

Highway Requirements Part 1

1. DESIGN PRINCIPLES

GENERAL PHILOSOPHY

1.1 The purpose of this section is to outline the basic reasoning and philosophy behind the requirements in this document which is intended to advise on matters affecting layout within areas to be adopted as publicly maintainable highway. Advice is also given on matters outside the area intended to become highway which would directly affect the safety of its users. In those areas which are intended to form part of the highway, those complying with this guide will normally be adopted as public highway

1.2 This document employs the concept of a hierarchy of roads within residential estates, from small scale cul-de-sac where pedestrian movements are predominant and vehicle speeds are restricted, to distributor roads catering for the free flow of vehicles. This hierarchy is intended to prevent, as far as possible, the areas where people live being intruded upon by traffic from outside their immediate area whilst trying to maintain ease of access for residents, visitors, and service vehicles to their homes. For very large scale developments, such as a new village for example, the adoption of a grid system may be another possibility of achieving these aims. Such developments are outside the scope of this document and advice should be sought from the planning authority, in conjunction with the highway authority, at a very early stage of the project. Innovative and unusual layouts will be considered for adoption on an individual basis.

1.3 The highway forms an integral part of any development. The design of the highway elements of the development cannot therefore be considered in isolation from the overall design; all elements involved in the production of a satisfactory and pleasing final product must be considered together at as early a stage as possible. Advice on such matters is contained within the Leicestershire Housing Development Guide.

1.4 Within the hierarchy of residential roads it is considered essential that layouts are produced which will result in the reduction of vehicle speeds from those which normally obtain on the major road network as soon as possible after entering the residential area. The Highways (Road Humps) Regulations 1990 allow the provision of road humps within residential estates subject to certain criteria which are summarised for convenience in section 1.17. Such provision will be welcomed by the Highway Authority and may reduce the requirements for visibility splays within estates, subject to the siting of the humps.

PEDESTRIANS

1.5 The safety of all users of the highway is of paramount importance. Provision for pedestrians must be made throughout the estate and where pedestrians and vehicles share the same surface measures must be introduced to control vehicle speeds. Except for the very busiest roads, pedestrians and vehicles should normally share the same routes. However, separate footpaths and cycleways can provide quick and direct access to shops, schools and other community facilities and thus reduce traffic within the estate. Such separate routes should be as short and direct as possible, should be well-lit and, as far as possible, overlooked by occupied property.

VISIBILITY

1.6 There is a need to ensure that visibility available to drivers is, at all times, appropriate to the speeds at which they and others will normally be travelling, at that point in the estate.

PARKING

1.7 Vehicles parked on the road are a major cause of accidents. They mask pedestrians, especially small children, from moving vehicles and screen vehicles from each other. In smaller streets they can obstruct access to residents and delivery vehicles and block up turning areas. On bus routes they can cause delays to services. It is essential therefore that sufficient convenient off-street parking is provided to meet all the normal needs of residents and their visitors.

PUBLIC TRANSPORT

1.8 Provision has to be made for public transport to pass within reasonable walking distance of each house, even though public transport may not be provided immediately following the construction of a new estate. A distance of 400 metres is considered to be a maximum. Within larger developments, provision should be made for public transport services to pass through the estate. The planning and highway authorities should be consulted at an early stage in the planning process over the likely routes for public transport services. In all cases such routes should have a minimum carriageway width of 6.75 metres.

UNDERGROUND SERVICES

1.9 Adequate provision must be made for statutory and other underground services to ensure that they are easily accessible to the undertakers and that maintenance work does not interfere unduly with the use of roads and footpaths or private property.

LANDSCAPING

1.10 Hard and soft landscaping within highway areas can be as important in determining the character of the development and integrating it into its surroundings as landscaping elsewhere within the site. The desirability of creating an attractive environment should not be underestimated. However, both the County and District Councils have limited resources for maintenance of landscaped areas, and in general the number of such areas should be kept to a minimum with low-maintenance planting being preferred. Where such areas are to be adopted it is preferable that they be concentrated into larger areas, so as to provide economies of scale and to ensure that small or remote areas of planting are not neglected. It is recommended that landscaping proposals should be prepared at the planning stage so that their suitability may be considered in good time and so that statutory undertakers can be consulted over the proposals, particularly for tree planting, which may affect services.

SINGLE POINT OF ACCESS

1.11 It is desirable to ensure that access by emergency vehicles can be maintained to all dwellings at all times, as far as is possible, and that the necessary travel distances of service and delivery vehicles are minimised within estates. In order to minimise the risks of

the former not being possible and reduce the latter, no more than 150 dwellings will be permitted to be served via a single point of access and the internal estate layout should be in the form of a loop wherever possible.

TURNING FACILITIES

1.12 Internal residential estate roads are often used by drivers who are unfamiliar with the estate, such as visitors or some delivery vehicles. Such drivers may become lost and wish to turn around and in order to allow them the opportunity to carry out such a turn in safety, rather than in a private drive, junctions or turning heads should be provided at a maximum spacing of 200 metres.

GRADIENTS AND CROSSFALLS

1.13 In order to avoid problems of ponding on flat roads and sliding of vehicles and pedestrians on steep gradients, particularly in winter, the following criteria should be adhered to. At junctions the minor road gradient should not exceed 1:30 for the first 10 metres along the minor road from the major road nearside channel. Elsewhere, at no point shall the carriageway gradient exceed 1:15 nor be less than 1:150. On very steeply sloping sites, these criteria may be relaxed at the discretion of the highway authority.

In normal circumstances, carriageway crossfalls of 1:40 are to be provided on all types of road apart from distributor roads which may have superelevation in accordance with the standards to which they are designed.

JUNCTIONS

1.14 Research has shown that the number of injury accidents which occur is related to the number of junctions and accesses for a given length

1.15 There is a general presumption against the construction of new junctions and accesses onto A and B class roads and against the intensification in use of existing accesses. Use should be made of existing side road junctions where these are available, with improvements where necessary. In special circumstances where favourable consideration is given to the construction of a new junction or access onto such roads, it shall be designed in accordance with Department of Transport Advice Note TD 42/95 for priority junctions, or Standard TD 16/84 AND Advice Note TA 42/84 for roundabouts.

1.16 Junctions and accesses onto C class roads and busy urban unclassified roads should normally be designed in accordance with the above standards, but these requirements may be relaxed in special circumstances at the discretion of the highway authority. The spacing of junctions with C class roads shall comply with the standards for those with local distributor roads (Type A, page 6).

ROAD HUMPS

1.17 The Highways (Road Humps) Regulations 1990 came into force on 13th April 1990 and allow the provision of road humps within residential estates providing that certain criteria are met. The humps can be either flat or round topped and the speed reducing ramps

which are specified for use in all shared surface roads comply with the regulations, as does the type of raised junction illustrated in the drawing on page 13.

In summary, the criteria which must be met are as follows:-

1.	There must be a system of street lighting with lamps no more than 38 metres apart.
2.	the first hump in a series must be within 40 metres of the entry to the estate from the main road system and the last must be within 40 metres of the end of a cul-de-sac
3.	Humps forming part of a series shall be between 20 and 150 metres apart.
4.	warning signs must be erected at the entry to the road hump system and at any other places considered necessary by the Highway Authority, and
5.	The Police and the appropriate District Council must be consulted over the proposals.

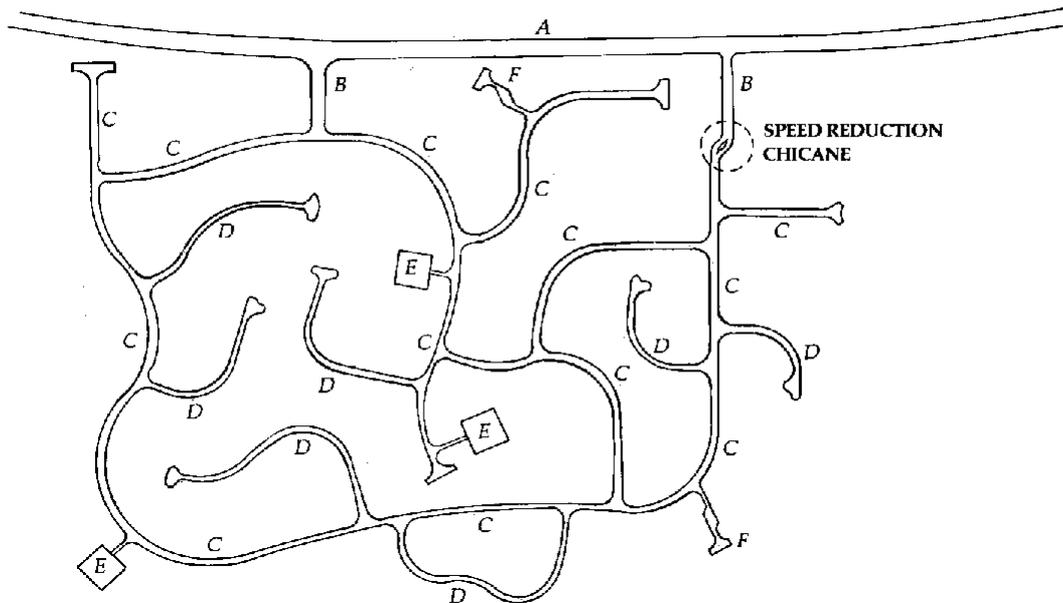
It is recommended that where developers wish to install road humps within estates they should consult the Highway and Planning Authorities at an early stage so as to achieve a suitable estate road layout prior to the submission of a planning application.

DESIGN SPEEDS

1.18 Design speeds are quoted for the various road types specified in sections 3 to 8 of this document. It is intended that designers should aim to reduce vehicle speeds on the various road types to these design speeds by using complementary speed reducing measures, however, if such measures are not used then visible speed requirements will be for speeds higher than the design speed of the road type, appropriate to the expected speed of traffic on the road network.

2. ROAD HIERARCHY

2.1 The road system within residential estates should comply with the road hierarchy shown in the diagram below. The aim should be that as many houses as possible are served off the lowest suitable road type.



KEY

Type A District or Local Distributor Road or Classified Road

Type B Collector Road

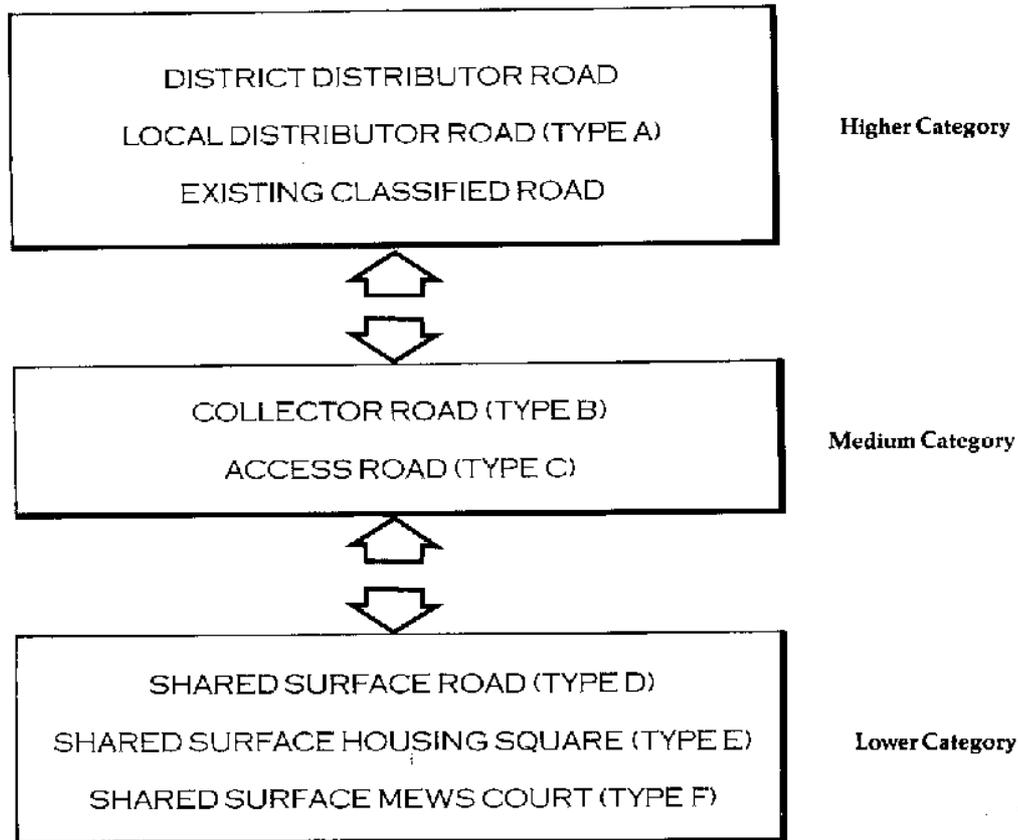
Type C Access Road

Type D Shared Service Road

Type E Shared Service Housing Square

Type F Shared Surface Mews Court

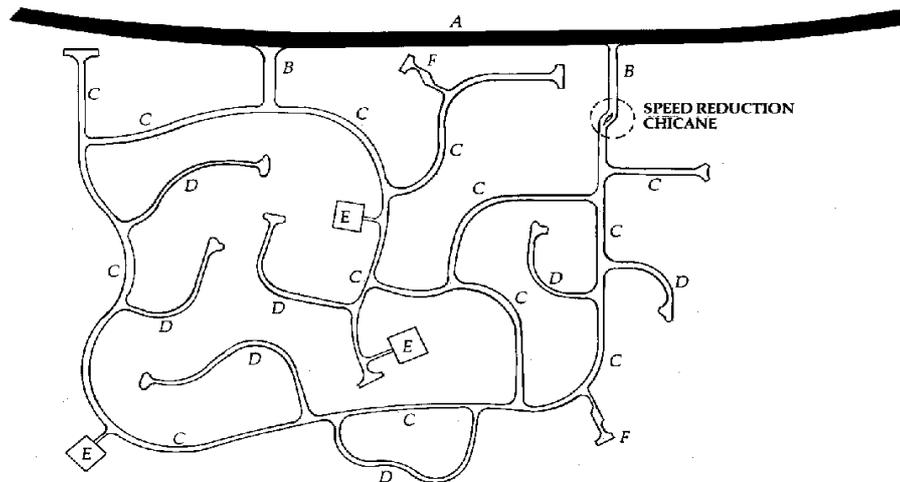
2.2 The following table illustrates the preferred ways in which the road types within the hierarchy may be connected to each other, however local circumstances may justify exceptions to these arrangements, with the approval of the planning and highway authorities. An existing unclassified road may be either Higher or Medium category depending on the individual circumstances



CHOICE OF ROAD TYPE

2.3 The choice of a particular road type will depend upon the expected traffic flow along the link in question. The following sections give details of each type and set out the number of dwellings which may be served. For estates with more than a single point of access, the limits are based not on the total number of dwellings, but on the number of dwellings which it is expected will feed traffic onto the length of road in question, including any future phases of the development under consideration. For example, if a 500 dwelling development has two points of access and it is considered that traffic will distribute equally between the two then, with 250 dwellings served off each access point, only Type C Access Roads will be required. However, if a 70:30 distribution is considered more likely due to the circumstances (i.e. 350:150 dwellings) then the more heavily used of the two points of access should be of Type B Collector Road standard and the other will be a Type C Access Road. This will obviously depend upon individual circumstances and the highway authority should be consulted at an early stage in the planning process over the likely traffic distributions.

3. LOCAL DISTRIBUTOR ROADS (TYPE A)



3.3 These roads are designed to distribute traffic within districts and link district distributor roads with residential roads. They should be safe, free flowing routes for vehicles and should consequently be designed in accordance with the Department of Transport Standard TD9/81 and Advice Note TA43/84. Their junctions with higher category roads should be designed in accordance with Department of Transport Advice Note TA20/84 for priority junctions, or Standard TD16/84 and Advice Note TA 42/84 for roundabouts. Attention is particularly drawn to the recommendations of TA20/84 that a right-turning lane junction should be considered for new urban junctions with side road traffic flows in excess of 500 vehicles per day (2-way AADT).

Very limited access from dwellings will be accepted onto local distributor roads, serving the traffic generated by less than 800 dwellings, to avoid visual monotony, such as continuous views of garden fencing or walls. Where permitted, such access shall normally be via shared private drives, turning facilities shall be provided within each curtilage and one additional, individually accessible parking space shall be provided for each dwelling above the normal provision. Verge widths may vary between 1.5 and 3 metres in order to maintain interest, to allow the retention of existing features and to provide opportunities for limited tree planting outside visibility splays.

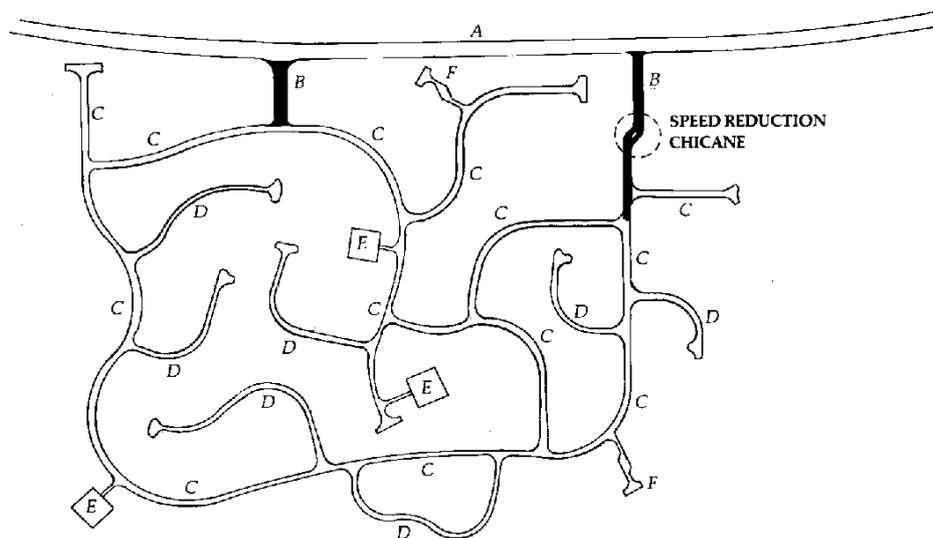
3.2

STANDARDS

No. of dwellings served	Over 400(see paragraph 2.3)
Min. carriageway width	7.3 metres
Footways	2 No. 1.8 metres wide
Verges	Average 2 metres

Design speed	38 mph (60 kph)
Min. centre-line radius	127 metres
Min. opposite junction spacing	50 metres
Min. adjacent junction spacing	100 metres

4. COLLECTOR ROADS (TYPE B)



4.1 These roads link residential areas to the local distributor road. They will usually be the most heavily used parts of through routes, but may serve as a transition between several access roads and the local distributor road. These roads have wider carriageway than access roads to allow for access by public transport and to cater for the combination of higher traffic flows and direct access from dwellings. Attention is particularly drawn to the recommendations of TA20/84 that a right-turning lane junction should be considered for new urban junctions with side road traffic flows in excess of 500 vehicles per day (2-way AADT).

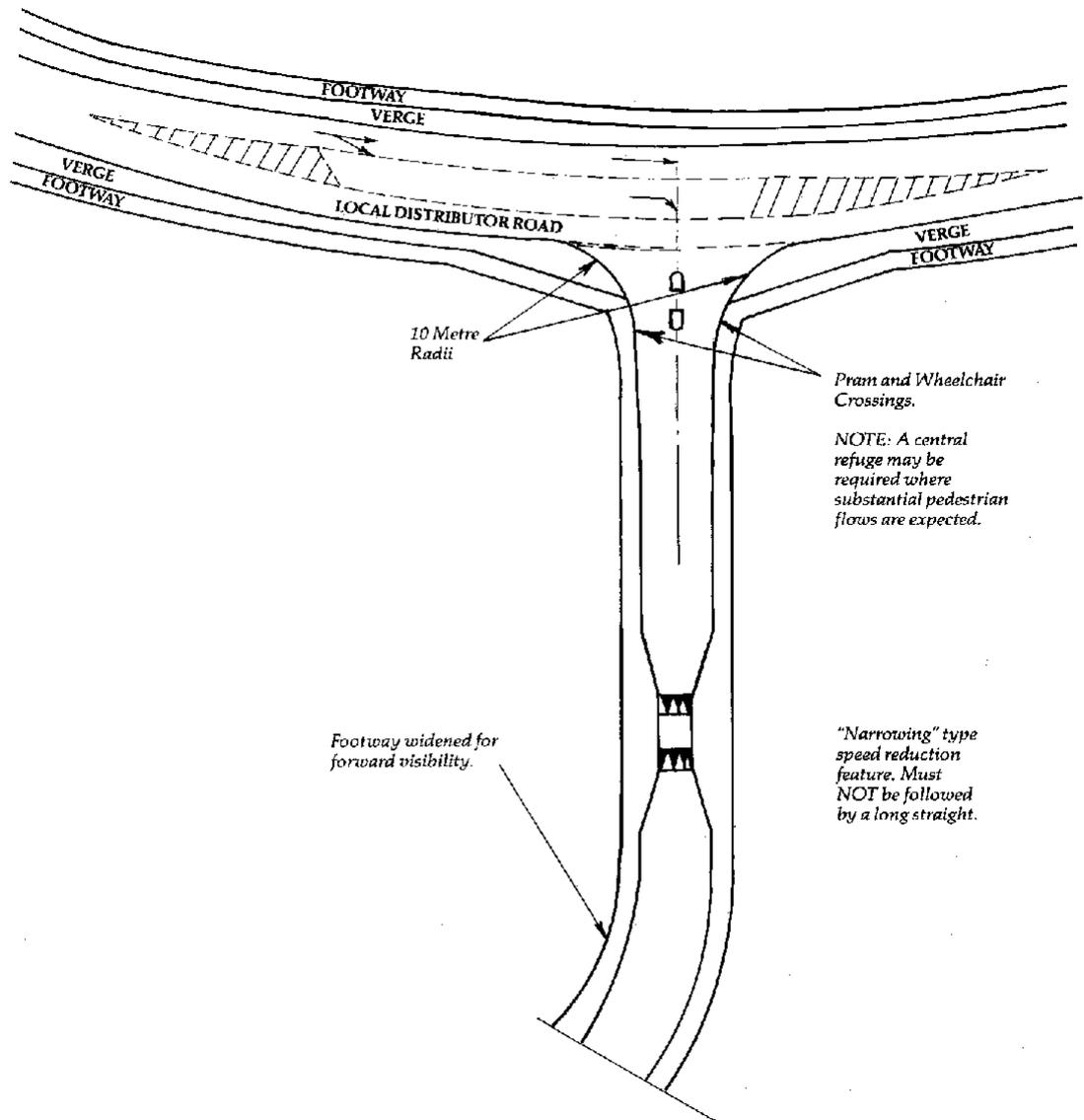
In order to follow the design principle of reducing traffic speeds as soon as possible within the residential area it is desirable to introduce a "give-way" junction within a short distance of entry into the estate, provided always that the expected traffic flows are fairly well balanced between the two arms of the junction. Alternatively, a "chicane" or "narrowing" type speed reduction feature, as shown on page 9, may be used to achieve this aim. These features should be between 30 and 60 metres from the junction with the higher category road and should by no means be followed by a long straight length of road.

STANDARDS

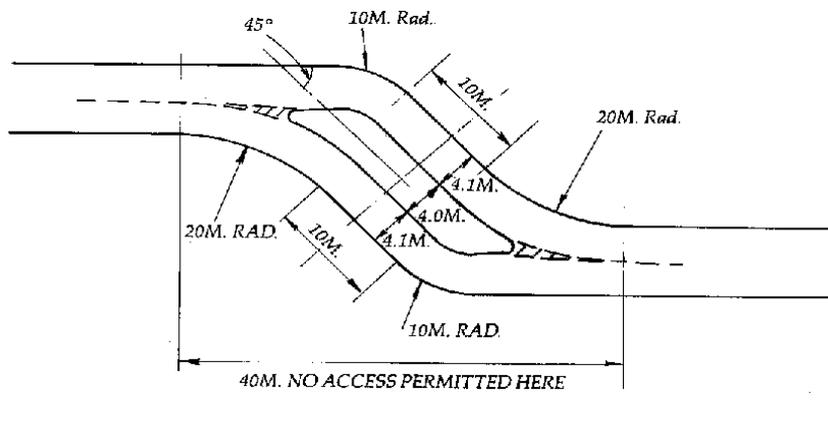
4.2 Use of road humps permitted.

No. of dwellings served	Between 400 & 300(See paragraph 2.3)
Min. carriageway width	6.75 metres, 6.0 metres where no direct access or buses
Footways	2 No. 1.8 metres wide
Design speed	30 mph (50kph)
Min. centre-line radius	35 metres
Min. opposite junction spacing	40 metres
Min. adjacent junction spacing	Major road visibility distance plus 10 metres
Turning facilities within site for individual dwellings	Normally required within 50 metres of. Junction with higher category road

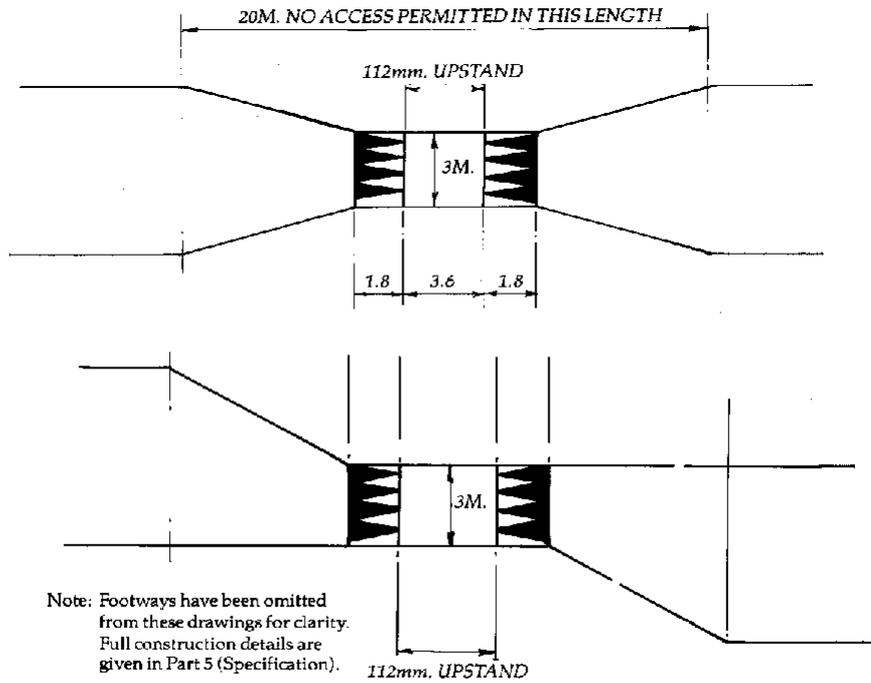
TYPICAL LAYOUT



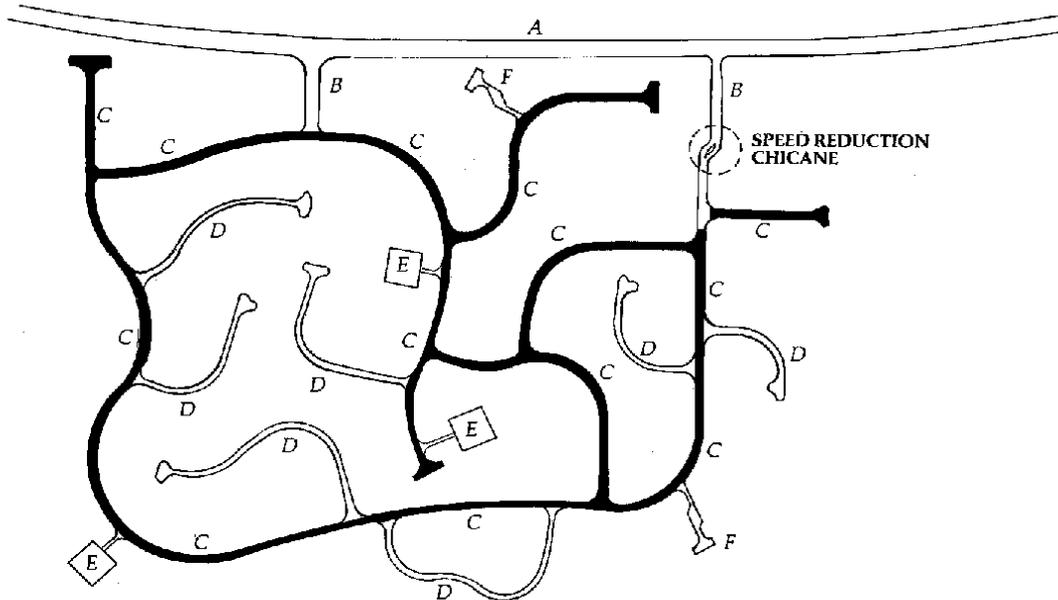
"CHICANE" TYPE SPEED REDUCTION FEATURE



"NARROWING" TYPE SPEED REDUCTION FEATURES



5. ACCESS ROADS (TYPE C)



5.1 These roads, as their name implies, provide access to dwellings from higher category roads. They also link the lower category roads with shared-use surface to roads of a higher category.

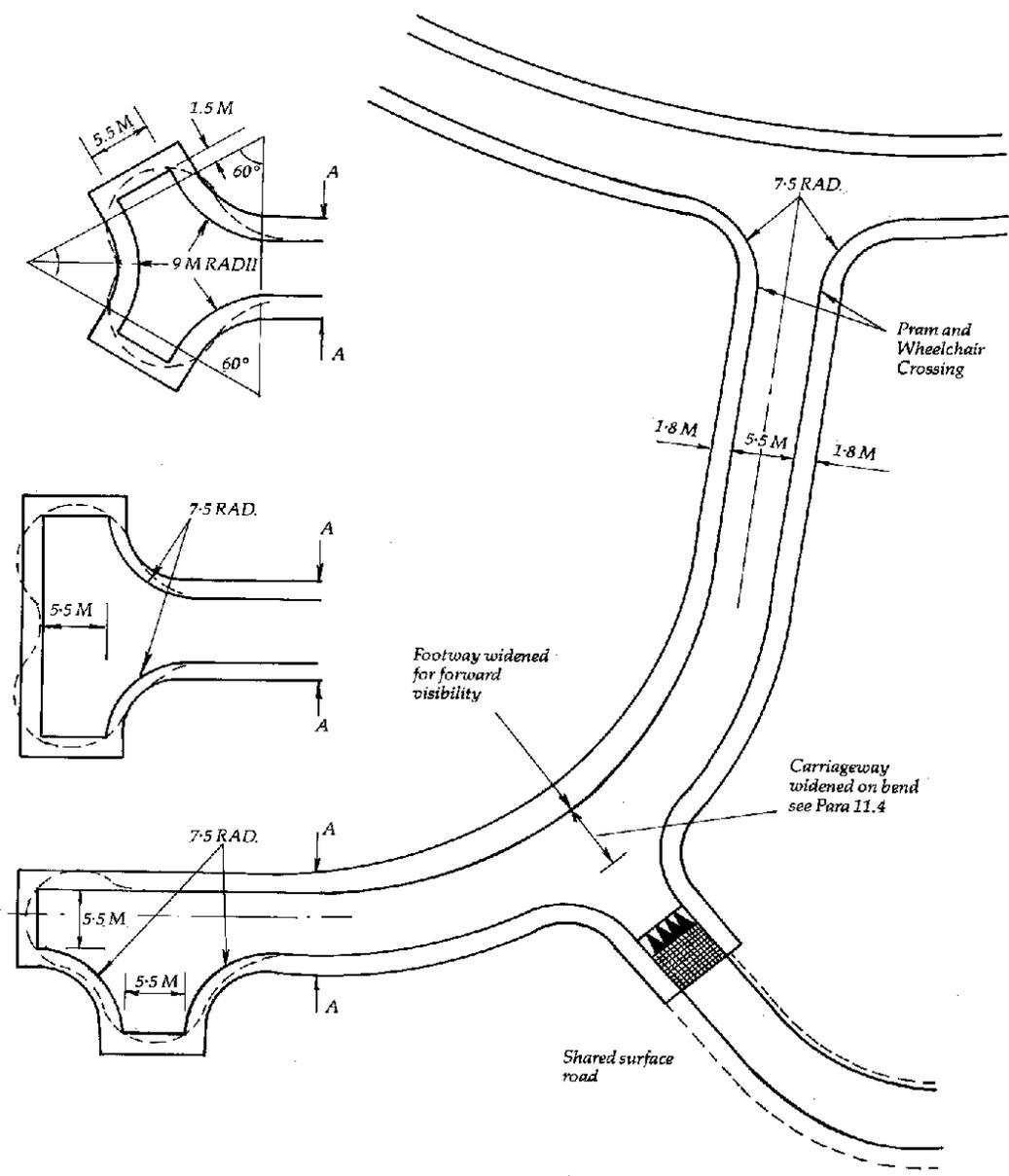
5.2 Since these roads will form part of residential areas where pedestrians and traffic will mix, layouts which will produce high vehicle speeds, for example with long, straight roads, should not be used. If there is no alternative to such layouts then the introduction of speed restricting devices, such as those illustrated in Part 5 (Specification), should be considered.

STANDARDS

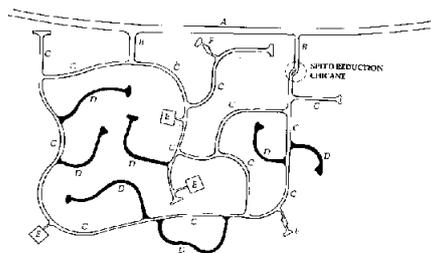
5.3 Use of road humps permitted.

No. of dwellings served	Up to 300 (see paragraph 2.3) 150 if one point of access
Min. carriageway width	5.5 metres
Footways	2 x 1.8 metres
Design speed:	25 mph (40 kph)
Min. centre-line radius	25 metres
Min. opposite junction spacing	20 metres
Min. adjacent junction spacing	Major road visibility distance plus 10 metres
Turning facilities within site for individual dwellings	Required within 50 metres of junction with Higher category road

ACCESS ROADS (TYPICAL LAYOUT)



6. SHARED SURFACE ROADS (TYPE D)



6.1 These roads, together with Shared Surface Housing Squares and Mews Courts form the lowest category of adoptable roads within the hierarchy of road types. They are small scale cul-de-sac, where pedestrian movements predominate and therefore vehicle speeds are deliberately restricted by means of speed reducing ramps. In accordance with the design principle that the highway elements of the development cannot be considered in isolation from the overall design, the use of standard house types and layouts such as those normally found on access roads is unlikely to produce a satisfactory and pleasing final product and is therefore normally discouraged. Advice on the most suitable types of development for these road types should be sought from the planning authority at an early stage.

6.2 Since pedestrians and vehicles share the same surface it is most important that all road users are made aware of the separate and distinct nature of these roads from other residential estate roads, not only by the presence of speed reducing ramps, but also by the use of differing carriageway surfacing materials. These roads **MUST**, therefore, be constructed using block paved surfacing.

6.3 Complaints are occasionally received by the planning and highway authorities from residents of this type of shared surface road about the "lack" of footway (it should be remembered that members of the general public often do not understand layout plans). This underlines the need for the measures outlined in 6.2 above. Developers are asked, therefore, to bring the nature of the shared surface to the attention of purchasers at the time of sale, preferably by means of a note on the property's deeds.

6.4 Where a shared surface road is less than 60 metres long, a reduced size of turning head is permitted, as shown in the typical layout for access roads on page 11 must be used. An amorphous turning head will usually be appropriate for this type of road and may be provided in accordance with the requirements of paragraph 11.3.

6.5 It is also permitted to link together two roads of this type in order to form a loop road and thus avoid the need for the provision of a turning head. Such a loop road must discourage non-access traffic and should normally leave and rejoin the same medium category of road. The medium category road may itself be a cul-de-sac.

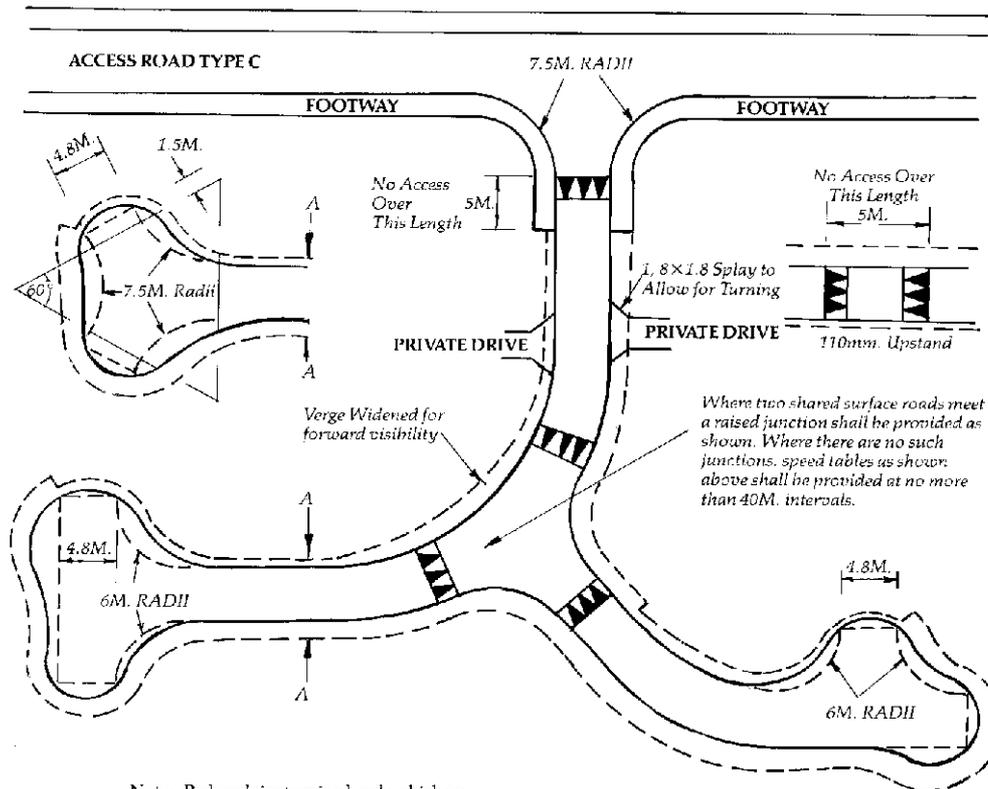
STANDARDS

6.6

No. of dwellings served	Up to 25, Max 50 for loops (see paragraph 2.3)
Min. carriageway width	4.8 metres
Service/maintenance	Two, 1.8 and 0.6 metres

margins:	
Design speed	15 mph (32 kph)
Min. centre-line radius	20 metres

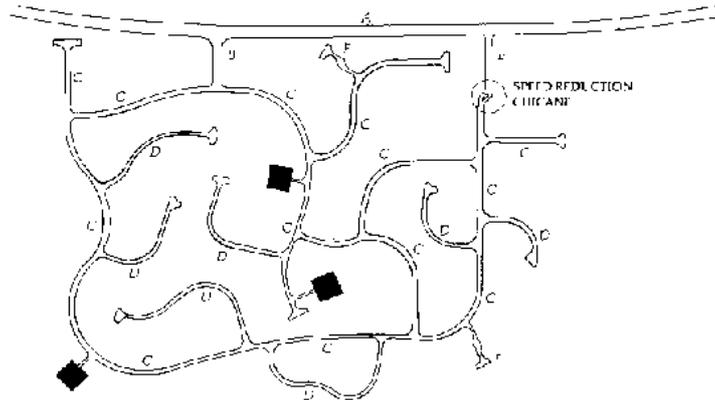
SHARED SURFACE ROADS (TYPICAL LAYOUT)



Note: Reduced size turning heads which are shown on this page for purposes of illustration may only be provided where the total length of the shared surface road does not exceed 60M. Where this length is exceeded, one of the standard turning heads shown on page 11 should be used, suitably modified to accommodate the service margins.

Highway boundary must be defined by a line of continuous edging kerbs or setts. The service margin should normally be grassed, the 0.6m maintenance margin may alternatively be hard landscaped.

7. SHARED SURFACE HOUSING SQUARE (TYPE E)



7.1 These roads, together with Shared Surface Roads and Mews Courts form the lowest category of adoptable roads within the hierarchy of road types. They are small scale cul-de-sacs where pedestrian movements predominate and therefore vehicle speeds are deliberately restricted by means of a speed reducing ramp at the entry to the housing square. In accordance with the design principle that the highway elements of the development cannot be considered in isolation from the overall design, the use of standard house types such as those normally found on access roads is unlikely to produce a satisfactory and pleasing final product and is therefore normally discouraged. It is important also to ensure that dwellings "front" onto the Square. Advice on the most suitable types of development for these road types should be sought from the planning authority at an early stage.

7.2 Since pedestrians and vehicles share the same surface it is most important that all road users are made aware of the separate and distinct nature of these roads from other residential estate roads, not only by the presence of the speed reducing ramp, but also by the use of differing carriageway surfacing materials. These roads **MUST**, therefore, be constructed using block paved surfacing.

7.3 The housing square generally serves dwellings which do not have individual garages or parking spaces allocated to them, communal parking areas are provided within the square to give the total number of spaces required. All parking areas must be clearly marked out. These areas are **NOT** adopted by the highway authority and must be controlled by a housing association or similar body. Inconsiderate parking can be a major source of dissatisfaction with this type of road and if parking spaces are not individually allocated but are communal then there should be a long-term management agency.

7.4 The overall plan form of the housing square may be varied, but the proportions are important and a roughly square shape should be maintained, so as to discourage high speeds. The maximum length shall not exceed 40 metres.

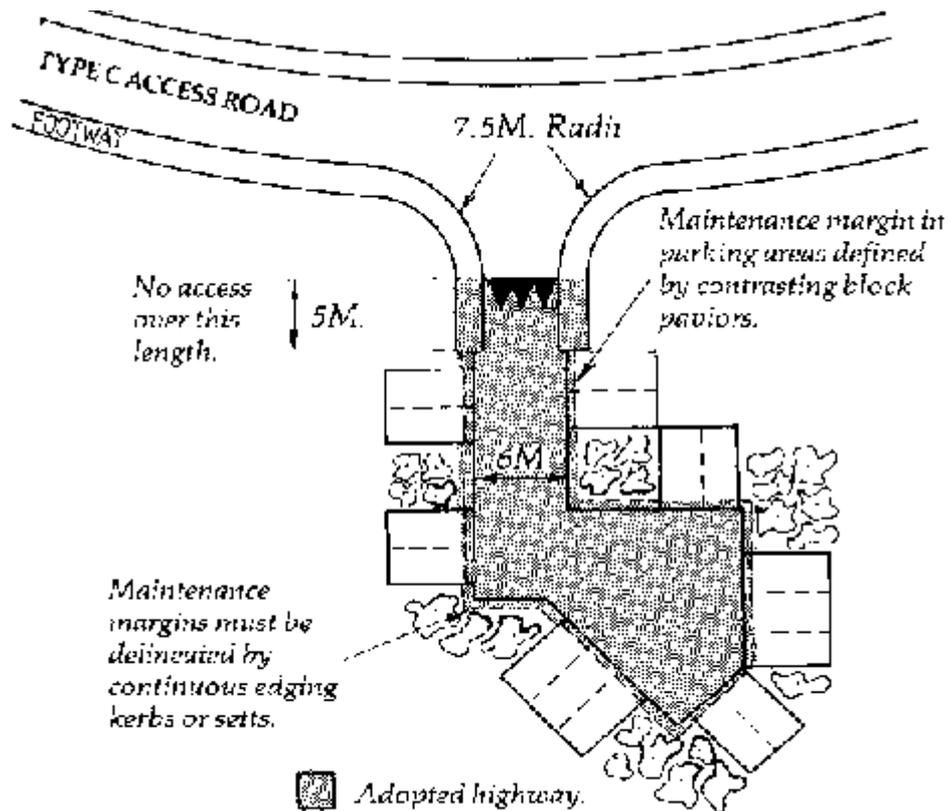
7.5 In housing squares there is no service reservation and all services will therefore be under the joint use surface. All mains should be laid in advance of the final surfacing and it is essential for developers to co-ordinate their works with all the statutory undertakers in order to avoid unnecessary disruption and extra expense. Problems of access to underground services can be minimised by keeping all services in the same zone at one edge of the adopted area. The service layout in the restricted space available must be carefully considered with the utilities at an early stage. The highway authority will need to be satisfied that such consultations have been carried out and that a satisfactory services arrangement has been agreed, prior to entering into a Section 38 agreement for the road.

STANDARDS

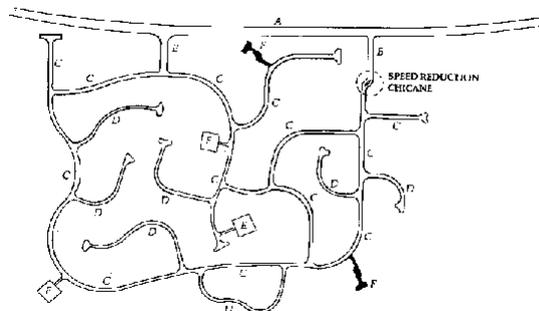
7.6

No. of dwellings served	Up to 12
Min. carriageway width	4.8 metres at entry 6.0 metres internally
Maintenance margins	0.6 metres all round edge of carriageway (0.4metres adjacent to parking areas)
Maximum length	40 metres

SHARED SURFACE HOUSING SQUARE (TYPICAL LAYOUT)



8. SHARED SURFACE MEWS COURT (TYPE F)



8.1 Mews Courts are particularly suitable for compact urban or village infill developments. In general, almost all of the spaces between houses will be paved and, since pedestrians and vehicles share the same surface it is most important that all road users are made aware of the separate and distinct nature of these roads from other residential estate roads, not only by the presence of speed reducing ramps, but also by the use of differing carriageway surfacing materials. These roads **MUST**, therefore, be constructed using block paved surfacing. Drainage shall be by means of centrally placed gullies.

8.2 As with other roads with shared surfaces, standard house types are not likely to be suitable in mews courts without alteration. The aim should be to use the buildings to enclose a "courtyard" space for the housing group, and again, the advice of the planning authority should be sought at as early a stage as possible.

8.3 The area of adopted highway should broadly follow the outline of a shared surface cul-de-sac, with the appropriate allowances for forward visibility around any bends, although layouts which have excessive areas of additional carriageway will not be accepted. All private parking spaces should be outside the adopted area.

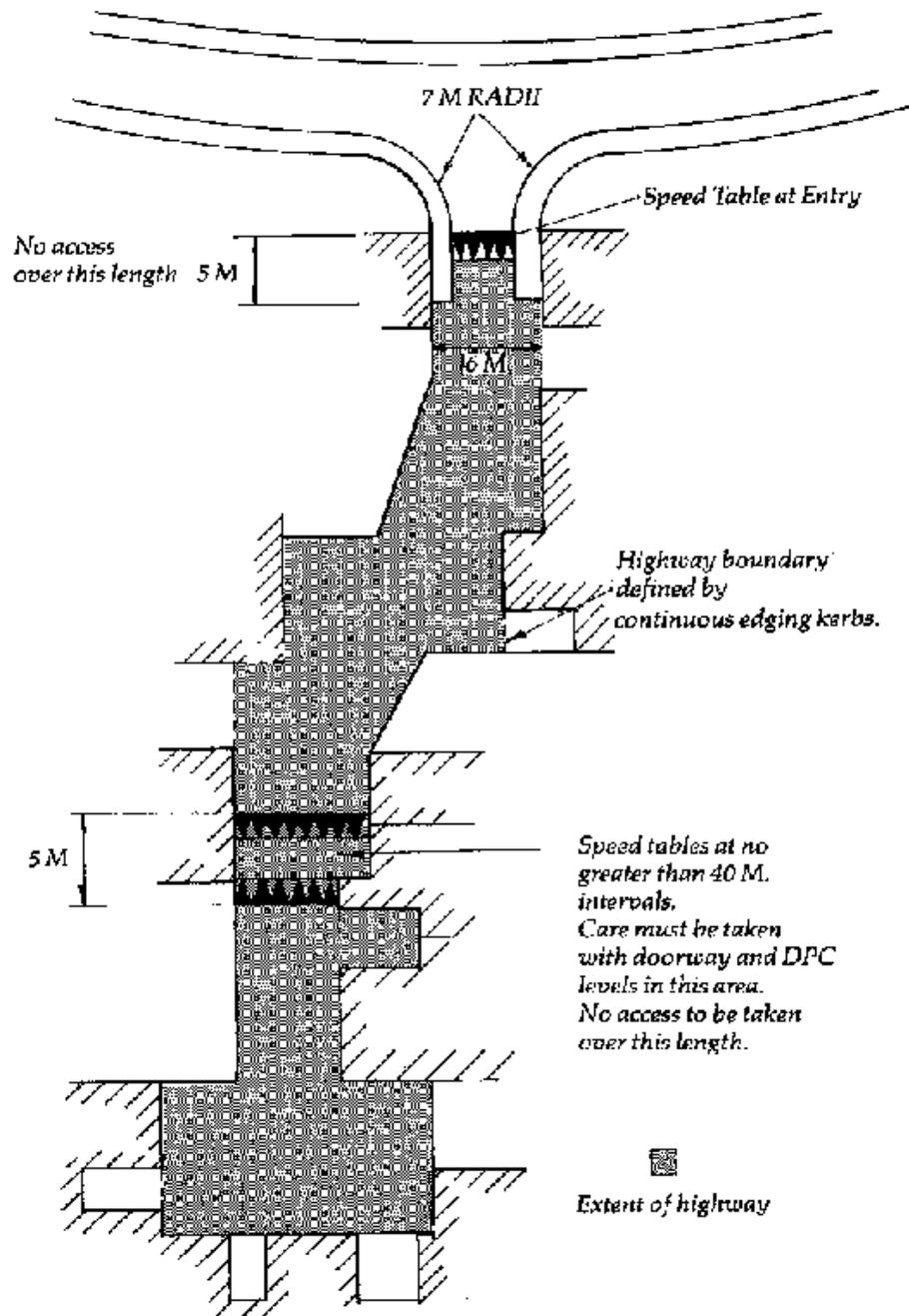
8.4 In mews courts there is no service reservation and all services will therefore be under the joint use surface. All mains should be laid in advance of the final surfacing and it is essential for developers to co-ordinate their works with all the statutory undertaken in order to avoid unnecessary disruption and extra expense. Problems of access to underground services can be minimised by keeping all services in the same zone at one edge of the adopted area. The service layout in the restricted space available must be carefully considered with the utilities at an early stage. The highway authority will need to be satisfied that such consultations have been carried out and that a satisfactory services arrangement has been agreed, prior to entering into a Section 38 agreement for the road.

STANDARDS

8.5

No. of dwellings served	Up to 25
Min carriageway width	4.8 metres at entry, 6.0 metres internally
Design speed	15 mph (24 kph)
Min. centre-line radius	20 metres

SHARED SURFACE MEWS COURT (TYPICAL LAYOUT)



9. CYCLEWAYS, FOOTWAYS AND FOOTPATHS

CYCLEWAYS

9.1 The local Planning Authority will consider the need for the provision of a separate cycleway network in relation to the area in which the development is taking place.

Factors to be considered include the size of development, the hilliness of the area and the relationship to other areas of development. In general, facilities for cyclists will be justified where a large number of journeys of under 3 miles in length are likely to be made.

9.2 Where a new cycleway is to be provided, it is essential that the designer is aware of any existing or potential cycle networks in the surrounding area. The new facility may then be linked to this network, thus increasing the usefulness of the entire system.

9.3 Quiet residential roads may form part of a cycle network, however, none of the shared surface road types D, E and F may form part of such routes.

9.4 In most areas, apart from rural sites, it is necessary to separate a cycleway system from any footpath system wherever possible, to avoid conflict between cyclists and the elderly, visually handicapped or infirm.

9.5 In the design of cycle schemes, reference should be made to the following Government publications:-

Department of Transport Local Transport Notes 1/83, 1/86 and 2/86 and Advisory Leaflet 1/87.

GEOMETRIC STANDARDS

9.6

Min. width	2.0 metres.5 metres if shared-use
Min. centre-line radius	6 metres
Min. forward visibility	20 metres
Crossfall	1 in 40 (no adverse camber)
Design Speed	15 mph (24 kph)
Maximum gradient	1:15

FOOTWAYS AND FOOTPATHS

9.7 These are grouped together, the only difference being that "footways" lie alongside a carriageway whereas "footpaths" take an independent route. The design standards for the two are identical.

9.8 Footways are required where dwellings or parking spaces are directly served, other than in the case of shared surface roads.

9.9 Major footpath links must not be linked to any part of a road with a shared surface and culs-de-sac should not normally be linked together by footpaths, in order to avoid the problems of nuisance and perceived lack of security which may be associated with such links. However, such links may be acceptable where their provision would improve local access, but adjoining dwellings should overlook any such route.

9.10 Care has to be taken that the needs of infirm and disabled people are catered for and that wheelchair/pram crossings are provided where footpath routes cross carriageways and, for footways, at road junctions. For more heavily trafficked junctions and on busy routes, pedestrian refuges should be provided in the centre of the carriageway so as to enable pedestrians to cross in stages.

9.11 Footpaths offered for adoption should not be less than 1.8 metres wide. Footways should similarly not be less than 1.8 metres wide; however, this width may be reduced over short lengths in exceptional circumstances. Footways in shopping areas should have a minimum width of 3.8 metres and those outside schools should have a minimum width of 3.0 metres.

9.12 At road junctions where visibility splays are required for vehicles, the back of footway should be coincident with the back of the visibility splay, which is generally the highway boundary. This will ensure that the visibility splay is clearly defined and that the presence of pedestrians on the footway does not interfere unduly with visibility

9.13 Sites for new development are often crossed by existing public footpaths and bridleways and due account should be taken of these in the design. If a public right of way must be diverted then a Diversion Order will be required before development commences. In the case of bridleways, special care will be required in their design so as to prevent their misuse by vehicles and the detailed design should be discussed with the highway authority.

9.14 Where footpaths join higher category roads then barriers should be provided in order to prevent children running straight out into the road and reduce the likelihood of misuse by cyclists. Details of these barriers are contained in Part 5 (Specification).

10. PRIVATE DRIVES AND ACCESSES

10.1 Private drives serving only one dwelling should not be less than 2.75 metres wide. Shared private drives should have a minimum width of 4.25 metres so as to allow two vehicles to pass and to allow for parked vehicles. All should be aligned at right angles to the carriageway. Where drives are bounded by walls, a margin of 0.5 metres should be provided.

10.2 Shared drives have disadvantages for the provision of services to dwellings and create problems for residents, often resulting in friction between neighbours as a consequence of indiscriminate parking. Future maintenance can also create problems and should be covered in suitably worded covenants in the conveyance to purchasers. No more than five dwellings should be served by shared private drives and the layout should allow vehicles to enter and leave in a forward direction.

10.3 Gradients of private drives and accesses onto any road should wherever possible not exceed 1:20 for the first five metres from the highway boundary and should never exceed 1:10. Care should be taken at the back of footway to avoid the risk of vehicles grounding.

10.4 Vehicular visibility splays should be provided in accordance with the information on page 21. Pedestrian visibility splays should be provided as shown in the typical layout drawing on the following page.

10.5 Care must be taken when positioning garages that sufficient space is left in front of the garage doors for a car to park clear of the highway, including the footway, whilst leaving sufficient space for the garage doors to be opened. In general, the minimum distances are as follows:-

Roller shutter, sliding and inward opening doors	5.0 metres
"Up and over" doors	5.6 metres
Hinged, outward opening doors	6.0 metres

10.6 Garages should preferably have the following minimum internal dimensions:-

Single garage 5.5 by 2.5 metres.

Double garage 5.5 by 5.0 metres,

and should have a minimum door width of 2.2 metres.

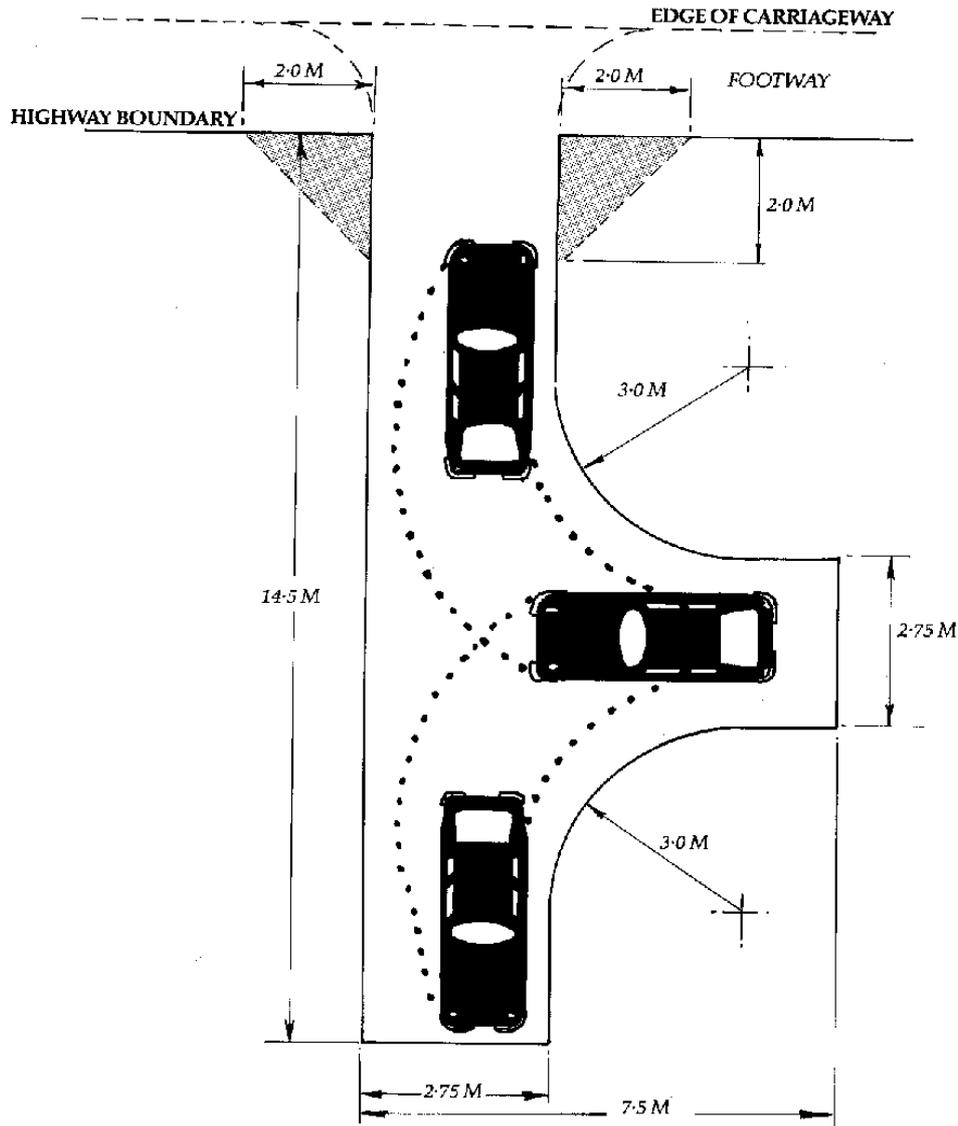
10.7 For long drives and accesses, attention is drawn to BS5906, 1980, which sets out a recommended maximum carry distance for refuse collection purposes of 25 metres. Where this distance is exceeded the British Standard recommends a minimum drive width of 5 metres, that turning facilities are provided within the site and that the construction of the drive should be sufficient to carry a refuse vehicle. Where "wheelie bin" collection methods are used consideration should be given to providing a communal collection point within the site, near to but off the highway. In addition, Fire Prevention

Note 1/70 also requires that "assured access be provided for fire fighting appliances to within 45 metres of any new dwelling".

10.8 Inadequate surfacing of access drives may lead to problems with cars skidding when trying to exit and with debris being carried onto the highway. All drives should be surfaced in tarmacadam, concrete or similar hard bound material (not loose aggregate or gravel) for at least the first 5 metres behind the highway boundary.

10.9 On busy roads (generally with peak hour flows exceeding 300 veh/hour), where gates are to be erected, they should be set back at least 5 metres from the highway boundary and should be inward opening only.

PRIVATE DRIVE (TYPICAL LAYOUT)



NOTES:-

These turning spaces will be required on busy existing roads (generally with peak hour flows exceeding 300 veh/hour), or on new roads where specified elsewhere in this document.
Radiused edging kerbs as shown should be

provided in rural areas where there is no footway.
The pedestrian visibility splays indicated by the shaded areas should be kept free of obstructions of over 0.6 metres in height above the level of the back of the footway.

11. ADDITIONAL INFORMATION

DRAINAGE

11.1 In general, with the exception of road gullies and their connections, this is the responsibility of the Water Companies (Severn Trent or Anglian). However, the County Council has a duty to ensure that arrangements for the drainage of the highway are adequate and will adopt systems which cater only for highway drainage. In other cases, sewers are adopted by the Water Companies to their own specification, which may be treated as complementary to this guide. Further information on drainage is given in Part

5; however, every effort should be made to ensure that manholes in the carriageway are located so that access can be obtained for maintenance without obstructing traffic flow. Where possible on distributor roads manholes should be located in the verge.

OFF-STREET PARKING

11.2 Wherever possible off-street parking should be provided within the curtilage of each new dwelling to the following standards:-

Dwellings with 3 or less bedrooms	minimum 2 spaces
Dwellings with 4 or more bedrooms	minimum 3 spaces
Local Authority and Housing Association developments, flats with two bedrooms or less	3 spaces per 2 dwellings

In all cases, one or more parking spaces may be a garage or garage space, however, where 3 spaces are required access must be able to be gained to at least two spaces individually when the other is occupied. Grouped car parking facilities, such as garage courts, are generally discouraged, but may be used in high density developments. Extreme care must be taken in their design and location to ensure that they are located conveniently close to the dwellings which they serve and that they are overlooked by a number of dwellings. Details of parking requirements for other types of development are included in Part 4 (Parking Standards).

TURNING HEADS

11.3 A turning head should be provided at the end of all culs-de-sacs or wherever vehicles would otherwise have to reverse over long distances or might turn in locations which could cause damage to adjacent verges or footways. A distance of 25 metres is considered to be the reasonable maximum distance over which vehicles should be forced to reverse. Amorphous shapes will be accepted provided that they encompass one of the three basic shapes shown on page 11 and that the additional surface area is not excessive. Small shared surface roads of Types D, E and F may occasionally join access roads at turning heads but care must be exercised in designing such junctions. The device of providing a dummy junction using a turning head to enable a road to turn through 90 degrees with very sharp radii and little or no visibility is, however, not acceptable, since the majority of drivers habitually do not treat them as junctions.

WIDENING ON BENDS

11.4 Carriageway widths on bends should be increased on all types of roads as follows:-

Centre-line radius (m) 20 30 40
Minimum widening (m) 0.60 0.45 0.30

Widening should be introduced gradually on the inside of the bend.

VERTICAL CURVES

11.5 Where changes in gradient occur, vertical curves will be required at crests and sags. On higher category roads, the length and radius used will depend on the need for driver comfort and to ensure adequate forward visibility along the carriageway. On such roads the recommendations of Department of Transport Standard TD 9/81 should be followed.

11.6 On other roads, the length of the vertical curve will depend upon the design speed of the road and the algebraic difference in gradients on the approaches to the curve. The length of curve is calculated using the formula.

$$L = KA$$

where L is the length of curve in metres, A is the algebraic difference in gradients and K is taken from the table below.

Road Type K value

Collector road	4.0
Access Road	2.5
All shared surface road types	1.5

11.7 On higher category roads it is important that the horizontal and vertical alignment are co-ordinated, both for aesthetic reasons and to improve drivers perceptions of the road alignment.

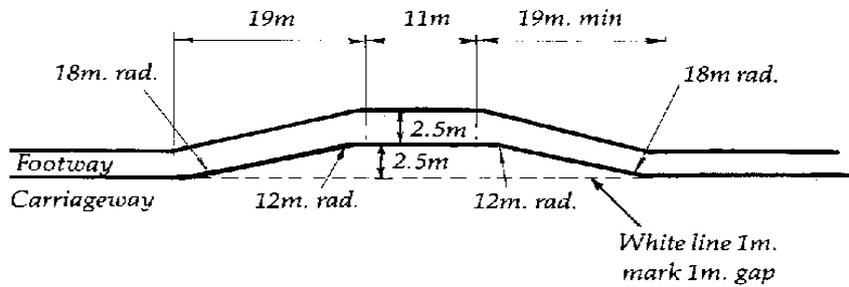
SPACING AND SITING OF BUS STOPS

11.8 Once a bus route has been planned within a residential layout, the number and location of bus stops must be considered together with the footpath system, so as to establish the optimum siting. Wherever possible they should not be located in junction visibility splays or opposite junctions. The spacing of stops will be governed by the need to find a balance between these requirements and the need to keep bus speeds at an acceptable level. On average, bus stops will be spaced at 4 or 5 per mile (2 or 3 per km). For

safety reasons, bus stops on opposite sides of the road should be staggered by about 45 metres, preferably so that the bushes stop "tail to tail" and move off away from each other. Where laybys are provided this distance may be reduced. At local centres, stops should be sited at the main pedestrian access to the centre, and in all cases stops should be located so as to avoid causing a nuisance or loss of privacy to residents. In all cases, consideration should be given to where pedestrians are likely to cross the road and dropped kerb crossings should be provided in appropriate locations.

11.9 Bus laybys should be provided for all bus stops on district distributor roads and at layover and timing points to the minimum dimensions shown in the diagram below:-

STANDARD BUS BAY



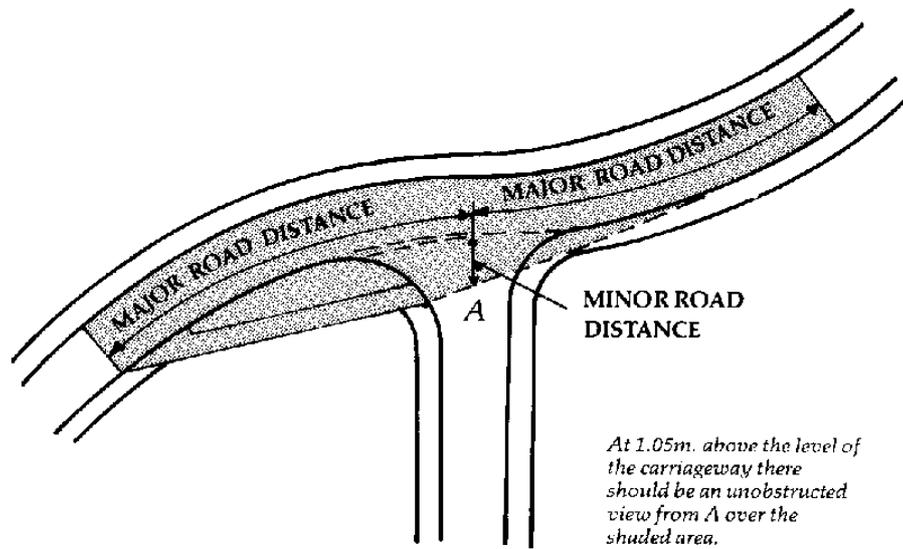
Where Bus laybys are provided consideration should be given to the provisions of a pedestrian refuge within the carriageway adjacent to the layby.

ROAD MARKINGS

11.10 Warning markings should be provided at all junctions with higher category roads (as defined on page 5), at road humps, at the entry ramps and intermediate ramps on shared surface road types and at "narrowing" type speed reduction features on collector roads in accordance with the Traffic Signs Manual Chapter 5. Additional road markings and traffic signs may be required at busy junctions at the discretion of the highway authority.

VISIBILITY SPLAY REQUIREMENTS AT JUNCTIONS AND ACCESSES

11.11



MAJOR ROAD DISTANCES ARE DETERMINED AS FOLLOWS:-

Where measured or expected 85%ile speeds are known.

Speed (mph)	Distance (m)
11-15	23
16-20	33
21-25	45
26-30	60
31-37	90
38-44	120
45-53	160
54-62	215
63-75	295

Where measured or expected 85%ile speeds are not known.

Speed Limit (mph)	Distance (m)
30	60**

30	90*
40	120
50	160
60	215
70	295

* Where major road is a higher category road.

** Where major road is a medium category road with speeds universally below 30 mph.

MINOR ROAD DISTANCES ARE DETERMINED AS SHOWN BELOW

Junctions between	Major Roads			
	Minor Roads	Dist/Local Distrib. Ex. Class	Collector Road	Access Road
Collector Road	9.0	4.5	4.5	N/A
Access Road	9.0	4.5	4.5	N/A
Access Road (serves<50 dwels.)	4.5	4.5	2.4	N/A
Shared Surfaces	N/A	2.4	2.4	2.4
Shared Pr. Drive	2.4	2.4	2.4	2.4
Single Pr. Drive	2.0	2.0	2.0	2.0

NOTE:-

Visibility splays to existing unclassified roads should normally be as required for existing classified roads.

FORWARD VISIBILITY ON BENDS

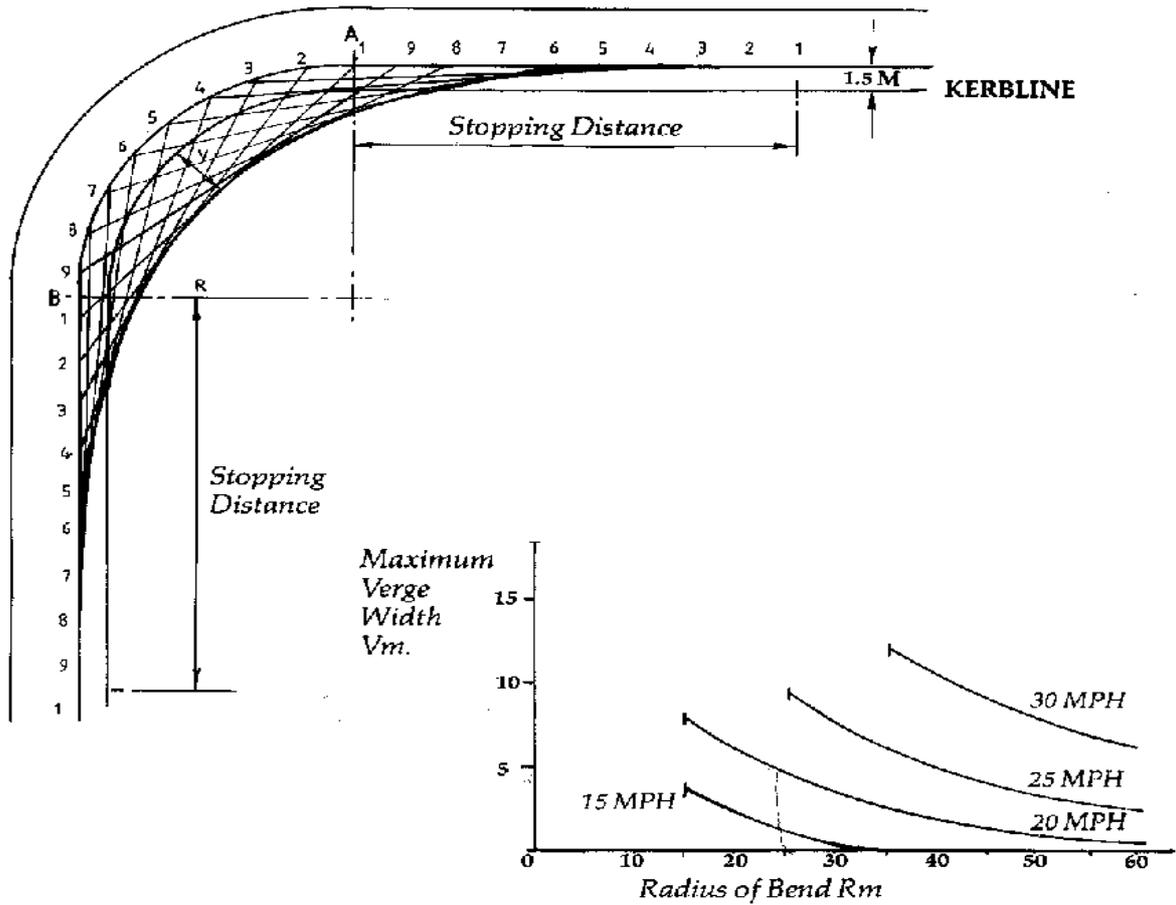
11.12 Forward visibility splays will be required on the expected or measured speed of traffic on the road. An unobstructed view across these splays is required from a point 1.05 metres above the road surface (drivers' eye height) to a point 0.26 metres above the road surface (height of fallen child or obstacle, etc), both points being 1.5 metres from the nearside kerb. It is recommended that minor widening is accommodated within the footway and a verge separating the footway and carriageway provided for widening in excess of 1 metre.

11.13 The required forward visibility splay on any bend is determined using a stopping distance proportional to the expected speed of traffic on the road. The following table gives the appropriate distances.

Expected speed (mph)	15	20	25	30*
Stopping distance (m)	23	33	45	60

*Speed in excess of 30 mph may be considered in layouts with long straight or nearly straight sections.

11.14 The splay requirement may be constructed using the method illustrated in the diagram below. For ease of reference the graph shows the widening required for various combinations of speed and radius at the mid-point of the curve.



HIGHWAYS AGENCIES WITHIN LEICESTERSHIRE

11.15 Within Leicestershire, six District Councils which Operate as sic District Councils which operate Agency areas for the whole or part of their administrative areas. These Authorities and the extent of their agencies are as follows: -

DISTRICT COUNCIL	ADDRESS	AGENCY AREA
Borough of Charnwood	Borough Surveyor, Macaulay House, Cattle Market,	Loughborough.

	<p>Loughborough, Leicester LE11 3DH. Tel: 01509 263151.</p>	
<p>Harborough District Council</p>	<p>Chief Housing and Environmental Services Officer, Adam and Eve Street, Market Harborough, Leicester LE16 7AG. Tel: Mkt. 01858 821100.</p>	<p>None, however you should contact the LCC in the first instance for information on the new working Agreement within the District Harborough.</p>
<p>Hinckley and Bosworth Borough Council</p>	<p>Director of Development, Council Offices, Argents Mead, Hinckley, Leicester LE10 1BZ. Tel: 01455 238141</p>	<p>Burbage and Earl Shilton.</p>
<p>Melton Borough Council</p>	<p>Chief Manager of Planning and Technical Services, Council Offices, Nottingham Road, Melton Mowbray, Leicester LE13 OUL. Tel: 01664 567771.</p>	<p>Melton Mowbray.</p>
<p>North West</p>	<p>Technical Services Officer,</p>	

Leicestershire District Council	Council Offices, London Road, Coalville, Leicester LE6 2JF. Tel: 01530 833333	
Oadby and Wigston Borough Council	Engineer and Surveyor, Bushloe House, Station Road, Wigston, Leicester LE8 2DR Tel: 0116 2888961	Whole Borough.

LEICESTERSHIRE COUNTY COUNCIL DIVISIONAL AREAS

11.16 The County Council's Highways and Waste Management Branch is responsible for supervision of construction, highway drainage, adoptions and day to day network management and is split into three divisional areas and one "maintenance partnership". These areas and their extent are as follows:-

Northern Divisional Surveyor, Leicestershire County Council, Leicester Road, Melton Mowbray, Leicester LE13 0DA Tel: 01664 565731.	Charnwood and Melton
Southern Divisional Surveyor,	Blaby

Divisional Office (Client), Coventry Road, Croft, Leicester LE9 6GP Tel: 01455 283341	
Harborough Highways Partnership Adam and Eve Street, Market Harborough, Leicester LE16 7AG. Tel: 01858 821060	Harborough, but contact LCC in the first instance for information on the new working Agreement within the District
Western Divisional Surveyor, Kilwardby Street Ashby-de-la-Zouch, Leicester LE6 5FR. Tel: 01530 414151.	Hinckley and Bosworth and North West Leicestershire

USEFUL REFERENCE DOCUMENTS

11.17 The following documents may prove helpful

To the designers of housing estates:-

Leicestershire Housing Development Guide	General advice on estate design - published by the County Council
Crime Prevention by Planning	General advice on estate

& Design	design – published jointly by Leicester City Council and the Leicestershire Constabulary
Paving the Way	Parking design for disabled people – published by Leicester City Council
Trees & Construction	Published by – Leicester City Council