Cycle-friendly design and planning: Overview

THIS BRIEFING COVERS

General principles; traffic volume reduction; urban streets and rural lanes; dual carriageways, inter-urban main roads and major junctions; off-road cycle facilities; other cycling infrastructure; maintenance and funding; ensuring high and consistent quality.

HEADLINE MESSAGES

- Cycling UK's vision is to see a massive step-change in cycle use, so that people of all ages, backgrounds and abilities feel able to cycle safely and confidently for all types of journey.
- Our neighbourhoods, town centres and road networks should be fundamentally redesigned to be 'people-friendly', with cycling not only contributing to a reduction in car dependence, but also benefiting from it. Through-traffic should be channelled onto a limited network of main roads – which should have dedicated cycle provision on or alongside them – while traffic volumes and speeds are kept low on other streets or lanes. Dedicated cycle routes and cycle-friendly access restrictions (e.g. limiting motorised access to town-centres or rat-runs) can encourage people to choose cycling over motorised travel for day-to-day journeys.
- The cycle network should include the whole road network, supplemented by high-quality cycle routes away from the road network, e.g. through parks and open spaces, or along canals, waterfronts and disused rail corridors. Dedicated cycle provision should be safe and feel safe, showing that society positively values those who choose to cycle, and avoiding any impression that they are a 'nuisance' to be 'kept out of the way of the traffic.'
- In general, Cycling UK advocates:
    - 20 mph limits for most built-up streets (including villages), and the widespread adoption of 40 mph or lower limits for rural lanes;
    - Some form of dedicated space on busier urban roads, particularly where higher speed limits are retained; and
    - Parallel off-road facilities for dual carriageways and inter-urban roads.

  However, decisions on appropriate solutions will also need to reflect local factors, such as junctions and junction layouts, and demand for parking or loading.
- In most places, the main priority for significant capital spending in the years ahead will be to redesign larger junctions to be cycle-friendly, or to open up links for cyclists across (or avoiding) major barriers to safe and convenient cycle travel. Opportunities should also be sought to maximise the funding for cycling improvements through the planning system and road maintenance budgets.

Cycling UK VIEW

General principles:

- An overall aim of transport planning should be to increase cycling as part of a strategy to halt and reverse the growth of motor traffic. This could be achieved through pricing mechanisms (e.g. fuel duty, road user charging, and tax incentives for cycling), the availability or cost of parking, or by regulations and physical road closures to limit motor vehicle access whilst maintaining access for cyclists.
- The road network and cycle facilities should be designed and maintained to a high standard, free of potholes, debris and obstructions.

Urban streets and rural lanes:

- 20 mph limits should be the norm for most streets in built-up areas, with exceptions to be identified by local authorities in consultation with local communities.
- Speed limits of 40 mph or lower should be the norm for rural single carriageways, with 20 mph the norm in villages.
- On both residential streets and rural lanes, low traffic speeds should preferably be achieved through quality design, to make the street or lane feel like it is primarily for people not motor vehicles. Cruder forms of traffic calming, such as road humps and narrowings, are a less good option, as they can be unpleasant and unsafe for cyclists, and are generally unpopular.
- On busier urban roads, some form of dedicated space for cyclists should be provided. Alternatively, this may include use of decent width bus lanes or on carriageway cycle lanes, preferably with coloured surfacing. It may also include cycle lanes created from carriageway space involving physical segregation both from motor vehicles and pedestrians, where the relevant highway authority has the will to do this to a high standard. Where there is insufficient space for such provision, the aim must be to reduce traffic volumes and/or speeds, so that cyclists can share the road safely with the other traffic using it.

Dual carriageways, inter-urban main roads and major junctions:

- On dual carriageways and inter-urban main roads, the form of cycle provision normally preferred should be a physically segregated cycle track parallel to the road, with provision made for cyclists to pass under, over, around or through major junctions.
- High speed or multi-lane junctions should either have signalised crossing points, 'early advance' cyclists' traffic lights, and/or safe and convenient bypass routes, bridges or underpasses, so that cyclists can get round or through the junction safely and conveniently in all directions.
- Bridges and tunnels designed to high standards should be provided at appropriate locations to enable cyclists and other non-motorised users to cross major roads where potential links on minor roads or off-road rights of way are currently severed.

Cycling UK VIEW (continued)

Off-road cycle facilities:

- Traffic-free routes should be provided away from roads, e.g. using parks and open spaces, canal and riversides. These should form direct and convenient connections to the wider road network and to key destinations, and should have good riding surfaces.
- Traffic-free routes away from roads should add to, not substitute for, the creation of safe, convenient and pleasant cycling conditions on or adjacent to the road network, so that cyclists have easy access to the full range of destinations that other road users can get to.

Other cycling infrastructure:

- Cycle signing should be provided to help people find suitable routes.
- Sensibly-designed cycle parking should be provided at key destinations to meet the needs of both short-stay visitors and longer-stay users e.g. at schools, workplaces and rail stations which will generally require more secure, sheltered provision. Levels of cycle parking provision should reflect anticipated increases in demand.

Maintenance and funding sources:

- Roads and off-road routes used by cyclists should be surfaced and maintained to a high standard. The needs of cyclists should be reflected in highway authorities' procedures for reporting, inspecting and repairing defects, and in the management of street works, winter maintenance, debris/vegetation clearance and lighting policies.
- The costings of off-road cycle facilities should include provision for their maintenance.
- Opportunities should be sought to maximise the funding available for improved cycling provision from new developments and highway maintenance budgets.

Ensuring high and consistent quality:

- Planners and engineers should be given professional training in the principles of cycle-friendly planning and design.
- The highway network and alterations to it should be subjected to a cycle audit and review process.

BACKGROUND INFORMATION

1. General principles

Cycling UK view:

- An overall aim of transport planning should be to increase cycling as part of a strategy to halt and reverse the growth of motor traffic. This could be achieved through pricing mechanisms (e.g. fuel duty, road user charging, and tax incentives for cycling), the availability or cost of parking, or by regulations and physical road closures to limit motor vehicle access whilst maintaining access for cyclists.
- The road network and cycle facilities should be designed and maintained to a high standard, free of potholes, debris and obstructions.

a. The 'Hierarchy of Provision'

Cycling is best served by solutions that achieve at least one of the following aims:

- reduction in motor traffic
- reduction in traffic speeds
- reallocation of road-space or junction capacity.
- providing cyclists with increased route options and access advantages over motor traffic.

This principle is enshrined in the *Hierarchy of Provision,* which has been developed to guide practitioners through the decision-making process on providing for cyclists on a particular section of the road network. It is set out in varied forms in the Government's *Manual for Streets*[1] and *Cycle Infrastructure Design* (LTN 2/08),[2] and *Shared Use Routes for Pedestrians and Cyclists* (LTN 1/12)[3] and is thus theoretically embedded in official cycling policies. Cycling UK recommends the following version for identifying solutions for existing roads:

Consider first ↓	i. Traffic volume reduction, traffic management
	ii. Traffic speed reduction
	iii. Junction redesign or hazard site treatment
	iv. Reallocation of carriageway space, e.g. quality cycle facilities
Consider last	v. Conversion of footways to shared use for pedestrians & cyclists

The solutions adopted for cycling should focus on and contribute to the *Hierarchy's* top measures, i.e. reducing the speed and volume of motor traffic, and/or reducing junction capacity and/or reallocating roadspace.

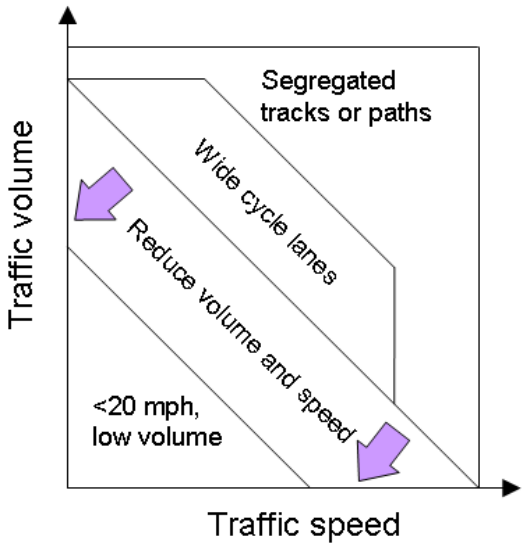
Tackling traffic volume can be achieved by limiting the availability of, or restricting access to, road-space or parking space, or by charging for the use of these in various ways (e.g. road user charging, fuel duty, parking charges or levies). Exempting cyclists from more localised regulations – e.g. from the closure of rat-runs, town centre access restrictions, one-way streets or banned turns – can provide an advantage for cycling over motorised travel. Such measures create an incentive for people to cycle rather than travel by car, particularly for local journeys.

Reallocation of roadspace can include segregated facilities where there is the political will to implement them to a high standard. Conversely, the creation of segregated facilities by converting footways (i.e. without any roadspace reallocation) is a solution that is normally only acceptable alongside rural and inter-urban roads, where there is unlikely to be conflict with pedestrians, or with motor traffic at junctions, side-roads or driveways. This is why footway conversions are at the bottom – the *Hierarchy*'s underlying principle is that pavements should be for pedestrians and that the carriageway should be safe and attractive for cycling.

Cycle routes away from roads through green spaces or other corridors (e.g. alongside waterways or disused railway corridors) are also hugely beneficial, particularly for children or novice cyclists. Cycling UK believes that they should be treated separately from the *Hierarchy of Provision*, on the grounds that high-quality off-road routes (i.e. providing they are well connected, designed and maintained) are bound to offer benefits. Nonetheless, such routes should be provided in addition to, not instead of, improving conditions on the road network.

As the options to be considered are not necessarily mutually exclusive, it is important not to approach the *Hierarchy* in rigid order. Equally, just because a measure at the top proves impossible, there is no obligation to introduce a measure towards the bottom – in some cases, that could prove more detrimental than doing nothing.

Choosing when and where to implement different interventions can be assisted with the use of a speed/flow diagram or table, for example Table 4.2 of *Shared Use Routes for Pedestrians and Cyclists* (LTN 1/12). Where speeds and volumes are high and it is difficult to restrict either (on an interurban dual carriageway, for instance), a segregated cycle track is likely to be the best solution. A suggested **speed/flow diagram** is as follows:



"The road network is the most basic (and important) cycling facility available, and the preferred way of providing for cyclists is to create conditions on the carriageway where cyclists are content to use it, particularly in urban areas. […]Measures that reduce the volume or speed of motor traffic benefit other road users by making the roads safer and more pleasant for them to use.'
Cycle Infrastructure Design (DfT, 2008).

- **Evidence supporting the Hierarchy**

Strong and growing evidence supports the approach advocated by the *Hierarchy*, including:

- *Cycling for transport and public health*[4]- this reviewed the evidence on how the built environment affects cycle use and found a positive association between levels of cycling and the provision of cycle routes and lanes.
- While 20 mph schemes were not highlighted in the above report, the DfT-commissioned review of the evidence on the relationship between *infrastructure and cyclist safety*[5] did find that such schemes – and other measures that reduce speed, such as raised tables, traffic signals and tighter corners at junctions – have strong cycle safety benefits. The review also noted that countries with high quality cycle networks have very good overall cycle safety, but found no evidence of direct safety benefits from cycle facilities, segregated or otherwise. Indeed, it cited evidence from Denmark that cycle facilities may reduce the risks cyclists face between junctions, but increase them AT junctions, which is where 75% of cyclists' collisions occur.[6]
- *Transport, Physical Activity and Health*[7] provides a more general overview of the evidence on the relationship between transport, physical activity and health, including effective ways to increase active travel. It noted the benefits of dedicated cycle infrastructure as well as many 'smarter choices' measures, such as cycle training and individualised marketing. However, it concluded that the strongest relationship was with traffic restraint. To quote the summary: **"The key relationship is between car use and physical activity. In order to increase levels of physical activity, it is necessary to reduce use of the car."**

b. Types of cyclists

There are many types of cyclists, of all ages, experience and abilities. When deciding on the approach to take to cycle provision in any given location, therefore, the sort of cycling it is likely to accommodate is another major consideration – i.e. children cycling on a street to school may benefit not only from lower speed limits, but also a greater degree of segregation than confident, fast cycle commuters who typically prefer to use the carriageway.

c. High standards of network planning, design and maintenance

Whatever the measures chosen, the whole road network that is available to cyclists should cater properly for them, and dedicated cycle facilities should meet with best practice. The ultimate aim should be to ensure that cyclists are able to reach their destinations comfortably, conveniently, directly, in attractive surroundings and in both actual and perceived safety, just like any other road user.

Too often, this need is ignored, and cycle provision in particular is substandard, inconsistent, and/or compromised by inadequate planning, bad design and poor implementation. This inevitably makes cycle journeys disconnected and many dedicated 'facilities' unattractive, hazardous and even unusable.

Keeping surfaces free of defects is vital too – cyclists suffer more than most from them, while the efficiency of cycling is greatly affected by surface quality.

2. Traffic volume reduction

As mentioned above, cycle-specific measures can contribute to traffic volume reduction, especially if they give cycling an advantage over driving, e.g.:

- exemptions from motorised access restrictions, one-way streets, banned turns and other traffic regulations;
- cycle gaps in road closures to give cyclists quiet and direct routes that are not available to motor traffic.

In turn, less motor traffic makes cycling more attractive.

Non cycle-specific measures that reduce the volume of motor traffic include:

- pricing mechanisms (e.g. fuel duty, road user charging)
- management of car parking, either by reducing availability or increasing prices;
- redistribution of the carriageway by introducing bus lanes or wide nearside lanes;
- land-use planning that reduces the need to travel particularly by motor vehicle – see Cycling UK's forthcoming briefing on planning);
- travel plans – see Cycling UK's briefings *Cycle-friendly employers* and *Smarter Choices.*

Cycling UK's campaigning briefings are all available at: www.cyclinguk.org/campaignsbriefings

3. Urban streets and rural lanes

Cycling UK view

- 20 mph limits should be the norm for most streets in built-up areas, with exceptions to be identified by local authorities in consultation with local communities.
- Speed limits of 40 mph or lower should be the norm for rural single carriageways, with 20 mph the norm in villages.
- On both residential streets and rural lanes, low traffic speeds should preferably be achieved through quality design, to make the street or lane feel like it is primarily for people not motor vehicles. Cruder forms of traffic calming, such as road humps and narrowings, are a less good option, as they can be unpleasant and unsafe for cyclists, and are generally unpopular.
- On busier urban roads, some form of dedicated space for cyclists should be provided. Alternatively, this may include use of decent width bus lanes or on carriageway cycle lanes, preferably with coloured surfacing. It may also include cycle lanes created from carriageway space involving physical segregation both from motor vehicles and pedestrians, where the relevant authority has the will to do this to a high standard. Where there is insufficient space for such provision, the aim must be to reduce traffic volumes and/or speeds, so that cyclists can share the road safely with the other traffic using it.

a. Lower speed limits

A reduction in traffic speeds will always benefit cyclists and pedestrians.

- **20 mph for most built-up areas**

Over the past few years, the Government has made it easier and less costly for local authorities to implement 20 mph, which Cycling UK believes should be the norm for most streets in built-up areas and in villages. Local authorities should consult with their communities about making any exceptions, as there may be arguments in favour of lower speeds even on a significant thoroughfare if it is heavily used by cyclists and pedestrians.

20 mph limits are very popular: 72% of respondents to the 2011 *British Social Attitudes*[8] survey supported their use in residential areas (only 11% were against them).

20 mph speed limits and zones have led to substantial reduction in injuries, but the benefits of reduced speeds go beyond this. They help create more people-centred environments, with more walking and cycling likely, better quality of life and the potential to reduce vehicle emissions.

- **40 mph for most rural single carriageways**

In rural areas, speed reduction can improve conditions not just for cyclists but for all road users as most fatalities occur on rural roads: on average, each year between 2008 and 2012 (inc.), 38% of fatal crashes occurred on rural A roads, with a further 21% on other rural roads.[9] 40 mph should therefore be the default speed limit that should apply on most rural single-carriageway roads.

b. Achieving low speeds

There is a variety of high quality design measures to make a street or rural lane feel like it is primarily for people, not motor vehicles, and to encourage drivers to proceed with caution, e.g. varied (but cycle-friendly) surfacing materials, planting, the layout of on-street parking areas and, on certain roads, the removal of centre lines. A change of status is another option, e.g. in rural areas, a road can be designated a 'Quiet Lane' under section 268 of the *Transport Act 2000*. (The case for lower speed limits, and the means of achieving them, are described more fully in Cycling UK's forthcoming briefing *Speed and speed limits.* www.cyclinguk.org/campaignsbriefings).

Cruder forms of traffic calming, such as road humps and narrowings, are a less good option, as they can be unpleasant and unsafe for cyclists, and are generally unpopular. Where traffic calming is used to reduce speeds, it must therefore be carefully designed and built to avoid creating difficulties or unforeseen hazards. A cycle audit will highlight any potential problems.

c. Dedicated space for cyclists / reallocation of road space

On busier urban roads, some form of dedicated space for cyclists should be provided. Where there is insufficient space for this, the aim must be to reduce traffic volumes and/or speeds, so that cyclists can share the road safely with the other traffic using it (see above).

- **Cycle lanes:** A cycle lane is space for cyclists marked by a painted line on the road, either using solid white lines (mandatory cycle lanes, which motor vehicles may not enter or park in during their hours of operation) or broken lines (advisory lanes, which drivers are advised to keep clear for cyclists, but where it is not an offence to enter or park unless there are other indications of a parking restriction, e.g. yellow lines). Any proposal for a cycle lane must consider the individual characteristics of the road and ensure adequate width. Cycle lanes should not be seen as a universal solution – a speed/flow diagram (see p5 above) may be useful in determining when to use them.
- **Bus lanes:** Bus lanes are another way to reduce the road space available to other motor traffic and Cycling UK believes that they should always be open to cyclists. Decent width bus lanes not only form a 'safe haven', at least for relatively confident cyclists, but are also conveniently direct routes into town and city centres. In London, bus lanes are much valued facilities, and their strict enforcement in recent years has doubtless helped the recent growth of cycling on London's main roads.
- **Segregation:** physical segregation from motor traffic and pedestrians works well in countries like Denmark and the Netherlands. However, a clear distinction needs to be made between high-quality segregation and the kind of segregated facilities which is positively harmful to the promotion of cycle use and cyclists' safety.

High quality segregated facilities will typically have the following characteristics:

- They will avoid conflict with motor vehicles at junctions, providing cyclists with at least the same level of junction priority as they would have if they used the road;
- They will also avoid creating conflict with pedestrians, particularly at bus stops or pedestrian crossing points;
- They will be a comfortable width for the expected levels of cycle use;
- They will enable cyclists to join or leave the facility safely and conveniently, not only at the start and end points and at junctions, but also at regular intervals along the route;
- They will be surfaced and maintained to a high standard.

Whilst junction priority is relatively easily achieved under the traffic rules of countries where quality segregation is common, it is a good deal less straightforward in the UK. Countries such as Denmark, the Netherlands and Germany have traffic laws that give clear priority to pedestrians and cyclists over drivers turning across their path, even where drivers have a green light at a signalised junction. Moreover, these rules are well respected, thanks to 'stricter liability' rules that create an assumption that drivers who collide with pedestrians or cyclists are responsible for any resulting injury damages. By contrast, the ability of pedestrians and cyclists in Britain to assert priority at junctions has been progressively eroded, not least by junction designs with wide turning circles, which invite drivers to maintain their speed on corners rather than to give way.

Recent design guidance in the Government's *Manual for Streets*[10] now encourages the use of tighter corners, an approach which may help to regain pedestrian and cyclist priority, at least at junctions with minor side roads. The recent segregated cycle facility on the Old Shoreham Road (see case study on the next page) is a good example of this approach. However, it remains to be seen whether design solutions alone will be sufficient to regain the necessary priority for segregation to work as well as it does in continental countries – including at traffic-light and roundabout junctions as well as at side-roads – or whether new legislation will also be required.

In the meantime, Cycling UK will support authorities who seek to implement high quality segregated facilities under the current rules, where they demonstrate the will to provide both the road-space and the funding necessary to deliver segregated facilities to a high standard, particularly at junctions. Conversely, where the local authority's cycle infrastructure budget extends to little more than some white lining, it is almost invariably preferable (at least in urban areas) to use this to create on-carriageway facilities than to convert pavements to shared use.

Although on-road facilities on urban main roads may not create the conditions where people of all ages and backgrounds are willing to take up cycling straight away, they may still be a more cost-effective means to boost cyclist numbers and hence the strength of 'the cyclists' vote' locally. In turn, this helps build the political conditions where campaigns for quality segregation become possible. London achieved substantial growth in cycle use during the first decade of the millennium, primarily through measures other than segregation. Other towns and cities, which are starting to create a cycling culture, may be well advised to follow their lead.

Segregation case study: Old Shoreham Road, Brighton

Old Shoreham Road is a main road leading westwards from Brighton's town centre. It was previously a wide road where speeding was prevalent. However 'hybrid cycle lanes' have recently been introduced along it, with the cyclists separated both from motor vehicles (on their right) and pedestrians (on their left) by half-height kerbs. These have not only created much better cycling conditions, but have also reduced traffic speeds, thereby also benefiting the safety of other road users, particularly pedestrians crossing the road.

Cyclists' priority at minor side roads is maintained by placing the cycle route on a raised table, and by marking the give way lines to the left of this (however it remains to be seen how well this priority will be observed by drivers turning into rather than out of the side-roads). At traffic light junctions, the designers have adopted the Danish practice of returning the cyclists to the main carriageway (using a well-designed 'protected merge'). Cyclists are also given an 'advance start' at the traffic lights through a cycle-specific traffic signal-head (however, its meaning is not entirely clear – changes in Government traffic signing regulations could help improve this).

The scheme is not without a few compromises – for instance, cyclists and pedestrians have to share relatively limited space where the facility crosses a railway bridge. However it represents a genuine attempt to achieve quality segregation within current UK rules. Cycling UK will support similar schemes elsewhere, and will monitor how they perform in terms of increasing cycle use and improving cyclists' safety, and their value for money in achieving these aims. Depending on the outcomes, we will press for whatever changes to traffic regulations may be necessary to maximise the benefits of these schemes, particularly in terms of cyclists' priority and safety at junctions.

For more, see:
www.cyclinguk.org/news/2012-06-18/brightons-old-shoreham-road-cycle-ways-to-future

For detailed guidance on design and maintenance specifications see Cycling UK's briefings: *On-road design for cycling* and *Highway maintenance* (both forthcoming). As a useful 'rule of thumb', the design of a cycle lane or track should adhere to the dimensions appropriate for a lane of motorised traffic, but with the widths halved.

4. Dual carriageways, inter-urban main roads and major junctions

Cycling UK view

- On dual carriageways and inter-urban main roads, the form of cycle provision normally preferred should be a physically segregated cycle track parallel to the road, with provision made for cyclists to pass under, over, round or through major junctions.
- High speed or multi-lane junctions should either have signalised crossing points, 'early advance' cyclists' traffic lights, and/or safe and convenient bypass routes, bridges or underpasses, so that cyclists can get round or through the junction safely and conveniently in all directions.
- Bridges and tunnels designed to high standards should be provided at appropriate locations to enable cyclists and other non-motorised users to cross major roads where potential links on minor roads or off-road rights of way are currently severed.

a. Physically segregated cycle tracks

The speed and volume of motor traffic on dual carriageways and inter-urban main roads may make cyclists feel intimidated and unsafe. In these situations, the majority of cyclists would prefer a parallel cycle track to the on-road alternative. Cycle tracks should be planned, designed and maintained in accordance with best practice. The main issues to consider are: adequate width and surfaces; priority over side roads; safe negotiation of major junctions; merges; and ongoing maintenance (see also 3c above).

b. High speed, multi-lane junctions

Major roads, large roundabouts and complex junctions can create the most intimidating and unpleasant environment for cyclists. If it is impossible for cyclists to negotiate them safely and conveniently, they can also sever their access to services, communities and leisure opportunities.[11]

In most places, therefore, the main priority for significant capital spending in the years ahead will be to redesign larger junctions to be cycle-friendly, or to open up links for cyclists across (or avoiding) major barriers to safe and convenient cycle travel, facilitating cycle movement in all the directions available to motor traffic. The assumption that "There won't be any cyclists anyway", too often made by road planners, turns into a self-fulfilling prophesy. Of course cyclists will stay away if conditions remain hostile to them, and the assumption merely perpetuates our society's excessive dependence on motorised mobility.

Major roads: good, signal-controlled, crossing points (e.g. toucans) in convenient locations should be provided for cyclists and pedestrians over busy roads, especially where the road cuts across a desire line or right of way.

Junctions and large roundabouts/gyratories: one of the best ways to cater for cyclists in the design stage is to place the emphasis on safety, not capacity. Signal controlled junctions are the most common kind of junction on busier roads in urban areas and in general they are safer for cyclists than roundabouts. However, they can create difficult conditions or delays for them, often quite unnecessarily, but this can be avoided if dealt with early enough in the design process.

Large junctions can benefit not only from Advanced Stop Lines (ASLs) but also from separate signals for cyclists because they allow them a few seconds to move out into the junction ahead of the motor vehicles behind them. High quality bypasses for cyclists can also provide a valuable solution, as long as they are reasonably quick, direct and well signed.

Bridges and tunnels/subways (grade separation): Grade separation at junctions or over busy roads may well be the best option where traffic volumes and speeds are high. Bridges should be of sufficient width, offer comfortable ramp gradients and good visibility on entry and exit, and avoid barriers that make the facility difficult to negotiate by cycle. Subways may also be a solution, provided they have sufficient width, headroom and sightlines and provided that personal security is not likely to be a problem or if it can be designed out.

For more on on-road design and other infrastructure features, see our series of 'Designed for cycling' briefings at www.cyclinguk.org/campaignsbriefings (some forthcoming).

5. Off-road, motor traffic-free cycle facilities

Cycling UK view

- Traffic-free routes should be provided away from roads, e.g using parks and open spaces, canal and riversides. These should form direct and convenient connections to the wider road network and to key destinations, and should have good riding surfaces.
- Traffic-free routes away from roads should add to, not substitute for, the creation of safe, convenient and pleasant cycling conditions on or adjacent to the road network, so that cyclists have easy access to the full range of destinations that other road users can get to.

Cyclists benefit from traffic-free routes that connect conveniently with the road network (e.g. in parks, open spaces, along canal towpaths, rivers and disused railway lines). All off-carriageway tracks should be designed with sufficient width and visibility to allow safe and comfortable use by the number of pedestrians and cyclists who use (or are expected to use) them, and they should be maintained to high standards.

However, cyclists still need to use the road network itself to get to their destinations, so traffic-free routes away from roads should not shift the focus from providing good conditions for cycling along the carriageway itself, or adjacent to it.

It is important to ensure that the design of off-road routes – and in particular any access controls – is compliant with both the letter and spirit of disability discrimination legislation, and does not hinder their use by people using non-standard cycles.

6. Other cycling infrastructure

Cycling UK view
- Cycle signing should be provided to help people find suitable routes.
- Sensibly-designed cycle parking should be provided at key destinations to meet the needs of both short-stay visitors and longer-stay users e.g. at schools, workplaces and rail stations which will generally require more secure, sheltered provision. Levels of cycle parking provision should reflect anticipated increases in demand.

Cycle signing: Clear directional signing can help cyclists find routes and advise them in advance about how to navigate their way through complex junctions. 'Cyclists dismount' signs should, however, be avoided unless there is a demonstrable need.

Cycle parking: Good quality cycle parking is not only a key element in developing a cycle-friendly environment, but it also sends out a positive promotional message about cycling. It should be provided at all major destinations, including high streets, shops, educational establishments, hospitals, employment sites, public transport interchanges and leisure attractions. Domestic cycle parking should also be included in housing developments, e.g. as a planning obligation.

It is important to ensure that cycle parking is secure, easy to use and conveniently located and fit for the particular purpose. If not, cyclists will be reluctant or unable to use it. Also, the quantity should not be decided on the basis of existing use, but likely demand – good, new cycle parking almost always fills up remarkably quickly.

For more on on-road design and other infrastructure features see our series of 'Designed for cycling' briefings at www.cyclinguk.org/campaignsbriefings (some forthcoming)

7. Maintenance and funding sources

Cycling UK view
- Roads and off-road routes used by cyclists should be surfaced and maintained to a high standard. The needs of cyclists should be reflected in highway authorities' procedures for reporting, inspecting and repairing defects, and in the management of street works, winter maintenance, debris/vegetation clearance and lighting policies.
- The costings of off-road cycle facilities should include provision for their maintenance.
- Opportunities should be sought to maximise the funding available for improved cycling provision from new developments and highway maintenance budgets.

Surfaces: both on-road and off-road cycle route surfaces should be as smooth and sound as possible, and preferably machine-laid. Coloured surfacing to denote and highlight a cycle facility is often helpful.

Maintenance: Approximately 13% of cyclists' injuries reported by members to Cycling UK's solicitors are the result of road defects[12], while the discomfort from poor or inadequately swept road surfaces can be a major deterrent to cycling.
Highways authorities' road maintenance policies and procedures should make sure that: no cycle facility is ignored; attention is particularly paid to the 2m strip next to the kerb where most cycling takes

place; inspection is frequent; reporting problems is easy (e.g. via a website / hot-line); defects are dealt with swiftly; winter maintenance is effective; sweeping and vegetation clearance is regular and properly done; and routes are well lit.

To ensure that off-road cycle facilities are maintained to a standard that encourages cyclists to use them, the finance needed to look after them should be included in the original costings.

Funding: There are several sources of funding that can be used to provide for cycling. These include developer contributions (e.g. Section 106 of the *Town and Country Planning Act, 1990,* and Section 278 *of the Highways Act 1980* in England and Wales; Section 75 planning agreement of the *Town and Country Planning (Scotland) Act 1997*); and the relatively new community infrastructure levy[13] (CIL, England and Wales).

It is also possible to look for opportunities to improve cycle provision as part of the highway maintenance programme, putting money from that budget towards it. New York City's Department of Transport has delivered significant investment in cycling infrastructure by this means, and UK local authorities (e.g. Plymouth) are starting to follow their lead.

Cycling UK urges all UK highway authorities to consider how their cycle infrastructure and planned road maintenance programmes could be linked, to maximise the benefits for cycling from the latter.

8. Ensuring high and consistent quality

Cycling UK view:
- Planners and engineers should be given professional training in the principles of cycle-friendly planning and design.
- The highway network and alterations to it should be subjected to a cycle audit and review.

Professional training: Cycle audit and review should complement professional training for planners and engineers in the principles of cycle-friendly planning and design. Undergoing national standards cycle training and becoming versed in the principles behind it, also helps practitioners understand the needs of cyclists and the manoeuvres they are most likely to make in any given situation – and they should ensure that all designs are consistent with it.

Cycle audit and review: *Cycle audit* is applied to new highways and traffic schemes, while *cycle review* is about assessing cycling conditions on an existing network. They should make sure that schemes and alterations will not (or are not having) adverse impacts on cyclists and identify opportunities to provide further benefits for them. These procedures are best carried out from a cycle, and should involve local cycling representatives – their perspective, expertise and local knowledge is invaluable. Some local authorities have adopted a simplified version of cycle audit procedures, such as Greater Manchester's *Concise Pedestrians and Cycle Audit* system.[14]

FURTHER READING

- Cycling UK's briefings on infrastructure, road safety, local transport, towpaths: www.cyclinguk.org/campaignsbriefings
- Cycling England's design checklists: http://ciltuk.org.uk/AboutUs/ProfessionalSectorsForums/Forums/Cycling/TheHub/Infrastructure.aspx
- Cycling Embassy of Denmark's *Collection of Cycle Concepts* (2012, 2nd edition) www.cycling-embassy.dk/2013/08/01/cycle-concepts2012/
- DfT's Local Transport Notes, including *Cycle Infrastructure Design* (LTN 2/08). https://www.gov.uk/government/collections/local-transport-notes
- DfT's *Manual for Streets* 1 & 2. (2007 / 2010). www.gov.uk/government/publications/manual-for-streets / www.gov.uk/government/publications/manual-for-streets-2
- Fairfax Advocates for Better Bicycling's *Guide for Reviewing Public Road Design and Bicycling Accommodations for Virginia Bicycling Advocates* (2010, USA) www.fabb-bikes.org/guide/FABBGuide-LowRes.pdf
- Sustrans *Handbook for cycle-friendly design* www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/Sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf
- SWOV road safety publications (Netherlands): https://www.swov.nl/index_uk.htm
- Transport for London's *London Cycling Design Standards*. (2005). www.tfl.gov.uk/businessandpartners/publications/2766.aspx
- Transport for Scotland's *Cycling by Design*. 2010 (revised 2011) www.transportscotland.gov.uk/files/documents/reports/Cycling_by_Design_2010__Rev_1__June_2011_.pdf

[1] DfT. *Manual for Streets*. Thomas Telford Publishing. March 2007. www.gov.uk/government/publications/manual-for-streets
[2] DfT. *Cycle Infrastructure Design*. Local Transport Note 2/08. 2008. October 2008. www.gov.uk/government/uploads/system/uploads/attachment_data/file/3808/ltn-2-08.pdf
[3] DfT. *Shared Use Routes for Pedestrians and Cyclists.* Local Transport Note 1/12. September 2012. http://assets.dft.gov.uk/publications/ltn-01-12/shared-use-routes-for-pedestrians-and-cyclists.pdf
[4] S D S Fraser & K Lock. *Cycling for transport and public health: a systematic review of the effect of the environment on cycling*. Published in the European Journal of Public Health. 2010. http://eurpub.oxfordjournals.org/content/21/6/738.abstract?etoc
[5] S Reid & S Adams. *Infrastructure and cyclist safety*. TRL. 2011. http://assets.dft.gov.uk/publications/infrastructure-and-cyclist-safety/infrastructure-and-cyclist-safety.pdf
[6] DfT. Calculated from Table RAS 20006, *Reported Road Casualties Great Britain: 2012*. Sept. 2013. https://www.gov.uk/government/publications/reported-road-casualties-great-britain-annual-report-2012. This figure has remained about the same for several years.
[7] R L Mackett & B Brown. *Transport, Physical Activity and Health: Present knowledge and the way ahead*. Centre for Transport Studies, University College London. 2011. http://www.ucl.ac.uk/news/pdf/transportactivityhealth.pdf
[8] DfT: *British Social Attitudes Survey 2012*: *public attitudes to transport.* July 2013. www.gov.uk/government/uploads/system/uploads/attachment_data/file/209890/bsa-2012.pdf (fig. 4.1).
[9] DfT. *Reported Road Casualties Great Britain: 2012*. Sept. 2013. Table RAS10002. https://www.gov.uk/government/publications/reported-road-casualties-great-britain-annual-report-2012
[10] See reference 1.
[11] For a thorough discussion, see *Breaking Point, the severance by road schemes of routes used by cyclists equestrians and ramblers*, published by Cycling UK, The British Horse Society, The Ramblers and the Countryside Commission, 1993
[12] Figures from Cycling UK's solicitors, Russell, Jones and Walker (as at 30th June, 2010)
[13] For an overview, see www.gov.uk/government/policies/giving-communities-more-power-in-planning-local-development/supporting-pages/community-infrastructure-levy
[14] The IHT produced the official, Government-commissioned cycle audit and review guidelines in 1998 (http://ciltuk.org.uk/Portals/0/Documents/The%20Hub/infrastructure/Cycle_Audit_and_Review_by_Department_for_Transport.pdf), but some local authorities have published their own, simpler procedures, e.g. COPECAT from GMTPA http://www.salford.gov.uk/d/copecat-quick-ref-guidance.pdf