APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways

(design standards - residential & industrial)

overview

This part of making it happen includes advice, guidance and information about highway design standards for residential and industrial developments.


design standards – residential roads

General

The information included in this section together with advice contained in the main guide, will help you produce the appropriate road design for your scheme.

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

Speed Control

Good design and well thought out road layouts within the development plays an important role in managing vehicle speeds. Buildings that are well located and positioned can also have a positive effect on controlling vehicle speed.

To achieve low speeds you should avoid:

- long straights;
- shallow bends;
- roads wider than the requirements for the safe and satisfactory passage of all road users; unless for the express purpose of accommodating casual parking; and
- layouts that provide greater or unneccessary visibility than recommended in this guidance.

You can avoid long lengths of straight road by introducing junctions, 90-degree bends or other speed control features into your design. Maximum distances between junctions or speed control features are shown in the table below. Distances between curves must be measured from the tangent points where applicable.

Table A - Maximum lengths of straight road between speed control features

85th %ile design speed (mph)	Maximum distance (metres)
30	150
25	100
20	60
15	40

Where there are valid reasons why vehicle speeds cannot be controlled through site layout alone, and traffic calming measures are required, you should consider horizontal measures first. Vertical measures must be used only as a last resort. All traffic calming measures must be in accordance with our Traffic Calming Code of Practice or national guidance issued by government.

You must take particular care over choosing a type of traffic-calming measure on a proposed bus route, cycle route or those routes likely to be used by the emergency services.

While certain types of traffic calming (particularly road humps) can have potential road safety benefits, they can also adversely affect the response times of emergency vehicles.

Where traffic calming measures are proposed on a key route, you will need to consult with the emergency services at a very early stage, certainly before you submit your planning application, and will need to work closely with them in the design of such measures.

Where any form of vertical calming feature is proposed, it must not be located within 25m of the edge of a structure, for example, a bridge or culvert. Such features must also be located away from private accesses and driveways to avoid problems of vehicles grounding as they turn into or out of the access.

The Divisional Manager may be prepared to consider other methods of vehicle speed control, where evidence supports the effectiveness of such measures.

You must discuss any such measures with the Divisional Manager and get approval where neccessary.

There are several recognised techniques for slowing tra□c to ensure more pedestrian friendly places. Chicanes and islands provide good traf-□c calming features (top left/right) Raised pedestrian tables can make pedestrian movement more comfortable and slow vehicles that have to cross them (top middle). The layout of new developments can restrict vis ibility around bends, forcing vehicles to slow as they approach (left). The entrance to a village or new residential area can include as a gateway feature that also slows tra□c (above).

The design of residential road layouts using tracking

Tracking is a method of design providing the required width for vehicle movement within the overall width of the road. It can also be used to establish appropriate corner radii.

Instead of taking the highway requirements as the starting point for layout design, you must consider the arrangement of the buildings and the boundaries of the development first. Buildings must be laid out to suit a particular form and identity.

Kerblines help to define and emphasise spaces but must be used carefully to avoid the layout becoming too formal and less pedestrian friendly. The width between kerbs can vary as shown opposite.

You must check the layout, including widths and bend radii, to ensure that every type of vehicle expected to use the road can manoeuvre adequately. This is likely to include a range of vehicles, including refuse lorries, fire tenders, pantechnicons and may include a bus on some developments.

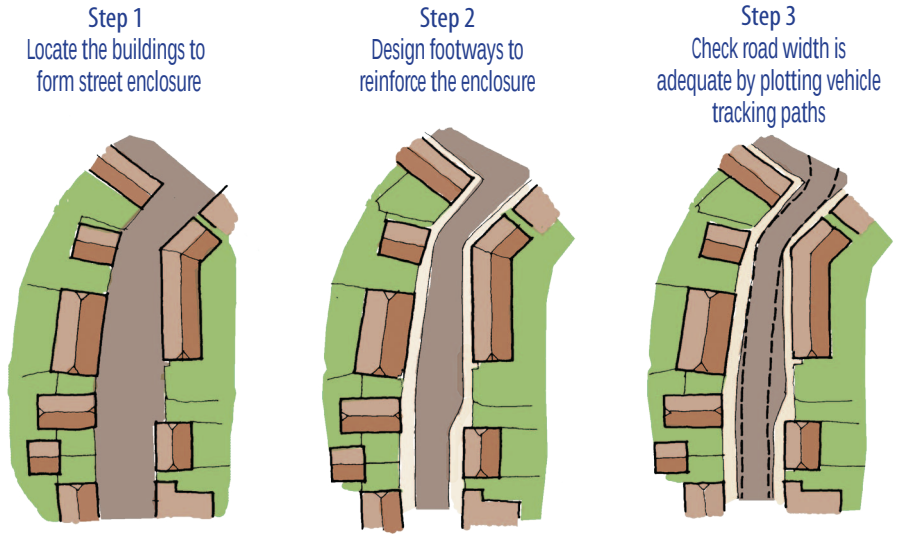
You need to check the requirements using a suitable computer software package that generates swept paths for vehicle types, that can be superimposed onto layout drawings.

Road widths must be provided in accordance with the designing for movement part of the main document. The tracking assessments will need to take account of any planned or likely on-street parking.

A balance needs to be found between providing turning areas for occassional large vehicles and creating too much underused highway space when not needed. You need to resolve this issue in your design brief and the risks and benefits of your layout.

The proposed layout must be approved by the Divisional Manager before you submit a planning application to the local District Planning Authority.

Examples of tracking used to define vehicle movement in layout



Further information on how to use tracking is provided in 'Places, Streets and Movement', published by the DETR.

A combination of building layout, parking and street furniture can help de□ne a safe vehicle path through a development. Use of materials for a carriageway surface can help de□ne di□erent areas.

The layout needs to satisfy other design criteria to achieve appropriate design speeds and to create a safe environment for all road users, including pedestrians and cyclists.

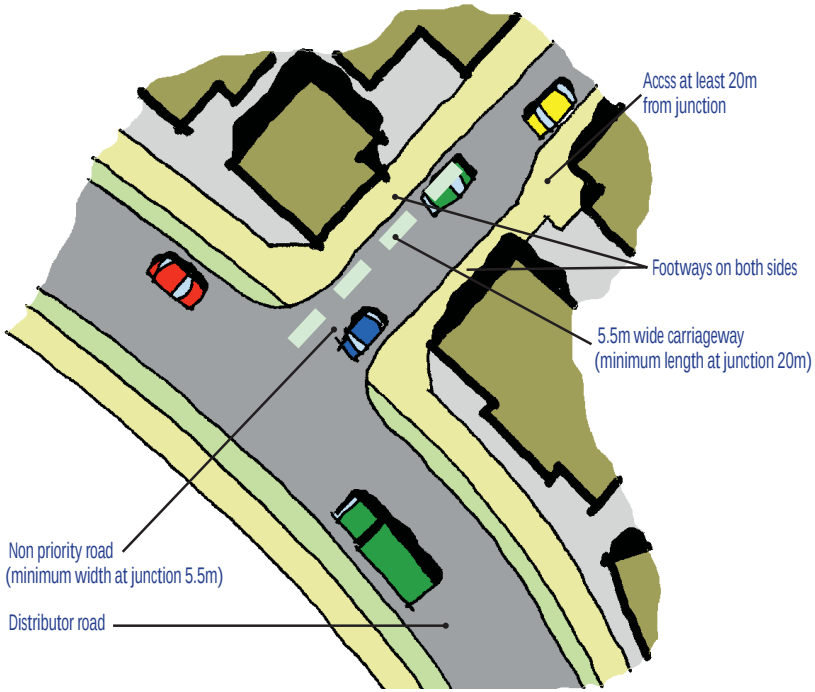
The layout of a successful space requires careful planning not only to provide for an attractive and safe scheme but also one that can accommodate all the vehicles it is designed for.

Junction Design

Junctions are generally required at intersection points where roads meet each other. Most junction arrangements take the form of some kind of priority junction, either 'T' types, staggered types or crossroads which are normally appropriate where traffic flows, particularly to and from minor roads, are relatively light. Where traffic flows are heavier or road layouts are complex, other types of layout or control measures are generally required to reduce the accident risk and to balance or improve capacity.

Where a residential road joins a distributor road, a road width of 5.5m should be maintained for at least 20m from the junction, with footways provided on both sides of the non-priority road. No other access or road junction should be provided within this 20m distance (see below).

Example of junction design for residential roads joining distributor roads



Junction arrangements involving major alterations to the existing highway are covered by separate agreements under Section 278 of the Highways Act 1980.

Junctions with local distributor roads must be designed in accordance with the Design Manual for Roads and Bridges, published by the Department of Transport, Volume 6 Section 2, TD42/95 or TD16/93 (roundabouts), depending on the traffic flow and turning characteristics.

Junctions for industrial and commercial roads must be designed in accordance with the advice included in this section on design standards for industrial and commercial roads.

Junctions involving all other road types shall be simple 'T' type arrangements.

A successful network of safe streets and open spaces should accommodate a variety of junction designs appropriate to the use of each road.

Where non-priority roads, including all feeder roads, serve more than 100 dwellings, the junction with the priority roads must be at an angle of 90° and be straight for a length of at least twice the kerb radius. Non-priority roads, including all feeder roads, serving less than 100 dwellings can join priority roads at angles between 80° and 100° (see right).

Some junctions involving minor roads, such as shared surface accessways or Home Zones, will require specific entry treatment arrangements to emphasise the changes in road use.

It is recommended that you hold early discussions, regarding the junction type, design and location, with the Divisional Manager.

Requirements for junction radii are included in the designing for movement part of the main document.

At road junctions where corner radii are less than 6m the footway must be strengthened in accordance with the requirements detailed in the Highway Pavement and Specification section.

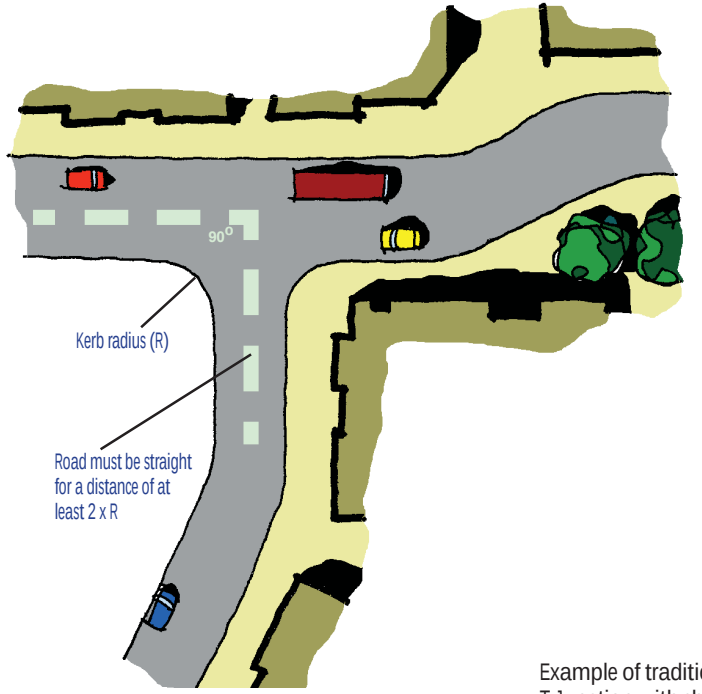
Right turning movements of vehicles from the priority road may need to be controlled by various methods, which can include, ghost islands, roundabouts and signal controls.

Right turning lane facilities are generally required where the priority road is a local distributor road or where the non-priority road, including feeder connecting roads, will generate in excess of 500 vehicle movements a day.

Right turning lane facilities must be designed in accordance with advice from the Divisional Manager. Industrial and commercial roads must be designed in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

It is recommended that you hold early discussions about all right turning lanes with the Divisional Manager.

Example of junction design for residential roads serving more than 100 dwellings



Example of traditional T-Junction with short length of straight before a curve (below).

Road crossings are necessary where pedestrians or cyclists need to:

- cross a road; or
- cross a side-road junction which includes any access more than a simple footway crossing.

In either case, appropriate crossing facilities are normally required. You must agree requirements with the Divisional Manager when preparing your development proposals.

The normal basic requirement is to provide dropped kerbs with buff-coloured tactile paving for uncontrolled crossing points and red-coloured tactile paving for controlled crossing points. Pedestrian facilities include uncontrolled pedestrian crossing points, refuge islands, zebra or signal controlled crossings. The degree of pedestrian facilities required will depend on the nature and volume of vehicular and pedestrian movements at the junction.

All road junctions must be designed with the safe interests of cyclists and pedestrians in mind. At busy junctions there may well be a need to provide separate cycling lanes, together with appropriate road markings and signing where space permits However, detailed facilities at the junction will depend on location and hierarchical characteristics. If necessary, consideration should be given to signalling the whole junction.

Zebra or signal controlled pedestrian crossings on minor roads are normally set back 15m to the stud line from the give-way line of the junction, and must be sited to minimise crossing widths.

Separation islands are normally situated at the mouth of the non-priority road. Dropped kerbs and tactile surfacing (at locations along distributor roads and where pedestrian flows are likely to be high), must be installed to asssist people with impairments.

Signal controlled crossings should be designed appropriately for pedestrians. Equipment should not dominate the street scene (top). Busy junction layouts can become cluttered and unattractive (above left). Crossings in historic areas should be sensitively designed (middle right). Uncontrolled Zebra Crossing can act as a safe crossing point for pedestrians (right).

Guardrails must be considered where significant pedestrian activity makes it necessary to channel pedestrians to the appropriate crossing point. Care must be taken to ensure that guardrails do not block visibility and consideration must be given to the type of barrier used.

Entrances to shared surface areas or Home Zones normally require visual characteristics that define them from conventional accesses.

This can be achieved by using a combination of design features such as rumble strips, closely spaced buildings, speed restraint features, ground cover planting or contrasting paving materials.

It is very important to emphasize to drivers entering shared surface areas or HomeZones that there is no separate provision for pedestrians. In the interests of safety, therefore, it is essential to restrain vehicle speeds to 15mph maximum.

Traffic signs or road markings can be considered as an integral part of the design process. Advanced direction or warning signs may be required. This will depend on the junction characteristics, however, you must keep signs and markings to an absolute minimum.

All traffic signs or road markings must be be designed in accordance with our 'Signing On Kent's Roads' document. This document is included in the reference documents section on our website.

It is recommended that you hold discussions over the type of traffic signs or road markings required with the Divisional Manager.

Landscaping can help define the outline of junctions, provide reference points and establish a background for signs. Sensitive use of textured surfaces, choice of street furniture and good quality planting enhances the general appearance. Landscaping must not compromise visibility and good long term maintenance must be taken into consideration.

Further advice is included in the section on Landscaping.

Ramps at the entrances to shared surface areas or Home Zones can also provide a comfortable crossing point for pedestrians (top left/bottom right). Guard rails should be used only where necessary and must be sympathetic to the existing street scene (top right). Landscaping can be used to help de□ne a junction and safe crossing point (left). Closely spaced buildings and landscaping help de□ne entry points (middle, above).

Visibility

To enable drivers emerging from the non-priority road to see and been seen by drivers proceeding along the priority road, unobstructed visibility is required within the blue shaded areas shown opposite, with inter-visibility being provided between 0.6 and 2m. You must be aware that sag and summit curves may affect visibility requirements.

All junctions require adequate visibility in accordance with the requirements detailed in the designing for movement part of the main document.

To enable drivers to see and react to obstructions on the highway, forward visibility within the blue shaded area shown on page 13 (both in the horizontal and vertical planes) must be provided along the road. The necessary visibility requirements are detailed in the designing for movement part of the main document.

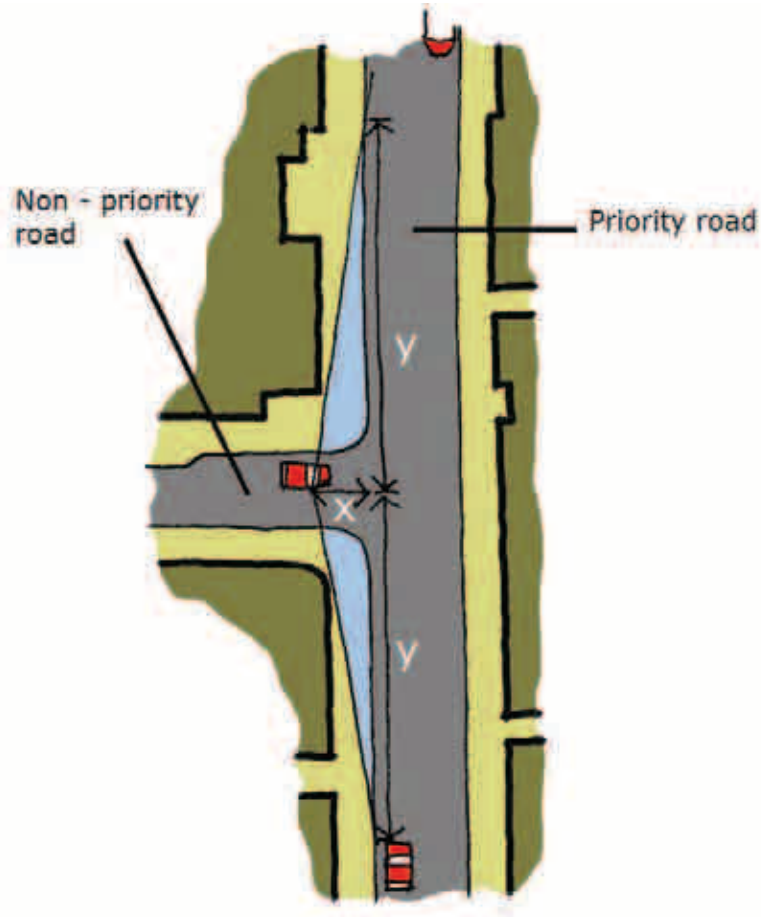
The horizontal distance over which unobstructed visibility should be maintained will depend upon the stopping distance of vehicles. This in turn will depend upon vehicle speeds, deceleration rates and driver reaction times (see table below).

Table B - Range of stopping distances commensurate with various vehicle speeds.

Speed												
0	5	10		15		20			25			30mph
0	8	16		24		32			40			48kph
0	6	14		23		33			45			60m

Visibility at junctions.

All aspects of layout design need to combine to produce safe places. Highway geometry by itself must not be used to the detriment of townscape. Buildings and landscaping can be used to restrict visibility safely to keep vehicle speeds down.

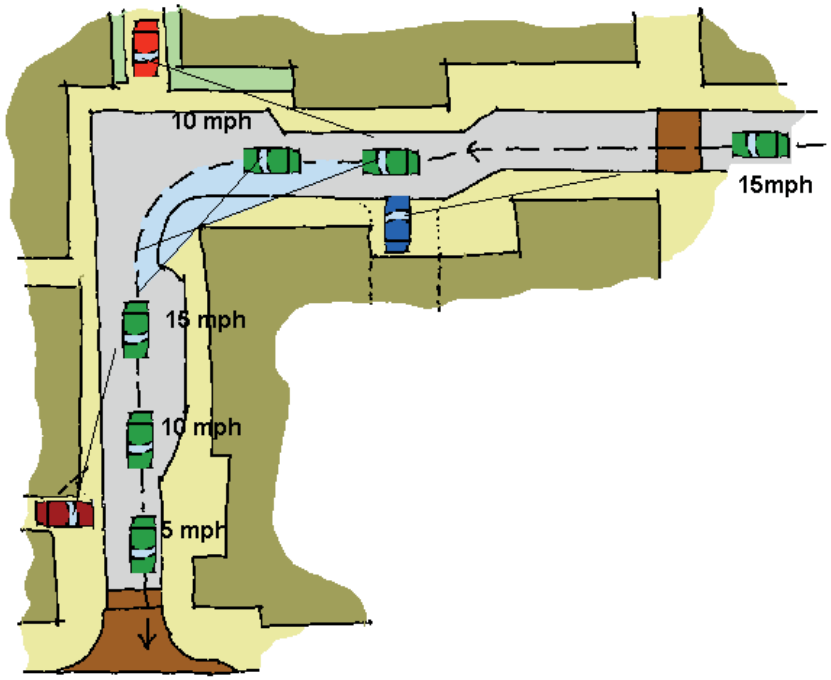


Forward visibility is normally measured between points in the road 1.5m from the channel line. (further information about how to measure visibility is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport)

Street lighting columns, street furniture and trees with narrow girth and high limb branches, can be located within the visibility splays. Larger obstructions must be avoided where it is likely to reduce safe visibility levels.

Visibility splays at junctions must be contained within the adoptable highway. It is generally desirable for a footway to be set back to the rear of the visibility splay.

Forward Visibility along the Carriageway



In an urban or surburban setting, the footway normally de□nes the visibility splay characteristics (top right).

In semi-urban or surburban settings, well de□ned and managed planting can be provided without restricting visibility (above).

Good visibility can be achieved without unreasonably a□ecting the character of landscape dominating the view (bottom right).

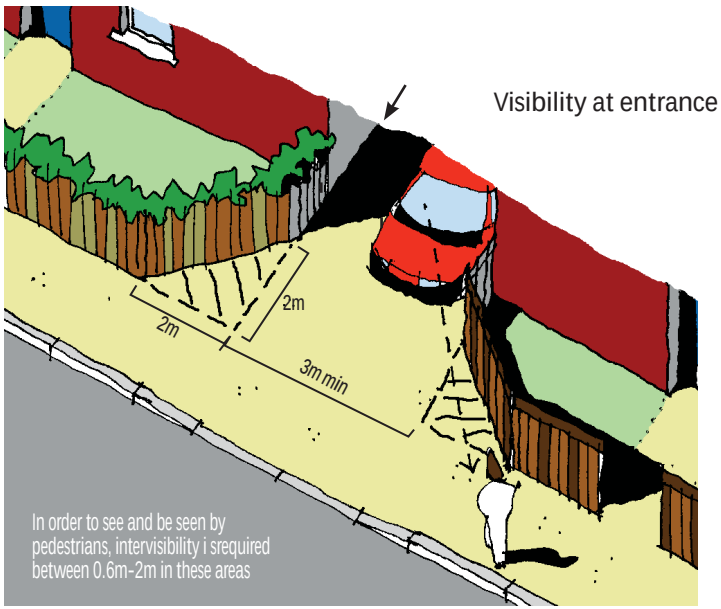
Where an emerging vehicle needs to cross a footway or service margin from a shared or individual private driveway, pedestrians and cyclists must be given sufficient warning of the vehicle's approach. In such circumstances a visibility splay of 2mx2m is required from the back edge of the highway limit as shown (below and right).

Clear inter-visibility is required between 0.6 and 2.0m above the highway.

To enable drivers to see and be seen by other drivers and other highway users proceeding along the road, visibility is required in accordance with the designing for movement part of the main document.

Visibility areas for shared and individual driveways are not normally included in the adoptable highway areas. In exceptional circumstances a planning condition may be imposed to control the visibility splays.

To enable drivers to see and be seen around speed control bends, forward visibility in the horizontal and vertical planes must be provided in accordance with the designing for movement part of the main document. Vehicle accesses must not be situated around speed control bends.



Visability splays at shared and individual private drive ways

Accesses to private drives need to be appropriate to the townscape setting of a scheme but they need to be safe aswell as practical. Good visibility is essential which helps both drivers and pedestrians.

Widening on bends

On roads serving more than 25 dwellings, carriageways are normally widened around bends, that curve more than 10 degrees in accordance with the requirements shown below.

Table C

Widening on Bends						
Centre-line radius (m)	20	30	40	50	60	80
Minimum widening (m)	0.60	0.40	0.35	0.25	0.20	0.15

Bends should be widened for industrial and commercial roads in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

You will be required to produce computerised vehicle-path assessments to show that the proposed layout can accommodate vehicles without endangering other road users, especially pedestrians and cyclists.

Roads can be widened at bends to allow larger vehicles to negotiate them. Areas that maybe over-run by vehicles can be attractively finished in paving materials.

Gradients

Sometimes there is a tendency to use steep gradients to avoid excessive cut and fill of the natural landscape when designing a layout. In order to minimise the dangers to road users in icy conditions and improve road safety on bends and at junctions, the maximum acceptable gradient that can be used must be restricted. Similarly, to assist in draining the road and prevent ponding areas occuring, there is a need to restrict the minimum acceptable gradient.

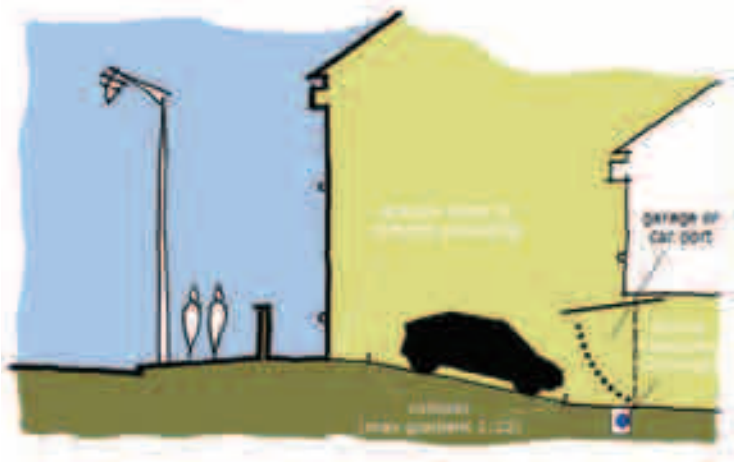
The maximum and minimum longitudinal gradients for roads are detailed in the movement and connections part of the main document.

You will need to design Industrial and Commercial Road gradients in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

Shared and individual private drives should not normally have a longitudinal gradient steeper than 10% (1 in 10). However, access gradients may be increased to a maximum of 12.5% (1 in 8) on sites where the level differences make it impractical to use less steep gradients.

To prevent vehicles from grounding, the gradient must be maintained at 10% (1 in 10) for a distance of at least 1.5m from the back of the highway boundary, or include a roll-over detail as shown below.

Private Drive Roll-over details



Roads must either have a cross-fall or cambered profile, generally with a gradient of 2.5% (1 in 40).

Gradients must not exceed 5% when rising, or 4% when falling towards the priority road, for a distance of twice the junction radii measured from the channel line of the priority road.

Footways and footpaths will generally have a cross-fall gradient of 2.5% (1 in 40), falling towards the road or away from property boundaries.

Changes in cross-sectional gradient from cross-fall to cambered must be avoided where the longitudinal gradient is flat. You need to think about using suitable methods, such as superelevation, to prevent flat areas which can lead to ponding problems.

Where changes in longitudinal gradient do occur, vertical curves are required at summits and sags for ease and comfort of driving and, at summits in particular to ensure adequate forward visibility along the road. Further information on vertical curves is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport and in the designing for movement part of the main document.

You need to hold early discussions with the Divisional Manager about large, flat sites, to ensure the vertical alignment is acceptable. In some cases, it may be necessary to provide channel blocks or combined kerbs. The design must ensure that ponding areas do not occur in the road.

For summits, it may be necessary to increase the length of the vertical curve in order to achieve the necessary visibility distance.

Road gradients should be designed to avoid ponding in the channel.

Alternative Means of Access for Emergency Road Closures.

The needs of the emergency services must be taken into account in the layout design. If the number of dwellings served by a cul-de-sac exceeds 50 or where a major access road is designed as a circuit road, an alternative means of access is required.

The width of the access must be sufficient to allow emergency vehicles and appliances to operate unhindered. It is recommended that you hold early discussions with the Divisional Manager and the emergency services to establish the necessary width. The minimum width must not be less than 3m and may need to open out to 3.7m wide to allow for fire appliance doors to fully open.

If a development requires an alternative means of access, the access must be constructed to vehicle cross-over standards and adopted by us. Where there are valid reasons why this cannot be achieved, and where the development proposals are otherwise acceptable, the Divisional Manager may be prepared to consider a private emergency access as long as:

- highway safety is not compromised and the access is unlikely to be a source of crime or anti-social behaviour problems;
- there are appropriate means of controlling its use (bollards or similar);
- you have fully consulted the emergency services and the proposals are acceptable to them (including consultations with the local Police);
- the access is designed to accommodate safely all vehicles likely to use it; and
- long-term maintenance responsibilities are clearly defined and secured.

Where suitable access arrangements cannot be guaranteed, the Divisional Manager may refuse to adopt the scheme.

A wider path allows fire engines and other emergency vehicles full access to building fronts.

Turning Movements

The need for turning facilities can be avoided by designing permeable layouts with sustainable through routes. Where this is not possible turning facilities must be provided wherever vehicles would otherwise have to reverse over long distances, or in locations which could cause damage to adjacent verges or footways.

In may be possible in certain situations to design the scheme in such a way that the turning area is part of the junction, rather than provide a specific turning head.

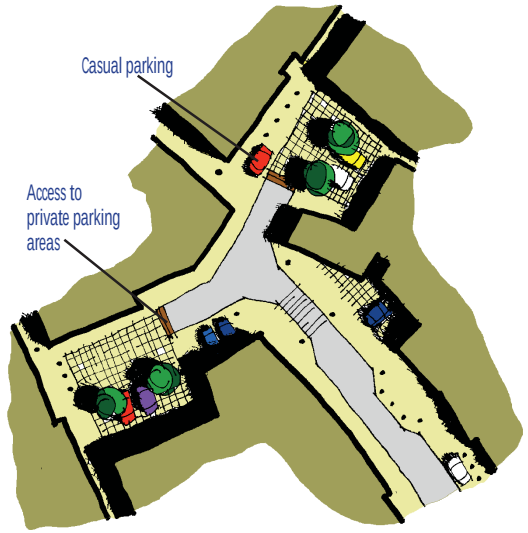
Turning areas must be designed to cater for the category and size of vehicles normally expected to use them. Further information on turning heads is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport and in the designing for movement part of the main document.

The siting of turning areas should aim to minimise the likelihood of vehicles using them for parking. Indiscriminate parking can be discouraged where the turning area provides direct access into private parking areas or driveways. Where casual parking is permitted outside the area required for turning, spaces must be located sympathetically and carefully between driveways (see right).

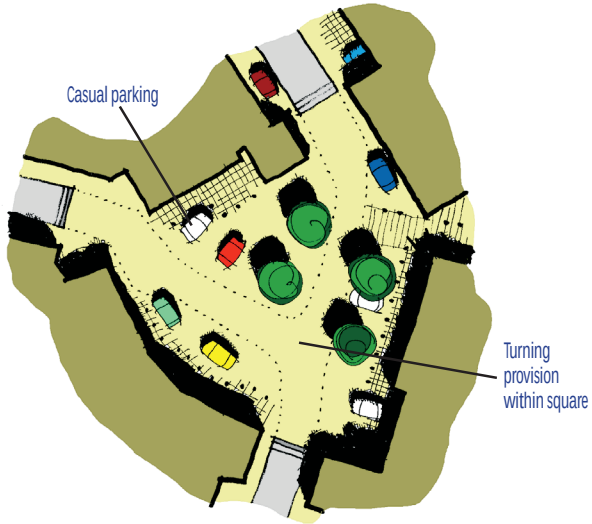
The Divisional Manager will consider larger areas, such as residential squares, that provide the minimum turning dimensions as long as their use as a turning area is not affected by on-street parking (below and right).

Residential squares or courtyards can combine parking areas with amenity space and allow su□cient space for vehicles to turn.

Turning Provision with access to private parking areas



Turning provision within parking square



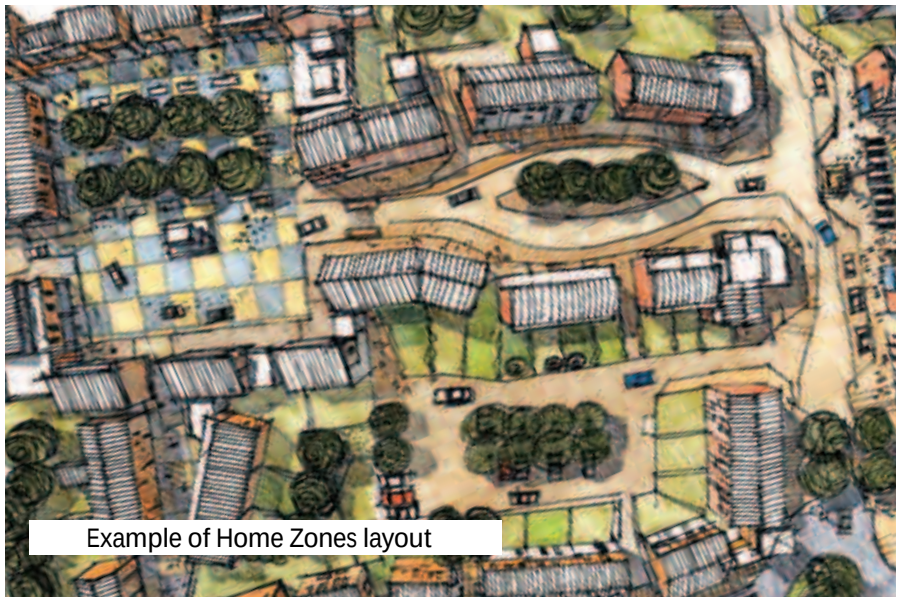
Home Zones

Home Zones are shared areas where pedestrians and cyclists have priority over motorists. The layout should make drivers aware of the fact that they are in an environment where people will use the whole of the street. A well designed Home Zone will make motorists feel they are guests in a pedestrian environment, and will make them drive accordingly.

Home Zones may include features which encourage people to use the street such as benches or play equipment. Entry gateways and signs are normally required to mark the limits of the Home Zone area.

The concept is relatively new in the UK, and some of the legal framework needed to support them, especially for new build, has only recently been put into place. Further regulations and guidance are likely to be issued in the future and you need to be aware of such requirements.

If you wish to include a Home Zone in your design proposals, you must discuss the principles with the Divisional Manager and the District Planning Authority at the earliest opportunity, and certainly before submitting a planning application.



Example of Home Zones layout

You must be aware of the following considerations with regard to Home Zones:

- No area of the County is specifically excluded in principle, however, Home Zones are more appropriate in urban areas that are well served by public transport and where car ownership is likely to be lower;
- The Divisional Manager will consider Home Zones in principle off any class of road. Where accessed off a classified road or a busy unclassified road, the junction must be designed in line with the Design Manual for Roads and Bridges and there must be a length of road between the site access and the beginning of the Home Zone. The length of the access road will depend on the speed and flow of traffic on the main road, the size of the Home Zone and local topography. Each site will be considered on its merits. Home Zones off other minor roads may normally be served by a traditional entry treatment arrangement;
- It is not normally appropriate for Home Zones to form part of a bus route;
- The Divisional Manager will normally only accept Home Zones where traffic flows are likely to be low. This applies to both small and large developments;
- Home Zones should ideally form part of a large permeable area but can be cul-de-sacs or small loop roads where there is little traffic from outside the development. Home Zones must be designed to prevent 'rat-running' between areas of development;
- Normally there will be no more than 25 dwellings in each cul-de-sac or 50 dwellings where there is any route for vehicles through the Home Zone. These limits are not intended to rule out larger developments consisting of a number of smaller type linked Home Zones arrangements. Layouts should be designed that allow both people and vehicles to move around the development; and
- Design speeds should be 10mph, with corresponding minimum visibility splays of 12m. The Divisional Manager will be prepared to consider lesser visibility splays where the proposed layout will achieve lower overall traffic speeds.

Home Zones combine traditional street patterns with new public space such as squares and play areas. Vehicles need to drive slowly to produce a feeling of pedestrian safety and comfort.

When designing a 'Home Zone' you must ensure that:

- their are methods of controlling entry speeds to the Home Zone;
- widths are suitable and adequate to allow vehicles, pedestrians and cyclists to use the Home Zone safely;
- vehicles keep to the intended design speed, preferably through the design and layout of buildings and where necessary, by using speed-control features;
- the design is safe for those with impaired mobility;
- accessibility for servicing vehicles, for example refuse-collection vehicles, is adequate;
- accessibility for emergency vehicles, including meeting the requirements of Building Regulations Document B – Fire Safety 2000 is adequate;
- the risk of accidents is reduced by making sure that there is appropriate inter-visibility;
- the extent of the public highway is defined for adoption purposes;
- there are areas for the installation of utility equipment (gas, water, cable TV etc) and access for maintenance will not disrupt the highway; and
- there is clearance for opening windows, drainage downpipes and overhanging eaves where buildings front directly on to the Home Zone.

In order that the Divisional Manager can properly and effectively assess your Home Zone proposals, you must submit a concept outline with supporting information at the earliest opportunity.

We will continue to review our guidance on Home Zones in the light of any new national guidance or practical experience gained, and may request some additional requirements not covered by this document.

Further advice on Home Zones is included in the designing for movement part of the main document.

Home Zone design involves careful consideration of public and private areas that includes street furniture, parking, through routes and planting. The entrance to a Home Zone has to be clearly de□ned and signposted.

Pedestrian and Cycling Provision

Walking and cycling offer real alternatives to car journeys, particularly over shorter distances. In the interests of sustainability new developments must make appropriate, high quality provision for pedestrians and cyclists. In respect of cycling, this includes provision of appropriate parking and supporting facilities where appropriate.

The general requirements for pedestrian only routes, including widths for footways, footpaths and cycleways is included in the designing for movement part of the main document. In the vicinity of bus stops and shelters, it may be necessary to widen the footway to 3m.

Where direct routes can be justified, for example, to give a more direct link to shops, schools, community or public transport facilities, you must take care to minimise crime opportunities. We work with Kent Police on initiatives to promote personal safety and to reduce crime, and you are advised to seek advice from them about your proposals as early as possible.

Separate cycle routes should normally comply with the following criteria:

- be in the open wherever possible. Where this is not possible, buildings should be designed with windows overlooking the route. You must avoid the use of blank walls or close-boarded fences next to these routes;
- routes should be short, straight and as direct as is practicably possible, ideally with each end being clearly visible from the other;
- routes should be well lit and include adoptable lighting; and
- all planting within 2m of the route should be low, ground-cover only. Plants should not have thorns. If a route is curved or has corners, you must increase the 2m distance to maintain satisfactory visibility. Care must be taken to ensure that all planting, particularly trees, does not reduce illumination from lighting.

Where a separate route joins another pedestrian or cycle route that runs alongside a road, the junction should be designed:

- so the route joins at 90 degrees to the traffic flow; and
- includes barriers to prevent users, particularly children, proceeding straight out into the road, and also to stop vehicles using it.

You must ensure that adeqaute visibility is provided for cycle routes so that cyclists emerging from the route can see and be seen. The visibility requirements are:

- 'x' distance – 2.4m; and
- 'y' distance - related to the target speed (mph) of vehicles on the adjacent road.

Signing

Direction signing can help highlight and promote the use of a route, although you need to take care to minimise clutter and visual disruption. You must identify any requirements for specific sites and agree them with the Divisional Manager in the early stages of preparing your development proposal. All signing and lining provided must be designed in consultation with the Divisional Manager.

Equestrians

Equestrians are entitled to use bridleways, byways and all-purpose roads. You must consider their needs in the design and safety audit of all developments which either:

- affect an existing or future bridleway; or
- affect an existing or future all-purpose road that permits horse riders.

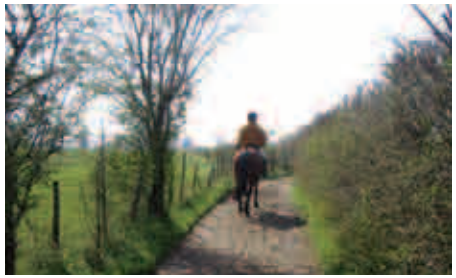
The guidance included in this section relates generally to lower-speed roads. For information regarding facilities for equestrians in other circumstances, please refer to TA57/87 Roadside Features, Section 11.

Bridleways can be used by horse riders, cyclists or pedestrians, and you must bear in mind the needs of all these groups when designing your scheme.

For bridleways, a blinded crushed stone surface is often best, being hard wearing without being hard on horses' hooves. Please consult us for further advice about bridleway construction.

Where a new junction is formed between a bridleway and a road, there should be sufficient standing space provided for a horse with adequate visibility for the rider. You must include bridleway signs in any design. See TA57/87 Fig 11 and Table 2 for further details.

New roads likely to carry significant numbers of horses (more than 100 trips a week) may require verges that are suitably surfaced for horses. For particularly well-used routes, for example, near a riding school, you must consider providing a separate horse trackway beyond the verge, possibly shielding the trackway from vehicles by suitable fencing or hedges.



Cycling is an attractive alternative to car journeys and should be considered at the earliest stages of design. Dedicated shared cycle paths can be incorporated into the footway (far right). Cycle routes must be clearly signposted (top left). The route of existing bridleways needs to be carefully planned (above middle). New bridleways need to be designed carefully to ensure pedestrians, cyclists and horseriders use them safely (both right).

Service Margins, Verges and Safety Strips

Service margins are generally required where footways do not abut the road, or in shared surface areas and Home Zones, to provide accomodation for Statutory Undertakers to lay their services and apparatus.

The boundary of all service margins must be clearly identifiable on site and any delineation should be sympathetic to the locality.

Advice about the widths of service margins and verges is included in the designing for movement part of the main document.

Service margins are generally landscaped. In Home Zones the service margin may be hard paved but should be sited outside the area normally associated with vehicle movement.

Where service margins are contiguous with private gardens, the highway boundary must be clearly identified and the householder made fully aware of our rights to maintain the margin, and those of the Statutory Undertaker with regard to access to services and apparatus.

Where appropriate we may be willing to grant a licence, under Section 142 of the Highways Act 1980, if a householder expresses a desire to cultivate the margin that is contiguous with their private garden.

Where Statutory Undertakers do not require services to be located in the service margin, the margin may be replaced with a minimum 1m wide safety strip to ensure adequate overhang of the highway.

Further information relating to the installation of services is included in the National Joint Utilities Group's (NJUG's) publication ' Guidelines on the Positioning and Colour Coding of Utilities' Apparatus'.

Legal covenants may be required to ensure that householders do not build unacceptable features such as walls, fences or rockeries in the margin (see bottom right).

Where a layby is provided in a shared surface area, the adjacent service margin must be hard paved so that persons alighting from vehicles have somewhere to stand.

Verges are used to separate pedestrians and vehicles. Statutory Undertakers may also decide to install mains and apparatus in them.

Verges shall be provided in accordance with the requirements set out in the main guide.

Verges are required to seperate pedestrians and vehicles and can also be used by Statutory Undertakers to lay their plant and apparatus.

Space in layouts needs to be put aside to accommodate service margins, verges and safety strips. These areas can be used by statutory undertakers to locate their services. Residents should not be encouraged to plant or install unacceptable features in service margins (right).

Highway Boundary

The highway boundary must be defined at all vehicular and pedestrian entrances to private premises. This can be achieved using a variety of different materials including granite setts, continuous precast concrete edging or by contrasting the colour of the block paving materials.

You must contact us about the extent of the existing publicly maintainable highway boundary, and also in respect of any recorded public rights of way in the vicinity.

Private Drives and Garages

The designing for movement section of the main document includes general requirements for shared private drives, however you must still ensure that:

- layouts are safe (in terms of road safety and personal safety);
- layouts are adequately lit with private maintenance regimes in place;
- layouts are accessible to all likely users, including those with mobility impairments; and
- suitable long-term maintenance arrangements are in place.

Shared private driveways situated off classified roads will require planning permission. The local District Planning Authority must be consulted over the layout arrangements and visibility requirements, which will be based on the target speed (mph) of the classified road.

Turning arrangements are required in private driveways so that vehicles can enter and leave in a forward direction. The layout should include measures to ensure that parked vehicles do not obstruct the use of turning areas. Where 'wheelie bin' waste collection methods are operated by the local District Planning Authority, you should consider providing a communal collection point within the site close to the highway.

Wherever possible driveways should incorporate shallow gradients or include roll-over details. (see opposite). Drivers will have less control of their vehicle's speed on steeper gradients, which could result in accidents.

Shared private driveways must incorporate suitable drainage systems which prevent surface water migrating onto the highway, and causing a safety hazard in the winter where the water freezes.

Shared private driveways should not be surfaced with gravel or any similar material which could migrate onto the highway.

Small stones can be hazardous for pedestrians on footways, can exacerbate drainge problems and are dangerous if propelled at high speed.

You must discuss such proposals for loose bound surfacing treatments with the Divisional Manager and the local District Planning Authority.

Garage doors and gates must be set back sufficiently to enable vehicles to stand clear of the highway. They must not open onto the highway or block the highway whatsoever.

Where properties are situated more than 45m from the highway boundary, you must design the driveway to accommodate emergency or service vehicles. The layout must accord with British Standard BS 5906, 1980 and Building Regulations Approved Document B.

All garages should be located to ensure:

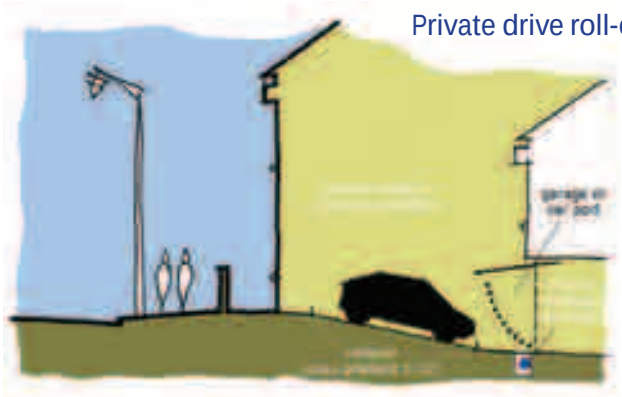
- cars can park in front of the doors; and
- the doors can be opened while the car is on the drive.

Cars parked on private driveways must not obstruct any part of the public highway.

In the interests of urban design, garages should not dominate the street scene. Where an integral garage is proposed you should hold early discussions with the local District Planning Authority about the design of the garage, the house and elevation of the property.

The local District Planning Authority may insist that some garages are located behind houses and may discourage the use of integral garages. Early discussions should be held with them to determine their requirements.

Private drive roll-over details



Artists impression of garage and undercroft parking incporating into a courtyard.

A variety of shared private access ways and drives. There should be enough space for vehicles to turn within them. Garage courts and individual garages with direct access should not dominate the street scene and should be safe and secure.

Refuse Collection.

Refuse vehicles will need to have access to most parts of the development, but will generally not need to access private drives or roads.

Refuse collection is generally made within 25m of an adopted road. However, in other cases shared bin collection points, which are suitably screened, should be provided.

The local District Planning Authority needs to be consulted about the necessary requirements for refuse collection.

Refuse storage areas don't need to be unsightly. If considered at the outset, bin storage can be incorporated into the building and be sympathetic to the surrounding area.

design standards – industrial and commercial roads

Speed Control

Vehicle speeds should be restrained to design target speeds by the use of horizontal measures rather than vertical deflection. This can be achieved by ensuring:

- distances between speed restraint devices are not greater than 150m;
- centre line radii for speed attenuation curves are not greater than 40m; and
- the length of the separating straight between attenuation curves of opposite hand are not greater then 24m.

Carriageway Widths

Carriageway widths are included in the designing for movement part of the main guide, however a width of 7.3m is usually sufficient to accommodate most types of large vehicles using industrial and commercial roads.

Widening around bends must be in accordance with the advice included in 'Designing for Deliveries' published by the Freight Transport Association.

Junction Design

Junction arrangements must be designed in accordance with the following criteria:

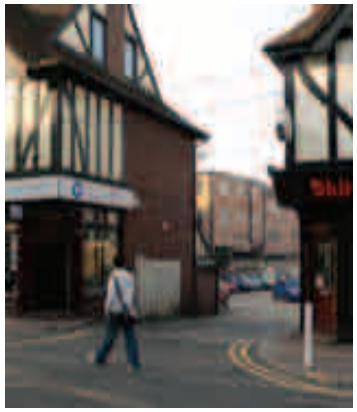
- configurations between local distributor and/or primary distributor roads will depend on traffic flow and turning proportions. Details must be in accordance with the requirements set out in the Design Manual for Roads and Bridges, published by the DETR Volume 6 TD42/95 or TD 16/93 (roundabouts);
- configurations between access roads and/or local distributor roads or other vehicle dominated environments shall be simple 'T' junctions;
- minimum spacing requirements between roads are included in the designing for movement section of the main document; and
- right-left stagger arrangements should be used instead of left-right arrangements to reduce vehicle conflict.

Junction radii must be in accordance with the following criteria:

- radii requirements are included in the designing for movement part of the main guide, however 15m is acceptable for most corners and access entrances;
- tapered kerb lengths equal to 1 in10 (10%) are required immediately after the tangent points of the radii:
  - along the near side of the non-priority road for vehicles exiting the priority road; and
  - along the near side of the priority road for vehicles exiting the non-priority road;
- footway construction around corners must be strengthened to vehicle crossing standards in accordance with the Highway Pavement and Specification section.

A right turning facility is required where the non-priority road is:

- a local distributor; or
- an access road which serves more than 15,000m2 of gross floor space, and the priority road is either a primary distributor or local distributor.



Junction designs for industrial and commercial roads. A controlled access junction serving an industrial estate (top left). Left turn at junction connecting with dual carraigeway (top right). Access to commercial parking and servicing area in an urban area (bottom left). Larger estates can incorporate road layouts that include roundabouts where landscaping can enhance the overall streetscene (middle left) Junction design, including kerb radii, should allow for large vehicles to turn safely (bottom right).

Visibility

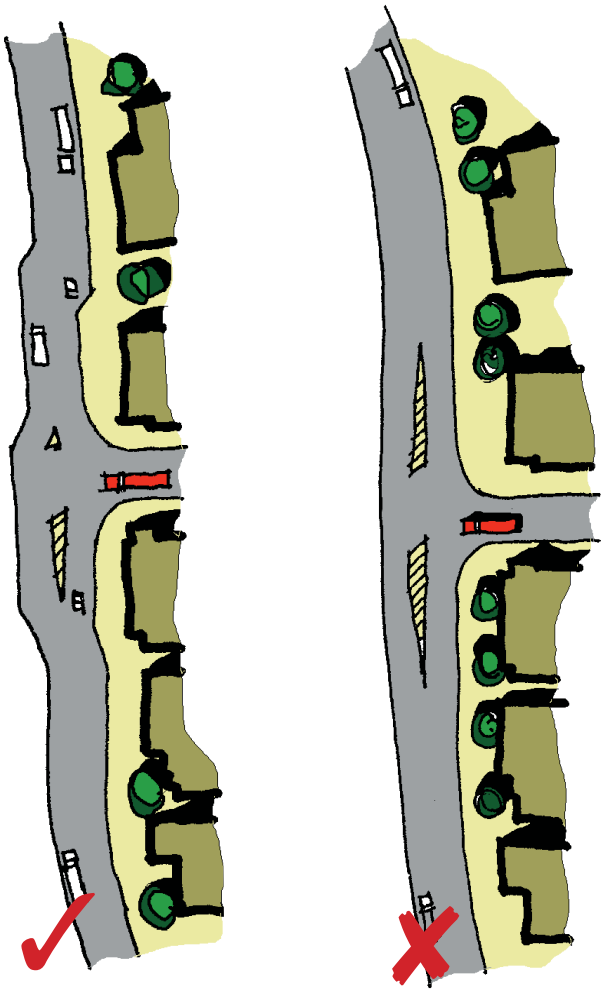
To ensure that drivers of vehicles can both see and been seen by other drivers at junctions, around bends and at entrances to premises, unobstructed visibility is required as follows:

- visibility must be provided in accordance with the advice included in the designing for movement part of the main document;
- Inter-visibility is required between 0.6 and 2m;
- Where traffic flows are expected to exceed 300 vehicle movements per hour, the 'x' distance must be increased to 9m; and
- Where the priority road is an existing road the 'Y' distance must relate to the existing measured 85th percentile wet weather speed on the priority road. (Advice relating to wet weather speeds and visibility are set out in Planning Policy Guidance PPG 13 and Design Bulletin 32 – 'Residential Roads and Footpaths', published by the Department of Environment and Transport).

Visibility around bends is related to vehicle stopping distances and must be provided in accordance with the advice included in the designing for movement part of the main document.

Visibility accesses must be provided in accordance with the following requirements:

- 'X' distance - 2m;
- 'Y' distance - relates to the vehicle speed on the adjoining road (see information about visability in the designing for movement part of the main document).



Visibility at junctions.

Visibility splays at junctions can be reduced where the priority road has speed reducing features. This helps reduce sterile areas of landscaping and can produce more acceptable character.

Industrial and commercial roads designed specifically to take high volumes of traffic need to be designed to be safe as well as attractive. Visibility around bends, junctions and entrances to individual premises must be planned for at the earliest stage of layout design.

Gradients

Gradients must be provided in accordance with the advice included in the designing for movement part of the main document.

Turning areas can be incorporated into the junction design.

Turning Facilities.

The manoeuvrability of large goods vehicles depends on their size, the number of axles, whether they are rigid bodied or articulated, and on the skill and judgement of the driver.

Some existing industrial and commercial estates cater for a whole range of vehicle types and sizes. In terms of sustainability it is both impractical and uneconomical to provide turning facilities that cope with the worst of all possible operating conditions, such as high numbers of the largest vehicles all requiring to visit a site in the same short space of time.

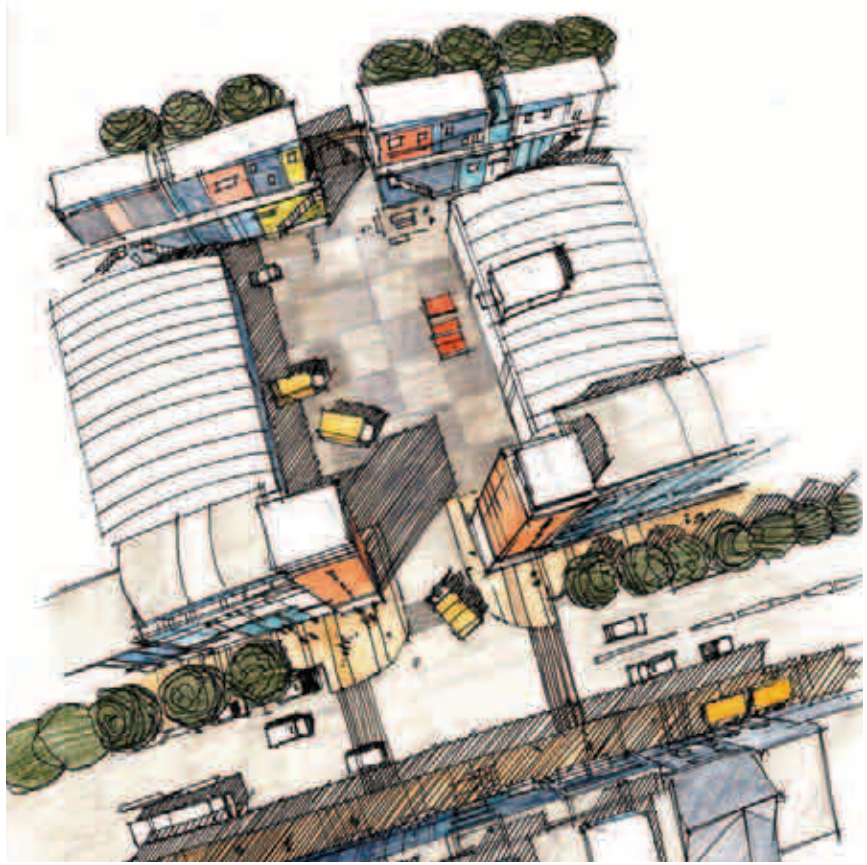
Layouts should take into account commonly occurring movements, recognising that a small number of vehicles will occasionally experience some difficulty in manoeuvring and that individual vehicle performance varies greatly with axle configuration and spacing.

Turning requirements can be checked using two methods. The first is to use standard templates, based on the type and size of vehicles expected to use the site and design techniques originally developed by the Freight Transport Association. The templates are included in the Freight Transport Association document entitled "Designing for Deliveries".

A second method is to use a computer software package available, either to generate the swept path for a particular vehicle type or to superimpose it on a pre-drafted layout drawing.

Additional information regarding the characteristics of turning manoeuvres is described in 'Design Bulletin 32 – Residential Roads and Footpaths'.

Roads that are not through roads or exceed 200m in length without a junction must always include a suitable turning facility.



Footways

Footways must be provided in accordance with the advise included in the designing for movement part of the main document. If no development is planned for one side of the road the footway may be replaced with a 1m wide safety margin.

If public transport is expected to visit the development the footway adjacent to all bus stops and shelters needs to be widened to 3m.

Footway construction must be in accordance with the Highway Pavement and Specification section, except that an additional 100mm of Base must be provided.

Longitudinal gradients must not be steeper than 6% (1 in 16.7).

Steps should be avoided wherever possible.

Cross-sectional gradients must be 2.5% (1 in 40) falling towards the road.

Vehicular Crossing Points

Vehicular access to premises should only be permitted off access roads, and must not be within 20m of the junction of a priority road.

The layout must take account of the necessary widths required for vehicular accesses, which should be able to accommodate all operating conditions. All large individual premises greater than 25,000m2 of gross floor space, should have their own access at least 6.1m wide.

All vehicular crossings must be constructed in accordance with the Highway Pavement and Specification section.

Verges

Verges can provide safe barriers for pedestrians and the environmental aspects of the development.

Verges can be extended to form part of the visibility areas if necessary.

Footways should create an attractive and safe environment for pedestrians. Landscaping can create a sense of place and can help soften the appearance of industrial buildings. Where there is no scope for planting a wider footway may be appropriate.

Parking

Parking must be in accordance with our latest 'Vehicle Parking Standards' (available on our website)

Security and convenience are important factors where vehicles or trailers are likely to be left for long periods. Accordingly, each individual unit will require sufficient parking facilities and loading areas, in order to prevent vehicles and trailers being left on the highway.

Indiscriminate parking on footways and roads can lead to problems with accessibility, and can cause damage and inconvenience to highway users.

You must discuss all necessary measures required to prevent indiscriminate parking with the local District Planning Authority and the Divisional Manager at the earliest convenience. Where such problems are likely to occur, you need to consider providing suitable off-street parking facilities.

Parking and access areas for deliveries needs to be considered at an early stage in the design. Each industrial or commercial unit needs dedicated areas for parking that does not conflict with vehicle loading and unloading.

Failing to provide adequate parking and loading areas can lead to indiscriminate parking on footways or verges.

Street Lighting

Road lighting must be provided in accordance with the highways street lighting section.

Vehicular Access to Premises

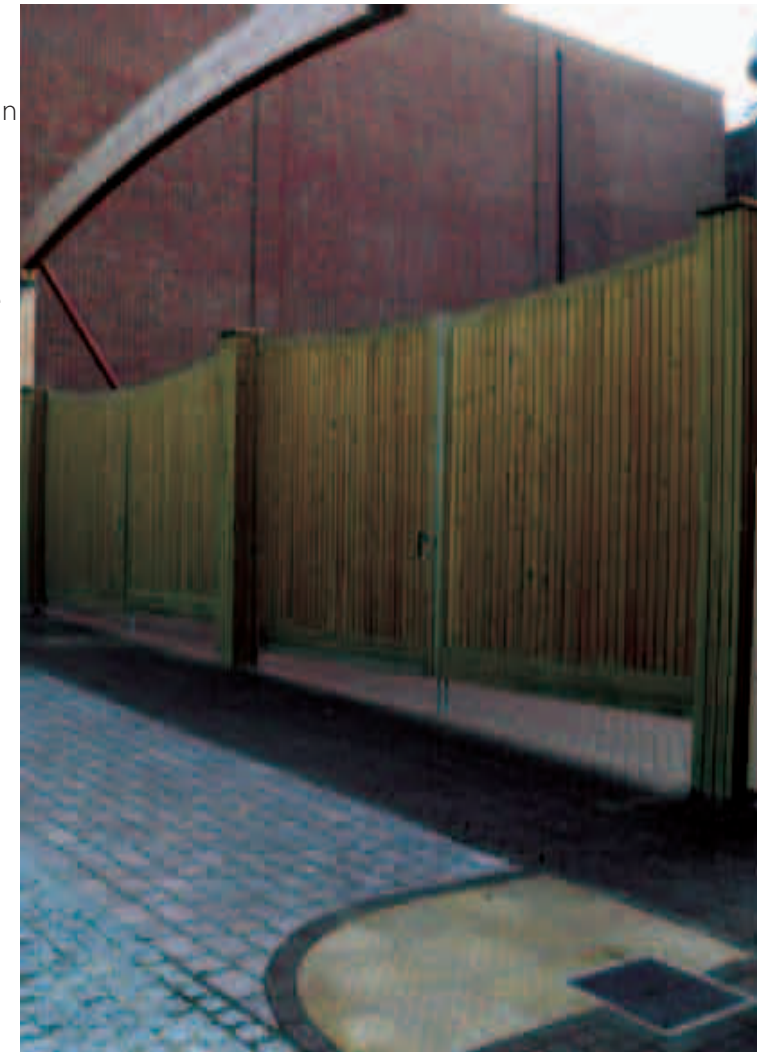
Further advice about accesses is contained in the Freight Transport Association document 'Designing for Deliveries'.

All private loading and parking areas must be designed so that vehicles can enter and leave in a forward direction. Large vehicles must not be allowed to reverese onto the highway which is both unsafe and unnacceptable.

Surface Water from Adjoining Accesses

All private loading and parking areas must be designed to prevent surface water migrating onto the public highway.

Accesses that do not take into account the needs of pedestrians, discourage walking.



The layout of industrial areas and buildings needs to safely accommodate loading and unloading and allow vehicles to enter and leave in a forward direction