Creating the Design

Step 3 - Designing for movement

2.3 DESIGNING FOR MOVEMENT

Activity is the life blood of a successful community. The ease with which people can move within and between neighbourhoods fundamentally affects activity. Once the fundamental elements of the layout are fixed, a strategy for movement can be designed.

Designing for Pedestrians and Cyclists

Developments should be 'permeable' *(easy to move through in all directions)* and linked to the surrounding network, allowing safe, direct routes for pedestrians and cyclists.

Streets and paths should be naturally overlooked. Walking and cycling on safe routes is a requirement,. Schemes such as 'Safe Routes to Schools' are encouraged (www.saferoutestoschools.org.uk). Convenient cycle storage should be provided in homes and outside community facilities, shops and other destinations.

It is particularly important to ensure that pedestrian and cycle routes are safe, secure and convenient; if they are not, people will feel forced back onto the roads resulting in conflict over the use of road space. In certain locations and street types eg homezones, pedestrians should have clear priority. 'Trim trails' and attractive walking routes will encourage residents to take regular exercise.

New footpaths should reflect the following:-

- footpaths should lead to where people want to go rather than follow a contrived geometric preconception
- people prefer to walk along streets where they can be seen
- dropped kerbs / at-grade crossings, and tactile paving should be provided at all junctions to assist people with disabilities.

The use of tactile paving and the choice of materials for paving must be carefully considered in order to avoid disfiguring attractive streetscapes.

Routes that link key areas should be considered at the outset so that, over short distances, residents are encouraged to walk or cycle.

Many development sites will include existing footpaths and bridleways which can be incorporated into more strategic routes for walkers and riders. Safety is enhanced by increasing the number of walkers and cyclists, and children will benefit from routes segregated from traffic. Routes should be designed to allow for the needs of blind or partially-sighted people.

People with disabilities benefit from direct links to and from services that have a smooth and well-maintained surface. The Kent County Council Public Rights of Way advice note provides further information on the design of rights of way.

Ribbed tactile paving should be used and raised line markings can be used to assist visibly impaired pedestrians to use the appropriate part of the path and to indicate the presence of side accesses or crossings.

Direct routes through developments should be provided for walkers and cyclists.

These may either be segregated or combined, but must be 'user-friendly'. They should not be too far removed from surveillance or hidden from roads or houses. Walking and cycling should be promoted as a dominant mode of travel for short trips, so these routes should be more direct than those for cars. Strategic foot and cycleways should be well lit to encourage use, unless they are primarily for leisure use where night time use is unlikely, or in rural surroundings where lighting would be inappropriate.

Cycle routes need to be planned strategically, rather than on a piecemeal basis. Where cyclists will share the use of a path with pedestrians and it is considered that conflicts will pose an unacceptable risk, it is desirable

to segregate the two uses. Where it is intended to include provision for cyclists on a public right of way, the 'Cycle Tracks Act 1984' should be referred to.

Space for cyclists should be designed to ensure safety of cyclists and pedestrians and encourage use. However the need to provide and indicate segregation should be balanced against the need to minimise the clutter and confusion created by small areas of different coloured surfacing, tactile paving, line markings and signs.

Factors such as the width of paths, cycling speeds, likely levels of use and the frequency of interruptions from side accesses and crossings should be considered at the initial design stage. The forward visibility requirements of cyclists should also be considered.

Adequate secure storage for cycles must be provided at dwellings and at destinations such as workplaces, shops, community facilities and transport nodes. It should be integrated with the design of buildings and streets, be weather protected and either within a lockable curtilage or have good natural surveillance.

Public Transport

Good public transport should be available at the initial phase of a new development, either by linking to existing networks or by establishing new routes. A coordinated approach between different transport modes should be encouraged with cycle pedestrian routes and taxi ranks linked to stations and all key transport nodes.

Designing for Bus Passengers

Bus stops should generally provide shelter facilities. Where real-time information services can be made available, such facilities must also be incorporated. Other considerations are:

- bus stops should be within a convenient walking distance
- shelters should be designed as an integral part of the streetscape and should be in context with the local area and the form of the development.
- Kerbs adjacent to bus stops should have a height of 185mm above the carriageway to facilitate boarding.
- bus priority measures should be considered where appropriate
- provide accessible routes to bus stops with dropped kerbs and tactile pavings as appropriate *(routes should be overlooked)*.

Motor Vehicle Provision

Access provision for motor vehicles should cater for the size and frequency of essential vehicles and should reflect the need for public safety and the requirements of all modes of transport.

Support for Sustainable Transport

A comprehensive movement framework will not be effective unless people are aware of it and are willing to support the more sustainable forms of transport. With the more major forms of development, schools, businesses and developers should submit 'travel plans' which encourage staff and, where appropriate visitors, to think about their travel choice and consider alternatives to the car. It is not an all-or-nothing choice. The essence of a travel plan is travel blending, where an alternative to the car is used perhaps once a week. Incentives can be offered to those supporting such initiatives.

2.3.1 SPATIAL TYPES

A development, depending on its scale and the context, will require a range of streets and spaces with differing characteristics *(spatial types).*

The range of spaces is outlined below. It is explained in more detail in step 2.

Industrial, Commercial and mixed use areas
Predominantly urban in character - usually serving areas with a high volume of traffic generation and usually with heavy peak flows.

Street
Urban or village in character with buildings providing enclosure.

Avenue
Usually suburban with tree planted verges.

Boulevard
Wide urban or suburban street characterised by further tree planting.

Crescent
Curved development - usually terraced, which excludes open space. More formal curved building lines which either enclose the street on both sides or on one side only overlooking an open space.

Square
Buildings formally arranged to define an open space. Squares should have a distinctive character and be regarded as places rather than streets. Routes through them should be indirect. They can be an important element in defining a sense of place, part of the public domain that people refer to in the context of the wider area.

Green
Buildings less formally arranged around an open space. As with squares, they should have a strong identity.

Lane
Found in rural or village locations. Usually serving areas with a low volume of traffic and characterised by an informal layout. Generally, soft landscaping will be a dominant feature of the street scene.

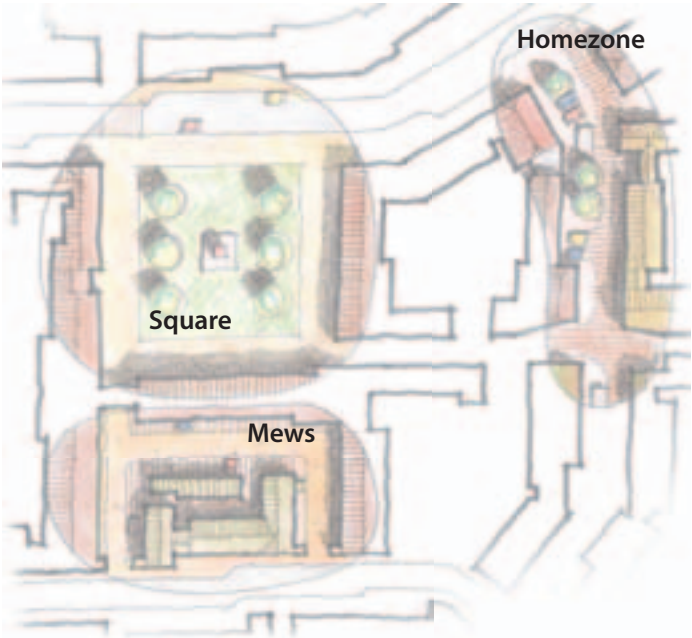
Mews
Set closely around a semi-public street. Parking is usually accommodated within the mews and in directly adjacent parking spaces or garages

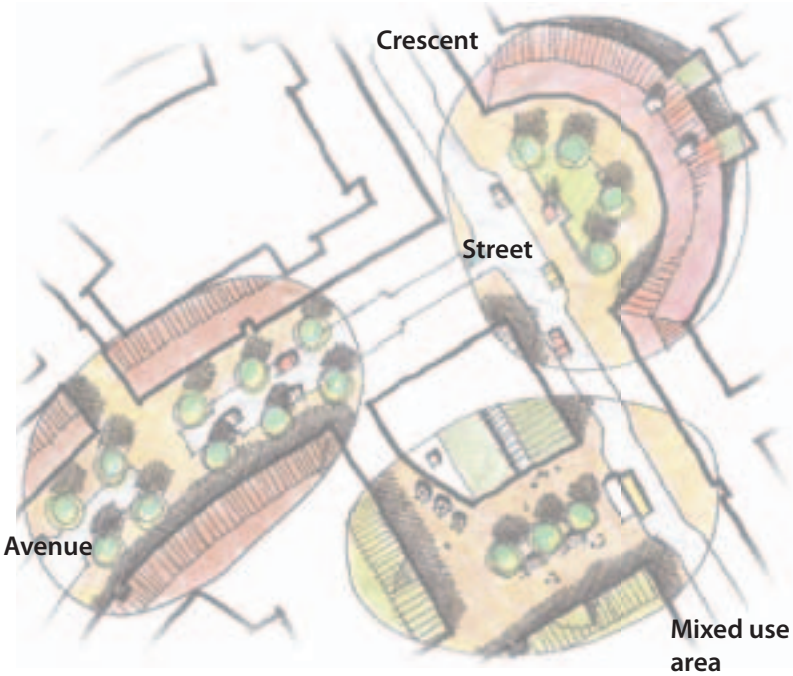
Courtyard
Courtyards are generally found in urban or village centre locations. They are tightly enclosed spaces that are on a smaller scale than a square. They should have an intimate feel and can be enhanced with one or more feature trees.

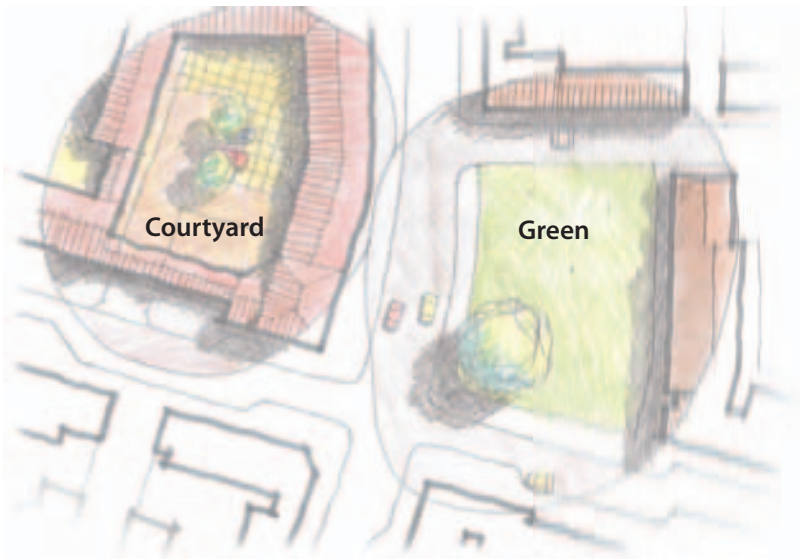
Private Developments
There may be exceptional circumstances when development characteristics are such that adoption of the road or roads within new housing developments is inappropriate or unnecessary. This may be due to the historic character of the site, its relationship to neighbouring development or unusual layout considerations. There may be a case for having gates at the entrance. A guidance note will be prepared separately to accompany this design guide.

Culs de sac
These are often suburban in character. The absence of through traffic creates a semi-private character.

Homezone
A residential street designed for very low traffic speed where people clearly have priority over vehicles.







Combining spatial types with a movement framework. *A skillful process turns roads and paths into attractive safe and practical public space.*

Getting Highway Geometry Right

Highway design should relate to a specific spatial type, use, form and function.

Guidance on the design of roads has previously tended to rely on a strict application of geometric standards related to road type and design speed. This may simplify matters for designers but it often restricts the ability to create attractive places and thoroughfares complementing surrounding buildings or open spaces. So, in addition to outlining the usual parameters applicable to each road function, this section gives guidance on flexibility of use and where in some cases minimum or maximum standards must apply. The tables should be used as guidance – flexibility is permitted to produce well-designed solutions.

STANDARD SPATIAL TYPE	Local Distri-Road	Major Access Road	Minor Access Way	Minor Access	Country Lane	Shared Drive	Path	Home Zone
Ind, Comm & Mixed use areas	•	•	•				•	
Street	•	•	•	•			•	
Avenue	•	•	•	•	•		•	
Crescent	•	•	•	•			•	
Square			•	•				
Green			•	•	•	•		
Lane			•	•		•		
Mews			•	•		•		
Courtyard/Private Dvts.				•		•		
Cul-de-sac			•				•	
Home Zone								•

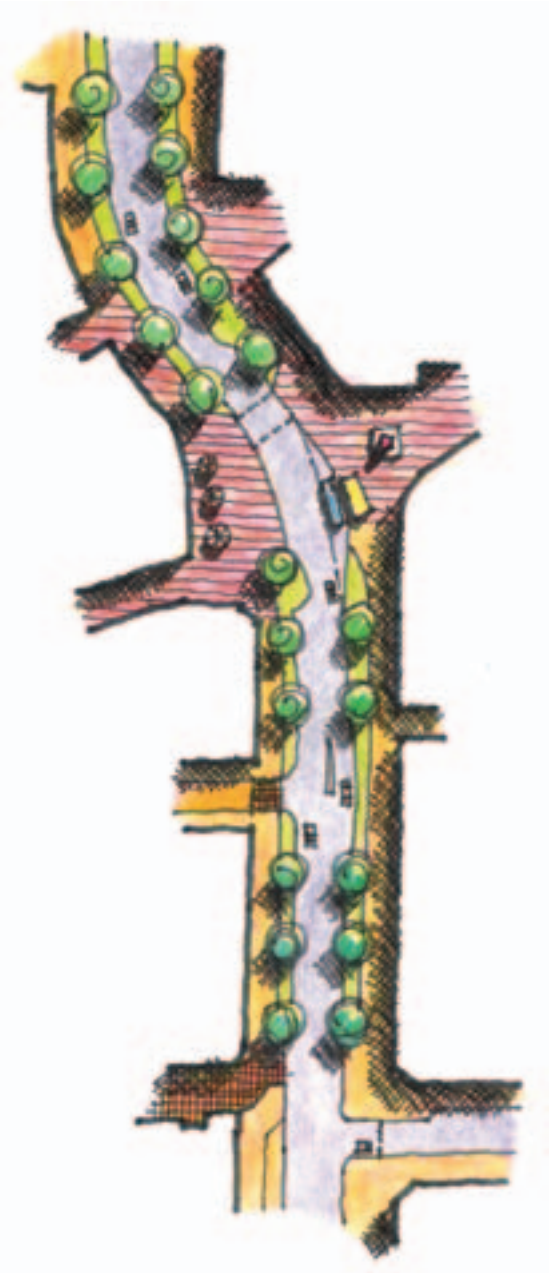
Diagram showing how an urban layout combines different types of highway to produce a variety of public spaces.

Lacuna at Kings Hill. Highway geometry and choice of surface materials are used to create a square at a cross roads. (Sunley Environ Homes).

Local Distributor Road

1 a busy road linking other distributor roads and residential access roads, distributing traffic within the primary residential districts of a town
2 a road type applicable to all sites on the outskirts of main towns or infill sites within existing suburban areas
3 generally serves over 300 dwellings
4 provides an opportunity for boulevard or avenue planting and cycleways.
5 for new developments, direct vehicular access to dwellings would not normally be provided, the exception being shared private drives with turning within the site

Diagram showing a Local distributor road with scope for an avenue of tree planting, cycle way and footway combined.



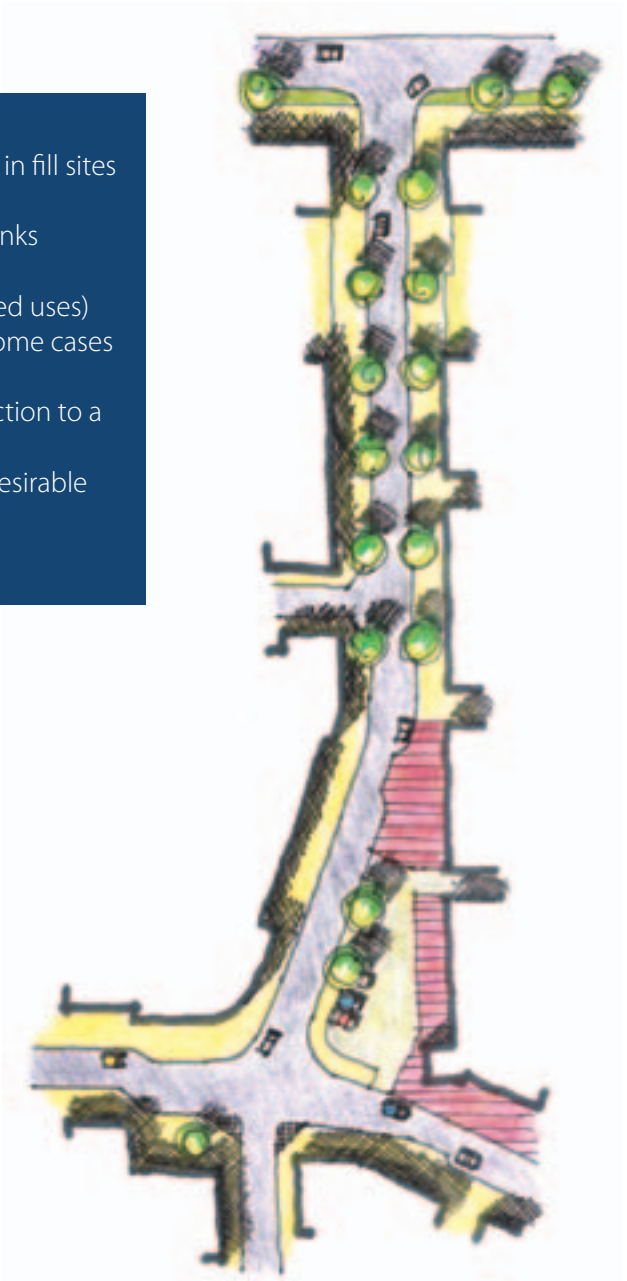
	Typical parameter	**Notes**	**Recommended parameter range** (mandatory shown in **bold**)
Carriageway width	6.75	may vary to suit building massing and to include features such as central islands minimum standard subject to tracking demonstrating that 2 anticipated vehicles can pass	**6.00m** / 10.50m
Anticipated vehicle types	to HGV all other types	assessment of likelihood of HGVs should be made depending on type of development and context of area	**pantechnicon**
Verge width	2m	verges less than 1 m wide will normally need to be paved	**0.5m** / 5.0m
Footway/cycleway width	3m	may be reduced if a nearby alternative cycle route is being provided, should be increased where pedestrian levels are expected to be higher than normal such as outside schools, shops etc, and limit should be 20mph where there are likely to be high levels of pedestrian and cycle movements	1.8m/5.0m
Target speed	20-30mph	must be 20 mph in the vicinity of schools and play areas. See also guidance on paths	< **30mph**
Distance between speed restraint features	150m	maximum distance should be reduced to 60m for 20 mph target speed	0 / **150m**
junction visibility x	4.5m	may be reduced if side road is a minor access road or lower category	**2.4m**
junction visibility y	70m	may be reduced if it can be demonstrated that vehicle speeds will be less than 30mph. Left sightline may be taken to centreline of road if measures are taken to deter vehicles travelling in the offside lane	>**33m**
forward visibility	60m	may be reduced if it can be demonstrated that vehicle speeds will be less than 30mph.	> **28m**
min junction spacing adjacent	60m		>30m
min junction spacing opposite R/L	15m	Cross roads fine if traffic speeds 20 mph or less. Cross roads should be avoided unless other feature such as roundabout is provided	> 15m
min junction spacing opposite L/R	30m		> 15m
right turn lanes	3.5m	normally only required if 2-way traffic levels from side road exceed 300 vph	3.0m
min longitudinal gradient	080%	1.25 for block paved surfaces	0.80%
Max longitudinal			
gradient	6 %	gradients may only be increased if unavoidable due to local topography	8%*
Cross section			
gradient	2.50%		**1.0%/5.0%**
Vertical curve min K value			
	11	may be reduced subject to a minimum curve length of 30m	5
Junction kerb			
Radius	10.5m		6.0m
Kerb height	125 mm		>**100** / 185

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.
* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%

Major Access Road

1 a road type applicable to all sites on the outskirts of main towns or in fill sites within existing suburban areas
2 gives direct vehicle and pedestrian access to dwellings and often links several residential areas to a local distributor road
3 generally serves between 50 and 300 dwellings (or equivalent mixed uses) including those located on other access roads feeding onto it. In some cases it could serve as a bus route.
4 preferably has two points of access or is a loop with a short connection to a single point of access and a secondary emergency access link
5 discourages non-essential through traffic but only where a more desirable alternative through-route exists
6 provides an opportunity for boulevard or avenue planting.

Diagram showing a section through a major access road with widened footway with cycle way on one side.



	Typical parameter	Notes	Recommended parameter range (required min or max standard shown in bold)
Carriageway width	5.5m	carriageway width not necessarily constant	4.8m / 10.5m
Anticipated vehicle types	low pantechnicon, possibly bus, fire tender, car	passing places for larger vehicles may be appropriate where their frequency is likely to be high	pantechnicon
Footway width/Cycleway	1.8m	footway width not necessarily constant min 1.2m width to be kept clear of obstructions. A verge may replace footway where there is no frontage development and not essential	**1.2m** / 3.0m without cycleway **1.8m** / 5.0m with cycleway
Target speed	25mph	must be reduced to 20 mph in the vicinity of schools and play areas and should be 20mph where there are high pedestrian and cycle movements	< **25mph**
Distance between speed restraint features	100m	advice on speed restraint features is contained in this section	< **120m**
junction visibility x	2.4m		**2.0m**
junction visibility y	45m	may be reduced in accordance with advice on visibility contained in this section	> **23m**
forward visibility	45m	may be reduced in accordance with advice on visibility contained in this section	> **23m**
min longitudinal		1.25% for block paved surfaces	
gradient	0.80%		0.80%
Max longitudinal gradient	6 %	gradients may only be increased if unavoidable due to local topography	*8%
Cross section gradient	2.50%		**1.0% 5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius		
Vertical curve min K value	7	may be reduced subject to a minimum curve length of 20m	4
Junction kerb radius	6m		4.5m
Kerb height	125mm		50mm / 185mm

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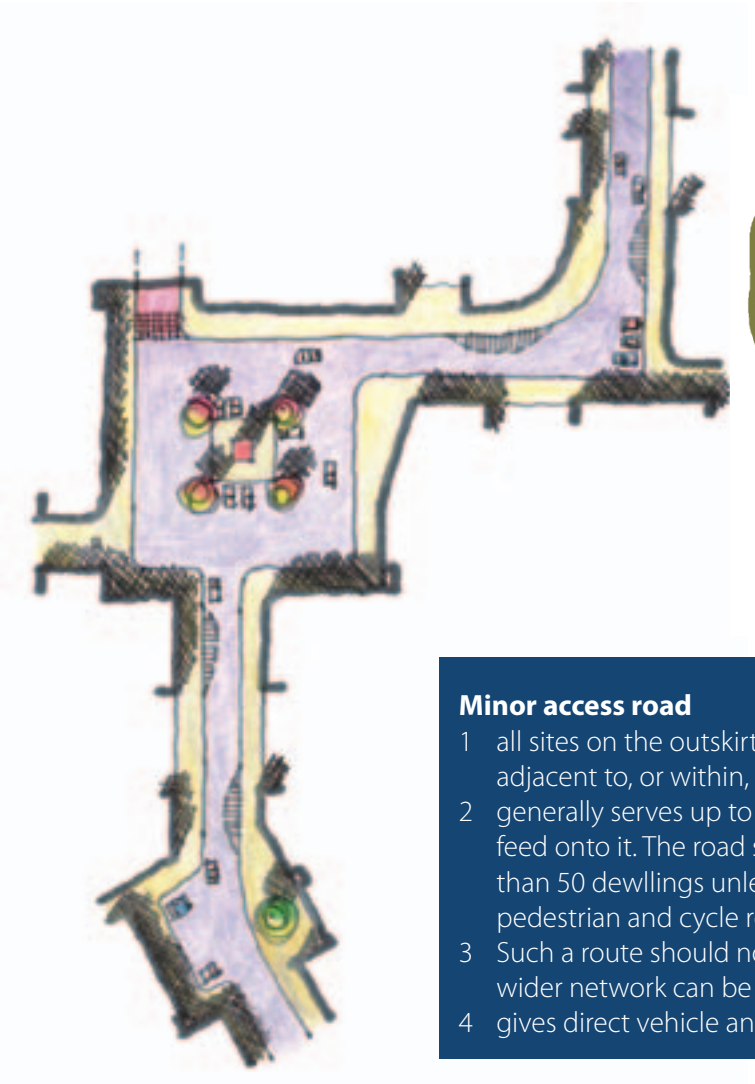


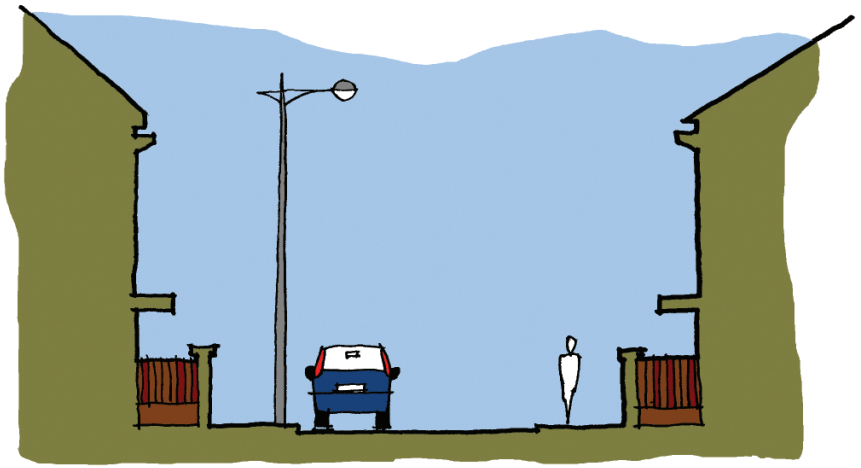


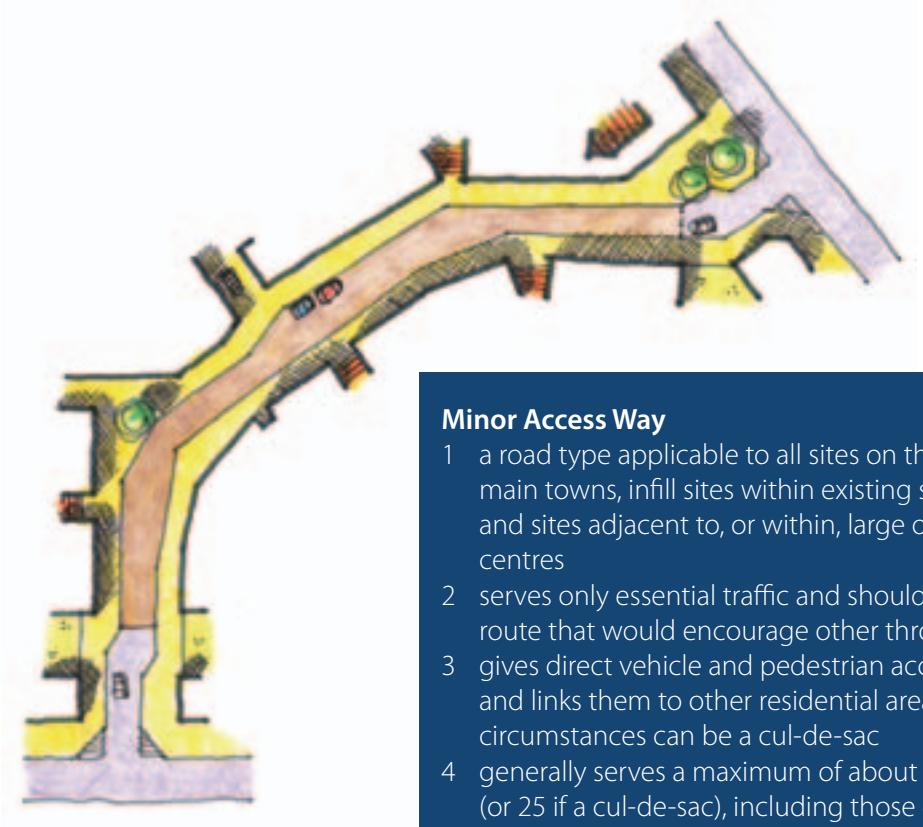
Diagram showing a minor access road with tightly enclosed space but retaining separate footways.

Minor access road

1 all sites on the outskirts of main towns, in fill sites within existing suburban areas, sites adjacent to, or within, large or small village centres
2 generally serves up to 100 dwellings, including those in other residential areas which feed onto it. The road should either be a through-road or, if a cul-de-sac, serve no more than 50 dewllings unless an alternative emergency access route, to serve also as a pedestrian and cycle route, can be provided
3 Such a route should not be provided below 50 dwellings if suitable connections to the wider network can be made
4 gives direct vehicle and pedestrian access to dwellings and links other residential areas.

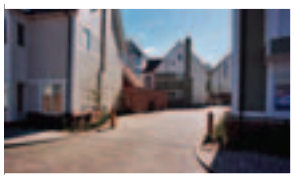
	Typical parameter		Notes	Recommended parameter range (required min or max standard shown in bold)
Carriageway width	4.8		carriageway width not necessarily constant but there should be sufficient space for two cars to pass each other at least every 40m, these spaces should be intervisible	> **3.0m subject to tracking**
Anticipated vehicle types	low pantechnicon, refuse vehicle, fire tender, car			fire tender
Footway width (where provided)	1.8m		footway width not necessarily constant	**1.2m** / 3.0m
Margin/Verge width (shared surfaces)	1.0m		margin width not necessarily constant	**0.5m** / 3.0m
Target speed	20mph	15mph		
Distance between speed restraint features	60m	40m	advice on speed restraint features contained in this section	not more than **120m**
junction visibility x	2.0m	2.0m		**2.0m**
junction visibility y	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
forward visibility	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
min longitudinal gradient	0.80%		1.25% for block paved surfaces	0.80
Max longitudinal gradient	6 %	7 %	gradients may only be increased if unavoidable due to local topography	***10%**
Cross section gradient	2.50%			**1.0%/5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius			**for a distance > 6m**
Junction kerb radius	6m			> **3.0m**
Kerb height	100mm		50mm	0 / 125mm

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.
* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%

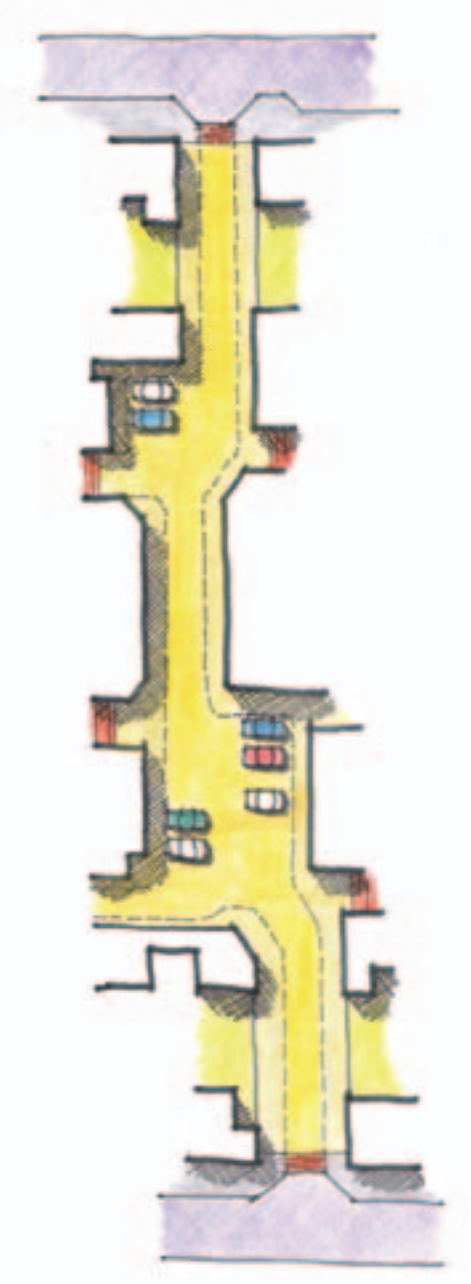


Minor Access Way

1. a road type applicable to all sites on the outskirts of main towns, infill sites within existing suburban areas and sites adjacent to, or within, large or small village centres
2. serves only essential traffic and should not provide a route that would encourage other through traffic
3. gives direct vehicle and pedestrian access to dwellings and links them to other residential areas but in some circumstances can be a cul-de-sac
4. generally serves a maximum of about 50 dwellings (or 25 if a cul-de-sac), including those dwellings from other areas feeding onto it
5. includes measures to prevent on-street parking except where designed into the layout through localised widening.



Minor acccess ways can service a range of layouts. Far left: Serving a courtyard. Middle: A town centre road leading to a quiet residential district. Right: An alley serving new and existing properties.

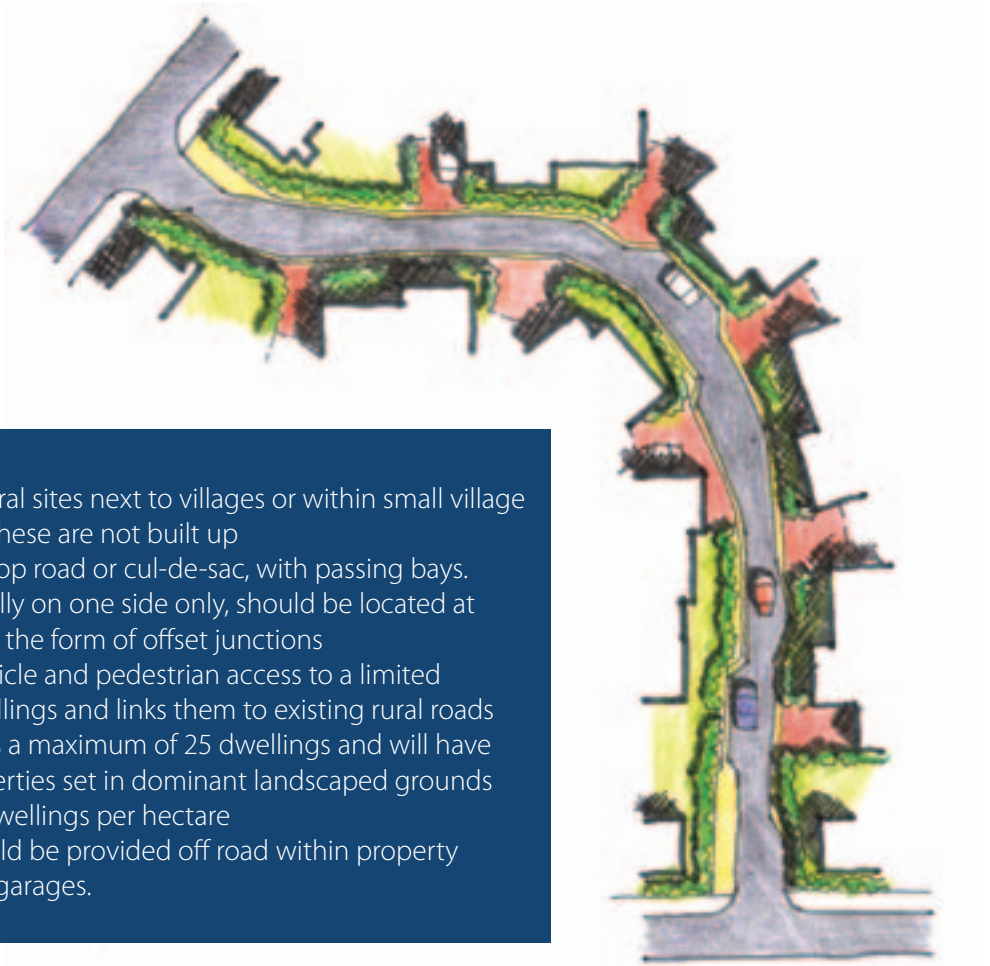


	Typical parameter		Notes	Recommended parameter range (required min or max standard shown in bold)
	with footways		**can be a shared surface**	
Carriageway width	4.1m*		carriageway width not necessarily constant. There should be sufficient space for 2 cars to pass each other at least every 40m. These spaces should be intervisible	> **3.0m subject to tracking**
Anticipated vehicle types	low pantechnicon, refuse vehicle, fire tender, car			fire tender
Footway width	1.8m		footway width not necessarily constant	**1.2m** / 3.0m
Margin/Verge width (shared surfaces)	1.0m		margin width not necessarily constant. The need to accommodate services should also be considered	**0.5m** / 3.0m
Target speed	20mph	15mph		
Distance between speed restraint features	60m	40m	advice on speed restraint features contained in this section	< **60m**
junction visibility x	2.0m	2.0m		**2.0m**
junction visibility y	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
forward visibility	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
min longitudinal gradient	0.80%		1.25 for block paving surfaces	0.80
Max longitudinal gradient	6 %	7 %	gradients may only be increased if unavoidable due to local topography and alternatives can be provided for the mobility impaired	***10%**
Cross section gradient	2.50%			**1.0%/5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius			**for a distance > 6m**
Junction kerb radius	4.5m			**3.0m**
Kerb height	100mm	50mm		0 / 125mm

*4.1 may need to be increased if HGVs use the road: footway/service strip parking and / or over-run is probable

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%



Lane

1 applicable to rural sites next to villages or within small village centres where these are not built up
2 a single track loop road or cul-de-sac, with passing bays. A footway, usually on one side only, should be located at access points in the form of offset junctions
3 gives direct vehicle and pedestrian access to a limited number of dwellings and links them to existing rural roads
4 generally serves a maximum of 25 dwellings and will have individual properties set in dominant landscaped grounds with up to 15 dwellings per hectare
5 all parking should be provided off road within property curtilages or in garages.

Left: A lane leading from a village centre. Middle: A country lane style new housing layout at the edge of a village. Right: A country lane serving a number of individual properties forming the soft edge to a village.

	Typical parameter	Notes	Recommended parameter range (required min or max standard shown in bold)
Carriageway width	3.0m	intervisible passing bays at < 40m spacing	3.0m / 4.8m
Anticipated vehicle types	cars, refuse vehicle, occasional pan-technicon fire tender		fire tender
Footway width	1.8m	footway, where present, normally on one side only	**1.2m** /2.0m
verge width	2.0m		1.0m / 2.0m
Target speed	20 mph		
Distance between speed restraint features	60m	for advice on speed restraint features see para 5.17	< **60m**
junction visibility x	2.4m		> **2.0m**
junction visibility y	33m	may be reduced in accordance with advice on visibility contained in para 5.31	> **14m**
forward visibility	33m	may be reduced in accordance with advice on visibility contained in para 5.30	> **14m**
min longitudinal gradient	0.80%		0.80
Max longitudinal gradient	6 %	gradients may only be increased if unavoidable due to local topography	*8%
Cross section gradient	2.50%		**1.0%/5.0%**
Junction gradients	5% rising 4 % falling for a distance of twice kerb radius		
Vertical curve min K value	7	may be reduced subject to a minimum curve length of 20m	4
Junction kerb radius	6m	entry treatment as shown in fig #	**3.0m** / 6.0m
Kerb height (where required)	125mm	kerbs may be omitted where this is in keeping with a rural context and are not required for drainage purposes	0 / 125mm

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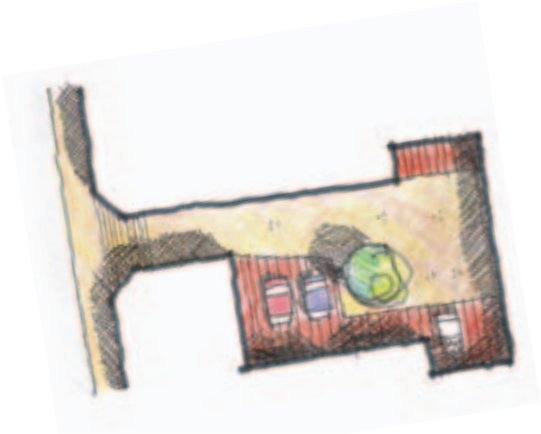


Far left: Diagram showing a private drive serving a courtyard. Left: A central courtyard in an urban mixed use development.

Shared Private Drive

1 private ways not being part of the public domain
2 provides direct vehicle and pedestrian access to a limited number of individual dwellings, usually from residential access roads and in some cases local distributor roads
3 a single track serving between 2 and 5 dwellings but with support for HGV (fire appliance, delivery vehicle) access and turning.
4 excessive distances between dwellings and the highway should be avoided, and a maximum distance of 25m is recommended.

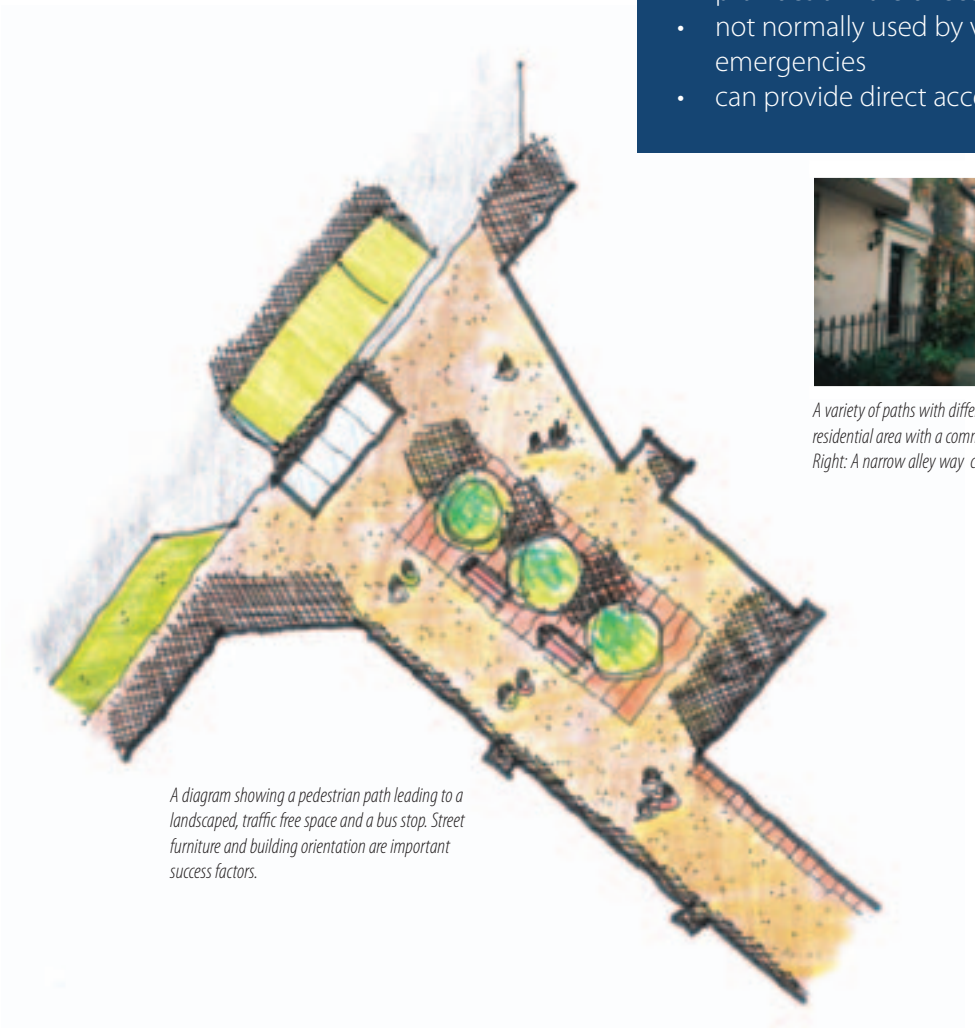
Above: A private shared access in a village setting using boundary walls to mark a line between public and private space. Left: A diagram showing a shared access to a cluster of properties in an informal layout.

	Typical parameter	**Notes**	**Recommended parameter range (required min or max standard shown in bold)**
Width	3.0m	minimum width 3.0m if access required for fire tender	2.4 m / 4.8m
Anticipated vehicle types	car, fire tender	see section 6.16 for guidance on access for fire appliances	
pedestrian visibility at junction with highway	2.0m x 2.0m		**>1.0m x 1.0m**
Maximum gradient	10%	measures may be needed for driveways having a steep downward gradient to prevent vehicles grounding . This can include providing a roll over as shown below or modifying footway cross fall gradients	0.13

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

Path

- provides a more direct route between different areas for walking and cycling
- not normally used by vehicles but can be an alternative access in emergencies
- can provide direct access to groups of dwellings.

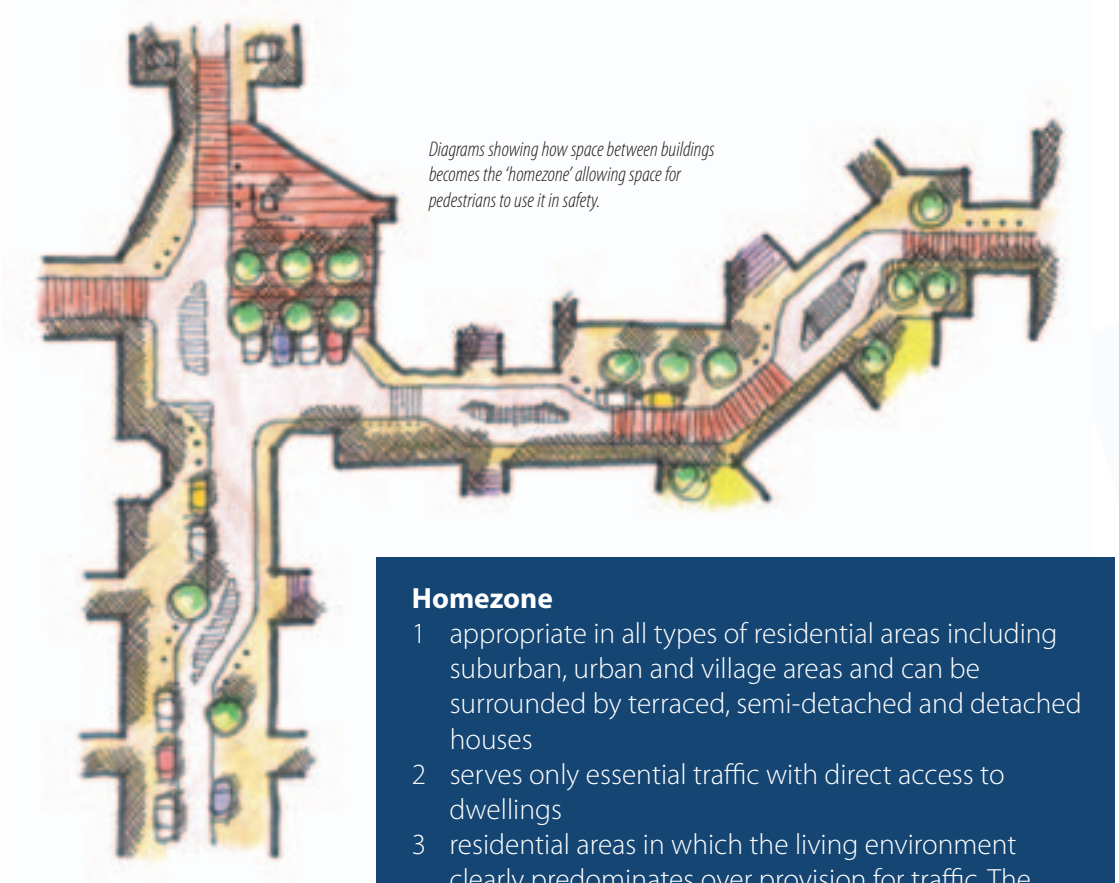


A diagram showing a pedestrian path leading to a landscaped, traffic free space and a bus stop. Street furniture and building orientation are important success factors.

A variety of paths with different functions. Above left: Town centre housing served by a path with no through route. Middle left: Path connecting a residential area with a commercial centre. Middle right: Suburban housing with parking at the rear served by a path giving access to front doors. Right: A narrow alley way connecting a lively mixed use centre with quieter residential areas.

	Typical parameter	Notes	recommended parameter range required min or max standard shown in bold).
Footpath width	2.0m	Minimum width 3.0m if access required for fire tender. Minimum 3.25m width is suggested where it is considered appropriate to indicate segregation between pedestrians and cyclists. Where the footpath width is less than 1.8m, care should be taken to avoid locating street furniture in such a way as to reduce the available clearance below 1.2m	1.2m /4.0m
Cycle/ footpath width	3.0m		2.5m/5.0m
cycleway forward visibility	20m		>10m
Longitudinal gradient	<5%	Cycle paths should not exceed 5% wherever possible.Steps may be provided in footpaths where the topography makes this unavoidable. However, reasonably convenient alternative provision must be made for wheelchairs	<10%
Cross fall	2.5%	steep crossfall, for example where there are long lengths of dropped kerbs, should be avoided by adjusting footway levels	<10%
Tactile paving	-	should be provided where pedestrans are required to cross Local Distributor roads and other places where pedestrian movements are likely to be high.	

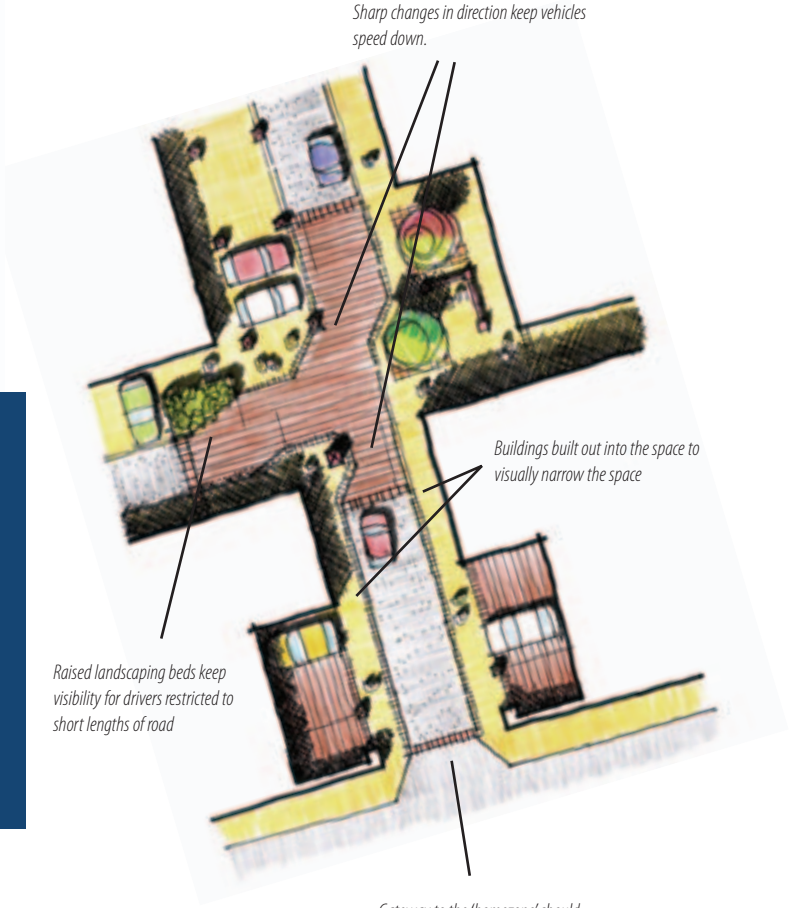
All figures are for guidance; design specification should be guided by local context and agreed with the local authority.



Diagrams showing how space between buildings becomes the 'homezone' allowing space for pedestrians to use it in safety.

Homezone

1 appropriate in all types of residential areas including suburban, urban and village areas and can be surrounded by terraced, semi-detached and detached houses
2 serves only essential traffic with direct access to dwellings
3 residential areas in which the living environment clearly predominates over provision for traffic. The aim is to promote neighbourliness, quality of life and social interaction.



Homezone Design

'Homezones' are residential streets where people come first and have priority over drivers. The Transport Act 2000 enables highway authorities to designate them. They must be designed from the outset with designation in mind as specific regulations apply. The benefits of homezones are that they provide additional outdoor leisure space with the associated health benefits; they can help prevent crime as well-used streets contribute to surveillance, and they encourage social interaction. There are also significant benefits for people with disabilities.

In conservation areas it may be possible to relax the vision splays required at the Homezone entrance; for instance, where there is space at the entry from the major road to include a waiting bay. Garages may be 'on-plot' or may sometimes be sited in small blocks. On no account should the blocks be allowed to become through routes to large parking areas elsewhere. Such arrangements encourage children to play in large groups where they are not wanted. Car parks are likely to form major areas of hard-surfacing within any scheme and be heavily used. If not 'on-plot' then, as an absolute minimum, all visitors' parking should be within the Homezone and the design of the rest of the layout ensuring that such spaces are not permanently occupied by residents' cars. This can be done by ensuring that all residents' parking is close and convenient to homes.

The key design characteristics of 'Homezones' are:

- traffic speeds are restricted to around 10mph
- high quality hard paving
- strong enclosure of the public access space
- minimal front gardens
- careful planting of trees within the public area *(the Highway Authority should be consulted on this)*
- integration within the overall network of streets, making them part of a through route system

In exceptional circumstances Homezone culs-de-sac will be permitted serving an upper limit of around 25 dwellings. Where the Homezone links other residential areas, or is part of a series of linked areas, it can be a through route serving up to 100 dwellings, where the maximum distance to any point within the Home Zone from the entrance or exit is 400m and the maximum traffic flow in any part of the Homezone does not exceed 100 vehicles per hour Pedestrians are given priority over vehicles by virtue of distinctive design, or communal features.

Diagram showing arrangment of planting and car parking in a homezone street. Paving is used to mark out play areas from the carriageway.

Homezone play area in Denton, Gravesend. Although this scheme is a 'retro-fit' scheme it contains many of the elements found in successful pedestrian priority new designs.

Further advice on the design of Homezones is contained in Homezone design guidelines *(Institute of Highway Engineers, 2002)* and Homezones-a planning and design handbook *(Mike Biddulph-Joseph Rountree Federation)*.

2.3.2 DESIGN TO CONTROL SPEED

Speed reducing features should be an intrinsic part of any layout and should be a combination of urban form and carriageway alignment.

The street pattern can have just as significant an impact on speed restraint as some traffic calming techniques. Building close to the edge of the road and building tall both help to emphasise the 'narrowness' of roads. This may be enhanced by controlled on-street parking. A variety of features should be used.

Raised measures such as road humps and speed tables are effective in keeping speeds low, but they are often visually intrusive and unsuitable for bus routes. They have the disadvantages of creating additional noise, increasing emergency service response times and raising pollution levels.

Horizontal restraint measures are preferable to vertical ones. Planting and differentiated surface textures can achieve speed restraint while some streets may provide a through route only for pedestrians or cyclists.

Target speeds should be self-enforcing. Sensitive design is needed, with the minimum inclusion of elements such as bollards that can clutter places and cause problems for people who are blind or partially sighted.

The main factors affecting vehicle speed are:

- driver perception of appropriate speed. For example, long clear vistas with little evidence of pedestrian or other activity will encourage higher speeds. Restricted forward visibility, combined with uncertainty about what lies ahead, will tend to make drivers more cautious
- physical features such as lateral shifts, narrowings, ramps and humps
- enforcement of speed limits by the Police or by the use of cameras. The need for such measures usually indicates that the design in itself has failed to promote sufficiently low vehicle speeds. Safety cameras are not an alternative way of achieving design speeds and can produce 'street clutter'.

A combination of highway geometry and building line restrict forward visibility, reducing vehicle speeds. (St Duntstans Gate, Canterbury, Berkeley Homes)

A gentle ramp and change in surface material slows vehicles at junctions whilst allowing larger vehicles to manoeuvre. (St Mary's Island, Ventura)

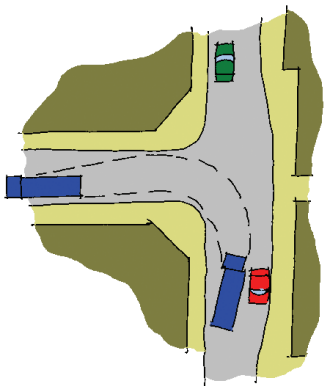
Speed cameras are an indication of a design problem and should not be needed to keep vehicle speeds down if the highway has been designed well.

Vehicle speeds in historic places tend to be reduced by narrower roads, tightly enclosed streets and congestion (Sandwich)

A simple feature built out to create a road narrowing will make drivers slow down. (Leybourne Lakes, Berkeley Homes)

Built Form

The layout of buildings enclosing the highway is an important factor influencing vehicle speed as well as offering a more attractive townscape. Articulation of buildings and frontages can be used to prevent long straight vistas. Buildings close to the highway help restrict visibility.

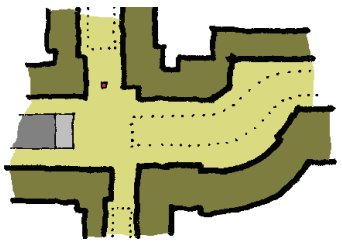


Junctions

Tight kerb radii encourage vehicles to turn into side roads at lower speeds. Slightly widening the main carriageway at the junction will enable larger vehicles to turn without the need to overrun the footway. Tracking can be used to establish the extent of any widening required. Where the frequency of large vehicles is likely to be low, such as in residential access roads, it is acceptable for their turning manoeuvres to use the full width of the side road.

Table Junctions

Raised carriageways at junctions can reduce vehicle speeds and may be particularly useful at cross roads. They can also tie a key public space together, announcing a sense of arrival to a place. They can also benefit pedestrians by providing a level surface and by increasing driver perception that pedestrians may be crossing. Where reduced kerb heights encourage vehicles to deviate from the carriageway, consideration should be given to the use of bollards. But this should be balanced against the desirability of minimising clutter. As with all features involving vertical deflections, designers should minimise the use of raised tables and should balance their advantages against disadvantages such as noise generation, unsuitability for cycles and buses and their effect on emergency services.



Ramped Pedestrian Crossings

In addition to speed restraint, a raised table/ramped crossing can help pedestrian movement and may be particularly suitable where a busy footway or cycleway crosses a road. Generally, the length of the flat section should extend for 1m either side of the crossing.

Narrowings

Narrowing the carriageway can be effective in reducing vehicle speeds, but care must be taken to ensure the safety of cyclists. It is likely to be more effective where vehicle flows are high or where drivers perceive that there is a strong possibility that they might need to give way to oncoming traffic. In urban situations, variation of carriageway width should result from the building layout and the process of tracking. But there may be opportunities to introduce this feature in other situations. Designers should ensure that there is inter-visibility between drivers approaching a narrowed section of carriageway. Generally this needs to be twice the appropriate stopping sight distance. Care should also be taken to ensure that vehicle access to frontages from narrowed sections can be achieved where necessary.

Gateways

The change in character to roads with a lower target speed can be emphasised by the creation of gateway features, for example at the entrance to a village or pedestrian dominated environment. These can range from an alteration of surface material to the provision of enhanced landscape or building forms combined with carriageway narrowing. Gateways should not normally take the form of structures that span above adopted highways.

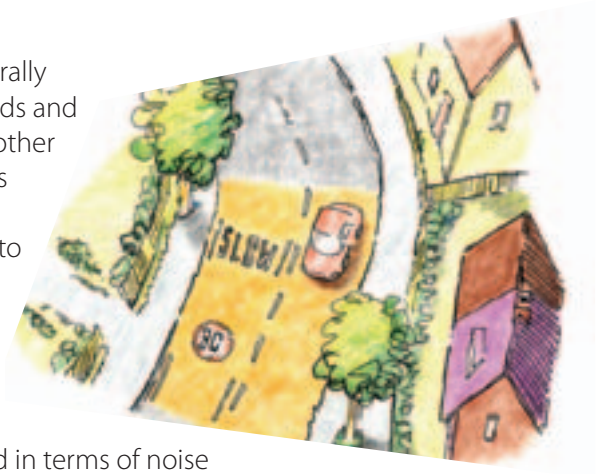
Bends

Tight radius bends force drivers to reduce their speed. They should not be used in isolation but should form part of the overall layout with other speed reducing features. Where a significant number of larger vehicles is anticipated, and it would be inappropriate for them to make use of the full carriageway width to negotiate the bend, over-run areas should be provided. Tracking should be used to establish the extent of the area required.

Lateral Shifts

These consist of deviations to create horizontal deflection. As a general rule, deflections should be sufficient to allow an alteration of direction of at least 70 degrees. Care should be taken to ensure that mild chicanes are not created, particularly in lightly trafficked areas with generous visibility as these may actually encourage high vehicle speeds.

Surface Texture



Uneven surface textures generally encourage lower vehicle speeds and can be useful to supplement other features. Proprietary surfacings such as Rippleprint® may be suitable for roads which have to accommodate large vehicles and where other features are difficult to incorporate. Designers need be aware of the drawbacks, particularly to pedestrians and cyclists and in terms of noise nuisance. Generally the use of cobbled surfaces should be restricted to short lengths in very low speed environments, such as on trackways through a Homezone. Loose gravel surfaces can be very effective in keeping vehicle speeds low. They should only be used in private parking courts and unadopted areas to avoid the risk of loose stones being transferred to the highway. An efficient gravel trap at the junction with the adopted highway is an alternative solution. Bound gravel works well visually where greater traction is required or where loose gravel may be disturbed. Visual demarcation between the adopted highway and land in private ownership is important, and should be provided by way of a clear change in materials or, where appropriate, subtle but identifiable indicators.

2.3.3 VEHICLE VISIBILITY

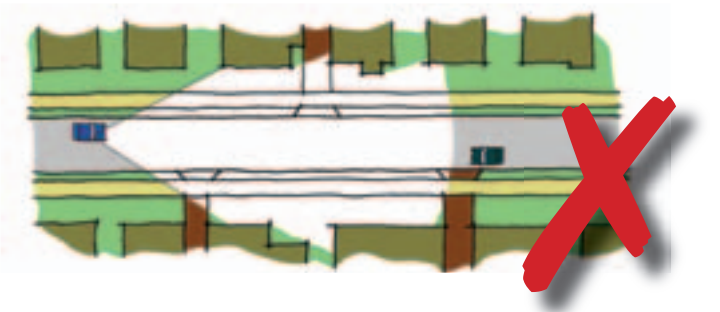
To enable drivers to both see and be seen at junctions, around curves and at entrances to premises, it is necessary to provide clear unobstructed visibility related to the anticipated vehicle speeds.

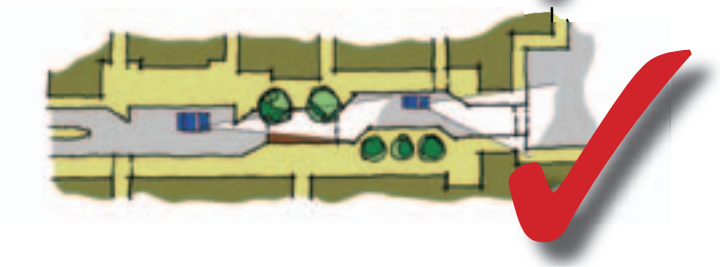
Previous guidance on sight line requirements has been based on the blanket application of minimum standards such as that contained in DB32. This has tended to result in wide, open areas detrimental to the built form and compromising the creation of attractive places.

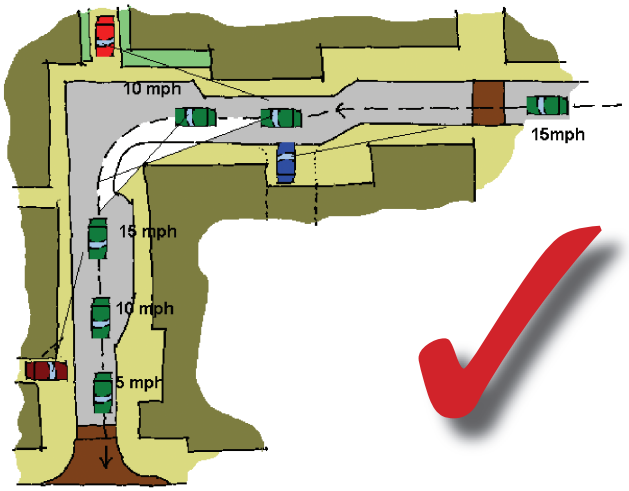
It is accepted that the provision of over generous visibility encourages higher speeds and, conversely, that the effect of a dense urban form with restricted visibility can contribute to speed reduction. Accordingly designers need to balance the need to provide adequate visibility for safety with the aims of achieving human-scale places and encouraging low vehicle speeds.

Ideally, to gain the greatest impact on vehicle speeds, forward visibility should be restricted to little more than that required for the target speed. The process should involve analysis of the proposed road network to establish anticipated vehicle speeds followed by the plotting of appropriate sight lines.

Forward visibility should be plotted along the line likely to be followed by a car driver. Generally this is at a distance of 1.5m from the kerb; visibility is required from a driver eye height of 1.05-2m to an object height of up to 600mm. It is important to prevent parked vehicles obstructing vision – there is a need for site specific risk evaluation. Junction visibility should be based on the distances given in the table below, appropriate to anticipated vehicle speeds. *[Check if diagram relates properly to the table]*. Visibility is required from a driver eye height of 1.05-2m to an object height of up to 600mm.



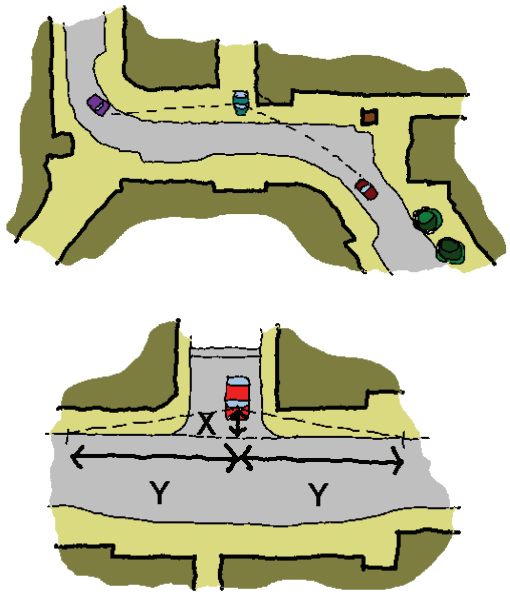




vehicle speed (mph)	forward visibility / Y distance (m)-
10-	14-
15-	23
20	33
22	37
25	45
30	60

Feature	design speed (mph)
bend - centreline radius (m)-	
10	10-
15	15
20	20
25	22
30-	25-
40-	30
vertical shift	15
lateral shift	20
narrowing to single lane	20
roundabout	20
narrowing to reduced width	30
2m wide central island-	30
4m wide central island-	20

distance from T junction or cul-de-sac- (m)	design speed (mph)
10	5
20	10
30	15
40	20



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

2.3.4 VEHICLE TURNING

The need for turning facilities should generally be avoided by designing layouts with through routes.

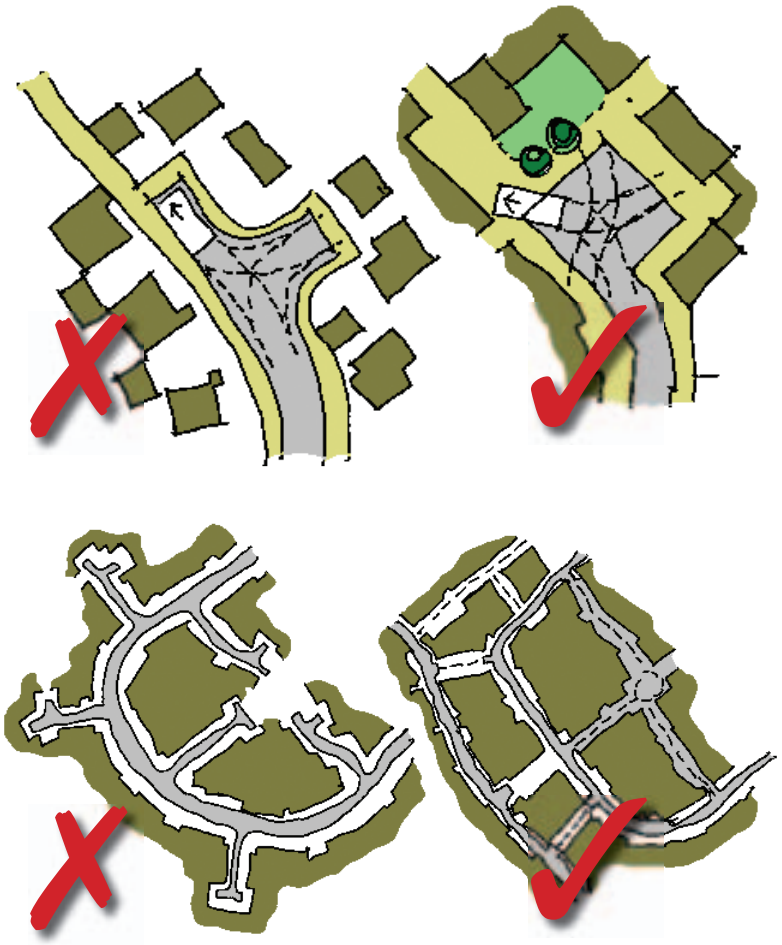
Where this is not possible, turning facilities should be provided wherever:

- vehicles would otherwise have to reverse for long distances
- vehicles might turn in places that could be unsafe or cause damage to verges.

Vehicle Turning Considerations

- large service vehicles should not be expected to reverse more than 40m
- refuse vehicles should not be expected to reverse more than 20m
- pantechnicons should not be expected to reverse more than 60m
- cars and smaller service vehicles should not be expected to reverse more than 25m.
- designers should note that poor provision for parking of large vehicles will affect accesses.

Designers should ensure that turning facilities do not dictate the form of layout but are incorporated within it. Templates for a variety of turning manoeuvres for different vehicles are given in Design Bulletin (DB32) available from HMSO. Some authorities may require higher standards for the refuse vehicles used in their areas. Manoeuvring requirements can also be checked using tracking. Generally it is desirable to provide sufficient space for a 3-point turn within the carriageway, but where turning will be infrequent a more complicated manoeuvre may be acceptable. Also where pedestrian flows are generally low, it may be acceptable to accommodate the turning requirements of infrequent larger vehicles within the whole highway envelope, subject to strengthening of footways and margins. Parked vehicles in turning heads can become a problem, so it is normally better to have through routes. Where large vehicles will have to carry out tight turns, ensure that surface materials specified are sufficiently robust.



Maintenance Access

A permeable layout will normally provide alternative routes in the event of a section of street having to be closed. However, where it is likely that main services or underground structures will be located in the carriageway of a cul-de-sac, the street must be of sufficient width to maintain access during maintenance.

Emergency Service & Refuse Vehicles

Consideration should be given in new development to the size and type of vehicles that need access and – for emergency service vehicles – the provision of 'standing' space.

Although it is important to avoid creating unnecessary road space, adequate provision for these vehicles must be made. Care is needed at an early stage in the design to ensure that there is a strategy for accommodating buses and larger vehicles. Early consultation with the Kent Fire and Rescue Service (www.kent.fire-uk.org) and the waste authorities is recommended. Waste collection and recycling points should normally not be more than 25 metres from the edge of the carriageway, with a preference to locate them as close as possible to the publicly-maintained road for convenient collection. The carry distance for larger bins used for flats should be considerably less. Careful siting can go a long way to minimising road space. With early consideration in the design process it is expected that collection distances will be considerably reduced. It should be recognised that larger refuse collection vehicles are coming into use.

Access for Fire Appliances and Other Heavy Vehicles

Access for fire appliances must be considered at the initial design stage.

Poor or inconsiderate vehicle parking can result in the loss of vital time when attending incidents. The Fire Brigade must be able to manoeuvre its equipment and appliances to suitable positions adjacent to any premises and, in the case of dwellings, suitable access maintained for fire-fighting to within 45 metres of all dwellings. Closer access may be required by The Building Regulations 1991 Approved Document B5). The maximum reversing distance for fire engines is normally 20 metres. Kent Fire Brigade publishes a Guidance Note 'Kent Estate Adoption Guide' and in *('Kent Fire Brigade Technical Bulletin No. G18')* on access for fire appliances. The fire service should be consulted before layouts are finalised.

Consideration must be given *(particularly for tall buildings)* to the access requirements of refuse freighters, oil tankers, furniture removal vans and cesspool emptying vehicles

2.3.5 MATERIALS

The materials used in the public realm are important in the creation of quality places.

This applies as much to the types of paving and character of kerbing as to the materials used on buildings. Materials should reflect the function of the street and the character of the area. Block paving can be acceptable for carriageway surfacing on roads that are to be adopted. A co-ordinated approach to street furniture and materials *(including tactile surfaces)* is particularly important when considering the needs of visually impaired people – to avoid hazards. For special areas the use of materials other than the standard black material is encouraged.

Paving and kerbing materials should be chosen with the same care as building materials. Concrete paving blocks or brick pavers, having proportions related to brick, give easily understood scale. They provide texture through their joints and slight variations of surface. Further variety and the visual "breaking down" of large scale areas can be achieved by colour changes and pattern. These can also be used as methods of demarcation. In domestic situations, block paving helps to give a sense of location. Tarmac surfaces may be seen as an extension to a highway-dominated environment.

In road construction, materials suitable for recycling could include granular materials arising from the site, asphalt planings, kerbs, channels, gully grates and pots, manhole and inspection covers. In building construction, aggregate may be sourced from on-site demolition of existing buildings.

Surfacing Materials

Macadam - The use of macadam for carriageways and footways, particularly when combined with standard drab grey kerbs, suggests car-dominated environments. Reinstatement of excavations by service companies can often result in an unattractive patchwork. A short, simple palette of materials should be used.

Block Paving - A large variety of types and colours are available. Generally block paving indicates a less car dominated environment. Reinstatements can be carried out that do not detract from the original appearance.

Stone Setts - Useful for providing demarcation between public and private domain. Can provide an uneven textured surface to deter vehicles in over- run margins or to deter high speeds.

Paving Slabs - Available in natural stone or textured concrete. Generally more attractive and easier to reinstate than macadam.

Bound Gravel - Less durable and not suitable for areas of high vehicle traffic. However, this is an attractive alternative to macadam or block paving for use in lightly trafficked areas and footpaths.

Kerb - Natural stone or textured concrete offer a much more attractive and equally durable alternative to standard plain concrete kerbs. Conservation style kerbs with a larger width and a shallower depth than standard concrete kerbs are also appropriate and attractive for many locations.

Varied materials - Designers should restrict the number of different types of materials. A limited amount of natural material can dramatically lift the quality of an area.