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

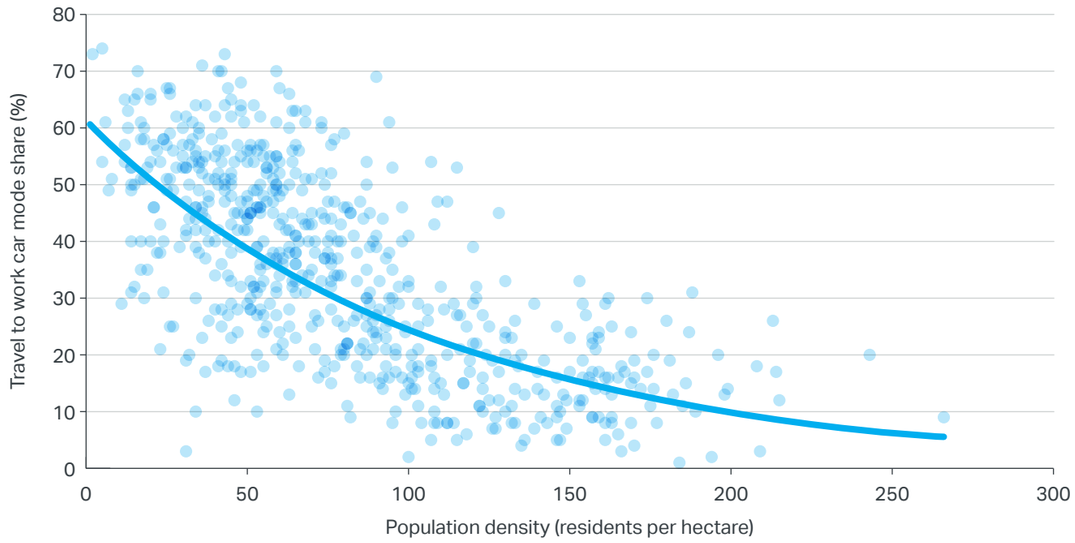
Improving access to public transport

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.

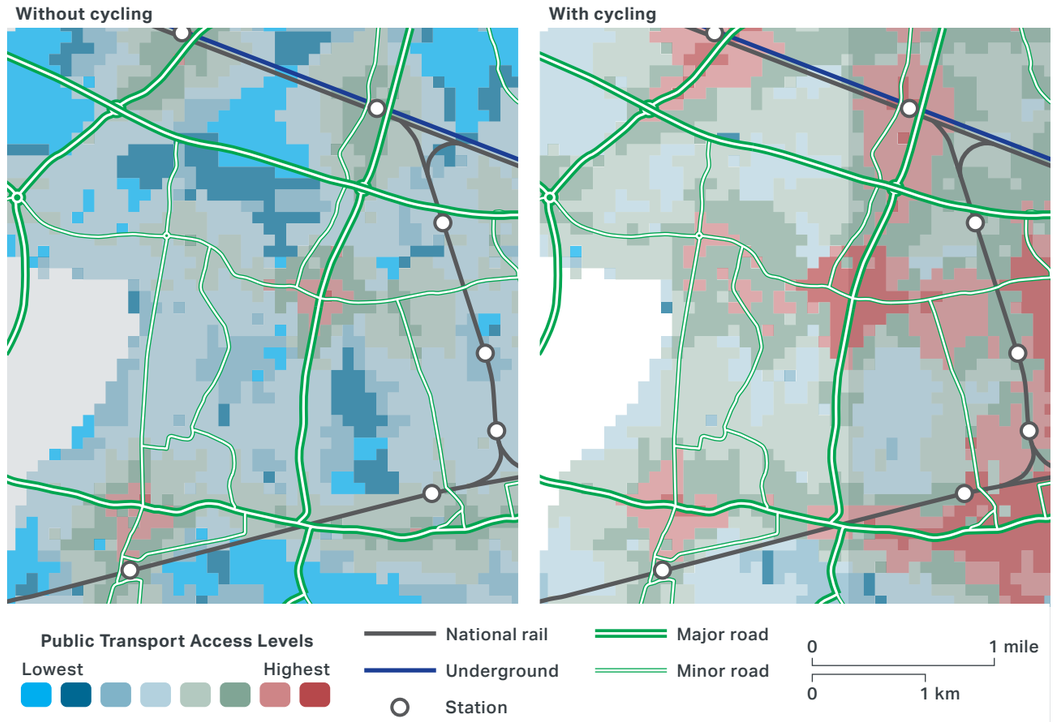
There are almost 600 rail and Tube stations in London, and opportunities for development around these stations should be explored, such as converting land use from low-density uses (retail parks, storage, parking, etc) to high-density, mixed-use development. Such change can act as a catalyst for the 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.

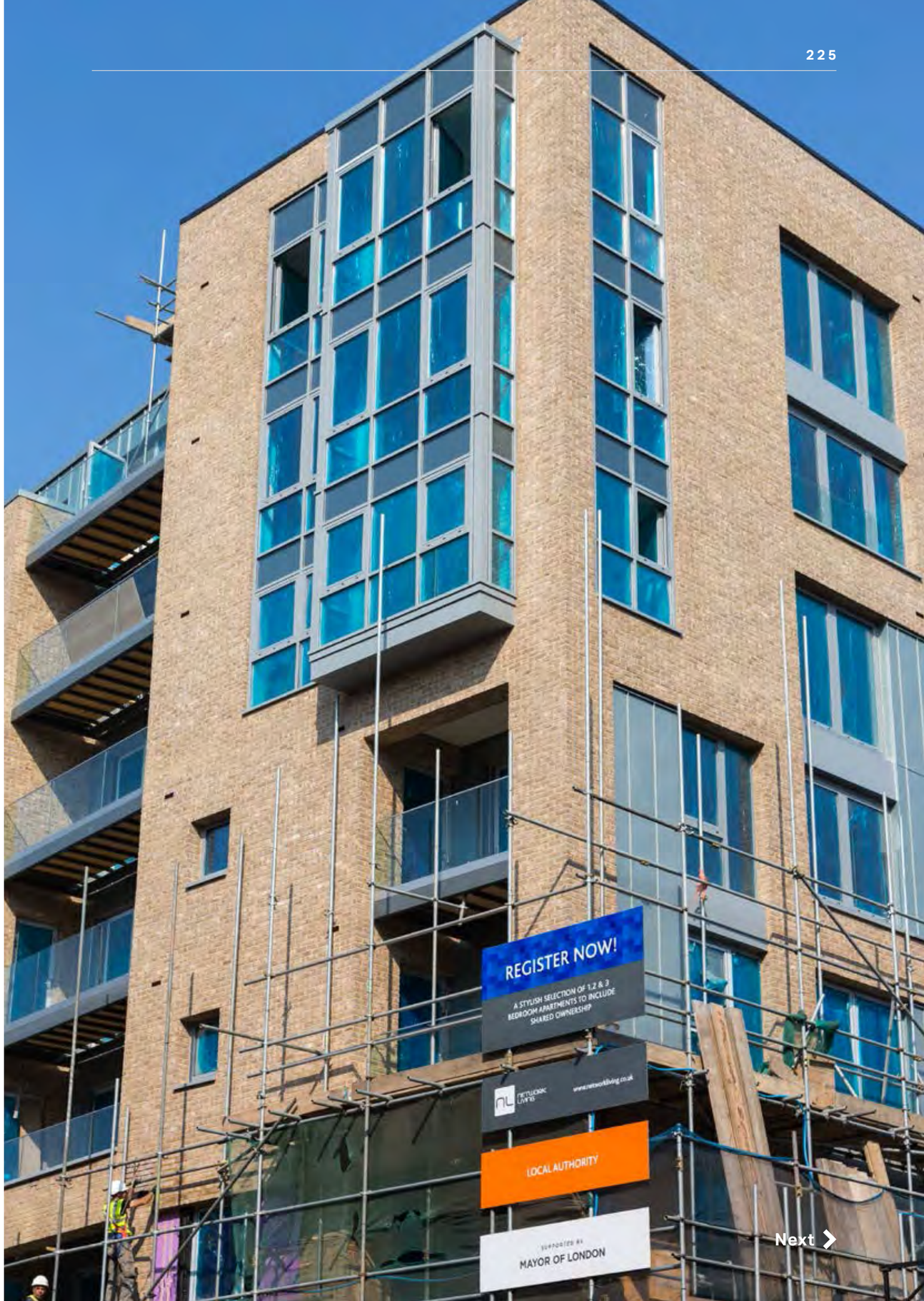
Proposal 83

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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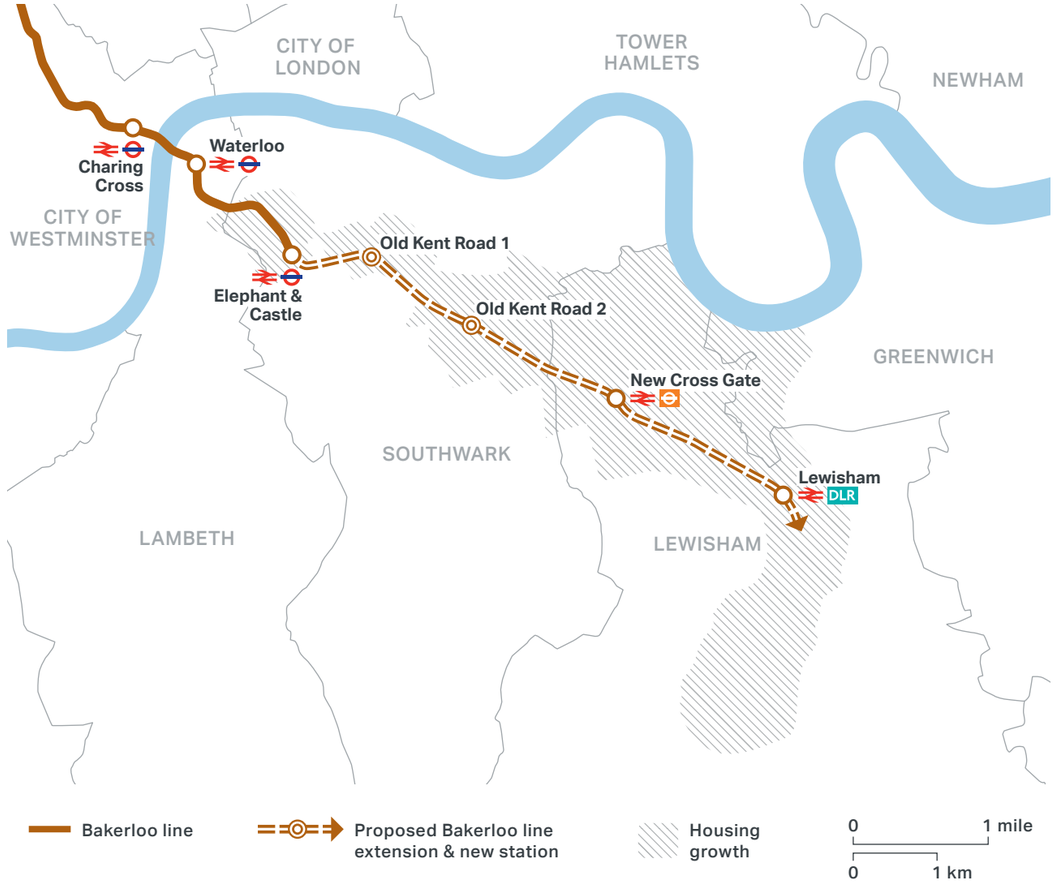
Bakerloo line extension

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.

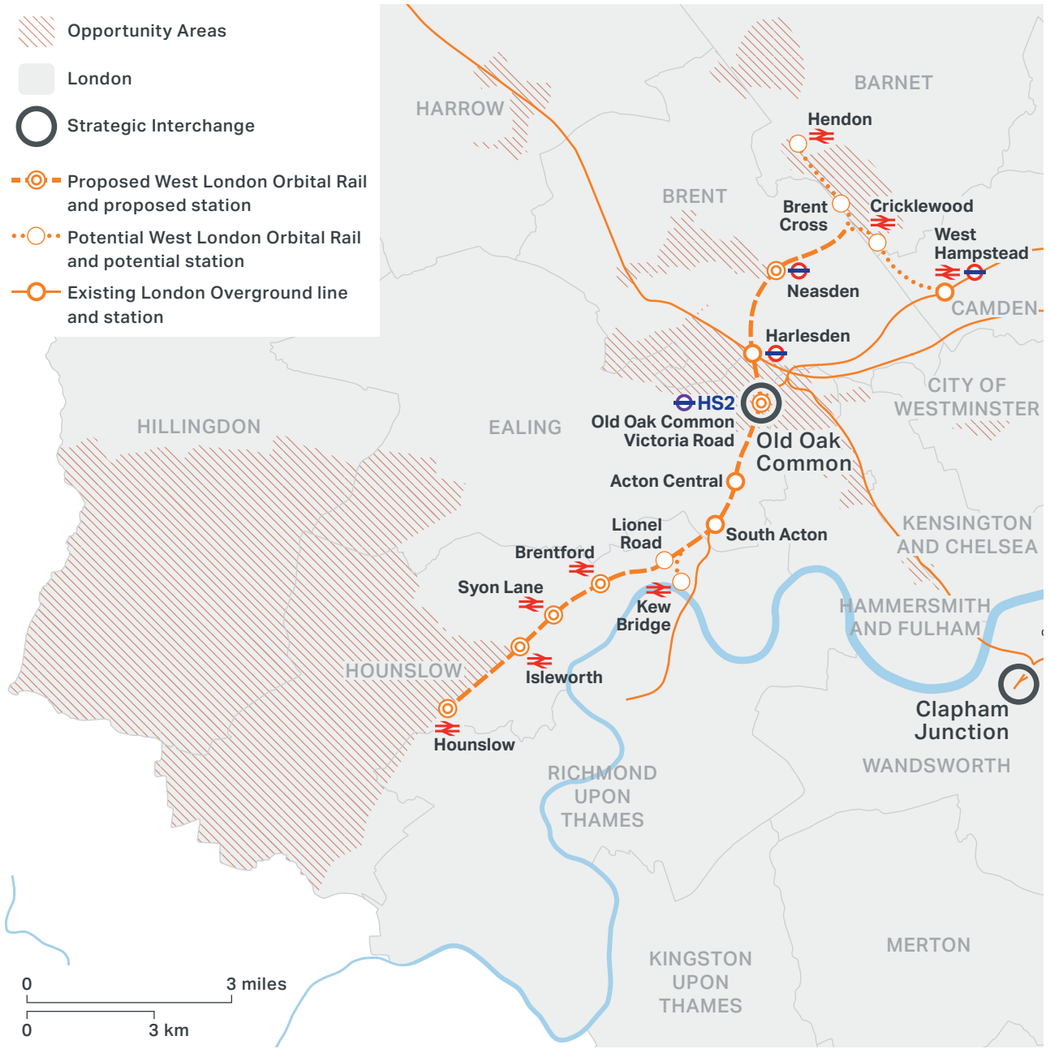
Opportunities from London Overground improvements

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.

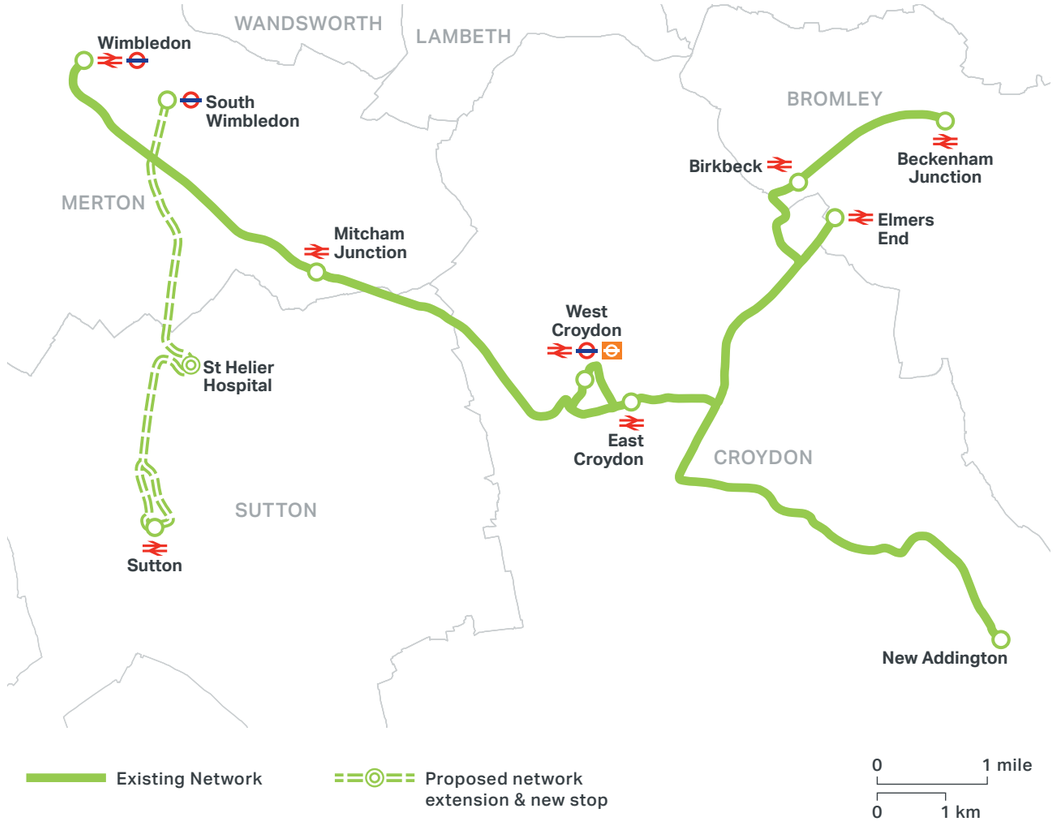
Proposal 89

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.

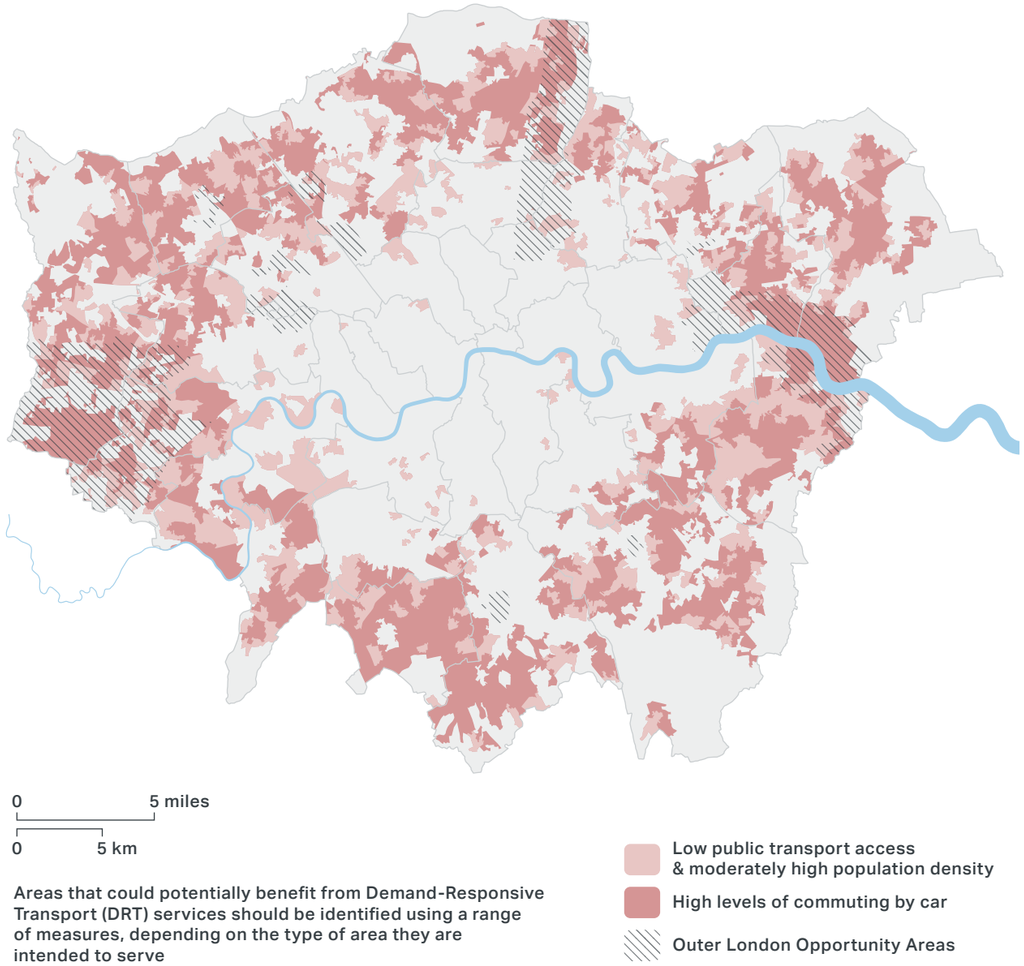
New bus connections
More diffuse growth can be supported by smaller improvements to the existing network, including providing new routes or enhancing or extending bus priority, coupled with improvements for walking and cycling. For example, the benefits of the Silvertown Tunnel will be maximised through 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.

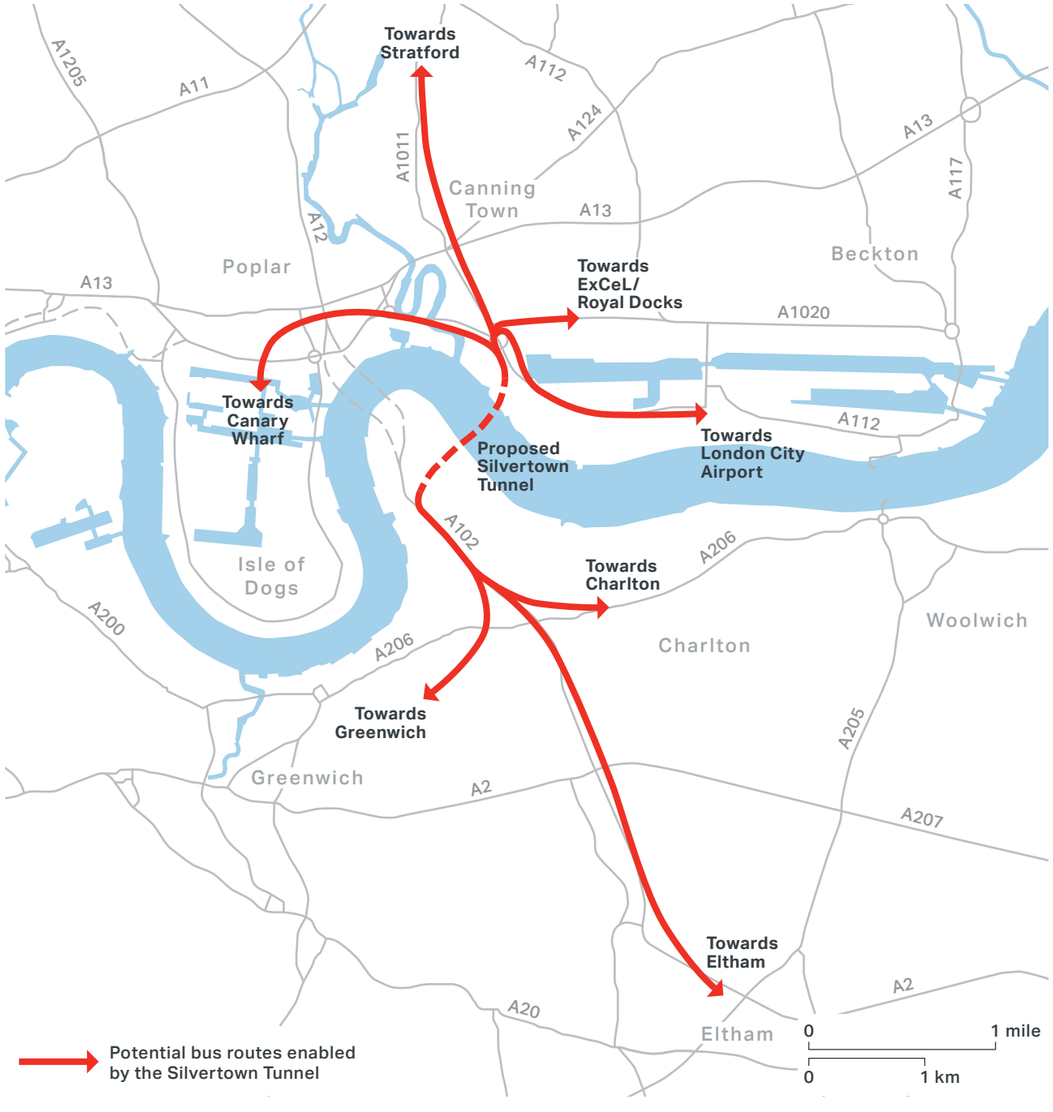
A Docklands Light Railway (DLR) extension to Thamesmead would support the development of thousands of new homes in Newham, Greenwich and Bexley, and could be delivered within ten years; other options being explored include the potential for an extension of the London Overground from Barking Riverside, 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.

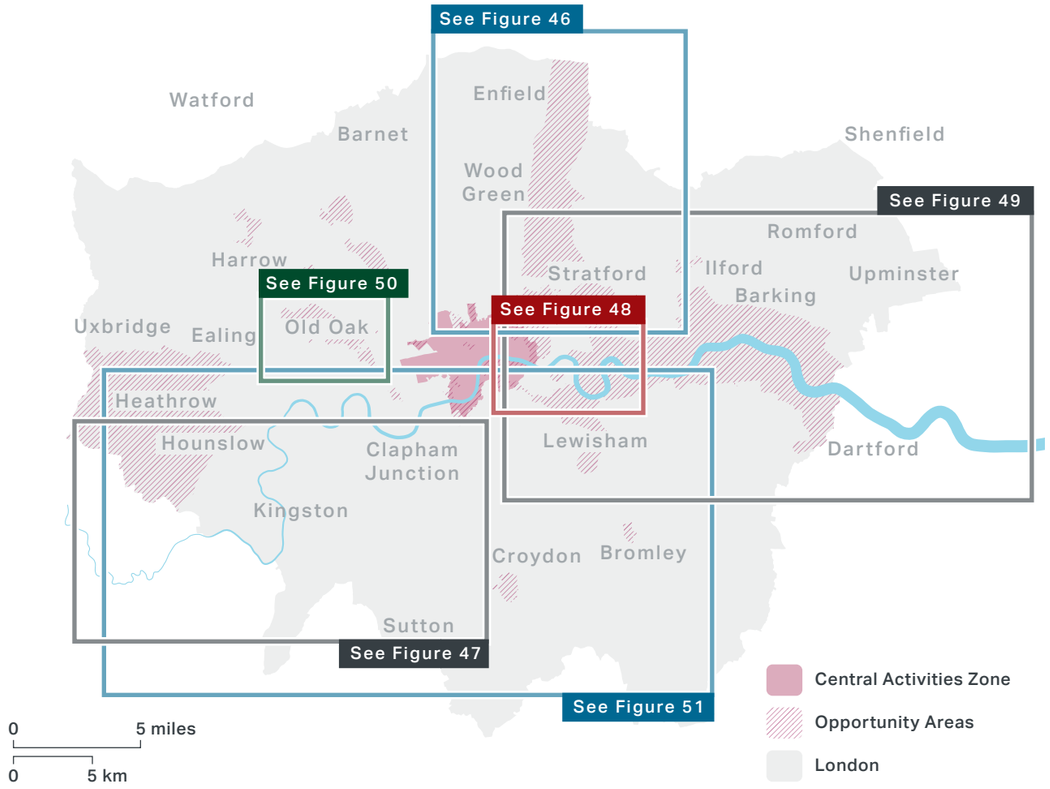
Development at TfL stations and other co-location opportunities
There are also opportunities to co-locate transport and homes or jobs as has been done at Hammersmith and Westminster Tube stations. Given the amount of operational land TfL holds, significant numbers of homes and jobs could be delivered 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.

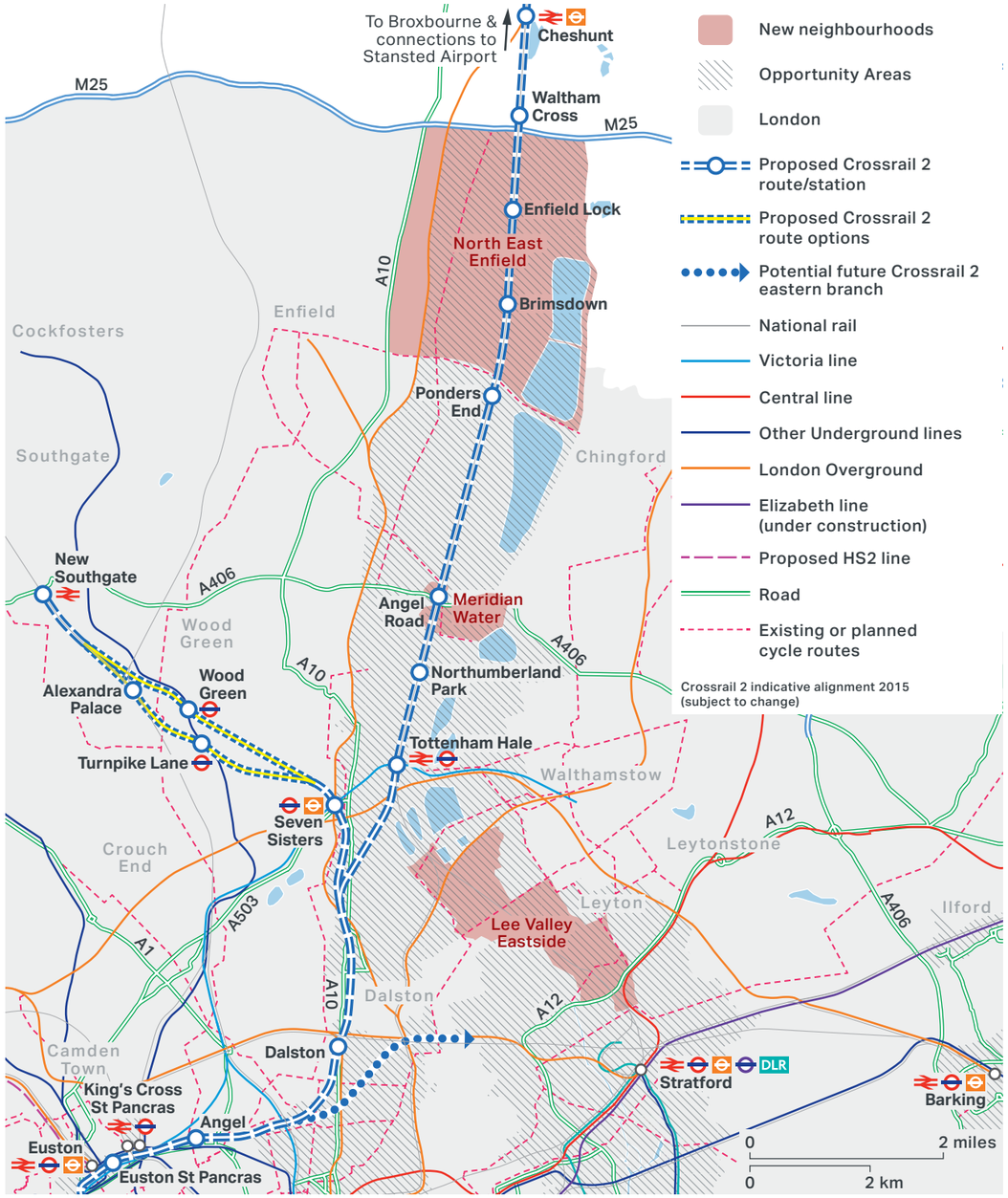
To reach its full potential and optimise the places it serves, Crossrail 2 will need to be complemented by a network of streets that enable and encourage walking and cycling and deliver a reliable and clean bus and freight network.

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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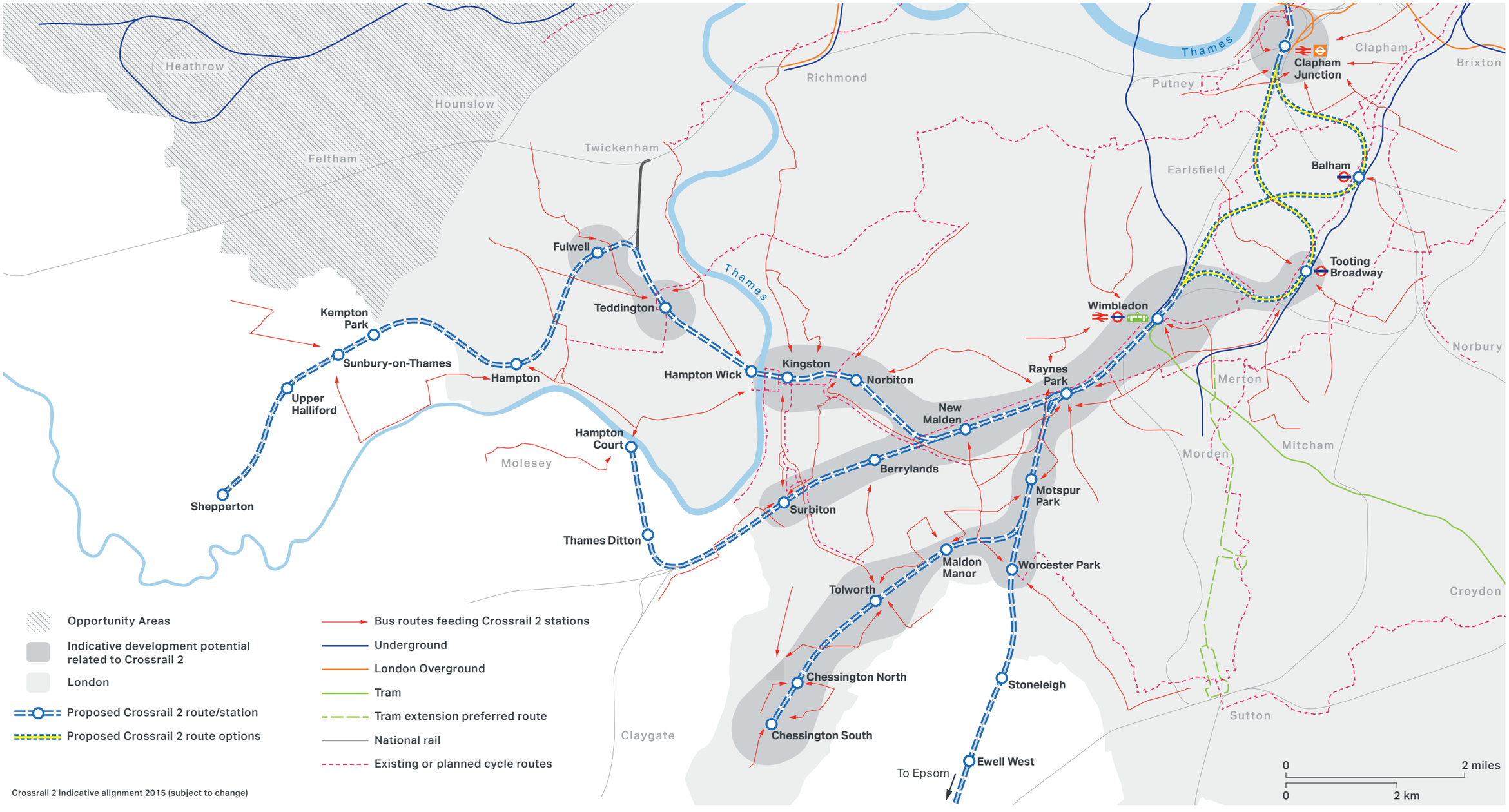
FIGURE 47: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN SOUTH WEST LONDON



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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.

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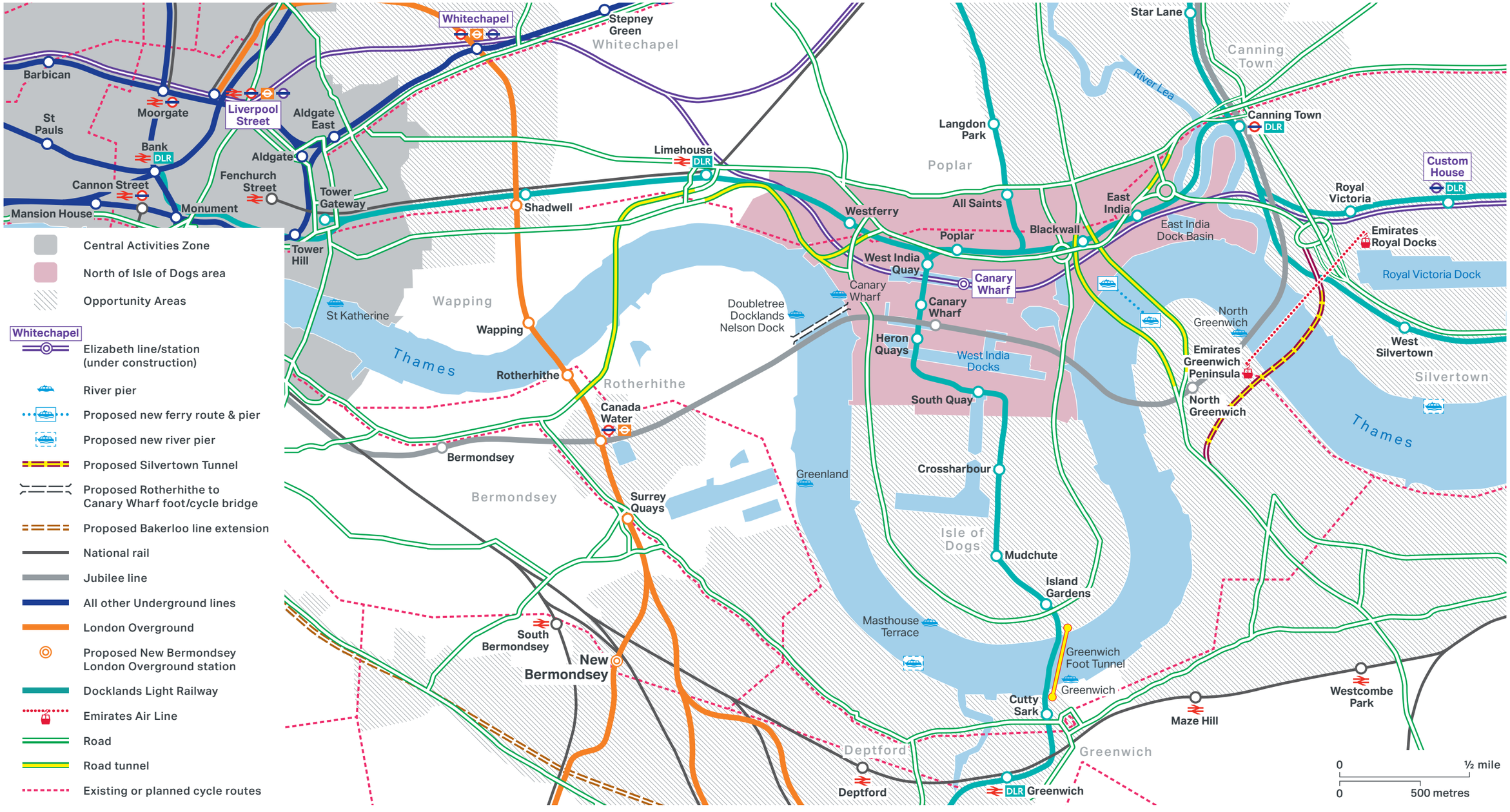
FIGURE 48: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN INNER EAST LONDON AND THE ISLE OF DOGS



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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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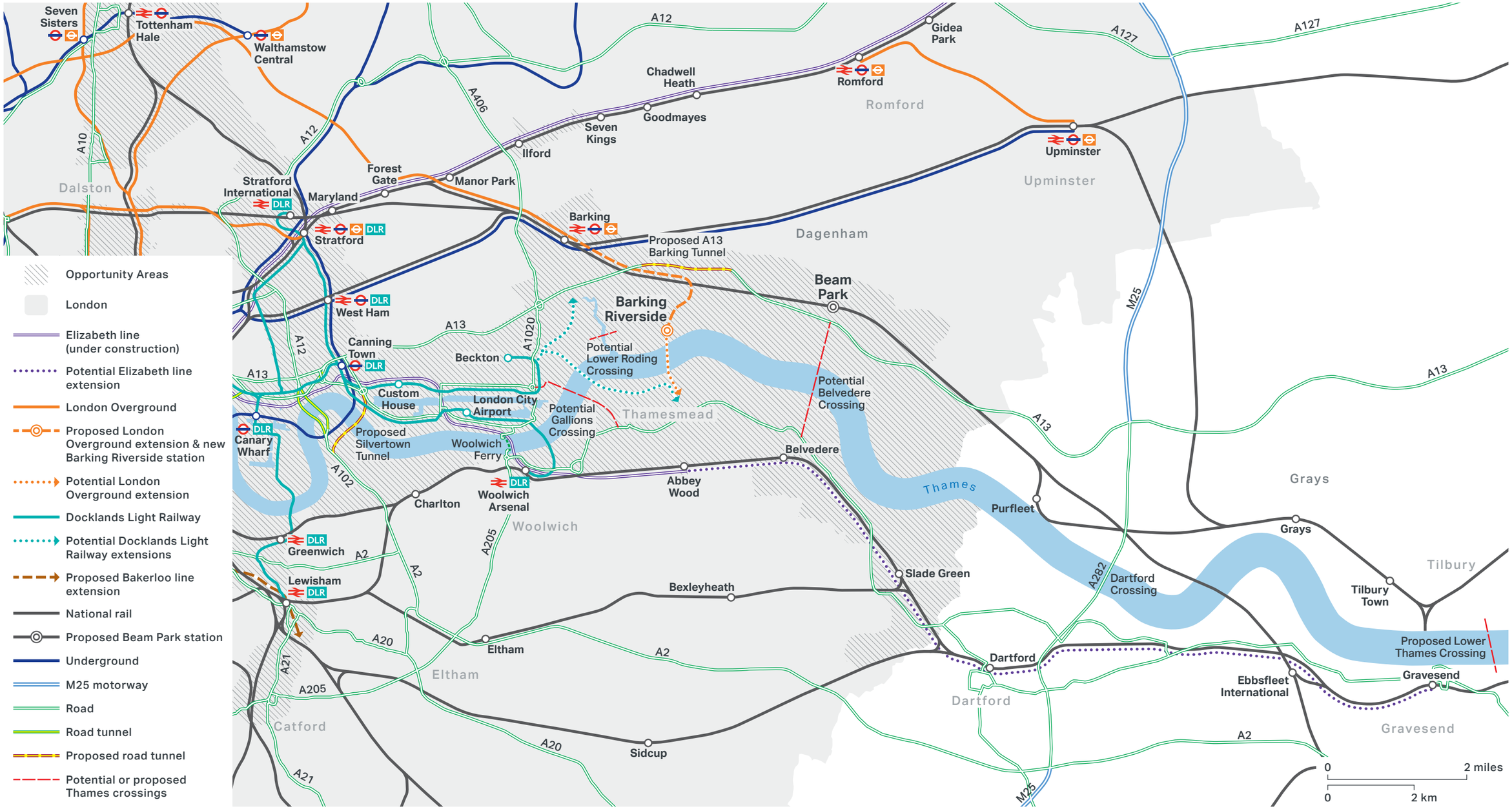
FIGURE 49: TRANSPORT PROPOSALS FOR HOMES AND JOBS IN OUTER EAST LONDON AND THE THAMES CORRIDOR



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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.

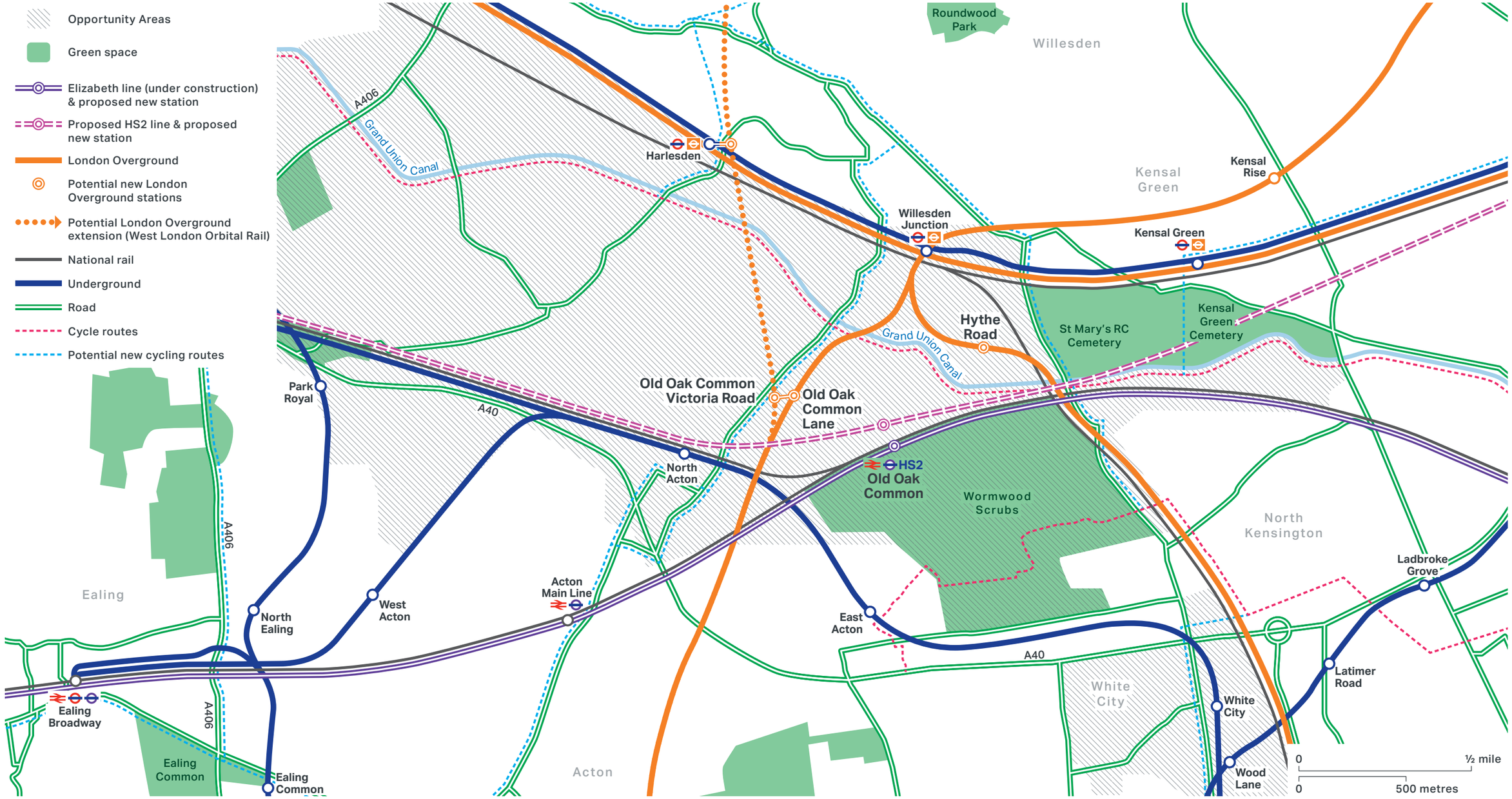
At present, the Grand Union Canal, railway lines and changes in level across the area create barriers to walking and cycling, and significant amounts of development are proposed for which public transport capacity and safe and convenient walking and cycling routes do not currently exist. It is essential 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.

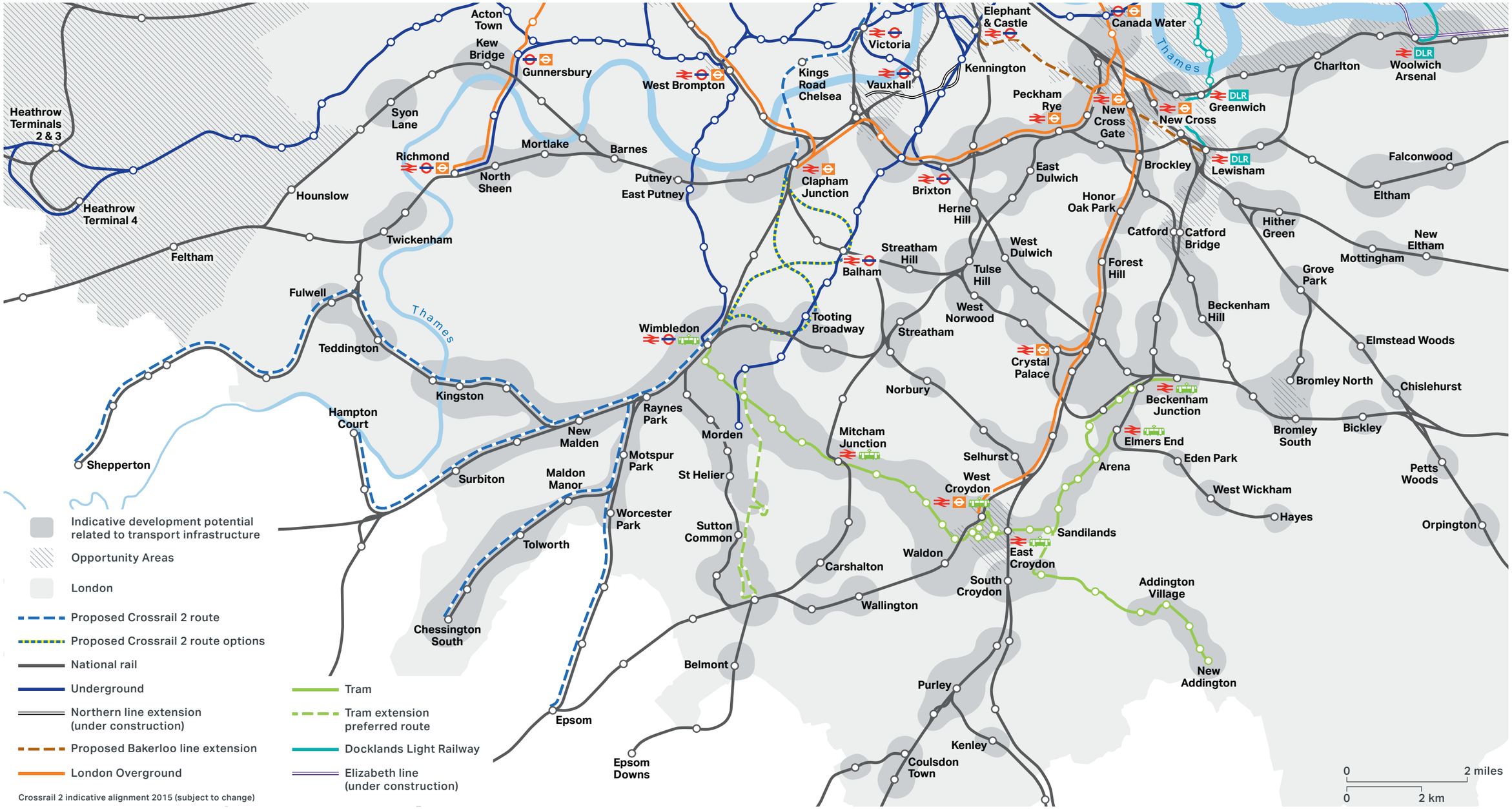
TfL will work with the GLA, boroughs and other stakeholders to better co-ordinate land use and transport planning activity around stations in south London, which will aid regeneration, increase the delivery of new jobs and homes and integrate them better with the local and wider area. By improving the 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.

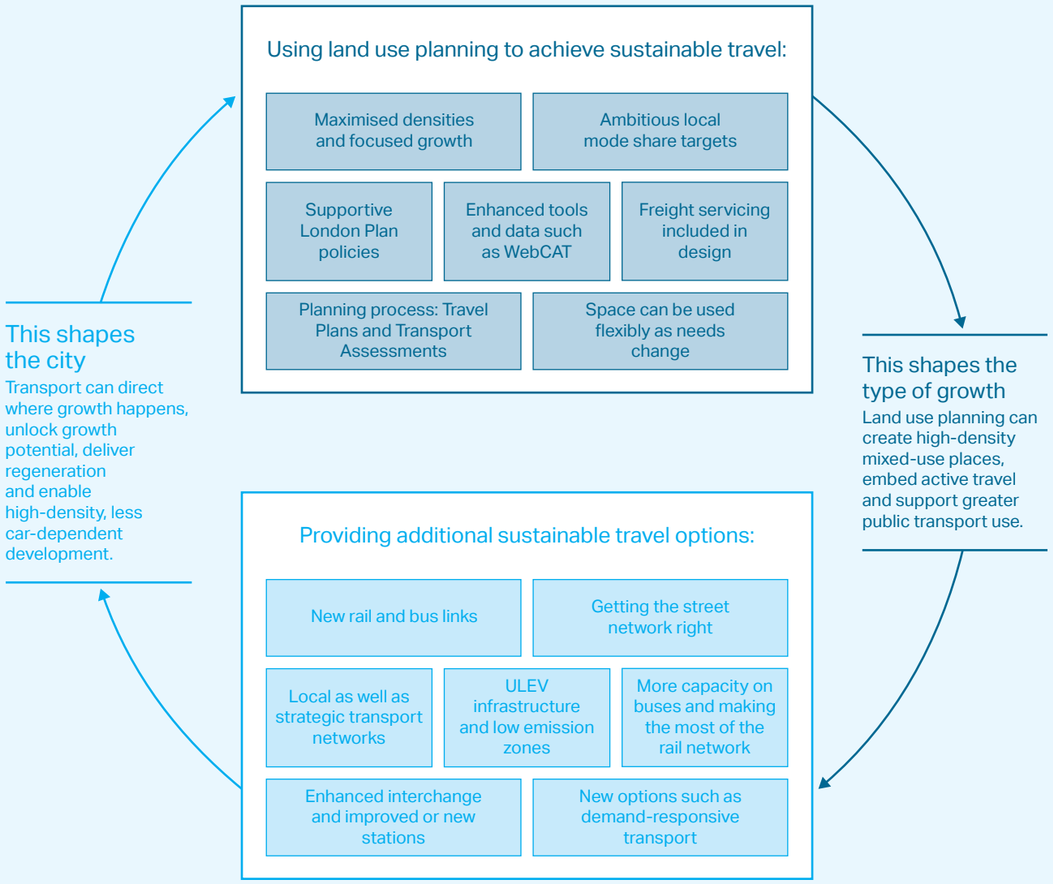
c) Use public sector funding, such as TfL's Growth Fund, for smaller scale transport schemes that help directly unlock the creation of new homes and jobs, and leverage funding for such purposes from other sources.

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.

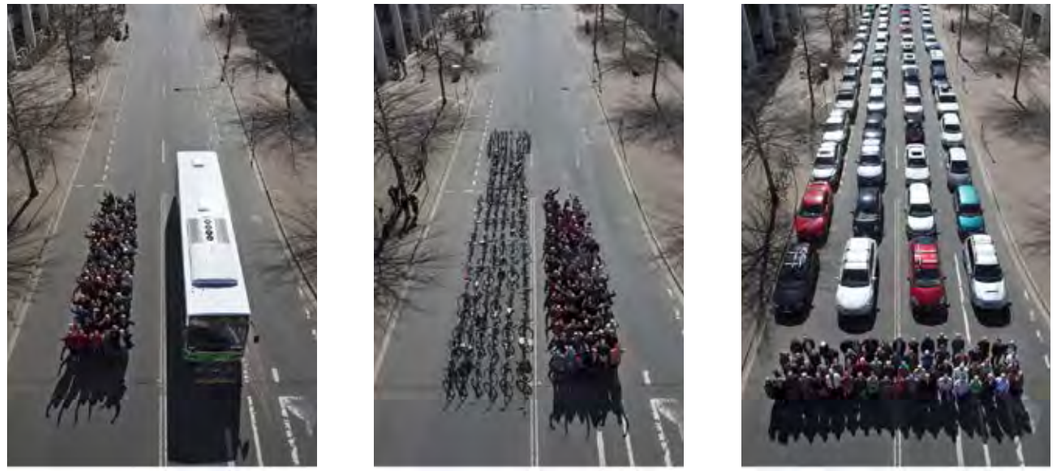
Proposal 102
The Mayor, through TfL, will work to ensure its information systems and payment platforms take account of technological advances and evolve to remain fit for purpose.

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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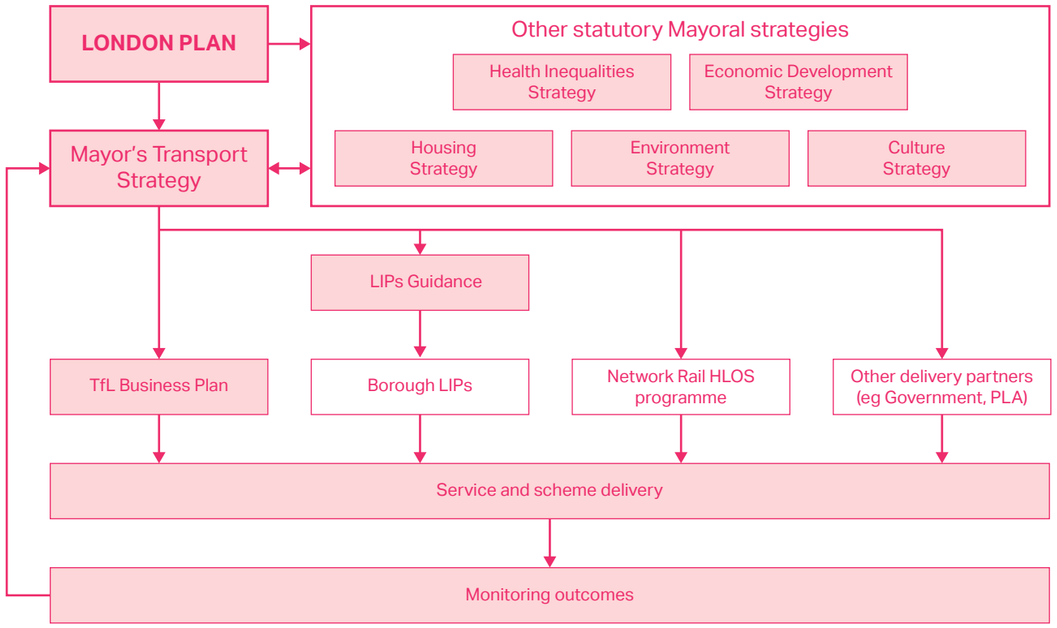
b) Delivery, funding and powers

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

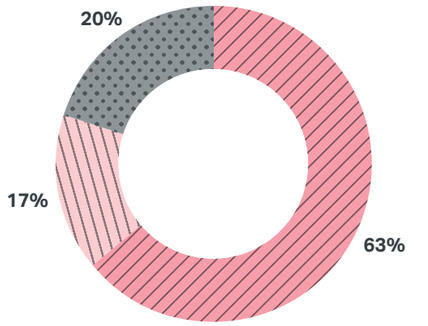

FIGURE 57: MODE SHARES FOR TRAVEL WITHIN AND BETWEEN CENTRAL, INNER, OUTER AND OUTSIDE LONDON

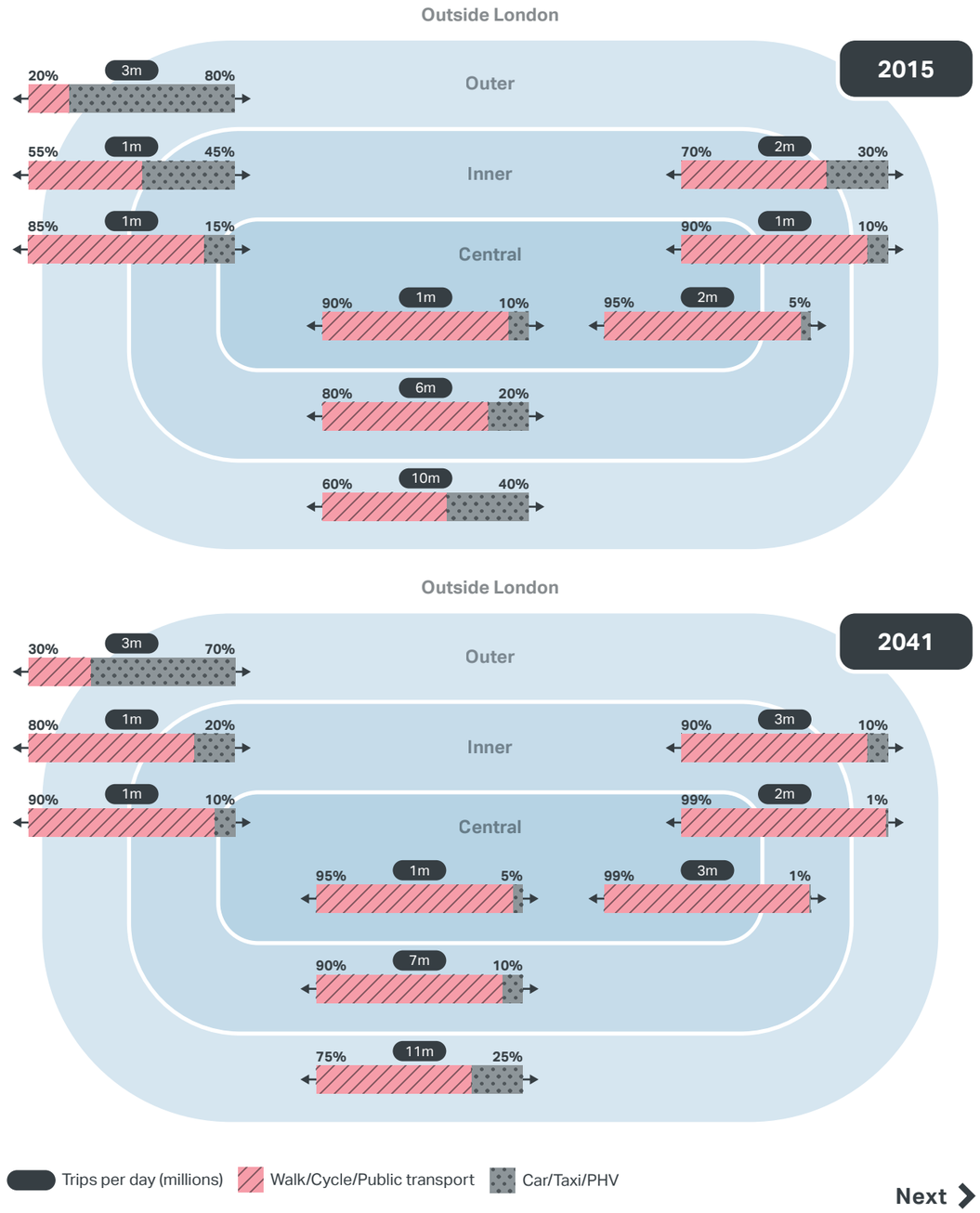

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FIGURE 58: OTHER EXPECTED OUTCOMES, 2041

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.

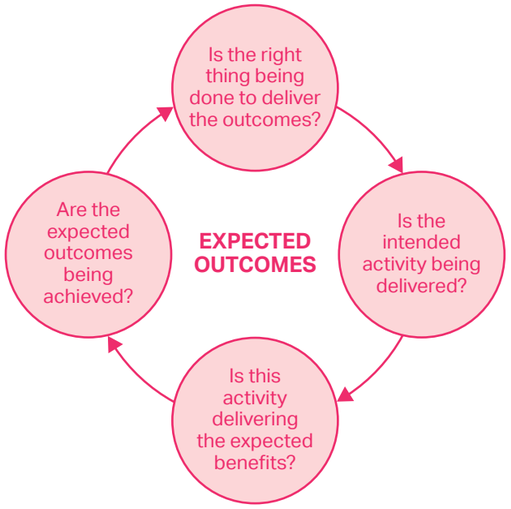
Critical to achieving this is to ensure there is a clear line of sight from the strategy's aims through to local and project-level objectives. TfL, London boroughs and other organisations delivering this strategy will bring forward schemes and proposals that accord with the policies and proposals of 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.

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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