



## Chapter three – Healthy Streets and healthy people

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

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

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

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

- a) Enabling active, inclusive and safe travel, by providing accessible, well-designed space for walking and cycling, the healthiest means of moving around London's streets.
- b) Using street space more efficiently – reducing traffic levels through better-managed freight and fewer car trips.
- c) Improving air quality and the environment, and ensuring London's transport system is resilient to the impacts of severe weather and climate change.

## Improving London's streets

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

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

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

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



## FOCUS ON: HEALTH BENEFITS OF ACTIVE TRAVEL

### Why do we need physical activity?

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

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

### How much physical activity do we need?

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

### How much physical activity do we get?

If an adult reports that they walk or cycle for at least two ten-minute periods most days, it is a good indication that they are getting the minimum activity they need to stay healthy. Currently, only 34 per cent of adult Londoners report having

walked or cycled for two ten-minute periods on the previous day<sup>2</sup>. Only three in ten children of school age reach the minimum recommended activity level<sup>3</sup>.

### The power of walking and cycling

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

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

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

Walking and cycling are important for disabled people, who – with the help of improved walking and cycling environments, consideration for wheelchair use and adapted cycles and more accessible public transport – can

realise the all-round health benefits active travel can provide.

### The health benefits of active travel

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

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

1 UK physical activity guidelines, [www.gov.uk](http://www.gov.uk), 2011

2 Travel in London Report 8, page 181, Transport for London, [tfl.gov.uk](http://tfl.gov.uk), 2015

3 Health Survey for England 2015, NHS Digital, [www.gov.uk](http://www.gov.uk), 2016

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

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

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

by car

<1 minute

by public transport

8–15 minutes

on foot

17 minutes

by bicycle

22 minutes

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

Type 2 diabetes  
**35–50%** ▼

Depression  
**20–30%** ▼

Coronary heart disease  
**20–35%** ▼

Alzheimer's disease  
**20–35%** ▼

Breast cancer  
**20%** ▼

Colon cancer  
**30–50%** ▼

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

## FOCUS ON: HEALTH BENEFITS OF ACTIVE TRAVEL (continued)

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

### Potential for more active travel

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

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



## a) Active, inclusive and safe travel

### Improving walking and cycling environments

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

#### Policy 2

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

Walking is already the norm for many short journeys, although its importance as a mode of travel and the need for

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

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

### Getting all Londoners walking and cycling

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

#### 1) Street environments that encourage walking and cycling

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

<sup>6</sup> Analysis of cycling potential 2016, Travel in London supplementary report, Transport for London, [tfl.gov.uk](http://tfl.gov.uk), March 2017

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

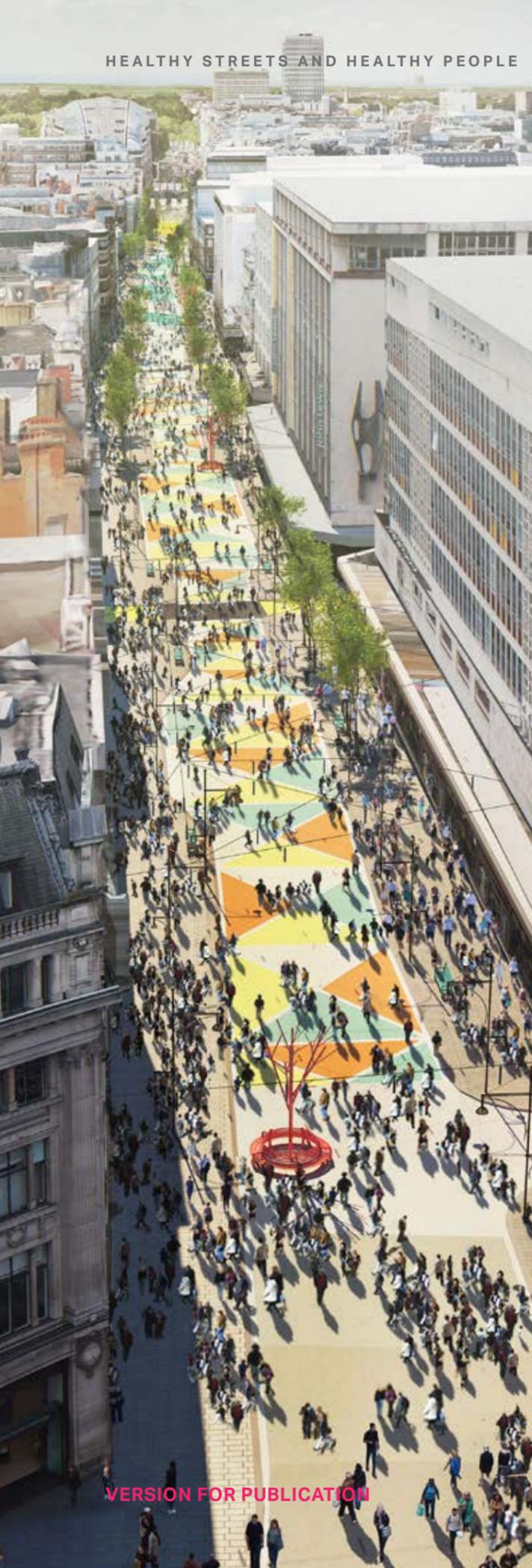


### Proposal 1

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

- a) Creating 'Liveable Neighbourhoods' to improve the public's experience of walking, cycling and using public transport and to increase opportunities to use streets as public spaces and for play, and to encourage fewer trips by car.
- b) Providing 'Healthy Routes' to create attractive, safe and accessible walking routes to schools and other local destinations, such as shops, health services and parks, with a particular focus on improving conditions for children, older people and disabled people.
- c) Providing more secure, accessible cycle parking, particularly in residential areas, town centres, public transport interchanges and at key destinations.
- d) Improving the accessibility of streets for older and disabled Londoners through measures including removing obstacles, widening pavements for wheelchair access, introducing tactile paving, raising sections of roadway to make crossing easier, providing seating, mitigating the impact of street works and, where possible, ensuring on-street cycling facilities cater for the wide range of cycles used by disabled people.
- e) Reducing the severance caused by roads and railways, which can separate people from local services and limit social interaction, community engagement and active travel.
- f) Ensuring any scheme being undertaken on London's streets for any reason improves conditions for walking and cycling.

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



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

#### Proposal 2

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

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

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

#### Proposal 3

The Mayor, through TfL and the boroughs, will:

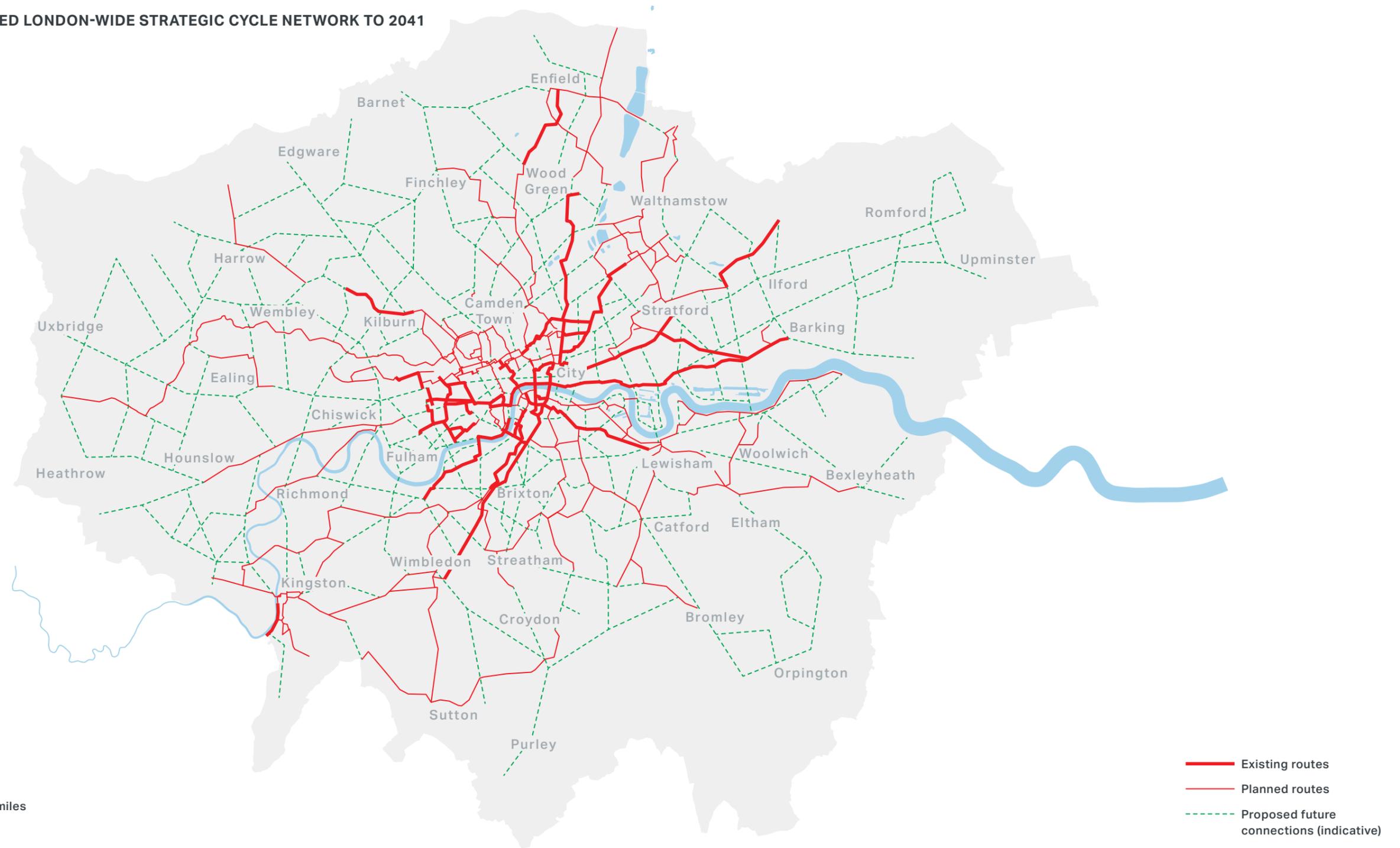
- a) Deliver a London-wide strategic cycle network, with new, high-quality, safe routes and improved infrastructure to tackle barriers to cycling for both shorter and longer trips. By 2041, 70 per cent of Londoners will live within 400 metres of the strategic cycle network.
- b) Encourage additional local and neighbourhood improvements, such as using physical restrictions to prevent motorised vehicles from using certain streets, to build on and complement the strategic cycle network.

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

#### Proposal 4

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

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



## FOCUS ON: WALKING AND CYCLING AND THE HEALTHY STREETS APPROACH



- 1 Making streets easier to cross, installing pedestrian crossings where people want to cross
- 2 Providing ample cycle parking that is suitable for all types of cycle
- 3 Using art and lighting installations to make walking routes more interesting and attractive
- 4 Planting street trees and other high-quality planting and greening
- 5 Improving the quality of lighting to make people feel safer and more secure
- 6 Providing benches and regular opportunities for people to stop and rest
- 7 Ensuring pavements are smooth and level, and wide enough for people using wheelchairs or buggies, or walking with children or in groups
- 8 Reducing speed limits to 20mph and designing streets to keep speeds low
- 9 Providing protected cycle lanes where required – to make streets safe and appealing for cyclists
- 10 Using the Direct Vision Standard to remove the most dangerous lorries from London's streets by 2020
- 11 Providing cycle crossings in parallel to pedestrian crossings to allow people cycling to cross busy roads with priority
- 12 Working with schools and local communities to identify local walking routes, play streets and other local improvements
- 13 Narrowing and raising the carriageway at entrances to side streets (to bring it level with the pavement) to give more priority to people walking and to reduce the speed of cars moving across the path of cycles
- 14 Ensuring streets and public spaces are high quality and well maintained
- 15 Using filtering to retain cycle access to local streets while removing access for cars
- 16 Ensuring that the space provided for cycling is sufficient for groups, children and people using inclusive cycles

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

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

### Proposal 5

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

- a) Maintaining, expanding and improving 'Legible London' walking wayfinding maps and ensuring that on-street cycle network signage is clear and consistent.
- b) Using new data to develop and improve online journey planning and navigation tools that will make walking and cycling trips the easiest journeys to plan.

cycle, and the Cycle Hire scheme has attracted new people to cycling<sup>7</sup>. It is important that the Cycle Hire scheme continues to broaden the appeal of cycling in London, while complementing the cycle network and integrating with public transport.

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

### Proposal 6

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

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

Making cycling easy and convenient for everyone is also about making it as simple as possible to get access to a

7 Attitudes towards cycling, Transport for London, September 2015

### 3) Promoting walking and cycling for all Londoners

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

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

#### Proposal 7

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

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

#### Proposal 8

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



## FOCUS ON: BUSES AND THE HEALTHY STREETS APPROACH

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

### Public transport supports active travel

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

### Buses free up street space

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

### Buses can reduce road danger

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

### Buses support local vitality

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

### Buses are accessible

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

### Clean buses provide an alternative to polluting private vehicles

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

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

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



## Vision Zero for road danger

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

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

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

### Policy 3

The Mayor, through TfL and the boroughs, and working with stakeholders, will adopt Vision Zero for road danger in London. The Mayor's aim is for no one to be killed in or by a London bus by 2030, and for all deaths and serious injuries from road collisions to be eliminated from London's streets by 2041.

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

- 2022 – reduce the number of people who are killed or seriously injured by 65 per cent against 2005-09 levels

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

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

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

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

- Safe speeds – lowering speeds is fundamental to reducing road danger because a person is five times less likely to be fatally injured if hit at 20mph than at 30mph

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

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

**Proposal 9**

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

- a) Introducing lower speed limits and improving compliance with speed limits through design, enforcement, technology, information and appropriate training. Twenty miles per hour limits will continue to be implemented on London's streets, with 20mph considered as part of all new schemes on the Transport for London Road Network. TfL will look to implement 20mph limits on its streets in central London as a priority, with implementation being widened across inner and outer London as soon as is practicably possible. TfL will work with the boroughs to implement lower speed limits on their streets, prioritising designs that are self-enforcing and that do not place an additional burden on policing partners. TfL will provide data analysis, training and technical guidance to support this.
- b) Conducting a systematic review of all road junctions, introducing road danger reduction measures at locations that pose significant risk to vulnerable road users.
- c) Working to ensure that vehicles driven on London's streets adhere to the highest safety standards, starting with a new Direct Vision Standard for HGVs and including the introduction of new vehicle technologies such as Intelligent Speed Assistance and Automatic Emergency Braking. TfL will develop a new Bus Safety Standard which will be introduced across the city's entire bus fleet featuring design and technological measures to protect passengers and other road users.
- d) Delivering a programme of training, education and (working with the police) enforcement activities to improve the safety of vulnerable road users, including the delivery of improved and new training for motorcyclists and working with stakeholders, including the freight industry, to improve standards of professional driving.
- e) Working with stakeholders to improve the emergency response to collisions, support victims of road crime, improve accountability and transparency, and learn from collisions.

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

**Proposal 10**

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

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

## FOCUS ON: MOTORCYCLING SAFETY

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

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

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

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

### Proposal 11

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

- a) Improving the safety of street design by following the guidance set out in TfL's Urban Motorcycle Design Handbook.
  - raising the safety standards of motorcycle courier businesses through training and accreditation
- b) Improving the quality of motorcycle safety training beyond the minimum required by law. A range of improved and new measures will involve:
  - improving the standard of motorcycle training in London by encouraging training providers to become accredited through the Motorcycle Industry Association
  - improving rider skills (particularly those of young riders) by promoting a suite of voluntary training courses including BikeSafe-London, ScooterSafe-London, 121
- c) Calling on all boroughs to allow motorcycle access to their bus lanes, to end the inconsistency between highway authorities that causes unnecessary confusion and risk to motorcyclists.
- d) Educating other road users on the shared responsibility for safer motorcycle journeys, through communications and the promotion of driver skills training.
- e) Supporting the police in targeting illegal and non-compliant behaviour that puts motorcyclists at risk, using data to focus on the streets with a higher risk of motorcyclist collisions.

Motorcycle Skills and through the introduction of a pre-Compulsory Basic Training theory app

## FOCUS ON: IMPROVING PERSONAL SAFETY AND SECURITY

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

### Policy 4

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

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

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

### Proposal 12

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

- a) Prioritise the tackling of 'high-harm' crimes, such as sexual offences and hate crime, on London's streets and public transport system in order to protect and offer reassurance to those who feel most vulnerable when travelling in London.
- b) Improve the safeguarding response to protect vulnerable adults and children using the transport network in London. This includes building on the work already under way to tackle rough sleeping on the transport network, linking in to the appropriate support services.

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

## FOCUS ON: IMPROVING PERSONAL SAFETY AND SECURITY (continued)

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

### Proposal 13

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

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

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

### Proposal 14

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

<sup>12</sup> Metropolitan Police Service crime recording information system, March 2017

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



## b) Making more efficient use of the street network

### Tackling congestion

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

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

However, 75 per cent of congestion is caused simply by there being too great a demand for limited street space. This

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

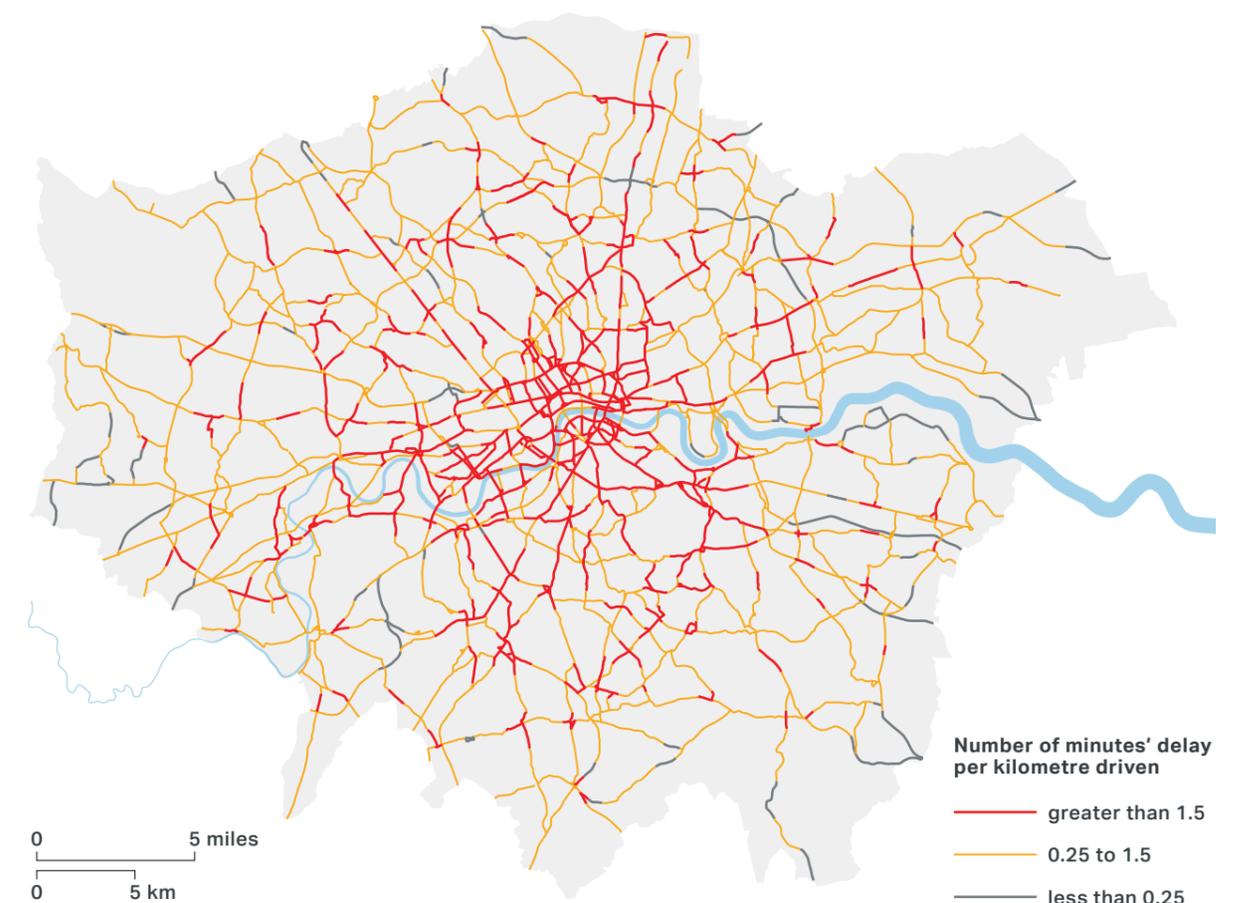
### Policy 5

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

Congestion has different causes and impacts in different parts of the city and so the approach to dealing with it must vary across London. In central London, where congestion is worst, constrained street space and rising levels of freight and private hire traffic are the main issues to be tackled. In outer London, car use is the main cause of congestion, and

although levels of delay are lower, the overall impact is far greater as there are more people travelling longer distances by car than in other parts of London. Addressing congestion in outer London will require large numbers of trips currently made by car to be shifted to public transport, cycling or walking.

FIGURE 5: JOURNEY DELAYS ACROSS LONDON





### Efficiency of deliveries and servicing

#### Streets and freight vehicles

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

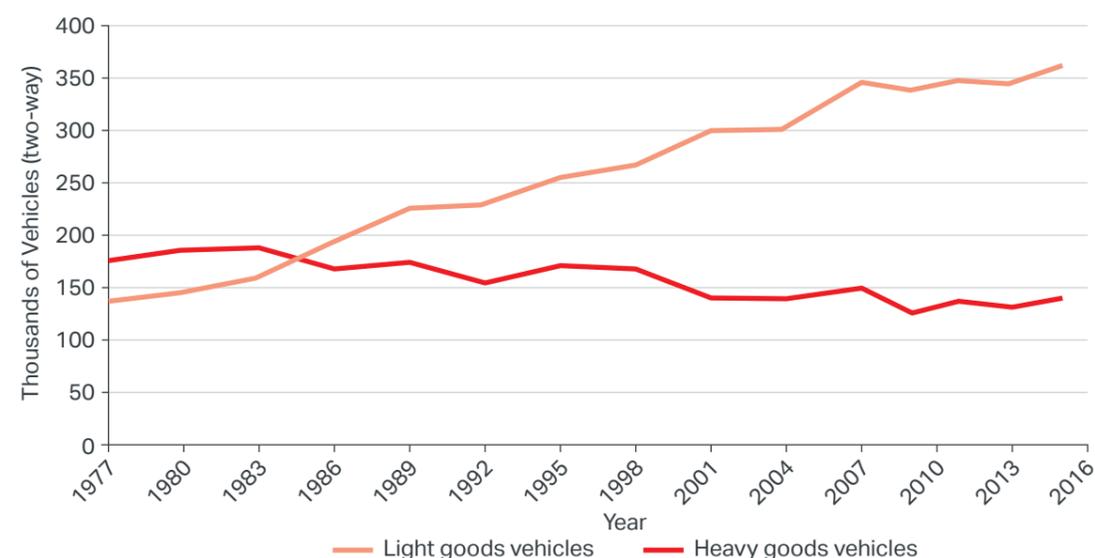
The impacts of freight and servicing are felt on London's streets in many ways. Both when loading and when moving, freight vehicles take up large amounts of street space that could otherwise be used for walking, cycling, public transport use or as space for people to spend time in and enjoy. They make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

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

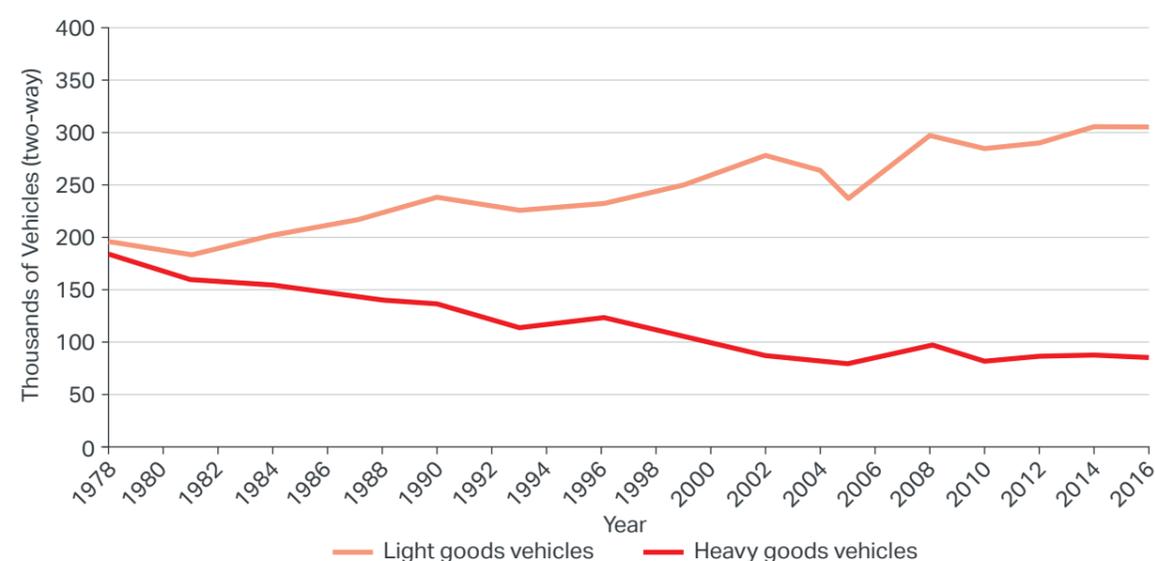
#### Proposal 15

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

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



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



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

### The growth of freight traffic in London

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

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

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

- Rising costs and a shortage of HGV drivers leading to freight being moved out of HGVs into vans

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

### Improving the efficiency of freight networks

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

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

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

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

The Mayor, through TfL and working with Network Rail, the DfT, rail freight operating companies and port operators, will review London's strategic freight network. This will seek to identify opportunities to get more of London's freight closer to its final destination by rail and to make the most of London's

rail freight opportunity, and to identify opportunities for capacity and capability enhancements where these will not impact existing and future passenger services, and where the benefits will be seen within London.

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

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

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

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

### Proposal 16

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

- a) Identifying opportunities for moving freight on to the rail network where this will not impact on passenger services and where the benefits will be seen within London.
- b) Increasing the proportion of freight moved on London's waterways.
- c) Reviewing the potential benefits of a regional freight consolidation and distribution network and completing the network of construction consolidation centres in London.

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



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

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

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

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

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

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

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

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

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

### Proposal 17

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

- a) Supporting BIDs and other clusters of businesses to jointly procure goods and services.
- b) Establishing a network of micro-distribution services and facilities served by zero emission vehicles and walking and cycling deliveries.
- c) Re-timing goods and services to the times where they will have least impact on streets.
- d) Using local access and loading restrictions to support more efficient freight practices.
- e) Improving the design and management of loading and servicing activities at the kerbside and off-street.
- f) Developing an online tool, incorporating a 'London lorry standard', to simplify the regulatory environment for HGVs operating in London.

Over the life of the strategy, new business models and technology may enable changes to the way goods are delivered and servicing activity is undertaken in London. These changes may benefit businesses and consumers, such as through providing faster or cheaper access to goods and services. However, it is important that these changes are shaped to contribute to

the Healthy Streets Approach and, in particular, help freight and servicing to use road space more efficiently and reduce its impact on other users of London's streets, including people walking and cycling. Policy 23 sets out the principles for new transport services, most of which are directly applicable to freight trips.

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

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

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

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

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

Improvements to the rail network outside London would mean that freight trains could avoid using the London Overground network, as much of the rail freight that currently travels through London is not bound for the capital, with a large proportion of that freight being transported from the Port of Felixstowe to the Midlands and beyond. In the first

instance, using the existing unfilled rail paths on the Felixstowe to Nuneaton corridor would help London. In addition, an upgrade and electrification of the Felixstowe to Nuneaton corridor would allow more freight services to avoid London. A new line linking the ports around Tilbury with the Great Eastern Main Line would allow freight traffic from the Essex Thameside route to access the Felixstowe to Nuneaton corridor without needing to pass through the city. These upgrades could release much-needed capacity and improve reliability across the London Overground network, as well as providing more room to move London-bound road freight onto rail, and thereby releasing freight capacity for London's major infrastructure projects.

### Proposal 18

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



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

### Reducing car use

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

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

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

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

### Proposal 19

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

### Changing the way we pay for roads

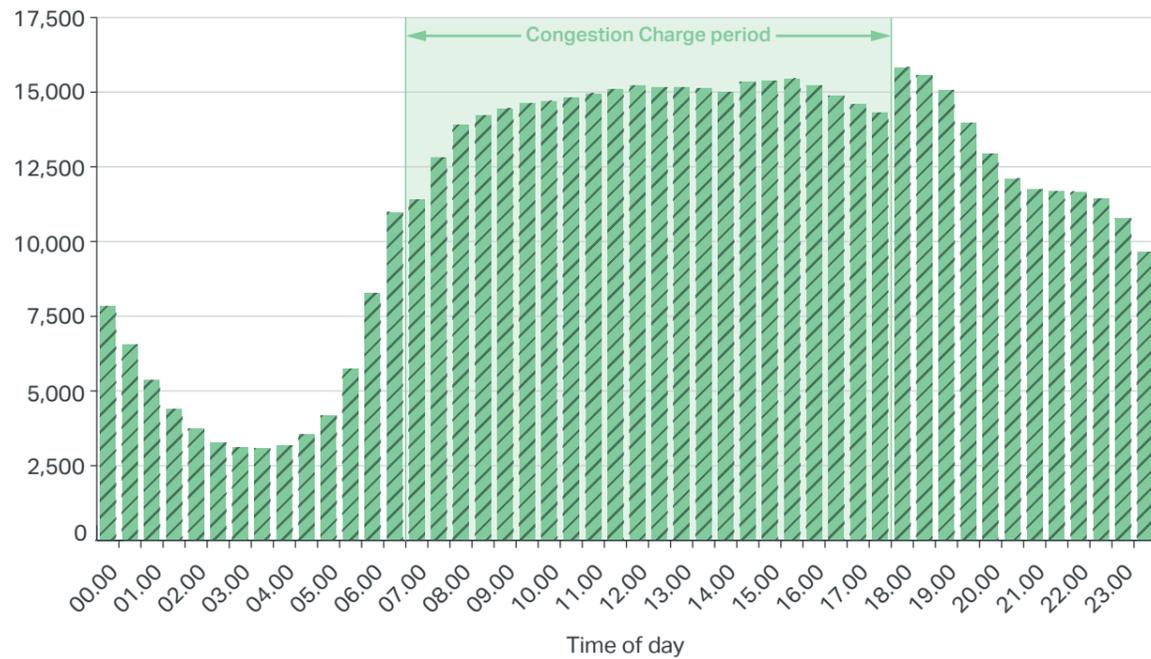
Changing the way Londoners pay for using private vehicles on London's roads could help significantly to reduce the congestion and emissions associated with car dependency and inefficient freight and servicing trips.

When the Congestion Charge was introduced in 2003, it was very effective in reducing traffic levels and congestion

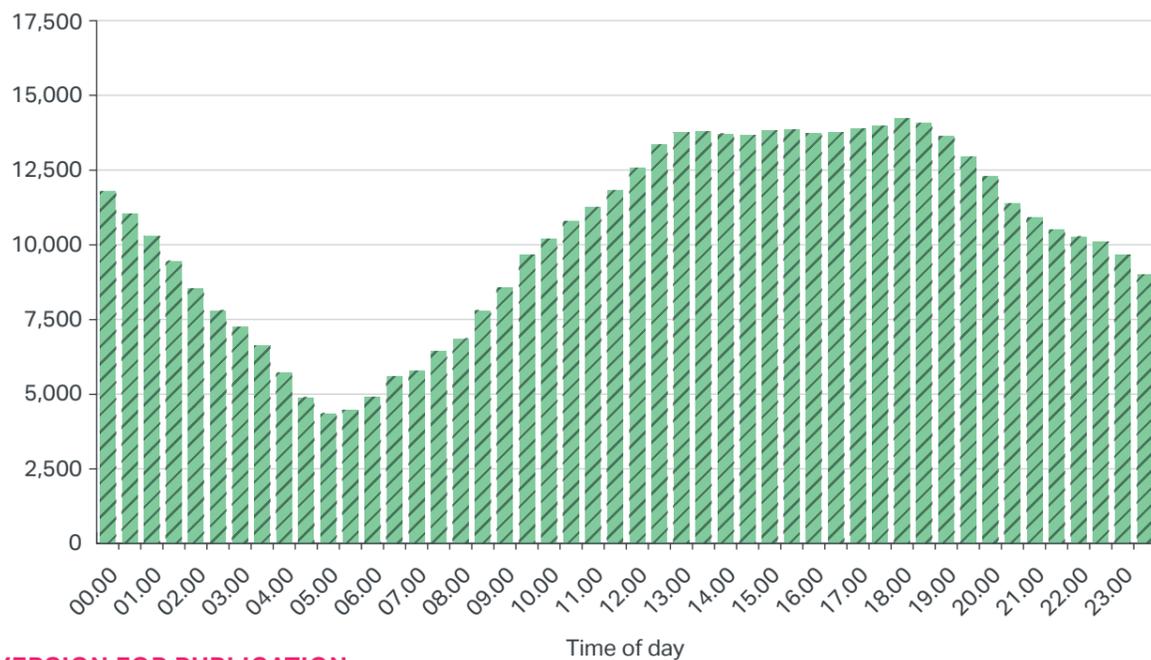
in the Congestion Charge zone (CCZ). The immediate impact was a 30 per cent reduction in congestion and 15 per cent less circulating traffic. Traffic in central London has continued to decline by a small amount each year, reflecting improved public transport and increasing public transport use for travel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

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

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



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



VERSION FOR PUBLICATION

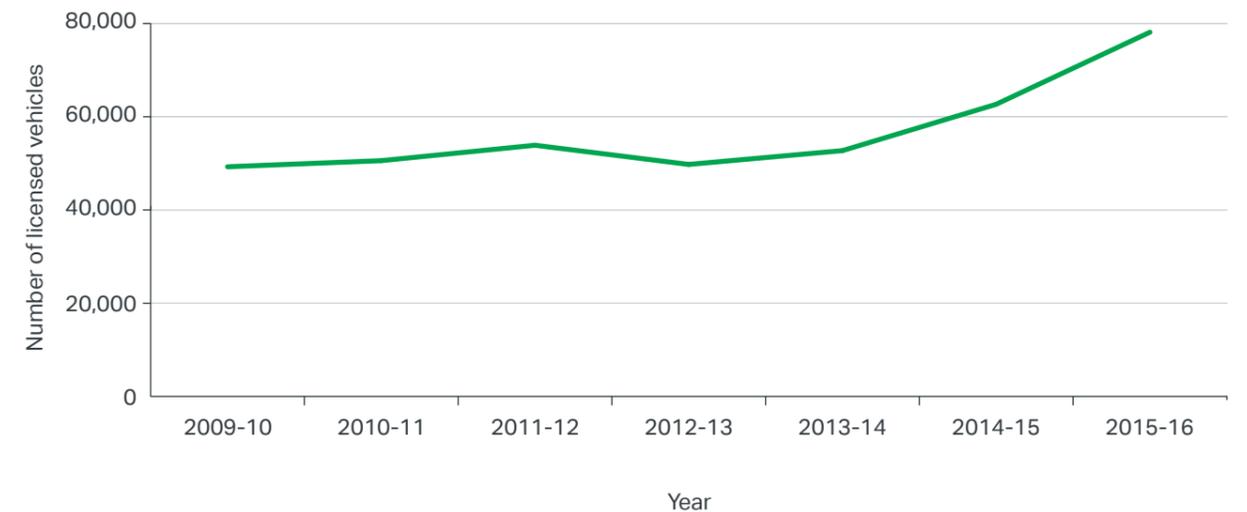
Furthermore, the proportion of vehicles in the zone that are subject to the charge continues to reduce, as falling numbers of private cars are counterbalanced by increasing numbers of licensed PHVs, which are exempt from the charge.

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

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

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

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



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

### Proposal 20

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

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

In the longer term, a different model for the way Londoners pay for their roads may be needed in order to meet the aim of an 80 per cent active, efficient

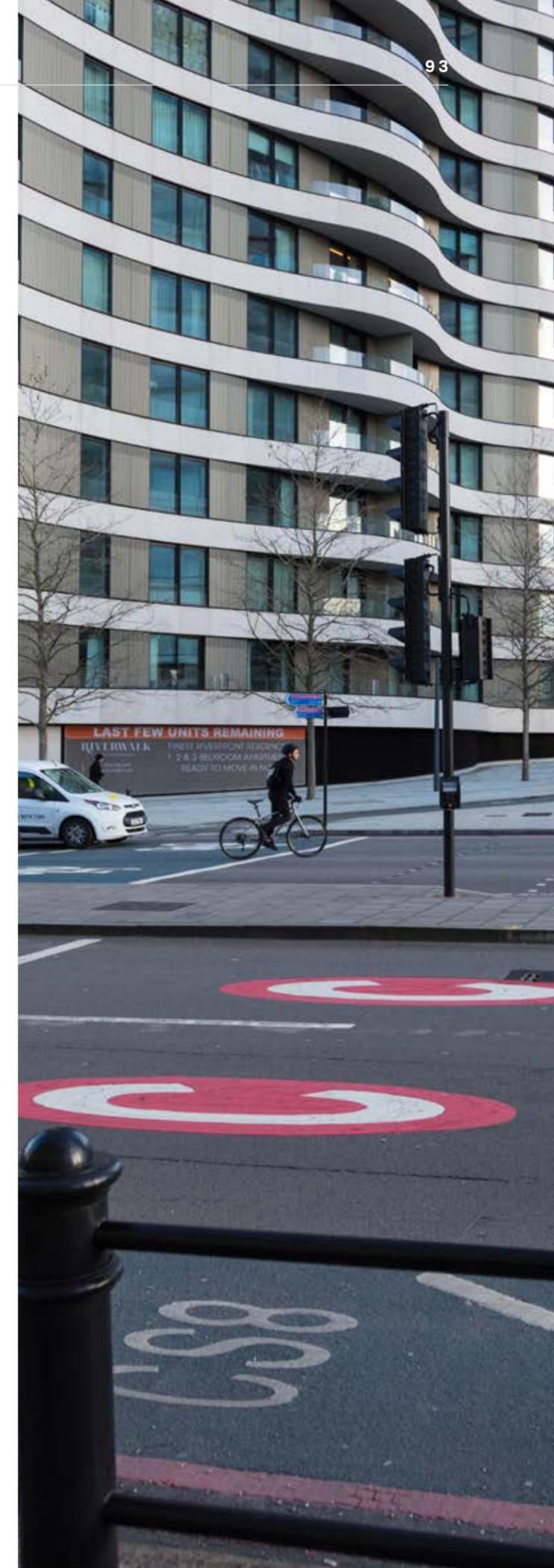
and sustainable mode share. The world has moved on from the 1990s when the Congestion Charge was conceived and a camera-based system was the best way to administer the scheme. In a rapidly changing technological context, it is worth considering whether road use by motorised vehicles should be paid for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

With the introduction of the Congestion Charge, London led the world, and it can again show the way forward by harnessing new technology to develop fair and sophisticated ways of charging for car use and managing the impact of journeys to tackle congestion and

emissions. This will make sure that London is a world-class, attractive, healthy city in which to live and work, as well as to visit.

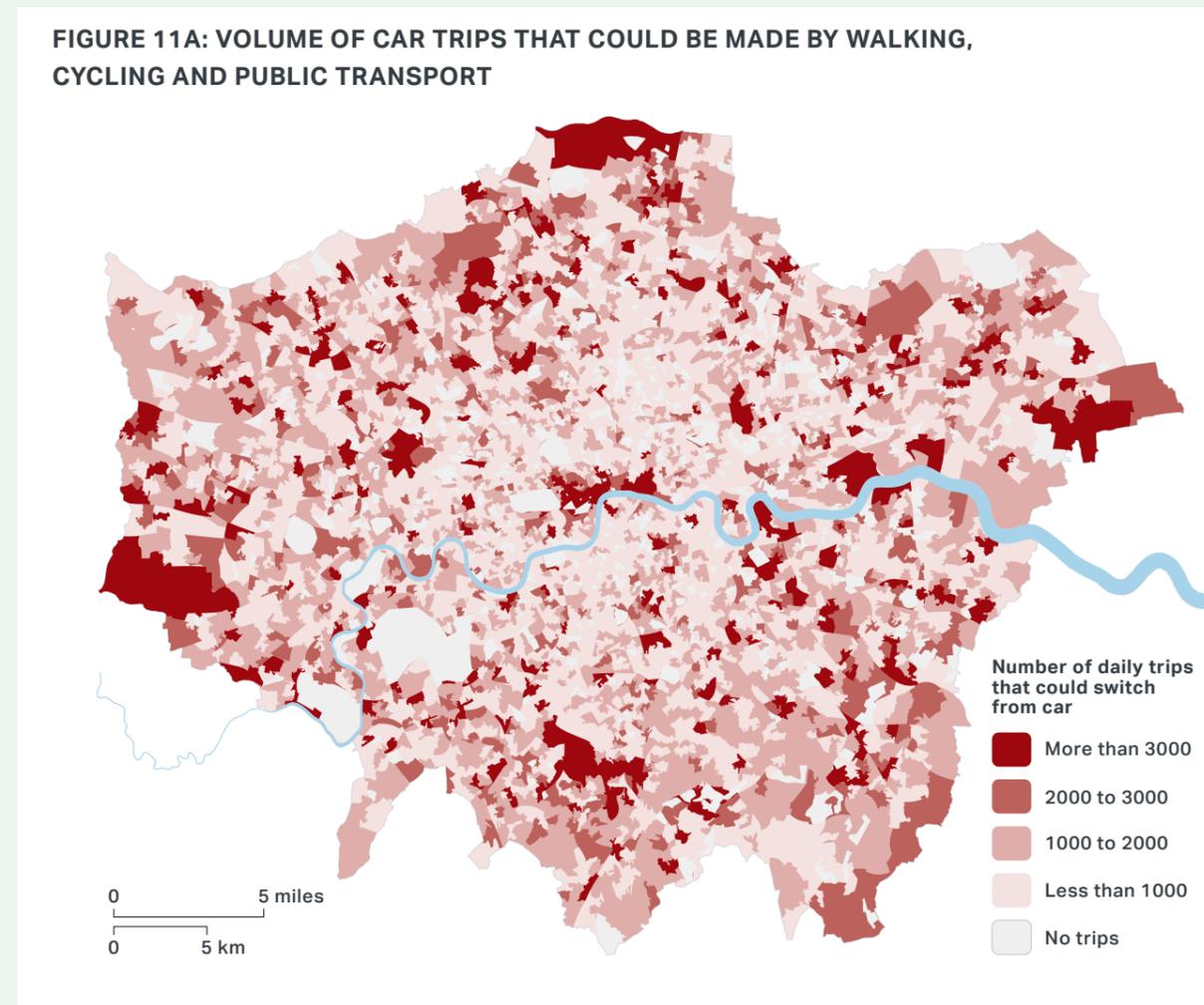
### Proposal 21

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



## FOCUS ON: OPPORTUNITY TO REDUCE CAR USE

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

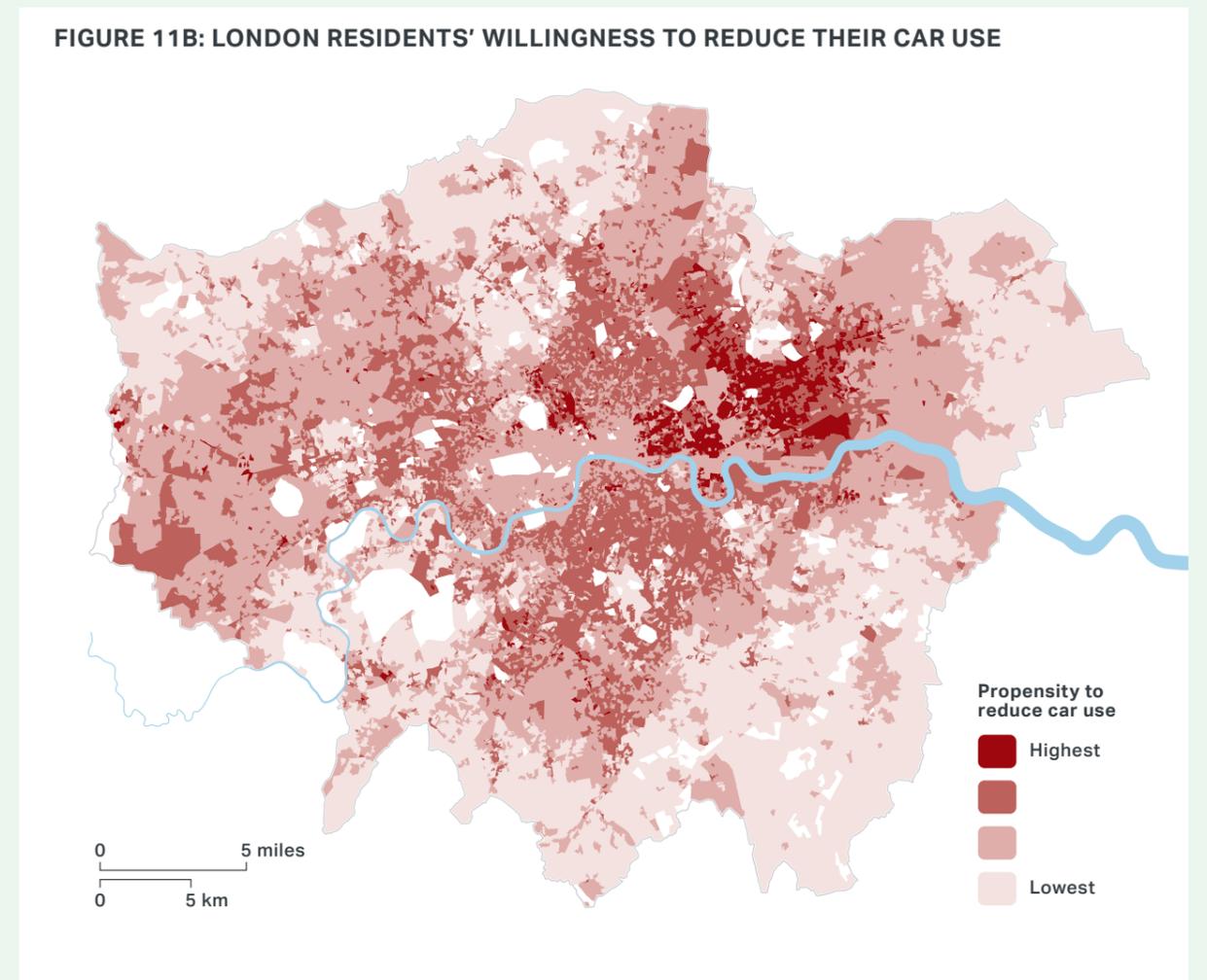


TfL's analysis<sup>16</sup> suggests that three quarters of journeys currently made by car could reasonably be made on foot, by bicycle or by public transport, and that there is the potential to reduce car use in all areas of London. People making shorter car journeys are most likely to

have an alternative option available to them, with short car trips particularly prevalent in outer London.

The characteristics of the places people live in have a big impact on their inclination to change their habits.

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



People living in more densely populated areas are more likely to change their travel behaviour, so as London's growth increases population density, more and more people could choose to switch from the car to other modes. Research also shows that there are already people

across London who would be willing to use cars less if there were better alternatives available. This means that, to reduce car use, it is necessary to improve conditions for walking, cycling and using public transport.

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

### Borough traffic reduction strategies

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

#### Proposal 22

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

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

#### Proposal 23

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



## FOCUS ON: BOROUGH TRAFFIC REDUCTION STRATEGIES

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

### **Improving the effectiveness, sustainability and reliability of alternatives to the car**

Alternatives to car use should be improved to ensure they are effective, reliable and attractive. This means enhancing walking and cycling environments, integrating green infrastructure to improve the experience of being on London's streets, improving on-street wayfinding and providing more secure cycle parking. New and improved bus priority measures could be considered to improve the reliability and experience of using

local buses. Renewed approaches to workplace and school travel planning can also encourage people to make different choices about how they travel. Establishing micro-distribution centres will enable deliveries to be made by foot or 'cargo cycle'.

### **Discouraging unnecessary journeys by car and freight**

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

### **Road space reallocation and enabling car-free lifestyles**

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



### c) Improving air quality and the environment

#### Reducing harmful air pollution from road transport

Air pollution caused by carcinogenic diesel emissions, high levels of nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM) exacerbate health conditions and shorten the lives of Londoners. The communities suffering the most from poor air quality are often the most vulnerable in society. London's transport network needs to contribute to the meeting of legal air quality levels as soon as possible and the achievement of a zero carbon city by 2050, thereby protecting the health of Londoners and demonstrating a commitment to tackling climate change.

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

Road traffic is often the greatest contributor to poor air quality in places where people live and work. Diesel is the most significant source of nitrogen oxides (NO<sub>x</sub>) emissions, which contribute to illegal levels of NO<sub>2</sub>. The reason for

this is partly because of the under-performance of some diesel vehicle emission standards over time, with significant discrepancies between official emission measurements and real-world vehicle performance in urban environments.

London does not meet legal NO<sub>2</sub> limits (see Figure 12), and the Mayor is committed to taking urgent action.

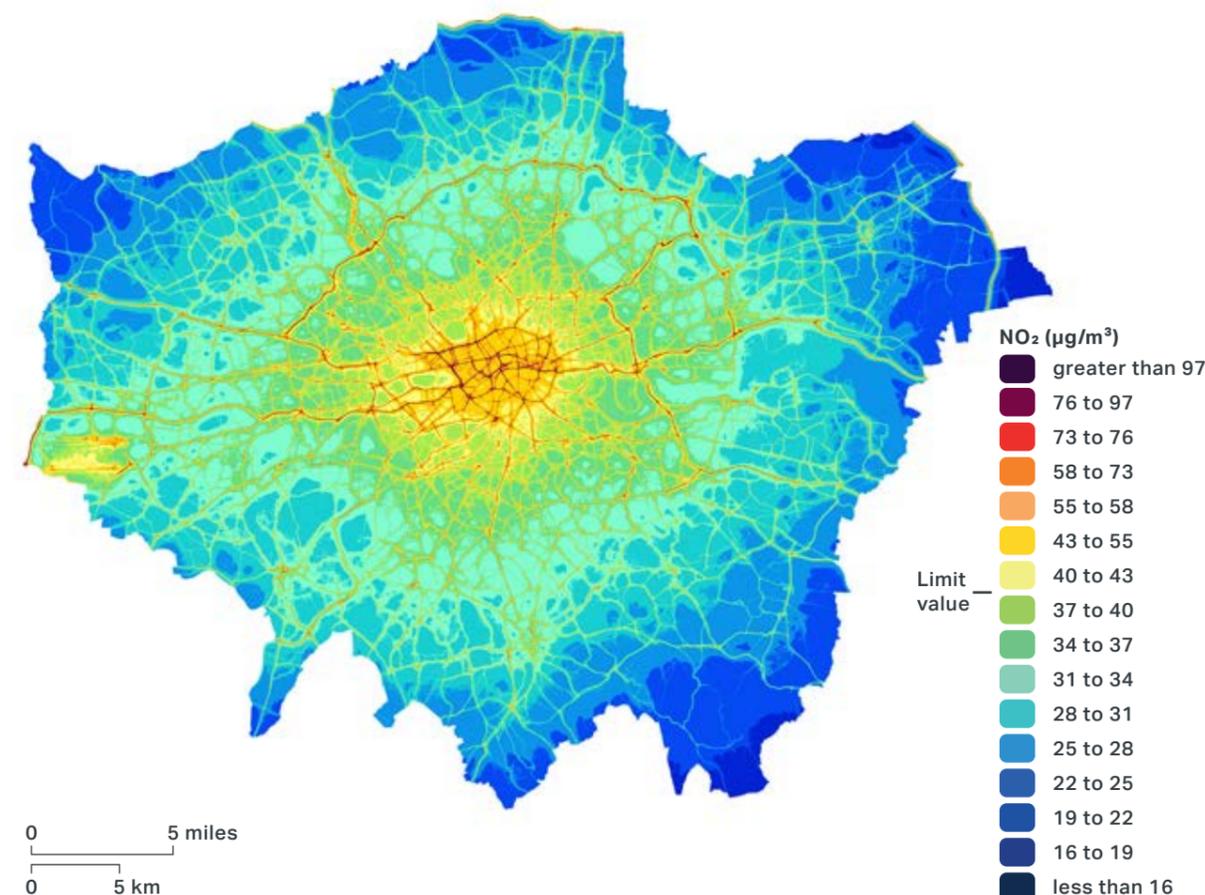
#### Policy 6

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

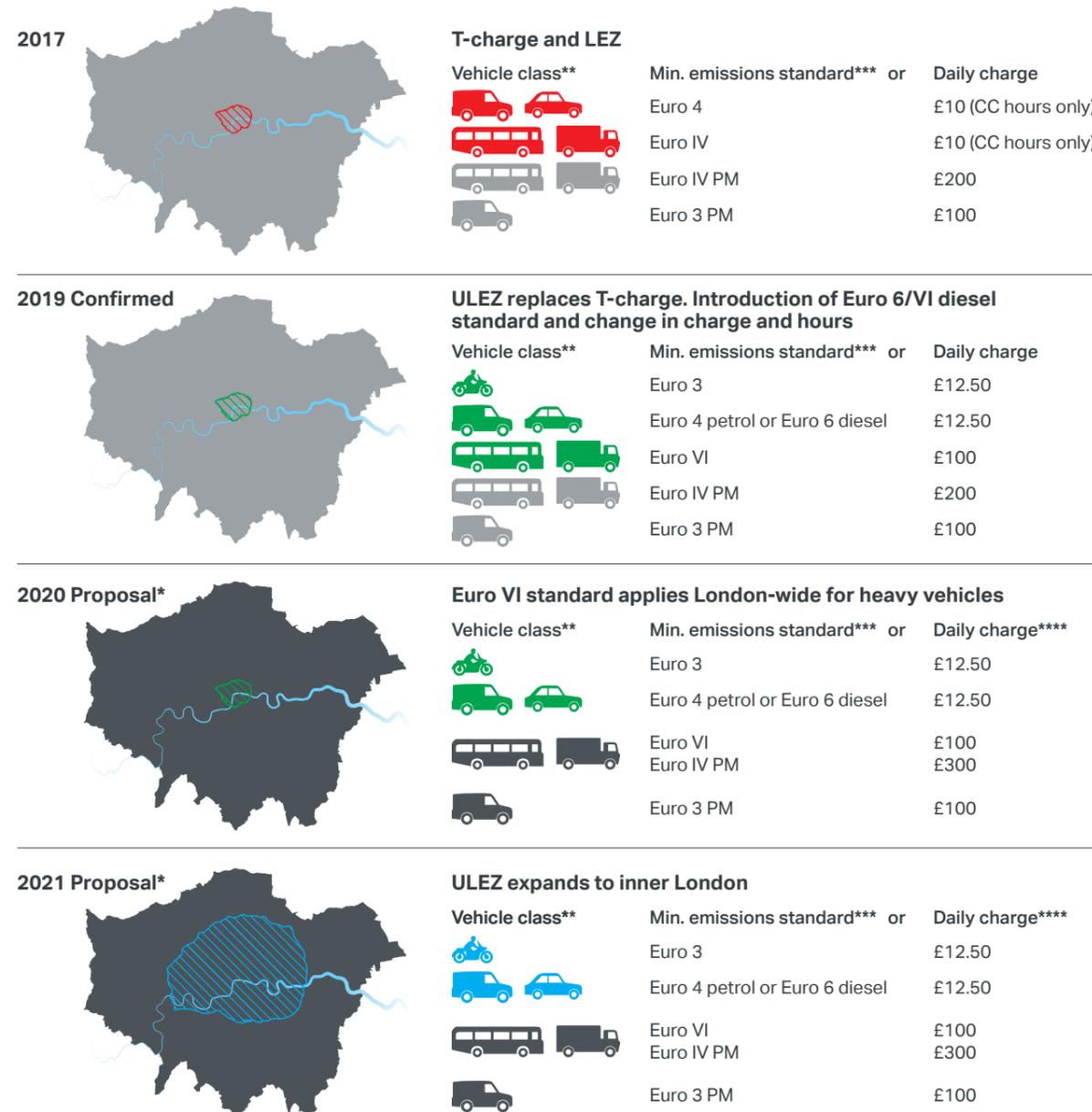
The introduction of real-world testing for cars and vans into the Euro 6 European vehicle-type approval process should mean that new vehicles are far less polluting than previous models. Real-world testing has already proved this

to be effective for lorries, buses and coaches. The introduction of measures that accelerate the switch to these new, cleaner vehicles is long overdue but will have a beneficial effect on air quality in London.

FIGURE 12: NO<sub>2</sub> LEVELS ACROSS LONDON, 2013



**FIGURE 13: ULEZ PROPOSALS**



Note: In hatched areas, standards indicated by both colours apply  
 \*These Proposals are subject to consultation and may change  
 \*\*Vehicle class is indicative only, additional vehicles are affected  
 \*\*\*Minimum emissions standards are for NO<sub>x</sub> and PM unless otherwise stated  
 \*\*\*\*Daily charges are indicative only and are subject to change

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

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

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

**Proposal 25**  
 The Mayor, through TfL, will ensure all TfL buses meet the Euro VI diesel standards for NO<sub>x</sub> and particulate matter by 2020 by accelerating the switch to new vehicles, installing proven retrofit technology and creating priority Low Emission Bus Zones.

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

#### Proposal 26

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

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

#### Proposal 27

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

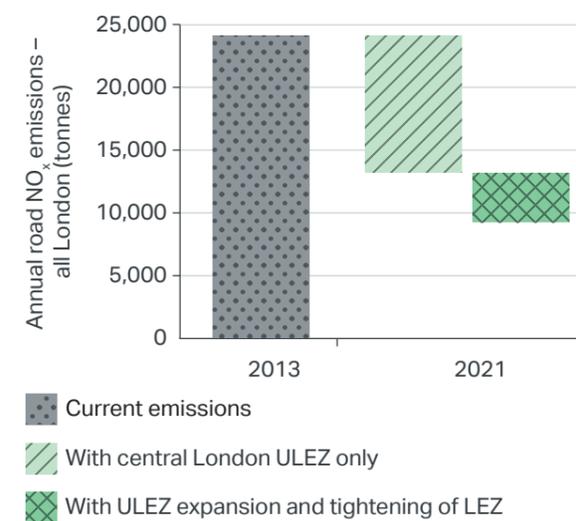
Achieving legal compliance with air quality limits cannot be achieved by the Mayor alone. The Government has a unique and crucial role to play in facilitating, supporting and taking action. The London Environment Strategy will set out the comprehensive plan that needs to be taken to achieve legal compliance as quickly as possible, but it is essential that Government now aligns

fiscal policy with policies such as ULEZ, now being taken by London and other cities, and plays its part in taking the most polluting vehicles off the road.

#### Proposal 28

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

FIGURE 14: REDUCTIONS IN ROAD NO<sub>x</sub> EMISSIONS, 2013-2021



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

### Achieving a zero carbon city and good air quality

Carbon dioxide (CO<sub>2</sub>) emissions from transport are unlikely to decrease quickly enough to support the Mayor's ambition for a zero carbon city by 2050 without significant action. Likewise, although London currently meets legal limits for PM less than 2.5 microns in diameter (PM<sub>2.5</sub>), London is still well above the level of 10µg/m<sup>3</sup> for PM<sub>2.5</sub> recommended by leading health experts. The Mayor has committed to achieving this by 2030. However, without further action, London is projected to exceed these guidelines until well after 2030.

#### Policy 7

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

The Government's approach of incentivising the use of diesel vehicles to achieve CO<sub>2</sub> savings has meant that local air quality has suffered. Rather than simply seeking to reverse this 'dieselisation', air quality and climate change must be considered together. This means a clear direction towards ultra low emission vehicles (ULEVs) to avert the adverse impacts of a rush back to petrol. ULEVs include battery electric vehicles, plug-in hybrid vehicles, range-extended electric vehicles and hydrogen fuel cell electric vehicles. For heavier vehicles, alternative fuels that demonstrate clear reductions in air pollutant and CO<sub>2</sub> emissions will be considered as a bridging technology on the path to zero emission by 2050.

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



FIGURE 15: ZERO EMISSION ROAD TRANSPORT TIMELINE

		NOW	2020	2025	2030	2035	2040	2045	2050	
London action	Demonstrating technologies	Zero emission capable taxis	Town centre Zero Emission Zones							
		Electric single-deck buses; bus charging infrastructure								
		Supporting low emission freight								
	Changing purchasing patterns	Deliver a major expansion in electric vehicle charging points		Further investment in charging and refuelling infrastructure				All newly registered heavy vehicles driven in London zero emission		
		At least 15 hydrogen fuelling stations installed in and around London				All newly registered cars and LGVs driven in London zero emission				
		All new taxis zero emission capable	All new private hire vehicles zero emission capable							
		All new buses will be hybrid, electric or hydrogen	Pan-London approach to parking charges for zero emission vehicles							
	Fleetwide adoption and managing congestion	Keep Congestion Charge under review and support borough measures		Develop a new, more sophisticated way of paying for road use, integrating existing and proposed emissions-based and congestion charging schemes						London-wide Zero Emission Zone
		Emission Surcharge/Central London Ultra Low Emission Zone		Expanded Ultra Low Emission Zone	Central London Zero Emission Zone	All buses zero emission or hybrid	Wider Zero Emission Zone			Zero emission road transport
				Tighten Low Emission Zone emission standards for heavy vehicles		All taxis and PHVs zero emission capable	All buses zero emission			
				All public sector car fleets zero emission capable						
National action		Increase use of renewable electricity generation for the National Grid until it results in net zero carbon emissions								
		Plug-in vehicle grants	Taxation encourages ultra low emission vehicles over conventional vehicles				Taxation discouraging ownership of non-zero emission vehicles			
		Funding low emission vehicle research – especially heavy vehicles		Financial incentives for businesses/manufacturers						
		Vehicle tax exemption for zero emission	National diesel scrappage scheme							

Key:	Taxis/PHV	Buses	Fleets	Congestion reduction	Infrastructure	Emissions Charging Zones	Taxation	Aim
------	-----------	-------	--------	----------------------	----------------	--------------------------	----------	-----

**Zero emission public transport**

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

**Proposal 29**

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

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

**Proposal 30**

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

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

**Proposal 31**

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

FIGURE 16: CLEANING THE BUS FLEET

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

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

### Proposal 32

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

### Zero emission private and commercial vehicles

The Mayor will help ensure ULEVs are the best choice for those needing to use a car or a van, to put London on a path to zero emission by 2050. The aim is for all new cars and vans in London to be zero emission by 2030 at the latest. Freight activity in London also

contributes towards poor air quality and carbon emissions. Through the LoCITY programme, TfL will continue to work with the freight industry to help overcome the barriers to adopting cleaner vans and heavy goods vehicles.

### Proposal 33

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

To succeed in making the transition to zero emission, the charging infrastructure will need to change significantly. This includes meeting the need for rapid charging to support ZEC taxis, PHVs and commercial vehicles, and working with boroughs to provide on-street residential charging. TfL will work to understand the long-term need for residential charging, alongside the potential requirement for alternative fuels for heavy vehicles as a bridging technology. Bringing in ULEVs will require a significant change to London's energy systems to ensure the supporting supply infrastructure is in place, while maximising CO<sub>2</sub> benefits. This will be delivered through the London Environment Strategy.



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

#### Proposal 34

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

As well as incentives and supporting infrastructure to encourage a move to ULEVs, it will also be necessary to use disincentives to phase out fossil fuel vehicles altogether. In addition to the introduction and expansion of ULEZ, tightening emission standards by implementing a network of zero emission zones would help reduce total CO<sub>2</sub>, NO<sub>x</sub> and PM emissions and would send a clear signal that the city is moving towards a fossil fuel-free future. A zero emission zone is likely to require vehicles that drive within it that are not capable of operating with zero exhaust emissions to pay road user charges (similar to those in ULEZ or LEZ). Other vehicle prohibitions and/or restrictions may also apply.

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

#### Proposal 35

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

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

#### Proposal 36

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

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

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

### Rail emissions

Rail electrification will reduce CO<sub>2</sub> emissions; by 2050, all rail lines in London should be electrified and all trains hauled by zero emission motive-power within London. Further measures to improve the energy efficiency of rail transport include new energy-efficient trains on the Elizabeth line from 2017, saving up to 30 per cent more energy through an on-train management system and regenerative braking. TfL will ensure that new Tube trains rolled out from the mid-2020s on the Piccadilly, Waterloo & City, Bakerloo and Central lines will be energy efficient, allowing a faster, more frequent service on the lines, with as little as possible additional energy required.

#### Proposal 37

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

### Infrastructure emissions

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

#### Proposal 38

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

- a) Continuing to monitor, report and reduce operational CO<sub>2</sub> and other air pollutant emissions from all of TfL's assets and infrastructure, including stations, buildings and street lighting.
- b) Seeking to work with stakeholders such as Network Rail to undertake measures to ensure that CO<sub>2</sub> and other air pollutant emissions from the construction and operation of transport infrastructure are minimised.

### River vessel emissions

Air pollutant and CO<sub>2</sub> emissions from river vessels represent a small but significant contribution to the London total. Emissions need to be carefully managed, particularly in light of the PLA ambition to increase the number of river users to 20 million a year by 2035. The Mayor will work with stakeholders to improve the energy efficiency of the river fleet and will lead by example by delivering new hybrid vessels for the Woolwich Ferry. New powers are required from Government to effectively control emissions from river vessels, and the Mayor will continue to lobby the Government for these powers.

#### Proposal 39

The Mayor, through TfL, will work with the Port of London Authority to publish an emissions strategy for the River Thames to reduce air pollutant and CO<sub>2</sub> emissions from all river vessels and urges Government to introduce new legislation to ensure that emissions from vessels can be effectively reduced.

### Low-carbon energy generation

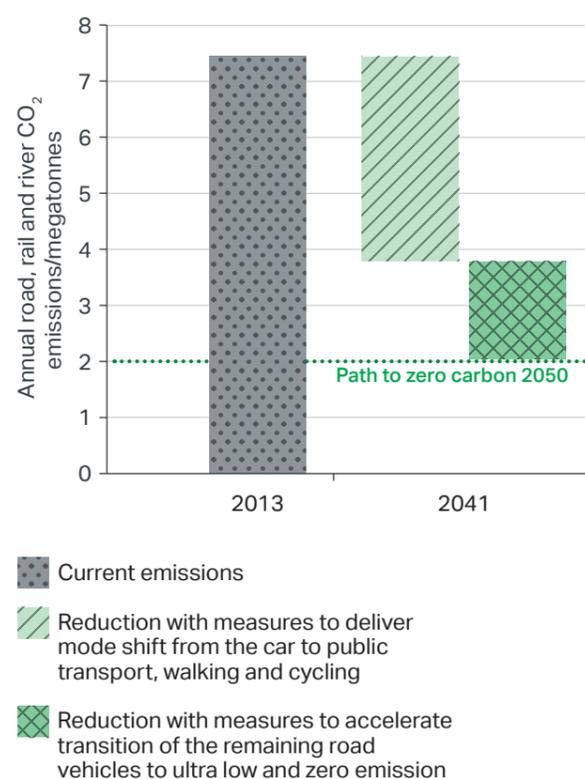
A significant opportunity to increase London's supplies of low-carbon energy can be found in transport infrastructure and land. A programme of solar generation over the next five years will greatly increase the level of solar power in TfL's buildings, and TfL's purchasing power will be used to further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

#### Proposal 40

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

Measures set out in the strategy will reduce CO<sub>2</sub> emissions from road, rail and river in London by 72 per cent by 2041 (in comparison to 2013, as shown in Figure 17), and set London's transport emissions on a clear trajectory to reach the Mayor's ambition of a zero carbon London by 2050.

**FIGURE 17: REDUCTION IN ROAD, RAIL AND RIVER CO<sub>2</sub> EMISSIONS, 2013-2041**



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

It is important to reduce emissions from diggers and other machinery (known as Non-Road Mobile Machinery (NRMM)) on construction sites, which in 2013 were responsible for about 7 per cent of NO<sub>x</sub> emissions and 8 per cent of PM<sub>10</sub> emissions in London<sup>17</sup>. NRMM planning policies apply in two zones: a Greater London zone, and a central zone comprising the Central Activities Zone (CAZ) and North Isle of Dogs. The central zone has a tighter emissions standard applied to it. However, the NRMM Low Emission Zone is based on planning powers that are not effective in controlling NRMM emissions. New powers are required from Government.

### Proposal 41

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

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

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

### Proposal 42

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

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

## FOCUS ON: NATURAL AND BUILT ENVIRONMENT AND CLIMATE CHANGE RESILIENCE

### Natural and built environment

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

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

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

### Policy 8

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

- a) Ensuring that transport schemes protect existing green infrastructure where possible, or – if there is a loss – providing new green infrastructure in order to deliver a net gain in biodiversity.
- b) Seeking additional opportunities to build new green infrastructure into the existing transport estate.
- c) Monitoring and protecting designated spaces on transport land, such as Sites of Importance for Nature Conservation.
- d) Maximising opportunities to protect, promote and enhance London's built heritage and sites of cultural importance that are affected by transport development.

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

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

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

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

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

### Proposal 43

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

The equivalent of two-and-a-half Hyde Parks of green garden land in London has been paved over annually in recent years<sup>18</sup>. This additional impermeable

surface area has resulted in an increase in surface water flooding. To deliver the recommendations set out by the London Sustainable Drainage Action Plan, transport projects should incorporate Sustainable Drainage Systems (SuDS) such as green roofs, rain gardens or swales to help reduce surface water flood risk.

### Proposal 44

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

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

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

### Proposal 45

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

<sup>18</sup> London: garden city?, London Wildlife Trust, 2010



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

### Climate change resilience

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

### Policy 9

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

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

### Proposal 46

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

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

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

### Proposal 47

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

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

## FOCUS ON: TRANSPORT NOISE AND VIBRATION

The World Health Organization has identified noise as the second greatest environmental cause of health problems after poor air quality<sup>19</sup>. Consistently elevated sound levels can cause hearing impairment, hypertension,

ischemic heart disease, stress and sleep disturbance. Road transport is a significant source of noise and vibration in London, and one of the ten Healthy Streets Indicators is that streets are 'not too noisy'.

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

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

### Proposal 48

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

- a) Reducing traffic volumes by encouraging mode shift from travelling by car to walking, cycling and using public transport.
- b) Minimising the noise impacts of vehicular traffic on streets by encouraging the use of quieter vehicles, reducing vehicle speeds and discouraging poor driver behaviours such as rapid acceleration and braking.
- c) Ensuring high levels of carriageway maintenance, installing low-noise road surfacing, and minimising the noise impacts from road and street works.

- d) Monitoring noise levels close to major road corridors to measure the adverse impacts of road transport on affected communities.
- e) Seeking to reduce the noise impacts of servicing and deliveries through appropriate design and management of delivery areas, promoting responsible behaviours, adopting best practice and encouraging the use of quieter vehicles and equipment.
- f) Working with the Department for Transport to investigate ways of reducing noise from the loudest vehicles such as some types of motorcycle and supercars.

### Proposal 49

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

- a) Addressing noise issues as part of all planned railway works and taking steps to minimise their impact on neighbours.
- b) Specifying and procuring quieter trains.
- c) Ensuring new rail infrastructure incorporates technology that is effective in reducing noise and vibration, such as shock-absorbent track fastenings.

- d) Investigating complaints of noise and vibration disturbance from railway construction and/or operations and endeavouring to eliminate the disturbance at source or otherwise mitigate its adverse effects.
- e) Maintaining open communication with residents before and during construction works, where levels of noise may be above what is normally expected and/or heard at unusual times.
- f) Continuing to reduce the impact of night services by reducing noise and vibration at their source and taking a robust approach to responding to complaints.

<sup>19</sup> Burden of disease from environmental noise, World Health Organization, 2011