Manual

Traffic and Road Use Management
Volume 3 – Signing and Pavement Marking

Part 2: Pavement Marking Usage

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1 General principles

Refer to MUTCD Part 2 Sections 5.1 and 5.2.

5.1 Scope

This Section specifies the lines, patterns, symbols, letters and numerals and markers used in or on road pavements and kerbs or adjacent to the road, for the purpose of guiding traffic.

NOTE: Raised islands or medians are not defined as pavement markings, although their surfaces may be marked.

Requirements for longitudinal pavement markings on sealed pavements of various cross sections are included also in Clause 4.2.2.

5.2 General principles

5.2.1 Purpose

A system of clear and effective pavement markings is essential for the proper guidance and control of vehicles and pedestrians.

Pavement markings may simply guide traffic or give advance warning, or they may impose restrictions which are supported by traffic regulations. They may act as a supplement to other road devices, but they are often the only effective means of conveying certain regulations and warnings to drivers.

It is essential to check their use against the traffic laws and regulations before they are installed or removed, to avoid possible conflict or confusion.

5.2.2 Removal of markings

Markings required on account of particular road conditions or to impose restrictions shall be removed or obliterated if those conditions cease to exist or the restrictions are withdrawn. Steps should be taken to ensure that marking removal does not leave a change in surface texture that could be mistaken for a marking or that covering material does not produce a slippery surface. Substantial changes to pavement markings may require pavement resurfacing.

5.2.3 Limitations

Pavement markings have the following limitations:

- They may not be clearly visible if the road is wet or dusty, for example, near an edge or a median.
- They are subject to traffic wear and usually require frequent maintenance.
- They can be obscured by traffic.
- Their effect on skid resistance requires careful choice of materials and precludes the use of large marked surface areas. Markings within a traffic lane may be a hazard to motorcycles and should, where practicable, be avoided on curves.

In spite of these limitations they have the advantage under favourable conditions of conveying information to drivers without diverting their attention from the road.
1.1 Types of markings

The following types of markings are described in this section:

a) Longitudinal lines
   - Dividing lines ................................................................. Section 2.2.1
   - Barrier lines ................................................................. Section 2.2.2
   - Lane lines ................................................................. Section 2.2.3
   - Edge lines ................................................................. Section 2.2.4
   - Continuity lines ................................................................. Section 2.2.5
   - Turn lines ................................................................. Section 2.2.6
   - Outline markings ................................................................. Section 2.2.7
   - Longitudinal lines at intersections ................................................................. Section 2.2.8
   - Wide centreline ................................................................. Section 2.2.9

b) Transverse lines
   - ‘STOP’ and ‘GIVE WAY’ lines ................................................................. Section 2.3.1
   - Crosswalk lines ................................................................. Section 2.3.1
   - Other transverse lines ................................................................. Section 2.3.1

c) Other markings
   - Diagonal and chevron markings ................................................................. Section 2.4.1
   - Messages on pavements ................................................................. Section 2.4.2
   - Marking of parking and loading areas ................................................................. Section 2.4.3
   - Kerb markings ................................................................. Section 2.4.4
   - Multi-lane roundabouts ................................................................. Section 2.4.5

d) Raised pavement markers
   - General ................................................................. Section 2.5.1
   - Permanent retroreflective pavement markers ................................................................. Section 2.5.2
   - Non-retroreflective pavement markers ................................................................. Section 2.5.4
   - Temporary raised pavement markers ................................................................. Section 2.5.4
   - Pavement bars ................................................................. Section 2.5.5
   - Audio-tactile line markings ................................................................. Section 2.5.6
1.2 Materials

Refer to MUTCD Part 2 Sections 5.2.5, 5.2.6, 5.2.7 and 5.2.8.

5.2.5 Pavement marking materials and reflectorisation

Pavement marking materials of various kinds are specified in AS4049 (Series).

All longitudinal lines, chevrons and diagonal markings having application at night shall be reflectorised. Reflectorisation should also be considered for other markings where an adequate level of skid resistance can be maintained. Glass beads for use in the reflectorisation of pavement markings are specified in AS/NZS 2009.

5.2.6 Colours

Except as specified following, the colour of pavement markings shall be white.

Yellow markings shall be restricted to the following uses:

a) Parking spaces whose use is restricted to certain user classes (see Part 11).

b) Edge lining to indicate no stopping.

c) Tram lane lines.

d) Longitudinal lines in snow areas except for the edge line where stopping is to be permitted.

Black may be used in the gaps of a broken pavement line to heighten contrast where a light coloured pavement does not allow adequate line definition to be obtained. This does not establish black as a standard colour.

Where yellow is used, the colour shall be Golden Yellow, Colour No. Y14 in AS2700. The colour coding for RRPMs differs from that for pavement markings (see Clause 5.6.2).

5.2.7 Size of markings

The size, spacing and pattern of longitudinal lines are shown in Figure 5.1.

5.2.8 Profile line marking

Longitudinal lines may be installed as profile markings in the form of regularly spaced ribs added to a uniform thickness line. Profile markings provide an audible warning when vehicles run over the lines and aid wet night visibility.

Road pavements may be marked by one or more of the following materials:

a) paint – with or without glass beads embedded or premixed (see AS4049.3) – limited to line marking only.

b) in situ plastic materials – with or without reflective properties.

c) pre-cut sheeting – with or without reflective properties.

d) raised pavement markers – studs which may be retroreflective (RRPM) or non-retroreflective (NRPM) set into the roadway or attached to the road surface with adhesives, lane dividers or pavement bars.

e) line marking tape – without reflective properties, usually black in colour to cover existing line markings on final pavement surfaces for temporary roadwork operations.
Refer to Part 4 of this document for information on pavement marking materials.

1.2.1 Performance criteria

Longitudinal line marking, excluding audio-tactile line marking, when applied, shall have a minimum retroreflectivity of 350 mcd/ lux/m² measured up to 20 days of wear.

Transverse markings shall incorporate an anti-skid treatment, with a skid resistance greater than 45 BPN when measured under wet conditions.

The application of anti-skid shall comply with the manufacturer’s requirements.

Refer to Transport and Main Roads Technical Specification MRTS45 for additional details on material performance criteria.

1.3 Colours

White paint shall have a colour equivalent to or whiter than Off White, Colour Y35 in AS2700.

Where yellow is used, the colour shall be Y14, Golden Yellow as detailed in AS2700.

Coloured pavement surfacings should be applied in accordance with best practice to ensure that these treatments are durable and have adequate skid resistance. Until such time as a Technical Specification has been developed for these coloured pavement surfacings, Transport and Main Roads Supplementary Specification Colour Surfacings for Cycleways (MRSS10B) should be used.

For further advice or to obtain a copy of the Supplementary Specification MRSS10B, please contact the Principal Engineer (Asphalt and Surfacings) from Transport and Main Roads' Pavement Research and Innovation Unit on telephone (07) 3066 7725.
2 Types of markings

2.1 General line types

Lines may be continuous or broken. In general, a broken line may be crossed by vehicles at the discretion of drivers. Continuous lines may or may not imply a legal constraint on crossing; legal requirements are related specifically to the line type (barrier line, lane line, edge line or stop line). The dimensions of the various line types are shown in MUTCD Part 2 Figure 5.1.

2.2 Longitudinal lines

For more information, refer to MUTCD Part 2 Section 5.3.

5.3 Longitudinal lines

5.3.1 General

A longitudinal line shall consist of a continuous or a broken line, or a combination of both, marked generally parallel to the direction of travel. Where warranted, longitudinal lines shall be used as described below. The pattern and dimensions of longitudinal lines are shown in Figure 5.1.

5.3.2 Dividing lines

5.3.2.1 General

A dividing line is used to separate opposing traffic movements on undivided (two-way) roads. It need not be in the geometric centre of the roadway. Where crossing of the line must be prohibited in one or both directions, a barrier line shall be used (see Clause 5.3.3).

5.3.2.2 Two-lane, two-way roads

A dividing line shall take one of the following forms:

a) a single broken line when provided on sealed pavements 5.5 m or more wide and where the guides given in Clause 5.3.2.4 are met.

b) A barrier (double) line where crossing of the line must be prohibited in one or both directions, for example, at a no-overtaking zone, or when entering or leaving the roadway (see Clause 5.3.3).

c) A single continuous barrier line as an alternative to a double barrier line but where the line may be crossed by traffic entering or leaving the roadway (see Clause 5.3.3.2).

5.3.2.3 Multi-lane roads

On undivided multi-lane roads having lane lines provided for one or both directions of traffic, a dividing line shall be provided as a dividing line of the type specified in Figure 5.1 for multi-lane undivided roads.

NOTE: A double two way barrier line may be used to restrict turning movements.

2.2.1 Dividing lines

For more information, refer to MUTCD Part 2 Section 5.3.2.4.

Overtaking and right-turning manoeuvres may be made across a broken dividing line in either direction. Right-turning movements may be made across a single continuous dividing line to enter or leave the road; however, overtaking movements cannot be made in either direction.
A single continuous dividing line may also be used where access driveways in an urban environment are so closely spaced that access breaks in a two-way barrier line (provided in accordance with Section 3.3.5 of this guide) would result in the two-way barrier line appearing as a series of broken lines and drivers may have difficulty in perceiving the presence of a no overtaking zone. In these circumstances, the width of the continuous dividing line should be 100 mm wide.

Dividing lines for overtaking lanes and climbing lanes shall be provided as for dividing lines on a two-lane, two-way road, with barrier lines provided if the warrants for a no overtaking zone are met.

Dividing lines should not be used on:

a) divided roads
b) rural undivided roads of less than 5.5 metres width
c) urban undivided roads of less than 6.8 metres width, unless there is a prohibition on kerbside parking or parking demand is very low.

For more information on dividing lines at intersections, see Section 4.1.2 of this guide.

### 2.2.2 Barrier lines

For more information, refer to MUTCD Part 2 Section 5.3.3.

#### 5.3.3 Barrier lines

##### 5.3.3.1 General

A barrier line is a dividing line which replaces the single dividing line to prohibit crossing movements from one or both directions, as described below:

a) Single barrier line. See Clause 5.3.2.2(c).

b) Double one-way barrier lines. A double one-way barrier line is continuous line beside a broken line. Overtaking across the lines are permitted from the broken line side but not from the continuous line side. Turning movements are permitted from both sides.

c) Double two-way barrier lines. A double two-way barrier line comprises two continuous lines side-by-side. Movements across the lines, or to the right of the lines, for the purpose of overtaking or turning in either direction are prohibited.

Under the *Queensland Road Rules*, Rule 134, barrier lines have the following effects:

a) Double one-way barrier lines: vehicles are permitted to cross the lines to overtake from the broken line side, but not from the continuous line side.

b) Double two-way barrier lines: overtaking movements are not permitted in either direction.

Vehicles are permitted to turn right across a double one-way barrier line to enter or leave the road from both the broken line side and the continuous line side of the barrier line.

Vehicles are not permitted to turn right across a double barrier line to enter or leave the road. Where crossing to / from a property, access may be allowed along a section of road with a two-way barrier line, a gap must be left in the two-way barrier line (see Section 3.3.5 of this guide for details).

Although the distance between the two component lines is specified in MUTCD Part 2 Figure 5.1, this distance may vary. The point at which a barrier line becomes a median island is therefore open to
interpretation. It is recommended that, where barrier lines meet a median island gore, the barrier lines are continued to form at least one of the edges of the island.

Audio tactile line marking (ATLM) may be used as a two-way barrier line treatment, in line with Section 2.5.6 of this guide, to alert drivers of lane drifting.

For more information on barrier lines at intersections, see sections 3.6.3 and 4.1.3.

2.2.3 Lane lines

For more information, refer to MUTCD Part 2 Section 5.3.4.

Lane lines are used to separate lanes of traffic moving in the same direction. Overtaking and right-turning movements may be made across a broken lane line, but Queensland Road Rule 147 generally prohibits a vehicle from crossing a continuous lane line. Continuous lane lines are used to enforce lane discipline – for example, between a right-turn only lane and the adjacent lane on the left.

For more information on lane lines at intersections, see Section 4.1.4 of this guide.

2.2.4 Edge lines

Refer to MUTCD Part 2 Section 5.3.5.

### 5.3.5 Edge lines

Edge lines are used as follows:

a) General delineation

Edge lines are used where specified or recommended in Clause 4.2.2 to provide a continuous guide to the driver and to discourage traffic from travelling on shoulders, thereby making driving safer and more comfortable, particularly at night.

Where used for this purpose they shall be placed on both sides of the sealed surface of the roadway as follows:

i) Sealed shoulder – at edge of traffic lane.

ii) Unsealed shoulder – 75 mm clear of edge of seal.

iii) Kerbed pavement – 300 mm clear of face of kerb.

b) Lane boundaries

Edge lines may be used to define the boundaries between moving traffic lanes and parking lanes.

c) Guidance past objects and through width transitions

Short lengths of edge line or a local widening of a continuing edge line may be used to guide traffic past an object that is close enough to the road to constitute a hazard, or to transition the road past a traffic island or at a narrowing of the pavement.
Where used to deflect traffic at a pavement narrowing, the length (L) of the edge lined transition shall be determined as follows:

\[
L = 0.5 \times V \times W
\]

where

\[
V = 85^{th} \text{ percentile speed, in kilometres per hour}
\]

\[
W = \text{lateral offset, in metres}
\]

Examples of such transitioning are shown in Figure 4.17.

ATLM may be used as a preferred edge line treatment in some locations. Guidelines for ATLM are contained in Section 2.5.6 of this guide and MRTS45 *Road Surface Delineation*.

For more information on edge lines at intersections, see Section 4.1.5 of this guide.

### 2.2.5 Continuity lines

For more information, refer to MUTCD Part 2 Section 5.3.6.

#### 5.3.6 Continuity lines

A continuity line may be used to indicate the edge of that portion of a roadway assigned to through traffic, and where it is intended that the line be crossed by traffic turning at an intersection, or lane changing when entering or leaving an added lane at its start or finish. Its use to delineate trap lanes is shown in Figures 2.10 and 3.5.

**NOTE:** Where a zip-merge is required (see Clause 4.7.2(a)), the continuity line is omitted.

A continuity line may also be used to indicate the edge of that portion of a road assigned to through traffic, and where it is intended that the line be crossed by traffic entering or leaving a freeway at the intersection of the ramp and the main freeway lanes. For treatment at expressway exit and entrance ramps, see Section 3.7. It is also used to show the continuity of a bicycle lane where it continues through an unsignalised intersection. For more information, see Section 3.8.2 of this guide.

Continuity lines may also be used to delineate the edge of the running lane at an indented bus bay. In this case, the line may be painted yellow. For more information on continuity lines at intersections, see Section 4.1.6 of this guide.

### 2.2.6 Turn lines

For more information, refer to MUTCD Part 2 Section 5.3.7.

Turn lines comprise a broken line 100 mm wide, with 600 mm stripes and 600 mm gaps. For more information on turn lines at intersections, see Section 4.1.7 of this guide.

### 2.2.7 Outline markings

For more information, refer to MUTCD Part 2 Section 5.3.8 and Section 2.5.5 of this guide.

Outline markings of splays, medians, islands, safety bars and shoulders shall be a single continuous line. The gap between the outline marking and safety bars should be 75 mm.
### MUTCD Part 2 Figure 5.1 – Longitudinal and transverse line types

**LONGITUDINAL LINES**

1. **Dividing lines**
   - (a) Two-lane roads
     - Non Freeway: 100
     - Freeway: 150
   - (b) Multilane roads

2. **Barrier lines**
   - (a) Single
     - 100
   - (b) One direction
     - 80
   - (c) Both directions
     - 80

3. **Lane lines**
   - (a) Broken
     - 100, 150
   - (b) Special purpose - broken, including exit lines at roundabouts
     - 100
   - (c) Continuous
     - 100, 150

4. **Edge lines**
   - (including transition lines)
     - 150* and 150

5. **Continuity lines**
   - 200 and 200

6. **Turn lines**
   - 100

7. **Outline markings**
   - 150 and 150

**TRANSVERSE LINES**

8. **Stop lines**
   - 300

9. **Give way lines**
   - 600 mm stripe and gap
   - 300

*This width may be reduced to 100 mm on rural roads with unsealed shoulders and on urban roads with a 60 km/h or lower speed zone.*
Table 2.2.7 – Design codes for line types

<table>
<thead>
<tr>
<th>Line code</th>
<th>Line type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDL</td>
<td>Dividing lines</td>
<td>Two-lane roads</td>
</tr>
<tr>
<td>MDL</td>
<td>Multi-lane roads</td>
<td></td>
</tr>
<tr>
<td>SBL</td>
<td>Barrier lines</td>
<td>Single</td>
</tr>
<tr>
<td>ODBL</td>
<td>One direction</td>
<td></td>
</tr>
<tr>
<td>DBL</td>
<td>Both directions</td>
<td></td>
</tr>
<tr>
<td>BLL</td>
<td>Lane lines</td>
<td>Special purpose – broken, including exit lines and roundabouts</td>
</tr>
<tr>
<td>CLL</td>
<td></td>
<td>Continuous</td>
</tr>
<tr>
<td>EL</td>
<td>Edge lines</td>
<td></td>
</tr>
<tr>
<td>CL</td>
<td>Continuity lines</td>
<td></td>
</tr>
<tr>
<td>TL</td>
<td>Turn lines</td>
<td></td>
</tr>
<tr>
<td>OM</td>
<td>Outline markings</td>
<td></td>
</tr>
<tr>
<td>SL</td>
<td>Stop lines</td>
<td></td>
</tr>
<tr>
<td>GWL</td>
<td>Give way lines</td>
<td></td>
</tr>
</tbody>
</table>

2.2.8 Longitudinal lines at intersections

For more information refer to MUTCD Part 2 Section 5.3.9.

5.3.9 Longitudinal lines at intersections and roundabouts

Use of longitudinal lines at, and on the approaches to intersections and roundabouts shall be as follows:

a) Dividing, barrier and lane lines

These lines shall be used as follows:

i) At minor side roads with or without STOP or GIVE WAY sign control, these lines, where existing on the major road approach, shall be carried through the intersection, except that a gap shall be left in a double barrier line for turning or crossing traffic – see Clause 5.3.3.2.

ii) At signalised intersections, the lines shall be discontinued at the stop line on each approach.

iii) Where lane changing just in advance of the intersection is a problem and needs to be prohibited, the last 10 m to 12 m of lane line on the approach shall be continuous.
iv) On an intersection approach controlled by STOP and GIVE WAY signs or across which is marked a give-way line, a dividing line terminating at the stop or give-way line comprising either:

(A) a single continuous dividing line 10 m to 12 m in length, or

(B) a special purpose broken dividing line (see Figure 5.1) up to 30 m in length unless a single continuous line is required for another purpose, for example, to control overtaking;

shall be marked wherever the sealed pavement width or width between kerbs is at least 6 m over the length of the line. It shall also be provided at lesser widths if the rest of the approach road is dividing line marked, or if there is a crest or curve on the immediate approach. The marking may need to be extended in the latter case.

v) Exit lines shall be marked at multi-lane roundabouts, except where geometric restrictions prohibit their safe use or where combinations of single lane exits and high turning traffic volumes can lead to operational difficulties. A typical example is shown in Figure 2.7.

Exit lines shall:

(A) comprise a special purpose lane line (see Figure 5.1)

(B) have a minimum of three segments marked per exit line

(C) commence from a line drawn tangentially from the central island to the splitter island exit edge line at the previous exit, and

(D) extend far enough into the roundabout exit to provide satisfactory guidance for exiting vehicles.

b) Edge lines

Where edge lines are used, they shall be discontinued through a major intersection or past intersecting roads or streets which have STOP or GIVE WAY signs. If the intersection is wide, a continuity line should be used.

For more information on longitudinal lines at intersections, see Section 4.1 of this guide.

2.2.9 Wide centreline

For more information refer to Transport and Main Roads Technical Note TN155 Wide centre line treatment – interim advice Section 4.
4 Dimensions and Design of a WCLT

Minimum length of WCLT

The minimum length that a WCLT should be installed over is 2 km (inclusive of intersections and other structure treatments).

Cross section of WCLT

The dimensions related to WCLT and application of ATLMs is detailed in Table 4.1 below.

Table 4.1 – WCLT Dimensions and ATLM Application

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>WCLT¹</th>
<th>ATLM</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 km/h and greater</td>
<td>1.0 m</td>
<td>Yes</td>
</tr>
<tr>
<td>70–80 km/h</td>
<td>0.8 m</td>
<td>No²</td>
</tr>
<tr>
<td>60 km/h</td>
<td>0.6 m</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes to Table:
1. WCLT is width between the centres of the lines at either side of the treatment.
2. ATLM to be applied if section is immediately adjacent to a 90 km/h or higher speed zone (transitioning drivers between high and low speed zones) or there is a history of fatigue related crashes.

Wide centreline treatment (WCLT) is used to provide additional separation for opposing traffic flows. WCLT shall comprise either a double barrier line or one-way barrier line; for more information, see Section 2.2.1 of this guide.

As per Clause 4.4.2 of TRUM Volume 2 Part 5, audio-tactile centre lines should only be applied in conjunction with audio-tactile edge lines, except on roads with sealed shoulder widths less than 500 mm or where audio-tactile edge lines are not used due to noise issues.

The positioning and layout of ATLM at WCLT are detailed in Transport and Main Roads Traffic Control sign drawings TC1978_1 to TC1978_3. It is important to note that the ATLMs are located offset, not on top of, the associated line marking. For more details on ATLM, see Section 2.5.6 of this guide.

2.2.10 Yellow Box Marking TC2309

Refer to Technical Note TN180 Yellow box marking at signalised intersections.

2.3 Transverse lines

For more information, refer to MUTCD Part 2 Section 5.4.

5.4 Transverse lines

5.4.1 General

Transverse lines should be wider than longitudinal lines to compensate for the low angle at which they are viewed.
5.4.2 Give-way lines

A give-way line shall comprise a broken line a minimum of 300 mm wide with line segments 600 mm long separated by 600 mm gaps. It shall be placed in a similar position to that specified for a stop line. The give-way line shall be used as follows:

a) To indicate the safe position for a vehicle to be held at a GIVE WAY sign at an intersection.

b) At a roundabout, to indicate the safe position for a vehicle to be held before entering. The line shall be placed across the entering road along the edge of the circulating roadway (see Figures 2.7 and 2.8). Markings shall not be placed across the exits from a roundabout.

It may be used to indicate the safe position for a vehicle to be held at a T-intersection or in any other location where a driver is legally required to give way to an intersecting or conflicting traffic stream.

5.4.3 Stop lines

A stop line is a continuous line that shall be marked across the traffic lanes approaching a traffic control device at which traffic is required to stop. It shall extend from the left-hand edge of pavement to the dividing line, median, or in the case of a one-way street, to the right-hand edge of pavement. It shall only be used in conjunction with another device which legally requires a driver to stop under prescribed conditions, and indicates the point behind which vehicles must stop when required.

At ‘STOP’ signs where visibility is often restricted, the driver’s line of sight both to left and right, the needs of pedestrians and the clearance from traffic in the intersecting road shall be considered when positioning the stop line. It shall be a minimum of 300 mm wide at a STOP sign and shall be parallel to the line of the intersecting road.

The use of stop lines at signalized intersections, railway crossings and at mid-block pedestrian crossings is given in Parts 14, 7 and 10 respectively.

5.4.4 Positioning of lines at ‘STOP’ and ‘GIVE WAY’ signs

The stop and give-way lines to be used with STOP and GIVE WAY signs shall be as illustrated in Figure 5.3. Figure 2.1 shows the use of the GIVE WAY signs and the associated markings on roads of various widths with and without a median. The use of STOP signs and associated lines shall be similar. Requirements and recommendations for these pavement markings are as follows:

a) The minimum pavement marking associated with STOP and GIVE WAY signs shall be a stop or give way line (see Clauses 5.4.2 and 5.4.3) normally placed in prolongation of the kerb line or edge line, but may be set back if there is a problem of vehicles over-running the line, or if it is desired to hold vehicles back some distance from the intersecting roadway.

b) If the intersection is wide, e.g. two lanes entering with a large radius kerb return, a continuity line should be used across the right hand side of the approach.

2.3.1 ‘STOP’ and ‘GIVE WAY’ lines

The ‘STOP’ or ‘GIVE WAY’ line may be marked as shown in MUTCD Part 2 Figure 5.3 and Figure 2.3.1 of this document.

For more information on ‘STOP’ and ‘GIVE WAY’ lines at intersections, see Sections 4.1.8 and 4.1.9 of this document.
**MUTCD Part 2 Figure 5.3 – Pavement markings at ‘GIVE WAY’ and ‘STOP’ signs**

Note:
1. Dividing line marked in accordance with Section 2.2.1 of this guide. Dimensions in millimetres unless otherwise shown.

**Figure 2.3.1 – Pavement markings at ‘GIVE WAY’ and ‘STOP’ signs**

Note
1. No distance is given for the setback between the stop, or holding, line and give way line. It is site-dependent and is desirable:
   a) where there is a problem with vehicles over-running the line,
   b) to hold vehicles back some distance from the intersection (such as service road crossing, road crossing, conflict with right turning vehicles that have priority).

2.3.2 Crosswalk lines

Refer to AS1742.10 Section 8.4.
8.4 Signs and pavement markings

The following signs and pavement markings are used at pedestrian activated traffic signals (mid-block):

a) No-stopping signs (R5-35, R5-36-1) See Clause 6.4(b)
b) Signals Ahead signs (W3-3) See Clause 11.2(a)
c) Stop lines 300 to 600 mm wide
d) Crosswalk lines comprising two parallel lines at least 2.4 m apart, 150 to 300 mm wide which may be either continuous or broken with 1 m line segments and 300 mm gaps.

The line marking arrangement for a mid-block pedestrian actuated traffic signal installation is shown in AS1742.10 Figure 5.
AS1742.10 Figure 5 – Pedestrian-actuated traffic signals (mid-block) – two-way roadway

Notes

1. Sign W3-3 (see ASS1742.3 Part 10 Section 11.2(a)) is required if crossing is in an isolated location or if crossing is not visible at a distance greater than 200 m. Where used, the Size B should be the minimum size. The ‘CROSSING AHEAD’ (W8-22) supplementary plate may be used with this sign.

2. Extended single barrier line is optional.

Dimensions in metres.
2.3.3 Other transverse lines

The use of transverse lines with ‘KEEP CLEAR’ markings is discussed in Section 2.4.2.3 of this guide.

2.4 Other markings

2.4.1 Diagonal and chevron markings

Refer to MUTCD Part 2 Section 5.5.1.

<table>
<thead>
<tr>
<th>5.5.1 Diagonal and chevron markings</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.1.1 General</td>
</tr>
<tr>
<td>Wide diagonal or chevron markings may be applied to areas of pavement which are not intended for use by moving vehicles.</td>
</tr>
<tr>
<td>They define splayed island approaches to obstructions, sealed shoulders, painted islands and medians and areas separating exit ramps from the main freeway traffic lanes (see Clause 5.7.2). They are also used to indicate escape areas, if required.</td>
</tr>
<tr>
<td>Diagonal markings are used when all traffic must pass to one side of the marking, and chevron markings when traffic may pass to either side of the marking.</td>
</tr>
<tr>
<td>5.5.1.2 Markings on splayed approaches</td>
</tr>
<tr>
<td>The markings of splayed approaches to islands or obstructions shall be parallel bars or chevrons as shown in Figure 5.4(a) and (b).</td>
</tr>
<tr>
<td>The bars shall be a minimum of 1.0 m wide measured normal to the bar with a gap between bars measured parallel to the road centre line of three to five times the width of the bar.</td>
</tr>
<tr>
<td>The angle between the bars or chevrons and the approach line should be 45 degrees maximum. On approaches where the 85th percentile speed is 90 km/h or greater, the angle may be reduced to 30 degrees (i.e. 60 degrees included angle between sides of a chevron).</td>
</tr>
<tr>
<td>The outline should be supplemented by raised pavement markers, especially where street lighting is substandard or absent.</td>
</tr>
<tr>
<td>5.5.1.3 Diagonal markings on shoulders</td>
</tr>
<tr>
<td>If a marking on sections of sealed shoulder is required to discourage vehicular encroachment, it shall comprise bars having a minimum width of 1.0 m measured normal to the marking and with a gap between bars, measured parallel to the road centre line of five to twenty times the width of the bar (see Figure 5.5).</td>
</tr>
<tr>
<td>5.5.1.4 Painted islands and median strips</td>
</tr>
<tr>
<td>Painted islands and median strips shall be defined by outlining areas of pavement with lines. The interior may be either sealed with an aggregate of contrasting colour or texture, or consist of diagonal or chevron markings (see Figures 5.6(a), (b) and (c)). The outline should be supplemented by raised pavement markers, especially where street lighting is substandard or absent.</td>
</tr>
</tbody>
</table>
Typical uses of painted islands include:

a) islands of substandard size in urban areas
b) channelising islands at rural intersections where operating speeds are high, or road lighting is absent or inadequate
c) narrow medians
d) part-time safety zones, and
e) narrow lane separators.

The island may be surrounded by double two-way barrier line if all crossing movements are to be prohibited.

The width and spacing of diagonal markings when used inside painted islands and median strips is shown in Figure 5.6.

The figures referred to in this extract show the application of various chevron and diagonal markings for roads other than freeways. MUTCD Part 2 Figures 3.3 to 3.5 show markings at exit and entrance ramps for motorways.

With reference to MUTCD Part 2 Figure 5.4 below, the following should apply:

**Orientation:** The diagonal (or diagonal component of the chevron) is angled toward the direction of travel at the running lane edge.

**Angle:** In the interests of keeping the pavement marking task simple and efficient, an angle of 45° for all situations is acceptable.

**Width:** The width ‘B’ of the painted bars is also subject to variation, depending on the type of device and the location, but again it is acceptable to adopt a fixed width of one metre to allow the use of a standard template in marking operations.

**Spacing:** The spacing ‘S’ between bars depends on device type and traffic speed. On higher-speed roads, bars should be more widely spaced to aid conspicuity; however, a narrower spacing may apply – for example, when there is an island on an approaching uphill grade. The given range of spacings should be maintained but, again, to allow the use of efficient methods of setting out (such as a standard template), the spacing may always be a whole number multiple of the standard template dimension. Refer to MUTCD Part 2 Section 5.5.1.2 for markings on splayed approaches.

See TRUM Volume 3 Part 3 Section 3.1.2 on diagonals and chevrons for more details of setting out and template dimensions.

**Outline:** Diagonal bars and chevrons are most commonly delineated by edge lines or outline markings. The gap ‘W’ between the ends of the bars and the outline should be 150 mm and consistent along all edges. Line marking widths for edge lines, outline markings shall be as per MUTCD Part 2 Figure 5.1.
**MUTCD Part 2 Figure 5.4 – Splayed approach**

LEGEND:
- Angle A = 45° or 30°
  - See Clause 5.5.1.2
- B = 1.0 m min.
- S = 3B to 5B
- W = 150 mm

(a) Traffic to left side only

(b) Traffic to either side

**MUTCD Part 2 Figure 5.5 – Shoulders**

LEGEND:
- B = 1.0 m min.
- S = 5B to 20B
- W = 150 mm
MUTCD Part 2 Figure 5.6 – Painted islands and median strips

(a) Channelising island

LEGEND:
B = 600 mm min.
S = 1.5B to 3B
W = 150 mm

(b) Median island

LEGEND:
B = 1.0 m min.
S = 3B to 5B
W = 150 mm

(c) Diagonal median marking

LEGEND:
B = 1.0 m min.
S = 5B to 20B
W = 150 mm
2.4.2 Message on pavements

For more information, refer to MUTCD Part 2 Section 5.5.2.

5.5.2 Messages on pavements

5.5.2.1 General

Words, numerals and symbols may be marked on pavements to convey guiding, warning or regulatory messages to drivers. They shall be elongated in the direction of traffic movement to make them legible at the maximum distance.

NOTE: The benefit obtainable with increasing elongation diminishes if the distortion ratio exceeds about 8:1.

5.5.2.2 Words and numerals

The length of letters and numerals shall be 2.5 m where the speed limit is up to 80 km/h and 5.0 m at higher speed limits. The shape of letters and numerals shall be as shown in Figure 5.7.

A message should, if possible, be confined to one line. Where two or more lines are required they should be designed as follows:

a) Where the 85th percentile speed is greater than 80 km/h, a separation of four times the character height shall be used, and the message arranged to read sequentially, i.e. with the first word nearest to the driver.

b) At speeds lower than in Item ‘a)’, the separation between lines shall be from one-half to one times the character height and the message arranged to read from top to bottom.

Word messages commonly used on road pavements are as follows:

‘BUS LANE’ and ‘BL’, ‘TRANSIT LANE’ and ‘TL’ – see Part 12

‘RAIL X’ – see Part 7

‘KEEP CLEAR’ – see Clause 4.5.2.6

5.5.2.3 Intersection arrows

Intersection pavement arrows give a positive indication of the paths vehicles must follow at intersections. They are legally enforceable. The choice of and need for intersection pavement arrow markings shall be determined as set out in Figure 5.9. This is based on the following requirements:

a) Where all the manoeuvres that are permitted by traffic legislation are to be allowed from a marked traffic lane, arrow markings need not be provided.

b) If all the manoeuvres that are permitted by traffic legislation are not to be allowed from a marked traffic lane, those manoeuvres which are to be allowed shall be marked with pavement arrows.

c) Where any arrow is required in a lane, all manoeuvres that are to be permitted from that lane shall be marked with pavement arrows.
d) Notwithstanding the provisions in Item (a) where it is considered desirable for safety or other considerations to mark arrows indicating the legally permitted manoeuvres from that lane, e.g. to emphasise that a turn is not permitted from a lane adjacent to an exclusive right turn lane by marking with a straight ahead arrow, these arrow markings may be provided. However, such markings should be restricted to those found to be necessary after observance of performance in the field.

Pavement arrows shall be marked in each lane of a multi-lane approach to a roundabout with two or more lanes to indicate the movements permitted from each lane.

If a lane on the approach to an intersection or roundabout is to be designated by means of arrows as above, arrows shall be placed in that lane as follows:

i) Arrow nearest a stop or give-way line – 6 m clear distance back from the line.

ii) Arrows in a through lane from upstream – at least two additional arrows at a head-to-head spacing of 15 m to 50 m.

iii) Arrows in a developed lane at least 36 m long (excluding taper) – at least two additional arrows, the first with its head at the point where the fully developed lane first begins and the second or subsequent arrows equispaced at 15 to 50 m head-to-head between the first and last arrows.

iv) Arrows in a developed lane less than 36 m long (excluding taper) – one additional arrow only or in very short lanes, less than 20 m, no additional arrows, i.e. one arrow only in the lane.

v) Provision of a single arrow in accordance with Item iv) shall comprise the one arrow nearest to the stop or give-way line only, 6 m clear distance back from the line.

At intersections where queues of vehicles are likely to occur, e.g. at traffic signals, pavement arrows should commence sufficiently in advance of the intersection so that waiting vehicles will not obscure them. Where this is not practicable, or where additional information for road users on lane designation (e.g. ‘trap’ lanes) is required, signs adjacent to or over the appropriate lanes should be installed to supplement the pavement arrows.

Where a turning lane is provided to cater exclusively for U-turns, and it is essential to distinguish it from a right turning lane before or after, the U-turn arrow may be used. If the distinction is not needed, a right turn arrow will usually be sufficient.

Where two separate successive turns in the same direction may be made from a single turning lane, the sequential turns arrow may be used in advance of the first turn. The use of this marking is the exception, rather than the rule.

Standard designs for pavement arrows shall be as shown in Figures 5.10 and 5.11. They are elongated similarly to letters or numerals in order to increase their recognition distance.

5.5.2.4 Lane change arrows

Lane change arrows shall be provided at lane reductions (merges) typically as illustrated in Figures 4.16, 4.18 and 4.20 in all situations where a lane change rather than a zip-merge is provided for, see Clause 4.7.2 and Figure 4.16.
Lane change arrows shall conform to the designs in Figure 5.12, the urban type to be used where the 85th percentile speed is 80 km/h or less, and the rural type where it is more than 80 km/h.

Three arrows shall be used in each case. They shall be equispaced between the advance merge sign and the start of the lane change taper.

Lane change arrows shall not be used in the zip-merge case described in Clause 4.7.2(a).

5.5.2.5 Expressway exit lane arrows

The use of the exit lane arrows shown in Figure 5.13 is specified in Clause 5.7.3. Their use is further illustrated in Figure 3.4.

5.5.2.6 Keep clear marking

A keep clear marking as shown in Figure 4.8 when used to control the blocking of entrances and exits at side streets or property access points by queued traffic, shall only be used in the following situations:

a) To allow emergency vehicle access from its depot or station.

b) Where a blockage would create a safety problem elsewhere in the system, e.g. vehicles stopping to turn right into a driveway causing a blockage at a nearby intersection.

The marking shall not be used primarily for the purpose of facilitating access/egress to a side street or driveway.

2.4.2.1 Traffic lane arrows

The choice of and need for pavement arrow markings at intersections is set out in MUTCD Part 2 Figure 5.9.
### MUTCD Part 2 Figure 5.9 – Use of intersection pavement arrows

<table>
<thead>
<tr>
<th>No.</th>
<th>Description of requirements</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legal manoeuvres if lane unmarked.</td>
<td>![Diagram 1]</td>
</tr>
<tr>
<td>2</td>
<td>Legal manoeuvres if left lane only marked</td>
<td>![Diagram 2]</td>
</tr>
<tr>
<td>3</td>
<td>Legal manoeuvres if right lane only marked</td>
<td>![Diagram 3]</td>
</tr>
<tr>
<td>4</td>
<td>Markings for two exclusive left turn lanes</td>
<td>![Diagram 4]</td>
</tr>
<tr>
<td>5</td>
<td>Markings for two exclusive right turn lanes</td>
<td>![Diagram 5]</td>
</tr>
<tr>
<td>6</td>
<td>Markings for shared left turn and through from lane adjacent to left turn lane</td>
<td>![Diagram 6]</td>
</tr>
<tr>
<td>7</td>
<td>Markings for shared right turn and through from lane adjacent to right turn lane</td>
<td>![Diagram 7]</td>
</tr>
<tr>
<td>8</td>
<td>Markings for shared left turn and through from lane adjacent to two exclusive left turn lanes</td>
<td>![Diagram 8]</td>
</tr>
<tr>
<td>9</td>
<td>Markings for shared right turn and through from lane adjacent to two exclusive right turn lanes</td>
<td>![Diagram 9]</td>
</tr>
<tr>
<td>10</td>
<td>Markings to indicate left turn prohibition (signing also required, see Clause 2.8.2)</td>
<td>![Diagram 10]</td>
</tr>
<tr>
<td>11</td>
<td>Markings to indicate right turn prohibition (signing also required, see Clause 2.8.2)</td>
<td>![Diagram 11]</td>
</tr>
</tbody>
</table>

### Notes
1. Full lines indicate arrows to be marked.
2. Dotted lines indicate manoeuvres, which are permitted by regulations, but which need not be marked.
3. On some intersection approaches, it may be necessary to combine two or more of the marking methods shown.
Turn arrows have legal status under Queensland Road Rules:

Under the *Queensland Road Rules* (Rule 28 and 32), right and left turners are treated in the same manner. To allow a turn from a lane adjacent to an exclusive turn lane, combination traffic lane arrows need to be installed that indicate to allowed movements. For more information on turn arrows, see Figure 5.7 of the MUTCD Part 2.

If any lane on the approach to an intersection is to be designated by means of arrows, at least three arrows should be placed in that lane. The head of the first arrow should have three metres clear distance from the stop or holding line (if any) or intersection boundary. A spacing of 15 metres to 30 metres, head-to-head, should be used between repeater arrows according to the size of the arrow, larger arrows being used for high-speed roads.

Where a traffic lane in which arrow markings are required is not long enough for three arrows at the normal spacing, the arrow spacing may be reduced to half the normal spacing. If it is necessary to reduce the spacing to less than 15 metres, then the number of arrows may be reduced. If there are no arrow markings in adjacent lanes, the spacing may be further reduced to enable three arrows to be provided. Where an exclusive bicycle lane is marked on the approach to a signalised intersection, two arrows are recommended in the bicycle lane.

The height of grid squares shown in MUTCD Part 2 Figures 5.10 and 5.11 is as follows:

a) Straight ahead and combined arrow
   
   Height of grid squares, \( Y = \frac{\text{arrow length}}{60} \) (100 mm minimum).

b) Turn arrow
   
   Height of grid squares, \( Y = \frac{\text{arrow length}}{40} \) (100 mm minimum).

c) U-turn arrow
   
   Height of grid squares, \( Y = \frac{\text{arrow length}}{50} \) (100 mm minimum).
Notes

1. Minimum length of arrow:
   a. Straight ahead arrow and combined arrow = 6 m.
   b. Turn arrow = 4 m.

2. The width of grid squares is constant at 100 mm. The height of the grid squares is 100 mm minimum.
**Notes**

1. Minimum length of arrow:
   a. Double turn arrow = 4 m.
   b. U-turn arrow = 5 m.
   c. Sequential turns and 45° turn arrows = 6 m.

2. The width of grid squares is constant at 100 mm. The height of the grid squares is 100 mm minimum.
Traffic Control Sign – Modified multi land roundabout pavement marking arrow TC1845_1

NOTES:
1. Minimum length of arrow = 6m.
2. The width of grid squares is constant at 100mm. The height of grid squares is 100mm minimum.
Traffic Control Sign – Modified multi-lane roundabout pavement marking arrow – right

TC1845_2

NOTES:
1. Minimum length of arrow = 6m.
2. The width of grid squares is constant at 100mm. The height of grid squares is 100mm minimum.
2.4.2.1.1 Lane change arrows

Lane change arrow designs are provided in MUTCD Part 2 Figure 5.12.

*MUTCD Part 2 Figure 5.12 – Merge pavement arrows*

Notes

1. Dimension ‘D’ should be approximately 0.6 times the width of the lane.
2. When installing arrows, it is recommended that the head be laid first.

Dimensions in millimetres
2.4.2.1.2 Freeways

Refer to MUTCD Part 2 Sections 5.7.2 and 5.7.3.

5.7.2 Exit ramp nose marking

Exit ramp nose marking is illustrated in Figure 5.28.

5.7.3 Expressway exit lane arrows

Expressway exit lane arrows shall be used on main expressway roadways where there is a ‘trap’ lane which is one from which all traffic must exit. Because the indicated movement is such a small angular divergence from the through path, the use of conventional turn arrows is not recommended. Use of slightly inclined straight ahead arrows as illustrated in Figure 5.29 is preferred. The shape of these arrows is specified in Clause 5.5.2.5.

Where arrows are used in the trap lane, a combination arrow shall be placed in the next lane to the right, adjacent to each trap lane arrow, indicating that the second lane is a shared exit and through lane. The recommended spacing is 50 m head-to-head.

NOTE: For best visual effect the arrow inclination should not exceed 15°.

Entrance ramp nose marking chevrons to be reversed. See Figures 3.3 and 3.4.

*MUTCD Part 2 Figure 5.28 – Exit ramp nose marking*

*MUTCD Part 2 Figure 5.29 – Expressway exit lane arrows in a ‘Trap’ lane and an adjacent ‘Optional’ lane*

This will normally only occur at two-lane exits as illustrated in MUTCD Part 2 Figure 3.4, which shows an arrow spacing of 50 m.
MUTCD Part 2 Figure 5.13 – Expressway exit lane arrows

2.4.2.2 Words, numerals and symbols

Legibility distance is increased by enlarging the length of characters; however, the benefit obtainable with increasing elongation diminishes if the distortion ratio exceeds about 8:1.

The proportions of letters and numerals should be as shown in MUTCD Part 2 Figure 5.7.
**MUTCD Part 2 Figure 5.7 – Pavement letters and numerals**

Notes

The grid width ‘X’ is constant at 100 mm, but the grid height ‘Y’ may vary as follows:

- \( Y = 62.5 \text{ mm} \) where the speed limit is up to 80 km/h
- \( Y = 125 \text{ mm} \) at higher speeds
Additional word messages for use on road pavements include the following:

- TRAFFIC SIGNALS
- HEAVY VEHICLES ONLY
- SCHOOL
- SCHOOL X
- FORM ONE LANE
- SLOW
- STOP
- GIVE WAY
- PED X
- LOW SPEED LANE
- TRUCK LANE

Where traffic lanes are reserved for the exclusive use of turning traffic, control by means of arrows is preferred.

Where the message is an advance warning message, the word ‘AHEAD’ should be added at the end of the message.

Where the letter ‘X’ is to be placed on a line by itself in the pavement messages, ‘PED X’, ‘SCHOOL X’ or ‘RAIL X’, the special widened form shown in Figure 2.4.2.2.5 of this guide should be used.

2.4.2.2.1 Narrow lanes

There are instances where the width of a lane, once edge lines and centre lines have been accommodated, is too narrow for a word such as ‘SCHOOL’ to be marked on the pavement using the recommended dimensions. It is impractical, because of the use of standard templates, and undesirable, in terms of legibility, to reduce the width of the letters.

A number of options are available:

a) The spacing between letters may be reduced.

b) On roads of more than two lanes, the message may extend across more than one lane for traffic travelling in the same direction.

c) On two-lane roads, where a tighter spacing would not achieve the required reduction in word length or legibility would be unacceptably reduced, the following may be adopted:

i. use an abbreviated form (as permitted by Queensland Road Rule 317(1)) if the abbreviation is commonly understood

ii. use a two-line message for ‘SCHOOL X’, ‘PED X’ and ‘RAIL X’, with the wide ‘X’ as shown in Figure 2.4.2.2.5

iii. use other road signs, or

iv. use the word ‘SLOW’ instead of the intended lettering, in conjunction with more specific road signs.
Details of non-standard treatments should be entered in Form M994 and approved by the Regional Director as appropriate prior to its installation on a road.

2.4.2.2 Speed zones

Refer to MUTCD Part 4 Section 11.

**Section 11: Pavement markings**

11.1 **General**

Where the pavement surface is suitable, painting of elongated numerals adjacent to the speed restriction sign (R4-1) may be used in the following circumstances:

- i. at the start of a lower speed zone where the difference in adjacent speed zones is 20 km/h or higher, with the exception of the start of a school zone or other variable speed zone
- ii. at repeater signs at major intersections only
- iii. on undivided multi-lane roads, at the start of the speed zone.

Such markings shall only be used to supplement speed restriction (R4-1) signs and shall not be used alone. Their use is generally restricted to locations where the provision of signs alone is not adequate, for example, where the impact of the sign is reduced by the nature of the roadside environment, and it is considered that the sign needs to be augmented to increase road user perception.

However, with the exception of school zones and other time-based speed zones, the use of pavement markings is encouraged at the start of HATUAs (see Section 4.3.4). Painted numerals shall not be used to indicate the speed limit on local streets.

11.2 **Marking details**

A separate set of numerals shall be painted in each traffic lane and no additional words or symbols shall be used.

The dimensions of the numerals shall be as prescribed in Part 2 of this manual.

Numbers may also be painted on the road at the start of special speed zones, such as 40 km/h local area speed limits and a 50 km/h speed limit where a nodal traffic calming scheme has been introduced on traffic carrying roads.

Numerals are to be painted as per MUTCD Part 2 Figure 5.7.
2.4.2.2.3 Bicycle lanes

For more information, refer to AS1742.9 Section 2.3.1.

2.3 Pavement markings

2.3.1 General

The following pavement markings as illustrated in Figure 2.1(1) shall be used for bicycle lanes and facilities on roads:

a) Bicycle lane line: The bicycle lane line shall be placed between the bicycle lane and lanes of moving traffic and where appropriate, parked vehicles. It shall be a white continuous line.

b) Continuity line: A continuity line shall replace the bicycle lane line:
   i. where motor traffic needs to enter or cross a bicycle lane when making a turn at an intersection or major driveway, and
   ii. to show the continuity of a bicycle lane where it continues through an unsignalised intersection.

c) Bicycle stop line: A white stop line the same width as the stop line provided for other traffic shall be provided in a bicycle lane at the point where bicycles need to stop at traffic signals. The bicycle stop line may be provided a minimum of 2.0 m in advance of the vehicular stop line to give bicycles a small head start at the onset of the green period, provided the line is clear of cross traffic and any marked pedestrian crossing.

d) Bicycle storage area: A safe storage area for bicycles at the head of a traffic queue at a signalized intersection. The bicycle symbol shall be marked in the bicycle storage box.

e) Hook turn storage box: A safe storage area for bicycles to indicate an alternative option for cyclists to turn right at signalized intersections. This facility is particularly suitable where cyclists would need to cross multiple lanes to turn right. A smaller bicycle symbol and pavement arrow shown in Figure 2.1(1) shall be used to indicate to cyclists where to stop and wait for the hook turn.

f) Bicycle pavement symbol: Where used on roads to indicate a bicycle lane, the bicycle symbol shall be as illustrated in Figure 2.2(1). The bicycle symbol may be installed in full-time and part-time bicycle lanes as follows:
   i. It may be used in lieu of the bicycle lane (R7-1-4) sign at the beginning of the lane in conjunction with the word 'LANE' and at additional locations along the lane as required (see Figure 2.2(2)).
   ii. It may be placed on the approach and departure sides of intersections (if the lane continues through the intersection). Symbols so placed may be considered as part of the Item (i) option.
   iii. It may be placed at the end of the lane in conjunction with the words 'LANE END' as shown in Figure 2.2(3).

Where necessary the symbol size shall be reduced proportionately to fit within the lane.
2.3.2 Other pavement markings

The following additional pavement markings may be used where required:

a) *No bicycle symbol*: The symbol illustrated in Figure 2.3 may be used in lieu of the No Bicycles (R6-10-3) sign as indicated in Clause 2.2(e).

b) *Bicycle lane safety strip*: Safety of cyclists can be improved by providing separation between the bicycle lane and the traffic lane or parked vehicles to avoid instances of 'dooring'. This separation may be provided by marking a safety strip as shown in Figure 2.1(2). Although desirable, it is not necessary to provide a safety strip on each side of the bicycle lane.

c) *Pavement arrow*: Pavement arrows may be used in conjunction with the bicycle symbol where a bicycle lane has been provided on the approach to traffic signals (see Figure 2.10) where some movements are restricted. The arrow is white in colour.

2.3.3 Pavement colour

Where used, the colour of pavement to indicate a bicycle lane shall be Emerald Green, as specified in Clause 1.6.

The use of pavement colour is optional. It should be limited to areas of potential conflict with motor vehicles, for example, bicycle storage areas and at the entry into auxiliary lanes or roundabouts.

For further information on the use of pavement colours in bicycle lanes, refer *Traffic and Road Use Management* (TRUM) manual Volume 1 *Guide to Traffic Management* Part 10 *Traffic control and communication devices*.

The 490 x 800 mm bicycle symbol may also be used in bicycle lanes on roadways where the larger 1100 x 1800 mm symbol would not be practicable.
AS1742.9 Figure 2.2(1) – Bicycle pavement symbol for road use

Notes:

- \( X = 65 \) mm for a 1100 mm x 1800 mm bicycle suitable for roadway lanes.
- A smaller symbol will be required for bicycle paths, see AS1742.9 Figure 3.1.
AS1742.9 Figure 2.2(2) – Bicycle lane pavement marking
AS1742.9 Figure 2.2(3) – Bicycle lane end pavement marking
AS1742.9 Figure 2.3 – No-bicycles pavement symbol for road use
2.4.2.2.4 Bicycle paths and footpaths

For more information, refer to AS1742.9 Section 3.3 with amendments from MUTCD Part 9 Section 3.3.

### 3.3 Pavement markings

The following requirements and recommendations apply to pavement markings used on paths:

a) **Separation lines (directional separation):** When used, lines used for separating opposing directions of travel on a path shall be as follows:
   
   i. A white unbroken line:
      
      (A) on curves where sight distance is poor  
      (B) in high volume locations or elsewhere where there is potential for conflict, or  
      (C) on the approaches to path / path intersections.
   
   ii. A white broken line in all other cases.

b) **Separation line (user separation):** The line used for separating pedestrians and bicycles on a separated path shall comprise a white unbroken line at least 80 mm wide.

c) **Bicycle and pedestrian pavement symbols:** These symbols are shown in Figure 3.1 in a size suitable for off-road paths and footpaths. Pavement symbols may be used on bicycle and separated paths in lieu of the Bicycle ONLY (R8-1) sign. Symbols or symbol groups should be installed as required.

d) **Pavement arrow:** This is shown in Figure 3.1 and may be used in conjunction with pavement symbols on busy paths where there is a need to encourage users to keep to the left.

e) **Multiple symbol display:** Where two or more of the pavement symbols in Items (c) and (d) are to be displayed as a group, they shall be displayed in the order bicycle-pedestrian-arrow in the direction of travel with a separation of 1.0 to 1.2 m between each symbol.

f) **Give-way and stop lines:** Where a GIVE WAY (R1-2) sign or a STOP (R1-1) sign is placed to face bicycle traffic on a path it may be accompanied by a white transverse line 200 mm wide, comprising:
   
   i. a broken line with 200 mm lines, 200 mm gaps at a GIVE WAY sign, or
   
   ii. an unbroken line at a STOP sign.

g) **Give way or stop pavement marking:** In lieu of a GIVE WAY or STOP sign, a give-way or stop pavement marking, respectively, may be marked on the path (see Figure 3.2(1)).

h) **No-bicycles symbol:** The symbol illustrated in Figure 3.3(b) may be used in lieu of the No Bicycles (R6-10-3) sign as indicated in Clause 3.2(b).

i) Pavement marking should contrast well with the path colour. If the contrast is inadequate, a darker background colour may be applied.
j) **Edge lines**: These may be provided in the following circumstances:
   
   i. In unlit areas to assist night-time navigation, especially where a path is not straight, or
   
   ii. Around hazards.

k) Utilisation of pavement marking signs is appropriate in lieu of signage with limited benefit or to supplement the existing signage. Usage of the pavement marking is to be treated as per the placement of the symbol and shall meet all the warrants for the relevant sign.

**AS1742.9 Figure 3.1 – Bicycle and pedestrian pavement symbols and arrows for paths**

![Bicycle and pedestrian pavement symbols and arrows for paths](image)

Note:

A larger bicycle symbol will be required for bicycle lanes on roadways (see Figure 2.2(1)).
AS1742.9 Figure 3.2(1) – Give way pavement symbol for paths

MUTCD Part 9 Figure 3.3(B) – No bicycles pavement symbol for paths
2.4.2.2.5 Advance warning of pedestrian crossings

‘PED X’, ‘SCHOOL X’ and ‘SCHOOL’ are the only pavement markings for use in advance of pedestrian facilities in Queensland. The zig-zag pavement markings, in advance of pedestrian crossings, have not been approved for use in Queensland and shall not be used.

For more information on bicycle facilities, see Section 3.8 of this guide.

Figure 2.4.2.2.5 – Wide ‘X’ for application at pedestrian, school and railway crossing on narrow pavement

Notes

1. The grid width (X) is constant at 100 mm, but the grid height ‘Y’ may vary as follows:
   
   \[ Y = \text{Height of letter or symbol required (mm)} / 40 \]

2. ‘X’ should be the same height as worded message.

3. For detailed design of word messages, refer to Section 2.4.2 of this guide.
2.4.2.2.6 Bus lanes and transit lanes

For more information, refer to AS1742.12 Section 6.2.

### 6.2 Pavement messages

#### 6.2.1 Message

Relevant word messages shall be marked on the road pavement in full-time or part-time bus, transit or truck lanes. Markings shall be white and elongated in the direction of traffic movement to improve their legibility.

NOTE: Legibility distance is increased by enlarging the length of characters. The benefit obtainable with increasing elongation diminishes if the distortion ratio exceeds about 10:1.

The relevant messages shall be selected from the following:

- BUS LANE and BL (may only be used as repeater markings)
- BUS ONLY
- TRUCK LANE
- T2 (T3) LANE and T2 (may only be used as repeater markings).

Other information such as AM, PM, AM + PM, times, M–F may be used together with any of the above messages if necessary to avoid confusion.

For an advance warning, the word ‘AHEAD’ should be added to the message.

#### 6.2.2 Design for low and high-speed roads

The length of letters should be not less than 2.5 m in urban areas but on high-speed highways and expressway-type roads may need to be at least twice this length. The dimensional proportions of letters should be as shown in Figure 3.

Where two or more lines of text are required, they should be designed as follows:

a) On high-speed roads, generally speed zones higher than 80 km/h, a separation of four times the character height should be used, and the message should be arranged to read sequentially, that is, with the first word nearest to the driver.

b) For low-speed, urban situations the separation between lines of text may, if necessary, be from one-half to one times the character height, in which case the message should be arranged to read from top to bottom. The method of placing these markings on low-speed urban roads is illustrated in Figure 4.

For arrangement of pavement messages, refer to Section 2.4.2 of this guide.
AS1742.12 Figure 3 – Pavement letters for lane messages

Notes

1. The grid width is constant at 100 mm, but grid height ‘x’ may vary:
   \[
   \text{The grid height } x = \frac{\text{height of letter required (mm)}}{40}
   \]

2. The word ‘AHEAD’ may need to be made narrower (e.g. grid width reduced to 75 mm) to fit into a lane.
2.4.2.3 Keep clear zones

Queensland Road Rule 128 prohibits traffic from entering an intersection if the intersection is blocked by vehicles. The bounds of an intersection are defined in the Queensland Road Rules as the

\[\text{area where two or more roads (except any road-related area) meet, and includes:}\]

\[a) \text{ any area of the roads where vehicles travelling on different roads might collide, and}\]
\[b) \text{ the place, other than a road-related area, where a slip lane between the roads meets the road into which traffic on the slip lane may turn.}\]

In an urban area, an intersection is generally defined by the kerb lines.

Rule 96 of the Queensland Road Rules allows the provision of ‘KEEP CLEAR’ markings on the road. Where it is considered desirable to indicate the limits of the prohibition, two transverse lines may be used as shown in MUTCD Part 2 Figure 5.8. The recommended transverse line width is 150 mm.

*MUTCD Part 2 Figure 5.8 – Keep clear marking*

Note

1. A single message covering two lanes may be adequate. The words may be made wider to suit.
2.4.2.4 Pedestrian (zebra) crossings

For more information, refer to AS1742.10 Section 6.5.

6.5 Pavement markings

Pedestrian crossing (zebra) marking shall consist of a series of white coloured longitudinal bars approximately 600 mm wide and not less than 3.0 m long. The bars shall run lengthwise along the road and shall be placed approximately parallel to each other with gaps of approximately 600 mm between bars. Whilst the crossing is usually at right angles to the line of the road, it may be angled by not more than 30 degrees where local circumstances require.

Additional approach markings at a raised pedestrian crossing (zebra) shall be as specified in Clause 6.2 and Figure 2.

As an alternative to the use of No Stopping signs, the no-stopping prohibition in the vicinity of the crossing may be imposed by means of a continuous yellow line on the roadway adjacent to the kerb or edge of pavement for the length of the prohibition.

For the profile of raised pedestrian crossings (zebra) on bus routes, refer to MUTCD Part 13 Clause 2.4.2.

Pedestrian crossing (zebra) markings are shown in AS1742.10 Figure 1.

For more information on pedestrian crossing facilities see Section 3.13 of this guide.
Notes

1. Sign R3-1 may be supplemented by flashing yellow signals.
2. Variations to no stopping distances may be required, see MUTCD Part 10 Section 6.2.
3. Sign W6-2 (minimum size B) is used in advance of pedestrian crossings where visibility of R3-1 sign is obstructed.
4. For installation of markings at a raised crossing, see MUTCD Part 10 Figure 2.
5. A single-barrier line should be provided on each approach to the crossing if the road has a dividing line.

Dimensions in metres.
2.4.2.5 Step-out markings

For more information, refer to MUTCD Part 2 Section 5.7.5.

5.7.5 ‘Step-out’ marking

The step-out marking shown in Figure 5.31 is used as illustrated in Figure 3.3 as an alternative to the normal exit ramp marking if visibility to the pavement along the ramp taper is poor (e.g. at a crest or left hand curve) or there is evidence of drivers inadvertently taking the exit. Green RRPMs may be used with step-out markings as illustrated.

MUTCD Part 2 Figure 5.31 – Step-out marking at an exit ramp

2.4.2.6 Road hump markings

For more information, refer to AS1742.13 Section 4.6.6.

4.6.6 Road hump markings

The pavement markings to be used at road humps consist of a marking on each face of the hump in the form of a transverse line with a series of alternate long and short lines at approximately half metre spacing running up the face of the hump. This marking is shown in Figure 4.3.

The marking may be omitted on humps if a contrasting colour pavement material has been used such that the hump is clearly visible under all conditions. Contrasting pavement material should have similar skid resistance to surrounding pavements for the benefit of bicycles and motorcycles.

Refer also to Section 5.2.2 of this guide for information on local area traffic management: road humps.
AS1742.13 Figure 4.3 – Pavement marking for road humps

Note:
1. The length of this part of the marking may be varied on the flat-top hump to suit the length of the taper (generally between 1000 mm–1500 mm).
Dimensions in millimetres.

MUTCD Part 10 Figure 2 – Markings on a raised pedestrian crossing (zebra)

Notes
1. Ramp height 75 mm to 100 mm.
2. Ramp grade 1:12 to 1:20.
Dimensions in millimetres.
2.4.3 Marking of parking and loading areas

2.4.3.1 Parking bay lines

For more information, refer to AS1742.11 Section 7.1.

7.1 Delineation of parking spaces

7.1.1 Parking spaces for general use

Parking spaces for general use are marked by one of the following methods (see Figure 7.1):

a) Continuous white lines 100 mm wide, indicating all sides of the space, except any sides indicated by kerbing or similar changes in paving (see Figure 7.1(a)(i) and the left-hand example in Figure 7.1(b)). This pattern shall not be used in locations where there are part-time clearways or other part-time No Stopping areas.

b) Continuous white lines 100 mm wide indicating only the divisions between the spaces and the ends of the parking area (see middle example in Figure 7.1(b)). This pattern shall be used only to delineate angle parking spaces.

c) White markings 100 mm wide in the shape of an inverted T or an L at the corners of the spaces only (see Figure 7.1(a)(ii)). This pattern may be used in locations where there are part-time clearways or other part-time No Stopping areas. It is not suitable for angle parking unless 600 mm-long lines are also marked out from the kerb (see right hand example in Figure 7.1(b)).

d) Raised pavement markers (non-reflective) indicating the outline of the spaces as a series of white dots for right angle or parallel parking, but not for angle parking at angles other than 90 degrees. This method should not be used where through traffic runs over parking bay markings at times when there is no parking.

e) Contrasting pavement materials, such as bricks, arranged in a manner similar to methods in Items (a), (b) or (c) above. Possible future discolouring and loss of contrast caused by dirt and tyres should be taken into account.

7.1.2 Special use parking spaces

Parking spaces which are to be permanently set aside for special uses such as coach parking or disabled parking may be marked by broken yellow lines using line widths, and line and gap lengths as shown in Figure 7.1(a)(iii) as an alternative to the methods given in Clause 7.1.1. This method may also be adapted to angle-parking.

7.1.3 Parking space dimensions

Dimensions for marked parking spaces are given in AS2890.5.


**AS1742.11 Figure 7.1 – Delineation of parking spaces**

(a) Parallel Parking

![Diagram of parallel parking](image)

(Not suitable in locations where there are part-time clearways or part-time no-stopping areas)

(i) Marking all sides with continuous white lines

![Diagram of parallel parking with continuous white lines](image)

(ii) Marking corners of spaces only (example application)

![Diagram of parallel parking with corner marking](image)

(c) Marking special use parking spaces with broken yellow lines

![Diagram of angle parking](image)

Notes

1. See Clause 7.1 of AS1742.11 in Section 2.4.3 of this guide for other methods. Dimensions in millimetres
2.4.3.2 No stopping and zone lines

For more information, refer to AS1742.11 Section 7.2.

7.2 Edge marking of no stopping and special purpose zones

Roadway edge marking used in the control of parking shall take one of the following forms:

a) Unbroken yellow no stopping line: This line shall comprise an unbroken yellow line, 80 mm to 100 mm wide, placed close and parallel to the edge of the roadway as shown in Figure 7.2(a). This line has a similar legal effect as the R5-35 full-time No Stopping sign and the R5-45 full-time clearway linear control sign, though it also prohibits stopping behind the line. It may be used to either supplement these signs or in lieu of them. If used in lieu of R5-45 full-time clearway linear control signs, the R5-50 CLEARWAY (start) sign is still required at the start and at intervals and the R5-51 END clearway and R5-39 Tow-away signs are still required if applicable (see Clause 4.3.1)

b) Broken yellow zone line: This line shall comprise a broken yellow line, 80 mm to 100 mm wide with 600 mm line segments and 900 mm gaps, placed close and parallel to the edge of the roadway as shown in Figure 7.2(b). It may be used to supplement signposted zones where only certain types of vehicles are permitted to stop.

If a special purpose zone is isolated from other marked parking spaces, a parking space or series of spaces outlined with broken yellow lines similar to those shown in Figure 7.1(d) may be used in lieu.
2.4.3.3 Other pavement markings

Refer to AS1742.11 Section 7.3.

### 7.3 Other pavement markings

Pavement messages may be used to supplement sign controls or statutory restrictions. Such messages shall consist of words at least 300 mm high, written either to face oncoming traffic (perpendicular to the edge of the roadway) or parallel to the edge of the roadway, facing to the middle of the roadway, as appropriate. The letters should be similar to Series D and should not be elongated.

Some typical messages are as follows:

- BUS ONLY or BUS STOP
- LOADING ZONE
- TAXI or TAXI RANK
- NO STOPPING
- NO PARKING
- KEEP CLEAR*
- Disabled symbol (minimum height shall be 800 mm).
The preferred colour for these pavement messages and symbols is white. However, the disabled symbol may be alternatively placed as a white symbol on a small blue rectangle within each parking space.

Some state and territory regulations prohibit vehicles from stopping or parking over some of these messages marked on the road surface. In a street where parking spaces are not marked, problems with vehicles parking across driveways and other statutory No Stopping areas can be reduced by painting a L-shaped marking to enclose the extremity of the permitted parking area, as illustrated at each end of Figure 7.1(a)(ii).

* Note: This use of the KEEP CLEAR marking relates only to the control of parking which may cause an obstruction, e.g. in front of a driveway. For use of the KEEP CLEAR marking in the queued traffic situation, refer to Part 2 of this manual.

2.4.3.4 Restricted parking zones

Diagonal pavement markings may be used to discourage parking in ‘NO STOPPING’ areas where the prohibition has been installed to permit unobstructed visibility to and of road users, such as at the approaches to school crossings, and violations of the stopping prohibitions are prevalent.

The arrangement shown in Figure 2.4.3.4 of this guide should be used sparingly and reserved for areas where a particular need exists.

For more information on parking control see Section 5.1 of this guide.
Figure 2.4.3.4 – Pavement markings for ‘No Stopping’ areas

Notes
1. Road to have a minimum sealed width of 10 m.
2. Diagonal markings shall be installed in accordance with MUTCD Part 2 Figure 5.5.
3. For details of other pavement markings and signs, refer to MUTCD.
4. Markings to be restricted to locations where parking violations continually occur.
5. Markings are not used where the parking lane is used as a traffic lane during peak hours.
2.4.4 Kerb markings

For more information, refer to MUTCD Part 2 Section 5.5.3.

5.5.3 Kerb markings

Kerbs of medians and traffic islands may be marked white and reflectorised if added visibility is required.

Generally, the noses of medians and islands should be so painted.

2.4.5 Multi-lane roundabouts

Pavement markings at a multi-lane roundabout consist of:

- a) ‘Give Way’ line across each entry
- b) pavement arrows in each lane approaching the roundabout – at least three arrows should be used in each lane, and
- c) exit line marking at multi-lane exits. Exit line markings are to be special purpose lane lines with a reduced width of 80 mm.

Typical arrangements for pavement markings at multi-lane roundabouts are shown in Figures 4.2.2(Q) to 4.2.2(W) at Section 4.2.2 of this guide. Modified multi-lane roundabout pavement marking arrows are shown in Traffic Control Sign – Modified multi-lane roundabout pavement marking arrow TC1845_1 and Traffic Control Sign – Modified multi-lane roundabout pavement marking arrow – right TC1845_2 depicted in Section 2.4.2.1 of this guide.

Exit line marking is provided at multi-lane exits where there is a common destination for two or more lanes at an entry to a roundabout. Where only a single lane at each entry has a destination at the multi-lane exit, an exit line is not provided – this arrangement is shown in Figure 4.2.2(T) at Section 4.2.2 of this guide. This arrangement reinforces the priority of the circulating vehicle. It also allows the (circulating) driver to select the appropriate exit lane in safety – this is important where a left-hand turn into a side street, or a diverge, is located a short distance after the roundabout.

Where a multi-lane roundabout must cater for a dual right turn to a multi-lane exit from the stem of a T-junction, the exit line would be extended to reflect this arrangement as shown in Figure 4.2.2(V) at Section 4.2.2 of this guide.

The exit line is marked concentrically to the central island and joined tangentially to the exit lane line. It is offset from the central island by sufficient width to allow a heavy vehicle to turn right without
mounting the non-trafficable section of the central island. It should not, however, leave an excessively large internal lane.

There must be no line marking across exit paths. The exit line marking must be designed so that it does not need to be crossed by drivers using the correct lanes travelling around the roundabout. Exit line markings should be the only lines on the circulating roadway (delete all other lines).

Where a multi-lane roundabout has a single lane exit, initially it may be necessary to narrow part of the circulating roadway with painted chevrons. The painted chevrons should be replaced with concrete kerb in the future, with due consideration of the turning circle requirements of large vehicles as shown in Figure 4.2.2(S) at Section 4.2.2 of this guide.

An alternative treatment may also be considered, i.e. ‘spiral’ markings as shown in Figure 4.2.2(W) to Figure 4.2.2(Y) at Section 4.2.2 of this guide. Spiral line marking should only be considered as a solution to assist in minimising operational problems on existing roundabouts where no other solution is feasible and would be supported by appropriate diagrammatic signs on the approaches to the roundabout. New roundabouts should be designed to ensure that spiral line marking is not needed. Where the proposed exit line marking varies from Figures 4.2.2(Q) to 4.2.2(V) at Section 4.2.2 of this guide or where unusual site conditions exist, advice should be sought from the department’s Traffic Engineering Unit.

2.5 Raised pavement markers

Refer to MUTCD Part 2 Section 5.6.

5.6 Raised pavement markers

5.6.1 General

Raised pavement markers are of the following types:

a) Retroreflective raised pavement markers (RRPM), see Clause 5.6.2.

b) Non-retroreflective raised pavement markers (NRPM), see Clause 5.6.3.

c) Internally illuminated pavement markers, see Clause 5.6.4.

Symbols used on plans to represent raised pavement markers are given in Table 5.4.

5.6.2 Retroreflective raised pavement markers (RRPM)

RRPMs are used to augment painted lines, stripes and chevrons when it is deemed necessary or desirable to improve their visual properties. As devices which are considered to be at same level as the road surface RRPMs are intended to be trafficable when placed within a painted island or median strip.

RRPMs generally provide more effective and durable pavement markings than painted lines because:

a) they are not generally obscured at night under wet conditions

b) they provide an audible and tactile signal when traversed by vehicle wheels, and

c) they are conspicuous in all conditions.

Physical and performance requirements for pavement markers are specified in AS 1906.3.
In deciding whether to use markers, the following factors should be taken into account:

i) operational effectiveness

ii) ease of installation

iii) self-cleansing properties under traffic

iv) effects of noise in or near residential areas.

The colour specified for RRPMs in various usages is shown in Table 5.3.

RRPMs shall not be displayed towards oncoming traffic on the right-hand edge lines on undivided roads.

5.6.3 Non-retroreflective raised pavement markers (NRPMs)

NRPMs shall be white. Their use in moving traffic situations is confined to lane guidance through intersections, see Clause 5.6.5.4.

5.6.4 Internally illuminated

The application of internally illuminated raised pavement markers in respect of colour, positioning and spacing shall be the same as for RRPMs. If used in a continuously operating mode, they shall also have retroreflective elements meeting the photometric requirements of AS1906.3. If used in a switching mode, they shall not be retroreflective. The markers shall not be used in a flashing mode.

NOTE: Users should satisfy themselves that the photometric performance of the self-illuminating feature of such devices is adequate for their purposes.

5.6.5 Application of raised pavement markers

5.6.5.1 Positioning of markers

Markers are generally located in gaps in the painted broken lines. The gap for placing markers should be sufficient to accommodate a margin for error in remarking operations.

For applications with continuous lines such as barrier lines and traffic islands, the marker shall be placed 25 mm to 50 mm from the line as shown in Figure 5.14.

On sharp curves, RRPMs augmenting painted edge lines, lane lines and painted median / island approaches shall be orientated so that the full retroreflective effect is realized on approach. This is achieved by aiming the reflective face in the direction of approaching traffic rather than tangentially to the curve.

5.6.5.2 Augmenting painted lines

The use of RRPMs in augmenting pavement markings shall be as illustrated in Figures 5.15 to 5.26. The positioning of RRPMs in relation to the painted lines, is specified in Clause 5.6.5.1.

The normal spacing between RRPMs, dimension N shown on the following treatment diagrams, is the distance indicated in Table 5.5 for the particular situation.

   a) lane lines
   b) dividing lines
   c) barrier lines
d) edge lines.

Except on single lane roadways, e.g. freeway ramps, RRPMs shall not be used to supplement edge lines unless they are also used, at the same location, to supplement dividing, barrier or lane lines (see Figure 5.20). They should not generally be used on edge lines where the shoulder is not sealed as they are likely to be removed or covered in grading operations, but if used they should be placed inside the edge line. Provision of RRPMs on edge lines on rural roads is optional but important in locations subject to fog or other adverse visibility conditions, or at points of special hazard, e.g. approaches to bridges with sub-standard shoulder width (see Figure 5.21).

RRPMs should generally be placed outside the painted line to prolong their effective life and to increase the apparent lane width. However, if sealed shoulders (forming part of an identified cycle network) or bicycle lanes are less than 1.5 m wide then RRPMs shall be placed to the right of the line.

NOTE: The preferred spacing on edge lines is 24 m and the maximum, 36 m (see Table 5.5).

e) Continuity lines

RRPMs should not be used on continuity lines, as they may inhibit rather than encourage the correct lane-changing manoeuvre. However they may be required if the line is on a curve or is of excessive length such as along a weaving section, and extra delineation of the lane-change area is needed. The spacing in this case shall be 24 m.

f) Traffic islands, medians and other devices

The configurations shown are intended to illustrate the use of RRPMs only and should not be taken as a guide to the lengths or sizes of the facilities described. If the island outline or bicycle lane line is less than 1.5 m from the face of kerb then RRPMs shall be placed to the right of the line. RRPMs should not be placed where outlines are less than 1 m from the kerb face and approaches to the island meet desirable delineation requirements.

5.6.5.4 Lane guidance through intersections

A treatment of the type illustrated in Figure 5.27 comprising the placement of NRPMs within an intersection to guide non-turning traffic may be considered where it is apparent that such traffic would have difficulty in finding the correct lane on the departure side. The treatment is normally applicable only to wide signalised intersections on multi-lane roads. Typical situations where the treatment may be required are:

a) lanes on opposite sides of the intersection offset by half a lane width or more, e.g. the north-south leg of Figure 5.27

b) drivers required to steer a curved course through the intersection, e.g. the east-west leg of Figure 5.27

c) highly skewed intersections where the travel distance within the intersection is excessive, or

d) other features such as tram lines or adverse vertical geometry which may make the course difficult to follow.
Where applied, the treatment shall be completed for all through lanes on all legs even though the problem may exist for one intersecting road only. Markers should normally be omitted from within the area bounded by turn lines when these are marked, but may be required if inadequate, confusing or incorrect guidance would result, for example, where a curved path is to be followed.

It is essential that these treatments be maintained at a high level so that confusing patterns will not be created by an excessive number of missing markers. The expected high cost of maintenance should be taken into account when considering the need for treatment.

As an alternative to NRPMs, short dashes of thermoplastic material may be used, provided they are at least as visible as NRPMs under all viewing conditions.

MUTCD Part 2 Table 5.3 – Colour of retroreflective raised pavement markers to augment painted lines

<table>
<thead>
<tr>
<th>Application</th>
<th>RRPM colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividing lines</td>
<td>Yellow</td>
</tr>
<tr>
<td>Lane lines</td>
<td>White</td>
</tr>
<tr>
<td>Right hand edge line, divided road and one-way road</td>
<td>Yellow</td>
</tr>
<tr>
<td>Left hand edge line, divided road and one-way road</td>
<td>Red</td>
</tr>
<tr>
<td>Left hand edge line, 2-way road</td>
<td>Red</td>
</tr>
<tr>
<td>Small* channelising island outline, painted or raised – all sides</td>
<td>White</td>
</tr>
<tr>
<td>Median island outline, painted or raised – all sides</td>
<td>Yellow</td>
</tr>
<tr>
<td>Roadway diverge outline, including expressway exit nose, and approach end of large island</td>
<td></td>
</tr>
<tr>
<td>• left† side</td>
<td>Yellow</td>
</tr>
<tr>
<td>• right† side</td>
<td>Red</td>
</tr>
<tr>
<td>Step-out markings at expressway exit ramps</td>
<td>Green</td>
</tr>
</tbody>
</table>

Notes:

* A small island should generally be regarded as one with no side, including approach and departure markings, longer than 12 m.

† Left or right when viewed in the direction of travel.
**MUTCD Part 2 Table 5.4 – Symbols for raised pavement markers**

<table>
<thead>
<tr>
<th>Marker or term</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-retroreflective raised pavement marker</td>
<td>○</td>
</tr>
<tr>
<td>Retroreflective raised pavement marker:</td>
<td></td>
</tr>
<tr>
<td><strong>Unidirectional</strong></td>
<td></td>
</tr>
<tr>
<td>• White</td>
<td></td>
</tr>
<tr>
<td>• Yellow</td>
<td></td>
</tr>
<tr>
<td>• Red</td>
<td></td>
</tr>
<tr>
<td>• Green</td>
<td></td>
</tr>
<tr>
<td><strong>Bidirectional</strong></td>
<td></td>
</tr>
<tr>
<td>• White</td>
<td></td>
</tr>
<tr>
<td>• Yellow</td>
<td></td>
</tr>
</tbody>
</table>

**MUTCD Part 2 Table 5.5 – Normal spacing (N) between RRPMs**

<table>
<thead>
<tr>
<th>Situation</th>
<th>Dimension N, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlit roads generally, lane lines and dividing lines</td>
<td>24</td>
</tr>
<tr>
<td>Substandard curves or curves 400 m radius or less</td>
<td>12</td>
</tr>
<tr>
<td>Dividing (barrier) lines on approaches to median ends</td>
<td></td>
</tr>
<tr>
<td>Roads with street lighting meeting AS1158.1.1 (except that 24 m spacing for lane lines may be sufficient in many cases)</td>
<td></td>
</tr>
<tr>
<td>Short length of special purpose dividing or lane line, exit lines at roundabouts</td>
<td></td>
</tr>
<tr>
<td>Dividing lines on all multi-lane undivided roads</td>
<td></td>
</tr>
<tr>
<td>Lines outlining traffic islands, median and separator ends, and other devices</td>
<td>4 min, 12 max*</td>
</tr>
<tr>
<td>Markers on edge lines including outlines of painted median strips and separators</td>
<td>24 preferred, 36 max</td>
</tr>
<tr>
<td>Dividing and lane lines on intersection approaches (minimum – one and marker at each end of the line)</td>
<td>12</td>
</tr>
</tbody>
</table>

Note:
* Shown on MUTCD Part 2 Figures 4.22 to 4.24 and 4.26 at the preferred dimension, 6 m.

**MUTCD Part 2 Figure 5.14 – Lateral placement of RRPMs**

![Lateral placement of RRPMs](image)

**MUTCD Part 2 Figure 5.15 – Broken lane lines**

![Broken lane lines](image)
MUTCD Part 2 Figure 5.16 – Continuous lane lines

MUTCD Part 2 Figure 5.17 – Broken dividing line

MUTCD Part 2 Figure 5.18 – Continuous dividing line

MUTCD Part 2 Figure 5.19 – Barrier lines

MUTCD Part 2 Figure 5.20 – Edge lines on a two-lane two-way road

MUTCD Part 2 Figure 5.21 – Edge lines on a multi-lane one-way roadway

Note: RRPMs are only used on rural divided roads as indicated in Clauses 5.6.5.2(d) of the MUTCD Part 2 extract in Section 2.5 of this guide.
**MUTCD Part 2 Figure 5.22 – Large raised or unpaved traffic island with diverging traffic**

Note: Spacing shown is indicative only.

**MUTCD Part 2 Figure 5.23 – Large raised or unpaved traffic island with subsequent merge**

Note: Spacing shown is indicative only.

**MUTCD Part 2 Figure 5.24 – Approach to (or departure from) median island (two-way flow)**

Note: Spacing shown is indicative only.
**MUTCD Part 2 Figure 5.25 – Painted median strips**

Note: Diagonal rows of RRPMs within the marked median are intended to be additional to the RRPMs on the outlines.

**MUTCD Part 2 Figure 5.26 – Painted islands**

Notes

1. For small islands, a minimum of two RRPMs should be visible on any one edge.
2. The spacing may be adjusted to allow even gaps between RRPMs.
2.5.1 General

Raised pavement markers may be permanent or temporary, retroreflective or non-retroreflective. They are also used individually to locate particular objects, e.g. fire hydrants and special survey points.

Retroreflective raised pavement markers were developed to improve wet / night visibility, when pavement striping provides less delineation and supplemental systems are necessary. These devices use a reflector, which extends above the smooth film of water on the road surface, providing a valuable delineation function by reflecting light from vehicle’s headlights. Raised pavement markers can improve driver’s performance by providing information about roadway geometry at a distance greater than is possible with pavement striping.

Temporary raised pavement markers are used to mark the travelled path at short-term work sites.
When used on narrow traffic lanes, raised pavement markers usually improve lane discipline. They are also very useful for highlighting sudden lateral shifts in lane lines, for use in conjunction with pavement markings at detours on long-term side tracks and deviations, on edge lines on substandard horizontal curves and for use on altered lane lines where confusion with previously painted markings may occur.

2.5.2 Permanent Retroreflective Raised Pavement Markers (RRPMs)

Continuous application of RRPMs to augment the painted dividing line on two-lane, two-way roads should be considered where the Annual Average Daily Traffic (AADT) exceeds 2000 vpd. Also, at isolated locations of special hazard, provision of RRPMs should be considered on any sealed surface irrespective of the traffic volume.

2.5.3 Non-retroreflective raised pavement markers

Non-retroreflective raised pavement markers shall be circular, approximately 100 mm in diameter and 15 mm high. The colour shall be white.

2.5.4 Temporary Raised Pavement Markers (TRPMs)

Temporary raised pavement markers may be used to mark the temporary travelled path at short-term work sites or to indicate the permanent travelled path on new work prior to the application of permanent pavement markings.

For marking temporary paths while work is in progress, TRPMs are simply glued to the surface, often using bituminous adhesive. For night-time performance, they should be fitted with retroreflectors compliant with AS1906.3.

TRPMs used to indicate the alignment for new markings should be placed on the surface of the road base or basecourse, so that the final surface course can hold the TRPM in place. The retroreflective flap then protrudes from the road surface to indicate the new marking alignment. Later, the flap may be cut away flush with the road surface.

2.5.5 Pavement bars

For more information, refer to MUTCD Part 2 Section 4.3.

<table>
<thead>
<tr>
<th>4.3 Pavement bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.1 General</td>
</tr>
<tr>
<td>Pavement bars are raised blocks that may be used to augment painted islands and painted median strips to discourage but not prohibit traffic movements across the islands or median strips.</td>
</tr>
<tr>
<td>4.3.2 Design and installation</td>
</tr>
<tr>
<td>Typically pavement bars are 200 mm wide and 400 mm long. They shall have an approximately hemispherical cross-section with rounded ends. Their use shall be limited to the following:</td>
</tr>
<tr>
<td>a) Where the 85th percentile approach speed is less than 75 km/h, the height of the bars shall be a maximum of 50 mm.</td>
</tr>
<tr>
<td>b) Where the 85th percentile approach speed exceeds 75 km/h pavement bars shall not be used. Raised retroreflective pavement markers arranged in transverse rows may be used instead (see Clause 5.6.5.2(f) and Figure 5.25).</td>
</tr>
</tbody>
</table>
Pavement bars shall be painted or otherwise coloured yellow and they shall be reflectorised. They shall be arranged perpendicular to the direction of travel so as to increase visual effect and minimize the possibility of loss of vehicular control if traversed.

4.3.3 Uses

Typical uses of arrangements of pavement bars are to:

a) control turning movements at intersections (see Figure 4.1).

b) lane control (see Figure 4.2).

c) supplementing barrier lines where frequent and hazardous infringements occur, except on substandard curves.

d) replacing raised islands where these are undesirable or not considered effective because of the absence of street lighting or restricted pavement width.

e) replacing a raised island where, but for limitation on minimum size, it would otherwise be used.

f) approach treatment to a median or other central obstruction (see Figure 4.3).

g) replacing a narrow median (see Figure 4.4).

h) islands traversable by over-dimensional vehicles.

Pavement bars shall not be installed on two-way roadways less than 6.8 m in width, nor on substandard curves.

Installations of pavement bars should normally be outlined with single continuous lines. If the installation is in the form of a median separating opposing directions of traffic, the outline markings may consist of barrier lines.

*MUTCD Part 2 Figure 4.1 – Pavement bars for control of turning movements at intersections*

Note: The 18 m length using seven bars at 3 m spacings may be reduced to 9 m using four bars at 3 m spacings.
The size and shape of pavement bars need to be carefully designed, so that they do not cause a hazard to motorcyclists and bicyclists.

Care should be exercised in the layout of islands using pavement bars to reduce the risk of drivers or riders losing control if the pavement bars are crossed. Where motorcycle and bicycle traffic are significant, or where serious vehicle encroachment over a painted traffic island is a persistent problem, it may be preferable to use close spaced RRPMs or to install a conventional kerbed raised island.

RRPMs may be used to supplement outline markings as shown in Figure 2.5.5 in this guide.
Figure 2.5.5 – RRPMs for pavement bar arrangements

(a) Pavement bars for lane control

(b) Pavement bars for median approach

(c) Pavement bars used as median

2.5.6 Audio-Tactile Line Markings (ATLM)

For more information, refer to MRTS45 Clause 7.7.
7.7 Audio tactile line marking

7.7.1 Application of audio tactile line marking

Where shown on the design documents, audio tactile line marking (ATLM) configured as a pattern of raised ribs shall be applied directly to the road surface on existing painted edge lines, centre double barrier lines, centre one-way barrier lines or wide centre line marking. At locations where edge lines have not been marked (such as across narrow structures), ATLM shall not be applied. ATLM shall be applied in a controlled manner, to produce a finished longitudinal line with a consistent appearance and profile that provides a significant audible warning.

7.7.2 Application on existing painted lines

All extraneous or loose material shall be removed from areas where the material is to be applied, immediately prior to application of ATLM. In addition, existing line markings shall be prepared and primed, in accordance with the manufacturer’s recommendations, to ensure satisfactory adhesion of the material.

7.7.3 Placement and dimension of audio tactile line marking

Where nominated in the Contract, ATLM shall be applied to all lines shown on the design documents and shall conform to the tolerances shown in Table 7.9.2. Use of ATLMs on Wide Centreline treatments are outlined in Section 7.11 of this Technical Specification.

The height of the raised ribs is measured from the plane surface formed by the tops of the aggregate.

Diagrams depicting these requirements are provided in Figure 7.7.3(a), Figure 7.7.3(b) and Figure 7.7.3(c).

7.7.4 Gaps for cyclists

A 1.5 m gap spaced every 20 m shall be provided in the ATLM edge line.

ATLM or raised profiled markings have proven to be effective in improving both wet / night visibility and in creating an audible and vibratory warning.

It should be discontinued 10 metres prior to structures (such as bridge rail, guardrail and culverts), where it is likely that cyclists might need to enter the traffic lane to pass the structure (this is likely where the structure is within one metre of the edge line) and recommence 10 metres past the end of the structure.

ATLM should be discontinued within 200 m of residences to prevent noise generated by ATLM from being a problem to nearby residents. For more information, refer to TRUM Volume 2 Part 5.
**MRTS45 Figure 7.7.3(a) – ATLM edge line**

**MRTS45 Figure 7.7.3(b) – ATLM centre double barrier lines**
3 Treatment between intersections

3.1 Scope

Refer to MUTCD Part 2 Section 4.1.

4.1 Scope

This Section specifies the signs and devices to be used for the control of traffic between intersections and sets out the principles for their installation together with typical applications.

All pavement markings and other pavement based delineation devices referred to in this Section are described in detail in Section 5.

3.2 General treatment of various road types

For more information, refer to MUTCD Part 2 sections 4.2.1 and 4.2.2.

4.2 Pavement markings and delineation

4.2.1 General

Requirements and recommendations for the use of dividing lines, lane lines, edge lines, and guide posts (with delineators) on rural and urban roads, divided and undivided, are given in Clause 4.2.2. Descriptions and uses of the pavement markings and the use of raised pavement markers to augment lines are given in Clauses 5.3 and 5.6.

4.2.2 General treatment

4.2.2.1 Rural road – undivided

a) **Sealed pavements less than 5.5 m wide.** Guide posts with delineators are normally the only devices used on undivided rural roads with pavements less than 5.5 m wide. Where used, guide posts shall be provided at, or near, the edge of the road formation at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The minimum clearance between opposite guide posts shall be 7.0 m. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

Dividing lines are not normally used, except that if the sight distance conditions for a no-overtaking zone are met (see Clause 5.3.3) a single continuous dividing line may be used (see Clause 5.3.2.2(c)). Edge lines shall not be used on two-way roadways, except for guidance through width transitions in accordance with Clause 5.3.5(c).

b) **Sealed pavements between 5.5 m and 6.8 m wide.** Where the pavement is between 5.5 m and 6.8 m wide, guide posts with delineators shall be provided at, or near, the edge of formation and at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

A dividing line is used in accordance with the requirements and recommendations of Clause 5.3.2.
Edge lines are not normally used except where one or more of the following conditions apply:

i. alignment is poor

ii. frequent fogs occur

iii. contrast between the pavement and shoulder is insufficient, e.g. sealed shoulders

iv. roadside hazards occur close to the pavement edge, e.g. trees.

Edge lines shall not be used unless:

(A) a dividing line is also marked, and

(B) the lane widths within the edge lines are at least 3.0 m or if there is a high proportion of heavy vehicle traffic, 3.2 m.

Exceptions to the above requirements are at a local pavement narrowing where edge lines may be continued across a narrow bridge (see Clause 4.6.2.1(b) and Figure 4.10) or at a one-lane roadway or bridge on a two-lane road (see Clause 4.6.2.2 and Figures 4.11, 4.12 and 4.13) or through the width transition at the narrowing of a two-lane road as shown in Figure 4.17.

c) Sealed pavements 6.8 m wide or greater. Where the pavement is 6.8 m wide or greater, guide posts shall be used on undivided rural roads at, or near, the edge of formation and at a constant distance (generally between 1.2 m and 3.0 m) from the pavement edge. The longitudinal spacing of guide posts is given in Clause 4.2.4.4.

Dividing lines are used in accordance with the requirements and recommendations of Clause 5.3.2. Edge lines are normally required but shall not be used unless a dividing line is also used.

d) Roads with sealed shoulders. Edge lines shall be provided at the edge of the running lane.

A different coloured aggregate from that used on the travelled part of the pavement may be used to provide contrast and to discourage driving on the shoulder.

Diagonal markings may be required on the shoulder if frequent use of the shoulder as a running lane creates a problem (see Clause 5.5.1.3).

4.2.2.2 Rural roads – divided, including rural expressways

Lane lines (see Clause 5.3.4) and edge lines (see Clause 5.3.5) shall be marked. Postmounted delineation shall be provided in accordance with Clause 4.2.4 and 4.2.5.

4.2.2.3 Urban roads – undivided

a) Two-lane unkerbed roads. Dividing lines are marked in accordance with Clause 5.3.2. Guide posts and delineators may also be used.

Dividing lines are not normally required on local streets.

Edge lines shall not be marked unless a dividing line is also marked and lane widths in accordance with Clause 4.2.2.1(b)(B) are provided.
b) **Two-lane kerbed roads.** A dividing line is provided on kerbed roads in accordance with the requirements and recommendations of Clause 5.3.2, if the pavement width available for moving traffic is 6.8 m or greater. Dividing lines may be provided on roads of a lesser width where there is a prohibition on parking, or if the parking demand is very low, provided that the pavement width between kerbs is at least 6.8 m.

c) **Multi-lane unkerbed roads.** A dividing line shall be provided in accordance with Clause 5.3.2. Where used, the form of dividing line specified in Clause 5.3.2.3, for multi-lane undivided roads shall be used. Lane lines shall be used on roads which provide for two or more moving lanes of traffic in any one direction at any time of day (see Clause 5.3.4).

d) **Multi-lane kerbed roads.** Lane lines and a dividing line shall be provided in accordance with Item (c). This should include the marking of kerbside lanes as running lanes except where parking is permitted at all times and is frequent during most of the day, in which case the kerbside lane may be separated from the running lanes by an edge line, if necessary for guidance of moving traffic.

### 4.2.2.4 Urban roads – divided and one-way roadways

Lane lines shall be provided in accordance with Clause 4.2.2.3(c) or Clause 4.2.2.3(d) as appropriate.

Edge lines, if provided, shall be placed on both edges of an unkerbed one-way roadway. Edge lines are not required on a kerbed roadway if the kerbs provide adequate edge delineation.

The pavement marking content of MUTCD Part 2 clauses 4.6.2.1 and 4.6.2.2 is contained within Section 3.9 of this guide.

#### 3.2.1 Freeways

Freeways are subject to the application of markings, whether painted or of the raised marker type, which should be designed, placed and maintained to the highest practicable standards.

The longitudinal markings used comprise lane lines, edge lines and continuity lines.

Edge lines on freeways comprise 150 mm continuous lines both on main freeway lanes and on-ramps. They are not normally supplemented with RRPMs, but in locations subject to fog or other adverse visibility conditions, or at points of increased potential hazard, such as approaches to bridges with substandard shoulder width, RRPMs may be provided as follows:

- left side – red only
- right side – yellow.

To delineate the approach to and entrance of an off-ramp, green unidirectional RRPMs are used in association with the edge line.

Continuity lines are used to indicate the edge of the through freeway lanes where it is intended that the line be crossed by traffic entering or leaving the freeway at a ramp, or entering or leaving an auxiliary lane at its start or finish. They should not be augmented with RRPMs.

Details of markings at exits and entries are given in Section 4.2 of this guide (MUTCD Part 2 figures 3.4 and 3.5).
Lane lines are either painted broken or continuous lines augmented with RRPMs. Continuous lane lines are used typically to separate a ‘trap’ lane from a through or combined lane in advance of an exit. They may also be used as ramp lane lines on two-lane entrance or exit ramps where they meet the main freeway lanes.

**Rural freeways:** Normally broken lane lines are painted, augmented with RRPMs at spacings of 24 metres (in every second gap). This spacing may be reduced to 12 metres (in every gap) in any of the following circumstances:

a) on roads subject to fog or other adverse visibility conditions

b) on lit roads, and

c) on curves of 400 metres radius or less.

**Urban freeways:** Normally lane lines are painted, RRPMs should be spaced at 12 metre intervals (in every line gap).

### 3.3 No overtaking zones

#### 3.3.1 General

Refer to MUTCD Part 2 Section 4.2.3.

#### 4.2.3 No-overtaking zones – barrier lines

On horizontal and vertical curves on two-way sealed pavements where the overtaking sight distance is substandard, barrier lines shall be marked to create ‘no-overtaking’ zones where required in accordance with Clause 5.3.3.

Barrier lines may also be required on the approaches to certain mid-block features, including medians and other central roadway obstructions, and on undivided approaches to intersections in some circumstances. These situations are covered elsewhere in this manual.

#### 3.3.2 Guidelines

Refer to MUTCD Part 2 Section 5.3.3.2.

#### 5.3.3.2 No-overtaking zones

Barrier lines shall be used to create no-overtaking zones in rural areas where there is restricted overtaking sight distance due to horizontal or vertical curves, or both, or where a hazardous condition exists, e.g. at approaches to major intersections or intersections and mid-block central roadway obstructions. Requirements for the provision of no-overtaking zones are as follows:

a) *Roads 5.5 m or more wide.* Vertical and horizontal curves on which the overtaking sight distance falls below that shown in Column 2 of Table 5.1 shall be marked as no-overtaking zones.
b) Roads less than 5.5 m wide. Barrier lines may be marked if the conditions above occur, but the sealed roadway should preferably be widened to at least 5.5 m over the section containing the barrier lines.

If it is not practicable to mark the no-overtaking zone at vertical curves, the CREST warning sign (W5-11) (see Clause 4.5.4.1) should be erected.

c) Two-lane bridges. Barrier lines shall not normally be marked on two-lane bridges, unless the warrant in Item (a) indicates that a no-overtaking zone is required and the width is 5.5 m or greater between kerbs.

Gaps in double barrier lines in rural areas may be provided for turning traffic where there is adequate sight distance to oncoming traffic as follows:

i) at intersections – min. 1 gap; max. 2 gaps

ii) at private entrances – min. 1 gap

where a gap is the module length.

A single continuous dividing line shall be used instead of a barrier line only in urban areas and where it is necessary to permit crossing of the line by traffic entering or leaving the roadway.

NOTE: General use of single continuous barrier lines to form no-overtaking zones is discouraged on safety grounds as they do not have the impact and better understood meaning of the double barrier line. Furthermore they are not able to indicate places where crossing the line is permitted in one direction of travel but not the other.

### 3.3.3 Location and setting out

Refer to MUTCD Part 2 sections 5.3.3.3 and 5.3.3.4.

#### 5.3.3.3 Location and setting out

The method for locating and setting out barrier lines is shown in Figure 5.2, and the steps to use are as follows (see also Clauses 5.3.3.4 and 5.3.3.5):

a) As the point \( A \) approaches the curve, overtaking sight distance progressively decreases.

b) Where the overtaking sight distance \( A \rightarrow B \) (Column 2 of Table 5.1) reaches the minimum for the 85th percentile speed selected (Column 1 of Table 5.1), a barrier line should commence at \( C \), the barrier line distance (Column 3 of Table 45.1) from \( B \).

c) After further eastward travel from \( C \), the minimum overtaking sight distance is regained at \( B \) and the barrier line is terminated.

#### 5.3.3.4 Modification of barrier line requirements

The application of the method specified in Clause 5.3.3.3 will, in some instances, result in too short a length of barrier line or too short a distance between barrier lines for passing to be accomplished. If this occurs, the barrier line should be either eliminated or lengthened, depending on the circumstances.
Some typical instances and suggested modifications are as follows:

a) Where only a short length of road (see Column 2 of Table 5.2) has substandard overtaking sight distance, barrier lines should not be marked, e.g. within a short sag (floodway, ford) in an otherwise level road.

b) Where a barrier line marked in accordance with Clause 5.3.3.3 is very short, it will not have sufficient visual impact and will not give the impression of continuity. The distance \( CE \) of Figure 5.2 in some circumstances will be less than the minimum length of barrier line (Column 3 of Table 5.2) and in rare situations \( CE \) will occur after \( BW \). In these cases the minimum length of barrier line (Column 3 of Table 5.2) should be marked to terminate at the point \( BW \) at which minimum overtaking sight distance (Column 2 of Table 5.1) is regained.

c) Where the distance between the end of one barrier line and the start of the succeeding barrier line restricting overtaking in the same direction is equal to or below the minimum (see Column 4 of Table 5.2), the barrier line should be joined to form one continuous line. For example, this may occur on a short straight between two curves in opposite directions.

**MUTCD Part 2 Figure 5.2 – Method for locating a no overtaking zone on an isolated curve**

**Notes**

1. For convenience, overtaking sight distance is measured along the centre-line. It is not worth taking account of the slight difference between left-hand and right-hand curves, i.e. for a left-hand curve, the overtaking vehicle is on the outside of the curve and for a right-hand curve, it is on the inside.

2. The marking of vertical curves is similar to that for horizontal curves.
Notes

1. The first chevron alignment marker (CAM) in each direction of travel is located as follows:
   a. two-way roadway:
      i. left-hand curve – on prolongation of the dividing line.
      ii. right-hand curve – on prolongation of the left-hand edge line.
   b. One-way roadway:
      i. left-hand curve – on prolongation of the right-hand edge line.
      ii. right-hand curve – on prolongation of the left-hand edge line.

   The last marker is placed at the end of the circular curve and intermediate markers equispaced at the spacing, shown in MUTCD Part 2, Table 4.3. A minimum of three markers are displayed to each approach direction. A minimum of two markers are to be visible on each approach to the curve (see MUTCD Part 2, Clause 4.4.7.11).

2. Raised retroreflective pavement markers should be used to supplement the dividing lines on pavement 6.8 m or wider (see MUTCD Part 2, Clause 4.4.7.11).

3. No overtaking zones are marked if necessary (see Clause 5.3.3 in MUTCD Part 2 extracts in sections 2.2.2, 3.3.2, 3.3.3 and 3.3.4 of this guide).

4. Guide posts with delineators, or delineators on guard fence or safety barrier, are provided on both sides of the curve at the spacings given in MUTCD Part 2, clauses 4.2.4.4 and 4.2.5.4.

5. Advance signs may be duplicated on the right-hand side of the road.

6. Edge lines should be provided on pavements 6.8 m or wider (see MUTCD Part 2, Clause 4.4.7.11) and may be supplemented with RRPMs (see Clause 5.6.5.2 in MUTCD Part 2 extract in Section 2.5 of this guide).
3.3.4 Checking marked barrier lines

For more information, refer to MUTCD Part 2 Section 5.3.3.5.

### 5.3.3.5 Checking marked barrier lines

Barrier lines marked strictly in accordance with Clauses 5.3.3.3 and 5.3.3.4 will occasionally produce no-overtaking zones which err on the safe side and may be too restrictive.

To check this, the road should be traversed at about the 85th percentile speed when marking is complete. At this speed all barrier lines should appear reasonable and not unduly restrictive. Particular attention should be given to sections of steep or winding alignment where little opportunity remains for overtaking. If the markings are considered too restrictive, the barrier lines should be reviewed as follows:

a) Check that the appropriate 85th percentile approach speed was used at each sight distance restriction. For example, while the 85th percentile approach speed to a section of winding alignment may be 100 km/h, the first curve may so reduce vehicle speeds that the approach speed to subsequent curves may be as low as 40 km/h.

b) See if short gaps can be left in the barrier line to allow cars to overtake slow-moving trucks. These gaps should, desirably, be not less than 100 m long. If necessary, the barrier line distance should be reduced to permit overtaking opportunities at the safest places consistent with shoulder width, roadside obstacles and other potential hazards, as well as sight distance.

3.3.5 Access breaks

Guidelines for the provision of access breaks are contained within the Traffic and Road Use Management (TRUM) manual Volume 1, Part 10, Section 6.3.3-1 Determination of centre line markings adjacent to property access.

3.4 Traffic islands and medians

3.4.1 General

A traffic island is a defined area within a road from which vehicular traffic is intended to be excluded. In the context of the highway between intersections, the term ‘island’ includes medians and separators. A median is a strip of road which separates opposing traffic lanes, while a separator delineates traffic moving in the same direction.

Islands may be designated by several means, including unsealed areas of pavement, painted markings, pavement bars or coloured material on the pavement surface, and raised areas defined by kerbs. Whether or not an island is demarcated with a painted outline, ends of islands exposed to oncoming traffic should be delineated.

3.4.2 Painted (flush) islands

Painted islands should be defined by outlining areas of pavement with lines. The interior may be either sealed with an aggregate of contrasting colour or texture, or consist of diagonal or chevron markings or pavement bars. The outline should normally be supplemented by raised pavement markers, especially where street lighting is substandard or absent (see MUTCD Part 2 figures 5.25 and 5.26 in Section 2.5 of this guide).
Typical uses of painted islands include:

a) islands of substandard size in urban areas  
b) channelising islands at rural intersections where operating speeds are high, or road lighting is absent or inadequate  
c) narrow medians  
d) part-time safety zones  
e) narrow lane separators.

Painted islands suffer the disadvantages of being more difficult to see in wet weather, especially at night, and not influencing driver discipline as much as raised islands. Pavement bars represent a compromise between painted lines and fully raised islands (see Section 2.5.1 of this guide).

3.4.3 Markings

Typical applications of markings to delineate islands and for end treatments are shown in MUTCD Part 2 figures 5.22 to 5.26, reproduced at Section 2.5 of this guide. The use of pavement bars is shown in MUTCD Part 2 figures 4.1 to 4.4, reproduced at Section 2.5.5 of this guide. There should be no gap between dividing lines and the end of islands or medians.

3.4.4 Wide centreline treatment

Refer to the department’s Guidelines for Road Design on Brownfield Sites for this treatment.

3.4.5 Vehicles crossing painted islands

Vehicles are not legally prohibited from encroaching on painted islands and medians with a single continuous line along the side or surrounding the island or median to enter or leave the road, or to enter a turning lane that begins immediately after the painted island. Where the encroachment of vehicles is not wanted, two-way (or double) barrier lines along one or more edges of the island or median are required to make that intention clear and regulatory. Furthermore, the continuation of two-way barrier lines along at least one edge of a median painted island, particularly where the gore is long and narrow, may help to allay any confusion between barrier lines and close-to-parallel island outlines.

Where it is necessary for vehicles entering or leaving a single unit residential property access to carry out a turning manoeuvre across the painted markings on the splayed approach to a raised median island, and it is safe to do so (that is, there is sufficient sight distance to approaching traffic for U-turning drivers and adequate space to store a U-turning vehicle clear of through traffic), a gap sufficient for the purpose may be made in the markings. This gap shall be defined with an ‘edge’ line to indicate the limit of the U-turn manoeuvre permitted, and a continuity line along the breaks in the outline markings of the painted island. This arrangement is considered only where no other reasonable alternative access is available and is applied only to single unit residential dwellings (that is, private homes). In all other cases, appropriate provisions for traffic generating developments would be required.

3.4.6 RRPMs

The use of RRPMs with islands is described in Section 2.5 of this guide and depicted in MUTCD Part 2 figures 5.22 to 5.26 reproduced in Section 2.5.
3.4.7 Pavement bars

The use of pavement bars is described in Section 2.5.5 of this guide and depicted in MUTCD Part 2 figures 4.1 to 4.4, reproduced at Section 2.5.5.

Pavement bars shall not be installed on roads less than 6.8 metres wide, nor on substandard curves.

The disadvantages of pavement bars are as follows:

   a) the control of turning or access movements is not as effective as with raised medians
   b) they are easily damaged
   c) they tend to collect dirt
   d) they may be hazardous to the riders of motorcycles and bicycles, and to pedestrians.

3.4.8 Width transitions

The presence of a median traffic island may necessitate the use of an edge line in accordance with MUTCD Part 2 Section 5.3.5(c).

3.5 Changes in pavement width

Refer to MUTCD Part 2 sections 4.7.2, 4.7.3 and 4.7.4.

<table>
<thead>
<tr>
<th>4.7.1 General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrowing of pavement width may involve a reduction in width of a roadway, with or without a reduction in the number of lanes, or a transition from a divided to an undivided road, also with or without a reduction in the number of lanes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.7.2 General treatments at lane reductions (merges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where there is to be a reduction in the number of lanes by means of a merge, each merge shall have signs and pavement markings appropriate to either a zip-merge or a lane change manoeuvre.</td>
</tr>
</tbody>
</table>

   a) Zip-merges*: The layout for a zip-merge is shown in Figure 4.16(a). The absence of any line in the area where the merge takes place invokes the zip-merge rule whereby any vehicle behind another vehicle in an adjacent stream, is required to give way to that vehicle during the merge even though its distance ahead may be less than the length of either vehicle.

   NOTE: * At time of publication of this Part of the Manual this term was synonymous with the term ‘merge’ in the Australian Road Rules.

   The zip-merge treatment shall be used where the $85^{th}$ percentile speed is $80$ km/h or less.

   The zip-merge treatment shall be used on climbing lanes.

   The addition of a continuity line to a zip-merge treatment which changes the merge treatment to a lane change / general case merge shall be limited to situations where drivers may have difficulty anticipating the merge ahead or require the increased direction assistance a continuity line can provide, e.g. because the merge is partially hidden by a crest or around a curve. If a continuity line is provided all signing and line marking must conform with the requirements of a lane change / general case merge.
The signs shown in Figure 4.16(a) shall be used as follows:

i. Short length of added lane, e.g. at a localised flaring:
   - 60 km/h or lower speed zone – signs are not required but if used they shall be as for Item (B).
   - 70 or 80 km/h speed zone – FORM 1(2) LANE(S), G9-15 or G9-16 signs only, shall be placed at the beginning of the taper.

ii. Runout of a long lane:
   - 60 km/h or lower speed zone – FORM 1(2) LANE(S), G9 15 or G9 16 position signs only, shall be placed at the beginning of the taper.
   - 70 or 80 km/h speed zone – position sign as above shall be provided along with advanced signs G9 15 or G9 16, with distance plates 200 m, G9 78, mounted under them.

b) Lane change / general case: The layout of a merge requiring a lane change manoeuvre is shown in Figure 4.16(b). The continuity line in the merge area is legally a lane line and hence, in any move across it, the obligation is on the driver crossing the line to find a safe gap in the adjacent traffic stream.

   This arrangement shall be used where the 85th percentile speed is greater than 80 km/h.

   This arrangement shall be used on overtaking lanes on two lane rural roads.

c) Lane change / expressway type entry ramp: The layout and signposting at expressway type entry ramps is shown in Figure 3.3.

4.7.3 Narrowing of a roadway

4.7.3.1 Narrowing of two-lane road

Where a reduction in pavement width occurs on a two-lane road, treatment depends on the final pavement width as follows:

a) if less than 5.5 m, the treatment shall be as shown in Figure 4.17(a)

b) if 5.5 m or greater, the treatment shall be as shown in Figure 4.17(b).

4.7.3.2 Transition from four-lane road to two-lane road (both undivided)

Where a four-lane undivided road changes to a two-lane road, the treatment should be as shown in Figure 4.18.

4.7.4 Transition of divided road to undivided road

The treatments required at the transition from a four-lane divided road to a four-lane undivided road and to a two-lane road shall be as shown in figures 4.19 and 4.20. On the approach to the median, the barrier line may be extended to the left side of the median nose.

Where there is considerable change in alignment at the start of the divided road, consideration should be given to the erection of one or more Directional Hazard markers in association with the sign KEEP LEFT (R2-3).
Additional guidelines related to changes in pavement width are provided in MUTCD Part 2 Clause 4.6.2-1 on signage and line marking for narrow bridges.

**Table 3.5 – Required lengths for distance A**

<table>
<thead>
<tr>
<th>$V_{85}$ (km/h)</th>
<th>A (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 75</td>
<td>80–120</td>
</tr>
<tr>
<td>75–90</td>
<td>120–180</td>
</tr>
<tr>
<td>&gt; 90</td>
<td>180–250</td>
</tr>
</tbody>
</table>

This table gives the maximum values for the lengths denoted by ‘A’ in MUTCD Part 2 figures 4.17(a) and (b) and figures 4.18 to 4.20.

**MUTCD Part 2 Figure 4.16 – Treatments at lane reductions (merges)**

Notes:

1. The ‘FORM 2 LANES’ sign applies if this illustration is one side of the divided road.
2. Lane change arrows are always used in Figure (b). They are not used in Figure (a).
**MUTCD Part 2 Figure 4.17 – Narrowing of two-lane road**

(a) Road narrows to less than 5.5 m

(b) Road narrows to 5.5 m or greater

Note

Guide posts are at a constant distance from the edge line, minimum 1.2 m, and at 10 m to 15 m longitudinal spacing throughout the transition.
Notes

1. Guide posts at 10 m to 15 m on the lane reduction transition side. Wider spacings may be used on the other side of the transition.

2. The lane reduction is treated either as a zip-merge, in accordance with Clause 4.7.2(a) in Extract 35, Section 3.5 or a lane change in accordance with Clause 4.7.2(b) in the MUTCD Part 2 extract in Section 3.5 of this guide. In the zip-merge case, both the lane change arrows and the continuity line are omitted. In the lane change case, the lane change arrows are used always.

3. ’M’ and ’D’ are the merge and diverge distances calculated from traffic speeds and lane widths, in accordance with road design practice.

4. If this is the start of an overtaking lane, see Clause 4.8 in the MUTCD Part 2 extract in Section 3.6 of this guide, the signs and pavement markings shown in MUTCD Part 2 Figure 4.21, reproduced in this guide at Section 3.6.1, will be required.
MUTCD Part 2 Figure 4.19 – Transition from four-lane divided to four-lane undivided road

Note:

* For Dimension A, see Table 3.5 in Section 3.5 of this guide.
MUTCD Part 2 Figure 4.20 – Transition from four-lane divided to two-lane undivided road

Notes

1. The lane reduction is treated either as a zip-merge, in accordance with Clause 4.7.2(a) in the MUTCD Part 2 extract in Section 3.5 of this guide or a lane change, in accordance with Clause 4.7.2(b) in the MUTCD Part 2 extract in Section 3.5 of this guide. In the zip-merge case, both the lane change arrows and the continuity line are omitted. In the lane change case, the lane change arrows are always used.

2. Additional signs to further remind road users of the change to two-way conditions may be required, see MUTCD Part 2, Clause 4.7.5.4(d).

3. 'M' and 'D' are the required merge and diverge distances calculated in accordance with road design practice.

4. For Dimension 'A', see Table 3.5 at Section 3.5 of this guide.
3.6 **Auxiliary lanes**

3.6.1 **General**

Refer to MUTCD Part 2 Section 4.8.1.

### 4.8.1 General

Climbing and overtaking lanes, and turnouts are provided and marked as follows:

- **a) Overtaking lanes:** These are provided on two-lane, two-way roads at long or steep grades or elsewhere where it is necessary or desirable to provide for traffic to pass slower moving vehicles. Overtaking lanes are designed as shown in Figure 4.21 to encourage all traffic in the first instance to travel in the added left-hand lane, leaving the centre lane for overtaking vehicles only.

- **b) Climbing lanes:** These are provided on multi-lane roads, i.e. two or more lanes in one direction, at long or steep grades to minimise reductions in capacity due to slow moving vehicles. Climbing lanes shall be marked as shown in Figure 4.22(a) to encourage only the slow-moving vehicles to use the added left-hand lane.

- **c) Turnouts:** These are provided only on low speed roads, 85th percentile speed 60 km/h or less, where it is desirable to provide for traffic to pass slower moving vehicles, but due to geometric, topographical or other constraints a full length climbing or overtaking lane cannot be provided. They are generally not more than 150 m in length overall including 50 m entry and exit tapers and shall have a layout and pavement markings as shown in Figure 4.22(b).

Other types of auxiliary lane which are not considered in detail in this section include turning lanes, weaving lanes and ramps on freeways, safety ramps and auxiliary lanes at T-intersections.

Climbing lanes are provided at steep grades on roads carrying high traffic volumes with a significant proportion of heavy vehicles. The signs and pavement markings for a typical climbing lane treatment are given in MUTCD Part 2 Figure 4.22, reproduced in this section. Such treatments are appropriate on particularly short, steep grades where provision for overtaking of an occasional slow vehicle is required. This system does, however, in some cases, encourage overtaking in the left lane, discouraging use of the climbing lane by slow vehicles.

As a general rule, all forms of auxiliary lane should be designed as overtaking lanes, as shown in MUTCD Part 2 Figure 4.21, reproduced in this section, to encourage maximum use of the auxiliary lane and allow overtaking even between vehicles travelling at similar speeds. The alternative design for climbing lanes and slow vehicle lanes should only be used to reduce use of the added lane.
**Notes**

1. A double barrier line is required if the warrants for a no overtaking zone are met in the single-lane direction. It should also be considered if the overtaking lane section is on curved alignment even though overtaking sight distance is available.

2. For erection where left lane is more than 1 km long. This sign is erected 500 m in advance of the G9-73 sign.

3. Merge arrows are optional (see Clause 5.5.2.4 in the MUTCD Part 2 extract in Section 2.4.2 of this guide).

4. ‘M’ and ‘D’ are the required merge and diverge distances calculated in accordance with road design practice.

5. For Dimension ‘A’, see Table 3.5 in Section 3.5 of this guide.
MUTCD Part 2 Figure 4.22 – Typical treatment for climbing lanes and turnouts

Notes

1. For use where the left lane is more than 1 km long.
2. The slow vehicle turnout can be used on any low-speed road, divided or undivided where $V_{85}$ is 60 km/h or less.
3. Use G9-11 where advance information is desirable, i.e. where overtaking opportunities are reduced for some distance in advance of lane (generally 2 km, maximum 5 km).
4. ‘M’ and ‘D’ are the required merge and diverge distances calculated in accordance with road design practice.
5. For Dimension ‘A’, see Table 3.5 in Section 3.5 of this guide.
3.6.2 Transition lengths

The minimum length of edge line ‘A’ leading into the transition are given in Table 3.5 in Section 3.5 of this guide.

3.6.3 Use of barrier lines

For auxiliary lanes constructed as three-lane road sections (see MUTCD Part 2 Figure 4.21 reproduced in Section 3.6.1 of this guide), three particular aspects are of relevance:

a) In the direction of the auxiliary lane (direction 1), it is normal practice to provide a continuous barrier line over the full auxiliary lane length, including tapers, to prohibit any use by direction 1 vehicles of the third or opposing traffic lane. This also serves to define the centrelane of the road and indicate that the centre lane is primarily for direction 1 traffic.

b) For direction 2 (opposing traffic), a barrier line is generally provided adjacent to the auxiliary lane diverge and merge tapers.

c) For direction 2 traffic adjacent to an auxiliary lane in direction 1, the direction 2 lane dividing line marking should follow normal practice for two-lane roads. This means that, if sight distance permits, direction 2 vehicles may be permitted to use the centre lane as an opposing traffic lane provided no vehicles are encountered in that lane.

The practice of allowing some use of auxiliary lane sections by opposing traffic has proved successful on many rural roads in Australia, particularly when traffic volumes are low; however, there may be cases where more restrictive line marking is appropriate. These will generally arise when there exists a combination of the following factors:

a) short auxiliary lane length

b) moderate to heavy traffic volumes

c) curved alignment or sight distances only marginally adequate for overtaking

d) perceived operational or safety problems on a given road section.

The use of more restrictive line markings should not be too widespread, however, since the presence of apparently unnecessary barrier lines can lead to driver frustration and a reduced quality of service on a road.
3.7 Special vehicle lanes

3.7.1 Scope

This part of the guide sets out the pavement marking devices used to delineate traffic lanes designated in the Queensland Road Rules as:

a) bus lanes, which are reserved for buses and other vehicles licensed to carry passengers for hire or reward, such as taxis, and bicycles

b) transit lanes, which are reserved for vehicles included in a) above, motor vehicles carrying two or more people (T2 lane) or three or more people (T3 lane) including the driver, and motor bikes

c) truck lanes, which are reserved for goods vehicles whose Gross Vehicle Mass (GVM) exceeds 4.5 tonnes

d) tram lanes, which are reserved for trams, tram recovery vehicles, buses, taxis and bicycles, and tramways, which are reserved for trams, tram recovery vehicles and buses only.

The lanes are designated by appropriate signs. Pavement marking devices used for bicycle facilities are treated in Section 3.8 of this guide.

3.7.2 General treatment

The general arrangement of markings for a bus lane is shown in MUTCD Part 12 Figure 5 reproduced in Section 3.7.4 of this guide. Similar treatment is used for transit and truck lanes, but with the appropriate signs and pavement messages. A typical treatment for a part-time transit lane is shown in MUTCD Part 12 Figure 8 reproduced in Section 3.7.4 of this guide.

The line separating the special lane from other lanes is a continuous white lane line, 100 mm or 150 mm wide, for full-time special vehicle lanes, and a broken white lane line, 80 mm or 100 mm wide, for a part-time special vehicle lane (that is, with 3 m line / 9 m gap). On freeways, where a bus or transit lane is not separated from other traffic lanes by a physical barrier, a painted island with chevron markings may be used in lieu. In both cases, the width of the lines delineating the designated lane should be 150 mm. Openings in the painted island allow access to and from the designated lane and are marked with a continuity line.

The beginning of the bus, transit or truck lane, where it restarts after having been stopped at an intersection, or on approach to an intersection where the lane may be entered legally by traffic about to make a turn, is demarcated using a white continuity line.

All pavement markings are white.
3.7.3 Pavement messages

Word messages for use on pavements are:

a) ‘BUS LANE AHEAD’
   ‘BUS LANE’
   ‘BL’ (for repeater markings only)

b) T2 or T3 LANE AHEAD
   T2 or T3 LANE
   ‘T2’ or ‘T3’ (for repeater markings only)

c) ‘TRUCK LANE AHEAD’
   ‘TRUCK LANE’

The messages should be applied in accordance with the guidelines in Section 2.4.2.2.5 and as shown in MUTCD Part 12 Figure 4 reproduced in Section 3.7.4 of this guide. Pavement messages are optional on part-time lanes and should not be used if they could mislead road users when the lane is not in operation.

The ‘BL’ marking, if used, (and ‘BUS LANE’ sign) may be repeated after each side street or at a maximum spacing of 200 metres. The ‘BUS LANE’ marking should be used after each major side street or at about a 1 km maximum spacing, replacing the ‘BL’ marking at these locations.

The ‘BUS LANE’ and ‘BL’ markings should be located centrally in the bus lane when used. ‘BUS LANE AHEAD’ should be located centrally in the kerbside lane.

These guidelines apply equally to transit lanes and (excluding the repeater markings) truck lanes.

3.7.4 Tram lanes and tramways

Tram lanes are marked along the left side of the tracks (when facing the direction of travel of a tram on the tracks) by a continuous yellow line parallel to the tracks, which is marked between a TRAM LANE sign and END TRAM LANE sign.

Tramways are marked along the left side of the tracks (when facing the direction of travel of a tram on the tracks) between a TRAMWAY sign and END TRAMWAY sign by either:

- two continuous yellow lines parallel to the tracks, or
- a structure (such as a dividing strip, pedestrian refuge, traffic island, row of bollards or separation kerb), whether or not the structure is also being used to indicate a safety zone.
AS1742.12 Figure 4 – Method of place lane messages in low speed roads

Notes

1. *35 m is the nominal length for a typical urban environment. Longer distance may be provided if necessary.*

2. On high-speed roads (>80 km/h) character lengths should be at least 5 m with spacings between characters four times the letter height and the words arranged to read sequentially, that is, first word nearest approaching driver.
Note

1. ‘BL’ pavement marking, if used, and ‘BUS LANE’ sign may be repeated after each side street or at 200 m spacing maximum. The signs and markings need not be in step with one another.

2. For expressway-type roads, see Clause 7.2 of AS1742.12.
**AS1742.12 Figure 8 – Typical treatment for a part-time transit lane**

Notes

1. ‘T2’ or ‘T3’ pavement marking and ‘TRANSIT LANE’ sign may be repeated after each side street or at 200 m spacing maximum.
2. Treatments at a major side street may be adapted from MUTCD Part 12 Figure 6 reproduced in this section of this guide.
3. For expressway-type roads, see Clause 7.2 of AS1742.12.
3.8 Bicycle facilities

3.8.1 Pavement symbols

The bicycle symbol shall be used as a pavement marking to supplement or reinforce the signs used to designate full-time bicycle lanes, bicycle paths and the bicycle portion of separated paths (see Section 2.4.2.2 and AS1742.9 Figure 2.2 reproduced at Section 2.4.2.2.3 in this guide). The pedestrian symbol shall be used to designate the pedestrian portion of separated paths.

It may also be used, in conjunction with the pedestrian symbol marking, to supplement or reinforce shared path signs (see Section 2.4.2.2 and AS1742.9 Figure 3.1 reproduced at Section 2.4.2.2.4 in this guide).

Where both pedestrian and bicycle symbols are used on a facility, they should be arranged in a similar manner to that shown on the relevant shared / separated path sign. Successive pairs of symbols should face alternate directions of travel. A pavement arrow may be used on busy paths in conjunction with pavement symbols where there is a need to encourage users to keep to the left. Where two or more pavement symbols are to be displayed as a group, they shall be displayed in the order bicycle-pedestrian-arrow in the direction of travel with a separation of 1.0 to 1.2 metres between each symbol.

The bicycle symbol may be painted on the bicycle portion of shared bicycle / carparking facilities where these two lanes are separated by an edge line. Bicycle pavement symbols may be used on part-time bicycle lanes but should not be used where they could mislead cyclists when the lane is not in operation. This symbol shall not be used to designate shared facilities which are intended for use by moving traffic, such as where parking is restricted during designated hours to provide a clearway.

The bicycle symbol may be placed on unsigned facilities, such as wide parking lanes with bicycle provisions, wide kerbside lanes and sealed shoulders. The bicycle symbol may be yellow in colour for these unsigned facilities. In all other cases, i.e. for signed facilities, it shall be white.

The 'No Bicycles' symbol may be used in lieu of the 'No Bicycles' sign (R6-10-3).

A pavement arrow may be used in conjunction with the bicycle symbol where a bicycle lane has been provided on the approach to traffic signals. The arrow is white in colour.

3.8.2 Longitudinal lines

The requirements and recommendations for longitudinal lines are in sections 2.4.2.2.2 and 2.4.2.2.3 in this guide.

A continuity line comprising a white broken line 100 mm or 200 mm wide as specified in Figure 5.1 in MUTCD Part 2, reproduced in Section 2.2.7 of this guide, with one metre line and 3 metre gaps, shows the continuity of a bicycle lane along the major road at major / minor unsignalised intersections and where traffic must enter or cross a bicycle lane at an intersection or major driveway. The 200 mm width is used on high-volume roads, for example, four-lane or six-lane roads, where the effect of a narrower line would be reduced. The 100 mm width may be considered for use in lieu of the 200 mm-wide line, where a road has a restricted environment, such as a two-lane road through strip shopping centres and commercial areas.

3.8.3 Transverse lines at stop and give way signs

The requirements and recommendations for lines at stop and give way signs are in Section 2.4.2.2.3 of this guide.
Where traffic on a road must give way to bicycles on a bicycle path crossing, the dimensions of the transverse lines at the ‘Stop’ and ‘Give Way’ signs specified in MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 of this guide shall be used.

### 3.8.4 Application

Typical bicycle lane treatments are shown in AS1742.9 figures 2.4 to 2.9. Arrangements for retrofitting bicycle lanes in left-turn lanes are shown in Traffic Control (TC) Signs TC1769_1 to TC1769_4.

For advanced stop lines for bicycles at signalised intersections, see Section 4.1.8 in this guide.

Typical bicycle path, shared path and separated path treatments are shown in MUTCD Part 9 figures 3.3 to 3.5 reproduced in Section 3.8.5 of this guide. For advice on the application of bicycle lanes at roundabouts, contact the department’s Traffic Engineering Unit.

### 3.8.5 Bicycle provisions on freeways

Refer to AS1742.9 Section 4.4.

#### 4.4 Pavement markings

Where bicycles are permitted to use the left hand sealed shoulder on a rural freeway and appropriate interchange signing is provided for cyclists, bicycle pavement symbols may be considered for use on the freeway shoulder. Bicycle pavement symbols at up to 1 km spacing will generally be adequate. Where provisions are made for cyclists to cross a freeway ramp (see Figure 4.1), a bicycle pavement symbol may be placed on the shoulder in advance of the crossing location. In these situations, the bicycle symbol may be a yellow marking.

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**AS1742.9 Figure 2.4 – Bicycle lane (full-time) adjacent to kerb**
AS1742.9 Figure 2.7 – Bicycle / car parking lane with optional kerb extensions

AS1742.9 Figure 2.8 – Wide parking lane with bicycle provision

AS1742.9 Figure 2.5 – Part-time bicycle lanes

(b) Bicycle lane same width as parking lane

NOTE: Alternatively, these cases may be signed as clearways.
AS1742.9 Figure 2.9 – Examples of bicycle lane treatments at an unsignalised intersection

Note:
Where traffic is required to enter the bicycle lane to turn left more than 50 m in advance of the intersection, legislation requires that signs permitting drivers to enter the bicycle lane be installed.
AS1742.9 Figure 2.10 – Bicycle provisions on the approach to traffic signals

(a) Advanced stop line for bicycles

(b) Treatment at left turn slip lanes
AS1742.9 Figure 3.3 – Treatment of shared bicycle/pedestrian paths – separation by direction of travel only

Notes

1. Bicycle and pedestrian pavement symbols are optional.
2. Pavement arrows are only needed on busy paths where it is necessary to encourage users to keep to the left.
3. Where a broken separation line is shown, the separation line may be omitted altogether if there will be an orderly flow of user traffic without it.
AS1742.9 Figure 3.4 – Signing and line marking of separated bicycle / pedestrian paths

Notes
1. These treatments show the bicycle path also with separated directions of travel. This is optional but is to be preferred wherever there is sufficient width.
2. Pavement arrows are only needed on busy paths where it is necessary to encourage users to keep to the left.
AS1742.9 Figure 3.5 – Treatment of bicycle paths

This sign may include a supplementary plate giving directions to a path for pedestrians

For road crossings see Clauses 3.7 and 3.8
AS1742.9 Figure 4.1 – Signing for bicycles at freeway interchanges – bicycles permitted to cross ramps
3.9 **Treatment to approaches to obstructions and structures**

3.9.1 **Lengths of longitudinal markings**

The approach to a structure or obstruction within or encroaching on the roadway generally entails a lateral shift in the traffic movement, hence a length of transition. Refer to Section 3.5 in this guide.

The minimum length of edge line ‘A’ leading into the transition, and the required length of barrier lines ‘C’ on the approach, are given in Table 3.5 in Section 3.5 of this guide and the relevant figures.

3.9.2 **Obstructions within the roadway**

The pavement markings on the approach to an obstruction within the roadway are similar to those used on the approach to a median island (see figures 5.22 to 5.26 in Section 2.5 of this guide). The treatment is shown in MUTCD Part 2 Figure 4.15 reproduced in this guide. It is recommended that the barrier line be extended along the left edge of the median nose. The barrier line may also be augmented with RRPMs as shown.

*MUTCD Part 2 Figure 4.15 – Obstruction within the roadway*

Note:

* For Dimension A, see Table 3.5 in Section 3.5 of this guide.
3.9.3 Bridges

Pavement marking treatments at the approaches to bridges depend on whether the bridge has more than one lane, its width and whether the approach is signalised.

If the bridge structure is close to the edge of the running lane, it may be advisable to provide an edge line, which may also be augmented with RRPMs in accordance with Section 2.5 of this guide.

Bridges with two or more lanes: Where full formation width is provided on a bridge, pavement markings and delineation on the approach are simply continued across the bridge.

If the bridge is less than formation width or the width between kerbs is less than 8.6 metres, treatment is as depicted in MUTCD Part 2 Figure 4.10 reproduced in this section of this guide. Edge lines and dividing lines should be provided. If the bridge is a two-way bridge less than 5.5 metres between kerbs, the dividing lines should be discontinued 30 metres before the bridge abutment or structure.

One-lane bridges on two-way roadways: One-lane bridges have a width between kerbs of less than either 5.0 metres, or 5.5 metres if the proportion of heavy vehicles is greater than one-third of the traffic or the approach alignment is poor. The treatment is shown in MUTCD Part 2 Figure 4.11 reproduced in this section of this guide. Edge lines and barrier lines should be provided (see above). The maximum width between edge lines shall be 4 metres.

If the bridge is more than 60 metres long, or traffic volume is high, or both points of entry to the bridge are not visible from either approach, it is advisable to indicate which direction of traffic is to give way, using the ‘GIVE WAY’ sign and a give way line (see MUTCD Part 2 Figure 4.12 in this section of this guide).

If the sight line between drivers approaching opposite ends of the bridge is poor or vehicle speeds are high, traffic signals with stop lines may be used. The layout for this is shown in MUTCD Part 2 Figure 4.13 reproduced in this section of this guide.
**MUTCD Part 2 Figures 4.10 and 4.11 – Narrow bridge and one-lane bridge**

(a) Narrow bridge  
(b) One-lane bridge

**Notes**

1. Width markers (D4-3) are required in accordance with Clause 4.6.7.2(c) of MUTCD Part 2.
2. The use of the R6-2 and W4-1 signs is given in Clauses 4.6.6.1(c) and 4.6.6.3(a) of MUTCD Part 2 respectively.
3. The arrangement for one-lane bridges (MUTCD Part 2 Figure 4.11 or 4.12) is required where the width conditions given in this Section 3.9.3 of this guide apply.
4. A one-lane bridge is one that meets the width limitations, specified in MUTCD Part 2 Clause 4.6.2.2. The maximum width between edge lines is 4.0 m.
5. For Dimension 'A', see Table 3.5 in Section 3.5 of this guide.
**MUTCD Part 2 Figure 4.12 – One-lane bridge with give way sign**

Notes

1. The approach on which this treatment is used should be selected in accordance with the priorities recommended in Clause 4.6.2.2(a)(iii) of MUTCD Part 2. The other approach is treated as shown in MUTCD Part 2 Figure 4.11 reproduced in this section of this guide.

2. Used only if sight distance to R1-2 is less than the lower limit given for Dimension ‘A’.

3. A one-lane bridge is one that meets the width limitations specified in this Section 3.9.3 of this guide. The maximum width between edge lines is 4.0 m.

4. For Dimension ‘A’, see Table 3.5 in Section 3.5 of this guide.
MUTCD Part 2 Figure 4.13 – One-lane bridge with signal control

Notes
1. The ‘STOP HERE ON SIGNAL’ (R6-6) sign is required if the position at which the vehicle must stop is not readily apparent (see MUTCD Part 2 Clause 4.10.6.7).
2. A one-lane bridge is one that meets the width limitations specified in this Section 3.9.3 of this guide. The maximum width between edge lines is 4.0 m.
3. For Dimension ‘A’, see Table 3.5 in Section 3.5 of this guide.
3.10 Railway crossings

For more information, refer to 1742.7 Section 3.

Section 3. Pavement Markings

3.1 General

A summary of requirements for pavement markings on sealed approaches to crossings is as follows:

a) RAIL X marking (see Clause 3.2) shall be used on all high-speed approaches of adequate seal width except at crossings on side roads where the distance to the crossing is less than specified in Clause 3.2.

b) Stop or give-way line (see Clauses 3.3 and 3.4) shall be used on all approaches in all cases.

c) No-overtaking lines (see Clause 3.5) comprising either single barrier line, double one-way and double two-way barrier lines shall be used on all undivided road approaches where the sealed width is 5.5 m or greater.

3.2 Railway crossing pavement marking (Rail X)

The pavement marking RAIL X shall be as shown in Figure 3.1. Except for crossings on side roads (see below), the marking shall be provided on all roads where the seal width is 3.0 m or greater and the speed limit is greater than 80 km/h. The marking is to read sequentially. On multi-lane roads a separate marking shall be placed in each approach lane.

It should also be considered for low-speed situations i.e. speed limit 80 km/h or less, where additional advance warning is considered desirable. In such cases, it may be reduced in letter height to that shown in Figure 3.1 and read ‘down’, i.e. the X preceding the RAIL.

On through road approaches to a crossing the marking shall generally be placed 15 to 20 m beyond the first advance sign, but positioned if necessary to provide adequate visual impact giving at least 50 m clear viewing distance to the near edge of the marking.

On approaches to crossings on side roads where the distance from the edge of the through traffic lane to the stop or give-way line is 60 m or more and the conditions above are met, the marking shall be placed 15 to 20 m beyond the edge of the through traffic lane. The marking may not be required where the side road distance as specified above is less than 60 m.

3.3 Stop line

A stop line is an unbroken line marked across traffic lanes. It shall be a minimum of 300 mm wide and 600 mm minimum where the speed limit is greater than 80 km/h. At all railway crossings on sealed roads controlled by RX-2, RX-5 and RX-6 (STOP sign, flashing signals and gate control) assemblies, a stop line shall be provided on each approach to indicate the location at which vehicles must stop as and when required by law.
It shall be placed at right angles to the road centre-line as follows:

a) At **STOP signs** – 3.5 m minimum back from the nearest rail at its closest point.

b) At **flashing signal control** – 3 m minimum back from the signal pedestal or boom barrier in its lowered position.

c) At **gates** – 3 m minimum back from the gates when closed to road traffic.

In the absence of a dividing line or median, the stop line shall extend only to the centre of the seal.

### 3.4 Give-way line

A give-way line is a broken line consisting of line segments 600 mm long separated by 600 mm gaps. It shall be a minimum of 300 mm wide or 600 mm minimum where the speed limit is greater than 80 km/h. At all railway crossings on sealed roads controlled by RX-1 (GIVE WAY sign control) assemblies, a give way line shall be placed on each approach to indicate the safe position for vehicles to stop, if necessary, to avoid conflict with a train. It shall be placed at right angles to the road centre-line 3.5 m back from the nearest rail at its closest point.

In the absence of a dividing line, or median, the give-way line shall extend only to the centre of the seal.

### 3.5 No-overtaking lines

On undivided sealed two-way roads where the sealed width is 5.5 m or greater, no-overtaking lines shall be provided on the approaches to and, where necessary, across railway crossings in accordance with Clause 3.1. The no-overtaking line on each approach should extend from the crossing to the initial warning sign or to the through road where the crossing is on a side road and requires treatment in accordance with Clause 2.2.5, 2.3.5 or 2.3.6. The no-overtaking line shall comprise one of the following:

a) **Double one-way.** A one-way barrier line consists of an unbroken line used in combination with a broken line. Crossing and overtaking movements across the lines are permitted from the broken line side but not from the unbroken line side. This line should be used if it is desired to permit overtaking across the separation line on the departure side of the crossing.

b) **Double two-way.** A two-way barrier line consists of two unbroken lines. Movements across the lines, or to the right of the lines, for the purpose of crossing or overtaking in either direction are prohibited.

c) **Single barrier line.** A single continuous line should be used only where it is desired to permit traffic to cross the line to enter or leave the road.

### 3.6 Yellow box markings

Yellow box markings shall only be used to discourage traffic queuing on a crossing where the conditions described in Clause 5.3 apply. Where used they shall comprise a yellow diamond hatch marking as set out in Figure 3.2. The lines forming the diamond pattern shall be 150 mm wide.

Where queuing is a problem in one direction only, the box marking shall be placed on that side of the pavement only as shown in Figure 3.2. If queuing is a problem in both directions of travel the marking shall be placed on both sides.
For more information, refer to MUTCD Part 7 Clause 7.2.4.

**7.2.4 Cane railway level crossing pavement marking (barrier lines and RAIL X)**

On undivided two-way roads, which have separation line markings, barrier lines shall be provided on the approaches to, and where necessary across, passive control cane railway level crossings. The need for barrier lines at active control crossings should be determined in accordance with the requirements of Part 2 of this Manual, excepting that they shall be provided where the flashing signals are not readily visible by overtaking motorists.

As cane railway crossings are used on a seasonal basis, pavement messages are not normally installed in advance of these crossings unless treating an existing safety issue.

This section describes the pavement markings used in conjunction with other devices to control and warn traffic at and in advance of railway and cane railway crossings.

The various configurations are shown in AS1742.7 figures 4.2 to 4.12 reproduced in this section of this guide.

**AS1742.7 Figure 3.1 – ‘RAIL X’ pavement marking**

Notes

1. The grid width is 100 mm minimum.
2. The grid height ‘X’ = Height of letter or symbol required (mm) / 40
3. Minimum dimensions for the length and spacing of the markings are:
   - Standard case: ‘X’ – 6.0 m
   - Low speed case: ‘X’ – 3.0 m
   - RAIL – 5.0 m
   - RAIL – 2.5 m
   - Spacing – 7.5 m
   - Spacing – 2.5 m
   - Message to read sequentially
   - Message to read down
4. Marking to commence with base of the first letter or word located 15 to 20 m beyond the first advance sign, e.g., W7-4 or W7-7.
**Note**

1. The ‘KEEP TRACKS CLEAR’ sign is to be located so that it does not obscure the crossing signals or associated signs. A mounting height of less than 1 m may be required.

Dimensions in millimetres.
AS1742.7 Figure 4.3 – Railway crossing with straight approach controlled by give way signs (passive control)

Notes
1. If more than one track, the ‘TRACKS’ sign W7-2-2, is added to the assembly.
2. A give-way line shall be provided in accordance with Clause 3.4 to indicate the safe position for vehicles to stop, if necessary, to avoid conflict with a train.
3. The barrier line (see Clause 3.5) should extend at least to the advance sign, W7-7.
4. The various alternatives and uses for crossing diagrammatic signs are described in Clause 2.2.4.
5. The right-hand side sign, W7-7(L), is for optional use on busy roads (see Clause 2.2.3).
6. RX-9 assembly may be required (see Clause 2.4.2).
7. For railway crossing pavement marking (RAIL X), see Clause 3.2.
Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by STOP signs.
3. The barrier line (see Clause 3.5) should extend at least to the advance sign, W7-7.
4. The right-hand side sign, W7-7(L), is for optional use on busy roads (see Clause 2.2.3).
5. For railway crossing pavement marking (RAIL X), see Clause 3.2.
AS1742.7 Figure 4.5 – Railway crossing controlled by stop signs preceded by a curve (passive control)

Notes
1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads.
3. The barrier line (see Clause 3.5) should extend at least to the advance sign, W7-7.
4. The right-hand side sign, W7-7(L), is for optional use on busy roads (see Clause 2.2.3).
5. Chevron alignment markers, D4-6, are used where required to reinforce the delineation of a sharp curve (see Clause 2.4.3).
6. For railway crossing pavement marking (RAIL X), see Clause 3.2.
AS1742.7 Figure 4.6 – Railway crossing with straight approach controlled by flashing lights (active control)

Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by flashing lights.
3. The barrier line (see Clause 3.5) should extend at least to the W7-4 sign.
4. The W7-4 sign may need to be repeated on the right-hand side of the carriageway (see Clause 2.3.3).
5. For railway crossing pavement marking (RAIL X), see Clause 3.2.
AS1742.7 Figure 4.7 – Railway crossing with straight approach controlled by flashing lights and half-boom barrier (active control)

Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by flashing lights.
3. A boom barrier may be provided (see Clause 2.3.8).
4. The W7-4 sign may need to be repeated on the right-hand side of the carriageway (see Clause 2.3.3).
5. An overhead flashing signal assembly (Clause 2.3.1) may be needed where there are more than two traffic lanes on the approach.
6. For railway crossing pavement marking (RAIL X), see Clause 3.2.
**AS1742.7 Figure 4.8 – Railway crossing with straight approach controlled by gates (active control)**

Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by gates.
3. The barrier line (see Clause 3.5) should extend at least to the W7-15 sign.
4. The W7-15 sign may need to be repeated on the right-hand side of the carriageway (see Clause 2.3.4).
5. For railway crossing pavement marking (RAIL X), see Clause 3.2.
Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. A give-way line shall be provided in accordance with Clause 3.4 to indicate the safe position for vehicles to stop, if necessary, to avoid conflict with a train.
3. The barrier line (see Clause 3.5) extends from the crossing to the through road.
4. If the intersection itself requires an intersection warning sign in accordance with AS1742.2, it will be placed at this position. The crossing on side road diagrammatic sign is required only if the intersection itself requires an intersection warning sign in accordance with AS1742.2. The various alternatives and uses for these signs are described in Clause 2.2.6.
5. If this distance is less than 50 m, the advance signs are placed as shown. If the distance is greater than 50 m but less than (50 + A) m, assembly RX-3-1, 2 or 3 is placed in the side road 50 m from the crossing, with assembly RX-4 only on the through road. If the distance is greater than (50 + A) m, all signs are placed in the side road in accordance with Figure 4.3.
6. If this distance is 25 m or less, an additional assembly RX-1 may be required (see Clause 4.4.1).
7. This dimension is measured from the point at which turns into the side road are completed. A single continuous line over this length may be substituted for the two-way barrier line.
Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by STOP signs.
3. The barrier line (see Clause 3.5) extends from the crossing to the through road.
4. If the intersection itself requires an intersection warning sign in accordance with AS1742.2, it will be placed at this position. The crossing on side road diagrammatic sign is required only if the intersection itself requires an intersection warning sign in accordance with AS1742.2. The various alternatives and uses for these signs are described in Clause 2.2.6.
5. If this distance is less than 50 m, the advance signs are placed as shown. If the distance is greater than 50 m, but less than (50 + A) m, sign W3-1 is placed in the side road 50 m from the crossing, with assembly RX-4 only on the through road. If the distance is greater than (50 + A) m, all signs are placed in the side road in accordance with Figure 4.4.
6. If this distance is 25 m or less, an additional assembly RX-2 may be required (see Clause 4.4.1).
7. This dimension is measured from the point at which turns into the side road are completed. A single continuous line over this length may be substituted for the two-way barrier line.
8. Advance warning of the railway crossing is not required on this approach.
AS1742.7 Figure 4.11 – Railway crossing on a side road controlled by flashing lights (active control)

Notes

1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by flashing lights.
3. The barrier line (see Clause 3.5) extends from the crossing to the through road.
4. This distance is less than that required to allow satisfactory display of the W7-4 sign on the side road in accordance with Figure 4.6. Where the crossing is very close to the main road, a second position assembly may be required (see Clause 4.4.1).
5. This dimension is measured from the point at which turns into the side road are completed. A single continuous line over this length may be substituted for the two-way barrier line.
AS1742.7 Figure 4.12 – Railway crossing on a side road controlled by gates (active control)

Notes
1. If more than one track, the TRACKS sign, W7-2-2, is added to the assembly.
2. Stop lines (see Clause 3.3) are required on sealed roads at crossings controlled by gates.
3. The barrier line (see Clause 3.5) extends from the crossing to the through road.
4. This distance is less than that required to allow satisfactory display of the W7-15 sign on the side road in accordance with Figure 4.8. Where the crossing is very close to the main road, a second position assembly may be required (see Clause 4.4.1).
5. This dimension is measured from the point at which turns into the side road are completed. A single continuous line over this length may be substituted for the two-way barrier line.

3.11 Water crossings

3.11.1 Scope

This section describes the pavement markings used in conjunction with other devices on the approaches to water crossings, such as ferries and opening bridges, which may entail stopping traffic before a boom gate or similar device. A typical layout, in this case a ferry approach, is shown in Figure 3.11.3 in this section of this guide.
3.11.2 Stop line
A stop line is required on each approach to indicate where vehicles are to stop if necessary. The distance from the stop line to the boom gate is generally five to 10 metres.

3.11.3 Barrier lines
Barrier lines should be provided on each approach and, where appropriate, across a bridge. The barrier lines should extend a distance of at least 60 metres from the boom gate and preferably to the warning sign.

*Figure 3.11.3 – Ferry approach*

3.12 Speed control zones
At changes in zoned speed, on roads where the surface is suitable, elongated numerals may be painted on the road surface in each lane adjacent to the sign.

Such markings are not used alone and shall only be used to supplement speed restriction signs. Their use is generally restricted to locations where the provision of signs alone is not adequate, such as where the effect of the sign is reduced by the nature of the roadside environment, and it is considered that the sign needs to be augmented to increase driver perception.

For details of numeral dimensions, see Section 2.4.2.2.2 in this guide.

Threshold treatments can also be used to inform road users that they are entering a speed control zone, such as a school zone or LATM area. Guidelines for threshold treatments at school zones are provided in TRUM Manual Volume 2 Part 3 Clause 3.2-1.
3.13 **Pedestrian crossing facilities**

3.13.1 **Scope**

This section deals with the facilities designed to help pedestrians cross roads at grade. These facilities include:

a) zebra crossings

b) children’s crossings

c) mid-block signalised crossings

d) pedestrian refuges.

3.13.2 **Zebra crossing**

The pedestrian (zebra) crossing comprises the markings specified in Section 2.4.2.4 of this guide and AS1742.10 Figure 1 reproduced in that section of this guide. They extend across the full width of the roadway. They are accompanied by the pedestrian crossing sign (R3-1). The advance warning sign (W6-2) is erected in advance of the crossing and may be supplemented by one of the pavement messages:

- ‘PED X’
- ‘SCHOOL X’
- ‘SCHOOL’

in accordance with Section 2.4.2.2 and MUTCD Part 2 Figure 5.7 reproduced in that section of this guide and Figure 2.4.2.2.5 in Section 2.4.2.2.5 of this guide.

Stop lines are not used.

3.13.3 **Children’s crossing**

Children’s crossings are defined as an area of road at a place with stop lines marked on the road, and children crossing flags, and indicated by two red and white posts erected on each side of the road and extending across the road between the posts. This type of crossing is the primary means of assisting children to cross the roadway at schools and is shown in AS1742.10 Figure 3 reproduced in this section of this guide. The advance warning signs may be supplemented with pavement messages as described in the preceding Section 3.13.2 of this guide.

For warrants regarding the installation of pedestrian crossings, refer to Section 3.4-1 of TRUM Volume 1 Part 6.
**MUTCD Part 10 Figure 7.2(a) – Children’s Crossing**

![Diagram of Children’s Crossing](image)

**Notes**

1. Variations to no-stopping distances may be required, see MUTCD Part 10 Clause 6.2.
2. A line (approximately 100 mm wide) may be painted on the footpath – 0.5 m behind the face of the kerb – to indicate the position where pedestrians should wait until directed to cross the roadway. Where used, this line extends the width of the sealed apron connecting the footpath and kerb or a distance of 3 to 6 metres, that is, between the crossing posts (without flags).
3. The W6-3 / W8-22 assembly is required if the sight distance to the crossing is substandard.
4. Pram / bicycle ramps should be installed.

Dimensions in metres

A line (approximately 100 mm wide) may be painted on the footpath – 0.5 metres behind the face of the kerb – to indicate the position where pedestrians should wait until directed to cross the roadway.
3.13.4 Mid-block signalised crossing

The crossing is delineated by parallel crosswalk lines, which are defined in MUTCD Part 2 Figure 5.1 in Section 2.2.7 and described in Section 2.3.2. The crosswalk lines are normally 3.5 m apart. If only small numbers of pedestrians will use the crossing, this distance may be reduced to a minimum of two metres if necessitated by other site considerations. If large numbers of pedestrians will use the crossing, the distance between the crosswalk lines may be increased as required to accommodate the pedestrians. A stop line should be located between three and six metres back from the crossing on each approach. The layout is shown in AS1742.10 Figure 5 reproduced in Section 2.3.3 of this guide).

3.13.5 Pedestrian refuges

Pedestrian refuges are raised islands with kerbing, which may have walk-through sections at pavement level. Channelising islands and medians may be designed to act as refuges.

Approach line marking, in accordance with Section 2.4.1 and MUTCD Part 2 figures 5.4, 5.5 and 5.6 reproduced in that section of this guide, is needed to ensure that vehicles are safely guided past the island. Refuges should not unexpectedly constrict the road width. The number of traffic lanes should be maintained past the island by modifying line marking. Also, parking controls must be introduced to provide a clear area for pedestrians to cross the road and adequate visibility of the crossing area (see AS1742.10 Figure 7 reproduced in this section of this guide). Bus stops and loading zones need to be located carefully to ensure safe traffic operations in the vicinity of the refuge.

Island kerbs may be painted white – in any case, the noses of the island should be painted.

The length of the painted splay should be increased, or other delineation devices considered if visibility to the island is restricted. RRPMs should be provided at five-metre intervals, in accordance with Section 2.5 and MUTCD Part 2 figures 5.22 to 5.26 reproduced at that section of this guide.

A double barrier line, augmented with RRPMs, should form the outline on the approach sides of the painted splays. A barrier line should also precede each splay for the distance ‘C’ (shown in Figure B3.3) as given in Table 3.13.5.

<table>
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<tr>
<th>V85 (km/h)</th>
<th>A (m)</th>
<th>C (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;75</td>
<td>80–120</td>
<td>30</td>
</tr>
<tr>
<td>75–90</td>
<td>120–180</td>
<td>60</td>
</tr>
<tr>
<td>&gt;90</td>
<td>180–250</td>
<td>100</td>
</tr>
</tbody>
</table>

3.13.6 Combined pedestrian crossing and children's crossing

A pedestrian crossing may be installed within a school zone for use by pedestrians outside of school zone times. This facility is normally installed if there is substantial pedestrian use outside school zone times and is shown in MUTCD Part 10 Figure 7.2(b) and reproduced in Section 3.15.2 of this guide.
AS1742.10 Figure 7 – Pedestrian refuge

Notes

1. Island kerbs may be painted white.
2. If a refuge is used in conjunction with a marked-crossing, the spacing between the islands shall be increased accordingly.
3. Length of splayed approach marking should be increased, or other delineation devices considered if visibility to the island is reduced by vertical or horizontal alignment. Unidirectional yellow raised retroreflective pavement markers shall be provided at 6.0 m spacings.
4. Painted median is preceded by a single barrier line extending for 30 m minimum.
5. Where refuges are used on arterial or high-speed roads, pedestrians or children warning signs W6-1 or W6-3 (minimum size B) as appropriate, shall be erected together with supplementary plate REFUGE ISLAND (W8-25) in advance of the refuge.
6. KEEP LEFT signs may be omitted if delineation of the island under all conditions is adequate.
7. When used near intersections, the length of the island nearest to the intersection may be reduced to accommodate turning traffic. A suggested minimum length is 1.25 m.
8. Road lighting in accordance with AS/NZS 1158.4 should be provided.
9. Frangible pedestrian assist handrails may be provided on the island at the pedestrian crossing point provided the island is at least 2 m wide.
10. Variations to the no stopping distance may be required, see Clause 6.2. The no stopping zone on the departure side may need to be extended if needed to a point where the roadway is wide enough for parking and passing traffic.
11. Width W to be desirably 3 m minimum if there are high pedestrian volumes or significant numbers of cyclists or people with disabilities or 2 m minimum in other cases.

Dimensions in metres
3.14 Roadside stopping places

A roadside stopping place is an area where vehicles may safely stop clear of the travelled way. These include service centres, rest areas and other areas such as lay-bys, breakdown bays, bus bays and telephone bays.

Pavement markings at these stopping places are provided consistent with the type of access, for example, exit and entry ramps, intersections and so on, and as generally indicated in this guide. This pavement marking supplements appropriate signing to the facility. Layout, pavement markings and signs for emergency stopping bays and phones are provided in Traffic Control (TC) Signs TC1340_1 and TC1340_2 in this section of this guide.

Where a roadside stopping place is a short informal sealed or paved area clear of the through pavement, without any associated signing, an edge line should be marked along the edge of the continuation of the through pavement. Where associated signing is provided at such a facility, a continuity line may be marked in lieu of an edge line where this would not conflict with any other nearby markings.
Traffic Control Sign – Emergency stopping bay and phone (TC1340_1)
Traffic Control Sign – Emergency stopping bay and phone for motorways (TC1340_2)
3.15 Other markings

3.15.1 Keep apart chevrons

These chevron markings consist of a series of white arrow heads painted on the road surface, which are spaced at one-second intervals. The chevrons are accompanied by roadside signs advising drivers to ‘Keep at least two chevrons apart’. The primary objective of the markings is to both inform drivers of the safe following distance and to encourage them to choose a safer following distance.

The markings can be applied in free-flowing environments exceeding 90 km/h where tailgating is known to be a problem and/or there is a history of rear-end-type crashes. Other factors that affect the performance and suitability of the chevrons include site geometry, traffic volume and the resurfacing program.

The layout, spacing and dimensions of the markings are shown in Traffic Control (TC) Sign TC1723_3 in Section 3.15.2 of this guide. For further advice on the suitability of proposed treatment sites, contact Traffic Engineering Unit.

3.15.2 Threshold treatments

Guidelines for threshold treatments at school zones are provided in TRUM manual Volume 2 Part 3 Clause 3.2-1.
MUTCD Part 10 – Combined children’s crossing and pedestrian crossing at school

Notes

1. Times of operation may be specified by use of R5-36-1 sign.
2. Where stationary vehicles near a crossing seriously limit visibility between drivers and pedestrians, an increase in these distances may be required.
3. Warning signs may be supplemented with advance pavement messages (see Section 6 of MUTCD Part 4).
4. A yellow line (approximately 100 mm wide) may be painted on the footpath – 0.5 m behind the face of the kerb – to indicate the position where pedestrians should wait until directed to cross the roadway. Where used, this line extends the width of the sealed apron connecting the footpath and kerb or a distance of three to six metres, that is, between the crossing posts (without flags).
5. Pram / bicycle ramps should be installed.
4 Treatment at intersections / roundabouts / interchanges

4.1 General use of pavement markings

Refer to MUTCD Part 2 Section 5.3.9.

5.3.9 Longitudinal lines at intersections and roundabouts

Use of longitudinal lines at, and on the approaches to intersections and roundabouts shall be as follows:

a) Dividing, barrier and lane lines

These lines shall be used as follows:

i. At minor side roads with or without STOP or GIVE WAY sign control, these lines, where existing on the major road approach, shall be carried through the intersection, except that a gap shall be left in a double barrier line for turning or crossing traffic see Clause 5.3.3.2.

ii. At signalised intersections, the lines shall be discontinued at the stop line on each approach.

iii. Where lane changing just in advance of the intersection is a problem and needs to be prohibited, the last 10 m to 12 m of lane line on the approach shall be continuous.

iv. On an intersection approach controlled by STOP or GIVE WAY signs or across which is marked a give-way line, a dividing line terminating at the stop or give-way line comprising either:

- a single continuous dividing line 10 m to 12 m in length, or
- a special purpose broken dividing line (see Figure 5.1) up to 30 m in length unless a single continuous line is required for another purpose, e.g. to control overtaking, shall be marked wherever the sealed pavement width or width between kerbs is at least 6 m over the length of the line. It shall also be provided at lesser widths if the rest of the approach road is dividing line marked, or if there is a crest or curve on the immediate approach. The marking may need to be extended in the latter case.

v. Exit lines shall be marked at multi-lane roundabouts, except where geometric restrictions prohibit their safe use or where combinations of single lane exits and high turning traffic volumes can lead to operational difficulties. A typical example is shown in Figure 2.7.

Exit lines shall:

- comprise a special purpose lane line (see Figure 5.1)
- have a minimum of three segments marked per exit line
- commence from a line drawn tangentially from the central island to the splitter island exit edge line at the previous exit, and
- extend far enough into the roundabout exit to provide satisfactory guidance for exiting vehicles.
b) Edge lines

Where edge lines are used they shall be discontinued through a major intersection or past intersecting roads or streets which have STOP or GIVE WAY signs. If the intersection is wide, a continuity line should be used.

4.1.1 Introduction

The various line types and their use at intersections are described briefly below. Detailed layouts for different types of intersection are given in Section 4.2.

In some situations, the strict application of the line types described below (particularly lane, edge and continuity lines) will result in a variety of line types in a single alignment over a short distance (see Figure 4.2.2(F) in Section 4.2.2 of this guide). Here a relaxing of the criteria may be desirable, for the sake of simplicity in both driver understanding and line marking operations. Figures 4.2.2(G) and 4.2.2(I) in Section 4.2.2 of this guide illustrate a way of doing this.

4.1.2 Dividing lines

At major / minor road intersections, with or without ‘STOP’ or ‘GIVE WAY’ control, broken lines on the major road are continued through the intersection, and lines on the minor road are terminated at the stop line or give way line, or at the major road edge line or edge of pavement.

A side road dividing line is not normally provided if the seal width, measured 10 metres back from the give way line or stop line, is less than 6 metres, unless either the side road is already marked with a dividing line, or there is a curve or crest on the immediate approach. The marking may be extended on curved approaches.

For general use of dividing lines, see Section 2.2.1 of this guide.

4.1.3 Barrier lines

The use of a barrier line on the side road is, in addition to any sight line requirements, subject to the same provisions as for dividing lines (see the preceding Section 4.1.2 in this guide).

Barrier lines may be supplemented by RRPMs if delineation of the intersection is likely to be a problem at night.

For general use of barrier lines, see Section 2.2.2 in this guide.

4.1.4 Lane lines

At major / minor road intersections, lane lines are continued through the intersection. A continuity line is used to show the continuation of a bicycle lane along the major road through major / minor unsignalised intersections.

Where lane lines are used to separate lanes for different turn types and lane discipline needs to be legally enforced, the line is continuous for some distance up to the stop line or give way line.

For general use of lane lines, see Section 2.2.3 in this guide.
4.1.5 Edge lines

Edge lines are discontinued through intersections, the termination point being the tangent point of the turn arc. The edge line may be continued around the turn to give a better indication of the course for turning vehicles to follow, especially where it can join up with an edge line on the intersecting road.

Edge lines are continued across the mouths of minor roads at intersections, where the T-intersection rule is relied upon.

Private property accesses do not count as intersections, and edge lines are continued across them.

For general use of edge lines, see Section 2.2.4 in this guide.

4.1.6 Continuity lines

A continuity line may be used through an intersection, where the line will be crossed by vehicles turning at the intersection, to indicate the edge of the roadway assigned to through traffic. It may also be used at the start or finish of an added lane where vehicles change lanes when entering or leaving the lane.

The continuous lane line is used when the lane has achieved full width and the continuity line is at least the minimum taper lengths ‘M’ or ‘D’ as shown in Figure 4.2.2(F) in Section 4.2.2 of this guide. Other applications of continuity line are shown in figures 4.2.2(G), 4.2.2(H) and 4.2.2(I) in Section 4.2.2 of this guide.

For general use of continuity lines, see sections 2.2.5 and 4.1.4 of this guide.

For continuity lines for bicycle lanes see Section 3.8.2 of this guide.

4.1.7 Turn lines

Refer to MUTCD Part 14 Section 6.2.4.

6.2.4 Turn lines

Turn lines may be used within major or complex intersections to indicate the proper course to be followed by turning vehicles. They should be used within an intersection to assist separation of traffic in the case of multiple turning lanes for the one turn. They are not required when the path to be followed is obvious to drivers under all conditions (see also Clause 6.3). Turn lines should not be carried through crossings.

Turn lines comprise a broken line 100 mm wide, with 600 mm stripes and 600 mm gaps.

For general information on turn lines, see Section 2.2.6 of this guide.

4.1.8 Stop lines

At intersections which are controlled by ‘STOP’ signs, the stop line must be used in conjunction with the ‘STOP’ sign. It is normally placed in prolongation of the kerb line or edge line.

Where there is a problem with vehicles overrunning the line or to hold vehicles back from the intersection, the stop line can be set back from the kerb or edge line (refer to MUTCD Part 2 Figure 5.3 reproduced at Section 2.3.1 of this guide).
Stop lines at intersections should be located adjacent to, or not more than, 3 m in advance of a primary signal post and 1.0 m minimum from parallel pedestrian crosswalks at intersections (measured from the outside edge of the crosswalk to the outside edge of the stop line).

Stop lines at mid-block crossings should be located 3.0 m minimum (6.0 m maximum) from signalised mid-block crossings (measured from the outside edge of the crosswalk to the outside edge of the stop line).

If the intersection is wide, a continuity line should be used across the right-hand side of the approach.

For general information on stop lines, see Section 2.3.1 in this guide.

Advanced stop lines for bicycles should be placed 2 metres ahead of other vehicular stop lines at intersections controlled by signals so that drivers of other vehicles, particularly bus and truck drivers, will be aware of bicycles waiting at the stop line prior to the start of the green period. An advanced stop line for bicycles is shown at (a) in AS1742.9 Figure 2.9 reproduced at Section 3.8.5 of this guide.

4.1.9 Give way lines

A give way line must be used in conjunction with a “GIVE WAY” sign at intersections. It is normally placed in prolongation of the kerb line or edge line.

Where there is a problem with vehicles overrunning the line or to hold vehicles back from the intersection, the give way line can be set back from the kerb or edge line (refer to MUTCD Part 2 Figure 5.3 reproduced at Section 2.3.1 in this guide).

If the intersection is wide, a continuity line should be used across the right-hand side of the approach.

See also Section 2.3.1 in this guide.

4.1.10 Pavement messages and symbols

Pavement messages are not generally used to supplement stop and give way signs.

4.1.11 Pedestrian crosswalk lines

Where crosswalk lines are marked at traffic signals they should be located up to 0.5 metres from the primary signal post. The stop line should then be located at least a further 2 to 3 metres in advance of the same primary signal post and not less than a clear 1 m distance from the crosswalk lines.

The standard width between crosswalk lines is 3.5 metres, but this may be increased where pedestrian flows are high or reduced to 2 metres if pedestrian flows are low and/or required by other site considerations.

4.1.12 Marked islands

If traffic encroachment on marked islands becomes a problem, pavement bars may be installed (see Section 2.5.5 in this guide).

See also Section 2.4.1 in this guide.

Treatment of islands other than painted islands is detailed in Section 3.4 of this guide.

4.1.13 Pavement arrows

Traffic lane arrows are discussed in Section 2.4.2.1 of this guide.
4.2 **Typical arrangements**

4.2.1 **General**

The signing and marking treatments for the various intersection types illustrated in MUTCD Part 2 figures 2.1 to 2.8 reproduced at Section 4.2.2 of this guide are typical only, and the layout of a particular intersection may require reference to two or more figures to obtain a suitable guide for a composite treatment.

The precise layout of pavement markings should be adjusted to suit the design of the intersection, and positioning of signs and the need for additional signs or delineating devices may be affected by variations in the layouts, particularly where there are curves or crests on any approach. Some relaxation of line-type application criteria may also be appropriate (see Section 4.1.1 of this guide).

Bicycle arrangements at intersections are covered in Section 3.8 of this guide. Bicycle lane treatments at unsignalised intersections are shown in AS1742.9 Figure 2.8 reproduced in this guide at Section 3.8.5, bicycle provision on the approach to traffic signals are shown in AS1742.9 Figure 2.9 reproduced in this guide at Section 3.8.5 and arrangements for retrofitting bicycle lanes in left-turn lanes are shown in Traffic Control (TC) Signs TC1769_1 to TC11769_4 shown at Section 3.8.5 of this guide.

4.2.2 **Typical arrangements at interchanges**

Signing and marking treatments for the interchanges are illustrated in MUTCD Part 2 figures 3.3 to 3.5 reproduced in this guide at Section 4.2.2. Provision for cyclists to cross a freeway ramp are discussed in Section 3.8.5 and AS1742.9 Figure 4.1 reproduced at that section in this guide.
**MUTCD Part 2 Figure 2.1 – Location of give way signs and associated pavement markings**

(a) No median

(b) Narrow median

(c) Wide median

(d) Wide median without diamond turn and with large radius left turn (see Clause 5.4.4(b))

**Notes**

1. Any dividing lines or lane lines on the main road, except double barrier lines, shall be carried through the intersection.

2. No marking should be painted across uncontrolled side roads. Edge or continuity lines should be discontinued across such intersections.

3. For dimensions of line marking, refer to MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 in this guide.
Figure 4.2.2(A) – Intersection treatment along rural (unkerbed) roads

Notes

1. Sealed side road.
2. Unsealed side road.
3. Property entrance.
4. ‘T’ intersection rule applies.
5. For a four-lane road, use separation and lane lines as per MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 in this guide.
6. If side road is not pavement marked, no turn lines to be used.
**Figure 4.2.2(B) – Intersection treatment along urban (kerbed) roads**

Notes

1. Sealed side road.
2. Unsealed side road.
3. Property entrance.
4. ‘T’ intersection rule applies.
5. For a four-lane road, use separation and lane lines as per MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 in this guide.
6. If side road is not pavement marked, no turn lines to be used.
Figure 4.2.2(C) – Intersection treatment along roads with wide reserves

(a) With edge lines

(b) Without edge lines

Notes

1. Sealed side road.
2. Unsealed side road.
3. Property entrance.
4. ‘T’ intersection rule applies.
5. For a four-lane road, use separation and lane lines as per MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 in this guide.
6. If side road is not pavement marked, no turn lines to be used.
Figure 4.2.2(D) – Intersection treatment along roads with medians

(a) Median width > 10 m

(b) Median width 3 m - 10 m
MUTCD Part 2 Figure 2.3 – Major rural intersection

Notes

1. Barrier lines and island outline markings may be augmented with retroreflective raised pavement markers (RRPMs). See Clause 5.6.5.2 in the MUTCD Part 2 extract in Section 2.5 of this guide for location and spacing. Barrier lines are extended if sight conditions on any approach so require.

2. Where the route is not edge lined continuously and edge lines are provided through the intersection, they should be continued to the end of the approach barrier line.

3. The GIVE WAY sign may be repeated on the median island if visibility to the left-hand sign is inadequate and may be provided on the slip lane.

4. The sight board is located for best long-distance visibility from the side road approach, that is, it may need to be offset if the approach is curved or raised if there is a crest in the side road approach.

5. A part of the parallel portion of the turning lane may be bounded by a single unbroken line if required for control of traffic using the turning lane or for better delineation of the adjacent through lane.
Figure 4.2.2(E) – Minor rural intersection straight approach

Note
1. Dividing line marked in accordance with MUTCD Part 2 Clause 5.3.9(a)(iv).
**MUTCD Part 2 Figure 2.4 – Minor rural intersection – curved approach**

Notes:

1. The W2-14(L) sign is not required if intersection visibility is satisfactory at the distance given in MUTCD Part 2 Table 2.3.
2. For use of the side road separation line, see Clause 5.3.9(a)(iv) in the MUTCD Part 2 extract in Section 4.1 of this guide.
3. Barrier lines may be supplemented with RRPMs if night-time delineation of the intersection is likely to be a problem and the remainder of the route is not treated continuously with RRPMs.
4. If the curve is substandard, Chevron Alignment markers (CAMs) (D4-6), are placed as shown in accordance with MUTCD Part 2 Clause 3.4.9. If the curve is not substandard, CAMs are not used but two D4-1-1 Hazard markers may be placed one each side of the intersection in the CAM positions.
5. This sign is provided in accordance with MUTCD Part 2 Table 2.4.
6. Similar signs may be required for the opposite approach.
Figure 4.2.2(F) – Auxiliary lanes and tapers – Controlled side road (full treatment)

Notes

1. These markings are omitted if auxiliary lane length (including taper) is less than or equal to ‘M’ or ‘D’ respectively.

2. ‘M’ or ‘D’ should be at least the length shown in the table. Longer lengths may be required on flat tapers and shorter lengths are sometimes necessary due to construction limitations.
Figure 4.2.2(G) – Auxiliary lanes and tapers – controlled side road (simplified treatment)
**Figure 4.2.2(H) – Auxiliary lanes and tapers – uncontrolled side road (full treatment)**

**Notes**

1. These markings are omitted if auxiliary lane length (incl. taper) is less than or equal to ‘M’ or ‘D’ respectively.

2. ‘M’ or ‘D’ should be at least the length shown in the table. Longer lengths may be required on flat tapers and shorter lengths are sometimes necessary due to construction limitations.

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<th>Design speed of Through Road km/hr</th>
<th>D m</th>
<th>M m</th>
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</tr>
</tbody>
</table>
**Figure 4.2.2(I) – Auxiliary lanes and tapers – uncontrolled side road (simplified treatment)**
Figure 4.2.2(J) – Urban three-way intersection – unsignalised

Notes
1. If side road not controlled, its centre line is broken and no stop or holding bar is to be used.
2. If side road not pavement marked, no turn lines are to be used.
Figure 4.2.2(K) – Urban four-way intersection – unsignalised

Note

1. If side road not pavement marked, no turn lines are to be used.
Notes

1. Unbroken lines may be used where lane discipline on the approach is a problem (see Section 2.2.3 of this guide).
**Figure 4.2.2(M) – Minor urban three-way intersections – signalised T-junction**

Notes

1. Barrier lines and island outline markings may be augmented with RRPMs.
2. Unbroken lines may be used where lane discipline on the approach is a problem (see Section 2.2.3 of this guide).
Figure 4.2.2(N) – Urban three-way intersection – signalised

This drawing does not seek to show the preferred traffic signal arrangements.

Notes
1. For further details on pavement arrow spacing see Section 2.4.2.1 of this guide.
2. Where loop detectors are installed on any particular approach, double barrier lines should be used on the separation line extending to the position of the loops.
3. The distance between the stop line and the kerb line projection in the intersecting road should not be less than 1 m. At rural intersections or intersections without kerbing on high-speed approaches, this distance should be 3–5 m clear of the nearest point of conflict with cross traffic.
4. The stop line should be placed not less than 1 m advance of the pedestrian crosswalk markings.
5. Where pedestrian volumes are large, this width may be increased.
6. No stopping signs to be located 3 m in advance of detector positions on approaches to intersection.
7. Turn lines can be omitted where the path to be followed is simple.
Figure 4.2.2(O) – Urban four-way intersection – signalised

Notes

1. For further details on pavement arrow spacing, see Section 2.4.2.1 of this guide.
2. Where loop detectors are installed on any particular approach, two-way barrier lines should be used on the separation line extending to the position of the loops.
3. Zebra crossing signs and pavement markings to be installed only if warranted.
4. The stop line should be placed not less than 1 m advance of the pedestrian crosswalk markings.
5. Where pedestrian volumes are large, this width may be increased.
6. The distance between the stop line and the kerb line projection in the intersecting road should not be less than 1 m. At rural intersections or intersections without kerbing on high-speed approaches, this distance should be 3–5 m clear of the nearest point of conflict with cross traffic.
7. No stopping signs to be located 3 m in advance of detector positions on approaches to intersection.
8. Adopt minimum of 11 m for one-lane right-turn in each direction. If two lanes right-turn, then clearance must be maintained (see Section 4.1.7 of this guide).
Notes

1. The GIVE WAY sign may be provided if indicated in MUTCD Part 2 Clause 2.5.4.
2. The sign is mounted on the signal post where practicable and angled towards right-turning traffic.
3. Dividing lines and island outline markings may be augmented with RRPMs. For layout and spacing, see Clause 5.6.5.2 in the MUTCD Part 2 extract in Section 2.5 of this guide.
4. The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see MUTCD Part 2 Clause 3.6.7).
5. 10 m to 12 m-long unbroken lines may be used where lane discipline on the approach is a problem and adequate length remains for turning traffic to enter the right lane (see Section 2.2.3 of this guide).
**MUTCD Part 2 Figure 2.6 – Major urban intersection with signals – divided road**

![Diagram of a major urban intersection with signals and divided road]

**Notes**

1. 10 m to 12 m-long unbroken lines may be used where lane discipline on the approach is a problem and adequate length remains for turning traffic to enter the right lane (see Section 2.2.3 of this guide).
2. Island outline markings may be augmented with RRPMs. For layout and spacing, see Clause 5.6.5.2 in the MUTCD Part 2 extract in Section 2.5 of this guide.
3. A Hazard marker may be required if the sign alone is not sufficient to delineate the median end (see MUTCD Part 2 Clause 3.6.7).
4. Turn lines may be omitted where the path to be followed is obvious to drivers under all conditions (see Section 4.1.7 of this guide).
Figure 4.2.2(P) – Major urban intersection – divided road – double right-turn lanes
**MUTCD Part 2 Figure 2.10 – Trap lane at urban intersection**

Notes

1. For arrow spacing in the trap lane, see Clause 5.5.2.3 in the MUTCD Part 2 extract in Section 2.4.2 of this guide. The length of the trap lane will depend on the queue length to be accommodated.

2. The panel at the bottom of the G9-43-4 sign is required if there is an intermediate intersection along the trap lane. Alternative legends, such as AT HIGH ST, 300 m may be more appropriate.

3. The R2-9(R) signs are provided at spacings not exceeding 100 m along the length of the continuity line.

4. An extra R2-9(R) sign may be required in advance of this point if earlier advice of the start of the trap lane is required. It may have either a location plate, R9-8, or a distance plate, G9-78 (see MUTCD Part 2 Clause 2.8.10(c)).
Figure 4.2.2(Q) – Roundabout pavement markings – four two-lane entry/exits

Notes

1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Figure 4.2.2(R) – Roundabout pavement markings – two two-lane and two one-lane entry / exits

Notes
1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
**Figure 4.2.2(S) – Roundabout pavement markings – four two-lane entry / exits with one exclusive left turn lane**

Notes

1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Figure 4.2.2(T) – Roundabout pavement markings – three two-lane entry / exits and one one-lane entry / exit with one exclusive right turn lane

Notes

1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Figure 4.2.2(U) – Roundabout pavement markings – T-junction with two two-lane entry / exits and one one-lane entry / exit

Notes
1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. Right-turn arrow marked to legally permit U-turn.
4. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Figure 4.2.2(V) – Roundabout pavement markings – T-junction with three two-lane entry/exits with optional marking for dual right turn

Notes

1. Exit lines are marked as 9 m line, 3 m gap.
2. Line marking not to leave an excessively large internal lane.
3. Right-turn arrow marked to legally permit U-turn.
4. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
5. A painted chevron may be installed, in conjunction with the exclusive left-turn lane (see Figure 4.2.2(S) in Section 4.2.2 of this guide).
Notes

1. Careful consideration needs to be given prior to the installation of ‘spiral’ markings and advice should be sought from the department’s Traffic Engineering Practice Unit, email TrafficEngineering.Support@tmr.qld.gov.au. The provision of such markings should be the exception rather than the rule.

2. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Notes

1. Careful consideration needs to be given prior to the installation of ‘spiral’ markings and advice should be sought from the department’s Traffic Engineering Practice Unit, email TrafficEngineering.Support@tmr.qld.gov.au.

   The provision of such markings should be the exception rather than the rule.

2. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
Figure 4.2.2(Y) – Roundabout with spiral markings – five approaches

Notes

1. Careful consideration needs to be given prior to the installation of ‘spiral’ markings and advice should be sought from the department’s Traffic Engineering Practice Unit, email TrafficEngineering.Support@tmr.qld.gov.au.

   The provision of such markings should be the exception rather than the rule.

2. The first pavement arrow shall be spaced at a distance of 15–30 m from the give way line.
**MUTCD Part 2 Figure 2.7 – Large roundabout**

Notes

1. Where geometry permits, exit lines are marked as shown and as described in Clause 5.3.9(a)(v) in the MUTCD Part 2 extract in Section 4.1 of this guide.
2. Pavement arrows are not normally marked on single-lane entries to roundabouts. Where a roundabout has two or more lanes on an entry, pavement arrows shall be marked to show movements permitted from each entry lane (see Clause 5.5.2.3 in the MUTCD Part 2 extract in Section 2.4.2 of this guide).
3. Sign R1-3 is required on both sides of each approach at a multi-lane approach, see MUTCD Part 2 Clause 2.6.2(a).
4. Island outline markings may be augmented by RRPMs. For layout, see MUTCD Part 2 Figure 5.24 in Section 2.5 of this guide.
5. The need for a Hazard marker should be considered if R2-3 is not sufficient to delineate the median end (see MUTCD Part 2 Clause 3.6.7).
6. Bidirectional Hazard markers may be required on splitter islands if additional night-time delineation is needed.
7. Hazard markers on the curve are required only if the curve cannot readily be seen by approaching drivers.
Notes

1. Signs W2-7A and D4-1-2 may not be required in local streets but should be used where there is poor visibility to the roundabout from one or more approaches.
2. Sign R1-3 should be placed on the side of the approach that will make it as conspicuous as possible to approaching drivers.
3. Sign R2-3A may not be necessary where traffic is clearly required to pass to the left of the island or where a Roundabout (R1-3) sign is located in the island.
4. Landscaping in the central island should not be high enough to restrict visibility across the island.
**MUTCD Part 2 Figure 3.3 – Single-lane exits and entrances**

Notes

1. For detail, see MUTCD Part 2 Figure 5.28 reproduced in Section 2.4.2.1.2 of this guide.
2. Lane line markings on expressways and ramps are shown in MUTCD Part 2 Figure 5.15 reproduced in Section 5.2.5 of this guide.
3. Alternative ‘step-out’ line for use at exit ramps where indicated in Clause 5.7.5 in the MUTCD Part 2 extract in Section 2.4.2.5 of this guide.
4. Alternative pavement marking when the entrance ramp leads directly into an added freeway lane, and direct merging is not required. The length of unbroken lane line may vary depending on traffic operation requirements. Generally, a length of 150–200 m is considered appropriate.
5. Lane change signing should be provided where length of full width acceleration lane exceeds 300 m.
**MUTCD Part 2 Figure 3.4 – Two-lane exits and entrances**

**Notes**

1. Edge line and nose marking details as shown in MUTCD Part 2 Figure 5.28 reproduced at Section 2.4.2.1.2 of this guide.
2. Retroreflective raised pavement markers (RRPMs) at 12 m spacing.
3. Pavement arrows in trap lane and adjacent lane are spaced at 50 m. Minimum of seven sets of arrows normally provided. They may be supplemented or replaced by a minimum of three LEFT LANE MUST EXIT signs (R2-19). For detailed design and positioning of these arrows, see Clause 5.7.3 in the MUTCD Part 2 extract in Section 2.4.2.5 of this guide.
4. Merge is signed as a lane change, general case, see Clause 4.7.2(b) in the MUTCD Part 2 extract in Section 3.5 of this guide.
5. Special purpose broken line, see MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 in this guide (9 m line, 3 m gap).
**MUTCD Part 2 Figure 3.5 – Trap lanes at expressway exits**

Notes

1. LEFT LANE MUST EXIT R2-19 signs are placed at 100 m maximum spacing.
2. Continuity line delineates the trap lane for 800 m minimum.
3. Pavement arrows in the trap lane and adjacent lane are spaced at 50 m. For detailed design and positioning, see Clause 5.7.3 in the MUTCD Part 2 extract in Section 2.4.2.5 of this guide.
4. Special purpose broken line, see Figure 5.1.5(A) in Section 5.1.5 of this guide (9 m line, 3 m gap).
5 Other facilities

5.1 Parking control

5.1.1 General

Pavement markings may be used to complement parking control signs or to optimise the number of spaces in a parking area, but they can also be used to emphasize regulatory restrictions. In some special cases, markings may be used alone, as indicated below.

5.1.2 Delineation of parking spaces

Parking spaces are marked by one of the following methods (see MUTCD Part 2 Figure 7.1 reproduced at Section 2.4.3.1 of this guide):

a) broken lines as shown in MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 of this guide
b) continuous lines may be used in lieu of (a) above. They shall not be used where there are part-time clearways or other part-time no stopping areas
c) markings in the shape of an inverted ‘T’ or an ‘L’ (as shown in MUTCD Part 2 Figure 5.3 reproduced at Section 2.3.1 of this guide) at the corners of the spaces only (not suitable for angle parking)
d) adhesive reflective markers indicating the outline of the spaces as a series of dots
e) contrasting pavement materials, such as bricks, arranged in a manner similar to (a), (b), or (c) above.

Lines may be produced using road marking paint or alternative long-life materials. Parking spaces are normally marked in white; however, where it is desired to identify spaces permanently set aside for special uses, such as taxis, buses or vehicles used by people with a disability, yellow may be used.

Where parking spaces, for example near an intersection, are subject to part-time clearways or to other part-time no stopping restrictions, they may be differentiated from adjacent permanent spaces by marking the corners of the spaces only, as described in (c) above.

5.1.3 Delineation of no stopping and zone areas

If it is desired to indicate by a line on the pavement a permanent no stopping area, applicable to all vehicles, it should be done by marking an continuous yellow ‘No Stopping’ line (as shown in MUTCD Part 2 Figure 5.1 reproduced at Section 2.2.7 of this guide), close and parallel to the edge of the roadway (see (a) at Figure 5.1.5 in Section 5.1.5 of this guide). This marking normally supplements signposting but may be used alone without signs (see Section 2.4.3.2 of this guide).

If it is desired to indicate by a line on the pavement a no stopping area or zone where only limited types of vehicles may stop or park, it should be done by marking a broken yellow zone line (as shown in MUTCD Part 2 Figure 5.1 reproduced in Section 2.2.7 of this guide), close and parallel to the edge of the roadway (see (c) at Figure 5.1.5(A) in Section 5.1.5 of this guide). These markings supplement statutory or signposted restrictions.

These edge markings are located in areas where drivers would reasonably expect this type of control. They shall not be used in lieu of normal edge lines.
5.1.4 Pavement messages and symbols

See AS1742.7 extract in Section 2.4.3.3 of this guide.

5.1.5 Typical layouts

Typical layouts for parallel, angle and centre-of-road parking are shown in figures 5.1.5(A), 5.1.5(B) and 5.1.5(C) respectively.

It is recommended, as shown in Figure 5.1.5(B), that the ends of a number of angled parking bays form a straight line rather than a saw-tooth. This improves the definition of the edge of the running lane and makes the line marking task simpler.
Figure 5.1.5(A) – Typical layouts for parallel parking and stopping areas

(a) Parking bays

Legend

W = 2.3 m, or 2.6 m at zones intended for use by wide vehicles viz. Bus zone, loading zone.

X = 2.3 m. This may be reduced to 2.1 m where it may assist the movement of traffic and where parking turnover is low and there are unlikely to be any wide vehicles parking.

Y = 5.4 m minimum where vehicles may enter or leave the parking space directly.

Z = 6.0 m to 6.7 m for intermediate bays, depending on parking turnover and traffic volumes.

Notes:

1. ‘No Stopping’ restrictions may be indicated by a yellow line, 80–100 mm wide, close to the kerb, as shown at (a).

2. Yellow bay markings should be used in lieu of white markings for parking bays with restricted use (see sections 5.1.2 and 5.1.3 of this guide).

Dimensions in millimetres.
**Figure 5.1.5(B) – Typical end treatments for angle parking**

Legend

\[ X = \text{the Statutory no stopping distance} \]

Notes:

1. Where ‘X’ is the Statutory no stopping distance, this panel is optional for isolated parking arrangements.
Figure 5.1.5(C) – Typical end treatments for parallel and centre-of-road parking

Legend

\[
X = \text{the Statutory no stopping distance}
\]

Notes:
1. Where ‘X’ is the Statutory no stopping distance, these panels are optional for isolated parking arrangements.
2. ‘Y’ is the distance required for intersection visibility.

5.2 Local area traffic management

5.2.1 General

A number of traffic control devices are specifically associated with local area traffic management (LATM) treatments, in particular road humps, small roundabouts and chicanes. Further details of these traffic control devices are contained within AS1742.13.

5.2.2 Road humps

Details of the markings required on road humps are shown in AS1742.10 Figure 2 reproduced at Section 2.4.2.6 of this guide.

The marking may be omitted on humps in an area-wide scheme, or a clearly-defined segment of a staged construction scheme, if pavement material of a contrasting colour is used such that the hump is clearly visible under all conditions.

The road humps in standard use are of the Watts profile or Flat-top type. Applications of these are shown in AS1742.13 figures 3.2 and 3.3 reproduced at Section 5.2.4 in this guide respectively.
5.2.3 Small roundabouts

Kerbs of realigned footpaths, medians and traffic islands may be marked white and reflectorised if added visibility is required.

Island outlines and kerb markings may be augmented with RRPMs. A typical application is shown in AS1742.13 Figure 3.5 reproduced at Section 5.2.4 in this guide.

5.2.4 Chicanes

Chicanes include lateral displacement and construction devices such as slow points and driveway links. Edge lines or painted kerbs, and RRPMs, are essential to their design for day and night safety. Typical applications are shown in AS1742.13 figures 3.6 to 3.9 reproduced in Section 5.2.4 of this guide.

AS1742.13 Figure 3.2 – Watts profile road hump

Notes:

1. For details of road hump line marking, refer to Clause 4.6.6.
2. Sign W3-4 is used in advance of an isolated road hump installation. Sign W8-17-2 is added if it is the first hump in a series. These signs are not generally required when the hump is part of an area-wide scheme.
3. The hump profile is shown in Appendix C.
4. The hump may be supplemented with kerb extensions, for example, of the type illustrated in Figure 3.6.
Notes:

1. For details of road hump line marking, refer to Clause 4.6.6.
2. Sign W3-4 is used at an isolated hump installation. Sign W8-17-2 is added if it is the first hump in a series. These signs are not generally required when the device is part of an area-wide scheme.
3. The hump may be supplemented with kerb extensions, for example, of the type illustrated in Figure 3.6.
4. If the device is to be a raised pedestrian crossing (zebra) (that is, a 'wombat crossing'), it is to be constructed, pavement marked and signed in accordance with AS1742.10.
5. The road hump profile is shown in Appendix C.
AS1742.13 Figure 3.5 – Small diameter roundabout

Notes

1. Sign R2-3(L) may not be necessary where traffic is clearly required to pass to the left of the island.
2. Sign R1-3 should be placed to create maximum conspicuity for approaching drivers.
3. Walk-through gaps at pavement level may be provided in median islands.
**AS1742.13 Figure 3.6 – Single lane slow point**

Notes

1. Hazard markers D4-1-1 may be replaced with one or more smaller hazard markers D4-1-2. Hazard markers may be omitted if the treatment is part of an area-wide scheme and there is adequate lighting and visibility to the start of the treatment or if the island is intended to be fully mountable. See also Appendix C, Paragraph C1(c).

2. To achieve satisfactory speed reduction, it may be necessary to incorporate a road hump in this device. If so, and if signs are required, the signing arrangement is in accordance with figures 3.2 and 3.3.
AS1742.13 Figure 3.7– Driveway link

Notes

1. Hazard markers D4-1-1 may be replaced with one or more smaller hazard markers D4-1-2. Hazard markers may be omitted if the treatment is part of an area-wide scheme and there is adequate lighting and visibility to the start of the treatment, or if the island is intended to be fully mountable. See also Appendix C, Paragraph C1(c).

2. Passing points may be required if the link is excessively long or drivers are not able to see from one end to the other.

3. Contrasting pavement material should have similar skid resistance to surrounding pavement for the benefit of bicycles and motorcycles.
Notes
1. Hazard markers D4-1-1 are not generally required when the treatment is part of an area-wide scheme. See also Appendix C, Paragraph C1(c).
2. Special consideration should be given to the provision of safe passage for bicycles. If provided behind the slow point, it should be able to be kept free from rubbish.
MUTCD Part 13 Figure 3.9 – Two-lane angled slow point

Notes
1. Sign W5-33 is not generally required when the treatment is part of an area-wide scheme.
2. Sign R2-3(L) may not be necessary where traffic is clearly required to pass to the left of the island.
3. Hazard markers D4-1-1 may be replaced with one or more smaller hazard markers D4-1-2. Hazard markers may be omitted if the treatment is part of an area-wide scheme and there is adequate lighting and visibility to the start of the treatment, or if the island is intended to be fully mountable. See also Appendix C, Paragraph C1(c).