Chapter 4
Links – Cycle lanes, cycle tracks and other cycle facilities

Contents

4.1 Introduction and general issues

4.1.1
The previous chapter dealt with ways of helping cyclists on links through general traffic management but without special cycle facilities. This chapter considers cycle-specific link options and specific requirements, including what is necessary to achieve a seamless interface with the rest of the network. Bus lanes and supporting facilities along bus routes are also addressed here.

4.1.2
In considering design options for integrating cycling into London's traffic networks, there is no one hierarchy of solutions, but rather a number of requirements, constraints, and problem sites for which options should be considered. Draft LTN1/04 sets out a hierarchy of provision. Design teams also need to take account of different traffic conditions on main roads e.g. with traffic queuing at peak times, but then accelerating and moving in excess of 30mph, and provide for cyclists in both situations.

4.1.3
Cycle lanes or tracks are an important part of the overall traffic management toolkit, because they help to raise awareness of cycling as a form of traffic, and promote cycling as an effective and valuable alternative travel mode.

4.1.4
Cyclists expect to have the same priority as general traffic moving in the same direction. Cycle lanes or tracks should not be introduced where they result in disbenefits to cyclists such as a loss of priority or time penalties. TfL research confirms such facilities remain unused and the investment has been wasted[11].

[11] TfL Impacts research

4.1.5
Cycle facilities that are physically separated from general traffic and adjacent to the footway may be treated as either a mandatory lane or as a cycle track. Designers must be consistent in following the appropriate procedures for the designation chosen.

Criteria for cycle facility provision

4.1.6
Before considering specific facilities for a particular link, it is important to determine where, in terms of the cross section of the highway, cyclists will find it most advantageous to travel. The default situation is on the carriageway in the kerbside lane.

4.1.7
On links where motor vehicle speeds and/or flows are medium or high (see figures 4.1 and 4.2), and it is not considered feasible to reduce them to acceptable levels by measures described in Chapter 3 of this document, then cycle lanes or off-carriageway cycle tracks or shared use paths should be provided. These are described in sections 4.4 and 4.5 of this chapter.

Bus lanes can improve conditions for cyclists

4.1.8

Bus lanes, permitted for use by cyclists, are an alternative method of improving conditions for cycling on the carriageway. These are covered in section 4.3. Wider inside lanes are another useful alternative.

4.1.9

The broad definitions of volume and speed with appropriate solutions are shown in figure 4.1. This is intended as a guide and all location-specific factors must be taken into account.

Cycle lanes or tracks should be provided to assist cyclists where motor vehicle flows and/or speeds are medium or high

Figure 4.1
Matrix of cycle facility solutions based on motor traffic volume and speed

	85%ile Speed			
	<20mph Very Low	**20-30mph Low**	**30-40mph Medium**	**>40mph High**
Very High >10,000VPD	Lanes or Tracks/paths	Lanes or Tracks/paths	Lanes or Tracks/paths	Tracks/paths
High 8,000-10,000VPD 800-1,000VPH	Lanes	Lanes	Lanes or Tracks/paths	Tracks/paths
Medium 3,000-8,000VPD 300-800VPH	Lanes or combined use with cycle symbols	Lanes or combined use with cycle symbols	Lanes or Tracks/paths	Tracks/paths
Low 1,500-3,000VPD 150-300VPH	Combined use with cycle symbols	Combined use with cycle symbols	Lanes or Tracks/paths	Lanes or Tracks/paths
Very Low <1,500VPD <150VPH	Combined use – no symbols necessary	Combined use with cycle symbols	Combined use with cycle symbols	Lanes or Tracks/paths

Notes:

1. This table assumes current conditions and trends.
2. Additional protection to lanes should be used in medium or high speed/flow situations (see drawing CCE/B12 for options)
3. Where Lanes OR Tracks/paths are shown, Lanes should be considered as the first option
4. "symbols" are the cycle symbol road marking to Diagram 1057 of TSRGD. Their use in association with route numbers may be appropriate
5. VPD = number of motor vehicles in typical 24hour weekday
6. VPH = number of motor vehicles in typical morning peak hour
7. In congested areas cycle lanes may be desirable where they are not justified on traffic volume and speed

4.1.10

The above information can be represented alternatively in graphical form as figure 4.2 below. This also shows that the two main options are either better mixed cycling conditions (on calmed roads with limited space and with low/slow flows) or better segregation (on highly trafficked/higher speed roads). The role of traffic calming is also shown, with traffic calming being used in a wider way to include situations where space is limited.

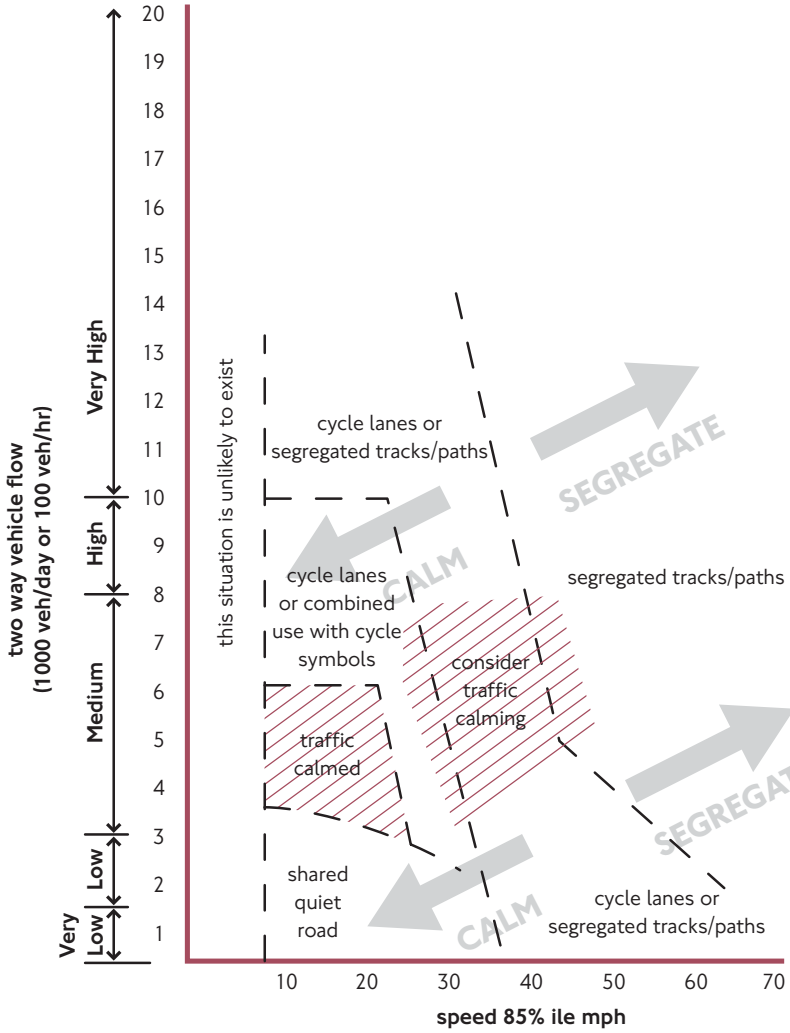

Figure 4.2
Diagram of cycle facility solutions based on motor traffic volume and speed

Notes:
1. Each route will need to be judged in the light of its specific situation
2. Cycle lanes or tracks will not normally be required in traffic calmed areas
3. Congested traffic conditions may benefit from cycle lanes or tracks
4. Designs should tend to either calm traffic or segregate cyclists

4.1.11

Other situations not included in the above are key routes such as the Thames bridges where traffic is slow moving or stationary during peak hours. Here, cycle lanes or tracks should be provided to enable cyclists to overtake on the inside legally, to minimise exposure to vehicle emissions and to maintain momentum on the uphill side of the bridge. Drivers generally respect these lanes, and in these circumstances the provision of a lane has also helped to reduce pavement cycling.

Link Types

4.1.12

Links types considered in this chapter can be grouped into two basic categories of on-carriageway or off-carriageway provision, as shown in figure 4.3:

Figure 4.3
Link types

On-Carriageway	Off-Carriageway
Lanes for cyclists (with-flow or contra-flow)	**Cycle Tracks (with flow or contra-flow) and Shared Paths**
• Mandatory • Advisory • Bus lanes	• Stand-alone cycle track • Adjacent track/path (segregated from pedestrians) • Shared path (with pedestrians)

Signs and Road Markings

4.1.13
Signs and road markings are covered in detail in Chapter 6. Cycle symbols to Diagram 1057 should be provided on cycle lanes and cycle tracks at the start of each lane or track, and immediately after each decision point thereafter (including just after a side road has joined the route). On long sections of route repeater symbols should be provided, to give a maximum interval between symbols of 200m. Where practical symbols should be placed close to street lights to maximise visibility after dark.

Cycle symbol markings should be provided after each decision point on cycle lanes and tracks, and at a maximum interval of 200m elsewhere.

4.1.14
See Chapter 5 for more details on use of symbols at junctions and crossings.

4.1.15
See drawing CCE/A5 for typical use of cycle symbols to Diagram 1057 at the start and finish of lanes. See also the end of section 7.4 regarding construction quality of cycle symbols.

4.1.16
'End' and 'Cyclists Dismount' signs should be designed out of new schemes. 'Cyclists Dismount' signs should be removed from existing cycle routes, with appropriately re-designed facilities that enable cyclists to proceed without dismounting. Where in exceptional circumstances this is not practical for all cyclists, for example at a subway with headroom of less than 2.3m which it is not feasible to change, warning signs stating "cyclists beware – low headroom" and the clearance available should be provided. It will then be up to each cyclist to decide whether or not to dismount, depending in the individual cyclist's height.

4.1.17
At locations on cycle lanes or tracks where cyclists are required to give way, Diagram 1003 dashed markings should be used. The optional triangular marking Diagram 1023 should normally be used where a cycle track or lane meets a carriageway where the cyclist does not have priority. In other situations the Diagram 1023 marking should only be used where it is justified on safety grounds. It is not normally necessary where cycle tracks join other cycle tracks or paths, where the 1003 marking should suffice.

4.1.18
Side-road warning signs to Diagrams 962.1 or 963.1 to warn motorists and pedestrians respectively are generally unnecessary except for situations where contra-flow cycling is permitted. Instead, cycle symbols to Diagram 1057 on appropriate parts of the carriageway should be used to warn motorists and pedestrians of the presence of cyclists.

4.2 Cycle lanes (on-carriageway)

4.2.1
Cycle lanes:

- increase drivers' awareness of cyclists
- encourage drivers to leave space for cyclists
- legitimise overtaking slow moving or stationery traffic which otherwise is a breach of the Highway Code
- encourages lane discipline by cyclists
- help to confirm a route for cyclists

4.2.2
In addition, by reducing the apparent width available to general traffic, cycle lanes may also be used to support motor traffic speed reduction.

4.2.3
Cycle lanes should be continued across side road junctions, and should connect seamlessly to the rest of the network, particularly with other cycle specific facilities used on a route. See Chapter 5 for more details at junctions.


Cycle lanes should be continuous across side road junctions

4.2.4
See drawing CCE/B1 and B1.1 for details of a cycle lane across a side road.

4.2.5
Cycle lanes as such appear to have little impact on road safety targets, but there is clear evidence of safety benefits in continuing lanes across junctions.

4.2.6
Figures 4.1 and 4.2 set out the situations where with medium or high traffic volumes and/or speeds, cycle lanes on the carriageway should be considered. For cycle lanes to be successful, it is essential that their position on the carriageway is where cyclists want and need to be. Consideration should be given to all cyclists' movements and whether the overall benefits of providing a cycle lane outweigh the disbenefits.

4.2.7
In order to allow comfortable use by cyclists, including those using trailers and cycles/tricycles used by disabled people, cycle lanes should normally be 1.5m wide, but 2.0m wide where space permits. A wider width will also allow a cyclist to overtake another slower cyclist without entering the main flow of traffic.

4.2.8

The exception to this is in congested situations where a narrower lane may be useful to allow cyclists to pass slow or stationary motor vehicles, particularly on the approach to junctions. DfT advice is that a lane as narrow as 0.8m is acceptable in these situations; however lanes not less than 1.2m are recommended on links and not less than 1.0m for Advance Stop Line approach lanes.

Types of cycle lane – Mandatory or Advisory

4.2.9

There are two basic types of on-carriageway cycle lanes, mandatory and advisory. Figure 4.4 sets out the main advantages and disadvantages of each:

Figure 4.4 Mandatory and Advisory cycle lanes

Advantages	Disadvantages
Mandatory	
• For exclusive use by cyclists during specified hours of operation • Delineated by a solid line less likely to be crossed by drivers • Drivers commit an offence if they drive in or park in the lane • Additional physical protection can be provided	• Requires Traffic Regulation Order which has potential for public consultation objections (and delays) • Cannot be used where other vehicles are permitted to cross the lane (e.g. side road entrances, parking and loading bays and adjacent to narrow lanes) • More statutory signing required than advisory lanes
Advisory	
• No TRO or consultation needed • Can be introduced quickly • Less signing clutter than mandatory lanes • Can be used adjacent to parking bays, as a central lane, across junctions and with narrow traffic lanes (<3.0m wide)	• Used only to show indicative area for cyclists – other traffic can legally enter cycle lane • No powers to enforce against moving vehicle encroachment (except parking, waiting and loading restrictions)

Cycle lanes require enforceable parking, waiting and loading restrictions

4.2.10

The purpose of mandatory cycle lanes is to define an area of the carriageway that is reserved for cyclists, and within which other vehicles may not encroach. Advisory traffic lanes are primarily used to warn motorists of the possible presence of cyclists, and to encourage motorists to adopt a line of travel away from the kerb. However it is permissible for motor vehicles to stray into advisory cycle lanes.

4.2.11

Where space permits and parking and loading can be banned, mandatory cycle lanes should be used. Where this is not practical, for example because the half-width of the road is not wide enough throughout the link to accommodate

HGVs as well as a mandatory cycle lane, an advisory cycle lane should be the fall-back option.

4.2.12

Figures 4.5 and 4.6 below give more guidance on typical lane width combinations.

Figure 4.5 Options for Mandatory cycle lanes on 2-way streets based on half-carriageway width

	Half-road width (m)	Minimum cycle lane width (m)	General traffic lane width (m)
No parking/loading	<4.5	No lane -see note 4	3.0-4.5
	4.5-5.0	1.5-2.0	≥3.0

Notes:
1. Lane widths are measured from kerb face to centreline of markings
2. Cycle lanes on roads with 40mph or higher speed limit should preferably be wider than 1.5m.
3. Mandatory cycle lanes of less than 1.5m may be desirable in some situations.
4. Mandatory cycle lane is not appropriate where adjacent general traffic lane is ≤3.0m.

Figure 4.6 Options for Advisory cycle lanes on 2-way streets based on half-carriageway width

	Half-road width (m)	Minimum cycle lane width (m)	General traffic lane width (m)	Notes	Drawing number
No parking/loading	3.5-4.4	1.5	2.0-2.9	2-way motor vehicle flows<5000vpd 30mph max speed limit	CCE/B6
	3.5-4.0	1.5	2.0-2.5	2-way motor vehicle flows<5000vpd 30mph max speed limit with central refuge/islands Diag 1010 marking alongside refuge/islands	CCE/B7
	≥4.0	1.5	≥2.5		CCE/B7
	4.5-5.0	1.5-2.0	≥3.0	All cases (mandatory lanes preferred)	-
With parking/ loading bay 1.8m wide	5.3-6.3	1.5-2.0	2.0-2.5	2-way motor vehicle flows<5000vpd 30mph max speed limit Coloured surface lane only with no road markings – minimum width of 1.5m	CCE/B9
	≥6.3	1.5 plus 0.5m gap to parking bay	≥2.5	2-way motor vehicle flows<10000vpd 30mph max speed limit	CCE/B9

Notes:
1. Lane widths are measured from kerb face to centreline of markings
2. Cycle lanes on roads with 40mph or higher speed limit should preferably be wider than 1.5m


Hatched marking outside cycle lane


Maintain cycle lane width past separations


Mandatory cycle lanes require effective enforcement

4.2.13
Additional protection of cycle lanes from motor traffic on the rest of the carriageway by physical features will increase cyclists' comfort and encourage use. Protection to cycle lanes can be provided by the following methods:

- Hatched road markings outside the cycle lane
- Intermittent traffic islands (which should not reduce the cycle lane width)
- Reflective road-studs (authorised for advisory but not mandatory lanes)
- Raised rib markings (requires DfT authorisation)

4.2.14
To avoid confusion, use of any of these measures must comply with TSRGD requirements. See drawing CCE/B12 for different methods of protecting cycle lanes.

Measures to increase the separation width between cyclists and drivers must not reduce the cycle lane width below 1.5m

4.2.15
A mandatory cycle lane should be replaced with advisory cycle lane markings where other vehicles are permitted to cross the lane, such as at road junctions or adjacent to parking bays.

Mandatory cycle lanes

4.2.16
A mandatory lane is for the use of cyclists only within the signed hours of operation and subject to Traffic Order restrictions. It is usually illegal for any motor traffic to enter mandatory cycle lanes, except taxis, which are normally allowed to stop within cycle lanes to drop-off and pick-up passengers.

4.2.17
Mandatory cycle lanes are enforceable by the police for violation of moving offences and by parking wardens for waiting regulations. They are indicated by solid white delineation line 150mm wide (Diagram 1049) and the associated signs Diagram 959.1, (and 958.1 for the optional advance warning).

4.2.18
Mandatory lanes must start with a diagonal broken line to Diagram 1009, although this is not required at intermediate breaks such as bus stops. It may be appropriate to place these diagonal markings after side-road junctions, where cycle lanes are wider than 1.5m, to ensure that the mandatory lanes are clearly visible and enforceable.

Start mandatory lanes with diagonal Diagram 1009 broken markings

4.2.19
CCE are currently discussing with the DfT the possible use of wider (250mm) delineation markings for mandatory cycle lanes.

4.2.20
The use of pre-formed raised lane delineators ("hedgehogs") is not currently authorised in the UK.

4.2.21
Cycle lanes may also be segregated from the rest of the carriageway by kerbed upstands, in which case they effectively become cycle tracks. Cycle tracks are dealt with in section 4.4 below. Two-way cycle facilities of this type are likely to include un-segregated junction arrangements that are not explicitly covered by current DfT signing guidance and regulations. DfT should therefore be consulted.

4.2.22
Classification of a facility as a lane or track must be made by the designer and all aspects of the design, particularly signing, should be provided in accordance with this designation.

DfT authorisation should be obtained for two-way cycle lanes/tracks at carriageway level, where these are unprotected by kerbed upstands

Advisory cycle lanes

4.2.23
Advisory cycle lanes indicate an area of the carriageway that is intended for the use of cyclists. Motorists are advised but not required to keep out of them although in the event of a collision, evidence of encroachment may be sufficient to determine blame.


In the event of collision, encroachment into an advisory lane is strong evidence that the motorist may be to blame

4.2.24
Advisory cycle lanes are indicated by broken white line (Diagram 1004) and associated sign (Diagram 967). Repeated cycle symbols (Diagram 1057) and the use of coloured surfacing are recommended in high-stress locations, such as across side roads and entrance/exit of petrol stations.

Cycle lanes and road markings should be continuous across side road junctions

4.2.25
A major drawback of advisory cycle lanes between junctions is that at times of day when parking and loading a permitted, cyclists using the lane have to pull out round parked vehicles. This can cause resentment with cyclists who feel that "the vehicle is parked on my cycle lane". Other northern European countries do not use advisory kerbside cycle lanes, primarily for this reason.

4.2.26
Where parked or loading vehicles are expected, it is better for the cyclist to maintain a riding position further into the carriageway so that the cyclist is more visible to other traffic and does not have to make abrupt changes in direction. CCE intend to explore with DfT ways of signing the advisory cycle lane as only operating during the hours during which parking and loading

restrictions are in operation. This would avoid resentment from cyclists that vehicles are parked on the cycle lane, and from motorists that cyclists are ignoring the cycle lane.

4.2.27
In the meantime, in situations where kerbside parking or unloading is legally permitted at some times of the day, the use of time-limited mandatory cycle lanes is preferred to advisory cycle lanes.

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Provision for 2-way cycling in one way streets

4.2.28
Provision for 2-way cycling in one-way streets may be achieved in a number of ways. Options include mandatory or advisory cycle lanes or cycle tracks or provision without any specific marking of 'cycle space' – see TAL 6/98. See drawings CCE/B13, B14 and B15 for typical layouts for contra-flow cycle provision.


Provision for 2-way cycling in one-way street

4.2.29
Mandatory contra-flow lanes are delineated by a solid white line marking to Diagram 1049 and signs to Diagram 960.1 as shown on drawing CCE/B13. Cycle symbols and one-way arrows will also be required. Mandatory lanes will be the normal way of providing for contra-flow cycling where there are moderate and high traffic flows or speeds, such that cyclists require their own protected space. Widths should be 2.0m (1.5m minimum) with physical separation by traffic islands being provided as necessary. Particular attention should be given to the design of entry and exit points, side roads, accesses and parking bays to ensure that all road users have adequate warning of priority and each others' movements.

4.2.30
Where traffic pressures are low then an advisory lane or no lane marking may suffice. The effective carriageway width may be as little as 4m for an advisory lane to work. Again, cycle symbols and sometimes arrows may be used to add clarity to the layout. Signing similar to Diagram 960.1 but without the line marking should be used but requires specific DfT site authorisation. Alternative layout options are shown on drawings CCE/B14 and 15. If, as CCE/B15, the 'no motor vehicles' sign to Diagram 619 is used at the entrance – for example to avoid the need for a central divider island – entry treatments, surfacing and markings should be used as necessary to reinforce the 'cycle only' character of the two-way working. For a fuller discussion see TRL Report 358[12].

[12] TRL Report 358: Further developments in the design of contraflow cycling schemes


This advisory contraflow lane saves cyclists a detour

Cycle lane widths

4.2.31
Introduction of a cycle lane will not necessarily require removal of an existing general traffic lane or result in a negative effect on the overall capacity of a link. In many situations, reducing the width of general traffic lanes can create the space required for a cycle lane and research has shown that reduction in general traffic lane width can contribute to a reduction in motor traffic speeds

4.2.32
If the proportion of HGV/PSV traffic is less than 10% and subject to the carriageway geometry and speed of traffic, the motor traffic lane widths may be reduced to between 2.5 and 2.9m, including those adjacent to advisory cycle lanes.

4.2.33
Figures 4.5 and 4.6 show suggested lane width allocations for the provision of mandatory and advisory cycle lanes respectively, based on half carriageway widths of 2-way carriageways.

Cycle lanes between junctions should be 1.5m wide, wider where feasible

4.2.34
Where the motor traffic lane is 3.0m wide or less and parking is not permitted the cycle lane should be advisory to allow for occasional encroachment of large vehicles. Mandatory cycle lanes should not be used in these circumstances. Additional cycle symbols and coloured surfacing can be used to further highlight the measures if necessary. See drawing CCE/B6, B7 and B9 for typical examples of this situation.

4.2.35
Where the need for a cycle lane has been established based on motor vehicle speed, flow or congestion and if peak period cycle flows are high (typically greater than 10% of all vehicle movements) then cycle lane widths of 2.0m or more should be considered. However care is required to ensure that wide cycle lanes (2.0m or wider) cannot be mistaken for a general traffic lane, in which case enforcement becomes an issue.

4.2.36
Where HGV/PSV flows are high (above 10% of all vehicle movements), general traffic lane widths alongside cycle lanes should not be less than 3m.

Cycle lanes should be easily accessible along their length

Use of coloured surfacing on cycle lanes

4.2.37
On-carriageway situations where green coloured surfacing should be used to raise awareness are:

- Across the mouth of side road junctions
- Feeder lanes and reservoirs at advanced stop lines
- Through junctions
- Alongside on–street car parking
- Through zig-zag markings (where cycle lane markings are not permitted)
- Any other areas of potential conflict with motor vehicles

4.2.38
In other situations, the use of coloured surface is generally not considered to be necessary, but this is subject to local discretion. Examples of typical uses of coloured surfaces are shown on cycle lane drawings in Appendix C.

Cycle lanes at zig-zag markings

4.2.39
Zig-zag markings are required on the approaches to zebra, pelican, puffin and toucan crossings. These can be uncomfortable for cyclists to ride over.

4.2.40
TSRGD does not permit other road markings to be used within the area controlled by zig-zag markings. The following options are available to provide continuity of cycle facility provision through these crossings within the current legal framework:

- Provide coloured surfacing for the 1.5m nearest to the kerb 'through' the zigzags.
- Where the cycle lane is wider than 1.5m, provide an additional row of zigzags in line with the approaching cycle lane marking, resulting in a clear path for cyclists between the two sets of zig-zags

4.2.41
To decrease the interruption to continuity of a cycle facility, reduction in the number of zig-zag markings to the minimum permitted of two should be considered, particularly on the exit from the crossing.

4.2.42
Details of cycle provision at zig-zag markings are shown on drawing CCE/B16.

Provide continuity for cyclists at zig-zag markings

4.2.43
At signal controlled junctions, pedestrian and/or cycle crossing facilities can be introduced without zig-zag markings, thus enabling the use of cycle lanes and advance stop lines.

Transition between cycle lanes and cycle tracks

4.2.44
It will occasionally be necessary to provide a transition from on-carriageway cycle lanes to off-carriageway cycle tracks and vice versa. This transition should be clear, smooth, safe and comfortable for cyclists. Minimum speed change and vertical and/or horizontal deviation for cyclists should be the objective. Drawing CCE/C4 shows a typical detail for this situation.

4.2.45
It is particularly important not to have a vertical step change in level along a line running along the general direction of travel. This can happen if cyclists are directed to cross at a shallow angle over a dropped kerb that has not been laid properly. Such situations can de-stabilise the cyclist's steering.


A seamless transition between two types of cycle facility

Cycle lanes – other complementary measures

4.2.46
Side road entry treatments along routes where cycle lanes are provided are recommended to slow motor traffic making turning movements. See Chapter 3.

Entry to and from side roads should be reviewed to ensure appropriate sightlines and speeds to mitigate risks to cyclists from turning traffic

Cycle lanes at bus stops

4.2.47
Cycle lanes should be terminated at bus stop cages (Diagram 1025.1) and recommence at the far end of each cage.

4.2.48
Cycle lanes should not normally be routed around the outside of a bus stop cage, unless it is a terminus stop or layover space. However, there may be locations where it is appropriate to route a cycle lane outside a bus stop cage, particularly if the cycle lane on the approach to the bus cage is located outside routinely occupied parking or loading bays.


Take cycle lane outside bus stop cage and adjacent car parking where this can safely be achieved

4.2.49
Where a cycle lane approaches a kerbed bus boarder and car parking is not present, it should be routed around the boarder with tapers (kerb or hatching) of 1:10.

4.2.50
Where car parking is present a tapered kerb is recommended at a minimum angle of 45° to the kerb line, to reduce risks to anyone cycling close to the kerb when parking bays are unoccupied.

Cycle lanes alongside kerbside parking

4.2.51
If there is parking on a route where cycle lanes are proposed then measures should be taken to provide a satisfactory situation. Removal or relocation of the parking to a side-road or into a specially constructed bay may be the best option for cyclists. The normal solution will be to run an advisory cycle lane on the outside of marked parking bays. With either constructed or marked bays sufficient clearance should be created so that cyclists are not unnecessarily endangered by the opening of vehicle doors. This can be achieved by leaving a gap of 0.5-1.0m between the inside of the cycle lane and the edge of the parking bay, giving adequate entry and exit tapers, as show on drawing CCE/B9.

Alternative ways of managing competing demand for kerbside lane space

4.2.52
Where there are short gaps between parking bays, including at junctions, then the lane should maintain its position in the road rather than zigzag back to the kerb-line. A maximum distance of about 30-35m is appropriate for this as show on figure 4.7 and on drawing CCE/B1.1. Figure 4.7 shows the normal route that a cyclist would take where there is a gap in the parking. I:5 exit tapers and 1:10 entry tapers are normally appropriate, although as this will depend on cyclists' individual speeds, gradients and other conditions may need to be assessed.

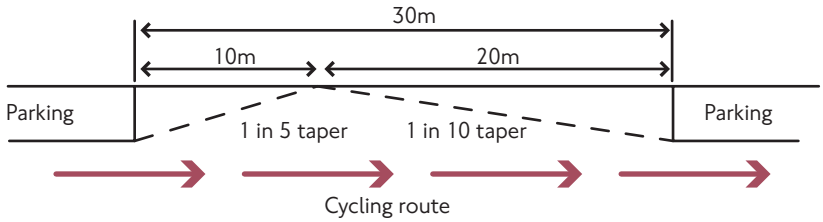

Figure 4.7
Minimum gap between parking where cycle lane returns to kerb

4.3 Bus lanes and other on-carriageway bus related infrastructure

General

4.3.1
Combined bus and cycle lanes are a valuable element in the provision of facilities for cyclists, enabling them to share in the time-saving benefits provided to buses, as well as providing safer conditions for cycling.

4.3.2
Designers of bus schemes should consider the needs of cyclists, and include provision for them unless there are exceptional reasons not to. Provision for cyclists can add to the justification and business case for the scheme.

Times of operation

4.3.3
Bus lanes should be available for cycle use for their full hours of operation.

Bus lane widths

4.3.4
The preferred situation is a 4.5m wide (or greater) bus lane with a 1.5m wide cycle lane marked within it. The cycle lane marking may be omitted on links where there are frequent bus stops and side-road turnings. Cycle lanes should not be marked within bus lanes less than 4.5m wide.

Cycle lanes within bus lanes should be 1.5m wide

For bus lanes the preferred situation is a 1.5m advisory cycle lane marked within a 4.5m wide bus lane

4.3.5
Where a 4.5m wide bus lane is not feasible, combined bus/cycle lanes of 4.0m may be acceptable where bus flows are moderate. If taxi flows are high, bus lane widths of 4.0m or greater are recommended to enable overtaking.

4.3.6
Where off-peak parking or loading is permitted in a bus lane, the lane should be at least 4.0m wide and preferably have marked parking bays to encourage drivers to park close to the kerb.

4.3.7
Alternatively, options to provide parking and/or loading bays off the carriageway or in an adjacent side road could be considered, thus enabling longer operating hours of the bus lane. A further alternative is to provide parking/loading based on tidal flow, with parking/loading permitted in the lane in the opposite direction to the peak flow.

4.3.8
Bus lane widths of between 3.2m and 3.9 m should not normally be provided as they leave insufficient room for buses to overtake cyclists or cyclists to overtake queuing or stopped buses within the lane.

The hours of operation of bus lanes where cyclists are permitted should be maximised to provide the highest practicable benefit for cyclists

If parking or loading is permitted in a bus lane during off-peak periods, the lane should be as wide as feasible to allow cyclists to pass stationary motor vehicles without leaving the bus lane

4.3.9
If bus lane flows are low (up to 20 buses/hour or 100 buses+taxis/hour) then bus lanes up to 3.2m wide may be satisfactory. This solution will not be acceptable on a significant uphill gradient or where there are high levels of infringement by unauthorised vehicles. In these situations an alternative should be considered.

4.3.10
Where bus lanes are physically segregated from other traffic (e.g. by kerbed upstands) they should normally be 4.5m wide to allow safe and unhindered overtaking of cyclists by buses (and vice-versa if there is a bus stop). This is less critical on short lengths of segregated bus lane where a narrower lane will normally be acceptable (e.g. contra-flow on one side of a gyratory).

Carriageway width (m)	Bus lane (m)	Other with-flow traffic (m)	Opposing traffic lane (m)	Cycle lane (m)
9.0	3.0	3.0	3.0 (see note 3)	0
9.5	3.0	3.0	3.5 (2.0) (see note 4)	0 (1.5)
10.0	3.0	3.0	4.0 (2.0-2.5) (see note 4)	0 (2.0-1.5)
10.5	3.0	3.0	3.0 (2.5)	1.5 (2.0)
11.5	4.0	3.0	3.0 (2.5)	1.5 (2.0)
12.0	4.5	3.0	3.0 (2.5)	1.5 (2.0)

Figure 4.8 Carriageway division lane widths with bus lane in one direction

Notes:
1. Not all possible permutations are shown
2 Alternative non-preferred option shown in brackets
3. Lane widths less than 4.0m without a cycle lane are likely to result in a pinch-point for cyclists – alternative treatments should be considered
4. Subject to local traffic characteristics, motor traffic lanes between 2.0 and 3.0m can be used to enable provision of the widest possible cycle lane
5. Where motor traffic lanes outside cycle lanes are less than 3.0m, the cycle lane should be advisory to allow for occasional encroachment

Carriageway width (m)	Bus lane (m)	Other with-flow traffic (m)	Opposing traffic lane (m)	Bus lane (m)
12.0	3.0	3.0	3.0	3.0
12.5	3.25	3.0	3.0	3.25
13.0	3.25	3.25	3.25	3.25
13.5	4.0	3.0	3.25	3.25
14.0	4.0	3.0	3.0	4.0
14.5	4.25	3.0	3.0	4.25
15.0	4.5 (4.25)	3.0 (3.25)	3.0 (3.25)	4.5 (4.25)
15.5	4.5 (4.25)	3.25 (3.5)	3.25 (3.5)	4.5 (4.25)
16.0	4.5	3.5	3.5	4.5

Figure 4.9 Carriageway division lane widths with bus lane in both directions

Notes:
1. Not all possible permutations are shown.
2. Alternative non-preferred option shown in brackets.
3. Local widening of lanes may be appropriate on bends.

Other issues related to on-carriageway bus infrastructure

4.3.11

Central (i.e. not nearside) bus lanes should be considered carefully because of the possibility of cyclists becoming vulnerable when manoeuvring into the bus lane, at the same point where other traffic is manoeuvring to avoid entering the

bus lane. A nearside bus stop shortly before the start of a central bus lane will create extra risk for cyclists.

Central bus lanes should be designed with particular care

4.3.12
Bus gates and other bus priority signals should be carefully designed to ensure that appropriate priority benefits are also given to cyclists. Cycle detection at signals should be provided where a long wait time for cyclists would result if signals were only linked to bus detection.

4.3.13
In some cases a cycle by-pass to bus-priority signals may be desirable, in which case this should be provided where feasible.

4.3.14
Cycle symbol road markings to Diagram 1057 should be used where appropriate to emphasise that a bus facility is available to cyclists; however they are only permitted by TSRGD to be used in bus lanes that are contra-flow. Site-specific authorisation from DfT should be sought in other cases.

4.4 Cycle tracks (off-carriageway)

4.4.1
Bicycles are vehicles and have the same rights to use the highway network as other vehicles - except where prohibited. Their removal from otherwise safe carriageways should be the last resort "unless they (the treatments employed) offer greatest overall advantage" (Draft LTN 1/04).

4.4.2
On the public highway, facilities off-carriageway are called cycle tracks. These may be adjacent to pedestrian facilities (previously referred to as segregated shared-use), or a joint facility for cyclists and pedestrians. Where there is no footway, for example in some parts of outer London, there may be a stand-alone cycle track, but this is not the kind of facility likely to be introduced on new roads or now retro-fitted.

4.4.3
This section deals with adjacent cycle tracks. For a fuller discussion see Draft LTN2/04. Paths shared with pedestrians are covered in section 4.5.

4.4.4
Where a cycle track run adjacent to a highway, the normal arrangement will be for the cycle track to be next to the road carriageway, rather than have the footway between the carriageway and the cycle track. If the latter arrangement is adopted, pedestrians are likely to use the cycle track in preference to the footway.

Cycle tracks should lie between the footway and the carriageway, rather than have the footway between the carriageway and the cycle track

4.4.5
From a legal perspective, a Cycle Track is a section of the highway adjacent to, but not on the carriageway, that has been dedicated for use by cyclists. Lengths of footway are converted to Cycle Track by using section 65(1) of the Highways Act 1980. This is a straightforward change by council resolution, with appropriate consultation.

4.4.6
Signing should be to Diagram 955 with associated 1057 cycle symbol markings. Centreline markings should be provided on two-way tracks to clarify the use of the track and encourage cyclists' lane discipline.

4.4.7
Also, half-size one-way arrows to Diagram 1059 may be necessary to clarify the direction of cycle flow. The number and size of these other markings should be kept to an absolute minimum and be appropriate to the location and aesthetic appearance of the facility.

Cycle tracks – direction of operation

4.4.8
All Cycle Tracks in the UK are two-way unless made one-way, covered by a Traffic Order and signed accordingly.

4.4.9
The designer must decide whether a track (whole or sections) is to be one or two-way. This governs the requirements for the signing and markings of the facility at all locations such as junctions, lay-bys, bus stops etc.

4.4.10
The directional status of the facility must be made clear using appropriate signing and road markings in accordance with TSRGD. If the cycle track is two-way, the use of a broken white line along the centre of the track is a useful reminder that the track is two-way, and will help distinguish it from an adjacent footpath.

4.4.11
There are particular issues regarding the clear indication of priorities of approaching traffic where two-way cycle tracks cross side roads. Caution is recommended in these situations. The TRL report "Review of Procedures" showed that this kind of facility can result in increased risk and casualties.

Use of broken white centreline and cycle symbols shows that facility is 2-way

On single carriageway roads, two-way tracks should normally only be used in one-way streets or gyratories, or where there are no side road junctions. Where there are side road junctions a careful balance must be struck between the requirements of priority and safety.

4.4.12
Where there is a cycle track alongside each side of a major arterial road (e.g. a wide dual carriageway with infrequent crossings) and it is unrealistic to expect cyclists to cross the road twice in order to reach a nearby destination on the same side, it may be safer to design both cycle tracks on the assumption that they will be two-way. A cyclist riding in the "wrong" direction will normally have good intervisibility with the driver of a motor vehicle about to turn left into a side road. However, a driver about to turn left from a side road into the main dual carriageway will not be expecting a cyclist to be approaching from the left unless there is clear signing that this may happen. Such signing must be provided.

Surfacing and colour on Cycle Tracks

4.4.13
In most off-carriageway situations, machine-laid black bituminous surfacing in conjunction with cycle symbols (and lane markings unless one-way) should be provided.

4.4.14
Footways adjacent to cycle tracks should have a contrasting surface. See drawing CCE/C1.

Geometry and sightlines on Cycle Tracks

4.4.15
A cyclist design speed of 15mph should be used on tracks where cyclists are segregated from pedestrians. In areas where cyclists share the track or path with pedestrians a cyclist design speed of 10mph should be used.

Use a cyclist design speed of 15mph except in areas shared with pedestrians where 10mph should be used

4.4.16
Instantaneous changes of direction should be avoided. The centreline of the track or path should follow a natural line that a cyclist can follow. A minimum radius of 15m should be used on tracks and paths. A 4m minimum external radius should be used at junctions where the cyclist may not need to stop.

4.4.17
The need for local widening and super-elevation (banking) should be considered on bends, particularly where cycle speeds are likely to be high.

For cycle tracks and paths a minimum radius of 15m should be used between junctions and a minimum external corner radius of 4m should be used at junctions

Visibility splays

4.4.18

Visibility splays at junctions should generally be provided in accordance with Design Bulletin 32 Residential Roads and Footpaths and the Design Manual for Roads and Bridges (DfT). It is anticipated that the new DfT Streets Manual due to be published in 2006 will give further guidance.

4.4.19

For cycle flows of over 200 cycles per day the set-back X-distance shown on figure 4.10 should be 2.4m minimum. For flows below this, the X-distance can be reduced to 2.0m. The minimum Y-distance along the kerb, assuming a 20mph speed, should be 33m. The 15mph speed has been included in figure 4.10 primarily for when cycle tracks are considered.

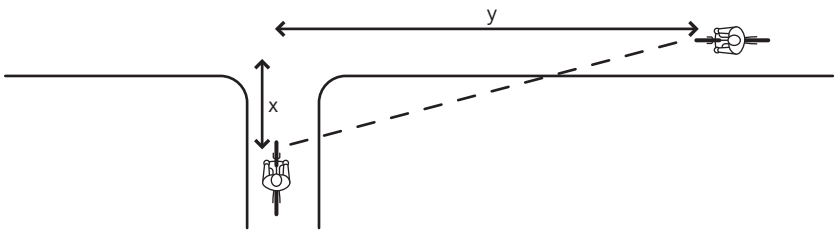

Figure 4.10
Visibility sight lines

Speed mph	30	25	20	15
Y (m)	60	45	33	20

Notes:
1. Motorist's eye level 1.05m minimum
2. Cyclist's eye level age/height dependent but assume 1.00m minimum

4.4.20

The normal set-backs for general (motor) traffic on roads are 9m preferred, 4.5m normal minimum, 2.4m minimum, and lesser distances in exceptional circumstances.

Continuity at side roads and accesses

4.4.21

The number and nature of discontinuities in cycle tracks will be a major factor in their attractiveness for cycling. Removal of discontinuities on existing tracks (where the track is to be retained) and minimising them on new tracks should be a primary objective. Details of road closures, point no-entries, banned turns etc. are given in Chapter 3.

4.4.22
Entry treatments incorporating continuity of the cycle track should be provided where the track crosses side roads. Cyclists can be given priority over the side road where the side road is one-way leading to the main road, or where the track can be set back greater than 5.0m from the main road kerb line (allowing necessary signs and markings). Refer to drawings CCE/C7.1 and C8 for typical details. This method can also be used to give cyclists priority at any crossing point along a link.

Cycle track has priority over one-way entry road with clear markings to warn drivers to give way

4.4.23
In circumstances other than those described above cyclists are required to give-way to traffic on the side road. In these situations a raised entry treatment should be provided to slow motor traffic making it easier and safer for cyclists and pedestrians to cross.

4.4.24
Where a cycle track is being considered but there are a significant number of side roads, it may be feasible for some of them to be closed or converted to one-way operation thereby enabling a track to be provided with fewer interruptions. Where this is not feasible, the appropriateness of a cycle track as a solution should be questioned.

Interruptions to cycle tracks should be minimised

4.4.25
Priority should normally be given to cyclists at access crossovers, which should be narrowed and raised where feasible. See drawing CCE/C6 for a typical detail. For larger accesses a give way symbol Diagram 1023 may be used to provide further warning to drivers leaving the access that they must give way to cyclists. At wide accesses, such as those at petrol filling stations, alternative measures to slow vehicles should be considered.

4.4.26
At access crossovers, it is important to retain good visibility of the cyclists for drivers of vehicles intending to turn left across the cycle track. This means keeping the kerbside clear of street furniture and parked vehicles. It is also necessary for drivers leaving the access to have adequate visibility of approaching cyclists.

Cycle track has priority over side access

Cycle tracks at bus stops

4.4.27
Careful consideration is required where adjacent cycle tracks pass bus stops to provide clarity regarding the use of the area, and to ensure that potential conflict between cyclists and pedestrians is managed and minimised.

4.4.28
Factors to be taken into account include:

- the number of bus passengers using the stop at different times
- the routes to and from the stop used by bus passengers
- access for wheelchair users

4.4.29
Where there is insufficient space to continue an adjacent cycle track past a bus stop, it is normally necessary to provide an area of shared use space instead.

4.4.30
It is essential that cycle, pedestrian and shared areas are delineated in accordance with appropriate corduroy tactile paving, as referred to in Chapter 7.

4.4.31
One option to increase the amount of space available for facilities is the filling in of existing bus bays. This option has fewer disadvantages than in the past as a result of recent reductions in bus boarding times. Bus boarding times are expected to decrease further following the London-wide introduction of cashless ticketing. Enabling the bus to pull up close to the kerb has significant benefits in accessibility to buses for all passengers, particularly the elderly and disabled and those with pushchairs or luggage.

4.4.32
These benefits need to be balanced against the disbenefits, including potential traffic delays and safety issues arising from buses stopping in the carriageway. Any proposals to fill in bus bays should be discussed with London Buses at the earliest opportunity.

4.4.33
Options for dealing with cycle tracks at bus stops are shown on drawings number CCE/C26, 27 and 28.


A table helps to slow cyclists at point of conflict with pedestrians

Junctions with other cycle tracks and paths

4.4.34
The primary consideration at junctions between cycle tracks and other tracks and paths is to provide clarity of priority.

4.4.35
Drawings CCE/C9, C10, C11 and C11.1 show typical details of these situations.

Cycle tracks at carriageway crossing points

4.4.36
There are various combinations of details required where cycle tracks intersect or pass carriageway crossings. Typical details of these situations are shown on the following drawings:

CCE/C12 and C13	Toucan Crossings
CCE/C14 and C15	Priority Crossings
CCE/C17 and C18	Zebra Crossings
CCE/C21	Parallel cycle and pedestrian crossing

Edge Strips

4.4.37
In order to provide safe clearance between cyclists and motor traffic passing on an adjacent carriageway an edge strip at least 0.5m wide should normally be provided. This is particularly important where cyclists on the outside of the track are facing oncoming motor traffic.


Lanes inside car parking offer cyclists good protection from fast traffic

4.4.38
The strip guides the cyclist away from the area of potential conflict such as from mirrors of large vehicles and opening vehicle doors. On roads with a higher speed limit (40mph plus) it is advisable to increase the width of the safety strip to 1m or more.

4.4.39
Edge strips should be visually differentiated from the cycle track by using a contrasting material.

A safety strip at least 0.5m wide is required adjacent to carriageways

	Desirable minimum width (m) (see note 1)	Absolute minimum width (m) (see note 1)	Safety strip to carriageway kerb edge minimum width (m) (see note 2)
One Way	2.0	1.5	0.5
Two Way	3.0	2.0	0.5

Figure 4.11
Cycle Track widths

Notes:
1. 0.5m should be added for each side of the track that is bounded (e.g. by a wall, railings fence or hedge)
2. Safety strip to carriageway kerb edge minimum width should be 1.0m adjacent to frequently accessed parked cars

Lighting

4.4.40
Personal security issues need to be considered in secluded locations. If the route is intended for use during the hours of darkness an appropriate level of lighting will be required. In secluded areas, opportunities for increased visibility to and from the cycle facility should be considered, for example by creating gaps in vegetation.

Signing and markings to indicate use and segregation

4.4.41
Segregation may be by means of verge, upstand (kerbs or edging), vertical barrier or raised white line to Diagram 1049.1.

4.4.42
Where kerbs are used, low (50mm) battered kerbs are preferred as they give clear segregation whilst allowing for occasional 'spillage' from one side to the other where necessary.

4.4.43
Signing is to Diagram 957 with associated 1057 cycle symbols and solid white delineation line.

4.4.44
Unless there are strong environmental reasons to the contrary, centreline markings should be used as these will help identify the cycle surface and encourage cycling on the left. This is particularly useful where there are significant numbers of pedestrians who may stray onto the cycle track. Following avoiding action in such situations, the cyclist may need to be reminded which side of the delineation line was intended for cyclists.

Centreline markings indicate which side is for cycles

4.4.45
Any signs and bollards associated with the cycle track may be placed in a position as to assist delineation, such as between the cycle and pedestrian surfaces.

4.4.46
Appropriate tactile paving should be provided – refer to section 7.7.

4.5 Shared-use paths

4.5.1
Green cycle corridor routes away from the public highway, for example alongside the canal or through parks in London will generally be shared with pedestrians. This helps to maintain the specific quality of the local environment.

4.5.2
Advice on surfacing is included in Chapter 7.

Geometry and sightlines on shared paths

4.5.3
A cyclist design speed of 10mph should be used on paths shared with pedestrians.

Cyclist design speed of 10mph should be used on paths shared with pedestrians

4.5.4
A minimum radius of 15m should be used on tracks and paths and a 4m minimum radius should be used at junctions.

Visibility Splays

4.5.5
The same visibility requirements that apply for cycle tracks as set out in figure 4.10 above should also be applied to shared-use tracks and paths.

4.5.6
Where these requirements cannot be met, measures to slow cyclists such as 'false bends', surface treatments, markings and signing can be considered.

4.5.7
In parks and other environmentally sensitive areas, signing, markings and other furniture should be minimised.

Widths of shared paths

4.5.8
The recommended width for a shared use path is 3.0m with a minimum width of 2.0m, plus an additional 0.5m for each side of the track that is bounded (e.g. by a wall, railings, fence or hedge).

4.5.9
Speed restricting measures for cyclists may be desirable, such as downhill and approaching locations of restricted visibility. Such measures should not restrict access for non-standard cycles and disabled people.

Recommended width for shared paths is 3.0m, minimum width 2.0m

In areas of restricted visibility, environmentally sensitive speed reduction measures for cyclists should be provided

4.5.10
Naturally coloured surface dressings may be applied to cycle tracks and paths in environmentally sensitive areas providing the treatment does not adversely affect ride comfort and safety.

Lighting

4.5.11
The same lighting requirements that apply for cycle tracks as set out earlier should also be applied to shared-use tracks and paths

4.5.12
Personal security issues need to be considered in secluded locations. If the route is intended for use during the hours of darkness an appropriate level of lighting will be required. In secluded areas, opportunities for increased visibility to and from the cycle facility should be considered, for example by creating gaps in vegetation.

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