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The National Assembly for Wales
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The Department for Regional Development Northern Ireland

Local Transport Note 1/95

The Assessment of Pedestrian Crossings

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TITLE - THE ASSESSMENT OF PEDESTRIAN CROSSINGS

Department for Transport, The National Assembly of Wales, The Scottish Executive, The Department for Regional Development

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ENQUIRIES

All enquiries on the general applicability of this Local Transport Note should be directed, in England to the appropriate Regional Government Office of the Department for Transport, in Wales to Welsh Assembly Government, Cathays Park, Cardiff CF99 1NA, in Scotland to the Scottish Executive, Development Department, St Andrews House, Edinburgh EH1 3DG, or in Northern Ireland to the Department for Regional Development Roads Service, Clarence Court, 10-18 Adelaide Street, Belfast, BT2 8GB. Enquiries about authorisation for non-prescribed crossings should be made to the above offices.

ABSTRACT

This note recommends the practices to be followed when planning at - grade pedestrian crossings. It describes all types of crossings, including shared facilities with cyclists, other than those at signalled junctions.

PUBLICATIONS SUPERSEDED

Departmental Advice Note TA 52 and Standard TD 28
(DMRB Vol.8, Section 5).

CONTENTS

1 INTRODUCTION

Pedestrian crossing facilities at traffic signal controlled junctions are covered in TA15[1].

1.1 General

1.1.1 This note describes an assessment method to be used when considering the provision and type of 'stand-alone' at-grade pedestrian crossings.

1.1.2 There are various types and combinations of crossings that can be used for pedestrians, equestrians and cyclists. 'Stand-alone' crossings may be implemented specifically for cyclists or equestrians but their legality is then as determined by the Traffic Signs Regulations and General Directions 1994[6] and not by pedestrian crossing Regulations. The principles of this assessment method can however be applied to those crossings.

1.1.3 The responsibility for the provision of pedestrian facilities rests with the relevant highway/roads authority. This note describes a method for assessing the need for a crossing which is recommended for use by highway authorities and their agents.

1.1.4 Crossings are provided as amenities to give access and easier movement to pedestrians. Generally the provision of crossings should be targeted at the needs of those people who experience most difficulty and danger. It should not be assumed that the provision of a crossing alone will necessarily lead to a reduction in road accidents.

1.1.5 The assessment method uses a framework to encourage informed decisions to be made as to whether a crossing is necessary and if so which type should be used. Site information is collected to form the basis of a SITE ASSESSMENT RECORD. This is used to complete an ASSESSMENT FRAMEWORK which is in two parts, THE SITE ASSESSMENT and the OPTION ASSESSMENT. Decision makers will already have been taking these into account implicitly; the explicit framework means that the grounds for decisions and their consequences should be made clear and visible. The framework is used to collate all the relevant information relating to a proposal. Installation and maintenance costs are included together with the consideration of road user needs and road safety aspects.

1.1.6 Light Signal Controlled Pedestrian Crossings (signal-controlled crossings) and Zebra Pedestrian Crossings (Zebra crossings) provide pedestrian crossing points on roads carrying significant volumes of traffic. Vehicles and pedestrians are positively controlled by signal-controlled crossings, whereas pedestrians are given precedence over vehicles at Zebra crossings Signal-controlled crossings may also be used to provide crossing points for cyclists and equestrians. The majority of crossings described are Zebra and signal-controlled types. However, the assessment procedure should also consider refuge islands and other traffic management measures.

When considering a crossing for equestrians, cyclists and/or pedestrians, then the general references to pedestrians in this document can be read to include all groups. However, only pedestrians may use pedestrian crossings.

1.2 Statutory Instruments

For Northern Ireland see section 6 REFERENCES.

- Statutory powers are defined by the Road Traffic Regulation Act 1984[2].
- The Zebra, Pelican and Puffin Pedestrian[3] Crossings Regulations and General Directions 1997.
- The Traffic Signs Regulations and General Directions 2002[4]. This does not apply in Northern Ireland where site specific authorisation for Toucan crossings is requred.

2 ASSESSMENT PROCEDURE

2.1 General

2.2.1 Where there are sufficient crossing opportunities in the vehicle flow most people are able to cross without the provision of a crossing. At sites with higher vehicular flows, pedestrians, in some cases particular groups of pedestrians may require a crossing facility before they feel secure enough to cross. There is little difference in the average rate of personal injury accidents at Zebra and signal-controlled types. At individual sites however, the type of crossing selected and its location may have a considerable effect on the future accident record.

2.2.2 The purpose of a crossing is to provide pedestrians with a passage across a carriageway. Each type of crossing has advantages and disadvantages; the type chosen should be appropriate to the circumstances of the site and the demands and behaviour of road users.

The decision whether or not to provide a crossing, and its type, should be a balanced judgement based on consideration of all the information included in the framework.

2.2.3 The procedures lead via a SITE ASSESSMENT to the production of an ASSESSMENT FRAMEWORK. The procedures should include the collection of site information, photographs maps records of any representations etc. All relevant factors included in the framework should be considered when deciding whether to provide a crossing and, if so, its nature. The framework should include factors quantifying the difficulties experienced by vulnerable road users.

3 SITE ASSESSMENT

3.1 General

3.1.1 It is recommended that a site survey and record of all relevant local and traffic factors is made by an experienced traffic engineer. An example of a SITE ASSESSMENT RECORD is shown in Appendix B. The record will form the basis for the ASSESSMENT FRAMEWORK and as much background information as possible should be gathered so that a fully informed decision can be made. In the case of roads not yet built, or where future development is likely, the information should be estimated and the basis noted. For existing roads the information should be measured.

3.1.2 The survey should include approximately 50 metres of road either side of the site. The exact length may be dictated by the existence of side roads, major entrances/exits etc. It may be necessary to measure several 100 metre lengths if there is no one specific crossing place proposed. If only one crossing is to be provided great care must be taken to select the site likely to attract most pedestrians. Once a crossing is installed the site will become a focus of concentration for drivers and the areas either side of the new crossing could become potentially hazardous for pedestrians. here random crossing patterns exist, a number of central refuges may be more suitable than a single pedestrian crossing.

3.1.3 Local Transport Note 2/95, The Design of Pedestrian Crossings[5] considers practical difficulties, such as proximity to junctions, visibility, skidding resistance, road lighting, bus stops, Statutory Undertakers' plant, nearby crossings and the needs of vulnerable pedestrians, including young, elderly and disabled people, and cyclists. The document should be read before visiting the site.

Other suggested factors to be taken into account are:

3.2 Carriageway and Footway Type and Width

Allow sufficient footway width for pushchairs, prams and cycles. Where crossings are to be provided specifically for equestrians or cyclists additional width will be required; see TA57, DMRB Vol 6 section 6.3[6]. Remember that guard railing will reduce the effective width.

3.2.1 The width of carriageway and its arrangement into lanes should be recorded as this will relate to the degree of difficulty that people have in crossing.

3.2.2 It is important that the usable footway width will be sufficient for pedestrians both waiting to cross and walking along the footway. A minimum of two metres is recommended.

3.3 Surroundings, Vehicular/Pedestrian Flow and Composition

3.3.1 The type of surroundings will determine the profile of pedestrian movements and the most representative day of the week for a vehicular/pedestrian count. Time of year may also be critical. The length of time over which the count should be taken will vary from site to site. However, a 12 hour count from, say, 07.00 - 19.00 would be suitable at most sites and analysis of the data will identify the peak periods. Both flow and composition of pedestrians should be recorded noting the numbers in any distinct groups. These groups are particularly

significant when assessing the difficulty of crossing at a site. The possibility that the present situation suppresses crossing demand because of difficulties in crossing the road should be considered. If the overall pedestrian count is increased to take this into account the facts should be recorded and the assumptions noted.

Where the 85 percentile speed is greater than 50 miles per hour, serious consideration should be given to speed reduction measures before installing at-grade crossings.

3.3.2 The level of traffic flow should be assessed, particularly at peak flow periods of the day. Estimates of the proportion of particular classes of vehicles, such as heavy goods, and the number of public service vehicles in the vehicle flow can be useful. Vehicle speeds should be recorded at peak and off-peak periods. The measured speed of vehicles (for each direction) taken, say, 50 metres before the crossing site should be recorded and the highest 85 percentile speed used in the assessment. The actual speed restrictions in force should also be noted. These will affect both the decision as to whether to install a crossing and, if so, the type.

3.4 Average Crossing Time and Difficulty of Crossing

The average time to cross from kerb to kerb, or kerb to refuge for staggered crossings, depends on the vehicular flow, the crossing speed for each group of pedestrians and the width of the carriageway. It is recommended that the average crossing speed be measured on site. The difficulty of crossing that pedestrians experience at a site can be assessed by considering the number of acceptable gaps in the vehicular flow which are available to pedestrians, and the consequences that this has for the average period that a pedestrian has to wait before crossing. This should be determined for all anticipated groups of users. Methods of determining the difficulty of crossing are given in Appendix A.

3.5 Road Accidents

3.5.1 The existing injury accident record for the proposed location, including 50 metres either side, should be noted. It is often useful to record details such as age, any special vulnerability such as a particular type of disability, location of accident and time of day to see if any pattern emerges. State the period over which the figures apply and describe any significant local changes in that time.

Where a crossing is being considered because of a high number of accidents, an investigation should be undertaken to establish the real cause. It may be that other measures are needed, such as traffic calming or improving visibility, either instead of or in conjunction with a formal crossing.

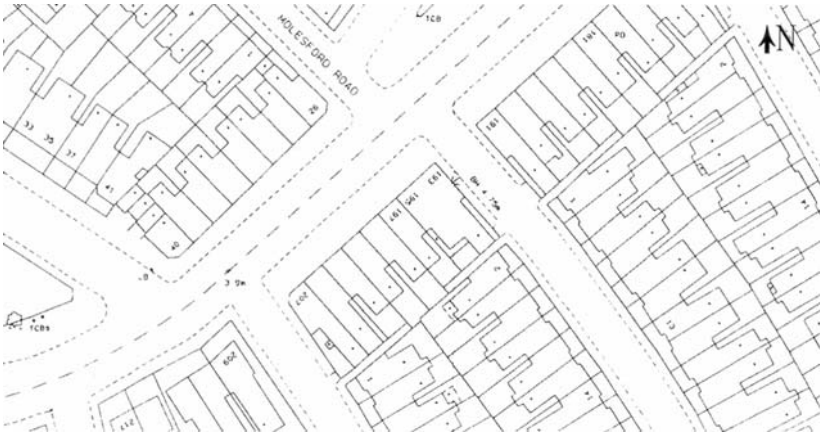
3.5.2 When assessing the effect of introducing a crossing on accidents, a comparison with statistics for other local sites should be made. The accident statistics from a large sample of similar crossings will give an average for a yearly period. The average should then be compared with the site in question. If the number of accidents at the site is below average then it may not be reasonable to predict a benefit in accident terms, although there may be other advantages, if a crossing is installed. Caution should be exercised that in improving access for pedestrians the accident potential is not made worse by installing a crossing. Reference should be made to The Design of Pedestrian Crossings[5] for advice.

Drivers' view

3.5.3 It has not yet proved possible to make general predictions about how the accident incidence or rates at a site might change following the introduction or change of type of crossing. It is recommended that a safety audit is completed for the option being considered.

3.6 Site Record

The site layout and its major features should be recorded in the form of photographs and a map having of scale of at least 1:2500. Photographs are particularly useful as an aide-memoire.



Pedestrians' view

for the assessment and later when designing the crossing. They should show such details as the drivers views of the crossing site from say 30 and 100 metres, the pedestrians views, and any accesses or side roads. The positions of any obvious ducting chambers, gullies etc. should be noted. The exact location and date should be recorded for each photograph.

3.7 Assessment Framework

A précis of the information recorded in the SITE ASSESSMENT RECORD should be included in the SITE ASSESSMENT section of the ASSESSMENT FRAMEWORK.

4 OPTION ASSESSMENT

Examples of factors most likely to have a bearing on the choice of pedestrian crossing type are:

- difficulty in crossing;
- vehicle delays during peak periods;
- carriageway capacity;
- local representations;
- cost (including maintenance);
- vehicle speeds.

There are a number of possible options for action when considering the provision of pedestrian crossings. These include:

- do nothing;
- provide traffic management (including refuge island);
- provide a Zebra crossing;
- provide a signal-controlled crossing.

The example ASSESSMENT FRAMEWORK given at Appendix C shows a summary of the relevant site information and options available.

4.1 Quantification of Factors

The effect of delays on vehicles must be considered but should not normally over-rule the provision of a crossing where there is a clear difficulty for pedestrians.

4.1.1 Difficulty in Crossing

This is a factor related to the average time that a person normally has to wait at the site for an acceptable gap before crossing. The value will differ according to traffic levels, age and mobility. It can be assessed by the methods described in Appendix A. The highest factor at an appropriate time of the day should be used in the appraisal.

4.1.2 Vehicle Delay

Vehicle delay is assessed by estimating the number of stops each minute, and the average duration of each stop, which the crossing flow levels would produce for each of the options. For example, if a Zebra is installed and crossing flows are very high the number of stops and their duration will be far higher than with a signalled crossing.

4.1.3 Carriageway Capacity

In addition to delays at the crossing, the reduction of carriageway capacity may have an effect on the local network. If problems are expected this factor should be noted.

4.1.4 Representations

The source of a request and any supporting correspondence should be recorded. This is not only to enable the correspondents to be informed of the decision but incoming correspondence may often give detailed local knowledge of problems.

4.1.5 Costs

The total cost of installation of the crossing should be estimated, including all civil, electrical and specialist contractors work, and considered in the ASSESSMENT FRAMEWORK. Costs may include traffic management during the works, moving road lighting columns, improving road lighting, installing supplementary lighting and upgrading skid resistance. Ancillary works by statutory undertakers may also be needed to move existing pipes and ducts.

The annual cost of maintenance of the crossing, including increases in the maintenance costs of any ancillary facilities necessary, should be estimated and included in the ASSESSMENT FRAMEWORK for consideration. The whole life cost of the crossing may also be calculated and included in the analysis.

4.2 Crossing Options

4.2.1 Do Nothing

The existing situation is already known and delays to vehicles and pedestrians, injury accidents and perceived difficulties can be noted. The impact of the following options should, therefore, be considered and quantified so that a valued judgement can be made.

4.2.2 Traffic Management/Traffic Calming

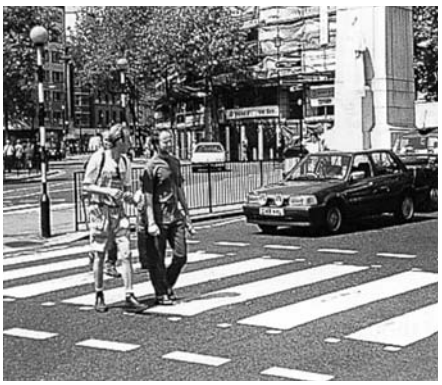
It may be possible to create more crossing opportunities by:

- the provision of a refuge or
- installing traffic calming measures or
- narrowing the carriageway (to reduce the crossing time).

The last method can have the advantage of allowing the footway to be widened thus enhancing visibility past permanent obstructions, such as trees, post boxes, etc.

Vehicle speeds and the percentage of heavy vehicles may influence the local acceptability of either option.

4.2.3 Zebra Crossing



People sometimes defer establishing a right of way at Zebra crossings by waiting at the crossing side until a suitable gap occurs in the vehicle flow because of concerns over personal safety or of causing traffic delay.

Where a crossing is thought necessary but crossing flows are relatively low and traffic flows are no more than moderate, then a Zebra crossing may be suitable. Pedestrians establish precedence by stepping onto the crossing and so delays to them are minimal. Vehicle delays are typically five seconds for a single able person crossing but can be much more where irregular streams of people cross over extended periods.

The likely effect of installing a Zebra crossing can be tested by checking the availability of sufficient gaps in the traffic flow. Where gaps are few, and waiting times long because people feel it may be hazardous to establish precedence, a Zebra crossing is likely to be unsuitable. The number of people at the site will also give an indication of the likely performance of a Zebra crossing. Higher flows of pedestrians will cause substantial delay to vehicles and a Zebra crossing is less likely to be a satisfactory choice.

Where traffic speeds are higher than 30 m.p.h., people will require longer gaps in the traffic flow or be exposed to the risk of more serious injury if precedence is not conceded for any reason. Zebra crossings should not be installed on roads with an 85 percentile speed of 35 m.p.h. or above.

Care should be taken at unusual sites, such as contra-flow bus lanes and one-way streets, as uncertainty can be caused. A signal-controlled crossing may be more suitable.

In some situations it may be appropriate to install road humps, providing these conform to the requirements of the Highways (Road Humps) Regulations[7], to slow speeds to below 30 m.p.h. The Regulations in these circumstances allow crossings to be humped. See LTN The Design of Pedestrian Crossings[7].

4.2.4 Signal-Controlled Crossing

This option can be in the form of a Pelican, Puffin or Toucan crossing. The Puffin crossing is planned to replace the Pelican type, as the standard stand alone pedestrian crossing, once the initial trials are complete. The Toucan crossing provides pedestrians and cyclists with a shared crossing. Site specific authorisation is required in Northern Ireland for Puffin and Toucan crossings and for special crossings for equestrians.

Puffin crossing

Signal-controlled crossings are used where:

• vehicle speeds are high, and other options are thought unsuitable;

• there is normally a greater than average proportion of elderly or disabled pedestrians;

• vehicle flows are very high and pedestrians have difficulty in asserting precedence;

• there is a specific need for a crossing for cyclists or equestrians;

• pedestrians could be confused by traffic management measures such as a contra-flow bus lane;

• there is a need to link with adjacent controlled junctions or crossings;

• pedestrian flows are high and delays to vehicular traffic would otherwise be excessive.

Caution should be exercised where pedestrian flows are generally light or light for long periods of the day. Drivers who become accustomed to not being stopped at the crossing may begin to ignore its existence, with dangerous consequences. The problems are accentuated as vehicle speeds increase.

Toucan crossing

5 ASSESSMENT FRAMEWORK

5.1 The assessment framework should present clearly the effects of each proposed option under consideration. The final decision as to whether to install a crossing and the choice of option will depend on a combination of factors. Examples are: the number of accidents, delays, local representations, local interest groups, cost and relative priority with other sites.

5.2 The use of a formal cost benefit methodology is not thought necessarily appropriate to the assessment of individual crossings. The costs of delays to road users are generally not reduced by the introduction of a pedestrian crossing. Neither can the road safety benefits be quantified with any degree of certainty and it should not be assumed that provision of a crossing will necessarily lead to a reduction in road accidents.

5.3 Appendix C illustrates the general form of the ASSESSMENT FRAMEWORK recommended. Relevant local features and factors given in the framework will help in making an objective decision.

6 REFERENCES

Note: * References are for Northern Ireland

Introduction

1. DfT Advice Note TA 15, Design Manual for Roads and Bridges (DMRB) Vol. 8 Section 1 - Pedestrian Facilities at Traffic Signal Installations.

2. Road Traffic Regulation Act 1984
* The Road Traffic Regulations (Northern Ireland) Order 1997

3. The Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997.
* 'Zebra' Pedestrian Crossings Regulations (Northern Ireland) 1974
* The (Pelican) Pedestrian Crossings Regulations (Northern Ireland) 1989

4. The Traffic Signs Regulations and General Directions 2002.
* The Traffic Signs Regulations (Northern Ireland) 1997

Site Assessment

5. The Design of Pedestrian Crossings. Local Transport Note 2/95.

6. DfT Advice Note TA 57, DMRB Vol. 6 Section 6.3 - Road Side Features.

7. The Highways (Road Humps) Regulations 1999.

The Scottish Executive equivalent is the Road Humps (Scotland) Regulations 1998.

* The Road Humps Regulations (Northern Ireland) 1999

APPENDIX A - METHODS FOR DETERMINING THE DIFFICULTY OF CROSSING

The difficulty of crossing at a site can be assessed by considering the number of gaps in the traffic flow which are acceptable to pedestrians.

Where vehicles enjoy free-flow conditions the gaps between successive arrivals are randomly distributed and the waiting time for an acceptable gap may be found to be relatively short. However, in such conditions speeds are likely to be higher than normal and, in consequence, the length of the gap required will be longer.

Nearby traffic signal controlled junctions, or other pedestrian crossings, will often produce a vehicle traffic flow in which platoons of vehicles are identifiable at regular intervals. At sites where periods of very heavily platooned flow occurs, crossing may be impossible whilst the platoon is passing. These periods will usually be followed by others where there is less difficulty in crossing; the waiting time may be longer but the first available gap is likely to be greater.

Acceptable Gap

An acceptable gap in which to cross, from kerb to kerb (or refuge), varies from person to person. The majority of pedestrians will accept a gap of 4-6 seconds at normal urban vehicle speeds to cross two lanes of traffic and even shorter gaps at slow vehicle approach speeds. Other groups may require somewhat larger gaps, of around 10 to 12 seconds or even longer. For these reasons the waiting times for various gap durations should be established for all types of users.

Two methods, ‘Data Logger’ and ‘Manual’, are described to gather the data from which an estimate of degree of difficulty of crossing can be determined. The method selected should be compatible with the complexity of the situation.

Data Logger Method

Comprehensive measurements of headway, flow and speed can be recorded automatically by a data-logger connected to vehicle detectors. The logger should record the arrival time and speed of each vehicle in each direction for a period during a typical weekday. The recorded data file can then be analysed to provide the following information:

- a table of the mean time for a gap to occur between vehicles greater than a specified range of values;
- a count profile of the vehicle flow throughout the day;
- a distribution of vehicle speeds throughout the day.

Important factors may then be extracted from the table for recording in the SITE ASSESSMENT RECORD and use in the ASSESSMENT FRAMEWORK.

Manual Method

The manual method for estimating the difficulty of crossing at a site relies on judgement by an experienced traffic engineer. The factor should be assessed on a descriptive scale from, say, ‘Impossible to cross safely at all times’ to ‘No difficulty in crossing within a second or two’ for the period of greatest concern.

APPENDIX B - EXAMPLE SITE ASSESSMENT RECORD

This check list and record sheet is recommended for use when assessing the need for an at-grade pedestrian crossing or changing an existing pedestrian crossing for another type.

SITE CHARACTERISTICS

1.1 **Site Location**	*Description*	
	Ordnance Survey Grid Reference	
1.2 **Carriageway Type**	*Single*	*Double*
	One Way	*Two Way*
	Number of lanes	
1.3 **Carriageway Width**		*metres*
1.4 **Footway Width**		*Side 1 metres*
		Side 2 metres
1.5 **Refuge Island**		*Yes* *No*
1.6 **Road Lighting Standard**		
BS5489 classification		*Category*
Is lighting to above standard?		*Yes* *No*
Any re-arrangement necessary?		*Yes* *No*
Better lighting standard needed?		*Yes* *No*
Supplementary lighting needed?		*Yes* *No*
1.7 **Minimum Visibility**		
Pedestrian to Vehicle	*Direction 1*	*metres*
	Direction 2	*metres*
Vehicle to crossing	*Direction 1*	*metres*
	Direction 2	*metres*
1.8 **Waiting/Loading/Stopping Restrictions**		
At prospective site		*Yes* *No*
Within 50 metres of the site		*Yes* *No*
1.9 **Public Transport Stopping Points**		
At prospective site		*Yes* *No*
Within 50 metres of the site		*Yes* *No*
Relationship to crossing		
[in direction of travel]	*Direction 1*	*approach/exit*
	Direction 2	*approach/exit*
1.10 **Nearby Junctions**		
Distance to nearest significant	*Direction 1*	*metres*
traffic junction	*Direction 2*	*metres*
1.11 **Other Pedestrian Crossings**		
Distance to next crossing	*Direction 1*	*metres*
	Direction 2	*metres*
Type of crossing	*Zebra / Pelican / Puffin / Toucan / Other*	
1.12 **School Crossing**		
Patrol Distance if less than 100 metres		*metres*
1.13 **Skid Risk**		
Does surface meet skid resistance requirements		*Yes* *No*

I.14 **Surroundings** (entrances within 100 metres)

Hospital/Sheltered housing/Workshop for disabled people	*Yes*	*No*
School	*Yes*	*No*
Post Office	*Yes*	*No*
Railway/Bus Station	*Yes*	*No*
Pedestrian leisure/shopping area	*Yes*	*No*
Sports stadia/entertainment venue	*Yes*	*No*
Junction with cycle route	*Yes*	*No*
Equestrian centre or junction with Bridle Path	*Yes*	*No*
Others (for example a Fire Station)		

CROSSING TRAFFIC INFORMATION

2.1 **Flow and Composition**

Pedestrian count	*number per - - hours*
Prams/pushchairs	*%*
Percent elderly	*%*
Unaccompanied young children	*%*
Severe mobility difficulties	*number per day*
Visually impaired	*number per day*
Crossing cyclists	*number per day*
Equestrians	*number per day*
Others	*number per day*

2.2 **Time to cross the road** (measured sample)

Able pedestrians	*seconds*
Elderly or disabled people	*seconds*

2.3 **Difficulty of Crossing**

Able pedestrians
Elderly or disabled people
(units as for selected method)

2.4 **Latent Crossing Demand**

Estimate *Unlikely / number per - - hours*

VEHICLE TRAFFIC INFORMATION

3.1 **Flow and Composition**

Vehicle count	*number per - - hours*
Cyclists	*number per day*
Heavy goods vehicles	*%*
Public service vehicles	*number per day*

3.2 **Vehicle Speed**

85 percentile	*m.p.h.*
Speed Limit	*m.p.h.*

ROAD ACCIDENTS

4.1 **Mean Personal Injury Accident Frequency**

Number per year at site (over 5 years if available)	*P. I. accidents/year*
Number per year at an average local site (over 5 years if available)	*P. I. accidents/year*

APPENDIX C - EXAMPLE ASSESSMENT FRAMEWORK

SITE ASSESSMENT

Characteristic	**Data and comments at 31 March 1995**
Location	The site at 555333 is a single two way, 2 lane (each approach) carriageway, total width 11.3 metres with 2.5, 2.3 metre footways.
Highway facilities	Road lighting is recent to a traffic route standard and no re-arrangement is needed. The road surface gives adequate skid resistance.
Visibility	Desirable visibility standards can be met. There is no need to further restrict parking, on visibility grounds, and the road is not a bus route.
Complexity	There are no road junctions, other pedestrian crossings, public buildings or facilities, other than the local primary school, within 250 metres.
Crossing traffic	About 1250 people cross the road daily with an average breakdown into groups. Crossing time and difficulty of crossing are typical for roads of this character in this area.
Vehicles	5600 vehicles a day with 2% of heavy goods. Highest two way peak hour flow 985. Highest 85 percentile in peak periods is 33 m.p.h. There is a 30 m.p.h. speed limit.
Road accidents	There were 3 P.I. accidents in 1994, none in the previous 4 years. None have been recorded this year.

OPTION ASSESSMENT

Factor	**Do Nothing**	**Refuge Island**	**Zebra**	**Signalled Crossing**
Difficulty of Crossing, average wait in seconds	20 (able) / 120 (elderly) in peak periods	15 (able) /40 (elderly) in peak periods	1 to 3 for all groups	1 to 3 after end of vehicle minimum green period
Vehicle Delay in peak periods	None	None	3 stops/minute of 10 seconds	2 stops/minute of 12 seconds
Road Capacity	Not reduced	Not reduced	50% reduction	40% reduction
Representations	Police suggest consideration of speed reduction measures may be correct course of action	Police do not favour because of uncontrolled bunching of schoolchildren on island	Local elected representatives think best balance between needs and costs	Public petition and individual letters favour to meet safety needs of children, elderly and disabled people. Stimulated by accident to girl on crutches after other incidents in 1994
Installation cost	None at this	1000	3000	20000
Operating cost	100	300	2000	

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