Transport for London

Travel in London

Report 3









MAYOR OF LONDON

Transport for London

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Overview

Travel in London summarises key trends and developments relating to travel and transport in Greater London. This third report uses the latest available data, usually referring either to the 2009 calendar year or the 2009/10 financial year, with historical context provided where available.

The Mayor's Transport Strategy (MTS) was published in May 2010. Transport for London's Travel in London reports will be the vehicle for tracking progress on implementing the MTS. A brief summary of progress towards MTS goals is given below.

The remainder of this Overview summarises highlights from the report. The MTS includes a set of Strategic Outcome Indicators (SOIs), and this year's Travel in London report updates and interprets these indicators in the wider context of developments affecting transport in London. A summary of progress with each of these indicators is provided in text-boxes throughout this Overview, with further material in the main text.

Overall summary of progress towards MTS goals

The year 2009 and into 2010 saw continued progress in improving many aspects of transport and travel in London, reflecting MTS strategic goals. In many cases this built on established positive trends over the decade since the year 2000.

Key developments over the decade to 2010 have been:

- A shift in mode share away from car towards more sustainable public transport modes, walking and cycling. There has been a 7 percentage point net shift in the journey stage based mode share between 2000 and 2009 towards public transport, walking and cycling (5 percentage points at the trip level). If the mode share in London had not changed in this way, and all other things had remained equal, this means that people in 2009 would have made 1 million more trips per day driving cars than they actually did.

- This shift in net mode share took place in the context of growing demand for travel, reflecting and supporting population growth and economic development. There were 8 per cent more trips made in London in 2009 than in 2000, reflecting an increase in population of 7.1 per cent since 2000 and 5.5 per cent more jobs.

- Substantial increases to the provision of public transport, with 32 per cent more bus kilometres and 9 per cent more Underground train kilometres operated in 2009/10 compared to 2000/01, and with the parallel development of the DLR and Tramlink light rail networks over the decade.

- Alongside highest ever levels of public transport service provision, there have also been sustained improvements to the service quality of public transport. Service reliability indicators for bus and Underground services in 2009/10 were either at, or close to their recorded highs, with 97 per cent of scheduled kilometres operated on both the Underground and bus networks.

Key indicators of public transport service provision and performance - 2000/01 to 2009/10 (summary – typical values).

Mode	Measure	Start of decade	Now
Service provision			
Buses	Kilometres operated	360 million	480 million
LU	Kilometres operated	65 million	70 million
DLR	Kilometres operated	2.9 million	4.6 million
Tramlink	Kilometres operated	2.4 million	2.6 million
Performance			
Buses	Excess Wait Time	2.0 minutes	1.1 minutes
LU	Excess Journey Time	8.5 min	6.5 min
DLR	Reliability	98%	98%
Tramlink	Reliability	99%	99%
National Rail	ORR L&SE PPM	80%	92%
Overground	ORR PPM	n/a	93%

- Road traffic volumes have reduced over the decade. There were 6 per cent fewer vehicle kilometres in London in 2009 compared to year 2000, while, by contrast, traffic in Great Britain as a whole increased by 8 per cent. However, there has also been a tendency for road congestion in London to have increased over the decade, only partially offset by initiatives such as Congestion Charging in central London. At the same time, cycling grew very substantially on all measures (see below in the Overview under Cycling, and Section 2.12 for more detail).

- Substantial improvements to the safety of London's travel environment, with 47 per cent fewer people being killed or seriously injured (KSI) on London's roads in 2009 compared to 2000 and, since 2006/07, reductions of 46 per cent and 25 per cent respectively in the number of reported crimes per million passenger journeys on the bus and Underground networks.

- For the environment, large strides have been taken to reduce emissions of local air quality pollutants, with emissions of NO_x and particles (PM_{10}) from ground-based transport 29 per cent and 36 per cent lower in 2009, respectively, than in 2004. (There are no comparable figures for the year 2000.) Although substantial progress has been made, comprehensively meeting air quality limit values for pollutant concentrations in the air in London remains a challenge.

- Carbon Dioxide (CO_2) emissions from ground-based transport have fallen by almost 10 per cent since 2003 (the earliest year for which comparable data is available). This net outcome, equating to reductions of just over 1 per cent per year (despite increases in London's population and employment over the decade) contrasts with the future requirement for an annual rate of reduction of approximately 3.5 per cent from 2008 to meet Mayoral emission reduction targets to 2025.

- There have also been many landmark changes to transport policy, the transport networks and transport operational practice over the past decade that have contributed to these outcomes. Alongside new policies and proposals in the Mayor's Transport Strategy, these will continue to contribute to the achievement of key transport goals for London.

Looking specifically at 2009 and into 2010:

- Transport trends were inevitably conditioned by the economic recession, which adversely impacted the London employment market and travel demand, and also, to a lesser extent, by the impact of upgrade projects on the Underground and the DLR.

- The recession led to a break in the decade-long established pattern of year-on-year growth in demand for travel - with total travel demand in 2009 being closely comparable to that of 2007 and 2008, albeit maintaining historically high levels and in the context of an overall 1 per cent increase in population between 2008 and 2009. Total trips fell by 0.4 per cent in 2009, the first fall (apart from 2005) since at least 1993.

- Overall mode shares in 2009 were similar to those of 2008, again retaining and reflecting the unprecedented shift towards more sustainable public transport, walking and cycling achieved in London over the preceding decade. Looking at the unrounded figures the shift continues – but by less than 1 percentage point.

- Volumes of road traffic in London fell by 3 per cent over just one year, undoubtedly reflecting a strong recessionary effect on top of the established trend towards less London traffic. There was a 1 per cent fall nationally, which represented a second successive year of decline.

- Volumes of travel on the public transport networks in 2009 increased marginally (by 0.3 per cent) contrasting with the historic trend of strong growth and reflecting the recession. Latest figures for 2010, however, do suggest that demand for public transport in London is now rebounding post-recession.

- Quality of public transport service provision has been maintained overall at historically high levels, despite the impact of upgrade projects which will bring longer-term benefits, such as on the Jubilee and East London lines, which re-opened in May 2010, and despite two relatively severe winters.

- There have been significant additions to the transport networks since the start of 2009, in the shape, for example, of the re-opened East London line (part of the London Overground network), the Woolwich Arsenal extension to the DLR and, most recently, the completion of the Kings Cross interchange project.

- More widely during 2009, TfL has developed a clear policy focus and priority to smooth road traffic and improve journey time reliability for road users, with statistics describing and quantifying this aspect available for the first time. These suggest that between 89 and 90 per cent of journeys on London's major roads are completed reliably.

- Road safety and crime on the transport networks have continued the recent trend of strong improvement, with comprehensive achievement of national targets for road casualty reduction in London. There were further reductions of 8 per cent in the number of KSIs and 15 per cent in the number of child KSIs in 2009 compared to 2008.

- For the environment, although there was a 3.6 per cent reduction to CO_2 emissions from ground-based transport in 2009. This largely reflected reduced road traffic associated with the recession, which may prove to be a temporary phenomenon, as opposed to improvements to the intrinsic carbon efficiency of the transport networks.

- 2010 was the Mayor's 'Year of Cycling' - seeing the successful launch of the Barclays Cycle Hire scheme in central London, and completion of the first two Barclays Cycle Superhighways. Almost 2 million cycle trips have now been made using Barclays Cycle Hire, and two thirds of these trips have replaced a trip by public transport, car or taxi. Early results suggest an average increase of 24 per cent in cycle flows along the first two Barclays Cycle Superhighways. Between two and three in ten of those cycling on these routes had switched to cycling their trip as a result of the scheme.

- The London Low Emission Zone scheme is estimated to have directly produced savings of 28 tonnes of PM_{10}, 26 tonnes of $PM_{2.5}$ (the most dangerous portion of PM_{10}), and 529 tonnes of NO_x (2008 whole-year-equivalent basis). The scheme has also been associated with observed reductions of between 40 and 50 per cent in concentrations of Black Carbon close to busy roads. These savings are comparable to those forecast by TfL prior to introduction of the scheme, and are a key contributor to London's projected ability to comply with limit values for PM_{10}.

Looking across the trends shown by the 24 Strategic Outcome Indicators that TfL uses to track progress with implementing the Mayor's Transport Strategy, and taking a 3 to 5 year view of these where available data permit, it is clear that London is broadly on track to achieve Mayoral transport goals. During 2009 these indicators record many positive developments, and no significant adverse ones. It is however evident that a continued strong focus on certain areas, such as public transport service quality, local air quality, road safety and - particularly - CO_2 emissions from transport will be necessary to ensure that historic progress is sustained and secured for the future.

Key highlights and developments - 2009 and 2009/10

Overall travel demand

Previous Travel in London reports have 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 MTS responds. Principal among these developments have been:

- Sustained growth in demand for travel, reflecting population and employment growth but also wider social and economic factors.

- A shift in mode share away from the car towards more sustainable public transport, walking and cycling. There has been a net 5 percentage point shift at the trip level towards public transport, walking and cycling over the decade. Journey stages by public transport increased in share from 34 per cent in 2000 to 41 per cent in 2008 (a net shift in mode share of 7 percentage points), while cycling mode share increased from 1.1 to 1.7 per cent over the same period.

- 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.

- Declining levels of London road traffic since 1999, particularly within central and Inner London, reflecting both the shift towards public transport but also a variety of factors specific to the road network.

Between 2008 and 2009 there was an evident break in the trend of growth in demand for travel – the first for at least 16 years apart from exceptional conditions in 2005 –as well as an acceleration of the established trend towards declining road traffic, both influenced by the economic recession.

- During 2009 as a whole, the number of **trips** made to, from or within London was 24.4 million per day. This is closely comparable to the preceding 2 years, representing a reversion to zero growth in travel following a sustained period of increase. The cause of this change, at least in part, reflects the impact of the economic recession on travel demand in London.

- Approximately 28.4 million **journey stages** were made in Greater London on an average day in 2009, a decrease of 0.5 per cent compared to the 28.6 million of 2008, and comparable to the level of 2007.

Key definitions

A **Trip** is a complete door-to-door movement by an individual to achieve a specific purpose (eg to go from home to work).
A **Journey Stage** is a part of a trip made on a specific mode of transport, eg a trip of 3 stages comprising a walk stage from home to a bus stop, a bus stage to central London, and a further walk stage to a place of work.

MTS Strategic Outcome Indicator 01: travel demand in London.

Values for 2009:

There were 24.4 million trips in London on an average day in 2009. This represents a reduction of less than half a per cent compared with the 24.5 million trips per day in both 2007 and 2008.

There were 28.4 million journey stages in London on an average day in 2009. This compares to 28.5 million in 2008, and 28.3 million in 2007.

Direction of change and assessment:

Overall trend is consistent with MTS expectation, albeit with a recent break in growth.

The number of both trips and journey stages in London grew consistently over recent years up until 2007. The values for 2008 and 2009 for both trips and journey stages were close to those of 2007. This reflects a break in the established pattern of year-on-year growth, at least in part reflecting the economic recession, with London's economy entering recession in the latter part of 2008.

Overall mode shares

- At the journey stage level, which is TfL's preferred measure for mode share, 41 per cent of all journey stages were made by public transport in 2009. 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.

- These 2009 mode shares are closely comparable to those of 2008. Journey stages by public transport modes (defined as bus, tram, Underground, Docklands Light Railway, 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 2009.

MTS Strategic Outcome Indicator 02: mode shares.

Value for 2009: Mode shares in 2009 were: public transport 41 per cent, private transport 37 per cent, walking 21 per cent and cycling 2 per cent. These shares are closely comparable to those of 2008.

Direction of change and assessment:

Long term trend is consistent with MTS expectation.

Mode shares in 2009 were similar to those of 2008. They maintain the trend of mode shift towards more sustainable public transport modes and walking and cycling achieved in London since 2000. Between 2000 and 2009, London achieved a 7 per cent net shift towards public transport and walking/cycling at the journey stage level, which is equivalent to a 5 percentage point increase in trip-based mode share for public transport, walking and cycling in London. This means that travel in London is becoming more sustainable. Looking at the unrounded figures this positive trend continued in 2009 – but by less than 1 percentage point.

Key public transport demand trends

Use of public transport in London has grown substantially in recent years, and this trend continued into 2008/09. However, the effects of economic recession beginning in the second half of 2008 depressed travel demand and this persisted throughout 2009.

- At 17.4 billion passenger kilometres, there was a marginal decrease of 0.4 per cent in passenger kilometres travelled on services operated by TfL in 2009/10 compared with 2008/09. Nevertheless, total passenger kilometres travelled on services operated by TfL were almost 40 per cent higher than in 2000/01, and more than 70 per cent higher than in 1991/92.

- There were 13 per cent more person-kilometres travelled by Underground in 2009/10 compared with 2000/01, and 65 per cent more person-kilometres travelled by bus. Between 2008/09 and 2009/10 there was an increase of 1 per cent in bus person-kilometres travelled, and a 2 per cent decrease in person-kilometres travelled by Underground.

- Person-kilometres travelled by DLR in 2009/10 were 87 per cent higher than in 2000/01, and 15 per cent higher than 2008/09, both figures reflecting the progressive extension of the network. The Tramlink and London Overground networks did not exist in 2000/01, but in 2009/10 carried 571 million passenger kilometres between them.

Cycling

Cycle activity can be measured in several different ways. All measures show a substantial 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 measurements themselves.

Key indicators of cycle trends include:

- There were an estimated 0.5 million journey stages made by bicycle in Greater London on an average day in 2009.
- The number of journey stages grew by around 5 per cent between 2008 and 2009.
- It is estimated that cycle journey stages grew by 61 per cent between 2001 and 2009, having been broadly unchanged between 1993 and 2001.
- TfL collects data through a set of permanent automatic cycle counters on selected sections of the TLRN. Average flows here were 117 per cent higher in 2009/10 than in 2000/01.
- The number of cyclists passing TLRN count points grew by 5 per cent (or 10 percentage points) between 2008/09 and 2009/10.
- The number of people entering central London by bicycle in the weekday morning peak more than doubled (an increase of 123 per cent) between 2001 and 2009. This included an increase of 15 per cent between 2008 and 2009.

Chapter 11 of this report provides information on the 2010 'Year of Cycling', including Barclays Cycle Hire and Barclays Cycle Superhighways.

Road traffic trends

The year 2009 saw an acceleration in the trend of falling levels of road traffic in London. Total vehicle-kilometres in London fell by 3 per cent between 2008 and 2009, to stand at an estimated 30.4 billion kilometres per year, having fallen by 2 per cent between 2007 and 2008 and by 1.4 per cent in the previous seven years between 2000 and 2007. The change over the most recent year undoubtedly is an impact of the economic recession. Over the longer term, this trend is thought to reflect a combination of improved public transport, together with capacity restraint resulting from the re-allocation of highway network capacity to other policy priorities, such as road safety and infrastructure replacement works.

Commuting to central London

Data in autumn 2009 from TfL's annual survey of people entering London during the morning peak period (7am to 10am), predominantly commuters, shows a 4 per cent fall against 2008, at 1.10 million, reflecting trends in central London employment. Mode shares were similar to recent years, with only 6 per cent of commuters using car and the overwhelming majority (78 per cent) using rail modes.

Travel by Londoners

TfL's London Travel Demand Survey (LTDS) provides information on the changing travel behaviour of London residents. Whilst this survey is not optimised to quantify detailed year-to-year changes, the following trends are evident from the latest data:

- Trip rates by London residents fell by 0.5 per cent in 2009/10, reflecting the economic recession.

- The estimated total number of trips made by London residents on an average day was 17.1 million in 2009/10, similar to 2008/09 but 7 per cent lower than the average of the preceding three years (18.3 million). This translates to an average of 2.4 trips per person per day.

- In terms of mode shares, 30 per cent of trips by Londoners in 2009/10 were made on foot – a proportion that has been stable since this survey started in 2005/06. Thirty-nine per cent of trips were made by car, either as driver or passenger, down from an equivalent value of 42 per cent in 2005/06.

- The time that Londoners spend travelling on average day continued to decrease slowly in 2009/10, to stand at just under 68 minutes per person per day. This compared to values of around 75 minutes in the two surveys from 2005/06 to 2006/07.

Freight transport

- Both road and rail freight fell significantly in 2009. The tonnage of road freight lifted in London in 2009 was 25 per cent lower than in 2008, compared to an 18 per cent reduction nationally. The overall tonnage figure for 2009 is 31 per cent below the historic peak of 2006, and 13 per cent below year 2000. These trends clearly suggest a dramatic impact from the economic recession.

- Total London rail freight lifted fell by 8 per cent to 6.7 million tonnes in 2009, down from 7.3 million tonnes in the previous year. However, air freight handled at London's airports totalled 1.76 million tonnes in 2009, an increase of 1 per cent on 2008.

Performance of the road network - traffic speeds, congestion and journey time reliability

Congestion on the road network is a complex phenomenon. Historically, average traffic speeds and delay have been used as a proxy for overall congestion levels. However, recent work in connection with the Mayor's smoothing traffic flow agenda is clarifying this. This includes a clear focus on the reliability of journey times and other factors which align with aspects that recent research suggests matter most to motorists.

There has been a long-term trend of increasing road congestion in London. Over the last decade congestion has been increasing despite static or falling traffic levels. This has reflected the removal of road network capacity for general traffic by an increase in utility and development works, and for other policy initiatives targeted at road safety, public transport and cyclist/pedestrian priority measures and urban realm improvements, among others.

However, recently-available GPS satellite tracking data covering the period from autumn 2006 to spring 2010 suggests some emerging stability in average traffic speeds over this period. Comparing the most recent two years for central and Inner London there has been a slight increase in speeds and corresponding reduction in delays. This is thought to reflect more significant recent falls in traffic levels as a result of the economic recession, but also a contribution from initiatives to manage the road network better, such as improved co-ordination of road works.

Journey time reliability is a primary concern of road users, alongside levels of disruption and volumes of road works. TfL has recently developed a monitoring system and indicator to measure journey time reliability.

Journey time reliability is defined, for this indicator, as the percentage of motor vehicle traffic which, for a 'typical' 30-minute journey, takes less than 35 minutes (the typical 30 minute journey time plus a five-minute 'allowance'). On this basis, TfL's journey time reliability indicator suggests that between 89 and 90 per cent of journeys on major roads in London are completed reliably - a value that can act as a baseline for future improvement initiatives.

MTS Strategic Outcome Indicator 04: road traffic journey time reliability.

Benchmark values for Quarters 1 & 2 2009/10 and 2010/11:

Q1 2009/10: 89.5 per cent of journeys achieved reliably.

Q2 2009/10: 90.3 per cent of journeys achieved reliably.

Q1 2010/11: 89.2 per cent of journeys achieved reliably.

Q2 2010/11: 89.1 per cent of journeys achieved reliably.

Direction of change and assessment:

There is currently insufficient data to allow an assessment against MTS goals.

The journey time reliability indicator has recently been introduced, and so it is not yet possible to establish trends in this indicator and set operational targets for journey time reliability. Nevertheless, the data so far available suggest that between 89 and 90 per cent of journeys on London's major roads are being achieved reliably.

Overall performance of TfL's public transport networks

Public transport in London continues to benefit from the longest run of sustained high performance ever recorded. All indicators of service performance have shown a marked trend of improvement over the last decade - alongside and complementary to often substantial enhancements to the level of service offered. Values for the most recent two financial years do inevitably reflect periods of severe weather in both winters, as well as specific upgrade projects, such as those affecting the DLR and the Jubilee line. When this is taken into account however it is clear that high levels of service performance are being sustained and improved upon wherever possible.

Performance of London Underground (LU)

Over the past 10 years LU has consistently increased its service offering, with general year-on-year increases in train kilometres scheduled and operated. However, the most recent two years have seen reductions in scheduled kilometres. This reflected, firstly, the temporary closure for upgrading work from December 2007 of the East London line, which ran approximately 0.7 million kilometres per year; and also the impact of the Underground upgrade programme which, for example, during 2009/10 necessitated several weekend closures of the Jubilee line. Consequently, in 2009/10, the number of train kilometres operated reduced to 69.4 million, 0.8 million less than 2008/09 - which itself was the highest ever level of service operated.

- In 2009/10 overall average journey time (scheduled journey time plus 'excess') averaged 44.1 minutes, a level only marginally higher than that of 2008/09 (43.9 minutes) and an improvement (ie reduction) of 0.4 minutes compared with 2007/08.

- Excess journey time is the average time added to journeys by delays, crowding and queuing, over and above the nominal scheduled journey time. Excess journey time in 2009/10 averaged 6.4 minutes, an improvement of 0.2 minutes compared

to the previous year and of 1.4 minutes compared to 2007/08, and the best performance since the measure was introduced 10 years ago.

Performance of London Buses

- In 2009/10, London Buses operated 482.9 million kilometres. A total of 497.2 kilometres was scheduled - both values reflecting a 10-year high point. This meant that 97.1 per cent of scheduled bus kilometres were actually operated - and this measure has been consistently above 97 per cent since 2003/04.

- In terms of reliability, both 'actual' and 'excess' waiting times for high frequency routes have consistently reduced over the decade - reflecting the introduction of Quality Incentive Contracts for operators, improved bus priority measures, Congestion Charging in central London, better service control and other measures designed to improve reliability. Values for 2009/10 were closely comparable to those for 2008/09, at 5.5 and 1.1 minutes respectively, again reflecting best 10-year performance.

Performance of DLR and Tramlink

- The DLR has shown strong and improving performance over the past 10 years, albeit that reliability in both 2008/09 and 2009/10 fell short of recent years. This largely reflects disruptions caused by major project works, and the commissioning of a new fleet of trains. In 2009/10, 97.2 per cent of scheduled services were operated and 94.8 per cent of trains were on time. This compares to values of 98.4 per cent and 94.7 per cent, respectively, for 2008/09.

- 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 2009/10 were both down slightly on 2008/09 due to major engineering work which closed some central Croydon stops. However, the percentage of kilometres operated was the highest so far recorded - at 99.2 per cent.

Performance of London Overground

- London Overground recorded an all-service public performance measure of 93.1 per cent, for the year 2009/10, up from 92.6, and a peak-only public performance measure of 95.4, up from 94.6 the previous year. Both values are above-average among both UK and London and South East train operators.

Performance of National Rail in London

- As with public transport operated by TfL, National Rail services in London have also seen substantial improvement - in terms of service offered and reliability - over the past decade. However, this in part reflected the infrastructure and safety difficulties at the start of the decade. Although the pace of improvement slowed in 2009/10, in part due to the severe winter weather, key measures were at or about their 10-year highs.

- The moving annual average public performance measure for London and South East operators (all services) in the financial year 2009/10 was 91.5 per cent (up from 90.6 per cent for 2008/09). For peak services, the equivalent values were 88.8 and 88.7 per cent. These compare to values for all services by franchised operators in Great Britain of 91.5 per cent for 2009/10, and 90.6 per cent for 2008/09.

Public transport capacity

- The past decade has seen progressively-increasing average bus occupancy levels, reflecting the large increase in bus ridership and commensurate service enhancements. The 2009/10 network average of 16.6 people per bus was identical to that of the previous year and indicates the continued matching of demand and supply which occurs through the bus network review process.

- Average Underground train occupancy rates over the decade have been relatively stable, to stand in 2009 at an average occupancy of 121.9 people per train, compared to 117.1 people in 2000/01. Those for the DLR (79.3 people per train in 2009/10, compared to 67.3 people in 2000/01) and Tramlink (53 people per tram) reflect the progressive development of these networks, including train lengthening on the DLR, and, as average values, are generally commensurate with the respective vehicle capacities.

MTS Strategic Outcome Indicator 13: satisfaction of those travelling on the public transport network with the level of crowding inside the vehicle.

Value for 2009: A multi-modal composite measure of customer satisfaction with the level of in-vehicle crowding gave a value of 76 out of 100 for 2009/10. This value is identical to that for 2008/09.

Direction of change and assessment:

Recent trend consistent with MTS - sets baseline for future assessment.

Identical values for both 2008 and 2009 reflect, according to TfL's norms for interpreting customer satisfaction scores, a 'fairly good' level of performance.

MTS Strategic Outcome Indicators 05 & 06: public transport capacity and public transport reliability.

Values for 2009/10 and comparison with 2008/09 - public transport capacity (measured in terms of planning capacities for vehicles multiplied by vehicle kilometres operated, expressed below as 'place-kilometres'):

- London Underground operated 55,431 million place-kilometres in 2009/10. This was a 2 per cent decrease on 2008/09.
- London Buses operated 29,311 million place-kilometres in 2009/10. This was a 1 per cent increase on 2008/09.
- Docklands Light Railway operated 2,027 million place-kilometres in 2009/10. This was an 18 per cent increase on 2008/09.
- London Tramlink operated 543.92 million place-kilometres in 2009/10. This was a 2 per cent decrease on 2008/09.

Values for 2009/10 and comparison with 2008/09 - public transport reliability:

- London Underground (overall average generalised journey time): 44.1 min (up 0.5 per cent).
- London Buses (excess waiting time for high-frequency routes): 1.1 min (no change).
- Docklands Light Railway (per cent of trains running to time): 94.8 per cent (up 0.1 percentage points).
- London Tramlink (per cent of scheduled services operated): 99.2 per cent (up 0.7 percentage points).
- National Rail (Office of Rail Regulation Public Performance Measure): 91.5 per cent (up 0.9 percentage points).
- London Overground (Office of Rail Regulation Public Performance Measure): 93.1 per cent (up 0.5 percentage points).

Direction of change and assessment:

Overall trends for both indicators are consistent with MTS expectation.

The total capacity offered by TfL's public transport networks in 2009/10 was broadly comparable to that of 2008/09. A 2 per cent fall on the Underground, primarily reflecting upgrade projects, was partially offset by growth in the bus network. An 18 per cent increase in DLR capacity reflected the opening of the Woolwich extension.

Public transport reliability in London continues to benefit from the longest run of sustained high performance ever recorded. All indicators of service performance have shown a marked trend of improvement over the last decade - alongside and complementary to often substantial enhancements to the level of service offered. For example, bus excess waiting time improved dramatically from 2000/01 to 2003/04, when values were in the range 1.4-2.2 minutes, to a level of 1.1 minutes that has been sustained since 2004/05.

Operating costs for TfL services and asset condition

- TfL's gross operating expenditure on public transport services (only) in 2009/10 was £4,462 million, and the equivalent net expenditure was £1,367 million. Total passenger kilometres were 17,405 million. Therefore, the gross operating cost for TfL services per passenger kilometre in 2009/10 was 26 pence per kilometre. The net operating cost per passenger kilometre in 2009/10 was 8 pence per kilometre.

- There was little change in both measures between 2008/09 and 2009/10. The gross operating cost measure did however increase by one penny between the two years, an increase of 3.4 per cent at current prices.

- The overall condition of TfL's assets is measured through a composite multi-modal score, looking at the condition of 'core' assets (such as rolling stock and the road carriageway) against industry-standard benchmarks, and weighted according to the usage of the different modes. This indicator complements a range of asset condition indicators specific to individual modes.

MTS Strategic Outcome Indicators 07 & 08: operating costs for TfL services and asset condition.

Values for 2009/10 and comparison with 2008/09 - operating costs for TfL services:

- The gross operating cost in 2009/10 was 26 pence per passenger kilometre.
- The net operating cost in 2009/10 was 8 pence per passenger kilometre.
- The gross operating cost in 2008/09 was 25 pence per passenger kilometre.
- The net operating cost in 2008/09 was 8 pence per passenger kilometre.

Values for 2009/10 and comparison with 2008/09 - asset condition:

- In 2009, 89.13 per cent of in-scope asset was deemed to be in good condition.
- In 2008, 92.58 per cent of in-scope asset was deemed to be in good condition.

Direction of change and assessment:

Trends in both operating costs and asset condition are consistent with MTS expectation.

There was little change between 2008 and 2009 for operating costs for TfL services. The gross operating cost did however increase by one penny (3.4 per cent) between the two years.

For asset condition, the 2009 composite value was 89.13 per cent, meaning that 89.13 per cent of in-scope asset in 2009 was deemed to be in 'good' condition. This compared to an equivalent value of 92.58 per cent in 2008, primarily reflecting an increase in the average age of the bus and rail fleet.

London's population

The resident population of Greater London at mid-year 2009 was estimated to be 7.75 million, an increase of 85,000 or 1.1 per cent from 7.67 million in 2008. Between 2001 and 2009 London's population grew by 5.9 per cent or over 430,000 people - more than any other region in the UK. The population growth in the most recent year in London was driven mainly by natural change (excess of births over deaths), which added 79,000 people to London's population.

London's economy

The economic recession of 2008/09 was the worst for 70 years, with six quarters of negative economic growth. However, both London and the UK are now recovering. In quarter 2 2010 UK economic output or Gross Value Added (GVA) rose by 1.2 per cent compared to the previous quarter, marking three quarters of consecutive growth.

- Over the recessionary period, London GVA contracted by 5.2 per cent in comparison to a fall of 6.4 per cent in UK economic output.

- The recovery to date (to Q2 2010) has clawed back 2 per cent of lost output with UK GVA still some 4.5 per cent below pre-recession levels and broadly level with Q2 2006.

- In comparison to the UK London emerged from recession in Q1 2010 (the latest period for which data are available) with quarter on quarter GVA growth 0.7 per cent.

London's employment

There were 5.5 per cent more jobs in London in 2009 compared to year 2000, reflecting steady growth over the decade. The recent economic recession has, however, interrupted this growth.

- There were just over 4.7 million jobs in London in the fourth quarter of 2009, the low point of the recession for employment (workforce jobs) in London. Compared to a year earlier this represented a reduction in employment of 217,000 or 4.4 per cent.

- Annual workforce jobs growth in London remained negative for the fifth consecutive quarter in Q2 of 2010 at -0.7 per cent, compared to -2.4 per cent in the previous quarter. London workforce jobs totalled more than 4.75 million in Q2 2010 in London.

- In spite of the annual fall, this seasonally adjusted all-London workforce jobs series rose for the second time on a quarterly basis. Compared to the low point in the fourth quarter of 2009 London workforce jobs have risen by 74,000 to quarter 2 2010, although they remain 143,000 below the high of quarter 4 2008.

- In spite of the decline in employment during the recent recession, total employment in London in the third quarter of 2009 was still equivalent to 2007 levels.

MTS Strategic Outcome Indicator 03: people's access to jobs.

Benchmark value for 2006:

This indicator is benchmarked on a three-yearly cycle. The latest available data relates to 2006, reflecting the modelling base used for the MTS. The number of jobs accessible within 45 minutes travelling time by public transport to the average member of the London population was 844,000 in 2006.

Direction of change and assessment:

There is currently insufficient data to allow an assessment against MTS goals.

With no time series for this indicator yet available, it is not yet possible to assess a recent trend. Estimates for 2009 should be available for inclusion in Travel in London report 4.

The recession and travel demand

London's economy, and that of the wider UK, now seem to be emerging from the effects of the worst recession in 70 years. Latest available data for quarter 2 2010 shows central London employment rebounding with growth of 1.2 per cent year-on-year, whilst the rate of decline in employment has slowed in the rest of London. 2008 and into 2009 saw a break to the established pattern of growth for public transport in London, reflecting the recession. However, the latest figures suggest that this is also now recovering strongly.

- Growth in bus journeys weakened during the recession. Growth in journeys picked up soon after the recession ended. Latest figures to August 2010 show bus journeys growing at between 1 and 2 per cent year-on-year, despite the fares increase in January 2010.

- After falling significantly during the recession Underground journeys in the final three months of 2009 recovered robustly - coinciding with the end of recessionary conditions more generally. Underground passenger demand has grown throughout 2010 with journeys growth in August 2010 of around 5 to 6 per cent year-on-year - back to around pre-recessionary levels.

Road safety

London's roads have become considerably safer in recent years. During 2009, 8.5 per cent fewer people were killed or seriously injured (KSI) in road traffic collisions compared to 2008. This is 52 per cent lower than the 1994 to 1998 average, the baseline for both the Government and Mayoral casualty reduction targets which are for 40 and 50 per cent reductions by 2010, respectively. It continues recent progress to reduce the more severe road traffic casualties. The year 2009 was the ninth consecutive year that total casualties in London were the lowest recorded.

MTS Strategic Outcome Indicator 17: number of people killed or seriously injured (KSI) in road traffic collisions in London per year.

Value for 2009 and comparison with 2008: In 2009, there were 3,227 people killed or seriously injured on London's roads. This is an 8.5 per cent reduction over the 3,526 KSIs of 2008.

Direction of change and status:

Trends are consistent with MTS expectation (a continued reduction).

The year 2009 saw continued good progress in reducing the more severe road traffic casualties. The 8.5 per cent reduction between 2008 and 2009 compares to a 6.8 per cent reduction between 2008 and 2007, and is in-line with the general trend in these numbers since 2001. London had previously met the national target (a 40 per cent reduction over the 1994-98 average by 2010) in KSIs, and in 2009 also met the more-demanding London-specific Mayoral target (for a 50 per cent reduction). In 2009, total KSIs in London were 52 per cent below the 1994-98 average of 6,684 per year.

Crime on the public transport networks

Rates of reported crime on bus and LU/DLR networks continued to fall in 2009/10, building on the substantial year-on-year reductions achieved since 2005/06. There were 11.1 reported crimes per million passenger journeys on London's buses and 12.8 per million passenger journeys on LU and DLR during the 2009/10 financial year. These rates were down from 12.1 crimes per million journeys on buses in 2008/09 (a reduction of 8.2 per cent), and 13.1 crimes per million journeys on LU in 2008/09 (a reduction of 2.0 per cent). Reported crime rates on or near the bus network have almost halved since 2005/06, and those on the Underground have reduced by over one-quarter.

MTS Strategic Outcome Indicator 18: crimes per million passenger journeys by principal public transport modes.

Values for 2009/10: In 2009 there were 11.1 crimes per million passenger journeys on the bus network; 12.8 crimes per million passenger journeys on London Underground/DLR.

Direction of change and status:

Trends are consistent with MTS expectation (a continued reduction).

Rates of reported crime on both bus and Underground networks continued to fall in 2009/10, albeit at a somewhat slower rate than over the previous five years. Nevertheless, reported crime rates on or near the bus network have almost halved since 2005/06, and on the Underground have reduced by more than one-quarter.

MTS Strategic Outcome Indicator 19: perception of crime and safety whilst travelling.

Values for 2009: 95 per cent of London residents feel safe on the modes that they use regularly during the daytime. 78 per cent of London residents felt safe on the modes that they regularly use at night-time.

Direction of change and status:

There is currently insufficient data to allow an assessment against MTS goals.

This is a new indicator and is so far only available for 2009. It is not therefore possible to give an assessment of the recent trend at this point.

Climate change - Carbon Dioxide (CO_2) emissions from transport

Emissions of CO_2 from ground-based transport in London fell by 3.6 per cent between 2008 and 2009. This fall is commensurate with the scale of year-on-year reductions required as part of the Mayor's commitment to achieve an overall 60 per cent reduction in CO_2 emissions (across all sectors) by 2025 from a 1990 base. However, this reduction principally arises from reduced road traffic in 2009, reflecting the economic recession. This may therefore prove only to be a temporary feature as the economy recovers.

MTS Strategic Outcome Indicator 23: CO_2 emissions from ground-based transport.

Values for 2009: Total ground-based transport emissions (including ground-based aviation) were estimated at 9.56 million tonnes in 2009. This was a 3.6 per cent reduction from 2008, on a comparable basis. Following an adjustment to the electric rail emissions the total ground-based transport emissions for 2008 were re-estimated at 9.92 million tonnes.

Direction of change and status:

The achieved reduction between 2008 and 2009 is consistent with the MTS reduction trajectory.

Access to opportunities and services

MTS Strategic Outcome Indicator 20: access to opportunities and services.

TfL's ATOS indicator of Access To Opportunities and Services at the London-wide level is to be updated on a three-year cycle, to reflect the evolutionary pace of strategic change in London's transport and service infrastructure.

Values for 2008: In 2008, the average time for accessing employment and services in Greater London by public transport or walking was 17.4 minutes.

Direction of change and assessment:

There is currently insufficient data to allow an assessment of trends against MTS goals.

The indicator was first bench-marked, in terms of an MTS Strategic Outcome Indicator, for the 2008 calendar year, as published in Travel in London report 2. A further benchmarking is planned for 2011.

Physical 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 goal, with real progress over the past year.

MTS Strategic Outcome Indicator 21: physical accessibility to the transport system.

This a modal composite indicator based on indices of physical accessibility for each mode, weighted according to journey stage based mode share.

Value for 2009/10: The composite physical accessibility score for 2009/10 was 37 per cent. This is a re-benchmarked value based on more complete data and is not, therefore, strictly comparable to the value of 36 per cent previously given in Travel in London report 2 for 2008. However, the comparison does reflect specific additions to the accessible network between 2008 and 2009/10.

Direction of change and assessment:

Trends are consistent with MTS expectation (continued incremental improvements).

The increase in the composite physical accessibility value reflects improvements to accessibility over the period - most notably the opening of new fully-accessible stations on the East London line extension.

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.

MTS Strategic Outcome Indicator 22: real fares levels.

The real fares level measures the actual average fare paid per kilometre travelled. It is a composite measure, covering bus and Underground only, calculated as the total actual adult fares revenue, adjusted for inflation and divided by total actual bus and Underground passenger kilometres.

Value for 2010: The actual average adult composite bus and Underground fare rose from a revised 19.8 pence per kilometre in 2009 to (a provisional value of) 20.2 pence per kilometre in 2010, representing an increase of 2.2 per cent between 2009 and 2010. This follows an increase of 5.3 per cent between 2008 and 2009.

Direction of change and assessment:

Recent trends are consistent with MTS.

As well as reflecting actual fares levels, this indicator is also sensitive to changes in modal usage and fares structures. The change between 2009 and 2010 reflected effectively static demand and stable balance between the different types of ticket.

Local air quality - emissions and concentrations of Nitrogen Oxides (NO_x and NO_2) and particulate matter PM_{10}

There have been substantial reductions to emissions of harmful local air quality pollutants in London over recent years. These reflect concerted action, and a range of specific initiatives such as TfL's London Low Emission Zone (LEZ) and the 'Euro' vehicle emissions standards, to work towards meeting limit values for NO_2 and particulate matter PM_{10}, as set out in the UK Air Quality Standards Regulations 2010.

The year 2009 saw further reductions to emissions, mirroring a mixture of falling road traffic, and ongoing vehicle technology improvements.

MTS Strategic Outcome Indicators 9 & 10: emissions of Nitrogen Oxides (NO_x) and Particulate Matter (PM_{10}) from ground-based transport.

Values for 2009 and comparison with 2008 - NO_x:

Total emissions of NO_x from ground-based transport sources in London in 2009 were 25,630 tonnes. This is a 9 per cent reduction on the value for 2008. These values exclude emissions from ground-based aviation, which are not available on a historically consistent basis.

Values for 2009 and comparison with 2008 - PM_{10}:

Total emissions of PM_{10} from ground-based transport sources in London in 2009 were 1,470 tonnes. This is a 5 per cent reduction on the value for 2008. These values exclude emissions from ground-based aviation, which are not available on a historically consistent basis

Direction of change and assessment:

Recent trends are consistent with MTS expectation (continued incremental reductions).

Emissions of both NO_x and PM_{10} from ground-based transport in London continued the recent trend of year-on-year reductions. These reflected both an element of reduced transport demand - primarily road traffic - and also a contribution from the ongoing renewal of the vehicle fleet with cleaner technology.

Local air quality - concentrations of NO_x and PM_{10}

Concentration of pollutants in the air is the basic measure of local air quality, and that against which compliance with limit values is assessed. Despite recent sustained and substantial reductions to emissions, London in 2009 still did not meet limit values for pollutants that were originally intended to apply from 2005, and the UK Government is in the process of applying to the EU to secure time extensions for compliance with limit values (which have been transposed into the UK Air Quality Regulations 2010) - to 2011 for PM_{10} and (up to) 2015 for NO_2. The recently-released Mayor's Air Quality Strategy projects that compliance with the limit value for PM_{10} should be achieved in 2011. However, compliance with the limit value for NO_2 before 2015 remains very challenging.

- Concentrations of NO_x, the principal contributor to atmospheric NO_2, have fallen consistently and significantly over the period. Typical contemporary concentrations are about 40 per cent lower than those of the late 1990s.

- Concentrations of PM_{10} fell sharply during the early part of the last decade, then tended to stabilise, before more recently resuming a reducing trend. Typical current concentrations are about 30 per cent lower than those of the late 1990s. On this basis, it is expected that London should be able to comply with both limit values for PM_{10} in 2011, albeit that compliance is expected to be marginal in a small number of heavily-trafficked locations in central London.

- Concentrations of NO_2 fell relatively sharply, in parallel with reductions to NO_x, during the late 1990s but then tended to stabilise – and have remained effectively stable since about 2004, despite ongoing reductions to concentrations of NO_x. Meeting the limit value for NO_2 by the possible time extension date of 2015 remains extremely challenging.

Transport and quality of life - customer satisfaction and perception

The Strategic Outcome Indicator set for MTS includes six that are based on surveys of customer satisfaction or customer perception with various aspects of the transport system. Four of these are considered under the heading of 'quality of life', and latest results for these are summarised in the text box below.

MTS Strategic Outcome Indicators 11, 14, 15 and 16: customer satisfaction with public transport; perception of journey experience; quality of the urban realm and satisfaction with transport-related noise.

Values for 2009/10 and comparison with 2008/09 - customer satisfaction with public transport:

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 79 out of 100 in 2009/10. This compares to a score of 80 out of 100 in 2008/09. According to TfL's norms for interpreting customer satisfaction scores, a score of between 70 and 79 is considered to reflect a 'fairly good' level of satisfaction (see also section 10.2 of this report).

Values for 2009/10 and comparison with 2008/09 - perception of journey experience:

The mean score for satisfaction with travelling in London was 66 out of 100 in 2010, compared to an equivalent score of 64 out of 100 in 2009. In general TfL considers a score of between 65 and 69 in satisfaction surveys to reflect a 'fair' level of performance.

Values for 2009/10 and comparison with 2008/09 - perception of the urban realm:

The mean score for satisfaction with the quality of streets, pavements and public spaces in London was 64 out of 100 in 2010, compared to a score of 63 out of 100 in 2009. In general TfL considers a score of between 55 and 64 in satisfaction surveys to reflect a 'fairly poor' level of performance.

Values for 2009/10 and comparison with 2008/09 - perception of transport-related noise:

The mean score for satisfaction with transport-related noise levels in London was 70 out of 100 in 2010, identical to that for 2009. In general TfL considers a score of between 70 and 79 in satisfaction surveys to reflect a 'fairly good' level of performance.

Direction of change and assessment:

Marginal change across all four indicators, with insufficient data time-series to establish a clear trend.

Customer satisfaction and perception-based scores for all four aspects in 2009 or 2009/10 were very similar to those for the previous year, suggesting little significant change overall to these indicators during the year.

Spotlight on cycling

A cycling revolution is underway in London. The Mayor believes that cycling can bring significant social, environmental, health and financial benefits to London and is determined to turn London into a cyclised city. Consequently, he has set a target to deliver a 400 per cent increase (from 2000) in the number of cycle trips, alongside a 5 per cent mode share for cycling by 2026. The Mayor declared 2010 the Year of Cycling; throughout the year, a wide range of interventions to improve conditions for cyclists and to raise the profile of cycling in London have been delivered.

In particular, the summer of 2010 saw the launch of two major schemes for cyclists: Barclays Cycle Hire for trips within central London and the first two Barclays Cycle Superhighways, designed to provide an attractive alternative for commuters from inner to central London.

Summary: Barclays Cycle Hire

- Barclays Cycle Hire has delivered an average of 20,000 cycle journeys a day, the vast majority of which were not previously cycled. Two thirds of trips made by Barclays Cycle Hire bicycle would previously have been made by a mechanised mode.

- The scheme has encouraged new people to give cycling in London a try, and many have become frequent cyclists as a result of the scheme. There is evidence of wider benefits arising from the scheme, with many of those new to cycling saying that they have bought a bike for their private use as a result of using the scheme. The most popular reasons for using the scheme were that that it was quicker, healthier and more convenient than their previous mode.

- The scheme has recently been expanded to allow casual use (without membership) and further research will be carried out to understand the impact of this upon usage patterns and the profile of users. This will be reported in future Travel in London reports.

Summary: Barclays Cycle Superhighways

- The first two pilot Barclays Cycle Superhighways were launched in July 2010. These were Barclays Cycle Superhighway 3 (CS3), along the A13 from Barking to Tower Gateway, and Barclays Cycle Superhighway 7 (CS7), along the A24 from Merton to the City.

- Early results suggest an increase of 24 per cent in average cycle flows, based upon cycle counts carried out before and after the introduction of each scheme. The vast majority of trips (more than eight in ten) are for commuting purposes, although cyclists are using the route at other times and for other purposes as well.

- The Barclays Cycle Superhighways have also encouraged new cyclists onto the routes: 28 per cent of those cycling on CS3 and 20 per cent of those cycling on CS7 had started cycling on the route as a result of the launch of the Barclays Cycle Superhighways, and more cyclists had switched route to travel on the Barclays Cycle Superhighways.

- The aspects of the route considered most influential on the decision of cyclists to use it were: the directness to their destination, the visibility of the blue road markings and the quality of the road surface. Those who were new to cycling saw benefits to health, cost and the quality of their journey, whilst those who had switched route found their journey safer and more enjoyable. People who were cycling on the Barclays Cycle Superhighways prior to launch have experienced an increase in the quality of their journey experience and are generally very supportive of the scheme; some have increased the amount they travel on the routes. More than three quarters said that the Barclays Cycle Superhighways had improved safety for cyclists.

- Wider benefits were seen amongst the target market, a third of whom had started cycling on the routes and many of whom had also increased the amount they cycle elsewhere in London. The wider cycling economy can be seen to be benefitting from the scheme as around three in ten of those cycling on the route had purchased a bicycle or cycle equipment since the launch.

Spotlight on London's Low Emission Zone (LEZ)

The first two phases of London's Low Emission Zone scheme were introduced during 2008 without significant operational problems, and all elements of the scheme continue to function effectively. The scheme operates 24 hours a day 365 days per year, and covers Greater London. The scheme targets, and has lead to valuable reductions to, emissions of toxic particulate matter (PM_{10}) – which are material to London's projected ability to meet limit values for PM_{10} in 2011.

- Consistently high levels of vehicle compliance with the requirements of the scheme are being achieved. Typically, 98 per cent of heavy goods vehicles (regulated by phase 1 of the scheme) and 96 per cent of medium goods vehicles (regulated by phase 2) are compliant on a daily basis. Operation of dirtier vehicles in the lower Euro emissions classes have been virtually eliminated, as operators have upgraded to vehicles that meet (or in many cases exceed) the basic minimum requirements for the scheme.

- These shifts in the emissions profile of goods vehicles operating in London have led to substantial savings in emissions of Particulate Matter (PM_{10}) and Oxides of Nitrogen (NO_x). On a basis equivalent to the whole 2008 calendar year, it is estimated that the scheme directly produced savings of 28 tonnes of PM_{10}, 26 tonnes of $PM_{2.5}$ (the most dangerous portion of PM_{10}), and 529 tonnes of NO_x. These savings are comparable to those forecast by TfL prior to introduction of the scheme, and are a key contributor to London's projected ability to comply with limit values for PM_{10}.

- For PM_{10} they represent a 3.6 per cent saving of road traffic exhaust emissions, and a 1.9 per cent saving of total road traffic PM_{10} emissions in London. For $PM_{2.5}$, they represent a 3.7 per cent saving of road traffic exhaust emissions, and a 2.4 per cent reduction to total road traffic emissions in London. For NO_x they reflect a 2 per cent saving of total road traffic exhaust emissions (all values are for 2008, equivalent whole-year values assuming full operation of both phases of the scheme).

- These values exclude the dramatic reductions to particulate emissions from the TfL bus fleet achieved separately but as part of wider efforts to improve air quality in London (these vehicles are in-scope for phase 2 of the LEZ scheme). Exhaust emissions of PM_{10} from TfL's buses have reduced by around 90 per cent since year 2000, despite a 32 per cent increase in vehicle kilometres operated.

- In terms of concentrations of key pollutants in the atmosphere, reductions attributable to the scheme can reach 0.5 micrograms of PM_{10} at busy roadside sites - the very places where pollution is highest, reflecting diesel-engined road traffic, and these reductions are most needed. In this way, LEZ targets benefits at those areas that are most in need.

- LEZ also differentially targets the most toxic portion of particulate matter. This is demonstrated by looking at trends in concentrations of Black Carbon (a marker in urban areas for finer particles from road vehicle exhaust and one of the most toxic components of particulate). At roadside sites with heavy goods vehicle flows, these trends reflect the implementation of the first two phases of the scheme and the vehicle operator 'pre-compliance' associated with them. Reductions of between 40 and 50 per cent have occurred over the period 2006 to 2009.

1. Introduction

1.1 Travel in London report 3

Travel in London is TfL's annual publication that summarises trends and developments relating to travel and transport in London. It provides an authoritative source of 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.

This Travel in London report 3 provides an update on key trends, wherever possible covering the 2009 calendar year, the 2009/10 financial year, or later, and looks in more detail at several specific topics related to the implementation of the Mayor's Transport Strategy. The MTS was published in May 2010. Alongside his draft London Plan, Economic Development Strategy and Air Quality Strategy also published during 2010, these strategies map out the policy framework for London over the next few years.

Travel in London is the main vehicle through which the implementation of the MTS will be formally monitored. However, its role is much wider than this. The travel environment experienced by Londoners and its ability to support London's economy is the result 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. Consequently, in tracking and ultimately assessing the impact of any set of policies, there is a vital need for careful analysis and interpretation across all of the available evidence. Travel in London therefore draws on and exemplifies a wide body of data and analysis, presenting a rounded appreciation of trends and developments in transport in London, and the factors that have affected these.

1.2 The Mayor of London's transport strategy

The MTS sets out the Mayor's 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 networks, 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. The key goals of the MTS are:

- Supporting economic development and population growth.
- Enhancing 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 their legacy.

Each of the first five of these goals is considered further in one or more chapters of this report. The sixth is outlined in Section 5.14 and will be featured in future editions. For each of these goals the MTS identifies a set of related transport challenges and, in relation to each of these goals and challenges, outlines the various outcomes that are sought from the strategy The MTS itself elaborates how these priorities will be tackled, through 26 policies and 130 proposals. Other material in this report provides essential interpretative context or, in 'Spotlight' chapters and 'Focus' topics, looks at specific matters of contemporary interest.

1.3 The monitoring regime for the Mayor's Transport Strategy

At the top level, the long-term outcomes sought by the MTS will be monitored through the collection and publication of a set of 24 Strategic Outcome Indicators (SOIs). These are generally to be reported annually, and relate to changes in actual conditions (ie 'outcomes') experienced by Londoners. The SOIs provide a manageable and transparent framework to quantify progress with 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 the wider quality of life in London. However, they are not formal performance indicators and, with a small number of exceptions, do not have associated MTS targets. Instead, they are to be used to evaluate, over the longer term, the overall direction of progress in relation to Mayoral transport goals, primarily so as to provide appropriate feedback to the ongoing policymaking process.

The 24 indicators do not cover all aspects and dimensions of transport that will be of interest. Furthermore, the relationship between strategic interventions and change in overall transport outcomes will not usually be simply direct or proportional. The MTS SOIs are therefore presented and 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 its delivery partners as part of the implementation of the strategy. This allows changes, developments, and the relative contribution of specific policies, to be more appropriately assessed.

The set of SOI set for the MTS is related to similar indicator sets for other Mayoral strategies, such as the draft London Plan. The MTS SOIs also sit at the head of a more extensive framework of indicators and supporting information. This is designed to measure delivery against the strategy's goals by TfL, the London boroughs through their Local Implementation Plans (LIPs, see also Appendix B) and other delivery partners in London, and to measure the outcomes of that delivery.

1.4 The MTS Strategic Outcome Indicators

Table 1.1 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 further information about the indicator can be found.

Table 1.1 Strategic Outcome Indicators for the Mayor's Transport Strategy.

Theme	Ref No.	Strategic Outcome Indicator	Brief definition	Section of this report
Contextual indicators	1	Travel demand	The number of trips or journey stages made to, from or within London per calendar year.	2.6
	2	Mode share	Proportion of trips or journey stages undertaken by each mode to, from or within London per calendar year.	2.8
Supporting economic development and population growth	3	People's access to jobs	Employment accessibility maps - number of jobs within 45 minutes travel time (three-yearly).	5.13
	4	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.	4.6
	5	Public transport reliability	Reliability indicators for each principal public transport mode will be presented separately.	4.14
	6	Public transport capacity	Calculated using planning capacities for the various train/tram/bus types, multiplied by kilometres operated.	4.15
	7	Operating costs per passenger kilometre	Operating cost per passenger kilometre, for the principal public transport modes.	4.18
	8	Asset condition	Composite multi-modal indicator measuring the percentage of in-scope asset that is deemed to be in good condition.	4.20
Enhancing the quality of life of all Londoners	9	NO_x emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of NO_x.	9.6
	10	PM_{10} emissions	Emissions from all identifiable ground-based transport sources in London per year, expressed as tonnes of PM_{10}.	9.8
	11	Public transport customer satisfaction	Overall satisfaction of those travelling on the network with the operation of the principal public transport modes.	10.3
	12	Road user customer satisfaction	Satisfaction of private road users with the maintenance and operation of the road network.	10.5

	13	Public transport crowding	Satisfaction of those travelling on the network with the level of crowding inside the vehicle, on the principal public transport modes.	4.16
	14	Perception of journey experience	Perception of London residents of their overall journey experience when travelling in the city.	10.7
	15	Perception of noise	Perception of London residents of transport-related noise levels in their local area.	9.11
	16	Perception of the urban realm	Perception of London residents of the quality of the urban realm in their local area.	10.9
Improving the safety and security of all Londoners	17	Road traffic casualties	Number of people killed or seriously injured in road traffic collisions in London per year.	6.4
	18	Crime rates on public transport	Crimes per million passenger journeys by principal public transport modes.	6.7
	19	Perception of crime/safety	Perception of London residents of their sense of safety and fear of crime when travelling in the city.	6.9
Improving transport opportunities for all Londoners	20	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).	8.3
	21	Physical accessibility to the transport system	Level of step-free access across the public transport and TfL Streets networks.	8.6
	22	Real fares levels	Cost of fares for a selected, representative 'basket' of trips.	8.10
Reducing transport's contribution to climate change and improving its resilience	23	CO_2 emissions	Emissions from all identifiable ground-based transport sources in London, expressed as tonnes of CO_2.	7.6
Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy	24	The Games themselves will not be measured by this monitoring framework.	The Games and their legacy will be the subject of appropriate content in this and future editions of this report.	See section 5.14

1.5 Treatment of MTS Strategic Outcome Indicators in this report

This is the second year of Strategic Outcome Indicator reporting for the MTS. Travel in London report 2 described the technical basis for these indicators, and provided both baseline and historic trend information then available. This report updates the set of indicators for this second year, and completes the technical description of the indicators and baseline data where these were not provided in Travel in London report 2.

For many of the indicators, this update provides an opportunity to assess trends, in the context of MTS goals, both for the short term against the previous year but also in some cases, where available data permit, more appropriately across a longer timescale.

The indicators are presented in two places in this report. Firstly, the individual indicators are described and updated at appropriate points throughout the main text (see contents list or Table 1.1 for specific locations). This reflects the fact that indicators relate to specific Mayoral challenges – and hence chapters of this report. It also allows changes and trends to be interpreted in the wider context.

For each indicator, a very brief definition is given alongside essential details of how the indicator is derived. Fuller details on these matters were given in Travel in London report 2. Values for the most recently available year are then given, and compared with the previous year or the recent trend as appropriate. A short assessment of the trend or direction of change shown by the indicator is made, in the context of the MTS goals, looking across the available information and wider context where appropriate.

Secondly, the Overview to this report provides an opportunity to bring these indicators together and assess overall progress against the MTS goals. Here, individual indicators are highlighted, alongside essential information describing the trend or direction of change in each case, and TfL's interpretation of it in the context of MTS goals.

To assist interpretation, a simple colour-coding (red/yellow/green) system is used in the Overview to give an overall, informal, assessment of performance, as measured by these indicators, against the MTS goals.

In interpreting this material, it should be noted that:

- The desired direction of change is different for different indicators. So, for example, the Mayor seeks reductions in emissions of Carbon Dioxide, alongside an increase in people's access to jobs and services. Also, an indicator showing stability or little change may well be appropriate in terms of Mayoral goals in certain circumstances.
- Generally, TfL seeks to assess the direction and appropriateness of changes over a period of greater than one year. The period over which these assessments are made will partly depend on the available data, but as a rule a timescale of between three and five years is to be preferred in order to allow a soundly-based assessment of the direction and appropriateness of overall change.

1.6 Relationship to other Transport for London (TfL) and Greater London Authority (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's distinctive role is for the provision of:

- an annual interpretative analysis of trends and developments in relation to the key Mayoral transport priorities;
- key datasets and statistics describing trends in travel and transport in London with supporting analyses and commentary;
- more in-depth analysis of specific 'Spotlight' and 'Focus' topics, reflecting issues of particular contemporary interest at the leading edge of transport 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 Key Performance Indicators (KPIs) for the organisation.
- Specific TfL reports focusing on issues such as traffic trends and the environmental performance of the organisation.
- Various other statistical compendia and reference documents produced by the GLA Group or central government departments, such as the Department for Transport.

Appropriate cross-references to these documents are provided in the text for readers interested in following up specific points.

1.7 Contents of this report

This third Travel in London report is organised by topic into the following chapters.

- Chapter 2 looks at trends for overall travel demand and mode shares in London. This includes aggregate volumes of travel, volumes of travel by mode of transport, mode shares and trends in these indicators over time.
- Chapter 3 looks at aspects of London residents' travel, alongside other modal trends. It reviews findings from TfL's London Travel Demand Survey (LTDS) for 2009/10, before looking at topics such as car ownership, freight transport in London, licensed taxis and Private Hire, and London's waterways.
- Chapter 4 considers the operational performance of the transport networks in London - looking at levels of service provision and at trends in outcomes such as journey times, journey time reliability, asset condition and crowding across the different travel modes.
- Chapter 5 updates data and trends relating to London's population and economy. It focuses on recent economic trends, following the severe recession in 2008 and 2009 that significantly affected volumes of travel in London. The chapter also exemplifies ways in which the transport networks support the economy of London.
- Chapter 6 considers the safety and security of Londoners using the transport system, including road safety, crime and the perception of crime.
- 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 provided by the transport system, physical accessibility to the transport system, and fares and prices.
- Chapter 9 is the first of two chapters looking at the Mayoral theme of transport and quality of life. This chapter focuses on local air quality, setting out trends in emissions and concentrations of key local air pollutants NO_x and PM_{10}, and the perception of ambient noise in London.
- Chapter 10 also considers transport and quality of life, this time from the perspective of how people perceive aspects of the travel environment and their own travel experiences, drawing on market research among Londoners.

There are then two 'Spotlight' chapters. The first focuses on progress with the Mayor's goal of spearheading a 'cycling revolution' in London (Chapter 11), including early findings in relation to the Barclays Cycle Hire scheme and Barclays Cycle Superhighways - both innovations having been launched during 2010. The second Spotlight chapter looks at findings from the impacts assessment work that TfL has carried out in relation to the first two phases of the London Low Emission Zone scheme, first introduced in 2008 (Chapter 12).

There are two 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 performance indicators for the monitoring of borough Local Implementation Plans (LIPs), updated to 2009 or 2009/10 as appropriate.

1.8 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 demand and mode shares

2.1 Introduction

This chapter looks at overall travel trends for Greater London, in terms of trips made (either in terms of numbers of people or of vehicles), mode shares (the percentages of journey stages or trips by the different types of transport), and trends for individual travel modes, focusing on developments over more recent years.

2.2 Review of long-term trends in travel in London

Previous Travel in London reports have consolidated historic information on travel trends in the Capital over the past 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 MTS responds. Principal among these developments have been:

- 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 2008, 24 per cent more journey stages were made to, from or within London than in 1993, and 12 per cent more than in year 2000.
- A shift in mode share away from the car towards more sustainable public transport, walking and cycling. Journey stages by public transport increased in share from 34 per cent in 2000 to 41 per cent in 2008, while cycling increased in share from 1.1 per cent to 1.7 per cent over the same period.
- 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.
- Declining levels of London road traffic since 1999, particularly within central and Inner London, reflecting both the shift towards public transport but also a variety of factors specific to the road network.
- From 2008 and into 2009, however, reflecting the severe economic recession, there was a break in growth in overall demand for travel. This was the first for at least 16 years apart from exceptional conditions in 2005, together with an acceleration of the established trend towards declining road traffic.

The following sections update key statistics for the 2009 calendar year or 2009/10 financial year, as appropriate, and extend the analysis of historic trends previously presented. The specific impact of the economic recession on travel in London is considered further in chapter 5 of this report.

2.3 Recent developments - 2009

- During 2009, the number of trips made to, from or within London was 24.4 million per day. This is similar to the preceding two years (down by 0.4 per cent on 2008), following a sustained period of increase. The primary cause of this change of trend is the impact of the economic recession on travel demand in London.
- Approximately 28.4 million journey stages were made in, to or from Greater London on an average day in 2009, a decrease of 0.5 per cent compared to the 28.5 million of 2008, and only slightly above the level of 2007.
- At the journey stage level, which is TfL's preferred measure for mode share, 41 per cent of all journey stages were made by public transport modes in 2009. 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. These 2009 mode shares are closely comparable to those of 2008.

However, over the longer term, journey stages by public transport modes (defined as bus, tram, Underground, DLR, rail, taxis and private hire vehicles) have increased in share from 30 per cent in 1993 to 34 per cent by 2000, and to 41 per cent by 2008.

This is a 7 percentage point shift in the share of public transport journey stages between 2000 and 2009. This is equivalent to a 5 percentage point shift in trip-based mode share in London, all in the context of substantial growth in the overall demand for travel. This means that travel in London as a whole is becoming more sustainable. If the mode share in London had not changed in this way, and all other things had remained equal, this means that people in 2009 would have made 1 million more trips per day driving cars than they actually did.

Correspondingly, the use of mass public transport in London has grown substantially in recent years, and this trend continued into 2008/09. However, the effects of economic recession beginning in the second half of 2008 depressed travel demand and this persisted throughout 2009. This resulted in a marginal decrease of 0.4 per cent in passenger kilometres on services operated by TfL in 2009/10 compared with 2008/09, with 17.4 billion kilometres travelled. Nevertheless, total passenger kilometres travelled on services operated by TfL were more than 70 per cent higher in 2009/10 than in 1991/92.

- Just under half (49 per cent) of these passenger kilometres were on the Underground, which saw a decrease of 2 per cent in 2009/10, while bus, accounting for 46 per cent of public transport passenger kilometres, increased by 1 per cent. The DLR showed the highest increase in passenger kilometres in 2009/10, increasing by 15 per cent, partly as a result of the opening of the Woolwich Arsenal extension in January 2009.
- Between 2008/09 and 2009/10, passenger kilometres on National Rail services in London fell by 1.8 per cent, and passenger journeys by 1.5 per cent, again reflecting the recession. However, between 2000/01 and 2009/10, passenger kilometres on all services by rail operators classified as London and South East regional operators grew by 24 per cent. Passenger journeys grew by 27 per cent over the same period.

The year 2009 saw an acceleration in the now well-established trend of falling levels of road traffic in London. Total vehicle kilometres in London fell by 3 per cent between 2008 and 2009, to stand at an estimated 30.4 billion kilometres per year, having fallen by 2 per cent between 2007 and 2008 and by 1.4 per cent in total in the previous seven years between 2000 and 2007.

The number of cycling journey stages grew by around 5 per cent between 2008 and 2009. (As a result, cycle journeys in London grew by 61 per cent between 2001 and 2009.) The number of cyclists passing TLRN count points also grew by 5 per cent between 2008/09 and 2009/10, increasing growth since 2000/01 from 107 per cent to 117 per cent. The number of people entering central London by bicycle in the weekday morning peak more than doubled (an increase of 123 per cent) between 2001 and 2009. This represented an increase of 15 per cent between 2008 and 2009.

Data from TfL's autumn 2009 survey of commuters entering central London during the morning peak shows a 4 per cent decline against 2008. In the long run, 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 million and 1.2 million since the survey began in the late 1950s, although the series shows a cyclical pattern following the cycle of employment in central

London. In recent years the total peaked in 2008 at 1.14 million, almost unchanged from the previous year, and then declined to 1.10 million in 2009, primarily reflecting the loss of jobs in central London (see also chapter 5 of this report).

2.4 Trips in London

Trips and journey stages are the most commonly used ways of measuring travel and most of the statistics in this chapter are based on these concepts. Definitions and further information on different measures of travel is given in the Notes and Definitions appendix of this report.

Number of trips

Daily average numbers of trips in Greater London (including trips to or from London) are given in Table 2.1 for 1993 to 2009. They include trips by both London residents and non-residents such as commuters from outside London, visitors and tourists. Trips in this table are classified according to their main mode - defined as the mode usually used for the longest distance stage of multi-stage trips. In chapter 3 of this report trips are defined based on the mode used for the longest distance portion of the trip (see Appendix A4 for further information).

During 2009 as a whole, the number of trips made to, from or within London was 24.4 million per day. This is similar to the preceding two years, representing a reversion to zero growth in travel following a sustained period of increase.

The number of trips in London increased steadily year by year between 1993 and 2007. This trend was interrupted only in 2005 when travel was depressed as a result of the London bombings in July of that year. Average growth in trips was 1.1 per cent per annum between 2000 and 2007, while the resident population increased by 0.6 per cent per annum.

The levelling off coincided with the onset of the economic recession in the second half of 2008, although the full effects on travel in London were not felt until well into 2009. In 2009 trips per day actually fell slightly, although the population continued to increase at about 1 per cent per annum.

The decline in trips by private transport is deduced from the trends observed in road traffic (see section 2.11 of this report). 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. After 1999 numbers of car trips declined to a low of 9.8 million per day in 2005. Following slight increases in car passenger trips in 2006 and 2007, both car driver and car passenger trips decreased in 2008 and 2009. In 2009 car trips in total (including both drivers and passengers) dipped by 2 per cent (to 9.9 million), following a similar percentage decrease in previous year.

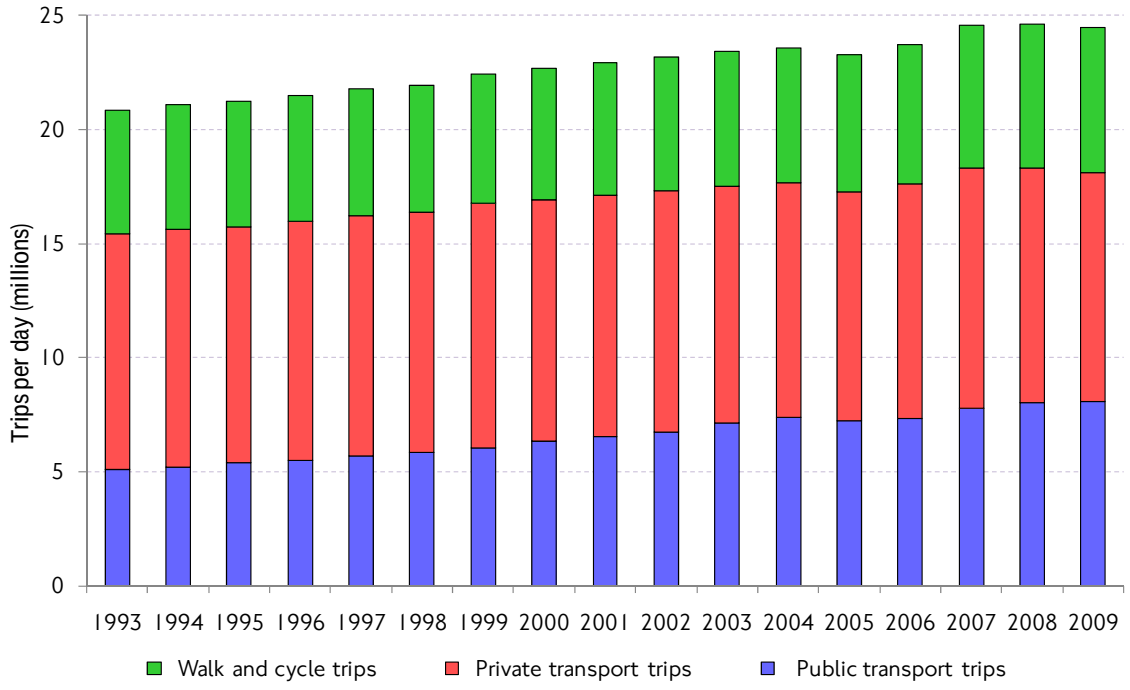
Table 2.1 Daily average number of trips in Greater London, 1993 to 2009, by main mode.

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	6.5	3.8	0.2	0.4	5.7	24.5
2008	2.2	2.1	3.5	0.3	6.4	3.6	0.2	0.4	5.8	24.5
2009	2.1	2.2	3.5	0.3	6.3	3.5	0.2	0.5	5.8	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 2.4 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.

Figure 2.1 Aggregate travel volumes in Greater London. Estimated daily average number of trips, 1993 to 2009.



Source: TfL Planning.

Trip rates

Overall trip rates have been relatively constant at between 2.7 and 2.8 trips per person per day during most of the period since 1993, peaking at 2.9 in 2007. The increase in total numbers of trips is therefore mainly associated with population growth. London's resident population increased by 13 per cent between 1993 and 2009. In addition, there are about 1 million other 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, 14 per cent between 1993 and 2009, but the differential narrowed slightly in 2009 as a result of a drop in the numbers of visitors (see section 3.8). Over the same period since 1993, the daily average number of trips increased by 17 per cent. This implies a small increase of 3 per cent in the average number of trips made per person per day over that 16 year period.

2.5 Journey stages in London

Trips may be broken down into their component parts known as journey stages. These are the segments of a trip, with each stage using a single mode of transport. Table 2.2 brings together the available data on average daily numbers of journey stages by all modes of transport in London, between 1993 and 2009. These are consistent with the numbers of trips by main mode in Table 2.1.

Trips and journey stages

Journey stages give an alternative way of measuring travel which is directly related to the usage of the different modes of transport. As such, they may be distinguished from trips, discussed in section 2.4, that are an appropriate measure from the perspective of traveller behaviour, considering travel as an activity and travel demand as the outcome of a wide range of external influences that affect people's propensity to travel.

Stage-based measures, on the other hand, which are built up from the usage statistics of the separate transport modes, reflect the availability and level of service of each mode. They may be related to the performance of the transport system considered as a whole and the networks associated with individual modes of transport. Actual levels of satisfied demand for travel result from the interplay between these 'supply-side' factors and the influences on travel demand, and both trip-based and stage-based measures contribute to understanding this.

Number of journey stages

About 28 million journey stages were made in Greater London on an average day in 2009, a decrease of 0.5 per cent compared with 2008 (Table 2.2). This includes journey stages with origin, destination or both within the Greater London area, made either by London residents or by non-residents such as commuters, visitors and tourists. Not included are those walk stages that do not form complete trips but which are made to access or to link stages made by other modes of transport - for example, walking to the Underground after arrival at a National Rail terminal. Most of these 'linking' walks are very short. The only walks included in Table 2.2 are trips undertaken by London residents entirely on foot. The table does not include walk trips by non-London residents within London.

The annual averages of journey stages per day to, from or within London since 1993 are shown in Figure 2.2, which clearly shows the increasing trend until 2007, then levelling off in 2008 and 2009 as the downturn in the economy took effect. Also shown is the basic mode

split between public and private transport, walking and cycling, with public transport taking an increasing share throughout the period, especially after 2001.

The average daily number of journey stages increased from 23.0 million in 1993 to 28.4 million in 2009, an increase of 24 per cent. Over the same period, the population grew at a lower rate so that the number of journey stages per person also increased. When commuters and visitors to London are included with residents, 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 2007 to 2009, an increase of 9 per cent. When set against the 3 per cent increase in the average number of trips per person (see section 2.4), this indicates that, over the period considered, trips in London have tended to include more stages, a finding which is consistent with the significant net shift from private to public transport during this period.

Between 2008 and 2009, the 0.5 per cent decrease in numbers of journey stages resulted from a fall in stages per person of 1 per cent combined with the 0.6 per cent increase in the daytime population. Apart from 2005 (when travel was affected by the London bombings) this was the first year that stage rates per person had fallen since this series began in 1993 and is another indication of the effect of the recession on travel demand.

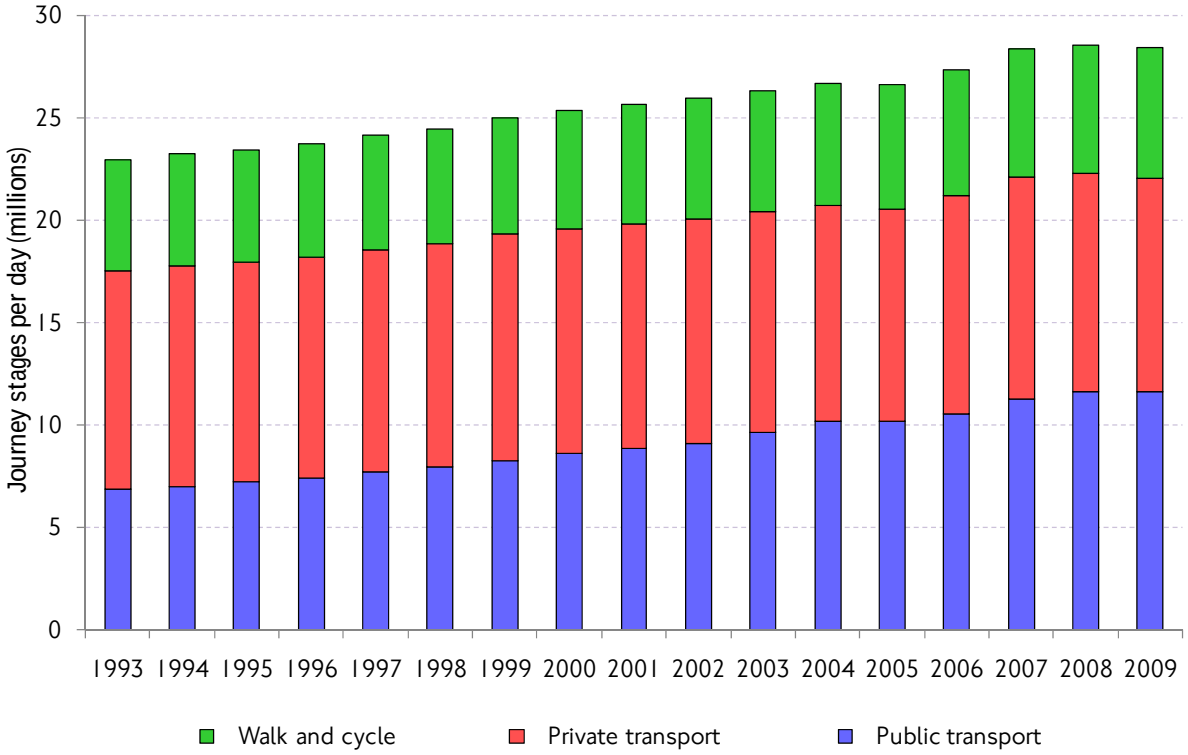
Table 2.2 Aggregate travel volumes in Greater London. Estimated daily average number of journey stages by mode, 1993 to 2009.

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	0.0	3.1	0.3	6.8	3.7	0.2	0.3	5.2	23.0
1994	1.4	2.1	0.0	3.1	0.3	6.8	3.8	0.2	0.3	5.2	23.2
1995	1.5	2.1	0.0	3.3	0.3	6.8	3.7	0.2	0.3	5.2	23.4
1996	1.5	2.1	0.0	3.4	0.3	6.9	3.8	0.2	0.3	5.3	23.7
1997	1.6	2.2	0.1	3.5	0.3	6.9	3.8	0.2	0.3	5.3	24.1
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	3.7	0.2	0.3	5.6	25.9
2003	1.9	2.6	0.1	4.6	0.4	6.9	3.7	0.2	0.4	5.6	26.4
2004	2.0	2.7	0.1	5.0	0.4	6.7	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	6.7	4.0	0.2	0.5	5.7	28.3
2008	2.4	3.0	0.2	5.7	0.4	6.6	3.8	0.2	0.5	5.8	28.5
2009	2.3	2.9	0.2	5.9	0.4	6.5	3.7	0.2	0.5	5.8	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 2009.



Source: TfL Planning.

2.6 MTS Strategic Outcome Indicator: travel demand in London

Definition of indicator

The number of trips made in London in a calendar year is a measure of the total demand for travel that is accommodated by the transport system. As such, it is a basic statistic for understanding the context for the Mayor's Transport Strategy. The strategy 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 a means to check at a basic level the continuing validity of these assumptions.

Value for 2009 calendar year and comparison with value for 2008 and 2007

There were 24.4 million trips in London on an average day in 2009. This includes all trips either wholly or partly within London. It compares to an equivalent value of 24.5 million trips in both 2007 and 2008.

There were 28.4 million journey stages in London on an average day in 2009. This compares with equivalent values of 28.5 and 28.3 million in 2008 and 2007, respectively.

On an annual basis, there were 8.9 billion trips and 10.4 billion journey stages in London in 2009.

These estimates are from the consistent series shown in Tables 2.1 and 2.2. When the method change for the estimation of bus journey stages, explained in section 2.9, is taken into account, the 2009 estimate of average daily trips is 24.8 million, and that for journey stages 28.9 million.

Assessment of recent trend

Numbers of both trips and journey stages in London grew consistently over recent years up until 2007. The values for both 2008 and 2009 were both close to those of 2007. This reflects a break in the established pattern of year-on-year growth, reflecting, at least in part, the economic recession, with London's economy entering recession in the latter part of 2008.

2.7 Mode shares

Journey stage based mode shares

Table 2.3 shows how total travel in London is distributed between the principal modes of transport. Given the variety of sources it is not possible to be wholly consistent between the different modes in the derivation of journey stages. Nevertheless, the table 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 for personal travel 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 transport mode shares.

Table 2.3 Percentage shares of journey stages by type of transport, 1993 to 2009.

	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%	22%
2001	34%	43%	1%	21%
2002	35%	42%	1%	21%
2003	36%	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%
2009	41%	37%	2%	21%

Source: TfL Planning.
Note: Mode shares are calculated from the consistent series for journey stages given in Table 2.2. If the method change for reporting bus journey stages is taken into account (see section 2.9), the mode share for public transport is 42 per cent in each year 2008 and 2009, while on this basis private transport mode share is 37 per cent and 36 per cent in 2008 and 2009 respectively.
Totals may not sum to 100 per cent due to rounding.

In 2009, 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. The changes in mode share between 2008 and 2009 were less than 1 percentage point for all these groups of transport modes: public transport marginally

increased its share by 0.3 percentage points and walking and cycling by 0.4 percentage points while, conversely, private transport decreased by 0.7 percentage points.

Trends in mode shares

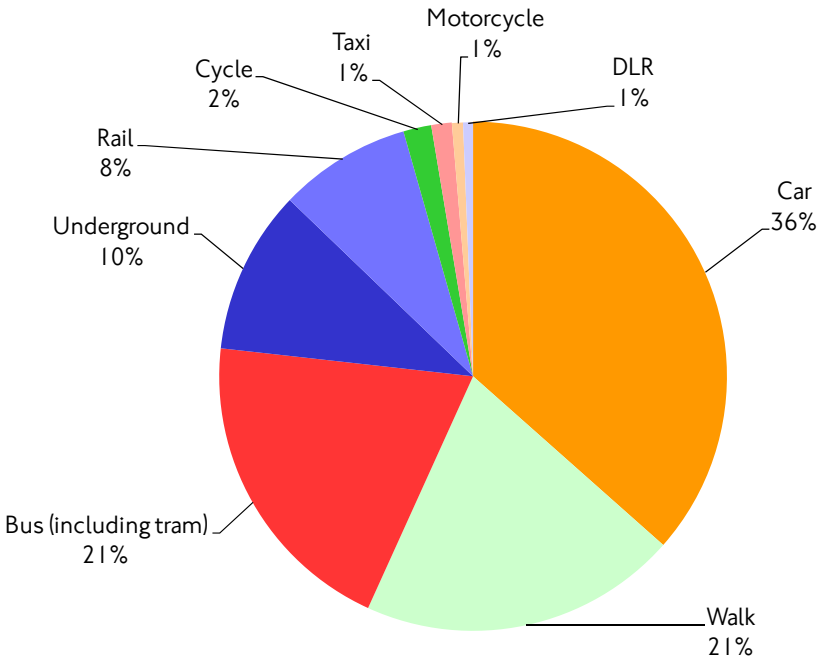
Looking at how these trends have developed over time, and bearing in mind the technical points applying to these data (see Table 2.2 footnotes), the basic trend of a substantial net shift away from private transport to the public modes in London is clear. In the early 1990s public transport accounted for just under 30 per cent of all journey stages, and the latest value for 2009 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 1 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, tram, 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 and 2009. This 7 percentage point increase in the share of public transport stages between 2000 and 2009 is equivalent to a 5 percentage point increase in trip-based mode share for public transport in London (see Table 2.4).

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 shares for all travel in London in 2009, based on the journey stage numbers shown in Table 2.2.

Figure 2.3 Modal shares of daily journey stages in London, 2009.



Source: TfL Planning.

Trip based mode shares

It is also possible to calculate mode shares in terms of trips, as shown in Table 2.4.

Public transport accounted for 24 per cent of all London trips in 1993. However this increased to 28 per cent by 2000 and 33 per cent by 2008 and it maintained this share in 2009. Conversely, private transport reduced its mode share from 50 per cent of trips in 2003 to 47 in 2000 and 42 per cent in 2008, falling to 41 per cent in 2009. This represents a net mode shift of 9 per cent from private to public transport between 1993 and 2009, and 5 per cent between 2000 and 2009.

Table 2.4 Trip-based mode shares - public and private transport, 1993 to 2009, 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%	42%	2%	24%
2009	33%	41%	2%	24%

Source: TfL Planning.

2.8 MTS Strategic Outcome Indicator: mode shares

Definition of indicator

Whereas the total numbers of trips and journey stages are measures of the demand for travel, the split between the usage of the different means of transport shows how the demand is being met, and is a starting point for assessing the overall suitability of existing transport provision in the context of wider Mayoral goals.

This indicator is derived by calculating the 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.

Value for 2009 calendar year and comparison with value for 2008

Mode shares in 2009 were: public transport 41 per cent, private transport 37 per cent, walking 21 per cent and cycling 2 per cent. These are similar to 2008, with public transport marginally increasing mode share, and private transport marginally decreasing, over the course of the year.

Assessment of recent trend

The changes in mode share between 2008 and 2009 represent a slowing of the previous trend towards higher shares for public transport and reductions in the share of motorised private transport. In each of the previous two years, public transport increased its share by over 1 percentage point, but in the year to 2009 this dropped to under half a percentage point. Private transport continued to decline in share, while to compensate there was an increase in walking, mainly reflecting the 1 per cent increase in London's population. Cycling, accounting for 2 per cent of journey stages (as in 2008), also marginally increased its share as a result of a 5 per cent increase in cycle journey stages in 2009.

2.9 Trends in travel by public transport - TfL operated services

Summary of content

This section is concerned with the overall trends in public transport use in London. It covers the services provided by divisions of TfL including London Buses, London Underground, DLR, London Tramlink, London Overground and London River Services. The other mass public transport mode considered is National Rail. These services are provided by Train Operating Companies under the regulation of the Office of Rail Regulation (ORR), and include those classified as London and South East regional operators and long-distance operators.

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 by calendar year for total travel by public transport modes, as considered in the preceding sections, are from the same source after allocating reporting periods to the appropriate year.

Latest trends in the use of TfL operated public transport in London

Use of mass public transport in London has grown substantially in recent years (Table 2.5). However, the effects of economic recession beginning in the second half of 2008 depressed travel demand and this persisted throughout 2009. This resulted in a marginal decrease of 0.4 per cent in passenger kilometres on services operated by TfL in 2009/10 compared with 2008/09, with 17.4 billion passenger kilometres travelled.

Just under half (49 per cent) of these passenger kilometres were on the Underground, which experienced a decrease of 2 per cent, while bus, accounting for 46 per cent of passenger kilometres, increased by 1 per cent. The DLR showed the highest increase in passenger kilometres, increasing by 15 per cent, partly as a result of the opening of the Woolwich Arsenal extension in January 2009. The London Overground is shown from its first full year of operation - 2008/09.

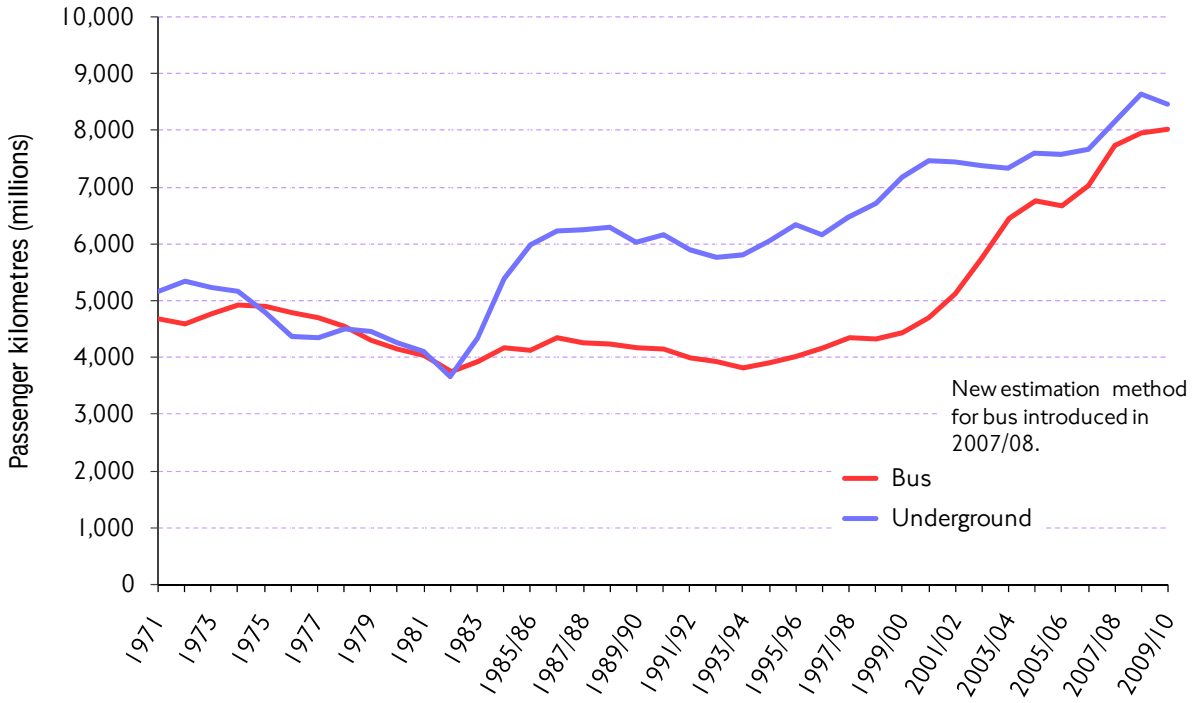
Table 2.5 Annual passenger kilometres travelled by public transport (millions), 1991/92 to 2009/10.

	Million passenger kilometres					
Financial Year	Bus	Underground	DLR	Tramlink	Overground	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	326	138	-	16,334
2008/09	7,942	8,641	318	142	427	17,470
2009/10	8,013	8,456	365	134	437	17,405

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. Change percentages quoted in the commentary are adjusted to take account of this change. See also methodological note following Table 2.6.

Figure 2.4 shows the long-term trend for bus and Underground travel in London. Total passenger kilometres travelled on services operated by TfL were more than 70 per cent higher in 2009/10 than in 1991/92. All the individual public transport modes shared in this growth, but it was especially pronounced on the bus network, which has increased patronage by 95 per cent during this period. Between 2000/01 and 2009/10, bus passenger kilometres increased by 65 per cent. This takes account of the method change between 2006/07 and 2007/08 - see also the technical note beneath Table 2.6.

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.

Public transport journey stages

Table 2.6 shows trends in public transport patronage in terms of passenger journey stages, as distinct from passenger-kilometres travelled. Up to 2008/09, substantial and consistent increases were seen across all public transport modes. Journey stages by bus increased by 78 per cent between 1991/92 and 2008/09, an average rate of increase of over 3 per cent per annum. Since 2006/07 the Underground has recorded more than a billion passenger journeys each year, reaching its highest ever recorded level in the 2008/09 financial year, when passenger journeys were 12 per cent higher than in 2000/01. The overall number of public transport stages in 2008/09 had increased by more than 70 per cent since the early 1990s, and by almost 40 per cent since 2000/01.

The long term increases in public transport usage reflect a variety of factors, including provision of new infrastructure for DLR and London Tramlink, increased services on existing networks, improved service quality and notably substantial enhancements to bus services as well as wider economic trends affecting travel.

Changes between 2008/09 and 2009/10 show effects on travel demand of the economic recession starting in the second half of 2008: overall journey stages fell by 0.3 per cent with bus journeys increasing by 0.5 per cent and Underground decreasing by 2.3 per cent.

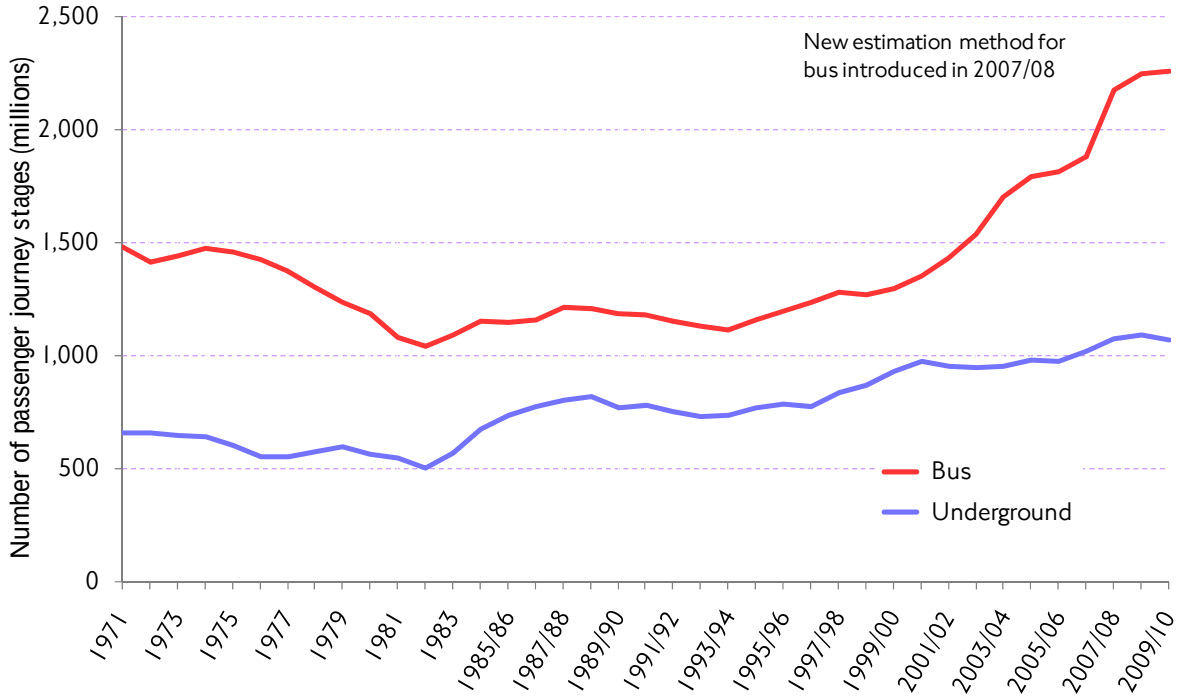
Table 2.6 Annual journey stages by public transport (millions), 1991/92 to 2009/10.

	Million journey stages					
Year	Bus	Underground	DLR	Tramlink	Overground	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	33	3,462
2009/10	2,257	1,065	69	26	35	3,452

Source: TfL Service Performance data.

Note on bus journey stages: 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.

London Overground

TfL London Rail operates rail services on the London Overground network within London. London Overground at the end of 2009/10 was 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 and included in the statistics for National Rail. London Overground statistics for 2009/10 do not include the East London line (formerly operated by London Underground until 2007/08) which re-opened in May 2010.

Passenger journeys by London Overground are included in the totals for London and South East operators in Table 2.7, as well as among the services operated by TfL in Tables 2.5 and 2.6. They amounted to 12.6 million journeys from November 2007 to March 2008 (part year), 33.1 million in 2008/09 and 34.6 million in 2009/10. Passenger kilometres on London Overground totalled 162 million in the last five months of 2007/08, 427 million in 2008/09, the first full year of operation, and 437 million in 2009/10.

2.10 Trends in travel by public transport - National Rail in London

Basic statistics of National Rail patronage are compiled by the ORR. Currently these do not give a clear spatial definition of trips into or within Greater London. However, as is clear from Table 2.7, reflecting patronage on all trains run by train operating companies classified by the ORR as London and the South East regional operators, the trend has been one of substantial passenger growth. Over the period between

2000/01 and 2009/10, passenger kilometres (all services by these operators, whether in London or outside) grew by 24 per cent. Passenger journeys grew by 27 per cent over the same period. However, between 2008/09 and 2009/10, passenger kilometres fell by 1.8 per cent and passenger journeys by 1.5 per cent, again reflecting the impact of the economic recession.

Table 2.7 National Rail: London and the South East operators, passenger kilometres and journeys, 1998/99 to 2009/10.

Year	Passenger kilometres (billions)	Year to year percentage change	Passenger journeys (millions)	Year to year percentage change
1998/99	17.1	..	616	..
1999/00	18.4	7.6	639	3.6
2000/01	19.2	4.3	664	4.0
2001/02	19.3	0.5	663	-0.1
2002/03	19.8	2.6	679	2.4
2003/04	20.1	1.7	690	1.6
2004/05	20.5	1.9	704	2.1
2005/06	20.7	1.1	720	2.2
2006/07	22.2	7.1	769	6.9
2007/08	23.5	6.1	828	7.7
2008/09	24.2	2.9	854	3.1
2009/10	23.8	-1.8	841	-1.5

Source: Office of Rail Regulation, National Rail Trends Yearbook, www.rail-reg.gov.uk .
2007/08 passenger journeys revised.

2.11 Road traffic in London

Context

This section summarises and updates key road traffic trends in London. The level of traffic in London, measured as vehicle-kilometres driven, has fallen in recent years. London traffic fell by more than 3 per cent during the period 2000 to 2008, and this decline continued at an increasing rate in 2009, with a further 3 per cent drop between 2008 and 2009.

While initially the scale of the decline was greater in Inner and central London than in Outer London, partly reflecting the introduction of Congestion Charging in central London in 2003, the latest change, between 2008 and 2009, was similar in all three areas. This 3 per cent fall in London for 2009 compares with a 1 per cent fall nationally in Great Britain, and is at least partly attributable to the wider effects of the economic recession that have similarly affected other areas.

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 2.7. While the overall demand for travel has been increasing with the growth in population, there has also been a consistent shift in mode share away from private transport towards public transport. Those factors specific to London that have affected the trend in road traffic over the longer term have included the high availability of public transport and reductions to the effective capacity of the road network.

Trends in road traffic in London

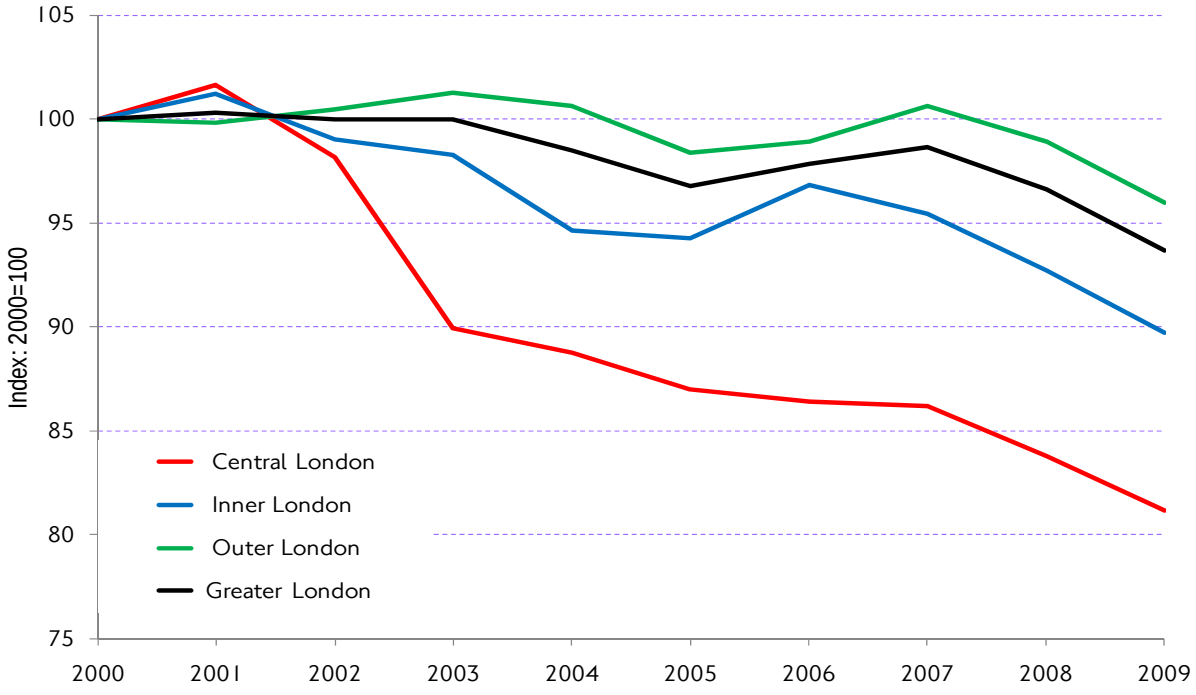
Total road traffic in London fell by 3 per cent between 2008 and 2009, having fallen by 2 per cent between 2007 and 2008 and by 1.4 per cent in the previous seven years between 2000 and 2007 (3 per cent overall between 2000 and 2008). The actual trend (Table 2.8 and Figure 2.6) shows a dip in 2005 to 3 per cent below the 2000 level, recovering slightly in 2006 and 2007 before declining again in 2008 and 2009. In contrast, traffic in Great Britain as a whole increased by 10 per cent between 2000 and 2007, but also fell in 2008 and 2009, by 0.8 per cent and 1 per cent respectively. These were the first year-on-year decreases recorded nationally since the 1970s.

Table 2.8 Index of London road traffic in central, Inner and Outer London: major and minor roads, all motor vehicles. Index: year 2000=100.

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	90.0	98.3	101.3	100.3	99.4	100.0	105.0
2004	88.8	94.6	100.6	99.4	96.8	98.5	106.7
2005	87.0	94.3	98.4	96.0	98.2	96.8	106.9
2006	86.5	96.8	98.9	97.4	98.6	97.8	108.6
2007	86.2	95.4	100.6	99.2	97.7	98.6	109.8
2008	83.8	92.7	98.9	97.4	95.2	96.6	108.9
2009	81.2	89.7	96.0	95.1	91.2	93.7	107.9

Source: TfL Planning.

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



Source: TfL Planning.

In London, the decrease in traffic between 2008 and 2009 in central and Inner London was a continuation of that experienced between 2007 and 2008, at a similar rate, about 3 per cent per annum in each case. In Outer London, however, the decline (3 per cent) in the year to 2009 was higher than the previous year (1.7 per cent between 2007 and 2008) – representing a significant acceleration of the downward trend.

It is still the case that over the past decade, traffic has fallen furthest in central London, where traffic in 2009 was 19 per cent lower 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 the introduction of charging from 2003 on traffic in the zone are only partly reflected in these trends.

Traffic in Outer London was 4 per cent lower in 2009 than in 2000, while traffic in Inner London fell by 10 per cent over the same period. These decreases in traffic have affected both major and minor roads, with minor roads showing the larger percentage decrease, 9 per cent, while major road traffic fell by 5 per cent, between 2000 and 2009.

Table 2.9 breaks down the total annual traffic (billion vehicle kilometres) for all motor vehicles by central, Inner and Outer London. For traffic statistics central London is approximated as the City of Westminster and the City of London, and Inner London as all other Inner London boroughs (see Appendix A Notes and definitions).

Table 2.9 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	1.2	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
2009	1.0	8.1	21.3	30.4	504.0

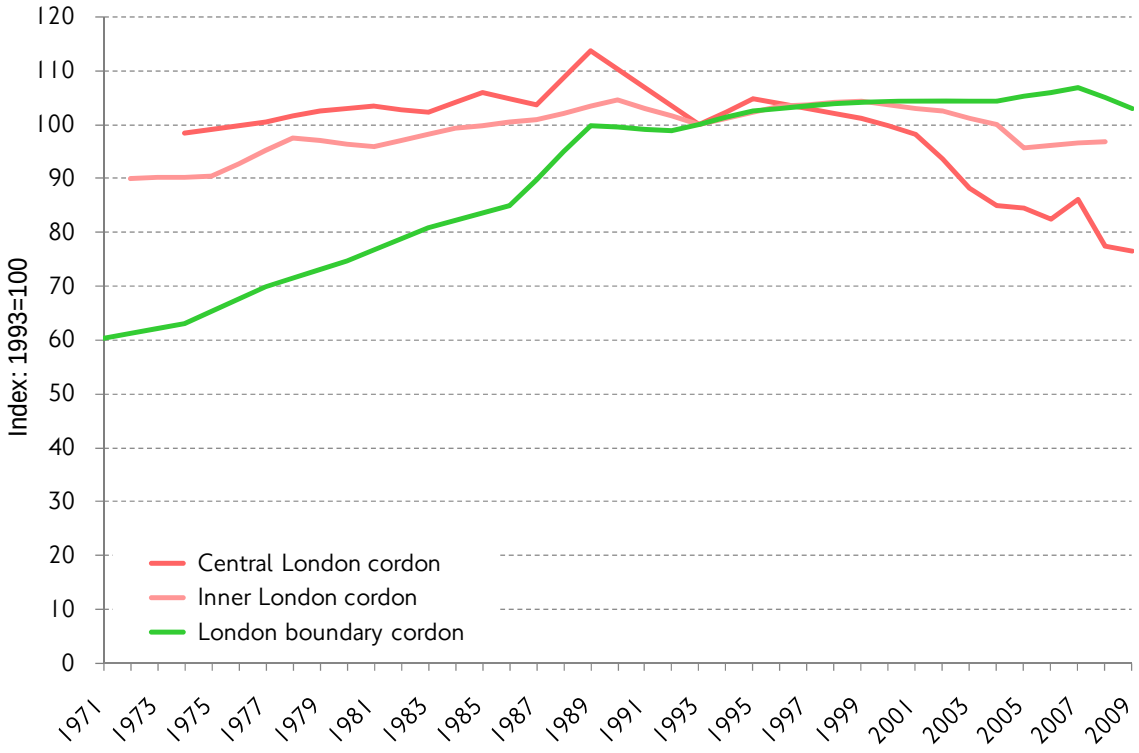
Source: TfL Planning.

Traffic trends based on counts across strategic cordons and screenlines

Long-term trends in traffic are also monitored by TfL's annual programme of surveys on strategic counting cordons and screenlines. These provide information on traffic trends at specific locations of strategic interest, and are therefore complementary to the vehicle-kilometre-based statistics described above. The main cordons are those around central London, Inner London, and at the Greater London boundary.

The trends in flows of vehicles crossing the three strategic cordons, in either direction, in a full 24-hour weekday are shown in Figure 2.7. Updates for both the central and London boundary cordons are available for 2009.

Figure 2.7 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.

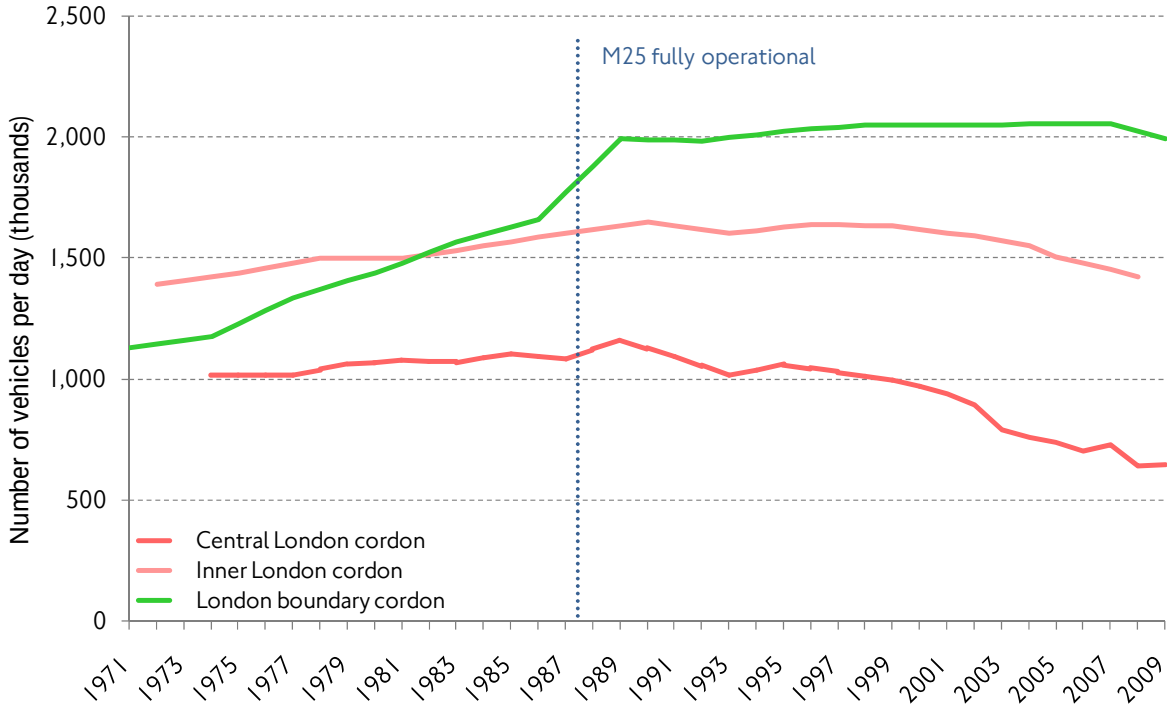
- On the central cordon, the count in 2009 continued the downward trend with a 1 per cent drop compared with 2008. The volume of traffic crossing into and out of central London has shown a steady decline since 1995 at an average rate of 2.4 per cent per year, interrupted only by a small upturn in 2007.
- Similarly there has been a downturn in traffic at the Inner London cordon although this started later (about 2000) and has not been so pronounced as at the central cordon.
- Traffic at the London boundary showed year-on-year growth throughout most of the 1990s and each year up to 2007. The latest count, in 2009, shows a decrease of 3.5 per cent compared with 2007.

Traffic trends by vehicle type

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 cordon, 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 2009 the car share was only 54 per cent of all motor vehicles at the central cordon.

The flow of cars (Figure 2.10) across the three cordons, therefore, shows similar trends to all motor vehicles but with larger decreases at the central and Inner cordons, and almost no growth at the London boundary, since the early 1990s. The total number of cars at the central cordon in 2009 was 33 per cent lower than in 2000, 44 per cent below the peak recorded in 1989, and 36 per cent lower than in 1974 when the series began.

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

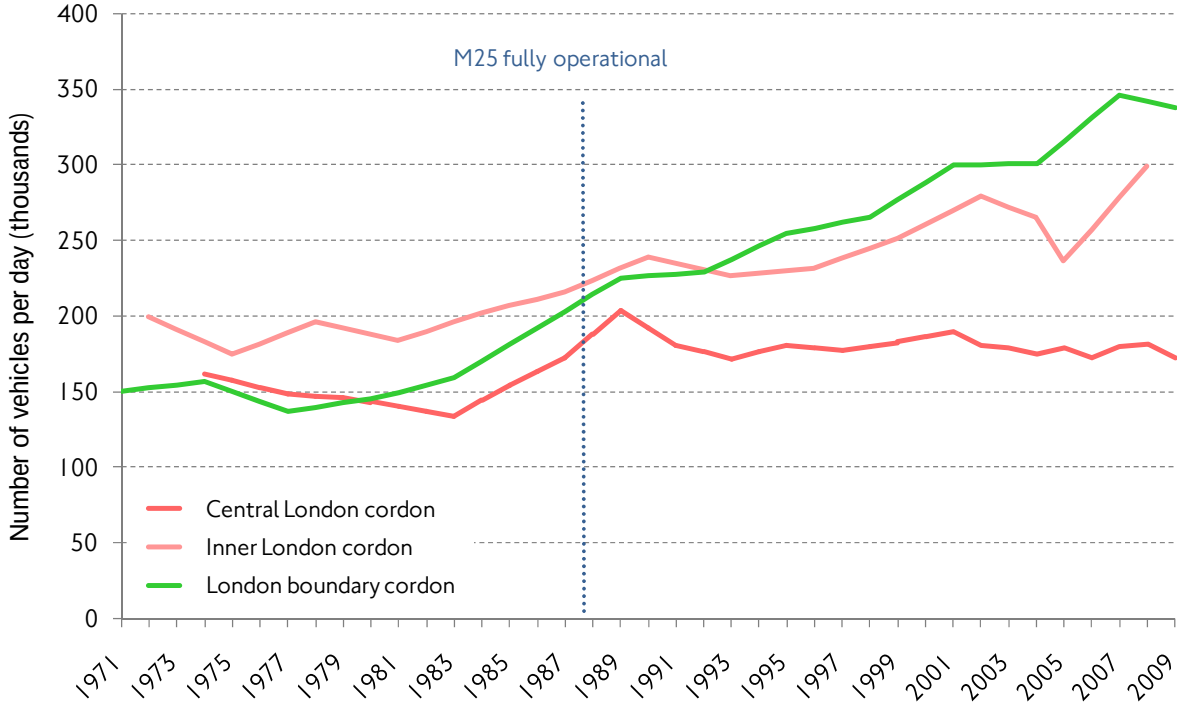


Source: TfL Road Network Performance.

The trend for vans and light goods vehicles 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 since 2000. The results from TfL's strategic cordons show vans growing particularly strongly at the London boundary cordon (Figure 2.9). 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 other goods vehicles. However, the 2009 counts at the boundary cordon and the central cordon show falls in the numbers of vans, in common with

other vehicle types, compared with the previous counts in 2007 and 2008, respectively.

Figure 2.9 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 Travel by bicycle in London

Key estimates of cycle trends

Cycle activity can be measured in several different ways. All measures show a substantial 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 measurements themselves.

Key indicators of cycle trends include:

- There were an estimated 0.5 million journey stages made by bicycle in Greater London on an average day in 2009.
- The number of journey stages grew by around 5 per cent between 2008 and 2009.
- It is estimated that cycle journey stages grew by 61 per cent between 2001 and 2009, having been broadly unchanged between 1993 and 2001.
- TfL collects data through a set of permanent automatic cycle counters on selected sections of the TLRN. Average flows here were 117 per cent higher in 2009/10 than in 2000/01.
- The number of cyclists passing TLRN count points grew by 5 per cent (or 10 percentage points) between 2008/09 and 2009/10.
- The number of people entering central London by bicycle in the weekday morning peak more than doubled (an increase of 123 per cent) between 2001 and 2009. This included an increase of 15 per cent between 2008 and 2009.

Chapter 11 of this report provides information on the 2010 'Year of Cycling', including Barclays Cycle Hire and Barclays Cycle Superhighways. This section deals with the position to 2009 or the end of the 2009/10 financial year.

Estimate of total cycle journey stages in London

A new method for tracking the daily average numbers of cycle stages and trips has been introduced for this report, resulting in some revisions to the series for cycling included in Tables 2.1 and 2.2, and the derived mode shares in Tables 2.3 and 2.4. This affects the 2001 to 2008 figures. The estimates are based on counts of cyclists on the road network, expressed in terms of total cycle kilometres travelled, from which aggregate numbers of cycle journey stages and trips are derived using data from the London Travel Demand Survey (LTDS, see chapter 3 of this report). The resulting estimate is that cycling journey stages increased by 61 per cent between 2001 and 2009, including a 5 per cent growth between 2008 and 2009, and that cycling journey stages were around 0.5 million per day in 2009. The available cycle counts use the full range of surveys available, covering all road classes, and including TfL's automatic cycle counters on the TLRN and other major roads, TfL's cordon and screenline counts, and surveys taken by the DfT for the national road traffic estimates. The LTDS survey also provides data on use of cycles for access and egress to other means of transport, which are then used to derive cycle (main mode) trips from the stage estimates.

From 2010/11, additional questions in LTDS will collect data on cycling trip numbers in a full 7-day week for each cyclist in the sample. Future growth in cycling will be measured using the trends in traffic-based estimates, the LTDS results for London residents, and monitoring data for specific schemes including Barclays Cycle Hire and Barclays Cycle Superhighways (see also chapter 11 of this report).

Cycle flows on London's major road network

This section looks at data relating to trends in cycle use on the London major road network to 2009. Note that this does not include any changes as a result of the Year of Cycling, Barclays Cycle Hire and Barclays Cycle Superhighways which were launched in 2010.

TfL collects data through a set of permanent automatic cycle counters on selected sections of the TLRN (see Figure 2.10 for a map of the count sites). Average flows here were 117 per cent higher in 2009/10 than in 2000/01 (Figure 2.11). The growth between 2008/09 and 2009/10 was five per cent (or 10 percentage points).

Figure 2.10 Map of cycle count sites on the TLRN.

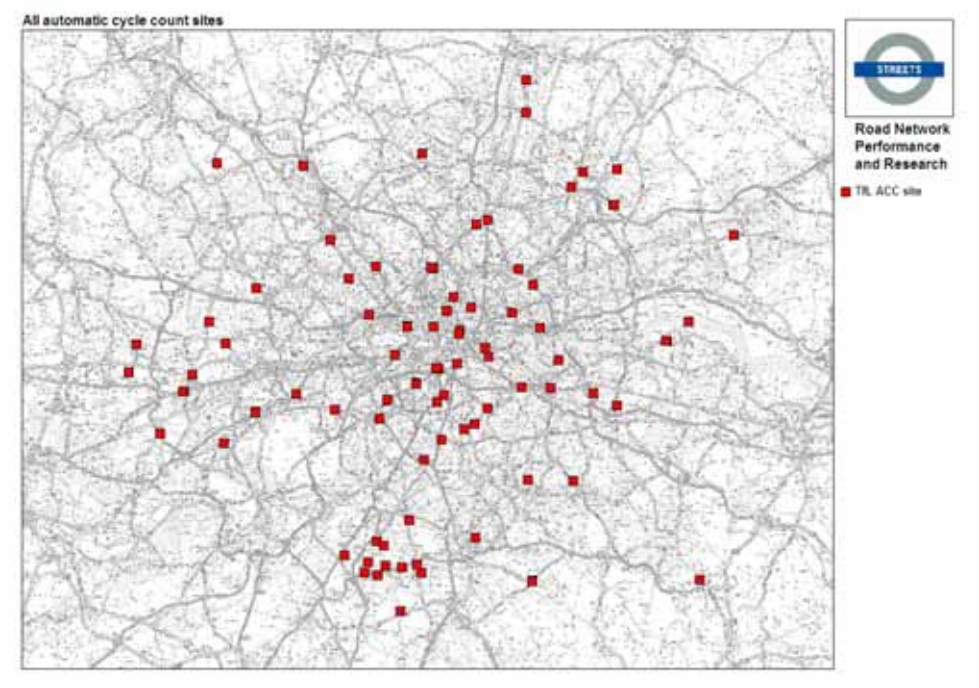
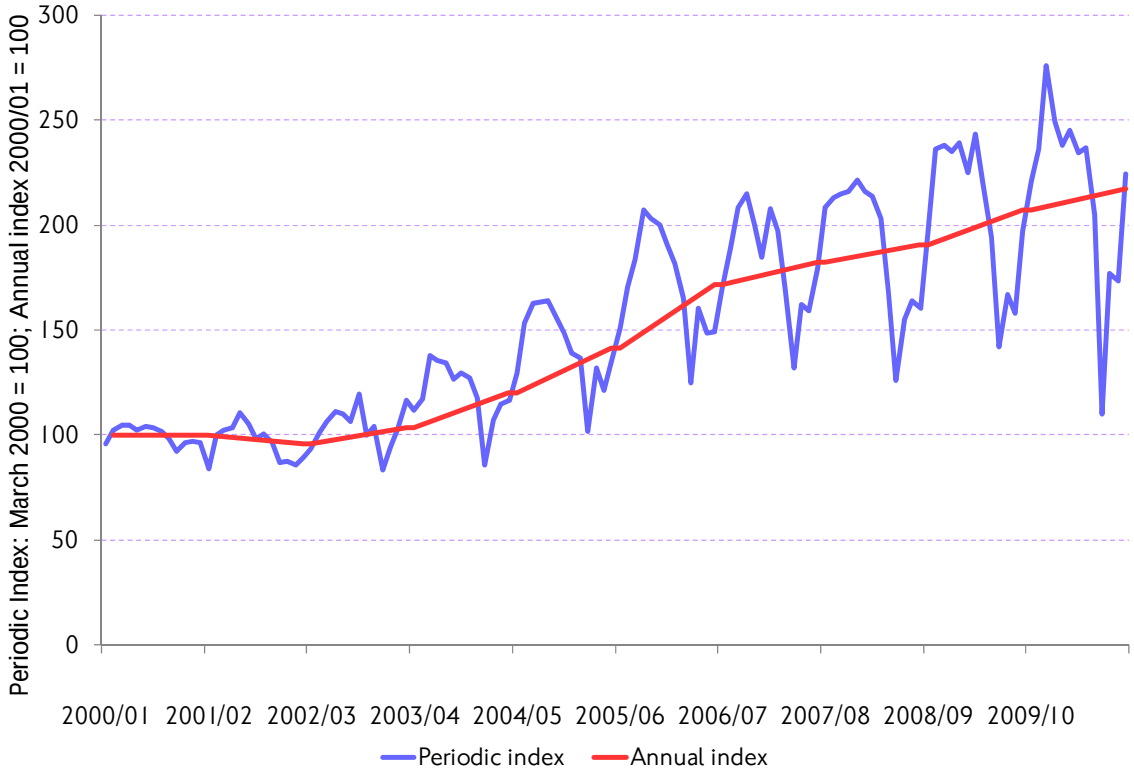


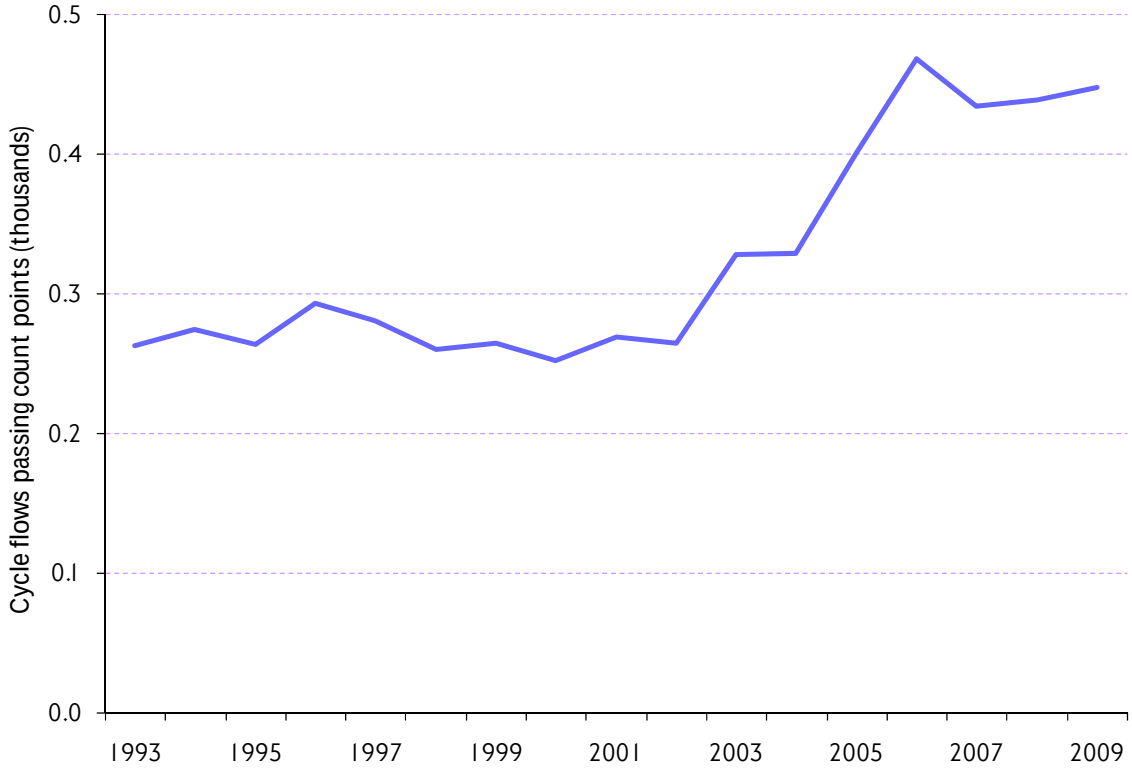
Figure 2.11 Trends in cycle flows on the TLRN, annualised and periodic indices.



Source: TfL Streets.

Figure 2.12 shows average daily two-way cycle flows on London's major roads since 1994, based upon the DfT National Road Traffic Survey; this includes counts of traffic on the TLRN and borough principal roads, some 1,720km in total. The trend was effectively flat between 1994 and 2001, but then increased such that average daily flows have since increased by 78 per cent, against a 2000 base.

Figure 2.12 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.

Cyclists entering central London in the weekday morning peak

The number of people entering central London in the weekday morning peak by bicycle increased by 15 per cent in 2009 – and more than doubled (an increase of 123 per cent) between 2001 and 2009.

2.13 Focus on: travel to central London in the weekday morning peak

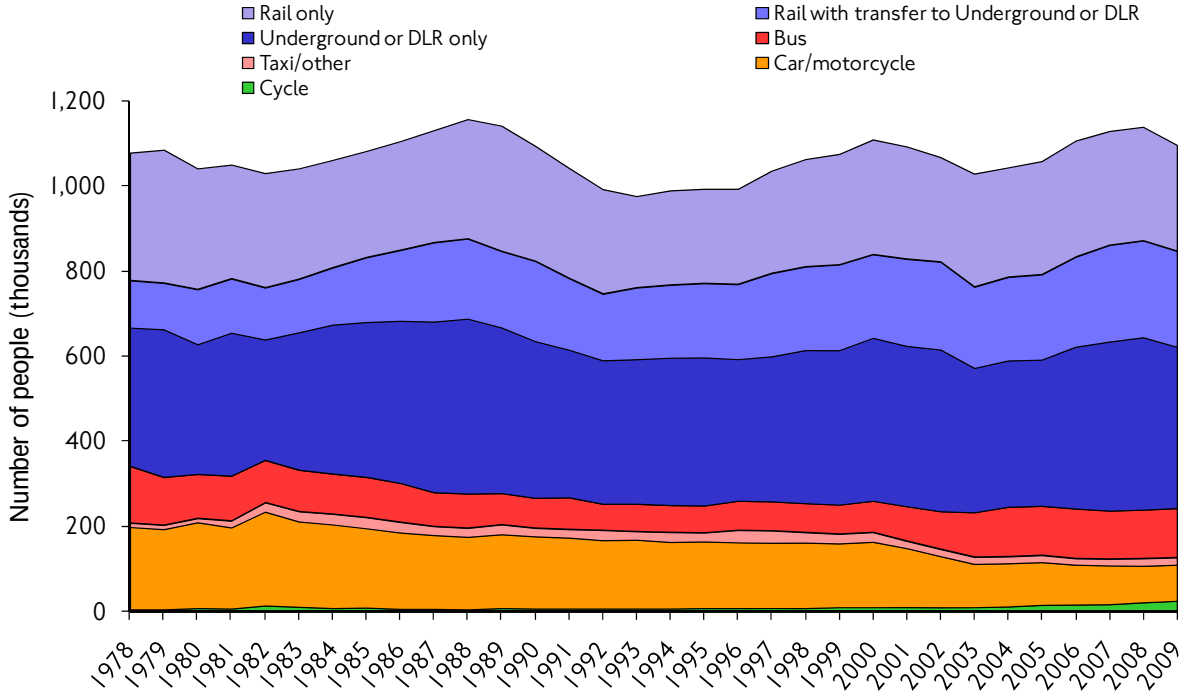
TfL's CAPC survey is a long-established annual count of people entering central London during the weekday morning peak period (07:00 to 10:00). Most of these people are commuting to work in central London.

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. The location of counts is such that there is no overlap between counts of bus passengers or occupants of other road vehicles and 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 2.13, 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 million and 1.2 million since the survey began in the late 1950s. Historically the series shows a cyclical pattern following the cycle of employment in central London. In recent years the total peaked in 2008 at 1.14 million, a 1 per cent increase from the previous year, and then declined relatively sharply by 4 per cent to 1.10 million in 2009, reflecting the impact of the economic recession of 2008 and 2009.

Figure 2.13 People entering central London in the weekday morning peak, 1978 to 2009.



Source: TfL Planning, CAPC survey.

Within a relatively stable overall total, there have been significant shifts in some of the modes of transport used to travel into central London (Figure 2.14). 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 again declined in 2009, falling by 0.4 per cent compared with the previous year and continuing a downward trend that began in 2001. The total of car travellers, 70,000, was only half the number recorded 10 years earlier. This trend was reinforced by the introduction of central London Congestion Charging in 2003.

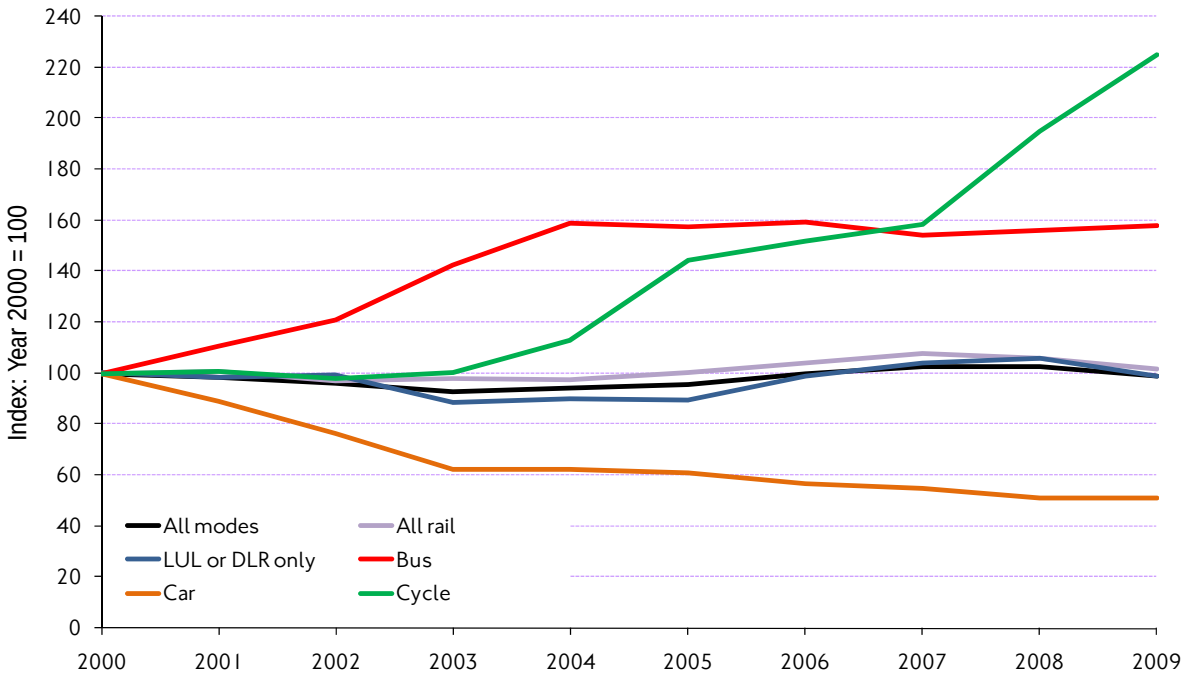
Rail passengers decreased by 4 per cent and Underground with DLR (excluding passengers who transfer to Underground from rail at their terminus) fell by 6 per cent. Bus passengers increased by 1 per cent, giving a net decrease of 4 per cent in the total for public transport.

As in the previous year, the largest percentage change was recorded for cycling, which increased by 15 per cent between 2008 and 2009, following an increase of 23

per cent between 2007 and 2008. There were 27,000 cyclists, accounting for 2.5 per cent of people entering central London during the morning peak, more than twice as many as in 2001.

Table 2.10 shows the year-by-year CAPC results since 1991, while Table 2.11 gives the corresponding mode shares.

Figure 2.14 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 2.10 People entering central London in the weekday morning peak, by mode of transport, 1991 to 2009.

Thousands of people

Year	All modes	Rail only	Rail with transfer to LU/DLR	All rail	LU or DLR only	Bus	Coach/ minibus	Car	Taxi	Two-wheeled motor vehicles	Cycle
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	190	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	1,139	266	227	493	405	114	11	70	7	15	23
2009	1,096	248	225	473	379	115	11	70	6	15	27

Source: TfL Planning, CAPC survey.

Table 2.11 Mode shares of people entering central London in the weekday morning peak, 1991 to 2009.

Percentage

Year	All modes	Rail only	Rail with transfer to LU/DLR	All rail	LU or DLR only	Bus	Coach/ minibus	Car	Taxi	Two-wheeled motor vehicles	Cycle
1993	100	22	17	39	35	7	2	15	..	1	1
1994	100	22	17	40	35	6	2	15	..	1	1
1995	100	22	18	40	35	6	2	15	..	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
2009	100	23	21	43	35	11	1	6	1	1	2

Source: TfL Planning, CAPC survey.

3. Travel by Londoners and key trends in freight, water transport and taxis

3.1 Introduction

Chapter 2 of this report described trends and developments in relation to overall travel demand and mode shares in London, in terms of personal travel by all people across the major transport modes. This chapter looks in more detail at the travel behaviour of Londoners. It then looks at a range of developments specific to particular travel modes or transport sectors in London, including carriage of freight, the use of waterways and taxis and private hire.

3.2 Key features and trends

TfL's London Travel Demand (LTDS) Survey

Previous Travel in London reports summarised the aims and method of TfL's LTDS survey, looking at the travel patterns and behaviours of London's residents, and exemplified the richness of the LTDS dataset. These data also provided part of the 'evidence base' for the MTS. This gave statistical exemplification for how:

- Travel volumes and origin/destination patterns of Londoners' travel 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.

Data from the 2009/10 round of this survey are now available, alongside data going back to the first of these annual surveys in 2005/06. Whilst this survey is not optimised to track detailed quantitative change from year to year, the following developments are evident from the latest data:

- Trip rates (the average number of trips made per person per day) by London residents fell by 0.5 per cent in 2009/10, reflecting the economic recession.
- Trip rates by London residents on public transport fell by 3.6 per cent in 2009/10 against the previous year, reflecting the impact of the recession on travel in London. This is consistent with the overall trends for public transport use described in chapter 2 of this report. Car driver trips fell by 0.5 per cent in 2009/10, following a large fall in these trips in 2008/09.
- The time Londoners spend travelling continued to decrease slowly, to less than 68 minutes for an average person on an average day.
- The average daily distance travelled per person within London (that is, on trips with both origin and destination in Greater London) also decreased slightly over the previous year.
- Cycle trip rates increased in 2009/10. Cycle mode share was highest for Inner London residents at 2.9 per cent compared 1.5 per cent for Outer London residents and 2.1 per cent for Londoners overall.

Freight in London

- Both road and rail freight fell substantially in 2009. The tonnage of road freight lifted in London in 2009 was 25 per cent lower than in 2008, compared to an 18 per cent reduction nationally. The overall tonnage figure for 2009 is 31 per cent below the historic peak of 2006. These trends clearly suggest a dramatic impact from the economic recession.
- Total London rail freight lifted was 6.7 million tonnes in 2009, down from 7.3 million tonnes in the previous year. However, air freight handled at London's airports totalled 1.76 million tonnes in 2009, an increase of 1 per cent on 2008.

Developing London's waterways

- The number of passengers carried on the river Thames doubled between 2000/01 and 2009/10, with particularly high growth, over 26 per cent, between 2007/08 and 2008/09.
- A key step in integrating river transport into London's public transport system was the extension of Oyster 'pay as you go' to commuter river services in November 2009.
- Integration of river services into London's public transport networks is also being taken forward by improved signage at interchanges with Underground and DLR, and with rail and bus services.
- For the 2012 London Olympic and Paralympic Games, the river will play an important part in carrying spectators to the Games. Plans are in preparation to provide additional services, with extra capacity to respond to demand, between central London and Olympic sites in East London, including the Olympic Park and Greenwich.

London's taxis and private hire

- London's 22,000 licensed taxis account for about 200,000 journey stages per day. The number of taxi drivers licensed in London has remained fairly stable at almost 25,000 since 2003, while the number of licensed taxi vehicles has continued to increase.
- The number of Private Hire Vehicles (PHV) licensed has grown from 37,000 in 2005 to 49,000 in 2009 and 2010. Over the same period, the number of licensed drivers has increased from 19,000 to 59,000, working within 2,900 operator businesses. In part, this trend reflects the progressive nature of the licensing process over recent years.

3.3 Travel by Londoners: TfL's LTDS survey

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 LTDS survey. 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. It can therefore provide a unique window on the travel needs of Londoners, and their likely responses to a range of potential policies.

Update for 2009/10

This section briefly updates headline trends and statistics with results from the 2009/10 round of the LTDS survey, comparing these where appropriate with findings

and trends from the earlier survey years going back to 2005/06 and also with the overall travel demand trends outlined in chapter 2 of this report.

Key findings for 2009/10

- Trip rates of London residents fell by 0.5 per cent in 2009/10, reflecting the economic recession.
- Trip rates by London residents on public transport fell marginally, by 3.6 per cent, while car driver trips per person fell by 0.5 per cent, after a large fall in car driver trips in 2008/09.
- People in households with access to two or more cars had higher trip rates in 2009/10 than the previous year, whereas trip rates decreased amongst people in households with only one car or none. Car ownership levels were almost unchanged overall.
- The average time Londoners spent travelling continued to decrease slowly, to less than 68 minutes on average per person per day.
- The average daily distance travelled within London also decreased slightly. This is shown by distance travelled per person on trips with both origin and destination in Greater London, which fell by 1 per cent.
- Cycle trip rates increased in 2009/10, particularly among residents of Outer London. Cycle mode share was highest among residents of Inner London at 2.9 per cent, compared 1.5 per cent for Outer London residents and 2.1 per cent for Londoners overall.

Travel by Londoners - recent developments

The LTDS survey is better at characterising travel behaviour and features of travel demand by residents of London, for example in terms of journey purpose, transport modes and type of travel, than at quantifying trends in the aggregate travel volumes in London. Nevertheless, indications of change can be derived that can be used to supplement modal sources on public transport and road traffic to understand change more robustly. In this context, results for the 2008/09 LTDS survey suggested that travel by London residents fell sharply, and that this lower level has been maintained in 2009/10.

LTDS results are restricted to travel by household residents of London and in the period between 2007/08 and 2009/10 they largely mirror the overall aggregate demand trends for travel by public transport. For car travel, LTDS suggested a larger decline in 2008/09 among London residents than was reflected in the road traffic statistics. However, these two sources are not directly comparable, since traffic on the road covers more vehicle movements than are accounted for by residents' personal travel. In particular, it includes travel for delivery of goods which is outside the scope of LTDS, as well as travel by visitors, tourists and commuters not resident in London households.

- From LTDS, the total number of trips made by London residents on an average day was 17.1 million in 2009/10, similar to 2008/09 and 6 per cent lower than the average of the preceding three years, which was 18.3 million.
- This in turn reflects a decline in personal trip rates - the average number of trips made per person per day. These fell to 2.4 in 2008/09, down 8 per cent from the average of 2.6 for the preceding three years.

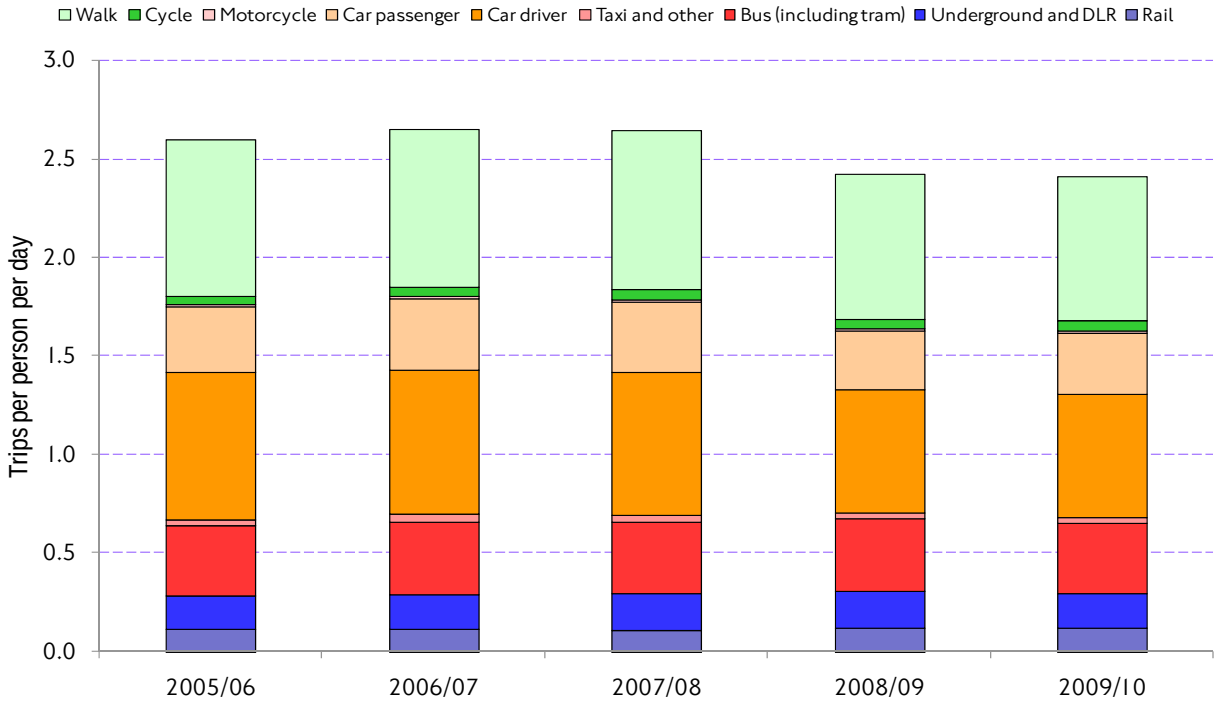
- Examination of the data shows that these overall trends and directions of change affected all parts of London and all groups of the resident population, albeit with some specific features of interest. The data clearly show a 'recessionary impact' on trip rates starting during the second half of 2008 and persisting throughout 2009 and into 2010, affecting both 2008/09 and 2009/10 survey years.

Travel by Londoners - trip rates

Average trip rates by London residents were 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, in the three annual LTDS surveys between 2005/06 and 2007/08, Londoners made 2.6 trips per person per day.

Data from the LTDS survey in 2008/09 showed a clear break with earlier years, indicating a substantial fall in average trip rates, from 2.6 to 2.4 trips per person per day. This has been continued, with the latest LTDS results for 2009/10, showing very similar results in overall trip rates to those of 2008/09. Figure 3.1 shows these trends in total travel and also broken down by mode of transport (when trips are classified according to the main mode used in the course of each trip).

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



Source: TfL Planning, LTDS.

- The average London resident made 2.42 trips per day in 2008/09, and 2.41 in 2009/10, compared with an average of 2.63 in the three years to 2007/08.
- The total number of trips made by London residents on an average day in 2009/10 was 17.1 million, slightly higher than in 2008/09 and down from an average of 18.3 million per day in the three previous years.
- The decrease in 2008/09 resulted mainly from falls in car driver and car passenger trip rates, which LTDS suggests fell by 14 and 16 per cent respectively

for London residents. Compared with 2008/09, car driver trips per person were almost unchanged in 2009/10 but car passenger trips increased by 4 per cent, indicating a slight rise in average car occupancy.

- Trip rates for the public transport modes all increased slightly in 2008/09 but fell back in 2009/10. Trip rates for main mode bus trips by London residents fell by 4 per cent, and Underground trips by 7 per cent, while rail trips increased by 2 per cent.

The limitations of the LTDS surveys for quantifying year-on-year change, together with the timing of the recent economic recession, mean that a 'two-year-view' of the results for both 2008/09 and 2009/10 provides the best appreciation from this source of the impact of the recession on the travel behaviour of Londoners. This particularly applies to changes in mode shares, where small apparent increases in travel by car in 2009/10 should be seen in the light of the very significant falls in trip rates in 2008/09. For public transport, the small falls in 2009/10 relative to 2008/09 reflect a relatively stable position compared with the pre-recession level.

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	2009/10
National Rail	0.11	0.11	0.11	0.11	0.12
Underground/ DLR	0.17	0.17	0.19	0.19	0.17
Bus/tram	0.35	0.37	0.36	0.37	0.36
Taxi/ other	0.03	0.04	0.03	0.03	0.03
Car driver	0.75	0.73	0.73	0.63	0.62
Car passenger	0.33	0.36	0.35	0.30	0.31
Motorcycle	0.01	0.02	0.01	0.01	0.01
Cycle	0.04	0.05	0.05	0.05	0.05
Walk	0.79	0.80	0.81	0.74	0.73
All	2.59	2.65	2.64	2.42	2.41

Source: TfL Planning, LTDS.

Travel by Londoners - overall mode shares

A result of the decline in public transport trips rates in 2009/10 was that the share of public transport trips by Londoners fell marginally from 29 per cent of all London residents' trips in 2008/09 to 28 per cent in 2009/10. This compares with the previously increasing trend and a public transport share of 26 per cent in 2007/08. Conversely, the share of trips made by car rose slightly from 38 per cent in 2008/09 to 39 per cent in 2009/10, still lower than the 41 per cent recorded in 2007/08 (Table 3.2).

Table 3.2 Shares of London residents' trips by main mode, 2005/06 to 2009/10. Seven-day week.

	2005/06	2006/07	2007/08	2008/09	2009/10
National Rail	4	4	4	5	5
Underground/DLR	7	7	7	8	7
Bus/tram	14	14	14	15	15
Taxi/other	1	2	1	1	1
Car driver	29	28	28	26	26
Car passenger	13	14	13	12	13
Motorcycle	1	1	1	1	1
Cycle	2	2	2	2	2
Walk	31	30	31	30	30
All	100	100	100	100	100

Source: TfL Planning, LTDS.

Travel by Londoners – travel time and distance

The distances people travel and the time spent in travelling are important variables that reflect both personal travel characteristics and the operation and performance of the transport networks. According to LTDS (Table 3.3), the amount of time London residents spent travelling on an average day continued to decrease in 2009/10, to an average of under 68 minutes per person per day. The mode-specific trends in time spent travelling generally reflect the changes in overall mode share (see Table 3.2 above).

Table 3.3 Time spent travelling per day by London residents by mode of transport.

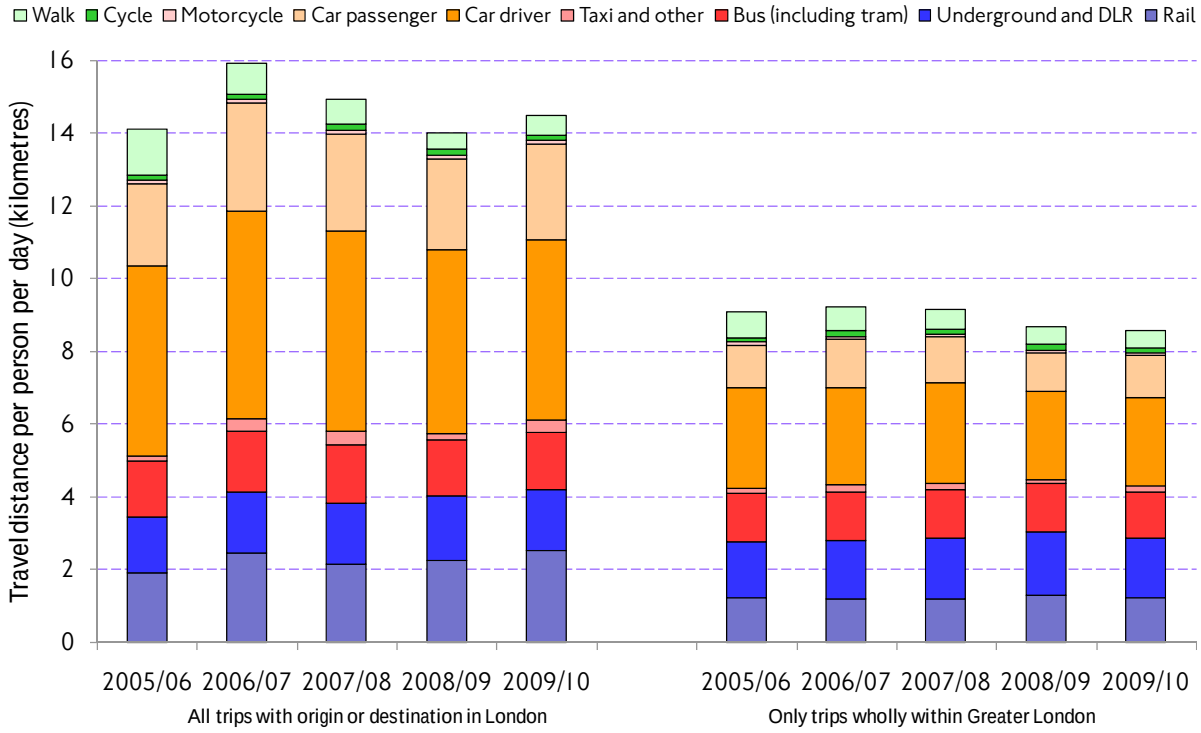
	2005/06	2006/07	2007/08	2008/09	2009/10
National Rail	5.1	5.2	4.4	4.3	4.5
Underground/ DLR	6.9	7.1	6.7	6.6	6.4
Bus/tram	13.3	13.0	12.0	12.1	11.7
Taxi/ other	1.1	1.4	1.1	0.7	0.9
Car driver	18.4	18.3	17.6	16.6	16.3
Car passenger	7.5	9.0	8.0	7.0	7.5
Motorcycle	0.3	0.3	0.3	0.4	0.3
Cycle	0.8	1.0	1.0	1.0	1.0
Walk	21.6	19.7	18.4	19.4	19.2
All	75.0	74.9	69.5	68.1	67.8

Source: TfL Planning, LTDS.

In contrast to the small decrease in time spent travelling by London residents, the average distance travelled increased by 3 per cent in 2009/10. This was mainly due to an increase in National Rail trips, for which average journey lengths tend to be longer than for other public transport modes.

However, average travel distance can be distorted by long distance trips made to or from Greater London. The right-hand side of Figure 3.2 includes only trips with both origin and destination within Greater London. This exhibits much lower variation than the left-hand side of the graph, and shows a 1 per cent decrease in average daily distances travelled in 2009/10.

Figure 3.2 Distance travelled per day (kilometres) by London residents.



Source: TfL Planning, LTDS.

3.4 Focus on: car ownership and travel behaviour

This section looks at trends in car ownership and use in London. It also highlights some recent work conducted by TfL which explores the particular determinants of patterns of car ownership and use in London.

Car ownership levels and trends

Levels of car ownership in London have tended to be lower than those of the rest of the country. According to the National Travel Survey (2008/09), 43 per cent of households in London did not own a car, compared to 23 per cent nationally. A similar difference is evident for multiple car ownership with 17 per cent of households in London having two or more cars compared to 34 per cent in the rest of the country. Looking at longer term trends NTS shows evidence of a decline in car ownership levels in London in recent years.

Levels of car ownership in London are also measured by TfL's LTDS survey which, in addition to London-wide estimates, allows disaggregation by area of London. As Table 3.4 shows, car ownership levels have not changed significantly during the five years of the survey, 2005/06 to 2009/10. The proportion of households with no cars has remained constant at 42 per cent, those with only one car varied between 41

and 43 per cent, and households owning two or more cars stood consistently at around 15 per cent.

Car ownership patterns differ significantly across London. Levels of car ownership in Outer London are higher than Inner London, albeit still relatively low when compared to the rest of Great Britain – 32 per cent of households in Outer London have no car, compared with 57 per cent of Inner London households.

Table 3.4 Car ownership in Inner and Outer London, 2005/06 to 2009/10.

	Percentage of households				
	No cars	One car	Two cars	Three cars 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
2009/10	42	43	12	3	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
2009/10	57	37	6	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
2009/10	32	47	17	4	100

Source: TfL Planning, LTDS.

Factors affecting car ownership in London

Car ownership is linked to household income and although this relationship is very strong, with households having lower incomes being less likely to own a car than households with higher incomes, there is evidence to suggest that other factors also influence car ownership in the Capital.

As a typical 'consumer good' the factors influencing car ownership can be grouped together into categories as follows:

- Price of cars, including purchase price, fixed running costs such as Vehicle Excise Duty and insurance and variable or use-related running costs such as fuel, parking and Congestion Charges.
- Quality of cars and the highway network, including vehicle quality and functionality and the level of service offered by the road network and parking supply.
- Price and quality of substitutes, including price, availability and quality of alternative means of travel. This includes access to public transport but also the

ease with which journeys can be made by walking or cycling, which implicitly relates to the spatial distribution of services and opportunities.
- Household income – which influences a household's ability to pay for a vehicle.
- Need to own and use a car, which is strongly influenced by the household size, structure, employment and location.
- Tastes and preferences, which determine the extent of influence of the other, more 'rational', factors. They would be influenced by lifestyle, values, perceptions and interests among other things.

TfL has undertaken detailed cross-sectional analysis of existing datasets in order to understand which factors influence car ownership in London and the role that they play in explaining differences by area of London. The following factors have been shown to explain the level of car ownership at the detailed geographical level:

- Household structure
- Household income
- Tenure
- Nationality
- Parking availability
- Public transport accessibility
- Access to employment and services
- Up-front and ongoing costs

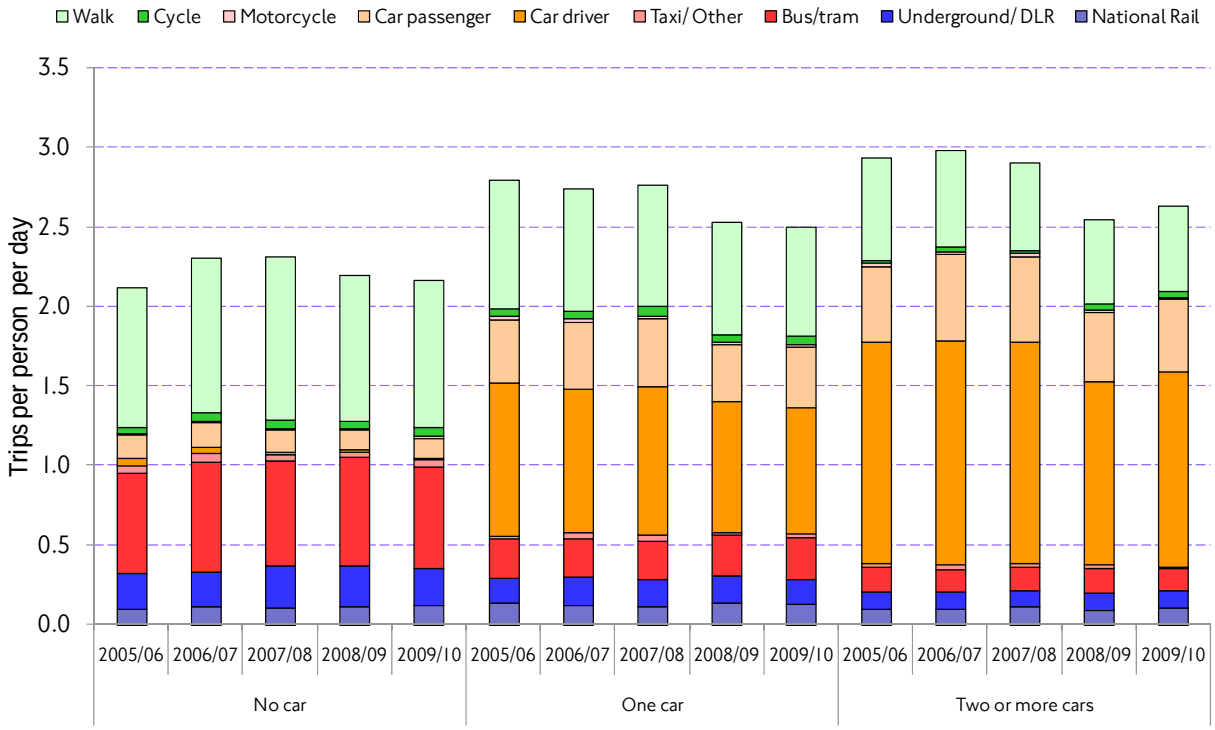
This analysis led to the development of a new car ownership modelling capability which enables TfL to test various options for policy interventions, and to study their potential influence on the level of car ownership across London.

Developing an understanding of car ownership is important, but TfL is also keen to improve understanding of car use and its relationship with car ownership. Car use is obviously highly linked to car ownership with almost all car trips made by people living in car owning households, as Figure 3.3 shows. It is also evident that people in car owning households make more trips overall than those without access to a car.

However, TfL's LTDS survey shows that among Londoners there is a recent declining trend in trip making overall – which is particularly driven by a reduction in car journeys. Trips made by people in households with one car fell by 9 per cent between the period 2006/07 to 2007/08 and the latest two survey years, 2008/09 and 2009/10. Car trips by these people fell by 12 per cent. Similarly trips by people living in households with two or more cars fell in the same period by 12 per cent, while their car trips fell by 15 per cent.

The emerging picture for London is therefore one of stable car ownership levels and declining car use – trends which have significant implications for transport policy development.

Figure 3.3 Trips per person per day, by household car ownership.



Source: TfL Planning, LTDS.

3.5 Freight in London

This section updates trends for freight in London, volumes of which declined significantly during 2009. The total weight of freight lifted in London decreased by 23 per cent in 2009, with road freight down substantially, by 25 per cent, and rail and waterborne freight down by 8 and 12 per cent respectively.

Road freight accounted for 86 per cent by weight of all freight lifted in London in 2009, down from 89 per cent in the preceding two years. The rest is carried mainly by rail or water, making up 5 and 7 per cent, respectively, of freight lifted. Each of these freight modes increased their share by 1 percentage point in 2009. Air freight through London's airports makes up the remaining 1 per cent of freight lifted, and consists largely of high value items, generally in relatively low weight consignments.

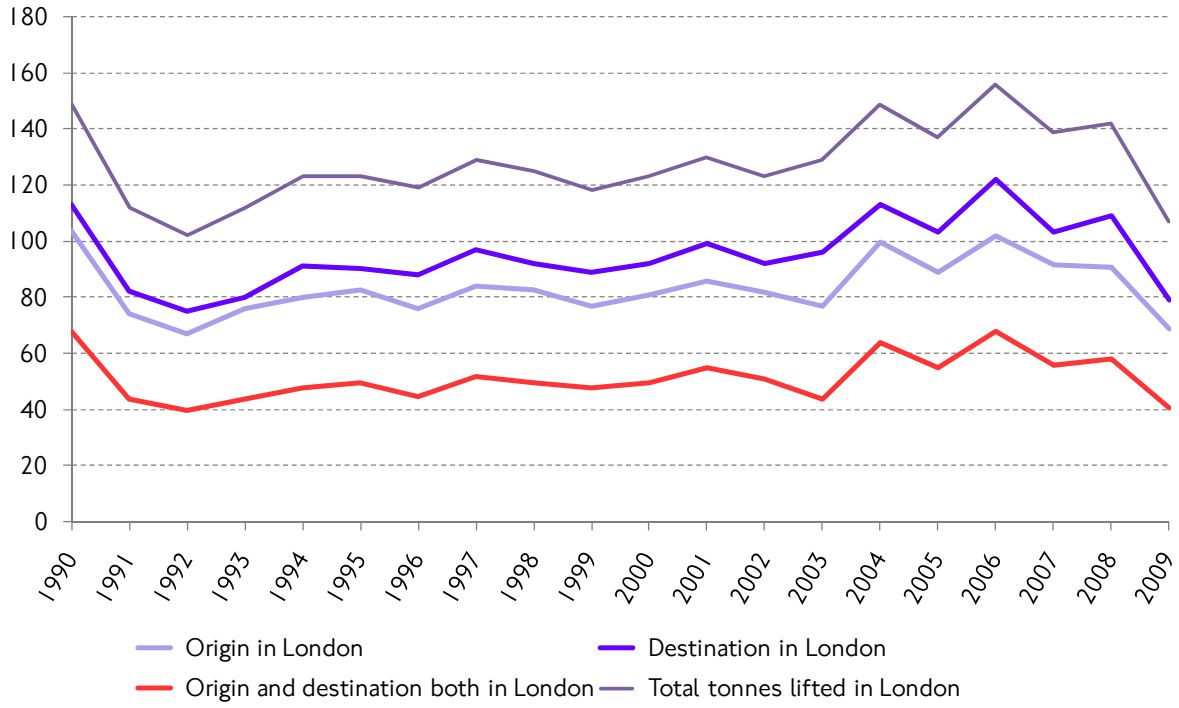
Road freight

Overall, road freight lifted in London in 2009 was 107 million tonnes, 25 per cent lower than in 2008. Freight originating in London fell by 24 per cent; freight with a destination in London by 28 per cent, and freight moved wholly within London by 29 per cent. The overall total is 31 per cent below the historic peak of 2006, and the lowest amount lifted in any year since 1992. This year-on-year decline in freight tonnage is more severe than is indicated by the traffic trends for goods vehicles, which account for 17 per cent of London road traffic (vehicle kilometres): vans and light goods vehicles traffic fell by 17 per cent between 2007 and 2009, while other goods vehicles fell by 4 per cent. This suggests some changes in patterns of distribution as a result of the recessionary effects on construction and economic

activity. Counts of vans and light goods vehicles taken at cordons in 2009 also declined compared with the previous year (see section 2.11 of this report).

The dramatic reductions in freight lifted in London were repeated, albeit to a slightly lesser degree, across Great Britain as a whole, where the tonnage of goods lifted decreased by 18 per cent and associated vehicle kilometres by 11 per cent in 2009 in relation to 2008.

Figure 3.4 London road freight lifted.



Source: Department for Transport.

Rail freight

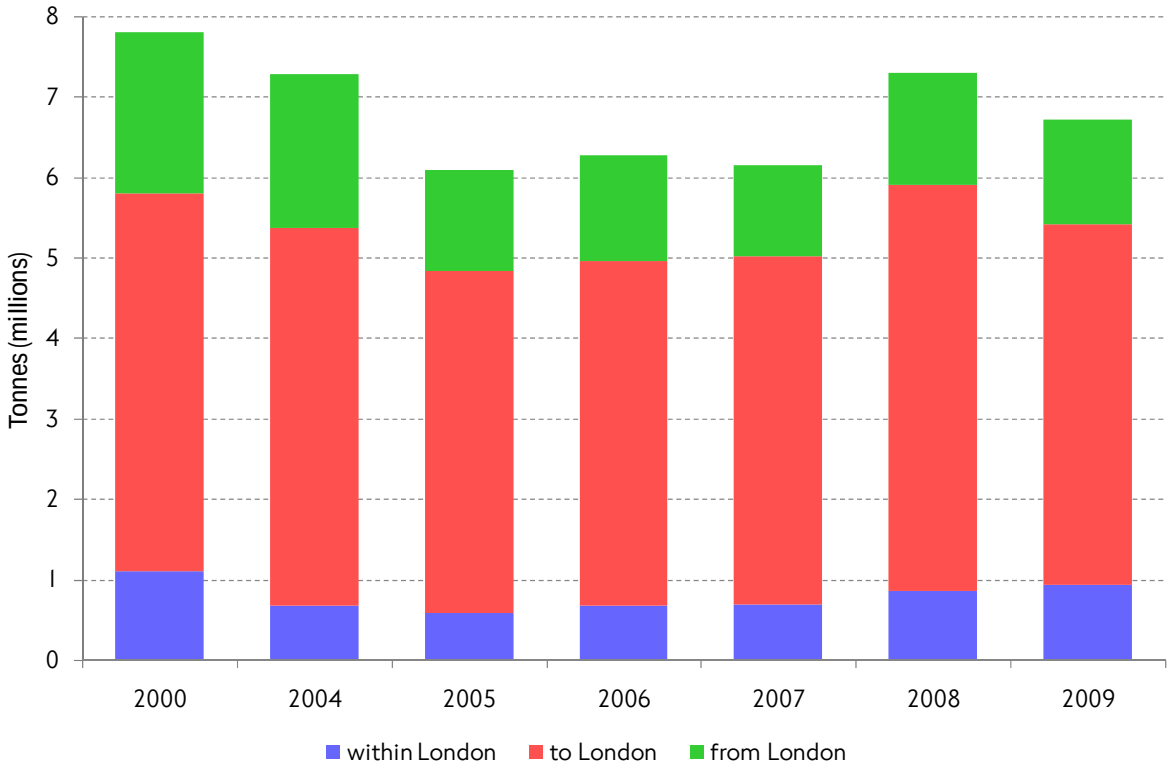
Rail freight is carried by privately-owned companies and, to preserve commercial confidentiality, detailed results for freight lifted or moved are not available. Annual rail freight data for London have not been published since 1994. Summary data for selected years for freight lifted in London, provided by Network Rail for independent analysis for TfL, are shown in Figure 3.5.

The freight lifted by rail on journeys to, from and within London in 2009 represented 7.5 per cent of the total rail freight lifted in Britain in 2009. In addition to freight loaded or unloaded in London, considerable quantities of rail freight pass through London to and from other regions (not included in Figure 3.5).

Total London rail freight lifted was 6.7 million tonnes in 2009, down from 7.3 million tonnes in the previous year, a decrease of 8 per cent, mainly due to a decrease in freight coming into London from other regions. Nationally, the tonnage of rail freight lifted fell by 14 per cent. More than two thirds of the London rail freight tonnage originated outside London.

The major flow of rail freight into and within London is 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 each year since 2007.

Figure 3.5 Rail freight lifted to, from and within Greater London.



Source: Network Rail data processed by MDS Transmodal.

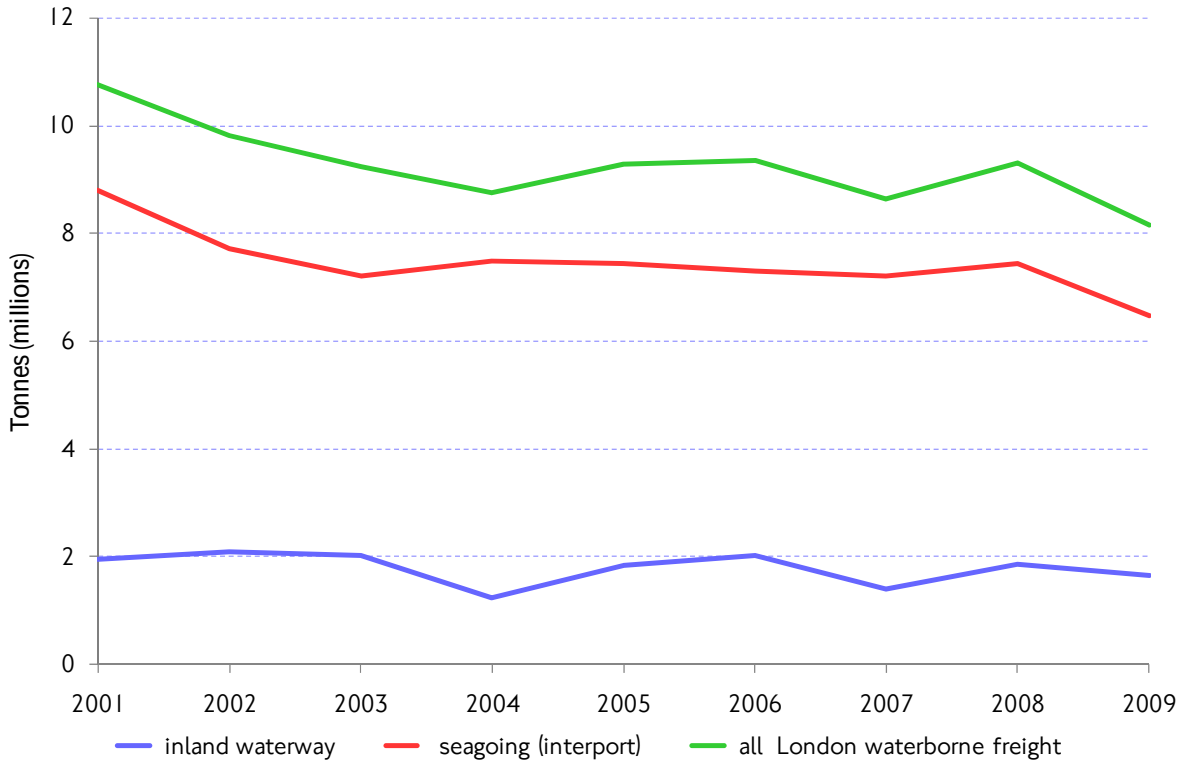
Waterborne freight

Waterborne freight to and from Thames wharves accounts for about 7 per cent of freight lifted in London. The traffic is of two kinds, internal inland waterway freight and inter-port (sea-going) cargo through the Port of London. Waterborne freight lifted in London amounted to 8.1 million tonnes in 2009, of which about a quarter was internal and three-quarters was inter-port.

In 2009 and recent years, the Port of London has ranked second (after Grimsby and Immingham) among ports in Great Britain in terms of weight of cargo handled. Total sea-going cargo through the Port of London in 2009 amounted to 45 million tonnes, down 14 per cent from 53 million tonnes in 2008. The majority of this freight does not pass through Greater London, with freight lifted in London accounting for 14 per cent of the total in 2009. The rest consisted mainly of unitised and bulk cargos handled at estuary terminals downstream in Essex and Kent. However, in terms of total waterborne freight lifted within Greater London, seagoing freight makes up more than three quarters by weight, while the rest is carriage of goods by inland waterway on the tidal Thames and its tributaries, and on London's canals.

Figure 3.6 shows recent trends in waterborne freight lifted within Greater London, split into seagoing and inland waterway freight. Seagoing freight fell by 13 per cent between 2008 and 2009, in line with the dip in total traffic through the Port of London. Inland waterway freight on the Thames within Greater London fell by 10 per cent from 1.9 to 1.7 million tonnes, while maintaining its share at 20 per cent of London waterborne freight.

Figure 3.6 Waterborne freight lifted in Greater London: inland waterway and seagoing cargos.



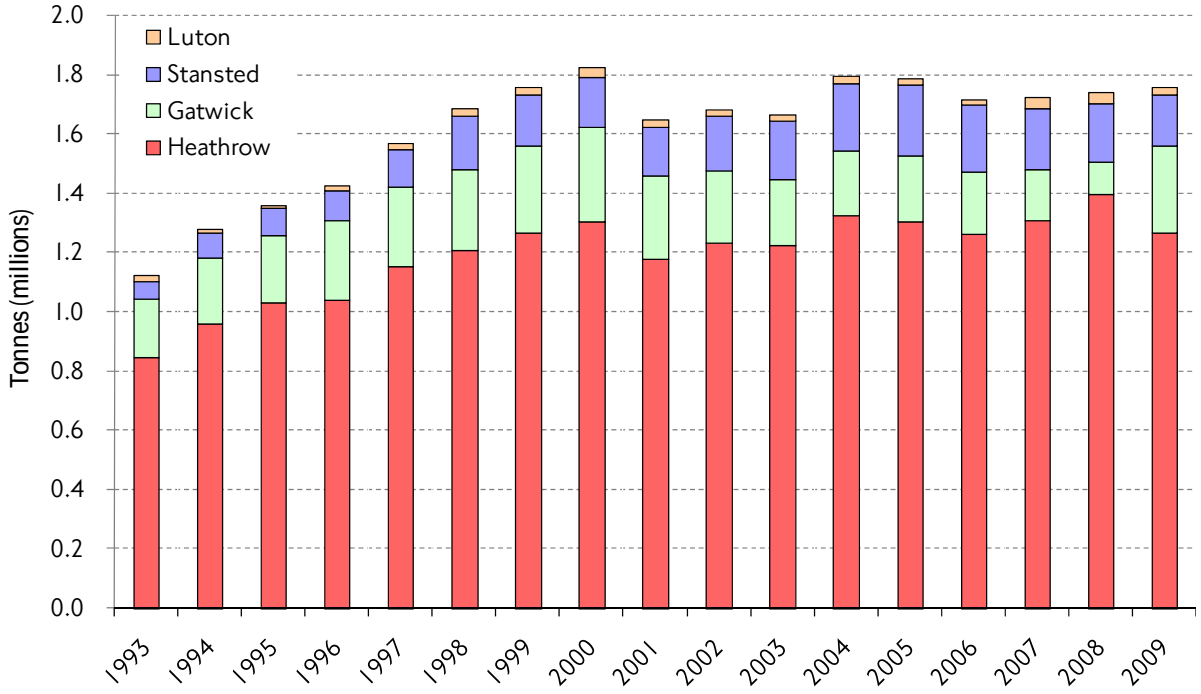
Source: Port of London Authority.

Section 3.6 of this report focuses on recent developments and prospects for water transport, both of passengers and freight, in the context of the Mayor's ambition to improve the use of water as a transport mode London.

Air freight

Air freight handled at London's airports totalled 1.76 million tonnes in 2009, an increase of 1 per cent on 2008. Heathrow accounted for the largest share at 72 per cent, with Gatwick 17 per cent, Stansted 10 per cent and Luton 1 per cent (Figure 3.7).

Figure 3.7 Air freight moved through London's principal airports.



Source: Civil Aviation Authority.

3.6 Focus on: developing London's waterways

The Mayor's Transport Strategy for the Blue Ribbon Network

London's system of waterways, which includes both natural and man-made watercourses, is known collectively as the 'Blue Ribbon Network'. It comprises the river Thames with its tributaries, London's canal network and some stretches of open water such as reservoirs and lakes. The canal network in London includes the Grand Union Canal, the Regents Canal, the River Lee Navigation, the Lower Lea and Bow Back Rivers, the Hertford Canal, the Limehouse Cut and West India Docks.

The MTS outlined proposals for making better use of the Blue Ribbon Network to fulfil its potential to provide transport services and so help to relieve pressure on other transport modes. Much of the network is navigable for the carriage of both passengers and freight.

Proposals include: working through the River Concordat to enable passenger services on the river Thames to reach their full potential and to integrate them better with the land-based public transport network; encouraging the provision of more pier capacity, together with infrastructure and boatyard facilities, to support river services; increasing the use of the Thames and the canal network for waterborne freight, and seeking to ensure that safeguarded wharves are used to their potential.

The River Concordat

In 2009, the River Concordat was set up between more than 30 interested organisations to work together to promote the use of the river Thames for passenger transport and to take steps to resolve strategic issues that have prevented this potential being fully realised. Membership of the concordat includes the Port of London Authority (PLA), British Waterways, London boroughs, TfL, the Olympic Delivery Authority, boat operators, pier owners, tourism authorities, and developers.

These cover a wide range of bodies and interests wanting to make better use of the passenger-carrying possibilities of the river.

The River Concordat Action Plan was published in April 2009 and sets out a framework for activity in the following specific areas: increasing pier provision; improving service quality; integrating ticketing with land transport; improving pier signage and passenger information; and delivering an enhanced river passenger service for the 2012 Olympic and Paralympic Games.

River Thames passenger services - trends

Over the past decade, the Thames has increasingly been seen as providing an alternative to the major public transport networks for travel to and from central London, offering services to match the different needs of Londoners, commuters, tourists and leisure travellers.

Table 3.5 shows the numbers of passengers using either commuter or leisure services on the river, in terms of the numbers of tickets sold at piers managed by London River Services (LRS). Note that passengers with return tickets are counted only once in these totals: the numbers are therefore not directly comparable with the annual totals of journey stages for other public transport modes. Passenger numbers almost doubled between 2000/01 and 2009/10, with particularly high growth, over 26 per cent, between 2007/08 and 2008/09.

LRS piers make up eight of the 33 piers with the London boundary that are in active use for boarding or alighting by river passengers. Passengers on commuter river services who board at non-LRS piers are included under 'other passengers'. Note that figures are not available for some tourist services and charter boat river cruises. If these were included, the total number of passenger journeys on the Thames would exceed 5 million in each year 2008/09 and 2009/10. In the future it is planned that improved methods of counting passengers will provide more comprehensive statistics; the existing series, however, has sufficient coverage to indicate the trend and show the growth in passengers on scheduled services.

Table 3.5 Annual passengers on the river Thames -2000/01 to 2009/10.

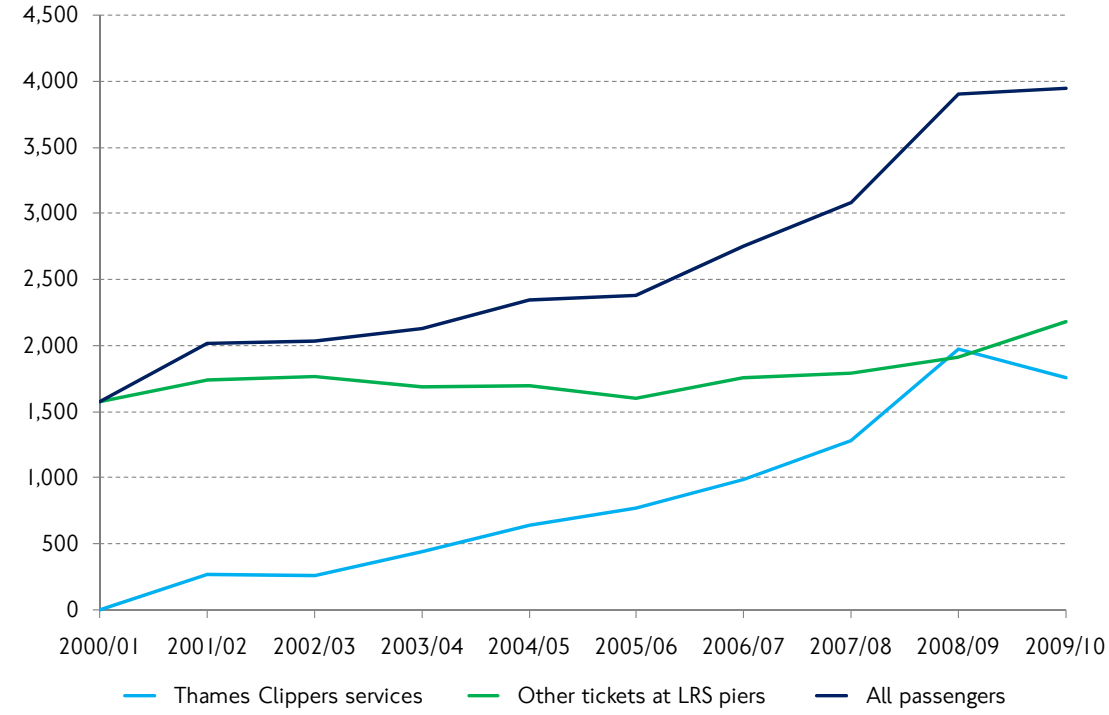
Thousands

LRS piers	2000/01	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Bankside	3	109	114	104	114	119	129
Blackfriars[1]	25	24	29	-	-	-	-
Embankment	357	255	190	216	193	168	262
Festival	15	9	6	8	11	8	8
Greenwich	177	184	194	209	233	445	489
Millbank	-	83	75	93	74	53	63
Tower	237	289	272	332	359	448	500
Waterloo[2]	291	-	-	-	-	-	-
Westminster	468	745	721	796	808	675	731
All LRS piers	1,574	1,698	1,601	1,759	1,792	1,916	2,182
Thames Clippers[3]	-	367	525	662	704	848	774
Other passengers[4]	-	278	247	326	583	1,128	984
All passengers[5]	1,574	2,343	2,373	2,747	3,078	3,893	3,940

Source: TfL London River Services.
Notes:
1 Since 2006, Blackfriars pier is served only by Thames Clippers (see note 3).
2 Waterloo Pier was managed by LRS until 31 July 2003.
3. Passengers boarding at LRS piers on Thames Clippers weekday peak hour services under contract to TfL/LRS.
4. Includes passengers on Thames Clippers commercial operations at non-LRS piers.
5 Passengers with return tickets are counted only once, on boarding for their outward journey.
Data are not available for the following services which have been excluded from the table:
Woolwich ferry, services from London Eye, Big Bus, and Original Sightseeing Tour passengers on City Cruises boats.

The growth of passenger travel on the river coincides with the extension of services for commuters and other travellers as an alternative to other public modes of transport. Thames Clippers operate a full all-day service for commuters and others, between central London and Greenwich or Woolwich Arsenal. Other scheduled services include River Bus services between Putney and central London. Leisure services for tourists have also grown over this period. Figure 3.8 therefore shows a strong trend of growth in passenger use of the river Thames over recent years.

Figure 3.8 Passengers on the river Thames.



Source: TfL London River Services.

Recent developments and future plans

A key step in integrating river transport into London's public transport system was the extension of Oyster 'pay as you go' to commuter river services in November 2009. Integration of river services into London's public transport networks is also being taken forward by improved signage at interchanges with Underground and DLR, rail and bus services.

For the 2012 London Olympic and Paralympic Games, the river will play an important part in carrying spectators to the Games. Plans are in preparation to provide additional services, with extra capacity to respond to demand, between central London and Olympic sites in East London, including the Olympic Park and Greenwich.

TfL and the Olympic Delivery Authority are jointly funding extensions, to be completed by 2011, to the Tower Millennium Pier, a major interchange for central London, the City and nearby tourist attractions.

Freight on the Blue Ribbon network

Almost all waterborne freight in London is carried on the river Thames, managed and regulated by the Port of London Authority, to and from wharves on the tidal river and its tributaries. A smaller component is carried in the canal network and its volume fluctuates from year-to-year depending on demand and location, largely for the carriage of aggregates and building materials for use in construction projects.

Safeguarded wharves

Safeguarded wharves are those wharves on the river Thames and its tributaries in London which have been given special status to ensure that they are protected from redevelopment for housing or office space and continue to be available for river

freight. The status of wharves was last reviewed in 2005, and selected wharves were designated as safeguarded by Direction of the Deputy Prime Minister.

At March 2009 there were 50 safeguarded wharves on the Thames in London, of which 28 were in active use for the loading and unloading of freight. In addition, there were two wharves in use that had not been safeguarded. The MTS and the London Plan proposes that the other 22 listed wharves should continue to be safeguarded, to allow them to be reactivated when possible so they may be brought back into use for cargo handling to relieve congestion on roads.

Freight on the canal network

The London Olympic Zone is located within the Lower Lea Valley, which is served by east London's waterways. The Bow Back Rivers form a five kilometre network of waterways linking the River Lea with the Olympic Park. Development work for the Olympics is generating important freight flows on these waterways. Construction of a lock and water control structure at Three Mills Wharf was completed in 2009 to control water levels and open up safe navigation for large (350-tonne) barges accessing the Olympic Park and Stratford City developments.

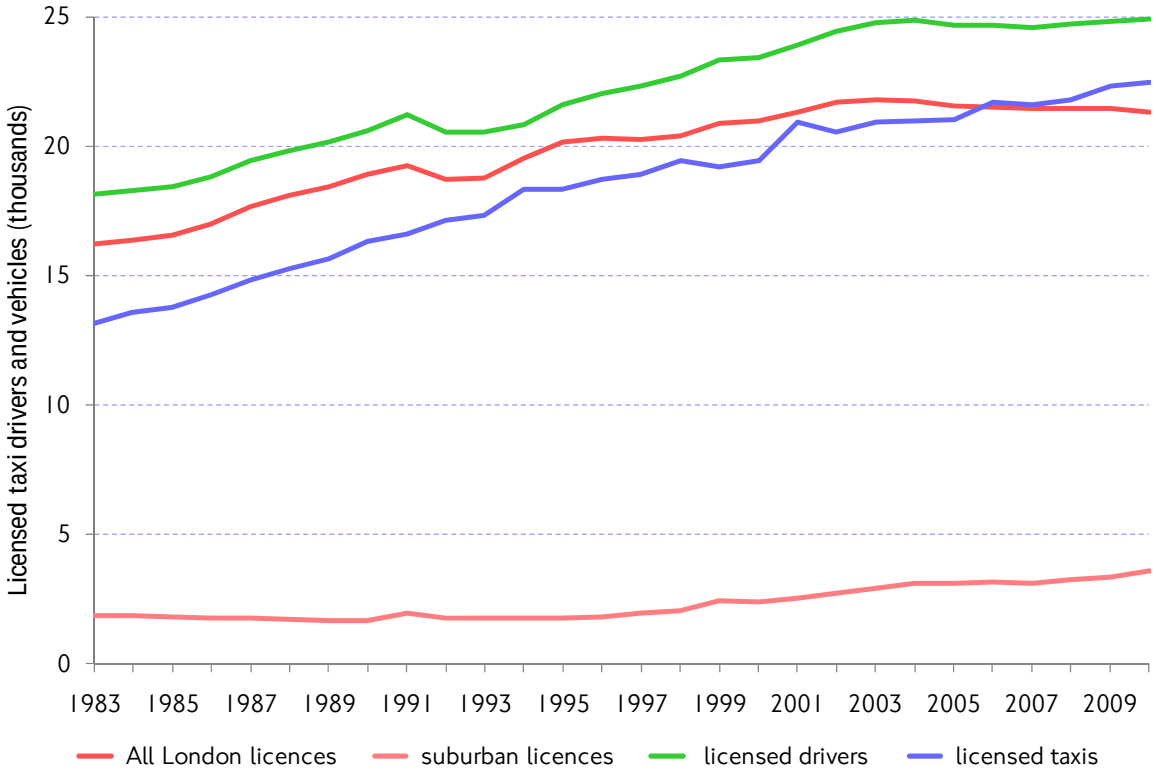
Other major construction projects in London present opportunities for the use of canals to transport construction materials and for the removal of spoil. Examples of such projects include Crossrail and the Thames Tideway Tunnels.

3.7 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 3.9 shows the trend for numbers of both licensed taxi drivers and vehicles. The number of taxi drivers licensed in London has remained fairly stable at almost 25,000 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 and 2010.

Figure 3.9 Key trends for licensed taxi drivers and vehicles in London.



Source: TfL London Taxi and Private Hire directorate.
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 nine 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.

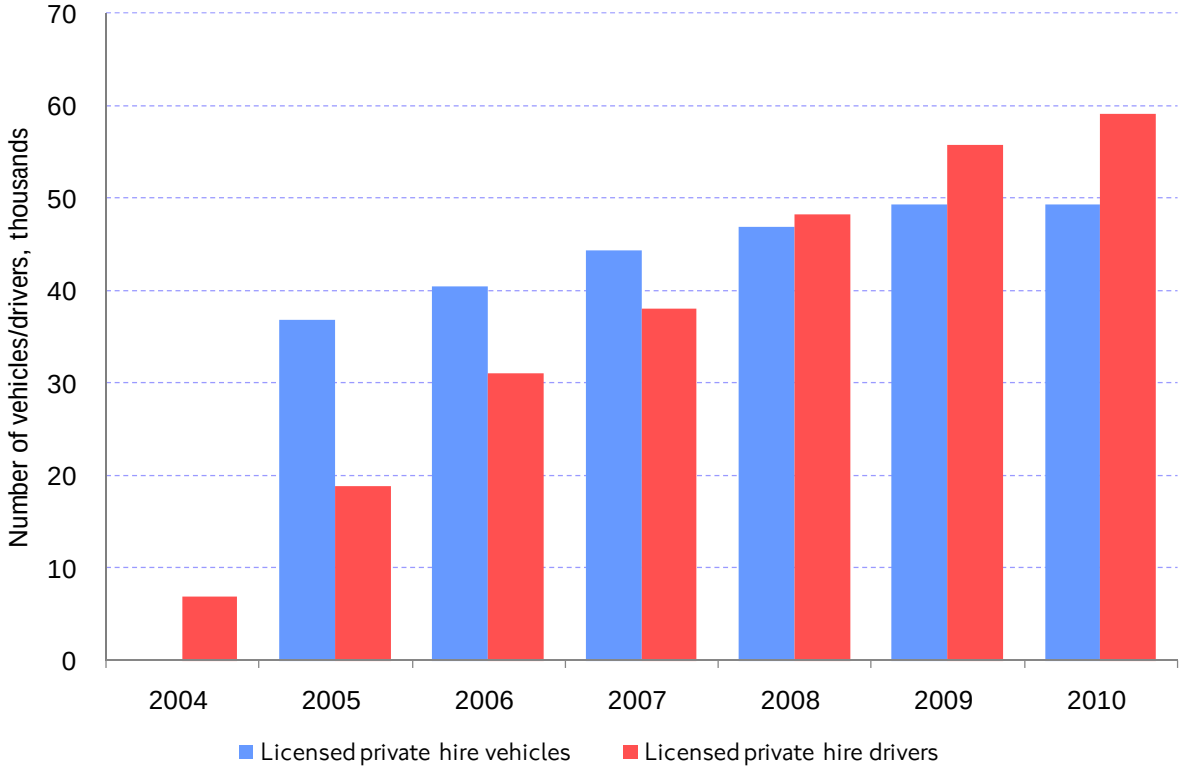
Licensed private hire

Licensed Private Hire Vehicles (PHVs) also provide a range of valuable transport services across the whole of London, and numbers are continuing to grow (Figure 3.10). All vehicles offered for hire in London, with driver and for up to eight passengers, must be licensed by TfL's London Taxi and Private Hire directorate. 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 vehicles must be booked with a licensed private hire operator 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 37,000 in 2005 to 49,000 in 2009 and 2010. Over the same period, the number of licensed drivers has increased from 19,000 to 59,000, working within 2,900 operator businesses. While this growth largely reflects the progressive nature of the licensing process in the earlier years, the data for more recent years continues to show significant year-on-year growth, although it should be noted that there is a high turnover of drivers within the private hire sector with a significant number not renewing their licence.

Figure 3.10 Licensed private hire vehicles and drivers, 2004 to 2010.



Source: TfL London Taxi and Private Hire directorate.

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

4.1 Introduction

The MTS seeks to develop London's transport system in order to accommodate sustainable population and employment growth. As well as developing and enhancing the level of service offered, the continued reliability of the transport networks is important to both businesses and individuals, and a challenge for TfL is to manage and maintain the networks in such a way as to provide a reliable and cost-effective service.

This chapter looks at the operational performance of the transport networks in London, updating the range of indicators, as introduced in previous Travel in London reports, for the 2009 calendar or 2009/10 financial year. These include road-network-based measures of average traffic speed, congestion and journey time reliability, together with indicators of service supply and reliability for the public transport modes. Finally, the chapter describes new baselines and measures relating to the condition of TfL's assets, and operating costs for TfL services. These reflect the MTS priorities to bring and maintain transport-related assets to a state of good repair, and to provide value-for-money for taxpayers and fare payers.

4.2 Key features and trends

Performance of London's road network - traffic speeds and congestion

Congestion on the road network is a complex phenomenon. Historically, average traffic speeds and delay have been used as a proxy for overall congestion levels. However, recent work in connection with the Mayor's smoothing traffic flow agenda is clarifying this, including a clear focus on the reliability of journey times by road.

- There has been a long-term trend of increasing road traffic 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. Over the period from 1980/82 to the latest complete survey cycle in 2006/09, average weekday traffic speeds in 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.
- Over the last decade congestion has been increasing despite static or falling traffic levels. This has reflected the removal of road network capacity for general traffic by an increase in utility and development works, and for other policy initiatives targeted at road safety, public transport and cyclist/pedestrian priority measures and urban realm improvements, among others.
- However, recently-available GPS tracking data covering the period from autumn 2006 to spring 2010 suggests overall stability in average traffic speeds over this period, with a tendency towards slightly-increasing speeds, and correspondingly-reduced congestion over the most recent two years. This is thought partly to reflect falls in traffic levels as a result of the economic recession. However, it is also thought to reflect recent initiatives to improve management of the road network - such as the extension of automatic traffic signal control and the better control of road works.

Performance of London's road network - journey time reliability

- Smoothing traffic flow is a major policy focus for TfL. Journey time reliability is a primary concern of road users, and TfL has recently developed a monitoring system and indicator to measure this. Journey time reliability is defined, for this indicator, as the percentage of motor traffic which, for a 'typical' 30-minute journey, takes less than 35 minutes (the typical 30 minute journey time plus a five-minute 'allowance').
- On this basis, TfL's journey time reliability indicator suggests that between 89 and 90 per cent of journeys on major roads in London (the TLRN network) are completed reliably - a value that can act as a baseline for future improvement initiatives.

Overall performance TfL's public transport networks

Public transport in London continues to benefit from the longest run of sustained high performance ever recorded. All indicators of service performance have shown a marked trend of improvement over the last decade - alongside and complementary to often substantial enhancements to the level of service offered. Values for the most recent two financial years do inevitably reflect the effects of periods of severe weather in both winters, alongside specific upgrade projects, such as those affecting the Docklands Light Railway and the Jubilee line, but when this is taken into account it is clear that high levels of service offering and performance are being sustained and improved upon wherever possible.

London Underground

- Over the last 10 years LU has consistently increased its service offering, with general year-on-year increases in train kilometres scheduled. However, the most recent two years have seen reductions - reflecting, firstly, the temporary closure in 2007/08 for upgrading work of the East London line, which ran approximately 0.7 million kilometres per year before closure, and also the impact of the Underground upgrade programme which for example, during 2009/10 necessitated several weekend closures of the Jubilee line. Consequently, in 2009/10, the number of kilometres operated reduced to 69.4 million, 1.3 million less than 2008/09,
- As well as operating historically high levels of service in recent years, the Underground also improved significantly on two other key measures of reliability: average journey time and 'excess' journey time. In 2009/10 the overall average journey time (scheduled journey time plus 'excess') averaged 44.1 minutes, a level only marginally down on that of 2008/09 and an improvement of 0.4 minutes compared with 2007/08.
- Excess journey time is the average time added to journeys by delays, crowding and queuing, over and above the nominal scheduled journey time. Excess journey time in 2009/10 averaged 6.4 minutes, an improvement of 0.2 minutes compared to the previous year and of 1.4 minutes compared to 2007/08, and the best performance since the measure was introduced 10 years ago.

London Buses

- In 2009/10, London buses operated 482.9 million kilometres. A total of 497.2 kilometres was scheduled, meaning that 97.1 per cent of scheduled bus

kilometres were actually operated. Both values were 1 per cent higher than in 2008/09, again reflecting a 10-year high-point.

- In terms of bus reliability, both 'actual' and 'excess' waiting times (high frequency routes) have consistently reduced over the decade - reflecting the introduction of Quality Incentive Contracts for operators, improved bus priority measures, the central London congestion charge, better service control and other measures designed to improve reliability.

Docklands Light Railway and Tramlink

- The DLR has shown strong and improving performance over the last 10 years, albeit that performance in both 2008/09 and 2009/10 fell short of recent years. This largely reflects disruptions caused by major project works, and the commissioning of a new fleet of trains. In 2009/10, 97.2 per cent of scheduled services were operated and 94.8 per cent of trains were on time.
- 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 2009/10 were both down slightly on 2008/09, but the percentage of kilometres operated was the highest so far recorded - at 99.2 per cent.

London Overground

- London Overground recorded an all-service Public Performance Measure (PPM) of 93.1 per cent, for the year 2009/10, up from 92.6 per cent, and a peak-only PPM of 95.4 per cent, up from 94.6 per cent the previous year. Both values are above-average among both UK and London and the South East train operators.

National Rail in London

- As with public transport operated by TfL, National Rail services in London have also seen substantial improvement - in terms of service offered and reliability - over the past decade. However, this in part reflected the infrastructure and safety difficulties at the start of the decade. Although the pace of improvement slowed in 2009/10, partly as a result of the severe winter weather, key measures were either at, or about, their 10-year highs.
- The annual average Public Performance Measure for London and South East operators (all services) in the financial year 2009/10 was 91.5 per cent, up from 90.6 per cent for 2008/09. These values were identical to the average for all GB franchised operators. For London and South East peak services, the equivalent values were 88.8 and 88.7 per cent.

Public transport capacity

- The past decade has seen progressively-increasing average bus occupancy levels, reflecting the large increase in bus ridership and commensurate service enhancements. The 2009/10 network average occupancy of 16.6 people per bus was identical to that of the previous year and indicates the continued matching of demand and supply which occurs through the bus network review process.
- Average Underground train occupancy rates over the decade have been relatively stable, to stand in 2009 at an average of 121.9 people per train, whilst those for the DLR and Tramlink reflect the progressive development of these networks and are generally commensurate with the respective vehicle capacities.

- A multi-modal composite measure of customer satisfaction with the level of in-vehicle crowding was 76 out of 100 for 2009/10. This is identical to the previous year and is considered, according to TfL's norms for interpreting customer satisfaction scores, to be 'fairly good'.

Operating costs for TfL services and asset condition

- TfL's total gross expenditure in 2009/10 was £4,462 million, and the total net expenditure was £1,367 million. Total passenger kilometres were 17,405 million. Therefore, the gross operating cost for TfL services per passenger kilometre in 2009/10 was 26 pence per kilometre. The net operating cost per passenger kilometre in 2009/10 was 08 pence per kilometre.
- There was little change in both measures between 2008/09 and 2009/10. The gross operating cost measure did however increase by 1 penny between the two years, an increase of 3.4 per cent.
- The overall condition of TfL's assets is measured through a composite multi-modal score, looking at the condition of 'core' assets (such as rolling stock and the road carriageway) against industry-standard benchmarks, and weighted according to the usage of the different modes.
- For 2009 this value was 89.1 per cent, meaning that 89.1 per cent of in-scope asset in 2009 was deemed to be in 'good' condition. This compared to an equivalent value of 92.6 per cent in 2008, primarily reflecting a temporary pause in equipment renewal ahead of the forthcoming large-scale replacement of train fleets on the Victoria, District, Metropolitan and Hammersmith and City/Circle lines.

4.3 Performance of London's road network

Delay and disruption on London's road network causes congestion. London has around 20 per cent of the UK's traffic congestion. Three-quarters of this congestion is on either the Transport for London road network (TLRN) or on the Borough Principal Road Network (BPRN). No less than 15 per cent of the UK's traffic congestion is therefore concentrated on less than 0.5 per cent of the country's 400,000 km of roads.

Congestion on the road network is a complex phenomenon, related to a number of factors, including road capacity, volume of demand, the amount of disruption and the wider resilience of the network as a whole. Historically, average speeds and the concept of 'excess delay' have been used to quantify congestion levels. These still provide a valuable long-term perspective on trends. However, recent work in connection with the Mayor's smoothing traffic flow agenda is clarifying policy priorities and developing new indicators, which also align to the key performance indicators that recent research suggests matter most to motorists. These include:

- Traffic speeds and average delay.
- Journey time reliability.
- Levels of disruption.
- Volume of road works.

These are described further in sections 4.4 to 4.8 below.

4.4 Traffic speeds and vehicle delay

Historic perspective

Travel in London report 2 set out the long-term trends in average traffic speeds and excess delay (congestion) in London going back to the late 1960s, based on 'floating vehicle' surveys that had been conducted periodically over this time. It was noted that the long-term trend in London over the last three decades has been consistently towards slower average traffic speeds and increased congestion.

Over the period from 1980/82 to the latest complete survey cycle in 2006/09, average weekday traffic speeds in 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.

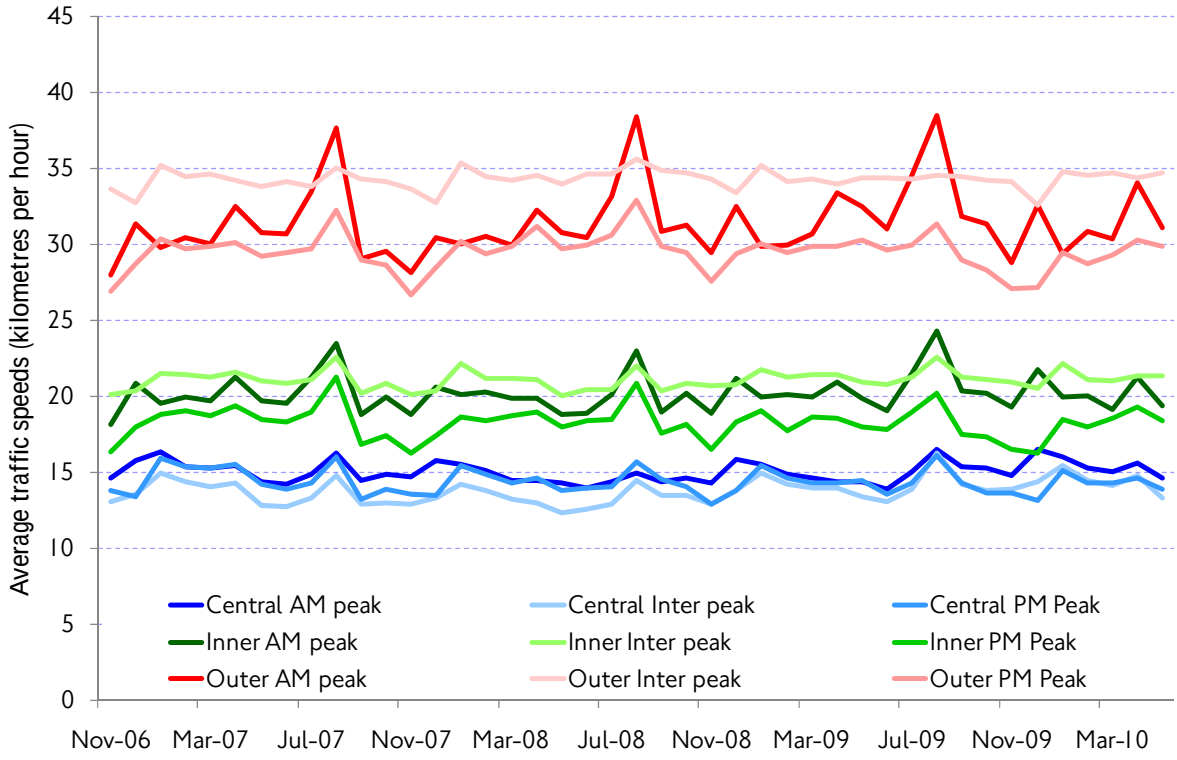
This downwards trend in speeds has affected all parts of London and all times of day, but has been particularly intense in central London, where weekday morning peak speeds fell by 23 per cent over the period, despite the introduction of Congestion Charging in 2003.

Travel in London report 2 contained an in-depth analysis of trends in traffic flow, traffic speed and excess delay in the two halves of the extended central London Congestion Charging zone since the introduction of charging in 2003. It concluded that the observed trend towards increased congestion, despite the operation of charging and initial decongestion benefits from the scheme, reflected a loss of effective road network capacity for motor vehicle traffic, which may have been as much as 30 per cent in the original central zone.

Recent traffic speed and congestion trends based on GPS satellite tracking data

Recently-available Global Positioning Satellite (GPS) data from in-vehicle technology providers now allows a much more disaggregate analysis of traffic speeds and congestion than had traditionally been possible. Figure 4.1 shows the recent trend, in terms of average vehicle speed, on the more major roads in London. These data now offer a consistent time-series back to late 2006, and the figure displays several basic features of interest.

Figure 4.1 Average monthly traffic speeds (kilometres per hour) by functional sector of London. Working weekdays, by time period.



Source: TfL, based on data from Trafficmaster.

- First, central, Inner and Outer London are clearly differentiated by having different 'prevailing' average traffic speeds. Average speeds in central London tend to be around 14 kilometres per hour; those in Inner London are typically about 20 kilometres per hour, and those in Outer London typically between 30 and 34 kilometres per hour.
- Second, looking at the differences between three time-periods, average traffic speeds in central London are less variable than those of Inner and Outer London, albeit at the slowest prevailing speeds of the three areas.
- In both Inner and Outer London, the lowest average traffic speeds occur in the PM peak period. Uniquely, central London traffic travels at the fastest average speed in the AM peak period, whereas in Inner and Outer London, traffic speeds are fastest during the inter-peak period.

Looking longitudinally at trends, the effect of seasonal factors such as Christmas, summer and Easter holiday periods with reduced traffic flows, is quite clear. Beyond this, however, there is little evidence of significant trends in average London traffic speeds at this level of aggregation and the best assessment would be that they have been broadly stable – or have slightly increased – in all three areas of London over the past three years (Table 4.1).

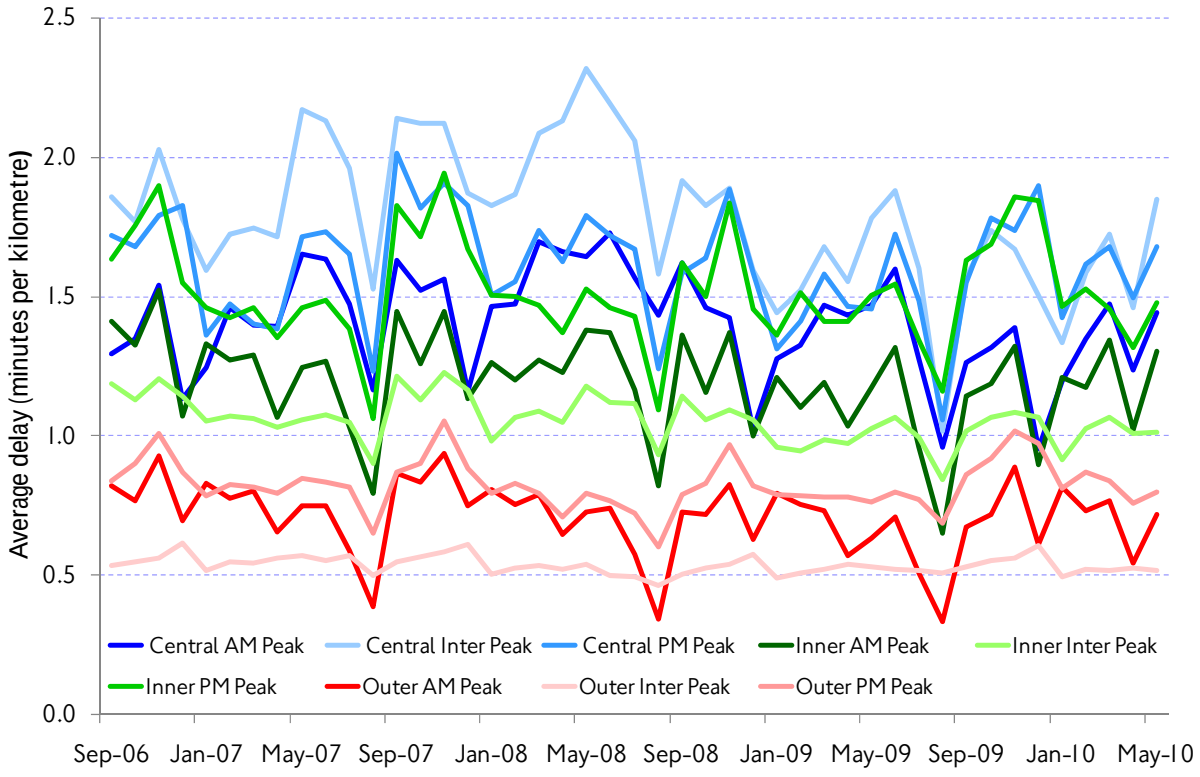
Table 4.1 Average traffic speeds (kilometres per hour) by functional sector of London. Working weekdays, by time period.

Area and time period	2007 speed (kph)	2008 speed (kph)	2009 speed (kph)
Central AM peak	15.2	14.7	15.1
Central inter-peak	13.6	13.4	14.2
Central PM peak	14.6	14.3	14.3
Inner AM peak	20.2	20.0	20.6
Inner inter-peak	21.1	21.0	21.3
Inner PM peak	18.4	18.4	18.0
Outer AM peak	31.0	31.6	32.1
Outer inter-peak	34.2	34.6	34.2
Outer PM peak	29.5	30.0	29.3

Source: TfL, based on data from Trafficmaster.

Figure 4.2 shows the same data as Figure 4.1, but in terms of average vehicle delay (expressed as minutes per kilometre). Here, travel rates (the inverse of speed) are calculated for day-time periods, from which equivalent travel rates measured in the overnight (notionally un-congested) period are subtracted. This leaves an 'excess delay', a value that is conventionally regarded as representing congestion.

Figure 4.2 Average vehicle delay (minutes per kilometre) by functional sector of London. Working weekdays, by time period.



Source: TfL, based on data from Trafficmaster.

Looking at Figure 4.2 in the light of Figure 4.1, and noting that the vertical axis of the graphic is inverted in comparison with Figure 4.1 (higher values meaning more delay and hence slower speeds):

- There is considerably more variability, both cross-sectionally (different time periods in the same geographical area) and longitudinally (month-by-month). This is to be expected, reflecting the numerical properties of the excess delay measure from this data source - but it also reveals some features and trends that are not apparent from the average speed data.
- Most noticeable of these is the similarity in excess delay between central and Inner London, particularly in the PM peak period. To a degree, this reflects the operation of Congestion Charging in central London in reducing congestion in comparison with what would otherwise be 'expected' in the absence of the scheme, but also reflects intrinsically high levels of congestion in Inner London.
- Secondly, looking longitudinally, both the magnitude of excess delays, and the degree of variability within each of the areas, appears to have reduced in central and Inner London over the past 18 months (Table 4.2).
- Although this suggests both reduced overall congestion and, potentially at least, smoother traffic, it is important to realise that these improvements took place against a backdrop of reducing traffic levels, largely reflecting the economic recession (see also section 2.11 of this report), and that the nominally 'uncongested' night-time travel rate (used as a basis for deriving the day-time delay measure) is itself a variable quantity.

Table 4.2 Average vehicle delay (minutes per kilometre) by functional sector of London. Working weekdays, by time period.

Area and time period	2007 delay (min/km)	2008 delay (min/km)	2009 delay (min/km)
Central AM peak	1.4	1.5	1.3
Central inter-peak	1.9	1.9	1.6
Central PM peak	1.6	1.6	1.5
Inner AM peak	1.2	1.2	1.1
Inner inter-peak	1.1	1.1	1.0
Inner PM peak	1.5	1.5	1.5
Outer AM peak	0.7	0.7	0.7
Outer inter-peak	0.6	0.5	0.5
Outer PM peak	0.8	0.8	0.8

Source: TfL, based on data from Trafficmaster.

Further reading

TfL has studied congestion trends in and around central London in some detail in connection with the monitoring of the Congestion Charging scheme. Details and analysis can be found in our six annual Congestion Charging Impacts Monitoring Reports, available at: www.tfl.gov.uk/roadusers/congestioncharging/6722.aspx. A full

interpretation of recent trends in relation to Congestion Charging was also given in Travel in London report 2.

4.5 Journey time reliability

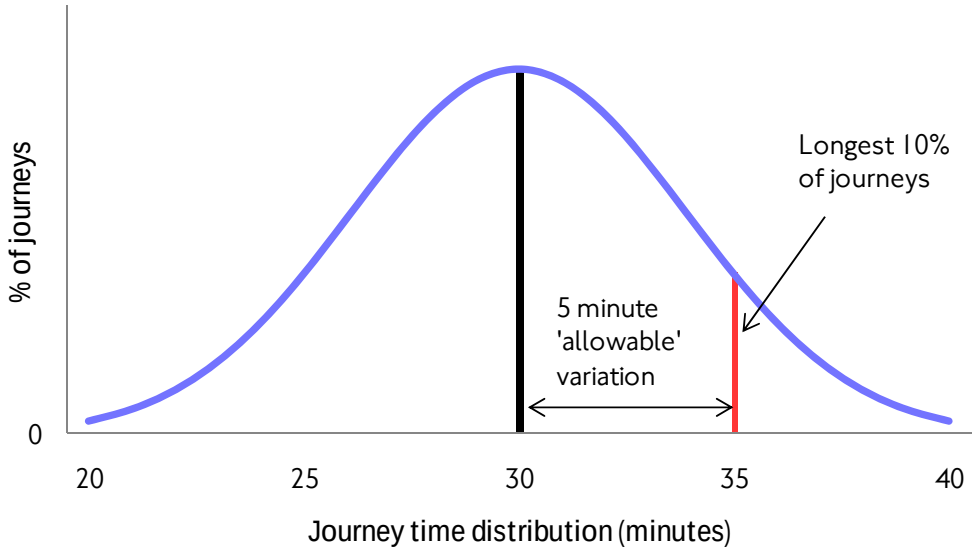
The MTS seeks to mitigate the potential effects of road congestion through a range of initiatives to smooth traffic flow. This describes a broad approach to managing congestion and, in particular, improving road traffic journey time reliability and predictability for all road users, including cyclists and pedestrians.

Further details on initiatives related to smoothing traffic flow can be found at: www.tfl.gov.uk/corporate/projectsandschemes/11351.aspx. TfL's initiatives to better manage the road network are described at: www.tfl.gov.uk/assets/downloads/corporate/Managing-londons-road-network-leaflet.pdf

Measuring road network journey time reliability

The key measure set out in the MTS for monitoring the smoothness of traffic flow is journey time reliability. It is defined as the percentage of journeys completed within an 'allowable' excess of 5 minutes for a standard 30 minute journey during the weekday morning peak period. This measure is calculated from recorded journey times, for segments of journeys normalised to 30 minutes duration (which is broadly representative of road journeys in London), between Automatic Number Plate Recognition (ANPR) camera pairings across the Transport for London Road Network (TLRN). Figure 4.3 demonstrates this concept.

Figure 4.3 Conceptual representation of journey time variability around an 'average' time for the same journey.



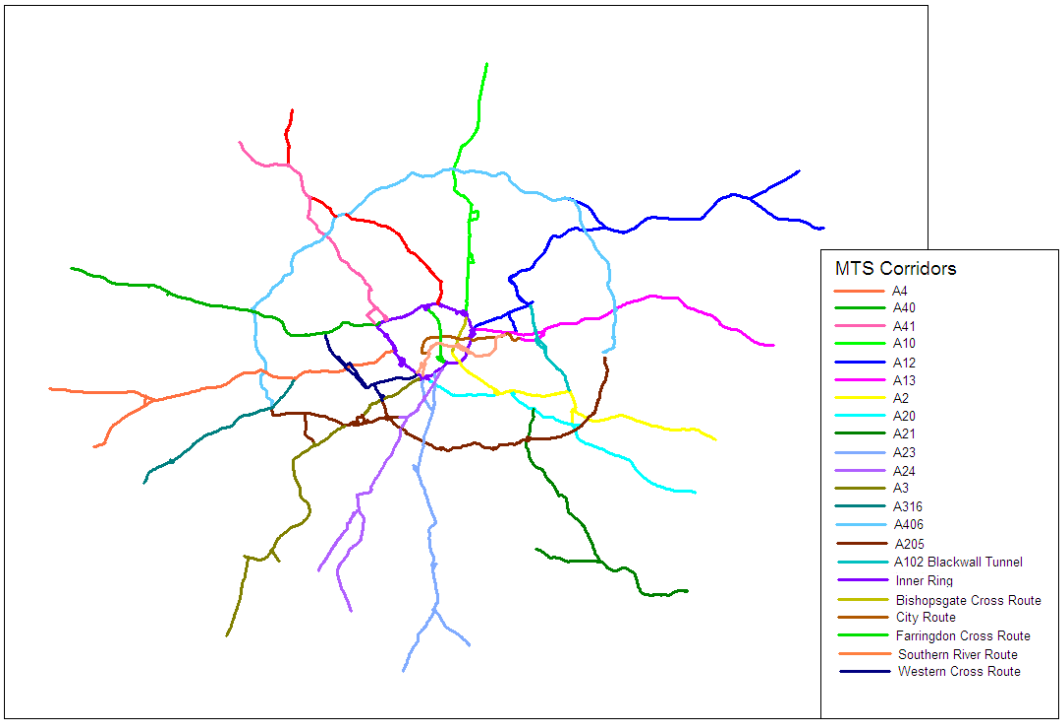
Assuming an 'allowable' daily variation in journey time of up to 5 minutes (ie trips completed within 5 minutes of the mean journey time are assumed to be on time) and the network (or an individual route) can be managed more reliably such that 9 out of 10 journeys are completed within this time, we can consider it to be 90 per cent reliable,

Network being monitored

Coverage by ANPR cameras in London is sufficient to provide good representation of the more major routes (primarily the TLRN), organised in terms of strategic

corridors (as described in the MTS). Figure 4.4 shows the 23 London-wide strategic road corridors that TfL is now analysing in terms of corridor performance.

Figure 4.4 Journey time reliability on the road network - strategic corridors being monitored.



Note: The named corridors do not exactly replicate the road number in the legend, but reflect the strategic radial and orbital corridors set out in the MTS. (eg the "A12 corridor" includes the A11 Mile End Road into central London).

Journey time reliability measure - baselines and recent trends

Travel in London 2 introduced TfL's London Congestion Analysis Project (LCAP), and described how this would be used to provide data for strategic monitoring of road network performance. It would also provide data for the MTS SOI for Journey Time Reliability - a key measure of the success of smoothing flow traffic policies.

This system has been successfully prototyped and is tracking network performance on the basis of paired four-week financial periods. Data are available for year-on-year comparison for the first six financial periods (two quarters) in both 2009/10 and 2010/11.

Table 4.3 shows the available data, aggregated into quarters (Q1 and Q2 only) for both 2009/10 and 2010/11, for nominally inbound-direction traffic in the weekday AM peak period. Quarters 1 and 2 for 20010/11 are directly comparable with equivalent quarters for 2009/10, allowing year-on-year change to be identified.

The journey time measure in the table shows, for each corridor, the percentage of journey segments, normalised to 30 minutes in duration, completed within the allowable 5-minute excess (ie taking no more than 34 minutes 59 seconds in total). Note that the final line of the table, for 'all routes' includes both inbound and outbound directions.

Table 4.3 Journey Time Reliability on the TLRN. Inbound and outbound direction in the AM-Peak by corridor.

Route type	Corridor/ Direction	2009/10 Q1	2009/10 Q2	2010/11 Q1	2010/11 Q2
Radial	A4 inbound	88.9	91.8	88.2	88.6
Radial	A40 inbound	77.4	79.9	77.0	77.8
Radial	A 41 inbound	88.2	89.6	85.3	87.8
Radial	A1 inbound	79.3	85.3	80.6	81.7
Radial	A10 inbound	88.9	89.5	87.8	87.3
Radial	A12 inbound	87.9	88.6	87.6	87.1
Radial	A13 inbound	88.9	87.8	87.4	88.1
Radial	A2 inbound	88.9	91.5	87.7	87.3
Radial	A20 inbound	92.3	90.7	90.1	88.8
Radial	A21 inbound	88.5	91.3	89.9	89.4
Radial	A23 inbound	86.4	84.6	85.0	82.1
Radial	A24 inbound	88.1	92.8	88.1	88.6
Radial	A3 inbound	88.9	88.3	86.3	87.0
Radial	A316 inbound	85.0	83.9	84.3	84.7
Orbital	A406 clockwise	90.5	91.9	91.0	91.6
Orbital	A406 anticlockwise	87.2	88.9	88.5	86.9
Orbital	A205 clockwise	86.5	85.9	85.8	85.8
Orbital	A205 anticlockwise	87.9	89.5	88.3	89.4
Orbital	A102 Northbound	79.3	75.3	76.3	75.3
Orbital	A102 southbound	96.7	95.8	96.3	95.7
Orbital	Inner Ring Road clockwise	83.1	84.1	83.5	84.0
Orbital	Inner Ring Road anticlockwise	82.6	82.5	83.1	83.0
Central	Bishopsgate Northbound	81.5	84.5	84.4	86.0
Central	City Westbound	77.8	76.1	79.0	79.9
Central	Farringdon Southbound	89.1	93.3	88.0	88.9
Central	South of river Eastbound	79.2	83.0	82.3	82.9
Central	West Centre Eastbound	87.3	88.2	87.9	88.3
Central	Central - area measure	85.3	86.6	87.3	86.8
TLRN	All Routes	89.5	90.3	89.2	89.1

Source: TfL Road Network Performance.

To assist with TfL's further exploration of road network performance, as opposed to representing official 'targets' for road network journey time reliability, values in Table 4.3 have been colour-coded, in relation to a nominal 'target range' of between 80 and 90 per cent of journey segments completed within 30+5 minutes. It is seen that:

- The majority of corridors achieve values within the nominal 'target' range. The values themselves are relatively consistent, both across the range of monitored corridors and also between quarters for specific corridors.
- Whilst some corridors (eg A40, A102) tend to score values just below the nominal target range, a similar number achieve values above the range - suggesting that a nominal range of between 80 and 90 per cent is broadly representative of typical network performance.
- Across all monitored links on the TLRN, the average scores for the four quarters currently available are towards the top end of the 'typical' range, consistently around 89-90 per cent. As the indicator is calculated as a flow-weighted average, this suggests that the more heavily-trafficked routes in London tend to be the more reliable.

The journey time reliability indicator has recently been introduced. As such there is insufficient history to understand fully the behaviour of this indicator and to set formal targets for journey time reliability, as characteristics such as the degree of seasonal variability in the data are still being explored.

4.6 MTS Strategic Outcome Indicator: journey time reliability for motor vehicles

Definition of indicator

This indicator is based on the concept of an 'allowable' variation around a standard mean journey time for motorised road traffic. The standard mean journey time being used is 30 minutes, which is broadly representative of journeys by road in London. The 'allowable' variation defined by the MTS is 5 minutes, with respect to this standard 30 minute journey time (see also Figure 4.3 above). The indicator is available at various levels of temporal and spatial disaggregation. For the purpose of the MTS SOI, the indicator quoted is a weighted annual average for the whole of the TLRN network for journeys in both the inbound and outbound directions in the weekday morning peak period.

Prototype baseline values for first and second quarter, 2009/10 and 2010/11

The journey time reliability indicator has recently been introduced. Data are available for year-on-year comparison for the first six financial periods in both 2009/10 and 2010/11, equating to two quarters. The time-series of available values so far is:

Quarter 1 2009/10: 89.5 per cent

Quarter 2 2009/10: 90.3 per cent

Quarter 1 2010/11: 89.2 per cent

Quarter 2 2010/11: 89.1 per cent

Assessment of recent trend

The journey time reliability indicator has recently been introduced, and so it is not yet possible to establish trends in this indicator and set operational targets for journey time reliability. Nevertheless, these quarter-on-quarter results suggest that:

- Typically, between 89 and 90 per cent of journeys on the TLRN in London are completed 'reliably'.

- Network performance in this regard tends to be relatively stable between quarters.
- The average reliability value for the whole monitored network is higher than that which would be typical for the respective corridors. As the indicator is calculated as a flow-weighted average, this suggests that the more heavily-trafficked routes in London tend to be the more reliable.

The observed reliability performance appears to correlate well with observed levels of planned and unplanned road works and other types of disruption across the network (see also section 4.7 below). Once sufficient data are available, it is expected that working targets for journey time reliability will be established by TfL.

4.7 Focus on: delay and disruption on the road network

TfL's London Streets Traffic Control Centre (LSTCC) records all delay and disruption observed on the network. The data can be analysed by both cause and severity.

The LSTCC categorises the impact of incidents into four degrees of severity:

- Minimal congestion. Traffic is light at a location, with no traffic queuing and no noticeable inconvenience to the road user.
- Moderate congestion. Traffic is moving, with some traffic queuing that is unusual for the time of day at the location.
- Serious congestion. There is traffic congestion that is unusual for the time of day at the location or in an area and traffic has been stopped for less than 5 minutes - but in excess of the red signal time displayed on the traffic signals operating on the road.
- Severe congestion. There is traffic congestion that is unusual for the time of day at the location or in an area and traffic has been stopped for more than 5 minutes; and traffic queuing is longer than normal for the time of day, more than for 'serious' congestion.

The 'serious' and 'severe' categories represent the most significant congestion on the network. In 2009/10, TfL recorded a total of 3,235 hours of serious and severe congestion across the whole of London's road network, spread across just under 1,300 individual events. TfL's priority is to minimise serious and severe congestion. Table 4.4 shows the main causes of serious and severe disruption recorded by TfL in 2009/10 across the whole of London.

Table 4.4 Hours of Serious and Severe disruption London wide – 2009/10.

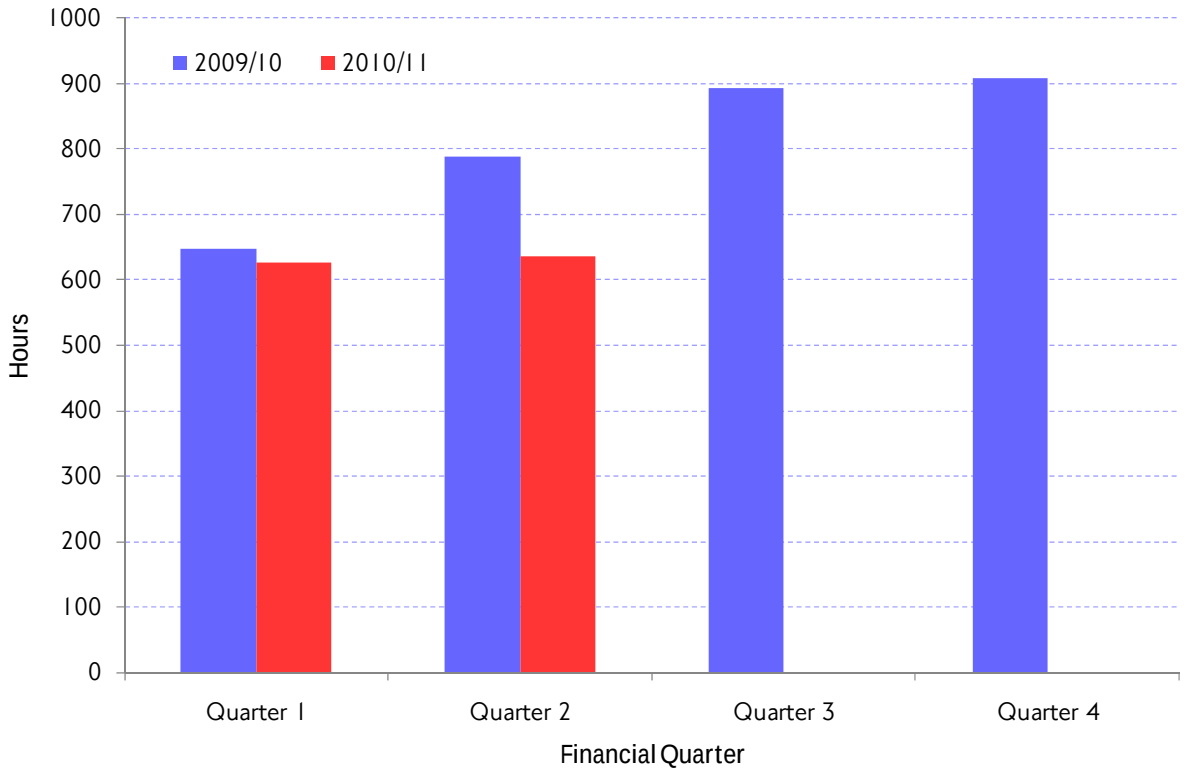
	Unplanned hours	Planned hours	Total hours	% of total hours of disruption
Accident	902	n/a	902	28%
Breakdowns	276	n/a	276	9%
Highway Authority works	116	483	599	19%
Utility works	303	303	606	19%
Congestion	297	n/a	297	9%
Obstruction	27	n/a	27	1%
Traffic signal failures	129	n/a	129	4%
Security/police checks	98	n/a	98	3%
Special events	71	70	141	4%
Other	160	n/a	160	4%
Total	2,379	856	3,235	100%

Source: TfL London Streets.

Recent trends

In the first two quarters of the financial year 2010/11, TfL has recorded a 12 per cent reduction in the hours of serious and severe disruption occurring across London, compared to the same period in 2009/10.

Figure 4.5 Total hours of Serious and Severe disruption recorded London wide by financial quarter.



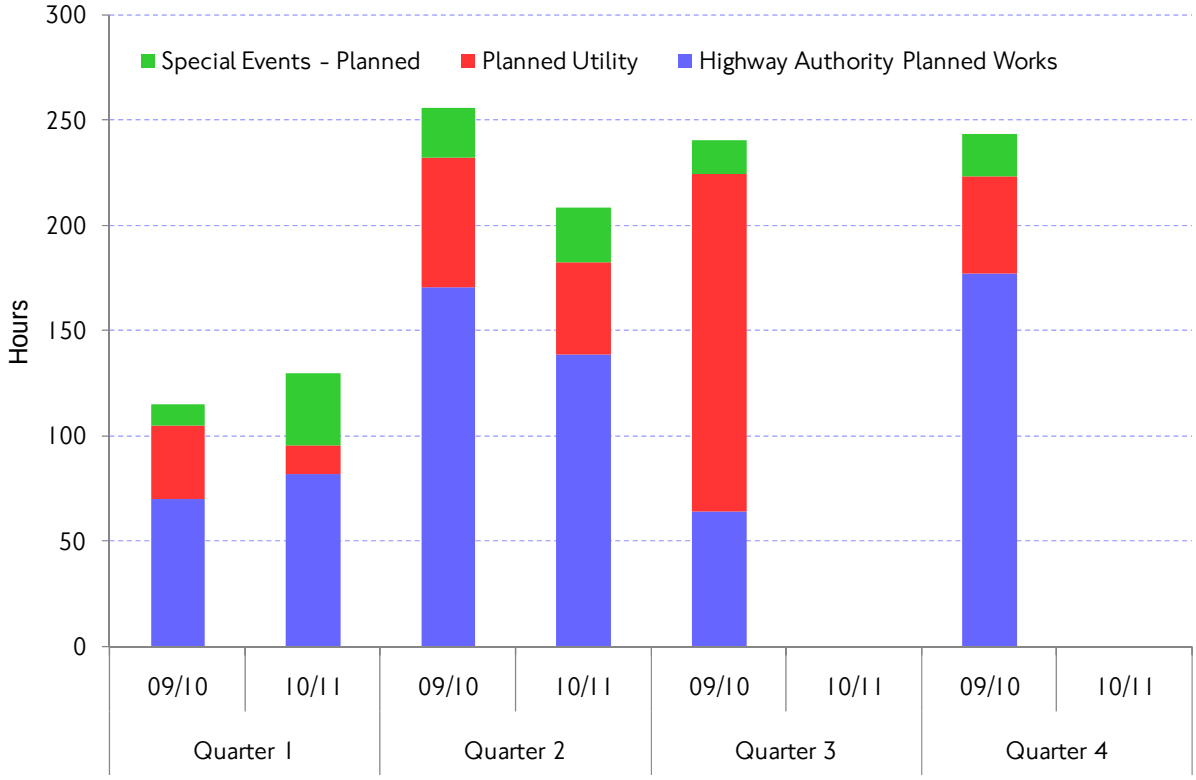
Source: TfL London Streets.

In order to provide useful performance information to manage the network on a day to day basis, the data is separated into that relating to planned and unplanned events on the road network, by cause.

Disruption from planned events

As can be seen from Table 4.4, around one quarter of total serious and severe disruption hours recorded across London are caused by planned events, consisting of planned highway authority and utility works and planned special events (eg the London Marathon and State Opening of Parliament). Figure 4.6 shows the breakdown of hours of serious and severe disruption caused by planned events occurring across London for the financial year 2009/10 and for the first two quarters of 2010/11.

Figure 4.6 Hours of Serious and Severe disruption caused by Planned Events (London wide) by financial quarter.



Source: TfL London Streets.

The majority of delay and disruption due to planned events is caused by road works and is within individual highway authorities' ability to control or influence through streetworks and Traffic Management Act powers.

Recent trends

There has been a 9 per cent reduction in the hours of serious and severe disruption caused by planned events across London in the first two quarters of 2010/11 compared to the same period in 2009/10.

London Permit Scheme for road works

The UK's first permit scheme for road works started in London on 11 January 2010. It now covers the TLRN and roads of the 18 boroughs that have chosen to participate in the first phase of the programme. Utility companies and other

organisations, including the Highway Authority, that want to dig up the roads will need to apply for a permit before they can start. This will give TfL and the boroughs greater opportunity to co-ordinate works and avoid the situation where the same stretch of road is dug up repeatedly by different companies.

Between the introduction of its Permit Scheme on 11 January 2010 and the end of (financial) period 7 (15 October 2010), TfL granted around 41,000 permits and has refused around 6,000 for varying reasons – making a contribution to smoothing traffic flow in the Capital. As well as providing an opportunity to co-ordinate road works, the scheme is producing new data on the typical durations of road works being undertaken – intelligence that will be useful in future efforts to minimise disruption.

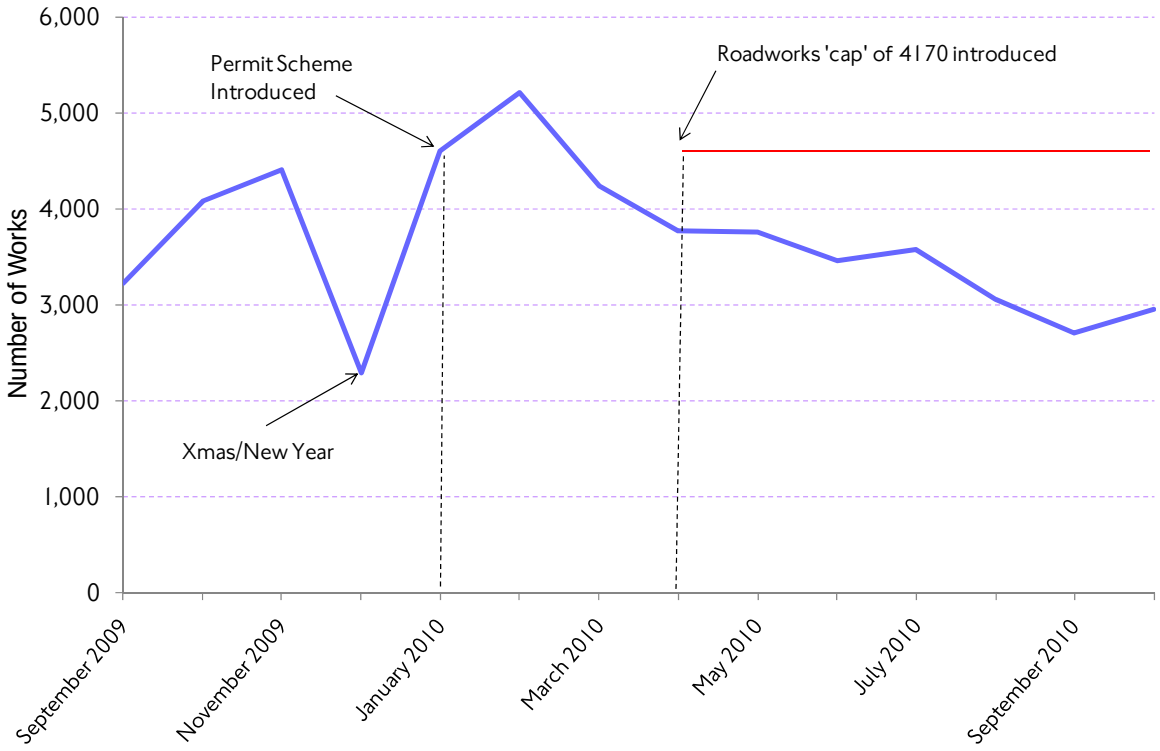
Reducing the impact of road works on the TLRN

The total number of road works undertaken on the TLRN in 2009/10 was 48,247. TfL is now able proactively to use the powers provided by the London Permit Scheme to control the volume of activity taking place on the TLRN, both overall and at any one time.

Through the permit scheme, and taking advantage of the improved engagement with the utility companies facilitated by the Mayor's Code of Conduct for Road Works, TfL is aiming to achieve a 5 per cent reduction in the overall number of road works taking place on the TLRN, and much higher reductions (up to 20 per cent) in peak levels of activity, such as occurred in January to March 2010.

Figure 4.7 shows the number of road works that have been undertaken on the TLRN in the 12 months between September 2009 and September 2010. It clearly demonstrates the peak activity that occurred between January and March 2010, and a significant reduction in that peak activity, particularly since April 2010, when TfL introduced a cap on the number of works that it would allow to take place on the network at any one time.

Figure 4.7 Number of road works undertaken on the TLRN, September 2009 to September 2010.



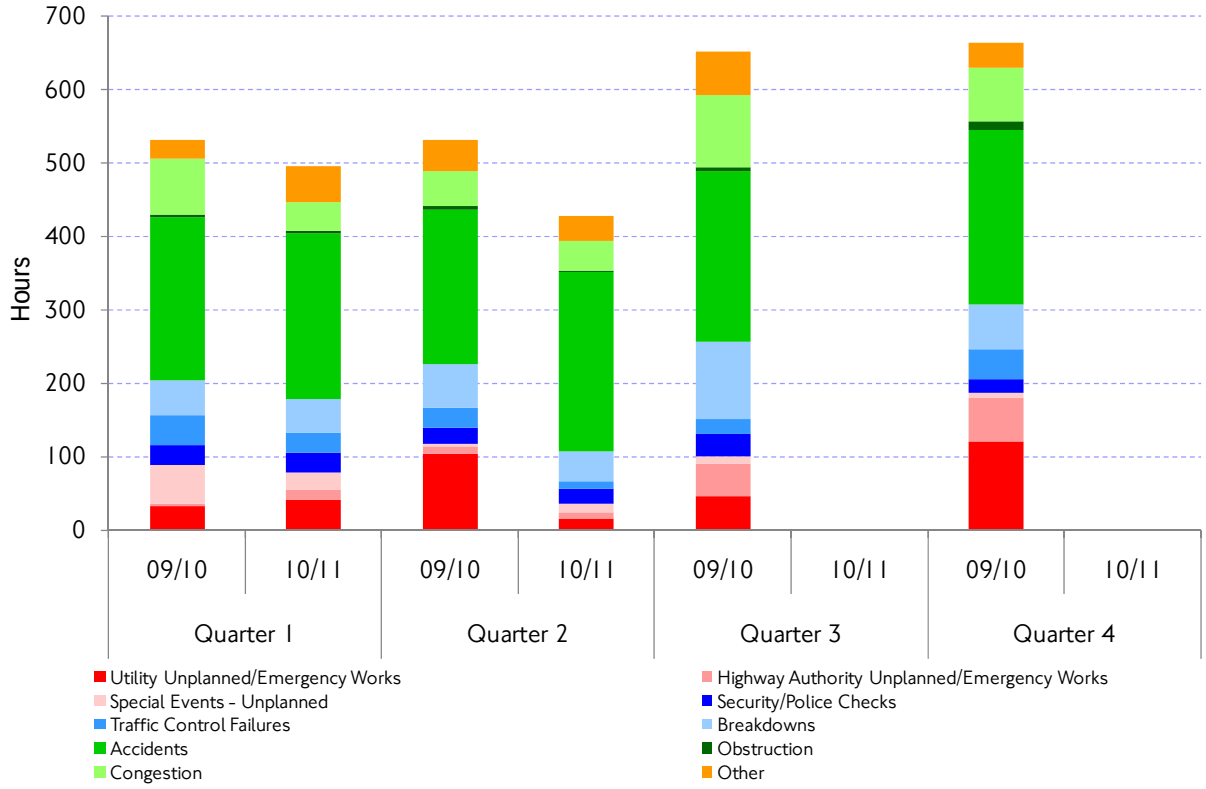
Source: TfL London Streets.

Disruption from unplanned events

There will always be unplanned events and incidents on the road network - emergencies, road traffic collisions, breakdowns, road defects and burst water mains - which cannot be planned for in advance. As Table 4.4 demonstrates, it is estimated that unplanned events and incidents are responsible for around 74 per cent of serious and severe traffic disruption across the network as a whole.

Figure 4.8 shows the breakdown of the hours of serious and severe disruption caused by unplanned incidents and events occurring across London for the financial year 2009/10 and for the first two quarters of 2010/11.

Figure 4.8 Hours of Serious and Severe disruption caused by unplanned incidents and events (London wide), by financial quarter.



Source: TfL London Streets.

The two largest contributors to the overall duration of unplanned incident hours are collisions and vehicle breakdowns, together accounting for almost half of unplanned disruption time. The data show that for the first two quarters of financial year 2010/11, the overall level of unplanned disruption is down by 13 per cent across London compared to the same period in financial year 2009/10.

4.8 Focus on: congestion hot-spots in London

Introduction

To contribute to the development of the Sub-Regional Transport Plans TfL has undertaken detailed analysis of traffic speed and delay data obtained from vehicles fitted with GPS devices The analysis identified a series of congestion 'hotspots' in each sub-region of London, and the total vehicle delay in these locations was calculated.

The analysis was undertaken for weekdays and weekends and covered different time periods across the day. It covered TfL's 'network of interest', comprising major roads in London including the TLRN and the BPRN (Borough Principal Road Network). Delay is expressed in minutes per kilometre over and above nominal 'free flow' conditions, calculated as a link total delay divided by link length. Data collected over a 12 month period were used for the analysis (May 2008 - April 2009). The analysis was undertaken for an average weekday, Saturday and Sunday.

These maps are intended to give a broad comparative feel for patterns of delay across London - and thereby highlight particular locations for further analysis. It is necessary to bear in mind that these patterns, which in part reflect traffic demand,

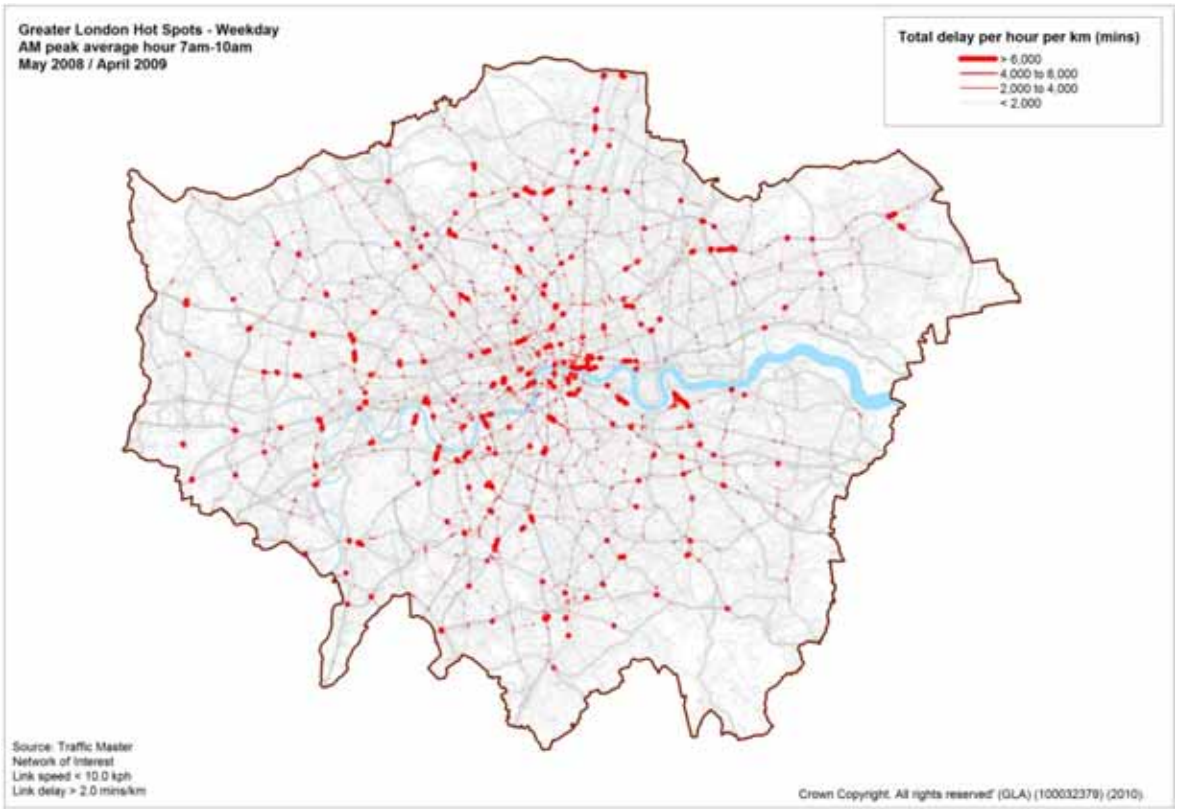
do not necessary represent people's 'end-to-end' journey times or reliability – which is what matters most for individual drivers. Furthermore, in a busy network, it is sometimes efficient to look at the network as a whole, rather than the individual link or hot-spot. Nevertheless, it is hoped that this will be a useful analysis for Boroughs and others in considering smoother traffic flow on Borough as well as TfL roads.

Congestion hotspots - weekdays

Figures 4.9 to 4.11 show the congestion hotspots identified in an average hour during the weekday AM peak, inter peak and PM peak periods respectively. Congestion hotspots are spread across London but it is evident that there is higher concentration towards central and Inner London. Also, the North Circular road has a number of congestion hotspots as do the approaches to some of the river crossings, particularly in East London.

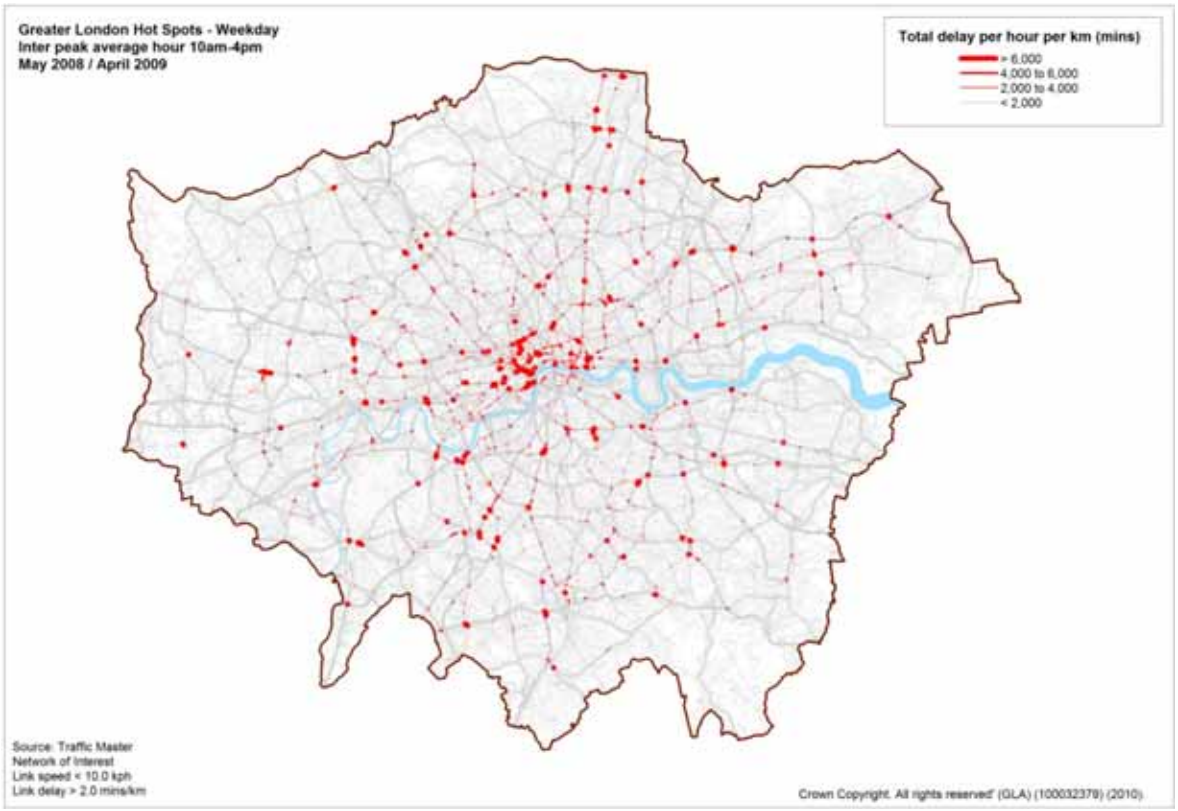
Congestion during the inter peak is lower overall compared with the AM peak, although it is noticeable that there are more congestion hotspots in central London during the inter peak than the AM peak. Congestion during the PM peak period appears to be the most severe of all three time periods analysed. The number of hotspots is higher in the PM peak and there are more widespread across Outer London (see also Figures 4.1 and 4.2).

Figure 4.9 London congestion hotspots - weekday AM peak period.



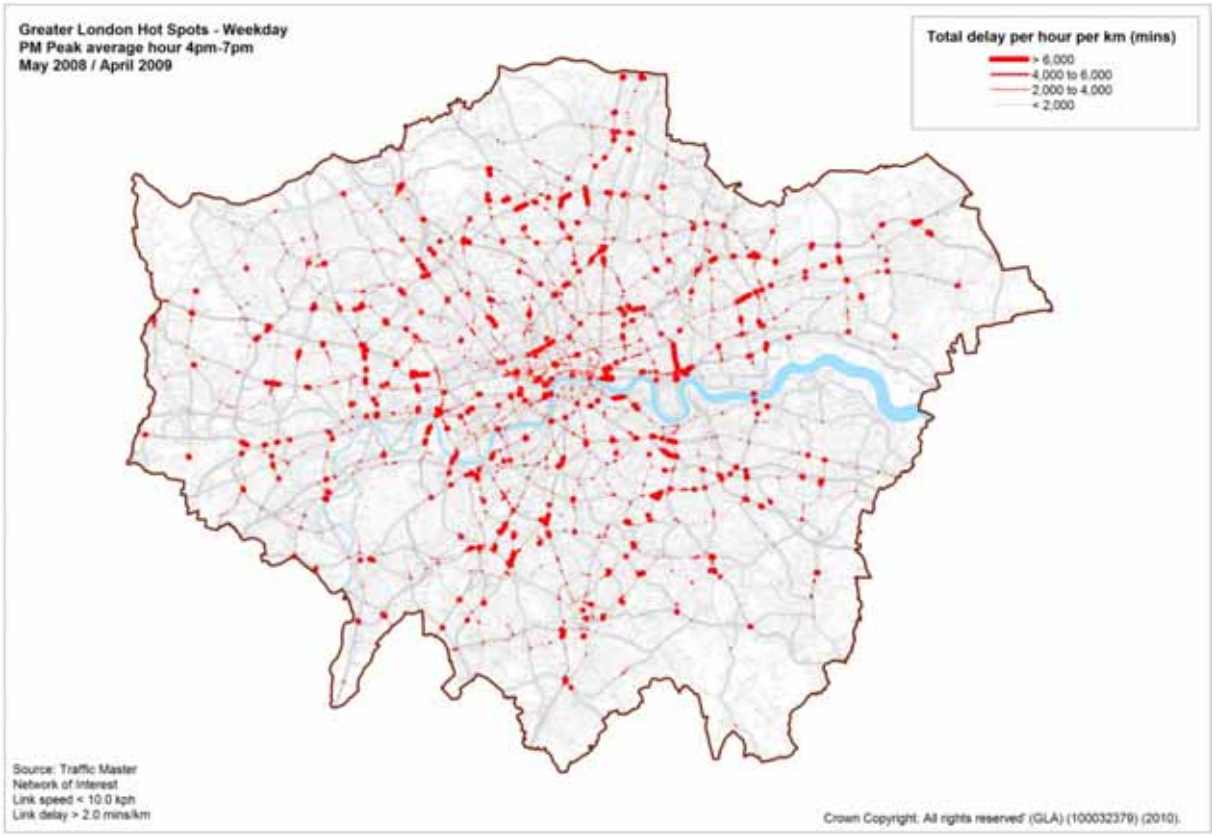
Source: TfL, based on data from Trafficmaster.

Figure 4.10 London congestion hotspots - weekday inter peak period.



Source: TfL, based on data from Trafficmaster.

Figure 4.11 London congestion hotspots - weekday PM peak period.



Source: TfL, based on data from Trafficmaster.

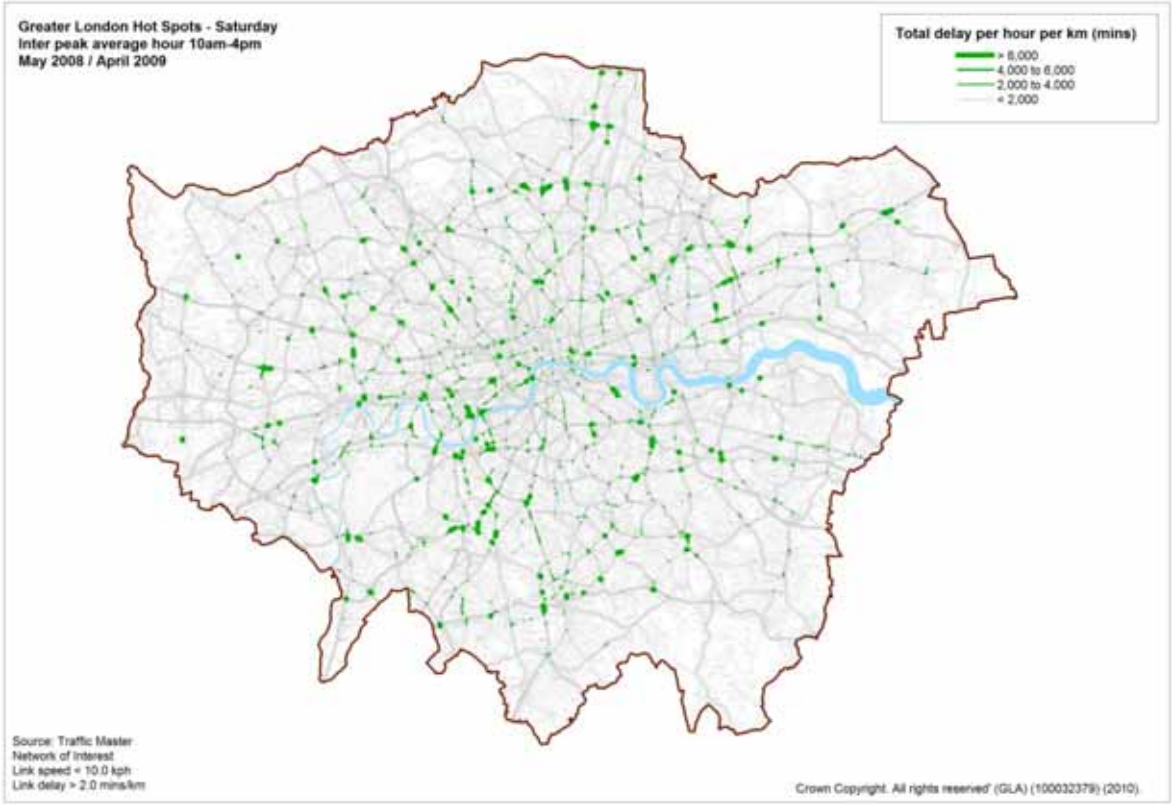
Congestion hotspots at weekends

Patterns of congestion on Saturdays and Sundays differ from those of weekdays. Typically, in the absence of the weekday morning peak, congestion is more a feature of the mid-day and afternoon periods. Figure 4.12 shows the congestion hotspots identified in an average hour between 10:00 and 16:00 on a Saturday (the Saturday 'inter-peak) while Figure 4.13 shows the congestion hotspots in an average hour between 16:00 and 19:00 on Saturdays (the Saturday 'PM peak').

During the Saturday inter-peak period, congestion hotspots are relatively widespread across much of Greater London. In contrast to the weekday equivalent, congestion in central London is relatively low. Many of the congestion hotspots tend to be on main routes and in town centres across London.

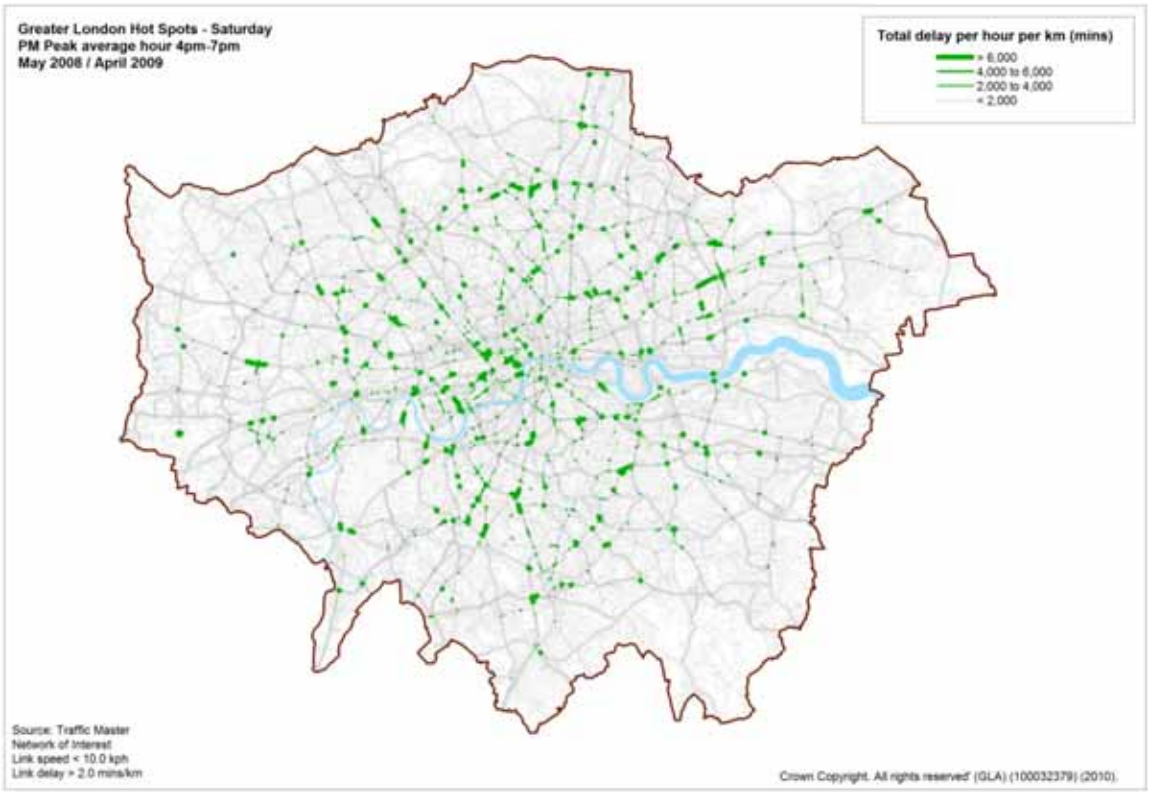
Looking at the Saturday PM peak period, congestion hotspots seem to be more frequent across London than during the inter-peak period. A key difference between this time period and the inter peak is the increased level of delay evident in central London. The North Circular Road has numerous congestion hotspots during the PM period on Saturday, a pattern repeated on most days and time periods. In contrast to the weekday PM peak, there are relatively few congestion hotspots towards the edges of the GLA area (the main exception being the A10 in Enfield).

Figure 4.12 London congestion hotspots - Saturday inter-peak period.



Source: TfL, based on data from Trafficmaster.

Figure 4.13 London congestion hotspots - Saturday PM peak period.



Source: TfL, based on data from Trafficmaster.

Analysis of congestion hotspots on a Sunday shows similar results to those for Saturdays - low delay during the AM peak which increases across the day albeit with slightly lower level of congestion observed overall. The main difference revealed by the analysis of Sunday PM peak congestion is that there are more congestion hotspots in the northern half of the GLA, a variation on the pattern of congestion observed in other time periods and on other days. There are also a higher number of congestion hotspots near the edges of the GLA area during the PM peak on Sundays.

4.9 Performance of the public transport networks - summary

The following sections look at the operational performance of the public transport networks in London, primarily in terms of the amount of service offered, and the reliability of that service. All measures are updated for the 2009/10 financial year, but in most cases it is most appropriate to view developments over the past year in the context of the medium-long term trend. Data to support this view are provided where possible. There is not one 'standard' measure of service provision or reliability that is applicable to all of the public transport networks – key definitions applicable to each are explained in the text. Measures for each of the modes are then brought together in an MTS Strategic Outcome Indicator (section 4.14).

Public transport in London continues to benefit from the longest run of sustained high performance ever recorded. All indicators of service performance have shown a marked trend of improvement over the last decade - alongside and complementary to often substantial enhancements to the level of service offered. Values for the most recent two financial years do inevitably reflect the effects of periods of severe weather in both winters, alongside specific upgrade projects, such as those affecting the Docklands Light Railway and the Jubilee line, but when this is taken into account

it is clear that high levels of service offering and performance are being sustained and improved upon wherever possible. Table 4.5 summarises headline figure comparing aspects of service provision and performance since 2000/01.

Table 4.5 Key indicators of public transport service provision and performance - 2000/01 to 2009/10 (summary – typical values).

Mode	Measure	Start of decade	Now
Service provision			
Buses	Kilometres operated	360 million	480 million
LU	Kilometres operated	65 million	70 million
DLR	Kilometres operated	2.9 million	4.6 million
Tramlink	Kilometres operated	2.4 million	2.6 million
Performance			
Buses	Excess Wait Time	2.0 minutes	1.1 minutes
LU	Excess Journey Time	8.5 min	6.5 min
DLR	Reliability	98%	98%
Tramlink	Reliability	99%	99%
National Rail	ORR L&SE PPM	80%	92%
Overground	ORR PPM	n/a	93%

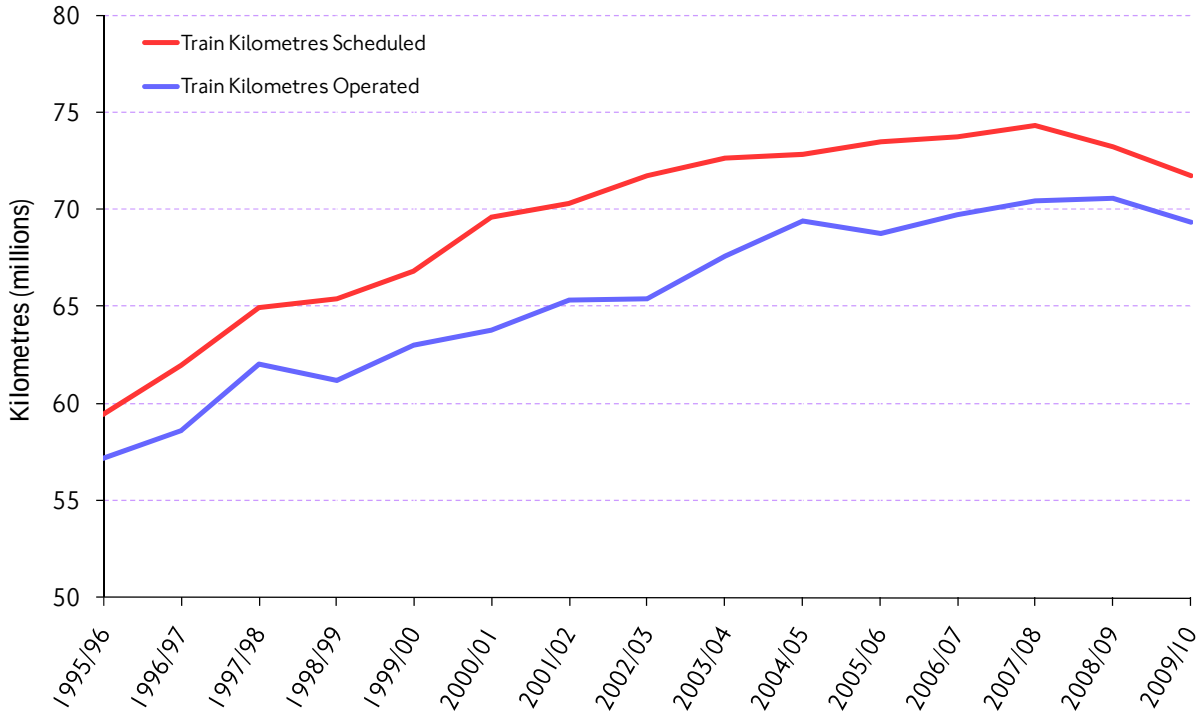
4.10 Performance of the London Underground (LU)

The following section looks at the main trends in LU service provision and service reliability, with particular reference to the most recent financial year.

LU service provision

Over the 12 years up to 2007/08 LU consistently increased its service offering, with general year-on-year increases in train kilometres scheduled (Figure 4.14). However, the most recent two years have seen reductions - reflecting, firstly, the closure for upgrading work in December 2007 of the East London line, which ran approximately 0.7 million kilometres per year before closure, and also the impact of the Underground upgrade programme which, for example, during 2009/10 necessitated extensive weekend closures of the Jubilee line and an increased level of closures on the sub-surface (Metropolitan, District and Circle & Hammersmith) lines (see also Figure 4.15).

Figure 4.14 London Underground: Scheduled and operated train kilometres.

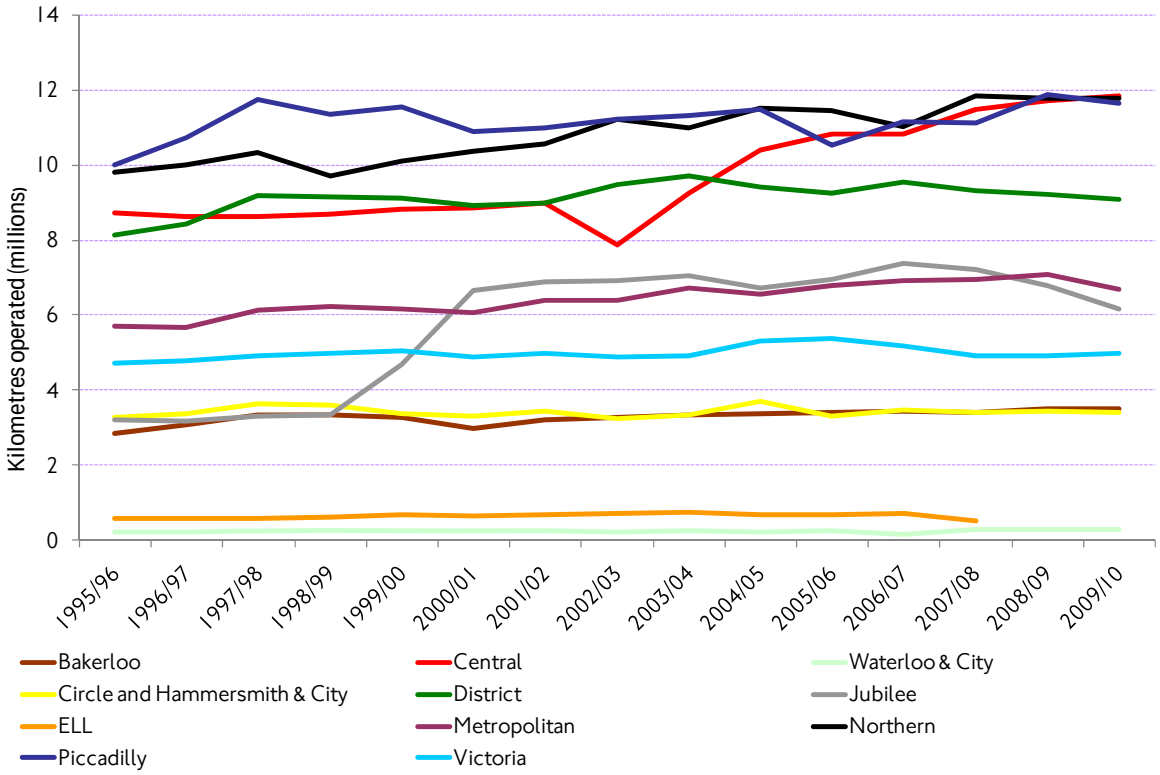


Source: London Underground.

Operated kilometres bear a close relationship to kilometres scheduled, the difference between the two of course being one measure of reliability. The recent high point in Underground kilometres operated was 2008/09, which at 70.6 million represented an all-time high. In 2009/10, the number of kilometres operated reduced to 69.4 million, 1.3 million less than 2008/09, this principally reflecting reductions, because of upgrade works, as described above, to the number of kilometres scheduled. It is noticeable, however, that the gap between scheduled and operated kilometres has narrowed considerably over the past two years, reflecting a more reliable service.

Figure 4.15 breaks this out by individual LU line, illustrating the impact of line-specific events such as the opening of the Jubilee line extension in 1999 and the more recent impact of the Underground upgrade programme. A major beneficiary over the decade to 2009/10 has been the Central line, reflecting progressive enhancements to the service to fully realise the benefits of the comprehensive upgrade of the line and trains since 2003.

Figure 4.15 London Underground - operated train kilometres by line.



Source: London Underground.
1. The East London line is no longer part of LU and since 2010 is operated by London Overground.

LU service reliability - network level

As well as operating historically high levels of service in recent years, the Underground also improved significantly on two other key measures of reliability: average journey time and excess journey time (Table 4.6). In 2009/10 the overall average journey time (scheduled journey time plus an 'excess' - see footnote to Table 4.6) averaged 44.1 minutes, a level only marginally down on that of 2008/09 and an improvement of 0.4 minutes compared with 2007/08.

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 2009/10 averaged 6.4 minutes, an improvement of 0.2 minutes compared to the previous year and 1.4 minutes compared to 2007/08, and representing the best performance since the measure was introduced 10 years ago.

The main reason for this reduction in excess journey time has been a significant improvement in train service reliability, which was driven by a reduction to 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.

Table 4.6 London Underground service reliability and journey times.

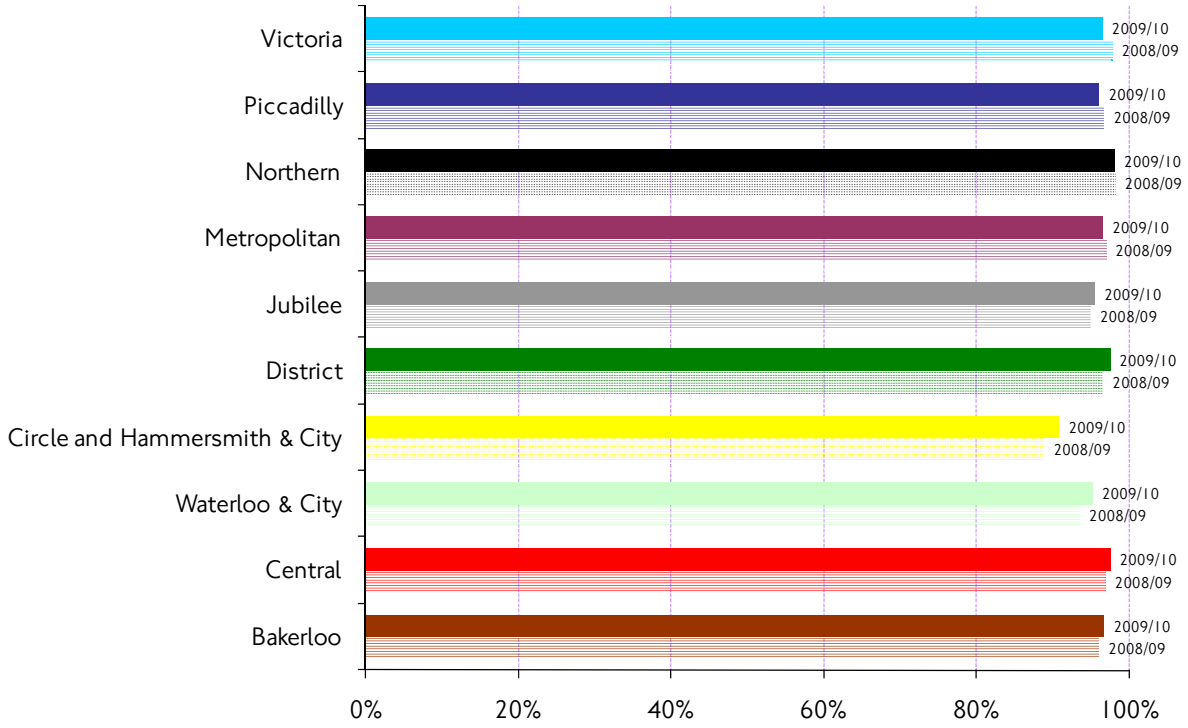
Year	Train kilometres scheduled (millions)	Percentage of scheduled kilometres operated	Average actual journey time (minutes)	Average generalised (weighted) journey time (minutes)	Excess journey time (weighted) (minutes)	Excess as % of generalised journey time
1998/99	65.4	93.6	27.7	43.5	7.1	16.4
1999/00	66.9	94.3	27.8	43.9	7.5	17.1
2000/01	69.6	91.6	28.6	45.7	8.6	18.9
2001/02	70.4	92.9	28.3	45.2	8.1	18.0
2002/03	71.8	91.1	29.1	46.7	9.7	20.7
2003/04	72.7	93.1	27.9	44.3	7.4	16.8
2004/05	72.9	95.3	27.7	44.0	7.2	16.4
2005/06	73.6	93.6	27.8	44.3	7.5	16.9
2006/07	73.8	94.5	28.0	44.7	8.1	18.0
2007/08	74.4	94.8	27.8	44.5	7.8	17.4
2008/09	73.2	96.4	27.5	43.9	6.6	15.1
2009/10	71.8	96.6	27.7	44.1	6.4	14.5

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

LU service reliability - line level

Service reliability differs between Underground lines. Figure 4.16, which shows the percentage of scheduled kilometres actually operated, shows a consistently strong performance and a general improvement over the previous year. However, the Victoria, Piccadilly and Metropolitan lines recorded small decreases in the percentage of scheduled kilometres operated in 2009/10 relative to 2008/09.

Figure 4.16 London Underground service reliability by line. Percentage of scheduled kilometres operated. Financial years 2007/08 and 2008/09 compared.



Source: London Underground.

Further reading

Periodic updates to the performance of London Underground can be found at: www.tfl.gov.uk/tfl/corporate/modesoftransport/tube/performance/. More information on TfL's Underground upgrade programme can be found at: www.tfl.gov.uk/corporate/projectsandschemes/10127.aspx

4.11 Performance of London Buses

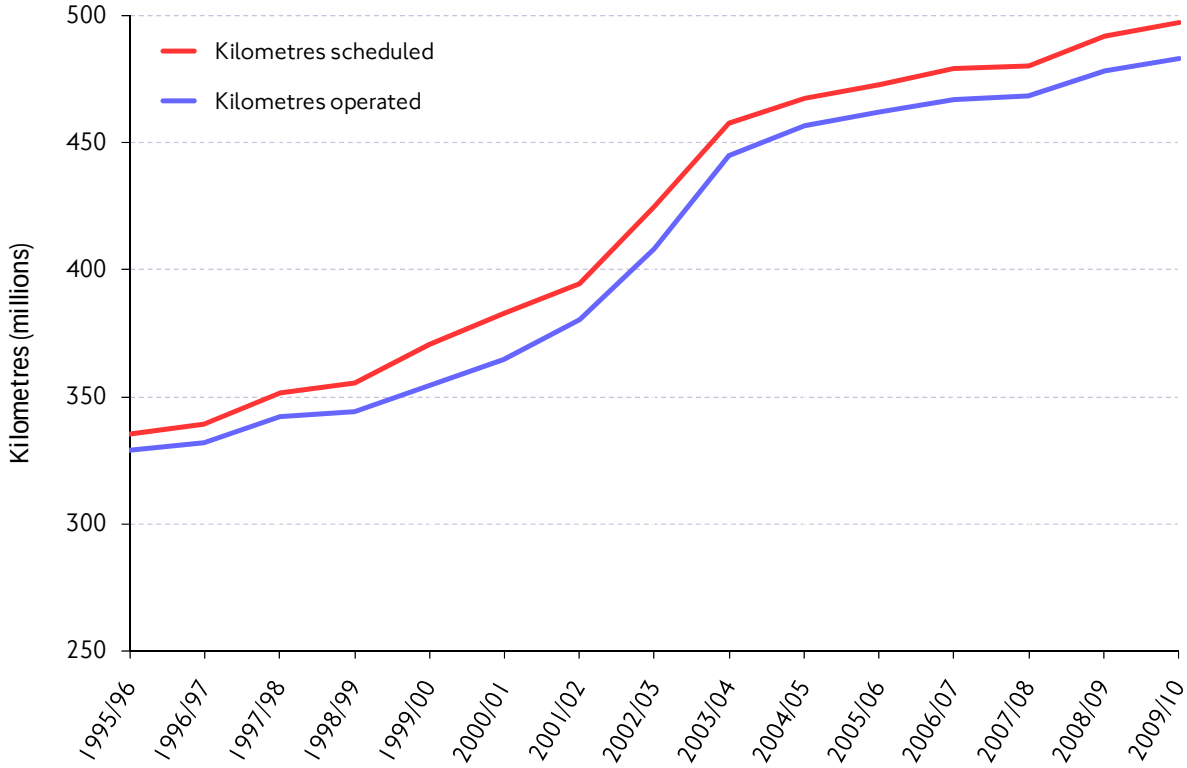
The bus has become one of London's transport success stories. Buses in London now carry 2.3 billion passengers each year - the highest level since 1960, with service levels at their highest since 1957.

Bus service provision

In the financial year 2009/10, London buses operated 482.9 million kilometres. A total of 497.2 kilometres was scheduled, with both values 1 per cent higher than in 2008/09 and reflecting a 10-year high point. This also meant that 97.1 per cent of scheduled bus kilometres were actually operated, this measure having been consistently above 97 per cent since 2003/4.

Figure 4.17 shows the trend for bus service provision in London since 1995/96. Scheduled and operated bus kilometres have both increased by around 53 per cent since 1993/94, with particularly strong growth between 2001 and 2005. This increase reflects substantial enhancements to the bus network made by TfL since 2000.

Figure 4.17 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 4.7. The percentage of scheduled kilometres that are operated has been 97 per cent or greater for the last seven years, the 97.1 per cent value for 2009/10 being comparable to the 97.0 per cent recorded the previous year. Both years were affected by periods of relatively severe winter weather, as well as industrial action by drivers.

Two measures of service reliability are provided for 'high-frequency' routes (see footnote to table). Both 'actual' and 'excess' waiting times have consistently reduced over the decade – as a result of additional buses and significantly improved bus service reliability. Values for 2009/10 were closely comparable to those for 2008/09 - again reflecting best-ever performance. The use of Quality Incentive Contracts, combined with various initiatives to improve control of routes, such as the recent introduction of iBus, has helped to maintain the high levels of reliability currently being achieved.

Table 4.7 Indicators of bus service reliability.

Year	Kilometres scheduled (millions)	Percentage of scheduled kilometres			High frequency services[1] Average wait time (minutes)		Low frequency services[2] Percentage of timetabled services on time[3]
		Operated	Lost due to traffic congestion[4]	Lost due to other causes[5]	Actual	Excess	
1995/96	335	98.2	1.0	0.8	6.5	1.7	71.4
1996/97	339	97.9	1.2	0.9	6.4	1.8	70.3
1997/98	351	97.4	1.3	1.3	6.4	1.8	70.0
1998/99	355	96.9	1.6	1.5	6.6	2.0	69.0
1999/00	370	95.7	1.8	2.5	6.7	2.1	67.8
2000/01	383	95.3	2.1	2.6	6.8	2.2	67.7
2001/02	395	96.4	2.0	1.6	6.6	2.0	69.4
2002/03	425	96.1	2.6	1.3	6.4	1.8	70.5
2003/04	457	97.2	1.7	1.1	5.8	1.4	74.6
2004/05	467	97.7	1.6	0.8	5.6	1.1	77.1
2005/06	473	97.7	1.7	0.6	5.6	1.1	77.2
2006/07	479	97.5	1.9	0.6	5.5	1.1	78.1
2007/08	480	97.5	2.0	0.5	5.5	1.1	79.1
2008/09	492	97.0	2.3	0.7	5.5	1.1	80.8
2009/10	497	97.1	2.3	0.6	5.5	1.1	80.5

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 fewer than 5 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 lost kilometres outside the control of the operator.
5. Includes all lost kilometres within the control of the operator.

4.12 Performance of DLR and London Tramlink

DLR

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 4.8 shows a track record of strong and improving performance over the last 10 years, albeit that performance in both 2008/09 and 2009/10 fell short of recent years. This largely reflects disruptions caused by major project works, such as the extension to Woolwich Arsenal, and the commissioning of a new fleet of trains.

Table 4.8 DLR service reliability.

Year	Percentage of scheduled services operated	Percentage of trains on time
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
2009/10	97.2	94.8

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 operated in 2009/10 were down slightly on 2008/09, due to major engineering work which took place from the end of July to early September. Some central Croydon stops were closed during this work. However, the percentage of scheduled kilometres that were operated was the highest so far recorded - at 99.2 per cent (Table 4.9).

Table 4.9 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
2009/10	2.62	2.60	99.2

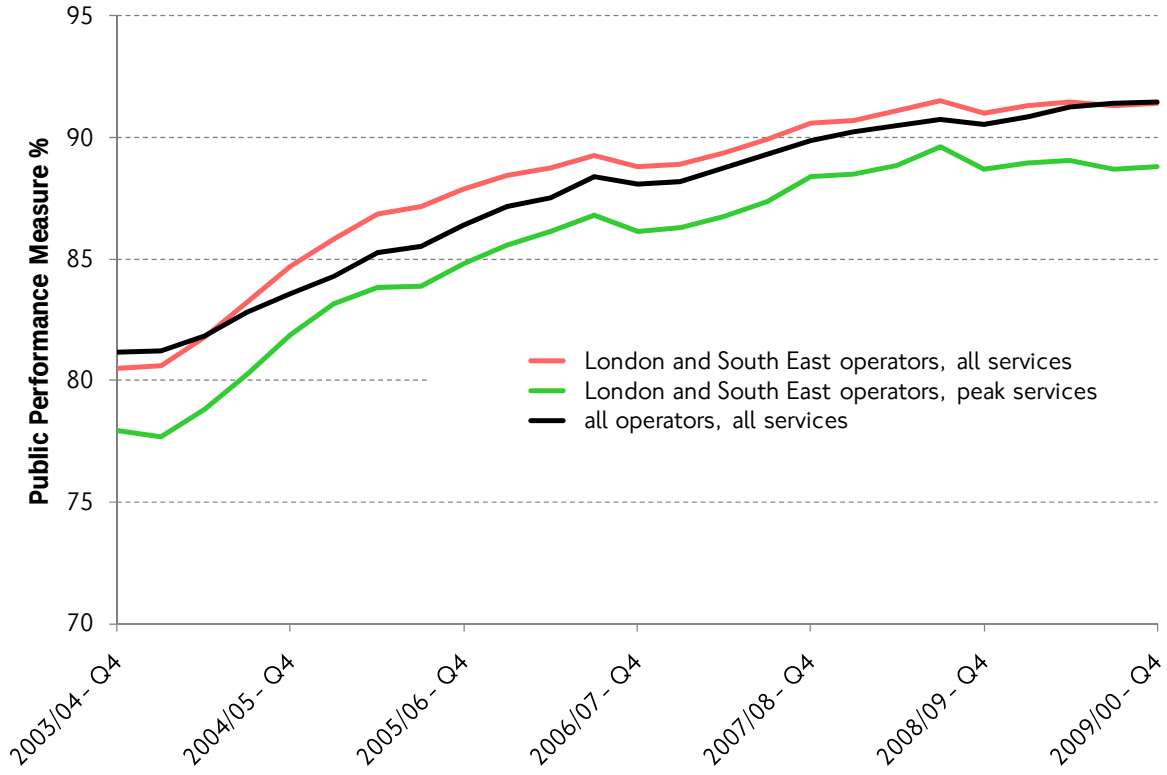
Source: London Tramlink.
1. Operated kilometres exclude replacement bus services operated during periods of track repair works.

4.13 Performance of National Rail including London Overground

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 not later than 5 minutes after the planned destination arrival time for London and South East regional operators, or 10 minutes for long-distance operators.

Figure 4.18 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 (TOCs) classified by the Office of Rail Regulation as London and South East regional operators is shown for weekday peak period services, as well as all services. The equivalent trend for all TOCs in Great Britain is also shown for comparison.

Figure 4.18 National Rail - public performance measure.



Source: Office of Rail Regulation.

The trend since 2003 has clearly been an improving one for all groups of operators - reflecting recovery from the infrastructure and safety difficulties at the start of the decade. More recently, however, the strong trend towards improvement has slowed, values for 2009/10 being comparable to those for the previous financial year. It is, however, noticeable that the performance of London and South East (LSE) operators' services now closely approximates to the average for all operators, albeit that the peak-service performance of LSE operators lags both averages by some margin.

The moving annual average PPM for LSE operators (all services) in the financial year 2009/10 was 91.5 per cent, up from 90.6 per cent for 2008/09. These compare to average values for all franchised train operators that were also 91.5 per cent in

2009/10, and 90.6 per cent in 2008/09. For LSE operators peak services, the equivalent values were 88.8 and 88.7 per cent.

PPMs are published for each individual train operating company by the Office of Rail Regulation. PPMs for the year ending 31 March 2010 were, in the main, comparable to those for the previous year. Operator c2c, running to south Essex from Fenchurch Street, was again the best-performing LSE operator, with an all-service PPM of 96.6 per cent, up from 96.3 per cent the previous year. At the other extreme, First Capital Connect and South Eastern, the latter operating from Victoria and Charing Cross to Kent, recorded PPMs of 89.5 per cent - both down from the previous year. London Midland (Euston) was the most improved operator over the period, with a PPM of 89.8 for the year ending 31 March 2010, compared to 88.5 for the previous year.

London Overground recorded an all-service PPM of 93.1 per cent, for the year ending 31 March 2010, up from 92.6, and a peak-only PPM of 95.4, up from 94.6 the previous year. Both values are above-average among both Great Britain and LSE TOCs.

Further reading

Further details of trends for National Rail services can be found in the Office of Rail Regulation publication 'National Rail Trends'. This is produced as an annual report with quarterly updates, and can be found at: www.rail-reg.gov.uk/server/show/nav.2026.

4.14 MTS Strategic Outcome Indicator: public transport reliability

Definition of indicator

This indicator brings together and summarises key reliability statistics for each financial year for the principal public transport modes in London, including National Rail. Values for each mode are itemised separately, with further commentary provided in the preceding sections of this report.

Values for 2009/10 financial year and comparison with values for 2008/09

- London Underground. Reliability of LU services is measured in terms of average overall (generalised) journey time. In 2009/10 average overall generalised journey time was 44.1 minutes. This was a marginal decrease in performance, over the equivalent value of 43.9 minutes for 2008/09.
- London Buses. 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 2009/10, excess waiting time for high-frequency routes was 1.1 minutes, a value identical to that for the previous five years. In 2009/10, 80.5 per cent of low-frequency services were on time, marginally less than the 80.8 per cent recorded in 2008/09, this largely reflecting the severe weather during December 2009/January 2010, but being above the range of 77-79 per cent typically recorded since 2004/05.
- DLR. Reliability of the DLR is measured in terms of the percentage of trains that ran to time. For 2009/10, 94.8 per cent of trains were on time. This was marginally up on the value of 94.7 for 2008/09, although once again fell below the values of above 97 per cent recorded between 2004/05 and 2007/08, this largely reflecting the impact of upgrade projects.

- London Tramlink. Reliability of London Tramlink is measured in terms of the percentage of scheduled service operated. This was 99.2 per cent in 2009/10, compared to 98.5 per cent in 2008/09 - the highest value so far recorded.
- National Rail. Reliability of National Rail in London is measured through the Office of Rail Regulation's PPM, which is a percentage score combining elements of punctuality and reliability. The all-operators measure (for LSE operators) at 31 March 2010, calculated as an average of the four quarters of 2009/10, was 91.5 per cent. This was an increase of 0.9 of a percentage point on the equivalent value of 90.6 for the four quarters to 31 March 2009 and reflected the best performance since the safety and infrastructure difficulties at the beginning of the decade.
- London Overground. The Office of Rail Regulation PPM measure for London Overground for the year ending 31 March 2010 was 93.1 per cent - above average for London and South East operators. This was an increase of 0.5 of a percentage point on the 92.6 per cent recorded for the year to 31 March 2009 and reflects a comparatively strong performance by this new operator.

Assessment of recent trends

Public transport in London continues to benefit from the longest run of sustained high performance ever recorded. All indicators of service performance have shown a marked trend of improvement over the last decade - alongside and complementary to often substantial enhancements to the level of service offered. Values for the most recent two financial years do inevitably reflect the effects of periods of severe weather in both winters and specific upgrade projects, such as those affecting the DLR and the Jubilee line, but it is evident that high levels of service performance are being sustained.

4.15 MTS Strategic Outcome Indicator: public transport capacity

Definition of indicator

This indicator is expressed in terms of 'place kilometres', calculated from established 'planning capacities' for the vehicles used, multiplied by kilometres operated. The modes included in the indicator are: Underground, buses, DLR, London Overground and London Tramlink. National Rail services are currently not included in this indicator (although see further below).

Values for the 2009/10 calendar year and comparison with value for 2008/09

- London Underground operated 55,431 million place-kilometres in 2009/10. This was a 2 per cent decrease on 2008/09.
- London Buses operated 29,311 million place-kilometres in 2009/10. This was a 1 per cent increase on 2008/09.
- DLR operated 2,027 million place-kilometres in 2009/10. This was an 18 per cent increase on 2008/09.
- London Tramlink operated 543.92 million place-kilometres in 2009/10. This was a 2 per cent decrease on 2008/09.

Assessment of recent trend

The total capacity offered by TfL's public transport networks in 2009/10 was broadly comparable to that of 2008/09. A two per cent fall on the Underground, reflecting upgrade projects, was partially offset by continued growth in the number of bus kilometres operated. An 18 per cent increase in DLR capacity reflected the opening of the Woolwich extension, as well as the reopening of Tower Gateway in April 2009 following closure in July 2008 for refurbishment.

Balance between public transport supply and demand

The capacity provided on the public transport networks is more meaningful when looked at in terms of the demand placed on it by passengers. This can be expressed in terms of average vehicle (unit) occupancy, as shown in Table 4.10. Looking at established trends and developments for 2009/10:

- Average bus occupancies increased by 26 per cent over the period 2000/01 to 2008/09 - but have stabilised in more recent years. This is despite continuing increases to demand and recently a move away from large articulated vehicles.
- Train occupancy rates on LU have been broadly constant over the review period, despite substantially increased patronage - reflecting the service enhancements highlighted above.
- Trends for both DLR and Tramlink show unit occupancy progressively increasing, in parallel with the development of the networks. DLR unit occupancy increased in 2008/09 with the introduction of longer trains.
- Looking specifically at 2009/10 in relation to 2008/09, there was little overall change to the unit occupancy statistics.

Table 4.10 Balance between public transport supply and demand - average number of passengers per bus, train or tram.

	Passengers per bus, train or tram			
Year	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
2009/10	16.6	121.9	79.3	53.5

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

Crowding on National Rail services in London

Crowding on National Rail commuter services in London is measured through DfT's Passengers in eXcess of Capacity (PiXC) metric, which provides a percentage-based indicator of overcrowding based on surveys of passenger numbers in the peak direction (inbound in the AM peak, outbound in the PM peak) conducted every autumn. Full details are available via the Office of Rail Regulation at: www.rail-reg.gov.uk/server/show/nav.2026.

In summary, reflecting the autumn 2009 counts and in comparison to the preceding two years:

- Overcrowding lessened across most train operating companies, principally reflecting lower demand associated with the economic recession. In 2009, 2.9 per cent of passengers were carried in excess of capacity in the morning peak (compared to 4.0 per cent in 2008), and 1.5 per cent in the PM peak (1.8 per cent in 2008).
- However, the general tendency towards less overcrowding was not evenly spread across operators. First Great Western, operating services into London Paddington and the LSE operator with the highest PiXC score in 2008 (of 8.9 per cent AM peak), saw further increased crowding in 2009 (an equivalent score of 11.4 per cent).
- At the other extreme, operators such as First Capital Connect saw substantial reductions to their PiXC scores (AM peak score of 0.9 per cent in 2009 compared to 4.9 per cent in 2008).

4.16 MTS Strategic Outcome Indicator: satisfaction with levels of crowding on the principal public transport modes

Definition of indicator

This indicator is derived from customer satisfaction surveys carried out with travellers on the major modes of public transport managed by TfL (see also chapter 10 of this report). Survey respondents are asked to rate their satisfaction with the level of crowding on a scale of 0 to 10, with 10 being 'extremely satisfied'. Responses have been converted to a mean score out of 100 and a composite measure created by combining modal results based on the mode share as shown in Table 2.6. The indicator should be considered in the light of the quantitative measures of network performance presented throughout in this chapter, and overall satisfaction with public transport services, which is dealt with in chapter 10 of this report.

Value for 2009/10 financial year and comparison with value for 2008/09

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 2009/10. This is identical to that for 2008/09. In general TfL considers a score of between 70 and 79 in satisfaction surveys to be 'fairly good'.

Table 4.11 summarises satisfaction with the level of crowding inside the vehicle for the major public transport modes separately and in aggregate. The table also includes data on the mode share, used as the basis to produce the composite score.

Table 4.11 Summary of satisfaction with crowding and mode share for principal public transport modes, 2009/10.

Mode	Customer satisfaction with crowding on the vehicle (out of 100)	Annual journey stages (millions)	Relative weight (per cent)
Bus	78	2,257	65%
Underground	71	1,065	31%
DLR	82	69	2%
Overground	72	35	1%
Tramlink	78	26	1%
Total	76	3,452	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.

Assessment of recent trend

With only two years of data to compare, it is not possible to draw any conclusions about a trend in the level of satisfaction with crowding on the vehicle across the major public transport modes in London. There has been no change in the level of satisfaction between 2008/09 and 2009/10. Modal scores demonstrate that levels of customer satisfaction with crowding remain fairly stable across most modes, at a 'fairly good' level of satisfaction.

4.17 Operating costs for TfL public transport services per passenger kilometre

Principles and further information

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 helps to ensure that TfL has a budget that balances income (including fares and grant) with spending. TfL publishes substantial information on its finances and costs. This can be found, for example, in TfL's Business Plans, Annual Reports and TfL's budget. These are all available on TfL's website (www.tfl.gov.uk). The following information is derived primarily from these Annual Reports.

TfL's operating costs in the 2009/10 financial year, with comparison for 2008/09

TfL's gross operating costs (excluding exceptional items) in 2009/10 were £5.7 billion. Capital expenditure in the same year was £2.8 billion. Note that this only includes operating costs incurred by TfL. Additional costs will also be incurred by other agencies providing or operating transport in London.

Table 4.12 shows a segmental analysis of TfL's expenditure on public transport services for the 2009/10 financial year. Expenditure is shown on both a gross, net and per passenger-kilometre basis, for each mode separately and for all modes combined. Table 4.13 shows the equivalent data for the 2008/09 financial year.

Table 4.12 TfL's expenditure and revenue on public transport services - 2009/10.

	Passenger kilometres (millions)	Gross expenditure (£m)	Gross expenditure per passenger kilometre (£)	Net expenditure (£m)	Net expenditure per passenger kilometre (£)
London Buses	8,013	1,851	0.23	685	0.09
London Underground	8,456	2,387	0.28	591	0.07
Docklands Light Railway	365	93	0.25	13	0.03
London Trams	134	30	0.22	13	0.10
London Overground	437	101	0.23	65	0.15
All above modes	17,405	4,462	0.26	1,367	0.08

Source: TfL Business Planning.
Note: Values for London Buses include Dial-a-Ride. Capital investment is treated differently between bus and rail.

Table 4.13 TfL's expenditure and revenue on public transport services - 2008/09.

	Passenger kilometres (millions)	Gross expenditure (£m)	Gross expenditure per passenger kilometre (£)	Net expenditure (£m)	Net expenditure per passenger kilometre (£)
London Buses	7,942	1,822	0.23	720	0.09
London Underground	8,641	2,308	0.27	539	0.06
Docklands Light Railway	318	86	0.27	22	0.07
London Trams	142	21	0.15	8	0.06
London Overground	427	95	0.22	56	0.13
All above modes	17,470	4,332	0.25	1,345	0.08

Source: TfL Business Planning.
Note: Values for London Buses include Dial-a-Ride. Capital investment is treated differently between bus and rail

The tables show that:

- In 2009/10, TfL services cost 26 pence per passenger kilometre to operate (gross operating cost). When revenues are taken into account, the net cost per passenger kilometre across all modes was eight pence.
- There was little change in both measures between 2008/09 and 2009/10. The gross operating cost measure did however increase by 1 penny between the two years, an increase of 3.4 per cent.
- Both gross and net operating costs vary somewhat between the TfL modes. On a gross cost basis, values are typically in the range 20-30 pence per passenger kilometre, with LU recording the highest values. On a net cost basis, the values are more variable.

Caution should nevertheless be used in making comparisons between the different modes of travel due to underlying differences in the way in which costs are accounted, especially the inclusion of some capital costs in operating expenditure, and the different treatment of capital investment between bus and rail. Note also that in the audited accounts in some cases the cost data presented covers more than one type of service, for example the London Buses data includes both the core bus network and specialist services such as Dial-a-Ride, for which no income is received.

4.18 MTS Strategic Outcome Indicator: operating costs for TfL services per passenger kilometre for the principal public transport modes

Definition of indicator

Operating costs for TfL services is an important measure of the efficiency and effectiveness of transport service provision in London. The modes that are included in this indicator are: buses; Underground, DLR, London Tramlink and London Overground.

Value for 2009/10 calendar year and comparison with value for 2008/09

Across all of TfL's modes, the total gross expenditure in 2009/10 was £4,462 million and the total net expenditure was £1,367 million. Total passenger kilometres were 17,405 million. Therefore, the gross operating cost per passenger kilometre in 2009/10 was 26 pence. The net operating cost per passenger kilometre in 2009/10 was 8 pence.

The equivalent values for 2008/09 were: total gross expenditure £4,332 million; total net expenditure £1,345 million. Total passenger kilometres were 17,470 million. Therefore, the gross operating cost per passenger kilometre in 2008/09 was 25 pence. The net operating cost per passenger kilometre in 2008/09 was 8 pence.

Assessment of recent trend

The gross operating cost measure increased by 1 penny between the two years, an increase of 3.4 per cent in current prices.

4.19 Asset condition - TfL services

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

Measures of asset condition

There are no established standards that are consistent across the different modes by which assets 'in a good state of repair' can be measured. Some possible criteria are:

- Safety - self-evidently, an unsafe network is not in a state of good repair.
- Age - life expired assets are those beyond their design life. However, this does not necessarily mean that they are not in good repair.
- Reliability - an asset could be in good repair, regardless of its age, if it is reliable.
- Freedom from defects - fixed assets, such as roads, are most often measured in terms of the presence or absence of defects.
- Maintenance cost - assets could be said to be in good repair if maintenance costs were low.
- Time before overhaul - good repair may be measured by the time before the next overhaul, ie good repair means recently overhauled and therefore free from defects.

There are, however, some basic 'pragmatic' benchmarks that are specific to the various modes. These reflect the more crucial operational or customer-facing features for that mode, and generally reflect 'industry-standard' definitions. These benchmarks are:

- TfL Road Network (TLRN): The percentage of carriageways and footways 'not in need of repair' - derived from visual inspection or measurement data according to established standards.
- London Buses: Age of vehicles (less than ten years old).
- London Underground: Time until next scheduled overhaul for both trains and track (6-year benchmark).
- Docklands Light Railway: Age of vehicles (less than 30 years old).
- Tramlink: Age of vehicles (less than 30 years old).
- London Overground: Age of vehicles (less than 30 years old).

Historic trend for TfL's assets

Table 4.14, reproduced from Travel in London report 2, shows the historic trend for TfL's assets up to the year 2009 according to the above definitions.

Table 4.14 Asset condition - historic trend according to standard benchmarks.

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Streets (TLRN)									
Percentage of carriageway not in need of repair	..	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	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 six years or more before next overhaul	92.8	95.1	94.1	94.0	93.6	94.2	94.9	94.1	93.2
Percentage of LU track with six years or more before next overhaul	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
Tramlink									
Percentage of tram rolling stock less than 30 years old	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	23	80

Source: TfL Finance.

Briefly reviewing this table, it is seen that:

- TfL's streets related assets have over recent years maintained consistent scores in the 93 to 94 per cent range.
- The values for TfL's bus fleet reflect the 'age cohort' effect of large investment in new vehicles over previous years.

- Values for Underground rolling stock are, as might be expected, relatively stable, given the need to undertake overhauls on a fixed-period basis. However, scores for track condition have been comparatively low, underlining the need for continued investment in this infrastructure.
- Values for DLR and Tramlink reflect the fact that these networks employ vehicles that were purchased from new, while those for London Overground partly reflect, during 2009, the wholesale replacement of the former train fleet for these services by new vehicles.

Deriving a modal composite measure

The MTS Strategic Outcome Indicator relating to asset condition demands a composite multi-modal indicator measuring the percentage of in-scope asset that is deemed to be in good condition. TfL's approach to calculating this makes use of the values in Table 4.14 relating to each of the principal modes. These are deemed to be 'in-scope' assets for the purpose of this indicator. The definition of 'in good condition' is taken as being those assets that achieve the relevant 'pragmatic' benchmark. For example, in 2009, 69.7 per cent of London Underground track had greater than six years before its next scheduled overhaul. Therefore, 69.7 per cent of this asset is deemed, on this basis, to be in 'good condition', although clearly all of the asset would meet other definitions of 'good repair' (above), such as safety.

Each of these measures applies to specific TfL modes. The most appropriate way to derive a modal composite measure is on the basis of person-kilometres travelled, which is the most comparable and consistently-available statistic across the different modes. While having the benefits of simplicity and transparency, there are three issues with this approach that need to be properly understood.

The first is that, because both asset condition indices and modal passenger kilometres (used to weight the mode-specific values in the composite indicator) can change between years, the outcome statistic could, under some circumstances, primarily reflect a change in mode share rather than a change in underlying asset condition. This is not necessarily a problem, since, for example, a significant increase or decrease in the usage of a particular mode would reflect a corresponding change in the number of people experiencing conditions on that mode. However, it does mean that year-to-year changes in the outcome statistic require careful interpretation.

The second issue reflects data limitations, since TfL will not necessarily have accurate year-by-year data for some aspects of personal travel. This particularly applies to estimates of London-wide passenger car occupancy, the proportion of all road traffic or pedestrian traffic in London that is carried on the TLRN network, and the aggregate walking distance of people in London per year. In these cases, the appropriate weighting statistic will be held constant at the latest known value available across years, pending an update when suitable new data for weighting is available.

Finally, all age-based measures of asset condition will reflect a 'cohort effect', as the fleet ages. Individual assets age continuously from when they are first put into service, whereas fleet replacement tends to be undertaken as part of large programmes at infrequent intervals. A small material change, such as a bus exceeding 10 years service, can therefore have a disproportionate effect on this type of indicator, even if the bus concerned remains reliable.

For 2009, the modal composite measure of TfL's asset condition is 89.13 per cent meaning that, on a modally-weighted basis that reflects the usage of each of the principal TfL modes, 89.13 per cent of in-scope asset in 2009 was deemed to be in 'good' condition.

The equivalent value for 2008 was 92.58 per cent, using the modal weights applicable to that year (2008/09 financial year). The change between 2008 and 2009, a small deterioration, reflects the balance of the values in Table 4.14, as briefly reviewed above.

4.20 MTS Strategic Outcome Indicator: asset condition for TfL services

Definition of indicator

Asset condition is a measure of the state of repair of TfL's assets. Understanding the condition of TfL's assets is important for understanding and enhancing the journey experience for users, as well as being a factor in enabling sound maintenance and investment decisions.

This indicator measures the percentage of TfL assets that are deemed to be 'in a good state of repair', according to existing mode-specific benchmarks, that generally reflect 'industry-standard' definitions. It is presented as a composite multi-modal indicator with the different modal components weighted according to their share of the overall person-kilometres travelled in Greater London for the calendar year to which the indicator applies.

Value for 2009 calendar year and comparison with value for 2008

For 2009, this value is 89.13 per cent meaning that, on a modally-weighted basis that reflects the usage of each of the principal TfL modes, 89.13 per cent of in-scope asset in 2009 was deemed to be in 'good' condition.

The equivalent value for 2008 was 92.58 per cent, using the modal weights applicable to that year (2008/09 financial year).

Assessment of recent trend

The change between 2008 and 2009 reflects:

- Small decreases in the percentage of both classes of TfL Streets assets in good condition, and somewhat larger decreases for both classes of London Underground asset (although large-scale replacement of train fleets on the sub-surface and Victoria lines has just commenced).
- The percentage of the bus fleet that was less than 10 years old reduced, reflecting the annual shift in the age profile of the bus fleet (a 'cohort effect' as the fleet ages), coupled with fewer deliveries of new vehicles than had been typical over the previous 10 years.
- This was partially offset by a dramatic improvement in the asset condition for London Rail, reflecting the fleet replacement programme then underway, albeit that this improvement applied to only a small proportion of overall travel in London.

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

5.1 Introduction and content

This chapter reviews and updates 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 implications of which on travel patterns are considered below.

The chapter also looks briefly at how transport facilitates access to employment, and at how the transport legacy of the 2012 Olympic and Paralympic Games will be captured and measured.

5.2 Key features and trends

London's population

- The resident population of Greater London at mid-year 2009 was estimated to be 7.75 million, an increase of 85,000 or 1.1 per cent from (a revised) 7.67 million in 2008.
- Between 2001 and 2009 London's population grew by 5.7 per cent or over 416,000 people, more than any other region in the UK.
- The population growth in the most recent year in London was driven mainly by natural change (an excess of births over deaths), which added 78,000 to London's population.

London's wider interactions

- The number of commuters, people living outside Greater London but working in London, increased from 700,000 in 2004 to 790,000 in 2008. It then fell to 770,000 in 2009 - but it recovered to 810,000 in 2010.
- Numbers of out-commuters, from London to the East and South East regions also show an increasing trend from 320,000 in 2008 and 2009 to 350,000 in 2010.
- Numbers of overnight visitors and tourists in London decreased in 2009, reflecting conditions in the national and world economy. There were 10.8 million visitors from the rest of the United Kingdom, 5 per cent fewer than in 2008 and equating to about 65,000 people on an average night. The number of overseas visitors, 14.2 million visits (or 235,000 on an average night) was down by 4 per cent compared with 2008.

London's economy

- The UK emerged from recession in quarter 4 2009 following six consecutive quarters of negative growth which reduced economic output by 6.4 per cent.
- In quarter 2 2010 UK economic output or Gross Value Added rose by 1.2 per cent compared to the previous quarter - marking three quarters of consecutive growth after the worst recession in more than 70 years.
- The recovery to date has clawed back 2 per cent of lost output, with UK GVA in quarter 2 2010 still some 4.5 per cent below pre-recession levels.

- In comparison to the UK, London emerged from recession in quarter 1 2010, the last period for which data is available, with quarter on quarter GVA growth 0.7 per cent.
- Over the recessionary period, London GVA contracted by 5.2 per cent, in comparison to a fall of 6.4 per cent in UK economic output.

London's employment

- London workforce jobs totalled more than 4.75 million in June 2010.
- Annual workforce jobs growth in London remained negative for the fifth consecutive quarter in quarter 2 2010 at -0.7 per cent, compared to -2.4 per cent in the previous quarter.
- In spite of the annual fall, this seasonally adjusted all-London workforce jobs series rose for the second time on a quarterly basis. Compared to the low point in fourth quarter of 2009 London workforce jobs have risen by 74,000 to quarter 2 2010 though they remain 143,000 below the high of quarter 4 2008.
- The biggest annual decline in central London employment came in quarter 4 2009 when employment fell by 5.7 per cent, or 82,000 jobs. In comparison, in the rest of London the largest fall in employment came in quarter 1 2010, with a fall of 3.6 per cent (or 97,000 jobs) compared to a year earlier.
- Latest available data for quarter 2 2010 shows central London employment rebounding strongly with growth of 1.2 per cent year-on-year, while the rate of decline in employment has slowed in the rest of London.

Travel demand and the recession

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. The year 2008 and into 2009 saw a break to the established pattern of growth in the use of public transport in London. However, the latest figures suggest that this is now recovering strongly.

- Growth in bus journeys weakened during the recession – being around 0 per cent for much of 2009. Journeys growth picked up soon after the recession and latest figures to August 2010 show bus journeys growing at between 1 and 2 per cent year-on-year.
- After falling significantly during the recession, Underground journeys in the final three months of 2009 recovered robustly, coinciding with the end of recessionary conditions more generally. Underground passenger demand has grown throughout 2010 with journeys growth in August 2010 of around 5 to 6 per cent year-on-year, returning to above pre-recessionary levels.

5.3 London's population - developments between 2008 and 2009 and review of long-term trends

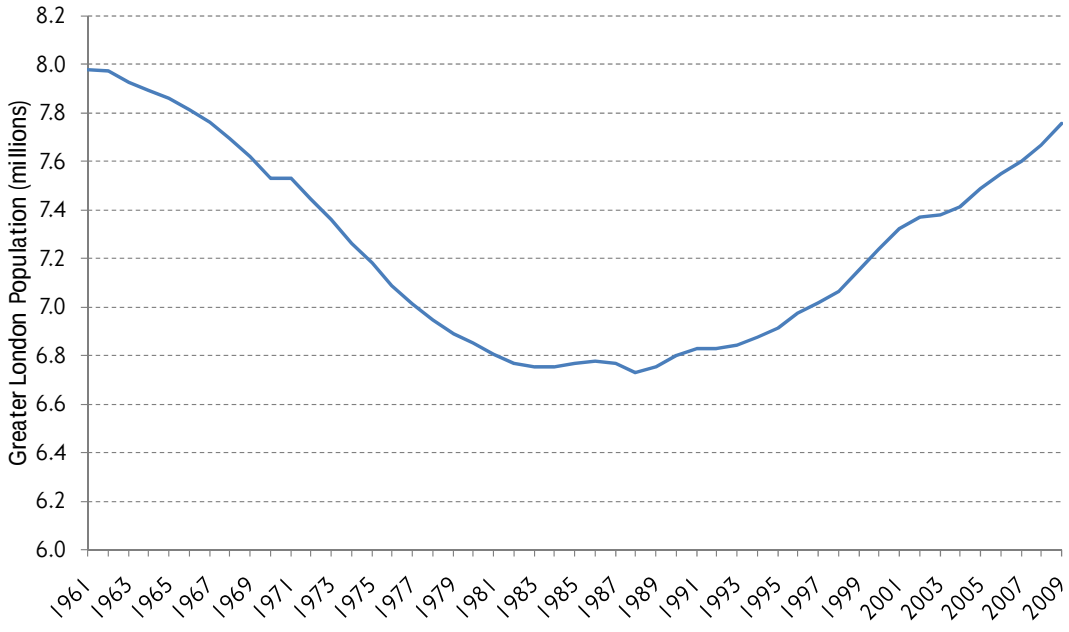
The basic source of data on population is the decennial Census of Population, last carried out in 2001. A new census is in preparation for 2011. Between censuses, annual population estimates are made from statistics of registered births and deaths and of migration, both internal within the UK and international 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-2009 population for London boroughs show that:

- The resident population of Greater London in mid-2009 was estimated to be 7.75 million, an increase of 85,000 people or 1.1 per cent over the previous year.
- The population growth was driven mainly by natural change (excess of births over deaths) which added 78,500 people to London's population. London contributed 36 per cent to the total natural change in the UK, while accounting for only 12.5 per cent of the total population.
- Among the London boroughs the largest percentage increases since 2008 in population were Tower Hamlets (3.5 per cent), Barking and Dagenham (2.4 per cent) and Camden (2.1 per cent). Only the Royal Borough of Kensington & Chelsea and Newham were estimated to have had a population decrease, of 0.7 per cent and 0.5 per cent respectively.
- Births between 2008 and 2009 mid-years were 127,700, while deaths were 49,300.
- Between 2008 and 2009 migration together with other changes resulted in a net inflow of 7,600 people to London. 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 416,000 people, or 5.7 per cent. Over the eight-year period the most consistent trend has been an increasing numbers of births. Hence the rate of natural change has grown considerably - from 47,000 people in 2001/02 to more than 78,000 in 2008/09.

Trend in total resident population and change 2008 to 2009

Figure 5.1 Greater London population, millions.



Source: Greater London Authority.

Figure 5.1 shows the long-run trend in the resident population of Greater London. From the start of the 1990s London's population has grown by slightly over 1 million people representing an increase of 0.7 per cent per annum over the 20 year or so period to stand at 7.75 million people in 2009. The forward projection is for continued growth, with around 1.1 million more people expected to be

accommodated in London – taking Greater London's population to a projected 8.83 million 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. Table 5.1 shows the annual change for each of the London boroughs.

Table 5.1 Resident population in London boroughs, 2001 to 2009.

	Thousands			Annual growth rate (%)	
	2001	2008	2009	2008 to 2009	2001 to 2009
Camden	203	227	231	*2.1*	*1.7*
City of London	7	11	12	*1.8*	*5.8*
Hackney	208	213	216	*1.5*	*0.5*
Hammersmith & Fulham	169	169	170	*0.7*	*0.0*
Haringey	223	225	226	*0.1*	*0.1*
Islington	180	189	192	*1.8*	*0.8*
Kensington & Chelsea	161	171	170	*-0.7*	*0.7*
Lambeth	275	281	283	*0.7*	*0.4*
Lewisham	255	262	265	*1.0*	*0.5*
Newham	251	242	241	*-0.5*	*-0.5*
Southwark	258	283	286	*0.9*	*1.3*
Tower Hamlets	202	227	235	*3.5*	*1.9*
Wandsworth	272	284	287	*1.0*	*0.6*
Westminster	203	247	249	*1.1*	*2.6*
Barking & Dagenham	165	172	176	*2.4*	*0.8*
Barnet	320	338	343	*1.5*	*0.9*
Bexley	219	225	226	*0.4*	*0.4*
Brent	271	255	256	*0.4*	*-0.7*
Bromley	296	308	310	*0.7*	*0.6*
Croydon	335	341	343	*0.5*	*0.3*
Ealing	308	312	317	*1.4*	*0.3*
Enfield	278	289	291	*0.8*	*0.6*
Greenwich	217	224	226	*1.1*	*0.5*
Harrow	211	225	228	*1.2*	*1.0*
Havering	225	232	234	*0.8*	*0.5*
Hillingdon	246	258	263	*1.7*	*0.8*
Hounslow	217	230	234	*1.7*	*1.0*
Kingston upon Thames	149	165	167	*1.3*	*1.4*
Merton	191	203	206	*1.8*	*1.0*
Redbridge	242	264	268	*1.5*	*1.3*
Richmond upon Thames	174	187	189	*1.0*	*1.0*
Sutton	181	190	192	*1.4*	*0.7*
Waltham Forest	223	221	224	*1.3*	*0.1*
Greater London	7,337	7,668	7,754	*1.1*	*0.7*
Inner London	2,867	3,030	3,061	*1.0*	*0.8*
Outer London	4,470	4,638	4,692	*1.2*	*0.6*

Source: GLA Focus on London 2010 Population and Migration. (http://data.london.gov.uk/datastorefiles/documents/FocusOnLondon-PopulationAndMigration.pdf).

5.4 London's wider interactions

London is the hub of the UK's economy and is a leading city destination for international travel, attracting around 14 million international and 11 million UK overnight visitors per year. This section updates some key trends that reflect travel to and from London.

Commuting to and from London

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. Table 5.2 shows that each year since 2004 the number of people commuting (by all transport modes) into Greater London from locations outside London has increased, from 700,000 in 2004 to 790,000 in 2008 and after a dip to 770,000 in 2009, to 810,000 in 2010. This is equivalent to 13 per cent of the adult resident population of Greater London and an increase of 16 per cent above the number in 2000.

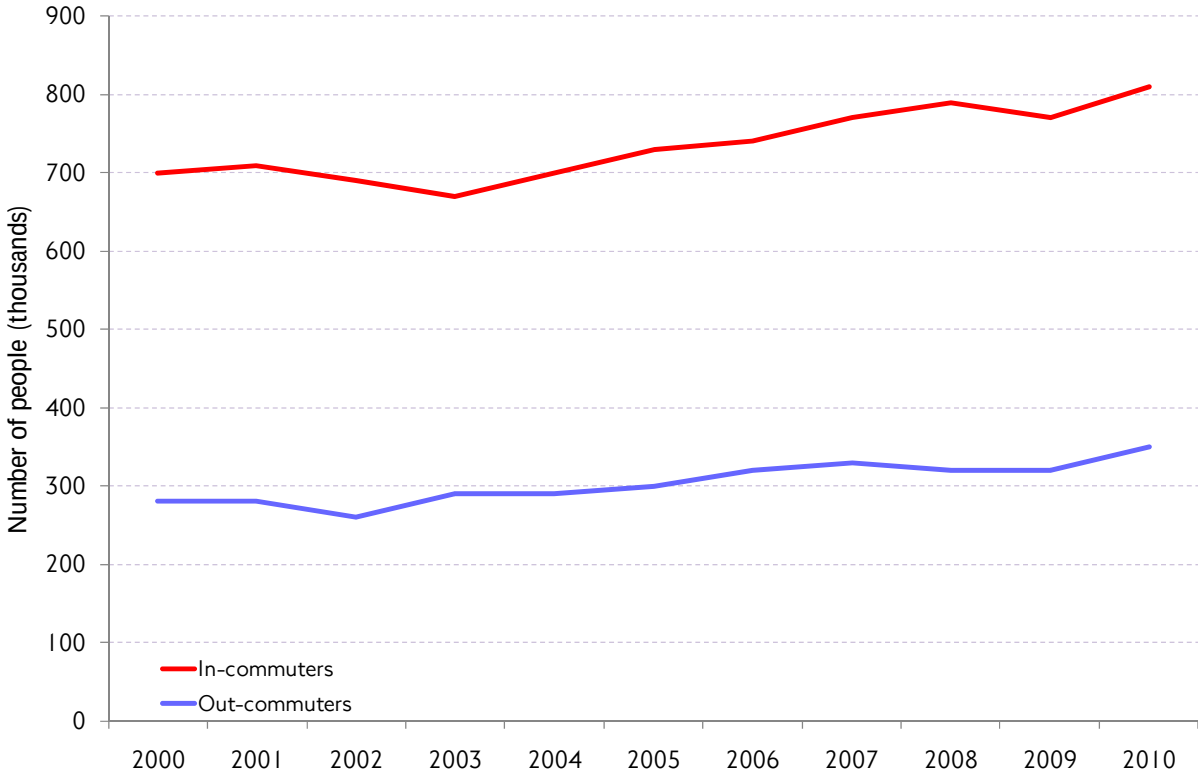
A larger percentage increase of 25 per cent was seen over the same period in out-commuters, London residents who travel to employment locations outside London. The net daily commuting inflow to Greater London was 470,000 people in 2008, decreasing to 460,000 in 2010, equivalent to 7.5 per cent of the 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 5.2 Daily commuters to, and from, Greater London, 2000 to 2010 (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
2009	770	320
2010	810	350

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 5.2 Daily commuters to, and from, Greater London, 2000 to 2010 (thousands).



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

London's 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.

Visitors to London

Table 5.3 sets out basic statistics in relation to non-resident visitors spending at least one night in London. In 2009 there were 10.8 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 65,000 people on an average night (down from 75,000 in 2008). The corresponding numbers for overseas visitors were 14.2 million visits per year (down from 14.8 million in 2008) and 235,000 people on an average night (down from 249,000 in 2008). These two categories of visitors (which do not include day-only visitors) therefore add an additional 300,000 people, about 4 per cent of the total resident population, who are present overnight in London on an average day. 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 5.3, 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 treated as indicative only.

Table 5.3 Number and characteristics of overnight visitors to London.

Year	Number of visitors (millions)	Average number of nights spent	Average spending (£ current prices)
Domestic visitors			
2000	18.5	2.3	166
2001	16.9	2.4	177
2002	16.1	2.2	175
2003	14.3	2.3	225
2004	12.8	2.3	216
2005	10.7	2.2	196
2006	11.0	2.2	207
2007	10.1	2.3	217
2008	11.3	2.4	208
2009	10.8	2.2	206
Overseas visitors			
2000	13.1	6.3	525
2001	11.4	6.6	510
2002	11.7	6.5	499
2003	11.7	6.8	502
2004	13.4	6.7	481
2005	13.9	6.6	494
2006	15.6	6.5	502
2007	15.3	6.2	534
2008	14.8	6.2	551
2009	14.2	6.0	580

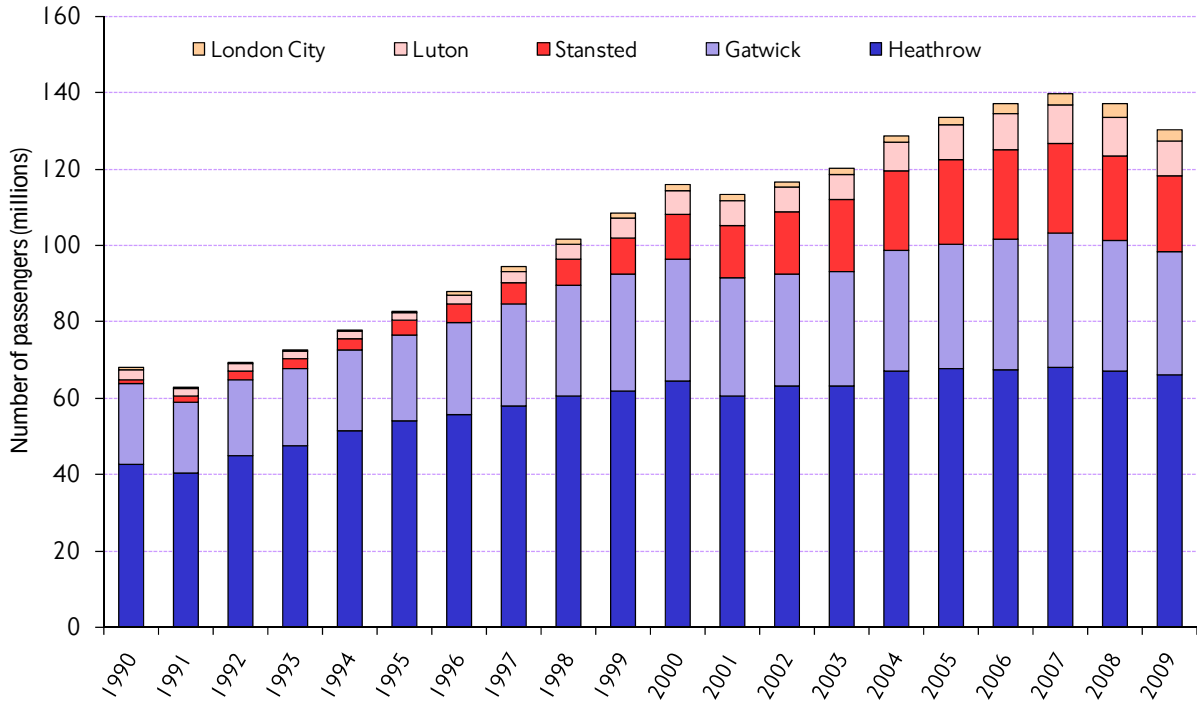
Source: United Kingdom Tourism Survey (UKTS), International Passenger Survey (IPS).
1. Excludes day visits.

Passengers using London's airports

London has five international airports, of which three are among the 25 busiest airports 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 60 per cent of the total of passengers at UK airports.

In 2009, 130 million passengers passed through London airports, 7 million fewer than in 2008. The number of passengers using London airports peaked in 2007 after a period of steady growth since the early 1990s. This decrease of 5 per cent between 2008 and 2009 follows a 2 per cent drop between 2007 and 2008, and primarily reflects the economic recession dating from the second half of 2008 (Figure 5.3).

Figure 5.3 Terminal passengers by London area airport.



Source: Civil Aviation Authority.

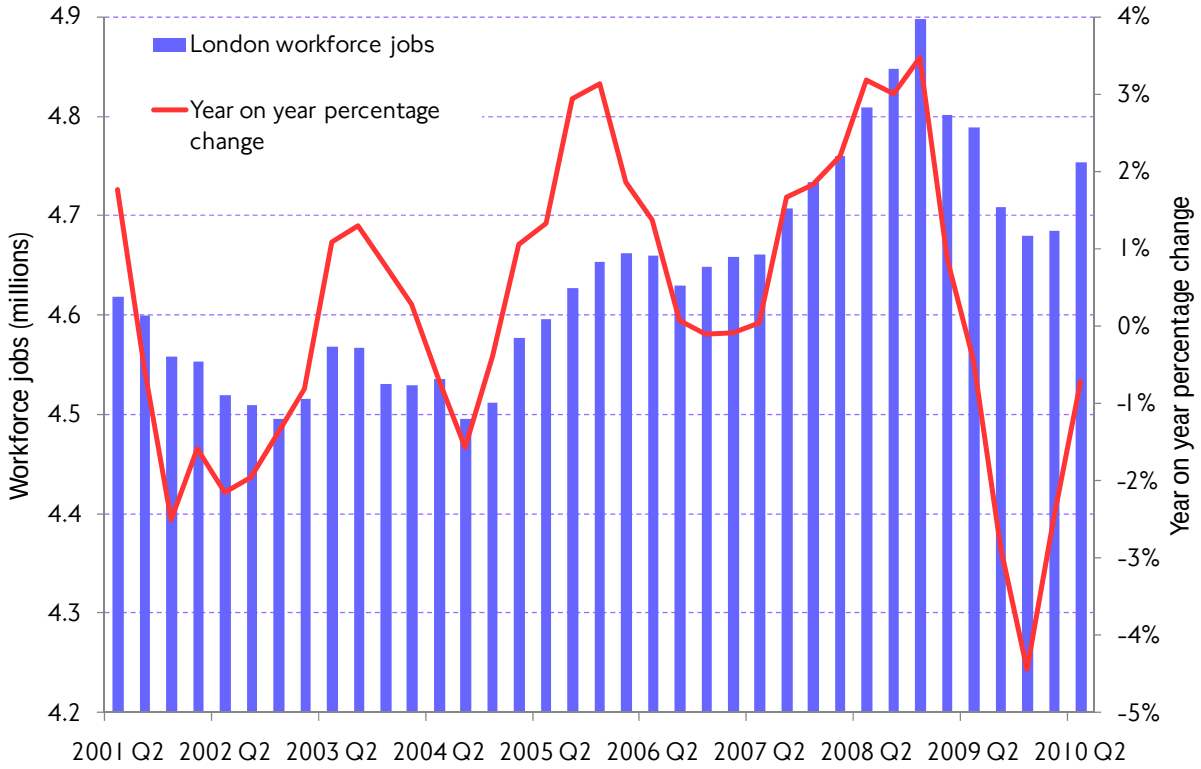
International rail travel

High-speed rail services connect London to mainland Europe. In 2009 a total of 9.2 million passengers used these services, an increase of 1 per cent compared with 2008, despite extensive service disruption in December. The largest increase was in travel between London and Brussels, up 6 per cent. Increased patronage continued in the first half of 2010, partly due to air travel being affected by the volcanic ash cloud but also to better rail connections with the rest of continental Europe, including Germany, Netherlands and the South of France.

5.5 Recent trends in employment in London

Workforce jobs totalled more than 4.75 million in Q2 2010 in London (Figure 5.4). Annual workforce jobs growth in London was negative for the fifth consecutive quarter in Q2 of 2010 at -0.7 per cent. The rate of decline eased, however, compared to -2.4 per cent in quarter 1 2010.

Figure 5.4 Trend in London workforce jobs and year-on-year change.



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

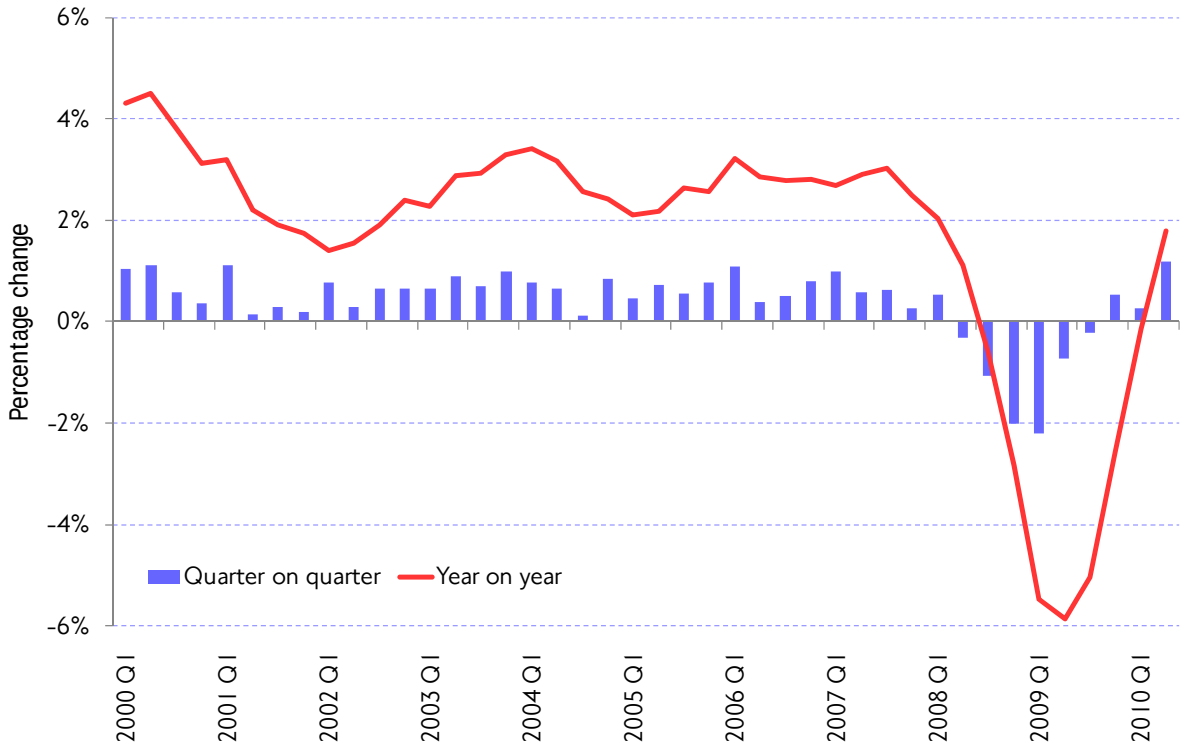
In spite of the annual fall, this seasonally adjusted all London workforce jobs series rose for the second time on a quarterly basis. Compared to the low point in the fourth quarter of 2009, London workforce jobs have risen by 74,000 to quarter 2 2010 though they remain 143,000 below the high of quarter 4 2008.

5.6 Economic output - Gross Value Added

In quarter 2 2010 UK economic output or Gross Value Added rose by 1.2 per cent compared to the previous quarter - marking three quarters of consecutive growth after the worst recession in more than 70 years. During the recession UK GVA contracted for six consecutive quarters between quarter 2 2008 and quarter 3 2009 resulting in a 6.4 per cent loss of economic output (Figure 5.5).

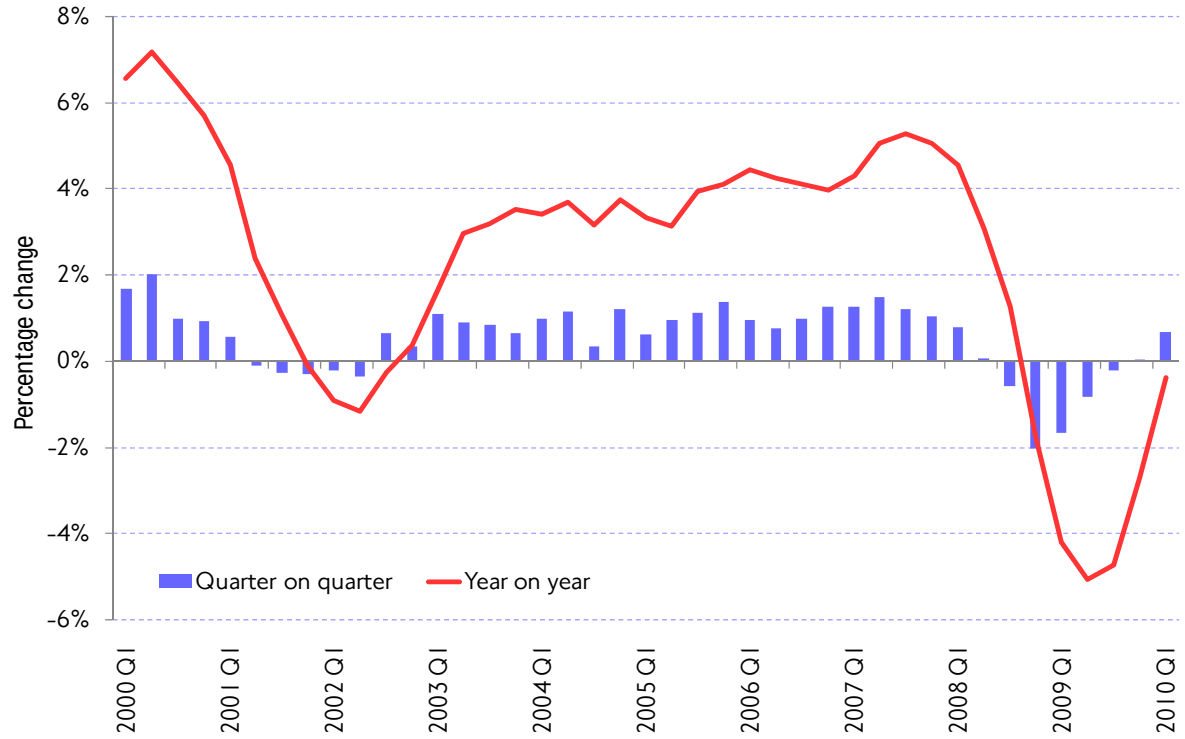
While the recent recession came after a sustained period of economic growth, economic output in the sixth quarter of the recession had fallen more than at the same points in either the 1990s or 1980s recessions. The recovery to date has clawed back 2 per cent of lost output, with UK GVA in quarter 2 2010 still some 4.5 per cent below pre-recession levels.

Figure 5.5 UK GVA growth, year-on-year and quarter-on-quarter percentage change.



Source: ONS GVA.

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



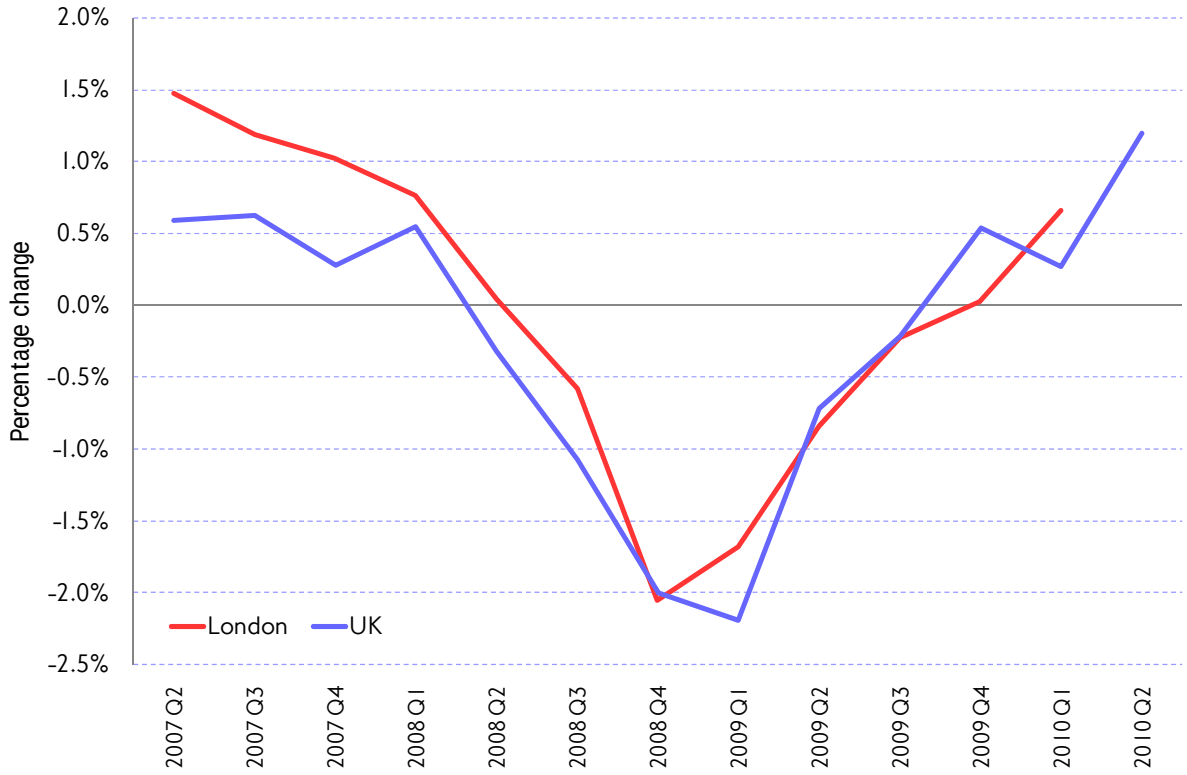
Source: Experian Economics.

Availability of economic output data for London lags that of the UK by one quarter. London emerged from recession in quarter 1 2010, the latest period for which data is available, with quarter on quarter GVA growth at 0.7 per cent (Figure 5.6). Between the first quarter of 2008 and the third quarter of 2009, the Capital experienced five quarters of negative growth and two quarters of zero growth at the beginning and end of the recession. Over the recessionary period, London GVA contracted by 5.2 per cent in comparison to a fall of 6.4 per cent in UK economic output. Thus, excluding the two quarters of zero growth sandwiching the recessionary period, London's economy contracted less than the UK's and the recession was slightly shorter.

5.7 The economy - a key travel demand driver

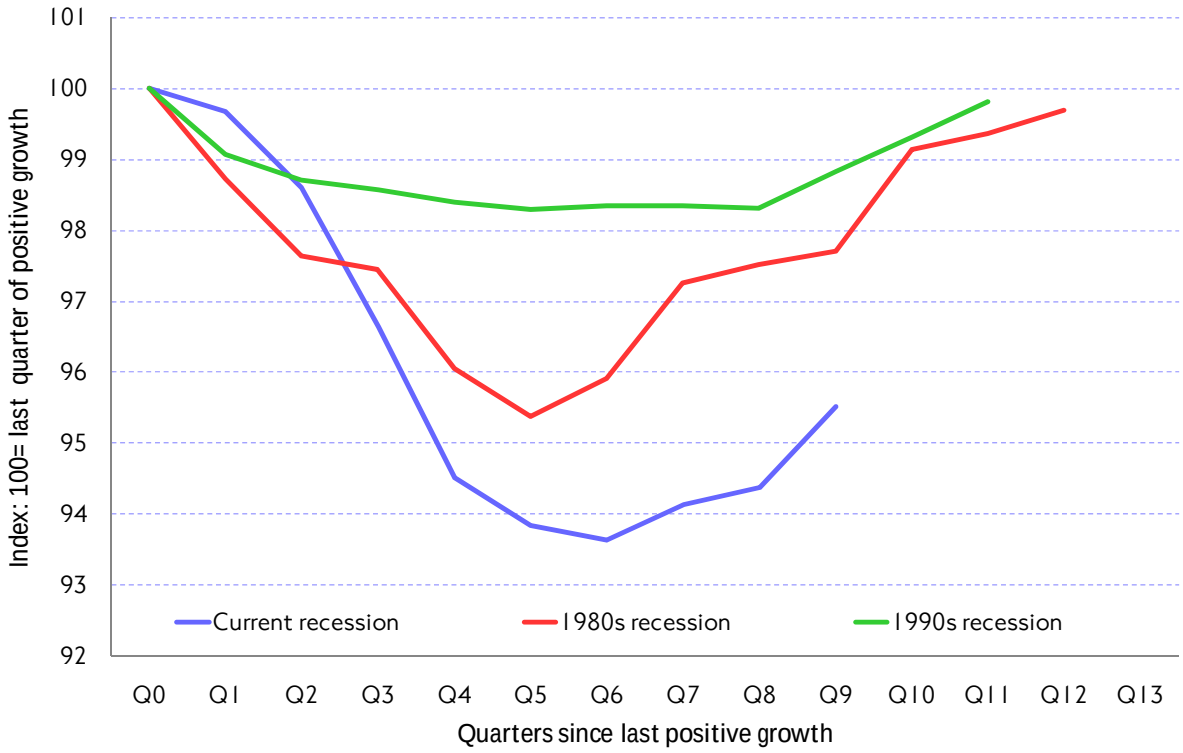
Although the UK and London have both emerged from recession London's recovery has been relatively more subdued despite London experiencing faster quarterly growth in the run up to the recession (Figure 5.7).

Figure 5.7 Real GVA growth, quarter-on-quarter percentage change, London and UK compared.



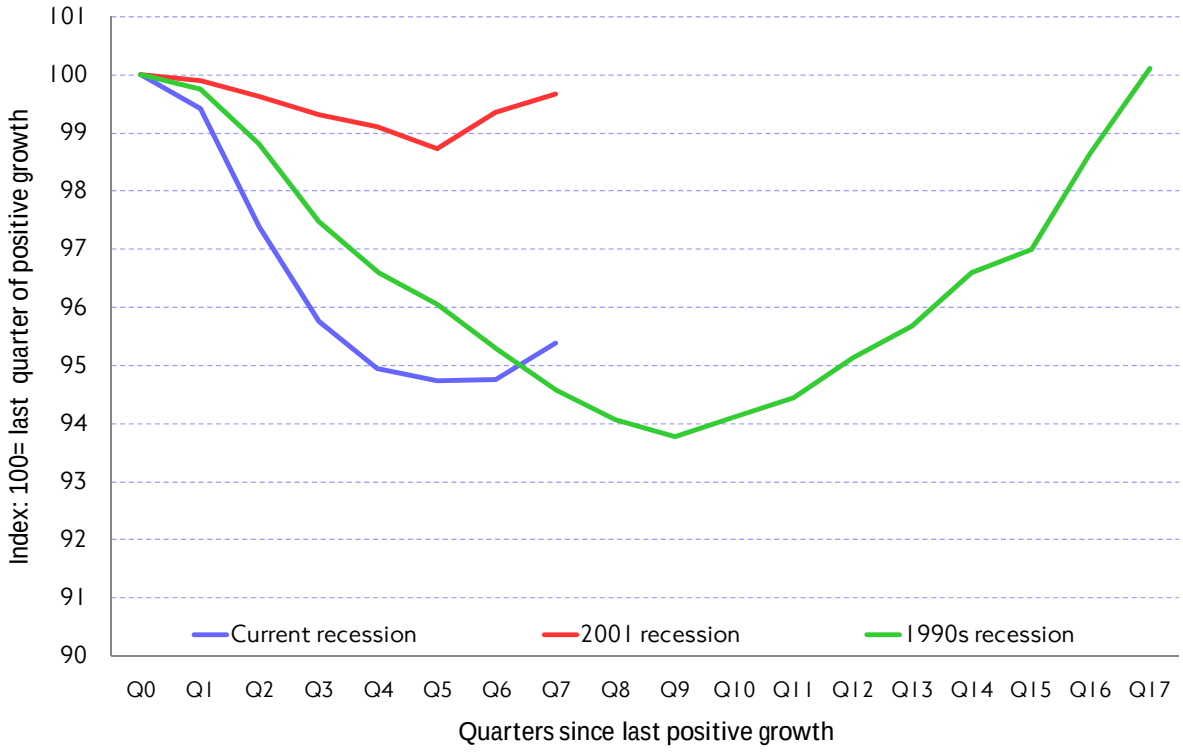
Source: ONS, Experian Economics

Figure 5.8 Comparison of past recessions in the UK: Quarterly GVA compared to the last quarter before the start of the recession.



Source: ONS.

Figure 5.9 Comparison of past recessions in London: Quarterly GVA compared to the last quarter before the start of the recession.

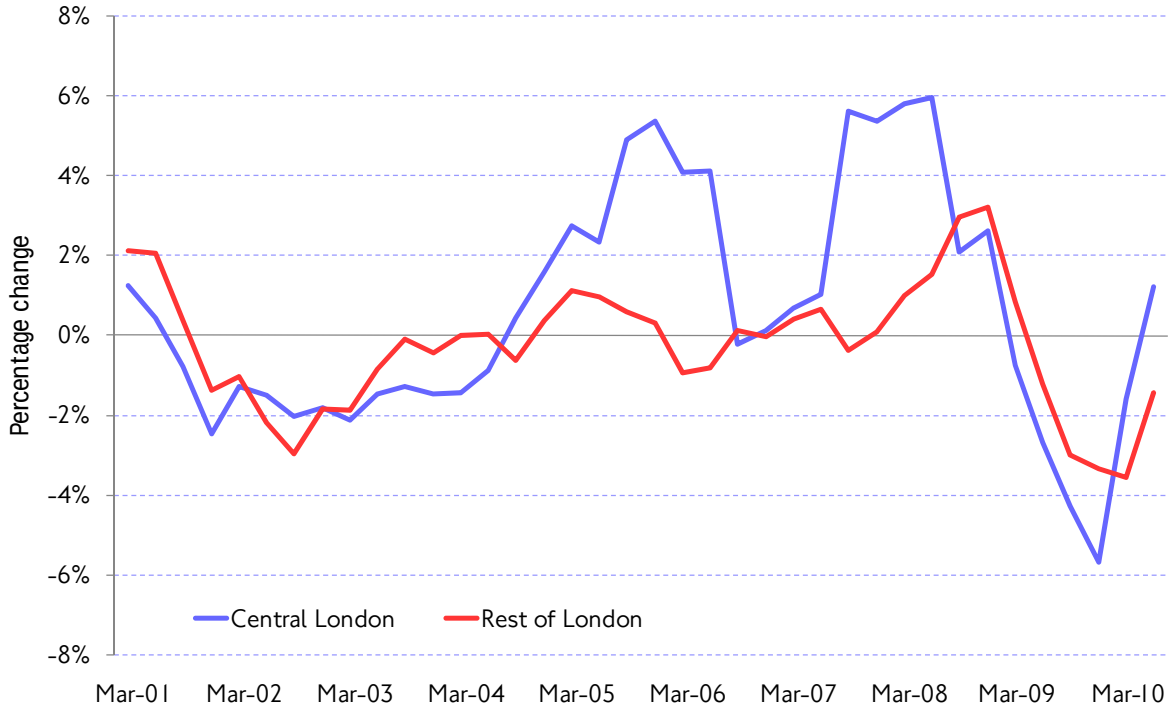


Source: Experian Economics

Furthermore, total economic output remains below pre-recession levels in the UK and London. Figures 5.8 and 5.9 show UK and London economic output since the first quarterly fall in GVA and compares this with previous recent recessions. In quarter 2 2010 UK GVA was still 4.5 per cent below pre-recession levels some nine quarters following the first fall in GVA in quarter 2 2008. This pace of recovery is therefore slower, comparatively, than after either the 1980s or 1990s recessions.

London's economic output, meanwhile, remained 4.6 per cent below pre-recession levels in quarter 1 2010 – seven quarters following the first fall in London GVA in quarter 3 2008 (Figure 5.9). This pace of recovery is slower than after the 2001 recession that was lot shallower. Compared with the much deeper 1990s recession in London, the recession of 2008-09 appears to have reached its low point earlier but the pace of recovery is slower.

Figure 5.10 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.

In percentage terms employment in central London fell more than in the rest of London during the recession (Figure 5.10). The biggest annual decline in central London employment, measured in terms of employee jobs excluding the self-employed, came in quarter 4 2009 when employment fell by 5.7 per cent, with 82,000 fewer jobs than a year earlier. In comparison, in the rest of London the largest fall in employment came in quarter 1 2010 with a fall of 3.6 per cent (or 97,000 jobs) compared to a year earlier. The larger numbers of lost jobs in the rest of London compared to central London is because about two thirds of all London employee jobs are outside central London.

Latest available data for quarter 2 2010 shows central London employment rebounding strongly, with growth of 1.2 per cent year on year while the rate of decline in employment has slowed in the rest of London.

5.8 Travel demand and the recession

Chapter 2 of this report looked at overall travel trends in Greater London. During 2009 as a whole, the number of trips made to, from or within London was 24.4 million per day. This is similar to the preceding two years, representing a reversion to zero growth in travel following a sustained period of increase. The primary cause of this change of trend is the impact of the economic recession on travel demand in London.

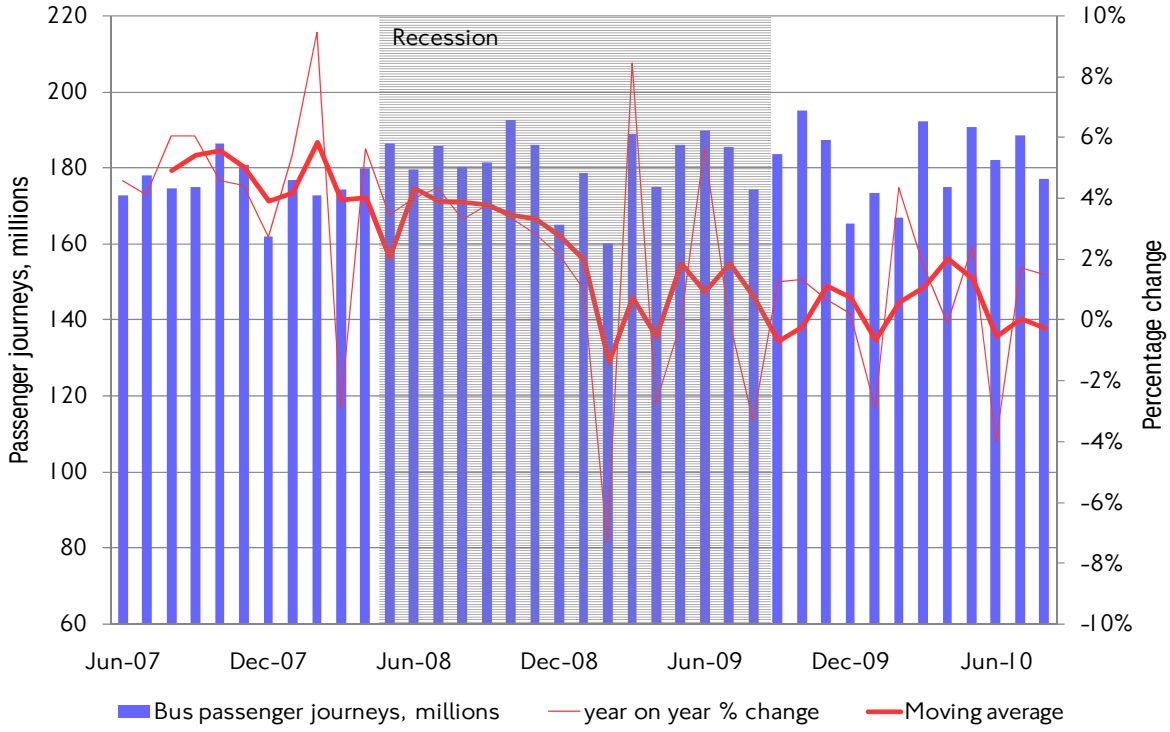
The years 2008 and 2009 thus represented a considerable departure from a long-standing trend. These aggregate net changes resulted from increases in the numbers of people travelling by public transport, offset by decreases in those travelling by car.

5.9 Travel demand - bus and Underground

This section looks at modal operational data - ticket-gate counts and ticket (Oystercard) 'clicks' data - disaggregating temporally to investigate the impact of the recent recession and the later signs of economic recovery on travel demand.

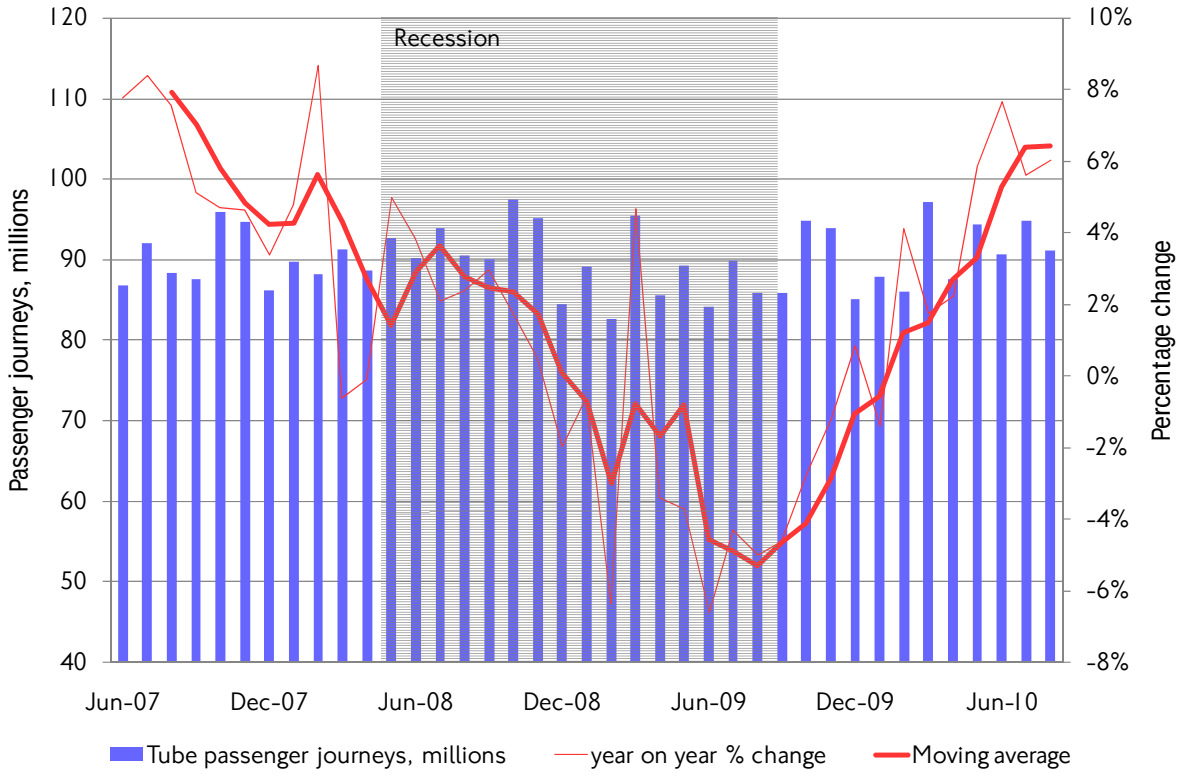
Bus and Underground patronage (ticket sales) data is available at four-weekly periods of disaggregation. Figures 5.11 and 5.12 show bus and Underground passenger journeys from June 2007, a year before the onset of recession, together with the year-on-year change (comparing four-week periods between one year and the next) and, to reduce volatility, the year-on-year change as a three-period moving average. Note that the thin red line spikes in the charts are due to the timing of Easter varying from year-to-year.

Figure 5.11 Bus passenger journeys (million) and year-on-year percentage change.



Source: TfL Fares and Ticketing.

Figure 5.12 Underground passenger journeys, million and year-on-year percentage change.



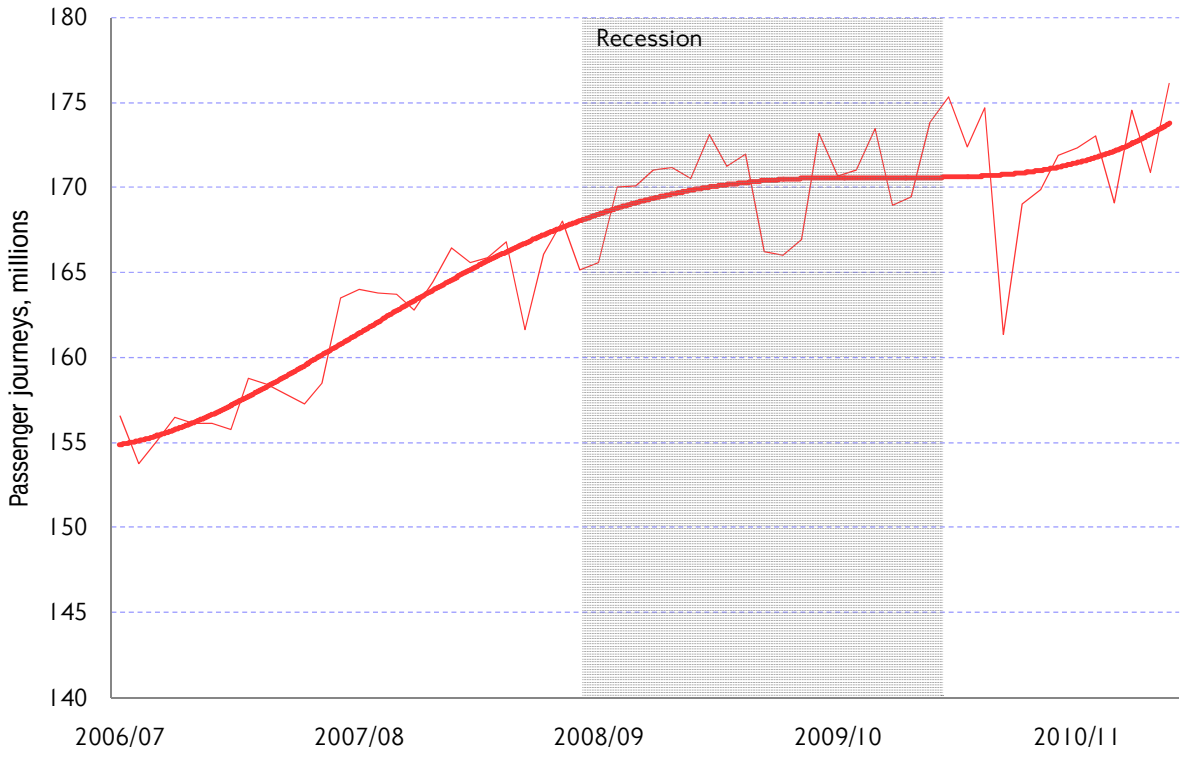
Source: TfL Fares and Ticketing.

Growth in travel picked up soon after the recession. Latest figures to August 2010 show bus journeys increasing at between 1 to 2 per cent year-on-year (Figure 5.11). This comes after bus travel recorded consistent growth of about 5 per cent year-on-year in the second half of 2007 before bus journeys growth weakened with the onset of recession - stabilising at around 0 per cent for much of 2009.

After falling significantly during the recession Underground journeys in the final three months of 2009 recovered robustly, reflecting the end of recessionary conditions more generally. Underground passenger demand has grown throughout 2010 with growth in August 2010 of around 6 per cent year-on-year, ie returning to above pre-recessionary levels.

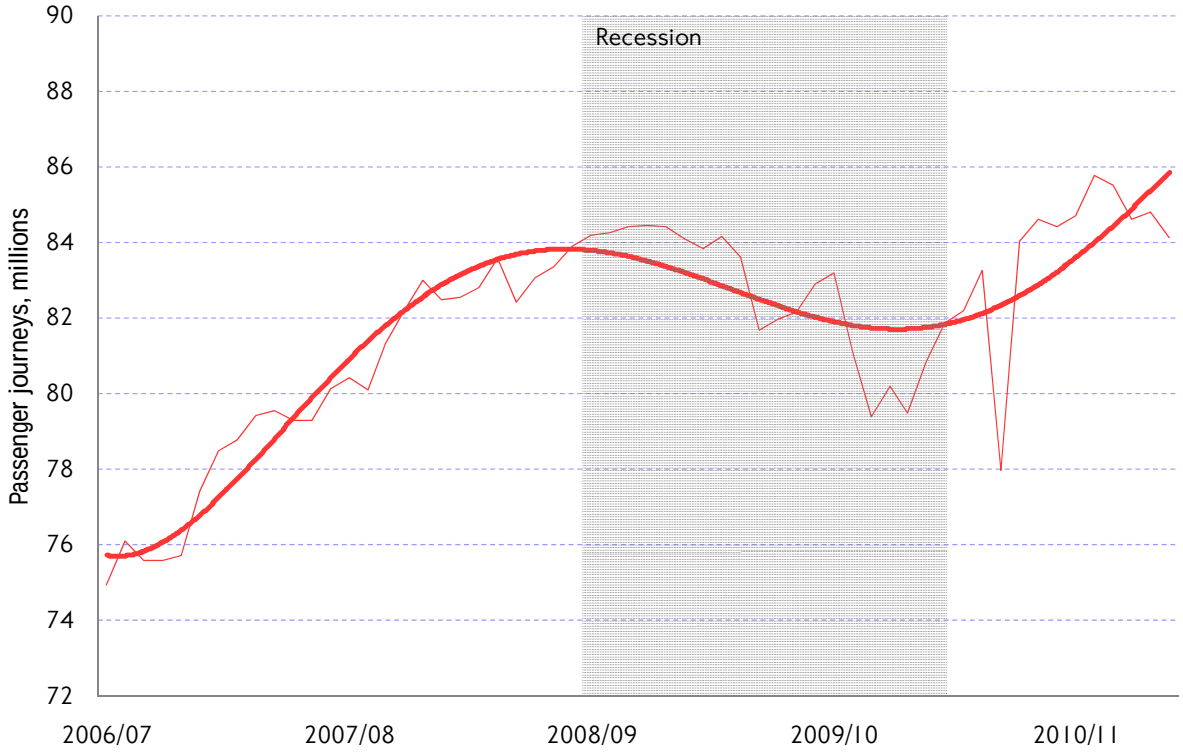
The seasonal nature of travel demand data complicates interpretation of trends. Year-on-year growth rates deal with this problem, but make comparisons during a year (and with the most recent data) difficult. Figures 5.13 and 5.14 therefore attempt to 'de-seasonalise' (seasonally-adjust) bus and Underground journeys using data for four-weekly financial periods.

Figure 5.13 Bus passenger journeys, million, four-weekly period, seasonally adjusted.



Source: TfL Fares and Ticketing.

Figure 5.14 Underground passenger journeys, million, four-weekly period, seasonally adjusted.



Source: TfL Fares and Ticketing.

Looking at the figures:

- Latest data for four-weekly periods 1-5 of 2010/11 (or Apr - Aug 2010) shows that the upturn in bus demand of between 1-2 per cent compared to the previous year comes after steady pre-recession growth in bus demand of about 3 per cent year-on-year, which eased with the onset of the recession. Bus journeys were broadly flat to the end of 2009/10.
- Pre-recession growth in Underground demand of about 4 to 5 per cent year-on-year fell sharply with the onset of the recession. At the low point of the recession Underground demand was 5 to 6 per cent lower year-on-year on a seasonally adjusted basis.
- Since the end of the recession Underground demand has grown robustly, quickly clawing back the loss in journeys, and was above pre-recessionary levels by May 2010.

Another way to measure Underground demand is ticket-gate count data. This enumerates passengers at entry/exit gates at Underground stations during autumn each year (Table 5.4). These are published on an annual basis - and therefore the impact of the recession is reflected in both 2008 and 2009 totals. A declining trend in growth between 2007 and 2009 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 5.4 Underground station gate count data, year-on-year change.

	2006	2007	2008	2009
Weekday AM peak	9.6%	6.3%	2.4%	-4.5%
Weekday inter-peak	9.2%	7.1%	3.2%	0.0%
Saturday	12.6%	7.4%	3.9%	-1.3%
Sunday	12.4%	7.7%	5.2%	-1.0%
Annual	10.5%	7.5%	2.9%	-2.5%
AM peak as % of weekday	35.4%	34.8%	34.7%	34.0%
London GVA	4.2%	3.7%	1.2%	-4.2%
UK GVA	3.0%	2.6%	0.6%	-4.8%

Source: ONS, Experian and London Underground Strategy and Service Development.

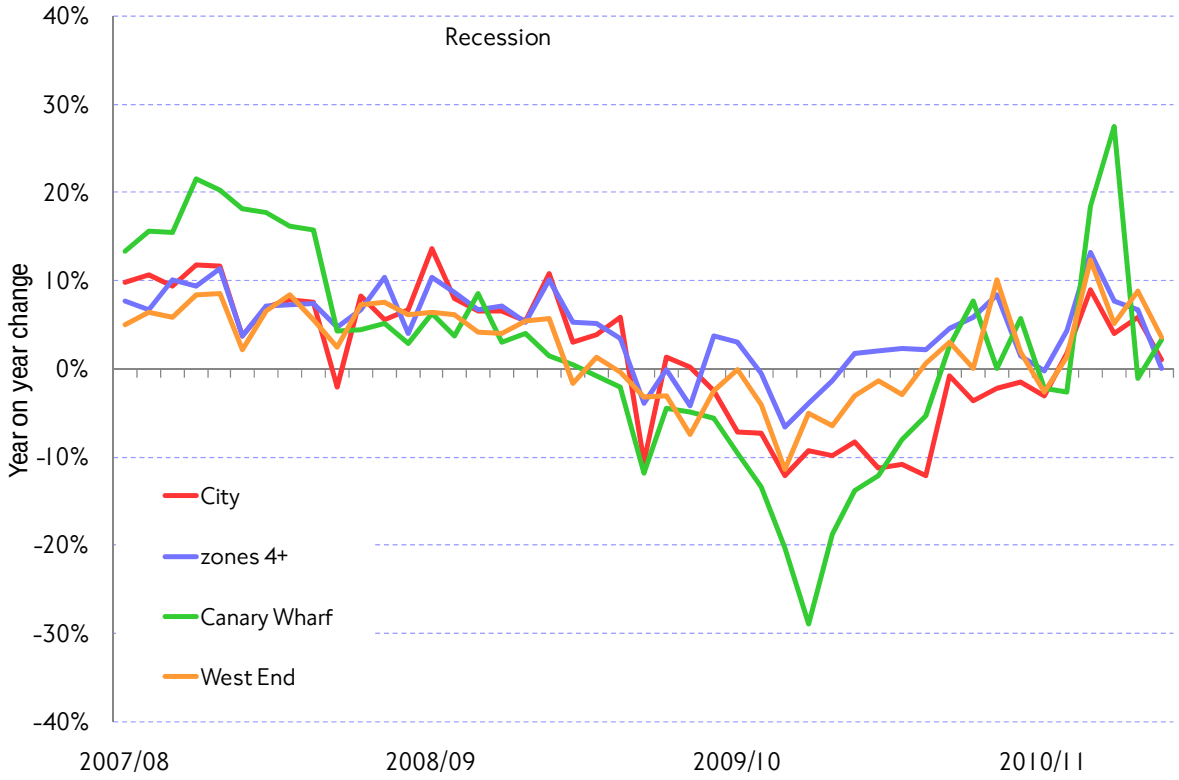
In comparison to annual ticket gate counts data presented above, Figure 5.15 shows four-weekly year-on-year growth in ticket gate counts since the start of 2007/08.

Recovery in ticket gate counts data is clearly visible with West End, City, Canary Wharf and Outer London stations all experiencing an upturn in demand from about quarter 3 2009 (Period 5 2009/10). Large year-on-year increases in the latest data for Canary Wharf in particular mainly reflects low points a year earlier (this station saw a comparatively large recession-related drop in demand, alongside a series of short, temporary closures of the Jubilee line for upgrade purposes).

Unsurprisingly, given the nature of the recession, travel to and from Underground stations in the City - and to an even greater extent, Canary Wharf - fell faster than total Underground journeys. By contrast, Outer London stations and stations in the

West End experienced smaller reductions in passengers over the recessionary period.

Figure 5.15 Underground station gate counts, year-on-year, four-weekly period.



Source: London Underground Operational Data

5.10 Travel demand - road traffic

Total road traffic (vehicle kilometres for all motor vehicles) in Greater London fell by 3 per cent in 2009 (see also section 2.11 of this report). Since the early years of the decade there has been a declining background trend for in traffic in London, which has been more pronounced in central than Outer London (Figure 5.16). However, over the recessionary period, 2008 and 2009, the rate of decline accelerated.

Greater London road traffic fell by about 0.2 per cent per annum over the seven years from 2000 to 2007 (Table 5.5) . In comparison over the recessionary years, 2008 and 2009, Greater London road traffic fell at 2.5 per cent per annum.

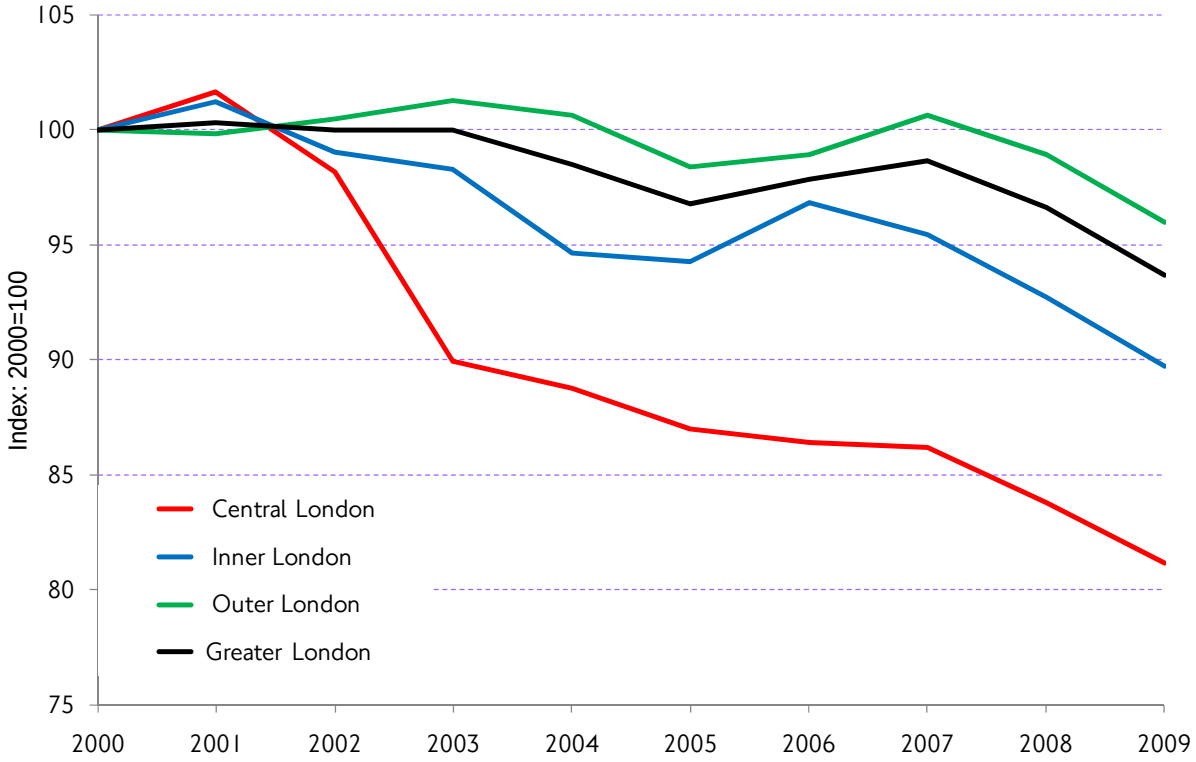
Traffic in Great Britain as a whole has also been affected by the recession. It did so however in the context of different background trends: an increase of 1.3 per cent per annum between 2000 and 2007, and an average fall of 0.9 per cent per annum over 2008 and 2009.

Table 5.5 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	90.0	98.3	101.3	100.3	99.4	100.0	105.0
2004	88.8	94.6	100.6	99.4	96.8	98.5	106.7
2005	87.0	94.3	98.4	96.0	98.2	96.8	106.9
2006	86.5	96.8	98.9	97.4	98.6	97.8	108.6
2007	86.2	95.4	100.6	99.2	97.7	98.6	109.8
2008	83.8	92.7	98.9	97.4	95.2	96.6	108.9
2009	81.2	89.7	96.0	95.1	91.2	93.7	107.9
Average annual growth							
2000-2007	-2.1%	-0.7%	0.1%	-0.1%	-0.3%	-0.2%	1.3%
2007-2009	-2.9%	-3.0%	-2.3%	-2.1%	-3.4%	-2.5%	-0.9%

Source: TfL Planning.

Figure 5.16 Trends in traffic (vehicle kilometres), all motor vehicles in central, Inner and Outer London (Year 2000=100).



Source: TfL Planning.

5.11 Travel demand - rail

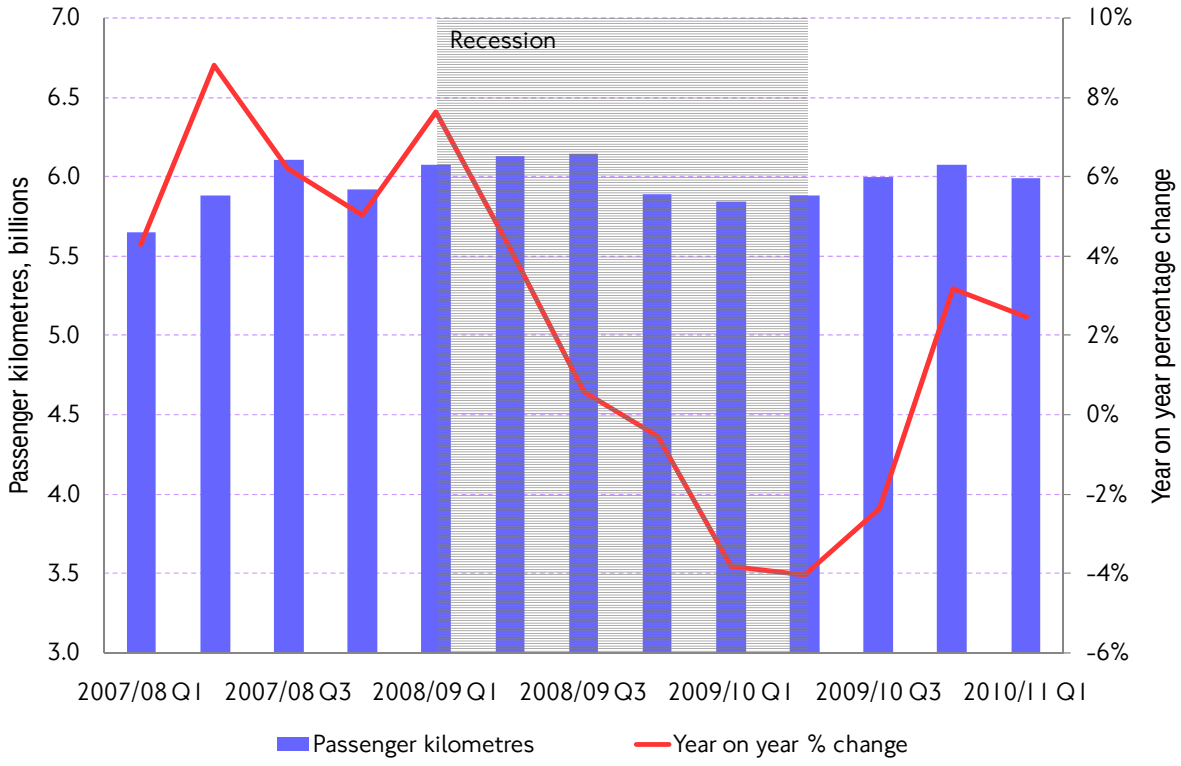
The Office of Rail Regulation provides data on train demand to and from London from companies operating the London and South East train franchises. Table 5.6 and Figure 5.17 show that passenger journeys on London and south east train operations recovered in the second half of 2009/10 (Q4 2009 and Q1 2010) after negative growth in the first half of 2009/10. An increase was also visible in passenger kilometres though they had yet to fully recover because passengers may have shifted away from the relatively more expensive shorter journeys. Fares revenue (which is shown in cash terms) has performed better than kilometres, as it has been buoyed by the annual fares increase. These trends, including a tendency towards journey lengthening, are seen on bus and Underground, as well as rail.

Table 5.6 London and South East train operation passenger kilometres, journeys and revenue, year-on-year change.

	2007/08	2008/09		2009/10	
		H1	H2	H1	H2
London & SE train operators					
Passenger journeys	7.7%	5.6%	0.8%	-5.0%	1.9%
Passenger kilometres	6.1%	5.9%	0.0%	-3.9%	-0.3%
Fares revenue	11.5%	12.0%	5.8%	0.5%	5.0%
London GVA	5.0%	2.2%	-2.2%	-4.9%	-1.6%
UK GVA	2.6%	0.3%	-3.8%	-5.5%	-1.4%

Source: Office of Rail Regulation, ONS.

Figure 5.17 London and South East train passenger kilometres, and year-on-year change.

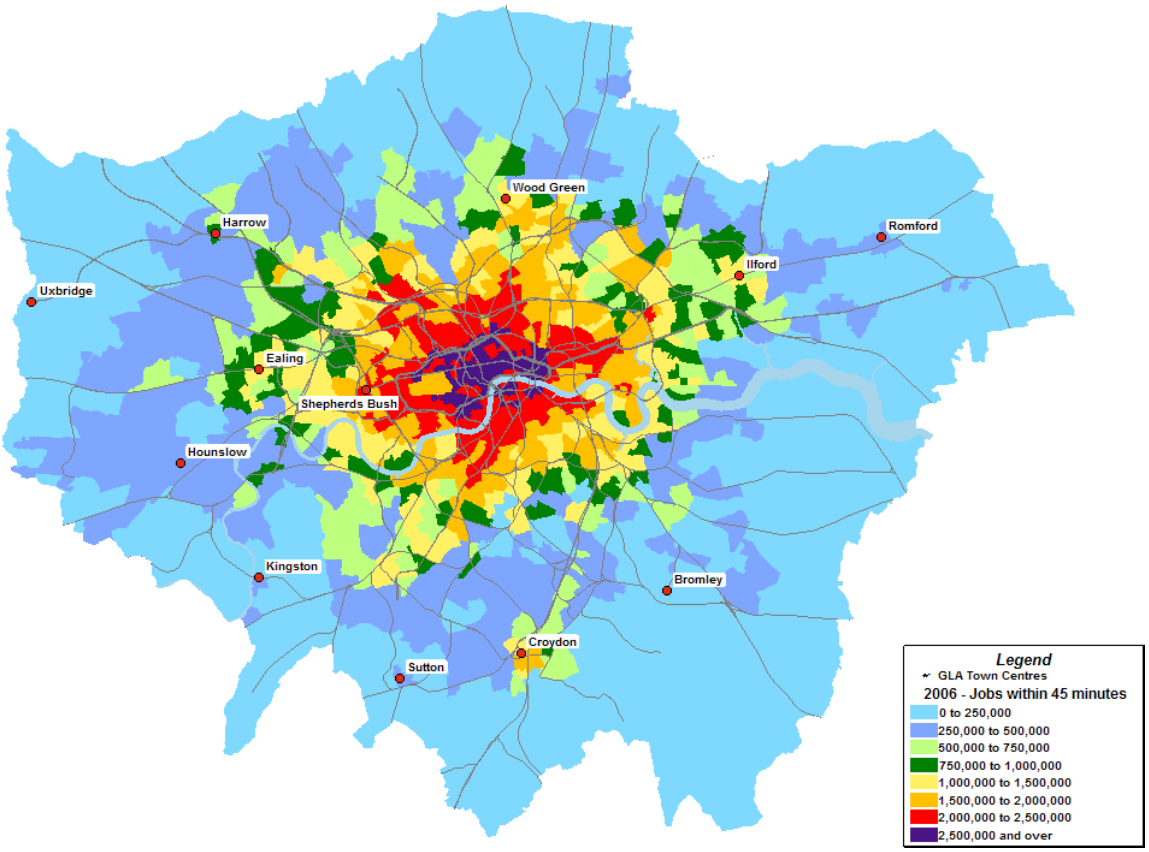


Source: Office of Rail Regulation.

5.12 Accessibility to jobs

Good transport links are essential for moving people between their homes and workplaces. A measure of this is the number of jobs that are potentially available within a given travel time from each residential location. This is illustrated by Figure 5.18, reproduced from Travel in London report 2, which maps, for each ward in London, the number of jobs accessible within 45 minutes travelling time by mass public transport.

Figure 5.18 Number of jobs available by mass public transport within 45 minutes travel time, 2006.



Source: TfL Planning.

This reflects the concentric pattern of employment density and also the primarily radial orientation of the public transport networks. Typically, for people living in Outer London, between 0.25 and 0.5 million jobs are potentially available from their home location within 45 minutes travel time. However, this rises to typically around 2.5 million jobs potentially available to the resident of central London.

5.13 MTS Strategic Outcome Indicator: people's access to jobs.

Definition of indicator

This indicator measures how transport facilitates economic and population growth through linking people with jobs. It is based on calculated travel time isochrones from the LTS strategic transport planning model, used for much of the analysis that underpins the MTS. Further methodological details are given in Travel in London report 2.

Value for 2009/10 financial year and comparison with value for 2008/09

This indicator is benchmarked on a three-yearly cycle, with the value for 2006 given in Travel in London report 2. This value was that, for an average member of London's population, 844,000 jobs were potentially available within 45 minutes travelling time by mass public transport. It is not yet possible to produce an equivalent value for the 2009 calendar year, reflecting the currency of the transport model scenarios on which this indicator is based. TfL expects to provide a value for 2009 in Travel in London report 4.

Assessment of recent trend

With no time series for this indicator yet available, it is not possible to assess a trend.

5.14 Securing and measuring the transport legacy of the 2012 Olympic and Paralympic Games for London

The hosting of the 2012 Olympic and Paralympic Games is a major opportunity to enhance London's physical transport infrastructure, achieve positive changes to the ways in which people travel, and contribute to the lasting wider regeneration of East London. This section summarises the transport legacy elements of the Olympic Legacy Action Plan and looks at how these will be monitored and reported.

What is meant by the Olympic and Paralympic transport legacy?

London's Olympic and Paralympic Legacy can be broadly defined as 'supporting regeneration and the convergence of social and economic outcomes between the six Olympic boroughs (see below) and the rest of London'. In transport terms this can be defined more specifically in terms of:

- A physical transport legacy
- A (sustainable) behavioural transport legacy

The delivery of the committed physical transport infrastructure required to support the Games is already nearing completion. This has included: upgrades to the Northern, Central and Jubilee Underground lines, as well as the DLR and London Overground, together with walking and cycling improvements. As well as directly supporting the Games themselves and aspects of the legacy plan, for example to facilitate access to the Olympic Park after the Games, these enhancements represent valuable and permanent additions to London's transport networks and serve wider regeneration objectives. Figure 5.19 shows the Olympic Park Legacy international, national, regional and local transport infrastructure.

However, the 2012 Games will mean that many Londoners may prefer to change the way that they travel during the Games period. There is an opportunity, therefore, to create a lasting legacy in terms of changes in travel behaviour that are of benefit to London, either through reduced crowding and congestion, the health and environment benefits of an increase in walking and cycling, as well as through the inspiration of the athletes themselves.

Olympics Legacy Action Plan

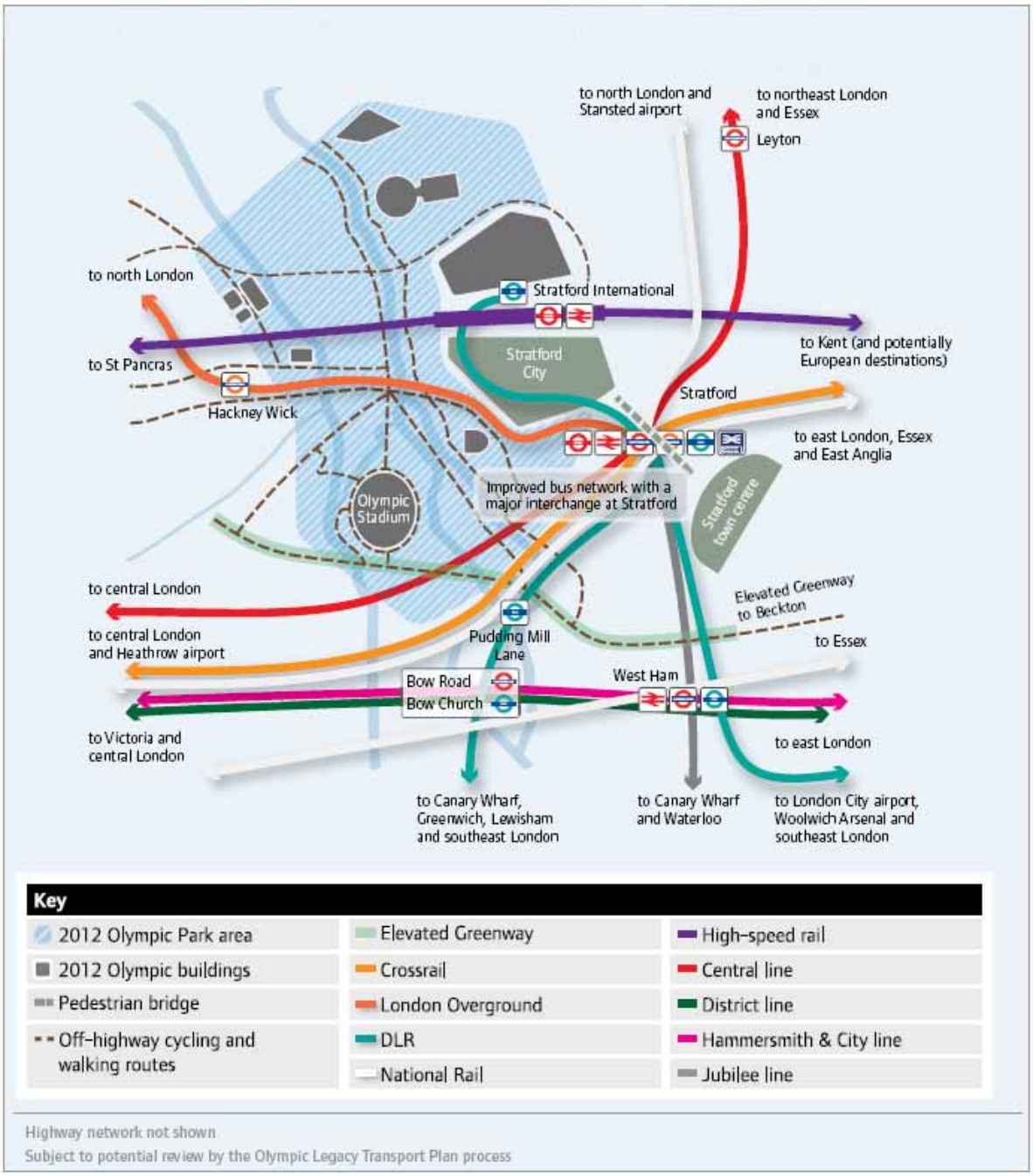
TfL expects to publish an Action Plan in early 2011 to meet the commitment made in Proposal 47 of the MTS. This will set out a series of actions that will build on the 2012 Games to inspire people to walk or cycle, and support the six host Olympic borough's aspiration of convergence.

Some examples of interventions that will help achieve the legacy outcomes, in this case in respect of cycling and walking, are:

- Using the successes of GB cyclists in the Games as an outreach programme into schools within the six host boroughs.
- Working with retailers to help develop a range of cycling products for the 2012 Games.
- Engagement with the community by developing cycling ambassadors.
- Working with the National Health Service to make cycling and walking an important way of dealing with health problems.
- Using the Olympic Legacy Supplementary Planning Guidance to secure more cycling and walking routes and to improve the built environment.
- Working with the future owner of the sporting facilities to produce travel plans for events.

A large amount of the new physical transport infrastructure, including initiatives for walking and cycling routes and DLR capacity expansion, will support convergence. These new facilities will need to be integrated within the wider transport networks and promoted to ensure that they are used fully by the communities within the six Olympic Boroughs. Further transport interventions may be needed to enable this.

Figure 5.19 Olympic Park physical transport legacy – international, national, regional and local transport infrastructure.



Note: For clarity, not all transport facilities are shown

Transport outcomes for the six 'Olympic boroughs'

The Action Plan focuses on the Six 'Olympic Boroughs' – Barking and Dagenham, Greenwich, Hackney, Newham, Tower Hamlets and Waltham Forest. The targeted outcomes within the six Olympic Boroughs from a transport point of view are:

- Improved connectivity to central London and access to employment.
- Maintained reliability of highway network, given the additional population and employment to be accommodated.

- Improved access to education.
- Improved access to sporting and leisure facilities.
- Improved access to health services.
- Improved air quality.
- Reduced impact of noise.
- Improved urban realm.
- Increase walking mode share.
- Increased cycling mode share.

All these transport outcomes tie into the wider outcomes from the Six Olympic Borough Strategic Regeneration Framework, for which transport is a key enabler. These are:

- Reducing worklessness, benefit dependency and child poverty.
- Improving educational attainment, skills and raising aspirations.
- Maximising the sports legacy and increasing participation.
- Creating a coherent and high quality city within a world city region.
- Enhancing health and wellbeing.
- Access to health services.

Monitoring the Olympic and Paralympic transport legacy outcomes

The Action Plan will be monitored for a period of at least 10 years after the Games. This monitoring will include selected indicators and targets, and an annual review of progress in respect of these targets. Future editions of Travel in London will include appropriate content covering the Games themselves, and their legacy. The examples below illustrate how some of the desired transport legacy outcomes will be monitored as part of this work, in terms of conditions and trends in the six Olympic boroughs compared with equivalent trends for the rest of Greater London.

Improved accessibility to jobs and services by public transport, walking and cycling.

Based on TfL's ATOS (Access to Opportunities and Services tool - see also section 8.2 of this report). Success indicated by average journey times reducing across range of in-scope jobs and services.

Encourage a shift towards more sustainable modes of travel.

Based on TfL's London Travel Demand Survey (LTDS) - see also section 3.3 of this report. Success indicated by commensurate changes in mode share for residents, between car and public transport, and towards cycling and walking.

Improve local air quality and reduce emissions of CO_2.

Based on London Atmospheric Emissions Inventory (see also section 9.4 of this report). Success indicated by reduced emissions of local and greenhouse gas pollutants, reflecting changes in mode share and related transport innovations. Compliance with applicable air quality standards, measured through resources such as the London Air Quality Network. Contribution to London's target to reduce greenhouse gas emissions.

Further reading

Details on the Strategic Regeneration Framework Olympic and Paralympic Legacy can be found on the London Borough of Waltham Forest website: (www.walthamforest.gov.uk/index/2012games/strategic-regeneration-framework.htm). Details on plans for the Olympic Park can be found on the Olympic Park Legacy Company website (www.legacy-now.co.uk/). Progress on preparations for the Games can be followed on the London 2012 website (www.london2012.com/making-it-happen/transport/index.php).

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 Mayoral goal 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

Travel in London became safer during 2009, with a continuation of recent progress towards road traffic casualty reduction targets and further falls in reported crime on the public transport networks.

Road traffic casualties

London's roads have become considerably safer in recent years. During 2009, eight per cent fewer people were killed or seriously injured (KSI) compared to 2008. This is 52 per cent lower than the 1994 to 1998 average, the baseline for both the Government and Mayoral casualty reduction targets, which are for 40 and 50 per cent reductions by 2010 respectively, and continues recent progress to reduce the more severe road traffic casualties.

- The year 2009 also saw a 13 per cent reduction in pedestrian KSIs compared to 2008, these now being 51 per cent lower than 1994-1998.
- There was a further 15 per cent reduction in child KSIs, which are now 72 per cent below the 1994-1998 level.
- Despite the substantial increase in cycling, 24 per cent fewer cyclists were killed or seriously injured in 2009 compared to the 1994-1998 average, with a 3 per cent drop between 2008 and 2009.
- The total number of casualties defined as slight - which comprise the majority of all casualties (88 per cent of all casualties) - rose slightly for the second year in succession, to 24,752 in 2009 (a 0.5 per cent increase). However, the number of slight casualties in 2009 was still 37 per cent below the 1994-1998 average.
- These trends represent continued substantial improvement in reducing the number of road casualties, with the majority of casualty reduction targets applicable to London having been met by 2009.

Safety on the public transport networks

London's public transport networks carry over 9 million passengers per day and offer an extremely safe travelling environment.

- Nevertheless, 127 people were injured while travelling on the Underground during the 2009 calendar year, including one fatality. On London's bus network, 124 people were injured, including three fatalities. All four of these fatalities on public transport involved accidental falls.
- These values are similar to those of 2008, but reflect lower absolute rates than those that prevailed in the earlier part of the decade. Because of increased patronage on both bus and Underground networks over the decade, they also reflect a consistent decrease in the risk of injury per passenger journey.

Trends in reported crime on the transport networks

- Rates of reported crime on both bus and Underground/DLR networks continued to fall in 2009/10, building on the substantial year-on-year reductions achieved since 2005/06.
- There were 11.1 reported crimes per million passenger journeys on London's buses and 12.8 reported crimes per million passenger journeys on LU and DLR during the 2009/10 financial year.
- These rates were down from 12.1 crimes per million journeys on buses in 2008/09 (a reduction of 8.2 per cent), and 13.1 crimes per million journeys on London Underground in 2008/09 (a reduction of 1.5 per cent).
- Reported crime rates on or near the bus network have almost halved since 2005/06, and those on the Underground have reduced by more than one-quarter.

6.3 Road safety

Background and road safety targets

Recent years have seen substantial 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: a 40 per cent reduction in those killed or seriously injured (KSIs) in road collisions; a 50 per cent reduction in the number of child KSIs, 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.

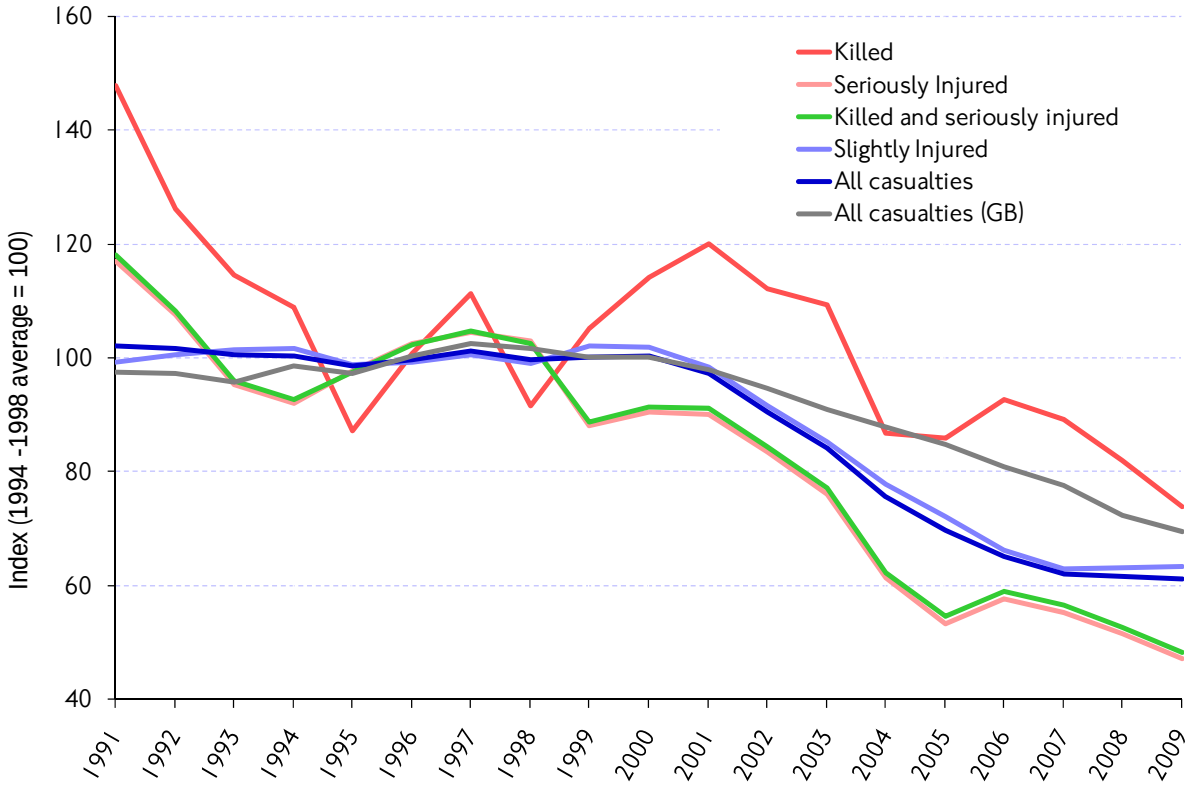
More challenging targets for London were set by the Mayor in 2006 to be achieved by 2010, these again being relative to a 1994 to 1998 base. These included: a 50 per cent reduction in total KSIs, a 60 per cent reduction in child KSIs, and for the 'slight' injury rate to fall by 25 per cent. New targets were also set for a reduction in pedestrian and cyclist KSIs by 50 per cent. Considerable progress has already been made towards achieving these more ambitious 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 and Mayoral targets). The Great Britain trend for all casualties is also shown for comparison.

The general trend of consistent year-on-year reductions in numbers of casualties is clear - although rates of reduction applicable to the different injury severity categories do vary considerably. The year 2009 was the ninth consecutive year when the total number of casualties in London was the lowest recorded, albeit that the rate of reduction in London has flattened noticeably over the last two years.

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



Source: TfL Research and Data Analysis (Delivery Planning).

Developments in 2009

During 2009 the recent downward trends of casualty reduction in London continued, although there was, for the second consecutive year, a small increase in the number of casualties defined as receiving 'slight' injuries. For the whole of 2009:

- Total KSI casualties were 52 per cent below the 1994 to 1998 comparison base, following an 8 per cent reduction to 3,227 in 2009, thereby achieving the Mayoral reduction target of 50 per cent.
- Child KSIs were 72 per cent below the 1994 to 1998 average, following a decrease of 15 per cent to 263 in 2009, again achieving the Mayoral reduction target of 60 per cent.
- Slight casualties were 37 per cent below the 1994 to 1998 comparison base, following a small increase of 0.5 per cent to 24,752 casualties in 2009. This followed an increase of 0.2 per cent in 2008 compared to 2007.
- The total number of casualties - slight, serious and fatal - was down 0.6 per cent to 27,979 in 2009, 39 per cent below the 1994-1998 average.

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

- Pedestrian KSI casualties were 51 per cent below the 1994 to 1998 comparison base, following a decrease of 13 per cent to 1,055 in 2009.
- Pedal cyclist KSI casualties were 24 per cent below the 1994 to 1998 comparison base, following a 3 per cent decrease to 433 in 2009.
- Powered two-wheeler casualties were 24 per cent below the 1994 to 1998 comparison base, following a 4 per cent decrease to 706 in 2009.

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 (%)	GLA target by 2010 (%)	1994 to 1998 average	Casualties 2008	Casualties 2009	% change for 2009 compared to 2008	% change for 2009 against 1994 to 1998 average
Fatal and serious casualties - total	-40%	-50%	6,684	3,526	3,227	-8%	-52%
Pedestrian KSI	-	-50%	2,137	1,208	1,055	-13%	-51%
Pedal cyclists KSI	-	-50%	567	445	433	-3%	-24%
Powered two-wheelers KSI	-	-40%	933	738	706	-4%	-24%
Children KSI	-50%	-60%	935	310	263	-15%	-72%
Slight casualties - Total	-10%	-25%	38,997	24,627	24,752	+1%	-37%
All			45,681	28,153	27,979	-1%	-39%

Source: TfL Research and Data Analysis (Delivery Planning).

Trends in sub-modal involvement and injury risk

Levels of collision and injury risk in London differ considerably between the various types of road vehicle. Table 6.2 sets out absolute casualty statistics for 2009, and compares them to equivalent numbers for 2008.

Table 6.2 Road casualties by modal involvement, 2009.

Mode of travel	Fatal	Serious	Slight	Total	% change in total 2009 vs. 2008	% change in total compared to 1994-98 average
Pedestrians	88	967	4,154	5,209	+2%	-44%
Pedal cyclists	13	420	3,236	3,669	+15%	-17%
Powered two wheelers	39	667	3,795	4,501	+7%	-26%
Car occupants	41	777	11,230	12,048	-8%	-45%
Bus and coach occupants	3	121	1,319	1,443	-3%	-37%
Other vehicle occupants	0	91	1,018	1,109	+3%	-37%
Total casualties	184	3,043	24,752	27,979	-1%	-39%

Source: TfL Research and Data Analysis (Delivery Planning).

Fatalities

There were 184 fatalities in London during 2009. This is 20 fewer than in 2008, a 10 per cent reduction, and 26 per cent less than the 1994 -98 average. In 2009, 140 of the 184 fatalities were people external to vehicles - pedestrians, pedal cyclists or powered two-wheeler users. Pedestrians make up the largest group of fatalities,

accounting for 48 per cent in 2009. However, pedestrian casualties in 2009 had shown a 35 per cent reduction from the 1994-1998 average.

Following a decrease from the 15 recorded in 2008 to 13 in 2009, pedal cyclist fatalities in 2009 were 12 per cent below the 1994-98 average. Their numbers are relatively small and, consequently, subject to year-on-year variation. However, the positive trend towards reduced pedal cyclist fatalities should be viewed in terms of substantial increases to cycle use over the past 15 years, as described in chapter 11 of this report. Users of powered two-wheelers accounted for 21 per cent of the total of 184 fatalities in 2009 - 16 per cent above the 1994-98 average. While very small in number, bus or coach occupant fatalities increased from one in 2008 to three in 2009 - the same as the 1994-98 average (all involving falls within the vehicle - see also section 6.5 below).

'Slight' casualties

The number of casualties receiving slight injuries accounted for 88 per cent of all casualties in London. In 2009, the number of slight casualties was 37 per cent below the 1994-98 average - having exceeded the Mayoral reduction target for 2010 of 25 per cent. Between 2000 and 2007 these numbers steadily decreased, but in both 2008 and 2009 there were small increases, approaching 1 per cent in total.

Noteworthy in 2009 against 2008 were a 6 per cent increase in pedestrian slight casualties, a 9 per cent increase in powered two-wheeler user slight casualties, and a 17 per cent increase in pedal cyclist slight casualties (balanced, in the totals, by an 8 per cent decrease in car occupant slight casualties).

Further reading

- TfL's London Road Safety Unit (now TfL Research and Data Analysis - Delivery Planning) published Issue 10 of 'Towards the year 2010; monitoring casualties in Greater London' in July 2010. This provides detailed casualty statistics for 2009, and analysis of trends and progress towards casualty reduction targets. It is available at: http://londonroadsafety.tfl.gov.uk/www/downloads/publications/towards-2010-monitoring-casualties-issue-10.pdf.
- TfL's Cycle Safety Action Plan examines recent trends in pedal cyclist casualties and sets out a range of actions to further improve cyclist safety in London. It is available at: www.tfl.gov.uk/corporate/projectsandschemes/15480.aspx.

6.4 MTS Strategic Outcome Indicator: road traffic casualties

Definition of indicator

This indicator looks at the number of people killed or seriously injured (KSI) 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 indicator specifically relates to casualties who were killed or categorised as having received a serious injury according to STATS 19 criteria.

Value for 2009 calendar year and comparison with value for 2008

A total of 3,227 people were either killed or seriously injured on London's roads during 2009. This was an 8.5 per cent reduction against 2008 (3,526 people killed or seriously injured).

Assessment of recent trend

The year 2009 saw continued good progress in reducing the more severe road traffic casualties in London. The 8.5 per cent reduction between 2008 and 2009 follows a 6.8 per cent reduction between 2008 and 2007, and is in-line with the general trend in these numbers since 2001 (see Figure 6.1). London has previously met the national target (a 40 per cent reduction over the 1994-98 average by 2010) in KSIs, and in 2009 also met the more-demanding London-specific Mayoral target (for a 50 per cent reduction). In 2009, total KSIs in London were 52 per cent below the 1994-98 average of 6,684.

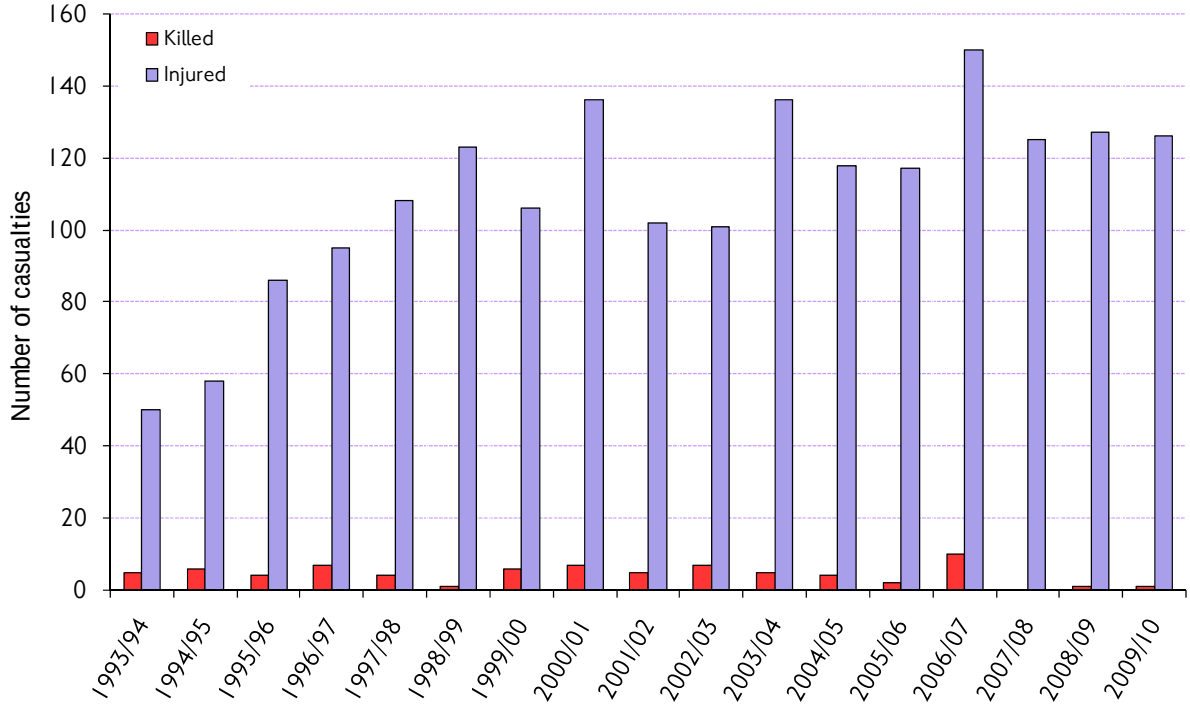
6.5 Passenger safety on the public transport networks

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.

London Underground

On the Underground, passenger injury rates in 2009 were similar to recent years, with one fatality (resulting from an accidental fall on stairs at Harrow and Wealdstone station) and 126 other injuries (Figure 6.2). The trends for recent years need to be seen against the backdrop of increased Underground patronage, and therefore represent a small reduction in risk per passenger overall.

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.

Buses and coaches

Casualties while travelling on buses and coaches are monitored through the 'Stats 19' process for road traffic casualties previously described, and are included in the overall casualty and KSI numbers discussed in section 6.3. In 2009, 121 bus users were seriously injured in London, with three fatalities - values not dissimilar to recent years. The three fatalities in 2009 all involved falls within the vehicle, one of whom was an elderly passenger, as opposed to resulting from a collision of the bus or coach. These casualty numbers exclude pedestrian and other vehicle users who might have been injured in collisions involving buses/coaches.

Figure 6.3 shows the trend in bus and coach occupant casualties 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 seriously injured while travelling on buses or coaches in London.

Source: Transport for London.

6.6 Crime and anti-social behaviour on the public transport networks

Crime on the bus and Underground networks

London's transport system is a safe, low crime environment and crime is now at its lowest levels since recording began over six years ago. In 2009/10 there were 11.1 crimes per million passenger journeys on the bus network, and 12.8 crimes per million passenger journeys on the London Underground/DLR networks. These rates are down from 12.1 and 13.1 respectively in 2008/09.

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 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 visible uniformed presence, targeted and intelligence led enforcement, and improvements to technology and the wider travel environment.

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

Crime type	2006/07		2007/08		2008/09		2009/10	
	Crimes	Rate	Crimes	Rate	Crimes	Rate	Crimes	Rate
Burglary	115	n/a	104	n/a	86	n/a	63	n/a
Criminal damage	7,710	4.1	5,846	2.7	3.723	1.7	2,350	1.0
Drugs	430	<1	683	<1	779	<1	693	<1
Fraud/ forgery	330	<1	414	<1	387	<1	325	<1
Other notifiable offences	298	<1	233	<1	234	<1	276	<1
Robbery	6,214	2.9	4,266	3.3	2,761	1.2	2,564	1.1
Sexual offences	481	<1	480	<1	535	<1	550	<1
Theft and handling	14,623	8.6	12,699	5.8	10.948	4.9	11,265	5.0
Violence against the person	8,281	4.7	8,400	3.9	7,609	3.4	6,890	3.1
Total notifiable offences	38,482	21.6	33,125	15.2	33,125	12.1	24,976	11.1

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

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

Crime type	2006/07		2007/08		2008/09		2009/10	
	Crimes	Rate	Crimes	Rate	Crimes	Rate	Crimes	Rate
Violence against the person	2,494	2.3	2,215	1.9	2,158	1.9	1,997	1.8
Sexual offences	393	<1	332	<1	338	<1	328	<1
Criminal damage	2,704	2.5	1,921	1.7	1,615	1.4	1,337	1.2
Line of route (eg trespass)	135	<1	142	<1	118	<1	112	<1
Theft of passenger property	7,988	7.4	7,481	6.6	6,134	5.3	6,794	6.0
Motor vehicle / cycle offences	390	<1	342	<1	359	<1	346	<1
Robbery	399	<1	192	<1	136	<1	137	<1
Theft of railway property / burglary	819	<1	592	<1	381	<1	407	<1
Serious public order	2,050	1.9	1,981	1.7	1,892	1.7	1,462	1.3
Serious fraud	167	<1	264	<1	230	<1	206	<1
Drugs	687	1	881	<1	1,616	1.4	1,266	1.1
Other serious offences	260	<1	102	<1	132	<1	144	<1
Total notifiable offences	18,486	17.2	16,445	14.4	15,109	13.1	14,536	12.8

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

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 available historically. Including the period before November 2007 when TfL London rail began running services on the network, the trend over the four available financial years is mixed: 2009/10 saw fewer reported crimes than 2008/09, but a similar number to 2007/08 , 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	2009/10 crimes
Violence against the person	112	98	103	93
Sexual offences	11	8	9	9
Criminal damage	92	67	43	51
Line of route	2	0	3	0
Theft of passenger property	100	86	67	68
Motor vehicle/cycle offences	15	16	13	23
Robbery	47	20	10	13
Theft of railway property/burglary	18	25	40	23
Serious public order	56	67	79	80
Serious fraud	5	4	3	2
Drugs	84	52	106	79
Other serious offences	11	4	16	9
Total notifiable offences	553	447	492	450

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

Crime on London Tramlink

There were 15.6 reported crimes for every million passenger journeys on the London Tramlink network in 2009/10. This compares to rates of 15.1 for both 2008/09 and 2007/08 financial years (ie there was a 3.3 per cent increase in 2009/10).

Further reading

- TfL's Community Safety Plan, available at: www.tfl.gov.uk/corporate/about-tfl/14691.aspx provides more information on TfL's activities, in conjunction with the police, to enhance safety and security across the transport system.
- TfL produces a quarterly crime and anti-social behaviour statistics bulletin, available at: www.tfl.gov.uk/corporate/about-tfl/14692.aspx.

6.7 MTS Strategic Outcome Indicator: crime on the principal public transport modes

Definition of indicator

This indicator is derived by dividing the number of crimes reported in a financial year by principal public transport mode by the number of passenger journeys made on that mode in the same financial year. The result is a rate of reported crime per million passenger journeys. This is currently available for two principal modes - the bus and Underground/DLR networks, since historic reported crime and consistent

passenger journey details for the developing London Overground network are not available.

Value for 2008/09 financial year and comparison with value for 2007/08

In 2009/10 there were 11.1 reported crimes per million passenger journeys on London's bus network, and 12.8 reported crimes per million passenger journeys on London Underground/DLR. These rates were down from 12.1 crimes per million journeys on buses in 2008/09 (a reduction of 8.2 per cent), and 13.1 crimes per million journeys on London Underground/DLR in 2008/09 (a reduction of 2.0 per cent).

Assessment of recent trend

Rates of reported crime on both bus and Underground networks continued to fall in 2009/10, albeit at a somewhat slower rate than over the previous five years. Nevertheless, reported crime rates on or near the bus network have almost halved since 2005/06, and on the Underground have reduced by over one-quarter.

6.8 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. Travel in London report 2 set out a range of indicators that were being monitored to understand this aspect of travel in London and monitor change. Indicators were presented relating to the 2009 calendar year. The timing of the surveys to support these indicators (autumn each year) does not allow an update for 2010 at present. For clarity, the MTS Strategic Outcome Indicator for this topic for the 2009 calendar year, previously presented in Travel in London report 2, is reproduced in section 6.9.

6.9 MTS Strategic Outcome Indicator: perception of crime/safety

Definition of indicator

This indicator is defined as 'the perception of London residents of their sense of safety and fear of crime when travelling in London (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, as reported by TfL's London Travel Demand Survey. The indicator is derived from an annual TfL telephone survey with a representative sample of 1,000 London residents.

Value for 2010 calendar year and comparison with value for 2009

As noted in section 6.8 (above), the indicator for 2010 is not yet available. However, in 2009, 95 per cent of London residents felt safe on the modes that they travelled on regularly (at least once a week) during daytime. After dark, 78 per cent of London residents felt safe on the modes that they travelled on regularly (at least once a week).

Assessment of recent trend

The year 2009 was the first year for which this indicator was produced, and therefore no historic trend is available.

7. Transport and climate change

7.1 Introduction

Carbon Dioxide (CO_2) is London's dominant climate change emission, with ground-based transport accounting for 22 per cent of emissions in 2008. The Mayor has committed to achieving a 60 per cent reduction in London's CO_2 emissions, measured against 1990 levels and across all sectors taken as a whole, by 2025.

The Mayor proposes to structure his approach to achieving the contribution of the transport sector to this target around three 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.
- 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 updates emissions trend data for transport-related CO_2 in London. The statistics presented are on a consistent, comparable basis, using estimates for locally-generated emissions, together with those from the remote generation of electricity based on a partial update to the GLA's London Energy and Greenhouse Gas Inventory (LEGGI) for ground-based transport sources for the 2009 calendar year.

7.2 Key features and trends - including update for 2009

Travel in London 2 comprehensively profiled emissions sources for CO_2 in London, based on a full update to the London Energy and Greenhouse Gas Inventory (LEGGI). According to the previous inventory update for 2008:

- Total CO_2 emissions in London were estimated at 44.7 million tonnes. Total London emissions were up 7 per cent since 2003, although their peak year (so far) was 2006, and between 2006 and 2008 they fell by 6 per cent.
- Emissions from ground-based transport had, by contrast, fallen since 2003. These emissions accounted for 22 per cent of London's total CO_2 emission in 2008, at 9.9 million tonnes (this total differs from that given in Travel in London Report 2 due to a an adjustment in the electric rail emissions for 2008).
- Emissions of CO_2 from road, diesel rail and shipping fell by 3.8 per cent between 2006 and 2008.
- Aviation had been growing. Including 'ground-based aviation' (ie emissions related to aviation but happening at less than 1,000 metres above ground), emissions fell by 2.2 per cent between 2006 and 2008.
- Compared to 2003, these ground-based transport CO_2 emissions were down 5.3 per cent (without ground-based aviation) and 1.8 per cent (with) respectively.
- London's CO_2 emissions from road transport fell 6.6 per cent between 2003 and 2008, partly reflecting reduced traffic (see also section 2.11 of this report).
- The principal public transport modes (bus, rail and Underground) each accounted for between 6 and 7 per cent of total CO_2 from ground-based transport - comparable proportions to 2006.

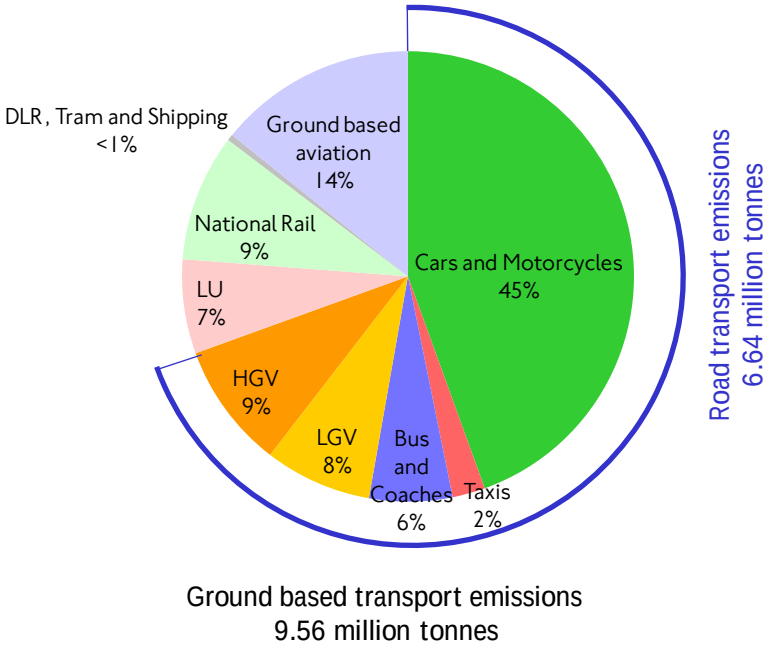
Looking at the updated data for 2009 against this previous trend:

- Total ground-based transport emissions were estimated at 9.56 million tonnes. Following an adjustment to the electric rail emissions the total ground-based transport emissions for 2008 were re-estimated at 9.92 million tonnes. On a comparable basis, therefore, CO_2 emissions from ground-based transport in London were 3.6 per cent less than in 2008.
- The largest proportion of transport emissions come from cars and motorcycles, which contributed almost half (45 per cent) of the total ground-based transport emissions in 2009 – a similar proportion to 2008 (46 per cent).
- Total vehicle-kilometres in London fell by 3 per cent between 2008 and 2009 (see also section 2.11 of this report), contributing towards a 4.9 per cent reduction in road traffic emissions compared to 2008 levels, from 6.99 to 6.64 million tonnes.
- Emissions from diesel and electric rail increased by 1.0 per cent relative to 2009 (on a comparable basis), largely reflecting specific service enhancements.

7.3 Basic source apportionment for London's CO_2 emissions

Figure 7.1 updates for 2009, for ground-based transport only, the basic source apportionment for CO_2 emissions in London as previously shown in Travel in London report 2.

Figure 7.1 Basic source apportionment for CO_2 ground-based transport emissions in Greater London. Percentage contribution to 2009 annual total.



Source: 2009 partial update to London Energy and Greenhouse Gas Inventory, GLA.

7.4 Trends in CO_2 emissions from ground-based transport

Trends in London's total CO_2 emissions since 2003 were reviewed in report 2. Ground-based transport sources (including ground-based aviation) were shown to be responsible for 22 per cent of London' total CO_2 emissions in 2008. The availability of updated data relating to ground-based transport sources (only) for 2009 allows the previous analysis to be extended (Table 7.1).

Table 7.1 CO_2 emissions - historical trends for annual total emissions (kilotonnes), by principal source sector.

		CO_2 emissions (ktonnes)						
		2003	2004	2005	2006	2007	2008	2009
Transport	Road transport	7,480	7,410	7,320	7,320	7,150	6,990	6,640
	Diesel Rail	190	190	190	230	260	280	290
	Electric Rail[1]	-	-	-	-	-	1,250	1,270
	Shipping	10	10	10	10	10	10	10
	Ground-based aviation	1,140	1,200	1,360	1,360	1,370	1,390	1,360
Total road, rail and shipping emissions		7,680	7,610	7,520	7,560	7,420	8,530	8,200
Total ground-based transport emissions (including ground-based aviation)		8,820	8,800	8,880	8,920	8,790	9,920[2]	9,560
Total London emissions		41,620	44,810	44,310	47,490	46,100	44,710	n/a

1.Back calculations for electric rail only available from 2008.
2.Total differs from that presented in Travel in London Report 2 due to a an adjustment in the electric rail emissions for2008
Source: 2009 partial update to London Energy and Greenhouse Gas Inventory, GLA.

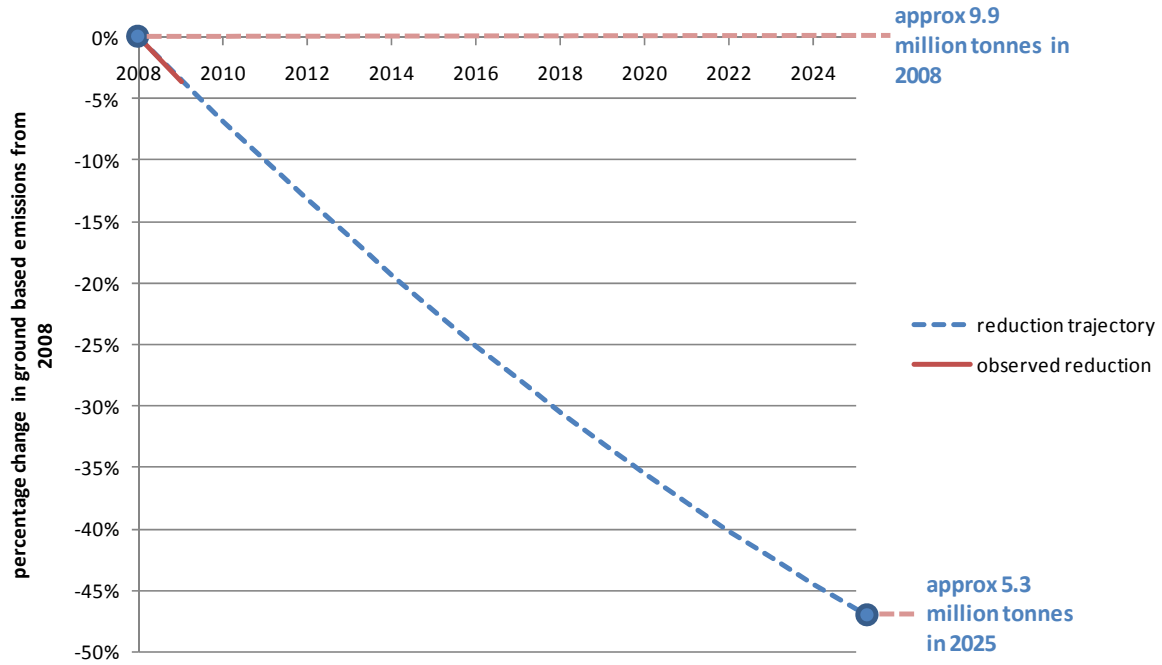
Table 7.1 shows emissions by principal transport source between 2003 and 2009. It is seen that:

- The 2009 total across all ground-based transport sources, of 9.56 million tonnes, represents a 3.6 per cent reduction on 2008 emissions, and a 5.6 per cent reduction on 2007 emissions (excluding electric rail from the total in this case for comparability).
- Ground-based aviation accounted for 1,360 kilotonnes of this total in 2009, or 14.2 per cent of ground-based transport emissions. This fell by 2 per cent between 2008 and 2009, reflecting a reduction in aircraft movements.
- Road traffic accounted for 6.64 million tonnes in 2009, 70 per cent of the ground-based transport total. This was a reduction of 4.9 per cent over the value for 2008, which in turn was a reduction of 7.2 per cent over the value for 2007. CO_2 emissions from road transport in London in 2009 were 11.2 per cent lower than in 2003.
- Emissions attributable to railways in London (all railways, including Underground, other TfL rail operations, National Rail, both electric and diesel powered, and freight) rose by about 1.0 per cent in 2009 compared to 2008. This largely reflected specific enhancements to national and international rail services.

7.5 Reduction trajectory for CO_2 emissions from ground-based transport

The MTS sets out a trajectory for the reduction of transport's CO_2 emissions to 2025. It is made clear that the exact reduction that is required, or can be achieved, from transport is – to a certain extent – dependent on reductions required/achieved from other sectors. Nevertheless, it is possible to derive an indicative reduction trajectory based on this for the purpose of analysis, and to compare this with actual calculated reductions each year from the emissions inventory. Figure 7.2 shows this indicative reduction trajectory, with the actual achievement from 2008 to 2009 superimposed (red line).

Figure 7.2 CO_2 emissions. Indicative reduction trajectory from 2008 for ground-based transport sources (only) to meet overall Mayoral target of 60 per cent reduction to London's CO_2 emissions by 2025.



Source: TfL Planning.

Between 2008 and 2009 the two trajectories are almost identical - but see also section 7.6 below.

7.6 MTS Strategic Outcome Indicator - CO_2 emissions from ground-based transport

Definition of indicator

Carbon Dioxide (CO_2) is London's principal greenhouse gas emission. Alongside wider national initiatives, the Mayor has committed to reducing emissions of CO_2 in London by 60 per cent overall relative to 1990 levels and across all sectors by 2025. In 2008, ground-based transport accounted for 22 per cent of London's total CO_2 emission.

This indicator relates to the total tonnage of CO_2 from ground-based transport emitted in London, including those from ground-based aviation, or from attributable to transport operations in London (eg remote electricity generation for rail). It is

derived from the London Energy and Greenhouse Gas Inventory (LEGGI), which is maintained by the GLA.

Value for 2009 calendar year and comparison with value for 2008

Total ground-based transport emissions were estimated at 9.56 million tonnes in 2009. This was a 3.60 per cent reduction from the previous year (on a comparable basis). Following an adjustment to the electric rail emissions the total ground-based transport emissions for 2008 were re-estimated at 9.92 million tonnes.

Assessment of recent trend

The 3.60 per cent reduction in ground-based CO_2 emissions in London between 2008 and 2009 slightly exceeded the required indicative reduction trajectory, to meet wider Mayoral reduction targets, of 3.49 per cent per annum. However, this partly reflected atypical conditions, principally the reduction in the road transport contribution which, in turn, reflected the impacts of the economic recession. Emissions from other sectors such as rail increased, reflecting enhanced service provision to meet growing demand.

The extent to which these reduced emissions from road transport are retained and improved upon in future years will be a key determinant of progress against reduction trajectories in the medium term.

7.7 Further reading

The Mayors' draft Climate Change Mitigation and Energy Strategy was released for public consultation in October 2010. It can be found at www.london.gov.uk/priorities/environment/climate-change/climate-change-mitigation-strategy

Carbon Dioxide emissions from TfL operations are examined as part of TfL's annual Environment Report. This can be found at: www.tfl.gov.uk/corporate/about-tfl/publications/1478.aspx.

8. Transport opportunities for all Londoners

8.1 Introduction

This chapter looks at how transport provides access to opportunities and services in London. It also considers physical accessibility to the transport network and the affordability of transport in London.

Much of the material dealt with by this report relates to features of London's transport networks that would be expected to change only over relatively long timescales, for example, major new additions to transport networks facilitating a step-change in the strategic pattern of accessibility to employment. However, there is also much that happens on a year-on-year basis, such as the continuing programme of upgrades to stations and other facilities to improve physical accessibility to the transport networks and, during spring 2010, the opening of the East London line extension.

8.2 Access to opportunities and services - PTALs and ATOS

What are PTALs and ATOS indicators?

Travel in London report 2 described how TfL measures the way in which transport facilitates accessibility to opportunities and services. TfL's main accessibility measure for London has been PTALs. These measure access to the public transport network for any location in London by combining walk time to access the transport network with service waiting time at stops and stations. PTALs, although informative, do not take account of where public transport goes or what services people can access using it, and it also does not take into account non-public transport modes.

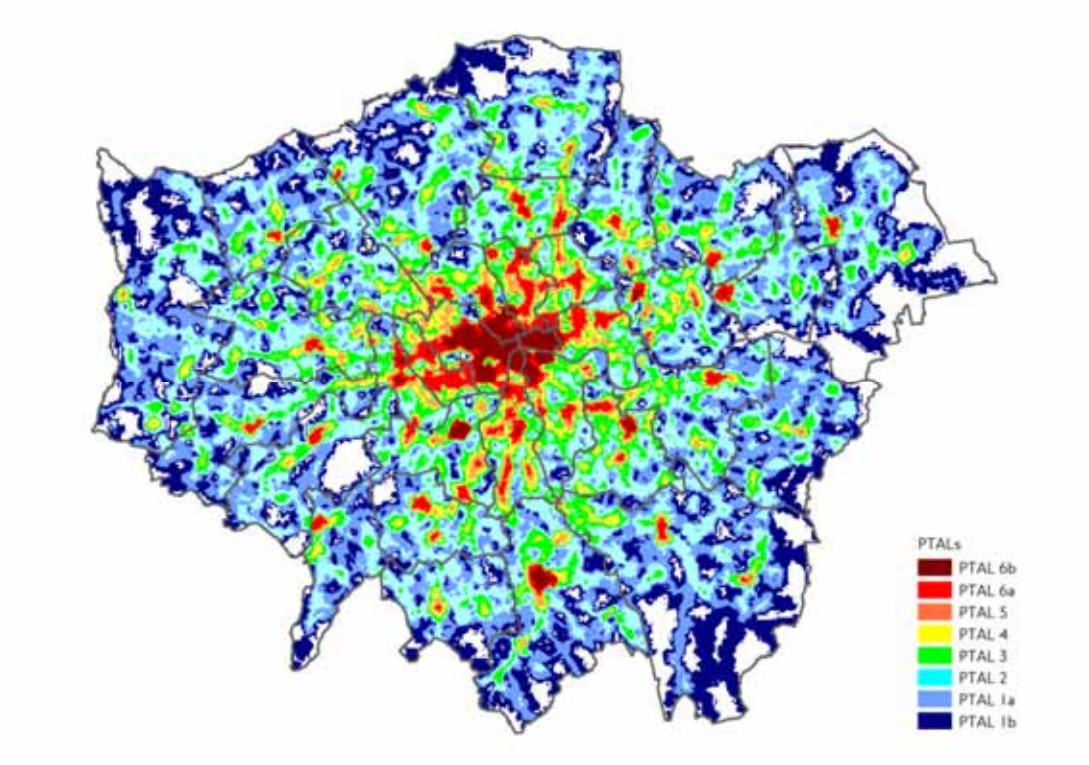
A new measure, which quantifies access to opportunities and services (ATOS), was therefore developed by TfL to address these issues. This measure reflects access to jobs, educational establishments, health services, food shopping/town centres and open spaces. In a dense urban environment accessibility in terms of travel time is not always the main issue - for example a school may be readily accessible, yet may not have sufficient capacity to accommodate local children or be appropriate to their specific needs. To account for these difficulties, ATOS typically looks at access to more than one establishment, thereby reflecting a degree of 'user choice' in the methodology.

The contemporary position

Indicators of accessibility such as PTALs and ATOS have many uses for local-scale analysis for example to assess transport provision in relation to a specific development. At the London-wide level, however, the strategic picture would be expected to change little from year to year. In particular, the MTS Strategic Outcome Indicator that relates to access to opportunities and services, base-lined for 2008 in Travel in London report 2, is intended to be updated on a 3 yearly cycle.

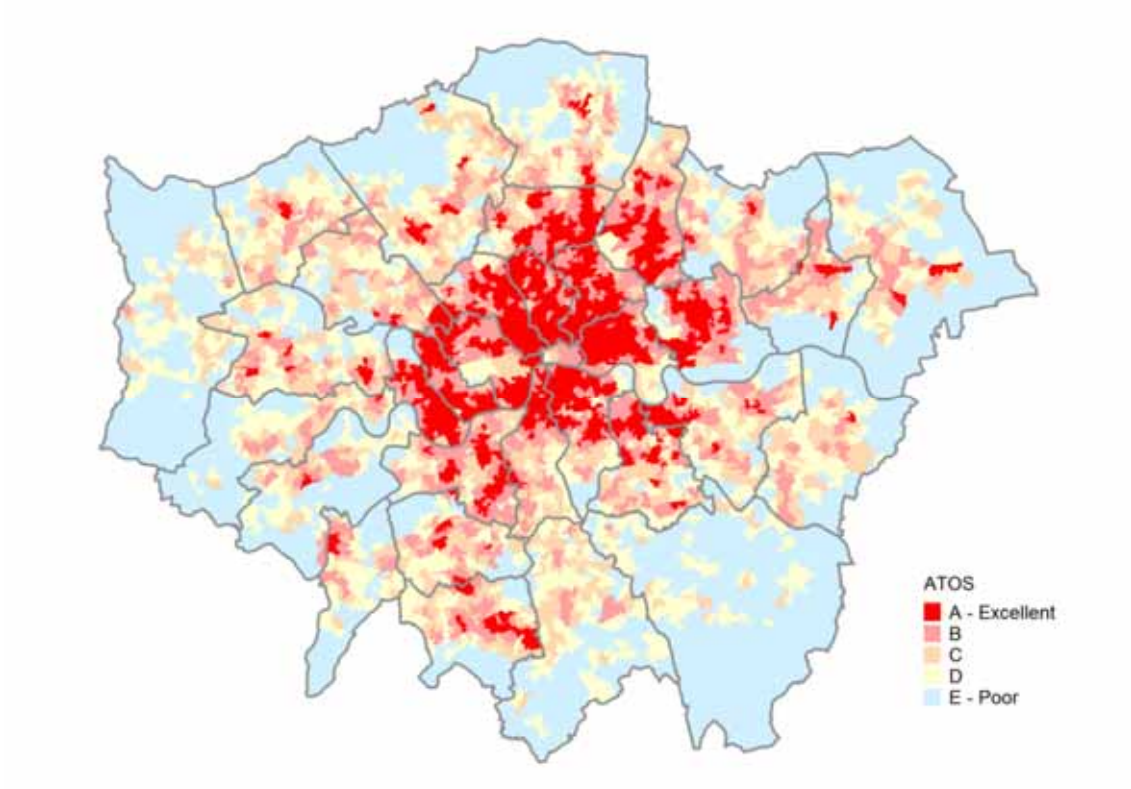
Figures 8.1 and 8.2, previously presented in Travel in London report 2, illustrate the nature of these indicators, and show the overall contemporary pattern of access to public transport (Figure 8.1) and access to opportunities and services (Figure 8.2) across London.

Figure 8.1 Public transport accessibility (TfL's PTAL indicator). Greater London overview, 2010.



Source: TfL Planning.

Figure 8.2 Access to opportunities and services (TfL's ATOS indicator), public transport and/or walking - composite score, 2009.



Source: TfL Planning.

Looking across these two maps:

- Unsurprisingly, PTAL scores, reflecting access to public transport, relate to basic urban density and are typically higher towards central London. However, they also clearly reflect the pattern of strategic town centres throughout both Inner and Outer London.
- ATOS scores show a similar overall pattern, although higher scores are more evenly distributed through (particularly) Inner London. This pattern reflects a higher level of public transport provision, and also a concentration of services in inner and central areas.

8.3 MTS Strategic Outcome Indicator: access to opportunities and services (ATOS)

Definition of indicator

ATOS is a TfL tool from which an indicator can be derived to assist in assessing the level of accessibility to key services with the greatest impact on quality of life. Access to employment, health services, education, quality food shopping and open spaces by public transport or walking are included in this indicator, which takes into account the characteristics of London's dense urban environment.

Benchmark value for 2008 calendar year

The ATOS-based indicator at the London-wide level is to be updated on a 3 year cycle, to reflect the pace of strategic change in London's transport and service infrastructure. The indicator was first bench-marked, in terms of an MTS Strategic Outcome Indicator, for the 2008 calendar year, as published in Travel in London report 2. No update is therefore available for the 2009 calendar year.

In 2008, the average time for accessing employment and services in Greater London by public transport or walking was 17.4 minutes. This is a baseline value against which future updates can be set to assess overall progress towards MTS goals.

Assessment of recent trend

This indicator is intended for long-term tracking of evolutionary change in strategic transport provision and, as such, it is not yet possible to give an assessment of the recent trend.

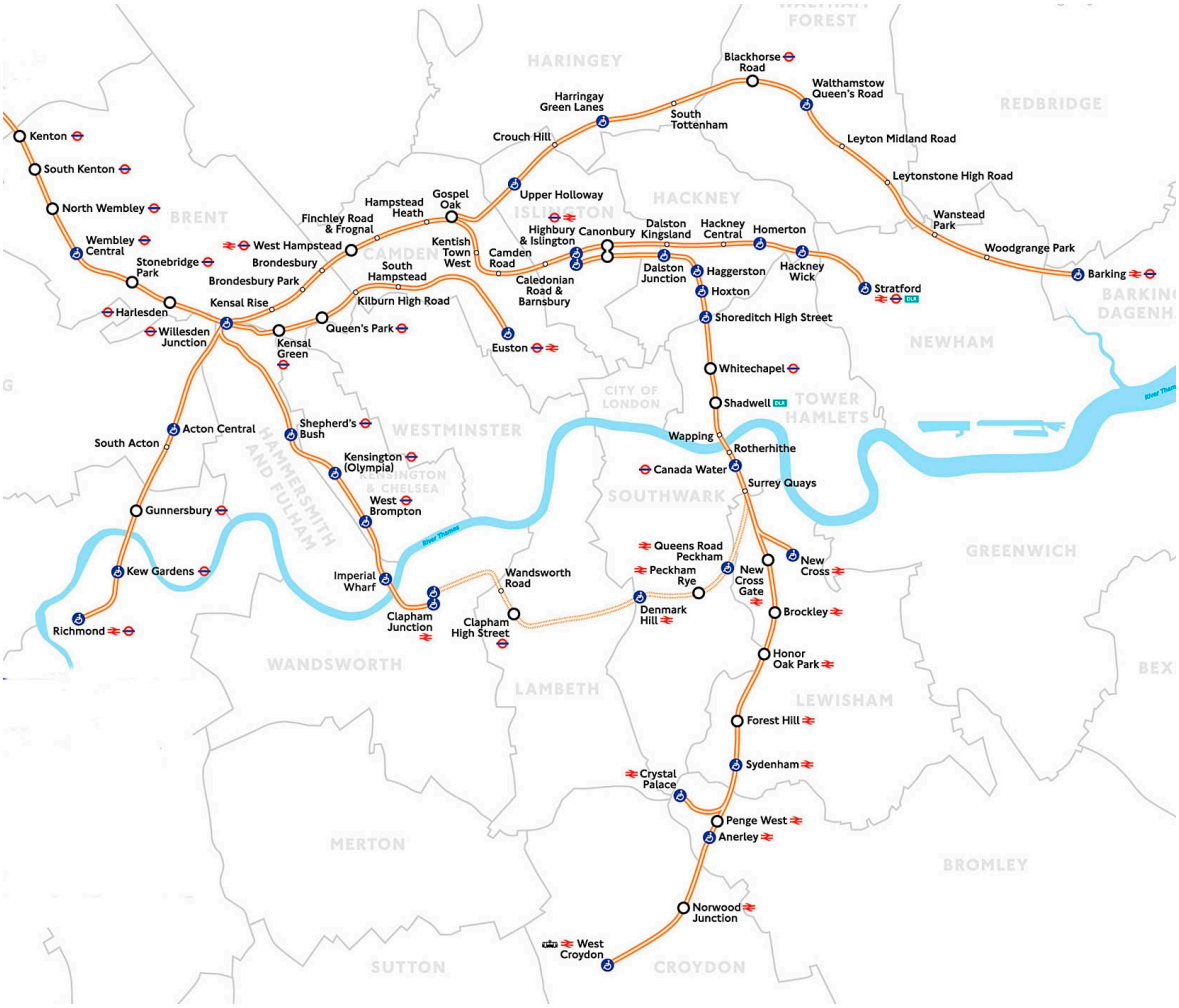
8.4 Focus on: TfL's East London line re-opening - connecting communities

The 23rd May 2010 saw the re-opening of the rebuilt and extended East London line, with trains operated by London Overground (following a 'preview' service between Dalston Junction and New Cross/New Cross Gate from 27th April 2010). The engineering details of this project, alongside planned future development of TfL's orbital heavy rail services in London, have been described elsewhere (see, for example, www.tfl.gov.uk/corporate/projectsandschemes/15360.aspx). This section looks at how the East London line in its present form (phase 1) facilitates and enhances access to opportunities and services in the area of London that it serves. Figures for population served are based on the 2001 census of population. Updated figures for employment (2007) are quoted alongside these where appropriate.

Figure 8.3 shows the core East London line alignment, running from Dalston Junction in the north to New Cross and New Cross Gate south of the Thames.

Service frequency in the core section is 12 trains per hour. Four of these run to and terminate at New Cross, whilst the remaining eight run through and beyond New Cross Gate to West Croydon (four trains per hour) and Crystal Palace (also four trains per hour). A further phase of the project now underway will see the completion of the Inner London orbital rail network between Surrey Quays and Clapham Junction, linking with the West/North London lines, alongside a connection between the East and North London Lines with East London line services projected to Highbury and Islington (see also Figure 8.3).

Figure 8.3 Map of the extended East London line and related London Overground rail services (planned position in 2012).



Source: TfL London Rail.

Characteristics of East London line catchment

- Around 451,000 people live within 15 minutes walk of an East London line station, which is 6 per cent of the GLA population.
- There are about 220,000 jobs located within 15 minutes walk of an East London line station, which is 6 per cent of London's total job market.
- 26 per cent of the people living within 15 minutes walk of an East London line station live within the 10 per cent most deprived areas of London.

- More than 80 per cent of people living within 15 minutes walk of Hoxton station live in locations defined as lying within the 10 per cent most deprived areas of London
- The predominant non English ethnic groups within the catchment of the East London line are Indian and Bangladeshi. Around 25 per cent of people living within one kilometre of Shadwell and Whitechapel stations were born in Bangladesh.

Improving accessibility and connecting communities

- Canary Wharf was the location for 50,000 jobs in 2001 (94,000 in 2007), which was 2 per cent of the total GLA employment. East London line phase 1 has meant that an extra 100,000 people now have a journey time to Canary Wharf of under an hour, with a large number of these coming from the London Borough of Hackney.
- The City of London was the place of employment for 320,000 jobs in 2001 (339,000 in 2007). Fourteen per cent of these are within 15 minutes walk of Shoreditch High Street station. Phase 1 has allowed 100,000 additional people to have a journey time to Broadgate (north-east of Liverpool Street) of under an hour.
- Croydon was the location for 42,000 jobs in 2001, and is one of the key Outer London employment areas within the GLA. Fourteen thousand of these jobs are located within 15 minutes walk of West Croydon station. Around a further 30,000 people now have a journey time to Croydon of under 30 minutes as a result of East London line phase 1.
- In addition, the number of people who live in the 10 per cent most deprived areas of the GLA with a journey time to Croydon of under 30 minutes has doubled - from under 3,000 to 6,000.
- Six per cent of London's employment was previously within 30 minutes travel time of Dalston. As a result of East London line phase 1, over 16,000 additional jobs are now within 30 minutes of Dalston, and almost 100,000 additional jobs are now within 60 minutes travelling time.
- 21,000 additional jobs will be within 30 minutes of Hoxton, improving accessibility from this highly deprived area, and over 200,000 additional jobs are now within 60 minutes.
- Sydenham had comparatively poor accessibility to jobs before the East London line reopened – a total of 38,400 jobs were within 30 minutes, and 1 million jobs within an hour, the latter representing only 27 per cent of London's total employment. As a result of East London line phase 1, 15,000 additional jobs are now within 30 minutes of Sydenham, and 475,000 additional jobs within 60 minutes, half of which are located within the City of Westminster.

An accessible addition to London's transport networks

- Train services on the East London line are provided by an initial fleet of 20 walk-through, high-capacity metro-style trains each able to accommodate around 700 people.
- Four new bright, modern and fully-accessible stations have been provided in Hackney, which also feature state of the art audio-visual customer communications and Closed Circuit Television coverage.
- A new fully-accessible station has been provided at Shoreditch High Street.

- Fourteen stations have been refurbished, six of which provide step-free access from street to platform.

Figure 8.4 East London line Class 478 'Electrostar' electric multiple unit train approaching Hoxton station.

8.5 Accessibility to the transport system

Physical 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 this. Comprehensive guidance for travellers requiring accessible facilities is also provided through TfL's website (tfl.gov.uk). The following sections update data on this topic previously given in Travel in London report 2.

London Underground

As at late 2010, London Underground had 60 stations (22.2 per cent of the total of 270 stations) which are step-free from street to platform. However, only 10 stations (3.7 per cent) were step-free from train to platform - seven of these on the Jubilee Line extension.

London Underground categorise the remaining step-free stations according to the size of the gap between the train and the platform, and the height of the step between train and platform (see www.tfl.gov.uk/assets/downloads/step-free-tube-guide-map.pdf). Note also that, at some interchange stations, accessibility characteristics may vary between lines and platforms.

Developments currently underway to further improve the accessibility of the Underground network include:

- Installation of humps at some platforms, which raise the platform to the level of the train.
- Tactile warning surfaces are being installed on platforms as stations are refurbished.
- New trains with improved accessibility are being introduced on to the Victoria Line. These trains have designated wheelchair spaces and a smaller step and gap between the train and the platform (a step of no more than 50mm and a gap of no more than 75 mm at platforms with level access boarding points).

London Overground

Seventy-eight stations are served by London Overground, 17 of which are fully accessible, with step free access to, and between, all platforms (22 per cent). At 35 of the 78 stations the Overground platforms are either directly, or indirectly accessible from the station entrance (45 per cent). At 41 of the 78 stations the station is only partially accessible to either National Rail, Overground or Underground services (53 per cent). The remaining 37 stations are not accessible (47 per cent).

National Rail

One hundred and three National Rail stations in London were step-free from street to platform in 2010 (31 per cent of the total).

DLR and London Tramlink

Both networks were constructed with fully accessible stations.

Accessible bus stops

As at March 2010, 50 per cent of the 17,600 bus stops in London were fully accessible (ie appropriate vehicle stopping controls, 100mm or greater kerb heights and no other boarding/alighting impediments). Of these, 2,200 are on the TLRN and 15,400 are on borough roads. Sixty-one per cent of the TLRN stops are fully accessible, as are 48 per cent of those on borough roads.

Accessible footways and crossings

For accessible crossings, in 2008/09, 36 per cent of all TLRN signalised crossings (either 'stand alone' or complete junctions) met the highest criteria of provision based on the (national) accessible crossing indicator.

Looking at provision of dropped kerbs and tactile paving for the 1,494 'clusters' of crossings on the TLRN (groups at a single location): 1,461 (98 per cent) had dropped kerbs; 1,311 (90 per cent) had tactile paving, and 1,311 crossings (88 per cent) had both tactile paving and dropped kerbs.

8.6 MTS Strategic Outcome Indicator: physical accessibility to the transport system

Definition of indicator

This indicator measures the level of step-free access across the public transport and TfL Streets networks. The indicator is defined as a modal composite, based on the proportions set out in section 8.5 (above), weighted according to journey stage based mode shares (see Table 2.2 of this report) - taking these as the appropriate 'target shares' to be achieved by those people with mobility impairment.

Value for 2009/10 calendar year

The composite physical accessibility score for 2009/10 was 37 per cent. This is a re-benchmarked value based on more complete data and is not, therefore, strictly comparable to the value of 36 per cent previously given in Travel in London report 2 for 2008. However, the comparison does reflect specific additions to the accessible network between 2008 and 2009/10.

Assessment of recent trend

Incremental progress with this indicator reflects enhancements over the most recent two years to progressively improve the accessibility of London's transport system.

8.7 Focus on: King's Cross interchange

Kings Cross St. Pancras, one of the Capital's oldest and busiest London Underground stations, is now completely wheelchair accessible thanks to ten new lifts. King's Cross St. Pancras is the 62nd Underground station in London to become step-free, and is part of redevelopment work that quadrupled the size of the station, easing congestion and making journeys more pleasant for the 300,000 daily passengers. It is the final part of an £800m redevelopment of King's Cross St. Pancras Underground station. Funded by the Department for Transport and delivered by TfL's Investment Programme, it is an early legacy benefit at one of the key London 2012 Olympic gateway stations.

Figure 8.5 King's Cross ticket hall showing accessible features.

More passengers pass through King's Cross St. Pancras every year than through Heathrow airport and by the time the Olympic and Paralympic Games take place in 2012 more than 100,000 people will be passing through the station at peak times every day. As well as speeding up ticket purchases and Oyster top-ups, the new

ticket hall that opened last year has put an end to closures due to overcrowding, and has made travelling easier for people who need step-free access.

Movement paths within the interchange are largely direct and clear with good sight lines and little clutter. Spatial management reflects good practice, with mixed use spaces arranged to either side of movement spaces, decision points are relatively clear with minimal advertising or other distractions. Much of the station environment is step free with lifts, where needed, located on desire lines. A visible staff presence, combined with pedestrian and retail activity promotes a sense of safety and security. Interchange from King's Cross main line to St Pancras main line is at street level.

8.8 Door-to-door transport services - Taxicard and Dial-a-Ride

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. These are: Dial-a-Ride, operated by TfL, and the Taxicard scheme, administered by the London Councils Transport and Environment Committee. This section updates trends in relation to the operation and use of these.

Dial-a-Ride

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 trends in the use of Dial-a-Ride. During 2009/10 there was a 7 per cent increase in the number of journeys made using Dial-a-Ride services compared to the previous year. There was also an increase in the number of registered passengers, bringing them to 53,000.

Table 8.1 Dial-a-Ride key trends.

Year	Number of journeys (thousands)	Number of buses	Registered passengers (thousands)	Average cost per passenger journey (2009/10 prices) (£)	Total grant (2009/10 prices) (£m)
2000/01	1,222	292	73	12.82	16.1
2001/02	1,260	302	86	14.28	18.0
2002/03	1,269	317	96	15.14	19.3
2003/04	1,325	316	61	15.78	19.7
2004/05	1,261	316	66	19.52	23.6
2005/06	1,232	336	71	21.37	25.5
2006/07	1,173	342	72	25.23	28.8
2007/08	1,127	355	52	26.78	29.6
2008/09	1,172	352	50	26.26	30.9
2009/10	1,255	355	53	24.43	31.0

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 three 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 were due to delays and difficulties with the implementation of a new booking system and central call centre.
4. Financial arrangements for services provided centrally by TfL have changed over time. Prior to 2005 a number of activities, notably computer services and HR support were funded centrally and not charged. Additionally, the bus fleet was provided as "free issue" during a period prior to 2005. These costs were therefore not reflected in the average cost per passenger journey but have been since 2005.

Taxicard

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 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 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]
2001/02	523	39	13.69	5.23	11.04
2002/03	653	44	13.78	4.63	12.64
2003/04	791	50	14.17	4.33	13.13
2004/05	948	63	13.13	2.91	13.99
2005/06	1,118	74	15.34	2.68	14.41
2006/07	1,275	77	14.76	2.46	16.48
2007/08	1,436	80	13.58	2.34	17.69
2008/09	1,638	83	10.28	2.26	18.89[4]
2009/10	1,736	87	10.34	2.19	18.80
Percentage change					
1 year	6%	5%	1%	-3%	-0%
10 years	246%	98%	-18%	-	-

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.
4. This value was incorrectly stated in Travel in London report 2.

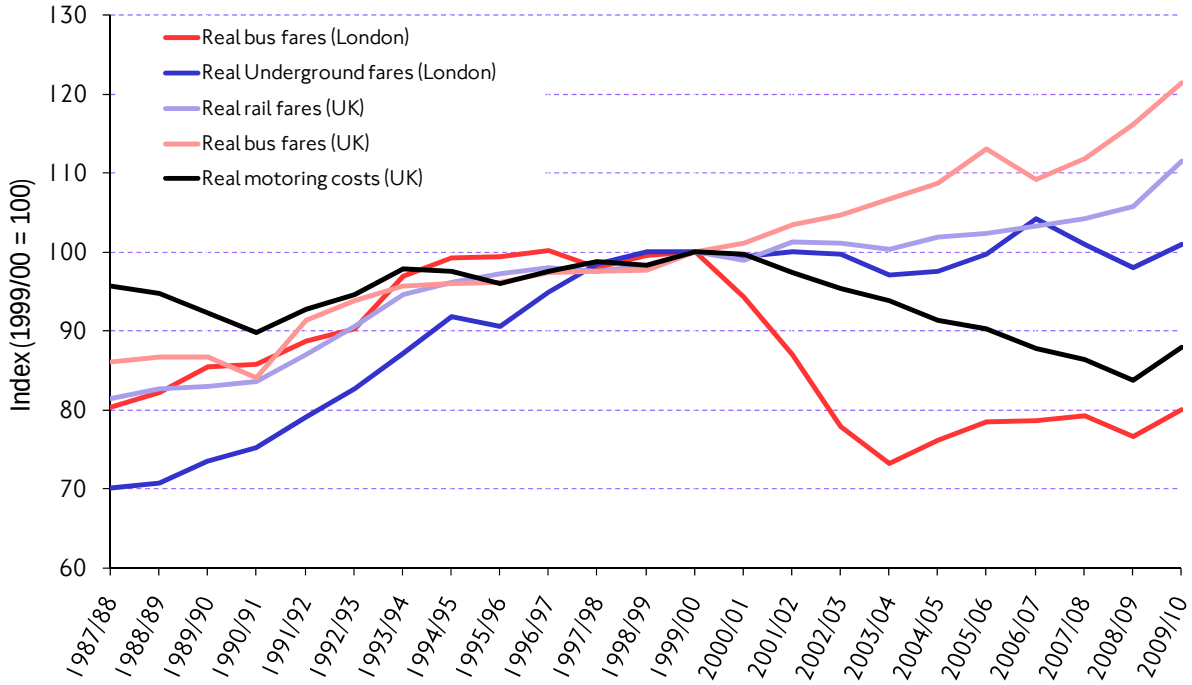
8.9 Transport affordability

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 trends in fare prices by mode are explored in more detail below and are compared with trends across the UK and with motoring costs. Figure 8.6 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 20 per cent lower than in 1999/2000. Underground fares have been relatively stable over the same period, and are currently just above 1999/2000 fares in real terms. Motoring costs, on the other hand, had shown a constant rate of decline until an increase in 2009/10, although they remained 12 per cent lower than in 1999/2000.

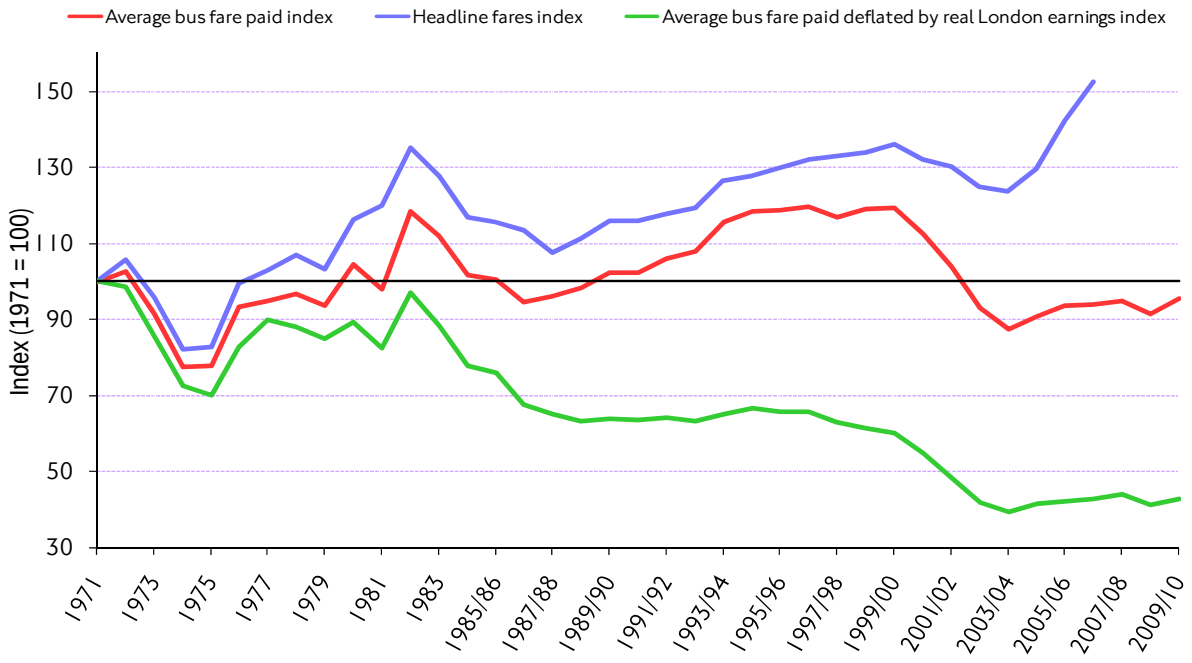
Figure 8.6 Public transport fares – UK and London compared.



Source: TfL Fares and Ticketing.

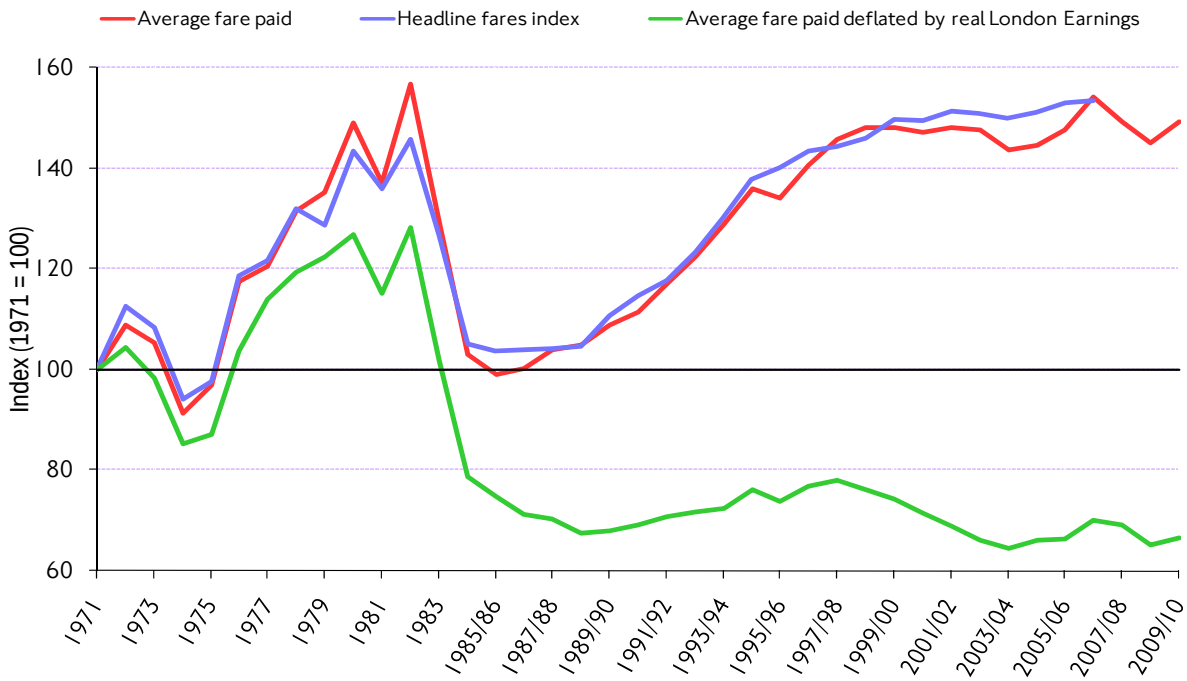
Figures 8.7 and 8.8 show trends in London bus and Underground fares in more detail. The average real bus fare is lower than it was in 1971 by 4 per cent, and when taking the increase in earnings into account the decline is almost 60 per cent. The average Underground fare, on the other hand, has increased by almost 50 per cent compared to 1971 prices, but when taking into account London earnings fares are about a third lower overall than in 1971.

Figure 8.7 London bus fare trends.



Source: TfL Fares and Ticketing.

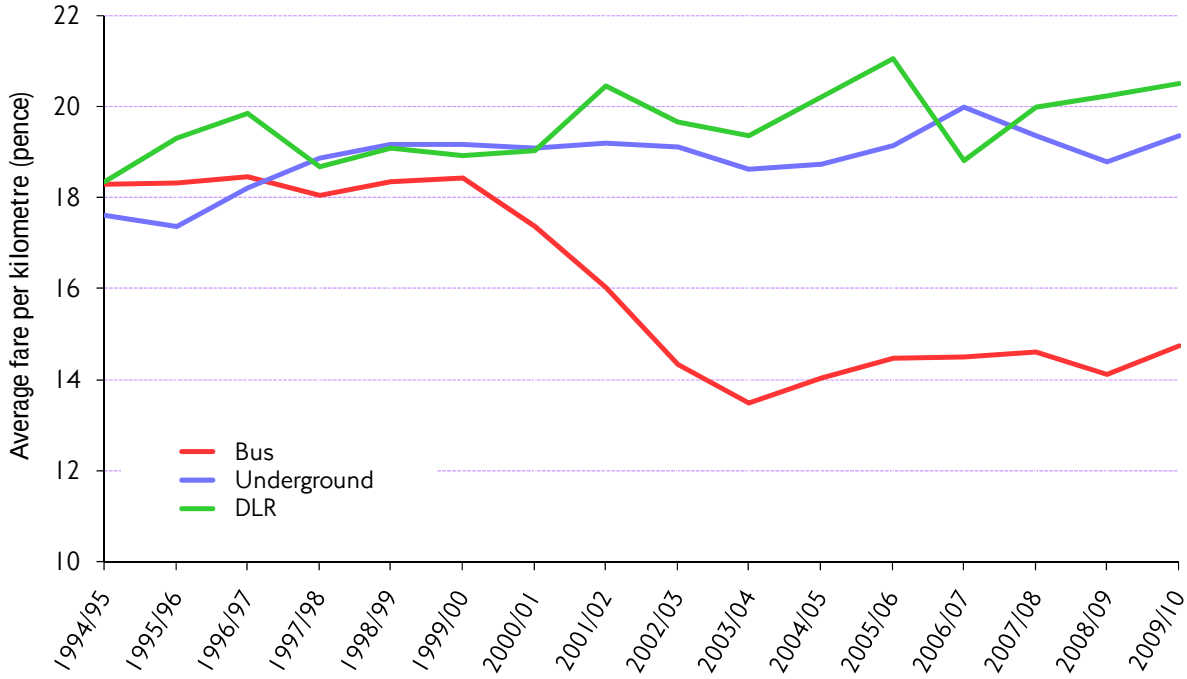
Figure 8.8 London Underground fare trends.



Source: TfL Fares and Ticketing.
Note: The headline fares index is no longer reported, as it does not take into account the considerable switching between ticket types since the introduction of Oyster pay as you go.

Figure 8.9 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.

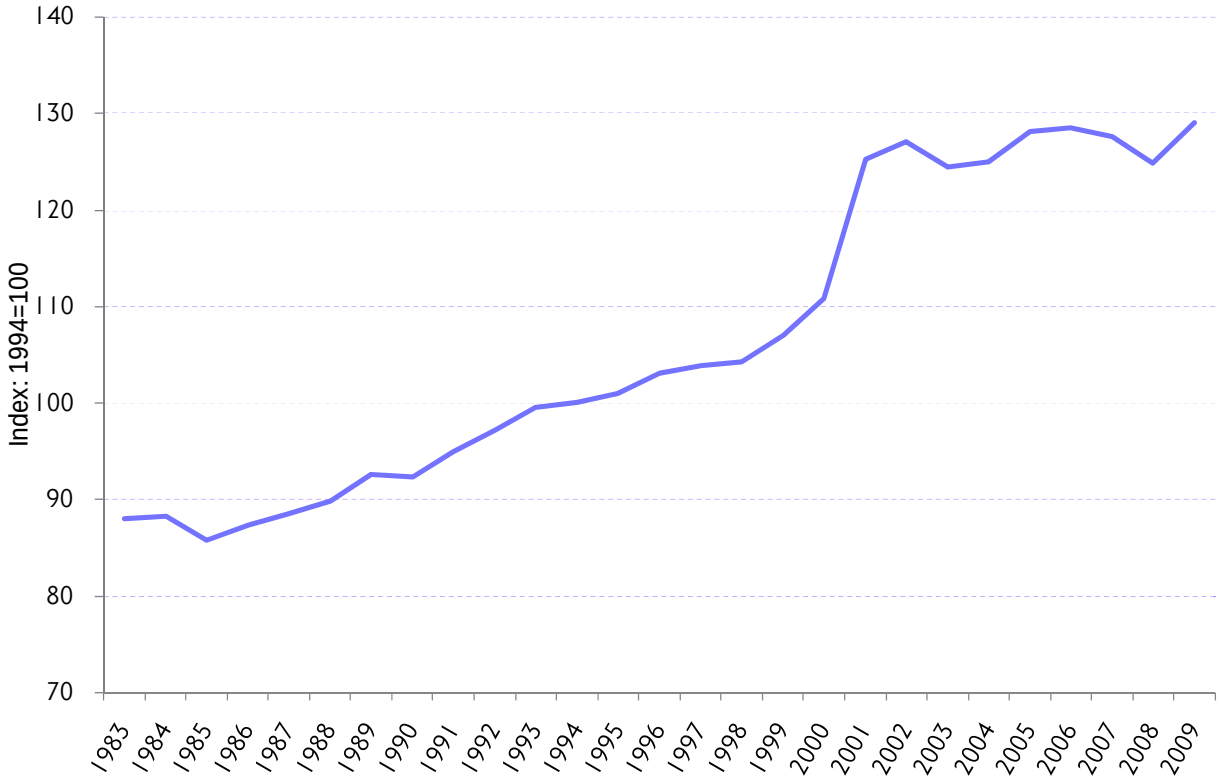
Figure 8.9 Average fare per kilometre by mode.



Source: TfL Fares and Ticketing.

Taxi fares are regulated by TfL. Figure 8.10 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 8.10 Taxi real fares index.



Source: TfL Fares and Ticketing.

8.10 MTS Strategic Outcome Indicator: real fares levels

Definition of indicator

The real fares level measures the actual average fare paid per kilometre travelled. It is a composite measure, covering bus and Underground only, calculated as the total actual adult fares revenue, adjusted for inflation and divided by total actual bus and Underground passenger kilometres. As such, it can only be updated once the relevant calendar year is complete. Note also that this indicator includes fares paid under discounted and concessionary fares arrangements, which have expanded in recent years, and average values will therefore be lower than those actually experienced by non-concessionary fare payers.

Values for 2008 and 2009 calendar years

The actual average composite bus and Underground fare was 18.8 pence per kilometre in 2008. It rose to 19.8 pence per kilometre in 2009 (a revised value from that previously published in Travel in London report 2, reflecting the later availability of complete-year data for 2009). This represented a real increase of 5.3 per cent. Provisional data for 2010, to be re-confirmed in Travel in London report 4, give a

value of 20.2 pence per kilometre - an increase of 2.2 per cent between 2009 and 2010.

Assessment of recent trend

The dependency of this indicator on both the actual fares levels charged and the kilometres travelled means that it is sensitive to changes in travel demand. When fares increase in absolute terms but fares structures and passenger kilometres remain stable, as in 2009, then any real increase will be reflected directly in the indicator. Growth in demand, or changes to the fares structure, will however tend to dilute this relationship. In 2007 and 2008, for example, growing demand combined with changes to the fares structure produced a change of -8.2 per cent in the indicator between the two years.

9. Transport and quality of life: local air quality and noise

9.1 Introduction and summary of content

This chapter and the next look at selected transport-related topics in relation to one of the Mayor's aims of improving the quality of life for all Londoners. This chapter starts by reviewing trends in emissions of key local air quality pollutants from transport-related activity, together with related air quality trends, followed by a consideration of the perception of transport-related noise in London.

Chapter 10 of this report then looks across a range of perception/satisfaction based indicators relating to aspects of the quality of transport in London, three of which directly provide MTS Strategic Outcome Indicators, considering aspects of Londoner's satisfaction with the principal TfL public transport modes, their journey experience and the urban realm.

9.2 Key features and trends

Local air quality - emissions of NO_x and PM_{10}

Nitrogen Oxides (NO^x, including NO and NO_2) and particulate matter (PM_{10}) are the two air pollutants of most contemporary concern in London. On a London-wide basis, locally-generated emissions contribute 60 per cent of both NO_2 and PM_{10} to the total of each pollutant typically found in London's air (estimate for 2010). This proportion can be addressed by local action to reduce emissions, such as the progressive improvement to the emissions performance of the road vehicle fleet, reflecting the 'Euro' emissions standards, and the London Low Emission Zone (see also section 12 of this report).

- In 2009, emissions of both NO_x and PM_{10} from ground-based transport in London continued the recent trend of substantial year-on-year reductions. These reflected both an element of reduced transport demand - primarily road traffic - and also a contribution from the ongoing renewal of the vehicle fleet with cleaner technology.
- Ground-based transport emissions of NO_x and PM_{10} in London have continued to decline with, for 2009, reductions of 9 per cent from 2008 in NO_x and 5 per cent for emissions of PM_{10} (both values exclude emissions from ground-based aviation, which are not available as a consistent historic time series).

Local air quality - concentrations of pollution in the atmosphere

The concentration of pollutants in the air is the basic measure of local air quality, and that against which compliance with limit values for air quality are assessed. Concentrations of both PM_{10} and NO_2 in London's air have not yet met these limit values.

The recent trend for concentrations of PM_{10} suggests that the relevant limit value should be met across London in 2011 (the latest date for which a time extension may be sought). For NO_2, concentrations have been effectively flat over the past decade, and compliance with the relevant limit value by 2015 (the latest date for which a time extension may be sought) remains extremely challenging.

Looking at longer-term trends:

- Concentrations of NO_x, the principal contributor to atmospheric NO_2, have fallen consistently and significantly over the period. Typical contemporary concentrations are about 40 per cent lower than those of the late 1990s.
- Concentrations of PM_{10} fell sharply during the early part of the last decade, then tended to stabilise, before more recently resuming a reducing trend. Typical current concentrations are about 30 per cent lower than those of the late 1990s.
- Concentrations of NO_2 fell relatively sharply, in parallel with reductions to NO_x, during the late 1990s but then tended to stabilise – and have remained effectively stable since about 2004, despite ongoing reductions to concentrations of NO_x.

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

Air pollution harms people's health and well-being. The Mayor published his Air Quality Strategy in December 2010. This outlines a range of policies and proposals to help London reduce pollution and comply with limit values for air quality. These initiatives cover 12 broad themes. The Mayor's Air Quality Strategy can be found at: www.London.gov.uk.

9.4 Local air quality trends: emissions from ground-based transport - update for 2009

Context

On a London-wide basis, locally-generated emissions contribute an 60 per cent of NO_2 and PM_{10} to the total of each pollutant typically found in London's air (estimate for 2010). These locally-generated emissions are, in principle at least, susceptible to policies to reduce them at the London scale. However, in most cases, further complementary action is required from others, such as central Government, to facilitate certain policies or increase their effectiveness. Over the past decade there have been many initiatives, as reflected in previous London and national air quality strategies, and regulatory action at the EU level, to reduce emissions. However, the results in terms of out-turn air quality have been mixed - with considerable achievements in reducing emissions and concentrations of PM_{10}, but less clear cut results for NO_x and NO_2.

Method for estimating emissions

Trends in emissions of key atmospheric pollutants in London are tracked using the London Atmospheric Emissions Inventory (LAEI). This is maintained by the GLA and is updated, typically, on a two-yearly cycle. The last complete update was for 2008. Travel in London report 2 summarised both trends in total emissions from all sources, and looked in more detail at the ground-based transport component, which is to be monitored as part of the MTS Strategic Outcome Indicator set for the two pollutants of particular concern in London: Oxides of Nitrogen (NO_x) and particulate matter (PM_{10}). For 2009, a partial update to the London inventory has been undertaken for these two pollutants, for ground-based transport sources only. These updated data are reported in the following sections, alongside some contextual information regarding the share of total emissions accounted for by ground-based transport, based on the 2008 update to the inventory.

Further reading

TfL's Environment Report 2010 contains specific details of TfL's operational impact on the environment (not covered here) and associated trends. It can be found at: www.tfl.gov.uk/corporate/about-tfl/publications/1478.aspx.

9.5 Local air quality trends: emissions of Nitrogen Oxides (NO_x) from ground-based transport

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. Compliance with health-based air quality limit values for NO_2 in London remains a significant challenge.

NO_x from ground-based transport as a proportion of all NO_x emissions

Features highlighted in Travel in London report 2, based on data for 2008, were that:

- Emissions of NO_x in London from transport and other sources had fallen substantially over recent years. In 2008 it was estimated that 52,130 tonnes of NO_x were emitted within the Greater London area (all sources). On a comparable basis this was 34.1 per cent lower than 2006, and 46.7 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 18.2 per cent lower than 2006, and 29.7 per cent lower than 2004. In other words, NO_x emissions from transport have reduced at a slower rate than those from other sources.

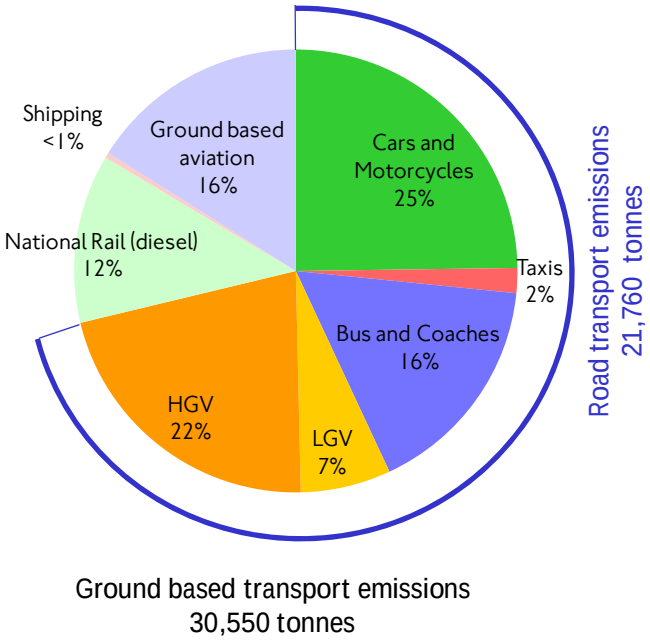
The 2009 update for NO_x emissions from ground-based transport

Table 9.1 updates the 2008 estimates for ground-based transport (only) with estimates for 2009. Looking at the table, and the trend chart at Figure 9.2:

- The 2009 total emission across all ground-based transport sources, excluding ground-based aviation, of 25,630 tonnes, represents a 9 per cent reduction on 2008 emissions, and a 36 per cent reduction on 2004 emissions.
- Road traffic accounted for 21,760 tonnes in 2009, 72 per cent of the ground-based transport total (including ground-based aviation). This was a reduction of 11 per cent over the value for 2008, reflecting the reduction in traffic seen in London during 2009 (see also section 2.11 of this report), together with a contribution from the ongoing renewal (turnover) of the vehicle fleet, with newer vehicles being manufactured to higher 'Euro' emissions standards. NO_x emissions from road transport in London in 2009 were 35 per cent lower than in 2004.
- Emissions from diesel rail of 3,760 tonnes, or 12 per cent of total ground-based transport in 2009, increased from the previous year by 1.6 per cent. This largely

reflected specific enhancements to rail services in London. However, since 2004, emissions from diesel rail has fallen by 40 per cent overall.

Figure 9.1 Basic source apportionment for NO_x ground-based transport emissions in Greater London. Percentage contribution to 2009 annual total.



Source: London Atmospheric Emissions Inventory, GLA.

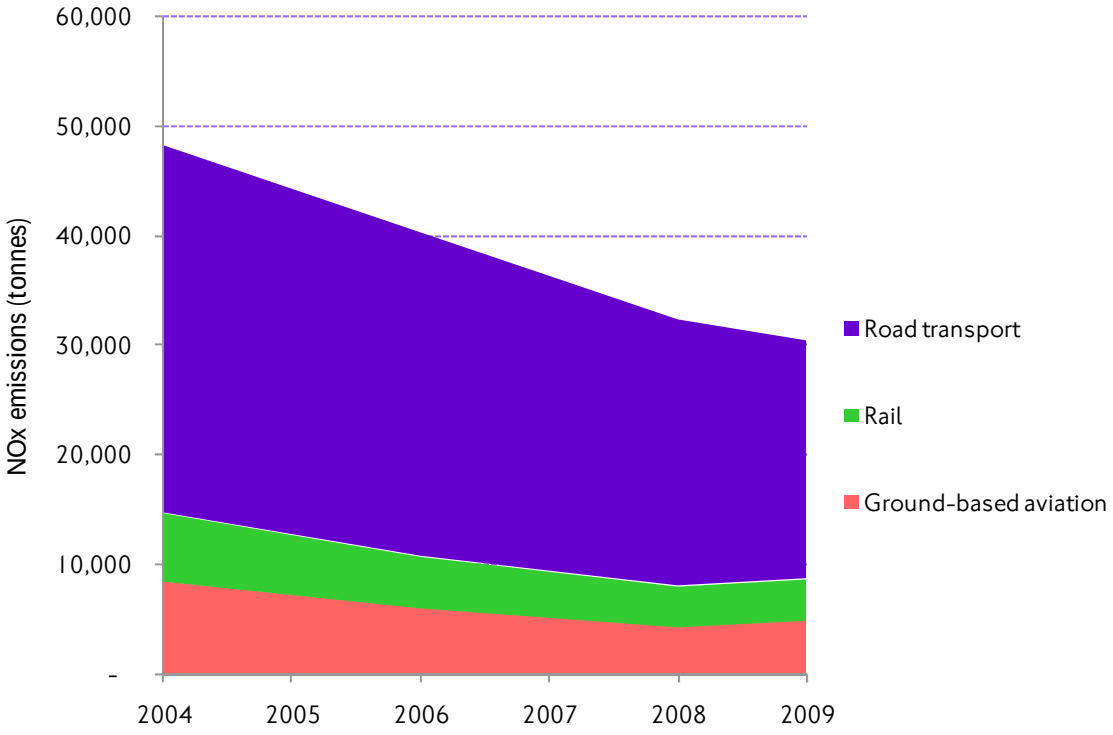
Table 9.1 NO_x emissions - historical trends for annual total emissions (tonnes), by principal source sector.

		NO_x emissions (tonnes)				Percentage change	
		2004	2006	2008	2009	2004 to 2009	2008 to 2009
Mobile sources	Road transport	33,590	29,590	24,340	21,760	-35%	-11%
	Diesel rail	6,220	4,680	3,700	3,760	-39%	2%
	Shipping	230	160	110	110	-50%	0%
	Total road, rail and shipping emissions	40,040	34,430	28,150	25,630	-36%	-9%
	Ground-based aviation	8,470	6,040	4,310	4,910	-42%	14%
Total ground-based transport emissions (including ground-based aviation)		48,500	40,470	32,460	30,550	-37%	-6%

Source: London Atmospheric Emissions Inventory, Kings College ERG on behalf of the GLA.

Note: The estimation methodology for ground-based aviation changed between the 2008 and 2009 inventories. The indicated increase of 14 per cent between the two years in Table 9.1 largely reflects this method change, and therefore values for the two years are not directly comparable.

Figure 9.2 NO_x emissions - historical trends for ground-based transport emissions (tonnes), by principal source.



Source: London Atmospheric Emissions Inventory, GLA.

9.6 MTS Strategic Outcome Indicator: emissions of Nitrogen Oxides (NO_x) from ground-based transport

Definition of indicator

This indicator is compiled using the LAEI, maintained by the GLA. Ground-based transport sources include emissions from all types of road vehicle; diesel railways, and river vessels. It currently excludes emissions from ground-based aviation, as these are not available as a consistent historic time-series. Emissions are expressed on an annual total basis as tonnes of NO_x emitted from all in-scope sources within the Greater London boundary.

Value for 2009 calendar year and comparison with value for 2008

Total emissions of NO_x from ground-based transport sources in London in 2009 were 25,630 tonnes. This was a 9 per cent reduction on the value for 2008.

Assessment of recent trend

The reduction of 9 per cent in NO_x emissions between 2008 and 2009 continues the recent trend of significant year-on-year falls, and reflects a combination of lower traffic levels and the continuing effect of improved vehicle technology.

9.7 Local air quality trends: emissions of Particulate Matter (PM_{10}) from ground-based transport

What is particulate matter and why is it important?

PM_{10} (particles with an aerodynamic diameter of less than 10 microns) has several significant adverse health effects, and compliance with health-based air quality limit values for PM_{10} at a small number of locations in central London remained a challenge in 2009.

PM_{10} from ground-based transport as a proportion of all PM_{10} emissions

Travel in London 2 reported on the 2008 update to the LAEI for PM_{10}. Features highlighted were that:

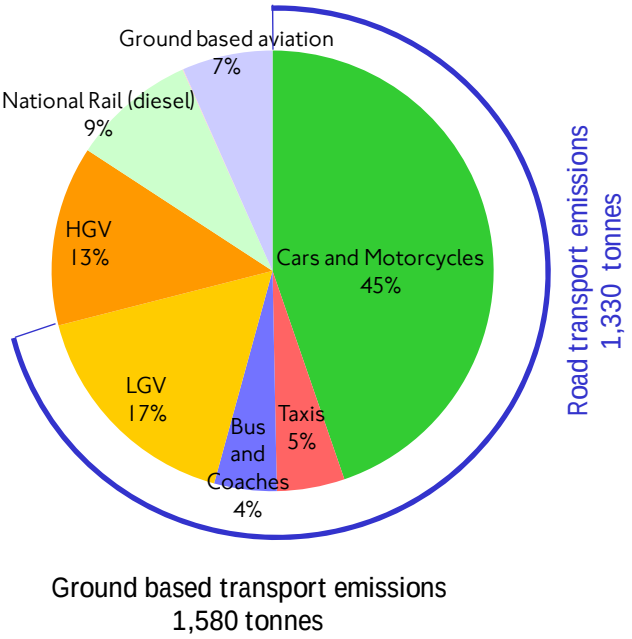
- As with NO_x, emissions of PM_{10} have fallen in London over recent years. Total PM_{10} emissions in 2008 were 2,490 tonnes. On a comparable basis this was 16 per cent lower than 2006 and 29 per cent lower than 2004.
- Ground-based transport (excluding ground-based aviation) accounted for 62 per cent of this total, or 1,550 tonnes in 2008. On a comparable basis this was 12 per cent lower than in 2006, and 25 per cent lower than 2004. Historically, therefore, emissions of PM_{10} from ground-based transport had declined at a slightly slower rate than that from all sources in London.

The 2009 update for PM_{10} emissions from ground-based transport

Table 9.2 updates the 2008 estimates for ground-based transport (only) with estimates for 2009. Looking at the table, and the trend chart at Figure 9.3 (for ground-based transport sources only):

- The 2009 total across ground-based transport sources, excluding ground-based aviation, of 1,470 tonnes, represents a 5 per cent reduction on 2008 emissions, and a 29 per cent reduction on 2004 emissions.
- Road traffic accounted for 1,330 tonnes of PM_{10} emitted in 2009, 84 per cent of the ground-based transport total (including ground-based aviation). This was a reduction of 6 per cent over the value for 2008, reflecting the reduction in traffic seen in London during 2009, together with the progressive inclusion in the vehicle fleet of newer vehicles manufactured to higher Euro emission standards. PM_{10} emissions from road transport in London in 2009 were 28 per cent lower than in 2004.
- Emissions from diesel rail of 140 tonnes, or 9 per cent of the total ground-based transport emission, increased from the previous year by 1.6 per cent. However, since 2004 emissions from diesel rail have fallen by 38 per cent overall.

Figure 9.3 Basic source apportionment for PM_{10} ground-based transport emissions in Greater London. Percentage contribution to 2009 annual total.



Source: London Atmospheric Emissions Inventory, GLA.

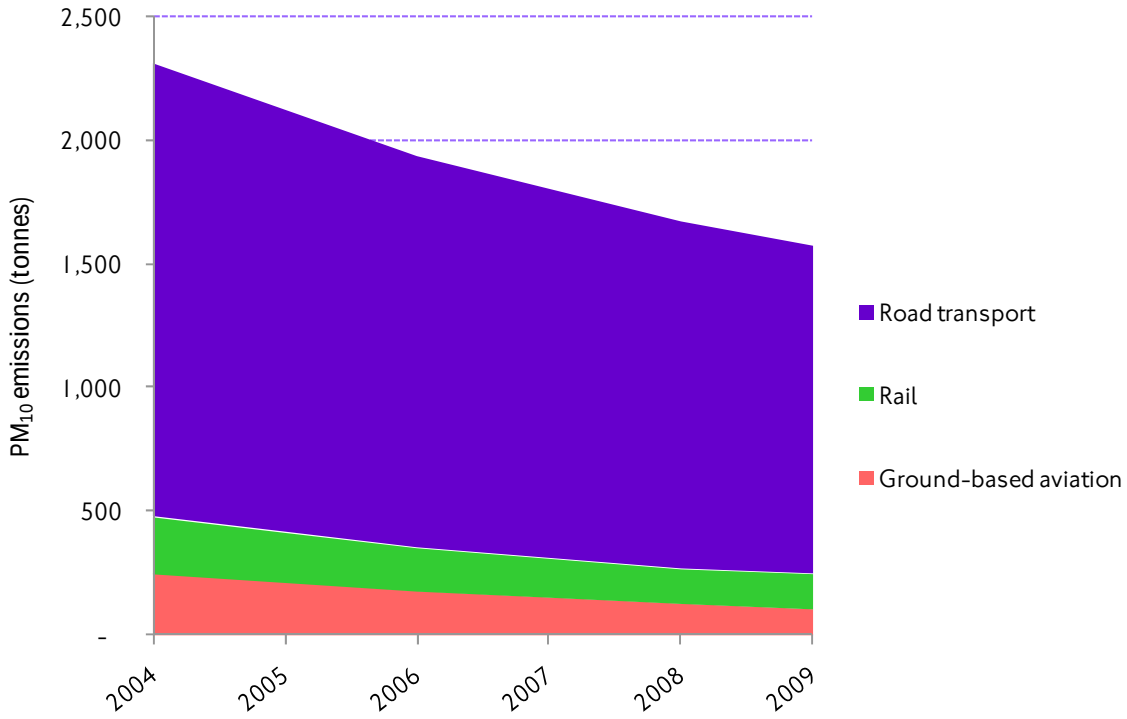
Table 9.2 PM_{10} emissions - historical trends for annual total emissions (tonnes), by principal source sector.

		PM_{10} emissions (tonnes)				Percentage change	
		2004	2006	2008	2009	2004 to 2009	2008 to 2009
Mobile sources	Road transport	1,830	1,580	1,410	1,330	-28%	-6%
	Diesel rail	230	180	140	140	-38%	2%
	Shipping	2	1	1	1	-50%	0%
	Total road, rail and shipping emissions	2,070	1,760	1,550	1,470	-29%	-5%
	Ground-based aviation	250	180	130	100	-58%	-18%
Total ground-based transport emissions (including ground-based aviation)		2,320	1,940	1,670	1,580	-29%	-6%

Source: London Atmospheric Emissions Inventory, Kings College ERG on behalf of the GLA.

Note: The estimation methodology for ground-based aviation changed between the 2008 and 2009 inventories. The indicated decrease of 18 per cent between the two years in Table 9.2 largely reflects this method change, and therefore values for the two years are not directly comparable.

Figure 9.4 PM_{10} emissions - historical trends for ground-based transport emissions (tonnes), by principal source.



Source: London Atmospheric Emissions Inventory, GLA.

9.8 MTS Strategic Outcome Indicator: emissions of particulate matter (PM_{10}) from ground-based transport

Definition of indicator

This indicator is compiled using the LAEI, maintained by the GLA. Ground-based transport sources include emissions from all types of road vehicle; diesel railways, and river vessels. It currently excludes emissions from ground-based aviation, as these are not available as a consistent historic time-series. Emissions are expressed on an annual total basis as tonnes of PM_{10} emitted from all in-scope sources within the Greater London boundary.

Value for 2009 calendar year and comparison with value for 2008

Total emissions of PM_{10} from ground-based transport sources in London in 2009 were 1,470 tonnes. This is a 5 per cent reduction on the value for 2008.

Assessment of recent trend

The reduction of 5 per cent in PM_{10} emissions between 2008 and 2009 continues the recent trend of significant year-on-year reductions, and reflects a combination of lower traffic levels and the continuing effect of improved vehicle technology, particularly the abatement of PM_{10} emissions from road vehicles, reflecting the progressive inclusion in the fleet of vehicles manufactured to the latest Euro emission standards.

9.9 Local air quality - trend in measured pollutant concentrations

Emissions and concentrations

The concentration of pollutants in the air is the basic measure of local air quality, and the measure against which compliance with limit values for air quality are assessed. Concentrations differ fundamentally from emissions, however, in that they are only measured at a limited number of discrete points, usually selected so as to be representative. Furthermore, local emissions from sources in London only account for a part of total pollutant in the air, and this proportion varies considerably according to time, weather conditions and location. 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 locally to reduce emissions from sources in London - these can only ever have a proportionately smaller impact on pollution concentrations.

Monitoring air quality and the air quality limit values

London's air quality is continuously monitored by the London boroughs and GLA at more than 100 different locations. These include kerbside, roadside, urban background, suburban and rural sites, and measurements are co-ordinated through the London Air Quality Network. For NO_2, the limit value that is most relevant is the annual mean concentration, which is not to exceed 40 μgm^3. This was initially intended to apply from the end of 2005.

For PM_{10} there are two limit values that are relevant. The first is the annual mean concentration, which is not to exceed 40 μgm^3. The second is the 'exceedence' value, 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. This was initially intended to apply from the end of 2004. Currently, the UK Government is seeking time extensions from the EU in respect of these limit values, with the Mayor's Air Quality Strategy projecting compliance with the limit values for PM_{10} in 2011, and working towards compliance with the limit value for NO_2 by the latest permissible time extension date of 2015.

Long-run trends in pollutant concentration

Figure 9.5 shows the 15-year trend for measured concentrations of three key pollutants in London's air - NO_x, NO_2 and PM_{10}. Bearing in mind that the lines represent an average of all measurements across London, including monitoring sites with widely differing characteristics, it is seen that:

- Concentrations of NO_x, the principal contributor to atmospheric NO_2, have fallen consistently and significantly over the period. Typical contemporary concentrations are about 40 per cent lower than those of the late 1990s.
- Concentrations of PM_{10} fell sharply during the early part of the last decade, then tended to stabilise, before more recently resuming a downward trend. Typical current concentrations are about 30 per cent lower than those of the late 1990s.
- Concentrations of NO_2 fell relatively sharply, in parallel with reductions to NO_x, during the late 1990s but then tended to stabilise – and have remained effectively stable since about 2004, despite ongoing reductions to concentrations of NO_x.

- The graphic also shows the impact of the atypical meteorology experienced during 2003 on average concentrations.

Figure 9.5 Trend in measured concentrations of key atmospheric pollutants - Greater London average.

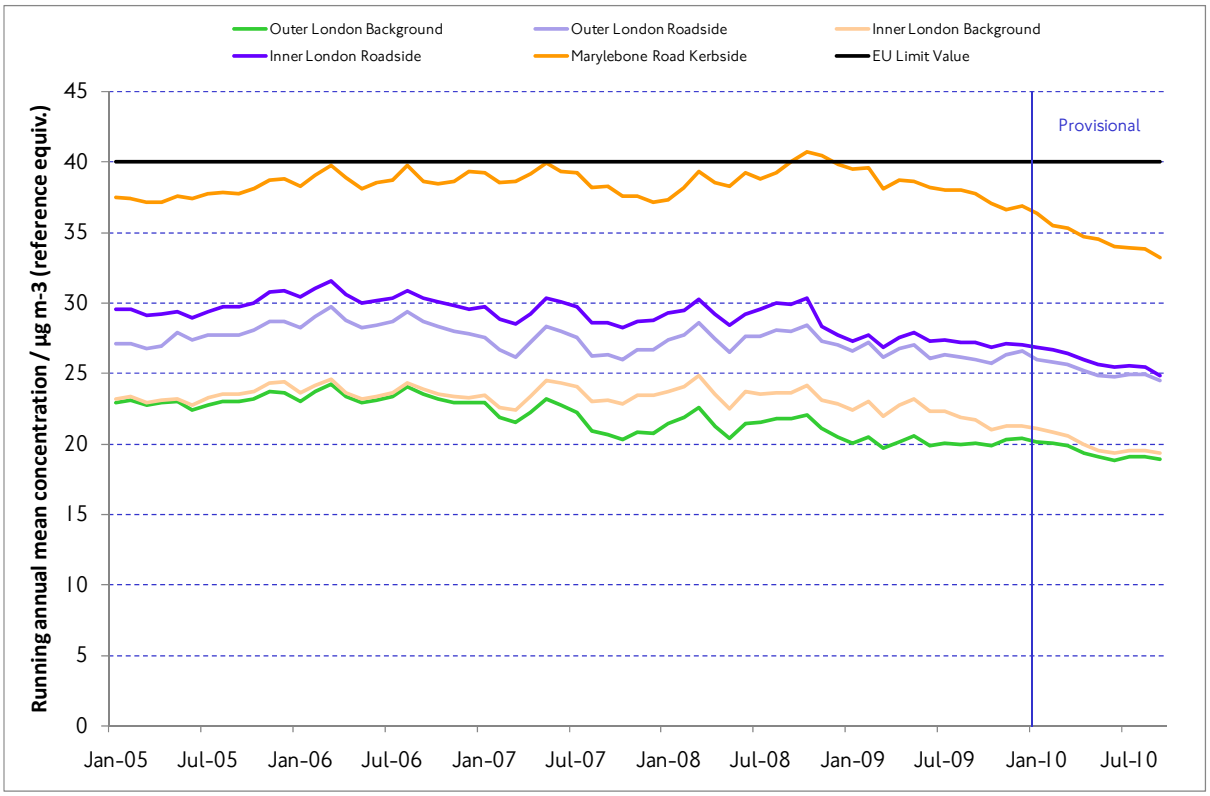
Source: Environmental Research Group, Kings College London. Based on data from the London Air Quality Network.

Therefore, there has been consistent progress with reducing concentrations of PM_{10}, and NO_x, the principal contributor to atmospheric NO_2. However, this favourable trend has not been reflected in concentrations of NO_2 itself, which have barely changed (on average) over the past 15 years.

Short-run trends in pollutant concentration and compliance with limit values – PM_{10} annual mean

Figure 9.6 shows the recent trend in PM_{10} concentrations in terms of running annual mean value for selected, representative groupings of air quality monitoring sites in London. The graphic shows that London has comfortably met the annual mean limit value of 40 µgm^3 across representative groupings of sites, apart from Marylebone Road (identified separately on the graphic), since before 2005. Between 2005 and 2009 compliance was marginal at Marylebone Road, but from 2009 and into 2010, albeit based on provisional data, the running annual mean value has been comfortably below the limit value. Compliance with this limit value in London has therefore been achieved, based on representative monitoring.

Figure 9.6 Running annual mean PM_{10} concentrations at selected air quality monitoring site groups in London.

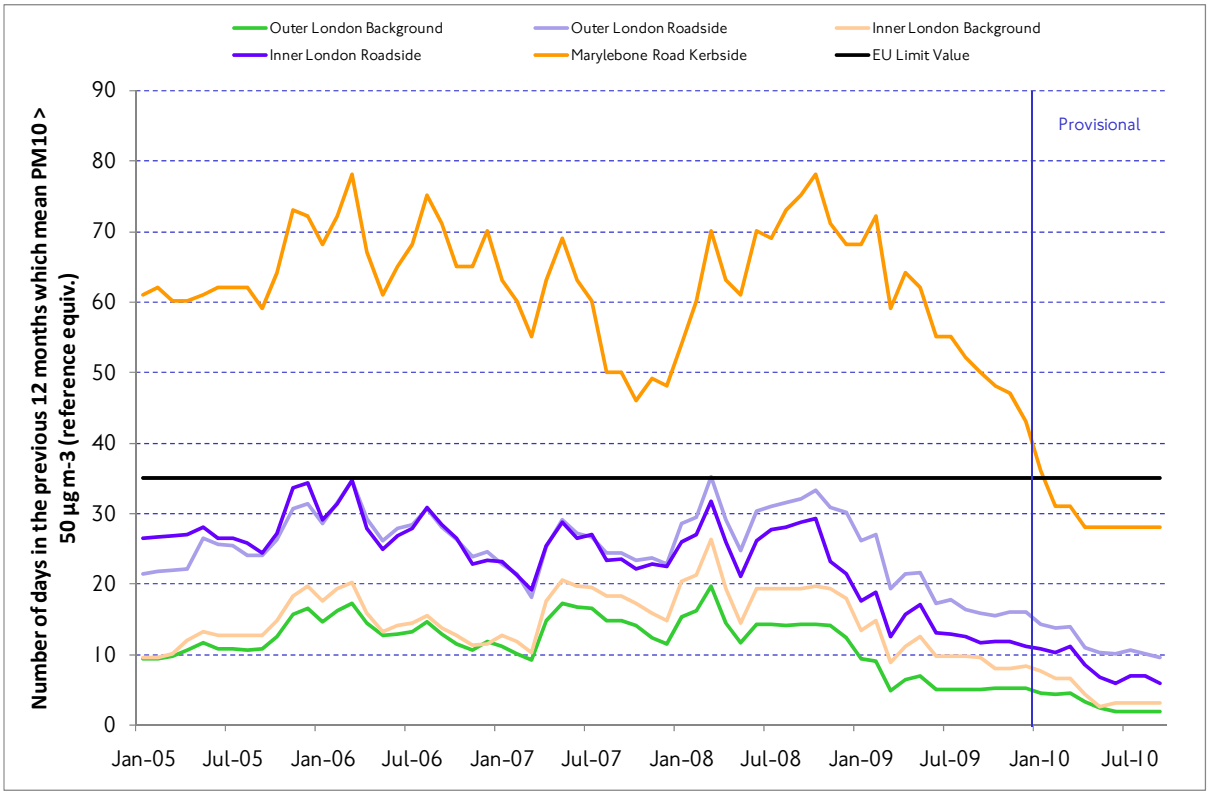


Source: Environmental Research Group, Kings College London. Based on data from the London Air Quality Network.

Short-run trends in pollutant concentration and compliance with the limit values - PM_{10} exceedence days

Figure 9.7 shows the recent trend in PM_{10} concentrations in terms of days that a concentration of 50 µgm^3 is exceeded (the 'exceedence day' statistic) for selected, representative groupings of air quality monitoring sites. This limit value is more challenging to meet than that for average concentration, as it is susceptible to greater variability from year to year, reflecting meteorological factors, and the UK is currently negotiating with the EU for a time extension for compliance with this limit value to 2011.

Figure 9.7 Number of days when average concentrations of PM_{10} exceeded 50 μgm^3 at selected air quality monitoring site groups in London. Running annual mean.



Source: Environmental Research Group, Kings College London. Based on data from the London Air Quality Network.

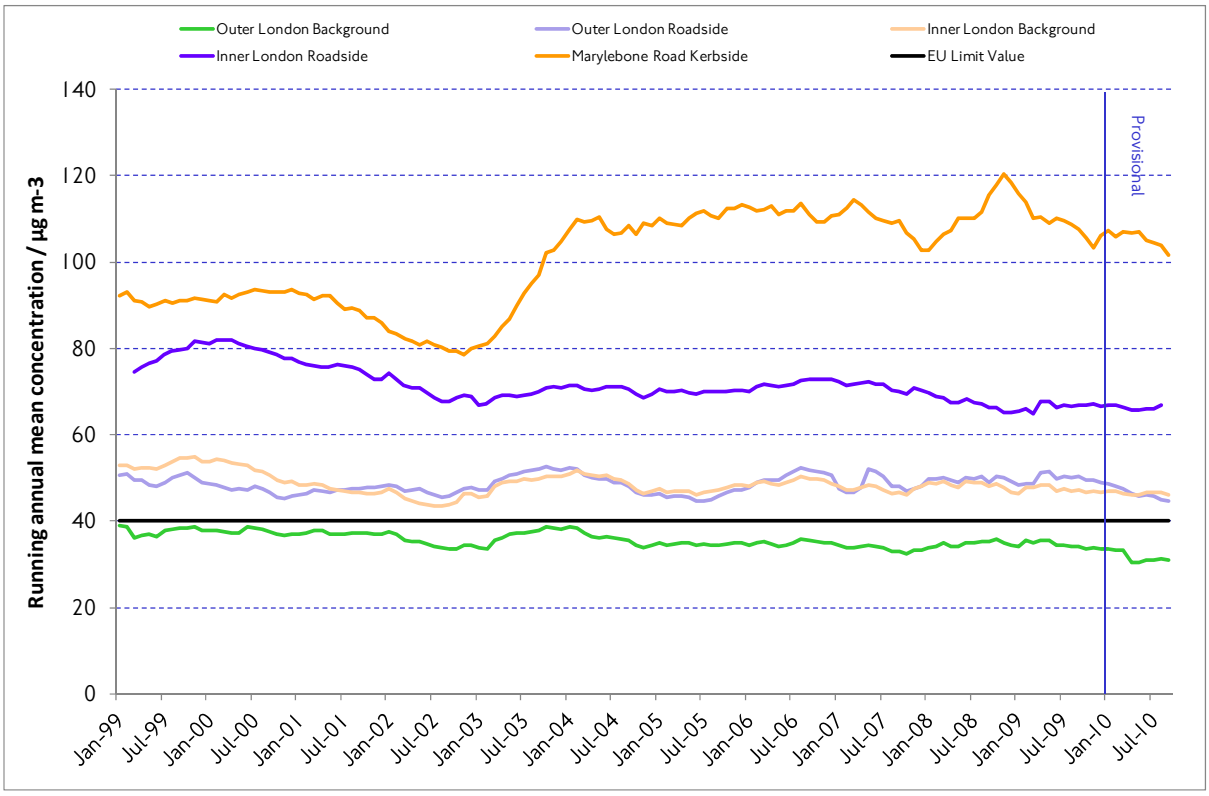
Figure 9.7 shows that, in terms of average values for most site groupings, London had achieved general compliance from about 2009. Values for 2010, albeit still provisional, reflect a continuation of the sharp falls of 2009, and demonstrate that the large majority of locations in London have already been brought to a state of compliance with this limit value.

Average statistics from groups of sites can disguise considerable variations at the individual site level. However, in terms of monitoring sites at relevant locations particularly affected by transport, only Marylebone Road has given recent cause for concern - and this is identified separately on the graphic. The trend for 2010 at this site follows that of the other site groups, and is also related to the trend in running annual mean concentrations, shown by Figure 9.6. Provisional data for 2010 suggest that the site should comply with the limit value - but by a relatively small margin.

Short-run trends in pollutant concentration and compliance with limit values – NO_2 annual mean concentration

Figure 9.8 shows the recent trend in NO_2 concentrations in terms of a running annual mean for selected, representative groupings of air quality monitoring sites. This limit value, which specifies that this value should not exceeded 40 μgm^3 on an annual mean basis, applies from 1st January 2010.

Figure 9.8 Running annual mean NO_2 concentrations at selected air quality monitoring site groups in London.



Source: Environmental Research Group, Kings College London. Based on data from the London Air Quality Network.

In contrast to the trends for PM_{10}, Figure 9.8 shows that most site groupings in London record values that exceed the limit value. Furthermore, the degree of exceedence is considerable, and the prevailing trend - over the 10-year time span covered by the graphic, is one of stability. The intractability of NO_2 concentrations to measures to reduce emissions of Nitrogen Oxides (NO_x) is now a widely-recognised feature of air quality management, not just in London but across the UK and Europe. The reasons are essentially technical, related to increased diesel-fuelled vehicles in the fleet, the performance characteristics of vehicle emissions standards and that of emissions abatement equipment targeted at reducing PM_{10}, and changes in atmospheric chemistry (eg Ozone levels).

In respect of this trend, the UK is expected to apply shortly to the EU for a time extension provision in respect of meeting the NO_2 limit values, which could extend the deadline to 2015. The Mayor's Air Quality Strategy also contains several proposals designed to assist with the wider national effort to bring the UK to a state of compliance with this limit value by the earliest possible date.

Further reading

The London Air Quality Network website makes available data from all affiliated air quality monitoring sites in London. It also provides access to analysis tools, research reports and related interpretative material. It is available at: www.londonair.org.uk/london/asp/default.asp?la_id=&showbulletins=&width=1280.

9.10 Ambient noise in London – measurement

Travel in London report 2 introduced noise maps that had recently been produced by the Department for Environment, Food and Rural Affairs. These arose from a national noise mapping exercise, focusing on urban areas and noise from transport and industrial sources only, that was due to be updated on a five-yearly basis. For London, the maps showed, fairly predictably, that the highest noise contours tended to reflect the major road network and increasing urban density towards the centre of the agglomeration. The flight paths associated with Heathrow Airport and, on certain parts of the periphery of the Greater London area, the M25 orbital motorway, were clearly visible as causes of elevated noise levels. These maps, together with supporting material, can be found at: http://services.defra.gov.uk/wps/portal/noise. These maps are intended to inform the production of noise Action Plans for large urban areas, major transport sources, and significant industrial sites in England, pursuant to the EU Environmental Noise Directive (2002).

9.11 MTS Strategic Outcome Indicator: perception of transport-related noise

Definition of indicator

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 are converted into a mean score out of 100. The indicator is developed from TfL's Perception of the Travel Environment Survey, carried out in November 2009 and June/July 2010. This survey will be conducted on an annual basis in the summer of each year from 2011.

Value for 2010 calendar year and comparison with value for 2009

The mean score for satisfaction with transport-related noise levels in London was 70 out of 100 in 2010, identical to that for 2009. In general TfL considers a score of between 70 and 79 in satisfaction surveys to be 'fairly good', according to the norms that TfL uses to interpret these scores (see also section 10.2 of this report).

Assessment of recent trend

The survey providing this indicator was established in 2009 and it is therefore too early to draw any conclusions about a trend in the perception of transport-related noise. There was no change in the level of satisfaction between 2009 and 2010.

9.12 Transport-related noise in London

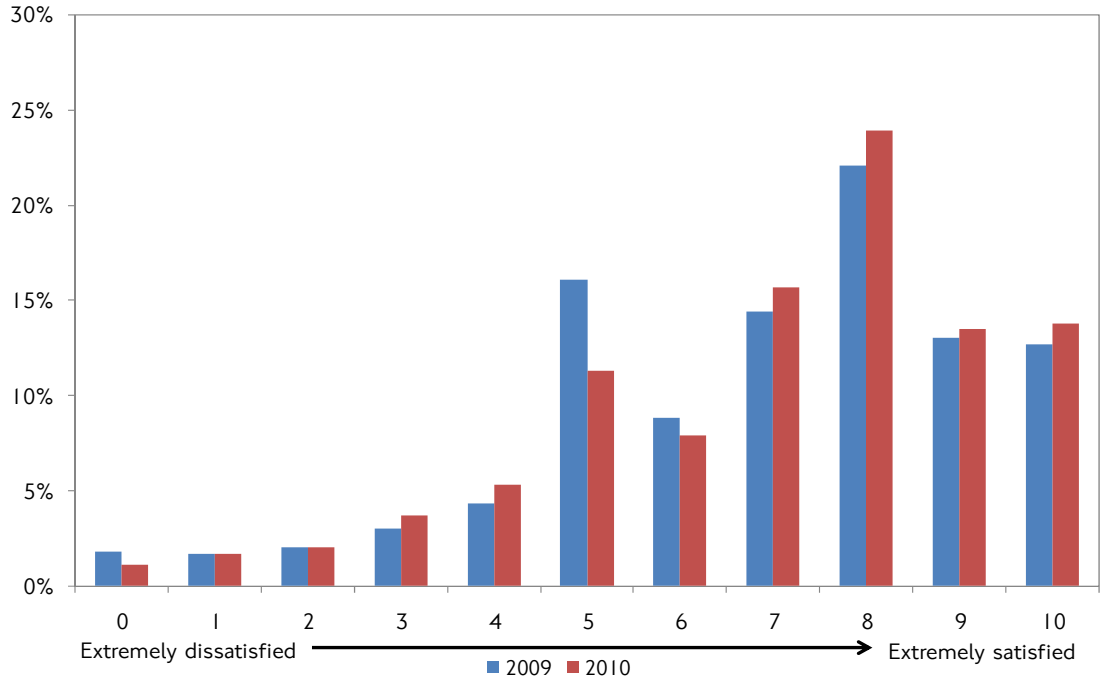
Measuring perceptions of the experience of noise

Alongside the measurement and mapping of noise levels, it is necessary to understand noise as experienced by London residents. Respondents to the TfL survey 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 available for London as a whole and for each of the London sub-regions.

Perception of general noise levels in London

The mean score for satisfaction with general noise levels in London was 70 out of 100, a slight improvement on the 2009 score of 69 out of 100. Figure 9.9 shows the distribution of scores, on a scale of 0 to 10 in 2009 and 2010.

Figure 9.9 London residents' perception of general noise levels in London, 2009 and 2010.



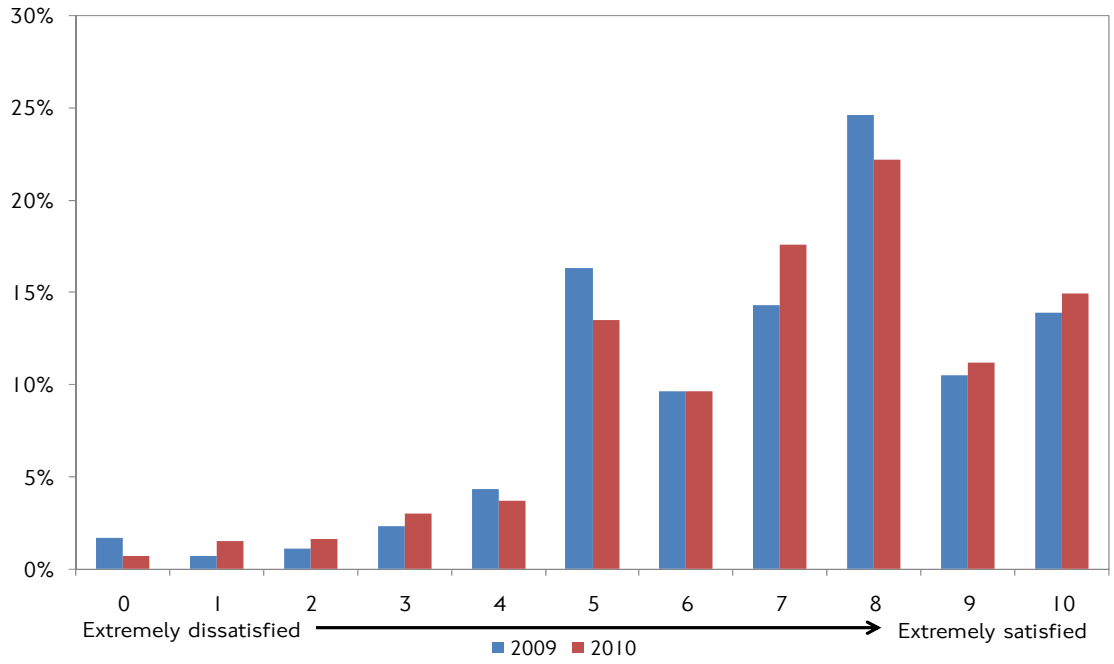
Source: TfL Perceptions of the Travel Environment Survey, November 2009 and July 2010.

Almost 70 per cent of respondents thought that general noise levels had remained the same over the past year, around 1 in 10 that they had got better and 20 per cent thought that they had got worse.

Perception of transport-related noise levels in London

The mean score for satisfaction with the reasonableness of transport-related noise levels in London was 71, a very slight improvement on the 2009 score of 70 out of 100. This is considered to be a 'fairly good' score. Figure 9.10 shows the distribution of scores, on a scale of 0 to 10.

Figure 9.10 London residents' perception of transport-related noise levels in London, 2009 and 2010.



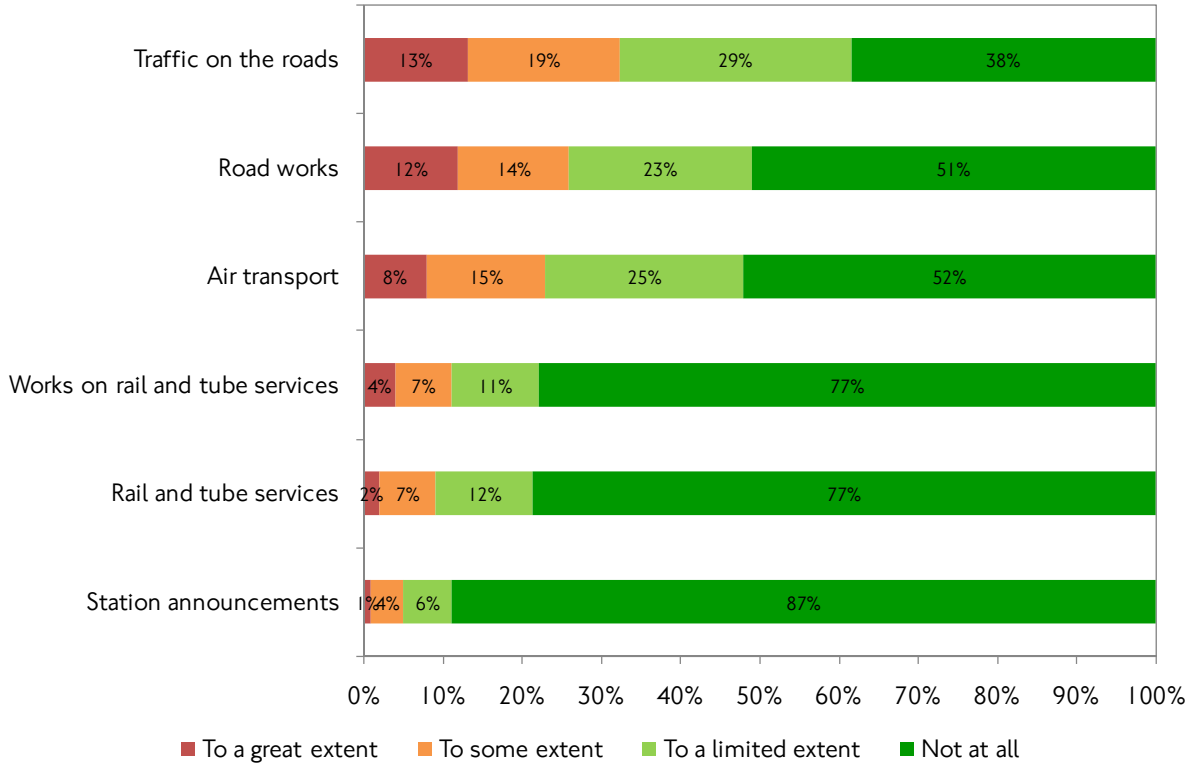
Source: TfL Perceptions of the Travel Environment Survey, November 2009 and July 2010

As in 2009, one third of respondents were not satisfied with levels of noise from transport in the local area (33 per cent scored less than 7). Comparisons demonstrate that for most London residents, there exists a strong correlation between satisfaction with general noise levels and noise from transport.

Aspects of transport-related noise

As shown in Figure 9.11, London residents were asked the level of disturbance caused by different aspects of noise from transport. Traffic on the roads was the most commonly stated (32 per cent) to disturb to some or a great extent, however this figure is lower than reported in 2009. Road works remain a major cause of disturbance, with 26 per cent of residents disturbed to some or a great extent. Nearly one quarter of London residents are disturbed by noise from air transport to some or a great extent.

Figure 9.11 Level of disturbance caused to London residents by aspects of noise from transport, 2010.

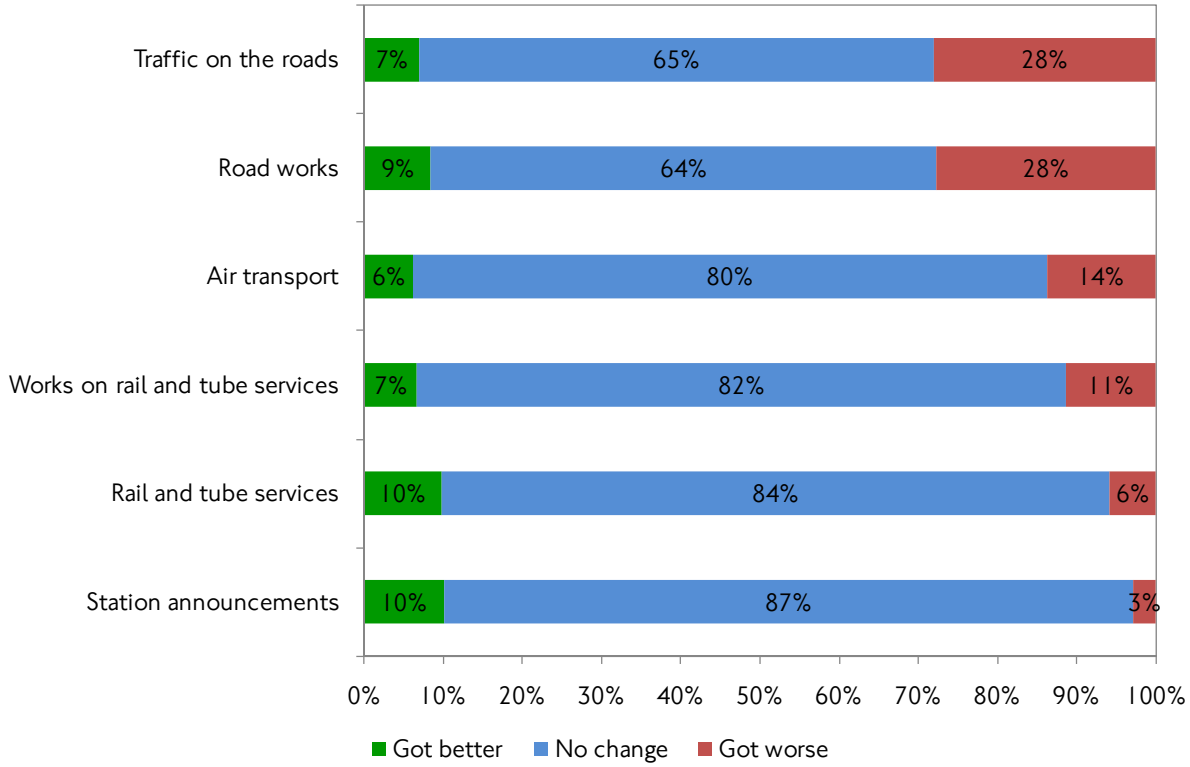


Source: TfL Perceptions of the Travel Environment Survey, July 2010

Those who said they were most disturbed by noise from road traffic were more likely not to be satisfied with levels of noise from transport (51 per cent compared to 34 per cent of London residents gave a score of less than 7). 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 remains 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 9.12 shows that traffic and road works were the sources of transport noise that residents were most likely to think had worsened over the past year. In particular, more than half of those who said that they were most disturbed by noise from road works 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 9.12 Whether levels of noise from aspects transport have got better or worse over past year for London residents, 2010.

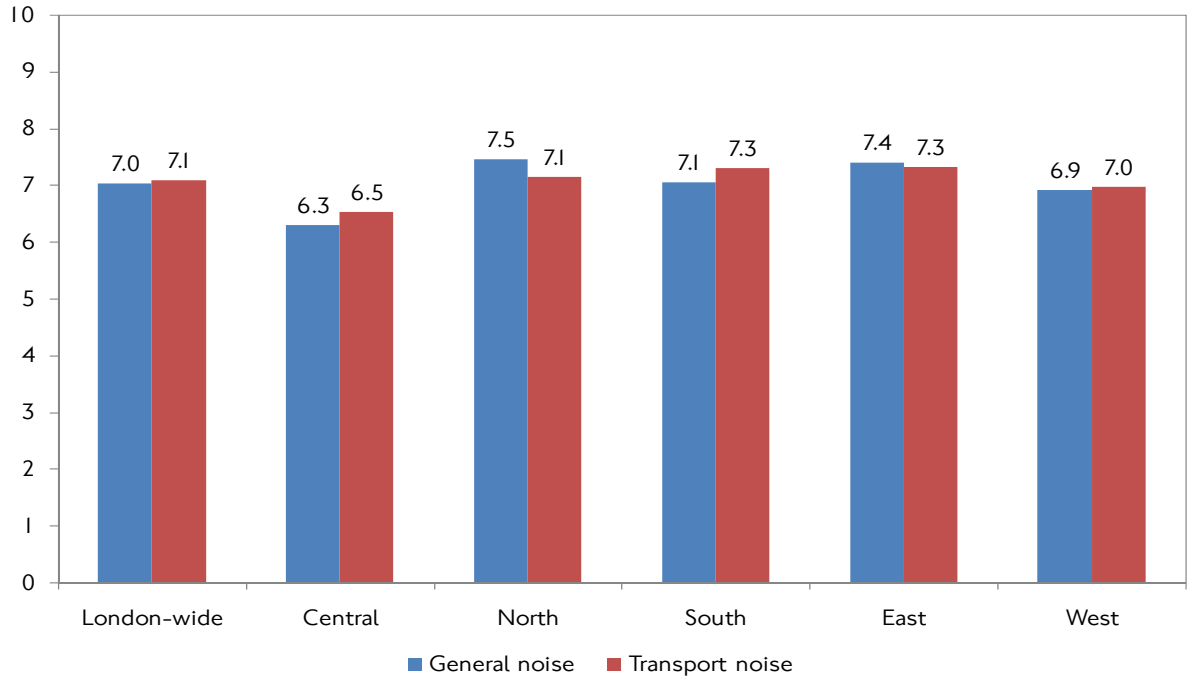


Source: TfL Perceptions of the Travel Environment Survey, July 2010

Perception of noise levels across the London sub-regions

As shown in Figure 9.13, 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 transport noise levels in their local area, however residents in the north sub-region are the most satisfied with general noise levels. This reflects the distribution of noise as shown in the Defra noise map (see Travel in London report 2, Figure 9.39), where higher levels of noise are observed in west London, especially near Heathrow, and near the major roads in north London.

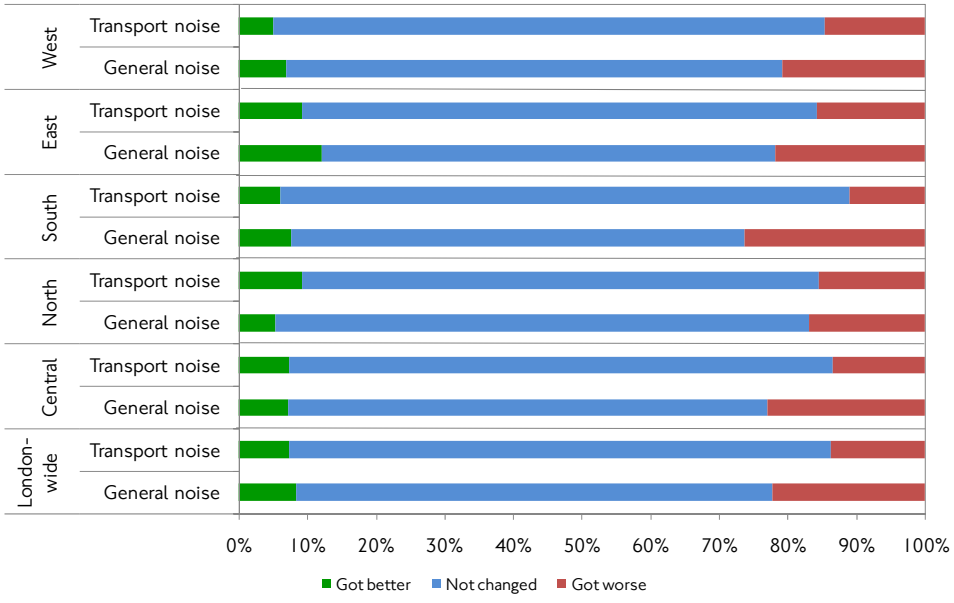
Figure 9.13 Comparison of satisfaction with general noise and noise from transport, residents by sub-region, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

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 9.14, residents of the central and south sub-region were the most likely to say that general noise levels had deteriorated in the past year. These sub-regional residents are also the most likely to consider that transport-related noise levels in their local area have remained the same.

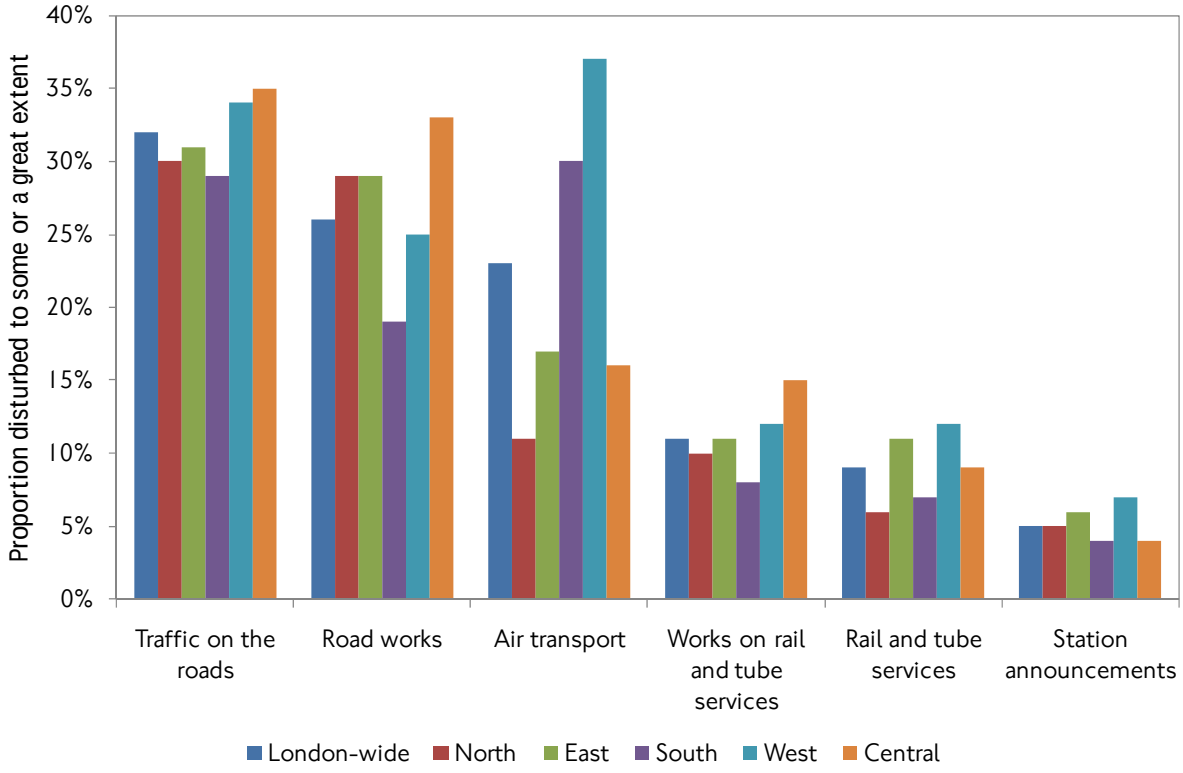
Figure 9.14 Whether general and transport-related noise levels have got better or worse over the past year, residents by sub-region.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

As shown in Figure 9.15 and similarly to last year, residents of the west and south sub-regions were more likely than residents elsewhere to be disturbed by noise from air transport, reflecting the locations of Heathrow and Gatwick airports. Again similarly to 2009 residents from the west and central sub-regions were the most likely to be disturbed by traffic on the roads, however across all sub-regions this has decreased slightly from 2009.

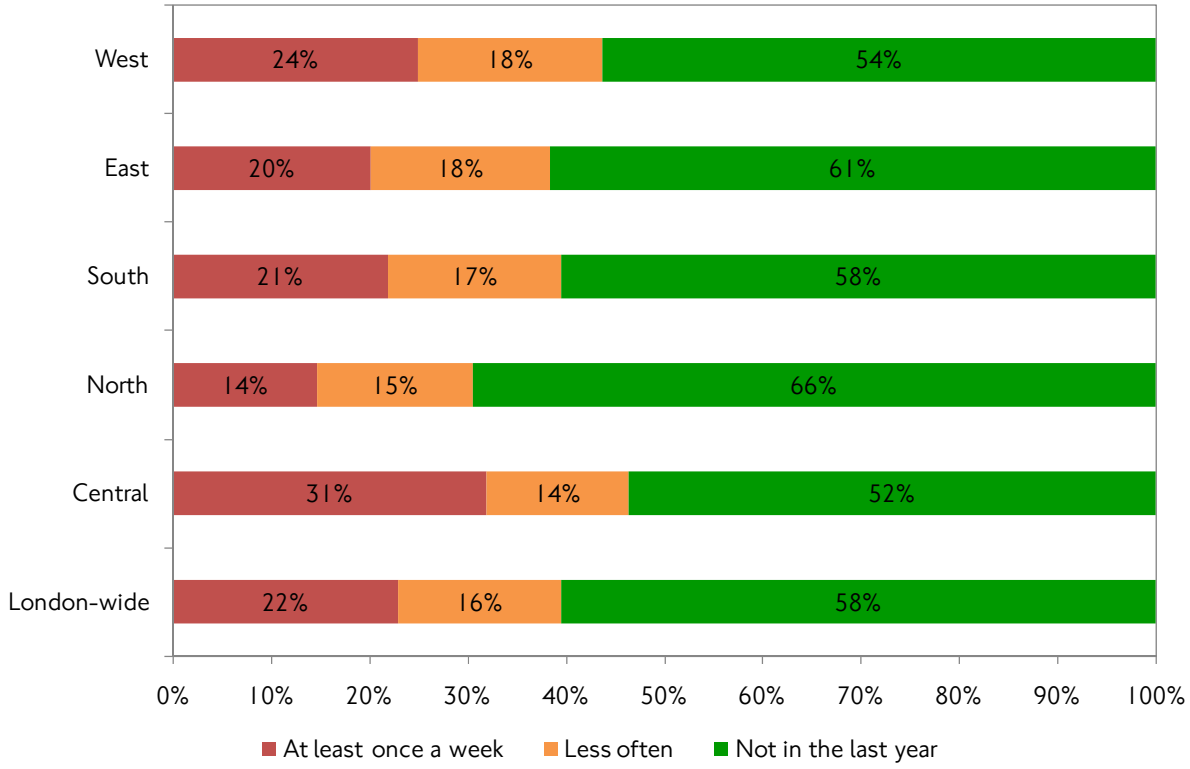
Figure 9.15 Sleep disturbance caused by noise from transport, residents by sub-region, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

Figure 9.16 shows that residents of central London were significantly more likely to say that noise from transport caused sleep disturbance (31 per cent compared to 22 per cent London-wide). Compared to 2009 there has been a reduction in the number of residents of the west sub-region saying that their sleep has been disturbed by noise from transport in the past year (42 per cent compared to 46 per cent), however of this the number of people who experience sleep disturbance at least once a week has slightly increased (24 per cent compared to 23 per cent).

Figure 9.16 Frequency of sleep disturbance caused by noise from transport, residents by sub-region, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

10. Transport and quality of life: customer satisfaction and perception

10.1 Introduction

This chapter looks across a range of perception/satisfaction-based indicators relating to aspects of the quality of transport in London. Three of these directly service MTS Strategic Outcome Indicators, relating to: the perception of journey experience, the perception of the urban realm and road user customer satisfaction.

This material originates from the same suite of surveys that also produce similar customer satisfaction/perception-based indicators relating to satisfaction with crowding on public transport (see section 4.16 of this report), and perception of transport-related noise (see section 9.11).

10.2 Measuring transport and quality of life

Transport has a fundamental impact on overall 'quality of life' as perceived by those who travel around the Capital - whether in facilitating ready access to opportunities and services, providing an acceptable and safe travel environment, or enhancing the built and natural environment. Although 'quality of life' may mean different things to different people, the Mayor has made it a particular priority to improve the quality of Londoners' overall daily travel experiences. The 'substantive outcomes' of these policies should be visible, in due course, in the various formal and informal performance measures considered elsewhere in this report, for example in more reliable journey times on the roads and on public transport. However, these do not themselves shed light on the extent to which the enhancements are appropriate for Londoners, in terms of their expectations and priorities, and consequently the extent to which people actually perceive a contribution from better transport to improving their overall quality of life.

TfL surveys of customer satisfaction and perception

Customer satisfaction data in this section are derived from a series of established TfL surveys exploring satisfaction with public transport and the road network, together with a new survey, now in its second year, probing aspects of people's perceptions of journey experience and the urban realm. In all cases, survey respondents have been asked to rate their satisfaction with the measure in question on a scale from 1 to 10, with 10 representing 'extremely satisfied'.

These scores have been converted to a mean score out of 100. TfL has carried out customer satisfaction research over many years and has developed an understanding of how to interpret these scores, albeit semi-subjective and open to different interpretation by different people. TfL's interpretation, as shown in Table 10.1, should therefore be regarded as indicative only. The main interest lies in assessing trends in the scores over time, and in comparing scores for one aspect against another.

Table 10.1 TfL's 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

These surveys provide the data for six MTS Strategic Outcome Indicators, four of which are dealt with in this chapter:

- Public transport customer satisfaction
- Road user customer satisfaction
- Perception of journey experience
- Perception of the urban realm
- Perception of transport-related noise (section 9.11 of this report)
- Satisfaction with levels of public transport crowding (section 4.6 of this report).

10.3 MTS Strategic Outcome Indicator: public transport customer satisfaction

Definition of indicator

This indicator is derived from customer satisfaction surveys carried out with travellers on the major modes of public transport managed by TfL. Survey respondents have been asked to rate their overall satisfaction with the service provided on a scale of 0 to 10, with 10 being extremely satisfied. Responses have been converted to a mean score out of 100 and a composite measure created by combining modal results based on the mode share, as shown in Table 10.2.

Measures of public transport customer satisfaction should be understood alongside quantitative measures of the operation of public transport services and satisfaction with crowding, as discussed in chapter 4 of this report.

Value for 2009/10 financial year and comparison with value for 2008/09

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 79 out of 100 in 2009/10. This compares to a score of 80 out of 100 in 2008/09. Despite the small drop overall, this change cannot be considered significant and is largely accounted for by a small drop in the overall satisfaction of bus users, from 80 in 2008/09 to 79 in 2009/10. In general TfL considers a score of between 70 and 79 in satisfaction surveys to be 'fairly good'.

Table 10.2 summarises satisfaction with the overall operation of the service for the major public transport modes separately and in aggregate. The table also presents data on the mode share, used as the basis to produce the composite score.

Table 10.2 Summary of customer satisfaction scores and mode share for principal public transport modes, 2009/10.

Mode	Overall customer satisfaction score (out of 100)	Annual journey stages (millions)	Relative weight (per cent)
Bus	79	2,257	65%
Underground	79	1,065	31%
DLR	80	69	2%
Overground	73	35	1%
Tramlink	86	26	1%
Total	79	3,452	100%

Source: TfL modal customer satisfaction surveys; mode share based upon journey stage estimates as shown in Table 2.6 of this report.

Assessment of recent trend

With only two years of data to compare, it is not yet possible to discern a clear trend in the overall level of satisfaction with the major public transport modes in London. Nevertheless, the modal scores demonstrate that levels of customer satisfaction remain fairly stable across most modes, within a longer term trend of gradual improvement.

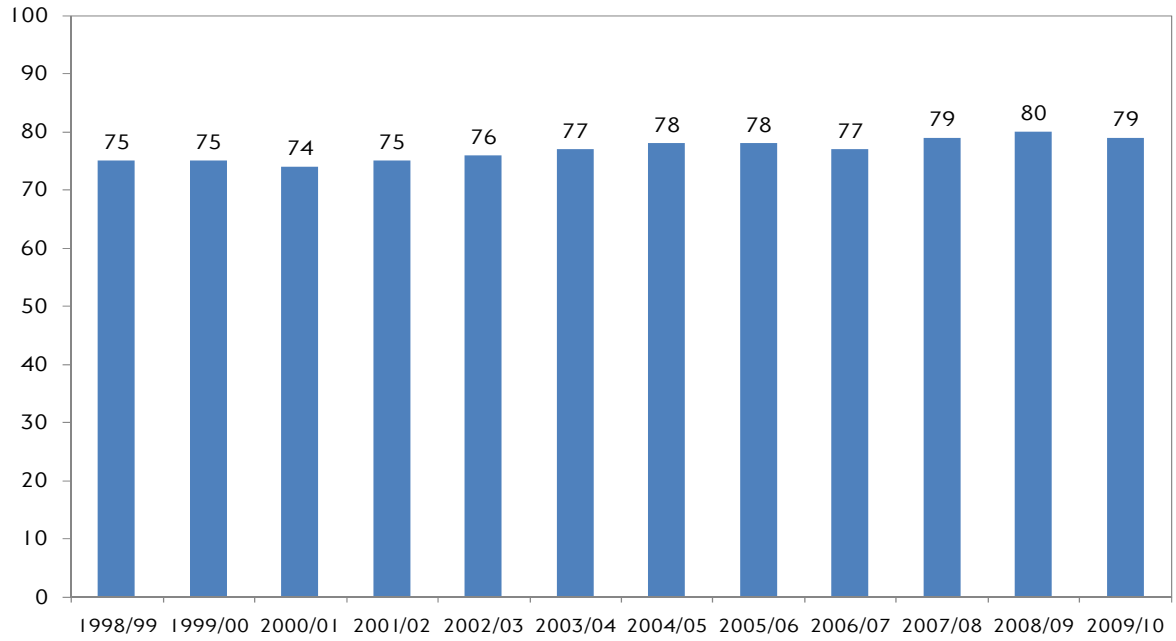
10.4 Public transport customer satisfaction

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 aspects of customer satisfaction with the most used public transport services in London, specifically buses, Underground and Overground rail services, the DLR, and Tramlink. Data relates to surveys carried out during 2009/10.

Customer satisfaction with London bus services

The mean score for satisfaction with bus journeys in London was 79 out of 100 in 2009/10. This is considered to be a 'fairly good' score. Figure 10.1 shows that customer satisfaction has increased at a fairly steady rate over the past decade and although there was a small decrease in 2009/10 in relation to the previous year, this is not considered to be significant or represent a change in trend.

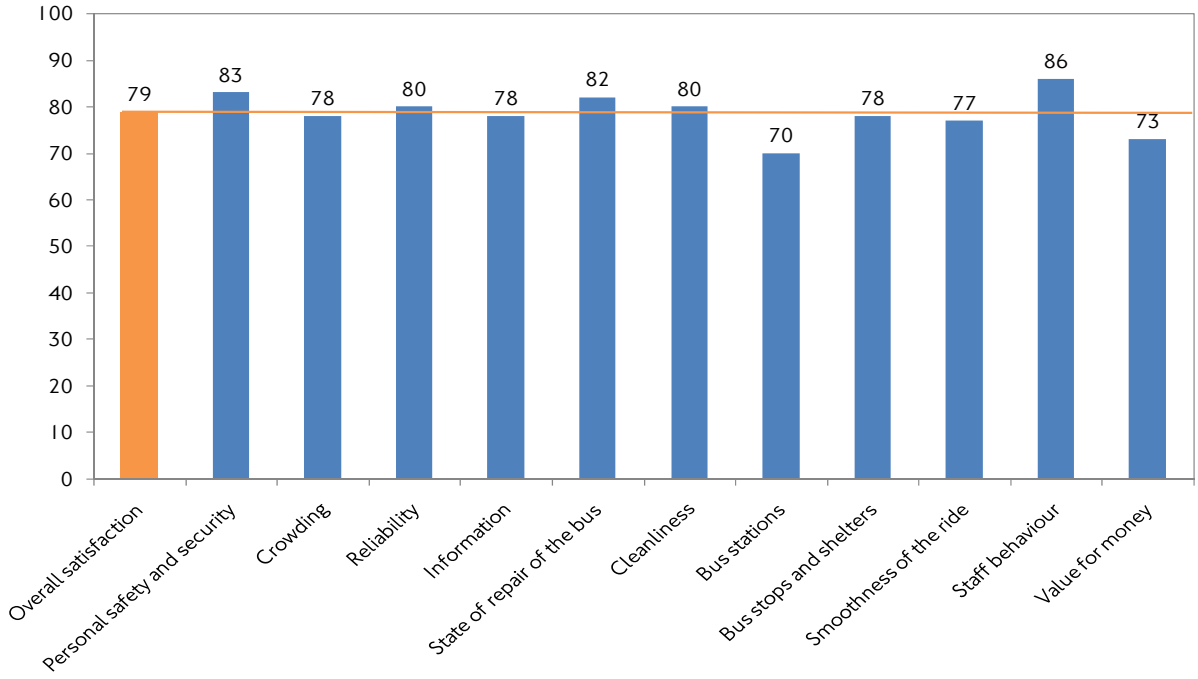
Figure 10.1 Overall satisfaction of bus passengers with their journey, 1998/99 to 2009/10.



Source: TfL London Buses Customer Satisfaction Surveys, 1998 - 2010.

As shown in Figure 10.2, which looks at satisfaction with different aspects of bus services, bus passengers were most satisfied with staff behaviour and personal safety and security. They were least satisfied with bus stations and the value for money of the service. These are the same aspects that bus passengers were most and least satisfied with in 2008/09, in fact there has been very little change in the ranking of the aspects in terms of satisfaction between the most recent two years.

Figure 10.2 Satisfaction of bus passengers with aspects of their bus journeys.

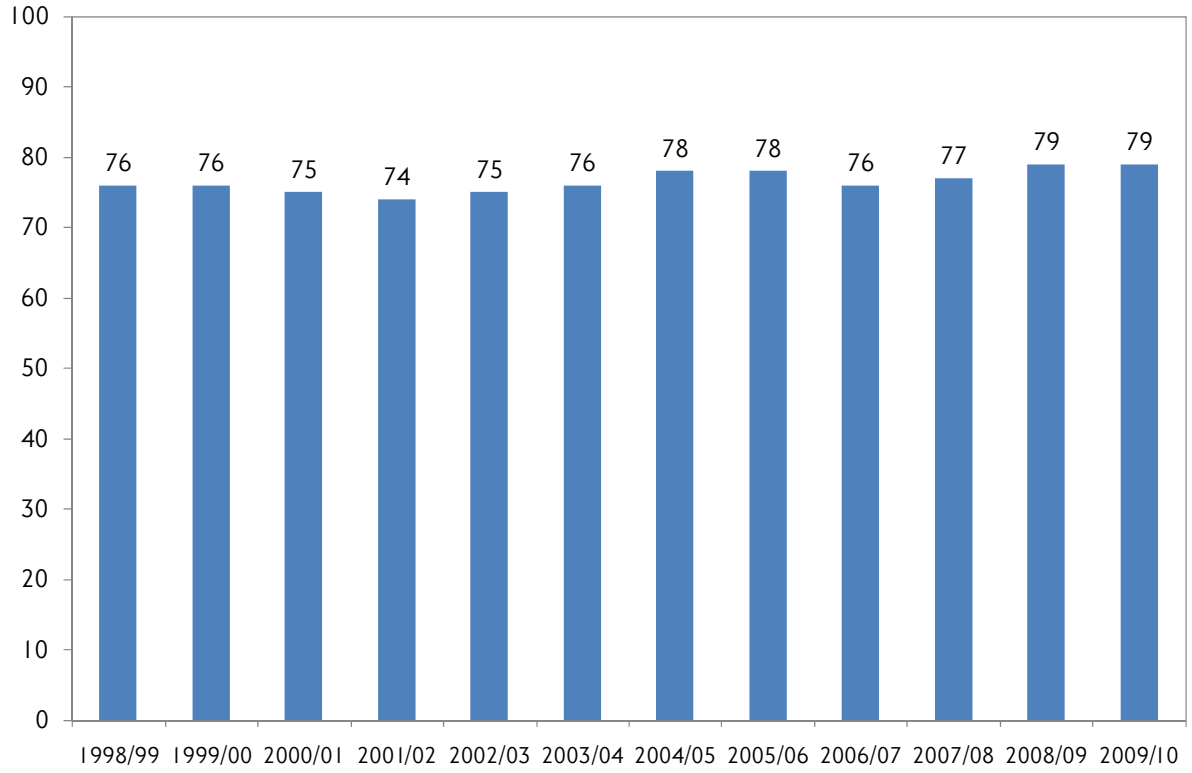


Source: TfL London Buses Customer Satisfaction Survey 2009/10.

Customer satisfaction with London Underground services

The mean score for satisfaction with Underground journeys in London was 79 out of 100 in 2009/10. This is consistent with the score for the previous year and is equivalent to the highest ever level achieved for satisfaction with London Underground services. Figure 10.3 shows overall satisfaction scores for the period 1998/99 to 2009/10.

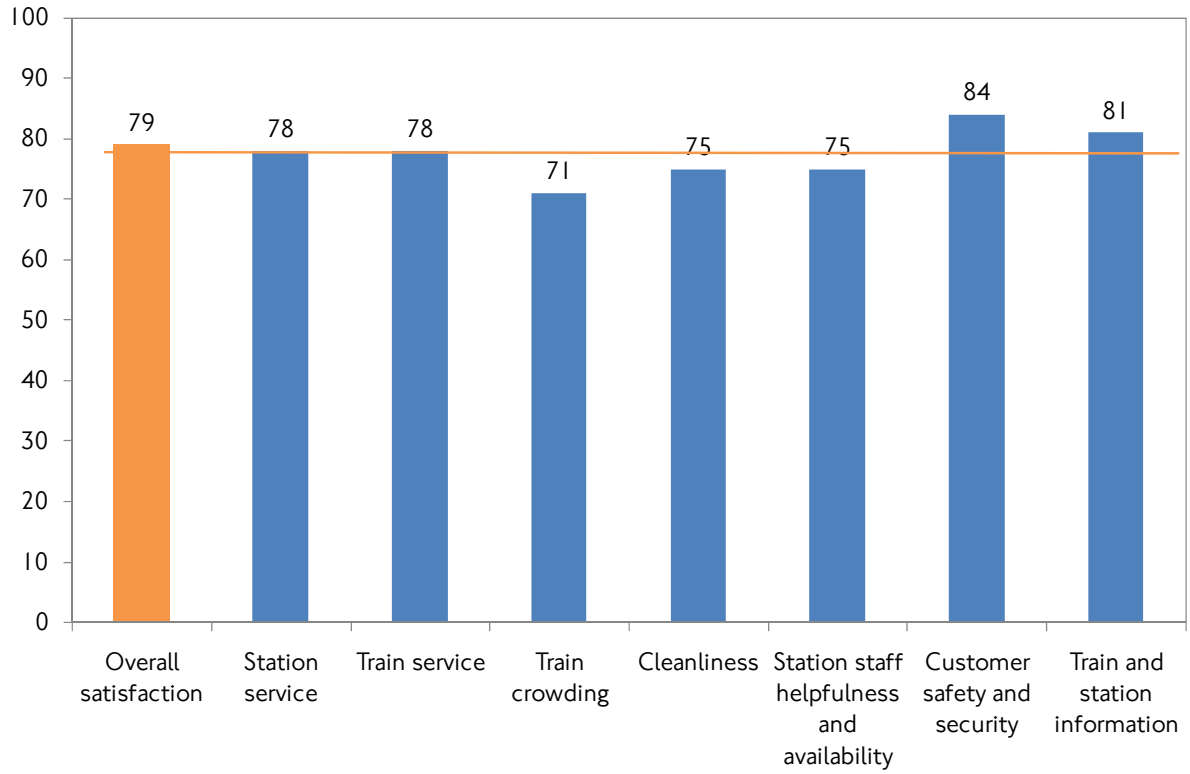
Figure 10.3 Overall satisfaction of Underground passengers with their journey, 1998/99 to 2009/2010.



Source: TfL London Underground Customer Satisfaction Surveys 1998-2009.

Figure 10.4 shows satisfaction of Underground passengers with aspects of the service. Underground passengers are most satisfied with safety and security (score of 84 out of 100). The aspect that Underground passengers were least satisfied with was train crowding (score 71 out of 100). There has been very little change in the level of satisfaction with different aspects of the service in recent years. However, there was a decrease in satisfaction with station staff helpfulness and availability, from 78 last year to 75 this year. This is still considered to be a 'fairly good' score by TfL.

Figure 10.4 Satisfaction of London Underground passengers with aspects of their journey, 2009/10.

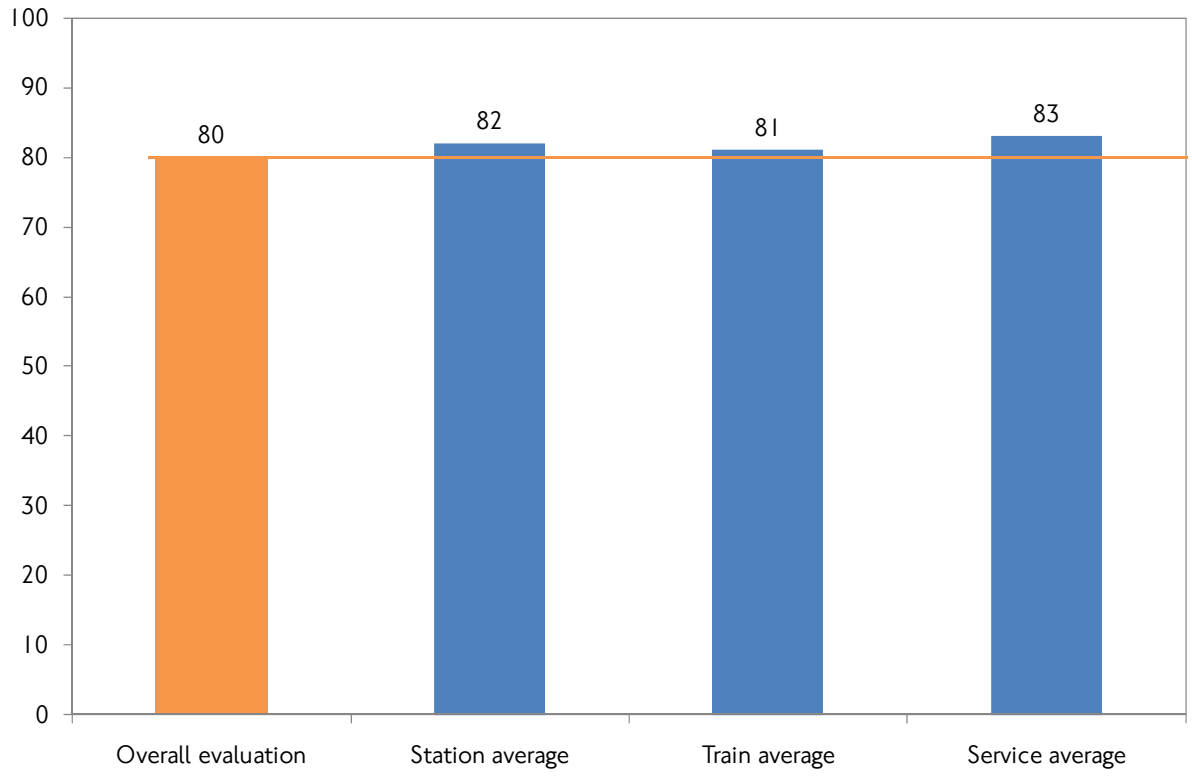


Source: TfL London Underground Customer Satisfaction Survey 2009/2010.

Customer satisfaction with the DLR

This is the second year of the DLR continuous customer satisfaction survey. The mean score for satisfaction with DLR journeys was 80 out of 100 in 2009/10. This is considered a 'good' score according to Tfl's norms, and is similar to the score in the previous year (79 out of 100). Note that this is only the second year that the survey has been conducted, so changes should be considered indicative only at this stage. Figure 10.5 shows that level of satisfaction of passengers is fairly consistent across all aspects of the DLR service.

Figure 10.5 Satisfaction of DLR passengers with aspects of their journey, 2009/10.

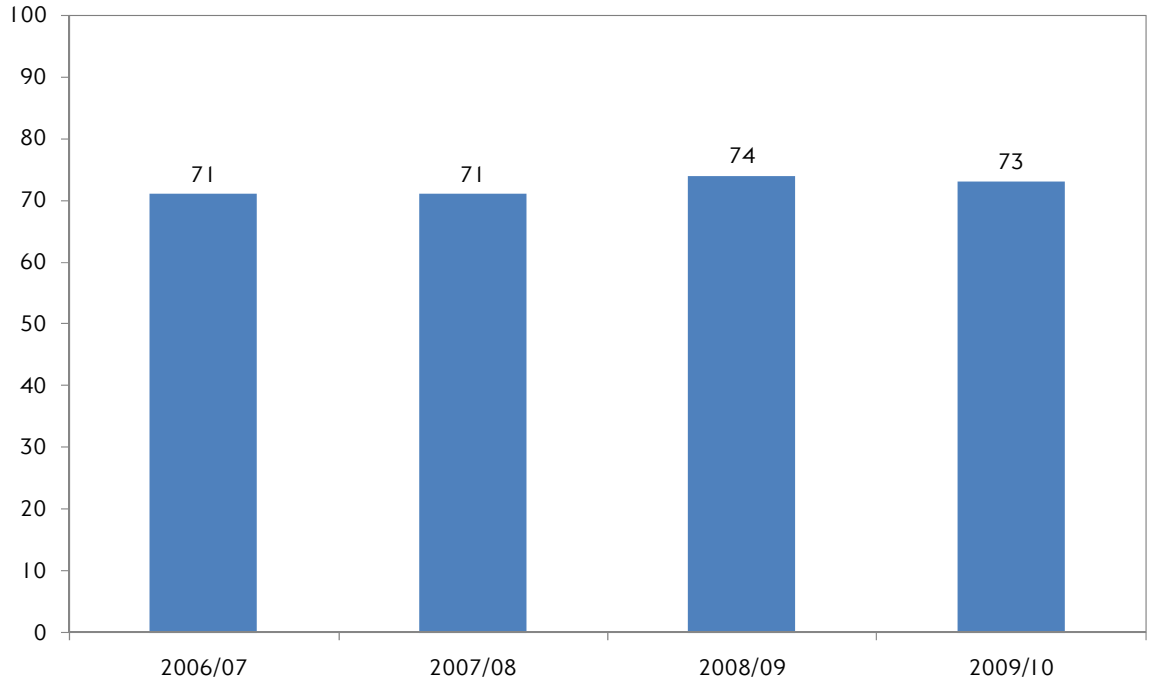


Source: TfL DLR Customer Satisfaction Survey 2009/2010.

Customer satisfaction with London Overground services

The mean score for satisfaction with London Overground journeys in London was 73 out of 100 in 2009/10; this is considered to be a 'fairly good' score. Although there has been a small decrease in satisfaction compared to the previous year, this may simply reflect normal year-on-year variation in the survey sample or be a reaction to the closures for extensive upgrade work in the last year; and it is too early to determine any trend. Figure 10.6 shows overall satisfaction with Overground journeys between 2006/07 and 2009/10. It shows that over the period since the start of the London Overground concession satisfaction levels have increased. The current enhancement programme delivers new trains and higher frequency, and this is expected to lead to increased customer satisfaction over time.

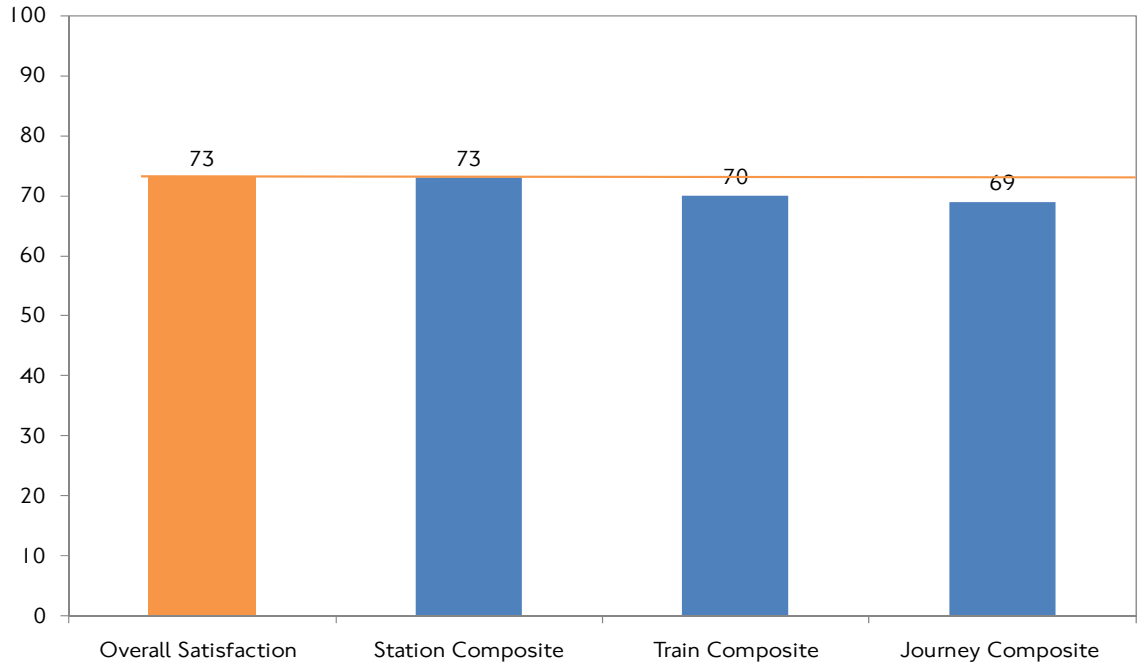
Figure 10.6 Overall satisfaction of Overground passengers with their journey, 2006/07 to 2009/10.



Source: TfL London Overground Customer Satisfaction Surveys, 2006 - 2010.

London Overground passengers are more satisfied with the service provided at stations than with services on the train or during their journey, although the gap between levels of satisfaction with these aspects has reduced over the past year.

Figure 10.7 Satisfaction of London Overground passengers with aspects of their journey, 2009/10.

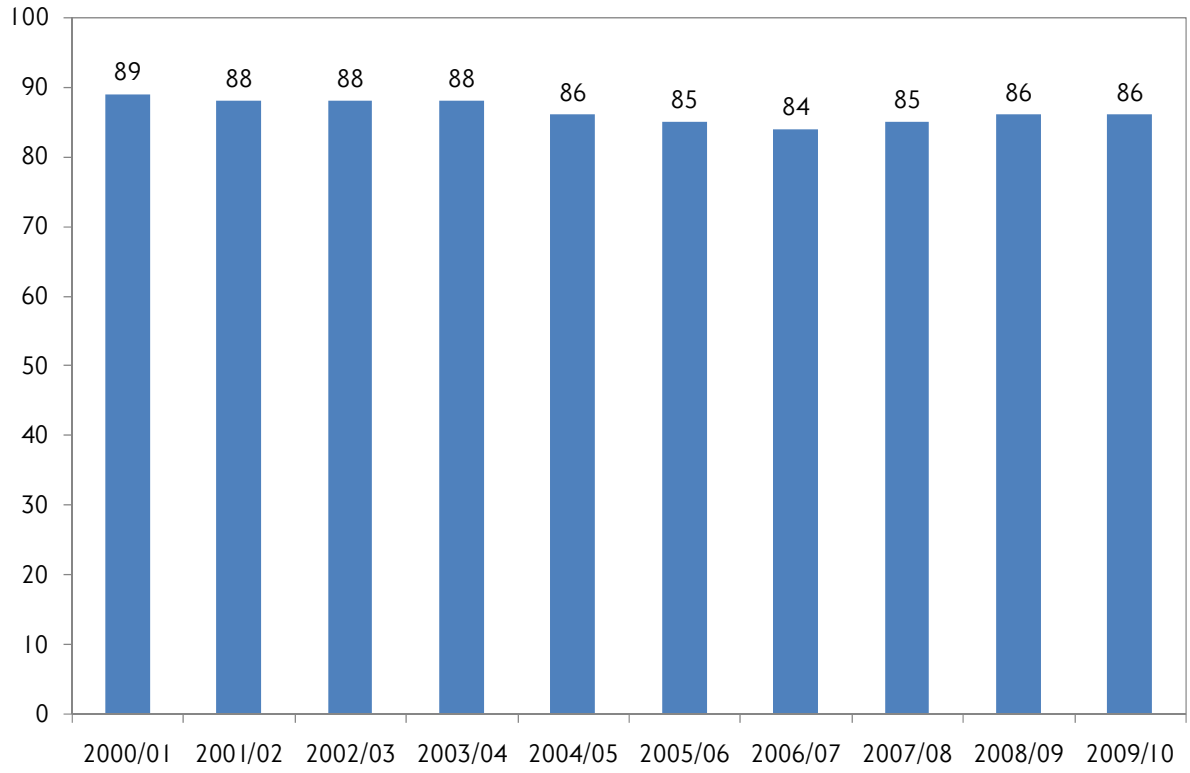


Source: TfL London Overground Customer Satisfaction Survey 2009/10.
Note that only respondents who joined their train at a London Overground station are asked about their satisfaction with the station

Customer satisfaction with London Tramlink services

The mean score for satisfaction with Tramlink journeys was 86 out of 100 in 2010. This is consistent with the score from the previous year and is considered to be 'very good' according to TfL's norms. Overall satisfaction scores for the period 2000/01 to 2009/10 are shown in Figure 10.8.

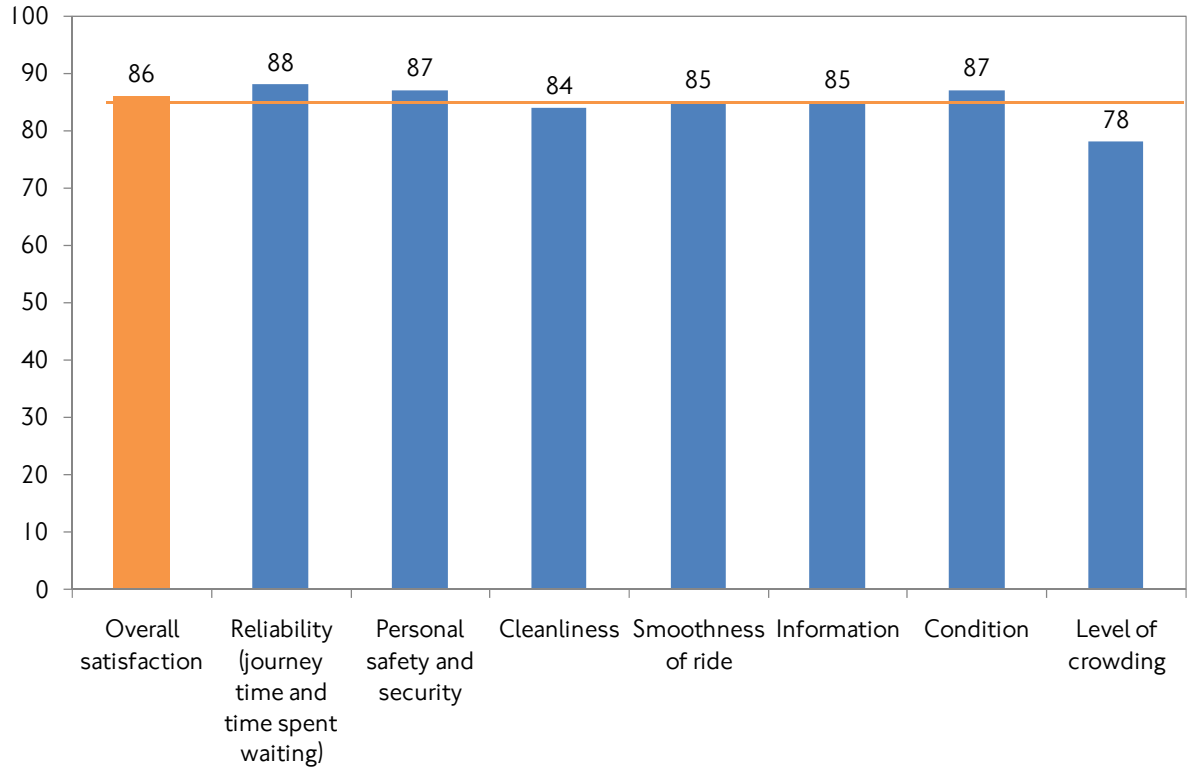
Figure 10.8 Overall satisfaction of Tramlink passengers with their journey, 2000/01 to 2009/10.



Source: TfL Tramlink Customer Satisfaction Surveys 2000 - 2010.

Satisfaction with different aspects of the Tramlink service is generally very high, with scores between 78 and 88 out of 100 as shown in Figure 10.9. The aspect of the service passengers are least satisfied with is crowding (78 out of 100) although satisfaction has increased from the previous year and is considered by TfL to be 'fairly good'. Tramlink passengers were most satisfied with the reliability of the journey (88 out of 100, which is the same score as last year), their personal safety and security and the condition of facilities (both scoring 87 out of 100).

Figure 10.9 Satisfaction of Tramlink passengers with aspects of their journey, 2009/10.



Source: TfL Tramlink Customer Satisfaction Survey 2009/10.

10.5 MTS Strategic Outcome Indicator: road user satisfaction

Definition of indicator

This indicator is defined as satisfaction of London residents with the operation of the Transport for London Road Network (TLRN), including those who travel on key Red Routes by car (as driver), bus, cycle, motorcycle, commercial vehicle and as a pedestrian.

A new survey is under development and it is anticipated that data will be published in Travel in London report 4. This will be presented alongside contextual data from the new and existing TfL surveys.

10.6 Road user customer satisfaction

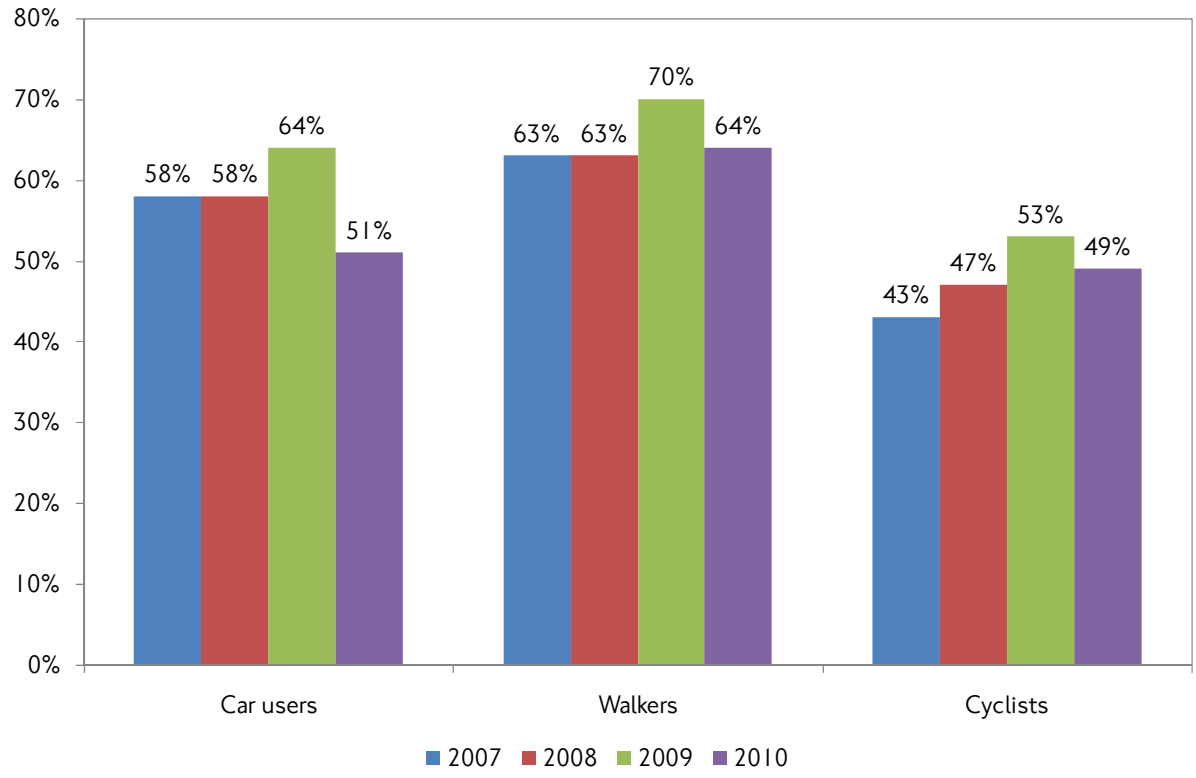
This section describes satisfaction with the operation of the road network in London. All data relate to the financial year 2009/10 and are derived from TfL's Street Management Customer Satisfaction Survey. The methodology used is consistent with that described in Travel in London report 2. In Travel in London report 2 the TLRN customer satisfaction survey was also described. The TLRN customer satisfaction survey was not conducted during this financial year so the latest customer satisfaction results for the TLRN are those reported in Travel in London report 2.

Satisfaction with the quality of London's streets and pavements

Overall, satisfaction with streets and pavements has decreased in the last year following a large increase in 2009, as shown in Figure 10.10. The chart seems to

show that the results for 2009 were unusually high, and that the results this year have normalised back to previous trends. Walkers' satisfaction with streets and pavements seems to be constant since 2007 (with the exception of 2009 being unusually high). Cyclists' satisfaction with streets and pavements has been increasing steadily since 2007. However, car users' satisfaction with streets and pavements has decreased since 2008.

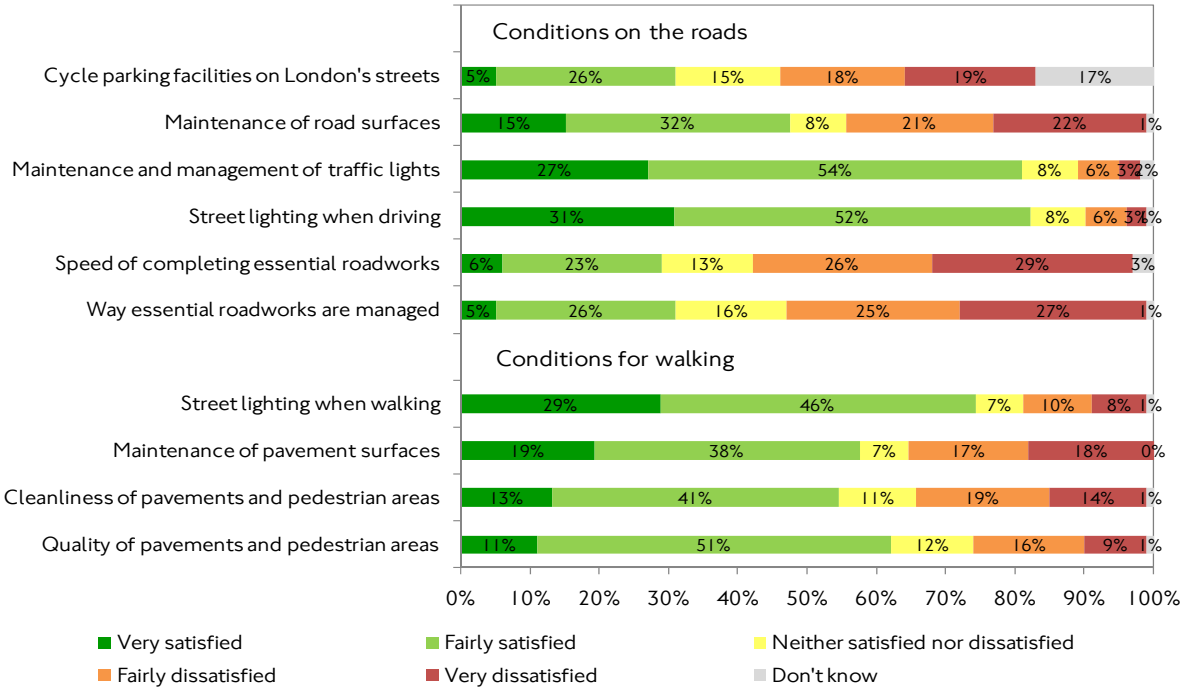
Figure 10.10 Overall satisfaction with streets and pavements, by road user type, London residents, 2006/07-2009/10.



Source: TfL Streets Management Customer Satisfaction Survey 2007 - 2010.

Figure 10.11 shows the satisfaction of London residents with aspects of streets and pavements. It is evident that there have been significant reductions in the proportion of road users reporting that they are satisfied with both the maintenance of the road surfaces and the way road works are managed. This may be linked to the decrease seen in car user satisfaction. The severe weather conditions of winter 2009/10 led to a reduction in the quality of the road surface across the whole of London which led to a higher number of works also being required. For pedestrian road users, there has been a decrease in the proportion saying that they are either 'very' or 'fairly' satisfied with the maintenance of pavement surfaces and a similar decrease in satisfaction with the quality of pavements, which may also have been affected by the severe weather.

Figure 10.11 London residents' satisfaction with aspects of streets and pavements, 2010.

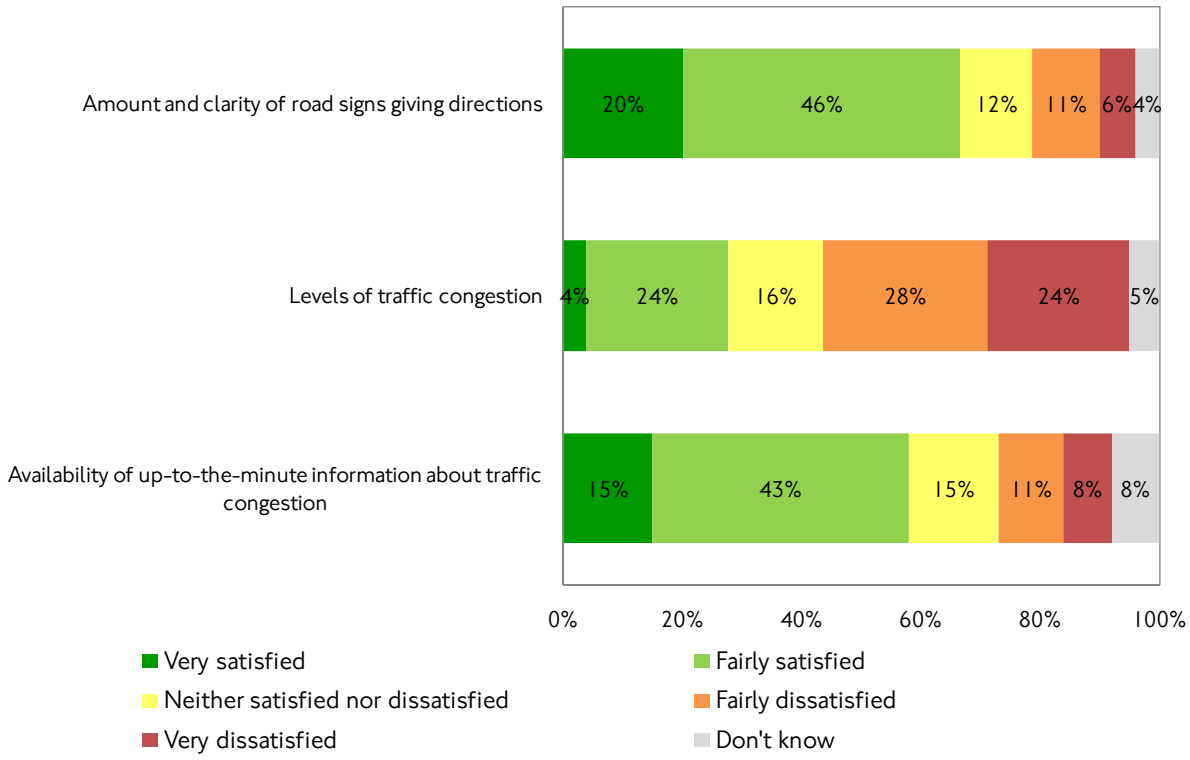


Source: TfL Streets Management Customer Satisfaction Survey 2010.

Satisfaction with the travel experience on London's streets

Figure 10.12 shows London residents' satisfaction with aspects of the travel experience on London's streets. There has been little change in the level of satisfaction since the previous year. The proportion of respondents reporting that they are very or fairly satisfied with the availability of up-to-the-minute information about traffic congestion has decreased by four percentage points since the previous year to 58 per cent.

Figure 10.12 London residents' satisfaction with aspects of the travel experience on London's streets, 2010.



Source: TfL Streets Management Customer Satisfaction 2010.

10.7 MTS Strategic Outcome Indicator: perception of journey experience

Definition of indicator

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 TfL's Perceptions of the Travel Environment survey. The survey was carried out in November 2009 and in June/July 2010, and will be carried out on an annual basis in the summer of each year from 2011. The survey consists of telephone interviews with a representative sample of 1,000 London residents selected randomly within each household sampled.

The indicator should be considered in the light of measures of satisfaction with individual modes and with public and road transport overall. Account should also be taken of perceptions of journey experience on the respondents' last journey, which tend in these surveys to be more positive than their evaluation of overall journey experience.

Value for 2010 calendar year and comparison with value for 2009

The mean score for satisfaction with travelling in London was 66 out of 100 in 2010, compared to a score of 64 out of 100 in 2009. Despite the slight increase in score, the change cannot be considered significant. In general TfL considers a score of between 65 and 69 in satisfaction surveys to reflect a 'fair' level of satisfaction overall.

Assessment of recent trend

The survey providing this indicator was established in 2009 and it is therefore too early to draw any conclusions about a trend in the perception of journey experience. There has been no significant change in the level of satisfaction between 2009 and 2010.

10.8 Perception of journey experience

The previous sections have considered the experience of travellers on a modal basis. However, 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.

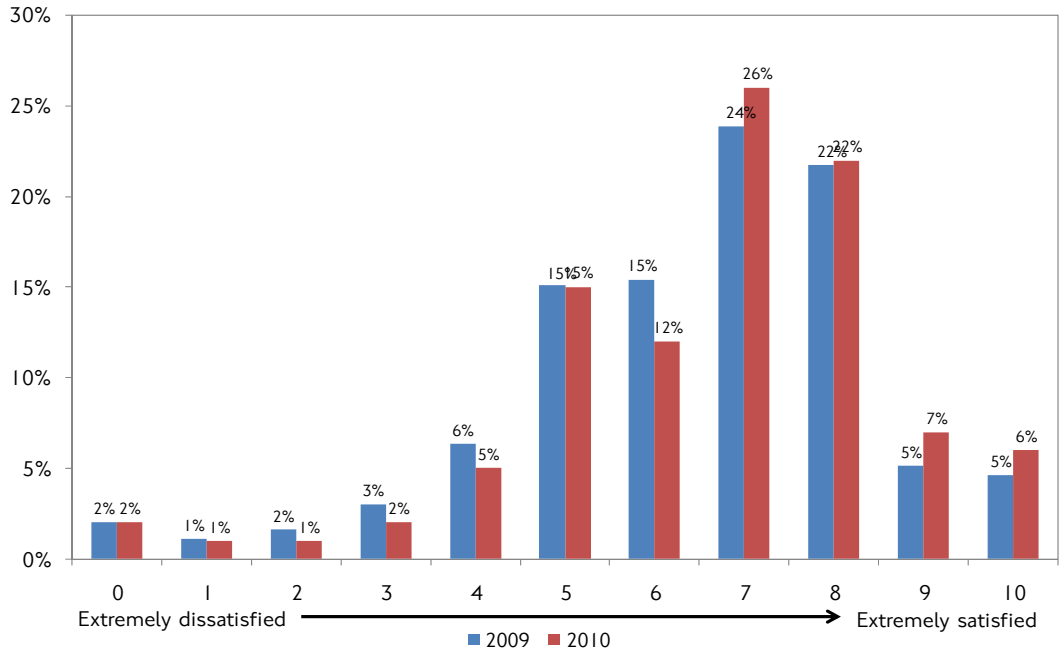
Note that modal customer satisfaction surveys are carried out with all travellers on that mode, including both residents and non-residents, however the Perceptions of the Travel Environment survey only includes London residents. Care should therefore be taken in comparing the findings between surveys.

The methodology used for perception of journey experience has changed slightly since Travel in London report 2. Additional qualitative research has been carried out to inform the interpretation of the findings of this section. Thirty qualitative in-depth interviews were conducted by telephone, among a sample of regular users of transport in London and included a mix of bus, Underground and train users, car drivers, cyclists and walkers. A new section of the survey has also been included looking at journey experience for the most recent journey made. This addresses a known issue with these surveys, that customers do not tend to consider car, walking and cycling trips when thinking about travel in London (as confirmed by qualitative research findings). The rest of the methodology is consistent to that used in Travel in London report 2.

Perception of overall journey experience

As described above, the mean score for satisfaction with journey experience while travelling in London was 66 out of 100, a slight increase from last year (64 out of 100). Figure 10.13 compares the distribution of scores in 2009 and 2010, on a scale of zero to 10. The proportion of Londoners who are very satisfied with travelling in London has risen since 2009 (by 3 percentage points). Although this is a statistically significant difference, the increase may have been influenced by a seasonal factor as the previous year's study was completed in November, as compared to June this year.

Figure 10.13 London residents' satisfaction with journey experience when travelling in London, 2008/09 to 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

Consistent with 2009, London residents commonly mentioned the main modes of public transport as being both the 'most' and 'least' satisfactory aspects of travelling in London. Although respondents are asked to consider all elements of travelling around London they do tend to focus on public transport even if they are regular car users and therefore their experience of public transport, however limited, is likely to be the main driver of their score.

Other than the main public transport modes, the aspects of travel in London that residents were most likely to highlight as reasons for satisfaction included: the regularity and frequency of services (17 per cent), punctuality of services (6 per cent) and ease and convenience of travelling in London (6 per cent).

In terms of the aspects of travel in London that were most often raised as sources of dissatisfaction, there has been no significant change since the previous year. The aspects of travel that residents most commonly referred to as causes of dissatisfaction, other than the main public transport mode, were crowding (17 per cent), engineering works (12 per cent), delays and disruptions, the cost of fares and congestion on the road network (all 10 per cent) and poor frequency of services (7 per cent).

Whether journey experience has got better or worse over the past year

There was little change in London residents' perception of the change in journey experience over the most recent year. London residents were more likely to say that travelling in London has 'got better' rather than 'worse' over the past year (29 per cent compared to 21 per cent) and nearly half considered that the travel experience had remained the same (47 per cent). This is consistent with London residents' perception of change when surveyed last year.

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 services (18 per cent), on increased frequency of services (14 per cent) and more punctual services (12 per cent). Those who felt travelling in London had worsened were most likely to say this was because of overcrowded services (24 per cent), delays and disruptions (21 per cent), increased congestion or traffic on the roads (15 per cent) and the cost of fares and fare increases (13 per cent).

Perception of most recent journey experience

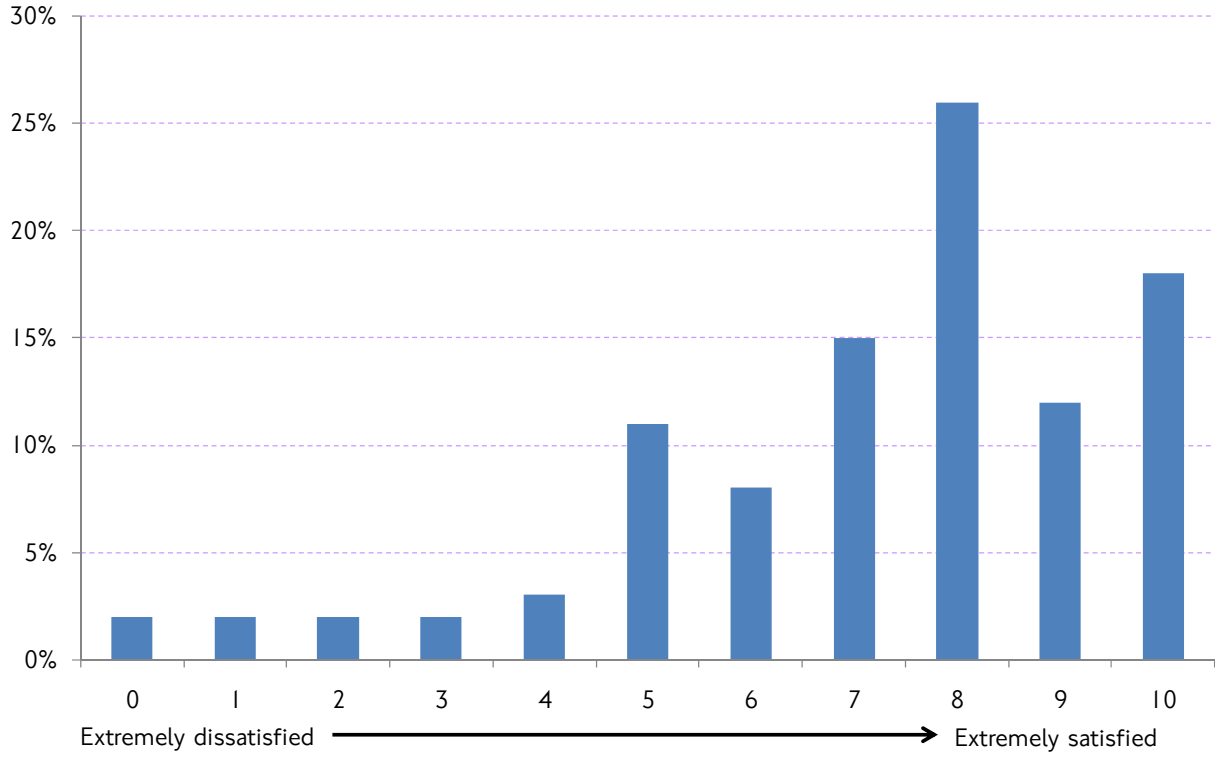
This year London residents were asked how satisfied they were with their most recent journey experience. The in-depth qualitative research described below shows that customers' perception of journey experience is more influenced by their most negative experiences. So, when people are asked about their overall journey experience the response is likely to be more negative than when asked about a specific journey. Therefore, this question has been included in the survey to give a more in-depth understanding of customers' perception of journey experience.

The mean score for satisfaction with the most recent journey experience was 72 out of 100. This score is considered to be 'fairly good' and compares to 66 out of 100 for satisfaction with overall journey experience. As this is the first year that the question has been asked, it is not possible to compare against results from previous years.

When asked which aspects of their most recent journey experience people were most satisfied with, the most commonly cited reasons were: that they arrived on time (25 per cent), that the roads were clear (12 per cent) and that the journey time was short (12 per cent). For the aspects of their most recent journey experience that people were least satisfied with, the most commonly cited reasons were: overcrowded transport (11 per cent), congested roads (11 per cent), and poor punctuality (9 per cent).

London residents whose main mode of transport for their last journey was walking were significantly more likely to be very satisfied compared to those whose main mode was the Underground, bus, train or car. London residents whose journey was under three miles and took place at the weekend were also significantly more likely than average to be very satisfied with their recent journey experience.

Figure 10.14 London residents' satisfaction with most recent journey experience when travelling in London, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010

Understanding the journey experience responses

There appear to be three main influences on the memories customers use to assess their experience when travelling in London; their initial impression of the London transport network when they first used it, their most recent journey experience and significant events which were unusual or had knock-on effects.

Customers form an initial impression of the London transport network when they first use it, and then tend to notice changes from this first use. For example, dissatisfaction with prices appears to stem from respondents who have lived in London for many years and have experienced increases in price over a long period without any perceived equivalent change in the service provided compared to their first impressions. Also, when expectations have been created, customers are more likely to notice and remember things which reinforce them.

Overall satisfaction scores seem to be based on relatively recent experiences and respondents tend not to think further back than two years. Respondents also seem more likely to remember a negative experience which had a significant knock-on impact to the rest of their day, for example, making them late for work or increasing their stress when already late. This in turn has a perhaps disproportionate negative impact on overall levels of satisfaction. Conversely, respondents are far more likely to be satisfied when taking journeys in a relaxed mindset and for leisure purposes where punctuality is less important.

Although respondents are asked to consider all elements of travelling around London when rating their overall satisfaction with journey experience in the city the

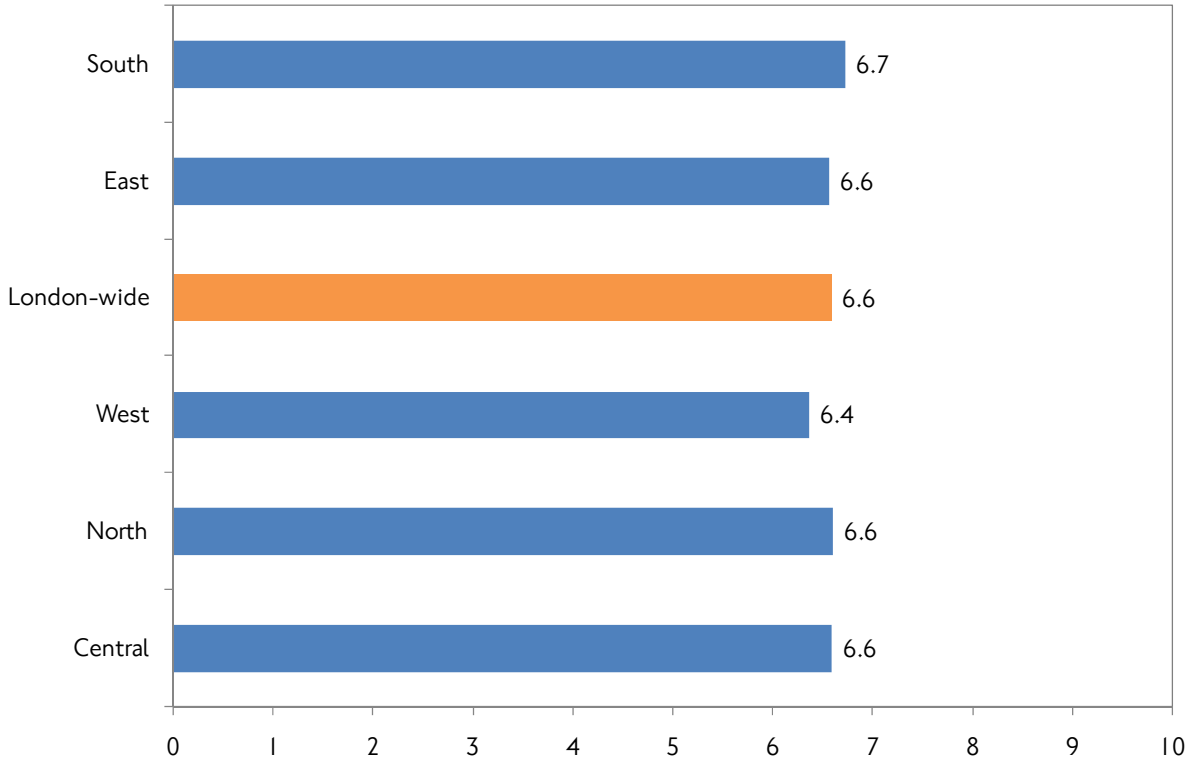
tendency is to focus on public transport even for regular car users. Respondents' experience of their most commonly used form of public transport is largely driving their level of satisfaction with overall journey experience.

For all modes of transport, the price of travel is not always included in initial views on satisfaction, though it can become a strong driver of negative satisfaction if the condition of services is felt to be negative.

Overall journey experience across the London sub-regions

There is not a significant difference in the level of satisfaction with overall journey experience across the sub-regions, shown in Figure 10.15, or in the aspects of journey experience driving satisfaction. The charts below show satisfaction based on the residents of each sub-region.

Figure 10.15 Satisfaction with journey experience when travelling in London, residents by sub-region, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

Residents of the east sub-region were more likely to state that travel in London has improved over the past year (35 per cent compared to 24 to 29 per cent for the other sub-regions); this could be due to the opening of the East London line in May 2010. The Perceptions of Travel Environment Survey was conducted in June 2010 when the opening of the line would have been fresh in respondents' minds. Residents of the north sub-region were more likely to state that travel in London has worsened in the last year (28 per cent compared to 16 to 26 per cent).

10.9 MTS Strategic Outcome Indicator: perception of the urban realm

Definition of indicator

The indicator is defined as the 'level of satisfaction of London residents, on a scale of zero to 10, with the quality of streets, pavements and public spaces in the area where they live'. Responses are converted into a mean score out of 100. The indicator is derived from TfL's Perceptions of the Travel Environment survey, described above.

Value for 2010 calendar year and comparison with value for 2009

The mean score for satisfaction with the quality of streets, pavements and public spaces in London was 64 out of 100 in 2010, compared to a score of 63 out of 100 in 2009. Despite the slight increase in score, the change cannot be considered significant. In general TfL considers a score of between 55 and 64 in satisfaction surveys to be 'fairly poor'.

Assessment of recent trend

The survey providing this indicator was established in 2009 and it is therefore too early to draw any conclusions about a trend in the perception of the urban realm. There was no significant change in the level of satisfaction between 2009 and 2010.

10.10 Perception of the urban realm

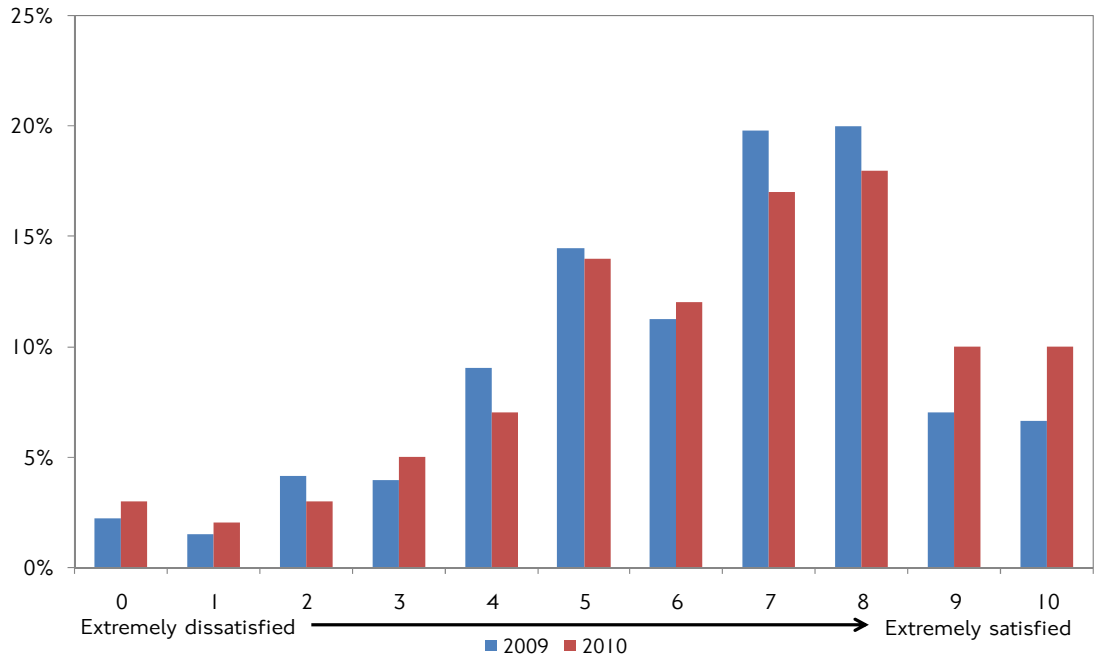
The transport network forms a large part of London's urban realm - roads, streets, and stations are all a part of the urban landscape and their design and maintenance affect the look and feel of the Capital. High-quality public spaces can bring communities and people together, encourage physical activity 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, together with the development of an effective wayfinding system, 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. 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.

Perception of streets, pavements and public spaces

As described above, the mean score for satisfaction with the quality of streets, pavements and public spaces for 2010 was 64 out of 100, a slight improvement on the 2009 score of 63 out of 100. Figure 10.16 shows the distribution of scores, on a scale of zero to 10 for 2009 and 2010.

Figure 10.16 London residents' perception of streets, pavements and public spaces in their local area, 2009 and 2010.

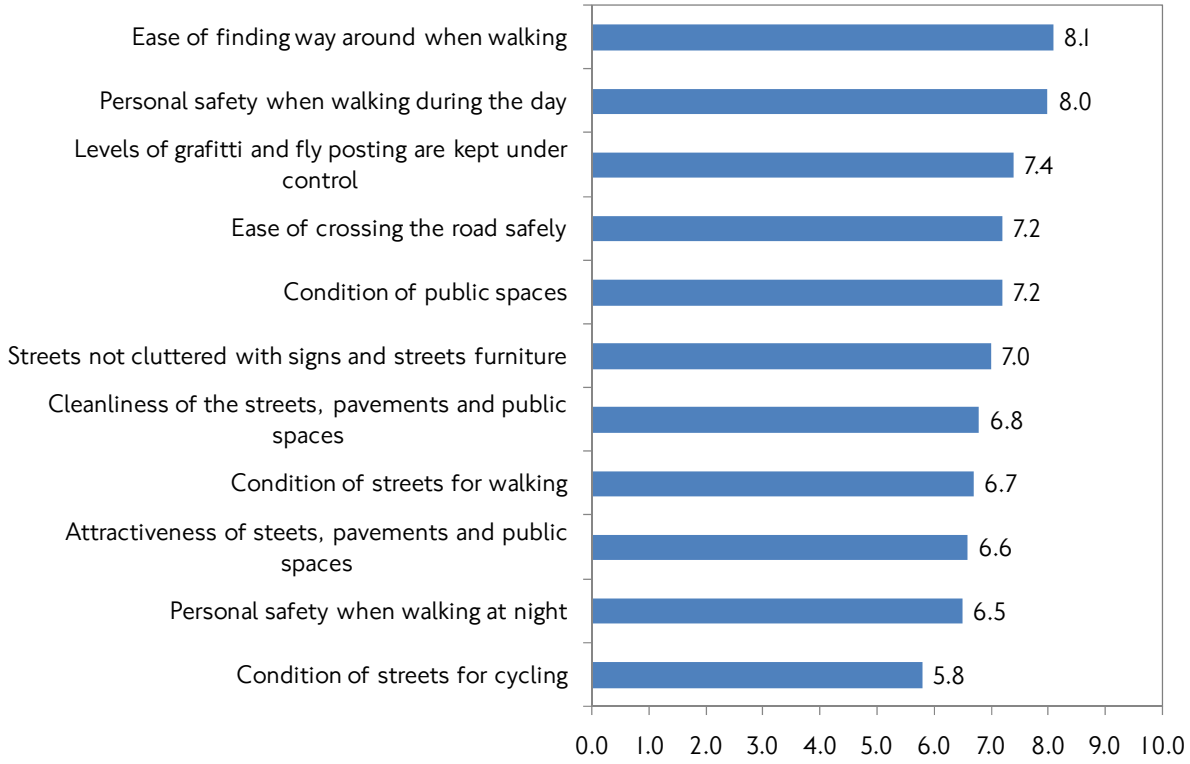


Source: TfL Perceptions of the Travel Environment Survey, November 2009 and July 2010.

Perception of aspects of the urban realm

As shown in Figure 10.17, the aspects of the urban realm that London residents were most satisfied with in their local area were the ease of wayfinding when walking (mean score 8.1) and personal safety when walking during the day (mean score 8.0). This could be related to the roll out of schemes such as Legible London. Conversely, the aspects respondents were least satisfied with were the condition of streets for cycling (mean score 5.8) and personal safety when walking at night (mean score 6.5).

Figure 10.17 London residents' mean satisfaction scores for aspects of the urban realm in local area, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

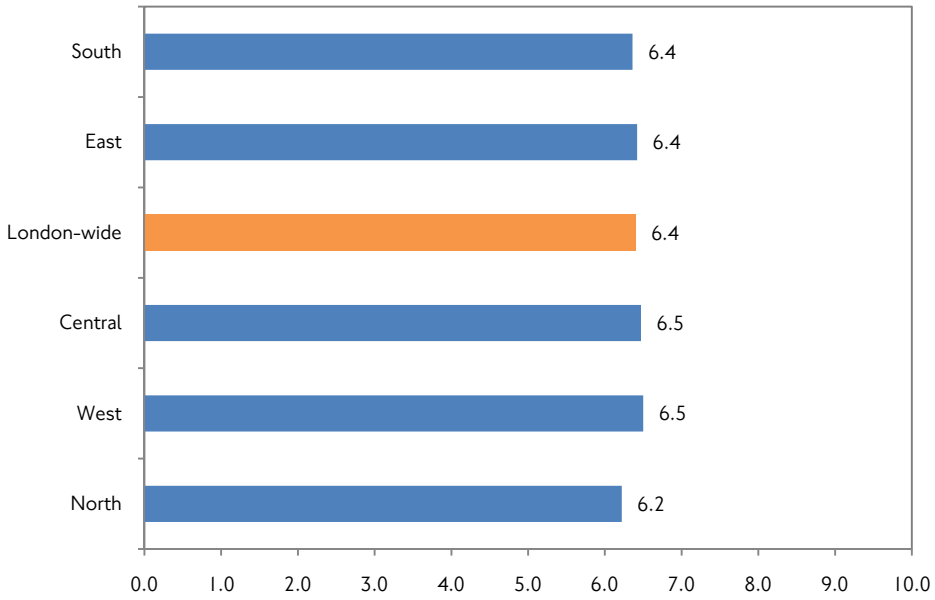
Perception of the urban realm across the London sub-regions

Figure 10.18 shows levels of satisfaction with the quality of the urban realm by residents of each London sub-region. Residents of the central and west sub-regions were most satisfied (mean score of 6.5) and residents of the north sub-region the least satisfied (mean score of 6.2). Compared to 2009, there has been no significant change in the level of satisfaction across London as a whole or in the sub-regions.

Across most sub-regions around 7 in 10 respondents think that the quality of the urban realm has improved or remained the same over the past year. However, despite no significant change in overall satisfaction scores, the proportion of respondents who feel that the quality of urban realm has got worse in the last year has increased in all sub-regions, especially north.

Residents of the central sub-region remain the most positive, with nearly 1 in 4 stating that the quality of the urban realm has improved over the past year, and nearly half believing that it has remained the same.

Figure 10.18 Perception of streets, pavements and public spaces in local area, residents by sub-region, 2010.



Source: TfL Perceptions of the Travel Environment Survey, July 2010.

11. Spotlight on the Year of Cycling

11.1 Introduction and context

This chapter presents an early insight into the impacts of the Barclays Cycle Hire and Barclays Cycle Superhighways schemes, launched in summer 2010.

A cycling revolution is underway in London. The Mayor believes that cycling can bring significant social, environmental, health and financial benefits to London and is determined to turn London into a cyclised city. Consequently, he has set a target to deliver a 400 per cent increase (from 2001) in the number of cycle trips and a 5 per cent mode share for cycling by 2026. The Mayor declared 2010 the Year of Cycling; throughout the year, a wide range of interventions to improve conditions for cyclists and to raise the profile of cycling in London have been delivered.

In particular, the summer of 2010 saw the launch of two major schemes for cyclists: Barclays Cycle Hire for trips within central London and the first two Barclays Cycle Superhighways, designed to provide an attractive alternative for commuters from Inner to central London.

11.2 Key features and trends

Year of Cycling: Barclays Cycle Hire

- Barclays Cycle Hire was launched in July 2010 for members, and currently comprises approximately 5,000 bicycles and 350 docking stations, spread across 45 square kilometres in the centre of London.
- In total, more than 100,000 people have signed up as members of the scheme, making an average of around 20,000 journeys on the bicycles every day. More than 1.7 million journeys had been completed by 19 November 2010.
- Most of those using Barclays Cycle Hire do so regularly, with eight in ten using the scheme at least once a week and two in ten using the scheme five days a week or more.
- Barclays Cycle Hire has attracted people who were not previously cycling in London, many of whom have now started to cycle frequently; six in ten scheme users surveyed in September and October 2010 had taken up cycling in the last three months.
- The most common reason for hiring a bicycle was to travel to and from work and the majority of trips are made on a weekday and during peak periods. Most trips are between 10 and 30 minutes in length.
- Respondents were asked what purpose they travelled for most recently by Barclays Cycle Hire bicycle, and then to describe the trip they had made most recently for that purpose. Most selected a weekday commute trip. Just over half said that they travelled all the way by Barclays Cycle Hire bicycle; of those who were making a multi-modal journey, 63 per cent had also travelled by train.
- Respondents were asked how they would have travelled for their selected trip before the introduction of Barclays Cycle Hire. Six in ten trips made by Barclays Cycle Hire bicycles have replaced a public transport trip, primarily Underground

(35 per cent) and bus (23 per cent), and 4 per cent have replaced a trip by car or taxi.

- The most popular reasons for using the scheme were that it was quicker, healthier and more convenient than the previous mode.
- Barclays Cycle Hire users were, most usually, white men aged 25 to 44 on a high household income. Around seven in ten are London residents, with the majority of the remainder commuting to London for work purposes. It would be expected that visitors and tourists will be more likely to use the scheme after the introduction of casual use.

Year of Cycling: Barclays Cycle Superhighways

- The first two pilot Barclays Cycle Superhighways were launched in July 2010. These were route 3 (CS3), along the A13 from Barking to Tower Gateway, and route 7 (CS7), along the A24 from Merton to the City. Early results suggest an average increase of 24 per cent in cycle flows along these routes, based upon cycle counts carried out before and after the introduction of the scheme.
- Research carried out with people living near the Barclays Cycle Superhighways and who made trips along the corridor by any mode found that 34 per cent of non-cyclists had started to cycle on the Barclays Cycle Superhighways. Of those who had cycled on the corridor since July 2010, more than half said that they had increased the amount they cycle on the routes of the Barclays Cycle Superhighways.
- More than four in ten cyclists on the corridor said that they had also increased the amount they cycle elsewhere in London, and around three in ten had purchased a bicycle or cycle equipment since the launch of the Barclays Cycle Superhighways.
- The majority of those travelling on the Barclays Cycle Superhighways are frequent cyclists who use the route regularly, with more than half of those surveyed cycling on the routes at least five days a week.
- More than eight in ten trips on the Barclays Cycle Superhighways are made for commuting purposes, with the majority of the remainder made for social and leisure purposes. On both routes, most respondents travelled less than 10 minutes before joining the Barclays Cycle Superhighways and typically 10 minutes onwards from the Barclays Cycle Superhighway to their final destination. The average time spent travelling on the route was 17 minutes for CS3 and 21 minutes for CS7, providing average end-to-end journey times of 38 minutes for CS3 and 40 minutes for CS7.
- Those surveyed whilst cycling on the route were asked to consider the journey they were making at that time and to describe any changes they had made to that journey since the introduction of the Barclays Cycle Superhighways. On route CS3, 28 per cent of respondents had switched to cycling their trip, including 14 per cent who had previously made the trip by another mode and 14 per cent who were making a new trip. On route CS7, 20 per cent of respondents had switched to cycling their trip, including 8 per cent who had previously made the trip by another mode and 12 per cent who were making a new trip.

- Those who had switched to cycling from another mode stated that the main reasons for doing so were to improve fitness, save money and because the journey is more pleasant. The aspects of the route that had encouraged them to switch were the directness to their destination, the visibility of the blue road markings, the quality of the road surface and the number of other cyclists on the route.
- 21 per cent of those cycling on CS3 and 13 per cent on route CS7 said that they had changed their route to include the Barclays Cycle Superhighway. The main reasons for doing so were that they felt safer, the route was quicker and more pleasant, and that it was less congested. Again, the aspects of the route that had encouraged them to switch were the directness to their destination, the visibility of the blue road markings, the quality of the road surface and the lack of obstructions on the route.
- Cyclists on the Barclays Cycle Superhighways identified benefits to their feeling of safety whilst travelling (80 per cent on route CS3 and 74 per cent on route CS7 felt safer) and the predictability and reliability of their journeys (78 per cent on route CS3 and 61 per cent on route CS7 saw an improvement). They also tended to agree that the Barclays Cycle Superhighways help London feel like "a city for cycling".
- Barclays Cycle Superhighways users were typically young (80 per cent aged 25 to 44), white (84 per cent CS3, 89 per cent CS7) men (77 per cent), who are in employment (70 per cent) and with a moderate to high household income (41 per cent CS3, 54 per cent CS7 over £50,000 per year). This is similar to the profile of cyclists across London as a whole.

11.3 Year of Cycling: Barclays Cycle Hire

Background to Barclays Cycle Hire

Barclays Cycle Hire expands the opportunities for short cycling trips in London. Launched in July 2010 for members, the scheme currently comprises approximately 5,000 bicycles and 350 docking stations, spread across 45 square kilometres stretching west to east from Kensington and Chelsea to Tower Hamlets and north to south from Islington to Lambeth. The scheme operates 24 hours a day, 365 days a year. Daily (24 hour), seven day and annual memberships are available, accompanied by a pricing structure which encourages the use of Barclays Cycle Hire for short cycling trips by offering the first 30 minutes of hire free of usage charges.

In total, more than 100,000 people have signed up as members of the scheme, making an average of around 20,000 journeys on the bicycles every day. More than 1.7 million journeys had been completed by 19 November 2010.

Research has been carried out with people who have used Barclays Cycle Hire, exploring their experiences of the scheme and its impact on their attitudes and travel behaviour. The survey was carried out online in autumn 2010 with a sample of more than 3,500 members, all of whom had used the scheme at least once. Not all respondents were asked all questions. This section describes the results of the research in terms of the nature of trips being made by Barclays Cycle Hire bicycle, the profile of those making them, and the impact of the scheme on travel behaviour choices.

Frequency of travel by Barclays Cycle Hire bicycle

Most of those surveyed were using Barclays Cycle Hire regularly, with eight in ten using the scheme at least once a week including two in ten who were using the scheme at least five times a week. Two thirds typically hire a bicycle twice a day on days that they use the scheme.

The aims of Barclays Cycle Hire are to improve access to bicycles in central London and encourage the use of the bicycle for short trips. It aims to make cycling appealing to those who are not currently choosing to cycle. In this, the scheme appears to have succeeded; six in ten of the registered users who responded to the survey had only started cycling in London in the past three months and more than half never cycle in London on their own bicycle. A key appeal is for people who work in London but are not residents; a quarter of those who had taken up cycling in the last three months live outside London in the South East of England.

Only around a quarter of scheme users are frequent cyclists in London (using a private bicycle) and, interestingly, the more experienced London cyclists tend to use the scheme less frequently than those new to cycling. Only a third of those who started cycling in London more than six months ago use the scheme three times a week or more, compared to 56 per cent of those who have started cycling within the past six months. A similar pattern of results is seen according to whether the person is resident in London, with non-Londoners using the scheme more frequently than Londoners. It may be the case that some respondents are existing cyclists in their local area, but new to cycling in London. Four in ten people using the scheme three days a week or more only started cycling in London in the last month.

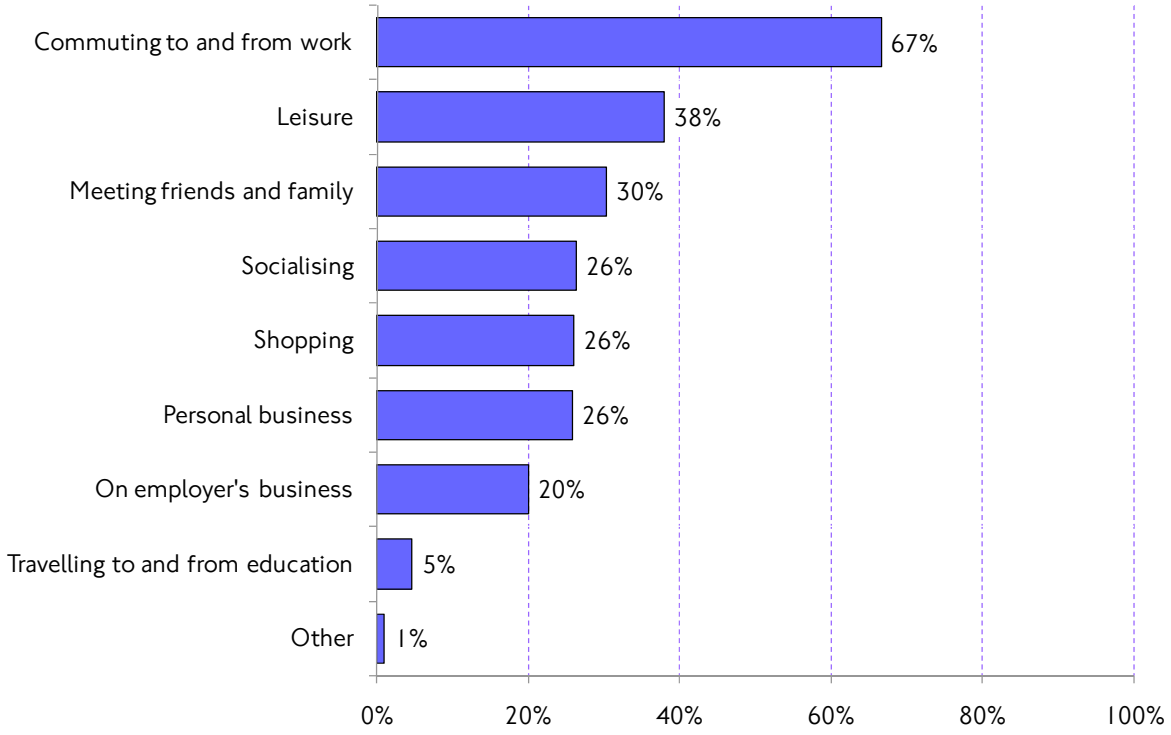
These results may suggest that many experienced cyclists signed up to the scheme out of interest, wanting to 'try it out' rather than looking to make a significant change; whereas non-cyclists and those working in central London found that the scheme provided them with a new transport option and have changed their routine travel behaviour accordingly. This is also reflected in the finding that, when asked about a recent trip, only 5 per cent of respondents said that they would previously have made the trip using their own bicycle.

Characteristics of travel by Barclays Cycle Hire bicycle

The most popular times to hire a bicycle were in the weekday morning and evening peaks (56 per cent and 62 per cent respectively) and most users hire a bicycle for between 10 and 30 minutes at a time (88 per cent).

The most common reason for hiring a bicycle was to travel to and from work, with two thirds of survey respondents using the scheme for this purpose. Figure 11.1 shows the types of trips made using a Barclays Cycle Hire bicycle.

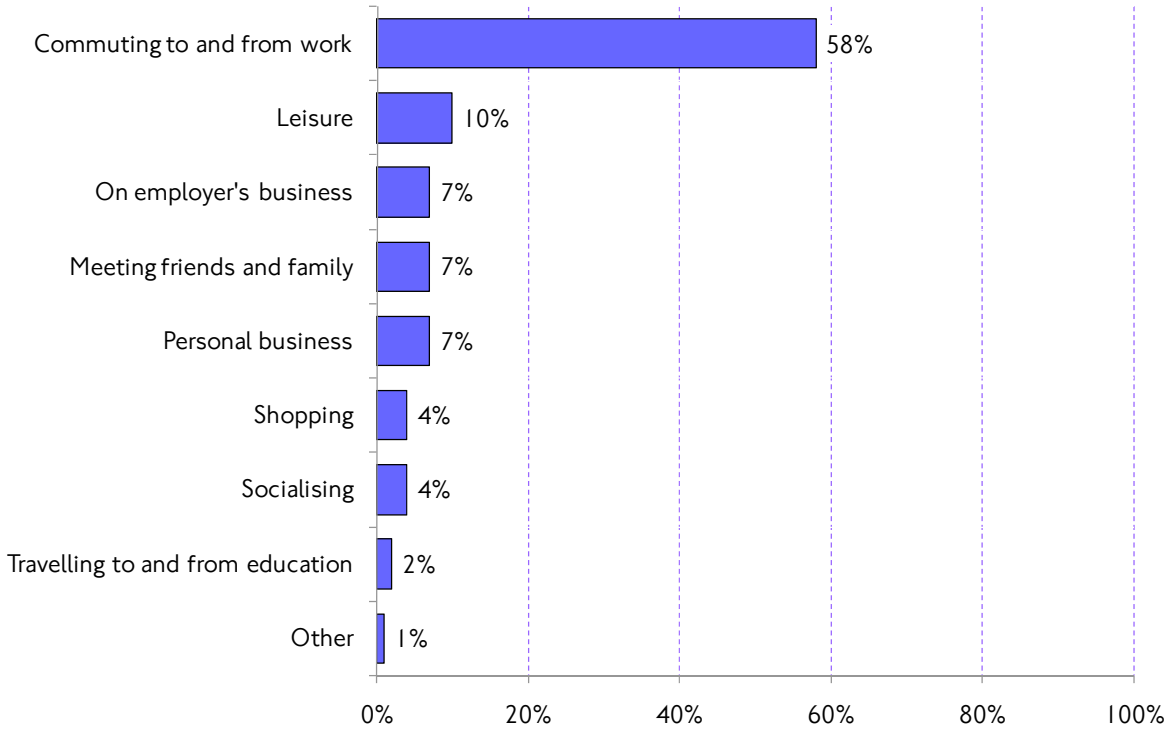
Figure 11.1 Journey purpose of travel by Barclays Cycle Hire bicycle.



Base: 3,754 respondents.
Source: Barclays Cycle Hire Behaviour Change and Customer Satisfaction Survey, TfL 2010.

When asked what journey purpose they travel for most frequently using a Barclays Cycle Hire bicycle, 58 per cent of respondents stated that they cycle most frequently to commute to and from work (see Figure 11.2).

Figure 11.2 Most frequent journey purpose for travel by Barclays Cycle Hire bicycle.

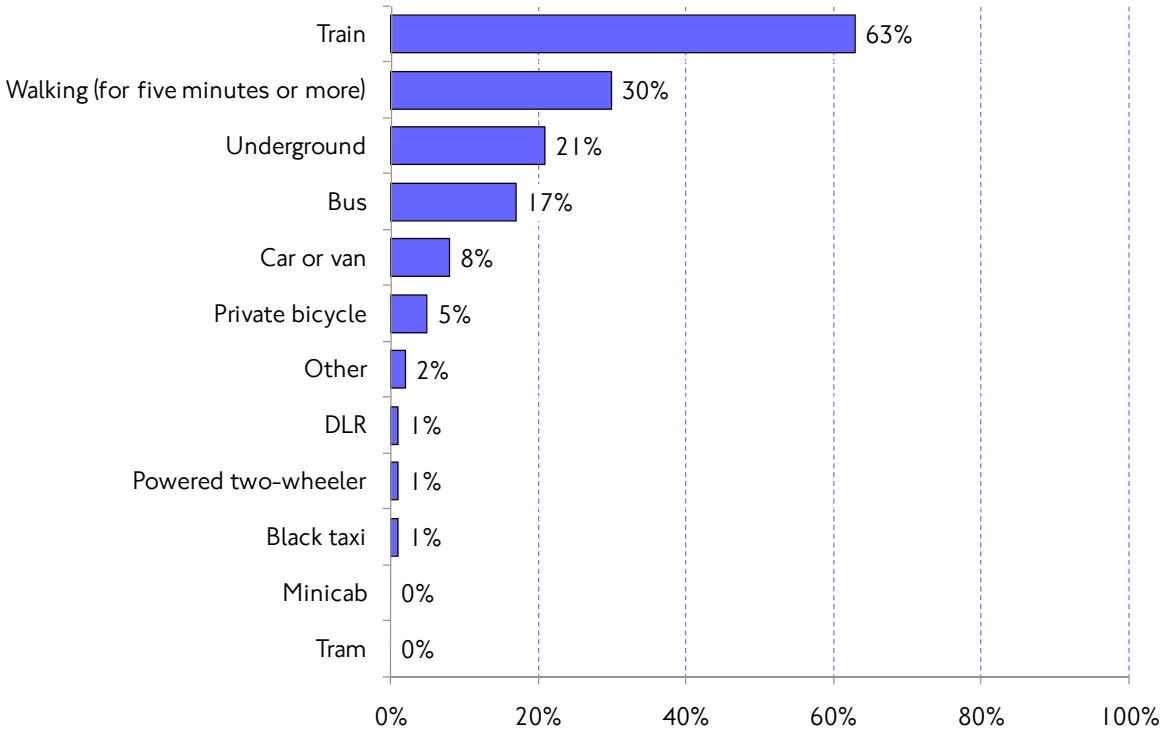


Base: 1,350 respondents.
Source: Barclays Cycle Hire Behaviour Change and Customer Satisfaction Survey, TfL 2010.

Selected respondents were asked to consider the most recent trip made for this purpose - the purpose they travel for most frequently. Given the predominance of commuting and travel on employer's business, it is unsurprising that 86 per cent of trips selected were made on a weekday and 60 per cent in either the morning or evening peak periods. Most users were travelling on their own (90 per cent) and hired a bicycle for less than half an hour (96 per cent), with the most common duration being 10 to 20 minutes (44 per cent).

Just over half the respondents said that they travelled all the way by Barclays Cycle Hire bicycle (54 per cent), with the remainder using the Hire bicycle as part of a longer journey by another mode. Of those making a multi-modal journey, the most popular mode used was train (63 per cent, see Figure 11.3); in total, around three in ten of those using Barclays Cycle Hire had travelled by train as part of their journey.

Figure 11.3 Modes in addition to Barclays Cycle Hire bicycle used for selected journey by Barclays Cycle Hire.



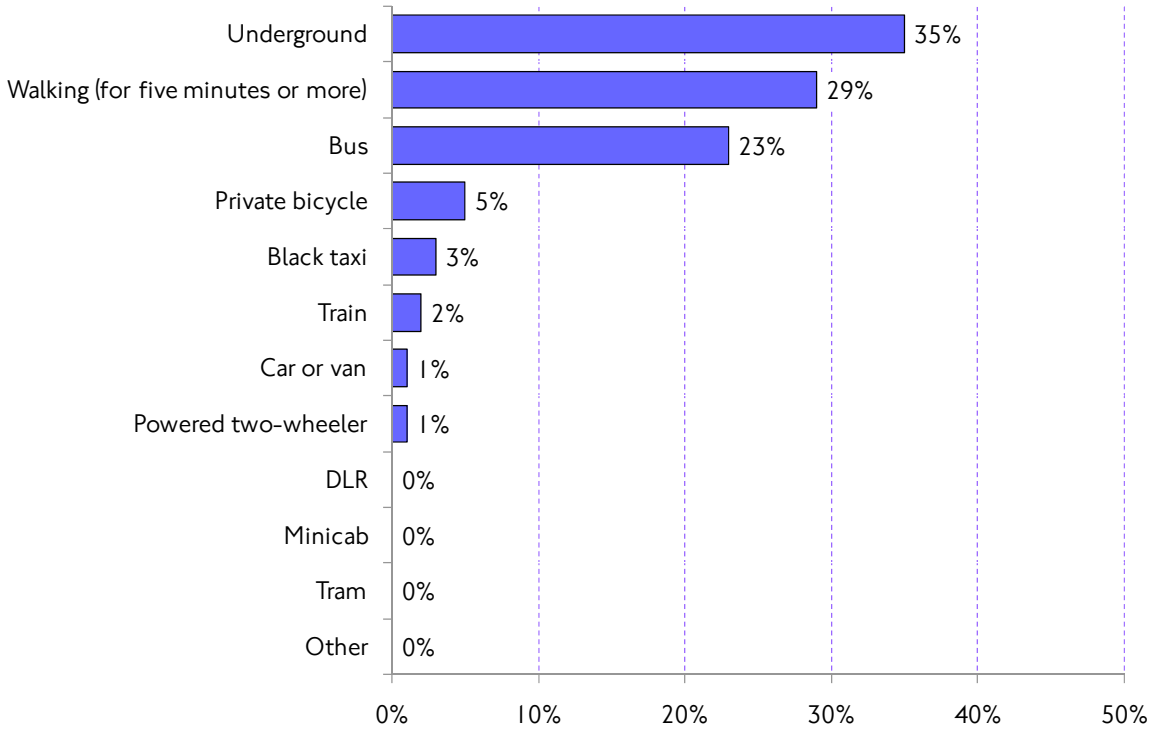
Base: 1,350 respondents.
Source: Barclays Cycle Hire Behaviour Change and Customer Satisfaction Survey, TfL 2010.

Around six in ten respondents make their selected trip at least once a week by Barclays Cycle Hire bicycle and slightly fewer make the trip at least once a week by other modes. Thirteen per cent were making the trip by Barclays Cycle Hire bicycle for the first time, and 11 per cent now never make the trip by any other mode.

Travel behaviour change as a result of the introduction of Barclays Cycle Hire

Respondents were asked how they would have travelled for their selected trip before the introduction of Barclays Cycle Hire. One per cent of respondents were making the trip for the first time and were therefore excluded from the analysis. Figure 11.4 shows the main mode of transport used to make the trip prior to the introduction of Barclays Cycle Hire. Six in ten trips made by Barclays Cycle Hire bicycle have replaced a public transport trip, primarily Underground (35 per cent) and bus (23 per cent), 4 per cent have replaced a trip by car or taxi, and 34 per cent have replaced a walk or existing cycle trip.

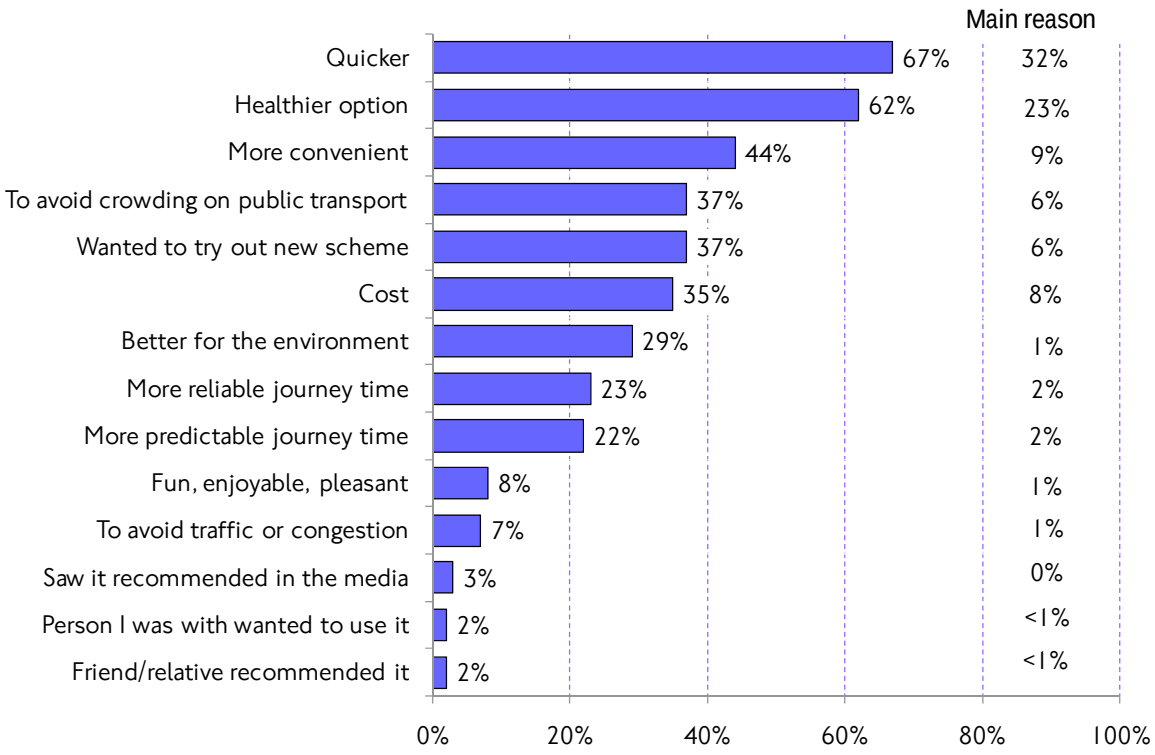
Figure 11.4 Mode of transport used for selected journey prior to the introduction of Barclays Cycle Hire.



Base: 1,350 respondents.
Source: Barclays Cycle Hire Behaviour Change and Customer Satisfaction Survey, TfL 2010.

Respondents were asked why they had chosen to change from travelling by their previous mode to travelling by Barclays Cycle Hire bicycle, and their main reason for doing so. Figure 11.5 shows that the most commonly selected reasons for changing were that their journey was quicker (67 per cent), because cycling is a healthier option (62 per cent), and that cycling is more convenient (44 per cent).

Figure 11.5 Reasons for switching mode of transport for selected journey to Barclays Cycle Hire bicycle



Base: 1,350 respondents.
Source: Barclays Cycle Hire Behaviour Change and Customer Satisfaction Survey, TfL 2010.
Note: Reasons selected by less than 1% of respondents are excluded from the graph.

Profile of Barclays Cycle Hire users

Cyclists tend to be white male young professionals, and the profile of Barclays Cycle Hire users is fairly typical of this:

- 68 per cent of scheme users are aged between 25 and 44. Relatively few young people were using the scheme in comparison with the profile of cyclists across London.
- Three quarters of those using the scheme are men. In comparison, across London around seven in ten cycle trips are made by men.
- 88 per cent of scheme users are of White British, Irish or other White ethnic origin. Around a third of London residents are from ethnic minority backgrounds and they are less likely to cycle: 71 per cent never cycle, compared to 57 per cent of white Londoners.
- Six in ten scheme users have a household income over £50,000 per year, compared to around a quarter of London residents, and only 5 per cent of users have a low household income of less than £20,000 per year, compared to four in ten London residents.

More than six in ten of those who took part in the survey were London residents, with the majority of the remainder commuting into London to work from elsewhere in the UK.

It is notable that women, residents of the South East of England (outside London) and to some extent people from ethnic minorities were more likely to be new to cycling in London and to have taken up cycling in the last month. It could be expected that 'casual use', offering one-off access without the need to register in advance, would appeal to a broader segment of the population. Further research will be carried out after the introduction of casual use to explore this and other questions.

Access to a bicycle for Barclays Cycle Hire users

Barclays Cycle Hire scheme users were somewhat more likely than the general population of London to have a bicycle within their household. Around four in ten London residents have access to a bicycle, compared to seven in ten Barclays Cycle Hire scheme users. Frequent users were less likely to have a bicycle in their household than infrequent users, and a third of those using the scheme at least once a week do not own a bike. Six per cent of scheme users had bought a bicycle in the last month.

Summary: Barclays Cycle Hire

Barclays Cycle Hire has delivered an average of 20,000 cycle journeys a day, the vast majority of which were not previously cycled. Two thirds of ten trips made by Barclays Cycle Hire bicycle would previously have been made by a mechanised mode. The scheme has encouraged new people to give cycling in London a try, and many have become frequent cyclists as a result of the scheme. There is evidence of wider benefits arising from the scheme, with many of those new to cycling saying that they have bought a bike for their private use as a result of using the scheme. The most popular reasons for using the scheme were that that it was quicker, healthier and more convenient than their previous mode.

The scheme has recently been expanded to allow casual use (without membership) and further research will be carried out to understand the impact of this upon usage patterns and the profile of users. This will be reported in future Travel in London reports.

11.4 Year of Cycling: Barclays Cycle Superhighways

Background to the Barclays Cycle Superhighways pilot routes

The Barclays Cycle Superhighways programme will deliver 12 radial routes providing cyclists with a safer, faster, more direct and continuous way of getting into central London. The Barclays Cycle Superhighways offer a package of highway improvements and supporting measures designed to break down the barriers that stop people cycling.

The first two pilot routes, Cycle Superhighway 3 (CS3), along the A13 from Barking to Tower Gateway, and Cycle Superhighway 7 (CS7), along the A24 from Merton to the City, opened in July 2010. The two routes deliver 40 kilometres of new or improved cycle lanes, 94 new or improved advanced stop lines at least five metres deep and 39 roadside safety mirrors. Early results from both routes suggest an overall increase of 24 per cent in cycle flows, based upon cycle counts carried out before and after the introduction of the scheme.

Research has been carried out with people in the target market for the two pilot Barclays Cycle Superhighways, defined as those resident within 1.5km of either route

and who travel (by any mode) along the corridor for at least 1km. Eighteen per cent of those initially contacted in the first wave of the research did not cycle on the route or make a suitable trip, and were therefore not included in the survey sample. Respondents were surveyed before and after the introduction of the Barclays Cycle Superhighways in order to understand usage and responses to the Superhighways and, for those who had cycled along the Barclays Cycle Superhighways, their experiences of using the routes. The survey was carried out online and by telephone in early summer and autumn 2010. A total of 904 respondents took part in wave one of the survey and 506 in wave two.

Additional research has been carried out with those who have cycled on the Superhighways. A survey was conducted online with cyclists recruited at the roadside whilst making a trip on one of the Barclays Cycle Superhighways. In total, 501 cyclists took part in the survey, which explored travel behaviour, attitudes and experiences of using the routes. Of the respondents to this survey, 200 had cycled on Barclays Cycle Superhighway 3, and 301 on Cycle Superhighway 7.

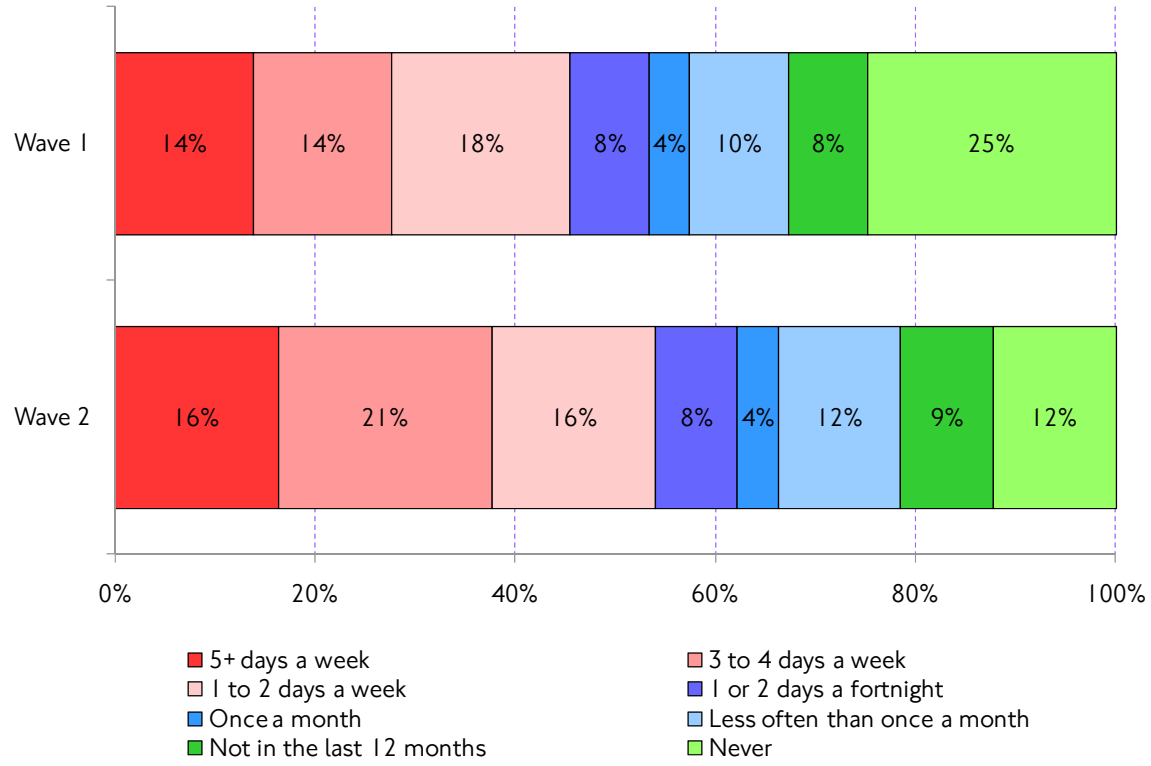
This section summarises the initial findings of both research elements in terms of the nature of trips being made on the Barclays Cycle Superhighways, the profile of those making them, and the impact of the scheme on travel behaviour choices for scheme users and the target market.

Impact of the Barclays Cycle Superhighways on the travel behaviour of the target market

Research with the target market for the Barclays Cycle Superhighways found that 34 per cent of those who had been categorised as a 'potential cyclist' in the first wave of the survey, carried out before the introduction of the routes, had started to cycle on the Barclays Cycle Superhighways by the second wave of the survey. 'Potential cyclists' were defined as those who make a trip along the general route of the Barclays Cycle Superhighways by a mode other than bicycle. Note that the 'potential cyclists' as defined in this research had not indicated any particular propensity or willingness to start cycling for their trip along the Barclays Cycle Superhighway corridor.

Overall, the proportion of those in the target market who said that they cycled at least once a week rose from 46 per cent in wave one to 53 per cent in wave two of the survey, and the proportion of those who said they never cycled more than halved, falling from 25 per cent to 12 per cent (see Figure 11.6).

Figure 11.6 Overall frequency of cycling in London, target market before and after launch of Barclays Cycle Superhighways.



Base: Wave 1: 904 respondents and Wave 2: 506 respondents.
Source: Barclay Cycle Superhighways Target Market Survey Waves One and Two, TfL 2010.

Wider benefits of the scheme for those cycling on the route, including those cycling previously and those who had started to cycle since the launch of the Barclays Cycle Superhighways (Base: 269 respondents), were:

- 27 per cent had bought a bicycle.
- 35 per cent had bought cycle equipment.
- 52 per cent had increased the amount they cycle on their local Barclays Cycle Superhighway.
- 43 per cent had increased the amount they cycle elsewhere.

Both routes saw a significant increase in the proportion of the target market who said that they cycled on the route.

- On route CS3, 36 per cent of respondents cycled on the route for 1 kilometre or more prior to the introduction of the Barclays Cycle Superhighway, and 50 per cent did so afterwards. This is an increase of 14 percentage points, representing growth of 39 per cent. (Base: Wave 1: 429, Wave 2: 222).
- On route CS7, 43 per cent of respondents cycled on the route for 1 kilometre or more prior to the introduction of the Barclays Cycle Superhighway, and 59 per cent did so afterwards. This is an increase of 16 percentage points, representing growth of 37 per cent. (Base: Wave 1: 475, Wave 2: 284).

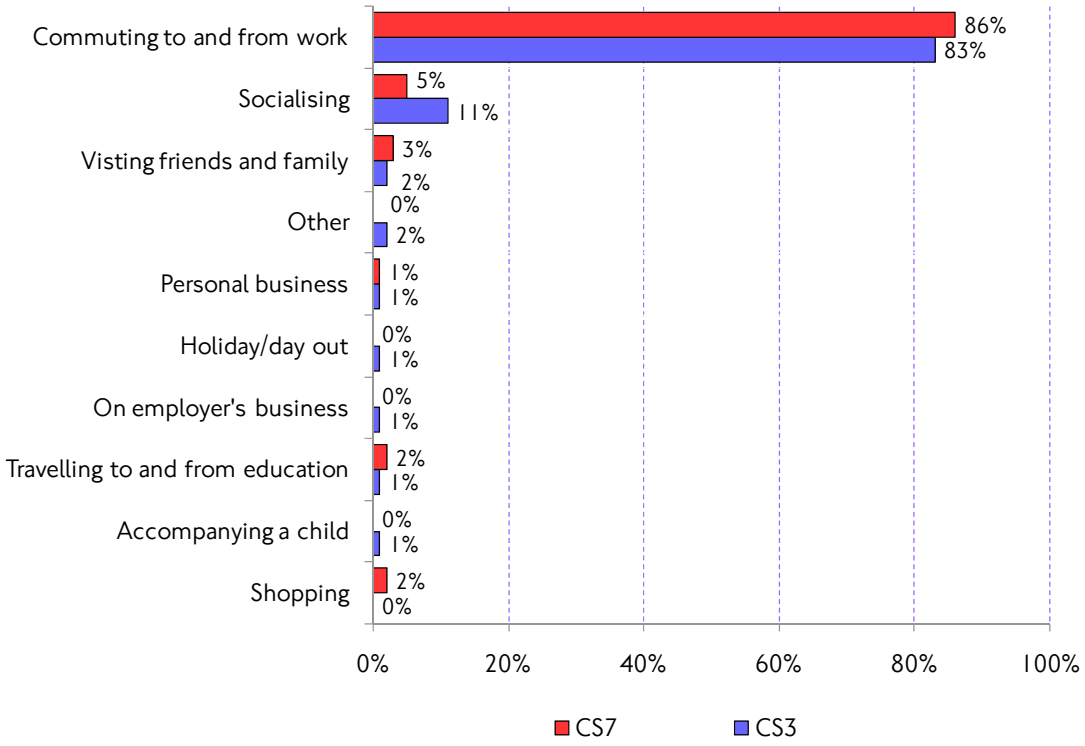
It is important to recognise that there is always some 'churn' in travel behaviour; 7 per cent of those who had been cycling on the route in wave one were no longer doing so, and similarly it is reasonable to presume that a small proportion of those who had started cycling may have done so regardless of the introduction of the scheme. Nevertheless, the survey data provides good evidence of a significant overall net gain in the proportion of the target market who were cycling on the Barclays Cycle Superhighways and across London.

Characteristics of cycle travel on the Barclays Cycle Superhighways

The vast majority of those surveyed whilst travelling on the Barclays Cycle Superhighways were frequent cyclists who use the routes regularly. Nearly all those surveyed travelling on the Barclays Cycle Superhighways do so at least once a week (96 per cent CS3, 97 per cent CS7) and more than half do so at least five times a week (55 per cent CS3, 54 per cent CS7). One third of those surveyed never use another mode than cycle to travel along the corridor.

In total, it is estimated that around 83 per cent of cycle journeys on route CS3, and 86 per cent of cycle journeys on CS7 are for commuting purposes, with the majority of the remainder taking place for social purposes and to meet friends and family (Figure 11.7). Around half of those surveyed only use the Barclays Cycle Superhighway for one trip purpose (generally to commute to and from work) but the remainder do cycle for other purposes along the corridor, mainly for socialising, shopping and leisure purposes.

Figure 11.7 Purpose of trips on the Barclays Cycle Superhighways.



Base: CS7: 301respondents and CS3: 200 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

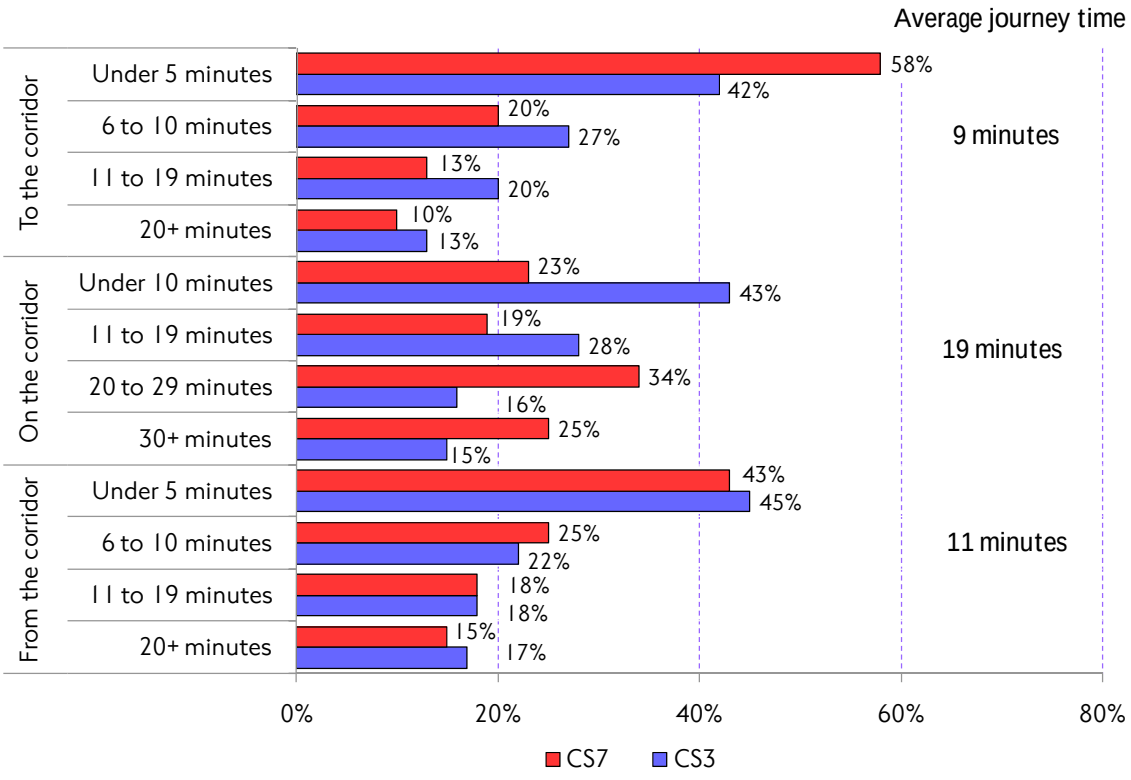
Description of most recent trip made on the Barclays Cycle Superhighways

Respondents were asked to describe the journey they were making when recruited to take part in the survey. As the recruitment was focussed on weekday trips inbound to central London, this was reflected in the responses.

The large majority of those recruited at the roadside whilst cycling on the Barclays Cycle Superhighways were commuting to or from work. Reflecting the habitual nature of travel to work, a similar proportion made the trip at least once a week and around half made the trip at least five days a week. Those living along the inner part of the route tended to make their journey more frequently than those living along the outer portion of the route. Given that the average journey length for those in the outer area was longer, it may be that those with further to travel, and therefore required to exert themselves more, tend to cycle on some days of the week and use an alternative mode on other days.

Most respondents had travelled for less than 10 minutes before they joined the Barclays Cycle Superhighways and for a similar amount of time after leaving the Barclays Cycle Superhighway to reach their final destination. The average time spent travelling on the Barclays Cycle Superhighway was 17 minutes for CS3 and 21 minutes for CS7. The average time spent travelling for the whole journey, including time spent travelling to and from the Barclays Cycle Superhighway, was 39 minutes. Figure 11.8 shows the access, egress and on-route journey times for both routes.

Figure 11.8 Access, on-route and egress journey times for cyclists on CS3 and CS7.



Base: CS7: 301respondents and CS3: 200 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

The first two pilot routes, Barclays Cycle Superhighway 3 (CS3), along the A13 from Barking to Tower Gateway, and Barclays Cycle Superhighway 7 (CS7), along the A24 from Merton to the City, opened in July 2010.

The most popular access and egress points for each route were:

- Barclays Cycle Superhighway 3 (A13 from Barking to Tower Gateway):
    - The most popular access points for route CS3 were Westferry DLR station and the junction of Cable Street and Butcher Row, accounting for 46 per cent of the total.
    - The vast majority of cyclists exited the route to travel on to their final destination at Tower Gateway (78 per cent), the end of the Superhighway route.
- Barclays Cycle Superhighway 7 (A24 from Merton to the City):
    - The most popular access points for route CS7 were in the Clapham area, with the access points at Clapham South, Common and North Underground stations accounting for 38 per cent of the total.
    - Only 38 per cent of those cycling on route CS7 travelled to Southwark Bridge, the end of the route, with 45 per cent leaving the route south of the river between Oval and Elephant and Cast Underground stations.

Travel behaviour change on the Barclays Cycle Superhighways

Respondents were asked to consider the journey they were making when recruited to take part in the survey and describe any changes they had made to that journey since the introduction of Barclays Cycle Superhighways, and the reasons for that change.

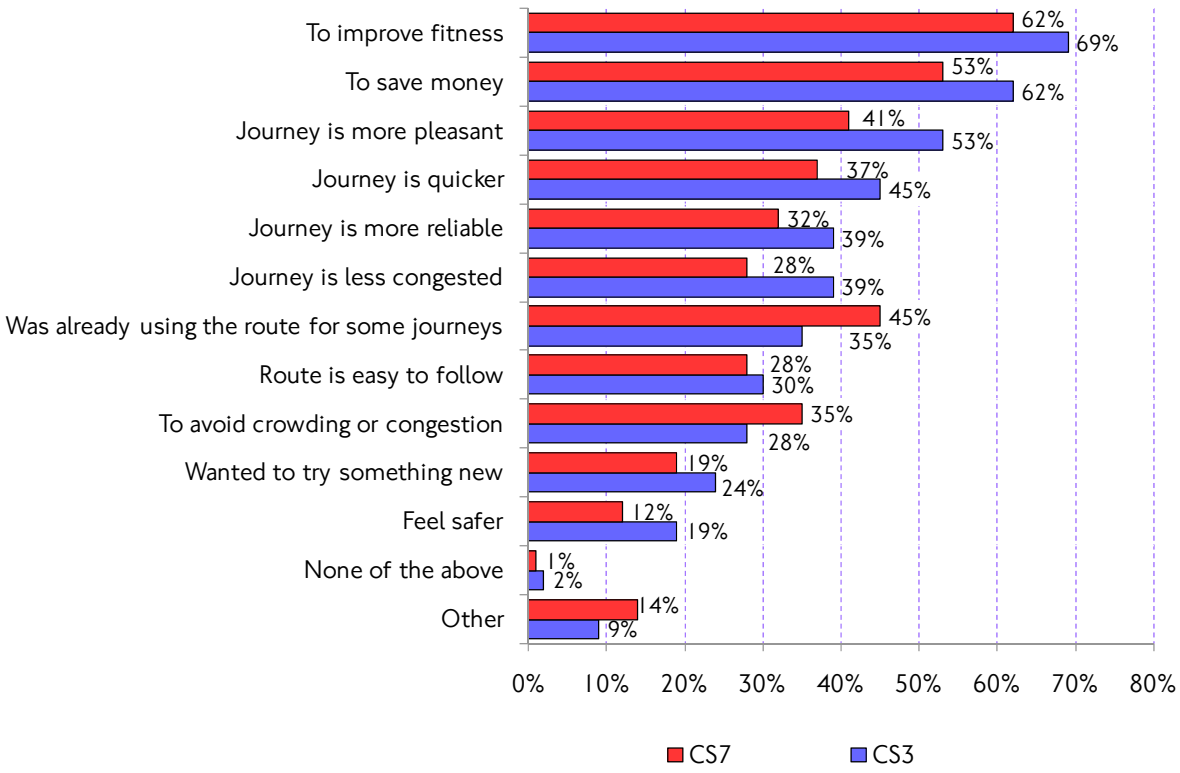
The majority of those surveyed had sometimes or always cycled the journey prior to the introduction of the Barclays Cycle Superhighways (72 per cent on CS3 and 80 per cent on CS7). On route CS3, the total shift to cycle was 28 per cent, encompassing 14 per cent who had previously made the trip by another mode, and 14 per cent who were making a new trip. On route CS7, the total shift to cycle was 20 per cent, encompassing 8 per cent who had previously made the trip by another mode, and 12 per cent who were making a new trip. Furthermore, 21 per cent of those cycling on CS3 and 13 per cent of those cycling on CS7 said that they had used a different route prior to the introduction of the Barclays Cycle Superhighways.

Those cycling on the Barclays Cycle Superhighways were able to identify wider benefits of the scheme. Around one in ten had been encouraged to buy a new bike and more had bought cycle equipment as a direct result of the introduction of the scheme. Fifty-eight per cent of those cycling on CS3 and 41 per cent of those cycling on CS7 said that they were cycling more on the Barclays Cycle Superhighway routes, and 33 per cent on CS3 and 21 per cent on CS7 said that they were cycling more elsewhere.

Reasons for changing mode to cycle on the Barclays Cycle Superhighways

Respondents who had switched to cycling from an alternative mode were asked what had prompted them to do so. Figure 11.9 shows that the main reasons for change were to improve fitness, to save money and because the journey is more pleasant. Some said that they had been prompted to change because they were already using the route to cycle some journeys.

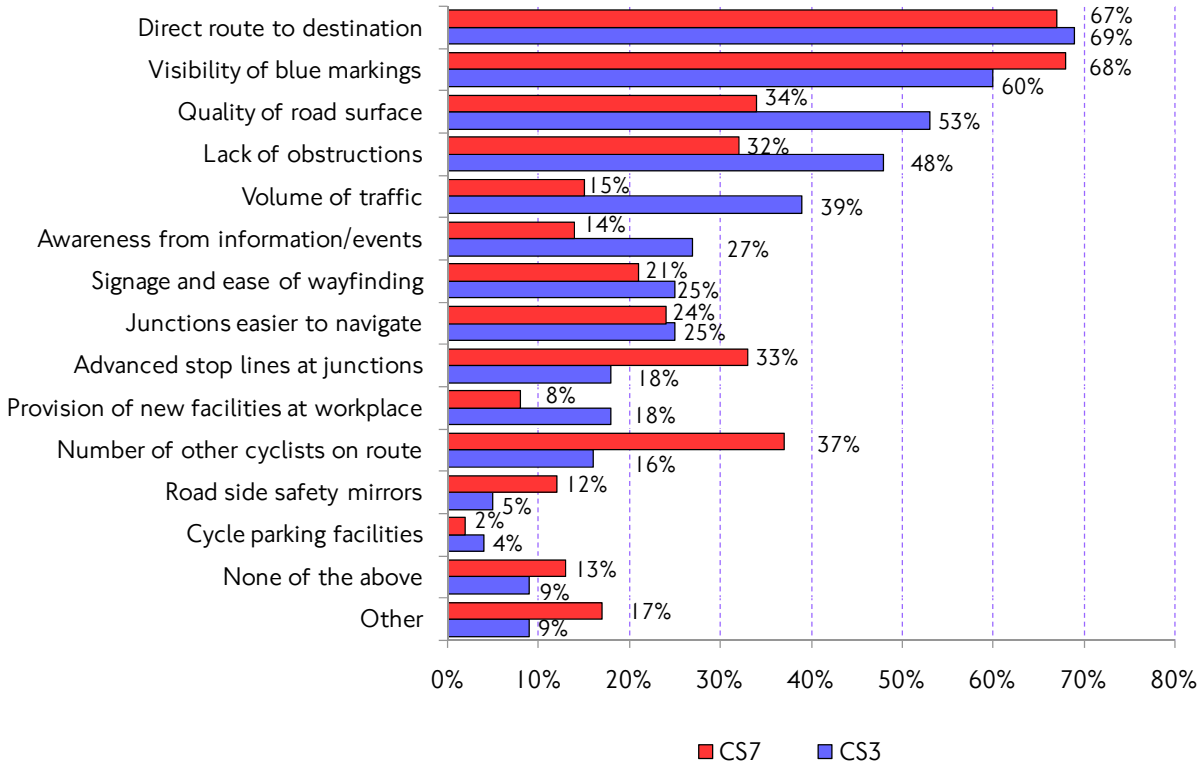
Figure 11.9 Reasons for changing mode to cycle on the Barclays Cycle Superhighways.



Base: all who changed mode on CS7: 95 respondents and CS3: 93 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

When asked which aspects of the route had most encouraged them to give cycling a try, the directness of the route to their destination, the visibility of the blue markings, the quality of the road surface and the number of other cyclists on the route were the most popular choices (see Figure 11.10).

Figure 11.10 Aspects of the route that encouraged those changing mode to cycle on the Barclays Cycle Superhighways.

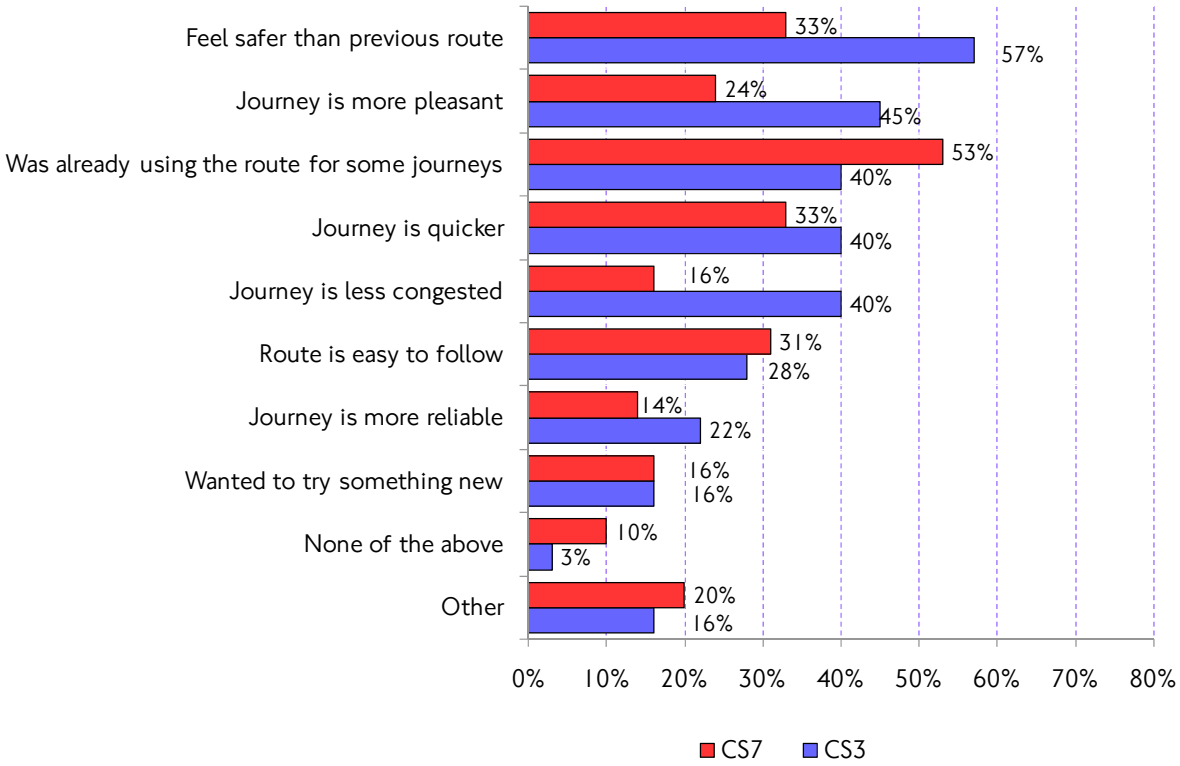


Base: all who changed mode on CS7: 95 respondents and CS3: 93 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

Reasons for changing route to cycle on the Barclays Cycle Superhighways

Respondents who had changed route to cycle on the Barclays Cycle Superhighways for their trip were also asked what had prompted them to do so. Figure 11.11 shows that the main reasons for change were that they felt safer, that the route was quicker and more pleasant, and that it was less congested. Again, some said that they had been prompted to change because they were already using the route to cycle some journeys.

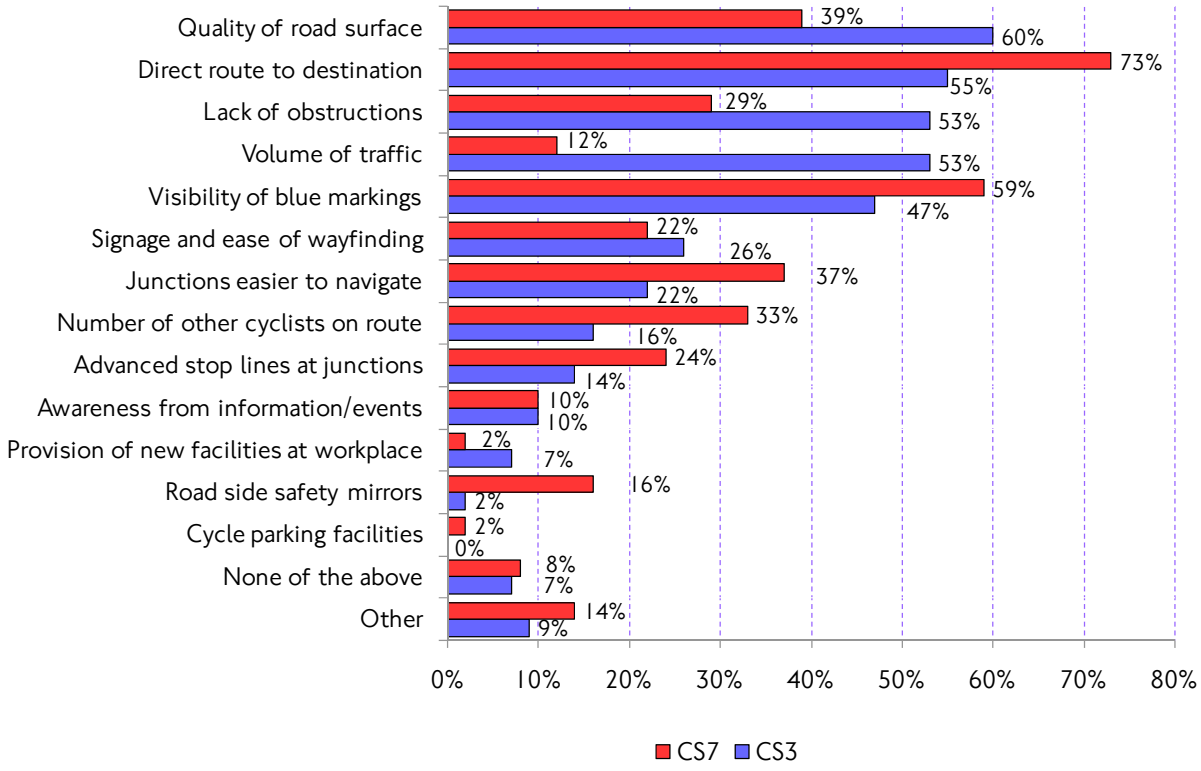
Figure 11.11 Reasons for changing route to cycle on the Barclays Cycle Superhighways.



Base: all who changed route on CS7: 51 respondents and CS3: 58 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

When asked which aspects of the Barclays Cycle Superhighway had most encouraged them to change route, the directness of the route to their destination, the visibility of the blue markings, the quality of the road surface and the lack of obstructions on the route were the most popular choices (see Figure 11.12).

Figure 11.12 Aspects of the route that encouraged those changing route to cycle on the Barclays Cycle Superhighways.



Base: all who changed route on CS7: 51 respondents and CS3: 58 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

Benefits of Barclays Cycle Superhighways

The vast majority of those cycling on the Barclays Cycle Superhighways agreed that the routes improve safety for cyclists – 80 per cent of those travelling on route CS3 and 74 per cent of those travelling on route CS7. Most felt that the blue road surfacing had improved their feeling of safety (60 per cent) or made no difference (31 per cent).

Roadside mirrors have been installed along the Barclays Cycle Superhighways to provide lorry drivers with a better view of cyclists who may be in their blind spot when waiting at a junction, with the goal of reducing collisions between lorries and cyclists. Research with LGV drivers found reasonable levels of awareness of the mirrors and most respondents said that they believed the mirrors would change the way they used junctions and would improve safety for cyclists. Amongst the 501 cyclists surveyed whilst travelling on the routes, around a quarter had noticed the mirrors and, of this group, most said that the roadside mirrors had improved (37 per cent) or made no difference to (56 per cent) their feeling of safety.

Further benefits identified by cyclists using the Barclays Cycle Superhighways were:

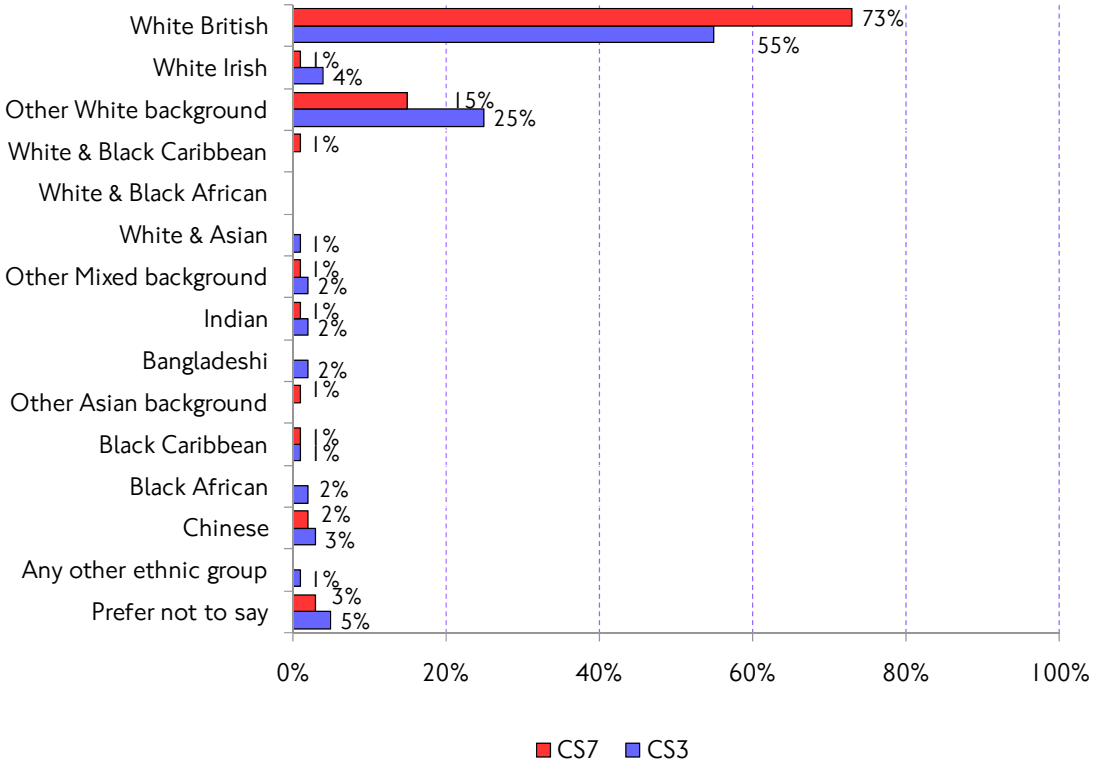
- 78 per cent of those travelling on route CS3 and 61 per cent of those using CS7 agreed that the Barclays Cycle Superhighways have improved the predictability and reliability of their journeys.
- Around eight in ten agreed that the Barclays Cycle Superhighways help London feel like a "city for cycling".

Profile of Barclays Cycle Superhighways cyclists

Most of those surveyed cycling on the two pilot Barclays Cycle Superhighways were young (80 per cent were aged 25 to 44 across both routes), male (77 per cent), and in employment (94 per cent). In comparison, around half of London residents are aged 25 to 44, half are male and 69 per cent of those aged 16 to 64 are in employment.

There were some differences in the profiles of those cycling on each of the two routes. On CS7, in south London, cyclists were more likely to be White British and less likely to be of other white or ethnic minority origin (see Figure 11.13).

Figure 11.13 Barclays Cycle Superhighway cyclists by ethnic origin.



Base: CS7: 301 respondents and CS3: 200 respondents.
Source: Barclays Cycle Superhighways Scheme Users Survey, TfL 2010.

Cyclists on CS7 had a higher average household income than those on CS3. Fifty-four per cent of those cycling on route CS7 had an annual household income over £50,000 per year, compared to 41 per cent on route CS3. Only 7 per cent of those cycling on route CS7 and 4 per cent on route CS3 had a household income lower than £20,000 per year, compared to around 40 per cent of London households in total. Research with the target market found that those who had cycled on the route were more likely to have a high household income (over £50,000 per year) than those who had not cycled (27 per cent compared to 20 per cent).

In general, those travelling on the Barclays Cycle Superhighways had low levels of car use and high levels of cycle and public transport use, although car ownership levels were higher amongst those living further away from the centre of London.

Access to a bicycle and bicycle facilities

Of those cycling on the Barclays Cycle Superhighways, more than half store their bicycle within their home, with most of the remainder storing their bicycle in a garage, shed or garden. At work, most have access to secure cycle parking and showers (around eight in ten for both facilities) and over half have access to lockers or storage facilities. Around one in ten said their employer was participating in other Barclays Cycle Superhighways initiatives such as the provision of training, maintenance and the display of promotional material.

Summary: Barclays Cycle Superhighways

The first two pilot Barclays Cycle Superhighways launched in July 2010. These were Barclays Cycle Superhighway 3 (CS3), along the A13 from Barking to Tower Gateway, and Barclays Cycle Superhighway 7 (CS7), along the A24 from Merton to the City. Early results suggest an increase of 24 per cent in average cycle flows, based upon cycle counts carried out before and after the introduction of the scheme. The vast majority of trips are for commuting purposes, although cyclists are using the route at other times and for other purposes as well.

The Barclays Cycle Superhighways have also encouraged new cyclists onto the routes: 28 per cent of those cycling on CS3 and 20 per cent of those cycling on CS7 had started cycling on the route as a result of the launch of the Barclays Cycle Superhighways, and more cyclists had switched route to travel on the Barclays Cycle Superhighways. The aspects of the route considered most influential in encouraging use were the directness to their destination, the visibility of the blue road markings and the quality of the road surface. Those who were new to cycling saw benefits to health, cost and the quality of their journey, whilst those who had switched route found their journey safer and more enjoyable. People who were cycling on the Barclays Cycle Superhighways prior to launch have experienced an increase in the quality of their journey experience and are generally very supportive of the scheme; some have increased the amount they travel on the routes. More than three quarters said that the Barclays Cycle Superhighways had improved safety for cyclists.

Wider benefits were seen amongst the target market, a third of whom had started cycling on the routes and many of whom had also increased the amount they cycle elsewhere in London. The wider cycling economy can be seen to be benefitting from the scheme as around three in ten of those cycling on the route had purchased a bicycle or cycle equipment since the launch.

12. Spotlight on London's Low Emission Zone

12.1 Introduction

This chapter looks at the impacts of the London Low Emission Zone (LEZ) scheme, providing a perspective from the viewpoint of nearly three years since the introduction of the first phase of the scheme in February 2008. It updates material previously presented in TfL's Baseline Monitoring Report for the scheme, which was published in July 2008 (see www.tfl.gov.uk/Lezlondon).

12.2 Summary of scheme and key developments

The London LEZ seeks to contribute to improved air quality by discouraging the individually most polluting heavier diesel vehicles from operating in Greater London. It does this by setting minimum emissions standards for particulate matter, in terms of 'Euro' emissions classes, for these types of vehicle. A substantial daily charge, set so as to be an effective deterrent, must be paid if an operator wishes to operate a non-compliant vehicle in the zone.

The LEZ targets emissions of particulate matter (PM_{10} and $PM_{2.5}$) - the pollutant in London of most immediate concern in terms of adverse health impacts and London's ability to meet limit values for air pollution. The scheme is part of a package of measures to help tackle air pollution and move London towards compliance with national and European air quality objectives.

Scheme operation, compliance and impact on vehicle fleet

- The first two phases of the scheme were introduced during 2008 without significant operational problems, and all elements of the scheme continue to function effectively. The scheme operates 24 hours a day, 365 days per year, and covers Greater London.
- Consistently high levels of vehicle compliance with the requirements of the scheme are being achieved. Typically, 98 per cent of heavy goods vehicles (regulated by phase 1 of the scheme) and 96 per cent of medium goods vehicles (regulated by phase 2) are compliant on a daily basis - this reflecting near 100 per cent compliance for practical purposes, allowing for a limited number of exempt and evading vehicles and the actual kilometres operated by these vehicles.
- These high levels of compliance reflect a substantial shift in the 'Euro Class' composition of the heavy vehicle fleet. Operation of dirtier vehicles in the lower Euro emissions classes have been virtually eliminated, as operators have upgraded to vehicles that meet (or in many cases exceed) the basic minimum requirements for the scheme.
- These shifts in the emissions profile of goods vehicles operating in London have led to substantial savings in emissions of Particulate Matter PM_{10}, this being particularly critical to London's projected ability to meet the limit values for PM_{10} by the extended compliance date of 2011, as set out in the Mayor's Air Quality Strategy. Importantly, the savings from the scheme effectively and differentially target the most harmful components of PM_{10} to health - $PM_{2.5}$ and Black Carbon.
- These shifts have also led to overall savings in emissions of NO_x at the London-wide level, which should contribute to reduced concentrations of NO_2, a pollutant of concern for reasons of public health and also subject to limit values that is still some way from being achieved near to roads in London.

Emissions savings

- It is estimated, based on observed data, that the scheme has directly produced savings of 28 tonnes of PM_{10}, 26 tonnes of $PM_{2.5}$ (the most harmful portion of PM_{10}), and 529 tonnes of NO_x. These savings are on a 'whole-year-equivalent' basis for the first two phases of the scheme, and relate to the year 2008. These savings are comparable to those forecast by TfL prior to the introduction of the scheme.
- For PM_{10} they represent a 3.6 per cent saving of road traffic exhaust emissions, and a 1.9 per cent saving of total road traffic PM_{10} emissions in London. For $PM_{2.5}$, they represent a 3.7 per cent saving of road traffic exhaust emissions, and a 2.4 per cent reduction to total road traffic emissions in London. For NO_x they reflect a 2 per cent saving of total road traffic exhaust emissions. Again, these figures relate to 2008, on a 'whole year' basis, and reflect the implementation of both phases 1 and 2 of the scheme.
- These values exclude the dramatic reductions to particulate emissions from the TfL bus fleet achieved separately but as part of wider efforts to improve air quality in London (these vehicles are included in phase 2 of the LEZ scheme).
- All TfL's buses were brought to (at least) a minimum state of compliance with the requirements of the scheme well ahead of the scheme implementation date. Tailpipe exhaust emissions of PM_{10} from TfL's buses have reduced by around 90 per cent since year 2000, despite a 32 per cent increase in vehicle kilometres operated.

Impacts on air quality

- In terms of concentrations of key pollutants in the atmosphere, these emissions savings translate through to estimated (modelled) average savings of 0.03 micrograms of PM_{10} on an annual average basis. This value is however an average across the whole of Greater London, little of which is located close to busy roads and is not therefore very meaningful in isolation.
- More relevant is the achieved concentration reductions in the more heavily-polluted locations, which can reach up to 0.5 micrograms for PM_{10}. In this way, LEZ delivers benefits at those areas that are most in need, reflecting the relative importance of emissions from diesel vehicles at these locations.
- Furthermore, because the daily mean exceedence value (the limit value that is most challenging to meet in London) is very sensitive to small changes in average concentrations, these 'targeted' reductions are crucial for London's projected ability to achieve compliance with the limit value by the extended compliance date of 2011, as projected by both the GLA in the Mayor's Air Quality Strategy and in the UK's recent time extension notification application to the European Commission.
- The position with NO_x/NO_2 is more complicated, as it is now widely recognised that certain pollution abatement devices - designed to reduce emissions of particulate matter - can have an adverse impact on direct emissions of Nitrogen Dioxide (NO_2). Thus, although the LEZ scheme results in significant overall savings to NO_x emissions, these do not directly feed through to reduced out-turn concentrations of NO_2, particularly close to the roadside.
- Nevertheless, the scheme is estimated to have reduced average concentrations of NO_2 across London by 0.12 micrograms, with peak reductions of up to 0.16 micrograms, these largest reductions being found some small distance away

from major roads, rather than immediately adjacent to the road itself (reflecting NO_x/NO_2 conversion dynamics in the vicinity of the road centreline).

- Although valuable in view of London's need to achieve the limit value for NO_2 as soon as possible (pending an expected UK application to the European Commission for a time extension until 2015) much greater reductions are required. Future developments to the LEZ scheme are therefore proposed to target NO_2 concentrations more specifically (with additional co-benefits for particulate) for which improvements to both vehicle/abatement technology and its certification as part of a national framework are important prerequisites.
- Despite the relatively small absolute magnitude of these concentration reductions overall, LEZ targets savings where they are most needed, most readily feasible, most effective, and at the pollutants of most immediate health and regulatory concern.

The LEZ scheme and measured air quality

- Because of the high 'background' variability inherent in the measurement of ambient air quality trends, and the multiplicity of other factors affecting air quality, which incidentally includes many other local, national and international air quality improvement initiatives all operating at the same time, it is not yet possible to quantify definitively a 'LEZ effect' component of general air quality trends.
- Nevertheless, PM_{10} concentrations across Greater London have reduced considerably over recent years. The latest measurements suggest that London is likely to comply successfully with the limit value for PM_{10} by 2011, and LEZ will have played an important part in making this possible.
- This trend of reducing PM_{10} has also been seen in other UK urban areas. These areas will also have benefitted indirectly from the improvement to vehicle fleets arising from the London scheme, and will have experienced - broadly - the same air quality benefits from non-scheme initiatives, as well as trends in regional climate, which particularly affect PM_{10} concentrations.
- Trends in NO_2 concentrations have, in recent years, failed to respond to reductions in NO_x emissions - average concentrations in 2009 in London were not dissimilar from those of 2004. This has also been seen more widely outside London and across Europe, and is thought to reflect the increased emission of 'primary NO_2' from newer diesel-engined vehicles and abatement equipment designed to reduce emissions of PM_{10}.
- To identify a 'scheme specific' impact on ambient concentrations in London, therefore, it is necessary to look beyond the overall regional trends and mass-based measurements at specific features that may reflect a 'signal' that reflects the various stages of the LEZ scheme.
- One such indicator is trends in Black Carbon - a component of particulate matter that, in urban areas, is closely analogous to $PM_{2.5}$, and which arises almost exclusively from diesel vehicle exhaust (ie it is a good reflection of emissions trends for vehicles in-scope for LEZ).
- This is not routinely monitored in London, but at the two sites where concentrations are monitored, both immediately adjacent to busy roads, the trends are highly suggestive of beneficial impacts – reflecting the trend in vehicle compliance with the scheme.

- The particular significance of this is that Black Carbon is recognised as one of the most toxic components of particulate matter - and the observed reductions of (typically) between 40 and 50 per cent, between mid 2006 and end 2009, in significant part from the scheme, reflect a substantial and beneficial change to the 'toxicity level' of particulate emissions, even if the small particle mass involved is not immediately recognisable in the overall PM_{10} (mass-based) trends.

12.3 Background to the scheme

Contribution to improving air quality in London

The London LEZ scheme is designed to reduce the emission of harmful air pollutants from the most individually-polluting diesel vehicles on the road and, in conjunction with a wider range of air quality improvement initiatives, to help London move towards achievement of limit values for air quality. London's current and expected future position in this regard is set out in the Mayor's Air Quality Strategy, from which it is clear that:

- Compliance with limit values for PM_{10} by the extended deadline of 2011 is achievable, though by a relatively small margin at certain heavily-trafficked locations. In part, this position reflects the impact of the earlier phases of the LEZ scheme, and looks forward to the introduction of vans and minibuses in the scheme from January 2011 (phase 3), together with a tightening of emissions standards for phases 1 and 2 of the scheme in 2012 (phase 4).
- NO_2 is still likely to be a significant problem in 2015, the latest possible extended date for compliance with the relevant limit value, and concerted action is required by a wide range of stakeholders, including Government, if the limit values are to be achieved by this extended compliance date.
- Much of London's air quality problems reflect road traffic emissions and urban density. Although these are certainly not the only factors in determining London's pollution geography (indeed, the majority of PM_{10} in the air is not immediately susceptible to action at the London level), road traffic is a major contributor whose emissions can be effectively addressed by Mayoral policy initiatives.

How the scheme works

The London LEZ works by requiring operators of larger diesel-engined vehicles in London to meet minimum emissions standards from certain specified dates. The scheme operates 24 hours a day, 365 days per year, and covers the Greater London area. The scheme as currently conceived has four 'phases', two of which are operational. The first phase applied to heavy goods vehicles over 12 tonnes maximum gross vehicle weight and was effective from 4 February 2008. The second phase of the scheme, affecting buses, coaches and medium or lighter goods vehicles of between 3.5 and 12 tonnes maximum gross vehicle weight, came into effect on 7 July 2008.

From the date of each individual phase of the scheme, operators of affected vehicles in London were required to ensure that their vehicle met the minimum applicable 'Euro' PM emissions standard (Euro III for LEZ phases 1 and 2). If this is not the case, then operators of non-exempt vehicles that do not comply with the requirements of the scheme are subject to a daily charge of £200 (£100 for vans and minibuses). This amount is set so as to encourage operators to take steps to make their vehicles

compliant, thereby delivering air quality benefits, rather than to continue to operate non-compliant vehicles in London.

Scheme benefits

Figure 12.1 shows the general nature of scheme impacts on the emissions performance of vehicles operating in London. The scheme works by bringing forward the otherwise natural, or 'background' process of fleet replacement by vehicle operators (reflecting the purchase of newer vehicles on life/economic expiry of their existing fleet, which are manufactured to progressively higher Euro PM emissions standards). Each phase therefore delivers maximum air quality benefits shortly after introduction, the benefits then tapering as natural fleet turnover would otherwise have 'caught up' with the mandated minimum Euro emission standard. In this way, the air quality benefits arising from current phases of the scheme become 'locked in', and further improvements can be sought through future phases specifying progressively higher minimum emissions standards.

Figure 12.1 General nature of scheme impacts on emissions performance of vehicles.

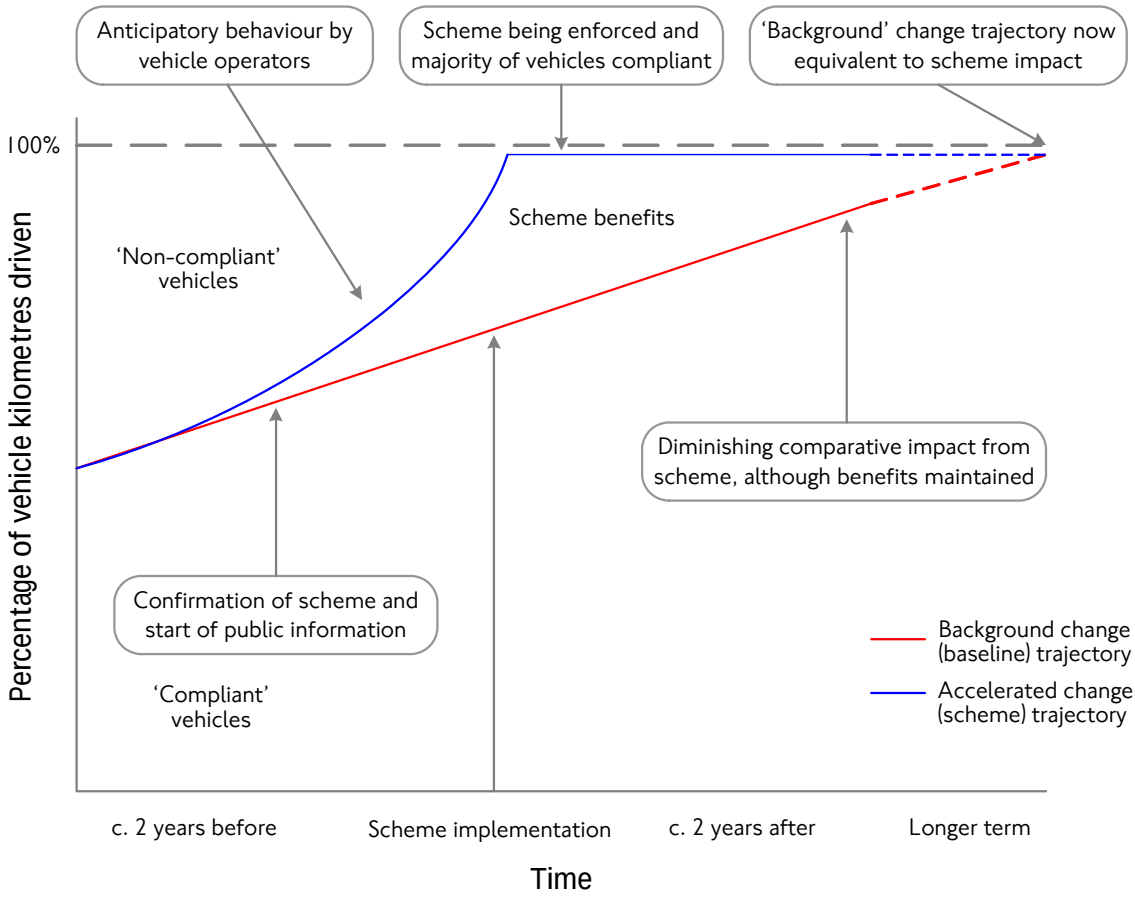
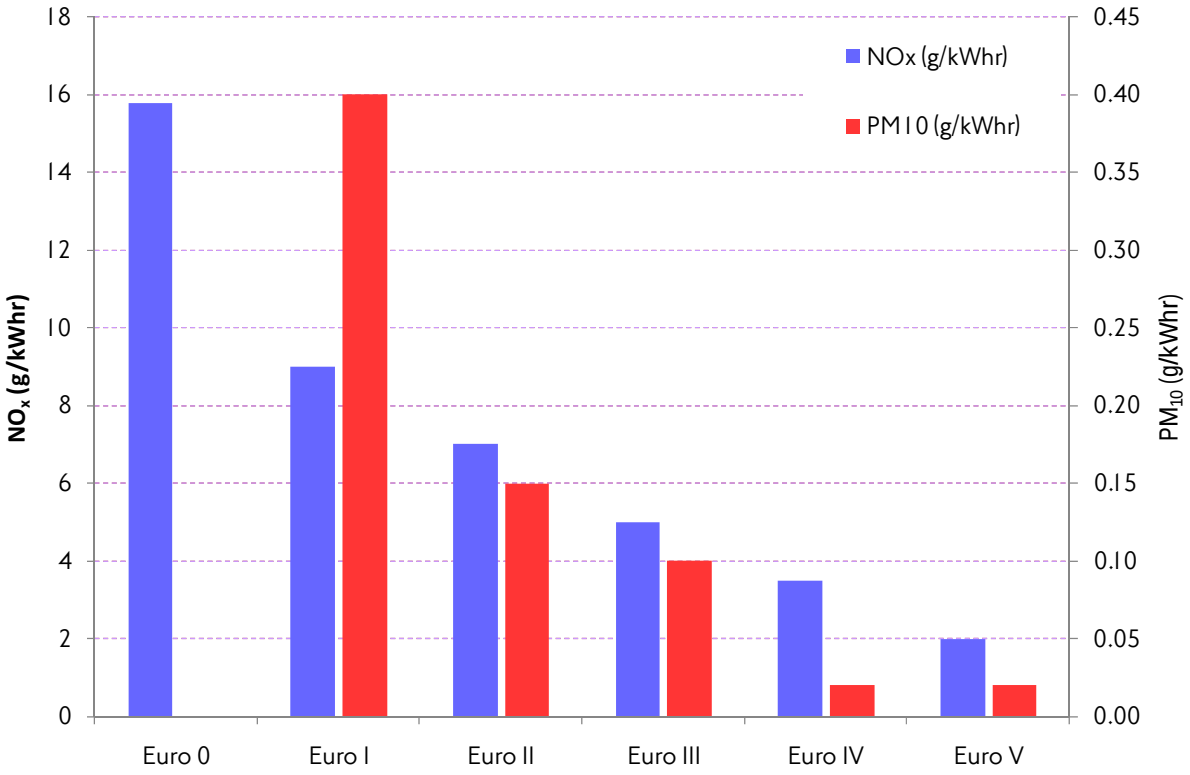


Figure 12.2 shows the reduction in emissions to be expected from progressively higher Euro emissions standards. Although these values may not necessarily reflect 'real-world' performance, the progressive and (over the complete spectrum) very substantial reductions in emissions of PM_{10} are clear. For example, a Euro 3 HGV can be expected to emit 33 per cent less PM_{10} than an equivalent Euro 2 vehicle, and 75 per cent less than an equivalent Euro 1 vehicle.

Figure 12.2 Emissions reductions associated with progressive Euro emissions standards. Example based on Class N2 heavy goods vehicles.



Typology of impacts from scheme

Key impacts from the scheme follow a hierarchical progression that was outlined in TfL's Baseline Monitoring Report. In summary:

- The most immediate indicator of the 'success' of the phase/scheme is the observed vehicle compliance rate for vehicles operating within the zone.
- This, in turn, reflects a shift in the Euro emissions class composition of the affected part of the vehicle fleet in London, involving various degrees of shifting up the 'Euro' emissions class progression.
- By characterising this shift, it is possible to calculate the attributable emissions saving from the phase/scheme, using an emissions inventory/model and the observed vehicle composition in terms of 'Euro' class (derived from camera-based measurements of traffic), against a 'no-scheme/phase' baseline.
- Given a calculated emissions impact, the attributable impact of the scheme on the concentration of key pollutants can also be calculated (modelled) and mapped at a spatially-disaggregate level.
- At this point, it is possible to compare a modelled estimate, albeit based on observed data, of scheme impacts on pollutant concentrations against the actual

observed change in concentrations, as established through the 100 or so ambient air quality monitoring sites in London.

- However, these measured air quality trends reflect the aggregate influence of the scheme, as well as the multiplicity of non-scheme factors that determine air quality in London. Among these, in particular, are the high degree of climatic-induced variability in prevailing concentrations from year-to-year, and the parallel impact of other air pollution reduction measures.
- This means that it is not generally possible to recognise or quantify, either informally or through more rigorous statistical treatment, an attributable change in prevailing observed pollution concentrations in London over the short-to-medium term.
- However, it can be said with certainty that prevailing concentrations of particulate matter in London will be lower than they would otherwise have been in the absence of a scheme/phase, by approximately the amount identified by the air quality model.

In this way, the currently-operating phases of the scheme are an important contributory factor to London's projected ability, given the additional measures outlined in the Mayor's Air Quality Strategy, to meet limit values for PM_{10} in 2011. Likewise, they are currently delivering air quality benefits for London and contributing to wider goals such as the improvement of public health.

The following sections set out the latest available information regarding the impacts of the first two phases of the scheme, reflecting observed conditions and using new data from Automatic Number Plate Reading (ANPR) cameras.

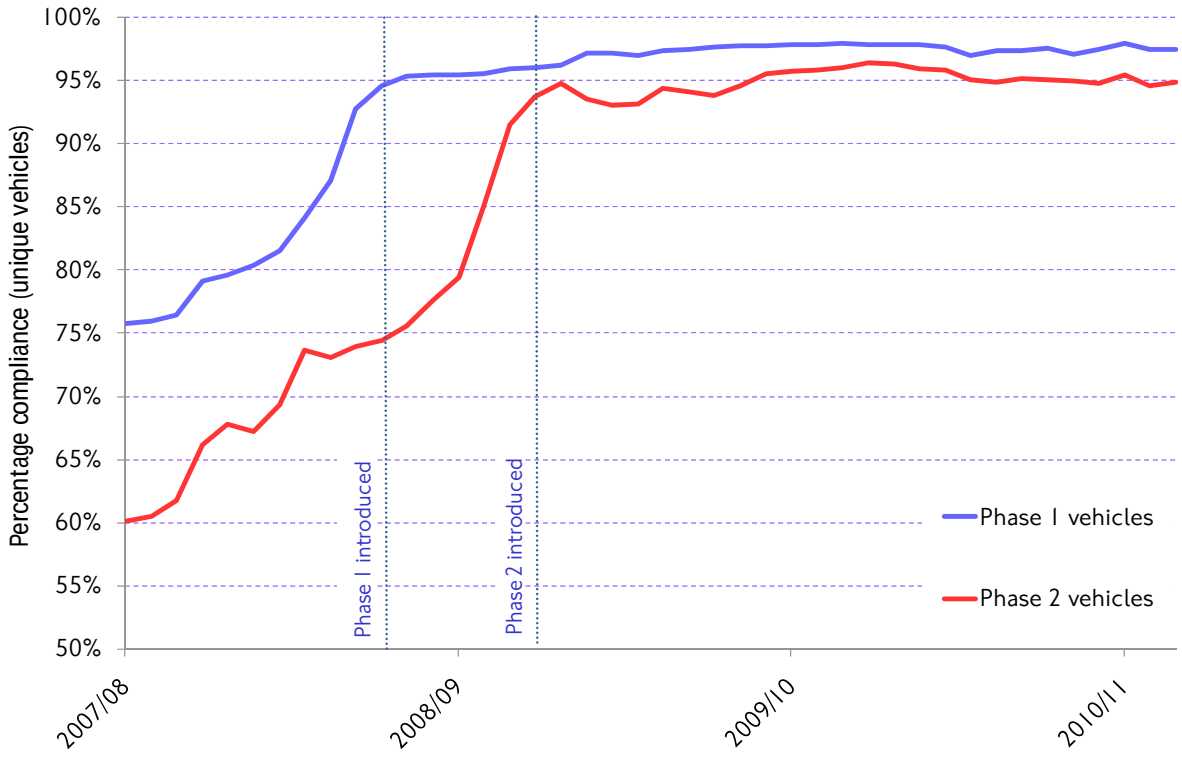
12.4 Compliance with the requirements of the scheme

Compliance with the requirements of the first two phases of the scheme is denoted by in-scope vehicles operating within Greater London achieving a minimum Euro III emissions standard. Vehicles not achieving the required standard (ie Euro II or below) are subject to a daily charge, set at a level so as to present an effective economic deterrent. Vehicle operators could achieve compliance with the scheme either by (a) replacing older vehicles with new or newer ones, being made at that stage to emission standards of Euro III or higher; (b) upgrading existing vehicles through fitting of pollution abatement devices, such as particulate traps; (c) reorganising their fleet so that only cleaner vehicles operate in Greater London, or (d) converting the vehicle to use an approved alternative fuel.

Compliance rates with the scheme

Figure 12.3 shows the trend in the measured compliance rates for vehicles that are in-scope for either phase 1 or phase 2 of the scheme, which became effective in February and July 2008 respectively.

Figure 12.3 Trend in vehicle compliance (% of vehicles observed in zone) for LEZ phases 1 and 2.



Source: TfL

Looking firstly at the compliance trend for vehicles that are in scope for phase 1 of the scheme (blue line):

- Eight months before the introduction of the scheme, in mid-2007, prevailing 'shadow compliance rates' for phase 1 vehicles operating in London were around 75 per cent, meaning that around one fifth of these vehicles were of Euro 2 emissions standard or lower, and therefore not compliant with the scheme.
- During 2007, when the Mayor had already confirmed his intention to introduce the scheme supported by an extensive public information campaign by TfL, the 'shadow compliance rate' for phase 1 vehicles rose substantially, to approach 90 per cent just prior to the actual introduction of the first phase of the scheme in early 2008.
- This reflected 'pre-compliance' by vehicle operators, in terms of taking action in advance of the scheme to upgrade their vehicles (this generally requiring a period of time to accomplish). In this way, the scheme was effective in delivering air quality benefits ahead of the formal implementation date of the scheme itself.
- During the first few months of the operation of phase 1 in 2008 compliance rates continued to rise, reaching the mid-90 per cent level during the summer and continuing to climb progressively since then. Compliance rates during 2010 are consistently between 97 and 98 per cent, on a 'unique vehicle' basis.
- Equivalent compliance rates on a 'kilometres driven' basis are typically a percentage point or two higher, both statistics representing almost 100 per cent compliance with the scheme, given that there will be a small number of exempt vehicles and vehicles whose operators attempt to evade the requirements of the scheme.

Looking at the equivalent trend for vehicles that are in scope for phase 2 of the scheme, the essential features of the compliance trend for these vehicles are similar to phase 1, with the exception that (a) prevailing 'shadow compliance' rates for phase 2 were just over 60 per cent one year before the introduction of the scheme, somewhat lower than for phase 1 vehicles, and (b) the settled achieved compliance rates, of typically between 95 and 96 per cent on a unique vehicle basis, are marginally lower than for phase 1. In part, this lower compliance rate reflects a more 'captive' vehicle fleet in the Greater London area for these smaller vehicles, and per-kilometre compliance rates again show percentage values typically 1 to 2 points higher than estimates based on unique vehicles.

Enforcement of the requirements of the scheme

These consistently high compliance rates reflect the strong enforcement infrastructure associated with the scheme. This involves dedicated ANPR number plate-reading enforcement cameras located across the London road network, backed up by a database that allows TfL to classify vehicles by their compliance status and a formal enforcement process for non-compliance.

The option of paying a daily charge is intended as something of a 'last resort' for very occasional visitors to London whose vehicles are not compliant. Clearly, the level of the charge means that for other than very occasional visitors, it is economically rational to bring vehicles to a state of compliance with the scheme rather than to pay the charge. Recent operational data shows that about 100 individual LEZ charges (for UK registered vehicles) were paid per week during 2009. The recent trend is for a very slow decrease in this number. Additionally, between 20 and 40 charges for foreign-registered vehicles were paid per week, with no clear recent trend. The number of charges paid are, as expected, very small in relation to the total number of vehicles in the zone. TfL's income from these charges does not, and is not expected to, cover the immediate operational cost of the scheme.

12.5 Impact on emissions performance of affected vehicle fleets

TfL measures the emissions performance of vehicles operating in London using number plate-reading cameras (ANPR). This is a proven technology that is used (taking full account of Data Protection principles) to sample vehicle flows at various points on the road network, using Driver and Vehicle Licensing Authority (DVLA) and other data to classify observations into Euro emissions classes. LEZ monitoring uses data from a statistical sample of 100 cameras, placed so as to be representative of heavy vehicle flows in London.

Phase 1 vehicles example

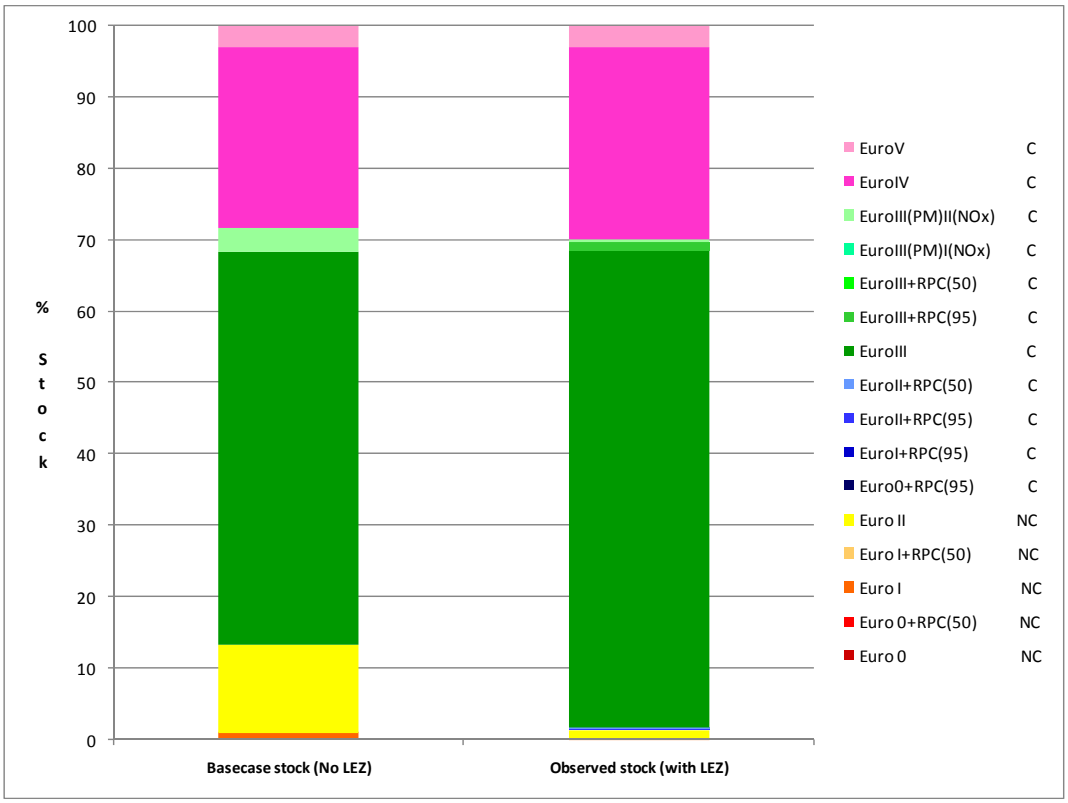
The graphics below (Figures 12.4 and 12.5) illustrate the observed changes to the Euro emissions class structure of vehicles operating in London, showing the detail of how these overall compliance rates are being achieved. Each graphic has two bars. The left hand bar in each case reflects a 'business-as-usual' scenario for end 2008 assuming no scheme. This has been derived from national estimates of vehicle stock, modified in certain respects to account for specific conditions in London. In other words, it is a revised 'base' scenario to that used originally to forecast the impacts of the scheme. It is partially based on newly-available camera observations that have been used to update the national fleet profiles for London, and therefore differs in certain respects from previous TfL estimates of the 'base case' for the scheme. The right-hand bar shows actual camera-based observations of vehicles, again for the end of 2008,

reflecting kilometres driven, with vehicles classified according to the 'Business Rules' applied by TfL to determine compliance with the scheme. This *inter alia* classifies vehicles by Euro emissions class, including details of how vehicles comply with the scheme (such as retrofitting of various types of pollution abatement equipment).

Note that these graphics relate to an 'end 2008' position, when operator behaviour in respect of both initial phases of the scheme can have been considered to be settled, and the difference between 'with-scheme' and 'without-scheme' cases would be close to (but not at) the maximum. In this latter respect, although compliance rates with the scheme are maximised, in the 'no-scheme' case, natural fleet turnover between the start and end of 2008 would have continued to improve 'shadow compliance' rates in the absence of the scheme, by up to about 3 to 4 percentage points. This analysis therefore tends to somewhat understate the true 'attributable' impact of the scheme.

Looking firstly at Figure 12.4 (for heavy articulated goods vehicles), fleet profile measurements suggest that in the absence of a scheme approximately 13 per cent of these vehicles operating in London at the end of 2008 would not have been compliant (ie of Euro II emissions class or lower). The observed profile with the scheme in operation shows that non-compliance has fallen to about 3 per cent, consistent with the overall compliance rate (see section 12.4 of this report).

Figure 12.4 LEZ phase 1 - before/after Euro Class profile of vehicles in London. Articulated goods vehicles (>12 tonnes weight).

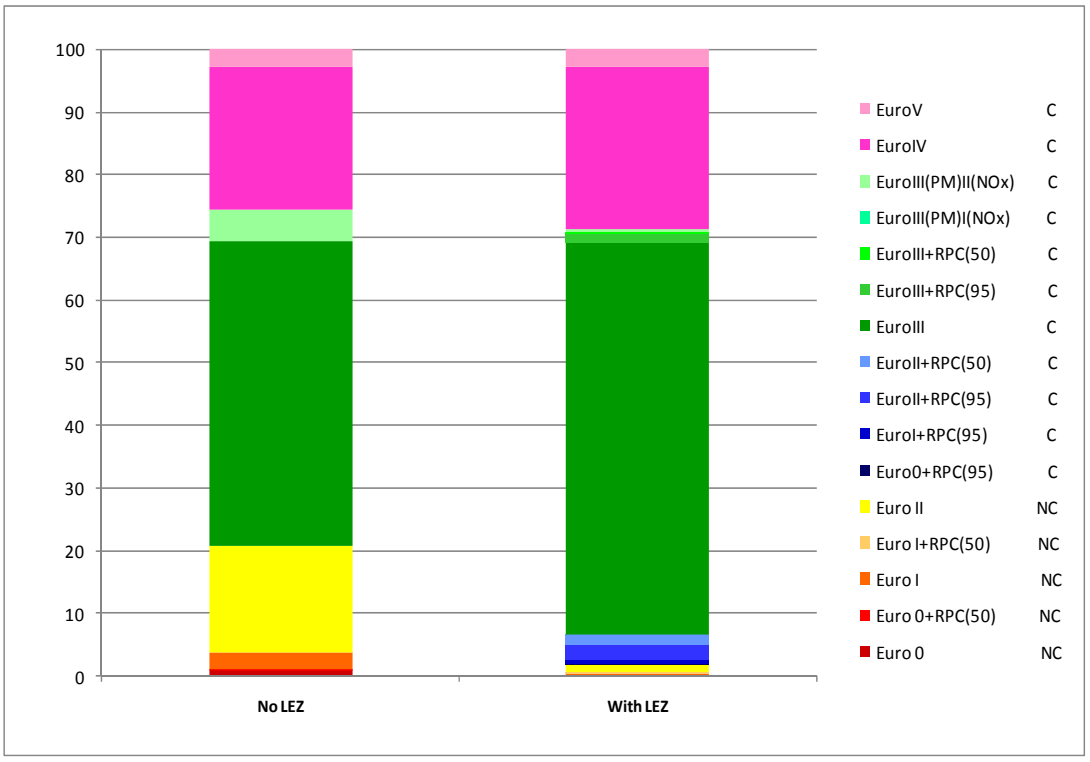


Source: Kings College Environmental Research Group, based on data from TfL.

In this case, the graphic suggests that to a large extent most of the transformation has resulted from operators upgrading from former Euro II vehicles or below to Euro III, with little evidence of 'trading up' to higher Euro classes. However, it is necessary to recognise that the two scenarios show equivalent cross-sectional 'out-turn' views at the same point in time - they do not therefore, of themselves, allow examination

of 'routes to compliance' over a longer time-period (ie the different paths by which individual vehicles became compliant).

Figure 12.5 LEZ phase 1 - before/after Euro Class profile of vehicles in London. Rigid goods vehicles (>12 tonnes weight).



Source: Kings College Environmental Research Group, based on data from TfL.

Figure 12.5 shows the equivalent view for heavy rigid goods vehicles. The picture is broadly similar to that for articulated vehicles, although the 'shadow compliance' rate is just under 80 per cent, meaning that one-fifth of these vehicles operating in London would not have been compliant at the end of 2008 in the absence of a scheme. Achieved compliance rates at the end of 2008 were approximately 97 per cent, and here there is more evidence of a shift from vehicles of Euro Class II and below to newer vehicles in (particularly) Euro emissions class IV.

12.6 Impacts on emissions

Consideration of the observed fleet changes above leads directly to estimates of the impact of the scheme on pollutant emissions. This is achieved using the London Atmospheric Emissions Inventory, a well-established tool for air quality assessment in London. In particular, this assessment uses the latest version of the inventory, calibrated to the end of 2008.

Headline emissions impacts

Table 12.1 summarises the 'headline' results in terms of emissions savings directly attributable to the scheme (bottom three rows).

Table 12.1 Emissions of key pollutants for 2008 based on LEZ scenarios for Greater London area (tonnes per annum). Road traffic emissions only.

Scenario	NO_x	NO_2	CO_2	Total PM_{10}	Exhaust PM_{10}	Total $PM_{2.5}$	Exhaust $PM_{2.5}$
Base case - No LEZ	26,227	4,401	7,279,780	1,498	778	1,073	695
Observed LEZ phase 1	25,890	4,460	7,281,584	1,483	763	1,059	681
Observed LEZ phase 2	26,035	4,458	7,282,219	1,485	765	1,061	683
LEZ phase 1 impact	-337	59	1,804	-15	-15	-14	-14
LEZ phase 2 impact	-192	57	2,439	-13	-13	-12	-12
LEZ phase 1&2 impact	-529	116	4,243	-28	-28	-26	-26

Source: Kings College Environmental Research Group, based on data from TfI..

Reducing emissions of particulate matter is the primary objective of phases 1 and 2 of the scheme. In brief:

- 1,498 tonnes of PM_{10} would have been emitted from road traffic in 2008 in the absence of LEZ. About 48 per cent of this 'road traffic' PM_{10} arose from tyre and brake wear as opposed to the vehicle exhaust, and as such this component is not able to be reduced by the LEZ scheme. Of the remaining 52 per cent, or 778 tonnes, LEZ phases 1 and 2 (combined) resulted in an attributable saving of 28 tonnes (or 3.6 per cent).
- $PM_{2.5}$ is a sub-set of PM_{10}, reflecting the finer fraction of particles. Particles in this size range are more closely associated with diesel vehicle exhaust, and are thought to be more harmful to health as they have the ability to penetrate more deeply into the airways and are chemically more toxic.
- 1,073 tonnes of $PM_{2.5}$ would have been emitted from road traffic in 2008 in the absence of the LEZ. About 35 per cent of this arose from tyre and brake wear and is therefore not able to be reduced by the LEZ scheme. Of the remaining 65 per cent, or 695 tonnes, LEZ phases 1 and 2 (combined) resulted in an attributable saving of 26 tonnes (or 3.7 per cent). These values, for the $PM_{2.5}$ component, are subsumed in the total for PM_{10} (ie PM_{10} mass includes $PM_{2.5}$).

In terms of the impact of the scheme on emissions of other pollutants:

- 26,227 tonnes of NO_x would have been emitted from road traffic in Greater London in 2008 in the absence of the LEZ. All of this arose from vehicle exhaust. LEZ phases 1 and 2 (combined) resulted in attributable savings of 529 tonnes, or 2 per cent.
- The scheme is not designed or expected to reduce emissions of CO_2, and the modelling suggests a neutral effect overall.

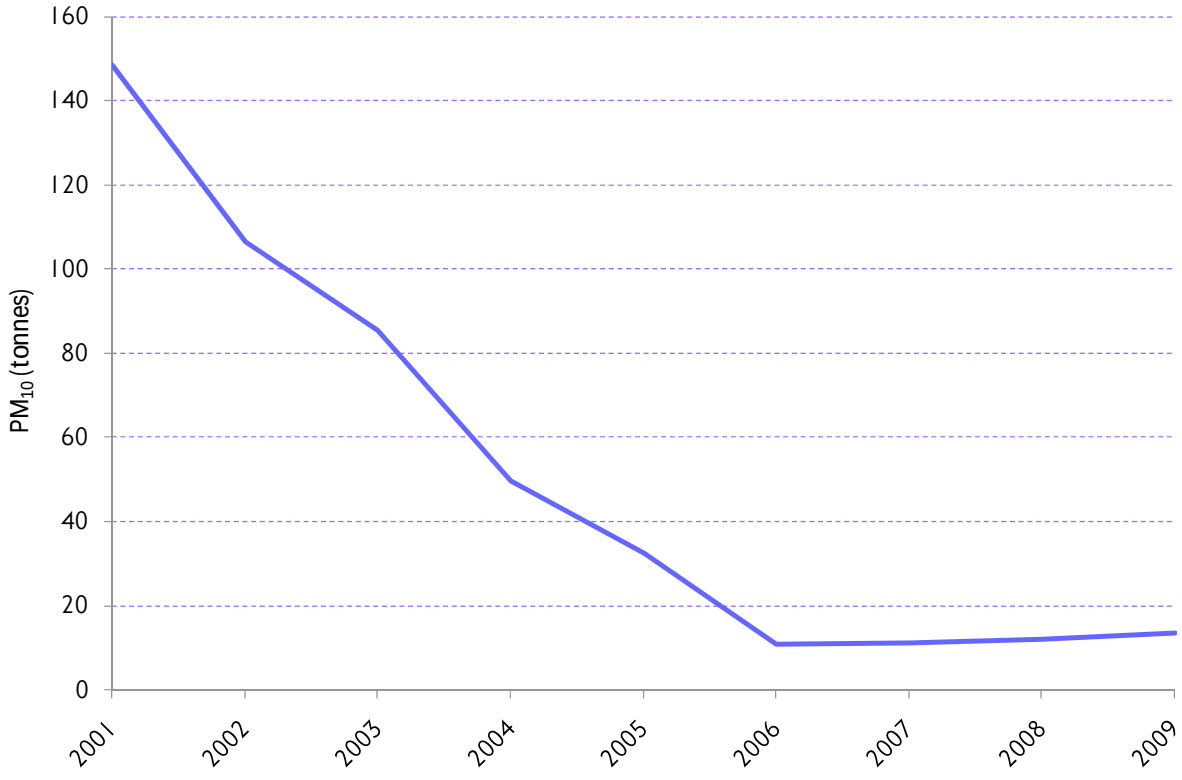
The tonnages and tonnage savings shown in Table 12.1 relate to the GLA area only. The beneficial effects of LEZ extend well beyond this area, and indeed operate on a national scale, as operators whose vehicles were brought to a state of compliance for the London scheme travel more widely on the national road network.

A note about TfL's bus fleet

TfL buses are included in phase 2 of the scheme. However, improvements to the emissions performance of the TfL bus fleet primarily reflects the wider set of policy initiatives by the Mayor and TfL to improve air quality in London. So, the TfL bus fleet met the LEZ emission standard of Euro III well ahead of the actual implementation date of the scheme. The savings of PM_{10} from these actions are therefore not captured in the modelling work described above, which looks at an end of 2008 scenario, although they are, at least in part, additional 'attributable' benefits from the scheme itself.

Figure 12.6 shows the trend in exhaust emissions (only) of PM_{10} from the TfL bus fleet from year 2001 to 2009 – a much longer period than that of specific interest for LEZ impacts. Exhaust emissions of PM_{10} from TfL buses have dropped by around 90 per cent – from about 140 tonnes in 2000 to about 14 tonnes in 2009 – this is despite the approximate 33 per cent increase in bus vehicle kilometres operated over this period. The trend of reduction was both substantial and continuous up to 2006, reflecting the retrofit of all Euro II and Euro III buses with particulate traps. More recent years have seen a slight increase in total emissions, albeit from a much-reduced total, reflecting the progressive expansion of the bus network over this period (see also section 4.11 of this report).

Figure 12.6 Particulate emissions from TfL's bus fleet (tailpipe exhaust emissions only).



Source: TfL buses.

Relationship to TfL's projections for the scheme

The reductions set out above reflect TfL's latest assessment of the impact of the scheme on emissions. They show reductions comparable to those previously forecast by TfL for the scheme, but since both the 'base' and 'scheme' cases have been updated to reflect new observed data and emissions factors, and an updated version of the LAEI has been used, the details of the calculations differ in several respects from those previously published by TfL. The emission reductions, although small in absolute terms, are a crucial factor in London's projected ability to meet the limit value for PM_{10} by the extended compliance date of 2011, alongside all other policies set out in the Mayor's strategies.

12.7 Impacts on concentrations of key pollutants in the atmosphere

As demonstrated above, the LEZ scheme reduces emissions of harmful pollutants to air. All other things being equal, these reduced emissions will feed through to reduced concentrations of pollutants in the air that people breathe. In other words, the air in London is cleaner, because of the LEZ, than it would otherwise be were there no LEZ.

Detecting and attributing an impact from the scheme

Demonstrating this robustly, using observed concentration data, and quantifying the extent to which the scheme itself is responsible for the overall observed change presents many challenges. Some of the more important are:

- Natural climatic and seasonal variability mean that a relatively long-run dataset is required so that these can be statistically accounted for.
- There are no ideal spatial or temporal analogues, or 'controls' against which air quality trends in London can be compared, given London's size and uniqueness and the confounding effect of variations in climate between cities.
- There are many factors affecting air quality - most of which are wholly independent of the scheme, and some of which are potentially confounding, such as increased primary NO_2 from PM_{10} abatement devices (see also below).

So, it is necessary to use a variety of methods in combination to begin to quantify the attributable impact of the scheme on observed pollutant concentrations in London.

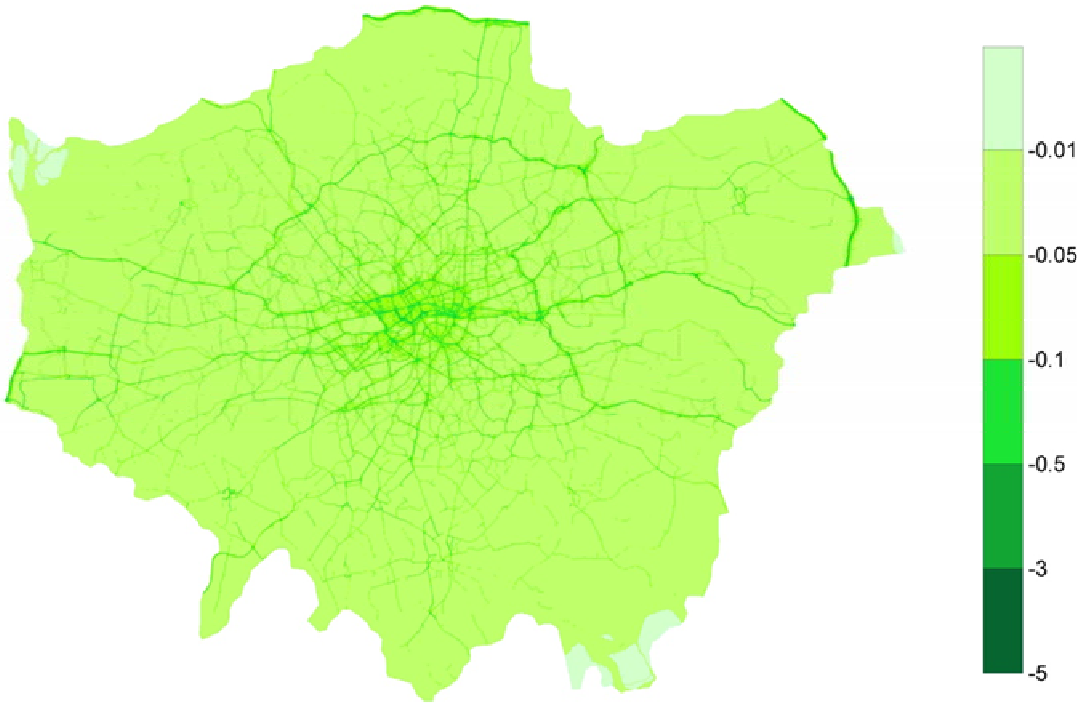
Modelled impact of air quality change from scheme

It is possible to use an air quality model to quantify the reduction in pollutant concentrations attributable to the scheme, based on the disaggregate emissions estimates discussed above. As with the emissions estimate, the use of a model allows all other variables to be held constant, so that equivalent scenarios with/without the scheme can be compared, and the attributable scheme impact quantified.

Figure 12.7 shows the estimated reduction in annual average concentrations of PM_{10} across Greater London, reflecting implementation of phases 1 and 2 of the LEZ scheme. The map shows that the whole of the Greater London area experiences a benefit - albeit small in many locations. As might be expected, higher reductions are associated with the road network, particularly towards central London. Indeed, the reduction close to busy roads in central London is many times the average impact - an important feature that is further described below. To put these values in context,

representative annual mean PM_{10} concentrations in London in 2008 ranged from about 20 micrograms (Outer London) to between 30 and 35 micrograms (central London).

Figure 12.7 Impact of phases 1 and 2 of LEZ scheme on concentrations of PM_{10}. Reductions attributable to scheme, micrograms, 2008 annual mean concentrations.



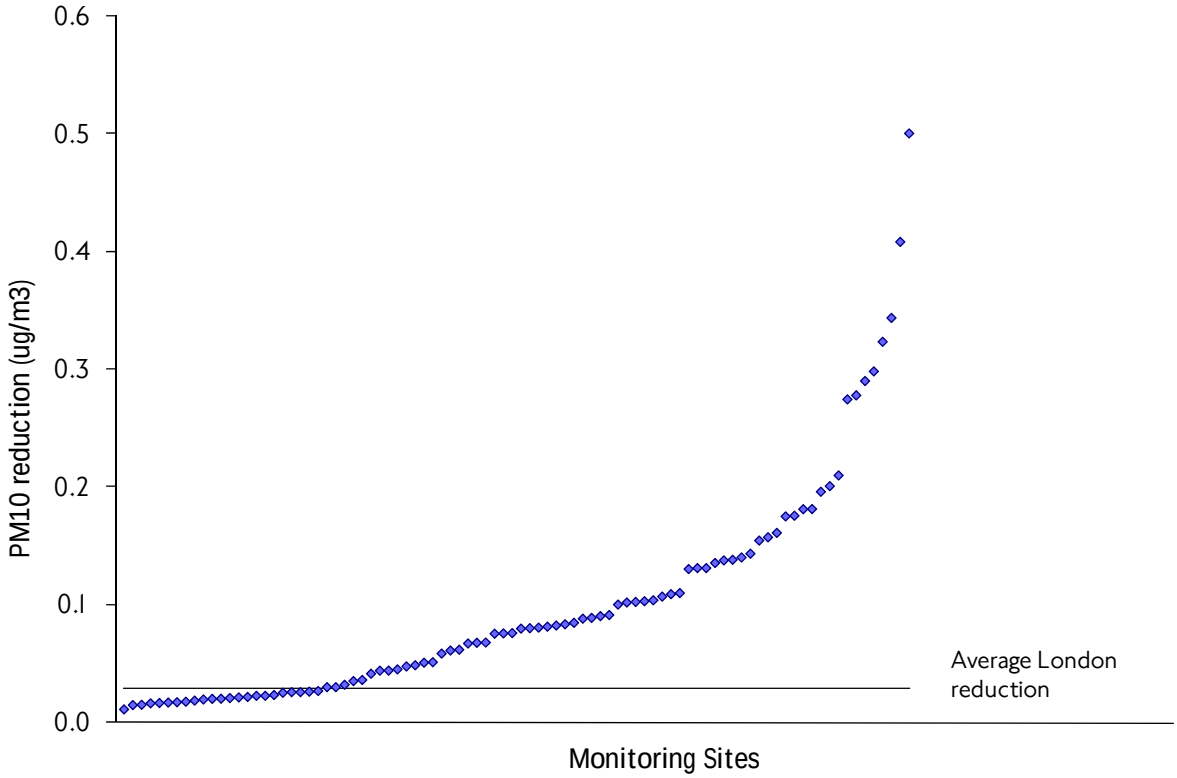
Source: Transport for London, based on data from Kings College Environmental Research Group.

Receptor-based analysis of concentration reduction from scheme

The scheme impact can also be represented in terms of site-specific concentration reductions attributable to the scheme, which draws out the much greater beneficial impact of the scheme at locations with the poorest air quality, as shown by Figure 12.8. Here, the blue dots represent individual air quality monitoring sites within London, ranked according to the prevailing ambient concentrations (X axis) and the modelled reduction in PM_{10} concentration (annual average, micrograms - Y axis) at each site that is, directly attributable from the modelling, to the first two phases of the LEZ scheme.

The black horizontal bar shows the average concentration reduction across the Greater London land area, most of which is of course not in close proximity to major roads. It is immediately apparent that reductions at most sites are considerably in excess of the London average, with those at particularly polluted sites, such as Marylebone Road, exceeding the average by a factor of 15 or more. Sites showing reductions less than the London average are 'background' type sites, generally not directly influenced by major roads.

Figure 12.8 Reduction in annual average PM_{10} concentration from phases 1 and 2 of LEZ at individual air quality monitoring sites. 2008 annual average, micrograms.



Source: Transport for London, based on data from Kings College Environmental Research Group.

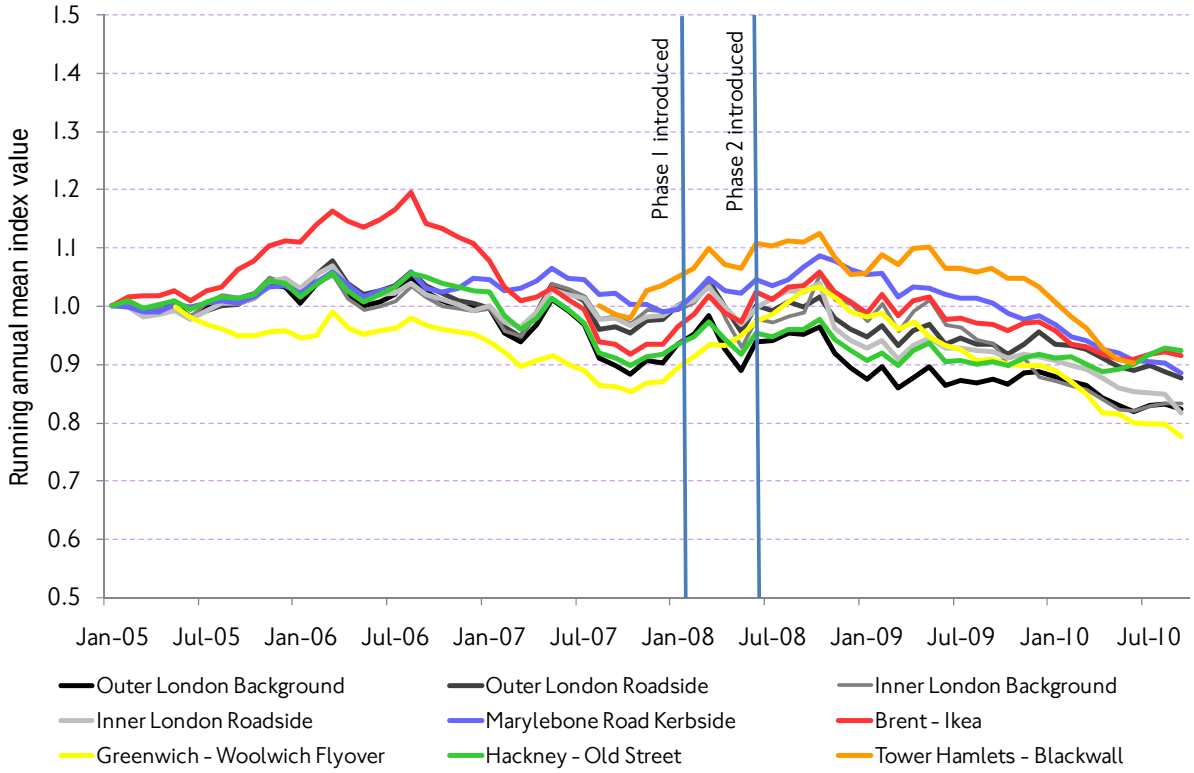
Looking at these results, it is clear that LEZ delivers the greatest improvement where it is most needed - and in this sense it is a policy that is effectively targeted to the problem that it seeks to ameliorate.

Ambient pollution concentration trends

General trends in concentrations of key pollutants across London were described in section 9.9 of this report. Figure 12.9 shows a more disaggregate analysis of PM_{10} trends, looking a site groupings and timescales of particular interest from the point of view of assessing scheme impacts. Lines in black/grey show trends for, respectively, Inner and Outer London roadside and background sites, grouped to show an average trend. Lines in other colours superimposed on these relate to specific individual enhanced LEZ monitoring sites. These are sites that lie adjacent to busy roads that have been specifically enhanced with additional equipment for the LEZ monitoring work.

Bearing in mind that LEZ should affect air quality across the whole of Greater London, and also the commentary on general trends already given in section 9.9, the general trend, direction and magnitude of change at enhanced monitoring sites is similar to that at the London-wide level. There is no clear evidence of a differential change, or reduction in PM_{10} concentrations, at these sites. Also, as would be expected, trends at individual sites tend to show greater variability than trends averaged across several sites.

Figure 12.9 Trend in measured PM_{10} concentrations. Index value, January 2005 = 1.00. Overall London trends (black/grey) and trend at LEZ enhanced monitoring sites (other colours).



Source: Transport for London, based on data from Kings College Environmental Research Group.

Nevertheless, the LEZ scheme has always been part of a package of measures to tackle poor air quality in London. PM_{10} concentrations across London have indeed reduced significantly in recent years, such that most of London is now very close to meeting the limit value in 2011, and LEZ will have played a significant part in this achievement. It is however not readily possible to disaggregate the extent to which the first two phases of LEZ, alongside other interventions, taken forward at the local, national and EU level, and extraneous factors, such as climatic variation, are proportionately responsible for this aggregate change.

PM_{10} - source apportionment and chemical speciation

It is, however, possible to look a little more deeply at the details of trends at specific air quality monitoring sites that are likely to show a relatively high 'impact signal' from the scheme. This analysis reveals some encouraging changes - particularly in respect of the most harmful components of particulate matter - Black Carbon and $PM_{2.5}$. Black Carbon is the portion of particulate matter most closely correlated with adverse health effects. It can be used as a good indicator of emissions from diesel-fuelled road vehicles as there are no significant natural sources. Furthermore, the large majority of the emission is in the finer ($PM_{2.5}$) size fraction, which has the potential to penetrate more deeply into the human airways. However, because it consists mostly of very fine particles, a significant reduction to emissions of Black Carbon will not necessarily show up as large reductions to mass-based measures of PM_{10}, which is the key metric for establishing compliance with limit values.

As part of the LEZ monitoring work, five air quality monitoring sites that were located close to busy roads with comparatively high goods vehicle flows were supplemented with additional measurement equipment, including two aethalometers to measure Black Carbon (the only two operational devices at the time in London). Measurements from these sites, over the period June 2006 to January 2010, were subject to a 'meteorological normalisation' procedure that attempted to remove variability attributable to climatic variation from the trend. A second statistical procedure attempted to remove, so far as possible, the influence of variability from non-local pollution sources. This left a trend that would reflect, so far as possible, changes in emissions from the adjacent road.

Table 12.2 shows the degree of change in 'local normalised' concentrations of pollutants of interest at the five modified monitoring sites. At most sites, the change in concentration over the review period was not statistically significant, ie was within the bounds of uncertainty given the analysis method. However, concentrations of Black Carbon, $PM_{2.5}$ and NO_x decreased significantly at the Brent North Circular (A406) site. Concentrations of Black Carbon also decreased by 27 per cent at the Tower Hamlets (Blackwall A12) site. Both of these sites are adjacent to six-lane roads carrying high flows of goods vehicles. Conversely, concentrations of $PM_{2.5}$ increased at the Hackney (Old Street) site, which is unexpected given the prevailing trend and seems to reflect specific local factors.

Table 12.2 Difference in 'local normalised' mean pollutant concentrations at five roadside monitoring sites. 20 months prior to and 22 months post implementation of LEZ phase 1.

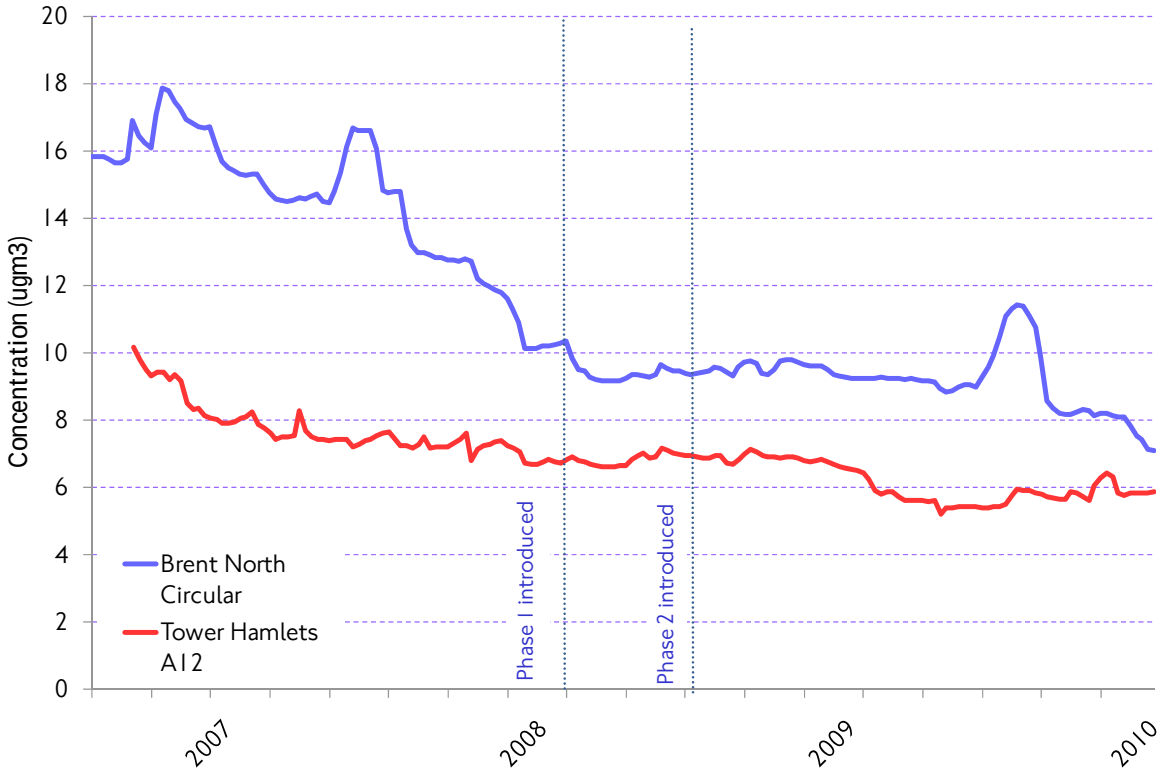
Pollutant/Units	Site[1]	Mean difference in concentration before/after[2]	Percentage change[3]
Black Carbon (ugm^{-3})	Brent 4 (North Circular)	**-6.9**	**-42%**
Black Carbon (ugm^{-3})	Tower Hamlets 4 (A12)	**-2.4**	**-27%**
$PM_{2.5}$ (ugm^{-3})	Brent 4 (North Circular)	**-2.6**	**-30%**
$PM_{2.5}$ (ugm^{-3})	Greenwich 8	-0.7	-6%
$PM_{2.5}$ (ugm^{-3})	Hackney 6	**+1.2**	**+40%**
$PM_{2.5}$ (ugm^{-3})	Marylebone Road	-0.3	-3%
$PM_{2.5}$ (ugm^{-3})	Tower Hamlets 4 (A12)	+1.0	+18%
PM_{10} (ugm^{-3})	Brent 4 (North Circular)	-1.6	-10%
PM_{10} (ugm^{-3})	Greenwich 8	+1.1	+6%
PM_{10} (ugm^{-3})	Hackney 6	-0.6	-9%
PM_{10} (ugm^{-3})	Marylebone Road	+0.7	+5%
PM_{10} (ugm^{-3})	Tower Hamlets 4 (A12)	+2.6	+24%
NO_x (ugm^{-3})	Brent 4 (North Circular)	**-65.9**	**-24%**
NO_x (ugm^{-3})	Greenwich 8	-12.8	-5%
NO_x (ugm^{-3})	Hackney 6	-6.1	-7%
NO_x (ugm^{-3})	Marylebone Road	-11.2	-4%

Source: Kings College London, Environmental Research Group.
1. Full site details and data are available through the London Air Quality Network website (www.londonair.org.uk/london/asp/default.asp?la_id=&showbulletins=&width=1280)
2. Comparing a period of 20 months before implementation of phase 1 of the scheme, in February 2008, with a period of 22 months following introduction of phase 1 of the scheme.
3. Figures in bold denote that the differences are statistically significant.

Reductions in Black Carbon concentrations

Figure 12.10 shows a longitudinal trend for Black Carbon at both the Brent North Circular and Tower Hamlets A12 sites. At Brent North Circular, it is seen that concentrations decrease relatively rapidly up to the implementation date of phase 1 of the scheme in February 2008, and then continue to decrease, albeit at a much slower rate. The pattern at Tower Hamlets A12 is similar. These trends broadly reflect that of the rate of compliance rates of heavier goods vehicles over this period (see also Figure 12.3). This gradual, rather than overnight, adaptation to the requirements of the scheme is reflected in the Black Carbon trends. Impacts from pre-compliance with phase 2, implementation being in July 2008, are overlaid on phase 1 trend.

Figure 12.10 Weekly mean 'local normalised' Black Carbon concentrations at Brent (North Circular) monitoring site. June 2006 to November 2009, ugm^{-3}.



Source: Transport for London, based on data from Kings College Environmental Research Group.

The particular significance of this trend is that Black Carbon is recognised as one of the most toxic component of particulate matter. The observed reductions of (typically) between 40 and 50 per cent, in significant part from the scheme, therefore reflect a substantial and beneficial change to the 'toxicity level' of particulate emissions, even if the small particle mass involved is not immediately recognisable in the overall (mass-based) PM_{10} trends.

Further reading

The Mayor's Air Quality Strategy for London was published in March 2010. It can be found at: www.London.gov.uk. Details of the nature and operation of the London LEZ, in particular containing information for vehicle operators and details of benefits expected by TfL from the scheme, can be found at: www.tfl.gov.uk/Lezlondon. TfL's Baseline Monitoring Report for the scheme is available at: www.tfl.gov.uk/Lezlondon. This sets out the expected impacts of the scheme in some detail, and describes how TfL is measuring these. Data and related material describing air quality trends in London are available through the London Air Quality Network website, at: www.londonair.org.uk.

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 the 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 separately 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 The London sub-regions

London sub-regions are a useful spatial unit of analysis for transport planning as reflected, for example, in TfL's Sub Regional Plans. TfL's approach is that sub-regions have flexible boundaries, and boroughs will be in more than one sub-region where that makes sense. 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 London Travel Demand Survey.

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 2.4 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.

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 Travel in London report 2):

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. The headline fares index is not reported after 2006/07.

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 that are 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.

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.

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 looks at 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. 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.

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 it intends 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 finalising their second round LIPs, which are due to be effective from April 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. Data for each of the indicators are reported within TfL's Travel in London reports on an annual basis. The data will also be reported directly to boroughs on an annual basis as part of a wider liaison process on LIP delivery.

This section sets out updated data for the LIP performance indicators for 2009 and 2009/10.

List of tables

Table B.6 Highway Asset Condition

This indicator monitors the proportion of principal road carriageway where maintenance should be considered, based on the percentage of length of the network with a RCI score of 70+ derived from 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) 2007/08 to 2009/10.

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	744	5%	15%	16%	2%	18%	3%	42%	100%
City of London	250	19%	26%	8%	3%	7%	2%	35%	100%
Hackney	377	4%	5%	26%	2%	20%	5%	40%	100%
Hammersmith & Fulham	477	2%	13%	16%	1%	25%	4%	38%	100%
Haringey	447	2%	9%	20%	1%	33%	2%	34%	100%
Islington	489	5%	11%	21%	1%	17%	3%	41%	100%
Kensington & Chelsea	518	1%	13%	14%	3%	21%	3%	44%	100%
Lambeth	546	6%	10%	21%	1%	29%	3%	30%	100%
Lewisham	448	9%	2%	19%	1%	37%	2%	30%	100%
Newham	539	2%	9%	16%	1%	33%	1%	39%	100%
Southwark	513	7%	8%	22%	1%	29%	3%	30%	100%
Tower Hamlets	525	3%	16%	16%	1%	21%	2%	41%	100%
Wandsworth	575	7%	6%	16%	1%	36%	3%	30%	100%
Westminster	1,186	7%	20%	15%	3%	13%	2%	39%	100%
Inner London	7,633	6%	12%	17%	2%	24%	3%	37%	100%
Barking & Dagenham	300	2%	5%	16%	1%	40%	1%	35%	100%
Barnet	770	1%	5%	12%	1%	49%	1%	31%	100%
Bexley	334	4%	0%	8%	1%	59%	1%	27%	100%
Brent	611	2%	7%	16%	1%	44%	1%	29%	100%
Bromley	728	6%	0%	8%	0%	56%	1%	29%	100%
Croydon	665	6%	0%	17%	0%	51%	1%	25%	100%
Ealing	621	2%	8%	16%	0%	47%	2%	26%	100%
Enfield	564	3%	3%	15%	1%	52%	0%	26%	100%
Greenwich	384	5%	3%	14%	1%	47%	1%	29%	100%
Harrow	424	1%	6%	10%	1%	52%	1%	30%	100%
Havering	485	4%	2%	13%	1%	58%	1%	21%	100%
Hillingdon	592	1%	4%	12%	2%	54%	2%	25%	100%
Hounslow	509	2%	4%	15%	1%	47%	3%	28%	100%
Kingston upon Thames	394	6%	0%	11%	1%	47%	2%	32%	100%
Merton	424	5%	5%	11%	1%	45%	2%	31%	100%
Redbridge	538	1%	5%	11%	0%	51%	1%	29%	100%
Richmond upon Thames	453	6%	2%	11%	1%	44%	5%	31%	100%
Sutton	359	5%	0%	11%	0%	54%	1%	28%	100%
Waltham Forest	395	2%	7%	13%	1%	41%	1%	34%	100%
Outer London	9,552	3%	4%	13%	1%	50%	1%	28%	100%
Greater London	17,186	4%	7%	15%	1%	38%	2%	32%	100%

Note: Whilst these data are provided annually, based on moving 3-year samples, the data to be used for monitoring performance towards achievement of targets will be for discrete (non-overlapping) three year blocks, in order to reduce statistical sampling error.

Table B.2 Bus service reliability indicator: mean excess waiting time by borough for all high-frequency routes, 1999/00, 2008/09 and 2009/10.

London borough	1999/2000 EWT	2008/2009 EWT	2009/2010 EWT
Barking & Dagenham	1.6	1.1	1.2
Barnet	2.1	1.0	1.0
Bexley	1.5	1.1	1.0
Brent	2.3	1.2	1.2
Bromley	1.9	1.1	1.0
Camden	2.3	1.3	1.2
City of London	2.3	1.3	1.2
Croydon	2.0	1.0	1.0
Ealing	2.1	1.2	1.2
Enfield	2.0	1.0	1.0
Greenwich	1.7	1.2	1.0
Hackney	2.2	1.3	1.2
Hammersmith & Fulham	2.4	1.1	1.2
Haringey	2.1	1.0	1.0
Harrow	2.0	1.0	1.0
Havering	1.3	1.0	1.1
Hillingdon	2.2	1.0	1.0
Hounslow	2.0	1.0	1.1
Islington	2.1	1.2	1.2
Kensington & Chelsea	2.5	1.2	1.2
Kingston upon Thames	1.8	1.0	1.1
Lambeth	2.3	1.2	1.2
Lewisham	2.2	1.2	1.2
Merton	2.1	1.0	1.1
Newham	1.8	1.2	1.2
Redbridge	1.9	1.2	1.3
Richmond upon Thames	2.0	1.1	1.2
Southwark	2.3	1.2	1.2
Sutton	1.9	0.9	1.0
Tower Hamlets	2.1	1.4	1.2
Waltham Forest	1.8	1.2	1.3
Wandsworth	2.3	1.1	1.1
Westminster	2.4	1.3	1.2
Greater London	2.1	1.1	1.1

Note: Based on "legacy" QSI system results, with routes measured at all points along the route (not just within specific borough). Results from next year will be based on iBus data based solely on results from QSI points within each borough

Table B.3 Road casualties, number of people killed or seriously injured in road traffic accidents by borough, 2007 to 2009.

	Year				% change from	
	1994-1998 average	2007	2008	2009	2007 to 2009 average	2008 to 2009	1994-1998 average to 2009
Barking & Dagenham	150	60	63	45	56	-29%	-70%
Barnet	269	158	136	137	144	1%	-49%
Bexley	146	105	73	82	87	12%	-44%
Brent	244	98	97	101	99	4%	-59%
Bromley	241	143	140	127	137	-9%	-47%
Camden	250	105	123	141	123	15%	-44%
City of London	65	48	51	46	48	-10%	-29%
Croydon	247	158	132	107	132	-19%	-57%
Ealing	287	137	113	126	125	12%	-56%
Enfield	236	98	85	97	93	14%	-59%
Greenwich	200	130	126	99	118	-21%	-51%
Hackney	209	127	162	103	131	-36%	-51%
Hammersmith & Fulham	149	103	94	93	97	-1%	-38%
Haringey	161	78	80	98	85	23%	-39%
Harrow	122	55	52	49	52	-6%	-60%
Havering	212	129	84	75	96	-11%	-65%
Hillingdon	255	116	107	88	104	-18%	-65%
Hounslow	226	103	102	101	102	-1%	-55%
Islington	186	112	75	77	88	3%	-59%
Kensington & Chelsea	171	120	113	94	109	-17%	-45%
Kingston upon Thames	124	49	65	52	55	-20%	-58%
Lambeth	313	185	164	173	174	5%	-45%
Lewisham	206	124	113	112	116	-1%	-46%
Merton	130	62	64	55	60	-14%	-58%
Newham	190	105	88	93	95	6%	-51%
Redbridge	187	96	83	69	83	-17%	-63%
Richmond upon Thames	135	76	64	56	65	-13%	-59%
Southwark	239	139	165	127	144	-23%	-47%
Sutton	116	70	74	57	67	-23%	-51%
Tower Hamlets	187	151	146	105	134	-28%	-44%
Waltham Forest	170	92	104	61	86	-41%	-64%
Wandsworth	255	166	116	120	134	3%	-53%
Westminster	409	286	272	261	273	-4%	-36%
Greater London	6,684	3,784	3,526	3,227	3,512	-8%	-52%

Table B.4 Road casualties, number of people slightly injured in road traffic accidents by borough, 2007 to 2009.

		Year				% change from	
	1994-1998 average	2007	2008	2009	2007 to 2009 average	2008 to 2009	1994-1998 average to 2009
Barking & Dagenham	781	515	552	479	515	-13%	-39%
Barnet	1,773	1,234	1,086	1,266	1,195	17%	-29%
Bexley	798	476	559	550	528	-2%	-31%
Brent	1,361	747	688	748	728	9%	-45%
Bromley	1,232	757	725	750	744	3%	-39%
Camden	1,431	736	730	767	744	5%	-46%
City of London	411	333	328	297	319	-9%	-28%
Croydon	1,632	987	997	1,035	1,006	4%	-37%
Ealing	1,614	1,011	887	953	950	7%	-41%
Enfield	1,504	932	769	925	875	20%	-38%
Greenwich	1,147	824	795	773	797	-3%	-33%
Hackney	1,098	810	816	819	815	0%	-25%
Hammersmith & Fulham	930	662	581	629	624	8%	-32%
Haringey	1,010	711	663	831	735	25%	-18%
Harrow	728	441	418	459	439	10%	-37%
Havering	1,096	773	848	673	765	-21%	-39%
Hillingdon	1,337	914	853	883	883	4%	-34%
Hounslow	1,352	829	828	778	812	-6%	-42%
Islington	1,114	555	606	734	632	21%	-34%
Kensington & Chelsea	1,005	674	716	671	687	-6%	-33%
Kingston upon Thames	678	320	388	409	372	5%	-40%
Lambeth	1,832	944	1,023	1,112	1,026	9%	-39%
Lewisham	1,390	756	767	860	794	12%	-38%
Merton	711	478	457	420	452	-8%	-41%
Newham	1,119	900	989	853	914	-14%	-24%
Redbridge	1,199	689	754	699	714	-7%	-42%
Richmond upon Thames	715	413	403	389	402	-3%	-46%
Southwark	1,543	911	1,024	981	972	-4%	-36%
Sutton	718	519	490	426	478	-13%	-41%
Tower Hamlets	1,023	818	957	787	854	-18%	-23%
Waltham Forest	1,028	747	823	675	748	-18%	-34%
Wandsworth	1,302	749	775	812	779	5%	-38%
Westminster	2,384	1,412	1,332	1,309	1,351	-2%	-45%
Greater London	38,997	24,577	24,627	24,752	24,652	1%	-37%

Table B.5 Locally generated CO_2 emissions by borough: principal sources (thousands of tonnes per year) and per capita emissions (tonnes) for resident population, 2009.

London Borough	Road transport	Ground-based aviation	Other transport	Total ground-based transport	% change in ground-based transport emissions (2008-2009)	Population ('000s)	Ground-based transport tonnes per capita
Barking & Dagenham	144	-	6	150	-4%	176	0.9
Barnet	369	0	18	387	-4%	343	1.1
Bexley	210	5	6	221	-5%	226	1.0
Brent	204	0	17	222	-4%	256	0.9
Bromley	257	1	5	264	-7%	310	0.9
Camden	147	-	16	164	-5%	231	0.7
City of London	45	-	0	45	-5%	12	3.8
Croydon	244	0	6	250	-7%	343	0.7
Ealing	275	46	63	383	-3%	317	1.2
Enfield	318	0	3	321	-4%	291	1.1
Greenwich	207	3	3	212	-5%	226	0.9
Hackney	121	-	2	123	-7%	216	0.6
Hammersmith & Fulham	130	0	17	148	-5%	170	0.9
Haringey	144	-	5	149	-9%	226	0.7
Harrow	143	0	7	150	-5%	228	0.7
Havering	335	3	8	346	-3%	234	1.5
Hillingdon	378	1,124	40	1,541	-1%	263	5.9
Hounslow	301	41	2	344	-3%	234	1.5
Islington	118	-	4	122	-6%	192	0.6
Kensington & Chelsea	115	0	11	127	1%	170	0.7
Kingston	166	-	2	168	-5%	167	1.0
Lambeth	162	-	4	166	-8%	283	0.6
Lewisham	174	-	7	181	-8%	265	0.7
Merton	150	-	3	153	-6%	206	0.7
Newham	179	30	5	214	-9%	241	0.9
Redbridge	256	0	3	259	-3%	268	1.0
Richmond	186	94	1	281	-5%	189	1.5
Southwark	201	1	4	205	-9%	286	0.7
Sutton	116	0	0	117	-3%	192	0.6
Tower Hamlets	193	9	3	205	-6%	235	0.9
Waltham Forest	173	-	2	175	-1%	224	0.8
Wandsworth	191	-	6	197	-8%	287	0.7
Westminster	289	1	14	305	-1%	249	1.2
Greater London	6,642	1,359	294	8,295	-4%	7,754	1.1

Table B.6 Highway Asset Condition - the percentage of the principal road network length which is in poor overall condition and requires maintenance based on Detailed Visual Inspection survey data.

London Borough	Year				
	2005/06	2006/07	2007/08	2008/09	2009/10
Barking & Dagenham	4.8	4.0	3.0	2.9	4.8
Barnet	13.1	6.0	6.5	5.2	3.0
Bexley	12.9	8.0	7.2	5.9	6.4
Brent	16.0	12.0	8.9	8.3	7.9
Bromley	15.1	10.0	7.6	6.5	5.7
Camden	14.1	12.0	12.8	9.7	6.6
City of London	16.0	13.0	12.3	12.6	9.0
Croydon	8.3	6.0	4.2	3.8	3.3
Ealing	19.9	12.0	8.6	8.7	10.8
Enfield	15.0	12.0	9.9	9.2	9.0
Greenwich	11.6	8.0	6.3	6.0	3.7
Hackney	15.6	12.0	6.8	7.1	8.8
Hammersmith & Fulham	10.4	11.0	8.6	7.7	8.4
Haringey	11.2	8.0	7.5	7.6	6.6
Harrow	14.2	10.0	7.7	7.0	7.7
Havering	8.8	6.0	4.1	3.9	3.1
Hillingdon	9.2	7.0	6.3	5.8	4.3
Hounslow	18.0	13.0	9.0	6.9	7.1
Islington	17.7	13.0	13.4	9.1	4.9
Kensington & Chelsea	4.3	4.0	4.0	2.9	2.4
Kingston	3.3	3.0	2.5	2.2	2.4
Lambeth	23.7	17.0	15.6	10.0	9.5
Lewisham	10.4	7.0	6.4	6.6	10.6
Merton	19.7	13.0	9.7	8.1	9.3
Newham	12.9	10.0	6.8	6.3	5.5
Redbridge	9.6	7.0	4.8	4.4	4.2
Richmond	26.5	22.0	16.4	15.3	14.2
Southwark	21.2	16.0	15.3	14.7	11.1
Sutton	6.4	7.0	6.5	5.7	7.5
Tower Hamlets	16.7	13.0	13.4	9.0	9.2
Waltham Forest	15.7	12.0	8.9	7.2	7.6
Wandsworth	6.2	5.0	5.2	4.7	6.9
Westminster	8.5	8.0	6.8	6.2	4.5
Greater London	12.9	9.5	8.0	7.0	6.5

Note: Please note that the data in Table B.6 are based on Detailed Visual Inspection (DVI) data. Data given previously in Travel in London report 2 were based on Coarse Visual Inspection (CVI) data. DVI data for 2008/09 are therefore reproduced in the above table.