Travel in London

Report 11

MAYOR OF LONDON

TRANSPORT FOR LONDON

EVERY JOURNEY MATTERS

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Travel in London report 11

Overview

Travel in London report 11

Travel in London is TfL's annual publication that summarises trends and developments relating to travel and transport in London. Its principal function is to describe how travel is changing and provide an interpretative overview of progress towards implementing the transport strategy of the Mayor of London and to inform future policy development. It also provides an evidence and analysis base for the general use of stakeholders and policymakers whose responsibilities cover many different aspects of transport and travel in London.

This eleventh report covers trends up to 2017 and into 2018. Publication of Mayor Sadiq Khan's transport strategy this year set out an ambitious programme to improve transport and the wider quality of life of Londoners over the period to 2041, based on an evidence base reflecting trends up to and including 2016.

The strategy established the overarching aim of increasing the mode share for walking, cycling and public transport in London to 80 per cent of all trips by 2041, to enable the city to grow and address key environmental and health challenges. This and the three related Mayoral priorities below form an overall structure for this report:

- Healthy Streets and healthy people
- A good public transport experience
- Supporting new homes and jobs

Data for the most recent years reviewed in this report reveal the emergence of several challenges to achieving the Mayor's aims, demonstrating the importance of implementing the policies and proposals in the strategy to ensure the overall vision of the Mayor can be achieved, and to secure London's long-term success.

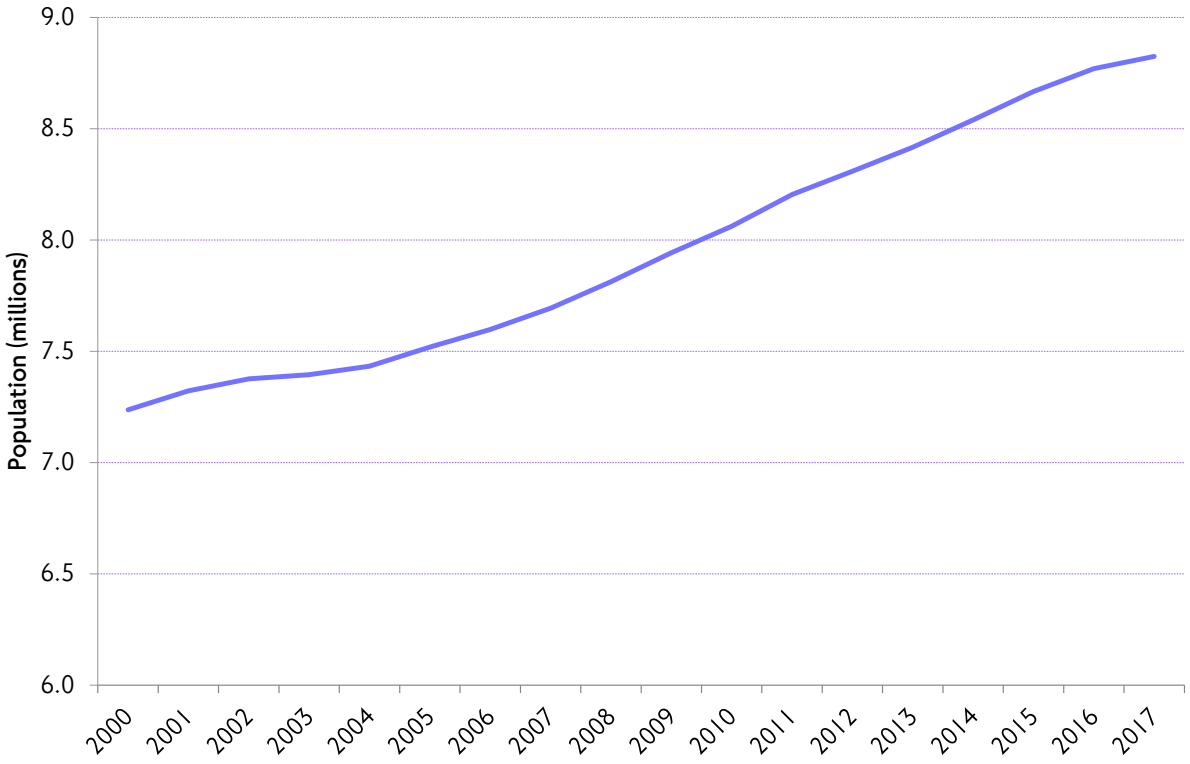
The developing context

For much of the period since 2000, London saw rapid population growth, which fed through to increased demand for travel. Usage of the key public transport networks grew, often at a more rapid rate than population. This reflected growing demand and sustained investment, such as early investment in the bus network, followed by the Tube Upgrade programme and the transformative development of the London Overground, innovations such as Oyster, as well as the recovery from the 2008 recession, with increased employment. Meanwhile, road traffic consistently fell, reflecting increasing constraints on the road network and the impact of the Congestion Charge, and underlying an overall change away from the private car and towards more attractive public transport, walking and cycling.

We are now starting to see a change in these trends. With a subdued economy, and evidence of a recent slowdown in the rate of population growth in London, public transport growth has levelled off. Meanwhile, in some parts of London there have been some increases in motorised road traffic, primarily reflecting an increase in van traffic. There has also been a squeeze on personal disposable incomes, affecting discretionary travel, alongside some evidence that more general generational, policy and lifestyle changes may be beginning to affect travel demand. All these changes mean that we will have to work even harder to deliver the transport strategy aims.

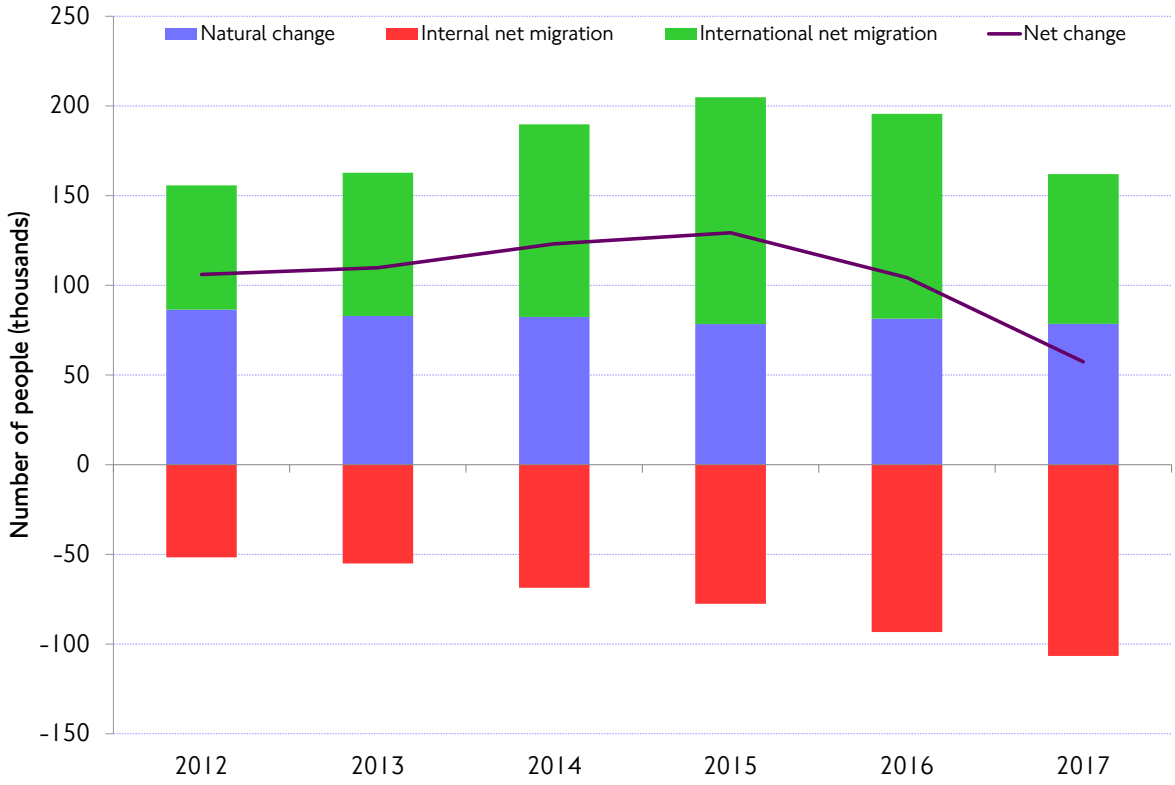
According to Office for National Statistics (ONS) estimates for 2017, London was still growing, albeit the rate of growth has slowed (figure 1). Population growth, which had typically been up to 1.5 per cent per year over the previous 10 years, fell to an estimated 0.6 per cent in 2017. This was primarily driven by a reduction in European Union (EU) migration and people moving to London from the rest of the UK, particularly young people. Although the short-term prospects for this are unclear, most commentators still expect substantial population growth in London over the medium-long term, emphasising the need for steady and substantial investment in infrastructure.

Figure 1 Resident population of London, 2000-2017.



Source: Office for National Statistics.

Figure 2 Components of London's population growth, 2012-2017.



Source: Office for National Statistics.

The last two years have also seen some specific developments that will have affected travel demand in London. These have included large-scale infrastructure works and prolonged industrial disputes on National Rail affecting demand on key interchange modes such as the Underground. A further factor is the changing competitor landscape, with new options such as app-based private hire having the potential to change the appeal of travel by modes like buses.

These population and economic effects may not be sustained, but they have had a short-term impact on outcomes. The possibility of more fundamental changes to travel behaviour is, however, a complex issue on which there is, as yet, no consensus about likely future trends. TfL plans to conduct further research in the coming year to better understand these factors.

All of these developments serve to intensify the need for the kind of policies outlined in the Mayor's Transport Strategy if transport is to continue to play a key 'enabling' role for London's future economic and social success, whatever the wider international and domestic context.

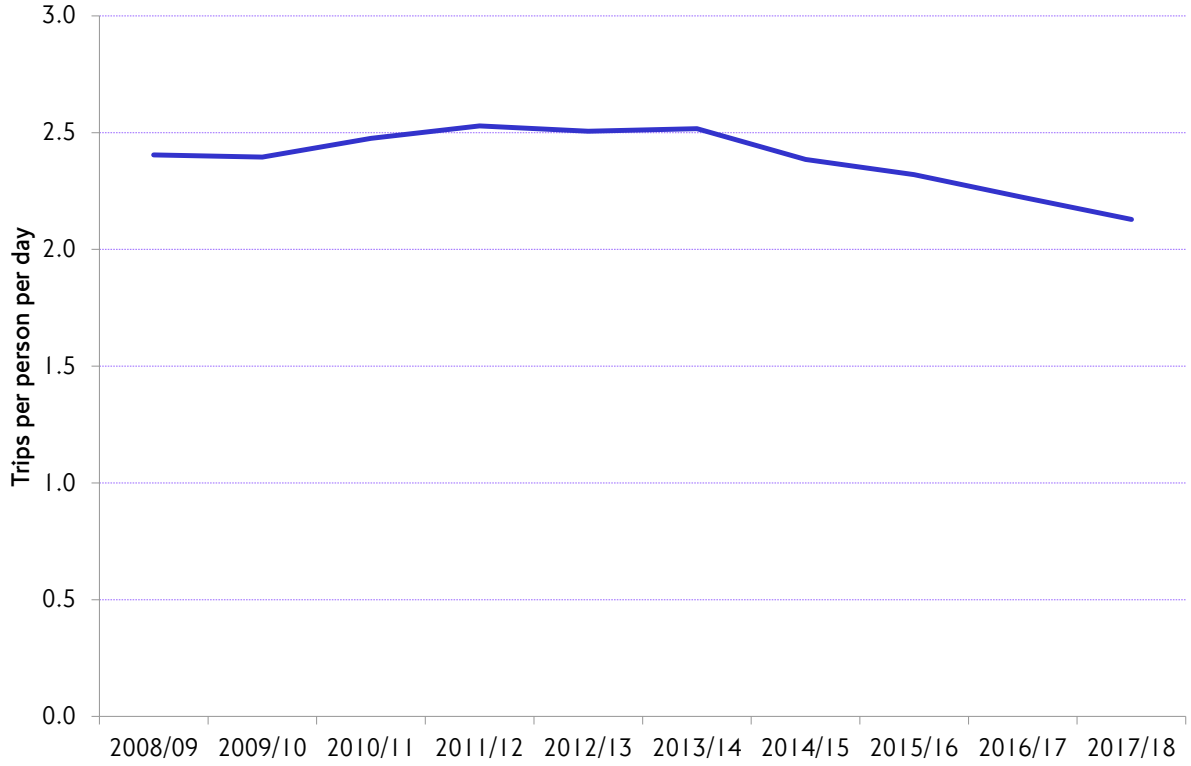
Against this backdrop, we continue to provide high levels of service and reliability on the key networks, with numerous recent and planned enhancements as the transport strategy is implemented and as further described in TfL's Business Plan.

Overall travel demand

Overall travel demand, in terms of the average number of trips per person per day (trip rate), among London residents only, fell to 2.13 trips in 2017/18, continuing the reduction previously observed and compared to 2.64 trips per person per day in 2006/07 (figure 3). As this is an average per person value, it signifies the continuation of an important 'background'

trend, which may reflect both economic and behavioural factors, of Londoners making fewer trips per day on average. This general pattern is paralleled at the national scale, as shown by DfT's National Travel Survey, and has also been seen in several other major cities.

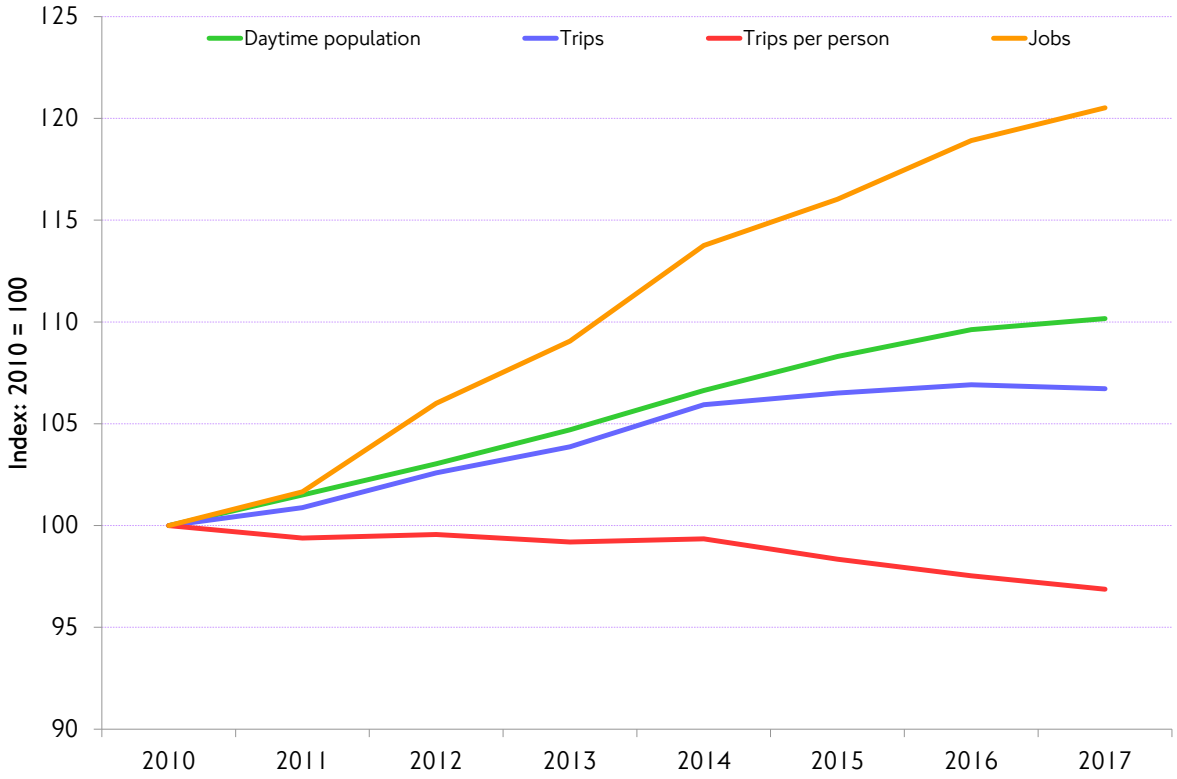
Figure 3 Average daily trip rates by London residents, 2008/09-2017/18.



Source: London Travel Demand Survey.

Reflecting these recent contextual trends, overall travel demand in London in 2017 was 0.1 per cent lower than in 2016, at an average of 26.8 million trips per day. Figure 4 illustrates the effect of reducing trip rates on overall travel demand growth for travel in London.

Figure 4 Relationship between population, jobs and trips in London, 2010-2017.

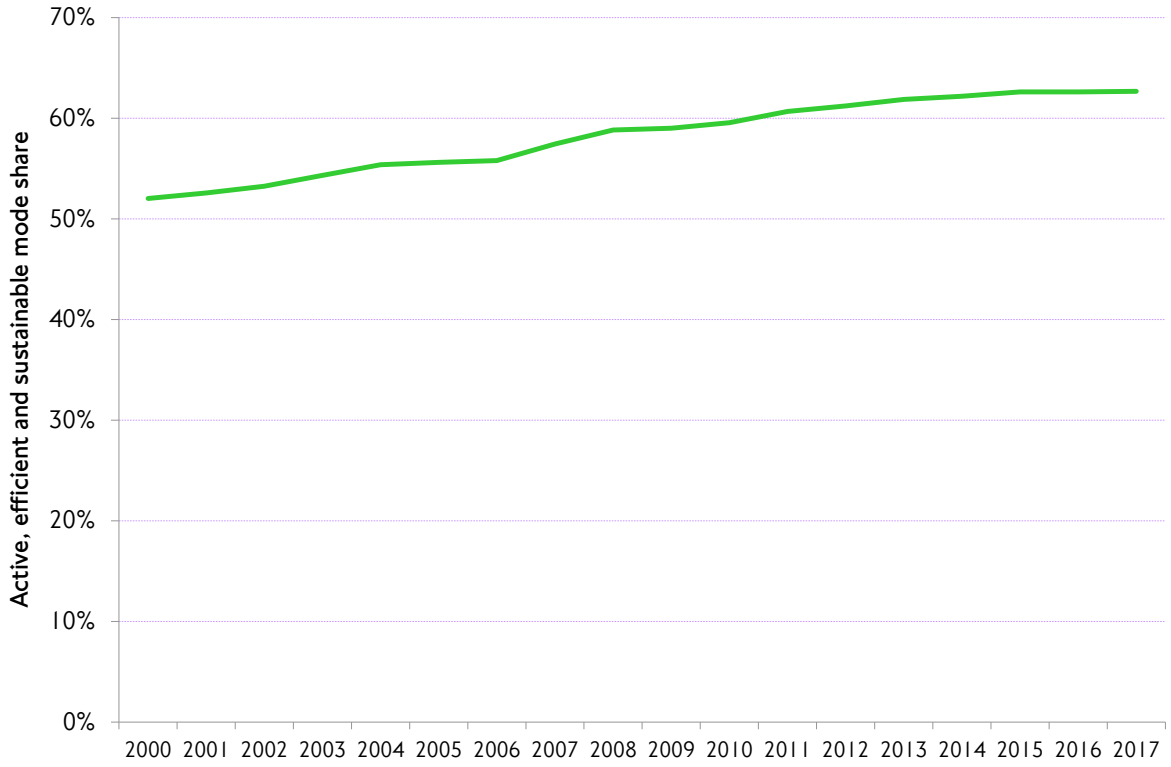


Source: Office for National Statistics and London Travel Demand Survey.

Active, efficient and sustainable mode share

These developments meant that the proportion of all **trips** in London made by active, efficient and sustainable modes (walk, cycle and public transport) increased slightly, to 62.7 per cent for the year, compared to a (revised) 62.6 per cent in 2016 and the transport strategy 'baseline' value, also of 62.6 per cent, in 2015. Recent years, therefore, have seen a flattening of the historic trend of progressive increase in this measure (figure 5), largely reflecting the more general changes to travel demand described above, although it should be noted that slower short-term growth in travel demand is not incompatible with the Mayor's mode share aim.

Figure 5 Percentage of trips in London made by active, efficient and sustainable modes, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

Travel demand trends on the main transport modes

Within this overall trend, however, and as described in detail in the main text, there were some differences between the individual travel modes, between different parts of London, and in relation to previously established trends. So, in terms of **journey stages**, in 2017:

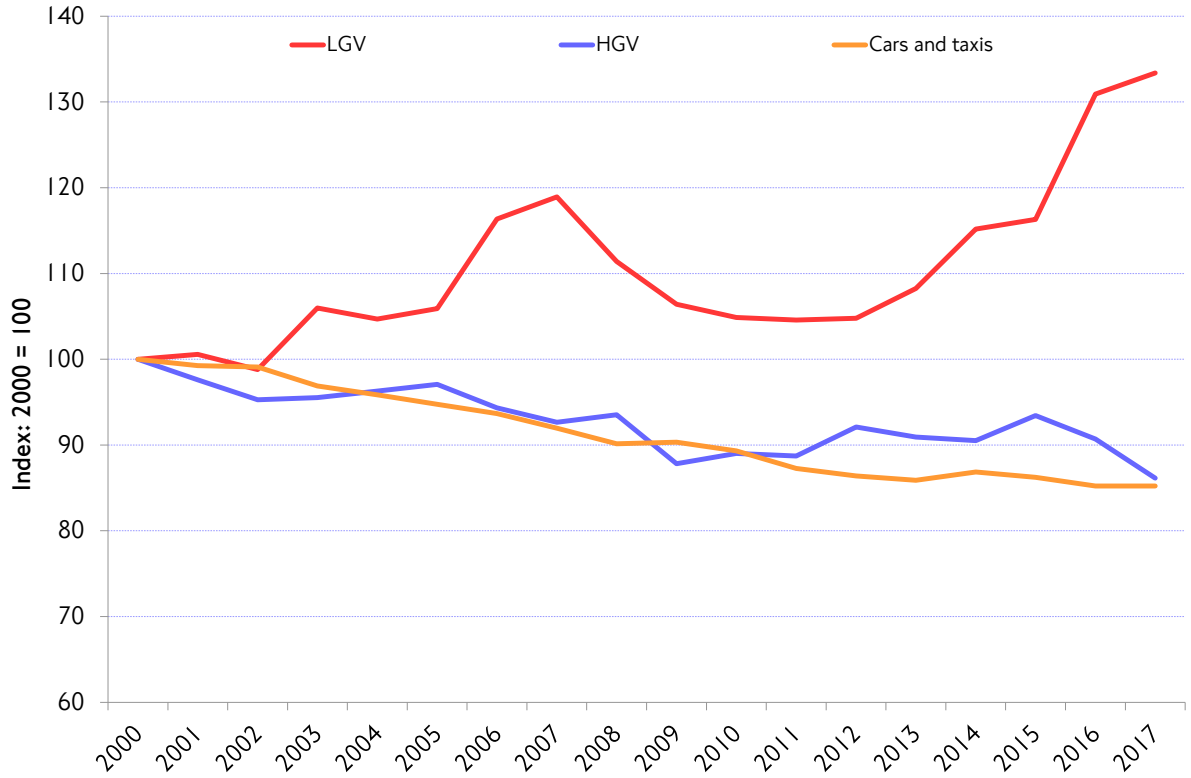
Bus journeys saw a slight growth in demand for the first time since 2014, up by 0.1 per cent between 2016 and 2017. The total number of bus journeys made in 2017 was, however, 6.5 per cent down on 2014, and this contrasts to the long-established trend of growth typical of the previous period.

Underground demand in 2017 declined for the first time since 2009, with total journeys 1.1 per cent down from the previous year. This is a change from the pattern of strong annual growth between 2 and 6 per cent between 2009 and 2015, although there are signs of a modest recovery into 2018.

This broad pattern of flattening demand was mirrored on **National Rail** services in London, which include some TfL operated services. National Rail journeys (defined by the Office for Rail and Road as London & South East) decreased by 1.9 per cent over the year. This contrasted with the annual growth of between 4 and 9 per cent between 2010 and 2015.

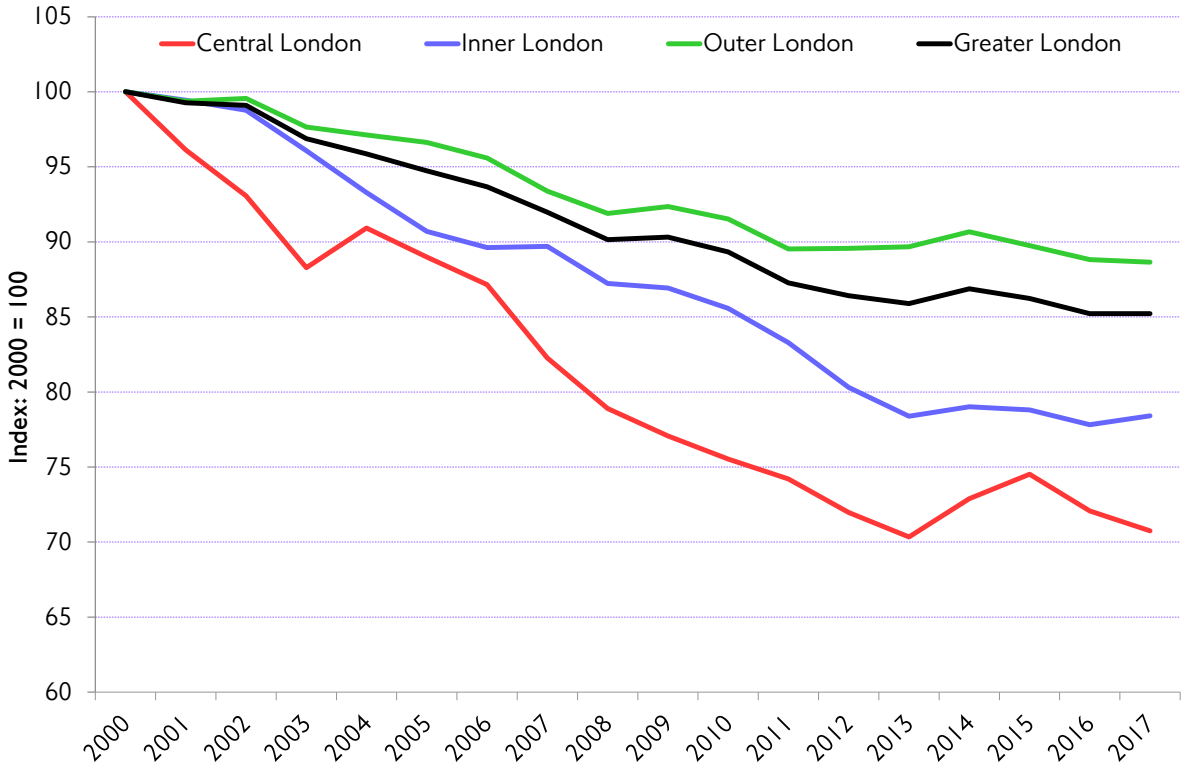
Department for Transport (DfT) road traffic data for London for 2016 has been subject to a revision, affecting the overall travel demand and mode share estimates above for 2016 and as previously published in Travel in London report 10. Although total **road traffic** increased by 0.1 per cent London wide between 2016 and 2017, the majority of this overall increase reflected LGV (van) traffic, up by 1.9 per cent over the year, perhaps reflecting the rise of internet shopping and associated changes in freight and distribution (figure 6). There was no growth in car traffic, with levels the same as in 2016 (figure 7).

Figure 6 Changes in LGV (van), HGV and car traffic levels, 2000-2017.



Source: Department for Transport's National Road Traffic Census for London.

Figure 7 Changes in car traffic levels by London area, 2000-2017.



Source: Department for Transport's National Road Traffic Census for London.

London-wide, in 2017, **cycled kilometres** increased by 4.3 per cent with respect to 2016. Cycle journeys, at an average of 721,000 per day in 2017 were, however, marginally down on the 2016 value of 727,000. Cycling in central London in the first quarter of 2018/19 was 8 per cent higher than the equivalent quarter the previous year. There was particularly strong growth in areas where there has been investment in improved infrastructure. For example, cycling levels have increased along many new Cycle Superhighway and Quietway routes by more than 50 per cent. Studies have also shown significant increases in cycling levels in Mini-Holland boroughs.

At the London wide level, the number of **walking trips** increased, by an estimated 0.5 per cent; this largely reflecting population growth in 2017.

It is significant that many of the trends affecting overall travel demand have parallels at the national level and appear to be longer established. Person trip rates at the national scale have declined in recent years; with trip rates in 2017 some 11 per cent lower than the highest recorded in 1996-98. Road traffic volumes nationally grew by 3.3 per cent between 2015 and 2017, an accelerating picture of growth with a net increase of 7.9 per cent between 2010 and 2017. Bus patronage nationally (outside London) has fallen, and growth on National Rail, hitherto typically between 3 and 8 per cent per year nationally, was down by 1.4 per cent in the latest year.

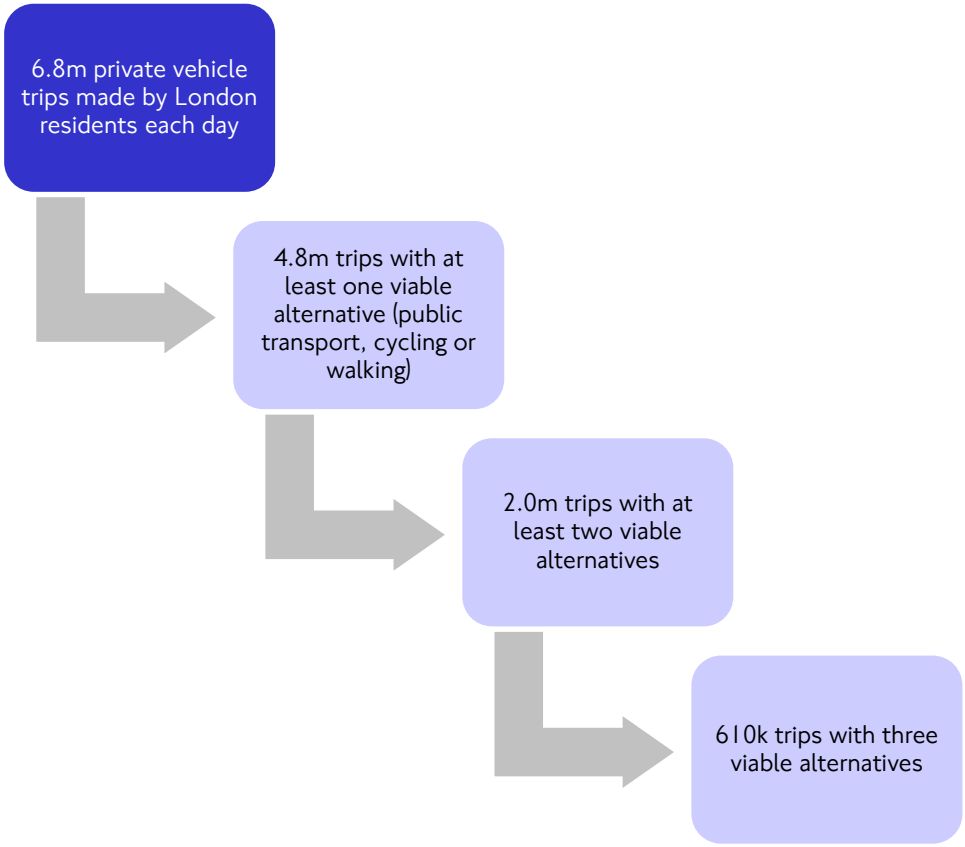
Progress towards Mayor's Transport Strategy aims

This backdrop, combined with the short space of time that has elapsed since publication of the transport strategy, are key to the review and evaluation of the data and trends in this report.

Healthy Streets and healthy people

New TfL analysis reveals that over 70 per cent of car trips made by London residents could potentially and realistically be walked, cycled or made by public transport. Over half could be cycled in around 10 minutes, and more than a third could be walked in under 25 minutes, demonstrating the large scope for changing overall mode shares to work towards the Mayor's aim of 80 per cent of travel in London to be made by active, efficient and sustainable modes by 2041 (figure 8).

Figure 8 Overall scale of potential for mode shift from private vehicle trips made by London residents.



Source: TfL analysis based on the London Travel Demand Survey.

In 2017/18, the percentage of Londoners who achieved two ten-minute sessions of active travel per day was 29.7 per cent, down slightly from the previous year. While some variability in this trend is to be expected on a year to year basis, the balance of the trend over the most recent four years has been slowly downwards. It is thought that flattening overall travel demand has been a particular factor here. Multi stage public transport trips frequently include opportunities for walking and have a major role to play in achieving this aim.

Strong investment in London's cycle network continues, with 8.8 per cent of Londoners now living within 400 metres of a high-quality cycle route; this expected to increase to 70 per cent by 2041, and there is emerging evidence of positive impacts on active travel through the investment in the Mini Holland boroughs.

The Mayor's Transport Strategy sets the aim to eliminate death and serious injury from our transport network by 2041. The Vision Zero action plan sets out our approach to improving safety on London's road network. Again demonstrating the scale of the challenge, the number of fatalities on London's roads increased during 2017, to 131, from the lowest level on record (116) in 2016. In particular, there were concerning increases in the number of pedestrian fatalities, up from 61 in 2016 to 73 in 2017, especially those involving heavy goods vehicles, as well as increases in casualties among people who cycle (10 in 2017 relative to 8 in 2016) and car occupant (14 relative to 10) fatalities.

A number of measures have been introduced to improve air quality – most notably the Toxicity Charge and Low Emission Bus Zones (LEBZs). Analysis of the Toxicity Charge and the Putney High Street LEBZ indicate that both initiatives have been effective in reducing

concentrations of NO_2. The forthcoming Ultra Low Emission Zone schemes, due to commence in central London from April 2019, the enhancements to the London wide Low Emission Zone and the introduction of all 12 LEBZs will further improve air quality across the Capital.

A good public transport experience

In 2017/18, London's combined public transport networks operated 114 billion place-kilometres, effectively unchanged from the previous year and an overall 28 per cent increase in capacity from 2009/10.

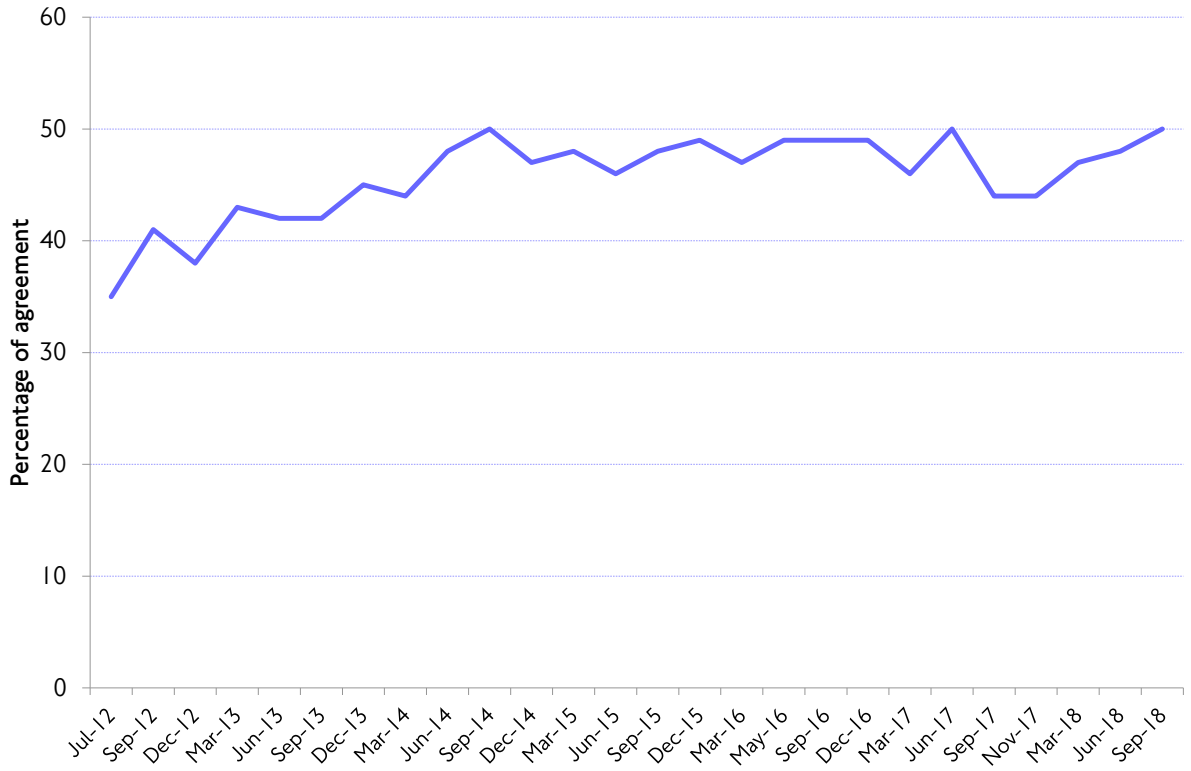
Over the last year, bus and Underground reliability improved in terms of all the usual customer service delivery indicators. Some 98.1 per cent of scheduled bus services were operated in 2017/18, the highest recorded level, whilst excess waiting time for high-frequency services returned to its recent recorded low of 1.0 minute.

On the Underground, scheduled train kilometres in 2017/18 were 1.0 per cent higher than in the previous year, the highest level recorded, with 96.7 per cent of scheduled kilometres operated. Both DLR and Tram networks also offered highest recorded levels of service in 2017/18.

The picture on National Rail services in London was more mixed. Both London Overground and TfL Rail operated highest-ever levels of service, but operational quality, measured in terms of the Public Performance Measure, declined slightly on both networks in 2017/18. On the wider National Rail network in London, although there is considerable variation by operator, the overall picture in recent years has been of a progressive decline in the Public Performance Measure from typical levels attained at the turn of the decade.

Overall customer satisfaction with the main public transport modes is relatively high, now typically scoring between 85 and 90 out of 100, and these scores have increased slowly over recent years. TfL has also developed a metric that measures the extent to which Londoners believe that TfL cares about its customers (including users of all modes). Measurements since 2012 show an increasing trend with, typically, between 45 and 50 per cent of people agreeing with the proposition (figure 9).

Figure 9 Trend in Care score (agreement with the proposition 'TfL cares about its customers'), 2012-2018.



Source: TfL Customer Research and Insight.

Older people and those with mobility needs require more time to complete journeys by public transport if they are able to use the step-free network only. In some cases, their journeys may not be possible. The Mayor's aim is to eliminate this differential as soon as possible. In 2017, across all possible public transport journey permutations, trips using only the step-free network (all buses and step-free stations) took, on average, 10 minutes longer than those that could make use of the full network – a time differential of 13 per cent and a slight improvement on the 2016 value.

The Elizabeth line will add 10 per cent to rail capacity in central London, initially serving the Central Activities Zone, Canary Wharf, Shenfield and Heathrow, before services are extended to Reading. This will mark a step-change in London's transport connectivity, bringing an extra 1.5 million people within 45 minutes commuting distance of central London, and it will also significantly improve step-free access across its length.

New homes and jobs

The transport strategy aims to provide for a future where, in 2041, London is expected to have 10.8 million residents, around 30 per cent higher than in 2011, and 1 million more jobs.

As part of the Healthy Streets Approach, all new developments will need to facilitate walking and cycling and reduced car use in order to tackle congestion and enable people to live active, healthier lives. Infrastructure enhancements in progress or in the pipeline are directed to supporting this approach, including key projects such as the Northern Line extension from Kennington to Battersea and the proposed extension of the Bakerloo line south of Elephant & Castle, as well as planned upgrades to the existing Tube network.

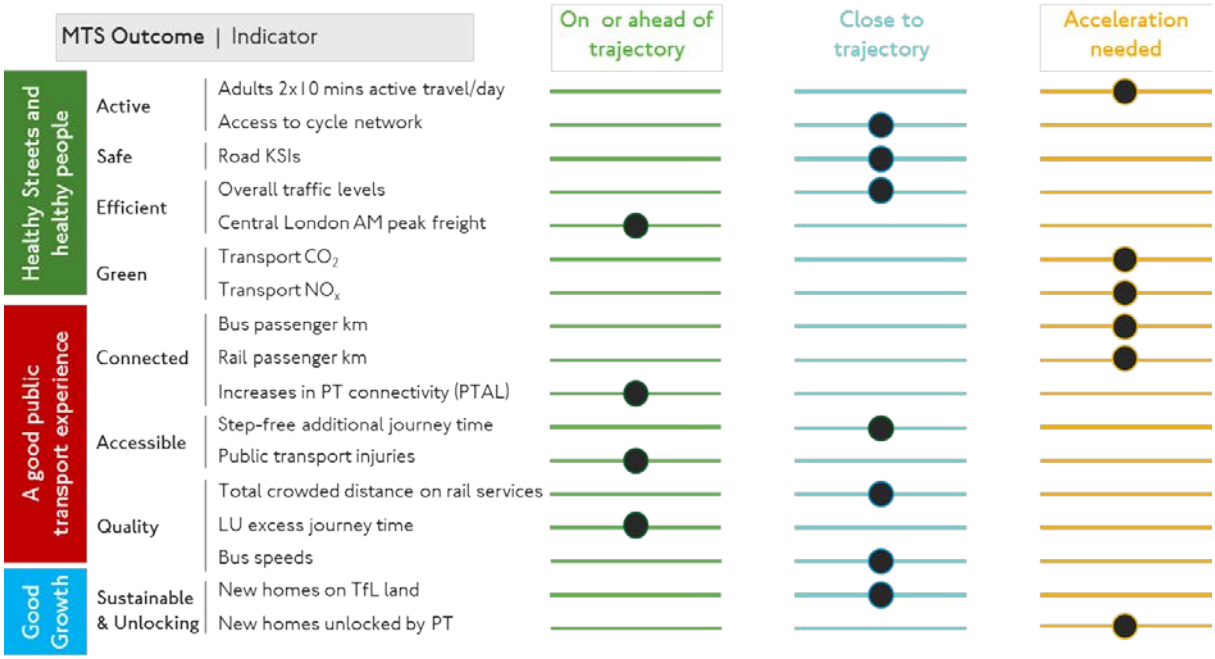
There were more than 45,000 housing completions in 2016/17, which is 3,000 above the adopted London Plan target of 42,000. Of these, 7,300 were affordable homes. This represents a continuing trend of increases in housing delivery in London, which started in 2012/13, and delivery in 2016/17 represents the highest single-year completions total recorded.

TfL, as a landowner, has a major role to play in addressing London's housing shortage, and has identified land not needed for operational purposes. By 2020/21, we plan to have started on property development sites that will provide 10,000 new homes and one million square feet of offices, shops and workspace. Residential projects brought to market in this mayoral term will deliver at least 50 per cent affordable housing across the TfL portfolio. We currently have partners in place to deliver c. 7,000 homes and will enter into commercial agreements for a further c. 3,000 this financial year.

Summary

The transport strategy identifies clear and challenging aims to improve transport to enhance overall quality of life. It is therefore to be expected that the starting points may not be ideal and that progress will be difficult, and finding the most effective way of working towards the aims is the essential task set for TfL by the Mayor. Figure 10 below is a visualisation of the current state of play in relation to the key outcomes sought by the strategy – reflecting data that largely pre-dates publication of the strategy itself in March 2018. The categorisation is indicative rather than definitive, and is largely based on the evidence set out in this report. The figure should therefore be interpreted as a periodic 'health check' on the progress of our journey, and our business planning is being adjusted to take account of those aspects where particular attention is called for.

Figure 10 Summary of progress towards Mayor's Transport Strategy aim.



Source: Transport Strategy, TfL City Planning.

1. Introduction and contents

1.1 TfL's Travel in London reports

Travel in London is TfL's annual publication that examines and summarises trends and developments relating to travel and transport in London. It provides an authoritative source of transport statistics as well as topical evidence-based analysis, and tracks trends and progress in relation to the transport and other related strategies of the Mayor. It also 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 daily lives of Londoners and the economic and social vitality of the Capital. As such, it serves as a general resource for those planning and operating transport in London, as well as a more specific 'evidence base' in relation to specific policy themes and challenges.

1.2 Travel in London report 11

This eleventh edition of Travel in London provides a comprehensive and updated overview of key travel and related trends and their causes, to inform the on-going development, implementation and monitoring of the transport and other strategies of the Mayor of London.

Sadiq Khan published his transport strategy in March 2018 (see: https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf). This drew on a wide range of evidential material, summarised in accompanying documents and in previous Travel in London reports. It has a central aim of an 80 per cent mode share for active, efficient and sustainable modes by 2041, and three themes:

- Healthy Streets and healthy people
- A good public transport experience
- New homes and jobs

The content of this report is therefore broadly organised around this overall aim and three themes. In line with the proposals in chapter 6 of the Mayor's Transport Strategy, Travel in London reports will be the primary means of tracking progress towards strategy aims through their role of bringing together available evidence from across the various monitoring and analysis programmes that are in place.

Travel in London Report 10, published in December 2017, set out a 'baseline' set of conditions relevant to the future monitoring of the transport strategy, largely based on data from 2016 and before, and described several new monitoring initiatives under development to help TfL better assess conditions in relation to Mayoral transport priorities. This eleventh report updates this evidence base, broadly reflecting conditions that applied at the time the final strategy was published, or shortly thereafter during 2018.

Over this time increasing evidence has emerged that what might be regarded as 'background' conditions affecting travel demand, both in London and elsewhere, are changing. These trends are thought to be being driven by a combination of economic and demographic factors, and also by possible wider behavioural changes. The outcomes are likely to be highly relevant to many aspects of the transport strategy in the future, and this report therefore includes a focus on these emerging developments.

1.3 About Transport for London (TfL)

Part of the Greater London Authority family led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's aims for transport.

We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners'. We are committed to creating a fairer, greener, healthier and more prosperous city. The Mayor's Transport Strategy sets an aim for 80 per cent of all trips to be made on foot, by cycle or using public transport by 2041. To make this a reality, we prioritise health, safety and the quality of people's experience in everything we do.

We manage the city's red route strategic roads and, through collaboration with the London boroughs, can help shape the character of all London's streets. These are the places where Londoners travel, work, shop and socialise. Making them places for people to walk, cycle and spend time will reduce car dependency and improve air quality, revitalise town centres, boost business and connect communities.

We run most of London's public transport services, including the London Underground, London Buses, the Docklands Light Railway, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line. The quality and accessibility of these services is fundamental to Londoners' quality of life. By improving and expanding public transport, we can make people's lives easier and increase the appeal of sustainable travel over private car use.

We are moving ahead with many of London's most significant infrastructure projects, using transport to unlock growth. We are working with partners on major projects like Crossrail 2 and the Bakerloo line extension that will deliver the new homes and jobs London and the UK need. We are in the final phases of completing the Elizabeth line which, when it opens, will add 10 per cent to London's rail capacity.

Supporting the delivery of high-density, mixed-use developments that are planned around active and sustainable travel will ensure that London's growth is good growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

We are committed to being an employer that is fully representative of the community we serve, where everyone can realise their potential. Our aim is to be a fully inclusive employer, valuing and celebrating the diversity of our workforce to improve services for all Londoners.

We are constantly working to improve the city for everyone. This means freezing TfL fares so everyone can afford to use public transport, using data and technology to make services intuitive and easy to use, and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day.

None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services. We all need to pull together to deliver the Mayor's Transport Strategy; by doing so we can create a better city as London grows.

1.4 Further information

For specific technical queries on the contents of this report, readers should contact TILenquiries@tfl.gov.uk.

Section 1: Overall travel demand and mode shares

2. Overall trends in travel demand and mode shares

2.1 Introduction

This section looks at overall travel demand trends in London, in terms of the overall number of trips made and the mode shares for the different forms of transport.

- **Chapter 2** focuses on 'top level' annual measures of travel and mode share, in Greater London by all people including residents and visitors, considered in their recent historic context and in terms of the aims set out in the Mayor's Transport Strategy.
- **Chapter 3** reviews recent data from TfL's London Travel Demand Survey (LTDS), which provides a detailed window on the travel behaviour of London residents, allowing this behaviour to be related to a range of socio-demographic and lifestyle attributes.
- With these 'top-level' trends as a backdrop, **chapter 4** looks at recent changes to the factors affecting travel demand in London – the 'drivers of travel demand'.

The evidence from chapters 2 and 3 is that there has been a recent slowing of the hitherto well-established trend of growing overall travel demand in London, primarily reflecting slowing population growth and economic factors. These trends are of obvious importance for understanding progress towards the transport strategy aims and for the formulation of future transport policy more generally. Chapter 4 assembles and reviews the evidence that is available so far.

Travel demand and operational performance trends for each of the main travel modes in London, and progress towards other transport strategy aims, are covered in greater detail in sections 2 and 3 of this report.

2.2 Historic and changing trends in total travel in London

The volume of travel in London has grown substantially over the last two decades or so, over the earlier part of the current decade at a notably faster rate than previously anticipated, albeit historically matched by a consistent shift in mode share away from the private car towards walking, cycling and public transport.

In the period 2000 to 2016, total travel demand in London grew by 18.6 per cent, largely reflecting population growth, and at the same time there was a 10.6 percentage point shift in mode share towards active, efficient and sustainable modes, broadly reflecting investment in these modes. These long-established demand trends formed part of the evidence base for the Mayor's Transport Strategy.

At the same time London's population was forecast to continue to grow strongly into the future, and policies contained in the transport strategy had the broad aim of effectively accommodating and providing for London's further anticipated growth in an efficient and sustainable way and continuing and accelerating the positive mode share trends.

Over the last two years however, confirmed by most recent data for 2017, the rate of growth in both population and travel in London has slowed significantly. Because of the way that this has played out between the different modes, progress towards active, efficient and sustainable modes has also slowed, increasing the effort required to meet the Mayor's aim of an 80 per cent share for active, efficient and sustainable modes by 2041.

As reviewed in chapter 4 of this report, the rate of London's population growth has recently fallen sharply. On the latest available evidence however London is still growing, and longer-

term projections forecast somewhat subdued but nevertheless still relatively strong population growth over the medium-long term.

2.3 Total travel in London

In 2017:

- 26.8 million trips were made on an annual average day in London, a 0.1 per cent decrease since 2016. This contrasts with the historic pattern of growth. The average number of trips in 2017 was 18.5 per cent higher than in 2000, an average growth rate of 1.0 per cent per year. Over this period, London's population grew by 21.9 per cent.
- In contrast to recent years, there was relatively little change in mode share, with public transport mode share remaining at 37 per cent for the fifth successive year.
- On an average day, the share for active, efficient and sustainable modes (walking, cycling and public transport) was 62.7 per cent, a slight increase of 0.1 per cent on 2016.

The Mayor's aim of 80 per cent of trips in London being made by active, efficient and sustainable modes in 2041 requires, on average, a yearly 0.7 percentage point shift towards public transport, walking and cycling. It is recognised that this is an idealised trajectory and that progress may vary from year to year. For comparison, the average annual percentage point shift towards active, efficient and sustainable modes between 2000 and 2015 was 0.7 per cent.

2.4 Trips in London

Essential background and terminology

This section updates consolidated estimates of total travel in London on an average day. A **trip** is defined as a one-way movement from an origin to a destination to achieve a specific purpose, for example, to go from home to work. Each trip may involve travel by one or more individual modes of transport. These component parts of trips are referred to as **journey stages**. Key concepts relating to trips, journey stages and main mode of travel were explained in detail in Travel in London report 5.

The Mayor's Transport Strategy vision of an increase in active, efficient and sustainable mode share to 80 per cent by 2041 is based on **trips**, which are explored in detail in this section, with trip-based mode shares discussed in section 2.6.

Total number of trips

Over the period since 2000, total trips in London have increased by 18.5 per cent overall, with particularly notable increases of 75.8 per cent in rail trips and 55.6 per cent in bus trips, with cycle trips (as main mode) increasing by 135.0 per cent.

The number of trips made in London in 2017 averaged 26.8 million per day, a decrease of 0.1 per cent over the previous year (table 2.1). This reflects the slowing down of travel demand in London in recent years, with an increase in trips of just 0.8 per cent since 2014 compared with an estimated population increase of 3.4 per cent over the same period.

Over the most recent year there was a small increase in bus trips, although there was a decline of 0.9 per cent in National Rail trips and 0.5 per cent in Underground trips. Car driver trips decreased by 0.9 per cent.

Included in these totals are all trips with an origin, a destination, or both, in Greater London by London residents and by non-residents, including commuters and day visitors from

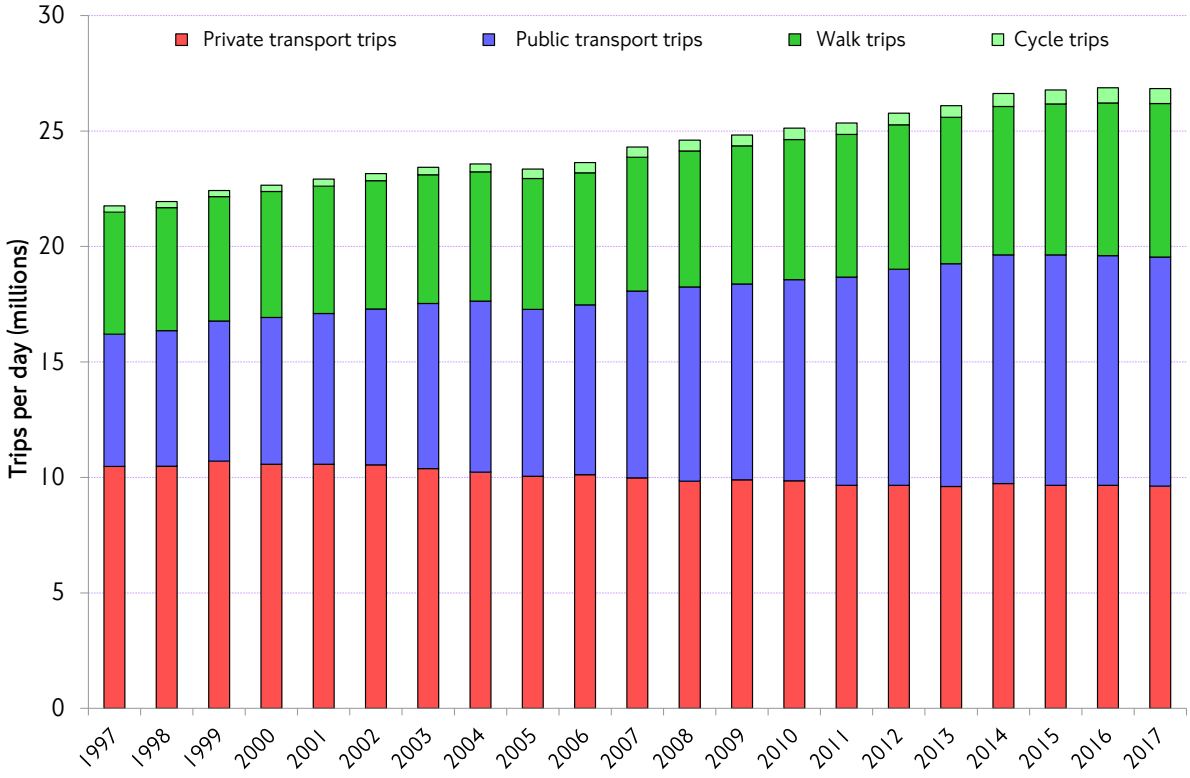
outside London as well as overnight visitors and tourists. The London resident population in 2017 was 8.8 million, estimated to be 0.6 per cent higher than in 2016 and 21.9 per cent higher than in 2000. The larger 'daytime population' of Greater London, including non-resident visitors, was estimated at 10.0 million in 2017, 0.5 per cent higher than the previous year.

Table 2.1 Aggregate travel volumes in Greater London. Estimated daily average number of trips by main mode of travel, 1997-2017. Seven-day week.

	Millions of trips									
Year	Rail	Under-ground /DLR	Bus (including tram)	Taxi/ PHV	Car driver	Car passenger	Motor cycle	Cycle	Walk	All modes
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	22.7
2001	1.7	1.9	2.6	0.3	6.8	3.6	0.2	0.3	5.5	22.9
2002	1.7	1.9	2.8	0.3	6.8	3.5	0.2	0.3	5.6	23.2
2003	1.8	1.9	3.2	0.3	6.7	3.5	0.2	0.3	5.6	23.4
2004	1.8	2.0	3.3	0.3	6.6	3.4	0.2	0.3	5.6	23.6
2005	1.8	1.9	3.2	0.3	6.5	3.4	0.2	0.4	5.7	23.4
2006	1.9	2.0	3.1	0.3	6.4	3.5	0.2	0.4	5.7	23.6
2007	2.1	2.0	3.6	0.4	6.3	3.5	0.2	0.4	5.8	24.3
2008	2.2	2.1	3.8	0.3	6.1	3.5	0.2	0.5	5.9	24.6
2009	2.1	2.2	3.9	0.3	6.2	3.5	0.2	0.5	6.0	24.8
2010	2.3	2.1	4.0	0.3	6.1	3.6	0.2	0.5	6.1	25.1
2011	2.4	2.2	4.1	0.3	5.9	3.6	0.2	0.5	6.2	25.3
2012	2.6	2.4	4.1	0.3	5.9	3.6	0.2	0.5	6.3	25.8
2013	2.7	2.5	4.1	0.3	5.8	3.6	0.2	0.5	6.3	26.1
2014	2.8	2.6	4.1	0.3	5.9	3.7	0.2	0.6	6.4	26.6
2015	3.0	2.8	3.8	0.3	5.9	3.6	0.2	0.6	6.5	26.8
2016	3.0	2.8	3.7	0.4	5.8	3.6	0.2	0.6	6.6	26.9
2017	2.9	2.8	3.8	0.4	5.8	3.7	0.2	0.6	6.6	26.8
Percentage change 2016 to 2017	*-0.9*	*-0.5*	*0.2*	*2.6*	*-0.9*	*0.4*	*1.0*	*-0.3*	*0.5*	*-0.1*
2000 to 2017	*75.8*	*43.2*	*55.6*	*32.6*	*-15.1*	*2.2*	*1.0*	*135.0*	*21.9*	*18.5*

Source: Strategic Analysis, TfL City 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 2.3 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.
5. Values for 'rail' include London Overground.
6. PHV: private hire vehicles.

Figure 2.1 Trips in Greater London – trend in total travel demand by principal mode. Estimated daily average number of trips by main mode of travel, 1997-2017. Seven-day week.



Source: Strategic Analysis, TfL City Planning.

2.5 Journey stages in London

Total number of journey stages

Table 2.2 shows the trend for total travel volumes and mode shares at the journey stage level. Notable from the table is the 17-year trend, showing a 24.3 per cent increase in total journey stages from 2000, with National Rail stages up by 81.6 per cent over the same period. Also notable is the 69.5 per cent increase in bus stages since 2000, despite a fall in bus patronage in more recent years.

Daily journey stages in London in 2017 were 31.5 million, effectively unchanged from 2016 and down from 31.7 million in 2015.

Annual average journey stages declined on rail-based modes, with decreases in 2017 of 1.1 per cent on London Underground and 1.9 per cent on National Rail compared with the previous year. Bus stages increased by 0.1 per cent, following two years of decline that started in 2015.

Car driver stages showed no change in 2017, following a slight decrease in the previous two years. Walk stages increased in 2017, by 0.4 per cent, while cycle stages declined by 0.8 per cent.

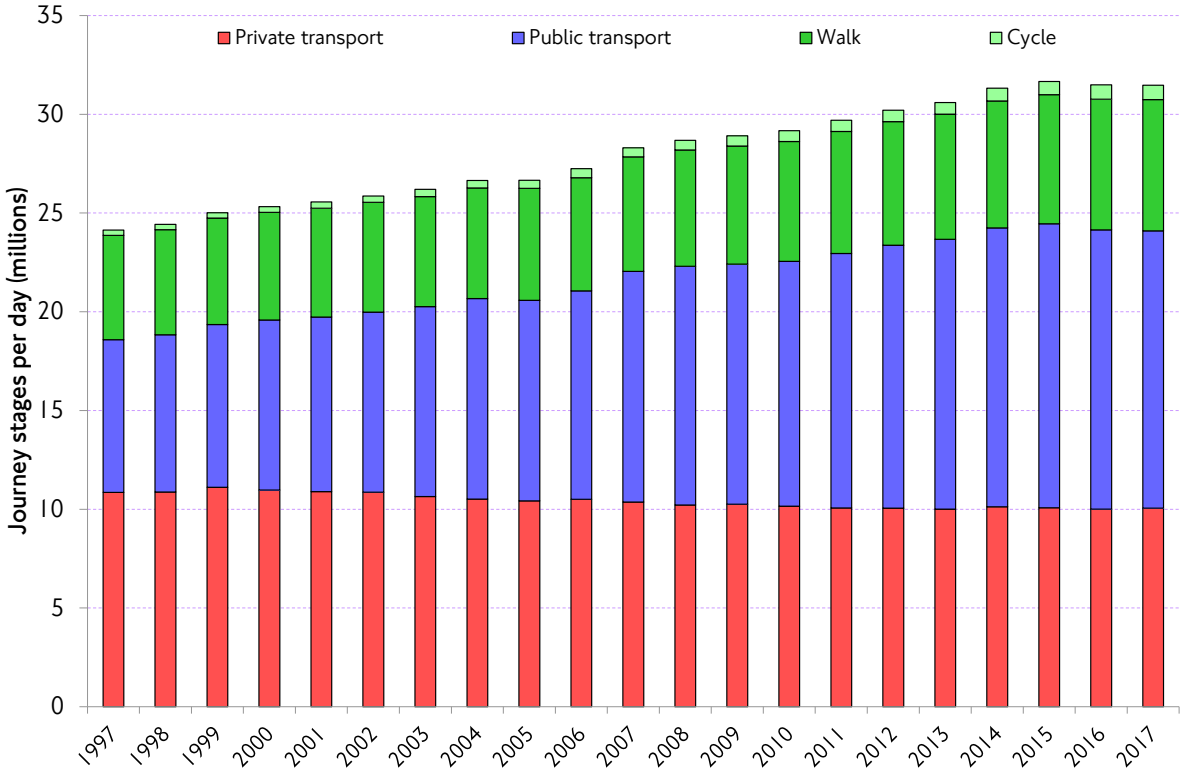
Table 2.2 Aggregate travel volumes in Greater London. Estimated daily average number of journey stages by mode, 1997-2017. Seven-day week.

Millions of journey stages

Year	Rail	Under-ground	DLR	Bus (incl. tram)	Taxi /PHV	Car driver	Car passenger	Motor cycle	Cycle	Walk	All modes
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	25.3
2001	1.8	2.6	0.1	3.9	0.4	6.9	3.7	0.2	0.3	5.5	25.6
2002	1.9	2.6	0.1	4.2	0.4	6.9	3.7	0.2	0.3	5.6	25.9
2003	1.9	2.6	0.1	4.6	0.4	6.8	3.6	0.2	0.4	5.6	26.2
2004	2.0	2.7	0.1	5.0	0.4	6.7	3.6	0.2	0.4	5.6	26.6
2005	2.0	2.6	0.1	5.0	0.4	6.6	3.6	0.2	0.4	5.7	26.7
2006	2.1	2.7	0.2	5.2	0.4	6.6	3.7	0.2	0.5	5.7	27.2
2007	2.3	2.9	0.2	5.9	0.4	6.4	3.7	0.2	0.5	5.8	28.3
2008	2.4	3.0	0.2	6.2	0.4	6.3	3.7	0.2	0.5	5.9	28.7
2009	2.3	2.9	0.2	6.3	0.4	6.3	3.7	0.2	0.5	6.0	28.9
2010	2.5	3.0	0.2	6.3	0.3	6.3	3.7	0.2	0.5	6.1	29.2
2011	2.7	3.2	0.2	6.4	0.4	6.1	3.8	0.2	0.6	6.2	29.7
2012	2.9	3.3	0.3	6.4	0.4	6.0	3.8	0.2	0.6	6.3	30.2
2013	3.1	3.4	0.3	6.5	0.4	6.0	3.8	0.2	0.6	6.3	30.6
2014	3.2	3.5	0.3	6.7	0.4	6.1	3.9	0.2	0.6	6.4	31.3
2015	3.4	3.7	0.3	6.5	0.4	6.0	3.9	0.2	0.7	6.5	31.7
2016	3.4	3.7	0.3	6.2	0.4	6.0	3.8	0.2	0.7	6.6	31.5
2017	3.3	3.7	0.3	6.2	0.5	6.0	3.9	0.2	0.7	6.6	31.5
Percentage change 2016 to 2017	*-1.9*	*-1.1*	*0.4*	*0.1*	*2.6*	*0.0*	*1.2*	*-0.5*	*-0.8*	*0.4*	*-0.1*
2000 to 2017	*81.6*	*40.6*	*231.0*	*69.5*	*23.4*	*-14.8*	*3.0*	*0.5*	*151.8*	*21.9*	*24.3*

Source: Strategic Analysis, TfL City Planning.
1. A journey stage is a part of a trip made by a single mode of transport.
2. Each rail interchange between train operating companies is 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.
6. Values for 'rail' include London Overground.
7. PHV: private hire vehicles.

Figure 2.2 Aggregate travel volumes in Greater London. Estimated daily average number of journey stages, 1997-2017. Seven-day week.



Source: Strategic Analysis, TfL City Planning.

2.6 Mode shares in London

Introduction

Mode shares reflect the choices that people make for travel in London. The Mayor's aim for 2041 is for 80 per cent of trips in London to be made by active, efficient and sustainable modes (walking, cycling and public transport). This section looks at historic trends in mode share and recent changes to this. Section 2.7 focuses on active, efficient and sustainable modes and the scale of change required to meet the Mayor's aim for 2041.

Trip-based mode shares

Public transport accounted for 36.9 per cent of trips in 2017, up from 28.1 per cent in 2000. Over the most recent year, the private transport mode share remained relatively stable, down by 0.1 percentage points compared with 2016. The mode share for public transport trips in London remains higher than for private transport – continuing the situation first seen in 2013. This highlights the large shift in how people travel around London over recent decades, given that in 1993 the public transport mode share was less than half the private transport mode share. Cycle and walk mode shares remained constant in 2017, at 2 per cent and 25 per cent respectively.

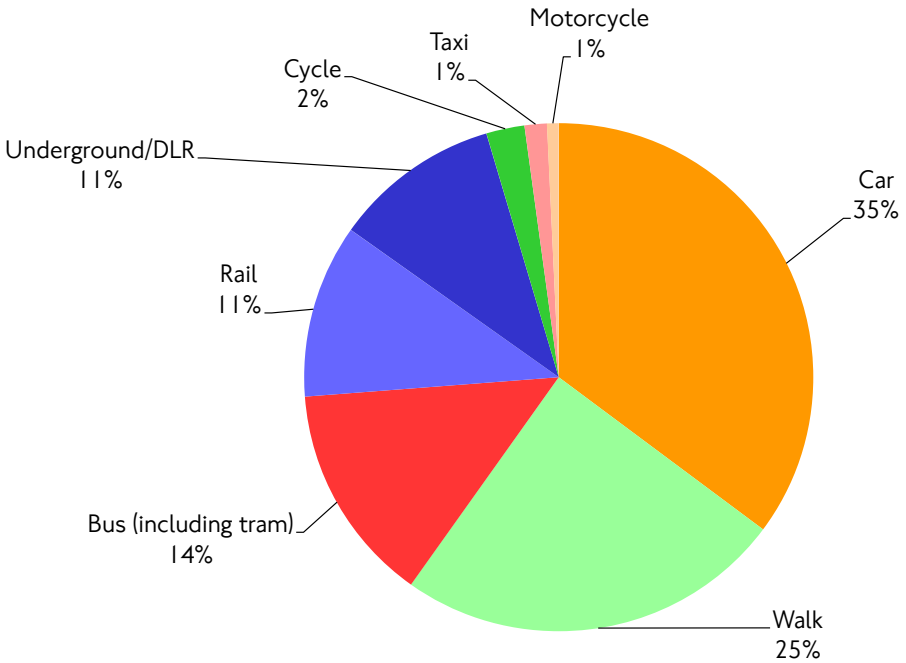
Over the longer term, the decrease of 11.4 percentage points between 2000 and 2017 in the private transport mode share in terms of journey stages is equivalent to a decrease of 10.8 percentage points in terms of trips. Similarly, the public transport mode share, which increased by 10.6 percentage points in terms of journey stages, increased by 8.9 percentage points in terms of trips since 2000 (note that public transport trips typically involve more than one stage).

Table 2.3 Trip-based mode shares – public and private transport by main mode, 1997-2017.

	Percentage of trips			
Year	Public transport	Private transport	Cycle	Walk
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	30%	44%	1%	24%
2004	31%	43%	1%	24%
2005	31%	43%	2%	25%
2006	31%	43%	2%	24%
2007	32%	43%	2%	23%
2008	34%	40%	2%	24%
2009	34%	40%	2%	24%
2010	34%	39%	2%	24%
2011	36%	38%	2%	24%
2012	36%	37%	2%	24%
2013	37%	37%	2%	24%
2014	37%	37%	2%	24%
2015	37%	36%	2%	24%
2016	37%	36%	2%	25%
2017	37%	36%	2%	25%

Source: Strategic Analysis, TfL City Planning.

Figure 2.3 Modal shares of daily trips in London, 2017.



Source: Strategic Analysis, TfL City Planning.

Journey stage-based mode shares

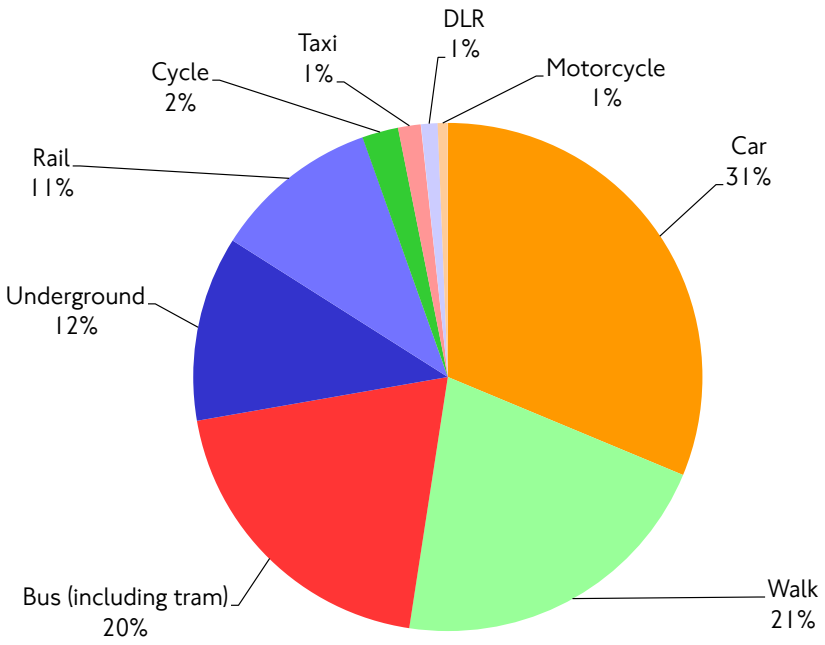
In 2017, 44.6 per cent of journey stages in London were made by public transport, compared with 31.9 per cent by private transport. This reflects the historic position of a well-established trend of a net shift in London away from private motorised transport to the public transport modes. Since 2000 the public transport mode share has increased by 10.6 percentage points. In the latest year, however, the public transport mode share decreased by 0.2 percentage points while the private transport mode share remained stable. Cycling and walking mode shares at the journey stage level remained at 2 and 21 per cent respectively.

Table 2.4 Percentage shares of journey stages by type of transport, 1997-2017.

	Percentage of journey stages			
Year	Public transport	Private transport	Cycle	Walk
1997	32%	45%	1%	22%
1998	33%	45%	1%	22%
1999	33%	44%	1%	22%
2000	34%	43%	1%	21%
2001	35%	43%	1%	22%
2002	35%	42%	1%	21%
2003	37%	41%	1%	21%
2004	38%	39%	1%	21%
2005	38%	39%	2%	21%
2006	39%	39%	2%	21%
2007	41%	37%	2%	20%
2008	42%	36%	2%	21%
2009	42%	35%	2%	21%
2010	43%	35%	2%	21%
2011	43%	34%	2%	21%
2012	44%	33%	2%	21%
2013	45%	33%	2%	21%
2014	45%	32%	2%	21%
2015	45%	32%	2%	21%
2016	45%	32%	2%	21%
2017	45%	32%	2%	21%

Source: Strategic Analysis, TfL City Planning.
Note: Mode shares are calculated from the consistent series for journey stages given in table 2.2. Totals may not add up to 100 per cent due to rounding. 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 2.4 Modal shares of daily journey stages in London, 2017.



Source: Strategic Analysis, TfL City Planning.
Note: 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.

Trends in journey stages by mode

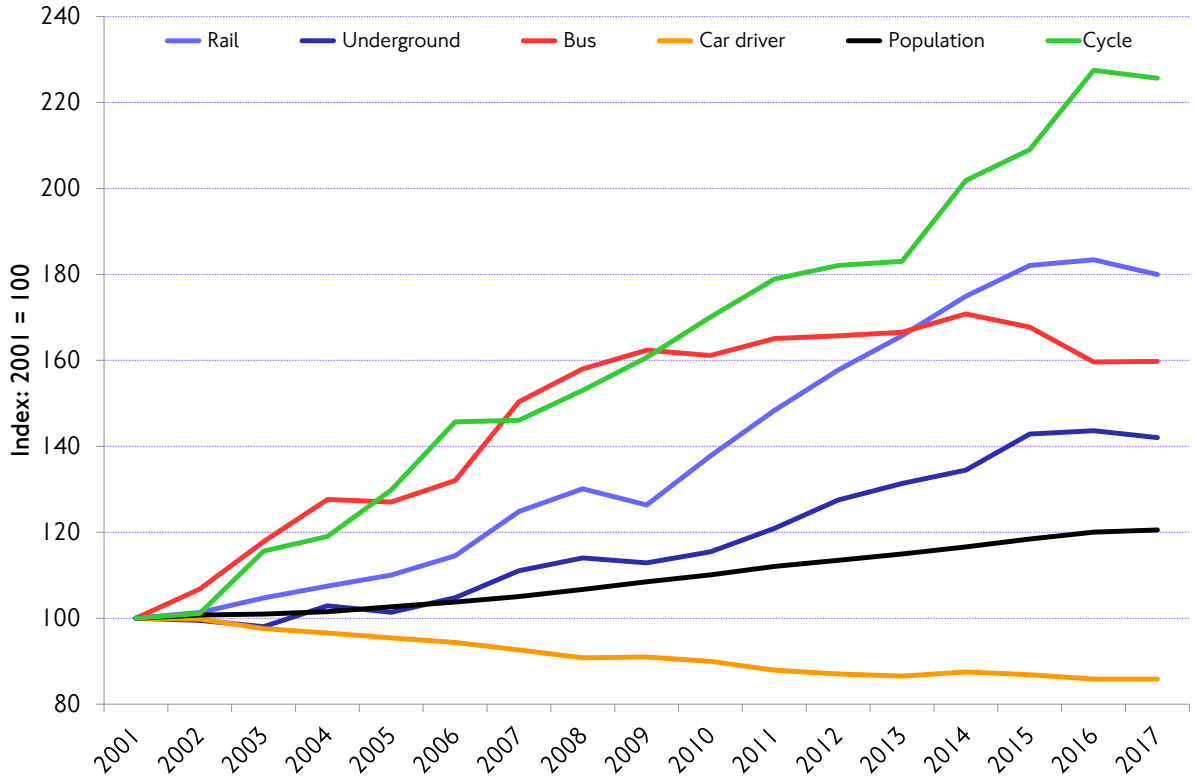
Figure 2.5 shows trends in demand on selected travel modes since 2001. Public transport use has grown strongly over this period, with demand for all the public transport modes growing faster than population, reflecting changing mode shares. Initially, growth was strongest on the bus network, with a 27.6 per cent increase in bus journey stages between 2001 and 2004. Following slower growth of 8.1 per cent between 2008 and 2014, bus stages have decreased over the last three years, although still remain 60 per cent higher than in 2001.

Growth in National Rail use (including London Overground) was initially slower than bus use until 2009. Since 2009, National Rail journey stages have increased by 42.4 per cent, partly helped by the opening of TfL's Overground network, with National Rail stages now 80.0 per cent higher than in 2001. However, growth in National Rail patronage has started to slow in the last two years, with a decline in 2017.

In contrast, Underground passenger growth closely followed population growth between 2001 and 2006, although use started to grow at a faster rate in more recent years, reflecting completion of upgrades to several lines, which has added extra capacity to the network. Again, however, the rate of growth has decreased since 2015, with a decline in 2017.

Car driver stages in 2017 were 14.2 per cent below the 2001 level. Growth has been highest in cycle stages, which have grown by 125.7 per cent since 2001, although again there was a small decline in 2017.

Figure 2.5 Growth in journey stages on selected modes, 2001-2017.



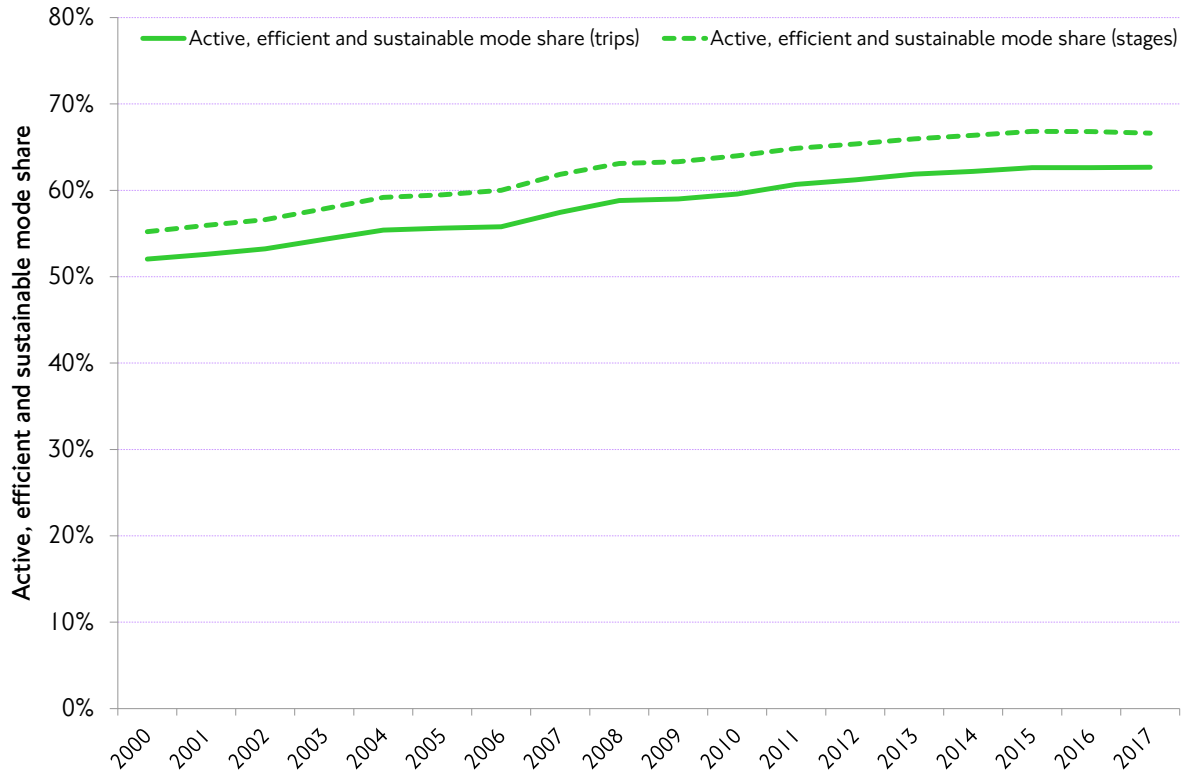
Source: Strategic Analysis, TfL City Planning.

2.7 Active, efficient, sustainable mode shares

Active, efficient and sustainable modes are defined in the Mayor's Transport Strategy as walking, cycling and public transport. For this purpose, public transport does not include trips by licensed taxi and private hire. The active, efficient and sustainable mode share is calculated on the basis of trips, by all people (including residents and visitors) travelling in London, on an annual average day. To be included, trips must have at least one 'end' in the Greater London area. Trips are assigned to a 'main mode' according to the stage of the trip on which the longest distance was undertaken (an established convention).

Figure 2.6 shows the historic trend, with data up to 2017.There has been a continuous year-on-year increase in the active, efficient and sustainable mode share since 2000, averaging 0.7 percentage points per year. In 2016 however, the active, efficient and sustainable mode share did not increase, remaining at 62.6 per cent. In 2017, the active, efficient and sustainable mode share increased marginally, by 0.1 percentage points to 62.7 per cent. This is thought to reflect the wider set of circumstances affecting travel demand and mode choice that are discussed in chapter 4 of this report.

Figure 2.6 Proportion of all trips and journey stages in London made using active, efficient and sustainable modes 2000-2017.



Source: Strategic Analysis, TfL City Planning.

Table 2.5 Percentage of trips and journey stages in London made by active, efficient and sustainable modes, 2011-2017.

Year	2011	2012	2013	2014	2015	2016	2017
Percentage of trips made by active, efficient and sustainable modes	60.7%	61.2%	61.9%	62.2%	62.6%	62.6%	62.7%
Percentage of journey stages made by active, efficient and sustainable modes	64.9%	65.4%	66.0%	66.4%	66.8%	66.8%	66.6%

Source: Strategic Analysis, TfL City Planning.

Long-term trend – journey stage-based mode share

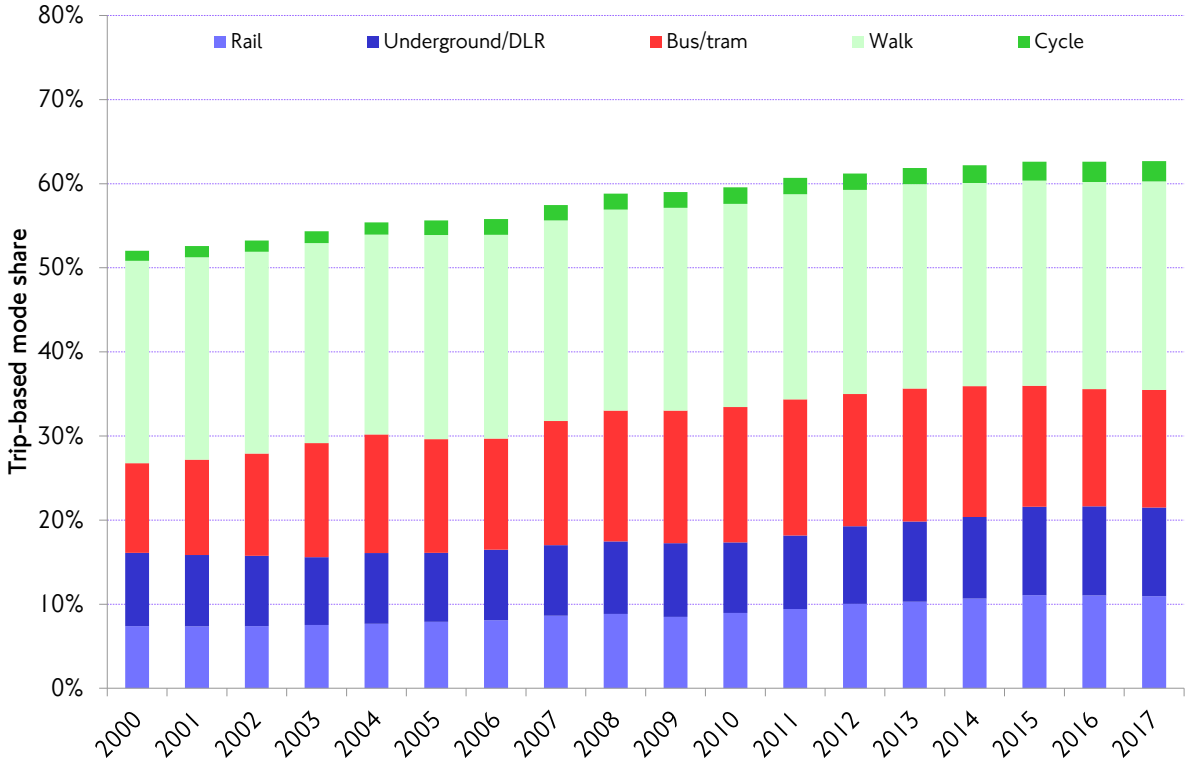
The trend in the active, efficient and sustainable mode share of journey stages has broadly reflected that for trips, with a continuous year-on-year increase up to 2015, and a decline of 0.2 percentage points in the latest year. The stage-based measure of active, efficient and sustainable mode share is higher than the trip-based measure, as public transport trips are more likely to be made up of multiple journey stages. In 2017, the active, efficient and sustainable mode share of journey stages was 66.6 per cent.

Components of active, efficient and sustainable modes

Figure 2.7 shows the breakdown between active, efficient and sustainable modes since 2000. The proportion of trips made by sustainable public transport modes (excluding taxi/PHV) has increased over the period, from 27 per cent in 2000 to 35 per cent in 2017. The cycle mode share has doubled over the period, albeit from a much smaller base, from 1.2 per cent in 2000 to 2.4 per cent in 2017. The mode share of walking trips has remained relatively stable, this reflecting a growth broadly in line with increasing population, although this increased to 25 per cent in 2017.

Overall, the active, efficient and sustainable mode share at the trip level has increased from 52.0 per cent in 2000 to 62.7 per cent in 2017.

Figure 2.7 Components of active, efficient and sustainable modes 2000-2017. Trip level.



Source: Strategic Analysis, TfL City Planning.

3. Trends in travel demand among London residents

3.1 Introduction

Chapter 2 reviewed overall travel demand trends in London in terms of the number of trips made by all people in London, whether residents or visitors, alongside overall mode shares for travel. This chapter reviews in more detail the travel demand trends and mode shares of London residents specifically, using data from the London Travel Demand Survey (LTDS). It is estimated that residents account for approximately 80 per cent of all travel in London on a typical day; however it is also likely to be the case that the travel patterns of non-residents are materially different from those of residents. Consequently, estimates of total travel and mode shares from this source will differ from those described in chapter 2 of this report.

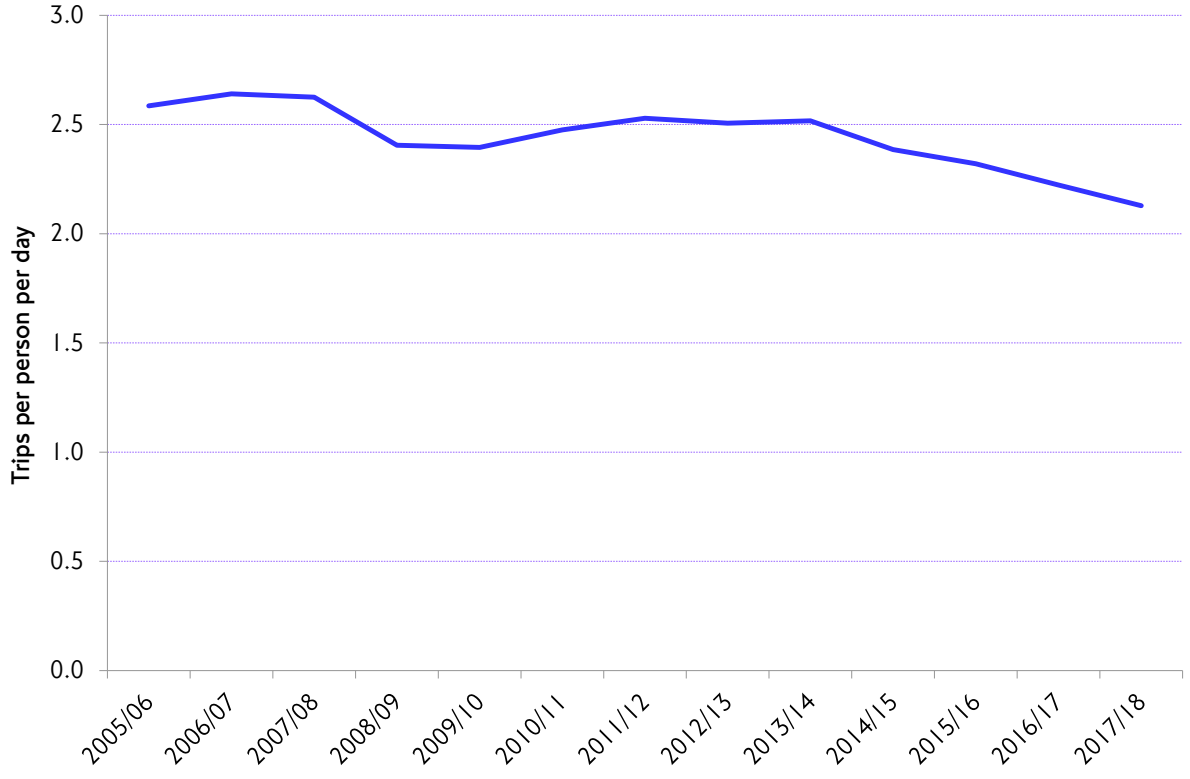
LTDS is a continuous household survey of the London area and has been running since 2005/06 with an annual sample size of around 8,000 households. It captures information on households, people, trips and vehicles and therefore allows for detailed analysis of trip making and its relationship to socio-demographic factors over time.

3.2 Travel by London residents – trip rates

Overall per-person trip rates by London residents

Trip rates are a basic indicator of travel – relating to the number of trips (or journey stages) undertaken on an average day – by Londoners in general or by more specific groups of people. LTDS has tracked a pattern of generally falling trip rates over the decade-long lifetime of the survey, a trend that is mirrored at the national scale, although this trend appears to have accelerated in more recent years.

Figure 3.1 Trend in average per person trip rate per day (annual average) by London residents, LTDS, 2005/06-2017/18.



Source: Strategic Analysis, TfL City Planning.

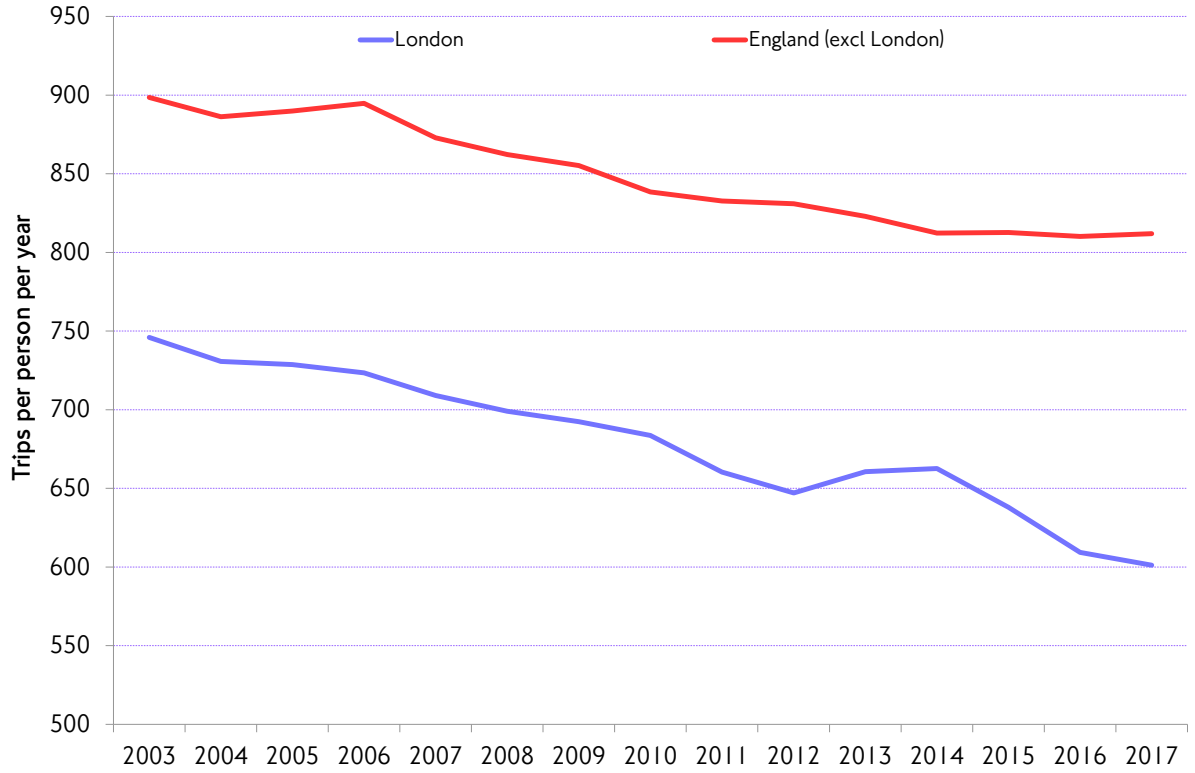
After rising from 2.40 trips per person per day in 2008/09 to 2.52 in 2013/14, trip rates for London residents have fallen by an average of 4.1 per cent per year for the last four years, this reduction primarily affecting 'discretionary' trips, for example trips for shopping and leisure.

In the most recent year, the number of trips per day (annual average) made by the average London resident fell again, from 2.22 in 2016/17 to 2.13 in 2017/18 (figure 3.1). This is a decline of 4 per cent in the latest year and 15 per cent lower than the most recent 'high' of 2013/14. Resident trip rates are notably lower than the average for all travellers in London (2.68 in 2017) but this difference is to be expected, given that the large majority of non-resident day visitors are already (by definition) in the course of making at least one trip on the day in question to get to or from London.

Parallels at the national scale

The trends in trip rates seen among London residents have parallels at the national scale. The National Travel Survey (GB, latterly England only) shows these trends to have been well established. Although emerging results from the National Travel Survey for 2017 suggest a small increase in per-capita travel in England (excluding London) of 0.2 per cent, the trip rate remained 10 per cent lower than in 2003. By contrast, trip rates in London, as recorded by the London component of this survey, have resumed a declining trend (figure 3.2). It should be noted that there was a change to the way the National Travel Survey collected data on short walks from 2016 onwards, so walks of less than a mile have been excluded from the analysis.

Figure 3.2 Trips per person per year (excluding walks of less than a mile). National Travel Survey, 2003-2017.



Source: Department for Transport.

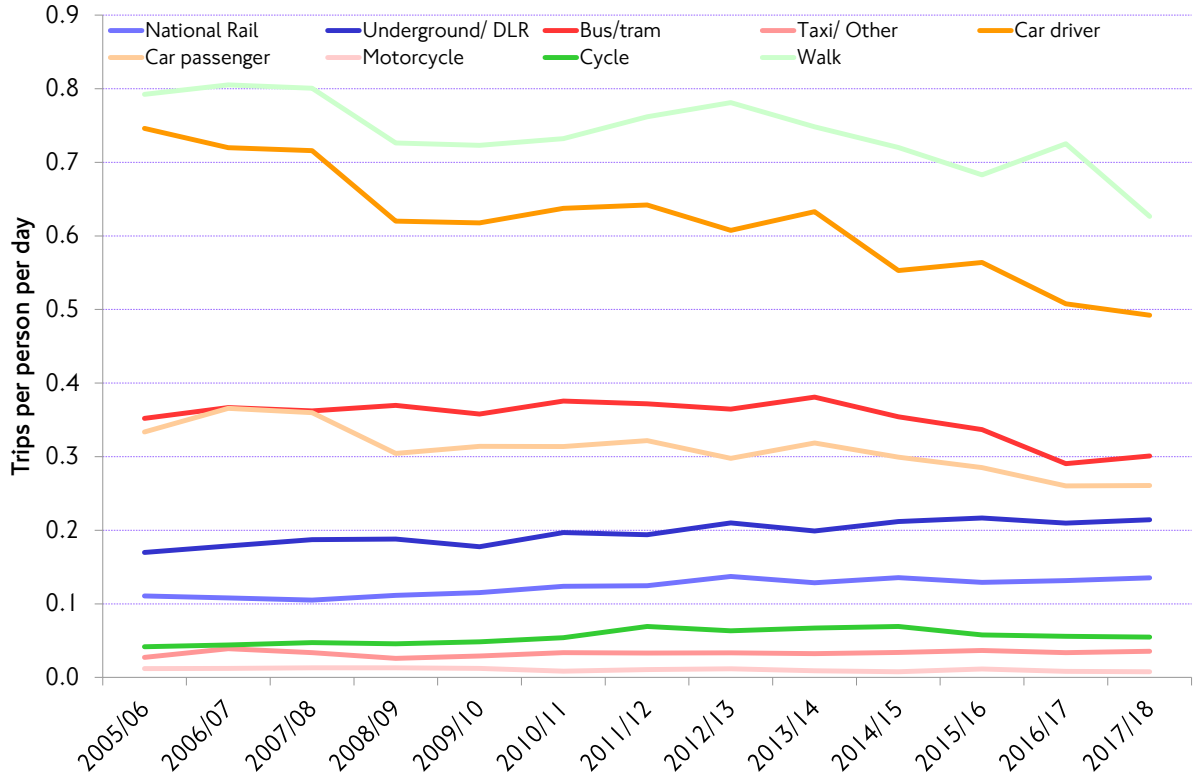
The overall conclusion from these data is that trip rates in England are now relatively static after a period of decline, whilst those in London seem to be continuing a slow downwards trend, only briefly interrupted in the 2012-2014 period.

Trip rates by mode

Over the long-term period of the LTDS survey, the most notable trends are the decline in car driver trip rates and the fluctuations in walking trip rates since 2005/06. Car driver trip rates have declined by 34 per cent since the start of the survey in 2005/06 and by 22 per cent since 2013/14 alone. The trend in walk trip rate over the period mirrors the overall trip rate, declining by 16 per cent since 2013/14 (compared to a 15 per cent decline in the total trip rate). National Rail and Underground trip rates have shown steadier growth over the period, increasing by 22 per cent and 26 per cent respectively since 2005/06.

In the most recent year, there has been a small increase in each of the public transport trip rates (between 2 and 4 per cent for rail and bus). Car driver trip rates decreased by 3 per cent, taxi trip rates increased slightly but active travel trip rates were slightly down on 2016/17 (figure 3.3).

Figure 3.3 Trend in average trip rate per person per day (annual average), by mode, London residents, 2005/06-2017/18.



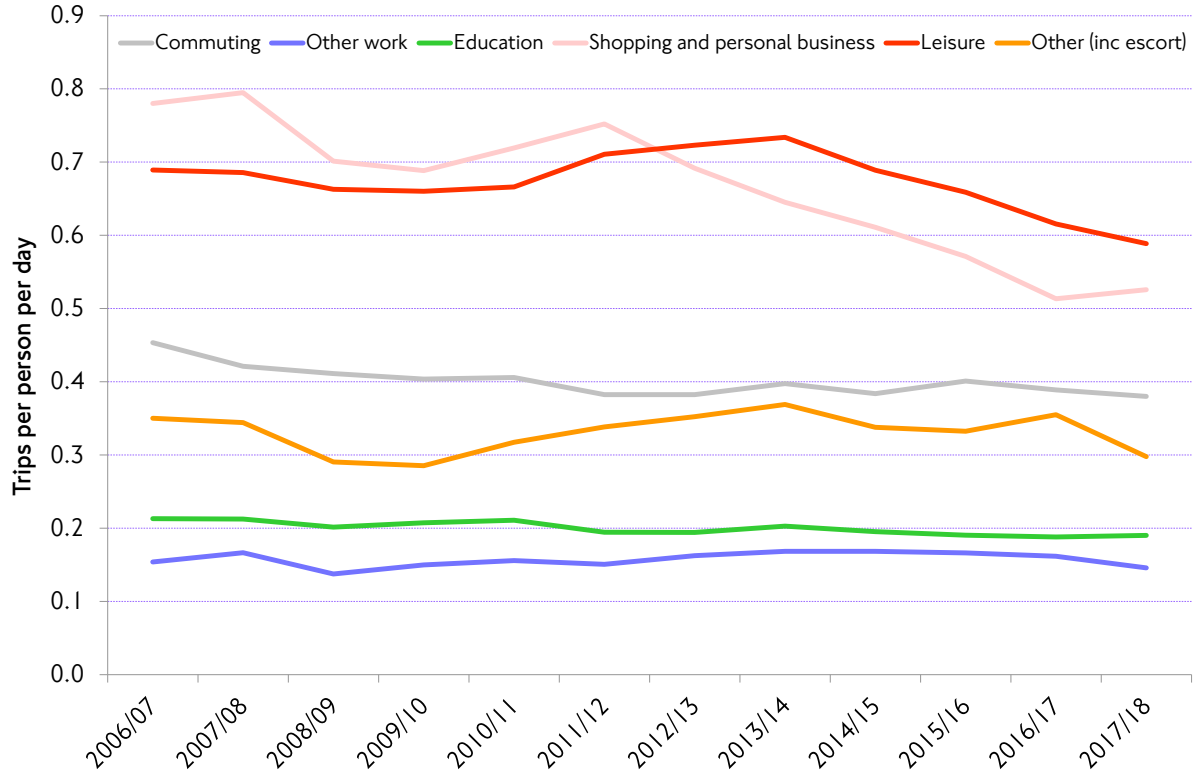
Source: Strategic Analysis, TfL City Planning.

Trip rates by journey purpose

By journey purpose, the number of trips London residents make per day for education and work-related travel has changed very little over the time period. In contrast, there have been substantial declines in the number of trips made for shopping and leisure purposes since 2011/12 and 2013/14 respectively. The number of trips made for shopping and personal business has declined by 30 per cent since 2011/12, despite a slight upturn in the latest year. Leisure trips are also down 20 per cent since 2013/14. Commuting trips have seen a gradual

decline over the period, down by 16 per cent since 2006/07 (figure 3.4). The reasons for these changes in travel by purpose are explored in more detail in chapter 4. It should however be noted that the declines in per-person trip rates took place in the context of a growing population, which had the effect of partially masking their effect on overall travel demand.

Figure 3.4 Trend in average per person trip rate per day (annual average), by journey purpose, London residents, 2006/07-2017/18.

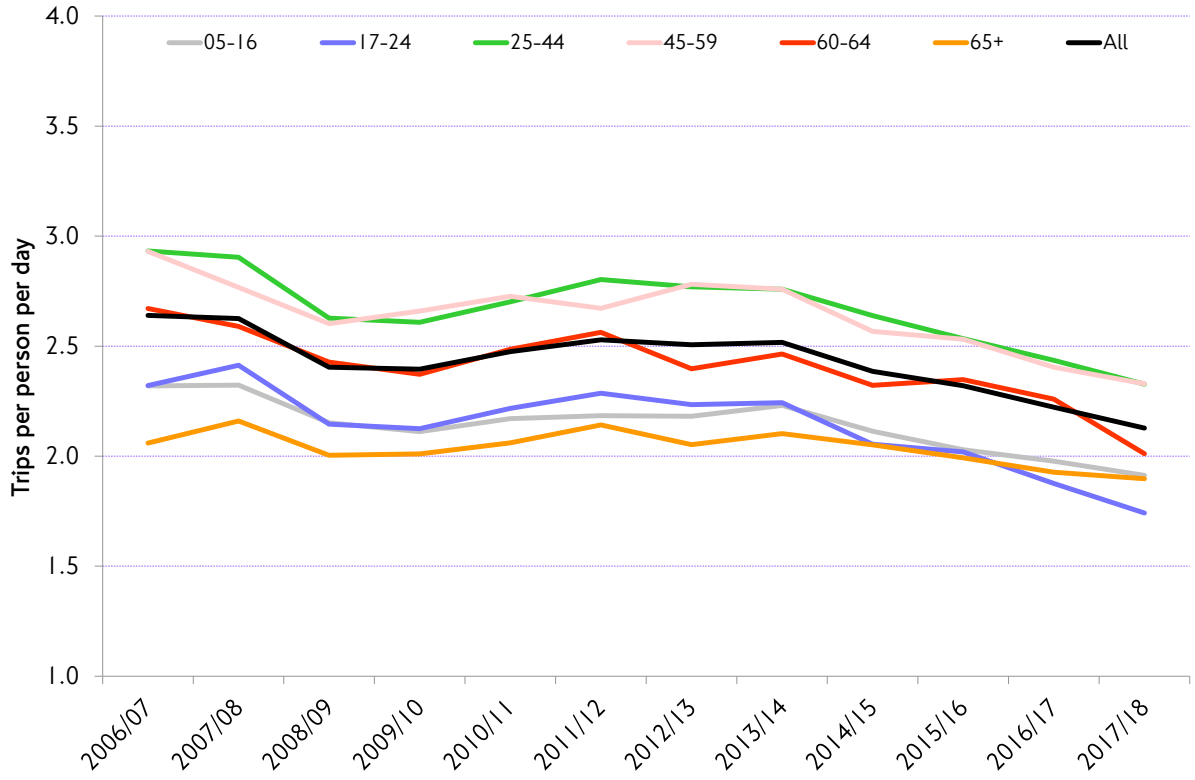


Source: Strategic Analysis, TfL City Planning.

Trip rates by age

London residents aged 25-44 and 45-59 make the highest number of trips per day (2.3 trips per person). The decline in trip rates that has occurred over the last four years is evident across all age groups, although the largest proportional decline in trip rates is seen among 17-24 year olds (a decline of 22 per cent since 2013/14 compared to an average of 15 per cent across all people). This means that 17-24 year olds now make fewer trips on average per day than those aged over 65, the group who have traditionally made the fewest trips per day (figure 3.5).

Figure 3.5 Trend in average per person trip rate per day (annual average), by age, London residents, 2006/07-2017/18.

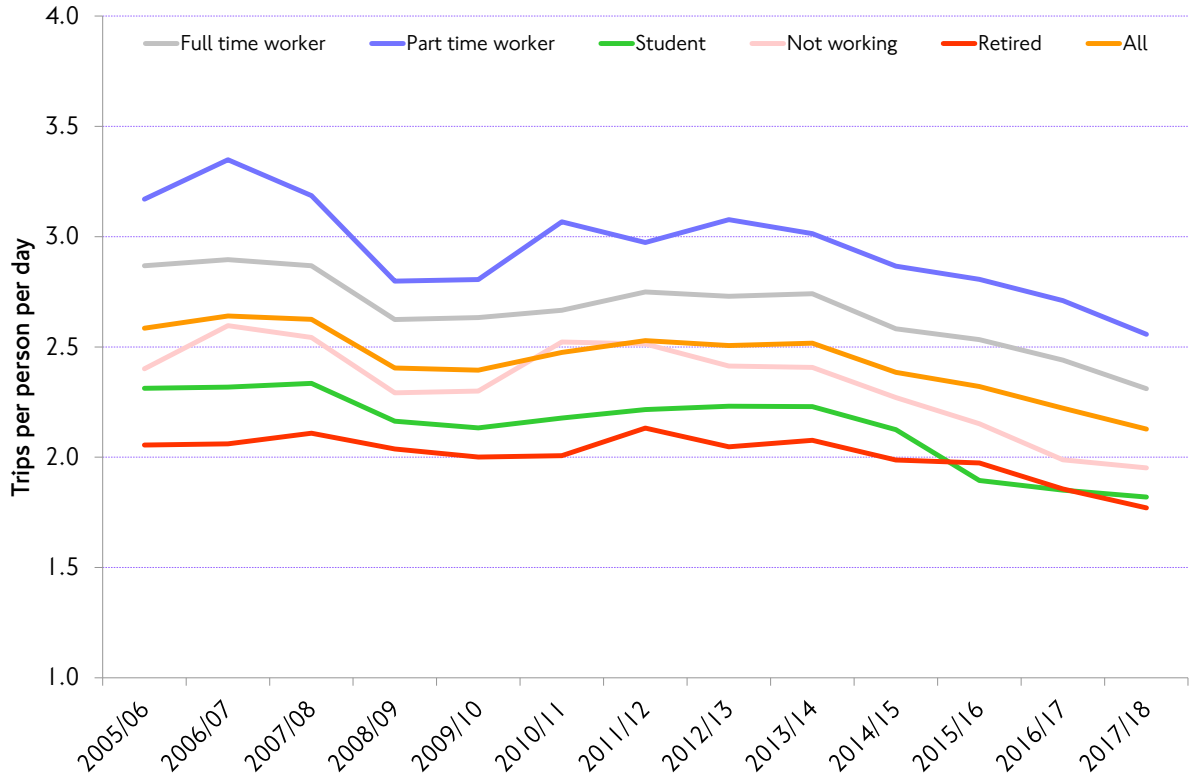


Source: Strategic Analysis, TfL City Planning.

Trip rates by working status

London residents who are in employment make the highest number of trips per day – those in part-time employment make around 2.6 trips per day and those in full-time employment make about 2.3 trips per day. London residents who are in education, retired or not working make fewer trips on average. The decline in trip rates that has occurred over the last four years is again evident across all working status groups, but students and London residents who are not working have seen greater declines in their trip rates since 2013/14 than the average London resident (figure 3.6).

Figure 3.6 Trend in average per person trip rate per day (annual average), by working status, London residents, 2005/06-2017/18.



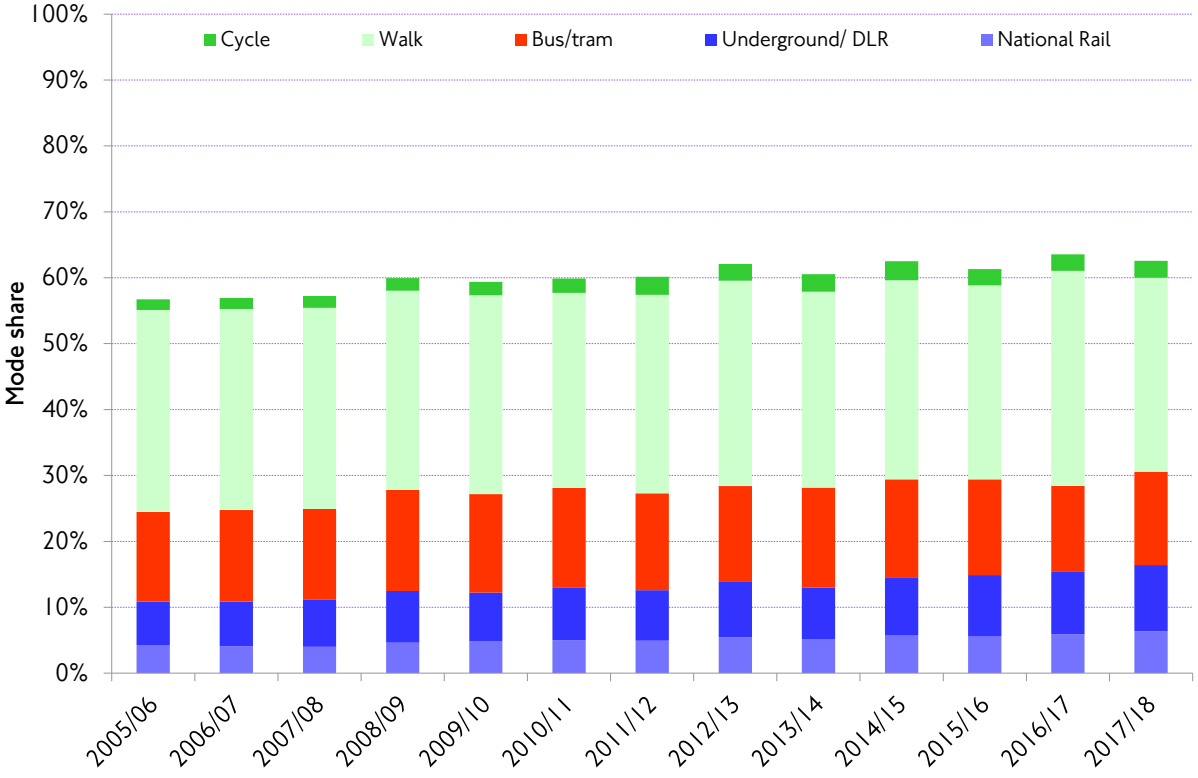
Source: Strategic Analysis, TfL City Planning.

3.3 Travel by London residents – active, efficient and sustainable mode shares

LTDS tells us about the mode share of London residents only, which is not the same as the Mayor's vision, which relates to all travel in London. The way in which the two elements are measured also differs – and so whilst the trends shown by LTDS are useful for assessing general progress, and reflect the majority of people travelling in London, the specific numbers and proportions will not relate directly to those calculated every year (and published in Travel in London reports), which relate directly to the Mayor's aim.

Figure 3.7 shows that the proportion of trips by London residents that are made by active, efficient and sustainable modes has fluctuated over the last few years at around 60 per cent. In the latest year, there has been a one percentage point decline in the active, efficient and sustainable mode share, which is the result of a small decline in the walking mode share. However, the mode share of rail-based modes and bus increased between 2016/17 and 2017/18.

Figure 3.7 Active, efficient and sustainable mode share for trips by London residents, 2005/06-2017/18.



Source: Strategic Analysis, TfL City Planning.

Spatial variation in active, efficient and sustainable mode share

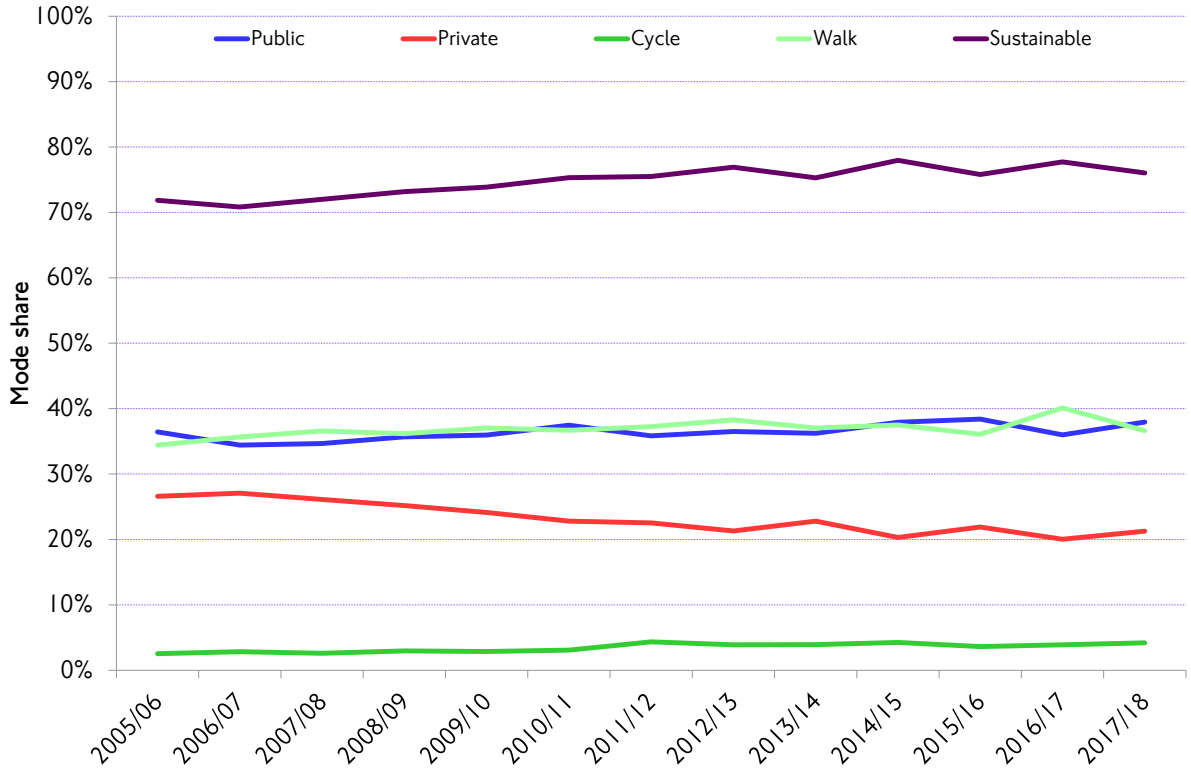
Mode shares vary geographically. Typically, the highest active, efficient and sustainable mode shares characterise trips involving central and inner London. This analysis is based on area of residence, although trips may be made in other areas, so long as one end of the trip is within the GLA area.

Inner London (including central London)

Among inner and central London residents, public transport mode shares have remained broadly constant at around 35 to 38 per cent, with a small increase in the latest year. Despite small fluctuations in recent years, there has been a sustained decline in private transport mode share over the period, falling from 27 per cent in 2005/06 to 21 per cent in 2017/18 (figure 3.8). Cycle mode share increased from 2.5 per cent in 2005/06 to 4.2 per cent in 2017/18, with a 0.3 percentage point increase in the latest year. The walk mode share has also fluctuated in recent years but has increased from 34.4 per cent in 2005/06 to 36.6 per cent in 2017/18, despite a small decline in the latest year.

Some 71.9 per cent of trips by central and inner London residents were made by active, efficient and sustainable modes in 2005/06, increasing to 76.1 per cent of trips in 2017/18, an increase of 4.2 percentage points over the period.

Figure 3.8 Mode share of trips by inner London residents. LTDS, 2005/06–2017/18.

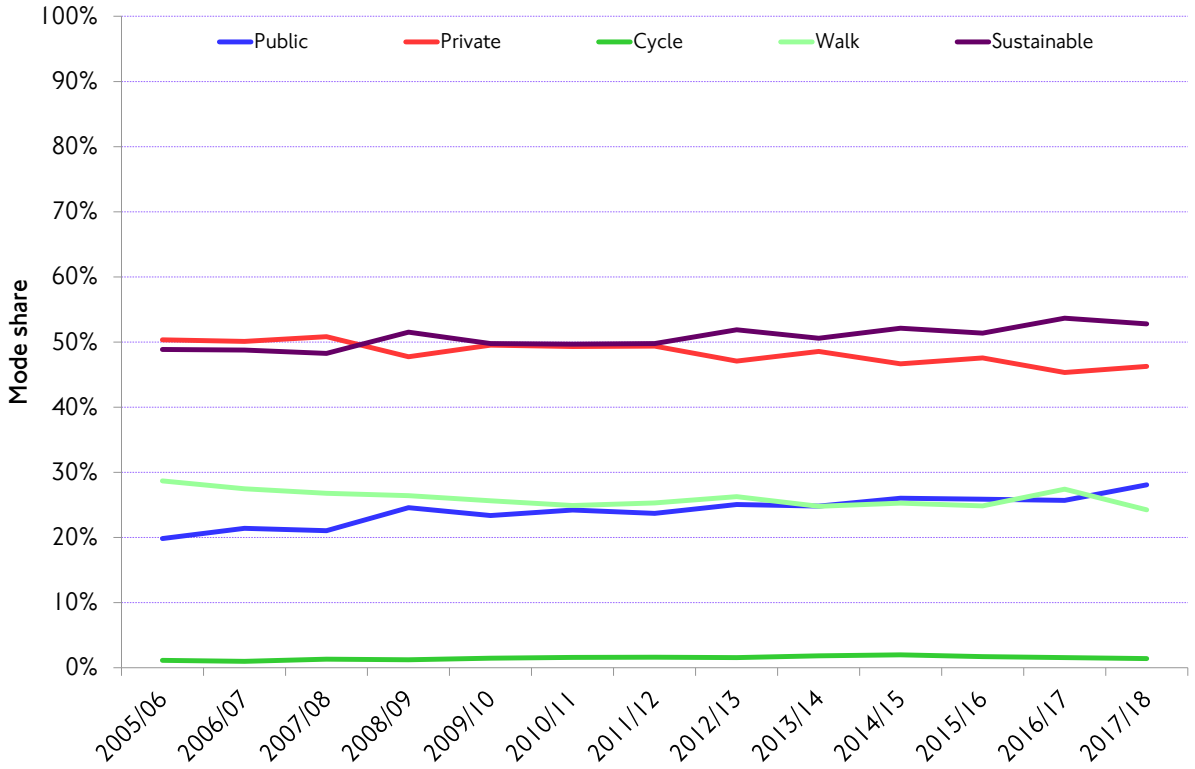


Source: Strategic Analysis, TfL City Planning.

Outer London

In outer London, where public transport coverage is less comprehensive, the trends have been different, with private transport mode share falling at a slower rate, from 50.4 per cent in 2005/06 to 46.3 per cent in 2017/18 (figure 3.9). Public transport mode share increased from 19.8 per cent to 28.1 per cent over the same period, with a 2.4 percentage point increase in the latest year. The cycling mode share among outer London residents is much lower than among inner London residents and has increased at a slower rate, from 1.1 per cent in 2005/06 to 1.4 per cent in 2017/18. The walk mode share has decreased over the period from 28.7 per cent in 2005/06 to 24.2 per cent in 2017/18. In 2005/06, less than half (48.9 per cent) of trips by outer London residents were made by active, efficient and sustainable modes, and in 2017/18 this had increased to 52.8 per cent of trips.

Figure 3.9 Mode share of trips by outer London residents, LTDS survey, 2005/06–2017/18.



Source: Strategic Analysis, TfL City Planning.

Borough level patterns

Figure 3.10 shows the trip-based active, efficient and sustainable mode share by borough of residence. This figure includes all trips undertaken by residents of each borough, irrespective of where the trips take place (although one end of the trip must be in the GLA area to be included). There are many reasons underlying these patterns but the considerable variation highlights both challenges and opportunities in respect of achieving the active, efficient and sustainable mode share aim.

In general, inner London residents have a higher share of trips made by active, efficient and sustainable modes, and this is to be expected given the denser land use and more comprehensive public transport network. Residents of the City of London have the highest overall active, efficient and sustainable mode share (92 per cent), but the smaller number of households in the City of London compared to other London boroughs should be recognised and means that this estimate is based on a relatively small sample of households.

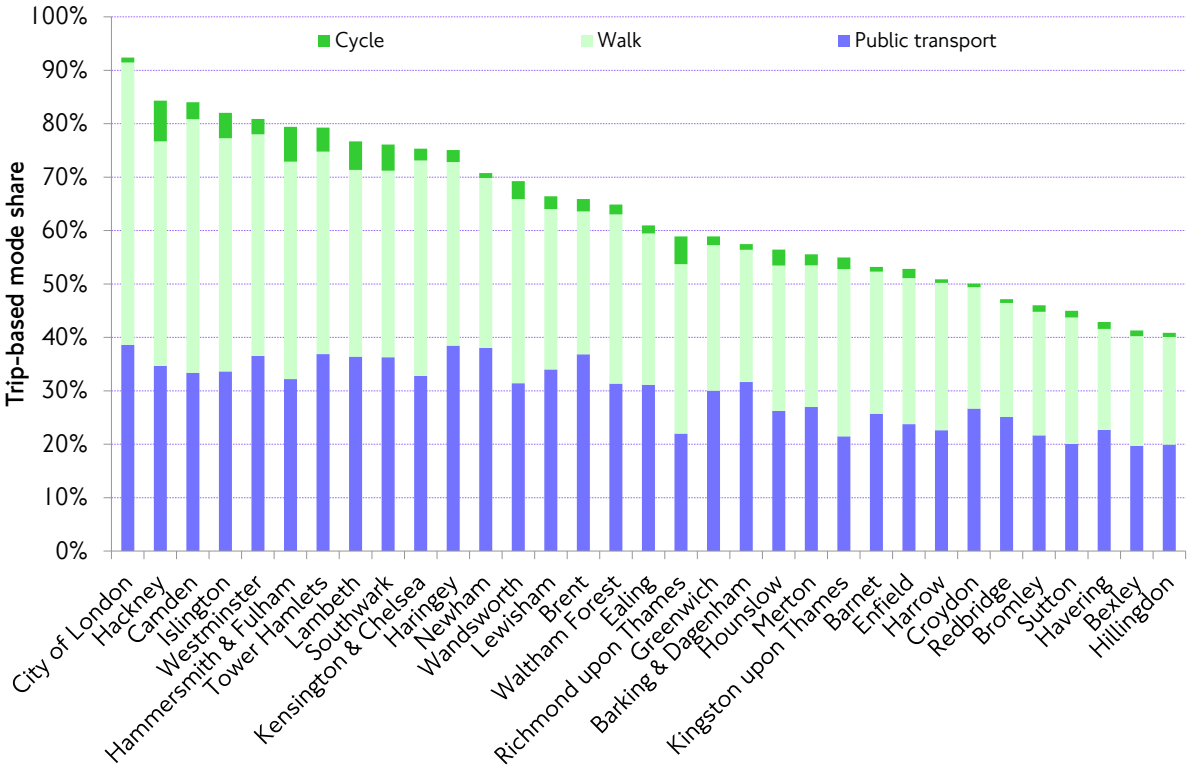
Hackney has the second highest active, efficient and sustainable mode share (84 per cent), in part due to the high cycle mode share of 8 per cent. Residents of the City of London, Camden and Islington have notably high walk mode shares, whereas residents of the City of London, Haringey and Newham have the highest public transport mode shares.

Outer London residents have lower overall active, efficient and sustainable mode shares. Residents of Brent have the highest active, efficient and sustainable mode share (66 per cent) of all of the outer London boroughs, due to a higher than average public transport mode share of 37 per cent. Residents of Waltham Forest also have a higher than average active, efficient and sustainable mode share for outer London, with the highest outer London walk mode share of 32 per cent, along with Richmond upon Thames. Richmond upon Thames residents also have the highest outer London cycle mode share of 5 per cent. Residents of

Bexley and Hillingdon have the lowest active, efficient and sustainable mode share of 41 per cent respectively, followed by Havering (43 per cent) and Sutton (45 per cent).

Particularly notable from the figure is the variation in the proportion of the mode share accounted for by cycling and (in particular) walking, with public transport mode shares being relatively more consistent between boroughs.

Figure 3.10 Trip-based mode share for active, efficient and sustainable modes, by borough of residence, LTDS 3 year average, 2015/16-2017/18.



Source: Strategic Analysis, TfL City Planning.

3.4 The potential for mode shift in London

Introduction

Achievement of the Mayor's active, efficient and sustainable mode share aim is predicated on substantially increasing the use of public transport, walking and cycling, this also having related benefits such as improving public health and relieving congestion on other networks.

We have updated our analysis of mode shift potential in London to reflect the most recent data on travel patterns. Previous versions of this analysis have been used extensively to support strategic and scheme-level planning, as it highlights parts of London, socio-economic groups and clusters of trip types that are most likely to be responsive to initiatives to increase use of active, efficient and sustainable modes. In this way, TfL's investment can continue to be targeted to greatest effect based on the latest data.

On an annual average day, London residents make approximately 19 million trips. Some 6.8 million of these are made by private vehicle. This analysis explores the extent to which these trips could reasonably be made by another mode that contributes to achieving the Mayor's 80 per cent aim.

Analysis

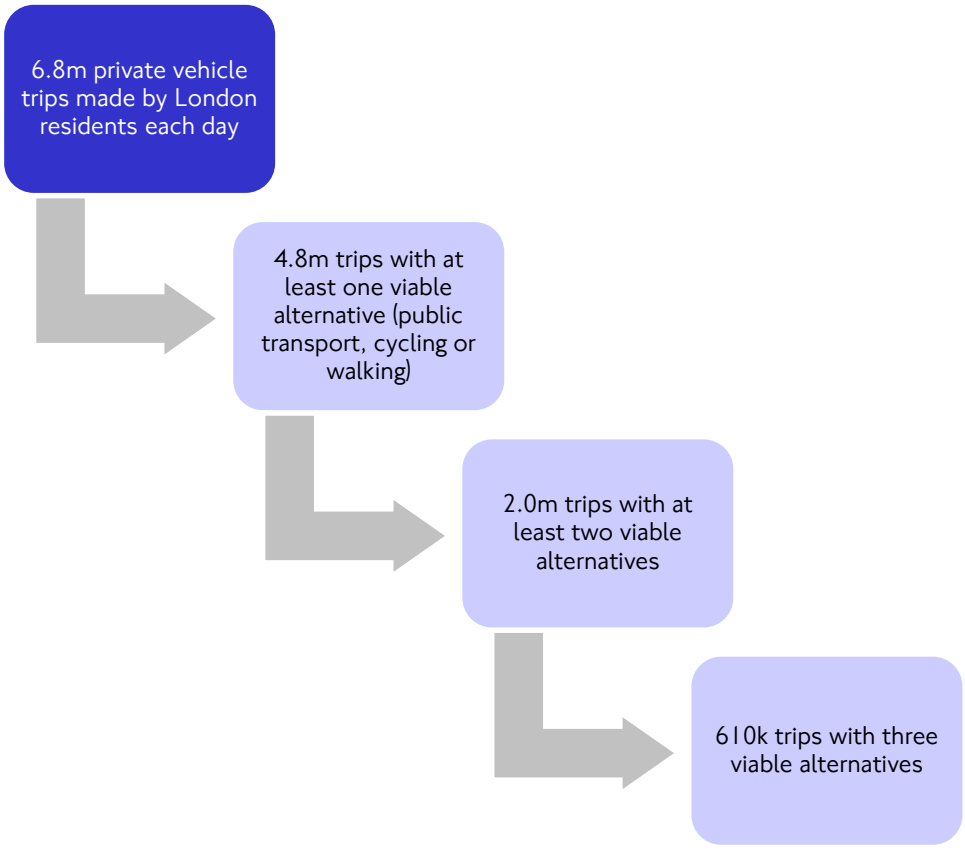
TfL's analysis, based on data obtained through the LTDS survey, uses the characteristics of a journey made by private vehicle (and the person making it) to determine whether it could reasonably be made by walking, cycling or public transport. The analysis uses criteria, based on knowledge of trips currently made by sustainable modes, to determine whether trips recorded in LTDS could feasibly be made by a more sustainable alternative. These include:

- Distance – is the trip too far to be walked or cycled?
- Encumbrance – is the person travelling with heavy or bulky items or with children or elderly people?
- Journey time - how does the alternative mode journey time compare to the current journey time?
- Related journeys - is the person making any other journeys (as part of a 'tour') that couldn't be switched?

Overall scale of the potential for mode shift from private vehicle trips

Figure 3.11 shows the overall scale of the potential for mode shift from private vehicle trips by London residents.

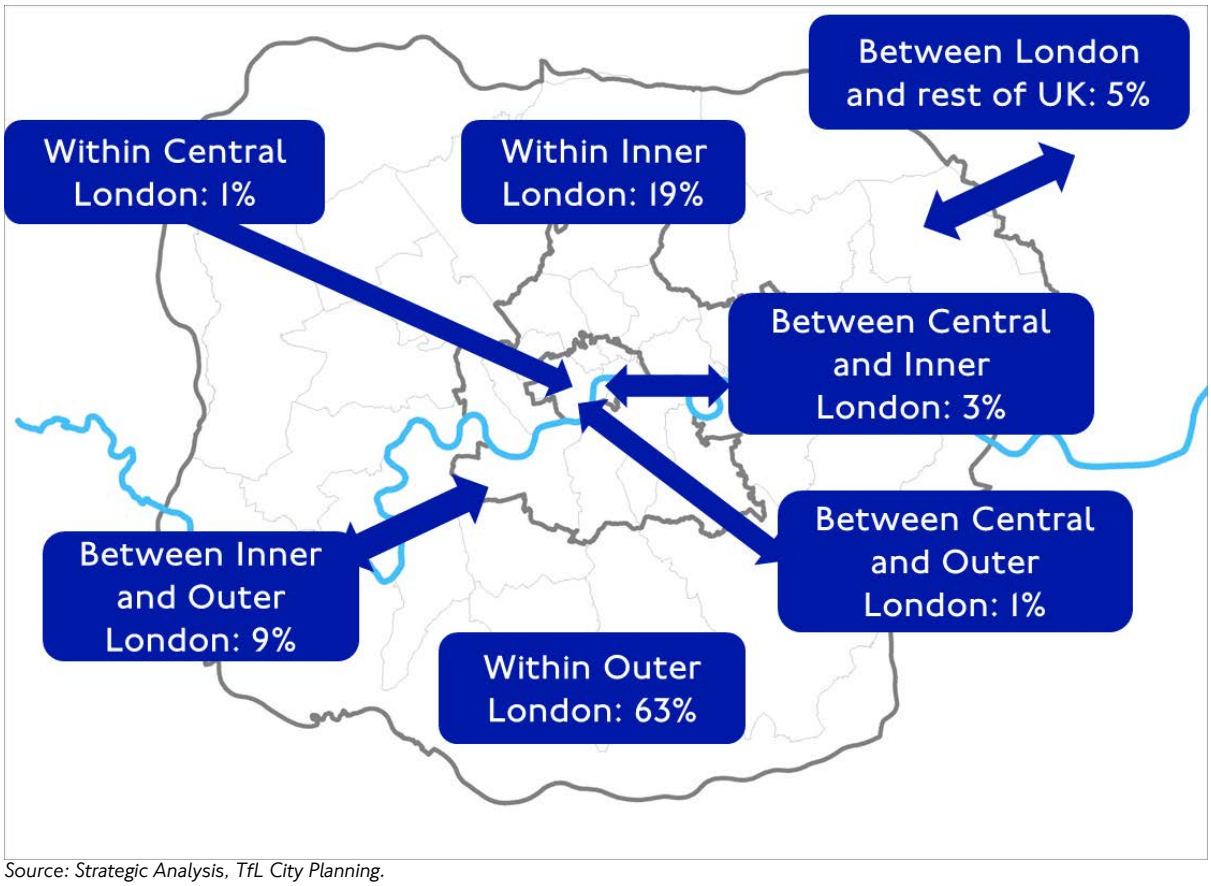
Figure 3.11 Overall scale of potential for mode shift of private vehicle trips made by London residents.



Source: Strategic Analysis, TfL City Planning.

Most of these potentially switchable private vehicle trips are wholly within outer London (63 per cent), as shown by figure 3.12. Notable are the relatively small proportions involving central and inner London, reflecting the established sustainable modal shares in these areas.

Figure 3.12 Spatial distribution of potentially switchable private vehicle trips by London residents.



Source: Strategic Analysis, TfL City Planning.

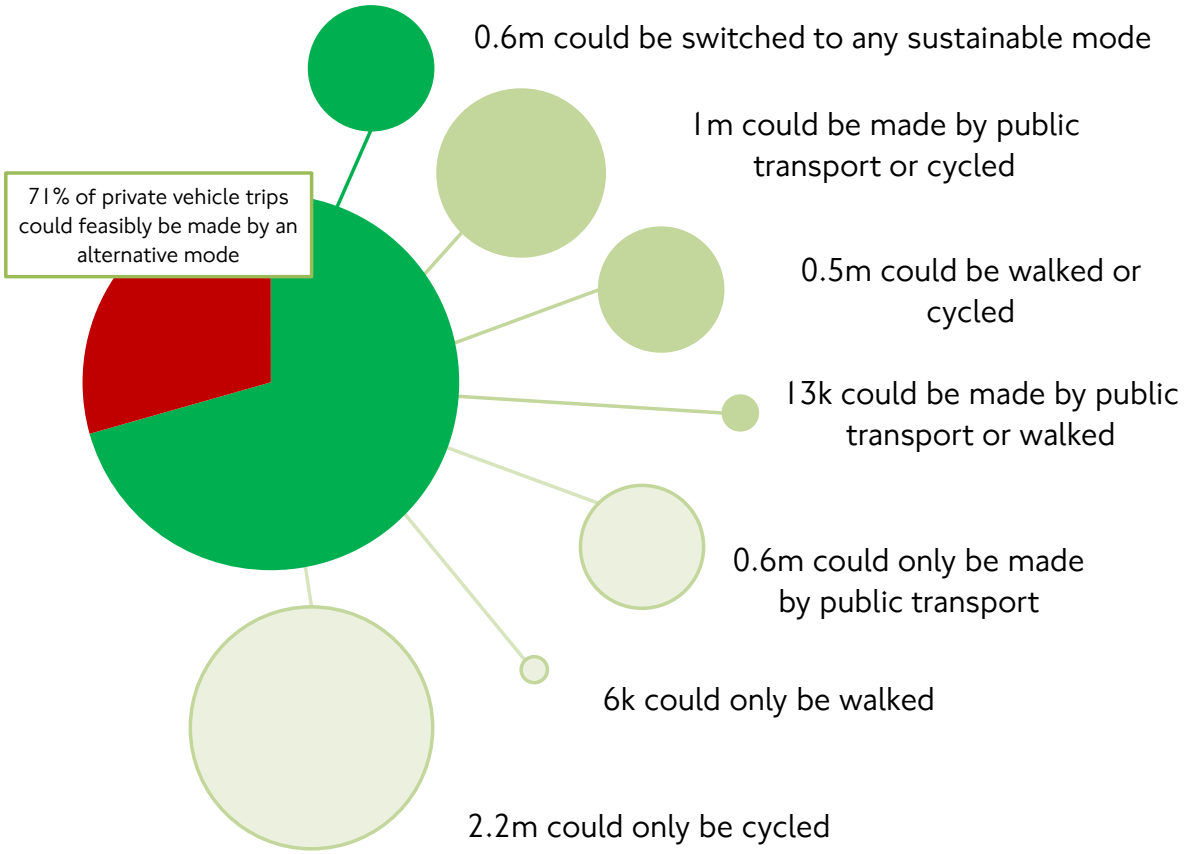
Switchable trips are also not confined to specific segments of the population, and are spread across all trip purposes, for example, looking at private vehicle trips:

- 2.2m switchable private vehicle trips per day are made by men
- 2.6m switchable private vehicle trips per day are made by women
- 1m switchable private vehicle trips per day are made by those under 25 years old
- 1.8m switchable private vehicle trips per day are made by 25-44 year olds
- 1.5m switchable private vehicle trips per day are made by 45-64 year olds
- 0.5m switchable private vehicle trips per day are made by over 65s
- 27 per cent of switchable private vehicle trips per day are leisure trips, 27 per cent are for shopping or personal business reasons, and about one-sixth are related to work (either commuting or other work-related travel).

Potential of switching private vehicle trips to other modes

Figure 3.13 shows the extent to which the 6.8 million private vehicle trips per day could be switched to other modes. It is important to recognise that a given private vehicle trip may have been assessed as having more than one potential switching option (eg to walk or to cycle), as well as the fact that some of these trips will not be assessed to be switchable in this context.

Figure 3.13 Potential switching of private vehicle trips to other modes. London residents, annual average day.



Source: Strategic Analysis, TfL City Planning.

Some 71 per cent of private vehicle trips could feasibly be made by an alternative mode (walking, cycling or public transport). There are 4.2m private vehicles trips that could be cycled, compared to 2.2m that could be made by public transport, and 1.1m that could be walked.

There are just over two million private vehicle trips with no viable alternative, that could not, according to the criteria used, reasonably be made by walking, cycling or public transport. This means that, in most cases, the trip was too long to be reasonably walked or cycled, or that the public transport alternative would be too slow to be considered competitive.

These trips are more likely to take place in outer London than in inner; for example, 36 per cent of private vehicle trips that originate in Hillingdon have no viable alternative, compared to 17 per cent of trips that originate in the City of Westminster and Royal Borough of Kensington & Chelsea.

4. The factors affecting travel demand trends in London

4.1 Introduction

This chapter assembles and reviews a selection of topical recent evidence relating to the underlying drivers of changing travel demand patterns in London, the net effects of which have been described in chapters 2 and 3 of this report. Better understanding of these factors will be an important consideration in terms of forecasting future travel patterns and in tracking progress towards the Mayor's vision. The material in this section updates an analysis that was previously published in September 2014 (see: http://content.tfl.gov.uk/drivers-of-demand-for-travel-in-london.pdf), further updated in Travel in London report 10 (http://content.tfl.gov.uk/travel-in-london-report-10.pdf).

This chapter explores recent trends in the key demographic and economic factors underlying travel demand. It also reviews some evidence from our LTDS survey that provides evidence of wider changes to shopping behaviour and working patterns potentially affecting travel.

It should be recognised at the outset that the number of people and jobs in London is the primary driver of travel demand. Travel demand trends over most of the last two decades have reflected London's population growth, and the impact of the 2008 recession and more recent pressures on the economy are visible as interruptions to a growth trend that is otherwise considered to be relatively predictable. However, there is emerging evidence that travel demand trends over the last decade or so, in London as more widely in the UK, have also reflected changes in wider generational, policy and lifestyle factors. The independent Commission on Travel Demand provide the most comprehensive review of these developments (see: http://www.demand.ac.uk/commission-on-travel-demand/).

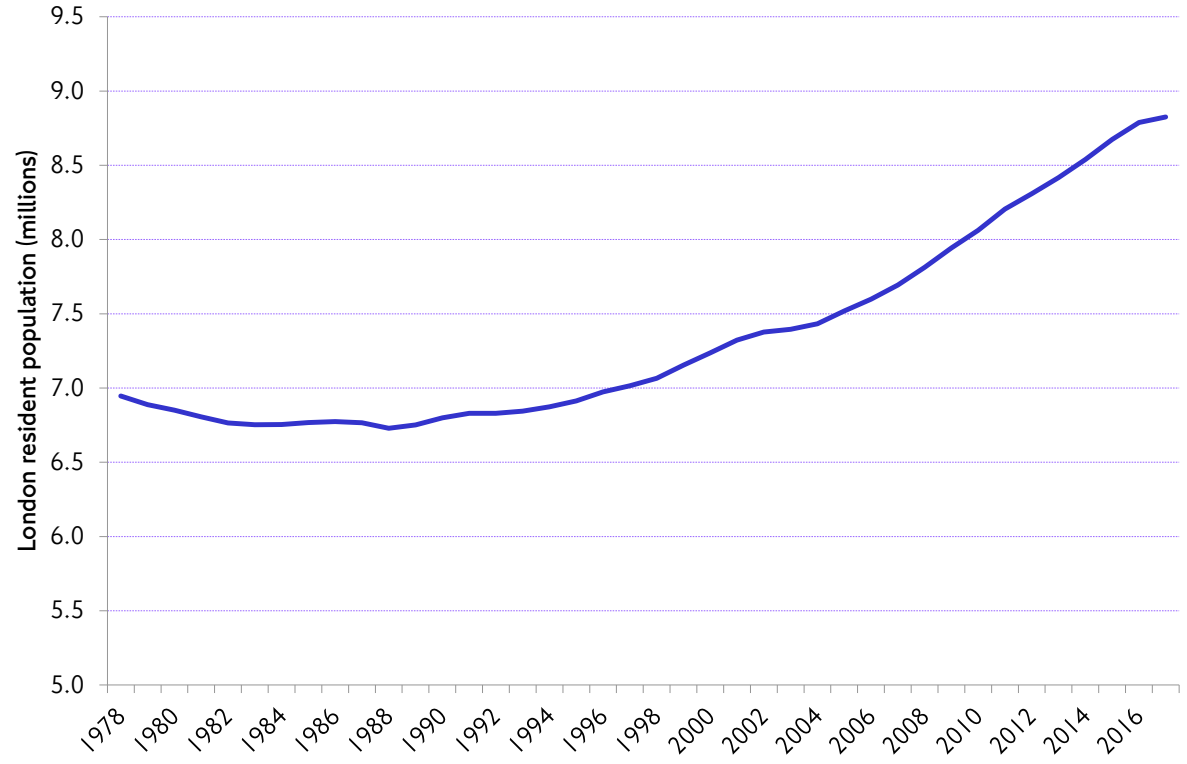
4.2 London's population

Long-term trend in London's resident population

Following a period of decline between 1939 and the late 1980s, London's population grew rapidly – by over 1 million people in the two decades up to 2011. During this time, London's population typically increased by around 1.5 per cent per year. More recently, the rate of growth in London's population has slowed, with particularly slow growth in the latest year to 2017 (figure 4.1). Although based on the best available data, it should be noted at this point that there is considerable uncertainty attached to estimates of population, especially in the latter half of the inter-Census cycle.

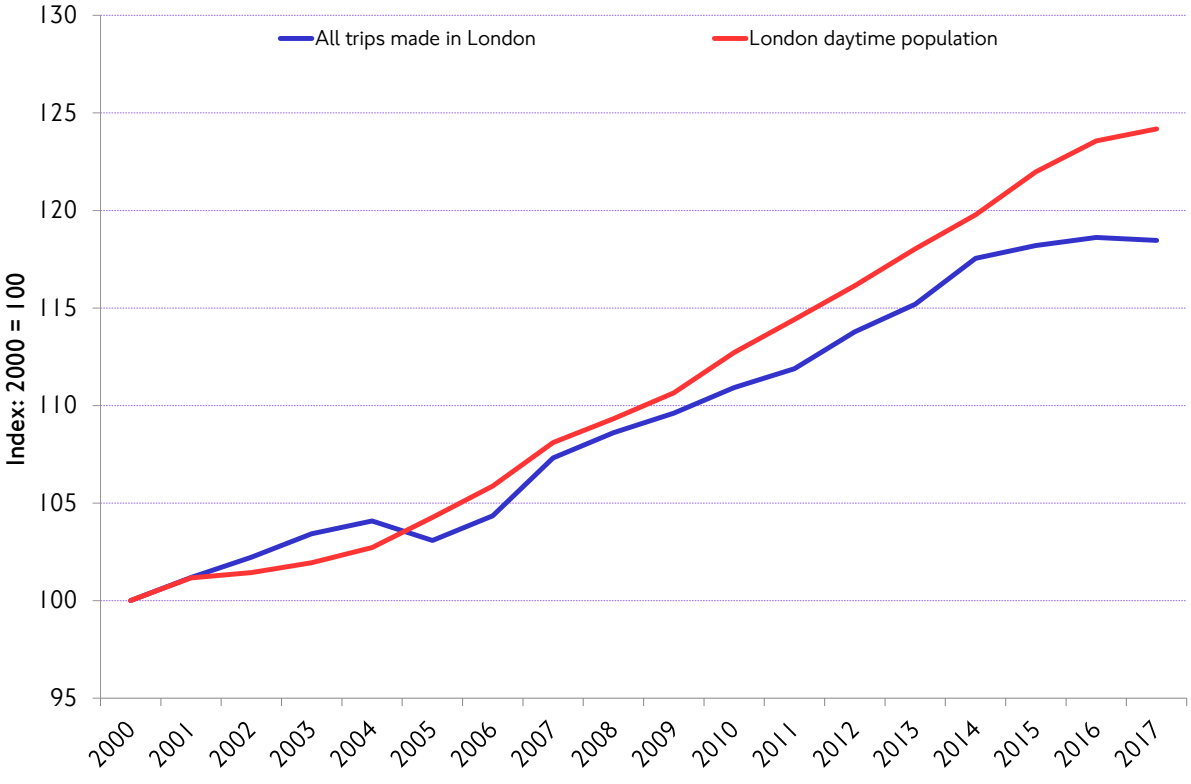
Historically, London's population has been a good predictor of travel demand, in that the rate of growth in London's population has broadly mirrored the rate of growth in the number of trips made in London, implying a relatively constant 'trip rate' – the average number of trips made per person per day. Visitors to London who are resident in other areas comprise a second group of travellers in London, whether 'day visitors', such as longer-distance commuters, or those staying in temporary accommodation (eg tourists). Together, these residents and visitors make up London's 'daytime' population, and it is this larger 'daytime' population to which the relatively constant trip rate observation applies.

Figure 4.1 Long-term trend in London's resident population, 1978-2017.



Source: Office for National Statistics.

Figure 4.2 Trend in the number of trips made in London and London's estimated daytime population, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

More recently, however, the trends in London's estimated 'daytime' population and total travel demand in London have been diverging (figure 4.2), with travel demand tending to grow at a slightly slower rate than population. This is an important observation, for it suggests that the nature of the relationship between the number of people in London, and the total travel demand, could be changing, albeit relatively slowly, over time. Furthermore, the evidence of figure 4.2 is of a consistent trend over a decade or more, although it appears to have accelerated in the most recent two years.

Short-term trend in London's resident population

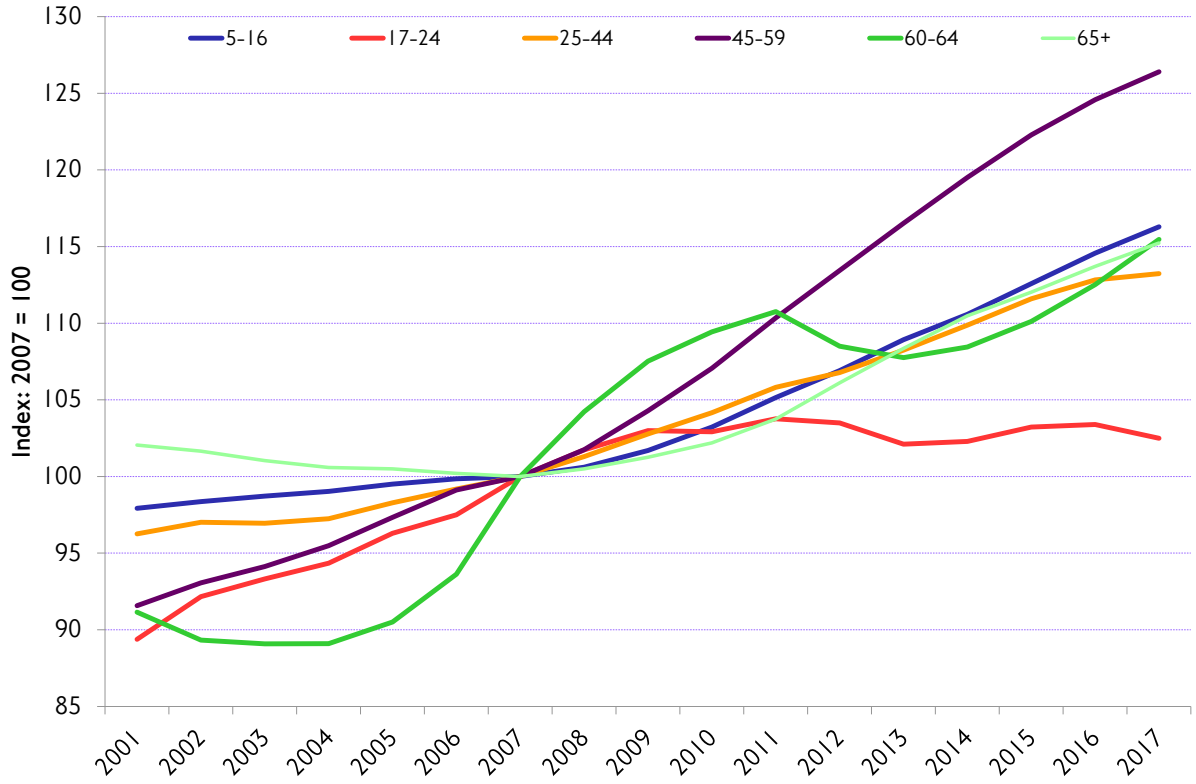
Between 2011 and 2015, London's population is estimated to have increased by around 1.4 per cent per year, with growth in net international migration particularly driving the increase in population between 2013 and 2015. Between mid-2015 and mid-2016, however, the increase in population is estimated to have been slightly less, at around 1.2 per cent, corresponding to a decline in net international migration. Growth in 2017 is estimated at just 0.6 per cent, so although, on the basis of that evidence, the population was in 2017 still growing, it was at a markedly slower rate than typical of recent years.

Most notably, there is evidence of a slowdown in the growth of London's working age population, with research suggesting that housing costs are now acting as a particularly significant barrier to in-migration to London. The next estimates of London's population in 2018 will not be available until mid-2019. In the interim, it is possible that the growth rate will continue to fall, although the consensus of longer-term estimates is however for continued strong population growth.

Estimates of population change by age in London

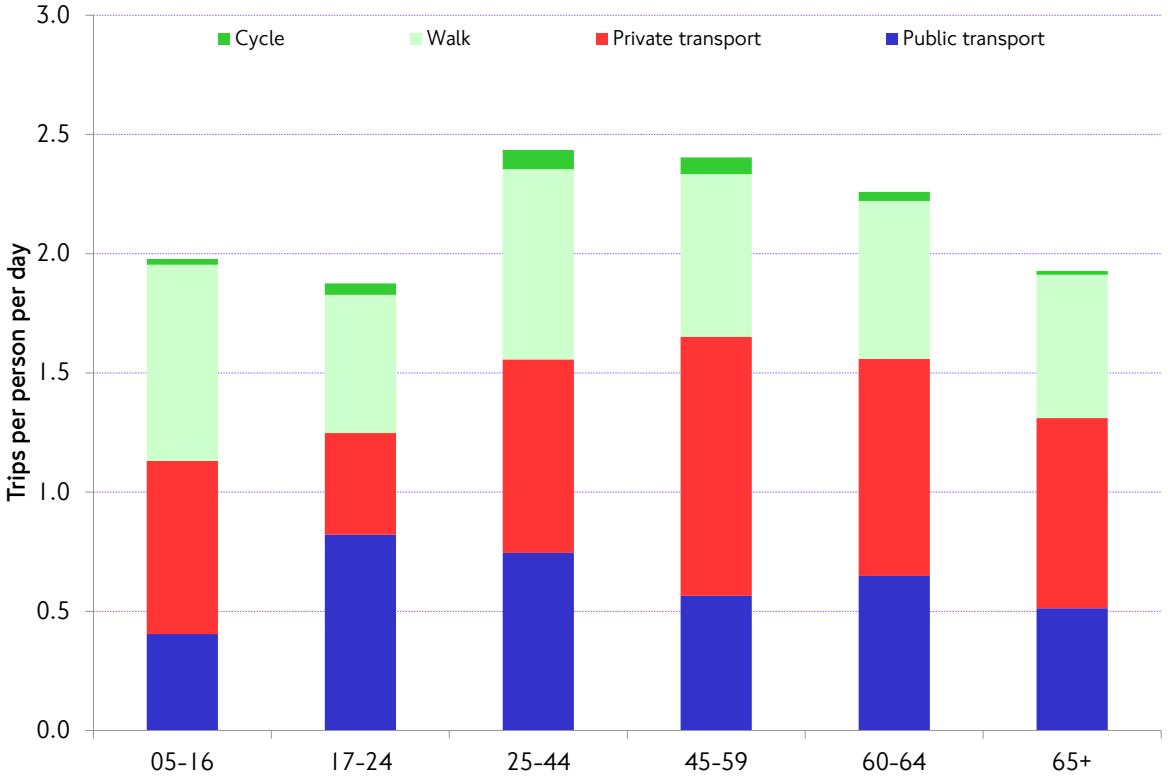
The rate of population change varies by age group in London. Over the past few years, the highest rate of growth has been among those aged 45-59, with increases typically of around 3 per cent per year. The population of 5-16 year olds and over 65s have also seen steady growth of around 2 per cent per year in recent years, the latter possibly reflecting birth rate fluctuations following the Second World War. The trends among those aged 17-24 and 60-64 have however fluctuated (figure 4.3).

Figure 4.3 Population series for London by age, GLA, 2001-2017.



Source: Greater London Authority.

Figure 4.4 Trip rates by mode and age. London residents, LTDS 2016/17.



Source: Strategic Analysis, TfL City Planning.

The latest population estimates show that there has been no growth in recent years among 17-24 year olds and a more recent flattening of growth among the 25-44 year old age group

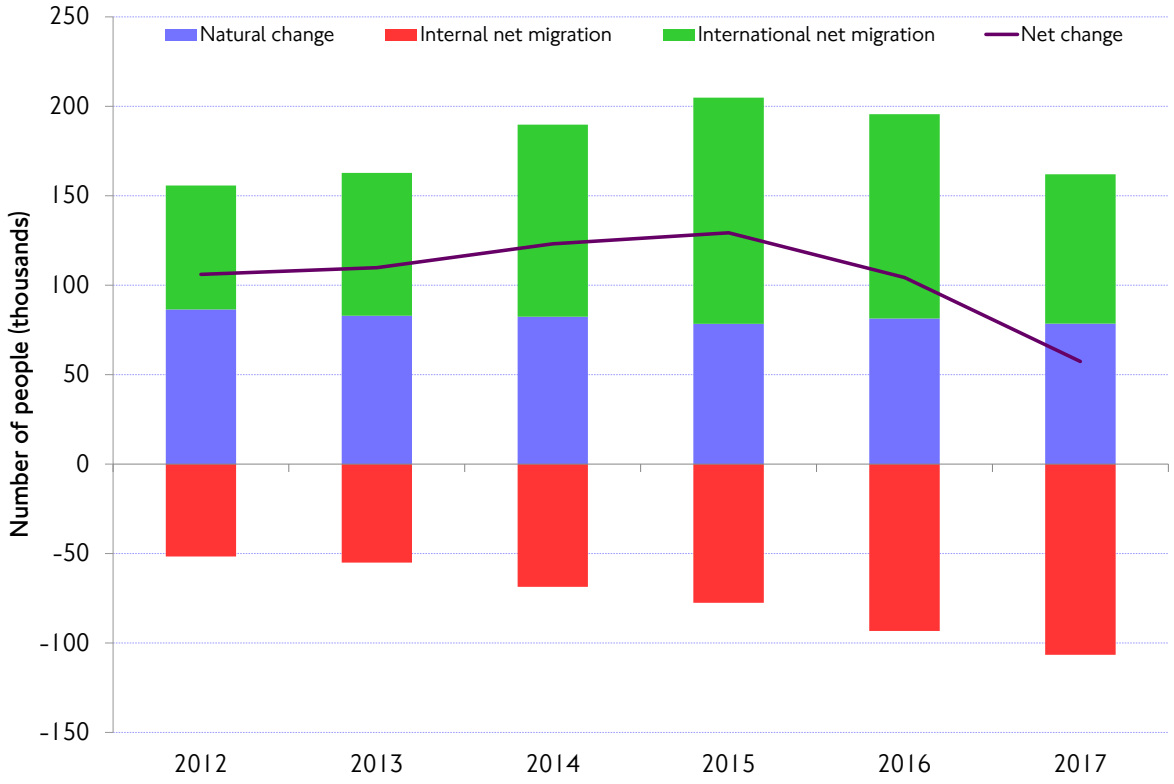
(essentially 'working age' adults). This lower rate of growth means that this age group now makes up a smaller proportion of London's population. Given the higher frequency of travel and use of public transport amongst this age group (shown in figure 4.4) this is likely to have had a disproportionate effect on recent public transport patronage trends.

Components of change

Figure 4.5 shows the trend in the components affecting London's population over the last few years. Between 2015 and 2017, the factors driving the slower growth in London's population were the increases in domestic and international emigration, coupled with a decline in international immigration.

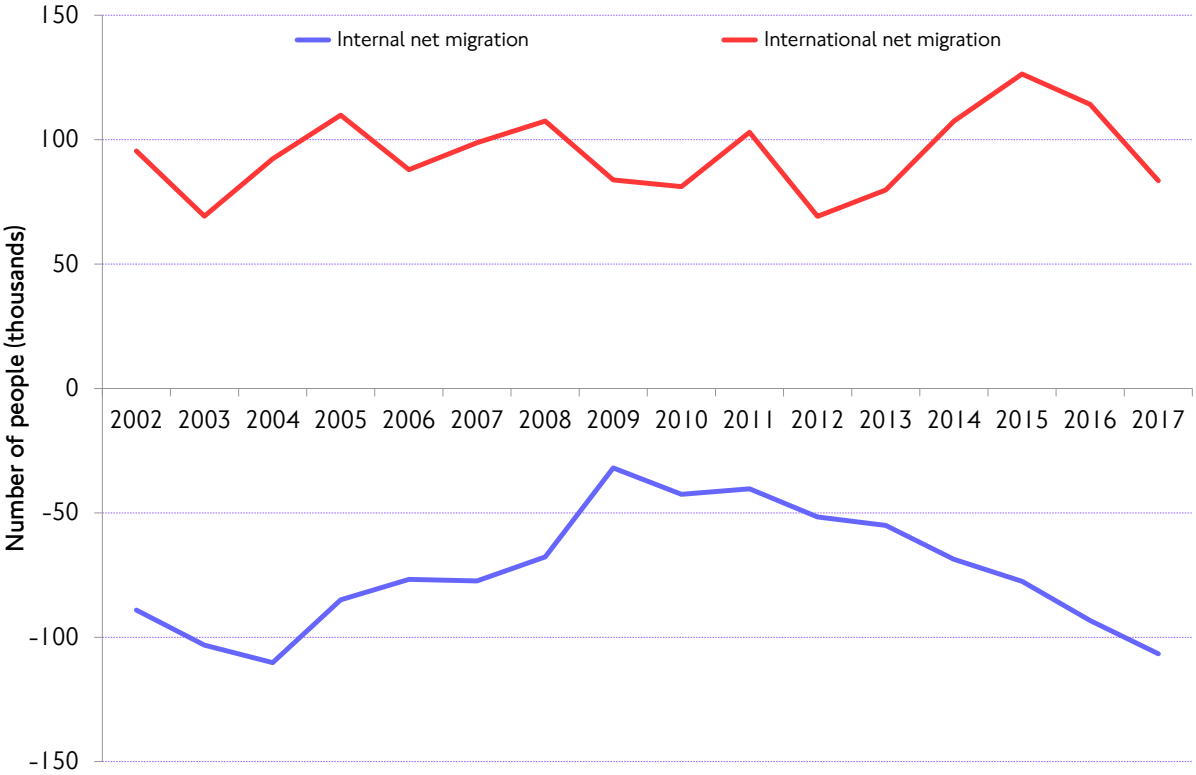
These trends have continued in 2017 to result in total net migration falling below zero, meaning an overall outflow of population from London for the first time since 2004, although natural change was still positive. This was partly due to the continued decline in international migration, which fell for the second year in a row, although remaining higher than in 2013. Domestic out-migration increased, with a domestic net migration figure showing an outflow of 107,000 people over the year.

Figure 4.5 Trends in natural and migratory change in London population, 2012-2017.



Source: Office for National Statistics.

Figure 4.6 Change in migration in London per year, 2002-2017.



Source: Office for National Statistics.

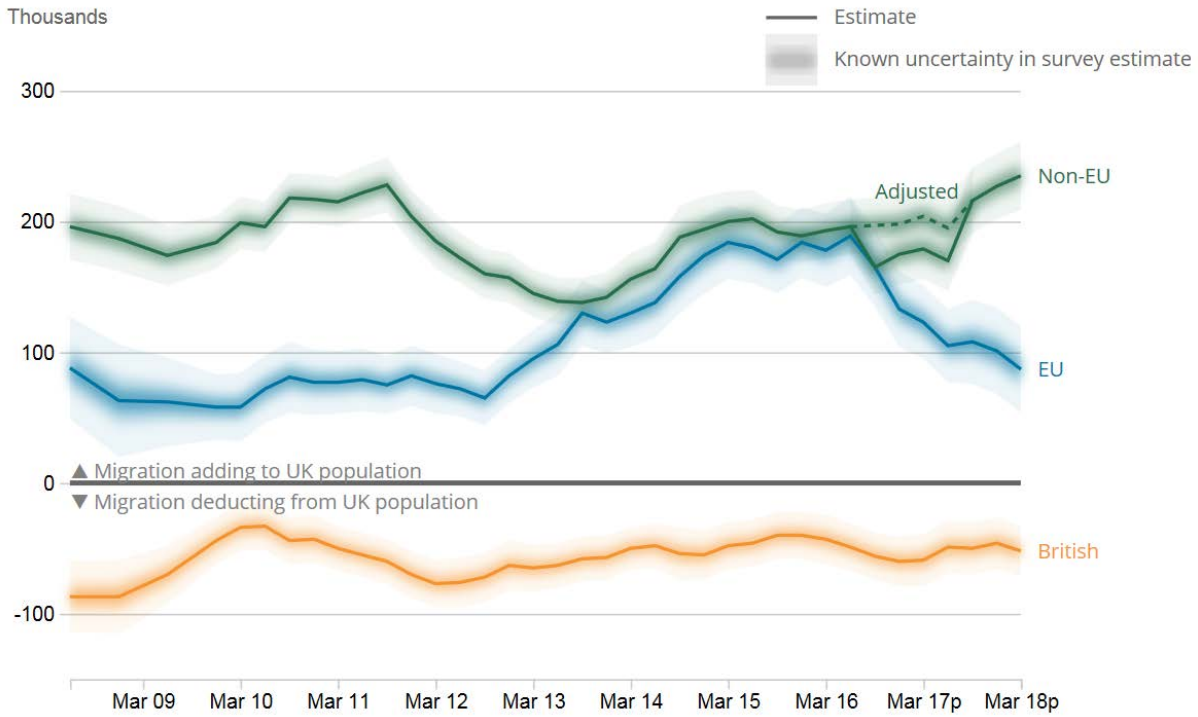
Migration (UK level)

The latest ONS figures on migration indicate that net migration to the UK as a whole increased slightly in the year ending March 2018, with net migration estimated at 271,000. European Union (EU) net migration was at its lowest level since 2012 but continues to add to the UK population, with around 90,000 more EU citizens coming to the UK than leaving.

Following previous reductions in the number of EU citizens coming to the UK looking for work, fewer EU citizens are now coming to the UK with a definite job offer. This could be because of uncertainty surrounding the vote to leave the European Union, because there are fewer attractive jobs available in the UK, or that the job markets in other EU countries are performing more strongly.

However, non-EU net migration has increased, and is now at similar levels to 2011, with most of the increase reflecting migration from Asia (figure 4.7). Of relevance is the acknowledged high degree of uncertainty with these estimates – in most cases greater than the indicated change – which adds to the difficulty of estimating population trends over the relatively short term in between decennial Censuses.

Figure 4.7 Net migration by citizenship, 2008-2018.



Source: Office for National Statistics.

Leisure visitors – domestic day visitors in London

In 2017, there were an estimated 327 million domestic day visitors to London, a decline of 3 per cent on the previous year (table 4.1). This follows growth in the number of visits in the previous three years, and is thought to reflect a combination of factors, primarily the high costs associated with leisure visits in the context of recent pressures on disposable incomes (see below). Significant disruption to the rail network is also thought to have contributed to the decline. Despite this, London had the greatest share of day visits for tourism and leisure amongst the English regions and the UK's top ten most visited attractions in 2017 were all in London.

Table 4.1 Leisure visitors to London (domestic), 2011-2017.

Year	Number of day visitors (millions)	Change (%)
2011	314	-
2012	362	15
2013	301	-17
2014	315	5
2015	322	2
2016	337	5
2017	327	-3

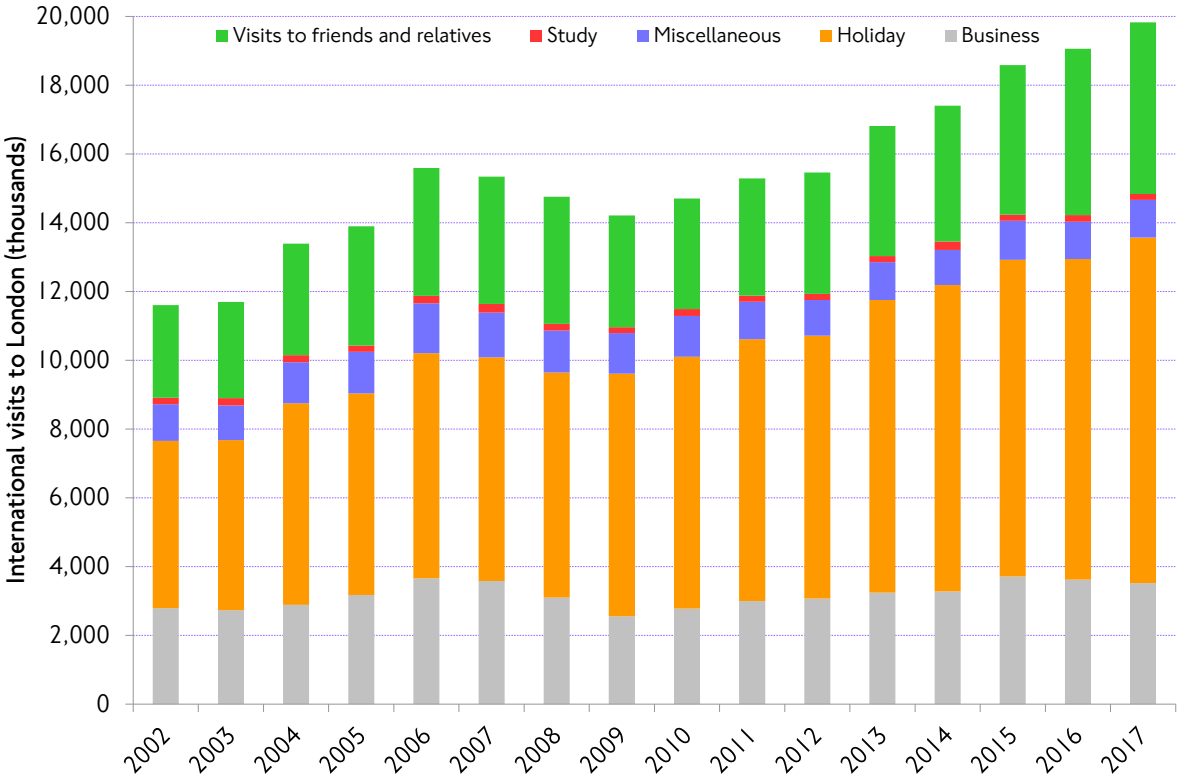
Source: Great Britain Day Visits Survey.

International visitors to London

The number of international visits to London has increased each year since 2009, with a 4.0 per cent increase between 2016 and 2017 and an aggregate increase of 40 per cent over the

period (figure 4.8). The growth over the last year was greater than the growth between 2015 and 2016, which was 2.6 per cent. Half of all visits to London were for holidays (51 per cent).

Figure 4.8 Trend in number of international visits to London, 2002-2017.



Source: International Passenger Survey.

The number of visits to London for business and study declined in the latest year, by 2.8 per cent and 10.6 per cent respectively. The uncertainty over Britain's departure from the European Union is a downside risk for business travel and is likely to have contributed to the decline in the number of business visits. The uncertainty may also have affected international students' decisions about whether to study in London or not. Visits for holidays, trips to see friends or relatives and other purposes were up by 7.8 per cent, 3.2 per cent and 1.1 per cent respectively, likely driven by the fall in the value of sterling since the vote to leave the European Union in 2016.

Summary assessment

To summarise key points from this section:

- London's population grew in 2017, but at a notably slower rate than recent years, and this slower growth is a significant factor underlying recent travel demand trends.
- EU-departure related uncertainty and all-time-high housing costs contributing to a squeeze on disposable incomes (see below) are thought to be particularly deterring EU citizens and younger people from migrating to London, disproportionately affecting short-term public transport patronage trends.
- Although the number of domestic day visitors to London decreased by 3 per cent in the latest year, the number of international visits to London increased by 4 per cent. This was mostly driven by an increase in leisure visits, as the number of international visits for study and business were down on the previous year.

- In addition, as shown by the evidence in section 3.2, resident Londoners are, on average, making fewer trips per day per person – a slow but progressive trend over the last decade.

The short term picture is therefore one of slowing population growth contributing directly to equivalent trends in travel demand, albeit with some suggestion of the possibility of a longer-term 'background' decoupling of the relationship between population and per person travel demand. Over the long term, however, London's population is still projected to grow strongly and therefore these recent developments do not invalidate the assumptions in the Mayor's Transport Strategy or the measures required to meet the strategy outcomes over the much longer time period to 2041.

4.3 London's economy

Alongside changing population trends, London's economy is in a period of uncertainty. This reflects both the unclear impacts of the vote to leave the European Union, and the slow pace of recovery from the recession of the last decade.

Total demand for travel is driven both by overall population trends and changes in the travel behaviour of individuals. At the individual level, travel behaviour is fundamentally linked to personal incomes. Employed people and those on higher incomes make more trips on average each day.

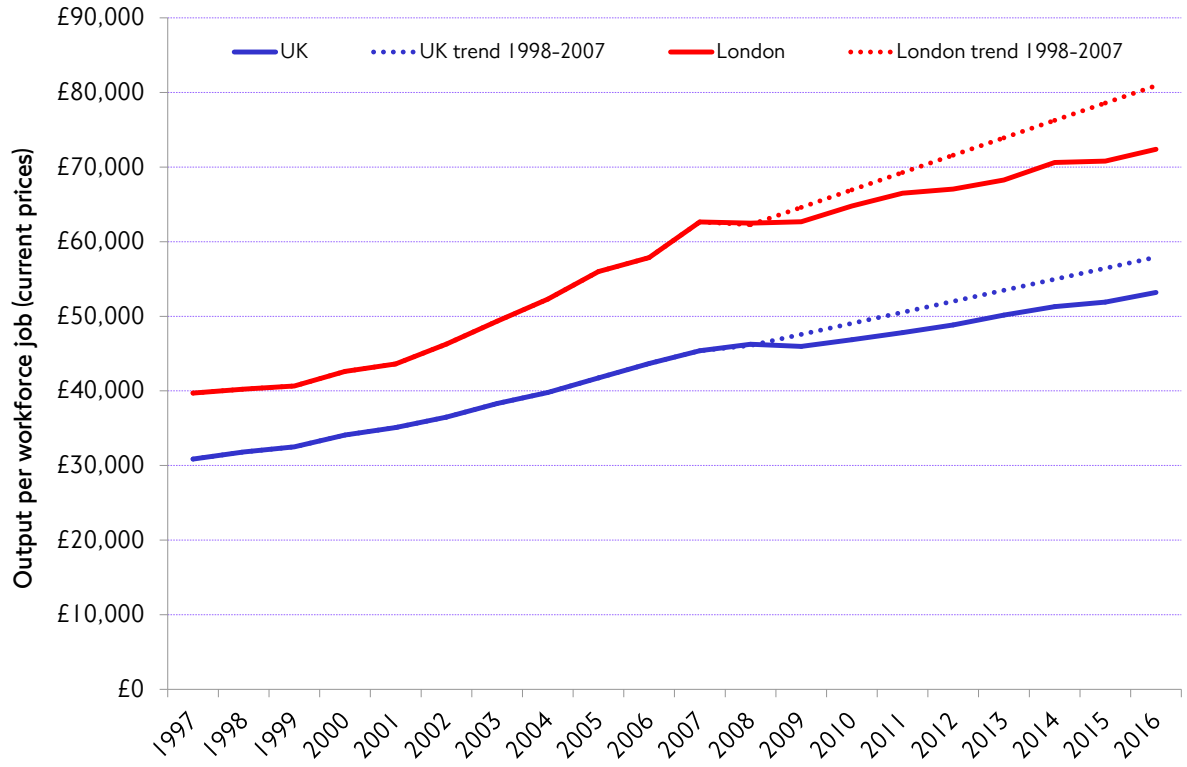
The financial crisis of 2008 led to a temporary pause in the established strong rate of growth in demand for travel as income and employment levels fell. Overall demand for travel in London however recovered quickly; boosted by high levels of population growth. However, income levels have been much slower to recover, and it is likely that this has had effects on individual demand for travel.

London's economic growth

Ten years on from the financial crisis, London is still feeling the effects of what was one of the deepest and longest recessions in history. Since 2008, the UK has seen persistently weak productivity growth – a phenomenon referred to as the 'productivity puzzle'. Labour productivity is defined as the quantity of goods and services (economic output) produced per unit of labour input – for example, per hour worked. It is a measure of the efficiency of the UK workforce, which is critical to long run economic growth. Historically, wages and quality of life have been closely linked to rising productivity. London continues to have high levels of labour productivity relative to other UK regions (figure 4.9). However since 2007, productivity has been rising at a much slower rate than that seen before the financial crisis. GVA per workforce job in London is now considerably lower than it would have been based on its pre-crisis trend.

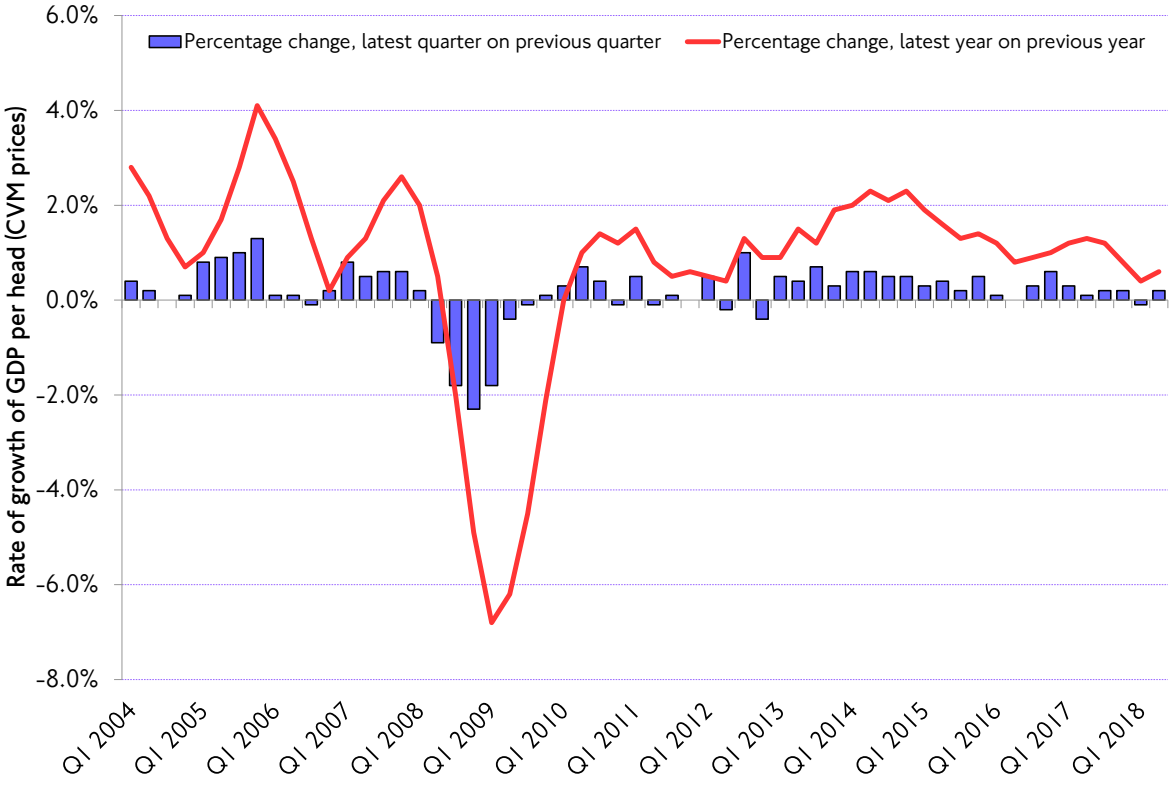
The recovery from the recession of the previous decade has been slower than from any recession in modern times. GDP is growing but growth remains sluggish. UK GDP grew at a modest pace of 1.4 per cent on average in 2017; a growth rate that remains well below historic standards (figure 4.10). A growing workforce rather than productivity growth has been the main driver of output growth. GDP per head only returned to pre-crisis peak levels in 2015 and is now just 3 per cent higher than that seen in 2008.

Figure 4.9 Output per job for London and UK, 1997-2016.



Source: Office for National Statistics.

Figure 4.10 UK GDP growth (chain value measures, reference 2016), 2004-2018.

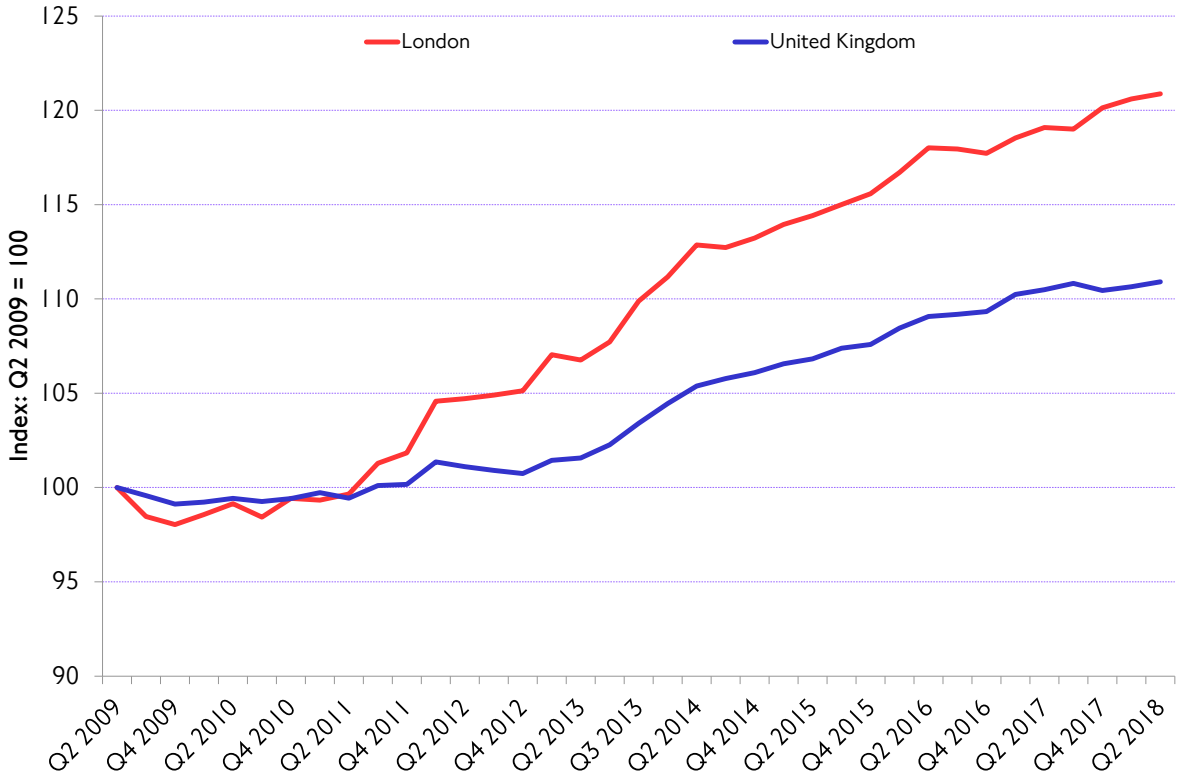


Source: Office for National Statistics.

Employment trends

The number of workforce jobs in London has seen a strong, albeit slowing, rate of growth in recent years. In June 2018, there were 5.92 million jobs in London, a record high, and 1.5 per cent growth on the previous year. This compares to a jobs growth of 0.4 per cent in the UK over the same period (figure 4.11). All other things being equal, growth in employment should stimulate growth in travel.

Figure 4.11 Total workforce jobs, 2009-2018.



Source: Office for National Statistics.

Unemployment levels reached a post-crisis peak in 2011 as people lost their jobs and firms stopped hiring. Since then, the unemployment rate in London has recovered to a historic low of 4.7 per cent for the three-month period May-July 2018.

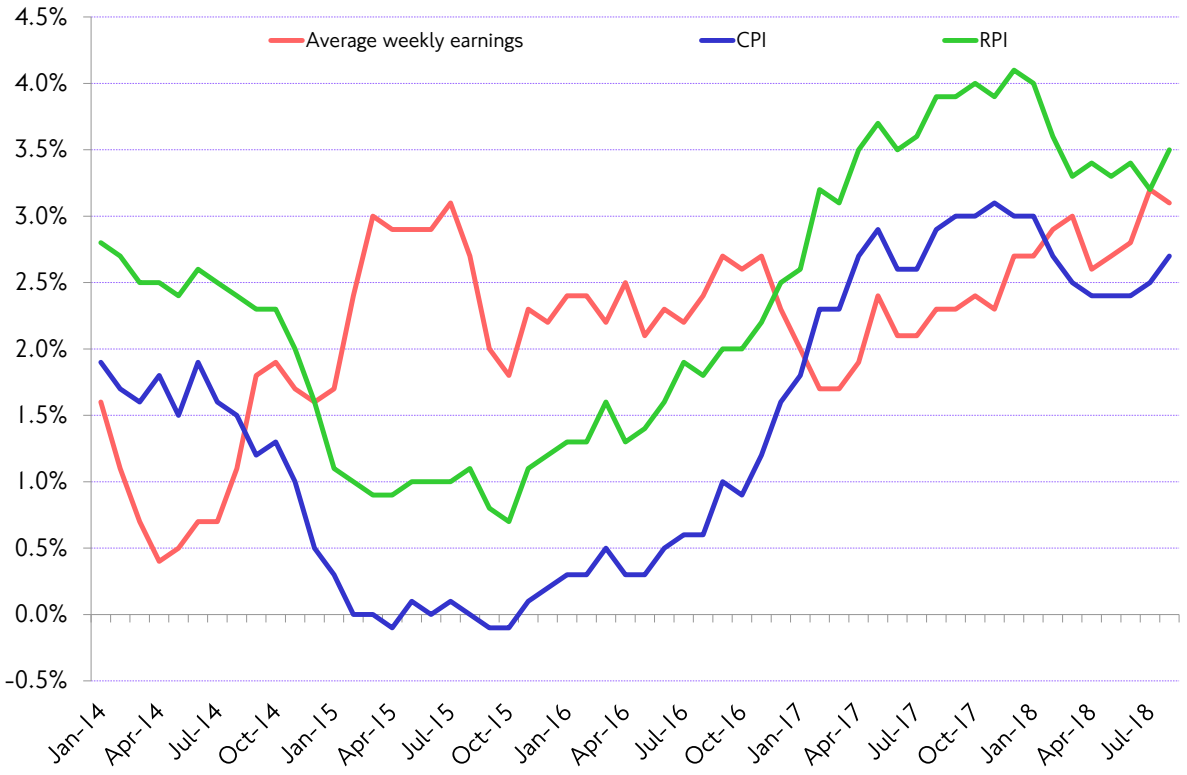
These figures overlook levels of underemployment – the number of people in employment who are working fewer hours than they would like to, eg in non-traditional forms of employment such as the 'gig' economy and on zero-hours contracts. The ONS Labour Force Survey estimates that 96,000 people in London were employed on zero-hours contracts in the period between April-June 2018 – equivalent to 2 per cent of total employment.

The scale of the gig economy is less well documented. However, research commissioned by the Department for Business, Energy & Industrial Strategy in 2018 found that 4.4 per cent of the population in Great Britain had worked in the gig economy in the last 12 months. Courier services, transport services and food delivery were the most common type of gig economy activity, accounting for 42 per cent, 28 per cent and 21 per cent of activity respectively. Those who had worked in the gig economy were generally younger than the total population and more likely to live in London. The rate of underemployment has been declining since it peaked in 2012 but remains high and is likely to have contributed to the historically low unemployment rate and slow wage growth, especially among young people.

Real wages

Low levels of unemployment have yet to cause significant upward pressure on wages. Meanwhile inflation, as measured by both RPI (Retail Price Index) and CPI (Consumer Price Index), has risen dramatically since mid-2016 driven by rising import prices. In 2017, wage growth failed to keep pace with inflation, leading to falling real incomes (figure 4.12). The impact of the weaker pound on inflation has now started to disappear, meaning wages are now rising faster than prices. However, inflation remains above the Bank of England's 2 per cent target and wage growth remains subdued.

Figure 4.12 Relationship of average weekly earnings in London to indices of inflation, 2014-2018.

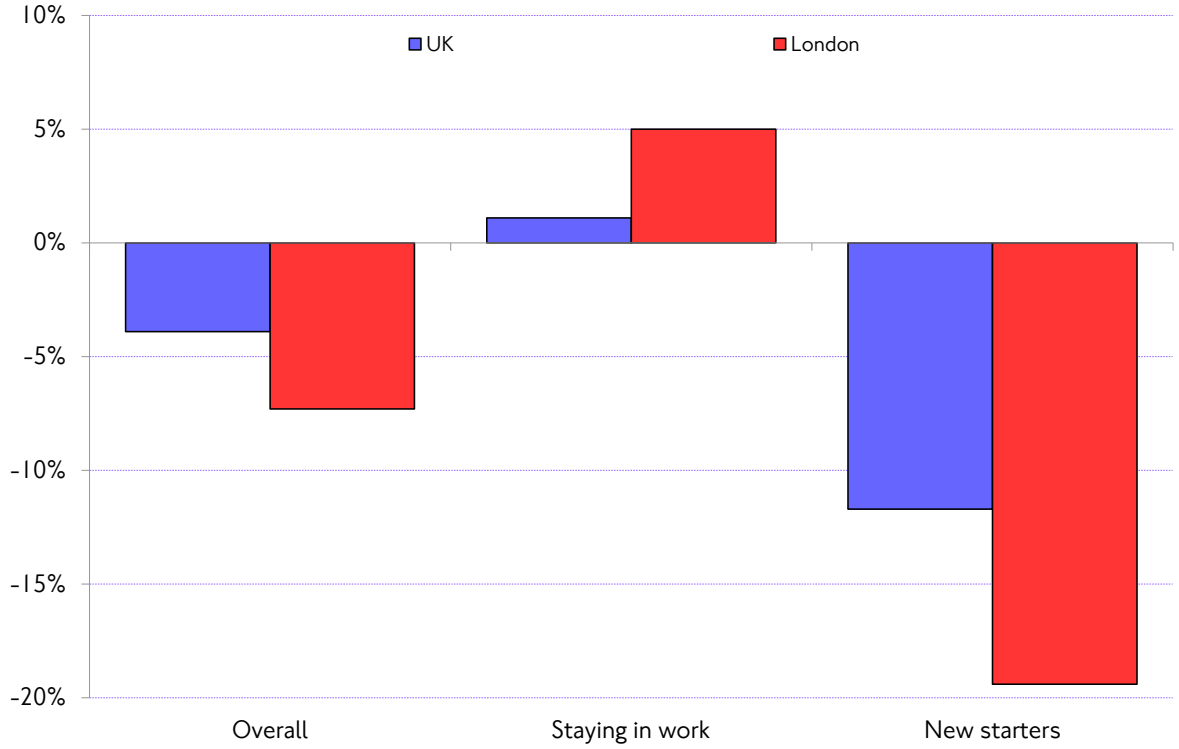


Source: Office for National Statistics.

The impact on wages has not been equal across the population. Average earnings in London remain significantly higher than in the rest of the UK. But London has also experienced a more pronounced wage squeeze than the rest of the country. According to IFS (Institute for Fiscal Studies) calculations, the average wage of London residents is now 20 per cent lower than it would have been had pre-crisis trends continued, compared to a UK average of 13 per cent.

Additionally, new entrants to the labour market in London have experienced a particularly acute pay squeeze (figure 4.13). This includes people starting work for the first time, and those who were previously economically inactive, who tend to be on lower incomes.

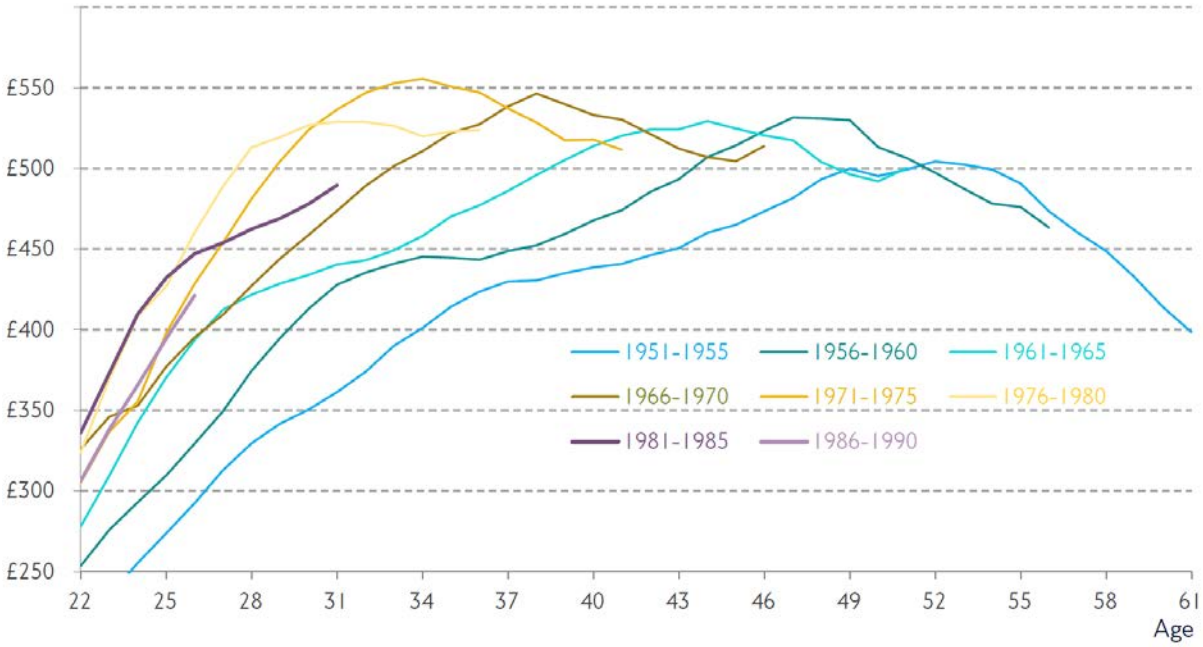
Figure 4.13 Change in median hourly pay since financial crisis.



Source: Resolution Foundation analysis of Office for National Statistics data.

At the UK level, median incomes of those in their 20s and 30s were 5 per cent and 7 per cent lower than in 2008 respectively. In comparison, median incomes were just 1 per cent lower than in 2008 among those aged 60+. Historically, the earnings of each cohort at any given age have surpassed that of the previous cohort. However, analysis by the Resolution Foundation shows that those born between the years of 1986-1990 earnt just under £400 a week on average at the age of 25, compared to earnings of approximately £430 a week among those born between 1976-1980 and 1981-1985 (figure 4.14). This suggests that younger people have particularly felt a squeeze on their income following the financial crisis and – at the London level – this is consistent with the migration estimates described above and the observed slowing in the rate of growth of demand for public transport in particular.

Figure 4.14 Median pay by age for each five-year birth cohort.

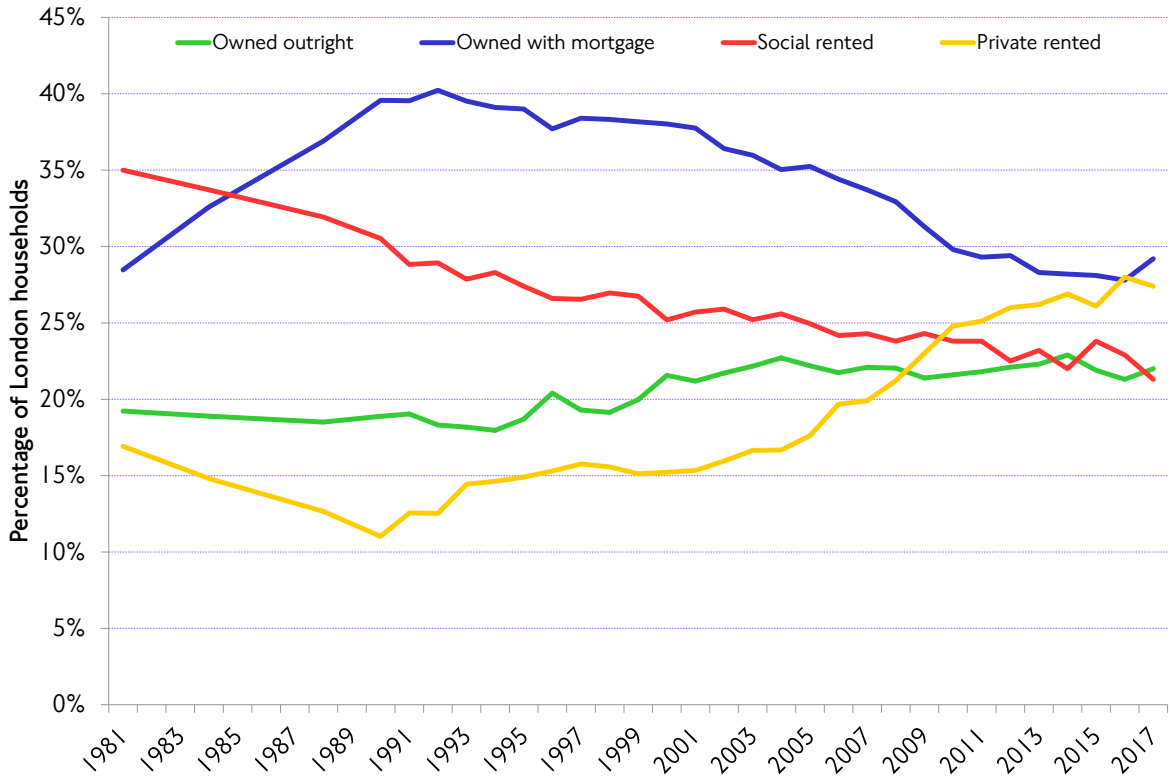


Source: Resolution Foundation analysis of Office for National Statistics.

Housing costs

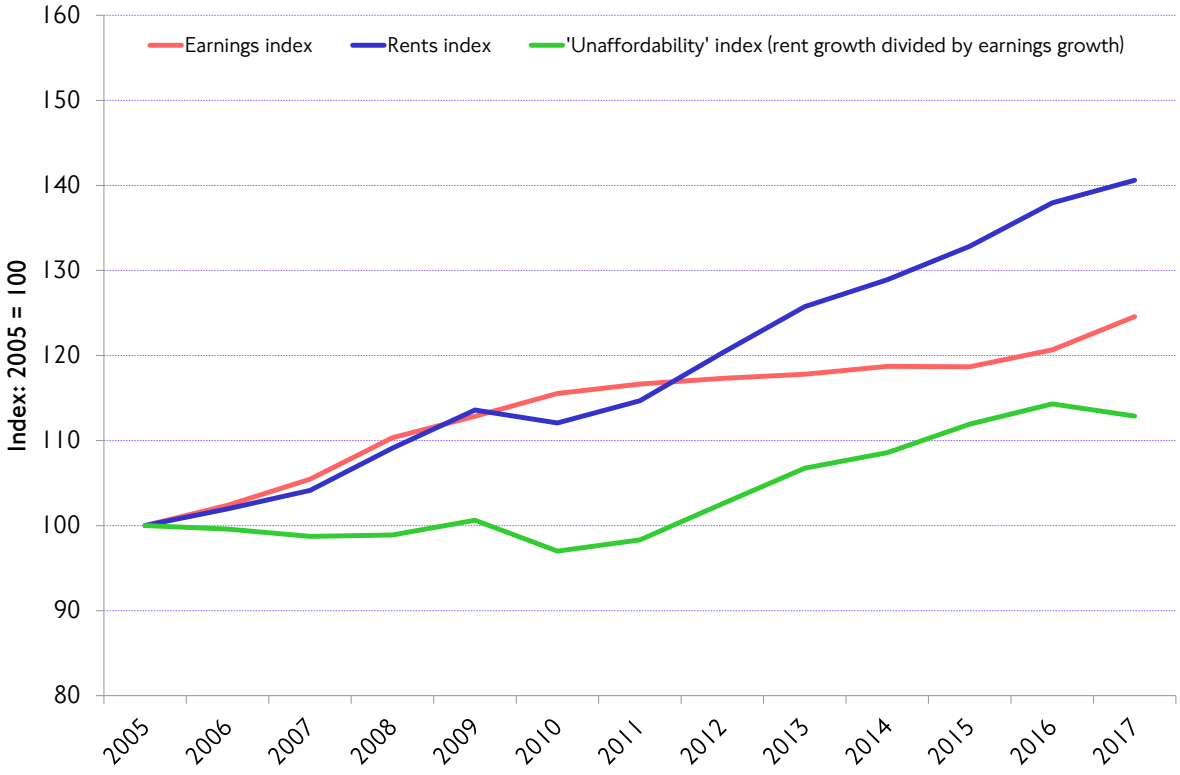
London house prices have increased by almost 50 per cent in real terms since 2011. In response there has been a marked increase in the proportion of people renting in London (figure 4.15). Furthermore, London rents have increased much faster than incomes (figure 4.16). Average private rents in London rose by 41 per cent between 2005 and 2017, compared to wage growth of just 25 per cent, implying increasing unaffordability.

Figure 4.15 Annual trend in household tenure in London, 1981-2017.



Source: GLA Housing in London.

Figure 4.16 Index of cumulative change in private rents, earnings and implied affordability in London, 2005-2017.



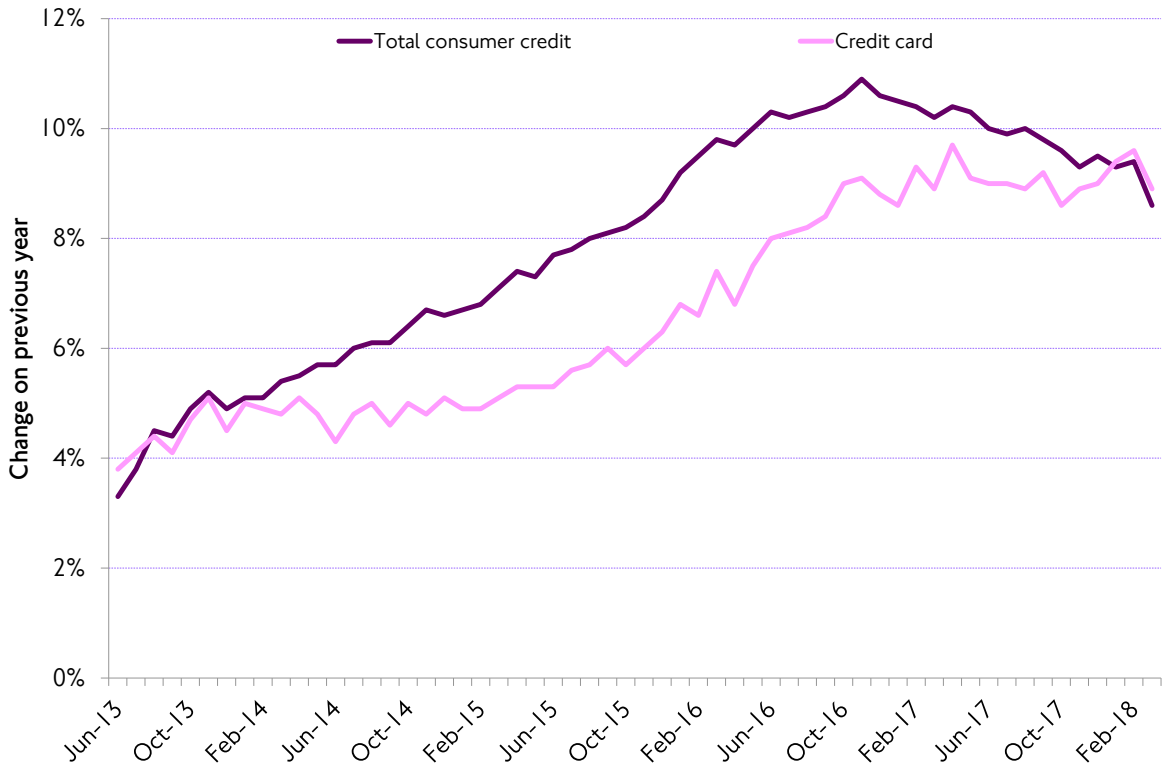
Source: GLA Housing in London.

Analysis by the Resolution Foundation found that 'Baby Boomer' households (those born between 1946 and 1965) were 50 per cent more likely to own a home at age 30 than 'Millennials' (those born between 1981 and 2000) currently are. As a result, younger people remain in the private rented sector for longer than previous generations, increasing the proportion of income spent on housing costs and failing to benefit from rising property prices – further exacerbating the squeeze felt on their disposable income. In addition, high housing costs would be expected to act as a deterrent to in-migration of (particularly) younger people to London, as described in section 4.2 above.

Consumer credit

Indicative of this squeeze in income, personal savings rates have fallen to historic lows, while consumer debt – which excludes mortgage lending – is growing at 8.8 per cent year-on-year. Credit card debt is accounting for an increasing share of this consumer debt, with 9.5 per cent annual growth to June 2018 (figure 4.17). This suggests that the effect of this squeeze on disposable incomes has yet to fully filter through into spending. Increasing interest rates or tighter lending conditions could result in a significant fall in consumer spending, and therefore demand for travel.

Figure 4.17 Growth in consumer credit lending, seasonally adjusted, 2013-2018.



Source: Bank of England.

Cost of travel

Cost of travel is a major factor influencing mode choice and the frequency at which people travel. Between 2009 and 2016, the real cost of travel on London's buses and the Underground increased. However, since the imposition of the Fares Freeze in January 2017, all bus fares and single Underground fares have been frozen. In real terms, the cost of travel on these modes has decreased, owing to a high rate of inflation (see section 10.17 for more information on public transport fares) .

The vote to leave the European Union

Uncertainty over the form that Britain's departure from the European Union will take, and the nature and extent of its impacts, continues to overhang short-term economic planning and confidence. Various attempts have been made to estimate the impact of this on UK GDP, and on London more specifically. The impact estimates cover a considerable range; however a general consensus would be that the economic risks are likely to be negative, although relatively modest in extent when seen in the context of long-term growth forecasts. It is likely that this uncertainty is already a significant factor affecting the migration trends discussed above and, at the time of writing, there remains the possibility of rapid change over the coming months.

Summary assessment

To summarise key points from this section:

- Since the financial crisis of 2008, economic growth has been slow and many Londoners have felt an unprecedented and prolonged squeeze on their personal disposable incomes. This is the result of near stagnant real wages and increased living costs, especially housing costs.
- These trends have had a knock-on effect on consumer spending; particularly spending on 'discretionary' activities. Discretionary spending includes travel for shopping and leisure – factors that are thought to partly underlie the recently observed decline in trip rates in London. A squeeze on incomes nationally may also have led to a decline in the number of trips made by people visiting London from the rest of the UK.
- On the other hand, strong growth in employment, and low levels of unemployment, have meant that commuting trips have remained relatively stable.
- Young Londoners and lower income groups have been disproportionately affected by slow wage growth and high housing costs. Trip rate decline has been particularly pronounced among those aged 17-24 (by 22 per cent between 2012/13 and 2017/18), perhaps connected to the budget pressures faced by this cohort in comparison to previous generations.
- The future of the UK's relationship with Europe is arguably the most pressing issue facing London's economy, with potentially important short-term repercussions for both the total population level and per person travel demand in London. Again, however, the consensus of longer-term forecasts is for continued strong economic growth in London.

4.4 Changing travel behaviour

Introduction

In addition to the core demographic and economic drivers of travel demand discussed above, the possibility that people's travel behaviour is changing on a more fundamental level has assumed increasing prominence over the past few years, reflecting what is a growing body of thought that suggests the emergence of both short-term and possibly longer-term changes to the 'need to travel' in order to accomplish daily activities. These factors could constitute an additional overlay that, whilst not wholly independent of demographic and economic drivers, has the potential to affect travel demand largely irrespective of the wider demographic and economic context.

The emerging evidence

Reductions to overall levels of travel demand in terms of per person 'trip rates' have been widely observed in cities across the UK, in Europe and in the USA over the last 5-10 years. These changes, although present in London over this period, have been masked by recent strong population growth, meaning that overall demand for travel has continued to grow, although London residents have been travelling less on average per person. Over the last two years however, absolute declines in patronage have been seen on London's bus, Underground and National Rail networks.

The recent changes to London's population and economy are undoubtedly significant in explaining recent travel trends. However they also need to be seen in the wider context – London's demographic and economic trends and short-term economic pressures are not necessarily shared by other parts of the UK, the EU, or the rest of the world. This suggests that there are additional factors at play that transcend geo-political boundaries.

There are several significant reports among the literature that describe this phenomenon. The **European Metropolitan Transport Authorities Barometer** report collates transport data from 16 European cities, including London. The latest report published in April 2018 (see: https://www.emta.com/spip.php?article267) summarises the decline in public transport demand across European cities in recent years. In 2013, inhabitants made 303 trips per year on average. This declined to 276 in 2014; 260 in 2015 and 246 in 2016.

The **UK Urban Transport Group** published 'Number crunch: Transport trends in city regions' in April 2018 (see: http://www.urbantransportgroup.org/resources/types/reports/number-crunch-transport-trends-city-regions). Data they analysed from the **National Travel Survey** shows that shopping trips have declined by 15 per cent in the last ten years and commuting trips are down by 14 per cent over the same period. Trips for leisure purposes have also decreased – trips made to participate in sport and for personal business are down by 22 per cent respectively and trips to visit friends have declined by 18 per cent.

The Urban Transport Group does not discount the impact of traditional factors such as the state of the economy on changing travel patterns. However, they place emphasis on transformative technological and social change, which, they conclude, is beginning to have significant impacts on travel patterns, particularly in relation to changing working patterns and the home as a place for shopping and leisure.

The 'All Change? The future of travel demand and the implications for policy and planning' report by the **Commission on Travel Demand** published in May 2018 (see: http://www.demand.ac.uk/commission-on-travel-demand/) is notable for its observation of wide-scale change in the UK and strong view that the observed trends reflect wider structural changes in how people organise travel as part of their daily lives, reflecting changes in wider generational, policy and lifestyle factors, and are not a short-term 'blip' or effect.

More detailed research into these phenomena and their impact on travel demand trends is clearly required, and an exploratory survey exercise is planned by TfL over the coming year. For the present, it is of interest to consider what some existing relevant indicators from the LTDS survey tell us about these aspects of travel demand among London residents.

Delivery and servicing activity – background

The growth in internet retailing over the last 20 years has led to significant changes in the domestic marketplace and the UK is now the Western world's leader in terms of reported

online market share (see: https://www.racfoundation.org/research/mobility/the-implications-of-internet-shopping-growth-on-the-van-fleet-and-traffic). More recently the use of mobile devices has fuelled growth by enabling 'shopping-on-the-move'. Furthermore, many online retailers offer next day delivery services and the availability of free delivery and returns encourages customers to purchase more items and results in a higher number of returns. This is thought to be a factor underpinning the observed rise in light goods vehicle (van) traffic further described in chapter 7 of this report.

In terms of travel demand, whilst the internet offers possibilities for obtaining goods at the cheapest price, and would therefore be attractive to those with lower incomes, it also offers a different shopping experience that is potentially attractive in its own right, and one for which travel is not directly required, although the practice of 'using the shop as a showroom' ahead of a cheaper online purchase is well documented.

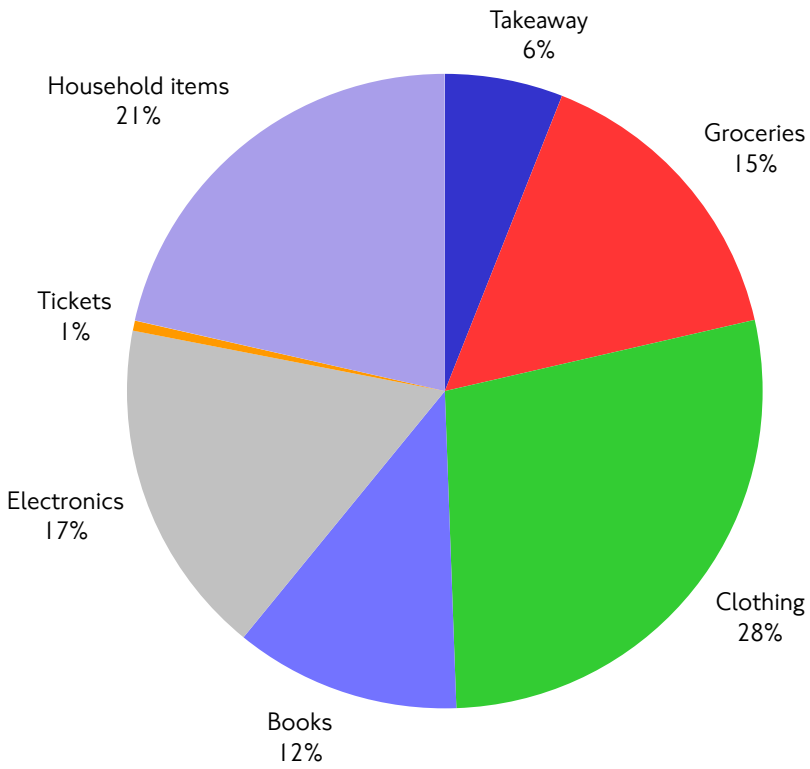
To understand how many deliveries London residents receive and for what purpose, new questions were added to the LTDS survey in 2017/18. These questions capture the number of deliveries London residents received in the week leading up to the day they were surveyed. They do not directly shed light on the extent to which these deliveries are substituting for trips by the individual concerned, although, almost by definition, a delivery involves a corresponding 'trip' by a professional deliverer – trips 'in the course of work' that are (conventionally) not recorded in surveys of personal travel.

Delivery and servicing activity – LTDS findings

Around one-fifth of London residents (22 per cent) received at least one delivery for a purchase made online in the week that they were surveyed. Almost all purchases made online by London residents were delivered to the home (94 per cent). A further 5 per cent are delivered to work, with just 1 per cent delivered to a 'click-and-collect' location. One per cent of deliveries were sent to other locations.

Figure 4.18 shows that London residents receive deliveries for a wide range of purchases. More than a quarter (28 per cent) of deliveries received by London residents were clothing purchases and around a fifth (21 per cent) were household items. Electronics accounted for 17 per cent of deliveries, groceries for 15 per cent and 12 per cent for books. Some 6 per cent of deliveries were takeaway food.

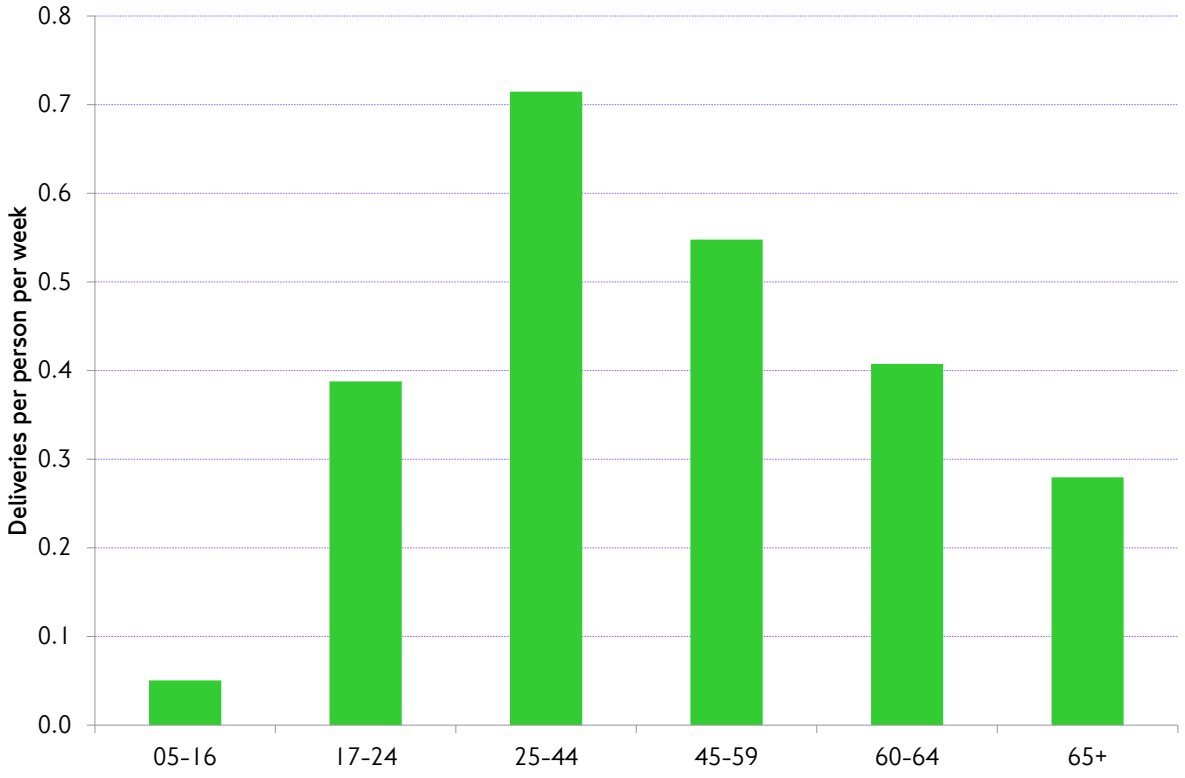
Figure 4.18 Purpose of delivery for items purchased online received in previous week by London residents, LTDS 2017/18.



Source: Strategic Analysis, TfL City Planning.

Figure 4.19 shows that London residents aged 25-44 are most likely to make purchases online for delivery, with the number of deliveries received decreasing with age. Children and those aged 17-24 are less likely to receive deliveries.

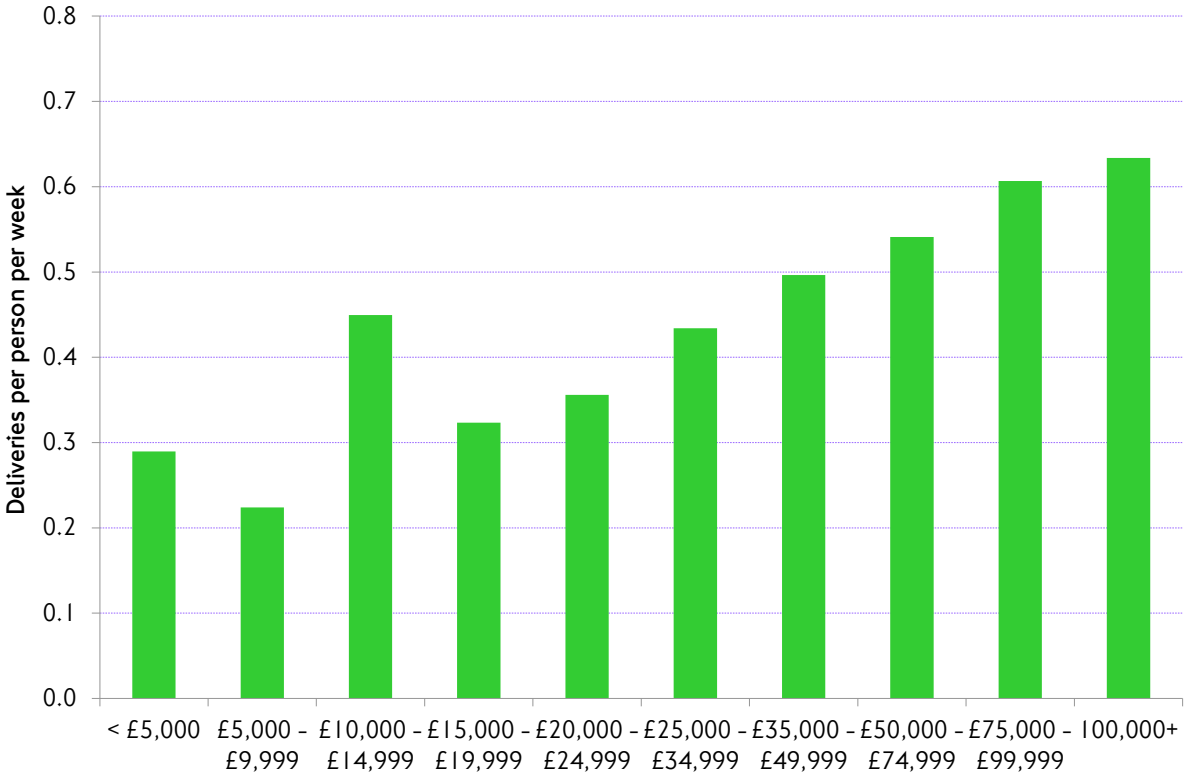
Figure 4.19 Deliveries per person per week by age group, LTDS 2017/18.



Source: Strategic Analysis, TfL City Planning.

Figure 4.20 shows that, broadly speaking, London residents with higher household incomes receive more deliveries per person than lower income groups. This is likely to reflect their higher disposable incomes.

Figure 4.20 Deliveries per person per week by household income, LTDS 2017/18.



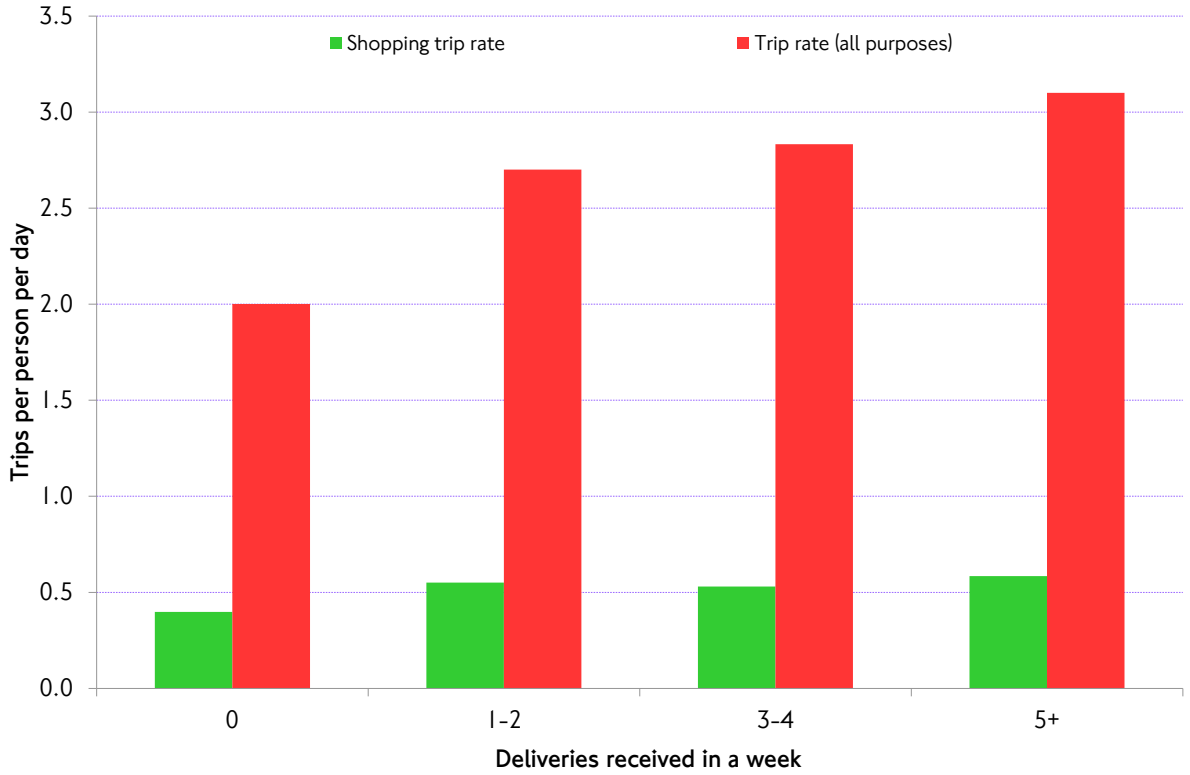
Source: Strategic Analysis, TfL City Planning.

Figure 4.21 shows how London residents' shopping trip rates and total trip rates vary according to the number of deliveries received in the previous week. The chart shows that, perhaps counter to intuition, as the number of deliveries received increases, so does the total trip rate, alongside the shopping trip rate. The shopping trip rate varies very little among those who received one or more deliveries, however those who received no deliveries made fewer trips on average for shopping than those who did.

Evaluation

These findings cannot provide direct evidence either way that London residents are directly replacing their shopping trips with online purchases, because any trips not made for this reason are not recorded by the survey in its current form. From these data it appears that London residents with higher disposable incomes are continuing to visit shops as well as purchase products online, and those with lower incomes make fewer shopping trips and are less likely to make online purchases. Research suggests that although online retail sales have soared, shops still have a role in supporting retailers. In this way, shopping is increasingly a combination of online and physical activities.

Figure 4.21 Trip rates by number of deliveries received, LTDS 2017/18.



Source: Strategic Analysis, TfL City Planning.

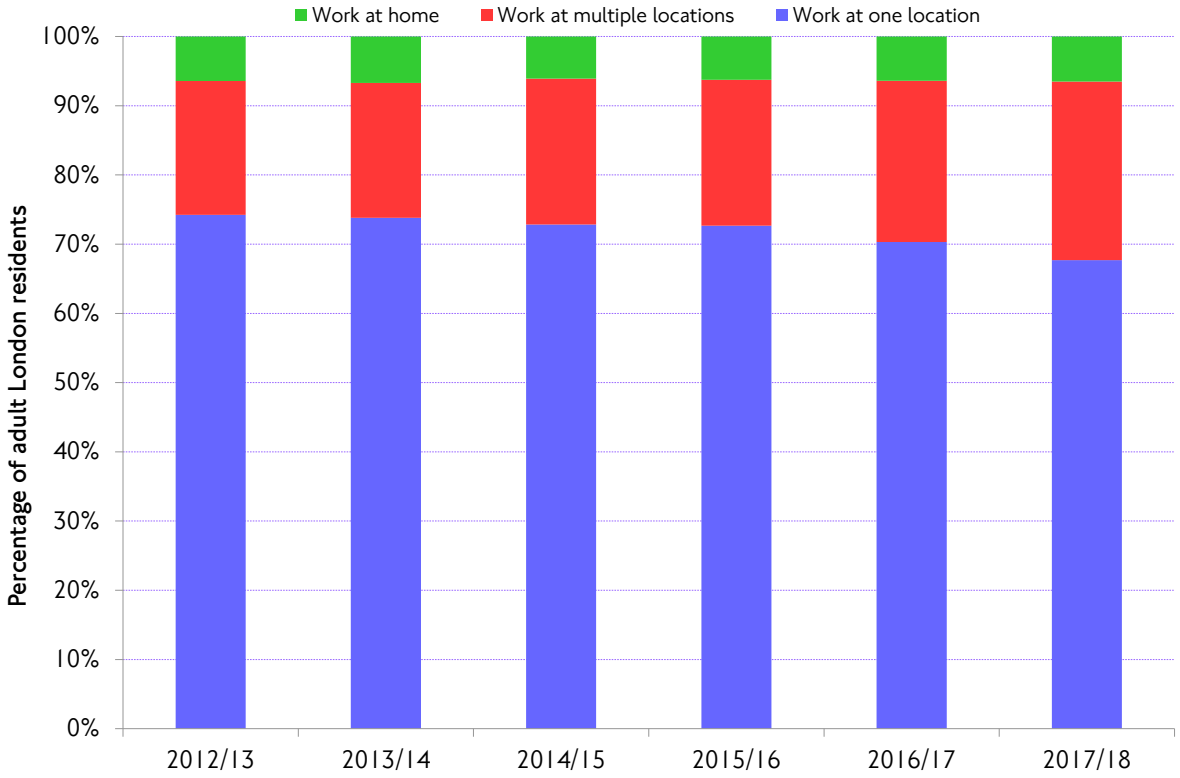
Working patterns – background

One aspect that has particularly attracted recent comment in the media has been changing working patterns, and their impact on travel. Every employee in the UK has the statutory right to request flexible working after 26 weeks of employment, and many businesses are adopting flexible working practices. A recent YouGov survey, for example, suggested that the traditional workplace hours of 9am to 5pm are now only the norm for 6 per cent of workers in the UK (https://yougov.co.uk/topics/economy/articles-reports/2018/08/24/over-nine-ten-not-working-usual-9-5-week). There are many forms of flexible working – ranging from some limited flexibility around start/end times through to the facility to 'work from home' for prolonged periods. Although these developing practices could imply changes to travel times or reduced demand at the aggregate level, it should also be recognised that flexible working could also imply the opposite, as businesses work from multiple sites and technology-enabled or economy-driven efficiencies require workers to be more flexible in their personal travel arrangements, commuting further or working from several widely-spaced locations.

What does LTDS tell us about the changing working pattern of Londoners?

Figure 4.22 shows that there has been a notable decline in the proportion of London residents who travel to the same place to work nearly every day, from 74 per cent in 2012/13 to 68 per cent in 2017/18. There has been a corresponding increase in the proportion of adult residents who work at multiple locations, increasing from 19 per cent to 26 per cent over the same period. The proportion of residents who work solely from home has also increased, but only slightly, from 6 to 7 per cent. As with deliveries (above), the available LTDS data describes a process of change, but is not capable of directly identifying its effect on travel demand – the evidence can be interpreted both ways. Nevertheless, the possibilities are sufficiently compelling as to require further investigation and quantification.

Figure 4.22 Working location of adult London residents, 2012/13-2017/18.



Source: Strategic Analysis, TfL City Planning.

Summary assessment

To summarise key points from this section:

- A slow but consistent reduction in average per person trip rates has been widely observed – in London, the UK and more widely, over much of the last decade. As well as a response to changing economic conditions this is thought to reflect a mix of generational, policy and lifestyle factors. Current survey evidence in London is insufficient to fully understand these influences, and improving the evidence base is a priority for TfL going forward.

Section 2: Healthy Streets and healthy people

5. Travel demand trends – active travel

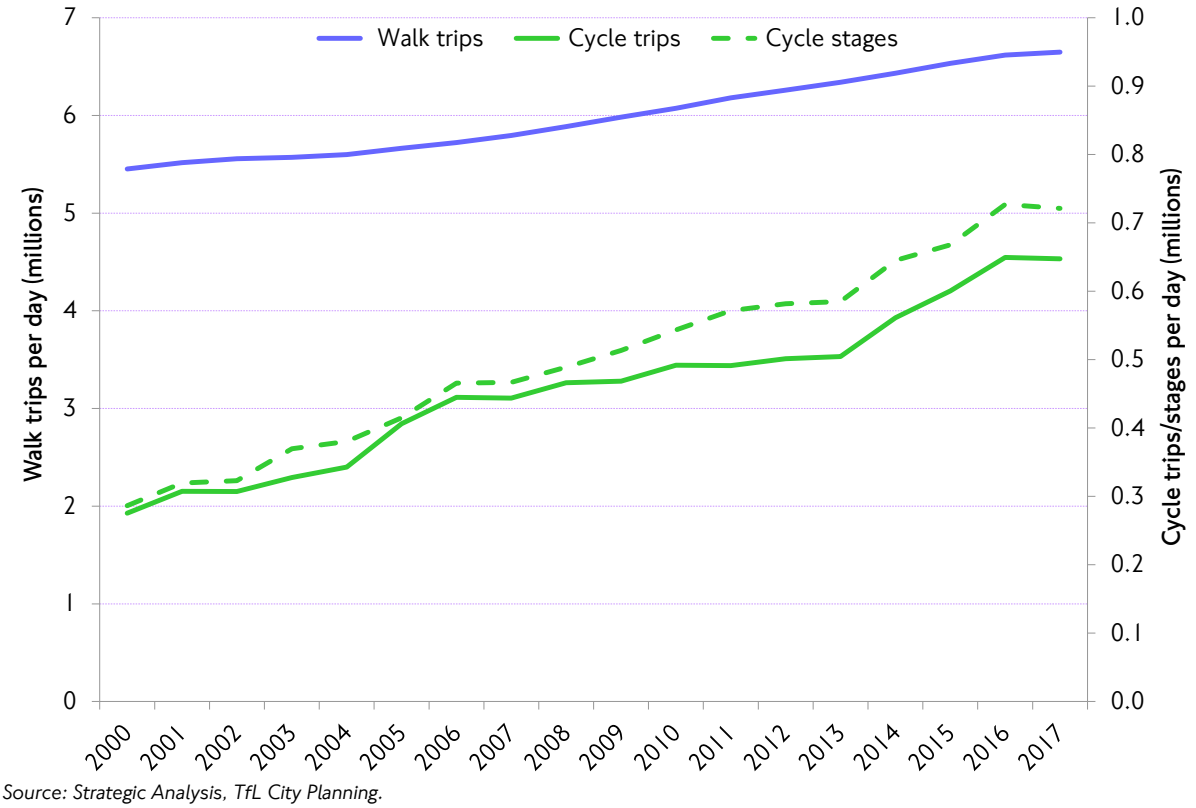
5.1 Active travel – overall trends

This chapter considers recent travel demand trends for cycling and walking in London, building on the commentary on overall volumes and mode shares for these modes in chapters 2 and 3.

Figure 5.1 shows the historic trend in the number of trips in London made by active modes – cycling and walking – on an annual average day. Whilst the absolute numbers of each differ in scale (note the dual axes of the graph) the trend for both has been steadily upwards over the period since 2000. This in part reflects population growth, particularly for walking, but also reflects enhancements to the walking, cycling and public transport networks to improve their attractiveness as a means of travel.

The average annual rate of growth for walking since 2000 has been 1.2 per cent and for cycling the average annual growth rate has been 5.3 per cent. Since 2010 the average annual growth rates were 1.3 and 4.1 per cent respectively, and over the latest year they were 0.5 and (a small fall of) 0.3 per cent respectively. The figure is suggestive of a levelling off in cycling growth across London, mirroring the trend seen across other modes, although there has been strong cycling growth in areas where investment has been made to make cycling safer.

Figure 5.1 Number of walk trips and cycle trips/stages in London on an average day, all travellers 2000-2017.



Source: Strategic Analysis, TfL City Planning.

5.2 Trends in cycling in London – cycling volume

Introduction

This section reviews available indicators of cycling in London. The overall picture over the last decade has been one of relatively strong growth, albeit at a rate slower than required to achieve the Mayor's 2041 mode share aim.

Much investment is currently being made to improve the provision for, and increase the attractiveness of, cycling in London, and this year we have seen cycling increase in those areas where cycling investment has been concentrated to date. For instance, there has been significant growth in the Mini-Holland boroughs (see section 5.5 for more details), and on Cycle Superhighways and Quietways, with many routes seeing more than 50 per cent growth.

However, demand for cycling continues to be quite seasonal, concentrated around the travel peak periods, concentrated among certain socio-demographic groups, and in central and inner London.

Summary of key volume statistics

TfL regularly collects extensive volumetric data on cycling levels. The current volumetric counts can be grouped into:

- Area-based counts of people who cycle.
- Counts of people who cycle crossing strategic (counting) cordons and screenlines.

Table 5.1 gives a summary of key cycling volume statistics for the latest year. The overall picture is a mixed one. Over the most recent year, the total distance cycled in London has increased by 4.3 per cent, with increases in the average number of people cycling per day in all areas (central, inner, and outer).

Table 5.1 Summary of key estimates of cycling volume in London, 2015-2017.

Metric	2015	2016	2017
Average daily number of cycles			
Central London	1,291	1,287 (-0.3%)	1,298 (0.9%)
Inner London	518	520 (0.4%)	536 (3.0%)
Outer London	125	121 (-3.1%)	129 (7.0%)
GLA total	**232**	**231 (-0.4%)**	**240 (3.9%)**
Average daily kilometres cycled (thousands)			
Central London	527	525 (-0.3%)	530 (0.8%)
Inner London	1,730	1,736 (0.4%)	1,789 (3.0%)
Outer London	1,556	1,507 (-3.1%)	1,612 (7.0%)
GLA total	**3,813**	**3,768 (-1.2%)**	**3,931 (4.3%)**

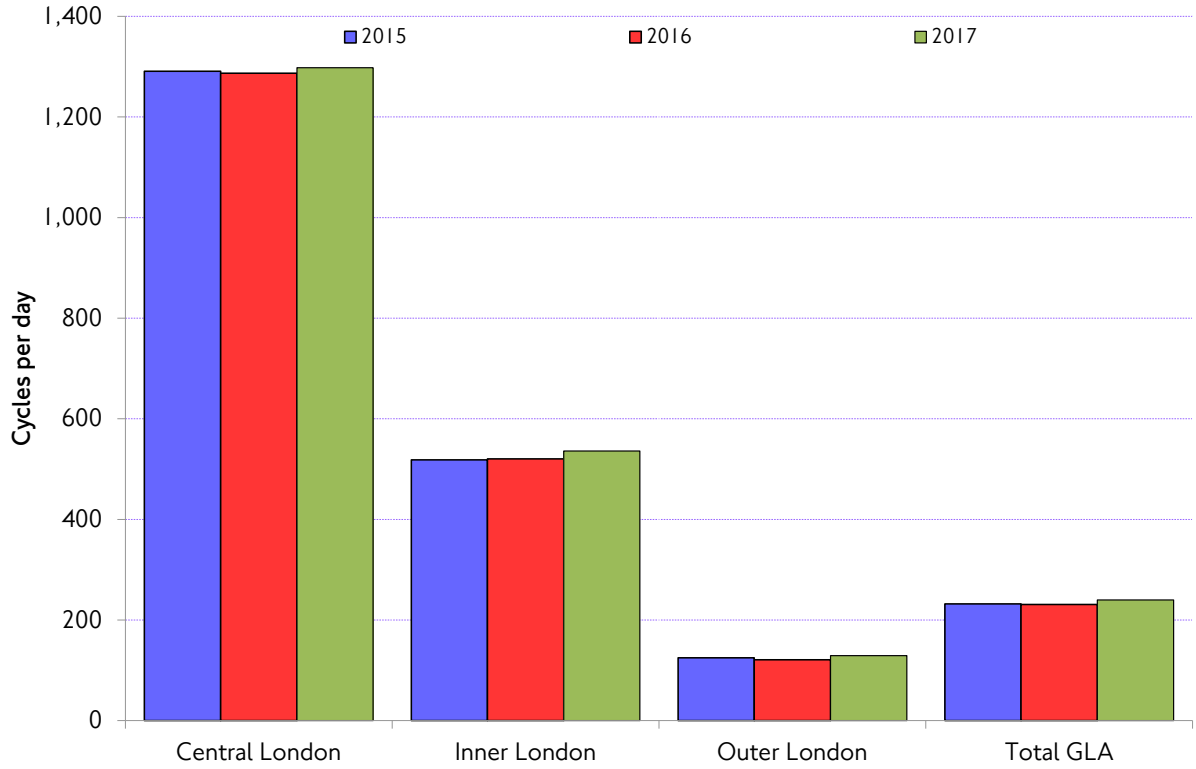
Source: TfL Traffic Data.

Cycling in central, inner, and outer London areas

TfL collects area-based cycling volume data to represent each of the central, inner and outer London areas within the GLA boundary.

Figure 5.2 shows the average number of people cycling per day counted in each of these areas since this monitoring began. The figure shows the broad relativity in cycling by area. Central London sees more than twice as many people cycling – on a normalised basis – as inner London, whilst outer London sees just one-fifth of the volumes of inner London. This suggests a high concentration of cycling trips in the centre with a much more limited presence in peripheral areas, which present a much lower cycling density given their much wider geographical expanse. However, central London comprises just 2 per cent of the land area of Greater London and is therefore of limited overall influence for Greater London totals.

Figure 5.2 Average number of cycles per day by area, 2015-2017.



Source: TfL Traffic Data.

In terms of total distance travelled (figure 5.3), however, inner London has the highest volume of cycling, followed closely by outer London. This indicates that trips in inner and outer London are likely to be longer, thus accounting for more kilometres, even if the absolute number of individual trips may be smaller.

Figure 5.3 Total kilometres cycled per day by area, 2015-2017.

Source: TfL Traffic Data.

Central London mode share of cycling

In 2016, the central London area counts were extended to all vehicles to better understand the share of cycles in the overall vehicle mix.

These counts showed that, in 2016, almost 1 in 4 vehicles (24 per cent) in central London during the day was a cycle, with several locations reaching much higher cycle shares. For instance, Tooley Street or Southwark Bridge, on a Cycle Superhighway, reached average daily cycle shares of 55 per cent and 48 per cent respectively, and on some minor roads like Torrington Place, the cycle share reached 65 per cent.

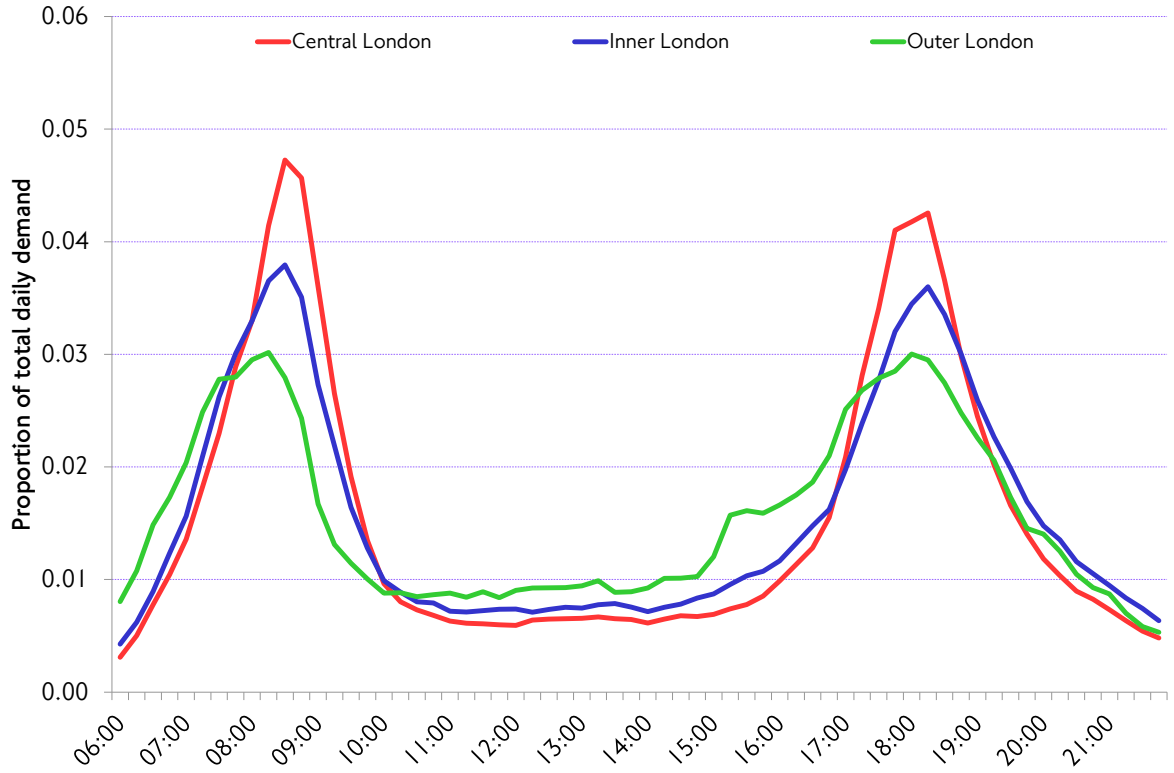
During each of the morning and evening peaks, the average cycle share across central London was as high as 33 per cent.

This shows that the cycle has a strong presence in central London, with an average of about 10 per cent of the cycles being TfL Santander Cycles (in 2016, this was the only cycle hire scheme operating in London).

Cycling by time of day

Another interesting aspect to explore is the distribution of demand throughout the day in each of these areas. To do so in a way that represents a like-for-like comparison, figure 5.4 shows the relative demand profiles in each area, which are normalised by the area total daily demand. These profiles have not changed much over the years, so for clarity only the most recent year (2017) is shown.

Figure 5.4 Relative demand profile throughout the day by area, 2017.



Source: TfL Traffic Data.

Cycling demand is mostly concentrated around the morning and evening peaks. However, this seems to be more pronounced in central and then inner London, whereas in outer London demand is slightly more evenly spread throughout the day.

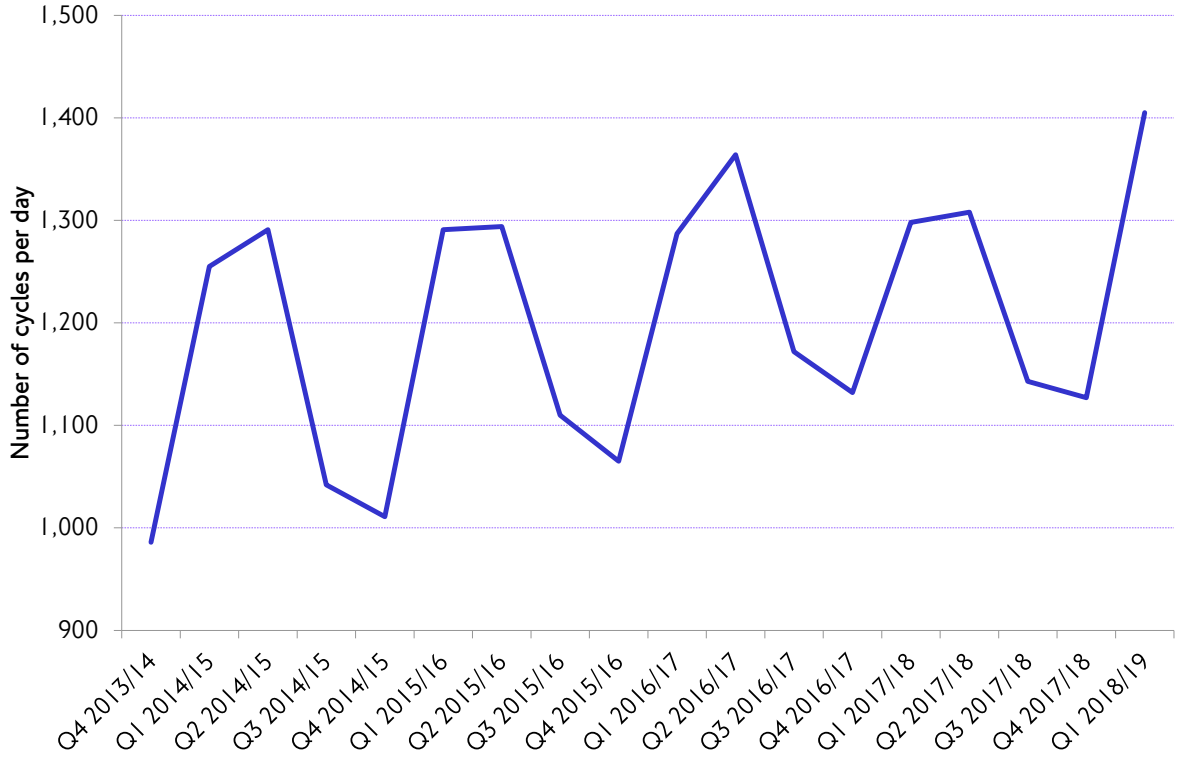
The 'peak of the peak' happens at slightly different times in each area. Particularly in the morning peak, it is possible to see a shift from an earlier peak in outer London that increases towards the centre. This is probably because of the common 'hard start' of the working day at around 09:00, which means that to reach the workplace on time, travel needs to begin earlier the further away the start location is. Higher job densities in central London and longer travelled distances in inner and outer London support this idea.

It is also interesting to note that the outer London profile presents another peak at around 15:15, which is probably linked to the end of the school day (typically at 15:00). The fact that this is only noticeable in outer London does not imply that it does not exist for central and inner London. But due to the higher volumes of cycling in these areas, it is probably masked by demand related to other purposes.

Seasonality in cycling trends

Unlike the inner and outer London areas, which are counted annually, the central London area is counted quarterly, which allows seasonal variation to be explored (figure 5.5). In the context of a general trajectory showing net growth, the seasonal peaks and troughs are very evident and are also remarkably consistent from year to year. Winter 'troughs' are about 20 per cent lower than summer 'peaks'. A degree of seasonal variation is of course to be expected, but it does highlight the difficulties of establishing what are 'typical' cycle volumes and the importance, as is the case with the similar counts for inner and outer London, of conducting counts at the time of year that is closest to 'annual average' flows.

Figure 5.5 Average number of cycles per day per (financial) quarter in central London.



Source: TfL Traffic Data.

Cycling across strategic cordons

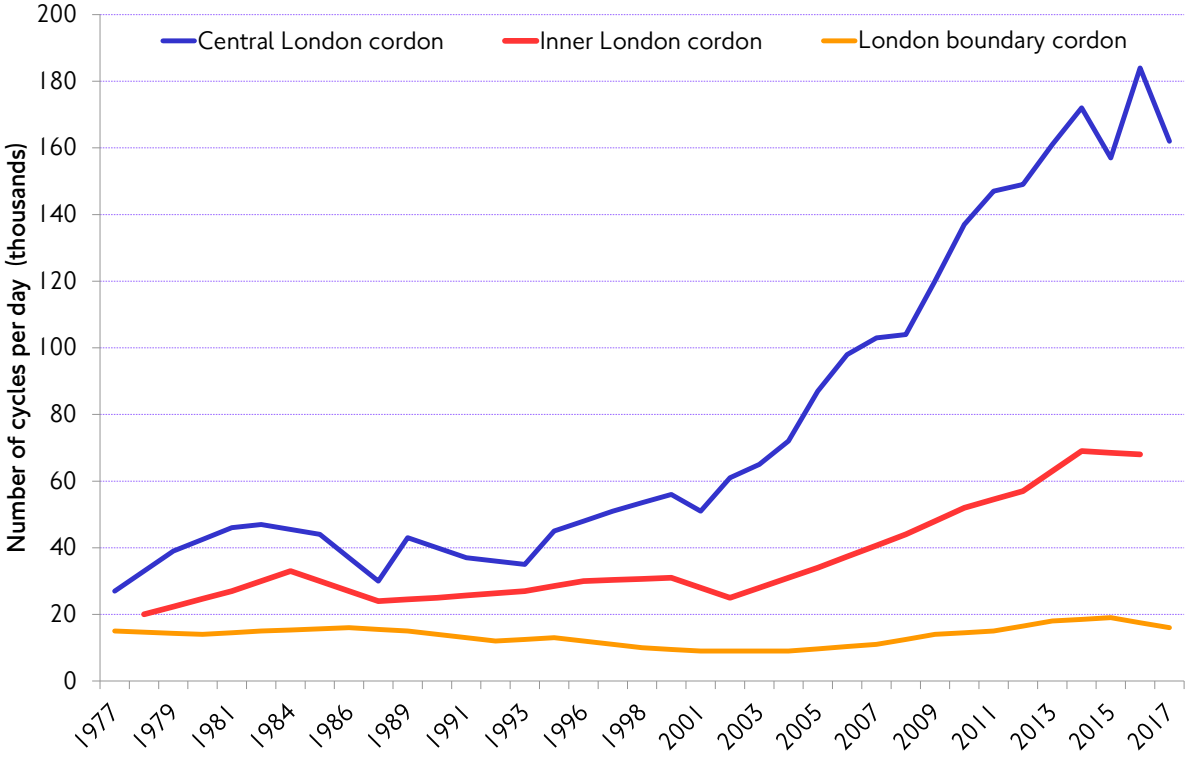
Figure 5.6 shows cycling volumes across the strategic London cordons (central, inner, and GLA boundary).

The inner London cordon was not counted in 2017 but has been included for reference. On the other two cordons, the last year has seen a decline on demand from 2016.

Cycling volumes across the central London cordon have declined by 12 per cent, but remain at the high levels seen over the last few years and above the demand seen on the previous drop in 2015.

On the other hand, demand on the GLA boundary cordon declined by 16 per cent against 2015, reversing a growth trend since 2001 and returning to volume levels of 2013.

Figure 5.6 Trend in cycle flows across strategic cordons and screenlines, 1977-2017.



Source: TfL Traffic Data.

5.3 Trends in cycling in London – demographics and attitudes

Introduction

Most cycling in London is undertaken by people who cycle regularly, and the majority of the population do not do this. People who cycle currently are more likely to be white, male and earning more than £20,000 each year, suggesting that the barriers to cycling are felt more acutely by women, BAME (black, Asian and minority ethnic) people and those earning less than £20,000 each year. These barriers to cycling are mostly related to safety and the motivators mostly related to fitness and enjoyment, with pleasure and exercise being the top cycling motivation for most people (although not necessarily making up most of the cycling trips in absolute volume terms).

In 2017, there were two surveys that looked at demographics and perceptions of cycling:

- TfL's London Travel Demand Survey (LTDS)
- TfL's Attitudes to Cycling survey

Cycling demographics from the London Travel Demand Survey

The London Travel Demand Survey offers some insights about the demographic profile of people who cycle. However, it is important to note that given the low numbers of people who cycle in the general population (and hence in the LTDS sample), the results may be subject to larger year-on-year variations which may not be representative of the whole population.

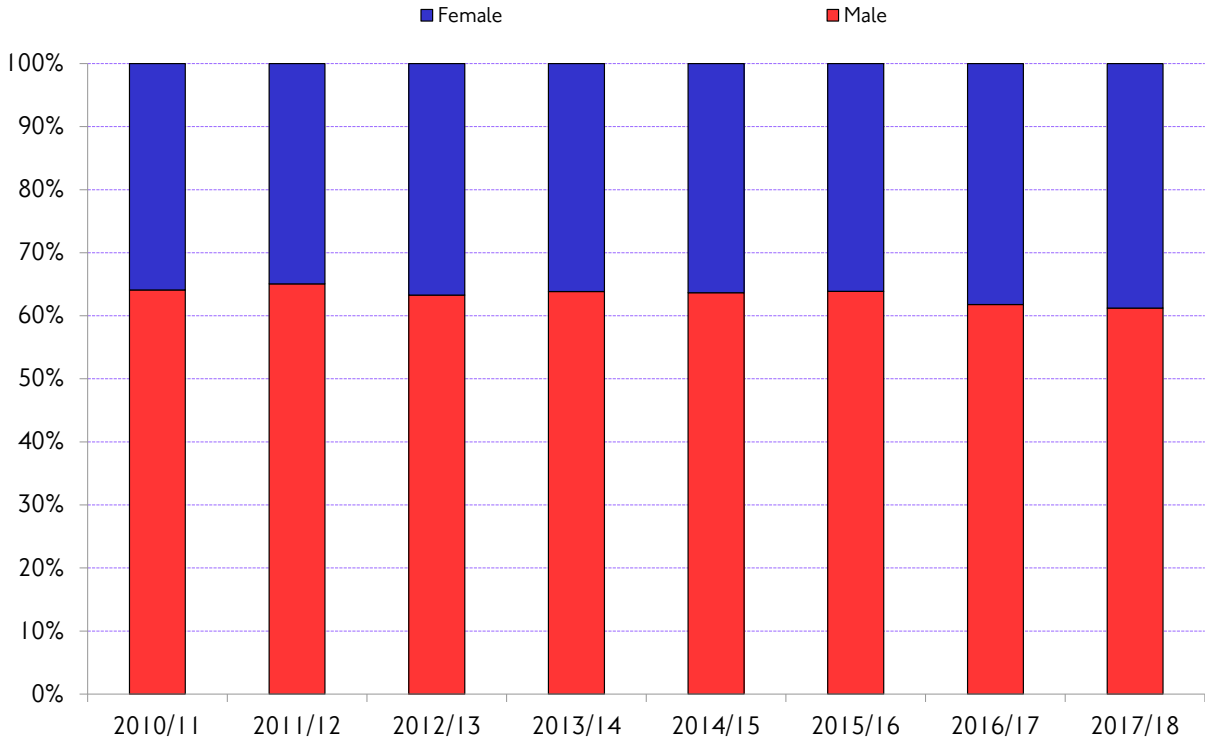
Gender and cycling

Figure 5.7 shows the gender profile of those who cycled at least once in the last year. This is the best available benchmark from our current surveys for measuring attitudes. Although just more than half of people who cycled at least once in the last year were male, there seems to be a long-term trend of a slow increase in the proportion of women who cycle at least once a year.

Early findings from the impact of some of the cycling investment programmes also shows that the proportion of women who cycle along those routes may be increasing. For instance, in 2017 the proportion of women cycling along the recently completed Quietway 1 increased to 35 per cent from 29 per cent in the 2014 baseline.

However, in terms of commuters by cycle, the difference between the proportion of men and women is higher, with more than 70 per cent of cycling commuters being male since 2010/11 and with slightly larger fluctuations over the years.

Figure 5.7 Gender profile of people who cycled at least once in the last year, 2010/11-2017/18.



Source: Strategic Analysis, TfL City Planning.

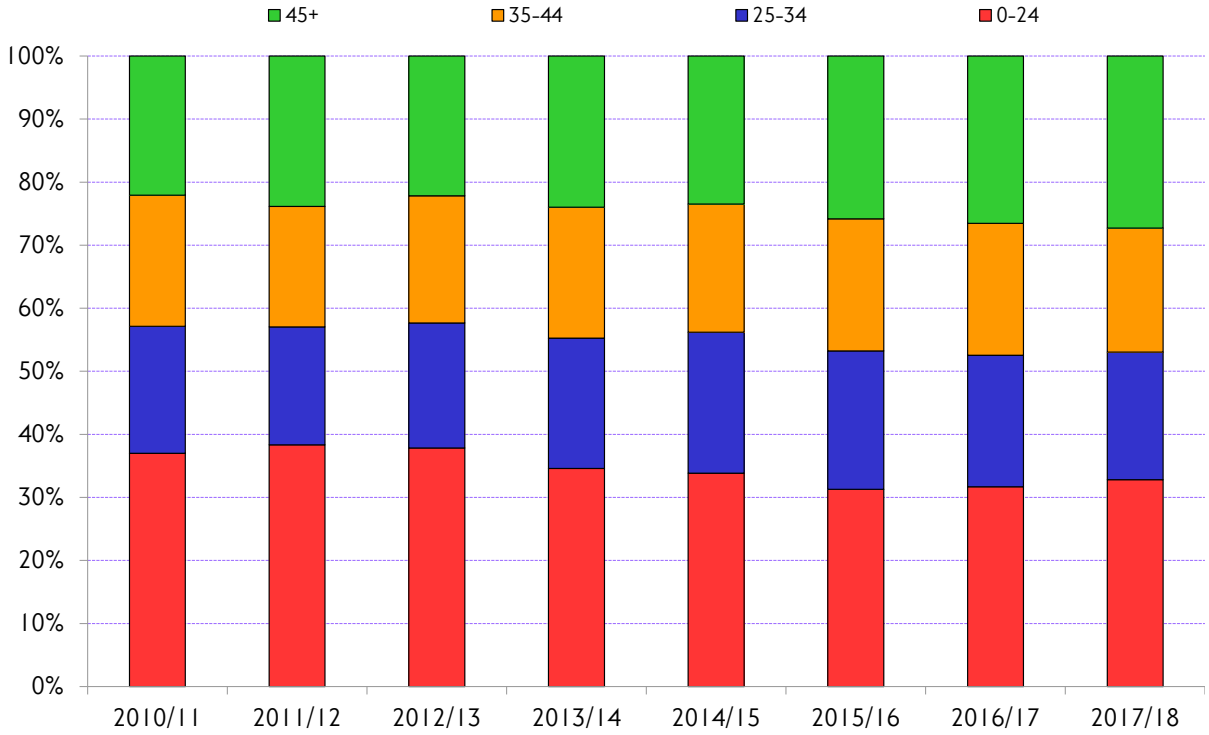
Age and cycling

In terms of the proportion of people who have cycled in the last year by age group (figure 5.8), the largest group is those between 25-44 years old, which make up around 40 per cent of people who cycle, a proportion that has remained fairly constant over time and that closely mirrors the share of this group in the general population (37 per cent).

It is interesting that the proportion of younger people who cycle (under 25) has seen a slight long-term decline, while the proportion of people over 45 who cycle has increased in similar measure. However, people who cycle in the under 25 age group still represent a higher proportion than there are under 25s in the population, while over 45s are under-represented in the group of people who cycle.

Looking only at those who commute by cycle, the proportion of younger cycle commuters (under 25) is much smaller than for cycling in general, around 20 per cent, while the age group immediately above (25-34) makes up around 30 per cent and is thus the most prevalent.

Figure 5.8 Age profile of people who cycled at least once in the last year, 2010/11-2017/18.

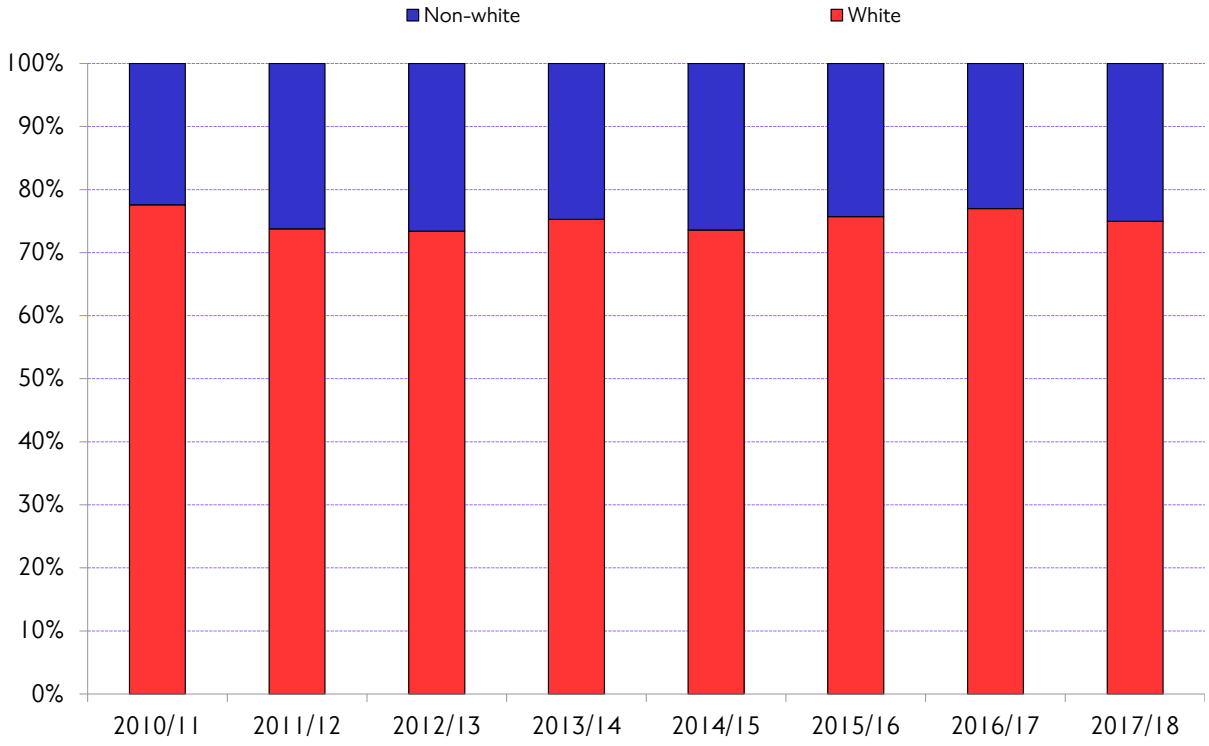


Source: Strategic Analysis, TfL City Planning.

Ethnicity and cycling

There is a rather static picture in the ethnic diversity of people who cycle at least once a year (figure 5.9). Only around 1 in 4 people who cycle (25 per cent) is of a non-white or mixed-race background, while the proportion of non-white and mixed-race people in London is up to 37 per cent. This gap is even higher when looking at cycling for commuting, where only 15 per cent of cycle commuters are from those minority backgrounds.

Figure 5.9 Ethnicity profile of people who cycled at least once in the last year, 2010/11-2017/18.

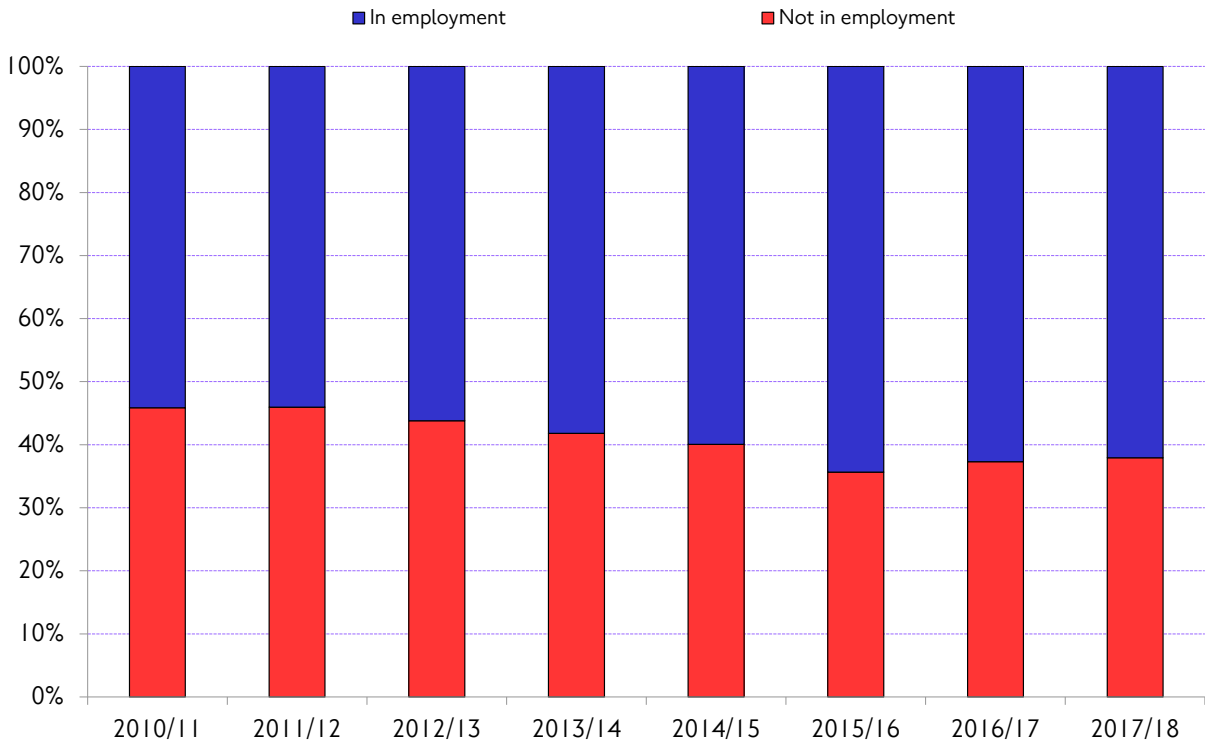


Source: Strategic Analysis, TfL City Planning.

Employment and cycling

In terms of the proportion of people who cycle at least once a year and their employment status (figure 5.10), most of them are in employment and their relative share in the population of people who cycle has increased slightly over the last few years and is now over 60 per cent. In contrast, the proportion of people in employment in the general population is just above 50 per cent. This trend may well be related to other observations like the fact that commuting is one of the main purposes for cycle journeys, particularly among people who cycle regularly, and that high quality cycle infrastructure facilitates commuter travel into central London along radial routes.

Figure 5.10 Employment profile of people who cycled at least once in the last year, 2010/11-2017/18.

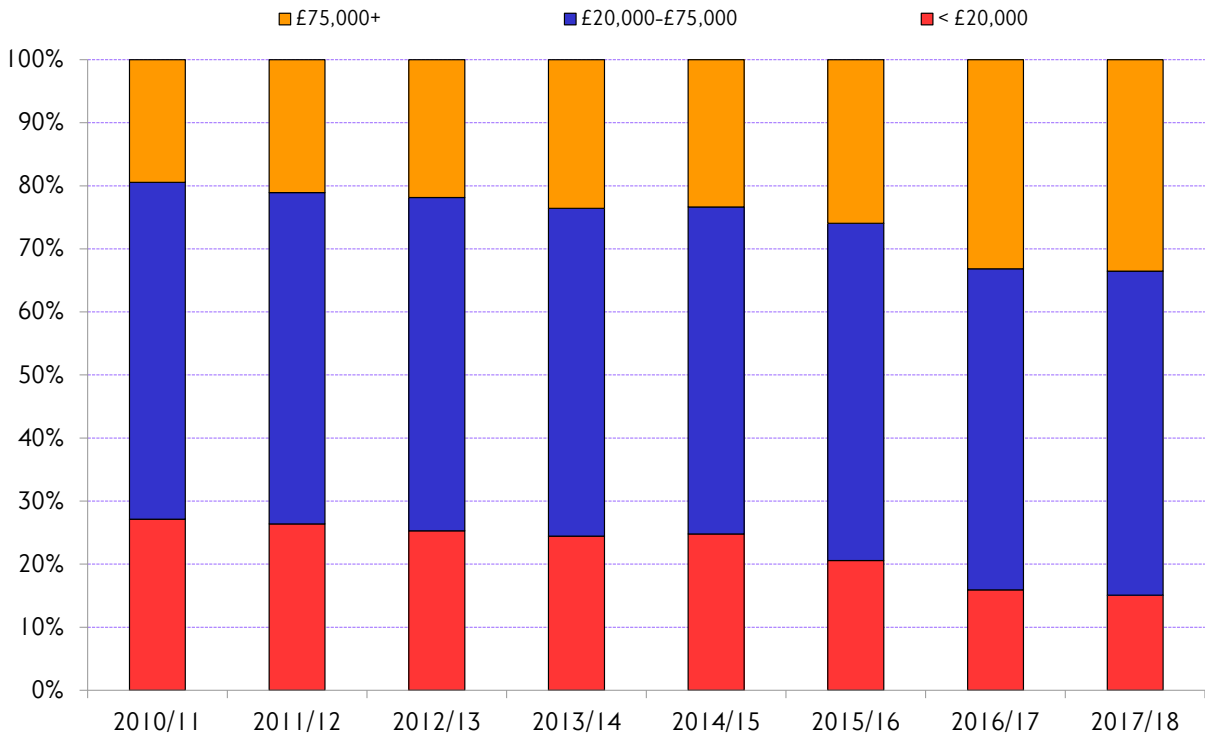


Source: Strategic Analysis, TfL City Planning.

Cycling and household income

Finally, it is interesting to explore the proportion of people who cycle at least once a year in the context of their household income (figure 5.11). The proportion of people who cycle in low-income households has followed a decline over the long term and is currently at around 15 per cent (under-representing the share of this group in the population, of around 25 per cent). Over the same period, the proportion of people who cycle from high-income backgrounds has increased in similar measure, reaching up to around 35 per cent in the last year. This trend may be indicating that cycling is becoming (or is perceived to be) a lifestyle choice rather than the inexpensive way to travel that it is.

Figure 5.11 Household income profile of people who cycled at least once in the last year, 2010/11-2017/18.



Source: Strategic Analysis, TfL City Planning.

Changing cycling behaviour over time

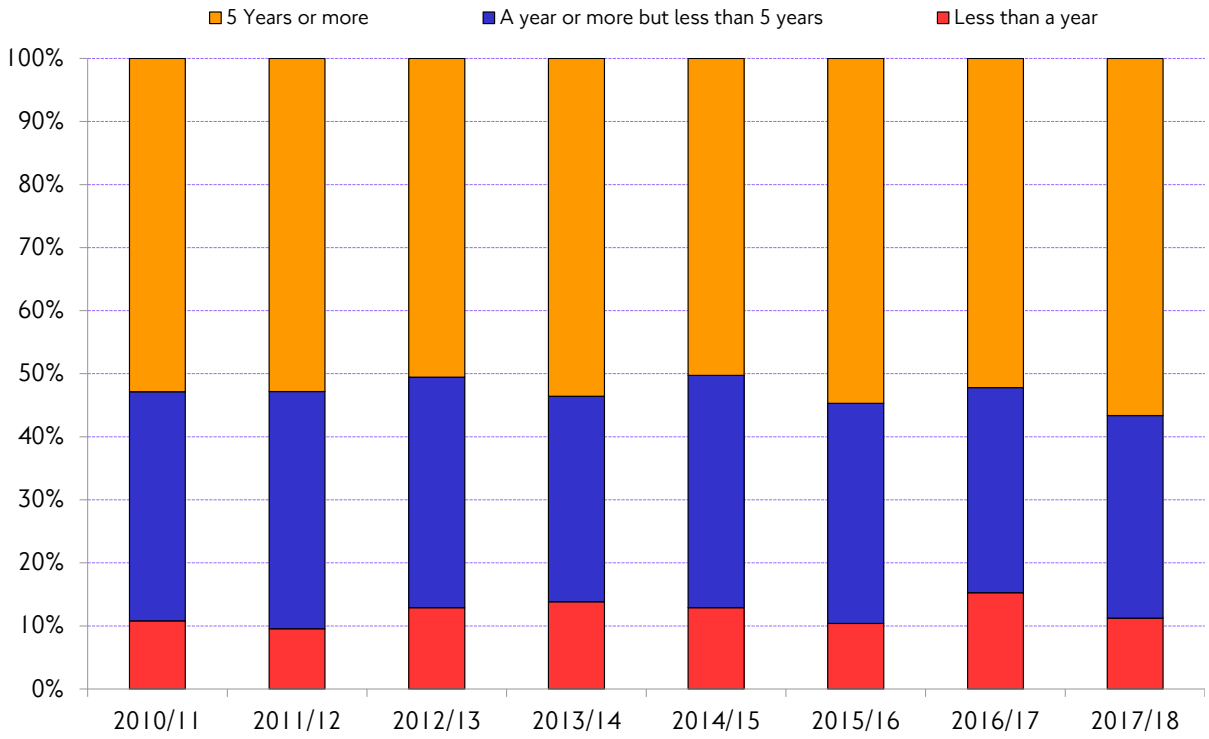
This section summarises a variety of indicators from the LTDS survey that look at aspects of cycling behaviour among London residents and how these have changed over time.

LTDS asks when an individual started cycling regularly, and the answers to this are indicative of whether there are an increasing proportion of people who cycle regularly. However, figure 5.12 shows that most people who cycle regularly have been doing so for a long time (over 5 years), and only a small minority of just over 10 per cent have started cycling in the most recent year.

These results are similar across all demographic groups (age excluded, where there would be an obvious correlation that would bias the results).

While there could be some methodological issues in the respondents' interpretation of the question (ie if they thought of when they learnt to cycle instead of when they started cycling regularly in London), the results could also point to a low take up rate for people who cycle regularly in the population.

Figure 5.12 Length of time of being a regular cyclist, 2010/11-2017/18.



Source: Strategic Analysis, TfL City Planning.

A large majority of people who cycle do so about the same as the previous year, with only few increasing the amount they cycle and even fewer decreasing it. This is consistent across all demographic groups.

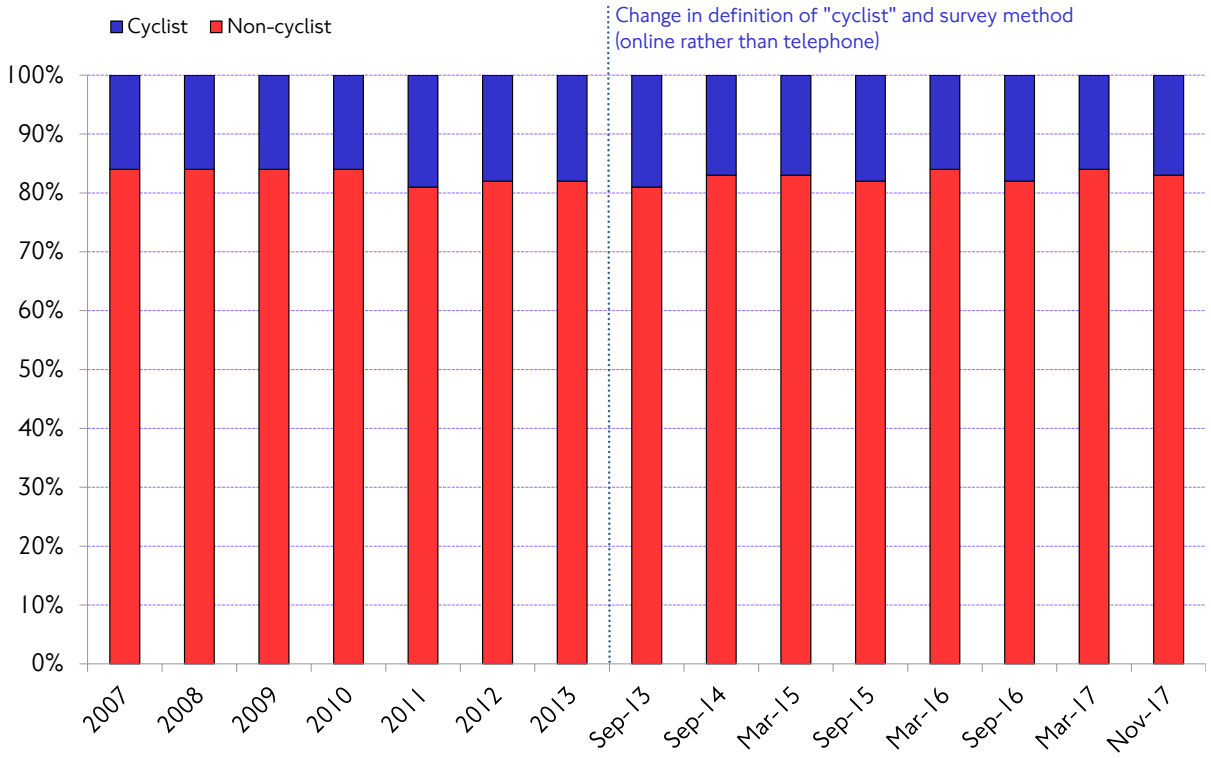
On one hand, this shows that in aggregate, cycling is experiencing a net increase because the number of people who cycle more (around 20 per cent) has always been higher than the number of those who cycle less (around 15 per cent). On the other hand, however, this depicts a rather static picture in cycling, whereby the same people seem to be cycling about the same all the time and few new people cycle regularly.

Cycling demographics and behaviour from the Attitudes to Cycling survey

TfL's Attitudes to Cycling survey also provides useful insights about the perceptions, motivations and barriers to cycling.

The proportion of people who cycle at least once a year has been stable over the last 10 years (figure 5.13): only 1 in 6 people cycle. This suggests that the increase in cycling volume observed in the same period is mostly due to population growth and from people who already cycle cycling more rather than from new people cycling.

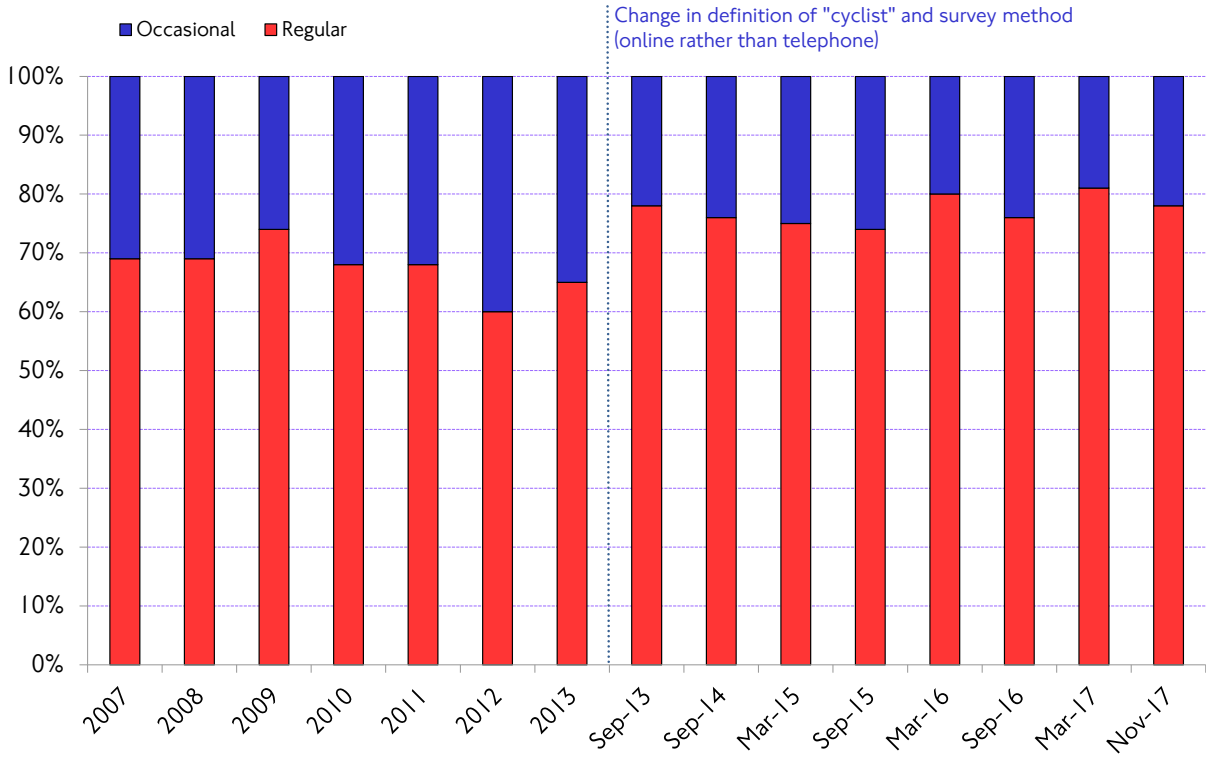
Figure 5.13 Proportion of people who cycle at least once per year, 2007-2017.



Source: TfL Customer Research and Insight.

The split between people who cycle occasionally (less than once a week) and regularly has also remained stable (figure 5.14). This further suggests that there is a small group of people who cycle regularly who account for most of the cycled distance and a large number of people who cycle very little or not at all.

Figure 5.14 Proportion of people who cycle regularly and occasionally, 2007-2017.



Source: TfL Customer Research and Insight.

Table 5.2 shows a summary of the demographic profile of people who have cycled in the last year and of those who do not currently cycle and are unlikely to start cycling in the future. Values of the split in the general population are also provided for reference.

Table 5.2 Demographic split of people who cycle and people who are unlikely to do so, 2017.

Demographic group	Population	People who cycled in the last year	People unlikely to start cycling in the future
Men	49%	63%	43%
Women	51%	37%	57%
Under 45	59%	82%	48%
Over 45	41%	18%	52%
White	63%	64%	65%
BAME	37%	36%	35%
Working	61%	81%	51%
Not working	39%	19%	49%
Social groups AB	50%	63%	46%
Social groups C1, C2 and DE	50%	37%	54%
Inner London residents	40%	53%	35%
Outer London residents	60%	47%	65%

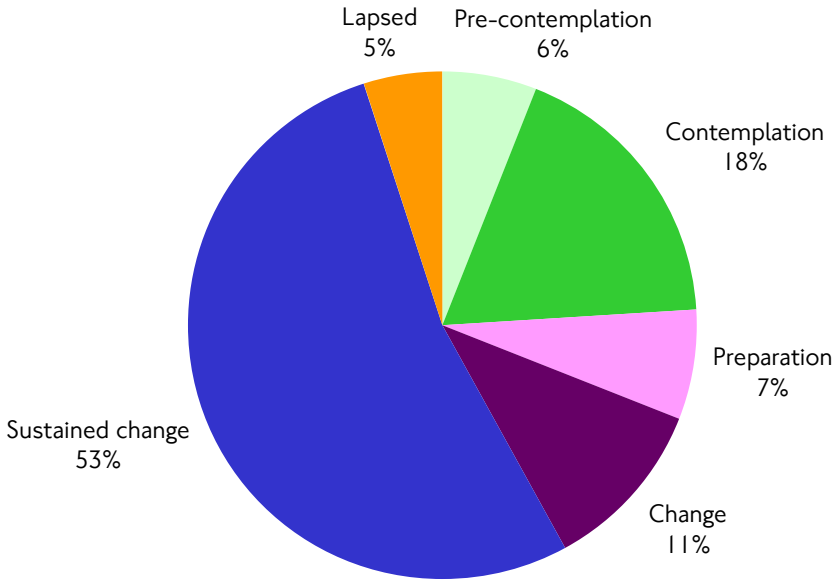
Source: Attitudes to Cycling survey.

Other key findings are that:

- Among those who cycle, 33 per cent cycled more in 2017 than in the previous year, with 50 per cent cycling about the same. This is up to 38 per cent for people who cycle regularly but only makes up 15 per cent of people who cycle occasionally, where 31 per cent (up from 26 per cent last year) report cycling less. This indicates a low retention rate of people who cycle occasionally.
- Most people who increased their cycling level did so by making more trips (66 per cent) rather than cycling longer distances (24 per cent).

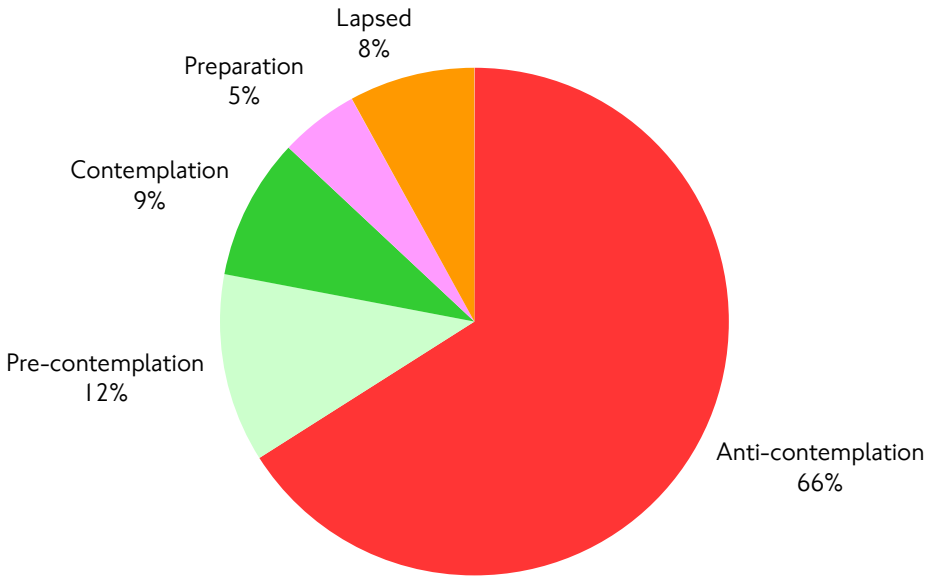
The split in people's attitudes to the idea of cycling for 2017 is shown in figures 5.15 and 5.16. This split has changed very little over the years. Most people who cycle have been cycling for a while and continue to do so (sustained change). Around 18 per cent are thinking of cycling more (contemplation) and 11 per cent are trying it (change). Among people who do not currently cycle regularly, the majority (66 per cent) are unlikely to cycle in the future (anti-contemplation); only 5 per cent are getting ready to start soon (preparation); and 9 per cent are considering it (contemplation).

Figure 5.15 People who cycle split into behaviour change categories, 2017.



Source: TfL Customer Research and Insight.

Figure 5.16 People who do not currently cycle regularly, split into behaviour change categories, 2017.



Source: TfL Customer Research and Insight.

Further findings from the Attitudes to Cycling survey are that:

- Access to a cycle and ability to cycle have remained high over the last few years. More than half of Londoners have access to a cycle and more than 80 per cent of them can cycle, although ability to cycle has had a slight long-term decline from 84 per cent in 2013.
- The top motivations to cycle remain fitness, enjoyment, convenience, time savings, and financial savings. Barriers to cycling more tend to be safety related, but they are becoming less deterring for people who currently cycle.
- The most popular purposes remain pleasure/exercise, commuting (except for people who cycle only occasionally), and social or other leisure activities.
- Cycling confidence in London has increased slightly from last year. In 2017, 66 per cent of people who cycle felt confident cycling in London. This is higher for people who cycle regularly (72 per cent) than for people who cycle occasionally (43 per cent).
- Most people agree that cycling is enjoyable (90 per cent of people who cycle, 72 per cent of people who do not currently cycle regularly in November 2017), but this has declined since 2013 from 95 and 82 per cent, respectively. Also, fewer people cite enjoyment as a reason to start cycling or cycling more. At the same time, agreement with the statement 'cycling is not for people like me' has been steadily increasing since 2013, suggesting that there is an issue with public perception of cycling.

In summary, there seems to be a rather stable picture of cycling demographics and perceptions, with few people cycling regularly and a large proportion of the population not attracted to the idea of cycling, with a clear demographic skew on each of those groups.

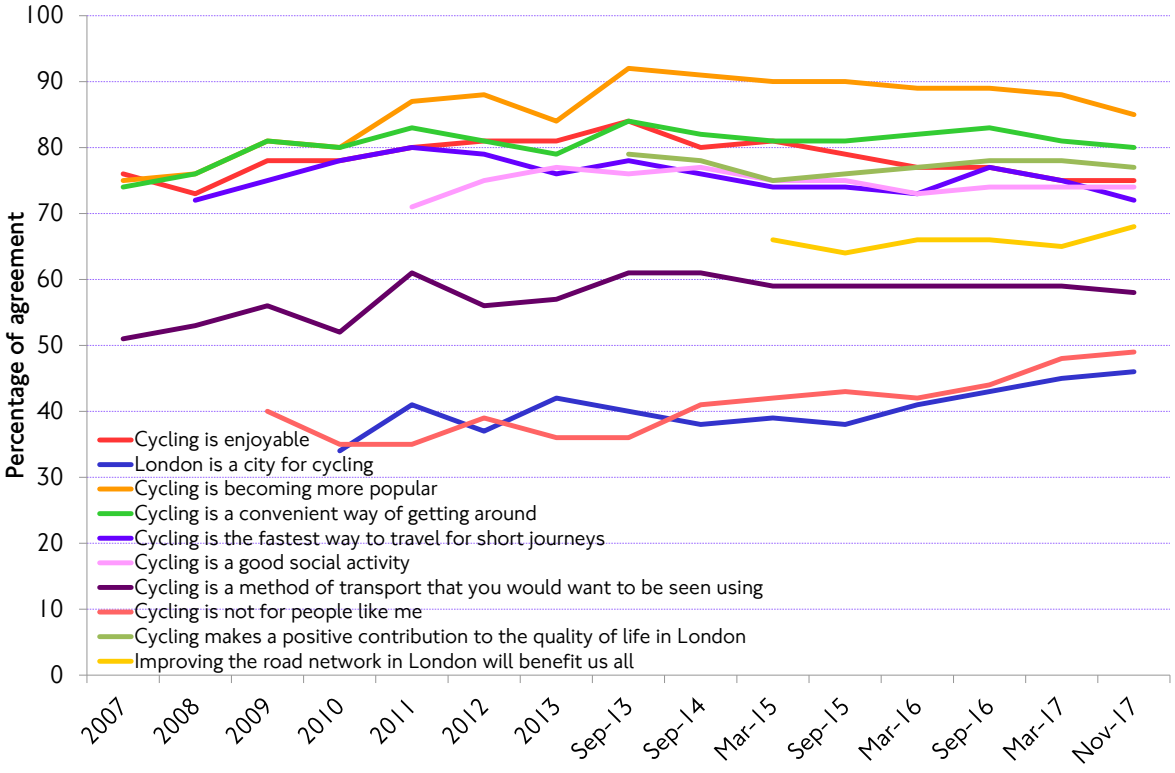
This suggests that the policy emphasis should continue to focus on making cycling safer and more attractive to a wider demographic of Londoners, and focus on improving the image of cycling and addressing other barriers, particularly safety, through creating inclusive street environments.

Perceptions of cycling from Attitudes to Cycling survey

The Attitudes to Cycling survey also presents respondents (who may or may not cycle) with a series of statements to understand the perceptions of different aspects of cycling. The results of this analysis have been summarised in three graphs, where statements have been grouped by topic:

- The first set of statements relate to the perceived image of cycling (figure 5.17).
- The second group collates all statements related to the perception of safety of cycling (figure 5.18).
- The remaining statements relate to the perception of TfL as an organisation that cares for people who cycle (figure 5.19).

Figure 5.17 Percentage of agreement with propositions about the image of cycling, all respondents, 2007-2017.



Source: TfL Customer Research and Insight.

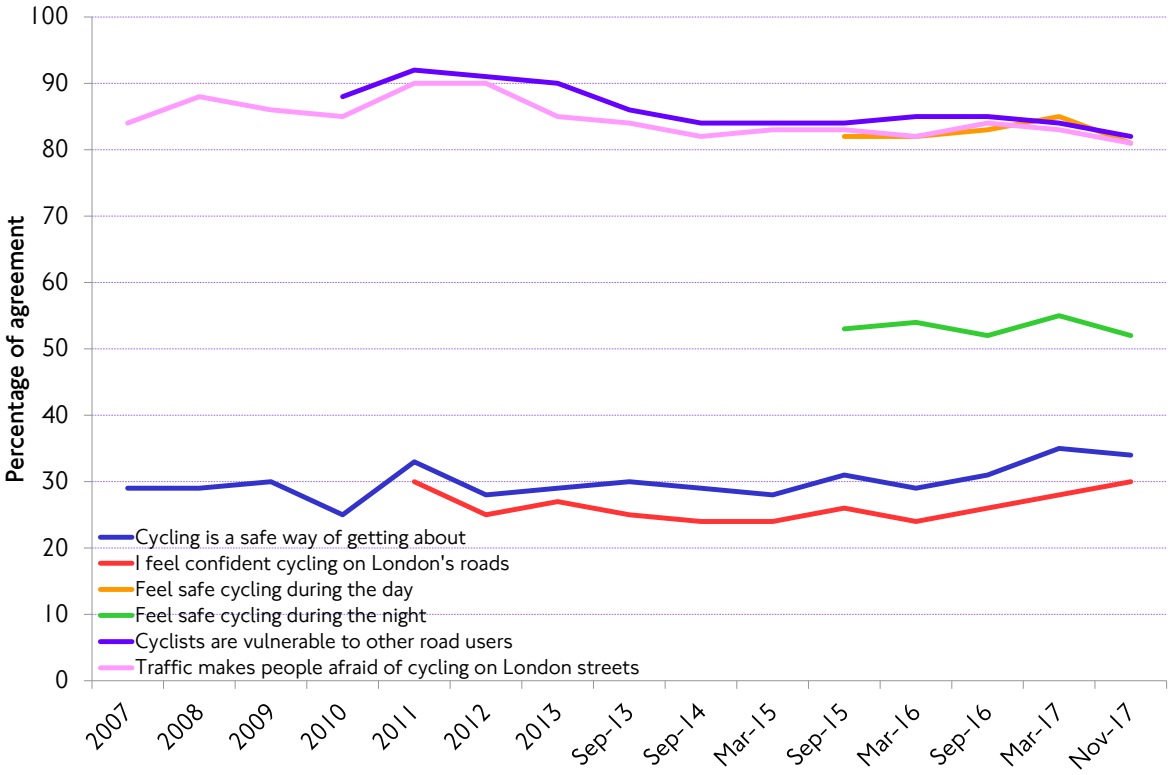
Over the last few years, the agreement with the statements that 'Cycling is enjoyable' and that 'Cycling is becoming more popular' have seen a small decline, thus suggesting a change in the perceptions of the 'fun' elements of cycling.

At the same time, there has been a noticeable increase in the agreement with the proposition that 'Cycling is not for people like me', which also suggests an issue in the image of cycling, which is perceived as an exclusive mode or one that is only accessible to certain demographic groups. On the other hand, there has been an increase in the agreement with the proposition that 'London is a city for cycling'.

There is also wide acceptance that 'Cycling makes a positive contribution to the quality of life in London' and that 'Improving the road network in London will benefit us all', which implies that even if people don't necessarily agree that cycling is their preferred mode or that

they would consider cycling in London, there is consensus that investment in cycling has a net positive contribution for the city as a whole.

Figure 5.18 Percentage of agreement with propositions about cycling safety, all respondents, 2007-2017.



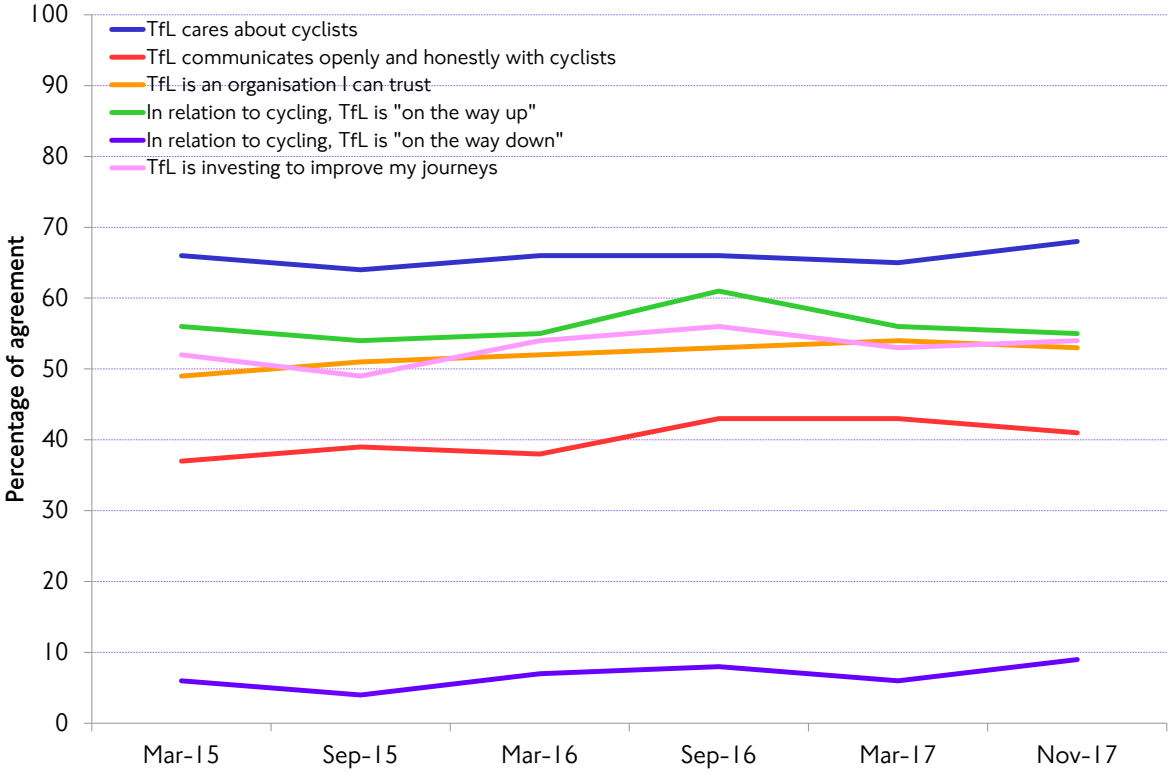
Source: TfL Customer Research and Insight.

Figure 5.18 shows that the perception of cycling as a safe mode of transport is slowly increasing, although it had a small decline between the last two survey waves and still falls short of the majority of the population agreeing with this proposition.

It is interesting to note the large difference between confidence levels for cycling during the day (with agreement well above 80 per cent) or at night (just above 50 per cent), which has remained roughly constant over time.

The perception of vulnerability and fear of traffic seem to have improved in recent years, although they remain at relatively high values. However, the level of confidence of people who cycle is increasing.

Figure 5.19 Percentage of agreement with propositions about TfL in relation to cycling, 2015-2017.



Source: TfL Customer Research and Insight.

Finally, figure 5.19 shows the public's perception of TfL as an organisation that works for people who cycle.

The main 'Care' metric remains high (well above 60 per cent agreement with 'TfL cares about cyclists') and is slightly increasing, alongside trust in the organisation and agreement with the statement that 'TfL is investing to improve my journeys'.

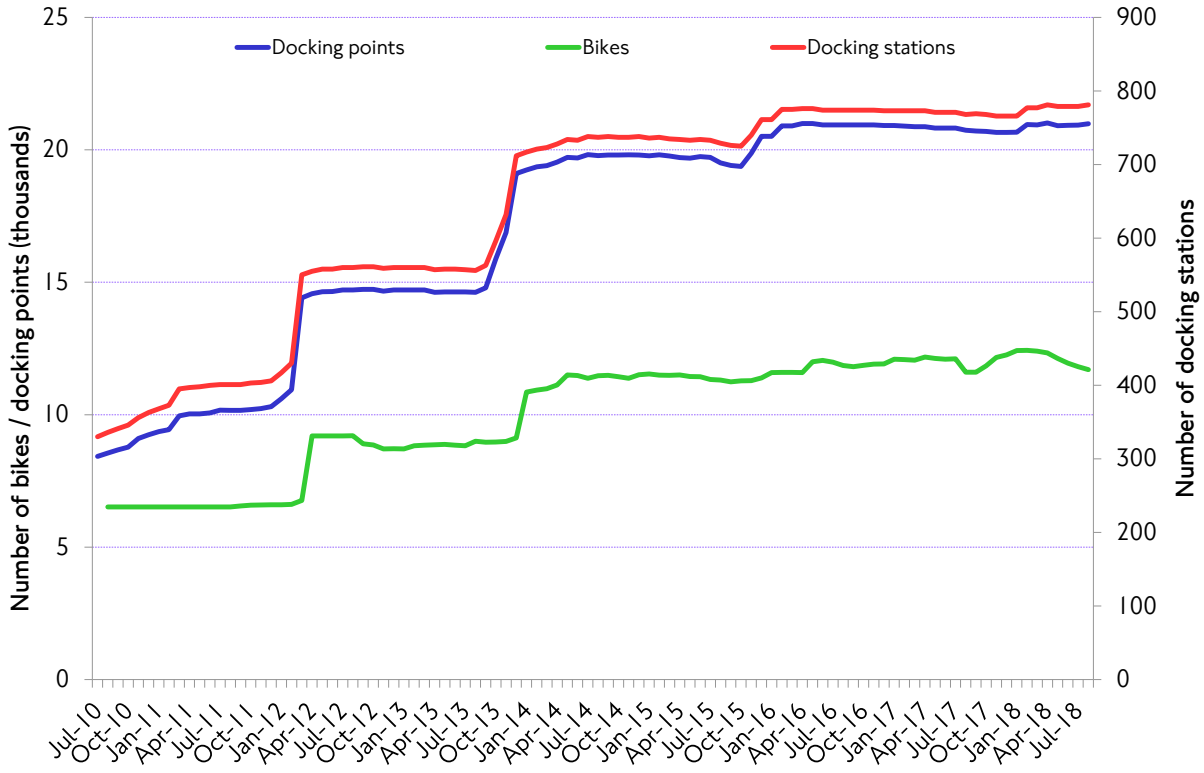
Many more people agree that TfL is 'on the way up' rather than 'on the way down', although in recent surveys this gap seems to be closing slightly.

5.4 Focus on: Santander Cycles

Development of the scheme

Santander Cycles is London's cycle hire scheme. It was launched in summer 2010 with 330 docking stations and over 8,400 docking points and since then it has more than doubled in size, currently having 781 stations, just under 21,000 docking points and more than 11,700 cycles. Currently, 1.29 million Londoners live within 400 metres of a docking station. Figure 5.20 shows the development of this scheme.

Figure 5.20 Number of docking stations, docking points and cycles available by month, 2010-2018.



Source: TfL Cycle Hire.

Demand trends

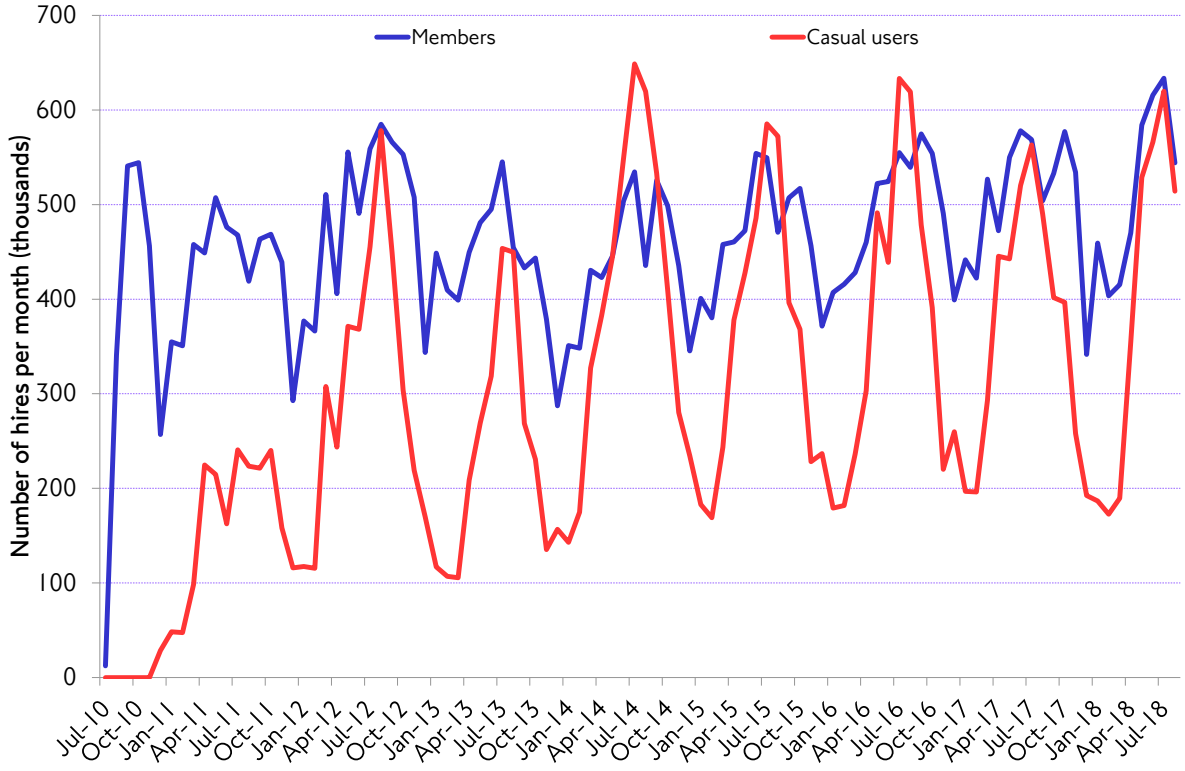
The demand for Santander Cycles (measured as the number of hires) has more than doubled since the scheme opening, closely following the trend in the provision of cycles and docking spaces, and is now at an average of around 900,000 hires per month (figure 5.21).

Figure 5.21 Average monthly hires and infrastructure provision per year, 2010-2018.

Source: TfL Cycle Hire.

As it was observed for cycling in general in section 5.2, demand for Santander Cycles is very seasonal. Figure 5.22 shows that the seasonal variations are larger for casual users than for members of the scheme. However, during the busier summer months the number of hires is similar and, often, casual hires exceed the number of member hires.

Figure 5.22 Total number of hires by user type per month, 2010-2018.

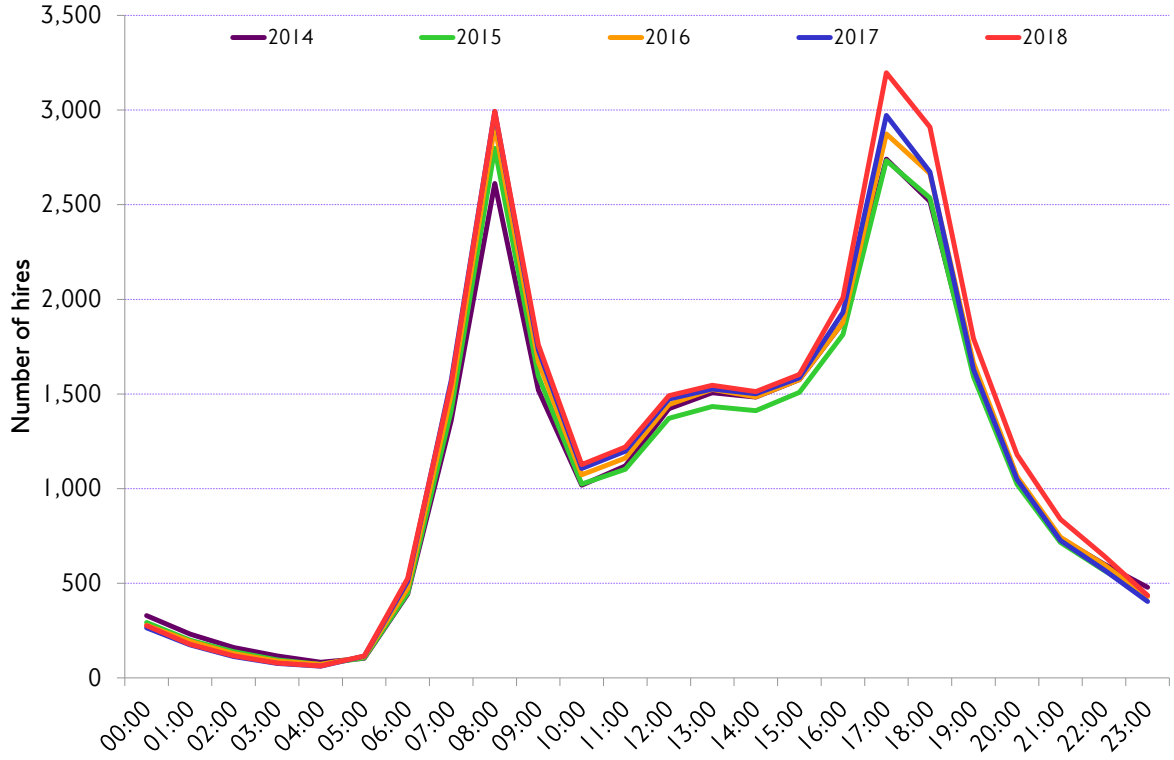


Source: TfL Cycle Hire.

The daily demand profile of Santander Cycles shows the traditional two peaks in the morning and evening but also a smaller peak in the middle of the day.

Figure 5.23 shows that this profile has been largely consistent over the years, and there is also evidence that this shape is consistent each month through the year.

Figure 5.23 Average number of hires per hour by year, 2014-2018.

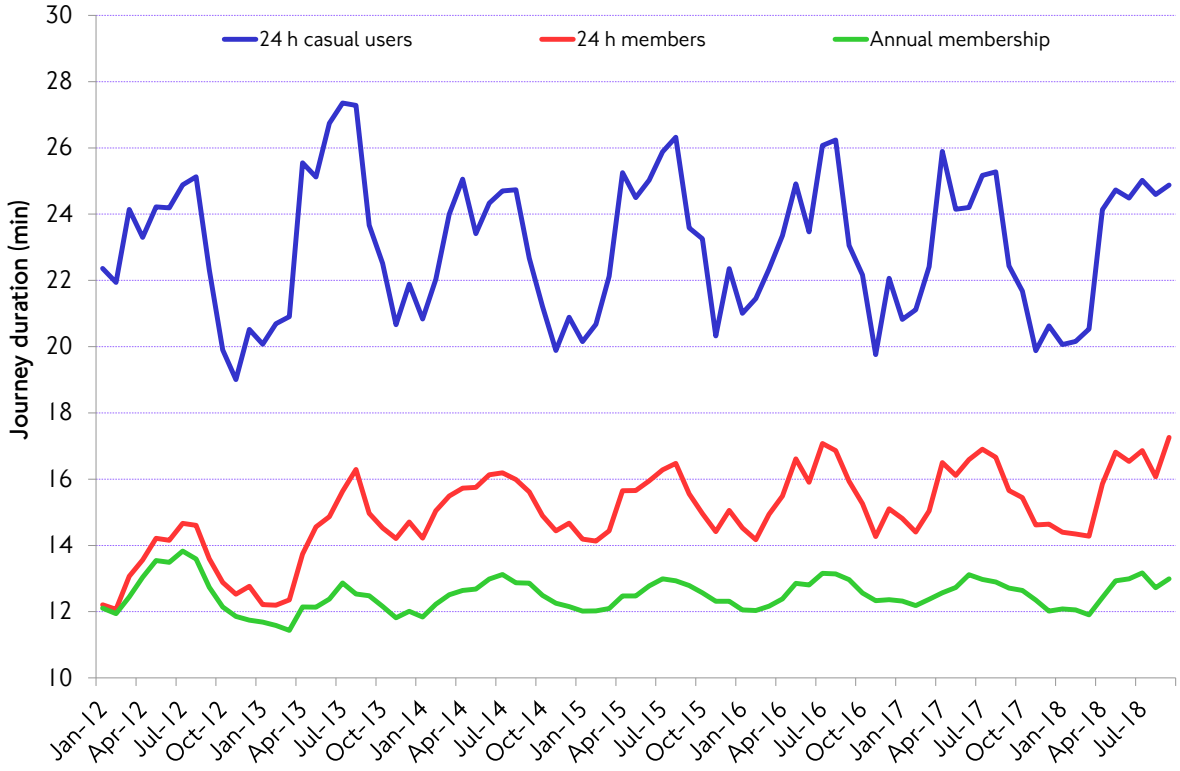


Source: TfL Cycle Hire.

The average hire duration (and its variability) differs significantly depending on user type (figure 5.24). Casual users hire cycles for the longest time period, around 20 minutes in the winter months and 25 minutes in the summer months; followed by registered members at around 17 minutes, and finally users with an annual membership (13 minutes).

Reasons to explain these trends may be that casual users tend to maximise their hire time to get the maximum value for money (especially if they are cycling for leisure) or may tend to be slower and less confident when cycling; while regular users are likely to make familiar journeys and complete them more quickly.

Figure 5.24 Average hire duration by user type per month, 2012-2018.



Source: TfL Cycle Hire.

Demographics and customer attitudes

Apart from a steady and increasing demand, Santander Cycles also scores well in the satisfaction indicators from customer surveys, the last of which was done in summer 2017:

- Overall satisfaction has remained high and currently scores 80 out of 100 for members and 85 for casual users. The recommendation score has also stayed high and is 83 for members and 90 for casual users.
- In 2017, 48 per cent of members stated that Santander Cycles had encouraged them to start cycling in London, and 26 per cent to cycle more.
- The availability of cycles and docking spaces remain the main drivers of the user experience, but ease of use is the main reason quoted by casual users as a factor that makes for a positive experience. On the other hand, value for money and scheme coverage are often mentioned as negative aspects of the scheme.
- The most popular reason for new members to join is health/fitness/lifestyle benefits, whereas speed and convenience are the most cited reasons for casual users to choose Santander Cycles for their last trip.
- Commuting has always been the main journey purpose for members to use Santander Cycles, while casual users mostly use the scheme for leisure. More than 75 per cent of members use the scheme at least once a week, and around 20 per cent of casual users are first-time users.
- The demographic profile of users has remained largely constant since the beginning of the scheme, which is mostly used by young, white men. BAME groups are particularly under-represented among members, and casual users tend to be younger than members and have lower incomes. Casual users have a higher proportion of students, while there

are more full-time workers among members. Some 25 per cent of the casual users live overseas, but most of them (62 per cent) are London residents.
- Over 80 per cent of members agree that the scheme makes a positive contribution to London and that cycling is enjoyable. Some 40 per cent of members agree with the statement that the scheme makes cycling in London safer.

5.5 Focus on: Mini-Hollands

Introduction

Three outer London boroughs – Enfield, Kingston and Waltham Forest – were awarded £30m each as part of TfL's Mini-Hollands programme. The investment aims to help them create a network of cycle routes and transform their local environments into more friendly areas for walking and cycling. Outer London typically has lower levels of walking and cycling compared to inner London and higher levels of car use. This section reviews emerging evidence about the impact of these schemes.

Mini-Holland interventions

More than 90 related schemes have been proposed by the three Mini-Holland boroughs. They include a range of innovative improvements for people who cycle such as redesigned town centres, cycle tracks, and low-traffic neighbourhoods.

The programme aims to benefit the wider community, not just people who cycle. In light of this all three of these boroughs have branded the programmes without mentioning Mini-Hollands in their title and incorporated measures such as pedestrian crossing improvements, public realm enhancements, and pocket parks. In terms of physical infrastructure the three boroughs are focusing on:

- **Cycle Enfield:** protected cycle routes on the A105 Green Lanes and the A1010 Hertford Road. A network of Quietway routes is being designed and implemented, using quiet back streets to link key destinations and corridors. Alongside this, traffic calming and other measures will be used to create Quieter Neighbourhoods. Enfield town centre will be redesigned to make it more pleasant and safer to walk and cycle around. Cycle storage hubs are planned at Enfield Town and Edmonton Green stations.
- **Go Kingston:** the area around Kingston station is being transformed and will link to several high-quality cycling routes, including Portsmouth Road along the river. A new separated cycle route is under construction on Wheatfield Way and will eventually link Kingston to Surbiton. New cycle routes will be developed on Kingston Hill, and between New Malden and Raynes Park.
- **Enjoy Waltham Forest:** there is a focus on neighbourhood measures to reduce motor traffic travelling through local streets and make walking and cycling safer and more appealing in residential areas. A number of cycle routes are planned including a fully segregated route along Lea Bridge Road. The 2.5 mile-long route is due to open in spring 2019 with upgraded bridges, pavements and junctions, and more attractive spaces and trees. Cycle hubs have been introduced for major stations within the borough, including Walthamstow Central, Leyton, Leytonstone and Wood Street.

All three boroughs have complementary programmes to go along with the new physical infrastructure. These include cycle training, cycle roadshows, cycle maintenance courses and residential cycle parking.

The Mini-Hollands programme continues until 2021. Interventions are most advanced in Waltham Forest – at the end of 2017 there were seven miles of new protected space for cycling and four 'Village' schemes with modal filtering. Figures 5.25 and 5.26 show examples of roads closed to traffic (between 10am and 8pm in the case of Francis Road), allowing only people who are walking or cycling to pass through.

Figure 5.25 Francis Road, Leyton – before and after the 'modal filtering' scheme which restricts vehicle access, and provides wider pavements and cycle stands.

Source: Waltham Forest borough.

Figure 5.26 Example of a filtered permeability scheme at a junction in Blackhorse Village, Waltham Forest – before and after.

Source: Waltham Forest borough.

Enfield has the largest geographical area and population, and the lowest baseline levels of cycling. Its first flagship route, along the A105 Green Lanes, opened in March 2018. Kingston had the highest baseline levels of cycling of the three boroughs. A cycle track along Portsmouth Road (shown in figure 5.27) and a one-way cycle track on St Mark's Hill were complete by mid-2017.

Figure 5.27 Portsmouth Road, Kingston – showing the new two-way cycle lane.

Source: TfL.

Who is using the Mini-Holland cycle routes?

TfL commission intercept surveys with people who cycle to give insight into who is using the Mini-Holland cycling infrastructure. 'After' surveys have taken place on the four completed Mini-Holland routes to date:

- Portsmouth Road (Kingston) in 2017
- Leyton to Blackhorse Road (Waltham Forest) in 2017
- Selborne Road to Vallentin Road (Waltham Forest) in 2017
- Green Lanes to Enfield Town (Enfield) in 2018

Most users are people who cycle regularly, with at least half of respondents surveyed on routes in the three Mini-Holland boroughs stating that they cycle on five or more days a week. A further one-quarter of respondents cycle three or four days a week. Around half of people cycling said they were cycling 'about the same' amount at the time of the follow-up survey compared to the previous year. A further 40 to 50 per cent said they were cycling a little or a lot more compared to the previous year. When asked why they were cycling more, the main reasons were to get fit/keep fit and because cycling is enjoyable. Around ten per cent said that better/more cycling infrastructure was the main reason for cycling more.

Around one in five respondents are relatively new to cycling, having started cycling in London within the last one to five years. Most respondents said they feel confident cycling on most roads (79 per cent in Enfield and Kingston and 64 per cent in Waltham Forest). Whilst some

users said their confidence level as a cyclist had increased in the last 12 months, over 60 per cent said there was no change.

Most recorded trips were for commuting, with the other main journey purposes being for pleasure/exercise rather than to get to a destination, for shopping, or to get to a leisure activity. In terms of why people choose to cycle that specific route, speed and safety were the top reasons given by Mini-Holland users.

Satisfaction with the Mini-Holland cycle routes

There was high awareness of the changes to the Mini-Holland routes, with most respondents stating they were aware of changes to their route: 88 per cent in Kingston, 77 per cent in Enfield, and 69 per cent in Waltham Forest. In terms of attitudes towards the improvements, more than half of respondents said the quality of their journey has improved since the upgrade. In addition around three-quarters said the changes would encourage new people to use the route.

Users of the completed routes seem satisfied with their experience. Over 65 per cent of Mini-Holland users rated their route as quiet or very pleasant, with the highest score for Portsmouth Road in Kingston (77 per cent). Most respondents on the cycle routes in Enfield and Waltham Forest felt safe for all or most of their surveyed journey (63 per cent and 69 per cent), rising to 80 per cent on Kingston's Portsmouth Road cycle route.

When comparing baseline and after surveys, satisfaction with the routes has increased notably. Users scored the routes most highly for availability of space for people cycling. In Kingston and Waltham Forest the greatest improvements in satisfaction were in relation to the volume of traffic. Across all three boroughs, there was increased satisfaction with the helpfulness of signage and markings and the ease of navigating junctions.

Understanding changes in travel behaviour and attitudes amongst Mini-Hollands residents

TfL worked with the University of Westminster to establish a longitudinal survey of residents living in the Mini-Holland boroughs (intervention sample) and a control group from the rest of outer London. Survey respondents came from three sources: a new random household-based sample, TfL's Oyster database of public transport users, and TfL's database of people who had registered for cycling-related news. More details about the methodology and results can be found in the study's first academic paper, published in Transportation Research A (Aldred et al, 2018: https://doi.org/10.1016/j.tra.2018.05.018).

The survey aim is to see if and how travel behaviour and attitudes to transport and the local environment change over time as a result of the Mini-Hollands investment. Three online surveys have been completed so far:

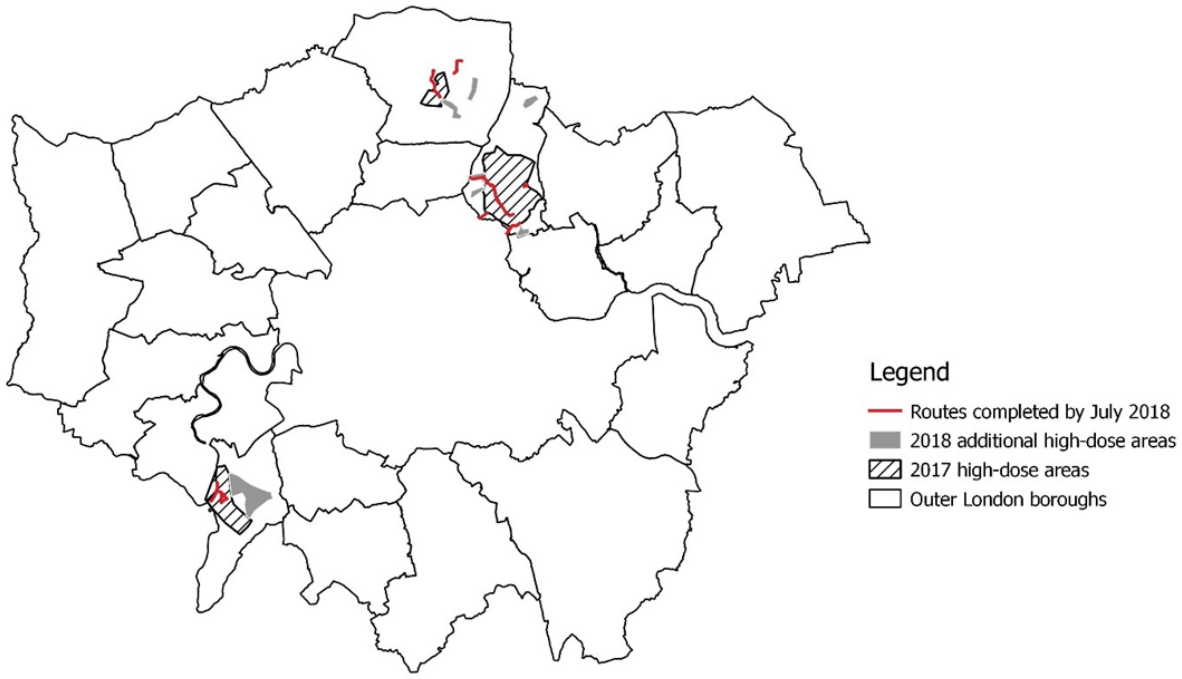
- Baseline survey in May-June 2016 = 3,435 participants
- Wave 1 in May-June 2017 = 1,712 participants
- Wave 2 in May-June 2018 = 1,610 participants

Research questions

Due to the long timescale of the Mini-Holland programme, the intervention sample was subdivided into two groups. This allowed comparison of those living in 'high-dose neighbourhoods' where Mini-Holland interventions had been implemented, versus 'low-dose neighbourhoods' where such improvements had not (yet) been made at survey follow-up time points.

Borough officers identified 'high-dose' areas at stakeholder meetings in October 2016 and October 2017, by marking on a map where they thought residents were likely to have been affected by interventions by the time of the first and second survey waves. Figure 5.28 shows the size of the high-dose areas and routes completed by July 2018. The high-dose areas covered a far wider area in Waltham Forest than in the other two boroughs. This reflects the more developed nature of the programme in Waltham Forest at the time of the survey and their focus on neighbourhood-based schemes in the southern and central parts of the borough.

Figure 5.28 Map showing high-dose areas within the Mini-Holland boroughs, and the routes completed by July 2018. The rest of outer London was used as the control group.



Source: Aldred et al (2018).

After the second wave of the survey (May-June 2018), the researchers also looked at behaviour change in relation to objective measures of intervention proximity. Specifically these were flagship cycle routes (as shown in figure 5.28), and whether each individual lived in a neighbourhood that had been 'modally filtered' using interventions to restrict the movement of through-motor traffic in the area.

Research findings

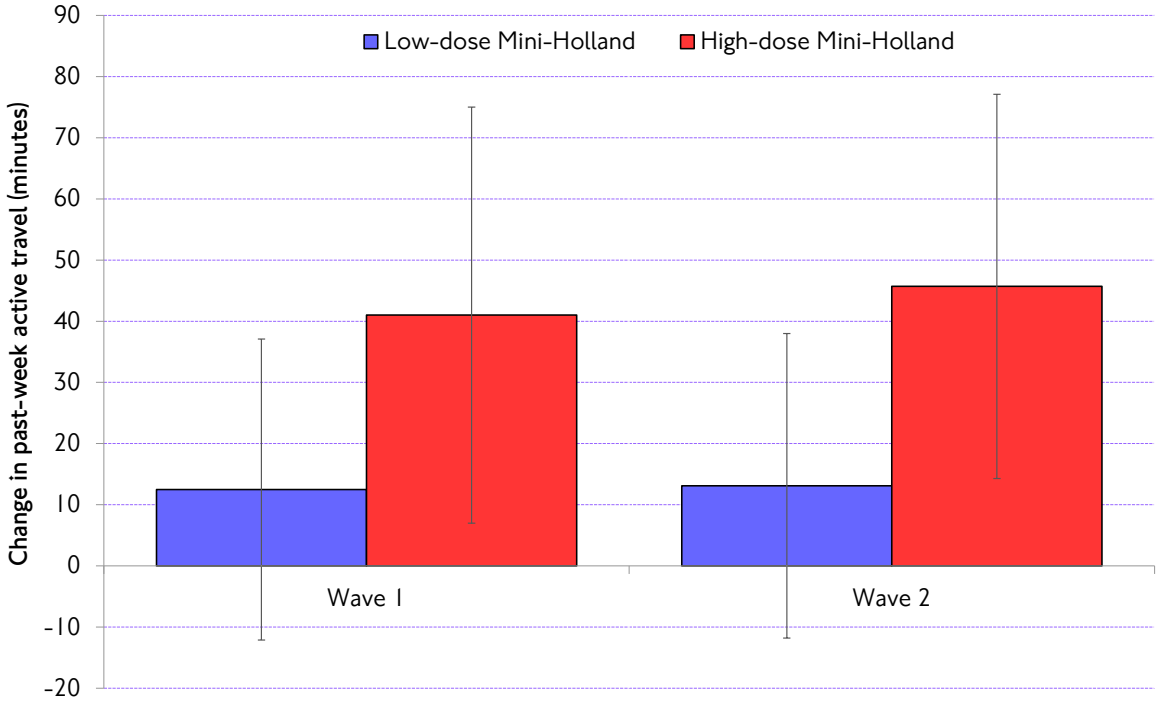
The sample was well-balanced in terms of gender but compared to the background population there was under-representation of 16-24-year olds, non-white individuals, and individuals not in employment. This means we should not take, for example, views about local areas as being statistically representative of outer Londoners in general. However, this demographic skewing was similar in the Mini-Holland and control groups, giving confidence

that comparisons between the groups (including in relation to changes year-on-year) are robust.

Findings: Travel behaviour

At the heart of the survey is a travel diary, asking people about trips they made in the past week. Both Wave 1 and 2 showed an increase in time spent travelling actively relative to the Baseline among those living in areas which have seen substantial changes in walking and cycling infrastructure through Mini-Holland interventions. Figure 5.29 shows that living in a 'high-dose' area was associated with increased past-week active travel, compared to the control group of other outer London boroughs: 41 minutes extra in Wave 1, and 44 minutes extra in Wave 2. Changes in the control areas are set to zero to enable comparison.

Figure 5.29 Change in minutes spent travelling by walk or cycle in Waves 1 and 2 compared to Baseline.



Source: TfL and University of Westminster results from Longitudinal survey, 2018.
Note: The chart shows 95 per cent confidence intervals. The chart controls for demographic differences between areas which might affect changes in active travel.

As well as more time being spent travelling actively, there was evidence of increased participation in walking or cycling (ie not just an increase in walking or cycling among people who already walk or cycle). At both Wave 1 and Wave 2 there was a trend to increased participation in cycling (24 per cent in Wave 1) but this only reached statistical significance in Wave 1. For walking, this was the other way around with a trend to increased participation reaching statistical significance only in Wave 2 (among people living closer to a Mini-Holland route).

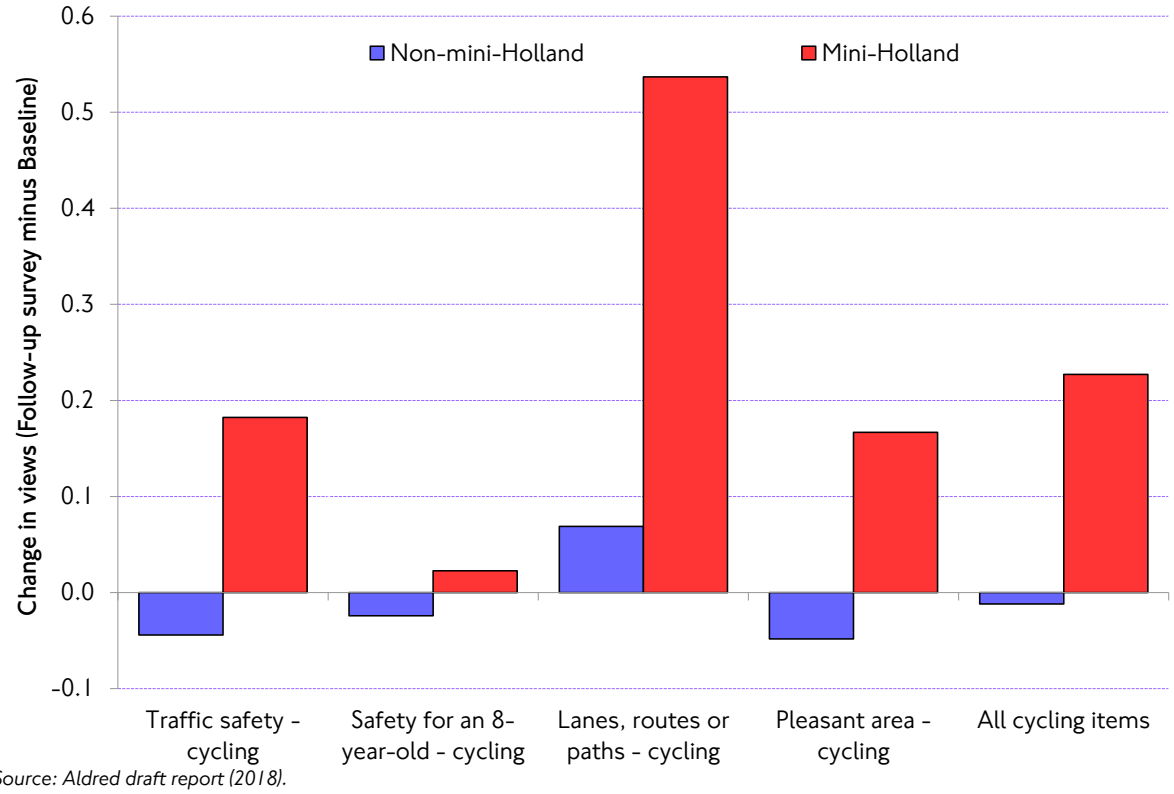
In Wave 2, there was a non-significant trend towards a decrease in time spent driving associated with proximity to Mini-Holland interventions. For likelihood of any past-week car or van use, there was a statistically significant decline associated with living in Waltham Forest. This proved to be linked to modal filtering, whereby roads are closed to motor traffic to restrict movement through the area. Compared to the control areas, people living in neighbourhoods that had been modally filtered by Wave 2 were 20 per cent less likely to

have used a car at all in the past week. Again compared to the control areas, people living in these areas spent less time (39.5 minutes in the past week) in the car.

Findings: attitudes to the local environment

Respondents were asked to what extent they agreed or disagreed with 14 statements to give a general 'local environment perception' score. Four of the statements were about cycling, and ten were about wider non-cycling items. In both Wave 1 and 2 there was evidence that more people living in a Mini-Holland borough had positive attitudes towards their local neighbourhood, in relation to cycling items. The largest changes between baseline and Wave 2 results were for whether there were 'lanes, paths or routes for cycling' as shown in figure 5.30. There was no consistent evidence of changes in the non-cycling items.

Figure 5.30 Change in attitudes to local environment cycling items between baseline and Wave 2.



Source: Aldred draft report (2018).

Findings - attitudes to investment in cycling

One topic with notable differences between the intervention and control groups was views about investment in cycling. In both Waves there was growth in the perception that 'too much' money is spent on cycling in intervention areas, but not control areas. In all the Mini-Holland boroughs, these changes were statistically significant between the baseline and Wave 1 and 2 surveys. The perception of the schemes as cycling-focused contrasted with the travel behaviour evidence showing an increase in walking greater than that found for cycling.

In the control group around 40 per cent of respondents said there was insufficient investment in cycling, and a further 20 per cent said it was 'about right'. By contrast, in Mini-Holland boroughs, at Baseline only 28 per cent said there was 'too little' institutional support for cycling; declining to 20 per cent in Wave 1 and to 19 per cent in Wave 2. At Baseline in

Mini-Holland boroughs, 27 per cent said there was 'too much' investment in cycling, which grew to 33 per cent in Wave 1 and 36 per cent in Wave 2.

Summary of findings

Overall, findings in both Waves suggest that the Mini-Holland schemes are having a measurable impact on active travel behaviour and perceptions of the local environment for encouraging active travel. Mini-Holland status (particularly being in the high-dose area) was associated with increased use of active travel at both Wave 1 and Wave 2. Mini-Holland status was associated with increasingly positive perception of the local cycling environment, and therefore a more positive overall perception of the local environment. Finally, Mini-Holland status was associated with increased likelihood of saying that too much money is being spent on cycling, and decreased likelihood of saying too little is spent. These more mixed views in Mini-Holland boroughs might reflect the widespread awareness and controversy surrounding the schemes in some areas.

5.6 London's developing cycle network

Since its formation in 2000, TfL has been working with London boroughs and other partners to improve London's cycle facilities, starting with the London Cycle Network (LCN) and London Cycle Network + (LCN+), then the cycle hire scheme and the first generation of Cycle Superhighways, and more recently the second generation of Cycle Superhighways and first phases of Quietways and Mini-Hollands. London's combined Superhighway and Quietway network is now more than 140km long.

The Healthy Streets Approach includes the continued expansion of London's network of quality cycle routes as part of wider changes to make streets more welcoming and accessible on foot, cycle and public transport. TfL's most recent Business Plan set out a Healthy Streets investment portfolio that committed investment to increase provision for cycling in London, alongside improvements for walking, safety and bus reliability. This planned infrastructure should triple the proportion of Londoners living within 400m of one or more of these cycle routes to around 28 per cent by 2024, from the current value of 8.8 per cent.

5.7 Walking in London

Introduction – TfL's Walking action plan

TfL published its Walking action plan for London in July 2018 (http://content.tfl.gov.uk/mts-walking-action-plan.pdf). This set out a programme to facilitate and encourage increased walking in London, as an essential component of achieving the Mayor's overall transport vision. The action plan set out a range of data characterising how people currently use walking as a mode of travel in London, and identified several areas where better data are required in order to target policies most effectively. The overarching framework for the Walking action plan is the application of the Healthy Streets Approach, which is further described in chapter 6 of this report.

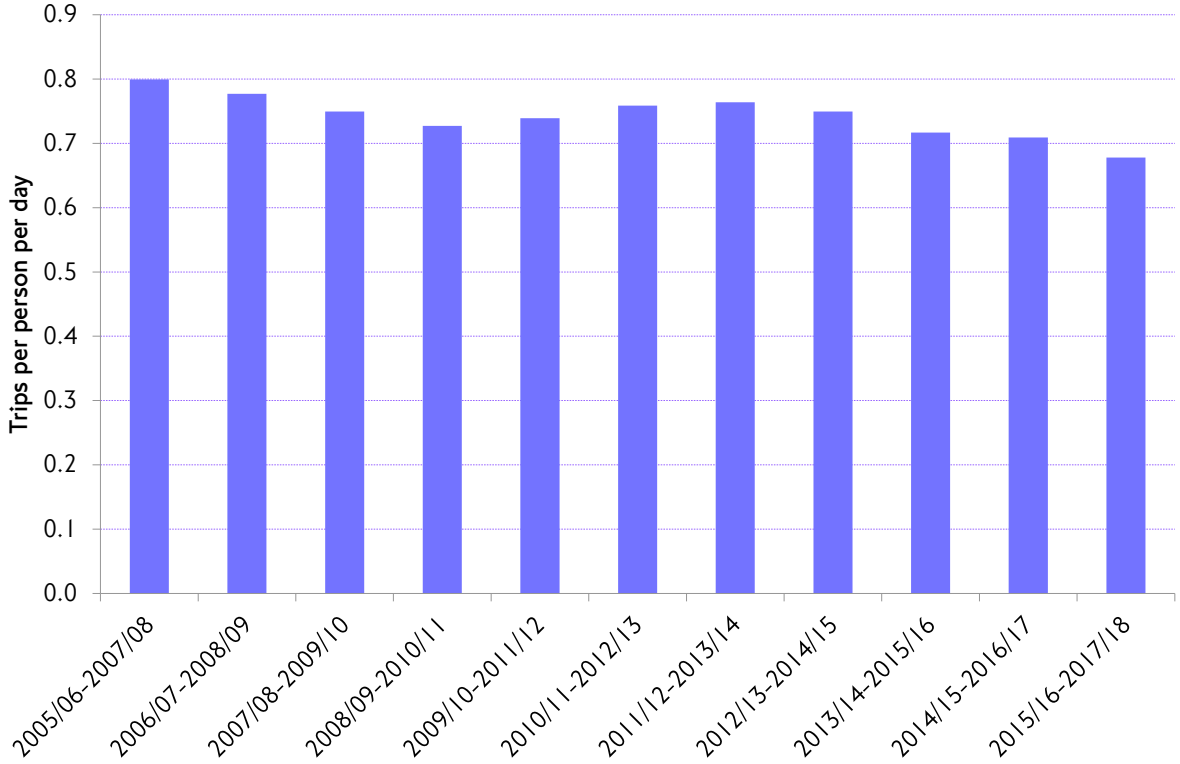
Updating the evidence base – walk trip rates

On an annual average day, based on data from the 2017/18 LTDS survey, London residents make 5.1 million walk-all-the-way trips, and 23.1 million walk journey-stages, where people walk for a component of a longer trip made by another mode, for example walking to and from stations as part of a rail trip.

A different way of looking at walking is in terms of per-person walk trip rates, which measure the average number of walk trips undertaken by Londoners on an average day (figure 5.31).

Over the past ten years walk trip rates have tended to fall slowly but consistently, reaching 0.7 walk trips per day in the last couple of years.

Figure 5.31 Trend in walk trip rates (average number per resident aged 5+ per day), three-year rolling average, 2005/06-2017/18.

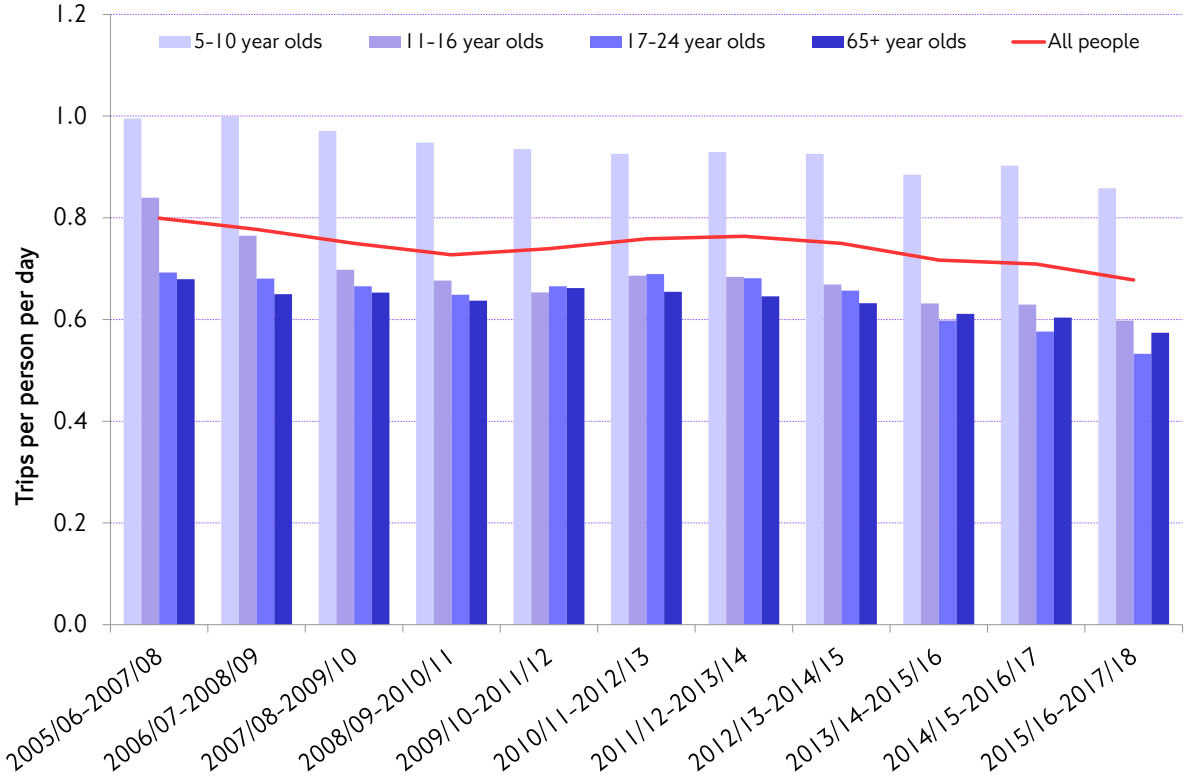


Source: Strategic Analysis, TfL City Planning.

Updating the evidence base – socio-demographic variation in walking

More useful than looking at averages is to understand the variation in these statistics between different groups. The Walking action plan particularly focuses on children and the physically inactive. Figure 5.32 compares average daily walk trip rates across various age groups within the general population.

Figure 5.32 Comparison of walk trip rates by age group using a three-year rolling average, 2005/06-2017/18.

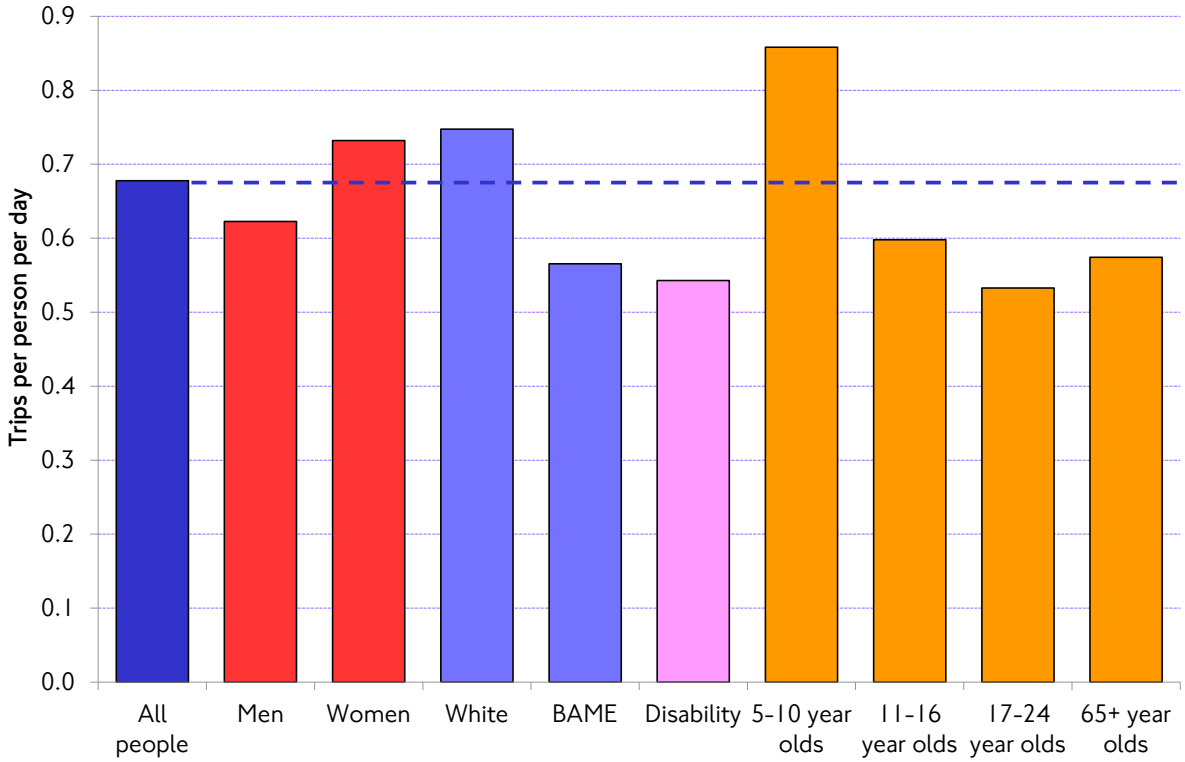


Source: Strategic Analysis, TfL City Planning.
Note: This shows only trips with an Origin and / or Destination in London, excluding summary shopping trips.

The figure shows that walk trip rates for different age groups have followed a similar pattern between 2005/06 and 2017/18 – levelling off in the early 2010s and typically decreasing from 2013/14. The only notable exception is a sharp fall in walk trip rate for secondary age school children (11-16 years) between 2005/06 and 2009/10. This is likely to reflect the introduction of the Zip Oyster photocard in June 2008 which provided free bus and tram travel for people under 18 years of age in full-time education. Despite the fall in walk trip rates, a detailed study of the impact of the introduction of free bus travel found that there were many health and social benefits for young people and it resulted in children walking the same amount as they had done before (through walking stages as opposed to trips).

Walk trip rates have been consistently higher for 5-10 year olds compared to the population average. Walk rates have typically been lowest for people aged over 65 years, but in recent years levels of walking amongst older people have fallen at a slower rate than walking amongst 17-24 year olds. This young adult group have seen walk trip rates fall by 22 per cent between 2011/12 and 2017/18, and they now make just 0.5 walk trips per day, compared to the all person average of 0.7 walk trips per day.

Figure 5.33 Comparison of walk trip rates across a range of demographic groups for latest three years, 2015/16-2017/18.

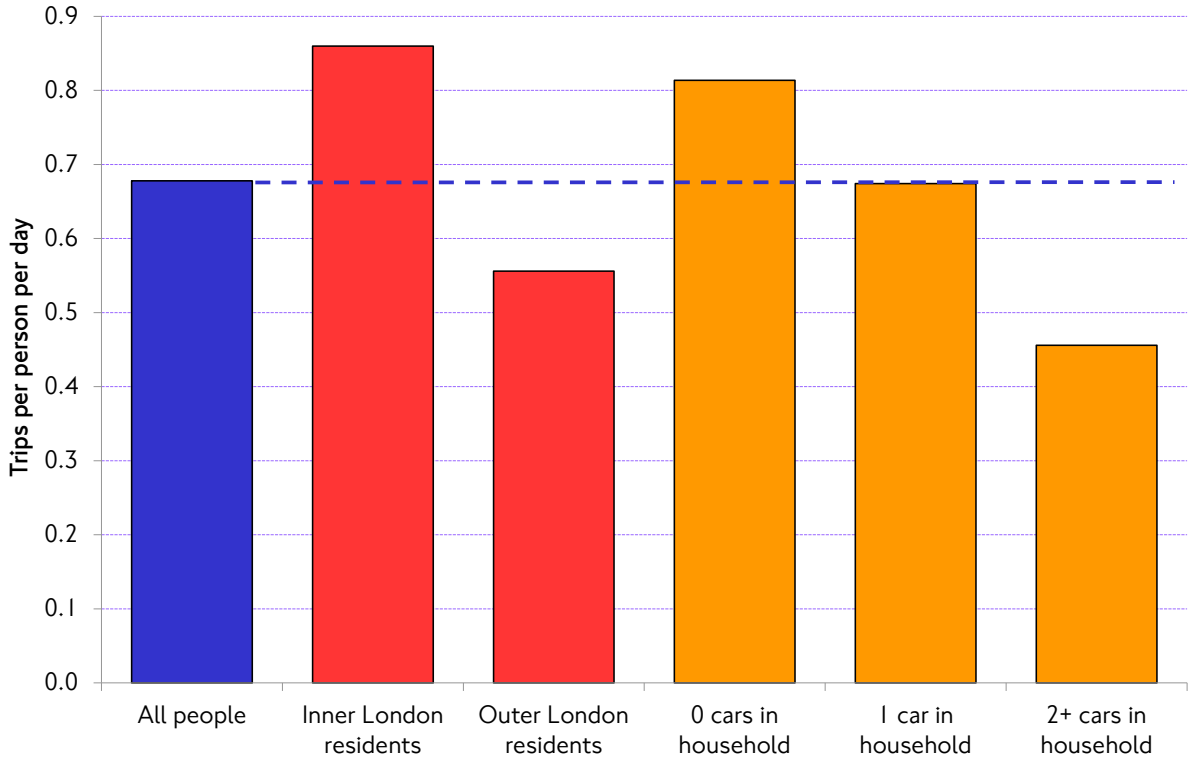


Source: Strategic Analysis, TfL City Planning.

Looking at an average of the latest three years' data in more detail, it is clear that levels of walking vary by demographic group. Walk trip rates are below the London average for groups from minority backgrounds, with lower levels of walking amongst disabled people and black, Asian and minority ethnic people (figure 5.33).

It is also known that attributes such as car ownership, residential location and working status are related to different levels of walking. Figure 5.34 shows that higher levels of walking are found amongst inner London residents and people who live in households without a car. People who do not have access to a car in their household make, on average, 0.81 walk trips per day, compared to 0.67 for those with one car, and just 0.46 walk trips per day for those with two or more cars. Car ownership levels are higher in outer London so these two factors are related to each other.

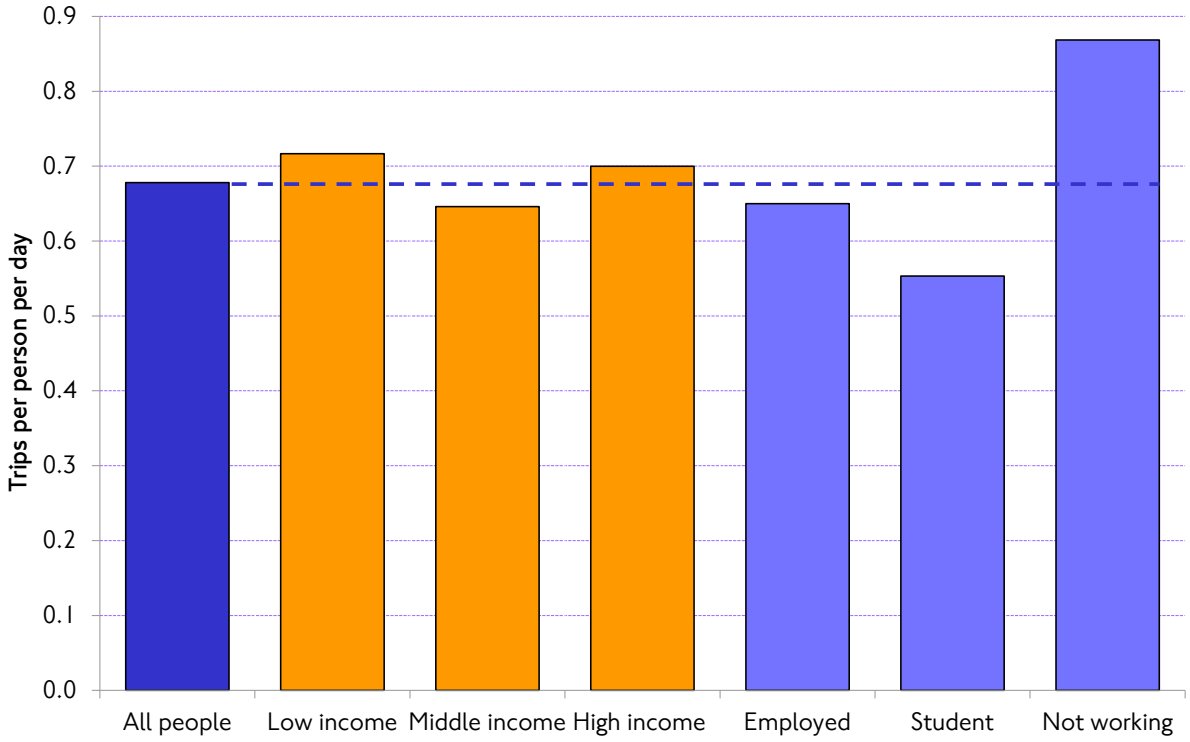
Figure 5.34 Comparison of walk trip rates by home location and whether there is access to a car in the household, latest three years' data, 2015/16-2017/18.



Source: Strategic Analysis, TfL City Planning.

There is less variation in terms of walk trip rates related to household income, with average walk trip rates staying near to the London average of just under 0.7 walk trips per day. Working status appears to have a bigger impact on levels of walking, with more walking per day by those who are not working. This 'not working' group aims to reflect those who are not working for an employer, but is a varied group including those who are seeking work, those unable to work and people looking after family/home. Students have lower than average walk trip rates, probably reflecting the lower levels of walking seen amongst teenagers and young adults in figure 5.33 above.

Figure 5.35 Comparison of walk trip rates by household income and employment status, latest three years' data, 2015/16-2017/18.



Source: Strategic Analysis, TfL City Planning.

5.8 New survey of walking in central London

The need for better measurements of walking in London

Measuring walking through travel-diary-based surveys such as LTDS (above) has several limitations. Foremost among these are limitations to the accuracy with which respondents recall the exact details of these trips, with a known tendency to under-report or miss very short or (what might be deemed, by the respondent) to be 'inconsequential' walk trips, such as short trips from the office at lunchtime to the sandwich shop 'next door', or a more lengthy walk between shops or services in the 'same' town centre.

Furthermore, there are uncertainties around the reporting or derivation of exact distances and duration of (particularly) shorter walk trips or stages, which inevitably leads to inaccuracies, albeit probably consistent ones overall, in the reporting of the key physical activity measure. Then there are sampling limitations, leading to inaccuracies in attempts to examine spatial patterns in walking density. Finally, LTDS only surveys London residents, yet (particularly in central London) non-resident visitors (commuters and tourists) make up a substantial proportion of the daytime population. Although these limitations are common to most surveys of this type and are present even where (as in LTDS) stringent efforts are made to minimise them, they mean that the actual amount of walking tends to be under-estimated, and many of the key statistics have uncertainties that limit their usefulness for tracking relatively small changes.

Travel in London report 10 outlined TfL's broad plans for a new survey of pedestrian populations (as a best proxy indicator for walking) in central London. This survey has now

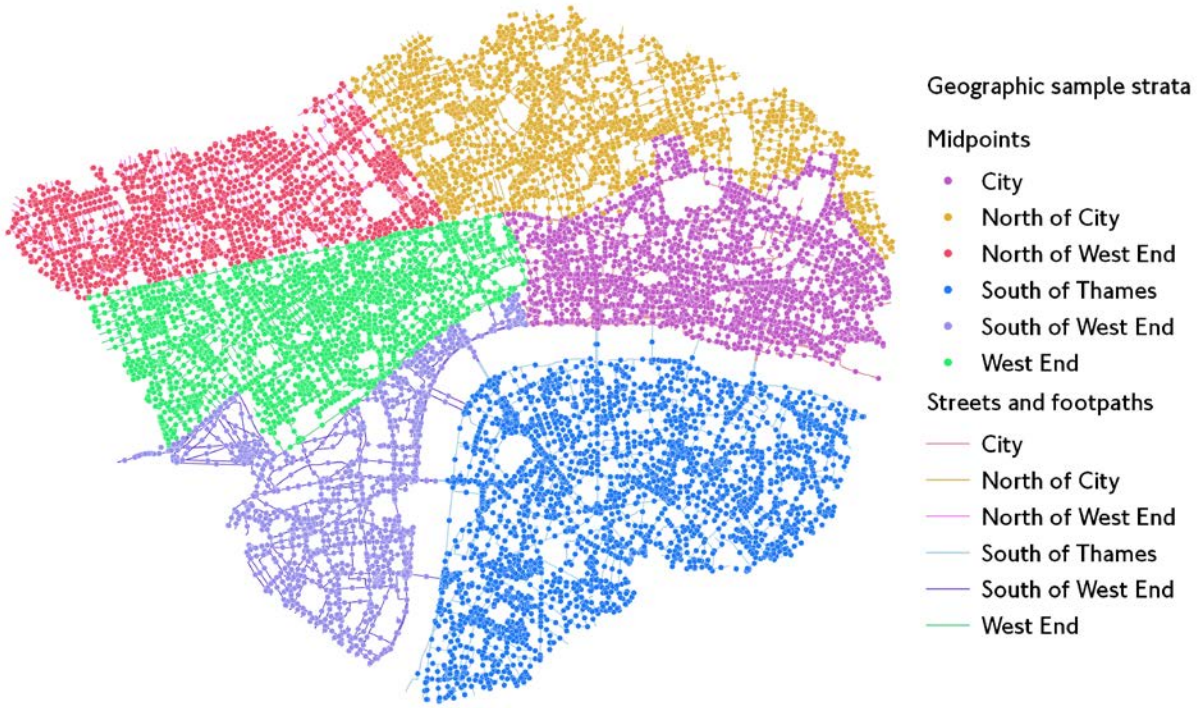
commenced and will report first data in 2019. This section gives a brief description of the survey and the kind of outputs that can be expected.

New survey of pedestrian populations in central London

The survey is designed to measure changes in walking in central London on a quarterly basis. Fieldwork commenced in October 2018, with the first available quarter of data being for quarter 3 2018/19.

Each quarter, 600 sites will be surveyed between 6am and 8pm for a two hour period, with the same panel of sites repeated each quarter. For the survey, central London is defined as the area within the Congestion Charge zone, and has been divided into six geographical areas (figure 5.36). There will be 100 sites surveyed within each geographical stratum.

Figure 5.36 Six geographical sample strata.



Source: Strategic Analysis, TfL City Planning.

Within each geographical area, each street has been classified according to a streets classification (figure 5.37), with 20 sites sampled from each of the five categories. The survey should provide representative 'average day' volumetric indicators of the numbers of pedestrians in central London, alongside robust geographical, street type and temporal stratifications.

Figure 5.37 Five street types.

Source: Strategic Analysis, TfL City Planning.

6. Healthy Streets and healthy people

6.1 Introduction

The Healthy Streets Approach is central to the Mayor's vision to create a better city for all Londoners. It is an overarching framework for the design and management of London's streets, incorporating measures to encourage walking, cycling and use of public transport, to reduce road danger, tackle poor air quality, reduce car dependency, improve the environment and deliver an accessible and inclusive transport system. The Healthy Streets Approach is intended to improve Londoners' experiences of the Capital's streets, helping everyone to be more active and to enjoy the health benefits that this brings.

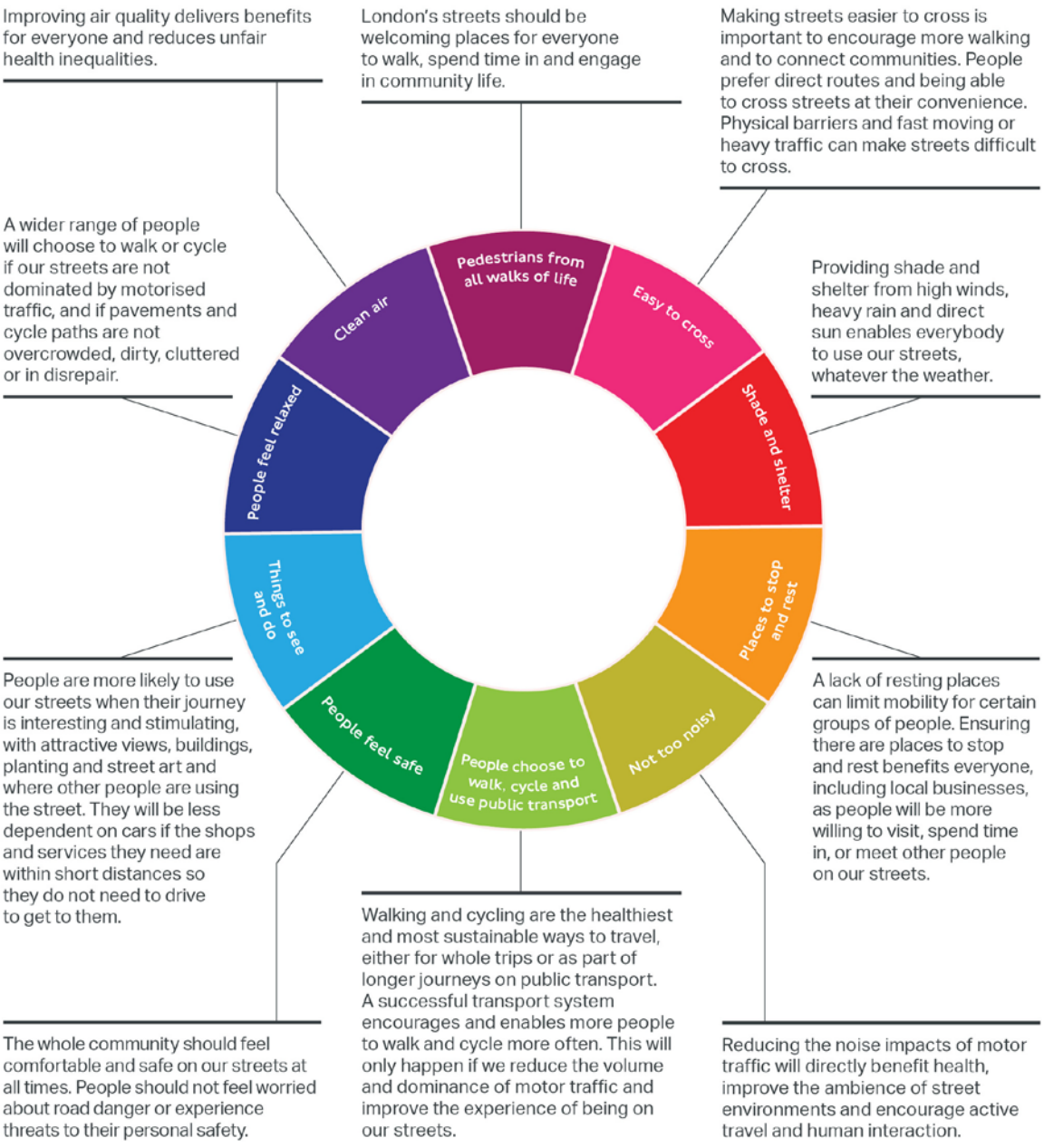
The Healthy Streets Approach also has wide applicability, including implications for the development of the wider public transport system to encourage active, efficient and sustainable travel, and for the planning of transport for new developments, homes and jobs.

This chapter sets out a range of evidence that will assist in framing these policies. London's streets provide an opportunity for people to stay active. Their design and management can facilitate walking and cycling, and reduce the impact of motorised traffic on people's health and wellbeing. Most journeys made by Londoners start, end or happen entirely on our streets. To enable these streets to support people living well, we need them to support people walking, cycling, using public transport and spending time on streets so both individuals and the city can benefit. The Healthy Streets Approach provides a framework to inform our decision making – in our own schemes, our relationships with the boroughs, and our role in planning for London's growth. More details on this Approach and how it is being taken forward in terms of strategic and local planning in London can be found at: https://tfl.gov.uk/corporate/about-tfl/how-we-work/planning-for-the-future/healthy-streets.

6.2 The Healthy Streets Indicators

There are 10 Healthy Streets Indicators (figure 6.1), which summarise the essential elements that make a street an inclusive and healthy environment. To deliver these 10 Indicators a wide range of measures can be needed. One of the best ways to assess the health of a street is to spend time on the street, observing how it looks and feels, and how it is being used by people. However, the Indicators can be assessed through more formal quantitative measures as well.

Figure 6.1 The 10 Healthy Streets Indicators.



Source: Lucy Saunders, Mayor's Transport Strategy.

6.3 Contribution of each of the 10 Indicators

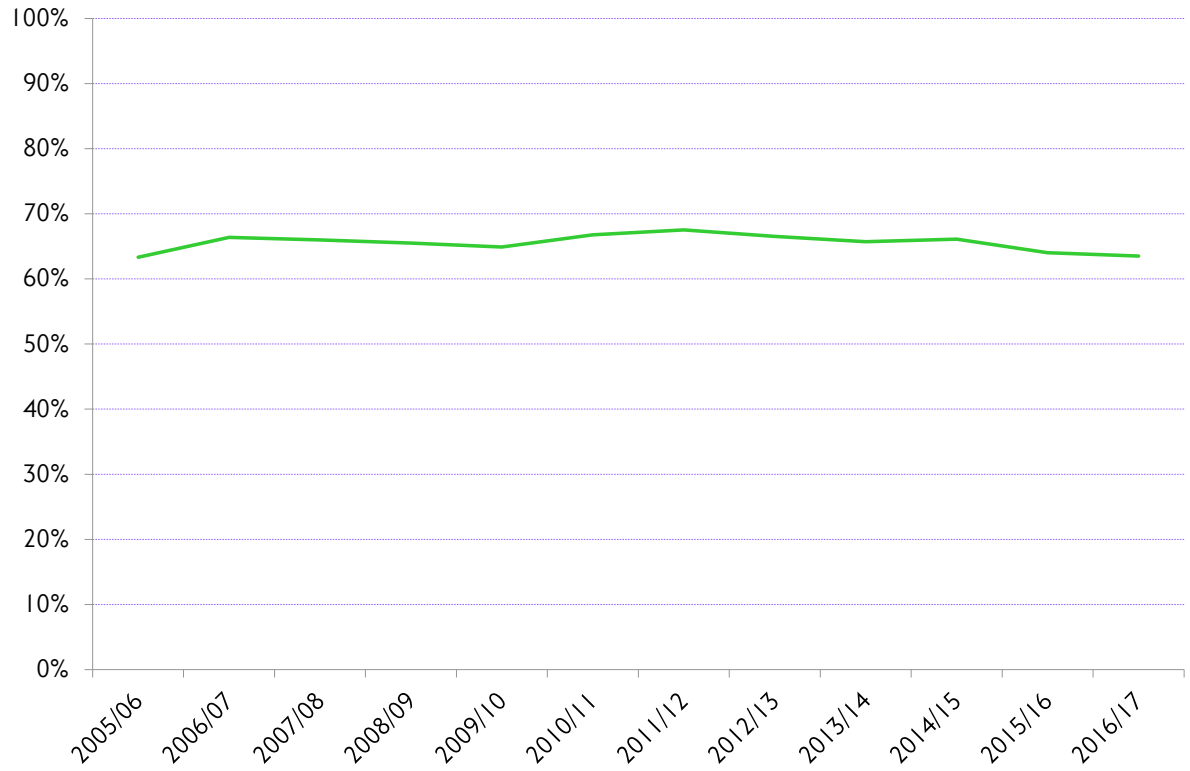
There are a number of different ways to quantitatively measure the 10 Healthy Streets Indicators; each has its strengths and weaknesses. Ideally, we would use a mix of methods to get a rounded picture of how streets are performing. At present we have limited data for describing each Indicator at a London-wide level. Our new Healthy Streets Mystery Shopper Survey (see section 6.4 of this report) and new walking and established cycle counts (see sections 5.8 and 5.3 of this report) will be very helpful for building a richer picture. The following sections summarise the contribution of each of the 10 Indicators in turn.

Pedestrians from all walks of life

The best test of a Healthy Street is whether there are people reflecting the full diversity of society on the street. Streets should be inviting for everyone to spend time and make journeys on foot, cycle or by public transport. Social norms influence active travel; people are more likely to walk and cycle when they see others doing the same.

Figure 6.2 shows that the proportion of London residents who report having walked for at least one minute on the previous day, ie having at least made it out onto the street on foot, has remained consistently around 65 per cent since our reporting began in 2005/06. This means that routinely 35 per cent of Londoners either do not leave their home or travel exclusively by modes that involve not even one minute of walking eg door to door car travel on a given day.

Figure 6.2 Proportion of London residents (aged 11+) who report walking for at least one minute on survey day, 2005/06-2016/17.



Source: Strategic Analysis, TfL City Planning.

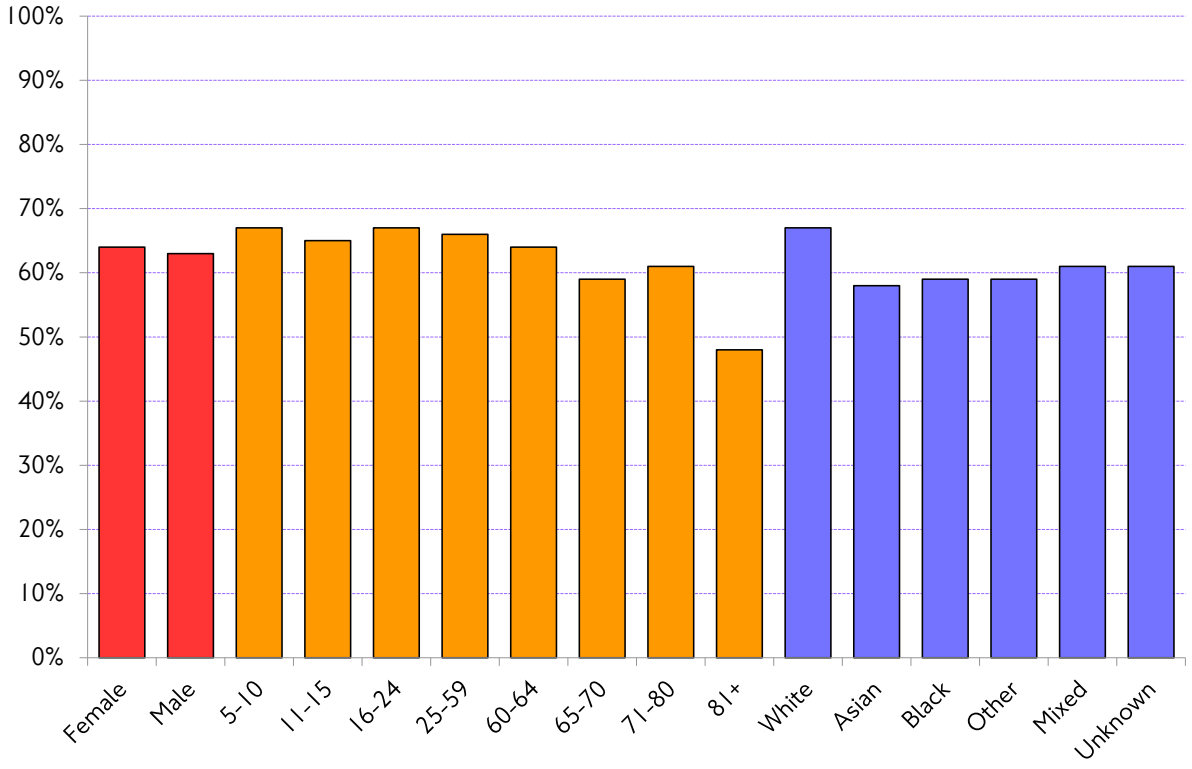
This suggests that London's streets are either not welcoming or not accessible for a proportion of the population. Further analysis of who reports having walked for at least one minute on the previous (survey) day shows there is little difference between different demographic groups. This is positive as it shows the streets are generally accessible for different kinds of people. There is almost no difference between genders and across age groups up to and including 80 years. Adults over the age of 80 years make up a very small proportion of the London population but they are significantly less likely to have left their home on the previous day (48 per cent) compared with young adults aged 16-24 (67 per cent).

Most ethnic groups report close to 60 per cent having walked for at least one minute on the previous day but white Londoners, who make up a much larger group, report higher levels (67 per cent). There is a significant difference in likelihood of having walked the previous day

between people who do not report a disability that affects their mobility (65 per cent) and disabled people (43 per cent). There will be some overlap between the disabled and elderly population but this suggests these groups find the street environments less accessible or attractive.

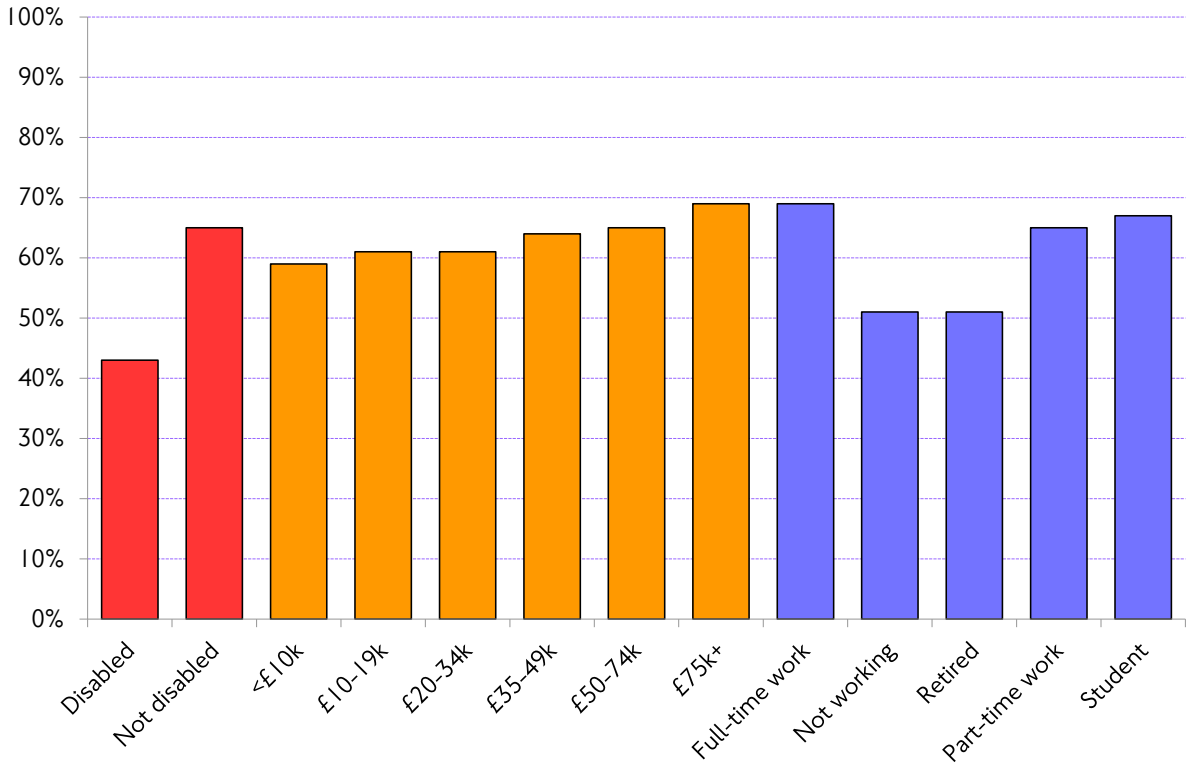
People having high household incomes (over £75,000) are the most likely to have walked for at least one minute on the previous day (69 per cent), suggesting some inequality across income groups, although values for the lowest household income groups are only 10 percentage points lower (59 per cent). People who are not working or retired (at 51 per cent) are less likely to have walked on the previous day compared with people in full (69 per cent) or part time (65 per cent) employment or studying (67 per cent).

Figure 6.3 Proportion of London residents who report walking for at least one minute on survey day by gender, age, and ethnicity.



Source: Transport Strategy, TfL City Planning.

Figure 6.4 Proportion of London residents who report walking for at least one minute on survey day by disability status, income, and employment status



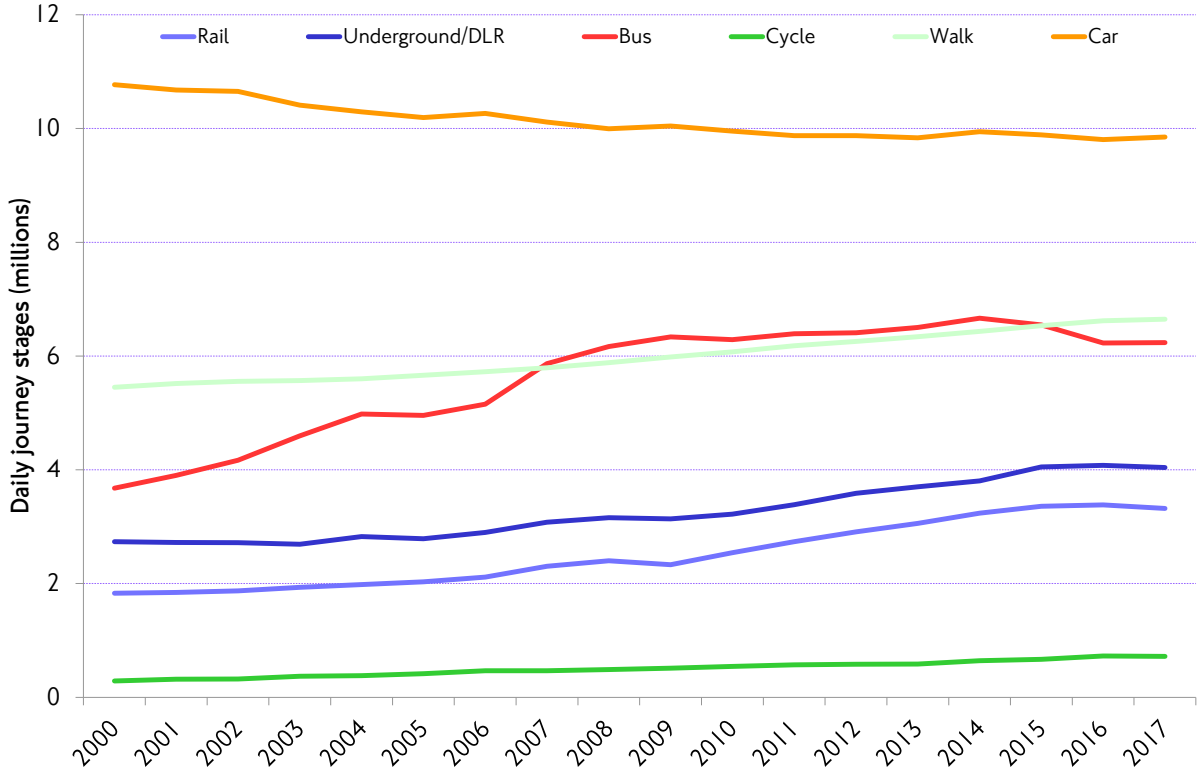
Source: Transport Strategy, TfL City Planning.

People choose to walk, cycle and use public transport

Walking, cycling and using public transport should be the most attractive ways to travel in urban areas. Making them more enjoyable will benefit everyone, including those already walking, cycling or using public transport. People walk and cycle on almost every street in London and do not always have an alternative travel option. This means even the streets with the heaviest traffic must be made more attractive to walk and cycle.

London has seen a steady mode shift to public transport use. Since 2000, overall public transport demand (journey stages) has grown by 63 per cent. In the same period, cycling has increased by an average of 5.7 per cent each year and walking has risen by an average of 1.2 per cent annually, although this is largely thought to have reflected population growth over the period. Figure 6.5 shows the growth in rail, Overground, Underground and bus demand over this period. Walk and cycle journey stages have also grown modestly, cycling from a low base and walking from an already high level. This is likely to be at least partly linked to growth in public transport use as most public transport journey stages are associated with at least one walk stage. Car use has declined but remains the dominant mode of transport in London (10 million journeys stages each day).

Figure 6.5 Long-term trends in key modes of transport, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

Clean air

Improving air quality benefits everyone while also helping to reduce health inequalities. Citywide measures are needed to improve overall air quality but there are also local actions that can be taken, for example the Low Emission Bus Zones described in section 8.3 of this report. Anything that significantly reduces that volume of traffic on the road or reduces the number of high polluting vehicles will help improve local air quality and will contribute to citywide measures. Across London air quality has been improving over recent years and the forthcoming Ultra Low Emission Zone (ULEZ) and related initiatives will improve it further.

Easy to cross

Streets without suitable crossing facilities make walking and cycling less appealing. They can be a significant barrier to some people travelling on foot or by cycle. The types of crossing needed will vary, but on all streets it should be easy for people of all ages and abilities to find a safe place to cross without having to go out of their way. Two-thirds of Londoners tell us that they are satisfied with the number of traffic lights for pedestrians.

At present we do not have a good objective measure to capture the ease of crossing streets London-wide. Most streets in London are local streets which do not require traffic light controlled crossing points and it can be challenging to assess how different people find the ease of crossing these streets. However, some 66 percent of London residents tell us their local streets are easy to cross.

TfL has responsibility for all London's traffic signals and in 2017, TfL reduced the wait times for people walking at 200 crossing locations close to schools, hospitals and transport hubs. Of the 200 reviewed crossings to date, 94 per cent now run a cycle time of less than one minute, meaning that if a person walking was to arrive just as the red signal for pedestrians

came on and traffic was given a green light, they would wait for around 40 seconds or less to cross.

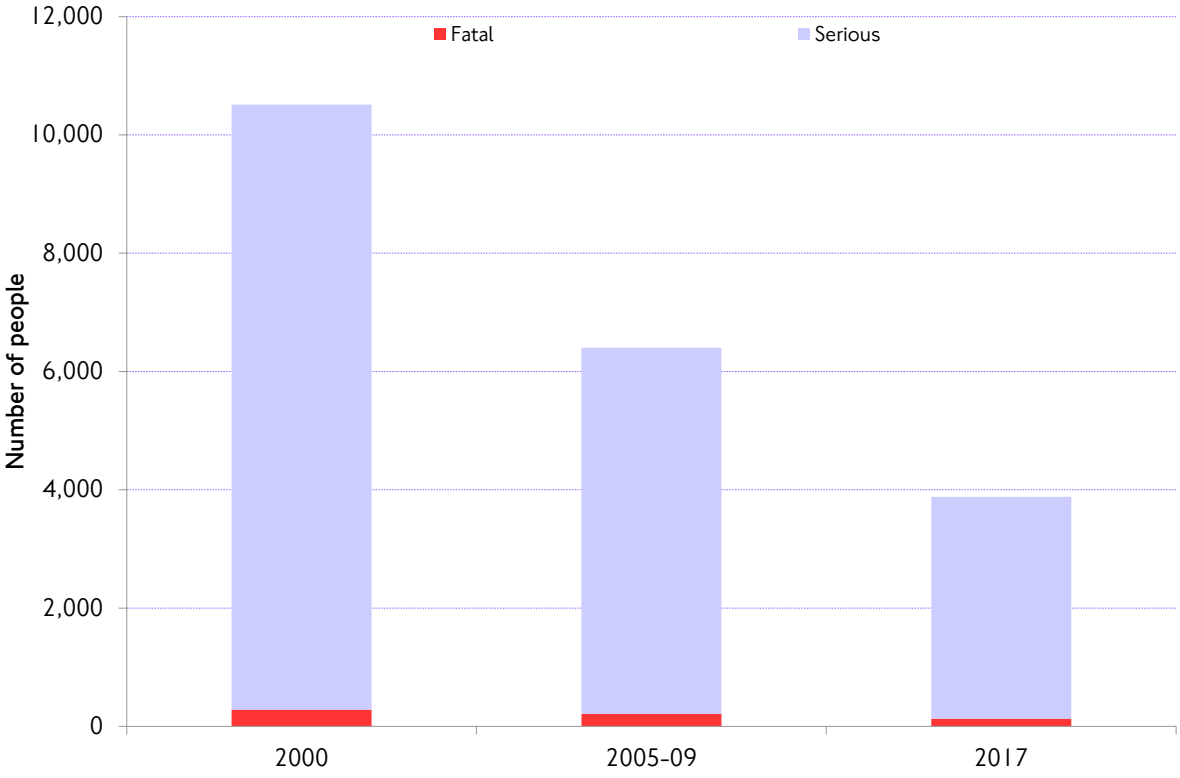
We also have measures based on delivery of infrastructure which can indicate improvement, for example, between 2010 and 2017, there was a 400 per cent growth in the number of crossing sites with pedestrian countdown timers indicating how much time people have left to cross the street.

People feel safe

People will be less willing to walk, cycle or use public transport if they feel unsafe on a street. The whole community should feel comfortable and safe from crime, intimidation or injury on any street, day and night.

Although the risk of being injured on London's roads is low, people's fear (or perception) of road danger is high, which deters people from walking, cycling and spending time on streets. The number of people killed and seriously injured on London's streets fell by 39 per cent against a 2005-09 baseline by 2017 (figure 6.6).

Figure 6.6 Number of people killed or seriously injured as a result of road traffic collisions on London's streets.



Source: Data and Spatial Analysis, TfL City Planning.

In 2017, more than 30,000 people were injured in road collisions. Of these, 131 people were killed, 3,750 were seriously injured and 28,686 were slightly injured. Eighty-three people were killed in London while walking or cycling in 2017.

Our customer surveys show the main deterrent to people taking up cycling, cycling more often, or being willing to let their children walk or cycle unaccompanied in London is the fear of traffic collisions. Improved safety is cited by Londoners as one of the main motivators for walking more.

Things to see and do

People are less willing to walk and cycle on streets that are visually unappealing or bland. People are more likely to travel actively when there are things to do locally and will also be less dependent on cars if shops and services are within walking distance.

Currently we have only customer satisfaction surveys to assess our performance against this Indicator London-wide. Our new Healthy Streets Mystery Shopper Survey (see section 6.4 of this report) will be beneficial in giving us a more objective assessment of this Indicator.

When asked about their satisfaction with things to see and do in their local area Londoners on average gave trees, plants and green spaces 63 out of 100, their enjoyment of local streets 59 out of 100 and the attractiveness of local streets 58 out of 100.

We also do not yet have measures of the range of local services within walking and cycling distance of home which would be a useful data source for this Indicator.

Places to stop and rest

Lack of resting places can limit mobility for some people, particularly those who are ill, injured, older or very young. Ensuring there are places where people have room to stop or somewhere to rest benefits everyone, including local businesses, as people will be more willing to visit, spend time in, or meet other people on these streets.

This Indicator reflects more than the frequency of benches, it also includes the quality of the seating provided and the space available for people walking and cycling to move out of the flow of moving people to a space where they can stop to wait for friends, check their route, put on a coat etc. Our new Healthy Streets Mystery Shopper Survey will be beneficial in giving us a rich picture of this Indicator as it will record the quality and nature of the seating provided and how well used it is.

At present our best source of pan-London data is the Healthy Streets Surveys which were conducted at 80 locations across London between 2014-2016 (see http://content.tfl.gov.uk/healthy-streets-surveys.pdf). This survey suggested that London currently performs poorly against this Indicator. When asked to rate streets on places to stop and rest Londoners on average gave them 4 out of 10.

People feel relaxed

People are more likely to walk or cycle if they feel relaxed and find it enjoyable. Good quality street design, a clean, well kept environment with greenery can help create attractive and relaxing places to walk and cycle. Ensuring there is enough space so that people walking and cycling don't feel stressed is important, as is making sure people can find their way around.

Our current pan-London measures are based on customer satisfaction surveys which suggest we are performing poorly against this Indicator at present. They gave an average of 63 out of 100 for their ability to move about easily on the street and rated the cleanliness of pavements just 55 out of 100.

When we asked Londoners to rate the street they were on for how relaxed it made them feel, on average they gave the street a score of 6 out of 10.

Our new Healthy Streets Mystery Shopper Survey will be beneficial in giving us a rich picture of this Indicator as it will capture the details of street greening, graffiti, litter, fouling, way-finding and many other factors that contribute to how relaxing a street feels.

Not too noisy

Motorised road traffic is a primary source of noise pollution in urban areas. This affects the health of people who walk, cycle, shop, work, study and live on noisy streets. Reducing traffic volumes and speeds, introducing quieter vehicles and low noise road surfaces all benefit health as well as improve the ambience of street environments, encouraging people to interact and travel actively.

Measuring traffic noise and the impacts on health can be challenging. Our customer satisfaction surveys tell us that 57 per cent are satisfied with noise on local streets in general.

In 2014-16 we asked Londoners on 80 streets across the city how noisy they found that street to be on a scale of 1 to 10. They rated streets an average of 4 out of 10, which was one of the lowest scores given, suggesting that perceptions of noise levels on streets are poor. Interestingly when these same people were asked what their expectations were for what the noise levels should be, they also gave a low score indicating that street noise is tolerated by those people who are out using the streets. These views will not reflect the opinions of those people who choose not to walk on the streets because they are discouraged by factors such as noise.

Shade and shelter

High winds, heavy rain, high temperatures and sun exposure can have a significant effect on people's ability to travel actively and spend time in the street as well as their enjoyment. Shade helps protect people from sun damage and enables them to keep cool. Heat can trigger exhaustion, confusion and hearts attacks, and worsen conditions such as cardiovascular and respiratory disease.

The need for shade and shelter will increase as the climate changes and London experiences more extreme weather. We need to increase shade on streets now to be ready for rising temperatures. The temperatures reached in the hot summer of 2018 are likely to feel average by the 2040s and cool by the 2080s.

We do not have a good pan-London measure for the availability of shade and shelter at present. Some measures that may seem intuitive such as tree canopy cover do not provide up to date information and cannot easily be analysed to provide information on street shade.

When we asked Londoners to rate their satisfaction with the ease of finding shade and shelter in their local area they gave an average score of 52 out of 100, indicating there is significant room for improvements. We also asked Londoners on the street in 80 locations to 'rate' the place they were standing in terms of shade and shelter and they gave an average score of 4 out of 10, a relatively low score.

6.4 Measuring and assessing the health of London's streets

Introduction

The Healthy Streets Check for Designers, described in Travel in London report 10, measures 'objective'outputs of the street design, such as the width of clear continuous walking space, distance between resting points, availability of street lighting and the quality of walking and cycling surfaces. It does not set out to capture the more experiential aspects of being on London's streets, which is ultimately what determines their perceived attractiveness to people spending time on the street, walking and cycling.

For example, the provision of specific elements of infrastructure, such as assisted crossing facilities or particular types of signage, may be mandated by street design guidance documents, but this infrastructure has to operate in many different actual street contexts, where factors external to the specific provision, for example illegal parking or excessive clutter or vegetation growth, can radically affect the usability or friendliness of the infrastructure. Similar combinations of infrastructure arrayed across different street contexts can present substantially different experiences to the user, depending on things like the level of road traffic or ambient noise. Standards of maintenance and the appropriate functioning of infrastructure is also an important issue, alongside factors like the presence of disruptive temporary construction works along the footway. The general 'feel' of a street, taking in factors such as the perceived economic vitality of the area and frontages, exposure to the elements, pedestrian density and feelings of personal security can only be partly addressed by the provision of infrastructure, yet are important determinants of whether people decide to walk, cycle or spend time on that street.

Measuring the experiential aspects of London's streets

Travel in London reports 7 and 9 described exploratory surveys that TfL developed to measure and assess the performance towards eight of the 10 Healthy Streets Indicators in the context of specific street locations across London. The Healthy Streets Surveys aimed to provide insight into how people perceive the street, including how attractive and enjoyable they find it to be there, how easy it is to cross the road and how safe it feels. Pedestrians were intercepted by interviewers and asked to complete the survey on the street, relating their answers to their immediate surroundings and present experience. A key aspect of these surveys was the distinction between people's experience and expectation of that street – allowing the difference between expectation and actual perceived performance to be quantified.

Key insights from these surveys, which were completed at around 80 sites between 2014 and 2016, were that:

- Average scores reflected the differing levels of traffic dominance in each location.
- People's expectations of conditions were a good reflection of actual conditions, albeit always higher on average than the achievement score.
- Relative scores and distributions for each of the street types allowed identification of the main 'drivers' behind satisfaction with aspects of street health, those being 'things to see and do', 'people feel relaxed' and 'people feel safe'.

The Healthy Streets Surveys provided vital insight into customer perceptions of the street environment and the variations across types of street. However, the main shortcoming of these surveys was that they were intensive at only a very small number of locations relative to the extent of the whole street network, which could not be widely extended or generalised to represent the entire network in London. They also had the potential to generate very similar scores if applied across a large number of similar sites.

Gaining a greater representation of London's diverse street network cost-effectively and using the surveys to track change in relation to improvement schemes therefore emerged as two development priorities from the exploratory work.

New Healthy Streets Mystery Shopper Survey (MSS) – methodology

To address these priorities, TfL has set up a new 'mystery shopper' survey to assess performance against the Healthy Streets Indicators during a surveyor visit to each site, rather

than to seek feedback from members of the public. Mystery shopper methodologies are well established and are widely used by TfL to assess the quality/performance of other aspects of the transport environment, for example aspects of bus services such as bus driver behaviour. They use evaluations of trained surveyors and are designed to give consistent feedback across a wide range of contexts and can therefore be developed for this purpose.

In this way a much larger number of sites can cost-effectively be included in the survey. This does not mean that the surveys will be statistically representative of London's streets, but the greater sample that is possible with this approach will give coverage that is usefully representative from a strategic monitoring point of view. Crucially, it also gives the ability, alongside and within a sample structure designed to be broadly representative, to specifically measure locations that have undergone specific improvements or that are of other interest (through equivalent before/after surveys). In these cases, scheme-specific scores can be compared to those from the general sample and on a before/after basis in relation to the scheme itself.

The survey is designed to provide metrics specific to various functional contexts, for example aggregated street types and broad geographic area. The 'core' survey will cover a sample size of 1,580 sites per year, which will take place on a continuous basis throughout the year, thus minimising seasonal bias. A dedicated team of surveyors will assess approximately 100 discrete metrics which contribute to the 10 Indicators of a Healthy Street, using perceptual judgement, as well as conducting a short count of people walking and cycling. The survey results will therefore provide detailed information at each street location which can be used to identify local needs as well as strategic trends.

Pilot survey – illustrative results

Ahead of the commencement of the core survey in October 2018, a pilot survey took place at 48 locations throughout August.

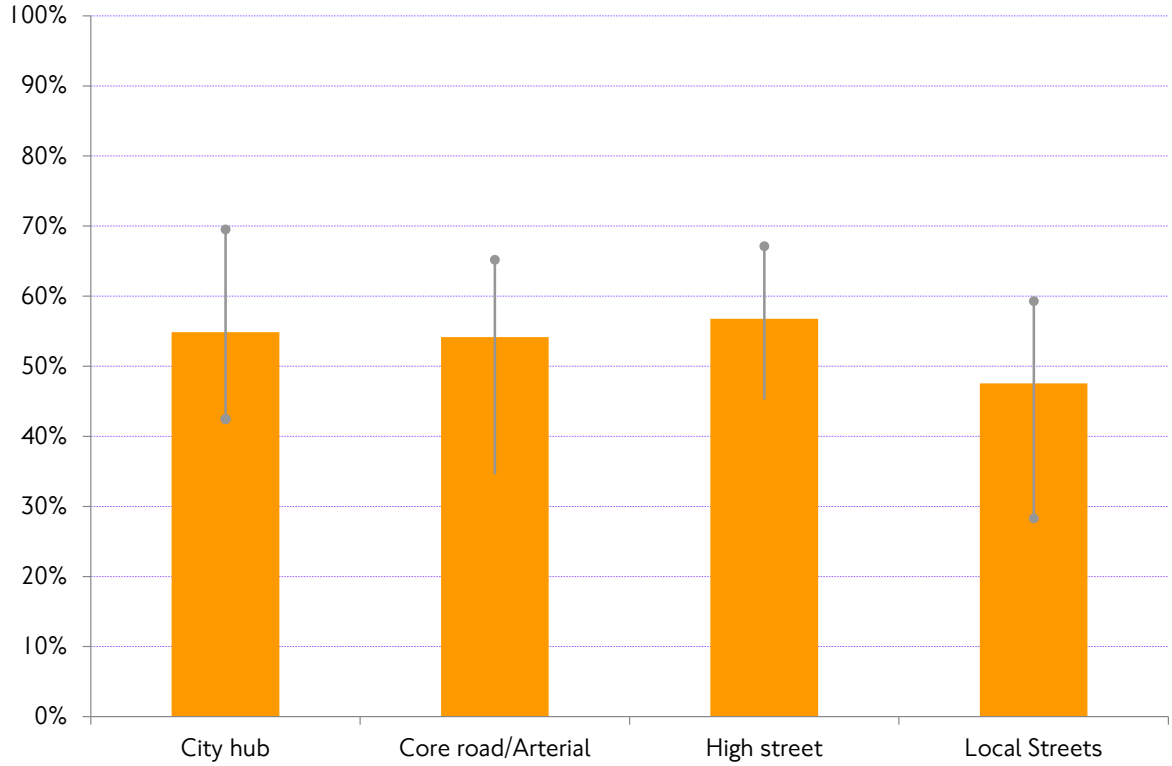
The series of charts below show the results of the Healthy Streets MSS from the pilot locations. The survey covers 9 of the 10 Healthy Streets Indicators, excluding 'clean air'. This indicator has been excluded from the survey due to the difficulties in measuring air quality at a single location from a surveyor visit. The overall scores presented show an average score across the 9 Healthy Streets Indicators covered in the survey. A number of metrics feed into each Indicator score, and each metric has been assigned a weighting to reflect the key drivers affecting each Indicator.

The results shown below represent scores at a small number of pilot locations only, and the distribution by street type, area and Indicator are likely to differ from the results from the full survey. These results should not be taken as a definitive measure of the quality of London's streets.

Figure 6.7 shows that scores do not vary considerably across types of streets, ranging from around 48 to 57 per cent. Local streets score the lowest overall (47.6 per cent) compared to High streets, which score the highest (56.8 per cent). The reason that Local streets score slightly lower than other street types is perhaps the lower general provision of infrastructure, street furniture and features improving the urban realm compared with other streets, eg seats. However, despite slight differences across street types, the similarity in overall scores shows that the street type categories are not distinct, and in fact there is a lot of variation in the look and feel of streets within street type categories. Local streets and Core roads/arterials had the highest variation in scores (as shown by minimum and maximum bars) with around a 30 percentage point difference in the highest and lowest performing street in

each category. High streets demonstrated the least variation in scores, and this is expected as, according to street length kilometres, this type of street accounts for just 2 per cent of all streets in London.

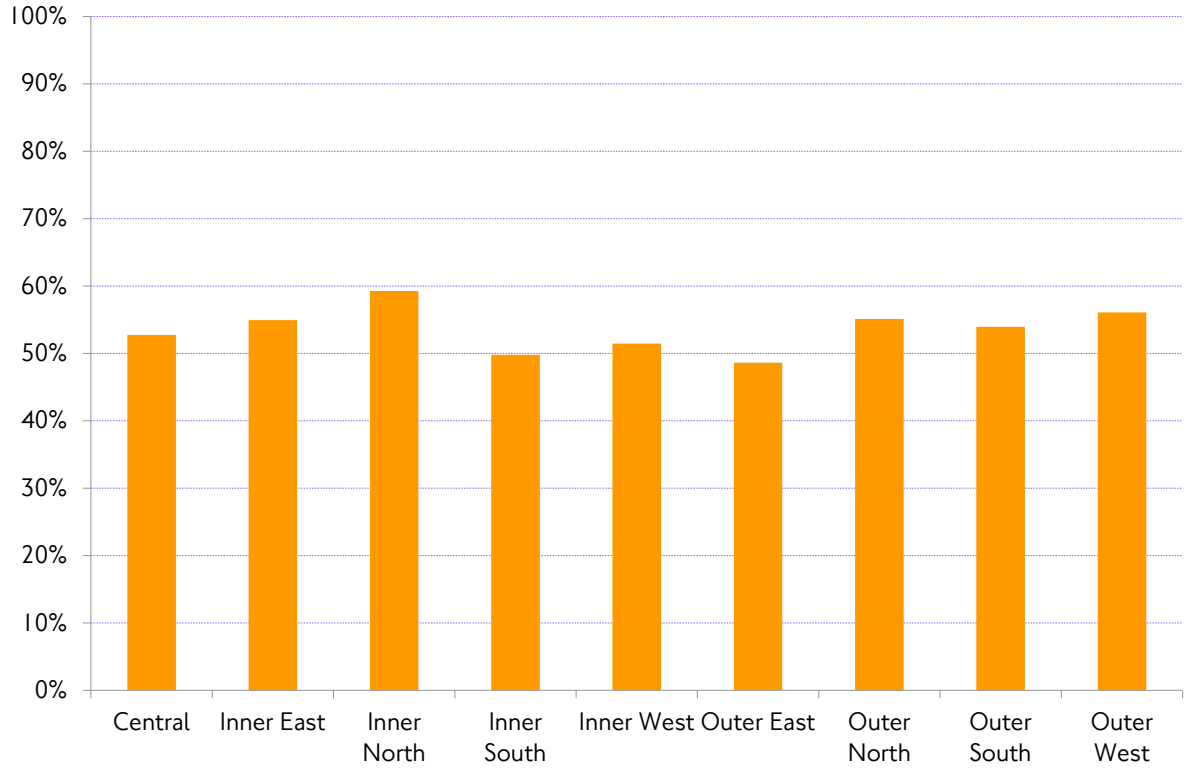
Figure 6.7 Average overall Healthy Streets score with bars showing minimum and maximum scores by type of street.



Source: Strategic Analysis, TfL City Planning.

Overall scores by geographic area are similarly consistent, with scores across the nine areas varying by only around 10 percentage points (figure 6.8). Streets in inner north London scored the highest overall (59.3 per cent on average) compared to 48.6 per cent in outer east London. The sample size of pilot locations in each area is small, but for the core survey this will be a useful measure to identify areas with lower performing streets for intervention.

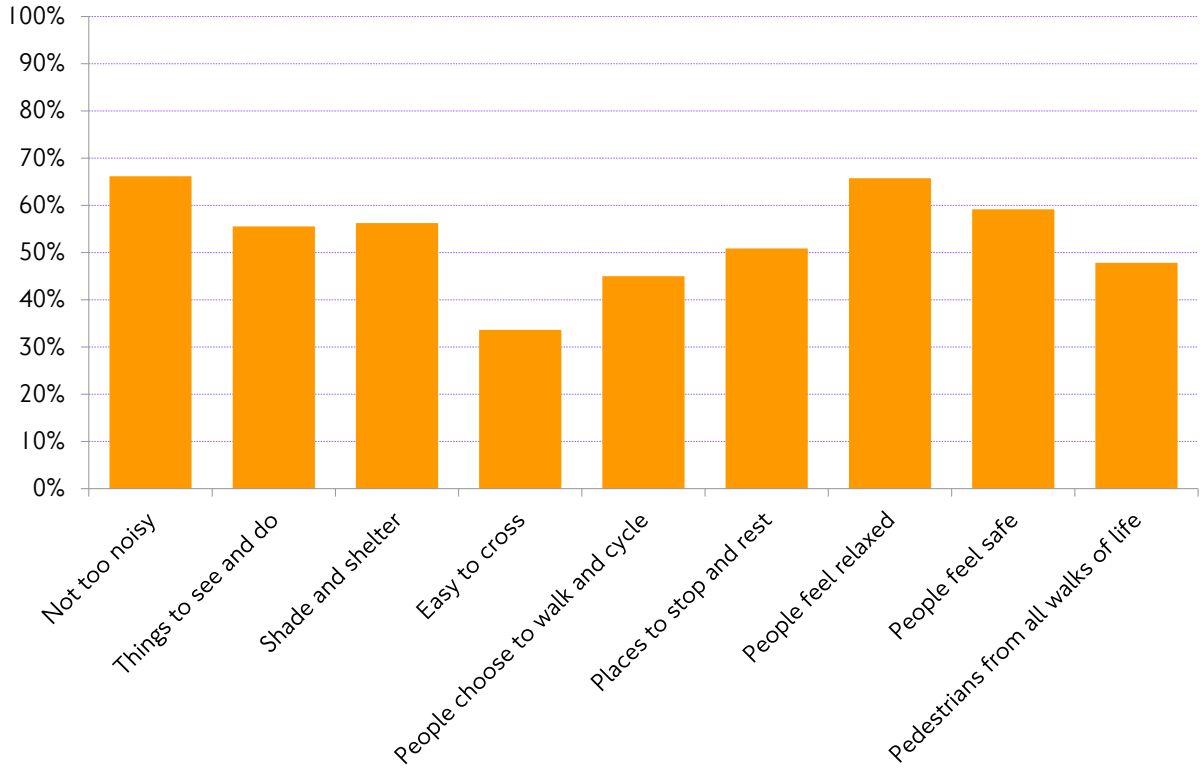
Figure 6.8 Overall Healthy Streets score at pilot locations by geographical area.



Source: Strategic Analysis, TfL City Planning.

Figure 6.9 shows the overall score by Healthy Streets Indicator across the pilot sites. The results show that the pilot locations had higher scores for 'not too noisy', 'people feel relaxed' and 'people feel safe'. Low scoring Indicators were 'easy to cross', 'places to stop and rest' and 'pedestrians from all walks of life'.

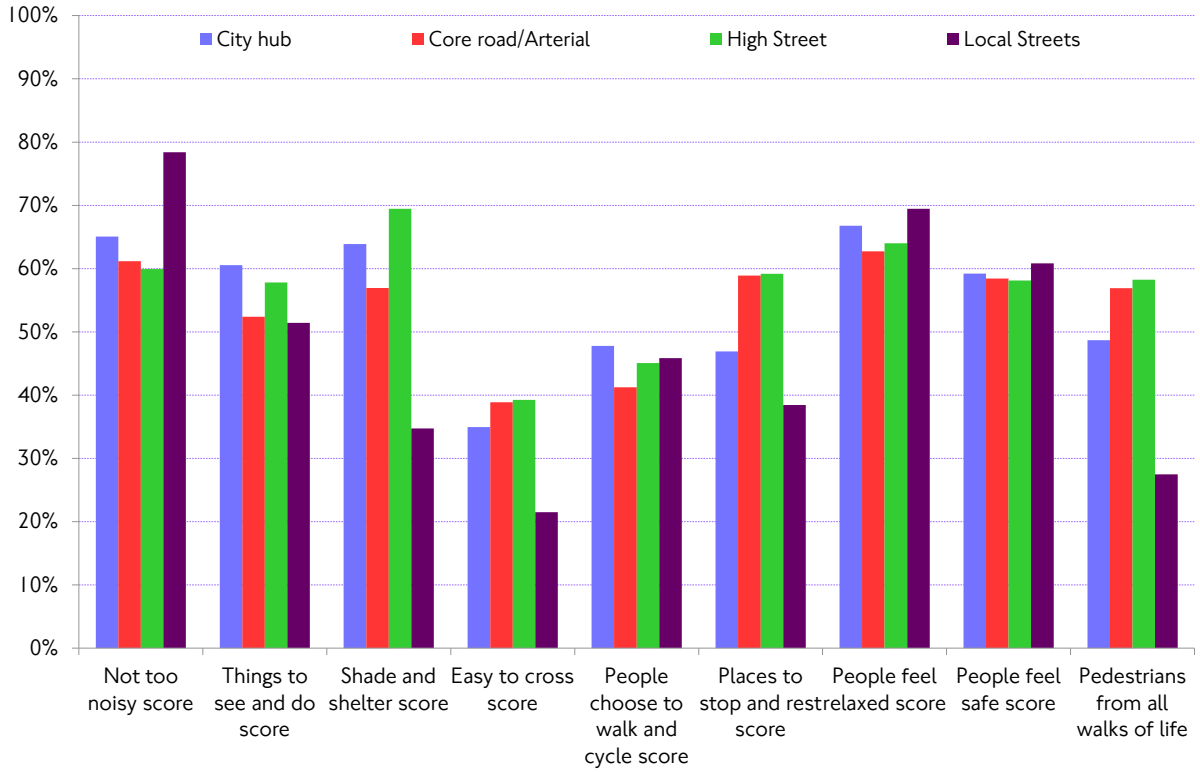
Figure 6.9 Overall score at pilot locations by Healthy Streets Indicator.



Source: Strategic Analysis, TfL City Planning.

Figure 6.10 shows overall scores by Indicator and type of street. The data shows that Local streets are most likely to feel quiet, safe and relaxing (scoring highest for 'not too noisy', 'people feel safe' and 'people feel relaxed'). High streets score well on ease of crossing, shade, shelter and seating whereas City hubs score highest for 'things to see and do' and 'people choose to walk and cycle'. Identifying the lowest scoring Indicators by type of street is useful to inform policy decisions on how to improve the experience of being on London's streets and make them more inclusive.

Figure 6.10 Overall score at pilot locations by type of street and Healthy Streets Indicator.



Source: Strategic Analysis, TfL City Planning.

In addition to providing evidence on strategic need, the Healthy Streets MSS also provides value in the detailed data collected for each street. The case study below demonstrates the breadth of information available from the survey.

Case Study: Chalk Farm Road, London Borough of Camden

Chalk Farm Road was surveyed during the late morning in the August pilot. Table 6.1 shows how the scores by Indicator compare to the average pilot scores.

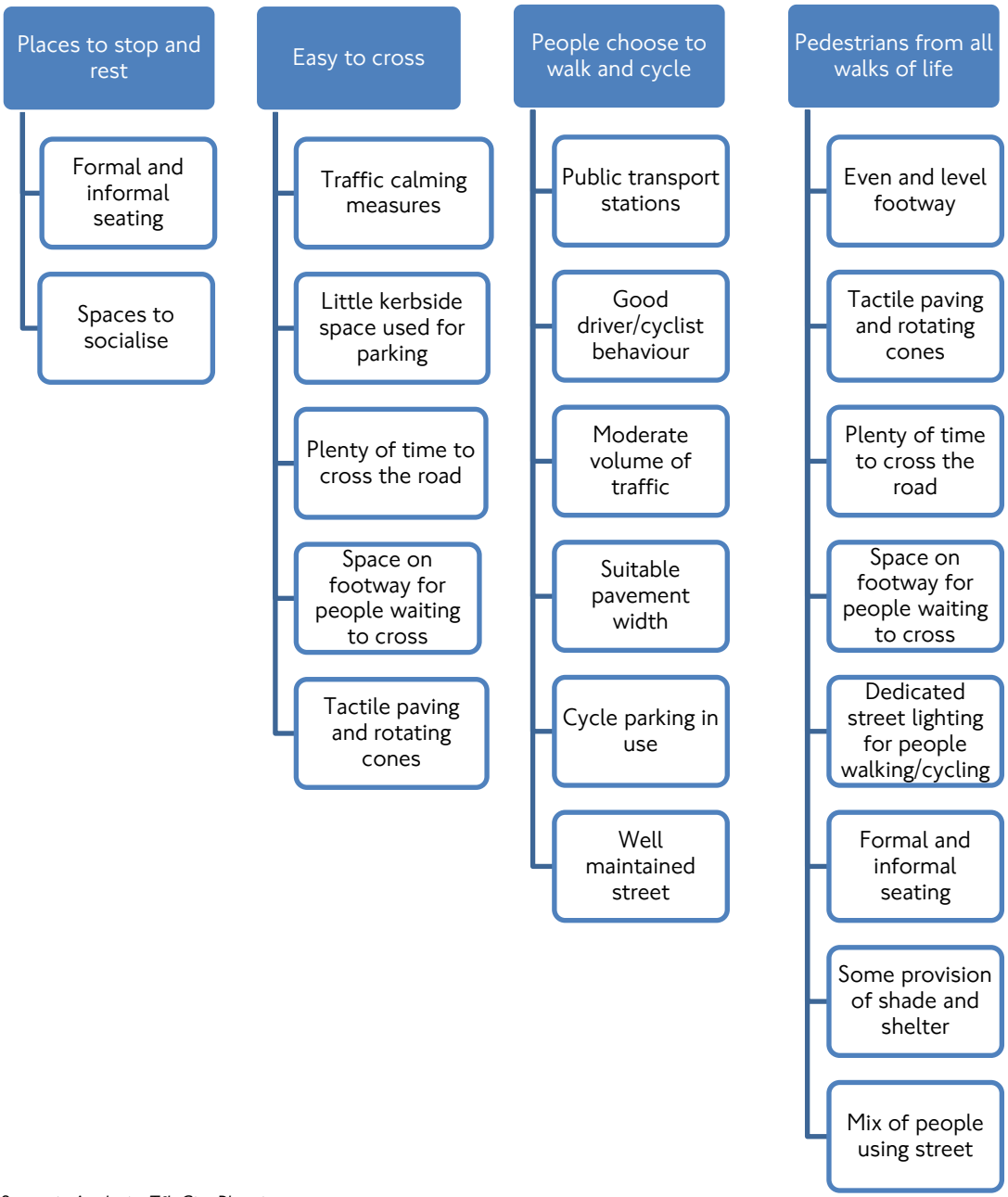
Table 6.1 Scores at Chalk Farm Road vs average pilot scores.

Indicator	Pilot results average	Chalk Farm Road
Not too noisy	66.1%	▼
Things to see and do	55.5%	▼
Shade and shelter	56.3%	▼
Easy to cross	33.6%	▲
People choose to walk and cycle	45.0%	▲
Places to stop and rest	50.8%	▲
People feel relaxed	65.7%	▼
People feel safe	59.1%	▼
Pedestrians from all walks of life	47.8%	▲

Source: Strategic Analysis, TfL City Planning.

Chalk Farm Road scored higher than average on easy to cross, people choose to walk and cycle, places to stop and rest and pedestrians from all walks of life. Figure 6.11 shows some of the factors contributing to these higher than average scores.

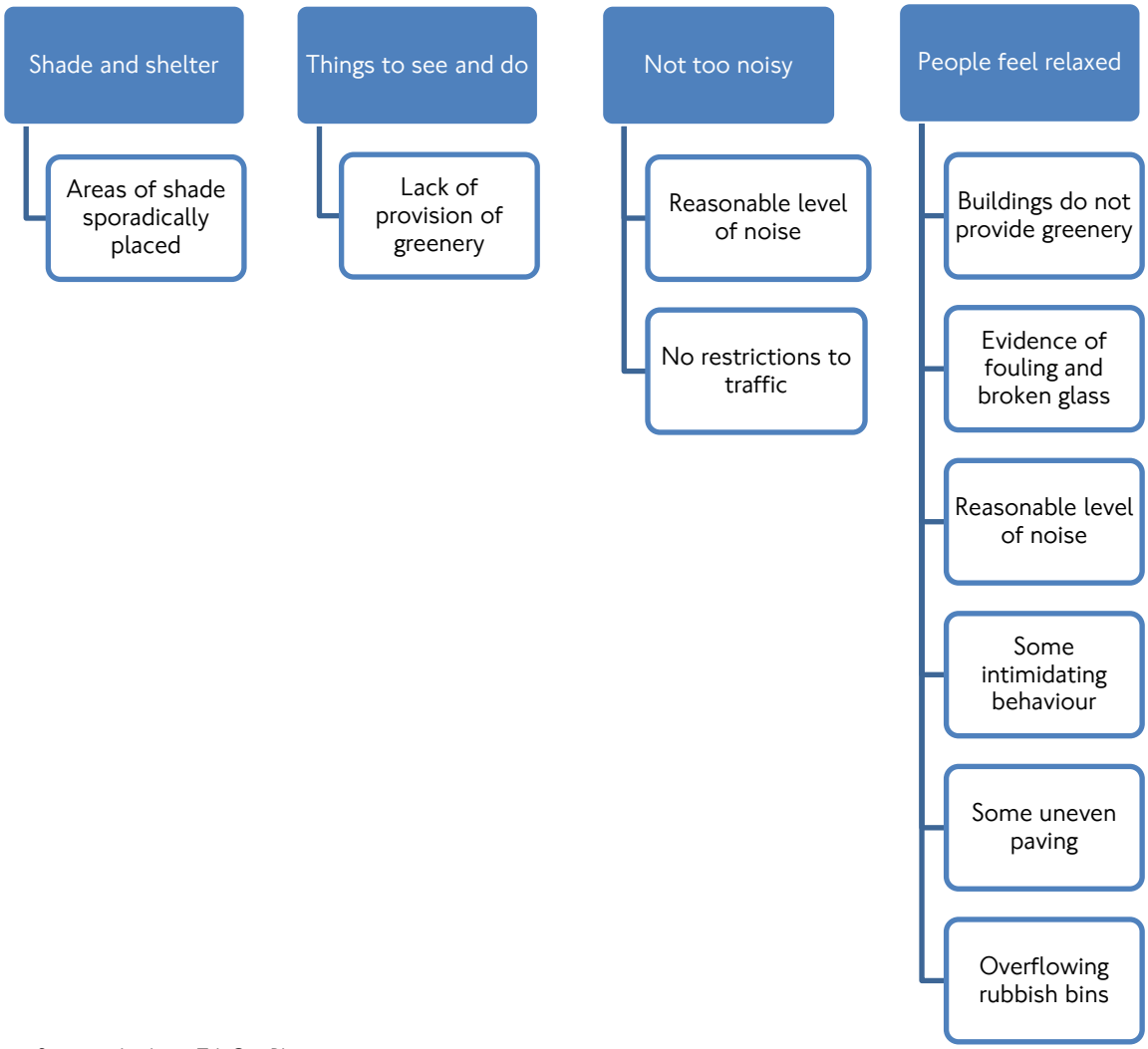
Figure 6.11 Factors contributing to higher than average Healthy Streets MSS scores on Chalk Farm Road.



Source: Strategic Analysis, TfL City Planning.

Chalk Farm Road scored lower than average on 'not too noisy', 'things to see and do', 'shade and shelter' and 'people feel relaxed'. Figure 6.12 shows some of the factors contributing to these lower than average scores.

Figure 6.12 Factors contributing to lower than average Healthy Streets MSS scores on Chalk Farm Road.



Source: Strategic Analysis, TfL City Planning.

6.5 Physical activity and travel

Introduction

The Mayor's Transport Strategy sets the aim for all Londoners to travel actively every day by 2041. We currently measure our progress towards this aim using the London Travel Demand Survey. This tells us the proportion of Londoners who report having walked or cycled for at least two ten-minute periods on the previous day. We take this as a proxy measure for Londoners travelling actively routinely. We acknowledge that a certain proportion of people will be routinely active but may not have travelled actively on the previous day eg due to sickness or caring responsibilities, so the aim for our proxy of everyone active is for 70 per cent of adults to report two ten-minute periods of active travel on the previous day by 2041. In 2017/18, 30 per cent of adult Londoners reported this level of activity. This figure has remained between 30 and 35 per cent for the past decade.

By measuring the proportion of people who report doing two ten-minute sessions of walking or cycling on the previous day, we can show the percentage of Londoners who are achieving minimum healthy levels of activity through active travel alone. This does not include other forms of physical activity, such as sport, which are additional to this measure.

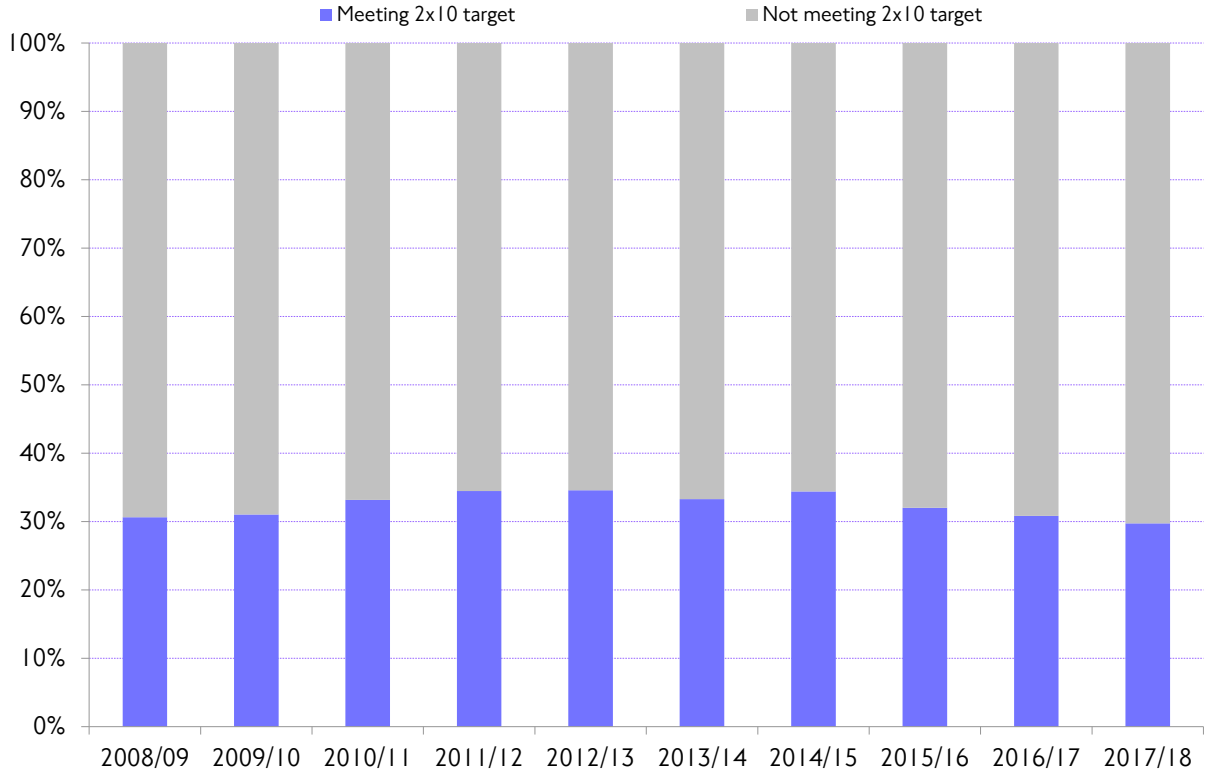
Trend in achievement of recommended daily active travel

The LTDS survey offers the best available data source on active travel in London, giving a daily snapshot of travel behaviour by London residents. From this source, we see that approximately one-third of Londoners have reported achieving two ten-minute periods of active travel per day over recent years. Some variability is to be expected on a year to year basis, but the balance of the trend over the most recent four years has been downwards. It is thought that this is likely a reflection of the wider trend towards lower overall trip rates for Londoners, discussed in section 3.2 of this report.

It should be noted that although the percentage of London residents who meet the physical activity aim through active travel alone has decreased in the last few years (see figure 6.13), people are also active in other ways, for example through their normal daily activities or through leisure activities. Intermediate walk stages of longer public transport trips also contribute to people's total daily activity.

It is important to make the distinction of this measure from walking and cycling trip rates and mode share. The rates of walking and cycling among Londoners have broadly increased over the past decade and this has contributed to increases in the sustainable mode share. However the proportion of people walking or cycling for two ten-minute periods has stayed relatively constant. This suggests the growth in walking and cycling has been among already active people who are doing more active travel rather than shifting inactive people to activity.

Figure 6.13 Percentage of London residents aged 20+ who achieve two ten-minute periods of active travel per day, 2008/09-2017/18.



Source: Strategic Analysis, TfL City Planning.

7. Travel demand trends – motorised road travel

7.1 Introduction

This section considers trends in the volumes of motorised road traffic in London. In 2017, some 35.9 per cent of all trips in London were made by private transport, principally the car. The Mayor's aim of an 80 per cent mode share for active, efficient and sustainable modes by 2041 requires a reduction in this percentage share to 20 per cent by 2041. However, it is necessary to recognise that London's population is expected to continue to grow over this period, and that a growing, more prosperous city will continue to put increasing demands on London's limited road space to accommodate more journeys by car. Other significant trends affecting motorised road traffic over recent years have been a substantial growth in van traffic, and the availability of new forms of private hire travel.

This section first looks at vehicle-kilometre based traffic trend estimates for London from the Department for Transport (DfT), and then looks at complementary traffic flow data from TfL's own traffic counts.

7.2 Overall trends for motorised road traffic in London

Overall motorised vehicle kilometres

The DfT produce an annual estimate of vehicle kilometres in London. This is part of a wider national traffic survey, but does provide a good long-term indicator of traffic trends in London. The latest available DfT data is for the 2017 calendar year. It shows a slight increase in motorised vehicle kilometres compared to 2016.

In 2017, motorised vehicle kilometres in London were up by 0.1 per cent overall against 2016. This is the third year in the last four that has seen an increase in motorised traffic in London. While traffic in central London decreased by 1.5 per cent, traffic in inner London increased by 0.6 per cent, although traffic in outer London, which accounts for about 70 per cent of all traffic in London, decreased by 0.1 per cent (figure 7.1). Note that the definition of central London used for the DfT data is different to the Congestion Charging zone.

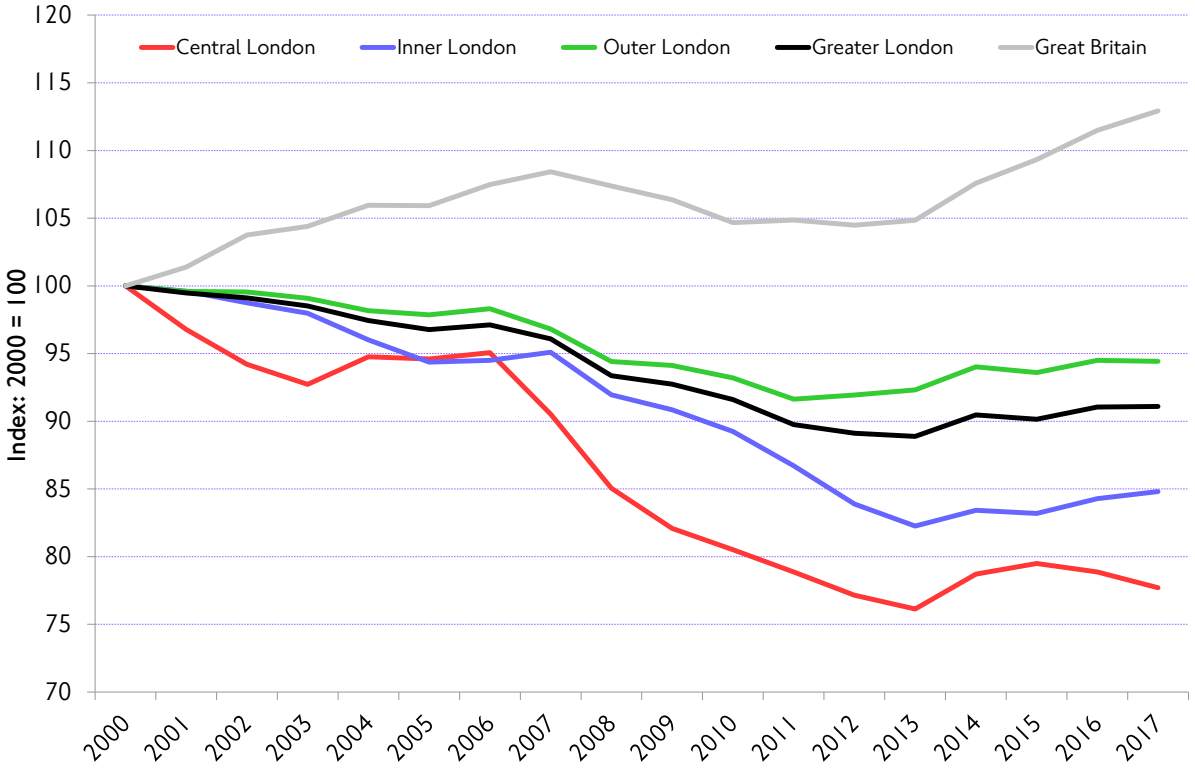
DfT data shows that vehicle kilometres in London as a whole in 2017 were 8.9 per cent lower than in 2000. In central London, vehicle kilometres in 2017 were 22.3 per cent below the 2000 level. In inner London, the equivalent aggregate fall was 15.2 per cent, while vehicle kilometres in outer London are down over the period by 5.6 per cent. At the national level, road traffic volumes increased by 1.3 per cent in 2017, the fifth successive year of increase, and it can be seen from figure 7.1 how traffic volume change in London tends to mirror that nationally.

Car traffic, according to the DfT statistics, has continued to decline, and is now 15 per cent lower than in 2000 at the Greater London level, and almost 5 per cent lower than in 2010, with no change over the latest year.

The recent increase in traffic is not therefore primarily due to an increase in car trips. **LGV (van)** traffic in particular has grown strongly since 2012 across all parts of London. This is likely to be partly driven by the observed decline in personal shopping and leisure trips, with London residents more likely to order goods and services online and having them delivered by a third party.

LGV traffic has grown particularly strongly in the last two years, up by 14.7 per cent against 2015, to a point higher than the previous high in (pre-economic crisis) 2007. In contrast, **HGV** (lorry) traffic has fallen by 7.8 per cent over the same period.

Figure 7.1 Trends in road traffic (vehicle kilometres), all motor vehicles in central, inner, outer and Greater London with national comparison, 2000-2017.



Source: Department for Transport.

Table 7.1 London road traffic (billion vehicle kilometres) by central, inner and outer London. All motor vehicles, with Great Britain comparison, 2000-2017.

Year	Central London	Inner London	Outer London	Greater London	Great Britain
2000	1.3	9.0	22.1	32.4	466.2
2001	1.2	9.0	22.0	32.3	472.6
2002	1.2	8.9	22.0	32.1	483.7
2003	1.2	8.8	21.9	31.9	486.7
2004	1.2	8.7	21.7	31.6	493.9
2005	1.2	8.5	21.7	31.4	493.9
2006	1.2	8.5	21.8	31.5	501.1
2007	1.2	8.6	21.4	31.2	505.4
2008	1.1	8.3	20.9	30.3	500.6
2009	1.0	8.2	20.8	30.1	495.8
2010	1.0	8.0	20.6	29.7	487.9
2011	1.0	7.8	20.3	29.1	488.9
2012	1.0	7.6	20.3	28.9	487.1
2013	1.0	7.4	20.4	28.8	488.8
2014	1.0	7.5	20.8	29.3	501.5
2015	1.0	7.5	20.7	29.2	509.7
2016	1.0	7.6	20.9	29.5	519.7
2017	1.0	7.6	20.9	29.5	526.4

Source: Department for Transport.

Table 7.2 Index of London road traffic (all motor vehicles, based on vehicle kilometres), with Great Britain comparison, 2000-2017. Index: 2000 = 100.

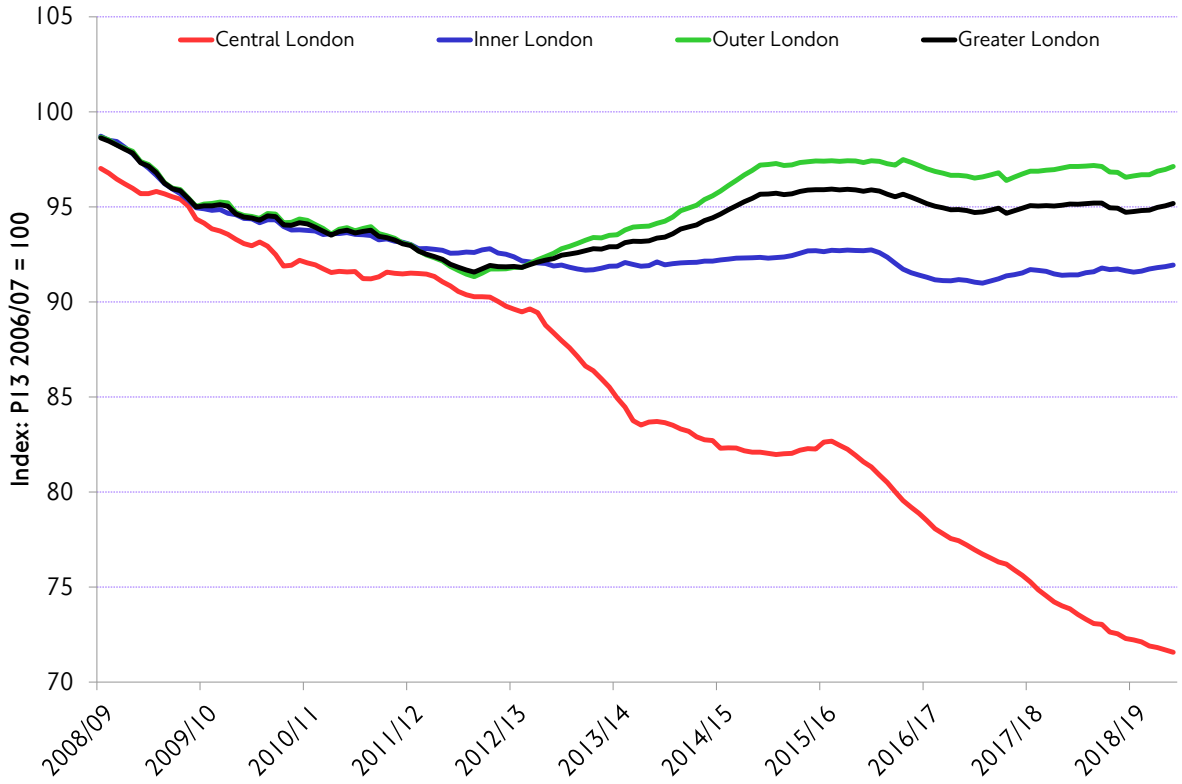
Year	Central London	Inner London	Outer London	Greater London	Great Britain
2000	100.0	100.0	100.0	100.0	100.0
2001	96.7	99.6	99.6	99.5	101.4
2002	94.2	98.8	99.6	99.1	103.8
2003	92.6	98.0	99.1	98.5	104.4
2004	94.7	96.0	98.2	97.4	106.0
2005	94.5	94.4	97.9	96.8	105.9
2006	95.0	94.5	98.3	97.1	107.5
2007	90.6	95.1	96.8	96.1	108.4
2008	85.1	92.0	94.4	93.4	107.4
2009	82.0	90.9	94.1	92.7	106.4
2010	80.5	89.2	93.2	91.6	104.7
2011	78.9	86.7	91.6	89.8	104.9
2012	77.2	83.9	91.9	89.1	104.5
2013	76.1	82.3	92.3	88.9	104.8
2014	78.7	83.4	94.0	90.5	107.6
2015	79.5	83.2	93.6	90.1	109.3
2016	78.9	84.3	94.5	91.1	111.5
2017	77.7	84.8	94.4	91.1	112.9

Source: Department for Transport.

Trend shown by TfL's volumetric data

Data from TfL's traffic counts provide a second indicator of traffic trends. It is important to note that they measure different indices to the DfT counts, although they show broadly similar long-term trends. The data shows a large drop in flows in central London (in this case using a definition aligned with the Congestion Charging zone), with traffic flows almost 30 per cent lower than in early 2007. In inner London, flows declined to 2011/12, and have been relatively stable since then, and are around 8 per cent lower than in 2006/07. Traffic flows in outer London also declined up to 2011/12, and after a return to growth up to 2014/15, flows have been relatively stable.

Figure 7.2 Trends in road traffic (traffic flows), all motor vehicles in central, inner and outer London, 13 period average, 2008/09-2018/19.



Source: TfL Surface Transport, Outcomes, Insight and Analysis.

Trend shown by TfL's cordon count data

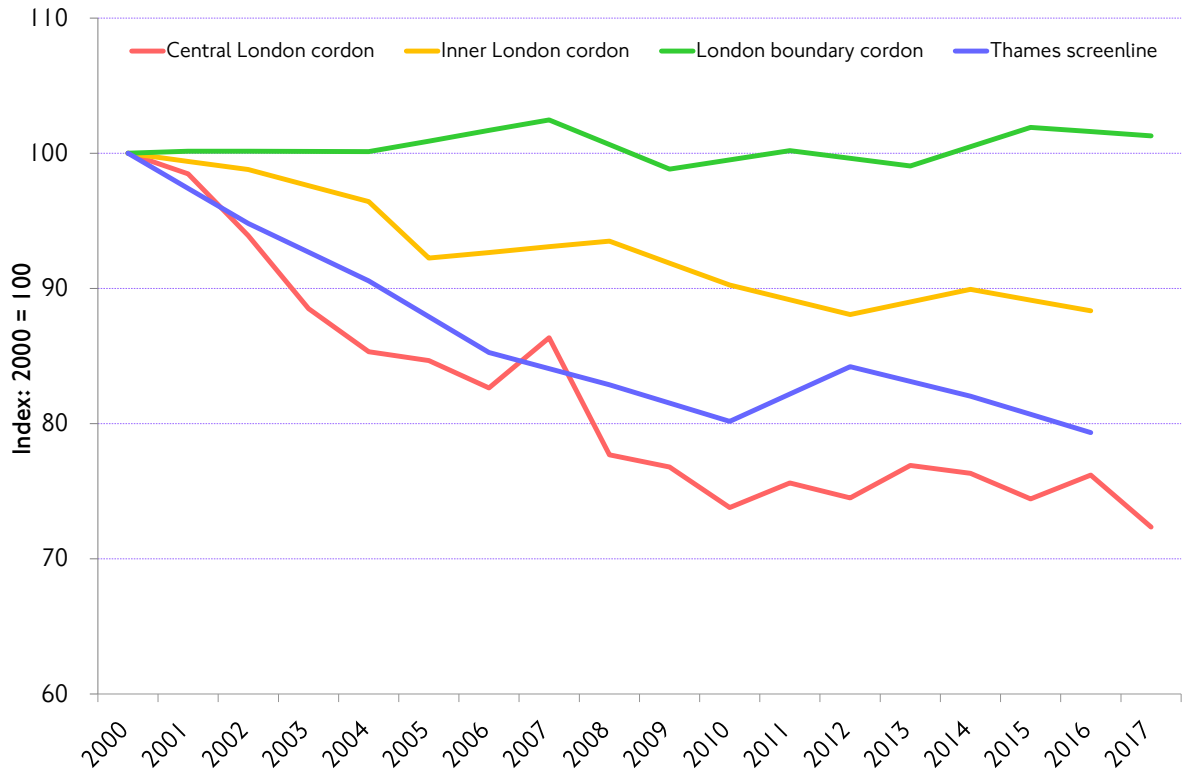
Trends in the numbers of motor vehicles crossing the three London cordons and the Thames screenline provide a third indicator of traffic volumes, and also show a broadly similar pattern to the other two indicators.

Since 2000, and bearing in mind that not all cordons are surveyed every year, the number of motor vehicles crossing the central cordon (enclosing a third definition of central London which is not aligned either with the Congestion Charging zone or with the DfT definition) has fallen by 27.6 per cent.

Across the inner cordon, the decline has been 11.7 per cent (up to 2016), while flows at the boundary cordon have been relatively stable, with a 1.3 per cent increase. The number of vehicles crossing the Thames throughout Greater London has also declined over the same period, with 20.7 per cent fewer vehicles in 2016 compared with 2000. In considering these cordon and screenline counts, it should be noted that there may be considerable variation locally from the trends quoted here, as they include a wide range of locations with differing road network and traffic growth characteristics.

Comparing the cordon data with the DfT traffic data in figure 7.1, the overall trends since 2000 are relatively similar. Both data sources show a drop of more than 20 per cent in central London, although the DfT traffic data suggests larger falls in both inner and outer London.

Figure 7.3 Daily number of motor vehicles crossing at the three cordons and Thames screenline, 2000-2017.



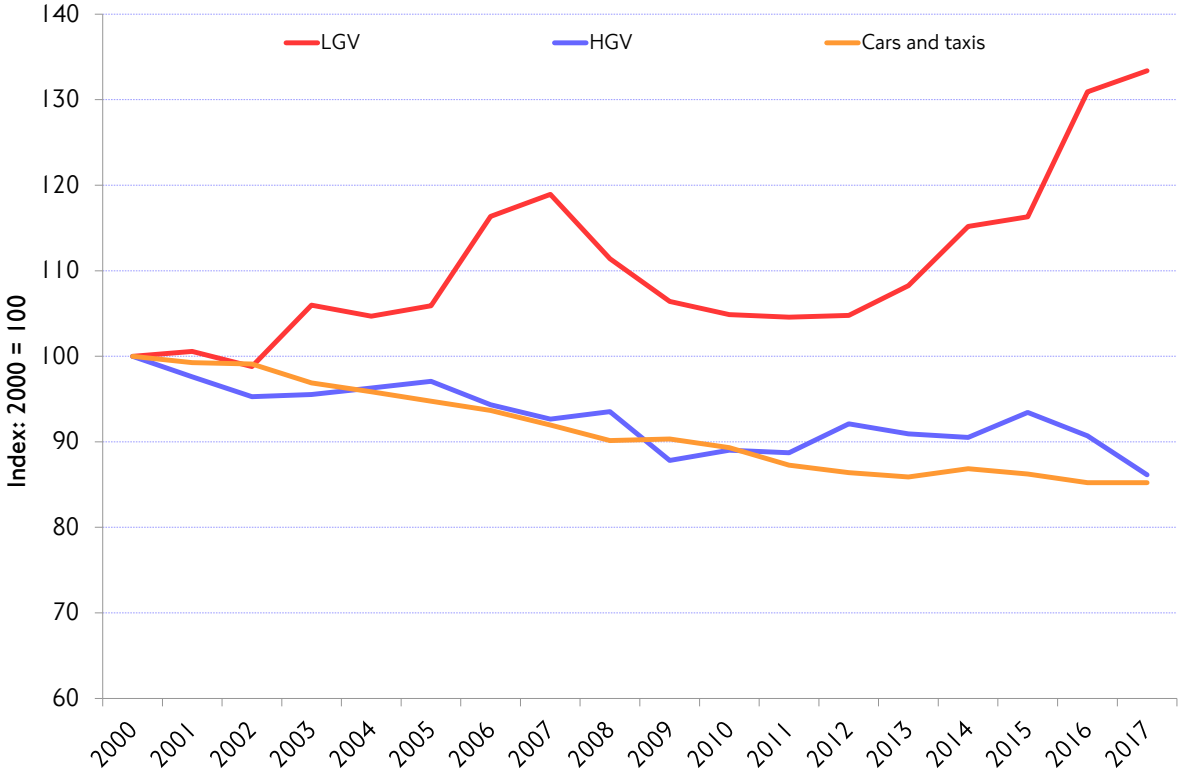
Source: TfL Surface Transport, Outcomes, Insight and Analysis.

Trends for motorised traffic by main vehicle type

Motorised road traffic consists of several different types of vehicle, not all of which have shown the same trends. DfT vehicle kilometre data gives an indicator of trends as they affect the principal motorised vehicle types.

Figure 7.4 shows the basic trend in vehicle kilometres for cars and taxis, light goods and heavy goods vehicles over the period since 2000. It is seen from the figure that vehicle kilometres by cars, taxis and HGVs have been declining steadily since 2000, and are both down by about 14 per cent on 2000 levels. In contrast, vehicle kilometres by LGVs increased by 19 per cent between 2000 and 2007, followed by a decline of 14 per cent between 2007 and 2011. Since then, LGV vehicle kilometres have increased fairly sharply, and in 2017 are above the previous high seen in 2007.

Figure 7.4 Trends in motorised vehicle kilometres in London, by main vehicle type, 2000-2017.

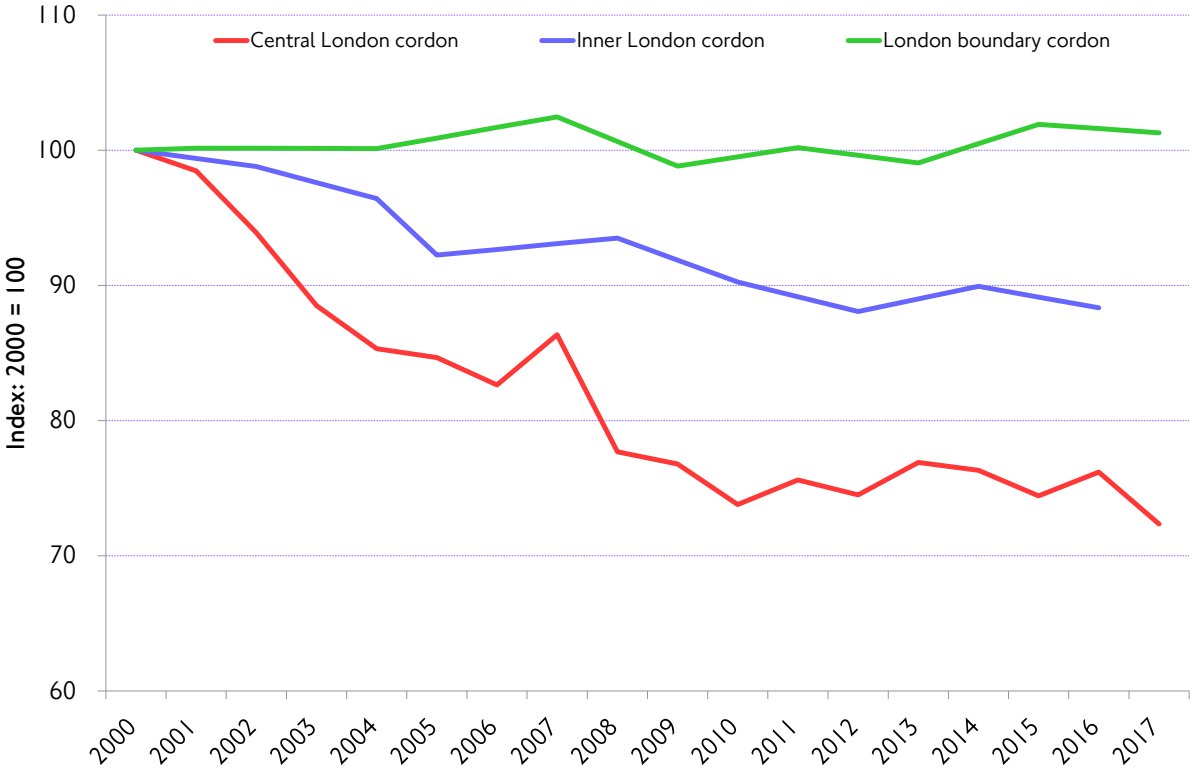


Source: Department for Transport.

7.3 Motorised traffic: Car

The overall picture of declining car volumes over recent years has not affected all parts of London in the same way. The figure shows the time-series of crossings of the TfL cordons by cars. Note that this includes licensed private hire vehicles, which cannot be distinguished in this type of traffic count, but does not include licensed or black cabs.

Figure 7.5 Trend in cars crossing TfL cordons, 2000-2017.



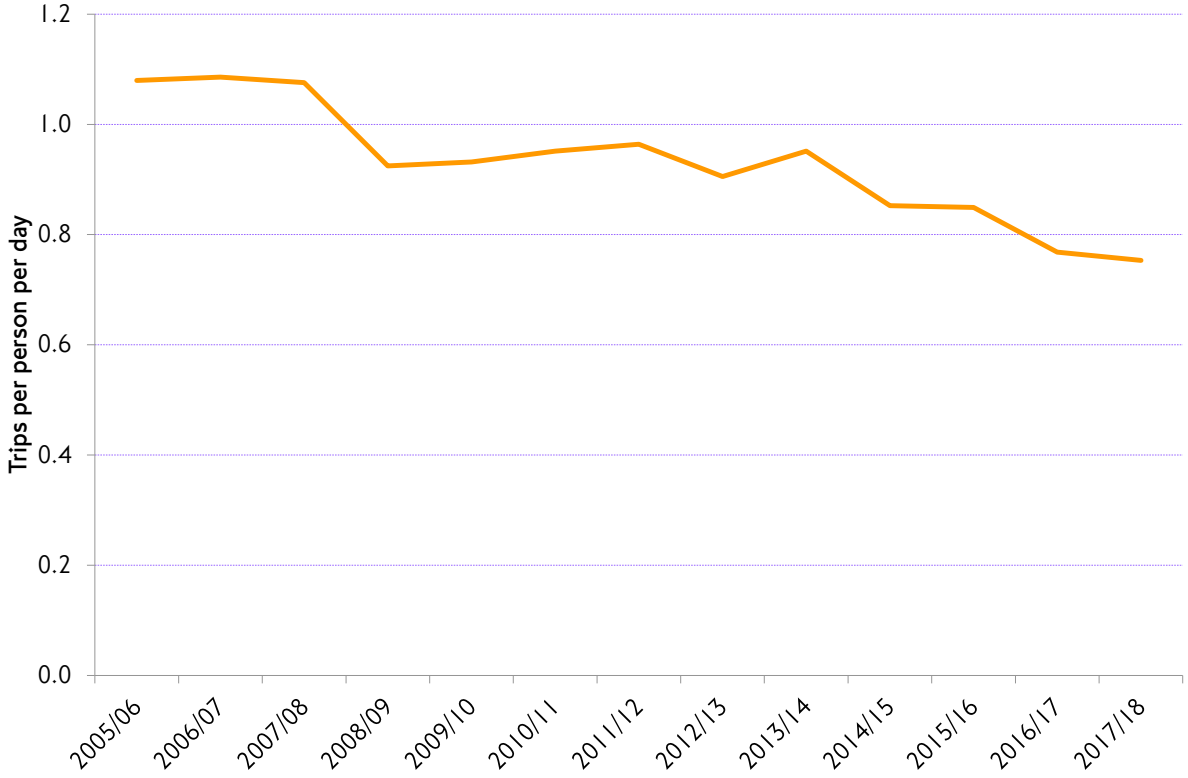
Source: TfL Surface Transport, Outcomes, Insight and Analysis.

The decline has been greatest across the central cordon, with 35 per cent fewer cars crossing the cordon in 2017 compared with 2000. There has been a 17 per cent decline in cars crossing the inner cordon up to 2016, whereas at the boundary cordon, flows are two per cent lower than in 2000. There is evidence of a recent increase in car flows across the central cordon, which has seen an increase of 5 per cent since 2012. This could be a result of an increase in private hire vehicles over this time period rather than private cars, however, and the central cordon encloses an area larger than the Congestion Charging zone.

Car travel by London residents

A further indicator of recent trends in car use, albeit only applying to London residents, can be taken from TfL's LTDS survey (figure 7.6). The figure in this case shows the average person trip rate by car (including both as car driver and car passenger) over the period since 2005/06. It is seen that London residents are making substantially fewer car trips per person than they were 10 years ago, with a 30 per cent decline in car trip rate since 2005/06.

Figure 7.6 Average person trip rate by car (as driver or passenger) for London residents, 2005/06-2017/18.



Source: Strategic Analysis, TfL City Planning.

7.4 Motorised traffic: Licensed taxis and private hire vehicles

Licensed taxis

Figure 7.7 shows the trend in the number of licensed taxis and private hire vehicles (PHVs), along with their drivers, within London since 2008/09. The number of licensed taxis in London has shown a gradual decline in recent years, decreasing by a further 1 per cent in 2017/18 to 21,026. The total number of licensed taxi drivers declined by 3 per cent to 23,286 in 2017/18, 7 per cent below the high in 2012/13.

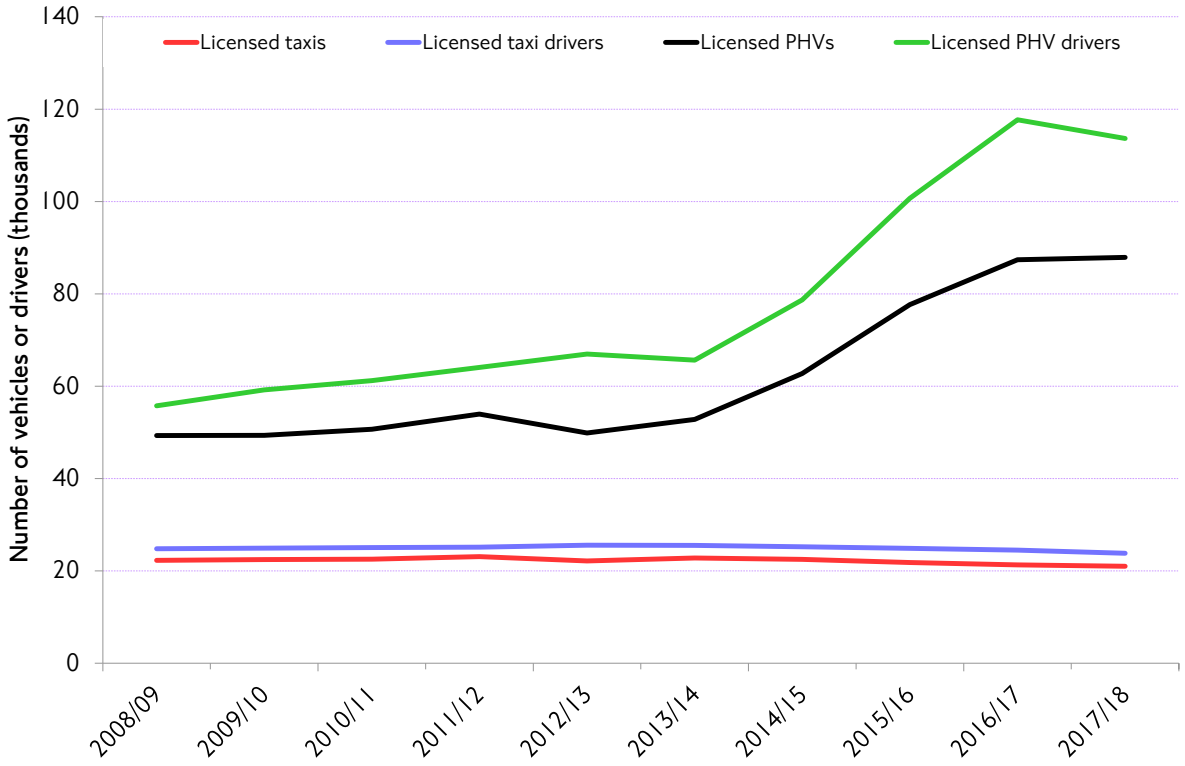
Licensed private hire

The number of licensed PHVs has increased by 78 per cent since 2008/09, up to 87,921 in 2017/18, although growth was much lower in the most recent year at just one per cent. Meanwhile the number of licensed PHV drivers decreased by 3 per cent in 2017/18, down to 113,645.

From 2008/09 through to 2012/13 the number of licensed PHV drivers grew steadily at an average rate of around 5 per cent per year. In 2016/17, the number of registered PHV drivers grew by 17 per cent, with the decline in the latest year being the first since 2013/14.

Despite the increase in the number of licensed PHVs and drivers in recent years, the number of private hire operators in London is declining. In 2017/18, there were 2,373 operators in London, a decline of 2 per cent on the previous year and a decrease of 25 per cent since 2012/13.

Figure 7.7 Recent trend of licensed London taxis and private hire vehicles, 2008/09-2017/18.



Source: Taxi and Private Hire, TfL Surface Transport.

Taxi and private hire trips

In 2017, taxi and private hire trips increased by 2.6 per cent compared with 2016, following a 9.8 per cent increase in the previous year. This is clearly linked to the increase in licensed PHVs in recent years, although it is notable that the increase in taxi and private hire trips is not as high as the increase in licensed PHVs and PHV drivers. This increase in taxi and private hire trips is particularly focused on central London and in the late evening period.

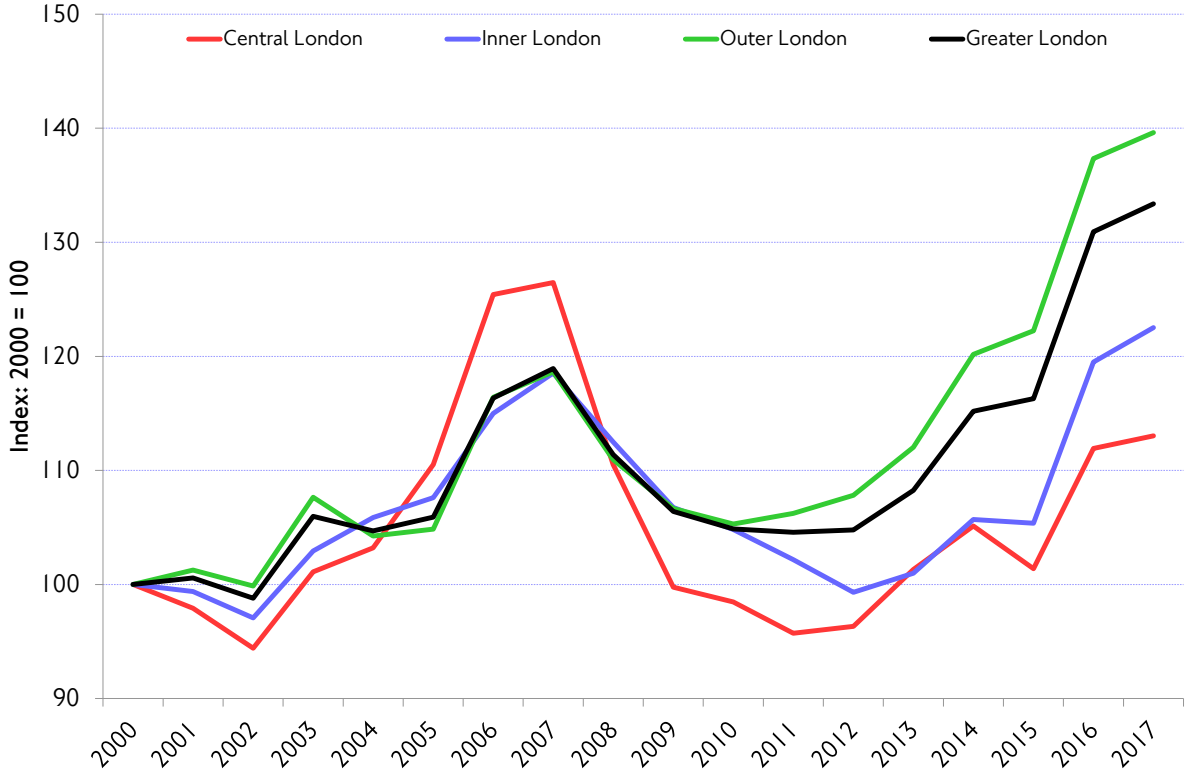
7.5 Motorised traffic: Freight

Road is by far the dominant mode for goods transport in London in terms of the weight of goods lifted – accounting for around 90 per cent of all tonnage. This section looks at trends in the volumes of road freight vehicles, in terms of vans or light goods vehicles (LGVs) and lorries or heavy goods vehicles (HGVs).

Trend in volumes of vans

Vans have been increasing in absolute terms and as a proportion of total traffic in London over recent years. Figure 7.8 shows the trend in light goods vehicle traffic (vehicle kilometres) in central, inner, outer and Greater London. Figure 7.9 is the equivalent trend in the volume of light goods vehicles crossing the central, inner and boundary cordons, corresponding to central London, the outer boundary of inner London and the GLA boundary respectively. Note that the counting cordons relate to a specific set of locations, which are optimised to measure radial traffic movements. They therefore may not be fully representative of overall traffic trends or levels 'within' the areas that they enclose, and therefore some differences between the two indicators may be expected.

Figure 7.8 Trends in LGV traffic (vehicle kilometres) in central, inner, outer and Greater London, 2000-2017.

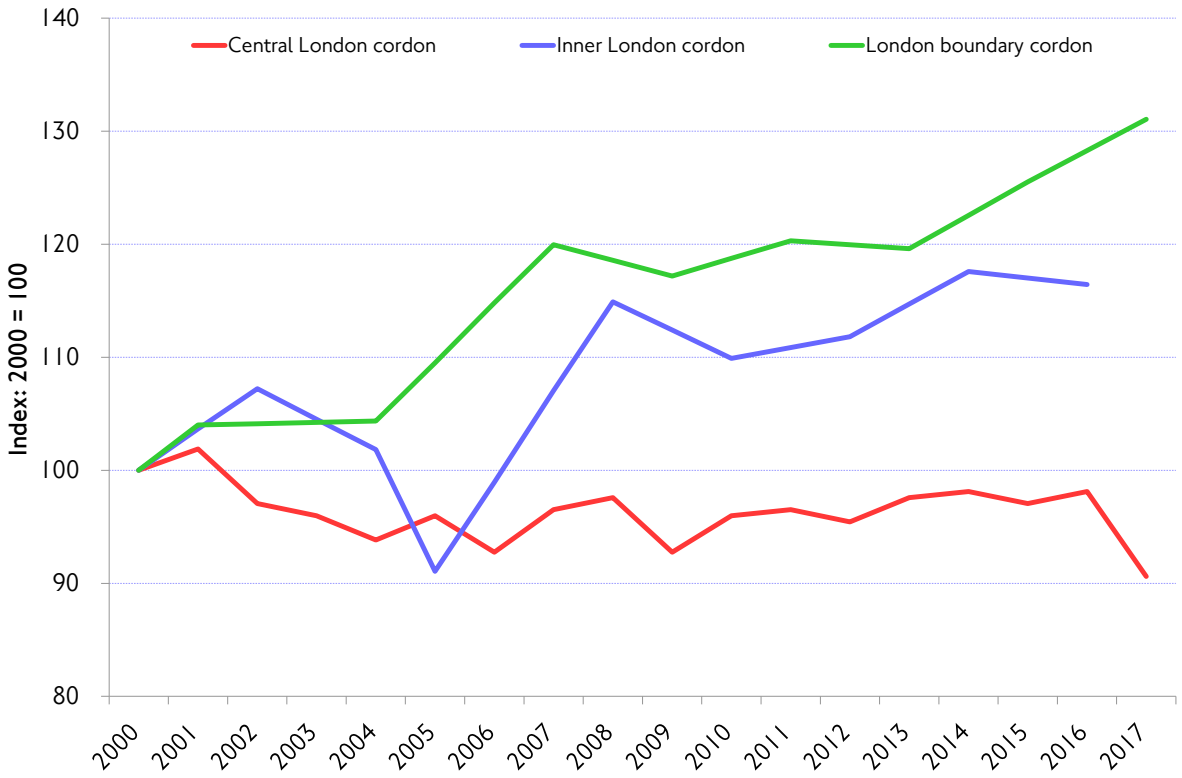


Source: Department for Transport.

Nevertheless, both figures 7.8 and 7.9 show evidence of a progressive if relatively slow increase in vans dating back to at least the mid-1990s. On a long-run basis based on figure 7.8, the average annual increase in vans (annual vehicle kilometres) over the period between 2000 and 2017 has been 0.7 per cent in central London, 1.2 per cent in inner London, 2.0 per cent in outer London and 1.7 per cent in Greater London as a whole. Cordon-based data shows a slightly different trend, with an overall decrease of 11.1 per cent at the central London cordon since 2001, an increase of 8.6 per cent at the inner cordon (since 2002), and an increase of 31 per cent at the London boundary cordon since 2000.

LGVs accounted for 16 per cent of the vehicle kilometres travelled by all motorised road vehicles in London in 2017, compared to 10 per cent in 1993 and 11 per cent in 2000.

Figure 7.9 Daily number of light goods vehicles crossings at the three cordons: 24 hour flows, 2000-2017.



Source: TfL Surface Transport, Outcomes, Insight and Analysis.

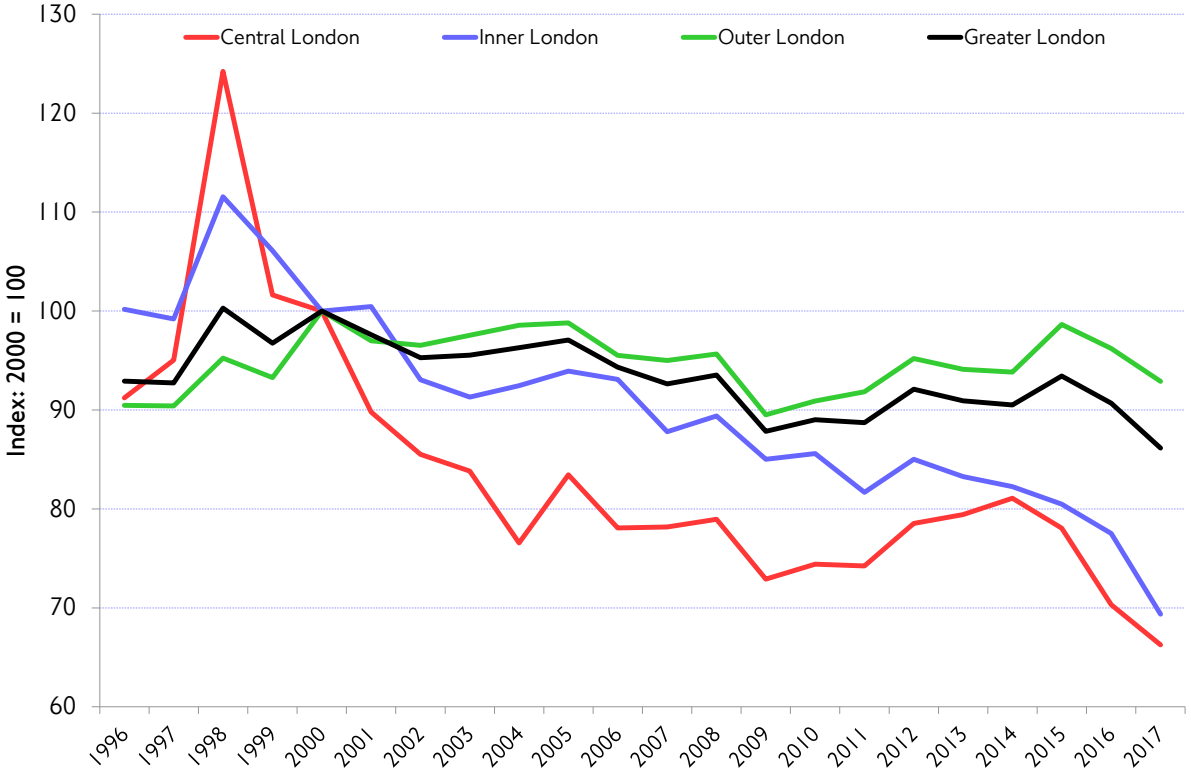
The most notable difference between figures 7.8 and 7.9 is the notional impact of the recession in the latter part of the last decade. Figure 7.8 shows this effect as being significant, with powerful growth pre-recession and an equally steep decline following it. Although perhaps intuitive, given the known connection between goods vehicle traffic and economic activity, the cordon data, however, does not clearly show this feature.

Also notable – evident from both figure 7.8 and 7.9, is that the rate of growth in central London has been relatively muted – the central cordon, for example, suggesting a generally flat trend and recent totals below those of the early 1990s. This may be considered surprising, given the acknowledged servicing needs of the growing central London economy, but it is not out of line with the equivalent trend for general traffic at this cordon, which fell by 27.6 per cent between 2000 and 2017.

Trends in the volume of heavy goods vehicles

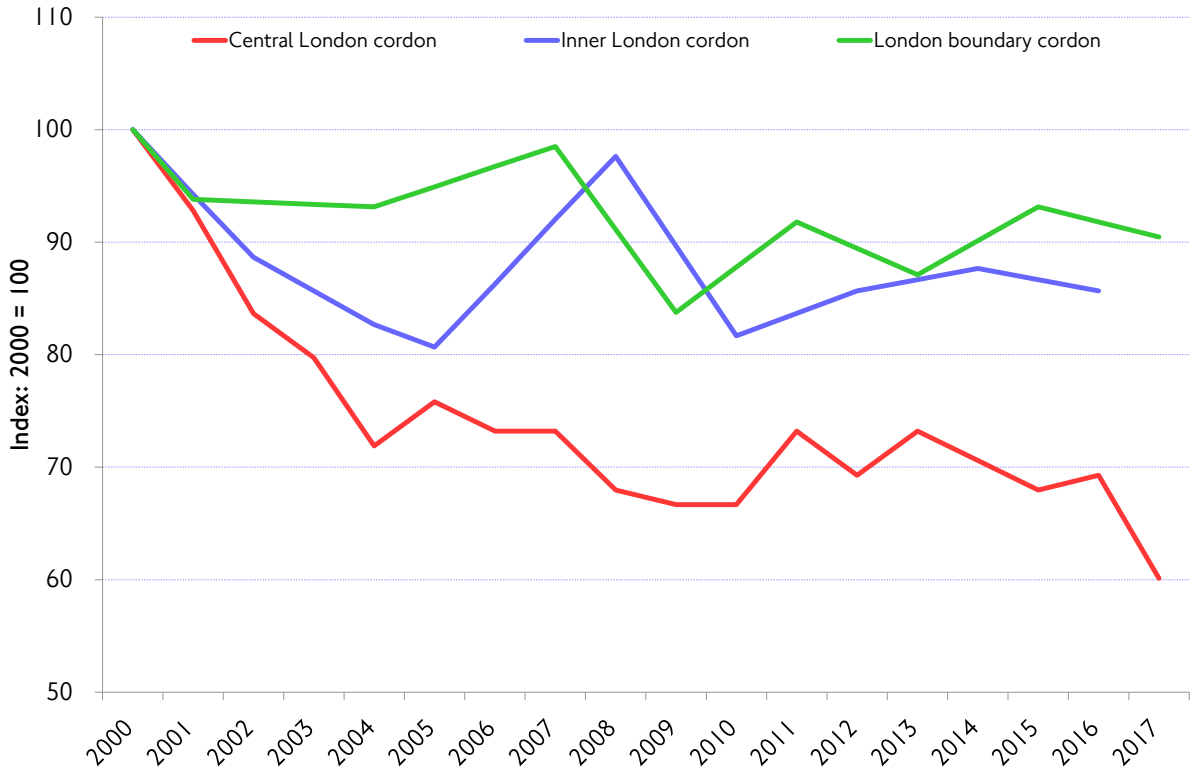
Figure 7.10 shows the trend in heavy goods vehicles traffic (vehicle kilometres) in central, inner, outer and Greater London. Figure 7.11 is the equivalent trend in the volume of HGVs crossing the central, inner and boundary cordons, corresponding to central London, inner London and the GLA boundary respectively.

Figure 7.10 Trends in HGV traffic (vehicle kilometres) in central, inner and outer London, 1996-2017.



Source: Department for Transport.

Figure 7.11 Daily number of heavy goods vehicles crossing at the three cordons: 24 hour flows, 2000-2017.



Source: TfL Surface Transport, Outcomes, Insight and Analysis.

Looking first at the vehicle kilometre data, HGV traffic has declined steadily across all areas of London, and is 14 per cent lower than in 2000 at the Greater London level. HGV traffic continued to decline in 2017, particularly in both central and inner London. In 2017 HGVs accounted for 3 per cent of total vehicle kilometres in central London, 3 per cent in inner London, 4 per cent in outer London, and 3 per cent at the Greater London level.

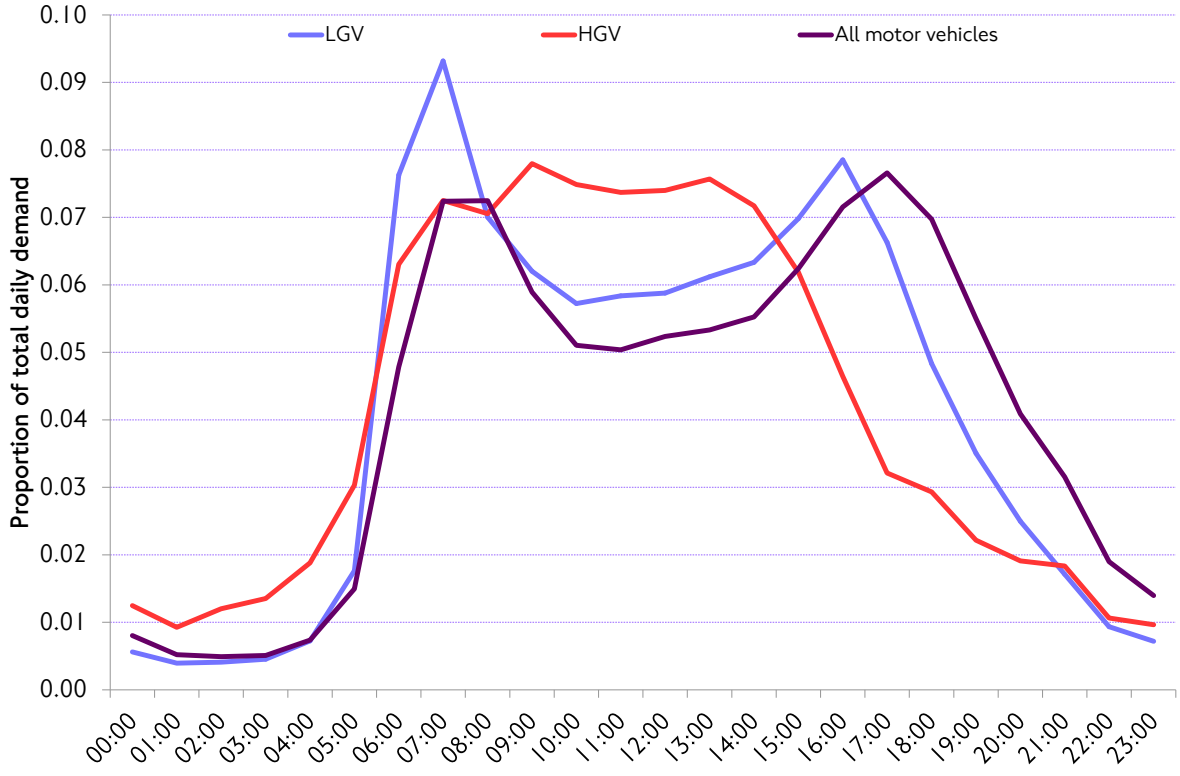
Cordon data (figure 7.11) also shows a long-term trend of decline in HGV volumes, in this case fairly consistently across all parts of London. On this basis the number of HGVs crossing the central cordon in 2017 was 35.2 per cent lower than in 2001, with equivalent reductions of 3.4 per cent for the inner cordon (from 2002), and 3.6 per cent at the London boundary cordon.

The volumetric trends for HGVs, alongside those for vans, are not what might immediately be expected in the context of a growing city over the past two decades. In central London the long-term trends broadly reflect those for general traffic, but with an apparent 'substitution' effect, with vans making up an increasing proportion of traffic in recent years at the expense of HGVs.

Temporal distribution of goods vehicle traffic in London

Figure 7.12 shows how goods vehicle traffic in Greater London is distributed across the hours of a typical day. It relates to observed vehicles crossing the three TfL cordons and the values show the percentage of the daily total of each vehicle type that each hour accounts for. It is seen that the profile for vans and HGVs differ from that for overall traffic. LGVs have an exaggerated relative peak in the morning, whereas the relative proportion of HGV movements tend to be more constant throughout the middle part of the day, falling away markedly during the afternoon.

Figure 7.12 Temporal distribution of freight movements in London.



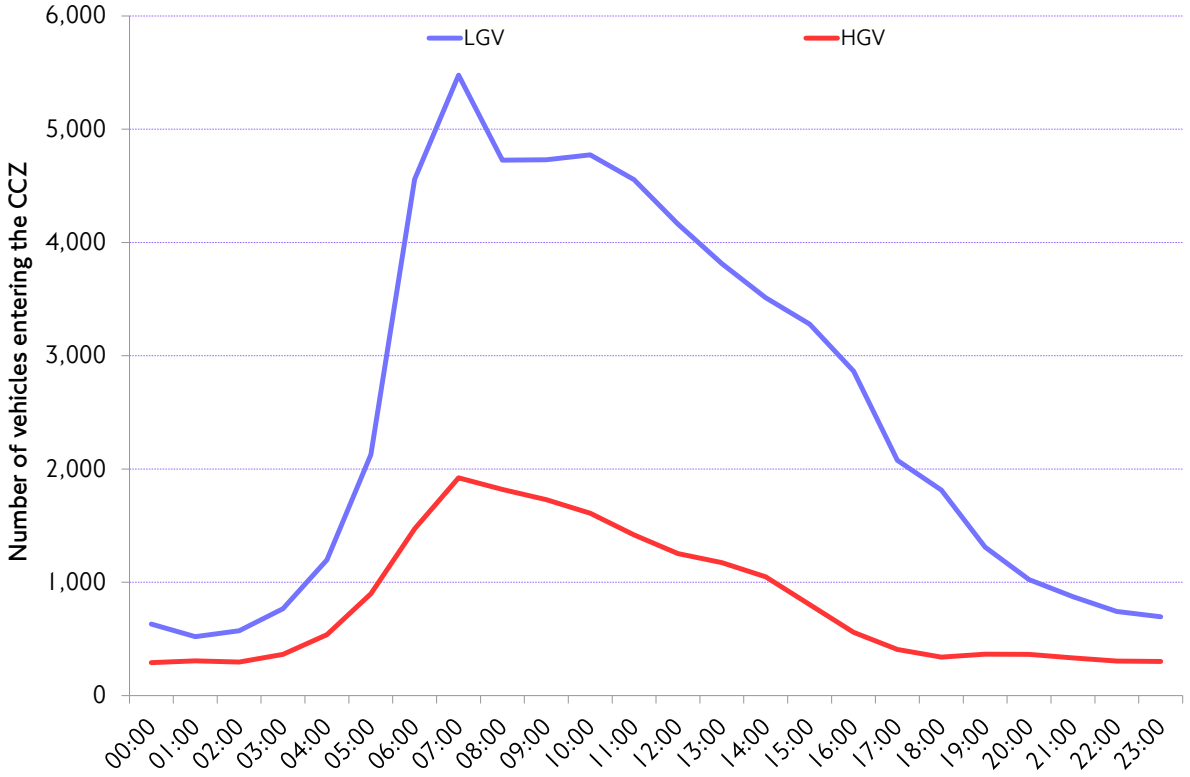
Source: TfL Cordon Counts.

Goods vehicles entering the central London Congestion Charging zone

A specific aim of the transport strategy is to reduce the number of heavy goods vehicles circulating in the central London Congestion Charging zone during the AM peak by 10 per cent by 2026, from 2016 levels. This reflects particular pressures on the road network at this time, and would help to reduce road danger.

Figure 7.13 shows the daily profile for the main freight vehicle types entering the charging zone, as an average for the 2017 calendar year.

Figure 7.13 Weekday freight vehicle entries to the central London Congestion Charging zone by vehicle type, 2017 average.



Source: TfL Surface Transport, Outcomes, Insight and Analysis.

It is immediately seen that both LGVs and HGVs are disproportionately concentrated in the early part of the day, with 5,478 vans and 1,922 lorries recorded as entering during the period 07:00 to 08:00 on an average weekday in 2017 (table 7.3). The extent to which this profile flattens over the coming years will be an indicator of progress towards this aim.

Table 7.3 Weekday freight vehicle entries to the central London Congestion Charging zone by vehicle type by hour, 2017 average.

Time	Number of LGVs	Proportion of LGVs over the whole day	Number of HGVs	Proportion of HGVs over the whole day
00:00	632	1.0%	290	1.5%
01:00	520	0.9%	306	1.5%
02:00	573	0.9%	297	1.5%
03:00	767	1.3%	364	1.8%
04:00	1,197	2.0%	537	2.7%
05:00	2,127	3.5%	899	4.5%
06:00	4,558	7.5%	1,472	7.4%
07:00	5,478	9.0%	1,922	9.7%
08:00	4,726	7.8%	1,820	9.1%
09;00	4,730	7.8%	1,730	8.7%
10:00	4,774	7.9%	1,609	8.1%
11:00	4,555	7.5%	1,418	7.1%
12:00	4,163	6.8%	1,253	6.3%
13:00	3,813	6.3%	1,173	5.9%
14:00	3,513	5.8%	1,048	5.3%
15:00	3,278	5.4%	804	4.0%
16:00	2,865	4.7%	558	2.8%
17:00	2,078	3.4%	406	2.0%
18:00	1,814	3.0%	340	1.7%
19:00	1,310	2.2%	365	1.8%
20:00	1,025	1.7%	364	1.8%
21:00	873	1.4%	332	1.7%
22:00	742	1.2%	305	1.5%
23:00	695	1.1%	301	1.5%
24 hour	**60,803**	**100%**	**19,914**	**100%**

Source: TfL Surface Transport, Outcomes, Insight and Analysis.

7.6 Road network efficiency

Redefining road network efficiency

First and foremost, London's roads should provide for the movement of people and goods, as opposed to motor vehicles per se. Limitations on the available road space and the expectation of increased population and economic activity in future mean that maximising the efficiency with which roads do this is an important objective. TfL is currently developing new measures that will assist in both baselining existing performance and tracking progress towards increasing road network efficiency. These will be described in the next Travel in London report.

Average traffic speed and vehicle delay

Historically road network efficiency has been considered in terms of average motorised traffic speeds and average vehicle delay. These two metrics are extensively described in previous Travel in London reports and continue to be updated. The following is a brief summary of recent trends in these indicators.

- Comparing equivalent periods between 2016/17 and the first nine months of 2017/18, average traffic speeds have increased in all sectors of London and in all time periods, except in outer London in the inter-peak where there was a decrease of 0.3 per cent. The largest overall increase in average traffic speed by area was in central London, by 2.7 per cent in the AM peak, 1.8 per cent in the inter-peak and 2.1 per cent in the PM peak, although the greatest single increase in speed was in outer London in the AM peak (2.9 per cent). Speeds in inner London and outer London increased by an average of 1.2 per cent and 1.0 per cent respectively.
- Similar to trends in average speeds, the greatest decreases in average vehicle delay over the most recent year were in the central area. The greatest decrease was in the AM peak (5.5 per cent), followed by the PM peak (4.3 per cent) and the inter-peak (3.2 per cent). Vehicle delay also declined in inner and outer London, by an average of 2.6 per cent and 3.7 per cent respectively.

8. Road danger, safety on public transport and local air quality

8.1 Casualties in London during 2017

Introduction

This section provides a summary analysis of personal injury road traffic collisions and casualties in Greater London in 2017 compared with 2016 and the average for the period 2005-2009. This is the baseline against which TfL measures progress towards the Mayor's aim of a 65 per cent reduction in Killed or Seriously Injured (KSI) casualties by 2022, set out in London's Vision Zero action plan. The Mayor's aim is for no one to be killed in or by a London bus by 2030, and for all deaths and serious injuries from road collisions to be eliminated from London's streets by 2041.

Changes in collision reporting by the police

From September 2016 onwards, the Metropolitan Police Service (MPS) introduced the Case Overview and Preparation Application (COPA) to report road traffic collisions. The City of London Police Service (CoLP) adopted the similar Department for Transport (DfT) Collision Reporting and SHaring (CRASH) system in September 2015. COPA and CRASH aim to bring improvements to the reporting of road safety data for London.

These systems use a new method of assessing the severity of injury sustained in collisions, as recommended by the DfT, whereby police officers record the type of injury suffered rather than their assumptions about the severity of the injury. The recording system then assigns an injury severity according to the type of injury recorded. This contrasts with the previous system where officers recorded whether, in their judgement, an injury was 'slight' or 'serious'. The use of these systems has resulted in improved accuracy in the recording of injury type, with more injuries being classified as serious rather than slight.

Data in this section is for personal injury road traffic collisions occurring on the public highway, and reported to the police, in accordance with the STATS 19 national reporting system. It should be noted that large percentage changes in small numbers may not necessarily be statistically significant. Estimated changes in the number of casualties takes into account changes in the police reporting of injury severity and online self reporting.

Key trends in 2017

The number of fatalities on London's roads increased during 2017 from the lowest level on record in 2016. There were concerning increases in the number of pedestrian fatalities, particularly those involving heavy goods vehicles, as well as increases in cyclist and car occupant fatalities. Despite reductions in motorcyclist fatalities, motorcyclists continued to make up a disproportionate number of fatalities and serious injuries given their traffic share. Child fatalities fell to the equal lowest level on record.

Taking into account changes in police reporting and online self reporting, serious casualties amongst car occupants and people cycling fell during 2017 compared to 2016. Child KSIs also fell. Despite these positive trends, pedestrian serious casualties increased, particularly those involving light goods vehicles, alongside an increase in light goods vehicle traffic in London. Child slight casualties also increased, with the greatest increase amongst pedestrians.

The data for 2017 highlights the challenge facing London in achieving Vision Zero. To further reduce the danger posed by motor vehicle journeys, road danger reduction efforts focus on four areas:

- **Safe speeds** (including ensuring all the Transport for London Road Network (TLRN) in the central London Congestion Charging zone has a 20mph limit and reducing speed limits at other locations to address areas of high road danger).
- **Safe streets** (including delivery of the Safer Junctions programme to reduce both collisions and the fear of collision at London's most intimidating junctions and ensuring that road danger reduction is central to design and delivery of all schemes).
- **Safe vehicles** (including world-leading Bus Safety Standard for the city's entire bus fleet, incorporated into all new London buses and bus operator contracts, and launching the world's first Direct Vision Standard for HGVs).
- **Safe behaviours** (including an enhanced approach to policing and enforcement, raising standards for professional drivers and providing improved and better targeted skills training and education on how to avoid road danger).

Table 8.1 Casualties in Greater London 2017. Mode of travel by severity and estimated percentage change over 2016.

Mode of travel	Fatal	Serious	Slight	Total	*% of total in 2017*
Pedestrian	73 (20%)	1,339 *(9%)**	5,240 *(10%)**	**6,652 *(10%)****	**20.4%**
Pedal cyclist	10 (25%)	675 *(-1%)*	3,836 *(-7%)**	**4,521 *(-6%)****	**13.9%**
Powered two-wheeler	31 (-6%)	1,068 *(6%)*	4,478 *(-4%)**	**5,577 *(-3%)***	**17.1%**
Car	14 (40%)	476 *(-18%)**	11,885 *(-4%)**	**12,375 *(-5%)****	**38.0%**
Taxi or private hire	0 (∞)	45 *(12%)*	859 *(4%)*	**904 *(5%)***	**2.8%**
Bus or coach	2 (100%)	106 *(-14%)*	1,644 *(2%)*	**1,752 *(1%)***	**5.4%**
Goods vehicle	1 (0%)	26 *(-19%)*	584 *(-10%)**	**611 *(-10%)****	**1.9%**
Other vehicle	0 (-100%)	15 *(58%)*	160 *(8%)*	**175 *(10%)***	**0.5%**
Total	**131 (13%)**	**3,750 *(1%)***	**28,686 *(-2%)****	**32,567 *(-1%)***	**100%**
% of total in 2017	***0.4%***	***11.5%***	***88.1%***	***100.0%***	

Source: STATS19.
Note: Asterisks (*) indicate where changes are significant at the 95 per cent confidence level, applying the Poisson probability distribution. Figures in italics show estimated percentage change in casualties which take into account changes in the reporting of collisions by the police and the introduction of online collision self reporting.

Casualties in 2017

Tables 8.1 and 8.2 show that the 27,089 collisions reported by the police during 2017 resulted in 32,567 casualties. Of these, 131 people were fatally injured, 3,750 were seriously injured, and 28,686 were slightly injured. The number of fatalities increased from 116, the lowest level on record in 2016, to 131 in 2017.

A total of 3,881 people were killed or seriously injured (KSI) in 2017. Taking into account changes in police reporting and the introduction of online self reporting, KSI casualties increased by an estimated 2 per cent in 2017 compared to 2016. Within this total the number of serious injuries increased by an estimated 1 per cent.

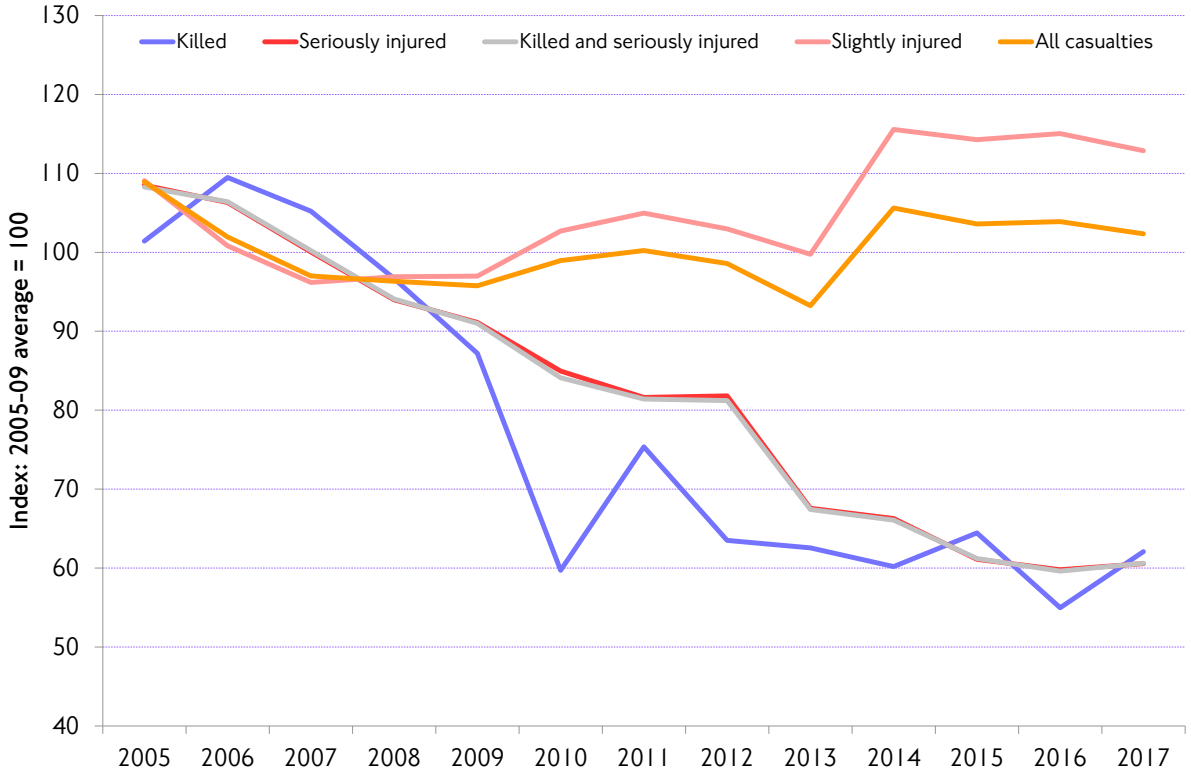
Slight injuries fell by an estimated 2 per cent to 28,686. Overall casualties in 2017 also fell by an estimated 1 per cent compared with 2016.

Table 8.2 Casualties in 2017 compared with the 2005-2009 average and 2016.

		Casualty numbers			Change in 2017 from	
Severity	**User group**	**2005-2009 average**	**2016**	**2017**	**2016**	**2005-2009 average**
Fatal	Pedestrians	96.0	61	73	20%	*-24%**
	Pedal cyclists	16.6	8	10	25%	*-40%*
	Powered two-wheeler	43.4	33	31	-6%	*-29%*
	Car occupants	49.4	10	14	40%	*-72%**
	Bus or coach occupants	2.4	1	2	100%	*-17%*
	Other vehicle occupants	3.2	3	1	-67%	*-69%*
	Total	**211.0**	**116**	**131**	**13%**	***-38%****
	Children (under 16 years)	**11.6**	**6**	**3**	**-50%**	***-74%****
Fatal and serious	Pedestrians	*[2,020.8]*	*[1,285]*	1,412	*-10%**	*-30%**
	Pedal cyclists	*[737.2]*	*[690]*	685	*-1%*	*-7%*
	Powered two-wheeler	*[1,396.8]*	*[1,042]*	1,099	*5%*	*-21%**
	Car occupants	*[1,773.1]*	*[591]*	490	*-17%**	*-72%**
	Bus or coach occupants	*[277.3]*	*[124]*	108	*-13%*	*-61%**
	Other vehicle occupants	*[197.4]*	*[85]*	87	*2%*	*-56%**
	Total	***[6,402.5]***	***[3,818]***	**3,881**	***2%***	***-39%****
	Child pedestrians	*[422.8]*	*[202]*	187	*-7%*	*-56%**
	Child pedal cyclists	*[62.5]*	*[24]*	20	*-18%*	*-68%**
	Child car passengers	*[81.5]*	*[29]*	12	*-59%**	*-85%**
	Child bus or coach passengers	*[23.4]*	*[9]*	10	*7%*	*-57%**
	Other child casualties	*[18.0]*	*[7]*	16	*123%**	*-11%*
	Children (under 16 years)	***[608.1]***	***[272]***	**245**	***-10%***	***-60%****
Slight	Pedestrians	*[3,855.9]*	*[4,748]*	5,240	*10%**	*36%**
	Pedal cyclists	*[2,672.9]*	*[4,128]*	3,836	*-7%**	*44%**
	Powered two-wheeler	*[3,592.2]*	*[4,682]*	4,478	*-4%**	*25%**
	Car occupants	*[12,843.9]*	*[12,441]*	11,885	*-4%**	*-7%**
	Bus or coach occupants	*[1,434.0]*	*[1,619]*	1,644	*2%*	*15%**
	Other vehicle occupants	*[1,017.0]*	*[1,619]*	1,603	*-1%*	*58%**
	Total	***[25,416.0]***	***[29,237]***	**28,686**	***-2%****	***13%****
	Children (under 16 years)	***[1,805.3]***	***[1,983]***	**2,152**	***9%****	***19%****
All severities	Pedestrians	*[5,876.7]*	*[6,034]*	6,652	*10%**	*13%**
	Pedal cyclists	*[3,410.0]*	*[4,818]*	4,521	*-6%**	*33%**
	Powered two-wheeler	*[4,989.0]*	*[5,724]*	5,577	*-3%*	*12%**
	Car occupants	*[14,617.0]*	*[13,032]*	12,375	*-5%**	*-15%**
	Bus or coach occupants	*[1,711.2]*	*[1,743]*	1,752	*1%*	*2%**
	Other vehicle occupants	*[1,214.5]*	*[1,704]*	1,690	*-1%*	*39%**
	Total	***[31,818.5]***	***[33,055]***	**32,567**	***-1%****	***2%****
	Children (under 16 years)	***[2,413.4]***	***[2,255]***	**2,397**	***6%****	***-1%****

Source: STATS19.
Note: Figures in square brackets [ ] are back estimated for the number of serious, slight and all casualties in the 2016 and 2005-09 baseline. Asterisks (*) and italics have the same meaning as in table 8.1.

Figure 8.1 Long-term trend for road traffic casualties in London, by injury severity, 2005-2017.



Source: STATS19.

Casualties – longer term change 2005-09 to 2017

Table 8.2 shows changes in casualties on London's roads against the 2005-09 baseline. The asterisks indicate where changes are significant at the 95 per cent confidence level, applying the Poisson probability distribution.

Comparing the number of casualties by severity in 2017 against the 2005-09 baseline:

- All fatalities were down by 38 per cent and all child fatalities were down by 74 per cent.
- All KSIs were down by an estimated 39 per cent and child casualties were also down by an estimated 60 per cent.
- Slight casualties were up by an estimated 13 per cent, and child slight casualties were up by an estimated 19 per cent.

Comparing the number of fatalities in 2017 by different road user groups against the 2005-09 baseline:

- Pedestrian fatalities were down by 24 per cent.
- Pedal cyclist fatalities were down by 40 per cent. This reduction should be seen in the context of a considerable increase in cycling over a number of years. The number of journeys cycled in London has more than doubled since 2000 to 720,000 journeys cycled each day.
- Powered two-wheeler fatalities were down by 29 per cent.

Casualty class – 2017

Data for 2017 show that vulnerable road users (pedestrians, pedal cyclists and powered two wheeler users) made up more than half (51 per cent) of all casualties on London's roads. Of this total, vulnerable roads users made up 114 out of 131 fatalities (87 per cent) and 3,196 out of 3,881 KSI casualties (82 per cent) in 2017.

Pedestrians accounted for

- 20 per cent of all casualties
- 36 per cent of all serious injuries
- 56 per cent of all fatalities
- 27 per cent of modal share (journey stages)

Pedal cyclists accounted for

- 14 per cent of all casualties
- 18 per cent of all serious injuries
- 8 per cent of all fatalities
- 3 per cent of modal share (journey stages)

Riders or passengers of powered two wheelers accounted for

- 17 per cent of all casualties
- 28 per cent of all serious injuries
- 24 per cent of all fatalities
- 1 per cent of modal share (journey stages)

Car occupants accounted for

- 38 per cent of all casualties
- 13 per cent of all serious injuries
- 11 per cent of all fatalities
- 42 per cent of modal share (journey stages)

Bus or coach occupants accounted for 5 per cent of all casualties, and **taxi or private hire occupant** casualties for fewer than 3 per cent of all casualties. **Goods vehicle occupants** (including light, medium and heavy goods vehicles) accounted for less than 2 per cent of all casualties.

Casualties – changes between 2016 and 2017

Pedestrian fatalities increased from 61 in 2016 to 73 in 2017, with a large goods vehicle involved in 22 fatalities in 2017 compared to 14 during 2016. Pedestrian KSI casualties decreased by an estimated 10 per cent, with the involvement of light goods vehicles increasing from 6 per cent to 9 per cent of all pedestrian KSIs. Slight injuries increased by an estimated 10 per cent, with the involvement of light goods vehicles increasing from 6 per cent to 7 per cent of slight pedestrian casualties. All casualties increased by an estimated 10 per cent. Increases in the involvement of light goods vehicles should be seen in the context of a 2 per cent increase in light goods vehicle traffic in London during 2017 compared to 2016.

There were 10 **pedal cyclist** fatalities in 2017 compared to 8 in 2016, which was the lowest level on record, and no cycle hire or pedicab rider fatalities. Pedal cyclist KSI casualties fell by

an estimated 1 per cent. Slight injuries also fell by an estimated 7 per cent and all pedal cycle casualties fell by an estimated 6 per cent. There were 7 cycle hire rider serious casualties and 83 slight casualties, and 5 pedicab rider slight casualties.

Powered two-wheeler fatalities fell from 33 in 2016 to 31 in 2017. However, KSI casualties increased by an estimated 5 per cent. Slight injuries fell by an estimated 4 per cent and all casualties fell by an estimated 3 per cent. Motorcycle traffic fell by 0.5 per cent in 2017 compared to 2016.

Car occupant fatalities increased from 10 in 2016, the lowest level on record, to 14 in 2017, which is the second lowest level on record. KSI casualties fell by an estimated 17 per cent. The number of slight injuries fell by an estimated 4 per cent and all car occupant casualties fell by an estimated 5 per cent.

There were no **taxi or private hire vehicle occupant** fatalities, however all casualties increased by an estimated 0.5 per cent to 904 casualties. Of all licenced vehicles, 80 per cent were private hire vehicles during 2016/17. Reflecting their greater mode share compared to taxis, just over two thirds (67 per cent) of all taxi or private hire casualties were private hire vehicle occupants.

All **goods vehicle occupant** casualties fell by an estimated 10 per cent to 611. Heavy goods vehicle traffic fell by 5 per cent between 2016 and 2017; however light goods vehicle traffic increased by 2 per cent.

Bus or coach occupant casualties increased by 1 per cent to 1,752. A total of 10 fatalities involved a bus, which included two bus occupants. Bus occupant KSIs fell by an estimated 13 per cent between 2016 and 2017, to 108 KSIs and the lowest level on record. Of all casualties involving a bus or coach, 95 per cent involved a bus. The number of KSIs in or involving a bus was estimated to be 54 per cent down on the 2005-09 baseline in 2017.

Table 8.3 Casualties in Greater London in 2017 – casualty class by vehicle.

Vehicle involved	Casualty class in 2017 *(and percentage of total)*			
	Driver/rider	Passenger	Pedestrian	Total
Pedal cycle	4,513 *(23%)*	8 *(0%)*	305 *(5%)*	**4,826 *(15%)***
Powered two-wheeler	5,460 *(27%)*	117 *(2%)*	716 *(11%)*	**6,293 *(19%)***
Car	8,736 *(44%)*	3,639 *(61%)*	4,063 *(61%)*	**16,438 *(50%)***
Taxi or private hire	535 *(3%)*	369 *(6%)*	475 *(7%)*	**1,379 *(4%)***
Bus or coach	93 *(0%)*	1,659 *(28%)*	363 *(5%)*	**2,115 *(6%)***
Goods vehicle	487 *(2%)*	124 *(2%)*	616 *(9%)*	**1,227 *(4%)***
Other vehicle	123 *(1%)*	52 *(1%)*	114 *(2%)*	**289 *(1%)***
Total	**19,947 *(100%)***	**5,968 *(100%)***	**6,652 *(100%)***	**32,567 *(100%)***
% of total in 2017	***61.2%***	***18.3%***	***20.4%***	***100.0%***

Source: STATS19.
Note: Figures in italics show estimated percentage change in casualties which take into account changes in the reporting of collisions by the police and the introduction of online collision self reporting.

Casualty class and associated vehicle

Table 8.3 shows the casualty class and type of vehicle directly associated with each casualty during 2017. For driver/riders and passengers, this represents the vehicle the person suffering personal injury was driving, riding or travelling in at the time of the collision. For pedestrians, it is the vehicle by which they were injured.

In 2017:

- **Of driver/rider casualties,** 44 per cent were car drivers, however motorcyclists made up 27 per cent of casualties followed by cyclists who made up 23 per cent of casualties.
- **Of passenger casualties,** 61 per cent were car passengers followed by bus or coach passengers who made up 28 per cent of casualties.
- **Of pedestrian casualties,** 61 per cent suffered injury in a collision with a car, followed by 11 per cent injured in a collision with a motorcycle and 8 per cent injured in a collision with a light goods vehicle. Of all pedestrians injured, 1 per cent resulted from a collision with a heavy goods vehicle. The involvement of light goods vehicles in pedestrian injury increased from 6 per cent of all injuries in 2016 to 8 per cent in 2017.

Gender of casualty - 2017

In 2017, table 8.4 shows that males accounted for 64 per cent and females for 36 per cent of casualties. It shows considerable variation in the proportion of male to female casualties for different modes of travel which, in part, reflects the different travel choices made by men and women.

Males accounted for 94 per cent of powered two-wheeler casualties, with on average of 87 per cent of all motorcycle journeys being made by men in 2016/17. Males also accounted for 76 per cent of pedal cyclist casualties, with 72 per cent of cycle journeys being made by men.

Of pedestrian casualties, 55 per cent were male and 45 per cent female, with men making on average 46 per cent and women 54 per cent of walking journeys.

Of car occupant casualties, 53 per cent were male and 47 per cent female, with men making on average 48 per cent and women 52 per cent of car journeys. Analysis of car occupants shows that males accounted for 58 per cent of car driver casualties and 54 per cent of car driver journeys, and females made up 59 per cent of car passenger casualties and 61 per cent of car passenger journeys.

Females accounted for 67 per cent of bus or coach occupant casualties, making on average 55 per cent of bus journeys in 2016/17.

Table 8.4 Casualties in Greater London in 2017 – mode of travel by age group and gender.

Mode of travel	Age group					Gender		Total
	0-15	16-24	25-59	60+	Unknown	Male	Female	
Pedestrian	1,201	1,033	3,337	971	110	3,654	2,998	**6,652**
Pedal cyclist	144	648	3,497	136	96	3,453	1,068	**4,521**
Powered two-wheeler	33	1,574	3,809	99	62	5,228	349	**5,577**
Car	730	2,294	7,974	1,063	314	6,556	5,819	**12,375**
Taxi or private hire	27	96	695	73	13	657	247	**904**
Bus or coach	251	95	826	550	30	572	1,180	**1,752**
Goods vehicle	7	64	495	35	10	561	50	**611**
Other vehicle	4	22	132	16	1	130	45	**175**
Total	**2,397**	**5,826**	**20,765**	**2,943**	**636**	**20,811**	**11,756**	**32,567**
% of total in 2017	**7.4%**	**17.9%**	**63.8%**	**9.0%**	**2.0%**	**63.9%**	**36.1%**	**100.0%**

Source: STATS19.

Casualty age groups – 2017

Table 8.4 also shows a wide variation in casualties according to age group for each mode of travel. Age was known for 98 per cent of all casualties in 2017.

Of young adult casualties (16-24 years), 39 per cent were car occupants, 27 per cent were powered two-wheeler users, 18 per cent were pedestrians, and 11 per cent were pedal cyclists.

Of adult casualties (25-59 years), 38 per cent were car occupants, 18 per cent were powered two-wheeler users, 17 per cent were pedal cyclists and 16 per cent were pedestrians.

Of older road user casualties (60 years and over), the largest groups were car occupants (36 per cent), pedestrians (33 per cent) and bus or coach occupants (19 per cent).

Child casualties – 2017

Table 8.5 shows that for child casualties (under 16 years), 50 per cent were pedestrians, 30 per cent were car occupants, 10 per cent were bus or coach passengers and 6 per cent were pedal cyclists.

During 2017, three child pedestrians were killed, a decrease from six in 2016 and the equal lowest level on record. Child serious casualties fell by an estimated 9 per cent to 184 casualties. However, child slight casualties increased by an estimated 9 per cent to 2,152 and overall child casualties increased by an estimated 6 per cent in 2017 compared to 2016.

Table 8.5 Casualties in Greater London in 2017 – child casualties (under 16) – mode of travel by severity and percentage change over 2016.

Mode of travel	Severity of casualty in 2017 *(and percentage change over 2016)*				
	Fatal	Serious	Slight	Total	*% of total in 2017*
Pedestrian	3 *(-25%)*	184 *(-7%)*	1,014 *(18%)**	1,201 *(13%)**	**50.1%**
Pedal cyclist	0 *(-100%)*	20 *(-15%)*	124 *(-21%)**	144 *(-21%)**	**6.0%**
Powered two-wheeler	0 *(∞)*	14 *(163%)**	19 *(189%)**	33 *(177%)**	**1.4%**
Car	0 *(-100%)*	12 *(-57%)**	718 *(-1%)*	730 *(-3%)*	**30.5%**
Taxi or private hire	0 *(∞)*	1 *(0%)*	26 *(61%)*	27 *(54%)*	**1.1%**
Bus or coach	0 *(∞)*	10 *(7%)*	241 *(27%)**	251 *(27%)**	**10.5%**
Goods vehicle	0 *(∞)*	0 *(∞)*	7 *(-41%)*	7 *(-42%)*	**0.3%**
Other vehicle	0 *(∞)*	1 *(∞)*	3 *(-80%)**	4 *(-74%)**	**0.2%**
Total	**3 *(-50%)***	**242 *(-9%)***	**2,152 *(9%)****	**2,397 *(6%)****	***100.0%***
% of total in 2017	***0.1%***	***10.1%***	***89.8%***	***100.0%***	

Source: STATS19.
Note: Asterisks (*) indicate where changes are significant at the 95 per cent confidence level, applying the Poisson probability distribution. Figures in italics show estimated percentage change in casualties which take into account changes in the reporting of collisions by the police and the introduction of online collision self reporting.

Casualty and collision variation throughout London – 2017

In terms of the spatial distribution of casualties and in 2017 compared to 2016:

- The total numbers of casualties fell by an estimated 1 per cent in inner London and by 2 per cent in outer London.
- Pedestrian casualties increased by an estimated 10 per cent in inner London and fell by 11 per cent in outer London.
- Pedal cyclist casualties fell by an estimated 3 per cent in inner London and fell by 12 per cent in outer London.

- Powered two-wheeler casualties fell by an estimated 3 per cent in inner London and fell by 2 per cent in outer London.
- Car occupant casualties fell by an estimated 7 per cent in inner London and fell by 4 per cent in outer London.

In terms of severity and comparing 2017 with 2016:

- Fatalities fell by 4 per cent in inner London to 54 but increased by 28 per cent in outer London to 77 fatalities.
- Serious injuries increased by an estimated 3 per cent in inner London and are estimated to have fallen slightly in outer London, by less than 0.5 per cent.
- KSI casualties increased by an estimated 3 per cent in inner London and increased by an estimated 1 per cent in outer London.
- Slight casualties fell by an estimated 2 per cent in inner London and also fell by an estimated 2 per cent in outer London.
- Overall all casualties fell by 1 per cent in inner London and fell by 2 per cent in outer London.

Vehicle involvement

In 2017 compared to 2016:

- Cars made up 47 per cent of all vehicles (including cyclists and motorcyclists) involved in collisions in inner London, a reduction from 48 per cent in 2016, and 69 per cent of collisions in outer London.
- Pedal cyclists made up 15 per cent of vehicles involved in collisions in inner London and 6 per cent of collisions in outer London, the same proportions as 2016.
- Motorcyclists made up 17 per cent of vehicles involved in collisions in inner London, an increase from 16 per cent in 2016, and 11 per cent of collisions in outer London.
- Goods vehicles (including light, medium and heavy goods vehicles) made up 8 per cent of vehicles involved in collisions in inner London and 7 per cent of collisions in outer London, the same proportions as 2016.
- Taxi and private hire vehicles made up 7 per cent of vehicles involved in collisions in inner London and 3 per cent of collisions in outer London, the same proportions as 2016.
- Buses and coaches made up 5 per cent of vehicles involved in collisions in inner London and 4 per cent of collisions in outer London, an increase from 3 per cent in 2016.

It is important to note that vehicles may be involved in a collision but not in direct contact with another road user.

8.2 Public transport safety and security

Introduction

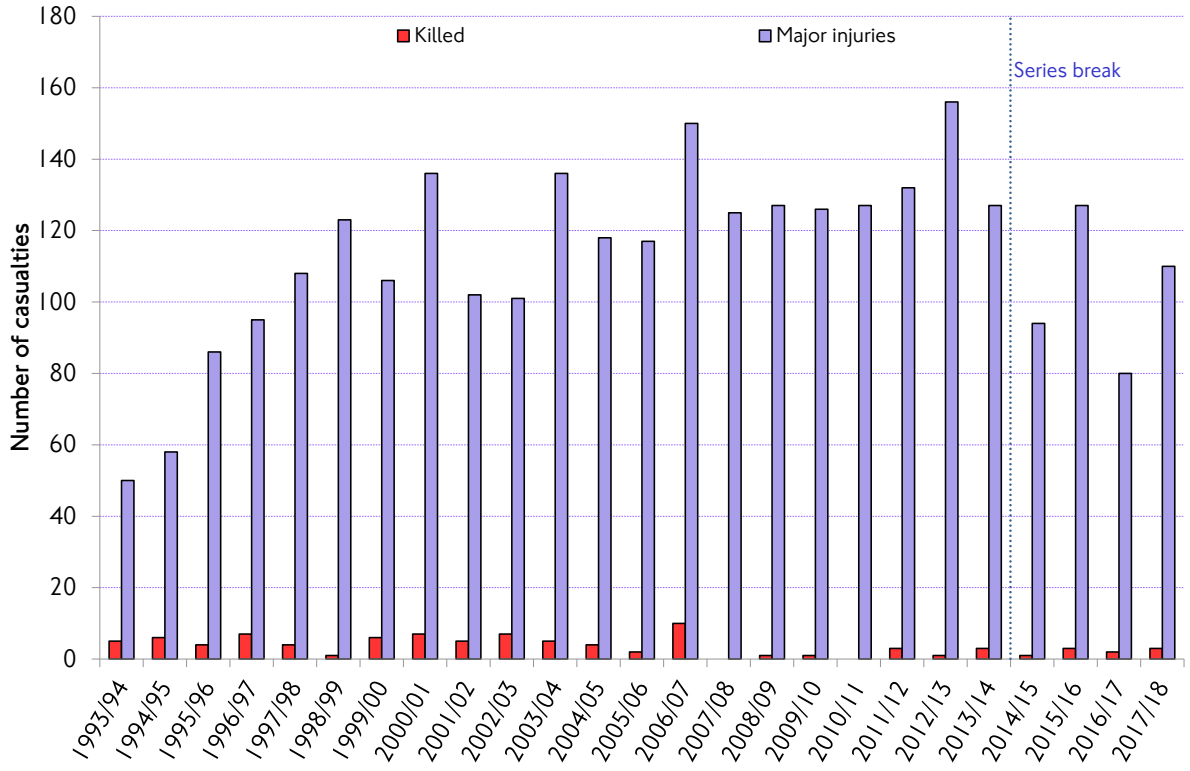
Customers need to be confident that the public transport networks are safe – both in terms of risk of injury from operational incidents and freedom from crime and fear of crime. London's public transport networks offer a safe, low-crime environment. However, after many years of safe operation, there was a major tram derailment at Sandilands Junction in November 2016, in which seven people lost their lives and more than 50 people were injured. This tragedy serves as a reminder that safety is paramount. This section reviews trends relating to customer injury and crime on the principal public transport networks.

Customer injuries

Figures 8.2 and 8.3 show the trend in passenger injuries and fatalities on the principal public transport networks up to the 2017/18 financial year. Figure 8.2 shows the trend for London Underground (excluding other rail modes) and figure 8.3 shows the trend for bus and coach occupants.

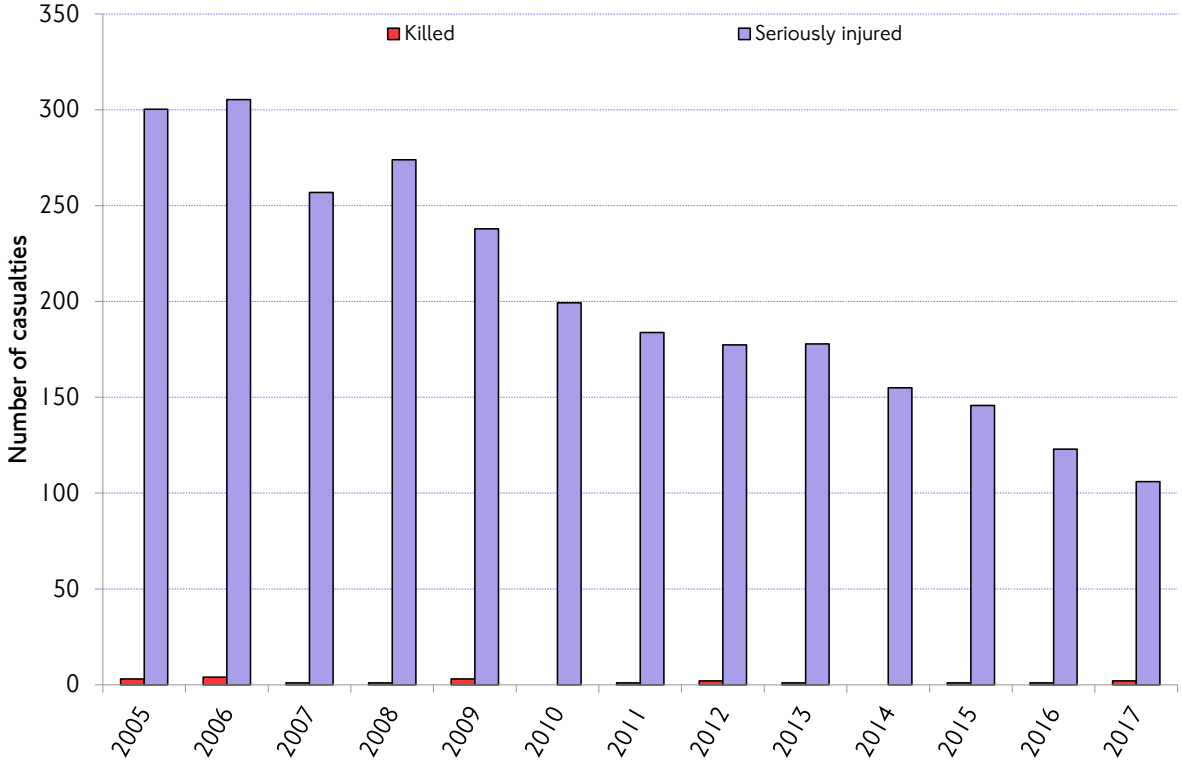
- On the Underground during 2017/18 there were 110 major passenger injuries and three fatalities, an increase on the previous year.
- In 2017, 106 bus or coach occupants were seriously injured in London, with two fatalities. These casualty numbers exclude pedestrian and other vehicle users who might have been injured in collisions involving buses or coaches.

Figure 8.2 Number of people killed or injured while travelling on the London Underground, 1993/94-2017/18.



Source: London Underground.
Note: Excludes suicides and victims of assault and terrorist activity.

Figure 8.3 Number of bus/coach occupants killed or seriously injured in London, 2005-2017.

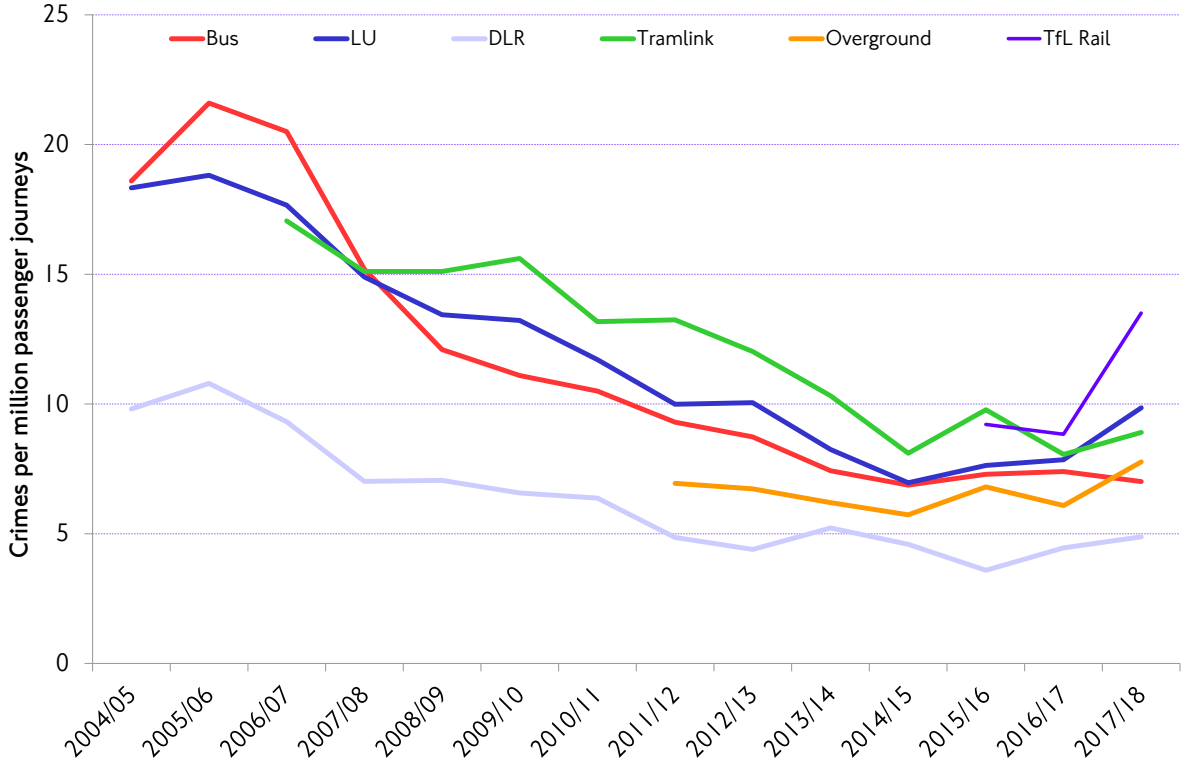


Source: Strategic Analysis, TfL City Planning.
Note: Excludes suicides and victims of assault and terrorist activity.

Crime and antisocial behaviour

Currently, over ten million passengers travel on TfL's public transport services each day with very few of them ever experiencing or witnessing crime. In 2017/18, however, levels of transport crime increased on most modes (except bus). However, it should be noted that comparability of reported crime statistics across years may be affected by initiatives to encourage reporting of crime (figure 8.4).

Figure 8.4 Reported crime on TfL's public transport networks, 2004/05-2017/18.



Source: TfL Enforcement and on-street operations.

Tackling transport crime and disorder is one of TfL's main priorities because crime, antisocial behaviour and the fear or crime can have a major effect on people's willingness to travel. Improving safety and security will help improve the quality of life and make London a fairer and more prosperous city. TfL is continuing efforts to reduce crime and antisocial behaviour and to identify opportunities and areas for improvement so that Londoners feel safe travelling at any time of day or night.

8.3 Air quality – Low Emission Bus Zones

Introduction and context

Ongoing monitoring and modelling of air quality in London continues to show that many roadside locations across the Capital are exceeding air quality limits and the Mayor is determined to reduce these and achieve compliance with air quality limit values for London.

In August 2016 the Mayor announced London's first Low Emission Bus Zone (LEBZ) with a total of 12 planned across London by 2020. The aim of these zones is to deliver improved air quality as quickly as possible, in advance of and alongside the many air quality measures being implemented and planned across London.

The location of the LEBZs was determined based on estimates of the relative contribution of emissions that TfL buses contribute on roads links, alongside air quality concentrations, and other criteria including:

- Pollutant concentrations were estimated to be above the legal limits for NO_2 (40ug/m^3 annual mean) in 2013 and 2020.
- Buses were forecast to contribute 40 per cent or more of road transport NOx on road links in 2020.

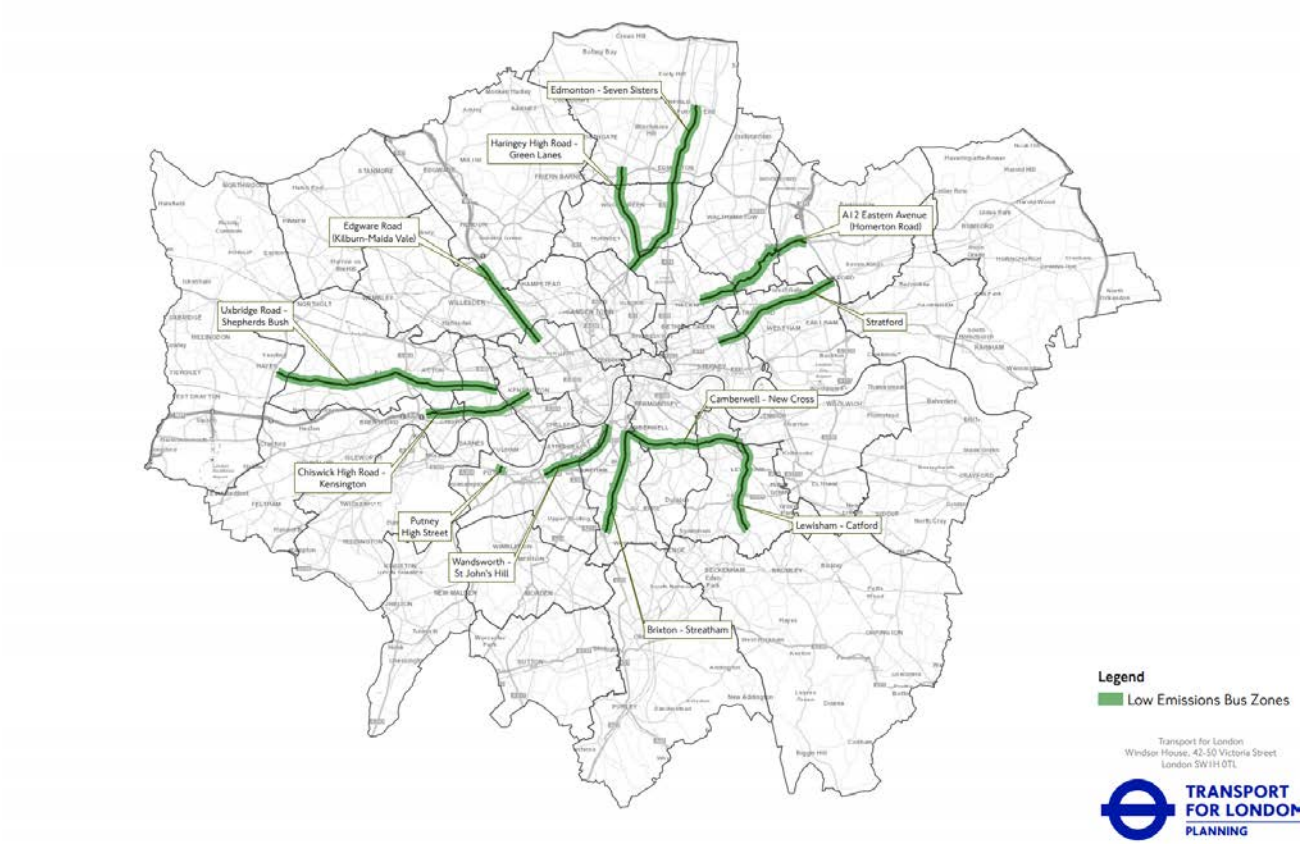
- Population exposure was considered in terms of location of Focus Areas established as key areas with high population exposure to poor air quality as part of the LLAQM (London Local Air Quality Management) regime.
- Population deprivation indices.
- Located close to schools.
- Located outside of the central London Ultra Low Emission Zone (ULEZ, due to come into operation in April 2019), as all TfL buses operating in the central London ULEZ will meet the highest Euro VI standard.

As part of the LEBZ, key routes within these corridors will be Euro VI or better for NO_x emissions. Euro VI buses are significantly cleaner than Euro IV or V buses with emissions reductions of around 85 per cent. Through delivering cleaner buses on targeted bus routes which operate on these corridors, substantial emissions reductions will be achieved, which will contribute to improving air quality locally.

Location of LEBZs

Twelve LEBZs have been designed as shown in figure 8.5 with the first seven being delivered by November 2018; dates when the other LEBZs are expected to be delivered are listed in table 8.6.

Figure 8.5 Low Emission Bus Zones in London.



Source: Strategic Analysis, TfL City Planning.

Table 8.6 Low Emission Bus Zones in London.

Name of LEBZ	Delivery Date
Putney High Street from Putney Station to Putney Bridge Road	March 2017
Brixton to Streatham from Brixton Road, along Brixton Hill, Streatham Hill and Streatham High Road	December 2017
A12 Eastern Avenue from Homerton High Street along Homerton Road, Warren Road, Gainsborough Road, Cambridge Park Road to Eastern Avenue	October 2018
Lewisham to Catford from Bromley Road, along Lewisham High Street to Lewisham Road	by end of 2019
Stratford from Mile End Road to Romford Road	by end of 2019
Haringey from High Road to Green Lanes	August 2018
Camberwell to New Cross from Camberwell New Road, along Peckham High Street to New Cross Road	August 2018
Wandsworth to St John's Hill from Lavender Hill to Wandsworth Road	August 2018
Edgware Road (Staples Corner to Maida Vale) from Cricklewood Broadway via Shoot-Up Hill to Kilburn High Road	November 2018
Edmonton to Seven Sisters from Hertford Road High Street via Fore Street to Seven Sisters Road	by end of 2019
Uxbridge Road to Shepherds Bush from Uxbridge Road via Ealing Broadway, The Vale to Uxbridge Road	by end of 2019
Chiswick High Road to Kensington from Chiswick High Road via Hammersmith Broadway to Kensington High Street	by end of 2019

Source: Strategic Analysis, TfL City Planning.

Air quality benefits due to LEBZ

Within each LEBZ buses with engines and exhaust systems that meet or exceed the highest Euro VI emissions standards will operate. This is true for all routes except a small number that cross a LEBZ for a very short distance and do not stop within the LEBZ. Taking into account the Euro standard of buses in 2016 – before the LEBZ were launched – and the Euro standards of the buses upon delivery of the LEBZ the estimated emissions savings of NOx are shown in table 8.7.

Table 8.7 LEBZ NO_x emissions reductions.

NOx Emissions	Emissions before LEBZ (tonnes) (2016)	Emissions after LEBZ (tonnes) (2018)	Savings (tonnes)	Reduction
Putney High Street	20	3	17	87%
Brixton - Streatham	82	9	73	89%
Camberwell - New Cross	104	11	93	90%
Wandsworth - St. John's Hill	53	5	48	91%
High Road (Haringey) – Green Lanes	86	7	79	92%
A12 Eastern Avenue (Homerton Rd)	59	5	54	91%
Edgware Road (Kilburn to Maida Vale)	43	5	39	90%
Total	**447**	**44**	**403**	**90%**

Source: Strategic Analysis, TfL City Planning.

This shows substantial reductions in NO_x emissions from TfL buses due to the implementation of the LEBZ. In the context of London wide bus emissions, the savings due to LEBZ alone represent about an 8 per cent reduction in bus emissions, or about 400 tonnes of NOx.

Impact of LEBZ on air quality concentrations

NO_2 monitoring data is available within four of the LEBZ that have been delivered and the data for 2016 and 2018 is summarised below in tables 8.8 and 8.9. Within each LEBZ significant improvements in air quality have been measured, in particular in Putney where annual mean concentrations have almost halved since 2016. The number of exceedances of the hourly NO_2 limit has dramatically reduced across the monitoring sites, reflecting improvements in short-term exposure to high levels of NO_2.

Table 8.8 Annual mean NO_2 concentrations monitored within LEBZ.

	Annual average in 2016 [µg m^{-3}]	Annual average in 2018[1] [µg m^{-3}]	Reduction	Legal limit
Putney High Street (Façade)	110	58	47%	40
Brixton - Streatham	118	98	17%	40
Camberwell - New Cross	46	43	11%	40
Wandsworth - St. John's Hill	45	43	4%	40

Source: Strategic Analysis, TfL City Planning.
1: To November 2018 except Brixton is end of August 2018 due to flooding.

Table 8.9 Number of hourly NO_2 concentrations exceeding 200 µg/m^3 monitored within LEBZ.

Number of Hours Exceeding 200ug/m^{-3}	Hours in 2016	Hours in 2018[1]	Reduction	Legal limit
Putney High Street (Façade)	807	2	99%	18
Putney High Street (Kerbside)	1,272	25	98%	18
Brixton - Streatham	539	83	85%	18
Camberwell - New Cross	0	0	-	18
Wandsworth - St. John's Hill	23	0	100%	18

Source: Strategic Analysis, TfL City Planning.
1: To November 2018 except Brixton is end of August 2018 due to flooding.

Lessons learned

Whilst it is clear that significant improvements in air quality have been brought about by policies including the LEBZ, a large number of factors play a role in air quality. Buses are only one contributor to road transport emissions, and the other traffic, along with weather influences, pollution from outside London, and on going activities which affect traffic flows and network performance all play a role.

It is important that as we implement policies that we learn from the operation and gain understanding of issues that can arise, especially where new technology is used. As part of the LEBZ some buses have been retrofitted with devices that reduce NOx and NO_2 emissions – these are called Selective Catalytic Reduction (SCR) systems. These systems are most efficient when the engine is working hard (ie when moving at speed or driving a heavy bus full with passengers). However where buses are sitting in stationary traffic for long periods of time the catalyst cools down and the NO_2 is not efficiently removed. This is particularly the case for retrofitted buses as they rely solely on the SCR for NOx reduction.

There is also potential for the SCR to be less efficient if it not properly maintained – which means tailpipe emissions of NO_2 can increase considerably.

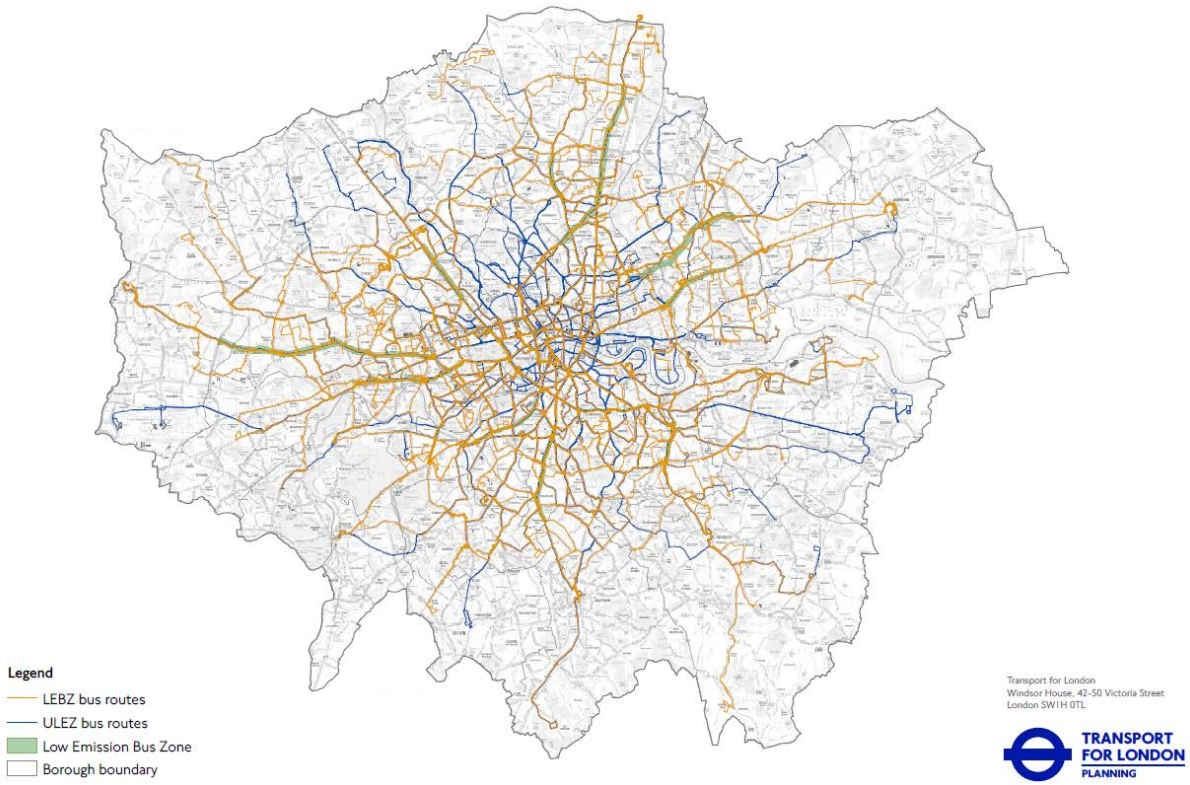
Through ongoing liaison with the bus operators it was discovered that some of the SCR systems in the Brixton Road LEBZ were experiencing crystallisation towards the end of 2017. Working with the operators the issue has been rectified by installation of an improved Adblue mixer. In addition, investigations undertaken by King's College London and analysis of the performance of the bus network in the Brixton area has also highlighted a general slow

down in traffic, with heavy congestion, likely reflecting a period of gas works. This combination of factors means that the SCR systems were initially performing less efficiently and were likely to have contributed to some slight increases in NO_2 concentrations after the initial significant reductions when the LEBZ was introduced.

Wider benefits

The benefits of the emissions reductions from the LEBZ will be seen on wider scale than the zones themselves – the benefits occur across the whole of the routes affected and not just in the LEBZ themselves. Figure 8.6 shows how extensively the emissions benefits from cleaner routes through LEBZ (orange lines) occur across London. The blue lines are the routes that are being upgraded as part of the ULEZ in central London which will come into operation in April 2019 – all of these buses will meet the Euro VI standard or better.

Figure 8.6 Cleaner bus routes in London.



Source: Strategic Analysis, TfL City Planning.

The LEBZ are an early measure implemented by TfL in order to provide rapid improvements to air quality as in interim and complementary step to improving air quality. A number of measures continue to be planned and implemented including:

- An emissions surcharge (T-Charge) on top of the Congestion Charge, to deter older polluting vehicles from central London.
- Introducing the world's first Ultra Low Emission Zone (ULEZ) in April 2019.
- Expanding the ULEZ in 2021 to the North and South Circular roads for all vehicles and London-wide for lorries, coaches and buses from 2020.
- Transforming the whole of London's bus fleet by phasing out pure diesel buses and purchasing only hybrid or zero-emission double decker buses from 2018, with the entire fleet becoming 'zero-emission' by 2037.

- No longer licensing new diesel taxis from 2018 and supporting the upgrade to much cleaner 'zero emission capable' vehicles.
- Reducing traffic volumes by encouraging mode shift from car to walking, cycling and public transport so that 80 per cent of all trips in London are made by active, efficient and sustainable modes by 2041.

The reduction in emissions and improvements in air quality within the LEBZ show the importance of targeted measures, but the more extensive measures set out by the Mayor are necessary to bring levels of NO_2 to below the legal limits and to improve air quality for all Londoners.

We will continue to monitor air quality within the LEBZ and across London in order to understand the trends in air pollution and the impacts of our policies. The full report for the evaluation of the first seven LEBZ is available here: https://www.london.gov.uk/sites/default/files/lebz_evaluation_report_final.pdf.

Section 3: A good public transport experience

9. Travel demand trends – public transport

9.1 Introduction

Chapter 2 of this report looked at trends in aggregate travel demand and mode shares in London. The historic picture since 2000 had been one of strong growth in London's population and travel demand, with demand on public transport growing at a faster rate than population – reflecting investment in the networks and the overall trend of changing mode shares away from the private car in London.

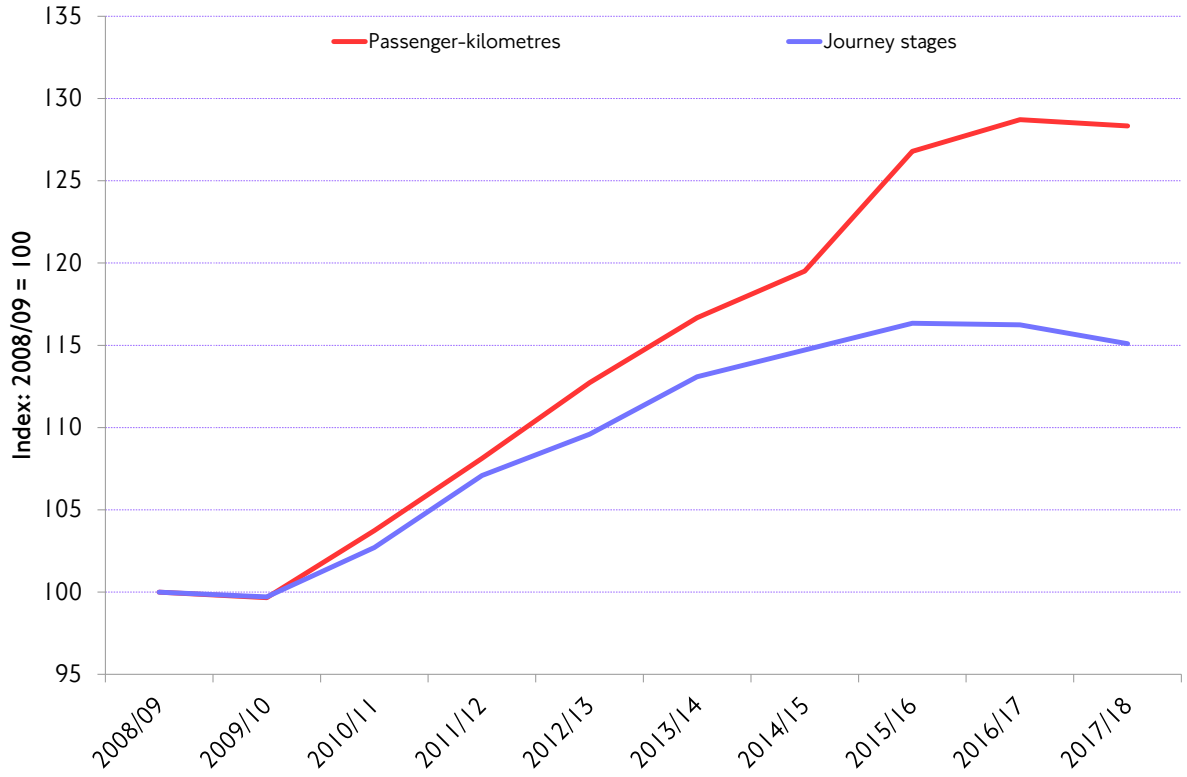
However, the last two years have seen increasing evidence of a slowdown in this historic rate of growth. It is thought that this primarily reflects a corresponding slowing in the rate of population growth in London, allied with particular economic pressures. This chapter looks specifically at trends in travel volumes (demand) affecting each of the principal public transport modes.

9.2 Public transport: Overall trends

Public transport patronage trends

The change in public transport journeys (bus, Underground and Overground/TfL Rail) and passenger kilometres over the last 10 years is shown in figure 9.1. Following the recession in 2008 the trend in both indicators of public transport patronage was strongly upwards. More recently, however, growth in both measures has slowed and flattened.

Figure 9.1 Change in journey stages and passenger kilometres on TfL public transport modes (excludes National Rail, Emirates Air Line and River Services), 2008/09-2017/18.



Source: Strategic Analysis, TfL City Planning.

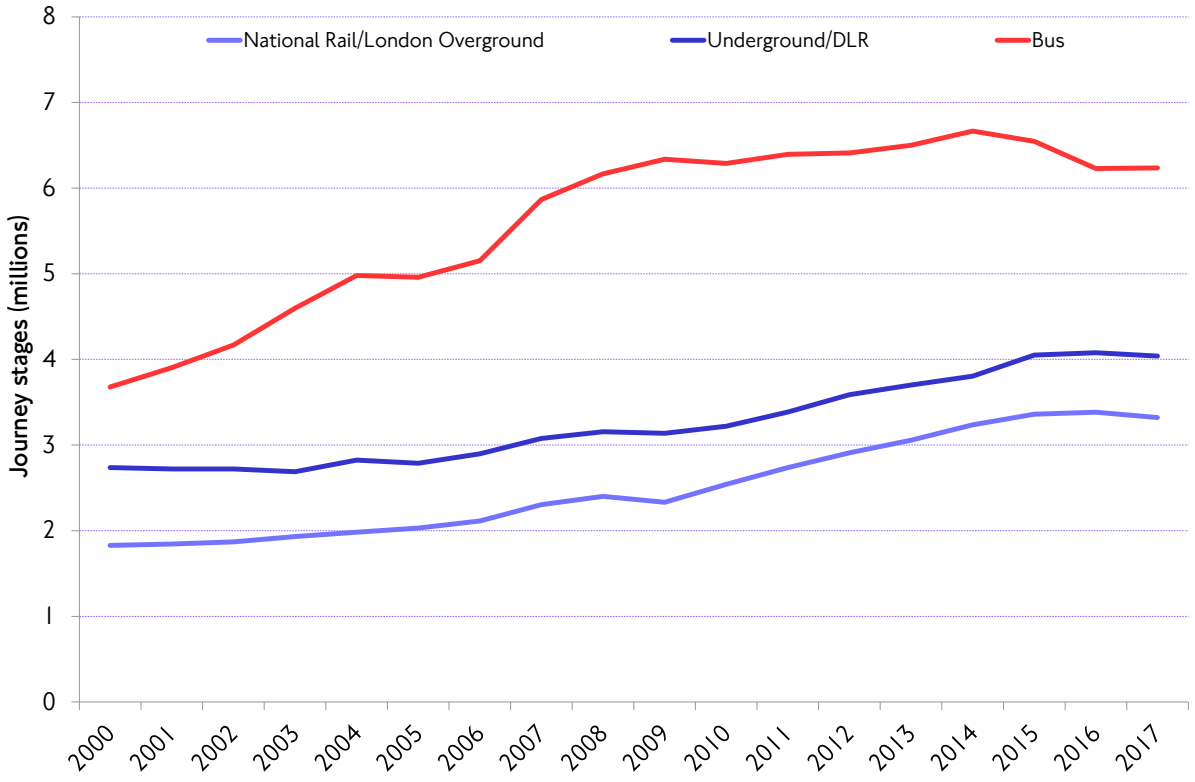
An interesting feature of the graph is the increasing divergence between these two trends, which may be interpreted as increasing average journey length. This may be caused by:

- A net increase in the average trip length per person, possibly explained by increased travel distances (particularly commuting distances).
- A net reduction in the number of shorter journeys (typically, discretionary journeys) with respect to longer journeys. This could be due to a proportion of shorter journeys not happening at all now or them being done by other modes.

Public transport patronage by mode

Considering the period 2000 to 2017, the total demand for public transport in London – measured in journey stages – grew by 64.9 per cent. In the longer-term historic context this level of growth was unprecedented. However, the growth has been focused on particular modes at different points in time. Figure 9.2 shows the demand growth trend for each of the principal public transport modes over this period. The figure is in terms of the absolute number of journey stages per day in each year, by all travellers in London, and therefore it also illustrates the differences in scale – in terms of the total volume of travel – across these modes.

Figure 9.2 Trend in journey stages on selected modes, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

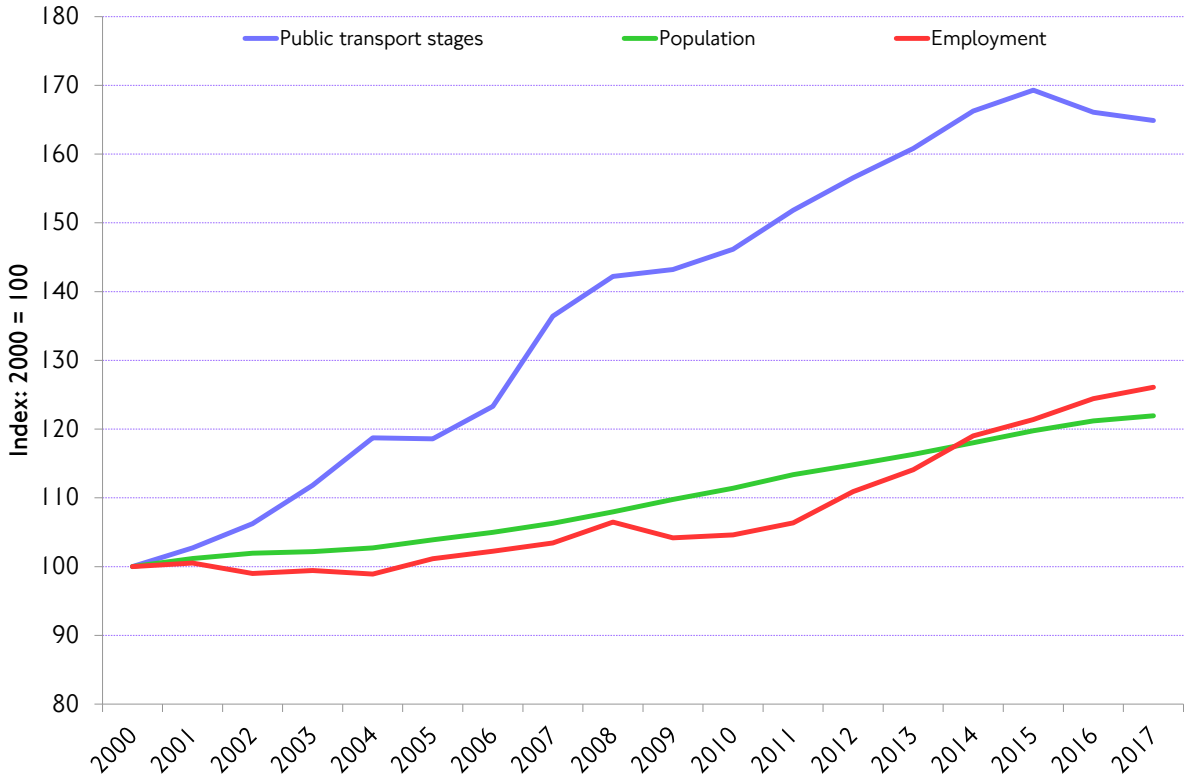
All modes have seen a growth in demand between 2000 and 2017, with the greatest growth on National Rail (81.6 per cent over the period), followed by bus (69.5 per cent) and Underground/DLR (47.5 per cent). Growth in bus demand was particularly strong between 2000 and 2008, corresponding to a period of particular investment in the bus network, and, after a period of levelling off, has declined by 6.5 per cent since 2014. Despite the slower growth rate and the decline in the latest two years, the absolute number of journeys made on the bus network is still much higher than the number of journeys made on rail or Underground/DLR.

Rail demand was most noticeably affected by the economic recession, dropping by 2.9 per cent between 2008 and 2009. Between 2009 and 2015, however, rail demand has been strong, increasing by 44.1 per cent over that period. However, growth in 2016 was just 0.7 per cent, followed by a decline of 1.9 per cent in 2017. Underground demand also increased between 2009 and 2015, by 29.1 per cent. Growth in Underground demand was slower than usual in 2016, increasing by just 0.7 per cent, and declined by 1.0 per cent in 2017, the first decline since 2009.

Relationship between public transport patronage, population and employment

The growth in demand for public transport in part reflects London's population growth. However, while population grew by 21.9 per cent between 2000 and 2017, public transport demand grew by 64.9 per cent – therefore public transport demand has grown much faster than population growth (figure 9.3), reflecting an underlying change in mode share towards public transport.

Figure 9.3 Growth in demand (journey stages) on the principal public transport modes compared with growth in population and employment in London, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

9.3 Public transport modes: Bus

Long-term trend in bus patronage

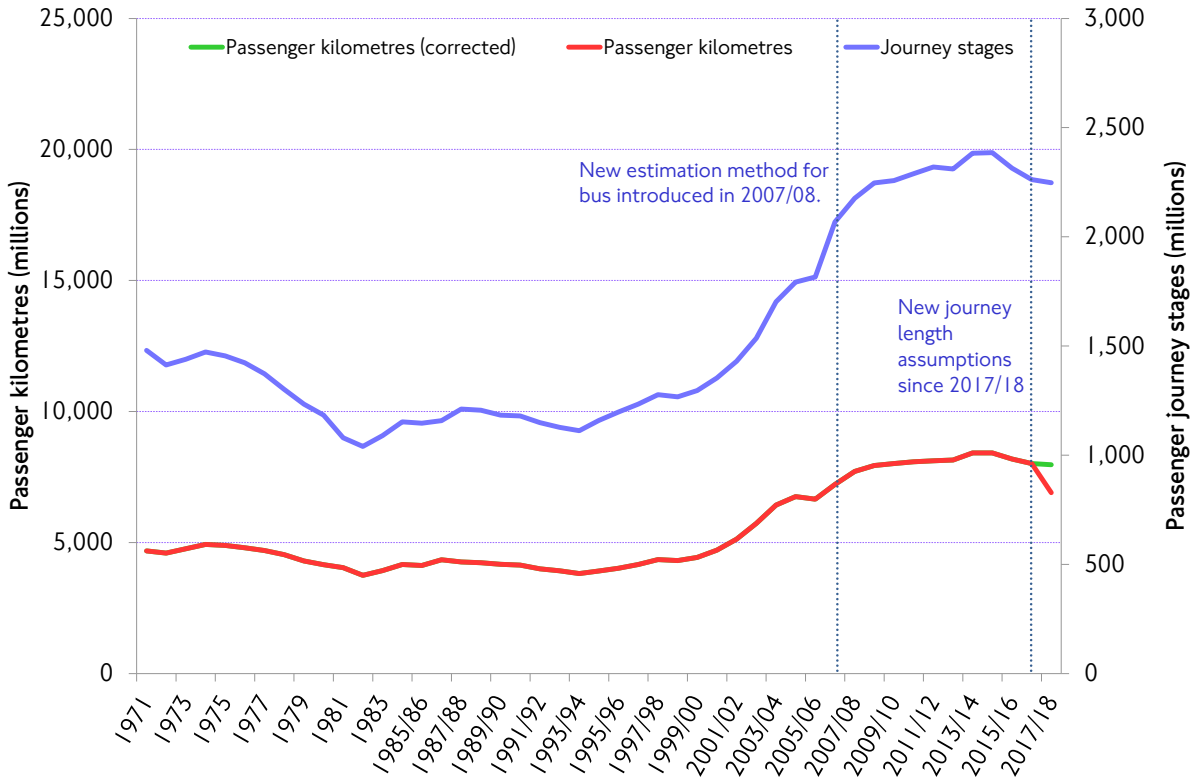
Figure 9.4 shows the long-term trend for bus patronage in London. The pattern of strong growth from the late 1990s gave way to a generally flat picture from the end of the last decade up to 2013/14. Since then, there has been a decline in patronage both in terms of journeys and passenger kilometres.

Following a decline of 2.3 per cent in journey stages and 2.1 per cent in passenger kilometres from 2015/16 to 2016/17, the most recent (financial) year has seen a further decline of 0.6 per cent in bus journey stages.

Although at face value there has also been a 13.9 per cent decline in passenger kilometres, this is explained by a change in the assumptions used to calculate this figure. Thanks to the smartcard data-based 'ODX' tool, there is now evidence that the average bus journey length is around 10 per cent shorter than it was previously assumed. Hence, the passenger kilometres figure for 2017/18 is not directly comparable to previous years.

In order to make like-for-like comparisons, a corrected series using the old assumptions has been included in figure 9.4 with a different colour. This then shows that bus passenger kilometres have decreased in equal measure to bus journey stages, which is a very small decline from the previous year.

Figure 9.4 Passenger kilometres and journey stages travelled by bus, 1971-2017/18.



Source: TfL Service Performance data.

Short-term trend in bus patronage

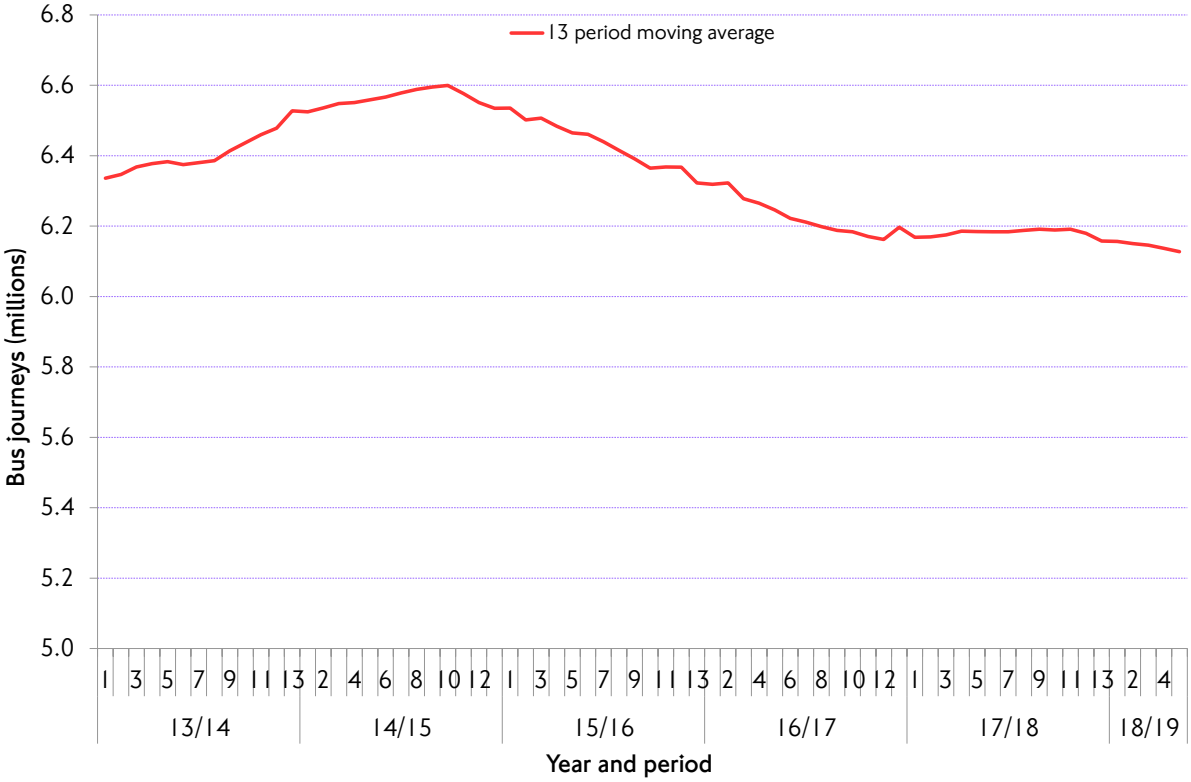
Figure 9.5 takes a closer look at more recent trends in bus patronage. Note that the values are moving averages across 13 four-week financial periods.

These results show that

- The start of the interruption to the long-term trend of growth occurred during the 2014/15 financial year.
- By period 12 of the 2016/17 financial year, patronage had fallen by 6.6 per cent from the highest point in 2014/15.
- During 2017, bus patronage was fairly flat, increasing by 0.5 per cent from the lowest point in 2016/17 to the highest in period 11 of 2017/18.

- From then on, demand has been declining slightly but steadily, by 1 per cent since period 11 of 2017/18 to the most recent period.
- This recent fall in patronage should be seen in the context of continuing, albeit subdued, growth to London's population, which would otherwise have been expected to result in patronage growth each year.

Figure 9.5 Recent trend in bus passenger journeys per day, 13 financial period moving average, 2013/14-2018/19.

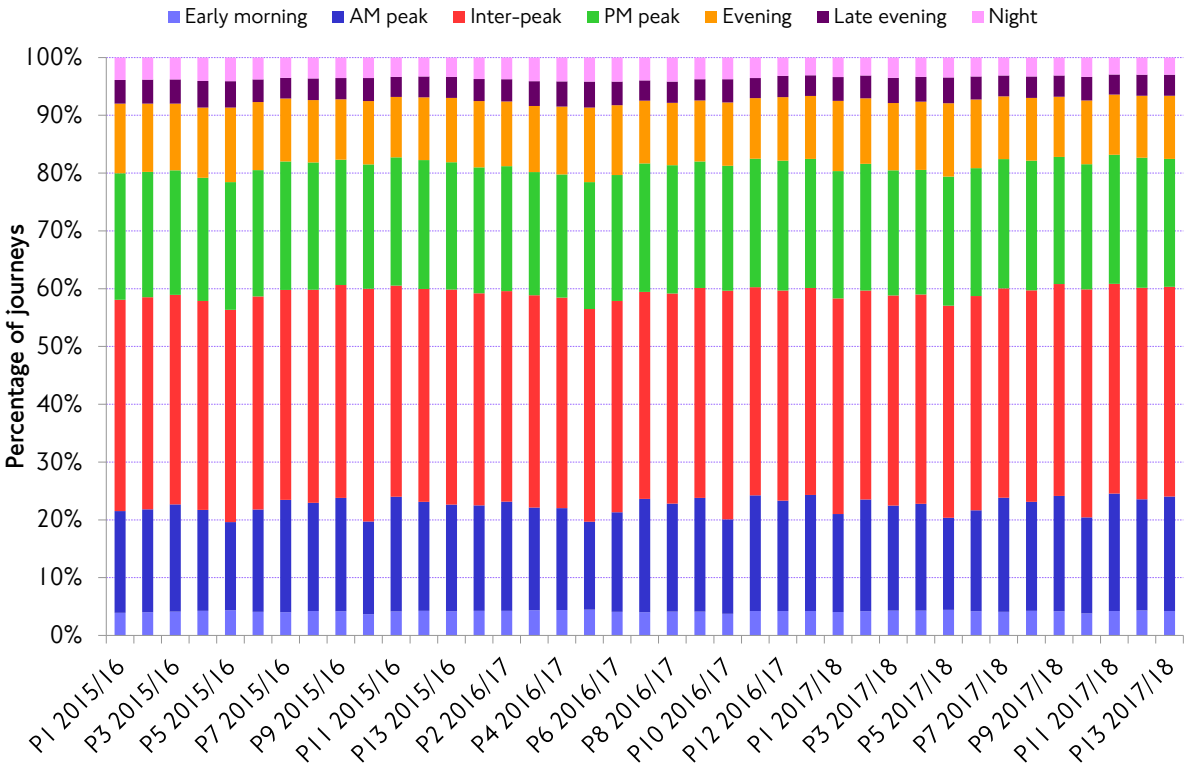


Source: TfL fares & ticketing.

Trends in bus patronage by time of day

It is also interesting to explore these trends in the context of demand across the whole day. Figure 9.6 shows that the proportion of bus journeys by time period has remained constant each four-week period over the last couple of years, thus implying that aggregate changes in demand have happened more or less consistently across all times of day.

Figure 9.6 Recent trend in proportion of bus passenger journeys by time of day, 2015/16-2017/18.



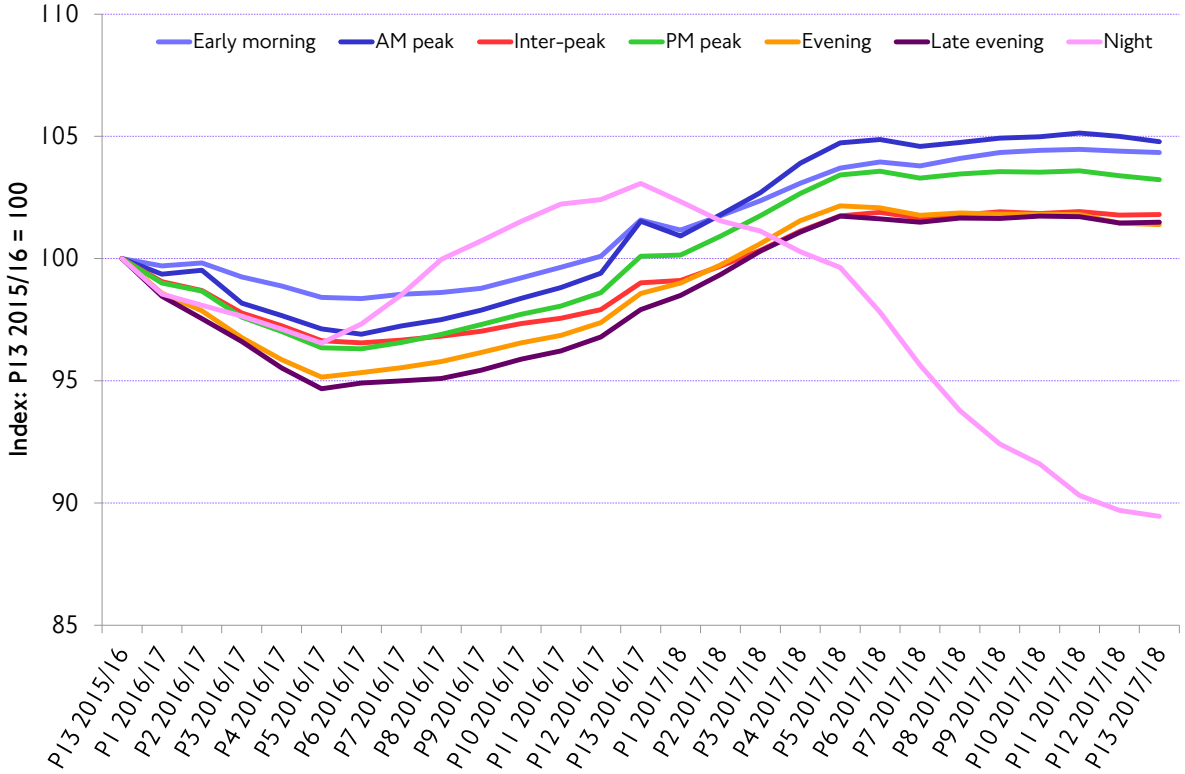
Source: TfL Public Transport Service Planning.

Figure 9.7 further explores this hypothesis by looking at the relative change in the number of journeys for each of those time periods. To correctly interpret this figure it is important to acknowledge that the underlying data come from smart payment taps (eg Oyster cards or contactless cards) only, and exclude other ticket types (eg magnetic). In that sense, the increase in the number of journeys seen in most time periods may not necessarily represent an increase in patronage. In fact, as seen in figure 9.5 above, patronage is actually on the decline.

Nevertheless, the very different trend shown by bus journeys during the night compared to all other time periods is a striking factor that points towards an above-average decline in night bus patronage compared to declines at other times.

To a great extent this is explained by the introduction of Night Tube and the London Overground Night Service on Friday and Saturday nights after (financial) period 5 2015/16, which is indeed the point in the graph where the night trend starts diverging from the others.

Figure 9.7 Recent trend in 13-period moving average of bus journeys by time of day (includes smartcard payments only), 2015/16-2017/18.



Source: TfL Public Transport Service Planning.

The impacts of Night Tube and the London Overground Night Service on night bus demand can be further explored by grouping bus routes according to their alignment and seeing the different impacts of demand on each of the groups.

Figure 9.8 shows Night bus journeys by period split according to the general orientation of routes into radial (from the city centre to the outskirts) and orbital (connecting smaller peripheral clusters avoiding the city centre), and further splitting into whether those are parallel to Night Tube lines or new orbital routes introduced after the launch of Night Tube.

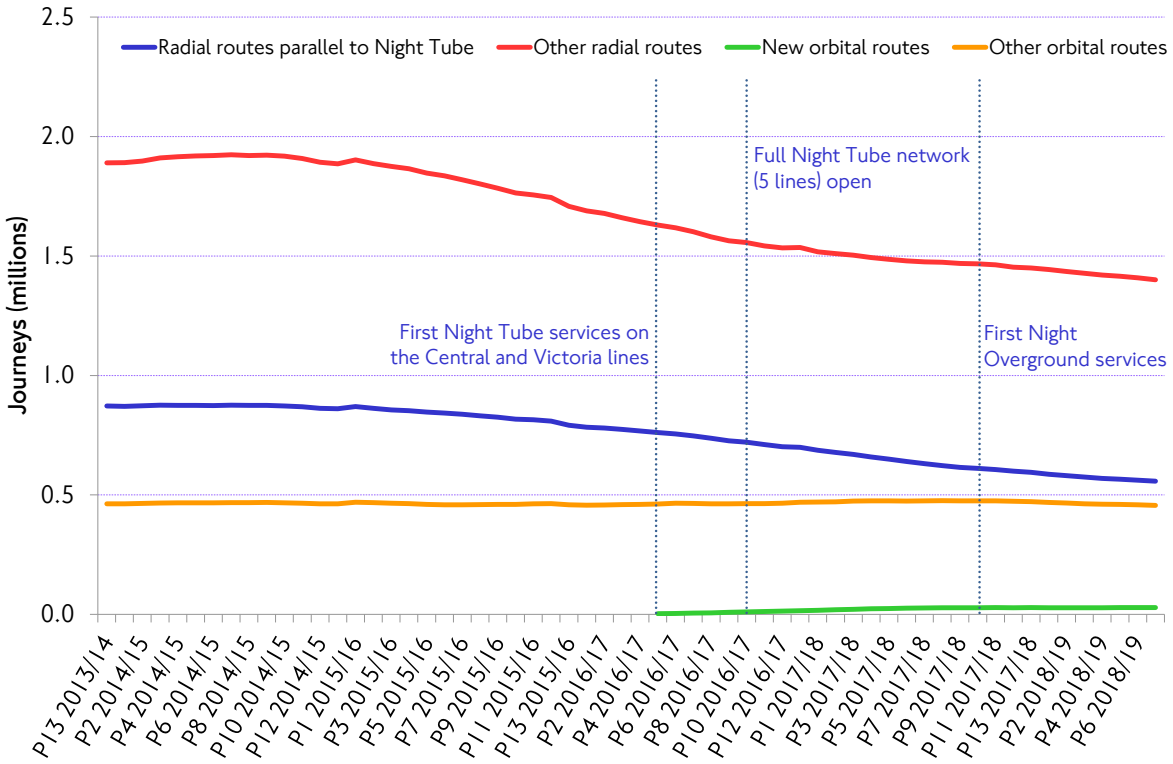
The first interesting insight from figure 9.8 is the different order of magnitude in terms of total volume of orbital versus radial routes, where the latter carry around four times as many passengers (combining those parallel with Night Tube services and the rest). This probably reflects the established land use patterns in London and the subsequent service provision, where radial movements are better serviced with more routes.

The other highlight is that demand on all radial routes has declined significantly over the period shown while the number of journeys on orbital routes has remained fairly stable.

The last thing of note is the much smaller order of magnitude of patronage on the new orbital routes introduced after the launch of Night Tube. This is because there are only a few such routes (17 out of a total of 145 Night bus routes) and hence they represent a very small share of the total market.

In terms of the interpretation of this figure, it is important to note that the numbers represent total demand for all days of the week, while Night Tube and the London Overground Night Service only operate on two of those nights (Fridays and Saturdays).

Figure 9.8 Journeys on Night buses (13 period average) by route alignment per period, 2013/14-2018/19.



Source: TfL Public Transport Service Planning.

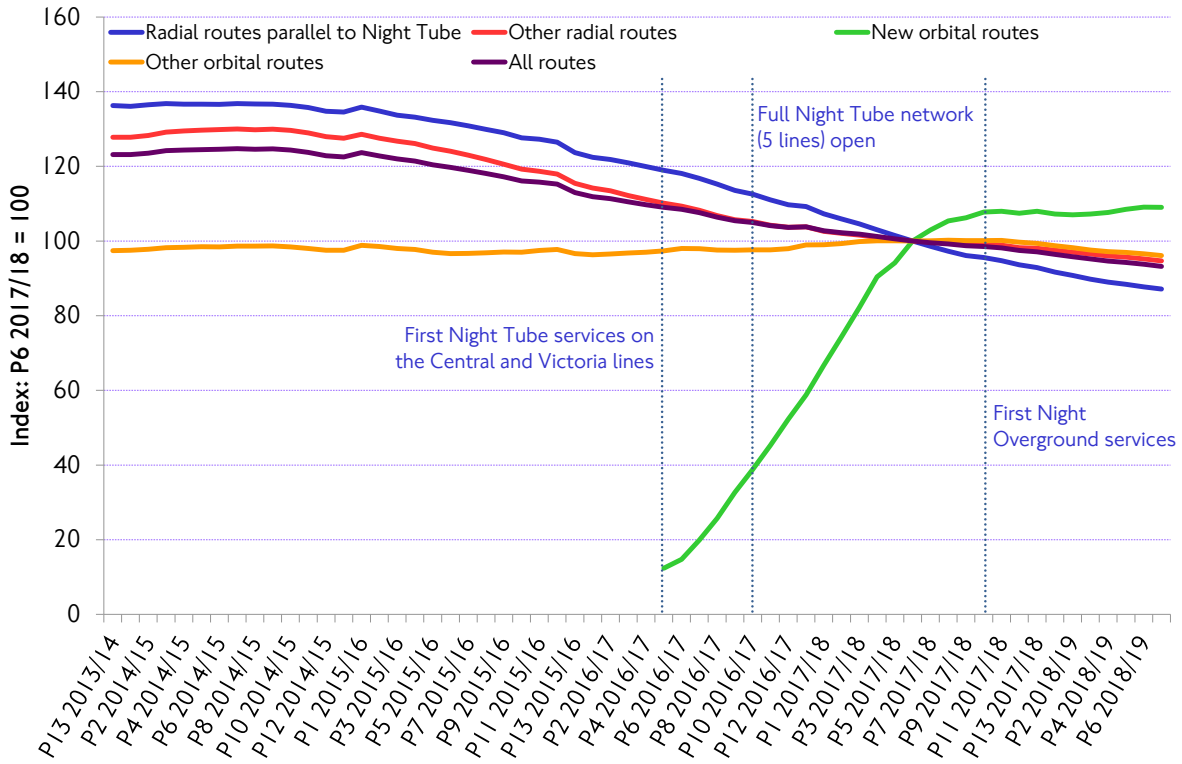
It is also interesting to explore the change in demand on each of those groups of routes, and this is plotted on figure 9.9.

Patronage on all routes has been generally declining (by 24 per cent over the period shown) but it has mostly been because of declines in patronage on radial routes. In particular, routes that largely serve the same corridors as Night Tube lines have seen a bigger decline (36 per cent) than other radial routes (26 per cent). This reflects a substitution effect that favours Underground services, probably because they tend to be more frequent and reliable, and also because the Night Tube fare system (with off-peak pricing) represents a smaller premium compared to the flat bus fare than at busier times.

However, the data used in the graph are for total demand across the week and not only during Friday and Saturday nights (when Night Tube and the London Overground Night Service operate), so there may be other factors affecting these trends.

On the other hand, demand on orbital Night bus routes has been stable on existing routes (with a minor, long-term 1 per cent decline over the whole period), and there has been very rapid growth on the new Night bus routes that entered service after the opening of Night Tube, whose alignment would have been chosen to act as a feeder to the new service. However, it is important to acknowledge that the growth started from a very low (effectively, zero) base. To address this discontinuity, the period of the index base has been chosen at a point where sufficient time elapsed from the introduction of these routes for demand to settle. Even so, after that point, demand on those routes continued to grow (albeit at a much lower rate) while patronage on the rest of the network continued to decline.

Figure 9.9 Trend on Night bus demand (13 period average) by route alignment per period, 2013/14-2018/19.

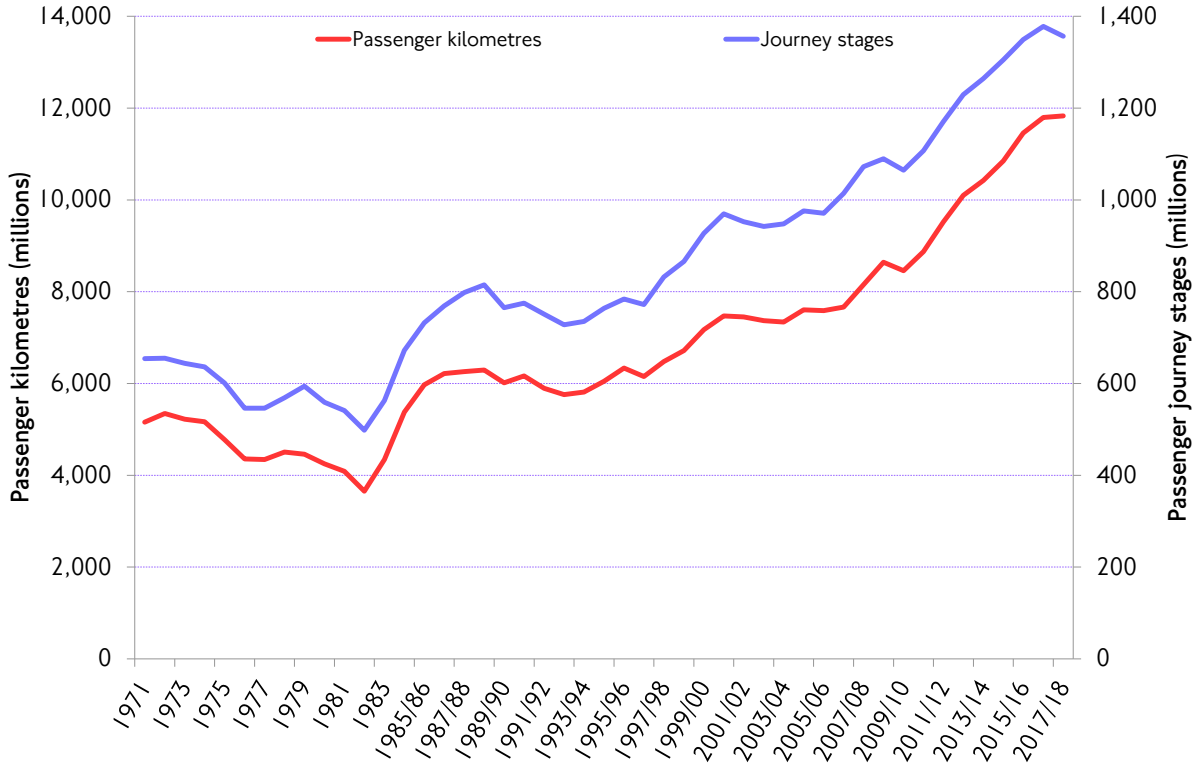


Source: TfL Public Transport Service Planning.

9.4 Public transport modes: London Underground

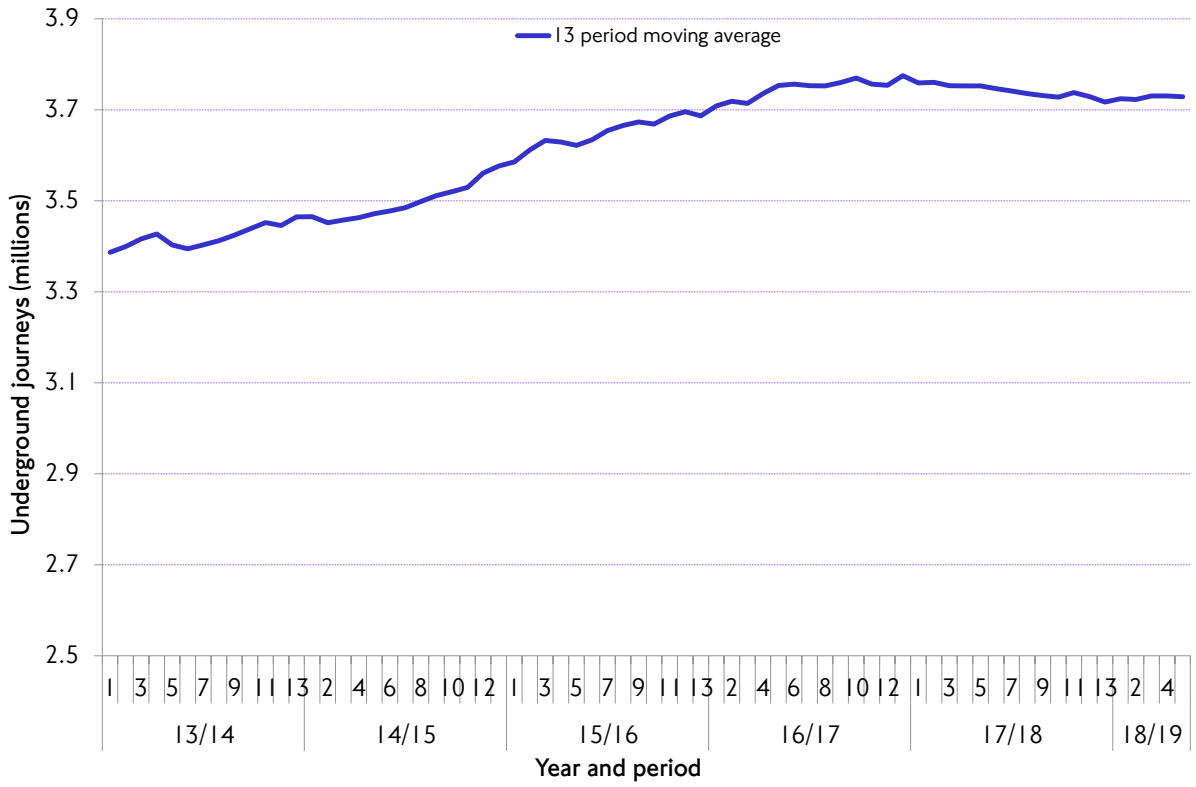
Figure 9.10 shows the long-term trend for Underground patronage in London. After reaching a record high number of people using the Underground in 2016/17, the most recent (financial) year has seen a flattening of the strong growth over the last few years (which was 5 per cent year-on-year on average in terms of passenger kilometres since 2010/11), with a 0.3 per cent increase in passenger kilometres and a small decline of1.5 per cent in journey stages.

Figure 9.10 Passenger kilometres and journey stages by Underground, 1971-2017/18.



Source: TfL Service Performance data.

Figure 9.11 Recent trend in Underground passenger journeys per day, 13 financial period moving average, 2013/14-2018/19.



Source: TfL fares & ticketing.

Figure 9.11 shows a 13 financial period moving average of Underground patronage over the last few years. It is seen that:

- The start of the interruption to the long-term trend of growth occurred towards the end of the 2016/17 financial year.
- The maximum patronage recorded was an average of 3.8 million journeys per day in period 13 of 2016/17. By period 13 of the 2017/18 financial year, patronage had fallen by 1.5 per cent.
- Since then, demand has been fairly flat, increasing by 0.3 per cent to the most recent period.
- This recent fall in patronage should be seen in the context of continuing, albeit subdued, growth to London's population, which would otherwise have resulted in patronage growth each year.

As with bus demand, this trend is likely to be the result of many interlinked factors affecting London's population, the economy, and changes in travel behaviour, which are not yet fully understood.

Night Tube

Night Tube is the name for the services operated on the London Underground and the London Overground Night Service is the name for services operated on the London Overground on Friday and Saturday nights.

The first Night Tube services on the Victoria and Central lines (between Ealing Broadway and Loughton/Hainault) started operations in August 2016. In October 2016, the Jubilee line opened to Night Tube services. Finally, the Northern (from High Barnet and Edgware to Morden via Charing Cross) and Piccadilly lines (between Cockfosters and Heathrow Terminal 5) entered service in November and December 2016, respectively, completing the initial phase of the project.

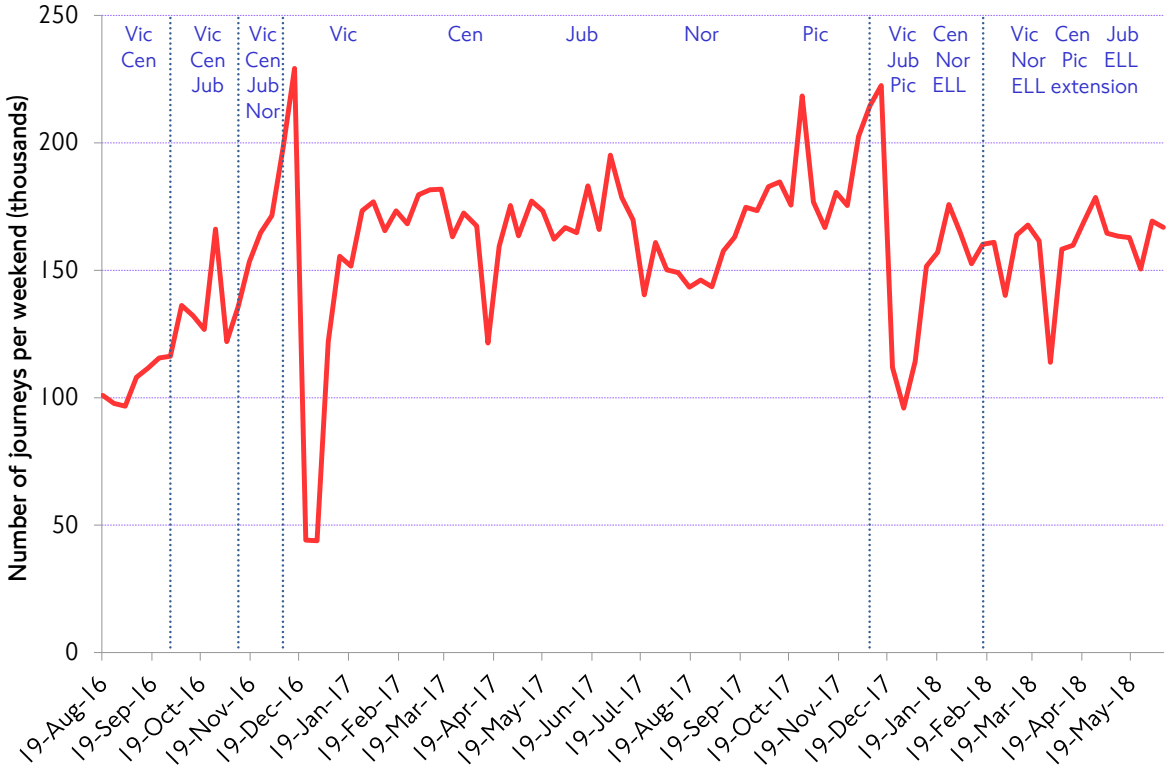
In December 2017, the first London Overground Night Service began to operate between New Cross Gate and Dalston Junction and, in February 2018, the service was extended to terminate at Highbury & Islington instead.

Currently, Night Tube and London Overground Night Service operate on six lines serving more than 150 stations with approximately one train every 10 minutes.

Overall, demand for Night Tube (excludes London Overground Night Service unless stated otherwise) grew in its second year, with 8.7 million customers using the service in 2017/18 compared to 7.8 million in 2016/17.

The average number of journeys on Night Tube is around 156,000 per weekend. Demand generally moves within a narrow band but it can vary a lot at certain weekends in the year, generally in line with holiday periods (figure 9.12). It tends to reach high levels of demand two weekends before Christmas and drop significantly the weekend immediately before, with the one after Christmas (and before New Year's Eve) reaching lows. Demand also tends to drop noticeably over the Easter weekend, weekends before Bank Holidays, and other periods like school holidays.

Figure 9.12 Journeys per weekend on Night Tube alongside network development, 2016-2018.



Source: TfL Public Transport Service Planning.

Service performance and reliability of Night Tube services are generally very good. However, due to the low train frequency, individual incidents tend to have a disproportionate impact on the whole service and cause delays. Despite that, most of the time headways are well maintained on all lines, the outer branches of the Central and the Piccadilly lines being the most challenging to operate reliably.

Night Tube services also have an important impact in the so-called 'night-time economy', providing wider benefits. Recent research has shown that in the last year, Night Tube helped to generate £190m for London's economy, an increase of almost £20m on the first year of operation. It has also supported over 3,900 jobs in the last year, which is an 8.5 per cent increase from the first year of operation.

9.5 Public transport modes: London Overground and TfL Rail

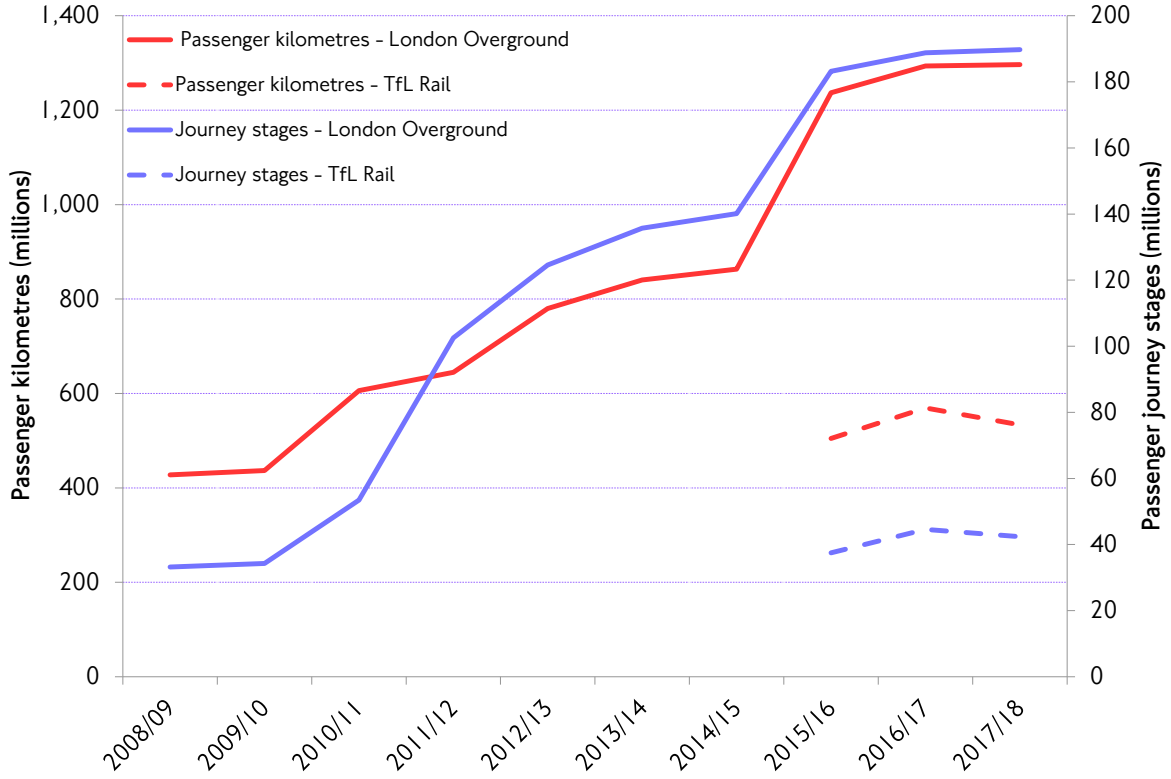
Since the first full year of operation of the London Overground, in 2008/09, patronage on London Overground services has more than tripled in terms of passenger kilometres and journey stages have increased more than six-fold. The year 2017/18 had the highest recorded demand, albeit following a very small increase in patronage since the previous year (0.2 per cent in passenger kilometres, 0.5 per cent in journey stages).

This reflects on one hand the progressive expansion of the network and on the other hand a shortening of journey stage lengths following the extensions to some key interchanges, such as Clapham Junction.

Since the latest step change in patronage following London Overground's takeover of some of the former Greater Anglia franchise services in May 2015, passenger kilometres on London Overground services increased 4.6 per cent from 2015/16 to 2016/17 but have

stayed almost constant over the most recent year, thus echoing the recent flattening in the growth observed more widely for travel in London.

Figure 9.13 Passenger kilometres and journey stages by London Overground and TfL Rail, 2008/09-2017/18.



Source: TfL Service Performance data.

In May 2015, TfL also assumed operation of the core Shenfield to Liverpool Street local service, currently operating as TfL Rail but due to form part of the Elizabeth line when this opens.

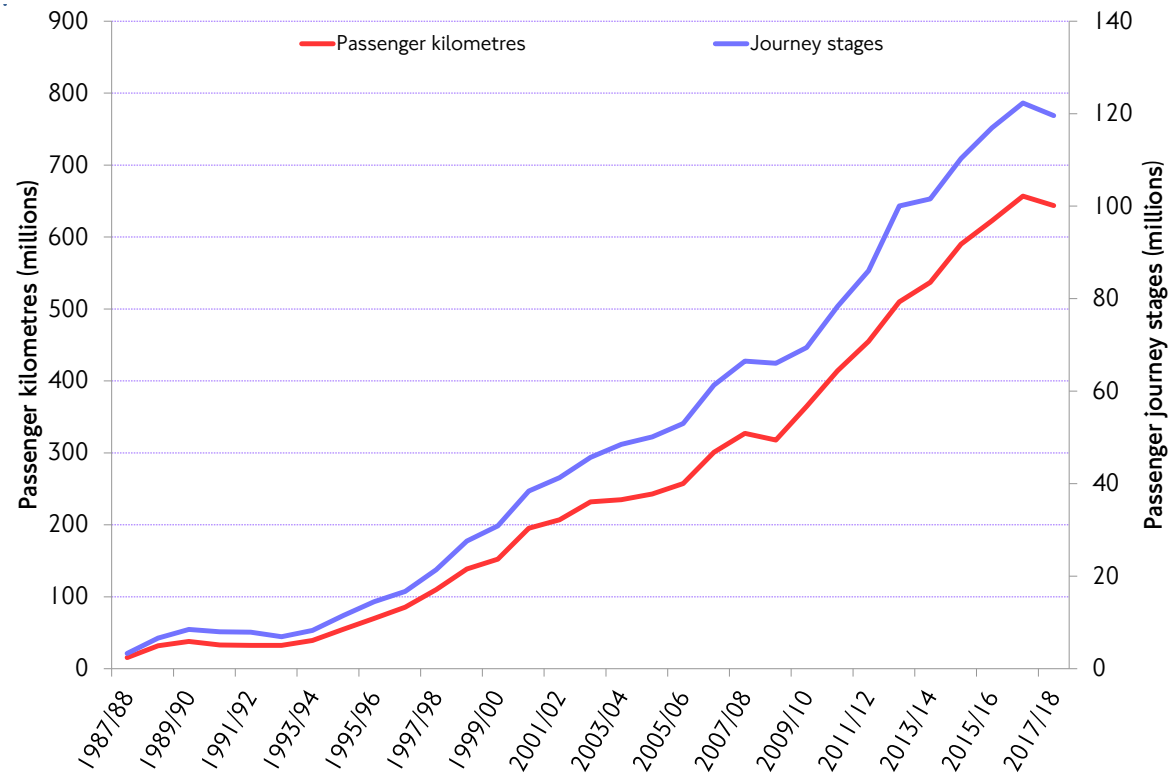
Compared to 2016/17, which was the first full financial year of operation of these services as TfL Rail, passenger kilometres in 2017/18 saw a 6.3 per cent decline, with journey stages decreasing by 5 per cent. This is again broadly in line with the decline in patronage seen across other public transport modes.

9.6 Public transport modes: Docklands Light Railway (DLR)

Patronage on the DLR has grown rapidly since its opening as the network has progressively been expanded.

The year 2016/17 marked a record high in demand but over the most recent year patronage has declined slightly, around 2 per cent in both passenger kilometres and journey stages, similar to the trends observed across other modes.

Figure 9.14 Passenger kilometres and journey stages by DLR, 1987/88-2017/18.

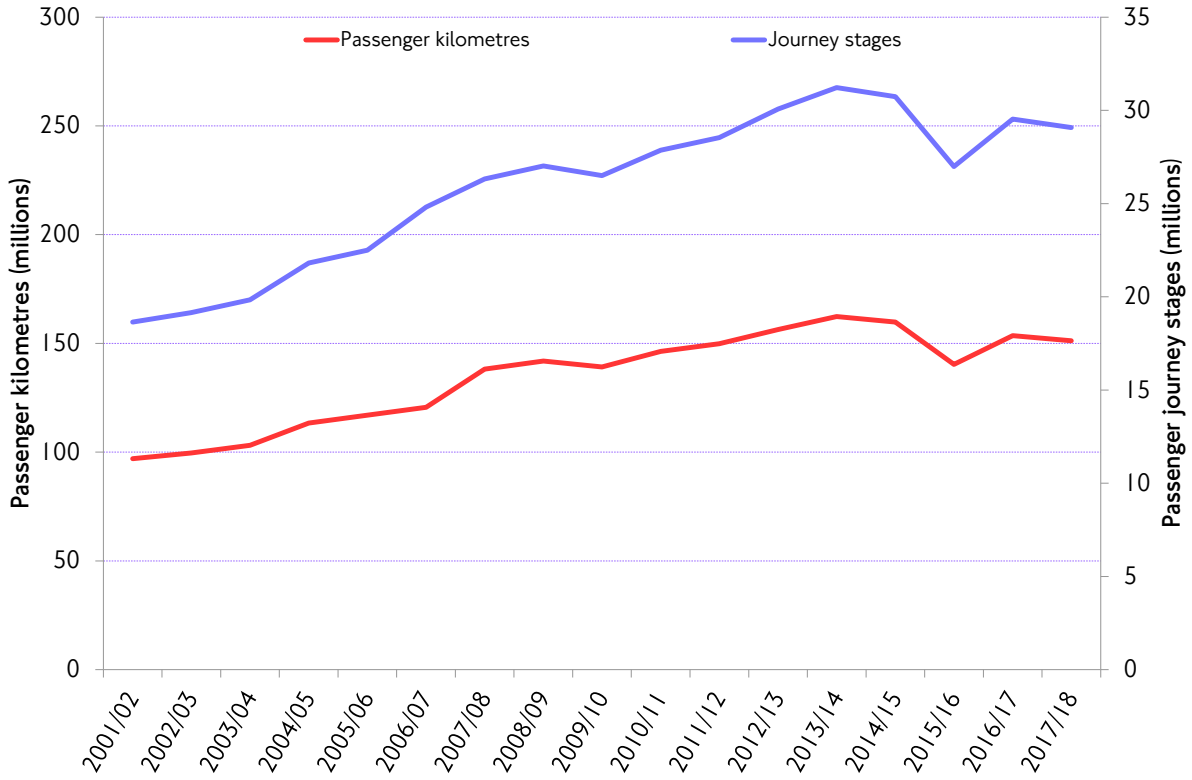


Source: TfL Service Performance data.

9.7 Public transport modes: London Trams

The London Trams network first opened in 2000 and has been relatively stable in extent since. In the long term, demand on London Trams has been steadily growing, but in recent years it has been subject to greater fluctuation. In 2017/18, demand declined slightly by 1.5 per cent both in terms of passenger kilometres and journey stages.

Figure 9.15 Passenger kilometres and journey stages by London Trams, 2001/02-2017/18.



Source: TfL Service Performance data.

9.8 Public transport modes: National Rail in London

National Rail travel has grown strongly at the national level over the past decade, with only a brief slowdown during the recession. This pattern is reflected for travel on services defined by the Office of Rail and Road (ORR) as 'London and South East' (L&SE) operators, although this service group is not an exact match for rail trips including London. The average rate of growth between 2000/01 and 2015/16 was 3.2 per cent per year in terms of passenger kilometres and 4.1 per cent per year in terms of passenger journeys.

In common with other public transport modes however there is also evidence of a slowdown in the historic high levels of growth for National Rail travel in the most recent year. Passenger kilometres decreased by 1.5 per cent in 2017/18, following growth of 0.4 per cent in 2016/17, a much lower level of growth than had been typical of the previous six years. Passenger journeys decreased for the second year in a row, by 2.1 per cent, following six years of high growth, between four and nine per cent (table 9.1).

Table 9.1 Passenger kilometres and passenger journey stages by National Rail – operators classified by ORR as London and South East operators, 2000/01-2017/18.

Year	Passenger kilometres (billions)	Year-to-year percentage change	Passenger journeys (millions)	Year-to-year percentage change
2000/01	19.2	4.4	664	4.0
2001/02	19.3	0.3	663	-0.1
2002/03	19.8	2.8	679	2.4
2003/04	20.1	1.7	690	1.6
2004/05	20.5	1.9	704	2.1
2005/06	20.7	1.1	720	2.2
2006/07	22.2	7.1	769	6.9
2007/08	23.5	6.1	828	7.7
2008/09	24.2	2.9	854	3.1
2009/10	23.8	-1.8	842	-1.4
2010/11	25.0	5.2	918	9.0
2011/12	26.4	5.3	994	8.3
2012/13	27.3	3.4	1,032	3.9
2013/14	28.6	4.9	1,107	7.2
2014/15	29.6	3.4	1,155	4.3
2015/16	30.5	3.0	1,203	4.2
2016/17	30.6	0.4	1,197	-0.5
2017/18	30.1	-1.5	1,171	-2.1

Source: Office of Rail and Road.

Although it is likely that disruption to parts of the National Rail network in London is a factor here, it is notable that growth in rail patronage has stalled at the national (all operators) level, with a decline of 1.4 per cent in 2017/18 compared with growth rates of 1 to 8 per cent in the previous seven years.

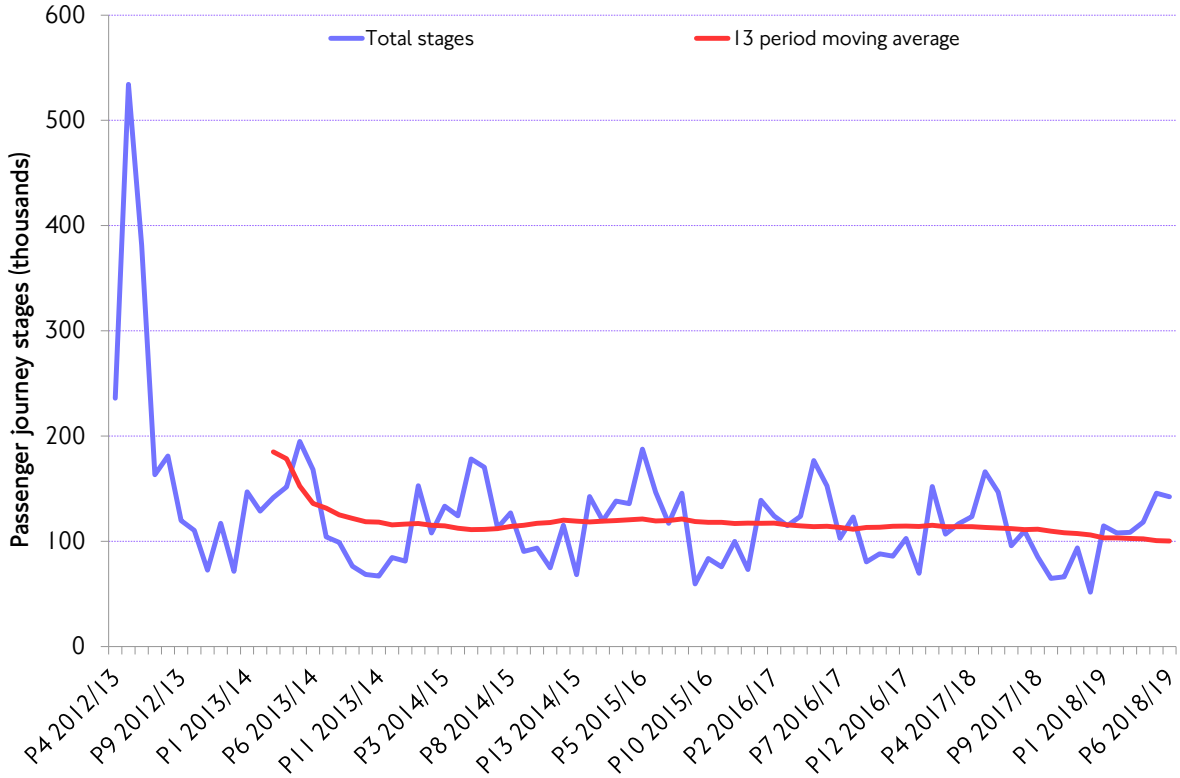
9.9 Public transport modes: Emirates Air Line

The Emirates Air Line is London's only cable car, which provides a river crossing service between the Greenwich Peninsula and the Royal Docks. It opened in June 2012, just before the London 2012 Games.

Following a period of unusually high demand during the Games in summer 2012, the service now presents a regular, very seasonal demand pattern that varies between some 70,000 journeys per four-week-period in the low season (typically around the winter months) and 175,000 passengers per four-week-period in the high season during the summer months.

The low demand around period 13 (ending 31 March) is partly explained by the annual maintenance closure, which happens on the second or third week in March.

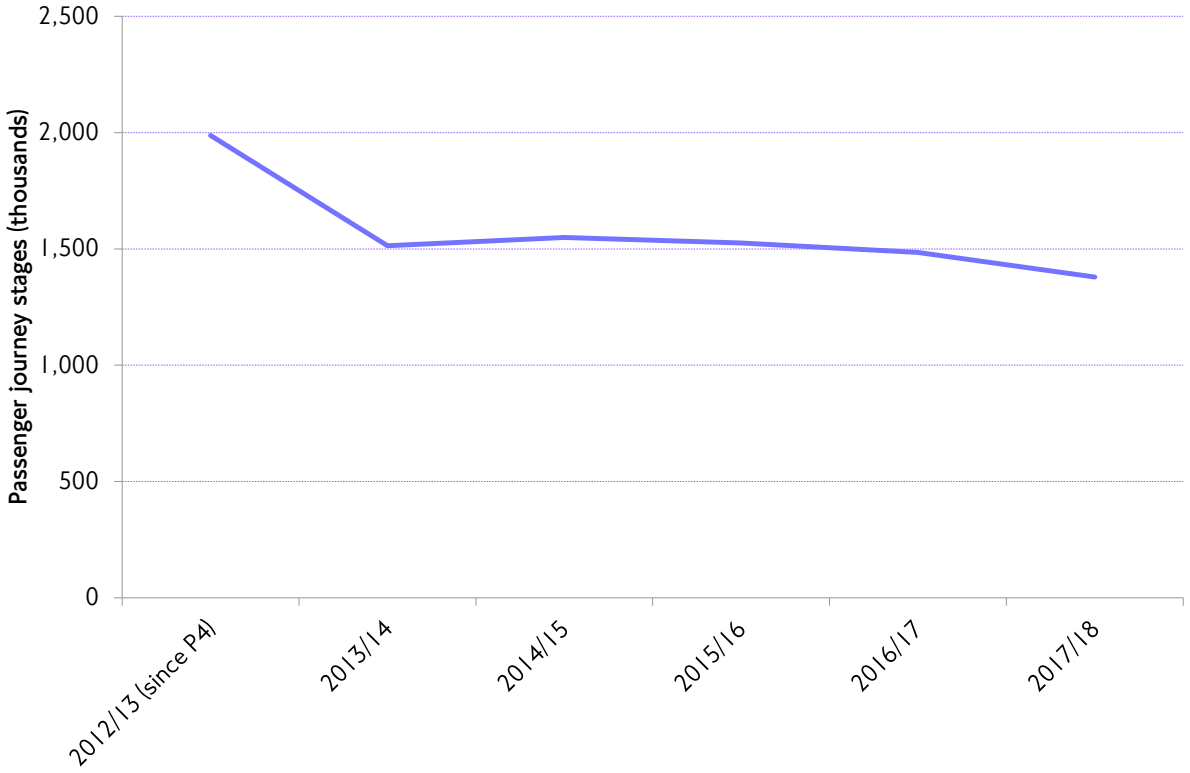
Figure 9.16 Number of journey stages per period on the Emirates Air Line, 2012/13-2018/19.



Source: TfL Service Performance data.

Annually, the Emirates Air Line has typically carried around 1.5 million passengers over the last few years (see figure 9.17). However, in 2017/18 the total number of journeys dropped 7 per cent to around 1.4 million journeys. This decline is in line with the trends in patronage observed across other public transport modes.

Figure 9.17 Number of journey stages per year on the Emirates Air Line, 2012/13-2017/18.

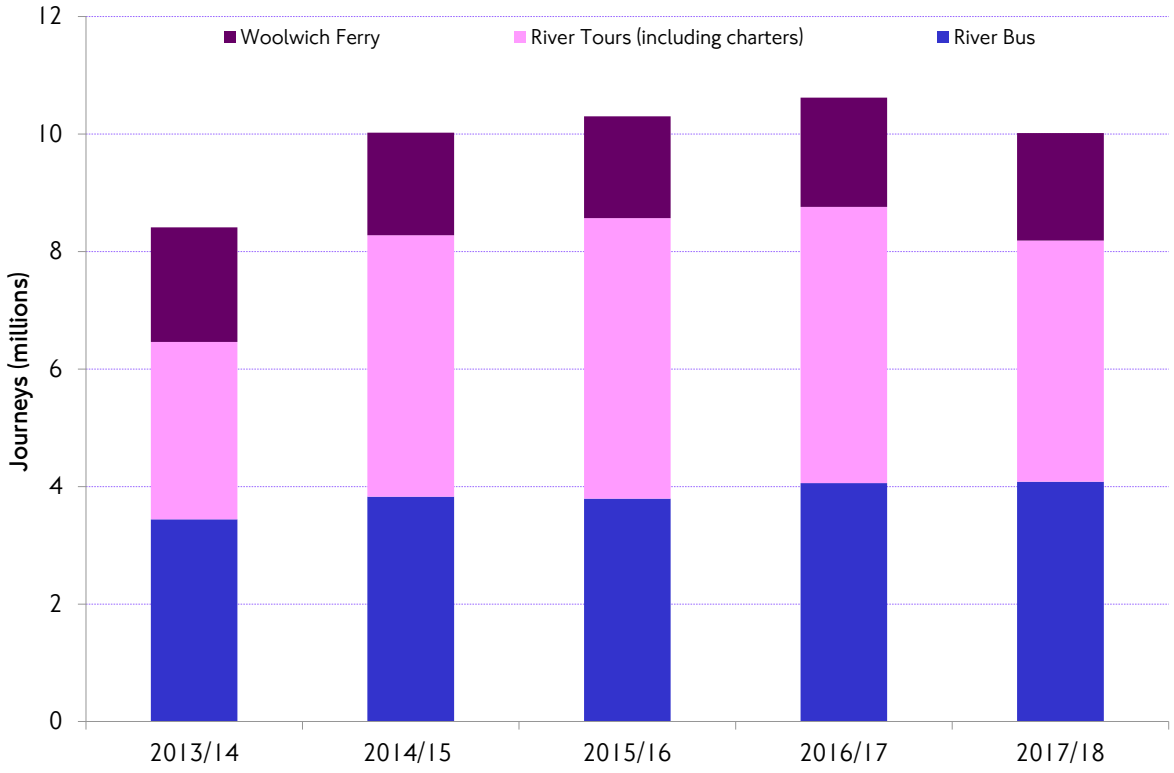


Source: TfL Service Performance data.

9.10 Public transport modes: River Services

Following an increase of more than 2 million passengers per year (a 26 per cent increase) between 2013/14 and 2016/17, the most recent year has seen a decline in River Services patronage of around 5.7 per cent, bringing the number of journeys to just above 10 million per year. The greatest contributor to that decline has been the contraction of River Tours, whose demand has fallen by 12.6 per cent.

Figure 9.18 Passengers using TfL's River Services, 2013/14-2017/18.



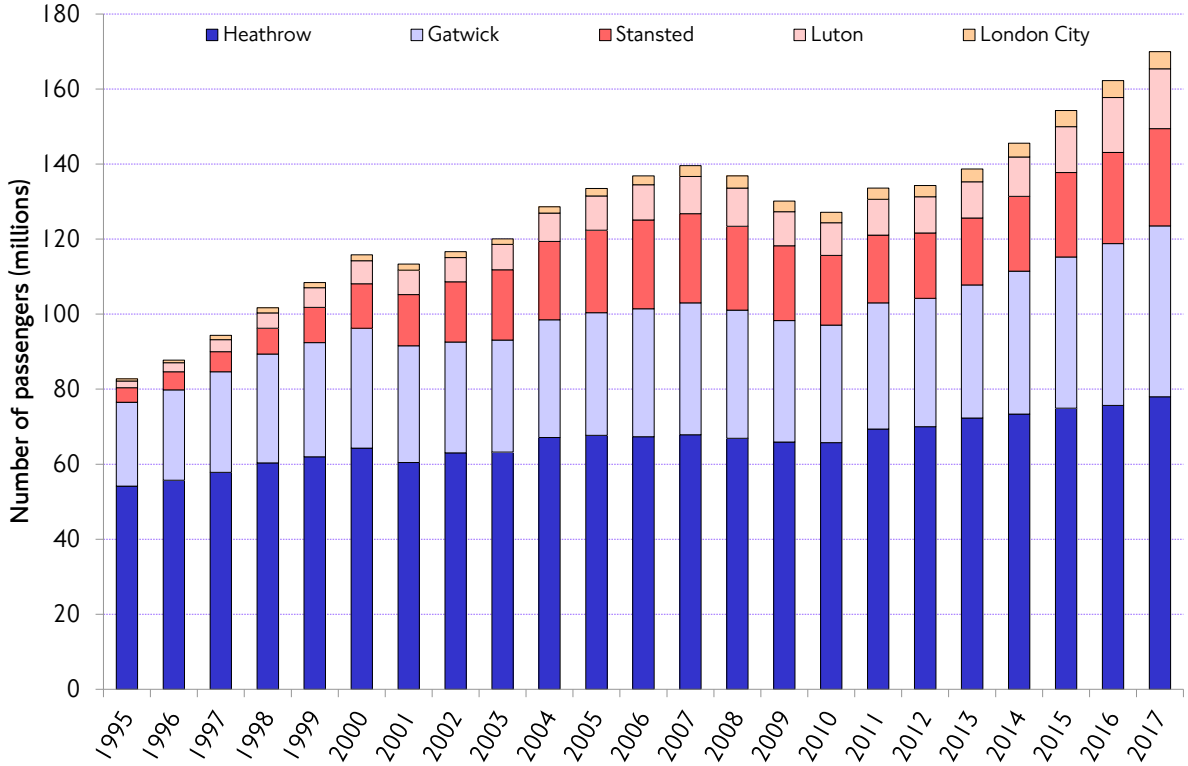
Source: TfL River Services.

Demand on River Services tends to follow a clear seasonal pattern, reaching the highest number of journeys in July/August (periods 4 and 5) and annual lows around January (period 11).

9.11 International air travel

Demand for air travel through London's airports continues to grow strongly year-on-year, reflecting a recovery from the recession in the latter part of the last decade. There were a total of 170 million terminal passengers passing through London's five main airports in 2016 – up 4.7 per cent on 2016. Heathrow airport accounted for 45.9 per cent of the total, with Gatwick accounting for 26.8 per cent (figure 9.19).

Figure 9.19 Number of terminal passengers by London area airport, 1995-2017.



Source: Civil Aviation Authority.

10. Public transport – service provision, operational performance and service quality

10.1 Introduction

An attractive, safe, reliable, comprehensive and accessible public transport network is fundamental to the achievement of the Mayor's transport vision. This chapter examines aspects of service provision, capacity and reliability – key 'operational' aspects that underpin the performance of the public transport networks on a daily basis.

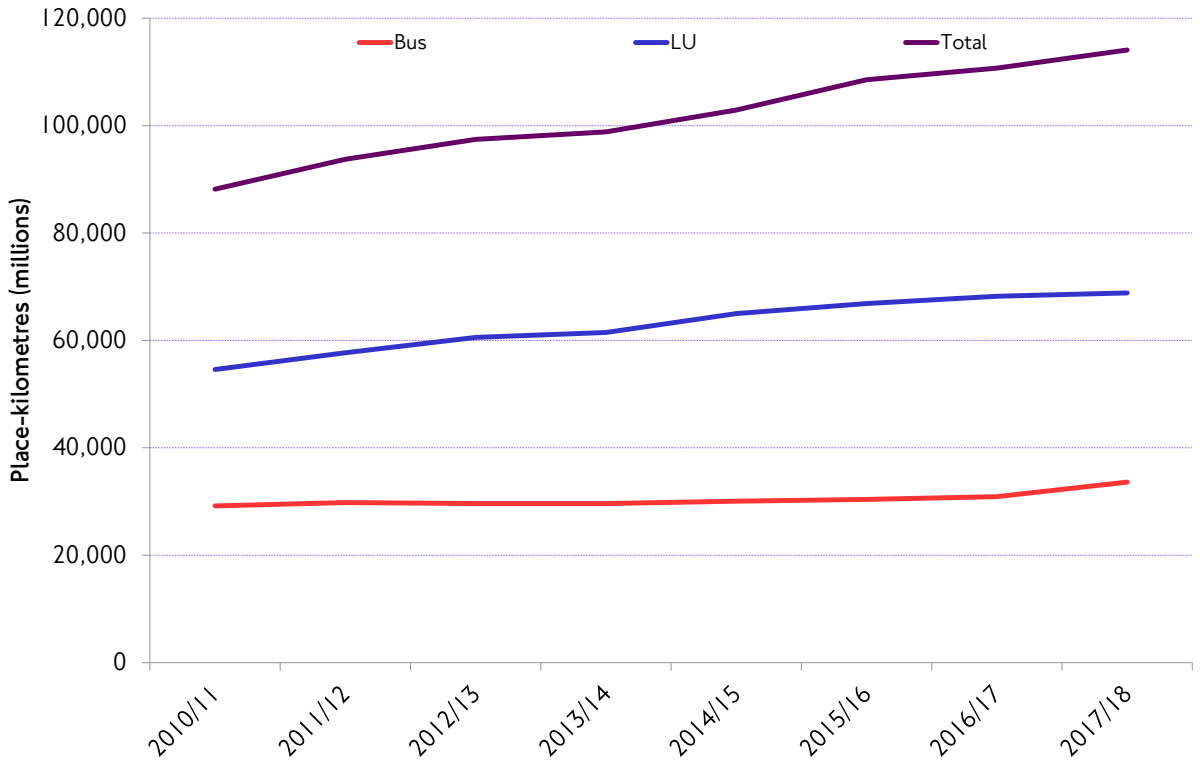
10.2 Overall capacity provided by the public transport networks and recent demand trends

Capacity of the public transport networks

Capacity on the TfL public transport networks has been steadily increasing in recent years (figure 10.1, table 10.1). In nominal terms, total place-kilometres (excluding TfL Rail) increased by 3 per cent in the last year and by 32 per cent since 2009/10. However, this calculation is affected by a change in the methodology to calculate bus capacity, following a review of the occupancy assumptions.

In real terms (using a like-for-like figure based on the old methodology), there was only a slight increase in public transport capacity over the last year (0.2 per cent), and the increase since 2009/10 is 28 per cent.

Figure 10.1 Capacity (million place-kilometres) on the main public transport modes (excluding TfL Rail/National Rail), 2010/11-2017/18.



Source: Strategic Analysis, TfL City Planning.

Table 10.1 Capacity (million place-kilometres) provided by the principal public transport modes, 2010/11-2017/18.

Mode	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Bus	29,175	29,804	29,626	29,605	30,057	30,386	30,903	33,602[1]
LU	54,567	57,694	60,572	61,461	65,010	66,880	68,224	68,844
LO	1,788	3,317	3,686	4,106	4,153	7,654	7,885	7,906
DLR	2,104[2]	2,371	2,980	3,061	3,083	3,029	3,065	3,060
Trams	534	536	574	599	596	601	634	653
Total	88,168	93,722	97,439	98,832	102,899	108,550	110,711	114,066

Source: Strategic Analysis, TfL City Planning.
Note: Values for all rail modes have been revised to consistently represent capacity using a uniform standing density assumption of 4 people per square metre. They differ from equivalent values published in previous Travel in London reports but are internally consistent.
1. Since 2017/18, there is a new methodology to calculate bus capacity, therefore this value is not directly comparable with previous years.
2. These values have been back-casted with the revised standing capacity assumption rather than directly calculated because the raw data to perform that calculation are no longer available.

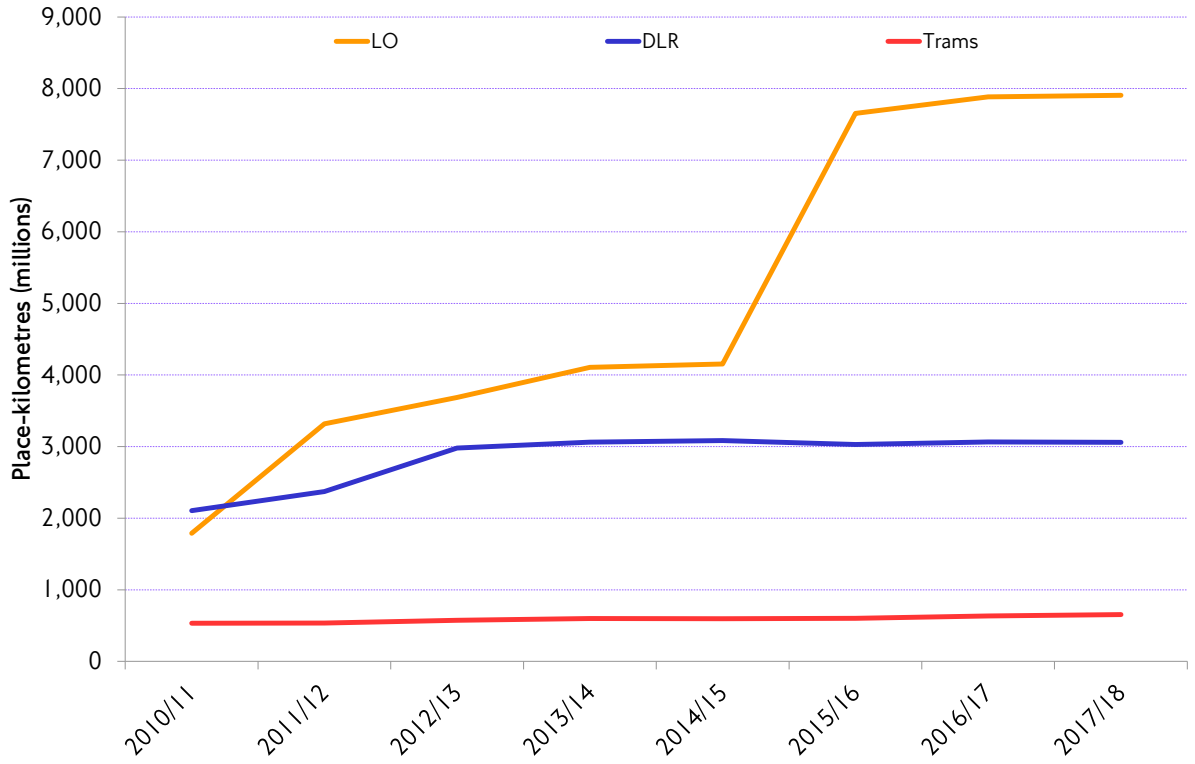
The increase in bus place-km reflects a change in the methodology to calculate them. In the past, an average 80 per cent occupancy was used for planning purposes. However, following improvements to the network's reliability (eg in terms of lower excess waiting time), it is now possible to deliver more of the scheduled capacity than in the past, so the occupancy assumption for planning purposes has been revised to 90 per cent.

At 90 per cent, the capacity in place-km for a 52-week equivalent year was 33,602 million place-km. However, using the same 80 per cent assumption as in the past, the comparable capacity with previous years would be 30,486 million place-km, which represents a minor decrease of 1 per cent in nominal terms. This decrease probably corresponds to the rationalisation and consolidation of bus services into fewer routes, particularly in central London, which has happened over the last year.

Nonetheless, given the reliability improvements mentioned, in practical terms there has been a small net increase in the scheduled capacity.

The trend for the newer modes (London Overground, DLR, and London Trams) is shown in figure 10.2. Although the overall contribution of these modes to the total capacity provided is much smaller (around 10 per cent of the total in 2017/18), their growth over the last few years has been much higher, mostly owing to continuous expansion of their networks.

Figure 10.2 Capacity (million place-kilometres) on other TfL rail modes, 2010/11-2017/18.



Source: Strategic Analysis, TfL City Planning.

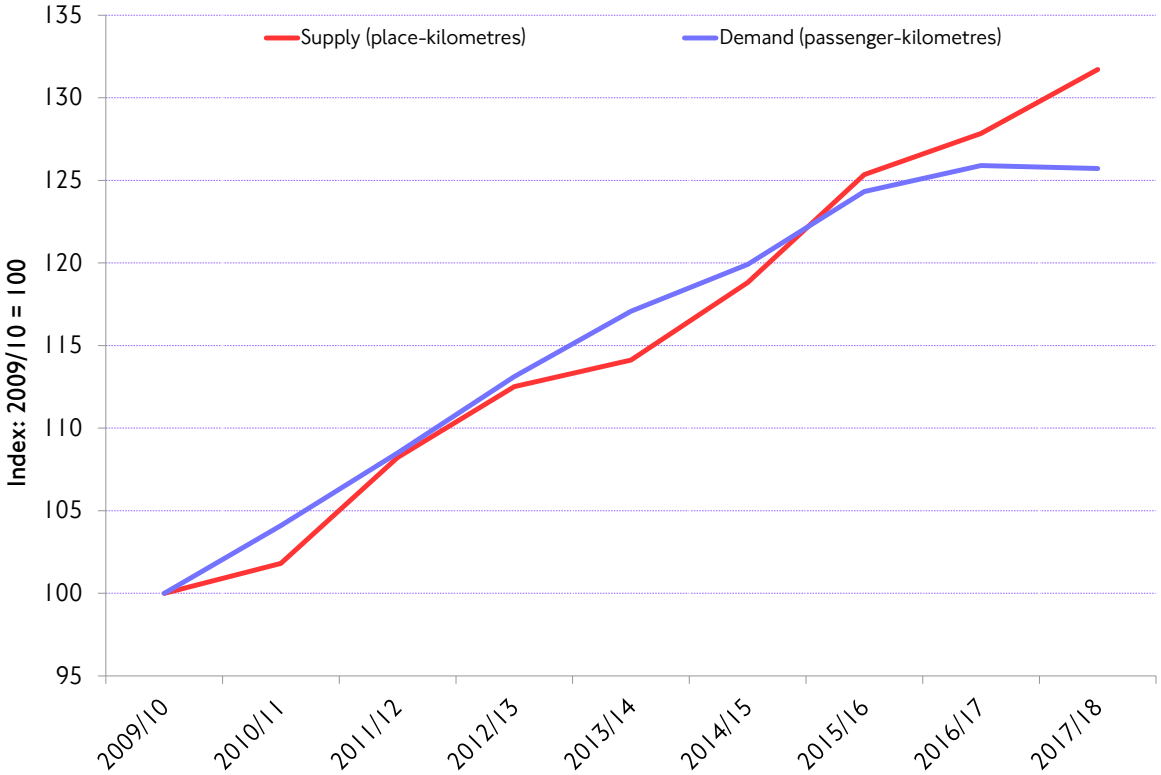
Relationship between public transport demand and supply

Between 2009/10 and 2014/15, demand for public transport (in terms of passenger kilometres) grew at a slightly faster rate than public transport supply, measured as place-kilometres (figure 10.3). However, since 2015/16 the trend has reversed and demand has flattened after a peak in 2016/17 (growth of 1 per cent between 2015/16 and 2017/18) while supply has continued to increase by a further 5 per cent.

This additional capacity with constant demand would suggest that, at an aggregate level, occupancy and crowding levels should have decreased. However, this is an average across all public transport journeys and would not have affected each mode, each service, and each time of the day in the same manner.

A more detailed analysis by mode is provided in subsequent sections.

Figure 10.3 Comparison of demand and supply trends on TfL's public transport networks (excludes TfL Rail, National Rail, Emirates Air Line, and River Services), 2009/10-2017/18.



Source: Strategic Analysis, TfL City Planning.

10.3 Service provision and operational performance: Bus

In 2017/18, London Buses operated 490 million bus-kilometres, slightly less (by 0.9 per cent) than the 495 million kilometres operated the previous year. This is due to a small reduction in the scheduled capacity, but the percentage of kilometres actually operated increased by 0.7 percentage points to reach a recorded high of 98.1 per cent. Of particular interest is the reduction in 0.6 percentage points on the percentage of bus-kilometres lost due to traffic congestion, which reached a low in the long-term series (table 10.2).

In 2017/18 there was also a small reduction in the average wait time on high frequency services, and an increase of more than 2 percentage points in the proportion of low frequency services that operated on time.

Finally, there are signs that the decline in bus speeds seen over the last few years has started to stabilise, with the average bus speed in 2017/18 almost at the same level as in 2015/16.

In summary, the last year has seen an overall improvement in bus performance across all usual indicators, albeit partly offset by a small reduction in the scheduled capacity.

Table 10.2 Bus service provision and reliability, 2000/01-2017/18.

Year	Kilometres scheduled (millions)	Percentage of scheduled kilometres: Operated	Percentage of scheduled kilometres: Lost due to traffic congestion[4]	Percentage of scheduled kilometres: Lost due to other causes[5]	High frequency services[1]: Average wait time (minutes)[6] Actual	High frequency services[1]: Average wait time (minutes)[6] Excess	Low frequency services[2]: Percentage of timetabled services on time[3,7]	Bus Speed (mph)
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	
2010/11	499	97.4	2.1	0.5	5.4	1.0	81.4	
2011/12	502	97.6	1.9	0.5	5.4	1.0	83.2	
2012/13	503	97.6	1.7	0.7	5.9	1.0	83.6	
2013/14	502	97.7	1.9	0.4	5.9	1.0	82.5	9.6
2014/15	504	97.1	2.0	0.9	6.0	1.1	81.8	9.5
2015/16	507	97.2	2.3	0.5	6.1	1.2	80.6	9.3
2016/17	508	97.4	2.0	0.6	6.1	1.1	80.1	9.2
2017/18	500	98.1	1.4	0.5	6.0	1.0	82.3	9.3

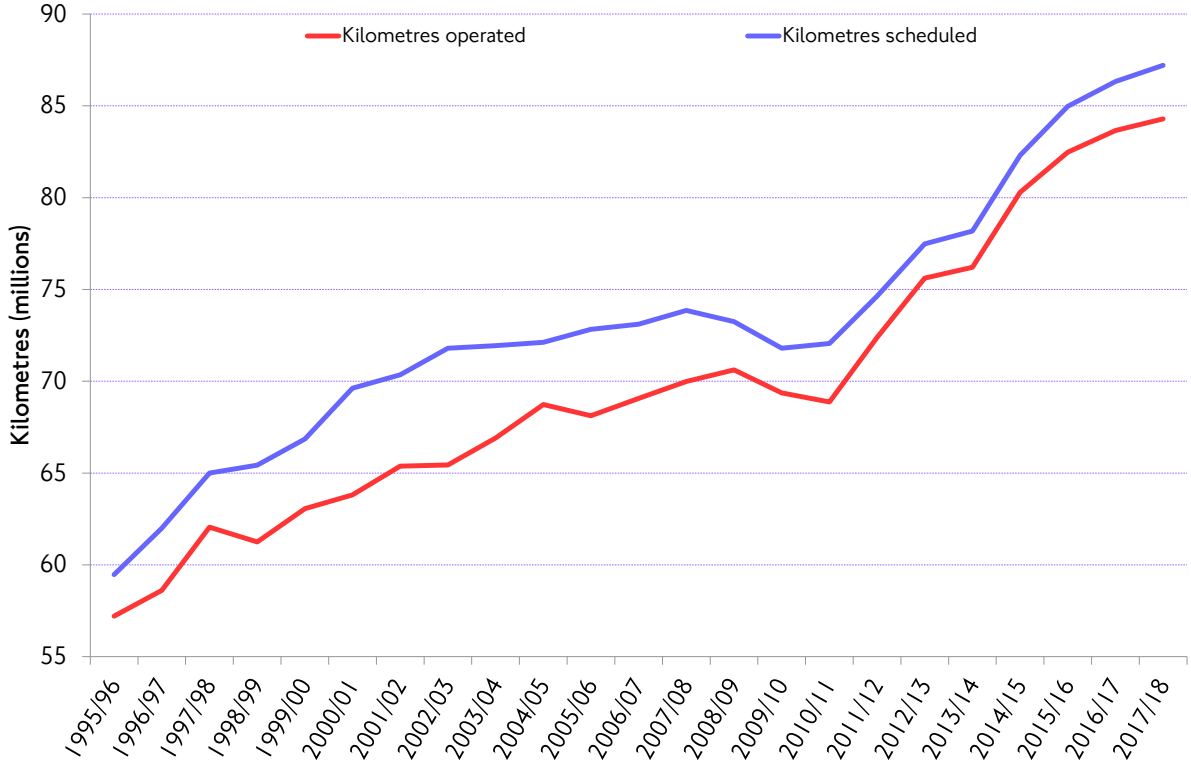
Source: London Buses.
1. High frequency services are those operating with a scheduled frequency of five or more buses an hour.
2. Low frequency services are those operating with a scheduled frequency of fewer than five buses an hour.
3. Buses are defined as 'on time' if departing between two and a half minutes before and five 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.
6. The rise in AWT in 2012/13 reflects the move to a greatly expanded QSI monitoring system for high frequency routes from P1 12/13. This figure is now based on continuous monitoring between 0500-2400 hours at an expanded number of locations. Scheduled levels of service are lower at additional times of day not previously monitored such as late evenings and Sunday mornings.
7. Results for low frequency routes from 2013/14 reflect the move to a greatly expanded QSI system for monitoring this group of routes.

10.4 Service provision and operational performance: London Underground

Since 2009/10, London Underground capacity has increased steadily and substantially within a largely static physical network in terms of its extent, thus reflecting service intensification on several lines following successful upgrade programmes increasing both capacity and service reliability (figure 10.4).

Train kilometres scheduled in 2017/18 were 1.0 per cent higher than in the previous year, while kilometres operated were 0.7 per cent higher, in both cases reaching the highest levels on record.

Figure 10.4 London Underground train kilometres scheduled and operated, 1995/96-2017/18.



Source: London Underground.

Table 10.3 summarises some key performance indicators. In 2017/18, 96.7 per cent of scheduled train kilometres were operated, which is very slightly lower than in 2016/17. However, all the other, customer-focused performance measures (average journey time and excess journey time) improved slightly – among the best results on record.

Table 10.3 London Underground service provision, reliability and journey times, 2000/01-2017/18.

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
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
2010/11	72.1	95.6	28.0	44.6	6.5	14.6
2011/12	74.6	97.0	27.5	45.1	5.8	12.9
2012/13	77.5	97.6	26.8	43.6	5.3	12.1
2013/14	78.2	97.5	26.8	43.4	5.2	12.0
2014/15	82.3	97.6	26.5	42.3	4.6	11.0
2015/16	85.0	97.1	26.3	41.7	4.6	11.0
2016/17	86.3	96.9	26.2	41.7	4.7	11.0
2017/18	87.2	96.7	26.1	41.6	4.6	11.2

Source: London Underground.
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.

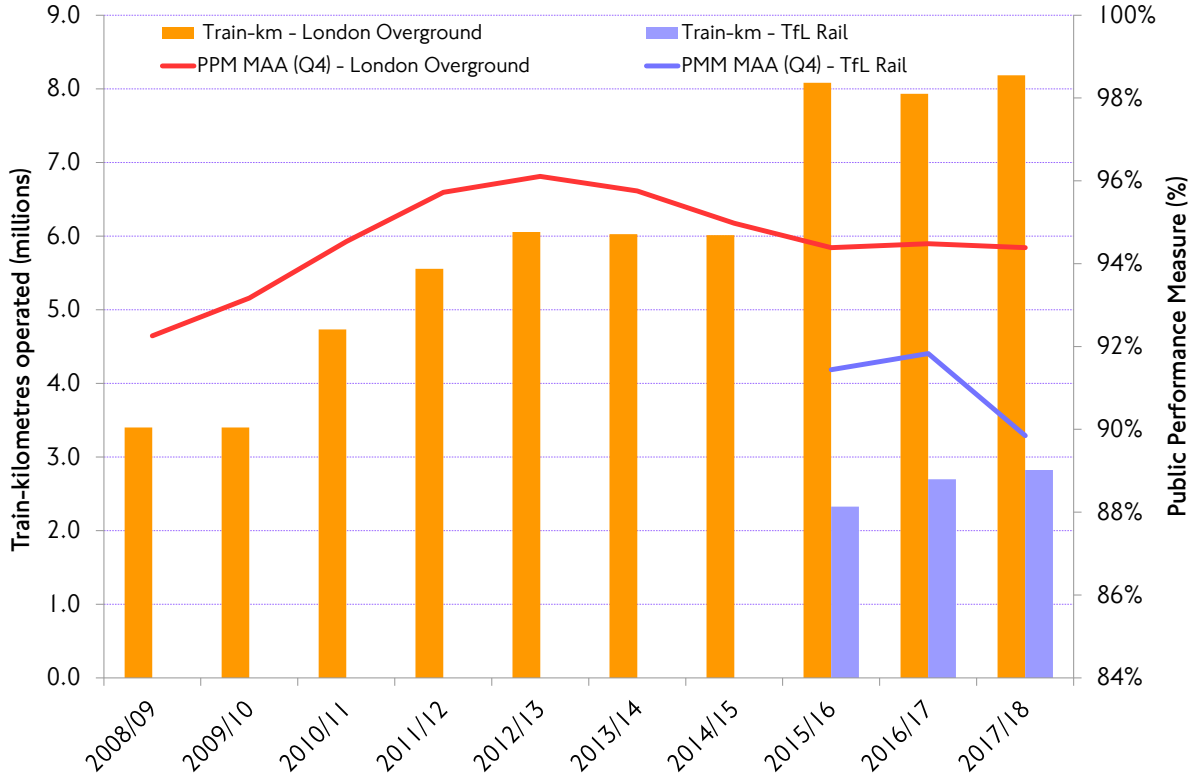
In summary, the last year has seen an increase in London Underground capacity and an overall improvement in performance and reliability. This suggests that the observed flattening of demand discussed in section 9.4 is not primarily associated with operational factors but rather to external causes.

10.5 Service provision and operational performance: London Overground and TfL Rail

Figure 10.5 shows the service provision (in train kilometres operated) and performance (in terms of Public Performance Measure – PPM) for London Overground and TfL Rail services.

The PPM combines figures for punctuality and reliability into a single metric that represents the proportion of trains 'on time' over the total number planned. For operators in the London and South East region (which include London Overground and TfL Rail), a train is defined as 'on time' if it arrives no later than five minutes after the scheduled destination arrival time.

Figure 10.5 London Overground and TfL Rail service provision and reliability (moving annual average of the Public Performance Measure at quarter four each year), 2008/09-2017/18.



Source: Office of Rail and Road.

There has been an increase in capacity on London Overground services since its first opening, which reflects the extensions to the network and also the subsequent service enhancements and capacity upgrades. The small decline between 2015/16 and 2016/17 is explained by the closures on the Gospel Oak to Barking route while electrification took place.

Performance on the London Overground peaked around 2012/13 and then decreased steadily by almost 2 percentage points until 2015/16. Since then, the PPM has remained almost constant and was 94.4 per cent in 2017/18.

TfL Rail capacity has been steadily increasing but PPM performance fell by 1.6 percentage points in the last year.

10.6 Service provision and operational performance: Docklands Light Railway (DLR)

In 2017/18, the number of train kilometres operated on the DLR increased by 0.6 per cent with respect to the previous year, thus reaching 6.1 million, the highest number on record (table 10.4). The percentage of scheduled services operated was 98.4 per cent, a slight decrease from the previous year, probably owing to a 48-hour industrial action in March 2018.

To bring the DLR in line with other TfL modes, in 2014/15 the 'percentage of trains on time' measure was replaced by a measure of excess waiting time (EWT), which has been back-cast to 2011/12 for comparison. The year 2017/18 saw an EWT figure of 0.11 minutes, a slight increase on 2016/17.

Table 10.4 DLR service provision and reliability, 2000/01-2017/18.

Year	Kilometres operated (millions)	Percentage of scheduled services operated	Percentage of trains on time	Excess waiting time (EWT)
2000/01	2.9	98.2	96.3	
2001/02	2.9	98.3	96.6	
2002/03	3.2	98.1	96.3	
2003/04	3.4	98.2	96.6	
2004/05	3.3	98.5	97.1	
2005/06	3.6	98.7	97.3	
2006/07	4.3	99.2	97.8	
2007/08	4.4	99.1	97.3	
2008/09	3.9	98.4	94.6	
2009/10	4.6	97.2	94.8	
2010/11	4.7	97.5	97.4	
2011/12	4.9	97.7	97.5	0.23
2012/13	5.7	98.5	98.8	0.14
2013/14	5.8	99.2	99.3	0.08
2014/15	5.8	99.3	n/a	0.07
2015/16	5.9	98.5	n/a	0.09
2016/17	6.0	99.0	n/a	0.10
2017/18	6.1	98.4	n/a	0.11

Source: Docklands Light Railway.

10.7 Service provision and operational performance: London Trams

In 2017/18, both the number of tram-kilometres scheduled and operated reached recorded high levels, increasing by around 1.5 per cent and 3.1 per cent respectively from the previous year. The proportion of operated services over scheduled also increased by 1.4 percentage points to 98.5 per cent of scheduled services, which shows a performance improvement with respect to the previous year.

Table 10.5 London Trams service provision and reliability, 2001/02-2017/18.

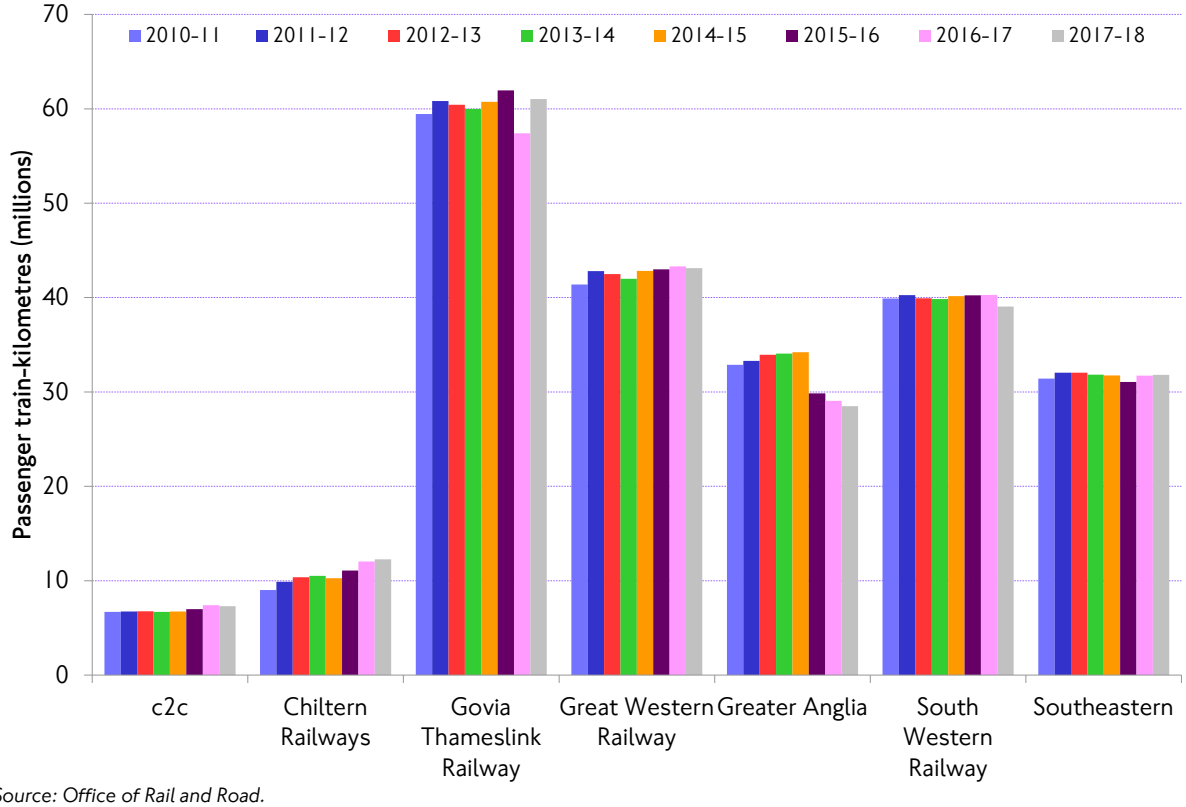
Year	Scheduled kilometres (millions)	Operated kilometres (millions)[1]	Percentage of scheduled services operated (%)
2001/02	2.44	2.41	99.1
2002/03	2.49	2.46	98.9
2003/04	2.50	2.48	99.0
2004/05	2.49	2.42	97.2
2005/06	2.50	2.44	97.4
2006/07	2.57	2.54	98.7
2007/08	2.60	2.57	99.0
2008/09	2.70	2.66	98.5
2009/10	2.62	2.60	99.2
2010/11	2.72	2.70	99.2
2011/12	2.74	2.71	98.9
2012/13	2.98	2.90	97.3
2013/14	3.06	3.03	98.9
2014/15	3.03	3.01	97.9
2015/16	3.07	3.04	99.0
2016/17	3.30	3.20	97.1
2017/18	3.35	3.30	98.5

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

10.8 Service provision and operational performance: National Rail in London

Figure 10.6 summarises the capacity in train kilometres operated by train operating companies that provide regional services in and around London.

Figure 10.6 Service provision (in train kilometres) – operators classified by ORR as London and South East operators, 2010/11-2017/18.



Source: Office of Rail and Road.

In general, changes in operated capacity have been small for most operators:

- Chiltern Railways has been steadily increasing its capacity over the last few years (by 36 per cent since 2010/11).
- Greater Anglia has seen its capacity decrease since 2014/15, partly owing to the transfer of some of its former services to London Overground and TfL Rail.
- Govia Thameslink Railway has seen a significant increase in capacity since last year, probably owing to the achievement of some milestones in the Thameslink Programme, including the lifting of some traffic restrictions to certain London terminals (eg Cannon Street).

Figure 10.7 summarises the performance (in terms of PPM) of National Rail operators providing regional services around London.

Figure 10.7 Performance (moving annual average of the Public Performance Measure at quarter four each year) – operators classified by ORR as London and South East operators, 2011/12-2017/18.

Source: Office of Rail and Road.
Note: Heathrow Express is not a London & South East regional operator, and it is not a franchised service, but has been included here for its interest to understand travel around London.

There has not been a uniform trend across all operators over the most recent year. Some operators whose performance had been declining for a couple of years are showing signs of recovery, while the performance of others has continued to decline.

In general, it seems that performance has been following a slow long-term decline and none of the current operators have been able to recover their record performance levels typical of the beginning of the decade.

10.9 Crowding on public transport

Introduction

Crowding arises where the demand for travel on a particular service exceeds a certain comfort threshold. Passengers find travelling in crowded conditions stressful and unsatisfying, and as such crowding is best analysed and understood as a subjective perception from the passenger point of view.

However, crowding has a big, measureable impact on reliability and is both cause and consequence of service performance. It may even also increase journey times, since customers may be forced to wait for a less crowded service.

Crowding is also one of the main drivers of the customer experience on public transport. It affects all elements of customer satisfaction, and has an impact on people's health and the value of travel time. Crowding may also have an inequality aspect, since it affects more severely passengers with disabilities and those on lower incomes, who tend to have longer journeys and less flexibility to change them.

At a system level, crowding is often monitored using occupancy or density of standing based metrics. A standing density of two passengers per square metre is already uncomfortable for passengers and may be used as an acceptable threshold for planning purposes. However, in practice, each mode is planned with a different purpose within its constraints and may target or accommodate a slightly different passenger density planning assumption.

For example, the Underground tends to be operated to maximise service levels within very tight constraints on the number of trains and signalling capability during the peaks; and to optimise the balance between operating costs and journey time savings outside those peaks, which may lead to 'acceptable' levels of crowding above the nominal two passengers per square metre. On the other hand, the DLR for example – where there is more scope for enhancements as it is not as constrained and saturated – is planned with the objective of not leaving people behind on the platform, which may occur at lower standing densities.

Public transport crowding in London

Crowding on London's public transport network can be a major issue at certain locations and during peak hours.

This is a reflection of the long-term growth in London's population and the much higher growth in demand for public transport over the same period, as detailed in section 9.2 of this report, in the context of a public transport capacity that grows at a slower and often uneven pace within the constraints of a complex and already well utilised network.

It is also a clear consequence of the existing land use distribution in London, which puts pressure on specific corridors and directions of travel throughout the day, and of prevailing social norms and associated travel behaviours, where demand for travel is highly concentrated around peak periods while supply cannot respond as flexibly.

The following sections give an overview of the currently available crowding measures for the main public transport modes. It is important to note that each network has different data sources to monitor passenger loading and hence is subject to different constraints and accuracy levels. The intention is to provide a comparable overview across all modes.

The key findings are:

- On all modes, crowding is largely an issue that happens during the peak periods and is concentrated on certain locations and specific services – particularly in and from/to central London.
- All networks have spare seated capacity and low standing densities on many services outside the busiest links (station-to-station stretches) and the busiest periods. However, those services often do not directly serve the needs of the majority of passengers, and higher proportions of the passengers travelling in the peak periods do so in crowded conditions: up to 40 per cent of demand on the Underground during the morning peak; just above 20 per cent on the London Overground; and between 10 and 20 per cent on the DLR.
- Each network has a few sections and links that are chronically crowded or very crowded during the peaks and whose impact on service performance and passengers' experience may be disproportionately higher than their geographical and temporal extent.
- On those sections and peak periods the experience of crowding can be quite unpleasant, with standing densities often around – and occasionally beyond – four people per square metre on the Tube network and two to four passengers per square metre on the other rail modes. This not only causes discomfort to passengers but also potential disruptions to their journeys and delays, since it may prevent people boarding the first service.

It is important to stress that the objective metrics described below capture only part of the crowding experience, which also has an important psychological and emotional dimension, since the perception of, and tolerance towards, crowding is affected by situational, emotional and behavioural factors.

Furthermore, those metrics are aggregated to the network level for each mode in order to provide a summary overview. But since the crowding experience is so personal to each passenger, crowding is better analysed at much more disaggregate levels (ideally, at a service level on each link), but such an analysis is outside the scope of this document.

TfL is working towards developing a better, more unified, measure of crowding that is applicable and comparable across the different public transport networks.

10.10 Crowding: Bus

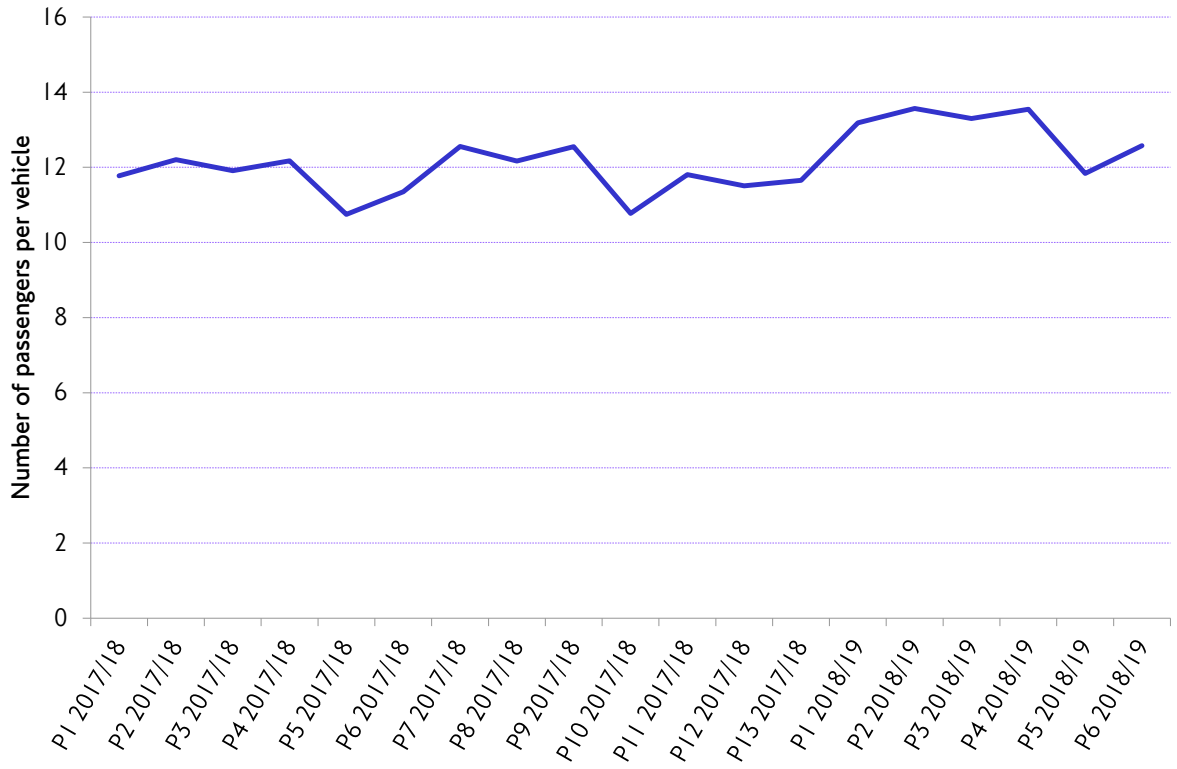
Overall trends

Only recently has it been possible to start systematically measuring bus occupancy and crowding, and there are still several technical challenges and difficulties to doing so consistently and effectively.

One of the indicators that is used to get an idea of how well buses are utilised and whether there are any crowding issues is the average bus load across all links (defined as stop-to-stop) on the network.

Figure 10.8 shows the recent trend on bus average loads for the whole bus network. The average load varies approximately between 10 and 14 passengers per vehicle. There are the usual seasonal variations from (financial) period to period, with average loads dropping in those periods with holiday seasons: period 10 for Christmas and period 5 for summer. There also seems to have been an increase in average loads in the last year when compared to equivalent periods a year earlier.

Figure 10.8 Average bus loads across the day, 2017/18-2018/19.



Source: TfL Public Transport Service Planning.

Of course, such system-wide averages conceal a large degree of variation. Last year, another piece of analysis was completed to look at bus loads on each link during the morning peak hour, using data from financial period 2 (May) in 2016. Table 10.6 summarises some of the key findings.

It is interesting that, even in the busiest hour of the day, the majority of bus links on the network have spare capacity to the point that it is possible to get a seat, with only just above 6 per cent of all links requiring standing, and only half of those in what could be considered uncomfortably crowded conditions (above 70 per cent occupancy). Whilst small in relative terms, these are the 'critical links' on which demand is highest, and on which customers experience discomfort and inconvenience.

Table 10.6 Bus occupancy during the morning peak hour, 2016.

		Percentage of serviced links…		
Average occupancy	**… with seats available**	**… with all seats taken and total occupancy up to 70%**	**… with all seats taken and total occupancy between 70 and 100%**	**…with all seats taken and total occupancy above 100%**
31.9%	93.9%	3.0%	3.0%	0.2%

Source: TfL City Planning, Transport Strategy.

10.11 Crowding: London Underground

Of all public transport modes, the Underground is particularly affected by crowding at certain times and locations.

The perception of a crowded Tube is engrained in the public opinion of Londoners and is also partly supported by the evidence of long queues to board trains, station control

measures to maintain safety (eg gateline closures, escalator reversals), or the need to wait for several trains before boarding.

Furthermore, it is not uncommon to observe passenger densities of four people per square metre and occasionally even more, which is well above acceptable comfort levels.

This is a reflection of the high demand volumes for the Underground, which fulfils a pivotal role as both a metropolitan service stretching out into the suburbs and an internal distributor and connector within the city centre, within a legacy infrastructure of mostly narrow and short tunnels and stations that operate at full capacity with only limited scope for improvement over the short term.

However, the evidence also shows that crowding is mostly problematic during the weekday morning and evening peaks and at certain locations (mostly concentrated in the Central Activities Zone), while at other times and locations the Tube operates with spare capacity.

Figure 10.9 shows the proportion of station to station links on the Tube network with seats available alongside the proportion of passengers travelling in each 15 minute period that do so under crowded conditions of more than three people per square metre.

This is based on demand data for a typical autumn weekday derived from the Rolling Origin and Destination Survey (RODS), working timetables for the third Wednesday in November for each year (compatible with the RODS period), and train capacities extracted from the rolling stock data sheets.

Although approximately the same proportion of links (just below half) have seats available at the height of each peak, the morning peak sees relatively many more passengers travelling in crowded conditions (above 40 per cent of the demand on the busiest periods in recent years) than the evening peak (just below 20 per cent). This is probably explained by the traditional 'hard start' of the working day (typically before 09:00) versus the much softer end and wider spread of the evening peak. Outside the peaks, passengers do not, typically, experience any severe crowding, and most links have spare seating capacity.

It is important to note that the data shown in figure 10.9 is based on average crowding by 15 minute period. It is expected that within each quarter hour there will be significant variation among specific services, some of which will be more crowded.

The colour coding also helps to show how crowding is an issue at the aggregate level only around the peaks; and how over the last few years these peaks have tended to spread slightly, particularly into the early hours of the morning and in the late afternoon. More generally, the proportion of passengers affected by crowding has been following a long-term increase.

Some of the most crowded sections on the Tube network are:

- Stratford to St. Paul's on the Central line
- Canada Water to Westminster on the Jubilee line
- Clapham South to Stockwell and much of the Bank branch of the Northern line
- Harrow-on-the-Hill to Finchley Road on the Metropolitan line
- The north part of the circle between Edgware Road and Liverpool Street

Figure 10.9 Proportion of serviced links with seats available and passengers travelling in crowded conditions on the Underground by 15 minute period (weekday only), 2010-2017.

	Links with seats available (%)								Passengers experiencing crowding above 3 ppsm (%)							
Time	2010	2011	2012	2013	2014	2015	2016	2017	2010	2011	2012	2013	2014	2015	2016	2017
05:00	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
05:15	100%	100%	100%	100%	100%	100%	99%	99%	0%	0%	0%	0%	0%	0%	0%	0%
05:30	98%	97%	97%	97%	94%	94%	91%	90%	0%	0%	0%	0%	0%	0%	0%	0%
05:45	97%	97%	97%	96%	94%	91%	91%	89%	0%	0%	0%	0%	1%	2%	3%	2%
06:00	96%	96%	95%	93%	92%	89%	88%	88%	0%	0%	0%	0%	1%	1%	3%	2%
06:15	94%	94%	93%	91%	89%	85%	82%	82%	0%	0%	0%	0%	0%	1%	1%	0%
06:30	92%	89%	90%	88%	83%	81%	78%	79%	0%	0%	0%	0%	0%	1%	2%	2%
06:45	88%	86%	86%	83%	79%	76%	75%	76%	0%	0%	0%	0%	0%	3%	3%	4%
07:00	81%	80%	81%	78%	74%	73%	70%	72%	0%	0%	0%	0%	0%	2%	2%	4%
07:15	72%	70%	73%	71%	67%	66%	64%	65%	1%	0%	0%	0%	2%	3%	6%	6%
07:30	65%	64%	66%	63%	60%	60%	58%	58%	3%	2%	2%	2%	5%	6%	10%	10%
07:45	61%	60%	61%	60%	56%	54%	53%	55%	4%	5%	4%	5%	8%	13%	18%	16%
08:00	51%	53%	55%	53%	50%	49%	47%	48%	12%	14%	11%	16%	21%	24%	28%	24%
08:15	47%	49%	50%	48%	45%	44%	44%	45%	25%	26%	27%	30%	34%	35%	39%	40%
08:30	48%	49%	50%	48%	44%	45%	45%	45%	27%	29%	30%	34%	37%	38%	41%	42%
08:45	51%	52%	52%	51%	47%	48%	47%	47%	21%	23%	25%	28%	31%	30%	35%	34%
09:00	54%	56%	58%	56%	53%	53%	53%	53%	12%	12%	10%	12%	14%	16%	24%	23%
09:15	60%	63%	63%	63%	60%	61%	59%	59%	2%	2%	2%	3%	3%	2%	5%	5%
09:30	66%	69%	71%	70%	67%	68%	67%	67%	1%	1%	0%	0%	0%	0%	1%	1%
09:45	75%	77%	80%	78%	74%	76%	74%	75%	1%	0%	0%	0%	0%	0%	0%	0%
10:00	84%	86%	88%	87%	85%	87%	86%	87%	1%	0%	0%	0%	0%	0%	0%	0%
10:15	88%	90%	92%	90%	87%	90%	90%	90%	1%	0%	0%	0%	0%	0%	0%	0%
10:30	88%	91%	93%	92%	90%	92%	91%	92%	1%	0%	0%	0%	0%	0%	0%	0%
10:45	92%	94%	95%	94%	91%	93%	93%	94%	1%	0%	0%	0%	0%	0%	0%	0%
11:00	93%	94%	96%	95%	93%	95%	95%	95%	0%	1%	0%	0%	0%	0%	0%	0%
11:15	91%	94%	96%	95%	93%	95%	96%	96%	1%	0%	0%	0%	0%	0%	0%	0%
11:30	92%	93%	96%	95%	93%	95%	96%	96%	0%	0%	0%	0%	0%	0%	0%	0%
11:45	90%	92%	95%	94%	92%	95%	95%	95%	0%	0%	0%	0%	0%	0%	0%	0%
12:00	91%	91%	94%	94%	91%	93%	94%	94%	0%	0%	0%	0%	0%	0%	0%	0%
12:15	90%	91%	95%	94%	91%	93%	94%	94%	0%	0%	0%	0%	0%	0%	0%	0%
12:30	89%	90%	94%	93%	89%	92%	93%	94%	0%	0%	0%	0%	0%	0%	0%	0%
12:45	89%	89%	94%	93%	90%	92%	94%	94%	0%	0%	0%	0%	0%	0%	0%	0%
13:00	90%	90%	95%	94%	90%	93%	95%	94%	0%	0%	0%	0%	0%	0%	0%	0%
13:15	89%	90%	94%	94%	89%	92%	95%	93%	1%	0%	0%	0%	0%	0%	0%	0%
13:30	89%	90%	94%	93%	89%	91%	95%	93%	0%	1%	0%	0%	0%	0%	0%	0%
13:45	92%	92%	95%	94%	91%	92%	95%	94%	0%	0%	0%	0%	0%	0%	0%	0%
14:00	92%	91%	94%	94%	91%	92%	95%	94%	0%	1%	0%	0%	0%	0%	0%	0%
14:15	90%	89%	94%	94%	90%	92%	94%	92%	0%	1%	0%	0%	0%	0%	0%	0%
14:30	91%	88%	94%	94%	89%	91%	94%	92%	0%	0%	0%	0%	0%	0%	0%	0%
14:45	90%	88%	93%	92%	88%	90%	93%	91%	0%	0%	0%	0%	0%	0%	0%	0%
15:00	88%	86%	92%	90%	85%	89%	90%	89%	0%	0%	0%	0%	0%	0%	0%	0%
15:15	86%	85%	90%	89%	84%	87%	89%	87%	0%	1%	0%	0%	0%	0%	0%	0%
15:30	83%	82%	87%	86%	80%	83%	84%	83%	0%	1%	0%	0%	0%	0%	0%	0%
15:45	81%	79%	83%	81%	76%	79%	79%	79%	0%	1%	0%	0%	0%	0%	0%	0%
16:00	77%	76%	80%	78%	72%	74%	74%	72%	0%	1%	0%	0%	0%	0%	0%	0%
16:15	71%	72%	75%	72%	66%	68%	66%	65%	1%	1%	0%	0%	0%	0%	0%	0%
16:30	67%	68%	68%	67%	62%	62%	61%	58%	1%	1%	0%	0%	0%	0%	1%	1%
16:45	63%	65%	65%	63%	58%	59%	57%	55%	1%	1%	0%	0%	0%	0%	1%	1%
17:00	56%	59%	61%	57%	53%	52%	51%	50%	1%	4%	2%	1%	5%	4%	8%	5%
17:15	53%	54%	55%	52%	49%	49%	47%	46%	5%	6%	5%	5%	11%	12%	15%	13%
17:30	51%	51%	54%	50%	47%	46%	44%	45%	7%	8%	5%	10%	17%	15%	16%	16%
17:45	50%	50%	52%	48%	46%	45%	44%	44%	8%	9%	7%	12%	18%	16%	21%	19%
18:00	51%	50%	52%	49%	47%	46%	44%	45%	5%	9%	8%	11%	18%	17%	20%	17%
18:15	53%	52%	55%	51%	49%	48%	47%	47%	2%	5%	3%	6%	13%	13%	15%	12%
18:30	55%	56%	57%	55%	52%	52%	51%	51%	1%	2%	2%	2%	7%	6%	11%	7%
18:45	61%	62%	62%	60%	57%	58%	57%	57%	1%	1%	0%	0%	2%	1%	2%	1%
19:00	68%	69%	70%	67%	64%	65%	64%	64%	1%	1%	0%	0%	0%	0%	1%	0%
19:15	75%	75%	77%	74%	71%	73%	74%	74%	1%	1%	0%	0%	0%	0%	0%	0%
19:30	81%	81%	83%	81%	77%	80%	80%	82%	0%	1%	0%	0%	0%	0%	0%	0%
19:45	87%	85%	88%	88%	84%	86%	85%	87%	0%	1%	0%	0%	0%	0%	0%	0%
20:00	90%	88%	91%	90%	89%	91%	90%	91%	0%	0%	0%	0%	0%	0%	0%	0%
20:15	91%	88%	92%	93%	91%	93%	92%	93%	0%	0%	0%	0%	0%	0%	0%	0%
20:30	93%	91%	94%	95%	93%	95%	95%	96%	0%	0%	0%	0%	0%	0%	0%	0%
20:45	94%	93%	95%	96%	95%	96%	96%	97%	0%	0%	0%	0%	0%	0%	0%	0%
21:00	95%	93%	96%	96%	96%	97%	97%	96%	0%	0%	0%	0%	0%	0%	0%	0%
21:15	95%	94%	96%	97%	97%	97%	96%	97%	0%	0%	0%	0%	0%	0%	0%	0%
21:30	95%	94%	96%	97%	97%	97%	97%	97%	0%	0%	0%	0%	0%	0%	0%	0%
21:45	94%	94%	97%	97%	97%	97%	97%	97%	0%	0%	0%	0%	0%	0%	0%	0%
22:00	95%	94%	96%	97%	97%	97%	97%	97%	0%	0%	0%	0%	0%	0%	0%	0%
22:15	94%	93%	94%	95%	96%	96%	97%	97%	0%	0%	0%	0%	0%	0%	0%	0%
22:30	92%	92%	94%	95%	95%	96%	97%	97%	0%	0%	0%	0%	0%	0%	0%	0%
22:45	93%	92%	94%	96%	96%	96%	98%	97%	0%	0%	0%	0%	0%	0%	0%	0%
23:00	94%	93%	96%	96%	97%	97%	98%	97%	0%	0%	0%	0%	0%	0%	0%	0%
23:15	96%	96%	96%	97%	98%	98%	99%	98%	0%	0%	0%	0%	0%	0%	0%	0%
23:30	98%	97%	98%	98%	98%	98%	100%	99%	0%	0%	0%	0%	0%	0%	0%	0%
23:45	99%	98%	99%	99%	99%	99%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
00:00	100%	99%	99%	99%	99%	99%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
00:15	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
00:30	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
00:45	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
01:00	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
01:15	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
01:30	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%

Source: TfL Public Transport Service Planning.

Another way of looking at how crowding on the London Underground has evolved over time is using the implicit crowding that can be calculated from the Journey Time Metric, which is shown in figure 10.10.

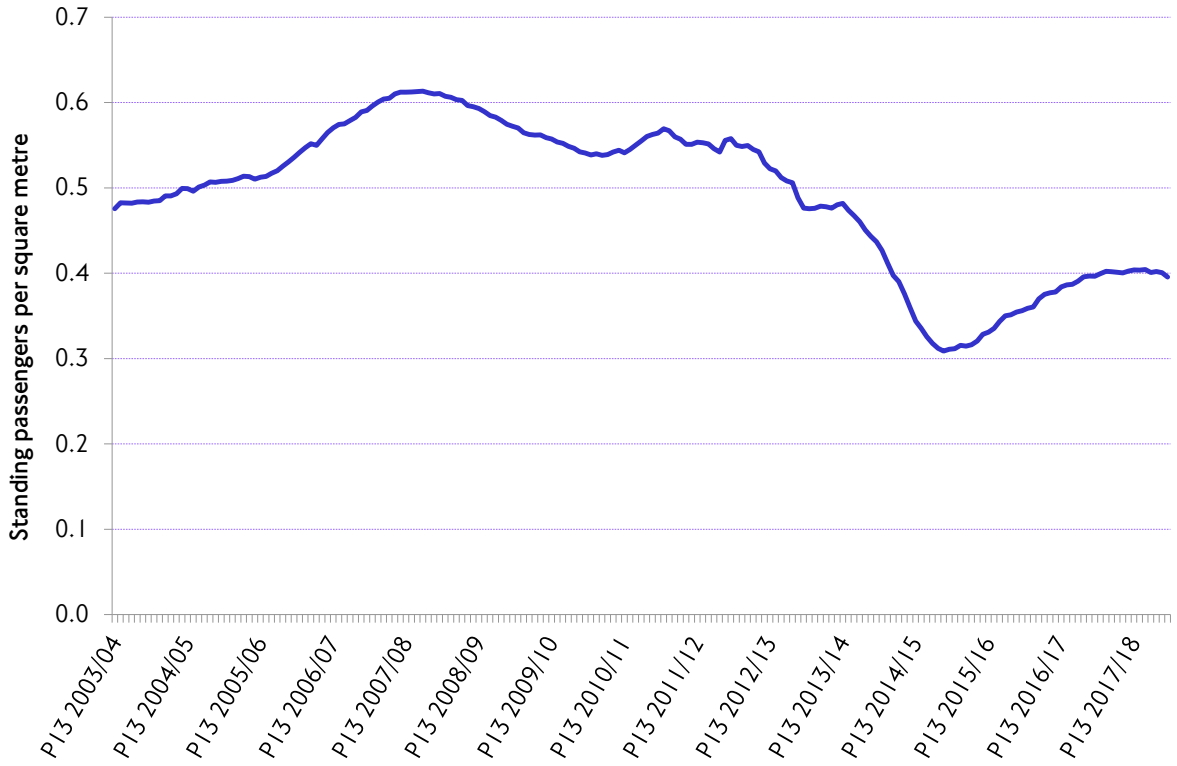
From 2004 until 2008, crowding on the Tube increased while demand was rapidly growing and the major upgrades and service changes had not yet started to relieve the pressure.

The benefits of some of the early upgrades (eg the introduction of S8 stock on the Metropolitan line and reliability improvements on the Jubilee and Waterloo & City lines) combined with a softening of demand growth due to the recession led to a subsequent improvement of crowding over the following years and until early 2011, following which further reliability issues on the Jubilee line and increasing pressure on the Victoria line led to a minor increase in crowding.

Finally, the first phase of the Victoria line upgrade and the Jubilee line upgrade started a trend of significant reductions in crowding and improvements of service quality to which the subsequent Northern line upgrade and the introduction of the S7 stock on the District, Circle and Hammersmith & City lines also contributed. The coincidence in time of the conclusion of a lot of those major upgrades explains most of the reduction in crowding up to the end of 2015.

After that, crowding has increased slightly again, probably as a consequence of increases in demand, although both demand and subsequently crowding have plateaued over the last year.

Figure 10.10 Trend in London Underground crowding (13 period moving average), 2003/04–2017/18.



Source: TfL Public Transport Service Planning.

10.12 Crowding: London Overground

The nature of the London Overground network (with a high proportion of ungated stations and interchanges with National Rail) and the lack of a tool equivalent to the Underground's RODS survey make it harder to calculate demand estimates by link, which are a key input to the passenger density calculations (together with the service frequency and the rolling stock capacity). However, the existence of a much younger fleet on this network (with features such as train weight reporting) provides other more direct measurements of passenger loading that have enabled the development of crowding monitoring tools in recent years.

The link loading estimates are based on the so-called train loadweigh, which infers the number of passengers on a train from the weight of that train as it departs from each station.

The loadweigh capability is only available on some of the London Overground rolling stock, and the processing of loadweigh data occasionally has issues because trains do not always report or send all data. However, at the level of aggregation that they are presented here, this data provide a good indication of crowding on the London Overground network.

Figure 10.11 shows the proportion of links with seats available by 15 minute period alongside the proportion of passengers travelling in that quarter hour that do so under passenger densities above three people per square metre.

This is based on average weekday demand for financial period 9 (around November) obtained from loadweigh data as well as service capacity (calculated from rolling stock capacities and timetables). It is important to note that in financial year 2015/16 the capacity of the class 378 train fleet was progressively increased by moving from a 4-car to a 5-car formation. Financial period 9 has been chosen because it is the closest to the time of year when the Underground RODS survey took place, and it is representative of a standard autumn day used for planning.

The London Overground network also presents crowding issues around the peaks only, and even then the proportion of passengers affected by it is about half of what it is for the Tube. The proportion of serviced links with seats available during the peaks is around 25 to 30 per cent, smaller than the Underground. This is because of the much smaller geographical extent of the London Overground network, which means that there are fewer links that are also concentrated within denser areas (Zones 1-4, since the data exclude the radial lines from Liverpool Street).

Over time, crowding on the London Overground appears to have reduced, probably following capacity upgrades and service enhancements.

The most crowded sections of the London Overground network are between Hackney Central and Highbury & Islington, between Brockley and Canada Water, and between Olympia and Shepherd's Bush.

Figure 10.11 Proportion of serviced links with seats available and passengers travelling in crowded conditions on the London Overground (excluding Romford-Upminster line and services from Liverpool Street) by 15 minute period (weekday only), 2015/16-2017/18.

	Links with seats available (%)			Passengers experiencing crowding above 3 ppsm (%)		
Time	2015/16	2016/17	2017/18	2015/16	2016/17	2017/18
05:00	100%	100%		0%	0%	
05:15	100%	100%		0%	0%	
05:30	90%	86%	89%	0%	0%	0%
05:45	89%	86%	87%	0%	0%	0%
06:00	78%	80%	79%	0%	0%	0%
06:15	67%	71%	71%	0%	0%	0%
06:30	56%	57%	61%	6%	7%	5%
06:45	43%	47%	52%	8%	4%	2%
07:00	40%	38%	42%	11%	16%	7%
07:15	32%	33%	34%	23%	24%	15%
07:30	27%	31%	32%	16%	20%	15%
07:45	24%	26%	30%	15%	11%	11%
08:00	21%	17%	30%	23%	22%	20%
08:15	20%	17%	23%	24%	21%	21%
08:30	20%	16%	25%	27%	26%	24%
08:45	35%	28%	37%	15%	14%	12%
09:00	38%	38%	40%	15%	12%	13%
09:15	47%	46%	52%	5%	6%	6%
09:30	57%	57%	63%	0%	0%	0%
09:45	73%	76%	81%	3%	0%	0%
10:00	86%	88%	90%	0%	0%	0%
10:15	89%	88%	91%	0%	0%	0%
10:30	91%	90%	93%	0%	0%	0%
10:45	93%	94%	95%	0%	0%	0%
11:00	96%	94%	96%	0%	0%	0%
11:15	95%	94%	95%	0%	0%	0%
11:30	93%	96%	96%	0%	0%	0%
11:45	98%	97%	98%	0%	0%	0%
12:00	95%	97%	98%	0%	0%	0%
12:15	95%	96%	95%	0%	0%	0%
12:30	95%	92%	95%	0%	0%	0%
12:45	92%	96%	96%	0%	0%	0%
13:00	93%	94%	95%	0%	0%	0%
13:15	92%	91%	92%	0%	0%	0%
13:30	94%	92%	93%	0%	0%	0%
13:45	94%	93%	94%	0%	0%	0%
14:00	92%	92%	93%	0%	0%	0%
14:15	93%	89%	92%	0%	0%	0%
14:30	89%	89%	90%	0%	0%	0%
14:45	88%	88%	90%	0%	0%	0%
15:00	84%	86%	88%	0%	0%	0%
15:15	87%	87%	88%	0%	0%	0%
15:30	83%	85%	86%	0%	0%	0%
15:45	74%	79%	78%	0%	0%	0%
16:00	65%	67%	70%	0%	0%	0%
16:15	55%	50%	57%	0%	0%	0%
16:30	45%	43%	46%	0%	0%	0%
16:45	39%	39%	43%	0%	0%	0%
17:00	35%	32%	38%	7%	5%	5%
17:15	24%	23%	25%	18%	17%	13%
17:30	20%	14%	23%	26%	18%	14%
17:45	16%	14%	23%	14%	19%	14%
18:00	22%	13%	26%	19%	15%	14%
18:15	23%	17%	27%	19%	18%	17%
18:30	30%	24%	31%	13%	10%	7%
18:45	37%	34%	40%	4%	0%	2%
19:00	44%	44%	51%	0%	0%	0%
19:15	52%	50%	63%	0%	7%	0%
19:30	60%	69%	72%	0%	0%	0%
19:45	74%	79%	83%	0%	0%	0%
20:00	85%	82%	88%	0%	0%	0%
20:15	89%	87%	90%	0%	0%	0%
20:30	89%	90%	92%	0%	0%	0%
20:45	89%	93%	94%	0%	0%	0%
21:00	90%	87%	92%	0%	0%	0%
21:15	90%	91%	91%	0%	0%	0%
21:30	90%	89%	92%	0%	0%	0%
21:45	93%	92%	94%	0%	0%	0%
22:00	92%	93%	93%	0%	0%	0%
22:15	91%	91%	93%	0%	0%	0%
22:30	92%	93%	91%	0%	0%	0%
22:45	90%	94%	95%	0%	0%	0%
23:00	90%	95%	96%	0%	0%	0%
23:15	89%	94%	96%	0%	0%	0%
23:30	94%	96%	96%	0%	0%	0%
23:45	92%	96%	97%	0%	0%	9%
00:00	100%	98%	97%	0%	0%	0%
00:15	100%	98%	98%	0%	0%	0%
00:30	100%	100%	96%	0%	0%	0%

Source: TfL Public Transport Service Planning.
Note: In 2016/17, the Gospel Oak – Barking line was closed for electrification, hence there are no data from this line in this year.

10.13 Crowding: Docklands Light Railway (DLR)

The DLR network has automatic passenger counters on all platforms. These can be used in combination with other data (such as origin-destination information from smartcard payments, timetables, and rolling stock capacities) to estimate passenger loading on each station-to-station link and obtain similar crowding outputs to those for the Underground and London Overground.

Figure 10.12 shows the proportion of links with seats available on the DLR by hour alongside the proportion of passengers travelling in crowded conditions in that hour. In this case, a threshold of two people per square metre has been used (instead of three). This is to accommodate the fact that on many links on the DLR network there are services from different origins and destinations with very different demand, so that when averaging across the hour at an aggregate link level the crowding on the busy services is concealed by the low demand of the other services, which would provide a misleading picture of crowding on the DLR network.

For consistency with the other networks, this is based on average weekday demand in financial period 9.

The figure shows once more that crowding is an issue during the peaks but, interestingly, on the DLR network there are fewer services with seats available in the evening peak than in the morning peak, and in the last year more people have travelled in crowded conditions in the evening peak than in the morning peak.

Over time, the proportion of services with seats available has decreased while the proportion of passengers affected by crowding has tended to increase. This probably reflects an increase in average demand and crowding on the DLR network over this period. The diagram colours also show evidence of increased demand in the shoulders of the peaks (peak spreading) over the last few years.

These trends can be partly explained by the big increase in demand on the DLR network in the recent past, which reflects progressive extensions, service upgrades, and general population and employment growth in the east London areas served by this network.

In recent years, none of the DLR network has seen hourly crowding with average passenger densities above three people per square metre. However, on a train by train basis, there will have been higher passenger densities, which do not show up on the average. On the whole, therefore, DLR capacity has broadly kept pace with growing demand thanks to service enhancements such as the lengthening of trains and increases in train frequency.

The most crowded sections of the DLR are the approaches to Canary Wharf and the section between Canning Town and London City Airport.

Figure 10.12 Percentage of serviced links with seats available and passengers travelling in crowded conditions on the Docklands Light Railway (DLR) by hour (weekday only), 2012/13-2017/18.

Links with seats available (%)

Time	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
05:00	100%	100%	100%	100%	87%	90%
06:00	73%	73%	68%	66%	60%	58%
07:00	74%	65%	60%	55%	51%	54%
08:00	51%	46%	38%	37%	36%	37%
09:00	84%	84%	79%	78%	70%	75%
10:00	97%	96%	95%	97%	96%	91%
11:00	97%	97%	96%	99%	97%	97%
12:00	n/a	97%	95%	100%	96%	93%
13:00	n/a	93%	93%	100%	97%	89%
14:00	n/a	93%	91%	98%	92%	84%
15:00	90%	86%	68%	79%	66%	68%
16:00	76%	70%	60%	65%	54%	59%
17:00	47%	42%	35%	36%	33%	33%
18:00	58%	50%	45%	42%	39%	39%
19:00	80%	74%	70%	73%	70%	63%
20:00	95%	92%	91%	92%	84%	82%
21:00	92%	88%	87%	100%	97%	97%
22:00	n/a	93%	90%	100%	100%	99%
23:00	n/a	96%	95%	100%	100%	100%
00:00	n/a	100%	100%	100%	100%	100%

Passengers experiencing crowding above 2 ppsm (%)

2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
0%	0%	0%	0%	0%	0%
0%	0%	11%	0%	0%	0%
0%	0%	0%	5%	9%	7%
3%	8%	18%	21%	26%	10%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
2%	1%	8%	2%	11%	20%
0%	0%	0%	0%	11%	6%
0%	2%	5%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%
n/a	0%	0%	0%	0%	0%

Source: TfL Public Transport Service Planning.

10.14 Crowding: London Trams

Aggregated summaries of crowding on Trams have only recently started to be produced, so there is no historic series.

In a way, London Trams are the rail mode with the richest data to calculate link loads and vehicle occupancy, because the rolling stock is fitted with automatic passenger counters above each door that can directly measure the number of boarders and alighters at each station. However, due to the relatively lower service frequency, aggregating the information from each service into hourly periods is subject to bigger estimation errors than in other cases.

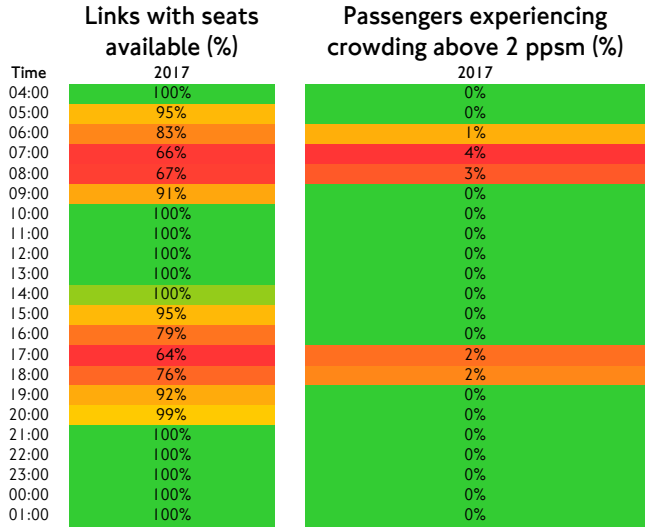
Figure 10.13 shows the proportion of seats available on Trams by hour alongside the proportion of passengers travelling in passenger densities above two people per square metre. The use of two instead of three people per square metre for Trams reflects the same logic explained for the DLR above.

In general, crowding on Trams is concentrated at the height of the peak, with a small proportion of people affected by it. Standing densities remain generally low and there is spare seated capacity for most of the day.

However, in 2017 crowding was a problem on individual trams because of services bunching together, which does not show on the network-wide hourly average because in the same hour there would have been very busy and nearly empty trams. A new timetable was introduced in 2018 to prevent this issue from recurring and it is expected that this will improve the passenger experience of crowding.

This needs to be put in the context of a relatively small geographically localised network with few links overall. The most crowded section of the network is between Wimbledon and Mitcham.

Figure 10.13 Percentage of serviced links with seats available and passengers travelling in crowded conditions on London Trams by hour (weekday only), 2017.



Time	Links with seats available (%) 2017	Passengers experiencing crowding above 2 ppsm (%) 2017
04:00	100%	0%
05:00	95%	0%
06:00	83%	1%
07:00	66%	4%
08:00	67%	3%
09:00	91%	0%
10:00	100%	0%
11:00	100%	0%
12:00	100%	0%
13:00	100%	0%
14:00	100%	0%
15:00	95%	0%
16:00	79%	0%
17:00	64%	2%
18:00	76%	2%
19:00	92%	0%
20:00	99%	0%
21:00	100%	0%
22:00	100%	0%
23:00	100%	0%
00:00	100%	0%
01:00	100%	0%

Source: TfL Public Transport Service Planning.

10.15 Crowding: National Rail in London

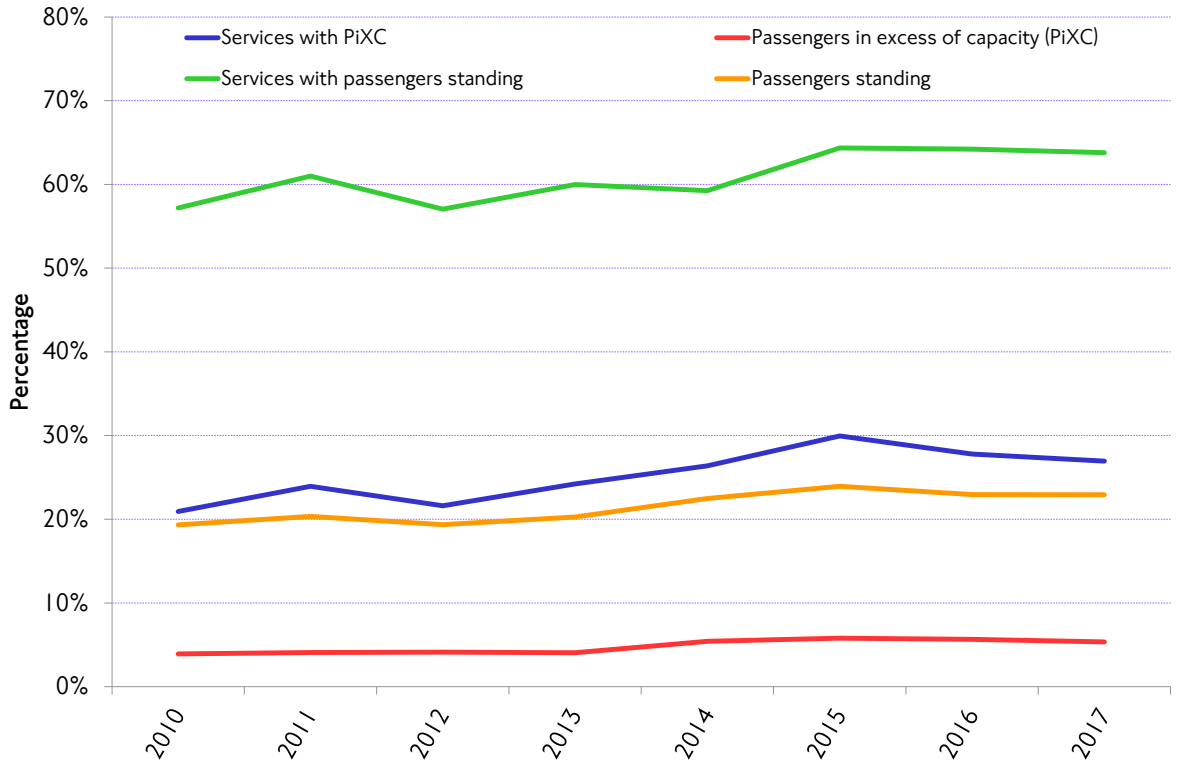
The Department for Transport measures crowding on National Rail in terms of the Passengers in Excess of Capacity (PiXC) metric, which is the difference between the capacity of services in the study period and actual demand.

Figure 10.14 shows the trend in the London PiXC value for the last few years against other occupancy metrics.

The proportion of passengers above capacity (PiXC) has remained fairly stable since 2010, with a minor net increase of around one percentage point since 2010 following a very slight decline of 0.3 percentage points in the last year.

The number of services with passengers above capacity has also improved over the last two years but still sits at just above a quarter (27 per cent), with the number of services with passengers standing reaching more than 60 per cent. That makes the number of standing passengers on services approaching London terminals slightly above a fifth (23 per cent).

Figure 10.14 National Rail – measures of crowding for services approaching London terminals during the weekday morning peak (07:00 to 10:00), 2010-2017.



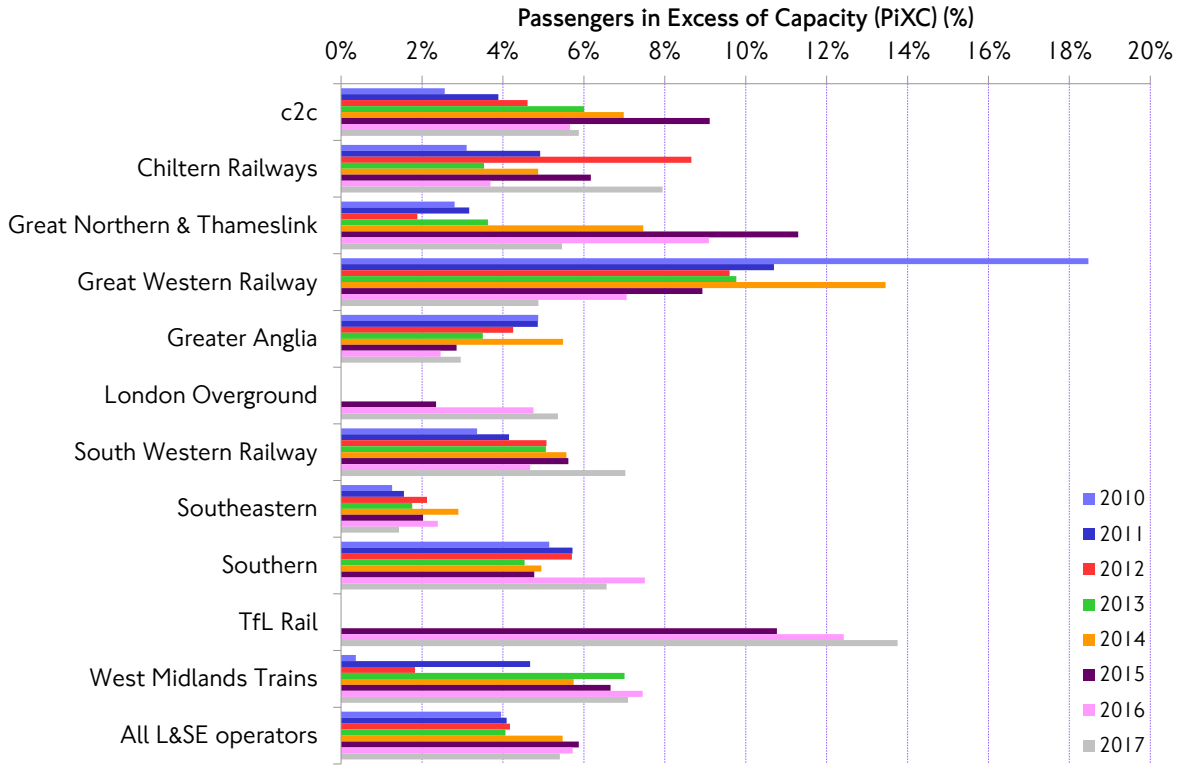
Source: Department for Transport.
Note: The PiXC for trains approaching London terminals is calculated from observations on departure from the last stop before arrival at the relevant London terminal (last link).

It is also possible to look at the trend in occupancy and crowding by operator (figure 10.15).

In the last year, the PiXC value across all operators combined continued the decline started in 2015, reaching 5.4 per cent, which reflects slower demand growth but is still short of the benchmark of around 4 per cent that used to apply before 2014.

Both London Overground and TfL Rail, alongside Chiltern, have continued to see an increase in crowding in the last year. On the other hand, Great Northern & Thameslink has seen an equally significant reduction in crowding.

Figure 10.15 Passengers in excess of capacity (PiXC) for National Rail operators in London during the weekday morning peak, 2010-2017.



Source: Department for Transport.

10.16 Public transport customer satisfaction and Care

Care and customer satisfaction are our primary measures for understanding the quality of the customer experience we deliver, from a customer perspective. They are complementary elements in determining how we are working for our customers, providing a rounded picture of our performance.

What is 'customer satisfaction'?

Customer satisfaction reflects how we are delivering our services to customers. It is an in-the-moment view of how well we met customers' expectations on their last journey.

For public transport modes, interviewers stop a representative sample of customers either on board or as they exit their destination stop or station, and ask them to rate their satisfaction with the journey they just made. An overall satisfaction question is followed by satisfaction questions relating to specific elements of the journey experience, expressed as a score out of 100.

What is 'Care'?

'TfL cares about its customers' is the measure we use to understand whether we are meeting expectations and making Every Journey Matter for our customers. Care measures Londoners' overall perceptions of TfL, and is the best reflection of how we meet expectations during every interaction with us (eg all journeys, interactions with the Contact Centre, communications such as email updates), not just the last journey.

TfL tracks Care through an online survey, which asks 1,000 Londoners about their opinions of TfL. An ongoing focus on care will help us understand, in the short term, how we work for

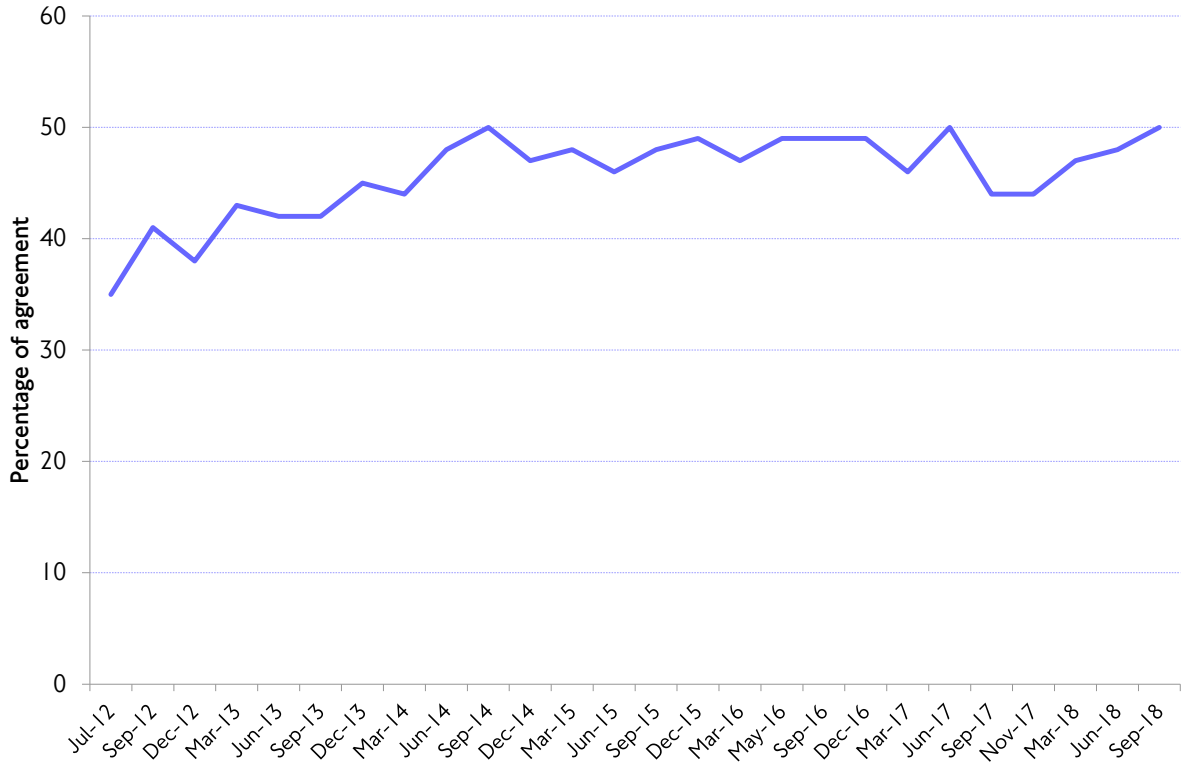
our customers and in the longer term, how to encourage greater use of active, efficient and sustainable modes.

Trend in Care scores

Figure 10.16 shows the overall trend for the Care measure since summer 2012, in terms of the percentage of customers who agree that 'TfL cares about its customers'. The overall trend shows strong improvement between 2012 and 2014, but with improvements to the score plateauing since then. In broad terms, this is thought to reflect a particular focus on customer service improvements during the early period (eg the introduction of contactless payments and the commencement of the Night Tube), and a relative lack of visible innovations, and progress against rising customer expectations, over more recent years. Issues with strikes, reliability of London Underground and, particularly, bus services over this period are also thought to have been an underlying factor affecting these scores.

In 2017/18, 47 per cent of Londoners agreed 'TfL cares about its customers'. While we have made good progress and often deliver very good customer experience, it is inconsistent and customers encounter 'pain points' when using our services. Understanding the key influences, or drivers, of the Care score allows us to prioritise actions to improve the overall customer experience.

Figure 10.16 Overall trend for agreement with the proposition 'TfL cares about its customers', 2012-2018.



Source: TfL Customer Research and Insight.

Improving the Care score

Key drivers analysis has highlighted the aspects of the customer experience which have the greatest influence on the Care score; the 'key drivers of care'. The key drivers show where we should be focusing efforts to improve the customer experience and perceptions of TfL.

These are:

- Supporting customers when things go wrong
- Communicating openly and honestly
- Providing good value for money for fare payers
- Investing to improve journeys
- Having friendly and helpful staff

Supporting customers when things go wrong is the greatest driver of care. When things go wrong on the network, our response, and how well supported customers feel, is crucial. The operational response to network problems is usually swift and effective but – whilst the problem is being fixed (a process usually invisible to customers) – our 'human' response is sometimes perceived as not being as strong, leaving customers feeling unsupported. Key aspects of demonstrating support include supporting customers with real-time information, empathising with customer needs, and rectifying mistakes. Supporting customers also means taking preventative measures, such as providing advance information about forthcoming engineering work or how customers can obtain best value for money, for example through fare capping.

10.17 Public transport fares and affordability

Real fares trends

Affordable public transport fares are essential for encouraging a shift from car to public transport, and to allow all Londoners to take advantage of the opportunities that the city offers.

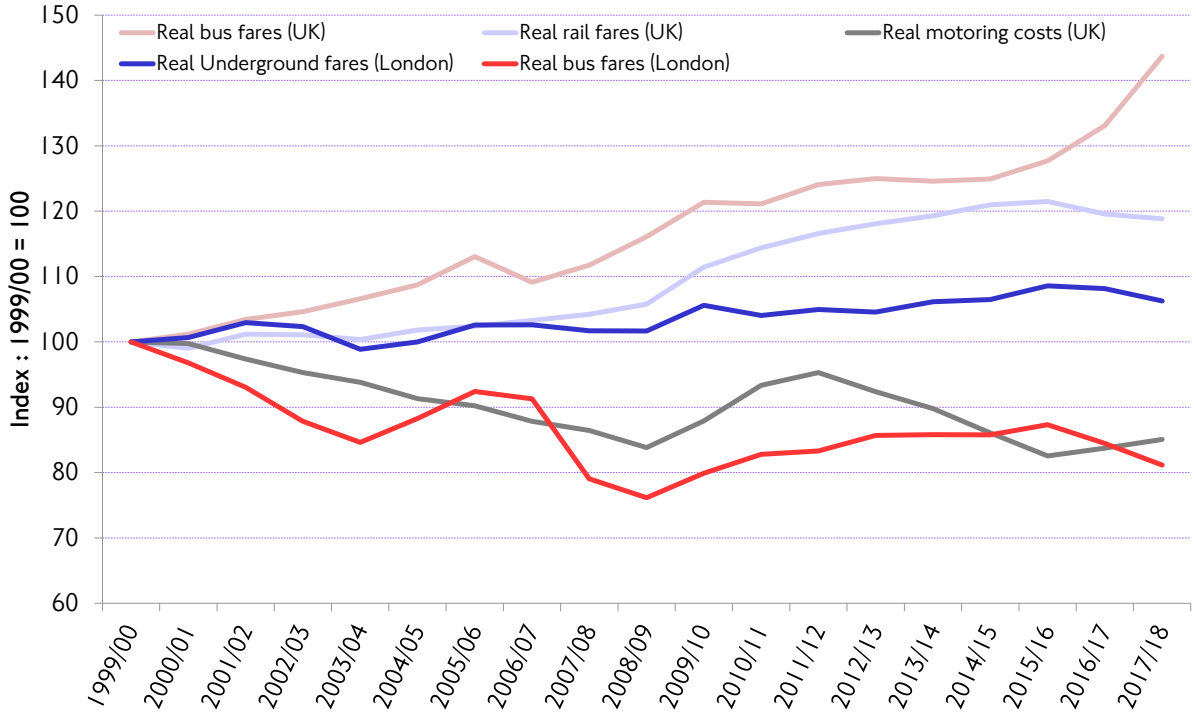
Figure 10.17 shows indexed real public transport fares in London (deflated by the Retail Prices Index) alongside national public transport fares and motoring costs for comparison. It is seen that, generally over the past two decades, public transport fares in London have compared favourably with those at the national level.

While bus fares in London have been increasing since 2008/09, they still (in 2017/18) remain 19 per cent lower than in 1999/00 in real terms following a sharp fall in fares between 1999/00 and 2003/04. In contrast, real bus fares in the UK as a whole increased steadily over the last decade and more dramatically in the past couple of years to their highest level – now 44 per cent higher than 1999/00. Similarly, while Underground fares have remained relatively constant in real terms (currently standing six per cent above the value for 1999/00), real rail fares in the UK as a whole have increased by 19 per cent.

The trend for real motoring costs declined steadily between 1999/00 and 2008/09, eventually bottoming out at 16 per cent below the 1999/00 value. They have since fluctuated, rising to within five percentage points of the 1999/00 value in 2011/12 before falling again. This fall to 2015/16 was driven by a large fall in petrol costs and a smaller decline in the costs of vehicle purchase since 2010/11. Real motoring costs increased slightly in the past two years but are still 15 per cent lower than in 1999/00. The biggest change in motoring expenditure has been in relation to vehicle tax and insurance, which has increased over 240 per cent from 1999/00 to 2017/18.

These indices are adjusted for inflation. When looking at the unadjusted data, motoring costs have risen at a slower rate than overall inflation, whereas national bus and rail fares have increased at a faster rate than inflation since 2000.

Figure 10.17 Public transport fare trends – London and UK compared, 1999/00-2017/18.



Source: Strategic Analysis, TfL City Planning.

Real fares levels

A real fares level indicator is available that measures the average actual fare paid in London per kilometre travelled. It is a composite measure, covering bus and Underground only, calculated as the total actual fares revenue for all passengers paying the full adult fare, adjusted for inflation and divided by corresponding actual bus and Underground passenger kilometres.

The trend from 2009/10 is shown in table 10.7. In 2017/18, the average adult composite bus and Underground fare was 16.8 pence per kilometre, the lowest figure in the period shown. This indicator has been relatively stable since 2011/12 at just over 17 pence per kilometre. When inflation is taken into account, both Underground and bus fares have fallen in recent years. The fall in real fares levels in the latest two years partly reflects the Mayor's fares freeze which came into effect from January 2017.

Table 10.7 Real fares levels for public transport - real revenue per kilometre (pence) for all passengers paying full adult fare on London Underground and buses, 2009/10-2017/18.

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Fare	18.8	18.9	17.1	17.1	17.4	17.5	17.6	17.4	16.8

Source: TfL Customer Experience.
Note: RPI indexed to 100 in 1999/00.

10.18 Impact of physical accessibility on journey times

Additional travel time required for those using the step-free network

Improving the accessibility of public transport is critical to delivering a better whole-journey experience for all Londoners, but in particular for those with specific physical accessibility

needs. Currently, 45 per cent of disabled Londoners find planning and making trips by public transport stressful. A more accessible public transport system will improve the journey experience and make it easier for disabled and older people to travel more spontaneously and independently. It will also improve overall quality of public transport for all travellers.

People with specific physical mobility needs can be disadvantaged in terms of trip making since not all of the public transport networks are fully accessible. In Travel in London report 10, figure 8.10 showed how the connectivity provided by the step-free rail network is considerably less than the full rail network. Using the more limited step-free network can often result in longer, more time-consuming journeys or, in some cases, may mean that the trip cannot be made by public transport. This can further contribute to social and economic disadvantage for these people. TfL is working to improve this situation, with a Mayoral aim to halve the additional journey time required by those using the step-free network only so that journey times on the step-free network become comparable to those on the wider public transport network. An average journey using only bus and step-free stations is estimated to take 10 minutes longer than the average by the fastest available route as shown in table 10.8.

Table 10.8 Comparison of average journey time by fastest available route and step-free network only – using the current network, 2017/18.

Year	2017/18
Average journey time by quickest route (minutes)	77
Average journey time using bus and step-free stations only	87
Relative additional journey time (minutes)	10
Relative additional journey time (%)	13

Source: Strategic Analysis, TfL City Planning.
Note: Journey times are averages reflecting door-to-door journeys between each zone and all other zones in the RailPlan model of London. They are hypothetical and do not reflect observed or frequently made journeys.

It is important to note that step-free features such as lifts and level platforms are also beneficial to those carrying heavy loads, those with children in buggies and, potentially, other non-disabled travellers such as older people and those feeling unwell. In this way, the overall appeal of the public transport network is also enhanced.

Step-free access on the London Underground

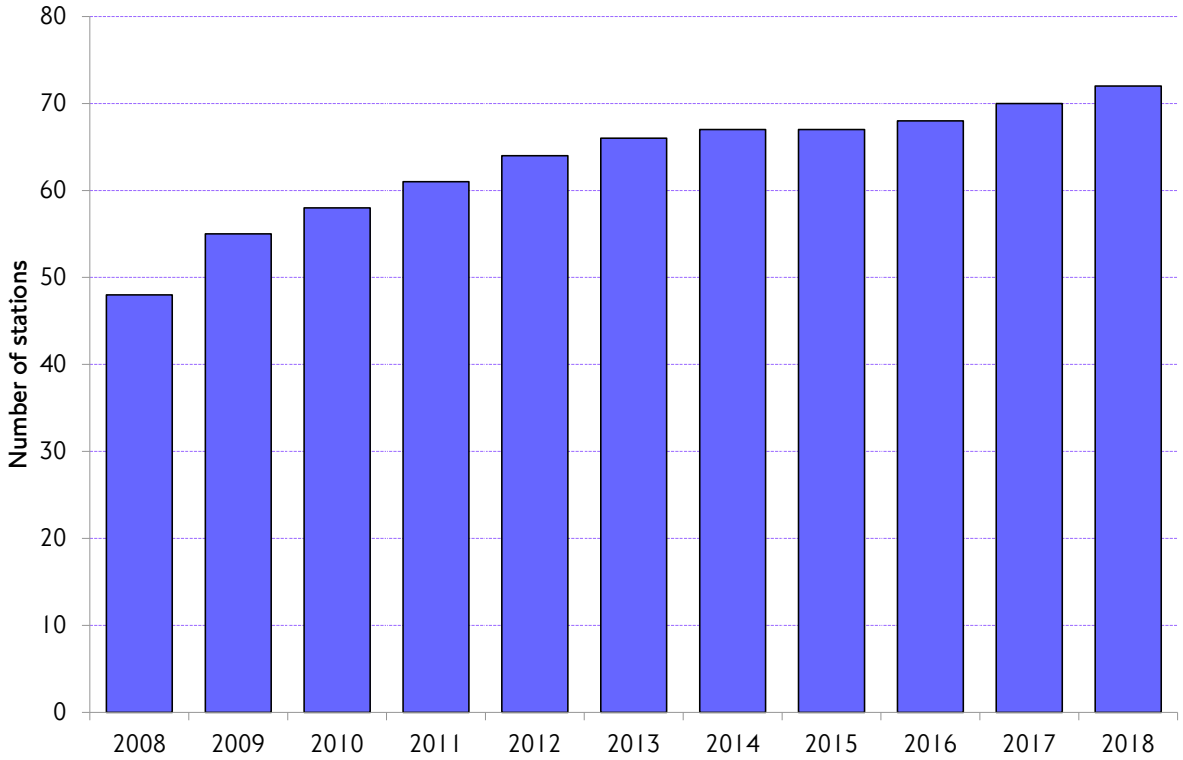
TfL is continuously working to increase the number of step-free stations on its network. The Mayor's long-term aim is for the majority of the Underground network to be step-free, recognising that the age and layout of some locations makes this extremely difficult to achieve. It is also important that other parts of the network, such as National Rail in London, and interchanges with the bus network, are also brought up to these standards, recognising the whole-journey nature of the requirements. New infrastructure will be designed from the outset to be accessible, including the Elizabeth line and the proposed Crossrail 2 project.

TfL have been working to increase the number of step-free stations, through simplification and modularisation of schemes. TfL aims to deliver this more cost-effectively and is pursuing collaborative opportunities to deliver accessibility improvements with third parties.

Figure 10.18 shows that the number of step-free Underground stations has increased substantially over the past decade, from 48 stations at the start of 2008 to 76 stations to date (November 2018). This reflects an increase in the proportion of Underground stations that are step-free from 18 per cent at the beginning of 2008 to 28 per cent in November 2018. The past year has seen the delivery of step-free access across four London Underground stations: Bromley-by-Bow, Newbury Park, Buckhurst Hill and Victoria. This

involved installation of lifts at each station except Buckhurst Hill which became step-free through ramped access to platforms.

Figure 10.18 Number of step-free Underground stations at the beginning of the year, 2008-2018.

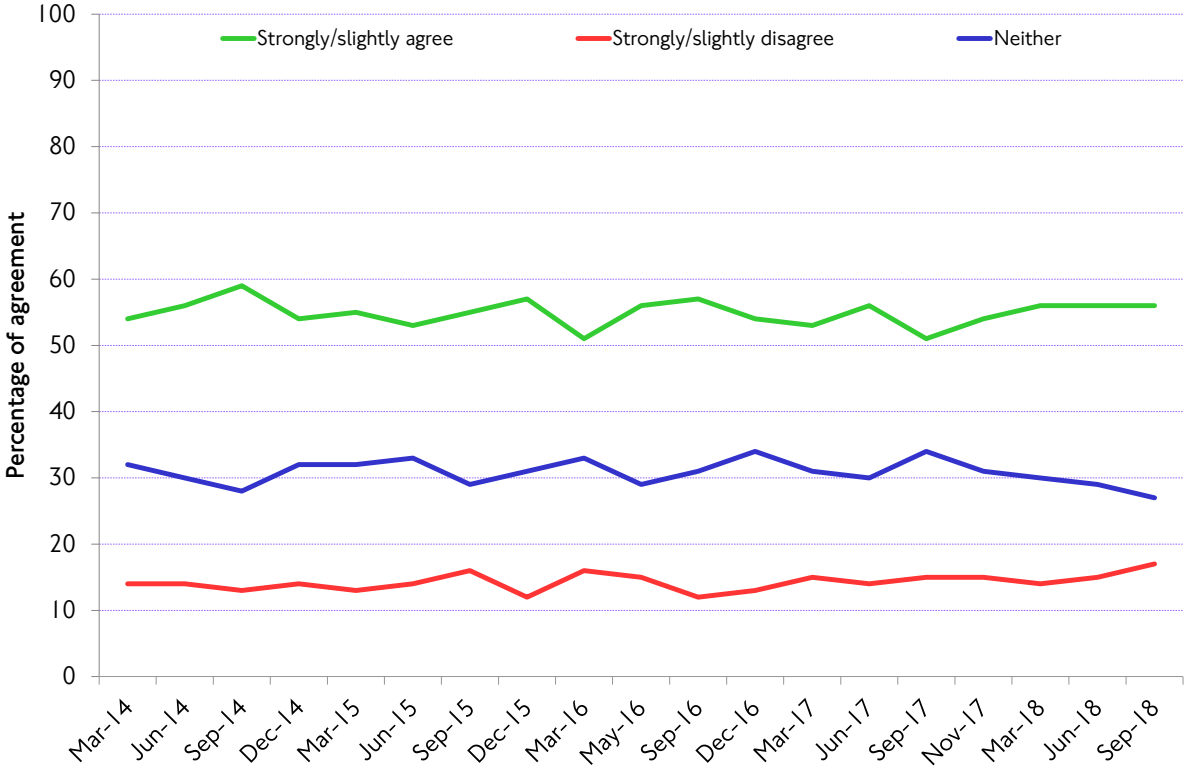


Source: London Underground.

Extent to which people agree that TfL is 'making it easier for disabled people to get around'

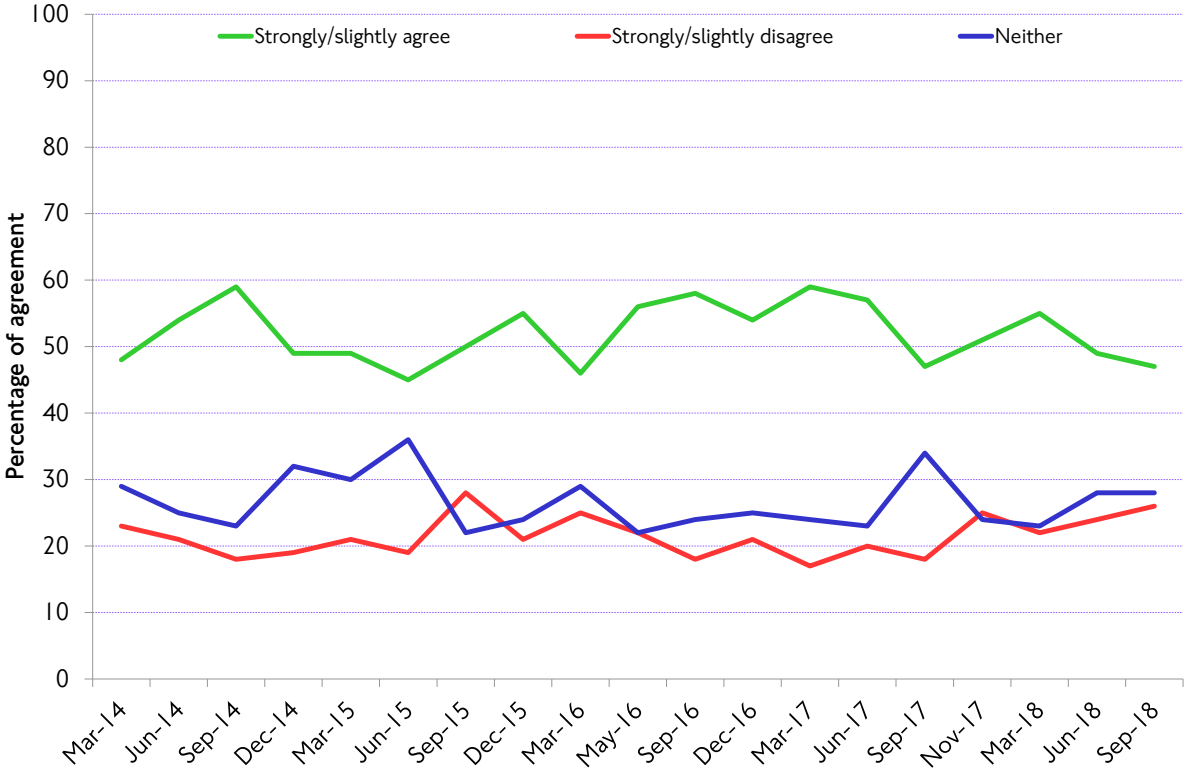
TfL gather customer feedback on a broad range of topics and aspects of the travel experience. In order to understand perceptions about accessibility, one measure that is used looks at the extent that Londoners agree with the proposition that TfL is making it easier for disabled people to get around. This is asked of the general population and also of a sub-sample of disabled Londoners. Figures 10.19 and 10.20 below illustrate levels of agreement with this proposition – for both the whole London population and for disabled people.

Figure 10.19 Percentage of agreement with the proposition that 'TfL is making it easier for disabled people to get around', all respondents, 2014-2018.



Source: TfL Customer Research and Insight.

Figure 10.20 Level of agreement with the proposition that 'TfL is making it easier for disabled people to get around' (disabled respondents only), 2014-2018.



Source: TfL Customer Research and Insight.

In previous years, responses have been similar for all Londoners and disabled people, but in recent surveys in 2018, there has been more differing opinion between respondents. In the latest survey in September 2018, whilst 56 per cent of all Londoners agreed with the proposition that 'TfL is making it easier for disabled people to travel around', only 47 per cent of disabled people agreed with this. Agreement with this proposition has been higher amongst disabled people in previous years, sometimes equalling or exceeding the level of agreement from all Londoners, for example in March and June 2017. However, there has been a significant decrease in the proportion of disabled people agreeing with the proposition over the last two survey waves.

Consistently more disabled people, typically just more than 20 per cent in the period under review, disagree with the proposition, compared to (typically) 15 per cent of all people. For both sets of respondents, levels of disagreement have increased over 2018, with 26 per cent of disabled people and 17 per cent of all Londoners disagreeing with the proposition in the latest survey. This raises the question of why disabled people are now less likely to agree, and why all people, including disabled people are more likely to disagree that TfL is making it easier for disabled people to travel around.

As part of trying to better understand the travel experience for disabled people, TfL has established a new approach to gathering information on accessibility needs and how they are being met. From recent accessibility research looking at complaints and feedback from disabled customers, we know that the customer experience is inconsistent, and information can do a lot more to help to reduce the impact when things don't go according to plan. Improving accessibility information and staff awareness about the needs of different people are current objectives for TfL.

Section 4: Supporting London's development

11. New homes and jobs

11.1 Introduction

This chapter addresses aspects of the role of the transport network in supporting London's development, including connectivity and housing. It also looks at how TfL is harnessing new technologies to monitor the development of sustainable travel in the context of new developments in London's Opportunity Areas.

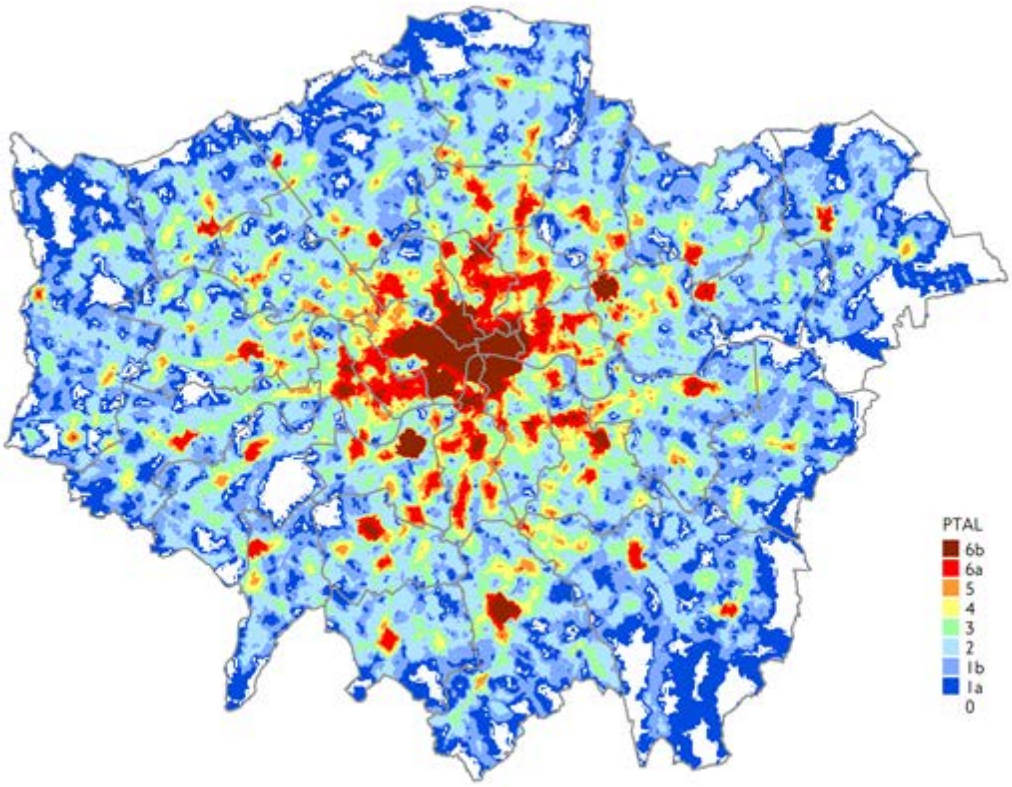
11.2 Transport connectivity

Public transport access levels across London (PTAL scores)

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

Figure 11.1 shows London PTALs for 2017. As would be expected, central London features high PTAL values, as do other metropolitan town centres, such as Croydon, Kingston and Harrow, where many locations have close proximity to public transport access points. The predominantly radial orientation of the main public transport corridors is also visible in the figure. Note that PTAL values are on a scale from 1 to 6, with 6 representing the highest connectivity level.

Figure 11.1 Public transport access levels (PTAL) in London, 2017.



Source: Strategic Analysis, TfL City Planning.

Access to jobs

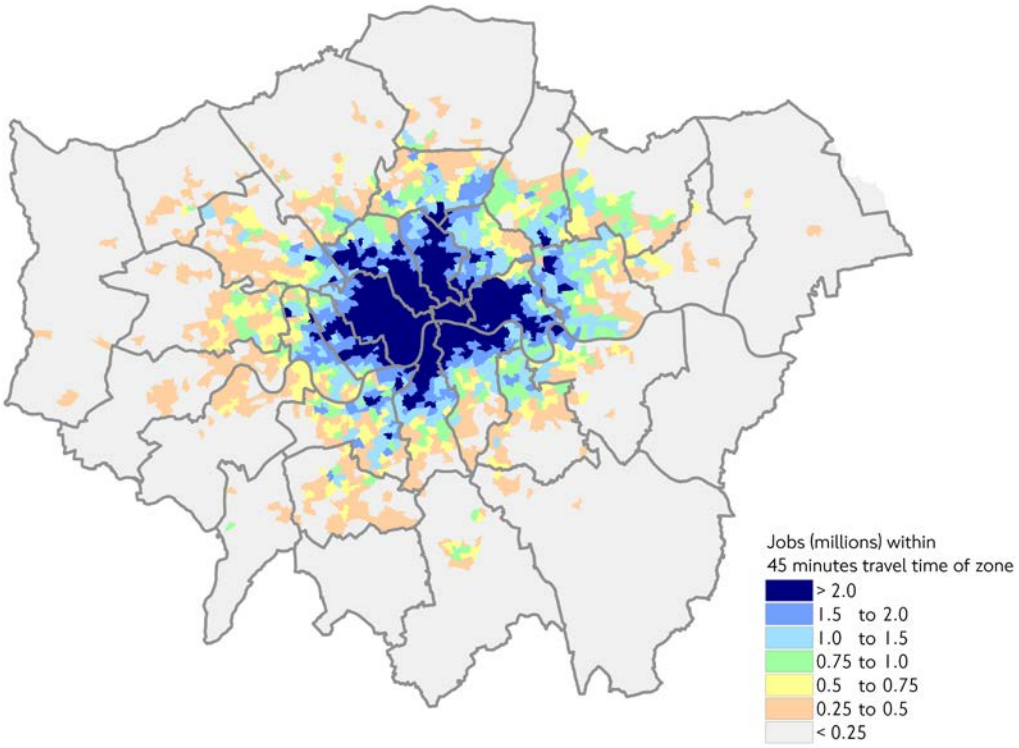
One measure that can be used to quantify the development of the transport networks in terms of the support that they give to London's economy is the number of jobs (whether filled or currently vacant) that are potentially available within a given travel time from a particular residential location. The basis for assessing this is a travel time contour of 45 minutes by the principal public transport modes, expressed as an aggregate measure across Greater London.

Figure 11.2 shows the pattern for 2017. The map should be interpreted in terms of, from any one point (effectively a small zone), the number of jobs that are potentially reachable in 45 minutes by public transport. The darker areas are therefore the most connected in this respect.

As might be expected, the map 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, less than 0.5 million jobs are potentially available from their home location within 45 minutes travel time. However, this rises to typically around 2.5 million jobs potentially available to a resident of central London or the more dense parts of inner London.

In 2017, based on an average of these small area scores and using a revised methodology, the average London resident could potentially access 869,575 jobs within 45 minutes by public transport, a 1.6 per cent increase over 2016.

Figure 11.2 Total number of jobs within 45 minutes travel time – 2017.



Source: Strategic Analysis, TfL City Planning.

11.3 Central London: trends in morning peak travel to central London

The Central Activities Zone (CAZ)

The CAZ is the global core of London and hosts a multiplicity of high value activities. It is distributed across 10 boroughs and includes the northern part of the Isle of Dogs. It is one of the world's most attractive and competitive business, retail and cultural locations. Over the last decade, the CAZ has changed very significantly in a number of ways, for example population has grown by around 22 per cent and there are half a million new jobs. Public transport capacity has increased substantially and the walk and cycle offer has also been improved.

The CAZ boundary reflects the functional centre of London, but it is not ideally aligned with established indicators of travel demand. Traditionally, these have been surveyed on the basis of a 'central statistical area' or on the basis of the Congestion Charging zone. More recently, a separate survey has enumerated travel to the Isle of Dogs. This means that there are no precise measurements of travel demand to the CAZ. However, indices or time-series based on the available historic indicators are both useful and relevant.

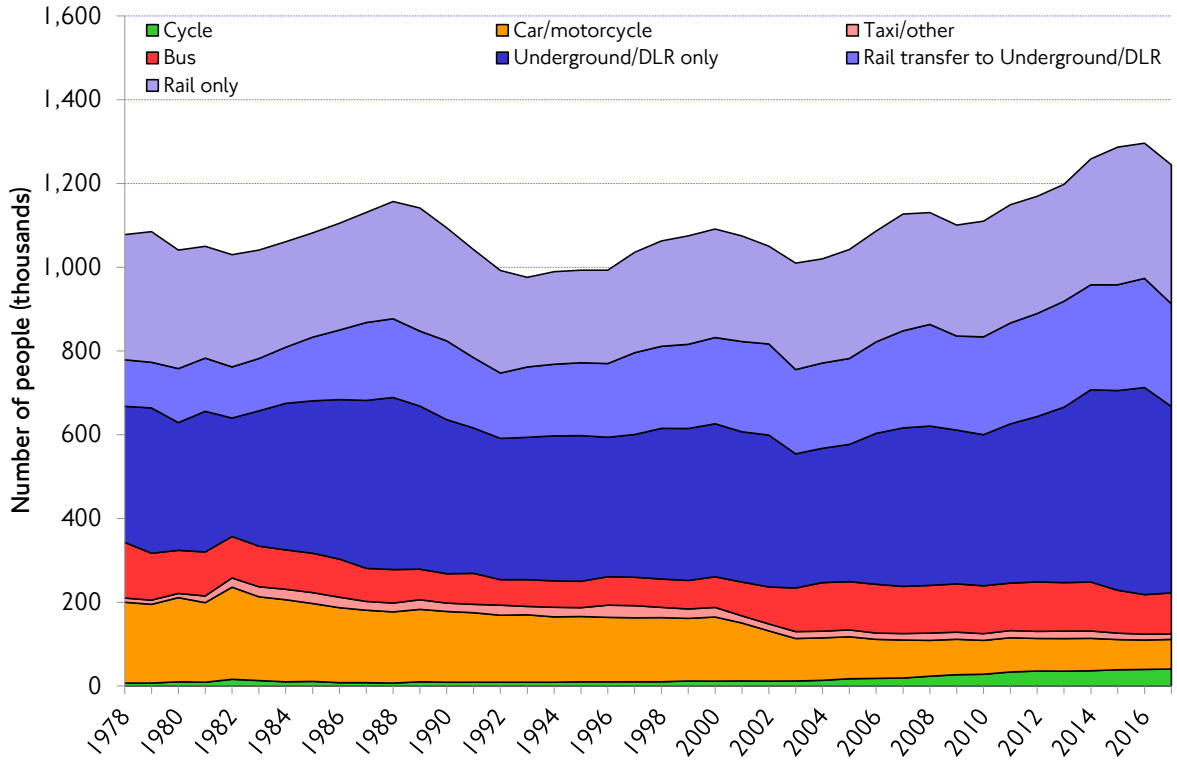
Travel demand to the central area in the weekday morning peak period

Based on the central London statistical area definition, the numbers of people entering central London during the weekday morning peak period (07:00 to 10:00) has been monitored since the 1970s through a long-established yearly count, taken in the autumn. The Central Area Peak Count (CAPC) survey covers all modes except walking and those travelling in commercial vehicles or travelling as part of their job (for example, licensed taxi drivers). Most of these people are commuting to work in central London, and this indicator provides a good picture of this one specific, but important, aspect of travel in London.

Long-term trends

Figure 11.3 shows the trend for the total number of people entering central London over the past 39 years and shows that 2017 saw 1.2 million people entering during the morning peak. The total number of people entering has varied relatively little over most of the period covered by the survey. These variations tend to follow the economic cycle in central London and interestingly have shown no clear trend over much of the period. However, the trend over recent years has been sharply upwards.

Figure 11.3 People entering central London in the weekday morning peak, 1978-2017.



Source: Strategic Analysis, TfL City Planning.

Change between 2016 and 2017

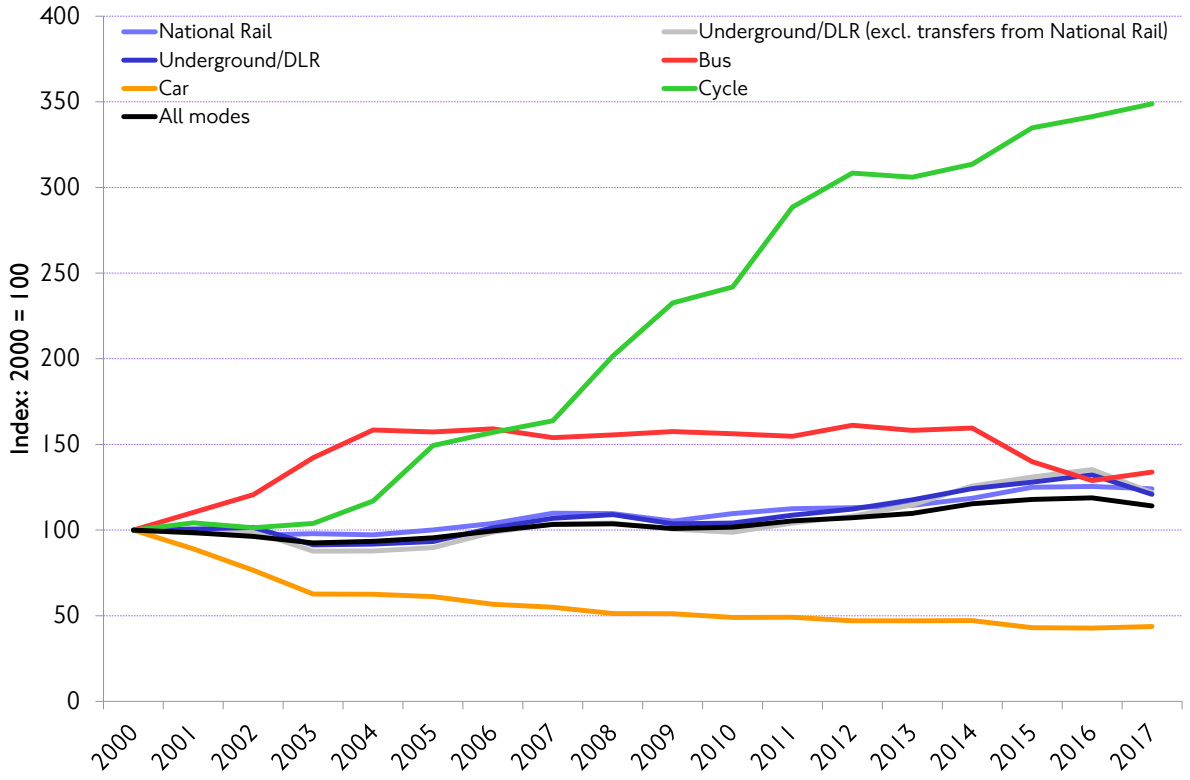
Between 2016 and 2017 the number of people entering the central cordon in the morning peak by all modes decreased by 4 per cent, the first decrease since 2009. This decrease was driven by a decline in the number of people entering central London by rail with transfer to Underground/DLR, Underground/DLR only and by coach or minibus. Despite an overall decline, the number of people entering central London by rail only (ie not involving interchange) increased by 2.8 per cent, as well as the numbers entering by bus (3.8 per cent), car (1.0 per cent) and cycle (2.2 per cent).

In broad terms, this decline mirrors the London-wide trend seen over the last two years, where absolute declines in patronage have been seen on London's bus, Underground and National Rail networks. It may also be a reflection of the recent changes to working patterns where many businesses are adopting flexible working practices.

Changes in mode share

Within a relatively stable overall total and in the context of a fairly consistent rail-based mode share of more than 80 percent, there have nevertheless been some substantial shifts in the relative shares of the various modes of transport used to travel to central London, particularly affecting road-based modes. These are best appreciated with reference to figure 11.4, which looks at the most recent 17 years and plots changes in the use of the principal modes as an index against the position in year 2000. The chart shows that there has been a reduction of more than half (56 per cent) in the number of people using the car. Bus use increased in the last year, following two years of decline and the number of people cycling into central London has continued to increase. The mode share of Underground/DLR decreased in the latest year reflecting the more general reduction in people travelling into central London on these modes.

Figure 11.4 Trends by mode of transport for people entering central London during the weekday morning peak, 2000-2017.



Source: Strategic Analysis, TfL City Planning.

11.4 Isle of Dogs cordon survey

Over the past 25 years, London's Docklands has developed as an area of high-density high-value employment, primarily in financial and business services, to complement the historic centre of these activities in central London. Development has been concentrated in the Isle of Dogs, located 3km east of the City of London, generating a significant number of trips and adding to overall travel demand, both locally and more widely across London. Transport networks have also been extended in parallel with this development, most notably the Jubilee line extension which opened in 1999, as well as development of the DLR network.

The Isle of Dogs cordon survey

With the regeneration of London Docklands during the late 1980s, TfL instituted a cordon-based count survey to cover the Isle of Dogs. As well as the AM peak period this survey covers an extended weekday (05:00 to 23:00). The survey counts trips into and out of the Isle of Dogs on a designated working day each autumn (except in 2009 and 2016 when no survey was carried out).

All trips that have an origin or destination within the Isle of Dogs or cross the boundary cordon are included. Through trips on the Jubilee line or DLR and interchange trips between the two rail modes that do not start or end in the Isle of Dogs are excluded on the basis of interchange surveys carried out on the same day. Internal trips within the Isle of Dogs are also excluded.

An additional cordon, inside the Isle of Dogs cordon, closely bounding Canary Wharf, is also identified and used to measure the number of trips to and from Canary Wharf, including

those to and from points within the Isle of Dogs. Canary Wharf is a major centre of employment within the Isle of Dogs, located at the northern end of the Opportunity Area.

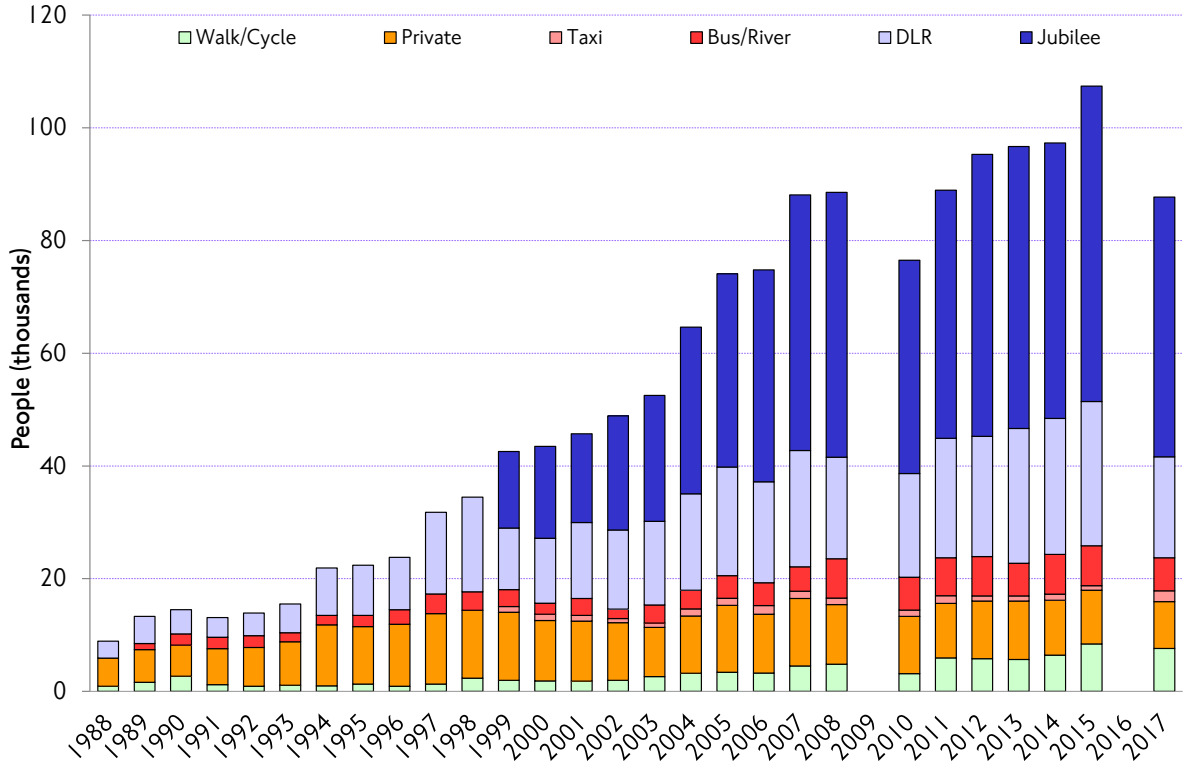
Long-term trend in inbound mode shares in the morning peak period

Figure 11.5 shows travel to the Isle of Dogs between 1988, the year in which construction started at Canary Wharf, and 2017. It shows the number of people entering the Isle of Dogs during the weekday morning peak (between 07:00 and 10:00) by mode.

Travel to Docklands has been monitored for over three decades and has shown a consistent pattern of year-on-year growth, reflecting the parallel development of the transport networks. Inbound travel demand grew from 8,900 trips in 1988 to 43,488 trips in 2000, to 107,394 trips in 2015 – an average annual percentage increase of 10.1 per cent.

The most recent survey, however, reveals a significant fall in travel demand to London's Docklands. In 2017, there were 87,714 inbound trips during the weekday morning peak, an 18.3 per cent decrease on the number of people counted in 2015.

Figure 11.5 Morning peak travel to the Isle of Dogs (including Canary Wharf) by mode of transport, 1988-2017.



Source: Strategic Analysis, TfL City Planning.

Following a continuous increase since the completion of the Jubilee line extension to Canary Wharf and Stratford in 1999, the Jubilee line mode share peaked at 52 per cent among cordon survey travellers in 2015. The Jubilee line mode share recorded in 2017 has increased to 53 per cent.

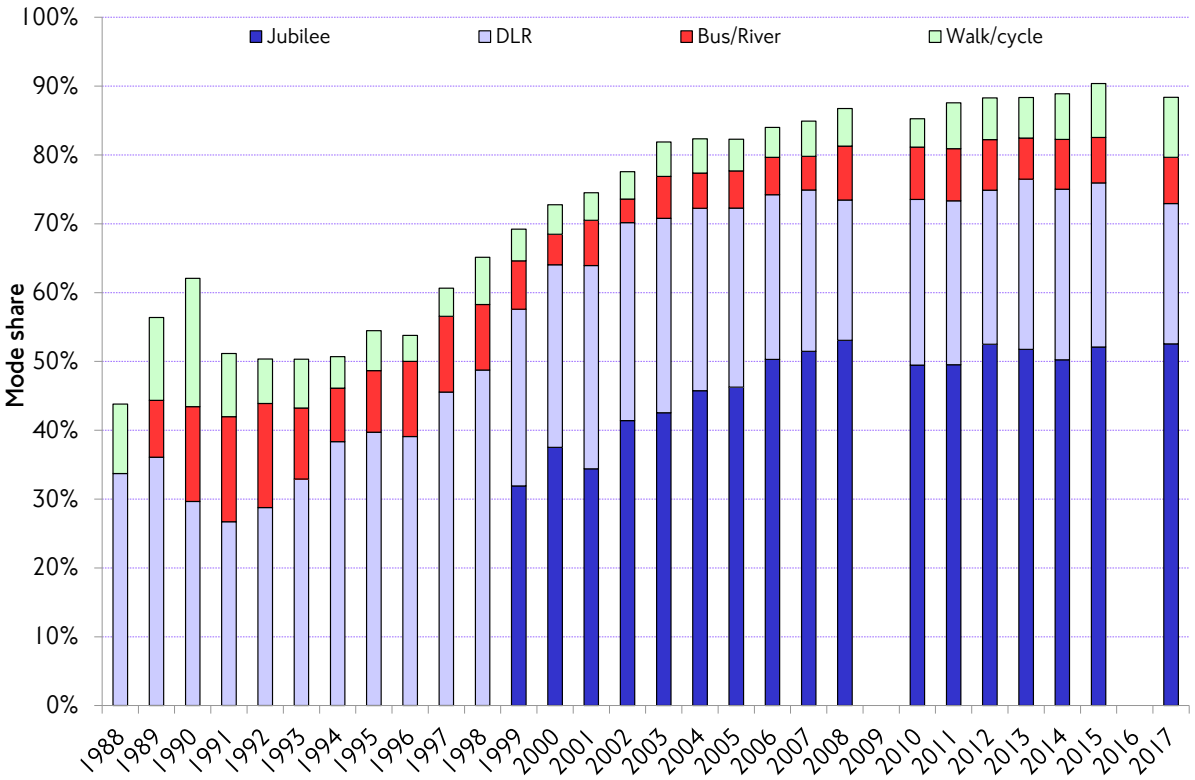
These results are significant for their magnitude, and also because they occur in a context mainly driven by commuting demand, as opposed to discretionary travel. Undoubtedly, the problems on the National Rail network during late 2017, although not directly coincident with the survey, were a contributory factor, although there is a possibility that they also reflect increased flexible working, perhaps further promoted by those same National Rail

problems, that may have persisted since. The Canary Wharf employee survey, for example, suggested an increase in employee jobs between 2015 and 2017.

In terms of active, efficient and sustainable modes, the proportions were 44 per cent in 1988, 73 per cent in 2000, and 88 per cent in 2017 (figure 11.6).

While public transport mode share decreased by 8.2 per cent between 2015 and 2017, active travel modes have seen an increase with 19.7 per cent more walking trips and 24.5 per cent more cycling trips.

Figure 11.6 Trend in active, efficient and sustainable mode share for travel to London Docklands in the weekday morning peak, 1988-2017.



Source: Strategic Analysis, TfL City Planning.

11.5 Monitoring travel to London's Opportunity Areas – Spotlight on Project EDMOND

Introduction

Transport for London aims to be at the forefront of innovation and technology across all its areas of planning and operation including in methods of data collection and use of new data sources. These have the potential to reduce costs, provide larger samples and generate new insights into travel behaviour. They can also pose new challenges in areas such as sample bias and privacy and data protection.

TfL, along with their consultants Jacobs, O2 and AECOM, have recently completed Project EDMOND (Estimating Demand from Mobile Network Data) which has utilised depersonalised and aggregated mobile phone event data to develop inputs for its transport models and also provide new insights into the way different groups use London's transport network.

Mobile phone 'event' data

Mobile devices (eg phones and tablets) generate event data as they communicate with the cellular network that they are connected to. These events record the mast that the device is connected to and the time and date of the connection. This data can be analysed in a depersonalised and aggregated format to create summaries of travel patterns at crowd level, based on the geographical areas around mobile phone masts.

It is important to emphasise that the data used for this project is aggregated to provide travel patterns at a crowd level, and any data relating to crowds of fewer than 10 individual devices is automatically excluded from any outputs, to ensure that TfL does not unintentionally identify any individual. More information on the nature of the data and its use on this project is available here: https://tfl.gov.uk/corporate/privacy-and-cookies/event-data-from-mobile-devices.

Processing of the data

The data used for this project was collected between September and November 2016. The raw data itself provides limited information on travel patterns and so significant processing was undertaken to generate the outputs required including:

- Identifying journeys
- Expanding the sample to the full population
- Identifying mode of travel

Identifying journeys

The scope of the project was all journeys between each origin-destination pair which has at least one viable route by highway or public transport intersecting the area bounded by and including the M25. When a device was observed to be stationary for a set period of time, its location was assumed to be the destination of its previous most recent journey, and the origin of its next journey. At no point was any data available to TfL that would enable the individual making the journey to be identified.

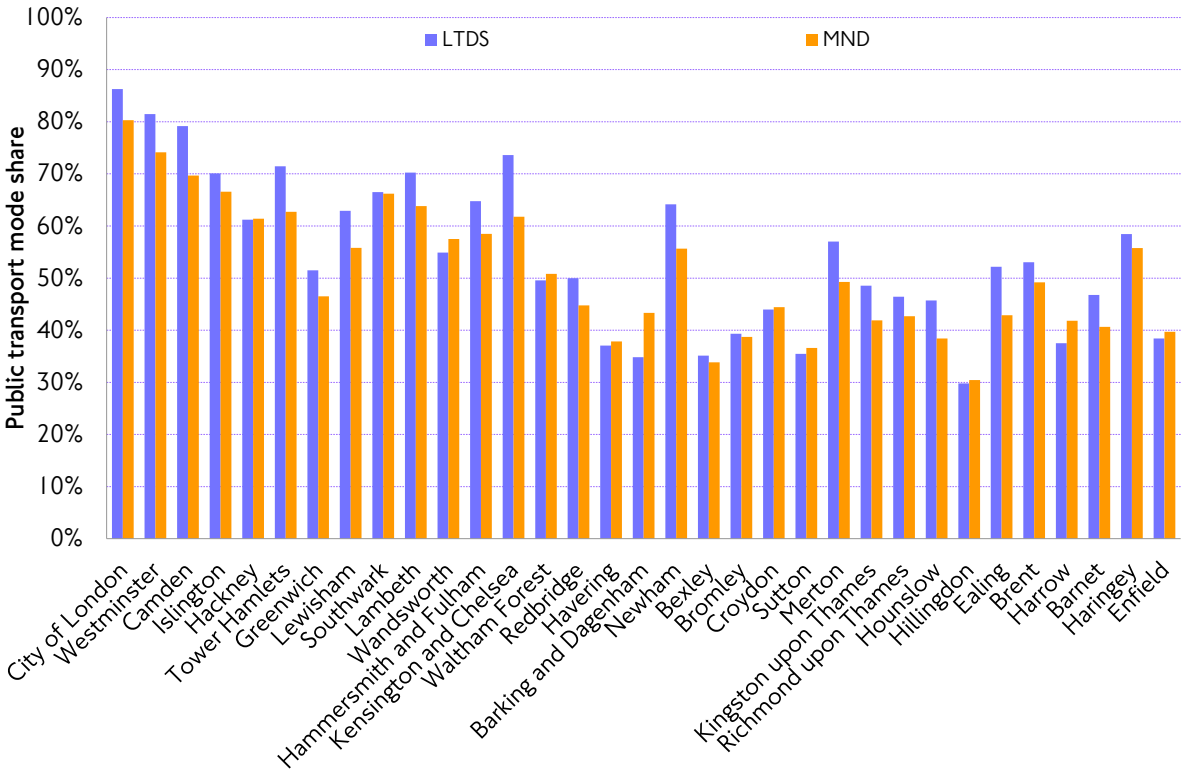
Expanding the sample to the full population

Devices which use the O2 network account for around 30 per cent of all devices in the UK. Expansion to the full population was achieved by comparing the number of devices inferred to have a 'home' in a given area with official population estimates for that same area, and then applying scaling factors to adjust for the difference. The expansion reflected variations in mobile phone ownership by age and income.

Identifying mode of travel

The process of identifying the mode of travel was the most challenging aspect of the project. Projects of a similar nature undertaken in different parts of the UK have relied on rules to assign each journey to a mode. This was an unsuitable approach for London where there are a variety of different modes sharing similar space on the network and often travelling at similar speeds (such as people walking and cars in heavy congestion). Instead, an approach which calculated a probability using variables such as matching to potential route options, the PTAL (Public Transport Access Level) of the trip origin and car ownership was implemented and was shown to be successful through extensive validation (see figure 11.7 for an example).

Figure 11.7 Validation of inferred mode (Mobile Network Data) against LTDS observed mode at borough level.



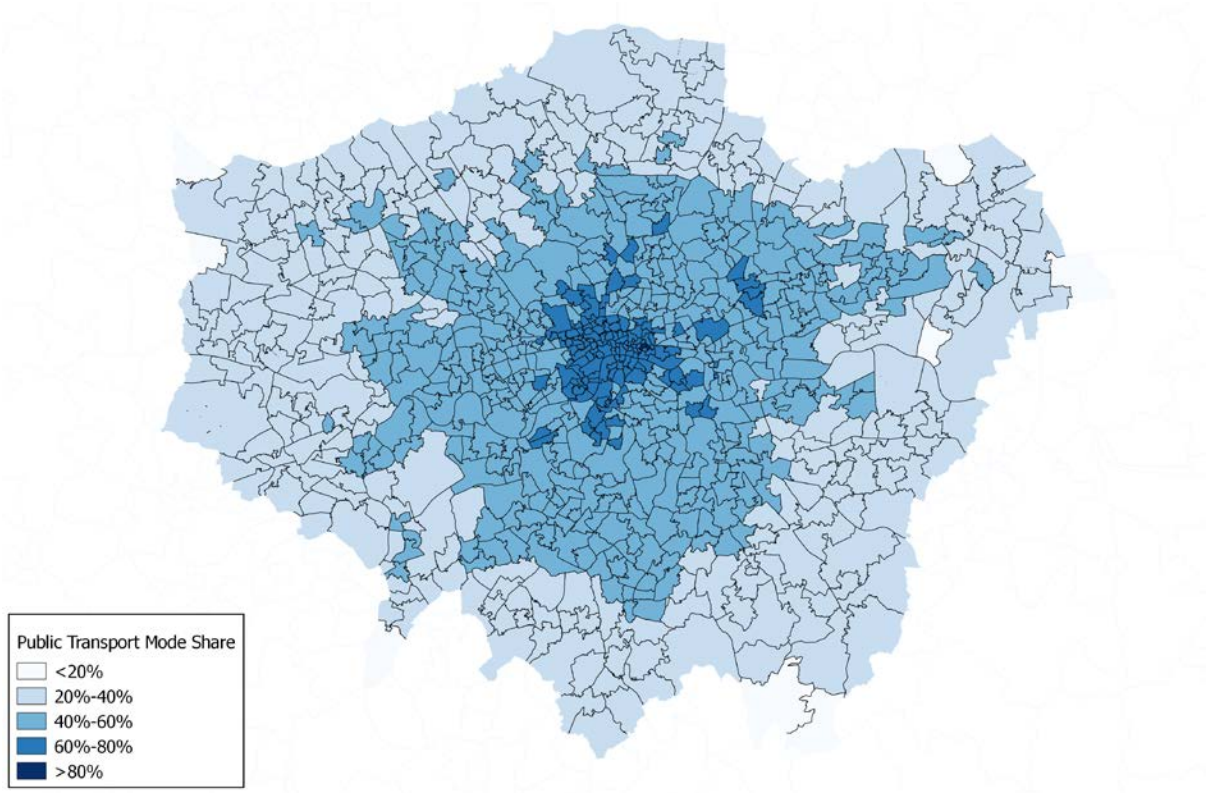
Source: Strategic Analysis, TfL City Planning.

Detailed mode share

The new transport strategy sets the aim of 80 per cent active, efficient and sustainable mode share for all personal travel of Londoners by 2041. The data collected using LTDS (see also section 3.3 of this report) allows progress of this aim to be monitored at an aggregate borough level, reflecting sample size limitations, albeit that LTDS is confined to residents of the Greater London area. However in some circumstances it may be useful to understand mode shares at a more detailed level, for example when monitoring mode shares in Opportunity Areas and, particularly in central London and town centres in outer London, where the proportion of non-resident visitors is believed to be particularly high.

Figure 11.8 shows how public transport mode share varies by EDMOND zone. It is consistent with LTDS in relation to the general pattern of mode share across central, inner and outer London, but it further reveals variations within those broad areas such as higher levels of public transport use in some of the outer London town centres and in corridors well served by rail and Underground lines.

Figure 11.8 Public transport mode share at Project EDMOND zone level.



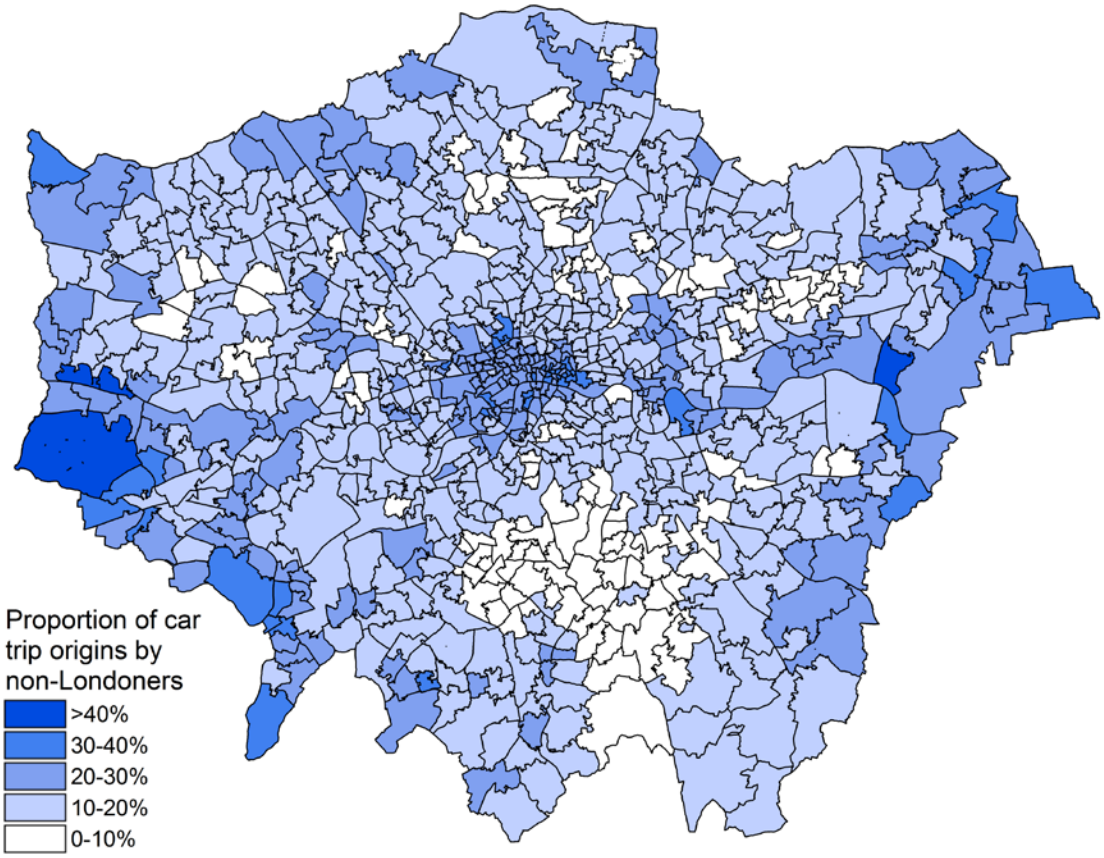
Source: Strategic Analysis, TfL City Planning.

Non-Londoner travel behaviour

Understanding how non-Londoners travel in London is important due to the large numbers of people from outside the GLA who travel into London each day. Non-Londoners are not in scope for LTDS and so mobile phone event data provides an approach to capturing their travel behaviour.

One aspect of particular interest is non-Londoner drivers in London. Figure 11.9 maps the proportion of car trips which are made by non-Londoners by Project EDMOND zone. It indicates that in certain parts of outer London this is as high as 30-40 per cent. It also shows that this level of non-Londoner car trip making is also seen in parts of central London. These results suggest that efforts to discourage car use as set out in the transport strategy must extend beyond London residents to those who travel into London from outside if they are going to be fully effective.

Figure 11.9 Proportion of car trips undertaken by non-Londoners.



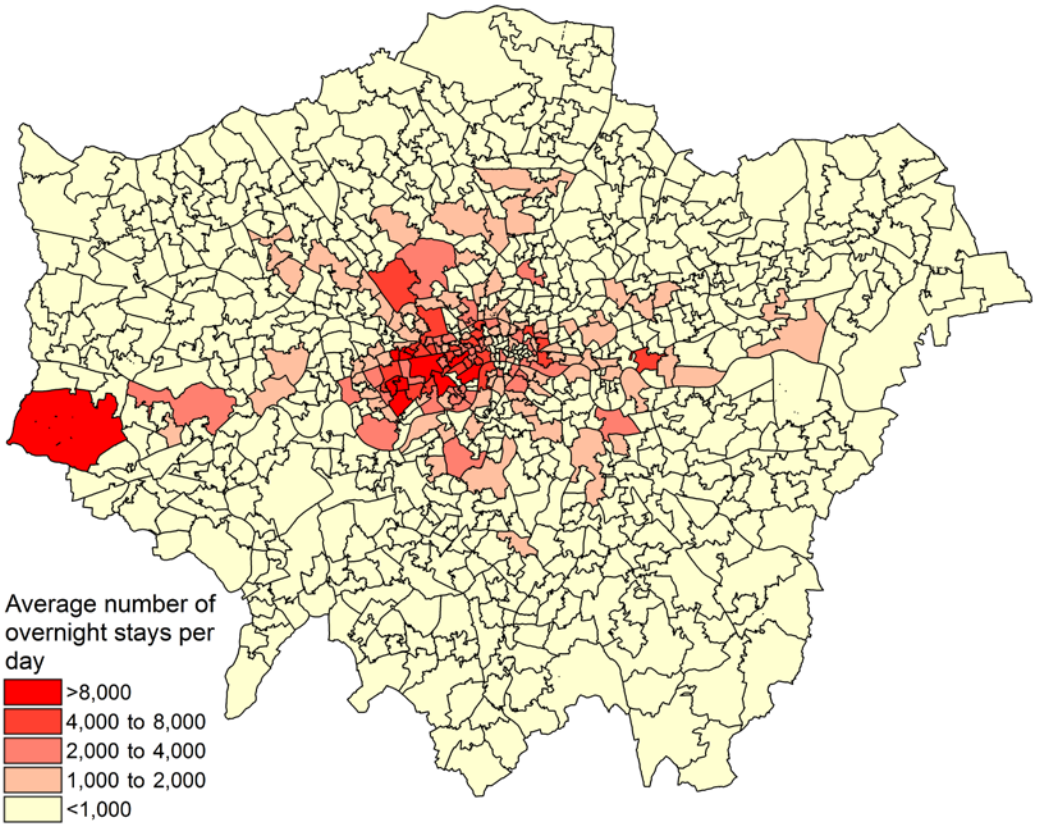
Source: Strategic Analysis, TfL City Planning.

International visitors

London attracts millions of visitors every year for business and leisure and international visitor travel accounts for a significant proportion of travel on London's transport networks, particularly on weekdays outside of the peaks, and on the weekend. However, capturing the travel behaviour of international visitors is relatively difficult. The nature of the data used for Project EDMOND allows international visitor travel to be differentiated from UK resident travel.

Figure 11.10 highlights the areas of London where international visitors were observed to stay with areas of central London, particularly the West End, standing out, and also near Heathrow Airport where people may stay before or after a flight. Understanding more about international visitor travel can help us to ensure that this segment of passenger demand on the network can be better catered for and ensuring that London remains an attractive city to visit for business and leisure.

Figure 11.10 International visitor locations of stay.

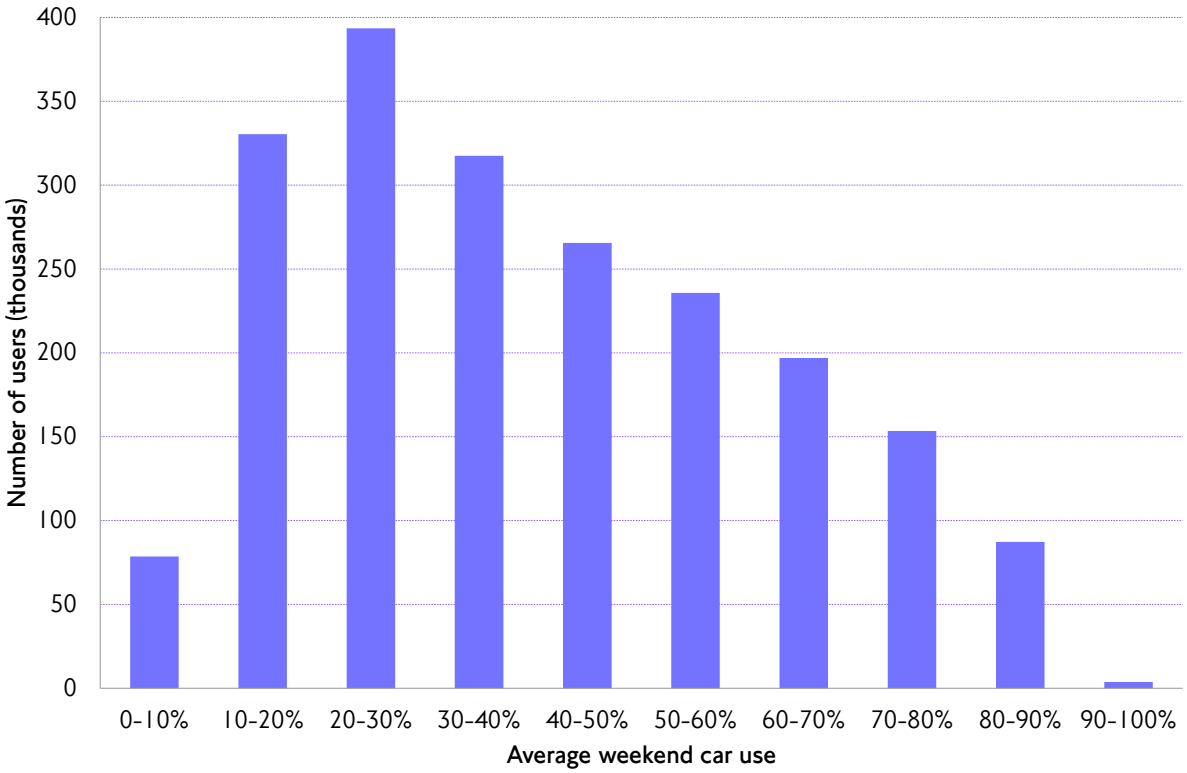


Source: Strategic Analysis, TfL City Planning.

Cohort analysis

The flexibility of the data generated on Project EDMOND allows cohorts of users to be defined based on particular behaviour or characteristics, and then for these to be analysed further. For example the graph in Figure 11.11 is based on users who travel by public transport for more than 70 per cent of their weekday commutes. These have been divided into groups based on the percentage of their weekend journeys undertaken by car. Although all of these users have a weekday car commute usage of less than 30 per cent, the graph shows that a significant proportion have weekend car use of greater than 40 per cent. This confirms the common assumption that many people in London who use public transport for their weekday commute revert to using their car at the weekend due to reasons such as travelling with young children, carrying heavy goods, or simply out of habit.

Figure 11.11 Weekend car use for users with more than 70 per cent public transport mode share for weekday commutes.



Source: Strategic Analysis, TfL City Planning.

Further potential

Project EDMOND has provided TfL with important data for use in updating its transport models and also new insight into travel behaviours of different groups who use London's transport networks. It has also given us valuable experience in working with this type of data so that we can understand its strengths and weaknesses and usefulness for a variety of different transport planning analyses. This experience will allow us to investigate the further use of this and other data sources for future applications to ensure that we remain at the forefront of the industry in this area.

11.6 Supporting new homes

London's housing challenge and targets

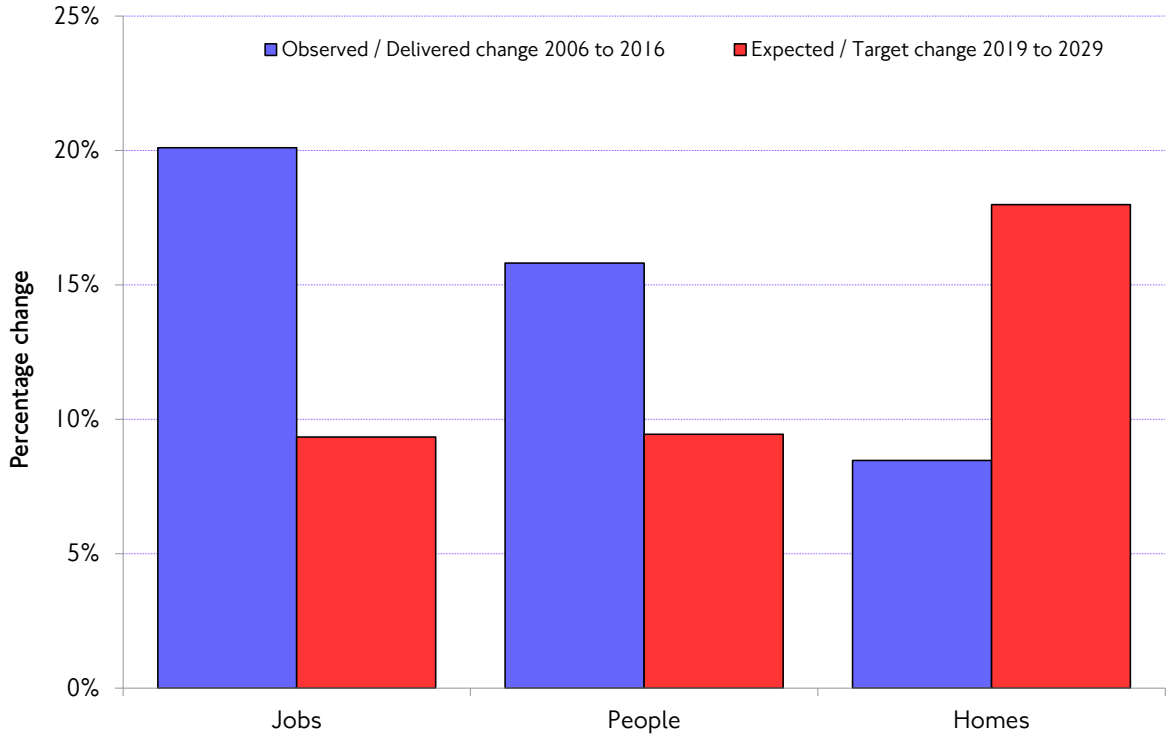
Over recent years, London's population has grown faster than previously anticipated resulting in continued and significant pressure to deliver more homes and jobs, while ensuring a high quality of life for all Londoners.

In recent decades, London has excelled at creating new jobs and opportunities. This in part saw the population increase substantially, but the number of new homes being built has not kept up. Figure 11.12 shows how the number of jobs has increased by 20 per cent between 2006 and 2016, and the population by 16 per cent, whilst the number of homes has risen at just half that rate (by eight per cent).

Growth in people and jobs in London is expected to continue, albeit at a slower rate. To cater for this further employment and population growth, and to correct the historical imbalances, the draft London Plan sets a housing target of 65,000 homes per year between 2018/19 and 2028/29, equivalent to an almost 20 per increase in the number of dwellings in

London. These targets are based on capacity assessed by the 2017 Strategic Housing Land Availability Assessment (SHLAA).

Figure 11.12 Change in number of jobs, people and homes in Greater London 2006-2016 and expected changes from 2019-2029.



Source: Office for National Statistics and GLA.
Note: the jobs and people figures for 2019 to 2029 are projections, whilst the homes figures are based on housing targets in the draft London Plan.

These targets look to meet the housing needs of London's growing population, which is estimated to be at least 66,000 new homes each year between now and 2041. The calculation of this need is set out in the 2017 Strategic Housing Market Assessment (SHMA).

Delivery of new homes over the previous decade or so has typically been significantly below the adopted London Plan's target of 42,000 a year, with just under 29,000 homes delivered in 2012/13. Over the same period, house prices and rents have continued to increase, and may be influencing migration of young people to and from the Capital. The net number of people in their 30s moving out of London has risen steadily since 2009. In 2016, for the first time since 2006, the balance of net domestic migration to London by those in their 20s and 30s was negative, meaning more young people of working age moved out of London than moved in.

While housing delivery overall has been low, there has been a recent trend of increased numbers of new homes, reaching 45,505 in 2016/17, 3,000 above the adopted target (as shown in table 11.1). Of these, 7,300 were affordable homes. The number of completions in 2016/17 is the highest single-year completions total in a London Plan Annual Monitoring Report – the latest version published in September 2018 (see: https://www.london.gov.uk/sites/default/files/amr_14_final_20180927.pdf).

Table 11.1 Number of housing completions in London.

Year	Housing completions
2012/13	28,911
2013/14	31,905
2014/15	34,035
2015/16	40,598
2016/17	45,505

Source: London Plan Annual Monitoring Report, GLA, September 2018.

The current housing crisis is generally accepted to be one of the greatest challenges facing London today, and continuing to tackle it is one of the Mayor's highest priorities. In May 2018 the Mayor published his London Housing Strategy, and it was formally adopted by the London Assembly and Secretary of State for Housing, Communities and Local Government in August 2018. This sets out the Mayor's plans to address the housing shortage through intensive use of London's available land. The strategy has five key areas:

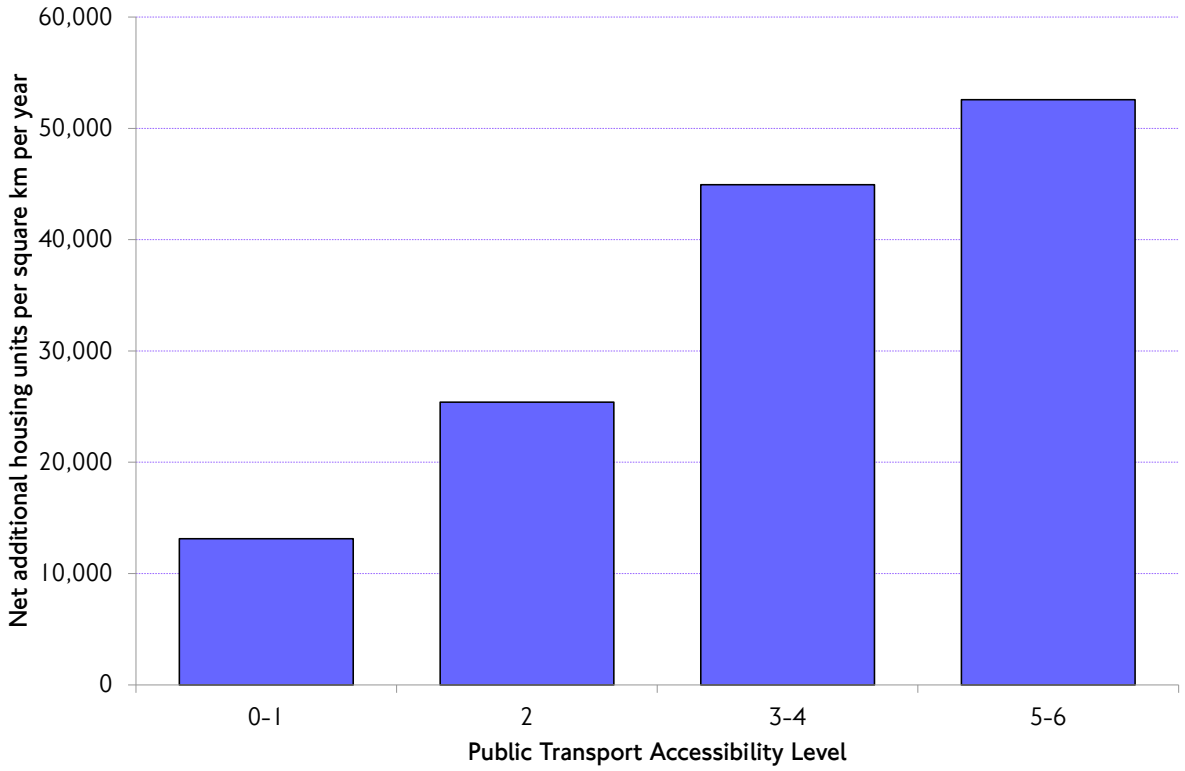
- Building more homes for Londoners
- Delivering genuinely affordable homes
- High-quality homes and inclusive neighbourhoods
- A fairer deal for private renters and leaseholders
- Tackling homelessness and helping rough sleepers

The role of transport

The transport network has a crucial role to play in improving housing availability in London. High quality public transport, and improving the environment for walking and cycling can enable high-density housing and mixed use development at transport hubs. In addition, new public transport connections can make parts of London viable places to build homes for the first time. Transport provides access to jobs and services and creates places where people want to live. Well-connected areas have high population and/or workplace density.

More developments tend to come through in areas with higher Public Transport Accessibility Level (PTAL- see also section 11.2 of this report). The land area within each PTAL group varies, so figure 11.13 shows the number of additional units per square kilometre, per year for the last three years. This shows that more housing units have been completed in higher PTAL areas.

Figure 11.13 Number of additional housing units per square kilometre per year, according to grouped PTAL of the area, 2014/15-2017/18.



Source: The London Development Database, GLA.

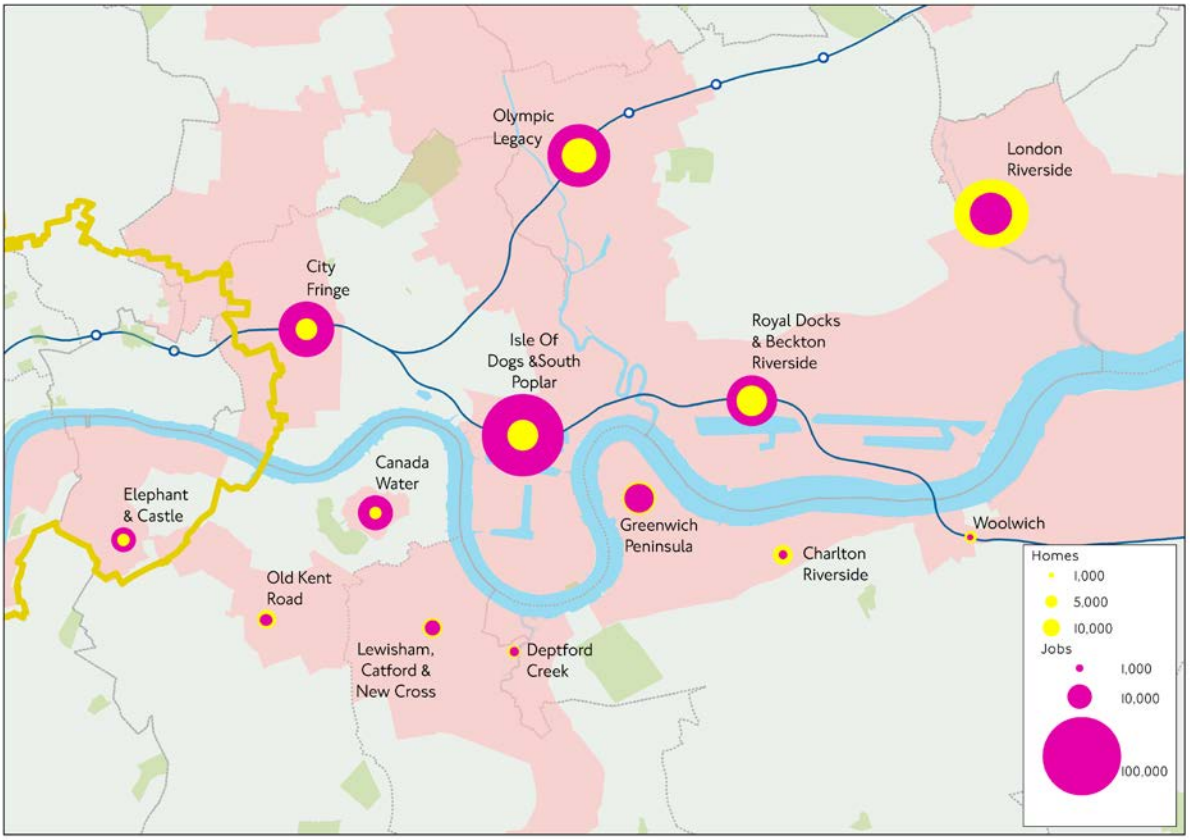
Opportunity Areas

Many of the areas with capacity for development have poor transport connectivity which has limited private sector investment in housing. The London Plan identifies Opportunity Areas which have significant capacity to accommodate new housing, commercial and other development linked to existing or potential improvements in public transport. Typically they can accommodate at least 5,000 jobs or 2,500 new homes or a combination of the two, along with other supporting facilities and infrastructure. The broad locations of London's Opportunity Areas were shown in Travel In London report 10, figure 10.1.

Case study on delivered and planned growth - the Isle of Dogs and South Poplar

The majority of growth across east and south east London will be accommodated within the Opportunity Areas (OA) highlighted in figure 11.14. The Isle of Dogs and South Poplar (IoDSP) OA sits at the epicentre of this growth, with an indicative figure of 31,000 new homes and 110,000 new jobs in this important inner London location by 2041, as set out within the draft London Plan.

Figure 11.14 Growth areas in east and south east London.



Source: GLA and IoDSP OAPF Draft Transport Strategy.

Over the past 20 years there has been a surge in development across the area, particularly around Canary Wharf and South Quay, with more growth coming forward. Despite this, parts of the OA represent some of the most deprived areas within London and the UK.

The Greater London Authority (GLA) is committed to working with TfL and the London Borough of Tower Hamlets to develop an Opportunity Area Planning Framework (OAPF) for IoDSP which will support the existing communities of the area, the employment centre around Canary Wharf and further residential growth over the coming decades. Good transport connections are essential in ensuring that residents have sufficient access to a range of suitable opportunities - a key element to tackling inequality, supporting regeneration and improving quality of life.

The 2011 Census records over 53,000 people living in the area, an increase of around 60 per cent over the preceding decade, whilst over 115,000 employees now work in and around the Canary Wharf estate. The OAPF highlights that a range of between 31,000 and 49,000 new homes could come forward by 2041. Of this over 19,000 are already permitted or considered to be 'active' in the planning process (based on 2015 data). The area plays an important role in terms of the economy of both London and the UK, where an additional 110,000 jobs are expected to come forward in and around Canary Wharf and the surrounding area over the course of the OAPF.

Challenges facing the area

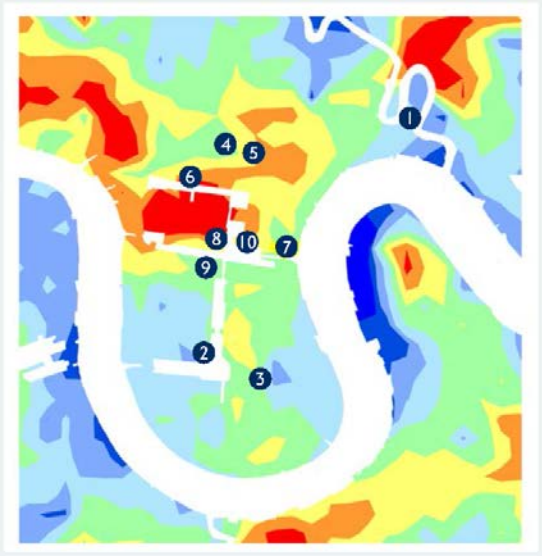
There are a number of existing challenges for the movement of people to, from, through and within the OA and this part of inner east London:

- Almost two thirds of all public transport commuters to the OA are from the west, with 75 per cent of them using the Jubilee line.
- On the most crowded section of the Jubilee line between Canada Water and Canary Wharf, 88 per cent of passengers are travelling to the OA.
- The most crowded sections of the DLR are travelling towards the Canary Wharf area from both the north and south.
- Within the OA, buses support shorter journeys with the heaviest flows on the western perimeter of the Isle of Dogs and around Canary Wharf.
- Connectivity within the OA is fragmented due to physical barriers to travel including the docks, rivers and road and rail infrastructure.

This is reflected within PTALs (Public Transport Accessibility Levels), which vary widely across the area. Figure 11.15 shows that PTAL scores are very high around the Canary Wharf area due to the proximity to the Jubilee line station, together with numerous DLR stations. The central spine of the peninsula retains moderate PTAL scores, corresponding to the path of the DLR, whereas the outer boundaries at the south west and south east of the peninsula have lower PTAL scores indicating poorer access to public transport.

With the introduction of the Elizabeth line, together with the delivery of improved frequencies, routing and physical connections in the area, significant improvement is expected in terms of accessibility across the whole OA, as shown in figure 11.15. This demonstrates the large impact transport investments can have on the connectivity of an area.

Figure 11.15 Map of the Isle of Dogs area showing baseline Public Transport Accessibility Level (PTAL) for 2011. Table shows 2011 PTAL values and future 2031 PTALs for 10 sites if all mitigation schemes are implemented.



Baseline PTAL for the Isle of Dogs and South Poplar (2011) calculated from Canada Square

0 1a 1b 2 3 4 5 6a 6b
Worst Best

ID	Name	PTAL 2011	PTAL 2031
1	City Island		
2	Greenwich View		
3	Mudchute Park		
4	Poplar 1		
5	Poplar 2		
6	Poplar DLR		
7	Preston's Road		
8	South Dock		
9	South Quay		
10	Wood Wharf		

Source: Draft Transport Strategy for the Isle of Dogs and South Poplar Opportunity Area Consultation, TfL 2018.

Work has been undertaken to develop a robust package of transport measures to address the current challenges and support the OA up to 2041:

- Making best use of the existing public transport in the area.
- Address crowding and congestion on the public transport network.
- Invest in the quality of the street network in the area to deliver Healthy Streets.
- Address severance through new and improved links across the area to enable sustainable travel through walking and cycling.
- Ensure the highway network maintains acceptable levels of performance, whilst supporting essential freight activity, and looking to reduce car dependency.
- Embrace innovation and new technologies to improve the way we travel and facilitate the sustainable movement of people and goods in the area.

The IoDSP Transport Strategy includes a transport implementation and delivery plan that sets out strategic and local infrastructure to support growth in the area as set out by figure 11.16.

Collectively the package of measures will support the delivery of the overarching themes of the Mayor's Transport Strategy, to deliver healthy streets for healthy people; deliver a good public transport experience; and support the delivery of new homes and jobs across the area and the rest of London.

Figure 11.16 Summary of the integrated transport strategy for the Isle of Dogs and South Poplar, to be delivered over the OAPF Plan period up to 2041.

Source: Spatial Planning, TfL City Planning.

The recent redevelopment and distinctive geography of the Isle of Dogs makes it a unique case study for research into the interactions between employment growth, transport provision and travel patterns. The annual Isle of Dogs and Canary Wharf cordon surveys have

monitored travel trends alongside the transformation of the area. These weekday surveys focus on the area as an employment district with trips entering and exiting the area across a cordon, inculding freight vehicles. The survey records patterns of longer distance commuting and highlights a decreasing private mode share and the challenge of high volumes in the peak direction at peak times.

TfL Growth Fund

The TfL Growth Fund was established in 2012 to fund smaller scale transport schemes that have a specific role in unlocking housing and employment growth. A unique investment programme in TfL, it helps to deliver the Mayor's commitment set out in his draft London Plan and transport strategy to increase the delivery of new homes with good connections to the public transport network.

Between 2012 and 2016, £350m from the Growth Fund has been allocated to support 15 projects across the city unlocking up to 55,000 new homes. A number of these projects are well underway including: the Barking Riverside Extension, Elephant & Castle public realm improvements and the Woolwich Elizabeth line station. This year we also allocated a further £23m to four schemes in outer London including: Walthamstow Central, Elmers End, Ilford and Colindale stations. These schemes will unlock a further 5,000 units.

The Growth Fund has been key to securing financial contributions from third parties. For example, in Woolwich a £100m deal was struck with Berkeley Homes as part of its development of 3,500 homes to deliver the station box on the Elizabeth line route, with the Growth Fund contribution of £24m delivering the fit out of this new station.

How TfL is delivering more affordable homes

The release of publicly-owned land for residential development has a key role to play in meeting housing targets. As one of the Capital's largest landowners, TfL can play a pivotal role in providing places to live and work and improving the connectivity that Londoners need. Since 2016, we have already brought to market sites that can deliver almost 5,000 homes. In 2018/19 we expect to unlock sites that can offer an additional 3,000 homes. By the end of 2020/21, we plan to have started on property development sites that will provide 10,000 new homes and one million square feet of offices, shops and workspace. Across the projects brought to market in this mayoral term, half of the homes will be affordable. We are also making further investment in our retail offering in and around stations to attract new tenants. In many areas, our sites will play a key role in encouraging development and regeneration – opening up new spaces, creating jobs and stimulating economic growth.

TfL is using a range of procurement approaches to select these development partners, working with major developers, SMEs and Community Land Trusts. The majority of our large, commercially-led sites that have been taken to market so far are being delivered through our Property Partnerships framework, for-sale joint ventures where TfL can share in the development profit of the sites. We have also recently begun looking for a funding partner for a build-to-rent vehicle to deliver an initial phase of 2,000 to 3,000 homes for rent. For larger sites where we are not looking to take an ownership stake, we are using the Mayor's new London Development Panel 2 (LDP2), and we have also jointly developed the 'Small Sites, Small Builders' portal. We have also forged innovative partnerships with organisations such as Pocket Homes and Apartments for London, who will be delivering precision manufactured affordable housing across a range of our sites.

We are determined to ensure that our projects provide a lasting legacy for London. This is why we are working closely with the Mayor's Design Advocates to ensure that exemplary design standards are achieved and are embedding the principles of Good Growth by Design and Healthy Streets in our schemes.

Example projects include the car parks being brought forward for housing at Canons Park, Rayners Lane and Stanmore Tube stations. The move will support the creation of a minimum of 400 homes, all of which will be affordable. These are prime locations, immediately adjacent to Tube stations, so they offer future residents great connectivity to the public transport network. We plan to retain commuter car parking at the three sites and will look to build housing above. There will also be retail, commercial and leisure spaces – as well as improved connections for people walking and cycling. We'll be working with the London Borough of Harrow and the selected partner to improve the step-free access at Stanmore station, making journeys easier for thousands of passengers.

Ensuring that developments make a positive contribution to London's streets

Transport and land use have become increasingly integrated in new mayoral policy, with clear links being identified between sustainable transport choices and the role of transport in shaping the city and its communities. The Mayor's Transport Strategy outlines that as the city grows it must also become a better place to live – London's growth must be 'good growth'. A big part of this is ensuring that new buildings integrate active travel options, good access to public transport, and well-designed public realm into their building plans.

As a result, the Healthy Streets Approach is being embedded not just in the planning of transport schemes, but also in land use and urban design. This will ensure that active travel and 'good growth' is built into the very fabric of London, making it easier and more attractive for Londoners to make healthy, sustainable travel choices and lead better-quality lives.