Chapter 3
Links – Plain links without special cycle facilities

Contents

3.1 Introduction and general issues

3.1.1
This chapter deals with links where there are no cycle-specific facilities such as cycle lanes or cycle tracks. These links are referred to as 'plain' links.

3.1.2
Conditions for cycling can be improved by reducing motor vehicle speeds and flows. Reduced speeds and speed differentials between cyclists and motorists will reduce potential accidents and improve cyclists' comfort. Reduction in motor vehicle flows will have a similar effect. On streets where existing motor traffic flows and speeds are low, specific cycle facilities are generally not necessary or desirable (there are exceptions to this such as streets where there is a high proportion of Heavy Goods Vehicles).

3.1.3
When considering the options for improving conditions for cyclists on a link, the designer should first consider traffic management measures to reduce traffic volume, followed by motor traffic speed reduction where practical. It is however recognised that on many main roads this may not be practical. Only when the opportunities for introducing these measures on a link have been assessed should cycle specific measures be considered as referred to in Chapter 4. However, it should be noted that some cycle specific measures such as cycle lanes can be effective as a speed restraint measure, thereby avoiding the need for physical traffic calming features.

3.1.4
On links with low traffic speeds but high levels of congestion, ways to ensure easy passage for cyclists should be provided. The most effective way of achieving this is by the provision of cycle lanes to allow cyclists to pass queuing traffic (See Chapter 4 for details of cycle lanes). When providing cycle lanes in these situations, care is required to avoid putting cyclists at undue risk when passing motor traffic on the nearside.

Opening up one-way streets to "through" cyclists increases overall network capacity

Quiet routes (e.g. town centre back-streets, residential roads, and roads through parks)

3.1.5
If all vehicle flows are less than 3000 veh/24hours and recorded 85 percentile vehicle speeds are less than 30mph then the route would be classified as a 'quiet route' and no lanes or tracks are required on the link.

3.1.6
However, flows below 1500 veh/24hours and speeds below 20mph should be the target, and measures to reduce traffic volume and speed should be considered to achieve this.

The target for quiet cycle routes along back streets, residential roads and roads through parks should be flows below 1500 veh/24hours and speeds below 20mph

Where motor traffic flows and speeds are low, specific cycle facilities are generally not needed

3.1.7
The level of visibility on quiet routes should be appropriate to the location. Reduced sight lines may have a slowing effect on traffic (see also Chapter 4 for further information).

Main town centre roads

3.1.8
On congested main roads, for example in busy high streets, where no cycle lanes or tracks are feasible, 20mph speed limits with complementary changes to the streetscape are the preferred option.

3.1.9
Wide nearside lanes of 4.0-4.5m width may be appropriate instead of cycle lanes, particularly where there is kerbside activity, such as loading.

Use of cycle symbols

3.1.10
Cycle symbol markings (Diagram 1057) should be used to provide visual continuity of cycle routes for users on roads where cycle lanes or tracks are not provided. They should be placed along the normal line followed by cyclists. This method of route confirmation is especially appropriate on routes off main roads with frequent changes of direction. Figure 6.1 in Chapter 6 gives more guidance on the use of Diagram 1057 symbols.

1057 Symbol

Cycle symbol markings should be provided at a minimum frequency of 50m intervals on cycle routes with no cycle lanes or cycle tracks (plain links) to provide visual continuity

3.2 Traffic management and volume reduction

3.2.1
Reducing the volume of motor traffic on a link is one of the two major factors in increasing the attractiveness of the link for cyclists. The other is traffic speed reduction.

Synergies

3.2.2
Many measures to reduce motor traffic volumes on some roads are part of wider transport policy and not appropriate to be covered in this document (for example, improving public transport and congestion charging). However, there are measures that can be introduced locally that can be used to regulate or reduce traffic flows, thereby improving conditions for cyclists. These measures include:

- Motor vehicle restricted areas (with cycle access)

- Point closures
- Turning restrictions
- One-way streets
- Width, weight and height limits
- Signing strategies
- Footway widening
- Streetscape improvements

Review the application of general traffic regulations e.g. turning restrictions, width restrictions and road closures, and exempt cyclists from them

Vehicle restricted areas

3.2.3

Provision of access for cyclists through pedestrianised areas is a good way of providing route options for cyclists and is particularly important if the alternative routes are less attractive (e.g. heavy and/or fast traffic, indirect or steep gradients).

3.2.4

Guidance on this issue can be found in the following documents:

- **LTN1/87** – Getting the Right Balance – Guidance on Vehicle Restriction in Pedestrian Areas
- **LTN 9/93** – Cycling in Pedestrian Areas
- **TRL582** – Cycling in Motor Vehicle Restricted Areas
- **LTN 1/04 (draft)** – Policy, Planning and Design for Walking and Cycling

Authorities are required to review all pedestrianised town centres served by LCN+ routes, with a view to encouraging cycling

Plan for direct and safe access to town centres from all directions

Point closures, turning restrictions and one-way streets

3.2.5

These measures can be provided as part of an area-wide traffic management scheme or as a stand-alone facility. Traffic Regulation Orders are required in all cases to provide new or change existing restrictions.

3.2.6

Point closures are used to close access to a street (one-way or two-way). Cyclists should always be provided with access through point closures. The minimum clear width for cycle gaps should be 1.5m. A greater width is desirable for two-way cycle gaps, particularly where cycle flows are high.

Where a gap greater than 1.5m is provided, supplementary measures to prevent unauthorised use by motor vehicles should be considered.

Cyclists should be provided with access through point closures

Cycle by-passes to general traffic restrictions should be a minimum of 1.5m clear width

3.2.7
Banning motor vehicles from making specific manoeuvres at junctions is another method of locally reducing traffic on a link (see below for specific restrictions on HGVs). Where only cyclists are permitted to make a turn, measures need to be taken to ensure that this can be done safely.

One-way streets

3.2.8
The introduction of new one-way streets is not recommended without careful consideration because they can result in a significant diversion for cyclists from their preferred direct route. They can also result in higher motor vehicle speeds with a consequent increase in risk to cyclists.

3.2.9
Wherever possible, provision should be made to permit cyclists to cycle both ways in one-way streets. Details of contra-flow cycle provision methods in one-way streets are given in Chapter 4. Layouts and signing requirements to exempt cyclists from one-way streets will be shown in a Local Transport Note due to be published in 2005[10] and on drawings CCE/B13, 14 and 15 in Appendix C.

[10] This was provisionally referred to in draft LTN 1/04 as LTN 3/04 – Signs and markings for cyclists

Permit cyclists to ride both ways in one-way streets

Restrictions on HGVs

3.2.10
Conflict between cyclists and Heavy Goods Vehicles (HGVs) is the cause of a high proportion of cyclist fatalities and injuries. It is therefore desirable, where feasible, to limit the number of HGVs on links which are part of cycle routes

and/or to restrict access or turning movements for HGVs to address a specific cyclist/HGV conflict at a junction.

3.2.11
Height, width and weight restrictions can all be used to limit the number of HGVs on a street. These are likely to be more effective when supported by physical restrictions. Cycle by-passes to width restrictions may be appropriate and these should provide a minimum of 1.5m clear width for cyclists.

Signing

3.2.12
Signing strategies can be used to direct the majority of traffic along suitable roads and away from unsuitable ones such as residential or narrow streets. This, in conjunction with complementary measures such as traffic calming and access restrictions, can be used to create attractive conditions for cyclists on routes that are not on the primary road network.

3.2.13
Signing for cyclists themselves will also be important so that they are aware of the facilities provided.

3.3 Traffic speed reduction – general

3.3.1
Many existing streets may be suitable for cycling without provision of specific cycle facilities. A maximum 85th percentile speed of 20mph should be the objective on these streets.

3.3.2
There are three basic types of treatment that can be used in order to reduce traffic speeds:

- Homezones
- Lower speed limits on individual streets or zones (with or without traffic calming)
- Traffic speed control measures (traffic calming and technology-based systems such as camera enforcement)

Home Zones

3.3.3
Home Zones give added focus to the non-motor traffic functions of streets and will often provide a good cycling environment. A 10mph limit normally applies, which is low for cycling, particularly on strategic routes such as the LCN+. However, this type of facility may be the most appropriate solution in some circumstances. A high level of consultation with local residents will be required.

Home zone without on-street parking

Lower Speed Limits

3.3.4
A reduction in the speed limit is always likely to be beneficial to cyclists, reducing the risk of serious collisions and making the route more comfortable and attractive.

3.3.5
Where cycle tracks are located off an adjacent carriageway, there may still be benefits for cyclists in reducing speed limits on the carriageway (for example from 50mph to 40mph) in order to increase the comfort and attractiveness of cycling on the track.

3.3.6
On congested main roads, such as shopping streets, 20mph speed limits should be considered. Streetscape features such as block paving or other contrasting surface should also be considered to visually emphasise the need for lower speeds.

20 mph speed limit in mixed town centre environment

20mph speed limits should be considered on congested main roads, such as shopping streets.

20mph zones

3.3.7
On some side-roads the existing geometry exerts a speed-reducing influence, for example when a road is not quite wide enough for two cars to pass except where there is a gap between cars parked at the side of the road. In other cases, where speeds are higher, 20mph limits should be introduced on single streets or a zone of streets to improve conditions for cyclists. It should be

noted that 20mph zones have a different legal status and require measures to encourage compliance.

20mph should be the speed limit on roads forming part of LCN+ routes off main roads

Technology-based enforcement

3.3.8
Where the length of a route along which speed enforcement is required is long enough to justify the expense, traffic cameras can be installed at each entry and exit to record the number-plates of all vehicles. If the time elapsed between entry and exit is too small, a violation has occurred. This type of system has the advantage over physical measures such as speed humps, in that vehicles do not accelerate after each hump and brake before the next one, with consequential increases in local air pollution and noise. There are also none of the problems for emergency services and buses that are associated with physical measures such as speed humps.


20 mph zone enforced by number-plate reading camera

3.3.9
The price of such systems is falling and technology is improving, although they are still more expensive than conventional measures. Other technology-based speed enforcement systems may become available in the future. Such systems should be considered wherever the street layout lends itself to this type of solution.

3.4 Traffic speed control by traffic calming – general issues

3.4.1
Where 2-way 24 hour traffic flows on a link are up to 3000 vehicles, or between 3000 and 6000 vehicles where there is traffic calming or other speed restraint such that the 85%ile speed is less than 20mph, then the link is likely to be satisfactory as a cycle route, without specific cycle facilities.

3.4.2
Notwithstanding the above, cycle lanes may be required to give cyclists priority in locations that suffer from motor traffic congestion.

3.4.3
The essential characteristic of speed control measures (traffic calming) is that features are introduced into the street scene that help define for motorists the role of the street for others. This should emphasise, through design, that speeds are to be kept consistently low to encourage safer driving. In this way motorists are more likely to tolerate the speed control measures as being reasonable.


A change in the layout of car parking may help to reduce the dominance of motor traffic

Speed-control engineering measures should:

- **prevent new hazards for cyclists from being created**
- **slow speeds and reduce flows of motor vehicles to a level where cycling is attractive and pleasant**
- **increase mutual awareness, respect and tolerance between cyclists and other road users**

3.4.4

Reducing motor traffic speeds is likely to improve levels of both actual and perceived cyclist safety. However, poorly designed or maintained features can create difficulties for cyclists.

Speed-control measures should NOT:

- **direct vehicles or pedestrians into the path of cyclists or vice versa**
- **make cyclists deviate sharply from their course**
- **otherwise de-stabilise cyclists (e.g. abrupt changes in level)**
- **force cyclists to stop or significantly lose momentum**
- **increase cyclists' anxiety or discomfort**

Recommended speed control measures

3.4.5

Recommended cycle-friendly measures should include:

- surface treatments
- lengths of road narrowing e.g. with limited passing places for cars
- addition of white lining down the middle of the effective carriageway width, so that a motorist knows that an oncoming cyclist is entitled to the other side of the road (a minimum overall road width of 5.5m is required for this arrangement)
- removal of road markings that give motorists more security than is appropriate, resulting in excessive speed
- vertical deflections from which cyclists are exempt, e.g. cushions or partial humps
- vertical deflections that do not destabilise or unreasonably slow down cyclists, e.g. tables, entry treatments and flat-top humps (sinusoidal profile ramps should be used for flat top humps, tables and raised entry treatments)
- humps with sinusoidal profile or gradients of between 1:10 and 1:20 (without any upstand between the bottom of the ramp and carriageway). Constructed with asphalt, block paving or imprint pattern. Good skid-resistance is important.
- more frequent zebra crossings

Vertical deflections should not destabilise the cyclist

Speed control measures that should be replaced or upgraded

3.4.6

Speed-control measures should not include those that are not cycle-friendly, these include:

- central hatching - where there are few turning movements, consideration should be given to reducing or replacing central hatching with kerbside cycle lanes or wider near-side lanes
- vertical deflections that destabilise cyclists or force them to lose momentum, e.g. rumble-strips and steep humps with up-stands
- sharply-angled footway build-outs that require cyclists to deviate from a direct path
- central islands where pinch-points are created. (Where there is little pedestrian activity consideration should be given to replacing central islands with cycle lanes or block paving and other forms of calming. If islands or build-outs are retained, coloured surface or road markings should be introduced to create a safe moving space for cyclists, to increase driver awareness and to encourage drivers to hold back and give cyclists priority at the pinch-point.)
- destabilising ramp surfacing material, e.g. bumpy or slippery surface

Existing speed control measures that are not cycle friendly should be replaced or upgraded

3.5 Vertical traffic calming measures – detailed considerations

3.5.1

Vertical deflections can be very effective at reducing vehicle speeds. However, unless carefully designed they can conflict with the LCN+ requirement that routes for cyclists be fast, safe and comfortable. Unreasonable vertical deflections can cause cyclists to slow down and hence lose momentum.

3.5.2
Only cushions and shallow-ramped flat-topped humps may be acceptable on routes used by buses. Also emergency service vehicles may have to be accommodated on their main routes, where vertical measures may not be acceptable.

3.5.3
Care is required to avoid introducing measures that could reduce cyclist's ability to safely use hand signals.

Sinusoidal profile humps

3.5.4
A cycle-friendly sinusoidal-profile should be used instead of a round-topped hump or to replace the ramps on flat-topped humps. See TAL 9/98 for more information on sinusoidal humps and ramp profiles.

Where road humps are to be traversed by cyclists, sinusoidal profile humps should be used

3.5.5
Sinusoidal humps are normally constructed in bituminous material. Pre-cast concrete units are available but are of a shorter and steeper profile and so should only be used with caution. The recommended profiles for both 75mm and 100mm high sinusoidal humps are shown on drawing CCE/A6.

Flat-topped humps and Junction tables

3.5.6
These can be constructed in a variety of sizes, ramp gradients and materials. The height is normally no greater than 100mm. Heights of 75mm or 50mm have been successfully used, particularly at raised crossings. They are also particularly useful as junction tables and entry treatments.

3.5.7
The use of sinusoidal profile ramps to these features is the preferred option for all but 50mm high ramps.

3.5.8
Linear ramp gradients should normally be 1 in 10 to 1 in 20, although the legal maximum is 1 in 6. Steeper gradients and higher tables will provide greater speed reductions, and may be suitable for less trafficked roads, but will be more of an inconvenience to cyclists. Where there are higher flows with buses and HGVs then flatter gradients and lower tables may be more appropriate.

3.5.9
A variety of materials can be used for ramps and tables. For low flow locations bituminous materials are inexpensive and quick to construct, and may be appropriate. In other locations block-paving tables will give a clearer pedestrian route. If block paving is used on ramps steeper than 1 in 20 then potentially

hazardous deformation is likely to occur. Contrasting colour or texture will make the feature more visible and have a greater slowing effect.

3.5.10
Ramps constructed of granite setts can be effective at slowing motor vehicles because of the rumble effect. The surface must be smooth enough to be comfortable for cyclists, particularly the (edge) section most used by them.

3.5.11
It is recommended that the new surface of the ramps is continued 500mm beyond the ramp into the existing surface to produce a smoother profile. See drawing No. CCE/A7.

3.5.12
See drawing No. CCE/A4 for details of a typical raised junction table.

Round-top Humps

3.5.13
The standard 75mm or 100mm high round-top humps are less cycle-friendly than sinusoidal or flat-topped humps, even when they are constructed to the specified profile. 100mm high humps are more effective in reducing the speed of motor vehicles but are less cycle-friendly so should not normally be used. As recommended for flat-topped humps, the new surfacing should continue 500mm beyond the hump into the existing surfacing to produce a smoother profile.

Speed Cushions

3.5.14
Speed cushions are often used on routes used by buses and emergency vehicles. Where used they need to be carefully positioned to take into account parked cars and their door-opening space. The route for cyclists and powered vehicles should be clear and direct, avoiding the need for either to deviate from a direct line, thus causing conflict. This may require parking controls for a short distance either side of the cushion. The nearside gap should normally be clear of gulleys and 1.2 to 1.5m wide (greater than the 0.7m specified by road humps guidance). Where frequent parking adjacent to the cushions cannot be avoided, gaps should fit cyclists' normal alignment.

3.5.15
The safety and comfort of cycle trailers and disabled people's cycles (including tricycles) must be considered when specifying cushions. However, if the only practical way of providing speed cushions at a particular location is with a nearside gap of less than 1.2 to 1.5m, the inconvenience to users of cycle trailers and tricycles needs to be weighed against the discomfort that might otherwise arise for other disabled persons such as ambulance passengers, or disabled users of two-wheeled cycles. If the decision is taken to provide a narrower nearside gap, the width of the cushion needs to be sufficient to allow users of cycle trailers and tricycles to ride over the top of the cushion.

3.5.16
Designers should also be aware that drivers often respond to cushions by steering into the kerb to avoid them.

Cyclists should not have to deviate from line to avoid speed cushions.

Entry Treatments

3.5.17
Entry treatments to side roads should be introduced adjacent to where a cycle route runs along a main road. They may also be appropriate on other roads that are traversed by a cycle route.

3.5.18
To provide the best conditions for cyclists, entry treatments should:

- narrow the side-road carriageway to between 5.0m and 6.5m - depending on the type of traffic using the road. Greater widths may be required on access routes used by buses, emergency response vehicles and HGVs.
- use a corner radius of kerb-line between 2.0m and 6.0m - depending on the side-road use and layout. Lower radii may be used where turning movements are restricted.
- raise the carriageway by 50-100mm, up to the same level as the adjacent footway
- use contrasting paving materials to raise awareness
- use approach ramps of between 1:10 and 1:20, located within the side road so as not to interfere with the through cycleway on the main road (shallower gradients may be needed on bus and emergency-service routes, and routes with higher vehicle flows)
- construct ramps of asphalt, or other non-skid material
- provide flat pedestrian crossing areas of at least 3m width with blister tactile-paving (off carriage/cycleway) to indicate crossing location
- provide bollards to prevent vehicle over-run of footway area when needed
- provide cycle stands on footway space created by the entry treatment where demand for them is reasonably anticipated (allow for visibility)

Side road entry treatment with bollards

3.5.19
See drawing No. CCE/A3 for details of a typical side road entry treatment.

3.5.20
Another way of dealing with side road entries that may be applicable in residential areas will be to install speed humps on the side roads, to slow traffic approaching the stop line at the road carrying the cycle route.

3.6 Horizontal traffic calming measures – detailed considerations

3.6.1
Horizontal measures may be more comfortable than vertical measures for cyclists as well as for buses and emergency service vehicles. However, the creation of pinch-points for cyclists should be avoided. There are a number of different measures that can be used, sometimes combined or in conjunction with vertical or other measures.

Horizontal traffic calming measures are usually more effective and comfortable for cyclists than humps

Traffic islands and pedestrian refuges

3.6.2

Where islands are introduced either to assist crossing pedestrians or for driver guidance then the following issues should be considered:

- One-way carriageway widths should not create dangerous or uncomfortable pinch-points for cyclists, and should be in accordance with figure 3.1 if cyclists are to use the gap
- To lessen intimidation, reduce general carriageway width and introduce a cycle lane and/or coloured cycling surfacing just before, adjacent to, and immediately past the island, with cycle symbol markings
- Cyclists should be able to maintain their speed on a direct route. For this reason, diverting cyclists off-carriageway past islands should be avoided

3.6.3

Alternative measures for pedestrians such as zebra or pelican crossings without central islands should be considered. See also other 'general' solutions e.g. lateral deflection traffic calming as discussed below.

Chicanes and pinch-points

3.6.4

It is important to ensure that the feature is designed in such a way that cyclists are neither squeezed nor intimidated. Options include:

- raising driver-awareness of cyclists with an advisory cycle lane (with or without coloured surfacing) and cycle-symbol road markings through the pinch point
- providing a clear one-way width in accordance with figure 3.1
- a cycle bypass that allows cyclists to travel past the obstruction without losing priority or having to 'give way'.

Figure 3.1
Suggested one-way lane widths at lateral deflection traffic calming where no cycle bypass is possible

85th percentile traffic speed	lane width (m)	
	no buses or HGVs etc	with buses, HGVs etc
< 20 mph	2.5 or less	3.0
21 – 30 mph*	4.0†	4.0
> 30 mph*	4.0	4.5

* additional measures (e.g. speed humps or cushions) should be considered to reduce speed in these instances

† 3.0m may only be used if frequent traffic calming measures are present along the length of road.

The gap widths in this table should enable cyclists to safely either to:
- claim the whole lane or
- share the lane with adjacent motor vehicles

3.6.5

If a cycle bypass is provided, this should satisfy the following:

- allow a minimum width between obstructions of 1.5m (see section 1.6 for further information)
- be marked with cycle symbol and, if appropriate, coloured surfacing
- be designed to prevent vehicles from blocking the entrance and exit preferably without the need for enforcement.
- waiting and loading controls may need to be introduced to protect the entrance and exit to the bypass
- If a bypass takes the cyclist off the carriageway the angle of deflection and vertical ramps for the cyclist should be kept to a minimum (not more abrupt than 1:10)

Cycle gaps should be at least 1.5m wide

Footway build-outs

3.6.6

Footway build-outs provide pedestrians with additional visibility when crossing the road at junctions and island sites. They are also commonly used for bus-boarders. It is essential, from both a road-safety and cycling perspective, that build-outs do not force cyclists to swerve into the path of vehicles, or restrict cycle flows. Improvements may include:

- add cycle lanes to give cyclists priority over other traffic past the build outs – these should be tapered at 1:10 past the build-out (or 1:15 on 40mph+ roads).
- minimum one-way lane widths as figure 3.1 above

Footway build-outs should not restrict cycle flows or require cyclists to swerve into the path of other vehicles

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