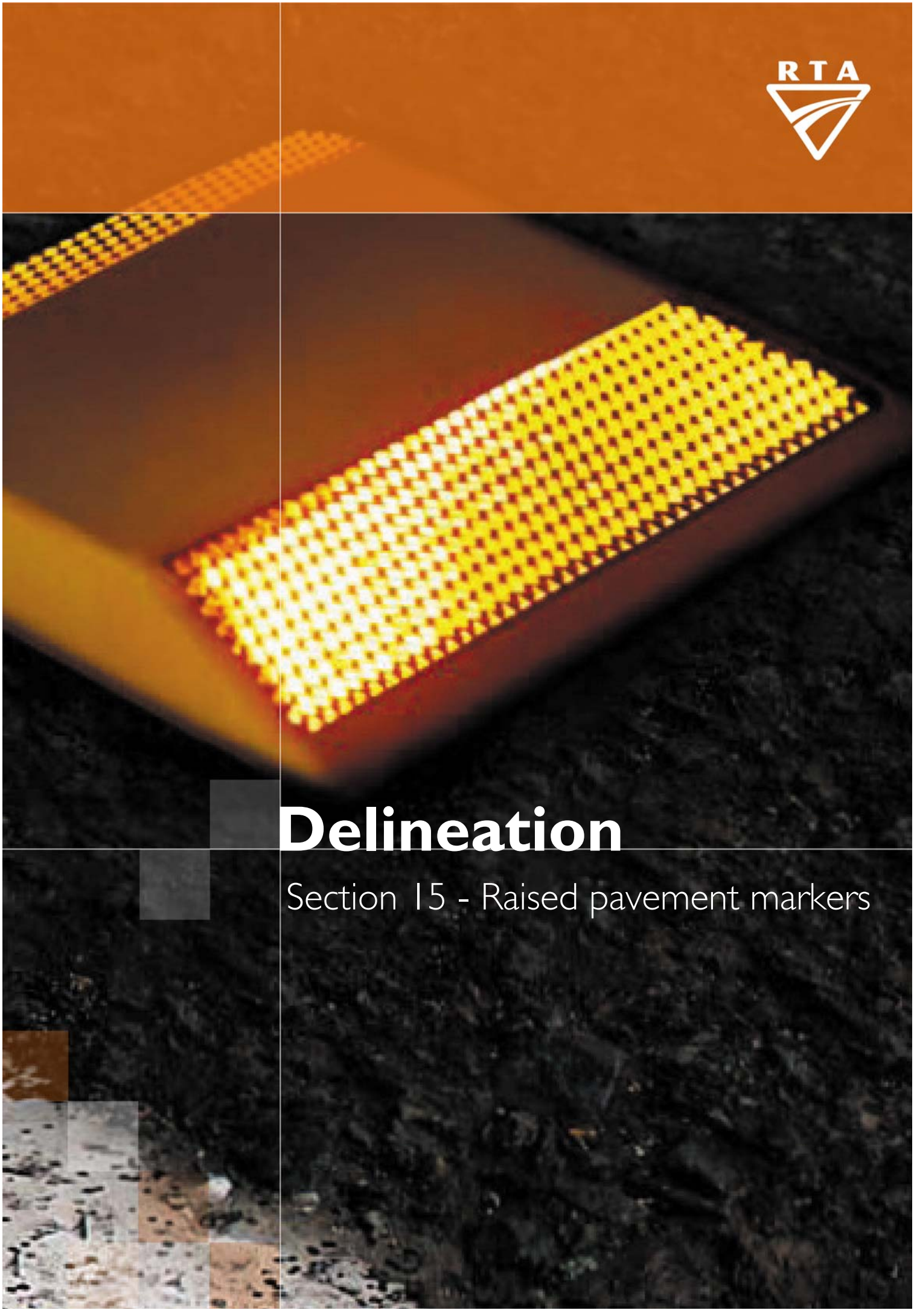

Delineation

Section 15 - Raised pavement markers

The delineation guidelines have been developed to assist in designing and maintaining a quality delineation system.

The guidelines are to comprise 19 sections and 2 appendices. These are initially being released individually and in no specific order. The sections which are to be released are as follows:

Part	Title
Section 1	Introduction
Section 2	Delineation principles
Section 3	Pavement markings
Section 4	Longitudinal markings
Section 5	Enhanced longitudinal markings
Section 6	Transverse markings
Section 7	Transverse markings - Pedestrian facilities
Section 8	Diagonal and chevron markings
Section 9	Messages on pavements
Section 10	Pavement arrows
Section 11	Pavement markings at roundabouts
Section 12	Pavement markings for bicycle facilities
Section 13	Pavement markings for kerbside parking restrictions
Section 14	Maintenance of pavement markings
Section 15	Raised pavement markers
Section 16	Guide posts and delineation of safety barriers
Section 17	Alignment signs and markers
Section 18	Delineation systems
Section 19	Delineation management and audit
Appendix A	Locating and setting out of dividing (barrier) lines

To determine which sections are currently available go to:

www.rta.nsw.gov.au/doingbusinesswithus/downloads/technicalmanuals/delineation_dl1.html

The information contained in the various parts is intended to be used as a guide to good practice. Discretion and judgement should be exercised in the light of the many factors that may influence the choice of delineation devices in any situation. The guidelines make reference, where relevant, to current Australian Standards and are intended to supplement and otherwise assist in their interpretation and application.

Delineation

Section 15

RAISED PAVEMENT MARKERS

Special Note:

As from 17 January 2011, the RTA is adopting the Austroads Guides (Guide to Traffic Management) and Australian Standards (AS 1742, 1743 & 2890) as its primary technical references.

An RTA Supplement has been developed for each Part of the Guide to Traffic Management and relevant Australian Standard. The Supplements document any **mandatory** RTA practice and any complementary guidelines which need to be considered.

The RTA Supplements **must** be referred to prior to using any reference material.

This RTA document is a complementary guideline. Therefore if any conflict arises, the RTA Supplements, the Austroads Guides and the Australian Standards are to prevail.

The RTA Supplements are located on the RTA website at www.rta.nsw.gov.au

Roads and Traffic Authority
www.rta.nsw.gov.au

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AMENDMENTS: Refer to Amendment Record

APPROVED BY:

SIGNED	**SIGNED**
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AUTHORISED FOR USE BY:

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www.rta.nsw.gov.au/doingbusinesswithus/downloads/technicalmanuals/delineation_dl1.html

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Amendment record

Please note that the following updates have been made to this document.

Amendment No	Page	Description	Issued	Approved By
1	Various	Location of RRPMs amended.	December 2010	R O'Keefe Mgr Traffic Policies, Guidelines & Legislation
2	Various	Figures 15.1, 15.8, 15.10, 15.11 & 15.12 amended	February 2012	R O'Keefe Mgr Traffic Policies, Guidelines & Legislation
3	15-7	Table 15.1 amended to include Enhanced line types.	August 2012	R O'Keefe Mgr Traffic Policies, Guidelines & Legislation

15.1 General principles

15.1.1 Purpose

Raised pavement markers (RPMs) are used to amplify, augment and, in some instances, to simulate painted markings.

The main advantages of raised pavement markers are:

(a) They provide day and night visibility during adverse weather conditions

(b) They provide an audible and tactile warning when traversed by vehicles

(c) They improve road safety by providing directional cues by the reflected colour

15.1.2 Limitations

(a) The principal disadvantage of using RPMs is their higher initial and on going maintenance costs compared to pavement markings. Their application, therefore, tends to be limited to important roads or critical situations.

(b) To reduce costs, their application should be restricted to those roads, which are not likely to be subjected to major repair for at least one year.

(c) The noise generated by motorists traversing the markers needs to be considered when in or near residential areas.

15.2 Types

Raised Pavement Markers shall be of a type approved by the Authority. Reference should be made to the relevant technical direction to ascertain which manufacturer products have been approved. Refer to Section 15.6 for details.

Following are the main types of RPMs:

15.2.1 Non–reflective raised pavement markers (NRPMs)

15.2.1.1 General

The Authority has discontinued the use of Non–reflective raised markers (NRPMs) due to the personal injury risk during their installation and maintenance on roads. There also existed the potential hazard of dislodged buttons thrown by vehicle tyres at high speed.

Non–reflective raised markers (NRPMs) are generally made of ceramic and plastic material with a glazed surface. The glazed surface is resistant to scratching and tyre marks. They were used for day visibility as an alternative to painted lines.

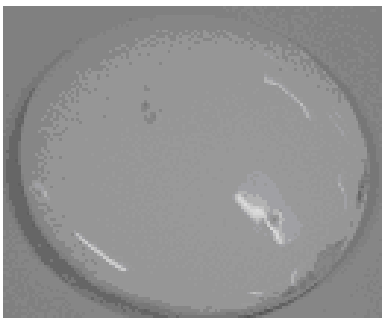


Figure 15.1: Non reflective raised markers (NRPMs)

15.2.1.2 Phasing out strategy for the NRPMs

(a) For new construction or reconstruction of freeway, dual carriageway or multi-lane road projects:

Non-reflective raised pavement markers should not be installed and 'L1' lane line (Profile or non-profile thermoplastic or water borne paint) shall be used in accordance with Section 4.4 and Table 4.4.

(b) For existing roads with non-reflective raised pavement markers installed for lane lines:

For the maintenance of lane lines on a substantial length of road, non-reflective raised pavement markers should be replaced by profile or non profile thermoplastic or water borne paint line-marking in accordance with Section 4.4 and Table 4.4, taking into account the time schedule of pavement re-sheet. The relevant Asset Maintenance Manager should be consulted prior to the installation of lane line-marking.

(c) In situations where pavement is planned for re-sheet within a short timeframe.

It may be more economical to install temporary lane lines (suggested width of 100 mm) over the ceramic buttons with water borne paint line-marking.

Maintenance for partial dislodgement of non-reflective raised pavement markers may continue in the interim if it is more cost effective to maintain a small number of non-reflective RPMs rather than installing profile, non profile or water borne paint line-marking over sections of short road lengths. The relevant Asset Maintenance Manager should be consulted.

15.2.2 Retro–reflective raised pavement markers (RRPMs)

15.2.2.1 General

Retro–reflective raised pavement markers (RRPMs) employ the principles of retro-reflection (refer Section 2.4.4 for detailed discussion on retro-reflection) to impart night-time visibility. The reflective unit (containing glass spheres or corner cubes) of the marker is generally cased in an acrylic or plastic shell with a honeycomb or flat base.

Figure 15.2: Retro–reflective raised pavement markers (RRPMs)

15.2.2.2 Use

RRPMs are used to supplement pavement markings for increased effectiveness, especially in night and inclement weather (wet or foggy) conditions.

The reflective markers complement centreline, lane lines and edge lines. They are also used for channelisation and gore markings.

15.2.3 Temporary raised pavement markers (TRPMs)

15.2.3.1 General

Temporary raised pavement markers (TRPMs) are made of traffic bearing high impact plastic. After the completion of a new paving job, TRPMs provide delineation on the road until longitudinal markings can be painted on the new surface. They are an economical option for temporary pavement markings. TRPMs are available in either white or yellow colours.

Figure 15.3: Temporary pavement markers (TRPMs)

15.2.3.2 Use

TRPMs are effective and convenient devices that provide temporary delineation both day and night. These markers are traditionally used in construction and work zones.

Depending on weather conditions, TRPMs are often required to last several weeks until paint can be applied. Temporary pavement delineation for lane lines and centre lines shall consist of TRPMs placed at longitudinal intervals of 12 m to 24 m apart.

TRPMs shall be the same colour as the colour of the RRPMs. For example, to supplement the lane line, they should be white and for the dividing line, they should be yellow. The TRPMs should simulate the normal RRPM pattern for the respective pavement markings.

15.2.4 Illuminated raised pavement markers (IRPMs)

15.2.4.1 General

Illuminated raised pavement markers (IRPMs) are self illuminating pavement markers, designed to provide enhanced road and lane delineation. They bring additional benefits by providing visual guidance at night and particularly in adverse weather when traditional marker performance is more limited. This improved highway delineation encourages a more controlled driving and better lateral positioning of the vehicle. However, they are expensive and costly to install and maintain.

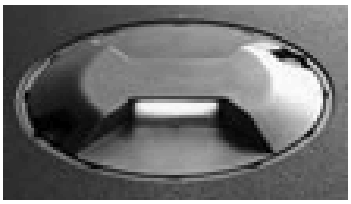


Figure 15.4: Illuminated raised pavement markers (IRPMs)

15.2.4.2 Use

IRPMs are used in many ways to address specific road safety issues as part of accident reduction programs where there is a need to improve the delineation of the road layout or where a street lighting scheme is difficult or expensive.

Note The NSW Centre for Road Safety is investigating the various types of IRPMs and their possible use on NSW roads. Approval should be obtained from NSW Centre for Road Safety before selecting any particular type of IRPM.

15.3 Colour pattern in RRPMs applications

15.3.1 Approved colours in RRPM application

The following four colours of RRPMs are used in road delineation:

(a) White

(b) Yellow

(c) Red

(d) Blue

No other colour shall be used.

The reflectors of RRPMs could be mono-directional or bi-directional.

15.3.2 Colour scheme

(a) White RRPMs are used to augment the lane lines.

(b) Yellow RRPMs are used to augment the dividing lines (separating opposing traffic), right hand edge lines of one-way carriageways, the outline of traffic islands and painted medians.

(c) Red RRPMs are used to augment the left hand edge lines.

(d) Blue RRPMs, although not an official delineation device, may be used on a road to mark fire hydrants or water supply locations. They shall not be used for any other purpose. The blue RRPMs are installed and maintained by the Fire Brigade or local council. They must be located 100 mm offset from the dividing line (or approximate centre where no dividing line is marked), on the side of the road where the hydrant is located.

When placed on freeways or motorways they should be placed on the shoulder to the left of edge line, opposite the fire hydrant. Because the location of fire hydrants may be difficult to see on high speed roads, the fire brigade may want to install supplemental signs.

Table 15.1 gives a summary of the colours, specified for RRPMs in various applications. The table should be read in conjunction with Section 15.6 and relevant drawings.

Application	Types of RRPM Reflectivity	Colour	Symbol
All lanes lines (Broken, unbroken, except L6 & L7)	Mono–directional	White	W
Dividing (separation) line	Bi–directional	Yellow	YY
Dividing (barrier) line (BB)	Bi-directional	Yellow	YY
Dividing (barrier) line (BS)	Mono–directional & Bi-directional	Yellow	Y YY
Enhanced (separation) line (S3)	Mono–directional	Yellow	Y
Edge lines – Right edge on one way carriageways (E3 line)	Mono–directional	Yellow	Y
Edge lines – Left edge (E1 & E2 lines)	Mono–directional	Red	R
Edge lines – Outline of traffic island and freeway ramp (E4 line)	Mono-directional	Yellow (right of traffic lane) and red left of traffic Lane	Y R
Edge lines – Outline of painted median (E5 lines)	Bi–directional	Yellow	YY
Continuity lines – (C1 lines) -General -Freeway off ramps	Mono–directional	White	W
Location of fire hydrants	Bi–directional	Blue	BB
	Note: that blue RRPMs are used to identify the locations of fire hydrants only. They are installed and maintained by the fire brigade, and are not used for delineation purposes.		

Table 15.1: Colour of RRPMs to Augment Pavement Markings

Note: This table is indicative only of the concept of colours used in the application of RRPMs. For actual application of RRPMs relevant drawings should be referred.

15.4 Specifications

15.4.1 Materials

Retro-reflective raised pavement markers must comply with the RTA QA Specification R142 Retro-reflective Raised Pavement Markers, with the requirements of AS 1906.3 and have the dimensions shown in **Figure 15.5**.

A list of pre-qualified retro-reflective raised pavement markers is given in RTA QA Specification R142 Retro-reflective Raised Pavement Markers.

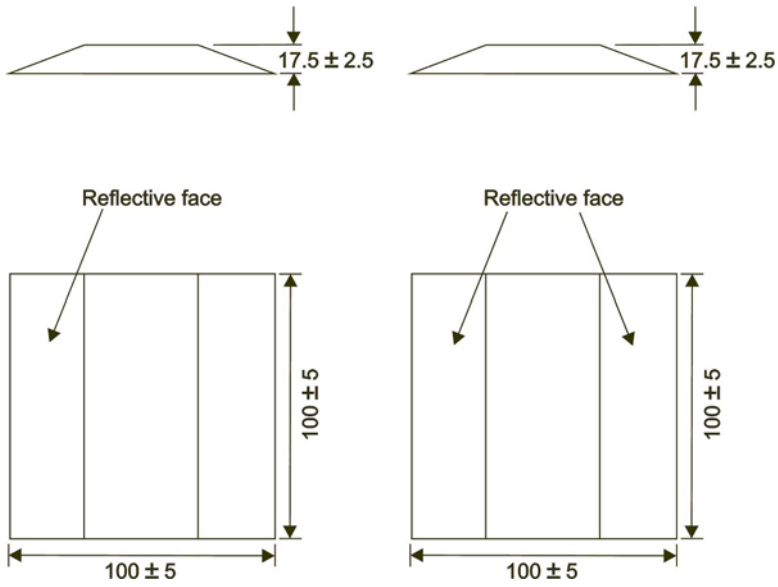


Figure 15.5: Specifications of RPMs
(All dimensions are in mm.)

15.5 Adhesives

Good adhesion or bond between the RPM and the pavement surface is a very important factor for RPM's service life and durability. The RPMs are installed on the road surface with the help of two part or hot melt adhesives. They should comply with RTA specification 3354 - Adhesives for Raised Pavement Marker Installation. The RTA also maintains a list of approved adhesives based on field trials and laboratory testing.

Selection of adhesive, method of its application and surface preparation are significant factors in achieving proper bonding.

15.6 Selection of markers

Commercially available RRPMs vary in all characteristics – such as size, shape, photometric properties and composition. These properties, especially the photometric properties and site-specific characteristics are considered when selecting RRPMs. The RTA maintains a list of approved RRPM suppliers for use on the Authority's works. It is recommended to use only those markers that are contained in that list.

In choosing the type of marker and adhesive, the following factors should be taken into account:

(a) Corner cube markers perform better than glass barrel type

(b) Markers with bituminous adhesive last twice as long (with respect to both reflectivity and retention)

(c) Wide angle RRPMs give better delineation on rural highways having a significant volume of heavy vehicle traffic

(d) The adhesive for marker installation should be selected according to the manufactures recommendation

15.7 Installation

To obtain best value for money, it is important that the markers and adhesive be appropriately selected. Pavement should be free from dirt, grease, oil, moisture and loose material that would adversely affect any interaction with the adhesive. The quantity of adhesive should be just sufficient to completely cover the area of contact between the RPM and the pavement. An excess amount of adhesive around the edges of the RPM, results in covering the reflective face of the RPM and should be avoided.

15.7.1 Placement of RRPMs

RRPMs are generally located in the gaps (broken lines) or with an offset (unbroken lines) to present no interference or degradation of reflective properties, during re-marking of the painted lines as in **Figure 15.6** and **Figure 15.7**.

(a) For application with broken lines the RRPM is to be located centrally between the lines and

(b) With unbroken lines an offset of 25 mm to 50 mm from the line should be kept

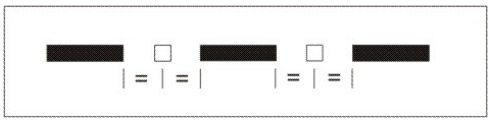


Figure 15.6: Placement of reflective raised pavement markers (Broken lines)

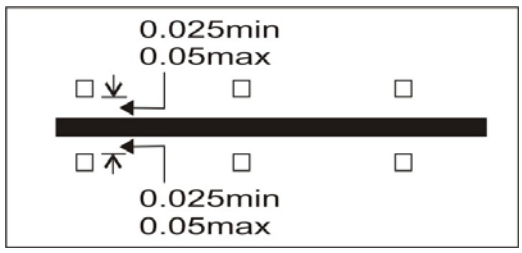


Figure 15.7: Placement of reflective raised pavement markers (Unbroken lines)

15.7.2 Positioning of RRPMs

The reflective face of the RRPMs should be oriented so that the full reflective effect is realised by vehicles on their approach, especially on sharp curves. RRPMs augmenting edge lines, lane lines and painted median/island approaches should be positioned in such a way that the reflective face is in the direction of approaching traffic rather than placing it perpendicular to the tangent of the curve.

15.7.3 Spacing of RRPMs

The spacing of RRPMs shall be in accordance with Table 15.2. Refer to Figures 15.8 to 15.11 for illustration.

Line Type	Spacing			Remarks
	24m	12m	8m	
• Lane lines • Dividing lines (separation and barrier) • Edge lines	Normal spacing on unlit roads generally, except that RRPMs shall be placed at 12m spacing for the situations given in the next column.	• Substandard curves or curves 400 m in radius or less • Dividing (barrier) lines on approaches to median ends • Roads with street lighting meeting AS 1158.1 (except that 24 m spacing for lane lines may be sufficient in many cases). • Short length of unbroken line. • Dividing line on all multilane undivided roads • Outline of painted median • Freeway ramp gore • Enhanced dividing lines • Enhanced lane line		No RRPMs on E6, L6, L7 lines
Continuity line	--	--	All situations	
Turn line	--	--	--	
No stopping & Clearway lines	--	--	--	

Table 15.2: Spacing of RRPMs to Augment Pavement Markings

15.8 Warrant for use

RPMs are used throughout the state in both rural and urban situations. In order to recover the high initial cost, the application of RPMs should be limited to the roads having a surface that will not be subject to major repair for at least one year.

The following conditions should be satisfied for RRPM installation:

15.8.1 Freeways and dual carriageway roads

Refer to Section 15.5 for the use of NRPMs for the purpose of lane line delineation. Wherever used, NRPMs should be supplemented with RRPMs (See Section 15.9 for details).

15.8.2 Single carriageway two-way roads

RRPMs should be used to supplement the dividing line if the annual average daily traffic (AADT) (see definition in Section 1.6) is in excess of the following:

(a) 3,000 vehicles on rural roads

(b) 6,000 vehicles on urban roads

RRPMs should be used to supplement the edge line if the AADT is in excess of the following:

(a) 5,000 vehicles on rural roads

(b) 10,000 vehicles on urban roads

15.8.3 Special warrants

On single carriageway, two-way roads, RRPMs should be provided where special conditions exist, such as:

(a) Average annual rainfall exceeds 1000 mm, or road is subject to frequent fogs

(b) Roads with sharp curves

(c) Hazardous locations, such as narrow bridges

(d) Roads with high incidence of wet-night accidents

(e) To maintain inter-state or inter-regional route continuity of marker application

15.8.4 Exceptions

(a) RRPMs may not be necessary on edge lines of rural divided or undivided roads if edge delineation in the form of edge line and guide-posts is properly maintained, except in those cases given above in 15.8.3.

(b) On single lane carriageways, e.g. freeway ramps. RRPMs should not be used to supplement edge lines unless they are also used, at the same location, to supplement separation, barrier or lane lines. They should not generally be used on edge lines where the shoulder is less than 1 m wide.

(c) RRPMs should not be used on continuity lines at lane drops in areas subject to frequent fogs, as they may inhibit rather than enable correct merging manoeuvres under such conditions.

(d) In urban areas, especially on narrow lanes, noise generated by traversing motorists may cause concern in or near residential areas. An alternative form of delineation (large glass beads) may be considered.

(e) RRPMs may not be necessary in tunnels, which are illuminated and are unlikely to get the pavement markings obliterated due to water. It is recommended to use profile lane and edge lines instead.

15.9 Raised pavement marker patterns

15.9.1 Simulating lane lines

The use of NRPMs has been discontinued by the RTA. Refer to Section 15.1.1 for details. The use of NRPMs and RRPMs for simulating lane lines (L2 line) shall be as illustrated in Figure **15.10**, for maintenance purposes only.

15.9.2 Augmenting lane, edge, continuity and separation lines

The use of RRPMs in augmenting painted lines, such as lane lines, dividing lines (separation and barrier lines), continuity lines and edge lines, shall be as illustrated in Figure 15.8 to Figure 15.15, with emphasis on the following points:

(a) Consistency in the use of a particular type of marker at one location, their spacing, offset and orientation.

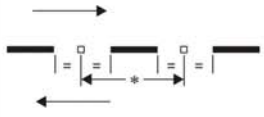
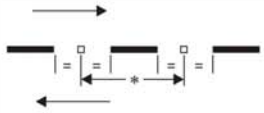
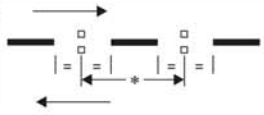
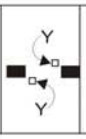
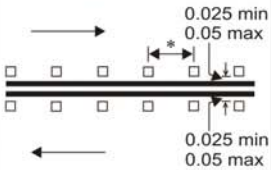
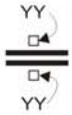
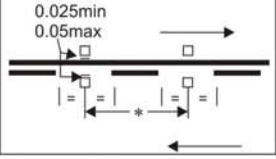
(b) On edge lines, RRPMs should be placed outside the painted line to prolong their effective life and to increase separation between vehicles. Where they are used on single lane carriageways they may be placed inside the edge line.

15.9.3 Augmenting traffic islands, medians and other devices

RRPMs shall be used to augment traffic islands, approaches to medians, raised and painted medians and pavement arrow, in accordance with Figure 15.12 to Figure 15.15. The recommended spacing for RRPMs used to outline traffic islands, medians, and other devices are as follow:

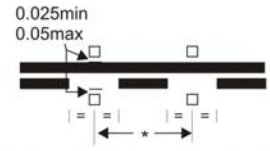
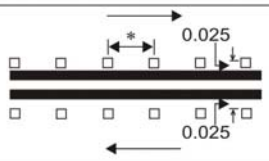
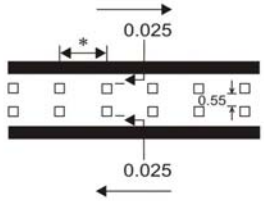
(a) Minimum – 4 m

(b) Maximum – 12 m

Line Type	Use	Dimensions (m) (for dimensions shown by * see marker spacing column)	Colour	Raised Marker Type	Marker Spacing (*) (m)	
					Normal Spacing (α)	Alternative Spacing (β)
DIVIDING (SEPARATION) LINES						
S1	Dividing (separation) line on 2 lane road		White	YY	24	12
S2		NO LONGER USED				
S6	Dividing (separation) line on multi lane road		White	YY	24	12
ENHANCED DIVIDING (SEPARATION) LINES						
S3	Enhanced dividing (separation) line on major highways to achieve greater separation between opposing traffic -prior approval needed of General Manager Traffic Management		White		12	12
DIVIDING (BARRIER) LINES						
BB	1. Replaces dividing (separation) line if restricted sight distance for distance for directions Or 2. Approach to median island Or 3. Approaches to a pedestrian crossing		White		12	12
BS	1. Replaces dividing (separation) line if restricted sight distance in directions Or 2. Climbing lane		White		12	12

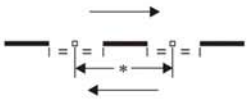
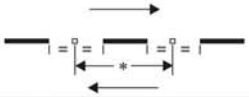
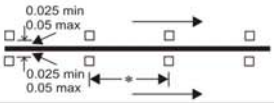
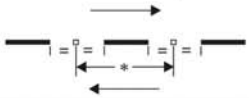
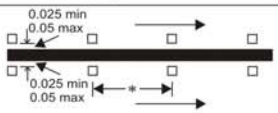
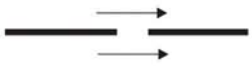
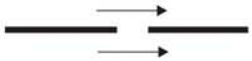
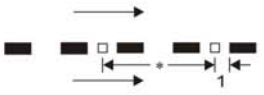
(A) Explanation of symbols	
(α)	(a) on unlit roads generally
(β)	(a) substandard curves or curves 400m in radius or less (b) dividing (barrier) lines on approaches to median ends (c) roads with street lighting meeting AS 1158.1 (except that 24m spacing for lane lines may be sufficient in many cases) (d) short length of unbroken line (e) dividing line on all multilane undivided roads
(B) General comments	
1	Arrow indicate direction of traffic
2	Code used for raised pavement marker types (a) **NW** = Non-retro-reflective white (b) **W** = Mono-directional retro-reflective white (c) **Y** = Mono-directional retro-reflective yellow (d) **YY** = Bi-directional retro-reflective yellow (e) **R** = Mono-directional retro-reflective red

Figure 15.8: Application of Raised Pavement Markers

Line Type	Use	Dimensions (m) (for dimensions shown by * see marker spacing column)	Raised Marker Type	Marker Spacing (*) (m)	
				Normal Spacing (α)	Alternative Spacing (β)
ENHANCED (DIVIDING) BARRIER LINES					
BS1	Enhanced dividing (barrier) lines strictly in the guidelines. Prior approval needed of *General Manager Traffic Management* *(See the notes below)*			12	12
BB1	Enhanced dividing (barrier) lines strictly in the guidelines. Prior approval needed of *General Manager Traffic Management* *(See the notes below)*			12	12
BB2	Enhanced dividing (barrier) lines strictly in the guidelines. Prior approval needed of *General Manager Traffic Management* *(See the notes below)*			12	12

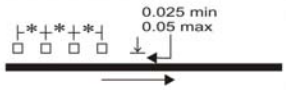
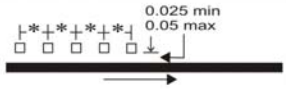
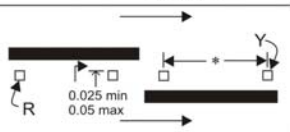
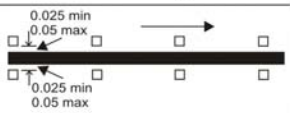
General comments	
1	Arrow indicate direction of traffic
2	Code used for raised pavement marker types, (a) **NW** = Non-retro-reflective white, (b) **W** = Mono-directional retro-reflective white, (c) **Y** = Mono-directional retro-reflective yellow, (d) **YY** = Bi-directional retro-reflective yellow, (e) **R** = Mono-directional retro-reflective red.

Figure 15.9: Application of Raised Pavement Markers

Line Type	Use	Dimensions (m) (for dimensions shown by * see marker spacing column)	Raised Marker Type	Marker Spacing (*) (m)	
				Normal Spacing (α)	Alternative Spacing (β)
LANE LINES					
L1	Lane line on multi lane road		W	24	12
L2	Lane line profile		W	24	12
L3	Lane line on multi lane road		W	12	12
L4	Exit lane line on multi lane roundabouts		W	12	12
L5	Enhanced lane line strictly in accordance with the guidelines. Prior approval needed of General Manager Traffic Management		W	12	12
L6	Defines the edge of a Bus or Bus Only Lane adjacent to general traffic lane		Not required	–	–
L7	Defines the edge of a Bicycle Lane adjacent to general traffic lane		Not required	–	–
CONTINUITY LINES					
C1	Defines edge of through carriageway adjacent to turning lane, freeway ramp, bus bay and start or finish of auxiliary lane		W	8	8
PARKING RESTRICTION LINES					
C2	Kerbside linemarking for Clearway restrictions		Not required	–	–
C3	Kerbside linemarking for No Stopping restrictions		Not required	–	–

(A) Explanation of symbols	
(α)	(a) on unlit roads generally
(β)	(a) substandard curves or curves 400m in radius or less (b) dividing (barrier) lines on approaches to median ends (c) roads with street lighting meeting AS 1158.1 (except that 24m spacing for lane lines may be sufficient in many cases) (d) short length of unbroken line (e) dividing line on all multilane undivided roads
(B) General comments	
1	Arrow indicate direction of traffic
2	Code used for raised pavement marker types (a) **NW** = Non-retro-reflective white (b) **W** = Mono-directional retro-reflective white (c) **Y** = Mono-directional retro-reflective yellow (d) **YY** = Bi-directional retro-reflective yellow (e) **R** = Mono-directional retro-reflective red

Figure 15.10: Application of Raised Pavement Markers

Line Type	Use	Dimensions (m) (for dimensions shown by * see marker spacing column)	Raised Marker Type	Marker Spacing (*) (m)	
				Normal Spacing (α)	Alternative Spacing (β)
EDGE LINES					
E1	Left hand edge line on general purpose road		R	24	12
E2	Left hand edge line on Freeway/Motorway		R	24	12
E3	Right lane edge on divided carriageway		Y	24	12
E4	Outline of traffic island or freeway ramp gore		Y R	12	12
E5	Outline of painted median		YY YY	12	12
E6	Line applied to incline face of the median kerb		Not required	–	–
TURN LINES					
T1	Defines turning paths at complex intersections		Not required	–	–

(A) Explanation of symbols	
(α)	(a) on unlit roads generally
(β)	(a) substandard curves or curves 400m in radius or less (b) dividing (barrier) lines on approaches to median ends (c) roads with street lighting meeting AS 1158.1 (except that 24m spacing for lane lines may be sufficient in many cases) (d) short length of unbroken line (e) dividing line on all multilane undivided roads

(B) General comments	
1	Arrow indicate direction of traffic
2	Code used for raised pavement marker types. (a) **NW** = Non-retro-reflective white (b) **W** = Mono-directional retro-reflective white (c) **Y** = Mono-directional retro-reflective yellow (d) **YY** = Bi-directional retro-reflective yellow (e) **R** = Mono-directional retro-reflective red.

Figure 15.11: Application of Raised Pavement Markers

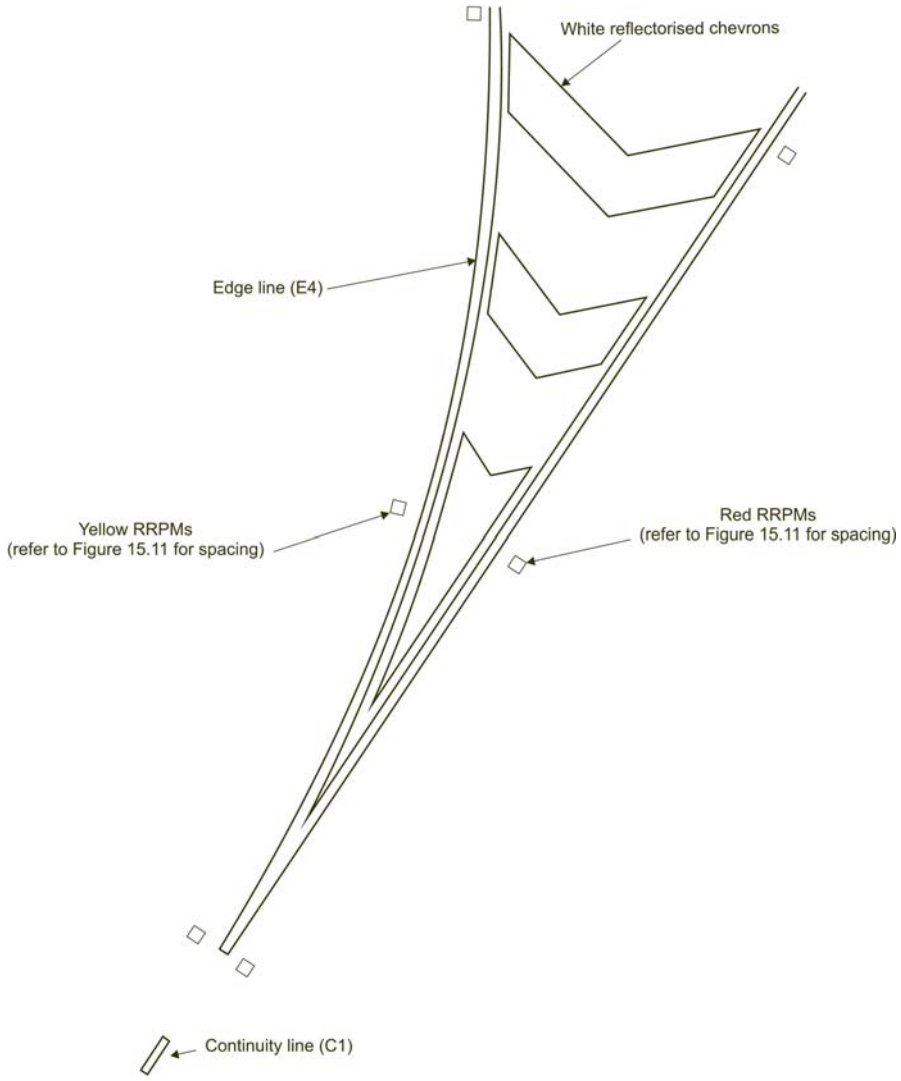


Figure 15.12: Application of Raised Pavement Markers
(Dimensions are in mm unless otherwise stated)

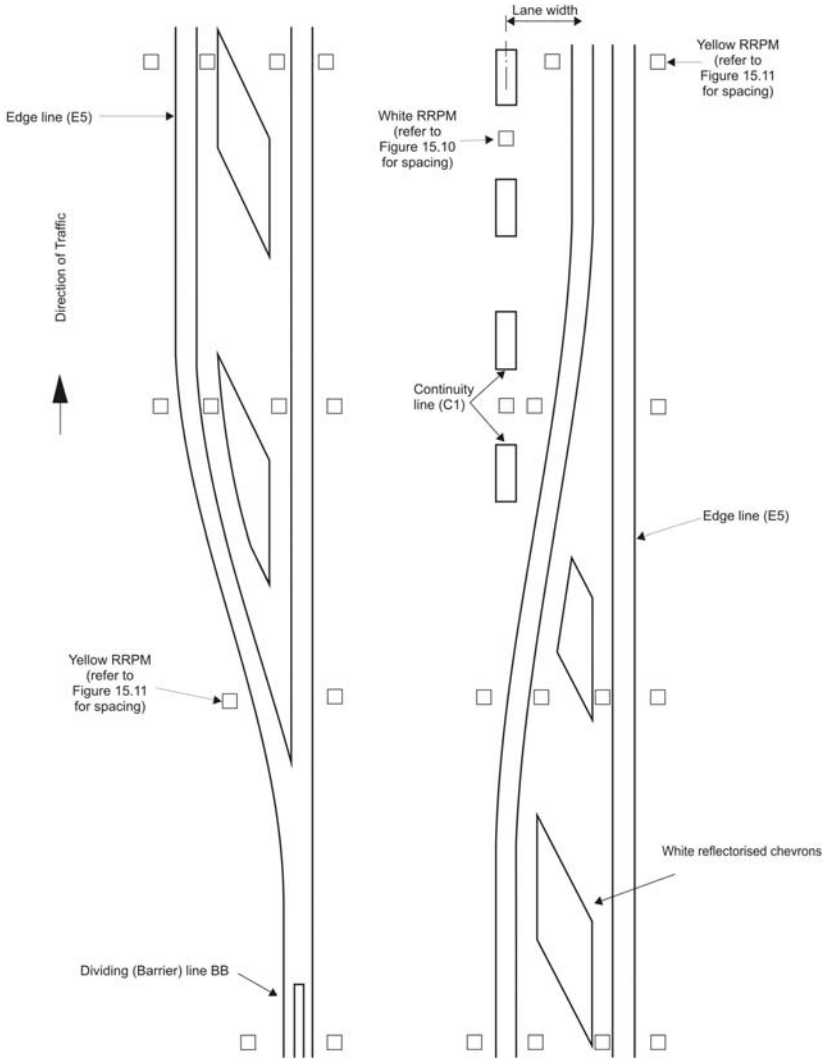


Figure 15.13: Application of Raised Pavement Markers
(Dimensions are in mm unless otherwise stated)

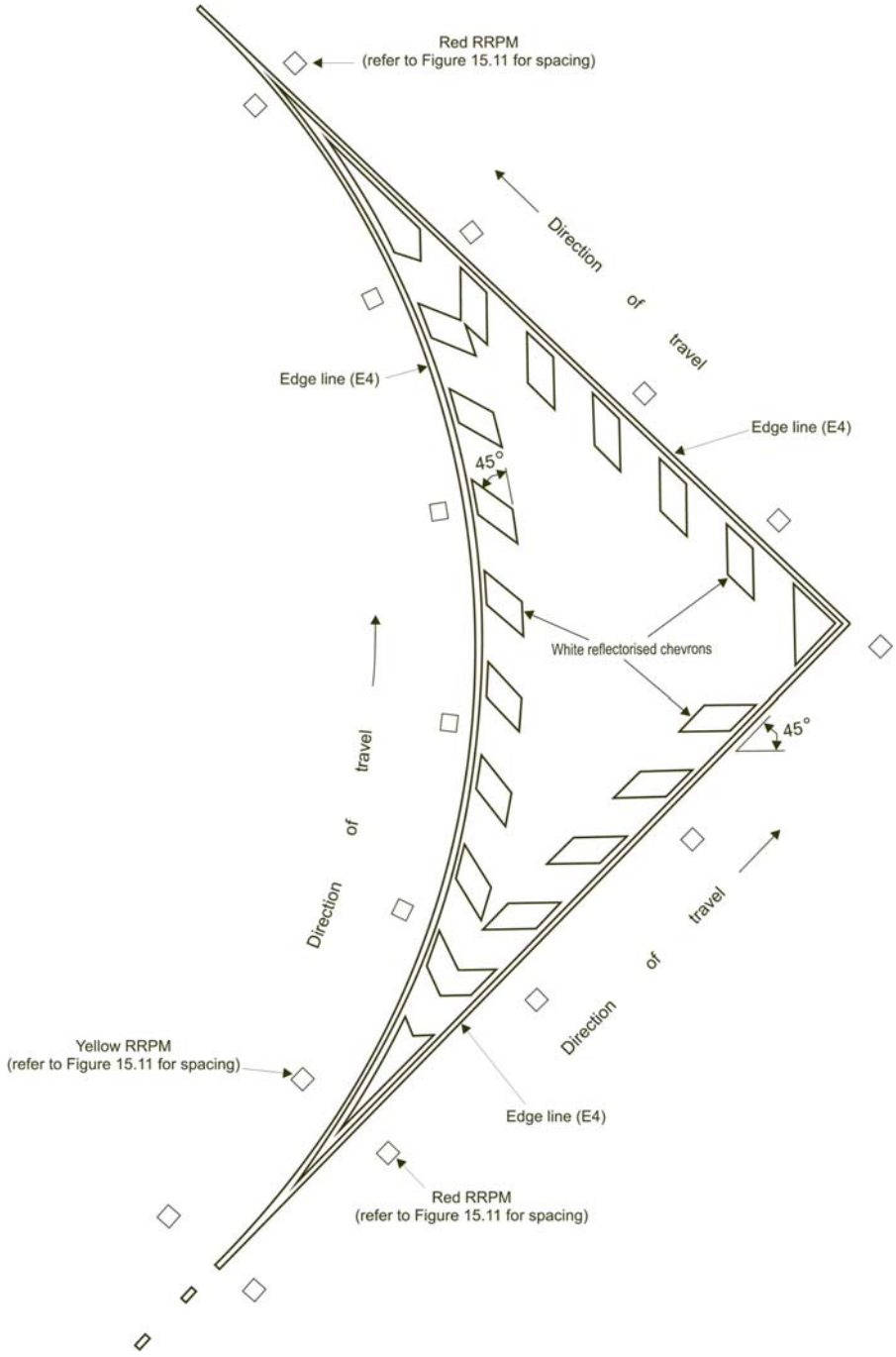


Figure 15.14: Application of Raised Pavement Markers
(Dimensions are in mm unless otherwise stated)

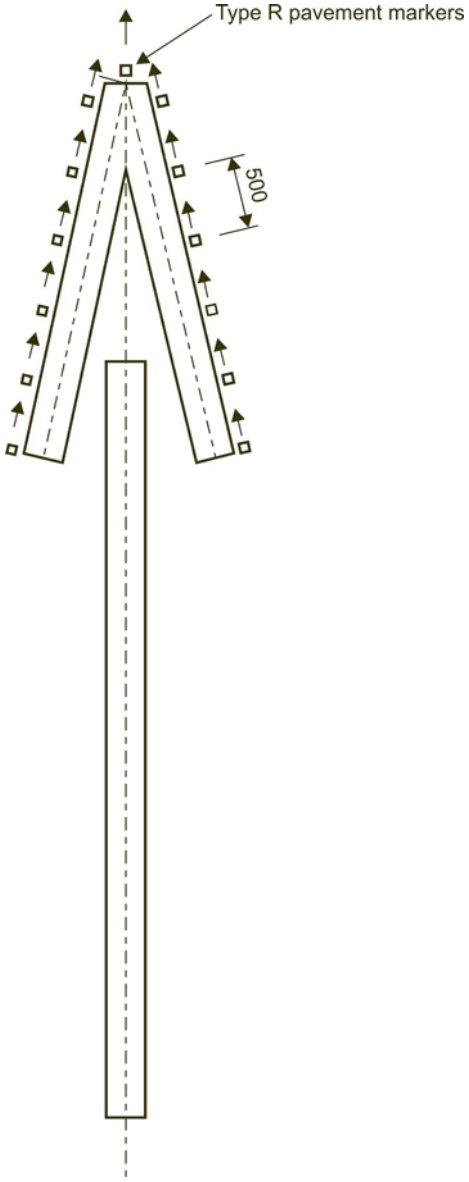


Figure 15.15: Application of Raised Pavement Markers
(Dimensions are in mm unless otherwise stated)

15.10 Maintenance of raised pavement markers

Retro-reflectivity of RRPMs drops to 1/20 to 1/50 of its initial value within a month due to factors such as build-up of road film and surface abrasion. However it remains relatively constant and adequate after large initial loss. Raised pavement markers should be maintained at an acceptable level in terms of their retention on the pavement surface and visibility (retro-reflectivity).

RRPMs should be maintained or replaced when their condition and functional performance have fallen below the satisfactory level. In other words, the condition of the RRPMs throughout the network should be assessed and recorded. The maintenance of RRPMs is then carried out based on condition and need.

Condition ratings for pavement markers and the corresponding general descriptions are listed below:

Condition 1 – New or as new, functional

Condition 2 – Good condition, functional

Condition 3 – Limited life, functional

Condition 4 – Poor condition, limited life, program for maintenance

Condition 5 – Missing or dangerous, not functional, immediate replacement

Measurement criteria for RRPMs are shown in Table 15.3.

	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5
Generic Condition Description for Traffic Facilities Assets	New or As New, Functional	Good Condition, Functional	Limited Life, Functional	Poor Condition, Limited Life, Program for Maintenance	Missing or Dangerous, No Function, Immediate Replacement
Measurement Criteria for Reflective Raised Pavement Markers (RRPMs)	>10 mcd/lux for White; >5 mcd/lux for Yellow; >5 mcd/lux for Red; 0 consecutive RRPMs missing; 0 to 10% missing or at these reflectivity levels over any 300 m section (3 km section for rural areas)	>10 mcd/lux for White; >5 mcd/lux for Yellow; >5 mcd/lux for Red; 0 to 4 consecutive RRPMs missing; 10 to 20% missing or within reflectivity ranges over any 300 m section (3 km section for rural areas)	10 to 5 mcd/lux for White; 5 to 3 mcd/lux for Yellow; 5 to 2 mcd/lux for Red; 4 to 6 consecutive RRPMs missing; 20 to 50% missing or within reflectivity ranges over any 300 m section (3 km section for rural areas)	<5 mcd/lux for White; <3 mcd/lux for Yellow; <2 mcd/lux for Red; >6 consecutive RRPMs missing; >50% missing or within reflectivity ranges over any 300 m section (3 km section for rural areas)	<5 mcd/lux for White; <3 mcd/lux for Yellow; <2 mcd/lux for Red; >6 consecutive RRPMs missing; >50% missing or at these reflectivity levels over any 300 m section (3 km section for rural areas)

Table 15.3: Measurement criteria for condition rating

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Roads and Traffic Authority

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