MAYOR OF LONDON



Mayor's Transport Strategy

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Mayor's foreword

Transport is a cornerstone of my vision for a fairer, greener, healthier and more prosperous city.

Transport doesn't only shape our daily lives and determine how we get around London – it can create new opportunities for Londoners and shape the character of our city.

As Mayor, I'm working to deliver the affordable, reliable and safe service Londoners deserve and to unlock the power of transport to improve people's lives. I've frozen TfL fares for four years. I've introduced the Hopper fare, which is saving money for millions of Londoners. And I'm planning new transport capacity and constantly looking for new ways to innovate, including accelerating the move towards zero emission vehicles.

But we also need to look at how we can fundamentally change the way people choose to move around our city as the current trends are increasingly causing problems for London.

Car dependency has contributed to an increase in poor public health across our city. Streets can often be polluted, congested and dangerous – unwelcoming places to walk or cycle. Tube, rail and bus services can be overcrowded and sometimes unreliable and indirect, meaning there is no appealing alternative to car use for many. And some parts of London have been planned around car use for so long that there are no decent alternatives.

To begin to resolve these problems, London must become a city where walking, cycling and green public transport become the most appealing and practical choices for many more journeys. These active, efficient and sustainable transport choices not only support the health and wellbeing of Londoners, but also the city as a whole by reducing congestion and enabling the most efficient use of valuable street space.

With an ever-growing population set to put increasing pressure on our city's infrastructure and public spaces in the coming years, it is important that we start to make these changes now.

This strategy document details how we aim to change the transport mix across London, providing viable and attractive alternatives that will allow Londoners to reduce their dependence on cars. The aim is simple but ambitious, and has important implications for our streets, public places and future growth as a city.

Major cities around the world are grappling with the same challenges we face in London. This world-leading strategy sets out a bold approach to creating a more liveable city, which will focus London's transport planning on the long-term needs of all Londoners.

Doing this will be vital to making London a fairer, greener, healthier and more prosperous city. A city that is not only home to more people, but a better place to live. A city where transport is affordable, reliable and accessible for all



Londoners. And a city where the best, easiest and most convenient transport choice will increasingly be the active travel choice.



Sadiq Khan
Mayor of London

Message from the Deputy Mayor for Transport

Transport has a unique role in planning for the future of our city. Its influence extends not only to its bus, Tube, rail and tram services, its cycling routes and its walking environments, but to the streets where Londoners live, work and spend their time. Getting these aspects of London life right will not only improve travel in London – it will transform the whole city.

This strategy uses all the powers of London's transport networks to set out a vision for the future of the city. At its heart is a bold aim for 80 per cent of all trips in London to be made on foot, by cycle or using public transport by 2041.

This is a big ask, and achieving it won't be easy. TfL Business Plans and policy documents will provide more detail on how this strategy will be delivered, along with the borough's vital Local Implementation Plans. TfL and its partners will need to change the way they operate, making every decision with this strategy in mind.

London will thank them for doing so. Achieving the aims of this strategy will improve Londoners' health and their quality of life. It will clean up the city's air and enhance its environment. It will reconnect communities and allow more people to engage with their city. It will help provide new homes and jobs in places that work well for people. In doing all this, it will create a better London – a place where people can live in good health and fulfil their potential.

I would like to thank everyone who has contributed to this strategy – the TfL staff who worked so hard on its development, the TfL Board members who contributed their expertise, and the key organisations and thousands of Londoners who took the time to comment on the draft document.

We couldn't have developed such an inspiring vision for London without you. Together we can make it a reality.





Valerie Shawcross CBE
Deputy Mayor for Transport



Chapter one – The challenge

London's transport matters

London is one of the most entrepreneurial, international and outward-looking cities in the world. Its dynamism and diversity make it one of the most attractive places in which to live and work. It is home to people from every corner of the globe, to a huge variety of unique neighbourhoods and public spaces and to some of the world's leading cultural attractions.

Transport networks make the city what it is – connecting communities, opening up opportunities and creating the conditions for London's global economy to flourish. The transport system also shapes Londoners' everyday lives – how much physical activity they do, how long and pleasant their daily journeys to work, to school and around town are, and even where they choose to live. Careful planning can enable millions of individual decisions to work together in a way that creates a healthy and environmentally sustainable city.

In many ways, the city's transport system is already enhancing Londoners' lives. In others, it is failing to do so. The way people move around needs to be re-examined in the context of the challenges the city now faces.

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‘London’s streets should be for active travel and social interaction, but too often they are places for cars, not people.’

Streets and cars

London’s streets should be for active travel and social interaction, but too often they are places for cars, not people. Most of the main causes of early death in London are linked to inactivity[1], including the two biggest killers – heart disease and cancer. This inactivity is in part due to an overdependence on cars, even for very short trips[2]. Today’s children are the first generation that is expected to live more of their lives in ill health from chronic diseases than their parents[3].

Cars take up a lot of space relative to the number of people they can move around, and reliance on this space-inefficient mode of transport has made London’s streets some of the most congested in the world. This has huge impacts on Londoners – causing pollution, making streets unpleasant places to be and delaying public transport journeys. It also reduces the efficiency of freight and commercial journeys – the trips that keep the shops stocked and London’s businesses running.

Motorised traffic is also overwhelmingly responsible for the greatest environmental challenges we face as a city. Currently, road transport is responsible for half of the main air pollutants, with cars contributing around 14 per cent of nitrogen oxides (NO_x) and 56 per cent of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) emissions – some of the pollutants that are most harmful to human health.

Road danger is caused by the dominance of large, heavy, potentially dangerous vehicles that can move at high speeds in places where people want to be. Recent reductions in fatalities and injuries have mostly been achieved among drivers, while the risk experienced by people who are walking and cycling – who pose very little danger to other road users – remains unacceptably high.

1 Start Active, Stay Active – a report on physical activity for health from the four home countries’ Chief Medical Officers, www.gov.uk, July 2011

2 Steps to solving inactivity, UKactive, www.ukactive.com, 2014

3 S.J. Olshansky et al, ‘A potential decline in life expectancy in the United States in the 21st century’, The New England Journal of Medicine, 17 March 2005, 352:1138-1145



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Public transport and quality of life
Most people already use public transport regularly, but too often Londoners are not getting the quality of experience they are entitled to expect. Unreliable rail services make journey times unpredictable, wasting people's time and even threatening their livelihoods. Overcrowding on rail and Tube networks has a big impact on people's lives – often making large portions of people's daily routine unpleasant and stressful – and can deter some people from using public transport at all.

Buses are London's most heavily used form of public transport and are also accessible, but journey times can be unpredictable and ridership levels have been falling[4]. Being stuck on a bus in traffic, not knowing how long it will take to get to work, school or the shops, is frustrating but it has been an increasingly common experience across London. For some, such as older and disabled people, this can be particularly problematic as buses may be the only form of public transport they can use.

Some parts of London are being held back by a lack of any viable public transport options at all. While central London is one of the world's best-connected places, parts of outer London are cut off from the opportunities the rest of the city has to offer by poor Tube, rail and bus links. Poor transport connections compromise economic fairness by limiting access to jobs, education and training. This in turn can isolate people and communities and lead to a less socially integrated city. Potential development depends so heavily on good connectivity that this not only hampers personal opportunities, but also limits housing and jobs growth.

High-quality public transport services that connect seamlessly to other forms of active, efficient and sustainable travel are required across the city to provide alternatives to car use. Looking at our transport system as a single, connected whole is the key to addressing London's current and future challenges.

4 Travel in London Report 9, page 63, Transport for London, tfl.gov.uk, 2016

Future growth and change
London's success means that people want to live and work here in greater numbers. With a population of 8.7 million, the city is now larger than it has ever been, and it is forecast to grow to 10.8 million by 2041 (see Figure 1)[5].

This growth is expected to generate about 6 million additional trips each day by 2041. Unless new ways are found to plan the city as it grows, overcrowding will see some public transport lines and stations grinding to a halt, air quality will get worse and streets and public places will become ever-more dominated by motor traffic. And it is important also to plan for an ageing population, with increasing accessibility needs.

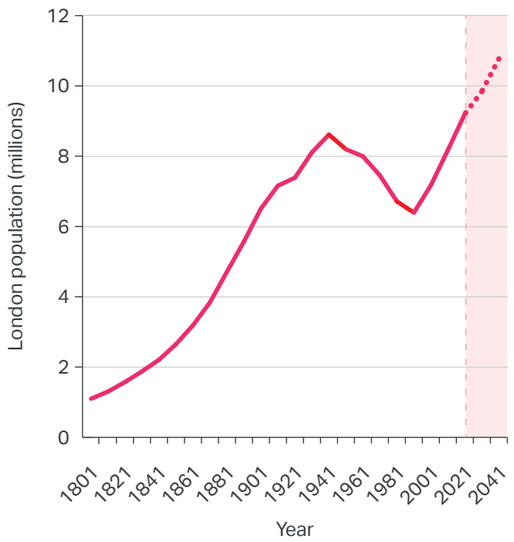
London's growth will mean an increasing demand for new, affordable homes, but the rate of homebuilding is currently only around half what is required. Transport is key to unlocking housing potential – new rail, bus, cycling and walking links are all necessary. To create places that people of all backgrounds and incomes can enjoy living in, London's future must be planned around active and inter-connected lives.

5 Where the strategy references 'today' or 'currently', it reflects 2015 or 2015/16 data or estimates unless otherwise stated. Where the strategy references a change from 'today', it reflects a change from 2015

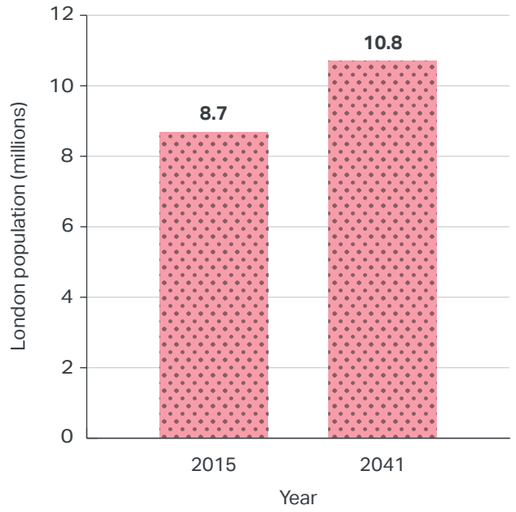
'Transport is key to unlocking housing potential – new rail, bus, cycling and walking links are all necessary.'

FIGURE 1: LONDON'S GROWING AND CHANGING POPULATION

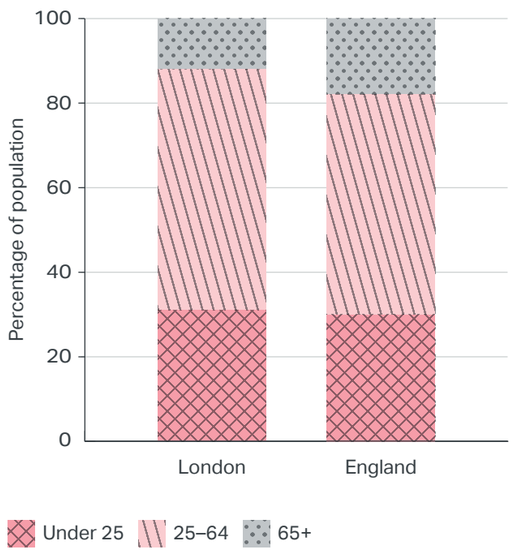
HISTORICAL AND FORECAST POPULATION GROWTH IN LONDON, 1801 TO 2041



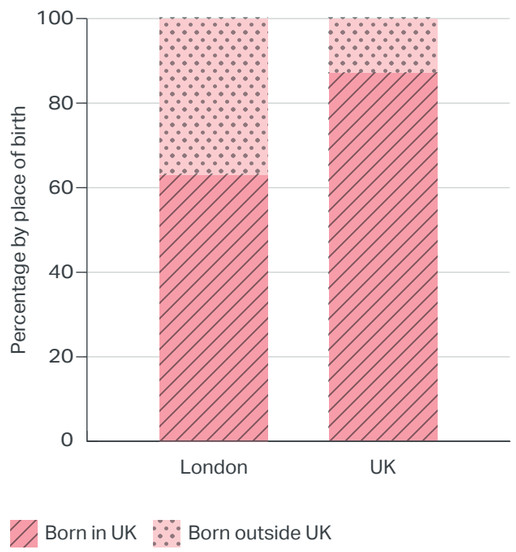
FORECAST POPULATION GROWTH IN LONDON, 2015 TO 2041



AGE PROFILE OF THE POPULATION (LONDON AND ENGLAND), 2015



PROPORTION OF THE POPULATION BORN IN THE UK (LONDON AND UK), 2015



London – and the world – are changing. Within the timescales of this strategy, changes in consumer behaviours, lifestyles and technology could have a profound effect on the ways cities work. Between now and 2041, two new generations will enter the workforce, new economic models based on shared access rather than private ownership will continue to evolve, and new technologies and increasing digital connectivity could significantly change the way people live and work. Engaging with these trends will allow the implementation of this strategy to adapt as needed to achieve its aims.

By 2041, rising public transport demand means that, without further action:

71% **of travel on London Underground in the morning peak would be in crowded conditions**

67% **of travel on national rail in the morning peak would be in crowded conditions**

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Chapter two – The vision

Transport is fundamental to the lives of all Londoners and is at the heart of many of the city's present and future challenges. The central aim of this strategy – the Mayor's vision – is to create a future London that is not only home to more people, but is a better place for all of those people to live in.

Changing the transport mix

The success of London's future transport system relies upon reducing Londoners' dependency on cars in favour of increased walking, cycling and public transport use.

This simple aim of a shift away from the car will help address many of London's health problems, by reducing inactivity and cleaning up the air. It will help to eliminate the blight of road danger. It will limit the city's contribution to climate change and help to develop attractive local environments. It will reconnect communities by creating places where people are prioritised over cars. It will revitalise local high streets and attract international businesses and their employees to more pleasant urban centres.

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Making alternative transport options accessible and appealing to all Londoners is the key to reducing car dependency. This means improving street environments to make walking and cycling the most attractive options for short journeys and providing more, and better, services to make public transport the most attractive option for longer ones. This approach will reduce health and economic inequalities and help support an ageing population by providing low-cost, accessible travel options for Londoners who are currently reliant on cars – or who cannot get around at all.

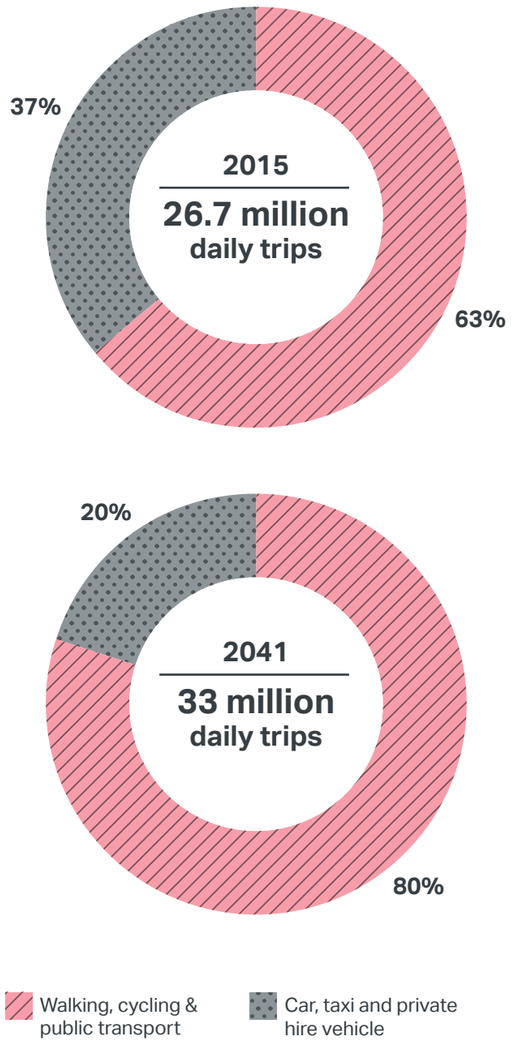
A shift from car use to these more space-efficient means of travel also provides the only long-term solution to the congestion challenges that threaten London's status as an efficient, well-functioning city. Reliable deliveries and servicing, high-quality public services and easy access to workplaces and cultural and leisure attractions are all dependent on the development of an increasingly efficient transport network. Reducing car dependency is the only way to keep London moving.

Above all, the shift away from the use of the car will be vital in creating a future London that is not only home to more people, but is a better place for all those people to live in.

Policy 1
The Mayor, through TfL and the boroughs, and working with stakeholders, will reduce Londoners' dependency on cars in favour of active, efficient and sustainable modes of travel, with the central aim for 80 per cent of all trips in London to be made on foot, by cycle or using public transport by 2041.

Throughout this strategy document, the term 'walking and cycling' is used for a range of end-to-end fully active modes of travel. Most of these are walked or cycled, but the term is used to include trips made by wheelchair and also by scooter, rollerblades and similar forms of active mobility. The term 'cycling' refers to all forms of cycling including trips made using tricycles, hand-cycles and other adapted cycles, and e-bikes.

FIGURE 2: MODE SHARE 2015, AND 2041 (EXPECTED)



'The central aim is for 80 per cent of all trips in London to be made on foot, by cycle or using public transport by 2041.'

Planning London's streets
Addressing car dependency must start with a new approach to London's streets – the places where most travel happens. Most people can get the physical activity they need to stay healthy by walking or cycling as part of trips they are already making, and improving the experience of being on streets is the most effective way of encouraging more people to do so. Building physical activity into the daily travel routine provides all-round health benefits and can be the best way for anyone – young and old, disabled and non-disabled, rich and poor – to keep active throughout life. Active travel has a vital part to play in solving London's inactivity crisis. The Mayor's aim is, by 2041, for all Londoners to do at least the 20 minutes of active travel they need to stay healthy each day.

Despite reductions in the number of people killed and seriously injured on London's roads, road danger still ruins lives and puts many people off walking and cycling. By promoting active, efficient and sustainable travel, reducing the dominance of motor traffic and targeting the sources of road danger, the Mayor's aim is for no one to be killed in or by a London bus by 2030, and for deaths and serious injuries from all road collisions to be eliminated from the streets by 2041. A similar focus on eliminating deaths and serious injuries from London's rail, Tube and other transport services will ensure Londoners can travel safely throughout the entire transport system.

Making streets work for people will provide huge economic benefits not only through revitalising town centres and attracting business to London, but also by freeing up space for the essential freight and commercial journeys that keep London's businesses functioning. Improving the efficiency of freight and commercial traffic, alongside reductions in car use, will help to keep London's streets operating well for the benefit of the city's businesses and the Londoners who rely on them. Without action now, freight traffic in the central London morning peak is expected to increase by up to 10 per cent in the next ten years. Accordingly, the Mayor aims to reduce freight traffic in the central London morning peak by 10 per cent on current levels by 2026, and to reduce total London traffic by 10-15 per cent by 2041, to help keep streets operating efficiently for essential business and public transport trips.

Transport emissions can blight street environments, harming human health and contributing to climate change now and in the future. London must meet legal pollution limits as soon as possible. This requires an earlier introduction and expansion of the Ultra Low Emission Zone and making sure public services lead the way. Air quality and climate change are such pressing issues with such dire potential consequences that London should provide international leadership in seeking to address and overcome their adverse effects where possible. The Mayor's aims are for all new taxis to be zero emission capable from 2018 and all new Private Hire Vehicles (PHVs) from 2023, all new buses to be zero emission from 2025, all new cars and vans from 2030 and all other vehicles from 2040. This would mean that all taxis and PHVs would be zero emission capable by 2033 at the latest, all buses would be zero emission by 2037 and London's entire transport system would be zero emission by 2050.

Improving public transport
Public transport is the most efficient means of moving people over distances that are too long to walk and cycle. It supports good health, because it tends to involve some active travel. It limits the city's impact on the environment and frees up street space for people. It opens up opportunities and connects communities.

The quality and accessibility of travel links are fundamental to Londoners' quality of life and there is a continuing need to improve the public transport network now, as well as to plan it well for the future.

To give Londoners the public transport experience they deserve and encourage more people to use public transport instead of cars, services must consistently be customer focused, accessible and affordable, with support provided by highly trained staff.
Every day, people should have a good experience from door to destination – making the whole journey as easy and seamless as car travel will help to reduce car dependency. Particular attention must be paid to how the complementary modes of walking, cycling and public transport interconnect at transport hubs and on streets across London.

This strategy sets out a wide-ranging plan for how this can be achieved through a combination of modernising existing services and providing new ones.

Crossrail 2 is essential to London's future. Linking rail networks in Surrey and Hertfordshire via new tunnels and stations between Wimbledon and Tottenham Hale, this major new line will provide capacity for an additional 270,000 people to travel into and across central London each morning. It will reduce the overcrowding that threatens to bring major London stations to a standstill. It will also unlock around 200,000 new homes, and support up to 200,000 new jobs. Working with partners, the Mayor aims to open Crossrail 2 by the early 2030s.

Suburban rail services must be brought up to the frequency and reliability standards Londoners have come to expect from TfL-run lines. The Mayor aims to create a London suburban metro. Responsibility for suburban rail services should be devolved from the Department for Transport to the Mayor. By the late 2020s, journey times could improve by up to 15 per cent, and peak period capacity from south London to central London would increase by up to 124,000 people. Devolution would also help provide seamless interchanges between suburban rail services and existing TfL services.

Disabled people, who currently make up 14 per cent of London's population, on average make one third fewer trips than non-disabled Londoners and, as the city's population ages, an increasing number of Londoners could face barriers to travel. Inclusive design must be used across the transport system to ensure it is accessible to all. TfL and its partners must continue to make walking and cycling environments accessible to older and disabled people, and provide lifts, level access and better customer care and information at stops and stations so people do not have to resort to private transport. The Mayor aims to improve the overall accessibility of the transport system including, by 2041, halving the average additional time taken to make a public transport journey on the step-free network compared to the full network.

New technologies could generate new ways of providing public transport. These could present significant opportunities and it is important that they contribute to making London a fairer, greener, healthier and more prosperous city.

Good Growth
In connecting businesses to each other, their employees and their customers, transport has a fundamental role to play in supporting the growth of London's economy. A key aspect of this will be new connections. New public transport services will be vital in creating the 1.3 million new jobs and more than 1 million new homes the city needs by 2041, because people want to live and work in places that are well connected. Improving existing public transport services helps communities to develop and grow.

Growth is good for London, and it is important that all of the city's current and future residents feel its benefits. As the city grows, it must also become a better place to live in – London's growth must be 'Good Growth'.

The role transport plays in facilitating growth presents an opportunity to shape London into a city that works well for everyone. Using new public transport links and better walking and cycling environments to help areas develop will create a future of reduced car dependency and increased active travel. Planning streets and places around walking, cycling and public transport will increase active, efficient and sustainable travel for short trips around new town centres. Improving public transport connections between existing communities will support a shift away from car dependency.

This strategy aims to ensure that regeneration and new development schemes incorporate the Mayor's principles of Good Growth, including local people in local decisions to provide the greatest benefit for everyone. Transport has a role to play in delivering growth that satisfies the following principles:

- Good access to public transport
- High-density, mixed-use developments
- People choose to walk and cycle
- Car-free and car-lite places
- Inclusive, accessible design
- Carbon-free travel
- Efficient freight

Changing the transport mix will put people back at the heart of the transport system, prioritising human health and experience over traffic dominance. All these changes will improve the experience of walking, cycling and using public transport now and in the future, allowing the ambitious shift away from car use required to make London a better place to live, visit and work in[1].

1 The full set of outcomes the strategy is expected to achieve are set out in Chapter six

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Transforming the transport system – a spatial approach

The many and varied areas of London have different characteristics, and the aims of this strategy will need to be pursued in ways that are tailored to each. In broad terms, the future of transport will look different in central, inner and outer London.

Central London

Central London is a global cultural and economic centre, with a dynamic financial and commercial hub, a vibrant West End, emerging tech quarters and a rich heritage. Most of the capital's employment growth will occur here as well as at Canary Wharf so, to compete for jobs on the world stage, it must remain very well connected, with a world-class public realm and safe air quality levels.

More than 1 million people travel into central London by rail and Tube every morning, and the success of the area as a business hub depends on high levels of public transport connectivity. Insufficient rail and Tube services for central London will constrain future economic growth – a capacity increase of about 80 per cent is required to tackle crowding on today's services and to cater for growth between now and 2041[2]. Bus services are also important, and buses must be properly prioritised on key routes to ensure they remain reliable.

Given the fundamental importance of efficient movement to the continuing success of such a limited geographical area, the future of central London must involve a steady reduction in car use. Walking, cycling and public transport use must continue to increase and deliveries must be consolidated, rescheduled and switched to more efficient and sustainable vehicles, including making more use of the Thames. All of these changes will reduce the congestion that inefficient travel causes, freeing up space for essential freight trips and more reliable bus journeys.

These changes will also free up space for other uses, beginning with the transformation of Oxford Street and continuing with restricting traffic where appropriate to provide better environments for walking and cycling. Areas around gateway stations such as Euston, Waterloo and Victoria must be welcoming and offer good-quality facilities for onward active, efficient and sustainable travel. Central London sees the most concentrated mix of demands for public space, so it is vital that this area is properly planned in a strategic way that makes it work well for people.

The challenge of improving the efficiency of London's streets is especially acute in central London where space is at a premium. The elements of this strategy will need to be managed carefully by TfL and the central London boroughs to ensure they all work together to deliver this vision.

2 TfL analysis, see evidence base

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Inner London
An intense mix of urban challenges exists in inner London – severe congestion, poor air quality, excessive noise, high levels of deprivation and limited access to green space. The area is already densely developed, and population and employment numbers are set to rise significantly by 2041[3].

While car use is lower than in outer London, the area presents the greatest immediate opportunity to reduce it even further by transforming facilities for people cycling. Most trips in inner London are relatively short and all of inner London is within a reasonable cycling distance of the city centre. New development should be designed so that walking and cycling are the most appealing choices for getting about locally.

Bus use is particularly important in inner London as it offers low-cost, accessible transport for everyone. Improving the quality of this most affordable form of public transport will help to reduce health inequalities through reduced car use. It will also unlock the potential to provide more homes. To encourage more people to travel by bus, journey times must be improved and bus services must be properly prioritised on London's streets.

To further reduce car dependency and build on the success of London Overground, where passenger numbers have increased fivefold since 2007, 'orbital' rail services (connecting inner London centres to each other) and 'mini-radial' services (connecting communities to local town centres) are needed. A series of accessible 'strategic interchanges' will make it easier to switch between rail, bus, walking and cycling, and provide more step-free options in inner London.

3 GLA population projections, London Datastore, data.london.gov.uk



Outer London
The majority of the city's residents live in outer London. Trips in this area tend to be longer and have many different start and end points, which makes it harder to provide efficient public transport services. Walking is the first choice for short trips, and buses are important in providing access to town centres, but the car is used for most other travel. Cycling, however, has huge untapped potential to replace many of the shorter car trips made in outer London.

Outer London high streets, town centres and communities are often traffic dominated, noisy and polluted, which impacts the local economy and residents' quality of life. Approximately one third of CO_2 emissions from London's transport is generated by cars in the area, and for the good of current and future residents of this part of the city, the dominance of motorised transport must be addressed. Improvements to walking and cycling environments will enable many of the trips currently made by car to be made on foot or by cycle. Measures that reduce car dependency will free up space for essential freight and business trips.

Significant improvements to public transport services will be required to achieve this reduction in car dependency. At present, many people have no choice but to drive, particularly for trips around outer London, rather than into the city centre. Rail services must be improved to make the most efficient public transport option for longer journeys more appealing. Improved bus routes – particularly services that could replace existing car journeys – will also be vital, and where traditional bus routes are not appropriate, this could include new models for 'demand-responsive' bus services.

A more joined-up approach to planning transport services and housing will encourage active, efficient and sustainable travel patterns in outer London growth areas. Commercial and residential development should be planned around good public transport access and well-connected town centres, so fewer people need to rely on cars.

Beyond London

A strong London, with a modern, efficient and affordable transport system, is good for the whole UK economy. Tax receipts from London help to fund Government spending on education, health and other public services that benefit everyone, not just Londoners. London's economy is of such importance to the UK that growth here has been shown to drive growth across the rest of the country[4].

Investment in transport should not be a 'zero-sum' game – getting infrastructure investment right in all UK cities provides a boost to the whole of the UK. Transport projects like High Speed Two (HS2) that connect UK cities show this in action. It is only with high-quality onward journeys in each of the cities it will connect – whether by tram, bus or Crossrail 2 – that the project's benefits will be maximised.

Transport investment in London would also benefit communities across the country. Investment by TfL and Crossrail has supported around 60,000 jobs a year for the last three years in their supply chains outside London. New trains support jobs in Derby, new railway track supports jobs in Scunthorpe, new buses are made in Falkirk and Birmingham's precision engineers overhaul motors for London Underground.

As a full member of the national Urban Transport Group, TfL shares its expertise with cities and transport authorities across the UK, helping develop active, efficient and sustainable transport in urban areas across the country.

London's regional, national and international links

London is so important to the success of the national economy that improving its regional, national and international connections will benefit the whole country.

New rail links are required, including HS2, as well as faster, more frequent and more comfortable services on existing rail lines. It is essential that HS2 is fully integrated into London's transport system so that people can complete their journeys with ease. This requires a new interchange at Old Oak, a new terminus at Euston, and Crossrail 2 to provide sufficient capacity and connectivity to destinations in central London and beyond.

An efficient national strategic road network is needed to cater for the freight, coach services and other traffic that help to keep London and the UK economy operating. In the Wider South East and M25 area, in particular, strategic roads must be managed to cater for essential journeys, without increasing car dependency within or outside London.

As a global trading and cultural centre, and as the UK's principal gateway to the world, better international rail and air links are required from London to continental Europe and to emerging economic powerhouses and markets beyond.

Improved international rail services could strengthen links between the UK and continental Europe's economic centres. Coupled with improved international air links for destinations further afield, this would bolster economic prospects for the entire country, enabling every region to access the global marketplace.

A three-runway Heathrow, however, would have severe noise and air quality impacts and put undue strain on the local public transport and road networks, and alternative airport expansion options should be considered. London's growth is important, and it must be made to work for all of the city's current and future residents.

Working together to create a city for all Londoners

This is a transport strategy for the whole of London, not just the parts of the city over which the Mayor has direct influence. Achieving this magnitude of change across London will require the Mayor and TfL to work with, among others, the Government, London's boroughs, other transport operators, businesses, and everyone who makes this city their home. As such, the aims of this strategy will be pursued collaboratively, using wide consultation and developing the right solutions to London's transport challenges for each borough, neighbourhood and street.

Alongside a new London Plan and the Mayor's other new strategies, this document provides a blueprint for a better London. By working together we can create a city for all Londoners.

4 Country and regional public sector finances: financial year ending March 2016, Office for National Statistics, www.ons.gov.uk, 2017

FOCUS ON: THE HEALTHY STREETS APPROACH

A new type of thinking is required to put into practice the theory of reducing car dependency and increasing active, efficient and sustainable travel. It requires an understanding of how Londoners interact with their city and what defines their quality of life, with particular attention to the streets where daily life plays out.

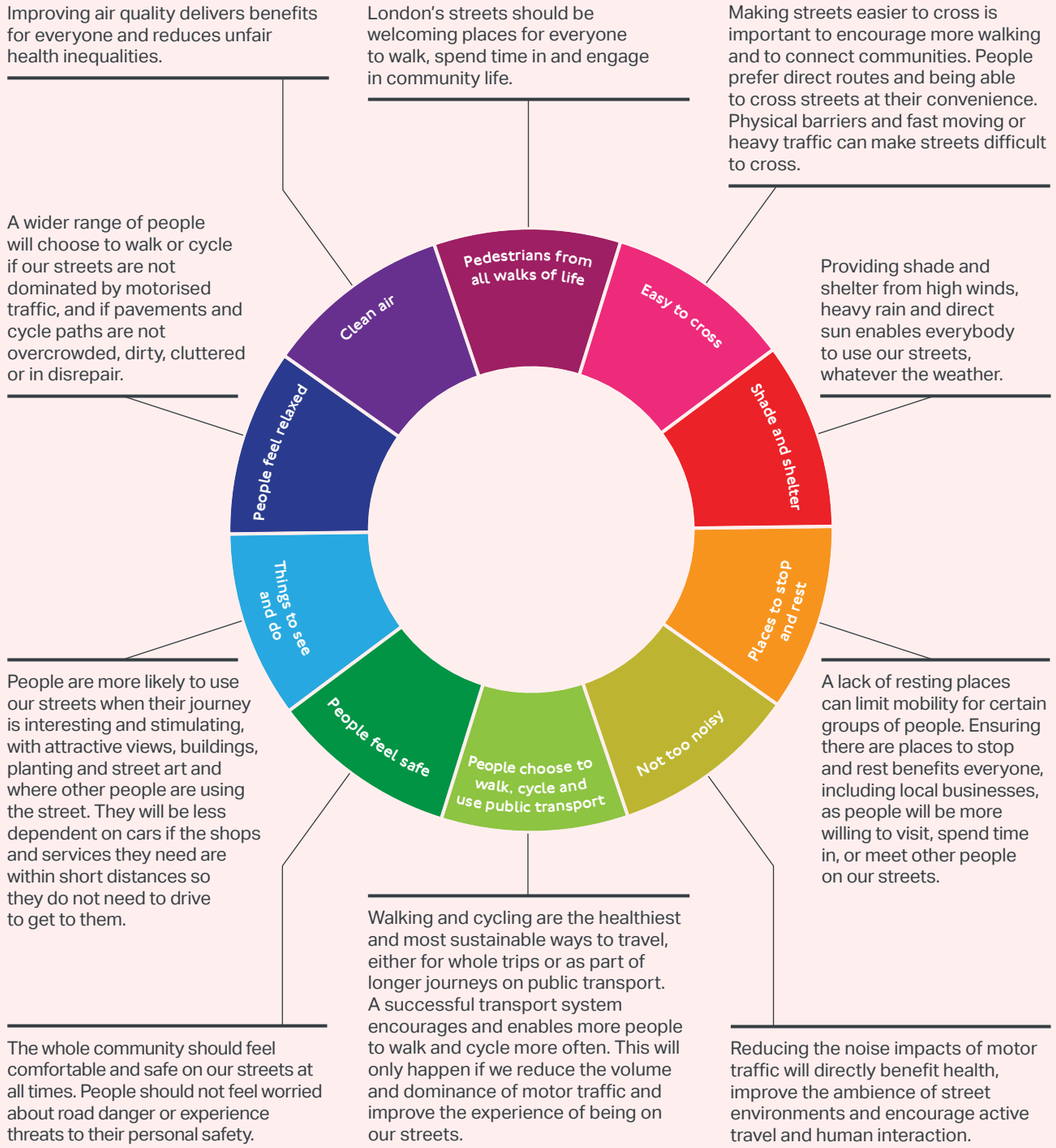
Whatever mode of transport Londoners use, the quality of the experience of using London's streets helps to define the quality of their journey. Eighty per cent of Londoners' trips are entirely on streets[5], and all Tube and rail journeys rely on good street access to stations. A good street experience is therefore key to providing attractive public transport options of whatever mode.

The wider role streets play in virtually every aspect of London life also provides an enormous opportunity to use the Mayor's strategy for transport to improve Londoners' broader experience of their city. Streets are where Londoners spend their time and meet other people – they make up 80 per cent of the city's public space. They are places where people live, shop and work, where children play, where communities connect and where businesses can thrive. The experience of being on London's streets is particularly important for older people, the very young, disabled people and those living on lower incomes, who disproportionately feel the negative impacts of living in a car-dependent city. Improving public transport and assisted transport services for older and disabled people will help a wider range of people to become less car dependent, and improving streets to increase active travel levels, reduce road danger, improve air quality and reconnect communities will be vital in reducing unfair health inequalities.

The Healthy Streets Approach provides the framework for putting human health and experience at the heart of planning the city. It uses ten evidence-based indicators, shown in Figure 3, to assess the experience of being on our streets. Good performance against each indicator means that individual streets are appealing places to walk, cycle and spend time. Improvements against all the indicators across the city's streets will radically transform the day-to-day experience of living in London, helping to fulfil this strategy's overall aim of creating a better city for more people to live and work in.

5 Improving the health of Londoners – transport action plan, Transport for London, tfl.gov.uk, February 2014

FIGURE 3: THE TEN HEALTHY STREETS INDICATORS



Source: Lucy Saunders

FOCUS ON: THE HEALTHY STREETS APPROACH (continued)

The following chapters explain how the Healthy Streets Approach will be applied to help deliver the aims of this strategy:

- Chapter three – 'Healthy Streets and healthy people' – explains how street environments and the wider street network will be planned to promote healthier, more efficient and more sustainable transport options. This includes the better planning and operation of freight and servicing trips to reduce their impact on people

- Chapter four – 'A good public transport experience' – explains how consideration of the whole journey will improve quality of life and reduce car dependency by providing attractive and accessible alternatives to car use. This includes providing higher-quality public transport services, better planned transport networks and the extension of public transport links to new areas

- Chapter five – 'New homes and jobs' – applies the Healthy Streets Approach to London's future development, creating the principles of Good Growth. This will ensure that regeneration and future development are planned around walking and cycling for shorter trips, and cycling and public transport for longer ones

Using the Healthy Streets Approach to improve the lives of all Londoners will also require wider action to support the work of this strategy. To help achieve this, the Mayor is embedding the Healthy Streets Approach in the full range of London strategy documents, including the Health Inequalities Strategy, the London Environment Strategy and the London Plan. This holistic approach to planning the city will help to transform London for the benefit of all of its residents.



Photo: Studio Weave

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Chapter three – Healthy Streets and healthy people

London's streets are fundamental to the character and operation of the city. Designing individual streets and the network they make up for people, rather than cars, and improving the experience of being on London's streets will have a huge impact on people's quality of life.

Attractive street environments encourage active travel, as little as 20 minutes of which a day is enough to stay physically and mentally healthy. Reducing car use will lower harmful emissions, and the trees and other greenery that make streets pleasant places to be improve the city's resilience to climate change. Streets that are busy with people, rather than cars, are safer. Well-designed streets help older and disabled people access the city, and better town centres strengthen communities. High footfall is good for local businesses, and a city that is made up of appealing streets and places will attract big businesses and their employees.

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Reducing Londoners' dependency on cars will be an essential component in realising all these benefits. Although London has made real progress in encouraging people to switch from using the car to active, efficient and sustainable alternatives, many more car journeys could still be made in other ways. One quarter of current car trips could potentially be walked, and two thirds could potentially be cycled. Increasing the rate of mode shift will be dependent upon planning streets for people to walk, cycle and use public transport.

This chapter sets out the importance of improving London's streets and then explains in three sections how they can be planned to achieve these improvements:

a) Enabling active, inclusive and safe travel, by providing accessible, well-designed space for walking and cycling, the healthiest means of moving around London's streets.

b) Using street space more efficiently – reducing traffic levels through better-managed freight and fewer car trips.

c) Improving air quality and the environment, and ensuring London's transport system is resilient to the impacts of severe weather and climate change.

Improving London's streets

To realise all the benefits of improved street environments, the uses of the whole street, from building line to building line, must be considered when making any changes at street level. Walking, cycling, and public transport should be prioritised, taking space from less efficient general traffic where required to minimise conflicts between complementary active, efficient and sustainable modes.

Individual street improvements can change local environments, but to achieve this strategy's ambitious aims, it will be vital to consider how the wider street network operates as a whole.

London needs appealing walking environments in every neighbourhood, so everyone can walk to local schools, workplaces or shops in comfort and safety. It needs appealing cycling environments and a strategic cycling network across the whole city because making cycling attractive is dependent upon making it easy to do wherever people live, and wherever they are travelling to. It needs a street network that is not dominated by dangerous, polluting vehicles. It needs a well-planned freight network, space for buses to be properly prioritised, and high-quality public transport connections that provide appealing alternatives to car use.

The way street space is allocated for these purposes will vary between different places in London, and by time of day and week. The appropriate use of street space will be considered while the policies and proposals within this strategy are used to deliver the Healthy Streets Approach throughout London.



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FOCUS ON: HEALTH BENEFITS OF ACTIVE TRAVEL

Why do we need physical activity?
Everyone needs to keep their body physically active throughout their whole life to keep it functioning well. Physical activity helps to keep our hearts healthy and blood pumping to all of our organs, including our brains, which assists in preventing certain long-term conditions such as stroke and some cancers. Physical activity also helps to keep us feeling positive and to sleep well.

In childhood, physical activity helps our bodies to grow, strengthening our muscles and bones, and assists in the development of skills such as balance and coordination. As we get older, everyday activity helps us to maintain our strength and cognitive skills.

How much physical activity do we need?
Children aged five–18 are recommended to do at least 60 minutes of moderate intensity activity (brisk walking or cycling) each day, while adults are recommended to do 150 minutes each week in periods of ten minutes or more. Everyone should be active every day and minimise the amount of time they spend sitting[1].

How much physical activity do we get?
If an adult reports that they walk or cycle for at least two ten-minute periods most days, it is a good indication that they are getting the minimum activity they need to stay healthy. Currently, only 34 per cent of adult Londoners report having walked or cycled for two ten-minute periods on the previous day[2]. Only three in ten children of school age reach the minimum recommended activity level[3].

The power of walking and cycling
Most people struggle to set time aside for physical activity, so the best way of keeping active is to build this activity into our existing routines. Our travel time is one of the few opportunities we have for easily incorporating activity into our day. Most people's daily public transport journeys contain stages that can be walked or cycled.

Children burn the most energy when they are walking, cycling and playing outdoors. While children need much more activity than adults, walking and cycling can make an important regular contribution to their daily activity levels.

Walking does not require any special facilities, skills or equipment – it's an activity that takes place in London regardless of gender, income, ethnicity or employment. Cycling is also one of the least expensive means of getting around, allowing anyone to reach any part of the city at any time.

Walking and cycling are important for disabled people, who – with the help of improved walking and cycling environments, consideration for wheelchair use and adapted cycles and more accessible public transport – can realise the all-round health benefits active travel can provide.

The health benefits of active travel
If everyone in London walked or cycled for 20 minutes every day, it would reduce their individual health risks significantly. Physical health and mental health are interdependent, and as well as reducing the risk of chronic illness and early death, walking and cycling have been shown to improve mood and self-esteem, and reduce stress, anxiety and depressive symptoms.

Increased active travel would reduce the burden placed on the NHS. A doctor is estimated to deliver around 20 years of healthy life through the care they provide each year[4]. If all Londoners walked or cycled for 20 minutes a day, this would deliver at least an additional 60,000 years of healthy life in prevented illness and early death each year[5].

1 UK physical activity guidelines, www.gov.uk, 2011

2 Travel in London Report 8, page 181, Transport for London, tfl.gov.uk, 2015

3 Health Survey for England 2015, NHS Digital, www.gov.uk, 2016

4 John P. Bunker, 'The role of medical care in contributing to health improvements within societies', International Journal of Epidemiology, 1 December 2001, Volume 30, Issue 6, pages 1260-63, Oxford University Press, www.oup.com

5 Transport and Health in London – the main impacts of London road transport on health, GLA, February 2014

By mode of travel, the amount of time spent being physically active during an average journey is:

by car
<1 minute

by public transport
8–15 minutes

on foot
17 minutes

by bicycle
22 minutes

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A person who is physically active every day reduces their risk of:

Type 2 diabetes
35–50%

Depression
20–30%

Coronary heart disease
20–35%

Alzheimer's disease
20–35%

Breast cancer
20%

Colon cancer
30–50%

Source: Start active, stay active: a report on physical activity for health from the four home countries' Chief Medical Officers, www.gov.uk, July 2011

FOCUS ON: HEALTH BENEFITS OF ACTIVE TRAVEL (continued)

The Healthy Streets Approach does not just benefit health through enabling people to be physically active, it also helps to reduce the negative health impacts of transport noise, air pollution, road danger, social isolation and the 'severance' effects of busy roads. Making our streets more welcoming places to spend time, walk, cycle and access public transport helps to strengthen our communities and reduce unfair health inequalities.

Potential for more active travel
At present, 37 per cent of trips in London are made by car, taxi or private hire vehicle (PHV) and on average these involve less than one minute spent active. Walking, cycling and public transport journeys involve much more activity.

TfL's analysis of the potential for mode shift suggests that three quarters of car journeys currently made by London residents could be made by a healthier mode. The improvements to streets and public transport networks set out in this strategy will enable an even higher proportion of car journeys to be replaced by more active, healthier forms of travel.



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a) Active, inclusive and safe travel

Improving walking and cycling environments

The success of London's transport system in the future relies on the city becoming a place where people choose to walk and cycle. Many Londoners already do so: every day, around 6.5 million trips are made solely on foot and around 600,000 trips entirely by cycle. However, it is estimated that almost 5 million journeys per day that could be walked or cycled are currently made by car.

Policy 2
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to make London a city where people choose to walk and cycle more often by improving street environments, making it easier for everyone to get around on foot and by cycle, and promoting the benefits of active travel. The Mayor's aim is that, by 2041, all Londoners do at least the 20 minutes of active travel they need to stay healthy each day.

Walking is already the norm for many short journeys, although its importance as a mode of travel and the need for good walking conditions are often undervalued in transport planning. Many people do not see walking as part of their daily travel, although they may walk ten minutes to and from a Tube station every day. More appealing walking environments will encourage people to walk more, improve the quality of journeys that are already walked all or part of the way, and enable everyone to make the most of their local area. This is particularly important in town centres, around homes, workplaces and schools, and in the links to and from bus, Tube and rail services. Better communicating the improvements to these environments is a good way of helping people see the importance of walking to their lives. The Mayor aims to make London the world's best city for walking.

The provision of more attractive walking environments will also make cycling a more appealing option. Cycling allows journeys that cannot practicably be walked to be conducted actively and sustainably. It is vital that the huge untapped potential of cycling[6] is realised, particularly in outer London where car dependency is highest. This requires pleasant local environments, just as with walking, and safe and direct routes over longer distances. Ensuring strategic cycle routes also improve environments for walking will mean that walking and cycling objectives are achieved together.

Getting all Londoners walking and cycling

Making walking and cycling more appealing to all Londoners requires a big change to take place in the city's culture. A three-point plan is proposed to make this happen:

1) Street environments that encourage walking and cycling
Londoners need quiet, safe, accessible streets that are not dominated by motorised traffic and that are pleasant for walking, cycling and spending time. Improving street environments to encourage walking and cycling will be integral to TfL's investment in, and management of, the Transport for London Road Network (TLRN), and TfL will work with London's boroughs to deliver improvements to their streets. This will build upon the best of the programmes already underway in, for example, Waltham Forest, Kingston and Enfield, aiming to reduce the volume of traffic through appropriate street closures, to develop streets as public spaces, and to discourage short car trips.

6 Analysis of cycling potential 2016, Travel in London supplementary report, Transport for London, tfl.gov.uk, March 2017

'Making walking and cycling more appealing to all Londoners requires a big change to take place in the city's culture.'



Proposal 1

The Mayor, through TfL and the boroughs, will improve and manage London's streets to create a high-quality public realm that encourages walking and cycling by all Londoners by:

a) Creating 'Liveable Neighbourhoods' to improve the public's experience of walking, cycling and using public transport and to increase opportunities to use streets as public spaces and for play, and to encourage fewer trips by car.

b) Providing 'Healthy Routes' to create attractive, safe and accessible walking routes to schools and other local destinations, such as shops, health services and parks, with a particular focus on improving conditions for children, older people and disabled people.

c) Providing more secure, accessible cycle parking, particularly in residential areas, town centres, public transport interchanges and at key destinations.

d) Improving the accessibility of streets for older and disabled Londoners through measures including removing obstacles, widening pavements for wheelchair access, introducing tactile paving, raising sections of roadway to make crossing easier, providing seating, mitigating the impact of street works and, where possible, ensuring on-street cycling facilities cater for the wide range of cycles used by disabled people.

e) Reducing the severance caused by roads and railways, which can separate people from local services and limit social interaction, community engagement and active travel.

f) Ensuring any scheme being undertaken on London's streets for any reason improves conditions for walking and cycling.

Improvements to the street environment to encourage walking and cycling are illustrated in Focus on: Walking and Cycling and the Healthy Streets Approach.

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A similar approach will be taken across central London, including enhancing Oxford Street by transforming the quality and quantity of space for people walking, with the aim of producing the world's best outdoor shopping experience. Improvements will also be made to other areas of central London where lots of people pass through or want to spend time.

Proposal 2
The Mayor, through TfL, will work with the central London boroughs to transform the experience of the walking and cycling environment in central London by reducing the dominance of vehicular traffic, including by transforming Oxford Street and looking urgently at changes to Parliament Square.

As well as improving environments for local walking and cycling trips, better connections must be provided over longer distances so that London can become truly connected for walking and cycling. An expanded network of cycle routes on both busier roads and quieter streets will be developed to help Londoners use cars less and cycle more.

As streets are improved for cycling, they will also be improved for walking. TfL's strategic cycling analysis enables infrastructure improvements to be made where they will be most used, mapping street changes to current and future cycling demand. This data-led approach will allow cycling infrastructure to grow and develop with the city.

Proposal 3
The Mayor, through TfL and the boroughs, will:

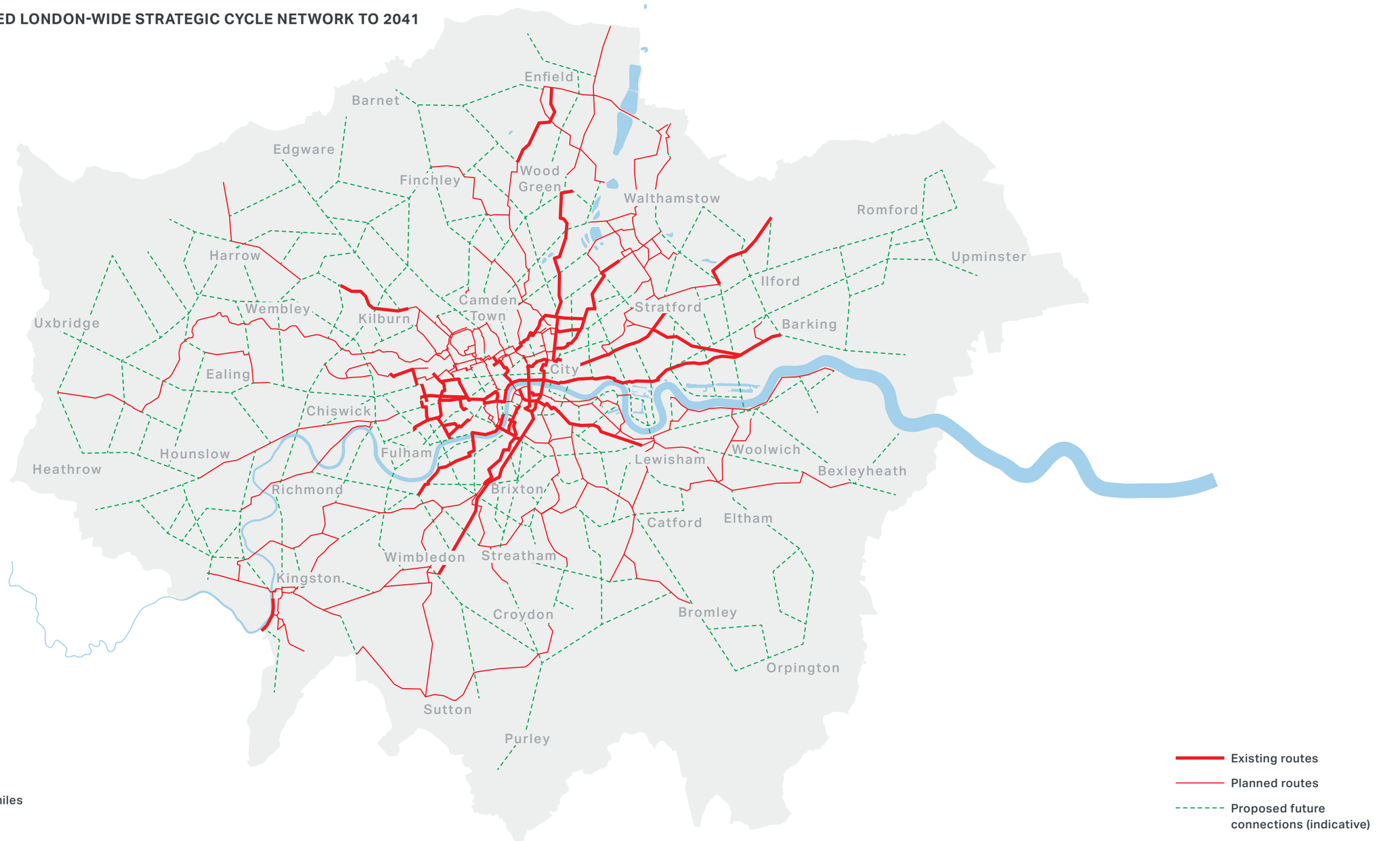
a) Deliver a London-wide strategic cycle network, with new, high-quality, safe routes and improved infrastructure to tackle barriers to cycling for both shorter and longer trips. By 2041, 70 per cent of Londoners will live within 400 metres of the strategic cycle network.

b) Encourage additional local and neighbourhood improvements, such as using physical restrictions to prevent motorised vehicles from using certain streets, to build on and complement the strategic cycle network.

Walking is also a great way to explore and enjoy London's green spaces. The Walk London network includes a number of established routes, including the Thames Path and Capital Ring. These routes need to be expanded, maintained and to remain accessible.

Proposal 4
The Mayor, through TfL and the boroughs, and working with other stakeholders, will protect, improve and promote the Walk London network and create new leisure walking routes.

FIGURE 4: RECOMMENDED LONDON-WIDE STRATEGIC CYCLE NETWORK TO 2041



FOCUS ON: WALKING AND CYCLING AND THE HEALTHY STREETS APPROACH



1 Making streets easier to cross, installing pedestrian crossings where people want to cross

2 Providing ample cycle parking that is suitable for all types of cycle

3 Using art and lighting installations to make walking routes more interesting and attractive

4 Planting street trees and other high-quality planting and greening

5 Improving the quality of lighting to make people feel safer and more secure

6 Providing benches and regular opportunities for people to stop and rest

7 Ensuring pavements are smooth and level, and wide enough for people using wheelchairs or buggies, or walking with children or in groups

8 Reducing speed limits to 20mph and designing streets to keep speeds low

9 Providing protected cycle lanes where required – to make streets safe and appealing for cyclists

10 Using the Direct Vision Standard to remove the most dangerous lorries from London's streets by 2020

11 Providing cycle crossings in parallel to pedestrian crossings to allow people cycling to cross busy roads with priority

12 Working with schools and local communities to identify local walking routes, play streets and other local improvements

13 Narrowing and raising the carriageway at entrances to side streets (to bring it level with the pavement) to give more priority to people walking and to reduce the speed of cars moving across the path of cycles

14 Ensuring streets and public spaces are high quality and well maintained

15 Using filtering to retain cycle access to local streets while removing access for cars

16 Ensuring that the space provided for cycling is sufficient for groups, children and people using inclusive cycles



2) Making it easy to get around on foot or by cycle

Ensuring that all people are able to navigate easily and safely around the city by cycle and on foot is another way that the experience of travelling actively on London's streets can be enhanced. Increasing numbers of people use apps to plan their journeys, and technology can help Londoners navigate on foot and by cycle. The Mayor is leading work on 'digital inclusion' as this information can be particularly useful for disabled people who may have fewer journey options. The increasing levels of (anonymous) data TfL is now collecting on cycling and walking patterns will allow ever more tailored navigation to be developed by TfL, potentially with app developers where necessary.

Proposal 5

The Mayor, through TfL and the boroughs, will make it easier for people to walk and cycle in London by:

a) Maintaining, expanding and improving 'Legible London' walking wayfinding maps and ensuring that on-street cycle network signage is clear and consistent.

b) Using new data to develop and improve online journey planning and navigation tools that will make walking and cycling trips the easiest journeys to plan.

The improvement of both on-street and online navigation tools will open up the benefits of active travel to the widest possible range of Londoners, making the city's streets accessible to everyone.

Making cycling easy and convenient for everyone is also about making it as simple as possible to get access to a cycle, and the Cycle Hire scheme has attracted new people to cycling[7]. It is important that the Cycle Hire scheme continues to broaden the appeal of cycling in London, while complementing the cycle network and integrating with public transport.

New 'dockless' cycle hire schemes can extend access to hired cycles to areas outside TfL's Cycle Hire scheme, increasing opportunities for Londoners to get around by cycle. However, it is essential that any new business models like this are deployed in a way that does not make London's streets less accessible or less attractive places to walk, cycle and spend time.

Proposal 6

The Mayor, through TfL, will seek to increase the use of TfL's Cycle Hire scheme, and explore the potential of new models of cycle hire, reinforcing the role of cycle hire as an integral part of London's cycling infrastructure and public transport network.

7 Attitudes towards cycling, Transport for London, September 2015

3) Promoting walking and cycling for all Londoners

The improvements that are made to the walking and cycling environment will lead to many more Londoners building walking and cycling into their daily routines. As this happens, it will be important to ensure the benefits of walking can be experienced by all Londoners from all backgrounds, particularly those who are currently inactive, helping to reduce health inequalities. This is especially important for young children, who need to do more physical activity to stay healthy as they grow. Children can benefit the most from street closures and from safe and accessible footpath networks and other public spaces for active, independent travel and play. Workplace and school travel planning – incorporating school air quality audits – will be used to support the delivery of 'Healthy Routes'.

Appealing environments are required to encourage new people to walk and cycle, but removing other barriers and changing perceptions will be equally important. New infrastructure will be complemented with work to promote the benefits of walking and cycling and to highlight how people's local streets have been improved. Londoners will be supported to change the way they travel using cycle training, workplace initiatives and community-led events.

Proposal 7

The Mayor, through TfL and the boroughs, will work with schools, employers and community and user groups to promote walking and cycling, whether for the whole journey or as part of a longer journey.

One way of showing Londoners how better walking and cycling environments can improve their lives is by trialling the closure of streets to some or all motorised traffic, as well as including other street changes within carefully considered consultation processes. Making it easier for Londoners to request regular street closures for community activities and for children to play can help them to see that streets can be planned for people, rather than cars. Closing streets to motorised traffic for street parties or larger cultural and sporting events can help Londoners to view their streets differently, promoting the benefits of a city where the car is less dominant.

Proposal 8

The Mayor, through TfL and the boroughs, will work with local communities and cultural organisations to promote one-off, regular and trial closures of streets to some or all motorised traffic so that Londoners can see their streets differently.



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FOCUS ON: BUSES AND THE HEALTHY STREETS APPROACH

London's buses transport more people than any other public transport mode. Buses form key links to town centres and other destinations in most parts of the city and are one of the most efficient uses of road space. Buses play an important role in delivering the Healthy Streets Approach.

Public transport supports active travel
More people using public transport instead of cars means more active travel. People using public transport typically do between eight and 15 minutes of active travel a day, compared to less than one minute for those using a car. Half of all walking journeys in London are to or from public transport stations and stops[8].

Buses free up street space
Buses can move 70 people in the same amount of space taken up by about three cars. Many trips that people make by car, which they may not want to make by foot or cycle, can be switched to the bus. This frees up street space and reduces the dominance of motor vehicles that can make streets unpleasant and discourage active travel.

Buses can reduce road danger
Buses help to reduce traffic[9] and therefore make streets safer and easier to cross. They are also safer for their occupants than cars and are becoming increasingly safe for all road users. Vision Zero is setting the goal of reducing the number of people killed in, or by, London buses to zero by 2030.

Buses support local vitality
Buses provide essential local transport links, getting people to high streets and town centres and supporting local economic vitality. They can also reduce traffic levels and congestion in and around town centres, which can blight the experience of spending time in these areas. Allowing buses access to places that are not open to cars, and providing well-designed stations, interchanges and stops, creates more people-friendly environments where people want to stop and spend time.

Buses are accessible
For older and disabled people, and those travelling with young children, buses offer an accessible form of transport. Buses are also one of the city's most affordable public transport options and, for many, they are the easiest choice. Buses are relied upon by a wide range of Londoners as their main form of transport, allowing them to get to places they might otherwise not be able to reach. For some, buses are the only way to get around London, making addressing issues such as reliability and ease of travel essential.

Clean buses provide an alternative to polluting private vehicles
London's buses are rapidly becoming cleaner and quieter, and increasingly offer a more environmentally friendly way of travelling around London. Low Emission Bus Zones will combine cleaner buses with improved bus priority to further enhance the 'green' credentials of London's buses.



8 London Travel Demand Survey (LTDS) 2013/14-2015/16, TfL analysis

9 1.125 million bus trips are made every day in London by people who live in car-owning households. This corresponds to 39 per cent of all bus trips made by London residents (2.88 million bus trips). Source: LTDS 2013/14-2015/16

Vision Zero for road danger

The aim of Vision Zero is the elimination of all deaths and serious injuries on London's transport system.

Minimising road danger is fundamental to the creation of streets where everyone feels safe walking, cycling and using public transport. Road danger disproportionately affects people travelling on foot, by cycle or by motorcycle, with 80 per cent of all those killed or seriously injured on London's roads travelling by these modes. Safety concerns are the main reasons people give for not cycling more, and for being unwilling to let their children walk unaccompanied.

Adopting Vision Zero will be central to the overall success of the Healthy Streets Approach, working towards the elimination of road traffic deaths and serious injuries by reducing the dominance of motor vehicles on London's streets.

Policy 3
The Mayor, through TfL and the boroughs, and working with stakeholders, will adopt Vision Zero for road danger in London. 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.

Vision Zero for road danger means ensuring the street environment incorporates safe speeds, safe behaviour, safe street design and safe vehicles to target road danger at its source. It means reducing the dominance of motor vehicles on streets, and then making the remaining essential motorised journeys as safe as possible. With Vision Zero, road danger reduction will be considered integral to all the schemes delivered on London's streets. The proposed pace of progress is set out by the short-, medium- and long-term targets[10] below:

- 2022 – reduce the number of people who are killed or seriously injured by 65 per cent against 2005-09 levels
- 2030 – reduce the number of people who are killed or seriously injured by 70 per cent against 2010-14 levels
- 2041 – eliminate all deaths and serious injuries from road collisions from London's streets

In addition, interim targets have been set for buses, recognising that these are the vehicles over which the Mayor, through TfL, has the greatest control:

- 2022 – reduce the number of people who are killed or seriously injured in, or by, London buses by 70 per cent against 2005-09 levels
- 2030 – reduce the number of people killed in, or by, London buses to zero

To achieve this, efforts to reduce the danger posed by motor vehicle journeys will be focused in five areas:

- Safe speeds – lowering speeds is fundamental to reducing road danger because a person is five times less likely to be fatally injured if hit at 20mph than at 30mph
- Safe street design – ensuring all transport infrastructure projects in London contribute to reducing road danger; attention will focus particularly on areas of highest risk such as busy junctions and roundabouts
- Safe vehicles – making sure those vehicles that need to use London's streets are as safe as possible
- Safe behaviour – improving the behaviour of all road users, especially drivers of motorised vehicles and, in particular, drivers of large vehicles that can do the most harm, will help make the city a safer place and encourage more people to walk and cycle
- Post collision – reducing the severity of injuries when a collision occurs through timely emergency responses, supporting victims of road crime and holding those responsible to account, and developing a clearer picture of how and why collisions occur

10 Targets are provisional, being subject to improvements being made to the way road safety data is collected

Proposal 9
The Mayor, through TfL, the boroughs and policing and enforcement partners, will seek to reduce danger posed by vehicles by:

a) Introducing lower speed limits and improving compliance with speed limits through design, enforcement, technology, information and appropriate training. Twenty miles per hour limits will continue to be implemented on London's streets, with 20mph considered as part of all new schemes on the Transport for London Road Network. TfL will look to implement 20mph limits on its streets in central London as a priority, with implementation being widened across inner and outer London as soon as is practicably possible. TfL will work with the boroughs to implement lower speed limits on their streets, prioritising designs that are self-enforcing and that do not place an additional burden on policing partners. TfL will provide data analysis, training and technical guidance to support this.

b) Conducting a systematic review of all road junctions, introducing road danger reduction measures at locations that pose significant risk to vulnerable road users.

c) Working to ensure that vehicles driven on London's streets adhere to the highest safety standards, starting with a new Direct Vision Standard for HGVs and including the introduction of new vehicle technologies such as Intelligent Speed Assistance and Automatic Emergency Braking. TfL will develop a new Bus Safety Standard which will be introduced across the city's entire bus fleet featuring design and technological measures to protect passengers and other road users.

d) Delivering a programme of training, education and (working with the police) enforcement activities to improve the safety of vulnerable road users, including the delivery of improved and new training for motorcyclists and working with stakeholders, including the freight industry, to improve standards of professional driving.

e) Working with stakeholders to improve the emergency response to collisions, support victims of road crime, improve accountability and transparency, and learn from collisions.

While seeking to reduce the number of deaths and injuries is the first priority, in tragic cases, those responsible must face serious consequences. There is little transparency around the sentencing of people involved in collisions currently. The Mayor's Office for Policing and Crime (MOPAC) has committed to addressing this with the publication of a joint Metropolitan Police Service (MPS)/TfL annual report of road traffic enforcement in London. MOPAC will also work with the Crown Prosecution Service and the Courts Service to collate and publish information about fatal and serious injuries.

Proposal 10
The Mayor, through TfL and the boroughs, will collaboratively set out a programme to achieve the Vision Zero aim of reducing the number of people killed or seriously injured on London's streets to zero. A joint police/TfL report will provide annual updates on progress.

'Lowering speeds is fundamental to reducing road danger because a person is five times less likely to be fatally injured if hit at 20mph than at 30mph.'

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FOCUS ON: MOTORCYCLING SAFETY

Adopting the Healthy Streets Approach means reducing reliance on private vehicles for personal travel, including motorcycles, by providing Londoners with more opportunities for walking, cycling and using public transport.

Two-wheeled vehicles could, however, play a more significant role in low-impact freight and servicing trips, especially where these vehicles replace trips by lorry or van and are made by ultra low emission motorcycle.

Where motorcycle journeys are necessary, they should be safe. Motorcyclists are disproportionately represented in fatal and serious injury collisions: 540 motorcyclists were killed or seriously injured in 2015[11], representing 26 per cent of all those killed or seriously injured on London's streets, despite representing only 2 per cent of traffic. Of even greater concern is the rise in the number of these collisions (up by 3 per cent from 2014 to 2015), while the number of those involving other vulnerable road users reduced. Adopting Vision Zero for road danger will include specific actions to make motorcycle journeys safer.

11 Figures for the number of serious injuries during 2016 are not currently directly comparable with previous years as a result of improved reporting of injury severity by police. TfL is working with the DfT on a method to allow comparisons to be made with previous years

Proposal 11

The Mayor, through TfL, the boroughs, police and stakeholders, will seek to improve motorcycle safety by:

a) Improving the safety of street design by following the guidance set out in TfL's Urban Motorcycle Design Handbook.

b) Improving the quality of motorcycle safety training beyond the minimum required by law. A range of improved and new measures will involve:

- improving the standard of motorcycle training in London by encouraging training providers to become accredited through the Motorcycle Industry Association
- improving rider skills (particularly those of young riders) by promoting a suite of voluntary training courses including BikeSafe-London, ScooterSafe-London, 121 Motorcycle Skills and through the introduction of a pre-Compulsory Basic Training theory app
- raising the safety standards of motorcycle courier businesses through training and accreditation

c) Calling on all boroughs to allow motorcycle access to their bus lanes, to end the inconsistency between highway authorities that causes unnecessary confusion and risk to motorcyclists.

d) Educating other road users on the shared responsibility for safer motorcycle journeys, through communications and the promotion of driver skills training.

e) Supporting the police in targeting illegal and non-compliant behaviour that puts motorcyclists at risk, using data to focus on the streets with a higher risk of motorcyclist collisions.

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FOCUS ON: IMPROVING PERSONAL SAFETY AND SECURITY

People should feel safe and secure moving around London at any time of the day or night. Better street lighting, well-designed and well-maintained public spaces and transport infrastructure, and CCTV coverage will help to achieve this. If streets and public transport do not feel safe to use, then people are more likely to take other options, including taking more car trips.

Policy 4
The Mayor, through TfL and the police, will seek to ensure that crime and the fear of crime remain low on London's streets and transport system through designing secure environments and by providing dedicated specialist and integrated policing for London's transport system.

'High-harm offences', such as sexual offences and hate crime, can have a marked impact on some Londoners, including on their confidence to travel. Tackling these crimes must continue to be a priority for TfL, transport operators and transport policing agencies. As part of this, the Mayor's Night Czar is developing a Women's Night Safety Charter.

Every day, vulnerable adults and children travel on London's transport system, and while it can sometimes be a daunting and challenging place, many use the network because of the safety and security it can provide. Some of London's rough sleepers seek refuge on the transport system and it is a common occurrence for frontline staff to intervene and provide valuable assistance to them, often putting them in contact with the appropriate outreach team or support service and, in some cases, the police. Whatever the circumstance or reason why a vulnerable adult or child might find themselves on the network, everyone who works on it has a critical safeguarding role to play.

Proposal 12
The Mayor, through TfL and working with other transport providers, police, local authorities and other partners, will:

a) Prioritise the tackling of 'high-harm' crimes, such as sexual offences and hate crime, on London's streets and public transport system in order to protect and offer reassurance to those who feel most vulnerable when travelling in London.

b) Improve the safeguarding response to protect vulnerable adults and children using the transport network in London. This includes building on the work already under way to tackle rough sleeping on the transport network, linking in to the appropriate support services.

'People should feel safe and secure moving around London at any time of the day or night.'

FOCUS ON: IMPROVING PERSONAL SAFETY AND SECURITY (continued)

The theft of motorcycles has doubled over the last five years[12]. Efforts are already under way in the MPS to tackle those organised criminal gangs engaged in motorcycle-enabled crime, most of which is carried out using mopeds. This addresses both the problem of stolen motorcycles, and also the criminals who use motorcycles to snatch phones, for example, from people walking or cycling, so undermining confidence to walk/cycle the streets.

Proposal 13
The Mayor, working with the police and local authorities, will take action to reverse the rise in motorcycle theft and motorcycle-enabled crime, especially that carried out using mopeds. Measures could include improving security by designing out crime, such as through the provision of secure parking both on street and in developments; targeted crime prevention messaging; and working with manufacturers to reduce the risk of theft. The police will maintain their focus on disrupting the criminal gangs involved in motorcycle theft and enabled crime.

London continues to face a number of external threats from terrorism, and the proportion of citizens who say that fear of a terrorist attack deters them from using or increasing their use of public transport remains a cause for concern[13]. Security services consider terrorism to be a long-term threat to London, so the city and the way its public spaces are planned should be adapted to prevent, protect against and deter future attacks.

The perpetrators of recent attacks have taken advantage of the dangers posed by motor vehicles, using them as weapons in crowded public places. Physically blocking vehicle access to some public spaces can help to prevent attacks, and hostile vehicle mitigation measures can be used to protect selected locations, deter potential attackers and provide reassurance to the public. These measures must be applied using the Healthy Streets Approach, enhancing the public realm to create spaces where people feel safe and want to walk, cycle and spend time.

Proposal 14
The Mayor, through TfL, will work with Government, the boroughs, law enforcement and security agencies, transport providers and other relevant organisations to respond to, and counter, current and future terrorist threats to London. Together, these organisations will develop an approach to protecting public spaces in identified sites across London that is proportionate to the risk. This could include removing traffic from some public spaces and, where appropriate, the use of hostile vehicle mitigation in a way that supports the Healthy Streets Approach and maintains the character and appeal of public places.



12 Metropolitan Police Service crime recording information system, March 2017

13 Safety and security annual report 2015, Future Thinking, tfl.gov.uk, June 2016

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b) Making more efficient use of the street network

Tackling congestion

London's streets are some of the most congested in the world, worsening air pollution, delaying vital bus services and freight, and making too many streets unpleasant places for walking and cycling. Lifestyle changes, increasing use of internet deliveries, Sunday shopping and a rapidly growing night-time economy, have caused changes in travel and congestion patterns in recent years. The congestion problem is not confined to the traditional morning and evening peaks, or just to central London – it affects neighbourhoods and town centres across London (Figure 5).

Action is needed to reduce the negative impact of congestion on the city. Advanced traffic management techniques are already used extensively to manage the streets more efficiently, and it is essential that these traffic control systems continue to be improved to ensure better outcomes for all road users, prioritising people who are walking, cycling and using buses.

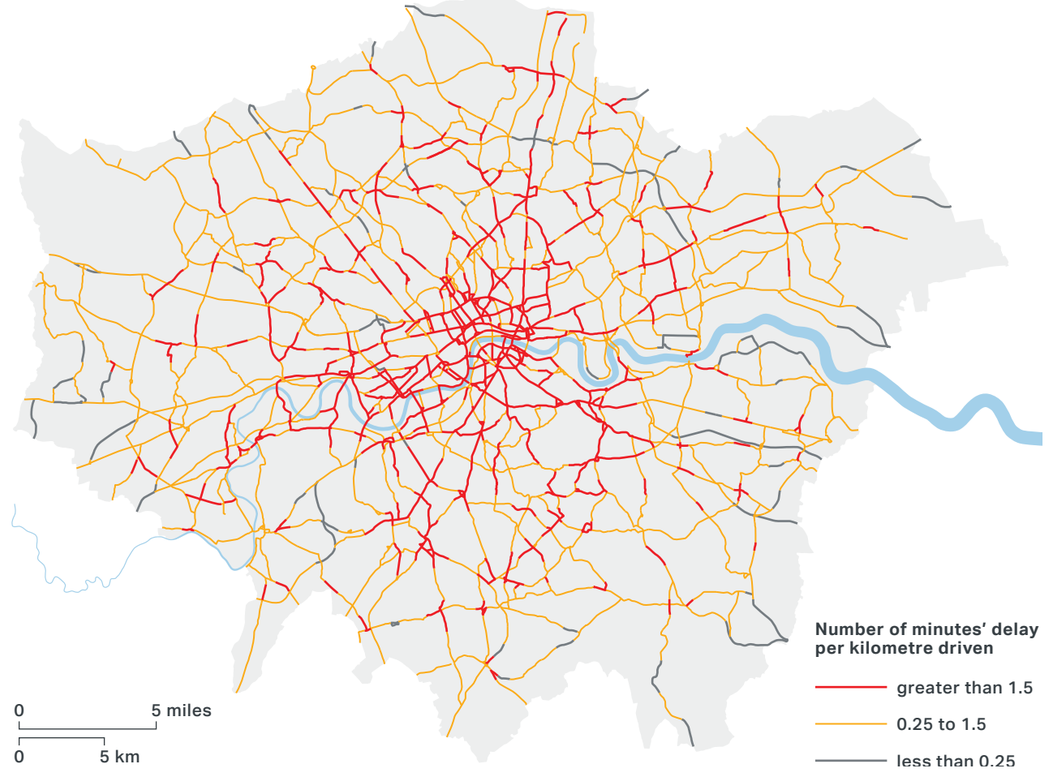
However, 75 per cent of congestion is caused simply by there being too great a demand for limited street space. This congestion cannot be solved through traffic management alone, however advanced. The longer-term solution must therefore be to better manage the way in which goods are delivered in London and to significantly reduce car use in favour of more space-efficient means of travel. A reduction in traffic of about 10-15 per cent (6-7 million kilometres per day) by 2041 is required to keep congestion in check, while also achieving the aims of this strategy. Over time, reallocating space to more efficient modes, combined with improvements to public transport, measures to manage demand, and applying the principles of Good Growth for new development, will create streets that function better not only for people who are walking, cycling and using public transport, but also for taxis and essential delivery, servicing, car and motorcycle journeys.

Policy 5

The Mayor, through TfL and the boroughs, and working with stakeholders, will prioritise space-efficient modes of transport to tackle congestion and improve the efficiency of streets for the movement of people and goods, with the aim of reducing overall traffic levels by 10-15 per cent by 2041.

Congestion has different causes and impacts in different parts of the city and so the approach to dealing with it must vary across London. In central London, where congestion is worst, constrained street space and rising levels of freight and private hire traffic are the main issues to be tackled. In outer London, car use is the main cause of congestion, and although levels of delay are lower, the overall impact is far greater as there are more people travelling longer distances by car than in other parts of London. Addressing congestion in outer London will require large numbers of trips currently made by car to be shifted to public transport, cycling or walking.

FIGURE 5: JOURNEY DELAYS ACROSS LONDON





Efficiency of deliveries and servicing

Streets and freight vehicles

London's continued success relies on safe, reliable, sustainable and efficient goods delivery and servicing. It is vital that freight and servicing trips are accommodated properly on London's streets, with adequate loading space and minimal congestion. However, London's streets can often be dominated by large numbers of vans and lorries providing similar goods and services to neighbouring businesses, contributing to congestion and making streets less safe and less pleasant for people walking, cycling and using public transport.

The impacts of freight and servicing are felt on London's streets in many ways. Both when loading and when moving, freight vehicles take up large amounts of street space that could otherwise be used for walking, cycling, public transport use or as space for people to spend time in and enjoy. They make a significant contribution to congestion, and in order to provide high levels of customer service as congestion worsens, freight and servicing operators often use more and more vehicles in a less efficient way, exacerbating this problem significantly. This is in no one's interest – it eats into operators' profit margins, increases costs for customers and makes London's streets less attractive for everyone visiting, living in or working in the city.

To allow London's businesses to continue to receive the goods and services they need to flourish, while ensuring that London's streets become better places for people, all aspects of freight and servicing activity must be actively managed in an integrated way. This is particularly important in zero emission zones and in places – like Oxford Street – that will be transformed to create pedestrian areas. Strong partnership working and the involvement of the whole supply chain will be essential to help make more efficient use of London's street network.

Proposal 15

The Mayor, through TfL, will work with the boroughs, businesses and the freight and servicing industry to reduce the adverse impacts of freight and service vehicles on the street network. The Mayor aims to reduce the number of lorries and vans entering central London in the morning peak by 10 per cent by 2026.

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FIGURE 6: GREATER LONDON BOUNDARY CORDON DAILY CROSSINGS – GOODS VEHICLES: 24-HOUR FLOWS, 1971-2015*

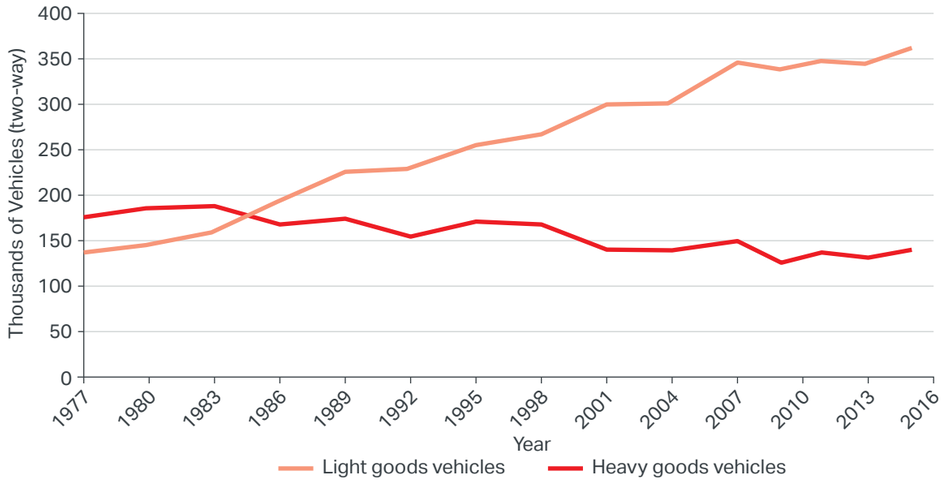
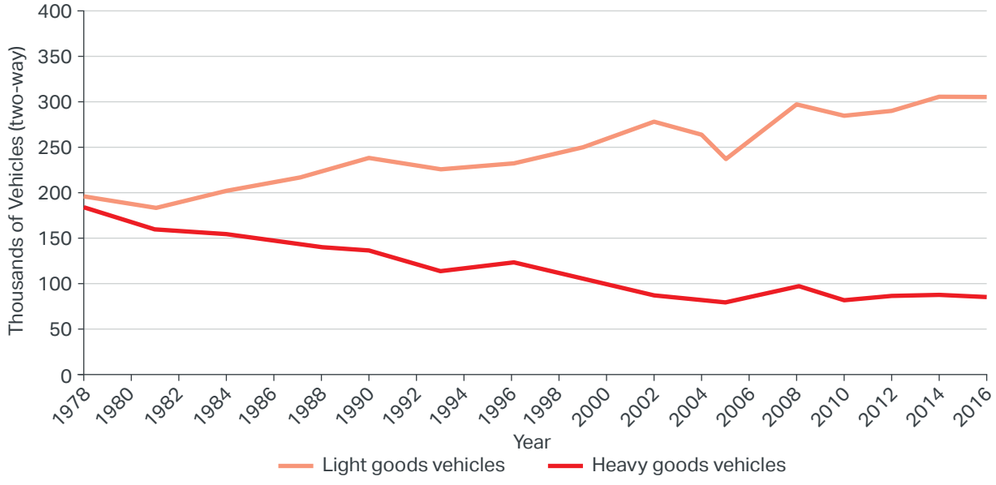


FIGURE 7: INNER LONDON CORDON DAILY CROSSINGS – GOODS VEHICLES: 24-HOUR FLOWS, 1972-2016*



* TfL Network Performance Directorate, Operational Analysis. In years where no surveys conducted, data has been extrapolated

The growth of freight traffic in London
Currently, lorries and vans account for around one fifth of road traffic in London and about one third in central London during the morning peak. As London grows, the volume of freight and servicing trips is also forecast to grow unless action is taken. This would place further pressure on street and kerb space. The majority of freight trips are made by vans – of which there are almost four for every HGV – and these have been growing since the 1970s.

Without action now, growth in the number of van trips can be expected to continue as a result of:

- Business and residential customers increasingly demanding quicker and more flexible deliveries and servicing
- The continued growth of the service sector
- Rising land values forcing logistics activities further out of town and leading businesses to reduce storage space in their premises, resulting in longer trips and more frequent deliveries
- Road congestion and limited loading facilities requiring more vehicles to deliver the same amount
- Rising costs and a shortage of HGV drivers leading to freight being moved out of HGVs into vans

To achieve this strategy's overall aim of increasing travel by active, efficient and sustainable modes of transport, action is needed to address the above challenges. This means providing a policy and regulatory framework that will ensure that freight and servicing trips are made as efficiently as possibly – using the right modes, at the right time, at the right frequency, and following the right route.

Improving the efficiency of freight networks
About 90 per cent of freight trips, and the majority of servicing trips, are carried out by road. Rail and water carry the remainder, and are particularly important for heavy and containerised goods, with about 40 per cent[14] of construction materials being brought into London by rail, for example. Shifting more freight onto these cleaner modes will enable improvements to be made against the Healthy Streets Indicators, help to reduce congestion and free up space on the road network for walking, cycling and buses.

14 Why is Rail Freight Vital for Housing and Construction?, Mineral Products Association and Rail Freight Group, 2016

Through the London Plan, the Mayor will require all new development proposals to demonstrate in their Construction Logistics Plans and Delivery and Servicing Plans that all reasonable endeavours have been taken towards the use of non-road vehicle modes. The London Plan will also safeguard wharves and railheads[15].

The Mayor will support the Port of London Authority (PLA) and the Canal and River Trust (CRT) to identify the wharves and piers that have the most potential to support the modal shift of freight from road to water. This will include ensuring that cargo-handling facilities are provided to accommodate new intermodal freight operations, such as roll-on roll-off deliveries, micro-containerisation and cargo cycles.

The Mayor, through TfL and working with Network Rail, the DfT, rail freight operating companies and port operators, will review London's strategic freight network. This will seek to identify opportunities to get more of London's freight closer to its final destination by rail and to make the most of London's rail freight opportunity, and to identify opportunities for capacity and capability enhancements where these will not impact existing and future passenger services, and where the benefits will be seen within London.

Freight and servicing trips that are made by road need to be efficient with, for example, vehicles making fewer trips to deliver the same or greater amount of goods. The Mayor, through TfL, will work with the boroughs, freight operators and London's businesses to consider the benefits of establishing regional consolidation and distribution centres in inner and outer London.

The identification and protection of new sites for load consolidation, particularly those adjacent to rail or river services, is supported by the London Plan and will be considered through the planning process. The use of these centres will be encouraged through the requirement for Construction Logistics Plans in the planning process.

Improving freight consolidation options for the construction sector will be particularly beneficial. The sector generates over one third of peak HGV trips and almost one quarter of van trips. The construction industry benefits from a number of existing construction consolidation centres. The Mayor supports the creation of further such facilities to complete a network of construction consolidation centres, enabling all of London to be within a 30-minute drive of a construction consolidation centre. This will require the support of boroughs, operators, developers and others to identify sites to complete the existing network.

Reducing the number and impact of freight and servicing trips on London's streets will require close partnership working between the freight industry, Business Improvement Districts (BIDs), individual businesses, the boroughs, London Councils, the PLA, the CRT, Network Rail and TfL, and will require action at all levels of the supply chain. The Mayor will therefore ask the Freight Forum to continue its coordination efforts to ensure freight and servicing make the most efficient use of London's street network.

Proposal 16

The Mayor, through TfL, and working with the boroughs and members of the Freight Forum, will improve the efficiency of freight and servicing trips on London's strategic transport network by:

a) Identifying opportunities for moving freight on to the rail network where this will not impact on passenger services and where the benefits will be seen within London.

b) Increasing the proportion of freight moved on London's waterways.

c) Reviewing the potential benefits of a regional freight consolidation and distribution network and completing the network of construction consolidation centres in London.

15 Chapter five sets out how efficient freight and servicing will be embedded in new development



Reducing the impact of delivery and servicing activity on central London and in town centres

Adopting the Healthy Streets Approach and delivering changes to London's streets through initiatives including Liveable Neighbourhoods and zero emission zones will require fundamental changes to the way freight and servicing trips are managed at the local level. Streets that are less traffic-dominated will still require adequate provision for delivery and servicing.

Larger businesses can significantly reduce the number of deliveries they receive by procuring their goods more efficiently in fewer, larger orders. Even greater benefits can be achieved when groups of businesses and BIDs work together to jointly procure goods and services or to form 'buying clubs'. Working with the customer end of the supply chain and the boroughs, TfL will support BIDs and other clusters of London's businesses to join together to review their buying and procurement practices and identify opportunities to use shared procurement to reduce the number of trips made to their sites.

Joint procurement practices will be complemented by establishing micro-distribution facilities from which goods can be delivered by foot, cycle or electric vehicle. In some places, these will be dedicated distribution centres, such as the one in Regent Street, but others may 'pop up' for short periods of the day in car parks, from a freight vehicle parked on the street or from a barge moored at a wharf. TfL will work with the London boroughs to give priority to micro-distribution centre vehicles such as these, as well as other zero emission freight and servicing vehicles, through local loading and access restrictions.

Many freight and servicing trips are time-critical or time-constrained, and some need to be conducted in peak time for this reason. However, at present, many trips that could be made at times where they would have less impact on streets are also made at peak times, because of out-dated or inappropriate restrictions and regulations. The Mayor will work with TfL and the London boroughs, retailers and stakeholders to better understand the barriers to delivering outside the busiest times and to make recommendations for updating and changing regulations and local restrictions.

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Starting with BIDs, the Mayor, through TfL, will also work with London's business community and public sector organisations to review the timing of their deliveries and to use their procurement power to discourage trips at the times of day when they have the greatest adverse impact on London's streets.

Thoughtful design and management of the kerbside is key when designing new streets and transforming places. As part of all street schemes, TfL, working with the boroughs, will review loading provision and ensure delivery and servicing facilities are designed in a way that allows streets to be attractive places in which to walk or cycle.

To create more vehicle-free and pedestrian areas in central London and town centres while still allowing convenient collection of personal deliveries, TfL, working with the boroughs, will encourage the use and growth of London's network of collection points. These are often located at local shops and post offices that Londoners can access on foot close to their homes or on their daily commute.

London can be a complex environment in which to provide goods and services, and it is therefore important that businesses and freight operators can access information they require easily and quickly. TfL will work with London Councils to develop an online tool, incorporating a 'London lorry standard', to make it as simple as possible for freight operators, in particular of HGVs, to contribute to reducing the impact of delivery and servicing activity and to ensure compliance with existing and future charges, regulations and standards.

Proposal 17

The Mayor, through TfL, working with the boroughs and the Freight Forum, will work with landlords and all parts of the supply chain, including the freight industry, Business Improvement Districts (BIDs) and individual businesses, to improve the efficiency of last mile deliveries and servicing. This will be achieved by:

a) Supporting BIDs and other clusters of businesses to jointly procure goods and services.

b) Establishing a network of micro-distribution services and facilities served by zero emission vehicles and walking and cycling deliveries.

c) Re-timing goods and services to the times where they will have least impact on streets.

d) Using local access and loading restrictions to support more efficient freight practices.

e) Improving the design and management of loading and servicing activities at the kerbside and off-street.

f) Developing an online tool, incorporating a 'London lorry standard', to simplify the regulatory environment for HGVs operating in London.

Over the life of the strategy, new business models and technology may enable changes to the way goods are delivered and servicing activity is undertaken in London. These changes may benefit businesses and consumers, such as through providing faster or cheaper access to goods and services. However, it is important that these changes are shaped to contribute to the Healthy Streets Approach and, in particular, help freight and servicing to use road space more efficiently and reduce its impact on other users of London's streets, including people walking and cycling. Policy 23 sets out the principles for new transport services, most of which are directly applicable to freight trips.

FOCUS ON: MAKING THE MOST OF LONDON'S RAIL NETWORK FOR FREIGHT AND PASSENGERS

Achieving the aims of this strategy requires the most to be made of London's rail network for both passengers and freight. However, as they share the same network infrastructure, careful planning is needed to make best use of rail capacity for everyone, using the following principles:

- Freight is moved at quieter times of day when demand for passenger services is lower
- Non-London freight bypasses London, on routes where more capacity is available and the demand for passenger services is lower
- The provision of additional London-bound rail freight services should not lead to a reduction in passenger services

Together, the pursuit of these principles will allow the rail capacity needed to be unlocked to accommodate growth in London-bound rail freight while improving and expanding London's passenger rail services. Specific measures that will be implemented to improve and expand passenger services are set out in Chapter four.

Currently, parts of the London Overground network are shared with freight trains. The different acceleration and speeds of passenger and freight trains reduces capacity for both services. More efficient use of the network for both passengers and freight could be made by scheduling freight services (as well as engineering and other non-passenger trains) to avoid passenger peaks, running them at quieter times (ideally at night); timetabling train paths to the second rather than rounded to minutes; and removing, or at least charging for, the booked but unused freight paths (a significant proportion of freight paths on each of the North London, South London and West London lines are unused). Rail regulatory policy should be changed to incentivise and/or enable the above.

Improvements to the rail network outside London would mean that freight trains could avoid using the London Overground network, as much of the rail freight that currently travels through London is not bound for the capital, with a large proportion of that freight being transported from the Port of Felixstowe to the Midlands and beyond. In the first instance, using the existing unfilled rail paths on the Felixstowe to Nuneaton corridor would help London. In addition, an upgrade and electrification of the Felixstowe to Nuneaton corridor would allow more freight services to avoid London. A new line linking the ports around Tilbury with the Great Eastern Main Line would allow freight traffic from the Essex Thameside route to access the Felixstowe to Nuneaton corridor without needing to pass through the city. These upgrades could release much-needed capacity and improve reliability across the London Overground network, as well as providing more room to move London-bound road freight onto rail, and thereby releasing freight capacity for London's major infrastructure projects.

Proposal 18
The Mayor, through TfL, will work to encourage the DfT and Network Rail to upgrade rail freight routes outside London so that non-London rail freight can be taken around London, thereby freeing up rail paths through the capital for additional passenger services and freight trains that serve London.



‘Changing the way Londoners pay for using private vehicles on London’s roads could help significantly to reduce congestion and emissions.’

Reducing car use

London has made real progress in encouraging people to walk, cycle and use public transport, but across London, cars still make up by far the bulk of road vehicles. Any strategy to make more efficient use of street space must therefore address car use.

Cars are a relatively inefficient means of moving people around. Cars, taxis and PHVs take up nearly half of all the street space in central London, but account for just 13 per cent of the distance travelled. In comparison, buses and coaches take up less than 10 per cent of the street space but account for nearly 40 per cent of distance travelled.

The space currently taken up by cars will need to be used more efficiently, particularly as the city grows towards 10.8 million residents by 2041. To achieve a meaningful switch in travel habits away from car use, London will need a wide-ranging approach to ensure there are the right alternatives to enable people to get around.

Where cars are still required for certain types of trips, alternative models of car use can be used to reduce the need for car ownership and private parking.

Proposal 19

The Mayor, through TfL and the boroughs, will support the provision of car clubs for residents when paired with a reduction in the availability of private parking, to enable more Londoners to give up their cars while allowing for infrequent car travel in inner and outer London.

Changing the way we pay for roads

Changing the way Londoners pay for using private vehicles on London’s roads could help significantly to reduce the congestion and emissions associated with car dependency and inefficient freight and servicing trips.

When the Congestion Charge was introduced in 2003, it was very effective in reducing traffic levels and congestion in the Congestion Charge zone (CCZ). The immediate impact was a 30 per cent reduction in congestion and 15 per cent less circulating traffic. Traffic in central London has continued to decline by a small amount each year, reflecting improved public transport and increasing public transport use for travel across London. Over time, congestion for this smaller number of vehicles has increased although, without the Congestion Charge, congestion in central London would be far worse than it is now.

Fifteen years after the introduction of the Congestion Charge, the challenge facing central London has changed. The bustling night-time economy and cultural scene mean that more people than ever wish to enjoy all that London has to offer in the evening, when traffic levels are at their highest. Weekend traffic levels are now similar to those of weekdays. Figures 8 and 9 show traffic levels across the average weekday, and at weekends, in the CCZ, respectively.

FIGURE 8: CCZ TRAFFIC LEVELS BY HALF HOUR, WEEKDAYS (MON-FRI AVERAGE, 2015)

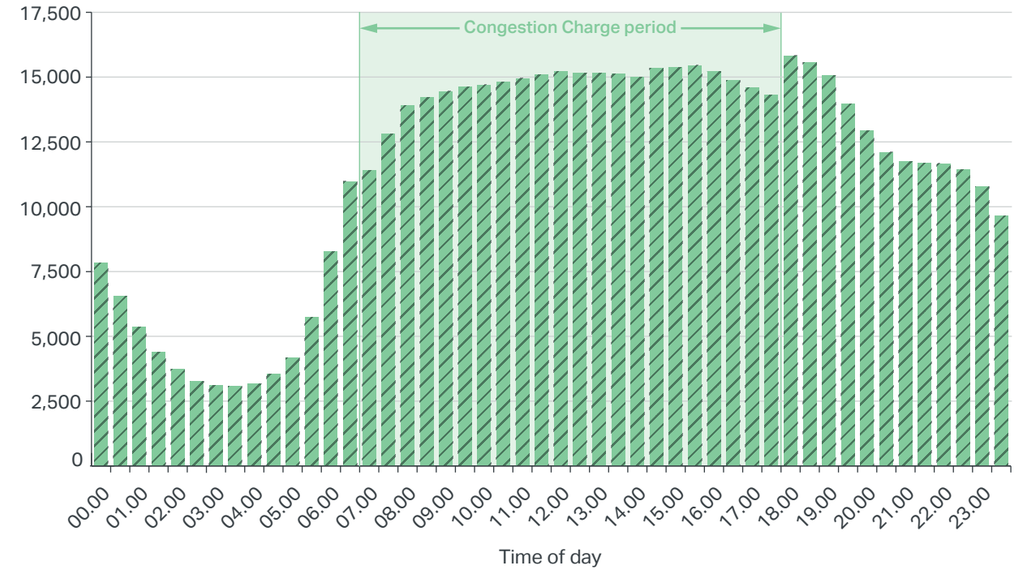
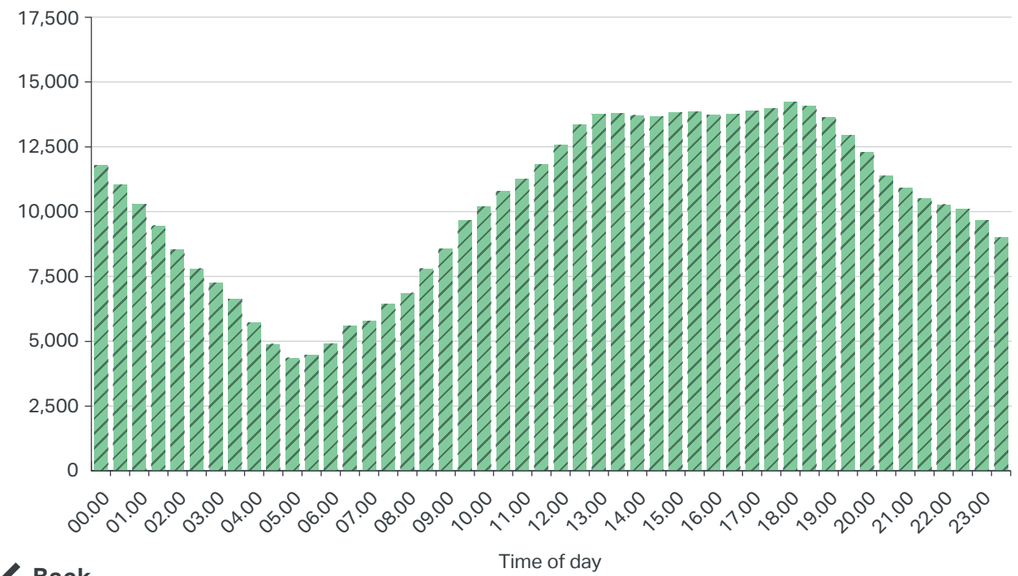


FIGURE 9: CCZ TRAFFIC LEVELS BY HALF HOUR, WEEKENDS (SAT-SUN AVERAGE, 2015)



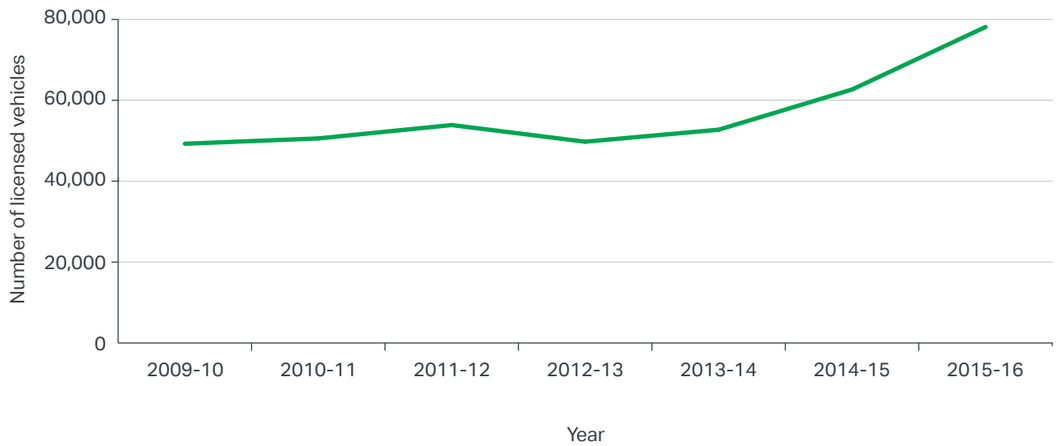
Furthermore, the proportion of vehicles in the zone that are subject to the charge continues to reduce, as falling numbers of private cars are counterbalanced by increasing numbers of licensed PHVs, which are exempt from the charge.

In recent years, central London has seen a substantial increase in the number of PHVs, which was not envisaged when the exemption from the Congestion Charge for PHVs was created. More than 18,000 different PHV vehicles now enter the CCZ each day in charging hours. PHV activity in the zone is particularly high on Fridays and Saturdays: since 2013, the total number of PHV entries into the zone during charging hours on a Friday has increased by more than 50 per cent.

It is important therefore to continue to keep the Congestion Charge scheme under review to make sure it is fit to tackle the congestion challenge now faced in central London, along with wider measures to ensure the streets work in the best way for people who are walking, cycling and using buses, as well as for freight and servicing trips.

In addition to the Congestion Charge, the Mayor is currently responsible for a number of other existing and planned charging schemes, including emissions charges and charges for new infrastructure (e.g. Silvertown Tunnel). While these existing and future charging schemes are designed to achieve different objectives, an integrated

FIGURE 10: NUMBER OF PRIVATE HIRE VEHICLES LICENSED BY YEAR, 2009-10 TO 2015-16



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approach will be important in the future to ensure they achieve a range of Mayoral priorities and the ambitious vision set out in Chapter two of this strategy, in a fair and balanced way.

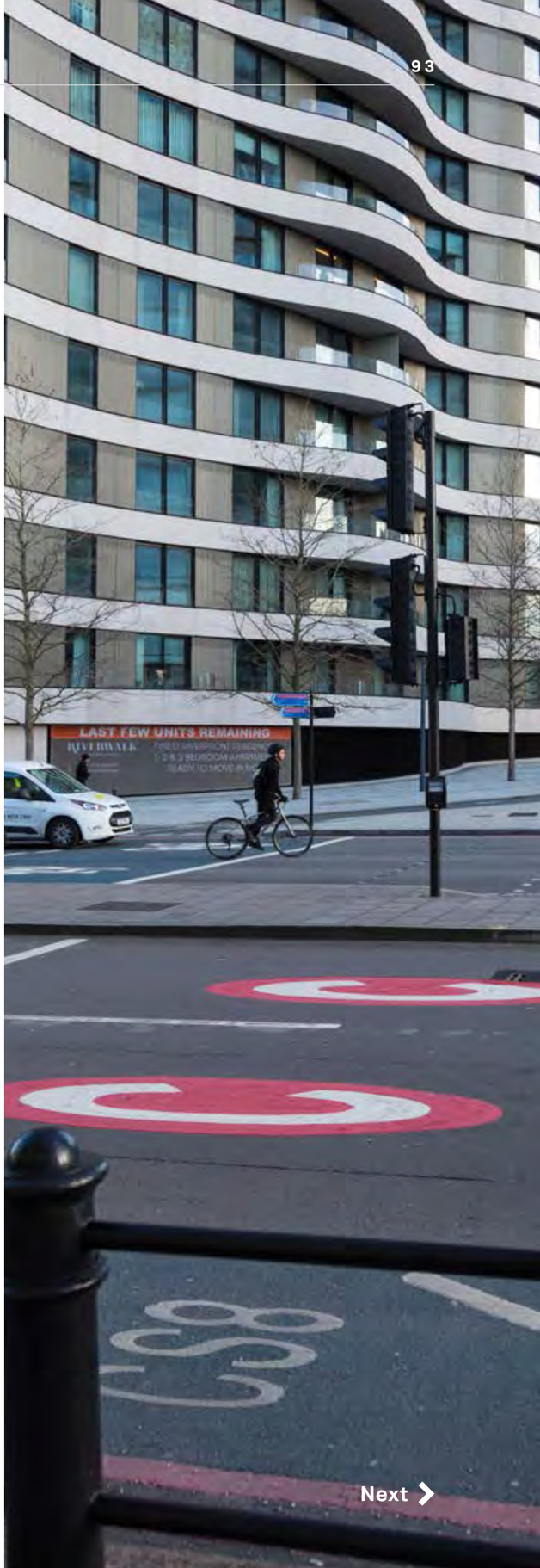
Proposal 20
The Mayor, through TfL, will keep existing and planned road user charging schemes, including the Congestion Charge, Low Emission Zone, Ultra Low Emission Zone and the Silvertown Tunnel schemes, under review to ensure they prove effective in furthering or delivering the policies and proposals of this strategy.

Beyond the centre, some parts of inner and outer London suffer from similar levels of congestion to central London. While the rate of congestion is highest in central London (both today and in the future), it affects the most people in outer London, where more car journeys are made, with the journeys tending to be longer. It will therefore be important to reduce demand for car travel beyond central London.

In the longer term, a different model for the way Londoners pay for their roads may be needed in order to meet the aim of an 80 per cent active, efficient and sustainable mode share. The world has moved on from the 1990s when the Congestion Charge was conceived and a camera-based system was the best way to administer the scheme. In a rapidly changing technological context, it is worth considering whether road use by motorised vehicles should be paid for in a way that better accounts for the impact and context of individual journeys. This would mean that some journeys would cost more (at busier times of day or in more congested areas or in more polluting vehicles), while others would cost less (shorter journeys in low emission vehicles in quieter areas outside peak hours). An integrated 'per mile' charge could replace pre-existing schemes (Congestion Charge, Low Emission Zone, Ultra Low Emission Zone (ULEZ), Silvertown charge) with a single, unified scheme which takes into account both congestion and emissions objectives. Any such scheme would consider the likely impact on health, the economy, the environment, safety, fairness and social inclusion to deliver balanced outcomes for Londoners.

With the introduction of the Congestion Charge, London led the world, and it can again show the way forward by harnessing new technology to develop fair and sophisticated ways of charging for car use and managing the impact of journeys to tackle congestion and emissions. This will make sure that London is a world-class, attractive, healthy city in which to live and work, as well as to visit.

Proposal 21
The Mayor, through TfL, will investigate proposals for the next generation of road user charging systems. These could replace schemes such as the Congestion Charge, Low Emission Zone and Ultra Low Emission Zone. More sophisticated road user charging and/or workplace parking levy schemes could be used to contribute to the achievement of the policies and proposals in this strategy, including mode share, road danger reduction and environmental objectives, and to help reduce congestion on the road network and support efficient traffic movement. In doing so, the Mayor will consider the appropriate technology for any future schemes, and the potential for a future scheme that reflects distance, time, emissions, road danger and other factors in an integrated way. TfL will develop the design, operation and technical elements of these proposals in consultation with road users and stakeholders.



FOCUS ON: OPPORTUNITY TO REDUCE CAR USE

FIGURE 11A: VOLUME OF CAR TRIPS THAT COULD BE MADE BY WALKING, CYCLING AND PUBLIC TRANSPORT

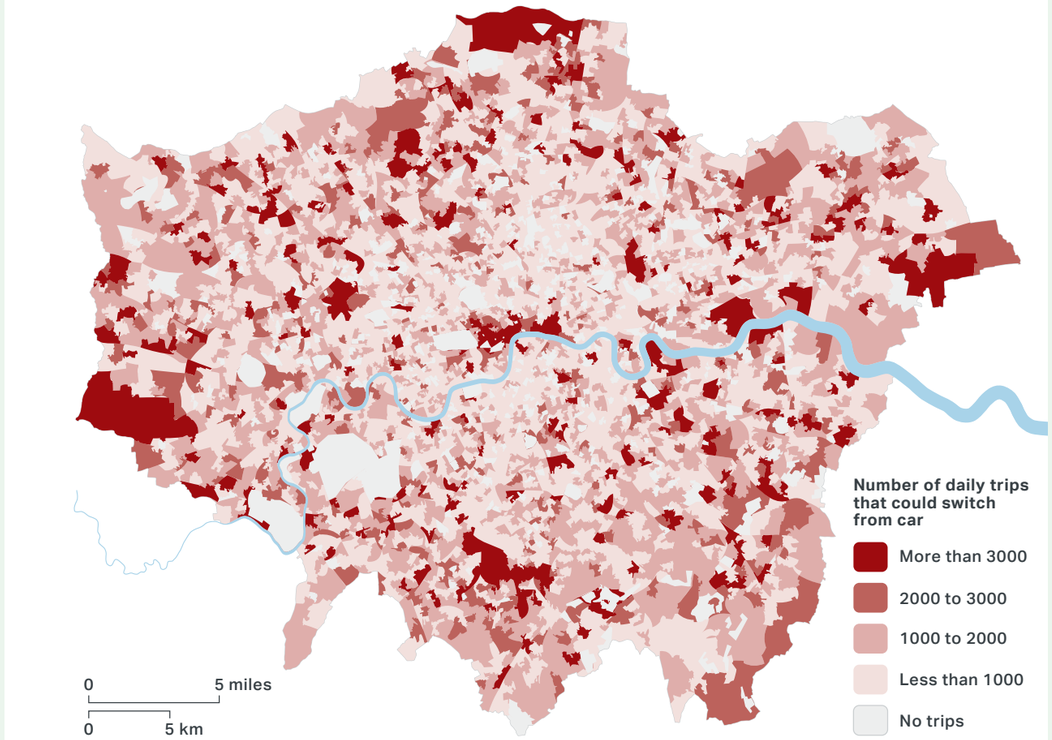
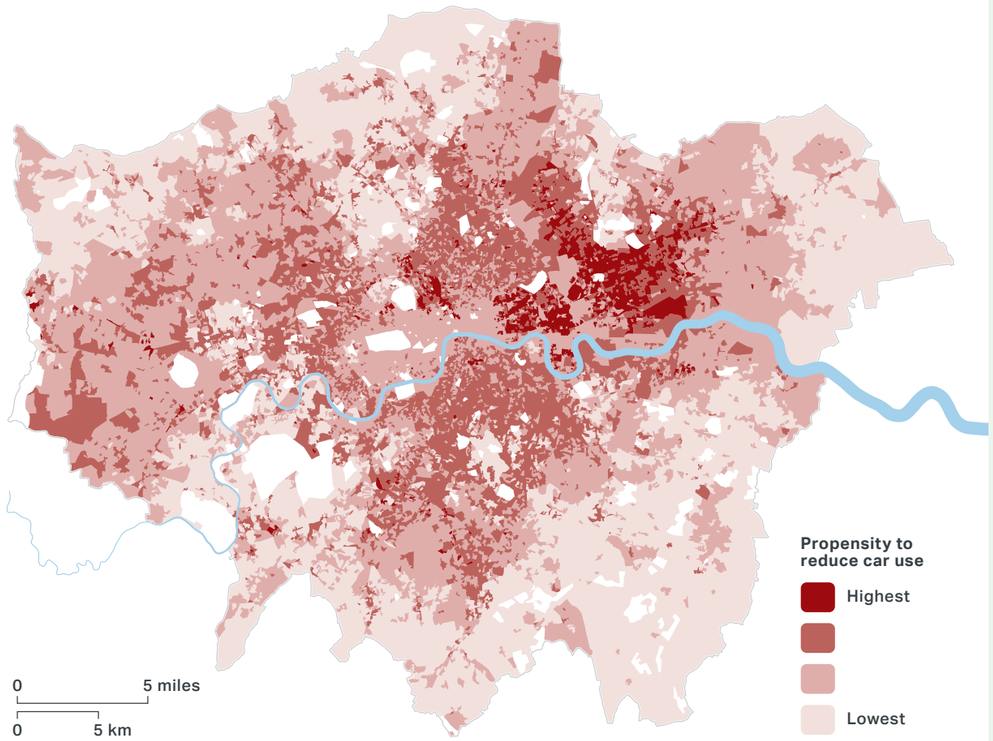


FIGURE 11B: LONDON RESIDENTS' WILLINGNESS TO REDUCE THEIR CAR USE



TfL's analysis[16] suggests that three quarters of journeys currently made by car could reasonably be made on foot, by bicycle or by public transport, and that there is the potential to reduce car use in all areas of London. People making shorter car journeys are most likely to have an alternative option available to them, with short car trips particularly prevalent in outer London.

The characteristics of the places people live in have a big impact on their inclination to change their habits. People living in more densely populated areas are more likely to change their travel behaviour, so as London's growth increases population density, more and more people could choose to switch from the car to other modes. Research also shows that there are already people across London who would be willing to use cars less if there were better alternatives available. This means that, to reduce car use, it is necessary to improve conditions for walking, cycling and using public transport.

16 Transport Classification of Londoners – presenting the segments, Travel in London supplementary report, Transport for London, tfl.gov.uk, February 2017

Borough traffic reduction strategies

Different approaches to reducing vehicle demand might be needed in different parts of London. London's boroughs play a crucial role in its transport system, owning and managing 95 per cent of the capital's streets. Borough policy and highway teams play a vital part in reducing traffic demand and managing congestion locally, and TfL will continue to work closely with them to deliver improvements to their streets and spaces and manage traffic demand locally, while ensuring wider objectives are met.

Proposal 22

The Mayor, through TfL, will support borough traffic-reduction strategies, including through the Local Implementation Plan funding process, where they are consistent with the policies and proposals set out in this strategy.

London boroughs will need to think radically about the role of demand management measures so as to tackle local traffic and transport challenges and improve local places. TfL will offer boroughs support, including for the development and administration of demand management schemes. TfL will work with boroughs to ensure these schemes are co-ordinated across London to increase their effectiveness and reduce costs.

Proposal 23

The Mayor, through TfL, will work with those boroughs who wish to develop and implement appropriate traffic demand management measures, for example local (TfL or borough) road user charging or workplace parking levy schemes, as part of traffic reduction strategies where they are consistent with the policies and proposals set out in this strategy.



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FOCUS ON: BOROUGH TRAFFIC REDUCTION STRATEGIES

Traffic reduction strategies should be developed at a borough level as part of Local Implementation Plans, with the aim of reducing car and freight traffic levels across London. This means providing alternatives to car use, discouraging unnecessary trips, looking at how street space is used most efficiently, supporting car-free lifestyles and taking action to reduce and re-time freight trips. The approach taken will differ across the city depending on whether a borough is in central, inner or outer London and will also take into account local needs and aspirations. Overall policies and proposals for traffic reduction are set out in this strategy, and more detail on how they should be applied by boroughs will be provided in the Mayor's LIP Guidance.

Improving the effectiveness, sustainability and reliability of alternatives to the car
Alternatives to car use should be improved to ensure they are effective, reliable and attractive. This means enhancing walking and cycling environments, integrating green infrastructure to improve the experience of being on London's streets, improving on-street wayfinding and providing more secure cycle parking. New and improved bus priority measures could be considered to improve the reliability and experience of using local buses. Renewed approaches to workplace and school travel planning can also encourage people to make different choices about how they travel. Establishing micro-distribution centres will enable deliveries to be made by foot or 'cargo cycle'.

Discouraging unnecessary journeys by car and freight
A look at new ways to discourage non-essential car and freight trips, especially shorter trips, is needed. Local road user charges or workplace parking levies could be considered by local authorities. Parking policy changes, such as introducing or extending controlled parking zones, or incentives to residents to give up parking spaces could also help discourage car use. Higher parking charges for the most polluting cars could additionally help encourage the use of cleaner vehicles. Reducing and retiming freight through joint procurement could help take non-essential trips off the streets, or move them outside peak times, as could encouraging more delivery points for personal packages away from central areas and closer to where people live. Approached in the right way, well-planned night-time deliveries need not disturb residents, and reviewing local restrictions that prevent night-time deliveries would help to shift more trips away from the busiest times.

Road space reallocation and enabling car-free lifestyles
Using street space more efficiently to encourage more walking, cycling and public transport should be considered. This could include creating vehicle-free zones, introducing 'filtered permeability' (using physical restrictions to prevent motorised vehicles from using certain streets) or creating space for cycle parking, greening or seating. This is not about being anti-car, but about supporting Londoners in moving around the city without having to rely solely on cars. By doing so, road space can be freed up for cycling and walking and for more necessary road usage. More car-free days in central London, town centres and high streets would enable people to experience their local area from a different perspective. In inner and outer London, boroughs' support for car clubs can enable more Londoners to give up their cars when delivered as part of a wider package to reduce car use.



c) Improving air quality and the environment

Reducing harmful air pollution from road transport

Air pollution caused by carcinogenic diesel emissions, high levels of nitrogen dioxide (NO_2) and particulate matter (PM) exacerbate health conditions and shorten the lives of Londoners. The communities suffering the most from poor air quality are often the most vulnerable in society. London's transport network needs to contribute to the meeting of legal air quality levels as soon as possible and the achievement of a zero carbon city by 2050, thereby protecting the health of Londoners and demonstrating a commitment to tackling climate change.

Even with higher levels of walking, cycling and public transport use, motorised vehicles will remain a feature of London's streets. This means that there is a need for strong policies that will encourage these vehicles to be as clean and energy efficient as possible.

Road traffic is often the greatest contributor to poor air quality in places where people live and work. Diesel is the most significant source of nitrogen oxides (NO_x) emissions, which contribute to illegal levels of NO_2. The reason for this is partly because of the under-performance of some diesel vehicle emission standards over time, with significant discrepancies between official emission measurements and real-world vehicle performance in urban environments.

London does not meet legal NO_2 limits (see Figure 12), and the Mayor is committed to taking urgent action.

Policy 6

The Mayor, through TfL and the boroughs, and working with stakeholders, will take action to reduce emissions – in particular diesel emissions – from vehicles on London's streets, to improve air quality and support London reaching compliance with UK and EU legal limits as soon as possible. Measures may include retrofitting vehicles with equipment to reduce emissions, promoting electrification, road charging, the imposition of parking charges/levies, responsible procurement, the making of traffic restrictions/regulations and local actions.

The introduction of real-world testing for cars and vans into the Euro 6 European vehicle-type approval process should mean that new vehicles are far less polluting than previous models. Real-world testing has already proved this to be effective for lorries, buses and coaches. The introduction of measures that accelerate the switch to these new, cleaner vehicles is long overdue but will have a beneficial effect on air quality in London.

FIGURE 12: NO_2 LEVELS ACROSS LONDON, 2013

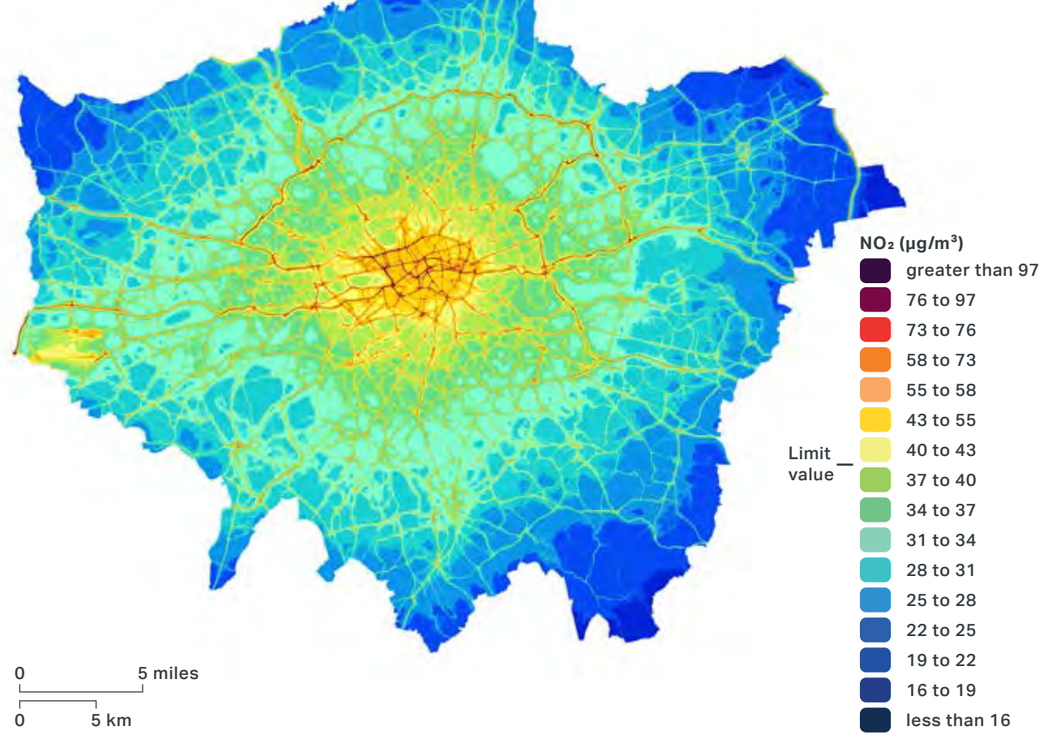


FIGURE 13: ULEZ PROPOSALS

2017

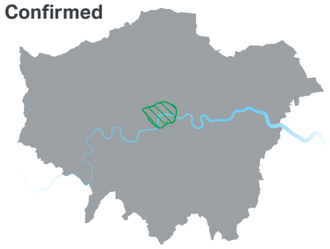


T-charge and LEZ



Vehicle class**	Min. emissions standard*** or	Daily charge
	Euro 4	£10 (CC hours only)
	Euro IV	£10 (CC hours only)
	Euro IV PM	£200
	Euro 3 PM	£100

2019 Confirmed



ULEZ replaces T-charge. Introduction of Euro 6/VI diesel standard and change in charge and hours



Vehicle class**	Min. emissions standard*** or	Daily charge
	Euro 3	£12.50
	Euro 4 petrol or Euro 6 diesel	£12.50
	Euro VI	£100
	Euro IV PM	£200
	Euro 3 PM	£100

2020 Proposal*



Euro VI standard applies London-wide for heavy vehicles



Vehicle class**	Min. emissions standard*** or	Daily charge****
	Euro 3	£12.50
	Euro 4 petrol or Euro 6 diesel	£12.50
	Euro VI Euro IV PM	£100 £300
	Euro 3 PM	£100

2021 Proposal*



ULEZ expands to inner London



Vehicle class**	Min. emissions standard*** or	Daily charge****
	Euro 3	£12.50
	Euro 4 petrol or Euro 6 diesel	£12.50
	Euro VI Euro IV PM	£100 £300
	Euro 3 PM	£100

Note: In hatched areas, standards indicated by both colours apply
*These Proposals are subject to consultation and may change
**Vehicle class is indicative only, additional vehicles are affected
***Minimum emissions standards are for NO_x and PM unless otherwise stated
****Daily charges are indicative only and are subject to change

The Mayor will further accelerate the switch to cleaner vehicles in London by introducing a Euro VI requirement London-wide for heavy vehicles (HGVs, buses, coaches and other specialist vehicles) and extending the ULEZ emission requirements from central London up to the North and South Circular Roads for light vehicles (cars, vans, minibuses, motorcycles and similar vehicles), as shown in Figure 13, so that in this inner London area all vehicles are subject to vehicle emission standards. The precise line of the boundary for the inner London ULEZ, including whether it should be based on an area within, but not including, the North and South Circular Roads, is subject to consultation.

Proposal 24
The Mayor, through TfL, will seek to introduce the central London Ultra Low Emission Zone (ULEZ) standards and charges in 2019, tighter emissions standards London-wide for heavy vehicles in 2020, and an expanded ULEZ covering inner London in 2021.

As described, a Healthy Streets Approach in inner and outer London will require a significant uplift in the number of journeys made by bus. It will be important to ensure these journeys do not lead to increased pollution. The Mayor has therefore committed to ensuring that all TfL buses meet the cleanest Euro VI standards for diesel and introducing 'Low Emission Bus Zones' within which the cleanest buses are prioritised along the most polluting routes.

Proposal 25
The Mayor, through TfL, will ensure all TfL buses meet the Euro VI diesel standards for NO_x and particulate matter by 2020 by accelerating the switch to new vehicles, installing proven retrofit technology and creating priority Low Emission Bus Zones.

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London-wide episodes of high pollution occur a few times each year – very high pollution episodes are rare. It is important that the public is kept fully informed and that London's transport network plays its part in minimising any health impact. Emergency measures targeting vehicle use may be required when high-pollution episodes are forecast to minimise even short-term exposure.

Proposal 26
The Mayor, through TfL and the boroughs, will create a comprehensive alert system to inform Londoners about air pollution episodes and, where appropriate, will implement additional emergency measures to reduce or restrict vehicle use when forecast or actual periods of very high air pollution risk have the potential to cause immediate adverse health effects.

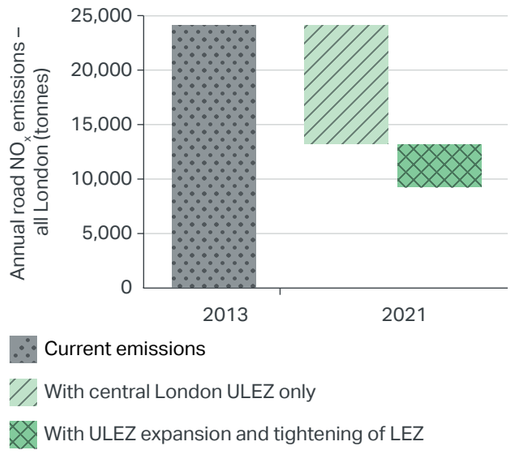
A new 'Liveable Neighbourhoods' programme of local measures will also be essential to address pollution from transport at borough level in local air quality hotspots and at sensitive locations such as schools. TfL and the boroughs will also be expected to take targeted action and fulfil their statutory duties, including using tools such as road charges, differential parking charges, street closures and vehicle restrictions, tackling engine idling, promoting efficient driving, implementing electric vehicle charging infrastructure, and supporting zero emission car clubs (where appropriate).

Proposal 27
The Mayor, through TfL and the boroughs, will tackle pollution from transport in local air quality hotspots and at sensitive locations (such as around schools) including through the Mayor's Air Quality Fund and other funding.

Achieving legal compliance with air quality limits cannot be achieved by the Mayor alone. The Government has a unique and crucial role to play in facilitating, supporting and taking action. The London Environment Strategy will set out the comprehensive plan that needs to be taken to achieve legal compliance as quickly as possible, but it is essential that Government now aligns fiscal policy with policies such as ULEZ, now being taken by London and other cities, and plays its part in taking the most polluting vehicles off the road.

Proposal 28
The Mayor proposes that Government amends fiscal incentives, including vehicle excise duty, so that only the cleanest vehicles are incentivised for purchase; and implements a national diesel vehicle scrappage fund to enable cities to take the most polluting vehicles off their streets.

FIGURE 14: REDUCTIONS IN ROAD NO_x EMISSIONS, 2013-2021



'A new 'Liveable Neighbourhoods' programme of local measures will also be essential to address pollution at borough level in local air quality hotspots and at sensitive locations such as schools.'

Achieving a zero carbon city and good air quality

Carbon dioxide (CO_2) emissions from transport are unlikely to decrease quickly enough to support the Mayor's ambition for a zero carbon city by 2050 without significant action. Likewise, although London currently meets legal limits for PM less than 2.5 microns in diameter ($PM_{2.5}$), London is still well above the level of 10µg/m^3 for $PM_{2.5}$ recommended by leading health experts. The Mayor has committed to achieving this by 2030. However, without further action, London is projected to exceed these guidelines until well after 2030.

Policy 7

The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to make London's transport network zero emission by 2050, contributing towards the creation of a zero carbon city, and also to deliver further improvements in air quality to help meet tighter air quality standards, including achieving a health-based target of 10µg/m^3 for $PM_{2.5}$ by 2030. London's streets and transport infrastructure will be transformed to enable zero emission operation, and the switch to ultra low and zero emission technologies will be supported and accelerated.

The Government's approach of incentivising the use of diesel vehicles to achieve CO_2 savings has meant that local air quality has suffered. Rather than simply seeking to reverse this 'dieselisation', air quality and climate change must be considered together. This means a clear direction towards ultra low emission vehicles (ULEVs) to avert the adverse impacts of a rush back to petrol. ULEVs include battery electric vehicles, plug-in hybrid vehicles, range-extended electric vehicles and hydrogen fuel cell electric vehicles. For heavier vehicles, alternative fuels that demonstrate clear reductions in air pollutant and CO_2 emissions will be considered as a bridging technology on the path to zero emission by 2050.

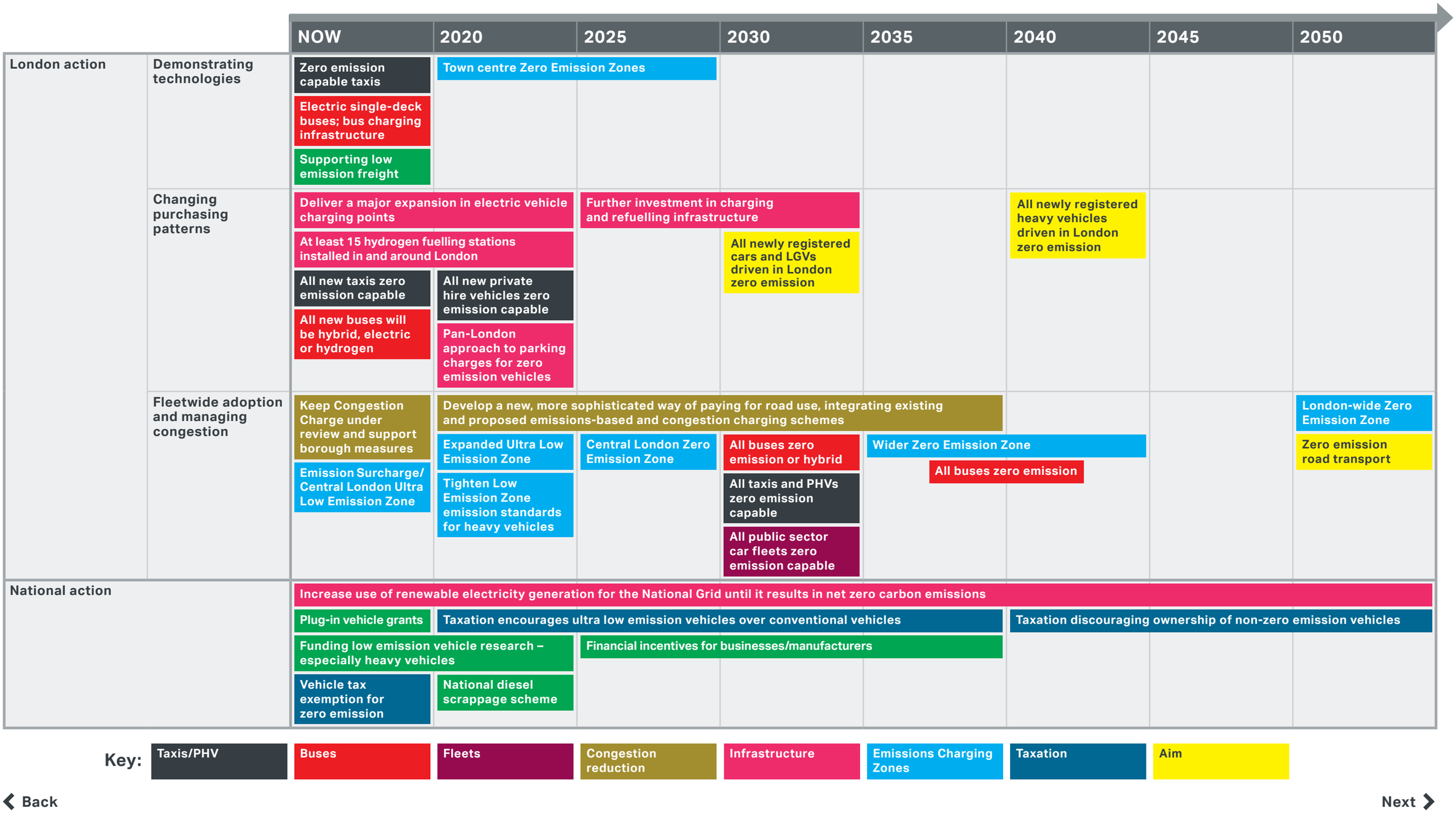
It will only be possible to bring about a zero carbon city by 2050 if all vehicles have zero exhaust emissions by that date. The Government's aim for all new cars and vans to be zero emission from 2040 is not ambitious enough, and should be accelerated to ensure that all new cars and vans are zero emission from 2030, with all new heavy vehicles (over 3.5 tonnes) being zero emission from 2040. TfL must take significant steps to achieve zero emission transport and accelerate the switch to ultra-low and zero emission technologies, with public fleets taking a lead. The actions required to reach zero emission road transport are shown in the timeline (Figure 15).



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FIGURE 15: ZERO EMISSION ROAD TRANSPORT TIMELINE



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Zero emission public transport
It is the Mayor's aim that London's public transport fleet should produce zero exhaust emissions. This means making the most of London's world-leading reputation for the switch to hybrid, electric and hydrogen technology in the bus fleet. Current analysis indicates that a fully zero emission fleet could be in place by 2037, as shown in Figure 16, however more work is needed on this issue and TfL will work with suppliers to see how this timetable can be accelerated.

Proposal 29
The Mayor, through TfL, will seek to ensure that, from 2018, all new double-deck buses will be hybrid, electric or hydrogen. In central London, all double-deck buses will be hybrid by 2019 and all single-deck buses will emit zero exhaust emissions by 2020. The aim is for the whole TfL bus fleet to emit zero exhaust emissions as soon as practicable, and by 2037 at the latest.

For too long, the taxi trade has been restricted to heavy diesel vehicles. The Mayor is determined to establish London's taxi fleet as the greenest in the world and to phase out diesel by requiring all newly licensed taxis to be Zero Emission Capable (ZEC) from 2018.

Proposal 30
The Mayor, through TfL, will work with stakeholders to produce and implement a comprehensive plan to encourage and accelerate the transition from diesel-powered taxis to Zero Emission Capable vehicles by providing financial incentives, the necessary infrastructure and regulation (including maintaining a taxi age limit, currently set at 15 years) with the objective of achieving a minimum of 9,000 such vehicles in the fleet by 2020.

Furthermore, the recent sharp increase in private hire vehicles (see Figure 10) has created a pressing need for this sector to reduce its emissions, through transitioning to ZEC vehicles.

Proposal 31
The Mayor, through TfL, will require all newly licensed private hire vehicles (PHVs) to meet continually improving minimum emission standards. Currently, there is a ten-year age limit for PHVs, all new PHVs younger than 18 months need to be Zero Emission Capable (ZEC) from 2020, and PHVs older than 18 months at time of first registration will have to be ZEC from 2023.

FIGURE 16: CLEANING THE BUS FLEET

	NOW	2020	2025	2030	2035	2037
Bus procurement and retrofit	Retrofit of existing double decks to Euro VI standards TfL will buy only hybrid double decks	TfL will buy only electric or hydrogen single decks	TfL will buy only electric or hydrogen double decks			
Bus fleet in central London		All single decks electric or hydrogen				All TfL buses electric or hydrogen
Bus fleet in central London		All double decks Euro VI and hybrid			80% of double decks electric or hydrogen	
Bus fleet in inner and outer London			50% of single decks electric or hydrogen	90% of single decks electric or hydrogen	All single decks electric or hydrogen	
Bus fleet in inner and outer London		All double decks meet Euro VI standard as a minimum	More than 85% of double decks hybrid, electric or hydrogen	60% of double decks hybrid; 40% electric or hydrogen	20% of double decks hybrid; 80% electric or hydrogen	

It is important that the GLA Group and the public sector lead by example in the take-up of ULEVs.

Proposal 32
The Mayor will seek to ensure that the GLA and its functional bodies lead by example in the use of Ultra Low Emission Vehicles (ULEVs) in their own vehicle fleets and will also encourage the boroughs to adopt the use of ULEVs. The GLA group will work towards: all cars in GLA group support fleets being Zero Emission Capable (ZEC) by 2025 at the latest; all newly purchased or leased cars and vans (less than 3.5 tonnes) in GLA group fleets, including emergency response vehicles, being ZEC from 2025; all heavy vehicles in GLA group fleets being fossil fuel-free from 2030; and entire GLA fleets being zero emission by 2050.

Zero emission private and commercial vehicles

The Mayor will help ensure ULEVs are the best choice for those needing to use a car or a van, to put London on a path to zero emission by 2050. The aim is for all new cars and vans in London to be zero emission by 2030 at the latest. Freight activity in London also contributes towards poor air quality and carbon emissions. Through the LoCITY programme, TfL will continue to work with the freight industry to help overcome the barriers to adopting cleaner vans and heavy goods vehicles.

Proposal 33
The Mayor, through TfL and the boroughs, will introduce regulatory and pricing incentives to support the transition to the usage of Ultra Low Emission Vehicles in London.

To succeed in making the transition to zero emission, the charging infrastructure will need to change significantly. This includes meeting the need for rapid charging to support ZEC taxis, PHVs and commercial vehicles, and working with boroughs to provide on-street residential charging. TfL will work to understand the long-term need for residential charging, alongside the potential requirement for alternative fuels for heavy vehicles as a bridging technology. Bringing in ULEVs will require a significant change to London's energy systems to ensure the supporting supply infrastructure is in place, while maximising CO_2 benefits. This will be delivered through the London Environment Strategy.



‘Creating zero emission zones will be an essential part of the move towards zero emission transport.’

Proposal 34
The Mayor, through TfL and the boroughs, will work with Government and stakeholders across London to ensure that sufficient and appropriate charging and refuelling infrastructure is put in place to support the transition from diesel- and petrol-powered vehicles to Ultra Low Emission Vehicles, including ensuring that London’s energy-generating and supply system can accommodate and manage the increased demand associated with this transition.

As well as incentives and supporting infrastructure to encourage a move to ULEVs, it will also be necessary to use disincentives to phase out fossil fuel vehicles altogether. In addition to the introduction and expansion of ULEZ, tightening emission standards by implementing a network of zero emission zones would help reduce total CO_2, NO_x and PM emissions and would send a clear signal that the city is moving towards a fossil fuel-free future. A zero emission zone is likely to require vehicles that drive within it that are not capable of operating with zero exhaust emissions to pay road user charges (similar to those in ULEZ or LEZ). Other vehicle prohibitions and/or restrictions may also apply.

Creating zero emission zones will be an essential part of the move towards zero emission transport. The Mayor will work with boroughs to develop and implement zero emission zones in town centres and central London before rolling them out across all of London by 2050 at the latest. These will complement measures to reduce emissions from non-transport sources described in the London Environment Strategy. The approach to zero emission zones will be developed over the next few years in conjunction with other policies and proposals in the strategy, such as the creation of Liveable Neighbourhoods, reducing road danger, and making more efficient use of the street network, including for freight and servicing. Any specific schemes would be subject to statutory consultation.

Proposal 35
The Mayor, through TfL and the boroughs, and working with Government, will seek to implement zero emission zones in town centres from 2020 and aim to deliver a zero emission zone in central London from 2025, as well as broader congestion reduction measures to facilitate the implementation of larger zero emission zones in inner London by 2040 and London-wide by 2050 at the latest.

If $PM_{2.5}$ levels are to be improved, a significant reduction in tyre, brake wear and auxiliary engine emissions will be needed. Such emissions are expected to make up about 90 per cent of road transport $PM_{2.5}$ emissions by 2030. The first step to achieving this will be a reduction in total vehicle kilometres by supporting a shift to walking, cycling and public transport and more efficient delivery and servicing. New technologies, including the use of regenerative braking, also have the potential to reduce emissions.

Proposal 36
The Mayor, through TfL, and working with Government, manufacturers and other relevant organisations, will work to reduce PM levels and support and accelerate the development and uptake of technologies to tackle tyre and brake wear and auxiliary engine emissions.

FOCUS ON: REDUCING CARBON EMISSIONS FROM NON-ROAD TRANSPORT SOURCES

As well as reducing emissions from road transport, to reach the target for a zero carbon city, reductions in emissions from other forms of transport are also needed. As part of this, network enhancements and the provision of new infrastructure must be undertaken in a way that minimises the additional burden on London's energy system.

Rail emissions
Rail electrification will reduce CO_2 emissions; by 2050, all rail lines in London should be electrified and all trains hauled by zero emission motive-power within London. Further measures to improve the energy efficiency of rail transport include new energy-efficient trains on the Elizabeth line from 2017, saving up to 30 per cent more energy through an on-train management system and regenerative braking. TfL will ensure that new Tube trains rolled out from the mid-2020s on the Piccadilly, Waterloo & City, Bakerloo and Central lines will be energy efficient, allowing a faster, more frequent service on the lines, with as little as possible additional energy required.

Proposal 37
The Mayor, through TfL, will seek to ensure that the energy impact of increased provision of transport services in London is minimised.

Infrastructure emissions
The Mayor will reduce emissions from across London's transport infrastructure. Major new transport schemes, such as Crossrail 2, will actively manage CO_2 emissions across their lifecycle, following the principles set out in the Government's Infrastructure Carbon Review.

Proposal 38
The Mayor, through TfL, will contribute to London's overall emissions reductions by:

a) Continuing to monitor, report and reduce operational CO_2 and other air pollutant emissions from all of TfL's assets and infrastructure, including stations, buildings and street lighting.

b) Seeking to work with stakeholders such as Network Rail to undertake measures to ensure that CO_2 and other air pollutant emissions from the construction and operation of transport infrastructure are minimised.

River vessel emissions
Air pollutant and CO_2 emissions from river vessels represent a small but significant contribution to the London total. Emissions need to be carefully managed, particularly in light of the PLA ambition to increase the number of river users to 20 million a year by 2035. The Mayor will work with stakeholders to improve the energy efficiency of the river fleet and will lead by example by delivering new hybrid vessels for the Woolwich Ferry. New powers are required from Government to effectively control emissions from river vessels, and the Mayor will continue to lobby the Government for these powers.

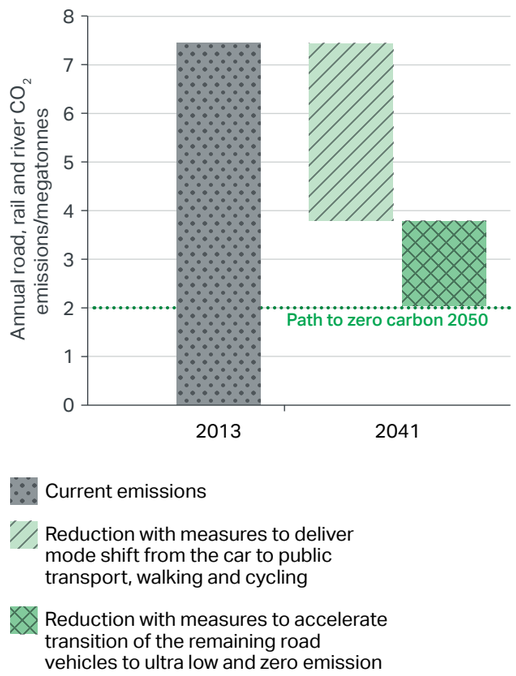
Proposal 39
The Mayor, through TfL, will work with the Port of London Authority to publish an emissions strategy for the River Thames to reduce air pollutant and CO_2 emissions from all river vessels and urges Government to introduce new legislation to ensure that emissions from vessels can be effectively reduced.

Low-carbon energy generation
A significant opportunity to increase London's supplies of low-carbon energy can be found in transport infrastructure and land. A programme of solar generation over the next five years will greatly increase the level of solar power in TfL's buildings, and TfL's purchasing power will be used to further stimulate renewable energy generation in London, for example through the Mayor's 'Licence Lite' scheme. In parallel, TfL will identify other opportunities for low-carbon and renewable energy generation, building on the success of the Bunhill waste heat scheme, which exports heat from the Northern line to a district heating scheme in the London Borough of Islington. TfL will also aim for rail services under its control to be zero carbon by 2030, and will support measures set out in the London Environment Strategy for all GLA Group buildings to be zero carbon.

Proposal 40
The Mayor, through TfL, will seek to deliver a package of measures both to increase the level of low-carbon energy generation on TfL's land and for supply to its assets.

Measures set out in the strategy will reduce CO_2 emissions from road, rail and river in London by 72 per cent by 2041 (in comparison to 2013, as shown in Figure 17), and set London's transport emissions on a clear trajectory to reach the Mayor's ambition of a zero carbon London by 2050.

FIGURE 17: REDUCTION IN ROAD, RAIL AND RIVER CO_2 EMISSIONS, 2013-2041



FOCUS ON: PARTICULATE AND OTHER EMISSIONS FROM NON-ROAD SOURCES

It is important to reduce emissions from diggers and other machinery (known as Non-Road Mobile Machinery (NRMM)) on construction sites, which in 2013 were responsible for about 7 per cent of NO_x emissions and 8 per cent of PM_{10} emissions in London[17]. NRMM planning policies apply in two zones: a Greater London zone, and a central zone comprising the Central Activities Zone (CAZ) and North Isle of Dogs. The central zone has a tighter emissions standard applied to it. However, the NRMM Low Emission Zone is based on planning powers that are not effective in controlling NRMM emissions. New powers are required from Government.

Proposal 41
The Mayor, through TfL, will meet or exceed the emissions standards set out by the Non-Road Mobile Machinery (NRMM) Low Emission Zone for Transport for London Road Network construction and maintenance activities and urges Government to introduce new legislation to ensure that all emissions from NRMM can be effectively reduced.

Improving London's air quality extends to the London Underground network. Comprehensive research has concluded that concentrations of PM – caused in part by train wheel and brake wear – are high in some parts of the Tube network. This PM is, however, of a very different composition to that found in the air above ground. Moreover, the increasing use of electric braking systems and regular cleaning on the network will help to reduce concentration levels.

There is no room for complacency on this matter, however, particularly as the understanding of the effects of air quality on health develops. The Mayor will ensure that TfL undertakes further dedicated research into the risks posed to customers and staff by the Tube's air quality, and will take action in response to any new issues, supported by robust and compelling evidence.

Proposal 42
The Mayor, through TfL, will conduct further research into the health risks of particulate matter on the London Underground network and take appropriate measures to mitigate the adverse effects of any risks found where practicable.

17 London Atmospheric Emissions Inventory (LAEI), London Datastore, 2013

FOCUS ON: NATURAL AND BUILT ENVIRONMENT AND CLIMATE CHANGE RESILIENCE

Natural and built environment
The Mayor aims for London to be a National Park City where more than half of its area is green, where the natural environment is protected and the network of green infrastructure is managed to benefit all Londoners.

Within this context, protecting and enhancing green infrastructure on transport land will help to improve the natural environment and contribute to London's overall resilience to climate change and the delivery of the Healthy Streets Approach. Green infrastructure includes the provision of green spaces and features such as street trees and green roofs. There are multiple benefits resulting from green infrastructure, including improved resilience to severe weather and climate change, better air and water quality, the encouragement of walking and cycling, and enhanced biodiversity. Improving existing, and providing new, green infrastructure will contribute towards the Mayor's ambition to make more than 50 per cent of London green and ensure that all children have access to nature.

London's built heritage and sites of cultural importance include four world heritage sites, 19,000 nationally listed buildings and their settings, numerous locally listed assets and their settings, 1,000 conservation areas, more than 150 registered parks and gardens and more than 150 scheduled monuments. Buildings make a significant contribution to defining the identity and character of London, through their design and the associated public realm. Where possible, new buildings should complement existing elements; with careful design, they can have a positive impact on the built environment, encouraging travel by foot, cycle and public transport, and bringing people and activity together in public spaces, contributing to improvements against the Healthy Streets Indicators.

Policy 8
The Mayor, through TfL and the boroughs, and working with stakeholders, will enhance London's natural and built environment by:

a) Ensuring that transport schemes protect existing green infrastructure where possible, or – if there is a loss – providing new green infrastructure in order to deliver a net gain in biodiversity.

b) Seeking additional opportunities to build new green infrastructure into the existing transport estate.

c) Monitoring and protecting designated spaces on transport land, such as Sites of Importance for Nature Conservation.

d) Maximising opportunities to protect, promote and enhance London's built heritage and sites of cultural importance that are affected by transport development.

TfL will work principally with London boroughs, Network Rail and Highways England to identify opportunities for additional green infrastructure, as well as to establish and regularly monitor a baseline of ecological data in order to demonstrate changes in biodiversity.

'There are multiple benefits resulting from green infrastructure, including improved resilience to severe weather and climate change, better air and water quality, the encouragement of walking and cycling, and enhanced biodiversity.'

FOCUS ON: NATURAL AND BUILT ENVIRONMENT AND CLIMATE CHANGE RESILIENCE (continued)

As well as affecting human health, road vehicle emissions also adversely impact the natural and built environment. They can lead to dirty deposits on buildings and the corrosion of some building materials. Increasing levels of nitrogen in the soil also result in damage to natural ecosystems.

Street trees can provide shade, shelter and cooling, helping to reduce the urban heat island effect and enabling everyone to use the streets.

Proposal 43
The Mayor, through TfL and the boroughs, will retain existing trees and plant new ones on the Transport for London Road Network (TLRN) and borough roads to protect tree canopy cover. Street tree numbers on the TLRN will be increased by 1 per cent every year between 2016 and 2025; and the Mayor will encourage boroughs to increase the numbers of trees along their streets.

The equivalent of two-and-a-half Hyde Parks of green garden land in London has been paved over annually in recent years[18]. This additional impermeable surface area has resulted in an increase in surface water flooding. To deliver the recommendations set out by the London Sustainable Drainage Action Plan, transport projects should incorporate Sustainable Drainage Systems (SuDS) such as green roofs, rain gardens or swales to help reduce surface water flood risk.

Proposal 44
The Mayor, through TfL and the boroughs, will create Sustainable Drainage Systems (SuDS) to enable, each year, an additional effective surface area of 50,000m^2 to first drain into SuDS features rather than conventional drains and sewers. Other non-road transport projects should be designed to achieve appropriate greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible (in accordance with the drainage hierarchy set out in the London Plan). In all cases, drainage should be designed and implemented in ways that deliver other Mayoral priorities, including improvements to the water quality, biodiversity and amenity of the highway network.

As well as being energy intensive, street lighting also causes light pollution, which can affect human health and cause damage to natural ecosystems. TfL will continue to install low-energy street lights on the TLRN in order to reduce energy consumption and light pollution and boroughs are encouraged to do the same.

By designing new infrastructure to use resources more efficiently and promote the circular economy, there are significant opportunities to decrease consumption of natural resources and minimise and re-use waste in order to reduce impacts on the natural environment. This should include the sustainable management of construction and demolition waste from new transport schemes. TfL will also support municipal waste and circular economy measures set out in the London Environment Strategy.

Proposal 45
The Mayor, through TfL, will support London's transition to a circular economy by encouraging transport providers to follow GLA Group Responsible Procurement Policy guidance.



18 London: garden city?, London Wildlife Trust, 2010

FOCUS ON: NATURAL AND BUILT ENVIRONMENT AND CLIMATE CHANGE RESILIENCE (continued)

Climate change resilience
Climate change is already having a detrimental effect on transport in London. Events such as the closure of large sections of London's rail network in June 2016 due to flooding highlighted the potential disruption that can be caused. As well as a general warming of the climate, severe weather events such as heatwaves, droughts and heavy rainfall are predicted to increase in frequency and intensity. Without adequate mitigation, climate change will reduce comfort, safety and reliability on public transport and will ultimately have a negative effect on London's economy. Climate change will disproportionately affect the most vulnerable, for example older people will be disproportionately affected by heat. More London-specific climate change research and evidence is needed to inform a cost-effective long-term plan and programme of mitigation work.

Policy 9
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to ensure that London's transport is resilient to the impacts of severe weather and climate change, so that services can respond effectively to extreme weather events while continuing to operate safely, reliably and with a good level of passenger comfort.

The key challenges to public transport posed by climate change include protecting rail assets and streets from flooding, managing heat on public transport, and maintaining service reliability in periods of extreme weather.

Proposal 46
The Mayor, through TfL, will work with transport and other infrastructure providers in London to undertake a dedicated programme of research to understand and prioritise the risk of severe weather and climate change adversely affecting the operation of London's transport network and to minimise any such impacts on the most vulnerable user groups. TfL will lead this work for the transport sector in London.

Once the risks and costs have been analysed, then actions will be implemented in three different ways by:

- Including adaptation measures in construction and asset renewals to provide resilience in the most cost-effective manner
- Ensuring major projects are designed to be future-proof against severe weather conditions for their entire lifetime, and
- Identifying high-priority locations for proactive severe weather resilience interventions

Proposal 47
The Mayor, through TfL, will seek to undertake and implement an evidence-based programme of measures to adapt existing, and to design and build new, transport infrastructure to make it resilient to severe weather conditions and the effects of climate change.

'Severe weather events such as heatwaves, droughts and heavy rainfall are predicted to increase in frequency and intensity.'

FOCUS ON: TRANSPORT NOISE AND VIBRATION

The World Health Organization has identified noise as the second greatest environmental cause of health problems after poor air quality[19]. Consistently elevated sound levels can cause hearing impairment, hypertension, ischemic heart disease, stress and sleep disturbance. Road transport is a significant source of noise and vibration in London, and one of the ten Healthy Streets Indicators is that streets are 'not too noisy'.

Proposal 48

The Mayor, through TfL and working with the boroughs, will reduce the number of Londoners exposed to excessive noise and vibration levels from road transport in London by:

a) Reducing traffic volumes by encouraging mode shift from travelling by car to walking, cycling and using public transport.

b) Minimising the noise impacts of vehicular traffic on streets by encouraging the use of quieter vehicles, reducing vehicle speeds and discouraging poor driver behaviours such as rapid acceleration and braking.

c) Ensuring high levels of carriageway maintenance, installing low-noise road surfacing, and minimising the noise impacts from road and street works.

d) Monitoring noise levels close to major road corridors to measure the adverse impacts of road transport on affected communities.

e) Seeking to reduce the noise impacts of servicing and deliveries through appropriate design and management of delivery areas, promoting responsible behaviours, adopting best practice and encouraging the use of quieter vehicles and equipment.

f) Working with the Department for Transport to investigate ways of reducing noise from the loudest vehicles such as some types of motorcycle and supercars.

The construction of new rail infrastructure and the operation of rail services can also cause significant localised noise and vibration. For residents in the vicinity, this can cause considerable disruption.

The Mayor's policy on aircraft noise is set out in the London Plan. See also Focus on: The Unacceptable Impacts of Expanding Heathrow.

Proposal 49

The Mayor, through TfL and working with Network Rail and train operating companies, will mitigate the effects of noise and vibration caused by Tube, DLR, Overground, tram and rail services in London where reasonably practicable, and thereby minimise their adverse impact on the health and quality of life of Londoners. Key measures will include:

a) Addressing noise issues as part of all planned railway works and taking steps to minimise their impact on neighbours.

b) Specifying and procuring quieter trains.

c) Ensuring new rail infrastructure incorporates technology that is effective in reducing noise and vibration, such as shock-absorbent track fastenings.

d) Investigating complaints of noise and vibration disturbance from railway construction and/or operations and endeavouring to eliminate the disturbance at source or otherwise mitigate its adverse effects.

e) Maintaining open communication with residents before and during construction works, where levels of noise may be above what is normally expected and/or heard at unusual times.

f) Continuing to reduce the impact of night services by reducing noise and vibration at their source and taking a robust approach to responding to complaints.

19 Burden of disease from environmental noise, World Health Organization, 2011



Chapter four – A good public transport experience

London has one of the most extensive public transport networks in the world, with more than 9 million trips made every day by bus, tram, Tube, train and river boat. Use of the public transport system has increased by 65 per cent since 2000, largely because of enhanced services and an improved customer experience.

An easy to use and accessible public transport system is an essential part of the Healthy Streets Approach as it gives people alternatives to car use for journeys that are not possible on foot or by cycle. By providing the most efficient and affordable option for journeys that are either impractical or too long to walk or cycle, public transport has helped to reduce Londoners' dependency on cars during the past 15 years and this trend must continue.

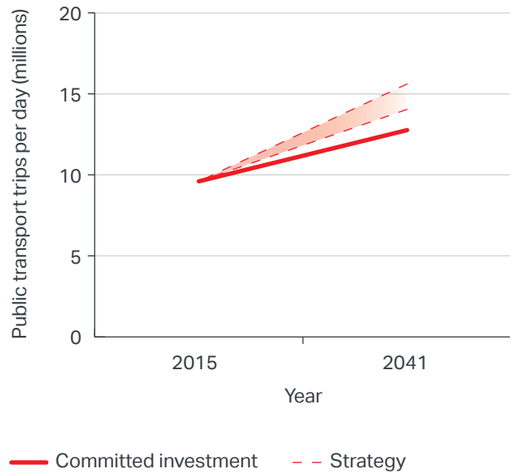
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‘By 2041, the public transport system will need to cater for up to 15 million trips every day.’

As it grows, the city requires the public transport capacity to reduce crowding and support increasing numbers of people travelling more actively, efficiently and sustainably. Figure 18 shows that by 2041 the public transport system will need to cater for up to around 15 million trips every day.

FIGURE 18: FORECAST GROWTH IN PUBLIC TRANSPORT TRIPS TO 2041



This chapter sets out the importance of a whole journey approach, where public transport improvements are an integral part of delivering the Healthy Streets Approach. The chapter then explains in four sections how London’s public transport services can be improved for all Londoners and also become a more appealing option than car use by:

a) Improving safety, affordability and customer service so the whole public transport network becomes easier and more convenient to use for more people.

b) Improving public transport accessibility so that disabled and older people can travel spontaneously and independently.

c) Shaping and growing the bus network to provide convenient, reliable, accessible public transport options where they are needed.

d) Making rail services the most efficient way for people to travel longer distances by tackling crowding and improving the reliability, comfort and appeal of rail travel.

The whole journey

A good public transport experience means catering for the whole journey, with all its stages, from its planning to the return home. All public transport journeys start or finish on foot or by cycle, and half of all walking in London is done to or from public transport stations or stops[1]. It is essential to integrate bus, Tube, rail and tram services with improvements to street environments to provide Londoners with attractive alternatives to car use.

The areas around and within stations, however, can be cluttered and difficult to navigate, provision for cycle parking can be inconsistent, and interchanges between services can be complex.

Stations and stops will be designed for active, efficient and sustainable onward journeys. The first things passengers will see on emerging from the station will be clear walking directions and maps, cycle hire facilities, bus connections and an attractive, accessible and inclusive public realm, rather than car parking and pick-up/drop-off spaces.

1 London Travel Demand Survey (LTDS) 2013/14-2015/16, TfL analysis



Policy 10
The Mayor, through TfL and the boroughs, and working with stakeholders, will use the Healthy Streets Approach to deliver co-ordinated improvements to public transport and streets to provide an attractive whole journey experience that will facilitate mode shift away from the car.

The walk to and from the stop or station, however short, can be an important part of staying healthy for many people. A key measure of a more integrated transport system will be to achieve year-on-year increases in the proportion of people who walk or cycle for at least 20 minutes a day.

The healthy, efficient and sustainable choice must be the easiest option every time, particularly at places where people change between transport modes. This will require good quality, secure cycle parking at a level that meets current demand and provides for future growth. Buses, cycle hire, Dial-a-Ride and community transport services will also need to be easy to access and navigate to, and taxi ranks should be accessible.

Proposal 50
The Mayor, through TfL and the boroughs, will make improvements measured and prioritised against the Healthy Streets Indicators to transform the design and layout of street space and transport facilities around bus, rail, Underground, London Overground, DLR and other stations, and around river piers, as far as practicable, to create safe, secure, accessible, inclusive, welcoming, well-designed gateways and routes to and from public transport, including provision of:

a) Sufficient space and desire-line connectivity for current and future volumes of people arriving and leaving on foot.

b) High-quality provision for cycling, consistent with London Cycling Design Standards, including secure and well-located cycle parking.

a) Improving safety, affordability and customer service

Vision Zero for safe public transport

Londoners rightly expect their public transport services to be operated safely and to be managed and policed to ensure their personal security. After many years of safe operation, there was a tram overturning on a curve 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. TfL will implement the relevant lessons learnt from both the Rail Accident Investigation Branch (RAIB) report[2] and TfL's independent investigation[3] more widely across TfL's operations. TfL will continue to work with the wider tram industry to ensure all the RAIB's recommendations are implemented and tram safety continues to improve.

Including and beyond this, the Mayor is committed to ensuring Londoners can travel safely throughout the entire transport system. All parts of the public transport network will play an important role in achieving Vision Zero, eliminating deaths and serious injuries from London's transport system by 2041. The policies and proposals in this chapter, setting out investment in new infrastructure and service enhancements, as well as other factors such as staff training, will help develop an even safer and more secure public transport system.

Priorities include reducing the danger to users on the transport network itself, for example when boarding and alighting trains, and also reducing the danger posed to Londoners more generally, such as that which can be associated with level crossings and low railway bridges over roads.

Sadly, there are a number of suicides each year on the transport system, and a range of measures will continue to be taken to prevent this, including working with the rail industry and organisations such as the Samaritans.

Policy 11

The Mayor, through TfL and the boroughs, and with the DfT, Network Rail, train operating companies and other transport infrastructure providers and service operators, will work to eliminate deaths and serious injuries from London's rail, Tube, London Overground, DLR, tram, river and cable car services by:

a) Ensuring that assets and infrastructure are maintained to the required safety standards and that all new assets and infrastructure are designed with Vision Zero in mind.

b) Identifying and implementing new approaches to reduce or eliminate injuries.

c) Training staff on their role in helping customers and users stay safe.

d) Developing new and more innovative ways of communicating safety messages to customers and users.

e) Applying appropriate arrangements for maintenance and other supporting services that are contracted or licensed.

f) Working closely with the emergency services to ensure rapid response to incidents.

The Vision Zero approach to road danger, including bus services, is set out in Chapter three.

2 'Overturning of a tram at Sandilands Junction, Croydon, 9 November 2016', Rail Accident Investigation Branch: Rail Accident Report, December 2017

3 'Tram overturning at Sandilands, Croydon on 9 November, 2016', TfL Board Paper: Safety, Sustainability and Human Resources Panel – RAIB and TfL Investigations – Update, 22 January 2018

Making public transport affordable

A fully inclusive public transport system would enable all Londoners to take advantage of the opportunities the city has to offer. An affordable fares system, both now and in the future, is essential to encouraging a shift from car to public transport.

To ensure that public transport is available to those who may find it least affordable, current concessions (such as the Freedom Pass) will be maintained. In addition, single fares across all current TfL services have been frozen until 2020, reducing the cost of using TfL services in real terms. A new 'Hopper' fare was introduced in September 2016 and then extended in January 2018 to allow customers to make unlimited bus or tram transfers within the hour, even if other trips on Oyster modes are made in between. This has improved the affordability of those trips that involve the use of multiple buses or trams. It has, in particular, delivered savings to those who are unable to afford rail travel over longer distances, and helped make the cost of travel by bus or tram more competitive compared to journeys by car.

Policy 12
The Mayor will ensure public transport fare levels are set to enable access to affordable travel for all Londoners.

Members of the public who use non-TfL services will still be subject to fares increases, however. Should such rail services be devolved to TfL, fares will be aligned with TfL's affordable fares policy, with affordability prioritised beyond the current 2020 timeframe. As many Londoners as possible should be able to benefit from affordable public transport services, with the same fares structure and policy applying across the whole transport system in London, whether or not it is provided by TfL.

Proposal 51
While a Government decision on further devolution of rail to London has not been forthcoming, the Mayor will press the Government to match TfL's fares freeze in London until 2020, and to prioritise affordability beyond then.

Enhancing customer service

In London, almost every resident, worker and visitor is a customer on the city's transport system. The experience of travelling around London has improved significantly in recent years. However, there are still too many inconsistencies across the network in terms of quality and reliability, information provision and general integration between different transport options. This can cause stress for individuals and, more broadly, weaken Londoners' confidence in the public transport system. An improved quality of service is needed to enable more Londoners to positively choose to use public transport as an alternative to the car.

Policy 13
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to make the public transport network easier and more pleasant to use, enabling customers to enjoy comfortable, confident, safe and secure, informed and stress-free travel.

Getting the basics right

Across all modes, what customers value the most is the service provider 'getting the basics right'. This means providing a reliable public transport service that gets customers to their destination safely and on time. Customers should have access to accurate real-time information and assistance along the way. There should be easy and accessible interchange between different public transport services and with walking and cycling.

This means, for the rail and Underground network, more frequent and reliable trains; fairer, simpler fares (including extending Oyster and contactless payment to more stations around the edge of London); modern, staffed stations; and information at every stage of the journey. On the bus network, there will be improved customer information during disruption and delays, as well as enhanced on-board services (e.g. cleanliness, seating and air conditioning). New customer service standards will be developed for bus stations, and customer-focused training – with a continuing emphasis on equality issues, particularly for older and disabled people – will be delivered to all bus drivers and front-line staff.

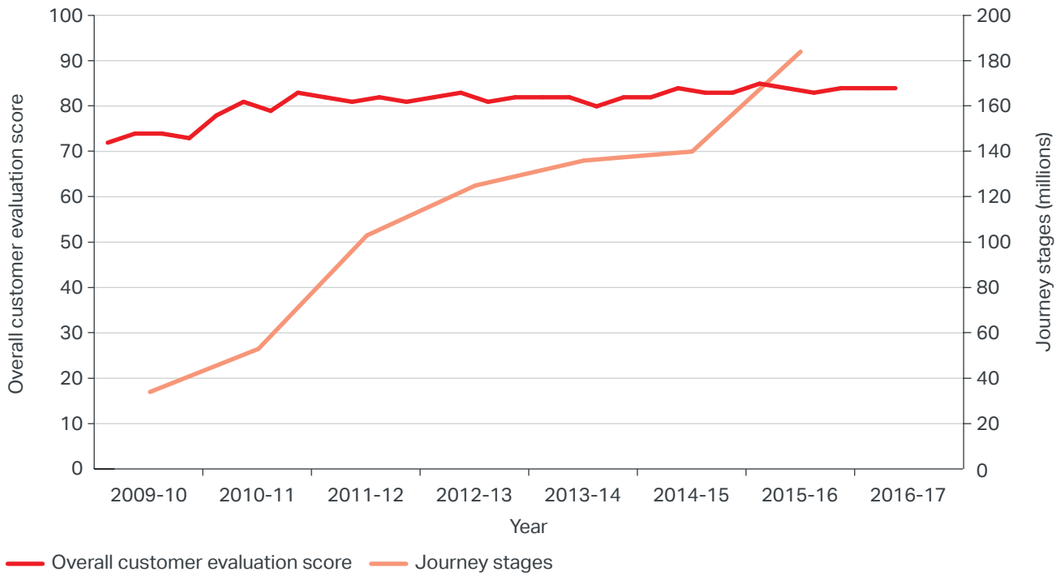
With 27 million journeys taking place in London every day, inevitably sometimes things will go wrong, so it is important that TfL and other transport service providers support customers when this happens. When there is service disruption, customers need to be given up-to-date information that enables them to make alternative travel arrangements. Customers should be confident that staff are helpful, knowledgeable and empowered to assist whenever they need help.

Customers should feel that they can trust the fares system. It is important that people are charged the cheapest fare and that any errors are fixed. As part of that commitment, TfL and other operators should put in place initiatives to reduce the number of maximum fares charged should customers forget to 'touch out', for example charging Oyster and contactless customers an average fare based on journey history. And, if customers need a refund for any reason, the process must be easy to follow.

Consistent level of service

Customers value a consistently good service. TfL's management of more of London's suburban rail network would support this, bringing staffed stations and a consistent level of service to areas beyond the existing Tube and London Overground networks. TfL has a proven record of improving customer satisfaction on London's transport system. Figure 19 shows the improvement when TfL took over and invested in the London Overground network.

FIGURE 19: LONDON OVERGROUND CUSTOMER EVALUATION SCORE AND PASSENGER JOURNEY STAGES, 2009/10-2016/17



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Londoners' travel habits are changing and off-peak, weekend and night-time public transport services also need to be better developed, enabling London to become a fully 24-hour city that is open to everyone, with a strong night-time economy. Devolution of suburban rail services to the Mayor would help integrate the provision of services and achieve a more consistent experience for customers across the public transport system.

Innovation

More than 80 per cent of Londoners now use the TfL website and 5 million people follow TfL on Twitter. In addition, more than 40 per cent of Londoners use some of the 600 apps powered by TfL data. Customer expectations will continue to evolve as new information technology emerges. Innovations in customer service are essential to attract Londoners to public transport, walking and cycling, and to make services more accessible and inclusive.

On the rail and Underground networks, rolling out WiFi to more stations will support staff in providing customer information. Staff will be equipped with mobile devices to provide real-time information to customers, and personalised and relevant live information will be integrated into Journey Planner and Twitter travel alerts. The London Underground is one of the most high-profile 'not-spots' in the country and, building on the improvements in communication technology for the emergency services, 4G mobile communications will be provided on the Underground. This gives a unique opportunity to provide public cellular services and in 2019 the Elizabeth line is planned to be one of the first lines to offer 4G connectivity.

On the bus network, vehicle layouts and branding could be varied to reflect customer needs on different types of route. New 'mobility' models could also be explored, for example demand-responsive services, where these can make public transport a more attractive alternative to the car.

Proposal 52

The Mayor, through TfL and the boroughs, and working with other transport operators, will improve customer service across the transport system with a focus on:

a) Improved staff training, including the training of bus drivers.

b) Providing a more consistent level of service across all transport modes (including rail services where devolved from the DfT).

c) Making the most of new technology and innovations in customer service, including provision of mobile phone access underground.



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b) Improving public transport accessibility and inclusivity

Making the public transport system more accessible and inclusive is critical to delivering a better whole journey experience for disabled people and the growing number of older people, and will also ensure that public transport is easier to use for all Londoners. The transport system needs to be able to cater for journeys made by people with a range of visible and invisible disabilities. These include mental health conditions, long-term health conditions, impaired mobility, and visual or hearing impairments.

However, the current public transport system can present a range of barriers to its use by disabled and older people. These barriers include the need to frequently plan journeys across a complex network in a high level of detail and in advance, inconsistent levels of staff availability and assistance, and the often poor physical accessibility of stations and interchanges. The extent that these barriers limit travel varies from person to person, and some barriers for some people can be so significant that they prevent them from using the network entirely.

Addressing these barriers, to create a more accessible and inclusive public transport system, will enable new trips to be made by disabled and older people, as well as making their current trips easier and quicker. This will improve social integration by giving more people a chance to participate in the opportunities that London has to offer, helping create a more inclusive city.

Accessibility improvements should be complemented by ensuring that the transport network is better connected across and within all modes and spaces through which people travel. Vehicles, stops, stations and streets should be designed to be as inclusive and accessible as possible, taking account of the needs of all users. There should be a focus on the needs of customers by providing good information and communication, and passenger support and assistance should be available, particularly when services are delayed or disrupted. Accessibility and inclusion also means that all members of the public feel safe and secure when travelling. Transport operators must place a greater focus on the needs of all those travelling to help improve their services. They should embed accessibility and inclusivity in all aspects of their transport planning and delivery.

Policy 14
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to enhance London's streets and public transport network to enable disabled and older people to more easily travel spontaneously and independently, making the transport system navigable and accessible to all and reducing the additional journey time that disabled and older users can experience.

Enabling spontaneous and independent travel

Currently, 45 per cent of disabled Londoners find planning and making trips by public transport stressful, sometimes having to rely on staff assistance to board and alight trains, as well as often having fewer alternative options should services be delayed or disrupted. This can make it difficult for disabled and older people to feel they can depend on public transport to travel spontaneously and independently – to 'turn up and go'.

Continuing to improve journey planning tools and travel mentoring programmes will be important in helping disabled and older people feel confident in using the public transport network. The availability of staff to assist, should this be required, is also important to enable journeys to be made spontaneously and independently.

TfL has staff at all Tube, TfL Rail, and Overground stations when services are running, while some piers, all boats, the Emirates Air Line and Victoria Coach Station (VCS) are staffed. Trams and buses are staffed by the driver and the DLR has a Passenger Service Assistant on every train. This means that:

- There is no need to book in advance to use TfL services
- Station staff are able to accompany customers to the train, help them board, including providing a ramp where step-free access is only to the platform, and arrange for them to be met at their destination. Staff are also encouraged to offer help to anyone who looks like they may need assistance
- Where a lift is unavailable at a Tube, TfL Rail or Overground station, staff will help customers plan an alternative route, or, where a reasonable alternative is not available, will book a taxi (at TfL's cost) to take them to their destination or another step-free station to continue their journey
- Staff on board DLR and trams are available to assist
- Staff should be easy to find at VCS, Emirates Air Line terminals and on piers and boats
- Help points can be found and easily accessed for assistance throughout TfL's networks to request information or speak to staff in an emergency

'Turn up and go' is provided on London Overground and will be introduced on London's other local stopping services (shown in Figure 29) where responsibility for them is devolved to TfL from the DfT.

Proposal 53
The Mayor, through TfL and working with transport operators, will enable spontaneous and independent travel for disabled and older people by:

a) Improving journey planning tools, ensuring advances in technology make the tools more accessible and easier to use; and guiding people to the most accessible journey options.

b) Providing travel mentoring and other opportunities to help Londoners gain confidence to use public transport.

c) Continuing to provide the current 'turn-up-and-go' service at all TfL-operated stations, and providing it at additional stations where national rail services are devolved to TfL.

d) Continuing to seek and act on feedback from disabled and older Londoners regarding public transport services.

Making bus services more accessible and inclusive

Buses are typically the most common form of public transport used by older people, disabled people and those travelling with children, often with prams or buggies. Buses are a relatively accessible form of public transport – all London buses meet strict accessibility requirements, and 95 per cent of bus stops are now wheelchair accessible. Specific training on helping those users with accessibility needs is being delivered to bus drivers, and TfL works with bus operators to ensure this training is put into practice in daily service provision. Nevertheless, on-board crowding, competition for the designated wheelchair space and the internal layout of the vehicle can negatively impact the experience of using buses. There is therefore a real need to further improve bus accessibility through future bus design.

In addition to making more bus stops wheelchair accessible, at key locations such as interchanges, a higher level of improvements will include improving shelters, seating, interchange information, and locating stops as close as possible to key destinations with excellent walking links.

Proposal 54
The Mayor, through TfL and the boroughs, will improve bus accessibility by:

a) Continuing to provide improved accessibility training to all bus drivers and working with operators to ensure they are meeting their requirements for the level of service that their drivers provide.

b) Reviewing existing bus design, including opportunities for increasing wheelchair space and internal layout to ease movement and improve safety.

c) Ensuring that new buses provide better accessibility for all users, including more on-board space for wheelchair users, improved boarding ramps, induction loops and consistent signage and messages regarding priority seating.

d) Continuing to upgrade existing bus stops, including hail and ride route sections, so that they meet the wheelchair accessible standard, and ensuring that all new and amended bus stops will be wheelchair accessible as a minimum.

e) Delivering a higher level of bus stop accessibility at key locations, such as major transport interchanges and key health and education hubs.

Making Tube, rail and other services more accessible and inclusive

London's Tube and rail network brings travel opportunities to millions of people, but for people who are older or disabled, or who are travelling with luggage or young children, it can sometimes be hard to get around and journeys that require a step-free route often take longer than those that do not. TfL analysis suggests that journeys by step-free routes take about 15 per cent longer than the quickest route on average across London, although this is considerably higher in areas served by Tube lines with few step-free stations (see Figure 21).

The inclusive and accessible design of stations and services is essential to open up the full potential of the rail and Tube network to all Londoners, including disabled and older people. This includes providing accessible and up-to-date information on access, appropriate and consistent wayfinding, tactile paving, soft-touch hand rails, accessible ticket machines, more seating for people who struggle to stand, and extending the use of hearing-aid induction loops across the network. Most of the network now has these features, but TfL will continue to review them to make sure they are of ongoing benefit to users.

TfL has already set ambitious aims to improve step-free access, and is working to make 40 per cent of the Tube network step-free by 2022 (a significant increase from the current 26 per cent). In this time, TfL will develop proposals for a further tranche of step-free stations for delivery beyond 2022. The Mayor's longer-term aim is for the majority of the Tube network to be step-free, recognising that some locations will be very difficult to retrospectively make step-free because of the age and layout of the original station. Network Rail must continue to make national rail stations step-free in parallel, so that the overall transport network is more accessible. Level access, platform humps and boarding ramps must be available at stations so that people can board trains, with staff available who are trained to assist, to provide a 'turn-up-and-go' service for those who require assistance such as some people with visual impairments and wheelchair users.



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Tube improvement programmes will benefit disabled and older people and those travelling with young children in two main ways. Firstly, they will provide greater capacity and thus reduce crowding (one of the most significant barriers to travel for disabled people). Secondly, the new trains that will be introduced as part of the programmes will incorporate inclusive design features such as spaces for wheelchairs and baby buggies, improved lighting, and visual and audible real-time information. Their design, together with platform humps at some stations, will also make it easier for those in wheelchairs to board and alight.

New infrastructure will be designed from the outset to be accessible and inclusive, and new lines and extensions will therefore open up significant new journey opportunities for disabled and older people. Notably, the Elizabeth line and Crossrail 2 will transform the ease with which disabled and older people can access central London.

In addition to bus, rail and Tube services, to ensure the whole journey is accessible, improvements to the accessibility of taxi ranks, river piers and services, and VCS (and its potential replacement), should continue to be made.

Proposal 55
The Mayor, through TfL and working with the DfT, Network Rail and other stakeholders, will make the transport network more accessible and inclusive by:

a) Using Inclusive Design, for example for station and train layout and facilities, including signing, information and seating, giving consideration to those with visible and invisible disabilities.

b) Providing step-free access at selected rail and Underground stations and on all new infrastructure, 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.

c) Providing step-free access at further national rail stations in London.

d) Improving the accessibility of taxi ranks, river piers and services, and Victoria Coach Station (and its potential replacement).

Figure 21 shows the reduction in the difference in journey times between the step-free and the full network that the strategy will deliver in the period to 2041.

Assisted Transport Services

The proposals set out above will make the public transport network more accessible for disabled and older people. However, there is also a pressing need to deliver a more reliable and convenient service for older and disabled Londoners who require door-to-door transport services such as TfL's Dial-a-Ride and the Taxicard scheme operated by London Councils. Services such as these, together with TfL's travel mentoring service, are known collectively as Assisted Transport Services (ATS).

TfL has undertaken a review of the provision of ATS and developed a Roadmap[4] for London to have world-leading service provision by 2021. The Roadmap identifies five design principles: safe and reliable journeys; convenience; flexibility and choice; integration; and innovation. Actions in the Roadmap include: establishing a simpler way to access ATS that will initially be hosted on the TfL website; better informing Londoners of what services are available to support them, their family or friends; and piloting new ways of extending flexibility and choice in how and when to use ATS. When completed, there will be a single integrated service that gives customers seamless access to a range of transport options, including London's public transport and core ATS. As the improved service is implemented, TfL will engage with other service providers to investigate opportunities for further integration to establish a broader coverage of London.

Proposal 56
The Mayor, through TfL and the boroughs, will design Assisted Transport Services around the principles of safe and reliable journeys, convenience, flexibility and choice, integration and innovation, delivering the Roadmap by 2021, and continuing to provide the service to those who need it.

Figure 20 sets out the proposed timetable for delivering accessibility improvements.

4 'Assisted Transport Services', TfL Board Paper: Customer Service and Operational Performance Panel, 1 November 2017

FIGURE 20: ACCESSIBILITY IMPLEMENTATION PLAN

Key: Supporting programmes | Service enhancements | Upgrading infrastructure | Station upgrades | Network extensions

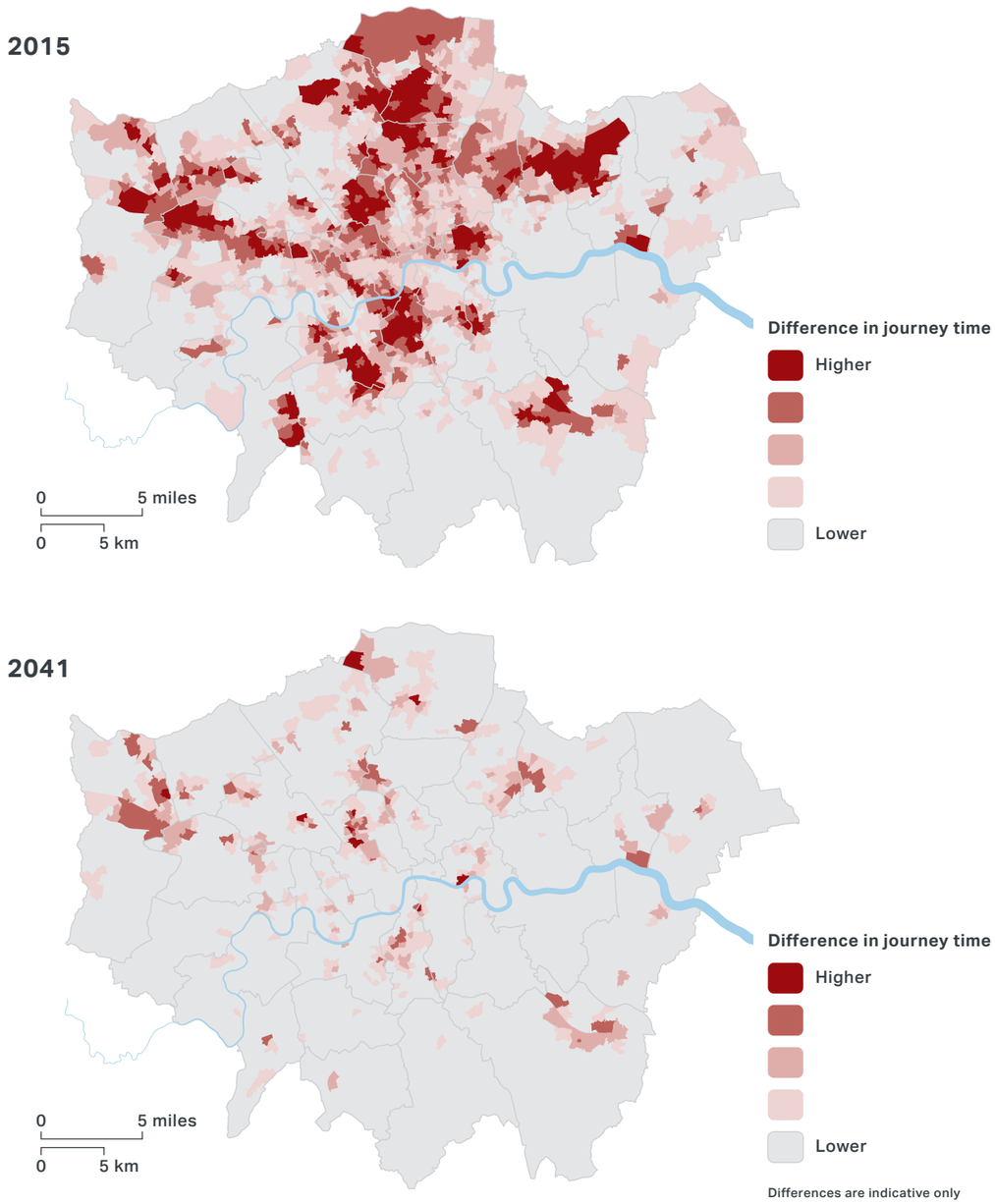
		NOW	2020	2025	2030	2035	2040
Enabling spontaneous and independent travel	Accessible streets	Embed accessibility and inclusivity in the planning and design of Liveable Neighbourhoods, Vision Zero schemes and other Healthy Streets programmes		Continue to deliver improvements to London's streets, including safe and accessible walking routes, removing obstacles, widening pavements, providing tactile paving and seating, making crossing easier and catering for cycles used by disabled people			
	Customer service and staff	Improve accessible journey planning and information provision	Continue to improve on-street and online navigation and journey planning tools				
		Implement fare freeze and extend Hopper offering	Continue to ensure public transport fare levels are set to enable access to affordable travel for all Londoners				
		Deliver staff training programmes					
	Safety and security	Ensure that crime and the fear of crime remain low on London's streets and transport system through designing secure environments and by providing dedicated specialist and integrated policing for London's transport system					
	Public transport	Continue to deliver improvements that make public transport easier for all users, including embedding the principles of Inclusive Design at stations, a review of 'turn up and go', and providing a more consistent level of service across all TfL operated services					
	Taxis	Deliver accessible taxi ranks					
Making bus services more accessible and inclusive	Customer service and staff	Deliver bus driver training programmes					
	Bus infrastructure	Deliver accessible bus stops					
		Deliver wheelchair accessible bus stops, to achieve 95% in all boroughs					
		Deliver bus priority to improve reliability					
	Bus services	Adjust bus service volumes to reflect changing patterns of demand					

FIGURE 20: ACCESSIBILITY IMPLEMENTATION PLAN (CONTINUED)

Key: Supporting programmes | Service enhancements | Upgrading infrastructure | Station upgrades | Network extensions

		NOW	2020	2025	2030	2035	2040
Making Tube, rail and other services more accessible and inclusive	National rail and London Overground	Deliver step-free upgrades at national rail and London Overground stations (eg Blackhorse Road, Brondesbury and West Hampstead)	Deliver Access for All step-free upgrades at rail stations (5-10 stations every 5 years)				
		Deliver station capacity and improvement schemes on national rail network					
		Introduce new London Overground rolling-stock					
	Tube stations (step-free and capacity upgrades including step-free)	Deliver 14 step-free Tube stations	Deliver approximately 25 step-free Tube stations	Deliver approximately 15 step-free Tube stations	Deliver approximately 15 step-free Tube stations		Deliver additional step-free Tube stations
		Deliver Tube station capacity and improvement schemes (eg Tottenham Court Road)	Deliver Tube station capacity and improvement schemes (eg Camden Town	Deliver Tube station capacity and improvement schemes (eg Holborn)			
	Approximate number of step-free Tube stations (end of period)	86	111	126	141		
	Tube improvement programme (new trains and reduced crowding)	Deliver Four-Line modernisation programme		Deliver Deep Tube upgrade – Piccadilly line	Deliver Deep Tube upgrade – Bakerloo, Central and Waterloo & City lines		
		Deliver Tube upgrade programme – Jubilee, Northern and Victoria lines					
	DLR & tram	Deliver DLR and tram upgrades to increase capacity and improve reliability					
	River & coach	Improve accessibility at river piers and Victoria Coach Station (and its potential replacement)					
	New infrastructure (new step-free and improved connectivity by accessible public transport)	Deliver Northern line extension (including 2 step-free stations)		Deliver Elizabeth line extension east of Abbey Wood (step-free access in outer south east London)			
		Deliver Elizabeth line (including 41 step-free stations)		Deliver Bakerloo line extension to Lewisham (step-free access in inner south east London)	Deliver Bakerloo line extension beyond Lewisham (step-free access in south east London)		
					Deliver Crossrail 2 (step-free access to and through central London from north and south west London)		
Assisted Transport Services review		Deliver Assisted Transport Services roadmap	Continue to provide a single integrated Assisted Transport Service to those who need it				

FIGURE 21: DIFFERENCE IN JOURNEY TIMES USING THE STEP-FREE AND FULL NETWORK, 2015 AND 2041



c) Shaping and growing the bus network

Buses play a unique role in the life of London – they are the most accessible form of public transport, and they provide the widest and densest network of travel options for distances that are too long to walk or cycle. Good bus services are fundamental to achieving less reliance on the car, making efficient use of street space and supporting London's sustainable growth.

In parts of inner and outer London, making the bus a more attractive option than the car will require significant enhancements to bus services. Trip times must be comparable to car journey times and good quality bus stations, bus stops and other facilities are vital. Alongside this, better customer communication and branding are needed to make the bus network both easier to understand and more appealing to existing and future customers.

Policy 15
The Mayor, through TfL and the boroughs, and working with stakeholders, will transform the quality of bus services so that they offer faster, more reliable, accessible, comfortable and convenient travel by public transport, while being integrated with, and complementing, the rail and Tube networks.

The role of the bus in reducing car dependency

The bus network has been carefully developed over the past decades to accommodate changing travel demands. The transport network and passenger expectations are ever changing and further service development is required to adapt to these recent changes.

The beauty of the bus network is that it is flexible – routes are relatively easy to add and remove compared to Tube and rail lines, so they can be much more responsive to changes in demand than other forms of public transport. This means that buses can be important in supporting regeneration and social integration – where there may not be the justification for investing in expensive, permanent rail infrastructure, new bus routes can be planned to connect new communities and support housing and jobs growth.

This flexibility also makes buses the perfect means of providing convenient public transport options in areas of London that are changing. As the Healthy Streets Approach is applied to realise the benefits of more walking, cycling and public transport use across the city, the character of many parts of London will change over time. Using buses to support these changes will allow public transport links to be added where they are needed now, and potentially reviewed as cycling and walking become more common options in the future.

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The Healthy Streets Approach will support buses by reasserting the priority of walking, cycling and public transport over car use, and taking an integrated approach to planning these complementary modes. It is therefore important at this pivotal moment in the future of London's transport system that a strategic view of how the bus network operates is taken.

It is essential that TfL's bus services match demand from Londoners and visitors, and attract new users by being seen as a viable alternative to the car, if they are to fulfil their potential for supporting London's transport future. It will be important to make the most of the flexibility of the bus network to reduce and remove existing services where they are no longer required in central and inner London, and use this freed-up capacity to provide new or improved services in outer London. This may be in existing neighbourhoods that are poorly served, locations of significant new housing growth where demand is expected to increase, or in locations where buses can feed new or enhanced rail services, such as the Elizabeth line. TfL will listen to borough views when making these changes. This will have an important part to play in achieving the strategy's aim of reducing the damaging effects of car dependency, particularly in outer London.

Re-shaping the bus network

The current strategy for bus network development is to redistribute resources to reflect changing patterns of demand. There has been, and will continue to be, a fall in demand for buses in central London as passengers transfer to the new and upgraded rail network (e.g. Elizabeth line) and to cycling and walking. Demand for buses is expected to increase in outer London, where the potential for mode shift to buses and for housing growth is greatest. TfL will therefore re-shape the bus network to increase its focus on outer London. This will help improve bus services in outer London – right now, and continuing in the medium and longer term.

Bus services will be focused on streets where high-quality bus priority can be provided, ensuring reliable and quick services (see Figure 22). In central London, bus services could be concentrated on streets where they can be given the high priority required and thereby significantly increase reliability. Concentrating services on to fewer routes with higher frequencies on these streets would reduce waiting times for most passengers and offer a simpler network for all bus passengers. This would create a genuine network of high-frequency, reliable bus services across central London, using the Healthy Streets Approach to design in benefits



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for people walking, cycling and using public transport.

In outer London, new or enhanced bus services will be introduced to reduce car dependency and support growth, particularly around Elizabeth line stations and in areas where housing growth is expected, including Barking Riverside, Croydon, Royal Docks, Colindale and the Lee Valley.

As outer London becomes more densely populated, new types of service could allow buses to play an increasing role in allowing longer trips to be carried out without people having to rely on cars. These could include 'express' services, running on the same corridors as 'local' routes, but with fewer stops so longer journeys can be conducted more quickly. To allow both express and local services to run smoothly, at high frequency, this approach works best where bus demand is high, and where buses can be given high priority and allowed to flow freely. In places where this is possible, express routes could help to provide orbital connectivity around outer London, something that was previously only thought achievable through rail provision.

This strategic approach is supported by focused reviews of services, such as a recently completed study of bus routes serving hospitals. This research concluded that, while most hospitals have a good bus service, changes in NHS service provision mean that some bus services could need to be adjusted. A specific set of proposals[5] has been developed by TfL, which will require additional funding and infrastructure such as bus stands.

Proposal 57
The Mayor, through TfL, will adjust bus service volumes, and consider new types of bus service, to support measures to reduce car use in conjunction with improvements to rail services and walking and cycling environments.

Improving bus journey times and reliability

Taking the Healthy Streets Approach in inner and outer London will require a significant uplift in the number of journeys made by bus instead of car.

Across London, reasonable and reliable bus journey times are essential to the attractiveness of bus services to existing and potential customers. TfL will make sure bus routes are adequately resourced, contracts are incentivised to ensure reliable journeys, and supporting infrastructure (e.g. bus priority, stops and stands) is protected and enhanced.

However, the greatest threat to journey times and reliability is from road congestion caused by cars and other traffic as well as by the increasing volume of utilities road works. Buses therefore need to be given greater priority on London's streets.

Proposal 58
The Mayor, through TfL and working with the boroughs, will protect buses from congestion by:

a) Putting people walking, cycling and using public transport at the heart of street network design, with the needs of bus passengers considered alongside those of people walking and cycling at the earliest stages of scheme design.

b) Prioritising buses alongside walking and cycling provision in day-to-day management of disruption on the street network.

Protecting buses from congestion will require a bus priority programme that uses investment in specific, high-quality street changes that will protect bus journey times and improve reliability.

Bus priority programme
TfL will start by making the best use of existing bus priority by reviewing the hours of operation and reducing interference from general traffic. The Mayor will review whether lanes that do not currently operate in off-peak hours, late evening or on Saturdays and Sundays, should be extended to operate at these times or on these days. This can be delivered quickly and at low cost.

Further bus priority will be essential to give Londoners a good public transport experience. This will be planned in a new, holistic way with other road users: for example, opportunities for further improvements for cycling will be integrated into the scheme design. This will achieve the best result for public transport, walking, cycling and essential freight, as well as improving the public realm and reducing emissions.

Central London is where there is the greatest opportunity to improve bus journey times and reliability through the deployment of bus priority measures. These will include 24-hour bus lanes and bus- and cycle-only corridors, all of which will help to make bus services

5 'Review of Bus Services to London's Hospitals', TfL Board Paper: Customer Service and Operational Performance Panel, 13 July 2017

in central London simple to use as well as improving air quality and future-proofing the bus network from further congestion impacts.

Many of the main radial roads in inner London are key bus routes to central London. They carry large numbers of people and it is essential they continue to do this reliably. But these bus routes must also work well for the communities and town centres they pass through. Measures to improve bus reliability on these routes will include revised bus lane hours, traffic signal priority, policing and enforcement, behaviour change initiatives and priority measures. To improve air quality, low emission buses will be deployed along these routes.

Proposal 59

The Mayor, through TfL and the boroughs, will seek to improve bus journey times and reliability by:

a) Developing a core network of reliable bus services in central London, through the provision of bus priority corridors.

b) Delivering bus priority to support the low emission buses being rolled out in the 12 Low Emission Bus Zones. Improvements will include signal schemes and reviewing bus lane hours.

c) Delivering bus priority on the busiest passenger links, including working with the boroughs to undertake a data-led review of all bus lane hours and to fill the gaps in bus priority on the busiest bus routes. These bus lanes represent a valuable transport asset and they must be utilised when bus passengers and people cycling need them most.

d) Improving conditions for buses serving inner and outer London town centres and providing orbital links.

e) Delivering bus priority in areas of growth to support frequency increases, for example to new developments, and for bus services providing links to new rail services, such as the Elizabeth line.

The provision of reliable bus services also requires infrastructure to support their operation, including suitably located bus stands and facilities for drivers.

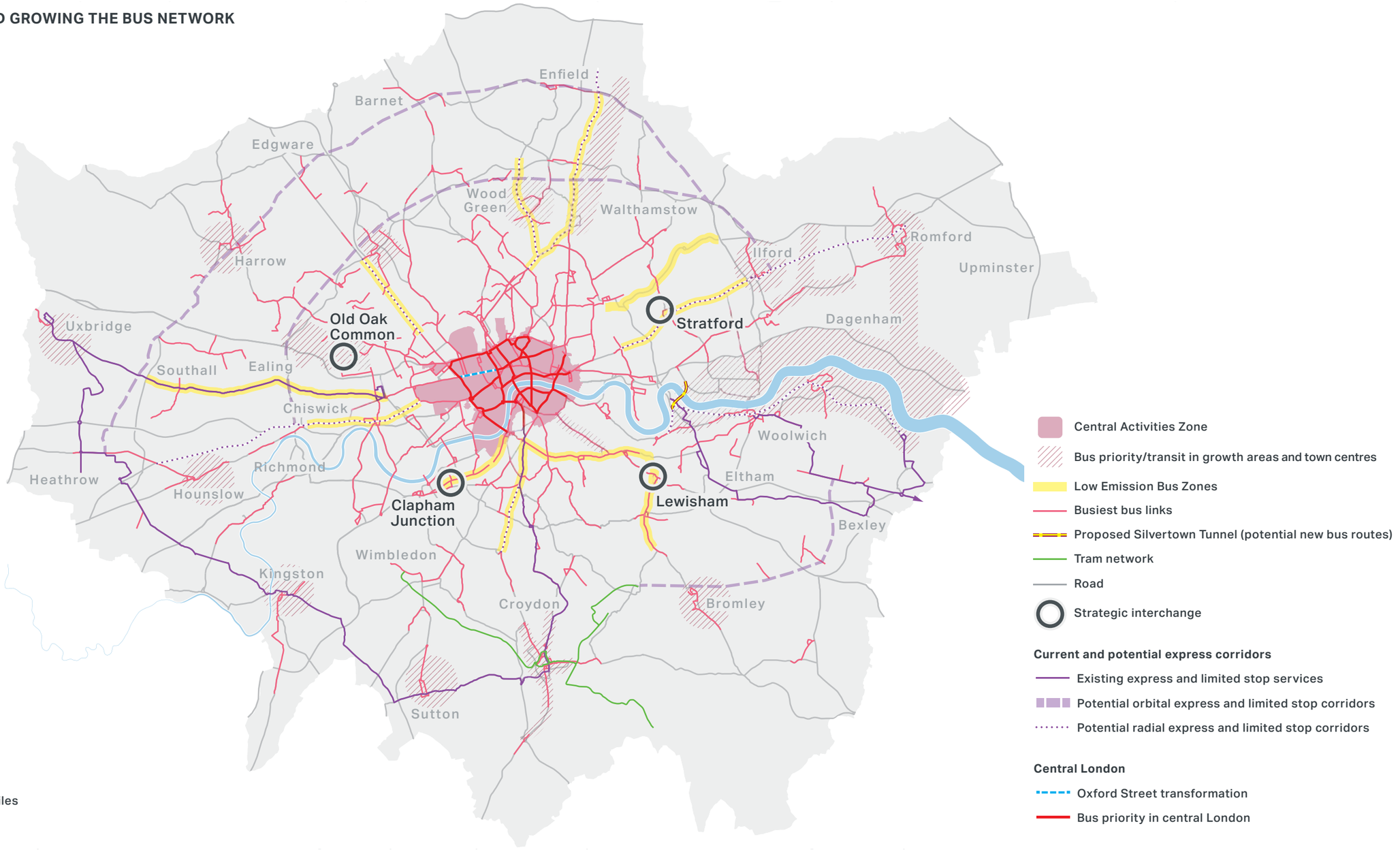
Improved bus services and bus priority are also essential in supporting the provision of new homes and jobs. This is addressed in Chapter five.

All of the above can only be successful if the public has an ongoing opportunity to shape and comment on TfL's plans. Accordingly, targeted consultation will be carried out on all service changes, and TfL will work with boroughs to discuss aspirations for bus priority and local bus networks. This work will continue to benefit from the expertise of bus operators, who have an essential role to play in the delivery of a high-quality network.

Demand-responsive services

New types of bus service, such as services that operate flexibly in response to levels and location of demand, are being developed across the world as different business models and technologies evolve. If designed well, these could complement walking, cycling and traditional public transport use in London to support the shift away from car dependency. However, services that operate with the wrong vehicles or in the wrong places could discourage walking, cycling and public transport use, potentially threatening the viability of existing bus services, which many people rely on. The proposed approach to demand-responsive services and other new transport models is set out in Chapter six.

FIGURE 22: SHAPING AND GROWING THE BUS NETWORK



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d) Improving rail services and tackling crowding

The importance of rail and Tube

London is more dependent on rail than any other city in the UK: 70 per cent of all rail travel (including Tube journeys) in the UK is to, from or within London. London's success is bound up with the future of its rail services. The Mayor will continue to improve the Tube, London Overground, DLR and tram services. It is vitally important that Network Rail and the train operating companies (TOCs) better serve London's needs, and that the Mayor has greater input and influence over the planning and delivery of their services.

Rail transport is critical to securing London's economic growth and future prosperity. The rail-based transport network has enabled central London to develop by facilitating access to a wide labour pool from well beyond London's boundaries, assisting business connections and allowing supply chain linkages. Rail-based modes of travel make up 80 per cent of the 1.3 million trips to central London in an average weekday morning peak period. The network of national rail and TfL lines needed to concentrate and then disperse such a volume of people is vast, and the 'hyper-connectivity' and capacity of the existing network of railways focused on central London enables the strong concentration of employment located there.

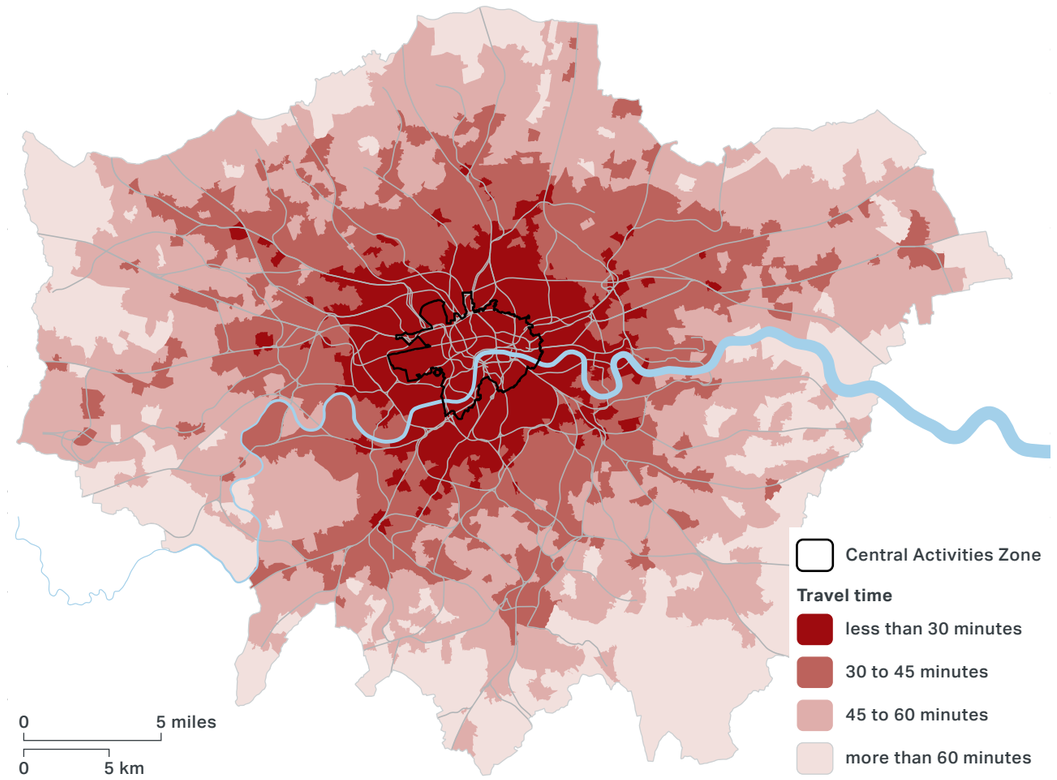
Figure 23 shows that residents of most of London can reach the Central Activities Zone (CAZ) in under an hour, with most inner London residents able to reach the centre in less than 45 minutes.

Tube and rail services are of essential importance to the functioning of the city, but too often the experience of using them is not good enough. Crowding is a real problem on most routes into central London on a daily basis: people struggle to get on board trains and experience uncomfortable journeys. It is also a significant barrier to using public transport for certain users such as disabled people and those travelling with young children.

Policy 16

The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to transform London's rail-based services to provide safer, modern, reliable, integrated, accessible and user-friendly services, with improved journey times and an increase in capacity of at least 80 per cent by 2041 to tackle crowding and facilitate mode shift to rail.

FIGURE 23: PUBLIC TRANSPORT TRAVEL TIME TO THE CENTRAL ACTIVITIES ZONE, 2015



Growth and crowding on radial services to central London

Crowding currently exceeds four people standing per square metre on six out of ten Tube lines coming into central London. Crowding is also severe on some national rail lines, such as those coming into Waterloo. At 60 per cent of stations within Zone 1, Tube trains depart with crowding in excess of four people standing per square metre. This is particularly challenging at Tube stations serving national rail termini, with more than 75 per cent of stations affected. This can make it difficult to board trains in some cases, and delays journeys.

Employment growth will exacerbate this, generating an increase in travel by all rail modes of more than 50 per cent by 2041. A step-change in capacity will be needed to address both of these challenges. If just the current investment programme (which excludes Crossrail 2) were followed, crowding on the Tube and rail networks would increase to well in excess of tolerable levels on some services in the morning peak by 2041, as shown by Figure 33.

The first step in tackling crowding is to inform the public of the best modes, routes and times for their journey so that they can, when possible, avoid the most crowded parts of the network. This might mean walking or cycling in the morning peak, for example, rather than making a short journey on a crowded Tube service. The provision of information both before and during the journey should be improved, making the most of new technological opportunities as they arise, to enable Londoners to make best use of their available travel options.

Proposal 60

The Mayor, through TfL, will seek to consistently deliver real-time data, information and visualisations for the Tube, rail, buses and streets via multiple customer channels. TfL will develop real-time tools for operational staff to improve the communication of overcrowding and congestion information to customers.

Most people travelling on crowded parts of the public transport system, however, have limited ability to alter their travel patterns. The provision of significant additional public transport capacity is therefore essential to tackle crowding, to enable mode shift and to provide for the expected growth in London's population.

A sufficient increase in capacity can only be achieved through building new lines, in particular Crossrail 2, and getting the most out of the existing network (see Figure 24). The strategy will increase capacity on all routes to enable growth and relieve the most crowded sections of the network. Rail capacity improvements to central London are shown in Figure 25. All the improvements contained in this strategy and set out in this chapter and Chapter five are needed to achieve this capacity increase.

FIGURE 24: PROPOSED RAIL AND TUBE CAPACITY INCREASES, 2015-2041, MORNING PEAK HOUR

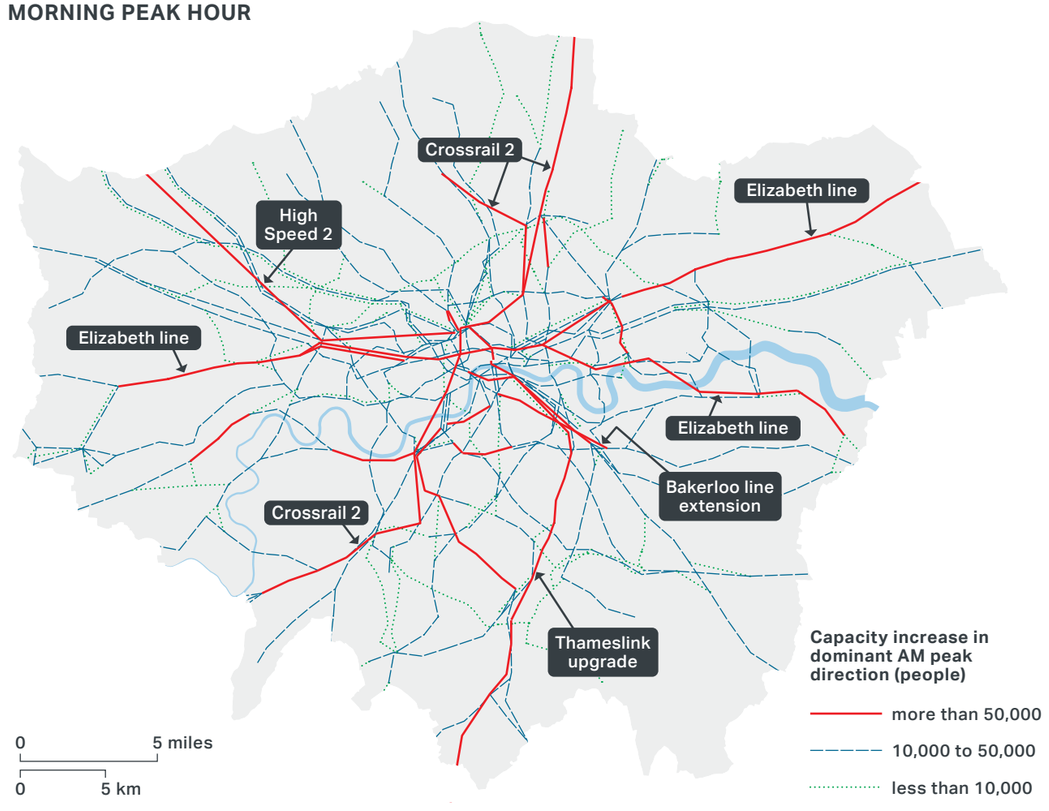
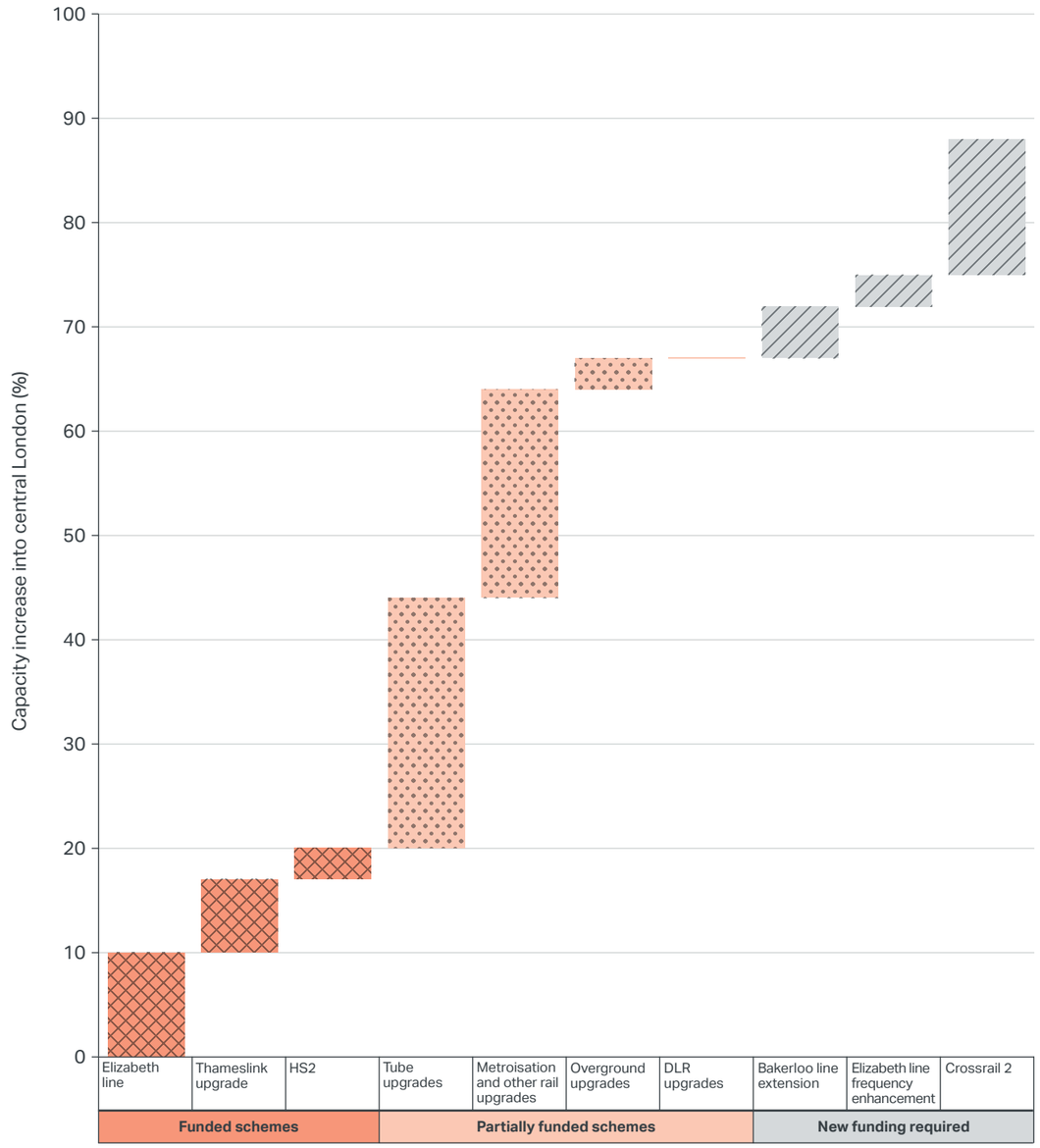


FIGURE 25: PROPOSED RAIL CAPACITY IMPROVEMENTS TO CENTRAL LONDON, MORNING PEAK, 2015-41



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FOCUS ON: CROSSRAIL 2

With London's population and employment growing, its transport infrastructure needs major improvements if it is to remain a successful city that can support the UK economy and provide a good quality of life for all its residents.

London is the world's pre-eminent international financial and business centre and the most productive economic region in the UK. Home to just over 13 per cent of the UK's population, it generates around 23 per cent of GVA and more than 25 per cent of national tax revenues. Through its trade and transport links, it also serves as an international gateway to the whole of the UK, with the entire nation benefiting from trade and investment generated in London. Despite current successes, however, the city's future international competitiveness is threatened by significant transport challenges and a severe housing shortage.

Crossrail 2 is a major new rail project that must be at the heart of London's response to these challenges. It will benefit businesses, residents and commuters across London, the Wider South East and the whole nation. It will enable London's highly productive economy to continue to grow by helping 270,000 more people get into the centre in the morning peak. It will thereby support 200,000 new jobs, as well as unlocking 200,000 additional new homes – more than 30 per cent of them outside London.

More than that, Crossrail 2 is an infrastructure scheme of national importance. It will be at the heart of the UK's post-Brexit economy, one of a series of key regional projects to boost Britain's competitiveness. Prioritising these schemes is not a zero-sum game: a series of infrastructure investments for growth is needed in every region, and each new project will support growth across the whole country. This will send a clear message that Britain is open for business and ready to compete.

Crossrail 2 involves connecting existing national rail lines in Surrey and Hertfordshire with two new 37km tunnels from Wimbledon to Tottenham Hale and New Southgate (see Figure 26). This main section will carry up to 30 trains an hour in each direction, increasing London's overall rail capacity by 10 per cent.

Combined with improved connectivity – the new line will connect with eight Underground lines, the London Overground, the Elizabeth line, High Speed Two (HS2) and national and international rail services – this extra capacity will allow Crossrail 2 to cut journey times to destinations across London. For example, a journey from Clapham Junction to Tottenham Court Road will be reduced by around 15 minutes.

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FOCUS ON: CROSSRAIL 2 (continued)

Crossrail 2 will reduce crowding on the Tube, which threatens to become severe by the early 2030s. For example, it will reduce demand on the busiest section of the Northern line Morden branch by around 20 per cent. Without Crossrail 2, many Underground station entrances across the network would need to be closed frequently in the future due to overcrowding. Crossrail 2 will prevent this at many of the busiest Underground stations across the network, including major interchanges at Waterloo, Euston and Victoria – playing a critical role in keeping London moving.

Moreover, Crossrail 2 will help make the transport network far more accessible. All Crossrail 2 stations will be step-free and Crossrail 2 trains will have wide doors and aisles, dedicated wheelchair spaces, and on-board passenger information. Like the Elizabeth line, it will deliver a step-change in London's rail capacity, as well as in links between London and the Wider South East, and provide an opportunity to enable better interchange between public transport modes, walking and cycling at key stations.

Crossrail 2 is vital not only to prevent London's transport networks coming to a standstill, but to open up connectivity across the whole of the Wider South East. Around a third of the benefits will be to users starting their journeys from outside London, and it will deliver reduced journey times across a wide swathe of southern England, from the Solent to the Wash.

For example, on the South West Main Line into Waterloo, the UK's busiest main line railway, crowding is already severe. Without Crossrail 2, in the 2030s it is forecast that there would be five people squeezed into every square metre of carriage space during peak periods. Crossrail 2 will transform that crush by creating space for an additional ten suburban trains and eight additional regional trains every hour in the morning peak, and a further ten new trains in the corridor between Wimbledon and central London. The new capacity it releases will allow new long-distance services to cities such as Portsmouth, Guildford and Southampton – key locations for housing and business growth.

Meanwhile, Crossrail 2 will also transform connectivity for key growth areas in north east London and beyond. It will allow at least 12 additional stopping trains to run on separate tracks on the West Anglia Main Line, as well as releasing extra capacity for regional services. It will deliver shorter, more reliable journeys between London, Cambridge and Stansted Airport – a key growth corridor.



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FOCUS ON: CROSSRAIL 2 (continued)

FIGURE 26: CROSSRAIL 2 ROUTE (CONSULTATION 2015)



Crossrail 2 indicative alignment 2015 (subject to change)

Only a major project bringing frequent, 'turn-up-and-go' rail services can open up some of the significant areas in need of regeneration in London, especially in north east London. Indeed, the route has been designed to improve links and to unlock major opportunities for new housing such as in the deprived Lee Valley, one of London's largest 'Opportunity Areas' for housing.

But the benefits of investing in Crossrail 2 will also be felt right across the UK. It will add up to £150bn to the UK economy. It will support the country's engineering, construction and manufacturing sectors and give them the confidence to invest, and develop skills. Based on analysis of the Elizabeth line supply chain, it is estimated Crossrail 2 spend with suppliers can, for example, add more than £1bn to the West Midlands economy, more than £200m to the north east of England and up to £170m to the Scottish economy. During construction, Crossrail 2 will also support around 60,000 full-time jobs across the UK, and thousands of apprenticeships.

Crossrail 2 is affordable. London has shown how it can fund more than half of the £30bn cost over time, and the project's huge boost to the national economy will generate additional tax revenues of up to four times the remaining half of the costs. These revenues include growth in stamp duty and business rates, which TfL's evidence[6] provided to the London Finance Commission showed can deliver an extra £9bn in zones around Crossrail 2 stations.

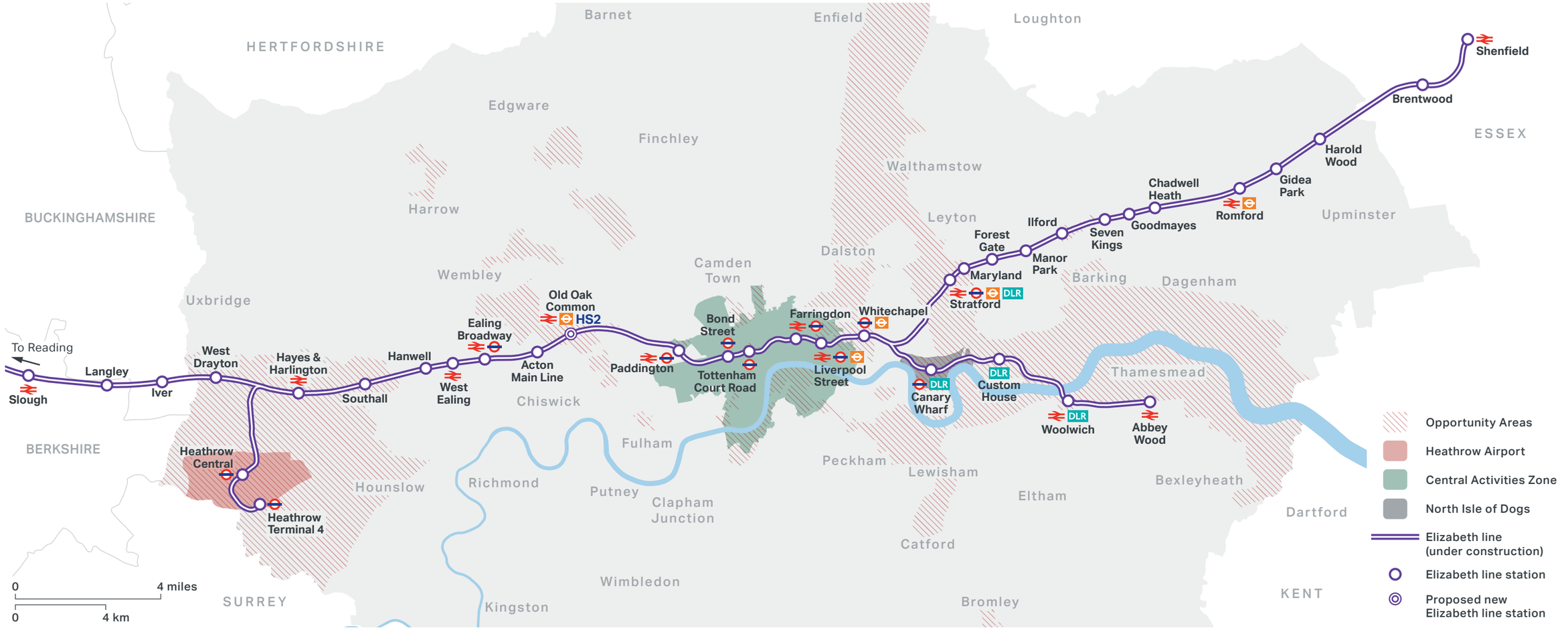
The proposal for Crossrail 2 commands widespread public support. It was unequivocally endorsed in 2016 by the National Infrastructure Commission, the Government's independent body tasked with reviewing the scheme in detail. The Government has already committed sufficient funding to obtain the necessary powers for its construction, through a hybrid bill in Parliament. Construction could start in the early 2020s, with Crossrail 2 opening before the arrival of HS2 phase 2b at Euston in the early 2030s. It is essential for the good of the nation that this project is delivered.

Proposal 61

The Mayor, through TfL, will work with Government and stakeholders to finalise the Crossrail 2 route alignment and stations, ensuring the project progresses through the detailed design phase to gain powers to enable construction to start in the early 2020s, with the line opening by the early 2030s in time for the opening of Phase 2b of High Speed Two.

6 Land Value Capture – final report, www.london.gov.uk, February 2017

FIGURE 27: ELIZABETH LINE



The Elizabeth line, due to open in 2019, will increase capacity to central London by about 10 per cent and will transform the experience of travel across the capital. Trains will feature walk-through carriages, air-conditioning, CCTV and live travel information. The line, the route of which is shown in Figure 27, will relieve crowding on the Tube network and reduce journey times from east and west London, including Heathrow, to central London and the Isle of Dogs. It will reduce congestion at Paddington and Liverpool Street and in the West End. The Elizabeth line will mean that an extra 1.5 million people will be within 45 minutes' commuting distance of central London; those living in the south east of the city, for example, will be able to directly access the West End for the first time.

The Elizabeth line has been designed to allow for future increases in capacity, given the expected demand growth associated with an increasing population and growing employment in the areas it serves.

Proposal 62

The Mayor, through TfL, will work with the DfT to open the Elizabeth line in 2019, with services initially providing 24 trains per hour through central London and increasing in frequency during the 2020s as demand requires.

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Increasing capacity and improving Tube services

Even with the Elizabeth line, as London grows, crowding on the Underground will increase significantly. Investment in the Tube network is essential to support this anticipated growth, seeking to make the most of the potential capacity the network can offer. New trains and upgrades to signalling, track, and train control systems will be needed to enable more frequent services and faster journey times, as well as improved accessibility and a more pleasant travelling environment. Upgrading the network while providing a safe, frequent service day in, day out is extremely challenging and requires significant resources. Investment in Tube improvements will need to continue over the lifetime of this strategy.

The current Four-Line modernisation programme will improve reliability and ensure a highly efficient service on the Metropolitan, District, Hammersmith & City and Circle lines. Following the roll-out of new walk-through trains, the programme will upgrade signalling and train control systems to enable higher service frequencies. This will result in an increase to 30 trains per hour in central London by 2021, allowing up to 102,000 additional journeys in the morning peak, with a further increase to 32 trains per hour in the mid-2020s. The programme will also provide step-free access from train to platform and a more comfortable journey experience.

In the longer term, capacity will need to be increased across the network. On the Piccadilly line, new higher-capacity, walk-through trains will be introduced, and signalling and track upgraded. This will enable frequencies of 33-36 trains per hour, allowing up to 77,000 additional journeys in the morning peak. TfL will optimise services in west London by running Piccadilly line services, instead of the District line, to Ealing Broadway. This will take place in the 2020s following the upgrades of these lines and will enable increased frequencies to the busier Richmond and Wimbledon branches of the District line.

On the Victoria line, frequencies were increased in 2017 to a peak of 36 trains per hour, and further improvements will lengthen the peak period and improve early morning services, allowing up to 15,000 additional journeys in the morning peak. Frequencies of up to 36 trains per hour could be achieved on the Jubilee line, allowing up to 27,000 additional journeys in the morning peak. On the Northern line, frequencies of 30-32 trains per hour could allow up to 54,000 additional journeys in the morning peak. Capacity will also be increased on the Waterloo & City, Central and Bakerloo lines.

Proposal 63
The Mayor, through TfL, will invest in the Tube network to improve the capacity and reliability of its train services.

Capacity increases on national rail services to tackle crowding

National rail services are vital to London's economy, allowing over half a million people to travel into central London every working day. In addition to commuters arriving from outside London, much of London itself, especially south London, is dependent on the national rail network for access to the centre. Demand on the network for travel to central London in the morning peak is forecast to rise by at least 50 per cent by 2041, increasing crowding, so capacity improvements are needed.

Investment is needed in modern, digital signalling and train control systems to enable higher service frequencies and reliability. Digital Railway, the rail industry's plan to modernise the UK's railways through targeted use of digital technologies, is expected to deliver improvements in performance and capacity. In some instances, especially in busy urban areas, this is less disruptive and more cost-effective than alternative options such as building new tracks. The plan focuses primarily on traffic management, which optimises the flow

of trains across the network and thereby improves performance, and the European Train Control System, also known as in-cab signalling, which reduces headways between trains and thereby has the potential to improve capacity.

In addition to Digital Railway, improvements in track layouts at key bottlenecks and capacity upgrades at stations would both allow more trains to run. More capacity is needed on both local and longer-distance services, the latter being used by outer London residents, as well as people travelling from further afield. Partnership working between the Mayor, TfL, Network Rail and the DfT is crucial to delivering these improvements.

The first priority is the Brighton Main Line, where a major upgrade is needed to unlock bottlenecks at East Croydon and other locations on the line that passes through Gatwick Airport. This will have substantial benefits for commuters using fast services from Croydon and outside London, as well as unlocking new capacity for better local services across South London, allowing more people to commute to Croydon town centre by rail.

Other priorities include additional Southeastern rolling stock, increased frequencies into Moorgate, longer trains into Fenchurch Street and improvements on the West Anglia Main Line. Reconfiguration of tracks at Bow and in Battersea will allow more trains to run to Liverpool Street and Waterloo, respectively. Electrification of more of the network (e.g. connections to the Gospel Oak line and services to Marylebone) and providing more 12-car train services (with platform extensions and station improvements to support this) are also required to provide the necessary capacity increases both to and within London.

In the longer term, improvement works will be needed to relieve bottlenecks at places such as Clapham Junction, Lewisham and Herne Hill. Many of these schemes will support proposals for more metro-like suburban rail services as described in the next section.

Proposal 64
The Mayor, through TfL, will work with Network Rail and the DfT on schemes that will increase the capacity and reliability of the national rail network to and within London, managing crowding on both local and longer-distance services.

Rail services to enable mode shift from car in inner and outer London

While rail and Tube are the main modes of radial travel to central London, cars are the principal means by which Londoners make orbital journeys in inner/outer London. The success of the London Overground orbital network in inner London – where usage has increased fivefold since the service was transformed by TfL – demonstrates that Londoners will use public transport services if provided.

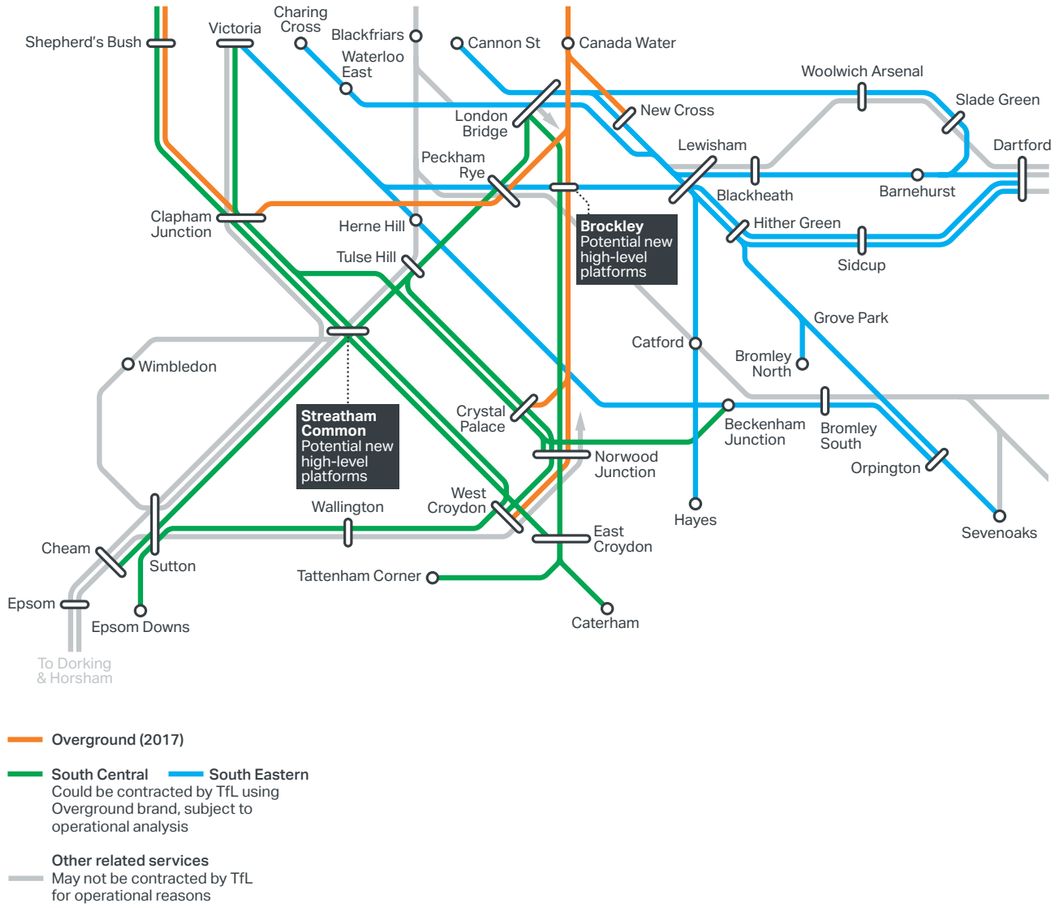
With the exception of London Overground and TfL Rail, the Mayor does not have direct control over the TOCs that provide local train services in London. Overall, the reliability and quality of the services provided by these TOCs – which provide most of the services used by Londoners – continue to lag behind that of London Overground and TfL Rail, and hence the Mayor has concerns regarding their ability to contribute to achieving the vision and aims of this strategy.

Responsibility for these services should therefore be devolved from DfT to the Mayor (see Focus on: Devolution of Suburban Rail Services to TfL Control), who would then work to ensure they are improved to provide better levels of service.

A new London suburban metro
South London relies on its suburban rail network for connectivity to central London. However, there is a substantial and growing gap between the level of service that can be offered on national rail in south London, and the frequency and reliability now offered on the Tube and bus network. Local train services on the Great Northern line and in south London (see Figure 28) should be modified to create a London suburban metro, offering improved frequencies, journey times and interchange opportunities. These improvements could be delivered by the late 2020s and would provide up to 124,000 additional places into central London in the peak period from south London, and up to 38,000 additional places in the peak period on non-radial services around inner and outer London. Journey times could improve by up to 15 per cent. As outlined in Proposal 64, TfL will work with Network Rail to identify and deliver the improvements to signalling, train control systems, junctions and stations that are needed to make best use of the network.

Proposal 65
The Mayor, through TfL, will work with Network Rail, train operating companies and stakeholders to seek the modification of the planning of local train services from Moorgate, Victoria and London Bridge to create a London suburban metro, offering improved frequencies, journey times and interchange opportunities by the late 2020s.

FIGURE 28: PROPOSED LONDON SUBURBAN METRO IN SOUTH LONDON



FOCUS ON: DEVOLUTION OF SUBURBAN RAIL SERVICES TO TFL CONTROL

Through the success of London Overground, TfL has demonstrated that it can significantly improve customer service. This same quality service should be available to all Londoners. While the capacity enhancements described above are crucial, even greater benefits to Londoners could be achieved if they were accompanied by devolution from the DfT to TfL of specifications for local train services in London within the South Eastern, South Western, South Central and Great Northern franchises as soon as practicably possible. There is a strong business case for devolution of these services as it would make the creation of a London suburban metro much simpler and faster, and would provide greater benefits for Londoners and visitors alike.

Devolution would enable the Mayor to put in place better incentives for the franchisee to deliver the same reliability standards as London Overground, and to specify improved service frequencies at off-peak times, especially at weekends. Stations would be more welcoming, with staffing from first to last trains, and a cleaner, brighter environment. There would be integrated travel advice and improved information, as well as a move towards more affordable, simple and integrated fares over time, and increased availability of step-free access and 'turn-up-and-go' travel for wheelchair users.

With devolution, TfL's role would be restricted to selected local passenger services within the London area or slightly beyond where the geography of the railway network requires it. Passengers using longer-distance services, which would remain the responsibility of the DfT, would be unaffected in terms of fares, train stopping patterns or relative priority of services. TfL would have no ability to alter their timetables, although TfL estimates there would be beneficial knock-on reliability improvements as a result of devolving local stopping services to TfL.

Figure 29 shows the assumed geographic scope of the local stopping services that would transfer to TfL under devolution. Almost 50 per cent of passenger journeys on these local stopping services are made on the existing London Overground network and the services that will form part of the Elizabeth line.

Proposal 66
The Mayor, through TfL, will continue to seek the devolution from DfT to the Mayor/TfL of the responsibility for local stopping rail services in London in the interest of providing improved customer services more efficiently and more quickly, and to enable better integration with London's wider transport system.

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FIGURE 29: ASSUMED GEOGRAPHIC SCOPE OF THE LOCAL STOPPING SERVICES THAT WOULD TRANSFER TO TFL UNDER DEVOLUTION



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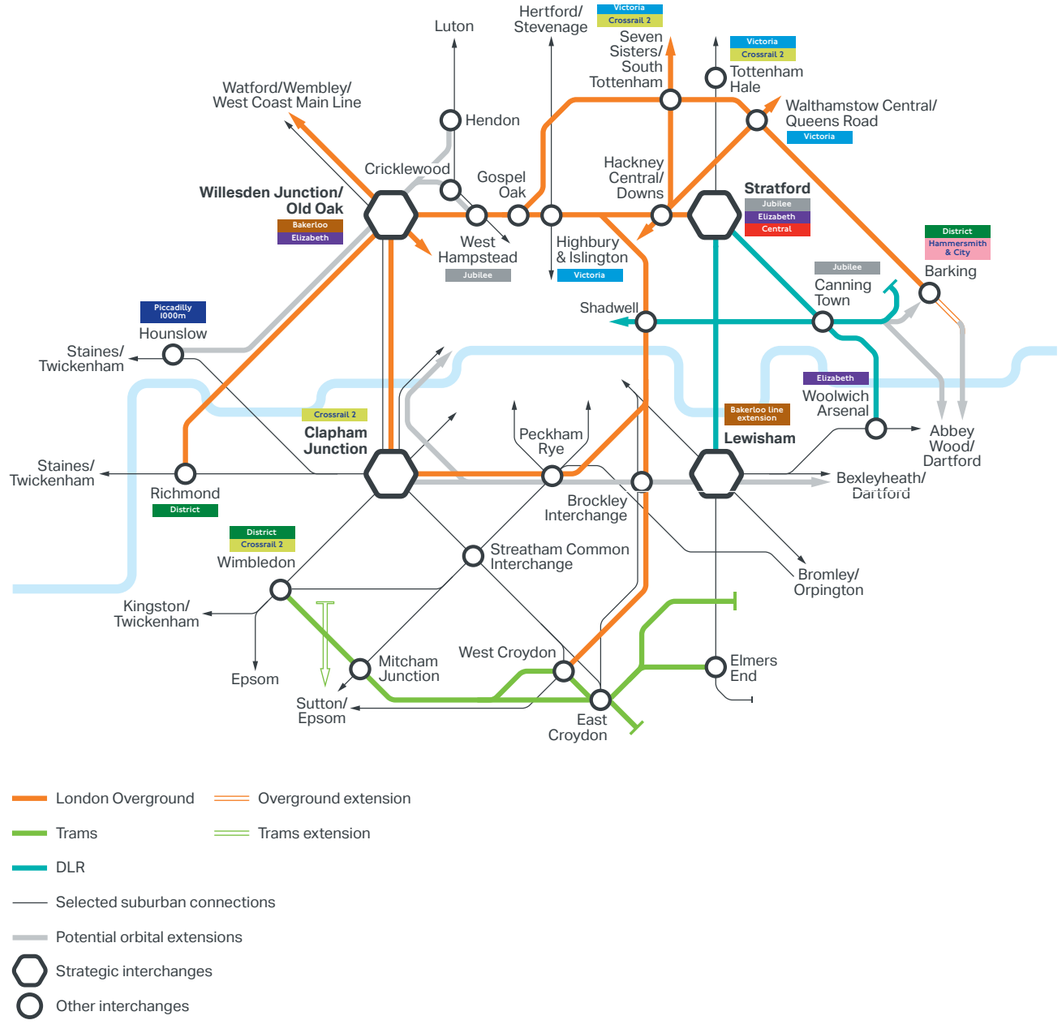
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Improving rail services to town centres
Travel in much of inner and outer London will be transformed by improved rail links to town centres, creating new rail hubs. Town centres would be served by 'mini-radial' networks, developed by improving train services on existing lines, opening some new lines, and creating new interchange hubs. Linked together, these mini-radial networks could provide for orbital trips to be made by rail in inner and outer London. Figure 30 shows potential mini-radial hubs and orbital rail links.

Improved orbital rail services, integrated with bus services and improvements for cycling and walking, would enable significant benefits to be achieved across most of inner London and much of outer London from what is largely the existing rail infrastructure. An improvement to the orbital network would enable mode shift and reduce reliance on the car by providing more options for Londoners to take good-quality, reliable, less crowded and fast public transport to local destinations in inner and outer London. The 'reach' of the step-free network would also be enhanced, in a cost-effective way, therefore increasing options for disabled users and those travelling with, for example, baby buggies or luggage.

FIGURE 30: POTENTIAL MINI-RADIAL HUBS AND IMPROVED ORBITAL RAIL LINKS IN INNER AND OUTER LONDON



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The improved orbital network would provide 'knock-on' benefits for users on some of the most crowded and congested parts of the network: it would reduce the need to travel to/through central London to reach the final destination, thereby reducing pressure on rail terminals and public transport routes to central London. The orbital network would also improve public transport network connectivity and resilience at times of service disruption.

Proposal 67
The Mayor, through TfL, will work to encourage the development and integration of inner and outer London rail services and multi-modal interchange hubs to create 'mini-radial' public transport links to town centres and to provide improved 'orbital' public transport connectivity.

In the first instance, improving the orbital rail network means enhancing those interchanges that maximise public transport connectivity across inner and outer London at Clapham Junction, Lewisham, Stratford and potentially Old Oak.

These interchanges are critical as they have superior connectivity in their respective areas of London. They can each provide multiple high-frequency radial services to central London, high-quality orbital services that connect to other parts of London and high-frequency local bus services.

Stratford and Clapham Junction are well-established hubs, but they are both becoming congested and more capacity is needed. Lewisham is a very significant local hub but needs a major upgrade and more frequent rail connections to the rest of south London to fulfil its potential as a strategic interchange. A new London suburban metro would support this. Old Oak is an emerging hub that will need new stations and connections to enable it to act as a major strategic interchange for north west London.

Priority should also be given to enhancing step-free connectivity at stations and busy bus interchanges, enabling multi-modal travel.

Current investment will enable an upgraded service on the Gospel Oak to Barking line in 2018 with longer, electric trains. Beyond this, a capacity enhancement programme should provide longer trains and/or higher frequencies on the North and West London lines by the mid-2020s, and potentially new stations at Old Oak, enabling a service offering 10-12 trains per hour between Clapham Junction and Old Oak. This will meet growing demand, and support growth at Old Oak and Stratford.

Also by the 2020s, improved signalling will enable train frequencies on the East London line to be increased from 16 to 20 and then to 24 trains per hour. This will allow more trains to serve Clapham Junction, and the rest of the line via Forest Hill. Targeted capacity improvements on the Watford-Euston and West Anglia lines should be provided in partnership with Network Rail.

Proposal 68
The Mayor, through TfL, will work with the DfT to increase the capacity of the London Overground network by 45 per cent by 2030.

The tram and Docklands Light Railway (DLR) networks provide radial services to rapidly growing Croydon, and to the City and Isle of Dogs areas respectively. In doing so, the networks also contribute to improving London's orbital connectivity. Capacity and other improvements are required on each of these networks to cater for mode shift from the car in the areas they serve, and also to connect better with the broader orbital network.

Rapid office and residential development in east London has meant a significant increase in use of the DLR, which is forecast to continue – it is essential therefore that capacity on this network is improved.

Proposal 69
The Mayor, through TfL, will increase the capacity of the existing Docklands Light Railway network by 120 per cent by 2041 through the introduction of a new higher-capacity train fleet and improved frequencies (towards 30 trains per hour across more of the network), accompanied by greater station capacity at major development sites and transport interchanges.



A significant capacity increase is needed on the tram system serving Croydon and south London to address crowding and help accommodate the anticipated growth in homes and jobs in south London, without reliance on the car. This will be achieved by means of new track to enable more trams to run to central Croydon by 2030, and a new and expanded tram fleet. Peak tram frequencies will be increased, from 12 trams per hour to 18 trams per hour or more on services west of Croydon (towards Wimbledon), and from 22 trams per hour to 30 trams per hour on services east of Croydon (towards Beckenham Junction/Elmers End/New Addington). Longer trams will also be introduced to increase capacity.

The above improvements will deliver an 85 per cent increase in total tram capacity to and from Croydon town centre. Most passengers will have a wait time of less than four minutes.

Proposal 70
The Mayor, through TfL, will upgrade the tram system to improve its reliability and to increase its capacity by 85 per cent to/from Croydon by 2030.

Station capacity
The increased capacity of train services described above must be accompanied by improved station capacity in some locations. Without this, stations can become bottlenecks, reducing the ability of the system to run smoothly, and resulting in station closures to ensure safety. Put simply, station capacity enhancements must be delivered in tandem with train service capacity improvements for the system to work as a whole.

On the Tube network, works are already under way at Victoria, Bond Street and Bank. Station capacity improvements will also be needed at Baker Street, Holborn, Camden Town and other major central London stations. On the rail network, priority stations include Liverpool Street, Clapham Junction, Wimbledon, East Croydon, Barking, Lewisham and Peckham Rye.

Major station schemes to relieve station congestion also enable improvements to be made to station and interchange accessibility, with inclusive design, lifts and step-free access provided. These measures benefit all users of the station.

Proposal 71
The Mayor, through TfL and working with Network Rail and the boroughs, will deliver a programme of station capacity improvements to complement line capacity enhancements and to improve the overall public transport journey experience in London.

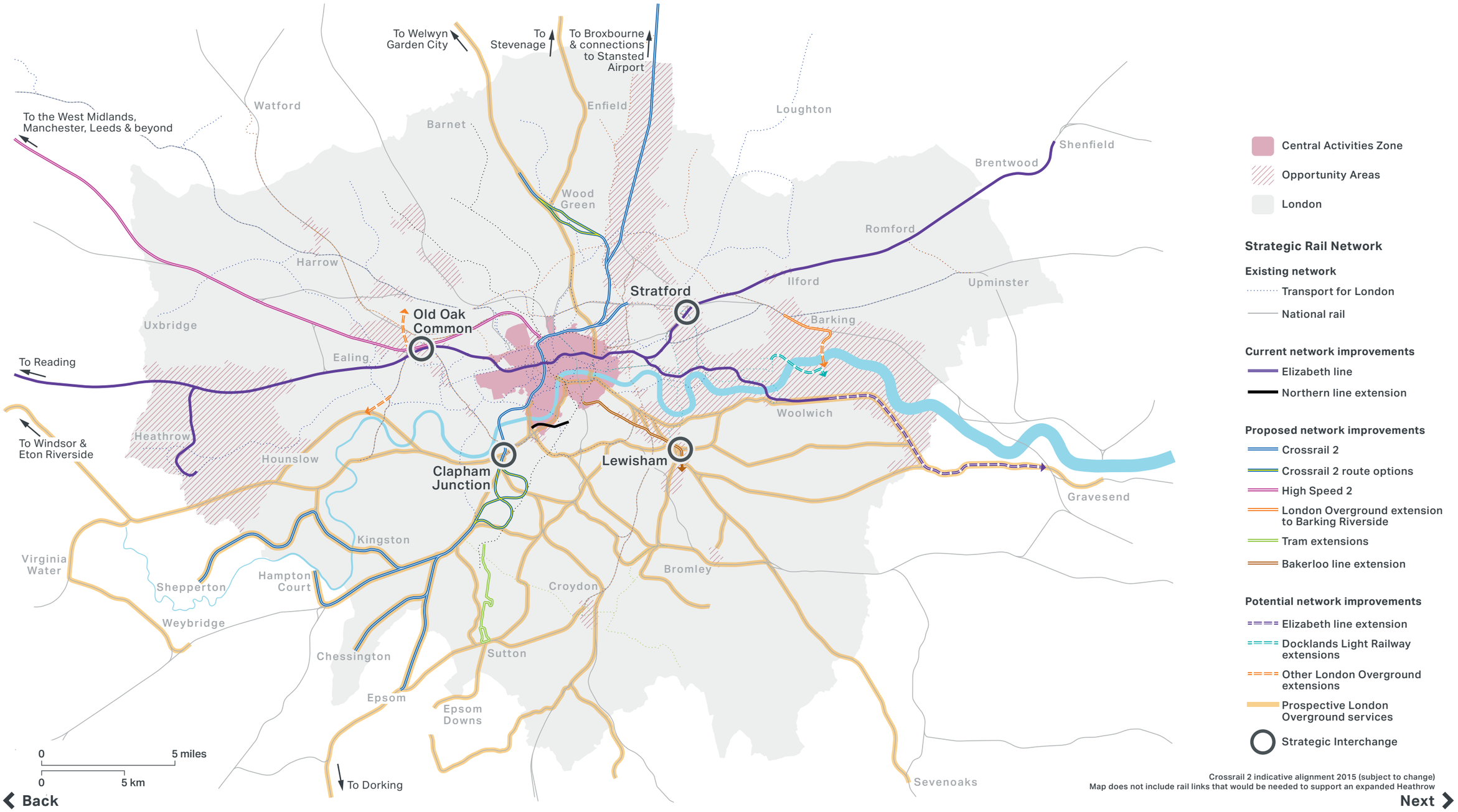
Extensions of the Bakerloo line to Lewisham and beyond (providing extra capacity on the Tube for 65,000 journeys in the morning and evening peak), of the London Overground to Barking Riverside, of the Northern line to Battersea, and of the DLR to Thamesmead will enable more Londoners to use public transport and reduce future car dependency. These schemes, which will unlock development, are described in Chapter five.

Crowding and connectivity
Some of the proposals to improve the rail and Tube network are shown in Figure 31. The public transport capacity enhancements included in the strategy will reduce the amount of crowding and offer better connections across the city. Figures 32 and 33 show the improvement in crowding delivered by the funded programme only compared to that delivered by the full strategy, respectively. Figure 34 shows how access to jobs will be expanded by new and improved public transport services.

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FIGURE 31: STRATEGIC RAIL NETWORK



Crossrail 2 indicative alignment 2015 (subject to change)
Map does not include rail links that would be needed to support an expanded Heathrow

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FIGURE 32: CROWDING ON THE RAIL, TUBE, DLR AND TRAM NETWORK, 2041, MORNING PEAK, WITH ONLY COMMITTED INVESTMENT (IE, EXCLUDING CROSSRAIL 2 AND OTHER CURRENTLY UNFUNDED SCHEMES)

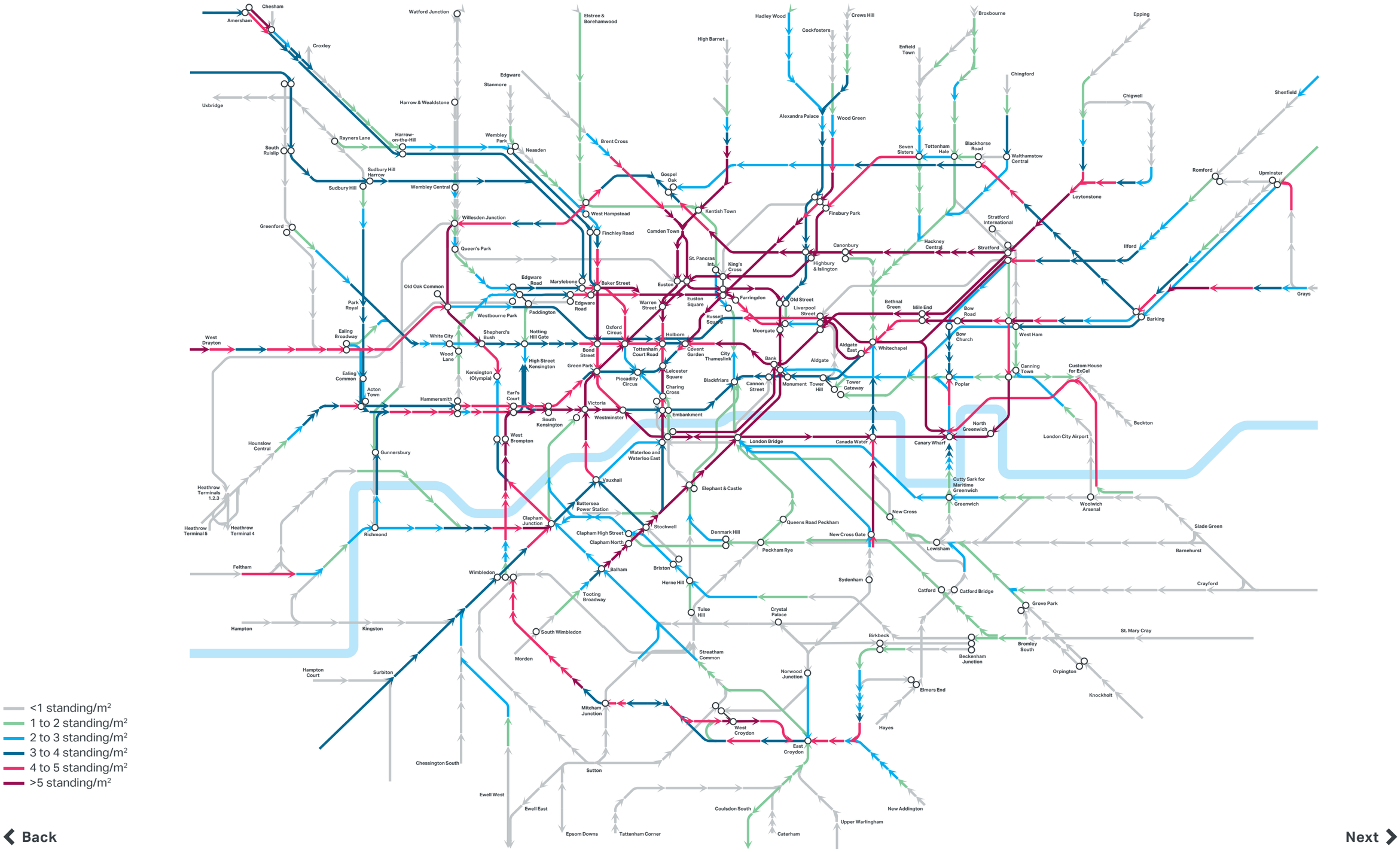
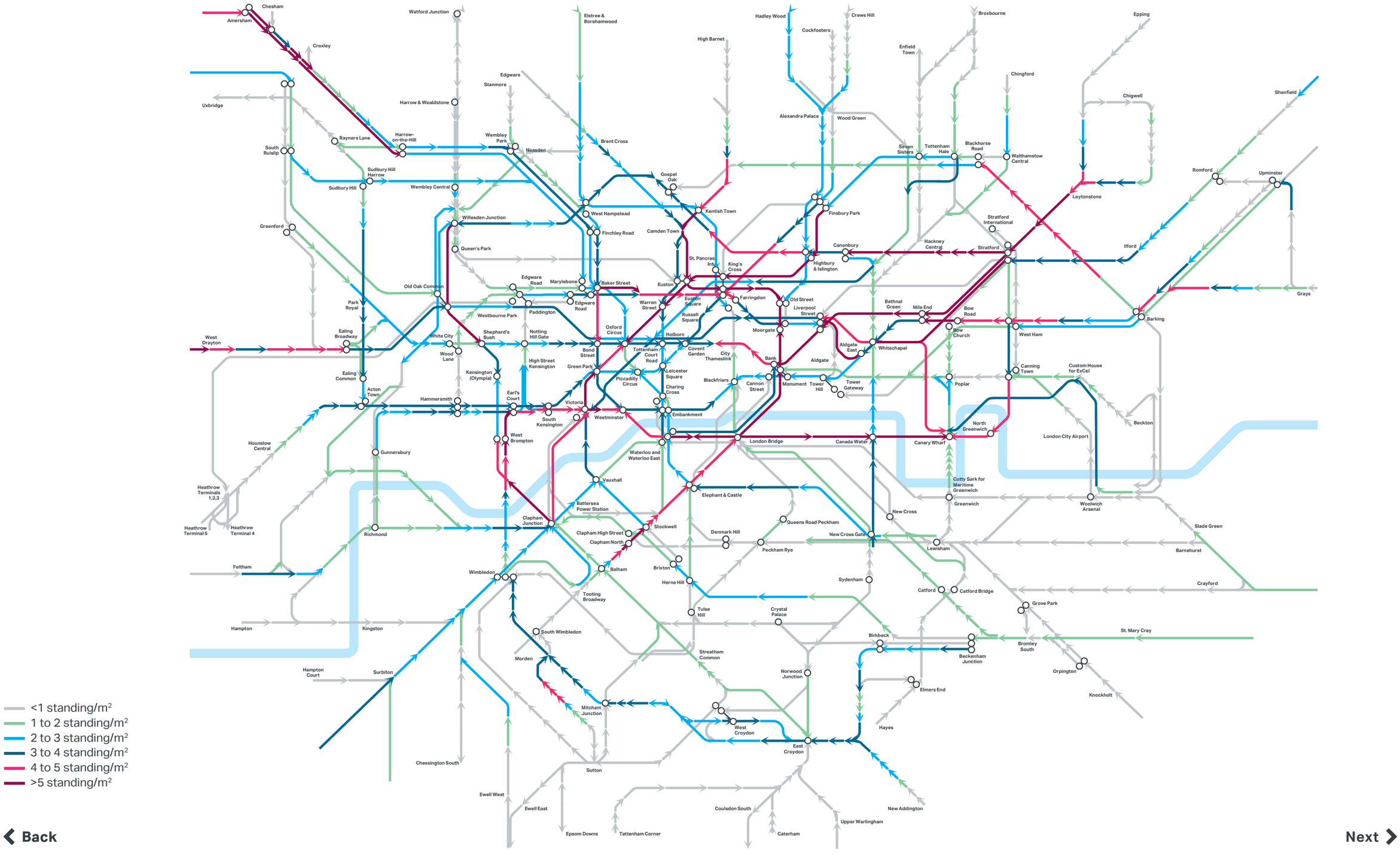

Chesham
Amersham
Croxley
Uxbridge
South Ruislip
Rayners Lane
Harrow-on-the-Hill
Sudbury Hill Harrow
Sudbury Hill
Greenford
Park Royal
West Drayton
Ealing Broadway
Ealing Common
Acton Town
Hounslow Central
Heathrow Terminals 1,2,3
Heathrow Terminal 5
Heathrow Terminal 4
Feltham
Hampton
Kingston
Hampton Court
Surbiton
Richmond
Gunnersbury
Chiswick Park
Turnham Green
Stamford Brook
Ravenscourt Park
Hammersmith
Wood Lane
White City
Shepherd's Bush
Kensington (Olympia)
Earl's Court
West Brompton
South Kensington
Wembley Central
Harrow & Wealdstone
Watford Junction
Wembley Park
Stanmore
Edgware
Neasden
Willesden Junction
Queen's Park
Kensal Green
Kensal Rise
Brondesbury
Brondesbury Park
Kilburn High Road
Kilburn
Westbourne Park
Paddington
Old Oak Common
Edgware Road
Marylebone
Baker Street
Great Portland Street
Regent's Park
Oxford Circus
Bond Street
Green Park
Piccadilly Circus
Charing Cross
Leicester Square
Tottenham Court Road
Holborn
Covent Garden
Embankment
Victoria
Westminster
Vauxhall
Battersea Power Station
Clapham Junction
Clapham High Street
Clapham North
Stockwell
Balham
Tooting Broadway
Tooting Bec
Wimbledon
South Wimbledon
Morden
Brixton
Herne Hill
Tulse Hill
Streatham Common
Mitcham Junction
Sutton
Chessington South
Epsom Downs
Ewell West
Ewell East
Tattenham Corner
Elstree & Borehamwood
Brent Cross
West Hampstead
Finchley Road
Swiss Cottage
St. John's Wood
Maida Vale
Warwick Avenue
Edgware Road
Paddington
Gospel Oak
Kentish Town
Camden Town
Euston
St. Pancras Int.
King's Cross
Farringdon
Euston Square
Warren Street
Russell Square
Holborn
Tottenham Court Road
Leicester Square
Charing Cross
Blackfriars
Cannon Street
Monument
Tower Hill
Bank
City Thameslink
Aldgate
Aldgate East
Whitechapel
Shadwell
Wapping
Rotherhithe
Canada Water
Canary Wharf
North Greenwich
London Bridge
Waterloo and Waterloo East
Elephant & Castle
Queens Road Peckham
Peckham Rye
Denmark Hill
Camberwell
Oval
Kennington
Waterloo
Lambeth North
Southwark
Borough
London Bridge
Bermondsey
Surrey Quays
New Cross
New Cross Gate
Lewisham
Sydenham
Forest Hill
Honor Oak Park
Crofton Park
Brockley
Catford
Catford Bridge
Grove Park
Bellingham
Beckenham Junction
Elmers End
Birkbeck
Hayes
West Croydon
East Croydon
Norwood Junction
Crystal Palace
Tulse Hill
Streatham
Streatham Hill
Streatham Common
Balham
Clapham North
Clapham High Street
Clapham Junction
Battersea Power Station
Vauxhall
Stockwell
Brixton
Herne Hill
Tooting Broadway
Tooting Bec
Wimbledon
South Wimbledon
Morden
Mitcham Junction
Sutton
Chessington South
Epsom Downs
Ewell West
Ewell East
Tattenham Corner
Coulsdon South
Caterham
Upper Warlingham
New Addington
Orpington
Knockholt
Bromley South
St. Mary Cray
Crayford
Slade Green
Barnehurst
Woolwich Arsenal
Beckton
London City Airport
Custom House for ExCel
Canning Town
Poplar
Limehouse
Westferry
Cutty Sark for Maritime Greenwich
Greenwich
Deptford Bridge
Lewisham
Hadley Wood
Cockfosters
Crews Hill
Alexandra Palace
Wood Green
High Barnet
Enfield Town
Seven Sisters
Tottenham Hale
Blackhorse Road
Walthamstow Central
Chingford
Broxbourne
Epping
Chigwell
Leytonstone
Stratford International
Stratford
Hackney Central
Canonbury
Highbury & Islington
Finsbury Park
Romford
Upminster
Shenfield
Grays
Ilford
Barking
Bethnal Green
Mile End
Bow Road
Bow Church
West Ham
Moorgate
Liverpool Street
Old Street
Farringdon
Russell Square
Euston Square
Warren Street
Euston
Baker Street
Marylebone
Edgware Road
Paddington
Westbourne Park
Old Oak Common
Willesden Junction
Harrow & Wealdstone
Wembley Park
Neasden
Brent Cross
Gospel Oak
Kentish Town
Camden Town
Finchley Road
West Hampstead
Swiss Cottage
St. John's Wood
Maida Vale
Warwick Avenue
Edgware Road
Paddington
Kensington (Olympia)
Earl's Court
West Brompton
South Kensington
Victoria
Westminster
Embankment
Charing Cross
Leicester Square
Piccadilly Circus
Green Park
Bond Street
Oxford Circus
Tottenham Court Road
Holborn
Covent Garden
Blackfriars
Cannon Street
Monument
Tower Hill
Tower Gateway

FIGURE 33: CROWDING ON THE RAIL, TUBE, DLR AND TRAM NETWORK, 2041, MORNING PEAK, WITH THE (FULL) STRATEGY

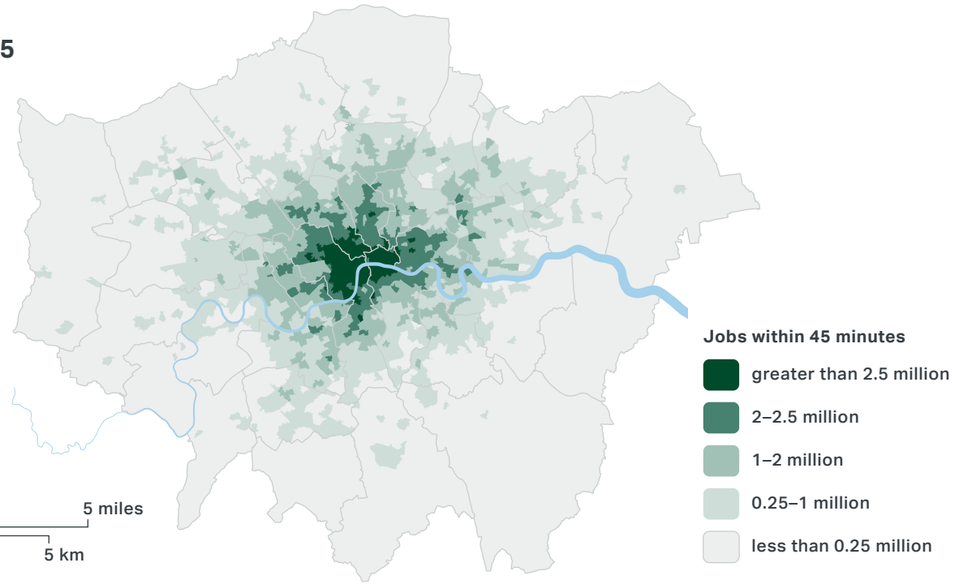


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FIGURE 34: IMPROVED ACCESS TO EMPLOYMENT BY PUBLIC TRANSPORT, 2015 AND 2041

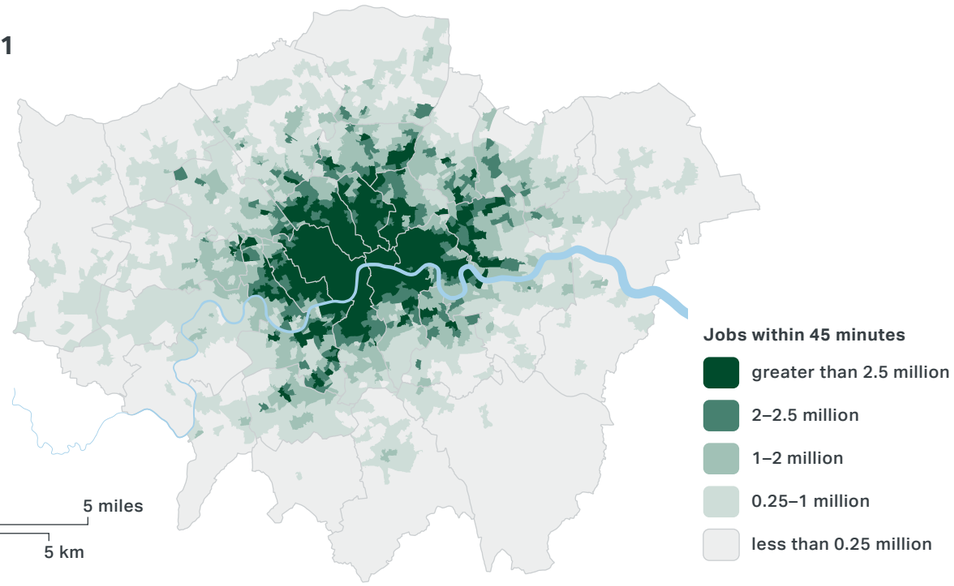
2015



Jobs within 45 minutes

- greater than 2.5 million
- 2–2.5 million
- 1–2 million
- 0.25–1 million
- less than 0.25 million

2041



Jobs within 45 minutes

- greater than 2.5 million
- 2–2.5 million
- 1–2 million
- 0.25–1 million
- less than 0.25 million

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FOCUS ON: RIVER SERVICES

River services are an integral part of London's public transport system and will play a role in supporting growth, particularly in east London where there is limited access to public transport. The Port of London Authority's (PLA) 2035 Thames Vision sets out proposals to better integrate piers and river services with other transport modes such as walking and cycling. The Mayor supports more freight on the river, and sees opportunities both to directly serve developments on the river and to help reduce lorry traffic. A new Thames and London Waterways Forum has been set up to co-ordinate improvements.

Policy 17
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek the use of the full potential of the Thames to carry passengers, to integrate river services with the public transport system, walking and cycling networks, and to enable the transfer of freight from road to river in the interests of reducing traffic levels and the creation of Healthy Streets.

Proposal 72
The Mayor, through TfL, will work with the Port of London Authority to produce a London Passenger Pier Strategy which will promote new piers and additional capacity at strategic piers. TfL will also investigate the feasibility of new cross-river ferry services, including services between the Isle of Dogs and North Greenwich to enhance resilience in the busy Jubilee line corridor.

An extended River Bus service to Barking Riverside would provide new links to the Opportunity Area and help achieve the PLA's 2035 Thames Vision target to double the number of annual river users to 20 million by 2035. This extended service is likely to reduce crowding on other public transport modes and the street network, as well as potentially encourage more walking and cycling. New piers could be provided as part of riverside developments and would help enable new river service connections.

Proposal 73
The Mayor, through TfL, will work with host boroughs and river service operators to investigate the potential for an extension of river transport services to Barking Riverside by the early 2020s to connect key growth areas with Canary Wharf and other new developments in east London.

To support sustainable passenger and freight growth on the Thames, the Mayor will work with the PLA and other stakeholders to investigate enhanced boatyard provision on the Thames, such as at Albert Island.

The Mayor and the PLA could better manage the river if powers to regulate vessel safety and river emissions were devolved to London, so the Mayor will lobby the Government for the devolution of these powers.



FOCUS ON: LONDON'S LINKS WITH THE WIDER SOUTH EAST AND BEYOND

For London to be a less car-dependent city, and to ensure that the wider city region remains economically successful, fully inclusive public transport must not only be provided for travel within London, but should be improved for travel between London, the Wider South East and the rest of the UK, as well as to international destinations via the Channel Tunnel and via ports.

Policy 18
The Mayor, through TfL and the boroughs, and working with stakeholders, will support improvements to public transport to enhance travel between London, the rest of the UK and international destinations, and will require regional, national and international transport schemes to be integrated into London's public transport system wherever possible.

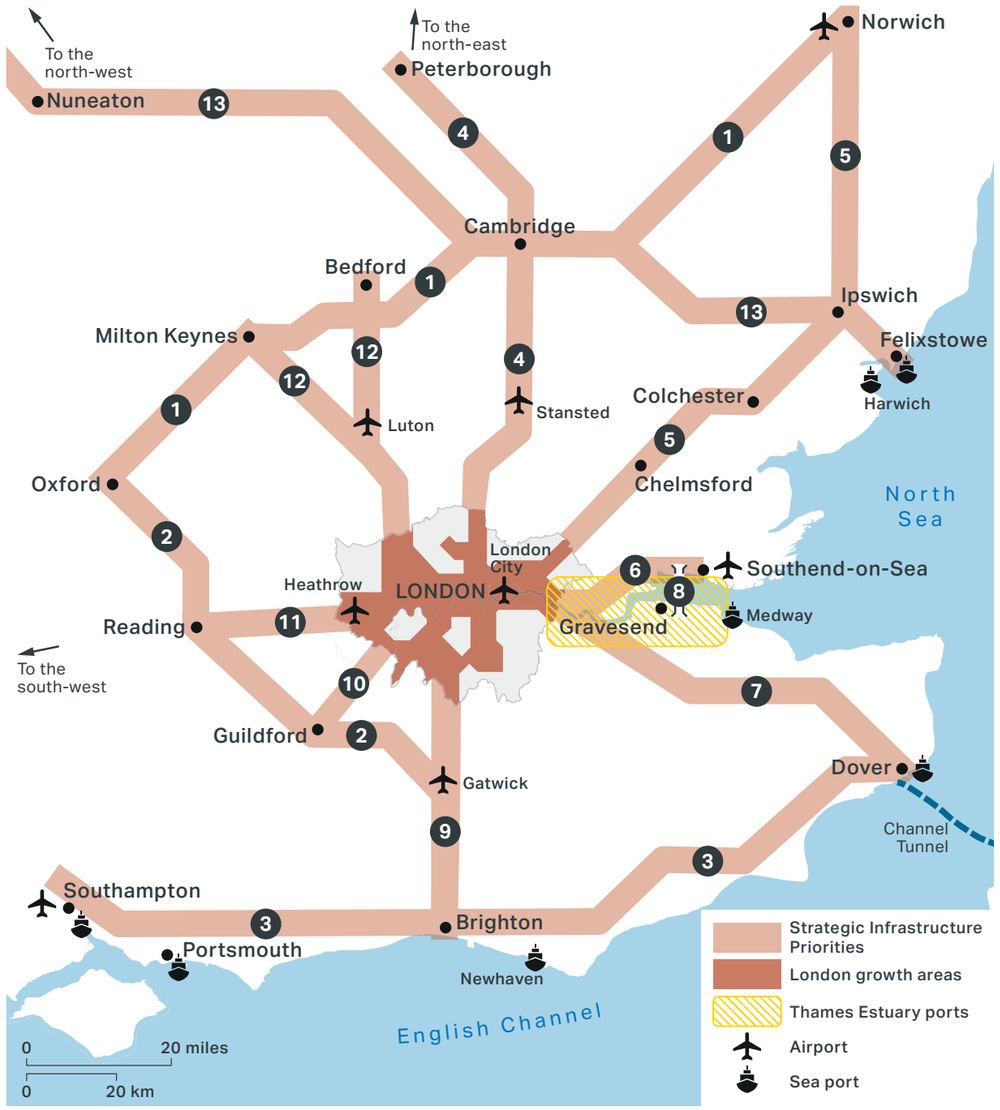
London's airports also play a vital role in maintaining and enhancing international connectivity. Proposals relating to airports are set out in Chapter five.

Wider South East

Economic growth and the provision of new housing in London and the Wider South East – the economic powerhouse of the country – depend on improvements to the connectivity and capacity of the strategic transport network. Improvements to the rail network are particularly important, as they support more active, efficient and sustainable travel. Figure 35 shows the initial strategic infrastructure priorities the Wider South East partners have broadly agreed for further investment. The orbital links (such as Dover to Southampton) are important for travel across the Wider South East and will also reduce pressure on London's crowded and congested transport system.

Proposal 74
The Mayor, through the GLA and TfL, will work with relevant stakeholders to seek to ensure that transport investment in the Wider South East supports the realisation of any associated economic and housing growth potential.

FIGURE 35: 13 INITIAL STRATEGIC INFRASTRUCTURE PRIORITIES



Strategic Infrastructure Priorities

1 East West Rail and new Expressway road link (Oxford-Cambridge)

2 North Downs Rail Link (Gatwick-Reading) including extension to Oxford

3 A27/M27/A259 and rail corridor (Dover-Southampton)

4 West Anglia Mainline, Crossrail 2 North (London-Stansted-Cambridge-Peterborough) and M11

5 Great Eastern Mainline (London-Ipswich-Norwich) and A12

6 Essex Thameside, A127 and A13 corridor

7 Thames Gateway Kent: Elizabeth line extension and HS1 (London-North Kent-Channel Tunnel)

8 Lower Thames Crossing

9 Brighton Mainline (London-Gatwick-Brighton)

10 South West Mainline, Crossrail 2 South West (London-Surrey/Southern Rail Access to Heathrow) and A3

11 Great Western Mainline (London-Reading/Western Rail Access to Heathrow)

12 Midlands and West Coast Mainline (London-Luton-Bedford/Milton Keynes)

13 Felixstowe-Nuneaton/ Midlands and A14

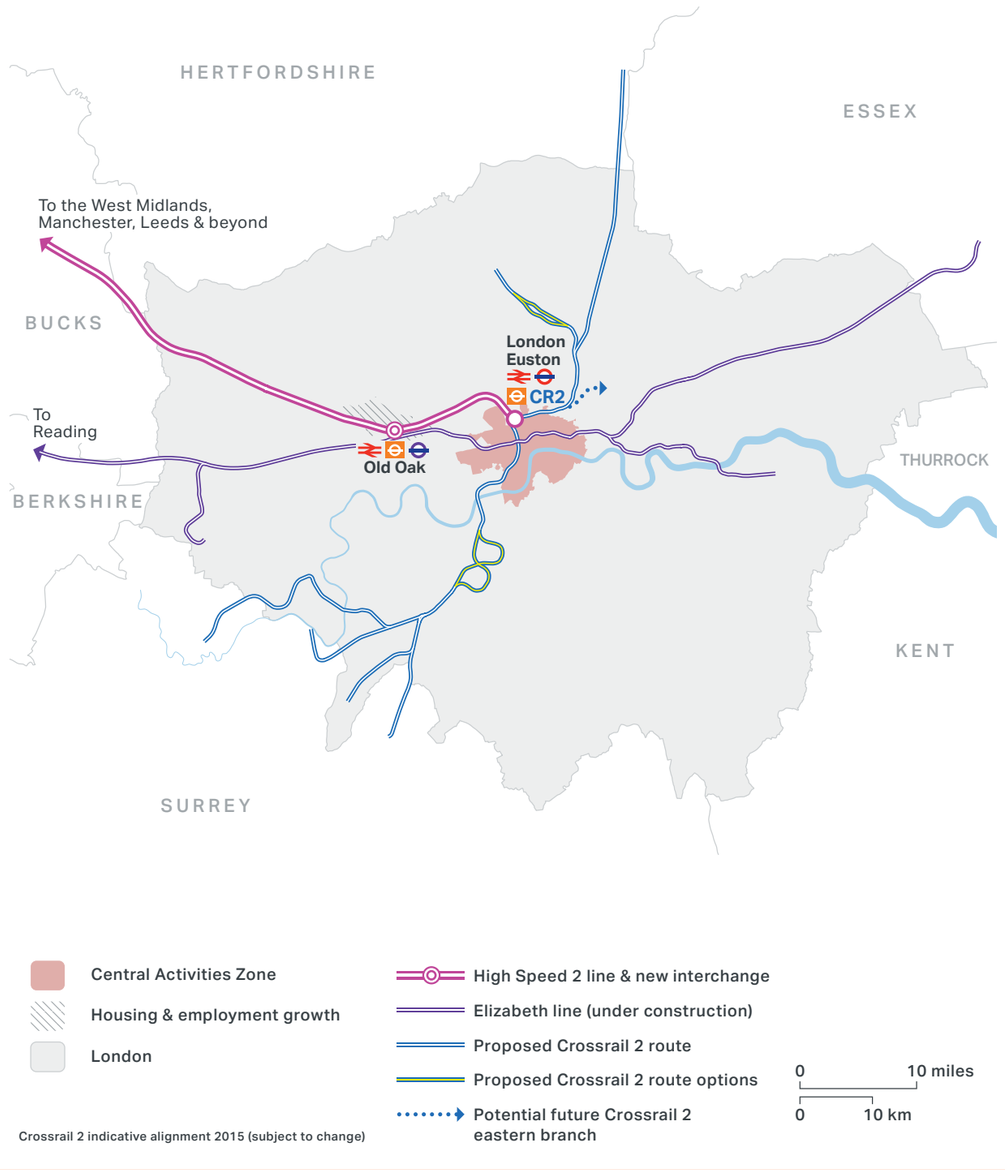
FOCUS ON: LONDON'S LINKS WITH THE WIDER SOUTH EAST AND BEYOND (continued)

High Speed Two
HS2 is the Government's scheme to improve rail capacity between London, the Midlands and the North. In order to be a success, the line must be fully integrated into the capital's public transport network to ensure access to central London from the rest of the UK, helping to spread the benefits of investment across the country.

Easy onward movement from HS2 termini will be critical to this. At Euston – where morning peak arrivals are forecast to double from about 30,000 now to more than 60,000 with HS2 phase 2 – this will necessitate Crossrail 2, a rebuilt Tube station and new bus, taxi and cycling facilities, plus improvements to walking routes in the area. It will also require a new transport hub at Old Oak Common station, linking HS2 with the Elizabeth line, London Overground and the Tube.

Proposal 75
The Mayor, through TfL, will work to encourage the DfT to ensure the delivery of High Speed Two is complemented by Crossrail 2, new gateway stations at Euston and Old Oak Common and other improvements to London's transport system, so that people are able to reach their final destination efficiently and in a timely manner by public transport, cycling or walking.

FIGURE 36: INTEGRATION OF HS2 WITH ELIZABETH LINE AND CROSSRAIL 2





FOCUS ON: COACH SERVICES IN LONDON

Coaches can play an important role in enabling people to access London for tourism, leisure and business, and to reach other parts of the UK and Europe. They are an affordable mode of travel and can be efficient for some group travel, such as, for example, school trips in outer London.

It is important that coaches are able to operate efficiently in London and are integrated into the wider public transport and street networks. This will enable improved connectivity to national and international destinations (including airports).

However, the use of coaches must be considered alongside the need to create Healthy Streets and the impact they can have on vulnerable road users. This means coaches will need to play their part in reducing vehicle dominance, particularly in central and inner London.

TfL does not operate coach services but is responsible for managing some facilities used by coaches – notably the Victoria Coach Station (VCS). It is expected that, from 2023, parts of the VCS facility will start to become unavailable to coaches due to requirements for a Crossrail 2 worksite and the expiry of leases.

Proposal 76
The Mayor, through TfL and the boroughs and other stakeholders, will ensure new coach facilities are well connected with London's public transport system while, at the same time, seeking to reduce coach kilometres travelled in central London. This will include:

a) Working with stakeholders to identify and deliver replacement facilities for Victoria Coach Station through the provision of one or more hubs.

b) Continuing to work with the coach industry to enable the provision of adequate on-street and off-street coach infrastructure in appropriate locations across London for scheduled and tourist coach services, and to allow for their safe and efficient operation.

c) Working with delivery partners including the coach and tourism industries to include coaches in the Fleet Operator Recognition Scheme (FORS).

FOCUS ON: PUBLIC TRANSPORT AND THE NIGHT-TIME ECONOMY

London's night-time economy accounts for 8 per cent of the city's GDP, contributing around £26.3bn annually, and it represents 40 per cent of the entire UK night-time economy[7]. It employs over 700,000 people. The Mayor wants to see this activity grow and has established a Night Time Commission and appointed a Night Czar to champion opportunities for businesses, restaurants, theatres and other cultural activities to make London a more vibrant city and offer an exciting experience for Londoners, visitors and tourists. This requires a comprehensive, integrated night-time public transport service.

Policy 19
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek the development of London's public transport services to support the growth of the night-time economy.

The Mayor opened the first Night Tube services in August 2016 on the Central and Victoria lines, with services on the Jubilee, Northern and Piccadilly lines following. More than 200,000 journeys are made on these Night Tube services on the busiest weekends, giving users an average 20-minute journey time saving compared to using other forms of public transport.

The Night Tube service has already been extended to parts of the London Overground and there is potential for expansion to other parts of the transport network in response to demand and other factors.

In expanding the night-time network, services will be planned so that London's residents are not unfairly impacted by unwelcome noise and vibration, and policed to address any concerns regarding anti-social behaviour. Clustering night-time activity around new and existing public transport links will help to avoid noise nuisance.

Cultural events involving street closures will also be used to activate the night-time economy, helping Londoners and visitors to see how streets can be used differently at night, as well as during the day.

Around 2,000 permanent jobs are expected to be created by Night Tube, adding approximately £360m to the night-time economy over the next 30 years.

Night Bus services will be adjusted to complement night-time rail services and areas with a thriving night-time economy. In addition, more dedicated and accessible taxi ranks will be provided at strategic locations and interchanges to link with night rail services.

London's streets will be well lit and inviting at night, providing a safe, secure and enjoyable experience for those travelling on foot and by cycle. This will ensure London maintains its status as a vibrant, 24-hour capital of business and culture.



7 London's 24 hour economy, London First and Ernst & Young, August 2016

FOCUS ON: TAXIS AND PRIVATE HIRE VEHICLES

London's taxis provide a reliable and trusted service to Londoners, tourists and business people from home and abroad, offering customers safety and convenience, aided by drivers' extensive knowledge of the capital's streets. Taxis are particularly important in central London, occupying 17 per cent of the road space on an average weekday, with a further 10 per cent occupied by Private Hire Vehicles (PHVs).

Policy 20
The Mayor, through TfL and the boroughs, and working with stakeholders, will seek to ensure London has a safe, secure, accessible, world-class taxi and private hire service with opportunity for all providers to flourish.

Taxis can expand travel horizons for those requiring safe, accessible travel options. High-quality accessible taxi ranks across the capital are vital to this. New safety, equality and regulatory knowledge assessments for PHV drivers will be introduced by TfL by 2018. As Night Tube expands, new and improved taxi ranks at stations will provide safe and accessible options for onward journeys.

Taxis also have a key role to play in tackling London's air quality challenge. From 2018, taxi electric charging points will be provided to support the roll-out of zero emission capable taxis as outlined in the Ultra Low Emission proposals in Chapter three.

It is essential that the iconic London taxi brand is maintained and enhanced as its environment continues to change. This means continuing to monitor service standards, facilitating customer feedback, further improving the customer experience using technology (such as including taxi options in TfL's Journey Planner), and exploring new ways to reduce the barriers to becoming a black cab driver without compromising the quality of service offered.

It is important to raise standards for PHVs, recognising that they have a role to play in moving people around but also contribute towards increasing congestion. TfL should be given more powers over the private hire market in London, including the ability to cap overall numbers of PHVs. The Government should also introduce legislation to provide statutory definitions of plying for hire and pre-booked services to clarify the difference between taxi and private hire services.

Issues of licensed taxis and PHVs working remotely from the area in which they are licensed are increasingly commonplace. It cannot be right that taxi and private hire licensees license themselves with one authority with, for example, the sole intention of working the majority of time in another authority area.

Taxi and PHV legislation also needs to take account of technological change, and new types of service, as the PHV and taxi trades are both evolving, for example through the emergence of customer and booking platforms and pooling services. The safety and fair treatment of drivers and passengers remain a top priority.

Proposal 77
The Mayor, through TfL, will seek:

a) Powers to limit the overall number of private hire vehicles licensed for use in London so as to manage their contribution to overall congestion, particularly in central London.

b) Powers to introduce a requirement to ensure that taxi and private hire journeys by TfL-licensed drivers must either start or end in the Greater London area.

Illegal and non-compliant taxi and private hire activity poses a risk to passenger safety and undermines the legitimate and law-abiding trades. Improving compliance and the safety of travelling by taxi and private hire remains a priority for the Mayor and TfL.

Proposal 78
The Mayor, through TfL, will raise the safety standards for all customers travelling by taxi and private hire vehicles through effective and transparent regulation and enforcement.

Regulations regarding the use of pedicabs in London are required to ensure the safety and security of passengers and other road users, and to reduce the impact they have on congestion, particularly in the West End.



Chapter five – New homes and jobs

More people than ever want to live and work in London. By 2041, there are forecast to be about 1.3 million more people working in the capital than there are today. To meet the demands of the growing population, experts say land will need to be identified in London for the building of at least 65,000 homes every year between now and 2041.

London's growth is a sign of its success as a city at the heart of the world economy and global culture. But it also comes at a cost. Londoners are being priced out of their city by an increasingly unaffordable housing market. Many Londoners are trapped paying rents that they can barely afford for homes that do not meet their needs or aspirations. If this situation continues to worsen, London could suffer.

While growth is good for London, it must not be pursued at the expense of people's quality of life – as London becomes a bigger city, it must also become a better one, where all Londoners are able to access the benefits that this growth brings.

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‘Good Growth means offering people across London the benefits of walking, cycling and public transport use that have been available in some parts of London for years.’

The transport network has a crucial role to play in this. Public transport connections can make parts of London viable places to build homes and create jobs for the first time. Using the Healthy Streets Approach to plan new developments around walking and cycling for local trips, and cycling and public transport for longer ones, will help people to live active and healthy lives and the city to function effectively even as it grows.

This chapter sets out the transport principles of Good Growth and then explains in two sections how transport can be used to help deliver homes and jobs in a way that will improve quality of life by:

a) Shaping the type of growth in London, using transport services to create high-density, mixed-use places where people can walk and cycle to local amenities, and use public transport for longer trips.

b) Shaping the city, using transport to support and direct Good Growth, so the potential for new jobs and homes in underdeveloped parts of the city can be unlocked.

Transport and Good Growth

Applying the Healthy Streets Approach to planning transport for growth creates a set of Good Growth principles that will help London grow in a way that works for Londoners.

This will contribute to the London Plan’s priorities for Good Growth, which are to build strong and inclusive communities, to make the best use of land, to create a healthy city, to deliver the homes Londoners need, to grow a good economy, and to increase London’s efficiency and resilience.

Good Growth means ensuring that people living in new housing in central, inner and outer London have options other than to drive to the shops, to school or to work. It means offering people across London – existing residents and new ones – the benefits of walking, cycling and public transport use that have been available in some parts of London for years.

Applying the transport principles of Good Growth will mean that, as London grows, a greater proportion of people will live in locations that are well connected to employment and other opportunities by walking, cycling or using public transport.

The transport principles of Good Growth

- Good access to public transport
- High-density, mixed-use developments
- People choose to walk and cycle
- Car-free and car-lite places
- Inclusive, accessible design
- Carbon-free travel
- Efficient freight

Policy 21

The Mayor, through TfL and the boroughs, and working with stakeholders, will ensure that new homes and jobs in London are delivered in line with the transport principles of Good Growth for current and future Londoners by using transport to:

a) Create high-density, mixed-use places, and

b) Unlock growth potential in underdeveloped parts of the city.

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a) Shaping the type of growth

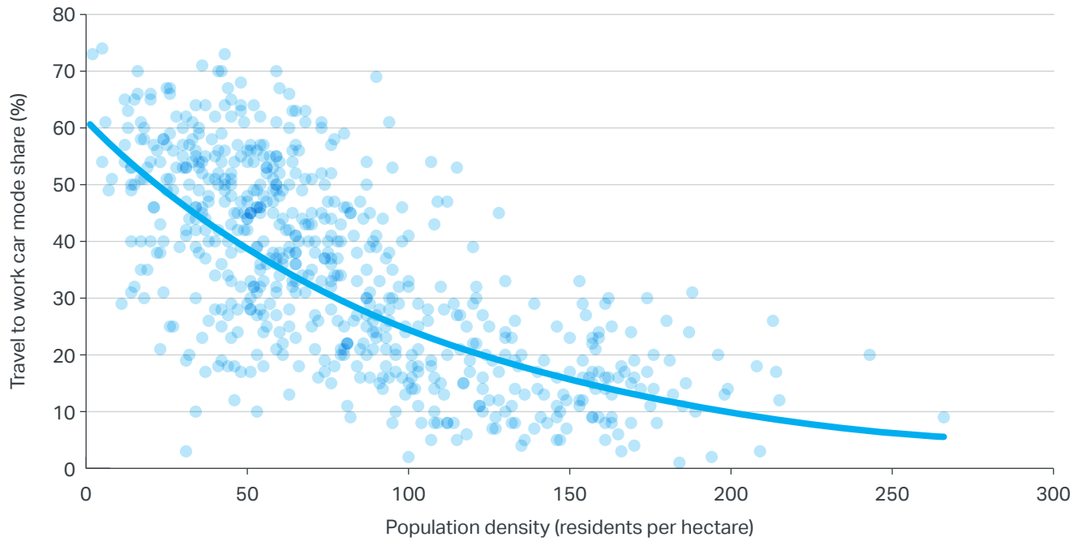
Improving access to public transport

Residential, commercial and other development should encourage walking, cycling and the use of public transport and minimise the use of the car. Fundamentally, this means that development should be suitably located where there is good access to public transport.

Developing in these locations will create high-density, mixed-use places where local amenities are within walking and cycling distance, and public transport options are available for longer trips. Using the Healthy Streets Approach to plan for this kind of active lifestyle will result in a more compact city, and also make the best use of scarce land.

People living in more densely developed places are less likely to depend on the car for their journeys, and more likely to use public transport, walking and cycling to get about. Moreover, the better people's access to public transport, the more likely they are to use it. Figure 37 shows the current relationship between population density and commuting to work by car in London.

FIGURE 37: COMMUTER CAR USE AND POPULATION DENSITY



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Creating high-density, mixed-use places
Land around stations provides opportunities to create high-density, mixed-use places – new communities that are well connected to local amenities, and to jobs and locations further afield. This makes the most of past investment in public transport, and the benefits of future public transport investment can be enhanced by providing new homes (including affordable homes in a range of tenures) and jobs nearby.

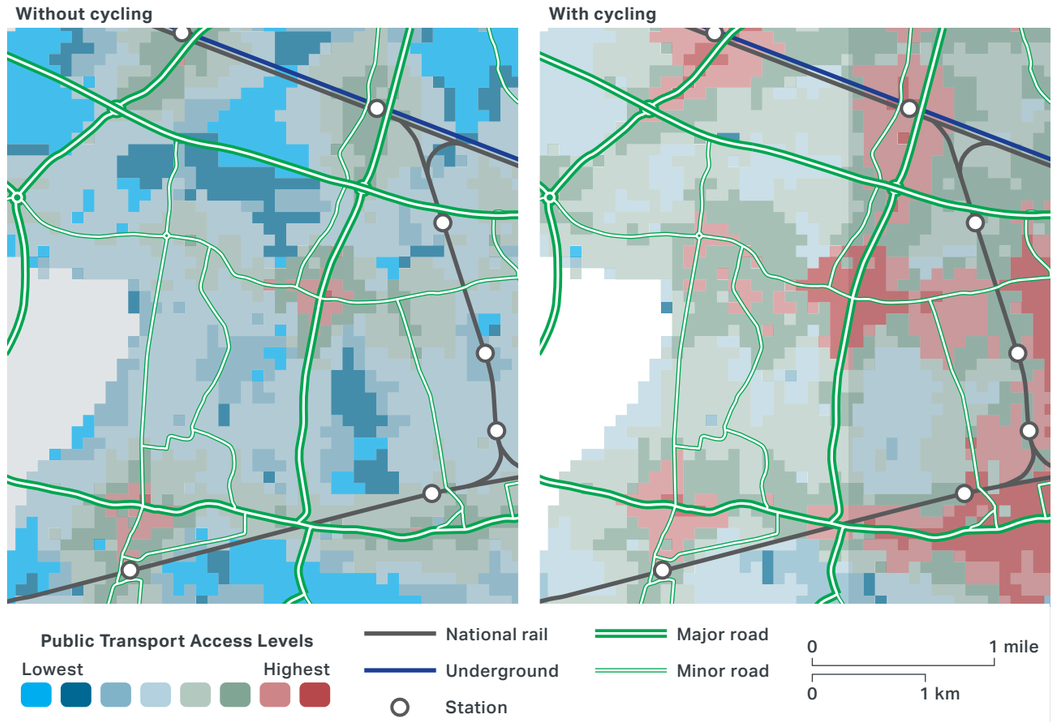
There are almost 600 rail and Tube stations in London, and opportunities for development around these stations should be explored, such as converting land use from low-density uses (retail parks, storage, parking, etc) to high-density, mixed-use development. Such change can act as a catalyst for the regeneration of town centres and neighbourhoods, and play a role in revitalising high streets. Development opportunities around stations are particularly attractive for 'Build to Rent'.

Planning policy and decisions that seek to locate high-density housing within walking distance of stations mean residents will not only be well connected by rail or Tube to employment opportunities, but will almost always be better connected to schools, hospitals and shops by public transport, walking or cycling. Land around stations is often owned by TfL, Network Rail and other public sector landowners, and presents a good opportunity to bring forward surplus or underused land for increased housing delivery.

High-density development further from stations can be supported through improved bus and cycle links; such networks can dramatically increase the catchment area of a station, providing greater employment opportunities and reducing Londoners' dependence on cars.

Figure 38 shows standard and enhanced Public Transport Access Levels (PTALs) in a typical residential area. By extending the access distance to rail stations (including cycling as well as walking as access modes), the PTAL can be raised and more areas can be made attractive for high-density residential development. This would be accompanied by improvements to the local cycle infrastructure, such as cycle parking and segregated routes, where necessary.

FIGURE 38: INCREASE IN PUBLIC TRANSPORT ACCESS LEVELS ASSOCIATED WITH CYCLING



Proposal 79
The Mayor, through TfL and the boroughs, will seek opportunities for densification of development supported by the public transport network, in particular around public transport stations and stops. Investment in improving station environments, interchanges and local walking and cycling networks, including third-party investment in the redevelopment of surrounding lower-density sites, will act as a catalyst to create wider growth.

Embedding active travel in new development

All new developments should comprise streets and places where people choose to walk and cycle. All developers should plan to deliver improvements against the ten Healthy Streets Indicators when designing local street networks, clearly putting people before motorised vehicles. These street networks should provide for the needs of the whole community. Inclusive, accessible design that enables people of all ages and abilities to access services without relying on the car is fundamental across London, and should be planned into all developments at the outset.

Secure cycle parking and storage must be built into all new developments to enable far higher levels of cycling in the future, and to enable all residents to own a cycle.

As future developments will be planned around active, efficient and sustainable transport modes, they should also be planned to discourage car use, and car-free and car-lite places must become the first option across London.

Provision for car parking should be restricted and that which is provided should be designed to enable alternative uses in the future as car dependency decreases. In those areas of London that are more accessible and well connected by public transport, there is already a tendency towards car-free developments, especially in central London and town centres. This trend needs to continue and spread, with car-free development becoming the starting point for all development in well-served places. Where car parking is considered appropriate in new developments, provision should be made for ultra low emission vehicles.

Proposal 80
The Mayor, through TfL and the boroughs, will:

a) Impose high expectations on developers to deliver transport solutions that will promote a shift to active, efficient and sustainable modes, reduce road congestion, improve air quality and assist in the development of attractive, healthy and active places.

b) Restrict car parking provision within new developments, with those locations more accessible to public transport expected to be car-free. New developments should contain high levels of cycle parking and storage, and contribute to the provision of on-street cycle parking in town centres and other places of high demand.

Car and cycle parking – guiding principles

- An expectation for car-free development in London's more accessible areas, and car-lite development elsewhere
- Any residential parking spaces permitted should make provision for ultra low emission vehicles to enable carbon-free travel
- Appropriate provision of dedicated spaces for disabled drivers
- Outside the Central Activities Zone (CAZ), car clubs could be provided in lieu of private car parking
- Well-located and accessible cycle parking provision

More detail, including standards for car and cycle parking, is set out in the London Plan.

Embedding efficient freight and servicing in new development

New developments will be expected to be designed to encourage efficient, safe and low-emission delivery and servicing trips. Planning permissions should secure delivery and servicing plans that support off-peak (including night-time) deliveries.

Proposal 81

The Mayor, through TfL and the boroughs, and working with stakeholders, will embed efficient freight and servicing in new development by:

a) Ensuring that delivery and servicing plans facilitate off-peak deliveries using quiet technology, and the use of more active, efficient and sustainable modes of delivery, including cargo cycles and electric vehicles where practicable.

b) Ensuring that large-scale developments and area-wide plans include a local freight and servicing strategy (consisting of measures such as shared procurement for consumables, co-ordinated waste and recycling collection, timetabled deliveries, 'click and collect' for residents and flexible loading bays).

c) Piloting ambitious plans in Opportunity Areas and around major developments such as High Speed Two to reduce the impact of freight and construction trips.

b) Shaping the city

Using transport to support and direct Good Growth

Creating high-density, mixed-use places will require transport investment to be fully aligned with the growth strategy set out in the London Plan.

The draft London Plan shows that the city's growth potential is concentrated in the CAZ and within its town centres and Opportunity Areas; there will also be growth potential from the managed intensification of suburban areas. This means maximising the capacity of the existing public transport network, extending the network to open up new areas for homes, optimising land use around stations and radically improving conditions for walking and cycling, supporting higher densities.

Each of London's areas is unique and will require tailored transport to support growth.

Central Activities Zone

Investment in the public transport system, particularly the rail network, is critical to enabling employment growth in central London. These improvements are set out in Chapter four. In addition, the vitality of central London depends on a good public realm and a healthy and clean environment, including measures to reduce traffic dominance, improve air quality and deliver far better provision for walking and cycling. This is set out in Chapter three.

Town centres

Town centres offer a range of vital services and facilities to meet Londoners' needs, as well as providing a focus for employment and leisure. By improving transport access between and within town centres, through a variety of transport modes and better conditions for walking and cycling, their role as nodes for growth can be strengthened, supporting higher development densities and greater housing capacity. Development in and immediately around town centres should be focused on public transport, walking and cycling networks, reducing car dependency and improving the local environment.

Opportunity Areas
Planning for London's growth corridors and Opportunity Areas (designated through the London Plan as areas with particular development potential) should embed best practice in Good Growth. Dedicated public transport and walking and cycling provision (such as bus rapid transit and segregated cycleways) should be at their heart, as well as good interchanges with rail and Tube for longer journeys and for those into central London. Within their growth corridor, Opportunity Areas should be well connected to each other as well as nearby town centres, schools, employment hubs and stations, including the provision of public transport options at weekends to enable car-free lifestyles.

Strategic planning for Opportunity Areas should ensure that unnecessary journeys by car are discouraged, partly through restricted parking (including mandatory car-free/car-lite developments), limited access for vehicles by time of day/vehicle type, and very low speeds, with traffic calming measures. Providing shared access to a car club instead of private parking bays in a new development (or in an existing residential street) is just one example of how car dominance can be reduced and space freed up for other infrastructure to support active travel.

Developments within Opportunity Areas should be well designed, compact, safe, walkable neighbourhoods with good access to facilities and services from the outset. Live-work areas can reduce the need to travel, and efficient deliveries and servicing infrastructure should be integrated within the site to reduce vehicle movements.

Proposal 82
The Mayor, through TfL and the boroughs, will support growth through transport investment and planning in the Central Activities Zone, in and around town centres, in close proximity to stations and in Opportunity Areas. The Mayor expects planning frameworks in these areas to set mode share targets that are significantly more ambitious than elsewhere in London and will require boroughs and other stakeholders to demonstrate how development plans will contribute to mode shift away from car use towards walking, cycling and public transport.

Suburban London
Many parts of suburban London also have the capacity to support new development, especially where there are good connections to central London and town centres. However, it is important that the development of the suburbs is achieved in a way that is not dependent on the car. To support this, the transport network needs to reach all parts of London, using the bus network in particular to better connect areas, but also creating a public realm that encourages greater levels of walking and cycling.

To deliver new homes and jobs in suburban London, full use needs to be made of London's transport network. This means extending the public transport network in a selected number of places to support major development opportunities. But crucially, it also means getting more out of the existing network, by upgrading the quality and capacity not just of the rail network, but other modes too, including buses.

Many town centres in outer London offer opportunities for high-density, mixed-use redevelopment that can improve the town centre offer for Londoners living in the suburbs. The Healthy Streets Approach should be applied in places such as Romford, Hounslow, Sutton and Wood Green, for example, as developments come forward to maximise the potential for improved public realm and quality of life for everyone living in, visiting or working in them. Town centre catchments can grow through improved conditions for walking and cycling, as well as enhanced bus services and priority, which will significantly improve suburban Londoners' access to employment and leisure opportunities, and contribute to regeneration in outer London.

Wider South East
Transport can play an important role in strengthening links between London and areas beyond the GLA boundary, including supporting growth. In planning London's transport, it is important that opportunities for creating new homes and jobs in other parts of the Wider South East are considered, working with willing partners to support development along the strategic corridors that continue outwards from London's growth corridors shown in Figure 35.

Unlocking growth potential through new rail links

Crossrail 2

In addition to relieving some of the most severe crowding on the transport system, Crossrail 2 will unlock the potential for homes and jobs on a region-wide scale. Crossrail 2 will deliver substantial benefits to the wider economy and is a scheme of national significance. The new railway could provide the infrastructure needed to support 200,000 new homes and 200,000 new jobs, and it will also enable growth further afield by releasing capacity on some of the most congested national rail lines into London. The overall case for Crossrail 2 is summarised in Chapter four.

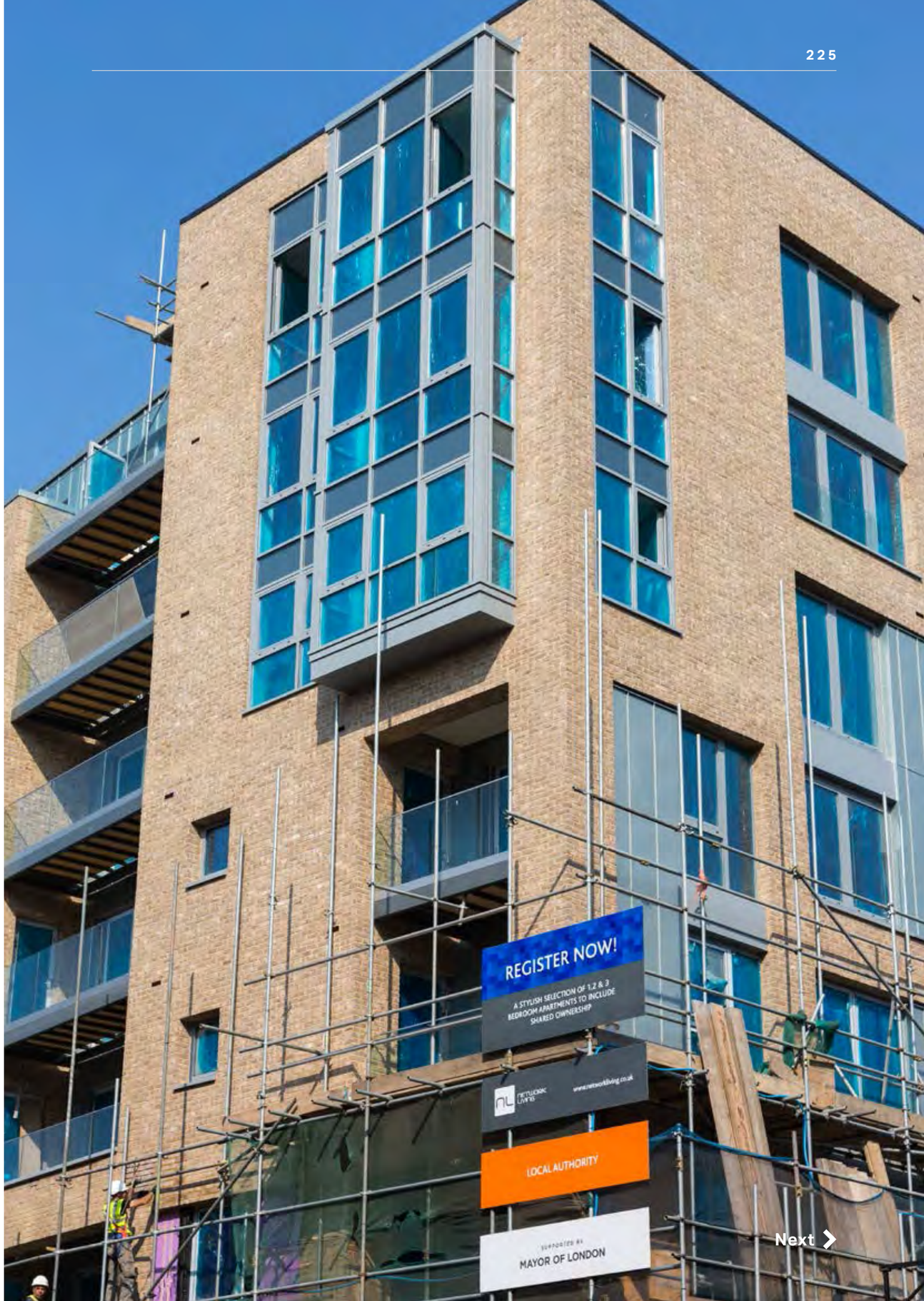
Proposal 83

The Mayor, through TfL and the boroughs, will seek to ensure that full advantage is taken of the opportunity presented by Crossrail 2 to maximise housing delivery and the creation of healthy new places that are fully integrated with their surroundings.

Increasing the capacity of the West Anglia Main Line and new bus services will support development of parts of the Lee Valley and beyond as part of a package of improvements with Crossrail 2. A phased approach can be taken, starting with a new Stratford to Angel Road service, followed by increased capacity ('four tracking') to Broxbourne. The Mayor is therefore undertaking a refresh of the planning framework for the wider Lee Valley which will consider whether strategic industrial land can be reconfigured (without net loss of industrial floor-space) in order to capture the housing potential of committed and potential transport improvements.

Proposal 84

The Mayor, through TfL and the relevant boroughs, will seek to encourage Network Rail to proceed with enhancements to the West Anglia Main Line to help create and support new homes and jobs in the Lee Valley.



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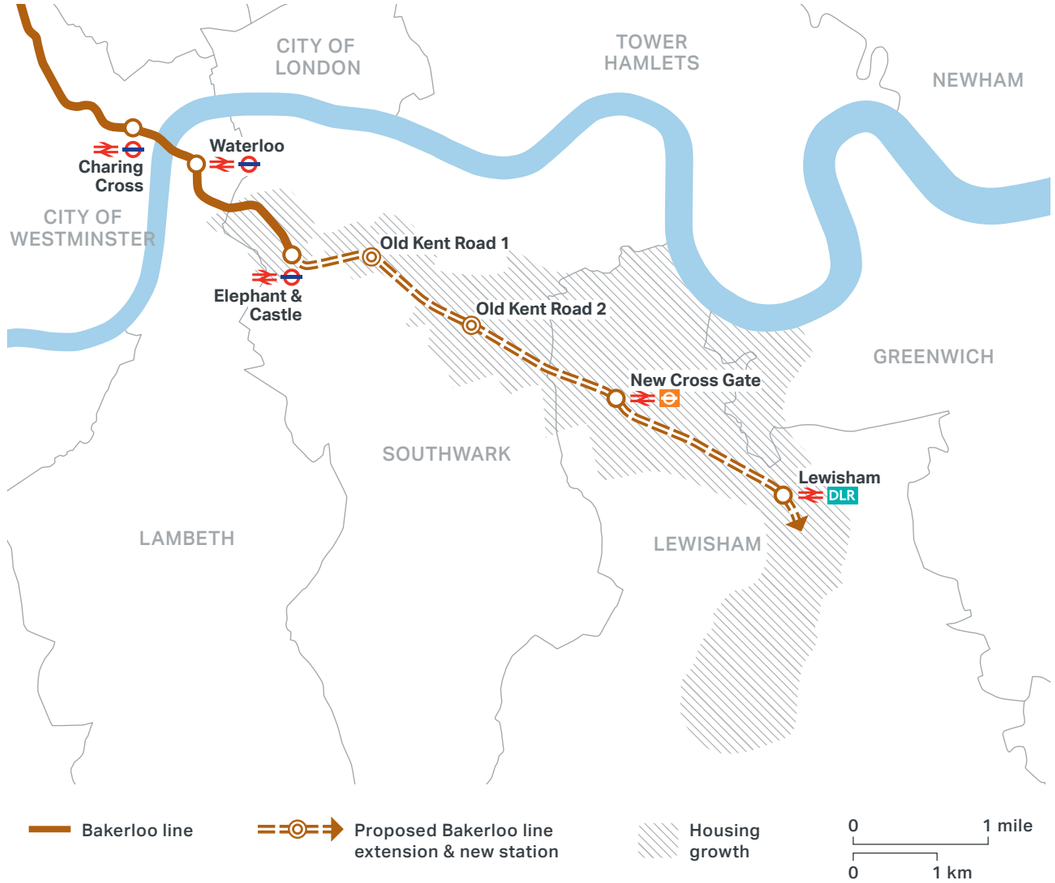
Bakerloo line extension

The Mayor has consulted on options for an extension of the Bakerloo line to improve public transport connectivity and capacity between south east London and central London, as shown by Figure 39. In addition to the transport benefits it delivers, the Bakerloo line extension could also enable more than 25,000 new homes and 5,000 jobs to be accommodated in the Old Kent Road and the Lewisham, Catford and New Cross Opportunity Areas. With the Bakerloo line extension, the Old Kent Road Opportunity Area provides a unique opportunity to create a high-density, mixed-used place near the CAZ. A new type of development can be created that supports significant levels of both employment and housing in an urban setting that could act as an example for other parts of inner London. This kind of development can ensure that the right balance is achieved between much-needed housing, and jobs. A potential phase 2 extension could offer high-capacity, high-frequency services that would enable more growth beyond Lewisham.

Proposal 85

The Mayor, through TfL, the relevant boroughs and Network Rail, will seek to extend the Bakerloo line to Lewisham and beyond in order to improve public transport connectivity in this part of London and enable the provision of new homes and jobs. The extension will be designed to facilitate the creation of an attractive, dense area in inner London, with active, efficient and sustainable travel behaviours and a mix of uses.

FIGURE 39: PROPOSED BAKERLOO LINE EXTENSION



Elizabeth line extension
Land to enable an extension of the Elizabeth line was safeguarded as part of the Crossrail Bill. An extension, shown in Figure 40, could support the 55,000 new homes and 50,000 new jobs planned along the route in Bexley and north Kent[1]. To achieve this, services on the existing rail network would also need to be improved. As well as providing vital support for growth plans in Kent, the Elizabeth line extension could link to High Speed 1 at Ebbsfleet and boost rail connectivity throughout the Wider South East. It should therefore be taken forward by Government as a scheme of regional and national importance.

FIGURE 40: POTENTIAL ELIZABETH LINE EXTENSION



Proposal 86
The Mayor, through TfL and relevant boroughs, will support a Government-led extension of the Elizabeth line eastwards from Abbey Wood to provide up to 12 trains per hour, enabling Good Growth in the Thames Gateway corridor within and beyond London.

New stations
TfL will work with boroughs and developers to identify places along the existing transport network that could be developed more intensively if new stations were to be built. This is already being done at Beam Park in east London, and opportunities for additional stations are currently being assessed at many sites including Old Oak.

Proposal 87
The Mayor, through TfL and the boroughs, will make the most of the transport network in London by identifying opportunities for new rail stations that will unlock the potential for significant numbers of homes and jobs to be created.

Other schemes supporting Good Growth

In addition to those included in this chapter, many of the schemes outlined in Chapter four will also support Good Growth in London, for example improved tram services in south London and national rail upgrades such as providing longer trains on services from Fenchurch Street. Additionally, other projects that are nearing completion (such as the Elizabeth line and the Thameslink upgrade) are already demonstrating how important transport investment is in boosting growth.

1 The method of estimating the number of homes and jobs supported by an extension to the Elizabeth line is different to that used for other schemes, so numbers should not be directly compared

Unlocking growth potential through improved rail services

Opportunities from London suburban metro

In recent years, areas around TfL stations have developed twice as quickly as elsewhere. This is because services from these stations provide higher frequencies and better connections to other parts of London.

There are particular opportunities to transform service quality and frequency on the national rail network (see London suburban metro proposal in Chapter four). This can act as a catalyst to regenerate existing neighbourhoods, and enable town centre residential intensification and other new development. Through working with boroughs to align planning policy and investment in the London suburban metro network, there is potential to facilitate higher densities in sustainable locations around stations in south London.

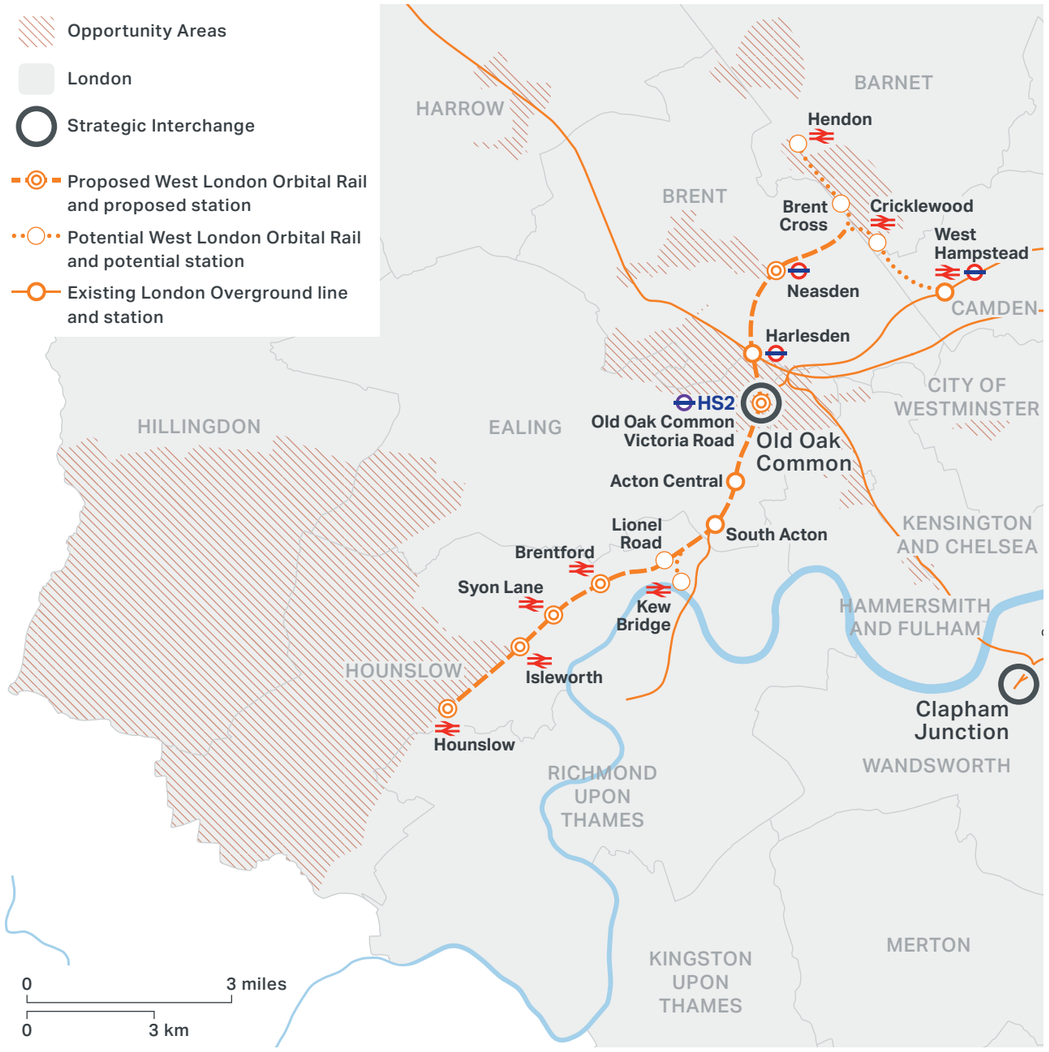
Opportunities from London Overground improvements

The London Overground network serves several Opportunity Areas across the capital and can therefore be a catalyst for growth. Most Londoners want to move around London – rather than in and out of the centre – every day, and the London Overground supports this type of travel. London Overground train service improvements are therefore needed to support new jobs and housing throughout inner London and parts of outer London. In particular, there is an opportunity to improve 'orbital' connections to Old Oak and across west London, between Hounslow and Brent Cross – Cricklewood via the Dudding Hill line. This new West London Orbital line could potentially support the delivery of an additional 20,000 homes, as well as employment growth in west London.

Proposal 88

The Mayor, through TfL, the West London Alliance boroughs and Network Rail, will work towards the delivery of a new London Overground 'West London Orbital' line connecting Hounslow with Cricklewood and Hendon via Old Oak, Neasden and Brent Cross.

FIGURE 41: PROPOSED WEST LONDON ORBITAL RAIL



Unlocking growth potential through tram network extensions

Extensions of the tram network will be considered where they enable the provision of new homes and jobs in line with Good Growth principles, are supported by Local Plans and can be funded primarily through locally derived sources.

An extension to Sutton, shown in Figure 42, is the first to be considered in this context and further extensions will be considered where they are consistent with this approach. The Sutton extension will be built on a north-south corridor from Sutton town centre, with a connection to the existing tram network and to the wider public transport network at the extension's northern terminus.

It is expected to enable the provision of more than 10,000 new homes as well as new jobs in the area, following the principles of Good Growth. Sutton town centre is a focus for many of these new homes. The tram extension would also increase the number of jobs accessible to local residents by providing faster, more frequent connections to centres of employment.

The extension will be delivered in line with the Healthy Streets Approach and Vision Zero policies, providing better walking and cycle environments, and enhancing the attractiveness of the area for new developments.

In the longer term, a further extension beyond Sutton town centre to the planned London Cancer Hub at Belmont, which may accommodate up to 10,000 new jobs, will also be considered to support the full development of the site. Trams could also run direct from Sutton to Wimbledon, linking to Crossrail 2 and delivering a wider improvement in connectivity in south west London.

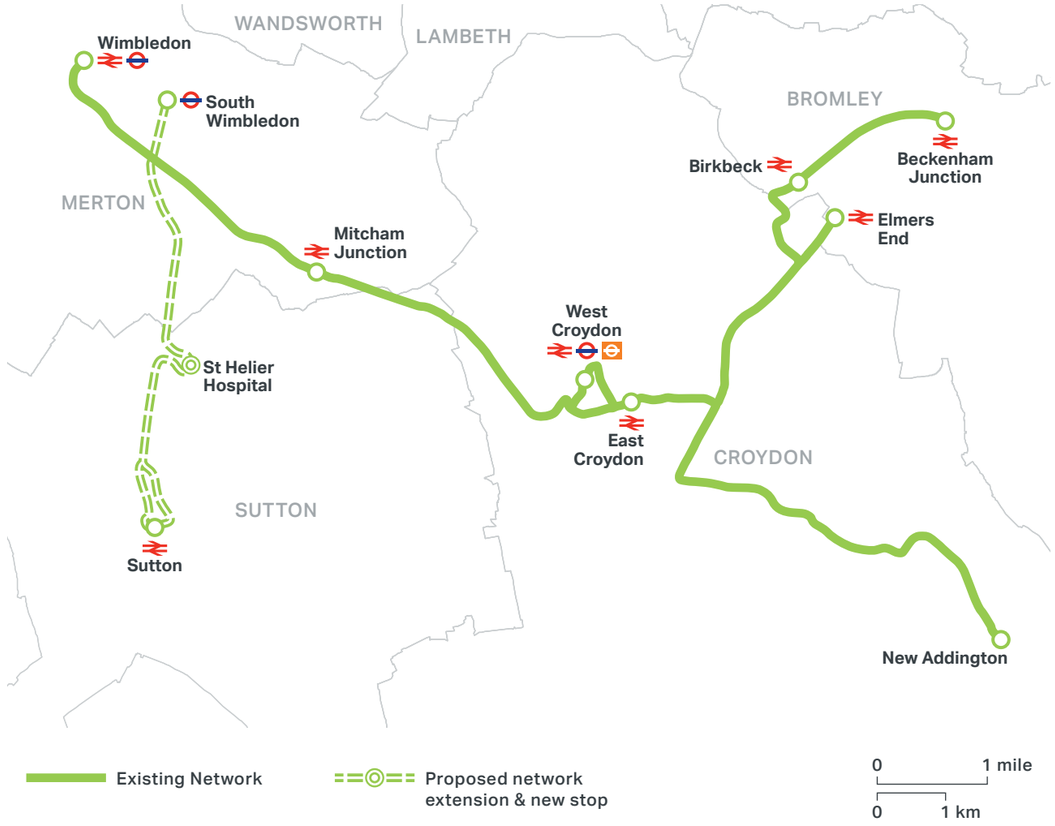
Proposal 89

The Mayor, through TfL and the boroughs, will use the tram network to enable Good Growth by:

a) Considering opportunities to extend the network where they would enable the provision of new homes and jobs, are supported by Local Plans and can be funded primarily through locally derived sources, and

b) Exploring opportunities, with the London Boroughs of Sutton and Merton, for an extension to Sutton and potentially beyond, including exploring innovative funding mechanisms.

FIGURE 42: TRAM NETWORK WITH INDICATIVE EXTENSION TO SUTTON





Unlocking growth potential through improved bus services

Increasing public transport connectivity across London

Improvements to London's bus network since 2000 have greatly improved connectivity for many parts of London and as a result have supported population growth across the city. Without this widespread uplift in access to public transport, housing densities would have been lower at many developments. Equally, if London is to deliver enough homes to meet demand, the intensification of existing suburban residential land will have to play a role in growth. The bus network, therefore, is one of the greatest enablers of development potential. This is particularly true for locations away from the immediate catchment area of rail and Tube stations.

Bus transit

New types of services, including high-quality bus transit, can unlock new areas for development (enabling housing densities akin to those associated with light rail). Bus transit services generally consist of enhanced vehicles and infrastructure, for example high-capacity buses running on dedicated carriageways, but can also take the form of continuous bus priority.

A major benefit of bus transit is that, by providing fast, reliable, sustainable bus connections from the outset, it can kick-start housing development ahead of investment in rail links to serve the area. This may require a different approach to planning less well-connected areas to provide investors with the confidence that other forms of public transport will be available in future.

Proposal 90

The Mayor, through TfL and working with the boroughs, will complement major transport infrastructure investment with improvements to local bus services, bus priority and bus infrastructure in order to enable high-density development over a larger area and thus spread the benefits of the infrastructure investment further.

Proposal 91

The Mayor, through TfL and the boroughs, will pilot bus transit networks in outer London Opportunity Areas with the aim of bringing forward development, either ahead of rail investment or to support growth in places without planned rail access. Consideration will be given to pilots at locations including Bexley/Greenwich, Enfield, Havering and Hounslow.

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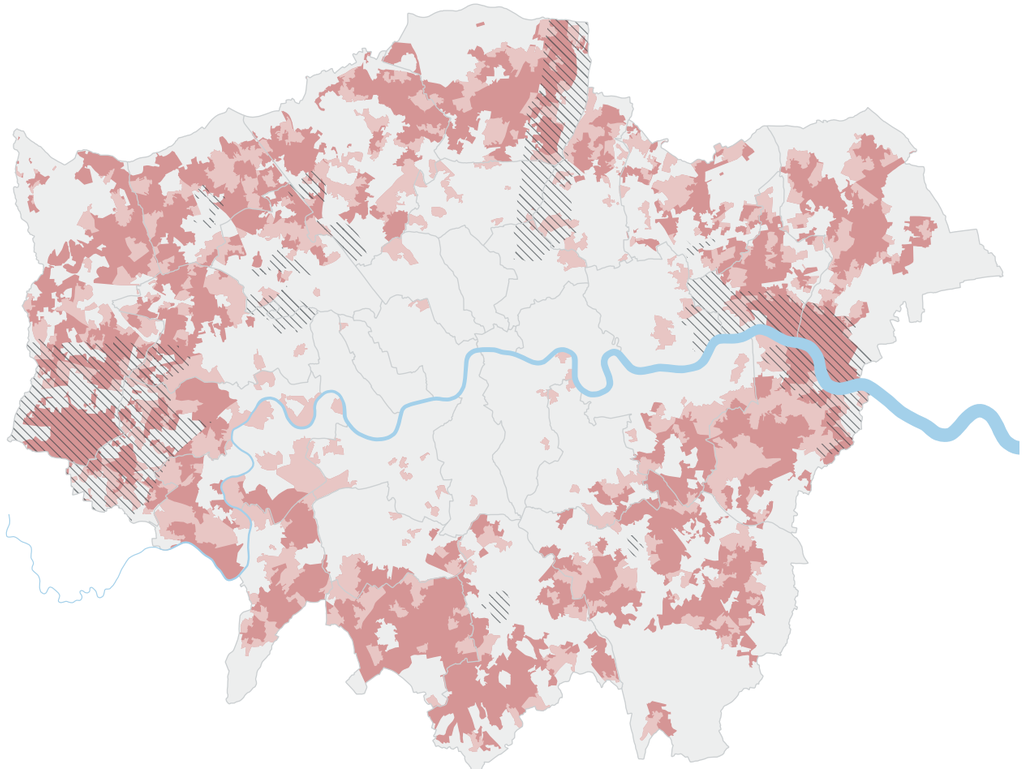
New bus connections
More diffuse growth can be supported by smaller improvements to the existing network, including providing new routes or enhancing or extending bus priority, coupled with improvements for walking and cycling. For example, the benefits of the Silvertown Tunnel will be maximised through the delivery of new cross-river bus services, which will increase the potential to deliver new housing and improve access to jobs.

New demand-responsive bus services
It will be important to explore new 'mobility' models (described in more detail in Chapter six) that enable wider growth, for example demand-responsive services. This should be focused in outer London, where more 'conventional' forms of public transport are less economically viable and car dependency is higher. These areas, shown in Figure 43, often have relatively low PTALs. About one third of Londoners live in areas with the lowest (0, 1a and 1b) PTALs.

In such areas, new services could offer the potential to reduce car ownership, cater for more diverse trip patterns and respond to changing lifestyles. Coupled with reduced car parking provision, this could support denser development in areas where it has traditionally been more difficult to provide more frequent public transport. In conjunction with measures to promote cycling and walking, demand-responsive services should deliver overall benefits for health and the environment. The flexible nature of these services could also support early transport provision in new areas of development, ahead of permanent infrastructure/fixed routes.

Proposal 92
The Mayor, through TfL and the boroughs, will explore the role for demand-responsive bus services to enable Good Growth, particularly in otherwise difficult-to-serve areas of outer London.

FIGURE 43: AREAS THAT COULD BENEFIT FROM DEMAND-RESPONSIVE TRANSPORT SERVICES



Areas that could potentially benefit from Demand-Responsive Transport (DRT) services should be identified using a range of measures, depending on the type of area they are intended to serve

Unlocking growth potential through improved cross-river connectivity

A key means of improving the efficiency of the transport network and unlocking growth potential is to eliminate physical barriers to movement. The Thames can in places present a barrier to easy movement, and therefore new river crossings would connect the communities on either side of it.

Throughout London, increasing the number and capacity of public transport links across the Thames will help to bring people together and improve access to employment opportunities. The Elizabeth line will provide a new cross-river link from south east London, and Crossrail 2 will create new links between south west London and central London.

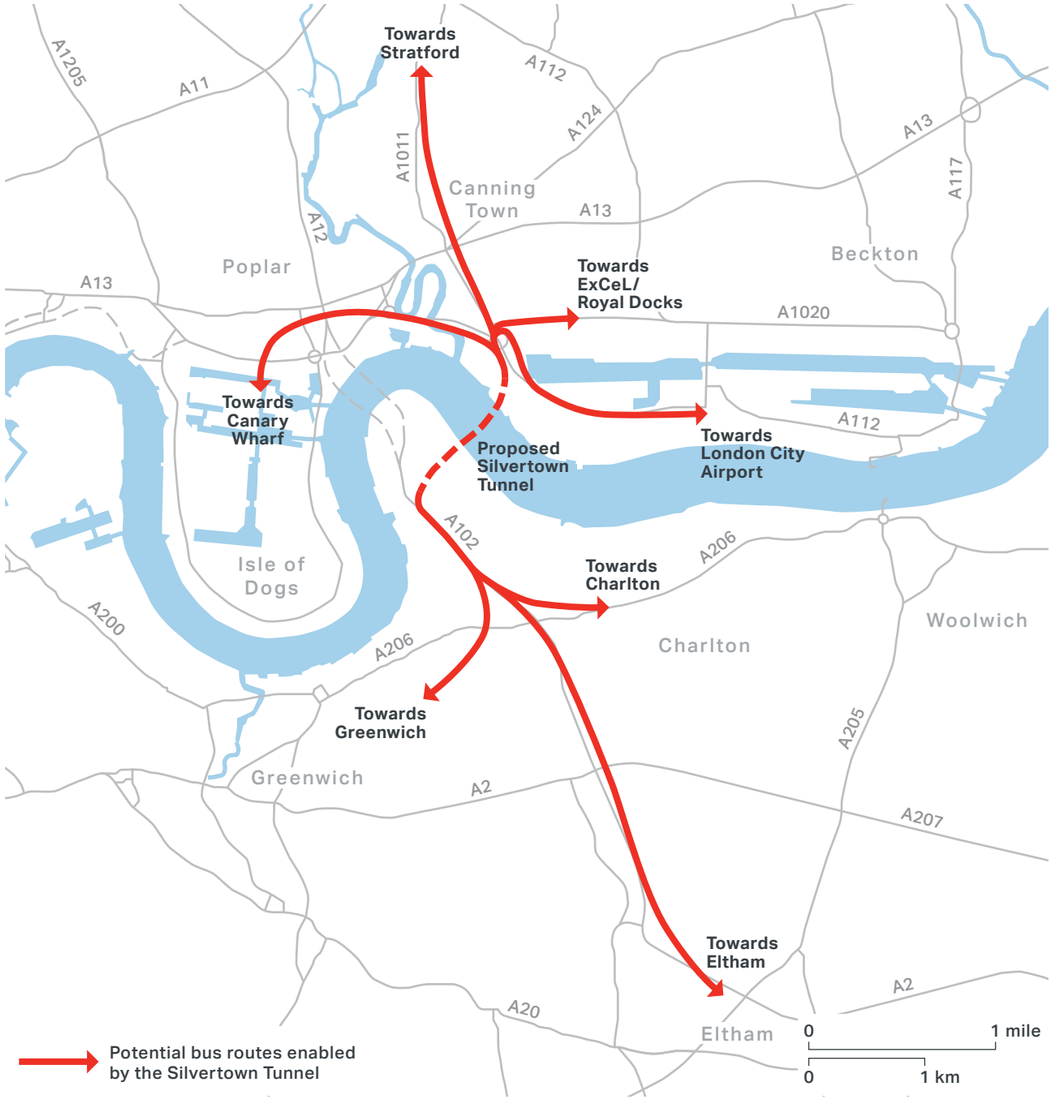
A Docklands Light Railway (DLR) extension to Thamesmead would support the development of thousands of new homes in Newham, Greenwich and Bexley, and could be delivered within ten years; other options being explored include the potential for an extension of the London Overground from Barking Riverside, which would enable orbital rail trips in outer London.

In east London, there is also the potential for new road crossings to reduce the barriers to trade between east and south east London. The Silvertown Tunnel will provide new bus links (see Figure 44) as well as ensure that there is a reliable and resilient road link between east and south east London. It will include user charges on the new crossing and on the Blackwall Tunnel to manage traffic demand.

Proposal 93

The Mayor, through TfL, will continue to support the construction and operation of the Silvertown Tunnel, together with the introduction of user charges on the Blackwall and Silvertown tunnels (once the latter is opened), to address the problems of traffic congestion and associated air pollution, frequent closures and consequential delays, and the lack of network resilience and reliability at the Blackwall Crossing.

FIGURE 44: POTENTIAL NEW BUS ROUTES ENABLED BY THE SILVERTOWN TUNNEL





In central and inner London, new crossings for people walking and cycling can help to connect local communities and encourage healthier lifestyles. A new walking and cycling crossing between Rotherhithe and Canary Wharf would give thousands of people a direct link between Canada Water and Canary Wharf, and support jobs and new homes in the area. Walking and cycling crossings could help to support Good Growth and encourage more active travel in other parts of London, and the Mayor will encourage their development where they are supported and led by the boroughs affected and where local funding is available.

Active travel and public transport crossings will be the first choice for further bridges and tunnels as they support healthy, sustainable living, and because public transport crossings in particular have the unique potential to unlock housing and jobs growth.

Proposal 94
The Mayor, through TfL, will promote new walking, cycling and public transport river crossings where such infrastructure would accord with the policies and proposals of this strategy.

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‘In the context of other measures in this strategy to promote a shift away from car use and to improve London’s air quality, any new road crossings would need to have a strong public transport element.’

On the M25 orbital motorway, there is already enormous pressure on the Dartford Crossing, an important artery for people and businesses in outer London. The new Lower Thames Crossing being proposed by the Government could help to reduce pressure on this important link.

However, there are no road bridges or tunnels in outer east London. As east and south east London grow, further road crossings in this part of London may be beneficial during the course of this strategy. In the context of other measures in this strategy to promote a shift away from car use and to improve London’s air quality, any new road crossings would need to have a strong public transport element and to meet the broader criteria set out in Proposal 95. Any decision on future crossings would be considered only once the effects of the Silvertown Tunnel, the Government’s Lower Thames Crossing, the planned public transport crossings and other improvements in the area, and the Mayor’s air quality measures are known.

Proposal 95

Following the delivery of the Silvertown Tunnel, the Government’s Lower Thames Crossing and the Docklands Light Railway (DLR) extension to Thamesmead, the Mayor will give consideration to the case for further road crossings of the river in east London where the following criteria are met:

a) The proposal is shown to meet a growth and development need that cannot be met through the provision of a public transport-only crossing.

b) The proposal has been developed through engagement with all affected boroughs, and its location and utility are determined by reference to demand and growth modelling.

c) The proposal is consistent with the Mayor’s overall vision for a healthy city, and includes provision for a mechanism to ensure that any negative impacts of the likely volume of traffic carried can be managed within relevant environmental limits.

d) In conjunction with the Silvertown Tunnel, the Government’s Lower Thames Crossing and the DLR to Thamesmead, the proposal would support Good Growth and reduce barriers to trade and employment between east and south east London.

e) The proposal includes appropriate provision for people walking, people cycling and public transport services (unless there is already alternative provision for these users nearby).

f) Legal limits for air quality are met, and there would be no significant adverse air quality impacts at sensitive receptors, including schools.

g) The use of the river for the movement of freight will be maintained and protected.

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FOCUS ON: NEW HOMES AND JOBS ON TRANSPORT LAND

Surplus land
TfL is the owner of substantial areas of public land in London. In order to facilitate delivery of much needed housing, the Mayor intends to ensure that TfL surplus land is used to maximise affordable housing and so reduce the inequalities in housing provision for those who are from low-income households, younger people and disabled people.

By 2020/21, TfL will start on the property development sites that will deliver 10,000 homes. The Mayor intends that, overall, 50 per cent of homes (as measured by habitable rooms) built on TfL land and brought to market since May 2016 will be affordable.

TfL has brought forward four schemes in 2016-17 (at Kidbrooke, Fenwick, Landmark Court and Blackhorse Road) which are on target to deliver, overall, more than 50 per cent affordable homes. Many more surplus sites will be brought forward over the next four years and beyond. Given their locations, most of them being within Opportunity Areas, town centres and in accessible locations within suburban areas, development will aim to meet the Good Growth principles, and the revenue raised will be reinvested into the transport network to benefit all Londoners.

The development of TfL's surplus sites will also act as a catalyst to other land owners, particularly those in the public sector, to bring forward their sites. Where appropriate, TfL will work with adjoining public sector land owners to maximise development opportunities.

Proposal 96
The Mayor, through TfL, will consider, when surplus transport land becomes available, its accessibility to the transport network and its potential for the development of sustainable, affordable housing. Any capital receipts generated from the sale of TfL surplus land shall be allocated to TfL's transport investment programme.

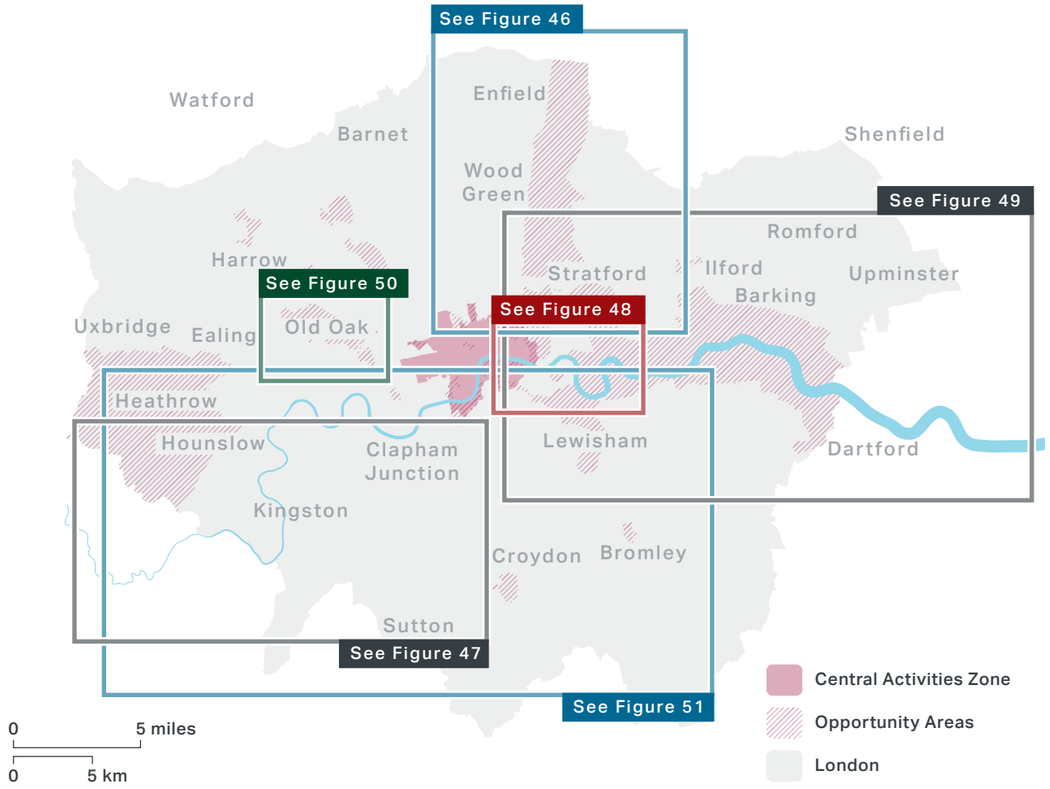
Development at TfL stations and other co-location opportunities
There are also opportunities to co-locate transport and homes or jobs as has been done at Hammersmith and Westminster Tube stations. Given the amount of operational land TfL holds, significant numbers of homes and jobs could be delivered in future, for example, by developing housing over or around bus and rail stations or depots. In developing innovative approaches to mixed-use redevelopment, the Mayor and TfL can lead the way in showing other land owners and businesses how to maximise homes and jobs as sites around the capital are redeveloped. Higher-density redevelopment at sites with low-density uses such as retail parks (including supermarkets) could support London's growth sustainably.

Proposal 97
The Mayor, through TfL, will pursue opportunities for mixed-use development and redevelopment in and around operational sites such as rail or bus stations to deliver much-needed housing and regeneration, while continuing to protect, and enhance where practicably possible, transport operations.

Decking over roads and other transport infrastructure
Large roads and other transport infrastructure can divide communities, create air pollution hotspots and take up a lot of land that could be used for housing or to support jobs growth. 'Decking over' is a method of building across underpasses or rebuilding roads or other transport infrastructure into tunnels, so the land above becomes usable for other types of development. This is expensive to do and must be carefully managed. Early feasibility studies suggest that there may be an opportunity at Barking on the A13 to deck over a section of highway. This could allow an area that has been blighted by noise and poor air quality to be made a more pleasant place to live, while also yielding land for new growth. This scheme would be funded by the development unlocked.

Proposal 98
The Mayor, through TfL and working with the relevant boroughs, will examine the feasibility of decking over the A13 at Barking and assess the case for its potential to support new homes and jobs, and to improve the character of the surrounding environment for the benefit of existing communities.

FIGURE 45: 'FOCUS AREAS': WHERE TRANSPORT IS THE ENABLER OF SIGNIFICANT CHANGE TO AN AREA



Crossrail 2 and the Lee Valley

Maximising the housing, employment and mode shift potential of the Lee Valley requires significant transport investment, including faster and more frequent public transport connections to more destinations and embedding active, efficient and sustainable travel patterns from the start through good design and place-making.

Crossrail 2 will support 200,000 new homes and 200,000 jobs along its route and has the potential to transform the accessibility and growth potential of the Lee Valley and its local centres. Early upgrades of the West Anglia Main Line in advance of Crossrail 2 could accelerate the delivery of this growth. Long-term planning for Good Growth is necessary in order to phase the delivery of homes and jobs alongside investment in the railway.

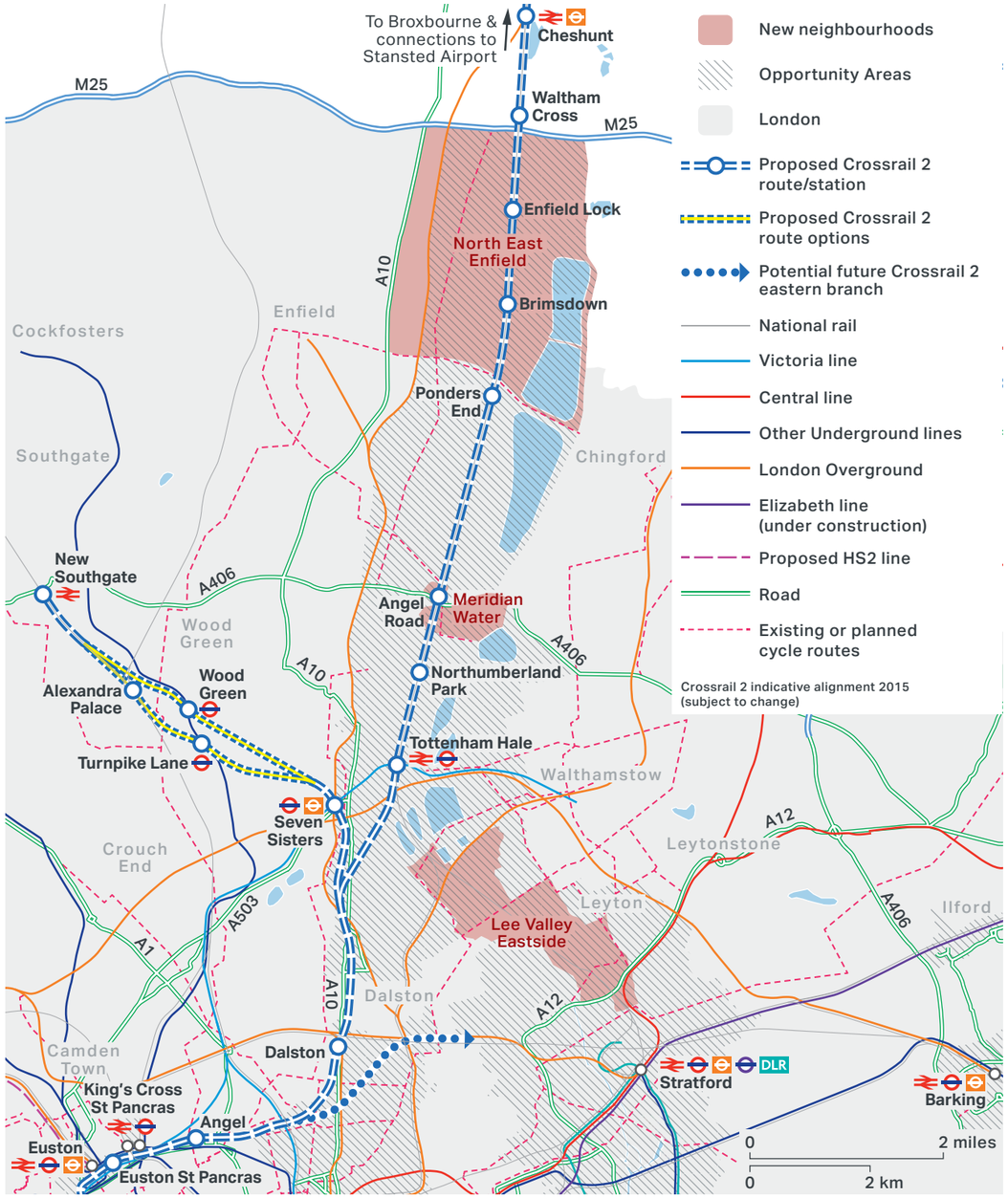
To reach its full potential and optimise the places it serves, Crossrail 2 will need to be complemented by a network of streets that enable and encourage walking and cycling and deliver a reliable and clean bus and freight network.

Barriers to more localised movement (for example east-west connectivity) must be addressed to support growth and enable behaviour change towards more active modes of travel that also support the local economy. Transforming the way local people see walking and cycling will depend on delivering new routes and enhancing the experience of walking or cycling through improvements to the public realm and excellent place-making. A particular focus will need to be put on ensuring better access to the poorly connected but newly emerging neighbourhoods of Meridian Water, Lea Bridge/Leyton and north east Enfield.

The Crossrail 2 corridor also provides excellent opportunities to support growth beyond London's boundaries, building on existing synergies, including as part of the London Stansted Cambridge Consortium.

Figure 46 sets out the main transport proposals to support new jobs and homes in the Lee Valley.

FIGURE 46: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN THE LEE VALLEY



Crossrail 2 in south west London

The growth enabled by Crossrail 2 will be delivered using the principles of the Healthy Streets Approach to create 'Liveable Neighbourhoods'. It will promote active forms of movement by densifying town centres and around stations, alongside targeted improvements in walking, cycling and the public realm.

This will be further supported by co-ordination of land use, transport and regeneration activity in south west London, implementing borough-level traffic reduction strategies, and improving existing links and 'feeder' bus and tram services to Crossrail 2 stations.

Rail capacity into central London will be radically improved by Crossrail 2. This will relieve crowding on existing south west rail routes and provide new direct connections.

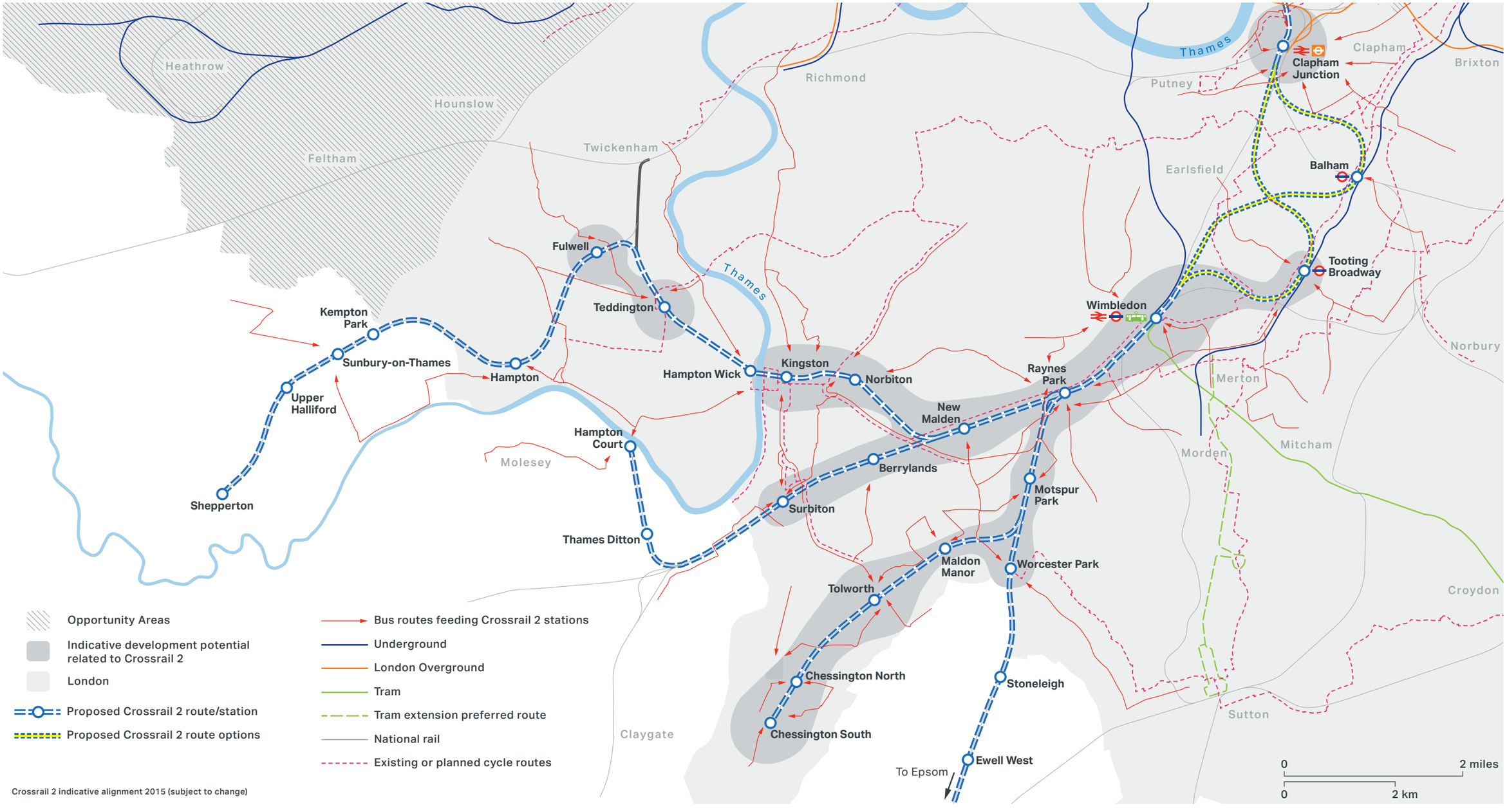
Currently, off-peak and weekend public transport services can be poor in areas of outer London, creating a cultural reliance on car ownership and travel. Complementary measures for Crossrail 2 will aim to tackle this bias towards car use by improving public transport links between outer London town centres, providing accessible multi-modal interchanges, as well as enhancing walking and cycling access to local services and destinations to reduce the need to travel long distances. These interventions will lead to many more people building walking and cycling into their daily lives and so help to tackle reliance on cars in outer London, reducing health inequalities by encouraging active travel, improving the environment and supporting local economies.

Figure 47 sets out the main transport proposals to support new jobs and homes in south west London.

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FIGURE 47: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN SOUTH WEST LONDON



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Inner East London and the Isle of Dogs

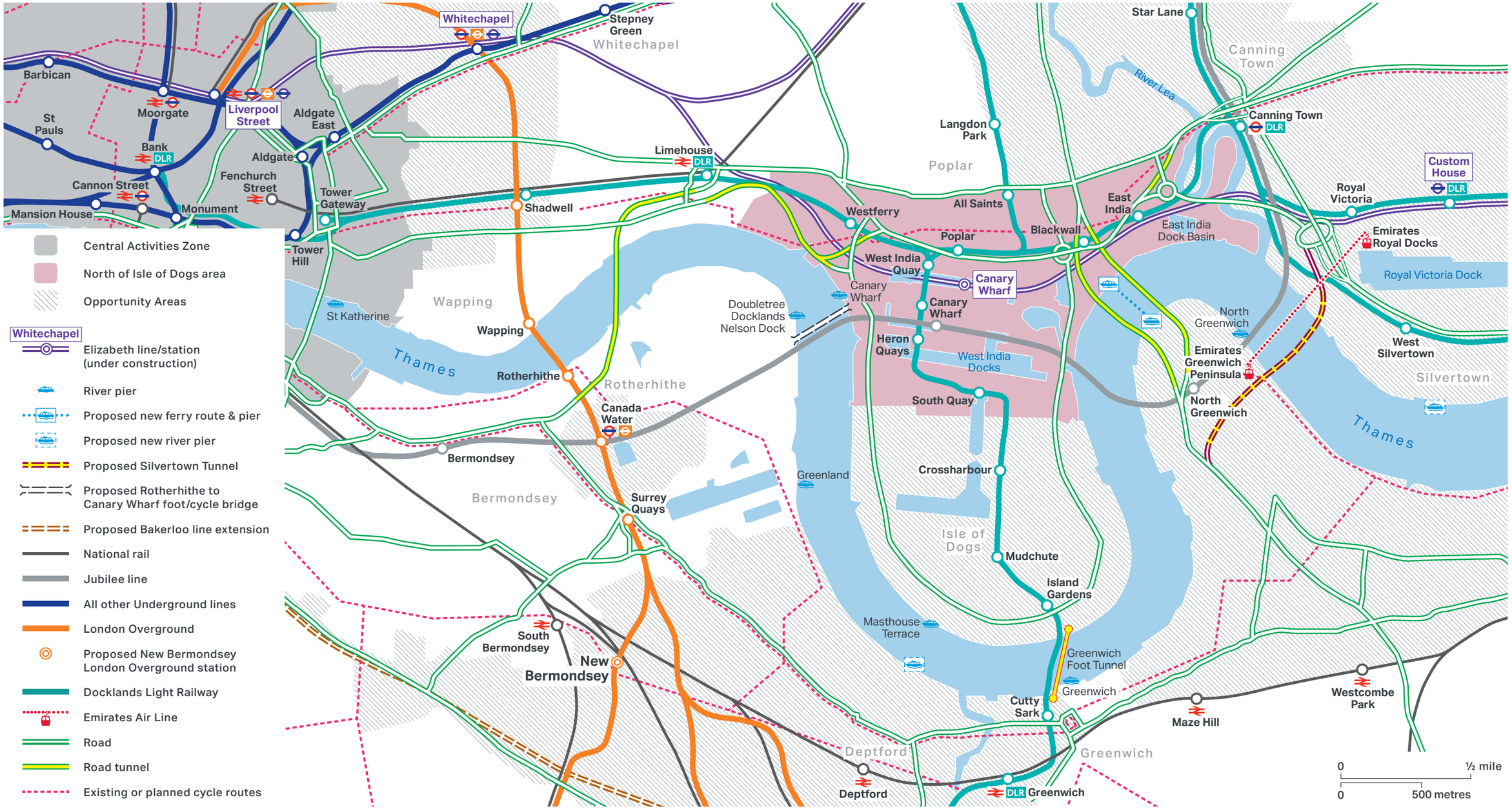
Significant growth is expected across Inner East London to 2041, with the potential to deliver more than 100,000 new homes and 170,000 new jobs. Within this, the northern part of the Isle of Dogs will continue to act as a global employment hub, at Canary Wharf.

Despite significant transport improvements, such as the Elizabeth line from 2019, crowding is predicted to worsen on all routes into the area. Further investment is needed to continue to support growth and serve existing communities, and so options for further enhancements to the network as well as new connections must be considered. Current proposals include DLR fleet replacement and improved services, Jubilee line upgrade, and an improved bus and cycle network to enable greater travel choice and enhance bus reliability. However, congestion on public transport and the street network is unlikely to reduce without a focus on behaviour change that enables and encourages people to choose to walk and cycle for short and medium-length journeys.

At present, the Thames contributes to this problem by acting as a barrier to movement, particularly for journeys by foot and cycle. Feasibility studies are under way for a new walking and cycling crossing from Rotherhithe to Canary Wharf. To optimise its potential to change travel behaviour and encourage more active forms of travel, any crossing will need to be supported by improvements to the surrounding walking and cycle networks in order to change the attitude towards these modes. New and updated piers and a cross-river ferry from North Greenwich will also mean more river services in east and central London. The Silvertown Tunnel will deliver a fundamental change in cross-river bus services.

Figure 48 sets out the main transport proposals to support new jobs and homes in Inner East London and the Isle of Dogs.

FIGURE 48: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN INNER EAST LONDON AND THE ISLE OF DOGS



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Outer East London and the Thames corridor

Outer East London and the Thames corridor have long been identified as having substantial potential for housing and employment growth, but progress has been limited by poor public transport connections. There is potential for a further 250,000 new homes and 200,000 new jobs within the GLA boundary over the next 20 years, subject to there being improvements to transport connectivity and capacity, and a reduction in the barriers to movement in the area presented by the Thames and local waterways.

TfL's planned extension of the London Overground to Barking Riverside will support the delivery of 11,000 new homes that would otherwise not have been viable. In addition, a further 55,000 homes and 50,000 jobs are planned along the proposed route corridor of a potential extension of the Elizabeth line in Bexley and North Kent (as shown in Figure 40), of which at least 20,000 homes would be directly unlocked by the scheme.

The Elizabeth line will boost the area's connectivity, and investment is already under way to continue to transform old industrial land into new neighbourhoods, while providing the necessary supporting transport infrastructure.

TfL is already investing in capacity enhancements such as the upgrade in DLR rolling stock and increasing capacity to the Docklands area. Further work is being carried out to understand what transport infrastructure is needed to support the growth in the Thames corridor in the medium and long term. This includes options for walking and cycling enhancements, new rail links and local bus improvements. It also includes the reduction of the severance caused by the A13, by putting a section of it into a tunnel.

It is essential that the Healthy Streets Approach is applied to any regeneration activity, to support a shift away from the car to walking, cycling and public transport in these places and to enable Good Growth. New developments should come forward in tandem with the provision of new transport links, and so high-quality, reliable bus connections will be fundamental to delivering and stimulating regeneration ahead of new rail links.

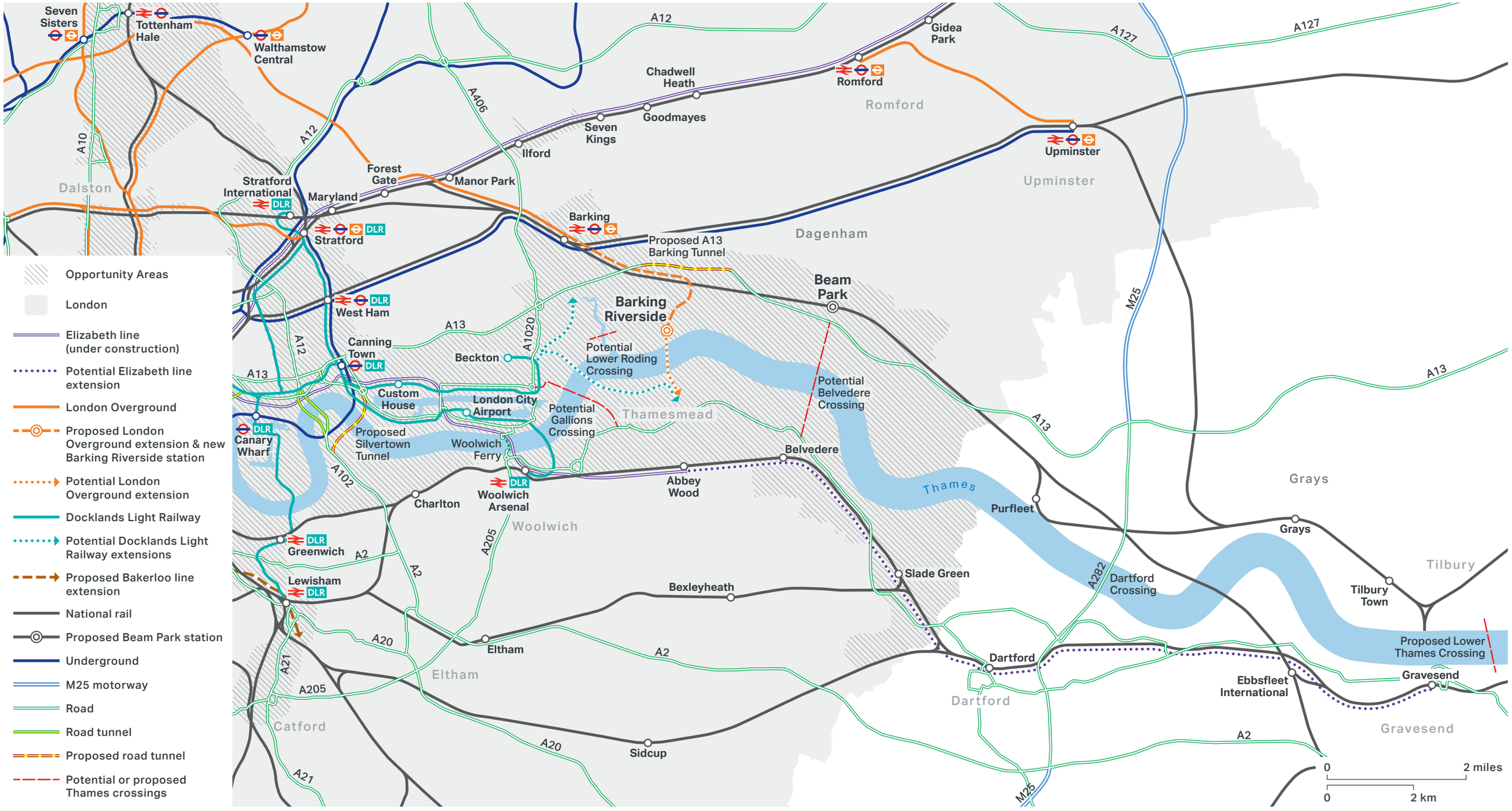
The Mayor recognises the importance of river crossings in east London to support new homes and employment in an area with significant growth potential. Options for new crossings are being examined, with the priority on improving public transport links across the river.

Figure 49 sets out the main transport proposals to support new jobs and homes in Outer East London and the Thames corridor.

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FIGURE 49: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN OUTER EAST LONDON AND THE THAMES CORRIDOR





Old Oak and Park Royal Opportunity Area – interchange between HS2, the Elizabeth line and the Great Western Main Line

Significant investment in transport infrastructure at the area around Old Oak could act as a catalyst for unlocking development opportunities.

There is space to create 25,500 new homes and 65,000 jobs for Londoners, making this one of the biggest growth areas in the city and the largest regeneration area in the UK. Neighbouring the Old Oak development area is Park Royal, Europe's largest industrial estate, which needs to be protected, supported and intensified through good transport infrastructure.

A new Old Oak station served by HS2, the Great Western Main Line and the Elizabeth line is set to open in 2026. This key strategic interchange will help to relieve pressure at Euston by allowing people to change between these lines before reaching central London, and act as a national and international gateway for travellers arriving from HS2 and Heathrow. The West London Orbital line will significantly improve orbital connectivity from Old Oak to north west and south west London.

The development area at Old Oak presents a unique opportunity to champion and implement the Healthy Streets Approach, using the principles of Good Growth to base development around active, healthy lives.

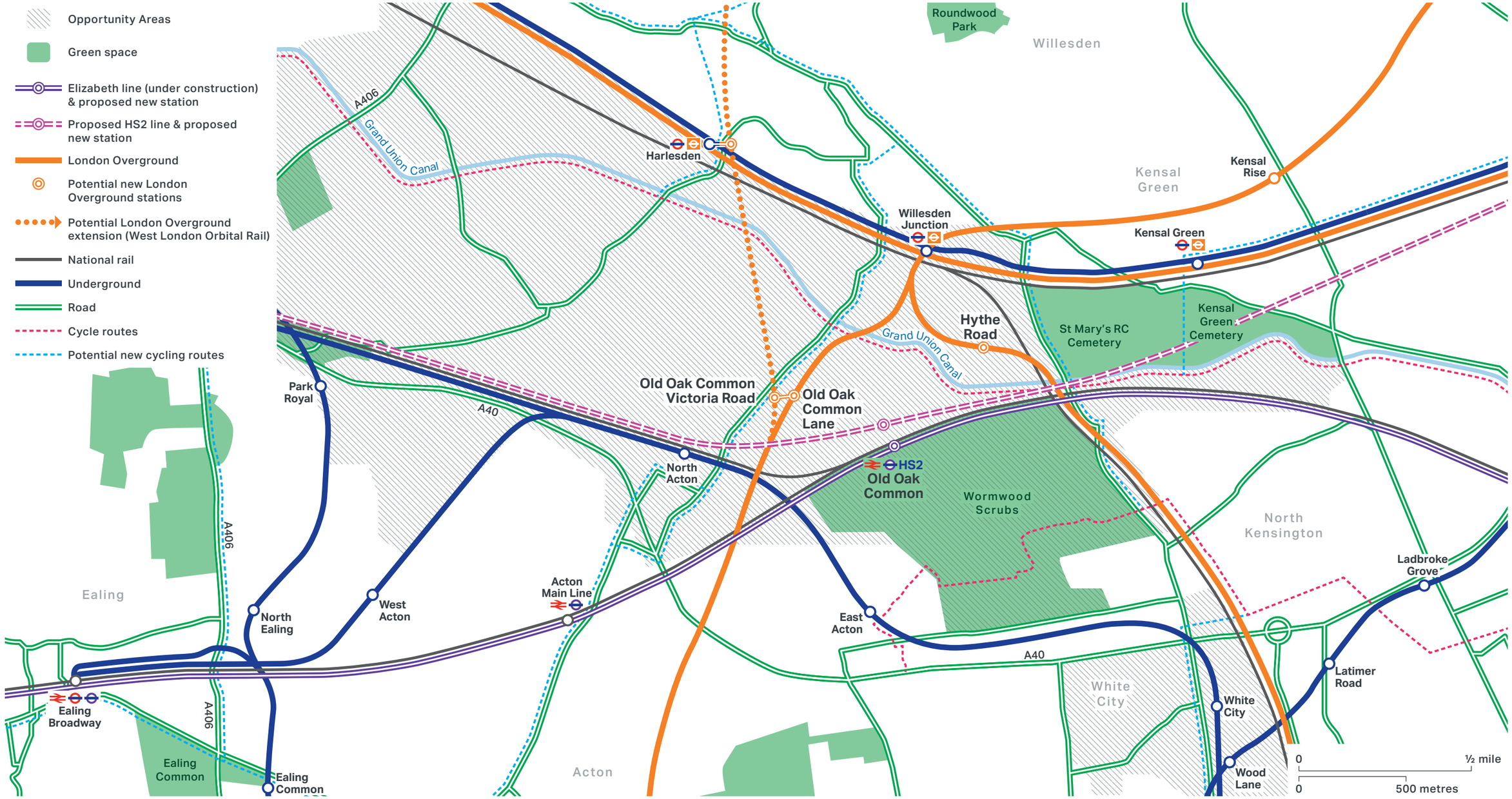
At present, the Grand Union Canal, railway lines and changes in level across the area create barriers to walking and cycling, and significant amounts of development are proposed for which public transport capacity and safe and convenient walking and cycling routes do not currently exist. It is essential that a new street network is developed using the Healthy Streets Approach to make walking and cycling the first choice across the area. This will require a series of new bridges and underpasses and careful consideration of how the proposed Old Oak High Street is delivered, ensuring it is able to link into all existing and proposed stations. High-quality and reliable bus links to and through the area from existing residential communities will also be required to ensure that everyone benefits from the proposals at Old Oak. High-density, mixed-use development will mean that local amenities are within walking and cycling distance, and exceptional public transport links for longer journeys will reduce the need to use cars.

There is already congestion on the surrounding highway network, particularly on the A40 and A406. The road network will need to be proactively managed to minimise the impact of development, especially during construction works. High-quality public transport, walking and cycling facilities, and limits on car parking are essential to encourage mode shift away from cars.

Development of this growth area is anticipated to happen over many years and transport proposals will need to be flexible enough to respond to changes in technology and behaviours. It is also essential that the needs of businesses at Park Royal and existing residential communities around the site are met during construction and development. TfL will work with stakeholders to consider a complementary package of transport investment, including the opportunities to connect with London Overground and Underground services, a potential new Chiltern Railways service to Old Oak, and new bus, walking and cycling links through the site, with flexible multi-purpose streets.

Figure 50 sets out the main transport proposals to support new homes and jobs at Old Oak and Park Royal.

FIGURE 50: TRANSPORT PROPOSALS FOR HOMES AND JOBS AT OLD OAK AND PARK ROYAL



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Devolution and London's suburban metro in south London

Historically, south London's growth has been constrained by the nature of its rail connections, and much of the area has low-density housing, with opportunities for intensification. There is a limited Underground network in the region and much of that network is overcrowded. Where good rail connections do exist, they serve a wide catchment area, causing commuters to use cars to reach stations and adding to congestion on the streets in these areas.

Crossrail 2 will add significant capacity to the network and enable densification of town centres such as Kingston and Wimbledon. The proposed Bakerloo line extension would also put south east London on the Tube map and underpin the development of 25,000 new homes and 5,000 new jobs.

Devolution of the south London rail networks would bring about an immediate improvement in service quality for existing users across a wide area. This could be followed by upgrades to signalling, track and stations to further enhance frequency and therefore capacity.

Trams provide a high-quality link between Wimbledon and Croydon, and connect with the existing and future planned rail services to central London. Large increases in patronage are expected over the next 20 years, and various options for expansion are being considered, in particular, an extension to Sutton, which would support the delivery of at least 10,000 new homes and improve public transport accessibility to Sutton town centre and St Helier Hospital.

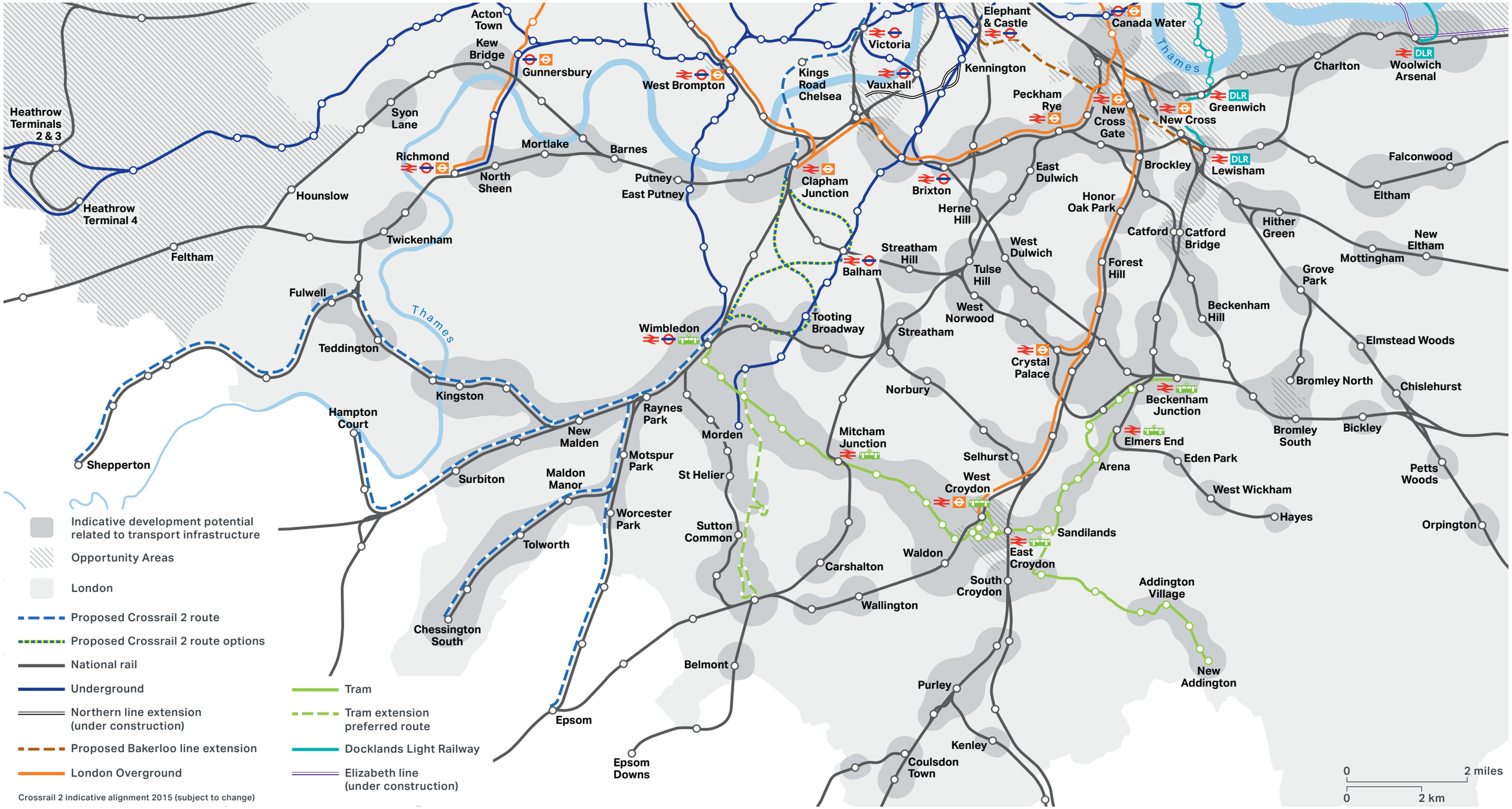
TfL will work with the GLA, boroughs and other stakeholders to better co-ordinate land use and transport planning activity around stations in south London, which will aid regeneration, increase the delivery of new jobs and homes and integrate them better with the local and wider area. By improving the environment for walking, cycling and public transport users, these will become the default modes of choice for travel rather than the use of cars.

There will also be focused transport investment at 'strategic hubs', such as Clapham Junction and Lewisham, to optimise customer experience, improve connectivity between town centres and improve accessibility by extending the reach of the step-free network.

In most places, the focus will be on increasing the density of existing land uses rather than converting industrial land (which is in scarce supply compared to other parts of the city) to housing. In some areas, it may be possible to consider the potential consolidation and co-location of industrial activities to enable the release of land for high-density development while maintaining the amount of floor-space available for industry.

Figure 51 sets out the main transport proposals to support new homes and jobs in south London.

FIGURE 51: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN SOUTH LONDON



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FOCUS ON: GETTING THE PLANNING PROCESS RIGHT

Delivering Good Growth depends on the planning process. It requires clear policy at all levels, with targets for mode share (such as through OAPF) and enhanced environmental standards, securing funding for transport from increased land values, and working with authorities and communities, in and outside London.

The London Plan is the spatial strategy for growth, with policies to ensure new development delivers Good Growth. Given the importance of transport infrastructure to support and unlock growth, new development must be expected to contribute to funding it. Public sector funds can unlock development and leverage further private funding. TfL's Growth Fund supports the delivery of transport schemes that accelerate housing delivery and unlock development and regeneration opportunities in London's growth areas. The Fund allows TfL to deliver beneficial development that might otherwise be unviable. TfL works with the GLA to allocate this Fund to appropriate projects.

Proposal 99

The Mayor, through TfL, the boroughs, planning authorities beyond London and other delivery agencies, will:

a) Develop mechanisms for co-ordinating planning and investment along transport growth corridors, building on approaches such as the London Stansted Cambridge Corridor and Old Kent Road.

b) Develop Opportunity Area Planning Frameworks with ambitious mode shares for walking, cycling and public transport, maximising the use of investment in transport infrastructure and services.

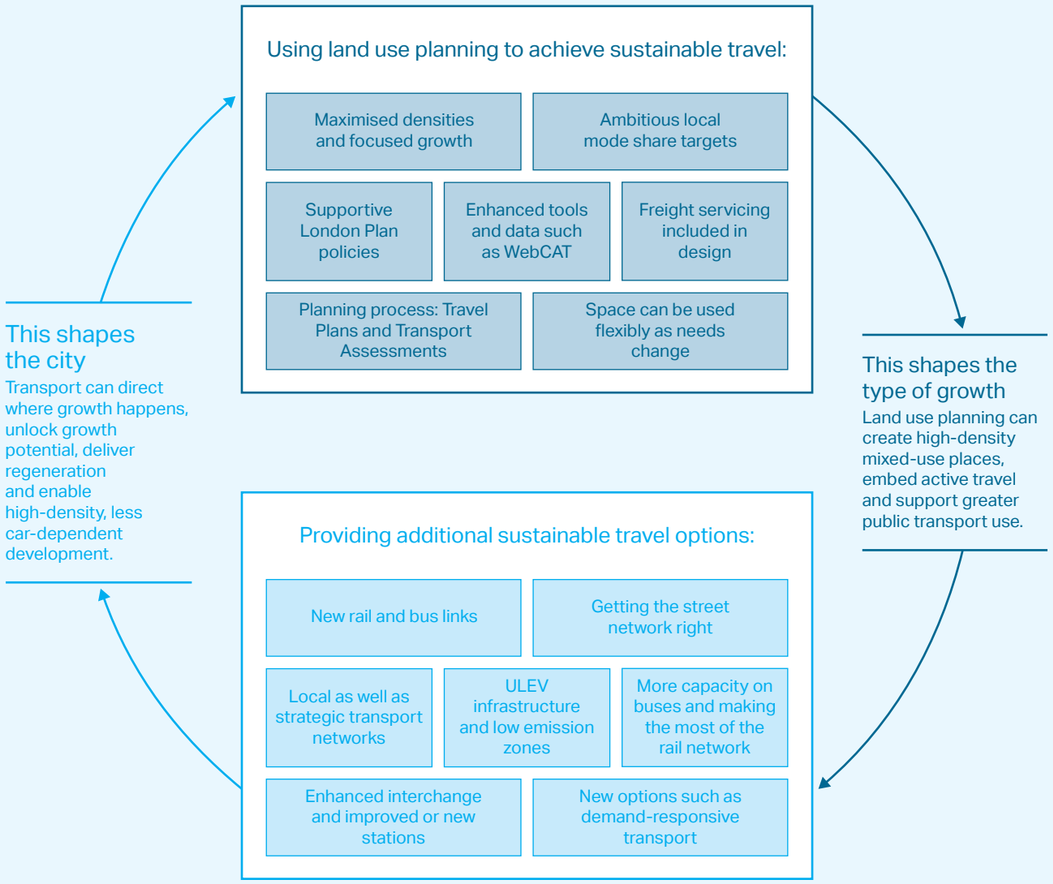
c) Use public sector funding, such as TfL's Growth Fund, for smaller scale transport schemes that help directly unlock the creation of new homes and jobs, and leverage funding for such purposes from other sources.

d) Embed Good Growth principles in TfL assessment of development proposals and Transport Assessment requirements, and then use and apply them.

e) Update TfL's Travel Plan guidance to ensure developments encourage active, efficient and sustainable travel, apply the Healthy Streets Approach and help deliver carbon-free transport.

FIGURE 52: DELIVERING GOOD GROWTH

Good land use planning enables the delivery of enhanced and increased public transport and active travel provision. Transport services and infrastructure in turn shape the city through enabling high-density development and liveable neighbourhoods where people want to live and work. This is the cycle of Good Growth.



Public transport links to airports

London's airports play a vital role in maintaining and enhancing its international connectivity for both passengers and freight. Improved public transport links, notably rail, have a key role to play in making the best use of existing capacity while supporting a shift to more active, efficient and sustainable ways of travelling.

Improvements should include:

- New, longer trains for Gatwick and Luton airports as part of the Thameslink Programme and Brighton Main Line upgrade, followed by the next phase of upgrade and redevelopment of Gatwick Airport station
- Upgrading the West Anglia Main Line serving Stansted airport, including four-tracking, to be followed by increasing frequencies associated with Crossrail 2
- Enabling new routes and frequencies to Heathrow airport, with the delivery of the Elizabeth line
- Further introduction of full-length and more frequent DLR services to London City airport
- Increased frequencies on rail services to Southend airport
- New automated people-mover to better connect Luton airport with the rail network

In addition to these major schemes, improvements to bus, coach, cycling and walking facilities have a valuable part to play in improving access to all six of London's airports. These enhancements will help to integrate the airports into the wider public transport network, enabling passengers and staff to make better use of them. All surface access improvements should be planned based on the principle that airport operators provide a fair share of funding.

Proposal 100

The Mayor will promote the improvement of surface links to London's airports, with airport operators contributing a fair share of the funding required.



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FOCUS ON: THE UNACCEPTABLE IMPACT OF EXPANDING HEATHROW

The Government announced its preference for a new north west runway at Heathrow in October 2016. This would increase the airport's current cap by more than 50 per cent, from 480,000 flights to 740,000 flights per year. The Mayor is engaging with the planning process around Heathrow expansion to ensure his fundamental concerns are raised and addressed.

The demand generated by the current airport combined with local traffic already place considerable strain on the roads and railways serving the airport and contribute to levels of NO_2 that are well in exceedance of legal limits. The Mayor considers that, as a result of the additional flights and associated traffic, any expansion at Heathrow would significantly impair London's ability to meet international air quality obligations in the shortest possible timescale and would contribute to an overall worsening of air quality relative to the situation without expansion.

Heathrow already exposes more people to significant aircraft noise than its five main European rivals combined, and the proposed increase in flights cannot avoid many people being newly exposed to significant noise.

Moreover, it would be unacceptable if the air quality gains secured by the Mayor and the potential noise improvements as a result of new technologies were not allowed to accrue to local communities to improve public health, but were instead used to enable expansion of Heathrow airport.

Policy 22
The Mayor will continue to oppose expansion of Heathrow airport unless it can be shown that no new noise or air quality harm would result and the benefits of future regulatory and technology improvements would be fairly shared with affected communities. Any such expansion must also demonstrate how the surface access networks will be invested in to accommodate the resultant additional demand alongside background growth.

The forecast additional airport-related highway trips are an essential component of the air quality impacts and one that any expansion would have to address. Without significant rail investment, the airport's aspiration for 'no net increase in highway trips' is not credible and would place further pressure on already congested streets, including through the increase in freight vehicles that would result from any expansion.

If the aspiration for no new highway trips is achieved, this would result in an increase in public transport trips of more than 250 per cent. But without significant new infrastructure, it will place severe strain on the public transport networks that serve the airport. Existing committed schemes such as the Elizabeth line and the Piccadilly line upgrade – designed to support London's population growth – will not be able to accommodate this increase. Delivering the shift to public transport requires Government commitment to further schemes to provide sufficient additional capacity and connectivity, notably:

- A western rail link to Heathrow – direct services from the Thames Valley: Slough, Maidenhead and Reading
- A southern rail link to Heathrow – direct services via a route with sufficient spare capacity from central, south and south west London, as well as Surrey

Any proposals must ensure that they can deliver significant additional capacity and connectivity that are capable both of attracting sufficient passenger and staff trips that would otherwise be made in cars and taxis, and of accommodating the additional demand. This cannot be at the expense of non-airport trips and services, nor should it erode the ability of the transport network – including already planned schemes – to enable growth.

There is an important role for improvements to bus, cycling and walking infrastructure serving the airport, particularly for staff journeys. It is also essential that the access for disabled people to the airport is improved.

Proposal 101
The Mayor will:

a) Work with industry partners and stakeholders to assess options for surface access to Heathrow, and

b) Seek a commitment from Government to fund and deliver within an appropriate timescale the extensive transport measures required to support the expansion of Heathrow.



Chapter six – Delivering the vision

Delivery in a changing world

This strategy seeks to deliver the Mayor's vision – to create a future London that is not only home to more people, but is a better place for all those people to live in. Fundamentally, this means reducing Londoners' dependency on cars in favour of walking, cycling and public transport use.

This chapter sets out how the vision will be delivered in the challenging context of a growing population, rapidly changing technology and falling Government grant to fund transport services in London. It will do this by:

a) Ensuring changing technology contributes positively to the aims of the strategy.

b) Working in collaboration with TfL, boroughs, Government, rail and others, and funding transport improvements through more efficient and fairer means.

c) Monitoring and reporting to ensure delivery is on track.

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a) Changing technology

Recent years have seen major technological developments, including the rapid uptake of mobile technology. The increased ability to share information, new payment methods and the ease of accessing the internet on-the-go have already changed consumer expectations about interacting with the transport system, and about how it is operated. Technology will continue to advance rapidly, and across the world billions of pounds will be invested in the development of 'new mobility services'.

While some predicted technological changes may be years or even decades away, many are more immediate and can be used to improve people's lives right now. This includes providing real-time information to people as they plan trips and move around the city. It also means using available technologies to make using active, efficient and sustainable travel options easier, including by ensuring that payment platforms are up to date and fit for purpose. By tracking and shaping new technological developments as they emerge, London will continue to benefit from one of the most comprehensive and integrated transport networks in the world.

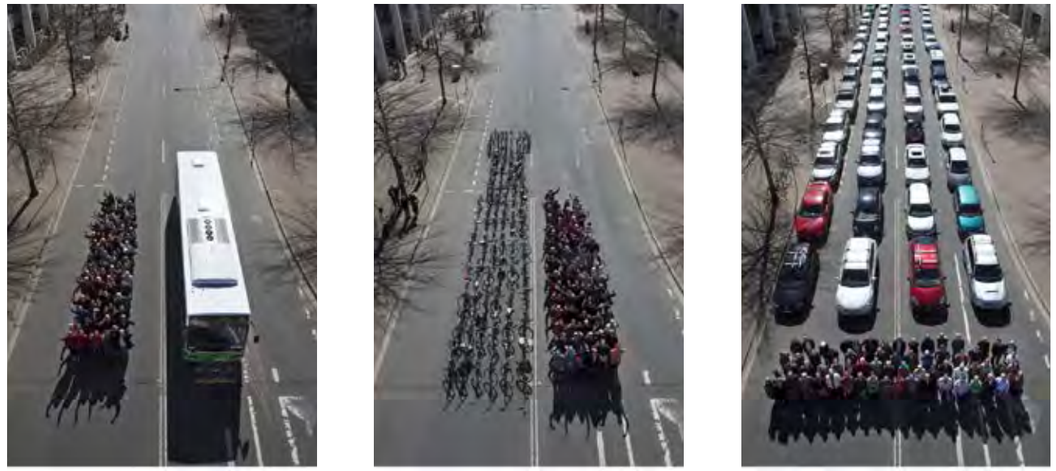
Proposal 102
The Mayor, through TfL, will work to ensure its information systems and payment platforms take account of technological advances and evolve to remain fit for purpose.

Principles for new transport services and technology

The evolution of technology has already generated new approaches to transport services in London and this is only set to continue. How these develop has the potential to either help or hinder the achievement of the strategy's aims. The best examples of this issue relate to technologies that are developing around how cars operate and how they can be accessed.

Car dependency and traffic dominance have many significant impacts on cities and their residents. These range from health impacts – increasing inactivity and road danger, worsening air pollution and noise, and creating severance between people and communities – to congestion. Many new technologies aim to resolve some of these problems – electric vehicles will reduce some types of pollution and autonomous vehicles may reduce road danger – but no car-based approach to transport can solve them all.

FIGURE 53: THE ROAD SPACE REQUIRED TO TRANSPORT 67 PEOPLE



Bus | **Bicycle** | **Car (whether privately owned or shared, diesel or electric)**

Source: © Cycling Promotion Fund

How efficiently road space is used for the movement of people provides a vivid example of this phenomenon. While moving, a car takes up the same amount of physical space, regardless of who owns it, how safe it is or how clean its engine is. While there may be some ways of improving how efficiently this space is used in the future – such as increasing occupancy, or using technology to co-ordinate vehicles – these will not make cars as efficient as buses or cycles, as illustrated in Figure 53. The same type of issue can be seen across all the impacts of car dependency and traffic dominance – new car-based services and technologies may resolve some problems, but others will remain.

The only way to tackle all of the problems associated with car dependency and traffic dominance is to reduce car use directly, through mode shift towards walking, cycling and public transport use. While technological changes to the way cars operate and how they are accessed have the potential to improve some aspects of London life in some ways, they are unlikely to be the best solution to London's problems in the long term.



In the worst cases, the adoption of new technologies could increase car dependency and traffic dominance, undermining efforts to increase walking, cycling and public transport levels. If car-sharing services are promoted in the wrong areas, people could switch from cycling or getting the bus. If autonomous vehicles make car use more appealing and easier to do, people may walk around their neighbourhoods less. This would present serious problems for the health of Londoners and the functioning of the city.

If well managed, however, new services could play an important role in catering for essential journeys in London, reducing car ownership and use, and helping Londoners to transition away from car dependency.

To put new services and technologies to the best use for all Londoners, they must, therefore, be carefully managed.

It is not yet clear which precise measures will be needed to do this over the full course of this strategy to 2041. The Mayor's approach to developing these measures will be based on a set of principles derived from the Healthy Streets Approach, set out in Policy 23. TfL will monitor changes to any transport services or technology that could affect how Londoners get around or experience London's streets. This includes those detailed below and a range of other potential developments, such as the use of drones or delivery robots, as well as applications of technology that cannot be predicted yet. The future development of policies and proposals will be informed by this and guided by Policy 23 to allow TfL to adapt as needed to ensure the aims of this strategy are achieved – potentially influencing how the organisation operates, engages with customers and businesses, and plans for the future.

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Policy 23
The Mayor, through TfL, will explore, influence and manage new transport services in London so that they support the Healthy Streets Approach, guided by the following principles:

a) Supporting mode shift away from car travel: new transport services should not encourage more car journeys, especially where there are good walking, cycling or public transport options.

b) Complementing the public transport system: new services should help more people who would otherwise complete their journey by car to access the public transport network, while not reducing walking and cycling to and from stops and stations. They should also provide a means of travel in areas where public transport connectivity is currently poor (especially in outer London).

c) Opening travel to all: new services should be accessible to all Londoners and should not contribute to the creation of social, economic or digital divides in which some Londoners would have better travel options than others.

d) Cleaning London's air and reducing carbon emissions: new services should achieve the very best emissions standards to reduce emissions of carbon dioxide, nitrogen oxides and particulate matter in London, and enable faster switching to cleaner technologies.

e) Creating a safe, attractive environment on our streets: new services and technology should help create a safer, quieter and more pleasant environment on London's streets, where it is more attractive to walk or cycle, and should not lead to existing active trips being made by non-active modes. There must always be an emphasis on the safety of passengers, people walking and cycling, and other road users. Where this involves introducing technology directly into the street, it should be done in a co-ordinated way that enhances the overall character of the street, reduces clutter, and does not prevent future potential re-allocation of space for walking, cycling and public transport.

Policy 23 (continued)

f) Using space efficiently: new services must make efficient use of road and kerb space, be appropriate for the area of London in which they operate and support opportunities to re-allocate space for walking, cycling and public transport.

g) Sharing data and knowledge: where possible, data and knowledge should be shared with TfL and the GLA to enable improved monitoring, operating and planning of the transport network.

Shared car and other low-occupancy services

New low-occupancy and car-based services, such as car sharing, ride pooling, and private hire vehicles that can be easily booked via smartphone apps, are playing an increasingly large role in how Londoners travel, and could continue to do so over the period covered by this strategy. If not managed well, the growth of these transport services could result in fewer people travelling by public transport, foot and cycle, undermining the principles above. However, providing that the supply of, and demand for, these services is appropriately managed, they could play a role in reducing car ownership by providing connectivity where public transport is harder to provide or for those who are not able to walk or cycle.

It will be important to provide walking and cycling environments and public transport services that make active, efficient and sustainable travel options more appealing than 'shared mobility' services. Managing the way people pay for road use could play a key role in ensuring that these services do not cause major increases in congestion or emissions.

Limiting parking provision and charging for its use is an effective means of managing private car usage, but it could be less effective for shared car services. How kerb space is used by shared vehicles will be an important issue to consider if they become more widespread.

Proposal 103
The Mayor, through TfL, will explore and monitor the relationship between access to kerb space, including for car parking, and the level of demand for all forms of car use to inform assessment of how demand management measures should evolve over time.

New public transport and higher-occupancy services

As these changes occur, TfL will continue its role of providing a public transport network to meet London's economic, environmental and social needs. Should technology enable new higher-occupancy services, such as those using vehicles larger than a taxi but smaller than conventional buses, TfL will look to use these to extend the reach of its network, where this is needed. Where other providers wish to deliver similar services, these should look to complement this essential public transport network and provide alternatives to car travel. They should not undermine TfL's ability to deliver any of the aims of this strategy, impact on its network management duties or cause additional congestion, particularly in central and inner London.

TfL will explore any opportunities for new ways to help reduce car use further alongside improvements to 'conventional' bus and other public transport services, helping to make better use of road space. Demand-responsive bus services, which operate without necessarily fixed routes or frequencies, are one particular application that could potentially cater for gaps in service provision where public transport is required. This could offer benefits particularly in outer London where travel patterns are characterised by trips having many different start and end points, and consequently conventional public transport is less able to provide services that cater for people's needs. These demand-responsive services could also help address demand pinch-points or provide alternatives where car travel still predominates.

TfL will carry out detailed assessment of evolving and emerging transport business models, including demand-responsive transport, to assess their potential contribution to achieving the policies and proposals of this strategy, and identify areas in which new demand-responsive bus services could enhance or complement existing public transport provision. TfL will work with boroughs and relevant stakeholders to agree how to identify which areas are the most appropriate in which to implement such services.

Proposal 104

The Mayor, through TfL, will explore and trial demand-responsive bus services as a possible complement to 'conventional' public transport services in London. This will include consideration of trials that could unlock otherwise difficult-to-serve areas of outer London.

Connected and autonomous vehicles

Looking ahead, changing vehicle technology, such as the advent of connected and autonomous vehicles, has the potential to change more radically how Londoners travel. Traditional vehicle manufacturers as well as high-profile technology companies are aiming to launch increasingly 'driverless' technology within the next five or so years, so it is essential that preparation takes place now. Many of the changes, particularly in the nearer term, will be incremental and do not amount to fully self-driving vehicles. For example, advanced driver assistance technologies offer the potential to prevent traffic incidents, and to protect passengers and people walking and cycling, reducing road danger in London. On-board software will increasingly allow vehicles to communicate with roadside infrastructure, and each other. This capability could provide opportunities to reduce road danger and improve traffic management.

Applications of these technologies are being developed. Real-world trials of highly autonomous vehicles have already begun and are likely to grow in number in the near term; industry aspirations for these vehicles increase in scale from the 2020s onwards. This technology could have a significant impact on every type of vehicle, including cars, freight vehicles and potentially public transport, as well as enabling new types of vehicle.

The Mayor's overall approach to these changes is to ensure the right transport services, using the right vehicles, in the right places. To do this, trials will be safely managed in the short term; and more detailed policies will be developed to shape the emergence of connected and autonomous vehicles in London. The guiding principles set out in Policy 23 will be used to ensure new technologies do not undermine the Healthy Streets Approach by leading to a growth in car use at the expense of a move to walking, cycling and public transport.

Shaped in the right way, connected and autonomous vehicles can make travel easier for older and disabled people and reduce road danger. This technology could also improve how efficiently road space is used, such as through route choice that avoids congested areas, optimising gaps between vehicles or simultaneous acceleration at junctions. This technology could also make high-occupancy services (such as conventional buses or demand-responsive services in the right locations) more attractive, to contribute to a shift away from car use.

There are also risks to be managed. Increasing access to car sharing could bring benefits, but these would be outweighed by the impacts on congestion, emissions and health if cheap, convenient car travel is extended to Londoners who do not own a car or do not have a driving licence. Even if technology is able to improve how efficiently cars use road space, connected and autonomous cars will not be as space-efficient as walking, cycling or public transport. The interactions of connected and autonomous vehicles with people walking, people cycling and conventional vehicles will also need to be made in a safe, predictable and manageable way, while any connected and/or autonomous vehicles should be secure from 'cyber-attack'.

Proposal 105
The Mayor, through TfL, will take part in trials of new vehicle technology, adopting a safety-first approach, and will consider the application of new vehicle technology in support of the Healthy Streets Approach.

Proposal 106
The Mayor, through TfL and working with the DfT and other stakeholders, will adopt an appropriate mix of policy and regulation to ensure connected and autonomous vehicles develop and are used in a way that is consistent with the policies and proposals of this strategy.



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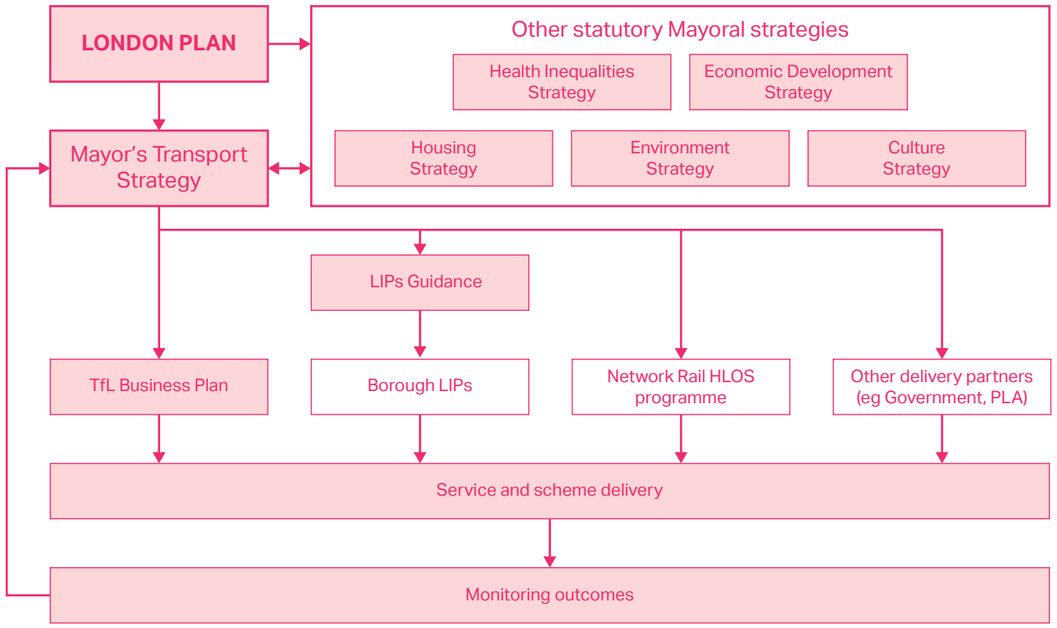
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b) Delivery, funding and powers

Delivery processes

Although the aims of this transport strategy will be partly delivered directly by TfL on the Mayor's behalf, they will also need in part to be delivered by the London boroughs' Local Implementation Plans (LIPs), and by the Mayor seeking to work with the rail industry, the Port of London Authority (PLA), Government and other stakeholders. This reflects the fact that direct responsibility for the operation and improvement of London's transport system is not currently unified under the Mayor. Only those schemes delivered by TfL are directly in the gift of the Mayor. The process is summarised by Figure 54.

FIGURE 54: TRANSPORT STRATEGY DELIVERY PROCESS



Funding and powers

Achieving a transport system that meets the needs of all Londoners and successfully delivers the policies and proposals of this strategy will require additional funding that is both stable and secure. Without adequate funding, quality of life, health and social integration are at risk, and there will be damage to London's economic growth, ability to deliver new housing and resilience to climate change.

There are a number of funding challenges to be addressed in delivering this strategy, including:

- How to cover London's transport operating costs through the available income sources in an environment where London's population is growing and Government grants are falling, while continuing to provide an efficient, reliable and affordable service and a continued programme of asset renewals and maintenance
- How to maximise funding from current sources and develop new income streams to continue to make essential new capital investments
- How to diversify funding sources – only possible with the devolution of additional powers to the Mayor – to create a more stable and secure funding environment to meet London's transport needs

A new approach to funding and delivering the transport network is therefore required. This must include addressing the fundamentally inadequate and unfair way in which road use is paid for in London, with motorists paying too little, and in effect being subsidised by public transport fare payers. Measures such as road user charging (where appropriate), land value capture and the devolution of financial powers to local level are essential to delivering an efficient and fair funding system.

Policy 24

The Mayor will seek to ensure that London's transport system is adequately and fairly funded to deliver the aims of the transport strategy. Additional powers should be devolved to the Mayor, the GLA or TfL to enable the Mayor and his agencies to respond effectively to economic, social and environmental change. These should include financial, regulatory and other powers to enable London's challenges to be met, and emerging opportunities to be optimised.

Cost of the strategy

In order to meet London's transport needs and successfully deliver the aims of the strategy, significant capital investment will be required between now and 2041. Delivering the schemes identified in the strategy will require an average capital investment by TfL and others of around £3.3bn a year. This equates to around 0.9 per cent of London's Gross Value Added. This means that the level of expenditure envisaged by the strategy is broadly in line with the National Infrastructure Commission's recommendation of an economic infrastructure spend of circa 1.2 per cent of Gross Domestic Product per annum.

TfL's current business plan covers the period to 2021-22 and has a planned net operating surplus towards the end of the period. This is supported by a comprehensive review of the organisation under a TfL-wide transformation programme to reduce costs and improve efficiency.

Beyond the business plan period, the operational surplus should be maintained, but this will be challenging. TfL's financial strategy assumes a balance between sustained investment in both operating transport services (including capital renewals) and new capital investment. Expenditure will need to meet the needs of Londoners and deliver a sustained growth in revenue to fund continued investment.

This level of capital spend is ambitious and can only be achieved through close collaboration between London's various delivery agencies, including the Government, national rail, London's boroughs and the private sector.

Funding the strategy

Transport in London is funded through a combination of sources, including:

- Business Rate Retention (BRR) under Mayoral control, which will replace existing direct Government grants for operations and new capital investment from 2017-18
- TfL 'prudential borrowing' against future revenue
- Revenue from fares and other 'user pays' sources (eg Congestion Charging)
- Non-fare sources (eg advertising and property)
- Contributions from the London boroughs and the private sector, for example, developer funding for associated transport investments
- Other specific grants

In addition, for the Elizabeth line project, all funds are ring-fenced specifically (eg specific levies such as Business Rate Supplement and Community Infrastructure Levy (CIL)).

TfL's operating expenditure, including capital renewals, will be primarily reliant on fares and BRR funding sources.

Other sources such as capital grants and prudential borrowing, which in the past have largely funded new capital investment, are likely to be scaled down. In the future, additional borrowing is only an option where the capital spend results in an increase in future revenues that can service the operating and financing costs.

A large part of TfL's future capital spend is expected to be used to deliver the aims of the Healthy Streets Approach, and although these types of schemes are generally much cheaper to deliver than large infrastructure schemes, they cannot typically provide the revenue required to sustain further borrowings. Additional sustainable funding sources and project-specific grants are needed to deliver the aims of this strategy alongside contributions from London boroughs and the private sector.

'Delivering the schemes identified in the strategy will require an average capital investment by TfL and others of around £3.3bn a year.'

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Potential future additional sources of funding and project-specific grants

The Mayor must have the right range of powers in order to ensure continued investment in the renewal and expansion of the transport system. Without this, it will not be possible to deliver an affordable transport system that is accessible to all and provides a better quality of life.

Successful transport systems benefit everyone in the city, and so it is logical that it is not fare payers alone who fund them. All beneficiaries, such as road users and businesses, should contribute to funding the transport system according to the benefits they get from the system, the external costs their use of it generates – such as congestion and air pollution – and their ability to pay.

There is a large gap between the wealth that London's economy generates and its ability to fund the major investment on which its success depends. Compared to other cities across the world, London controls relatively little of the tax raised within it and this means it can appear over-reliant on the national Government.

Devolving financial powers to London and other UK cities could allow them to manage their own growth. When asked, most Londoners would support more of the tax raised in London being controlled at the London level, while the evidence reviewed by the London Finance Commission (LFC) suggests that granting cities revenue-raising powers can promote accountability, fairness and economic efficiency.

In recognition of this, and following an invitation for TfL to bring forward proposals for financing infrastructure projects from land value uplift, the Government has agreed to establish a joint task force (including the GLA and TfL) to explore the options for piloting a Development Rights Auction Model (DRAM) on a major infrastructure project in London.

This is a welcome development, which represents a positive step towards the devolution of fiscal powers called for in a report published by the LFC[1]. This recommended the full devolution of property taxes, including council tax, business rates and stamp duty, as well as permissive powers to develop new mechanisms, subject to consultation. This would allow for the development of a consistent approach with Section 106 payments and the Mayoral and Borough CIL. The LFC made further recommendations that would build on this and help London deliver major transport, housing and other capital investments.

In addition to the LFC recommendations, Vehicle Excise Duty (VED) should be devolved to TfL to provide revenue for investment in strategic roads in London, the responsibility for the management of which was devolved to TfL in 2000. This would bring investment in London's streets in line with the Government's intention to allocate VED revenue to the English Strategic Road Network from 2020. Powers to change how VED is levied would also provide London with the flexibility to trial new ways of paying for roads, which would be better linked to the impacts vehicles have on them and on London as a whole. Taxation rules should also be reviewed to ensure they incentivise active, efficient and sustainable travel to/from and for work.

Proposal 107

The Mayor, through TfL and working with Government, will fund the delivery of the strategy by:

a) Maximising any available efficiencies, subsidising services at appropriate levels and ensuring that value for money is otherwise achieved from the existing and planned transport network.

b) Seeking to ensure a sustained level of funding from fares, Business Rate Retention and other existing sources of income.

c) Seeking additional taxes, financial powers or other similar mechanisms, including Vehicle Excise Duty in London, to create a fairer way of funding the delivery of transport schemes and services, to better capture and conserve the benefits they create and to enable the delivery of the transport and community benefits that the pursuit of this strategy will bring to London, the Wider South East and the UK as a whole.

1 Devolution: a capital idea, London Finance Commission, 27 January 2017



Implementation plan

A 25-year programme for mode shift

This section summarises how the policies and proposals set out in Chapters three, four, five and six will be implemented to achieve the central aim of this strategy – that 80 per cent of trips will be made on foot, by cycle or using public transport by 2041.

The implementation plan shown in Figure 55 consists of a broad range of measures, from local changes to very large infrastructure schemes and area-wide policy initiatives like the ULEZ. Some of these schemes will deliver greater change than others, and many will take some time to complete, so progress towards the London-wide active, efficient and sustainable mode share aim will, in practice, vary from year to year.

Although this aim is expressed as a single measure of 80 per cent across London, different parts of London have different characteristics, and will contribute to the aim in different ways. Some areas of London already have an active, efficient and sustainable mode share of well over 80 per cent, while others are unlikely to achieve this aim locally over the next 25 years. The policy mix required to achieve the necessary local contribution to the city-wide aim will therefore vary between different parts of London.

This will mean that sustained investment in improving walking and cycling environments and public transport services in inner and outer London will be required to enable the long-term changes in travel behaviour envisaged in this strategy. However, across London three quarters of existing car trips are short enough to be switched right now, and almost 20 per cent of Londoners – from across London – want to reduce their dependency on cars, so a lot can also be achieved in the short term.

Central London

Ninety-five per cent of trips are already made on foot, by cycle or using public transport in central London. Almost all of the remaining car journeys could be switched to these modes now, and rail and Tube capacity improvements, the opening of the Elizabeth line and plans for Crossrail 2 will enable this to be increased further. The transformation of Oxford Street, the re-shaping of the bus network, an improved cycle network and better street design at key junctions such as Old Street will be accompanied by initiatives to enable businesses to consolidate and retime their deliveries and servicing. This programme will enable more people travelling into central London to build active travel into their day and will enhance the experience of being in central London.

Inner London

Eighty per cent of trips in inner London are already made on foot, by cycle or using public transport. This is enabled by inner London's dense public transport network, relatively good conditions for cycling and walking, and short trip distances. However, more than 90 per cent of current car trips here are short enough to feasibly be switched to walking, cycling and public transport, and TfL's Transport Classification of Londoners research shows that about 40 per cent of inner Londoners are amenable to reducing their car use.

Many inner London streets are already relatively appealing places to walk, cycle and spend time, so some of this potential can be unlocked through specific measures in the short term. Liveable Neighbourhoods will be created in key inner London locations, the strategic cycling network will continue to develop with Cycle Superhighways 4, 9 and 11, and a walking and cycling river crossing will be built between Rotherhithe and Canary Wharf. All these changes will allow more local trips to be made on foot or by cycle.

Public transport will be significantly improved to provide appealing and convenient alternatives to car use for longer journeys that cannot practicably be done on foot or by cycle. Bus priority will be improved for busy routes and to provide efficient services for radial routes in particular. Tube lines will be upgraded, step-free access will be improved, and the Elizabeth line will be opened. Night Tube, DLR and Overground services will be extended to reduce reliance on cars for late-night travel.

Planning the creation of new homes and jobs alongside transport improvements in inner London will embed walking, cycling and public transport use into growth areas. This will be a longer-term change, that will see improvements made on the Isle of Dogs, at Stratford (associated with the Elizabeth line), at Old Kent Road (associated with the Bakerloo line extension), at Battersea (associated with the Northern line extension), and at various locations including Clapham and Hackney (associated with the substantial improvement in rail connectivity that will be provided by Crossrail 2).

Outer London

Only 60 per cent of journeys are done on foot, by cycle or using public transport within outer London, with cars currently being used for the remaining 40 per cent. While about 80 per cent of these car journeys are short enough to feasibly be switched to active, efficient and sustainable modes now, unlike elsewhere, such a switch is dependent on providing new or more appealing alternatives. Compared to people living in inner London, people in outer London are less amenable to reducing their car use, so providing these alternatives is key to improving the lives of many people. A recent history of planning around car use in outer London, in particular, will mean that this is a challenge that will take longer to overcome.

Because the potential to switch existing trips is so high, even in outer London, improvements to the walking environment for short local trips to shops, leisure activities and schools could significantly reduce car dependency. Likewise, new and enhanced cycling infrastructure will allow people to switch to cycling for commuter, shopping and leisure trips. As for inner London, the Liveable Neighbourhoods programme will support these changes. Borough LIPs' traffic reduction strategies will seek to actively reduce traffic levels in town centres, on high streets and other places where people want to be, including by reducing the space allocated to moving and parked cars, to create welcoming environments for people to walk, cycle and spend time in.

Public transport will be improved to help people not to use cars for longer trips and those that cannot practicably be walked or cycled. This will include re-shaping bus services, creating new express services, bus transits and orbital routes, and the provision of bus priority in town centres. Improved rail services, including orbital services, and enhanced connectivity via strategic interchanges will provide options for rapid, longer-distance journeys around London.

Following the opening of the Elizabeth line in 2019, further public transport improvements including the new West London Orbital line, the extension of the tram network to Sutton, the creation of a London Suburban Metro and the delivery of Crossrail 2 will enable the creation of high-density, mixed-use places in outer London town centres, as well as an intensification of homes around stations and interchanges. New public transport, walking and cycling river crossings, such as a DLR extension to Thamesmead, will support Good Growth in outer east London. Planning new developments around walking, cycling and public transport use in this way is essential to achieve the longer-term changes that are required to transform outer London for the benefit of its residents.

Using the Healthy Streets Indicators in implementing the strategy

The ten Healthy Streets Indicators will be used to assess schemes to ensure they improve the experience of streets for all Londoners.

TfL's Guide to the Healthy Streets Indicators will be the starting point for ensuring policies and proposals contribute to the Mayor's vision for London. The Healthy Streets Check for Designers will be used to assess significant changes to street layouts to ensure they are delivering all-round improvements for people walking, cycling, using public transport and spending time.

Implementation plan summary table

Implementation of the schemes identified in the strategy can be grouped into three time periods: 2017-20, 2020-30 and 2030-41.

The implementation plan reflects current delivery priorities. It will be regularly reviewed through the TfL Business Plan to ensure it continues to align with the Mayor's priorities.

Longer-term unfunded schemes are at varying stages of development. These will be regularly reviewed to ensure alignment with policy priorities, value for money, deliverability and to take account of opportunities for funding that may become available.

FIGURE 55: IMPLEMENTATION PLAN

Healthy Streets and healthy people

Policy 2 – Active travel	Cost	2017–2020	2020–2030	2030–2041
Improve local walking routes, including routes to schools	L			
Transform Oxford Street and investigate options for Parliament Square	L			
Deliver a London-wide strategic cycle network	M			
Protect, improve and promote the Walk London Network	L			
Develop and support Cycle Hire	M			
Support and encourage cycling and walking to school	L			
Promote and support cycling and walking to work and in local communities	L			
Improve wayfinding for walking and cycling	L			
Improve walking and cycling information in TfL Journey Planner	L			
Embed accessibility and inclusivity in planning and design of Healthy Streets	L			

Policy 3 – Vision Zero for road danger	Cost	2017–2020	2020–2030	2030–2041
Deliver Vision Zero by encouraging safer road user behaviours with a programme of education, engagement and enforcement initiatives	L			
Deliver Vision Zero by improving vehicle safety (includes banning most dangerous HGVs/HGV Direct Vision)	L			

Policy 4 – Security	Cost	2017–2020	2020–2030	2030–2041
Improve personal safety and security on London's streets	L			
Ensure safety and security on the public transport network	L			

Policy 5 – Efficient streets	Cost	2017–2020	2020–2030	2030–2041
Encourage more freight consolidation	M			
Reduce, re-time and re-mode deliveries	L			
Work with boroughs to develop traffic reduction strategies, including workplace parking levies	L			
Improve customer communication for road users	L			

Healthy Streets and healthy people (continued)

Policy 6 – Air quality	Cost	2017–2020	2020–2030	2030–2041
Retrofit and procure cleaner buses	M			
Reduce emissions from the freight fleet	L			
Deliver cleaner taxis	L			
Introduce ULEZ in central London	M			
Introduce ULEZ in inner London	L			
Tighten LEZ standards London-wide for buses, coaches and HGVs	L			
Deliver Low Emission Bus Zones (including bus priority)	L			

Policy 7 – Zero carbon	Cost	2017–2020	2020–2030	2030–2041
Introduce Zero Emission Zones	L			
Provide incentives to support the transition to ULEVs	L			
Optimise rail energy efficiency	L			
Manage the impacts of air quality on the Underground	L			
Lobby for increased low-carbon energy generation	M			
Reduce emissions from non-road mobile machinery	L			
Reduce emissions from transport construction and operations	L			
Reduce river-based emissions	L			
Ensure the electric charging infrastructure is in place to support the transition to ULEVs	M			

Policy 8 – Local environment	Cost	2017–2020	2020–2030	2030–2041
Implement sustainable drainage on streets	L			
Increase number of street trees	L			
Reduce rainfall run-off from rail schemes	L			

Policy 9 – Climate change	Cost	2017–2020	2020–2030	2030–2041
Develop climate change mitigation schemes	L			
Include resilience measures in maintenance and upgrade programmes (ongoing)	L			
Reduce noise and vibration impacts from rail	L			

L low (<£100m) M medium (£100m-£1bn) H high (>£1bn)

FIGURE 55: IMPLEMENTATION PLAN (CONTINUED)

A good public transport experience

Policy 10 – Whole journey approach	Cost	2017–2020	2020–2030	2030–2041
See Policies 1-3 and 11-19				
Policy 11 – Vision Zero for safe public transport	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Work to eliminate deaths and serious injuries from public transport services	M			
Policy 12 – Affordability	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Ensure public transport fare levels are affordable	L			
Policy 13 – Customer experience	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Improve information provision and use of technology	L			
Policy 14 – Accessibility	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Upgrade national rail stations to step-free	M			
Deliver step-free Tube stations and more accessible vehicles	M			
Deliver wheelchair-accessible bus stops	L			
Improve accessibility of taxi ranks for wheelchairs	L			
Launch 'one-stop shop' platform for ATS	L			
Expand ATS marketing	L			
Improve provision of accessible information and communication	L			
Policy 15 – Bus	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Develop bus network to meet existing and future demand	M			
Deliver bus priority network	M			
Policy 16 – Rail	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Deliver the Elizabeth line	H			
Deliver Thameslink Programme	H			
Deliver Brighton Mainline Upgrade (higher frequencies)	H			
Devolve suburban rail services to Mayoral control	M			
Deliver London suburban metro	H			
Increase rail capacity (other lines)	M			
Deliver Crossrail 2 (scheme includes delivery of West Anglia Main Line 4-tracking)	H			
Investigate feasibility of Crossrail 2 eastern branch	H			
Deliver national rail station capacity upgrades	M			
Lobby for upgraded rail freight routes	L			
Deliver Four-Line Modernisation programme – Metropolitan, District, Hammersmith & City and Circle	H			

A good public transport experience (continued)

Policy 16 – Rail (continued)	Cost	2017–2020	2020–2030	2030–2041
Deliver Tube upgrade programme – Jubilee, Northern and Victoria	H			
Deliver Deep Tube programme – Piccadilly, Central, Bakerloo and Waterloo & City	H			
Deliver London Underground station capacity programme	H			
Deliver London Overground frequency upgrades (network-wide)	H			
Deliver strategic interchanges at Clapham Junction, Lewisham, Stratford and Old Oak Common and improved accessible interchange facilities across inner and outer London	L			
Deliver station upgrade programme (London Overground)	M			
Deliver Tram upgrades	M			
Deliver DLR upgrades	H			
Deliver station upgrade programme (DLR)	L			
Provide better information to help customers plan their journeys to avoid crowding	L			
Policy 17 – River	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Publish a joint Port of London Authority/TfL pier strategy for London	L			
Investigate extended river services to the east	L			
Investigate feasibility of pedestrian/cycle ferry between North Greenwich and Canary Wharf	L			
Encourage the use of the river for freight	L			
Policy 18 – Wider South East and beyond	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Provide more 12-car HS1 domestic services	L			
Deliver HS2 and associated national rail changes, including mitigation of impacts at street level	H			
Deliver new coach hub(s)	M			
Policy 19 – Night-time	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Extend Night Tube services	L			
Introduce night-time services on London Overground	L			
Introduce night-time services on DLR	L			
Policy 20 – Taxi and Private Hire	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Raise safety standards for all customers travelling by taxi and private hire vehicles through effective and transparent regulation and enforcement	L			

L low (<£100m) M medium (£100m-£1bn) H high (>£1bn)

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FIGURE 55: IMPLEMENTATION PLAN (CONTINUED)

New homes and jobs

Policy 21 – Good Growth	Cost	2017–2020	2020–2030	2030–2041
Investigate feasibility of transport improvements to enable growth	M			
Deliver Bakerloo line extension to Lewisham and beyond	H			
Introduce Stratford – Angel Road service	M			
Deliver Elizabeth line extension east of Abbey Wood	H			
Deliver Northern line extension	H			
Pilot bus transit networks in Opportunity Areas	L			
Deliver Barking Riverside London Overground extension	M			
Investigate feasibility of other London Overground extensions (including West London Orbital)	M			
Deliver tram extension to Sutton and beyond	M			
Investigate feasibility for DLR extension from Gallions Reach to Thamesmead	M			
Deliver Silvertown Tunnel and associated bus services	M			
Investigate new river crossing at Gallions Reach and/or Belvedere	M			
Investigate feasibility for other new public transport river crossings in east London	M			
Deliver a new pedestrian and cycle crossing between Rotherhithe and Canary Wharf	M			
Investigate further pedestrian and cycle crossings	L			
Continue TfL Growth Fund to deliver small-scale schemes	M			
Policy 22 – Airports	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Deliver Heathrow Airport Western Access and Southern Access (required for airport expansion)	M			

Delivering the vision

Policy 23 – New transport services	Cost	2017–2020	2020–2030	2030–2041
Develop framework to ensure connected, autonomous and shared vehicles contribute to achieving the strategy's vision	L			
Investigate feasibility of demand-responsive bus services	M			
Policy 24 – Funding and Delivery	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Lobby for additional powers to be devolved to the Mayor	L			
Policy 25 – Local Implementation Plans	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Deliver Local Implementation Plans	M			
Policy 26 – Monitoring	**Cost**	**2017–2020**	**2020–2030**	**2030–2041**
Monitor the outcomes of the strategy	L			

L low (<£100m) M medium (£100m-£1bn) H high (>£1bn)

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Working in partnership

This programme is ambitious, particularly in outer London where there is the greatest need and opportunity to reduce car dependency. The Mayor, through TfL, will work with all London boroughs, transport operators, infrastructure providers, business, community and other stakeholders, and the public to deliver the aims of the strategy.

Such partnership working will be taken forward through the LIPs process with boroughs, through existing forums such as the Thames and London Waterways Forum and the Freight Forum with stakeholders, and by establishing new means for partnership working, for example with Network Rail, should they be identified as the most effective and efficient way to deliver the aims of the strategy.

This partnership working will help support, as far as practicable, the integrated delivery of this strategy with the Mayor's other statutory strategies, shown in figure 54.



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Local Implementation Plan guidance

The boroughs have Highway Authority powers, and play a crucial part in managing and operating London's roads. Indeed, 95 per cent of the network is under their control. They are also responsible for planning, parking controls, education, leisure and other activities that impact on transport, and bring in third-party funding for transport schemes. Within this strategy, several policies can only be delivered with substantial borough-level intervention.

At the local level, the implementation of the strategy is to be effected through a LIP that is prepared by each of the London boroughs. The GLA Act sets the requirements for boroughs to prepare a LIP that shows how they will deliver the strategy locally and to do so 'as soon as reasonably practicable' after the strategy has been published. The Mayor will issue guidance on the preparation of the next LIP when this strategy is published.

Policy 25

The boroughs shall prepare and implement Local Implementation Plans (LIPs) containing proposals for the implementation of the Mayor's Transport Strategy in their area. Each LIP should also contain a delivery plan and a monitoring plan.

The priorities that are required to be addressed by the boroughs in their LIPs are:

- A contribution to reducing Londoners' dependency on cars in favour of active, efficient and sustainable modes of travel, with the central aim for 80 per cent of all trips in London to be made on foot, by cycle or using public transport by 2041
- The application of the Healthy Streets Approach across all areas of local transport and public realm policy
- The improvement of street environments for people who are walking, cycling and spending time, including the introduction of traffic reduction strategies
- The provision of a good public transport experience for those who live in, work in, or visit the borough
- The use of the transport principles of Good Growth to guide the development of new homes and jobs

c) Expected outcomes of the strategy

Assessing the impact of the strategy

The strategy is grounded in a wide-ranging evidence base. It has been developed using TfL's available data and forecasting tools to understand past trends and events and the current traffic and transport situation in London, and to identify the likely challenges and opportunities that London will face over the coming decades. Projections of a future with and without the traffic and transport measures proposed have been undertaken, testing a range of scenarios for the accommodation of London's future population, economy and transport network. The analysis is described in the evidence base[2] accompanying the strategy.

The expected outcomes of the strategy are described below. These are based on a number of assumptions about the future, described in more detail in the evidence base. Given the uncertainty inherent when considering the future, a series of sensitivity tests were conducted to demonstrate the impacts of alternative assumptions. Where ranges are presented below, these in large measure reflect the outputs of those sensitivity tests. Beyond this, major economic, technological or cultural changes could influence travel patterns in unforeseen ways.

2 Challenges and Opportunities and Outcomes Summary Report, Transport for London, https://consultations.tfl.gov.uk/policy/9b28c200/

Expected outcomes

The strategy has set out a range of policies and proposals aimed at creating Healthy Streets and healthy people, providing a good public transport experience and new homes and jobs. The aim is for 80 per cent of trips to be made by active, efficient and sustainable modes – public transport, walking and cycling – by 2041, compared to 63 per cent today. This aim is expected to be fulfilled by increases in levels of walking and cycling from the current 27 per cent to between 30 and 40 per cent of trips, and increases in public transport use from the current 35 per cent to between 40 and 50 per cent of trips. The expected outcomes of the strategy are summarised in Figures 56, 57 and 58.

FIGURE 56: EXPECTED MODE SHARE OUTCOMES, 2041

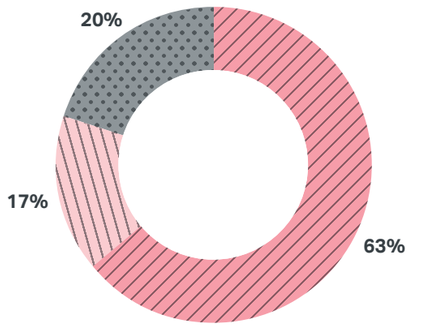


FIGURE 57: MODE SHARES FOR TRAVEL WITHIN AND BETWEEN CENTRAL, INNER, OUTER AND OUTSIDE LONDON

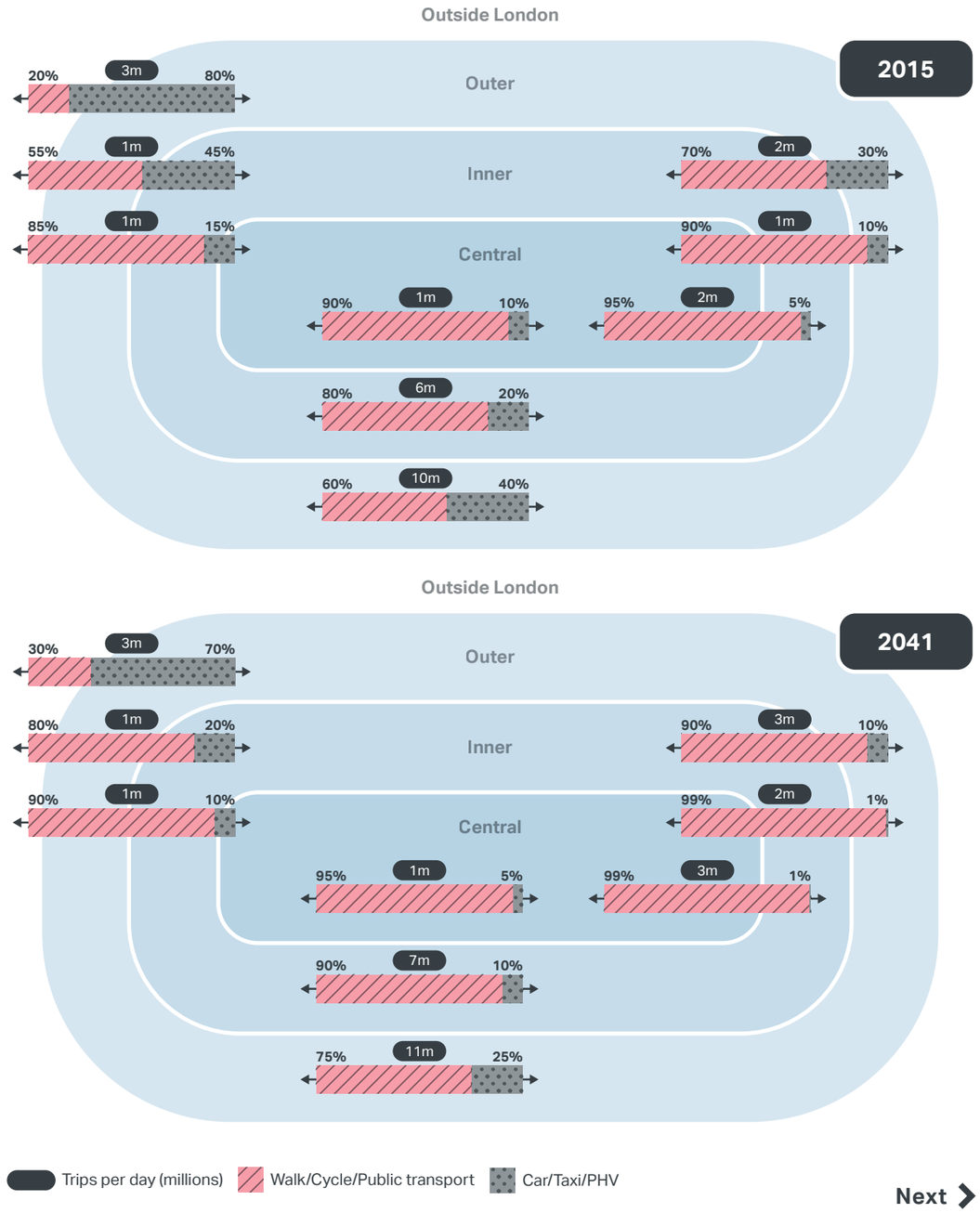


FIGURE 58: OTHER EXPECTED OUTCOMES, 2041

Healthy Streets and healthy people By 2041, the strategy is expected to have delivered the following outcomes:	
London's streets will be healthy and more Londoners will travel actively (see Policy 2)	
All Londoners to be doing a healthy level of activity through travel Everyone who is able to should be sufficiently active for health through their regular travel, demonstrated by 70 per cent of people reporting two periods of ten minutes spent walking or cycling on the previous day.	**Walking or cycling will be the best choice for shorter journeys** Seventy per cent of Londoners will live within 400m of the London-wide strategic cycle network. The walking environment will be appealing so that 3 to 5 million more trips could be made by active modes every day.
London's streets will be safe and secure (see Policies 3 and 4)	
Aim for there to be no deaths or serious injuries on London's streets A 65 per cent reduction in the number of people killed or seriously injured on London's streets by 2022 (against 2005-09 levels) and a 70 per cent reduction by 2030 (against 2010-14 levels). By 2030, no one will be killed in or by London buses.	**Everyone will be able to feel safe and secure when travelling on the street** The proportion of people who say that they do not feel safe walking by themselves in their local area – currently one in four people – will fall, and fewer people will say that they are deterred from travelling by safety concerns.

Healthy Streets and healthy people (continued) By 2041, the strategy is expected to have delivered the following outcomes:		
London's streets will be used more efficiently and have less traffic on them (see Policy 5)		
Falling car ownership and use There will be at least 3 million fewer daily car trips and one quarter of a million fewer cars owned in London.	**Less road freight transport at peak times in central London** A 10 per cent reduction in morning peak freight transport in central London by 2026.	**Traffic will fall and congestion kept in check, allowing more efficient operations** Falling car use and more efficient freight activity reduces overall traffic levels by 10-15 per cent. Traffic congestion remains broadly at today's levels during peak periods.
London's streets will be clean and green (see Policies, 6, 7, 8 and 9)		
London's transport will be on track to be zero emission by 2050		**Streets will be greener and not too noisy**
A 72 per cent reduction in CO_2 emissions from transport (excluding aviation, 2013 base) in London, with road and rail transport on a clear trajectory to reach zero carbon by 2050.	A 94 per cent reduction in road transport NO_x emissions, and compliance with legal limits for NO_2 levels on London's streets.	A 53 per cent reduction in road transport $PM_{2.5}$ and 45 per cent reduction in road transport PM_{10} emissions.	Transport schemes will deliver a net positive impact on biodiversity. Fewer people will be affected by noise from traffic. The transport system will be more resilient to effects of climate change.

FIGURE 58: OTHER EXPECTED OUTCOMES, 2041 (continued)

A good public transport experience
By 2041, the strategy is expected to have delivered the following outcomes:

The public transport network will meet the needs of a growing London (see Policies 10, 17, 18 and 19)

Between 14 and 15 million trips will be made by public transport every day

Total travel will increase by around 55 per cent on London's buses and nearly 100 per cent on the Tube and rail network (measured by passenger kilometres).

The public transport network will offer new connections and more frequent services

Total capacity on rail services (London Underground, DLR, tram and national rail) will increase by around 90 per cent, with more than 80 million additional seat kilometres.

The Thames will be used more for passengers and freight

Public transport will be safe, affordable and accessible to all (see Policies 11, 12, 14 and 20)

Everyone will be able to travel safely throughout the entire transport system

The Mayor has frozen fares to make travel more affordable

The Mayor will seek to ensure public transport fare levels enable affordable access to travel for all Londoners, including any devolved rail services in TfL's affordable fares pledge.

Everyone will be able to travel spontaneously and independently

On average, the amount of extra time spent travelling to make a journey on the step-free network compared to the same journey on the full network will reduce by around 60 per cent. Travel time, customer care and the overall accessibility of the network will also be improved.

Journeys by public transport will be pleasant, fast and reliable (see Policies 13, 15 and 16)

Bus journeys will be quick and reliable – an attractive alternative to the car

Bus speeds will improve by approximately 5-15 per cent London-wide, with particular improvements expected in inner London.

Rail and Tube journeys will be less crowded, despite rising passenger volumes

Crowding on rail and Underground services will reduce by around 10-20 per cent compared to today, measured in terms of the total crowded distance compared to total distance travelled.

New homes and jobs
By 2041, the strategy is expected to have delivered the following outcomes:

Active, efficient and sustainable travel will be the best option in new developments (see Policy 21a)

Car dependency will be reduced and more people will live in well-connected areas

Fewer London residents will be dependent on a car to access opportunities and services. About 1 million more people will be living in places with the best transport connections.

Across London, improved rail and bus services will improve connectivity

In total, 7.6 million people will live within 45 minutes' travel time of central London, 2.3 million more than today. The number of jobs accessible to the average Londoner within 45 minutes by public transport will increase by 70 per cent.

Transport investment will unlock the delivery of new homes and jobs (see Policy 21b)

Rail capacity to central London will increase by more than 80 per cent, with new public transport services improving connectivity and reducing crowding, enabling the delivery of new homes across London

Crossrail 2 will provide new direct connections through central London, relieving crowding and supporting 200,000 new homes and 200,000 new jobs.

The Bakerloo line extension will enable more than 25,000 new homes and 5,000 jobs in the Old Kent Road Opportunity Area.

An extension of the DLR to Thamesmead could enable up to 17,000 new homes and around 3,000 new jobs.

Development will also be supported by bus service improvements

Transport for London land will, where possible, be brought forward for development

New places where transport infrastructure could enable more intensive development will be identified, with transport land used to deliver housing where possible. By 2020/21, TfL will start on the property development sites that will deliver 10,000 homes.

Outcomes monitoring and reporting

This strategy sets out a clear vision for London in the period to 2041 and commits to a number of aims as well as a wide range of ambitious outcomes against which progress will be measured.

Monitoring, appraisal and evaluation are essential to ensuring the policies and proposals of the strategy are likely to be achieved. They will inform planning and prioritisation of resource use to ensure delivery of the strategy stays on track. The process is set out in Figure 59.

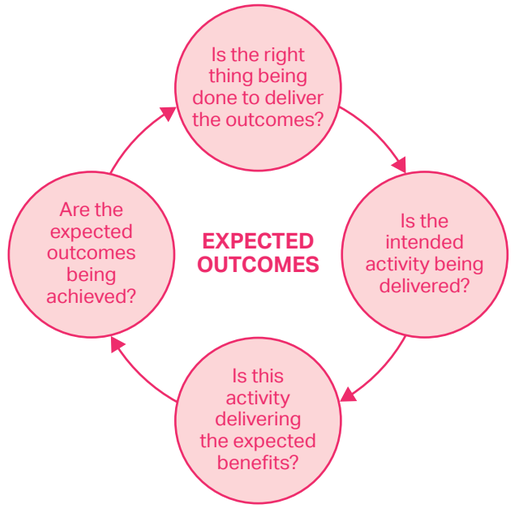
Critical to achieving this is to ensure there is a clear line of sight from the strategy's aims through to local and project-level objectives. TfL, London boroughs and other organisations delivering this strategy will bring forward schemes and proposals that accord with the policies and proposals of the strategy, to be appraised through a new multi-criteria framework tool. The policies, proposals and outcomes of the strategy will be embedded in the way that TfL makes decisions and assesses performance, ensuring that projects and programmes deliver the expected benefits, and that these benefits contribute to the outcomes set out in the strategy.

Progress against the aims and challenges identified in the strategy will be measured through a wide-ranging programme of monitoring and evaluation, reported annually in TfL's Travel in London statistical report of transport trends and outcomes. The approach to monitoring will be focused on transport outcomes but placed in the wider social, economic and environmental context.

Policy 26

The Mayor, through TfL and the boroughs, and working with stakeholders, will review their delivery plans to ensure the expected transport outcomes of this strategy are achieved as far as practicable should monitoring show that otherwise they would be unlikely to be achieved.

FIGURE 59: MONITORING, APPRAISAL AND EVALUATION CYCLE



As well as ongoing London-wide monitoring, all major schemes and proposals will be supported by a monitoring plan that assesses their contribution to achieving the strategy's aims and outcomes. TfL will put in place appropriate monitoring programmes for schemes it will deliver but it is recognised that individual boroughs may not have the resources required to monitor schemes for which they are responsible.

Proposal 108

The Mayor, through TfL, will offer support and guidance to ensure that local transport schemes and initiatives as set out in boroughs' Local Implementation Plans are supported by monitoring plans that demonstrate delivery against the policies, proposals and expected outcomes of this strategy.

Glossary

A

Accessibility:
In the context of this strategy, accessibility refers to how easy it is for people to use London's streets and public transport to get to places, jobs, homes and services, considering particularly the needs of older and disabled people.

Active, efficient and sustainable modes:
The primary aim of this strategy is for 80 per cent of trips to be made on foot, by cycle or using public transport by 2041. Collectively, these can be referred to as 'active, efficient and sustainable modes'.

Adapted (inclusive) cycle:
A cycle adapted for disabled people, for example one that is pedalled by hand rather than by foot.

Air pollutants:
Generic term for emitted substances in the air that have adverse effects on humans and the ecosystem.

Autonomous vehicles:
Vehicles that perform at least some of the 'driving' task themselves. How autonomous a vehicle is depends on how much it can do (eg steering, acceleration, braking) and how much responsibility the driver retains (eg performing some driving functions, just monitoring or being free to do other things).

B

BikeSafe London:
Skills training for motorcycle riders in London, run by the Metropolitan Police.

Bus Safety Standard:
A standard to be introduced on new buses entering service from 2018. The standard will use new technology to improve the safety of buses in London, including Intelligent Speed Adaptation to limit the speed at which buses are able to travel. It will also build on analysis of collisions involving buses in London to inform the development of vehicle design and technology to give the greatest casualty savings.

Business Improvement District (BID):
A defined area in which a levy is charged on all business rate payers in addition to the business rates bill. This levy is used to develop projects that will benefit businesses in the local area.

Business Rate Supplement (BRS):
The Business Rate Supplements Act makes provision for councils to levy a supplement on the national non-domestic rate (or business rate). The GLA has introduced a BRS to help finance the Crossrail project.

C

Car club:
A short-term car rental service that allows members access to cars parked locally for a per-minute, per-hour or per-day fee.

Car dependency:
Reliance on cars to get around, whether through habit, because street environments have been planned around car use, or because walking, cycling and public transport alternatives are not available or appealing.

Car-lite development:
A housing development that is designed to deter reliance on cars and encourage walking, cycling and public transport use.

Car sharing/shared cars:
Cars that are not owned by the people who use them to travel. This includes car clubs, taxis and private hire vehicles.

Carbon dioxide (CO_2):
Principal greenhouse gas related to climate change.

Central Activities Zone (CAZ):
The area of central London in which planning policy promotes finance, specialist retail, tourist and cultural uses, and activities.

Central, Inner and Outer London:
These definitions can vary depending on the context in which they are being used. For the purposes of analysis (and future monitoring), this strategy has used the following definitions:

- Central London: an area broadly equivalent to the Central Activities Zone (CAZ), as defined by the London Plan
- Inner London (excluding central London, as appropriate): the boroughs of Camden, City of London, Hackney, Hammersmith & Fulham, Haringey, Islington, Kensington & Chelsea, Lambeth, Lewisham, Newham, Southwark, Tower Hamlets, Wandsworth and the City of Westminster, as defined by the Office for National Statistics
- Outer London: the boroughs of Barking and Dagenham, Barnet, Bexley, Brent, Bromley, Croydon, Ealing, Enfield, Greenwich, Harrow, Havering, Hillingdon, Hounslow, Kingston upon Thames, Merton, Redbridge, Richmond upon Thames, Sutton and Waltham Forest, as defined by the Office for National Statistics

The London Plan also set outs similar definitions of inner and outer London, which may be updated over time. However, for some uses, boundaries based on borough or the CAZ are not appropriate, such as the inner London ULEZ, which is based on the North and South Circular Roads, or the Congestion Charge zone, which is based on the Inner Ring Road. In other circumstances, the concepts of central, inner and outer should be used more flexibly, such as when planning where transport services operate, as these are unlikely to do so only on one side of a boundary.

Circular economy:
An economic model in which resources are kept in use at the highest level possible for as long as possible in order to maximise value and reduce waste, moving away from the traditional linear economic model of 'make, use, dispose'.

Community Infrastructure Levy (CIL):
A non-negotiable charge, which allows local authorities (including the Mayor) to help fund infrastructure needed to support the development of an area in line with local development plans.

Compulsory Basic Training (CBT):
A course usually taken before someone can ride a moped or motorcycle on the road. It teaches people to ride safely on their own while practising for full moped or motorcycle tests.

Congestion Charge (CC):
The charge applied to vehicles entering a defined area of central London, introduced to reduce congestion. Some vehicles are currently exempt from the Congestion Charge.

Connected vehicles:
Vehicles that can communicate with other vehicles and/or infrastructure.

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Next

Connectivity:
The general term for how easy it is for people to get to places, jobs, homes and services.

Consolidation:
The process of rearranging and combining deliveries to reduce the number of van and lorry journeys made in London.

Consolidation centre:
A centre where deliveries can be brought for more efficient onward movement to their final destinations. It enables organisations and planning authorities to improve operational efficiency, resulting in reduced congestion, fewer delays and improved safety.

Construction and demolition waste:
Waste arising from the construction, repair, maintenance and demolition of buildings and structures, including roads. It consists mostly of brick, concrete, hardcore, subsoil and topsoil, but it can contain quantities of timber, metal, plastics and occasionally special (hazardous) waste materials.

Construction Logistics Plan (CLP):
A travel plan that aims to improve the sustainability of construction freight movements by establishing site management and procurement processes to reduce the impact of construction traffic on the street network.

D

Delivery and Servicing Plan (DSP):
A travel plan that aims to improve the sustainability of freight and servicing. Produced jointly by suppliers, clients and the freight industry, the DSP seeks to reduce the number of deliveries required, while ensuring remaining deliveries are made as safely as possible and in an environmentally friendly way.

Development Rights Auction Model (DRAM):
A new land value capture mechanism that looks to capture value uplift from new development to fund future infrastructure.

Dial-a-Ride:
A door-to-door transport service for disabled people for whom public transport services are unsuitable.

Direct Vision Standard:
A method of assessing the extent to which HGV drivers can see other road users directly from their cabs, rather than through mirrors, cameras or other devices.

Disability:
As defined by the Equality Act 2010, a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on a person's ability to do normal daily activities. The social model of disability defines disability as the effect of the barriers, discrimination and disadvantages faced by disabled people, not the impact of their specific impairment.

E

Electric vehicle (EV):
A vehicle that uses an electric motor for propulsion, comprising ones that run solely on batteries, as well as plug-in hybrid electric vehicles that have an attached petrol or diesel engine to power the battery engine.

Euro standards:
EU standards that define maximum air pollutant emissions for new vehicles sold within EU member states. These range from Euro 1-6 for light vehicles and Euro I-VI for heavy vehicles.

Evening peak:
The period in the afternoon and evening when travel demand is highest (4pm-7pm).

G

Green infrastructure:
A network of green spaces – and features such as street trees and green roofs – that is planned, designed and managed to deliver a range of benefits. These include mitigating flooding, cooling the urban environment and enhancing biodiversity and ecological resilience, as well as providing more attractive places for people.

Green roofs/walls:
Planting on roofs or walls that helps cool the urban environment, improves air quality, slows rainwater run-off and creates wildlife habitats.

Greening:
The improvement of the appearance, function and wildlife value of the urban environment through soft landscaping.

Gross Domestic Product (GDP):
A monetary measure of the market value of all final goods and services produced by a country in a period.

Gross Value Added (GVA):
A monetary measure of the value of goods and services produced in an area, industry or sector of an economy.

Growth area:
A specific area for new residential development to accommodate future population growth, as outlined in the Government's Sustainable Communities Plan. Within London, these include the Thames Gateway and the London-Stansted-Cambridge-Peterborough corridor.

H

Health inequalities:
Health inequalities are systematic, avoidable and unfair differences in mental or physical health between groups of people. These differences affect how long people live in good health and are mostly a result of differences in people's homes, education and childhood experiences, their environments, their jobs and employment prospects, their access to good public services and their habits.

Healthy routes:
A TfL-funded programme of street improvements, delivered by TfL and the boroughs, to create better routes to schools and local attractions, which may include cycle parking and the implementation of 20mph limits and zones.

Healthy Streets Approach:
The Mayor and TfL's approach to prioritising people and their health in decision-making to create a healthy, inclusive and safe city for all. The approach makes London a more attractive place to walk, cycle and use public transport, and reduces the dominance of motorised transport.

Heavy goods vehicle (HGV):
A motor vehicle (such as a truck or lorry) with a maximum gross vehicle weight of more than 3.5 tonnes.

Hybrid vehicle:
A vehicle that utilises batteries and electric traction motors in conjunction with the internal combustion engine.

Hydrogen bus:
A bus powered by a hydrogen fuel cell.

Hydrogen fuel cell:
A cell that acts like a constantly recharging battery, electrochemically combining hydrogen and oxygen to generate power. Vehicles powered by hydrogen fuel cells produce only water and heat as by-products.

I

Inclusion:
Removing barriers and taking steps to create equality, harness diversity and produce safe, welcoming communities and cultures that encourage innovative and fresh ways of thinking, and allow people to speak up, especially to suggest where things could be done better.

Inclusive design:
The creation of environments that everyone can use – confidently, independently and with choice and dignity – to access, and benefit from, the full range of opportunities available. Inclusive design avoids separation or segregation and is made up of places and spaces that acknowledge diversity and difference, meeting the needs of everyone in society.

Induction loop:
A system that can help some people with a hearing impairment by transferring information to their hearing aid.

Inner London:
See 'Central, Inner and Outer London'.

Integrated Impact Assessment (IIA):
A systematic process for assessing the likely sustainability effects of the strategy in order to ensure they are fully considered and addressed at the earliest appropriate stage of decision-making. The transport policies and proposals within the draft strategy are subject to the following assessments, and the findings have been collated into the overall IIA Report: Strategic Environmental Assessment (SEA); Habitats Regulation Assessment (HRA); Equalities Impact Assessment (EqIA); Health Impact Assessment (HIA); Assessment of Economic Impact (AEI); and Community Safety Impact Assessment (CSIA).

J

Journey stage:
Part (or sometimes all) of a trip made by a single mode of transport. A home-to-work trip, for example, may contain three journey stages: a walk to a bus stop, a bus journey stage, and a further walk from the bus stop to the workplace.

K

Killed or Seriously Injured (KSI):
A standard metric used to measure levels of road safety.

L

Legible London:
A map-based walking wayfinding and information system that gives people clear and consistent information to facilitate and encourage walking journeys. It is managed by TfL but available for third-party use.

Licence Lite:
The Mayor's scheme to stimulate the decentralised and low-carbon energy market, in which the GLA acts as a licensed energy supplier and works with partners to supply energy to non-domestic consumers in London.

Liveable Neighbourhoods:
A TfL-funded programme, delivered by TfL and the boroughs, to improve the public realm and the experience of walking, cycling and using public transport while increasing opportunities to use streets as public spaces and reducing car trips.

Local Implementation Plan (LIP):
A statutory transport plan produced by London boroughs, which brings together transport proposals to implement the strategy at a local level.

LoCITY:
An industry-led programme helping the freight and fleet sector lead the way in improving air quality and reducing carbon emissions.

London Atmospheric Emissions Inventory (LAEI):
A database of emissions sources and information about rates of emissions for air pollutants within and around London.

London Councils:
An organisation that represents London's 33 local authorities, and lobbies on their behalf. London Councils also runs a number of pan-London services.

London Finance Commission (LFC):
The Commission helps the Mayor and London's local authorities to improve the tax and public spending arrangements for the city to promote jobs, growth and greater equality. It was reconvened in 2016 by the Mayor of London, Sadiq Khan, to review the fiscal powers – control over taxes and spending – London should have to invest in its infrastructure, deliver public services and stay internationally competitive.

London Plan:
The Mayor's spatial development strategy for London. At the time of publishing, the Mayor had consulted on a new London Plan.

Londoners:
Permanent and temporary residents of London and, where also applicable, commuters from outside London, visitors and tourists.

Low Emission Zone (LEZ):
A charging zone across most of Greater London for vehicles that do not meet emissions standards for particulate matter.

M

Maximum fare:
A charge that can be applied if a pay as you go Oyster or contactless payment card is used at only one end of a journey made by Tube, DLR, London Overground, TfL Rail, River Bus or national rail services in London.

Mayor's Air Quality Fund:
Funding from the GLA to London boroughs to support a wide range of projects aimed at improving air quality.

Mixed-use development:
Development for a variety of activities on single sites or across wider areas such as town centres.

Mode share:
The relative use of each mode of transport. The calculation of mode share in the strategy is based on trips.

The Mayor's Office for Policing and Crime (MOPAC):
Mayoral office responsible for policing in the capital outside the City of London.

Morning peak:
The period in the morning when travel demand is highest (7am-10am).

N

National Infrastructure Commission (NIC):
A commission that provides the Government with impartial, expert advice on major long-term infrastructure challenges.

Network Rail:
The owner and infrastructure manager of most of the rail network in England, Scotland and Wales.

Nitrogen dioxide (NO_2):
A gas formed by combustion, identified as an air pollutant harmful to human health. The legal limit values measure concentrations of NO_2 in the air.

Nitrogen oxides (NO_x):
A generic term for nitrogen dioxide (NO_2) and nitrogen monoxide (NO) – the latter can form NO_2 in the atmosphere. Euro standards set NO_x vehicle emissions limits.

Non-road Mobile Machinery (NRMM):
Any mobile machine, item of transportable industrial equipment or vehicle that has a combustion engine and is not intended for carrying passengers or goods on the street.

NRMM Low Emission Zone:
An area of London subject to regulation of NRMM emissions, as defined by the GLA's Supplementary Planning Guidance, 'The Control of Dust and Emissions from Construction and Demolition'.

O

Opportunity Areas:
London's principal areas of opportunity identified in the London Plan for accommodating large-scale development to provide substantial numbers of new jobs and homes. Each typically has more than 5,000 jobs and/or 2,500 homes, with a mixed and intensive use of land, assisted by good public transport accessibility.

Opportunity Area Planning Framework (OAPF):
Strategic spatial plans for Opportunity Areas in London, as designated in the London Plan.

Orbital travel:
Non-radial journeys made between one part of London and another, where the end destination is not in central London.

Outer London:
See 'Central, Inner and Outer London'.

P

Particulate matter (PM):
A mixture of various solid and liquid particles of various chemical compositions suspended in the air.

$PM_{2.5}$:
Particulate matter that is 2.5 microns or less in diameter. Particulates of this size are small enough to penetrate deep into the lungs and other organs, causing a wide range of health impacts, and are therefore subject to legal limit values.

PM_{10}:
Particulate matter that is 10 microns or less in diameter. It is harmful to human health and subject to legal limit values.

Police:
In the context of the strategy, this refers to all police forces in London tasked with law enforcement on transport infrastructure. Principally, this incorporates all relevant divisions of the Metropolitan Police Service, City of London Police and British Transport Police.

Port of London Authority (PLA):
A public trust established to administer, preserve and improve the Port of London.

Port of London Authority's 2035 Thames Vision:
The Port of London Authority's framework for the development of the tidal Thames between now and 2035.

Private Hire Vehicle (PHV):
Any vehicle that seats up to eight passengers and is available for hire with a driver. These vehicles require a PHV licence to operate in London.

Public realm:
Publicly accessible space between and within buildings, including streets, squares, forecourts, parks and open spaces.

Public transport accessibility level (PTAL):
A measure of connectivity to the public transport network. For any given point in London, PTALs combine walk time to the network (stations, bus stops) with service wait time at these stops to give an overall accessibility index. There are six accessibility levels (1=poor, 6=excellent).

R

Radial travel:
Journeys made into and out of the centre of London.

Responsible procurement:
Socially, environmentally and economically sustainable procurement to deliver an improved quality of life and better value for money. It involves working across London to provide sustained employment opportunities and improve working conditions. It means opening up access to contract opportunities for London's diverse businesses, and voluntary and community sector organisations, encouraging improved practices with suppliers and promoting greater environmental sustainability to make London a better place to live and work.

S

ScooterSafe London:
Skills training for scooter riders in London, run by the Metropolitan Police.

Section 106 (s106):
These agreements confer planning obligations on persons with an interest in land in order to achieve the implementation of relevant planning policies as authorised by Section 106 of the Town and Country Planning Act 1990.

Servicing trips:
Trips made to provide a service such as the collection of waste or to conduct maintenance or repairs.

Shared mobility:
A form of personal travel in which users share access to vehicles rather than privately owning them.

Social integration:
The building of strong communities where all Londoners can lead interconnected lives and play an active part in their city and the decisions that affect them. This can only be achieved by working to prevent, identify and remove inequalities and barriers that prevent people from engaging in their communities and wider society, while recognising the important role played by interaction and participation in overcoming these.

Step-free network:
The network of Underground, London Overground and/or national rail stations that provide step-free access from the street to the platform or train, such as through the provision of lifts or ramps.

Surface water:
Rainwater lying on the surface or within surface water drains/sewers.

Sustainable Drainage System (SuDS):
Measures and techniques to help capture, use, delay the dispersal of, discharge or absorb surface water. London's approach is set out in the Sustainable Drainage Action Plan.

T

Thames Gateway:
A corridor of land on either side of the Thames extending from east London through to north Kent and south Essex. The London part of the area extends eastwards from Deptford Creek and the Royal Docks and includes parts of the lower end of the Lee Valley around Stratford. It also includes parts of the boroughs of Barking and Dagenham, Bexley, Greenwich, Havering, Lewisham, Newham and Tower Hamlets as well as limited parts of Hackney and Waltham Forest.

Town centres:
Places in London that provide access to a range of commercial, cultural and civic activities, including shopping, leisure, employment, entertainment, culture, and social and community facilities. Town centres are classified in the London Plan according to their existing role and function in light of characteristics such as scale, mix of uses, economic performance and accessibility.

Traffic reduction strategy:
Borough-led strategy to reduce car and freight traffic at a local level, developed as part of LIPs.

Train operating company (TOC):
A train operating company (TOC) runs rail passenger services, leasing and managing stations from Network Rail. TOCs are the consumer face of the rail industry, and generally apply for franchises to run specific routes from the Department for Transport. The London Overground franchise is managed by Transport for London. TOCs normally lease trains from rolling stock companies.

Transport assessment:
A process that sets out transport issues relating to development proposals.

Transport for London (TfL):
One of the GLA group of organisations, accountable to the Mayor, with responsibility for delivering an integrated and sustainable transport strategy for London.

Transport for London Growth Fund:
A fund for smaller-scale transport schemes that helps directly unlock the creation of new homes and jobs, and leverages funding for such purposes from other sources.

Transport for London Road Network (TLRN):
Described in the GLA Act 1999 as the Greater London Authority Road Network, this is now known as the Transport for London Road Network. It comprises 580km of London's red routes and other important streets.

Travel plan:
A long-term management strategy that encourages active, efficient and sustainable travel for new and existing developments. It sets out transport impacts, establishes targets and identifies the package of measures needed for improvement.

Trip:
A one-way movement from one place to another to achieve a single main purpose. Trips may be further sub-divided into journey stages.

U

Ultra Low Emission Vehicle (ULEV):
Vehicle with reduced emissions of air pollutants and CO_2, including battery electric, hydrogen fuel cell electric, plug-in hybrid and range-extended electric vehicles.

Ultra Low Emission Zone (ULEZ):
Charging zone in which vehicles that do not comply with emissions standards for air pollutants will be subject to a daily charge.

Urban realm:
The area between building alignments, including public spaces next to streets. Streets make up the greatest part of the urban realm in most cities.

V

Vehicle Excise Duty (VED):
A tax (also known as 'vehicle tax', 'car tax', and 'road tax') that is levied as an excise duty. It must be paid for most types of vehicles being used (or parked) on the public roads in the United Kingdom.

Vision Zero:
An approach to road danger reduction that works towards the elimination of road traffic deaths and serious injuries by reducing the dominance of motor vehicles on London's streets.

Vulnerable road user:
A person travelling on foot, by cycle or by motorcycle, who is disproportionately affected by road danger in London. Vulnerable road users make up 80 per cent of those killed or seriously injured on London's streets.

W

Walk London Network:
A network of seven routes across London, forming one of the largest walking networks of any city in the world. The routes are designed to be easily accessible by public transport and can be walked in sections. The seven routes are: the Capital Ring, Green Chain, Jubilee Greenway, Jubilee Walkway, Lea Valley, London Outer Orbital Path (LOOP) and the Thames Path.

Wider South East (WSE):
The WSE comprises 156 authorities and 11 Local Enterprise Partnerships within London, the south east and the east of England. Collaboration arrangements are in place to co-ordinate strategic policy and infrastructure investment to underpin economic prosperity across the region.

Workplace Parking Levy:
A charge on employers who provide workplace parking. Revenue raised must be re-invested into transport improvement schemes.

Z

Zero carbon:
Activity that causes no net release of carbon dioxide and other greenhouse gas emissions into the atmosphere.

Zero emission capable (ZEC) vehicle:
A vehicle that is constructed to be capable of operating in zero emission mode for at least part of its operating cycle. The zero emission mode may be augmented by an internal combustion engine configured to extend the driving range of the vehicle, either by propelling the driven wheels or by powering an on-board generator.

Zero emission transport:
Transport that produces zero harmful exhaust emissions, including PM, NO_x, NO_2, CO and CO_2.

Zero emission zone:
A zone within which vehicles not capable of operating with zero-pollutant exhaust emissions are subject to road user charges (similar to ULEZ or LEZ) and/or other vehicle prohibitions or restrictions.

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