GUIDELINES FOR
PLANNING FOR PUBLIC TRANSPORT IN DEVELOPMENTS

THE INSTITUTION OF HIGHWAYS & TRANSPORTATION

GUIDELINES FOR
PLANNING FOR PUBLIC TRANSPORT IN DEVELOPMENTS

Foreword

by Glenda Jackson MP, Minister for Local Transport, and
Richard Caborn MP, Minister for the Regions, Regeneration and Planning

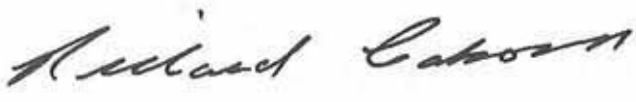
The Government's White Paper, *A New Deal For Transport: Better For Everyone* has charted a course to a better, more integrated transport system – leading to less congestion, less pollution, and less dependency on the car. The aim of our policies must be to increase personal choice by improving the alternatives to the car and securing mobility which is sustainable in the long term.

Most of us would use public transport more if it offered a better service and a genuine alternative. Too often in the past, developments – new houses, shopping centres, factories, warehouses – seem to have been thrown up without any consideration of how they could be reached by public transport. Indeed, there are many examples where developments appear designed to make this as difficult as possible. We have to make these mistakes a thing of the past and ensure that developments are served by the kind of public transport which people want to use.

Planning policies – reducing the need to travel – will be an essential part of integrated transport strategies. The issue is about all aspects of the location and design of developments as they relate to public transport. These Guidelines are a very welcome expression of the kind of "joined-up thinking" we need to start making a difference.

The Institution Of Highways & Transportation is to be applauded for bringing forward such a timely and worthwhile publication. These Guidelines clearly identify the need to think about public transport access at every stage of the planning process; right from initial location of a development, through the layout of buildings, roads and footpaths, to the detailed design of facilities such as bus stops and pavements. We have no doubt that that *Planning for Public Transport in Developments* will prove an invaluable aid for everyone involved in ensuring that in future our built environment enables us to make more sustainable travel choices.

Glenda Jackson MP
Minister for Local Transport



Richard Caborn MP
Minister for the Regions, Regeneration and Planning

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MESSAGE FROM THE PRESIDENT
BILLY MCCOUBREY
IHT PRESIDENT 1998–1999

The design of much of our highway infrastructure has given priority to vehicles over pedestrians and cyclists, and unintentionally has often favoured cars over buses. Access to developments of all types almost always gives priority to the private car. Housing layouts in particular have been dictated by the road hierarchy, from the distributor road to the cul-de-sac. Too often, road design has created places which offer a poor living environment.

Since the publication of Planning Policy Guidance note 13 (PPG13) in 1994, developments have been required to be located and designed so that they reduce growth in the length and number of motorised journeys; encourage alternative means of travel which have less environmental impact; and hence reduce reliance on the private car. The recent White Paper *A New Deal for Transport: Better for Everyone* makes clear that the Government is committed to sustainable development and will promote greater use of walking, cycling and public transport, and discourage use of the car.

Measures to assist public transport are therefore an integral part of good land use and transport planning. However, the planning system now also aims to place much greater emphasis on issues of "place and community" with layouts that enhance these qualities. The changes needed to encourage public transport are consistent with the need to improve access, safety and environmental quality. These Guidelines are intended to show how it can be done. They concentrate on the technical requirements for public transport, but reflect the new emphasis on high quality, sustainable developments that reflect the character of the local area. For residential developments in particular, the DETR guide *Places, Streets and Movement* offers advice to local authorities on the design and layout of residential roads and footpaths to create movement networks where vehicles are catered for but do not dominate, and which are based on the nature of the place.

Planning for Public Transport in Developments is a set of Guidelines to assist those seeking to promote the use of public transport through the physical location and design of developments. The approach recommended emphasises first the need to locate new developments where they can be well served by public transport (whether existing or improved services). Second, the development should be laid out so that, as well as creating a place with character and a quality environment, it can be served well by public transport with services that will be attractive to passengers, including those who have the option to use a car. This involves simultaneously locating buildings, designing a bus route, locating bus stops or stations and designing a network of footpaths and cycle routes to the stops or stations, rather than giving priority to any single

aspect. Today, public transport and its network of pedestrian routes is often fitted in to a *fait accompli* of a committed development. The third stage, for detail planning permission, is to make sure the detail design of the roads, bus stops, footpaths and information sources makes the use of public transport at least as easy as using a car.

We would like to thank all those involved in the production of this document. Particular thanks must go to the members of the Steering Group, the local authorities and organisations that provided information and illustrations, and the associations and institutions consulted on the draft. Special thanks must be given to the organisations that provided the finance which made it possible to undertake this project: London Transport; the Passenger Transport Executive Group; the Rees Jeffries Road Fund; and the Department of the Environment, Transport and the Regions.

We hope that these Guidelines will hasten the improvement of conditions for public transport users in the UK.

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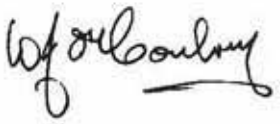

President
1998–99

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Executive Summary

Introduction

Since the publication of Planning Policy Guidance note 13 *Transport* (PPG13) in 1994, developments have been required to be located and designed so that they reduce growth in the length and number of motorised journeys; encourage alternative means of travel which have less environmental impact; and hence reduce reliance on the private car. The recent White Paper *A New Deal for Transport: Better for Everyone* makes clear that the Government is committed to sustainable development and will promote greater use of public transport, walking and cycling, and discourage use of the car. The Royal Commission on Environmental Pollution set a target to increase the proportion of passenger kilometres carried by public transport from 12% in 1993 to 20% by 2005 and 30% by 2020. The White Paper does not endorse these specific targets, but its policies aim to increase the proportion of travel carried by public transport.

The main objective of these Guidelines is to describe best practice in linking developments to the existing public transport system and in providing for public transport within existing and new developments. The Guidelines are about the location and design of developments as they relate to public transport, not only about public transport facilities. The emphasis of these Guidelines is on planning, layout and engineering – what to do and how to do it. Those involved in the development process also need to put a new emphasis on achieving good design. Good urban design, a concern for the overall quality of new development and the built environment as a whole, is necessary for the creation of attractive living environments which work well for everyone.

During recent decades, many developments have been unsatisfactory because their layout design has focused on the movement and parking of vehicles at the expense of other considerations. The DETR guide *Places, Streets and Movements* sets out an approach that is intended to prevent residential developments being dominated by roads and vehicles and becoming standardised. Reconciliation between the quality of place, the requirements of road design and the provision of public transport is not straightforward. For all schemes, a development brief or framework should be established at the outset. This should be done by the developer in close liaison with the local authority. Key factors to consider are:

- The nature of the place where development is to occur, including local topography, character, existing building types and layouts;
- How the development relates to its surroundings, including movement routes;
- The framework of the development to provide for all forms of travel, including walking, cycling and public transport with networks of spaces and movement patterns that work well for everybody; and
- The need for buses to serve the development efficiently without dominating it. Good public transport can reduce car dependency and improve the environment for everybody. Particularly in residential areas, streets and spaces must contribute to a high quality public realm and not be designed primarily for the movement of vehicles.

These Guidelines show how developments can be laid out to allow bus services that are attractive to passengers and economic to operate, by using routes that allow buses to serve a development without delays, while locating bus stops close to passengers' destinations. For a development to be efficient to serve by public transport, and to have good access by walking

and cycling, consideration must be given to its location, size, density, type and mix of uses, hierarchies of roads and parking provision.

The approach recommended involves:

- First, locating new developments where they can be easily served by public transport (existing or slightly extended services), walking and cycling.

- Second, when seeking outline planning permission, design the layout of the development so that it can be served by public transport that is attractive to passengers, including those who have the option to use a car, and efficient and economic for its operator. This involves designing the public transport and pedestrian routes at the same time as buildings and car parks are being positioned. The bus route needs to be progressive without diversions into loops or culs-de-sac; bus stops or stations need to be as near the doors of destinations as are the car parks; the footpath and cycle route network to the stops or stations needs to be direct and of high quality; bus stops should, if possible, be located at local centres so that footpaths and cycle routes can serve both stops and centres; and, buildings should be positioned for easy access from stops, stations and footpaths. The traditional approach of laying out roads and positioning buildings, and only then trying to fit public transport and its associated network of pedestrian routes into a *fait accompli*, rarely leads to satisfactory public transport provision.

- Third, for detail planning permission, make sure the detailed design of the roads, bus stops, footpaths and information sources makes the use of public transport as easy as using a car.

At each of these stages, balance must be struck between the requirements for attractive public transport services and a high quality environment for everyone that is not dominated by over-large roads.

Public transport can compete with the car on routes where it can offer an attractive service. This requires a package of measures, including quality public transport, bus priorities, park-and-ride services and restrictions or pricing to manage car parking in town centres and at other destinations in congested areas. National and local policies now emphasise limiting traffic growth, reducing reliance on the car, and encouraging the use of public transport, walking and cycling. Developments that do not take account of these policies will, increasingly, be unlikely to be permitted.

At each stage of the planning of a development it is important to consult on how to make it easy for public transport to serve. It is important to consult the Passenger Transport Executive or local authority Transport Co-ordinating Officer at an early stage of the development process, preferably before firm agreements are made between a developer and a particular public transport operator.

At the earliest stage of planning the development, the local authority will start to consider what contributions it will require from the developer towards the cost of works to improve accessibility and to accommodate the travel and traffic generated. Improved public transport services and improvements to the highway network to assist public transport operation should be considered alongside any highway improvements to cater for generated traffic.

Passenger Requirements For High-Quality Public Transport

To attract passengers, a public transport service must satisfy travellers' requirements; it must serve routes that link the principal origins and destinations of trips, offer a high frequency

service, be reliable and quick, use high quality vehicles and staff and be affordable. To be viable, the service must not incur ongoing costs greater than its revenue. The location and layout of a development must seek to minimise the costs of public transport operation and to maximise revenue potential. The quick journeys required by bus passengers and the minimisation of bus miles required by operators are both achieved by routes that are direct and which avoid delays due to congestion.

Developments, whether in urban or rural areas, should be located to be served by existing public transport networks without circuitous diversions, loops and cul-de-sac extensions. Routes within developments should be reasonably direct, with final destinations on either side of the route and close to bus stops, while being sensitive to the type of development and not dominating residential developments. Direct routes do not imply straight roads, and steps to avoid congestion are mainly concerned with the junctions that connect the development to the surrounding road network.

Public transport must provide a high quality product to attract car users who have a more convenient and often cheaper alternative available. Quality Partnerships are important as a method of ensuring commitment to high levels of quality from both operators and local authorities.

The target market for public transport must be the whole of the population, rather than the non-car owners who constitute traditional bus users. The design of a development must cater for the needs of travellers walking to and from a bus stop, waiting for the bus or cycling to a railway station. These parts of a journey have a major effect on the attractiveness of public transport.

Where ridership is likely to respond to a good public transport service in the longer term, so that financial support for a service to a development can eventually be removed, then pump priming to start the service is a viable option. It must be given a time limit of, say, five years. If the service is likely to require ongoing public funding, then careful consideration should be given to the value for money achieved relative to revenue support for other services.

Encouraging Public Transport Use

Public transport can only attract and retain passengers if the services it offers match the requirements of travellers and are of a sufficiently high quality. But simply providing the services is not enough, on its own, to attract passengers. People need to be told what is available and how to use it, and organisations that generate travel need to arrange their affairs to encourage public transport use.

Lack of information about services is one of the major barriers to public transport use. Providing information for potential passengers is an adjunct to providing and managing a public transport service. Network information should provide a route map covering all services in an area, regardless of operator, plus basic service details. Service information providing timetable and route information for a single service or group of services, as in timetable leaflets, is also vital. Information at bus stops is important as this is often the first point of contact with the network; real time information can give confidence in the service.

Green Commuter Plans and Company Travel Plans promote the use of environmentally friendly forms of travel. Green Commuter Plans target workplaces and the means staff use to travel to work, whereas Travel Plans are more wide-ranging and are aimed at both staff and visitors, and include business travel as well as commuting. The main aim of a Green Commuter Plan is to reduce reliance on the car and to encourage the use of more sustainable forms of transport. The alternatives must be attractive, some deterrence to car use may be needed and the plan must have the active support of senior management. Green Travel Plans

are sometimes being required as a condition for planning permission, and this is likely to become a more common requirement.

Location Of Developments And Planning Principles

The White Paper *A New Deal for Transport: Better for Everyone* sets out the key role that Regional Planning Guidance (RPG) has to play through the regional transport strategy in meeting the objective of promoting public transport. RPG should provide a locational framework which will guide major developments to locations where a range of transport modes either is, or can be, provided. It should include public transport accessibility criteria for regionally or sub-regionally significant levels or types of development, advise on the approach to be taken to standards for the provision of off-street car parking, and provide a strategic context for demand management measures such as congestion charging. The regional transport strategy will provide the context for the preparation of development plans and local transport plans.

New commercial activities and developments should be focused on existing centres, since these are usually already linked to the public transport system. The sequential approach to preferred locations described in PPG6 *Town Centres and Retail Developments* means choosing first sites in traditional town centres, then edge-of-centre sites, then district and local centres and only then out-of-centre sites that are accessible by a choice of means of transport. Edge-of-town and out-of-town developments are very difficult to serve by public transport and are to be avoided.

It has been standard practice to consider the potential catchment for a development in terms of the population within certain drive times by car. The local planning authority should also assess the accessibility of a development by public transport, walking and cycling, particularly in view of the policies set out in the White Paper *A New Deal for Transport:Better for Everyone.* This should be done before sites are selected, and not after locations and site layouts have been determined.

There are two aspects to identifying public transport accessibility:

- access to public transport, which measures how far a location is from the public transport network and the level of service on that network; and
- access by public transport, which takes account of where the services go and identifies the public transport catchment areas.

Access by public transport should be measured in terms of travel time and cost, both absolute values and relative to travel by car.

A major public transport node provides the opportunity for a higher density of development. High density, high trip generating activities should be located in areas of good public transport accessibility. Policies and standards for parking should also reflect accessibility to public transport, with reduced maximum parking standards in the better-served locations.

Outline Planning – The Layout Of Developments

The planning system aims to achieve a balance between many factors to create places which are attractive and which work for everyone. The layout of a development should consider together the arrangement of buildings, street patterns, spaces, roads, footpaths, parking and movement patterns. Residential developments, in particular, need to respect the existing local character of the area and aim for residential amenity and a high quality environment. New developments should be located where they can be well served by existing public transport or

slightly extended services. The points at which buses enter and leave a development should be compatible with the local public transport network and allow efficient routeing through the development.

Bus routes through a development should be reasonably direct without loops or back-tracking in culs-de-sac, whilst supporting positively the nature of the place. Footpaths from buildings to bus stops and stations are also part of the public transport system, and should be designed to be as direct, safe and easy to use as possible. Bus stops must be positioned where they are safe for traffic as well as convenient for passengers, and buildings positioned so that their entrances are at least as near the bus stop or entrance to the station as they are to the car park. If bus stops can be located at local centres, then the footpath and cycle route networks can serve both stop and centre, and cycle parking at the centre can be used by bus passengers.

If the layout of the development is not designed correctly at the outline planning stage, no amount of detailed improvements and traffic management measures will make it attractive for bus passengers or efficient for bus operators to serve. However, a balance needs to be struck between roads and the creation or maintenance of a high quality environment where roads do not dominate. This provides the context for the following sections.

Developments Served By Existing Bus Routes

A development served by an existing route is likely to be on one side only of the road carrying the bus route, and a safe means of crossing the road must be provided. Bus stops should be as close as possible to the entrances/exits of the buildings that are the final destinations. The walking distance from the bus stop should be no more, and preferably less, than from the car park. Buildings set back from the bus route must be linked to it by footpaths that are direct, well surfaced, well lit and, if possible, protected from the weather.

Developments Served By New Bus Services Or Diversions From Existing Services

In general, the bus route through a development should be as direct as possible, with destinations for bus passengers either side of the route in a corridor whose width involves walks of up to 400m, and preferably no more than 300m, to the route. It is more important to provide frequent bus services that are easy for passengers to understand than to reduce walking distances to bus stops by a few metres. Where pedestrian routes have been fitted into an existing traffic situation, walking distances may be 1.3 times the straight-line distance to the bus stop. For people with mobility impairments, walking distances can be much more than 1.3 times the straight-line distance. These groups must be considered when designing pedestrian routes.

Developments Served By Railway Stations

When a development is served by or close to an existing railway station, the location and layout of the development will be largely determined by the location of the pedestrian entrance to the station. If the station is a new one on an existing line, the choice of possible station locations will be influenced by railway operating considerations. Early consultation with Railtrack is essential. A significant difference between rail– and bus–served developments is that people have been found to be willing to walk about twice as far to an office from a station as from a bus stop; up to at least 800m for rail, compared to about 400m for bus.

Bus Stop And Car Park Locations

The maximum walking distance to a bus stop should not exceed 400m and preferably be no more than 300m. Bus services should not be distorted to satisfy this criterion. Direct and

simple bus routes are more important than walking distances a little more than 400m for a few passengers or destinations.

Bus stop locations are constrained by considerations of traffic safety and congestion, which influence the locations of stops relative to junctions and curves. Building locations, the highway layout and the locations of bus stops should be considered together at the outline planning stage, to ensure that the bus stops can safely be positioned where they are required for passenger convenience.

Bus stops must be sited to enable buses to pull in safely to the kerb and maintain adequate sightlines for departure. Buses at a stop should not create a hazard for other traffic. To function properly, bus stops and their approaches and exits must be kept clear of parked vehicles. Loading restrictions and bus stop clearways can prevent parking at stops, if enforcement is sufficient. Bus boarders that project about two metres from the kerb line at the stop are self–enforcing against parking and avoid delays to buses leaving stops. They also require a shorter length of kerb than do conventional kerbside stops.

Bus bays (lay–bys) allow traffic to delay buses leaving the stop. They should not be used unless they are unavoidable for reasons of road safety or congestion. In areas which have traffic calming or where the local authority wishes to reduce the traffic flow, it is often considered acceptable to make traffic wait behind a bus at a stop. This approach can be taken further by the use of bus boarders. Developers should commission a safety audit of new bus stops to identify potential hazards.

Stops on opposite sides of the road should be staggered so that buses stop tail–to–tail and move off away from each other. At junctions, the staggering of stops should be achieved by locating them on the exit sides of the junction, but as close to the junction as traffic and safety considerations allow. Where a pedestrian crossing is provided, stops should be on the exit sides but as close as safety permits.

The provision of a bus standing place at the service terminal is almost essential for the operation and scheduling of a bus service as it provides a place for a bus to stand before starting its return journey.

Car park and set–down areas, and the access roads to them, should be positioned so that they do not increase the walking distances for bus or train passengers, and so far as possible do not require pedestrians to cross roads. It is easier for cars to change level and to travel further to avoid pedestrian routes than it is for pedestrians to change level or to divert from a direct route to a road crossing.

Detail Planning – Highway Design And Traffic Management

Highway and footpath geometry

Most highway authorities design bus facilities to accommodate all types of bus. The dimensions and manoeuvring capabilities of the largest rigid bus permitted by the DETR on British roads should be used as a benchmark for design. In general, this size of bus needs a road lane width of 3.65m and, when turning, sweeps out a wider path. In residential areas, two–way roads six metres wide can be used for bus routes, to avoid the roads overwhelming the development. At corners and junctions, additional space is needed to accommodate the path swept by the bus. Roads narrower than six metres can be used by midi– and mini–buses. Residents have accepted bus services using small vehicles but objected when large buses were used.

Footways (pedestrian paths alongside roads) and footpaths should be at least 1.8m wide, and preferably two metres to allow prams and wheelchairs to pass. At bus stops the footway should be wider, to leave a 1.8m clear path past the bus shelter and any people waiting. As with roads, footway and footpath widths need to be flexible and considered in the context of their setting. In residential areas, narrower paths may be used for environmental reasons, though the widths given above are needed to function effectively. Wider paths are needed for shared use by cyclists and pedestrians. Footways and footpaths should be hard surfaced, well drained and lit. Footways and footpaths should be designed so that they can be overlooked, for personal security.

Bus stops

Bus stops should be well lit for road safety and personal security reasons, and should provide passengers with clear information about the services using the stop. Convenient locations, shelters, seating and paved areas for waiting, all help to make a bus service more attractive to passengers. Kerb height at a bus stop should be 125mm, except at bus boarders where it should be 160–180mm.

The requirements for bus shelters, signs, information and lighting at bus stops are described in these Guidelines. Inclusion of a public telephone within or adjacent to the stop should be considered. New bus stops should always be accessible to people with a range of disabilities. In particular, they should include space for the ramp or lift that allows passengers in wheelchairs or with buggies or shopping trolleys to board buses.

Where possible, bus stops should be sited on footways that are sufficiently wide to avoid obstruction to pedestrians by waiting bus passengers. If necessary, footways should be widened locally at bus stops to avoid conflicts between waiting passengers and passing pedestrians.

The carriageway near a bus stop should be sound and uniform for the comfort and safety of all passengers, especially for those who are standing. An uneven surface can cause a passenger to fall while waiting to disembark. The carriageway construction at stops should be designed to accommodate oil discharges from buses to avoid on-going maintenance problems. To reduce the risk of splashing waiting passengers, bus stops should be located where the water flow in the road drainage channel is at a minimum.

Bus priority, traffic management and bus–only links

Priority measures for buses are essential for reliable bus services in congested conditions. These can be provided by bus lanes, the design of junctions to bring buses to the front of a traffic queue, by turns for buses only and by operating traffic signals to give buses priority over other traffic. These measures should be considered when the road system of the development is being designed in detail.

With-flow and contra-flow bus lanes are designed to enable buses to move freely, particularly during peak periods. These facilities may be required within a development but, more usually, would be features of the adjacent road network. Bus lanes on existing roads often demand some of the existing highway space, but in a new development they should be provided when the road is constructed, if congestion is anticipated.

Buses can be given priority at road junctions, by permitting buses to make turning movements prohibited to other traffic, by giving priority to flows containing a high proportion of buses, or by adjusting signal controls when a bus is detected in the traffic stream.

Delays to buses can be reduced at signal controlled junctions by the provision of induction loops and bus detection equipment to provide extra green time for buses. The use of such

schemes on the public highway is growing and they can be extended to include access to new and existing developments.

Bus-only streets or links enable buses to maintain their route-patterns and to avoid detours, particularly where road systems have changed. Services can continue to provide access for passengers to business, residential and shopping areas, where such access may be denied to other vehicles.

Traffic calming

Traffic calming schemes should be designed as part of an overall policy for an urban area. Bus stops themselves can provide an element of traffic calming. Traffic calming schemes should be designed with bus operations in mind, for example using horizontal rather than vertical deflections to control traffic speed. Where vertical deflections are the only practical calming measure, speed cushions rather than road humps should be used on bus routes. Traffic calming schemes should be developed only after consultation with the local Passenger Transport Executive or Transport Coordinating Officer, and bus operators. The risk of damage to vehicles may be a deterrent to bus operators from servicing routes on roads with traffic calming. A greater potential effect is the reduced passenger comfort and increased passenger risk on routes in traffic calmed areas.

1. Introduction

The Need for Guidelines

Objectives

1.1 The main objective of these Guidelines is to describe best practice in linking developments to the existing public transport network and in providing for public transport within existing and new developments. The Guidelines are about the location and design of developments as they relate to public transport, not only about public transport facilities. They are intended to provide an initial reference for planners, developers, designers and engineers who need technical advice on how to locate developments and how to provide suitable access and facilities for public transport. Some of the material in the Guidelines is also relevant to providing for public transport on existing highways. References providing additional and more detailed guidance are given at the end of each chapter.

1.2 Application of these Guidelines should lead to public transport in developments that offers a better service and is less expensive to provide. They should also offer benefits and savings to developers. By improving public transport, it should be possible to increase the density of developments and reduce the cost of providing for car parking. In many cases, particularly for employment and retail developments, demonstrating good access by public transport and agreeing to achieve a specified modal split for travellers may be necessary to obtain permission for a development.

Scope and emphasis

1.3 The emphasis in these Guidelines is on planning, layout and engineering – what to do and how to do it. Those involved in the development process also need to put a new emphasis on achieving good design. Good urban design, a concern for the overall quality of new development and the built environment as a whole, is necessary for the creation of attractive living environments which work well for everyone. The policy and planning framework is outlined, but the focus is on the design process that, together with decisions on location, is of crucial importance to the end result. Issues of why to provide for public transport are covered only briefly. The White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998a) provides the policy context for promoting public transport, walking and cycling, and reducing reliance on the car.

Sources of advice and the overall approach

1.4 Four publications have provided much material for these guidelines. These are the IHT manual *Transport in the Urban Environment* (IHT, 1997), *Keeping Buses Moving* (Local Transport Note 1/97, DETR, 1997a), *Better Buses – Good Practice in Greater Manchester* (GMPTE, 1992) and *Bus and Coach Issues for Local Authorities* (CPT, 1997). In some cases foreign examples give useful indications of ideas that could be applied in the UK. However, the recommendations in these Guidelines are all compatible with the existing legislative frameworks for England, Wales, Scotland and Northern Ireland, unless stated otherwise.

1.5 During recent decades, many developments have been unsatisfactory because their layout design has focused on the movement and parking of vehicles at the expense of other considerations. *Places, Streets and Movement* (DETR, 1998b) sets out an approach that is intended to prevent residential developments being dominated by roads and vehicles and becoming standardised, regardless of their situation. These Guidelines show how attractive

and efficient public transport can be provided for developments designed in this way. In particular, the Guidelines indicate how the layout of developments can allow bus services to be attractive to passengers and economic to operate, by using routes that allow buses to serve a development without delays, while locating bus stops close to passengersí destinations. Many recent developments, even where the roads have been designed before the buildings, have road networks that do not permit bus routes that progress reasonably directly without diversions to reach destinations. Direct routes for buses (which do not imply very wide or straight roads) are essential for the provision of services that are attractive to passengers.

1.6 These Guidelines are to assist those seeking to promote the use of public transport through the physical location and design of developments. The approach recommended involves:

- First, locating new developments where they can be easily served by public transport (existing or slightly extended services), walking and cycling.

- Second, when seeking outline planning permission, design the layout of the development so that it can be served by public transport that is attractive to passengers, including those who have the option to use a car, and efficient and economic for its operator. This involves designing the public transport and pedestrian routes at the same time as buildings and car parks are being positioned. The bus route needs to be progressive without diversions into loops or culs-de-sac; bus stops or stations need to be as near the doors of destinations as are the car parks; the footpath and cycle route network to the stops or stations needs to be direct and of high quality; bus stops should, if possible, be located at local centres so that footpaths and cycle routes can serve both stops and centres; and buildings should be positioned for easy access from stops, stations and footpaths. The traditional approach of laying out roads and positioning buildings, and only then trying to fit public transport and its associated network of pedestrian routes into a *fait accompli*, rarely leads to satisfactory public transport provision.

- Third, for detail planning permission, make sure the detailed design of the roads, bus stops, footpaths and information sources makes the use of public transport as easy as using a car.

In many recent developments it has been difficult to provide public transport services that are attractive and can compete with car travel. Developments should be located where they can be served by existing, extended or new public transport (usually bus) and designed for the efficient operation of bus services. Existing railway stations and new stations on existing lines should be exploited where possible. Individual buildings should be positioned to be close to bus stops or stations after the outline public transport system has been decided.

Guidelines, not standards

1.7 These Guidelines attempt to set out best practice. It is recognised that it will not always be possible to meet these criteria and that compromises must sometimes be made. The Guidelines therefore try to indicate the desirable provision and also alternative approaches that may prove satisfactory in certain circumstances. It is the task of the professional planner, designer and engineer to decide if a lower standard is acceptable in given circumstances or if another approach would be more beneficial. The planning and development process needs to strike a balance between various goals to create settlements that are attractive, safe, promote community and sustainability and work for everyone. This involves many more factors than the location, layout design and engineering on which these Guidelines focus.

Guide to the Guidelines

1.8 The Guidelines set out the relevant policy and planning framework for providing public transport in the UK today, stressing the need for integrating regional and local land-use and

transport plans. In this Chapter, paragraphs 1.45 to 1.68 describe the various bodies involved in development, transport planning and transport provision. Chapter 2 lists the features that make public transport attractive to its users and suggests ways to plan and provide high-quality public transport. Chapter 3 describes several activities, such as Green Commuter Plans, to encourage its use. Chapter 4 describes methods for assessing public transport ridership and the transport impact of a development. Chapters 5 to 7 are concerned with the steps necessary at different stages of the design of a development to assist the provision of public transport.

1.9 Chapter 5 considers the locational and planning principles, one of which is to recognise the benefits of concentrating a mix of activities together to gain economies of scale in public transport operations. The application of these principles at the outline planning stage is considered in Chapter 6. Chapter 7 concentrates on the design and traffic management issues that are required for detail planning permission. Chapters 5 to 7 are intended to provide a tool-kit of techniques and examples to help plan for public transport in developments. For local authorities, some of the suggested investments to improve public transport services and efficiency could be used as a list of possible subjects for developer contributions.

Nomenclature

1.10 Where the term "highway" is used this should be taken to mean "road" in Scotland. Legislative and administrative differences for Scotland, Wales and Northern Ireland are shown where necessary. The establishment of a parliament for Scotland will undoubtedly increase administrative differences, so specific procedures for Scotland will need to be checked at the time a development is being proposed.

Background – the growth in car ownership and its effects

Travel by car and public transport

1.11 The mobility offered by mechanised transport has extended the opportunities open to individuals. It has made possible the transformation of urban areas from small self-contained towns to large conurbations and complex urbanised regions. Before 1950 this mobility was mainly provided by public transport. Since then, the growth of private car ownership, from 62 per 1000 people in 1955 to 374 per 1000 in 1996, has been accompanied by a decline in the use of buses, but not of rail services (Figure 1.1).

1.12 The growth in mobility matches growth in personal choice, both being the product of a more affluent society. The resulting patterns of travel are complex and wide-ranging. They are a far cry from the regular journeys – rigid in terms of place and time – traditionally associated with public transport. Journeys for work and school have reduced from 46% of all journeys in 1965 to 28% in 1996, and social and leisure journeys have increased in significance (Table 1.1). Many of the journeys people now make – indeed the lives they now live – would not have been possible using only public transport and walking. Some of the growth in travel by car has resulted from people without a car travelling with those who have. Non-drivers in car-owning households make over 70% of their journeys by car, and even members of households without cars make more than a quarter of their journeys by car – almost as many as by bus (DOT, 1997). The growth in car travel and the decline in the use of buses are mainly consequences of the lifestyles that affluence and the car make possible, but part of the decline has been caused by traffic congestion, which has made bus services slower and less reliable.

1.13 The average journey rates shown in Table 1.1 hide great differences between individuals and areas. Buses are used more by women, older people, those in metropolitan areas and

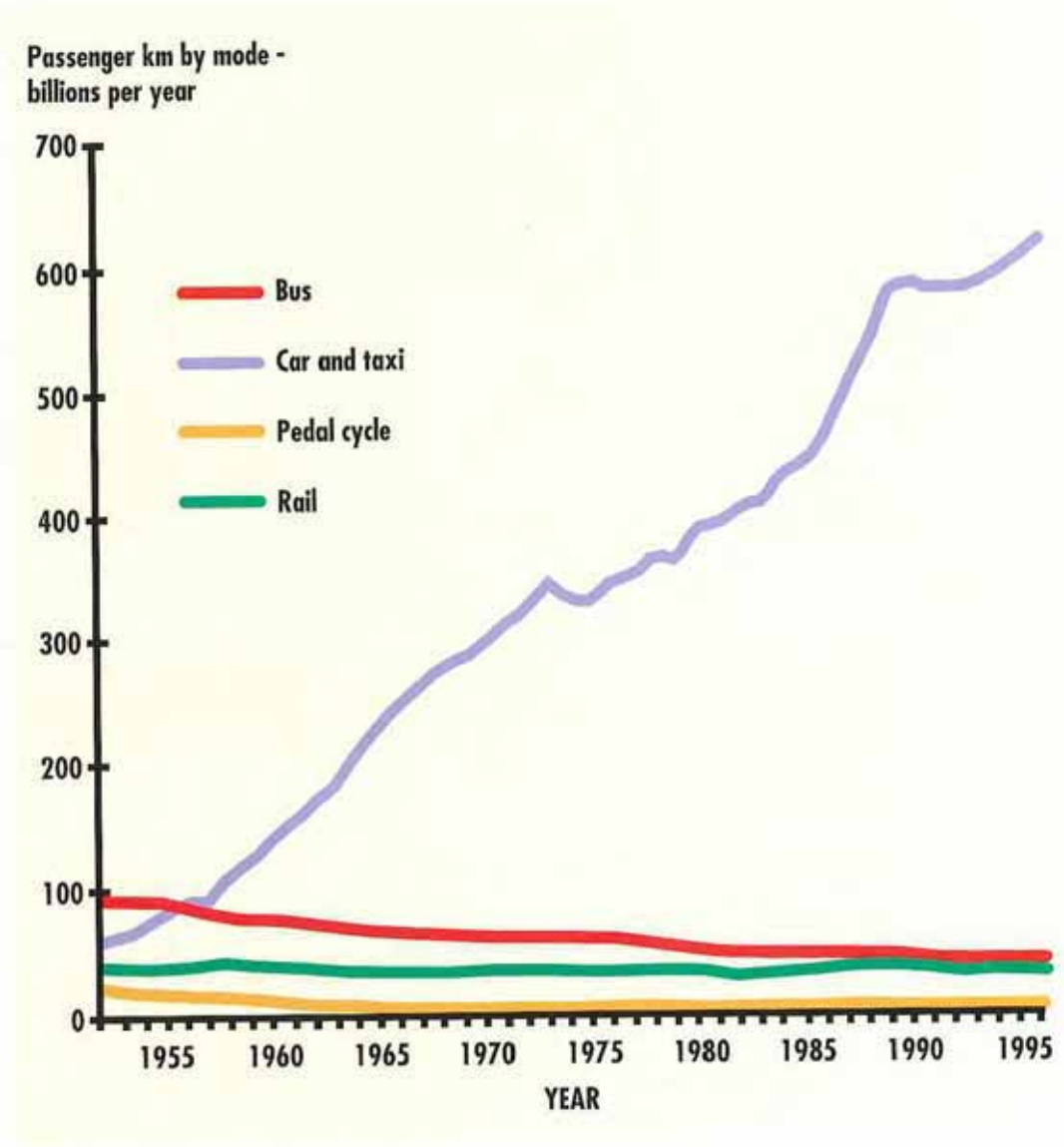


Fig 1.1: Passenger travel by mode, 1952–1996 Great Britain.
Source: Transport Statistics Great Britain (DETR, annual).

poorer people. Trains and cars are used more by men, wealthier people, and those living in rural and suburban areas. Table 1.2 shows that public transport is used most in London and the major provincial cities, and progressively less as the size of the urban area reduces. These generalisations conceal the fact that there are some journeys, radially into a city centre or between town centres, for example, for which public transport competes realistically with the car. For other journeys, such as between two outer suburbs, public transport has great difficulty providing an attractive alternative to the car.

1.14 In many areas, businesses organise their activities, locate their premises and advertise their services on the assumption that people will travel to them by car. Households make arrangements to share the use of a car to make journeys not served by public transport, and to avoid the perceived risks of walking and cycling. Where public transport is available, they may try to avoid being subject to its vagaries. Car use becomes "the norm", not merely in a numerical sense but in the sense of what is expected.

Table 1.1: Journeys* per person per year by main mode and purpose, 1994/96 (including journeys less than 1 mile long)

Journeys* per person per year

Purpose	Walk	Cycle	Car/ motorcycle	Bus	Rail	Other public	Total No. (%)
Commuting	18	6	113	12	8	1	159 (15)
Business	4	1	31	–	2	–	38 (4)
Education	32	1	23	10	1	–	68 (6)
Escort education	24	–	24	1	–	–	49 (5)
Shopping	74	2	122	22	2	2	223 (21)
Pers. business	43	1	137	8	2	1	192 (18)
Visit friends	48	2	121	8	2	4	187 (18)
Sport/ entertainment	12	–	44	3	1	1	62 (6)
Holiday/day trip	2	1	26	1	–	1	32 (3)
Other	45	–	2	–	–	–	47 (4)
Total	303	17	643	65	16	13	1,057 (100)

Source: National Travel Survey 1994/96 (DOT, 1997)
Row and column totals do not tally because of rounding errors.

**A journey is a one–way course of travel having a single main purpose. Outward and return halves of a return journey are counted as two separate journeys.*

Table 1.2: Modal split of journeys* according to size of urban area, 1994/96 (including journeys less than one mile long)

Modal split, percent

Transport Mode	Greater London	Major Cities and Metro Counties**	Other Large Urban Areas Population over 100k	Medium Urban Areas Population 25k to 100k	Small Urban Areas Population 3k to 25k	Rural
Walk	33	30	28	29	28	23
Car/van	46	56	63	61	64	70
Public Transport	18	12	6	6	5	4
Other	2	2	3	3	3	3
Total	100	100	100	100	100	100
Average no. of journeys per person per year	1,005	1,039	1,100	1,051	1,088	1,096

Source: National Travel Survey 1994/96 (DOT, 1997)

**A journey is a one–way course of travel having a single main purpose. Outward and return halves of a return journey are counted as two separate journeys.*
***West Midlands, Greater Manchester, West Yorkshire, Greater Strathclyde, Merseyside, South Yorkshire and Tyne and Wear.*

1.15 To recognise this situation is not to condone it but rather to acknowledge the context in which planning for public transport often takes place. Public transport can offer an attractive alternative to the private car, but only in certain circumstances. The promotion of services has to contend with car-orientated attitudes and habits and very possibly negative pre-conceptions about travel by public transport. Public transport has to be designed and managed to fulfil two functions – to provide comprehensively for people without cars and to bid selectively for a share of the non-captive market in situations where public transport can realistically compete with the car.

1.16 There are many examples from the UK and elsewhere of public transport increasing its ridership through improved services and traffic management that gives priorities to buses. In Leeds, SuperBus on one radial corridor has increased total bus ridership by over 50% in two years, with 25% of the new passengers having a car available. This has been achieved by providing a quality service with low floor buses and priorities that are saving over 10 minutes per journey using a guided busway at several congested junctions and a contra-flow bus lane near the city centre.

1.17 The cities of Oxford and Copenhagen claim no increase in car traffic over the past twenty years, in the former due to a programme of park and ride, bus priorities, restrictions on town centre parking and road closures to deter through traffic. Bus use in Oxford, excluding park and ride, increased by 80% between 1986 and 1997. In Copenhagen, transport policies to encourage walking, cycling and the use of public transport, and to discourage car use, have been helped by high taxation of the purchase of cars. Many other European cities are attracting car users to public transport by similar packages of measures. The new town of Almere in the Netherlands is constructed around a network of bus-only links. The bus network provides more direct connections to the town centre and between neighbourhoods than the routes for car traffic. The central core is not surrounded by car parks and buses provide better access to it than do cars (DOE/DOT, 1995).

Despite the attractiveness of travel by car and the rise in car ownership, public transport can compete with the car on routes where it can offer an attractive service. This requires a package of measures including quality public transport, bus priorities, park and ride services and restrictions or pricing to deter car parking in town centres.

Land-use and travel patterns

1.18 The growth of car ownership has had an important effect on land-use, which has produced growing car dependency. The mobility provided by the car has enabled people to live further away from traditional urban centres. This, and the difficulties for car users in cities (traffic congestion, slow speeds, limited parking), has meant that car users perceive suburban or peripheral destinations, particularly those near motorways and ring roads, as being easier to reach.

1.19 The trend in the 1980s and early 1990s to locate new commercial and leisure developments and businesses away from traditional centres reinforced these shifts in accessibility. Destinations away from traditional centres and public transport corridors are particularly difficult to serve by public transport. People who were once happy to travel by public transport to shops, workplaces, cinemas etc., when they were located in traditional centres, find that it is now more convenient – or perhaps only possible – to travel by car. People without the option of using a car find the range of opportunities open to them diminishing. At the same time, over the last three decades, the real cost of public transport has increased while that of car travel has declined.

1.20 The effect of these locational changes is clearly evident in the changing form and character of towns, particularly in the decline of inner areas and the growth of new

commercial developments on the edge-of-town. But the dispersal of trip patterns – the increasing numbers of places between which trips are made – is much greater than the visible changes in towns would imply. People in one town now travel to jobs and facilities in the next, on the way passing their counterparts travelling in the opposite direction. Car owners take advantage of the inter-urban road network to travel greater distances in the same or less time than before.

1.21 At the local level, changes in the design and layout of built-up areas have also promoted car use, both in the redevelopment of traditional areas and the building of new ones. Accommodating the private car has compromised access by non-car modes. Bus routes have typically been pushed out from traditional streets on to distributor roads encircling housing estates or town centres. Cycle use has reduced as increased traffic has made roads more dangerous. Walking – whether as a mode in its own right or as a means of access to or from a bus stop or rail station – often involves forced detours, changes in level and/or the crossing of traffic streams. In town centres it is much more common to be able to walk or take a lift straight from a multi-storey car park into a shopping development than it is to do the same from a bus stop or rail station.

1.22 Continuing these trends in travel and land-use is unsustainable. Government planning policy guidance, particularly PPG6 *Town Centres and Retail Developments* (DOE, 1996) and PPG13 *Transport* (DOE/DOT, 1994), has now put an emphasis on locating shops, office and leisure developments in town centres and places well served by public transport. It is likely that, in the future, most major developments will be in or on the edge-of-town centres, with public transport brought to or into the site. The following section describes the national and local policies which have been introduced to prevent undesirable trends continuing.

Many developments over the past thirty years have built in car dependency through their location, layout and detail design. These Guidelines give advice on how to avoid doing this, and give examples of good and bad practice.

Policies and legislation relating to land-use and transport planning

Sustainable development

1.23 Commitments to sustainable development, reducing carbon dioxide (CO_2) emissions and the comprehensive range of actions encompassed by Agenda 21 of the Earth Summit of 1992 have considerably changed the emphasis of transport policy, as set out in the Governmentís 1994 Sustainable Development Strategy (DOE, 1994). A national network of air quality monitoring stations has been established and, in the transport sector, emissions of various pollutants are being reduced by more stringent standards for vehicles. In March 1998, the Department of the Environment, Transport and the Regions issued *Sustainable Development: Opportunities for Change*, a Consultation Paper on a Revised UK Strategy (DETR, 1998c).

1.24 Following the Kyoto Conference on Climate Change in 1997, the UK has a legally binding target to reduce greenhouse gas emissions (mainly carbon dioxide CO_2) to 12.5% below 1990 levels by the period 2008 to 2012. There is also a domestic aim to reduce CO_2 emissions in the UK to 20% below 1990 levels by 2010. The Government will be consulting on the savings from the transport sector in relation to measures which could be taken in other sectors.

1.25 Planning Policy Guidance note 13 *Transport* recognised that forecast levels of traffic growth, particularly in urban areas, could not be provided for in full and that building new roads or upgrading existing highways would in some cases be environmentally unacceptable

(DOE/DOT 1994). The guidance advised local authorities to plan land use and transport together in ways which help to reduce the need to travel, and to promote the use of modes other than the car. Planning Policy Guidance note 6 *Town Centres and Retail Developments* promotes the location of shopping, offices, leisure and other key town centre uses in existing centres (DOE, 1996). PPG 13 is to be revised and reissued during 1999. The Scottish Office has published consultation drafts of a National Policy Guideline and a Planning Advice Note *Transport and Planning*.

1.26 Local authorities are focusing on reducing congestion and pollution as well as improving the environment with new strategies that favour local access. They are also undertaking large-scale information and publicity campaigns to encourage people to switch to more environment-friendly modes. Public transport is becoming a central element in these strategies. The box shows examples of selected local authority objectives, strategies and policies covering new developments. Lothian Regional Council has published a booklet for developers on transportation policy (Lothian Regional Council).

Selected local authority objectives, strategies and policies covering new developments

- Improved accessibility for buses, cyclists and pedestrians in new developments.
  Bolton Metropolitan Borough, Agenda 21, Objective T3

- ...wherever possible, development is accessible on foot, by cycle and by public transport as well as by private vehicles.
  West Sussex Structure Plan, Proposed Modifications to Deposit Draft, Policies G5 and T8

- In those larger town centres where it is the policy under an urban transport strategy to reduce long-stay town centre parking provision,...developers will be encouraged to enter into arrangements with the district council and others so that the need for use of the private car is reduced by provision for public transport or walking and cycling.
  Kent Structure Plan, 1996, Policy T14

1.27 The White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998a) states "The way forward is through an **integrated transport policy**. By this we mean:

- integration **within and between different types of transport** – so that each contributes its full potential...;
- integration **with the environment** – so that our transport choices support a better environment;
- integration **with land-use planning** – at national, regional and local level...;
- integration **with our policies for education. health and wealth creation** – so that transport helps to make a fairer, more inclusive society." (para 1.22).

1.28. The Royal Commission on Environmental Pollution (1994) made two key recommendations on public transport:

- to increase the proportion of passenger-kilometres carried by public transport from 12% in 1993 to 20% by 2005 and 30% by 2020 (recommendation 12.54); and

- to reduce the proportion of urban journeys undertaken by car from 50% in the London area to 45% by 2000 and 35% by 2020, and from 65% in other urban areas to 60% by 2000 and 50% by 2020 (recommendation 11.12).

In a subsequent report, the Royal Commission on Environmental Pollution (1997) reiterated that buses should have a central place in an environmentally sustainable transport system, and that five–30% of current car trips could easily be avoided or made in other ways. The White Paper (DETR, 1998a) does not endorse these targets, but much of its thrust is to provide good quality alternatives to the car, including public transport, to encourage people not to use their cars.

National planning policy

1.29 Through national Planning Policy Guidance Notes (PPG) and Regional Planning Guidance (RPG), the Government provides the policy framework within which local authorities prepare development plans. The aim of national guidance is to secure a consistent approach to plan making and decision taking by defining policies clearly. RPG deals with matters of regional or sub–regional significance.

1.30 Statutory development plans must take account of national and regional guidance and material representations from interested parties. They set out the policies and proposals for the development and use of land in their areas and provide an essential framework for decisions. The roles of various types of local authority, and the plans they produce, are described in paragraphs 1.65 to 1.67. PPG12 *Development Plans and Regional Planning Guidance* states that land–use policies and traffic management proposals should be included in development plans (DOE, 1992).

1.31 PPG6 *Town Centres and Retail Developments* states that the Government's objectives include "to focus development, especially retail development, in locations... (which) maximise the opportunity to use means of travel other than the car" and that local planning authorities should "locate major generators of travel in existing centres, where access by a choice of means of transport, not only by car, is easy and convenient" (DOE, 1996).

1.32 PPG13 *Transport* (DOE/DOT, 1994) advises local authorities to carry out their land–use policies and transport programmes in ways which help to reduce growth in the length and number of motorised journeys; to encourage alternative means of travel which have less environmental impact; and hence to reduce reliance on the private car. The guidance is wide–ranging and sets out various approaches to promoting more sustainable transport through the planning system, addressing issues such as location, use and density, as well as parking standards and complementary transport measures. It encourages local authorities to promote new development in urban areas, locating major generators of travel in existing centres which are accessible by means other than the private car; to improve choice in walking, cycling and public transport; and to limit parking provision for developments. The government provided further advice on implementing PPG13 in *PPG13: A Guide to Better Practice* (DOE/DOT, 1995).

1.33 The White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998a) announced the updating of several planning policy guidance notes relevant to transport: PPG11 on Regional Planning (a new PPG); PPG13 on Transport; PPG12 on Development Plans: and PPG3 on Housing.

1.34 The White Paper explained that the updated edition of PPG13 would build on the 1994 edition, providing more detailed guidance on topics including location, accessibility, parking

standards, protecting key sites and routes and traffic management (DETR, 1998a). The Government states it "will update existing guidance on locations for major growth and travel generating uses, with an increased emphasis on accessibility to jobs, leisure and services by foot, bicycle and public transport" including "the promotion of major development within public transport corridors and other areas where good public transport exists or can be provided". Further, the Government will "ensure that development plan policies for parking support our policies for the location of development", while "Parking standards should be devised and applied having regard to the accessibility of locations by modes other than the car".

1.35 The White Paper goes on to say that "Development plans should give better protection to those sites and routes (both existing and potential) which could be critical in developing infrastructure to widen transport choices", and "Alternative uses relating to sustainable transport should be considered first for sites now surplus to transport requirements". The Government will provide further guidance on "how land use planning can promote public transport, cycling and walking and clarify the handling of traffic management issues in development plans" and on "the land use issues arising from re-allocating road space to pedestrians, cyclists and buses". The Government will want new planning policies and implementation to take full account of the needs of all in society, including disabled people and those in rural areas.

1.36 Local transport plans are a major new initiative in the White Paper on transport (DETR, 1998a) (see paragraph 1.43). Implementing the transport aspects of development plan strategies, they will be key to the delivery of integrated transport locally. It will be important that they and local development plans together produce consistent local transport and planning strategies; regional planning guidance will have a key role to play through regional transport strategies in achieving a co-ordinated and consistent approach. The revised PPG12 *Development Plans and Regional Planning* and *Draft Guidance on Local Transport Plans* (DETR, 1998d) will provide guidance on how the two types of plan will integrate with each other. Issues relating to development and the provision of public transport will inevitably be prominent in both types of plan.

1.37 In January 1998 the Department of the Environment, Transport and the Regions issued a Consultation Paper on the Future of Regional Planning Guidance (DETR, 1998e). This proposed that Regional Planning Guidance in the future should present a "spatial" strategy for the region, ie, the range of policies not narrowly focused on land-use that are intended to influence the future distribution of activities within the region. It proposed that RPG should incorporate a regional sustainable transport strategy to ensure that land-use planning is integrated more effectively with transport, based upon environmentally friendly modes.

1.38 The White Paper on transport (DETR, 1998a) states that "A key proposal is for RPG to include a regional transport strategy" and "we will publish draft guidance (PPG11) setting out the new arrangements..." (para 4.50). It also states that "by ensuring that Regional Planning Guidance is up-to-date and incorporates regional transport strategies, we can help to ensure that local authorities' plans and decisions, and proposals from individuals and businesses, reflect integrated transport policy" (para 4.157). Thus RPG will provide a strategic framework for the preparation of development plans and local transport plans. In more detail, the White Paper advises that regional transport strategies should include, for example, regional priorities for transport investment, to support the regional strategy; public transport accessibility criteria should be taken forward in development plans to guide the location of development that is significant at the regional or sub-regional level. "Properly considered development plans are important but achieving better integration on the ground depends also in getting the right development in the right place." (para 4.209).

1.39 The Government also intends to revise planning guidance on housing (PPG3) to give clearer advice on the location and form of housing development, emphasising the benefits of providing new homes in towns and cities and making the most of places or vacant buildings which can be well serviced by public transport or easily reached on foot or by bicycle. Local planning authorities will be required to consider the future travel patterns that would be created when planning for new homes. The revised guidance will stress the need for careful planning of those places and sites that are not close to existing public transport. The Government's aim is for new housing to avoid undue reliance on the car. Options available to local authorities include ensuring any major new development provides good public transport as part of the scheme or using the places for activities which do not generate significant travel demands.

1.40 The White Paper emphasises the need to achieve good design of developments:

"Good design of new development is important if we are to make the most of opportunities for walking, cycling and public transport in new developments. We are publishing two documents which stress the importance of design issues in the development process: the *Good Practice Guide on Design in the Planning System* sets out key urban design principles, including ease of movement and mixed use development, to maximise the opportunities for public transport, cycling and walking. *Places, Streets and Movement*, a companion guide to Design Bulletin 32, advocates distinctive, safe and attractive estate layouts which better reflect local character, and moves away from planning which caters solely for car use." (para 4.176).

1.41 National policies are encouraging the re–use of previously used land ("brownfield sites"). In some cases, such as open–cast mining or gravel extraction sites, considerable earth moving is involved. When this is the case, the local Passenger Transport Executive or Transport Co–ordinating Officer should be consulted, to ensure that the levels of the reclaimed site do not create problems for the future provision of public transport. In recent years, several examples have occurred in which access to a development has been less satisfactory than it might have been, because the requirements of public transport were not considered early enough.

Local Transport Plans

1.42 Up to and including 1998, local highway authorities have set out their transport intentions in annual Transport Policies and Programme submissions (TPPs). These include the provision of infrastructure for public transport operations (see box for examples of policies). Through the "package approach", the DETR has emphasised the need for a comprehensive and coherent approach to tackling transport problems, particularly in urban areas. For example, "Reducing car dependency – TPPs should, where appropriate, include policies to encourage alternatives to the car. They should aim to encourage the provision of quality public transport, in particular developing the use of bus services by providing for bus priority measures and other measures to encourage bus use." (DETR 1997b). PTEs have been able to bid for improvements to infrastructure through the Borough Councils that cover their operating area.

1.43 From 1999 the TPP system is to be replaced by a system of Local Transport Plans (LTPs), which are a core part of the White Paper's proposals (DETR, 1998a; paras 1.26 and 4.73). In England, local transport plans will be the key to the delivery of integrated transport locally, as described in *Draft Guidance on Local Transport Plans* (DETR, 1998d). Local authorities will draw up five year plans to cover all modes, consulting widely with local people, businesses, transport operators and community groups. These plans will replace the existing TPP system for councils outside London. The plans will include future investment plans and propose packages of measures to meet local transport needs. LTPs will be non–statutory in the first instance, so that "provisional" plans can be produced in July 1999, covering the period

2000/01 to 2004/05. Authorities will then roll their plans forward by one year and submit "full" plans for 2001/02 to 2005/06 in July 2000. Legislation to make the plans statutory will follow.

Rotherham Metropolitan Borough

"...the Council is considering the adoption of a road user priority order system. This will have the effect when carrying out any new highways schemes, of considering different road users in the following priority order:

1. Pedestrians and people with disabilities
2. Cyclists and public transport users
3. Commercial vehicles
4. Private cars"

TPP, 1998/99

North Lincolnshire Council

"The Deposit Draft of the North Lincolnshire Local Plan will contain a Road User Hierarchy for the area. In all matters, therefore relating to transport and land-use planning, consideration will be given to the needs of the following groups in order of priority:

1. Pedestrians (including those with restricted mobility)
2. Cyclists
3. Public transport/taxis
4. Powered two wheeled vehicles
5. Commercial/business users
6. Car and coach borne shoppers and visitors
7. Car borne commuters

In addition to reinforcing the Council's commitment to the promotion of sustainable mobility, the Road User Hierarchy is fundamental in raising awareness of the needs of the most vulnerable of road users. It will also be a key consideration in the review, promotion and implementation of any transport related scheme undertaken by the authority."

TPP, 1998/99

Transport studies and road traffic reduction

1.44. TPP submissions, particularly "package bids", were often underpinned by strategic transport studies, although these have not been required by DETR. This is likely to be even more the case under local transport plans. Most of these transport studies are multi-modal and increasingly aim to integrate public transport within the transport network. In addition, the Road Traffic Reduction Act 1997 requires local authorities to produce a report containing assessments of traffic levels on local roads in their area and a forecast of growth in those levels. The reports should also contain targets for reducing traffic levels or their rates of growth, although authorities have the option of not setting targets for all or part of their area if they consider them to be inappropriate. Since most trips are local, and given the objectives of PPG13, it is important that any studies to support plans and policies are designed to consider the role of bus and rail services, as well as walking and cycling. The IHT Guidelines on *The Development of Urban Transport Strategies* (IHT, 1996) describe the processes for planning the effective integration of public transport within transport and land-use plans.

National and local policies now emphasise reducing traffic growth and reliance on the car, and encouraging the use of public transport, walking and cycling. Developments that do not take account of these policies will, increasingly, be unlikely to be permitted.

The parties involved

1.45 Many agencies are involved in the provision of public transport services and the infrastructure required, and in the initiation and location of developments. Naturally, the agencies are different for rail and bus services. This section draws heavily on *Keeping Buses Moving* (DETR, 1997a) when describing the situation for bus services, and PPG13 (DOE/DOT, 1994) when describing the planning and development control system. Appendix A of *Keeping Buses Moving* gives greater detail on the agents and legislation involved with bus services. The situation described in this section relates specifically to England. Some of the agencies in Scotland are different, and will become even more so after the establishment of the Scottish Parliament.

Bus services

1.46 **Bus operators** decide what bus services to run commercially and also provide services under contract to local authorities.

1.47 **Traffic Commissioners** are responsible for the licensing of operators, receiving the operators' registration of their bus services and the enforcement of the appropriate standards. The White Paper (DETR, 1998a) announces wider roles for the Traffic Commissioners in strengthening the passenger voice and delivering integrated transport.

1.48 **Highway authorities** are responsible for maintaining and managing the local road network, for making Traffic Regulation Orders, for providing traffic control systems and for bus priority measures. Highway Authorities can be county councils or unitary authorities, including London Boroughs. The Highways Agency is the Highway Authority for the trunk road network, including motorways.

1.49 **County Councils and Passenger Transport Authorities (PTAs)** in metropolitan areas outside London are responsible for supporting local public transport in their areas, including capital investment in infrastructure. **Passenger Transport Executives (PTEs)** carry out the policy of their PTA. Local authority responsibilities for local bus and rail services are explained below.

1.50 Outside London, Strathclyde and the English metropolitan areas, **county councils, district councils and unitary authorities** are responsible for the procurement of socially necessary bus services where these are not already provided commercially, as well as the operation of concessionary fares schemes. They may also promote the use of public transport in their area.

1.51 **Passenger Transport Executives (PTEs)** in the English metropolitan areas and in the Strathclyde area are responsible for securing public transport services in their areas. They procure socially necessary bus services where these are not already provided commercially, and operate concessionary fares schemes. They may also promote the use of public transport in their area. There are seven PTEs covering Greater Manchester, Merseyside (Merseytravel), South Yorkshire, Strathclyde, Tyne and Wear (Nexus), West Midlands (Centro) and West Yorkshire (Metro).

1.52 In **London**, most bus services operate under contract to **London Transport Buses (LTB)**, the main licensing authority, following competitive tender. Commercial services which provide a significant benefit to the network also operate under agreement with LTB. LTB acts as network planner and provides expertise on issues such as bus priorities. **London Transport**, which is responsible for planning rail and bus services in London, is consulted on the transport implications of development proposals. Arrangements may change as a result of the introduction of the currently proposed Greater London Assembly.

1.53 **The police** are responsible for enforcing traffic control measures that affect moving traffic and for most waiting and loading restrictions outside London. Within London, **The Traffic Director for London** is responsible for waiting and loading restrictions on Red Routes.

1.54 Initial discussions on the provision of public transport to a development should be with the Transport Co-ordinating Officer of the county council or unitary authority, or with the Passenger Transport Executive, if there is one.

Rail services

1.55 **Train operating companies (TOCs)** provide passenger rail services. Each of the TOCs is owned by a private sector company which has been granted a franchise by the Franchising Director (see below) to run services for a fixed number of years (usually between seven and fifteen years). At the heart of each franchise is the Franchise Agreement, which is a contract between the Franchising Director and the franchisee.

1.56 The **Rail Regulator** is appointed by the Secretary of State but is independent. He heads the Office of the Rail Regulator (ORR), a non-Ministerial Government Department. His regulatory functions include the granting of operator licences and licence exemptions; enforcing licence conditions; supervising the granting of access to track, stations and depots including approval of access charges; certain responsibilities under competition legislation; decisions on proposals for closures; and acting as the guardian of rail users interests. His statutory functions include promoting the use and development of the railway and promoting efficiency, economy and competition. There is some overlap of functions between the Rail Regulator and the Franchising Director (see paragraph 1.59 below). These functions may become responsibilities of the Strategic Rail Authority proposed in the White Paper.

1.57 **Railtrack** is the public limited company which owns the vast majority of the heavy rail network in Great Britain including stations, passenger light maintenance depots and most freight terminals, yards and sidings. Railtrack operates and maintains the track, signalling and associated infrastructure and 14 major stations. It leases the other 2,500 stations and light maintenance depots to Train Operating Companies and the freight terminals, yards and sidings to Freight Operators. It sells access to its track and major stations to TOCs and Freight Operators under access agreements. It controls the movements of trains on its network, produces the working timetable, publishes the passenger timetable and has an important role in railway safety. It receives no direct Government subsidy but relies on income from customers, principally TOCs, most of whom receive significant public support.

1.58 The three **Rolling Stock Companies (ROSCOs)** own virtually all the ex-BR passenger rolling stock. They lease this stock to the Train Operating Companies.

1.59 **The Franchising Director's** role is to secure the provision of improved railway passenger services through franchise agreements. The Franchising Director is responsible for franchising services and paying public subsidy through Franchise Agreements to franchisees. With the letting of each franchise, the focus of the Franchising Director's work has switched to that of monitoring, management and enforcement to ensure delivery of value for money for passengers and the taxpayer.

1.60 **Rail Users Consultative Committees (RUCCs)** were set up under the Railways Act 1993, as successors to the former Transport Users Consultative Committees (TUCCs), to protect the interests of users of the services and facilities provided by Britain's rail network. Each RUCC is established by the Rail Regulator and, in addition to its other duties, acts as his "eyes and ears". A Central Committee (CRUCC) co-ordinates this activity.

1.61 **County and district councils and unitary authorities** seeking new or additional rail services may negotiate with the relevant service providers, consulting the Franchising Director as necessary. **Passenger Transport Executives (PTEs)** are signatories to the Franchise Agreements relating to the provision of local heavy rail services in metropolitan areas. As such, they can contribute financially to the provision of local rail services. With the exception of the Tyne and Wear Metro, which is operated by the PTE, light rail services are operated by private sector concessionaires. **County Councils and Passenger Transport Authorities (PTAs)** in metropolitan areas outside London are responsible for capital investment in infrastructure for local public transport, including stations, in their areas.

1.62 Initial negotiations for a new station in an English metropolitan area or in Strathclyde should be with the Passenger Transport Executive. In other areas, the contact should be with the local authority, who will negotiate with Railtrack for the provision of a station and the Train Operating Company regarding the stopping of trains at the station. A general guide has been published by Railtrack and the Association of Transport Co-ordinating Officers to foster a greater understanding of each other's planning and funding processes (Railtrack and ATCO, 1997).

Development

1.63 **Central Government** issues Planning Policy Guidance notes (PPGs) which provide overall guidance on the generic locations and scale of developments that will be encouraged, and policies to be followed on transport provision. This guidance must be taken into consideration by local authorities in preparing their local development plans and in their day to day control of development. The notes most directly relevant to the integration of transport and land-use planning and the provision of transport for developments are Planning Policy Guidance Note 6 (PPG6) *Town Centres and Retail Developments* (DOE, 1996) and Planning Policy Guidance Note 13 (PPG13) *Transport* (DOE/DOT, 1994). The Department of the Environment, Transport and the Regions decides appeals relating to planning permissions.

1.64 **Government Offices for the Regions** in England represent a number of Central Government Departments in each region. The Government Offices are responsible for issuing Regional Planning Guidance, which applies national policies to the particular circumstances of the region and defines the broad spatial framework within which local planning authorities operate. Regional Planning Guidance also provides guidance on the regional transport strategy and priorities. It is informed by the priorities for the environment and development proposed by the regional conferences of the local authorities (DOE/DOT, 1994).

1.65 **County councils, some unitary authorities and National Park authorities** produce structure plans (in many cases on a joint basis) which set out key strategic policies and provide a framework for local plans. They provide the opportunity to assess patterns of new development and to specify the general location of significant individual developments and broad areas of restraint on development, and the travel patterns likely to be generated. They should set out broad policies to reduce the need to travel (DOE/DOT, 1994).

1.66 The majority of non-metropolitan authorities (**district councils and some unitary authorities**) and National Park authorities produce district-wide local plans in which the detailed relationships between development proposals and transport are examined, and which have to be in general conformity with the relevant structure plan. Local plans need to be concerned with ways in which the precise location of development can be shaped to minimise the need for motorised travel. District councils consider applications for permission to develop particular sites. Section 54A of the Town and Country Planning Act 1990 requires that planning decisions are made in accordance with the relevant development plan unless material considerations indicate otherwise.

1.67 Metropolitan areas (including **London Boroughs**) and some non-metropolitan unitary

authorities produce Unitary Development Plans (UDPs) which combine the function of structure and local plans. Part I of a UDP consists of a written statement of the local authorities' general policies for the development and use of land in their area. This then forms the framework for the detailed proposals for the use and development of land in Part II of the UDP.

1.68 **Developers** design, finance, obtain permission for and construct developments. Because of the long lead times involved, developers have to anticipate social and economic changes, especially those affecting the requirements and preferences of potential occupants. Locating and designing developments in a way which will enable them to be marketed as accessible by a range of modes will be an increasingly important attribute – for example, for companies who are seeking to adopt travel reduction plans. Attempting to pursue car-orientated developments will come to be seen as an increasingly risky venture commercially and one which will meet greater resistance from planning authorities.

The need to plan for public transport

Types of public transport

1.69 Public transport is especially well suited to providing travel to town centres and other centres of activity for four main reasons:

i) it makes efficient use of space and of fuel and so can provide for larger passenger flows along a given corridor with fewer environmental effects than can cars;

ii) the network of public transport routes means that the centres which are its focal points enjoy a high standard of service (direct routes, frequently served) from a wide catchment area;

iii) it is not necessary to provide space at the destination for car parking, particularly long-term parking; and

iv) by limiting traffic in town centres, the environment for walking and cycling can be improved.

1.70 Public transport comes in varying forms ranging from fixed-track systems to buses and taxis running on streets. Rail systems include the Railtrack and London Underground networks; light rail includes the Tyne and Wear Metro, Manchester Metrolink, South Yorkshire Supertram and the Docklands Light Railway. Other fixed track systems include guided buses (where for at least part of their route buses use a track edged by kerbs which guide them) and trolley buses. Guided bus-ways are in operation in Leeds and Ipswich. An electronically guided trolleybus system is being planned for Merseyside. Light Rapid Transit (LRT) includes all the fixed track modes which have vehicle weights less than traditional railways. They can negotiate steep gradients and smaller curve radii.

1.71 Each class of public transport system has a maximum capacity and is most efficient for a particular range of passenger flows. The box below shows the capacities of a range of systems from minibuses to suburban rail services. Other sources suggest that buses on busways can achieve higher capacities than shown in the box – perhaps as high as 20,000 passengers per hour.

1.72 The flows needed to justify the provision of a service will vary with its location and whether the system needs separate infrastructure or can use existing infrastructure (much of the Tyne and Wear Metro follows existing suburban rail routes). It may be worth providing a public transport service as part of a wider local development strategy, even if it cannot be

justified economically in isolation. Many rural and suburban bus routes are provided to satisfy demands that are well below 30 passengers per hour (one-way). For most developments, access by buses of varying sizes will be the most appropriate form of public transport. Buses make use of the existing highway infrastructure and can provide access to most developments. However, their use of the existing highway means that they are subject to existing congestion and may not be able to provide a reliable and fast service, unless bus priority measures are introduced.

Comparative capacities of different forms of public transport

Mode	Passenger carrying capacity	Practical headway (mins)	Units per train	Hourly capacity one-way (passengers)
Bus on ordinary roads				
Mini	16	1	1	1000
Midi	35	1	1	2100
Single deck	60–70	1		13600–4200
Double deck	75–100	1	1	4500–6000
Bus on busway				
Single deck	60–70	1	1	3600–4200
Articulated	75–150	1	1	4500–9000
Tram	150–180	1	2	9000–21600
Light rail	18–210	1.5	3	7200–25200
Metro	400	1.5	2	16000–32000
Suburban rail	344	3	3	6880–12300

Better public transport for cities
Chartered Institute of Transport, 1996

1.73 Buses have the same rights to use public highways as other road-users. The highway network is the bus's basic and most important facility. With the increase in traffic volumes, many roads have become less attractive for bus services, and the design of new roads has often ignored the needs of bus operators. There is little prospect of constructing a totally separate bus route network that is comprehensive, direct and convenient. In most urban areas there is neither the space nor the resources, even if this were desirable. Planning for buses must therefore start from the premise that the highway network should be made suitable for buses, particularly in urban areas. In residential areas roads of only 6.0m can be used for bus routes, to avoid the road overwhelming the development, but elsewhere roads of 7.3m are usually preferable (see **Residential areas**, Chapter 6, paragraphs 6.42 to 6.47).

Hierarchy of actions

1.74 Existing public transport services, both rail and bus, need to be exploited as a means of focusing development. In future, Regional Planning Guidance is likely to be more specific over integrating land-use plans and transport, and spatial locations for developments. In development plans, sites for developments should be identified and allocated on the basis of public transport accessibility.

1.75 **Initial planning** For all but the smallest developments, a development brief should be prepared (see Chapter 5, paragraph 5.39). This can be done by the local authority or the developer, but is best done by both parties working together. Local authorities and Rural Development Agencies should consider access by public transport when identifying locations and sites for development in development plans. If previously used land is being reclaimed,

even before a specific development is planned, access routes by public transport to any eventual development should be considered, as was mentioned in paragraph 1.41. This is best achieved by consultation with the local Passenger Transport Executive or Transport Co-ordinating Officer.

1.76 When a development is first being contemplated, its location should be considered in terms of service by public transport, by assessing its accessibility by public transport. Can it be served by existing bus routes without requiring them to divert into the development? Will the footpath system lead passengers easily, safely and comfortably to bus stops from sites within the development? Can bus stops be located at local centres so that the footpath network can serve both stops and centres? Can the development be designed to make the distances from bus stops less than the distances from car parks? Can space be taken from roads or car parks to enable public transport to be provided more efficiently? If a useful rail or LRT service exists, can the development be clustered around the station or tram stop to allow convenient access within acceptable walking distances? Can new stations or stops be provided to serve the development directly? The location and planning principles for developments are described in Chapter 5.

1.77 Where it proves impossible to serve a development by an unaltered public transport service, the question becomes whether the development needs and can justify completely new services or whether existing services could be diverted into the development. In either case, the road network of the development must be planned from the start to allow the provision of an attractive service. The bus route should enter and leave the development at points that link to the surrounding route network. Within the development, the route should be reasonably direct and progressive, without diversions into loops or culs-de-sac. Buildings should be located and orientated so that their entrances are nearer to existing or new bus stops than to the car parks. Bus stops must be placed where it is safe and convenient for passengers to wait, efficient for the bus operator to serve and safe for other traffic. Pedestrian routes to the stops must be direct, safe and convenient and if possible avoid crossing busy roads. Where possible, footpaths and cycle routes should serve local centres as well as bus stops.

1.78 If a development has to be served by a loop road, buildings need to be close to the bus route. It may be possible for all bus stops to be on the same side of the road as the buildings, though this does lead to longer journeys in the bus and services that are more expensive to provide and less attractive for passengers. The link from the development to the highway network must allow buses to enter and leave the development safely and without delay.

1.79 At the earliest stages of the development, consideration should be given to the possibility of introducing a mix of uses or other developments close by that would increase the passenger flows on public transport and make possible services that could not be justified by the initial development on its own. At Filton Abbey Wood, a new station and rail service has been justified by the combination of a MoD office complex for 6,000 staff, several other employment sites, the University of the West of England and existing residential areas. In Reading, an edge-of-town multiplex cinema complex has provided the car park for a day-time park and ride service to the town centre. While Government policy is to avoid edge-of-town developments, many exist already and some new ones may yet be built. Much can be done to mitigate the transport impacts of non-central developments by improving public transport services.

1.80 **Outline planning** During the outline planning of the development, great care is needed to ensure that the layout of the road system and the development's links to the surrounding highways are compatible with the provision of a quality bus service. There are many examples of developments where this has not been done, with the result that it is either impossible or unnecessarily expensive to provide a public transport service. For these developments, travel by car becomes the norm, expensive car parking has to be provided, congestion often occurs and journeys to and from the development are slow, stressful and accident-prone. These

effects are the almost inevitable consequence of developments that unintentionally force people to become car-dependent. The planning of developments at the outline stage is the topic of Chapter 6, which includes examples of good and bad practice.

1.81 **Detail planning** Provided the outline design of a development is suitable for public transport, then during its detailed design there are many things that can be done to make bus services more attractive for users and more efficient for operators, as set out in Chapter 7. Passengers are attracted by bus stops close to the development, well-lit footpaths to bus stops; the provision of shelters and seats at stops; good information about the services; good quality, clean, buses; a frequent service that is easy to understand; and roads on which buses are not delayed and can provide a smooth and comfortable ride. Stops must be kept clear of parked vehicles, and the road must be easy for pedestrians to cross, to provide access to the stop from both sides of the road. These details are important, but are ineffective if the earlier stages of location and layout have not created a development that is easy to serve by public transport.

The importance of consultation

1.82 At each stage of the planning of a development it is important to consult on factors that will help public transport to serve the development. Participants should include the agencies described in paragraphs 1.45 to 1.68, in particular the Passenger Transport Executive (PTE) in areas where there is one, and elsewhere the county council or unitary authority Transport Co-ordinating Officer (TCO). These organisations will act as links to local bus operators, and ensure that contact is made at the correct level. They will also advise whether the Traffic Commissioners, with whom bus services are registered, should be involved.

1.83 The highway authorities should also be consulted. The local highway authority will usually be the county council or unitary authority Transportation Department (which may be combined with planning), and if the development is near a county border, both authorities should be consulted. If the development is off a trunk road (one funded directly by Central Government), then the Highways Agency of the Department of the Environment, Transport and Regions is responsible. As well as advising on the layout of the roads for the development and their links to the surrounding highways, the highway authorities will ensure that any traffic signals can be linked into the area traffic control system and that transponders on buses are compatible with any existing bus detection systems.

Scope for improving public transport

1.84 There can be no doubt that conditions for public transport operators and users in Britain can be substantially improved. British and continental experience suggests that towns can significantly raise the level of bus use, and that public transport use is entirely compatible with modern prosperous economies and attractive environments. A study for the Confederation of Passenger Transport UK has shown that bus passengers can form a majority of the shoppers in a town centre (Wootton Jeffreys Consultants Ltd, 1994). It is clear that pressure to encourage greater use of public transport can only increase. The question, therefore, is how can this best be achieved? Not all the design options will be possible in all locations. Dedicated bus facilities may be the solution in some areas, but traffic restraint and speed reduction may also be needed. In all cases a specific and detailed consideration of users' needs is essential.

1.85 At the earliest stage of planning the development, the local authority will start to consider what contributions it will require from the developer towards the cost of improvements to the highway network or to public transport services. For example, if diverting a bus service into a development increases its running time, the local authority might suggest the developer funds a bus lane on the highway to the town centre to allow the operator to reduce running time for that section and so maintain the bus schedule while also serving the development.

References

CPT (1997) *Bus and Coach Issues for Local Authorities* Confederation of Passenger Transport UK Ltd, London.

DETR (1997a) *Keeping Buses Moving* Local Transport Note 1/97, Department of the Environment, Transport and the Regions, HMSO, London.

DETR (1997b) *Transport Policies and Programme Submissions for 1997–8* Department of the Environment, Transport and the Regions, London.

DETR (1998a) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London.

DETR (1998b) *Places, Streets and Movement – A Companion Guide to Design Bulletin 32, Residential roads and footpaths* Department of the Environment, Transport and the Regions, HMSO, London.

DETR (1998c) *Sustainable Development: Opportunities for Change* Consultation Paper on a Revised UK Strategy, Department of the Environment, Transport and the Regions, London.

DETR (1998d) *Draft Guidance on Local Transport Plans* Department of the Environment, Transport and the Regions, London.

DETR (1998e) *The Future of Regional Planning Guidance* Consultation Paper, Department of the Environment, Transport and the Regions, London.

DOE (1992) *Development Plans and Regional Planning* Planning Policy Guidance note 12, Department of the Environment, HMSO, London.

DOE (1994) *Sustainable Development: the UK Strategy* Cm 2426, Department of the Environment, HMSO, London.

DOE (1996) *Town Centres and Retail Developments* Planning Policy Guidance note 6, Department of the Environment, HMSO, London.

DOE/DOT (1994) *Transport* Planning Policy Guidance note 13, Department of the Environment/Department of Transport, HMSO, London.

DOE/DOT (1995) *PPG13: A Guide to Better Practice* Department of the Environment Department of Transport, HMSO, London.

DOT (1997) *National Travel Survey 1994/96* Department of Transport, HMSO, London.

DOT (Annual) *Transport Statistics Great Britain* Department of Transport, HMSO, London.

GMPTE (1992) *Better Buses – Good Practice in Greater Manchester* Greater Manchester Passenger Transport Executive for the Association of Greater Manchester Authorities, Manchester.

IHT (1996) *The Development of Urban Transport Strategies* The Institution of Highways & Transportation, London.

IHT (1997) *Transport in the Urban Environment* The Institution of Highways & Transportation, London.

Railtrack and ATCO (1997) *Partnership in Railway Development* Railtrack, London.

Royal Commission on Environmental Pollution (1994) *Transport and the Environment* Report 18, Royal Commission on Environmental Pollution, Cm 2674, HMSO London.

Royal Commission on Environmental Pollution (1997) *Transport and the Environment – Developments since 1994* Report 20, Royal Commission on Environmental Pollution, Cm 3752, HMSO London.

Wootton Jeffreys Consultants Ltd (1994) *The Role of the Bus in the Urban Economy* Confederation of Passenger Transport UK, London.

2. Planning For The Public Transport Passenger

2.1 If a development can be provided with satisfactory public transport, then car traffic and parking space can be reduced, the quality of life for the people on and near the development improved and a more sustainable transport system achieved. This is in line with government policy. To attract passengers, a public transport service must satisfy the requirements of travellers. It needs to serve the correct routes, offer a high frequency, be reliable and quick, use high quality vehicles and staff and be affordable. To be viable, the service must not incur ongoing costs greater than its revenue. A survey for Transport 2000 has defined what is meant by quality public transport (Transport 2000 Trust, 1997). The box shows the five major barriers to using public transport identified by Transport 2000.

Five barriers

The major barriers to using public transport

1. Networks: the failure of public transport systems to serve the routes that people want to travel.

2. Poor or no **information** (particularly for bus); what transport is available, whom to ask, when to ask: both before and during a journey.

3. The lack of **time:** overall journey time and interchange time.

4. Access: problems due to permanent or temporary physical disability: carrying heavy loads, escorting young children.

5. Usability: the unwillingness of significant numbers of people to use public transport however suitable it may be – as a result of either ignorance or experience.

Blueprint for Quality Public Transport – Transport 2000 Trust, 1997

2.2 Understanding passenger requirements and the economics of operating a bus service is necessary for the provision of public transport services in developments. From the earliest stages of planning a new development it is essential that the developer consults the highway authorities and either the Passenger Transport Executive in English metropolitan areas or Strathclyde, or the county council or unitary authority Transport Co-ordinating Officer elsewhere. This consultation is described in Chapters 5, 6 and 7 for the three stages of concept, outline planning and detail planning respectively.

2.3 Buses form the major part of the local public transport system. Bus services can be run as purely commercial activities, at no cost to the Passenger Transport Executive, county council or unitary authority, or they can be supplied by a bus operator under tender to the local authority. Tendered services are provided where a requirement is perceived by the local authority, but the required service cannot cover its cost from revenue. The shortage of funds for local authorities means that the number of tendered services is limited.

2.4 Since the deregulation of bus services, there has been no guarantee that a commercial bus service will be maintained, even if a good road infrastructure and priority access to a development are provided. Some 84% of services are commercial. Good provision for public transport can increase this percentage, by making services more economic to operate and more attractive to passengers.

Understanding customer requirements

2.5 In any business it is most important to understand the requirements of the customer. In public transport the passenger is the customer; both the existing and potential markets for public transport need to be considered.

2.6 The market for bus services in Britain is usually perceived to be people without cars; the elderly, young people, mothers and low income groups. The general increase in car ownership, the greater affluence of the old and the car dependency of many young families have caused the size of the traditional bus market to reduce. Elsewhere in Europe, and in Britain where high quality bus services have been introduced, ridership on bus services is often increasing and is drawn from a wider social group. Park and ride, whether by bus or train, naturally attracts car drivers to public transport.

2.7 Reducing dependence on the private car means that any new development must be designed to encourage car owners to use public transport as well as providing good public transport for people who do not have a car. It is important that the public transport service caters for people with mobility problems, as will be required by the Disability Discrimination Act, 1995. The design standards required by this group of passengers can improve the service for all customers.

2.8 The design of a bus service needs to reflect the requirements of the passengers it is intended to attract. For example, in a housing development where car ownership is expected to be high, the development must receive an excellent service as soon as the first occupants move in, to establish a habit of using the bus and to deter the purchase of second or third cars. Where this has been done, as in the example in Chapter 6, paragraph 6.11 and Figure 6.3, people with cars do use the bus service provided. The cost of early provision can be met from a Section 106 agreement.

2.9 Research by MORI for the Confederation of Passenger Transport UK (CPT, 1995) classified people as:

- regular public transport users: retain and encourage to travel more;
- occasional public transport users: encourage to make more use of public transport;
- non-rejecters of public transport, who would consider public transport in the right circumstances: encourage to become actual users; and
- rejecters, who would never think they needed public transport: do not spend resources trying to attract them.

The target market for public transport must be the whole of the population rather than the non-car owners who constitute the traditional market, particularly for travel by bus.

What do travellers need?

2.10 The needs of bus users are relatively well known, though not necessarily quantified. The order of priority may vary, but passengers require speed and frequency, reliability, ease of access and egress, convenience, route stability, information, comfort, safety and security, value for money and image (CIT, 1996; PTE Group, undated). Experience with Quality Partnerships shows that people with a car available will use a bus if they perceive it to be as convenient and comfortable as their car (see **Quality Partnerships** paragraph 2.15). This means that the buses must be of high quality, easy to board, clean and comfortable. Staff must be helpful, friendly

and efficient. Stops must be close to the origin and destination of the journey. The service must be reasonably frequent and reliable, to give a choice of the time at which to travel, short waiting times and overall confidence that the bus will arrive. Information about the service must be readily available, and real time information at bus stops appears to increase confidence in the service and reduce stress. Journeys must be direct and quick. There is evidence that passengers will accept longer ride times than by car, provided the ratio is less than a factor of about two (Wootton Jeffreys Consultants, 1994). Bus priority can reduce the time advantage enjoyed by the car. For individual passengers, the fare seems to be less important than the other aspects of the service.

2.11 In the special case of the Tyne and Wear Metro, car users who might use the Metro listed the following as necessary improvements; personal security on stations and on trains, cost of tickets and reliability of trains. Information was 10th on the list of priorities, cleanliness of trains was 15th and comfort of trains 25th (Transport 2000 Trust, 1997). Surveys have found that up to 60% of car drivers say they would never travel by bus, however good the service (the 5th group in paragraph 2.9 above).

2.12 Modal shift from the car can be achieved where public transport is easy to use and can offer as good a journey as the car. Using a bus is not only the ride on the vehicle. It is the complete journey, which consists of several elements. For a typical urban journey the durations of the most important elements are:

Element of Journey	Duration
Seeking information	May be a problem
A walk	5 minutes
A wait	6 minutes
A ride	12 minutes
A walk	5 minutes

The time on the bus may be only 40–50% of the total time of the overall journey. Travel time can be reduced by bus priority measures and by improved ticketing to speed boarding. However, passengers value time walking or waiting even more highly than time on the bus, so it is important to reduce the durations of these parts of the journey.

The design of a development must cater for all the parts of the journey which complement the ride on the bus. This means short walks to bus stops and stations, direct and convenient footpaths, safe and protected places to wait for buses or trains and good information about services. These have a major effect on the attractiveness of public transport.

The need for a quality product

2.13 The design of a new development and its ability to cater for public transport is very important to the life of the people who will live, work or visit there. Decisions on where to live and work, where to send children to school, which medical practitioner to select and whether to buy a first or second car, will depend in part on the quality of the local public transport. Nobody should have to accept incomprehensible information, poorly lit pedestrian paths, an unpleasant waiting environment and long waits, unreliability, old vehicles, a slow ride and, especially, a down market image. Those without a car may have no other option, if the local bus service is poor. Car owners will only consider using quality public transport, because they have an option, and one which is often perceived to be less expensive than public transport.

2.14 The location of a development and the layout and design of its infrastructure are the most important factors affecting the quality of the public transport service provided and the success of that service. Bus routes need to be reasonably direct to allow bus journeys that are quick and attractive to passengers. These routes are also economic for operators. In particular, buses should not divert from direct routes into loop roads or into culs-de-sac from which they have to double back. Bus routes need to be simple to understand, frequent, quick and direct. Buildings need to be located so that their doors are as close to the bus stop as to the car park, to allow the bus service to compete with the car.

Quality Partnerships

2.15 The White Paper *A New Deal for Transport: Better for Everyone* (DETR 1998) makes Quality Partnerships, supported where necessary by Quality Contracts, one of its main mechanisms for the delivery of better bus services.

"Quality Partnerships work but they need to be more widespread and put on a firm footing. We will therefore introduce legislation to put these partnerships on a statutory basis." (para 3.17).

"Quality Partnerships should be for rural as well as urban areas, although a rural Quality Partnership might well look different." (para 3.18).

"In some cases, strengthened Quality Partnerships may not be sufficient to guarantee the necessary improvements. We will therefore introduce primary legislation to give powers to local authorities, where it is in the public interest, to enter into Quality Contracts for bus services." (DETR, 1998; para 3.20).

2.16 Even before the White Paper, Quality Partnerships had proved to be important as a method of ensuring commitment to high levels of quality from both operators and local authorities. These have been encouraged by both the Passenger Transport Executive Group (see box) and the Confederation of Passenger Transport UK (see box). The principle of quality partnerships is that the transport operator, the local authority and other bodies become involved in the development of high quality transport provision.

Quality Partnerships

The partners sign a joint declaration of intent under which:

- the bus companies provide new low floor buses and customer care trained drivers, and lead the marketing of the project.
- the local authority provides bus priority measures and stop docking facilities for the buses, and leads the public consultation.
- the PTE provides bus shelters and information, including real-time information, and provides overall management of the project.
- the police provide the necessary supervision to enforce the bus priority measures on the highway.

Better Buses – Frameworks for Partnerships
Passenger Transport Executive Group (undated)

2.17 There is much agreement between bus operators and the PTE Group on what has to be done to achieve the necessary quality bus service and image. All recognise that these

improvements require effective partnerships between PTEs (if there is one in the area), bus operators and local authorities.

2.18 High quality public transport provides for each part of the journey as follows:

- **Enquiry** – high quality information available in the home
- **Walk** – footpaths focused on bus stops
- **Wait** – safe and attractive bus stop environment with real time information;
  – high frequency service, or very reliable where high frequency is unrealistic, for short waiting time
- **Ride** – high standards of service, staff and buses;
  – bus priority for reliable and fast journeys;
  – low floor/ easily accessible buses
- **Walk** – access to central areas
- **Image** – high quality design, customer service and promotion

Quality Partnerships

Bus services for the next millennium

It is important that government at both national and local level provides the framework which enables bus operators to raise the quality of bus services in the UK.

Bus operators are ready to invest in improved vehicles and services but the greatest benefits will flow through to passengers if there is matching investment in infrastructure.

The Confederation of Passenger Transport UK is working on a series of measures aimed at formalising agreements between bus operators and local authorities to raise the quality of the nation's bus services.

These **Quality Partnerships** would impose certain duties on bus operators, local authorities and the Traffic Commissioners.

Operators

When entering into Quality Partnerships, operators would have to provide:

- Vehicles of low floor DPTAC standards where appropriate.
- Vehicles which meet the latest emission standards (Euro 2 or better)
- Levels of service provision which meet the locally agreed transport vision statement
- High quality staff with planned programmes for NVQ and customer care training.
- Modern fare collection, possibly including smart cards, through ticketing and travel cards.
- Comprehensive information provision, perhaps including real time, in conjunction with the local authority.
- High quality service marketing.

Local Authorities

In return, Local Authorities can provide:

- Regular dialogue with local operators about local transport and traffic planning.
- Routes with a high degree of bus priority and other traffic management measures, enabling bus services to run in a congestion-free environment
- Modern, accessible (to both passenger and operator) bus stop and station infrastructure.
- Convenient inter-modal and bus/bus interchange sites.
- Bus access to key town centre destinations

Confederation of Passenger Transport UK, *Quality Partnerships* (CPT, 1996)

2.19 Examples of quality bus services, by PTEs, local authorities and operators, include:

- Liverpool SMART bus, which includes low-floor buses and Quality Bus measures;
- Belfast City Express, which uses direct service, trained staff and quality vehicles;
- Superoute 66 in Ipswich, where 31% of passengers are new to public transport;
- SuperBus in Leeds, with low-floor buses, guided busway sections for priority at junctions and a contra-flow bus lane for direct access to the city centre; and
- Birmingham line 33, with low-floor buses and quality infrastructure and information along the line of route.

It is important that all parties are involved in early discussions for the planning of a new development so that all parts of the public transport journey achieve a high and consistent level of quality. Quality Partnerships are a good way to achieve this.

Economics of public transport operation

Importance of commercial viability

2.20 Unless the local authority considers the service important enough to support as a tendered service, it will only exist if it is commercially viable to the operator. This means that at the very least the cost of the service must be covered by the revenue provided from ticket sales and advertising. In the longer term, the operator will expect to make an overall profit from the service, which means that it must cover all of its costs, including a contribution to overheads and input to reinvestment. As a rule of thumb, a bus needs to earn revenue of £300 per day or £30 per hour to operate.

2.21 Provision of public transport for a new development is most readily achieved if the development is in an existing public transport corridor and only requires the operator to stop to pick up new customers. If a completely new service is required, or an existing service needs extension or diversion, extra resources will be needed. A diversion to an existing route may inconvenience existing passengers and reduce the attractiveness of the service and the revenue achieved. It may be possible to overcome this problem by using contributions from the developer to provide priorities for buses on the existing route, to recover the time needed for the diversion.

2.22 The operator may take the commercial view that the passengers from a new development would be carried on the existing bus network and that the cost of providing additional services cannot be justified. Public transport revenue issues should be considered in the design of the development and it is important to understand the economics of transport operation (see **Revenue**, paragraph 2.24, and **Costs**, paragraphs 2.25 and 2.26, and Tunbridge and Jackson, 1980) to assist in putting features into the development which will help minimise costs and maximise revenue.

2.23 It is important to provide a satisfactory public transport service immediately a new development comes into use (see **Pump priming**, paragraph 2.28). In the case of housing, this can get occupiers into the habit of using buses and prevent them purchasing second cars. This is even more important for any car-free housing development, of the kind proposed in Edinburgh (see Chapter 5, **Car-free housing**, paragraphs 5.29 to 5.33). In the case of a development providing employment, the service enables employees to use public transport to commute; they may choose where to live on the basis of the services provided. It may well be necessary to

support an unprofitable service while a development is being completed and occupied, to avoid the users of the development acquiring additional cars and taking decisions that make them car-dependent. For leisure developments, which people will visit on a less regular basis, it is very difficult to persuade car owners to adopt the habit of using public transport.

Revenue

2.24 Revenue for the provision of the transport service can come from:

- travel sales – on and off bus revenue;
- support for concessionary fares from the local authority
- advertising at bus stops and in vehicles;
- developer contributions based on the increase in land value;
- developer purchase of extra buses, services and marketing;
- organisations such as BAA Heathrow and supermarkets for services to their sites; and
- support from the local authority or Passenger Transport Executive if the service is tendered.

The majority of revenue is from travel sales and these are driven by the attractiveness of the service to passengers and the unit price of the fare. The quality of service is particularly relevant for new developments; a high quality will maximise ridership and may allow higher fares to be set by the operator.

Costs

2.25 Costs of operation will be incurred for a new service or an extension to an existing service. These will include (Tunbridge and Jackson, 1980):

- standing costs – tax, insurance, MOT preparation, depreciation;
- running costs – drivers costs, fuel, tyres, mileage-based maintenance;
- semi-variable costs – supervision costs, promotion, administration; and
- costs of infrastructure and systems – highways and traffic management, bus shelters, information systems and maintenance of these items.

The operating cost per vehicle km for local bus services is given in *Transport Statistics Great Britain* (DETR, 1997) (see box below). Costs in Wales are about half those in London.

The Passenger Transport Executive (PTE) or local authority Transport Co-ordinating Officer (TCO), as well as individual local operators, will be aware of revenue potential as well as operating costs. It is important for both developers and planning authorities to involve the PTE or TCO at an early stage of the development process, preferably before any firm agreement is made on the provision of public transport services.

2.26 The location and layout of a development must seek to minimise the costs of public transport operation and to maximise revenue potential. This will involve such issues as:

- attractors at each end of the service (to permit "against the flow" ridership);
- grouping developments to increase demand for public transport services;
- bus services that perform several functions (inter-urban routes, urban trunks and interchange);
- minimising walk distances (by careful routing and stop locations); and
- bus-only links to minimise mileage and maximise penetration by allowing direct routes.

Local bus services: operating costs, pence per vehicle-kilometre, 1995/96

Area	Excluding depreciation	Including depreciation
London	133	141
English met counties	87	92
English shire counties	70	76
England	86	92
Scotland	75	80
Wales	66	70
All outside London	76	81

Transport Statistics Great Britain 1997 (DETR, 1997)

2.27 The principles which determine the costs are the same for all modes of transport, but there are differences between modes in terms of the flexibility of provision. These will affect the willingness of an operator to provide a service:

- **taxis** very flexible and can respond to passenger demand on a trip by trip basis;
- **buses** flexible, especially where no extra capital resources such as vehicles or depots are required. Mini- or midi-buses can be used where full sized buses are not necessary; and
- **rail** inflexible. Revenue estimates need to be robust. Costs vary considerably depending on whether a new station is required or an existing station served by a new or enhanced service.

Other specialised forms of service, such as social transport, dial-a-ride and community transport, will not be considered in these Guidelines, as they are unlikely to be important to most developers. Developers of sheltered housing and other developments targeted at older people should consult the Community Transport Association as well as the PTE or TCO regarding transport provision.

Developments should be located to take advantage of existing public transport networks without circuitous diversions and cul-de-sac extensions. Routeings within developments must be as direct as possible with final destinations on either side of the route and very close to bus stops.

Pump-priming to develop a viable service

2.28 For some developments, the cost of providing a public transport service will not be covered by the achievable revenue, rendering the service non-viable. In these cases a commercial service will not be provided. There will also be cases where only a low level of service is justified commercially, but where support for a high level of service may be appropriate to attract car owners until the revenue increases enough to cover the cost of operation. An example of successful pump priming of this type is the BAA Heathrow support for the service 285 Kingston to Heathrow (see box).

285 Local Link Kingston – Heathrow

In November 1994, BAA Heathrow and British Airways formed a partnership to invest over £300,000 in route 285. Following this investment, the 285 operates every 10 minutes throughout the day, with additional early morning and late evening services providing a good quality link from Heathrow to Feltham, Teddington and Kingston.

The service enhancement provides a crucial link with the local community where over 2,500 airport employees live. Because the 285 links with the rail network at Feltham and serves some of the airport's largest office complexes, this has ensured that staff not only travel to work by bus, but also use it as an ideal way of getting around the airport.

Of the extra 400,000 journeys made on the 285, which equates to growth of over 92%, since BAA Heathrow and BA's funding support was introduced, nearly 300,000 are airport employees. After only 18 months of support, the 285 has become so successful that BAA Heathrow and British Airways have been able to divert their support to other services.

Heathrow Airport Transportation Policy Winter 1996/1997
BAA Heathrow, 1997

2.29 It is important in all cases to assess the long term viability of public transport to ensure that the investment is justified. This means analysis of:

- the captive market;
- the potential market; and
- the ability to serve adjacent sites which may be developed in the future.

2.30 If the decision to go ahead with a new development depends on financial support for a public transport service from the local authority or PTE, then there must be a clear indication that the support will be for a limited period. Otherwise, the service could be a drain on public funds whilst not attracting many passengers from car to bus. The limit to the period for support will depend on many factors, including the rate at which the development is built and occupied. It needs to be at least six months after the development is fully occupied, and in practice is likely to be one to two years from the start of building a residential development. For a major development, it may be necessary to increase the frequency of service ahead of demand for several years as development occurs. For the Kingston to Heathrow bus service 285, it took 18 months for the ridership to increase enough to make the service commercially viable. The analysis of the potential demand must be realistic. If ridership does not increase to the level needed for viability, either because the analysis of demand was optimistic or because the quality of the service provided was low, the service will collapse as soon as the subsidy is removed.

2.31 There are a number of ways of providing initial financial support for public transport provision to a development. These include:

- subsidy for the bus service for set period;
- a commuted payment to provide a subsidy for the bus service;
- a commuted payment for vehicle maintenance;
- purchase of vehicles; and
- payment for infrastructure.

These may often be funded by the developer, local authority, operator or other public/private sources. Payment for the infrastructure is a much safer alternative than revenue subsidy, as it provides the basis for a quality public transport route on which higher levels of service in terms of frequency and destination choice can be built in the future.

2.32 The success of public transport is dependent on its relative attractiveness compared with other modes, particularly the car. The success of the service can be helped by measures to restrain the use of cars which can be built into the design of the development. Such measures may include:

- restrictions on car parking;
- restraint on car access to certain areas or at certain times;
- traffic calming measures to increase journey times by car; and
- provision of public transport immediately a development starts to be occupied.

If the market can realistically be seen to respond to a good public transport service in the longer term, so that support can eventually be removed, then pump priming is a viable option. If ongoing public funding for the service is likely to be required, careful consideration needs to be given to the value for money achieved relative to revenue support for other services.

References

CIT (1996) *Better Public Transport for Cities* Chartered Institute of Transport, London.

CPT (1995) *Buspower 2000* Unpublished study by MORI for the Confederation of Passenger Transport UK, London.

CPT (1996) *Quality Partnerships* Confederation of Passenger Transport UK, London.

DETR (1997) *Transport Statistics Great Britain 1997* Department of the Environment, Transport and the Regions, HMSO, London

DETR (1998) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London

PTE Group (undated) *Better Buses – Frameworks for Partnership* Passenger Transport Executive Group.

Transport 2000 Trust (1997) *Blueprint for Quality Public Transport* Transport 2000 Trust, London.

Tunbridge R J and R L Jackson (1980) *The Economics of Stage Carriage Operation* by Private Bus and Coach Companies TRRL Laboratory Report 952, Department of the Environment Department of Transport, Transport Research Laboratory, Crowthorne.

Wootton Jeffreys Consultants Ltd (1994) *The Role of the Bus in the Urban Economy* Confederation of Passenger Transport UK, London.

3. Encouraging Public Transport Use

3.1 Public transport can only attract and retain passengers if the services it offers match the requirements of travellers and are of a sufficiently high quality. Simply providing the services is not enough, on its own, to attract passengers. People need to be told what is available and how to use it, the benefits of using public transport need to be publicised, and organisations that generate travel need to arrange their affairs to encourage public transport use. This chapter describes some of the measures that can be taken to encourage public transport use, once high quality services are available for people to use. Developers should initiate some of these measures and, indeed, these measures can be the subject of a planning agreement under Section 106 of the Town and Country Planning Act 1990.

3.2 The White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998) states that:

"The New Deal for Transport means:

- Government departments taking the lead in introducing 'Green Transport Plans' – plans which help to cut down on car use;
- local authorities, business, community organisations, schools and hospitals encouraged to produce their own Green Transport Plans;
- a major national awareness campaign;
- new initiatives on school journeys;
- individuals/families/communities considering their own travel habits." (para 1.49)

and commits the government

"to fund publicity campaigns at the national level to raise awareness of how small changes in personal behaviour and lifestyle can make for a better environment." (DETR, 1998; para 5.50).

Travel awareness campaigns

3.3 Many local authorities are participating in travel awareness campaigns to exhort people to use cars less and to make more of their journeys by public transport or on foot (DOE/DOT, 1995). These have become a near national campaign called "Travelwise", after the county-wide travel awareness campaign started by Hertfordshire in 1993. Public information programmes have become a permanent feature of transport planning in many counties. The Travelwise campaign has an "umbrella" promotional role which parallels the development of package bids, cycle facilities and public transport priorities.

3.4 Another early campaign, called "Headstart", was begun by Hampshire in 1994. This three-year campaign to persuade transport users to travel without using private cars was based around the message "Use Your Head, Not Your Car (DOE/DOT, 1995). Spending on Headstart was planned to be about £0.3m over three years, with other initiatives bringing the total budget to some £1.2m. Benefits, in terms of reduced traffic growth, reduced congestion and pollution, are expected to be more than twenty times the cost.

3.5 Chapter 6 of *Transport in the Urban Environment* (IHT, 1997) reviews travel awareness campaigns. Although their effectiveness has yet to be proven, they are an important part of changing peoples attitudes and behaviour.

Information for travellers

3.6 Lack of information about services is one of the major barriers to public transport use. Providing information for potential passengers is an adjunct to providing and managing a public transport service. The DOT booklet *Better Information for Bus Passengers* describes what information is needed and how it can be provided (DOT, 1996). It distinguishes between network and service information. Network information should provide a route map covering all services in an area, regardless of operator, plus basic service details such as days/periods of operation and an indication of frequency. Service information provides timetable and route information for a single service or group of services, as in timetable leaflets.

Real time information at bus stops increases passenger confidence. *(Courtesy: Derek Palmer).*

3.7 Network and service information can be provided through enquiry offices, telephone enquiry services, terminals in public places, displays in stations, bus shelters and bus stops, and information on vehicles. These traditional sources can be supplemented by information via cable television using teletext and via the internet. Printed timetable material is often difficult to read, with poor layout and small type. Better Information for Bus Passengers (DOT, 1996) provides some guidance on good practice.

Information for bus passengers

Market research in 1993/94 found that bus passengers preferred to obtain information from:

At home:

1. printed timetables
2. telephone enquiry service
3. mailed personal timetables (for regular users)

At bus stops

1. timetable displays
2. frequency guides (in metropolitan areas) or real time indicators

In town centres

1. posters indicating routes and stops
2. interactive terminals.

The methods for town centres would also apply to railway stations, ports and airports.

Better Information for Bus Passengers (DOT, 1996)

3.8 Real time information is being displayed at bus stops and railway stations. The information displayed is usually the time to wait for the next bus on each service using the stop, or the next few trains. Cities in which real time information systems are in service include Southampton, Birmingham, Leeds and London. The systems are proving popular and being expanded, and additional cities are introducing systems. In addition to displays at bus stops, real time bus information could be displayed in large supermarkets or superstores, which are open for most of the hours that buses operate. This could bring real benefits to bus shoppers not certain if they need to hurry to the bus stop or not, and useful to the bus operator because the bus message is being made visibly to the motorist shopper. A supermarket in Ipswich, served by the high quality Superoute 66 to Martlesham and Kesgrave, has a display of real time bus information, which is reported to be working well. A real time information display could be an item for funding through a Section 106 agreement with a developer.

3.9 A simple way to publicise a bus route, which is being used by several operators, is to display a simplified diagram of the route on the side of the bus. This requires vehicles to be dedicated to a particular route.

3.10 In Canada, most bus operators provide automatic telephone systems that announce the times of the next few services from a particular bus stop when the unique number for that stop is dialled. The telephone number is displayed on the bus stop flag. Where bus location equipment is in use, the announcements are based on real time information; otherwise, scheduled times are used. In Britain, as elsewhere, provision of both schedule and real time information through the internet will become more common.

3.11 As long ago as 1981, the Transport and Road Research Laboratory demonstrated that distributing leaflets providing details of local bus services to households along the routes generated enough revenue through increased patronage to cover the cost of producing the leaflets between three and ten times.

Network and service information for passengers is essential to make a bus service useable. Publicity can encourage people to try public transport. They will only continue to use it if the service provided matches their expectations.

Green Commuter Plans and Company Travel Plans

3.12 Commercial practices can act as a major influence on travel demand. Specialisation, rationalisation and relocation by a company all affect the distance employees travel and the means of transport that they use. Company policies on company cars, travel budgets, the allocation of parking places and the provision of storage for pedal cycles all influence the means of travel chosen by employees. Schemes such as flexi–time give employees the ability to adjust their working day to match public transport timetables.

3.13 Green Commuter Plans and Company Travel Plans are similar approaches which promote the use of environment–friendly forms of travel. Green Commuter Plans target workplaces and the means staff use to travel to work, whereas Travel Plans are more wide–ranging and are aimed at both staff and visitors, and include business travel as well as commuting. The main aim of a Green Commuter Plan is to reduce the level of car commuting to the workplace, particularly driver only trips, whilst encouraging greater use of sustainable forms of transport such as cycling, walking and public transport (Transport 2000 Trust, 1997; BAA Heathrow and CBI, 1996).

3.14 Building on the experience of companies in California, Germany and the Netherlands, many authorities and organisations in the UK are now introducing Green Commuter Plans and Travel Plans. There are a number of examples where these have been sought by local

authorities as a pre-requisite for obtaining planning permission. These are usually the subject of a Section 106 agreement, and examples involve business developments, schools, hospitals and tourist attractions.

The Royal School, Hampstead

This is a private school where there has been a gradual increase in the number of day pupils and where local residents had expressed concern at the increasing level of "school run" traffic.

The council granted planning permission in 1997 for an increase in the school roll, subject to a Section 106 agreement to reduce the amount of traffic attracted to the site.

The Travel Plan included a target to reduce car use by 30% over the next three years. To ensure that this target was achieved, the council only granted a temporary three year consent.

The School carries out annual travel reviews, the first of which indicated a 23% reduction of car trips in the first year. The most effective measures appear to be:

- a car sharing system;
- private minibuses to transport day pupils;
- information packs to all new staff and pupils; and
- regularly emphasising to parents the importance of the Travel Plan.

Benefits of Green Travel Plans

3.15 For **local authorities**, Green Travel Plans provide a means by which individual organisations and businesses can take a proactive role in managing their own travel demand. This reduces the burden placed on authorities in terms of managing traffic congestion and provides a mechanism by which organisations can contribute to local authority traffic reduction targets. For this to happen, authorities need to be consistent in terms of policy application and planning decisions, and provide the necessary framework for Green Travel Plans to be prepared, implemented and monitored. Local authorities can lead by good practice and by participating in demonstration projects with suitable organisations.

The Royal Free Hospital, London

This hospital has been expanding on the same site for some time and there are now considerable traffic and parking problems; the hospital is widely perceived to be a bad neighbour.

The hospital submitted several applications for small extensions each year. In 1997, the council stated that it would not consider any further applications until the hospital developed a Travel Plan. This plan included:

- a target to reduce non-emergency vehicle use;
- low interest loans for public transport season tickets for all staff who agree not to use or to give up using their cars;
- information boards for staff and visitors detailing public transport services; and
- a staff car sharing scheme to be developed to offer priority parking.

3.16 For **developers**, Green Travel Plans may provide the opportunity to bring forward development in locations which are at the margin of acceptability for PPG13 policy. If developers are willing to sign up to agreements relating to mode split and traffic generation targets, certain development sites may become more acceptable in travel generation terms. However, such agreements would not make acceptable schemes that are fundamentally at odds with planning policy. In particular, Green Travel Plans should not be expected to enable a development that is acceptable in itself to proceed in an unsustainable location. Green Travel Plans are particularly important for existing sites with expansion programmes (see box, Royal Free Hospital). By limiting vehicular travel demand at a site, the amount of on site parking can be reduced and the space allocated to other uses. This has increased importance since the announcement on the taxation of employee car parking in the recent White Paper (DETR, 1998).

3.17 For **individuals**, Green Travel Plans can:

- provide more travel choice;
- provide an alternative to driving on congested roads;
- improve reliability;
- reduce costs and journey times; and
- improve safety for travellers, particularly cyclists.

3.18 In terms of the **organisations/businesses** having to implement Green Travel Plans, the following benefits could be achieved:

- taking a more proactive role in managing their own travel demand could lead to greater choice and reliability for the organisation, as travel options are more tailored to individual need;
- with commuter plans, staff are less reliant on one mode of transport as travel options become more varied which could result in efficiency gains and benefits to staff; and
- costs may reduce as the burden of providing company cars/dedicated parking falls.

Policy and institutional frameworks

3.19 Guidance to local authorities on submissions for transport funding recognises the importance of local partnerships. Authorities should as a matter of routine involve the community – particularly employers – in their plans to promote alternatives to the car (DETR, 1997). Green Commuter Plans and Travel Plans are thought to help change travel to work behaviour at little cost. They are seen as an important and effective tool in raising awareness and contributing to demand management. As such, they are a significant element in the package of policies adopted by local authorities. It is recognised that within a company plan, a package approach is required and that this will need to include complementary restraint measures if the demand for car travel is to be reduced.

Access to public transport

Hewlett-Packard cut a 20 minute walk to the bus by laying a new footpath across its Bristol site and opening up an unused entrance. Staff can now cut through the adjacent university campus and reach a well-served bus terminal in just five minutes.

Changing Journeys to Work Transport 2000 Trust, 1997

3.20 Local authority policies need to be clear as to what type of development, of what size and in what location should require a Green Travel Plan, and who should be responsible for preparing and implementing it. Planning policies should stipulate what is to be achieved by a Travel Plan and how it is to be secured, for example through a Section 106 agreement. This provides certainty for developers. As part of this process, a clearly defined mechanism for monitoring and enforcement should be applied which takes into account the issues associated with implementing Green Travel Plans and the time taken for results to happen. This process should enable individual organisations to seek support from local authorities if difficulties are arising in meeting targets. Similarly, enforcement measures and penalties should be fair and clearly defined from the start.

3.21 Green Commuter Plans will become more common-place in the future and are likely to be introduced by three different processes:

- local authorities, as major employers, setting an example;
- other large employers and organisations introducing plans, typically in partnership with the local authority; and
- through planning obligations or conditions for new developments.

Initially Green Commuter Plans are likely to focus on larger employers as they usually have the resources to introduce a plan and implement it successfully. The principles could equally be applied to smaller workplaces, but it is important that each plan is individually tailored to the particular site, its use, and the opportunities available.

Organisational issues

3.22 The success of a Green Travel Plan is largely dependent on effective organisation and management. This is an issue which is largely outside the realm of the development control process but nonetheless crucial in securing the success of such initiatives. In the USA, successful Travel Plans have been prepared and implemented by individual organisations with an appointed Travel Coordinator, by the establishment of a Green Commuter Plan working party or through the work of a Transportation Management Organisation (TMO) which includes a range of organisations in one location. In the case of the latter, a TMO comprises elected representatives from member employees. Their aim is to address the transport problems of a particular area. As the organisation represents a larger number of employees than a single organisation, it has greater power and resources to tackle transport problems more effectively.

A Dutch example

Oranjewoud, a firm of consulting engineers, are to appoint a part-time administrator to co-ordinate a plan to ensure greater use of public transport and car pools. The firm hopes to make an annual saving of 70,000 guilders (£28,000) – net of the co-ordinators salary – since first-class travel by public transport would cost less than paying car mileage allowances. Increased staff travelling time would be offset on the assumption that one third of this time would be used for working.

Ministry of Transport, Public Works and Water Management, the Netherlands
Quoted from: *All Aboard!* BAA Heathrow and CBI, 1996

3.23 BAA Heathrow and the CBI have produced a booklet *All Aboard!* which provides guidance on the measures that should be considered in a company Travel Plan, and their likely effects (BAA Heathrow/CBI, 1996). The Transport 2000 Trust has published a detailed manual on the

production of a Green Commuter Plan (Transport 2000 Trust, 1997). When developing a Travel Plan it is important to have support and commitment from all levels within the organisation or organisations. It needs to have credibility within the business community and with representatives of the public sector. Financial commitment and security is essential as the results will only be achieved over time.

3.24 A good understanding of travel behaviour is required prior to the formulation of a Travel Plan. This involves a detailed survey of employees and of visitors to ascertain the following key issues:

- mode of travel to work;
- start and finish times;
- journey origin (usually area of residence);
- usual journey time with details of delays;
- journeys made throughout the course of work;
- reasons for using particular modes of travel;
- views about changing to an alternative mode of travel;
- socioeconomic data; and
- views about certain measures and initiatives such as car sharing.

3.25 Analysis of this data will provide an understanding of the existing travel situation. From this, individual measures and policies can be tested to identify their impact on travel demand. This is particularly important when monitoring the effectiveness of plans in achieving mode split targets.

Thames Water

A staff travel survey helped Thames Water in Swindon to fill up their works buses. The company's free shuttle service between its offices and the town centre often left with just a handful of passengers. But following a questionnaire and discussions with staff, some buses were re-routed to pick up passengers from two residential areas. As a result, numbers leapt up. The scheme has also proved popular with other workers on the same business park who pay a low fare. Policy adviser Chris Betteridge says the buses cost them £275 a year for every passenger, while the cost of leasing additional parking space would be almost double. Staff who come in by bus can take a free taxi home if they have an unforeseen emergency or need to work late.

Changing Journeys to Work Transport 2000 Trust, 1997

3.26 The type of measures to be included within a Green Travel Plan are not prescriptive and depend on a number of factors, such as the type of organisation and its associated travel behaviour; size; local geography of the area and location. However, the following broad range of measures that should be considered when developing a Travel Plan:

- car sharing schemes;
- guaranteed ride home facility for car sharers in case of late working or urgent need;

- car park schemes which provide priority access for car sharers;
- requests to bus companies for routes nearer the company;
- financial support for new public transport services;
- promoting public transport through improved marketing;
- discounted tickets for regular public transport users;
- information;
- introducing loans for public transport tickets and the purchasing of cycles;
- improving cycling facilities including secure storage and changing facilities;
- using information technology to reduce travel demand during the working day, for example, internet food shopping; and
- official journeys and business trips to be made by taxi and rail whenever possible.

3.27 Green Travel Plans will only be successful if monitoring is established in agreement with the Travel Plan organisation and local authority. This will be particularly important if mode split targets are to be achieved. The following issues should be addressed:

- when monitoring will take place;
- the nature of the monitoring and cost implications;
- who pays for the monitoring and who has access to the results;
- what happens if targets are not met;
- penalties for non-compliance; and
- reasonable methods of enforcement.

These should be agreed with the Local Authority and if possible secured through a Section 106 agreement prior to the implementation of the Plan. A typical requirement could be for a developer to monitor modal split and report annually to the Highway Authority. If the target modal split is not achieved, additional contributions towards non-car means of transport could be required. The scale of development for which a Green Transport Plan should be required could be based on similar criteria to those for a Transport Impact Assessment (see Chapter 4, box after paragraph 4.2).

3.28 The role of public transport has been particularly important in the Green Commuter Plans and Travel Plans developed to date. Major employers, hospitals and educational establishments are all major trip generators. While car sharing and increasing the proportion of walk and cycle trips play an important role, it is usually public transport which is able to achieve the greatest change away from the car. The commitment of senior management is essential to the success of the plan. Where possible, senior staff should lead by example.

3.29 Green Commuter Plans have achieved varying degrees of success. The target which is often set is to cut car use by 30% within three years, although each plan will need to consider

the targets appropriate to the situation. For the Bausparkasse bank in Germany, packages involving the promotion of public transport in conjunction with car restraint increased the percentage of employees travelling by bus from 18% to 62%. In the Netherlands, the main hospital in Arnhem achieved an increase of use of public transport from eight percent to 40%.

3.30 One of the significant benefits to arise from Green Commuter Plans is the relationship and exchange of information between the employer and staff, the local authority and the public transport provider. This potential source of detailed data on catchment areas and potential demand, timing of services and even sensitivity to price can assist the transport operator in providing an attractive service within an environment where public transport is being promoted and car use restrained.

Green Commuter Plans and Company Travel Plans can substantially reduce car travel. The alternatives must be attractive, some deterrence to car use may be needed and the plan must have the active support of senior management.

Safe Routes to Schools

3.31 Up to 20% of rush-hour traffic comes from journeys to and from schools, and parents repeatedly cite fear of traffic and fear of assault as the two main reasons for driving children to school (Wenban-Smith, 1997). Thirty-five percent of English school children travelled to school by car in 1990, compared with around 10% in 1971. Table 1.1 (Chapter 1) shows that for Great Britain in 1994/96, 47% of education journeys were on foot, 34% by car and 15% by bus.

3.32 The Safe Routes to Schools project, led by Sustrans, is one of the initiatives aimed at reversing this trend. Ninety percent of children own a bicycle and over a third want to use it for journeys to school. Sustrans believes that by transforming the physical environment in areas surrounding schools and using traffic calming to reduce the speed of traffic, children and their parents can be attracted back onto the streets. While Safe Routes to School is principally about encouraging cycling in place of travel by car, the same approach applies to encouraging walking and travel by public transport.

3.33 The White Paper notes that the Government is already helping to fund Sustrans "Safe Routes to School" demonstration projects in Leeds, York, Colchester and Hampshire, and funding other specific projects elsewhere (DETR 1998; para 5.32). It commits further initiatives to encourage more children to get to school other than by car (para 5.34).

3.34 Most Safe Routes to Schools projects begin with a survey measuring how children currently travel to school. Sustrans believes it is vital to focus on the pupils' own concerns and interests. Two years into pilot projects with ten schools, Sustrans has identified the 10–13 year olds as the most likely to respond to cycling initiatives. Sustrans has produced an eight page guide *How to establish a Safe Routes to School Project* to help parents and teachers persuade schools and local authorities to get involved. The same approach can be used to develop safe routes to other key destinations such as the town centre.

References

BAA Heathrow and CBI (1996) *All Aboard!* Confederation of British Industry, London.

DETR (1997) *Transport Policies and Programme Submissions for 1998–99* Department of the Environment, Transport and the Regions, HMSO, London.

DETR (1998) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London.

DOE/DOT (1995) *PPG13: A Guide to Better Practice* Department of the Environment/ Department of Transport, HMSO, London.

DOT (1996) *Better Information for Bus Passengers* Department of Transport, London.

IHT (1997) *Transport in the Urban Environment* The Institution of Highways & Transportation, London.

Sustrans (1996) *How to establish a Safe Routes to School Project* Guide RSO–3, Sustrans, Bristol.

Transport 2000 Trust (1997) *Changing Journeys to Work – An employers' guide to green commuter plans* Transport 2000 Trust, London.

Wenban-Smith J (1997) *Safe Routes to Schools* Transport Retort, 20/6, Nov/Dec 1997, London.

4. The Public Transport Impact Of Developments

Assessing the transport impacts of developments

4.1 Developers will usually be required by planning authorities to assess the traffic impacts of their proposed developments. This is a result of general concern about the traffic movements associated with developments, particularly major developments. In 1994, The Institution of Highways & Transportation published Guidelines on *Traffic Impact Assessment* (IHT, 1994). These Guidelines have established a framework for estimating traffic impacts, which also ensures that the impacts are considered prior to approving a development. They concentrate on the demand for vehicular movement generated by the development and, in that context, are as valid now as they were in 1994. However, additional guidance is needed on the movements of people by public transport, bicycle and on foot due to the development, and this chapter indicates how these movements can be estimated.

4.2 The IHT Guidelines estimate vehicular trip rates from the scale of the development, the number of employees, or a combination of both. In particular, they quote vehicle trip rates per 100m² of Gross Floor Area for a range of types of development. The data used is mainly drawn from the TRICS database, which has accumulated trip rates for a range of land uses over a number of years (see para 4.7). However, those undertaking a Traffic Impact Assessment may need to carry out additional surveys to provide data for their assessment. This could be necessary because of the unique nature of the development being proposed or because of a lack of recent data in the databases relating to comparable developments. The underlying principle applied to the assessment is that any data used must be appropriate and comparable.

Transport Impact Assessments/Statements

It would be helpful if a range of "triggers" for Transport Impact Assessments were agreed. The following "triggers" from the London Borough of Camden's Unitary Development Plan give an idea of the sort of thresholds that can be used.

> A TIS will normally be required when a development generates:
> (a) more than 1000 people per day, or
> (b) more than 500 vehicles per day, or
> (c) more than 100 person trips during the peak hours, or
> (d) more than 100 vehicle movements in any single hour, or
> (e) more than 20 heavy goods vehicles (over 7.5 tonnes) per day, or
> (f) any goods vehicle movements between midnight and 6 am.
>
> *(Source: LB Camden, Deposit Draft UDP, 1993)*

4.3 The IHT Guidelines on *Traffic Impact Assessment* are incomplete in that they do not provide guidance on the non-car movement of people generated by developments. Whilst a multi-modal approach is necessary, in many cases the most significant and damaging transport impact of a new development is vehicular traffic. Estimates of public transport ridership, and of travel on foot and by bicycle, are needed to assess the viability of providing alternatives to car travel, and to check that existing services and facilities will not be over-loaded.

4.4 Trip rate databases have been improved in recent years to include additional data on the movement of people generated by the development and their use of all forms of transport. For example, information on the development's catchment area and its accessibility to public transport are now included in TRICS, and trip rates by modes other than car are being

collected (see paragraph 4.7). This should ultimately provide sufficient information for a comprehensive assessment of the transport impacts of a proposed development. Other special studies are collecting multi-modal trip data which may be available before the main databases are able to provide information. This chapter suggests sources of multi-modal information during the transitional period until the main databases are able do so routinely.

4.5 The change of terminology from "Traffic Impact Assessment" to "Transport Impact Assessment" reflects the policy changes which have taken place in recent years, and the current drive towards more sustainable development. The White Paper *A New Deal for Transport: Better for Everyone* states "We are developing a new approach to the appraisal of transport projects. ... It looks at the contribution of different forms of transport in developing alternative solutions .... It is our intention that this new approach, once finalised, will be applied to the appraisal of all transport projects. ..." (DETR, 1998; para 4.195). Details of the new approach to the appraisal of the transport impacts of developments are not yet available to include in these Guidelines. The remainder of this chapter gives sources which will soon be able to supply data on trip rates by public transport, cycling and walking, and indicates the approach to deciding the level of public transport service that should be provided for a development.

4.6 Planning authorities that require a Transport Impact Assessment for a new development should require the developer to assess accessibility by public transport at the same time (see Chapter 5). The local planning and highway authorities should negotiate with the developer the transport improvements required, without which the application would be subject to refusal on transport grounds.

Data on public transport demand

4.7 At the end of 1998, there was no national database relating multi-modal demand for travel to various aspects of a development. There have been many estimates and surveys of bus, walk and bicycle trips from specific developments for local planning authorities, but these are only now being collected into the databases TRICS, GENERATE and TRAVL. GENERATE also gives users access to multi-modal trip data from individual transport studies that are not

Trip Rate Data Bases

The following Trip Rate Data Bases are or soon will be available:

TRICS	A trip generation database for development control. More than 1,100 sites nationwide and 83 development types Ian Coles, JMP Consultants Ltd 172 Tottenham Court Road, London W1P 0NA Tel: 0171-391-7004 Fax: 0171-387-0078
GENERATE	A database to calculate trips to and from proposed developments. 43 development types. Sites nationwide, but majority in Midlands. Barry Storey, jdt (a Division of Mott McDonald) Canterbury House, 85 Newhall Street, Birmingham B3 1LZ Tel: 0121-237-4020 Fax: 0121-237-4003
TRAVL	Trip generation data base for more than 130 sites in London Paul Bowdage, Environment and Transport Studies Department London Research Centre, 81 Black Prince Road, London SE1 7SZ Tel: 0171-787-5650, Fax: 0171-787-5606 E-mail: paul.bowdage@london-research.gov.uka

included in the overall data base. Developers should ask their local planning authority whether data for other local developments could be used to estimate trip rates for a proposed development.

Table 4.1 Journeys per person per year by region of residence: 1994/96

Journeys

	Greater London	Other English metro areas	South East excluding London	Rest of England and Wales	Scotland	All areas
Walk	52	56	55	57	60	56
Car	423	546	678	613	536	583
Local bus	90	103	29	44	85	62
LT underground	45	–	2	–	2	6
Surface rail	27	7	17	4	8	10
Other public	13	17	10	9	14	12
Total	669	744	822	757	722	753

Note: This table excludes journeys under one mile
Columns do not sum to totals because of the omission of little–used modes

National Travel Survey 1994/96 (DETR, 1997)

4.8 The London Research Centre is developing a trip generation database called TRAVL (Trip Rate Assessment Valid for London). This contains data on a wide variety of land uses and is a useful tool for estimating the effects of proposed developments on transport in London. TRAVL contains details of over 130 sites in London surveyed since 1992. These include supermarkets, garden centres, hotels, bingo clubs and offices. TRAVL also holds details on site size, location, public transport accessibility and the availability of parking. The TRAVL database should be available for commercial use early summer 1999. While TRAVL is intended specifically for London, data for sites in outer London should provide some indication of likely trip rates by bus and on foot, but not by car, for developments in other large cities. Table 4.1 gives trip rates by the main modes for residents of Greater London and other areas, and shows that rates for journeys on foot and by bus are similar for London, other English metropolitan areas and Scotland (note that this table excludes journeys under one mile long, while Table 1.2 includes short journeys).

4.9 The Transport Research Laboratory is surveying trip rates by all modes for 30 sites in London, for the Government Office for London. These sites include residential developments, supermarkets, other retail sites and employment sites. The results of these surveys were not in the public domain at the time of publication.

4.10 If none of the existing trip rate databases are able to provide relevant trip rates for a proposed development, transport models can be used to estimate the transport implications of a proposed development. These are discussed in **Modelling public transport demand**, from paragraph 4.21. These models may well prove useful if it is proposed that several different developments are grouped together so that they can jointly justify the provision of public transport services. Although such clustering of developments offers many benefits, the planning process (and the securing of financial contributions from developers) can have difficulty in achieving this outcome. Dealing with a clustered development as a number of individual planning applications can restrict the opportunity for funding a package of measures through combined contributions from the individual developers.

4.11 Different types of development, such as residential, retail, office, trading estate and so on, generate very different numbers of trips by all modes and provide different degrees of opportunity for attracting travel to public transport. These issues are covered in Chapter 6, **Special aspects of particular types of development**, from paragraph 6.43.

4.12 The demand for public transport generated by a development depends on both the type and scale of the development and its supply of public transport. This is different from the case of vehicular traffic, in that if the development has ample parking, the demand for car traffic will depend on the development but not the surrounding road network. With the growing tendency to restrict parking to deter car traffic, this situation may change. The effect of service supply on the demand for public transport means that it is not possible to estimate the demand for a bus service only in terms of the size of the development. It is also necessary to include the service frequency (which in turn depends on the potential bus ridership) and some measure of the catchment area covered.

4.13 One approach is to estimate the demand for public transport for a standard level of service, say four buses per hour and fares equal to the national average. The effect of changing the headway between buses, the running time or the fare level can then be estimated very approximately using appropriate elasticities (see Table 4.2). For motorists, it is the perceived costs of public and private transport that influence behaviour. Since there is considerable variability in both elasticities and perceptions of costs, a consultant with experience in modelling demand for public transport should be appointed if this approach is to be used.

Table 4.2 Effect of car availability on public transport service elasticity

Elasticity with respect to:	UK study		Dutch study		
	car–available	whole sample	car–available	car in HH but not available	no car
Walk time	–0.31	–0.14			
			–0.94	–0.74	–0.17
Wait time	–1.67	–0.63			
In–vehicle time	–1.21	–0.45	–1.43	–0.86	–0.42
Fare	–1.04	–0.33	–	–	–

Webster (ed), 1980; Table 8.12

Providing public transport for the development

4.14 Estimates of the demand for public transport from a development may be based on the patronage a well–designed service can attract. Since the Road Traffic Reduction Act 1997 and the White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998), it is possible that planning and highway authorities will define a maximum quantity of vehicular traffic to be generated by a development. This quantity would be based on air quality and traffic reduction targets. People movements, in addition to those catered for by the limited vehicular traffic, would have to use public transport or cycle or walk. The developer would require occupiers of the development to prepare Green Transport Plans (see Chapter 3) to achieve the specified limitation of vehicular traffic.

4.15 In the vast majority of developments, the decision to enhance existing public transport services or to provide new services has to be taken before the development is occupied and before any evidence of demand for public transport can be obtained. The Passenger Transport Executive or the Transport Co-ordinating Officer, and the managers of the local bus operators, will have good estimates of the likely ridership from a given development. Their advice should be sought. In many cases, the public transport provision will simply recognise the fact that providing good services will encourage more of the people travelling to the development to use public transport in the longer term.

4.16 This reflects the general approach being advocated throughout the UK at present, which is to invest in public transport to achieve some long term gain, even where current demand levels would not justify investment. Rather than provide services to cope with expected demand (c.f. highway improvements to cope with vehicle demands), the objective should be to increase the opportunities for passengers to travel by public transport in the longer term. This is discussed in Chapter 2, **Pump priming**, from para 2.28.

4.17 Traffic congestion and constraints on car-parking are reducing the attractiveness of travel by car for some types of trip. Good public transport services for a new development, particularly if these offer greater reliability and reduced journey times through the provision of bus priorities, will ensure that viable alternatives are available when the choice of the regular means of travel to the development has to be made.

4.18 Demand assessment (and Transport Impact Assessment generally) has a parallel in the current Traffic Impact Assessment procedure. Three questions need to be addressed:

- What is the existing situation with respect to public transport provision in the area around the proposed development?
- What transport provision is required to ensure that the proposed development meets national and local transport policy objectives?
- Are the transport features of the development consistent with the transport policy objectives, and if not, can they be changed to enable the policy objectives to be achieved?

4.19 In the traditional Traffic Impact Analysis approach, these questions are readily answered by surveying traffic volumes on the existing roads adjoining the planned development and defining the capacity of the existing road network. The capacity of the network is then tested against the sum of the existing traffic volume and the predicted additional traffic due to the development. Where capacity thresholds are breached, mitigation measures such as junction improvements must be provided. In general terms, the criteria used for capacity are the same throughout the UK, although detailed assessment against the criteria may vary according to location.

4.20 For public transport, criteria are not so well-defined. It is possible to define a broad methodology which will at least allow the issues to be identified and debated. This follows the following general principles:

- Investigate existing public transport provision. Most information required at this stage can be obtained from train and bus timetables, although discussion the Passenger Transport Executive (PTE) or Transport Co-ordinating Officer (TCO) will be useful. These discussions will help to identify any weaknesses in the public transport links between the development and its catchment area. The PTE or TCO should also be asked whether any of the existing services are already at capacity, and therefore unable to carry additional ridership from the development.

- Using the above information, determine whether the site is well served by public transport, taking account of issues such as periods of peak activity at the proposed development and hours of operation of public transport.

- Where the site is not well served or existing services are fully loaded, suggest measures to rectify this situation in consultation with the PTE or TCO. Improvements to existing services can include increasing frequency, increasing capacity by using larger vehicles and diverting routes closer to the development. The costs of improving existing services or providing new services need to be identified (see Chapter 2, paragraphs 2.20 to 2.27).

- Define infrastructure for the proposed development which will enable public transport to be operated efficiently and make it attractive to potential passengers. Factors that influence the attractiveness of a service were described in Chapter 2. These include the distance to the bus stop and the speed and directness of the bus route, all of which depend on the layout of the development (see Chapter 6), but may also include features such as improved traffic signals, traffic management measures, bus priority measures such as bus lanes, shuttle bus services to rail stations, improved footpath linkages and bus shelters (Chapter 7).

Modelling Public Transport Demand

4.21 Decisions on whether to provide public transport to a development are rarely based on calculations of the demand for the service using transport models. This is because it is often possible to estimate the expected additional loadings from the experience of the public transport operator. However, modelling may be necessary to check that a developer will meet an agreed target for the share of travel by public transport.

4.22 There are exceptions, particularly in the case of large scale developments in conurbations, where the impact on public transport can be large. The development itself could have a positive influence by attracting additional passengers to public transport. In London, the public transport authority is now a statutory consultee for planning applications and, in that role, will suggest and/or recommend how a developer could contribute to achieving a higher modal share for public transport. This could involve a number of measures but, in recent cases, it has been translated into legal agreements involving financial contributions by the developer towards public transport running costs. These can take the form of net cost agreements, which require the developer to underwrite the cost of providing a new service or enhancing existing services. The developer is then carrying the financial risk of the success of the service and he may wish to know the range of risk involved. To estimate this range of outcome, it will be necessary to carry out some demand modelling using a public transport model.

4.23 Public transport models are fairly complex and are summarised in Chapter 8 of *Transport in the Urban Environment* (IHT, 1997) and Chapter 6 of *Guidelines for Developing Urban Transport Strategies* (IHT, 1996). They require a considerable amount of data about the public transport service as input to the model. The modelling needs to take account of the walking time to access the service, the waiting time, any interchange time and the travel time itself. It also needs to include the costs of using private and public transport and any penalties involved in changing mode. The cost and time elements of the journey need to be measured in same units (either money or time) and therefore monetary values of time need to be derived.

4.24 The collection of this information for all routes and services, defining the existing and projected demand scenarios, running the demand model and interpreting its results is a fairly complex task which usually can only be justified for a large-scale development. Where a public transport model already exists, the scale of development for which modelling may be justified would be lower, although the use of public transport models within the development

planning process is still very limited. Access to data bases containing information on population, land–use and transport networks, referenced to a common Geographical Information System (GIS), is very helpful. With increasing emphasis on integrated transport provision, there may be a trend towards more public transport and multi–modal modelling in the longer–term, particularly in the larger built–up areas. Simpler forms of model that can be run on a personal computer using a spreadsheet are beginning to appear, and should encourage greater use of demand and modal choice models.

References

DETR (1997) *National Travel Survey* 1994/96 Department of the Environment, Transport and the Regions, HMSO, London.

DETR (1998) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London.

IHT (1994) *Traffic Impact Assessment* The Institution of Highways & Transportation, London.

IHT (1997) *Transport in the Urban Environment* The Institution of Highways & Transportation, London.

Webster FV (ed) (1980) *The Demand for Public Transport* Report of the International Collaborative Study of the factors affecting Public Transport Patronage, Transport and Road Research Laboratory, Crowthorne.

5. Location Of Developments And Planning Principles

Preliminary consultation – the agencies involved

5.1 The most important single factor in determining whether a development can be served efficiently by public transport is its location relative to other activity centres and to the public transport network. New activities and developments should be focused on existing centres, as these are usually already linked to the public transport system. These centres can be traditional town centres, district centres or even edge–of–centre sites if they are large enough, contain a mix of uses and are well served by public transport (although planning policy seeks to discourage out–of–centre proposals). Such a concentration of activities can provide a node for the public transport network. This leads to good access for everybody and helps to reduce reliance on car travel. Edge–of–town and out–of–town developments are difficult to serve by public transport, so access to such developments is usually dominated by the car. Such locations should be avoided.

5.2 In rural areas, the first choice of location for a development is in an existing town centre or large village, where it can be served by existing public transport. Only if there is a clearly established need should any other location be considered, with the next best choice being places where the development can be served by an inter–urban bus route or existing station.

5.3 The location, density and mix of uses in settlements can determine how people travel to, from and between various activities. Town, district, neighbourhood or village centre locations, higher densities, a mixture of uses close together, and footpaths, cycle routes and bus routes focused on the centre, all reduce the need to use cars. Higher density mixed use also ensures that car parking is used more efficiently and can justify the higher cost of multistorey car parking, allowing less land–take for a given development.

5.4 The agencies involved in approving developments and establishing public transport routes were described in Chapter 1, **The parties involved** (paragraphs 1.45 to 1.68). The chance of achieving a successful development which is well served by public transport is greatly increased by consulting various parties at the earliest stage of conceptual planning. The planning department of the local district council, borough council or unitary authority, will advise on whether the proposed development is compatible with the development plan for the area. The local highway authority will assess whether the development would generate traffic flows on the local road network that would have implications for congestion or capacity, and what links to the local network would be needed. The Highways Agency will undertake the same assessment for developments near or affecting trunk roads. The Institution of Highways & Transportation Guidelines *Traffic Impact Assessment* (IHT, 1994) will assist with this assessment.

5.5 The Passenger Transport Executive (PTE) in an English metropolitan area or Strathclyde, or the Transport Co–ordinating Officer (TCO) of a county council or unitary authority elsewhere, can advise on existing public transport routes, operators and the steps to take to provide for public transport services to the development. The PTE or TCO may also know of planned services, even if these are to be provided on a commercial basis without local authority involvement, and will be able to put the developer in contact with Railtrack and the local Train Operating Companies if there is any question of the development being served by rail.

Location and accessibility

5.6 Interaction between land-use and transport has long been recognised. Planning Policy Guidance note 13 *Transport* (PPG13; DOE/DOT, 1994) provides advice on how local authorities should integrate transport and land-use planning in ways which will encourage people to take transport decisions that are compatible with environmental and community goals. This advice has been reflected in subsequent guidance, for example, in PPG6 *Town Centres and Retail Developments* (DOE, 1996), Regional Planning Guidance and Strategic Planning Guidance for London (GOL, 1997). In the White Paper *A New Deal for Transport: Better for Everyone* the Government announced that it would update existing guidance on locations for major growth and travel-generating uses, with an increased emphasis on accessibility to jobs, leisure and services by foot, bicycle and public transport. (DETR, 1998a; para 4.163).

5.7 PPG6 describes the sequential approach to determining preferred locations for retail development that the Government wishes local planning authorities to take.

> "Adopting a sequential approach means that first preference should be for town centre sites, where suitable sites or buildings suitable for conversion are available, followed by edge-of-centre sites, district and local centres and only then out-of-centre sites in locations that are accessible by a choice of means of transport."
>
> The Government has subsequently made clear that the same approach applies to leisure developments. The implications for the London area are discussed in *Leisure Development in London* (LPAC and LT, 1999).

5.8 Accessibility by public transport is one of the factors that influences how people travel. A London Transport study shows a strong correlation between public transport accessibility and public transport travel to food stores in London. There is also a strong correlation between the residential catchment around stores and the trips made by walking (London Transport, 1996). PPG13 states that "the likely availability and use of public transport is a very important ingredient in determining location policies designed to reduce the need to travel by car". It suggests establishing accessibility profiles to determine suitable sites for development.

5.9 It has been standard practice to consider the potential catchment for a development in terms of the population within certain drive times by car, as road access is a prime concern. There should also be an assessment of the accessibility of a development by public transport, walking and cycling. This should be done before sites are selected and not after locations and site layouts have been determined. For travel generating developments, accessibility by means other than the car should be the basis for site selection. Measures of accessibility are described in **Access by public transport** (from paragraph 5.17).

5.10 The first priority is to locate developments in areas well-served by public transport. If space with good accessibility is not available, the next best choice is locations to which efficient public transport services can be extended.

5.11 There are two aspects to identifying public transport accessibility:

- access to public transport, which measures how far a location is from the public transport network and the level of service on that network; and
- access by public transport, which takes account of where the services go and identifies the public transport catchment areas.

5.12 Most journeys by public transport involve walking stages, making walking easy is a key to an effective integrated transport system. To encourage walking, the environment needs to be convenient, attractive and safe. If it is not, many people will opt to travel by car rather than use public transport. Various measures can be taken to create good conditions for walking, including reallocation of space from road traffic to pedestrians; provision of high quality pedestrian networks to public transport and local centres; appropriate layout and orientation of buildings; dedicated pedestrian approaches and access to buildings; and ensuring that developments include a mix of land uses, to reduce the need to travel and the distance travelled (see paragraphs 5.21, 6.5, 6.6 and 6.20). The White Paper states "...we will expect local authorities to give more priority to walking by ...using their planning powers to ensure that land use mix, layout and design of development is safe, attractive and convenient for walking" (DETR, 1998a; para 3.4).

5.13 People may also wish to cycle to bus or rail stations and leave their bicycle or take it with them on their onward journey. To encourage cycling, the environment for cyclists must be safe, convenient and attractive (IHT *et al*, 1996). This can be achieved by appropriate layout, a mix of uses, good access to buildings, cycle networks, signage and secure cycle parking. Bus stops or terminals at local centres can share cycle racks or storage provided primarily for shoppers. Facilities such as showers, lockers and changing rooms at workplaces can encourage cycling.

The "ABC Location Policy" in the Netherlands

To combat increasing decentralisation, the Dutch Government has adopted a policy aimed at concentrating employment-intensive land-uses around public transport routes and interchanges. The policy, known as "the ABC location policy", is based on establishing and then matching accessibility definitions and mobility definitions for businesses.

Accessibility definitions

"A" locations – main public transport interchanges in town centres with easy access by cycling and walking as well as fast and frequent rail services to other centres. Parking can be provided for no more than 20% of the work force, with supporting park-and-ride facilities on feeder routes.

"B" locations – at a transport interchange in a district centre or a bus interchange in a small town, near a main trunk road or motorway junction. Parking for 30% of employees.

"C" locations – no specific public transport requirements and therefore within the immediate vicinity of motorway junctions normally at, or near, the edges of urban areas.

Mobility definitions

"A" People-intensive land-uses in relation to surface area and a high need for public transport.

"B" Commercial services, such as the clothing industry, instruments and optics, sport and recreation, social services, and retail of all kinds.

"C" Goods-intensive uses and those dependent on private transport.

To match mobility and accessibility, businesses of mobility "A" can only be located in locations with accessibility "A" and, likewise, for types "B" and "C".

In response to the ABC policy, developers in the Netherlands have proposed fewer developments adjacent to motorways and show greater commercial interest in type "A" locations. However, there is still resistance to promoting sites with severely constrained car parking.

PPG13: A Guide to Better Practice (DOE/DOT, 1995)

The White Paper (DETR, 1998a) calls on local authorities to "...use their planning powers to promote cycling through influencing the land use mix, layout and design of development and through the provision of cycle facilities" (para 3.10).

Access to public transport

5.14 Measuring access to public transport provides a way of identifying the relative accessibility of different locations. Good accessibility by public transport is essential for major people-intensive developments. This has been applied in the Netherlands as the "ABC location policy" (see box). Figure 5.1 shows an example of A, B and C sites in the den Haag area.

Fig 5.1: An example of A, B and C sites in the den Haag area. Dutch Ministry of Transport.

5.15 The London Planning Advisory Committee has published a similar classification of developments and locations in *Advice on Strategic Planning Guidance for London*, (LPAC, 1994).

"The classification of locations according to their transport characteristics, capacity and accessibility, can be applied to different sizes and types of development and to a variety of locations. It can be used to match the size and type of development to locations. This could work as follows:

> **Category A**. Development proposals which generate a large number of person trips, because of the size, nature and intensity of their activities, should be located where there is high public transport accessibility and where the current or proposed public transport network has the capacity to cope with the additional trips. Parking provision would only provide for essential car trips.
>
> **Category B**. Development proposals which generate a more modest number of person trips could be acceptable where public transport accessibility, though still

good, is complemented by the highway network which could cater for some non-essential car trips. The proportion of total person trips provided for by car could be determined by the factors identified in LPACís Parking Advice...

Category C. Development proposals which generate relatively few person trips could be acceptable in areas of more limited public transport accessibility, provided that the capacity of the highway network could cater for the car-based trips...

LPAC, 1994; para 5.13

Policy T6. Boroughs should:

More fully reflect transport's contribution to sustainable development in the planning process by:

- classifying the development opportunity of locations, in accordance with the framework set out (above), with a view to ensuring that transport and development proposals are consistent with strategic transport and planning objectives;

- developing public transport initiatives to support and encourage appropriate developments in the Opportunity Areas;

- ensuring that the type, mix and intensity of all proposed development is consistent with the accessibility and capacity of available and committed transport modes to accommodate the potential level of person trips generated; and,

- considering with developers, the transport aspects of development proposals via Transport Impact Statements and Assessments and encouraging employers to prepare Transport Plans for their employees, which seek to reduce dependency on the car.

LPAC, 1994; Policy T6

5.16 A method of measuring access to public transport has been developed by the London Borough of Hammersmith and Fulham called Public Transport Accessibility Levels (PTALs) (Bull 1997; DOE/DOT, 1995). The PTAL method calculates the level of access in terms of the walk time to bus stops and stations and the waiting time to get onto public transport, based on the frequency of services. Effectively, it measures the amount of public transport service that is available from specific points. It is particularly applicable to inner urban areas with dense public transport networks.

The Public Transport Accessibility Level (PTAL)

The main steps of the PTAL method are:

- For each service within walking distance, the minimum access time (walking and waiting) is found.

- To compare services at different distances, access times are converted to the equivalent doorstep frequency (EDF) – as if walking distance was nil.

- The index is a simple addition of the EDFs, with a weighting in favour of the most accessible service for each mode.

- The accessibility level or PTAL is determined from the index, using six banded levels.

The PTAL Development Group can be contacted at:
London Borough of Hammersmith and Fulham,
Environment Department, Town Hall, King Street, Hammersmith, London W6 9JU

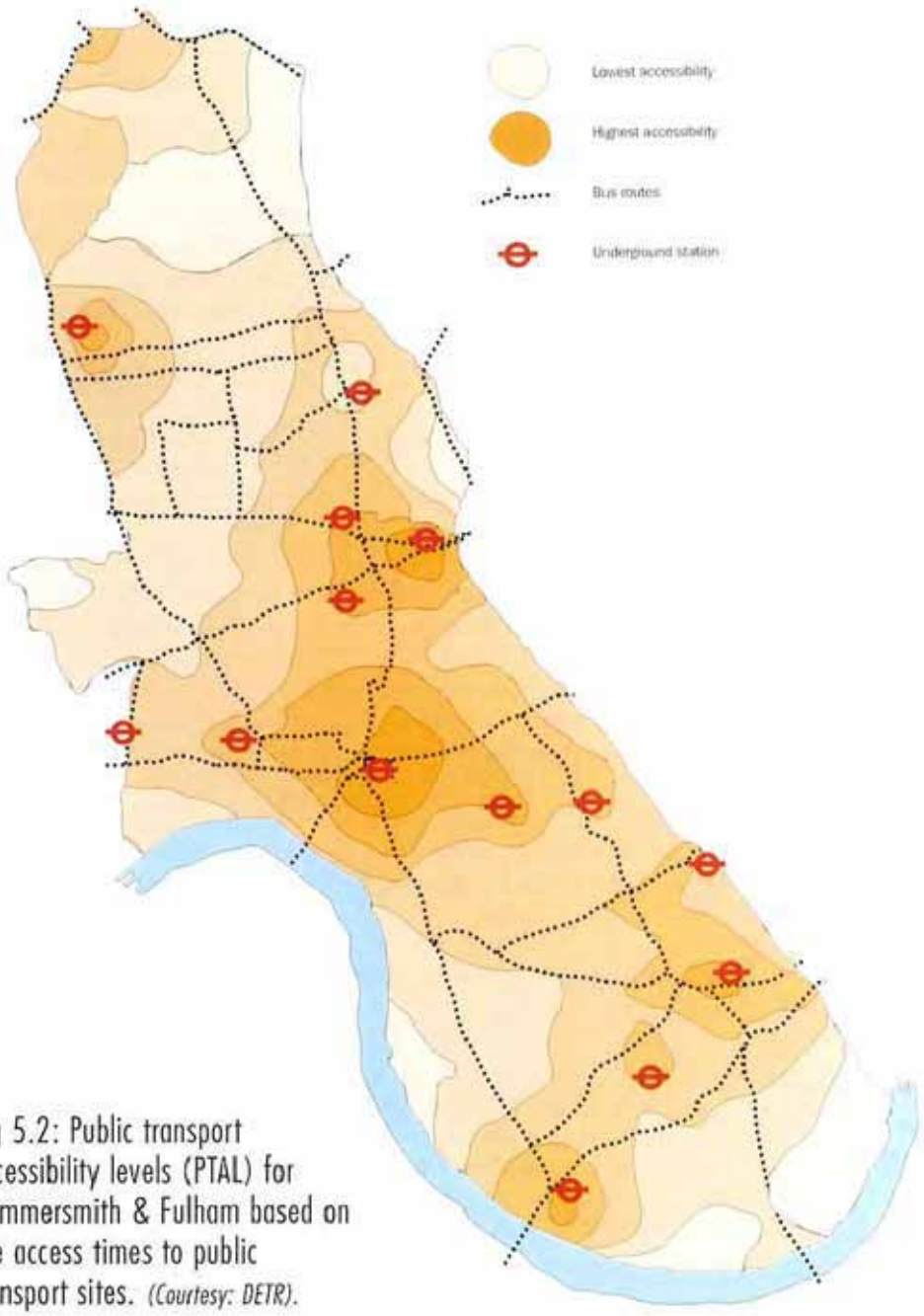


Fig 5.2: Public transport accessibility levels (PTAL) for Hammersmith & Fulham based on the access times to public transport sites. *(Courtesy: DETR).*

It has been used in parts of London, not only as a tool for determining suitable locations for development, but also for defining parking standards and encouraging higher density of development in locations with good public transport accessibility (high PTAL allows a high plot ratio).

5.17 Using the PTAL method it is possible, particularly in conjunction with a Geographic Information System (GIS) data base, to plot the relative levels of accessibility to public transport across an area. Some local authorities produce public transport accessibility maps. Local authorities should use these in their statutory plans as a basis for defining location policy. Major trip generating developments should be encouraged to locate in the areas of good accessibility. Figure 5.2 shows an example of public transport accessibility levels (PTAL) for Hammersmith and Fulham.

5.18 Other areas set standards for access to public transport in terms of distance to a bus stop or station. Centro (the West Midlands Passenger Transport Executive) has set, as part of their service quality standards, a maximum desirable walking distance for each person to a bus stop between 7 am and 7 pm. This distance is 400m, although it is reduced where severe gradients or a large population of elderly people exist. At other times of the day the maximum walking distance can be increased to 700m. The Department of the Environment has recommended that residents should not have to walk more than 400m (¼ mile) to their nearest bus stop (DOE, 1973). These standards should be treated as guidance, to be achieved where possible by services that operate at regular frequencies and along direct routes. It is more important to provide services that easy for passengers to understand and attractive to use than to achieve slavish adherence to some arbitrary criteria for walking distance. Residential areas in particular need sensible routes that do not spoil the quality of the place.

Access by public transport

5.19 Measuring access to public transport gives an overview of the comparative levels of public transport provision across an area. Accessibility by public transport identifies how easy it is to reach a given destination by public transport from a given origin. This is particularly relevant where there are few public transport services.

5.20 Defining the car catchment area for a development is relatively straightforward. Isochrones of drive time are defined as the distance that can be reached in say 10, 20, 30 and 60 minutes, assuming either an average speed on the road network or the appropriate speeds for each class of road and time of day. If a development does not have its own parking, the time to park and walk to the development should be included. A developer will be looking for a minimum population within a specific drive time, which will depend on the activity; shorter for a food superstore, longer for a major leisure complex. The same approach can be used to derive isochrones for access by bicycle or on foot; for pedestrians it should allow for delays at road crossings, the effects of hills and diversions to reach road crossing points.

5.21 Defining the public transport catchment needs to take account of the time for walking or cycling to the stop or station, waiting at the stop or station, time on the bus or train, and time walking or cycling to a destination in the development. It is well established that bus passengers value time spent walking and waiting about twice as highly as they value time on a bus. New developments should be located so that public transport trips involve a walking distance of less than 400m from the nearest bus stop or 800m from the nearest railway station. In city centres, the walking distance from a bus stop should be less than 200m. The opportunity for interchange between different parts of the public transport network should also be included, with the appropriate walk and wait times.

5.22 The transport planning package TRANSAM has been designed to produce travel time isochrones and to combine these with information on population and locations of activities (Cleeve, 1996). The isochrones represent the time it actually takes for people to reach a destination by public transport, which can be compared directly with the time by car. Figure 5.3 shows isochrones to central Basingstoke for travel by car, bus, cycle and on foot. Unless buses are given effective priority and cars are slowed by congestion, journey time by bus will inevitably be longer than by car. Bus journeys to town centres typically take twice as long as the same journey by car (Wootton Jeffreys Consultants, 1994). The directness and simplicity of bus routes is more important to passengers than a few metres on walking distance. Routes should not be split or diverted to reduce all walking distances below 400m, if a direct and simple route can be achieved at the expense of a small percentage of destinations being a little more than 400m from their nearest stop.

5.23 The denser the public transport network, the higher the frequency of services and the better the priority schemes for buses, the closer accessibility by bus approaches that by car.

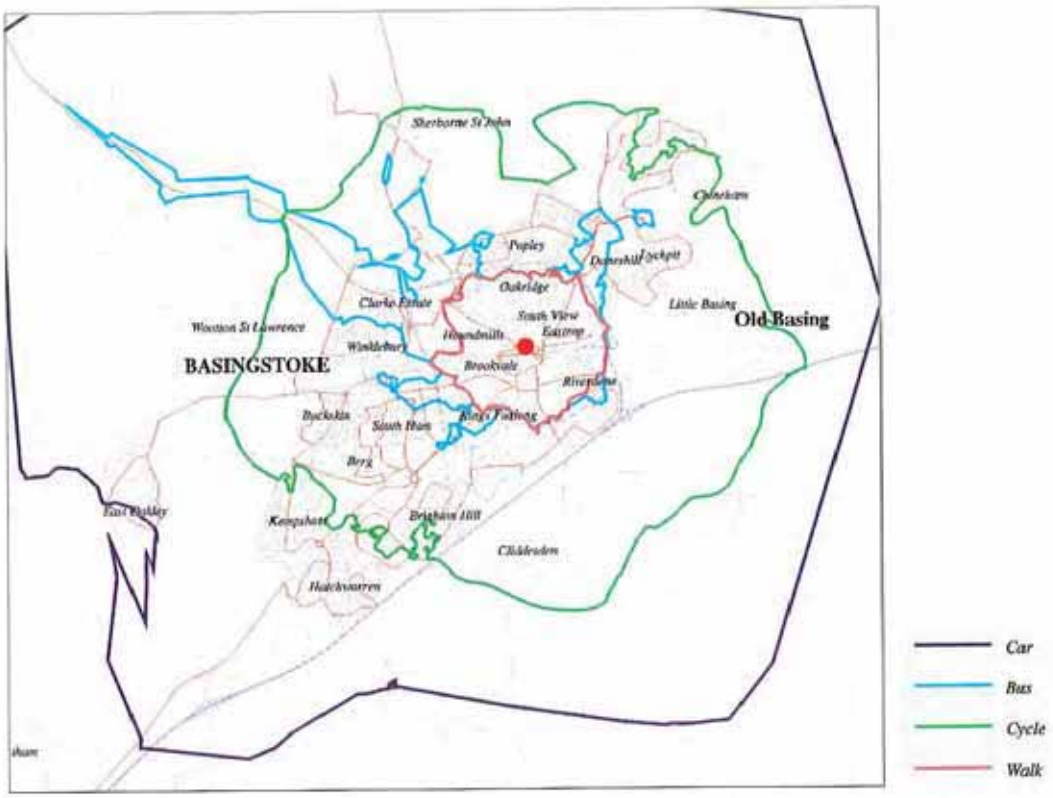


Figure 5.3: Fifteen minute travel isochrones to central Basingstoke by car, bus, cycle and on foot. *(Courtesy: Howard Humphreys Transport Planning).*

Town centres, which are the focus of public transport services, are good locations for access by public transport. Figure 5.4 compares the accessibility by bus to central Guildford (Figure 5.4a) and to a retail area about one kilometre from the centre of town (Figure 5.4b). The better access to the city centre is clearly shown by the larger area of the city within a given travel time.

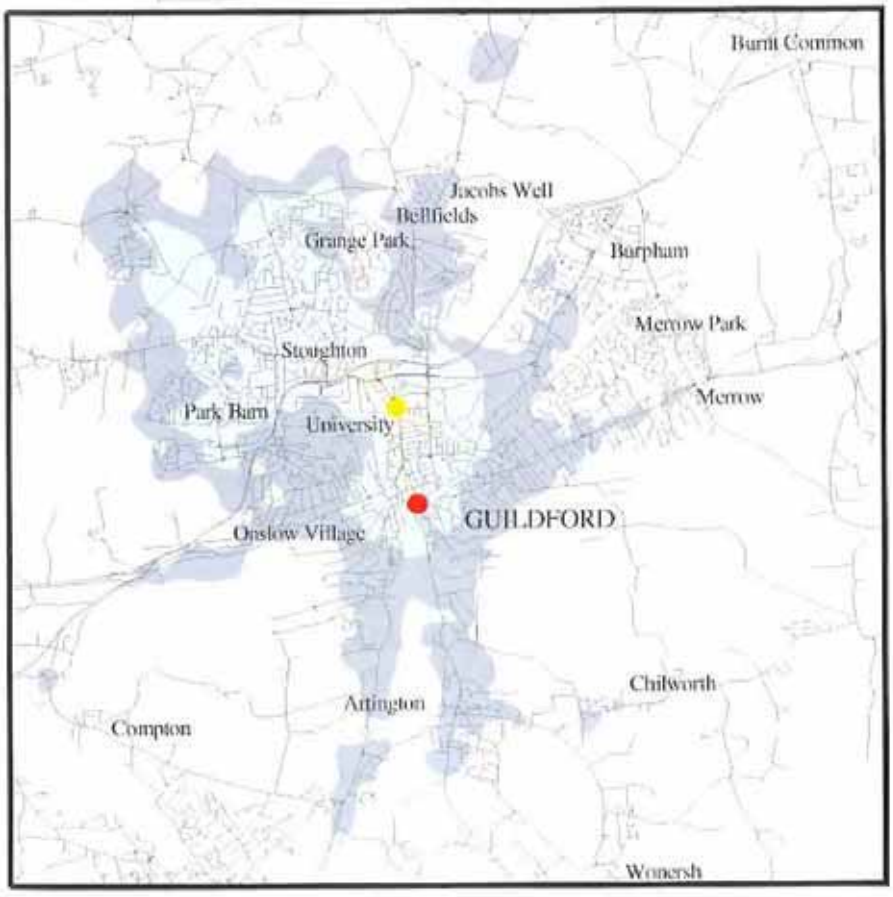
Development density

5.24 Lower-density development makes public transport more difficult to provide and less attractive to use. This is because lower-density developments usually involve longer walks to the nearest bus stop or station, and fewer passengers within the public transport corridor to justify a frequent service. In very low density areas, a car or taxi is often the only mode able to serve the development, so these areas tend to be car dependent.

5.25 A major public transport node provides the opportunity for a higher density of development, since more people can have easy access to the network. This is the basis of the Dutch ABC policy for the location of developments. Higher levels of public transport service can be justified where the density of development is greater, and where the land-use patterns relate to public transport. The range of densities should reflect access to public transport with high density, high trip generating activities located in the areas of good accessibility. Similarly, policies and standards for parking can depend on accessibility to public transport, with low maximum parking standards in the better served locations. Kent County Council has consulted on defining parking policies for sites within urban areas that are also within 400m of frequent bus routes or important railway stations (Kent CC, 1998).

5.26 Some local authorities have policies which define plot ratios in relation to the level of public transport accessibility. The London Borough of Hammersmith and Fulham's Unitary

Figure 5.4a: Access to a retail area at the centre of town. *(Courtesy: Howard Humphreys Transport Planning).*



10 minutes or less

Between 10 and 20 minutes

Between 20 and 30 minutes

Development Location

Town Centre Location

Figure 5.4b: Access to a retail area one kilometre from the centre of town. *(Courtesy: Howard Humphreys Transport Planning).*

Development Plan lists the maximum plot ratios allowed for employment trip generating developments, which depend on the PTAL accessibility level. These plot ratios range from 0.5:1 for locations with a PTAL of one (low) to 2:1 for a PTAL of six (high). The parking standard is one space for every 600m² of site area, regardless of plot ratio (Bull, 1997). By relating plot ratio to public transport access, it is possible to permit larger scale development without allowing larger amounts of parking. Developers can achieve more floorspace without providing onerous amounts of parking. There are other issues to address regarding high buildings – for example, townscape, urban scale and protected views, but there should be a general principle of encouraging greater densities where high levels of public transport use can be achieved, such as around stations and public transport interchanges.

This tram route in Grenoble serves several high density residential developments. *(Courtesy: Derek Palmer).*

Mixed uses

5.27 Having a mix of different uses located close together can help to reduce the need for people to travel. Furthermore, in large urban areas a mix of uses can make public transport services more viable, by providing a broader range of demands throughout the day and evening. Large single-use developments may generate significant demands at certain times, but are unlikely to provide sufficient overall demands to enable attractive public transport services to be provided, unless they are located close to the existing network.

5.28 Town centres provide the best examples of how mixed uses can work well. In most town centres there is a range of activities which make it possible for people to do a number of things in one visit without having to drive between activities. It may be possible to go to work, shop for different types of goods, go to the library, to the bank, the post office, to the doctor, have a meal, a drink, and to be entertained, all with one visit to the town centre. It is important to consider how activities are linked so that it is convenient to move between them on foot. They should not be separated by heavily-trafficked roads or large areas of car parking.

5.29 The promotion of mixed use developments is a key ingredient in a sustainable development strategy. Diversity of uses can provide an attractive, livable environment. An urban area with a range of uses can generate sufficient demand to enable an attractive and viable public transport service to be provided. Attracting car users to public transport, by providing good services with bus priorities, allows road and parking space to be re-allocated to pedestrians and cyclists, improving the attractiveness of the town centre.

5.30 With the increase in car ownership, the pattern of peoples' travel behaviour has become more complex. Instead of individual trips for a single purpose, people often make a series of

linked trips to a number of activities at scattered locations in a single journey. For example, a trip to take a child to school may be followed by a trip to work, with a trip to shop on the way home. The more diverse the pattern of peoples' travel movements, the less able public transport is to satisfy their demands. To address these issues it is important to consider how different land-uses relate to each other and how walking, cycling and public transport can be made as attractive as possible.

Car-free housing

5.31 One approach to reducing car dependency and promoting use of public transport is to design new housing developments without allocating any space for car parking, except for a small number of car parking spaces reserved for disabled drivers, service vehicles and emergency services. The space that would have been used for parking is available for other uses such as play areas, parks or higher density developments. Car-free developments must have good accessibility by public transport, walking and cycling. Urban centres, particularly near public transport nodes, would provide suitable locations.

5.32 Lack of convenient, secure, parking spaces can cause problems for residents and in inner urban areas can act as a deterrent to car-ownership, even in conventional residential areas. Providing car-free housing with good accessibility by walking, cycling and public transport can help to overcome this problem by removing the need to own a car at all. A part-way approach is to provide limited car parking, not allocated to particular houses. This reduces car ownership, without eliminating it completely.

5.33 A different approach is for residents to agree voluntarily to restrict their car usage, for example by not parking or driving in the local authority area, but care is required when drawing up such agreements to ensure they are legally sound and enforceable. Edinburgh City Council already has one such scheme. Richmond and Camden Boroughs of London have explored the option of linking such agreements to both existing and new housing.

5.34 Car clubs, through which access to a car is provided when required rather than through direct ownership, can satisfy occasional needs for a car. For example, Auto Teilet Genossenschaft (ATG), based in Lucerne, Switzerland, has over 5,000 members, including a number of businesses, and Stadt-Auto, a similar organisation based in Bremen, has over 3,000 members. Research suggests that ATG members have reduced their typical annual mileage from 15,000 km to about 5,000km and have made significant savings in their total transport expenditure. Several car-clubs are already in operation in the UK, for example in Leeds and at Cranfield University.

5.35 Car-free housing developments are already being considered in the UK. The City of Edinburgh has sponsored an inner city housing development in which the purchasers of houses covenant not to own a car. Arrangements are being made for ready access to rented vehicles on favourable terms, based on the "Stadt-Auto" car club concept.

General design principles and layouts

5.36 The benefits of locating major developments where there is good public transport access, and the benefits of mixing different activities together, can be undermined if the design and layout of developments do not take proper account of public transport. It is important to consider the detail of how developments are laid out, how they relate to public transport, how they link to the surrounding road network and how they complement the other activities. This is considered for various types of development in Chapter 6.

5.37 The entry and exit points for bus routes through a development should link to the bus network in the surrounding area. Routes through the development should be as direct as possible while respecting the nature of the place, and should enable buses to serve the key destinations and activity centres. Stops and stations should be an integral part of the layout. Their locations should be close to the main entrances of buildings for easy access to the public transport system. Walks to the stops or stations should be as direct and attractive as possible. The footpath system and pedestrian crossing points must be considered part of the public transport system, so that passengers can gain easy access to services. Bus stops at local centres can be served by the footpaths and cycle routes that provide access to those centres. Guidelines for the design of pedestrian routes are to be published by The Institution of Highways & Transportation (IHT, to be published).

5.38 Wherever possible, stops and stations – the access points to the public transport system – should be closer to the main destinations than the car parking. This increases the attractiveness of public transport relative to the car. The route for public transport and the locations of stops should be considered as an integral part of the layout process. The locations of bus stops, the footpath network, the layout and orientations of buildings and the positions of car parks, should then be planned together. If attractive living, shopping and working environments are to be created, sensitivity is needed to avoid the roads and the provision for buses dominating the development.

5.39 For all schemes, a development brief or framework should be established at the outset. This should be done by the developer in close liaison with the local authority. The principal functions of the development brief will be:

- To ensure that the key characteristics of the local context are taken into account from the outset;
- To establish the overall form of the development, based on the density, types and mix of uses, and the layout of buildings and spaces;
- To show how the layout of roads and streets will contribute to the spatial hierarchy, as well as linking the development to the rest of the locality; and
- To identify bus routes, cycle routes and footpaths to ensure good access by walking, cycling and public transport. Where the bus routes serve local centres, the footpaths and cycle routes and cycle storage can serve both bus stops and centres.

5.40 *Places, Streets and Movement* (DETR, 1998b) recommends an approach to the layout of residential areas that is sympathetic to the nature of the local place, rather than the rigid requirements of vehicle movement. The brief for a residential development should define the basic layout of spaces (streets, squares, courtyards, etc) and how movement relates to them. Buildings should be arranged to suit the local context, and the roads then fitted into the spaces created. The brief needs to consider a route for public transport and its associated network of footpaths that does not dominate the development nor harm the quality of the environment. "Bus provision should feature high on the agenda of all discussions concerning new development. ...Local authorities can ensure that consideration is given to bus provision from the development brief onwards, though they cannot dictate the type of bus on a particular route." (DETR, 1998b). With good initial design, it may be possible for buses to serve a residential area without penetrating it.

Rural developments and attractions

5.41 Developments in rural areas, and attractions and activities in rural areas that may require public transport, vary greatly in type and scale. In the past there have been major industrial

developments in rural areas to which staff must travel; examples are the nuclear installations at Dounreay and Sellafield and various coastal power stations. Other types of development include rural theme parks, such as Alton Towers, and exhibition sites, such as the National Exhibition Centre. Some airports can be considered a combination of a rural employment site and an attractor for visitors.

5.42 Some existing villages and areas of countryside attract more cars than they can accommodate in local car parks. Other rural attractions such as historic houses, wild-life centres and areas for walking, attract visitor numbers ranging from dozens to thousands a day. Finally, there have been many groups of a few dozen to a few hundred houses built in isolated locations not served by public transport. These different rural developments and attractions justify different types of public transport service, and differing types of infrastructure to help public transport (ICE, undated). Where possible, tourist developments should be designed to enable public transport, rather than cars, to be used by visitors and staff.

Industrial developments

5.43 A major industrial development, whether it is in the country or in a built up area, has the same requirement for employees to travel to and from the site. In a rural area this is likely to be by special works bus services, but the design of the bus stops and standing areas within the works is the same, whether the buses are public or private. The local road network may need improvements to make it suitable for buses, as outlined in Chapters 6 and 7, but these improvements are likely to be needed in any case for freight or construction traffic.

Major tourist and visitor attractions

5.44 A major tourist or visitor attraction, such as Alton Towers or a major exhibition centre, will receive sufficient visitors to justify bus services from the local railway station and from other transport hubs and accommodation areas, plus provision for coaches to set-down and collect parties, with space to park the coach during the day. Euro-Disney, to the east of Paris, has been provided with a station on the suburban rail system to Paris and another on the TGV express train network, but this is an exceptional situation. The layout of the facilities for local buses and coaches can be similar to any major exhibition site, of which the National Exhibition Centre in the countryside near Solihull is typical.

5.45 In addition to a bus station for local services and shuttles to a railway station, bus-only routes or bus priorities should be provided on and near the site. Otherwise, buses can be seriously delayed by the congestion caused by visitors arriving and, even more, leaving the site. The bus station needs additional space for coaches to set-down and collect passengers. At sites used by large numbers of coaches, comfortable waiting space can be provided for coach parties to assemble at designated points for collection by a coach which has been waiting outside the station, rather than provide space in the station for coaches to wait while their parties assemble.

5.46 *Leisure Development in London* (LPAC and LT, 1999) describes a survey of cinemas, bingo and bowling, to inform policies on large-scale leisure developments. It summarises the planning policy framework and discusses the importance of different modes of access to leisure developments. The industry places a heavy emphasis on the private car as the primary means of access to large leisure developments, which makes this survey relevant to rural and edge-of-town sites. London Boroughs place more emphasis on public transport than do developers and operators, for whom public transport is very much a secondary consideration.

Over-crowded tourist sites

5.47 Tourist sites which do not have the space or road capacity for visitors to arrive by car can provide shuttle bus services from remote car parks and, if there is one, the local railway station. This arrangement was introduced for the Goyt Valley in the Peak District National Park in the 1970s, with great success, and is now in use in a number of West Country villages, such as Clovelly. Apart from the car park, little provision for public transport is needed since the roads are kept car-free for pedestrians and buses, and mini- or midi-buses are used which can be accommodated within the existing road system. The buses should be accessible to people in wheelchairs, to avoid the need to find parking space for orange badge holders in the car-free area. After the year 2000, new single deck buses will be required by the Disability Discrimination Act 1995 to be accessible to people in wheelchairs.

Attractions with fewer visitors

5.48 One National Trust property, Prior Park landscape garden, near Bath, has no car parking and visitors are advised to use public transport. Three bus services from Bath pass the property and provide services every 10 minutes or less (but every 30 minutes on Sundays). There is a bus and coach drop-off point outside the gates to the property. Access is proving to be 40% by bus and 30% on foot. The remaining 30% of visitors travel by bicycle, walk from legal parking places in the outskirts of Bath or are users of the three disabled parking spaces. Renewal of temporary planning permission to open the property is dependent on the success of the Green Transport scheme for visitors. Since opening in July 1996, visitor numbers have been 25,000 per year; daily numbers are variable and weather dependent.

5.49 Despite the success of the public transport access arrangements for Prior Park, it is not realistic to expect dedicated public transport to be provided to a site, such as a historic house, which might generate only a few dozen bus passengers a day. Unless an existing bus service passes close to the site, as at Prior Park, it is not likely that a bus operator would extend a route to serve such a site. The only plausible form of public transport is a taxi, possibly as a shared service. The only provision required is a marked collection point; a telephone for passengers to call for a taxi (with a list of local operators and the name of the collection point); and somewhere to sit, sheltered from the weather. These facilities may well be combined with a gift shop or cafe, to the commercial advantage of the site operator. In wildlife or recreational areas, it may be necessary to use a bus shelter as a telephone box, taxi collection point, information centre and waiting area.

Rural housing

5.50 Many housing developments have been built which are in isolated locations far from any existing bus routes. Figure 5.5 shows a typical example, which contains about 50 houses, in relatively open country, which could be found in many parts of Britain. This particular example was built, probably in the 1950s or 60s, as local authority housing for people who may well not have a household car, yet it is about one kilometre from the interurban route between Reading and Yateley. In addition, two buses a day pass the entrance to the development and additional services are being planned.

5.51 Developments of the type shown in Figure 5.5 are not large enough to justify their own bus service, unlike the urban development shown in Figure 6.3. Unless an existing bus route runs close to the development and can be diverted to serve it, there is nothing that can be done to provide public transport on a viable, commercial, basis. If a nearby service can be diverted, then the roads in the development should be laid out to provide either a through route or a turning circle for buses, as described in Chapter 6.

Fig 5.5: Public sector housing development in a remote location.

Developer contributions

5.52 It has been common practice to secure traffic and highway improvements associated with development through Section 106 of the Town and Country Planning Act, 1990, and agreements have also been made under Section 278 of the Highways Act 1980. Agreements with developers and the legislation involved are described in some detail in section 27.4 of *Transport in the Urban Environment* (IHT, 1997).

5.53 Developer contributions are being used increasingly to fund public transport, to help achieve sustainable patterns of development. Government policy makes it clear that developers can be expected to pay for public transport in relation to their developments. The types of measure which can be secured include new or improved bus or rail stations, park-and-ride car parks, improvements to bus services, bus priority schemes, shelters, real time information and other infrastructure measures. The features such as bus lanes, bus links and gates, junction priorities, footpaths and bus stop furniture, which are described in Chapters 6 and 7, can be regarded as items for which developer contributions could be sought.

White City Centre Development

A major mixed use development is proposed on a 40 acre site at White City in West London. The proposal includes a 620,000ft^2 shopping centre, a multiplex cinema and other leisure uses, housing and workshops. The developer, Chelsfield, is keen to ensure there is good public transport access to the development. They forecast that initially about 40% of people will travel by public transport, which could rise to 50% in the medium term.

Chelsfield has signed agreements with Hammersmith and Fulham Council and Kensington and Chelsea Council which include provisions for improving public transport. The agreements include a rail station on the West London Line (up to one million pounds); a bus station; a contribution towards subsidising public transport (£500,000 total over two years); a bus link to a nearby housing estate (£400,000 total over eight years); a contribution to improve access by bus from the neighbouring borough (£650,000 total over five years); and, improvements to London Underground stations (up to one million pounds).

5.54 Planning Policy Guidance note 12 (PPG12) (DOE, 1992) gives guidance on development plans and the procedures for preparing and approving them. Department of Environment Circular 1/97 provides advice on planning obligations and indicates that agreements should meet the following tests: (i) necessary (ii) relevant to planning (iii) directly related to the proposed development (iv) fairly and reasonably related in scale and kind to the proposed development (v) reasonable in all other respects (DOE, 1997). In seeking contributions towards sustainable transport provision, local authorities should be certain that there is a specific and direct connection between the benefit and the development. The absence of a planning obligation should not result in an acceptable development being refused, nor should an unacceptable development be permitted because of unnecessary benefits offered by an applicant.

5.55 The level of funding for public transport is likely to reflect the number of journeys generated by the proposed development and the problems that would be caused if these journeys were by car. Contributions are also likely to be required for developments away from town centres where accessibility by non-car modes may need to be improved. In land-use planning terms, developments should seek to exploit existing public transport. This not only helps to use existing resources efficiently and effectively, but reduces the developer contributions required.

5.56 To identify the transport requirements of a particular development, the planning authority is likely to require a transport impact assessment to be carried out (see Chapter 4). This would usually be done by a transport consultant on behalf of a developer to satisfy the requirements of the planning authority and to form the basis of discussions with the local authority. It is strongly recommended that there is early involvement by the Passenger Transport Executive or local authority Transport Co-ordinating Officer, and through them the transport operators, if public transport improvements are being proposed. A transport impact assessment should estimate the likely volume and pattern of trips and the modes of travel, and include an assessment of access to the development by public transport, walking and cycling. These analyses will form the basis for deciding what measures are necessary to satisfy the transport requirements of the development.

5.57 Funding arrangements are likely to vary and reflect local circumstances. The Government is reviewing the use of planning obligations. In the White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998a) it announced that, once the review is complete, it would use guidance to shift the emphasis towards providing for public transport, cycling and walking and away from catering for car traffic when improving off-site transport facilities. It would also consider encouraging the incorporation of Green Transport Plans into planning obligations. Revenue support of public transport services is an allowable contribution, but such funding should be for a limited period only. It is recommended that funds for maintenance should not normally be borne by a developer. The box gives examples of items that are likely to be considered suitable for developer contributions.

Developer contributions

The following items are likely to be considered as appropriate for developer contributions towards the cost of providing public transport.

- subsidy for the bus service for set period;
- a commuted payment to provide a subsidy for the bus service;
- a commuted payment for vehicle maintenance;
- purchase of vehicles;
- payment for infrastructure;
- provision of a junction, possibly with bus priority, at the entrance to the development;
- purchase of bus shelters
- provision of pedestrian crossings
- provision of bus lanes.

References

Bull D (1997) *Measuring Public Transport Accessibility* Background papers, Paper 3, London Planning Advisory Council 1997 Parking Advice, LPAC, London.

Cleeve, I (1996) *Determining Accessibility for Proposed Developments* TRICS Conference, 1996, JMP Consultants Ltd, London.

DETR (1998a) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London.

DETR (1998b) *Places, Streets and Movement – A Companion Guide to Design Bulletin 32, Residential Roads and Footpaths.* Department of the Environment, Transport and the Regions, HMSO, London.

DOE (1973) *Bus Operation in Residential and Industrial Areas* DOE Circular 82/73, Department of the Environment, London.

DOE (1992) *Development Plans and Regional Planning Guidance* Planning Policy Guidance note 12 (PPG12), Department of the Environment, HMSO, London.

DOE (1996) *Town Centres and Retail Developments* Planning Policy Guidance note 6, Department of the Environment, HMSO, London.

DOE (1997) *Planning Obligations* DOE Circular 1/97, Department of the Environment, London.

DOE/DOT (1994) *Transport* Planning Policy Guidance note 13 Department of the Environment/Department of Transport, HMSO, London.

DOE/DOT (1995) *PPG13: A Guide to Better Practice* Department of the Environment/ Department of Transport, HMSO, London.

GOL (1997) *Strategic Planning Guidance for London Local Authorities* Government Office for London, London.

ICE (undated) *A Vision for Rural Public Transport* The Institution of Civil Engineers, London.

IHT (to be published) *Guidelines on Providing for Journeys on Foot* The Institution of Highways & Transportation, London.

IHT *et.al.* (1996) *Cycle-Friendly Infrastructure* The Institution of Highways & Transportation, London.

Kent CC (1998) *Vehicle Parking Standards – consultation draft* Kent County Council, Maidstone.

London Transport (1996) LT evidence regarding a Safeway development at Plough Lane, Wimbledon, London SW19. Wimbledon Borough Council, Planning Department, Application 96/P0682.

LPAC (1994) *Advice on Strategic Planning Guidance for London* London Planning Advisory Committee, London.

LPAC and LT (1999) *Leisure Development in London* LPAC and LT, London Transport, London.

Wootton Jeffreys Consultants (1994) *The Role of the Bus in the Urban Economy* Study for the Confederation of Passenger Transport UK, London.

CASE STUDY

FILTON ABBEY WOOD

The construction of a new station at Filton and the linked provision of an enhanced rail service from Bath, formed the first stage of the Avon County Council Heavy Rail Strategy. The objectives of the scheme were threefold: to develop the use of rail for journeys to the developing northern fringe of Bristol, particularly from the Bath area; to reduce the traffic impact of the MoD establishment at Filton and of other development in the locality; to provide direct rail services to the new station from the Gloucester and Weston-super-Mare corridors, South Wales, and communities east of Bath.

The main impetus for the scheme became the opening of the MoD Procurement Executive at Filton and planned transfer of 6,000 staff from three main sites in Bath, Portsmouth and London (5,000 are now on site). A site was chosen by the MoD for their new home that was well served by the road network and within 1 mile of Bristol Parkway Station. Whilst the MoD have become the largest single employer in the area, other major employers nearby include Sun Life (2,000 jobs), Hewlett Packard and the University of the West of England. In fact some 25,700 jobs have been committed to the north fringe and adjacent areas.

In 1995, the Bath – Filton Abbey Wood Heavy Rail Scheme proposed a programme of work to open two new stations, at Filton Abbey Wood (adjacent to the MoD complex) and, at Newton near Bath, plus an improved train service operating along the Bath - Filton rail corridor. Whilst lack of funds has delayed the construction of Newton Station (a scheme which is now the responsibility of Bath & North East Somerset), Filton Abbey Wood Station and the enhanced train service have been in place for over two years.

The scheme to date has been very successful, with 13% of MoD commuters now regularly using Filton Abbey Wood Station (plus a significant further percentage using Bristol Parkway Station) - a figure which should be set against a 1995 modal split forecast by Regional Railways of nine percent for rail. In real numbers some 700 return trips are made per day using the station. It was also forecast in 1995 that seating capacity would be sufficient until 2005/06 – this forecast proved very wrong since overcrowding became a problem within a few months of the station opening.

Numbers using the station are set to increase again when a further 1,000 Bath based MoD staff transfer to Filton in the next two years. Few of this new intake are considered likely to move home which means that they will have to make a choice between driving on the heavily congested local road network or using the train. With no spare capacity to carry additional peak rail passengers, discussions have now commenced with OPRAF to find an acceptable solution.

If there is a major downside of the scheme so far, it is that the usage by non–MoD commuters and by the local community has not been as great as envisaged. This is believed to be a reflection of the relative isolation of the station and poor bus service links.

The location of the station was determined by a number of operational constraints. It had to be some way south of the Filton rail junction for safety and signalling reasons. The brief also dictated a design that could allow for a later extension of the platforms to accommodate inter–city trains and one that could also accommodate the

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requirements of the planned Bristol & South Gloucestershire Rapid Transit scheme. The result was a station located some distance from the main road and away from existing frequent bus services.

Serving the station by bus has always proved difficult. When the station opened certain existing frequent radial services diverted into the station car park to pick up passengers. Low usage and inconvenience to existing passengers soon stopped this. A dedicated (and infrequent) service continues to operate, though passenger numbers remain resolutely low.

One way in which the Council is trying to improve access for the local community, is through the provision of new footpath and cycleway links. One existing footpath has recently been surfaced to a high standard and provided with new lighting. Another, is planned for construction and will significantly reduce the distance to the main road to where the main buses run. Through bus and rail tickets are also now available.

Other measures are planned to make the station more user friendly. A comprehensive CCTV scheme covering the station and car park is due to be installed shortly, along with a new public payphone.

The success of the scheme to date can be explained by a number of reasons:

- Throughout, the MoD have adopted a very proactive approach to encouraging their staff to use public transport.

- In those cases where staff had to move, they were "guided" to locations to reside in which could be reached by public transport.

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- Staff were offered an interest free season ticket loan for five years.

- The biggest attraction is probably that from station to desk takes no more than five minutes.

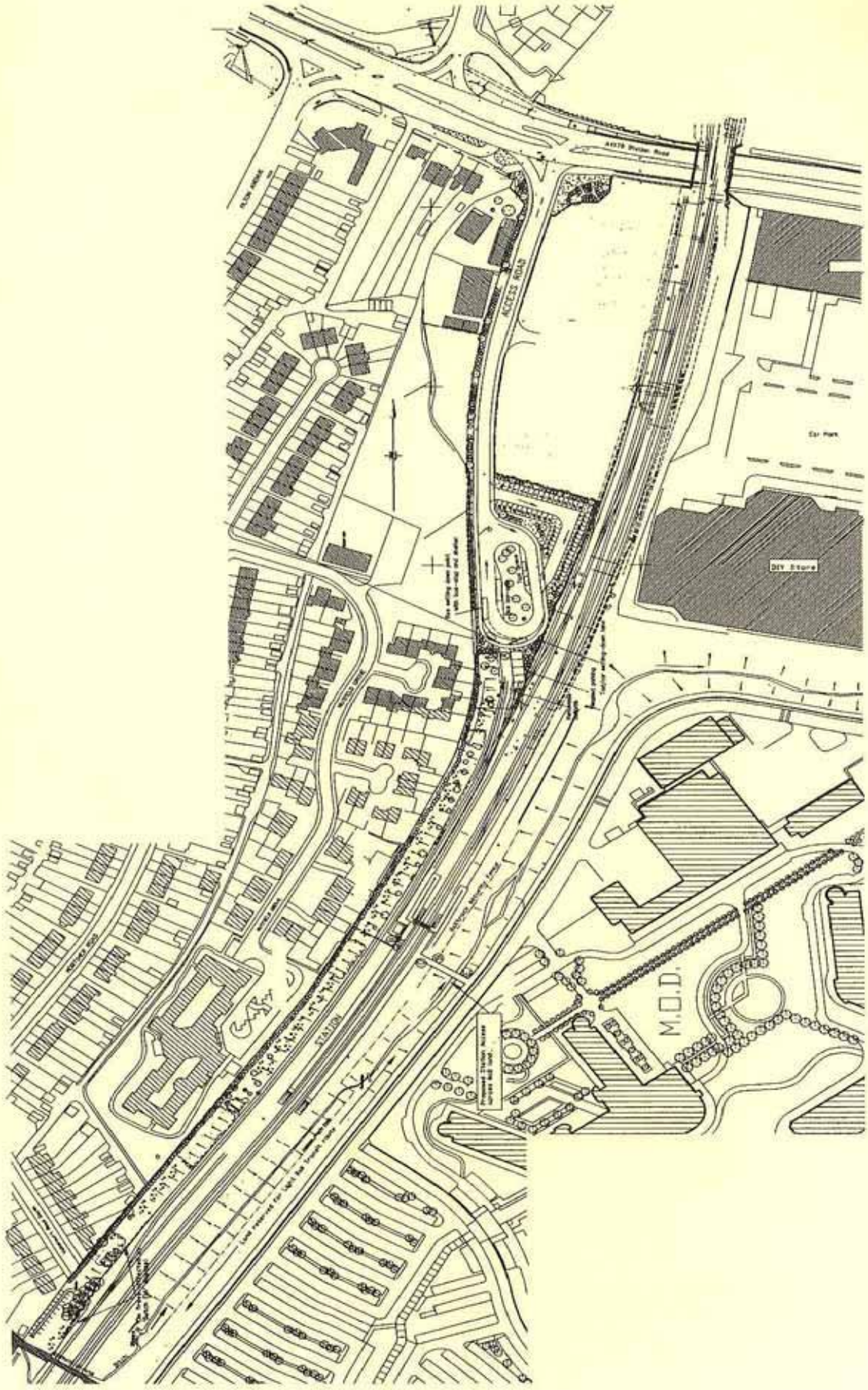
Also:

- The MoD car parks are now nearly always full and alternative parking involves a long walk and possibly additional parking charges.

- The roads in the area are very heavily congested at peak times and in many cases it can take twice as long to drive as travel by train.

With packed trains and packed roads in the north Bristol fringe area, there is considered to be considerable latent demand to move more passengers by rail. However, this will only happen when a way can be found to increase train capacity, linked to a programme of opening more stations such as those proposed for Newton near Bath and Corsham in Wiltshire (both currently stalled for lack of funds).

MQ Craig
South Gloucestershire Council



CASE STUDY

6. Outline Planning – The Layout Of Developments

Overall layout of a development

6.1 Chapter 5 considered the locations of developments to enable them to be served by public transport. This chapter considers the layouts of the developments that best suit public transport, once the location has been chosen correctly. Throughout the chapter, the twin foci are on layouts that make public transport easy and convenient for passengers to use, and layouts that make it economic and efficient for operators to provide public transport. These are not, of course, the only considerations for planners. The planning system aims to achieve a balance between many factors to create places which are attractive and which work for everyone. Large roads can create severance and produce a poor quality living environment, particularly in residential areas, and are not essential for bus routes. Reconciliation between the quality of place and the requirements of road design is never easy, especially as no one place is quite like another. Key factors to consider are:

- The nature of the place where development is to occur (this includes the topography of the area, the style, size and use of existing buildings, existing movement patterns, etc);
- How that place relates to its surroundings, including movement routes; and
- The framework of the development, including the network of spaces and movement patterns. (DETR, 1998b)

Detailed applications will differ with the type of development, the particular site and its setting, as set out later in this chapter.

6.2 Good bus services that reduce car traffic improve the environment. The route for buses through a development should aim to be as direct as possible whilst respecting the area. There will be tradeoffs. The road layout for the bus route must not overwhelm the development, but should allow a route that does not require diversions into loops or culs-de-sac, if the service is to be attractive to passengers. Bus gates can be used to limit through traffic except for buses, refuse collection vehicles and emergency vehicles. Traffic calming can be used to limit speeds on the roads for the bus route (see Chapter 7, paragraph 7.63). The junctions between the development's roads and the surrounding road network should be planned to avoid delays caused by congestion.

6.3 Bus stops at local centres can be served by the footpaths and cycle routes that provide access to those centres. The footpath system to bus stops and stations must be regarded as part of the public transport system, and designed to be as direct, safe and easy to use as possible. Bus stops must be positioned where they are safe and efficient for the operator and buildings should be positioned so that their entrances are at least as near the bus stop or station as they are to the car park. If the layout of the development is not designed

Bus stops should be close to the entrances to buildings. *(Courtesy: Derek Palmer).*

correctly at the outline planning stage, no amount of detailed improvements and traffic management measures will make the development attractive for bus passengers or efficient for bus operators to serve. The Confederation of Passenger Transport UK has listed eight planning based solutions to public transport problems (see box).

6.4 During the design of the layout, the developer should consult with the local highway authority and the Passenger Transport Executive or local authority Transport Co–ordinating Officer on road safety, traffic flow and bus operations on the roads of the development. This should include the locations of buildings to make it easy for people to use public transport. Chapter 4 has listed sources of data for estimating the number of people who will travel to the development. The amount of road traffic generated by the development can be estimated from The Institution of Highways & Transportation's Guidelines *Traffic Impact Assessment* (IHT, 1994).

Parked cars can make residential roads unsuitable for bus services. *(Courtesy: Reading Transport Ltd).*

Some planning based solutions

1. Commercially based pricing for parking together with other parking policies to encourage commuting by public transport.

2. Modal interchanges, bus stops, stations and coach parks need proper planning to encourage usage. Co–ordinated timetables are one possibility to make that use easier.

3. All aspects of land use planning to promote passenger transport. In particular, land acquisition powers should be utilised for beneficial bus priority schemes.

4. Policies should be linked to create properly funded transport investment packages, carefully evaluated to ensure passenger transport alternatives. Where necessary, the private sector should be involved.

5. Pedestrian routes to and from passenger transport should be included at the planning stage, with bus stops in town centres to be within 200m of all retail outlets.

6. Planning to encourage development in town centres along existing bus corridors.

7. Where out of town retail or office developments are economically necessary, their planning must consider existing and possible future public transport links and coach facilities.

8. All initiatives should include especial consideration for less mobile and disabled passengers. In addition, measures should exist to ensure passenger safety and security.

Bus and Coach Issues for Local Authorities
Confederation of Passenger Transport UK, 1997

Developments served by existing bus routes

6.5 A development served by an existing route is likely to be on one side only of the road carrying the bus route, and a safe means of crossing the road must be provided. To make bus use attractive to people travelling to the development, the bus stop or stops need to be as close as possible to the buildings that are the final destinations for passengers. Ideally, the walking distance from the bus stop should be less than from the car park. Buildings set back from the bus route must be linked to it by footpaths that are direct, well surfaced, well lit and, if possible, protected from the weather. For safety, the footpaths require direct sightlines and to be overlooked rather than isolated. If the paths are not direct, the walking distance is typically 1.3 times the straight line distance to the stop. People leaving the development can be helped by displays of real time public transport information within the buildings. For example, one supermarket in Ipswich has a display of the minutes until the next bus departure in its exit area near the check outs.

Pedestrians using this supermarket must cross the car park to reach the shop entrance. *(Courtesy: Derek Palmer).*

6.6 Figure 6.1 outlines two possible layouts for a supermarket and car park on a main road carrying an existing bus route. Layout (A), which is commonly used and in which the car park and garage are placed adjacent to the bus route, makes the bus much less convenient to use than a car. The walk distances for bus passengers are as long as possible and no consideration is given for shoppers carrying loads back to the bus stop. Layout (B), in which the supermarket adjoins the bus route, does not inconvenience car users, but makes bus use much easier.

6.7 Similar considerations apply to developments in town centres. It is very common to find a lift or covered way from a car park into a shopping centre, while bus passengers have to walk several hundred metres, often up or down a slope, exposed to the weather (see Figure 6.2). Pedestrianised town centres can make this situation worse, by banishing buses to an inner relief road (often lined by blank walls, entrances to car parks and loading bays at the rear of the shopping centre). Where possible, a new shopping centre should have a bus stop immediately outside its main entrance, protected from the weather by a canopy and with sufficient space for passengers to wait without obstructing other pedestrians. In passing, the centre shown in Figure 6.2 does little better for pedestrians. The sheltered housing in the

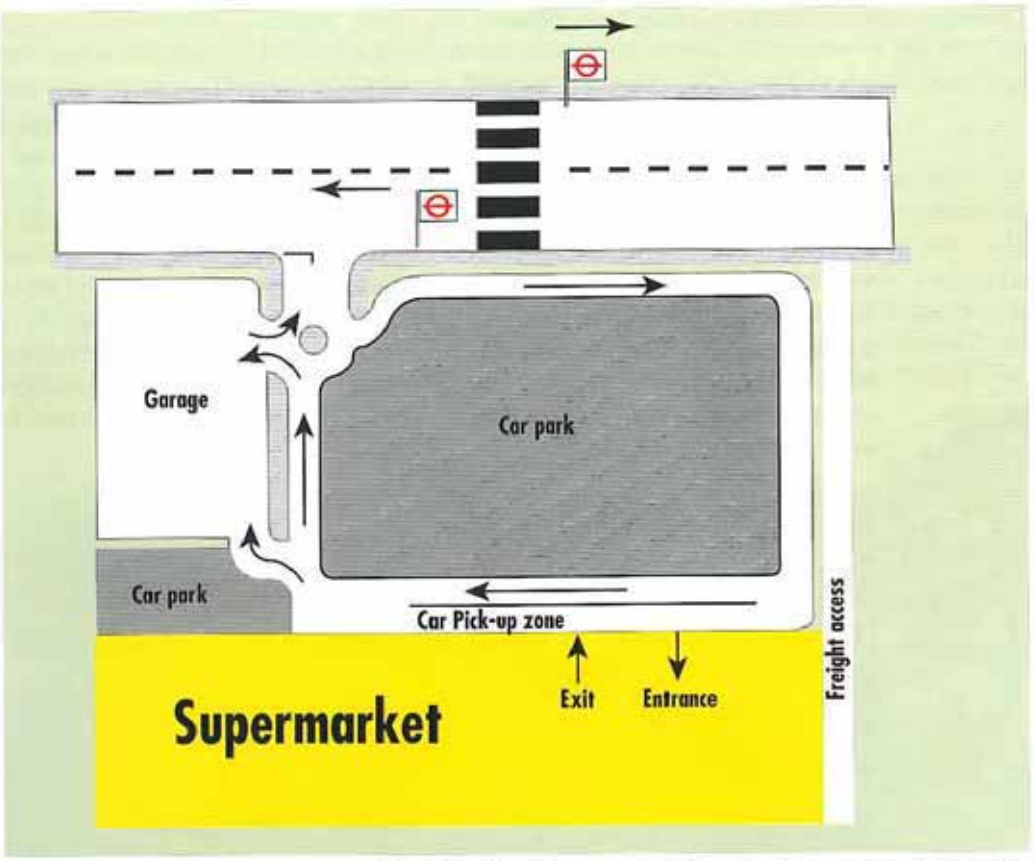


Fig 6.1 (A): Supermarket layout, not easy for bus users.

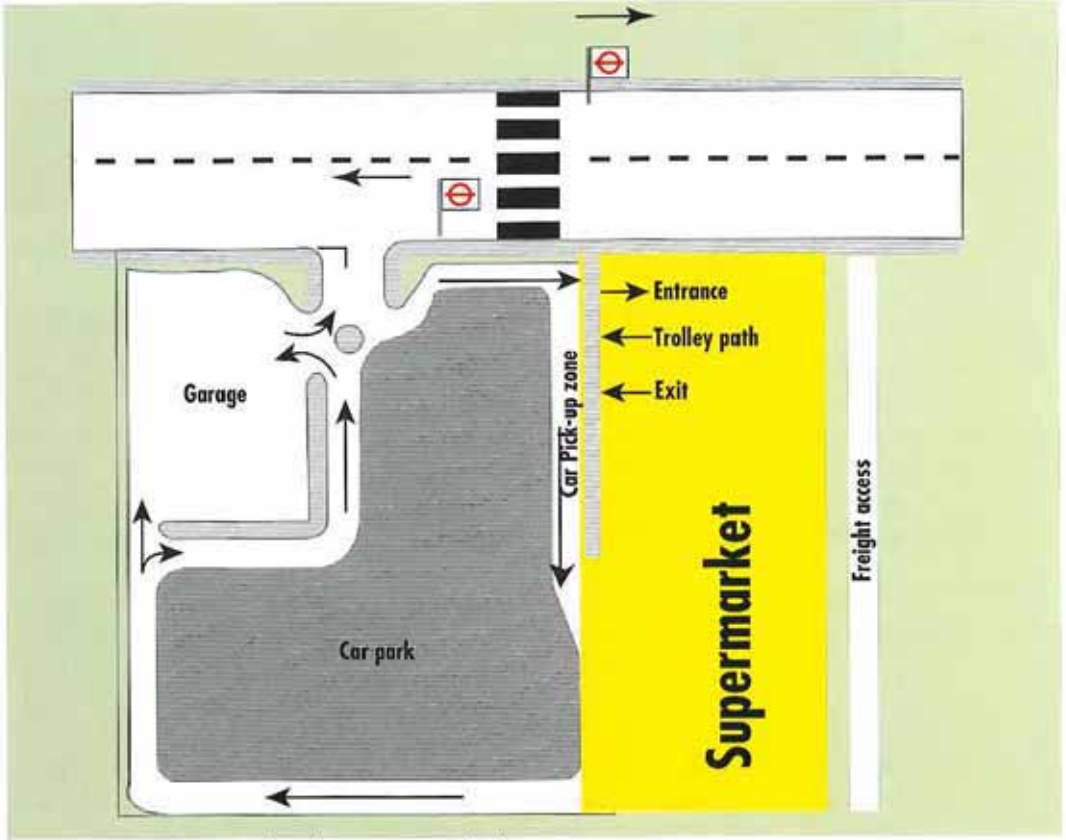


Fig 6.1 (B): Supermarket layout, easy for bus users.

Fig 6.2: A shopping centre with better access by car than bus.

adjacent road faces a blank wall and residents must walk round the block to reach the entrance to the shopping centre, crossing the access road to the loading bay in the process.

Developments served by new bus services or diversions from existing services

6.8 As with developments served by existing bus routes, passenger convenience is enhanced by a development in which bus stops are located close to the entrances of buildings or activity centres. In addition, passengers want fast journeys, frequent and reliable buses and a comfortable ride on well designed and well maintained roads. The operator wants to serve the development using the least possible vehicle time and mileage and avoiding congestion that causes unreliability. These objectives are consistent with providing fast and reliable journeys that are attractive for passengers.

6.9 The bus route through a development should be as direct as possible, with entry and exit points compatible with the surrounding network of bus routes. Travel through the development should not require back-tracking or excessive extra running time or bus route length. Destinations for bus passengers should be either side of the route in a corridor whose width involves walks of up to about 400m to the bus stops (though 300m is preferable if it can be achieved). It is better to provide bus routes that are simple and direct than slavishly follow limits on walk distances to stops. Routes should not be split or diverted to achieve a walk distance of less than 400m from every destination to its nearest bus stop.

6.10 The walking distance will typically be about 1.3 times the straight line distance to the bus stop, and safe crossing places on the road carrying the bus route are needed for each stop. Where pedestrian routes have been fitted in to an existing traffic situation, it is found that walking distances for people with mobility impairments are more than 1.3 times the straight line distance. These groups must be considered when designing pedestrian routes (see *Reducing Mobility Handicaps*, IHT, 1991). If pedestrian routes are to be shared with cyclists, the

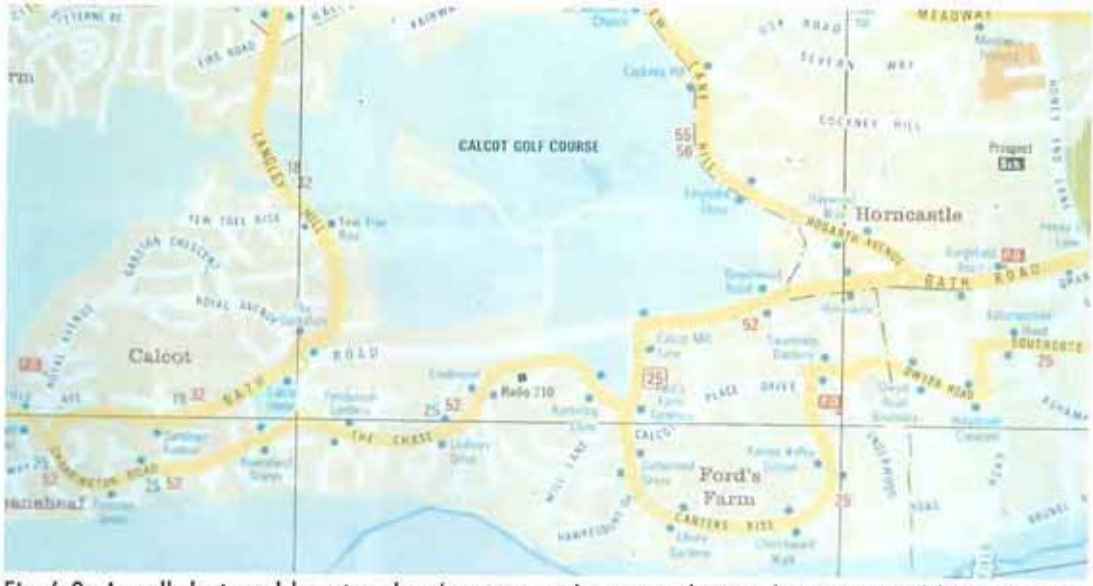


Fig 6.3: A well designed housing development with a central spine bus route and bus gates to stop car traffic. *(Courtesy: Reading Transport Ltd).*

issue of possible pedestrian/cyclist conflict must be addressed. Advice on how to deal with this is provided by DOT Local Transport Note 2/86 (DOT, 1986) and included in the IHT Guidelines *Cycle-Friendly Infrastructure* (IHT *et al*, 1996).

6.11 Figure 6.3 shows a housing estate that was planned as a whole to be easy to serve by bus. It fills a strip of land about four kilometres long and 0.7km wide between a railway line and a severely congested radial road. The estate distributor roads provide a reasonably direct route for buses which parallels the radial road and is cut at several places by bus gates to prevent its use by cars as a "rat run". Houses are built on loop roads and culs-de-sac both sides of the bus route, with typical walking distances of 200–300m to a bus stop. Footpaths are used to provide direct routes to bus stops from houses off the bus route. Once the bus route has rejoined the main road, bus lanes are used to give a fast and reliable journey to the town centre, where many of the roads have been made "bus-only" streets. The estate is large enough

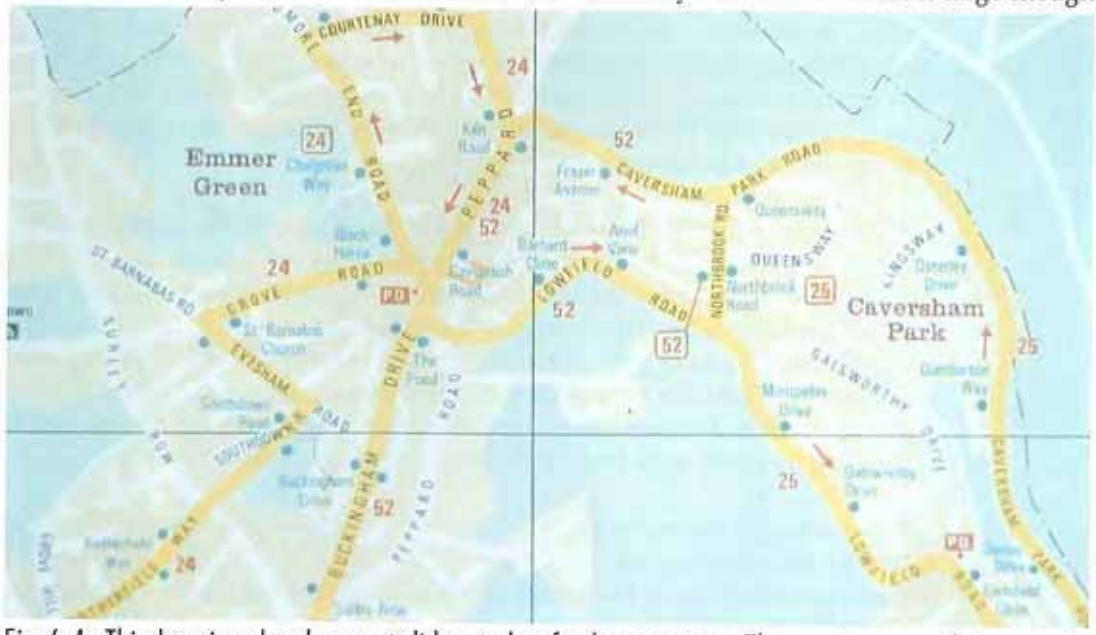


Fig 6.4: This housing development did not plan for bus services. The services provided are not attractive and are little used. *(Courtesy: Reading Transport Ltd).*

to justify a frequent service, and a good service was provided immediately the first houses on the estate were occupied. Travel to the town centre by bus is quicker than by car (in the peak, five kilometres on the main radial can take 30 minutes), and the services are well used and profitable.

Despite a 30 minute shuttle bus service, most people in this housing development need, and use, a car.
(Courtesy: Aerofilms Ltd).

6.12 In contrast to the well-planned estate of Figure 6.3, Figure 6.4 shows an estate in the same town that was planned with no consideration for public transport. Again, houses are built on loop roads and culs-de-sac which are not suitable for bus services. However, in this case the distributor road is a loop round the outside of the estate, with no housing on the outside of the loop. Because there are few direct footpaths, walking distances to the distributor road are often over 400m. The two radial main roads to the town centre are too narrow for bus lanes, are fronted by low density housing with high car ownership and are heavily congested. Running buses anti-clockwise round the loop distributor road, to place the bus stops on the developed side of the road, leads to circuitous bus journeys one way or the other. Various service arrangements have been tried. The current provision consists of four services an hour on one loop (A) supplemented by two an hour on the other loop (B). Services on loop A travel to the town centre through a dense area of terraced housing, which subsidises the service to the outer estate. Buses on loop B travel to the town centre via another housing area.

6.13 Similar considerations apply to business parks. Figure 6.5 shows a common layout for a business park on an edge-of-town site beside a major radial road. The site houses several separate organisations, each with their own access road and car park. The loop distribution

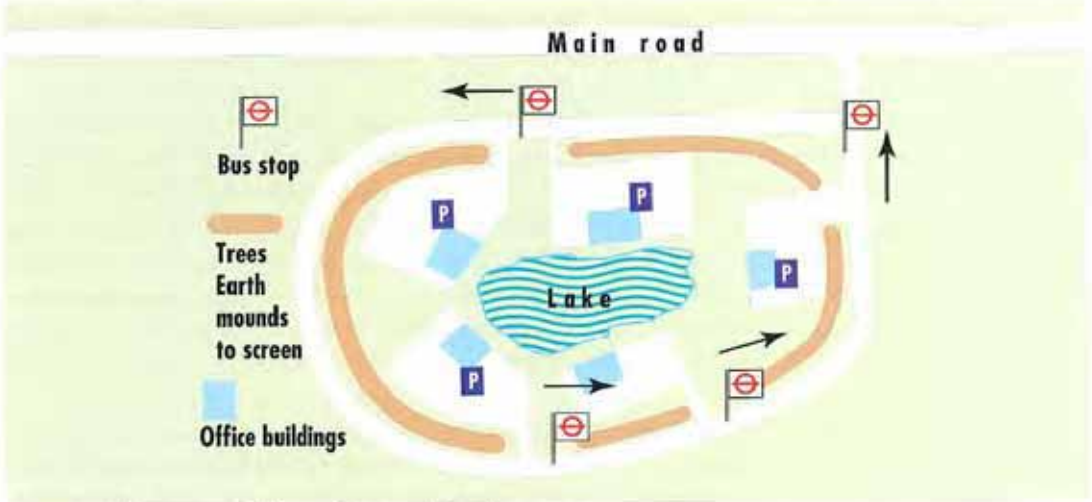


Fig 6.5: A business park not designed for bus services.

Guildford science park with the Royal Surrey Hospital in the background. Note the extensive car parking, the only possible bus route and the poor pedestrian access from the bus route to some buildings. *(Courtesy: Aerofilms Ltd).*

road, along which a bus service can run, causes maximum additional mileage for a diverted bus service. It also has bus stops much further from the final destinations than the car parks, often without good paths for bus passengers to reach the stops. There are no pedestrian paths between organisations, so travel within the site tends to be by car.

6.14 Contrast Figure 6.5 with the business park shown in Figure 6.6. Here the bus route through the site is progressive and parallels the main road outside, to minimise extra bus mileage. The developments of the individual organisations are located close to the bus route, with car parking beside or behind them. Footpaths along the distributor road and between developments encourage walking for trips within the park. Finally, a footpath from the main road to the middle of the park allows passengers to be served by buses either on the main road or through the business park. This second layout is easier and cheaper for bus operators to serve and more attractive to bus passengers.

6.15 Where car parks for individual organisations can be grouped together, there is the possibility of needing less in total, because peak demands do not coincide. In addition, there is the further possibility of using the parking space for a park and ride service when it is not required for the office developments, perhaps on a Saturday.

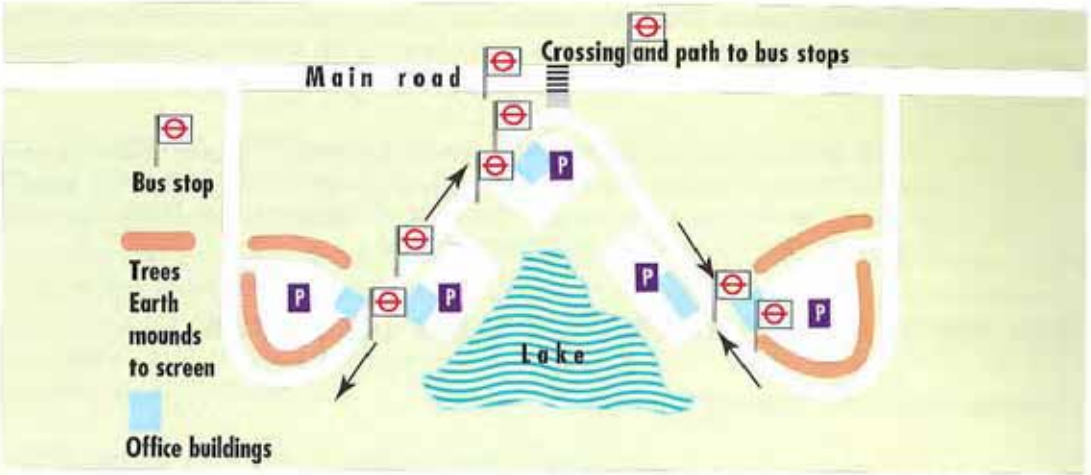


Fig 6.6: A business park designed for good bus access.

Developments served by railway stations

6.16 When a development is served by rail, the same principles apply to the layout of the development round the station as would apply to the layout round a bus stop. If the station is an existing one, the location and layout of the development will be dictated by the position of the pedestrian entrance to the station. If the station is a new one on an existing line, the choice of possible station locations will be limited by the line and by railway operating considerations. In either case, early consultation with Railtrack is essential. A significant difference between rail– and bus–served developments is that people have been found to be willing to walk about twice as far to or from a station than a bus stop; up to about 800m for rail compared to about 400m for bus.

6.17 The provision of secure storage for bicycles can encourage people to cycle up to at least three kilometres to a station. In Lund, in Sweden, the city has provided covered secure cycle storage which is staffed by attendants who would otherwise be unemployed. The "Bikepark" at Victoria Station, London, offers cycle hire as well as cycle storage. To further increase the use of a station by passengers from outside the development, and hence the justification for providing it, consideration should also be given to the provision of car parking and drop–off and collection facilities.

6.18 At Filton Abbey Wood (see Case Study, Filton Abbey Wood page 84), a new railway station and an enhanced train service has been justified by a new office site where 5,000 people

Table 6.1 Population required to justify a new station.

New station type	Number of weekday ons and offs required	Population within 800m required
A	81	2550
B	125	3900
C	177	5550

Notes: Station types:
A – Single platform station
B – Small double platform station
C – Larger double platform station

Population rounded up to nearest 50
Calculated for the mid–1980s – station costs are now much greater
Based on: Preston, 1987

are employed, close to several other office employment developments, a university and local housing. At Grazeley, south of Reading, a new station on an existing line is being proposed for an initial development of 2,500 houses.

6.19 A study (Preston, 1987) estimated the scale of residential development required to justify a new station on an existing line. Table 6.1 is based on mid–1980s costs, and the capital costs of new stations have increased sharply since that time, but the Table should give some indication of the scale of development required.

Bus stop, footpath and car park locations

General objectives for stop location

6.20 Bus stops are located to minimise passengers' walking distances to their final destinations. The maximum walking distance to a bus stop should not exceed 400m and preferably be no more than 300m. These distances are quoted for guidance, and should not be followed slavishly if that would lead to complex or indirect bus routes. Bus stop locations are constrained by requirements of the bus operator and by considerations of traffic safety and congestion. These requirements influence the locations of stops relative to junctions and curves. Building locations, the highway layout and the locations of bus stops need to be considered together at the outline planning stage, to ensure that the bus stops can safely be positioned where they are needed for passenger convenience. If bus stops can be located at local centres, the network of footpaths and cycle routes can serve both the stop and the centre, and the cycle racks provided for shoppers can also be used by bus passengers.

6.21 Where a side road junction with a main road is closed, it may be possible to locate a bus stop across the former side road entrance. This minimises walking distance and reduces annoyance to adjacent premises. Buildings can be positioned to reduce intrusion from an adjacent stop. For example, houses near stops can be designed to have a blank end wall facing the stop. The footpaths between bus stops and the final destinations on a development need to be as direct as possible.

6.22 The optimum spacing of bus stops depends on the density and type of development, but in urban areas should normally be in the range 300–400m. If the distance between stops is increased, access times become excessive; if they are decreased, bus speeds become too low. Wider spacing between stops will normally be acceptable in rural or semi–rural areas. In city centres the stop spacing should not be more than 300m and bus stops should be convenient for the main shopping and business areas, and preferably closer to these than the major car parks. If the density of a development is sufficient, a direct bus route with frequent stops and short walks to the final destinations becomes possible. This is preferable to a tortuous route designed to locate stops immediately outside individual buildings.

6.23 Where densities are low, or there are many small potential destinations, it may be preferable to operate bus services as "hail and ride". No specific bus stops are provided; passengers hail the bus from the footway or ask the driver to stop to set them down. Hail and ride services are most appropriate for mini– or midi–buses and for roads carrying only light traffic. A disadvantage of hail and ride services with no fixed stops is the lack of indication that the road is served by bus, and there is nowhere to display service information. It may also be more difficult to get close to the kerb to stop, which is particularly important for wheelchair accessible buses.

6.24 However well public transport serves a development, some car parking space will almost certainly be required, plus an area for car passengers to be set down and collected. These car park and set–down areas, and the access roads to them, need to be positioned so that they do

not increase the walking distances for bus passengers, and so far as possible do not require pedestrians to cross roads. It is easier for cars to change level and to travel further to avoid pedestrian routes than it is for pedestrians to change level or to divert from a direct route.

6.25 Wherever new bus stops are proposed, or an existing stop is to be moved, discussions should be held between the developer/property owner, PTE or local authority and bus operators (in London, London Transport Planning and London Buses), the local Highway Authority and the police, to determine the most suitable location. Where agreement cannot be reached, the Traffic Commissioner may be asked to arbitrate. It is preferable that passengers do not have to cross major traffic flows to reach a stop. If this is unavoidable, bus stops should be located close to pedestrian crossing facilities, or a new pedestrian crossing installed expressly to serve the bus stop.

6.26 To summarise, bus stops should, ideally, be located:

- to minimise walking distances, yet maximise the potential catchment areas;
- on pedestrian routes to and from the main generation points for bus trips;
- at local centres served by footpaths and cycle routes;
- on a road that allows a direct bus route;
- close to pedestrian crossing facilities and on their exit sides;
- close to junctions and on their exit sides, to facilitate passenger interchange with other buses without interfering with junction capacity or compromising road safety;
- not directly in front of banks or building societies, where security vehicles need to park; and
- away from residential and other sensitive frontages, where noise and disturbance are undesirable.

In practice, achieving all these criteria may not be possible, in which case safety considerations must dominate.

Location of bus stops for traffic safety

6.27 Bus stops must be sited to enable buses to pull in safely to the kerb and maintain adequate sightlines for departure. Buses at a stop should not create a hazard of other traffic. Bus stops should not be sited on the inner kerb of a bend if other traffic is required to pass. Often these criteria will conflict. It is recommended that the developer commissions a safety audit of new bus stops to identify potential hazards (IHT, 1996).

6.28 Bus stops placed directly opposite each other on narrow single carriageway roads can cause traffic problems and should be avoided. Stops on opposite sides of the road should be staggered so that buses stop tail–to–tail and move off away from each other. For safety reasons and to allow other vehicles to pass, staggered stops should be spaced at least 40m apart. At junctions, the staggering of stops should be achieved by locating them on the exit sides of the junction, but as close to the junction as traffic and safety considerations allow (Figure 6.7). Similarly, where a pedestrian crossing is provided, stops should be on the exit sides but as close as safety permits.

6.29 Bus bays (lay-bys) have often been provided at bus stops (see Chapter 7, **Layout of the highway at bus stops**, paras 7.10 to 7.18). These reduce the delays to other traffic caused by stopped buses, but cause serious delays to buses when they re-enter the traffic stream. Bus bays do not help bus services to operate efficiently and should not be used unless demanded for reasons of road safety or congestion. In areas which have traffic calming or the local authority wishes to reduce traffic flow, it is often considered acceptable to make traffic wait behind a bus at a stop. This approach can be taken further by the use of bus boarders which

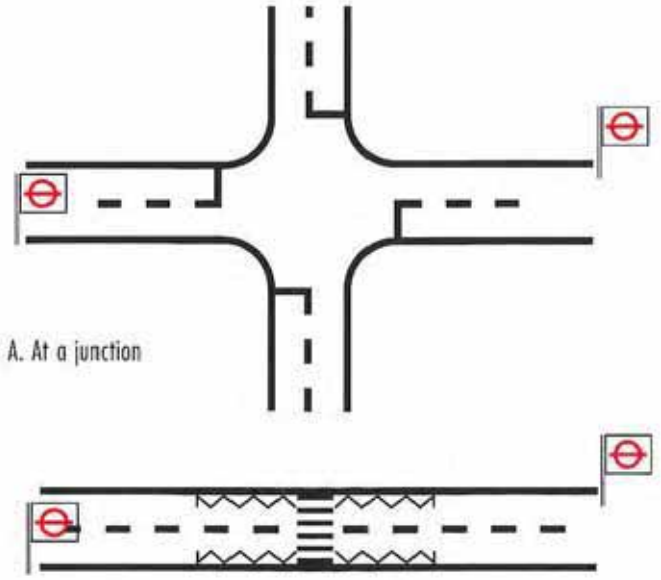


Fig 6.7: Correct location of bus stops. (GMPTE, 1992).

project from the kerb line (see Chapter 7, para 7.13). These prevent bus stops being blocked by parked vehicles, and avoid delays to buses leaving a stop.

6.30 As more wheelchair accessible buses enter service, it will become more important for the bus to be able to stop at the kerb. The entry and exit to stops must be kept clear of parked vehicles. Traffic management in the form of loading restrictions and bus stop clearways can help, though enforcement is needed to make these effective.

Location of bus stops near junctions

6.31 Where bus routes intersect at a junction, passenger transfers between services will occur. Some operators recommend that bus stops at junctions should therefore be sited to take account of the predominant interchange movements, to minimise the numbers of pedestrians crossing the road (Figure 6.8). This may require some stops to be sited on the approach to a junction. Other operators locate stops on the exit sides of junctions so that all buses travelling in one direction use one stop or group of stops, even if this means numbers of passengers cross the road to interchange.

Bus terminals and standing places

6.32 The terminal point of any bus service is set primarily by passenger and operational requirements, but it is also influenced by the need to turn the vehicle. In many cases this can be done on the public highway, using a roundabout, gyratory system or "round the block" route, or off the highway in a purpose-built bus station. A bus standing place at the terminal

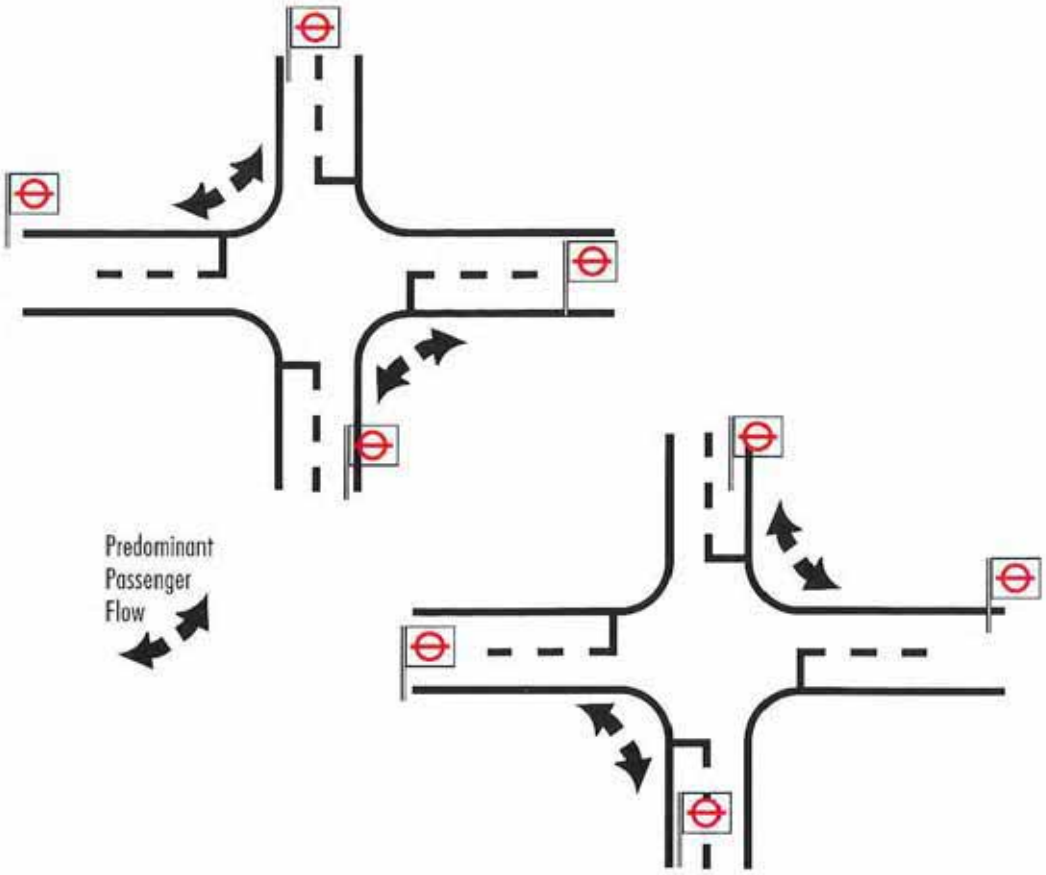


Fig 6.8: Possible location of stops for interchange (GMPTE, 1992).

point is almost essential for the operation and scheduling of a bus service. The type of terminal provided is very much dependent on the number of buses terminating, the need to turn vehicles around and the land available. The provision may vary from a simple bus stop to one that incorporates off-street areas for turning and standing, plus a passenger waiting area.

6.33 Bus service terminal points that involve a turning loop off the highway should be located on the departure side of the bus route where possible, for the following reasons:

- the entrance will be narrower (and hence the pedestrian crossing required will be shorter); and

- the right-hand entry turn off the highway and the left-hand exit turn onto the highway associated with departure side sites are easier for the driver.

6.34 Figure 6.9 shows four layouts for bus turning and standing areas, with capacities of one to five buses stopped off the highway. The first (Figure 6.9a) provides space for one terminating bus and allows the exit manoeuvre to be made without crossing the carriageway centreline. Figure 6.9b shows a modification incorporating a standard one-bus lay-by for a possible passing service. An additional lay-by could be used for a second terminating bus (Figure 6.9c) in which case the second bus can depart before the first. Designs with an operational capacity of five vehicles, all contained off the highway, may be useful where peaks of bus use occur, for example at a school or recreation area (Figure 6.9d).

6.35 The use of a car or cycle to reach public transport is increasing. Consideration needs to be given to providing secure cycle parking at bus terminals. Park and ride services are spreading

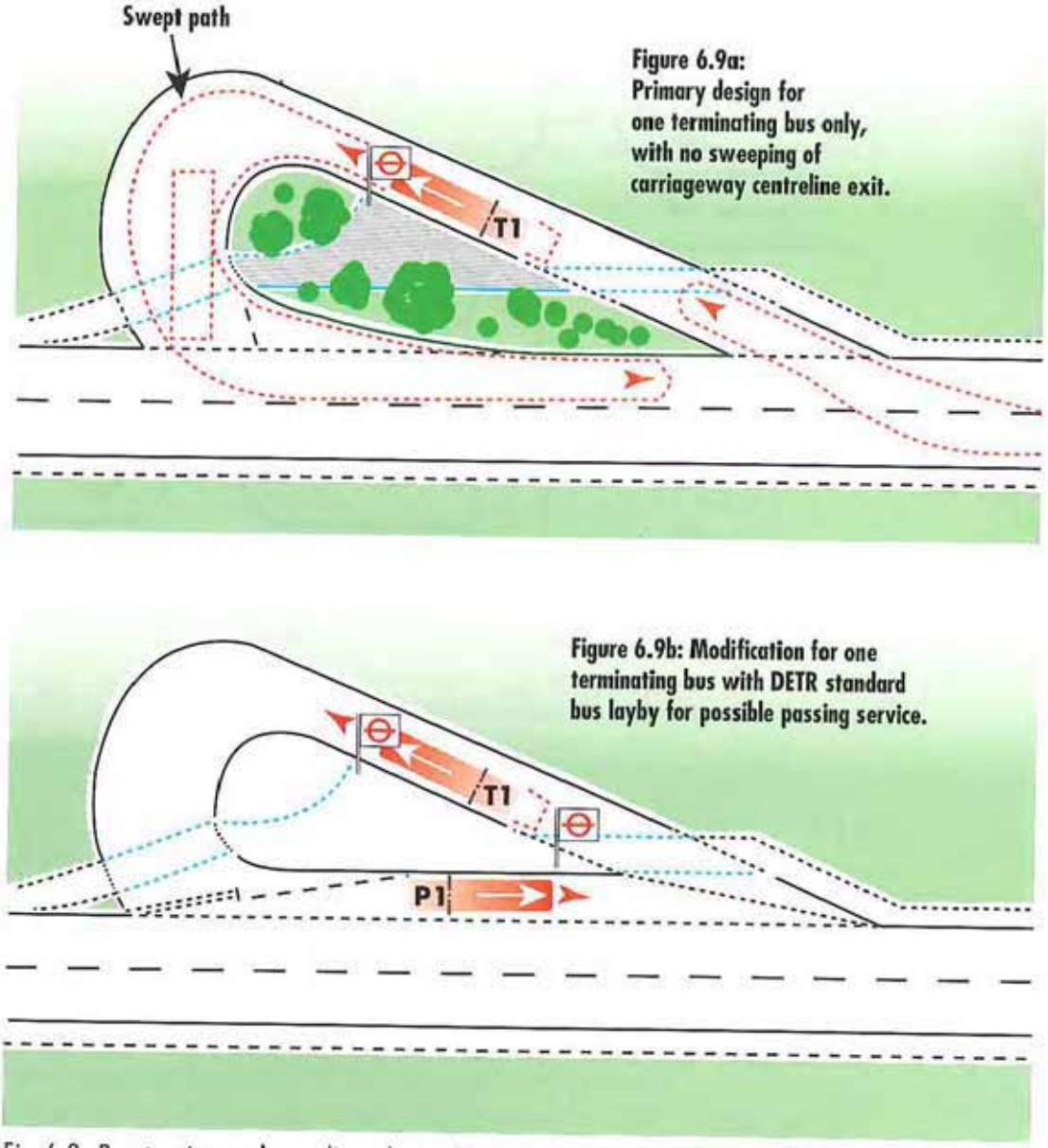


Fig 6.9: Bus turning and standing places (GMPTE, 1992).

rapidly, sometimes using parking for edge-of-town shopping or leisure centres as the car park for park and ride. Bus terminals also need to have space for motorists to drop off or collect bus passengers, though this is not yet as common as for rail passengers. The English Historic Towns Forum (EHTF, 1993) provides a good practice guide for park and ride. Park and ride schemes should form part of a wider transport strategy and must be supported by central area parking restraint policies. Buses serving park and ride sites should be protected from traffic congestion by priority measures along their route.

Highway geometry for bus operations

6.36 Most local highway authorities design bus facilities to accommodate all types of bus. Private developers should, wherever possible, follow suit, although this may not be appropriate for some residential developments where only midi- or minibuses are expected to

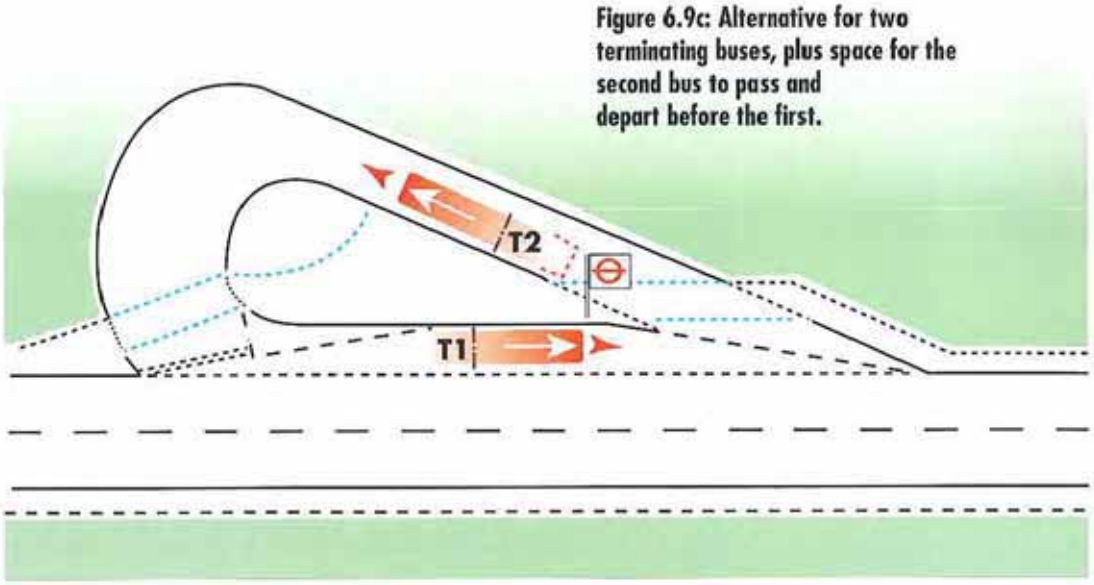


Figure 6.9c: Alternative for two terminating buses, plus space for the second bus to pass and depart before the first.

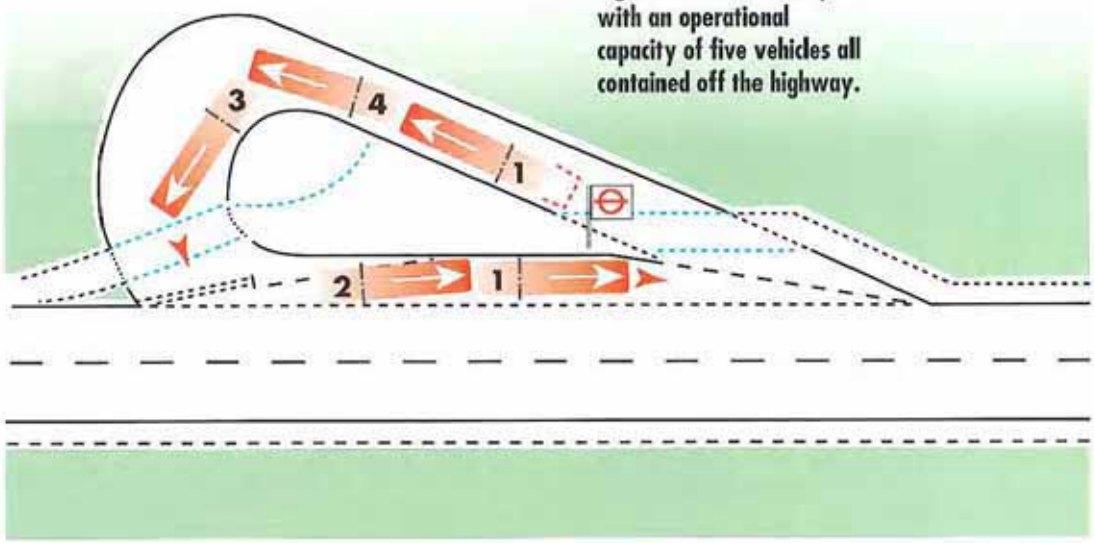


Figure 6.9d: Bus facility with an operational capacity of five vehicles all contained off the highway.

Fig 6.9 (continued): Bus turning and standing places (GMPTE, 1992).

be used. The dimensions and manoeuvring capabilities of the largest rigid bus permitted by the DETR on British roads (12m long and 2.55m wide, excluding the mirrors) should be used as a benchmark for design. In general, this size of bus needs a road lane width of 3.65m and, when turning, sweeps out a wider path. Figure 6.10 shows the path width swept by a 12m bus performing various manoeuvres. The highway width should allow a margin of 1.0 m between the inside of the swept path and the kerb, and of 0.5m on the outside. In residential areas, roads 6.0m wide can be used for bus routes, to avoid the roads dominating the development. At corners and junctions, additional space is needed to accommodate the path swept by the bus.

6.37 Buses up to 18m long are permitted if they are articulated. The swept path for an articulated lorry at a road junction, which is wider than that for an articulated bus, is shown in section 30.6 of *Transport in the Urban Environment* (IHT, 1997). Rigid coaches 15m long are permitted in some European countries, but not the UK. Developers planning facilities for

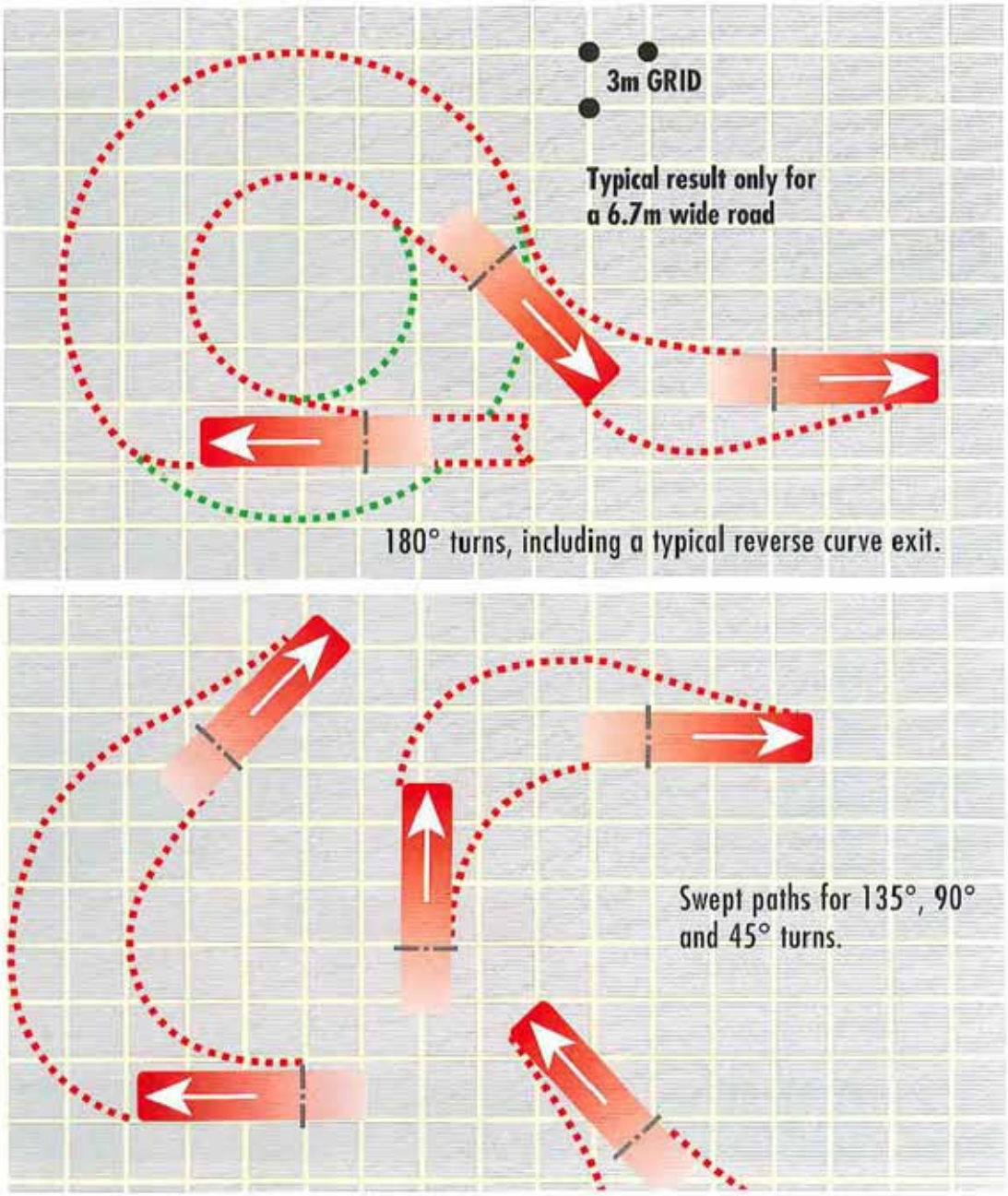


Fig 6.10: Swept paths for a 12m bus. (GMPTE, 1992).

coaches should consider designing to accommodate 15m coaches (or be easy to modify to accommodate them), in case they are permitted in the UK at some future date.

6.38 Since the 1985 Transport Act came into force, the bus industry has made increasing use of smaller buses. A key feature of the 1985 Act is that it allows bus operators greater freedom to provide services, with the onus of proof on the highway authority to show why any particular road is not suitable for a public transport service. Smaller buses have an advantage in that they can gain access to places which are not accessible to large buses, such as narrow residential roads with on-street parking and highways that are affected by weight and height restrictions. Many bus operators and passengers perceive smaller buses to be more "user-friendly" than large buses. There have also been cases of residents objecting to bus services on their street when full size buses were used, but accepting a service using smaller vehicles.

Types of bus

6.39 Buses over 9.5m long are considered to be "large" buses. The trend in these buses is towards single deck and away from double deckers. A growing number of single deck buses have "low floors". This means that at least half the length of the bus has a flat floor with a height of about 320mm and with no internal steps at the entrance or exit. The bus can be knelt to an entrance height of about 220–250mm at stops, which makes it much easier to board and practical to carry shopping trolleys, baby buggies and passengers in wheelchairs. The Disability Discrimination Act 1995 will lead to new single deck buses after the year 2000 being wheelchair accessible, and bus stops should be designed to be compatible with them.

6.40 Single deck buses shorter than 9.5m are called "small" buses. Those under 7.5m long are called mini-buses and those between 7.5 and 9.5m long, midi-buses. Small buses are usually slightly narrower than large buses and have smaller turning circles and narrower swept paths. Figure 6.11 shows the swept path for a 8.4 m midi-bus turning at full lock. Small buses can use roads that are narrower than those required by large buses.

6.41 Guidance on the detailed design requirements for highways, bus stops, footways and footpaths, that are needed at the detail planning stage, are given in Chapter 7.

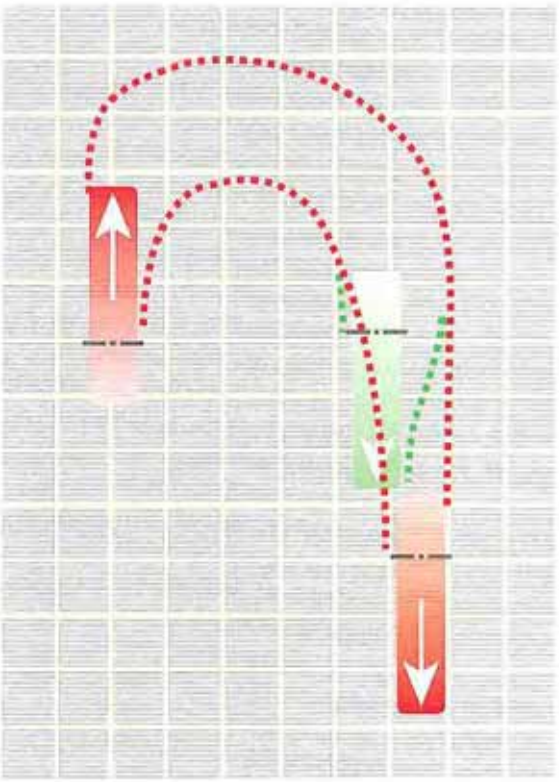


Fig 6.11: Swept paths for an 8.4m midi-bus at full lock (GMPTE, 1992).

Bus priority and traffic management

6.42 The broad principle, that buses will be given priority, needs to be considered from the outset of planning, to ensure that space is available to accommodate the priority measures. Because of congestion in urban areas at peak times, buses often spend 80% of their running time travelling just 20% of their running distance. Details of the various priority measures are described in Chapter 7. For any development to be suitable for public transport, it is essential that buses are not delayed by congestion at the junctions with the surrounding road network or within the development. This may require the provision of special designs of junction, bus lanes or even bus-only roads for some types of development (see Chapter 7, paragraph 7.32 **Bus priorities and traffic management to assist buses** and paragraph 7.58 **Bus-only streets and links, and bus gates**). Bus-only links allow buses to follow a direct route through a development, while excluding other through traffic. This can affect the layout of the development at the outline planning stage. If bus priority is predicted to be necessary, then Chapter 7 should be consulted and sufficient space left in the outline layout.

Special aspects of particular types of development

6.43 This section discusses the requirements for public transport of particular types of development. It is mainly concerned with new developments, which the policies of PPG6 and PPG13 are seeking to locate in existing centres and where they can be easily served by public transport. However, there are many existing developments located at the edges of towns and at other places where the provision of public transport is difficult. These are described, even though they are not preferred locations, because there is likely to be a requirement to increase the use of public transport to such sites.

Residential Areas

6.44 PPG13 recommends that wherever possible, new housing should be located in existing urban areas, or in areas well served by public transport. Change of use from industrial to residential is common where redevelopment takes place, particularly in inner city areas, and conversion of offices is being encouraged in some places. Residential development in these areas can be in the form of low rise flats as well as free standing houses. Purpose built accommodation for the elderly is often incorporated. The then Department of the Environment recommended in 1973 (DOE, 1973) that residents should not have to walk more than 400m (¼ mile) to their nearest bus stop. This criterion has been hard to satisfy comprehensively, but the advent of small buses has made it much more achievable. This standard should be adopted for major new housing developments, extending bus services where necessary but recognising that direct, frequent and easily understood services are more important than a few metres of walking distance. The layout of roads in residential developments is set out in Design Bulletin 32 (DOE/DOT, 1992).

6.45 *Places, Streets and Movement* recommends that bus routes in residential areas require roads that are 6.0m wide (DETR, 1998b). These roads must be kept almost completely clear of parked vehicles. If this leads to excessive traffic speeds, local narrowings or chicanes can be used to reduce speeds (see Chapter 7, paragraph 7.63 **Traffic calming**). Bus gates (see paragraph 7.62) can be used to provide direct routes for buses, refuse vehicles and fire engines while excluding through traffic. The layout of roads in residential developments is described in detail in Chapter 29 of *Transport in the Urban Environment* (IHT, 1997). Narrow roads that cannot be used by large buses can often be used by midi- and mini-buses.

6.46 *Places, Streets and Movement* (DETR, 1998b) recommends an approach to the layout of residential areas that is sympathetic to the nature of the local place, rather than the rigid requirements of vehicle movement. As was described in Chapter 5, paragraph 5.39, it recommends that for all schemes a development brief or framework should be established at the outset. This will define the basic layout of spaces (streets, squares, courtyards, etc) and how movement relates to them. Buildings should be arranged to suit the local context, and the roads then fitted into the spaces created. The brief needs to consider the provision of public transport. This requires routes for the service and its associated network of footpaths and cycle routes that add to the quality of life for residents and which do not harm the environment or encourage traffic.

6.47 To allow the provision of bus services to residential areas, the initial layout of the development should select bus entry and exit points for the development that link to the local bus network and define a through route for buses that enables the operator to provide efficient and attractive services, but which does not dominate the development. This should pass local centres, which are natural places for bus stops and cycle storage. The bus route will require roads of some 6.0m width, but narrower if the route is to be limited to midi- and mini-buses. Off the bus route, the layout of the development should be based on spaces and roads of varying width fitted in among sympathetically positioned buildings. A network of high-quality

footpaths and cycle routes is needed to link the houses to bus stops and local centres, with a maximum walking distance of about 400m. For small and medium developments, it may well be possible to provide a bus service without penerating the residential area.

6.48 Bus stops are ideally sited about every 300–400m, but this is flexible. Circumstances alter stop spacing (see paragraph 6.20). A stop outside a block of flats or accommodation for older people is a high priority. Care should be taken to avoid conflict with the immediate residents, yet maximise convenience for passengers. People like to have a bus service, but not a bus stop outside their front door. Stops can be sited by the flank wall of houses which front onto a side road, or across the end of a closed–off side road, provided the developer designs for it. This is something the local authority can influence at the detail planning stage.

6.49 It may be necessary to create a bus terminus in a residential area (see paragraph 6.32). The standing space for buses needs to be sited with consideration for local residents – for example, alongside a flank wall or adjacent to a neighbourhood centre or open space. Depending on circumstance, a turning circle may be required. A short loop working can avoid the need for a turning circle but its length should be no greater than a stop spacing, i.e. about 400m. This avoids some residents being served only by buses in one direction.

6.50 While residential developments on sites in town are usually close to existing bus services, developments on isolated greenfield sites or at the edge of town will require a new or extended bus service. The size of development needed to justify a new service depends on the location, the car ownership of the residents and the efficiency with which the development can be served. As a very rough guide, a development of 500–1000 houses would normally justify a new bus service, while a much smaller one could well justify an extension to an existing service.

6.51 Problems have occurred when residential developments on existing bus routes have required established bus stops to be moved. Local authorities should require that bus stop and shelter positioning should be agreed within the detail planning permission wherever an established bus route adjoins the development. This will help to avoid potential conflict with neighbouring properties.

Supermarkets and superstores

6.52 PPG 6 seeks to locate new supermarkets and superstores in or on the edge of existing centres, within walking distance (less than 200 to 300m) of the town centre itself. They will normally be provided with car parking, which may also serve the town centre. The sequential approach for the selection of preferred locations for retail development has been described in Chapter 5, paragraph 5.7. In all cases the developer and the local authority should determine how the existing public transport network can provide access from the expected catchment area. Liaison with the Passenger Transport Executive, local authority Transport Co–ordinating Officer, or London Transport Planning, and through them, the transport operators, has already been emphasised.

6.53 Analysis will reveal any gaps in coverage of the public transport network and possible capacity problems. To some extent frequencies will improve naturally to meet increased demand, but new services involve careful planning and co–operation between the retailer, the transport provider and the local authority. Where buses pass the site, the sales space and pedestrian entry/exit should be adjacent to the roads used by buses, rather than at the back of the site (see Figure 6.1). Problems of bus stops being blocked by cars waiting to load from supermarket trolleys can be alleviated by the use of bus boarders or by loading restrictions and bus stop clearway orders, supported by effective enforcement.

6.54 Where a bus service terminates at a large store, a means of turning the bus and a place for it to stand will be required (see paragraph 6.32). These may be on–street or on–site; for either,

the layout should be planned rather than left until after the store is built. On-street bus stands are not liked by frontagers, either residents or small traders.

Edge-of-town shopping centres and retail parks

6.55 Isolated shops or supermarkets at the edge of a town may not generate enough ridership to justify a new bus service, and are discouraged by current planning policies and the sequential approach of PPG6. If no sites exist in or on the edge of the town centre, they should be located on an existing inter-urban bus service. If a new district centre is required, it should be defined through the local plan. It should contain a mixture of shops, offices, leisure facilities and perhaps a health centre, and only needs a single car park. It can become a local hub for the public transport network, but even this will not achieve access by public transport from as wide an area as does the town centre (Figure 5.4). The car park can be used for a park and ride service to the main town centre. If a district centre has been agreed in the local plan, the local authority should direct development into the single centre, rather than allowing it to be scattered onto isolated sites spread around the edge of the urban area.

6.56 Retail parks are warehouse style developments for the sale of household goods such as DIY, furniture, electrical and garden implements. The transport implications of retail parks are similar to those of isolated shopping centres. Such developments are not in line with the planning policies set out in PPG6 and new retail parks are unlikely to be approved. Existing parks are often built on awkward sites not suitable for other uses such as residential. They tend to be on fast, often dual carriageway, roads and parking provision is generous. The supposition is that bulky goods will be taken away by customers by car. In fact, there is more opportunity at retail parks to window shop and to order goods for home delivery than at a foodstore, so there should be scope for travel by bus. However, the locations of retail parks are rarely served by public transport. Wherever possible, existing out of town shopping centres or retail parks should be encouraged to provide a bus connection to the local town centre and/or residential area for staff at the centre as well as customers.

Leisure developments

6.57 Purpose built leisure complexes may include a multi-screen cinema, a family entertainment centre, a swimming pool, a bowling alley and some form of physical participation activity like tennis, keep fit and golf. There will be a fast food outlet and pub and night club facilities are common. The complexes always have large car parks, which reflect the perceived need to cater for patrons at off peak times - midday, evenings and weekends. They have usually been located adjacent to a ring road, major radial or motorway at the edge-of-town, on former railway land or beside man made or natural barriers to movement. These locations are difficult to serve by public transport and are contrary to current planning policy; the sequential approach of PPG6 is to be used for future leisure developments. There are examples of sites which are close to town centres, for which pedestrian access could be improved by relatively simple measures - the provision of a safe pedestrian path, a protected road crossing or a means of crossing a railway or canal. Planning authorities should seek opportunities to obtain contributions for improved access when developers wish to extend or modify their site.

6.58 Where buses terminate on site, they need to set down passengers on a proper raised footway close to the entrance for the most appropriate building, have somewhere to stand for a few minutes, and then pick up passengers at an equally convenient point. Where only one bus route is involved, these functions can usually be combined at one point; where there are several bus services it may be better to separate them.

6.59 Provision for coaches is also required. Set down/pick up facilities alongside a raised footway similar to those for buses are needed, but because of the longer dwell time, a separate

coach parking area should be designated with a safe and convenient pedestrian access route for passengers. Coach passengers should not have to pick their way through a car park to reach a distant row of coaches, nor board direct from the road surface. Where there is any likelihood of pedestrians walking within the coach parking areas, the detailed layout should avoid the need for coaches to reverse into or out of parking positions.

6.60 Leisure developments that result in many patrons leaving the site at the same time may require a bus lane to the exit or an exit reserved for buses and coaches. This gives a real benefit for buses over cars at busy times and can demonstrate the advantages of public transport.

Tourist attractions and developments

6.61 Much of the previous section (paragraphs 6.57 to 6.60) also applies to tourist attractions. Generally, a higher proportion of visitors to tourist sites will arrive by coach, and provision for coaches is essential, in addition to local public transport. At many attractions, perhaps particularly in the south of England, coaches from mainland Europe will be common. Such vehicles have their entrances and exits on their right hand side. It is becoming increasingly important (and wise) to allow for some offside loading facilities when making arrangements for coaches at tourist attractions. Coach facilities should be designed to accommodate the 15 metre rigid coaches that are currently permitted in Europe (or be easily modified to accommodate them), even though these are not yet permitted in Britain.

6.62 More emphasis should be placed on the importance of coach parties, and recognition given to the longer loading and unloading times for coaches in terms of footway lengths. An "island" loading platform allows for left hand drive coaches as well as British vehicles.

Although this hospital is on a green–field site, it has a pedestrian path from the adjacent underground station and is served by several bus routes. *(Courtesy: Aerofilms Ltd).*

Layouts which do not require coaches to reverse in areas where pedestrians may be present are safer. Separate entry and exit for coaches and cars is desirable where space permits and essential for the larger venues where queues of vehicles are likely.

Hospitals

6.63 Many new large hospitals have been built on the edges of towns, and usually cannot be served by public transport directly from all over the town. Such sites are contrary to the policies of PPG6 and PPG13. Hospitals have extensive catchment areas and are often sufficiently large to stimulate the provision of local public transport. For example, Northwick Park Hospital in Harrow, although on a relatively isolated site, has several bus services routed past its entrance, plus a direct pedestrian path from a nearby underground station.
6.64 Buses need to get as close to their passengers' destinations as are the car parks. Hospitals can spread over a considerable area, so a bus terminus within the hospital grounds is desirable in most cases. If the entries and exits from the site can be separated, a loop road can allow buses to turn without needing a special turning circle. Where buses have to serve a hospital from outside its grounds, signing between stops and hospital departments via a footway network is essential.

6.65 Many of the visitors and patients are unfamiliar with the layout of the hospital buildings, the wards, and the various facilities. Many older people visit or attend hospitals. Most hospitals have speciality departments which attract patients and visitors from outside their normal catchment areas. On–site and home information on bus services and times is essential, as are on–site direction signs. Real time displays of public transport information in reception and outpatient areas should be encouraged. Directions to the hospital from local bus stops and rail stations are needed. Safety issues on the hospital road system must be considered carefully, because the site will be used by emergency vehicles and elderly pedestrians.

6.66 Management of all large hospitals, be they existing, new or redeveloped through amalgamation, should produce Green Transport Plans (see Chapter 3, **Green Commuter Plans and Company Travel Plans**, para 3.10). These should consider visitors and outpatients as well as the work force.

Schools

6.67 The White Paper *A New Deal for Transport: Better for Everyone* places considerable emphasis on journeys to school.

> "Our policies will help reduce the need for children to be driven to school by encouraging safer routes for walking and cycling, giving greater priority to public transport and, through our planning policies, improving opportunities to get to (school) without having to use the car." (DETR, 1998a; para 5.30).
>
> "We will continue to take account of transport when shaping Government policies which relate to children's journeys to school." (para 5.31).
>
> "We will take further initiatives to encourage more children to get to school other than by car." (para 5.34).

6.68 Some new schools have been built at edge–of–town locations. This, plus the greater choice of schools now available to parents, has increased the distances children travel to school. The edge–of–town sites are contrary to the policies of PPG6 and PPG13, but existing schools need to be served by bus and a few new schools may still be built at locations with poor accessibility by public transport, because of the space they need. Where this happens, they should be adjacent to one or more existing bus routes.

6.69 School bus transport can be provided by:

- normal service buses, duplicated where necessary, as part of the local public bus network;
- dedicated public service buses, which divert from the main route to serve individual schools; and
- bespoke services arranged by the education authority using contract hire arrangements.

6.70 Schools and local authorities can help in a number of ways:

- they can make provision for buses to pick up and set down safely, and turn and stand. Where possible, this should be within the school grounds, so that school staff can supervise pupils on and off vehicles;
- they can provide kerbside railings at bus stops to prevent active youngsters spilling into the path of moving traffic;
- they should ensure pedestrian crossing facilities are provided between the school entrance and any bus stop on the far side of the road;
- they should protect bus stops from car parking and prevent escorting vehicles obstructing traffic;
- they can ensure bus operators are informed of school term dates, including special event days when demand for transport will change; and
- they can liaise regularly and consistently with the transport providers.

References

DETR (1998a) *A New Deal for Transport: Better for Everyone* White Paper, Department of the Environment, Transport and the Regions, Cm 3950, HMSO, London.

DETR (1998b) *Places, Streets and Movement – A Companion Guide to Design Bulletin 32,* Residential roads and footpaths Department of the Environment, Transport and the Regions, HMSO, London.

DOE (1973) *Bus Operation in Residential and Industrial Areas* DOE Circular 82/73, Department of the Environment, London.

DOE/DOT (1992) *Residential Roads and Footpaths – Layout Considerations* Design Bulletin 32, Department of the Environment/Department of Transport, London.

DOT (1986) *Shared Use by Cyclists and Pedestrians* Local Transport Note LTN 2/86, Department of Transport, London.

EHTF (1993) *Bus–Based Park and Ride – A Good Practice Guide* English Historic Towns Forum, Bath.

GMPTE (1992) *Better Buses – Good Practice in Greater Manchester* Greater Manchester Passenger Transport Executive for the Associations of Greater Manchester Authorities, Manchester.

IHT (1991) *Reducing Mobility Handicaps* The Institution of Highways & Transportation, London.

IHT (1994) *Traffic Impact Assessment* The Institution of Highways & Transportation, London.

IHT (1996) *The Safety Audit of Highways* The Institution of Highways & Transportation, London.

IHT (1997) *Transport in the Urban Environment* The Institution of Highways & Transportation, London.

IHT *et al* (1996) *Cycle–Friendly Infrastructure* The Institution of Highways & Transportation, London.

Preston J (1987) *New Local Rail Stations* Paper to 1987 PTRC Summer Annual Meeting, PTRC Ltd, London.

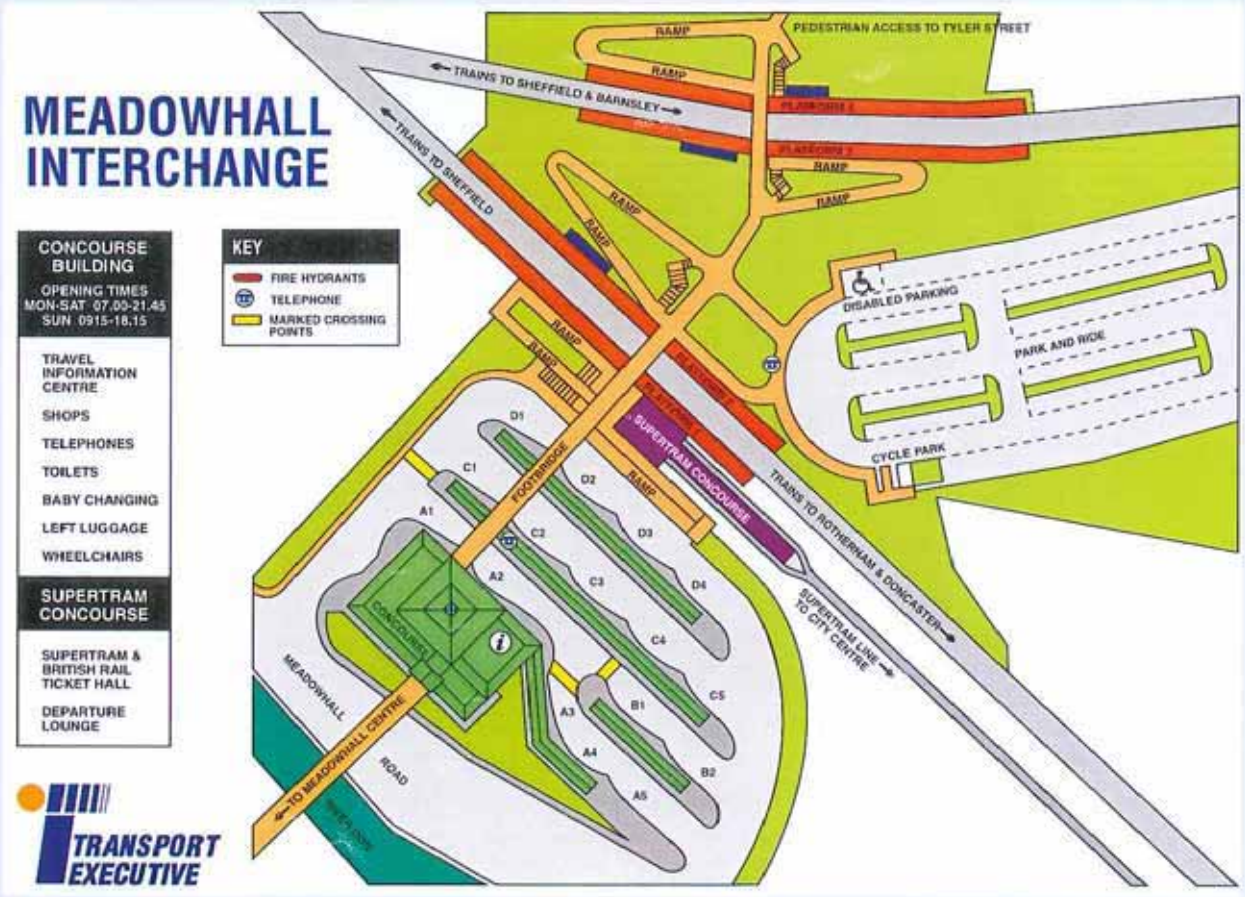
MEADOWHALL SHOPPING CENTRE

The Meadowhall regional shopping centre was built on the site of a former steelworks midway between Sheffield and Rotherham town centres. The centre comprises one million sq ft of retail with an 11-screen multiplex cinema, 12,000 parking places and a purpose-built public transport interchange for bus, tram and train.

It is located adjacent to Junction 34 of the M1 but also alongside the main railway line from Sheffield to the North, at the point where it is joined by the branch line to Huddersfield and Leeds via Barnsley. The main bus routes through the Don Valley between Sheffield and Rotherham also pass the site. This location was crucial in enabling good quality public transport services to be provided.

The local highway authority recognised that the site would require extensive changes to the local highway network, traffic signals and an extension of the Urban Traffic Control system including CCTV cameras to manage flows to and from a site so close to the M1.

The Passenger Transport Executive was invited to early discussions between the developer's architect and the highway authority. It was at this stage that the architect was persuaded to consider providing facilities for public transport. The Supertram light rail network was also being developed at this time and, to assist in regeneration of the Don Valley, a line from Sheffield City Centre into the valley was being requested by Sheffield City Council.



CASE STUDY

CASE STUDY

European Regional Development Funding was available at 50% to support transport infrastructure projects which assisted with regeneration. The developer transfered the land for a transport interchange to the Transport Executive, which obtained a grant for the project. The developer also agreed to underwrite the Transport Executive's share of the capital costs and the annual operating costs of the Interchange which is maintained and managed by the Transport Executive.

The interchange was chosen as the terminus of the Supertram light rail system in the Don Valley. As a condition of making a "Section 56 Grant" towards the cost of the light rail system, the government required that contributions be obtained where possible from land owners benefitting from the project. These were obtained from Sheffield City Council, the Sheffield Development Corporation and the owners of the Meadowhall Shopping Centre.

The detailed design of the transport interchange was carried out by the architects of the shopping centre with advice from the Transport Executive. It consists of a railway station with four platforms, a bus station with 16 stands and a terminal for the Supertram light rail line. The interchange is linked to the shopping centre via a covered footbridge which is glazed and carpeted.

In 1998, the percentage of trips to Meadowhall by public transport was around 23%.

Planning permission has recently been given for an extension to the Marks & Spencer store at Meadowhall. Marks & Spencer have offered to extend the covered walkway linking the interchange and centre to the doors of their store and to fund the provision of information on how to get to Meadowhall by bus, tram and train to their card holders. This has been accepted as an obligation by the local planning authority together with an obligation to extend the Marks & Spencer store in Sheffield City Centre before opening the extension at Meadowhall.

R Barlow
South Yorkshire Passenger Transport Executive

7. Detail Planning – Highway Design And Traffic Management

Consultations during detail planning

7.1 Consultation with the highway authority and the Passenger Transport Executive or the local authority Transport Co-ordinating Officer should have started before the initial application for outline planning permission. This consultation should continue during the detailed design of the development. As design proceeds, local bus operators and the police should also become involved. The roles of the various agencies have been set out in Chapter 1, paragraphs 1.45 to 1.68. In some cases it may be desirable to consult with local frontagers, to gauge local reaction.

Design of highways, footways and footpaths

7.2 The detailed design of highways to make provision for buses are described in a number of publications. Useful references are *Keeping Buses Moving* (Local Circular 1/97, DETR, 1997), *Better Buses – Good Practice in Greater Manchester* (GMPTE, 1992), *Bus and Coach Issues for Local Authorities* (CPT, 1997) and particularly Chapters 24 and 30 of *Transport in the Urban Environment* (IHT, 1997). *Places, Streets and Movement* (DETR, 1998) describes the approach to residential developments recommended by the Department of the Environment, Transport and the Regions. Principles for the basic layout of the development and its highway system have been described in Chapter 6. This chapter is concerned with the design details to implement the layout selected.

7.3 Lane widths for roads to carry large buses should be 3.65m wide. In residential developments, roads of 6.0m (two 3.0m lane widths) should be used for bus routes providing parked vehicles can be excluded. Narrower roads can be used if services are to be limited to midi- and mini-buses. These widths require ample off-street parking, and may need bus gates to stop through traffic and road narrowing or chicanes to limit traffic speeds. At corners, buses sweep a wider path, as described in section 6.4 and illustrated in Figures 6.10 and 6.11.

Illegal parking blocking buses on a town centre road for buses and access only. *(Courtesy: Reading Transport Ltd).*

7.4 Skew gradients and adverse cambers have considerable influence on the safety and comfort of passengers, particularly when they occur on the approach to a bus stop where passengers are likely to be standing, and should be avoided wherever possible. A good standard of surface alignment and condition is necessary to provide bus passengers with a smooth and comfortable journey.

Mini–roundabouts and changes in camber can cause a bus to lean, endangering standing passengers. *(Courtesy: Reading Transport Ltd).*

7.5 Some designs of mini–roundabout involve severe changes of camber and can be very disturbing for bus passengers. Many authorities are now using mini–roundabouts with a one to two metre central island, domed or upstanding 100mm, surrounded by a ring two to four metres wide of white block paving, upstanding 50mm and edged with half–batter kerbs to provide a ramped edge. These cause large horizontal path deflections, and substantial reduction of speed, for light vehicles. Goods vehicles and buses are able to track across the paved area with little disturbance.

This mini–roundabout slows light vehicles while allowing buses and goods vehicles to track across the block–paved outer ring. *(Courtesy: Malcolm Bulpitt).*

7.6 To avoid ground clearance problems, the gradient of a road used by buses should not change suddenly. A change in the longitudinal slope of the carriageway of 12° (1 in 5) should be the maximum permitted for a 12m bus without a transition curve. Steeper gradients can be negotiated provided adequate transitions are incorporated. The definition of body to ground clearances is considerably more complex when the bus negotiates a change in gradient on the skew, and this situation should be avoided on any roads intended to be used for bus routes.

7.7 *Places, Streets and Movement* (DETR, 1998) recommends that footways (pedestrian paths alongside roads) and footpaths should where possible be 1.8m wide, but narrower where this width would overwhelm the development. Guidance on footpaths is also set out in The Institution of Highways & Transportation Guidelines *Reducing Mobility Handicaps* (IHT, 1991), which recommends a general width of 2.0m and a minimum width of 1.8m, to allow prams and wheelchairs to pass. Where obstructions such as lamp standards, poles for road signs and litter bins are set in to the footway or footpath, a clear path 1.0m wide (absolute minimum 0.9m) should be left (double buggies are 0.9–1.0m wide). Although this guidance is specifically concerned with disabled people, the standards recommended make travel on foot easier for everyone, including those pushing prams or shopping trolleys. Wider footways and footpaths enable shared use with cycling but can create potential conflicts between pedestrians and cyclists (DOT, 1986; IHT *et al*, 1996). At bus stops the footway should be wider, to leave a 1.8m clear path past the bus shelter and any people waiting. Footways and footpaths should be hard surfaced, well drained and lit.

7.8 It is important that the footpaths linking the development with a bus stop or railway station are direct. Pedestrian route desire lines may be obvious in the form of well trodden tracks across grassed areas, but the direct route may be obstructed by more permanent features, such as walls or landscaping. The most direct route should be determined by consultation with bus users, from on–site surveys and observation. Where there are gradients on the footpath system, the recommended walking distance to a bus stop should be reduced by 10m for every one metre rise or fall. With good planning, the footpaths and cycle routes that serve the bus stop or railway station should also serve the local centre or corner shop.

7.9 Pedestrian access to the bus network can be improved by Zebra and light–controlled pedestrian crossings (Puffin, Pelican or Toucan), pedestrian phases at traffic signals, pedestrian refuges and footway improvement on identified routes to bus stops. These features also help to reduce pedestrian/vehicle conflict (see *Transport in the Urban Environment* section 22.7 (IHT, 1997)). They may be required to be funded by a developer on an existing bus route if the development generates additional pedestrian movements.

The detailed alignment and design of roads influence the efficiency of bus services using them, and have a large effect on the comfort and safety of passengers. There is ample information in the references cited in this chapter to enable roads to be designed that are suitable for bus routes. Developers should decide the routes for buses to serve a development and than design these roads to be suitable for the operation of buses.

Layout of the highway at bus stops

7.10 Layouts for various different types of bus stop are shown in *Transport in the Urban Environment* section 24.11 (IHT, 1997), *Keeping buses moving* (Local Circular 1/97, DETR, 1997), *Better Buses – good practice in Greater Manchester* (GMPTE, 1992) and *Guidelines for the Design of Bus Bays and Bus Stops to Accommodate the European Standard (12m length) Bus* (London Bus Priority Network Steering Group; LBPNSG, 1995). The City of Edinburgh Council (1997) offers detail guidance on the layout of bus stops, poles and shelters. Stops can be kerbside, in bus bays (lay–bys) or at protruding bus boarders, as shown in Figures 7.1 to 7.3. These layouts apply to roads with speed limits up to 40miles/h, and for 12m buses with doors at both front

and centre. The aim is to permit buses to stop within 200mm of the kerbside, and preferably closer, without overhanging or over-running the footway. A kerb height of 125 mm helps passengers board, but kerbs higher than 125mm can damage the underside of the bus. At bus boarders, where the bus does not overhang the footway, the kerb height should be 160–180mm. Special types of kerb such as the Kassel design can assist buses to approach as near as possible to the footway, particularly at bus boarders. The Kassel kerb itself is designed for kerbs about 180mm high. New designs of kerb, such as the Charcon Access Kerb, are higher (up to 220mm) but also allow buses to be aligned flush to the kerb at an elevated bus stop platform.

Kerbside stops

7.11 Buses need to be able to approach and leave stops without delay or obstruction. Vehicles parked close to or at bus stops prevent buses from reaching the kerb and force them to stop in the carriageway. Yellow lines to prevent parking, supplemented by No Loading markings and coloured surfacing of the bus stop box, are the commonest way of keeping the road free for buses at bus stops. Where these measures are not sufficient, traffic regulation orders should be applied, preferably using a bus stop clearway order (No stopping except buses); the Traffic Signs Regulations and General Directions allows flexibility for the highway authority to choose the times of operation. All such measures will require a supporting Traffic Regulation Order.

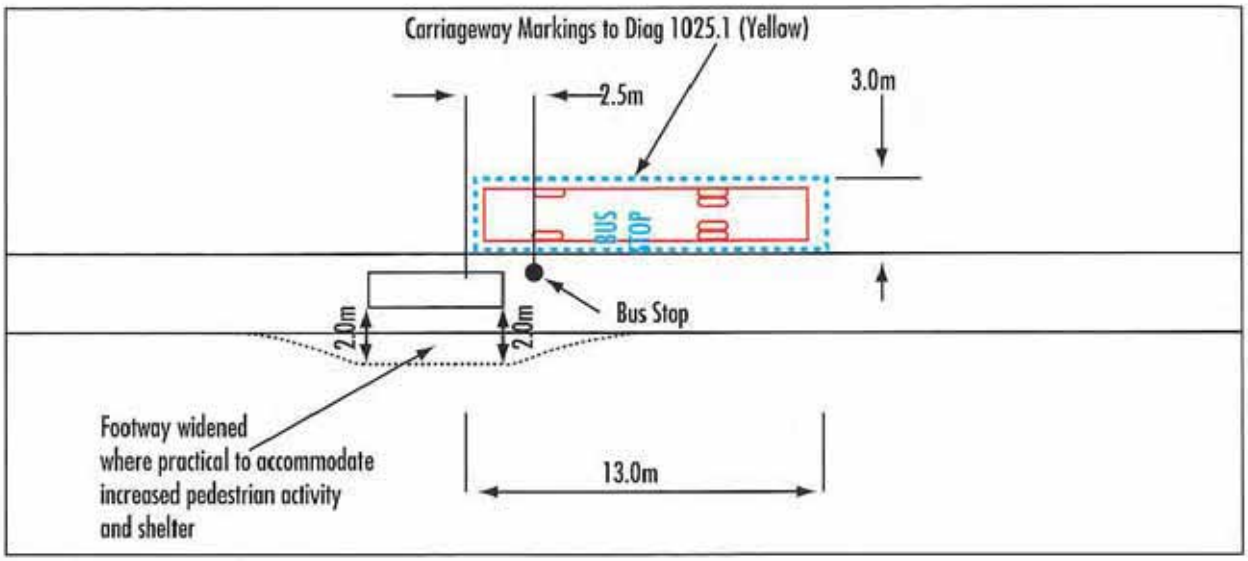


Fig 7.1: A kerbside bus stop.

Bus bays

7.12 Bus stops in bus bays (lay-bys) protect the road space at bus stops, but can create difficulties for buses seeking to rejoin traffic on the main carriageway. Because of their potential for delaying buses, they are not generally welcomed by bus operators and should only be used where they are unavoidable for reasons of road safety or congestion. A variety of layouts are shown in *Transport in the Urban Environment* section 24.11 (IHT, 1997).

Bus boarders

7.13 Bus stop boarders help to resolve the problem of on-street parking at or near to bus stops. They are created by extending the footway about two metres into the carriageway in the vicinity of the bus stop (Figure 7.3). Boarders require less kerb length than conventional bus stops located between rows of parked cars. They provide an effective deterrent to kerbside

parking at the stop itself and define the parking areas up– and down–stream of the bus stop. Boarders enable buses to align with the kerb and create passenger waiting areas which do not conflict with general pedestrian flows (IHT, 1997). A bus at a boarder projects into the traffic stream less than a bus that cannot get to the kerb because of parked cars, so street width is usually not a limitation for the use of bus boarders.

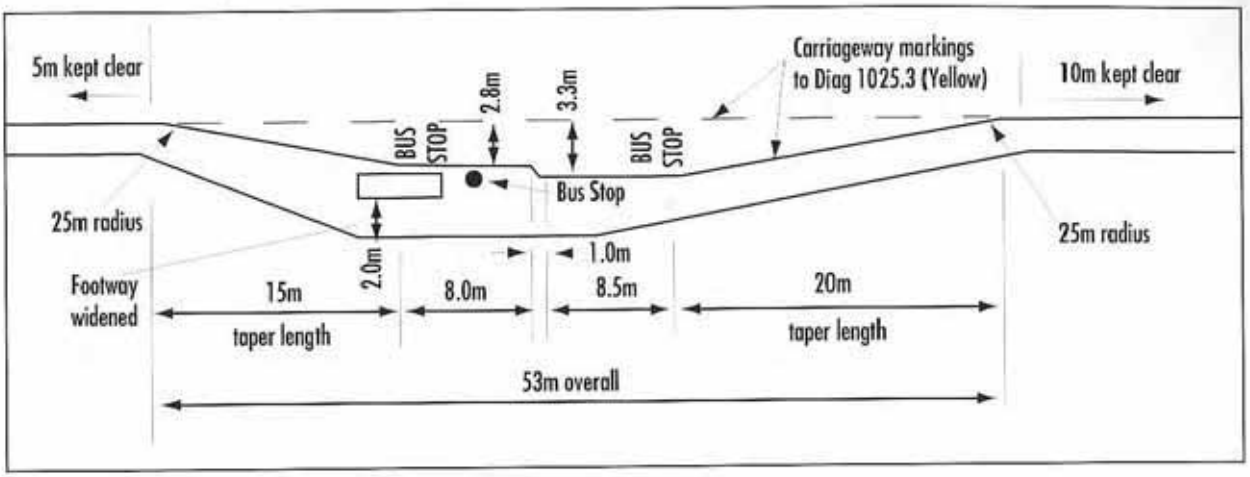


Fig 7.2: A bus stop in a bus bay.

A bus bay with a shelter. *(Courtesy: Derek Palmer).*

7.14 Bus stop boarders which extend at least two metres should be constructed with a kerb height of 160–180mm, to give prominence to the bus stop and assist passengers when boarding or alighting, particularly those with mobility impairments (Figure 7.4). The kerb and bus boarder is sloped back to meet the existing kerb line, but care must be taken not to introduce steps or gradients of more than five percent on the footway. The shelter should be positioned on the boarder, but at least 0.5m from the kerb. Half–width boarders that extend about one metre from the kerb have also been used, but these are a less effective deterrent to parking. The kerb height for half–width boarders should be limited to 125mm, as buses may need to swing over the footway to stop close to the kerb. The upstream end of a bus boarder should be provided with illuminated or reflective bollards, to make it clearly visible at night (see Bus boarder photograph on following page). If there is no parking adjacent to the upstream end of the boarder, this section of the carriageway should be marked with painted hatching

A bus boarder should be clearly visible at night. *(Courtesy: Reading Transport Ltd).*

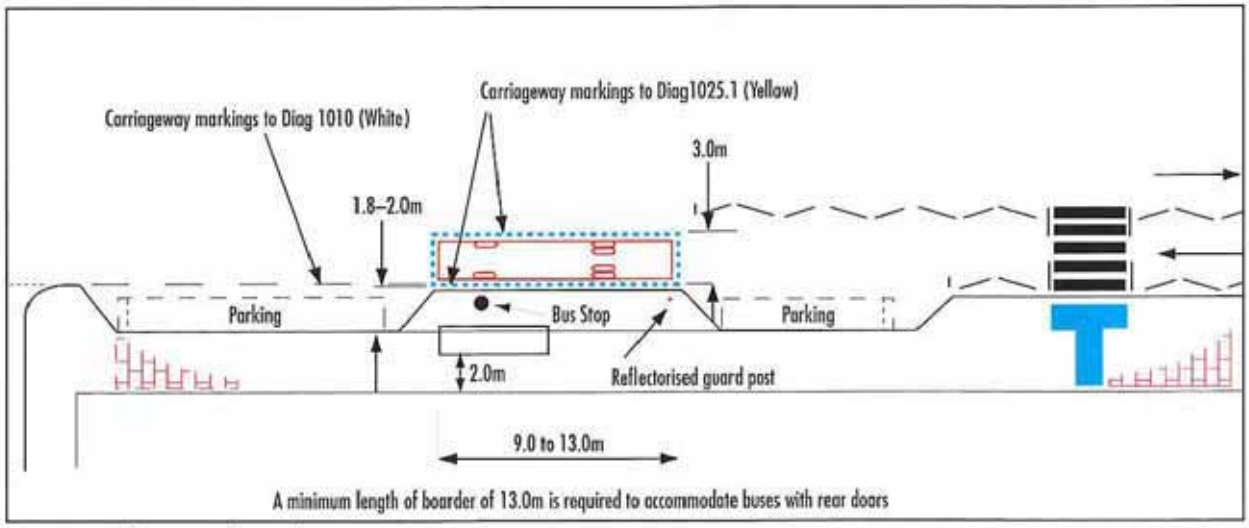


Fig 7.3: A bus stop boarder.

Carriageway drainage at bus stops

7.15 Since bus stops are adjacent to the channel of the carriageway, they should be located where water flow in the drainage channel is least. A traditional gully system with adequate longitudinal flow will have a least width of water in the channel on the downstream side of a gully. In this system the ideal position for a bus stop, to minimise splash from passing vehicles, is approximately five metres downstream of a gully.

7.16 On flat roads a summit and valley system may be incorporated, whereby the channel is lifted at the summit to induce a gradient in the channel. The summit may be easily located by observing the varying distance between kerb top and channel from the opposite side of the road, or alternatively by measuring this distance until the minimum figure is obtained. The ideal position for a stop on this type of road, with regard to drainage, is the summit; there is a disadvantage with this location in that the step height from the footway to the bus is

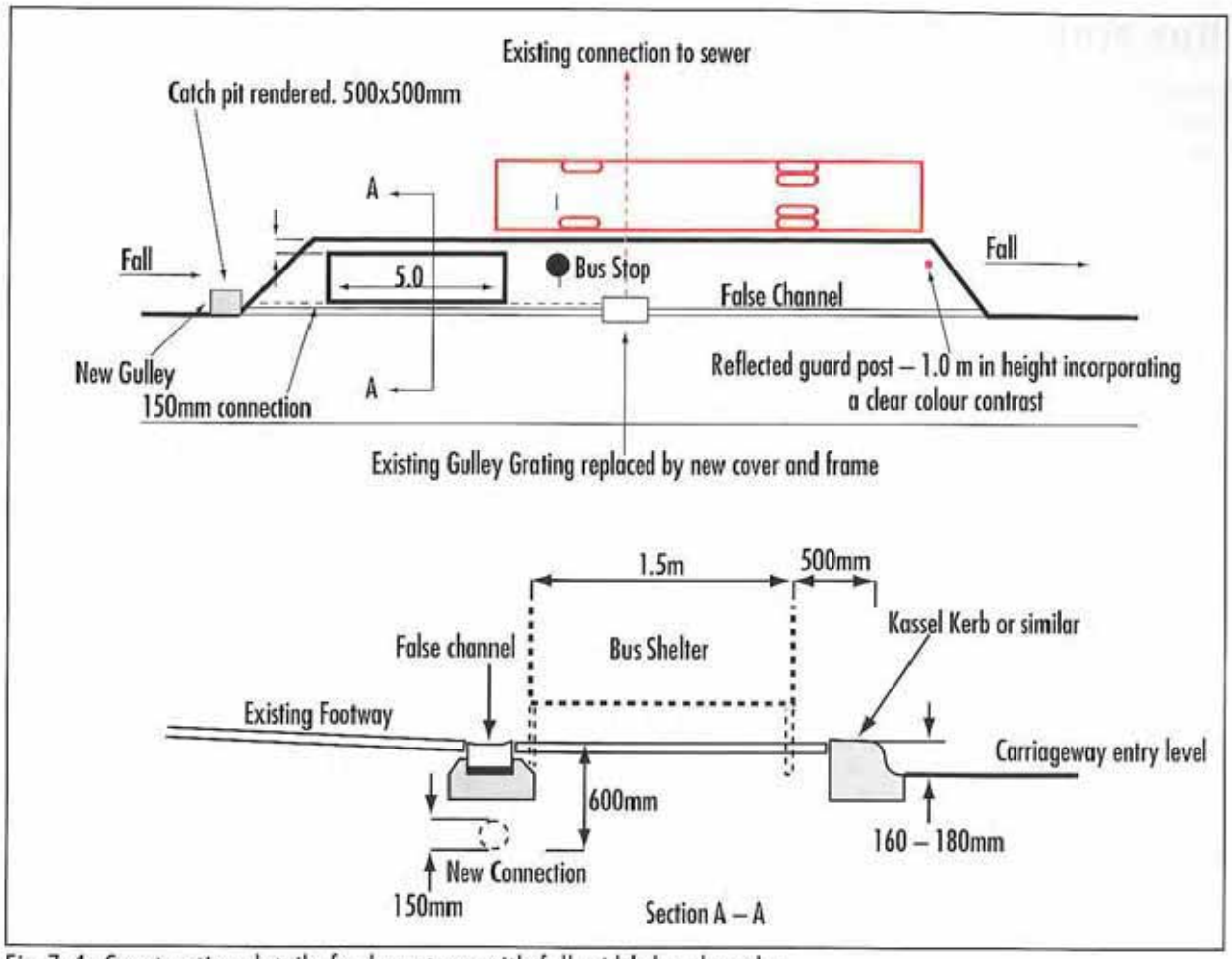


Fig 7.4: Construction details for bus stops with full width bus boarder.

increased by up to 50mm. Wherever possible, the bus stop should be located where the kerb height is 125mm, and more at bus boarders.

7.17 Drainage of a bus bay can be away from the main road but, more commonly, is towards the main road. When designing a bus bay which drains away from the main road, the aim must be to minimise the depth of water at the fixed boarding points; where possible linear drainage, such as Beany Blocks (a combined kerb and channel block) or some form of grated channel system, should be used. If traditional gullies are employed, then gradients should be directed away from the boarding point and more than one gully should be provided for times when the system becomes blocked (GMPTE, 1992).

Carriageway condition

7.18 The carriageway in the vicinity of a bus stop should be sound and uniform for the comfort and safety of all passengers, especially for those who are standing. An uneven surface, for example from a poorly reinstated trench or rutted carriageway, or changes in camber or gradient, can cause a passenger to fall while waiting to disembark. The carriageway construction at stops should be designed to accommodate oil discharges from buses to avoid on-going maintenance problems.

Stops on bus boarders or at the kerbside are most efficient for bus operations, and should be used whenever possible. Stops in bus bays (lay-bys) cause delays to the service and should only be used when traffic or safety considerations make other types of stop unusable.

Bus stop furniture and footway conditions

7.19 Although the advice in this section is written in terms of bus stops, much of it also applies to stops for tramways and Light Rapid Transit (LRT) systems. Her Majesty's Railway Inspectorate has published guidelines on the safe operation of tramways, which includes a section on the interactions between tramways, highways and footways (HMRI, 1997).

7.20 A formally agreed bus stopping place is normally designated by a bus stop pole and/or shelter. Bus stops should be well lit for road safety and personal security, and should provide passengers with clear information about the services using the stop. Shelters, seating, paved areas for waiting and convenient access, all help to make a bus service more attractive to passengers. Developers should check with the Passenger Transport Executive or Transport Co-ordinating Officer to determine whether bus stop furniture is provided by the local authority, PTE or local bus operator. It is probable that standard designs of furniture will be in use in the area of the development. Two commercial organisations provide bus shelters and signs free of charge in return for the right to sell advertising space in the shelters.

7.21 Consideration should be given to the provision of a public telephone in or near a bus shelter. If a telephone is provided, enquiry numbers for the operators whose services use the stop should be displayed prominently. Similarly, if a bus stop is in a local centre which provides cycle parking, efforts should be make to locate this near the bus stop to encourage cycle access to the bus service.

7.22 Where possible, bus stops should be sited on footways that are sufficiently wide to avoid obstruction to pedestrians by waiting bus passengers. Bus boarders allow passengers to wait away from pedestrian paths, although this is not their primary purpose. The preferred minimum clear footway width past a bus shelter is 1.8m: the absolute minimum width is 1.3m, but this must only be in exceptional cases. The minimum clearance between the kerb edge and the bus stop pole is 0.5m (GMPTE, 1992). The movements of both able-bodied and mobility impaired pedestrians must be taken into account, including those with shopping trolleys or pushing children in buggies (a twin buggy is about one metre wide) (IHT, 1991).

7.23 Footway construction at stops varies greatly, but will generally be a form of concrete flagstones, block paving or a type of macadam construction. It is essential that the footway materials do not become excessively slippery when wet or from wear. Certain types of stone flagging can attract moss, which can cause danger for alighting passengers. The footway surface requires a positive gradient of about two percent to shed water (any greater cross-fall causes problems for people in wheelchairs) and a uniform profile so that pedestrians do not trip. At boarding points the footway should be 125mm above the adjacent road surface. A kerb height of 160–180 mm is desirable at bus boarders (see paras 7.10 and 7.14).

7.24 Guidelines for the design of public transport infrastructure, including bus stops, which address the needs of elderly and disabled people are contained in *Accessible Public Transport Infrastructure* (Barham *et al*, 1994) and *Accessibility Handbook for Transit Facilities* (Balog *et al*, 1992). With the general introduction of wheelchair accessible buses from 2000 under the Disability Discrimination Act 1995, space for a passenger using a wheelchair should be provided at all bus stops. Specific DDA guidance or regulations for bus stops was not available at the time of writing. Balog *et al*, (1992) defines the space needed at a bus stop for a wheelchair accessible bus as 1.5m along the kerb by 2.4m at right angles to the kerb. Where this clear space is not available, the space should be as large as can be provided. The City of Edinburgh Council recommend that colour-contrasting plain paving slabs be used to indicate where the entrance door of the bus should be (City of Edinburgh Council, 1997).

Signs and lighting

7.25 The bus stop sign can be independently mounted or attached to a shelter or lighting column, which is preferable to reduce clutter and ensure that the stop is well lit. When independently mounted, the sign should be at least 0.5m from the edge of the road and the sign pole should be placed so as not to interfere with pedestrian flows. The bottom of the sign should be at least 2.1m above the surface of the footway, and a height of 2.5m is better. Whether it is on a pole or shelter, the bus stop sign should be placed so as to be illuminated by either a nearby lighting column or an illuminated advertising panel in the shelter. Adequate lighting at stops reduces the likelihood of falls during disembarking. It improves security and gives prospective passengers greater confidence when waiting for a service. To further improve passenger confidence, stops should not be located in isolated positions or near bushes or waste ground.

Passenger shelters

7.26 Waiting time is one of the prime deterrents to travel by public transport. Wherever possible it is important to minimise the discomfort involved by providing passenger shelters and seating. Shelters should, wherever possible, be internally illuminated and incorporate seating as well as passenger information. Most will also include advertising panels at one end. The provision of seating assists older people, particularly if access to the bus stop requires a long walk or if the bus service is infrequent and passengers have to wait for long periods. The seating provided should be simple, robust and designed to assist routine cleaning and graffiti removal. Passenger shelters must not only protect the passenger from wind, rain and snow but must provide a user-friendly environment, which is improved by illumination.

7.27 There are many different types of shelter, each with specific dimensions. For planning purposes, typical dimensions of bus shelters are as follows:

Ground level dimensions	Length, 3.5–5.0m;	width, 1.3–1.5m
Roof dimensions	Length, 4.0–5.0m;	width, 1.5–1.6m;
	height, 2.3–2.7m.	

7.28 In many local authority areas, shelters along the public highway can only be sited or moved if an agreement is reached at a site meeting between representatives of owner or constructor, the local highway authority, the Police and, where appropriate, the Passenger Transport Executive. In conservation areas the planning authority will need to grant permission and for commercial advertising a similar procedure is necessary. A bus shelter must be transparent for the user to see the approaching bus, and in a prominent position close to the road for the waiting passenger to be seen. In rural locations with wide verges, footpaths and cycleways, it is undesirable to position shelters on the highway boundary as people may feel vulnerable by being isolated from passing motorists.

Information at bus stops

7.29 DETR has published *Better Information for Bus Passengers – a Guide to Good Practice* in which bus operators and transport authorities are encouraged to provide legible and easily understandable passenger information (DOT, 1996). Ideally, every bus stop should be clearly signed with the standard bus stop emblem and should exhibit the numbers of the buses serving the route and the name of the stop together with, where appropriate, the general direction of travel (to town centre, for example). It is helpful for the name of the stop to be visible to passengers inside the bus. Wherever possible, the stop should have a timetable indicating the frequency and time of the service, and the main fares. For high frequency

services and routes where timetables are difficult to adhere to, service intervals and the times of first and last journeys should be posted. A telephone number for further information should be clearly displayed. A simplified map of the routes serving the stop can be helpful. The display of information should conform to the design standards recommended by the Disabled Persons Transport Advisory Committee in Legibility of Timetable Books and Leaflets (DPTAC). It is crucial that information is up to date.

7.30 At shelters, where notice boards can be larger, route maps should also be given including "You are here", general information, shopping details and, where appropriate, tourist information and a clock.

7.31 The image of public transport and passenger services can be enhanced by the use of real time information displays based on automatic vehicle location (AVL) systems (Tarrant, 1996; section 18.5, IHT, 1997). These show the expected time to the arrival of the next bus and its service number. Cities in which real time information displays are in service include Birmingham, Leeds, London and Southampton. Consideration should be given to public telephones at key stops, to add to passenger confidence and security. Developer contributions could well be sought for these features along routes serving a development.

The requirements for bus shelters, signs, information and lighting at bus stops are well known. With the introduction of accessible buses under the Disability Discrimination Act 1995, new bus stops should always be accessible to people with a range of disabilities. In particular, they should include space for the ramp or lift that allows passengers in wheelchairs to board buses.

Bus priorities and traffic management to assist buses

7.32 There are a number of traffic management measures that can be used to encourage the greater use of buses by increasing the reliability and speed of services and by improving access to developments. These are described in more detail in the references listed in paragraph 7.2. The aim of bus priorities and traffic management is to achieve a reliability of at least 95% of journeys within three minutes of schedule. Traffic management measures can improve the efficiency of bus services by reducing delays and increasing the average speed of buses. The movement of buses can often be assisted by measures to reduce congestion and improve the flow of traffic in general. Examples are measures to remove through traffic from congested urban streets and to control the indiscriminate parking that reduces the capacity of the street network.

Traffic Regulation Orders

7.33 Delays to buses can be reduced relatively inexpensively by the introduction of Traffic Regulation Orders, which can promote, protect and prioritise bus movements. Their use, however, should he restricted to situations where there is likely to be a high degree of self enforcement. Failure to do this is likely to compromise the success of a particular scheme and place unreasonable demands on Police time. The legislation under which Traffic Regulation Orders can be made is described in the box opposite.

Bus lanes

7.34 With–flow and contra–flow bus lanes are designed to enable buses to move freely, particularly during peak periods. These facilities may be required within a development but, more usually, would be features of the adjacent road network. Bus lanes on existing roads demand some of the limited existing highway space, but in a new development they can be

Traffic Regulation Orders

Highway authorities and some other authorities in Britain are empowered under the Road Traffic Regulation Act 1984 to make Traffic Regulation Orders, to regulate the speed, movement and parking of vehicles and to regulate pedestrian movement. The Highways Act 190, including the amendments made by the Traffic Calming Act 1992, give highway authorities powers to introduce measures which regulate the movement of vehicles, reduce accidents or improve the local environment and which do not require Orders to be made.

The procedures for making Orders are laid down by the Secretary of State and must be observed strictly by the Order-making authority, to avoid legal difficulties. The procedures generally involve consultation on, and publishing of, proposals and the consideration of objections. In some circumstances, public inquiries must (or may) be held. Local authorities also have powers to make Orders, similar to Traffic Regulation Orders, which require the same or a similar procedure to be followed.

Even where an Order is not required, there may still be a statutory requirement to advertise and consult on proposals and to consider objections. Where there is no statutory requirement to do so, it is still advisable to consult widely in the development of a traffic scheme.

Several different regulations specify the procedures for making traffic and parking Orders, under the Road Traffic Regulation Act 1984 (Chapter 4, IHT, 1997). These are:

- The Local Authorities' Traffic Orders (Procedure) (England and Wales) Regulations, 1996;
- The Secretary of State's Traffic Orders (Procedure) (England and Wales) Regulations 1990 which prescribe the procedures that the Secretary of State must use; and
- The Road Traffic (Temporary Restrictions) Procedure Regulations 1992.

All of these regulations specify, in rather precise terms, the procedures which are to be used. There are variations between them for different Order-making authorities and between the procedures required for Orders of different types or purposes, such as permanent, temporary or experimental Orders. There are, however, certain general similarities.

All traffic signs must be in accordance with the current Traffic Signs Regulations and General Directions 1994 (Statutory Instrument 1994 No. 1519) or else be specially authorised by the Secretary of State. Advice on the design and use of traffic signs is given in the Traffic Signs Manual (DOT, 1977a), supplemented by other publications issued by the Department of Transport (DOT, 1994) and Working Drawings for Traffic Signs Design and Manufacture, Volume 1, 1994.

The management of traffic can be achieved through the implementation of a variety of procedures and measures. Some of these will require the making of one or more Orders or other statutory procedures, to permit regulation of traffic, whilst others will not. The 1996 Regulations are intended to be quicker and cheaper to use and easier to understand for Order-making authorities than previous versions while, at the same time, continuing to safeguard the interests of road-users, frontagers and the public at large.

provided when the road is constructed. To promote safe and convenient movement it is recommended that a minimum bus lane width of 4.0m is provided to also accommodate cyclists, where separate cycle lanes cannot be provided.

7.35 Bus lane throughput is a function of bus flow, the number of bus stops and passenger demand at stops, but bus flows and passenger demand do not usually impose capacity constraints on the design of bus lanes. A single–lane bus lane, with normal passenger demand at stops, can cater for about 120 buses/hour, without special measures (NATO, 1976). Above this level, special measures are likely to be necessary, such as provision for overtaking at stops through the use of bus lay–bys or variation in the bus lane width.

7.36 Bus lane operating periods should be determined, primarily, by the times and duration of traffic congestion. Thus, they may be limited to peak periods. Bus lanes which operate all day, say 07:00 hours to 19:00 hours or 24 hours, are more readily understood by other road users and are consistent with a general policy of encouraging public transport. All day lanes materially affect frontage access for loading and off–loading and, where frontage loading requirements are intense, peak period only bus lanes may be unavoidable. Alternative solutions are to use an off–side bus lane with stops located on islands, or to provide a parking lane on the inside of a bus lane, as has been done with the Leith Walk Greenway in Edinburgh.

7.37 Where all day bus lanes exist, the loading issue may be resolved by:

- servicing frontage premises from nearby side streets; or
- loading out of 07:00–19:00 hours ie, not between 7 am and 7 pm; or
- direct frontage service access, notwithstanding the all day bus lane.

7.38 Early in the planning of any bus lane, the views of the police should be sought on both the safety of the proposed measures and their enforcement. Also, any developer contributions for bus lanes should include funds to monitor the effectiveness of the measures.

With–flow bus lanes

7.39 A with–flow bus lane is a traffic lane, usually on the nearside, reserved for the use of buses and other permitted vehicles for all or part of the day, in which the buses operate in the same direction as the general traffic flow (Figure 7.5). It is the most common form of bus priority measure. Pedal cyclists are normally allowed to use with–flow bus lanes, and certain other classes of vehicle, such as coaches and other non–local buses, may also be permitted.

A with–flow bus lane in Reading.
(Courtesy: Reading Transport Ltd).

7.40 With–flow lanes enable buses to bypass traffic queues, usually on the approaches to signal–controlled junctions or roundabouts. This will often mean a substantial time saving to buses and their passengers, possibly offset by some additional delay to the vehicles that have been overtaken. With–flow bus lanes:

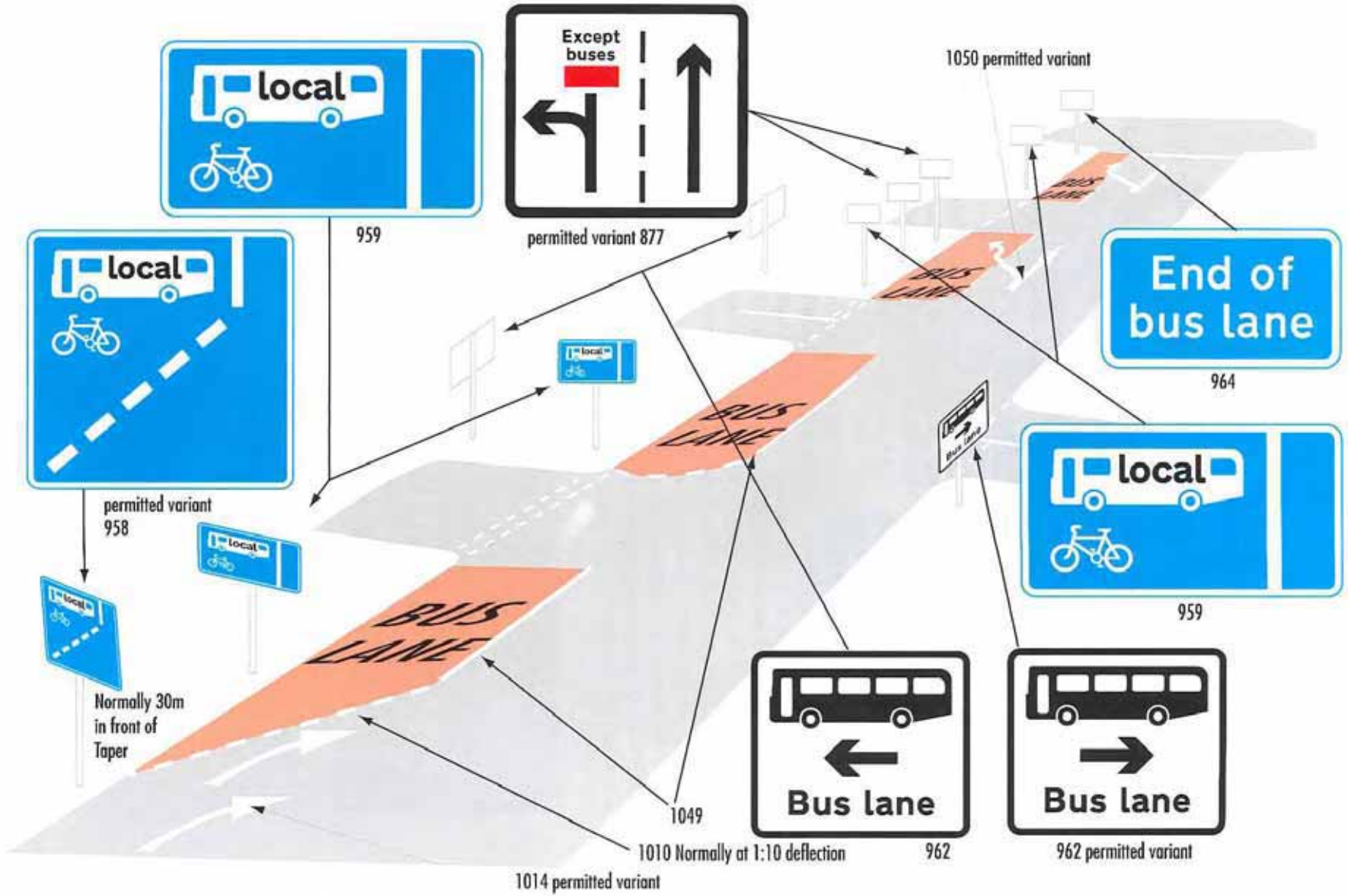


Figure 7.5: Schematic layout of a with–flow bus lane. *Transport in the Urban Environment*, IHT 1997.

- are usually located at the kerbside, in order to serve bus stops, but some off-side bus lanes exist, for example, to assist right-turning buses;
- give buses priority at the locations and times most needed;
- minimise disruption to normal traffic patterns;
- need only be part time, thus allowing reasonable access to frontage properties; and
- are relatively inexpensive to implement, with the capital cost often repaid by benefits in less than one year.

7.41 Bus lanes must start upstream of the end of the predicted traffic queue. Where roads are wide enough the bus lane should be 4.25m wide and the minimum preferred width is four metres; this allows buses to overtake cyclists safely and reduces the risk of interference by traffic in the adjacent lane. The minimum acceptable width, where the alternative is not to have a bus lane, is three metres; in this width of lane, cyclists will delay buses and should not normally be permitted to share the lane. Where there are significant numbers of cyclists, a width of 4.25m to 4.6m is recommended. Above 4.25m, a designated cycle lane (one metre) may also be provided alongside the kerb by carriageway marking.

7.42 Most with-flow bus lanes are terminated before the traffic signal stop-line of a junction. This set-back of the end of the bus lane ensures that the full width of the stop-line is available to all vehicles during the green signal period, so the capacity of the junction is maintained. It also facilitates, and makes safer, left turns. The length of the set-back should allow buses entering from the bus lane to clear the traffic signal stop-line on the first available green phase (sections 24.6 to 24.8, IHT, 1997). A shorter set-back may be used if the junction is not the constraint on the route capacity or if the bus lane continues downstream of the junction. In these cases, a short set-back will allow the left lane to be used for left turns and buses only. Theoretical investigations suggest that at the approach to a roundabout the optimal set-back is between 10m and 30m.

SuperBus in Leeds. The guideway in the central reservation acts as a self enforcing bus lane and gives priority at the next junction. *(Courtesy: Leeds City Council and First Group).*

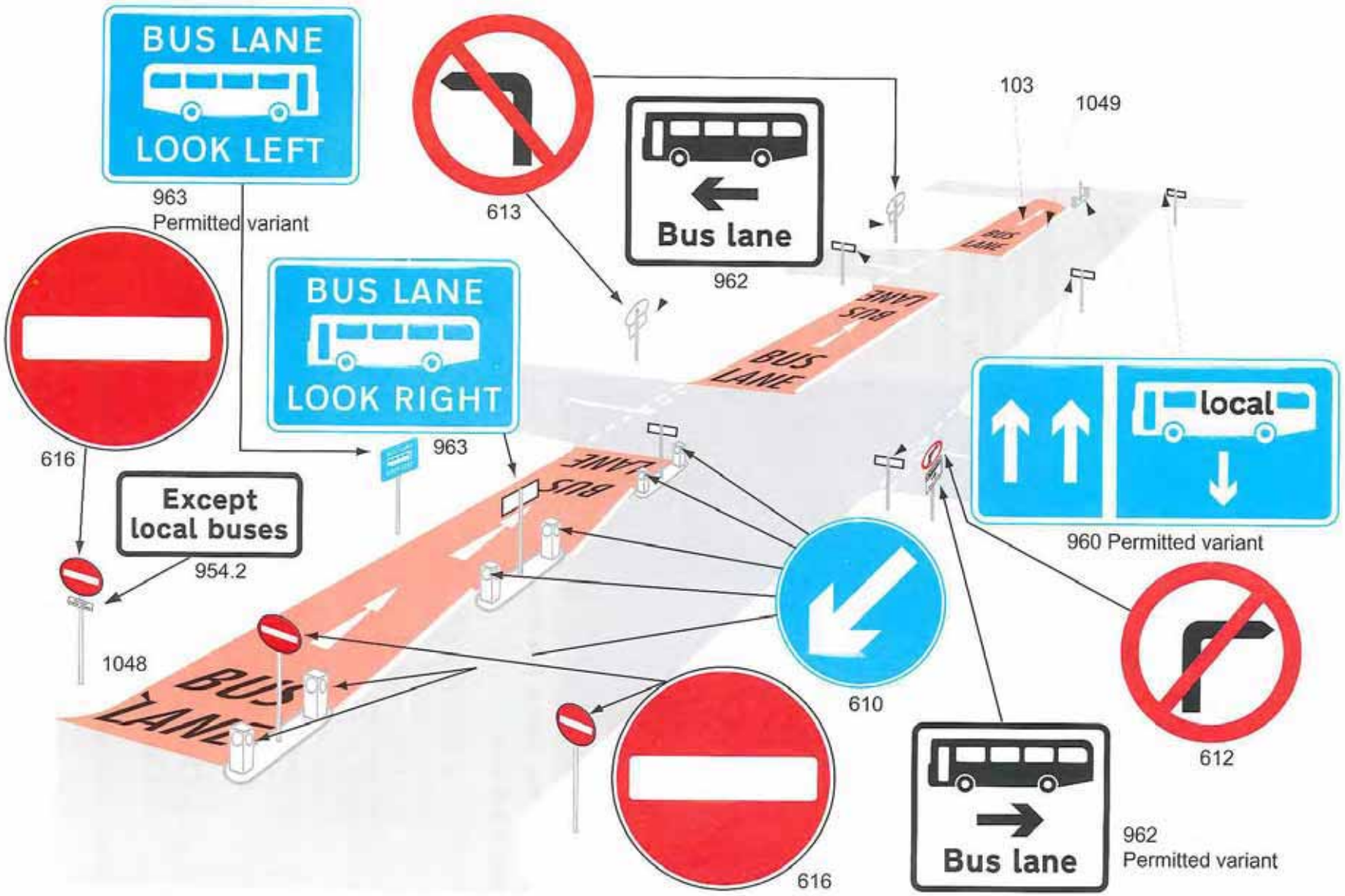


Fig 7.6: Schematic layout of a contra–flow bus lane. *Transport in the Urban Environment*, IHT 1997.

7.43 A with-flow bus lane may be extended up to the signal stop-line under four conditions:

- if a reduction in the traffic capacity of the junction is acceptable, as part of a traffic restraint strategy for the area;
- if the junction is not the critical constraint on the capacity of the route;
- if safe provision can be made for left-turning traffic; and
- if right-turning traffic can be accommodated in such a way that it does not restrict flow in the other non-priority lane(s).

Bus lane, Hyde Park. *(Courtesy: Traffic Director for London).*

7.44 With-flow bus lanes are separated from other traffic by carriageway markings comprising a solid white line 250 mm–300mm wide. Signs and road markings must convey sufficient information to drivers to enable them to obey the regulations applying to the scheme. The signs and road markings to be used are described in *Keeping Buses Moving* (DETR, 1997) and *Transport in the Urban Environment* (IHT, 1997), and are summarised in Figure 7.5. The application of coloured road surfacing also assists with compliance.

Contra-flow bus lanes

7.45 A contra-flow bus lane is a traffic lane reserved for the use of buses travelling in the direction opposed to the general traffic flow (Figure 7.6). Contra-flow lanes operate on a 24 hour basis (section 24.7, IHT, 1997). Contra-flow bus lanes are usually introduced in area wide one way traffic systems, where the effect is to create a two way road with buses only in one direction and all types of vehicle, including buses, in the other. Contra-flow lanes enable buses to maintain direct routes and thus save time and improve access for buses to business and shopping areas. The main characteristics of contra-flow bus lanes are:

- buses follow the same route on outward and return journeys in one-way systems;
- savings are achieved in bus kilometres and bus hours;
- reduced walk times for bus passengers; and
- if well-signed, they are easily understood and respected by other drivers.

7.46 A contra-flow bus lane will have particular road safety implications, which must be considered. Pedestrian crossing facilities and pedestrian protection, such as short lengths of guardrails to channel pedestrians to suitable crossing facilities, may be necessary.

7.47 Contra-flow bus lanes should be separated from the rest of the carriageway by a continuous island or a series of long islands. While physical separation ensures that other vehicles do not enter the lane, it may introduce potential difficulties, such as:

- reducing the perception by pedestrians of two way operation;
- causing tracking damage to the road surface if the lane is narrow;
- creating difficulties for buses having to take avoiding action in emergency or breakdown; and
- creating difficulties for loading/unloading to frontage premises.

Alternatively, contra-flow lanes may be separated from other traffic by a solid white line, 250mm–300mm wide, supplemented by traffic islands and/or double white lines with hatching between them. Coloured surfacing reinforces the special nature of the lane.

7.48 Contra-flow bus lanes that are for buses only should be 3.0–3.25m wide. Cyclists may be permitted to use contra-flow bus lanes, in which case a lane-width of 4.0–4.25m should be provided (IHT *et al*, 1996). Experience shows that pedal cyclists are safe in the bus lane, but can have a high accident risk at the ends of the lane if proper interfaces with the general traffic are not provided. If cyclists are permitted to use a contra-flow bus lane, then either a separate cycle gate must be provided, or all motor vehicles could be prohibited with an exemption for buses and cycles.

A contra–flow bus lane, separated by islands and road markings.
(Courtesy: Reading Transport Ltd).

7.49 If traffic flow in the opposing direction is heavy, and if loading is allowed in the lane, it may be difficult and unsafe for buses to overtake stationary vehicles. In these circumstances, possible remedies include:

- a double width contra-flow bus lane;
- servicing from nearby side streets;
- delivery vehicles permitted to park, whilst loading/unloading, along the off-side kerb of the bus lane, where it is physically segregated or partly segregated; and
- the provision of loading-bays, within the curtileges of buildings fronting the contra-flow lane.

Particular care is needed at pick-up points on a contra-flow bus lane and special traffic islands may be required.

Bus priority at junctions

7.50 Buses can be given priority at road junctions, by permitting buses to make turning movements prohibited to other traffic, by giving priority to flows containing a high proportion of buses, or by adjusting signal controls when a bus is detected in the traffic stream (DOT, 1977b). Allowing buses to make turns prohibited to other traffic can give buses advantages, as journey distance can then be shorter than for other traffic. Clear signs are necessary to prevent other vehicles making the turns intended for buses only. Keeping Buses Moving (DETR, 1997) gives details of the signs required.

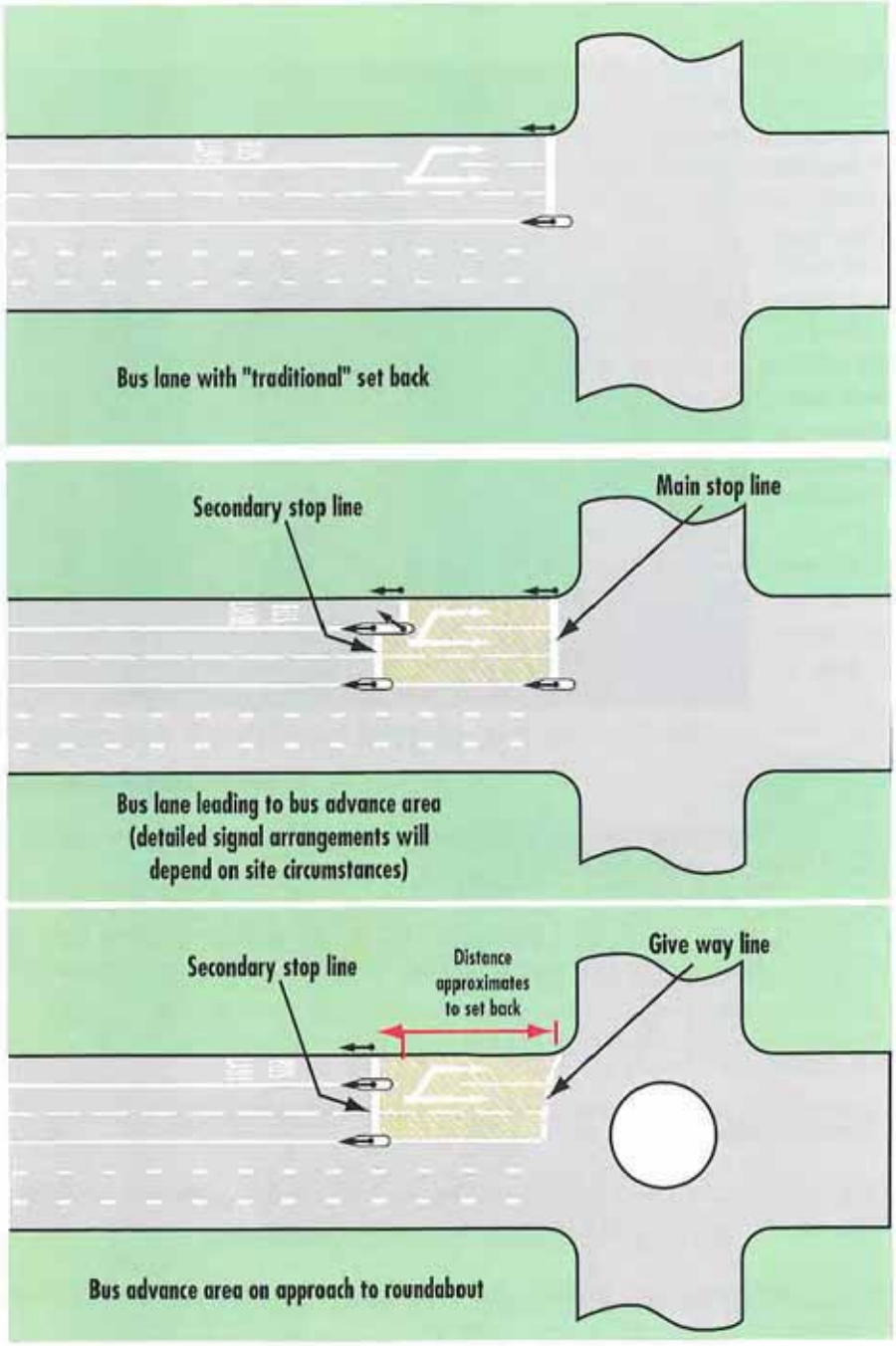


Fig: 7.7: Bus advance areas at a signal controlled junction and a roundabout.
Source: *Keeping Buses Moving*, DETR 1997.

Bus priority at traffic signals

7.51 Buses can be given priority at traffic signals by making signals respond to the arrival of a bus using a Selective Vehicle Detection (SVD) system. Buses fitted with transponders can communicate with the traffic signal controller. The transponder is interrogated either via a roadside beacon or detector loop buried in the road and a coded signal is sent to the signal controller. As buses approach the signals, the traffic signal timings can be altered in their favour. Where buses are turning right, they can call the next stage of the signal cycle, enabling that bus to make the turn. SVD for buses has been applied, for example, in Oxford and Swansea, linked to SCOOT (the computer system that optimises the timing of traffic signals over an urban area).

7.52 A system using automatic vehicle location (AVL) and signal priority is outlined in the box. This requires more expensive bus equipment but offers lower roadside costs, which makes it easier to extend the coverage of the system. It also provides continuous vehicle location for use in real time information systems.

Measures that do not require bus detection

7.53 A "Bus–Advance Area" (see Figure 7.7) permits buses to advance into an area of road, clear of traffic, before a signal–controlled junction. Pre–signals, in advance of the junction, control traffic entry to the advance area, with a bus lane provided up to the pre–signals. The objective of the pre–signals and advance area is to re–order vehicles, so that buses reach the junction first. The maximum traffic throughput of the junction is unchanged.

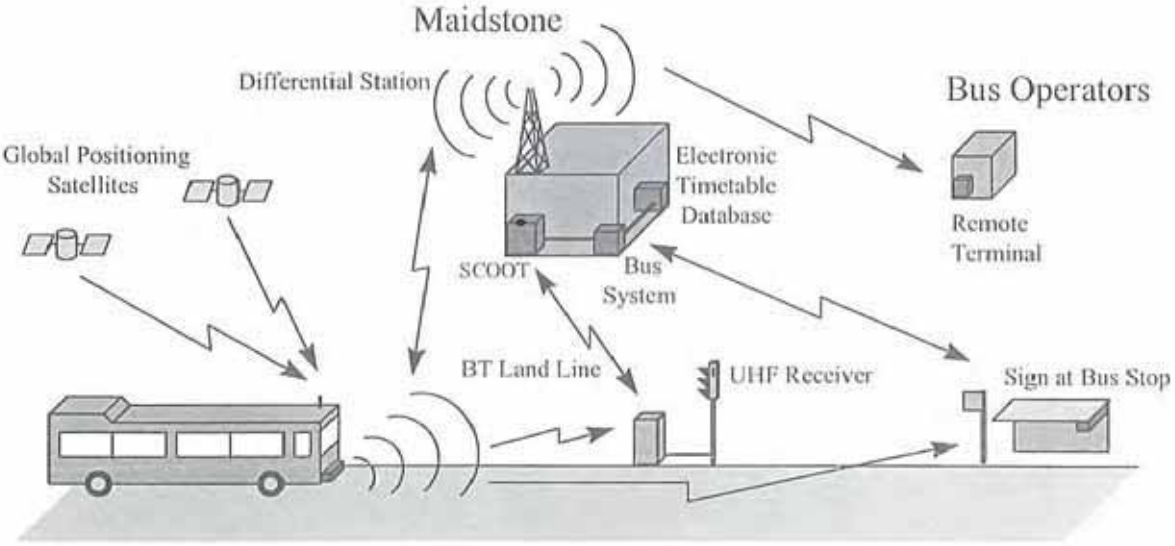
7.54 The bus lane to the pre–signal enables buses to overtake the traffic queue. When the pre–signal is red for other traffic, buses may proceed to the main junction signal, taking their preferred lane in the advance area. The bus lane may enter the advance area with no control, or be subject to a "give way", or be signal controlled. Pedestrian crossings can be incorporated, with a separate bus lane stop–line, although this is not generally favoured (IHT, 1997).

7.55 Shortly before the junction signal turns green, general traffic is released from the pre–signal and enters the advance area (if there is space) to make full use of the green time at the junction. The benefits of schemes of this type are high and scheme costs can often be recovered in less than one year (Astrop *et al*, 1994). The concept can be extended to provide a

This bus lane allows buses onto a roundabout ahead of other traffic. *(Courtesy: Reading Transport Ltd).*

INTELLIGENT BUS PRIORITY IN KENT

Improvements in urban traffic flow, reduction of congestion and increased use of public transport are high on Kentís traffic management policy agenda. Intelligent bus priority is being developed as an integral part of this policy to promote the use of buses as an alternative to the private car. Intelligent bus priority involves fitting buses with Global Positioning Satellite (GPS) location devices and on board computer and transmission systems to allow priority through the network. Kent is the first UK Highway Authority to apply this innovative combination of satellite location and priority. The system is of most benefit in compact urban areas where there is little scope for carriageway widening to provide dedicated bus lanes, but passengers in rural areas can also benefit through the real time passenger information available.



Bus location. The GPS system in conjunction with the differential station allows the bus to pinpoint its location speed and direction at any given time. This information is then transmitted to the control centre and bus operators for information and necessary action. It is the basis for real time information for passengers at bus stops.

Bus Priority. Knowing its location and the distance to the next signalised junction, the bus can accurately calculate the approach time. At the appropriate point it sends this information to the UHF receiver at the signalised intersection, and the SCOOT traffic computer revises the signal timings to ensure the bus is not delayed.

Passenger Information. As with priority, the bus is able to send approach time information to signs at bus stops directly or via the control centre. Digital display boards at the stops are able to inform waiting passengers when buses are due.

Electronic Timetable Database. It will not always be necessary to grant a bus priority at a junction because it may not be running behind schedule. In order that the bus and junction controller are able to determine whether a priority call is required, the systems will be linked to an electronic timetable database which provides the scheduled arrival times at all bus stops. This will ensure that other road users are not delayed unnecessarily as a result of a bus priority call.

Kent County Council, 1998

segregated lane for buses right up to the signal stop-line of the junction. In this case, overall junction capacity will generally be reduced. The bus lane must be long enough to enable buses to enter the lane freely to overtake the whole traffic queue.

7.56 Traffic metering, also termed queue relocation, involves a bus lane to the first of two or more stop-lines in a congested section of road. This alters the volume of traffic which can enter the congested section. Traffic metering causes traffic to queue at the upstream stop-line so that it, rather than the downstream junction, becomes the capacity limit for the road link. The bus lane enables buses to by-pass the relocated traffic queue. Traffic metering is a way to provide priority for buses over a congested route section where there is not space for a bus lane.

7.57 The technique of combining bus-advance areas and pre-signals with traffic metering is particularly applicable on approaches to town centres where, because of constraints such as narrow roads and loading requirements, bus lanes cannot be introduced. The Uxbridge Road/Park View Road (Southall) scheme in Ealing has shown significant reductions in journey times (London Borough of Ealing, 1995).

Bus advance area. Islington. *(Courtesy: Traffic Director for London).*

Priority measures for buses are essential for reliable bus services in congested areas. These include bus lanes, the design of junctions to bring buses to the front of traffic queues and operating traffic signals to give buses priority over other traffic. The techniques are well known and may need to be planned for when the road system of a development is being designed in detail. Bus priorities can reduce the running time of buses, reduce the cost of providing a service and make services more attractive.

Bus-only streets and links, and bus gates

7.58 A bus-only street is a section of road for the use of buses only. It may allow buses to take a more direct route than other vehicles, for example between a new housing area and the existing road network, it may be a pedestrianised street in a town centre or it may allow buses to by-pass congested junctions. The use of a bus-only street in a town centre is, typically, restricted solely to buses, although limited access by other categories of vehicle, such as taxis,

may be allowed or the street may be open during limited time periods for servicing (IHT, 1997).

7.59 Bus–only streets allow buses to maintain their routes where road systems have changed. Services can continue to provide access to business, residential and shopping areas, where such access may be denied to other vehicles. Bus–only streets or links usually require a bus gate (see para 7.62) at the point(s) of access, to ensure compliance by other vehicles.

7.60 Pedestrians often share bus–only streets and the bus track should be emphasised by the use of different levels or materials or colours to enhance pedestrians' awareness and safety. Their alignment should discourage high speeds (James *et al*, 1991); for effective space sharing with pedestrians, bus speeds need to be kept below 15km/h (nine mph). Kerbs are not necessary but low kerbs may be considered to facilitate drainage on curved alignments and, at stops, to prevent buses overrunning and to help passengers boarding and alighting. The DETR Mobility Unit advocates a 25mm kerb upstand, except at crossing points, along all shared use roads, to assist blind persons. Care is needed to avoid creating a tripping hazard with a small upstand, for example by use of colour contrast.

7.61 Bus–only links should not cause loading problems, since they are generally purpose–built without frontage access. However, for bus–only streets in existing shopping areas, servicing is a key planning constraint. The conventional solutions apply, ie, access limited to certain specified times of day and provision of facilities in nearby side roads or at the rear of premises.

Bus gates

A bus gate with a physical obstruction to stop violations by cars.
(Courtesy: Reading Transport Ltd).

7.62 Short lengths of bus–only street are sometimes referred to as bus gates. Short, standard width, sections of road protected only by signs have been used; violation rates are often high at such installations. Narrowing the road to the width of one vehicle in the bus gate itself, using a different colour for the road surface and/or installing calming features can improve compliance.

Bus gates (supplemented by Traffic Regulation Orders) can be designed to prevent vehicles other than buses from driving along a length of highway (Figure 7.8). These could be traffic signals, actuated by the buses, or physical barriers, surmountable only by buses and emergency vehicles, or signs, such as "No Entry Except Local Buses", often coupled with local road narrowing. Rising bollards, activated by a transponder on the bus, are effective.

Bus only links and bus gates allow buses to follow more direct routes and provide services that are more attractive to passengers. They enable unwanted traffic to be kept out of areas which it is necessary to serve by bus.

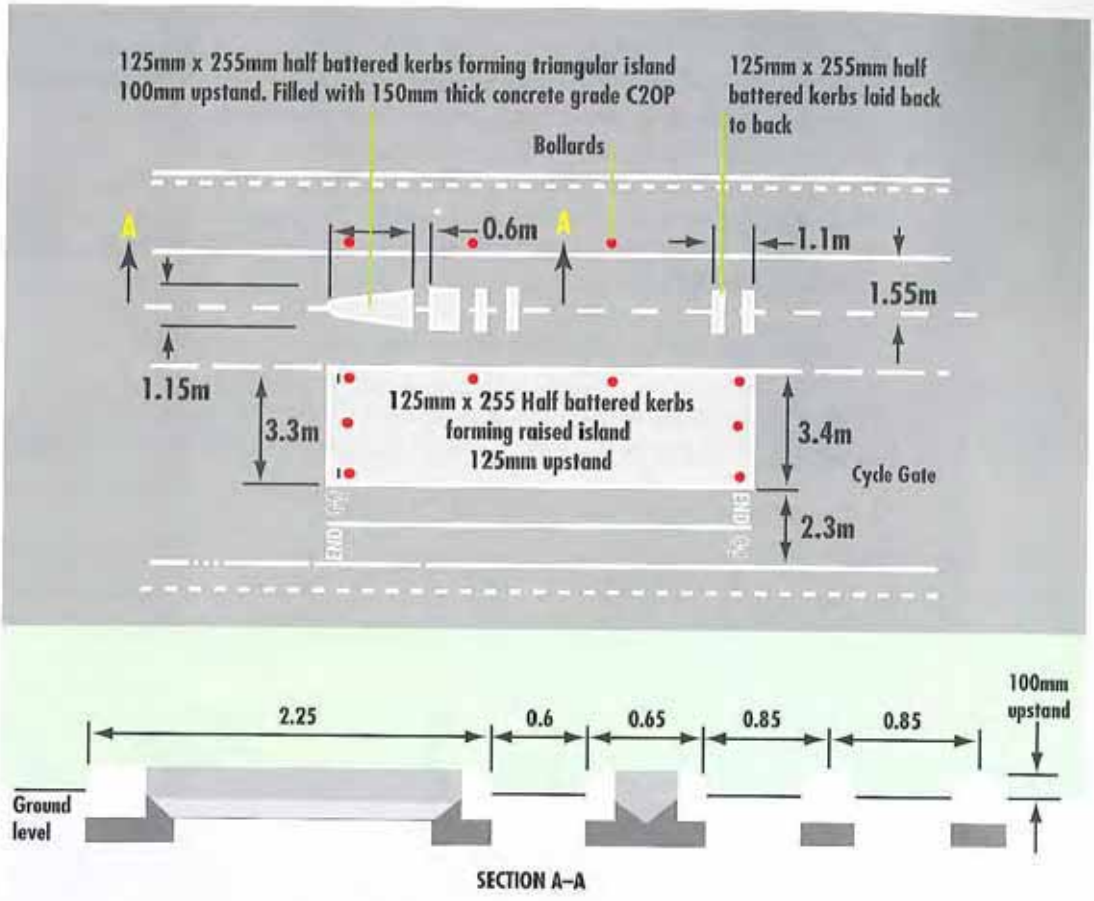


Fig: 7.8: A bus gate that physcially prevents access by light vehicles.
Source: *Better Buses*, GMPTE 1992.

Traffic calming

7.63 Traffic calming covers a range of techniques designed to reduce the adverse effect of traffic. Traffic calming features have been and are continuing to be introduced into many areas, particularly residential streets, to improve the environment and reduce accidents by lowering vehicle speeds (IHT, 1997). Traffic calming schemes should not be designed in isolation but as part of an overall transportation strategy for an urban area. Bus stops themselves can provide an element of traffic calming, where roads are too narrow for traffic to pass a stopped bus or where bus boarders are used at stops.

7.64 Traffic calming schemes affect bus operations and should be developed only after consultation with passenger transport bodies, bus operators, the police and the emergency services. The control of speed can be achieved by a wide variety of measures, including road narrowing, mini-roundabouts, large central islands, horizontal deflections caused by chicanes and vertical deflections caused by humps and cushions. Horizontal deflection devices are often less effective than vertical deflections, particularly in light traffic conditions. Nevertheless, horizontal deflection devices are preferable to vertical deflection devices on bus routes (CSS *et al*, 1997). Research on traffic calming in progress for DETR at the end of 1998 may in due course provide more detailed guidance on what calming devices are most suitable in particular circumstances.

7.65 If vertical deflections have to be used, CSS *et al*, (1997) propose the following guidelines:

- vertical deflections should only be used when they can be shown to be the only effective measure at the site concerned;
- speed cushions are preferable to full width humps on bus routes;
- ramp gradients for speed cushions should not exceed 12% and side ramps should not be steeper than 25%;
- if used, road humps should be the extended flat top type;
- the plateau length should not be less than the longest wheelbase of any public service vehicle likely to use the route, usually eight metres, with a six metre minimum length;
- the hump height should not exceed 75mm; and
- the ramp gradient generally should not exceed 1 in 15.

The importance of complying with these guidelines has been increased by the introduction of low-floor buses.

Where traffic calming has to use vertical displacement devices, speed cushions are preferable to road humps. *(Courtesy: Reading Transport Ltd).*

7.66 The DETR Traffic Advisory Unit has issues Traffic Advisory Leaflets covering many aspects of traffic calming. The box lists a number of these. Leaflet 3/98 *Traffic Calming Bibliography* lists the complete set of leaflets, Transport Research Laboratory Reports on traffic calming and other relevant DETR publications.

7.67 Care must be taken to ensure that proposed traffic calming schemes do not discourage bus services, particularly where commercial operations are provided. Buses need to be able to negotiate their routes safely at a reasonable operating speed, despite traffic calming. Bus operators may be deterred from servicing routes with road humps, because of the risk of damage to the underside of vehicles and, possibly, the risk of industrial injuries to drivers caused by the humps. An even greater potential danger is the possibility of grounding of some vehicles. In addition to effects on vehicles and staff, road humps can reduce ridership on a bus route because of the uncomfortable ride for passengers.

7.68 Powers to construct traffic calming measures are detailed in The Traffic Calming Act 1992, which amended the Highways Act 1980, by the addition of sections 90G, 90H and 90I, which

allow works to be carried out for the purposes of promoting safety or preserving or improving the environment through which the highway runs. Other powers contained in Part V of the Highways Act 1980 include those under sections 64 (roundabouts), 68 (pedestrian refuges), 75 (variations in relative width of carriageways and footways) and 77 (alteration of the level of a highway). The Highways (Traffic Calming) Regulations 1993 (Statutory Instrument 1993 No. 1849) and The Highways (Road Humps) Regulations 1996 (Statutory Instrument 1996 No. 1483) also apply in England and Wales. In Scotland, the appropriate legislation is the Roads (Scotland) Act 1984 and the Road Humps (Scotland) Regulation 1998 (SI 1998 No 1448 (S.74)). Guidance on traffic calming and buses has been published jointly by CSS, CPT and ATCO (CSS *et al*, 1997).

7.69 Standing passengers, particularly the elderly or mobility impaired and passengers carrying shopping, are at risk of falling when a small bus traverses a road hump or a chicane (GMPTE, 1992). Much depends on the way the bus is driven. Vehicles with air suspension systems provide a smoother ride when traversing road humps.

Traffic calming, if not well designed, can cause serious problems for bus operators and make services less attractive to passengers. Well designed schemes can reduce congestion on the bus route and allow better services to be operated. Discomfort for drivers and passengers, and damage to vehicles, must be avoided. The references cited in this chapter show how the adverse effects of traffic calming on buses can be minimised.

Traffic Advisory Leaflets on Traffic Calming

The following leaflets are available tree of charge from Traffic Advisory Unit, Driver Information and Traffic Management Division, Department of the Environment, Transport and the Regions, Zone 2/23, Great Minster House, London SW1P 4DR.

Leaflet No	Date	Title
3/93	May 1993	Traffic Calming – Special Authorisations
7/93	August 1993	Traffic Calming Regulations
12/93	November 1993	Overrun Areas
3/94	October 1994	Fire and Ambulance Services – Traffic Calming: A Code of Practice
4/94	October 1994	Speed Cushions
9/94	December 1994	Horizontal Deflections
7/95	November 1995	Traffic Islands for Speed Control
1/96	January 1996	Traffic Management in Historic Areas
2/96	April 1996	75mm High Road Humps
6/96	May 1996	Traffic Calming: Traffic and Vehicle Noise
7/96	June 1996	Highways (Road Humps) Regulations 1996
1/97	February 1997	Cyclists at Road Narrowings
12/97	December 1997	Chicane Schemes
1/98	February 1998	Speed Cushion Schemes
3/98	February 1998	Traffic Calming Bibliography

References

Astrop AJ, and Balcombe RJ (1994) *Performance of Bus Priority Measures in Shepherd's Bush* TRL Report, Department of Transport, Transport Research Laboratory, Crowthorne.

Barham P, P Oxley and T Shaw (1994) *Accessible Public Transport Infrastructure* Mobility Unit, Department of Transport and the Passenger Transport Executive Group, Department of Transport, London.

Balog JN, D Chia, AN Schwartz and RB Gribbon (1992) *Accessibility Handbook for Transit Facilities* FTA Report FTA–MA–06–0200–92–1, Federal Transit Administration, US Department of Transportation, Washington DC.

City of Edinburgh Council (1997) *Guidelines on the Siting and Layout of Bus Stops and Shelters* Public Transport Department, City of Edinburgh Council, Edinburgh.

CPT (1997) *Bus and Coach Issues for Local Authorities* Confederation of Passenger Transport UK Ltd, London.

CSS, CPT and ATCO (1997) *Traffic Calming and Buses – Guidance Notes* County Surveyors' Society, Confederation of Passenger Transport UK Ltd, Association of Traffic Co-ordinating Officers; Confederation of Passenger Transport UK Ltd, London.

DETR (1997) *Keeping Buses Moving* Local Transport Note 1/97, Department of the Environment, Transport and the Regions, HMSO, London.

DETR (1998) *Places, Streets and Movement – A Companion Guide to Design Bulletin 32*, Residential roads and footpaths Department of the Environment, Transport and the Regions, HMSO, London.

DOT (1977a) *Traffic Signs Manual* Department of Transport, HMSO, London.

DOT (1977b) *Bus Priority at Traffic Signals Using Selective Detection* Department of Transport Technical Memorandum H2/77, Department of Transport, London.

DOT (1981) *Traffic Signs Regulations: General Directions* Department of Transport, London.

DOT (1986) *Shared Use by Cyclists and Pedestrians* Tocal Transport Note LTN 2/86, Department of Transport, London.

DOT (1994) *Traffic Signs, Signals and Road Markings Bibliography* Traffic Advisory Leaflet 8/94, Department of Transport, London.

DOT (1996) *Better Information for Bus Passengers* Department of Transport, London.

DPTAC *Legibility of Timetable Books and Leaflets* Disabled Persons Transport Advisory Committee, Department of the Environment, Transport and the Regions, London.

GMPTE (1992) *Better Buses – Good Practice in Greater Manchester* Greater Manchester Passenger Transport Executive for the Association of Greater Manchester Authorities, Manchester.

HMRI (1997) *Railway Safety Principles and Guidance. Part 2, Section G, Guidance on Tramways* Health and Safety Executive/Her Majesty's Railway Inspectorate, London.

IHT (1991) *Reducing Mobility Handicaps* The Institution of Highways & Transportation, London.

IHT (1997) *Transport in the Urban Environment* The Institution of Highways & Transportation, London.

IHT *et al* (1996) *Cycle–Friendly Infrastructure* The Institution of Highways & Transportation, London.

James N, A Jessop and J Roberts (1991) *Space sharing* TEST Report No. 92. Transport and Environmental Studies, London.

LBPNSG (1995) *Guidelines for the Design of Bus bays and Bus Stops to Accommodate the European Standard (12m) Length Bus* London Bus Priority Network Steering Group, London Transport, London.

London Borough of Ealing (1995) *Park View Road Pre–Signals – Before and After Study* London Borough of Ealing, London.

NATO (1976) *Bus Priority Systems* NATO CCMS Report No 45, Transport and Road Research Laboratory, Crowthorne.

Tarrant D (1996) *Electronic Systems to Assist Transportation Issues* In Intelligent Transport Systems Supplement, June 1996, *Highways & Transportation*, Vol. 43, No 06, The Institution of Highways & Transportation, London.

CASE STUDY

LEEDS GUIDED BUS

The project

The Leeds Guided Busway project is one of several public transport initiatives supported by the Leeds Transport Strategy which was developed in 1991/92 from technical studies and extensive public consultation. The objectives of the project have been to provide more reliable, quicker and more comfortable bus service on the A61 Scott Hall Road corridor.

Between 1995 and the start of 1998, Leeds City Council installed three sections of guideway, totalling 1,100m in length, along the A61 Scott Hall Road. Guideways have been built in the central reserve of the dual carriageway and in the side verge. Each section of guideway ends at a light controlled junction. Closer to the city centre a 550m section of contra-flow bus lane on the approach to a bus-gate provides a direct priority link to the central core of the city.

Buses fitted with guide wheels are able to make use of a self-enforcing priority system to by-pass traffic queues without causing further delays to other traffic. The buses are new low-floor single deckers, marketed as "SuperBus".

A fourth section of guideway 400m long opened in July 1998, together with a 157 space park and ride car park. Along the corridor there are also plans for a 250m bus lane, selective bus detection and an additional park and ride.

Leeds City Council and First Group.

Technical details

The size and shape of the busway is the same as the O-Bahn Busways in Essen and Adelaide, but the application has been specially developed for Leeds. The busway consists of twin 250mm running tracks with grass or gravel between them and precast guide kerbs.

CASE STUDY

Buses need to be fitted with small guide-wheels ahead of the front wheels, attached to the steering arms. Even with guide-wheels fitted, buses can travel safely on the normal highway. As the bus approaches the guideway, the driver steers into a funnel section and this adjusts the path of the bus smoothly into the guideway proper.

A vehicle detector on the guideway prompts a traffic signal controller to give a green signal to the bus by the time it arrives at the end of the guideway, and a brief red signal for general traffic. The bus leaves the guideway ahead of the queue and progresses through the junction in the normal way.

Buses on the guideway provide level boarding. On the highway, stops served by guided buses can be modified to reduce the step height.

Monitoring

The bus operator reported patronage increases of over 40% after the first two sections of guideway, 60% after two years and recently 85%. Time saving per morning peak journey was 10 minutes on a 30 minute journey with two sections of guideway and the contra-flow bus lane into the city centre.

Twenty-nine percent of passengers were not using the service before SuperBus was introduced, with 11% previously using a car. Frequency, comfort and speed were the aspects of service felt to be most improved. With two sections of guideway, the scheme had removed about 500 car journeys per week.

Partnership

The project was developed from its outset as a partnership between Leeds City Council, West Yorkshire Passenger Transport Executive (Metro) and the private bus operators. Leeds City Link operate the services with a team of specially trained drivers.

Leeds City Council

Annex A – Developer's Checklist

(Numbers in brackets refer to the appropriate paragraphs in the Guidelines)

Conceptual planning

Development brief prepared. (1.75, 5.39).

Discuss with planning authority (District or Borough Council, or unitary authority, whether the development is consistent with the Structure Plan or Unitary Development Plan. (1.65)

Discuss with highway authority (county or borough council, or unitary authority, for local roads; Highways Agency for trunk roads, including motorways, in England; Welsh Office or Scottish Development Department respectively for trunk roads in Wales and Scotland) what improvements to the highway network will be needed to handle traffic generated by the development. (1.48, 1.83)

Discuss with the Passenger Transport Executive, or the Transport Co-ordinating Officer of the county or borough council or unitary authority, whether the development can be served by existing public transport routes, whether extensions or diversions to existing routes might be appropriate or whether a new service could be justified. Also discuss the outline locations of parts of the development within the site for ease of access by public transport. (1.49 to 1.52, 1.82, 5.5)

Can other developments be located to generate extra public transport ridership, or can the public transport be routed through existing developments to produce extra ridership? (1.75 to 1.79)

Discuss with planning authority possible Developer Contributions that may be required under Section 106. (5.52 to 5.57)

Is land reclamation or earth-moving involved? If so, discuss implications for public transport access with the Passenger Transport Executive or Passenger Transport Co–ordinating Officer. (1.41)

Outline planning

Public transport supply

Has liaison been established with Passenger Transport Executive/local authority Transport Co–ordination Officer? (6.4)

Has traffic implications been discussed with highway authority? (6.4)

Map and list public transport services near the proposed development. Can any serve the development:

i. without modification?

ii. by diverting or extending an existing service?

If a new or modified service is required, has its commercial viability been established by discussion with the PTE/TCO? (2.20 to 2.25)

Layout (developments served by bus)

Will the bus service proposed be attractive to users of the development? (6.5 to 6.15)

Are the entry and exit points for the development compatible with the local bus network? (6.9)

Does the proposed road layout allow buses a direct route through the development? (6.8 to 6.14)

Can buses enter and leave the development without traffic delays? If not, consult the highway authority on junction designs and bus priority measures to avoid delays. (6.42, 7.32 to 7.57)

Check bus stop locations for operational efficiency and safety. Conduct initial safety audit of bus stop locations and links to surrounding highways. (6.27 to 6.31)

Does the bus route terminate in the development? If yes, has a bus turning point and standing place been provided? (6.32 to 6.35)

Does the footpath network feed directly to bus stops? (6.3, 6.5, 6.16, 7.8)

Are entrances to buildings close to bus stops? If not, can building locations or orientations be changed to improve access? Are any destinations more than 400m from a bus stop? Are car parks between bus stops and final destinations? (6.20 to 6.26)

Can passengers get to and from bus stops without crossing major roads? If not, are safe crossing facilities provided? Initial safety audit of pedestrian routes. (6.24, Fig 6.7)

Has space been left for accessible bus stops and bus shelters? (7.10 to 7.14, 7.22 to 7.28)

Layout (developments served by rail)

Will there be a rail station within the development? If yes, has development been discussed with the Rail Regulator, Railtrack and the local Train Operation Companies (contact through the PTE or TCO)? (1.55 to 1.62)

Will the train service proposed be attractive to users of the development?

Does the footpath network feed directly to the station? (6.3, 6.5, 6.16, 7.8)

Are entrances to buildings close to the station? If not, can building locations or orientations be changed to improve access? Are any destinations more than 800m from the station? Are car parks between the station and final destinations? (6.20 to 6.26)

Can passengers get to and from the station without crossing major roads? If not, are safe crossing facilities provided?

Is parking required at the station to attract other passengers to improve the viability of the train service?

Developer's contributions and general

What Developer's Contributions will be required under Section 106? (5.52 to 5.57)

Conduct initial accessibility audit of footpaths, bus stops and/or railway station for the Disability Discimination Act 1995. (7.7, 7.24)

Detailed planning

Developments to be served by bus

Does road network provide space for buses?

i. Lane width 3.65 m on bus routes (but see 6.53 to 6.60 for residential developments).
ii. Space for swept path at junctions. (Figures 6.10 and 6.11)
iii. Turning point for terminating bus services. (6.32 to 6.35)
iv. Standing space for terminating buses. (6.32 to 6.35)
v. Space for any bus priority measures. (7.32 to 7.57)
vi. Road structure strong enough for axle loads of buses. (11.5 tonne)

Bus stops

i. Will bus stops be needed or will bus service be "hail and ride"? (6.23)
ii. Confirm stop locations are close to final destinations for passengers.
iii. Check stops are not isolated, windswept, near waste ground or other open space that would be perceived as hazardous by passengers.
iv. Can buses use stops without being delayed by other traffic?
v. Do stopped buses pose hazards for other traffic?
vi. Is it possible to use bus boarders or kerb-side stops? Are bus bays inevitable?
vii. Sight lines for buses and other traffic .(6.27)
viii. Safety audit of bus stop location and design.
ix. Drainage designed to minimise puddling at bus stops. (7.15 to 7.17)
x. Kerb height 125mm at bus stops. (160–180 mm at bus boarders)

Bus stop furniture

i. Can bus stop flag be mounted on lamp standard or bus shelter? (7.25)
ii. Check with PTE or TCO for preferred type of shelter, and possibility of free supply by advertising company. (7.28)
iii. Check footway width two metres minimum past the shelter. (7.22)
iv. Check space for ramp or lift from accessible bus. (7.24)
v. Check street lighting satisfactory for stop. (7.25)
vi. Check planned provision of information at stops. (7.29 to 7.31)
vii. Name of stop visible to passengers within the bus? (7.29)

Footpaths

i. Check routes from buildings to stops are direct and less than 400m.
ii. Check footpaths well overlooked with good sightlines for users.
iii. Check footpath lighting.
iv. Check footpath gradient preferably not steeper than five percent.
v. Footpath surfacing prevents puddling; cross-fall or camber of two percent for drainage.
vi. Footpath width two metres, with narrowest pinches at obstructions not less than one metre.
vii. Check signage for pedestrians to and from bus stops.
viii. Possibility of shelter from weather along footpaths.

Pedestrian safety

i. Check safety of pedestrian crossings at all major roads.
ii. Conduct safety audit of pedestrian travel in development.

Traffic management

i. Do buses require priority measures within the development? If yes, identify problems needing solution, list possible measures to solve problem, select most appropriate solution. (7.32 to 7.57)
ii. Ensure space is available for priority measures.
iii. Do buses require priority measures entering or leaving the development? If yes, liaise with highway authority to identify problems needing solution, list possible measures to solve problem, select most appropriate solution.
iv. Do local buses carry transponders? Check with PTE/TCO to ensure systems on development compatible with any local equipment(7.51)
v. Are traffic management measures needed to discourage car use? (7.58 to 7.62)

Bus service

i. Contact local bus operator through the PTE or TCO. Agree service to be provided when development occupied and timetable for service introduction.

General

i. Audit accessibility of footpaths, bus stops and planned bus services.
ii. Check plans for public transport information in buildings on development.

Developments to be served by rail

Footpaths

i. Check routes from buildings to station are direct and less than 800m.
ii. Check footpaths well overlooked with good sightlines for users.
iii. Check footpath lighting.
iv. Check footpath gradient preferably not steeper than five percent.
v. Footpath surfacing prevents puddling; cross-fall or camber of two percent for drainage.
vi. Footpath width two metres, with narrowest pinches at obstructions not less than one metre.
vii. Check signage for pedestrians to and from station.
viii. Possibility of shelter from weather along footpaths.

Pedestrian safety

i. Check safety of pedestrian crossings at all major roads.
ii. Conduct safety audit of pedestrian travel in development.

Rail service and traffic management

i. Liaise with Rail Regulator and Train Operating Company on rail service.
ii. Liaise with Railtrack on station design.
iii. Decide on need for additional parking at station.
iv. Are traffic management measures needed to discourage car use by travellers to development?

General

i. Audit accessibility of footpaths, station and planned train services.
ii. Check plans for public transport information in buildings on development.

ANNEX B

west sussex county council

PUBLIC & SUSTAINABLE TRANSPORT ASSESSMENT

FORM ST6

SITE REF: ..... DATE: .....

SHORT TITLE: .....

PROPOSED LAND USE: .....

☐ HORSHAM
☐ ADUR ☐ CHICHESTER ☐ MID-SUSSEX
☐ ARUN ☐ CRAWLEY ☐ WORTHING

RAIL STATION ..... DISTANCE: .....

SERVICES: .....

BUS ROUTES *Nos:* ..... DISTANCE: .....

OPERATORS: .....

FREQUENCY (BUSES PER HOUR):	DAYTIME:					
	EVENING:					
	SUNDAYS:					
FUNDED BY WSCC:	ALL?					
	PART?					

CYCLING AND WALKING

SUGGESTED IMPROVEMENTS

☐ BUS SHELTERS: .....
☐ EVENING SERVICES: .....
☐ SUNDAY SERVICES: .....
☐ DAYTIME SERVICES: .....
☐ ALTERED ROUTEING: .....
☐ RAIL IMPROVEMENTS: .....
☐ BUS PRIORITY: .....
☐ PED./CYCLE IMPROVEMENT .....
☐ TRAVELWISE PLAN .....
☐ PLANNING AGREEMENT .....

PARKING

☐ PROVIDE SECURE, CONVENIENT, COVERED CYCLE PARKING

☐ 1 PER BED SPACE ☐ 1 TO EVERY 4 EMPLOYEES / CUSTOMERS ☐ OTHER .....

CARS / LORRIES / BUSES .....

RECOMMENDED:-

☐ IS ACCESSIBLE TO PUBLIC TRANSPORT
☐ IS NOT ACCESSIBLE TO PUBLIC TRANSPORT (REASON FOR REFUSAL)
☐ IS NOT ACCESSIBLE TO PUBLIC TRANSPORT BUT COULD BE MADE SO BY A PLANNING AGREEMENT

OTHER .....

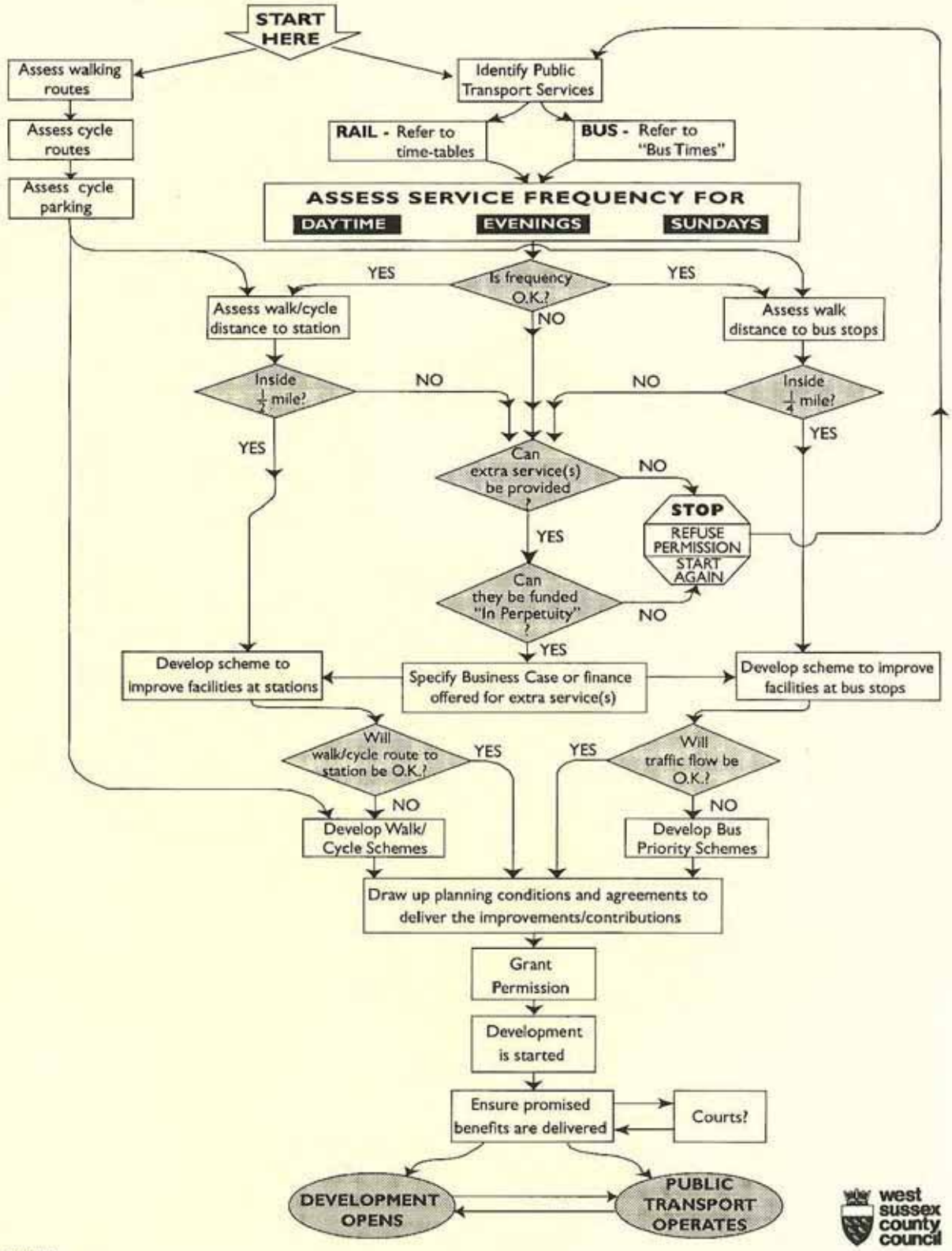
SIGNED: .....

Ref. RHP 15/5/98

PLANNING APPLICATIONS:-

FORM ST7

FLOW CHART FOR ASSESSING REQUIREMENTS FOR PUBLIC TRANSPORT, WALKING AND CYCLING



SU48A/Q1

west sussex county council

Ref. RHP 15/5/98

ANNEX C – A TYPICAL BUS OPERATOR'S CHECKLIST

(Based on the Checklist for the Audit of Bus Services into/around Heathrow)

ROUTE NO..... (One sheet per route. Complete both sides)

1. **Status within tender procedure**

2. **Route length**

3. **End–to–end journey time** Peak
   Off–peak

4. **Vehicle type**
   Make/age/number in fleet

   Percentage low floor (cost for 100%)

   Capacity (i) Seated (ii) Standing
   Luggage space (high/medium/low)

5. **Bus stop / waiting environment**
   Number of stops/Percentage with timetables

   Number of shelters

   Percentage with good facilities – Illuminated
   2/3 way enclosed
   Seating
   Undersized

   Security issues (cctv/alarms/etc)

6. **Vehicle tracking**
   Percentage of fleet with AVL/timescale/cost

   Percentage of route with real time displays/timescale/cost

7. **Bus priority**
   General need for bus priority (high/medium/low)

   Status in any bus priority programme/estimated cost

   Reliability of route as a whole

   Percentage of miles lost through congestion

8. **Driver**
   Customer service/attitude

   Percentage with uniforms/appearance

9. Patronage

(i) Total patronage per route.

(ii) Percentage of patronage to/from Heathrow area.
(Users to/from A4 (between Hatch Lane, Compass Centre and Harlington Corner), Hatton X, Southern Perimeter Road, all terminals) – see Connections Map for area).

(iii) Percentage year on year changes for (i) above – note any major route changes).

(iv) Percentage year on year changes for (ii) above – note any major route changes).

10. Cost of operation

Gross annual cost of operation.

Total cash revenue.

Total off-bus revenue.

Net annual deficit.

The above data is for planning purposes only.
It will be kept confidential within the Heathrow Area Transport Forum.
It will be used to prioritise services and corridors which are in most need of support.
It will benchmark a patronage base for monitoring change.
If you have any additional comments, notes or suggestions please feel free to comment.

Please use only one form per route. Where routes bifurcate (74/5; 436/441; 555/6/7), please use separate forms for the separate legs.

Courtesy BAA Heathrow

INDEX

Introduction

Index entries are to paragraph numbers and Tables as designated. Alphabetical arrangement is word-by-word. The index is not exhaustive, and no responsibility is taken for any errors or omissions.

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