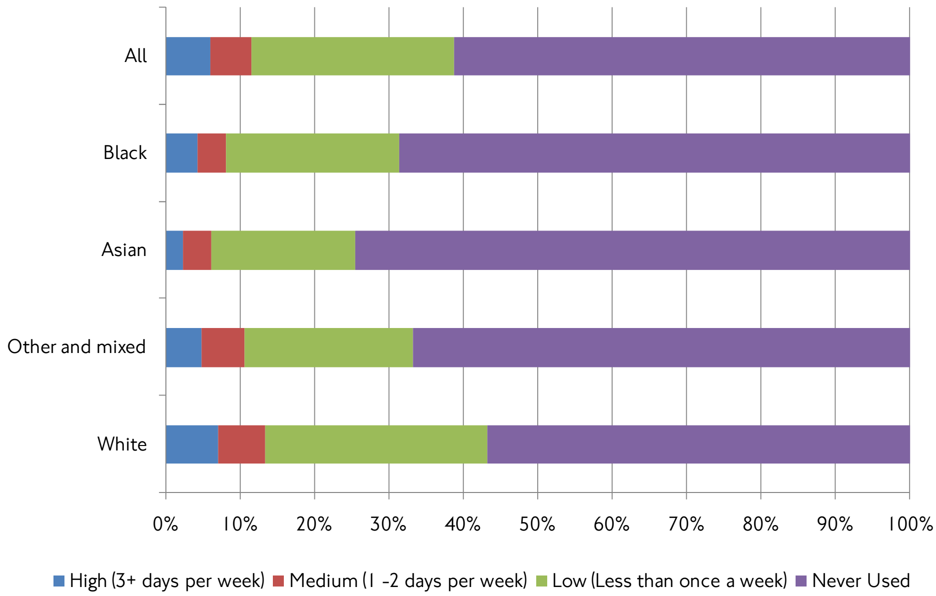
Figure 13.11 London residents by frequency of travel by bicycle and age.



Source: London Travel Demand Survey 2005/06-2007/08

White Londoners are more likely to cycle than those from an ethnic minority group, and in particular Asian residents are the least like to cycle, with only a quarter saying they ever cycle and just 6 per cent cycling at least once a week (see Figure 13.12). Despite this, TfL's Attitudes to Cycling survey found that people from ethnic minorities were equally likely to say that they find cycling appealing.

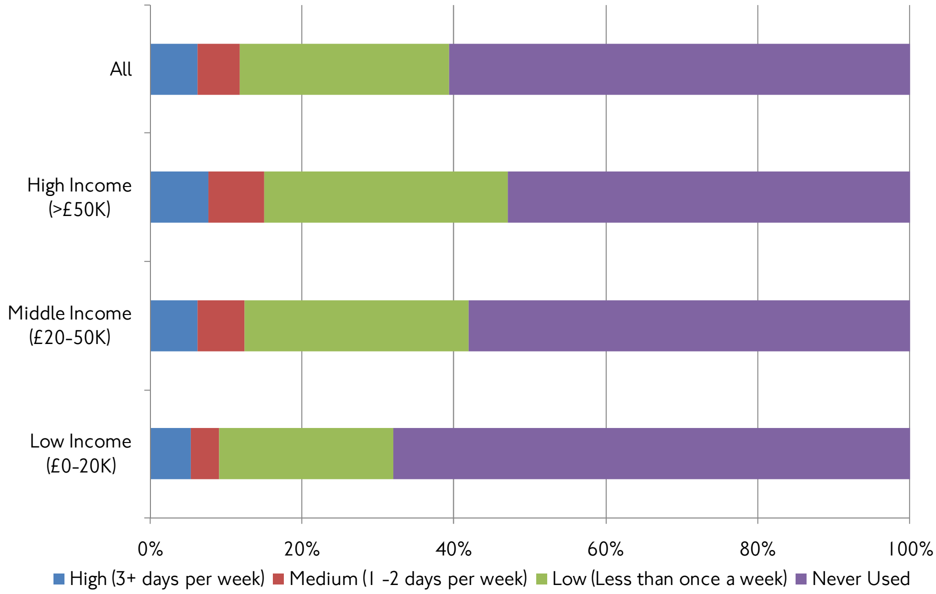
Figure 13.12 London residents by frequency of travel by bicycle and ethnicity.



Source: London Travel Demand Survey 2005/06-2007/08

Although cycling is often considered a low cost mode of transport, it is predominantly used by those on a higher income. Fifteen per cent of London residents with an annual household income of £50,000 or more cycle at least once a week, compared to only 9 per cent of residents with a household income of less than £20,000 per year (see Figure 13.13). This may suggest that a more sophisticated understanding of the cost of cycling is needed, or may reflect other barriers to travel by bicycle among low income groups, such as fear of crime and anti social behaviour, or concerns about image.

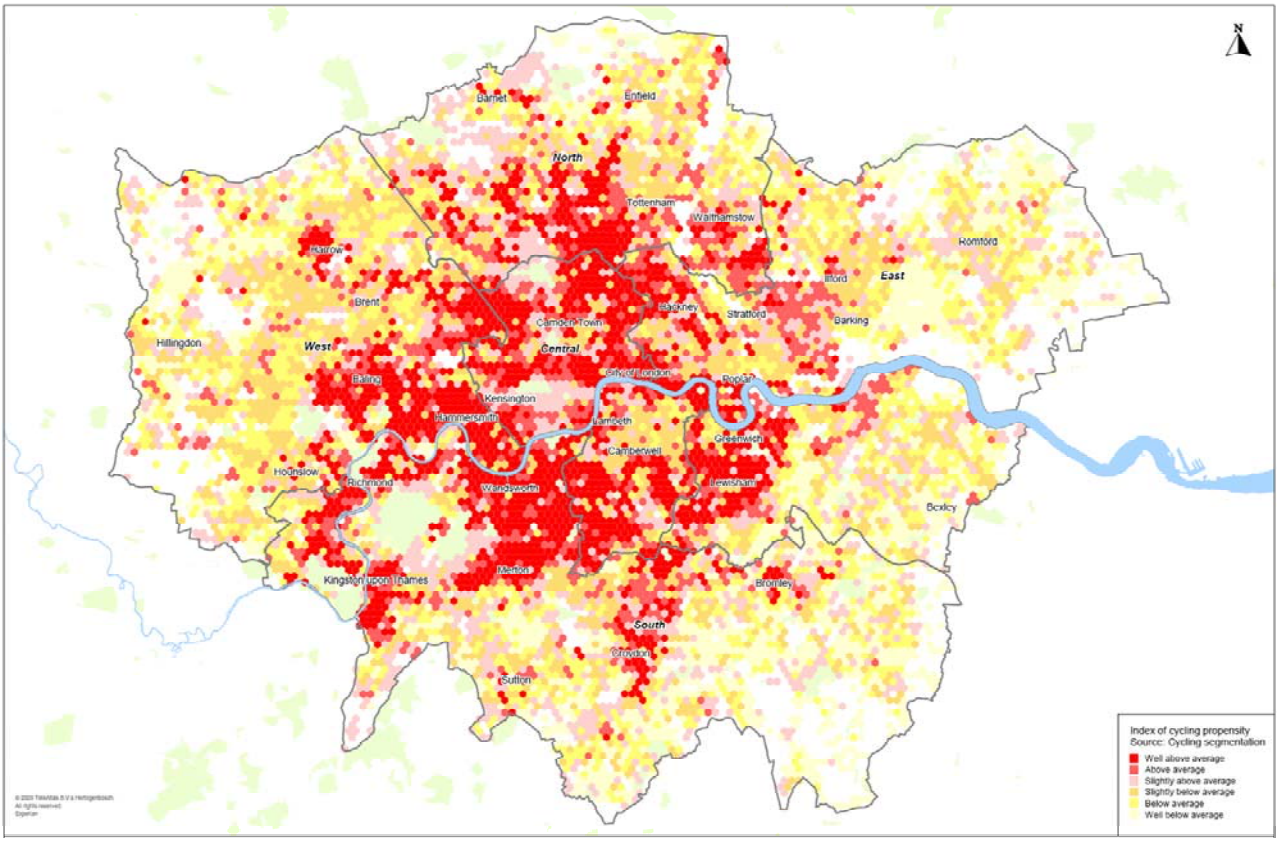
Figure 13.13 London residents by frequency of travel by bicycle and household income.



Source: London Travel Demand Survey 2005/06-2007/08

It is evident that cycling behaviour varies significantly between different groups of the population and different areas of London. TfL has commissioned a 'cycling market segmentation study' in order to understand more fully which groups in the population are most likely to cycle at present or would be most amenable to cycling in future. The analysis draws together evidence from the LTDS survey as presented above, Experian's MOSAIC database and TfL's market segmentation study, a survey of around 5,000 London residents exploring travel behaviour, demographics, attitudes and lifestyle choices. Figure 13.14 shows the propensity to cycle, based on postcode area across London. This shows that those with the greatest propensity to cycle live in Inner London, and in Outer London in the south west and south. The propensity to cycle is low in the south east and east of London.

Figure 13.14 Map of the propensity to cycle of London residents.



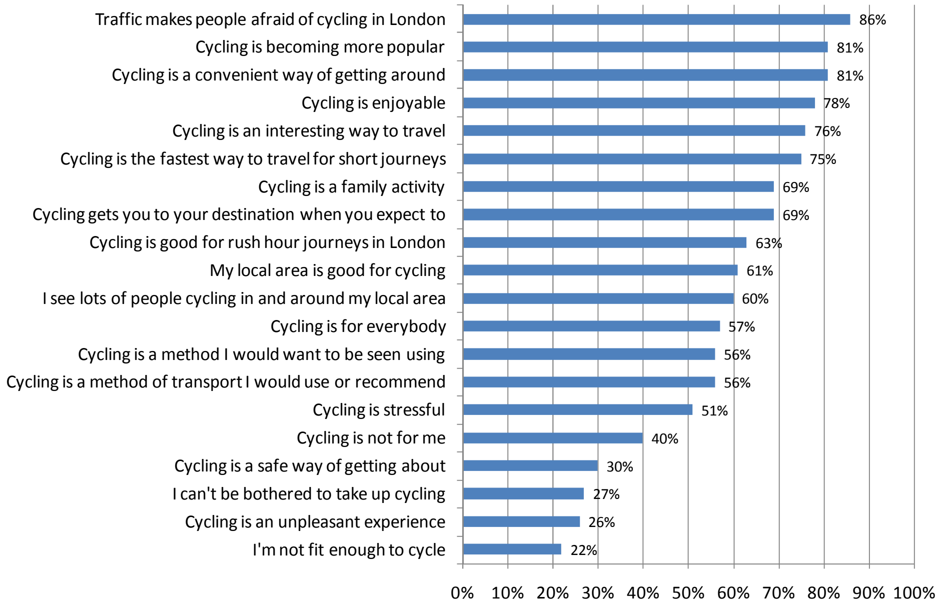
Source: Cycling Market Segmentation 2009

13.5 Understanding attitudes to cycling and overcoming the barriers

Understanding attitudes to cycling

TfL's Attitudes to Cycling Survey is carried out annually with a representative sample of around 1,000 adult London residents and around 50 children. Generally most people hold positive attitudes to cycling, agreeing that it is a convenient, enjoyable and fast way to travel. As shown in Figure 13.15, around 4 in 5 London residents surveyed agree that cycling is becoming more popular and the same proportion that it is a convenient way of getting around; this proportion has significantly increased, from 74 per cent and 76 per cent respectively, in 2008. There has also been a significant decrease in the proportion of respondents stating that cycling is stressful (51 per compared to 61 per cent in 2008) and an unpleasant experience (26 per cent compared to 38 per cent in 2008).

Figure 13.15 Attitudes to cycling, London residents.



Source: Attitudes to Cycling 2009

Although more than half of London residents surveyed agreed that cycling is a mode they would want to be seen using and would use or recommend, it is notable that fewer agreed that cyclists are 'like them' (37 per cent) and around half agreed that cyclists are dangerous and not law abiding (49 per cent and 46 per cent, respectively). None the less, attitudes towards cyclists have improved during the past 12 months.

Cycle safety and fear of traffic

It appears that the greatest barrier to cycling in London is fear of traffic, with 86 per cent of respondents agreeing that traffic makes people afraid of cycling in London. This does not, of course, necessarily mean that they themselves are put off cycling by traffic levels, but it does indicate the strength of feeling in this area. Most existing cyclists say that they feel safe from traffic on quiet roads (78 per cent) but not very or at all safe on busy roads (65 per cent).

As discussed in chapter 6 of this report, there were 445 pedal cycle casualties in 2008, a 21 per cent drop from the 1994 to 1998 average of 567. Over the same period, counts of cycle flows on the TLRN have increased by 107 per cent. Thus, the casualty rate for cyclists has dropped disproportionately and cycling is significantly safer than in the late 1990s. There are some signs, however, that this positive trend is starting to reverse, as cycle casualties rose by 7.8 per cent between 2007 and 2008. This situation will be monitored closely. It is also the case that, despite significant improvements, cyclists are more likely than users of mechanised modes to be killed or seriously injured; cyclists make up 13 per cent of casualties but only 2 per cent of trips.

Overcoming the barriers to cycling

London residents are typically quite positive about the appeal of cycling, with 1 in 4 non-cyclists stating that they intend, or are quite likely to, take up cycling in the next 12 months (Attitudes to Cycling Survey 2009). The main reasons given for this were to get fitter (51 per cent), save money (20 per cent), enjoy the good weather (18 per cent) and to save time (18 per cent). Nevertheless, evidence from past years shows it is only to a very limited extent that these intentions are converted into real behavioural change, and there is some evidence that much of the increase in cycle activity in recent years can be explained by current cyclists cycling more frequently, rather than a substantial increase in the proportion of the population who ever cycle. In particular, LTDS showed an increase of only 3 per cent in the number of cyclists between 2005/06 and 2008/09 (40,000 people), from 1.39 million to 1.43 million, but an increase of nearly 50 per cent in the proportion of these who were frequent cyclists, from 26 per cent to 38 per cent.

Qualitative research carried out with people who said that they would possibly or definitely consider cycling in the next 12 months highlighted a number of barriers preventing people from realising these intentions to change their behaviour. Despite recognising the benefits of cycling, the respondents were prevented from doing so by apathy, reflected in the presentation of contradictory and somewhat irrational reasons for not acting on their intentions, as well as an array of interrelated attitudinal and practical barriers. These varied by life stage, with younger respondents more concerned about image ('it's for kids'), the effect on their social life, cost and physical appearance, and older respondents affected by lack of confidence, fear, perceived and actual lack of physical fitness, perceptions of 'what cyclists are like', and lack of practical infrastructure.

Further qualitative research carried out with those who had started cycling recently found that new cyclists had typically spent a long time 'considering' cycling, but had been put off by a number of barriers until a specific experience or event had triggered the change. In the event, it appeared that once this trigger had prompted the change in behaviour, the preparation phase was quick and fairly unplanned, with little use made of support services available (although note that the sample for this research was very small and cannot be considered representative). Those surveyed did not tend to view themselves as 'cyclists' and were not necessarily strongly committed to maintaining the change in behaviour and continue or increase the amount they cycled.

It is clear that people are most likely to start cycling if they believe the benefits outweigh the disbenefits, have the knowledge and skills to cycle safely, and also experience some sort of prompt to change their behaviour. This prompt may come from change in their own life, such as a change in financial circumstances, a job or home move; from a change in their attitudes, for example, a decision to get fit or reduce the household carbon footprint; or from a change in the transport environment, such as the introduction of a new cycling initiative in their local area, or a worsening of their journey conditions when travelling by other modes.

13.6 Walking travel patterns

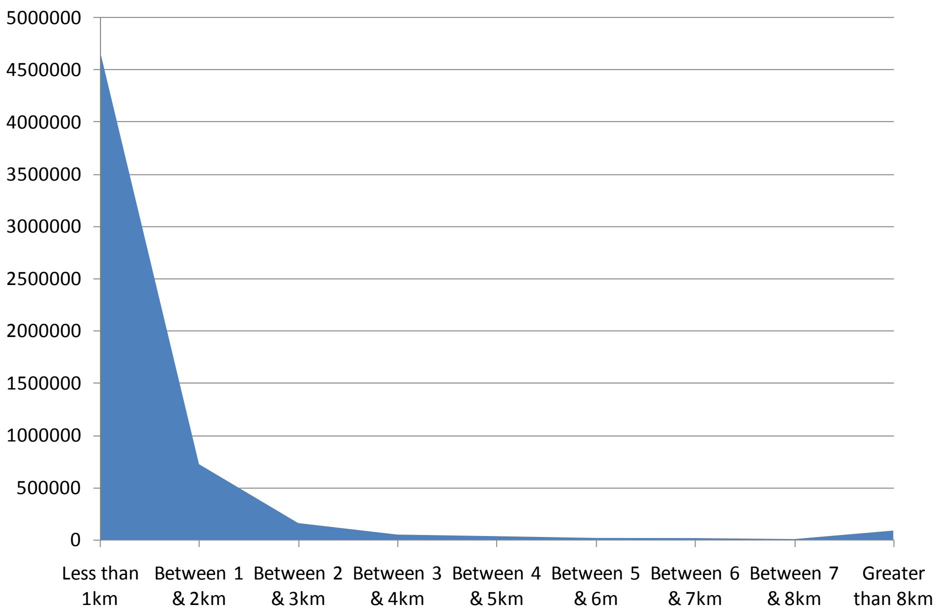
Trips made on foot in Greater London

Walking is a near-universal experience. Almost all London residents, workers and visitors walk for at least part of a trip on most days of the week. As described in chapter 2 of this report, the walking mode share for trips made in Greater London was 24 per cent in 2008, representing 5.7 million walk trips a day. The mode share for walking has remained fairly stable over time, with evidence of a small decline in the early 1990s, from 25 per cent in 1993 to 24 per cent throughout the 2000s. This estimate does not take account of walking by non-residents, for which there is no survey source. Walking accounts for 30 per cent of London residents' trips. In addition, many trips made by other modes as the main mode will include walk stages, to and from stations, bus stops and car parks and while interchanging between modes. Walk trips are typically under-reported by respondents when reporting their travel in diary surveys, and despite efforts to overcome this in the survey methodology and administration, it is reasonable to assume that the importance of walking as a mode of travel is even greater than these statistics show.

Trips made on foot by London residents

Three in 10 trips made by London residents are walked all the way. These are primarily short trips, with 8 in 10 one kilometre or less and 6 in 10 taking less than 10 minutes. Figure 13.16 shows the distribution of walk trips by distance.

Figure 13.16 Walk trips by distance, London residents.

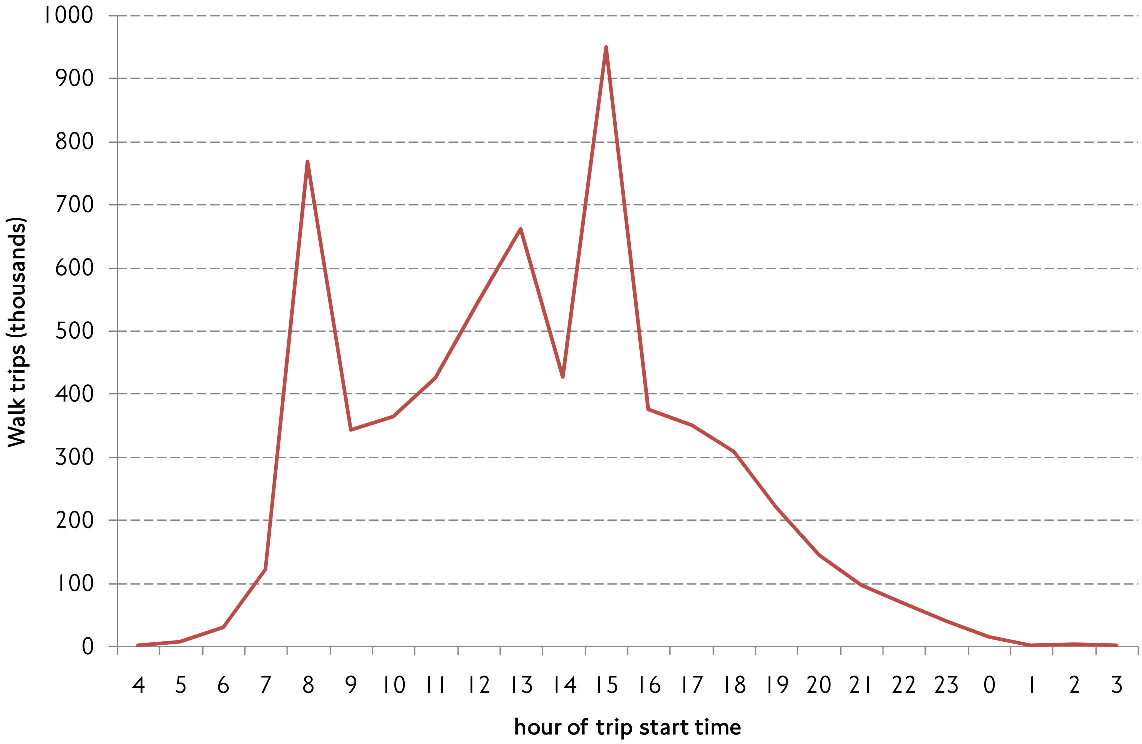


Source: London Travel Demand Survey 2005/06-2007/08

Most walk trips are undertaken during normal daylight hours, with 90 per cent made between 7am and 7pm. As seen in Figure 13.17, walk trips on weekdays show similar morning and afternoon peaks to trips by mechanised modes, although the afternoon peak is earlier in the day, between 3pm and 4pm. This reflects the high proportion of walk trips made for education purposes (19 per cent, as shown in Figure 13.18). There is, in addition, a further peak of lunchtime walks in the middle of the day, between 1pm and 2pm.

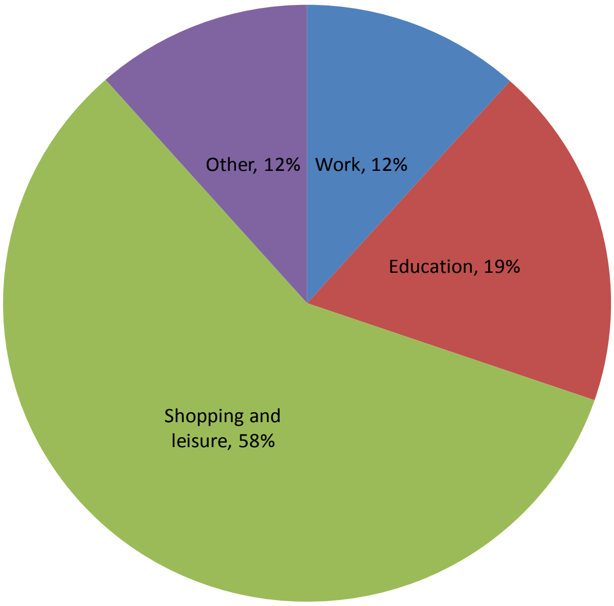
Unlike cycling, a relatively low proportion of walk trips are made for work (12 per cent), although the high overall mode share for walk means that this actually amounts to a greater absolute number of trips. Six in 10 walk trips are made for shopping and leisure purposes. The importance of walking for shopping and leisure purposes is also demonstrated by the fact that nearly a quarter (24 per cent) of all walk trips take place at the weekend, which can perhaps be explained by greater availability of time at the weekend, and also the tendency to spend time in the local area.

Figure 13.17 Number of walk trips by start time, weekdays only, London residents.



Source: London Travel Demand Survey 2005/06-2007/08

Figure 13.18 Walk trips by journey purpose, London residents.



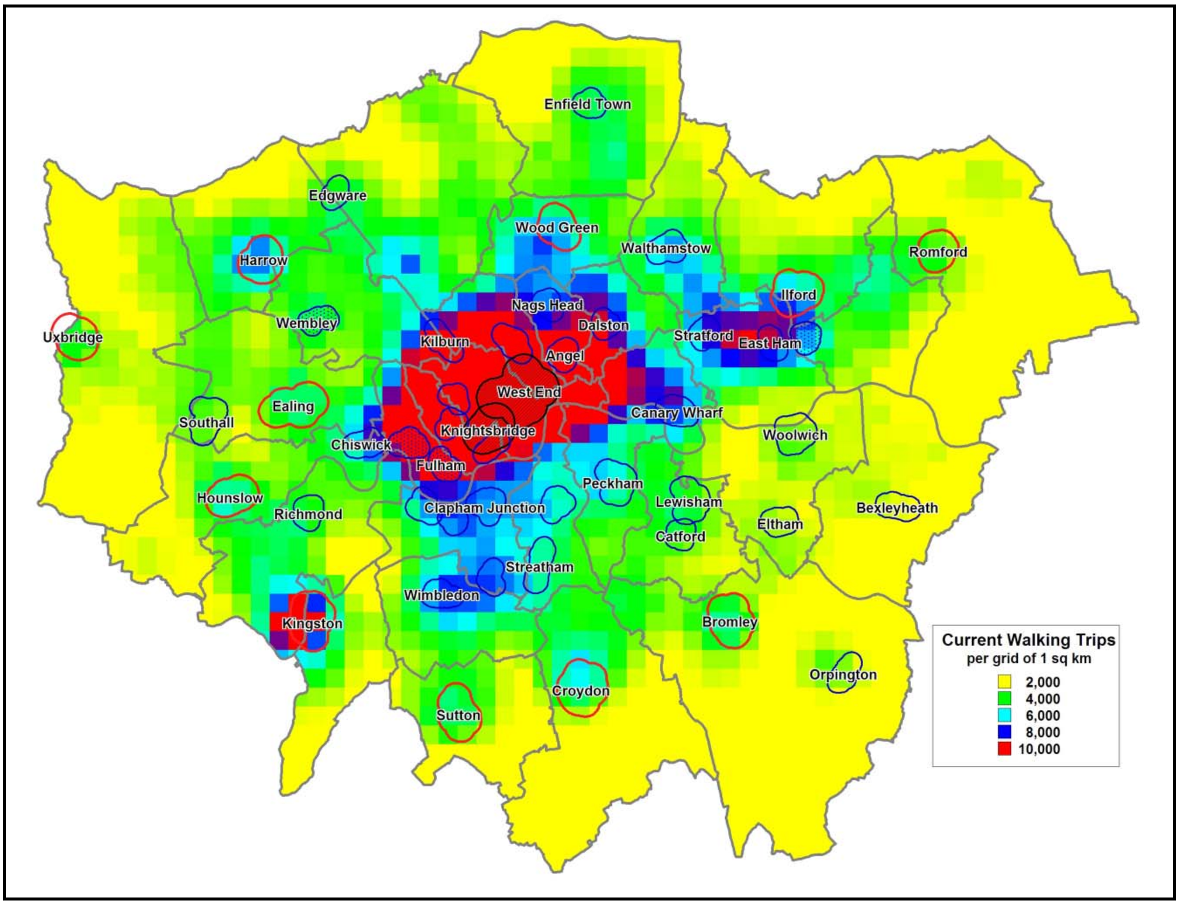
Source: London Travel Demand Survey 2005/06-2007/08

Origin and destination of walk trips

Walk trips tend to be short and only 4 per cent are longer than 3 kilometres. The vast majority of walk trips are therefore contained within one sub-region (95 per cent) and over 99 per cent of walks made by London residents with an origin or destination in London are wholly contained within the capital.

Figure 13.19 shows the density of walk trips by destination. Walk trips are densest in Central and Inner London, and around Outer London town centres such as Stratford, Ilford, Kingston and Wimbledon.

Figure 13.19 Map of walk trips by destination, London residents.



Source: London Travel Demand Survey 2005/06-2007/08

Walking in the London sub-regions

Across all sub-regions, the mode share for walking is similar, at around 3 in 10 trips (see Table 13.4). The mode share for walk is lowest in south London, where just over a quarter of trips are made on foot (26 per cent). A quarter of all walk trips have a destination in the central sub-region, of which 75 per cent are made by a resident of that sub-region. Three in 10 walk trips with a destination in the central sub-region are made in Westminster (464,000 trips), more than half of which are made by residents of the borough, a further 12 per cent by other residents of the central sub-region and around a third by residents of other London sub-regions. Note that this analysis includes trips made by London residents only, excluding workers and visitors resident outside the capital.

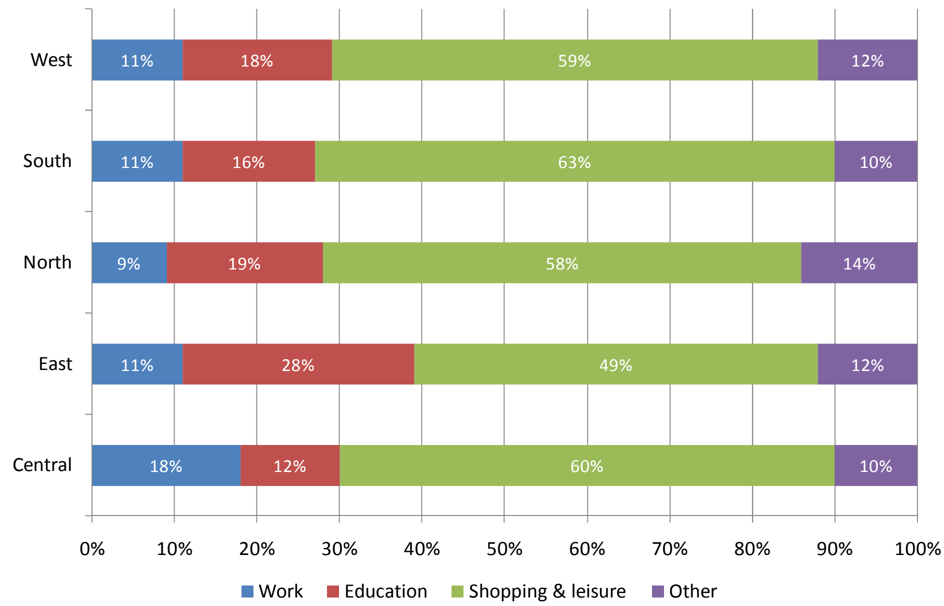
Table 13.4 Walk trips with an origin and/or destination in each sub-region, London residents.

London sub-region	Walk trips (millions)	Mode share	Proportion of total walk trips
Central	1.57	29%	27%
South	1.23	26%	21%
West	1.09	27%	19%
North	0.81	27%	14%
East	1.33	29%	23%
All London	**5.8**	**31%**	**100%**

Source: London Travel Demand Survey 2005/06-2007/08
Note that trips are with origins and/or destinations in each sub-region are included in the sub-regional totals. Therefore, trips that travel between one sub-region and another appear in the table twice and the sum of the sub-regional totals is greater than the London-wide total.

In central London, 18 per cent of walk trips are made for work purposes, whereas across all other sub-regions around 1 in 10 walk trips are made for work purposes (see Figure 13.20). In east London, a high proportion of walk trips are made for the purpose of travelling to school or college (28 per cent). However, across all sub-regions, the majority of walk trips are made for shopping and leisure purposes.

Figure 13.20 Walk trips by journey purpose and London sub-region, London residents.



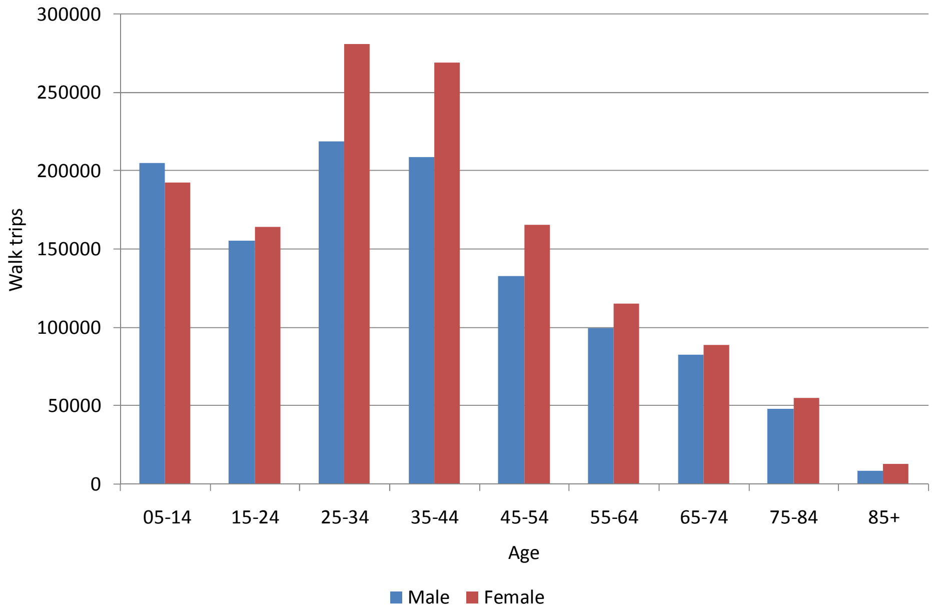
Source: London Travel Demand Survey 2005/06-2007/08

13.7 Profile of London walkers

Who walks?

Nearly everyone walks and every day about 2.5 million Londoners make a trip wholly on foot. Women are more likely to take a walk trip than men (54 per cent of walk trips are made by women), as can be seen in Figure 13.21. In particular women aged 25 to 34 are the most likely to make a walk trip.

Figure 13.21 Walk trips by age and gender, London residents.



Source: London Travel Demand Survey 2005/06-2007/08

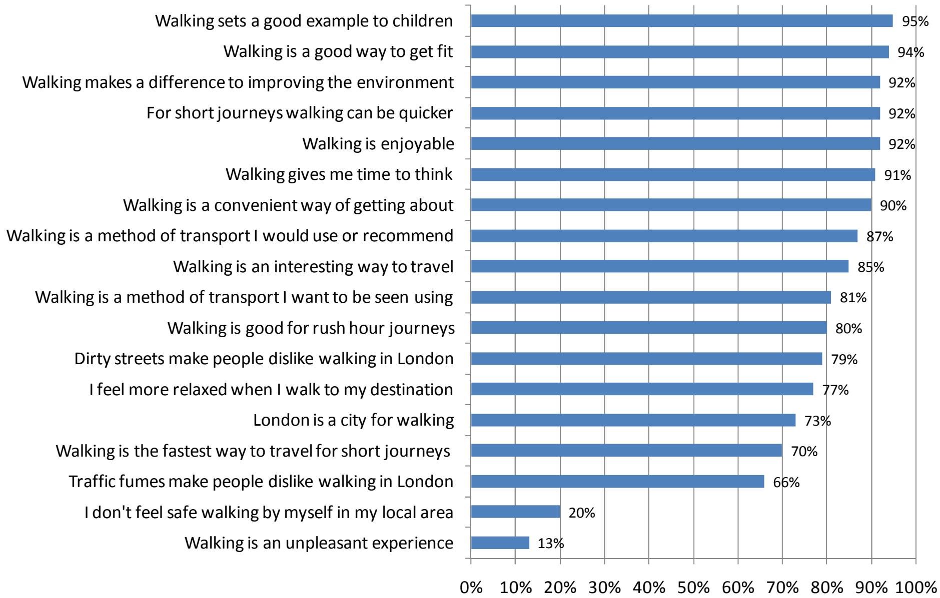
Walking is a low cost mode chosen by people who would rather take more time or travel less far than increase the cost of their trip. Consequently, people on a low income are also more likely to walk: 44 per cent of walk trips are made by people with a household income of less than £20,000 per year and those with an income of less than £10,000 per year make 40 per cent of their trips on foot. Overall, the propensity to walk is similar for people from minority ethnic and white communities, but some groups are more likely to walk than others. For example, people from Bangladeshi communities typically walk for more than half of their journeys. Walking is an accessible mode for most people, and 6 per cent of walk trips are made by people with a disability.

13.8 Understanding attitudes to walking and overcoming the barriers

Attitudes to walking

Walking and cycling are the only modes of transport which people commonly use simply for pleasure, rather than to get from A to B. Walking is the most popular leisure activity in the UK, with 77 per cent of adults walking for pleasure at least once a month. Qualitative research with London residents found that walking evoked a pleasant image of being outdoors, enjoying good weather and having space to think and bond with family and friends. Those who walk frequently view walking as an effective way of getting about, as well as a positive experience that they actively choose to build into their day. As shown in Figure 13.22, 9 in 10 London residents agree that walking is enjoyable, convenient, a good way to get fit and sets a good example to children. Few London residents say that walking in London is an unpleasant experience (15 per cent) or that they do not feel safe when walking in their local area (20 per cent). Survey respondents did tend to agree that traffic fumes and dirty, vandalised streets put people off walking.

Figure 13.22 Attitudes to walking, London residents.



Source: Attitudes to Walking Survey 2008

Overcoming the barriers to walking

Despite highly positive attitudes to walking, 27 per cent of trips of less than 1 kilometre are made by car, 1.7 million trips a day, and it is estimated that 20,000 trips that are made on the Underground every day would, in fact, be quicker to walk. For some journeys, walking is not a practical option, when travelling with small children or baggage, for example, or when making a series of linked trips, but for many journeys other barriers are preventing people from choosing to walk, summarised in Table 13.5. Three in 10 London residents say that they would definitely consider walking more during the next 12 months. The most common factors that would encourage people to walk more were if there were: more facilities in their local area (60 per cent), if the pavements were cleaner (59 per cent) and if they had better information on walks (57 per cent).

Table 13.5 Summary of barriers to walking.

	Image	Infrastructure
Knowledge	Perceived distance Perceived time it takes to walk Convenience of the car Lack of knowledge of location Not wanting/able to rely on maps	Lack of consistent way finding information Lack of landmarks for navigation Lack of information about time and distance on maps and signs
Safety	Fear of attack, especially after dark Fear of child abduction Fear of traffic	Poor lighting Litter and graffiti Poor maintenance of the urban realm Lack of safe places to cross the road
Other	Habitual nature of travel choices Time and convenience Not considering walking as an option Practical and emotional benefits of the car	Bad weather Pollution Carrying heavy baggage, shopping etc Complicated patterns of linked trips

Source: Walking in London 2008

Qualitative research carried out by TfL with London residents found that they felt time-poor and therefore wanted to travel in the most efficient way possible. Walking was perceived as less time efficient and convenient than other modes. Furthermore, people found it difficult to estimate the distance and time a journey would take. TfL's Attitudes to Walking Survey (2007) found that 18 per cent of respondents over-estimated the amount of time it would take to walk 1 mile by at least 4 minutes, with 5 per cent estimating that it would take 30 minutes or more. At typical walking pace, a journey of 1 mile should take between 15 and 17 minutes.

Traffic acts as a barrier to walking due to concerns about safety, noise and pollution. The reality of a utility walk trip in an urban environment can be far from the pleasant image evoked by walking for pleasure. In general, feelings of vulnerability prevent people from choosing to walk, especially after dark. Busy roads, intimidating people on the streets, and an unappealing urban environment were all seen by focus group respondents to contribute to feelings of vulnerability. In particular, the 2008 Attitudes to Walking Survey found that people from low income groups and people with a disability were more likely to say that they feel unsafe walking in their local area (33 per cent and 30 per cent respectively compared to 20 per cent overall).

Finally, the habitual nature of everyday travel choices, apathy and the ease of travelling by car all play a part in preventing people from choosing to walk even where it would be a practical option. Unlike cycling, nearly everyone walks and most hold positive attitudes towards walking, so the key to encouraging more walking is a combination of tackling the infrastructure barriers and helping Londoners to think about how they make short journeys.

Appendix A - Notes and definitions

A1 Administrative areas

Greater London: The area consisting of the 32 London boroughs and the City of London, and administered by the Greater London Authority.

For analysis purposes Greater London is split geographically into Inner and Outer London, using the following allocation of boroughs which is the same as that used for UK National Statistics by the Office for National Statistics:

> **Inner London** consists of the London boroughs of Camden, Hackney, Hammersmith & Fulham, Haringey, Islington, Kensington & Chelsea, Lambeth, Lewisham, Newham, Southwark, Tower Hamlets, Wandsworth, the City of Westminster, and City of London.
>
> **Outer London** consists of the London boroughs of Barking & Dagenham, Barnet, Bexley, Brent, Bromley, Croydon, Ealing, Enfield, Greenwich, Harrow, Havering, Hillingdon, Hounslow, Kingston upon Thames, Merton, Redbridge, Richmond upon Thames, Sutton, and Waltham Forest.

Inner London may be further divided into Central London (see below) and the rest of Inner London. When both Central and Inner London are shown in tables or figures, it should be understood that results for Inner London exclude Central London.

Central London (also known as the Greater London Conurbation Centre or Central Statistical Area) is an area roughly rectangular in shape, bounded by Regent's Park to the north, Whitechapel to the east, Elephant & Castle and Vauxhall to the South, and Kensington Gardens to the west. It is a larger area than the Central London Congestion Charging zone (excluding the Western Extension), and includes the Inner Ring Road and Paddington, Marylebone, Euston and King's Cross rail stations. It is equivalent (apart from minor boundary differences) to the Central Activities Zone (CAZ) as defined for the London Plan.

A2 London sub-regions

TfL's approach is that sub-regions have flexible boundaries, and boroughs will be in more than one sub-region where that makes sense to them – see chapter 10 of this report. For statistical purposes only, in order to ensure that journeys are captured only once, sub-regions are defined in this document as the following groupings of boroughs:

Central London sub-region: City of London, and the London boroughs of Camden, Islington, Kensington & Chelsea, Lambeth, Southwark and Westminster.

East London sub-region: The London boroughs of Barking & Dagenham, Bexley, Greenwich, Hackney, Havering, Lewisham, Newham, Redbridge and Tower Hamlets.

North London sub-region: The London boroughs of Barnet, Enfield, Haringey and Waltham Forest.

South London sub-region: The London boroughs of Bromley, Croydon, Kingston upon Thames, Merton, Richmond upon Thames, Sutton and Wandsworth.

West London sub-region: The London boroughs of Brent, Ealing, Hammersmith & Fulham, Harrow, Hillingdon and Hounslow.

A3 Travel – trips and journey stages

A trip is defined as a one-way movement from one place to another to achieve a single main purpose. Round trips are divided so that the return leg is treated as a separate trip. These definitions apply to data from interview surveys such as the London Area Transport Survey and the LTDS.

Trips may be further subdivided into journey stages, the component parts of a trip using a single mode of transport between interchanges. Walking is counted as a separate mode, but walks within single premises or between platforms at interchange stations are not included.

A4 Mode share

A single trip may use several methods or **modes** of transport, which divide the trip into its separate stages. In this way, trip rates can be analysed by **trip main mode**, based on distance: the main mode of a trip is the mode on which the greatest proportion of the total trip distance is travelled. In Tables 2.1 and 2.2 of the report a slightly different definition is used, namely the mode typically used for the longest distance part of the trip.

A5 Trip (or journey) purpose

The purpose of a trip is defined by the activity at the destination, except when the trip is returning home in which case the purpose is defined by the activity at the origin. The following purposes are defined:

Work/commuting – travel to, or from, the respondent's usual place of work;

Employer's business/other work – travel in course of work, or to work at a location that is not the respondent's usual workplace;

Education – travel as a pupil or student to or from school, college or university;

Escort education – accompanying a child to, or from, school;

Shopping and personal business – including shopping and use of services such as hairdressers, dry-cleaners, doctors, dentists, banks, solicitors, etc;

Leisure – travel to, or from, entertainment, sport or social activities;

Other (including escort) – all purposes not otherwise classified, including accompanying or meeting another person if that is the main purpose of the trip.

A6 Weekday time periods

AM peak – morning peak, 07:00 to 10:00.

Inter-peak – 10:00 to 16:00.

PM peak – evening peak, 16:00 to 19:00.

Evening – 19:00 to 22:00.

Night-time – 22:00 to 04:00.

Early am – 04:00 to 07:00.

A7 Work status

Working full-time: People in paid employment normally working for more than 30 hours a week.

Working part-time: People in paid employment working for not more than 30 hours a week.

Self-employed: Those who in their main employment work on their own account, whether or not they have any employees.

A8 Ticket types

Oyster card: A 'smart card' that can be used as a season ticket, such as bus passes and Travelcards, or to pay for travel on a pay as you go basis using credit held on the card. Travelcards on Oyster card are valid on Underground, DLR, trams and National Rail services within chosen zones and across the entire London bus network. Pay as you go is an alternative to paying cash for single or return fares and offers cheaper single fares, daily price capping and ticket extensions automatically. In addition to TfL's usual ticket outlets, season tickets can be renewed and pay as you go credit can be topped-up online or over the telephone.

Season ticket: A ticket valid for unlimited travel over a specified period of time either within specific fare zones or between specified origin and destination stations. A 'season ticket' can be valid for bus travel, National Rail travel, or a Travelcard which is valid for all modes detailed below.

Travelcard: A ticket valid for unlimited travel on National Rail, buses, DLR, London Tramlink and Underground, subject to certain conditions within specific fare zones and for a specified time period. Includes both Travelcard seasons (weekly, monthly or annual tickets) and One Day Travelcards. Underground and National Rail services within Greater London are divided into six fare zones; DLR services operate within Zones 1, 2 and 3. The cost of a ticket depends on the number of zones it covers. Zone 1 covers Central London, approximately the area served by the Circle line and the South Bank.

Bus Pass: A ticket valid for a specified time giving unlimited travel on London bus services. Bus Pass 'seasons' can be weekly, monthly or annual.

Freedom Pass: Concessionary pass issued free by local authorities to London residents aged 60 and above and disabled people, giving unlimited travel within Greater London by National Rail, DLR, London Tramlink, buses and Underground, subject to certain conditions.

Ordinary ticket: Valid for one specific trip (a single ticket) or for two trips to, and from, the same place (a return).

A9 Traffic cordons

Locations of traffic counts for monitoring long-run trends in traffic flows, are organised to form three cordons (see Figure 2.7 of this report):

Boundary cordon: Roughly corresponding to the boundary of Greater London and entirely within the M25 orbital motorway.

Inner cordon: Enclosing an area similar to the Inner London boroughs.

Central cordon: A cordon, enclosing Central London, situated outside the Inner Ring Road and within a radius of 2.5 to 3 kilometres from Aldwych.

A10 Prices

Retail price index (RPI): Measures the price of a constant basket of goods and services purchased by households in the UK. The RPI is available from the UK National Statistics website (www.statistics.gov.uk).

Headline Fares Index: Tracks the change in the Gross Yield, ie the direct effect of a fares revision assuming passengers would buy the same ticket but at the new fare. This does not allow for switching to other ticket types and is likely to overestimate the increase in average fare actually paid. To construct the index, the percentage increase in Gross Yield, deflated by the headline RPI, is applied to the Headline Fares Index from the previous year.

Real London Earnings: The actual gross weekly earnings of adults in full-time employment in Greater London deflated by headline RPI. Gross weekly earnings are based on the New Earnings Survey from 1971 to 1998 and the Annual Survey of Hours and Earnings from 1998/99 and are available from ONS.

Real prices and fares: current price levels converted to a common reference period by adjusting for the effects of inflation as measured by the RPI.

A11 PTAL

Public Transport Accessibility Level (PTAL) is a measure of public transport accessibility reflecting: the access time (by walking) from the point of interest to public transport service access points (for example, bus stops, stations) within a catchment area; the number of different services (eg bus routes, train services) operating at the service access points; and levels of service (ie average waiting times, with an adjustment for the relative reliability of different modes). These components are then used to calculate an accessibility index (PTAI) which is allocated to bands corresponding to Public Transport Accessibility Levels (PTALs). The levels 1a and 1b correspond to a ‘very poor’, 3 corresponds to ‘moderate’, 6a and 6b correspond to an ‘excellent’ level of public transport accessibility, and 0 refers to areas where there are no public transport services within the specified catchment area.

A12 Roads classification

Major roads: Include motorways and all class A (principal) roads.

TLRN: The Transport for London Road Network is those major roads in London for which TfL has direct responsibility, comprising 580 kilometres of London's red routes and other important streets.

Minor roads: B and C classified roads and unclassified roads.

Within London, the London boroughs are responsible for maintenance of minor roads and A roads not part of the TLRN.

A13 Glossary of principal sources of data

CAPC Central Area Peak Count: TfL estimates of people entering Central London in the morning peak period, derived from vehicle and passenger counts annually each autumn.

CAADC Central Area All Day Count: TfL estimates of people entering and leaving Central London across the working day, derived from vehicle and passenger counts. Undertaken for the first time in 2009.

LCF Living Costs and Food Survey (formerly the Expenditure and Food Survey): ONS survey of household expenditure with a sample of about 5,000 households per annum in the UK.

GLBPS Greater London Bus Passenger Survey: Quarterly sample survey of bus boarders on a sample of London bus routes, with associated counts for grossing, used principally for apportionment of Travelcard and Concessionary fare revenues.

IPS International Passenger Survey: ONS sample survey of passengers at UK ports and airports.

LATS London Area Transport Survey 2001: Interviewer-administered sample survey of 30,000 London households, carried out for TfL between January 2001 and April 2002. The survey included a one-day travel diary to collect data on London residents' weekday travel patterns. The data have been expanded to represent the household population of Greater London as measured by the 2001 Census of Population.

LTDS London Travel Demand Survey: Annual sample survey of 8,000 randomly selected households in London and the surrounding area. The survey design and methodology are similar to the LATS 2001 household survey.

LFS Labour Force Survey: ONS quarterly sample survey with a rolling sample of approximately 57,000 households in Great Britain, a major source of information on participation in the labour market.

UKTS United Kingdom Tourism Survey: Survey carried out by the National Tourist Board, of trips undertaken by UK residents. The main results are the number of trips taken, expenditure, and nights spent away from home.

UUS Underground Users Survey: On-platform interview sample survey for LU of more than 30,000 passengers in each two-year survey cycle. The survey measures usage of ticket types and collects passenger profiles in terms of socio-demographic, economic and other characteristics.

A14 Glossary of acronyms of organisations

TfL Transport for London

DfT Department for Transport

DLR Docklands Light Railway

GLA Greater London Authority

LBSL London Bus Services Limited

LRS London River Services

LUL London Underground Limited

(LBSL, LRS and LUL are wholly owned subsidiaries of TfL)

ONS Office for National Statistics

ORR Office of Rail Regulation

A15 Different measurements of travel

There are several different measures of travel in general use, with each able to provide certain unique insights. Much of chapter 2 of this report is based on the concepts of trips or journey stages, as these are most appropriate when considering total travel by both London residents and non-residents. The material in chapter 3, which focuses on London residents' travel through TfL's London Travel Demand Survey, provides the additional opportunity to look specifically at travel in terms of distance travelled and time spent on travelling, as well as the concept of 'tours' (see Appendix C). Further information on different measures of travel is given below.

Trips

The unit most commonly used to measure travel is the trip. A trip is the movement of an individual person from one place to another to achieve a specific purpose.

> This report prefers the term 'trip' to 'journey' and it always uses 'trip' when the complete movement from origin to destination is meant. This is to distinguish a trip from the related concept of a journey stage (see below). It must be recognised, however, that other reports may use 'journey' in either sense (trip or journey stage), for example, in speaking of bus journeys to mean passenger movements by bus. The reader therefore needs to exercise caution when comparing statistics from different sources.

Depending on the source of data, it may be possible to break down trips into different types of trip purpose: such as travel to and from work, education, shopping or personal business, and a variety of social and leisure activities. In a minority of cases the activity may itself be related to the process of travel. For example, people may make a trip, such as a coach excursion, simply for the pleasure of the journey. Another example would be going for a walk just for exercise. These are both leisure purposes.

Most trips are personal travel, because they are directly related to the needs, aims or objectives of the person making the trip. However, some travel, particularly some travel in course of work, is not considered personal travel: in these cases the purpose of the travel is not to get the traveller themselves to a destination, but to achieve some other objective unrelated to the person. Examples of non-personal travel are bus or taxi drivers when driving at work, and lorry drivers when delivering goods. These trips are routinely excluded from surveys of personal travel. However, if the driver is providing a service at the destination and not just delivering goods, then the trip is deemed to be personal travel.

Journey stages

A single trip may involve more than one mode of transport. For example, a trip to work may consist of a walk to the local station, a train ride to a central London terminus, use of the Underground to reach another part of town and, finally, a further walk from the nearest Underground station to the workplace. The purpose for the travel remains the same – to get to work – and the different modal components usually follow sequentially and immediately from each other, without significant activities being undertaken intermediately.

In this way, trips can be divided up into their component parts, described as journey stages (or just 'stages'). Broadly, a journey stage is a part of a trip that is undertaken by a single means of transport or mode. Thus, a walk to a station to catch a train to another station, followed by an Underground journey and a further walk to a workplace, is one trip consisting of four stages (one rail stage, one Underground stage, and two walk stages).

The precise definition of a journey stage depends on the particular mode of transport, and often reflects differences in the statistical data sources used. Most statistics relating to journey stages are collected through simply counting people at a convenient point in their journey. Counts at station entries (eg of Underground passengers) do not include passengers changing from one line to another within the station, so therefore a single Underground journey stage may consist of components undertaken on more than one Underground line. However, when changing from one bus to another, passengers are counted at each boarding and so each bus boarding is taken to be the start of a new journey stage.

Travel distance and travel time

Other measures of travel activity are the distance travelled and the time taken in travelling. These measures are interesting from several perspectives.

Lengths of individual trips vary considerably, from short walks to local shops to long distance national and international travel. Even within London, there is a wide disparity in journey lengths. Patterns of land use may determine whether people tend to make lots of short local trips as they work, shop and find their leisure activities in the same locality, or whether they make fewer but longer trips to different areas for work and for leisure. A measure in terms of numbers of trips alone could suggest that the former is leading to higher absolute levels of travel when in fact the reverse may be the case. Furthermore, initiatives to encourage walking and cycling need to recognise that these modes are particularly suited to shorter-distance trips, for example around Central London, and should be optimised accordingly.

Simply adding up trips or stages, therefore, misses some of the more subtle changes in travel and their effects. For many purposes, travel distance is a better measure of aggregate travel and of the resources used in travel. For a more complete understanding, however, it will still be necessary to break down the statistics by mode of transport.

Time spent travelling is another useful measure, particularly in understanding variations and trends in travel behaviour. People's travel 'time budget' refers to the amount of time they are prepared to devote to travelling on an average day. Over time, at the national level, mean travel time per person has tended to remain relatively constant while distance travelled has tended to increase, as long-distance travel has become easier with increasing levels of car ownership. Conversely, such constant time budgets may effectively set a limit to the potential for mode switching to slower modes of transport for the same trip.

Tours

Tours are defined as sequences of consecutive trips that a person performs, starting from one location and travelling to different destinations to undertake activities, until he or she returns to the original starting point only at the end of the tour.

It is usual to distinguish tours that start and end at home. Typically a person's travel pattern on a particular day consists of one or more tours as they start from home to go to their daily activities involving travelling between one or more destinations and finally typically travelling back to home.

A simple tour would be made up of just two trips, such as going to work in the morning and returning in the evening without making any other trips in between. This simple tour may be made more complex by adding other trips in a number of ways: examples would be travel in the course of work, or trips for non-work purposes in the lunch break. Parents may accompany a child to school (an 'escort trip') before themselves travelling on to work. Purposes such as shopping, leisure or recreation may also be made as sequences of trips forming a tour.

Appendix B – Borough Local Implementation Plan (LIP) performance indicators

B1 Monitoring of borough LIPs

Under Section 145 of the GLA Act 1999, each London borough is required to produce a Local Implementation Plan (LIP) setting out how they intend to contribute towards the implementation of the Mayor's Transport Strategy. As well as outlining the borough's local transport objectives, a LIP should detail the specific interventions and schemes intended to contribute towards meeting the MTS goals, challenges and opportunities. A clear strategy for monitoring performance should also be included. Boroughs are currently in the process of producing their second round LIPs, which are due to be effective from 2011.

As part of the process of monitoring LIPs, progress will be tracked against five strategic performance indicators on which boroughs are required to set locally specific targets. These five indicators - on mode share, bus service reliability, road traffic casualties, CO_2 emissions and asset (highway) condition - all relate to key priorities within the MTS over which London boroughs have a degree of influence. The data is also to be reported within TfL's Travel in London reports on an annual basis [subject to availability in the case of data on CO_2 emissions]. Data for each of the indicators will also be reported directly to boroughs on an annual basis as part of a wider liaison process on LIP delivery.

List of tables

Table B.1 Londoners' trips by borough of origin, trips per day and shares by main mode, average day (7-day week) 2006/07 to 2008/09

Three-year average data showing mode share for London residents for trips originating in borough. From TfL's London Travel Demand Survey.

Table B.2 Bus service reliability indicator: mean excess waiting time by borough, 1999/2000 and 2008/09

Data from TfL's iBus system.

Table B.3 Road casualties, number of people killed or seriously injured in road traffic accidents by borough, 2006 to 2008

Data from TfL's London Road Safety Unit, using the STATS 19 form.

Table B.4 CO_2 emissions by borough: principal sources and per capita emissions for resident population, 2008

Data from GLA's London Energy and Greenhouse Gas Inventory (LEGGI). This is planned to be updated on an approximately annual cycle. The data underpinning this indicator differs from that specified for National Indicator NI 186 in that the LEGGI inventory provides more detailed and appropriate data for use by London boroughs in the context of the implementation of the Mayor's Transport Strategy.

Table B.5 Highway Asset Condition

This indicator monitors the proportion of the principal road carriageway where maintenance should be considered and is based on Detailed Visual Inspection survey data.

Table B.1 Londoners' trips by borough of origin, trips per day and shares by main mode, average day (seven-day week) 2006/07 to 2008/09.

		Percentage of trips by main mode							
London borough	**Trips per day (000s)**	**Rail**	**Under-ground /DLR**	**Bus/ tram**	**Taxi/ Other**	**Car/ motor -cycle**	**Cycle**	**Walk**	**All modes**
Camden	717	5%	16%	15%	2%	19%	3%	39%	100%
City of London	242	19%	27%	7%	3%	6%	3%	35%	100%
Hackney	388	3%	5%	27%	2%	23%	3%	37%	100%
Hammersmith & Fulham	453	2%	15%	16%	2%	24%	4%	37%	100%
Haringey	451	2%	9%	21%	1%	34%	2%	31%	100%
Islington	468	5%	11%	23%	1%	17%	3%	40%	100%
Kensington & Chelsea	521	1%	13%	14%	3%	25%	4%	40%	100%
Lambeth	526	7%	9%	21%	1%	31%	3%	29%	100%
Lewisham	448	7%	2%	20%	1%	39%	2%	30%	100%
Newham	519	2%	8%	15%	2%	34%	1%	38%	100%
Southwark	531	6%	7%	21%	1%	31%	3%	32%	100%
Tower Hamlets	503	4%	17%	15%	1%	21%	2%	40%	100%
Wandsworth	593	6%	6%	16%	2%	36%	3%	31%	100%
Westminster	1,162	7%	20%	15%	3%	14%	3%	38%	100%
Inner London	**7,523**	**5%**	**12%**	**17%**	**2%**	**25%**	**3%**	**36%**	**100%**
Barking & Dagenham	309	2%	5%	15%	1%	40%	1%	37%	100%
Barnet	800	1%	5%	11%	1%	53%	1%	29%	100%
Bexley	369	4%	0%	9%	1%	60%	1%	25%	100%
Brent	596	2%	7%	15%	1%	42%	1%	31%	100%
Bromley	727	5%	0%	9%	1%	56%	1%	28%	100%
Croydon	681	5%	0%	16%	1%	52%	1%	24%	100%
Ealing	628	1%	8%	14%	1%	48%	1%	27%	100%
Enfield	572	2%	3%	15%	1%	50%	0%	28%	100%
Greenwich	393	5%	3%	17%	1%	46%	1%	27%	100%
Harrow	430	1%	6%	10%	0%	52%	1%	30%	100%
Havering	469	4%	2%	12%	1%	60%	1%	20%	100%
Hillingdon	640	1%	5%	12%	2%	54%	2%	25%	100%
Hounslow	508	3%	4%	15%	1%	47%	3%	29%	100%
Kingston upon Thames	415	5%	0%	11%	1%	48%	2%	33%	100%
Merton	445	5%	4%	11%	1%	44%	1%	33%	100%
Redbridge	539	2%	5%	10%	0%	53%	1%	28%	100%
Richmond upon Thames	450	6%	2%	11%	1%	44%	4%	32%	100%
Sutton	370	4%	1%	11%	1%	58%	1%	25%	100%
Waltham Forest	429	2%	7%	13%	1%	43%	1%	32%	100%
Outer London	**9,772**	**3%**	**4%**	**13%**	**1%**	**50%**	**1%**	**28%**	**100%**
Greater London	**17,294**	**4%**	**7%**	**15%**	**1%**	**39%**	**2%**	**31%**	**100%**

Table B.2 Bus service reliability indicator: mean excess waiting time by borough, 1999/2000 and 2008/09.

London borough	1999/2000 EWT	2008/2009 EWT	Percentage change
Barking & Dagenham	1.60	1.13	-29%
Barnet	2.10	1.02	-51%
Bexley	1.48	1.08	-27%
Brent	2.26	1.21	-46%
Bromley	1.88	1.04	-45%
Camden	2.33	1.25	-46%
City of London	2.31	1.27	-45%
Croydon	1.96	0.98	-50%
Ealing	2.13	1.15	-46%
Enfield	2.02	0.97	-52%
Greenwich	1.74	1.20	-31%
Hackney	2.16	1.28	-41%
Hammersmith & Fulham	2.44	1.10	-55%
Haringey	2.12	1.02	-52%
Harrow	2.00	1.00	-50%
Havering	1.33	0.95	-29%
Hillingdon	2.15	0.99	-54%
Hounslow	1.96	1.01	-48%
Islington	2.13	1.17	-45%
Kensington & Chelsea	2.51	1.18	-53%
Kingston upon Thames	1.81	0.95	-48%
Lambeth	2.34	1.20	-49%
Lewisham	2.21	1.21	-45%
Merton	2.08	1.03	-50%
Newham	1.84	1.16	-37%
Redbridge	1.90	1.23	-35%
Richmond upon Thames	1.96	1.06	-46%
Southwark	2.28	1.20	-47%
Sutton	1.87	0.92	-51%
Tower Hamlets	2.08	1.35	-35%
Waltham Forest	1.76	1.19	-32%
Wandsworth	2.32	1.07	-54%
Westminster	2.35	1.25	-47%
Greater London	**2.07**	**1.13**	**-45%**

Table B.3 Road casualties, number of people killed or seriously injured in road traffic accidents by borough, 2007 and 2008.

London borough	Year					% change from	
	1994-1998 average	2006	2007	2008	2006 to 2008 average	2007 to 2008	1994-1998 average to 2008
Barking & Dagenham	150	67	60	63	63	5%	-58%
Barnet	268	147	158	136	147	-14%	-49%
Bexley	146	103	105	73	94	-30%	-50%
Brent	244	107	98	97	101	-1%	-60%
Bromley	241	163	143	140	149	-2%	-42%
Camden	249	123	105	123	117	17%	-51%
City of London	64	61	48	51	53	6%	-21%
Croydon	246	149	158	132	146	-16%	-47%
Ealing	287	147	137	113	132	-18%	-61%
Enfield	235	135	98	85	106	-13%	-64%
Greenwich	200	122	130	126	126	-3%	-37%
Hackney	208	117	127	162	135	28%	-22%
Hammersmith & Fulham	149	133	103	94	110	-9%	-37%
Haringey	160	117	78	80	92	3%	-50%
Harrow	121	58	55	52	55	-5%	-57%
Havering	211	120	129	84	111	-35%	-60%
Hillingdon	255	110	116	107	111	-8%	-58%
Hounslow	226	146	103	102	117	-1%	-55%
Islington	185	81	112	75	89	-33%	-60%
Kensington & Chelsea	170	114	120	113	116	-6%	-34%
Kingston upon Thames	124	77	49	65	64	33%	-48%
Lambeth	312	195	185	164	181	-11%	-48%
Lewisham	206	132	124	113	123	-9%	-45%
Merton	130	74	62	64	67	3%	-51%
Newham	189	75	105	88	89	-16%	-54%
Redbridge	187	98	96	83	92	-14%	-56%
Richmond upon Thames	135	103	76	64	81	-16%	-53%
Southwark	239	138	139	165	147	19%	-31%
Sutton	116	83	70	74	76	6%	-36%
Tower Hamlets	186	124	151	146	140	-3%	-22%
Waltham Forest	169	100	92	104	99	13%	-39%
Wandsworth	254	134	166	116	139	-30%	-54%
Westminster	408	293	286	272	284	-5%	-33%
Greater London	**6,684**	**3,946**	**3,784**	**3,526**	**3,752**	**-7%**	**-47%**

Table B.4 CO_2 emissions by borough: principal sources (thousands of tonnes per year) and per capita emissions (tonnes) for resident population, 2008.

London Borough	Non-transport	Road transport	Ground-based aviation	Other transport	Total emissions	Total ground-based transport	Population ('000s)	Total tonnes per capita	Ground based transport tonnes per capita
Barking & Dagenham	682	150	-	7	839	157	169	5.0	0.9
Barnet	1,252	385	0.2	17	1,654	402	332	5.0	1.2
Bexley	917	220	5.9	6	1,149	232	223	5.2	1.0
Brent	1,114	213	0.2	18	1,345	231	271	5.0	0.9
Bromley	1,096	276	1.5	5	1,379	283	303	4.6	0.9
Camden	1,251	156	-	16	1,423	172	236	6.0	0.7
City of London	1,176	48	-	0	1,224	48	8	153.0	6.0
Croydon	1,291	263	0.3	6	1,560	269	342	4.6	0.8
Ealing	1,194	290	47.0	57	1,588	394	309	5.1	1.3
Enfield	1,178	333	0.1	3	1,514	336	288	5.3	1.2
Greenwich	834	217	3.1	3	1,057	223	223	4.7	1.0
Hackney	721	129	-	3	852	131	212	4.0	0.6
Hammersmith & Fulham	980	139	0.5	16	1,135	155	172	6.6	0.9
Haringey	807	158	-	5	971	164	226	4.3	0.7
Harrow	771	152	0.3	7	930	159	216	4.3	0.7
Havering	848	344	3.8	8	1,203	355	230	5.2	1.5
Hillingdon	1,523	387	1,134.3	42	3,086	1,563	253	12.2	6.2
Hounslow	1,182	312	41.8	2	1,538	356	223	6.9	1.6
Islington	1,067	126	-	4	1,197	130	191	6.3	0.7
Kensington & Chelsea	972	114	0.6	12	1,098	126	180	6.1	0.7
Kingston	532	175	-	2	709	177	160	4.4	1.1
Lambeth	1,026	176	-	5	1,206	180	275	4.4	0.7
Lewisham	896	189	-	7	1,092	196	262	4.2	0.7
Merton	736	161	-	3	900	164	201	4.5	0.8
Newham	1,110	192	36.8	6	1,345	235	250	5.4	0.9
Redbridge	767	263	0.0	3	1,032	266	258	4.0	1.0
Richmond	821	197	96.7	1	1,116	295	180	6.2	1.6
Southwark	1,776	222	0.8	4	2,002	227	278	7.2	0.8
Sutton	631	120	0.0	0	752	121	188	4.0	0.6
Tower Hamlets	2,090	204	11.4	3	2,308	218	221	10.4	1.0
Waltham Forest	773	175	-	2	950	177	223	4.3	0.8
Wandsworth	1,071	209	-	6	1,286	214	284	4.5	0.8
Westminster	2,967	294	1.5	12	3,275	307	236	13.9	1.3
Greater London	**36,053**	**6,986**	**1,387**	**289**	**44,715**	**8,662**	**7,623**	**5.9**	**1.1**

Table B.5 Highway Asset Condition - the percentage length of network which is in poor overall condition and requires maintenance based on Detailed Visual Inspection survey data.

London Borough	Year				
	2004	2005	2006	2007	2008
Barking & Dagenham	7	3	3	2	2
Barnet	7	7	4	4	3
Bexley	14	12	7	7	5
Brent	11	9	7	6	6
Bromley	17	13	9	7	5
Camden	14	13	10	11	8
City of London	6	16	12	11	11
Croydon	4	3	2	2	2
Ealing	11	14	10	8	8
Enfield	13	12	9	8	7
Greenwich	9	11	8	6	5
Hackney	16	13	10	6	5
Hammersmith & Fulham	9	12	9	7	6
Haringey	8	7	6	6	5
Harrow	11	9	7	5	5
Havering	7	6	3	2	2
Hillingdon	10	6	5	4	4
Hounslow	3	4	3	3	3
Islington	17	13	10	10	7
Kensington & Chelsea	3	5	4	4	3
Kingston	3	2	2	2	2
Lambeth	14	16	13	13	8
Lewisham	8	9	6	6	6
Merton	9	7	5	4	3
Newham	8	8	6	4	3
Redbridge	8	5	4	2	2
Richmond	19	20	17	13	12
Southwark	15	17	12	13	12
Sutton	2	4	4	4	3
Tower Hamlets	6	14	11	12	7
Waltham Forest	15	12	9	7	5
Wandsworth	7	4	3	3	3
Westminster	3	3	4	3	3
Greater London	**10.0**	**9.1**	**6.8**	**5.9**	**4.9**

Appendix C - Further information on travel by London residents

C1 Introduction

This Appendix provides additional information relating to the travel behaviour of Londoners from TfL's LTDS survey – extending the material discussed in chapter 3 of this report.

C2 Travel by Londoners – day of week and time of day

Patterns of trip making by Londoners differ depending on the time of day and day of the week. This is particularly evident in the difference between weekday and weekend travel, as well as how trip purposes vary by time of day. The main distinguishing features are the twin morning and afternoon weekday peaks, associated with work and education trips, compared to a single peak in the middle of the day at weekends, associated with shopping and leisure related trips. This edition of Travel in London looks in particular at the differences in modes used by residents on weekdays and weekends, and at travel in the inter-peak period, considering also how these aspects have changed in 2008/09.

Day of week

Looked at as an average over the preceding three LTDS survey cycles, Londoners make more trips on weekdays than on weekends. Trip rates are around 6 per cent higher on an average weekday than on an 'average day' (ie including weekends). A greater proportion of weekday trips are made using public transport modes, reflecting the greater number of commuting trips made in the week.

On an average Saturday, Londoners made around 7 per cent fewer trips than on an average weekday, with an average Sunday seeing around 25 per cent fewer trips. Interestingly, the weekend sees fewer trips by all modes of transport except for car. On an average weekday, there are around 7.1 million car trips made by London residents, compared with 8.3 million on a Saturday and 7.4 million on a Sunday. This difference is due to higher numbers of car passenger trips at the weekend, implying higher levels of car occupancy rather than an increase in road traffic.

As previously highlighted, the total number of trips made in 2008/09 is lower across all days than the 2006 to 2009 average. This is particularly true for Sundays, where there were 1.2 million fewer trips in 2008/09 compared with the three-year average.

Time of day

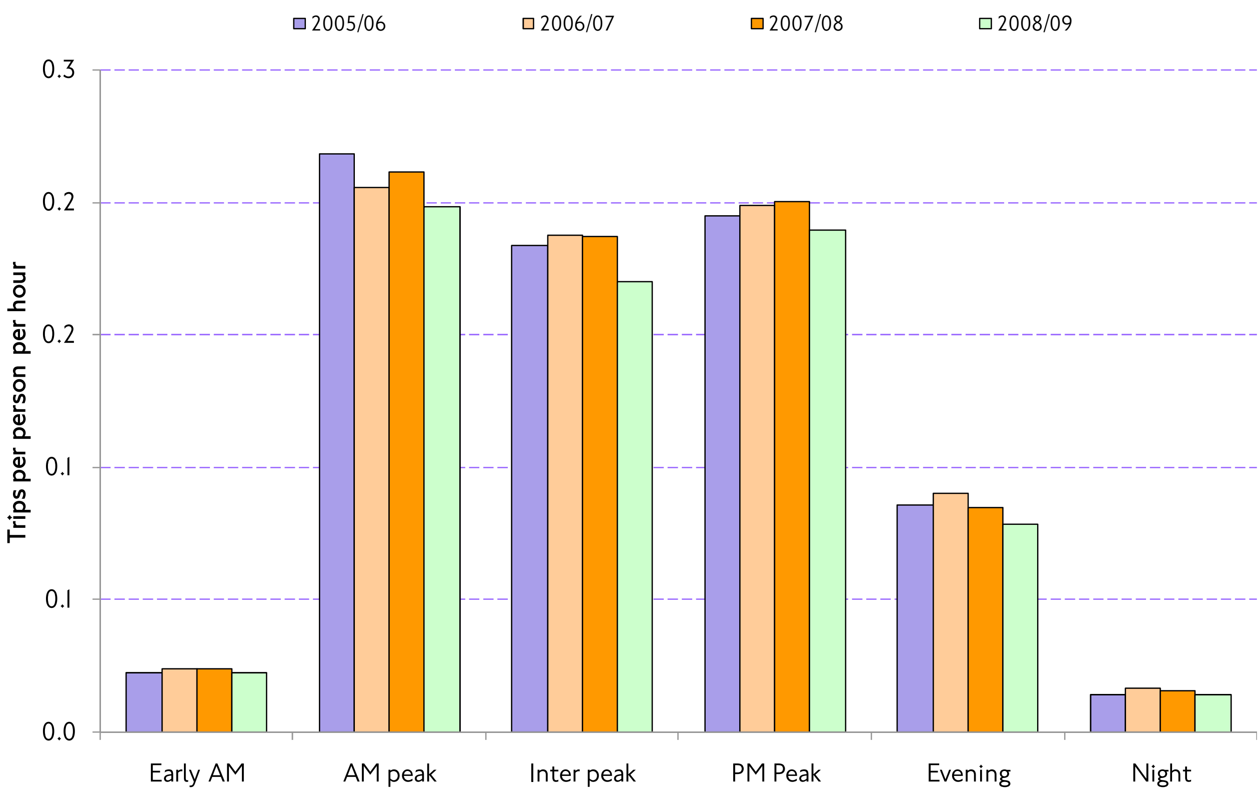
On an average weekday, Londoners make just under half their trips (45 per cent) in the peak periods (7am to10am and 4pm to 7pm), with around a fifth of trips starting in each period, but a slightly higher proportion in the morning peak. About 40 per cent of trips started in the inter-peak period (between 10am and 4pm). However, trip rates have fallen at a greater rate in the inter-peak period, and were around 9 per cent lower in 2008/09 than in 2007/08 (Figure C.1).

Table C.1 Estimated total number of trips by London residents, 2006/07 to 2008/09 average values, millions.

Mode	No. of trips – weekday	No. of trips – Saturday	No. of trips – Sunday	No. of trips – average day
Rail	0.9	0.4	0.3	0.8
Underground or DLR	1.5	1.0	0.6	1.3
Bus	2.9	2.3	1.5	2.6
Taxi and other public	0.2	0.3	0.2	0.2
Car driver	5.1	4.9	4.1	4.9
Car passenger	2.0	3.4	3.2	2.4
Cycle	0.4	0.2	0.2	0.3
Walk	6.1	5.3	4.3	5.7
All modes (2006 to 2009 average)	**19.1**	**17.8**	**14.4**	**18.1**
All modes (2008/09 only)	**18.0**	**16.9**	**13.2**	**17.0**

Source: TfL Planning, LTDS

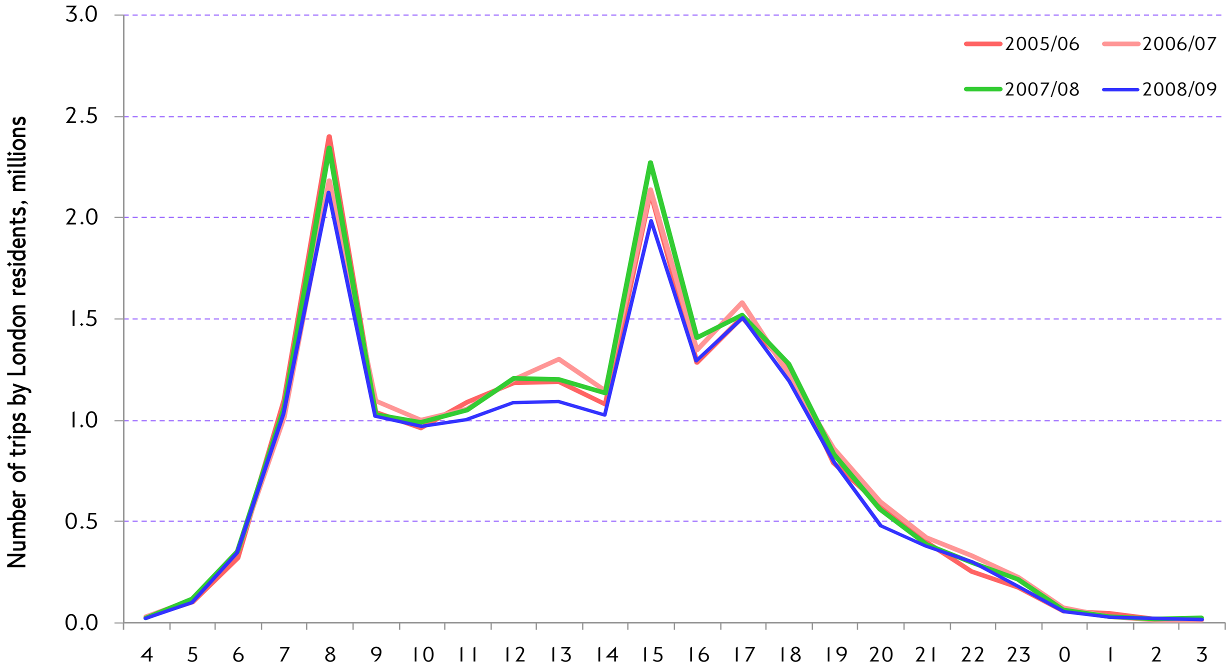
Figure C.1 Trip rates, trips per person per hour, by time period, weekdays only.



Source: TfL Planning, LTDS.

Looking at an LTDS time-series (Figure C.2), trip-making by time of day follows a similar pattern in all four LTDS years, with a single peak between 8am and 9am, and two further peaks in the afternoon. The first afternoon peak occurs between 3pm and 4pm (ie before the start of the conventional pm peak period at 4pm) and is due to children returning from school, together with any associated escort-education trips; the later peak starts between 5pm and 6pm and is due to commuting and other trips from work at the end of the working day. For 2008/09, however, it is clear that there were noticeably fewer trips made in both peak and off-peak periods compared to earlier years.

Figure C.2 Number of trips by start time, weekdays only. London residents, 2005/06 to 2008/09.



Source: TfL Planning, LTDS.

Travel in the weekday inter-peak period

Table C.2 breaks down, by journey purpose, weekday trips starting between 12 noon and 3pm - that is, during the central part of the inter-peak period and before children leave school contributing to the first afternoon peak. The types of trips being made during this period appear to have changed in 2008/09; the share of commuting and other work-related trips has fallen by 3 percentage points, with shopping and personal business trips down 2 percentage points. A greater proportion of trips in this time period in 2008/09 are leisure-related. This may reflect fewer 'discretionary' trips being made in the middle of the day for residents' personal business or for work purposes.

Table C.2 Purpose share of weekday trips starting between 12:00 and 15:00.

	2005/06	2006/07	2007/08	2008/09
Commuting	*13.8*	*14.8*	*13.5*	*12.2*
Other work	*5.5*	*6.9*	*7.3*	*5.9*
All work	***19.4***	***21.7***	***20.8***	***18.1***
Education	*5.9*	*3.6*	*3.4*	*4.0*
Shopping and personal business	*47.5*	*46.7*	*47.9*	*46.1*
Leisure	*17.4*	*19.2*	*19.3*	*22.8*
Other (incl escort)	*9.9*	*8.8*	*8.5*	*9.0*
All	***100***	***100***	***100***	***100***

Source: TfL Planning, LTDS.

C3 Travel by Londoners – area of residence

Londoner's trip making is strongly related to area of residence. This can be considered in relation to London's geography, most notably differences between residents of Central, Inner and Outer London, or in terms of the London sub-regions (see also chapter 10) or individual London boroughs.

Studies previously reported in Travel in London report number 1 showed that:

- Around half of trips by Outer London residents were by car, compared with a quarter of trips by Inner London residents.
- Average trip rates and travel distance are lower for residents of Inner London than of Outer London.
- In broad terms, the further away from Central London people live, the lower the public transport mode share. In contrast, car use increases with distance from Central London
- Despite these general patterns, there is considerable local variation by borough, reflecting transport networks, such as the greater availability of Underground services north of the river and, for example, factors seeming to favour much greater cycle travel in some boroughs than others.

Trip rates by functional sectors and London sub-regions

Table C.3 shows average trip rates per person per weekday by area of London. Values for 2008/09 are clearly down on those of 2007/08 and this applies to all parts of London. The average percentage fall for Greater London is 7 per cent, although this does vary, with residents of Outer London and, especially, east and north sub-regions showing higher proportionate declines.

Table C.3 Trips per person per weekday, by area of residence, all modes.

Area of residence	1991	2001	2005/06	2006/07	2007/08	2008/09
Greater London	2.5	2.8	2.8	2.8	2.8	2.6
Central and Inner London	2.3	2.7	2.4	2.6	2.7	2.6
Outer London	2.7	2.9	3.0	2.9	2.8	2.6
London sub-region						
- Central	2.3	2.7	2.3	2.6	2.8	2.7
- North	2.5	2.8	3.0	3.0	3.0	2.4
- East	2.4	2.7	2.4	2.4	2.5	2.2
- South	2.8	3.1	3.2	3.1	2.9	2.8
- West	2.7	2.8	3.0	2.8	2.8	2.7

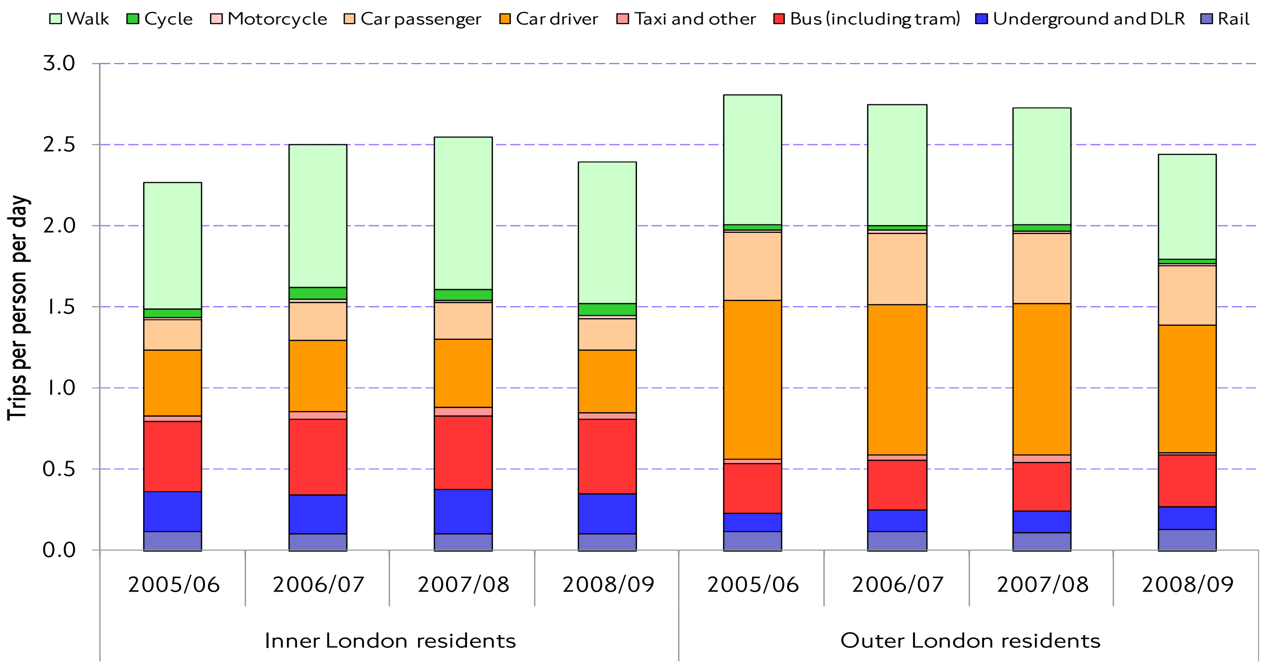
Source: TfL Planning, LATS and LTDS.

Mode use by inner and outer London

Figure C3 shows how trip rates differ between Inner and Outer London, broken down by main mode of trip. The following are the main points to note:

- Residents of Outer London make more trips, on average, than those of Inner London. However, the difference has narrowed considerably during 2008/09 – a 10 per cent reduction for Outer London residents compared to 6 per cent for those of Inner London.
- Looking at mode shares, basic patterns reported in Travel in London report number 1 are evident. Outer Londoners make more use of the car than those of Inner London, whereas Inner Londoners make proportionately more use of the main public transport modes.

Figure C.3 Trips per person per day, by main mode and area of residence. Seven-day week.



Source: TfL Planning, LTDS.

Travel by residents of London boroughs

The LTDS survey is a rich source of data at the borough level. Although annual samples of households in each borough are limited, averaging data over several years produces reliable statistical estimates at this level. Table C.5 shows how Londoners' travel varies by borough of residence, considering several different measures of travel. Note that this is a different basis to borough of trip origin or destination, as used elsewhere in this report.

There are many features of interest in this table. For example, residents of Southwark make on average 1.8 trips per day, compared with more than 3 trips per day by residents of Camden, City of London and Westminster. Similarly in Outer London, residents of Greenwich make on average 1.9 trips per day, whereas residents of Kingston upon Thames make 3.3 trips per day. Residents of Outer London also generally travel a greater distance per day, reflecting their distance from the main employment areas in central London.

Table C.5 London residents' trip characteristics by borough or sub-region of residence, 2006/07 to 2008/09 average, Seven-day week.

London borough or sub-region	People (aged 5 and over) ('000s)	Trips per day (000s)	Total straight line travel distance by residents per day ('000 km)	Trips per person per day	Straight line travel distance per person per day (km)
Camden	189	579	2,647	3.1	14.0
City of London	9	32	189	3.7	22.2
Hackney	198	422	2,227	2.1	11.3
Hammersmith & Fulham	163	479	2,682	2.9	16.4
Haringey	212	525	3,055	2.5	14.4
Islington	178	456	2,195	2.6	12.4
Kensington & Chelsea	156	457	2,249	2.9	14.4
Lambeth	264	579	2,959	2.2	11.2
Lewisham	243	542	2,884	2.2	11.9
Newham	232	542	2,546	2.3	11.0
Southwark	249	445	2,323	1.8	9.3
Tower Hamlets	207	442	1,837	2.1	8.9
Wandsworth	263	672	4,320	2.6	16.4
Westminster	198	652	2,837	3.3	14.3
Inner London	**2,761**	**6,823**	**34,951**	**2.5**	**12.7**
Barking & Dagenham	154	372	2,090	2.4	13.6
Barnet	299	914	4,697	3.1	15.7
Bexley	203	429	2,907	2.1	14.4
Brent	253	664	3,457	2.6	13.7
Bromley	279	833	5,748	3.0	20.6
Croydon	309	768	4,611	2.5	14.9
Ealing	288	723	4,826	2.5	16.8
Enfield	265	658	4,228	2.5	16.0
Greenwich	212	409	2,975	1.9	14.0
Harrow	202	519	3,194	2.6	15.8
Havering	214	542	3,920	2.5	18.3
Hillingdon	232	648	4,526	2.8	19.5
Hounslow	207	538	3,429	2.6	16.5
Kingston upon Thames	141	463	2,666	3.3	18.9
Merton	180	523	3,322	2.9	18.5
Redbridge	230	601	3,488	2.6	15.2
Richmond upon Thames	169	522	3,252	3.1	19.3
Sutton	170	439	2,841	2.6	16.7
Waltham Forest	204	494	3,009	2.4	14.7
Outer London	**4,212**	**11,058**	**69,186**	**2.6**	**16.4**
All London boroughs	**6,972**	**17,881**	**104,137**	**2.6**	**14.9**
central London sub-region	1,242	3,199	15,398	2.6	12.4
north London sub-region	980	2,591	14,989	2.6	15.3
east London sub-region	1,892	4,301	24,875	2.3	13.1
south London sub-region	1,512	4,219	26,760	2.8	17.7
west London sub-region	1,345	3,571	22,114	2.7	16.4

Source: TfL Planning, LTDS.

C4 Travel by Londoners – sequences of trips (or tours)

While some travel breaks down naturally into individual trips, there are other aspects of travel that are better captured by the concept of a 'tour', defined as a sequence of consecutive trips which starts and ends at home (see Appendix A Notes and definitions). If travel itself is regarded as an activity, it is the sequence of a person's trips that is of interest rather than each trip in isolation. Much of the thrust of travel policy is directed at reducing the need to travel by linking activities more efficiently in sequences of trips.

Trips and tours

For the purpose of analysing tours, the 'travel day' is defined as beginning at 4am and ending 24 hours later. Any trips before the first trip from home, or those which do not return home before the end of the day, are disregarded. These 'exceptional' trips at the start and end of the day account for only 3 per cent of Londoners' trips. The remaining 97 per cent of trips may then be allocated to tours, to give a valuable additional way of looking at travel patterns.

Numbers of trips in tours

Table C.6 shows the distribution of tours, by numbers of trips in the tour. The simplest tour consists of just 2 trips, an outward trip from home, followed, perhaps several hours later, by a return trip to home, without the person making any other trips in between. About three quarters (74 per cent) of tours are of this type, and these account for 60 per cent of trips. At the other extreme, fewer than 2 per cent of tours have more than 5 trips, and these account for about 4 per cent of trips.

Table C.6 Distribution of tours and trips by number of trips in the tour. LTDS 2005 to 2009.

Number of trips in tour	Number of tours		Number of trips	
	Thousands	% of tours	Thousands	% of trips
2	5,402	73.7	10,766	60.4
3	1,109	15.1	3,327	18.7
4	539	7.4	2,156	12.1
5	175	2.4	876	4.9
6	66	0.9	393	2.2
7 or more	38	0.5	297	1.7
All tours	7,328	100	17,815	100

Source: TfL Planning, LTDS

Purposes of tours

The purposes for which people make tours may be defined in terms of the purposes of their component trips. Here the definition of tour purpose is derived by ranking the trip purposes in the following order: work-related trips (including commuting), education, shopping or personal business, escorting or accompanying, leisure, and other purposes. The purpose of the tour is then taken to be the highest ranked purpose in this list.

Table C.7 shows that, of the 7.3 million tours made by Londoners on an average day (including weekends), 1.9 million are work-related. That is, they include some travel to work or in course of work, although this does not preclude trips for other (non-work) purposes being made within the course of the tour. The largest number of tours, 2.3 million, are for shopping or personal business, while 1.6 million tours are made to get to, and from, leisure activities.

A third (34 per cent) of tours with main purpose work have more than 2 trips. These include tours by workers travelling either in course of work or for other purposes during the working day, as well as those who break their journey to or from work to undertake other activities. For tours with main purpose shopping or personal business, 38 per cent have more than 2 trips, with movements from shop to shop within a shopping centre being counted as an individual trip, distinguishing it from the trips between home and the shops.

Table C.7 Distribution of the number of trips in a tour, by tour purpose (LTDS 2006/07 to 2008/09).

Number of trips in tour	Work	Education	Shopping or personal business	Escorting	Leisure	Other	All purposes
2	65.7	81.7	62.0	80.0	90.3	99.4	73.4
3	13.4	10.9	25.8	13.1	7.2	0.4	15.4
4	13.1	5.7	7.9	5.3	2.1	0.3	7.4
5	4.4	1.1	2.9	1.1	0.3	-	2.3
6	2.1	0.4	0.8	0.4	0.1	-	0.9
7 or more	1.3	0.2	0.6	0.1	0.0	-	0.5
All tours	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of tours (thousands)	1,896	731	2,293	665	1,573	125	7,297

Source: TfL Planning, LTDS

Modes of transport

The main mode used in the course of a tour is defined in the same way as the main mode of a single trip; that is, the mode used for the journey stage which is longest in distance. Table C.8 shows how numbers of trips in a tour vary between tours with different main modes. Thus, 85 per cent of walking tours have only 2 trips, an outward trip and a return trip, both of which are (almost always) walks. Other modes provide more opportunities for intermediate trips to be combined into more complex tours. Among the major modes, 30 per cent of car driver tours, and 27 per cent of car passenger tours, include more than 2 trips. A quarter of tours by van or lorry have more than 3 trips, reflecting typical use of these vehicles in course of work. For public transport, rail and Underground (with DLR) have the largest proportions, almost 40 per cent, of tours with more than 2 trips.

Table C.8 Distribution of the number of trips in a tour, by main mode of tour (LTDS 2006/07 to 2008/09).

	Main mode of tour										
Number of trips in tour	Rail	Underground/DLR	Bus	Taxi or PHV	Car driver	Car passenger	Van or lorry	Motor-cycle	Cycle	Walk	Percentage all modes
2	63.4	61.1	69.9	65.0	70.1	73.2	55.8	66.4	75.7	84.5	73.4
3	17.4	17.1	18.6	21.0	16.4	17.6	19.1	12.4	9.8	11.0	15.4
4	12.8	14.2	7.6	9.3	8.5	6.3	14.7	14.0	8.5	3.4	7.4
5	4.0	4.3	2.6	2.3	2.8	2.0	5.5	5.1	3.9	0.8	2.3
6	1.4	2.3	0.9	0.8	1.2	0.6	1.9	1.0	1.2	0.2	0.9
7 or more	0.9	1.0	0.4	1.7	0.9	0.3	2.9	1.1	0.8	0.1	0.5
All tours	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of tours (thousands)	345	553	1,115	80	1,894	1,004	85	37	142	2,030	7,297

Source: TfL Planning, LTDS.

Durations of tours

The average duration of a tour (ie the time between leaving home and returning home) is 301 minutes. This varies with the purpose of the tour, with work tours having a mean duration of 576 minutes, ie almost 10 hours between leaving home to go to work and returning home. The travel time within each tour is taken to be the total of the duration of the individual trips. Typically only a fifth of the duration of a tour is spent travelling. Tours with purpose escorting have the shortest average durations at 80 minutes, half of which is spent travelling (Table C.9).

Note that, although shopping or personal business tours have 36 per cent of their duration spent travelling, this is likely to be inflated by the inclusion of shopping trips moving from shop to shop, which does not distinguish in-shop time from travel time.

Table C.9 Tour durations and travel times by tour purpose (LTDS 2006/07 to 2008/09).

Purpose of tour	Total tour duration (minutes)	Travel time (minutes)	Travel time as percentage of tour duration
Work	576	97	*17*
Education	454	59	*13*
Shopping or personal business	149	53	*36*
Escorting	80	40	*50*
Leisure	227	55	*24*
Other	174	44	*25*
All purposes	301	64	*21*

Source: TfL Planning, LTDS