SIGNING FOR HEAVY VEHICLES

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MAY 2012

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**KEYWORDS**

ROAD SIGN, ROAD MARKING, REGULATORY, WARNING

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11.1 INTRODUCTION

11.1.1 General
1 The purpose of this chapter is to provide guidelines on, and illustrate how, under various circumstances, specific signing related to heavy vehicles and abnormal vehicles should be provided.

2 This chapter should be read in conjunction with various chapters of Volume 1, "Uniform Traffic Control Devices", which deal with signing policies and design principles, together with specific information in the meaning of, and individual application of, all traffic control devices. Specifically the following should be referred to:
   (a) Chapter 2 - Regulatory Signs;
   (b) Chapter 3 - Warning Signs;
   (c) Chapter 4 - Guidance Signs;
   (d) Chapter 7 - Road Markings.

3 Numerous supplementary aspects relating to the application of these various road signs are dealt with in Volume 2, and the following chapters should be referred to:
   (a) Chapter 2 - Road Marking Applications;
   (b) Chapter 3 - Regulatory and Warning Sign Applications;
   (c) Chapter 5 - Freeway Signing.

11.1.2 Summary of Typical Heavy Vehicle Problem Areas
1 Heavy and abnormal vehicles create numerous problems and are subject to limitations due to their size, mass, freight and/or operational characteristics. These problems must be addressed in order to provide safe and efficient traffic operation, and inter alia, specific signing to assist heavy vehicle drivers should be provided.

2 The typical problem areas are:
   (a) steep down-grades;
   (b) steep up-grades;
   (c) routes, particularly in urban areas where the presence of heavy vehicles creates or increases congestion problems;
   (d) routes with physical limitations which do not allow for passage of vehicles with certain characteristics;
   (e) routes with environmental limitations along which passage of certain freight is undesirable or along which noise, vibration or air pollution limits are required;
   (f) delivery sites where there is inadequate off-street parking for the delivery vehicles.

3 Signing measures to address the problems related to steep down-grades shall include:
   (a) adequate warning of the down-grade and, where necessary, details of the down-grade inclusive of slope, bends and distance;
   (b) enforcement of measures to be taken such as engaging of low gear and speed restrictions;
   (c) adequate advance warning of arrestor beds and escape lanes;
   (d) lane use control.

4 Signing measures to address steep up-grade problems include:
   (a) adequate warning of the up-grade;
   (b) lane use control.

5 Signing measures to address routing problems include:
   (a) indication of mandatory routing;
   (b) prohibition of use of certain routes.

6 In all situations the agreed signing for heavy vehicles should be provided an adequate distance before the beginning of the condition requiring special signing.

11.1.3 Terminology
1 The term "heavy vehicle" is used throughout this chapter. The term does not, however, have specific legal significance with regard to road traffic signs. It refers generally to vehicles over 3500 kg gross vehicle mass (GVM) or gross combination mass (GCM).

2 For signing purposes the term "heavy vehicles" commonly applies to vehicles over a specified GVM or GCM which is considered "heavy" in the environment to which it is related, and is therefore somewhat subjective.

3 "Heavy vehicles" over 10 tonnes GVM or GCM refers to all such vehicles, including any buses, tractors, construction vehicles etc. To sign such a collective group of vehicles would require the use of signs such as R102 or R202. If it is required to sign only for a single class of vehicle, such as goods heavy vehicles, signs such as R123 to R127 and R229 to R233 are appropriate (see Section 11.2).

4 It should be noted that "command" regulatory signs such as R102 and R123 to R127 have two functions. The one is to "command" that, in the context of heavy vehicles, a specific class of vehicle proceeds only in a particular lane or a part of a roadway. The other "command" function is to reserve that lane or part of a roadway for the indicated class of vehicle only, therefore, no other class of vehicle shall use such a portion of the roadway.
11.1.2 Road Traffic Sign Colour Indication

1. The chapters of Volume 2 of the South African Road Traffic Signs Manual (SARTSM) are not prepared in colour. Relevant examples used to illustrate appropriate signs, signals and markings are shaded in a black and white coding which is illustrated below.

2. The basic principles of the road traffic sign colour coding system are shown, in colour, in the SADC-RTSM Volume 1, Chapter 1, Section 1.4, and in the Contents sections of relevant Volume 1 and 4 Chapters.
11.2 RANGE OF APPLICABLE SIGNS AND MARKINGS

11.2.1 General

1 This section provides firstly an indication of the symbols related to heavy vehicle regulation, and then relates these to the specific signs used for this purpose. It also indicates the range of signs and markings necessary for adequate control and guidance of heavy vehicles.

11.2.2 Basic Symbols

1 There are a number of basic symbols which are used in various signs, and as road markings for regulating heavy and abnormal vehicles. The symbols which are illustrated in Figure 11.1 relate to aspects such as:

(a) indication of type or class of vehicle;

(b) controlling physical characteristics of vehicles such as mass, width, length and height which may restrict the use of a particular route or facility;

(c) specification of specific action such as engaging a lower gear;

(d) demarcation of a specific feature such as an arrestor bed.

2 These symbols are used in regulatory, warning and guidance signs.
11.2.3 Regulatory Signs

1. The range of regulatory signs applicable specifically to heavy and abnormal vehicles is given in Table 11.1 and illustrated in Figure 11.2.

2. The details of the warrants for, and the placement requirements of, individual signs, are provided in the respective sub-sections of Volume 1, Chapter 2 while their application is dealt with in Section 11.3. General applications of regulatory signs are also covered in Volume 2, Chapter 3.

3. The specific size and colour of regulatory signs is dealt with in Volume 1, Chapter 1, Section 1.4 and Chapter 2, Section 2.0.

11.2.4 Warning Signs

1. The range of warning signs applicable specifically to heavy and abnormal vehicles is given in Table 11.2 and illustrated in Figure 11.3.

2. The details of the warrants for, and the placement requirements of, individual signs are dealt with in detail in Volume 1, Chapter 1, Section 1.6 and Chapter 3, and their application is dealt with in Section 11.3. General applications of warning signs are also covered in Volume 2, Chapter 3.

3. The shape, size and colour of the warning signs is dealt with in Volume 1, Chapter 1, Section 1.4 and Chapter 3, Section 3.1.

11.2.5 Guidance Signs

1. The guidance signs which are primarily related to heavy vehicle application are those of the diagrammatic type and these are listed in Table 11.3 and illustrated in Figure 11.4.

2. The details of the warrants for, and the placement requirements of, individual diagrammatic signs, are dealt with in detail in Volume 1, Chapter 1, Section 1.6 and Chapter 4, Section 4.12. Their shape, size and colour are also dealt with in Section 4.12.

3. When it is required to create a preferred route for heavy vehicles, or even a route prohibition, it may become necessary to provide versions of MAP-TYPE DIRECTION sign GD9. These signs may include appropriate command and/or prohibition signs and/or vehicle class symbols. An example of such signing is illustrated in Figure 11.24.
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<td>▲</td>
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<td>GOODS VEHICLES</td>
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VEHICLES CONVEYING DANGEROUS GOODS

Fig 11.1 Applicable Symbols
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Fig 11.2

Applicable Regulatory Signs
### TABLE 11.2

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### Fig 11.3

Applicable Warning Signs
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<tr>
<td>Low gear engagement</td>
<td>GS505</td>
<td>4.12.24</td>
</tr>
<tr>
<td>Overhead: arrestor bed advance exit</td>
<td>GS601</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: arrestor bed exit</td>
<td>GS602</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: lane use control (command)</td>
<td>GS603</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: lane use control (prohibition)</td>
<td>GS604</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: lane use control – with distance (command)</td>
<td>GS605</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: lane use control – with distance (prohibition)</td>
<td>GS606</td>
<td>4.12.26</td>
</tr>
<tr>
<td>Overhead: arrestor bed pre-advance exit sign</td>
<td>GS6501</td>
<td>4.12.28</td>
</tr>
<tr>
<td><strong>DIRECTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Map-type direction</td>
<td>GD9</td>
<td>4.8.17</td>
</tr>
</tbody>
</table>

Fig 11.4  Applicable Diagrammatic Type Guidance Signs
11.2.6 Combination Signs

There are numerous combinations of signs which relate to the regulation of heavy and abnormal vehicles, a few examples of which are given in Figure 11.5.

There are four relevant types of sign combination:

(a) regulatory selective restriction combining primary and secondary messages (these messages are classified into LIMIT, ACTION, OBJECT messages in combination) - selective restriction signs may also be combined with an information class SUPPLEMENTARY PLATE sign IN11 (see Details 11.5.1 and 11.5.4);

(b) guidance/regulatory signs in combination in one of two forms:
   (i) a regulatory sign placed on the face of a DIRECTION sign (such applications are not common except for toll routes and will usually require a specifically designed sign) (see Detail 11.5.2);
   (ii) one or more regulatory signs placed on a DIAGRAMMATIC sign (see Detail 11.5.3);

(c) advance warning/information sign combinations involving one or more information SUPPLEMENTARY PLATE signs IN11 (see Detail 11.5.5);

(d) regulatory and/or warning signs on high visibility backgrounds - with or without information signs (see Detail 11.5.5).

2 LIMIT-LIMIT type of SELECTIVE RESTRICTION regulatory signs comprise primary and secondary message signs both of which relate to limits of one type or another. The addition of the secondary limit message to the primary limit message qualifies the applicability of the primary limit (see Volume 1, Chapter 2, Subsection 2.7.15). Typical examples are:

(a) a PROHIBITION sign indicating that vehicles exceeding a MASS LIMIT of 5 tonnes shall not proceed beyond the sign within the TIME LIMIT of 18:00 to 08:00 - see Detail 11.5.1;

(b) a PROHIBITION sign indicating a SPEED LIMIT of 40km/h for all vehicles with a GVM exceeding a MASS LIMIT of 10 tonnes - see Detail 11.5.1.

3 LIMIT-OBJECT types of SELECTIVE RESTRICTION regulatory signs comprise primary message signs relating to limits, the applicability of which are qualified by secondary message signs relating to an object being regulated, (see Volume 1, Chapter 2, Subsection 2.7.15). A typical example is:

(a) a COMMAND sign indicating a MINIMUM SPEED of 30 km/h applies to all GOODS VEHICLES - see Detail 11.5.1.

4 ACTION-LIMIT types of SELECTIVE RESTRICTION regulatory signs comprise primary message signs relating to actions, which include movements or turns, the applicability of which are qualified by secondary message signs relating to a limit (see Volume 1, Chapter 2, Subsection 2.7.17). A typical example is:

(a) a COMMAND sign indicating a mandatory requirement to PROCEED STRAIGHT ON ONLY applying only to GOODS VEHICLES of the GVM or GCM MASS INDICATED (on the symbol) - see Detail 11.5.1.

5 ACTION-OBJECT types of SELECTIVE RESTRICTION regulatory signs comprise primary message signs relating to actions, which include movements or turns, the applicability of which are qualified by secondary message signs relating to an object being regulated, (see Volume 1, Chapter 2, Subsection 2.7.18). Typical examples are:

(a) a COMMAND sign indicating the mandatory requirement to TURN LEFT ahead, applying to DELIVERY VEHICLES only - see Detail 11.5.1;

(b) a PROHIBITION sign indicating that a prohibition exists on the OVERTAKING of GOODS VEHICLES by VEHICLES CONVEYING HAZARDOUS SUBSTANCES - see Detail 11.5.1.

6 OBJECT-LIMIT types of SELECTIVE RESTRICTION regulatory signs comprise primary message signs relating to objects, the applicability of which are qualified by secondary message signs relating to a limit. Applications of this type of SELECTIVE RESTRICTION SIGN should be restricted to secondary message TIME LIMITS. Speed or mass limits should not be used, (see Volume 1, Chapter 2, Subsection 2.7.19). A typical example is:

(a) a TEMPORARY RESERVATION sign indicates a TEMPORARY reservation on the use of a roadway or area by CONSTRUCTION VEHICLES within the TIME LIMIT 06:30 to 20:00 - see Detail 11.5.1.

7 A LIMIT-OBJECT type of SELECTIVE RESTRICTION sign (see paragraph 11.2.6.3) which may be particularly relevant in urban areas relates to a parking restriction specific to a class of heavy vehicle. A typical example is:

(a) a (TIME) LIMITED PARKING RESERVATION sign indicating a maximum stay limit of 120 minutes for DELIVERY VEHICLES - see Detail 11.5.1.

8 These types of combination selective restriction regulatory signs may also include a supplementary information plate as indicated in Detail 11.5.4.

9 Prior advice of a limiting factor which may affect heavy vehicles at some point on the road ahead should be given well in advance of the limiting point as indicated in Detail 11.5.4. In this example, early indication is given of a height restriction ahead enabling the affected vehicles to take an alternative route.

10 Various heavy vehicle and abnormal vehicle related advance warning signs may be used in combination as indicated in the following examples:

(a) a steep down-grade sign (W323) combined with an information sign (IN11.2) indicating the length of the down-grade - see Detail 11.5.5;

(b) the combination of the steep down-grade sign (W322) with a warning of a winding road ahead sign (W209) on a high visibility background and an indication of the length of the down-grade (IN11.2 information sign) is shown in Detail 11.5.5;

(c) various combinations of warning of a steep down-grade or compulsory stop on a high visibility background with details of the nature of the downgrade, and including the option of flashing warning lights, are illustrated in Detail 11.5.5
11.2.9

**Examples of Typical Sign Combinations**

- **No Overtaking Goods Vehicles By Vehicles Conveying Dangerous Goods**
  - R202 - 501 Mass Limit (mm) or SDM - Time Limit
  - R215 - 571 No Overtaking Goods Vehicles By Vehicles Conveying Dangerous Goods

- **Regulatory - Selective Restriction Sign Combination**
  - TR219 - 561 Construction Vehicles - Time Limit (Temporary)
  - R208 - 561 Limited Parking - Delivery Vehicles

- **Diagrammatic/Regulatory/Information Sign Combinations**
  - Sign indicates a prohibition on goods vehicles leaving the roadway at the exit and using the R209 signs must be located on the Howick Road off-ramp to effect the prohibition. This application is NOT appropriate for COMMAND signs UNLESS the exit is for the indicated class of vehicles ONLY. Application could be used with temporary prohibition signs such as TR209 if required.

- **Guidance Sign/Regulatory Combination - Includes a Distance**
  - DA2 (with specially adapted arrow)

- **Advance Warning/Information Sign Combinations - incl. High Visibility Applications**
  - Example of a typical sign combination with high visibility background and flashing yellow lights.
11.2.7 Relative Placement of Signs at Road Junctions

1 At road junctions numerous signs in addition to the heavy vehicle related signs have to be accommodated, namely:
   (a) regulatory signs such as stop and yield signs;
   (b) advance warning and hazard marker signs;
   (c) direction signs;
   (d) tourism and/or local direction signs.

2 The basic requirement for the placement of signs is dealt with in the following chapters/sections of the Manual:
   (a) regulatory signs - Volume 1, Chapter 2 and Volume 2, Chapter 3;
   (b) warning signs - Volume 1, Chapter 3 and Volume 2, Chapter 3;
   (c) direction signs - Volume 1, Chapter 4, Section 4.8 (see specifically Figures 4.56, 4.57 and 4.58);
   (d) tourism signs - Volume 1, Chapter 4, Section 4.10 and Volume 2, Chapter 4;
   (e) local direction signs - Volume 1, Chapter 4, Section 4.11 and Volume 2, Chapter 9.

3 The distance which an advance warning sign must be placed ahead of the hazard, and its size, are dependent on the operating speed of the road, as indicated in Table 11.4.

4 In all cases of signing where several sign types are required close to each other, as on the immediate approach to a junction, priority should be given firstly to the regulatory signs, then the warning signs, the direction signs and finally the tourism signs. Signing for heavy vehicle control on the approach to an intersection is likely to require signs in addition to a standard sequence of signs. Care must be exercised regarding the proximity of one sign to another. In addition sign spacings must always be adjusted to take account of the total sign display and the road geometry, both horizontal and vertical (see Volume 1, Section 1.6). Guidelines for sign spacing are given in Table 11.5.

---

**TABLE 11.4** ADVANCE WARNING SIGN LOCATION AND SIZE

<table>
<thead>
<tr>
<th>Operating Speed (km/h)</th>
<th>Location Distance from Hazard (m)</th>
<th>Recommended Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>330 (400)</td>
<td>1500</td>
</tr>
<tr>
<td>100</td>
<td>240 (320)</td>
<td>1500</td>
</tr>
<tr>
<td>80</td>
<td>160 (220)</td>
<td>1200</td>
</tr>
<tr>
<td>60</td>
<td>120 (160)</td>
<td>900</td>
</tr>
</tbody>
</table>

**NOTE:**
(1) Figures in brackets represent extended location positions for advance signs.

**TABLE 11.5** SPACING BETWEEN CONSECUTIVE SIGNS

<table>
<thead>
<tr>
<th>Operating Speed (km/h)</th>
<th>Minimum Separation (m)</th>
<th>Preferred Separation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freeway</td>
<td>Other Roads</td>
</tr>
<tr>
<td>120</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>80</td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>60</td>
<td>n/a</td>
<td>50</td>
</tr>
</tbody>
</table>

**NOTE:**
(1) Separations indicated apply between any two consecutive signs irrespective of class.
(2) Legibility of text must also be taken into account when deciding which sign should come first of a closely separated pair of signs.
(3) The sign sequences in this chapter should not be erected without due attention to sign spacing – there is no point in putting up signs that cannot be seen.
(4) If a section of road is "busy" in terms of driver workload preferred sign separations, or better, should be specified.
11.3 HEAVY VEHICLE SIGNING APPLICATIONS

11.3.1 General

1 The problem areas identified in Subsection 11.1.2 of this chapter are looked at in detail in this section and the signing requirements for the following situations are addressed:

(a) heavy vehicle routing based on vehicle physical characteristics for rural and urban situations;
(b) heavy vehicle routing based on vehicle or freight classification;
(c) prohibition of vehicles on certain routes;
(d) lane control in relation to steep up-grades;
(e) lane control in relation to down-grades, inclusive of mandatory stopping points;
(f) requirements at arrestor beds;
(g) requirements at mass measuring stations.

2 In the following sections the figures detailing the signing requirements focus specifically on the heavy vehicle/abnormal vehicle aspects, but where necessary other signing is indicated although not detailed.

11.3.2 Routing Based on Vehicle Characteristics

1 Under various limiting circumstances it will be necessary to divert heavy or abnormal vehicles from a route which has certain physical restrictions and will thus not permit passage of certain vehicles. Thus drivers of vehicles which exceed a specified mass, height, width or length must be provided with clear signing as to what alternatives are open to them.

2 Principles which should be borne in mind are:

(a) positive guidance for such vehicles must be given to the alternative route(s), that is, there must not merely be a prohibition of a specific route but the alternative(s) must be clearly and continuously signed until the original route can be joined again; where appropriate a MAP TYPE ADVANCE DIRECTION sign GD9 indicating the extent of the detour should be considered (see Figure 11.24);
(b) adequate warning of a restriction ahead must be given.

3 The signing requirements for routing heavy vehicles are given in Figure 11.6 for rural application and in Figure 11.7 for urban application. The examples indicate a requirement for all goods vehicles over 10 tonnes to follow the route indicated. The instruction could also be based on the height restriction, width restriction, length restriction or axle mass restriction. Other routing specifications may be used where appropriate and as shown in the respective figures. The route to be taken by heavy vehicles is shaded in the figures for additional emphasis.

4 Mandatory command signs such as R108-569 or R109-569 must be used with care. The primary regulatory message used in selective restriction signs of this sort must be chosen so as to achieve the intended purpose. As a general rule the use of an ACTION: OBJECT selective restriction combination is recommended. The use of a primary OBJECT message is NOT recommended unless the route is exclusively for the class of vehicles concerned (see paragraph 11.1.3.4).
### Notes for Figure 11.6

1. Other routing specifications may be used in place of the “goods vehicle over specified tonnage”. The appropriate symbols indicating the restriction would be used in the command and prohibition signs and the following are applicable:

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol for Mandatory Sign</th>
<th>Prohibition Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Vehicles Exceeding Given Mass (GMW-X tonnes)</td>
<td>X t</td>
<td>R202</td>
</tr>
<tr>
<td>ii. Axle Mass Load Limit X tonnes</td>
<td>X t</td>
<td>R203</td>
</tr>
<tr>
<td>iii. Height Limit</td>
<td>X,YZ</td>
<td>R204</td>
</tr>
<tr>
<td>iv. Length Limit</td>
<td>X m</td>
<td>R205</td>
</tr>
<tr>
<td>v. Goods Vehicles Exceeding Given Mass</td>
<td>X</td>
<td>R230</td>
</tr>
<tr>
<td>vi. Abnormal Vehicles</td>
<td>A</td>
<td>R233</td>
</tr>
<tr>
<td>vii. Width Limit</td>
<td>X,Y,Z</td>
<td>R239</td>
</tr>
</tbody>
</table>

**Fig 11.6**

Heavy Vehicle Routing Based on Vehicle Characteristics - Rural

---

Distance indicated on IN1 will vary in accordance with placement restrictions.
### Fig 11.7

**Notes for Figure 11.7**

1. Other routing specifications may be used in place of the “goods vehicle over specified tonnage”. The appropriate symbols indicating the restriction would be used in the command and prohibition signs and the following are applicable.

2. Where appropriate a map type advance sign (GD9) should be used to guide vehicles through a complicated routing. See also Figure 11.24 as an additional example.

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol for Mandatory Sign (Command or Prohibition)</th>
<th>Prohibition Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Vehicles Exceeding Given Mass (GW-X tonnes)</td>
<td>X t</td>
<td>12t</td>
</tr>
<tr>
<td>ii. Axle Mass Load Limit X tonnes</td>
<td>X t</td>
<td>2 t</td>
</tr>
<tr>
<td>iii. Height Limit (X metres to 2 decimal places)</td>
<td>X.YZ</td>
<td>4.42</td>
</tr>
<tr>
<td>iv. Length Limit (X metres to nearest metre)</td>
<td>X.m</td>
<td>15 m</td>
</tr>
<tr>
<td>v. Goods Vehicles Exceeding Given Mass (GW-X tonnes)</td>
<td>X.t</td>
<td>10 t</td>
</tr>
<tr>
<td>vii. Width Limit (X metres to 1 decimal place)</td>
<td>X.Y.m</td>
<td>2.1 m</td>
</tr>
</tbody>
</table>

**Fig 11.7**

Heavy Vehicle Routing Based on Vehicle Characteristics - Urban
11.3.3 Routing Based on Vehicle and/or Freight Classification

1. Under certain circumstances it may be necessary to re-route certain types of vehicles and/or vehicles carrying certain types of freight, such as various toxic materials, away from certain areas. Drivers of these vehicles must be provided with clear signing as to what alternatives are open to them.

2. For the principles applicable here, see paragraph 11.3.2.2.

3. The example given in Figure 11.8 illustrates the required signing for rerouting vehicles carrying hazardous materials. Other routing specifications may be used where appropriate as shown in this figure. The route to be taken by heavy vehicles is shaded in the figures for additional emphasis.

4. Mandatory command signs such as R108-569 or R109-569 must be used with care. The primary regulatory message used in selective restriction signs of this sort must be chosen so as to achieve the intended purpose. As a general rule the use of an ACTION- OBJECT selective restriction combination is recommended. The use of a primary OBJECT message is NOT recommended unless the route is exclusively for the class of vehicles concerned (see paragraph 11.1.3.4).
Fig 11.8
Heavy Vehicle Routing Based on Vehicle and/or Freight Classification

Notes for Figure 11.8

1. Other routing specifications may be used in place of the "vehicle carrying hazardous substances" symbol. The appropriate symbols indicating the restriction would be used in the command and prohibition signs and those listed below are applicable.

2. Where appropriate a NAP TYPE ADVANCE DIRECTION sign should be used to guide vehicles through a complicated routing (see also Figure 11.24).
11.3.6 Heavy Vehicle Route Prohibition

1 Specific circumstances may necessitate the prohibition of certain vehicles or types of freight along certain routes. Aspects of using prohibition signs have been indicated in Subsections 11.3.2 and 11.3.3 where the signs have been used in conjunction with a system of positive guidance through command signs. There are instances, however, where only prohibition signs are used, namely:

(a) prohibited exit from a freeway at a specific interchange;
(b) prohibition of access onto a minor side road;
(c) prohibition of access into a private entrance to a development such as an office park, shopping centre, townhouse complex, etc.

2 The signing for prohibiting of certain vehicles from exiting a freeway at a particular interchange is illustrated in Figure 11.9 where a ground-mounted sign system is used, and in Figure 11.10 where an overhead upward pointing arrow sign system is used. The means of indicating the prohibition is by incorporating the appropriate prohibition sign into the section of the arrow indicating the off-ramp in each of the direction signs in the sequence leading up to the off-ramp. In order to make the prohibition legally effective a ground-mounted prohibition sign shall be placed at the entrance to, and on the left side of the off-ramp as shown in the figures. A second sign on the right of the off-ramp is recommended (see Figure 11.12).

3 Where a downward pointing arrow system is used in the direction signs in advance of an interchange, the incorporation of the prohibition sign in the arrows is not possible. In such a sequence this is only possible in the arrow of the GC1 pre-advance exit direction sign. Another approach must be taken to indicate the exit prohibition as illustrated in Figure 11.11. For the example shown, this is achieved by:

(a) including a R107-569-RA sign with the GC2 sign one kilometre from the exit and with and between the GC2 and GC3 signs 500 metres from the exit;
(b) including a GS604 sign (incorporating the R230 sign) next to the GC4D sign as shown.

The example illustrated in Figure 11.11 indicates a prohibition for all goods vehicles over 10 tonnes but other alternatives for other vehicle restrictions, as indicated, are also possible. The appropriate prohibition sign shall also be ground-mounted on the left-hand side of the exit ramp. A second sign on the right of the off-ramp is recommended. The display of a ground-mounted version of a command sign such as R107-569 on the left of the through carriageway of the freeway, just beyond the GORE-EXIT sign GA4, is optional (see Figure 11.12).

4 At a minor side street junction or private access to a development where heavy vehicle access is prohibited, a selective restriction R209 sign in combination with the symbol of the prohibited vehicle should be placed immediately ahead of the entrance while a similar R210 combination sign for right-turning vehicles should be placed on the far side approach as indicated in Figure 11.12. In this example a prohibition on goods vehicles exceeding 10 tonnes is indicated. If advance indication is considered necessary, signs such as R209-569 and R210-569 can be located up to 120 m in advance of the junction or access, subject to the operating speed of the road. These signs should then be followed by signs R211-569 and R212-569 at the point of turn, as illustrated in Detail 11.12.2 in Figure 11.12.
Fig 11.9
Heavy Vehicle Prohibition at a Freeway Offramp – Ground Mounted Sign Sequence

Notes for Figure 11.9

1. No Vehicles Exceeding Given MASS LIMIT (t/m)
2. No Vehicles Exceeding HEIGHT LIMIT Indicated
3. No Vehicles Exceeding LENGTH LIMIT Indicated
4. NO GOODS VEHICLES
5. NO GOODS VEHICLES OVER INDICATED t/m
6. NO VEHICLES CONVEYING DANGEROUS GOODS
7. ABNORMAL VEHICLES
8. No Vehicles Exceeding WIDTH LIMIT Indicated

(1) The example given indicates a prohibition for goods vehicles exceeding 10 tonnes to exit at the next interchange.
(2) Other prohibitions may be used where appropriate. The following signs are applicable for incorporation into the direction signs in advance of the interchange.
Fig 11.10
Heavy Vehicle Prohibition at a Freeway Offramp – Overhead Signs: Upward Pointing Arrows

Notes for Figure 11.10
(1) The example given indicates a prohibition for goods vehicles exceeding 10 tonnes to exit at the next interchange.
(2) Other prohibitions may be used where appropriate. The following signs are applicable for incorporation into the direction signs in advance of the interchange.

1 No Vehicles Exceeding Given MASS LIMIT (GVM)
2 No Vehicles Exceeding HEIGHT LIMIT Indicated
3 No Vehicles Exceeding LENGTH LIMIT Indicated
4 NO GOODS VEHICLES
5 NO GOODS VEHICLES OVER INDICATED GVM
6 NO VEHICLES CONVEYING DANGEROUS GOODS
7 ABNORMAL VEHICLES
8 No Vehicles Exceeding WIDTH LIMIT Indicated

See Fig 11.12
1. No Vehicles Exceeding Given MASS LIMIT (GVW)

2. No Vehicles Exceeding HEIGHT LIMIT Indicated

3. No Vehicles Exceeding LENGTH LIMIT Indicated

4. NO GOODS VEHICLES

5. NO GOODS VEHICLES OVER INDICATED GVW

6. NO VEHICLES CONVEYING DANGEROUS GOODS

7. ABNORMAL VEHICLES

Fig 11.11
Heavy Vehicle Prohibition at a Freeway Offramp – Overhead Signs: Downward Pointing Arrows
Fig 11.12 Local Details of Heavy Vehicle Prohibitions

If it is necessary to prohibit the entry of heavy vehicles into a minor side road or private access the use of signs R209-569 and/or R209-568 will normally be sufficient. For extra impact signs R211-569 and R212-569 may be specified in which case signs R209-569 and R210-569 should be located in an advance position.
11.3.5 Lane Use Control in Relation to Steep Up-grades

1 Long up-grades tend to slow down vehicles, especially heavy vehicles, and in order to maintain high levels of service, it is generally expedient in such areas to separate the slower and fast moving traffic. An integral part of effectively separating the slow traffic is achieved through signing.

2 The separation of traffic may be accomplished in one of the following two ways:
   (a) the prohibition of use of certain lanes by heavy vehicles;
   (b) the mandatory use of certain lanes by a specific class of vehicle (which prohibits their use by other classes of vehicle).

3 The signing required is illustrated as follows:
   (a) Figure 11.13 indicates the requirements for lane use control on multilane undivided roads using ground-mounted signs;
   (b) Figure 11.14 indicates the requirements for lane use control on freeways and multilane divided roads using ground-mounted signs.
   (c) Figure 11.15 indicates the requirements for lane use control on freeways using overhead signs.

4 Command signs incorporated into the diagrammatic sign shall only be used when the lane so designated is for the exclusive use of the vehicle type indicated.

5 If the exclusive use of a lane by the class of vehicle to be controlled is not practical due to the mix of traffic using the road, effective control may be achieved by specifying an appropriate MINIMUM SPEED in the right side lane (or centre and right side lanes on a 3-lane roadway). To achieve such control, command MINIMUM SPEED sign R101 can be placed in a diagrammatic sign GS303 or GS305, as appropriate. The value of minimum speed to be displayed should be determined as a result of an engineering assessment of the specific site, but it is likely to be higher than normally used on sign R101, typically in the range of 60 km/h to 80 km/h.

6 Signs are required as follows:
   (a) at a minimum distance of 5 km apart where the affected distance is longer than 5 km; and
   (b) in the case of freeways, immediately after every interchange.

7 With regard to construction vehicles, where relevant, temporary signing may be used during the construction period.
Notes for Figure 11.13

(1) The examples illustrated in this figure are related to “goods” vehicles over a mass of 10 tonnes.

(2) Other command and prohibition signs may be used where relevant in the diagrammatic signs and the range of these is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Command Sign</th>
<th>Prohibition Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Vehicles Exceeding Given Mass</td>
<td><img src="image1" alt="10t" /></td>
<td><img src="image2" alt="12t" /></td>
</tr>
<tr>
<td>ii. Goods Vehicles</td>
<td><img src="image3" alt="truck" /></td>
<td><img src="image4" alt="truck" /></td>
</tr>
<tr>
<td>iii. Goods Vehicles Exceeding Given Mass</td>
<td><img src="image5" alt="10t" /></td>
<td><img src="image6" alt="10t" /></td>
</tr>
<tr>
<td>iv. Vehicles Carrying Dangerous Goods</td>
<td><img src="image7" alt="truck" /></td>
<td><img src="image8" alt="truck" /></td>
</tr>
<tr>
<td>v. Abnormal Vehicles</td>
<td><img src="image9" alt="truck" /></td>
<td><img src="image10" alt="truck" /></td>
</tr>
<tr>
<td>vi. Construction Vehicles</td>
<td><img src="image11" alt="truck" /></td>
<td><img src="image12" alt="truck" /></td>
</tr>
</tbody>
</table>

Fig 11.13
Lane Use Control on Multi-lane Undivided Roads – Ground Mounted Signs
Lane Use Control on Freeways and Divided Multi-lane Roads – Ground Mounted Signs

Fig 11.14

Notes for Figure 11.14

1. The examples illustrated in this figure are related to “goods” vehicles over a mass of 10 tonnes.
2. Other command and prohibition signs may be used where relevant in the diagrammatic signs and the range of these is as follows:

- Vehicles Exceeding Given Mass
- Goods Vehicles
- Goods Vehicles Exceeding Given Mass
- Vehicles Carrying Dangerous Goods
- Abnormal Vehicles
- Construction Vehicles

Description

Command Sign

Prohibition Sign

12t

10t

10t

\[\text{Fig 11.14}
\]

Detail 11.14.2 Lane Use Prohibition (Prohibition Sign)

Detail 11.14.3 Mandatory Use of Lane (Command Sign)

Description

Command Sign

Prohibition Sign

\[\text{Fig 11.14}
\]

Lane Use Control on Freeways and Divided Multi-lane Roads – Ground Mounted Signs

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HEAVY VEHICLES
Notes for Figure 11.15

1. The examples illustrated in this figure are related to "goods" vehicles over a mass of 10 tonnes.
2. Other command and prohibition signs may be used where relevant in the diagrammatic signs and the range of these is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Command Sign</th>
<th>Prohibition Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Vehicles Exceeding Given Mass</td>
<td>R102</td>
<td>12t R202</td>
</tr>
<tr>
<td>ii. Goods Vehicles</td>
<td>R123</td>
<td>R229</td>
</tr>
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Fig 11.15
Lane Use Control on Freeways - Overhead Signs
11.3.6 Lane and Vehicle Control in Relation to Steep Down-grades

1 A potentially dangerous situation exists for heavy vehicles on steep and/or long down-grades and effective warning of the approach of such down-grades in order to slow down the vehicles timeously to enable the engaging of a low gear is essential.

2 The following figures illustrate various aspects related to the signing in advance of a steep down-grade:
   (a) Figure 11.16 indicates typical requirements for a two-lane two-way roadway;
   (b) Figure 11.17 indicates typical requirements for a freeway or multilane divided road;
   (c) Figure 11.18 indicates typical requirements where there is a compulsory heavy vehicle stop ahead, in advance of the start of the down-grade on a freeway or multilane divided road, using ground-mounted signs;
   (d) Figure 11.19 indicates typical requirements where there is a compulsory heavy vehicle stop ahead, in advance of the start of the down-grade on a freeway or multilane divided road, using overhead signs.

3 Figure 11.16 illustrates the situation where no special provisions are made for the heavy vehicles in the way of an exclusive crawler lane, and thus it is advisable to provide the SLOW MOVING TRAFFIC advance warning sign W324 at the start of the down-grade rather than the advance warning of a STEEP DESCENT sign W322. The maximum speed allowable will be dictated by the horizontal geometric design of the down-grade. On long down-grades the W324 and the R201 signs should be repeated at regular intervals of not more than 2 km.

4 Figure 11.17 illustrates the situation where an exclusive crawler lane is provided for the heavy vehicles. For a situation where heavy vehicles are prohibited from the right-hand lane but all vehicles may use the left-hand lane, then the GS301 or GS303 sign incorporating the R124 sign located at 500 m and 800 m from the start of the steep descent should be omitted.

5 Figure 11.18 illustrates the situation where a mandatory heavy vehicle stop is provided in advance of the steep down-grade, and heavy vehicles are required to use an exclusive crawler lane on the down-grade. The provision of a stop is desirable in advance of long and/or steep down-grades and this situation is preferable to that indicated in Figure 11.17.

6 Figure 11.19 illustrates the situation on a multilane freeway where a mandatory heavy vehicle stop is provided in advance of the steep down-grade, and an exclusive crawler lane for heavy vehicles is provided.
Fig 11.16
Steep Downgrades – Two Lane/Two-way Roads
Fig 11.17
Steep Downgrades – Freeway and Multilane Divided Roads

NOTE:
Application of a Mandatory Command sign to a lane means that the lane shall only be used by the class of vehicle displayed.
Fig 11.18
Compulsory Stopping Area in Advance of Steep Downgrade – Ground Mounted Signs
Compulsory Stopping Area in Advance of Steep Downgrade – Overhead Signs
11.3.7 Arrestor Beds/Escape Roads

1. On long and/or steep down-grades, arrestor beds or escape roads should be provided as a safe escape device for out of control heavy vehicles. The signing to advise drivers of heavy vehicles of the approach of an arrestor bed or escape road is as illustrated in Figure 11.20 and Figure 11.21.

2. Figure 11.20 illustrates the signing requirements on an arrestor bed approach using ground-mounted signs while Figure 11.21 illustrates the signing requirements on the approach to an arrestor bed on a freeway using overhead signs. Similar signing may be used on the approach to an escape road (see paragraph 11.3.7.5).

3. On two-way single lane roads the arrestor bed should have a left-hand exit unless the lanes are split as indicated in Figure 11.20.

4. Figure 11.22 illustrates the special markings required at an arrestor bed. In addition to the paint markings, white roadstuds are to be placed along the outside edge of the arrestor bed apron for clear demarcation of the arrestor bed at night or in misty weather.

5. Figure 11.23 shows the special markings required when an escape road is provided. The function of an escape road is to provide an unobstructed path through what would otherwise be a physical barrier across a roadway, on, or at the end of, a long and/or steep downgrade. The most likely application is at a toll plaza spanning the full width of the plaza apron. The route of the escape road, and its position through the plaza should be as direct as possible so that a heavy vehicle driver is not required to significantly change direction of a runaway vehicle on the approach to the plaza. The purpose of road marking WM9.2 is to make this direct path obvious.

6. Subject to expected weather conditions at an arrestor bed i.e. mist or fog, the reduced area of coverage of marking WM9.2 may be considered at arrestor beds.

7. Due to the relatively small size of ARRESTOR BED symbol GS51 on signs GS501 to GS504 it is recommended that the same symbol be used for signs provided for both arrestor beds and escape routes.
Fig 11.20
Signing for Arrestor Beds – Ground Mounted Signs

Right Hand Exit Arrestor Bed
only if lanes for two-way
low traffic are separate.
See Figure 11.22 for accurate
detailing of ARRESTOR BED
merging markings.

= Optional Signs

NOTE:
Standard signs GS501
to GS504 are for a
left exit arrestor bed.
Signs must be 'handed'
for a right exit. ENSURE
THIS IS NOTED WHEN
ORDERING SIGNS.
Fog 11.21  Signing for Arrestor Bed – Overhead Signs
Refer to Fig 11.20 and 11.21 for details of signs and their placement.

Road studs to be included within the painted blocks. Refer to enlarged detail.

Block Markings in Shoulder for 75m including road studs.
Fig 11.23
Escape Road Markings

Detail 11.23.1
Escape Road Markings and Roadstuds

Detail 11.23.2
Typical Escape Road Treatment at a
Toll Plaza—requires permanent allocation
of one aisle through the place.

Detail 11.23.3
Pattern Generation Detail for
Escape Road Marking MM6.2

Detail 11.23.4
Optional use of Marking MM6.2
at an Arrester Bed (reduced)
area of painted coverage

Lane Line 2m/10m
Continuity Line 2m/2m/2m

Minimum 2 x Single Block Pattern
Minimum 2 x Double Block Pattern
Balance of Length to Aisle
Triple Block Pattern

White/White Roadstuds
6m or 4m centres

GS502 or GS503
See Figure 11.21

3m, 3m, 3m, 3m, 3m
11.3.8 Compulsory Use of a Mass Measuring Station

1 The approach to a mass measuring station should be signed as illustrated in Figure 11.24. If the mass measuring station is not permanently manned, allowance should be made for signs to be covered up or removed when the mass measuring station is not operational.

2 On single lane two-way traffic roads carrying heavy volumes of traffic an additional deceleration lane, at least 300 metres long, should be provided on the approach to the mass measuring station entrance for the heavy vehicles (see Detail 11.24.2).
Fig 11.24
Mass Measuring Station

The signs shown in Detail 11.24.2 represent changes or additional signs to those shown in Detail 11.24.1. All other signs shown in Detail 11.24.1 are also required.
Fig 11.25
Example of Signing for Heavy Vehicle Routing Through an Urban Area
SIGNING FOR TRAFFIC CALMING

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12.1 Introduction
12.2 Types of Traffic Calming Measures
12.3 Planning for Traffic Calming
12.4 Traffic Calming Signing Applications

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### SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL

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**KEYWORDS**

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# CHAPTER 12: SIGNING FOR TRAFFIC CALMING

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CHAPTER 12:
SIGNING FOR TRAFFIC CALMING

12.1  INTRODUCTION

12.1.1  General

1. The objective of traffic calming is to improve traffic safety and the living environment by moderating traffic behaviour through physical and legislative measures aimed at reducing vehicle speeds and/or traffic volumes whilst giving due regard to mobility and accessibility requirements.

2. The objective of this chapter is to provide guidance regarding the application of road traffic signs for Traffic Calming Measures. In this context this guidance consists of providing information on the road signs and markings to be used when implementing traffic calming measures and providing examples of road signing and road marking layouts.

3. Prior to formulating any decision on the implementation of traffic calming measures, it is important to be aware of the large number of traffic calming measures that do exist and which can be incorporated into a traffic calming concept. A section of this chapter is therefore devoted to defining different types of traffic calming measures.

4. Since the concept of traffic calming is relatively new to South Africa, viewpoints on the merits of traffic calming can vary substantially. This Chapter should not be seen as a guideline for or against the implementation of traffic calming measures per se. However, the Chapter does address the issue of planning for traffic calming. This is deemed necessary because, although committees have been established with the objective of developing "Traffic Calming Guidelines", there are presently no generally accepted policies at a national, regional or local authority level nor has it yet been ascertained whether this need exists at all three levels. At this point in time it should therefore, be recognised that the implementation of traffic calming measures should not be brought about by, for example, an automatic and instantaneous decision by a road authority. On the contrary, it should be acknowledged that the traffic calming concept is a very complex one and that the implementation of traffic calming can have far reaching implications. Hence there is a vital need to ensure that appropriate and extensive study work has been undertaken, and is available prior to the decision making process, and it is therefore the required elements of this study work that are addressed herein.

5. Since it was only in the last quarter of 1993 that certain signs and markings relevant to traffic calming measures were prescribed in the Road Traffic Act, Volumes 1 and 4 of the South African Road Traffic Signs Manual only address the concept in a limited manner (refer to paragraph 12.1.1.6). Nevertheless, in regard to road traffic sign design, and by way of general comment, it can be stated that the signs required in terms of implementing traffic calming measures generally fall into the regulatory, warning and information signs which can be used in conjunction with the provision of traffic calming measures (see Figures 12.1 and 12.2). Nevertheless, as more measures come to the fore, and the need to implement these measures gains general approval, there may well be the need to prescribe additional traffic calming signs both in the Road Traffic Act, and in the South African Road Traffic Signs Manual.

6. Relevant references in Volume 1, which will not be repeated in this chapter, are as follows:
   (a)  requirements of traffic control devices (Subsection 1.1.5);
   (b)  uniformity of traffic control devices (Subsection 1.1.6);
   (c)  placement of traffic control devices (Subsection 1.1.7);
   (d)  principles of signing (Subsection 1.1.9);
   (e)  environmental impact (Subsection 1.1.10);
   (f)  legal aspects (Subsection 1.1.22);
   (g)  road traffic sign classification (Section 1.3);
   (h)  shape, size and colour (Section 1.4);
   (i)  sign placement (Section 1.6);
   (j) all of Chapter 2: Regulatory Signs, but specifically:
       (i)  Section 2.1 Introduction;
       (ii) Section 2.2 Control signs;
       (iii) Section 2.3 Command signs;
       (iv) Section 2.4 Prohibition signs;
       (v) Subsection 2.6.3 Woonerf;
   (k) all of Chapter 3: Warning Signs, but specifically:
       (i)  Section 3.1 Introduction;
       (ii) Section 3.3 Direction of Movement signs;
       (iii) Section 3.4 Symbolic signs;
       (iv) Section 3.5 Hazard Marker signs;
       (v)  Section 3.6 Combinations;
   (l) all of Chapter 5: Information Signs, but specifically:
       (i)  Section 5.1 Introduction;
       (ii) Subsection 5.2.2 Cul-de-sac;
       (iii) Subsection 5.2.5 Supplementary Plates;
Fig 12.1  Signs and Markings Used for Traffic Calming Measures - 1
Fig 12.2  Signs and Markings Used for Traffic Calming Measures - 2
12.1.4 INTRODUCTION

(m) all of Chapter 7: Road Markings, but specifically:
   (i) Section 7.1 Introduction;
   (ii) Section 7.2 Regulatory markings;
   (iii) Section 7.3 Warning markings;
   (iv) Section 7.4 Guidance markings
   (v) Section 7.5 Roadstuds.

7 The following references to relevant parts of Volume 4 will also not be repeated elsewhere in this chapter:
   (a) road traffic sign sizes (Section 1.2);
   (b) dimensional details (Section 1.3);
   (c) arrows and letters on road signs (Section 1.4);
   (d) all of Chapter 2: Regulatory Signs but specifically:
       (i) Section 2.1 Introduction;
       (ii) Section 2.2 Control signs;
       (iii) Section 2.3 Command signs;
       (iv) Section 2.4 Prohibition signs;
       (v) Subsection 2.6.3 Woonerf;
   (e) all of Chapter 3: Warning Signs but specifically:
       (i) Section 3.1 Introduction;
       (ii) Section 3.3 Direction of Movement signs;
       (iii) Section 3.4 Symbolic signs;
       (iv) Section 3.5 Hazard Marker signs;
   (f) all of Chapter 9: Information Signs but specifically:
       (i) Section 9.1 Introduction;
       (ii) Section 9.2, pages 9.2.2 to 9.2.5, Cul-de-sac;
       (iii) Section 9.2, pages 9.2.8 to 9.2.13, Supplementary Plates;
       (iv) Section 9.3 Symbols;
   (g) all of Chapter 11: Lettering for Road Traffic Signs;
   (h) all of Chapter 12: Road Markings.

12.1.2 Road Traffic Sign Colour Indication

1 The chapters of Volume 2 of the South African Road Traffic Signs Manual (SARTSM) are not prepared in colour. Relevant examples used to illustrate appropriate signs, signals and markings are shaded in a black and white coding which is illustrated below.

2 The basic principles of the road traffic sign colour coding system are shown, in colour, in the SADC-RTSM Volume 1, Chapter 1, Section 1.4, and in the Contents sections of relevant Volume 1 and 4 Chapters.

![Road Traffic Sign Colour Indication](image-url)
12.2 TYPES OF TRAFFIC CALMING MEASURES

12.2.1 General

1 Different types of traffic calming measures are categorised below in terms of those measures normally located at intersections, those located between intersections, and area-wide measures.

2 The measures are described in terms of their traffic calming objective, however, this is not to say that the use of such measures is restricted solely to traffic calming schemes. On the contrary, several of these measures are, under appropriate circumstances, excellent traffic control devices. Examples in this regard would be the use of mini-circles as a traffic management/control device at intersections, or the use of rumble strips not to calm urban traffic but to warn traffic, say on a rural road, to reduce speed because of a sharp curve ahead.

3 The descriptions of the traffic calming measures given in Subsections 12.2.2 to 12.2.14 should be read in conjunction with the individual sketches given in Figures 12.3 and 12.4.

4 The different types of traffic calming measures can be broadly classified in terms of where they are used within the road network as follows:

   (a) measures used at intersections (see Subsections 12.2.2 to 12.2.6);
   (b) measures used between intersections (see Subsections 12.2.7 to 12.2.12); and
   (c) area wide measures (see Subsections 12.2.13 and 12.2.14).

5 Traffic calming measures applied at intersections are primarily aimed at reducing speed into the road or limiting or removing access movements. The more common traffic calming measures applied at intersections are:

   (a) mini-circles;
   (b) raised intersections;
   (c) intersection diverters;
   (d) street closures;
   (e) intersection narrowing.

6 The main objective of traffic calming measures applied between intersections is to reduce vehicle speeds. These measures may be used in conjunction with landscaping, using physical elements such as trees, posts or bollards to emphasise the site and to improve the street environment. Traffic calming measures commonly applied between intersections include:

   (a) speed humps;
   (b) chicanes, pinch points or chokers;
   (c) rumble strips;
   (d) carriageway narrowing;
   (e) pedestrian crossing/table;
   (f) semi-spheres.

7 Area-wide measures include the following holistic applications of traffic calming:

   (a) "Woonerf";
   (b) more traditional general treatments such as one-way systems.

12.2.2 Mini-circles

1 Mini-circles have evolved from the conventional traffic circle (i.e. a traffic circle normally with a large physical inner island) with the objective of endeavouring to develop a traffic control device which will induce correct usage, and which is inherently self-regulating, and which can also be used as a traffic calming measure. They are widely used to reduce vehicle speed and to minimise vehicle stops at intersections. Their major advantage is that they do not stop traffic to the same extent as traffic signals and STOP signs. For mini-circles, raised central islands are a better option than painted central islands as the latter are unsightly and are not as effective in reducing the speed of motor vehicles.

2 The use of mini-circles, has, to some extent, led to confusion amongst motorists regarding the correct behaviour at a mini-circle. For this reason guidelines for motorists to follow when approaching a mini-circle, are included in Subsection 12.4.2 (see also Chapters 2 and 3 on general elements of junction control).

12.2.3 Raised Intersections

1 Raised intersections are design features intended to make drivers aware of the presence of a junction. In residential areas greater pedestrian movements can be expected at junction, and the raised junction area therefore introduces a greater pedestrian safety element. Because it is raised, normally to a height of 50 mm to 100 mm above normal road surface, it is more visible and it thus produces a reduction in speed. It is also a useful measure to use on the perimeter of the traffic calming area as a means of informing the motorist that such an area is being approached.

2 A potential problem with raised intersections is that they can interfere with the traffic flow priorities at intersections. At a major/minor road intersection, for example, the traffic on the major road will slow down as it approaches the raised intersection (either because of its raised nature or because of pedestrians crossing the road), and this can often be viewed by the traffic on the minor road, which under normal circumstances would be under stop or yield control, as an opportunity to proceed either across the intersection or into the main road. This tendency for raised intersections to equalise priority can, to a large degree, be overcome by appropriate signing. Nevertheless, prior to introducing this type of traffic calming measure, it should be ensured that the benefits of the measure, in traffic calming terms, outweigh any dis-benefits resulting from poorer traffic control/management, and a mix-up of traffic flow priorities.

12.2.4 Intersection Diverters

1 There are three primary types of diverters which are, the diagonal, partial and star diverters. Their main objective is to make the trip length through the local residential area longer by creating a “maze” type of system. They can be used in isolation
Fig 12.3  Traffic Calming Measures Used at Intersections
Fig 12.4  Traffic Calming Measures Used Between Intersections
with no other supplementary traffic measures, and are very effective.

2 They do, however, create access restrictions for the local residents and emergency vehicles. The diagonal diverter is a barrier placed diagonally across a four-leg intersection which converts the roadway into separate streets and prevents through traffic movements at the intersection. The semi-diverter is a barrier placed diagonally across a four-leg intersection which limits some but not all movements at the intersection. The star-diverter basically consists of a central star-shaped island which only allows left turning movements at the intersection (see Figure 12.3).

12.2.5 Street Closures

1 Street closures completely remove all vehicular traffic from the road, and can be accomplished by creating a cul-de-sac at a junction. However, street closures cannot be introduced until alternative routes for the displaced traffic have been identified.

2 In addition, any decision to close a street as a traffic calming measure, should include in the assessment process, planning for the ultimate visual closure of the road by means of landscaping measures. Due consideration must be given also to the likely need for vehicles to turn around in the cul-de-sac.

12.2.6 Intersection Narrowing

1 Intersection narrowing a measure to restrict access and can be designed to operate either as a one-way or two-way access system. When used as a two-way access system it essentially acts as a “pinch point” (see Subsection 12.2.3) located at an intersection.

12.2.7 Speed Humps

1 Speed humps are an extremely effective means of reducing vehicle speeds. Speed humps are most suitable for local collectors and access roads, and overseas experience shows that they are most commonly used in residential streets with traffic flows of up to 500 vehicles/hour. Both round and flat top (raised plateau) speed humps are acceptable. A major advantage of flat topped road humps is that they can be used as pedestrian crossings. Speed humps must be located along a road such that they are always preceded by a speed reducing feature, such as another speed hump (in a series), and by road markings. A hump may be of any height between 50 mm and 100 mm to suit particular cases. The length of the hump is greater than that of a motor vehicle's wheelbase, yet it constrains the speed of cars. It is acceptable to use a variety of heights and profiles in a series of speed humps but the length, (the dimension parallel to the road centreline) should be in the order of 3.5 m to 4.0 m.

2 The use of speed bumps (i.e. humps of minimal length) is not supported since they can, if not seen by oncoming drivers, result in drivers losing control of their vehicles. There is no restriction on the number of humps in a series but it is recommended that not more than 20 be used.

12.2.8 Chicane - Pinch Points/Chokers

1 A chicane is formed by developing two adjacently located pinch points/chokers on opposite sides of the road. These measures reduce the carriageway width at either one location, or two adjacent locations on opposite sides of the road. The width reduction can vary to allow two cars to pass each other slowly, but where it would be difficult for a car and a bus or heavy vehicle to pass "comfortably". The most common form allows for the passage of one vehicle, in one direction only, at a time.

12.2.9 Rumble Strips

1 Rumble Strips are rough surface areas or transverse strips commonly provided in sets, at progressively decreasing spacings between sets. Rumble strips introduce a type of noise and vibration that contrasts with an asphalt, concrete or paved surface, and therefore give a clear indication to drivers that they should reduce their speed. It is generally accepted that rumble strips can be a useful speed reducing instrument, but in residential areas their usefulness is limited as a result of the noise and vibration effects. For this reason their use in urban areas is, in general, not recommended.

12.2.10 Carriageway Narrowing

1 Carriageway narrowing has been widely used in town centres and residential areas. It is used over the total section of road that requires traffic calming. It can be accomplished in a number of ways, which include planting trees/widening the pavement; providing a central reservation; providing multi-purpose side strips/providing bus lanes and providing cycle lanes. Whilst planting trees on the side of the carriageway can be a cheap option, it can cause problems with underground utility services. In isolation the use of hatched areas has almost no influence on vehicle speeds but does seem more effective when combined with other measures. The provision of bus lanes and cycle lanes reduces road capacity, but has a minimal effect on motor vehicle speed.

12.2.11 Pedestrian Crossing/Table

1 Pedestrian crossings/tables basically consist of a wide speed hump (see Subsection 12.2.7) with a flattened mid-section to facilitate a pedestrian crossing. They are typically used where motorists need to be made aware of the presence of pedestrians. They can be used on access roads to schools, hospitals, pedestrian malls, etc.

12.2.12 Semi-spheres

1 Semi-spheres are designed to have the same effect as speed humps, namely to reduce vehicle speeds. They can be made from a variety of materials but one of the most common form consists of individual compressible plastic spheres aligned in two or three rows across the road. Since it is generally only possible to travel over the spheres at very low speeds and since they can constitute a danger to traffic, especially motorcycles, they should only be used downstream of another speed reducing measure or where vehicles speeds are very low (5 km/h to 10 km/h). For this reason their use on public streets is generally not favoured, although where the intention is to keep all vehicle speeds low (e.g. in car parks and/or on circulatory roads to and from car parks), they can be effective.

12.2.13 The "Woonerf"

1 "Woonerf", meaning "shared space", is a concept rather than a specific traffic calming measure. The primary aim of the woonerf concept is to create an environment in which human activities have priority. Features inherent in the woonerf concept and/or area, may include the discouragement of traffic by formulating designs which only permit low vehicle speeds, reducing vehicle speeds by signing or specific traffic calming
measures, utilizing hard and soft landscaping, different surface treatments and street furniture, and even laying down codes of driver behaviour to be adhered to when travelling within the woonerf.

12.2.14 Area-wide Measures

1 These include one-way street systems, maze or limited entry systems. The systems are applied where access and/or egress is to be limited either totally (no-entry or no-exit), or partially (turn prohibitions, time restrictions etc.). The systems are applied to eliminate through traffic movements and to reduce vehicle speeds.
12.3 PLANNING FOR TRAFFIC CALMING

12.3.1 Traffic Calming Objectives and Planning Overview

1 The principle goal of traffic calming is to improve or reinstate the social and environmental attributes of residential neighbourhoods. In terms of this goal, and as defined in overseas literature, the principle objective should not be to exclude traffic, but rather to manage and moderate its behaviour, whereby accessibility and mobility for residents, shoppers, workers or visitors is not significantly reduced.

2 In a South African context, the demand for the introduction of traffic calming measures has emerged because, in the eyes of some road users, the operating conditions on routes through residential areas are simply better than those on the primary (arterial) road network. This has led to the increased use of residential roads/streets for “through” trips. This characteristic, commonly referred to as “rat-running”, is illustrated in Figure 12.5. Recent studies have shown that in certain local authorities, the increase in “rat-running” has been quite dramatic.

3 The potential to “rat-run” has, to a large degree, been augmented by the land-use structure prevalent in South Africa’s urban areas. By way of general description these areas utilize a rather “open” transport/land-use structure which as a rule takes minimal cognisance of the principle of separate residential and traffic zones first expounded by Buchanan in the early sixties and which has general acceptance worldwide. The “open” land-use structure also makes it difficult to successfully fulfil the objectives of traffic calming. This can be concluded since, although the introduction of traffic calming measures in one particular area can create benefits for that area, the “rat-run” traffic can all too easily circumnavigate the traffic calmed area, and hence reintroduce the initial problem in adjacent or other residential neighbourhoods.

4 In order to address the problems outlined above, there is a need to identify those planning aspects which need to be considered when contemplating the introduction of the traffic calming concept and to ensure that appropriate study work is undertaken prior to considering the introduction of these concepts. In this regard special cognisance should therefore be taken of:

(a) what can be achieved, in global transportation and land-use terms, by adopting a residential zone/traffic zone development process in future planning, which can reduce the conflict between residents and through traffic movements;

(b) the fundamental need to define roads and streets into a proper hierarchical structure, identifying those roads in the traffic zone which must not be subject to traffic calming (the primary network), and those which fall within the residential zone (see Volume 1, Chapter 4 and Volume 2, Chapter 9); subsequent to defining the primary network, there is an additional need to ensure that the roads incorporated in this network can adequately accommodate the traffic demands (including the traffic displaced from the residential streets), because if they cannot, rat-running in the residential neighbourhoods will continue unabated;

(c) the need to continually strive for and support development related to minimising vehicle pollution, and to attain improved driver behaviour through education, because such efforts can reduce conflict and can create additional social and environmental benefits;

(d) the need to undertake traffic calming studies in a responsible and comprehensive manner (see Subsection 12.3.2);

(e) the need for accord on the legality of traffic calming measures, which can be accomplished by means of national co-ordination and by prescribing these measures in the Road Traffic Act.

12.3.2 Traffic Calming Study Requirements

1 It can be anticipated that on-going requests from residential groups for the implementation of traffic calming measures will continue. There is therefore an urgent need to establish the means whereby such requests can be properly evaluated and subsequently concluded to be either justified or unjustified. As traffic calming is a traffic/transport issue, it seems logical to conclude that the most appropriate means of determining justification is to ensure that a proper and sufficiently comprehensive traffic/transport study is undertaken. Although this statement appears obvious, it should be acknowledged that many past traffic calming studies in South Africa have not incorporated sufficient information on detailed aspects, and they have not addressed the “bigger picture” issues, and hence they have been somewhat lacking. In making this comment no criticism of those responsible for these studies is intended, for it is concluded that the primary reason for this outcome is that traffic calming is seen as something local, something small and hence funds directed to its study tend to be limited. As it is also the norm for traffic calming studies to incorporate public involvement, and public involvement is generally expensive, this has further limited the amount of funds available for technical traffic/transport work.

2 In order to address the issue of traffic calming warrants, the following subsections focus on highlighting the study work requirements deemed necessary for a traffic calming study. Obviously in practice the size of, and the issues involved in, these studies, will vary and therefore not all these study requirements will be needed in every study. However, the availability of a detailed study requirement listing, does provide a checklist which can be referred to at the outset of each traffic calming study.

12.3.3 Public Involvement

1 Public involvement should always be viewed as being a very beneficial exercise, and this is particularly the case in traffic calming studies, since residents of the neighbourhood can directly relay their concerns and their first hand knowledge of their area, in terms of its traffic issues (e.g. its bad points and its good points), to the study team. Such information generally assists in ensuring that the study is comprehensive, and often the nature of this information is such that without the residents input, it may have been overlooked. When identifying the
requirements of the public involvement programme and particularly if adopting a group representation approach, it must be assured that a representative cross section of opinion is obtained. In this regard it should be noted that opinions can differ within a neighbourhood itself, and from one neighbourhood to another, and hence without wide representation the study outcome can be heavily biased. Past experience has also shown that residents who are promoting traffic calming in their neighbourhood can often themselves be "rat-runners" in adjacent or other neighbourhoods. In the promotion of traffic calming measures, it must therefore be acknowledged that one rule must apply to all, and hence the right to traffic calm in one neighbourhood can be transferred to all residential neighbourhoods. Residents must therefore not expect to keep "through" traffic out of their neighbourhood, but to continue themselves to impact others. Rather they must accept that they too, will be diverted back to the arterial network and accommodated at the "correct location". This particular point provides one example of why traffic calming studies cannot be undertaken in isolation, and in an ad-hoc manner, for arterial network needs must be examined from the point of view of the "ripple affect" of traffic calming, and the potential diversion of traffic from many and not just one residential neighbourhood.

2 Formulating an exact "shopping list" of the authorities, groups and associations who should be included in the public involvement process is difficult, since these will vary from study to study, but the following list should assist in the identification of potential role players:

(a) neighbourhood resident groups/associations;
(b) adjacent resident groups/associations;
(c) Local Authority within which the neighbourhood is situated;
(d) adjacent Local Authorities;
(e) Metropolitan, Provincial and National Road Authorities when applicable;
(f) representation from Emergency Services;
(g) representation from the business sector, commerce and industry etc. when applicable;
(h) representation from the private transport sector and from the authorities, operators and users of other transport modes if applicable.

12.3.4 Study Area Definition

1 Although the definition of the appropriate study area is often viewed as being one of the easier tasks, this is often not the case. Definition of the study area requires specific information on the extent of the problem, and, more often than not, this can only be ascertained when detailed traffic survey work has been undertaken. Conducting traffic surveys, and defining the study area, therefore often requires an interactive process until both requirements are fully satisfied.

12.3.5 Survey Requirements

1 Preliminary discussions with residents in a neighbourhood will reveal their concerns. The traffic engineer/transportation planner can then "brainstorm" these concerns and in so doing also identify external related issues and hence design an appropriate overall survey package. Survey requirements and study requirements are of course interlinked. More information on survey requirements is given in Subsection 12.3.6.

2.3.6 Study Requirements

1 From the outset it must be acknowledged that although the development of traffic calming measures is relatively small in terms of road capital expenditure, it is not a small budgetary issue in transport planning terms, and hence adequate funds for its study should be allocated. In clarifying this statement it must be remembered that many forms of traffic calming involve traffic diversion or may be designed to motivate a change in transport mode, and that the upgrading of roads and the provision of more public transport to accommodate such diversion is not a cheap business. Traffic calming schemes that have gone wrong can therefore have very expensive consequences, and hence this must be duly recognised when setting traffic calming study budgets.

2 Before entertaining the introduction of traffic calming measures, proper investigations/studies must be undertaken. These studies must address, and where applicable, collect reliable information on:

(a) the precise concerns of residents (through traffic, speed, noise, accidents etc.);
(b) the magnitude of the problem, and in particular the magnitudes of the "internal" traffic (residential) and the external traffic;
(c) the origins and destinations of the external traffic, thereby ensuring that the reasons for using the residential streets in question are known;
(d) an examination and analysis of the roads at the "correct" location, thereby ensuring that the reasons why these streets are not used are known, and hence ensuring that problems in this regard can be rectified;
(e) travel times through the residential neighbourhood (this is vitally important since if incorrectly designed, the time taken to travel through the local residential area after implementation can remain quicker than the arterial route option, hence making the newly implemented measures obsolete);
(f) the identification of other routes/roads which have the potential to be impacted should traffic calming measures be introduced;
(g) the implications on residents should traffic calming measures be introduced (especially when considering the introduction of street closures, diverters etc.);
(h) the implications beyond the bounds of one neighbourhood, in terms of the "ripple" effect from one area to another, if roads at the "correct" location require upgrading/improvement (these implications to be known in traffic, economic and cost terms);
(i) emergency vehicle access requirements;
(j) public transport implications.
Fig 12.5  
Typical Environment Appropriate to Traffic Calming
12.4 TRAFFIC CALMING SIGN APPLICATIONS

12.4.1 General

1 Certain road traffic signs specifically related to traffic calming (e.g. speed hump), are prescribed in the Road Traffic Act and many other regulatory, warning and information signs and markings can be utilised when implementing a traffic calming concept. However, with the passage of time, there is a good possibility that additional traffic calming related signs will need to be prescribed in the Road Traffic Act. This seems logical since in those overseas countries where the traffic calming concept is much more entrenched/established, there are a larger array of traffic calming related signs prescribed. Regardless of this fact, there is a variety of signs and markings prescribed in terms of present legislation, which can be used at traffic calming locations. Examples of these signs are shown in Figures 12.1 and 12.2.

2 A further point to acknowledge in regard to traffic calming signing is that at the present time no overall consensus has been attained and hence there is an on-going debate, regarding aspects of the legality of traffic calming measures. Whilst this is obviously of concern, there is however total agreement on the fact that the success of any legal claim for liability arising from the introduction of such measures, will be much reduced if appropriate road traffic signs have been erected at, and in advance of, these measures. It should therefore be assured that this requirement is strictly adhered to.

3 The following section provides information on, and/or examples of, typical traffic calming signing layouts in respect of implementing traffic circles, speed humps, chicanes / pinch points and raised intersections.

4 The sequence of the signs (i.e. where regulatory, warning and information signs should be placed) required in terms of implementing other traffic calming measures, such as pedestrian tables, diverters etc. will be similar, however, it should be noted that whilst there are “generic” signing options, at present the Manual does not incorporate specific signs for these measures.
12.4.2 Mini-circles

1 A typical traffic calming signing layout for a traffic circle is shown in Figure 12.6. Other aspects with respect to the implementation of mini-circles are outlined below.

2 Raised central islands are a better option than painted islands because the latter are unsightly, and may also not reduce the speed of motor vehicles sufficiently. Wholly painted central islands are also a maintenance burden on the local authority, due to the relatively large areas of paint involved.

3 The traffic circle should preferably have an outer radius not less than 10.5 metres to allow most vehicles to circumnavigate the centre island.

4 The provision of flared entries and the deflection of through movements will increase the effectiveness of traffic circles.

5 The very efficiency of traffic circles tends to make them not suitable when located within a signalised system for they can overload downstream signals. They also tend not to be suitable when heavy “tidal” flows are present.

6 The continuous traffic flow promoted by the efficiency of traffic circles can also cause problems for pedestrians and cyclists, hence the needs of these road users must not be overlooked.

7 Installing speed humps on the approaches to the mini traffic circles with the aim of reducing approach speeds is deemed beneficial, particularly when both types of measure are used within an area.

8 Advance signs to warn of the presence of a mini-circle is obligatory. In this regard road sign W201 should feature prominently.

9 Traffic regulations in regard to negotiating mini-circles are governed by the YIELD AT MINI CIRCLE sign R2.2. The regulation pertaining to this sign, as defined in the Road Traffic Regulations, reads essentially as follows: "This sign indicates to the driver of a vehicle approaching a mini circle that the driver shall yield right of way to any vehicle which will cross any yield line at such junction before him and which, in the normal course of events, will cross the path of such driver's vehicle."

10 Whilst the above regulation suggests a "first come, first served" situation it is important that this not be interpreted as a right to demand "right of way." In this regard it must be noted that road traffic rules do not allocate "rights" but only pass an obligation onto the driver of a vehicle to act in a prescribed manner. Bearing this in mind and because many motorists are confused regarding the proper use of mini-circles, the following guidelines are recommended:

(a) if not passing straight through the mini-circle, use your indicators well in advance to give clear notice of your intended movement through the mini-circle;

(b) when approaching a mini-circle controlled by traffic circle yield signs, reduce speed to less than 30 km/h, depending on circumstances, and observe your position in relation to other vehicles already in the mini-circle area or vehicles approaching the mini-circle;

(c) allow vehicles already in the mini-circle, and which may cross your path of entry, to pass through the mini-circle;

(d) enter the mini-circle (i.e. cross the yield line) if your manoeuvre is not in direct conflict with any other vehicle already in the mini-circle.

11 Pedestrians always have right of way and this should be kept in mind at all times. Some mini-circles include pedestrian crossings which are slightly removed from the circle itself. This is done to separate the interaction between vehicles and vehicles, from the interaction between vehicles and pedestrians. Always act correctly at pedestrian crossings, even if they are part of the mini-circle.

12 Cycles share the roadway with other motor vehicles and are also vehicles which have right-of-way. Cycles at mini-circles must be regarded the same as any other vehicle but with much more consideration for the safety of the cyclist. Do not enter the mini-circles at the same time as the cyclist if there is any chance of conflict. Care should however always be exercised where pedestrians and cyclists are involved.

13 Because of the limited geometry of mini-circles, heavy vehicles in most cases need to cross over at least some part of the centre island of the mini-circle and go through the mini-circle at very slow speeds. Always allow the heavy vehicle all the space needed to complete its movement through the mini-circle.

14 In Figure 12.6 the “deflector” islands shown in the entry/exit paths are not detailed because their function is geometric. If these are mountable or semi-mountable they should be marked with PAINTED ISLAND markings RM5 to enhance their visibility. The “geometry” of the circle area may also be enhanced by means of marking RM5 when appropriate. An example of this is illustrated in Detail 12.6.1 which depicts a three-legged mini-circle constructed at a T-junction. Since mini-circles may have little vertical dimension road markings play an important role in enhancing visibility of the circle area when intersection and road profile may combine to “hide” the island. Designers must acquaint themselves with specific site conditions and should carefully consider the combination of island height, road markings and optional road studs in such situations.

15 It should be noted that options for the signing treatment of medium to large sized traffic circles are greater than for mini-circles. This relates primarily to the wording of the rule of the road pertaining to drivers actions at traffic circles, and to the common size constraint of mini-circles, used as traffic calming measures, in this context. For further details refer to Chapter 3, Subsection 3.3.3.
12.4.3 Notes on Figure 12.6

(1) Signs and Markings per Approach

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<thead>
<tr>
<th>Quantity</th>
<th>Type</th>
<th>Min. External Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R2.2</td>
<td>900 side</td>
</tr>
<tr>
<td>1</td>
<td>W201</td>
<td>900 side</td>
</tr>
<tr>
<td>1</td>
<td>IN11.3</td>
<td>900 wide</td>
</tr>
<tr>
<td>1</td>
<td>RTM2</td>
<td>200 wide</td>
</tr>
<tr>
<td>1</td>
<td>RM5</td>
<td>18 metres</td>
</tr>
<tr>
<td>1</td>
<td>WM5</td>
<td>2500 or 1250</td>
</tr>
<tr>
<td>1</td>
<td>RM15</td>
<td>varies</td>
</tr>
</tbody>
</table>

+ = optional signs

(2) When several mini-circles comprise an area traffic calming treatment, the use of high visibility signs W201-WB+IN11.1 at the main entry points to the area is recommended. The normal size of such signs is 1600 mm x 1200 mm but 1200 mm x 900 mm may be specified. If a reduced speed limit is imposed within such an area the use of high visibility "Zone Ends" R201-WB signs may be warranted on leaving the area.

(3) If the area is subject to a variety of traffic calming measures sign W201-WB+IN11.2 may be replaced by one of signs W339-WB+IN11.2 or W332-WB+IN11.1 as appropriate (see Figure 12.2).

(4) Checklist

The following factors should be checked when considering signing for traffic calming measures which include speed humps:

- are any mini-circles in the area difficult to see, either by day or by night?
- is the use of retroreflective roadstuds advisable?
- are SUPPLEMENTARY PLATE signs IN11.3 required with sign W201 or is the entry point to the circle, and therefore sign R2.2, clearly visible?
- is the mini-circle one of several? if yes, is use of sign W201-WB+IN11.1 advisable?
- is the mini-circle one of several types of traffic calming measure in the area? - if yes, is the use of sign W339-WB+IN11.1 appropriate?

Fig. 12.6
Typical Road Sign Layout
For Mini-Circles
12.4.4 Speed Humps

1 A typical traffic calming signing layout for a speed hump is shown on Figure 12.7. Other aspects with respect to the implementation of speed humps are outlined below.

2 Speed humps may be used on single carriageway roads provided there is a 60 km/h speed limit and the road is not an arterial road. It must be ensured that local street lighting is sufficient and if this is not the case, lighting must be specially provided.

3 Speed humps should be located along a road so that they are always preceded by a speed reducing feature. Examples of speed reducing features are:
   (a) controlled intersection;
   (b) road bend (which will reduce vehicle operating speed to an appropriate level);
   (c) another speed hump within a series;
   (d) another appropriate traffic calming measure.

4 There is no restriction on the number of humps within a series but it is recommended that not more than 20 be used. Distances between speed humps and other features should be as follows:
   (a) distance between speed humps not less than 20 m nor greater than 150 m;
   (b) distance from a pedestrian crossing not less than 30 m;
   (c) distance from an intersection not greater than 40 m;
   (d) distance after bend not greater than 40 m.

5 Speed humps may be coincident with pedestrian crossings, subject to the necessary speed reducing features being present. Humps should not be located within 30 m of the crossing. It can also be an advantage to site a speed hump at an uncontrolled crossing place. Where speed humps coincide with any crossing it is strongly recommended that only flat top humps are used.

6 Visually impaired people can have great difficulty in distinguishing between the carriageway and the footway at both controlled and uncontrolled crossings coincident with a road hump. Consideration should be given to the use of suitable tactile surfaces to indicate the edge of the footway.

7 Providing the necessary speed reducing features are present, there are no restrictions as to how close speed humps may be placed to intersections. However, to help avoid any stability problems arising for two wheeled vehicles, the hump could be set back from the intersection by 5 m - 8 m, depending on site conditions.

8 Humps must not be constructed on any bridge or other structure such as a subway, inside a tunnel, or within 25 m of such a structure or tunnel. The reason for these restrictions is the risk of structural damage caused by vehicle impact, or increases in impact loading.

9 Although the use of full 100 mm high humps is not excluded along bus routes, it may be appropriate, in order to minimise any detrimental effects on buses and their passengers to consider the use of lower height humps. The type and frequency of bus should be taken into account when determining this, as smaller buses or a low frequency of services should not normally require a lower height of hump.

10 There have been fears raised about the possible dangers of tapered humps to riders of two wheeled vehicles who might attempt to ride in the channel between the hump and the kerb or who might slip off the edge of the hump into the channel. Painted LEFT EDGE LINE markings RM 4.1 should therefore be provided as these will serve as a guide to encourage cyclists and motorists to keep clear of the edge of the taper.

11 The provision of advance traffic signs to warn of the presence of a speed hump or a series of humps is obligatory. In this regard road sign W332 should feature prominently. In addition to the provision of warning signs, information signs (e.g. indicating the distance to the first hump, the distance over which the humps extend etc.), should also be displayed.

12 The actual position of each hump should be marked by placing DANGER PLATE signs W401 and W402 in the verges to each side of the hump on both approach.

13 Details 12.7.2 to 12.7.4 illustrate specific details of the marking and construction of speed humps.
12.4.5 Notes on Figure 12.7

(1) Signs and Markings per Approach

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<th>Type</th>
<th>Min. External Dimension (mm)</th>
</tr>
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<td>W401</td>
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</tr>
<tr>
<td>1</td>
<td>W402</td>
<td>600 x 150</td>
</tr>
<tr>
<td>1</td>
<td>W332</td>
<td>900 side</td>
</tr>
<tr>
<td>1*</td>
<td>IN11.1</td>
<td>900 wide</td>
</tr>
<tr>
<td>1*</td>
<td>IN11.3</td>
<td>900 wide</td>
</tr>
<tr>
<td>1</td>
<td>RM1</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>RM4.1</td>
<td>-</td>
</tr>
</tbody>
</table>

PLUS per speed hump

1          | WM10    | 200 stripes                  |
3          | Red     | roadstuds                    |
4          | Yellow  | roadstuds                    |

* = optional signs

(2) When several speed humps comprise an area traffic calming treatment the use of high visibility signs W332-WB+IN11.1 at the main entry points to the area is recommended. The normal size of such signs is 1600mm x 1200mm but 1200mm x 900mm may be specified. If a reduced speed limit is imposed within such an area the use of high visibility “Zone Ends” R201-WB signs may be warranted on leaving the area.

(3) If the area is subject to a variety of traffic calming measures sign W201-WB+IN11.2 may be replaced by one of signs W339-WB+IN11.2 or W332-WB+IN11.1 as appropriate (see Figure 12.2).

(4) Checklist

The following factors should be checked when considering signing for traffic calming measures which include speed humps:

- does street lighting exist in the area?
- is the speed hump an isolated one or part of an area traffic calming treatment?
- is the speed hump part of a traffic calming treatment involving a range of different traffic calming measures?
- is the speed hump a flat top hump which is used as a pedestrian crossing?

Fig. 12.7

Typical Road Sign Layout
For Speed Humps
12.4.6 Chicanes or Pinch Points

1. Typical traffic calming signing layouts for a chicane are shown in Figure 12.8. Other aspects with respect to the implementation of chicanes/pinch points are outlined below.

2. Pinch points reduce the carriageway width on opposite sides at a specific part of the road. It is also possible to have a single pinch point on one side of the carriageway (see Detail 12.8.3). A useful width restriction is to allow for a carriageway width where two cars can pass each other slowly (carriageway width 4.2 m to 4.4 m) but one car and a bus or heavy goods vehicle together would have difficulties in passing. More commonly used are pinch points that only one vehicle can negotiate at a time (carriageway width 2.75 m to 3.2 m).

3. The form and shapes of pinch points vary considerably. Often they are constructed as pavement peninsulas or as small planted areas combined with trees. This type of pinch point may be designed in such a way that the existing road drainage is unaffected. It is also possible to use pinch points in combination with cycle facilities. Such pinch points are used as separators between the carriageway and the cycle lane.

4. In order to maintain a low speed over a longer stretch of road, pinch points, for one-or two-way traffic, should be placed not more than 50 m apart (30 m to 40 m spacings are, in fact, advisable).

5. In regard to the suitability of pinch points for one-way and two-way traffic flows, the following should be noted:

   (a) One-Way Traffic:
   - pinch points reducing the carriageway to one lane are not suitable for main roads with high traffic flows. The Dutch traffic calming manual only recommends pinch points for flows of 400 to 600 vehicles per peak hour (maximum 4,000 to 6,000 vehicles per 12 hours); according to the Danish manual, pinch points that reduce the carriageway width to one lane are advised only for traffic flows of up to 3,000 motor vehicles per day.

   (b) Two-Way Flow:
   - pinch points reducing the carriageway width to 4.2 m to 4.4 m could be used on roads with higher motor vehicle flows than recommended in the Dutch manual, but only if the heavy goods vehicle and bus proportions are low (about 5% and less).

6. Pinch points with a high frequency of buses and/or HGV’s need a wider carriageway width (4.6 m to 4.8 m). The Dutch manual suggests a carriageway width for two-way traffic of 5 m to 6 m when there is a high portion of bus and heavy goods vehicle traffic. However, the speed-reducing effect will then be minimal unless other traffic calming measures are added.

7. Pinch points appear to be ideal for low-frequency bus routes when neither road humps nor speed cushions are acceptable to bus operators.

8. Pinch points need enough light to be seen well in advance by motor vehicle drivers during the hours of darkness. This will also apply for chicanes.

9. As with all traffic calming measures, chicanes and pinch points need to be complemented by traffic control devices of various sorts to ensure that drivers are made aware of the presence of the “obstruction” in their anticipated or normal path. The extent of this marking for visibility is likely to depend on whether the measures have been installed as part of an initial development, complete with landscaping, or as an after measure with little attention to landscaping. The least that is likely to be required is the use of retroreflective panels on decorative bollards placed on the chicanes or pinch points and the possible use of KERBFACE marking GM8.

10. For a one-way pinch point some form of control over the passage of vehicles in one direction is required. Depending on the geometry of the pinch point, AND whether it forms part of an intersection, conventional STOP signs R1 or YIELD signs R2 may be used. However, pinch points are commonly located in a mid-block position and the use of YIELD TO ONCOMING TRAFFIC sign R6 in one direction, and either RIGHT OF WAY sign IN7 or an appropriate DIAGRAMMATIC sign in the other direction. If sight distance to the pinch point is limited, advance versions of signs R6, IN7 or a DIAGRAMMATIC sign may be used with SUPPLEMENTARY PLATE signs IN11.3. A YIELD LINE marking shall be provided on the approach which loses priority (see Detail 12.8.3).

11. The signing of a chicane or double pinch point will vary according to whether it is intended to operate on a one-way or two-way basis. Detail 12.8.1 shows controlled use by means of YIELD TO ONCOMING TRAFFIC signs R6. In such a situation the operation involves a “first-come/first-served” approach, whereby the vehicle arriving at a yield line whilst another is within the chicane area, shall yield to that vehicle, and so on (keeping in mind that this form of traffic calming is only appropriate for low orders of traffic volume - see paragraph 12.4.6.5). If the chicane is to work in a two-way manner there is no yield control involved and warning of the restriction in width should be given by ROAD NARROWS advance warning signs W238, W239 or W330 or by advance warning WIDTH RESTRICTION sign W260 and TWO-WAY TRAFFIC sign W212 (see Detail 12.8.2). In all cases the option exists to indicate the distance to the pinch point using SUPPLEMENTARY PLATE signs IN11.3 or to provide the “warning” message in a high visibility or diagrammatic sign form.
### 12.4.7 Notes on Figure 12.8

#### (1) Signs and Markings per Approach

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Type</th>
<th>Min. External Dimension (mm)</th>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>CHICANE</td>
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<td>(i) Yield Approach – Detail 12.8.1</td>
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<tr>
<td>1</td>
<td>R6</td>
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<td>1</td>
<td>W360</td>
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</tr>
<tr>
<td>1</td>
<td>W401</td>
<td>600 x 150</td>
</tr>
<tr>
<td>2</td>
<td>W402</td>
<td>600 x 150</td>
</tr>
<tr>
<td>1*</td>
<td>IN11.3</td>
<td>900 wide</td>
</tr>
<tr>
<td>1</td>
<td>RTMs</td>
<td>200 wide</td>
</tr>
<tr>
<td>1</td>
<td>RM1</td>
<td>9 metres</td>
</tr>
<tr>
<td>1</td>
<td>GM8</td>
<td>length of chicane</td>
</tr>
<tr>
<td>(ii) Non-Yield Operation – Detail 12.8.2</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>W330 or W360</td>
<td>900 side</td>
</tr>
<tr>
<td>1*</td>
<td>W212</td>
<td>900 side</td>
</tr>
<tr>
<td>1</td>
<td>W401</td>
<td>600 x 150</td>
</tr>
<tr>
<td>2</td>
<td>W402</td>
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<td>half length</td>
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<tr>
<td>1</td>
<td>GM8</td>
<td>length of chicane</td>
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#### PINCH POINT

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<th>Yield Operation – Detail 12.8.3</th>
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<td>2*</td>
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<tr>
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<tr>
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</table>

* = optional signs

#### (2) Checklist

The following factors should be checked when considering signing for traffic calming measures which include speed humps:

- are peak hour traffic volumes under 600 vehicles per hour?
- is the area adequately illuminated?
- is the road used by public transport vehicles or a significant percentage (5% or more) of heavy goods vehicles?
- is operation to be one-way or two-way?
- are chicanes to be landscaped - if yes, W401/W402 signs may be omitted?
- are diagrammatic signs required to assist awareness?

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**Fig. 12.8**

Typical Road Sign Layout
For Chicanes/Pinch Points
12.4.8 Raised Junctions

1. A typical signing layout for a raised junction is shown on Figure 12.9. Other aspects with respect to the implementation of raised junctions are outlined below.

2. The plateau height should be of the order of 100 mm and the plateau should be paved in block-paving with a distinctive colour and a textured finish.

3. The adjacent sidewalk should preferably be 10 mm to 20 mm higher than the plateau in order to assist people with a visual handicap.

4. Ramps on the approaches to the junction should be a minimum length of 600 mm.

5. It should be ensured that roadway lighting at the junction is extremely good.

6. A raised junction may be provided at a signalised junction or a non-signalised junction. If the provision of the raised junction is intended to specifically improve the priority of crossing pedestrians (rather than the presence of pedestrians being incidental - as at any urban junction) care must be taken with the selection of road traffic signs. The use of block paving or textured surfaces must not be seen as an argument for not providing recognised pedestrian crossing markings.

7. It should be noted that if a pedestrian crossing point is not indicated by road markings, the area in which pedestrians may have the right of way to cross a road in terms of the "Rules of the Road" may be significantly larger than would otherwise normally be allocated by markings (see Chapter 3, Figure 3.1).

8. There are three recognised ways in which pedestrian crossings may be marked, namely:
   (a) PEDESTRIAN CROSSING LINES marking RTM3 (appropriate at traffic signals); or
   (b) BLOCK PEDESTRIAN CROSSING marking RTM4 (appropriate at non-signalised crossing points); or
   (c) GUIDE LINES marking GM2 (appropriate if no form of priority other than the rule of the road is applicable).

9. It has been the general practice in South Africa not to use BLOCK PEDESTRIAN CROSSINGS marking RTM4 at junctions. Given that traffic calming measures, in certain situations, are specifically provided to improve pedestrian safety and freedom of movement, the wider use of marking RTM4 may be beneficial. In terms of the provisions of the Road Traffic Act, Act 93 of 1996 and its Regulations the use of marking RTM4 at a junction is not precluded.

10. Figure 12.9 shows a non-signalised junction with a raised plateau junction area. The figure illustrates the option to use markings RTM3 AND RTM4 at such a junction. From the illustration used it can be assumed that in this example pedestrian movements are greatest crossing the priority road.
12.4.9 Notes on Figure 12.9

(1) Signs and Markings per Approach

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<td>W303</td>
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<tr>
<td>1</td>
<td>W306</td>
<td>900 side</td>
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<tr>
<td>1</td>
<td>In11.3</td>
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<td>Wm10</td>
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<tr>
<td>1</td>
<td>RTM4</td>
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<tr>
<td>1</td>
<td>RTM2</td>
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<tr>
<td>1</td>
<td>RTM1</td>
<td>300</td>
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</tbody>
</table>

* = optional signs

(2) Checklist

The following factors should be checked when considering signing for traffic calming measures which include speed humps:

- Is the junction signalised or not?
- Are additional measures necessary to control pedestrians?
- Can the vertical height of the plateau be made clearly visible to drivers?

Fig. 12.9
Typical Road Sign Layout
For Raised Intersection