

# HIGHWAY DESIGN GUIDE

## Part 1 INTRODUCTION

### 1.1 Foreword

Coventry City Council wants Coventry to be a growing, accessible city where people choose to live, work and be educated, and where businesses choose to invest. Well designed and maintained streets and spaces with high quality well constructed materials and robust attractive coordinated street furniture are essential. This will assist in achieving vibrant and attractive places and set the context for the adjoining buildings and activity in the spaces themselves.

Providing high quality public spaces, which are safe, uncluttered, active and easily identifiable, is one of the eight principles of urban design (Coventry Urban Design Guidance 2004). Public space includes streets, squares, waterways, recreational areas and parks; it is an integral part of the urban fabric and should make a positive contribution to the built environment. Good quality public space is achieved through details, materials and activities. Investment in these key elements can turn public spaces into memorable and enjoyable places. Streets serving residential, recreational and commercial developments are core elements of public spaces.

Streets are the lifeblood of our city. In addition to providing for the movement of pedestrians, cyclists, public transport users and motor vehicles, they provide circulation space for activity and entertainment, a place where people can meet, access to buildings and spaces, spaces for parking and servicing and a route for above and below ground services.

The quality of our streets and spaces is one of the elements which determine how the people who use it value it, whether they enjoy being there, want to use its facilities, and whether they will continue to value it. Quality places encourage greater use, are better looked after and respected by those who use them, and in turn become sustainable both economically and socially.

The purpose of this design guide is to achieve the above aspirations in practice by assisting with the design and delivery of high quality residential, commercial and mixed use developments. A hierarchy of policy exists and guidance from the following has influenced this highway design guide;

#### National Policy Guidance

PPS1	Delivering Sustainable Developments
PPG 13	Transport

#### Regional Guidance

Regional Spatial Strategy (RSS) – Transport & Accessibility Policies  
Regional Spatial Strategy Phase Two Revision (RSS Preferred Options) –  
Transport and Accessibility Policies  
West Midlands Local Transport Plan (LTP)

#### Local Guidance

Core Strategy Development Plan Document (DPD)  
Delivering a More Sustainable City Supplementary Planning Document

## 1.2 Improving Environmental Quality

It has been recognized that the design standards for our streets have placed the wrong emphasis on their use and that streets should not just be designed to accommodate the movement of motor vehicles. This has resulted in a review of design procedures and aspirations and refocused on the need for streets to serve pedestrians as their main priority within a high quality, well maintained public space.

The “Manual for Streets” (MfS) published by the Department for Transport in 2007 emphasizes the overall importance given to place making, and encourages the design of streets based on their function rather than purely the level of traffic carried. (MfS replaces previous guidance given in Design Bulletin 32 and Places, Streets and Movement.)

This document provides local guidance and builds on the principal aims of the MfS which are to assist in the creation of streets that:

- help to build and strengthen the communities they serve;
- meet the needs of all users, by embodying the principles of inclusive design;
- form part of a well-connected network;
- are attractive and have their own distinctive identity;
- are cost-effective to construct and maintain; and
- are safe.

It discourages the building of streets that are:

- primarily designed to meet the needs of motor traffic;
- bland and unattractive;
- unsafe and unwelcoming to pedestrians and cyclists; and
- poorly designed and constructed.



Improving urban design

The Council endorses these principles and is committed to creating excellent new places for people to live and work. The purpose of this design guide is to achieve these aims in practice and supports Coventry’s Core Strategy Policy EQ1: Ensuring High Quality Design which expects developments to meet key principles including:

- respond to local contexts reflecting local distinctiveness and identity;
- preserve and enhance the character and settings of major transport corridors;
- clearly define the boundaries between public and open space;
- provide attractive, safe, uncluttered, active and easily identifiable, high quality public spaces;
- make places that inter-connect and are easy to move through;
- seek high quality design;
- adopt sustainable construction principles; and
- consider green infrastructure.

High quality urban design will be promoted in Coventry by ensuring that all new development takes these principles into account. The aim of the guide is to:

- raise awareness and understanding of urban design;
- provide advice to applicants for planning permissions; and
- encourage an innovative, design led, approach to developments.

This document is an important tool to assist in the delivery of a high quality environment in residential, commercial and mixed use developments and should be used in the context of other national and local planning design guidance. It supports the intentions of Local Transport Note 1/08, Traffic Management and Streetscape (March 2008) to improve on streetscape and combine the principles of good traffic management with good streetscape design, where neither is helped by over provision and clutter. The guidance aims to reflect the approach to design as set out in MfS and supersedes the Council's former 'Highway Design Guidelines for New Developments' document.

Good design is developed through a collaborative approach between all parties including developers, planners, architects, designers, contractors, safety auditors and maintenance engineers. The guidance is intended for use by all parties and seeks to stimulate innovative designs that are appropriate for the context, character and location of a site and can be used safely by the traveling public. Designers will be encouraged to incorporate quality sustainable materials that are visually attractive, require minimal maintenance, and are in keeping with the specific local character of the area.

### **1.3 Design Principles**

Public highways have several and varied purposes. They are an integral part of a development, fundamental for the creation of an accessible city and cannot be considered in isolation from the overall design. The Council's Core Strategy Policy AC1: Transportation seeks to ensure that developments contribute to efficient and integrated, sustainable and safe transport networks in order to improve accessibility for all and giving priority to improving facilities for walking and cycling.

The key recommendation for the design of new street is that consideration should be given to the place function of the street and that the hierarchy of importance of users is taken as:

- pedestrians;
- cyclists;
- public transport users;
- specialist service vehicles;
- other motor traffic.

It is not intended to repeat the contents of MfS, however it must be read in conjunction with this guide. The guide covers developments that will be served by public streets. The development figures stated are typical examples. They are not definitive criteria as each development will have its own characteristics which will help define layouts and features based on location, settings, connectivity etc. Developers are encouraged to discuss with the Council at an early stage the goals for their individual proposals:

- shared surface residential streets serving typically up to 80 dwellings;
- residential developments serving typically up to 600 dwellings;
- mixed use developments which generate a similar level of traffic flow to that generated typically by 600 dwellings;
- industrial and commercial developments serving typically up to 20 hectares of developable land; and
- local distributor roads linking development areas.

Roads and junctions serving more than the above developments should be designed under the general principles stated in this guide and comply with appropriate standards in the "Design Manual for Roads and Bridges" (Department of Transport). The developer should consult with the Council on any specific requirements that may be needed to ensure that vehicle speeds are appropriate to the link and place setting.

When mixed use developments are proposed, the design of the streets should comply with the general principles with in these guidelines. The proposed layout and street scene should be discussed with the Council to agree appropriate objectives.

New developments should provide an attractive and safe environment in which people would wish to live and work. Layouts should be based on providing maximum interest, variety, a sense of space and ownership. They should also provide natural surveillance in the interest of security and crime prevention.

New developments must be designed in order that they can provide safe, efficient and easy movement of people and goods through the development and throughout the city. Highway design should help facilitate appropriate types of movement in a manner which will provide a reduction in road collisions, improve the quality of the environment and safeguard all highway users. Developments should also have a safe and appropriate access to the highway system which avoid danger or inconvenience to pedestrians, cyclists or drivers and their layout should encourage permeability throughout the development.

These guidelines should help to define a layout for new developments that support the Council's transport policy and:

- help to create attractive areas in which people live, work and take their leisure;
- provide convenient pedestrian routes made safer by design;
- encourage cycling;
- help in providing a suitable public transport system;
- keep vehicle speeds low in vicinity of homes, schools and other areas of pedestrian movement; and
- promote safety for all users of the highway.

#### **1.4 Safety**

The complexity of the urban environment leads to many conflicts between the users of the highway. The Council has a statutory duty-of-care to ensure the safety of the highway. Safety considerations therefore form an important aspect in approving new highways or amendments to an existing highway.

MfS recommends that greater degree flexibility is permitted in the application of design standards. Guidance with too many unnecessary rules restricts and inhibits innovation. This guide will set out some minimum standards to satisfy the basic requirements for access, movement and safety. It will require the project team to demonstrate that their designs satisfy these criteria, along with maintenance and sustainability issues whilst providing a high quality environment.

The guidelines incorporate designs based on self enforcing speed reduction and promoting safety. Traffic calming should be considered for all highway schemes within developments which encourage reduced speeds.

Reductions in any guidelines which will affect the safety of the highway should be discussed with the highway authority at an early stage to determine if compensatory measures will be acceptable.

As part of the highway authority's design approval process, safety audits will be undertaken of the proposed design. In addition, a further safety audit will be undertaken upon completion of the works. All safety concerns raised during the audit will need to be addressed prior to new works being adopted as a public highway.

#### **1.5 Security**

The design of new developments can make a major contribution to the prevention of crime and the sense of fear of crime. It is therefore important that permeability is built into designs. High permeability is conducive to walking and cycling if paths and streets are well used and overlooked. By providing natural surveillance the possibility of criminal action is reduced.

Where it is necessary to provide separate footpaths and cycleways, these should be on overlooked routes or on routes which generate high levels of movement and should be as short as possible.

Safer Places: The Planning System and Crime Prevention (2004) highlight the following principles for reducing the likelihood of crime in residential areas:

- the desire for connectivity should not compromise the ability of householders to exert ownership over private or communal 'defensible space';
- access to the rear of dwellings from public spaces, including alleys should be avoided – a block layout, with gardens in the middle is a good way of ensuring this;
- cars, cyclists and pedestrians should be kept together if the route is over any significant length – there should be a presumption against routes serving only pedestrians and/or cyclists away from the road unless they are wide, open, short and overlooked;
- routes should lead directly to where people want to go along desire lines;
- all routes should be necessary, serving a defined function;
- cars are less prone to damage or theft if parked within the curtilage. If cars cannot be parked in-curtilage, they should ideally be parked on the street in view of the home. Where parking courts are used, they should be small and have natural surveillance;
- layouts should be designed with regards to existing levels of crime in an area and layouts should provide natural surveillance by ensuring streets are overlooked and well used.

Layouts should provide a clear definition of responsibility to avoid anonymous and uncared for spaces.

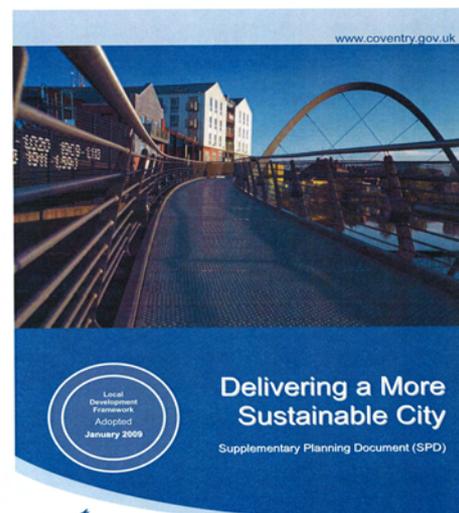
## 1.6 Sustainability

The design and detailing of new developments should support the Council's Climate Change Strategy and sustainability objectives as stated in the Delivering a More Sustainable City SPD.

The principles of sustainability are supported by layouts that:

- reduce travel by car;
- reduce pollution;
- minimise and manage the risk of flooding
- reduced traffic speeds and improved safety particularly for pedestrians and cyclists;
- sustainable drainage systems;
- minimise the use of minerals and other natural resources; and
- tree planting and grassed areas.

It is important that the design of our streets and spaces, and the street furniture and materials used, positively contribute to the environment in a sustainable way.



## 1.7 Access for All

Design for disabled and elderly people, and those with young children, must be considered in all projects. Safe, comfortable, uncluttered and easily read streets and places benefits all people. The Disability Discrimination Act (DDA) 1995 commits to the creation of inclusive environments, Part III of which gives people a right of access to goods, services and facilities which include pedestrian movement. Important access elements include:

- level entry to buildings;
- crossings level with the footway or dropped kerbs, audible signal or tactile crossing indicators. Seating at regular intervals;
- blue badge parking spaces clearly marked with pavement dropped along the whole side of the parking spaces;
- good lighting.

## **1.8 Walking**

The Council's Core Strategy Policy AC1: Transport promotes improved facilities for walking to improve accessibility for all throughout Coventry. RSS Policy T3 seeks to provide greater opportunities by ensuring that new developments improve walking and cycling access. Developments must provide a network of convenient pedestrian routes made safer by design and in particular, special attention must be paid to the needs of disabled people. Pedestrians are vulnerable to accidents and it is vital to improve the environment in order to encourage this most sustainable form of travel.

Infrastructure for pedestrians should be planned using the following design criteria which also ensure that the needs of cyclists and disabled users are taken into account:

- **Accessibility:** Routes to key destinations, including public transport access points, should be continuous and direct;
- **Convenience:** There should be minimal delay at crossings with pedestrian signals. Routes should be unimpeded by parked vehicles or street furniture;
- **Safety:** Designs should minimize actual and perceived danger for pedestrians. Traffic volumes and speeds should be reduced where necessary to create a safer environment for walking;
- **Comfort:** Local facilities should meet design standards for footway widths, gradients, quality of surface; and cater for all types of user including disabled people;
- **Attractiveness:** A high standard of urban design should create an environment that is attractive and interesting.

The expected standard for any new development is to provide an environment conducive to walking and all proposed new developments and highway schemes must seek to fulfill the five principles of planning for pedestrians.

Pedestrians feel safe when they are on routes where they can be seen and wherever possible these should be close or alongside roads and streets.

Suitable crossing facilities must be provided at all road junctions, which must include provisions for disabled users.



**Footpath along a canal with access to houses**

## 1.9 Cycling

The Council's Core Strategy Policy AC1: Transport promotes improved facilities for cycling to improve accessibility for all throughout Coventry. RSS Policy T3 seeks to provide greater opportunities by ensuring that new developments improve walking and cycling access. Convenient and comprehensive cycle facilities, made safer by design, must therefore be incorporated into the design of new developments and the needs of cyclists should be considered from an early stage. Cyclists are vulnerable to accidents and it is vital to improve the environment in order to encourage this most sustainable form of travel. New developments must be linked to the existing or planned City Cycle Network.

The following are core principles required of a cycling scheme for it to be accepted by cyclists and be effective in increasing levels of cycling. They have been aligned with the needs of pedestrians and disabled users to ensure they are better integrated into schemes for cyclists and have been combined with the five principles of planning for pedestrians.

- **Accessibility:** Routes to key destinations, including public transport interchanges, should be continuous and direct and should be situated on desire lines. Sufficient provision should be made for crossing barriers such as major roads;
- **Convenience:** Cycle networks should take people where they want to go. Wherever possible, priority should be provided where cycle routes cross side roads and the delay to cyclists at signalled crossings should be the minimum which is practicable;
- **Safety:** Facilities for cyclists must not only be safe, but they must be perceived by users to be safe. Both the risk and fear of crime can be reduced by allowing long sight lines, removing hiding places along routes, providing adequate lighting, and the presence of natural surveillance from nearby properties or other users;
- **Comfort:** All facilities should conform to design standards for width, gradients, and surface quality. Cyclists benefit from even surfaces with gentle gradients;
- **Attractiveness:** A high standard of urban design can create an environment that is attractive and interesting. The ability for cyclists to ride two abreast also makes for a more attractive facility.

The expected standard for any new developments is to provide an environment conducive to cycling and all proposed new developments and highway schemes must seek to fulfill the five principles of planning for cyclists.

Routes for cyclists should be as direct as possible, reflecting desire lines. Routes should form a coherent entity and be continuous and consistent in standard. A cycle route will not be convenient if cyclists are required to stop or give way frequently. Such delays should be kept to a minimum and consideration given to providing priority at certain junctions.

For communal residential dwelling blocks and for business developments, secure cycle parking facilities must be provided. Facilities should be conveniently located, secure, easy to use, adequately lit, well signed, and sheltered wherever possible. Very secure, covered parking is particularly important for long term parking to be used by employees on commercial developments. Small groups of cycle stands situated in prominent and convenient locations are recommended for short stay parking for visitors or shoppers.

## 1.10 Public Transport

The Council's Core Strategy Policy AC1: Transport is that new developments should promote efficient, integrated and sustainable transport networks that will improve accessibility for all.

In order to meet the needs of people without access to private transport, to reduce car usage and to enhance the environment, it is essential to ensure the accessibility of new developments by public transport vehicles. New developments must provide for safe, convenient and efficient bus services and incorporate adequate provision for public transport services including connectivity through major developments. In addition, direct and secure pedestrian access to these services is required.

The Council's "Delivering a More Sustainable City" require that where route improvements are required, public transport entry points to a development should be conveniently located to provide the appropriate level of safety, comfort, convenience so as to maintain the overall quality of the public transport journey.

Bus services generally operate on district and local distributor roads. Where it is likely that they will penetrate into new developments the routes must be carefully designed for usage by appropriate buses. Consultation should take place with Centro (the West Midlands Passenger Transport Executive) to determine suitable routes.

On large estates bus only links may be provided to avoid routes which would be attractive to general through traffic. Bus only gates should be provided to avoid the use of links by private cars.



Public transport - PrimeLines

For all new developments with greater than 50 new dwellings or 100 new employees, it will be necessary for developers to show that public transport has been considered with new facilities proposed where they would be of benefit to people living or working in the area.

## 1.11 Parking

The parking of vehicles is a key requirement of all new developments and it needs to be properly considered as part of the design process to identify appropriate locations. Parking spaces can be provided both on and off the street. On-street parking facilities provide a common resource for residents and visitors and can add to the activity of the street. Negative effects include being a contributory factor in road collisions particularly if speeds are above 20mph and they can be visually dominant distracting from the overall appearance of the street.

As a general rule, all on street parking spaces must be clearly defined. Discrete parking bays adjacent to running lanes are the preferred method of providing on-street parking. They should be provided in small groups, separated by kerb build outs, or other features, to break up their visual appearance. Unless identified as a parking location, all carriageway space should be assumed as being required for traffic movement, not for parking. Their use on the inside of bends must take into consideration safety aspects and the impact on any visibility requirements.

Appropriate levels of car parking will be required to serve the needs of residents, employees and visitors to avoid causing congestion for others. It is essential that sufficient off-street parking is provided to satisfy reasonable levels of residents' and their visitors' demands over and above any levels of on-street parking that is provided. Within communal parking areas, tandem parking bays shall not be permitted for non designated parking.



**Parking within curtilages**



**On street parking provision**

# HIGHWAY DESIGN GUIDE

## Part 2 DESIGN GUIDANCE

### 2.1 Key Objectives

It is important when designing new developments that the design does not only centre on highway and transportation issues but also focuses on other important aspects that make up a development and cater for the people who will use them, and not just cars.

There needs to be a clear distinction between roads and streets. Roads are essentially a highway feature that is primarily concerned with accommodating the movement of vehicular traffic. Streets on the other hand are usually lined with buildings and public spaces, and while movement both vehicular and pedestrian is still important, the place function is of more importance.

A sense of place encompasses a number of aspects but most notably in streets these are:

- local distinctiveness;
- visual quality; and
- propensity to encourage social activity.

The choice of materials to be used, street furniture, landscaping and overall layout can have a huge impact on achieving a sense of place.

Designs of new developments should meet the following objectives:

- design of high quality developments that are sustainable;
- ensure that streets are designed primarily for people whilst still maintaining their use by other types of street users;
- link the development to the surrounding networks for pedestrians, cyclists, buses and motor vehicles;
- offer an alternative and more sustainable mode of travel to people than the car;
- pedestrian access should be designed for people of all ages and abilities;
- provide a parking system that does not dominate the street scene and is safe and secure;
- make use of simple, high quality materials that are sustainable whilst also being durable and economic in terms of maintenance; and
- design for community safety.

## 2.2 General Outline

To achieve the key objectives outlined previously it is understood that there will need to be a greater flexibility in highway design standards in order to embrace these ideas and those presented as best practice in the “Manual for Streets” (MfS). Guidance that contains too many rules and restrictions can prevent innovative schemes from being developed. However this more flexible approach will place even more responsibility on designers to ensure that their proposals are maintainable, can operate safely and are sustainable.

This guide covers the following developments that will be served by public streets. The development figures stated are typical examples and are not definitive criteria. Each development will have its own characteristics which will help define layouts and features based on location, settings, connectivity etc. Developers are encouraged to discuss with the Council at an early stage the goals for their individual proposals:

- shared surface residential streets serving typically up to 80 dwellings;
- residential developments serving typically up to 600 dwellings;
- mixed use developments which generate a similar level of traffic flow to that generated typically by 600 dwellings;
- industrial and commercial developments serving typically up to 20 hectares of developable land and
- local distributor roads linking development areas.

A natural hierarchy of street and road form is specified to determine the user priority of the space created, balanced with the need to transport people and goods. The following street/road standards are covered within this guidance document:

- shared surface streets and mews courts;
- local residential streets;
- connecting streets;
- private drives
- non-residential access roads; and
- local distributor roads.

Mixed use developments need to be flexible depending on the type and intensity of non-residential use. For developments where the traffic flow is not expected to be above that which could be generated by 600 dwellings, the connecting street could provide appropriate guidance on the highway standards that may be expected. These should be agreed with the highway authority as soon as practicable.

Any street or road that is intended to serve more than 600 dwellings will need to be discussed with the Council and be designed under the general principles encouraged within these guidelines. The design should include a layout to encourage vehicles to travel at appropriate speeds, be based on predicted traffic and pedestrian flows and in accordance with appropriate elements in “Design Manual for Roads and Bridges”. However if the development is to serve a larger estate than those listed above this does not mean that the design principles set out in this document should not be adhered to. The guidance given for local distributor roads needs to be formally agreed with the highway authority as soon as practicable.

## 2.3 Street Types

### 2.3.1 Residential Street Hierarchy.

When considering the layout and design of new developments a permeable network of streets will provide greater connectivity to people within the development and these linked layouts will lend themselves to a more socially acceptable aspect to the area.

Developments, whose streets end in a number of culs-de-sac, often with small uninviting alleyways linking the streets, do not promote a safe and easy route for pedestrians. Linked streets are encouraged as these will allow greater connectivity for pedestrians, cyclists and wheelchair users.

For new developments an assessment of the existing area functions surrounding the proposed site in terms of movement and place is required. This will enable the main areas to be connected and required linkages, both within and to the site, to be identified to ensure that the important desire lines can be accommodated. This process will ensure that the new development integrates with the surrounding area to enhance it rather than disrupting it or acting as an environment that becomes curtailed from the surrounding community.

The hierarchy of the streets needs to provide a logical transition from the external road networks, where motor vehicle movements are the primary concern to residential streets, where the needs of pedestrian and non motor vehicle users will come to the fore. To achieve this it is essential that the streets within a development form a hierarchy that considers the levels of vehicle and pedestrian/cycle activity that each should accommodate together with specific requirements for bus routes.

Culs-de-sac should be avoided in residential developments but sometimes due to boundaries or other site constraints, layouts may dictate their inclusion. They may be useful at reducing traffic levels on some developments, however, through routes for pedestrians and cyclists from culs-de-sac should be given careful consideration and designers must ensure that pedestrian and cycle routes are overlooked preferably with active frontages.

The three types of adoptable residential streets that are set out in this design guide are as follows:

- shared surface streets and mews courts;
- local residential streets; and
- connecting streets.

(Details on the design life and design specifications for each option can be found in Part 5.)

Whilst it is recognized that there is a need to have a hierarchical system for streets in order for the Council to impose a level of control on roads that are to be adopted, the MfS warns against a rigid hierarchy that is based on vehicular movements. Therefore this guide and the streets identified within it have been designed on the basis of the number of dwellings and type and volume of traffic that are likely to use them. This is only a starting point for the design of the streets and the choice of design elements included within it should include an assessment of place and movement as suggested in MfS section 2.4.

### 2.3.2 Shared Surface Streets

Shared surface streets are road layouts for the joint use by pedestrians and vehicles but pedestrians must visibly have priority within the street with pedestrian safety of primary concern. They are likely to have very high levels of pedestrian and cyclist activity, particularly from small children. Vehicle speeds must be very low and be self-enforcing through good design. Shared surface streets include mews courts, courtyards, squares and Home Zones.

It is essential that shared surface streets are recognised as visually and functionally distinct from other streets. This can be provided by layouts featuring gateways, changes in highway widths, changes in direction, suitable surfacing materials, landscape features and street furniture.

The commencement of the shared surface street must be associated with a road junction or a change in direction. The entrance to a shared surface street shall be defined by a shallow ramp or rumble strip. This may be reinforced by a gateway feature. Footways should be provided at the beginning of shared surface streets to beyond the entrance ramp and the start of the block paving.



Rumble strip entrance to shared surface street

Thought can be given to how different kinds of surface materials can help to distinguish on street parking areas and delineate different parts of the highway. Careful consideration of parking arrangements is necessary for the shared surface to function safely. It is important to ensure that parking facilities are adequate and conveniently sited so that vehicles are not left on the area of shared surface that is required for traffic movement.

The overall layout of shared streets may be formal, i.e. courtyard or informal, i.e. mews courts. The highway layout should be designed to be incorporated with the defined space but carriageways and footways may vary in width throughout the street to suit the street scene. The design should allow a



Informal street layout

vehicle movement path to be maintained throughout the street around any incorporated features such as parking spaces or landscaping elements or changes in alignments. Vehicle tracking may be required to demonstrate that minimum widths are provided to enable vehicles to safely pass through.

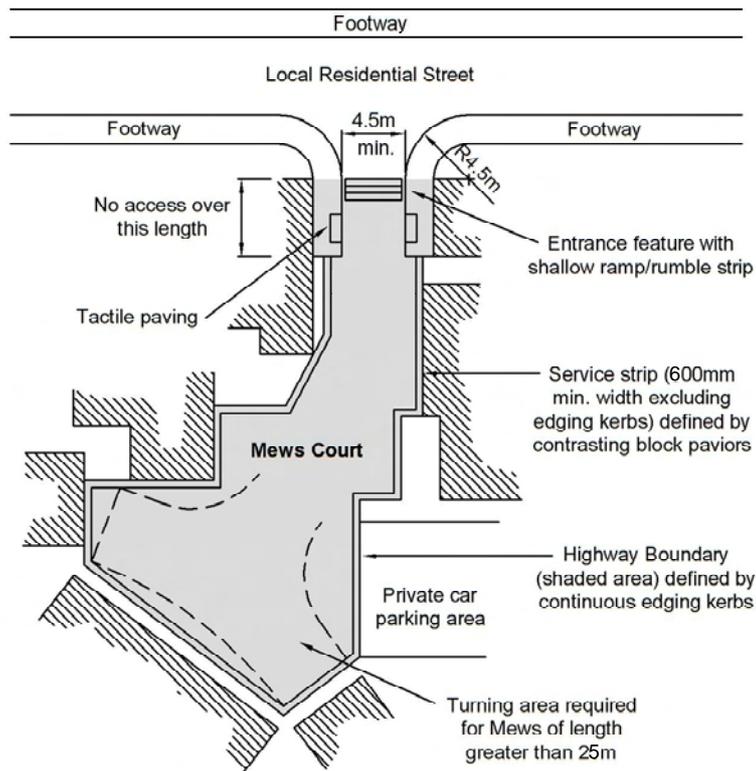
Service strips or maintenance verges can be paved or soft landscaped with grass. The highway boundary should be defined by continuous edging kerbs along the back of the service strip. Small pockets of land around lighting columns should be included within the adoptable area.

The shared surface can extend between buildings although vehicle paths should have a 600mm margin to any building or boundary face. Where buildings abut the street, lighting columns may be fixed to buildings subject to an agreement with the owners of the properties. The proposed adopted highway shall drain away from any abutting buildings. Gullies or drainage channels must not be provided against buildings.

Culs-de-sac of length greater than 25m or accessed off a collecting street or higher category of road require a turning area. Culs-de-sac of length greater than 180m may require an emergency access and should be discussed with the highway authority and the fire service.

To meet the adoption standards of the highway authority a shared surface street should be designed to comply with the following requirements.

## MEWS COURT TYPICAL LAYOUT



Irregular street layout patterns



<b>Shared Surface Street</b>	
i) Number of dwellings to serve	Typically in the order of 50 in a cul-de-sac or 80 on a through route or loop road and may be applicable for a similar scale of mixed use, social or commercial developments. The figures are to be taken only as a guide and may be increased depending on the development's character and layout.
ii) Number of access points to primary roads or main network	Single access point for a cul-de-sac and two access points for a through route or loop road. Where shared surface streets join a connecting street or a road of a higher category, the first 10m length should be constructed as a local residential street to enable a gradual reduction in design speed for a shared surface.
iii) Design speed	15 mph
iv) Carriageway width (Only applicable where there is a designated carriageway)	Variable, but with a minimum overall adopted highway width of 7.3m. The minimum carriageway width should be 4.1m except for localized pinch points where the minimum width should be 3.1m. There should be a footway/verge margin provided to both sides of the carriageway of a minimum width of 600mm. A 1.8m wide service strip should be provided.
v) Footway width	Not required unless a particularly strong pedestrian desire line or through route is identified through a link analysis and a separate path is required.
vi) Verges	Maintenance verges or service strips are required. Landscape verges are not normally permitted due to maintenance liabilities but desired landscaping features may be incorporated into the overall street scene.
vii) Length between speed control features	Maximum 40m with initial shallow ramp or rumble strip at entrance.
viii) Access to properties	Provide direct access to dwellings.
ix) Pedestrian crossing facilities	Not required - shared use.
x) Provisions for cyclists	Not required - shared use.
xi) Minimum forward visibility	20m, visibility above this should be minimised to deter excess speed.
xii) Vertical curve	Minimum vertical curve length to be 20m or a minimum "K" value of 6.
xiii) Bend	All bends and changes in direction should be subject to a tracking analysis to confirm there are no safety implications with the layout.
xiv) Gradient	Maximum gradient 7% or 8% over short lengths. Minimum gradient 1% to comply with block paving requirements.
xv) Crossfall	1:40
xvi) Junctions	<ul style="list-style-type: none"> <li>• Junction radius onto a local residential street to be a maximum of 4.5m. Radius should be kept to a minimum to maintain pedestrian desire lines. Tracking shall be used to confirm suitability for use by appropriate vehicles.</li> <li>• Minimum length of straight before a main road channel line to be 10m and at a grade not greater than 2.5%.</li> <li>• Side road junction visibility requirement to be 2.4m x 20m.</li> <li>• No access will be permitted off the entry radius of a bell mouth.</li> <li>• Private drive visibility 2.0m x 20m for a single access and 2.4m x 20m for shared drives.</li> <li>• Junction with main road to be 75-105 degrees.</li> </ul>

### 2.3.3 Local Residential Streets

These streets begin to provide a greater balance in use between pedestrians, cyclists and motor vehicles. They will provide for this wide range of movement modes and will be the type of streets where direct access to properties can be provided.

A local residential street will serve up to 300 dwellings. These streets may provide direct access to the existing external road network but will primarily be used to provide access to a local distributor road that will then in turn link to the wider local network.

These streets will not be designed to cope with large volumes of traffic and as such the geometry of them will be different to connecting streets and local distributor roads in terms of tighter junction radii and reduced forward visibility. They should be designed as urban streets and incorporate the ideas put forward in MfS.

Culs-de-sac should be avoided where possible. If it is absolutely necessary due to boundary constraints, they should have a maximum length of 180m. Turning facilities should be provided if the cul-de-sac is longer than 25m, and if the length of the cul-de-sac is greater than 100m then additional turning facilities may be required.

Although the provision of more than one access is encouraged, where this is not possible a single vehicular access may be accepted providing the internal network forms a loop, with the shortest possible connection between this loop and the point of access.

Vehicle tracking should be used to confirm turning radius at junctions to minimise vehicles speeds, provide safe turning movements and to maintain pedestrian desire lines where possible.

To meet the adoption standards of the highway authority a local residential street should be designed to comply with the following requirements:

<b>Local Residential Street</b>															
i) Number of dwellings to serve	Typically up to 300 for a street with at least two access points or 150 for a cul-de-sac.														
ii) Number of access points to primary roads or main network	Up to 150 dwellings – two preferred. 150-300 dwellings – at least two.														
iii) Design speed	20 mph														
iv) Carriageway width	5.5m. Width may be reduced to 4.8m over short lengths where the street serves up to 50 dwellings. Roads to be widened through bends to enable vehicles to pass safely.														
v) Footway width	2m minimum footway on both sides of carriageway.														
vi) Verges	1m minimum if provided.														
vii) Length between speed control features	Every 60m. Not more than 10 speed reduction measures, including 6 vertical features to be passed from any dwelling to a connecting street or local distributor.														
viii) Minimum forward visibility	25m.														
ix) Access to properties	Provide direct access to dwellings.														
x) Pedestrian crossing facilities	Safe convenient locations for pedestrian crossings will be required on desire lines, by either raising the carriageway to footway level or by the use of dropped kerbs. All crossings to have tactile paving.														
xi) Provisions for cyclists	Facilities for cyclists can be provided for off carriageway routes.														
xii) Gradient	Maximum gradient 7% and minimum gradient 0.7%.														
xiii) Minimum radius bend	20m preferred but can be reduced depending on overall layout.														
xiv) Vertical curve	Minimum vertical curve length to be 25m or a minimum “K” value of 6.														
xv) Crossfall	1:40														
xvi) Road widening	<table border="1"> <thead> <tr> <th>radius (m)</th> <th>80</th> <th>60</th> <th>50</th> <th>40</th> <th>30</th> <th>20</th> </tr> </thead> <tbody> <tr> <td>width (m)</td> <td>5.65</td> <td>5.75</td> <td>5.8</td> <td>5.85</td> <td>5.9</td> <td>6.1</td> </tr> </tbody> </table>	radius (m)	80	60	50	40	30	20	width (m)	5.65	5.75	5.8	5.85	5.9	6.1
radius (m)	80	60	50	40	30	20									
width (m)	5.65	5.75	5.8	5.85	5.9	6.1									
xvii) Junctions	<ul style="list-style-type: none"> <li>As a guide, junction radii onto a local distributor road to be 10.5m or 6.0m onto a collecting street. Junction radii onto a local residential street serving up to 300 dwellings to be 6.0m or 4.5m onto a local residential street serving up to 150 dwellings. Vehicle tracking shall be used to confirm suitability of junctions.</li> <li>Minimum length of straight before a main road channel line to be 10m and at a grade not greater than 2.5%.</li> <li>Minimum junction spacing along a road to be 20m for opposite junctions and 40m for adjacent junctions.</li> <li>Crossroads are permitted.</li> <li>Side road junction visibility requirement to be 2.4m x 25m.</li> <li>Left turn into local residential street to have a forward visibility radius of 19.0m for 10.5m junctions, 10.0m forward visibility radius for 6.0m junctions and 9m forward visibility radius for 4.5m junctions.</li> <li>No access will be permitted off the entry radius of a bell mouth.</li> <li>Dwellings should have turning spaces on roads serving more than 150 dwellings.</li> <li>Private drive visibility 2.0m x 25m for a single access and 2.4m x 25m for shared drives.</li> <li>Junction with main road to be between 80 and 100 degrees.</li> </ul>														

### 2.3.4 Connecting Streets

These are the streets that provide the structure for any new residential development and their primary role will be to connect the development to the surrounding highway network and important places.

These streets are designed to serve between 300 and 600 dwellings and provide a transition between the major roads outside the development and the streets within the residential areas. They will act as the primary vehicular access to the development and will form the spine of the permeable network of streets within the residential areas where pedestrian and cyclist movements will come more to the fore. In the design it has been considered that these routes would be used to carry bus routes through the development.

Major developments must allow for 'full size' bus penetration. Bus stops should be determined following consultation with the highway authority and confirmation will be required if bus showcase style bus boarders are required.

The streets should allow access by public transport, cater for higher traffic flows and permit some direct frontage access. The connecting street should assist in reducing vehicle speeds into local residential streets. This should be achieved by providing a traffic calming feature between 40m and 60m from the distributor road.

These streets should be kept as short as practicable.

The use of a connecting street helps to reduce the number of access points on distributor roads.

On streets where more than 300vph are expected facilities for cyclists are required.

<b>Connecting Street</b>	
i) Number of dwellings to serve	Typically between 300 - 600 dwellings and may be varied depending upon the development layout.
ii) Number of access points	One or two onto local distributor road.
iii) Design speed	25 mph but at particular locations, such as schools and shops, a design speed of 20mph will be required.
iv) Carriageway width	6.0m minimum Bus route or with access to frontages = 6.75m On carriageway cycle route = 9.0m.
v) Footway width	2m minimum footway on both sides of carriageway. Should be increased to a 3m minimum footway in areas of denser pedestrian movements (shops, schools, bus stops etc).
vi) Verges	2m minimum, increased to 3m minimum where trees are included.
vii) Length between speed control features	Maximum length is 70m.
viii) Access to properties	Frontage access to dwellings is permitted but there must be turning areas within the private drive off the highway.
ix) Pedestrian crossing facilities	Safe convenient locations for pedestrian crossings will be required on desire lines, by either raising the carriageway to footway level or by the use of dropped kerbs. All crossings to have tactile paving.
x) Provisions for cyclists	Facilities for cyclists will be required either on carriageway advisory routes (allowing 1.5m on each side of the carriageway) or off carriageway routes.
xi) Minimum forward visibility	33m.
xii) Minimum radius bend	40m.
xiii) Gradient	Maximum gradient 7% and Minimum gradient 0.7%.
xiv) Vertical curve	Minimum vertical curve length to be 30m or a minimum "K" value of 10.
xv) Crossfall	1:40 Bends of radius less than 600m shall have adverse camber eliminated to give a uniform crossfall towards the inside of the bend.
xvi) Junctions	<ul style="list-style-type: none"> <li>• Junction radii on to a local distributor road to be 10.5m.</li> <li>• Minimum length of straight before a main road channel line to be 20m and at a grade not greater than 2.5%.</li> <li>• Minimum junction spacing along a road to be 30m for opposite junctions and 60m for adjacent junctions.</li> <li>• Side road junction visibility requirement to be 2.4m x 33m.</li> <li>• Left turn into a connecting street to have a forward visibility radius of 19m for 10.5m junctions and 10m forward visibility radius for 6.0m junctions.</li> </ul>

## 2.4 Non-Residential Access Roads

These types of development will by their very nature be more focused towards vehicular than pedestrian movements. The developments will still require the designer to consider the interaction of all street users, in particular the interaction between HGV's and cyclists and the inclusion of good pedestrian links to all public transport stops.

Access roads serving industrial, commercial and office developments should connect directly to a distributor road and must not be served through residential estates. Non-residential development access roads should be safe free flowing roads for vehicles. Developments greater than 8 hectares should preferably not be served by a single access. Minor industrial estates will always be served by a cul-de-sac. The maximum length of a cul-de-sac is 180m otherwise an emergency access will be required.

Access roads serving sites generating 300 or more HGV turning movements a day are to be provided with an overall carriageway width of 9.5m so as to enable ghost islands and turning lane facilities to be provided.

Footways must be provided on both sides of the carriageway where there is frontage development. Cycle facilities should be provided as be provided where more than 2,000 employee/visitor vehicle movements per day are expected. Opportunities should be sought to provide more direct and convenient pedestrian and cycle access to employment/retail sites by creating footpath and cycle track links along desire lines. Safe convenient locations for pedestrian crossing facilities must be provided and formed with dropped crossings and tactile paving complying with DfT standards. Secure, covered cycle parking must be provided at visible locations close to employee/visitor entrances to premises. For industrial and retails developments, footways abutting the carriageway are required to be constructed as strengthened footways.



Footway and cycling facilities serving developments

Premises must have adequate turning spaces to ensure that vehicles can enter and leave the carriageway in a forward direction. On minor estate roads it is permissible for vehicles servicing premises of less than 5,000 sq.m gross floor area with accesses off turning heads to manoeuvre vehicles within the carriageway turning head.

Junctions and accesses should be designed so as to avoid large vehicles having to cross onto the wrong side of the road whilst turning on major industrial roads and office/retail roads. It has been noted that collisions tend to increase with increasing numbers of junctions and accesses.

Provision shall be made for public transport to serve the development.

For all business premises, any gates to individual sites, gatehouses, security offices and weighbridges should be set back at least 15m from the Highway boundary. Where large numbers of long vehicles can be expected, the distance should be increased to 30m.

Sufficient off-street parking must be provided.

<b>Non-residential Residential Access Roads</b>																												
i) Number of access points	The number of accesses should be kept to a minimum.																											
ii) Design speed	30 mph.																											
iii) Carriageway width	For industrial estates carriageway width to be 7.3m or 9.5m for roads serving sites generating 300 or more HGV movements per day. For office/business and retail developments carriageway width to be 7.3m or 9.5m where cycle lanes are provided, comprising of a 6.5m general carriageway width with a 1.5m advisory cycle lane on each side.																											
iv) Carriageway widening	Road widening shall be provided to avoid a 15m articulated vehicle cutting across the centre line. Road widening shall not be required for developments consisting only of offices. Road widening to be applied in accordance with the following table. <table border="1"> <tr> <td>bend radius (m)</td> <td>150</td> <td>100</td> <td>80</td> <td>55</td> <td>50</td> <td>45</td> <td>40</td> <td>35</td> </tr> <tr> <td>road width (m)</td> <td>7.5</td> <td>7.6</td> <td>7.7</td> <td>7.8</td> <td>7.9</td> <td>8.1</td> <td>8.3</td> <td>8.5</td> </tr> <tr> <td>forward visibility (m)</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>40</td> <td>35</td> <td>30</td> </tr> </table>	bend radius (m)	150	100	80	55	50	45	40	35	road width (m)	7.5	7.6	7.7	7.8	7.9	8.1	8.3	8.5	forward visibility (m)	45	45	45	45	45	40	35	30
bend radius (m)	150	100	80	55	50	45	40	35																				
road width (m)	7.5	7.6	7.7	7.8	7.9	8.1	8.3	8.5																				
forward visibility (m)	45	45	45	45	45	40	35	30																				
v) Footway width	Footways 2m wide on both sides with a crossfall of 1:30.																											
vi) Verges	Verges 2m minimum width but where trees are included, 3m minimum should be provided.																											
vii) Length between speed control features	None unless a specific need is identified.																											
viii) Pedestrian crossing facilities	Safe convenient locations for pedestrian crossings will be required on desire lines, by either raising the carriageway to footway level or by the use of dropped kerbs. All crossings to have tactile paving.																											
ix) Provisions for cyclists	Facilities for cyclists will be required either on carriageway, advisory routes or off carriageway routes where more than 2,000 employee/visitor vehicle movements per day are expected.																											
x) Minimum forward visibility	45m.																											
xi) Minimum radius bend	Minimum radius bend 80m Transition curves may be required where the centre line radius is less than 300m. This will depend on typical vehicles that may use the roads and safety implications.																											
xii) Gradient	Maximum gradient 7% and Minimum gradient 0.7%.																											
xiii) Vertical curve	Minimum vertical curve length to be 30m or a minimum "K" value of 10.																											
xiv) Crossfall	Crossfall 1:40 Bends of radius less than 600m shall have adverse camber eliminated to give uniform crossfall towards the inside of the bend.																											
xv) Junctions	<ul style="list-style-type: none"> <li>• Junction radii for industrial developments to be 15m.</li> <li>• Junction radii for office only developments to be 12m.</li> <li>• Minimum junction spacing along a road to be 40m for opposite junctions and 80m for adjacent junctions to premises that are greater than 15,000 sq.m. gross floor area.</li> <li>• Minimum junction spacing along a road to be 20m for opposite junctions and 40m for adjacent junctions to premises less than 15,000 sq.m. gross floor area.</li> <li>• Junction visibility requirement from side roads on to non-residential access roads to be 9m x 45m.</li> <li>• Junction visibility requirement from private accesses on to non-residential access roads to be 4.5m x 45m.</li> <li>• At junctions, the gradient of the minor road should not exceed 1:30 for the first 20m from the major road channel line.</li> </ul>																											

## **2.5 Local Distributor Roads**

These roads are designed to distribute traffic within districts and link primary and secondary distributors with residential roads. They should be safe free flowing roads for vehicles and must not be a cul-de-sac. Roads should be designed such that it can be anticipated the 85 percentile speeds are not higher than the speed limit.

Right turning lanes should be provided for new developments generating in excess of 300vph during the peak periods.

To meet the adoption standards of the highway authority a local distributor road should be designed to comply with the following requirements:

<b>Local Distributor</b>																												
i) Number of Dwellings to serve	Typically over 600 dwellings and can serve mixed developments.																											
ii) Number of access points	Minimum of two.																											
iii) Design Speed	Generally 30 mph but at particular locations such as schools a design speed of 20mph will be required.																											
iv) Carriageway width	Carriageway width to be 7.3m or 9m where cycle lanes are provided, comprising of a 6.0m general carriageway width with a 1.5m advisory cycle lane on each side.																											
v) Footway width	2m minimum footway on both sides of carriageway. Should be increased to 3m minimum in areas of denser pedestrian movements (shops, schools, etc).																											
vi) Verges	2m minimum, increased to 3m minimum where trees are included.																											
vii) Length between speed control features	None unless a specific need is identified.																											
viii) Access to properties	Acceptable if it can be demonstrated that these will not cause an issue on the highway. Shared drives should have turning areas and have their spacing controlled. Measures may be needed to restrict cars from parking on footways and verges.																											
ix) Pedestrian crossing facilities	Safe convenient locations for pedestrian crossings will be required on desire lines, by either raising the carriageway to footway level or by the use of dropped kerbs. All crossings to have tactile paving.																											
x) Provisions for Cyclists	Facilities for cyclists will be required either on carriageway advisory routes (allowing 1.5m on each side of the carriageway) or off carriageway routes.																											
xi) Minimum forward visibility	45m.																											
xii) Minimum radius bend	80m Transition curves required where the centre line radius is less than 300m and the speed limit is greater than 40 mph.																											
xiii) Carriageway Widening	Road widening shall be provided to avoid a 15m articulated vehicle cutting across the centre line. Road widening to be applied in accordance with the following table  <table border="1"> <tbody> <tr> <td>bend radius (m)</td> <td>150</td> <td>100</td> <td>80</td> <td>55</td> <td>50</td> <td>45</td> <td>40</td> <td>35</td> </tr> <tr> <td>road width (m)</td> <td>7.5</td> <td>7.6</td> <td>7.7</td> <td>7.8</td> <td>7.9</td> <td>8.1</td> <td>8.3</td> <td>8.5</td> </tr> <tr> <td>forward visibility (m)</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>45</td> <td>40</td> <td>35</td> <td>30</td> </tr> </tbody> </table>	bend radius (m)	150	100	80	55	50	45	40	35	road width (m)	7.5	7.6	7.7	7.8	7.9	8.1	8.3	8.5	forward visibility (m)	45	45	45	45	45	40	35	30
bend radius (m)	150	100	80	55	50	45	40	35																				
road width (m)	7.5	7.6	7.7	7.8	7.9	8.1	8.3	8.5																				
forward visibility (m)	45	45	45	45	45	40	35	30																				
xiv) Gradient	Maximum gradient 7% and Minimum gradient 0.7%.																											
xv) Vertical curve	Minimum vertical curve length to be 40m or a minimum "K" value of 10.																											
xvi) Crossfall	1:40 Bends of radius less than 600m shall have adverse camber eliminated to give a uniform crossfall towards the inside of the bend.																											
xvii) Junctions	<ul style="list-style-type: none"> <li>• Junction radius from local distributor onto major road 12m.</li> <li>• Side road junction radius 10.5m.</li> <li>• Minimum junction spacing along road to be 40m for opposite junctions and 80m for adjacent junctions.</li> <li>• Side road junction visibility requirement to be 9.0m x 45m for junctions serving non-residential or mixed developments and 4.5m x 45m for junction serving residential developments.</li> <li>• Frontage access restricted to shared drives at half the above junction spacing with turning areas provided within the drive.</li> <li>• Left turn into a local distributor to have a forward visibility radius of 20m.</li> </ul>																											

## **2.6 Footways and Footpaths**

### **2.6.1 General requirements**

Footways are provided for the use by pedestrians and generally abut the carriageway or are separated from the carriageway by a verge. Footpaths are provided for the use by pedestrians but can take an independent route and not run parallel or alongside a carriageway. The design standards for footways and footpaths are identical.

Footways shall be provided along all distributor roads. They are required along all roads where there is a developed frontage to provide direct access to all dwellings and premises.

Major footpath routes linking large developed areas to local facilities should not pass through a shared surface carriageway.

All footpaths must be overlooked and preferably have some frontage access. The ends of footpaths should be intervisible without any concealed areas to provide a feeling of security to any pedestrian.

Footways will normally be required to follow the line of forward visibility sight lines along roads in order to avoid possible obstructions being placed within the vision area.

Footways should follow the back of visibility lines at road junctions to encourage pedestrians away from the widest crossing point. Footways will need to be widened if this results in narrow areas of grass verges.

### **2.6.2 Widths**

Minimum footway (and footpath) widths should normally be 2m on either side of the carriageway although in certain situations one footway may be acceptable if there is no likelihood of pedestrians utilising a second footway. In such a case, sufficient land may need to be dedicated as adopted verge if there is a reasonable likelihood of a footway being needed at any time in the future. The minimum width should increase to 3m in areas of identifiably higher levels of pedestrian activity, such as adjacent to schools, shops, bus stops, etc. Greater widths may be required at specific points (e.g. around bus shelters)

### **2.6.3 Gradients and Crossfalls**

The desirable maximum longitudinal section gradient of adoptable footways or footpaths is 1 in 20 (5%). If this is not achievable then the specific circumstances should be discussed with the Council.

Where possible it is preferable to have a crossfall between 1 and 3 per cent. This is a manageable crossfall for most footpath users and in particular wheel chair users and also provides good drainage. Where possible, footways shall drain towards the carriageway channel. This will avoid the need to install additional drainage in the footway that may become a maintenance issue.

### **2.6.4 Vertical Clearance**

A general vertical clearance of 2.1m should be provided on footways and 2.4m on cycleways.

### 2.6.5 Steps

Where flights of steps are included in a footway or footpath, provision should be made for a complementary ramped route (see section 2.6.7.2 for the design of ramps). If a ramp cannot be accommodated within the space available, then the design of the steps should take account of a person assisting a disabled person in a wheelchair.

Steps shall have a constant rise of between 100mm minimum and 150mm maximum with a preferred width of 330mm wide (minimum 280mm), should be non-slip and marked with a non-slip edging at the head of each flight. The dimensions must be such that the product of tread plus twice the riser is between 550mm and 600mm. Nosings should be splayed off rounded to a 6mm radius. There should be a minimum of 3 steps in a flight and a maximum of 12, with resting places between successive flights. Resting places should be at least 1200mm long, preferably 1800mm.



Steps within an embankment

Handrails must be provided, they should be smooth and continuous where there is more than one flight of steps and should be terminated no less than 300mm past the end of the flight and “closed” to the stair wall. Handrails should be set at a height of between 900- 1000mm above the tread of each step and should be round in section, between 40-50mm in a diameter and with a minimum gap to the wall of 50mm, 60mm preferred. Handrails should be provided on sides, a minimum of 1200mm apart and a maximum of 1800mm apart.

Non slip hazard paving should be provided at the top and bottom of steps.

### 2.6.6 Crossing Points

Dropped kerbs should be provided at all junctions and particular pedestrian desire lines, including connections to external footpaths.

Guidance on the use of tactile paving or other suitable and approved materials is given in Section 2.6.7.3 and at all times the use of simple, appropriate, well-detailed, high quality materials should be a key objective.

In some locations pedestrian guard rails are required for safety reasons to protect pedestrians and guide them to the appropriate crossing point, although wherever possible unnecessary “street clutter” should be avoided.

Where a pedestrian refuge is provided, the dropped kerbs should be aligned with the refuge. A minimum refuge width of 1.55 metres should be provided.

Where dropped kerbs are provided across the minor route within a major/minor junction they can lie within the corner of radius for junctions with radii of 4m or 6m. However for junctions with radii of 10 or 15 metres, they should be positioned further from the major route to reduce crossing distances. For low levels of development, dropped crossings are preferable to the provision of kerb radii to give priority to pedestrians.

Pedestrian crossing points can be delineated by raised plateaux, but they should not be designed to give pedestrians a false sense of security

## 2.6.7 Designing for Disabled People

### 2.6.7.1 Principles

The design guide considers the needs of disabled people within all elements of the design guidance, so that their requirements are incorporated from the start of the process, rather than added as an afterthought.

Potential obstacles to be aware of include steps, steep gradients, narrow passages or footways, badly located street furniture, excessively smooth surfaces and poor attention to construction details. Changes of gradients at bends (especially at side street crossings) need to be carefully designed to prevent tipping over of wheelchairs.

### 2.6.7.2 Ramps

A pedestrian ramp is generally defined as a pathway with a slope of more than 1 in 20 (5%). It provides an alternative access to stairs for wheelchair users. The preferred gradient is 1 in 20 (5%) for a length no greater than 10m. The maximum gradient is 1 in 12 (8.3%) for a length no greater than 2m. Resting places are required if more than one flight is needed. These should be level and the full width of the ramp with a preferred length of 2m. Stepped ramps should be avoided.

Ramps should preferably be 2m wide to permit wheelchair to pass and not less than 1.2m over short lengths. A 100mm high upstand should be provided to protect the sides of the ramp and handrails are required at 900-1000mm above the surface.



Ramps into individual buildings must not be located within the adopted footway.

If there are problems in achieving the above requirements, the specific circumstances should be discussed with the Council.

### 2.6.7.3 Tactile Paving

Tactile paving to assist blind or partially sighted people should be utilised in accordance with the DETR guidance on the Use of Tactile Paving Surfaces. Suitable alternatives may be considered in particular circumstances.

## 2.7 Cycling

### 2.7.1 Routes for cyclists



Cycle route signage

In Coventry, the preferred form of provision for cyclists is to create conditions where cyclists may safely and conveniently use the carriageway. This is because in an urban area there is rarely the opportunity to provide a high quality off-carriageway facility where cyclists do not face hazards or lose priority at side roads and where provision for pedestrians is not also compromised as a result.

On roads with high speeds and traffic flows: district or primary distributors, then it usually desirable to provide an off-carriageway route for cyclists, especially for less experienced / confident cyclists.

One of the most controversial types of facility for pedestrians and cyclists is the shared use of footways and footpaths i.e. with no segregation between the two sets of users. User surveys show that shared-use routes are generally disliked by both pedestrians and cyclists but can be made more acceptable to most people through good design which minimises conflict. However, some of the most vulnerable groups of pedestrians, including older and disabled people have far lower levels of toleration, and for some people shared-use routes can have the effect of exclusion.

Therefore a hierarchy of measures should be strictly applied to determine the right design solution.

### 2.7.2 Hierarchy of measures

Consider first



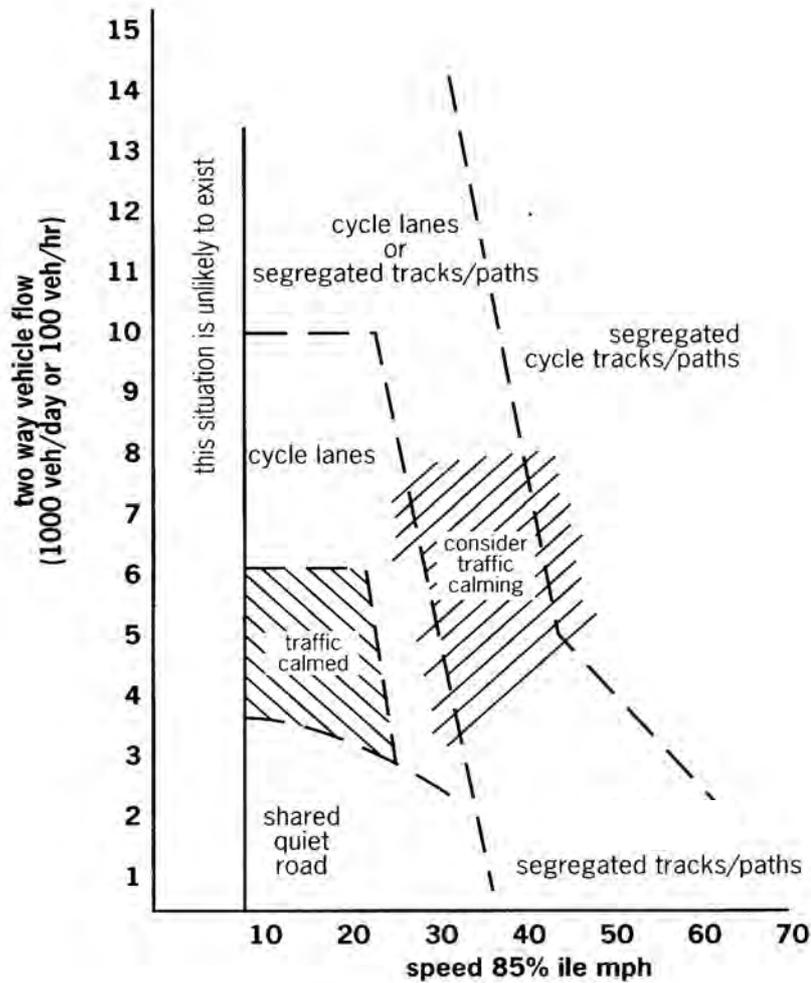
1. Traffic volume reduction
2. Traffic speed reduction
3. Junction treatment, hazard site treatment, traffic management
4. Re-allocation of carriageway space
5. Cycle tracks away from roads
6. Conversion of footways / footpaths to shared-use for pedestrians / cyclists

Consider last

### 2.7.3 Consideration of alternative measures

Having reviewed the hierarchy of measures and in consultation with relevant stakeholders, a view may be put forward to implement traffic calming or a cycle lane for example. The suitability of these measures is related to the traffic conditions on a route.

The nomograph below gives guidance on the traffic speeds and flows that are appropriate for each measure:



© London Cycle Network Steering Group

## 2.7.4 Design Standards

### 2.7.4.1 Principles

Cycle routes in developments should meet the same basic criteria as pedestrian routes; namely convenience, safety, attractiveness, and directness.

Cycle linkages between key areas within the development and around it should be designed into a scheme from the start, with particular attention to routes to schools, local facilities and adjacent neighbourhoods.

New infrastructure for cyclists should link to existing and intended routes that form part of the existing and proposed Coventry Strategic Cycling Network.

Evaluating how cyclists are best provided for in a scheme should be addressed within the Design and Access Statement, and is considered in detail in Local Transport Note (LTN) 1/04, and on the Cycling England website ([www.cyclingengland.org.uk](http://www.cyclingengland.org.uk))

### 2.7.4.2 Widths

Whilst cycle lanes on residential streets are not normally appropriate, where they are considered beneficial, they should be 1.5m wide (down to 1.2m as a minimum in exceptional circumstances)

While good quality of carriageway routes may be favoured, shared unsegregated use of a path alongside the carriageway by the cyclists and pedestrians is a last choice option. Where this is proposed the minimum width is 3m. If the pedestrian and cycle routes are parallel but segregated by level difference or by a tactile dividing line, different widths apply. Principles and appropriate widths for shared and adjacent facilities for pedestrians and cyclists are considered in detail in LTN 2/04. "Adjacent and Shared Use Facilities for Pedestrians and Cyclists".

### 2.7.4.3 Cycle Lanes

The minimum widths for different types of un-segregated and segregated shared-use paths are given below. This will be essential where higher flows are expected. Desirable minimum widths are also provided; again these should be increased where high flows of pedestrians or cyclists are planned for. Where significant cycle flows are expected the width for cycles should be 3m.

It should also be noted that these are effective widths. Where a path is bounded by a wall, hedge or railing an additional 0.5m width will be required for each bounded side. Similarly for paths adjacent to the carriageway a buffer zone will be required. Normally this should be 1m but may be a minimum of 0.5m where space is limited.



Cycle track with block paving buffer strip

### Minimum Widths

Type of Segregation	Footway Width (m)	Cycletrack Width (m)	Segregation (m)	Total Width Required (m)
verge	2.0	2.0	0.5*	4.5
level change	2.0	2.0		4.0
railing / barrier	2.0	2.0	0.5	4.5
raised white line	2.0	2.0		4.0
un-segregated (two-way flow)				3.0

**Note:**

Add 0.5m to each side that abuts a wall, railing or other barrier

Add 0.5m to widths as a buffer zone when track runs parallel to the carriageway

\* Where the minimum 0.5m width segregation verge is used, the type of path construction should avoid use of any raised edgings so that conventional grass mowing can still be carried out

#### **2.7.4.4 Access Controls**

Where off-road cycle tracks are installed away from the carriageway, access measures such as “K” frames or bollards should be used to prevent access by cars or motorbikes. All access barriers must comply with Disability Discrimination Act (DDA) regulations. These measures should be installed if abuse is considered likely.

If the pedestrian and cycle routes are parallel but segregated by level difference, the preferred widths are 2m for each route. See LTN 2/04.

#### **2.7.4.5 Visibility**

Where a cycle track joins a carriageway, an appropriate x-distance must be provided with a normal minimum of 2.5m. Where a crossing or a junction with a carriageway is approached by means of a “jug handle” arrangement the x-distance can be reduced to 1.0m, or if the cyclist is physically slowed to a stop immediately before the crossing or junction by means of a barrier. Further details are in DMRB 6/3 Part 5.

#### **2.7.4.6 Further Guidance**

For further guidance on the design of cycle routes, please read:

- Cycle Friendly Infrastructure (IHT, CTC, DoT 1996);
- The National Cycle Network Guidelines and Practical Details Issue 2 Sustrans 1997;
- Local Transport Note 1/04 Policy, Planning and Design for Walking and Cycling;
- Local Transport Note 2/04 Adjacent and Shared Used Facilities for Pedestrians and Cyclists; and
- Local Transport Note 2/08 Cycle Infrastructure Design.

#### **2.7.4.7 Cycle Parking**

For apartments, communal cycle facilities should be provided which are secure, conveniently located, and covered. They should enjoy good natural observation, be lit, and should not obstruct pedestrian or cycle routes.

Commercial and industrial developments should be provided with secure, conveniently located, and covered long stay cycle parking facilities as specified in the UDP. This can take the form of lockers or lockable compounds. They should be located where they are easily observed by the development’s occupants, be lit, and should not obstruct pedestrian or cycle routes, or pedestrian desire lines. Short stay provision should also be provided for visitors of the site in the form of Sheffield Stands or similar, situated in full view as close as practical to the main entrance of the building.

## **2.8 Public Transport**

### **2.8.1 Road Width for Buses**

The minimum carriageway width for conventional two-way operation on distributor roads and connecting streets should be 6.75m. Where bus services will use local residential streets, a minimum carriageway width of 6.0m will be required. Lane width should not be reduced to less than 2.8m at any point. Where there is likely to be high levels of cycling in bus lanes, a width of 4.5m is preferred for shared lanes and the minimum width should be 4.0m. Widths below 4.0m are not recommended for bus lanes physically bounded on both sides, unless they are over very short distances.

As a general principle, parked cars should be discouraged from parking on the carriageway on bus routes. Where a development layout suggests on street parking is likely, additional carriageway width will be required or parking bays provided. "Bus Only" routes can not have frontage access.

### **2.8.2 Bus Stop Location**

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 positioning.

Bus stops should be located so that the maximum walking distance from any dwelling is 400m. This should be reduced to 250m for areas with a significant proportion of elderly people. In shopping, commercial and industrial developments the maximum walking distance should be 250m.

Planning applications for new residential developments with at least 50 dwellings and commercial/industrial developments with 100 new employees should be supported with a plan showing the nearest existing bus stop locations and any new proposed bus stop locations.

Wherever possible, bus stops should not be located in junction visibility splays or opposite junctions. For safety reasons, bus stops on opposite sides of the road should be staggered by about 45m, preferably so that the buses stop "tail to tail" and move away from each other. Where it is not possible to reasonably achieve the staggered layout bus stops should be placed directly opposite each other. Where lay-bys are provided the stagger 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 kerbed crossings should be provided in appropriate locations.

### **2.8.3 Bus Lay-by**

Lay-bys are not normally required unless there is over-riding safety or operational considerations. Special considerations include use of the stop as a bus terminus, bus stop location on the outside of a bend and an expected above average stop time (i.e. school site, local centre etc).

When required bus lay-bys should be designed to enable the appropriate type of buses to dock correctly with the bus boarding point. Bus lay-bys should be located where the bus driver has a good rear view of approaching traffic. A contrasting surface colour and texture, e.g. by use of paviors, to the rest of the carriageway is recommended.

### 2.8.4 Footway Width at Bus Stops

The normal footway width is 2.0m but consideration should be given to an increased minimum width of 3.0m to facilitate pedestrian movement at bus stopping points where shelters and/or seats are to be sited and numbers of passengers are expected to congregate and wait for buses. There should be a minimum clear width of 1.2m past any shelter but where the area is likely to have a large amount of pedestrian movements, a minimum clear width of 2.0m is required.



Footway widening to accommodate a bus shelter

### 2.8.5 Traffic Calming on Bus Routes

Proposals for the installation of traffic calming features on proposed or existing bus routes must be discussed with service providers. For bus routes, generally only horizontal features should be used for traffic calming.

On residential streets where speed control is appropriate, consideration of speed cushions or speed tables should be made as an alternative to conventional round top road humps. In general, vertical measures such as road humps should be avoided where possible.

Traffic calming measures on bus routes should not be located within 12m of a bus stop.

### 2.8.6 Bus Showcase Routes



Bus gate on a Showcase route

On certain main bus routes in the city, a partnership involving the local authority, the passenger transport authority and local bus operators exists to achieve quality improvements which include the design of improved bus stop facilities. Where appropriate, Bus Showcase stops should be designed to a specification in agreement with the highway authority and the passenger transport authority. Developers will need to liaise closely with the passenger transport authority regarding the selection of the appropriate bus shelter and its supply and installation. Signing and passenger information at the boarding point will also need to be agreed.

### 2.8.7 Maintaining Services During Development

During the construction period adequate arrangements must be made to ensure the continuation of existing bus services. If a diversion is necessary, the needs of boarding and alighting passengers should be met at the nearest point of closure at the developer's expense.

Large developments should be phased in such a way so that bus services can be introduced at an early stage. This may include temporary turning facilities to ensure the safe running of the service.

Developers may have to subsidize early provision of a bus service so that it is available when residents/workers start to move in so that the public transport habit can be established at the outset.

### 2.8.10 Bus Shelter and Flags

Bus shelters, stops and flags are significant features in the street scene. High quality bus shelters at such stops significantly improve the quality of both the streetscape and the total journey. Location is determined by policy and operational considerations based on passenger convenience, pedestrian and vehicular safety, and the number and frequency of services. Bus shelters, stops and flags are permitted development under part 17 of the General Permitted Development Order 1995. The design of bus stops should comply with the following guidelines;

- shelters and flags should have a minimum clear passageway around them of 2m where possible;
- shelters should be able to accommodate the numbers of passengers likely to wait for services as well as provide travel information;
- it is important to consider impact on adjoining buildings and spaces (e.g. residential units), and visual setting including listed buildings and conservation areas, and the relationship to street trees;
- standard blue shelters are used on PrimeLines and Showcase routes;
- seating, information and litter bins should be provided; and
- bus stop poles should be installed only where shelters are not provided.



Showcase bus stop

## 2.9 Speed Restraint (Traffic Calming)

### 2.9.1 Need for Speed Restraint

Speed restraint is an important feature of modern residential areas to ensure that design speeds for each type of street are not exceeded. It increases the safety of motorists, pedestrians and cyclists by putting them on a more equal footing and minimising the potential for collisions. It is widely known that collisions occurring at slower speeds result in less serious injuries so speed restraint measures are highly recommended where pedestrians and vehicles may come into contact with each other. Such features must be carefully selected so as to reduce any negative aspects including increased noise.

Through residential areas, drivers should be encouraged to reduce their speed progressively as they move further from a distributor road. An abrupt speed reduction measure is not acceptable. Instead, a series of measures should gradually reduce the speed of the vehicles. It is essential that it is not legislation only that is relied upon in order to slow the traffic. This should be done through the design of the road and adjacent developments, making it clear to drivers that they are in a reduced speed zone. Any measures implemented should be located at regular intervals in order that drivers are not given the chance to speed up in between and should be incorporated from the outset and not introduced as an “after thought”.

For the purpose of this design guide, “residential areas” are defined as those served by connecting streets, local residential streets and shared surface streets. The recommendations therefore do not necessarily apply to higher category roads. However, suitable features may need to be investigated at the interface with the higher category road.

Speed restraint measures may include the use of 20mph Zones.

### 2.9.2 Purpose of Speed Restraint Features

Speed restraint should not be on a scale that residents suffer unreasonable delay in traveling from their properties to main roads. It should be used to reduce vehicle speeds progressively and to encourage this reduced speed through developments.

The design of the street scene should both influence and encourage appropriate speeds in a residential area. A driver’s perception of a safe speed can be influenced by building form and spacing as well as the use of contrasting materials and landscaping.

Roads within speed restraint areas must not form convenient through routes which may cause a greater disturbance to residents.

The design of speed restraint measures must include consultation with Centro (the West Midlands Passenger Transport Executive), public transport operators, emergency services, cyclist groups and disability groups.



Road markings to encourage speed restraints

### 2.9.3 Speed Restraint Measures

Vehicle speeds can be reduced using a number of methods, the majority of which involve changes in either the vertical or horizontal alignment of the road. Each method provides both a physical and visual indication that the driver is entering a zone with a reduced design speed.

Vertical features are one of the most effective forms of speed reduction but selection of such features will depend on individual circumstances. Their use should be kept to a minimum and should be used as a necessary support to horizontal features

Speed restraint features must comply with Department for Transport standards and guidelines.

Although not exhaustive, typical examples of speed restraint measures which may be considered relevant are indicated below. However, it should be re-iterated that forward visibility should not be so great as to encourage high speeds.

#### 2.9.3.1 Narrowings

A narrowing of the road width can be used to reduce speeds on residential roads. A narrowing can either be a build out (one side only) or a pinch point (both sides).

Cyclists will benefit from lower speeds but can be put in danger from overtaking vehicles if there is insufficient room at the narrowing. Narrowings of a width between 3.0 to 4.0m are not recommended unless a cycle by-pass is provided.

On connecting streets and local residential streets, the width should be reduced to 3.0m and can incorporate a ramp to encourage further slowing. The use of ramps on bus routes or roads with a large flow of heavy goods vehicles however is discouraged for comfort and noise reasons. Cycle bypasses (width 1.0 - 1.5m) on each side of the carriageway are preferred as they prevent cyclists being squeezed and mean cyclists do not have to deviate from their desired course. Where cycle bypasses are not possible, the road should be reduced to 3.0m or should be 4.0m or greater. A formal vehicle priority system should be incorporated in conjunction with the narrowing. Where a narrowing is 4.0m or greater consideration should be given to the use of a speed cushion or raised section within the narrowing.

On local residential streets, the width should be reduced to 3.0m, if wider (ie greater than 4.0m), cycle bypasses should be provided. No vehicle priority system is required.

Both types of road narrowing will make drivers slow down for oncoming traffic. It is necessary however, that the flows in each direction are similar to prevent a continuing stream of traffic from either direction and abuse of priorities.

In the vicinity of the build-out no direct access to dwellings is permitted onto the road until the normal road width is resumed.



**Give way narrowing as a speed restraint measure**

Narrowing of the carriageway should be undertaken near the beginning of the roads where there are larger flows of traffic. However, the vehicle priority system needs to ensure that queuing into adjacent junctions does not occur. Beyond half way along the road, alternative features should be incorporated.

See 'Typical Layouts for Road Narrowings' in Part 6.

### 2.9.3.2 Chicanes

Their effectiveness depends on the spacing of the build-outs and the path angle through the chicane (the angle through which the traffic lane is displaced. A recommended path angle of 15° or greater is likely to reduce speeds to 20mph or less. If the build - outs are too close together, larger vehicles have difficulty passing, but if they are too far apart, their effectiveness is reduced as vehicles are able to take a racing line through the middle. (see LTN 1/07 published by Department for Transport)  
Chicanes are not to be used on roads with high traffic flows.

No direct access to dwellings is permitted onto the road until the normal road width is resumed.

The design of the chicane should take into account the safe passage of cyclists. Cycle bypasses should be provided where it can prevent cyclists from having to deviate from their desired course, and reduce the risk of cyclists being squeezed

### 2.9.3.3 Central Refuge (both pedestrian and traffic)

Although central refuges can help to maintain reduced speeds, they primarily prevent overtaking manoeuvres and narrow the road width. Pedestrian refuges – provide safe haven for pedestrians crossing the road, making it safer as they only have to cross one stream of traffic at a time.

Central refuges should not be used where the road is narrow so are best located on collector roads or roads of a higher category. They should however, not be located near to any accesses onto the road and should not restrict turning movements in any way.

Most central refuges are raised and kerbed with a hatched area of carriageway leading to either side. If they are to be used as a pedestrian crossing point, two smaller islands separated by an at-grade gap should be provided. Appropriate tactile paving should be incorporated at the refuges. The dropped kerb should be painted with white thermoplastic paint.

A central refuge to help a cyclist to cross the road should be a minimum of 2.0m wide.

See 'Typical Layout for Central Refuges' in Part 6.

### 2.9.3.4 Gateways

A gateway at the entrance to a reduced speed zone gives a visual indication to drivers to slow down. They should not be sited so that drivers encounter them suddenly.

A gateway can be achieved in a number of ways. The most common methods use pinch points at buildings, walls, pillars or build-outs of the kerb line. Also effective is a variation in road surface colour and/or texture such as a transition strip consisting of a series of concrete blocks laid flush with the road surface. Other materials that could be used are granite setts or coloured surfacing. Where a change of texture or colour is used the feature should be at least 5m long. If a ramp is to be incorporated, its height should not be greater than 25mm and any vertical faces should not exceed 6mm. Suitable signing and road markings are always required.

If a physical structure is incorporated in the gateway careful consideration needs to be given to the effect if impacted by a vehicle.

As the effect of gateways decreases over time, it is not sufficient for one to be used as a traffic calming feature alone. It must be followed by other measures to maintain the slower speed of vehicles.

### 2.9.3.5 Speed Control Bends

The inclusion of speed control bends on access roads is effective in reducing the speed of vehicles along roads and provides opportunity for design variety. They should only be used on access roads where speeds have already been reduced.

Speed control bends must be clearly visible as being different from a normal bend. There should be a vertical feature or building behind the bend highlighting the bend to approaching drivers.

Speed control bends should have a deflection of between 80° and 100°. The full forward visibility for the appropriate design speed should still be provided.



**Speed control bend with contrasting paving  
and override area**

See 'Speed Control Bend Detail' in Part 6.

It is necessary to incorporate a mountable over-run to permit the overriding by service vehicles. It must be demonstrated that a designated vehicle (eg fire appliance and/or refuse vehicle) can utilize the street. There should be a difference in level and preferably contrasting colour between the mountable over-run area and the adjacent footway in order to discourage over-running of the footway by vehicles.

Along access roads, speed control bends may be constructed in block paving to add to the street scene and to reinforce the traffic calming feature.

### 2.9.3.6 Speed Control Islands

Any traffic island is effective at reducing the speed of vehicles but on an otherwise straight section of road, a "false island" can be used. This does not incorporate a junction but merely provides some lateral deflection in order to slow the traffic.

This form of speed reduction measure may only be used on minor access roads.

The central island is non-mountable by light vehicles and provides a displacement of 2m while the mountable shoulders allow for the passage of service vehicles. There should be a clearly defined kerb up-stand between the mountable over-run areas and the adjacent footway to deter over-running by vehicles.

The maximum deflection for a speed control island is 10°.

Accesses to premises are not permissible at speed control islands.

### 2.9.3.7 Road Humps

Road humps are widely considered as the most effective way of reducing traffic speeds but are not encouraged if horizontal measures can be implemented. Round topped humps, which are more comfortable for cyclists to pass over, should be considered in the first instance.

For 20mph zones road humps should be 75mm high and at spacing not greater than 60m along the road. The first hump in a series should be within 40m of the entrance to the zone

The “on-off” slopes should have a gradient of no more than 1/15 and for round topped humps the longitudinal length should be 3.7m.

Laterally, the speed humps should be tapered at the sides with a gap of 200-300mm to the kerb line to allow for drainage. This gap may be sufficient to allow cyclists to bypass the hump, and should be provided where appropriate. Humps can stretch the full width of the road with drains to prevent water collection behind the hump.

Road humps can be constructed with either bituminous material (preferable), pavements, pre-cast units or of molded rubber.



Road hump with contrasting surfacing

Road humps will not normally be permitted on roads used by public transport vehicles and on major routes used by emergency vehicles and other measures must be considered.

Relevant signing should be provided which complies with the Traffic Signs regulations and General Directions 2002.

See ‘Typical Layout for Road Hump and Sign Details’ in Part 6.

### 2.9.3.8 Speed Cushions

Speed cushions have the same effect as road humps. They slow the traffic and are mainly used on higher category roads with bus routes and large HGV flows. They are designed so the wheels of larger vehicles pass either side of the cushions causing minimal disturbance to any passengers, while cars and smaller vehicles must slow to go over the main body of the cushion.

They are usually constructed in pairs as illustrated below but three cushions are acceptable on wider roads. They can be, moulded rubber cushions, pre cast units or bituminous material (preferable).

The distance between cushions and between cushions and kerbs needs consideration to avoid cars swerving around the cushions which can cause problems with oncoming traffic.

Cycle bypasses are provided at speed cushions by a minimum gap of 0.75m between the base of the cushion and the kerb. Speed cushions therefore inconvenience cyclists less than other traffic calming measures.

Relevant signing should be provided which complies with the Traffic Signs Regulations and General Directions 2002.

Refer to ‘Speed Cushions’ detail in Part 6.

### 2.9.3.9 Speed Tables (Plateau) or Junction Speed tables

These are extended road humps with a large plateau set at 75mm above the road surface. They seem more acceptable to drivers than standard humps and can be effective in reducing speeds.

Along a straight section of road the speed table should measure a maximum of 7m from one end of the plateau to the other.



Raised junction table

The preferred material for these features is concrete blocks set out in a herring bone pattern, although an alternative option can be considered.

Table junctions are used where the potential for traffic conflict is the greatest and accidents are common. Table junctions should extend into the adjoining side street by 5m both for the benefit of pedestrians crossing and to provide a flat surface for cars to wait at the Give Way line and to reduce the hazard for turning two-wheeled vehicles. The footway width adjacent to the table should be a minimum of 2.4m and if necessary bollards installed to protect pedestrians and prevent parking on the footway.

The recommended distance between successive tables is between 40m and 100m and there should be not more than 40m to the nearest bend or the end of a cul-de-sac. Within 20mph zones features should be no further apart than 60m.

It is important that there is a distinction between the raised plateau and the footway in order to safeguard visually impaired and partially sighted people.

To ensure cyclists comfort, the edges of ramps up to speed tables must be carefully constructed to provide a flush transition.

Refer to 'Ramp to Raised Table' detail in Part 6.



Raised junction table

### 2.9.3.10 Ramps

Ramps are used at entrances to mews style developments and shared surfaces. They are intended to reduce the speed of vehicles to as low as 10mph by acting as a visual and physical boundary, and also make drivers aware that they are entering an area which is designed to cater for the needs of pedestrians more than the needs of vehicles.

The top of the ramp is typically set 100mm above the surrounding road surface and can be reached in one stage, rising 100mm in a distance of 1200, or in two stages separated by a plateau, with each ramp rising 50mm in 600mm.

To ensure cyclist safety and comfort the edges of the ramps should be flush with the road surface.

### 2.9.3.11 Complementary Measures

The immediate surroundings of a street can also discourage high speeds and should be used in conjunction with other measures as described previously.

The layout of buildings along a street can clearly indicate a change in direction by forming an end-stop, or can be used to narrow the road at a pinch point. Both of these examples urge drivers to take extra care and reduce their speed.

Bollards can be used to highlight the presence of a speed reducing measure such as a road narrowing or a chicane. Where a mountable shoulder is to be incorporated, bollards should also be used to separate this from the adjoining footway and prevent over running by vehicles.

The careful location of suitable varieties of tree along the street emphasizes the presence of speed reducing measures such as bends, and are considered both aesthetically and environmentally acceptable.

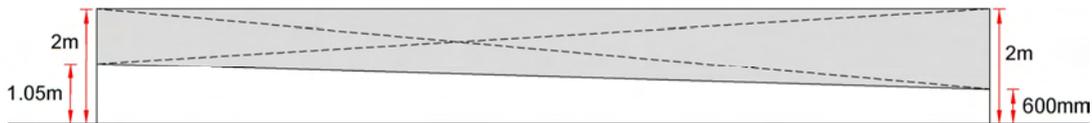
## 2.10 Visibility

Visibility splays are required for the safety of all users of the highway. The extent of visibility required is dependant upon the design speed. Clear visibility is necessary for drivers to be able to see a potential hazard in time to take appropriate action and be able to stop in time.

In order to maintain clearance within vision splays, they will be adopted as part of the public highway. Where visibility splays cross soft landscaped areas they should be delineated.

The maximum height of plants within visibility splays shall not exceed 300mm above ground level or a top vertical sightline of 600mm. All planting within visibility splays requires approval.

### 2.10.1 Vertical visibility envelope



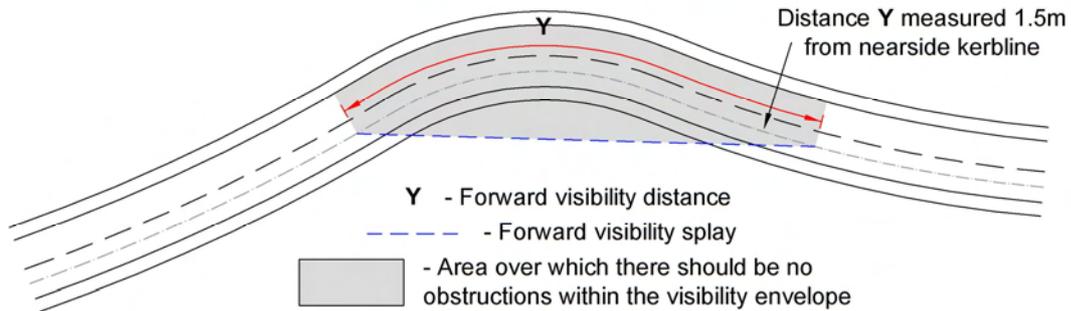
The vertical visibility envelope should be measured from a driver's eye height between 1.05m and 2m to an object height between 2m and 600mm.

For pedestrian safety, a clear vision splay of 600mm above the ground is required in order for drivers to be able to see small children.

There should be no obstructions within the vertical visibility envelope.

Signposts and lighting columns are permitted within visibility splays. Signs should be mounted so that the bottom edge of the sign is outside the vertical visibility envelope.

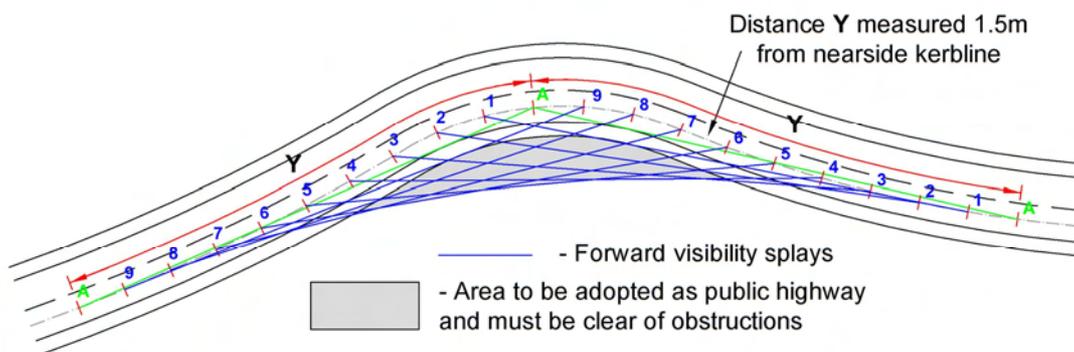
### 2.10.2 Forward visibility



The above diagram demonstrates the method for constructing a single forward visibility splay. The forward visibility distance, Y, is determined by the category and design speed of the road. The minimum forward visibility values set out in the table below should be used:

Road category	Design speed	Minimum forward visibility (Y)
<i>Local distributor road</i>	<i>30mph</i>	<i>45m</i>
<i>Connecting street</i>	<i>25mph</i>	<i>33m</i>
<i>Local residential street</i>	<i>20mph</i>	<i>25m</i>
<i>Shared use street</i>	<i>15mph</i>	<i>20m</i>
<i>Non-residential access road</i>	<i>30mph</i>	<i>45m</i>

The method for constructing a single forward visibility splay should be repeated several times to assess the forward visibility around a bend, as per the following diagram:

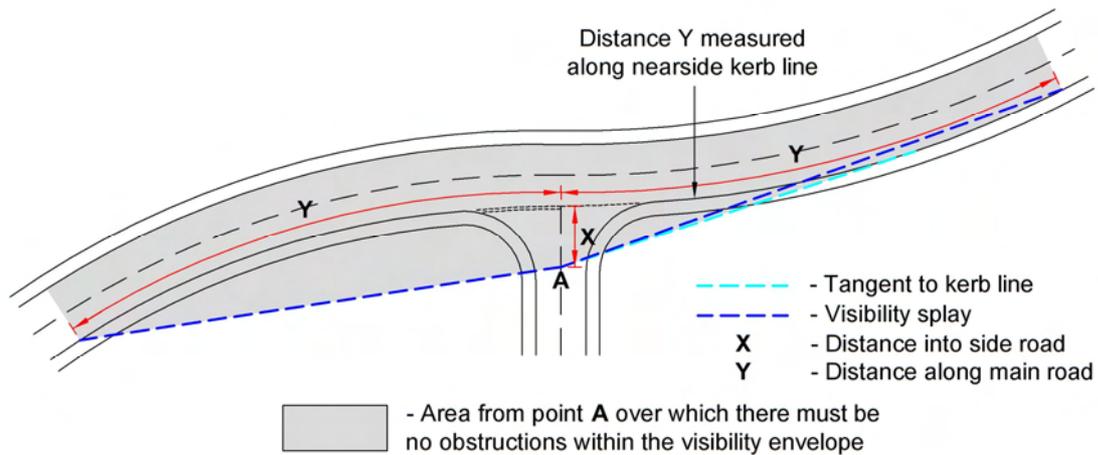


- Draw the first forward visibility splay A-A which should be located on the approach to the bend but should not cross the nearside kerpline.
- Draw the forward visibility splays at regular intervals. Dividing the forward visibility distance into 10 segments should be adequate in most circumstances.
- Continue drawing the forward visibility splays until they no longer cross the nearside kerpline. In this example the last visibility splay would be A-A.
- There should be no obstructions within the arc created by the forward visibility splays.

Note that it is not necessary to check the vertical visibility envelope for each forward visibility splay around a bend. In the above example, checking the vertical visibility envelope for splays 2-2, 4-4, 6-6 and 8-8 should be sufficient.

Forward visibility should also be checked on approach to pedestrian crossings. The full width of the crossing should be visible at a distance Y back from the crossing.

### 2.10.3 Junction visibility



Visibility splays must be checked at every junction. The visibility splay requirements vary depending on the category and design speed of the **main** road.

The values set out in the table below should be used for **X** and **Y**:

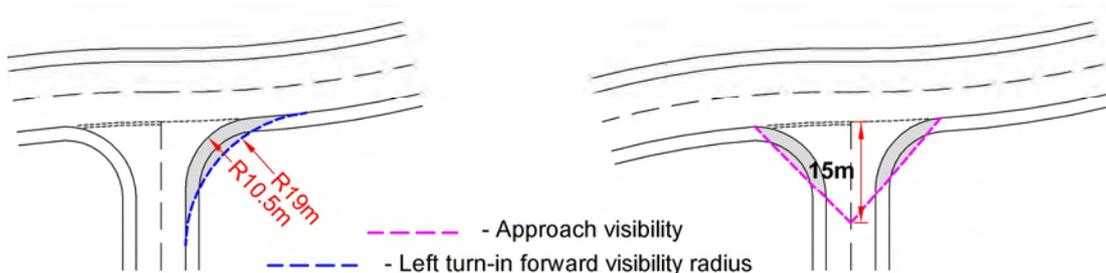
Road category	Design speed	X	Y
Local distributor road	30mph	4.5m	45m
Connecting street	25mph	2.4m	33m
Local residential street	20mph	2.4m	25m
Shared use street	15mph	2.4m	20m
Non-residential access road	30mph	9.0m*	45m

\*9.0m for side roads and 4.5m for private accesses onto non-residential access roads

The distance **X** is measured back from the give way line along the centreline of the side road. The distance **Y** is measured along the nearside kerblines of the main road from the centreline of the side road. Point **A** is at a distance **X** back from the give way line.

Where the side road joins the main road on a bend an additional line should be drawn from point **A** at a tangent to the nearside kerblines of the main road. This ensures that there are no blind spots within the visibility splays.

The following additional visibility checks at junctions are required:



The approach visibility should be checked for local distributor and non-residential roads and connecting streets. It is measured 15m back from the give way line along the centreline of the side road. Drivers should be able to clearly see the layout of the junction on approach to the main road.

The left turn-in forward visibility radius should be checked at every junction. The radius should be drawn tangential to the side road and main road kerblines.

Junction radius	Left turn-in forward visibility radius
12.0m	20m
10.5m	19m
6.0m	10m
4.5m	9m

There should be no obstructions within any of these visibility splays.

The verges or footways may be widened or realigned to match the visibility splays although it is not necessary. The decision should be based on desire lines and aesthetics.

Junctions linking local distributors to primary, secondary and district distributors should be in accordance with the visibility requirements set out in *TD 42 DMRB 6.2.6*.

#### 2.10.4 Roundabouts and signal controlled junctions

Roundabouts, mini-roundabouts and signal controlled junctions should be designed in accordance with the visibility requirements within the 'Design Manual for Roads and Bridges' *TD 16 DMRB 6.2.3*, *TD 54 DMRB 6.2.2* and *TD 50 DMRB 6.2.3* respectively. The stopping sight distances in *TD 9 DMRB 6.1.1* should be used.

#### 2.10.5 Private drives and accesses

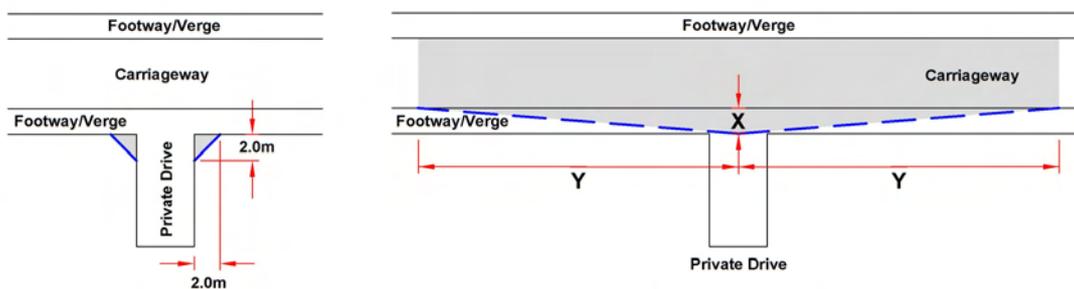
Visibility splays from business premises and industrial accesses will need to be provided and identified as part of a planning permission. They will not be adopted as part of the public highway but will need to be maintained to ensure the safety of vehicles in exiting premises.

The visibility splay requirement is 4.5m x 45m for private accesses of this type.

In addition to adopted visibility splays, the following splays will need to be provided and identified as part of a planning permission:

- private drives adjoining roads;
- pedestrian visibility splays where private drives cross the back of footway.

Although these areas will not be adopted, they will have the same limitations with regard to planting as an adopted splay.



The X distance should be 2.0m for private drives and 2.4m for shared drives.

The Y distance is the minimum forward visibility distance of the main road.

Pedestrian visibility to back of footway to be 2.0m x 2.0m on both sides.

## 2.11 Turning Areas

Residential culs-de-sac accessed off a connecting street or local distributor road always require a turning area. Residential culs-de-sac accessed off a local residential street or shared use street require a turning area where the cul-de-sac is greater than 25m in length. Turning areas in residential streets should be designed to allow for refuse vehicles.

Turning areas are required for all non-residential access roads ending in a cul-de-sac. In industrial and retail developments, turning areas should allow for articulated vehicles. Office developments may have a smaller size of turning area based on a pantechicon vehicle. Business developments are used by drivers not used to the road layout and turning facilities should be provided at a maximum spacing of 360m.



**Turning area forming a square with rumble strip entrance**

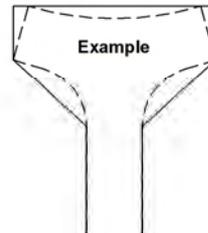
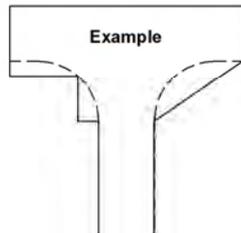
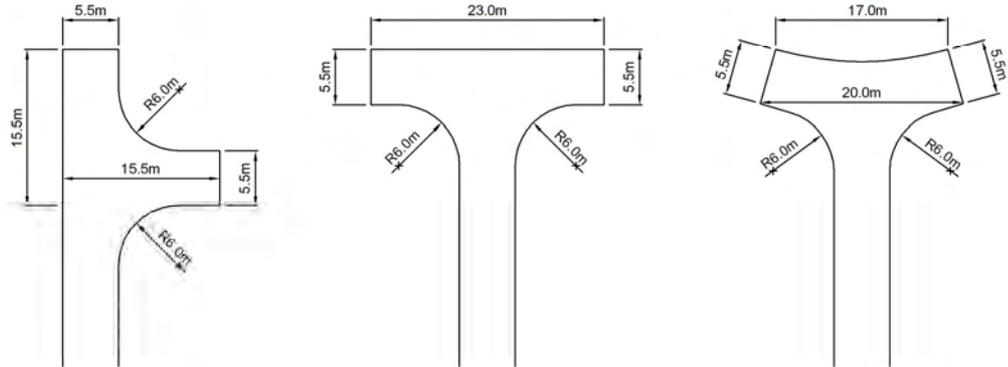
The diagrams below give the minimum dimensions required for turning areas so that the design vehicle can carry out a three-point turn. These diagrams are for guidance only and the actual layout of the turning area should relate to its environment (see Manual for Streets para. 7.10.2). In exceptional circumstances, a five-point turn may be considered if the existing available space is restricted and parking is not feasible within the turning area.



**Turning head with entrance to a private drive**

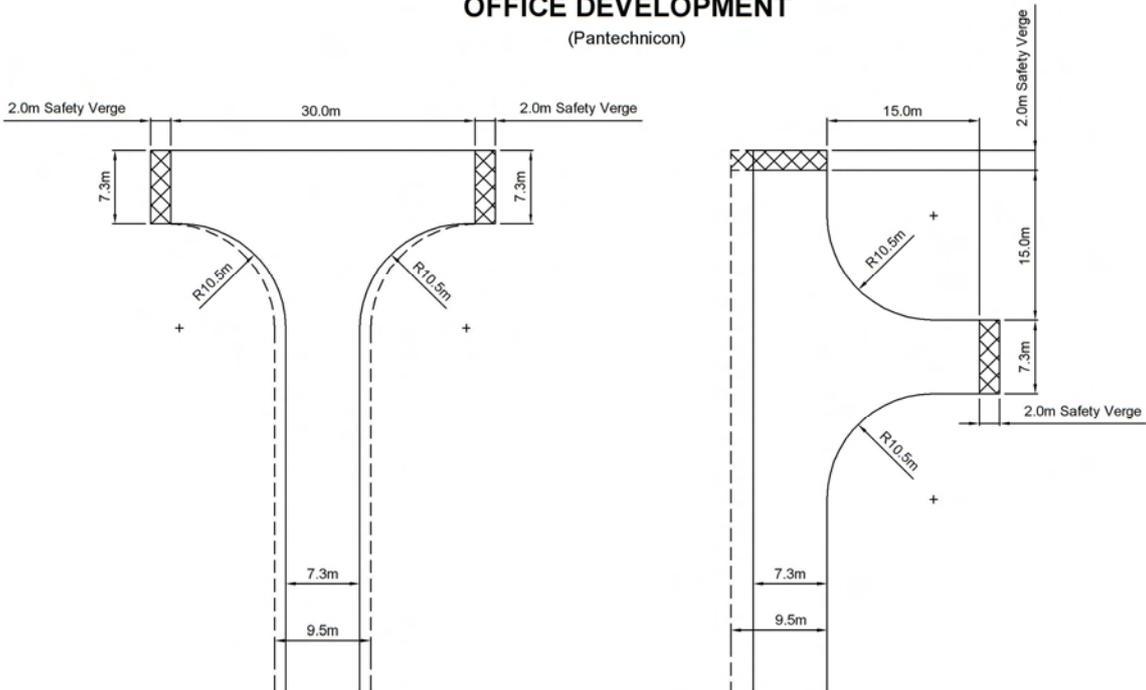
## RESIDENTIAL DEVELOPMENT

(Large 3-Axle Refuse Vehicle)

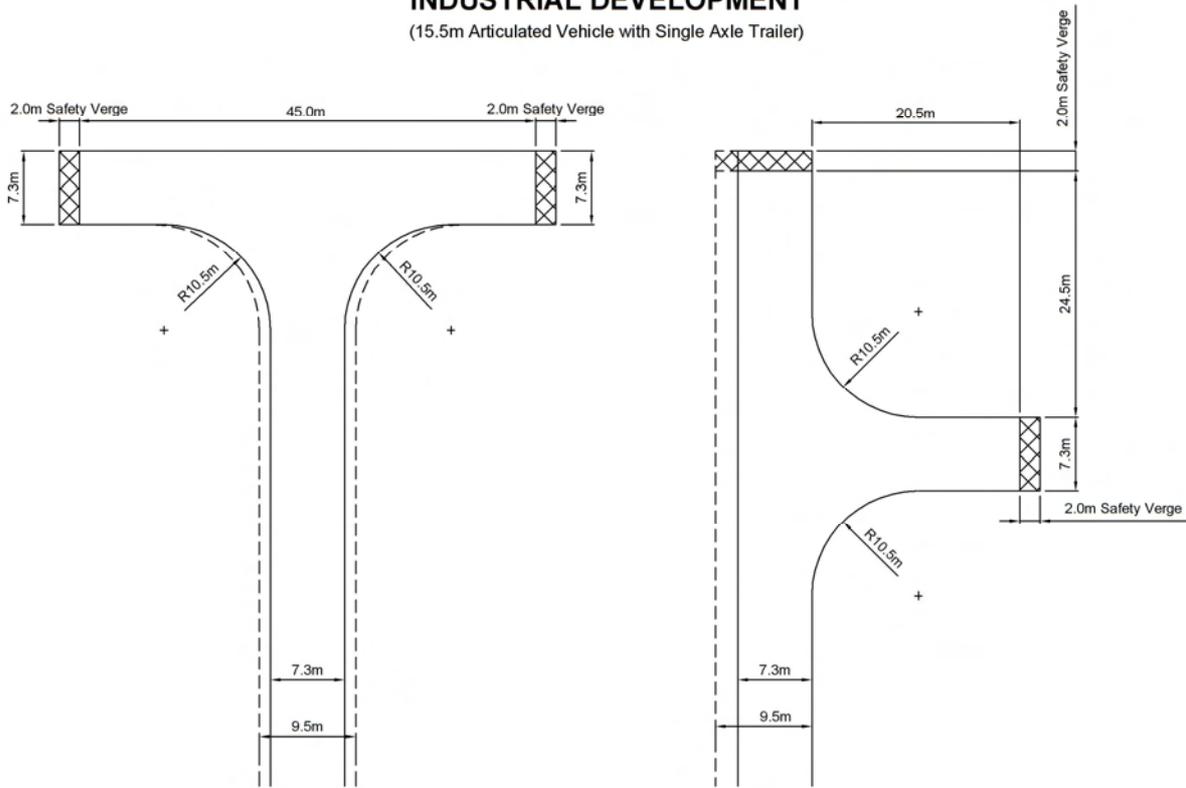


## OFFICE DEVELOPMENT

(Pantechnicon)

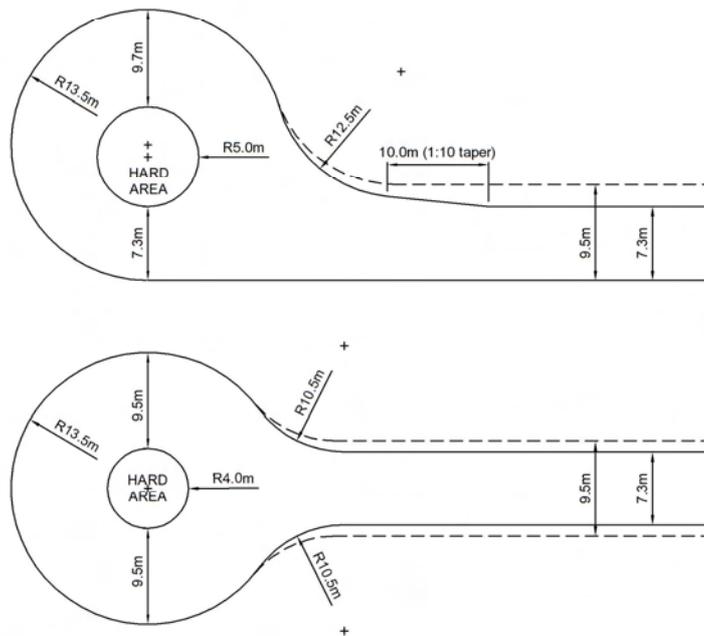


**INDUSTRIAL DEVELOPMENT**  
(15.5m Articulated Vehicle with Single Axle Trailer)



**NON-RESIDENTIAL DEVELOPMENT**  
**TURNING CIRCLES**

(15.5m Articulated Vehicle with Single Axle Trailer)



## 2.12 Emergency Access

A vital requirement of all services is that the layout of an estate should be easily understood and that clear signing of streets and numbering of properties is achieved.

It has generally been found that the fire service requirements cover the requirement of the police and ambulance authorities.

The width of any road, drive or path should not be less than 3.7m. Restrictions to 3.1m may be permitted over short lengths subject to agreement with the fire service.

Culs-de-sac should not exceed a length of 180m in order to provide satisfactory access for emergency services. If the development site does not permit a layout to comply with this requirement, an emergency vehicle access route should be provided.



Emergency access with removable bollards

The highway authority will maintain such emergency vehicle accesses, provided the developer conveys the land to the highway authority and at no cost to the authority or it will be adopted under Section 38 of the Highways Act.

Emergency access routes should be as straight and as short as possible.

The minimum centreline radius shall be 10m.

The minimum headroom clearance shall be 3.7m.

Serious consideration should be given to the combined provision of a footpath and a cycle link where emergency accesses are required. It will not be permissible to install services within the above dedicated widths.

The ends of the emergency access shall be secured by removable bollards to prohibit the use of unauthorized users.

It is accepted that in exceptional circumstances it may not be possible to construct an emergency access. In these locations, the carriageway width at the start of the cul-de-sac may be increased in width with the agreement of the fire service. (A copy of this agreement should be submitted to the highway authority as part of any approval procedure.) For residential developments the width of the carriageway shall be 7.3m. For other types of development, the width shall be 9.0m. The widening shall be provided along the road to the extent that the road exceeds 180m in length. The reduction in the carriageway width should occur thereafter at a road junction. On residential developments it may be necessary to provide speed restraint measures as the increase in road width may encourage excessive vehicle speeds.

It will not be permissible to install services within the adopted emergency accesses.

### 2.13 Private Drives

Any development serving more than 5 houses should be designed to adoptable standards and offered for adoption. The highway authority will not normally adopt developments of 5 dwellings or less of any type.

Private drives are designed to serve up to 5 dwellings and should have a very low design speed and should take note of the following design guidance.

1. Drives serving flats will not normally be adopted as a private management company will maintain the drive. However, roadways which serve mixed developments of houses and flats will be considered for adoption providing there are more than five dwellings.
2. On all layouts where the road/drive will remain private, careful consideration must be given to how refuse is to be collected. Layouts should be provided which do not require refuse vehicles to reverse, whilst refuse vehicles should be able to get to within 25m of the storage point. Residents should not be required to carry waste more than 30m.
3. Restricted access off roads serving greater than 300 houses.
4. Restricted access near junctions.
5. No drives within bellmouths.
6. Width of a single dwelling drive to be 2.75m. For shared drives, the width shall be 4.5m minimum for a distance of 10m from the carriageway.
7. Single parking spaces to be 5.5m minimum length abutting a Highway.
8. Not more than 4 parking spaces in a row abutting a highway. Where practical any adjacent rows should be separated by at least 1 full face kerb.
9. Long drives may require private lighting.
10. Maximum gradient 1 in 10 off an unclassified road and 1 in 15 off a classified road.
11. Junction with road at restricted locations to be 90 degrees. At unrestricted locations, drives can join the road at an angle between 70 and 110 degrees.
12. Private drive visibility to carriageway 2.0m x "Y"m for a single access and 2.4m x "Y"m for shared drives. "Y" relates to the design speed of the main road.
13. Pedestrian visibility to back of footway to be 2.0m x 2.0m.
14. The carry distance from any dwelling to the nearest waiting point for service vehicles should not exceed 25m otherwise a turning facility should be provided within the site.
15. Surfacing to drives must be of a suitable material to avoid spillage onto the highway. These may include permeable surfacings which incorporate a SUDs solution to surface water drainage.
16. Private drives must not drain onto a Highway.



Private drive with an alignment to enforce low speed

# HIGHWAY DESIGN GUIDE

## Part 3 SUPPLEMENTARY DESIGN ISSUES

### 3.1 Highway Structures

#### 3.1.1 Introduction

Coventry City Council requires all proposed structures within, over or adjacent to the public highway boundary which could have an impact on the highway, to be subject to a technical approval. This can include structures proposed for adoption or others remaining private which have a potential impact on highways. The objectives of the technical approval procedures are to ensure, as far as reasonably practical, that highway structures will be safe, serviceable in use and fit for their intended functions.

The main purpose of the technical approval is to maintain public safety.

#### 3.1.2 Definition of Highway Structures

The definition of a highway structure for these guidelines is given below which briefly can be summarised as:-

- a) Any structure built in, under, adjacent or over the highway where the clear span or internal diameter is greater than 0.9m. Included are bridges, footbridges, culverts, chambers, pipe bridges and the like. Also covered are all sign gantries, large signs and traffic signal mast arms.
- b) Retaining walls, headwalls and basement walls, where the designed retained height (level at back of wall to the finished ground level in front of the wall) is 1.5m or higher. Note that Section 167 of the Highways Act 1980 provides special powers to local authorities for private walls over 4' 6" high.

#### 3.1.3 Adoption Policy

The highway authority will adopt structures which are situated wholly or partly within the highway and are necessary to support any feature of the highway.

Structures which would not be adopted include private overbridges and retaining walls supporting adjacent development. These would still require technical approval and may in addition need a licence.

The highway authority will only adopt walls constructed to support the highway if an embankment is not practical. Walls (including toes) constructed to support private land adjacent to the highway will not be adopted and will remain the responsibility of the land owner.

Highway structures should be designed, detailed and constructed in accordance with the Department of Transport Specification for Highway Works.

Where a structure is to be adopted by the highway authority, this must be specifically included in the Section 38 or 278 Highway Agreement together with the agreed commuted sum which will normally be required for the future maintenance of highway structures.

## **3.2 Drainage Design**

### **3.2.1 Introduction**

These guidance notes are intended to describe the steps required to be carried out for the design of the surface water drainage systems and to summarize various other aspects of drainage design into one document. It does not go into great detail but refers to other documents in which the detailed procedures may be found.

Topics are discussed in general terms, with consideration being given to the purpose of the procedure and steps to be taken in order to achieve this purpose. Some typical methods and techniques are outlined and some possible difficulties are highlighted.

This note confines itself to the "mechanics" of drainage design and makes no attempt to deal with the legal or theoretical aspects. If clarification of legal matters related to the Highways Act, Water Act, Land Drainage Act or any other statutory instruments are required; advice should be sought in the first instance from the client's legal representatives. A highway authority should satisfy itself of the powers which enable the authority to carry out its function and also should satisfy itself that the necessary consultations, if required, have been carried out during the development of a highway scheme.

There are a number of new and developing initiatives and policies that need to be considered when carrying out drainage designs. Sustainable Urban Drainage Systems (SUDS) are becoming more and more prevalent.

### **3.2.2 General**

Normally the highway drainage on new developments shall be connected to a new drainage system that will be adopted by the water authority (Severn Trent Water) and shall be subject to a Section 104 agreement under the Water Industry Act 1991. Evidence of this agreement must be made available to the Council before entering into a Section 38 agreement for adoption of the highway. The highways shall not be adopted until Severn Trent Water has issued a Provisional Certificate for the drainage system or where discharge to the drain is limited to highway run-off only, the drain will then be adopted as a highway drain.

There may be occasions when the highway drainage will be connected to an existing public sewerage system. In that case the developer will be required to provide evidence of consent from the appropriate authority to discharge drainage flow to the sewer. Similarly, written evidence must be provided of the right to discharge water from a highway drain into any receiving ditch or watercourse with no liability on the Council. Consent to discharge into a ditch or watercourse would normally be granted by the Environment Agency however, some watercourses remain the responsibility of the local council.

All highway drains (including soakways) are to be located within land that is to be adopted as highway. Only in exceptional circumstances will it be permissible for them to be located in private land and then it will require an easement agreement This should be in place before, or be a condition of, the Section 38 Agreement.

Where a piped system discharges into an existing ditch or watercourse, the pipe invert (bottom of the inside of the pipe) must not be lower than the level of the average flow in the ditch or watercourse and it should always be at least 150mm above the ditch or watercourse invert. The end of the pipe shall be orientated so that it discharges at an angle less than 60 degrees to the direction of flow in the ditch or watercourse. The end of the pipe must have a headwall and apron which supports the bank above and adjacent to the pipe and prevents any scouring underneath the pipe. In addition, appropriate measures shall be incorporated to protect the banks of the ditch or watercourse from scouring. It will also be necessary to comply with the requirements of the Environment Agency or local Internal Drainage Board. A flap must be provided at the outfall to prevent the intrusion of vermin or flood water.

Oil interceptors shall be installed as required by the Environment Agency, and prior to a highway drain discharging into a soakaway.

If the proposed drain is to outfall to an existing highway drain, the developer shall provide details to prove the capacity and condition of the existing drain prior to any approval being granted for the connection. A CCTV survey of the existing drain may be required and any improvement works found necessary shall be undertaken at the developer's expense.

Drainage of other non-adopted areas into an existing or adoptable highway drain shall not be accepted. Where private non-adoptable drives and other surfaces fall towards the adoptable highway, measures must be put in place to prevent surface water run-off from reaching the highway boundary and entering the highway drainage system.

### **3.2.3 Land drainage**

Where there is or is likely to be run-off from landscaped areas, open spaces and adjoining land, appropriate arrangements shall be made for land drainage. This can include providing intercepting drains and ditches with satisfactory outfalls.

### **3.2.4 Existing drainage systems**

Appropriate measures shall be put in place to deal with any existing drainage systems within the development site, including any land drains, ditches, watercourses, outfalls from adjacent land or drainage systems, to the satisfaction of the Council, the Environment Agency and the owner of the systems. Consent of the Environment Agency for piping an existing ditch or watercourse, in accordance with Section 23 of the Land Drainage Act 1991 must also be obtained.

### **3.2.5 Sustainable urban drainage systems (SUDS)**

Sustainable Urban Drainage Techniques (SUDS) should be considered for all new developments.

Where SUDS are proposed for highway drainage, discussions with all relevant parties must be entered into at an early stage (in advance of any planning application) to agree ownership and responsibility for the facility. The design of the SUDS facility must include adequate provision for future maintenance of the system.

Where a system of SUDS incorporates the use of soakaways for disposal of highway run-off, the soakaways shall be designed in accordance with the requirements of BRE Digest 365. The design, together with details of the associated soakaway tests shall be submitted to the Council for their approval.

The developer will be required to pay commuted sums for the future maintenance of SUDS and other non-standard drain elements, including above and below ground flow attenuation systems and pollution control devices that are adopted as highway. Details of the sums payable will be calculated on a site-specific basis.

### **3.2.6 The hydraulic design of adoptable highway drains**

The hydraulic design of adoptable piped highway drains must meet the requirements of the current edition of 'Sewers for Adoption' published by WRc plc.

Hydraulic calculations using the specified method of calculation and format shall be submitted for approval of the Council together with design drawings showing the layout of the proposed drains. The layout drawing shall be annotated to enable easy cross reference with the calculations. Output from an approved computer programme using the specified method and parameters shall be acceptable.

### **3.2.7. Minimum pipe size**

The minimum pipe diameter for adoptable highway drains and gully connections is 150mm.

### **3.2.8 Combined kerb and drainage systems**

The use of combined kerb drainage systems will not normally be accepted for new development.

Consideration may be given to the use of a system of combined kerb drainage in order to overcome a site-specific difficulty. Where a system of combined kerb/drainage is proposed, full details of the system, including hydraulic calculations specifications and outfall details must be submitted to the Council for approval in advance.

If a combined kerb drainage system is approved by the Council for a particular site, the developer shall pay a commuted sum to cover the additional cost of future maintenance of the system. The sum will be calculated by the Council on a site-specific basis.

### **3.2.9 Approving drainage structures**

Any drainage item meeting the following criteria will be classified as a highway structure and shall be subject to the specific requirements that apply to highway structures:

- drain, piped or box culvert, sewer or drainage structure that has a clear span or internal diameter of greater than 900mm; or
- headwall greater than 1m retained height.

### **3.2.10 Manholes**

A catchpit (an access chamber, with sump, on a drainage system) shall be provided where there is any discharge into an existing ditch or watercourse.

On all drainage runs with a pipe diameter of 900mm or less, a manhole shall be provided at:

- every change of alignment or gradient;
- the head of all main pipelines;
- every junction of pipelines except for connections from single gullies;
- every change in pipe diameters; and
- a maximum spacing of 90m.

### **3.2.11. Catchpit and manhole positions**

Catchpit or manhole shafts should normally be located within the verge and not the carriageway, on all classified roads and other roads with a higher status than a residential access street or industrial access road. The outside of catchpits and manholes should be at least 500mm from the face of the kerb or the edge of the carriageway. Any catchpits or manholes within a carriageway must be located so that they can be accessed for maintenance operations while providing the necessary safety zones and without preventing traffic from passing. This will generally mean that they should not be sited at or near the centre of the carriageway or within a width restriction. Access requirements should also be considered where it is necessary to locate catchpits or manholes within junctions or roundabouts. Where manhole covers are located within the carriageway, they should be positioned such that they do not cause problems to wheeled vehicles and must have an anti-slip finish.

### 3.2.12 Positioning and alignment of highway drains and storm and foul sewers

Highway drains must be laid:

- in straight lengths;
- to straight grades between manholes; and
- within the carriageway or verge.

Under normal circumstances drains and associated chambers will not be permitted in footways as this space is required for other utility apparatus.

### 3.2.13 Gullies

All gullies should be trapped street gullies.

The spacing of gullies shall be in accordance with the table below. The chart gives the maximum areas to be drained by gullies for stated carriageway gradients, crossfalls and footway provisions. The drained area shall include roads, footways, verges, landscape areas and adopted parking areas.

Gradient	Width of Flow 0.5m		Width of Flow 0.75m		Width of Flow 1.0m	
	x - fall 1:40	x - fall 1:36	x - fall 1:40	x - fall 1:36	x - fall 1:40	x - fall 1:36
1:150	75	85	210	230	410	450
1:100	90	100	250	275	500	550
1:80	105	120	280	310	550	605
1:60	120	135	330	365	630	695
1:40	150	170	400	440	720	800
1:30	170	190	460	505	850	925
1:20	200	225	560	620	1000	1100

For design purposes the following guidelines should be used:

- 1 Residential developments: Width of Flow to be used: 0.5m
- 2 Connecting streets and roads with heavy pedestrian movements or cycle ways:  
Width of Flow to be used: 0.5m
- 3 Connecting streets and roads with light pedestrian movements:  
Width of Flow to be used: 0.75m
- 4 Non-residential developments with footways:  
Width of Flow to be used: 0.75m
- 5 Main roads and non-residential developments with grass verges:  
Width of Flow to be used: 1.0m

When calculating the areas drained, allowances must be made for all footways, footpaths, paved

areas and verges that fall towards the carriageway. On residential developments, an allowance of 1/3<sup>rd</sup> the areas of soft landscaping should be included within surface runoff calculations.

In addition the layout of gullies shall take into consideration the following requirements:

1. Gullies must not be spaced more than 40m apart, irrespective of the areas drained, except at summits where the first gully should not be more than 12m from the high point.
2. Double gullies shall be provided at sag points and low points. For valleys draining less than 50sq.m. and, where in the event of a blockage of a gully, water will not drain onto private property, then a single gully is permitted.
3. Gullies shall be sited immediately upstream of the tangent point at road junctions so that surface water in the channel does not flow across the junction. Care should be taken to avoid ponding near the mid-point of radius kerbs.
4. Where a road is super-elevated, a gully should be sited just before the point where the adverse camber is removed to prevent water in the upstream channel flowing across the carriageway.
5. Care should be taken to avoid ponding in the transition length, when the longitudinal gradient is flat or where there are traffic islands, central reserves or speed restraint measures.
6. In footpaths, footways and cycleways separated from carriageways, gullies or channels connected to the highway drainage system shall be provided where surface water would otherwise discharge onto adjacent property or cause flooding of footpaths, footways or carriageways.
7. Gullies shall not be sited within pedestrian crossing points or within the area of a vehicular crossing. Where possible, they shall be located directly upstream of the crossing point.
8. Gullies shall not be located where traffic would be prevented from passing while they are being emptied, for example within a carriageway width restriction.
9. The layout of gullies shall be shown on the design drawings submitted in support of an application for Works under a Section 38 Agreement.

### **3.2.14 Sub-soil drainage**

A system of sub-soil drainage to a suitable agreed outfall shall be provided where:

- the winter height of the water table is within 600mm of formation level; or
- the sub-soil is unstable because of being waterlogged; or
- there is a likelihood of water running from or out of the adjacent ground.

### **3.2.15 Flood Risk and Planning Permission**

The Council's policy is to protect the function of flood plains and watercourses and not to approve development which would increase the risk of flooding. Where a proposed development is at risk from flooding, or could create a risk of flooding elsewhere, a flood risk assessment must be submitted with the planning application.

Flood risk is a combination of two components: the chance (or probability) that a location (region, river-basin, site) will flood from any source or type of flooding, and the impact (or consequence) that the flooding would cause if it occurred. The probability of an event is typically defined as the relative frequency of occurrence of that event, out of all possible events. Probability of flooding will be expressed as a percentage and/or an annual chance. For example:

- a chance i.e. '... a 1 in 100 chance of flooding at that location in any given year'

Or

- a probability i.e. ‘... a 1% annual probability of flooding’.

Climate change over the next few decades is likely to result in an increased frequency and severity of storm events in the UK, leading to increased and new risks of flooding over the lifetime of developments.

Planning Policy Statement (PPS1) on ‘Delivering Sustainable Development’ (2005) states that all forms of flooding and their impact on the natural and built environment should be taken into account in planning decisions. This should include both consideration of present and future flood risk (the probability of a flood occurring and the scale of its potential consequences) and the wider implications for flood risk of development outside flood risk areas.

PPS25 on ‘Development and Flood Risk’ (2006) seeks to ensure that flood risk is taken into account at all stages of the planning process by avoiding inappropriate development in areas at risk of flooding, directing development away from areas at highest risk and seeking to minimise run-off from new development onto adjacent and other downstream property and into the river systems.

The ‘sequential’ approach should be applied at all levels of the planning process in order to steer new development towards areas with the lowest probability of flooding (Zone 1). Where there are no reasonably available sites in Flood Zone 1, both in allocating land in spatial plans and in determining applications for development at any particular location, account should be taken of the flood risk vulnerability of the proposed use and consider reasonably available sites in Flood Zone 2. Only where there are no reasonably available sites in Flood Zones 1 and 2 should consideration be given to sites within Flood Zone 3.

### **3.2.16 Climate Change Adaptation**

The Council will require all development proposals to take account of the expected changes in local climatic conditions throughout the lifetime of the development through the incorporation of adaptation measures or sufficient flexibility of design to allow for future adaptation, including measures to:

- minimise overheating and contribution to heat island effects;
- minimise solar gain in summer;
- reduce flood risk by applying principles of sustainable urban drainage;
- minimising water use; and
- protect and enhance green infrastructure.

Details of the proposed climate change adaptation measures must be provided in sustainable design and construction statements.

### 3.3 Street Lights

Street lighting is installed primarily to make the passage of vehicles and pedestrians safer but also to provide some security against night time crime and the fear of crime. A careful balance therefore needs to be struck between providing lighting to enhance security and at the same time exercising restraint to maintain the character of the developments.

The guidance given on lighting levels recommended purely to illuminate highways should not be regarded inflexibly and the creative use of lighting in more urban areas can enhance the setting of buildings and public spaces, although designers will need to consider a balance between the environmental impacts and the desire to minimise visual intrusion in the public realm.

All street lighting of the highway must be adopted by the highway authority. Lighting schemes prepared by a developer should be designed to 10 lux average luminance with a minimum point value of 2.5 lux, and will require the technical approval of the Highway Authority. Lighting should be designed in accordance with BS EN 13201- 2,3 & 4. Guidance on lighting is given in BS 5489-1, the Code of practice for the design of Road Lighting, to comply with BS13201

The equipment specification for each site will be provided by the highway authority, a limited range of alternatives to suit different environmental situations may also be required. Where alternative lanterns and columns are required by the developer (and are acceptable to the highway authority), a capital contribution will be required to cover additional maintenance and replacement costs.

Communal areas and non private footpaths more than 15m from the adopted highway, shall also have lighting provided and commuted maintenance costs paid to the Council, or agreed maintenance arrangement approved by the Council in writing. The areas covered by new junctions with existing highways will be treated as part of estate lighting systems.

Lighting for new estate roads must be considered in relation to existing lighting systems. Additional lighting may be required on existing roads approaching new developments to ensure consistency of lighting levels.

The location of lighting columns should avoid impacting on pedestrian and cycle routes. In general they should either be at the rear of paths or within verges and clear of any private drives. Columns should be set back appropriate distances from the edge of the carriageway taking into account the category of road upon which they are placed.

Consideration needs to be given to the impact on lighting envelopes if trees are planted in the vicinity of lighting columns.

Part 7 includes the Standard Development Specification for Street Lighting Works

### 3.4 Signs and Markings

#### 3.4.1 Traffic Signs

Traffic signs are provided to give highway and directional information and warning of hazards, and may have static or variable messages.

The aim should be to create a public realm that is as free from clutter as possible. Minimising highway signage can help achieve this. In a legible place with a strong sense of character and low vehicle speeds, it should be unnecessary to direct people or warn against the unexpected.

Many highway signs are not a legal requirement. However, where there is a statutory requirement for a sign, or where it is considered absolutely essential to provide one, they should be of minimum size as defined in the Traffic Signs Regulations and General Directions 2002 (TSRGD) and located as sensitively as possible.

For direction signs to private addresses, developers should consult with the Council at an early stage to establish if direction signs will be permitted to be erected on the highway.

Street nameplates should be of a design appropriate to the area and to the typical detail that is at the back of this guide.

#### 3.4.2 General Requirements

Traffic signs shall comply with the following general requirements;

- 1) Keep signs to the absolute minimum permissible and only use when they convey essential information. For example the TSRGD allows a single "No Entry" sign, rather than two, to be used where a road is very narrow, particularly within an area of historic or architectural merit.
- 2) Use the smallest variant, the simplest format, and the smallest possible text commensurate with adequate conveyance of the information.
- 3) Where possible, locate signs on buildings, railings, walls, existing poles and lamp columns rather than new poles.
- 4) Coordinate designs and colours. The TSRGD makes provision for the poles for traffic signs to be single colour so they can be co-ordinated with other street furniture, and for signal poles to be grey, black, brown, dark blue or dark green. Grey is the preferred colour in all streets, although black or brown can be considered for historic streets.
- 5) Avoid locating next to historic buildings or attractive views if possible.
- 6) Poles should not exceed the height of the sign (unless used to illuminate the sign face) and caps should be used on poles to prevent corrosion. Poles to be tubular steel, diameter to be the minimum possible for the area of the sign face. Where possible, designs which integrate poles into the signs should be used (e.g. Chromatic).
- 7) The total number of destinations should be as few as necessary to maximise legibility.
- 8) If a new sign is added at a particular location, all existing signs and information should be reassessed to ensure appropriateness and provide a minimalist approach.
- 9) Use one pole in preference to two wherever possible subject to design considerations. Cantilever signs reduce the number poles. Where considered appropriate, the pole should be at the front and not the back of footway so that drivers are aware of the sign if tempted to mount the footpath.
- 10) Sign plates should be robust and durable, and sign faces should have a protective overlay film to provide protection against posters and stickers.
- 11) Yellow, grey or black backing boards around signs should not be used unless absolutely essential for road safety.
- 12) Reflective signs are generally smaller than illuminated signs and should be used where possible. Illuminated signs should be internally lit except when the smallest available internally lit unit is too large, when they should be externally lit using the smallest possible light fitting.

- 13) Signs should be fixed to poles using stainless steel strips or extruded aluminum alloy sections, cast aluminum or plastic covered mild steel. Fixings should be anti-rotational.
- 14) The minimum clearance to the underside of traffic signs in pedestrian – only footpaths is 2.1m (2.5m where cyclists are present), but this may be increased to discourage vandalism. However, the height needs to ensure that it remains in the appropriate visibility envelope. Wherever possible clearances should be kept uniform.

### 3.4.3 Road Markings

The absence of road markings can significantly enhance the appearance of a street and can reduce the impression of vehicle domination. As with signage, there should be little or no need for road markings if the layout is clear and vehicle speeds are low and it should be presumed that secondary and tertiary streets will not normally require any road markings.

Where markings are required such as at a junction with a main street or to enforce parking restrictions, they should be of the minimum widths permitted in TSRGD.

### 3.5 Traffic Signals and Control Boxes.

The design of traffic signal controlled junctions and crossings is complex and requires specialist guidance. Without careful consideration traffic signals and control boxes can dominate the street scene producing visually chaotic views as well as increasing maintenance requirements and using more electricity. The basic principle is to minimise their number and size, and coordinate with other elements of street furniture.

- 1) Simple junction designs require fewer signal heads. Where possible road designs should be such that poles/ buttons / tactiles are not required in the central reservation. There are situations where the crossing width is such that it is recommended for this to be staggered with the two halves of the crossing operating independently. These require poles/buttons/tactiles in the central reservation. This reduces the amount of lost time in the signal cycle and can allow walk with traffic pedestrian phases increasing the capacity of the junction. There may also be the need to accommodate secondary or offside primary signals on central reservations.
- 2) At pedestrian crossings on single carriageway roads, two rather than four poles and signal heads should be used. There may be a need at Puffin crossings with a high pedestrian flow where an additional pole, push button unit and possibly an indicator unit will be required on the left hand side of the crossing.
- 3) Some junctions have two signal heads per pole, one stacked above the other. This also adds to visual clutter, and should not generally be used.
- 4) All signal poles may be straight, not cranked, and be painted grey or black depending on their location within the city. Most elements of street furniture have vertical and horizontal emphasis. The use of the cranked signal poles can create visual discord. Side-mounted or offset signal head brackets will therefore be used in preference to cranked poles in situations where footway space is restricted.
- 5) Large backing boards and reflective white bands increase visual impact and should not be used.
- 6) Poles at pedestrians crossings should be located 500mm from the kerb edge. Poles at junctions need to be located so as to maintain clearance to signal heads or backup board of 500mm from the kerb edge.
- 7) Signal poles should have low level indicators with knurled tactile and audible signals. Audible signals cannot be used with staggered crossings.
- 8) Where the TSRGD 2002 and TS Manuals give alternative minimum and maximum dimensions (e.g. height of signal head), the smallest should be used wherever possible.
- 9) Small duct covers should be in a colour to match the main paving.

### **3.6 Street Furniture**

#### **3.6.1 General requirements**

Street furniture and lighting equipment have a major impact on the appearance of a street and should be well integrated into the design and the principles agreed at an early stage. Retrospective imposition of a “standard”, streetlight layout onto a street without consideration of the position of buildings or the impact of lighting on the wider area is unacceptable. Similarly, the need to accommodate any signage should be considered at an early stage and thought given to how it will be located.

Street furniture that encourages human activity can contribute greatly to a sense of place, an obvious example being seating. However excessive street furniture, such as guard railing, bollards and equipment owned by utilities and third parties should be avoided. Each element of street furniture must have a clearly defined useful purpose to avoid unnecessary clutter.

Street furniture, including lighting columns and fittings, needs to be resistant to vandalism and placed in positions that minimise the risk of damage by vehicles. Street furniture and lighting should be set within the limits of the adoptable highway. It should also be placed to allow easy access for street cleaning and maintenance

For developments within the city centre developers should refer to the “Coventry City Centre Streetscape Design Guide” which provides detailed guidance on the palate of street furniture that may be used and advice on the siting of street furniture.

#### **3.6.2 Pedestrian Safety Barriers/Guarding**

These have been used in the past for a variety of reasons including preventing pedestrians spilling out onto the carriageway, stopping pedestrians crossing at unsafe locations, and guiding pedestrians to correct crossing points at signalised junctions.

Despite their prime safety function, standard highway style galvanised pedestrian barriers look cheap and ugly, and can create severance and visual degradation. The general principle should not to use them unless there is an essential road safety requirement. They reduce the amount of footpath available to pedestrians, divert pedestrians away from their desire line even at times of low traffic flow, reduce intervisibility between wheel chair users and motorists, create a hostile caged environment and can encourage higher vehicle speeds. People may jump over them, or walk on the carriageway side rather than the footpath because it is more convenient.

Where guarding is unavoidable, it is not acceptable to use standard unfinished galvanised metal barriers. The general principle should be to use a contemporary design using stainless steel, or a stainless steel/galvanised combination. They should not be used in historic streets.

Where provided they should be set back 450mm from the kerb face, be at least 1.1m high and be designed to allow clear sight of people behind the railing when viewed from an acute angle.

#### **3.6.3 Bollards**

Bollards are sometimes needed to prevent vehicular access into pedestrian areas, and can be used to define space and guide vehicles. However, they can be over used because they provide an easy design solution. In such cases they clutter the streetscape and can create a hazard for pedestrians. They should only be used where absolutely necessary and there is no alternative means, such as using other items of essential street furniture, to keep vehicles off the footway. Better enforcement and strengthening footway verges is preferable to using bollards to stop vehicles damaging the footway. Where their use can be justified they must be carefully located so as not to present an obstruction to pedestrians or a trip hazard.

Bollards should be located 450mm from the kerb face. Where used to prevent vehicular access they should be at 1.5m centres, where they are used to prevent vehicles mounting the edge of the footway they should be placed at 3.0m centres.

#### **3.6.4 Street Cabinets and Feeder Pillars.**

Cabinet and pillars can be needed for a wide range of purposes (e.g. traffic signals, power supplies, controls for architectural lighting schemes etc) by the Council and utility companies. They can be large structures, which reduce footpath space, attract fly-posting, and add to visual clutter. Where unavoidable, they should be designed and located to minimize visual and physical intrusion / obstruction. They should be simple, minimally designed, as small as possible, and painted in a neutral colour or to match / blend in with adjacent structures. Consideration should also to be given installing sunken / recessed models or using basements and nearby buildings.

### 3.7 Landscaping

#### 3.7.1 General

The standards set out in this document create the opportunity to provide a better environment within which people can live.

The reduction in the visual dominance of the road is further enhanced by the provision of additional landscaping of areas within the street scene.

The variety and extent of landscaping that is provided is one of the most important elements in achieving visual interest and therefore should be regarded as an essential part of the layout design process.

Apart from areas of grass, consideration must be given to the retention of existing trees and hedgerows, the introduction of new selective planting of trees and groundcover/evergreen shrubs, the provision of paving and fencing etc to suit the overall scale and character of the housing scheme.

The landscaping must be carefully sited to avoid causing any obstruction to visibility. Trees and shrubs should not be planted close to statutory undertakers' services as their roots may cause damage and the trees themselves will be damaged by excavation for maintenance or access.



Landscape area incorporated into overall layout

#### 3.7.2 Verges

The resources of local authorities for maintenance are limited and the maintenance of any landscaping will be more successfully carried out when related to adjacent dwellings. This higher standard of maintenance may be achieved in residential areas by making verges/service strips contiguous with private gardens. The limits of Highway verges must be clearly demarcated with continuous line of edgings and developers must ensure that purchasers are aware of the different status of the verge and that the rights of the highway authority and statutory undertakers are understood. Purchasers must be aware of the prohibition of building walls or fences and the planting of hedges, large shrubs and trees. They should also understand that undertakers may excavate in the landscaped areas at any time.

For areas of substantial landscaping in industrial and commercial developments, it may be desirable for developers to undertake the maintenance of the areas. Where these areas are to be the responsibility of others, the developers should contact the highway authority and have a Section 142



Maintained verges within the street layout

Agreement under the Highways Act 1980 prepared to ensure maintenance responsibilities are agreed.

Where areas will not be the responsibility of others and the area is not required for the installation of underground services, the highway authority may request the planting of low maintenance low growth shrubs.

The maximum height of plants within visibility splays shall not exceed 300mm above ground level or a top vertical sightline of 600mm.

Below a 1.0m width, verges should be paved unless they abut an open garden or public open space.

### 3.7.3 Trees

The provision of trees have significant benefits to the environment and tree planting within highway contribute to absorption of dust and noise, reduce the visual impact of the highway and help I to make the street more attractive for its users.

The retention of existing trees and the provision of new trees within the highway must be approved by the highway authority.

The highway authority may wish the developer to remove diseased or unsuitable trees and to undertake the pollarding of large trees. Existing trees should have a form compatible with vehicular and pedestrian traffic within its influence.

Trees should have a clear height of 5.5m between the road surface and the lowest branch. A 2.6m unrestricted clearance should be available over footway areas and 3.0m over cycleways. Trees should preferably be positioned with a minimum of 3.0m from the edge of a carriageway. This clearance distance will be dependent upon location and tree type.

The type and position of new trees will be agreed before the commencement of planting and will form any approval under a Section 38 Agreement of the Highways Act 1980. The position of all trees must be considered carefully as they can be restrictions in lines of vision and form formidable obstructions to highway users.

Trees must not obstruct illumination from street lighting.



Layouts alignment around existing trees

Trees will not generally be allowed within vision splays but consideration may be given to isolated thin trunked trees.

Trees along footpath routes must be sited with safety and security considerations so as not to form any dark concealed areas.

Planting of trees must avoid future encroachment of root systems along service routes.

The Council will require the developer to provide adequate commuted sums for the future maintenance of trees and landscaping and for any specially paved areas in which trees might be set within publicly maintained highways.

### 3.7.4 Potential Trees for Use in Streets

#### 3.7.4.1 Trees for Narrow Streets

The following trees have narrow heads or narrowly conical outline and a good hardiness rating.

ULTIMATE SIZE *	SPECIES	ORNAMENTAL FEATURES	APPROX SIZE AFTER 25 YRS (height x spread in m)
S	<i>Acer campestre</i> 'Streetwise'	Yellow autumn colour	7 x 3
L	<i>Acer platanoides</i> 'Columnare'	Yellow flowers, yellow autumn colour	7 x 2.5
M/L	<i>Acer platanoides</i> 'Crimson Sentry'	Purple leaves	8 x 3
M/L	<i>Alnus cordata</i>	Yellow catkins	12 x 3
M/L	<i>Carpinus betulus</i> 'Streetwise'	Yellow autumn colour	9 x 3
M	<i>Carpinus betulus</i> 'Frans Fontaine'	Tight columnar form	9 x 2.5
L	<i>Corylus colurna</i>	Yellow autumn colour	8 x 3
L	<i>Fagus sylvatica</i> 'Dawyck'	Golden foliage	8 x 2
L	<i>Fagus sylvatica</i> 'Dawyck Gold'	Yellow foliage fading to green	8 x 2
L	<i>Fagus sylvatica</i> 'Dawyck Purple'	Purple leaves	8 x 2
S/M	<i>Malus trilobata</i>	Red/purple autumn colour	6 x 2.5
S/M	<i>Malus tschonoskii</i>	Purple/red/yellow autumn colour	6 x 4
S	<i>Prunus</i> 'Amanogawa'	Pink flowers, double	7 x 1
S	<i>Prunus</i> 'Ichiyo'	Pink flowers, double	7 x 4
M	<i>Prunus padus</i> 'Albertii'	Racemes of white flowers	7 x 3.5
S	<i>Prunus sargentii</i> 'Rancho'	Pink single flowers red autumn colour	7 x 2
M	<i>Prunus schmittii</i>	Small pink flowers. Attractive bark	10 x 4
S	<i>Prunus</i> 'Snow Goose'	White flowers. Bright green leaves	6 x 3
S	<i>Prunus</i> 'Spire'	Single pink flowers. Purple/red autumn colour	6 x 3
M	<i>Prunus</i> 'Sunset Boulevard'	Pink flowers, red autumn colour	10 x 3
M	<i>Pyrus calleryana</i> 'Chanticleer'	White flowers. Orange/yellow autumn colour	8 x 3
L	<i>Quercus robur</i> 'Fastigiata'	Columnar habit. Good when large stature tree required in a narrow space	15 x 4
S/M	<i>Sorbus aucuparia</i> 'Streetwise'	Brilliant autumn colour	7 x 3
S	<i>Sorbus aucuparia</i> 'Cardinal Royal'	Dark red fruits	9 x 4
L	<i>Tilia platyphyllo</i> 'Streetwise'	Red winter shoots	12 x 4

\* L - over 20 m high

M - 10 to 20 m high

S - 5 to 10 m high

### 3.7.4.2 Trees for Wide Streets

The following are generally large trees with a dense canopy and a good hardiness rating

ULTIMATE SIZE *	SPECIES	ORNAMENTAL FEATURES	APPROX SIZE AFTER 25 YRS (height x spread in m)
L	Acer platanoides 'Emerald Queen'	Yellow flowers, yellow autumn colour	12 x 7
L	Acer platanoides 'Crimson King'	Black/purple leaves	10 x 6
L	Acer platanoides 'Deborah' ('Schwedlen')	Red/purple young leaves Red/orange/yellow autumn colour	12 x 7
L	Acer rubrum 'Armstrong'	Spectacular autumn colour	10 x 7
L	Aesculus x carnea 'Briottii'	Red "candles". Produces conkers	7 x 3
L	Aesculus hippocastanum	White "candles". Produces conkers	8 x 4
L	Aesculus indica	Large pink "candles". Orange/yellow autumn colour	8 x 4
M	Betula utilis jacquemontii	Chalk white bark	10 X 4
M/L	Carpinus betulus	Yellow autumn colour	8 x 4
L	Castanea sativa	White flower spikes	12 x 6
L	Fagus sylvatica	Yellow/brown autumn colour	8 x 4
L	Fagus sylvatica 'Purpurea'	Purple foliage	8 x 4
M/L	Fraxinus angustifolia "Raywood"	Fine texture. Purple autumn colour	8 x 5
L	Fraxinus excelsior "Westhof's Glorie"	Young foliage bronze	8 x 5
M	Fraxinus ornus	Masses of white flowers	8 x 4
L	Juglans nigra	Furrowed bark, pinnate leaves	12 x 6
L	Juglans regia	Pinnate leaves, walnuts	10 x 5
L	Liriodendron tulipifera	Yellow autumn colour	12 x 6
L	Platanus hispanica	Bold foliage, flaking bark	12 x 7
M/L	Prunus avium 'Plena'	Double white flowers	10 x 6
M	Prunus padus 'Watereri'	White flower spikes	12 x 8
L	Pterocarya fraxinifolia 'Heerenplein'	Pinnate leaves, catkins	15 x 7
L	Quercus cerris	Glossy lobed leaves	12 x 8
L	Quercus frainetto 'Hungarian Crown'	Large dark green leaves	15 x 10
L	Quercus ilex	Evergreen	7 x 4
L	Quercus palustris	Red autumn colour	10 x 5
M	Robinia pseudoacacia 'Bessoniana'	Pinnate leaves, white flowers	10 x 8
M	Sorbus thibetica 'John Mitchell'	Large grey leaves	7 x 5
M/L	Tilia cordata 'Greenspire'	Fragrant ivory flowers	10 x 5
M	Tilia x euchlora	No aphid problems	10 x 6
L	Tilia platyphyllos 'Aurea'	Yellow twigs in winter. Upright	8 x 4
L	Tilia platyphyllos 'Princes Street'	Red twigs in winter. Upright	12 x 5
L	Tilia tomentosa 'Brabant'	Grey foliage. No aphid problem	10 x 6

### **3.8 Services**

#### **3.8.1 General**

Early in the planning process consideration should be given to the location and installation of utility apparatus and in the consideration of any development the needs of the statutory undertaker must be taken into account. Therefore it is essential that they be consulted at an early stage by the developer.

Apparatus needs to be considered both above and below the ground, particularly where surface areas are shared. The layout must ensure that footway widths are not compromised and the location chosen should not have a detrimental affect on an otherwise attractive street scene.

#### **3.8.2 Location of Equipment**

In order to afford ease of future maintenance, mains will normally be laid in public footways, service strips, under verges or pedestrian routes, or other public land. If no other route is possible then mains may be sited in the carriageway in which case the installation arrangement (laying zone, duct/jointing pit facilities) must be agreed with the highway authority.

However, the highway authority is not able to bear the cost of maintaining separate land not forming part of the adopted highway solely to provide a service track for public utilities and if the adopted highway or public land is insufficient for statutory undertakers needs then developers must provide service routes with secure easements for the statutory undertaker concerned.

The layout of all service plant must be coordinated to avoid conflict between undertakers.

Ducts laid across carriageways shall be laid at locations specified by the undertakers. All utility excavations should be backfilled with suitable material to the underside of the road construction. All undertakers are required to comply with the requirements of the New Roads and Streets Works Act 1991.

In shared surface streets where there are not any dedicated footways, service strips shall be clearly demarcated. There shall be a minimum remaining paved area width of 3.0m alongside any service strip.

Where mains are to be laid in a highway verge service strip which adjoins a private garden, the developer must make the purchaser fully aware that:

1. No planting, (except grass or low ground cover shrubs of weak root growth), or any obstruction shall be placed within the verge.
2. The highway authority and statutory undertakers have unencumbered rights of access to the verge.

This document should be read in conjunction with the series of documents produced by the National Joint Utilities Group (N.J.U.G.) which offers advice with respect to activities associated with existing and new mains and services. Developers shall follow these recommendations which aim to improve the efficiency of the installation process through better liaison and communication with the utilities.

#### **3.8.3 Covers**

The siting of service covers within footways should be carefully considered and must avoid areas of tactile paving. Whilst this may be seen as detail, numerous covers, located apparently at random and of contrasting colour to the carriageway or footway surfacing, can significantly detract from the overall appearance.

In areas of block paving the use of recessed covers should be considered provided that these are laid to Coventry's standard details and that they can be laid to the correct specification and do not become

a maintenance issue for the Council once the road has been adopted. Manhole and inspection chamber covers to private drains will not be permitted within the highway.

#### **3.8.4 Phones & Post Boxes**

A minimum clear footway width of 2.0m shall be maintained around telephone and post boxes. These boxes should be located such that a parked car would not create a hazard to users of the highway e.g. within visibility splays.

#### **3.8.5 General Issues**

Any separate service margin should be at least 2m wide, in line with NJUG 7. Any utility equipment that is above ground, for example, cabinets, boxes, pillars and pedestals should be sited so that it:

- does not constitute a danger to the public or to staff working on it;
- does not obstruct driver's view, for example, by sitting it in visibility splays;
- does not obstruct pedestrians, wheelchairs, prams, pushchairs, etc. At least 1.2 clearance; increased to 2m in areas of high pedestrian flows (500 pedestrians an hour), shall be provided;
- is not located within 5m of any other street furniture that would create a double obstruction to pedestrians;
- does not enable illegal access to adjacent premises or property (e.g. locating cabinets adjacent to high boundary walls, where the apparatus could be used to climb over the wall);
- does not restrict the outlook from the window of a house, intrude into areas of open-plan front gardens or disrupt the line of low boundary walls;
- does not spoil the view of a listed building;
- does not result in 'visual clutter' by being in an inappropriate place; and
- does not indiscriminately create wide sterile easements within verges or public greenspace (i.e. grassed areas maintained by the Council).

All apparatus above the ground should:

- be positioned so there is enough access for the equipment and the surrounding highway to be maintained and cleaned;
- not be located within any tactile paving (in the case of surface covers);
- allow space for associated jointing chambers;
- allow for future surfacing work, for example by allowing for spare cable if the boxes are raised in future;
- meet the license requirements for listed buildings and conservation areas. Special consideration to cabinet design in conservation areas is required; and
- incorporate anti-graffiti coating measures.

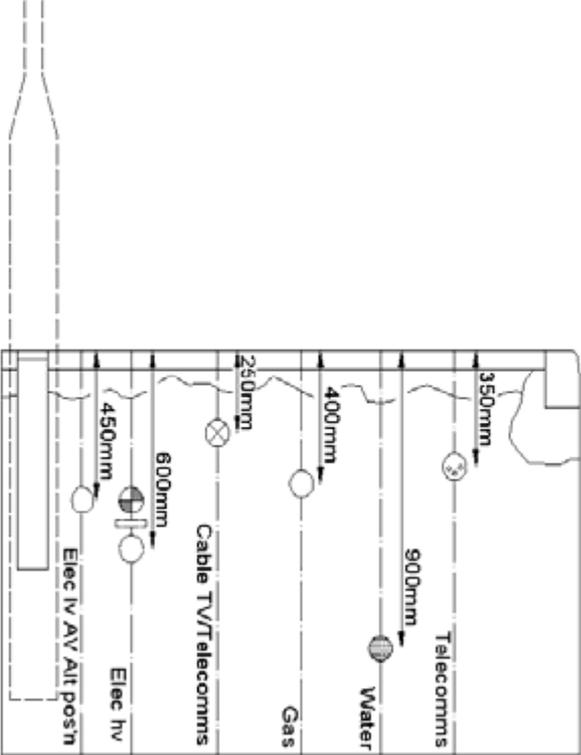
Where equipment is to be located within the highway, cabinets and other apparatus shall be located in the verge with a hard margin where surrounded by grass. Cabinets shall be located with at least 1.5 m clearance between the cabinet and the edge of the carriageway. Access doors should always open to the footway. If there is no verge, cabinets and other apparatus shall be located at the back of footway.

Consideration may be given to adopting any additional small areas outside the normal highway boundary so that above-ground apparatus can be located in accordance with the above requirements. If, however, the above requirements cannot be met within a clearly defined adoptable area, the apparatus should be located outside the adoptable highway, which may necessitate an easement to allow utility providers access for future maintenance.

Utility apparatus below ground shall, be positioned in accordance with the requirements of NJUG7.

This should avoid impact on tree root zones by their judicious location and by special methods of working where this is unavoidable, in accordance with NJUG10 and B.S.5837 (2005) "Trees in Relation to Construction Recommendations".

A recommended apparatus layout within the footway is set out in the drawing below:



# HIGHWAY DESIGN GUIDE

## Part 4 HIGHWAY AUTHORITY REQUIREMENTS AND PROCEDURES

### 4.1 Adoption Requirements

#### 4.1.1 General

It is important that all areas within a development layout have some arrangement for future maintenance. This may be dealt with by adoption by the highway authority, inclusion within the curtilage of privately owned land, or clearly identified as being the responsibility of a residents' association, private management company or similar group. In all cases it is important to ensure that there are no small parcels of land remaining where the responsibility for maintenance is unidentified.

#### 4.1.2 Adoption of Highways

##### 4.1.2.1 Roads

It is the aim of the highway authority to ensure that, subject to the provision of this document, new streets, roads, footpaths and cycleways which provide access for the benefit of the public at large and are constructed to suitable standards, generally should be adopted as highways maintainable at the public expense.

The highway authority will not normally adopt streets which serve less than five individual dwellings. No through roads which only serve developments of flats or apartments will also not normally be adopted as a management company will be responsible for the service road maintenance.

##### 4.1.2.2 Footpaths

The design of a footpath network linking public focal points, for example schools, shops, bus stops, clinics, etc. is often of primary importance in the layout of housing developments. The highway authority will adopt footpaths which are suitably constructed and form access routes along main pedestrian desire lines provided that they do not create an unnecessary duplicated pedestrian route. Footpaths serving single properties or acting as a secondary access or of limited public use will not be adopted.

##### 4.1.2.3 Sight Lines and Service Verges

Land required for sight lines on bends and at junctions will normally be adopted as highway.

Where a footway is not required, a landscaped verge to accommodate utilities' services will normally be adopted by the highway authority. Where situated adjoining private gardens the householder will be encouraged to maintain the surface treatment of the verge.

##### 4.1.2.4 Soft Landscape Areas

The highway authority's policy for the adoption of limited areas of soft landscaping may conflict with the desirability to create an interesting and attractive appearance in new residential developments. General amenity, play and landscaped areas will not normally be adopted by the highway authority. In instances where such areas are to be provided the developer should satisfy the planning authority that their maintenance will be satisfactorily achieved by other means. If open areas are to be adopted, a commuted sum will be payable to cover future maintenance.

#### **4.1.2.5 Parking Spaces**

Parking provision should be made by a combination of on-street and off street parking. Private parking spaces, private drives and communal car parks will not be adopted by the highway authority. Communal waiting areas which abut the highway, and which are clearly not for the regular use of any specific dwelling, may be adopted by the highway authority providing that proper provision is made for traffic flow and safety. Unallocated parking spaces on a street which are integral to the street e.g. sandwiched between carriageway and footway, will normally be included within the adoptable area.

#### **4.1.2.6 Sewers**

Main sewers within the public highway will generally be adopted by the Water Authority under a Section 104 Agreement. Where a Section 38 Agreement is required as well as a Section 104 Agreement, the Section 104 Agreement must generally be signed before the Highway Authority will enter in to a Section 38 Agreement. Likewise the adoption of the highway under a Section 38 Agreement will not normally be allowed to proceed until the Section 104 sewers have been adopted. The purpose of this is to ensure that an acceptable outfall from highway drains and gullies is secured before the highway authority is committed to adopt the road.

#### **4.1.2.7 Private Drains**

Private drains are not permitted within the adoptable highway other than drain connections to the public sewer. All connections are to be a minimum of 150mm diameter. Private manholes and inspection chambers are not permitted within the adoptable highway. A private access chamber should be located close to the highway boundary.

#### **4.1.2.8 Highway Structures**

Structures, including structural embankments, supporting the highway are to be adopted as part of the highway.

#### **4.1.3 Commuted Sums**

Commuted sums to cover the extra maintenance costs above the norm may be payable by the developer and where this is required the highway authority will normally identify the requirement to the developer at planning stage. Examples of areas where commuted sums may be required are:

- (a) drainage units requiring regular maintenance
- (b) drainage storage tanks within the highway which require regular inspection;
- (c) highway structures which are to be adopted;
- (d) special paving materials,;
- (e) areas of shrub planting within the highway;
- (f) trees within tree pits;
- (g) lighting columns which are outside the highway;
- (h) traffic signal equipment, and
- (i) traffic signs.

## 4.2 Planning Applications

The local highway authority (LHA) is a statutory consultee on all planning applications that may affect the public highway. The process is subject to guidelines published by ODPM in their Circular 08/2005 and it is important that the LHA receives all the information it needs to provide an informed response.

As part of any planning application that requires the 'means of access' to be discharged, the following minimum details should be submitted, but not limited to;

- (a) a site location plan showing the surrounding existing public highways and adjacent properties, with the development land to which the application relates outlined in red to a scale of not less than 1:1250;
- (b) plans of existing layout details (to a scale of not less than 1:500) showing existing trees and vegetation, the position and width of all accesses including dropped kerbs, existing parking spaces and relevant street furniture;
- (c) plans (to a scale of not less than 1:500) showing the position and widths of proposed accesses within the existing public highway. The plans should also identify the full length of visibility splays and any alterations that may be required to existing accesses and street furniture. The proposed parking provision should be clearly identified.
- (d) plans (to a scale of not less than 1:500) showing details of any proposed streets, roads, footways, footpaths, cycleways, verges, access positions and private drives. The width of carriageways, footways, footpaths, cycleways, verges and accesses should be dimensioned. Details may also be required to show the proposed drainage of the highway and proposed levels. Parking provision, whether on or off street should be clearly identified.
- (e) the plans should clearly identify the means of access from and connectivity to adjoining pedestrian routes;
- (f) the provision for cyclists should be identified;
- (g) Design and Access Statement;
- (h) Transport Assessment/Transport Statement in accordance with the Guidance for Transport Assessment published by the Department for Transport, where required.

Planning applications for new residential developments and non-residential developments should be supported with a plan showing the nearest existing bus stop locations and any new proposed bus stop locations.

### 4.3 Adoption Procedure

Where developers make an Agreement with the Council under Section 38 of the Highways Act 1980 roads, footways, footpaths and cycleways can be automatically adopted as public highways upon satisfactory completion.

Immediately a development receives building regulation approval the highway authority requires a statutory guarantee that the roads and footpaths will be completed to the satisfaction of that authority.

Before building construction begins the developer must either:

- (a) Complete payment of the estimated cost of the highway works under the Advance Payments Code (APC) of Section 219 of the Highways Act 1980, or
- (b) Enter in to a Section 38 Agreement and provide a bond for due completion.

If the developer wishes to construct a development in distinct phases, the phasing should be shown on his submission for approval. In phased developments construction traffic should not be permitted to use roads serving occupied dwellings. Where this is unavoidable, strengthening of the carriageway construction may be required. This should be agreed with the highway authority.

If an early start to construction is proposed, developers should make an Advance Payment or ensure that the payment is secured and then replace this as soon as possible with a Section 38 Agreement. In this case the Advance Payment Bond is cancelled (or a cash payment is refunded with interest).

Developers are required to notify the highway authority of the commencement of any work on prospective public highways so that inspection of the Works can be arranged. This applies to work subject to both the APC and Section 38 Agreements. Works not so inspected will not be adopted until proven at the developer's expense.

An inspection fee will be required before the Agreement is signed. The inspection by the council's staff is limited to verifying that the works are in accordance with the drawings and specification. It does not include the routine checking of the setting out of the roads, sewers or any other aspects of the estate development.

A coloured plan or plans will be required to accompany the Agreement to show the carriageways, verges, footways, footpaths, cycleways, gullies, gully connections and highway drains to be adopted as public highway, which subject to approved amendments, will on completion become the adoption plan.

Under the terms of the Agreement the highways will normally be adopted twelve months after the commencement of the maintenance period provided that the developer carries out any necessary remedial works to the satisfaction of the Engineer. During this period it is the developer's responsibility to maintain, cleanse roads, footways, footpaths, sewers and gullies, cut grass, maintain lighting and generally keep all works in a safe state. The Council will not normally be prepared to adopt roads and footways until heavy construction traffic has ceased to use the estate roads.

#### Occupation of Dwellings

Before any dwelling having a frontage on to a new road is occupied, the developer must ensure that both a safe carriageway and footway access is provided to at least binder course level and these must be lit to the satisfaction of the Engineer.

#### 4.4 Details for Adoption Approvals

The Agreement for adoptable highway works under Section 38 of the Highways Act 1980 shall be generally as the Model Section 38 Agreement, Roads for Adoption (2<sup>nd</sup> Edition) 1990 as issued by the Association of County Councils, Association of District Councils, Association of Metropolitan Authorities and House Builders Federation.

The Agreement for adoptable drainage works will normally be under Section 104 of The Water Industry Act 1991 with Severn Trent Water Ltd.

The highway works shall be designed in accordance with the "Highway Design Guide" document as published by the Council and the Highways Agency "Design Manual for Roads and Bridges" and any amendments or additional clauses issued by the Council.

Drainage works shall be designed in accordance with "Sewers for Adoption" (6<sup>th</sup> Edition) as issued by Water UK.

In order for the drawings to be considered for approval, two copies of drawings showing the following are required. (For small schemes some of these plans can be combined. However, the coloured plan should not be combined with other plans.

- (a) Coloured plan to a scale of not less than 1/500 showing roads, footways, footpaths, cycleways, driveways and accesses, surface water and highway drainage in outline, gullies and gully connections and key width and radius dimensions. The drawing must also indicate the boundaries of the site in the ownership of the developer.
- (b) Engineering layout plan to a scale of not less than 1/500 showing the changes in the type of construction, speed restraint features, tactile paving, visibility splays, vehicle crossings, surface water and highway drainage in outline and gullies and gully connections. All widths of roads, footways, footpaths and verges and all radii should be clearly dimensioned. The drawing must identify the extent of the works proposed for adoption which must include all visibility splays. The extent of the vehicle crossings must be clearly identified with a second line being shown behind the kerb. The gradient and direction of falls on private drives abutting the road should be identified.
- (c) Drainage layout plan to a scale of not less than 1/500 showing the lines of drains, surface water and foul sewers, the positions of manholes and connections and the pipe sizes, gradients and bedding types. The plan must identify the works proposed for adoption and any drainage easements for proposed adoptable highway drains must be clearly indicated. This drawing or another drawing must also indicate the catchment areas coloured used in the calculations of the highway drainage systems.
- (d) Longitudinal sections of the roads, including the drains and sewers showing existing ground levels, proposed road levels (at not greater than 20m intervals), invert levels and manhole cover levels. Any highway drains should be clearly identified. The scale of the sections shall be not less than 1/500 horizontal and 1/50 vertical.
- (e) For developments with significant falls or variable cross sections, cross sections are required through the proposed roads at 20m intervals showing existing and proposed levels and the proposed gradients adjacent to the highway boundary. The scale of the sections shall be not less than 1/100 horizontal and 1/20 vertical.
- (f) Highway details drawing showing typical sections, carriageway tie-in details, details of speed restraint features, details of dropped kerbs and tactile paving and details of bollards, tree pits and other street furniture.
- (g) Manhole schedule showing cover levels, invert levels for each incoming and outgoing pipe including gully connections, depths to invert, depths to soffit and types of manhole and cover.

- (h) Drainage details drawing showing details of the manhole types to be used for highway drainage and pipe bedding details.
- (i) Detail plans of any roundabouts with contours to a scale of 1:200.
- (j) Layout plan showing traffic signs and road markings to a scale not less than 1:500.
- (k) Traffic sign schedules and details.
- (l) Street lighting layout, design and details.
- (m) Traffic signal design and details.
- (n) Details of highway structures with AIP, design and Check certificates.
- (o) Details of soft landscaping.

**Note: One copy of the approved planning layout must be sent with the above information.**

Drainage calculations will be required for all highway drains. These calculations shall cross reference to the drawings listed above and shall include bedding calculations.

Developers should note that the minimum amount of cover to a sewer or drain within a carriageway is 900mm.

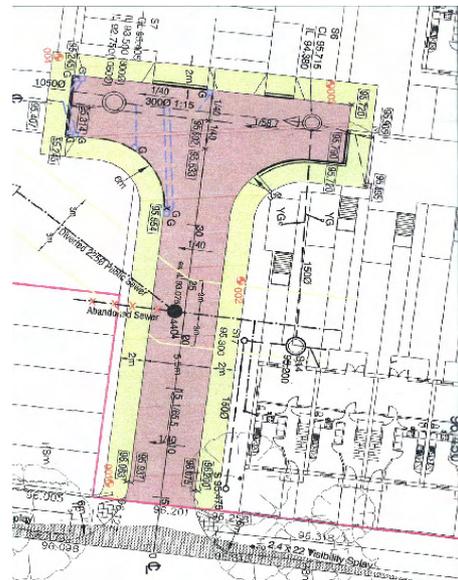
Whilst the drawing requirements for Section 278 Works are generally the same as above developers should note that a separate specification document will also normally be required.

When the drawings HAVE BEEN APPROVED, nine copies of the coloured drawings and six copies of the detailed drawings are required for the preparation of the Section 38 Agreement coloured as follows:

Section 38/278 Agreement Works

- |                         |   |                                    |
|-------------------------|---|------------------------------------|
| roads                   | — | brown                              |
| footways and footpaths  | — | yellow                             |
| grass verges            | — | pink                               |
| gully/gully connections | — | blue                               |
| highway drains          | — | blue (labelled<br>"highway drain") |

Note: The boundary of the site in the ownership of the developer to be edged in RED.



Fees are payable for the preparation of the Agreement, approval of the drawings and inspection of the works during construction, and the adoption of the works following the satisfactory completion of the maintenance period.

The approval and inspection fee payable to the Council is 6.0% of the council's estimated value of the Section 38/278 Works or £1,500, whichever is the greater. The value of the works will include for the backfilling of all sewers constructed within the highway under an agreement with Severn Trent Water.

The fee allows for inspection of the works by the Council. Developers must note that this covers inspection only and that the developer will be responsible for the setting out of any works.

In order for the approval of the drawings to proceed, an Advance Payment of £1,500 is required to be made to the Council. For larger developments, the Council may request interim payments of fees if the approval process is likely to be prolonged. These amounts will be deducted from the final fee payable.

If work starts on site before the Section 38 Agreement is completed then the FULL 6% FEE MUST BE PAID (the developer will receive an invoice) before site inspections can commence.

The above fee is provisional and may be adjusted when the Agreement is completed to take account of the points raised in the following paragraph and any amendments to the drawings that may be required.

In order to reduce the amount of abortive work by the Council in the approval of the submitted drawings it may be necessary to make a charge for additional time spent checking drawings. Following the submission of the initial drawings for approval, developers will be permitted two sets of revisions in order to obtain drawings satisfactory for approval. For each set of drawings submitted after the two permitted revisions, an additional charge of a minimum of £200 will be required in order to process the amendments. In addition, all revisions of drawings submitted after approval of the scheme has been given will also result in an additional charge of a minimum of £200 in order to process the revisions and amend the Agreement. There may also be additional fees to be paid before adoption if abortive site visits are made.

If Traffic Regulation Orders are required the fee will be identified and must be paid along with other outstanding fees before the Agreement is completed.

There will also be a legal fee from the City Secretary for the preparation and completion of the Highway Agreement and any easements associated with highway drains.

**For Section 278 Works, the legal Agreement must be signed before works can commence on the public highway.**

All works in the existing adopted highway, including service openings, will be subject to "The New Roads and Street Works Act 1991". Contractors must contact Street Services on 024 7683 4324.

## **4.5 Road Safety Audits**

### **4.5.1 Safety Audit Stages**

Road Safety Audits (RSA) are a systematic process for checking the safety of new schemes on roads or improvements to existing roads. They enable road safety engineers to feed their experience into the highway design process.

The Council requires Road Safety Audits to be undertaken by its in house safety audit team at the following stages. There is a charge for the various stages.

- Stage 1 - Completion of feasibility design (this stage is required for major development schemes)
- Stage 2 - Completion of detailed design (Stage 1/2 - Completion of detailed design on minor schemes)
- Stage 3 - Completion of construction

Requests for audits should be made on the relevant Audit Request form.

### **4.5.2 Interim Audits**

There is an additional type of RSA known as an Interim Audit which can be carried out during the design process. This may be beneficial where developers may wish to seek road safety advice before the more formal stages of design are reached. This process should not be used to by-pass the RSA process and the Council reserves the right to charge for this work.

While looking through scheme plans auditors may identify deficiencies in designs that are not directly related to road safety. These can be identified in a comments section at the end of the Road Safety Audit Report.

### **4.5.3 Safety Audit Responses**

Once the Road Safety Audit report has been completed and submitted to the developer a response is required to the issues raised. This should be done by means of the Safety Audit Action Record form and should include responses from previous audits.

In most cases this response will accept the safety recommendations or provide alternative solutions for the audit team to consider. If agreement cannot be reached between the developer and the audit team on a specific safety issue as a last resort the developer should provide an exception report.

This report can either;

- i. accept that the identified problem exists but that the recommendations cannot be implemented for certain reasons in which case the report should describe alternative measures to be implemented or
- ii. the recipient of the report does not accept that there is a problem. In this case evidence will be required to identify why the problem is not considered valid. However, it should be noted that the Road Safety Audit Report, any responses and the Exception Report could be used in future litigation.

## **4.6 Highway Structures – Technical Approval Procedures**

### **4.6.1 Technical Approval Procedures**

#### **4.6.1.1 Design Requirements**

The technical requirements for the design of highway structures shall generally comply with the relevant Standards and Advice Notes in the DMRB and be constructed in accordance with the Specification for Highway Works (SHW). Other proposed standards shall be agreed with the Technical Approval Authority (TAA) through the Technical Approval process.

#### **4.6.1.2 Categories and Proposals**

Proposals shall be placed in one of four Categories: 0, 1, 2, or 3, according to the criteria in BD2 ranging from Category 0 for the least significant structures to Category 3 for the most complex structures. The Designer shall submit preliminary details of all Proposals to the TAA for agreement of the Category.

Category 0 Proposals do not require a formal Approval in Principle (AIP). The submission should include a Design Brief and sufficient information to allow the TAA to agree the Category level  
Category 1, 2 and 3 Proposals require submission of AIPs which will provide sufficient information to demonstrate compliance with design requirements, including the Technical Approval Schedule, i.e. details of all relevant documents proposed for use in the design.

#### **4.6.1.3 Operation of the Category procedures**

Consultation shall be between the developer and the Council initially to agree the communication channels. Once the communication path is agreed, the developer shall communicate with the TAA to agree the Category Level and to complete the approval procedures.

#### **4.6.1.4 Approval in Principle**

The AIP submission shall be a record of all matters agreed at the Proposals stage. This shall generally include the Technical Approval Schedule, location plan, general arrangement drawing, relevant parts of the geotechnical report, documents related to consultation and any other relevant information. It shall be forwarded to the TAA for acceptance and a signed copy shall be returned to the designer. It should be noted that the TAA will not endorse an AIP submission until content with the information/criteria recorded therein.

#### **4.6.1.5 Drawing Approvals**

The design shall be developed to ensure that the structure is harmonious with the surroundings, and are buildable, durable and maintainable. Drawings are to be submitted for approval. No construction shall take place until the final approval is obtained.

#### **4.6.1.6 Design and Check Certificates**

The Design and Check certificates shall be signed to declare satisfactory completion of the design and forwarded to the TAA for acceptance. These certificates shall refer to the relevant AIP. Category 0 certificates shall include the TAA reference number. Copies of the calculations shall be submitted for record purposes but will not be checked by the TAA.

#### 4.6.1.7 Technical Approval

This shall include the following before construction starts:

- acceptance of the Design and Check Certificates by the TAA;
- construction drawings; and
- set of calculations.

#### 4.6.1.8 Completion Certificate

A Completion Certificate is to be submitted for acceptance, including a set of as built drawings. In addition the following is required:

- acceptance Inspection report to be completed at an agreed date by all parties during the maintenance period with the inspection carried out jointly by all parties in compliance with the inspection procedures of adopted structures;
- Health and Safety File at the end of the maintenance period if appropriate; and
- If the Health and Safety File is not relevant, a maintenance record is to be submitted with the material supplier's names.

### 4.6.2 Definition of a Highway Structure

#### 4.6.2.1 Introduction

The following structures are to be part of the Technical Approval procedures:



Earth retaining wall

- bridges, buried structures, subways, culverts and any structure which affects the highway with a clear span or internal diameter greater than 0.9m;
- overhead crossing carrying conveyor or utility service;
- access gantry;
- earth retaining structure of at least 1.5m height (finished level difference between the front and rear of the structure). This includes reinforced/strengthened soil/fill structures.
- portal and cantilever sign and/or signal gantry;
- cantilever mast for traffic signal and/or speed camera;
- lighting column;
- high mast of more than 20m height;
- mast for camera, radio and telecommunication transmission equipment;
- catenary lighting support system;
- environmental barrier;
- proprietary manufactured structure; and
- highway signs of more than 7m height.

#### 4.6.2.2 Category 0

These structures do not require an AIP. However designers are to submit their proposals for Category 0 and confirm their structures are from the list below:

- buried structures of less than 3m clear span with 1;0m min cover;
- multi-cell buried structures with accumulative span of less than 5;0m and over 1;0m cover;
- single simply supported structure with less than 5m span;

- environmental barriers less than 3;0m high and no overhangs;
- lighting columns within the scope of BD 94 and not in exposed sites;
- CCTV masts within scope of BD 94;
- cantilever masts for traffic signals/speed cameras within scope of BD 94;
- other mast structures less than 10m high and horizontal arm of less than 3m;
- highway signs on posts more than 7m, but less than 12m high;
- earth retaining structures with effective retained height of less than 2m, and
- masonry arches with span of less than 6.5m (for assessment only).

#### 4.6.2.3 Category 1

Any structure which meets Category 1 requirements requires an AIP. The Category is to be agreed with the TAA before the design starts as this dictates the method of design and checking. This requirement applies to Category 2 and 3 as well:

- single simply supported structure of less than 20m span and less than 25° skew;
- buried concrete box and corrugated steel buried structures with less than 8m span;
- earth retaining structure with effective height less than 7m;
- environmental barriers 3m or higher, or with overhangs;
- lighting columns outside scope of BD 94, or sited at exposed area;
- CCTV masts outside scope of BD 94;
- cantilever masts for traffic signals/speed cameras outside scope of BD 94; and
- other mast structures more than 10m, but less than 25m in height, or where the horizontal arm projection is more than 3m.

#### 4.6.2.4 Category 2

Structures, not within the parameters of Categories 0, 1 or 3.

#### 4.6.2.5 Category 3

Complex structures which require sophisticated analysis or with any of the following:

- high structural redundancy;
- unconventional, novel or esoteric design aspects;
- any span exceeding 50m;
- skew exceeding 45°;
- difficult foundation problems;
- moveable bridges;
- access gantries;
- bridges with suspension systems;
- steel orthotropic decks;
- internal grouted duct form of post tensioned concrete structures; and
- earth retaining structures of at least 14m height.

### **4.6.3 Inspection procedures before a new or amended highway structure is “adopted”**

#### **4.6.3.1 Introduction**

Highway structures are continually being constructed and may at some stage become adopted as part of the city’s highways. There are also existing structures which may be amended by developers and others and have to be checked before they are “re adopted”. This set of procedures is to be followed before the Council can accept the structure as part of the adopted Highway. These procedures are based on those outlined in CSS’s Management of Highway Structures Bridge Code. Firstly definitions:-

#### **4.6.3.2 General Inspection (GI).**

A general inspection is a visual inspection of all parts of the structure without making use of access equipment. This is usually done every two years.

#### **4.5.3.2 Principal Inspection (PI)**

A principal inspection is a close inspection of all accessible parts, within touching distance. If required access equipment is to be used. This is usually done every six years.

#### **4.6.3.3 Acceptance Inspection (AI)**

An acceptance inspection is a one off inspection carried out prior to handover. The purpose is to handle the changeover of responsibility from one organisation to another. The standard is to be that of a PI, and include development of a snagging list if found necessary. The purpose of the AI is to identify any snags, but more importantly to create a Record of the structure for future maintenance. The timing of the AI must be whilst the contractor is still on site (to provide access equipment), and there is sufficient time to rectify such defects. It must also be before opening the structure to traffic.

#### **4.6.3.4 Procedures**

- During construction, the works shall be inspected by the Council’s representative.
- The date for the AI is to be agreed between the Contractor and the site inspectors.
- The contractor is to provide the necessary access equipment for the AI.
- Ideally the AI should be carried out by the contractor and the site inspectors.
- Any snagging is to be rectified within an agreed period with the contractor.
- Prior to the final handover before adoption, a final inspection is to be done to ensure all defects are rectified. However the standard of inspection will depend on the period since the AI. If it is within one year, a GI can be implemented. If it is over one year, a PI must be followed. The cost of any access provisions to be borne by the developer.

The handover must include the completion of the following (where appropriate), Approval in Principal, Design and Check certificates, calculations, as built drawings, Acceptance Inspection report, and Maintenance Schedule with list of suppliers.

#### 4.7 Notes to be shown on Section 38 Agreement Plans

##### GENERAL NOTES - ADOPTION OF ROADS AND HIGHWAY DRAINS

1. Roads, footways and cycleways to be adopted under Section 38 of the Highways Act 1980 shall comply with the Council's 'Highway Design Guide' and be in accordance with the Highways Agency Design Manual for Roads and Bridges.
2. Highway drains to be adopted under Section 38 of the Highways Act 1980 shall comply with the Water UK Guide 'Sewers for Adoption 6<sup>th</sup> Edition'.
3. ALL adoptable pipe work for highway drains to be minimum concrete Class 120 to BS 5911 or minimum clay Class 120 (28 kN/m crushing strength if 150 mm diameter) to BS EN 295-1 and laid on Class S Granular bed unless shown otherwise.
4. All drainage laid within the highway should have a minimum cover of 0.9m measured from the top of the pipe barrel to the finished road surface.
5. Where pipe work has less than 1.2m cover under roads and 0.9m cover under drives and gardens, the pipes are to be surrounded with 150mm of Class ST4 concrete with flexibility of joints maintained as stated in Clause 5.2.26 of the Water UK Guide. Concrete bed and surround to pipe work shall use sulphate-resisting cement.
6. All drainage under proposed adoptable roads and footways to be minimum 150 mm diameter.
7. Manhole covers and gully grates to be adopted shall be kite marked and to BS EN124, Class D400.
8. All connections to highway drains must be made via factory made junctions.
9. All gullies pots to BS 5911 shall have a minimum size of 900 mm x 450 mm.
10. All drainage under the proposed adoptable roads must be backfilled with an approved graded granular material.
11. All planting in visibility splays to be agreed and approved by the Engineer and in all cases no planting to be above 600 mm in height above the carriageway. Also no obstructions of any kind are permitted within the visibility splay areas.
12. Rear of visibility splays to be delineated with a continuous 50 x 150mm precast concrete Type EF square edging set at a level to enable the grass (if any) to be cut.
13. ALL adoptable road, footway and footpath finished surface levels to be a minimum 150mm below any damp proof course levels adjacent to the highway.
14. In drainage easement areas no buildings, walls or other structures, no planting of trees, shrubs or hedges and no private drains or manholes are permitted.
15. The developer shall provide the Council with a satisfactory colour CCTV survey and an "As Constructed Drawing" of all highway drains prior to the commencement of the maintenance period.
16. The developer shall provide road markings and signs to the Council approval.

# HIGHWAY DESIGN GUIDE

## Part 5 PAVEMENT CONSTRUCTION

### 5.1 Carriageway Design Specification

#### 5.1.1 Sustainability

The designs and specifications of material proposed within this guide are based on national standards. Consideration will be given to the use of any alternative material that has a recycled or reused material content, subject to it achieving a comparable performance specification. The use of these material supports the Council's Delivery a More Sustainable City SPD and is in accordance with the Regional Spatial Strategy including Preferred Option Policy SR3.

#### 5.1.2 Methodology for design of prescriptive construction.

The different types of public streets that may be required in a new development have been itemised in the street hierarchy section of this guide.

The pavement design has been based on a 40 year design life. This is to ensure the maximum life of pavement for the Council and to allow for the fact that there may not be accurate level control on construction layers.

The designs have been based on Design Manual for Roads and Bridges Volume 7, HD 26/01 as this considered more appropriate to the size of schemes being considered rather than the updated HD26/06. Foundation design is similarly based on HD25/94, rather than its successor, Interim Advice Note IAN73/04.

If a developer cannot provide accurate traffic flows for a proposed development they must use the generic designs and pavement options that are contained in this document. However a developer may submit an alternative design based on traffic flows to provide a forty year design life. This would have to be checked and approved by the Council.

Similarly if the Council feel that a development falls outside of the sizes assumed in the generic design list they will request a design based on the proposed traffic flows for the development. Any works to the Class A and B roads on the primary route network will require consultation with the Council to agree the appropriate standards for the design of the carriageway works.

#### 5.1.3 Materials

In certain circumstances the design of alternative materials to those included in this guide may be permitted. When alternative materials are proposed the acceptance of these will be subject to the material meeting the appropriate requirements for quality, durability, maintainability and sustainability.

For developments that fall within the city centre development area reference will need to be made to Coventry City Councils Streetscape design guide on the permitted palette of materials that can be used.

#### 5.1.4 Installation

All construction works and laying of materials shall comply with BS594987:2007 and be in accordance with the requirements in the Specification for Highway Works.

## 5.2 Construction Specification for Roads and Footways

The Specification below is set out generally in the manner of Appendix 7/1 of the Highway Agency's Specification for Highway Works.

To determine the specification for a given road, drive crossing, footway or cycleway refer to Schedule 1.

This refers you to Schedule 2 for the general requirements for surface regularity and Schedule 3 for the layer thicknesses and acceptable material types. Sub-base and capping layer thicknesses are also identified. The material references given in Schedule 3 are then explained in Schedule 4.

For PT1 roads developers may in some cases have their own traffic flow data. The Council will consider alternative designs based on this data providing that a 40 year design life is assumed. The same applies to the use of alternative and sustainable materials, provided the design is to national standards with the same design life.

### 5.2.1 Permitted Pavement Options – Schedule 1

Area	General Requirements	Permitted Pavement Option (see Schedule 3)
Local Distributor Road / Connecting Street Non-residential Access Road for developments Exceeding 2 ha.	Schedule 2	PT1 (Flexible)
Local Residential Street Non-residential Access Road for Developments 2ha. or less	Schedule 2	PT2 (Flexible)
Shared Use Street	Schedule 2	PT3 (Blockwork)
Footway, Footpath or Cycleway (Remote from Carriageway - Pedestrian / Cycles Only). Also adequate for occasional car-only overrun	Schedule 2	PT4 (Flexible) PT6 (Blockwork)
Footway or Cycleway (Adjacent to Carriageway – Risk of Heavy Vehicle overrun)	Schedule 2	PT5 (Flexible) PT7 (Blockwork)
Emergency Crossing	Schedule 2	PT2 (Flexible) PT3 (Blockwork)
Blockwork Feature Areas in Local Residential Street	Schedule 2	PT3 (Blockwork)
Industrial / Commercial Crossing	Schedule 2	PT2 (Flexible) PT3 (Blockwork)
Domestic Crossing	Schedule 2	PT5 (Flexible) PT7 (Blockwork)
Crossing to Car Park (less than 10 vehicles)	Schedule 2	PT5 (Flexible) PT7 (Blockwork)
Crossing to Large Car Park (10 or more vehicles)	Schedule 2	PT2 (Flexible) PT3 (Blockwork)
Footway using Concrete Paving Flags pedestrian use only	Schedule 2	PT8 (Flag Paving)
Footway and Crossing using Concrete Paving Flags Vehicle use	Schedule 2	PT9 (Flag Paving)

**5.2.2 GENERAL REQUIREMENTS – SCHEDULE 2**

Requirement		PT1, PT2	PT3	PT4, PT5, PT6, PT7, PT8, PT9
Grid for checking surface levels of pavement courses	Longitudinal dimension	10m	10m	10m
	Transverse dimension	At Channels and lane lines	At Channels and centre line	At Channels only
Surface regularity		See Table A below	Not Required	Not Required
Interval for measurement of longitudinal regularity		75m	Not Required	Not Required
Interval for measurement of transverse regularity		5m	Not Required	Not Required
Whether Surface Texture* is required:		Required	Not Required	Not Required

\* Surface texture is defined as the roughness of the road surface as determined by the volumetric patch method described in BS594987 Section 8, and tested in accordance with BS EN13036-1. The test involves application of a known volume of sand to the road surface and spreading it out in a circle using a rubber disc. The larger the circle, the lower the texture depth as this can be mathematically related to the volume of a cylinder, based on the diameter of the circle and the volume of the sand.

<b>TABLE A</b>	<b>Measurement of Longitudinal Regularity</b>				
	Maximum number of surface irregularities permitted in a Road Type PT1 or PT2 when tested using a Rolling Straight Edge in accordance with the method described in TRRL Report SR290				
Irregularity Limits	Larger than 4mm		Larger than 7mm		10mm or more
Length of road section	300m	75m	300m	75m	Any
Maximum permitted number of irregularities	20	9	2	1	0

5.2.3 Permitted Construction Materials - Schedule 3

<b>PART A: CARRIAGEWAYS</b>						
	<b>PT1</b>		<b>PT2</b>		<b>PT3</b>	
<b>Pavement Layer</b>	<b>Material Ref</b>	<b>Thickness (mm)</b>	<b>Material Ref</b>	<b>Thickness (mm)</b>	<b>Material Ref</b>	<b>Thickness (mm)<sup>c</sup></b>
Surface Treatment	ST1 <sup>a</sup>	-	ST1 <sup>a</sup>	-	-	-
Surface Course	SC1, SC1R or SC2 <sup>b, g</sup>	35 <sup>b</sup>	SC2 or SC4	30	BLK1	80
Hot Rolled Asphalt	or SC3 <sup>c</sup>					
Laying Course Sand <sup>d</sup>	-	-	-	-	LCS1	30
Binder Course	BC1	65 <sup>b, c</sup>	BC1	70	BC2	125
Base	B1	160 <sup>e, f</sup>	B1	100	-	
Sub-base	SB1	(see below)	SB1	(see below)	SB1 or SB2	(see below)
Capping Layer	CL1	(see below)	CL1	(see below)	CL1	-
<b>Total Thickness (Excludes Capping Layer &amp; Sub-base)</b>		<b>260</b>		<b>200</b>		<b>235</b>

For material references and details see schedule 4

<sup>a</sup> Refer to drawings for extent of surface treatment where specified

<sup>b</sup> Where SC2 is used, reduce thickness to 30mm and increase BC1 to 70mm

<sup>c</sup> Where SC3 is used, increase thickness to 45mm and reduce BC1 to 55mm

<sup>d</sup> Based on BS7533-2 Cat II

<sup>e</sup> The thickness of 160mm will be satisfactory for Class C local distributor and connecting streets but greater thicknesses are likely to be required for Class A and Class B local distributor roads.

<sup>f</sup> Laid in 2 layers

<sup>g</sup> Surface course laid on roundabout circulatory areas and approaches are subject to higher Polished Stone Value (PSV) and Aggregate Abrasion Value (AAV) requirements than those required on 'non event' sections. An additional Thin Surface Course System, ST1R is included in Schedule 4 for use at roundabout circulatories and approaches. Surface course selection will be based on site specific geometry and commercial vehicle loading and detailed specification of which material to use and its extent is beyond the scope of this specification. Surfacing details for all sites containing roundabouts shall therefore be agreed with the Engineer prior to start of works.

Capping Layer/Sub-base

Subgrade CBR	Capping Thickness (with 150mm Sub-base) (PT1 & PT2) (mm)	Sub-base only thickness ( PT1 & PT2) (mm)	Sub-base only thickness (PT3) (mm)
Less than 2%	600 (+150 sub-base)	N/A	400
2% to 5%	400 (+150 sub-base)	350	350
Greater than 5%	N/A	250	150

<b>PART B: FOOTWAYS</b>								
	<b>PT4<sup>d</sup></b>		<b>PT5<sup>e</sup></b>		<b>PT6<sup>d</sup></b>		<b>PT7<sup>e</sup></b>	
<b>Pavement Layer</b>	<b>Material Ref</b>	<b>Thickness (mm)</b>						
Surface Course	SC4	20	SC4	20	BLK2	65	BLK1	80
Laying Course	-	-	-	-	LCS1	30	LCS1	30
Binder Course	BC1	50	BC1	70	-	-	BC1	70
Sub-base	SB1 or SB2	100	SB1 or SB2	150	SB1 or SB2	150	SB1 or SB2	150
<b>Total Thickness</b>		<b>170</b>		<b>240</b>		<b>245</b>		<b>330</b>

For material references and details see schedule 4

<b>PART C: FOOTWAYS AND CROSSINGS USING CONCRETE PAVING FLAGS</b>				
	<b>PT8</b>		<b>PT9</b>	
<b>Pavement Layer</b>	<b>Material Ref</b>	<b>Thickness (mm)</b>	<b>Material Ref</b>	<b>Thickness (mm)</b>
Surface Course	FLG2	65	FLG1	80
Laying Course	LCS1	30	LCS1	30
Base	-	-	BC1	70
Sub-base	SB1 or SB2	150	SB1 or SB2	150
<b>Total Thickness</b>		<b>245</b>		<b>330</b>

5.2.4 Requirements for Construction Materials – Schedule 4

Schedule 4:															
Material Ref	SHW Clause	Description	Requirement												
CL1	N/A, (CCC Spec)	Capping Layer Class 6F5 (CCC Specification) Selected Granular Material (Type W75)	Imported on to the Site. Plasticity Index of material less than 0.425mm shall be Non Plastic Los Angeles Coefficient BSEN13242 LA <sub>60</sub> Grading Specification ( BS1377 test 7) <table border="1"> <thead> <tr> <th>Sieve Size</th> <th>% Passing</th> </tr> </thead> <tbody> <tr> <td>75mm</td> <td>100</td> </tr> <tr> <td>37.5</td> <td>45-75</td> </tr> <tr> <td>5mm</td> <td>5-40</td> </tr> <tr> <td>0.6mm</td> <td>0-15</td> </tr> <tr> <td>0.075mm</td> <td>0-15</td> </tr> </tbody> </table>	Sieve Size	% Passing	75mm	100	37.5	45-75	5mm	5-40	0.6mm	0-15	0.075mm	0-15
Sieve Size	% Passing														
75mm	100														
37.5	45-75														
5mm	5-40														
0.6mm	0-15														
0.075mm	0-15														
SB1	803	Type 1 unbound mixtures													
SB2	807	Type 4 (Asphalt Arisings) Unbound Mixtures	Where required by the Engineer, Type 4 shall be assessed by a trafficking trial, as described in SHW clause 802, Para 12-18												
B1	906	Dense Base Asphalt Concrete (Recipe Mixture) AC32 dense base 40/60	Material shall conform to BSEN13108-1 and the detailed requirements of PD6691 Annex B including table B11 Aggregate 1. The fine aggregate may contain crushed glass 2. Gravel coarse aggregate and sand fines shall not be used Installation 3. Material shall be installed in accordance with BS594987:2007. 4. Maximum layer thickness shall be 100mm 5. Minimum Temperature on arrival 130°C 6. Minimum Temperature prior to rolling 100°C												
BC1	906	Dense Binder Course Asphalt Concrete (Recipe Mixture) AC20 dense bin 40/60 rec	Material shall conform to BSEN 13108-1 and the detailed requirements of PD6691 Annex B including Table B11 Aggregate 1. The fine aggregate may contain crushed glass 2. Gravel coarse aggregate and sand fines shall not be used Installation 3. Material shall be installed in accordance with BS594987:2007 4. Maximum layer thickness shall be 90mm 5. Minimum Temperature on arrival 130°C 6. Minimum Temperature prior to rolling 100°C												

<b>Schedule 4:</b>			
<b>Material Ref</b>	<b>SHW Clause</b>	<b>Description</b>	<b>Requirement</b>
ST1	924	High Friction Surfacing	Type Classification [924.3]: Type 1 Minimum PSV [924.4]: 72+ Aggregate Calcined Bauxite shall be buff coloured on approaches (and dark grey between stop line and studs where applicable). The use of Thermoplastic HFS is not permitted
SC1	942	Thin Surface Course Systems (10mm size aggregate)	Site Information 1. The site has maximum traffic of 400 cv/lane/day. 2. The site stress level is 0 Material Information 3. The minimum declared PSV of the coarse aggregate shall be 60 4. The maximum AAV of the aggregate shall be 16 5. The wheel tracking performance level shall be Level 1 6. The road/tyre noise reduction shall be Level 2 Installation 7 System shall be installed by BBA HAPAS approved contractor in accordance with a BBA HAPAS approved Method Statement. 8 The initial and retained macrotexture depth performance level for the site shall be that required for Level 1 Performance Guarantee 9 The material shall be subject to the performance guarantee as described in Clause 942: 16

<b>Schedule 4:</b>			
<b>Material Ref</b>	<b>SHW Clause</b>	<b>Description</b>	<b>Requirement</b>
SC1R (For roundabouts and approaches)	942	Thin Surface Course Systems (10mm size aggregate)	<p>Site Information</p> <ol style="list-style-type: none"> <li>1. The site has maximum traffic of 400 cv/lane/day.</li> <li>2. The site stress level is 2</li> </ol> <p>Material Information</p> <ol style="list-style-type: none"> <li>3. The minimum declared PSV of the coarse aggregate shall be 68</li> <li>4. The maximum AAV of the aggregate shall be 14</li> <li>5. The wheel tracking performance level shall be Level 2</li> <li>6. The road/tyre noise reduction shall be Level 2</li> </ol> <p>Installation</p> <ol style="list-style-type: none"> <li>7. System shall be installed by BBA HAPAS approved contractor in accordance with a BBA HAPAS approved Method Statement.</li> <li>8. The initial and retained macrotexture depth performance level for the site shall be that required for Level 1</li> </ol> <p>Performance Guarantee</p> <p>The material shall be subject to the performance guarantee as described in Clause 942: 16</p>
SC2	N/A	Stone Mastic Asphalt SMA 6 surf 40/60	<p>Material shall conform to BSEN 13108-5 and the detailed requirements of PD6691 Annex D including Table D1</p> <p>Aggregate</p> <ol style="list-style-type: none"> <li>1. Sand fines shall not be used</li> <li>2. The minimum declared PSV of the coarse aggregate shall be 60</li> <li>3. The maximum AAV of the aggregate shall be 16</li> </ol> <p>Installation</p> <ol style="list-style-type: none"> <li>4. Material shall be installed in accordance with BS594987:2007</li> <li>5. Minimum Temperature on arrival 130°C</li> <li>6. Minimum Temperature prior to rolling 100°C</li> </ol>

Schedule 4:			
Material Ref	SHW Clause	Description	Requirement
SC3	911	Hot Rolled Asphalt HRA35/14 F surf 40/60 des	Material shall conform to BSEN 13108-4 and the detailed requirements of PD6691 Annex C including Table C.2A ( Design Mix) Aggregate 1. The minimum declared PSV of the coarse aggregate shall be 50 Coated Chippings 2. Coated Chippings shall be 14/20mm size and shall conform to the requirements of BSEN13108-4 and PD6691 Annex C Clause C2.8.2 3. The minimum declared PSV of the coated chippings shall be 60 4. The maximum AAV of the coated chippings shall be 14 Installation 5. Material shall be installed in accordance with BS594987:2007 6. Minimum Texture Depth 1.2mm (BS594987 8.2) 7. Minimum Temperature on arrival 140°C 8. Minimum Temperature prior to rolling 85°C
SC4	909	6mm Dense Asphalt Concrete Surface Course (Recipe Mixture) AC6 dense surf 100/150	Material shall conform to BSEN 13108-1 and the detailed requirements of PD6691 Annex B including Table B15 Aggregate 1. Gravel coarse aggregate and sand fines shall not be used 2. Minimum declared PSV of the coarse aggregate shall be 55 Installation 3. Material shall be installed in accordance with BS594987:2007 4. Minimum Temperature on arrival 120°C 5. Minimum Temperature prior to rolling 95°C
BLK1	-	Concrete Paving Blocks	Concrete Paving Blocks shall be 100 x 200x80mm work size Blocks shall be supplied in accordance with BSEN 1338:2003 Blocks shall be laid in accordance with BS7533-3 in a herringbone laying pattern unless otherwise agreed by the Engineer
BLK2	-	Concrete Paving Blocks	Concrete Paving Blocks shall be 100 x 200x65mm work size Blocks shall be supplied in accordance with BSEN 1338:2003 Blocks shall be laid in accordance with BS7533-3 in a herringbone laying pattern unless otherwise agreed by the Engineer
LCS1		Laying Course Sand	Laying Course Sand shall be Category II in accordance with BS7533-3 Table D2 and D3

<b>Schedule 4:</b>			
<b>Material Ref</b>	<b>SHW Clause</b>	<b>Description</b>	<b>Requirement</b>
FLG1		Small Element Concrete Flags	Concrete Paving Flags shall be 400x 400x80mm work size Flags shall be supplied in accordance with BSEN 1339:2003 Flags shall be laid in accordance with BS7533-4
FLG2		Small Element Concrete Flags	Concrete Paving Flags shall be 400x 400x65mm work size Flags shall be supplied in accordance with BSEN 1339:2003 Flags shall be laid in accordance with BS7533-4