Bus priority design guidance

2025

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Contents

Introduction

These guidelines offer advice and best-practice approaches to the development of bus priority and integrated schemes

Putting buses first for a greener, healthier London

Buses play a critical role in ensuring a green, healthy and inclusive future for London, where more trips are made by public transport, walking and cycling, and fewer by private car

Buses are the most commonly used form of public transport in London. Our Bus action plan (2022) sets out an ambitious vision for London's bus network and a range of actions required to make bus travel a more attractive option, including actions to reduce bus journey times.

On-street interventions that give buses priority over general traffic are an effective way to achieve quick and reliable bus journey times. Our Bus action plan commits us to delivering more bus priority schemes and providing best-practice design guidance to support scheme developers and promoters.

Well-designed bus priority schemes can significantly improve bus journey times and reliability. Schemes such as bus and cycle-only streets and bus lanes also provide benefits to other road users and the environment more widely.

This guidance offers an integrated approach to developing bus priority schemes in London. It considers the needs of people walking, wheeling and cycling when designing for buses, in line with the Mayor's ambition for Vision Zero and the Healthy Streets approach.

Giving buses priority improves bus journey times and reliability

Bus lanes are just one of the design solutions for giving buses priority

About this guidance

We aim to improve the quality and consistency of bus priority schemes across London

This guidance is for use by anyone involved in the planning, design and implementation of bus priority schemes in London, including officers across TfL and the London boroughs.

It sets out best-practice principles for scheme development and design, and outlines various bus priority solutions and their suitability in different contexts.

Design guidance, best-practice principles and operational considerations are included to help ensure efficient and reliable bus operations are built into the design of new and re-configured streets.

The guidance supplements existing standards, requirements and guidelines, such as the Department for Transport Traffic Signs Manual.

A number of associated TfL and national guidance documents also relate to the design of bus priority and healthy streets in London. These are referred to throughout the Design toolkit, and, where relevant, we highlight where more information on a topic can be found.

The guidance begins with the case for prioritising buses over general, private motor traffic on London's roads. This is followed by best-practice approaches to the early development of bus priority and integrated schemes, before outlining the various tools and design solutions that can be used to improve bus journey times and reliability.

Throughout the guidance, we direct users to the relevant teams within TfL that should or could be consulted with on the planning and design of bus priority interventions. For contact details, please speak to the TfL sponsor who oversees the borough or boroughs in scope.

For more information, contact busprioritydesign@tfl.gov.uk

Why give buses priority?

A shift from car use to more space-efficient methods of travel offers the only long-term solution to the congestion challenges that threaten London

Buses are important across the whole of London in delivering healthy streets. They are London's most heavily used and most affordable, accessible and available form of public transport, playing a central role in allowing people to travel easily and independently, irrespective of age, income or disability.

Improving the quality of bus services will help to reduce health inequalities, enable more active travel, reduce the sources of road danger and improve air quality through reduced private motor vehicle use.

However, bus journey times can be unpredictable and ridership levels have been falling in recent years. Being stuck on a bus in traffic, not knowing how long it will take to get to your destination, is frustrating and has been an increasingly common experience across London. Bus services must be properly prioritised on London's streets to make bus journeys quicker and more reliable.

Mayor's Transport Strategy

The central aim of the Mayor's Transport Strategy (2018) is for 80 per cent of trips in London to be made by active, efficient or sustainable forms of transport. Achieving this requires fundamentally changing the way people choose to move around our city.

Cars take up a lot of space relative to the number of people they can transport, and reliance on this space-inefficient mode of transport has made London's streets highly congested. This has huge impacts on Londoners – causing pollution, making streets dangerous, creating unpleasant places to walk, cycle and spend time, and delaying public transport journeys. High streets, town centres and communities are often dominated by traffic, making them noisy and polluted, and affecting residents' quality of life.

London is a growing city, with a potential for 1.3 million new jobs and more than one million new homes by 2041. This growth is expected to generate about six million additional trips each day, which could worsen air quality, increase road danger and make London's streets and public places ever-more dominated by motor traffic.

Buses are the most frequently used, accessible mode of public transport

Buses have the greatest reach of any public transport option. They easily cater to new demand, provide reliable and comfortable feeder services to rail stations and allow for car-free or car-lite developments. It is critical that buses are given priority through London's streets to enable them to facilitate the city's sustainable growth.

Net zero carbon

The UK has a target to bring all greenhouse gas emissions to net zero by 2050. The Mayor's Transport Strategy reflects this, but, in response to the climate emergency, in 2020 the Mayor brought forward his ambition for London to become a net zero carbon city from 2050 to 2030. Enabling more people to use more sustainable modes of transport will be central to reducing the carbon footprint of travel in London, and buses have an important role in providing a green alternative to private motor vehicle use.

6 million

additional car trips expected by 2041[1]

61%

of road and rail carbon dioxide emissions are caused by cars[2]

1 Mayor's Transport Strategy 2018

2 Bus action plan

Bus action plan

Our Bus action plan outlines our vision for buses in London as a zero-carbon travel option that more Londoners will choose to use as part of a comprehensive, efficient and sustainable transport network.

The plan sets out actions across five priority areas, set out in the table below.

Bus action plan priority areas

Priority	Aim for 2030
Decarbonisation and climate change resilience	A green bus network with a zero-emission fleet, achieved with support of additional Government funding and support from manufacturers and operators
Inclusive customer experience	A modern bus network that is relevant to Londoners and makes it easy for people to travel spontaneously and independently
Safety and security	A safe and secure bus network, achieved through our Bus Safety Standard, with no-one killed on or by a bus by 2030 and fewer people saying they are put off travelling due to safety concerns
Journey times	A faster and more efficient bus network, with journey times improved by 10 per cent compared to 2015
Connectivity	A bus network that provides better connectivity for longer trips, particularly in outer London, while maintaining our network coverage of more than 96 per cent of Londoners living within 400 metres distance of a bus stop

Source: Bus Action Plan (2022), Transport for London

The actions needed to realise our vision for buses in London would bring a wide range of benefits, including:

- Helping to tackle the climate emergency declared by the Mayor of London and 30 London boroughs, by cleaning up tailpipe emissions from London buses and reducing reliance on private motor vehicle use
- Supporting diverse travel needs across London to enable more people to make trips on our public transport network, either standalone bus trips or to access Tube and rail stations
- Enabling more walking and cycling, creating more pleasant, safe and liveable streets with cleaner air and less congestion, which in turn helps support communities and local economies
- Enabling London's sustainable growth and development by facilitating a significant increase in bus trips in areas with existing high bus demand, as well as supporting new trips emerging in locations where we need more mode shift from the car, particularly in outer London

Tackling
tailpipe emissions from London buses

Supporting
diverse travel needs across London

Enabling
more walking and cycling

Facilitating
London's sustainable growth and development

Integrated planning

This section outlines best practice in planning for buses as part of a multi-modal, integrated approach, considering the varying functions, character and performance of London's streets

Taking a holistic approach

The principles for designing in an integrated way where there are competing pressures for road space

The challenge

London is characterised by the organic development of its streets over time. As a result, space in its streets is often constrained. The rise in private vehicle trips over past decades has created high levels of congestion, air pollution and road danger. Our [Travel in London statistics] show that almost three-quarters of trips made by London residents are under three miles.

Streets filled with private motor vehicles (both parked and moving) have a detrimental impact on bus services. To reduce reliance on private motor vehicles, we need to ensure that buses provide a viable alternative to driving, and central to this is improving bus journey times and reliability. We need a well-planned network that ensures buses are prioritised, while also ensuring our streets enable more walking and cycling.

A range of bus priority measures can be used, depending on the nature of the road and space available. However, there are also circumstances where bus priority measures may not be possible, such as when space is restricted, or the strategic function of the road prevents intervention. In all cases, it is critical to consider how traffic reduction measures, including changes to kerbside activity, could cut congestion and improve bus journey times and reliability.

Evidence-led and integrated planning

We have developed an integrated suite of map-based analyses for London's street network. The analyses are designed to ensure that potential opportunities and demands for active, sustainable and space-efficient modes of transport are considered holistically, and that competing demands between modes are properly assessed and worked through.

The analyses set out below can be used alongside local factors and knowledge to help identify and plan investment priorities.

Strategic bus analysis

This supports the planning and prioritisation of bus priority schemes in London. It includes two layers: bus performance and bus network classifications.

The bus performance layer highlights sections of borough roads and the TfL Road Network that are performing poorly for buses in terms of average speeds and journey time reliability, and which would benefit from new or enhanced bus priority infrastructure.

The bus network classifications categorise sections of road that make up the bus network into core, strategic, connector and local to provide insight into their relative importance within the network.

The classifications suggest that, in order to benefit the highest number of passengers, we and the boroughs should seek to improve bus performance and maintain or enhance bus priority infrastructure on the core and strategic bus network. The connector and, specifically, the local network may provide the only public transport link for connecting people to a station or town centre, making them critical to supporting sustainable travel. Therefore proper consideration should be given to these links as well.

Road safety priorities

This identifies where casualty harm is higher than the network average and where interventions should have the biggest impact in reducing road risk. Addressing dangerous locations and promoting safety are integral to the design of any street scheme in London. This analysis should be considered in the development of all bus priority schemes.

Strategic walking analysis

This highlights opportunities to address barriers to walking in the street environment and can be used as a supplementary tool when developing bus schemes. It provides insight into where people may experience difficulty in accessing bus stops on foot.

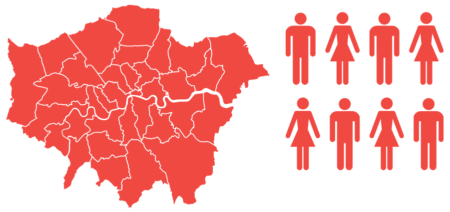
Strategic cycling analysis

This identifies a network of future connections where high-quality, signed cycle routes would have the greatest impact on the growth of cycling. This is an important tool to consider in the early development of bus schemes as it highlights where there may be competing pressures for road space and can determine the approach to further scheme development.

The suite of analyses should be used to determine where a scheme is needed and the types of interventions that may be necessary to address the challenges of the area. Each should be explored alongside other analyses to understand the full picture, not only of the scheme location, but of the surrounding area. The analyses, additional available data and local knowledge can help to build a detailed understanding of the area.

8.9 million

people live in London[3]



3 [London Datastore]

Context-based design

Not every bus priority intervention outlined in this guidance will be relevant for every location. Understanding the vision, challenges, context and user needs will provide insight into which bus priority intervention or tool to choose.

For example, a bus- and cycle-only street is likely to be more appropriate on an existing high street with high footfall and levels of cycling, where there is an ambition to increase walking and cycling, or where there is a vision to create a pleasant environment for shopping or eating out. On the other hand, a bus lane is likely to be more appropriate on a high-movement road with more limited street activity.

As indicated above, design solutions should not rely solely on what is there now. Bus priority interventions can shape the nature of a place. Aspirations for the scheme and wider area should be considered, including how bus priority measures may be used to transform urban environments from being car dominated to places where walking, cycling and bus use are attractive options.

Design solutions should not rely solely on what is there now. Bus priority interventions can shape the nature of a place

Below are some examples of bus priority tools that can be used to achieve broader Healthy Streets outcomes.

Bus- and cycle-only roads

These can be created through a series of bus gates and side-road closures or filters, helping to create high-quality public spaces. By providing more convenient access for bus passengers and other permitted modes, these interventions can help reduce demand for private motor vehicles and can increase the appeal of the street, make it a more attractive location for businesses and in turn increase economic activity.

Bus gates

These can also be used to remove through-traffic from residential areas. By closing off routes for through-traffic, this sort of scheme can have an area-wide impact, creating safer environments for people walking and cycling.

Preferential routing

This enables the distance by bus to be shorter than the equivalent journey by car, and can be an effective way of reducing demand for private vehicles for short-distance trips. Preferential routing can be achieved through various bus priority approaches and in a variety of street environments.

See the Design toolkit for more information on the contexts that different bus priority interventions typically work well in. This section also sets out requirements for working with our Network Performance team to ensure that wider network implications and any required mitigations are properly assessed, where appropriate.

Bus gates help to create a more pleasant environment

Early scheme development and multi-outcome planning

For any corridor scheme with multiple pressures on the available road space, we recommend a staged approach to scheme development (pre-scheme inception) with outcomes and preferred design approaches (types of intervention) collectively agreed from the outset. This ensures location-specific challenges are adequately considered before progressing a scheme. Undertaking pre-inception work is critical to timely and better-informed decision-making and avoids costly scheme redesigns.

Stages of pre-inception work

01 Review strategic and local policies and priorities including TfL's suite of streets analyses (see page 9)

02 Develop a corridor plan to understand users, current performance, challenges and opportunities, supported by an initial site visit if possible. This analysis should drive proposed project outcomes to flow through the project lifecycle.

03 Speak to TfL sponsors for advice on the extent to which TfL needs to be involved in the agreement of scheme outcomes. Our Network Performance team can provide insight on potential scheme assessment requirements.

04 Agree outcomes with core stakeholders to secure early buy-in and prevent costly design reworking later. This process should also identify local issues and potential opportunities for interventions.

05 Undertake site visits to further identify and confirm on-street challenges and opportunities. Ideally visits to should include TfL and representatives of key stakeholder organisations to ensure site-specific issues are understood by all parties and the scheme outcomes are determined collectively.

06 Develop a long-list of potential design interventions across all scales of change. From this, use a qualitative matrix to identify short-list options to explore in first-stage design.

07 Consider permanent or trial interventions to enhance or transform the wider area, looking at the wider road network and opportunities. Consider more transformational solutions. This is particularly valuable in car-dominated environments and areas with competing priorities.

08 Explore different design interventions to achieve the desired outcomes and examine where trade-offs may be required. There may be a need to review, discuss and provide design options for the wider area.

09 Hold design review workshops where stakeholders can have an input and critique potential solutions. This can strengthen design quality and produce new ideas.

10 Identify near-term opportunities for delivery within 1-2 years, and medium to longer-term opportunities that may require highway modelling and/or public realm design work.

11 Continue to refine designs and use the full range of assessment tools, including highway modelling if necessary, to identify the single preferred scheme design. Subsequent design stages will allow for further refinement towards build.

Design toolkit

This section provides technical guidance on a range of bus priority interventions, including on-street measures, bus routing, and bus stops and stands

Designing for bus priority

London's wide range of street types means one size does not fit all

The layout of the highway and the activities occurring on it are fundamental to how the bus network operates. London's wide range of street types means that no single solution can be applied, and planners and designers should consider the most appropriate interventions in each context.

This section sets out considerations and requirements for the successful implementation of measures to improve bus journey times and reliability in London. It aims to guide users in thinking about what is possible, signposts relevant guidance and highlights some key design interventions which could facilitate bus operation.

Local Transport Note 1/24 provides national recommended guidance for supporting and prioritising buses and their passengers within an integrated road network. It emphasises that local authorities are responsible for setting design standards for their roads. The following pages offer an overview of how national guidance can be applied in a London context.

Bus lanes are the most visible form of bus priority

Design layout guidance

National legislation and design guidance for bus priority and healthy streets is set out in the following documents:

- Traffic Signs Regulations and General Directions (TSRGD) 2016
- Department for Transport Traffic Signs Manual
- Department for Transport Local Transport Note 1/24: Bus user priority
- Department for Transport Local Transport Note 1/20: Cycle infrastructure design
- Department for Transport Traffic Advisory Leaflet 1/24: Motorcyclists using bus lanes

TfL specific advice is set out in:

- Accessible bus stop design guidance
- Streetscape guidance
- Kerbside loading guidance
- Guidance note on pedestrian crossings at bus stop bypasses
- London cycle design standards
- New cycle route quality criteria

Bus priority interventions along links

Bus lanes

Bus lanes are the most visible form of bus priority. They can be used in most street environments and on a wide range of road types. They dedicate a lane of the carriageway for buses (and other permitted users) during specific times of operation. This can benefit bus users by reducing delays and maintaining reliable journey times. The most common type of bus lane is the nearside, with-flow bus lane.

Operational hours

The operational hours of bus lanes can vary. Historically bus lanes have been introduced on weekdays in the morning and evening peak periods. However, with peak travel periods becoming extended to earlier in the morning and later at night, plus increased traffic flow during school peaks and at weekends, longer operational hours can improve the effectiveness of bus lanes.

In September 2020, we changed the majority of bus lanes on the TfL Road Network to operate 24 hours a day, seven days a week. The change was made as part of a trial to make bus journeys faster and more reliable. The outcome was that bus passenger journey times were reduced on routes where bus lane hours were changed, while no data was found to suggest a link between the trial and negative journey time impact for other traffic. In early 2022 the changes were made permanent.

We recommend that new bus lanes in London should, as a default, be considered for operation 24 hours a day, seven days a week, unless there are clear requirements for alternative arrangements.

We also recommend that the operational hours of existing bus lanes be reviewed to determine if they are still appropriate and if 24/7 operation can be introduced.

This differs from LTN 1/24, which states that hours of operation should be chosen to coincide with peak hours. However, given the number, and important role, of buses in London and the city's traffic conditions, we consider 24/7 operation necessary to support the Mayor's Transport Strategy.

With lighter flows outside peak hours the bus lane should have limited impact on general traffic and, consequently, there should be no requirement to allow general traffic to use the bus lane outside peak periods.

It is not necessary to curtail the operational hours of a bus lane to permit the use of the kerbside for loading or access for Blue Badge holders. Bus lane traffic orders prohibit driving within the bus lane, but any vehicle may still enter it to stop, load or unload where this is not prohibited. However, the preferred approach for London is to restrict all stopping in bus lanes at all times.

While it is recognised that removing all kerbside activity is not always practical, bus lanes should always be kept clear of parked or loading vehicles during periods of peak congestion.

Bus lanes which operate 24/7 are also available for cyclists to use at all times of the day.

Where all bus lanes do not operate 24/7 and there is more than one bus lane along a particular length of road or within the same geographical area, the times of operation should be consistent, where possible, to avoid driver confusion.

Bus lane hours of operation should be discussed with a range of stakeholders, including our Bus Operations and Network Performance teams and local authority traffic managers.

We recommend that new bus lanes in London should be considered for 24 hours a day, seven days a week operation

Permitted users

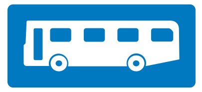
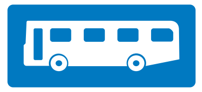
The function of bus lanes is to deliver quick and reliable bus journeys safely and efficiently, but bus lanes can also benefit other users, including emergency service vehicles and cyclists. Allowing additional vehicle types to use the bus lane can provide benefits to Londoners and service providers. However, when deciding what modes should be permitted to use any bus lane the impact on safety and bus performance should always be considered – both on the link and at junctions.

Cyclists should be allowed in with-flow bus lanes unless there are compelling operational or safety concerns. If cyclists are not permitted, DfT authorisation is required for the associated regulatory traffic sign.

The table on the right summarises the vehicles which may be permitted to use nearside with-flow bus lanes on the TfL Road Network and if their access is shown on the sign or included in the Traffic Order.

Where it is proposed to include (and exclude) vehicle types, the reasons should be documented, together with any appropriate evidence.

Vehicles permitted in with-flow bus lanes on the TfL Road Network

Vehicle class	Permitted in nearside with-flow bus lanes – best practice (TLRN)	Comments	Shown on sign or included in Traffic Order
Bus[4]	Yes	None	Symbol on sign 
Local bus[5]	Yes	None	Symbol on sign 
Privately chartered bus or coach service	Yes	Excluded if 'Local' included on sign	Symbol on sign 
Pedal cycle	Yes	Includes electrically assisted pedal cycles, adapted cycles and cargo bikes If not included, DfT authorisation required	Symbol on sign 
E-scooters	No	Privately-owned e-scooters or other powered transporters are not legal to use on public roads	N/A
E-scooters	Yes, as part of trial	When being used as part of designated trial	Permitted by the symbol for cycles
Solo motorcycles	Yes, not by default	At local highway authority's discretion Permitted in most TfL Road Network bus lanes	Symbol on sign 
Licensed taxis (Hackney carriages)	Yes, not by default	At local highway authority's discretion. TfL's general policy is to allow access except where ther are specific safety or bus operational issues[6]. Boroughs are encouraged to consider access on streets for which they are responsible	Text 'Taxi' included on sign
Private hire vehicles (PHVs)	No	At local highway authority's discretion – not part of TfL's current policy	Text 'authorised vehicles' included on sign
Emergency service vehicles – on emergency call	Yes	Permitted by London Local Authorities Act 1996	Traffic Order & London Local Authorities Act 1996
Emergency service vehicles – not on emergency call	Yes	Permitted by London Local Authorities Act 1996. Note: TfL considers liveried patient transport vehicles to be ambulances	Traffic Order & London Local Authorities Act 1996

4 Bus – a motor vehicle constructed or adapted to carry more than eight passengers (not including the driver), i.e. a minimum of 10 people one of which must be the driver

5 Local bus – a public service vehicle used for the provision of a local service not being an excursion or tour

6 Exceptions to the general policy include where there are, in the view of TfL, safety, operational and/ or Mayor's Transport Strategy reasons to limit access. Where an exception arises or is likely to arise, we will table discussion of proposals at regular stakeholder forums unless it is impractical to do so

Protected space for cycling may be provided within bus lanes

Bus lane widths

Where bus lanes have notable cycle flows or are strategic cycle links, the recommended bus lane width is 4.5 metres to enable buses to pass cyclists with sufficient room and allow cyclists to pass buses at stops without entering the general traffic flow. However, it is recognised that achieving this can be challenging in London. Bus lanes of 4.0-4.5 metres can be acceptable, depending on site-specific conditions.

A narrow bus lane of 3.0-3.2 metres may be provided in constrained scenarios although this does not allow buses to overtake cyclists within the lane. The minimum recommended bus lane width is 3.0 metres. As with general traffic lanes, bus lane widths between 3.2 metres and 4.0 metres should not be implemented as they can lead to overtaking behaviour that is detrimental to cyclist safety.

Cycle lanes or protected space for cycling may be provided within, or adjacent to, bus lanes where the overall width available is 4.5 metres or more, for example on London Bridge.

Designers should consider the overall road layout when determining bus lane widths. Narrow bus lanes with narrow adjacent traffic lanes can result in buses unable to progress if larger, or poorly positioned, vehicles in the adjacent traffic lane impinge on the bus lane.

On bends and at junctions the swept path of the bus should be checked to ensure the bus lane is wide enough for the bus to progress without impinging on adjacent traffic lanes, with the potential for conflict or delay. More information on conducting vehicle swept path analysis can be found on page 39.

Signs and lines

The correct signage and road markings should always be used to ensure the lane is enforceable and drivers are aware of bus lane restrictions and hours of operation.

The appropriate signage is prescribed in the Traffic Signs Regulations and General Directions (TSRGD) 2016. Advice on use is given in the Traffic Signs Manual (TSM) Chapter 3, section 9 and LTN 1/24.

Designs should seek to minimise the use of traffic signs to reduce street clutter. Only those signs considered essential to scheme delivery should be proposed as detailed in our Streetscape guidance.

TSRGD diagrams 958 and 959B

On the TfL Road Network where bus lanes operate at all times, we generally add the text 'At all times' to diagrams 958 and 959B. Although this differs from the guidance given in TSM Chapter 3, feedback suggests that this is better understood by road users.

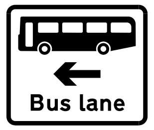
On the TfL Road Network use of the following signs is limited as follows:

TSRGD diagram 964 – End of bus lane

Generally not used
As stated in TSM Chapter 3, the end of a with-flow bus lane will usually be obvious through the termination of the diagram 1049A marking.

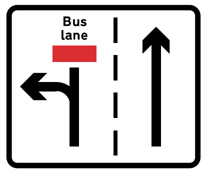
TSRGD diagram 962 – Bus lane(s) on road at junction ahead

Generally not used
This sign may be provided on side roads to warn emerging drivers of the presence of a bus lane on the major road, however in most cases the presence of a continuous line to diagram 1049A, a broken line to diagram 1010 and a sign to diagram 959B should give adequate warning to drivers as they turn onto the major road.

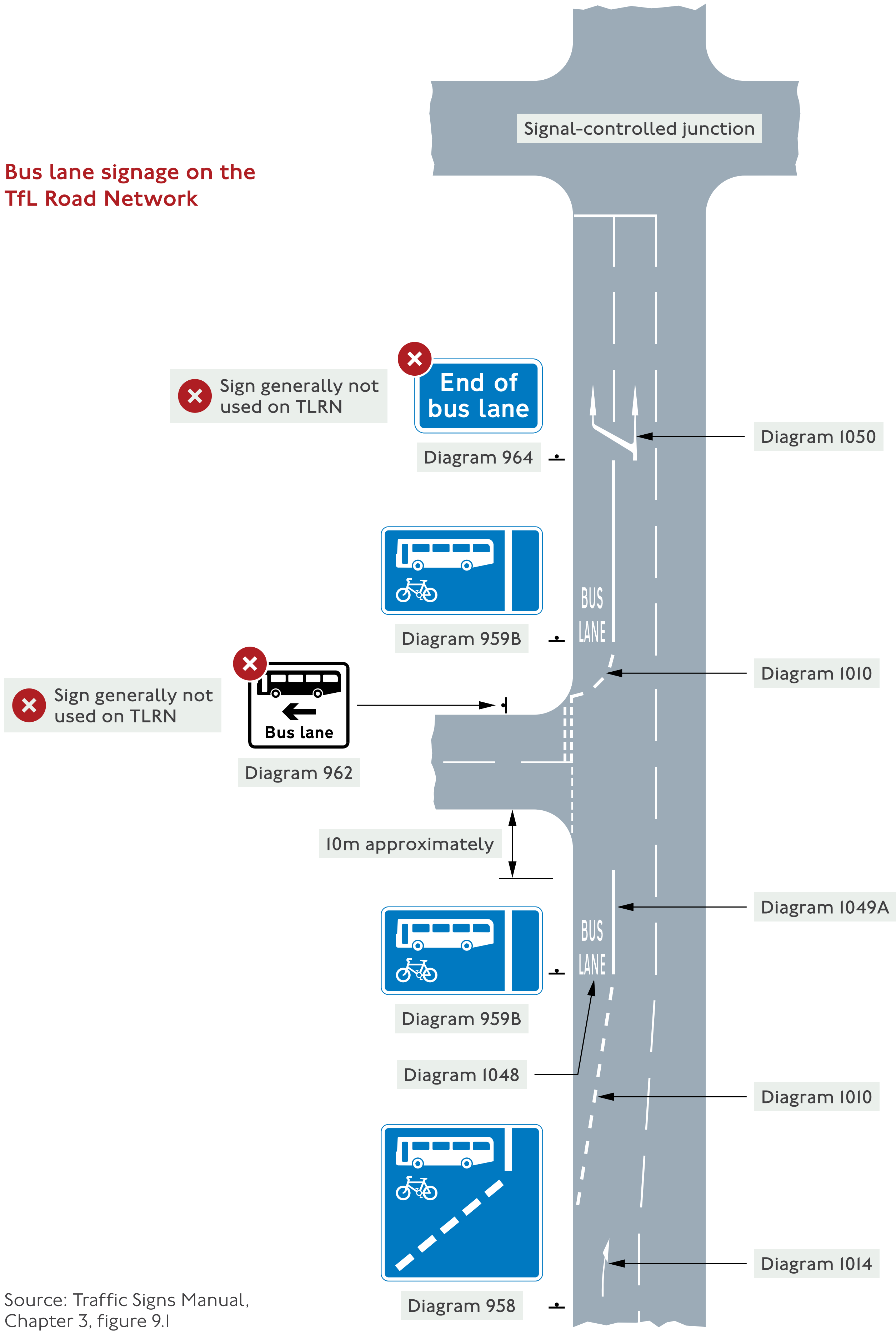


TSRGD diagram 877 – appropriate traffic lane for junction ahead

Use limited
Use of this sign is limited to intermediate junctions within nearside bus lanes where there is a heavy left turn flow and the diagram 1049A is replaced with a broken line to diagram 1010 or where a bus lane is continued to the stop line at a signal-controlled junction with only vehicles using the bus lane and left-turning general traffic permitted to use the nearside lane. It is only used where the downstream continuation of the bus lane is not obvious.



Bus lane signage on the TfL Road Network



Source: Traffic Signs Manual, Chapter 3, figure 9.1

The taper at the start of a bus lane allows vehicles to merge

Bus lane tapers
The start of a with-flow bus lane is set out in TSM Chapter 3, section 9.3. The start of the bus lane is marked using a line marking to diagram 1010 and normally laid at a taper no sharper than 1:10. Our preference is for a taper no less than 1:10 to provide sufficient space for merging and to reduce the risk of side-swipe type collisions.

However, it is accepted that the provision of a 1:10 taper may be challenging in some contexts in London. TSM Chapter 3 acknowledges that there may be situations where a sharper taper is necessary. Where traffic can be directed away from the start of a bus lane in a safe manner a shorter, sharper taper may be appropriate, for example, where a single lane of traffic is deflected around the taper and no merge is required, or on the exit from a junction where the upstream bus lane continues to the stop line and only one lane turns from the side road.

Bus lane breaks and termination
The start and end of bus lanes at signal-controlled junctions, roundabouts and uncontrolled side roads is detailed in TSM Chapter 3.

At signal-controlled junctions the bus lane set-back in metres is generally a maximum of twice the minimum green time (in seconds). This allows a bus at the end of the bus lane to clear the junction on a single green. It also maximises capacity for other modes, minimising delays, and facilitates – and makes safer – left or right turns at the junction.

However, green times can vary at a junction throughout the day. It may also be necessary to change the set-back depending on the volume of other traffic using the bus lane or other local conditions. Our Network Performance team should be consulted to assist with local site conditions.

Continuing with-flow bus lanes to the stop line at signal-controlled junctions provides the maximum benefit for buses and other users of the bus lane, and, in certain circumstances, can allow the bus lane to restart with a reduced taper on the exit from the junction.

Where traffic can be directed away from the start of a bus lane in a safe manner a shorter, sharper taper may be appropriate

Where it is not possible to continue the bus lane to the stop line it may be appropriate to allow only left-turning vehicles into the nearside lane, with only vehicles in the bus lane permitted to proceed ahead from this lane. This provides some of the benefits of continuing the bus lane to the stop line but allows for left-turning vehicles. Advice on signing this layout can be found in TSM Chapter 3.

A bus lane should be continued to the stop line, or the nearside lane restricted to buses and left-turning vehicles, only:

- If safe provision can be made for turning traffic
- If traffic waiting to turn right within the junction does not restrict flow in the ahead lane
- If a reduction in capacity of the junction is acceptable and does not result in delays to buses or safety issues
- Where the bus lane continues beyond the junction or there is sufficient width on the exit for all lanes to proceed ahead or merge safely

At roundabouts that are not signal-controlled, a set-back for a nearside bus lane should be provided to allow left-turning traffic to safely enter the nearside lane, and to ensure the full width of the roundabout entry is available to all traffic at peak periods.

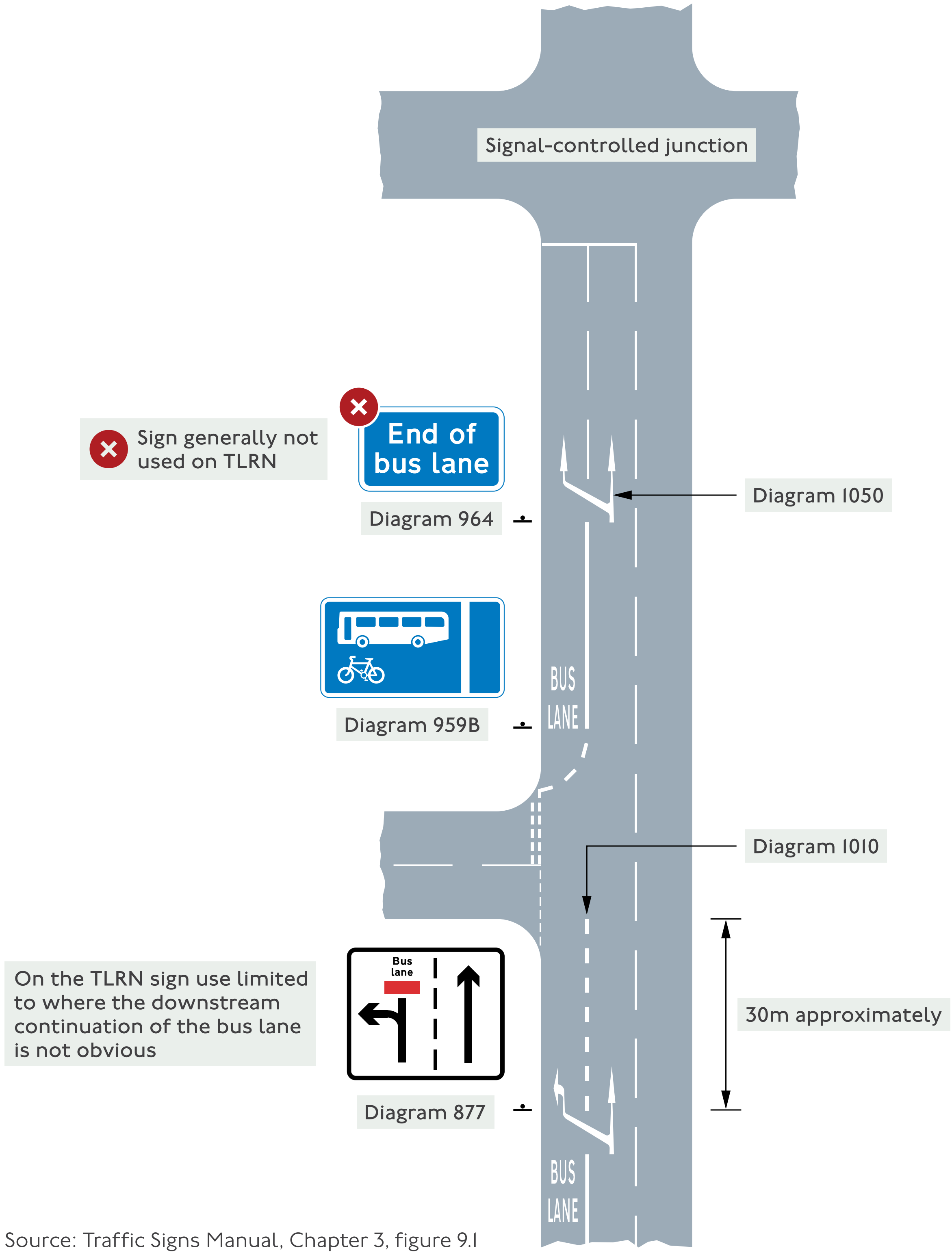
The set-back distance should be determined on site by observing flows, queues and traffic behaviour. Other factors such as side roads and pedestrian crossings should be considered. If the roundabout is controlled by traffic signals, the set-back should be determined in accordance with the guidance for signal-controlled junctions on page 18.

TSM Chapter 3 advises that where a nearside bus lane passes a minor side road the diagram 1049A marking should be terminated approximately 10m before the junction (or at the junction if the minor road is one-way towards the major road). However, where the junction has a major left-turning flow into the side road, the line to diagram 1049A should be replaced with a broken line to diagram 1010.

The diagram shows that the broken line should start 30 metres in advance of the junction and should be accompanied by the arrow to diagram 1050 indicating a left turn. It is recommended that what constitutes a major flow should be determined based on traffic flows, both in the bus lane and turning left, and on-site conditions.

Continuing a bus lane across a side road using the broken line to diagram 1010 is not appropriate.

Layout of a with-flow bus lane where side road has major left-turn flow



Source: Traffic Signs Manual, Chapter 3, figure 9.1

An off-side with-flow bus lane at a junction facilitates bus-only access

At most private accesses it is not necessary to end the diagram 1049A as vehicles are allowed to cross a bus lane to get to or from any road or lay-by adjacent to the bus lane or any vehicular access to premises adjacent to the bus lane. However, if the private access is used by larger volumes of traffic (for example, a petrol station or local shopping centre car park) it may be necessary to terminate the bus lane as detailed above. This should be based on an assessment of local site conditions and traffic volumes.

Where a bus lane ends and traffic merges into a single lane, measures to ensure the bus is given priority and not delayed should be considered: for example, a signal-controlled bus gate such as that on Uxbridge Road near the junction with Park View Road in the London Borough of Ealing or on Dog Kennel Hill, north of East Dulwich station in the London Borough of Southwark. Where this is not possible, the designer should consider the distance required for the safe merge between vehicles, based on the speed limit, vehicle flow and overall link geometry. A distance of 100 metres may be suitable for this merge (based on TSM Chapter 6, Traffic Control, para 4.4.3). Other measures, such as deflection arrow markings to diagram 1014 in the off-side traffic lane, may be appropriate to encourage other drivers to give priority to vehicles in the bus lane.

Off-side bus lanes

Off-side with-flow bus lanes are generally used as a lead-in to a bus gate, bus only turn or bus only area at a junction ahead. Off-side bus lanes can be found at Vauxhall gyratory to facilitate bus access to the bus station within the gyratory and on Kingston Bridge to allow access to a bus (and taxi) only right turn. On the A21 southbound approach to Catford town centre the off-side bus lane allows access to the contraflow bus lane while all other traffic must turn left to proceed around the gyratory.

TSM Chapter 3 advises that where an off-side bus lane is provided in a two-way road, it should generally be separated from the opposing flow of traffic by a solid island or hatch markings to diagram 1040 where the boundary line is formed by the marking to diagram 1049A. However, where space is constrained, successful layouts have been achieved when the boundary line on both sides of the bus lane has been formed by the marking to diagram 1049A (for example, Catford gyratory and Kingston Bridge).

The width of the bus lane should be determined as for a nearside with-flow bus lane.

Modes permitted to use the bus lane can be as a standard nearside with-flow bus lane but are often determined by the restriction ahead. As with nearside bus lanes, where the lane is not appropriate for use by pedal cycles, the upright regulatory sign will need to be authorised.

Off-side bus lanes generally operate at all times.

Advice on signing for off-side bus lanes can be found in TSM Chapter 3.

Centre bus lanes

Centre with-flow bus lanes are generally used on the approach to signal-controlled junctions where there is a dedicated left-turn lane for traffic. They allow the bus lane to be continued to the junction stop line. Examples can be found northbound on Falcon Road at the junction of York Road and Battersea Park Road in the London Borough of Wandsworth and eastbound on Ilford Hill to the junction with Cranbrook Road and Chapel Road in the London Borough of Redbridge.

If proposing such bus lanes, the potential for conflict between buses and cycles in the bus lane proceeding ahead and vehicles accessing the left-turn lane should be considered.

The width of the bus lane should be determined as for a nearside with-flow bus lane.

Modes permitted to use the bus lane are as a standard nearside with-flow bus lane. As with nearside bus lanes, where the lane is not appropriate for use by pedal cycles, the upright regulatory sign will need to be authorised.

We recommend that all new bus lanes in London should, as a default, be considered for 24 hours a day, seven days a week operation, including centre bus lanes. However, the operational hours should generally match any bus lanes in the local area, particularly bus lanes that immediately precede or follow-on from the centre bus lane.

Advice on signing a central bus lane can be found in TSM Chapter 3.

A contraflow bus lane runs in the opposite direction on a one-way street

Contraflow bus lanes

A contraflow bus lane typically consists of a bus lane running in the opposite direction to general traffic on a one-way street. They are generally used to allow buses to take a more direct route than general traffic, avoiding potentially long diversions and delay. In addition, by allowing buses to run along the same road in both directions, the network is easier to understand for passengers who can board and alight on the same road.

Signing of a contraflow bus lane should be in accordance with TSM Chapter 3, section 9.4.

Cycles may be allowed to use contraflow bus lanes, but consideration must be given to interaction at the start and end of the bus lane, at junctions and at bus stops, to ensure cyclist safety is not compromised and buses delayed. Other classes of vehicle are not permitted to use contraflow bus lanes without special signs authorisation from the DfT.

The width of the contraflow bus lane must reflect any requirement to overtake slower or stationary vehicles. Where kerbside activity is permitted, buses are anticipated to overtake pedal cyclists or other buses at stops, or cyclists must overtake buses at stops, it is important to ensure that sufficient space is provided to enable safe overtaking without impacting the cycle space or moving into the opposing traffic lane.

Contraflow bus lanes operate at all times.

While contraflow bus lanes can have benefits for buses and their passengers, there can be issues with their operation. The layout at the start and end, and at any intermediate junctions, must be designed to ensure the contraflow lane can operate safely at all times for all road users.

Pedestrian safety should be considered at contraflow bus lane locations where pedestrians might not realise that traffic travels in both directions, for example where a lane is introduced into a street where traffic was previously one-way or where there are low bus flows. Where appropriate warning signing and road markings should be considered. Guidance on signs for pedestrians in these circumstances is detailed in TSM Chapter 3, section 9.5.

In addition to the above, when introducing contraflow bus lanes, the impact on the following should be considered:

- Kerbside activity, including Blue Badge holder set down and pick-up
- Opposing running lanes
- Vehicle access and egress to side roads or private properties

Examples of contraflow bus lanes are northbound on London Road, between Elephant & Castle northern roundabout and St George's Circus and westbound on Pentonville Road, between Penton Rise and Weston Rise.

Other supporting measures

Other measures may be considered to improve understanding of, and compliance with, bus lane restrictions:

- Coloured carriageway surface treatments: these can be used to highlight the presence of the lane and reduce unintentional encroachment by other vehicles. This is not considered necessary in London and is not used on the TfL Road Network as it increases construction and maintenance costs, and can reduce the life of the asphalt
- Full segregation: a bus lane may be separated by kerbs from the general carriageway. This is more common with contraflow bus lanes but is not often used in London owing to the lack of available carriageway width, the requirement for vehicles to cross the lane to access side roads and private entrances, the possible need for part-time access to the lane and resilience concerns (for example, in the event of a vehicle breakdown the lane would be closed for all road users)
- Traffic islands: islands may make separation of the bus lane from the rest of the carriageway more obvious and, if constructed appropriately, can act as pedestrian crossing refuges facilitating access for bus passengers and other pedestrians

Where segregation or traffic islands are proposed, it should be ensured that the road alignment allows buses to pass between the footway and the islands without impinging on either kerb.

Bus-only streets

A bus-only street is a section of road to which only buses (and other permitted vehicles, generally including cycles) have access. Bus-only streets can minimise the impact from external factors on the bus network and support a more efficient, resilient and reliable bus network.

Bus-only streets are generally, but not exclusively, introduced in areas of higher pedestrian footfall, such as town centres, business areas and transport interchanges. They allow buses to serve these areas while reducing other motorised traffic. This helps to make bus services a more attractive choice by providing convenient access for bus passengers. Bus-only streets can also have wider benefits such as improving air quality, reducing noise pollution, creating a safer environment for pedestrians and street activity and providing potential for urban realm improvements.

Cyclists should normally be permitted to use bus-only streets and consideration can be given to permitting other modes, if appropriate. Other traffic can be excluded from bus-only streets at all times or permitted at certain times, for example to permit the servicing of shops and businesses.

Bus-only streets make busy urban areas more pleasant for people

Clarence Street/Wood Street in the Royal Borough of Kingston upon Thames is a bus, cycle and taxi-only street in a busy town centre. Orford Road in Walthamstow is an example of a bus and cycle-only street with a timed vehicular restriction, while on Rye Lane, in the London Borough of Southwark, access is limited to buses, cycles and taxis at all times, with loading permitted only between 07:00 and 10:00.

Bus-only streets are an effective form of bus priority but can have an impact on the wider network, including other bus routes. Speak to us to understand the wider network implications and any required mitigations, where necessary. It is anticipated that this will require a macro-level review of the surrounding network by our Network Performance team, who are available to assist with assessing the impact of changes.

As bus-only streets are often introduced in town centres, a detailed review of delivery activities is recommended, working with businesses and stakeholders to understand servicing requirements and achieve consensus on limited, timed access if required.

Bus-only streets require relatively little infrastructure, with the main on-street requirements being signage and enforcement. Guidance on the signage, including diagram requirements, can be found in TSM Chapter 3.

Bus gates

A bus gate is a short length of bus-only road. Bus pre-signals (see page 28) are often referred to as 'bus gates', but should not be confused with the bus gates described below. Bus pre-signals use traffic signals to separately control the bus and general traffic lanes.

Bus gates often resemble a point access restriction. They create a point closure for motor traffic other than buses and permitted modes and can be used to:

- Remove through-traffic from a road but allow full access and maintain bus routes. For example, Stoke Newington Church Street in the London Borough of Hackney and Railton Road, south of the junction with Kellett Road, in the London Borough of Lambeth
- Control access to bus and cycle-only streets. For example, Bishopsgate, between Liverpool Street and Middlesex Street, on the Strategic Road Network in the City of London
- Allow buses to bypass width or other restrictions. For example, Kimpton Road near the junction with Willow Walk in the London Borough of Sutton

By removing through-traffic or creating bus and cycle-only streets, bus gates can be used to support area-wide treatments, reducing road danger, air pollution and noise and enabling more walking and cycling.

A bus gate is a short length of bus-only road, closed to general traffic

Buses must slow down or stop where space is limited

A bus gate may be located either at a junction or part way along a road and can be implemented through physical measures such as rising bollards, traffic signals or upright traffic signs and road markings. Signed restrictions will require a Traffic Order to ensure they are enforceable.

On a two-way road, access may be restricted to buses in one direction only, with all traffic permitted in the opposite direction. This is similar to a contraflow bus lane but too short to be signed as such. In this case, that part of the carriageway reserved for buses should be separated from the opposing flow of traffic by a traffic island and not by a continuous marking to diagram 1049A. Full guidance on layouts and signage can be found in TSM Chapter 3.

Bus gates may operate at all times or (with appropriate signing) at certain times of the day.

Bus gates may be used by other vehicles where permitted by the Traffic Order and nearside bus gates should by default be accessible by pedal cyclists. The use of the bus gate by other vehicles depends on the location and function of the facility. Some bus gates, including measures such as rising bollards or signals, may be activated by transponders on permitted vehicles which will limit their use to those vehicles.

As with other measures, bus gates can have an impact on the wider network, including other bus routes. Speak to us to understand the wider network implications and mitigations, where necessary. This may require a review of the surrounding network by our Network Performance team, who can assist in assessing the impact of any changes.

Removing pinch points and kerbside obstructions

The preferred minimum carriageway width for a bus route is six metres (two lanes at three-metre widths).

However, road space in London can be extremely constrained, with sections of road where buses must slow down significantly or stop, wait and move into the adjacent or opposing traffic lane. This can have significant impacts on bus journey times, reliability and passenger experience.

To address this, understanding the pinch points on bus routes is key. An assessment of pinch points can be done on any road which carries buses and low-cost interventions can potentially yield significant bus benefits.

Localised carriageway widening at pinch points

While extensive carriageway widening is not desirable, it may be appropriate to consider short lengths of widening at localised pinch points. Kerb realignment to remove the pinch point on Brixton Hill, at the junction with Baytree Road, which was limiting access to an existing bus lane, is an example of this. Care must be taken to ensure that footway provision is not unduly impacted or that sudden changes in kerb lines do not create unsafe conditions.

At some locations amendments to central islands, both on links and at junctions, may be appropriate to address a pinch point or ensure buses can turn safely. As with changes to kerb lines, care must be taken to ensure that pedestrian provision is not unduly impacted or that sudden changes in kerb line do not create unsafe conditions for all road users.

Kerbside restrictions and activity control

Many pinch points on London's roads can be caused by kerbside activity such as parking and loading. Poorly managed kerbside activity can delay buses, impact reliability and prevent full access to stops. Where buses cannot pass vehicles at the kerbside and are forced to wait, the following vehicles can also be delayed, resulting in wider congestion.

Kerbside activity also adversely impacts cyclists, who risk being struck by doors when passing parked vehicles, coming into conflict with vehicles entering or exiting kerbside spaces and who must move into the carriageway to pass parked vehicles with the risk of conflict with vehicular traffic.

Kerbside space is at a premium along London's roads and must be designed and managed carefully. We prioritise kerb space for healthy street interventions which support active travel, bus and emergency vehicle movement.

Where parking and loading causes delays to buses it should be removed, relocated, consolidated, inset or controlled as appropriate for the location to minimise the delay to buses.

The preferred approach for London is to restrict all stopping on bus routes whenever possible. However, we recognise that removing all kerbside activity is not practical at all locations.

Different approaches are required depending on the type of activity. Loading may be required to service businesses and, while it may not be possible to relocate large servicing vehicles to adjacent side roads, smaller delivery vehicles could be relocated. Blue Badge parking should not be removed but consideration could be given to relocation. General parking may be easier to remove or relocate.

When relocating Blue Badge parking, consideration should be given to the inclusiveness of the new site to ensure a wide range of users can use the space effectively. This will include the space allocated, the location of drop kerbs and the distance to relevant local services and facilities.

We often choose to relocate activity to side roads when removal is not possible. Where it is proposed to relocate kerbside activity, the suitability of the new site should be assessed. Factors such as safety (including visibility of the new location), footway and carriageway widths, the location and type of local facilities that the activity will serve, and interaction with entrances to side roads and pedestrian/cycle crossings should be considered.

Where it is proposed to relocate loading, vehicle tracking of the largest vehicle surveyed using the existing facility (or anticipated to use the facility) should be carried out on the route into and away from the facility. This may require tracking of several junctions if loading has been relocated to a side road, as the route to or from the facility should not include reversing on to a major road. For all kerbside activity relocation, a refuse vehicle should be tracked (as the largest class of vehicle required to access the majority of roads in London) around the new kerbside provision to ensure the new location does not negatively impact other road users.

Kerbside activity must be carefully managed

If kerbside activity must be permitted on the bus route, inset bays or on-footway loading bays can maintain kerb access while reducing the delays for buses. Although on-footway loading allows vehicles to mount the kerb, it also permits pedestrians a full unhindered footway width when vehicles are not present and can benefit the urban realm.

Care must be taken to ensure inset or on-footway loading or parking does not unduly impact pedestrian provision. Sufficient space must be retained to allow pedestrians to pass safely. If on-footway bays are provided, it may be necessary to limit use of the facility to outside peak pedestrian periods. Our Kerbside loading guidance provides further information.

On-footway loading will also require a pavement design to ensure the pavement can support the imposed loads without premature failure. BS 7533-101 provides further guidance on this.

Where parking and loading causes delays to buses it should be removed, relocated, consolidated, inset or controlled

If provision must be made at the kerbside, the length of any permitted activity should be limited and it should be located to minimise the impact on buses. When activity is permitted and the duration of stay should both be considered. Activity should ideally be restricted to overnight only and should be avoided during peak periods such as the morning, evening and school peak. Restricting the length of stay will remove long-stay parking (for example, close to stations or town centres) and can result in a turnover of vehicles, allowing the use of the provision to be maximised and the extent of the provision to be minimised.

Even in locations where a number of lanes are provided and space may not seem constrained, a review of existing waiting and loading restrictions is recommended to assist bus operations. Existing kerbside controls may have been introduced some time ago and may not protect bus operation when required, for example into the evening or on Sundays.

A detailed review of kerbside activity is recommended, working with businesses and stakeholders

A detailed review of kerbside activity is recommended, not only during the working week day, but also in the evening, at weekends and, in some locations, overnight. It is also important to work with businesses and stakeholders to understand requirements and, where possible, achieve consensus on revised restrictions.

These are the steps we follow for making changes to kerbside provision:

1. Determine the extent of kerbside activity in scope for removal/relocation and, if it is proposed to remove activity or restrict use, identify possible alternative locations, if required

2. Undertake surveys to understand existing use, such as the volume and type of activity, duration of stay and vehicle type. Surveys should cover both the kerbside under review and any locations identified for relocation

3. Design removal/relocation into scheme

4. Local engagement and/or public consultation, including an Equality Impact Assessment (EqIA)

5. Statutory traffic order consultation/ advertising

6. Implementation via a Traffic Management Order

We recommend that any change to kerbside provision is subject to an EqIA to ensure the effects on people with protected characteristics are identified, considered and mitigated against so far as reasonably possible. EqIAs are mandatory for any TfL-led scheme that involves changes to kerbside provision to ensure inclusive design.

Use of Clearways

If vehicles stopping to pick up and set down passengers on yellow lines are causing delay on a heavily trafficked road, a Rural Clearway could be considered.

Rural Clearways prohibit stopping at all times. They are suitable for use only on semi-urban or rural roads where there are very few premises requiring access from the main carriageway. As they restrict stopping by all vehicles, bus stops must be clearly marked and should generally be located in laybys (see page 33 for on advice on bus stop laybys).

Interventions at pedestrian crossings

Zebra crossings

Zebra crossings are generally used when pedestrian numbers and vehicle flows are moderate. Pedestrians establish precedence by stepping onto the crossing and, as a result, they experience minimal crossing delays, which can create a more attractive environment for walking.

Vehicle delays are also typically low but may increase where irregular streams of people cross for extended periods (for example, outside schools and stations at certain times of the day or in town centres) and this may have a detrimental impact on bus journey time and reliability.

Where this is an issue and there is space, it may be appropriate to introduce a central island at some zebra crossings. A zebra crossing with a central island is two separate crossings (Highway Code Rule 20). Buses will not have to wait for pedestrians to clear the whole crossing before proceeding. The island should be of sufficient width to accommodate the anticipated volume of pedestrians and people with prams or using wheelchairs. When considering this measure, care should be taken to ensure safety is not compromised.

In locations where buses are experiencing delays, it may be appropriate to consider replacing the zebra with a signal-controlled crossing.

Pedestrian ‘call cancel’ at signal-controlled standalone pedestrian crossings

Pedestrian ‘call cancel’ should be included in all new signal-controlled pedestrian crossings and retrofitted to existing crossings. If, after the push button has been pressed, the pedestrian decides to walk away, or crosses in a gap in traffic, the call is automatically cancelled and the pedestrian phase will not appear. This avoids unnecessary delay to vehicular traffic which may be caused when no pedestrians are waiting to cross. Advice should be sought from our Network Performance and Traffic Control Engineering teams.

Interventions at junctions

Interventions at non-signal-controlled junctions

General traffic movements and flows have a significant impact on bus speeds and reliability, the overall passenger experience and general road safety. Vehicles turning to and from side roads can cause delay to through vehicles, including buses.

While vehicles turning out of side roads can result in some delays, the largest impact is from vehicles turning from the main road into side roads, particularly vehicles waiting to turn right. To reduce delay to buses at non-signal-controlled junctions, a number of traffic management interventions can be explored.

Right-turn pockets

Where right-turning vehicles at side roads cause delays to buses and other priority measures cannot be implemented, the provision of a right-turn lane/pocket, or ghost island, could be considered.

These can be used to afford right-turning vehicles some protection, create space to help other traffic, including buses, pass right-turning vehicles and make the junction more conspicuous. However, right-turning lanes can make it more difficult for pedestrians to cross the major road and may encourage higher speeds. The impact on all road users should be considered before such measures are proposed.

Where right-turn lanes are proposed or retained, refuges should be provided within ghost islands to facilitate pedestrians crossing.

Guidance on right-turn pockets can be found in TSM Chapter 5 (Road Markings, section 5) and in Manual for Streets 2 (Section 9.4).

Side road closures or filters

Rationalisation of junctions and access points along a corridor can reduce the delay to buses caused by turning vehicles and improve general traffic flow.

Closing side roads completely, or to vehicular traffic, should be considered. Side road closures or filters also support active travel and reduce road danger, making it easier to walk and cycle and reducing the risk of pedestrians and cyclists being struck by turning vehicles.

Closing side roads, or limiting access, may have an impact on the wider network, including other bus routes. This impact and any necessary mitigation measures, should be assessed and understood. Changes should be discussed with our Network Performance team who can assist with assessing the impact.

Side roads used by buses should not be considered for full closure as part of a bus priority scheme as bus service accessibility and interchange can be severely impacted.

A right-turn pocket gives space for buses and other traffic to pass safely

Banned turns

If side roads cannot be closed fully, prohibiting turns, either permanently, or at key times of the day, can minimise obstruction and delay to buses. Turns used by buses should not generally be banned as part of a bus priority scheme, however the benefits and disadvantages to all buses should be considered. It may be appropriate to ban a turn and exempt buses from the restriction.

As with full closure this can also be used to support other measures designed to enable active travel choices. Again, the potential impact on the wider network should be considered as part of any such proposals.

Guidance on signing banned turns, including providing exemptions for buses and cyclists, can be found in TSM Chapter 3.

Changed priority at junctions

At some locations it may be appropriate to change the layout and priority at a non-signal-controlled junction to give priority to the road with the bus route. This is only anticipated to be an option on roads with similar traffic flows on all arms in more lightly trafficked areas.

Signal control

In response to safety or delay issues on a link served by buses, it may be appropriate to signalise an existing uncontrolled junction. This option may result in delays for buses on other arms of the junction and mitigation may be required. Mitigation measures should preferably be on the immediate approaches to the junction, but if this is not possible, or is insufficient to address all delays to buses, further measures in the wider area may be required. The full implications should be carefully assessed if this option is considered.

TfL owns and operates all traffic signals in London. Our Network Performance and Traffic Control Engineering teams should be contacted to discuss any potential new signals. Both teams are available to assist in assessing the feasibility of new signals and the impact of changes.

Interventions at signal-controlled junctions

Providing bus priority through traffic signal infrastructure can be a highly effective way of minimising delays at junctions and reducing bus journey times.

The suitability of introducing bus priority depends on a number of considerations, including junction layout and operation, spare capacity, bus frequency and movements and coordination requirements.

Our Network Performance and Traffic Control Engineering teams will assess the suitability of all traffic signal sites when bus priority is proposed. Liaise with our teams when considering the introduction of any of the following measures:

Signal timing review and identification of efficiencies

Signal-controlled junctions can be a contributing factor to slow bus journeys and reviewing signal timings to ensure they are optimised to enable efficient movement of buses can be a simple and effective way to improve bus journey times. We run a continuous programme of signal reviews to help ensure the network operates efficiently.

If an existing signal-controlled junction is identified as contributing to poor bus performance, signal operation should be discussed with our Network Performance and Traffic Control Engineering teams. The junction will be reviewed to understand how the signals are set up and optimised for different arms, whether bus priority is installed and, if so, how it is optimised, and whether there are any faults with the signal equipment. Additional signal timing efficiencies, such as five-second minimum greens for side roads, can also be explored.

Bus detection and priority

Buses can be given priority at traffic signals through selective vehicle detection. This can hold signals on green for an approaching bus or, if the bus arrives at a red signal, return the approach to green quicker. With differential bus priority, signals can be run to prioritise those buses running behind schedule, allowing time to be regained on these routes. The methods of providing the priority and the level of priority differ depending on the site. Advice should be sought from our Network Performance team.

Pedestrian 'call cancel' at signals

As with standalone signal-controlled pedestrian crossings, pedestrian 'call cancel' should be provided at pedestrian crossings within signal-controlled junctions. This automatically cancels the call and pedestrian phase if the pedestrian decides to walk away or crosses at a gap in traffic. This avoids unnecessary delay to vehicular traffic which may be caused when no pedestrians are waiting to cross. Advice should be sought from our Network Performance and Traffic Control Engineering teams.

Junction layout, operation and permitted movements

Junctions with multiple movements, separately signalled arms, straight across pedestrian crossings and separate cycle stages can result in long cycle times to safely accommodate all movements and modes.

By reducing the number of turning movements at a junction there is potential to improve the operational efficiency, allowing buses to pass through junctions more quickly. If such measures are being considered, the impacts on all road users and the wider network must be assessed.

Where it is proposed to ban turns at signal-controlled junctions, we strongly advise that buses are exempted. Bus service accessibility and interchange can otherwise be severely impacted. When permitting buses to make banned turns, consideration should be given not only to scheduled bus routes but also diversion routes, curtailment points and out-of-service running. Care should also be taken to ensure the bus can make the manoeuvre safely (see page 39 for tracking advice).

Reviewing signal timings to ensure they are optimised to enable efficient movement of buses can be a simple and effective way to improve bus journey times

Bus pre-signals separately control buses and general traffic

Bus pre-signals

Bus pre-signals are located at the end of a bus lane, with the bus lane and adjacent traffic lane separately controlled by traffic signals. This allows the bus to be given priority while general traffic is held.

In order to avoid possible confusion and conflict between buses and general traffic it is necessary for the bus lane and pre-signal to operate at all times. Nearside bus pre-signals should by default be accessible by pedal cyclists and can be useful to allow cycles to move to the head of a traffic queue and take the primary riding position in the lane.

The use of the pre-signal by other vehicles depends on the location and function of the facility. Some pre-signals may be activated by transponders on permitted vehicles, which will limit their use to those vehicles. Use by large numbers of other modes may negate the bus and cycle benefits.

A traffic island of sufficient width to accommodate the necessary signal infrastructure to control the general traffic must be located between the bus lane and general traffic lane. The bus lane can be signal controlled or operate on a give-way.

Bus pre-signals are commonly used in the following situations:

- On the approach to a junction, roundabout or gyratory to permit the bus to pass queuing traffic and position itself at the front of a queue (for example, on Stockwell Road on the approach to the junction with Clapham Road at Stockwell station)
- To hold traffic outside an area of constrained carriageway to give buses priority through the area (for example, southbound on Dog Kennel Hill north of East Dulwich Station, and Walworth Road in the London Borough of Southwark)
- Where a bus lane ends and traffic merges into a single lane (for example, on Uxbridge Road near the junction with Park View Road in the London Borough of Ealing)
- To allow buses to move safely from a nearside bus lane to the centre or off-side lane, mitigating any scissor movement (for example, on the westbound A11 approach to the junction with Sidney Street in Whitechapel)
- To permit the bus to move into a bus-only area (such as a bus station, bus-only link or town centre) without conflicting with general traffic (for example, Plumstead Road at Pettman Crescent)

The bus lane should be of sufficient length to allow the bus to avoid any queues which may form on the approach to the bus pre-signal.

The bus pre-signal can be co-ordinated to the next set of signal-controlled junction(s) to achieve a level of progression through a series of junctions, or linked in such a way to ensure no general traffic is between the bus pre-signal and the next signal-controlled location.

As the bus and general traffic lanes are signalled separately there may be stationary traffic in one lane while vehicles are moving in other lanes. Pedestrians seeing traffic stopped in one lane may start to cross the road, failing to appreciate that vehicles may be moving in the adjacent lane. The moving vehicles may be masked from crossing pedestrians by the queueing traffic. Due to these pedestrian safety concerns, a signal-controlled pedestrian facility must not be incorporated into a bus pre-signal unless a separate pedestrian crossing facility is provided across each lane with sufficient offset between the crossings.

Bus pre-signals are often referred to as 'bus gates'. However, they should not be confused with the bus gates described on page 22. Bus pre-signals use traffic signals to separately control the bus and general traffic lanes, while a bus gate is a very short length of bus-only road which can often resemble a point access restriction.

Bus-only signals

Bus-only signals control bus-only movements through signal-controlled junctions. They generally form part of a signal-controlled junction and can be used in the following situations:

- To permit the bus to move into a bus-only area (such as a bus station, bus-only link or town centre) without conflicting with general traffic (for example, Byward Street into Great Tower Street in the City of London and Theobalds Road junction with Drake Street in the London Borough of Camden)
- To permit the bus to make a bus-only turn at a junction (for example, Clarence Street into Cromwell Road in the Royal Borough of Kingston upon Thames)
- To permit the bus to make a bus-only U-turn (for example, on Waterloo Road, at the junction with Pearman Street, on the A1, at Despard Road, north of Archway and on Uxbridge Road, to the west of Greenford Road, Hanwell)

Buses should be in a dedicated lane, which vehicles other than those permitted to make the manoeuvre are prohibited from using, and other traffic should be stopped to allow the bus to turn safely.

Modes permitted to pass through the bus-only signal depends on the wider site, for example, if the movement is into a bus and cycle-only street. Some signals may be activated by transponders on permitted vehicles, which will limit their use to those vehicles. Large numbers of other modes using the facility may negate the bus benefits.

Bus-only signals control movements for buses in a dedicated lane

Bus-only signals control bus-only movements through signal-controlled junctions

Preferential bus routing and exemptions

Preferential routing

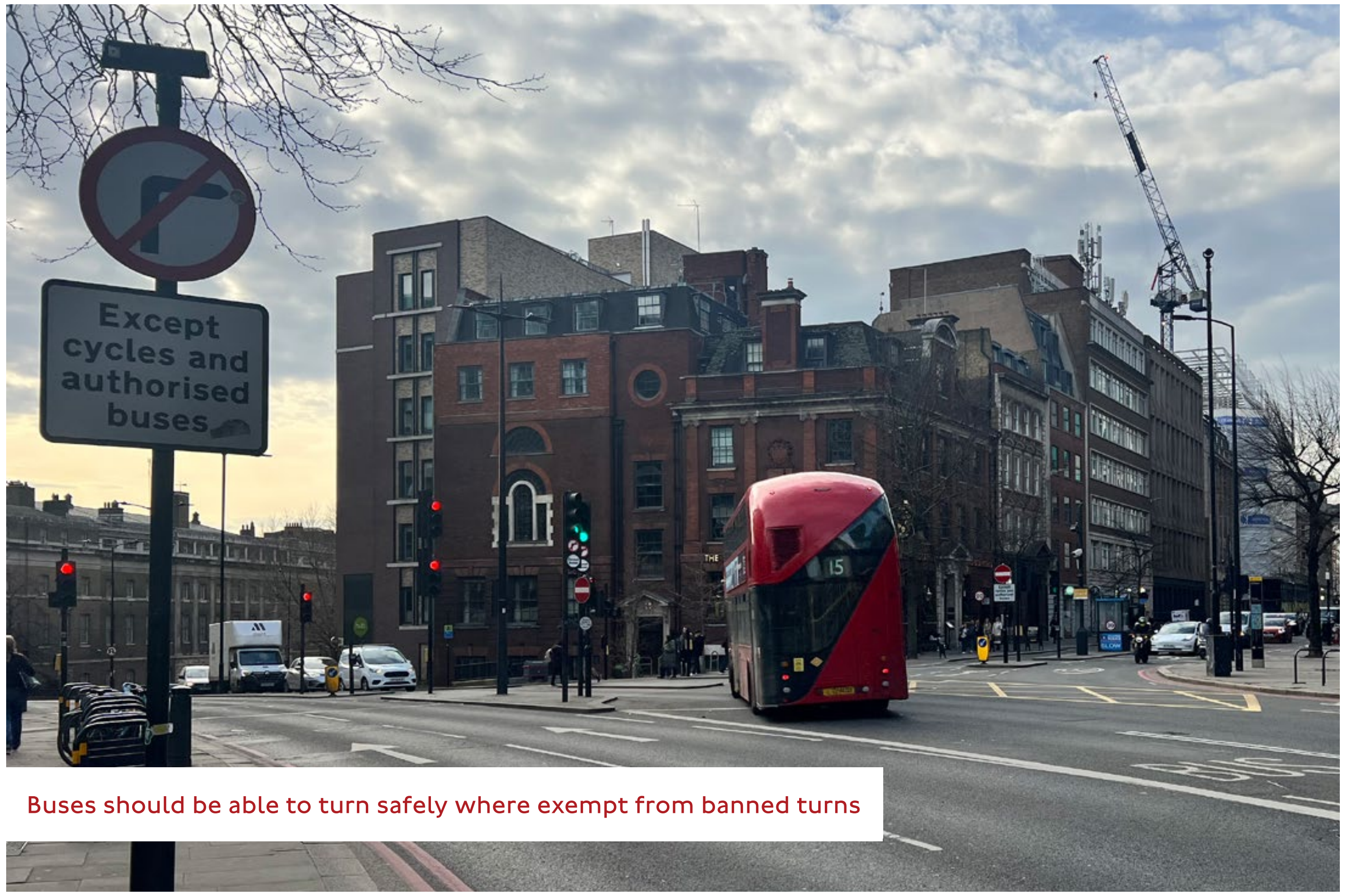
Preferential routing of bus services enables the distance by bus to be shorter than the equivalent journey by car. This can reduce bus journey time and increase the attractiveness of the bus over the car. Depending on the measure adopted, it can also reduce the amount of other traffic on the bus route and minimise delays.

Preferential routing can be achieved through many of the bus priority measures detailed previously. For example:

- Off-side and contraflow bus lanes allow buses to bypass the gyratory at Streatham Hill
- A mix of with-flow and contraflow bus lanes on Pentonville Road, on the approach to Kings Cross, allows buses to avoid a large diversion
- An off-side bus lane and bus-only signal on Clarence Street in Kingston allows buses to avoid a long diversion around a gyratory
- The bus gate on Stoke Newington Church Street in Hackney, allows more direct bus routing while stopping through-traffic.

Early consultation with our Public Service Planning team is essential if such measures are proposed, as passenger access and interchanges could be impacted. We need to approve any bus route changes.

Preferential bus route on Kingston gyratory system



Buses should be able to turn safely where exempt from banned turns

Buses should be exempt from weight and width restrictions if possible

Banned turn exemptions for buses

Exempting buses from turn bans is a simple form of bus priority.

When permitting buses to make banned turns, consideration should be given not only to scheduled bus routes but also diversion routes, curtailment points and out of service running. Our Bus Client team should be consulted to identify the appropriate turns for exemption. Where it is proposed to exempt buses from banned turns, care should be taken to ensure buses can make the manoeuvre safely (see page 39 for tracking advice).

Width and weight restrictions

Where it is necessary to introduce a width restriction on a bus route, measures should be put in place to allow the bus to continue to use the route. This may take the form of an exemption, bus gate or bus lane. For example, a bus gate allows buses to by-pass the width restriction on Kimpton Road near the junction with Willow Walk in the London Borough of Sutton, while a bus lane serves the same purpose on Longwood Gardens between Abbotswood Gardens and Northwood Gardens in the London Borough of Redbridge.

Buses should also be exempted, wherever possible, from other restrictions on large vehicles. The exemption may not be as obvious as exempting buses directly. For example, by signing a goods vehicle weight limit of 18 tonnes on Tower Bridge, buses are exempted from the restriction on large vehicles while protecting the bridge.

Exempting buses from banned turns is a simple form of bus priority

Bus stops and associated infrastructure

Relocation and removal

It may be necessary to relocate or remove a bus stop, for example to address a pinch point, facilitate priority through junctions or as part of a wider scheme. Proposed changes should be discussed with our Bus Client and Asset Operations teams.

Removing and consolidating bus stops can reduce bus journey times, but bus stops are installed with careful consideration of interchange points, trip generators, passenger boarding and alighting numbers and buses per hour. Removal or consolidation of stops solely to improve bus journey times should be avoided, other than in exceptional circumstances and following engagement and approvals from our Bus Client team.

Where it is necessary to remove, relocate or consolidate bus stops as part of a wider scheme (for example, gyratory removal or new developments) the impact on passengers – including interchange, access to trip generators and the distance to other stops – must be assessed.

Where changes to bus stop locations are proposed the following key issues should be considered.

Location and spacing

For most schemes bus stops will already be present. Where new bus stops are proposed, for example through a new development or on a new route, it should be ensured that all homes are within 400 metres of a bus stop. We generally aim to have stops no further than 400 metres apart, and a lesser distance in built-up and busy areas such as town centres. Where it is proposed to remove, relocate or consolidate bus stops, the impact on bus stop spacing and the distance to other stops must be assessed.

Placing bus stops on the exit from signal-controlled junctions assists when providing bus priority through selective vehicle detection at the traffic signals (see page 27). Advice should be sought from our Network Performance and Traffic Control Engineering teams.

Bus stop layout

Accessible bus stops are key to delivering a high-quality bus network, both in terms of ensuring inclusive access and ensuring the efficient operation of services. Comprehensive information about designing bus cages, stops and boarders can be found in our Accessible bus stop design guidance. Key points relating to bus journey times and reliability are highlighted in the following sections.

Bus stop cages and markings

There is no requirement for a Traffic Order for a bus stop cage. TSRGD (S7-3-3) makes it an offence not to comply with the markings. It is strongly recommended that those likely to be affected by the introduction of a new bus stop should be consulted over the location and times of operation of the proposed restrictions. However, there is no specific requirement under the Road Traffic Regulation Act 1984.

TSRGD diagram 1025.1 (S7-4-9) permits the bus stop cage to be a maximum of 3.25 metres wide, but there is no minimum width specified. On the TfL road network bus stop cages are usually three metres wide, but can be reduced to 2.7 metres where carriageway widths are reduced to ensure the cage marking is clear and does not over-lie the centre line marking.

The length of the bus stop cage is determined by a number of factors (see section on bus stop layouts and manoeuvres, page 33). Markings should be provided within the cage to indicate that only buses can stop. The appropriate markings differ between borough roads and the TfL Road Network. The table below sets out the markings for TfL Road Network and borough roads.

Bus stops can be signed so they do not operate at all times, but this is not recommended in London.

Bus stop markings for the TfL Road Network and borough roads

Road	Marking		Signing
TfL Road Network	TSRGD 1025.1 (S7-4-9)	Variation: double red lines	None
		Variation: Single wide red line	None
Borough	TSRGD	1025.1 (S7-4	TSRGD S4-3-2

Bus stop layouts and manoeuvres

The bus stop cage includes not only the area where the bus stops, but also an entry and exit taper to manoeuvre around parked vehicles or other obstacles, and a straightening length. The cage ensures the bus can enter and exit the stop safely and efficiently and can stop parallel to the kerb, leaving a gap of no more than 200mm between the bus and the kerb edge. This helps to ensure quick and easy boarding and alighting for all passengers, including those who require the bus to 'kneel' or the ramp to be deployed to provide step-free access (for example, wheelchair users). This is achieved by an appropriate bus cage marking to diagram 1025.1 (see the table on page 32).

The standard 37-metre cage is only applicable where just one bus is expected to use the bus stop at a time and vehicles up to 2.1 metres wide are allowed to stop on either side of the bus stop cage.

If more than one bus is expected to use the stop at the same time, the cage length must be increased to accommodate the additional buses and allow buses to pull out past a bus already at the stop.

If vehicles wider than 2.1 metres are expected to stop immediately before the stop, or greater lateral movement is required on entry, the entry taper should be increased.

At locations where buses are required to manoeuvre around parked vehicles to exit a stop, sufficient clear exit length is necessary for buses to re-join the general traffic lane without the rear of the vehicle overhanging the kerb. Where vehicles up to 2.1 metres wide are expected on the exit, the minimum recommended clear exit distance is nine metres. If wider vehicles are expected on the exit, or greater lateral movement is required, the minimum exit length should be increased accordingly.

Where the bus stop is located downstream of a side road or a pedestrian crossing protected by zig-zag markings, or there are double red lines on the entry or exit from a stop, the cage length can be reduced to reflect the protection these offer. However, it is important to locate the stop based on the frequency of buses to ensure all buses can be accommodated within the cage marking and buses do not block the crossing or side road.

Buses are permitted to stop on zig-zag markings on the exit side of a signal-controlled or zebra crossing to pick up or set down passengers. Reducing the length of exit zig-zag markings is not recommended or required.

The kerb over the full length where the buses are expected to stop should be as straight as possible.

Bus stops should maintain the position of the bus in the traffic stream. This simplifies access and improves bus reliability as the bus is not delayed waiting to re-join the traffic stream.

Bus bays (or bus stop lay-bys) should only be used where there are compelling safety or capacity reasons as they present operational problems for buses. Where a bus stop lay-by is proposed, our Accessible bus stop design guidance (Chapter 8) should be consulted on how to best mitigate the negative impact.

Bus boarders extend from the kerb line to facilitate access

Bus boarders

Bus boarders are generally built out from the existing kerb line and provide a convenient platform for boarding and alighting passengers.

Where there is extensive parking, bus boarders can reduce how far a bus must move laterally to reach the kerb, reducing the length of the bus stop cage, and the impact on parking and loading. Bus boarders also maintain the place of the bus in the traffic stream.

For roads subject to a 30mph speed limit or less, bus boarders should be considered at bus stops where parked or loading vehicles cause operational problems for buses and/or buses have difficulty rejoining the main traffic flow.

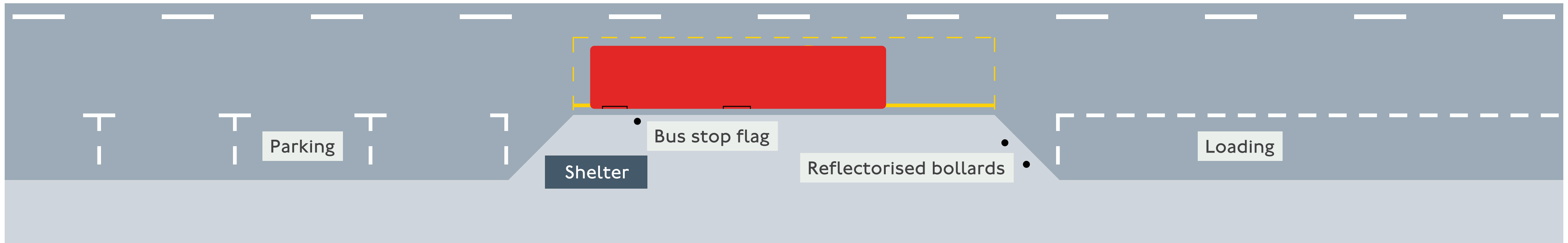
A full-width boarder offers the best solution for both bus and passenger access while minimising the kerb length required and deterring illegal waiting or loading. A full-width boarder should project far enough into the carriageway for the bus to avoid manoeuvring past parked vehicles.

Full-width boarders provide a waiting area separated from the adjacent pedestrian flow and thus move towards the standards achieved by tram and light rail systems. They should not be used where the frequency of buses or their dwell times will cause delay to following buses and significant delays to general traffic, usually on the highest strategic movement corridors.

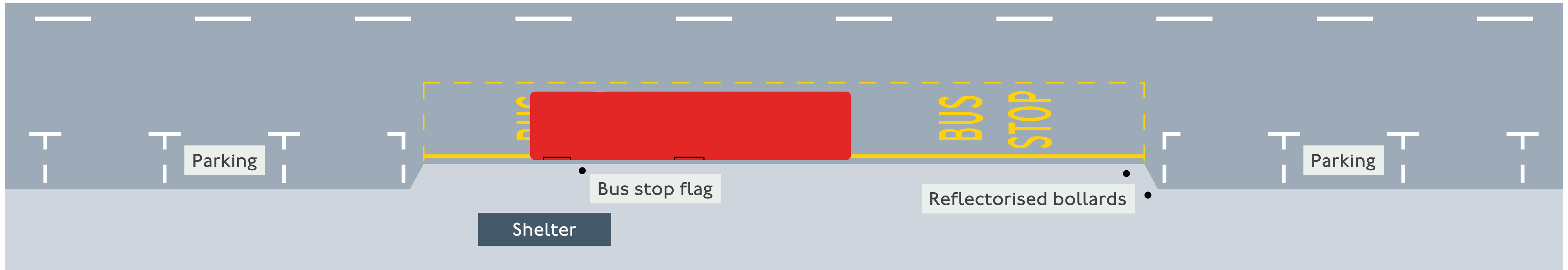
Where a bus stationary at a boarder occupies much of the traffic lane, the impact on over-taking cyclists should be considered. A full-width bus boarder is located on A21 Rushey Green, north of Catford town centre, in the London Borough of Lewisham and on Grove Green Road, north of Central Avenue, in the London Borough of Waltham Forest.

The half-width boarder build out from the kerb can range from 0.5 metres up to the width of a full boarder, although they are commonly one to 1.5 metres wide. They can be used where frequent delays to other vehicles are to be avoided, where cyclists use the carriageway, or where a full-width boarder would place the bus in, or too close to, the opposing traffic stream.

Full-width boarder



Half-width boarder



A half-width boarder can provide space for cyclists to pass buses while passengers are boarding and alighting. A half-width bus boarder is located on Grove Green Road to the east of High Road Leyton in the London Borough of Waltham Forest.

Bus boarders are generally used in locations where there is extensive parking, however if, at times, there will be no parked vehicles they may be a hazard if not clearly visible to road users.

Consideration should be given to appropriate signing to ensure the boarder is clearly visible to all road users. Bus boarders should also be designed to avoid unduly sharp deflections on the approach to the build out, so that cyclists have sufficient time to move into a primary position.

There may be circumstances where, for safety reasons, it would not be appropriate to encourage an overtaking manoeuvre by other traffic, such as near the brow of a hill or an approach to a refuge/island.

Where a bus stop boarder is being considered, our Accessible bus stop design guidance (Chapter 7) should be consulted.

Facilitating bus operations

Good, well-located bus infrastructure and facilities enable the efficient operation of the bus network and help to support both network and financial resilience. To deliver a reliable bus service it is necessary to consider not just the normal bus routing experienced by passengers but also the following:

- Mid-route curtailments
- How a route operates in times of disruption when the usual routing is not available
- The route between the last stop on one journey and the first stop on the next

In times of planned and unplanned disruption, bus services may need to divert away from the usual line of route. Measures such as bus-only turns or U-turns can ensure buses can run as close as possible to the normal routing, reducing the impact of disruption on passengers, improving reliability on a route and minimising operating costs.

The availability of bus stands in appropriate locations is critical. Minimising the time taken between the last stop on a journey, the stand area (with welfare facilities) and the first stop of the next journey allows a more efficient and less costly service.

Bus U-turning

At certain locations buses may have to U-turn, for example at the end of a route or mid-route curtailments where a bus must terminate its route early.

The bus can turn from the nearside lane (for example, on Waterloo Road, at the junction with Pearman Street, and on the A1 at Despard Road, north of Archway), or off-side lane (for example, Uxbridge Road, to the west of Greenford Road, Hanwell).

In all cases, buses should be in a dedicated lane that other vehicles are prohibited from using, and traffic should be stopped to allow the bus to turn safely.

The following should be considered when determining whether buses should turn from the nearside or off-side:

- The location of the last stop on a route – can the bus move safely to the off-side lane after the stop
- The traffic flow and number of lanes – can the bus move safely across the traffic, without undue delay, to access an off-side bus lane
- Carriageway width – is there sufficient space to accommodate the bus turn in the central island or in the centre of the carriageway

Bus curtailment routes

It is sometimes necessary to curtail buses or run alternative routings. When considering any scheme, including schemes not directly involving bus priority, it should be ensured buses can still run safely along diversion and curtailment routes when required. Appropriate tracking should be undertaken and exempting buses on diversion or curtailment routes from banned turns should be considered wherever possible.

These routes are not always obvious, and our Bus Client team should be consulted to determine these routes.

Buses need a dedicated lane for U-turns, with traffic stopped for safety

Bus stands

The provision of sufficient and well-laid-out bus stands is critical to allow the safe, regular and efficient operation of the bus network. Bus stands are required at the end of each route to provide a terminus and mid-route to provide curtailment points.

Bus stands can be used for standing only or for standing and passenger boarding and alighting. They can also be located immediately adjacent to bus stops.

Bus stands should be marked as per TSRGD diagram 1025.1 with the text 'STOP' amended to 'STAND'. Owing to the different stopping restrictions, if a stop and a stand are immediately adjacent, they should be separated by a broken transverse yellow line and marked appropriately.

The buses per hour (bph) frequency for each route determines the number of stand spaces required:

Bus stand space requirement

Buses per hour (total for all routes using stand)	Stand space required
<5	1
5 to 9	2
10 to 12	3
>12	4

The safety of bus drivers at stands must be considered

Each stand space should be a minimum of 12 metres long and three metres wide. As at stops, buses must be able to stop parallel to the kerb, leaving a gap of no more that 200mm between the bus and the kerb edge. The bus stand cage should therefore include not only the area where the bus stands, but also an entry and exit taper to manoeuvre around parked vehicles or other obstacles, and a straightening distance. This allows passengers to board and alight where necessary but also allows the driver to test the ramp and carry out other checks.

Where a stand includes provision for more than one bus, the length of the stand should be sufficient to enable buses to move in and out of each stand independently without relying on drivers remaining on board to move the bus forward. Failure to achieve this will lead to buses queuing for stand space and blocking the highway.

The minimum distance between buses on a stand is nine metres, but swept path analysis must be provided to demonstrate the design works for 12-metre standard and 12-metre electric buses.

Buses must be able to enter and leave bus stands by forward movement only. Reversing on the public highway is not permitted.

Consideration must be given to the location of the stand and the safety of bus drivers. The bus stand and surrounding footway should be well illuminated and maintained. Landscaping should be planned to ensure there are no opportunities for concealment or areas of poor visibility or illumination. The stand should not be isolated. Consideration should be given to natural surveillance and the surrounding land uses reviewed to ensure driver safety is not compromised. The stand should be covered by CCTV. Safe driver walking routes are required between the stands and the driver facilities.

Best practice for stands is that they should be designed so drivers are able to step off the bus onto the footway on the nearside. Off-side stands are not permitted where passengers board or alight.

Speak to our Bus Client team to discuss any departure from the best practice detailed above.

The requirement for bus driver facilities at stands at the termini of each route should be discussed with our Bus Client team.

Managing the road network

Roadworks

Roadworks are a significant contributor to bus delays in London. When approving roadworks the impact on buses should be assessed and mitigation measures implemented. Tools such as Lane Rental and Bus Sense should be considered.

Lane Rental applies a daily charge to any roadworks to encourage them to be undertaken at less disruptive times. The charge also ensures works are carried out efficiently.

Bus Sense, a programme that we partner with boroughs to deliver, takes a strategic approach to the planning and coordination of roadworks to minimise the disruption to bus services.

Advice should be sought from our Network Performance team on setting up these programmes and for broader best practice approaches to managing roadworks.

Roadworks are a significant contributor to bus delays in London. Tools such as Lane Rental and Bus Sense should be considered

Roadworks should be assessed for their impact on bus journey times

Traffic signal timing reviews

We use a real-time optimiser (RTO) system at traffic signals across London. On the bus network, signal timings are designed to improve bus journey times, react to changes in demand and minimise impacts on buses in response to incidents on the network.

Additionally, we have a rolling programme of whole bus route reviews, which includes consideration of route-level performance data and on-street observations, to identify potential changes to the way traffic signals operate along the route. These changes can provide instant operational benefits to buses, and the programme also identifies opportunities for bus priority schemes on the route, both along links and at junctions, in the longer term.

Design checks, implementation and maintenance

This section introduces appropriate assessment tools and highlights the importance of consultation, enforceability and maintenance

Assessment and implementation

Public and stakeholder engagement, plus careful assessment and implementation are key to successful bus priority schemes

Consultation

Stakeholder engagement and public consultation are critical to developing a successful scheme. We recommend that all proposed schemes are discussed with us to determine any impact on buses. The appropriate teams to contact at TfL are detailed in the relevant sections.

Highway authorities will have their own local engagement and consultation policies and plans, but the following points are highlighted:

- Engagement should take place throughout scheme development. It is often easier to address concerns or make changes early in the design process
- Local residents and businesses should be engaged with and/or consulted to understand their concerns and requirements. This can help identify their needs and the effects on them which may need mitigation. It can help get wider buy-in
- Local authority access officers and local groups representing those with a protected characteristic (as defined in the Equality Act 2010) should be consulted throughout scheme development to ensure their needs are understood and responded to

Assessment tools

Healthy Streets check

Our Healthy Streets check is a spreadsheet tool for designers. It helps designers and planners to ensure any proposed changes to the way streets are laid out or used result in improvements. It enables users to check the scheme against the 10 Healthy Streets indicators (comparing it with the existing conditions on that street).

We recommend that designs which propose physical changes to streets on which buses run are assessed using the Healthy Streets check methodology. Embedded in the scoring system are the following metrics, prompting the designer and/ or planner to consider the impact of the scheme on buses:

- Metric 25: Factors influencing bus passenger journey time
- Metric 26: Bus stop accessibility
- Metric 27: Bus lane operation
- Metric 28: Impact of kerbside activities on bus operations
- Metric 29: Bus stop connectivity with other public transport services

Network assessments

Any bus priority measure has the potential to affect the wider network, including other bus routes. Speak to us to understand the wider network implications and identify mitigations where necessary. This will likely require a macro-level review of the surrounding network via our Network Performance team, who can assist with assessing the impact of changes.

Vehicle swept paths and electric vehicle requirements

The movement of buses should be assessed using vehicle swept path software when physical changes are proposed on-street or where a new, or modified, route is proposed. This ensures buses can safely navigate the street environment.

Appropriate tracking should be undertaken, not only on the scheduled bus route, but also on any diversion or curtailment routes where buses are exempt from banned turns and on any out-of-service routes. To determine these routes, our Public Transport Service Planning team should be consulted for new routes and the Bus Client team for existing routes.

We are converting our bus fleet to be zero emission (electric or hydrogen vehicles). The wheelbase of the new electrically powered buses (ZE Buses) is different to existing diesel and hybrid buses. This change affects the turning circle of ZE Buses. Tests have shown that on a 90-degree turn the new ZE Buses require an extra metre of clear road space.

Although a range of buses operate across the London bus fleet at present, to allow for the introduction of the ZE Bus and any potential diversions or out-of-service running, it is imperative that new highway designs, both on the public highway and within private developments, are tested against the 12-metre ZE Bus to avoid expensive remedial works later.

The minimum tracking requirement are:

- A 12-metre ZE Bus travelling at 10mph for turning movements
- No ‘turn on the spot’ manoeuvres
- No part of the bus body should overhang the kerb
- When turning right from an off-side lane, or right-turn pocket, the rear of the bus should not impinge on the adjacent traffic lane where it may conflict with vehicles passing the turning bus in the same direction
- When entering a side road, a bus should not overrun lanes where another vehicle may be present/waiting to leave the side road.

Signs should be simple and clear, with a regular maintenance routine

Our document, Vehicle swept path assessments for highways and traffic engineering schemes on the TfL Road Network (SQA 680), sets out the minimum requirements for vehicle swept path assessments undertaken for highways and traffic engineering schemes on, or that interface with, the TfL Road Network.

It must be used by design teams within TfL Engineering and external design organisations that develop traffic engineering schemes on the TfL Road Network. While not a requirement for schemes developed on the Strategic Road Network, London Borough Road Network or for developments on third-party land, it may be referred to as best-practice guidance.

We have created an AutoTrack file (for use in AutoCAD) of a 12-metre ZE Bus to allow scheme designs to be tested at an early stage of their development. This can be accessed through the following link:

[TfL – Electric Bus Vehicle Tracking – File Request]

If AutoTrack is not being used, we can provide vehicle details to allow the appropriate tracking to be undertaken. Please contact our Bus Client team.

Carriageway surfacing

During scheme development and following implementation, it should be ensured that carriageway surfaces are in good condition and free from defects.

In particular, the bus stop cage, including the approach and exit, should be smooth and free of ruts and potholes. Poor surface condition around stops can cause delay as bus drivers proceed very slowly to ensure passenger safety and comfort.

Defects to service covers and gullies around bus stops should either be remedied promptly or reported to the necessary statutory undertaker.

Advice on this, including material recommendations, can be sought from our Engineering team.

Signing and post-implementation

Signing
Signing of all measures should be in accordance with the Traffic Signs Regulations and General Directions 2016 and the Traffic Signs Manual, noting the specific additional recommendations in this guidance. All signing should be as simple and clear as possible.

Enforcement
Any measure is only effective if it is used correctly by all road users. Where drivers ignore measures, enforcement may be necessary to ensure safe highway operation and realise the planned benefits of a scheme.

To ensure a scheme is enforceable the signing should be correctly installed and maintained and the necessary Traffic Orders should be in place.

Maintenance

For all measures, signs and lines should be kept in good order. A regular sign maintenance routine should be in place, in accordance with a local authority's maintenance requirements.

To ensure a scheme is enforceable the signing should be correctly installed and maintained and the necessary Traffic Orders should be in place

Further reading

TfL documents for further reference

[Mayor's Transport Strategy]

[Bus action plan]

[Guidance note on pedestrian crossings at bus stop bypasses]

[Healthy Streets]

[New cycle route quality criteria]

Our Streets toolkit offers a number of relevant guidance documents on creating high-quality streets and public spaces, including:

- Accessible bus stop design guidance
- Kerbside loading guidance
- London cycling design standards
- Streetscape guidance

Our suite of map-based street analyses enables issues to be considered holistically:

- Strategic bus analysis
- Bus network classifications
- Road safety priorities
- Strategic walking analysis
- Strategic cycling analysis

Vehicle swept path assessments for highways and traffic engineering schemes on the TfL Road Network

For more information, contact
buspprioritydesign@tfl.gov.uk

Department for Transport

Local Transport Note 1/24: Bus user priority

Local Transport Note 1/20: Cycle infrastructure design

Manual for Streets

Traffic Advisory Leaflet 1/24: Motorcyclists using bus lanes

Traffic Signs Manual

Traffic Signs Regulations and General Directions

About us

Part of the Greater London Authority family led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's aims for transport. We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners' and helping to create a safer, fairer, greener, healthier and more prosperous city. The Mayor's Transport Strategy sets a target for 80 per cent of all journeys to be made by walking, cycling or using public transport by 2041. To make this a reality, we prioritise safety, sustainability, health and the quality of people's experience in everything we do.

We run most of London's public transport services, including the London Underground, London Buses, the DLR, London Overground, Elizabeth line, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the IFS Cloud Cable Car.

We manage the city's red route strategic roads and are responsible for the maintenance, management and operation of more than 6,000 sets of traffic lights across the capital. The London boroughs are responsible for all the remaining roads within their boundaries. The experience, reliability and accessibility of our services are fundamental to Londoners' quality of life. Safety remains our number one priority and we continue to work tirelessly to improve safety across the network for both colleagues and customers.

Our vision is to be a strong, green heartbeat for London. We are investing in green infrastructure, improving walking and cycling, reducing carbon emissions, and making the city's air cleaner. The Ultra Low Emission Zone, and fleets of increasingly environmentally friendly and zero-emission buses, are helping to tackle London's toxic air. We are also improving public transport options, particularly in outer London, to ensure that more people can choose public transport or active travel over using their vehicles.

That is why we are introducing the outer London Superloop bus network, providing express bus routes circling the entire capital, connecting outer London town centres, railway stations, hospitals and transport hubs.

We have constructed many of London's most significant infrastructure projects in recent years, using transport to unlock economic growth and improve connectivity. This includes major projects like the extension of the Northern line to Battersea Power Station and Nine Elms in south London, as well as the completion of the London Overground extension to Barking Riverside and the Bank station upgrade.

The Elizabeth line, which opened in 2022, has quickly become one of the country's most popular railways, adding 10 per cent to central London's rail capacity and supporting new jobs, homes and economic growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

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

We are constantly working to improve the city for everyone. This means using information, data and technology to make services intuitive and easy to use and doing all we can to make streets and transport services accessible and safe to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day. None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services. By working together, we are creating brighter journeys and a better city.

April 2025

tfl.gov.uk

PUB25_013