
VOLUME 6 ROAD GEOMETRY

SECTION 3 HIGHWAY FEATURES

PART 5

TA 87/04

**TRAFFIC CALMING ON TRUNK ROADS
A PRACTICAL GUIDE**

SUMMARY

This document provides advice on the use of traffic calming measures on trunk roads and illustrates “good practice” over a comprehensive range of measures. It is not intended to be a detailed design guide and designers should make reference to appropriate Standards, Advice Notes and Legislation.

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Traffic Calming on Trunk Roads A Practical Guide

Summary: This document provides advice on the use of traffic calming measures on trunk roads and illustrates “good practice” over a comprehensive range of measures. It is not intended to be a detailed design guide and designers should make reference to appropriate Standards, Advice Notes and Legislation.

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1. INTRODUCTION

Scope

1.1 This Advice Note is applicable for use on trunk roads. It sets out the background to traffic calming and provides advice on the situations in which it can be used to best effect. Specific design issues, essential to the success of traffic calming, are identified and advice provided. It also provides examples of existing practice.

1.2 This is not intended to be a detailed design guide and designers should refer to appropriate legislation, Advice Notes and Traffic Advisory Leaflets.

Background

1.3 Traffic calming uses specific measures to reduce and control vehicle speeds to a level commensurate with the activities taking place along a road. It can also encourage drivers to adopt a uniform speed without excessive acceleration or deceleration. In addition, traffic calming can be used to influence driver behaviour towards non-motorised road users.

1.4 Traffic calming has mainly been used in urban areas on roads with speed limits of 30mph or less. This has reflected the predominance of these lower speed roads in the urban environment and the much higher proportions of accidents involving non-motorised road users.

1.5 However, with increasing recognition of the importance of dealing with problems on rural roads, traffic calming measures for rural locations have been developed. Suitable measures are now available for higher speed roads, although as speeds increase it becomes less safe to use physical measures and greater reliance is placed on non-physical means. This means that physical measures are less likely to be used on trunk roads. Non-physical measures are likely to result in less significant reductions in speed unless they can be accompanied by strict enforcement of speed limits. As far as practicable, schemes should be designed to be self-enforcing. This will help achieve the required speed reductions and will have the added advantage of reducing the demand on police resources.

1.6 Much work has been done by central and local government on developing traffic calming measures for use on rural roads. The Village Speed Control project (VISP) monitored a number of existing measures in

rural villages, with the results being published in 1994. The VISP project showed an overall reduction in injury accidents of between one-fifth and one-quarter and a reduction in killed and seriously injured accidents of between one-third and one-half. Further monitoring of trunk road traffic calming measures was carried out at a number of locations including the A49 Craven Arms, the A47 Thorney, the A59 Copster Green, the A49 Dorrington, the A6 Great Glen, the A1079 Hayton and the A36 West Wellow. The measures used included gateways, signing and lining, speed cushions and mini-roundabouts. The findings from these schemes were positive and showed that, where a complementary range of measures was used throughout the length of the scheme, sustained substantial reductions in speed could be achieved. The public perceptions of noise and vibration increases were less positive.

1.7 Whilst, traditionally, traffic calming has been seen as appropriate to villages on trunk roads, it is now recognised as being equally suited to rural routes of considerable length that may have only very limited frontage development or do not pass through any settlements.

1.8 While safety may be the primary factor in justifying a traffic calming scheme, the local environment, community severance and accessibility issues are all acceptable reasons for introducing traffic calming on trunk roads.

1.9 In some instances, conflicts can arise between achieving appropriate speed reductions and reducing the visual impact of the measures on the surrounding landscape. It has been found, for example, that the most effective traffic calming measures are generally those that are very conspicuous. Unfortunately, such measures may not blend with the surrounding landscape and conflicts of aesthetics can arise. Obviously a balance must be struck, but designers must be aware that compromises in the design of traffic calming measures may result in a less than effective solution. In particular, less speed reduction might be obtained and this must be taken into account fully when informing the public as to the likely effect of a particular scheme.

1.10 High proportions of heavy vehicles will have a significant effect on the measures to be employed when designing traffic calming schemes for trunk roads. Proposals must take into account vehicle noise, vibration and turning areas required for larger vehicles.

1.11 A significant number of traffic calming schemes have now been implemented on the trunk road network. Experience from these schemes has been used, where possible, in preparing the examples of existing practice contained in this Advice Note.

Traffic Calming Objectives

1.12 Traffic calming on trunk roads has a clear role in supporting the Government's objectives for transport as well as achieving specific additional objectives of the Overseeing Organisation. This Advice Note highlights the potential benefits of traffic calming in relation to the following Government transport objectives:

- improving safety;
- protecting the environment;
- integrating transport;
- improving accessibility; and
- assisting economic growth.

1.13 Although some traffic management and control techniques may not immediately be thought of as traffic calming, they can assist in achieving the above objectives as part of a package of measures that together promote calming.

1.14 More specifically, traffic calming schemes may be used on trunk roads to:

- encourage appropriate vehicle speeds;
- enhance safety along a particular route;
- reduce community severance;
- facilitate access for public transport, pedestrians, cyclists and horseriders;
- enhance the local environment; and
- improve driver awareness and promote appropriate behaviour.

1.15 Where appropriate, the use of 30mph limits in villages is encouraged. In such villages, traffic calming or traffic management measures are likely to be needed to help enforce the limit.

1.16 As well as being proactive in the development of trunk road traffic calming schemes to meet the objectives above, Overseeing Organisations should consider a partnership approach with local authorities where they may be developing sustainable travel plans for an area and may wish for traffic calming measures to be implemented on a trunk road link forming part of the network.

2. GUIDANCE FOR DESIGNERS

2.1 There is a range of traffic calming techniques that fall into the broad categories of:

- physical measures such as horizontal and vertical deflections which encourage drivers to reduce speed by a sharp change in the vertical and/or horizontal alignment which causes discomfort when travelling at higher speeds; and
- non-physical measures that encourage adjustments in driver behaviour such as textured surfacing, variable signs, speed limits, gateways, etc.

2.2 Most traffic calming schemes will consist of a combination of physical and non-physical measures. In any particular scheme, the techniques to be used for achieving the objectives should be based on the most appropriate and effective measures. Examples of a number of measures and their combinations are given in DfT Traffic Advisory Leaflets listed in Chapter 5.

2.3 Road humps, other traffic calming measures and signs must all comply with the relevant legislation. If non-compliant designs are being considered they should be discussed with the Overseeing Organisation. Where necessary, special authorisations or directions may be given. Reference should be made to Chapters 4 and 5 of the Traffic Signs Manual for guidance on the use of signs and markings.

Speed and Accidents

2.4 The use of traffic calming measures to reduce vehicle speeds and “smooth” traffic flow can produce substantial reductions in personal injury accidents, particularly in the fatal and serious categories. Results from a study of 56 village traffic calming schemes generally implemented between 1992 and 1997 (TAL 11/00) and located mainly, but not exclusively, on trunk roads, demonstrated the typical accident savings that could be achieved in relation to various levels of reduction in 85th percentile speeds. These are shown in Table 2.1 below.

Table 2.1

% Changes in Injury Accident Frequency by 85 th Percentile Speed Reduction	
Speed Reduction	Change in Accidents (All Severities)
0-2mph	- 10%
3-4mph	- 14%
5-6mph	- 32%
7mph or over	- 47%

[From TAL 11/00]

2.5 As a general rule, a 1mph reduction in mean speed will result in a 5% reduction in all-injury accidents and a 10% reduction in killed or seriously injured accidents. Whilst this acts as a good general indicator, the actual casualty savings achieved will depend on local circumstances.

2.6 The higher the speeds at a particular location, before an effective measure is implemented, the greater the speed reduction is likely to be.

Calming in Settlements

2.7 For those schemes in small towns or villages, the measures to be adopted should aim to remind drivers that they are sharing the road with other users and therefore they should drive with due consideration. In these cases traffic calming schemes can have:

- measures to highlight to drivers that there is a change in character of the road;
- measures at the entrance of a settlement where drivers are expected to adopt a different style of driving and lower speeds;
- measures within a settlement, where drivers are expected to continue to drive with consideration for the local people;
- measures to increase driver awareness of the presence of non-motorised road users; and
- measures to assist non-motorised road users.

2.8 The techniques to be adopted should be appropriate for the objectives of the particular scheme. To reduce and control speeds on the approaches to and through a village, it will generally be necessary to employ a combination of all the measures referred to above. Individual measures may not have much effect on speed control if they are applied on their own.

Calming on Routes

2.9 Increasingly, trunk road traffic calming has been used as a “route” treatment with measures being implemented along several miles. The route may include a number of settlements or it may have no settlements at all and only very limited frontage development. In the same way that local traffic calming schemes can address a range of problems, so route based schemes can address a range of problems including safety, environment, severance and accessibility.

2.10 Particular objectives of route based schemes could be to:

- reduce accidents;
- smooth traffic flows between settlements;
- rationalise crossing facilities/locations for pedestrians and cyclists;
- improve the quality of life of residents living alongside the road;
- enhance drivers’ awareness of other road users;
- enhance drivers’ awareness of road hazards; and
- ensure consistency of treatment along a route.

2.11 Route based schemes can utilise the measures typically used in local traffic calming schemes. More specifically, measures used might include:

- reductions in speed limit from 60mph to 50mph on single carriageway rural roads;
- extensions of 30mph and 40mph speed limits at the limits of settlements;
- gateways at entrances to all settlements;
- enhanced signing and lining;
- coloured surfacing;
- provision of crossing facilities;
- widening or provision of footways and cycleways.

Self Calming Routes

2.12 The concept of “self calming” involves achieving conventional traffic calming objectives by using the existing environment. A self calming scheme may utilise speed controlling features such as bends, hump back bridges or parking, provided these features do not, in themselves, constitute a hazard.

2.13 A driver’s speed may be influenced by a number of factors. For example:

- wide roads can make drivers feel more comfortable at speed;
- tall enclosing features such as buildings, walls, hedges or trees will give drivers the impression of a narrower road width and make them feel less comfortable at speed;
- busy roadside activity, parking, street furniture and landscaping may make drivers more cautious;
- level roads and open bends may encourage higher speeds; and
- natural features, such as bends, which may constrain forward visibility, can encourage lower speeds; however such features may need to be signed to ensure that safety is not compromised.

2.14 All these factors should be considered when developing a traffic calming scheme.

Scheme Development

2.15 An appropriate level of engineering, safety, traffic and environmental assessment should be carried out for all traffic calming schemes to identify constraints and opportunities and inform decisions.

2.16 Traffic calming objectives are best achieved by a multi-disciplinary approach. Consultation with road safety officers, landscape architects, planners, police and other professionals can assist in maximising the benefits to be derived from a scheme and easing its passage through public consultation. Where local roads might be affected, even indirectly, it is essential to consult the local highway authority. The range of expertise required will depend on the location, size and sensitivity of the project. However, the key stages of scheme development, assessment and appraisal, detailed design, public consultation and monitoring will be appropriate to all schemes to some degree.

2.17 It is important to identify the problems to be addressed and to define clearly the objectives for the scheme. This will allow for better assessment of options as well as helping to define the requirements for “before” data. Scheme objectives may include casualty reduction, speed reduction, environmental improvement, promotion of sustainable modes, accessibility or other community benefits. Different options should be developed and even at this early stage, value engineering should be introduced.

Assessment and Appraisal

2.18 Assessment and design, together with consultation, must be an iterative process and the appropriateness and significance of issues should be considered. However, care should be taken to ensure that the project does not lose its focus on the pre-defined objectives. Community input is extremely important in any traffic calming scheme but it is not the sole input. However popular a particular scheme might be and regardless of the level of public support it might enjoy, if it will not achieve the stated objectives to an acceptable level, it should not be progressed.

2.19 Particular emphasis should be attached to the transport objectives listed in Chapter 1 and to measures that benefit local communities, whether by improving safety and accessibility, assisting public transport, pedestrian and cycling provision or enhancing the environment. It should be noted that the success of traffic calming schemes is often linked to the associated environmental enhancement of the area.

2.20 In addition to an appropriate level of environmental assessment, the requirements of the Overseeing Organisation’s project appraisal procedures should be met. On larger projects consideration should be given to the requirements of value engineering.

2.21 Provision also needs to be made for the safety auditing of schemes as defined by the Overseeing Organisation.

2.22 Consideration must be given to any special authorisations that may be required. The scheme programme should allow sufficient time for the Overseeing Organisation to comment on any proposals and for any necessary approvals, authorisations and departures from standards to be obtained and any Orders to be made. (See Chapter 4)

Public Consultation

2.23 The extent of consultation with other bodies is a matter of judgement for the Overseeing Organisation, bearing in mind that traffic calming schemes will, in most cases, materially affect the community, including arrangements for pedestrians, traffic and parking. The following groups should be consulted where appropriate:

- emergency services – Police, fire, ambulance;
- local authorities (covering councillors and relevant departments including as appropriate, refuse disposal, street cleaning, schools, sheltered accommodation, planning and local roads);
- parish/community councils;
- statutory undertakers;
- maintaining agents and contractors including those responsible for winter maintenance;
- bus operators;
- civic societies, conservation groups and heritage groups;
- residents, especially frontagers;
- special interest groups – elderly, cyclists, pedestrians, disabled people, equestrians;
- statutory bodies;
- haulage and motoring associations;
- local farmers
- members of Parliament/Assembly or Executive where applicable;
- local businesses/industry; and
- post offices/shops.

2.24 Some traffic calming measures require statutory consultation and local advertisement prior to their implementation. For example, in the case of road humps, the police, fire and ambulance services, and organisations representing persons using the highway, must be consulted. Traffic calming works falling under the Traffic Calming Regulations require the police, and other persons using the highway to be consulted (as and when the highway authority thinks fit). It is advised that

other emergency services and bus operators (where routes are affected) should be consulted on all proposed schemes.

2.25 An important part of consultation is related to the process of seeking the views of those members of the public likely to be affected by the traffic calming including users of the road as well as frontagers. Traffic calming is provided for the benefit of local communities, to address their concerns, enhance their safety and improve their quality of life. Wide consultation and public participation is, therefore, very important at the scheme development stage. Reasons for the scheme must be explained before implementation and an opportunity must be given for people to comment on the schemes; it needs to be demonstrated that due consideration has been given to the points raised. Publicity leaflets, photomontages, questionnaires and public meetings are important tools in involving the public.

2.26 Designers should note that experience to date has shown that residents are unlikely to be satisfied with schemes that do not achieve their expectations. Their hopes should not, therefore, be raised unrealistically.

2.27 For complex or innovative schemes consideration should be given to carrying out post implementation consultation on the scheme's effects.

Design Considerations

2.28 The achievement of design objectives will require consideration of a wide variety of measures, bearing in mind that traffic calming applies to urban and rural situations. Solutions will vary from simple signing and markings to larger projects in sensitive locations that require more comprehensive solutions.

2.29 Individual schemes should be considered in relation to the overall route on which they are located. Although all schemes should be designed to provide site specific solutions, designers should consider issues of route consistency. There may be merit in presenting a driver with a consistent message along a route e.g., similar gateways at every settlement, so that they become familiar with what to expect at a particular location. Good design should try to accommodate local character as well as route consistency.

Pedestrians, Cyclists and Equestrians

2.30 In considering the needs of non-motorised users it is important to allow for their need to cross the road as well as to move along it.

2.31 The effects of traffic calming on cyclists should be considered and, where appropriate, the design should be modified to accommodate them. (See "Cycle Friendly Infrastructure" by IHT). Local authority Cycling Officers should also be contacted to ascertain local requirements and preferred techniques.

2.32 Pedestrian desire lines should be established and traffic calming schemes examined from a walking perspective. Potential obstacles to walking should be identified, particularly for the young and elderly. Consideration of the needs of the disabled should also be included in the design process.

2.33 The provision of controlled and zebra crossings and pedestrian refuges assist pedestrians, help to promote walking and can act as traffic calming tools in their own right. Care should be taken if an island is used which requires relatively sharp vehicle deflections as drivers may focus their attention on this manoeuvre rather than on crossing pedestrians. In such circumstances, pedestrians may need to be discouraged from using the island or alternative traffic calming measures considered.

2.34 In developing schemes, it is important to ascertain if there is any equestrian usage. If so, their needs must also be addressed.

Bus Services

2.35 The provision of bus services in rural areas is an important part of the Government's transport strategy. It is therefore important to recognise that there may be a conflict between the application of traffic calming and the desirability of enhancing and improving bus journeys as part of a drive towards sustainable transport. A balanced approach should be adopted which minimises the impact on bus services whilst achieving the overall objectives of the scheme. In striking this balance due consideration will need to be given to the frequency of the services affected. The siting of bus stops is an important factor as they often result in pedestrians crossing in the immediate vicinity. Bus pull-ins and loading platforms may be considered to assist buses and bus passengers. Bus stops and chicanes should not be sited near to each other as this may cause safety problems for overtaking vehicles. Although they are unlikely to be used in trunk road traffic calming schemes, road humps can create difficulties for buses. Alternatives to full-width road humps, such as cushions, may need to be considered in order to limit delay to buses and minimise discomfort to bus passengers. However, where a hump is to be placed at a signal controlled or zebra crossing it should be a kerb to kerb flat top hump.

Emergency Services

2.36 It is important to identify key routes through traffic calmed areas where special provision for emergency services should be provided. Emergency services often have concerns about the effect of traffic calming schemes on response times. This is particularly important where substantial route treatments have been implemented as this may affect a large part of the emergency vehicle's journey. DfT Traffic Advisory Leaflet 3/94 presents advice on common practice. The emergency services must be consulted on traffic calming schemes.

Parking and Servicing

2.37 Parking and servicing requirements should be integrated in the overall design. Within settlements, opportunities may be available to rationalise parking for residents, shoppers, visitors and service vehicles.

Location and Spacing of Measures

2.38 Although generally referred to as "speed reducing" features, in practice, many traffic calming measures in the UK work on the basis of low speeds being kept low i.e. they are "speed controlling" features. This means that some measures can only be introduced at locations where speed is expected to be relatively low. Speed reducing features are measures used in advance of a scheme to reduce speeds to the desired level.

2.39 Reduced speed will not be maintained unless measures are used at regular intervals along a route. The spacing of measures is an important influence on speed reduction. Generally, the closer together the measures, the greater the impact they will have. The intention should be that measures are spaced to achieve a constant speed at an appropriate level. Physical speed controlling measures at not more than 100m spacing will be needed to control 85th percentile speeds to 30mph whilst spacing of less than 70m will be needed if vehicle speeds are to be constrained to 20mph.

2.40 Spacing of measures will also have an impact on the amount of acceleration and deceleration and hence on environmental impacts including noise, vibration and vehicle emissions. The closer the measures, the more likely drivers are to travel at a constant speed, thus minimising the adverse effects of accelerating and decelerating. Advice on the spacing of specific measures is available in relevant TALs (see Chapter 5).

Environmental Considerations

2.41 The degree to which environmental considerations should be applied will vary depending on the scale and complexity of the project. The methodology for environmental assessment is set out in Volume 11 of the Design Manual for Roads and Bridges. The potential for partnership with others, the character of the area and any distinctive features, the quality and range of paving materials and street furniture, improvements to existing lighting, noise and air quality implications, planting including offsite planting, and maintenance implications should all be considered.

2.42 Care needs to be taken in designing schemes and selecting measures, to ensure that adverse environmental effects are minimised. Noise and ground-borne vibration can be generated by some measures, particularly where vertical deflection is involved. These problems are exacerbated where there is a high proportion of heavy goods vehicles. In some instances, use of visually appealing materials such as cobbles has led to a high number of noise and vibration complaints. This may be due to a change in character of the noise rather than the volume. A holistic approach is required taking all potential impacts into consideration. Guidance on noise and ground-borne vibration generated by road humps is given in TAL 10/00 (Road Humps: Discomfort, noise and ground-borne vibration).

Signs, Markings and Lighting

2.43 Signs, markings and lighting are used to provide information to ensure that appropriate warning of traffic calming features is given to approaching drivers at all times. Many measures will need to be accompanied by signing to indicate to motorists how they should be used. It is recognised that road clutter and the visual impact of signs can be a problem so the rationalisation of signs and the use of sympathetic lighting systems are recommended. Traffic calming measures need to be visible during both day and night and during wet and dry conditions. It may not be possible to identify colours at night under certain types of artificial lighting. If coloured surfacing is used, it is important that the lighting used to illuminate it has good colour rendering. Signs and markings must conform to the Traffic Signs Regulations and General Directions or special authorisation for their use must be obtained. Detailed guidance on the correct use of warning signs and road markings will be found in Chapters 4 and 5 of the Traffic Signs Manual.

2.44 Many miles of trunk road are unlit, including lengths through many settlements. If traffic calming is to be implemented on an unlit road, consideration needs to be given as to whether purely amenity lighting is provided to assist personal security and accessibility or whether a system of street lighting is provided. If a system of street lighting is provided then the speed limit will be 30mph unless a specific order is made for a higher speed limit. Street lighting in settlements may not always be welcomed by the local community and outside a settlement there may be environmental objections.

Enforcement, TROs and Speed Limits

2.45 It is important that, as far as practicable, traffic calming measures should be self-enforcing. Where specific traffic regulation orders (TROs), including changes to speed limits are required, they should not be imposed without the support of the police which is essential if they are to provide an appropriate level of enforcement in a safe and effective manner. Where enforcement by mobile cameras is envisaged then safe parking off the carriageway will be required for the police vehicle in a highly visible location. Even where fixed site cameras are used, there must be safe parking for servicing the camera and changing films.

2.46 The processes involved in making a TRO or changing a speed limit can take several months and will involve statutory consultation. It is important that the time taken is built into any project programme.

General Maintenance

2.47 The implications for maintenance and whole life costs should be considered in the preparation of traffic calming schemes. Very often traffic calming schemes make use of premium materials to enhance the streetscape and minimise adverse environmental impact. Materials that are not readily available should be avoided if possible because of the high replacement costs. However, where materials that are not readily available are used it is essential that additional stocks are taken into store to ensure that a match can be achieved where statutory undertakers' work is reinstated or when accident damage is repaired. Not all materials can be readily "patched" and this should be a consideration in the final design.

2.48 As well as capital maintenance, consideration needs to be given to routine maintenance requirements. Gullies should be located so that they can be emptied without unnecessarily obstructing the flow of traffic and the design of physical features should not prevent street sweeping.

2.49 Gullies may make cycling uncomfortable and cyclists may swerve to avoid them. If practicable, kerb face drains should be used on cycle lanes. If surface gullies are used the drain slots should be at right angles to the cycle flow.

2.50 If cycle bypasses are implemented, their maintenance requirements should also be considered. In some cases they may require manual or special sweeping arrangements.

2.51 Maintenance of signs is also necessary. This may include washing, trimming of vegetation, removal of graffiti and the replacement of damaged signs.

2.52 Consideration must be given to refuse collection within settlements. Many authorities have agreements with their workforce limiting "carry" distances, so refuse vehicles may have onerous access requirements. Furthermore a significant proportion of householders are obliged to place their refuse bins at the kerbside and the layout of the traffic calming scheme must accommodate this without causing a hazard. Early contact with the waste collection authority to determine their needs is advised.

Winter Maintenance

2.53 Winter maintenance requirements such as snow clearance and precautionary salting will also need to be accommodated. Experience to date suggests that traffic calming measures do not pose any significant problems. However, it is important that maintenance crews are made aware of the location of traffic calming features and take a flexible approach to winter maintenance to provide the level of service required

2.54 It may be necessary to adjust speed in some areas and special attention may be needed when ploughing near speed humps, overrun areas and certain types of kerb and ramps. Plough blades should be carefully adjusted, particularly when ploughing in the vicinity of features that protrude above the normal carriageway level or from the horizontal kerb-line. Consideration should be given to the use of spring-loaded plough edges.

2.55 De-icing of cycle by-pass lanes located at the nearside of build-outs and other similar features can be a problem.

Monitoring

2.56 Monitoring of traffic calming schemes is essential to ensure that the objectives for a scheme have been achieved and that the problems originally identified have been addressed satisfactorily. It is important that the effectiveness of a scheme is assessed in a realistic way commensurate with its scale and nature. As a minimum, for any scheme, data on flows, accidents and speed should be monitored. For schemes requiring road safety audits, then post opening safety monitoring is required in accordance with the standard.

2.57 For complex or innovative schemes, in order to monitor the performance fully, surveys of vehicle and pedestrian flows, accidents, speed, noise, air pollution and public perception should be carried out 'after' as well as 'before' implementation. Careful consideration needs to be given to the need to collect 'before' data as, in most instances, this cannot be collected retrospectively. If there is doubt as to the need for a particular element of 'before' data then it may be wise to collect the information even if the expense of analysing it is deferred until it is certain that it is needed.

2.58 It is important that the results should be recorded for future reference as required by the Overseeing Organisation. For any scheme, consideration should be given to publicising the results so that local residents and road users are made aware of the scheme's performance.

3. TRAFFIC CALMING MEASURES

Range of Traffic Calming Measures

3.1 The range of designs of traffic calming measures is extensive. Changes in legislation have been specifically aimed at encouraging innovation although that brings with it an added degree of care and responsibility.

3.2 Most traffic calming measures are made up of a selection of one or more common features. These include:

- (a) gateways;
- (b) signs, lines, markings;
- (c) coloured surfacing;
- (d) textured surfacing;
- (e) changes to speed limits;
- (f) safety cameras;
- (g) reduction in carriageway width;
- (h) traffic regulation measures including prohibition or restriction of selected categories of traffic;
- (i) pedestrian/cyclist crossing facilities;
- (j) changes to junction priorities;
- (k) horizontal deflection; and
- (l) vertical deflections.

3.3 A selection of available measures is set out below under the basic headings of general measures, horizontal deflection and vertical deflection. However, the scope for using measures involving vertical deflection is likely to be limited on the trunk road network.

3.4 To assist designers, the main legislation relating to each measure has been indicated using the following key:

TSRGD:	Traffic Signs Regulations and General Directions 2002
RH:	Highways (Road Humps) Regulations 1999
TC:	Highways (Traffic Calming) Regulations 1999
RTRA:	Road Traffic Regulation Act 1984
HA:	Highways Act 1980

General Measures

<ul style="list-style-type: none"> - Gateways [TC] 	<p>a combination of features used to indicate the entry into a particular area where a driver's behaviour should change, i.e. the entry to a village or residential area.</p>	<ul style="list-style-type: none"> - Signs [TSRGD] 	<p>signs are integral elements of most gateways. They are also used to indicate speed limits and other regulations as well as to advise drivers of the presence of certain features.</p>
<ul style="list-style-type: none"> - Side Road Entry Treatments [TC, RH] 	<p>changes in colour and/or texture, vertical deflection or narrowing placed at the entry to side roads. May also include a continuation of the "footway" over a side road, requiring vehicles to slow down to drive over it; this feature makes it easier for pedestrians, particularly for those with mobility handicaps, to cross the side road. Technically the continuation of the "footway" is a flat top hump and must comply with the road hump regulations.</p>	<ul style="list-style-type: none"> - Speed Limits [RTRA] - Cycle Facilities [Other ²] 	<p>reduced speed limits can be introduced on particularly sensitive parts of the network such as settlements.</p> <p>not strictly traffic calming features but may be introduced to improve the safety of cyclists. Includes cycle lanes, cycle tracks and crossing facilities.</p>
<ul style="list-style-type: none"> - Road Closures [RTRA, HA¹] 	<p>used to prevent access or redistribute traffic. Can apply to all vehicles or selective categories, can still allow access for non-motorised users.</p>	<ul style="list-style-type: none"> - Pedestrian Facilities [RTRA] - Lane Reallocation [RTRA] 	<p>may be introduced to improve the safety of pedestrians. Includes improved footways, formal crossing facilities, refuges and kerb build-outs.</p> <p>the provision of specific lanes for particular types of vehicle or road user, e.g. buses, cyclists. Most likely to be used in the larger rural settlements.</p>
<ul style="list-style-type: none"> - Coloured Surfaces 	<p>can be used to highlight particular features or areas of the carriageway or to indicate reallocated road space such as bus and cycle lanes.</p>	<p>Note ¹</p> <p>Note ²</p>	<p>RTRA 1984 if temporary closure.</p> <p>Highways Act 1980 if permanent. Highways Act 1980 and Cycle Tracks Act 1989 for Cycle Tracks. TSRGD 2002 for crossings.</p>
<ul style="list-style-type: none"> - Street Furniture and Planting [TC] 	<p>can be used for visual impact and for reallocating road space.</p>		
<ul style="list-style-type: none"> - Parking [RTRA] 	<p>defining parking areas can reduce carriageway width, ensure sightlines are maintained and reallocate road space.</p>		
<ul style="list-style-type: none"> - Road Markings [TSRGD] 	<p>usually hatching, ghost islands or non-physical narrowings but can also include features such as speed limit roundels on the road surface.</p>		

Horizontal Deflection

- Build-outs [TC] narrowing of the carriageway on one side of the road.
- Narrowings [TC] consist of short or long lengths of build-outs on both sides of the road opposite each other.
- Chicanes [TC] consist of build-outs on both sides of the road but spaced so that they are not opposite one another.
- Pinch points [TC] similar to narrowings but at a specific point and often with very severe width restriction.
- Sheltered Parking [TC] the use of build-outs to protect parking areas.
- Mini Roundabouts [TC] when well designed, can be used to reduce traffic speed and reduce accidents.
- Islands/Refuges [TC] may be used to help reduce vehicle speeds, control lane discipline, prevent overtaking and assist pedestrian movements. Can also be used to separate cyclists from other traffic.
- Footway Widening/ Provision [HA] can be used to constrain road width, assist pedestrian movements and constrain parking.
- Over-run Areas [TC] a narrowing of the carriageway using texture and colour but still allowing large vehicles to encroach on it.
- Priority Working [TSRGD] alternating priority to traffic on the same road through the use of “give way” or signal control. Often associated with narrowings, chicanes or pinch points.

Vertical Deflection

- Road Humps [RH] may be round topped, flat topped; sinusoidal; flush with kerb or drop sided; “H” or “S” shaped. Although rarely used on trunk roads, humps can be very effective in controlling speeds. Their use is not permitted on roads with speed limits greater than 30mph. The maximum height permitted is 100mm although 75mm maximum is recommended.
- Raised Junction [RH] an extended flat topped hump covering the whole of a junction.
- Speed Cushions [RH] a form of hump that does not cover the full width of a traffic lane and can be spanned by the axle width of larger vehicles such as buses, fire engines and ambulances.
- Thumps [RH] a type of mini hump, formed of thermoplastic and between 900mm and 1500mm wide measured in the direction of travel and 30-40 mm high.
- Rumble Devices [TC] alerting devices limited to a maximum height of 15mm, designed to generate noise or vibration as a vehicle passes over them; may generate complaints if used near residential properties.
- Textured Surfacing [TC] less severe than rumble devices but used to denote a change in use or character of the carriageway; often used as part of gateways.

Specific Traffic Calming Measures

3.5 The following measures are typical of those used on the trunk road network with some success. Information is provided about each measure with indicative results on their effectiveness where available. The list of measures is not intended to be exhaustive and the examples shown are not necessarily recommended for a particular situation. Each scheme will need to be assessed on its own merits.

3.6 Traffic calming may be used on the approaches to settlements, within settlements or on routes outside settlements. For each of the measures below, the locations where they are most likely to be used have been indicated by the following key:

- A: Approach to settlements;
- W: Within settlements;
- O: Outside settlements.

Gateways A



3.7 Gateways are a common feature of most trunk road traffic calming schemes. They are designed to highlight to drivers that they are entering an area of changed road use e.g. a village. They may involve some form of physical measures, carriageway markings, signing, often incorporating the name of the village, and a change of speed limit.

3.8 The visual impact of Gateways can be enhanced by the incorporation of markings to reduce width at the edge or centre of the carriageway and by the use of “virtual” road humps.

3.9 The use of signs on each verge is preferable to placing a sign on a central island that may be hazardous on high speed approaches.

3.10 Experience from nine sites (TAL 01/00) has shown that the inbound mean speeds at the Gateways decreased by 3-13mph with an average decrease of 5mph.

3.11 An important issue in the design of gateways is achieving a good balance between “visual impact” and the local environment. Gateways can be designed using sympathetic local materials whilst still conveying the required message to drivers.

3.12 Generally, speed reductions at these more muted gateways are likely to be lower than at sites with bolder designs. Mean and 85th percentile speeds may be reduced by between 5-7mph..

Central Hatching A W O



3.13 The virtual reduction of carriageway width by the use of central hatching is a common feature of trunk road traffic calming schemes. The hatching can be used to deter overtaking and can be widened to incorporate protected right turning facilities. Coloured surfacing is often used in conjunction with hatching to emphasise the presence of the markings. The impact on the character of the route and specific location should be considered. (See Section 3.16).

Central Hatching/Refuges A W O



3.14 The overtaking deterrent effect of central hatching can be enhanced by the introduction of refuges either as a single feature or as a series along the road. The visibility of refuges should be emphasised by the installation of illuminated refuge indicator lamps. This is particularly important when refuges are installed on unlit roads where damage to the actual illuminated bollards may create visibility problems at night.

3.15 As refuges will be used by pedestrians as a crossing aid, care needs to be taken to locate them only at points where it is acceptable for pedestrians to cross. If this is not practicable, they should be designed to deter pedestrian use. Refuges creating sharp horizontal deflections should be avoided if possible as this may distract drivers' attention from crossing pedestrians.

Coloured Patches A W O



3.16 Coloured surface patches are commonly used as part of gateways or to emphasise the presence of particular traffic calming features. They are generally laid across the full width of the carriageway and are typically 8-12m long. The choice of colour is important. Red surfacing will have high initial visual impact but

will be prone to fading. It may also be aesthetically unacceptable. Buff surfacing may be more expensive and have less visual impact than red but will be less prone to fading, less visually intrusive and may have better whole life value. Guidance on the use of colour is provided in DMRB TA 81/99. Patches may be overlaid with a legend e.g. "SLOW" or a speed limit roundel (see Section 3.17).

Speed Limit Roundels A W O



3.17 Coloured patches with speed limit roundels are designed to alert drivers to a change in speed limit and to encourage drivers to reduce their speed. The patches may be placed across the full width of the carriageway with speed limit roundels for both directions of flow.

3.18 In early trials of 30mph and 40mph roundel markings carried out in eight villages, small mean speed reductions of about 3mph were observed overall at the 40mph sites only. Since then, roundels have been used more successfully in combination with other measures, such as coloured road surfacing and gateway signing.

3.19 TSRGD 2002 permits the use of roundels in conjunction with terminal signs showing "20" "30" "40" and "50", and, on dual carriageway roads with a 60mph speed limit order "60". They may also be used with repeater signs displaying these speeds except on lit roads subject to a 30mph limit.

Speed Limits A W O



3.20 Many accidents on rural roads are a result of drivers travelling at excessive or inappropriate speed. Reducing speed limits may help in controlling speed. However, care must be taken to ensure that the reduced speed limit is seen as being reasonable, appropriate and consistent, otherwise it may be unenforceable. Self compliance with a new speed restriction is unlikely to occur if the current 85th percentile speed is 7mph or more (or 20 per cent or more) above the proposed limit. Speed limit changes can be supported by a variety of other traffic calming features such as coloured road surfacing, central hatching and gateway treatments. The location of reduced speed limits should be chosen with care so that drivers can see a difference in character along the road and a reason for the change in limits. Speed limits should not be changed without the support of the police. This is essential if they are to provide an appropriate level of enforcement. Guidance on setting local speed limits is currently given in Circular Roads 1/93 (DfT, 1993).

Safety Camera A W O



3.21 Although found in traffic calming schemes, strictly speaking safety cameras are an enforcement

tool. There are strict rules governing the location and use of cameras and the advice of the Overseeing Organisation must be sought.

Pedestrian Facilities W



3.22 It is important within any traffic calming scheme to make appropriate provision for pedestrians. Like cyclists, pedestrians need to move along the road and across it. Provision of good quality footways can encourage walking in a relatively safe environment. Widening footways and reducing the carriageway width available to vehicles can help calm traffic. Whilst pedestrian crossing facilities are not specifically seen as traffic calming features they can act as measures that will slow traffic down, particularly where there is frequent use. Good quality pedestrian crossings sited to service pedestrian desire lines will encourage walking. Where signal controlled facilities are installed care needs to be taken to ensure that there is a reasonable pedestrian demand, otherwise there is a risk that drivers will become used to having a green light and may fail to stop when confronted by a red signal.

Cycle Facilities A W O



3.23 It is important to determine the likely level of cycling within a traffic calming scheme and make appropriate provision for it. Cyclists need to move along the carriageway and across it. Movement along the carriageway can be accommodated by the provision of on- or off-carriageway cycle facilities e.g. cycle lanes or cycle tracks. On-carriageway facilities can act to calm traffic by reducing carriageway width. However, care needs to be taken to ensure that drivers do not endanger cyclists by trying to overtake them where inadequate carriageway width may exist, e.g. at pinch points or refuges.

3.24 Where cycle facilities are introduced, additional calming measures may be required to encourage cycle use and enhance cycle safety by reducing vehicle speeds.

Vehicle Activated Signs A W O



3.25 Vehicle activated signs are ones which convey an illuminated message to drivers in response to a pre-defined “trigger” – usually a speed threshold. This has the effect of targeting the message specifically at those drivers who need it. Signs can be located on the approaches to bends, junctions or a speed limit change. However, they should not be seen as a substitute for getting the basic signing and marking correct. TSRGD 2002 permit signs displaying diagram 504.1, 505.1, 506.1, 507.1, 510, 512, 512.1, 512.2, and 513 to be accompanied by the legend “SLOW DOWN”. This is also the case when the sign is showing diagram 670 displaying “20” “30” “40” or “50” and associated equipment detects the presence of a vehicle exceeding the speed limit indicated by the sign. Recent research has shown that vehicle activated signs can be very effective in reducing speeds, particularly those of the faster drivers who contribute disproportionately to the accident risk, without the need for enforcement such as safety cameras. Average speeds can be reduced by between 1-7mph, and substantial accident reductions

can be achieved. Careful consideration needs to be given to the siting of the sign. If the sign is too close to a junction then drivers will not have sufficient time to respond. If it is too far away then the effects may diminish and drivers start to speed up. Siting will be influenced by the prevailing speed limit and the approach speed of vehicles. An appropriate trigger speed (85th percentile) will need to be determined. (See TAL 1/03.)

Street Lighting A W



3.26 Whilst not a traffic calming measure, street lighting can reduce accidents and enhance road users’ sense of wellbeing and personal safety. Nevertheless, street lighting in settlements may not always be welcomed by the local community and outside a settlement there may be environmental objections.

3.27 Where street lighting is felt to be appropriate, consideration needs to be given to the type of lighting provided. If a system of street lighting is provided then the speed limit will be 30mph unless a specific order is made for a higher speed limit. Simple amenity lighting may be adequate. Traffic calming measures need to be visible during both day and night and during wet and dry conditions. If coloured surfacing is used, it is important that the type of road lighting used allows the coloured surface to be seen at night.

Lane Reallocation A W O



3.28 Allocating carriageway for the specific use of a particular type of vehicle such as a bus or cycles can act as a calming measure by reducing the space available for other motorised users. This technique is most likely to be used in, or on the approaches to, larger settlements. Cycle lanes should not be put in solely as a traffic calming measure where there is no demand or suppressed demand. Drivers can become accustomed to empty lanes and start ignoring them.

Carriageway Width Reduction A O



3.29 Reducing carriageway width to encourage drivers to reduce their speed can be achieved through using markings as well as physical means. This approach can be used to terminate dual-two carriageways to moderate speeds. It can also be used to protect downstream turning movements by the provision of ghost islands. It can also be used on single carriageway roads by width reduction at the centre (see Central hatching) or at the verges. Care should be taken if reducing width at the verges not to create unacceptable risk of head-on collisions.

Virtual Road Hump A W



3.30 Virtual road humps are achieved through the use of painted edge markings applied to give the impression to approaching drivers that the carriageway has been raised to form a road hump. This technique has tended to be used as part of a gateway treatment. It is unlikely to produce any significant reduction in vehicle speed and any reduction it does produce is likely to be short lived as drivers realise that there is no physical effect associated with the virtual hump. Virtual humps may be appropriate on routes where the objective is to reduce the speed of tourist or visitor traffic as they are least likely to be aware of its virtual nature.

Dragons Teeth A



3.31 “Dragons Teeth” markings can be used in conjunction with gateways to increase their visibility, although they are only likely to be seen by drivers when they are close to them. The teeth are laid in pairs either side of the carriageway or a lane. Although there is no specific constraint, typically between 9 and 17 pairs of teeth have been used in trunk road traffic calming schemes. The “teeth” may increase in size as the hazard is approached or they may be all the same size, generally with a 750mm base and 600mm high. There

are no specific results available for the use of dragon's teeth but as they are only fully visible close up, their contribution to any speed reduction is likely to be small.

Countdown Markers A O



3.32 Countdown signs can be used to indicate the distance in hundreds of yards to a roundabout or the next point at which a driver may leave a route. Although mainly intended for roundabouts and non-lane drop grade separated junctions, they might also be appropriate at at-grade junctions where deceleration lanes are provided.

Mini Roundabouts W



3.33 Mini roundabouts can be used within settlements, usually on roads of 30mph or less, as a means of slowing traffic. They can also substantially reduce accidents. However, it is necessary to ensure that the flows on the various arms feeding into the roundabout are reasonably balanced so that there are no unacceptable delays to main road traffic but that side road flows are sufficient to ensure that main road traffic does have to slow down.

3.34 The use of a flush or domed island will allow large vehicles to overrun the central area if necessary. However, care needs to be taken with the siting of mini roundabouts as they can result in increased noise and ground-borne vibration. The maximum height of the domed central area is 125mm and the vertical face at the edge must not exceed 6mm.

Chicanes A W



3.35 Single chicanes can reduce speeds by up to 20mph. However, chicanes designed to reduce car speeds down to about 20mph will be too tight for articulated HGVs. Designs to allow buses, coaches and articulated HGVs to pass through at 20mph will have little effect on cars. Designs with a speed cushion on the approach will help alleviate this problem by slowing cars to 20mph as well.

3.36 Double chicanes (two closely located horizontal deflections) can reduce speeds further by up to 5mph compared to reductions at single chicanes.

Kerb Build Outs W



3.37 Kerb build outs are most appropriate within towns or major settlements on trunk roads. The build

out can be used to reduce carriageway width, shelter permitted parking and reduce crossing widths for pedestrians. Build outs need to be visible in both daylight and darkness and street lighting will, therefore, be necessary. Bollards, with the appropriate prescribed sign face, must be provided. Hatching on the approach will be needed from the kerbline to the outer edge of the build out. Where build outs are used to demarcate the ends of parking bays the appropriate edge line must be used. Care should be taken to ensure that cycle lanes are not intermittently obstructed by kerb build outs. Cycle lanes should be continued across the face of the build outs or terminated at the first obstruction by means of a formal “give way”.

Priority Working A W



3.38 Priority working, or single lane working, requires traffic in one direction to give priority to opposing traffic on the same road. This may be achieved through the use of narrowings, chicanes or pinch points with signs to diagram 615 with 615.1 on one approach and diagram 811 with 811.1 on the other. “Give Way” markings, diagram 1003, may also be used. The direction of travel that has priority can be alternated along the road at each narrowing to prevent continuous fast flow in one direction. Chicane dimensions and spacing can be varied depending upon the road type and the ‘target’ speed required. Traffic Advisory leaflets 9/94 and 12/97 give advice on chicane design and acceptable levels of flow for single lane working.

3.39 Where possible, a cycle bypass through the chicane should be considered to avoid cyclists being “squeezed” by motor vehicles.

3.40 Alternating priority working at a specific site (shuttle working) can be achieved through the use of traffic signal controls. At a site such as a narrow bridge, the use of alternating priority may allow single lane working resulting in an opportunity to make better provision for pedestrians and cyclists.

Rumble Devices A



3.41 Rumble devices are designed to alert drivers to approaching hazards or gateways through noise, vibration and visual effect. Devices may be referred to as rumble bars, jiggle bars, rumble strips or rumble areas. Bars or strips are usually formed of thermoplastic and must not exceed 15mm in height and no vertical face may exceed 6mm in height. Adequate audible and vibratory warning can be achieved from 13mm high rumble devices.

3.42 Bars or strips may be laid as a single group or as several groups. Various spacings between devices within a group have been tried. Generally, spacings below 400mm will be best suited to roads with speed limits of less than 40mph as faster drivers will tend to experience less effect.

3.43 Care should be taken in selecting materials for bars or strips to ensure that adequate skid resistance is maintained, particularly for motorcyclists.

3.44 Rumble areas act in a similar way to bars and strips by providing an audible and vibratory warning to drivers. They consist of wide bands of coarse material (typically 14mm chippings or block paving) laid across the carriageway.

3.45 It is preferable to lay rumble devices across both sides of the carriageway to avoid encouraging drivers to pass around the feature on the other side. A small gap at the edge of the carriageway will allow cyclists to bypass the rumble device. Whilst they can be laid in any colour, white is not recommended for rumble devices as they may be confused with other road markings.

3.46 Rumble devices are likely to produce only modest reductions in mean speeds of up to 3mph but may provide benefits by raising drivers’ attention levels. Initial reductions in speed may not be sustained over time. Because of noise generation, traditional

rumble devices should not be used in close proximity to residential properties.

3.47 Rumblewave surfacing is a recent development in traffic calming. The surface has an undulating profile designed to create an alerting noise and vibration within vehicles but only minimal changes in external noise. It is still being researched to determine its impact in a wider variety of settings. A TAL on rumblewave surfacing is due to be published shortly.

Textured Surfacing A O



3.48 Changes in surface texture can be used on the approaches to hazards or gateways. Textured surfacing can provide a visual, audible and vibratory warning to drivers but to a lesser degree than rumble devices or rumble areas. It is important to ensure that skid resistance is maintained. This is best achieved through the use of a high skid resistant surfacing.

Speed Cushions W



3.49 Whilst the opportunities on the trunk road network for using measures involving vertical deflection are limited, speed cushions can be appropriate. Cushions are a form of hump that are

sufficiently wide for cars and light vehicles to have to drive over them whilst being narrow enough for the wheels of large vehicles to straddle them. This results in less discomfort for bus passengers and less reduction in speed by large emergency vehicles. Parking controls may be needed in conjunction with cushions to ensure that large vehicles are not prevented from straddling the cushions by parked vehicles. Cushions must not be used on roads with a speed limit greater than 30mph and must only be used on roads that are lit, in accordance with the Highways (Road Humps) Regulations 1999.

3.50 Typical designs for cushions are given in TAL 1/98. The gap between a cushion and the kerb should normally be at least 750mm. This will allow cyclists to pass by unaffected but cushions may also have minimal effect on motorcyclists. Typically, speed reductions of up to 15mph can be achieved at the site of the cushion, depending on its design and the vehicle approach speed. The “between” cushion speed reductions will be somewhat less although typically 10mph overall reductions may be achieved. Cushions can be effective in bringing mean speeds down to 30mph but they are unsuitable for reducing speeds to 20mph (TRL 385). At Craven Arms, on the A49(T) there was a reduction of 8mph in the speed of light vehicles at the cushions (TAL 2/97). However, cushions are not so effective at reducing the speed of heavy goods vehicles.

Road Humps and “Thumps” W



3.51 On trunk roads where there are relatively large traffic flows and high proportions of large vehicles, road humps are unlikely to be used. Nevertheless, at locations where they are considered appropriate it is important that they comply fully with current regulations, including signing and markings. It should be noted that road humps cannot be installed on roads with speed limits greater than 30mph without special authorisation.

3.52 Humps may be round top or flat top or may be used across a whole junction as a raised table. Although humps are permitted up to 100mm high, 75mm is generally recommended and for trunk roads, with high proportions of goods vehicles, 50mm may be more appropriate.

3.53 Speed reductions can be substantial with 75mm high humps giving mean speed reductions midway between humps of about 10mph depending on hump spacing and “before” speeds. Humps of 50 mm height will have less speed reducing effect.

3.54 If humps are used, care needs to be taken with their siting as they can generate noise and vibration from large vehicles.

3.55 Thermoplastic humps (Thumps) may be seen as a cheap alternative to road humps. Thumps are typically 37mm high with a width of 900mm measured in the direction of travel. Widths up to 1500mm are feasible but greater widths will result in lower speed reductions. Thumps are not recommended for use on roads with speed limits greater than 30mph. Thumps can reduce mean speeds between features by 7mph. Whilst thumps may be cheaper than conventional 50mm high road humps, they need to be laid at closer spacings (approximately 50m) to achieve similar effects. (See TAL 7/94).

3.56 Road humps and thumps must only be used on roads that are lit.

4. LEGISLATION, AUTHORISATION AND DEPARTURES

Legislation

4.1 The use of traffic calming measures may be subject to regulations, advice or guidance. Legislation, or its application, may differ in England, Scotland, Wales and Northern Ireland. It is important that reference is made to the relevant legislation for the particular country concerned. For Scotland refer to “Roads (Scotland) Act 1984”, “Road (Traffic Calming) (Scotland) Regulations 1994” and “Road Hump (Scotland) Regulations 1998”. For Northern Ireland refer to “Traffic Calming Regulations (Northern Ireland) 1995” and “Road Hump Regulations (Northern Ireland) 1999”.

Highways Act 1980

4.2 The Highways Act (with amendments) is the primary legislation upon which secondary legislation covering traffic calming has been built. It provides the enabling powers for highway authorities to install traffic calming measures including road humps on public roads.

- Section 64 – roundabouts;
- Section 68 – pedestrian refuges;
- Section 75 – variations in the relative width of carriageways and footways;
- Section 77 – alterations in the level of the highway;
- Sections 90A-F – (added by the Transport Act 1981), provides powers to install road humps as defined in the Highways (Road Humps) Regulations 1999;
- Sections 90G-I – provides powers to install traffic calming works, which are defined in the Highways (Traffic Calming) Regulations 1999.

Traffic Calming Act 1992

4.3 The Traffic Calming Act 1992 amended the Highways Act 1980 by the addition of Section 90G, 90H and 90I which allow works to be carried out for the

purposes of promoting safety and preserving or improving the environment. This added to powers already in the Highways Act 1980 that could be used for traffic calming purposes.

The Highways (Traffic Calming) Regulations 1999

4.4 These regulations provide powers for highway authorities to install build-outs, chicanes, pinch-points, gateways, islands and overrun areas and rumble devices.

The Highways (Road Humps) Regulations 1999

4.5 The Highways (Road Humps) Regulations 1999 enable highway authorities to adopt a very flexible approach to the design of road humps. However, highway authorities must exercise a duty of care and should ensure that innovative designs do not compromise safety.

4.6 It should be noted that road humps cannot be installed on roads with speed limits greater than 30mph without special authorisation. To date no road hump design has been found suitable for use on roads with speed limits greater than 30mph.

The Traffic Signs Regulations and General Directions 2002

4.7 The Secretary of State for Transport makes Regulations and gives Directions regarding traffic signs and road markings within this Instrument.

Special Authorisations (Trunk Roads Only)

4.8 The purposes for which signs are prescribed in the Traffic Signs Regulations and General Directions cannot be changed by special authorisation. If, however, innovative features are introduced for which there is no prescribed warning, information sign or marking, applications can be considered for special authorisation.

4.9 Special authorisations are not automatically given and it is important, therefore, that advice is sought at an early stage on whether a special

authorisation is likely to be needed and whether it is likely, in the particular circumstances, to be given. The scheme programme should allow sufficient time for any necessary approvals or authorisations to be obtained.

4.10 Any authorisations of novel signing are likely to be for a limited time period and a report on their effectiveness will be required before further authorisation is considered.

4.11 Applications for special authorisation of traffic signs and markings for use on trunk roads should be sent to the appropriate section within the Overseeing Organisation.

Departures from Standards

4.12 There are no specific Standards relating to traffic calming measures. However, the use of traffic calming measures may result in changes to the trunk road layout such that it does not comply fully with the current Standards of the Overseeing Organisation. Advice should be sought at an early stage on whether a departure from Standards is likely to be needed and whether it is likely, in the particular circumstances, to be given. Where a specific departure from Standards is needed it should be sought from the appropriate section within the Overseeing Organisation.

5. REFERENCES

Primary Sources

Legislation

Highways Act 1980

Traffic Calming Act 1992

Highways (Road Humps) Regulations 1999

Highways (Traffic Calming) Regulations 1999

Traffic Signs Regulations and General Directions 2002

Traffic Signs Regulations (Northern Ireland) 1997

Traffic Calming Regulations (Northern Ireland) 1995

Road Hump Regulations (Northern Ireland) 1999

Roads (Scotland) Act 1984

Road (Traffic Calming) (Scotland) Regulations 1994

Road Humps (Scotland) Regulations 1998

Policy

1997 White Paper “A New Deal For Transport: Better for Everyone”

DfT – Circular Roads

3/90 Road Humps

2/92 Road Humps and Variable Speed Limits

1/93 Road Traffic Regulation Act 1984: Sections 81- 85
Local Speed limits

2/93 The Highways (Traffic Calming) Regulations 1993

5/99 20mph Speed Limit

Other Standards/Guidance Notes

Traffic Signs Manual, various chapters, Stationery Office

“Coloured Surfacing in Road Layout (Excluding Traffic Calming)” TA 81/99 Design Manual for Roads and Bridges Volume 6, Section 3, Part 4

“Traffic Calming on Through Routes” (Scottish Office, 1997)

Disability Unit Circular 1/91 “The Use of Dropped Kerbs and Tactile Surfaces at Pedestrian Crossing Points” (Department of Transport)

“Guidance on the Use of Tactile Paving Surfaces” (DfT Mobility Unit)

“Residential Roads and Footpaths. Design Bulletin 32” (Department of the Environment, 1992)

“Places, Streets and Movement. A companion guide to Design Bulletin 32, residential roads and footpaths” (DfT, 1998)

“New Direction in Speed Management, a Review of Policy” (DfT, 2000)

“Tomorrow’s Roads – Safer for Everyone, The Government’s Road Safety Strategy and Casualty Reduction Targets for 2010” (DfT, 2000)

“The Air Quality Strategy for England, Scotland, Wales and Northern Ireland” (DfT, 2000)

“A Road Safety Engineering Good Practice Guide” (DfT, 2001)

“Transport in the Urban Environment” Institution of Highways and Transportation (1997)

“The Rural Town and Village Initiative – Reducing Accidents and Making Life Better” (The National Assembly for Wales, 2001)

“Traffic Calming Trials – A Review of Traffic Calming Schemes on the Trunk and Principal Road Network in Wales” (The National Assembly for Wales, 1999)

“Cycle Friendly Infrastructure: Guidelines for Planning And Design” (IHT/Bicycle Association/CTC/DfT 1996)

DfT – Traffic Advisory Leaflets

3/90 Urban Safety Management – Institution of Highways and Transportation Guidelines

7/93 Traffic Calming Regulations

11/93 Rumble Devices

- 12/93 Overrun Areas
- 13/93 Gateways
- 1/94 VISP – A Summary
- 2/94 Entry Treatments
- 3/94 Emergency Services & Traffic Calming: A Code of Practice
- 4/94 Speed Cushions
- 7/94 “Thumps” – Thermoplastic Road Humps
- 9/94 Horizontal Deflections
- 1/95 Speed Limit Signs – A Guide to Good Practice.
- 2/95 Raised Rib Markings
- 4/95 Pedestrian Crossing – Assessment and Design.
- 7/95 Traffic Islands for Speed Control
- 1/96 Traffic Management in Historic Areas
- 2/96 75mm High Road Humps
- 4/96 Traffic Management and Emissions
- 6/96 Traffic Calming: Traffic and Vehicle Noise
- 7/96 Highways (Road Humps) Regulations 1996
- 1/97 Cyclists at Road Narrowing
- 2/97 Traffic Calming on Major Roads: A49, Craven Arms, Shropshire
- 6/97 Traffic Calming on Major Roads: A47 Thorney, Cambridgeshire
- 12/97 Chicane Schemes
- 1/98 Speed Cushion Schemes
- 9/98 Sinusoidal, ‘H’ and ‘S’ Road Humps.
- 1/98 Speed Cushion Schemes
- 13/99 Historic Core Zone: Bury St Edmunds
- 14/99 Traffic Calming on Major Roads: A Traffic Calming Scheme at Costessey, Norfolk
- 1/00 Traffic calming in villages on major roads
- 10/00 Road Humps: Discomfort, noise and ground-borne vibration
- 11/00 Village Traffic Calming – Reducing Accidents
- 5/01 Traffic Calming Bibliography (Revised Annually)
- 1/03 Vehicle Activated Signs
- 3/03 Equestrian Crossings
- 4/03 Cycling Bibliography
- 5/03 Walking bibliography

Further Reading

- Transport Research Laboratory (Transport Research Foundation)
- Project Report 18, “Road Humps for Controlling Vehicle Speed”
- Project Report 32, “Speed Control Humps – A Trial at TRL”
- Project Report 33, “An assessment of rumble strips and rumble areas”
- Project Report 35, ”The effectiveness of village “gateways” in Devon and Gloucestershire”
- Project Report 43, “On Road, Trials of Speed Cushions in Sheffield and York”
- Project Report 85, “Speed Reduction in 24 Villages: Details from the VISP Study”
- Annex to Project Report 85, Speed Reduction in 24 Villages: Colour Photos from the VISP Study
- Project Report 101, “Speeds at “Thumps” and Low Height Road Humps”
- Project Report 102, “Speed Control using Chicanes – a Trial at TRL”
- Project Report 103, “Vehicle and Traffic Noise Surveys alongside Speed Control Cushions-York”
- Project Report 174, “The Environmental Assessment of Traffic Management Schemes: A Literature Review”
- Project Report 177, “Traffic Calming – Vehicle Activated Speed Limit Reminder Signs”

TRL 180 "Traffic Calming: Vehicle Noise Emissions alongside Speed Control Cushions and Road Humps"

TRL 186 "Traffic Calming – Road Hump Schemes using 75mm high humps"

TRL 212 "Traffic Calming on Major Roads: The A49 Trunk Road at Craven Arms, Shropshire"

TRL 235 "Traffic Calming: Vehicle Generated Ground-borne Vibration Alongside Speed Control Cushions and Road Humps"

TRL 238 "Traffic Calming on Major Roads: The A47"

TRL 241 "Cyclists at Road Narrowings"

TRL 245 "Using the Driver simulator to Evaluate Traffic Calming Measures"

TRL 288 "Traffic Calming in Historic Core Zones: Crosseley Street, Halifax"

TRL 307 "Traffic Calming and Vehicle Emissions: A Literature Review"

TRL 311 "Traffic Calming – Public Attitudes: A Literature Review"

TRL 312 "Traffic Calming – Speed Cushion Schemes"

TRL 313 "Traffic Calming – An Assessment of Selected On-road Chicane Schemes"

TRL 363 "Urban Speed Management Methods"

TRL 364 "A Traffic Calming Scheme at Costessey, Norfolk"

TRL 377 "Sinusoidal, 'H' and 'S' Humps"

TRL 417 "Traffic Calming: Passenger and Rider Discomfort at Sinusoidal, Round-Top and Flat-Top Humps – a track trial at TRL"

TRL 421 "The Effects of Drivers' Speed on the Frequency of Road Accidents"

TRL 482 "The Impacts of Traffic Calming Measures on Vehicle Exhaust Emissions"

TRL 500 "Countryside Traffic Measures Group: Traffic Calming in Norfolk and Suffolk"

TRL 501 "Countryside Traffic Measures Group: Traffic Calming in Charlwood, Surrey"

TRL 502 "Countryside Traffic Measures Group: Demonstration Schemes"

Others

Urban Safety Management Guidelines – Institution of Highways and Transportation

Rural Safety Management Guidelines – Institution of Highways and Transportation

"Village Speed Control Working Group – Final Report" (CSS, DfT, The Scottish Office, The Welsh Office, TRL)

"The Effect of Traffic Calming Measures on Vehicle and Traffic Noise", by Phil Abbott, Marie Taylor and Roger Layfield (Traffic Engineering and Control, September 1997)

"The Grounding of Vehicles on Road Humps", by David C Webster (TRL Traffic Engineering and Control, July/August 1993)

"Traffic Calming in Practice" (County Surveyors' Society, Department of Transport, Association of Metropolitan District Engineers, Association of London Borough Engineers and Surveyors, Association of Chief Technical Officers)

"Traffic Calming Measures: Fibre Optic Speed Activated Sign – A140(T) Scole Village – Before and After Study" Report DOTP.25/S8 (Planning and Transportation Department, Norfolk C C, November 1993)

"Speed Limit Compliance – On main roads through villages in Essex and the effectiveness of physical speed reducing measures", by N J Aspden (Anglia Polytechnic University, March 1993)

"Speed Cameras in Oxfordshire", by D Hook, A Kirkwood, and, D Evans (Highways and Transportation, February 1995)

"A Review of Speed Camera Operations in the UK", by Mike Winnett (Proceedings Seminar J 22nd European Transport Forum)

"Reducing speeds in villages: the VISIP study", by Allan Wheeler and Marie Taylor (Traffic Engineering and Control, April 95)

Natural Traffic Calming. Guidance and Research Report (Scottish Executive, 1999)

6. ENQUIRIES

All technical enquiries or comments on this Advice Note should be sent in writing as appropriate to:

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