

Supplement to AS 1742.2:2009

Manual of uniform traffic control devices
Part 2: Traffic control devices for general use

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1. Introduction

1.1 General

All road agencies across Australia are working towards greater consistency between States/Territories in how road networks are managed. In order to achieve this, the Austroads Guide to Traffic Management and Australian Standards relating to traffic management have been adopted to assist in providing that level of consistency and harmonisation across all jurisdictions. This agreement means that these Austroads Guides and the Australian Standards are the primary technical references.

Australian Standards AS 1742.2:2009 - *Manual of uniform traffic control devices – Part 2: Traffic control devices for general use* is a nationally agreed standards document outlining the use of traffic control devices on the road network and has been adopted by all jurisdictions, including VicRoads.

All jurisdictions will be developing their own supplement to clearly identify where its practices currently differ and to provide additional guidance to that contained within AS 1742.2:2009. This document is the VicRoads supplement and shall be read in conjunction with AS 1742.2:2009.

1.2 How to Use this Supplement

There are two key parts to this document:

- **Classification of Supplement Information:** this table classifies supplement information as a Departure, Additional Information or both. This information assists with identifying its hierarchy in relation to the Australian Standard.
- **Details of Supplement Information:** this section provides the details of the supplement information.
 - **Departures:** where VicRoads practices differ from the guidance in the Australian Standard. Where this occurs, these differences or 'Departures' will be highlighted in a box. The information inside the box **takes precedence** over the Australian Standard clause. The Australian Standard clause is not applicable in these instances.
 - **Additional Information:** all information not identified as a departure provides further guidance to the Australian Standard and is read and applied **in conjunction** with the Australian Standard clause.

Where a clause does not appear in the body of this supplement, the Australian Standard requirements are followed.

2. Classification of Supplement Information

The classification of each clause as a Departure, Additional Information or both is shown in the table below.

Clause	Classification
1.4.2	Additional Information
1.4.10	Additional Information
1.5	Additional Information
1.6	Additional Information
1.7.1	Additional Information
1.7.2.4	Additional Information
1.7.2.5	Additional Information
2.4	Additional Information
2.5.5 (a)	Additional Information
2.8.2	Additional Information
2.8.3	Additional Information
2.8.4	Additional Information
2.8.5	Additional Information
2.8.6	Additional Information
2.8.7	Additional Information
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2.9.2.3 (a)	Additional Information
2.9.3 (a)	Additional Information
2.11.2	Additional Information
3.1	Additional Information
3.4.2 (a)	Additional Information
3.4.2 (b)	Additional Information
3.4.2 (c)	Additional Information
3.4.3 (a)	Departure
3.4.3 (b)	Additional Information
3.5 (a)	Additional Information
3.5 (b)	Additional Information
3.5 (c)	Additional Information

Clause	Classification
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3.5 (d) (ii)	Additional Information
3.5 (e)	Additional Information
3.6 (a)	Additional Information
3.6 (b)	Additional Information
3.8	Departure / Additional Information
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4.2.4	Additional Information
4.2.4.1	Additional Information
4.2.4.2	Additional Information
4.2.4.3	Additional Information
4.2.4.4 (a)	Additional Information
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4.2.4.4 (d)	Additional Information
4.2.4.4 (f)	Departure / Additional Information
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4.6.6.1 (e)	Additional Information
4.6.6.1 (g)	Additional Information
4.6.6.1 (h)	Additional Information
4.6.6.2 (b)	Additional Information

Clause	Classification
4.6.6.3 (a)	Additional Information
4.6.6.3 (c)	Additional Information
4.6.7.1	Additional Information
4.6.7.2 (a)	Additional Information
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4.7.5.4 (d)	Additional Information
4.8.1 (a)	Additional Information
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4.11.2.9	Additional Information
4.11.2.10	Additional Information
4.11.2.17	Additional Information
4.11.2.18	Additional Information
4.11.3.4	Additional Information
4.11.3.5	Additional Information
4.13	Additional Information

Clause	Classification
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Clause	Classification
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Attachment B	Additional Information
Attachment C	Additional Information
Attachment D	Additional Information

Australian Standard requirements are followed for clauses not shown in this table.

3. Details of Changes

Clause 1.4.2 – Expressway type road (expressway)

The definition also includes roads with an M Route number.

Clause 1.4.10 – 85th percentile speed (V85)

In some situations, it may not be practical to use the 85th percentile speed (e.g. low speed environments). The posted speed limit will often be used instead of the 85th percentile speed.

Clause 1.5 – SPECIFICATION OF SIGNS, MARKINGS AND DELINEATORS

Road signs in Victoria shall be manufactured in accordance with VicRoads Standard Specification Section 860 - Manufacture of Road Signs (2014).

Clause 1.6 – RESPONSIBILITY AND AUTHORITY FOR INSTALLATION

Road Management Act 2004

The roads for which VicRoads is the coordinating road authority are declared as 'freeways' and 'arterial roads' under the Act. The roads for which a municipal council is the coordinating road authority are referred to as 'municipal roads'. There is a third category of public roads called 'non-arterial state roads' which are declared as such under the Act, and the coordinating road authority for these roads is usually a State government agency.

Section 37 of the Act determines which road authority is the responsible road authority for the road and the components of the road.

On freeways, VicRoads is the responsible road authority for the whole of the road reserve. On declared arterial roads, VicRoads is the responsible road authority for:

- the part of the roadway used by through traffic
- the roadside in a rural area.

On declared arterial roads, the relevant municipal council is the responsible road authority for:

- any part of the roadway not used by through traffic
- any service road
- the median (outer separator) between the roadway and the service road
- any pathway
- the roadside in an urban area.

On municipal roads, the relevant municipal council is responsible for the whole road reserve.

Section 37 (2) of the Act indicates that the responsible road authority for road-related infrastructure on a road is the responsible road authority for the roadway or pathway to which the road-related infrastructure relates. So, even though a sign on an arterial road may be located on the roadside for which a municipal council is responsible, VicRoads would be responsible for the sign if it relates to the roadway used by through traffic. Similarly, a sign at the side of a municipal road would be the responsibility of VicRoads if it relates to an intersection for which VicRoads is the responsible road authority.

These demarcations of responsibility are further clarified by the Ministerial Code of Practice - Operational Responsibility for Public Roads.

Road Safety (Traffic Management) Regulations 2009

The authority to install traffic control devices rests with the relevant road authority as described in the Road Safety (Traffic Management) Regulations 2009. Some signs, markings and devices which may be critical to road safety or traffic operation are listed in Schedule 1 of the regulations as Major Traffic Control Devices (Major TCDs).

Traffic Engineering Manual Volume 3 Part 2.2 provides more information the use and authorisation of Major TCDs.

Special approvals

Special approvals are required for the signs, devices and applications listed below. The reason for such a requirement is either that there is a special need to ensure a state-wide uniformity of practice in the use of these devices, or there is a financial or other resource restraint that may necessitate assignment of priorities. In either case compliance with any quantitative warrants or guides will almost always be a prerequisite for approval.

The approval of the Manager – Network Standards, is required for:

- Any departure from warrants, or substantial departures from guides or other specified applications.
- Any non-standard signs or devices.
- Naming of rest areas on rural freeways (refer to the VicRoads Supplement to AS 1742.6).
- Pavement word or symbol markings other than those listed.
- Use of raised pavement markers in lieu of painted lines on other than metropolitan freeways.
- Certain regulatory signs associated with freeways.

Installation of treatments affecting trucks

Any treatment that affects trucks on metropolitan roads may be referred to the Truck Operations Committee (TOC) prior to being approved by the road authority. This includes proposals for No Trucks signs (which are Major TCDs), Load Limit signs (which are not Major TCDs), road humps, slow points and any other devices or treatments that ban or restrict the passage of trucks.

Any treatment should be referred to the VicRoads Regional Director for agreement, before being approved by Council, if any element of the treatment does not comply with this Standard (or Supplement) or if there are any issues with the passage of buses and/or emergency vehicles.

On local roads, Council is responsible for all consultation with relevant stakeholders prior to approval being sought from VicRoads.

Under Schedule 11 of the Local Government Act 1989, a Council may prohibit or restrict vehicles of a certain size or weight from using a road. Although a Load Limit sign may be appropriate, the No Trucks sign should also be considered.

Note: The Truck Operations Committee is a committee chaired by VicRoads that provides advice on the impacts to industry and business in regard to truck restriction proposals. It seeks to ensure greater communication with local government, the general community, transportation providers and industry. All requests for No Truck signs are referred to the Truck Operations Committee prior to VicRoads approval.

The committee is comprised of representatives from VicRoads, the Victorian Transport Association, Transport Workers Union, Police, RACV, Municipal Association of Victoria, Local Government Professionals, Metropolitan Fire Brigade, Metropolitan Ambulance Service, Bus Association of Victoria and the community.

Clause 1.7.1 – Basic principles for all traffic control devices

A sign or device may be installed for one or more of the following reasons:

- A warrant or guide for the sign or device is given in this Supplement and is met at a particular site.
- There are external requests or pressures for the device. An engineering assessment is vital in such cases, to determine whether the device will have the desired effect, and that it will not merely add to an unnecessary or distracting proliferation of devices. The use of signs or devices not meeting a warrant or guideline should be carefully considered.

Clause 1.7.2.4 – Non-standard signs

Refer to Clause 1.8 in the Supplement to AS 1742.1 for requirements relating to non-standard signs.

Clause 1.7.2.5 – Excessive use

For the installation of signs, there must be a situation positively identifiable as a hazard to road users, and it must be subsequently apparent to a driver that it is a potential hazard:

- The potential hazard should not be one which is easily perceived by a driver under virtually all conditions.

- The degree of potential hazard must be assessed to be effectively reduced by use of a sign. This assessment includes expert judgement that a driver will be able to understand the nature of the hazard, and select an appropriate response, from the message on the sign.
- The sign must not be used to warn of possible illegal or negligent manoeuvres by other road users unless such manoeuvres are likely to occur frequently and unintentionally (in these cases, the problem should be rectified and the sign should only be regarded as a short term solution).
- Conditions giving rise to a hazard must occur frequently enough for the sign to be respected by drivers.
- Alternative and more effective means of eliminating the hazard are not economically or otherwise feasible at the time.

If any of the above points cannot be satisfied, use of the sign should be refused.

Clause 2.4 – APPLICATION OF DEVICES

For the selection of intersection controls for roads of different traffic function, refer to the VicRoads Supplement to Austroads Guide to Traffic Management, Part 6 (2013).

Intersection control signs and signals are Major Traffic Control Devices (refer to Volume 3 Part 2.2).

Detailed intersection design will include consideration of the appropriate design vehicle and checking vehicle, as well as the needs of other likely users, such as cyclists and pedestrians.

Clause 2.5.5 (a) – GIVE WAY (R1-2)

GIVE WAY signs should be provided at left turn slip lanes. In this situation, the sign is normally placed on the right hand side on the splitter island to maximise prominence.

GIVE WAY signs shall not be placed adjacent to freeway entry ramp tapers (i.e. a merge area).

Supplementary signs shall not be used with the GIVE WAY R1-2 sign.

Clause 2.8 – REGULATION OF MOVEMENTS AT INTERSECTIONS

No Motorcycle Lane Filtering and End No Motorcycle Lane Filtering



R6-V115



R6-V116

A No Motorcycle Lane Filtering sign (R6-V115) may be used to prohibit motorcycle lane filtering on a length of road in accordance with road rule 151B, where motorcycle lane filtering is likely to pose a risk to road users. It shall be accompanied by an End No Motorcycle Lane Filtering sign (R6-V116) at the end of the length of road to which the No Motorcycle Lane Filtering sign applies.

These signs may also be used at locations in between intersections to prohibit motorcycle lane filtering.

A No Motorcycle Lane Filtering sign may be installed to prohibit motorcycle lane filtering along a length of road where:

- There is a demonstrated crash history involving motorcyclists and either pedestrians or cyclists due to motorcycle lane filtering.
- There is a likely crash risk due to a high number of pedestrians and/or cyclists, and motorcyclists using the road in slow moving traffic.

A demonstrated crash history is where there is documented evidence of recorded crashes or near misses in the last five years involving motorcyclists and either pedestrians or cyclists. The crashes should be those that would have been prevented if motorcycle lane filtering was prohibited.

A likely crash risk area is a location that has a high level of pedestrian activity, a high volume of motorcycles (approximately 150 motorcycles per day or more), and where a road safety assessment indicates that lane filtering manoeuvres are likely to result in a crash.

Clause 2.8.2 – ONE WAY (R2-2) (L or R))

Another situation where sign R2-2 may be installed is to inhibit wrong way movements by traffic turning into divided roads. If there is no median opening (or outer separator opening), the sign is placed directly opposite the stem of the T-intersection.

The R2-2 sign should also be located to face driveways onto a divided road, where there is no median break and where it is likely the driveway will be used by unfamiliar drivers (typically at commercial or community facility driveways).

Clause 2.8.3 – KEEP LEFT and KEEP RIGHT (R2-3 (L or R))

The KEEP LEFT sign R2-3(L) shall not be installed:

- On the left of a road for the purpose of directing traffic to drive to the left.
- Part way along an island to the right of drivers, to delineate the edge (hazard markers may be used for this purpose).

The KEEP RIGHT sign (R2-3(R)) has only very limited application (e.g. in conjunction with a supplementary exemption sign at the start of a separate bus carriageway). Care should be exercised in any design involving a KEEP RIGHT sign to ensure that it will not be mistaken for a KEEP LEFT sign.

Clause 2.8.4 – NO ENTRY (R2-4)

A supplementary sign may be used in conjunction with a R2-4 sign where:

- entry to a roadway is restricted to certain classes of users but not others (e.g. BICYCLES EXCEPTED)
- the restriction is time-based and an internally illuminated sign is not warranted.

The R2-4 sign shall not be used to prohibit wrong way movements into a divided carriageway unless the divided road is a freeway and/or M Route. ONE WAY signs (R2-2) and KEEP LEFT signs (R2-3(L)) should be provided for this purpose.

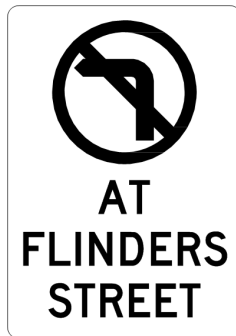
Signs may be duplicated if potential entering traffic may approach from more than one direction or if a pair of signs (i.e. one on each side of the carriageway) would make it easier to determine which the applicable carriageway is.

The sign is covered in rule 100 of the Road Safety Road Rules 2009.

Clause 2.8.5 – Turn prohibition signs (R2-5, R2-6 and R2-7)

Advance signing of turn bans

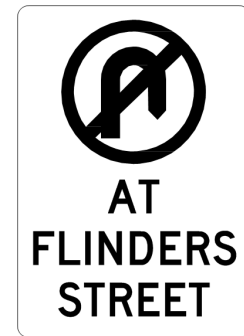
If advance signing of a turn ban at an intersection is required, then the R2-V126(L), R2-V126(R) or R2-V127 signs shall be used. A black annulus is used instead of red and the name of the road to which the restriction applies is included on the sign. The sign should be installed a minimum of 100 m from the intersection to ensure drivers are given sufficient warning of the restriction.



R2-V126(L)



R2-V126(R)



R2-V127

The internally illuminated versions of the above signs are within a square or circular enclosure comprising a white symbol with white annulus and slash on a black background.

No Right / Left Turn, No U-Turn

The No U-Turn sign (R2-5) shall also be used at each urban freeway median opening for emergency and maintenance vehicle use (refer to Clause 4.13.7 of this Supplement).

At other intersections or driveways where a turn is prohibited, the appropriate R2-6 sign should be used unless other signs such as No Entry (R2-4) or One Way (R2-2 or R2-17) or the alignment of the roadway makes the prohibition obvious.

Where the road alignment or layout makes it ambiguous which road is 'on the right', care should be exercised in the use of an R2-6(R) sign. If the sign is required in such cases, a supplementary sign (e.g. 'INTO JONES STREET') may be required.

The sign is covered in rule 91 of the Road Safety Road Rules 2009.

Clause 2.8.6 – LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) (R2-9)

The sign is located beside or above the lane to which it refers and where it can be identified with the intersection and is installed:

- Alongside the second arrow if the lane is more than 30 m long
- At further intervals up to 80 m if the lane is more than 100 m long.

A supplementary sign may also be used in conjunction with sign R2-9 to direct the second lane from the kerb of two turn lanes into a separate road or separate carriageway (e.g. 'INTO CENTRE LANES'). In this case, supporting pavement arrows should be distinctively different to those adjacent lanes, i.e. straight ahead arrows angled at say 15 degrees or combination arrows if a turn is permitted into two separate roads.

Clause 2.8.7 – All Traffic Turn (left or right) (R2-14)

This sign or any other regulatory or traffic instruction sign comprising an arrow and the word ONLY shall not be installed beside or over a lane to indicate that traffic in only one lane, rather than all lanes, must travel in the direction indicated. In these situations, individual turn lanes are indicated most typically by pavement arrows.

Where a trap lane or other confusion may arise, signing should be provided using LEFT (RIGHT) LANE MUST TURN LEFT (RIGHT) sign R2-9 (side mounted), or an overhead or side mounted sign with arrows in the style of the G9-43 guide sign (refer to Clause 2.3 of AS 1742.15:2007).

A combined version of this sign may be used on a single lane approach where traffic is permitted to turn left or right but not to proceed straight ahead. However, a combined sign should not be used where there is more than one approach lane.

Clause 2.8.10 (a) – Time of Operation module (R9-1)

Day(s) of operation listed on a sign do not apply on public holidays as per rule 318(3) of the Road Safety Road Rules 2009. For the day(s) of operation displayed to be applicable on public holidays,

the words 'public holidays' or approved abbreviation as per the Road Safety Road Rules 2009 shall be used.

Use of such words shall be limited to special needs following consultation with affected users. The use of 'public holidays' on such signs requires the approval of Director – Network Policy and Standards.

Where used, the words should appear on a separate supplementary sign located under the parent sign.

Clause 2.8.10 (b) – Exception plates

Rule 317 of Road Safety Road Rules 2009 allows the responsible road authority to make inscriptions on signs limiting the operation of the sign in relation to classes of vehicles. A common example of this is a No Entry sign on a street with 'Bicycles Excepted' added to allow access to the street via a bicycle lane or path.

Schedule 2 of the Road Safety (Traffic Management) Regulations 2009 indicates that the erection of a sign included in Road Safety Road Rules 2009 which has an inscription limiting its operation in respect to classes of persons or to classes of vehicles, is a Major Traffic Control Device and approval of the sign is not delegated to Councils. VicRoads must approve the use of these signs.

Use of a legend which limits the application of a traffic sign described in rule 318 of the Road Safety Road Rules 2009 in respect of classes of persons or classes of vehicles makes the sign or combination of signs a Major Traffic Control Device, which requires the approval of VicRoads as set out in Traffic Engineering Manual Volume 3, Part 2.2 – Authorisation of Traffic Control Devices.

In Victoria, the following additional supplementary signs may also be used:

- OVER x.x t (R9-V107-1) - to indicate a mass limit greater than the standard limit (refer to AS 1742.12:2000)
- OVER x.x m WIDE (R9-V107-2) - to indicate a width limit (refer to AS 1742.12:2000)
- OVER xx m LONG (R9-V107-3) - to indicate a length limit (refer to AS 1742.12:2000)
- TRAMS EXCEPTED (R9-V106).



R9-V107-1



R9-V107-2



R9-V106

The supplementary sign TRAMS EXCEPTED (R9-V106) is used at traffic signals where the tram operates in its own right of way and is excepted from the red signal display at pedestrian signals.

Table 2.3 – STOPPING SIGHT DISTANCE ON LEVEL SEALED PAVEMENTS

DEPARTURE

In the note to Table 2.3, the reference to 'Rural Road Design, Austroads, 2003' should now be 'Section 5.3 of Austroads Guide to Road Design Part 3 (2010)'. The Austroads Rural Road Design document has been superseded by the Austroads Guide to Road Design Part 3.

Clause 2.9.2.2 (a) – Crossroad (W2-1, W2-15)

The W2-1 sign can be used on rural freeways to warn drivers of the presence of an at-grade intersection. The appropriate sign shall be installed 500 m in advance of an intersection, together with a Distance ... m sign (W8-5). The signs should be erected on both sides of each carriageway. The C size assembly is used for this case.



Clause 2.9.2.2 (b) – Side Road Intersection (W2-4)

This sign can be used on rural freeways to warn drivers of the presence of an at-grade intersection. The appropriate sign shall be installed 500 m in advance of an intersection, together with a Distance ... m sign (W8-5). The signs should be erected on both sides of each carriageway. The C size assembly is used for this case.



Clause 2.9.2.2 (c) – Staggered Side Road Intersection (W2-8)

If separation between side road centre lines is less than 10 m, the cross road symbolic warning sign W2-1 is used instead of sign W2-8.

Clause 2.9.2.3 (a) – T-intersection, Straight Approach (W2-3)

The W2-V112-1 and W2-V112-2 (symbolic divided road) sign may only be used instead of a W2-3 sign only on a side road which approaches a divided road, and the geometry of the intersection is such that it may not be apparent to an approaching driver that the road about to be entered is divided, and there is potential for wrong way movements to occur.



W2-V112-1



W2-V112-2

Clause 2.9.3 (a) – Roundabout Ahead (W2-7)

In Victoria, the roundabout diagrammatic advance direction sign G1-V5 is generally used instead of sign G1-5.

Clause 2.11.2 – Sight boards

Additional mounting arrangements for sight boards can be found in Figure 1.

The assemblies comprise one or more hazard markers displayed, as illustrated in Figure 1 (Types 1 to 5), together with intersection direction signs in accordance with Clause 2.6 of AS 1742.15:2007 (also shown on Figure 1, as illustrations of typical assemblies only). A guide to the use in rural areas of the various types illustrated is given in Table 1.

The assembly should be located so that as far as practicable, it is directly in front of the driver and visible over the last 100 to 300 m (depending on approach speed) of the approach to the intersection. Where there is a curve in the terminating road just before the intersection, the sight board may need to be offset to improve its visibility.

The normal mounting height is 1 m to underside of the hazard markers, but the whole assembly may need to be raised if there is a crest in the terminating road just before the intersection.

Table 1: Guide for the selection of T-intersection sight boards in rural areas

T-JUNCTION SIGHT BOARD TYPE (Figure 1) (1)	SIDE (TERMINATING) ROAD APPROACH CONDITIONS		
	TRAFFIC VOLUME (AADT)	APPROACH SPEED (km/h)	APPROACH ALIGNMENT
Type 1	< 100 vpd	< 90	Straight
Type 2	< 100 vpd	> 90	Straight
Type 3	< 100 vpd	< 90	Curve or crest
	> 100 vpd	< 90	Straight
Type 4	100 - 600 vpd	> 90	Straight
Type 5	100 - 600 vpd	> 90	Curve or crest
	> 600 vpd	> 90	All cases

Notes: Refers only to display of hazard markers. Direction signs in Figure 1 are added as illustrations of typical assemblies only.

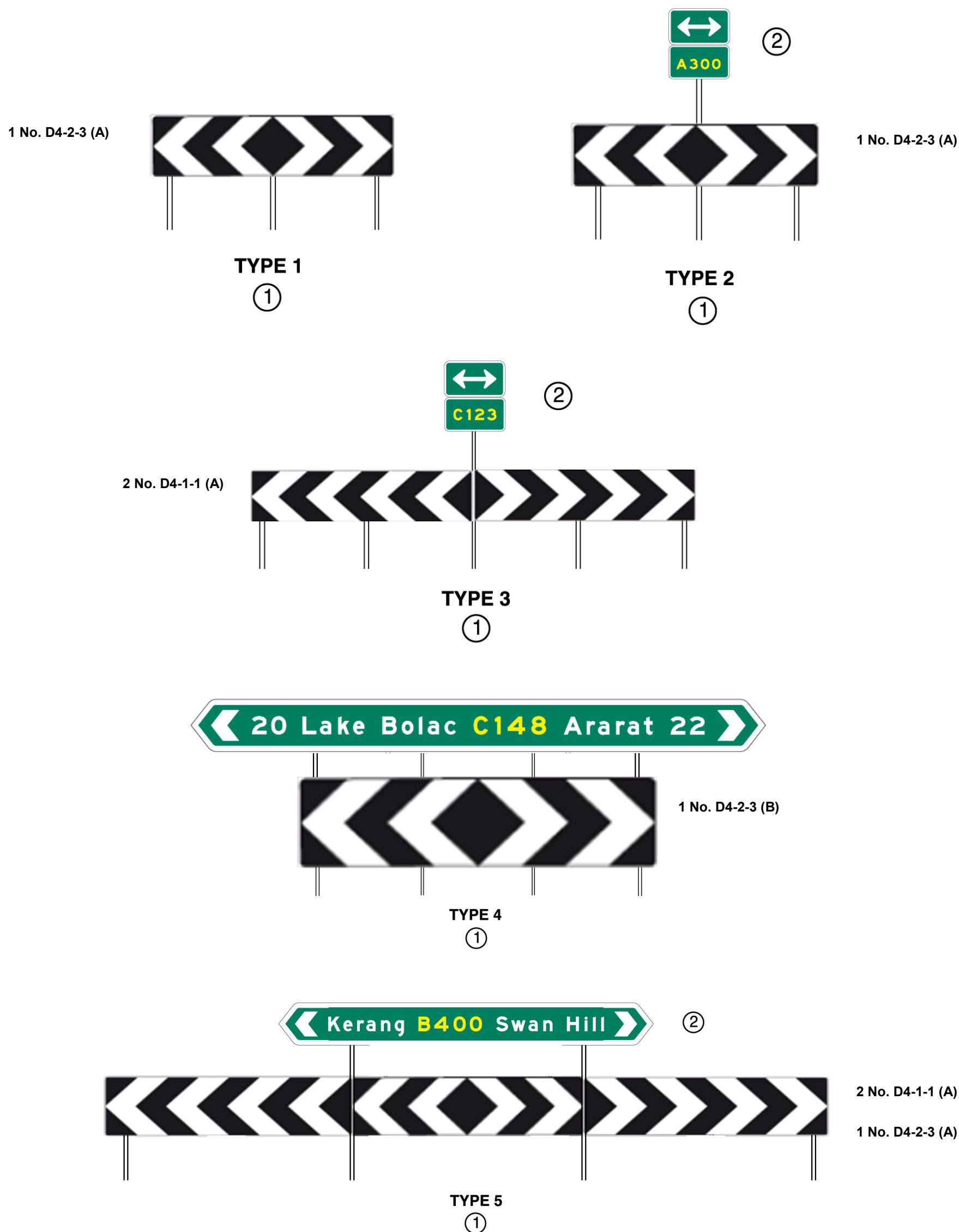


Figure 1: T-intersection sight boards (guides for use of each type given in Table 1)

Notes to Figure 1:

1. 'Type No.' refers to hazard marker assembly only.
2. Intersection direction signs or free standing route number signs with arrow plate should be provided in accordance with AS 1742.15 (and Supplement).

Clause 2.12 – TYPICAL ARRANGEMENT DIAGRAMS FOR INTERSECTIONS

The following figures provide additional information regarding the signing and marking treatments for the various intersection types in Victoria. They may be used in conjunction with the Figures in Clause 2.12 of AS 1742.2:2009 and where there are differences, the Victorian figures in this Clause generally take precedence.

These figures show direction signs in outline only. Direction sign treatments for these intersection layout examples are given in the VicRoads Supplement to AS 1742.15.

The Victorian versions of AS 1742.2 Clause 2.12 figures are:

Figure 2.3 – Major rural intersection:

- Figure 2 of this Supplement

Figure 2.4 – Minor rural intersection — curved approach:

- Figure 3 of this Supplement

Figure 2.5 – Major urban intersection with signals:

- Figure 4 of this Supplement

Figure 2.6 – Major urban intersection with signals — divided road:

- Figure 5 of this Supplement

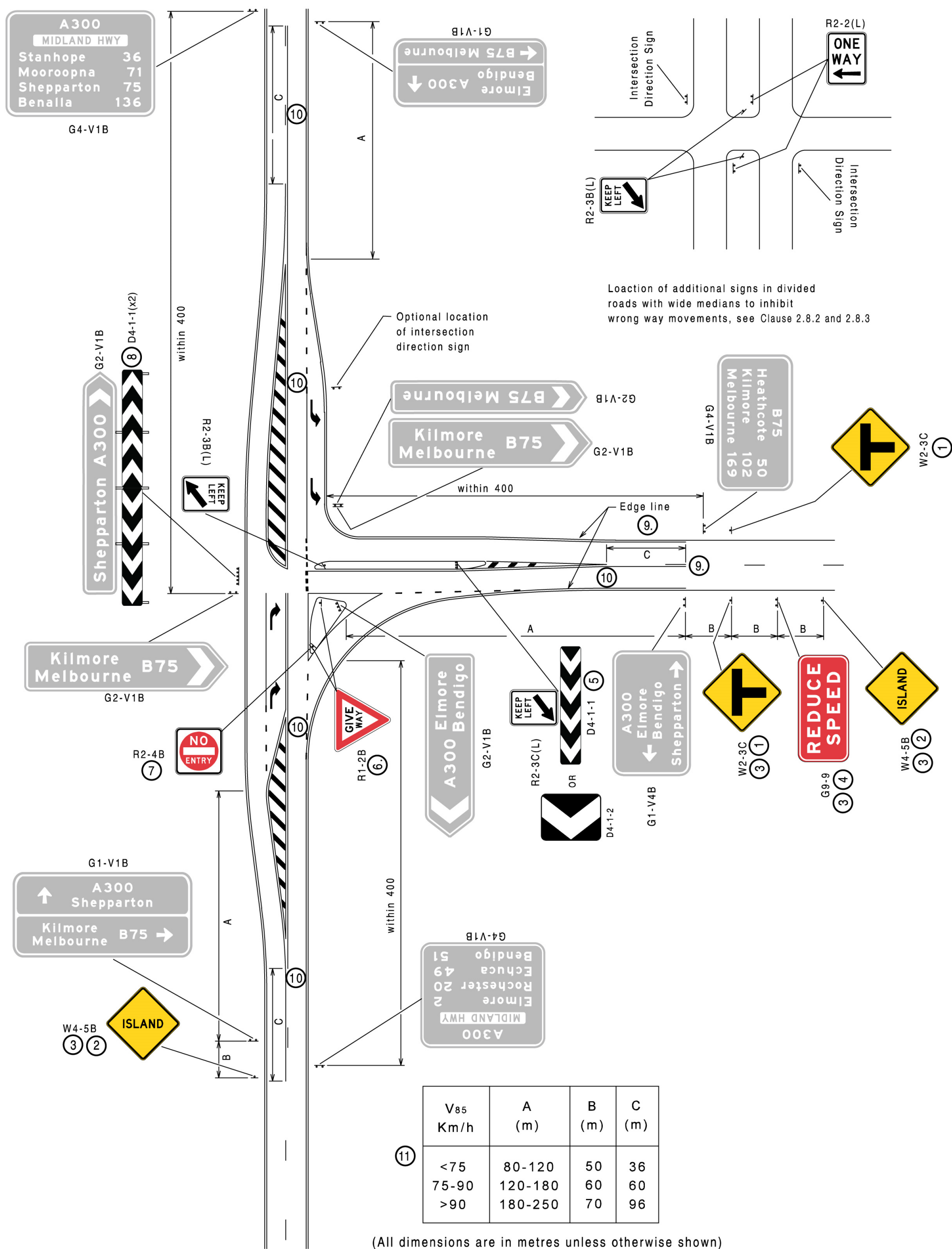


Figure 2: Major rural intersection

Notes to Figure 2:

- 1. Required only if excessive approach speed is a problem (refer to Clause 2.9.2.1 of the Supplement to AS1742:2 2009). A duplicate sign on the right hand side may be provided in accordance with Appendix D2.1 of AS1742:2:2009.**
- 2. Not required if visibility to the traffic island is satisfactory.**
- 3. These signs shall be sited so that visibility of the sign immediately beyond is maintained.**
- 4. Required only if excessive approach speed is a problem.**
- 5. Hazard markers may not be required if the Keep Left sign alone is sufficient to delineate the median end, refer to Clause 4.6.7.2(a) in AS 1742.2 and in this Supplement.**
- 6. Use C size GIVE WAY sign if required to improve delineation of conflict point. The sign may be duplicated if conspicuity of the sign is limited. A GIVE WAY sign should be used facing slip lane traffic, even though under the road rules, a driver turning left using a slip lane is required to give way (except to vehicles making a U-turn).**
- 7. Use NO ENTRY sign only if wrong way movement in turning roadway is likely to be a problem. The sign shall be located and/or angled so that it clearly applies only to the turning roadway. Relocation to the opposite side of the turning roadway may be necessary.**
- 8. T-intersection sight board Type 4 or 5 (refer to Clause 2.11.2 of this Supplement). Locate for best long distance visibility from the side road approach i.e. may need to be offset if the approach is curved, or raised if there is a crest in the side road approach.**
- 9. Where route is not edge lined continuously, edge lines are continued to nominal end of approach barrier line.**
- 10. All barrier lines, including painted island outlines, are supplemented with RRPMS. Refer to Clause 5.3.3 of AS 1742.2 and Clause 5.6.5 of this Supplement respectively for location and spacing.**
- 11. V85 = 85th intersection percentile approach speed measured 300 to 500 m in advance of the intersection.**

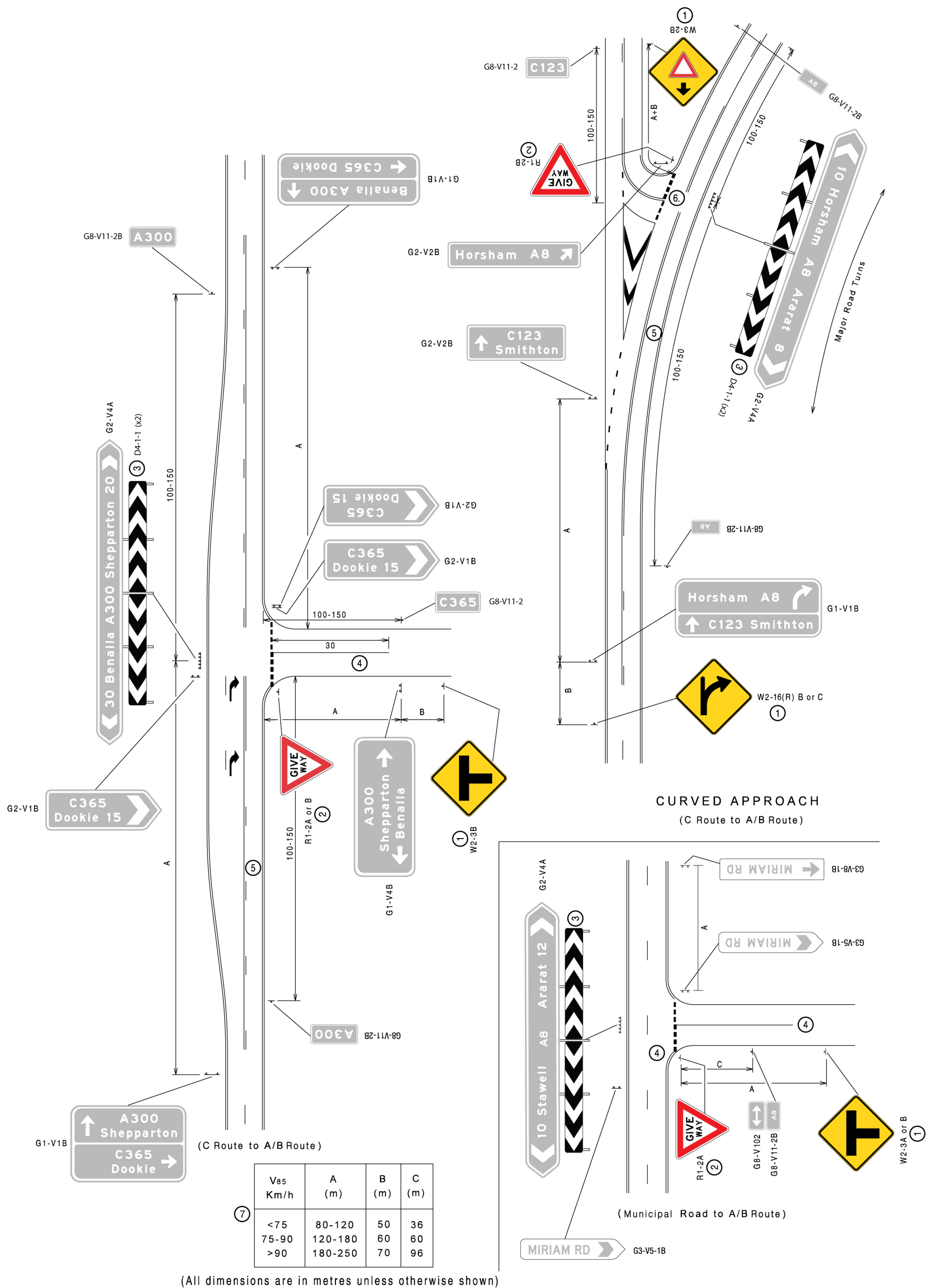


Figure 3: Minor rural intersection (including C Route intersection)

Notes to Figure 3:

- 1. Warning sign is not required if visibility of the intersection is satisfactory at distance A + B. Refer to Clause 2.9.2.1 of AS1742:2 2009 for guidelines for the use of this sign. These signs shall be sited so that visibility of the sign immediately beyond is maintained.**
- 2. Locate GIVE WAY sign as near to intersection as practicable consistent with long range visibility for side road traffic. Oversize sign may be required to improve delineation of the conflict area.**
- 3. T-intersection sight board selection from Clause 2.11.2 of this Supplement.**
- 4. Side road dividing line is not provided if seal width measured 10 m from give-way marking is less than 6 m, unless there is a curve or crest on the immediate side road approach. Marking may be extended if necessary on curved approaches.**
- 5. Barrier lines may be supplemented with RRPMs if night time delineation of the intersection is likely to be a problem even though the remainder of route is not treated continuously with RRPMs.**
- 6. A passing lane treatment on the major road may be required in this case.**
- 7. V85 = 85th percentile approach speed measured 300 to 500 m in advance of the intersection.**

Notes for Figure 4:

1. *Refer VicRoads Supplement to AS 1742.10 for advance warning requirements for zebra crossings.*
2. *A GIVE WAY sign should be used facing slip lane traffic, even though under the road rules, a driver turning left using a slip lane is required to give way (except to vehicles making a U-turn).*
3. *Mount KEEP LEFT sign on signal pedestal if practicable and angle towards right turning traffic.*
4. *All barrier lines and painted island outline markings to be supplemented with RRPMs. For layout and spacing, refer to Clause 5.6.5 of AS 1742.2:2009.*
5. *Where turns across the painted island are to be prohibited, a double barrier line may be used instead of a single barrier line, refer to Clause 5.5.1.4 of AS 1742.2:2009.*
6. *Where merge length is less than 50 m, the line pattern is the intersection continuity line (600 mm line, 600 mm gap, 150 mm wide). If greater than 50 m, use the standard continuity line (1 m line, 3 m gap, 100 mm wide). Refer to Clause 5.3.6 of this Supplement for further information.*
7. *Refer to Clause 5.5.2.3 of AS 1742.2:2009 and this Supplement for pavement arrow use, location and spacing.*
8. *Refer to Clause 5.6.5.3 of AS1742:2 2009 and Figure 61 in this Supplement for use of lane guidance markers within the intersection.*
9. *V85 = 85th percentile approach speed, measured 300 to 500 m in advance of the intersection. In urban areas where the measurement may not be practical or provide appropriate values, the posted speed limit may be used.*
10. *30 m (minimum) continuous lane lines are required prior to the stop line at traffic signals. Refer to Clause 5.3.4 (b) of this Supplement for further details.*

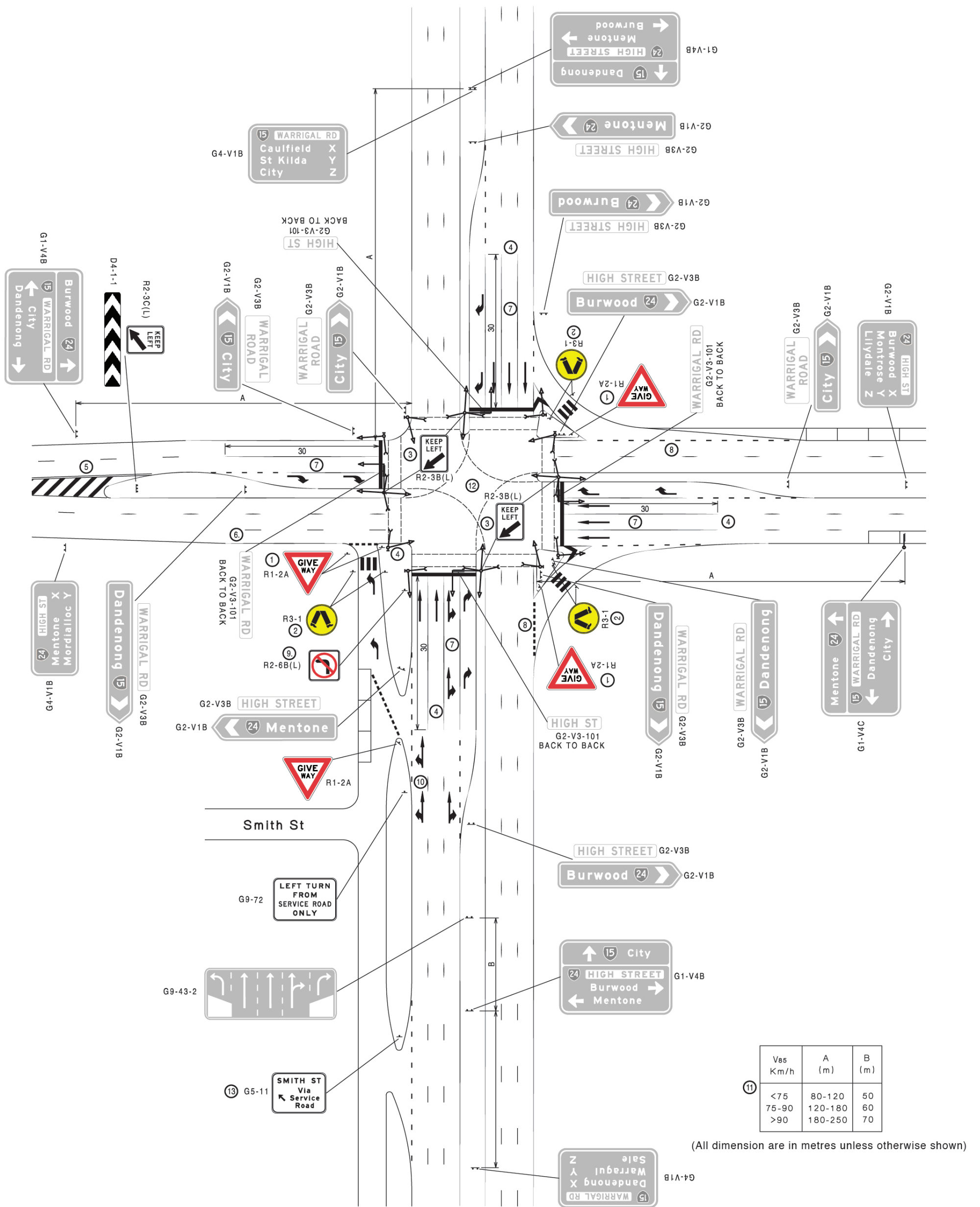


Figure 5: Major urban intersection (divided)

Notes for Figure 5:

- 1. A GIVE WAY sign should be used facing slip lane traffic, even though under the road rules, a driver turning left using a slip lane is required to give way (except to vehicles making a U-turn).**
- 2. Refer to the AS1742.9 and AS1742.10 (and the relevant VicRoads Supplements) for advance warning sign requirements for zebra crossings.**
- 3. Mount KEEP LEFT signs on signal pedestals where practicable, and angle towards right turners from side road.**
- 4. Continuous lane lines for through lanes, including those on curved approaches, should commence 30 m in advance of the stop line.**
- 5. Where turns across the painted island are to be prohibited, a double barrier line may be used instead of a single barrier line, refer to Clause 5.5.1.4 of AS 1742.2:2009.**
- 6. Continuity line is not provided in this case. Refer to Clauses 4.7.5.1 and 5.3.6 of this Supplement.**
- 7. Refer to Clause 5.5.2.3 of AS 1742.2:2009 and this Supplement for pavement arrow use, location and spacing.**
- 8. Where merge length is less than 50 m, the line pattern is the intersection continuity line (600 mm line, 600 mm gap, 150 mm wide). If greater than 50 m, use the standard continuity line (1 m line, 3 m gap, 100 mm wide). Refer to Clause 5.3.6 of this Supplement for further information.**
- 9. Install R2-6 (L) sign where compliance is unsatisfactory.**
- 10. Combination arrows are used in this case only in conjunction with the LEFT TURN FROM SERVICE ROAD ONLY sign.**
- 11. V85 = 85th percentile approach speed, measured 300 to 500 m in advance of the intersection. In urban areas where the measurement may not be practical or provide appropriate values, the posted speed limit may be used.**
- 12. Turn lines to be used in accordance with Clause 6.2.4 in the Supplement to AS1742:14 2014. Refer to Clause 5.6.5.3 of AS1742:2 2009 and Figure 61 of this Supplement for use of lane guidance markers within the intersection.**
- 13. Sign G5-11 should only be used in accordance with Clause 2.8.11 of AS1742:2 2009.**

Clause 3.1 – SCOPE OF SECTION

It should be noted that, where specified, a number of Clauses in Section 3 of AS 1742.2:2009 also apply to at-grade intersections on freeways and M Routes. Otherwise, the standard treatments specified in Section 2 of AS 1742.2 shall be applied to these intersections.

Clause 3.4.2 (a) – NO ENTRY (R2-4), WRONG WAY (GE9-15)

Signing arrangements are also shown in interchange figures in Clause 3.8 of this Supplement.

Use of this assembly is not restricted to freeways or exit ramps. Another common use of this assembly is at at-grade M Route intersections to reduce the risk of drivers inadvertently entering the wrong carriageway.

These assemblies should be located so that at least one is prominent in the field of view of a potential wrong-way driver approaching from any likely direction.

Clause 3.4.2 (b) – No Left Turn (R2-6(L)), No Right Turn (R2-6(R))

The use of these signs at freeway interchanges and intersections is illustrated in figures in Clause 3.8 of this Supplement.

Clause 3.4.2 (c) – WRONG WAY, GO BACK (G9-69)

The WRONG WAY - GO BACK sign (G9-69) is also used to inhibit wrong way movements by drivers inadvertently attempting to enter the wrong carriageway at a freeway or M Route at-grade intersection.

The WRONG WAY - GO BACK sign (G9-69) should only be used on freeways and M Routes.

Signing arrangements are shown in interchange figures in Clause 3.8 of this Supplement.

On freeway exit ramps, one of the signs is normally mounted back to back with the advance direction sign.

Clause 3.4.3 (a) – Classes of Traffic Prohibition (R6-13, GE6-2)

DEPARTURE

The Victorian versions of the R6-13 sign are the R6-V13-1, R6-V13-2 and R6-V13-3 signs. The wording on these signs supports the Victorian Road Rules.

Classes of Traffic Prohibition (R6-V13 series, GE6-2) (road access sign)

On urban freeways, it is normal to show only “pedestrians”, “bicycles” (unless they are specifically catered for by signing and/or other physical provisions) and “tractors” (R6-V13-1 sign).

On rural freeways, it is normal to show only “animals” and “agricultural machinery” (R6-V13-2 sign). Generally, bicycles are permitted on rural freeways and bicycle signing shall be provided, refer to VicRoads Supplement to AS 1742.9:2000. A R6-V13-2 sign is erected on any road which terminates at an intersection onto a rural freeway.

If bicycles are not permitted, it will usually be necessary to sign an alternative route. Pedestrians, tractors and horse drawn vehicles are generally prohibited, but their incidence of use is low and they are therefore not included on the sign.



R6-V13-1



R6-V13-2

These signs are generally installed at the beginning of an entrance ramp.

Where a freeway commences as a direct extension of a non-freeway road, the words “BEYOND THIS POINT” should be altered to “BEYOND THIS EXIT” (or “BEYOND THIS INTERSECTION”, if appropriate) and the sign is erected in advance of the exit or intersection.

As per rule 97(2) of the Road Safety Road Rules 2009, the restrictions imposed by signs R6-V13-1 and R6-V13-2 terminate at an END FREEWAY sign (R6-21) or at an assembly of a R6-V13 series signs with an END supplementary plate. For non-freeway roads, the restrictions end at the end of the road or at an assembly of a R6-V13 series signs with an END supplementary plate.

Sign GE6-2 is not generally used on the side road approach to a freeway unless there is high occurrence of prohibited classes of traffic turning into the freeway.

(Classes of traffic) MAY CROSS BUT NOT TRAVEL ALONG (R6-V13-3)

This sign shall be erected on each side road approach to a cross road intersection on a rural freeway, refer to Figure 15 in Clause 3.8 of this Supplement. This sign is mounted with the “START FREEWAY” sign.



R6-V13-3

Clause 3.4.3 (b) – START FREEWAY (R6-19), FREEWAY ENTRANCE (R6-20), END FREEWAY (R6-21)

The START FREEWAY sign (R6-19) is used at or near the start of a freeway generally where it is a continuation of an existing road.

The FREEWAY ENTRANCE sign (R6-20) should be located at the intersection of an entry ramp or other freeway access and an intersecting road to indicate that the ramp or other access leads to the freeway. It is normally applicable to freeway entrances part way along a freeway rather than at the start of a freeway. It is normally located under the Classes of Traffic Prohibition sign (refer to Clause 3.4.3 (a) of this Supplement).

Sign size depends on the speed of passing traffic. The smaller size is used where traffic speed is low, traffic is turning slowly or (for the END FREEWAY sign) where all traffic must slow down to make a turn off the freeway. Otherwise the largest size shall be used where traffic approaches and continues at high speed.

Use of these signs at interchanges, intersections and freeway terminals are shown in the figures in Clause 3.8 of this Supplement.

Tollways

On tollways, signs R6-V19-2, R6-V20-2 and R6-V21-2 shall be provided in similar locations as described above, for the start and end of tollway regulations. In this case the word FREEWAY shall

be replaced by TOLLWAY and the signs shall have a yellow legend and border on a blue background.



R6-V19-2



R6-V20-2



R6-V21-2

Clause 3.5 (a) – ONE WAY (R2-2)

Sign R2-2 is also used in the following situations to inhibit wrong way movements by traffic turning into divided roads (freeways and M Routes):

- If there is no median opening, the sign is placed directly opposite the stem of the T intersection. The R2-2 sign may also be located to face busy driveways onto a freeway/M Route, where there is no median break and where it is likely the driveway will be used by unfamiliar drivers.
- At wide median openings, especially in rural areas, there is potential for drivers entering the road to turn right (i.e. the wrong way) into the near carriageway. In such cases, the sign is placed in the median of the near carriageway, just to the right of the intersection, and is orientated to face the entering traffic.

Clause 3.5 (b) – LEFT LANE MUST EXIT (R2-19)

Where the exclusive (trap) lane is not a continuation of a through lane, the first R2-19 sign shall be located 100 m beyond the start of the added lane, so that drivers are not led to believe that the left through lane must exit.

Where the exclusive (trap) lane is a continuation of the through lane, the first sign is located at the start of the continuity line. An example of the use of this sign is illustrated in Figure 13, in Clause 3.8 of this supplement.

Clause 3.5 (c) – EMERGENCY STOPPING LANE ONLY (R5-58(L, R))

Exceptions to driving in an Emergency Stopping Lane

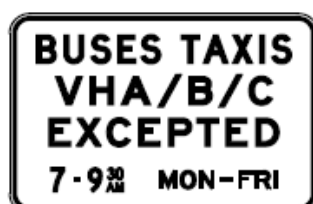
Rule 95 of the Road Safety Road Rules 2009 describes prohibitions of driving in a emergency stopping lane, and rules 177 and 178 describes prohibitions on stopping on a freeway except in a emergency stopping lane under certain conditions.

The signs shall also be placed just prior to an interchange structure on the right hand side where an emergency stopping lane is provided on the right hand side.

Where narrow medians exist and the standard size sign cannot be installed, smaller signs shall be provided.

An exception plate (R9-V101 series) shall be installed below the R5-58 sign where specific classes of vehicle are permitted to travel along the emergency lane (shoulder). For example, use of the shoulder by buses and taxis requires a plate stating “BUSES/TAXIS EXCEPTED”.

Where the use by specific classes of vehicles is limited to particular times of day or days of the week, those times or days shall be indicated on the plate. Note that the times shall not repeat “AM” or “PM” on any one line, to be consistent with signing practice for R5 and R9 series signs, refer to Clause 3.3.3 of AS 1742.11:1999.



R9-V101-3

The Excepted Vehicles MERGE RIGHT sign (GE9-V103) shall be used where these vehicles (e.g. buses and taxis permitted to use the left emergency stopping lane) are required to merge back into the left traffic lane in advance of an entry or exit ramp. Refer to Figure 6 in Clause 3.8 of this Supplement for typical layout of signs and markings.



GE9-V103

The use of emergency stopping lanes by bicycles (refer to AS 1742.9:2000) is permitted under the Road Rules under certain circumstances. In the case of urban freeways, the road access sign (R6-V13-1) at entry ramps prohibits cyclists from entering the freeway. Consequently, the "BICYCLES EXCEPTED" plate is not erected with the EMERGENCY STOPPING LANE ONLY signs.

Cyclists are generally permitted to use rural freeways by the exclusion of bicycles from the road access (R6-V13-2) signs. Although the Road Safety Road Rules 2009 allow cyclists to ride in emergency stopping lanes, "BICYCLES EXCEPTED" signs shall continue to be used on rural freeways in order to encourage cyclists to use the shoulder rather than the left traffic lane. This practice also informs motorists that cyclists are permitted to use the freeway.



R9-V101-1

Refer to Figure 6 below and Figure 7 and Figure 8 in Clause 3.8 of this Supplement for examples of the use of emergency stopping lane only signs and exception signs.

Figure 6 shows the layout of signs and markings for permitting buses and taxis to travel along an emergency stopping lane. Where this is permitted along the left shoulder, these vehicles must merge into the left traffic lane in advance of each entry or exit ramp. The use of the right emergency stopping lane for this purpose is not appropriate, due to difficulties and hazards with merging left, and in transferring passengers if buses break down. The exception would be a scheme that involves the provision of special ramps in the median so that buses are not required to merge left at all.

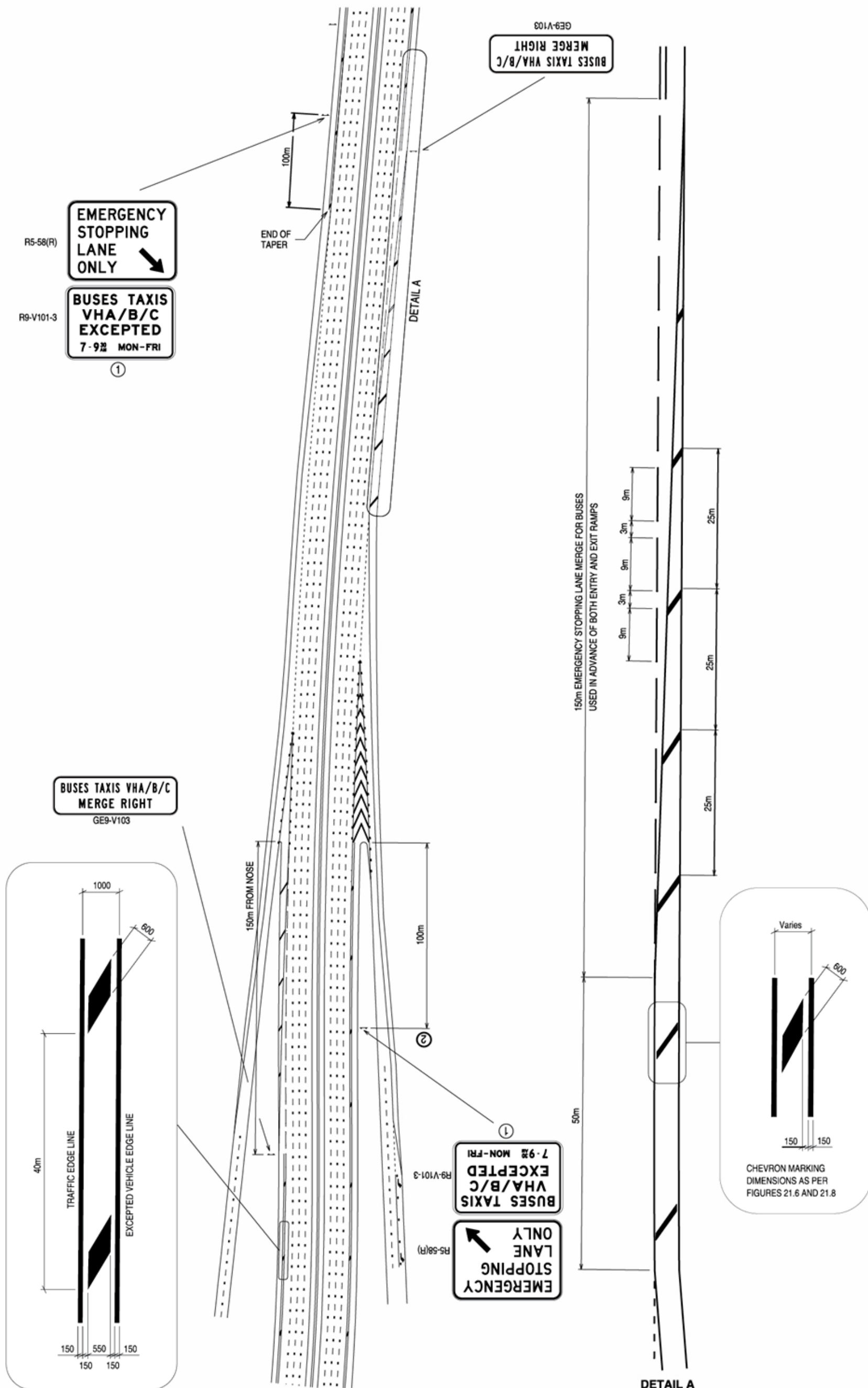


Figure 6: Signs and Markings for Excepted Vehicles to Use Emergency Stopping Lane

Notes to Figure 6:

1. *Preferred location of sign assembly, but may need to be repositioned to take account of other signing requirements near the end of the entry ramp taper.*
2. *This sign assembly should be omitted at full diamond interchanges due to the limited distance between exit and entry ramp noses. Location of sign may need to be repositioned to take account of other signing requirements.*

Clause 3.5 (d) (i) – Merging Traffic (W5-34)

The Merging Traffic sign (W5-34) shall be placed in the entry ramp nose area to indicate to drivers on both the ramp and the freeway that entering traffic is required to merge. The C size sign is used in this case.

It shall also be used at other locations where traffic is required to merge at common speed such as ramp to ramp connections. The B size sign would normally be used at these lower speed connections.

The former sign with the words “MERGING TRAFFIC” is no longer a standard sign and shall not be used.

Clause 3.5 (d) (ii) – Added Lane (symbolic) (W5-35), ADDED LANE (W8-26)



The more major carriageway shall always be indicated by the straight arrow on sign W5-35, whether or not that carriageway is straight.

On freeways, the assembly shall be used where two carriageways converge without any lanes merging and there is more than one added lane, unaltered, in the ramp nose area. Regardless of the actual alignment of the carriageways, the curved arrow shaft shall be located on the side of the entry ramp. The C size sign is used in this case.

Where traffic on a road turns left through substantially a right angle and joins a second road which continues for at least 200 m, the W5-35(L) sign may be rotated anticlockwise through 90 degrees and displayed to traffic before it makes the turn (if this would more efficiently convey the desired information). In this case a separate assembly with sign W5-35(L) in its more usual orientation should be erected to face traffic on the second road.

At a freeway entry or exit ramp terminal, the left turn lane past a left turn island may be designed to lead directly into an added lane in the intersecting road. In this situation, where the added lane is not obvious or expected, the W5-35/W8-26 assembly may be installed to face the left turning traffic only. In this case the W5-35 sign should be rotated anticlockwise through 90 degrees. The B size sign is normally used at ramp terminals.

The assembly shall not be installed at a two lane entry ramp where the right ramp lane merges. For the signing arrangement in this circumstance, refer to Figure 13 in Clause 3.8 of this Supplement.

Clause 3.5 (e) – EXIT SPEED x km/h (W1-9)

The EXIT SPEED sign (W1-9-1) is used to advise drivers leaving the freeway of the need to reduce speed to the value shown in order to negotiate a lower standard horizontal alignment, or a short exit ramp.

To assess the design speed value of a horizontal alignment, reference should be made to the Austroads Guide to Road Design Part 10 (2010), Section 7, and Part 4C (2009), Section 6.4, and the relevant VicRoads Supplements. As a guide, it is considered that ramps which have radii greater than 400 m should not require Exit Speed signs. Radii less than this would need to be assessed taking superelevation into account.

A sign shall be installed when the assessed speed value is 10 km/h below the exit design speed at the nose. The speed value shown on the sign shall be in multiples of 5 km/h.

Traditionally, an absolute minimum ramp length of 200 m and a desirable length equal to or greater than 300 m has normally been adopted in design. It is expected that all ramps would therefore be of sufficient length, negating the need for this sign (i.e. would satisfy deceleration lengths shown in Austroads Guide to Road Design).

It should be noted that the above does not take into account the possibility of traffic queues on the exit ramp that can occur during peak periods. Depending on the sight distance to the expected tail of queues, Exit Speed signs (or some other form of warning sign indicating that traffic queues may be encountered) may be appropriate.

At conventional interchanges, it is placed on the left side of the ramp opposite the exit nose. It may also be used on freeway to freeway connections where the advisory speed of the ramp is less than the speed limit of the freeway the driver is leaving.

Clause 3.6 (a) – END FREEWAY 2km (GE6-9), END FREEWAY 1 km (GE6-10)

The END FREEWAY 2 km sign (GE6-9) should be followed by a similar sign END FREEWAY 1 km (GE6-10). In urban areas it is normally adequate to use only the END FREEWAY 1 km (GE6-10) sign.

This sign is installed on the left hand side of the freeway. Where the freeway carriageway has two or more lanes, the sign shall be duplicated on the right side or be overhead mounted, see Appendix D of AS 1742.2:2009 for overhead mounting guidelines.

The REDUCE SPEED NOW sign GE9-3 is used in conjunction with this sign and is desirably located 500 m in advance of the freeway terminal.

Clause 3.6 (b) – REDUCE SPEED NOW (GE9-3)

The REDUCE SPEED NOW (GE9-3) sign is used in advance of the end of a freeway where there is a large difference in speed (e.g. a low speed limit or a stop condition) at the freeway terminal. It is desirably located 300 m to 500 m in advance of the end of the freeway. Where there are more than three lanes or added emphasis is desirable, it is repeated on the right side of the carriageway, or mounted overhead, refer to Figure 14 in Clause 3.5 (c) of this Supplement.

For the sign to be effective, drivers need to see a purpose for slowing down and therefore an END FREEWAY x km (GE6-9) sign should be placed upstream of the GE9-3 sign.

The sign may be used in advance of any other condition on a freeway where experience shows that some drivers are approaching at too high a speed for safety.

Clause 3.8 – SIGNS AND PAVEMENT MARKINGS AT INTERCHANGES AND TERMINALS

The following figures provide additional information regarding the signing and marking treatments for the various intersection types in Victoria. They may be used in conjunction with the Figures in Clause 2.12 of AS 1742.2:2009 and where there are differences, the Victorian figures in this Clause generally take precedence.

These figures show direction signs in outline only. Direction sign treatments for these intersection layout examples are given in the VicRoads Supplement to AS 1742.15.

DEPARTURE

The Victorian versions of the R6-13 sign are the R6-V13-1, R6-V13-2 and R6-V13-3 signs. The wording on these signs supports the Victorian Road Rules. Where a R6-13 sign is shown, the Victorian version of the sign shall be used instead.

Refer to Clause 3.4.3 (a) of this Supplement for further details.

The Victorian versions of AS 1742.2 Clause 3.8 figures are:

Figure 3.1 – Typical urban interchange:

- Figure 7 and Figure 8 of this Supplement

Figure 3.2 - Typical urban cross street with ramp treatment:

- Figure 10 of this Supplement

Figure 3.3 – Single lane exits and entrances:

- Figure 9 of this Supplement

Figure 3.4 – Two-lane exits and entrances:

- Figure 13 of this Supplement

Figure 3.5 – Trap lanes at expressway exits:

- Figure 13 of this Supplement

Figure 3.6 – Expressway terminals

- Figure 14 of this Supplement

Other Victorian figures include:

- Figure 11: Interchange with roundabout terminal
- Figure 12: Typical urban pavement markings at single lane exits and entries
- Figure 15: Rural freeway intersection at-grade

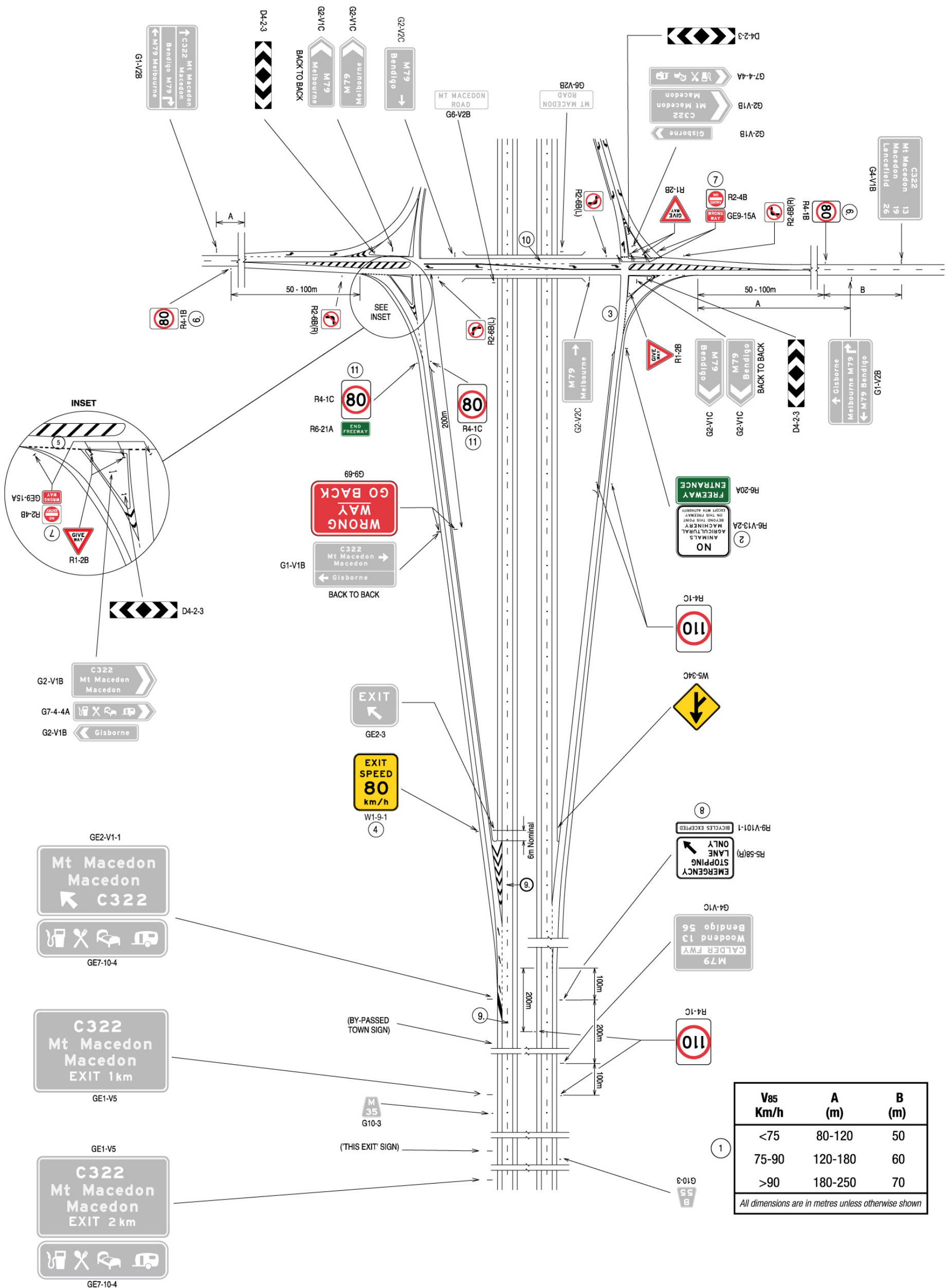


Figure 7: Typical rural interchange (diamond interchange)

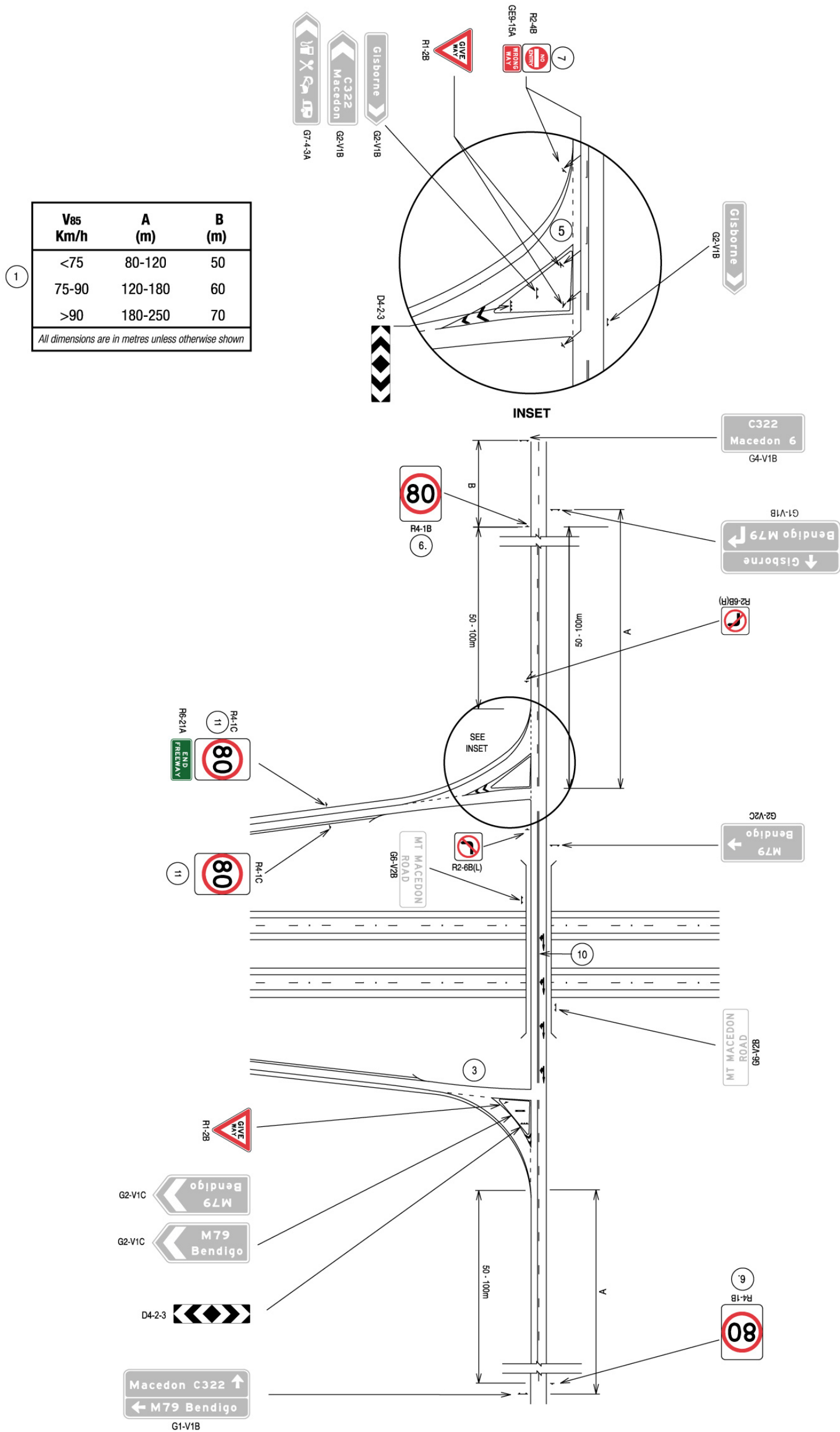


Figure 8: Typical rural interchange (half diamond)

Notes to Figure 7 and Figure 8:

- 1. *V85 = 85th percentile approach speed, measured 300 to 500 m in advance of the closest point to the interchange (e.g. start of off ramp).***
- 2. *This sign assembly may need to be located closer to the cross road and duplicated if necessary to permit drivers of prohibited classes of traffic to read the sign in time and to take appropriate action.***
- 3. *For multi-lane entry ramp, refer to Figure 10 and adopt the treatment used.***
- 4. *“EXIT SPEED” sign is used only if required (refer to Clause 3.5 (e) of AS1742:2 2009).***
- 5. *Where an added lane treatment is installed on a left turn slip lane, refer to Clause 3.5 (d) (ii) of this Supplement for further details.***
- 6. *For requirements and locations of repeater speed limit signs, refer to VicRoads Speed Zoning Guidelines.***
- 7. *These “No Entry, Wrong Way” signs must be sited and angled to cover all potential wrong way turning manoeuvres.***
- 8. *Exception plate shall be installed where specific classes of vehicle are permitted to travel along the emergency stopping lane. Refer to Clause 3.5 (c) of this Supplement.***
- 9. *Refer to the Clause 5.7 of AS 1742.2:2009 for pavement marking details at ramp noses and for “step out” exit line marking.***
- 10. *Where the cross road is divided, refer to Figure 10 and adopt the treatment used for the urban case.***
- 11. *Do not include R4-1 speed zone signs on the exit ramp if the speed zone on the surface road is more than 80 km/h.***

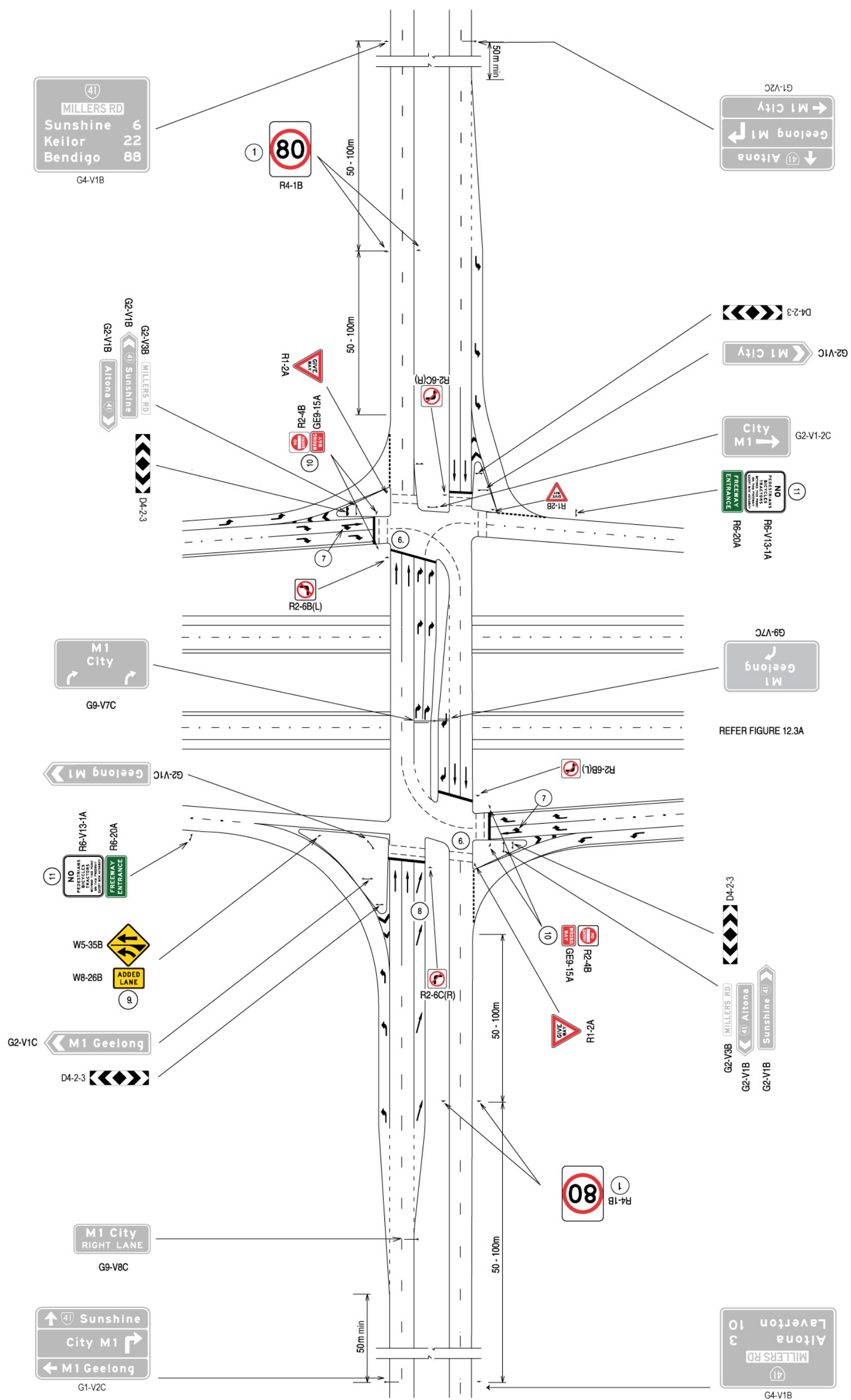


Figure 10: Typical urban interchange – cross road

Notes for Figure 9 and Figure 10:

- 1. For requirements and locations of repeater speed limit signs, refer to VicRoads Speed Zoning Guidelines.**
- 2. Refer to the Clause 5.7 of AS 1742.2:2009 for pavement marking details at ramp noses.**
- 3. “EXIT SPEED” sign is to be used in accordance with Clause 3.5 (e) of AS1742:2 2009.**
- 4. An exception supplementary sign shall be installed where specific classes of vehicle are permitted to travel along the emergency stopping lane. Refer to Clause 3.5 (c) of this Supplement.**
- 5. On an entry ramp, a continuity line and merge arrows at a lane drop are only provided where the position of the lane drop is difficult to see (refer to Clause 5.5.2.4 of AS1742.9:2009).**
- 6. If the intersection is not signalised, care is required that signs will not obscure intersection sight distance for turning traffic.**
- 7. Combination through and right turn arrow to permit through movement to opposite ramp.**
- 8. Where a right turn lane is provided in advance of an exit ramp, mark the auxiliary right turn lane with straight ahead arrows, angled at 15 degrees (1 in 4) to the alignment of the lane, to discourage straight ahead traffic from using it, but also to discourage right turns into the exit ramp. Beyond the exit ramp, mark the lane with right turn arrows.**
- 9. Where an auxiliary lane is provided and is not obvious, a W5-35/W8-26 “ADDED LANE” assembly may be installed to face left turning traffic (refer to Clause 3.5 (d) (ii) of this Supplement).**
- 10. These “No Entry, Wrong Way” signs must be sited and angled to cover all potential wrong way manoeuvres.**
- 11. This sign assembly may need to be located closer to the cross road and duplicated if necessary to permit drivers of prohibited classes of traffic to read the sign in time and to take appropriate action.**

Notes to Figure 11:

- 1. *V85 = 85th percentile approach speed, measured 300 m to 500 m in advance of the closest point to the interchange (e.g. start of off ramp).***
- 2. *Roundabout regulatory sign, R1-3, is generally located in the splitter island and repeated on the left side on cross road approaches and on both sides on ramp approaches.***
- 3. *Additional hazard marker installed under the KEEP LEFT sign may be required if the KEEP LEFT sign alone is not sufficient to delineate the median or splitter island, refer to Clause 4.6.7.2 (a) of this Supplement.***
- 4. *For requirements and locations of repeater speed limit signs, refer to VicRoads Speed Zoning Guidelines.***
- 5. *All barrier lines, including painted island outlines, are supplemented with RRPMS. Refer to Clause 5.3.3 of AS 1742.2 and Clause 5.6.5 of this Supplement respectively for location and spacing.***
- 6. *This sign assembly may need to be located closer to the cross road and duplicated if necessary to permit drivers of prohibited classes of traffic to read the sign in time and to take appropriate action.***

Notes to Figure 12:

- 1. Details of red, yellow and green RRPMS are not shown in Figure 12. Refer to Figure 68 for layout of red, yellow and green RRPMS on edge lines.**
- 2. On kerbed ramps, the 150 mm edge line usually stops where the shoulder no longer exists and beyond which standard lane widths apply. Where the edge line continues adjacent to the kerb to enhance delineation, a clear distance of 300 mm is provided from face of kerb or just clear of the lip of channel. On unkerbed ramps, the 150 mm edge line is located at the edge of the running lane and is generally not less than 1 m clear from the edge of seal.**
- 3. Step-out markings are provided at rural exits; see Figure 68 and Clause 5.7.4 of AS 1742.2:2009.**
- 4. For the spacing of RRPMS at the exit ramp nose, refer to Clause 5.7.2 of AS 1742.2:2009.**
- 5. The gantry or cantilever is preferably placed at the start of the ramp taper. However, it may need to be relocated back towards the gore area (limited to half way along the gore area) in cases where:**
 - The exit direction sign is too wide to be positioned over the left hand lane (refer to Clause 3.4 of AS 1742.15:2007)**
 - Additional signs are required, e.g. for closely spaced exits or the left lane ends immediately downstream of the exit ramp (see Figure 26).**
 - See AS 1742.15:2007 for conditions where a cantilever or side mounted sign is permitted.**
- 6. Location of side mounted exit direction sign, where provided.**
- 7. On the entry ramp, continuity line and merge arrows at a lane drop are only required where the position of the lane is difficult to see, refer to Clause 5.5.2.4 of AS 1742.2:2009.**
- 8. Red RRPMS installed along the edge of the left shoulder shall commence on the left side of ramp opposite the ramp nose.**
- 9. In exceptional circumstances, chevron markings may be provided between the through lane and the entering ramp, i.e. to promote lane discipline where there is a wide expanse of pavement. The chevron markings shall be the same width and spacing as for the exit ramp with the chevron angle reversed.**

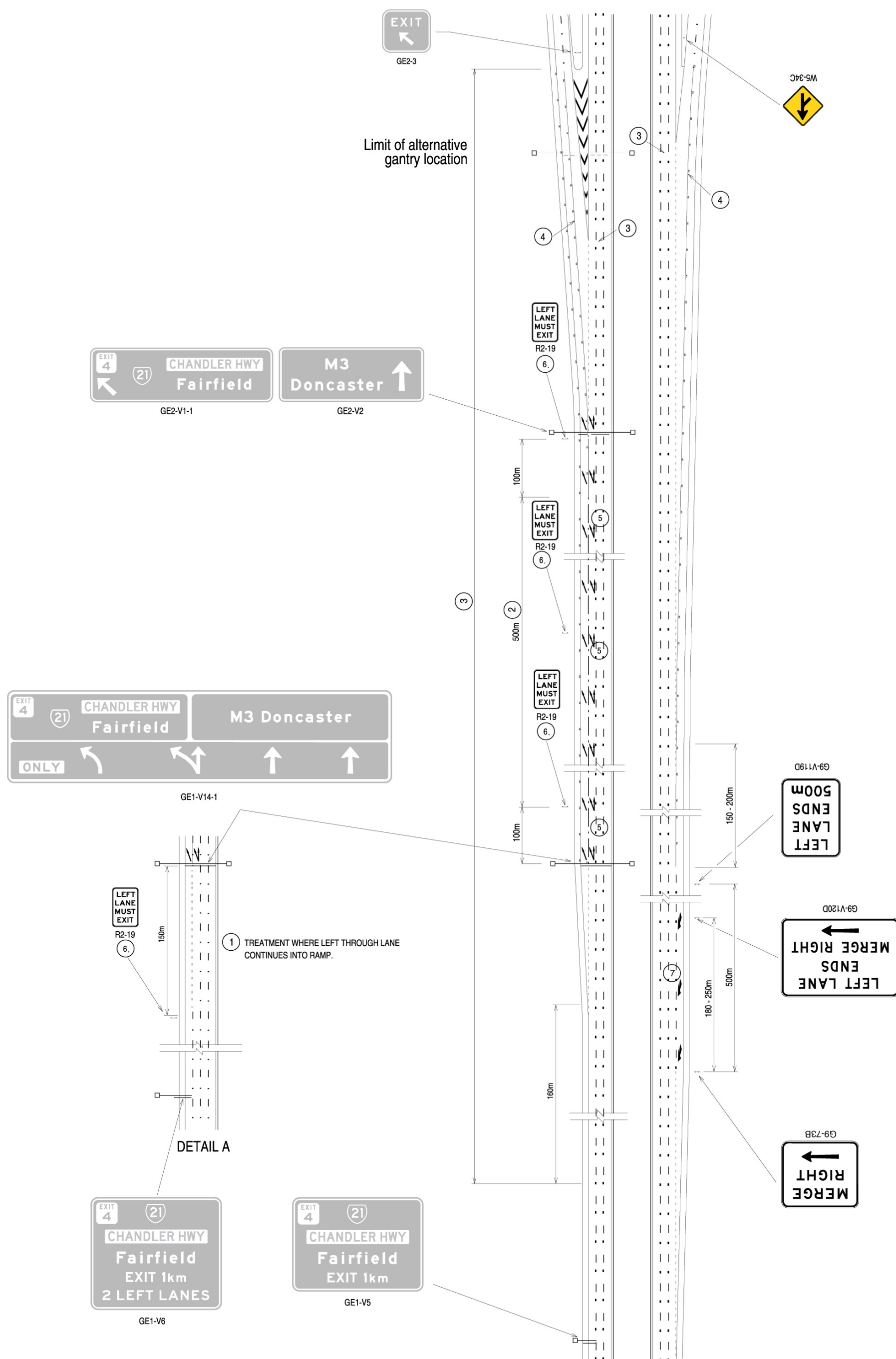
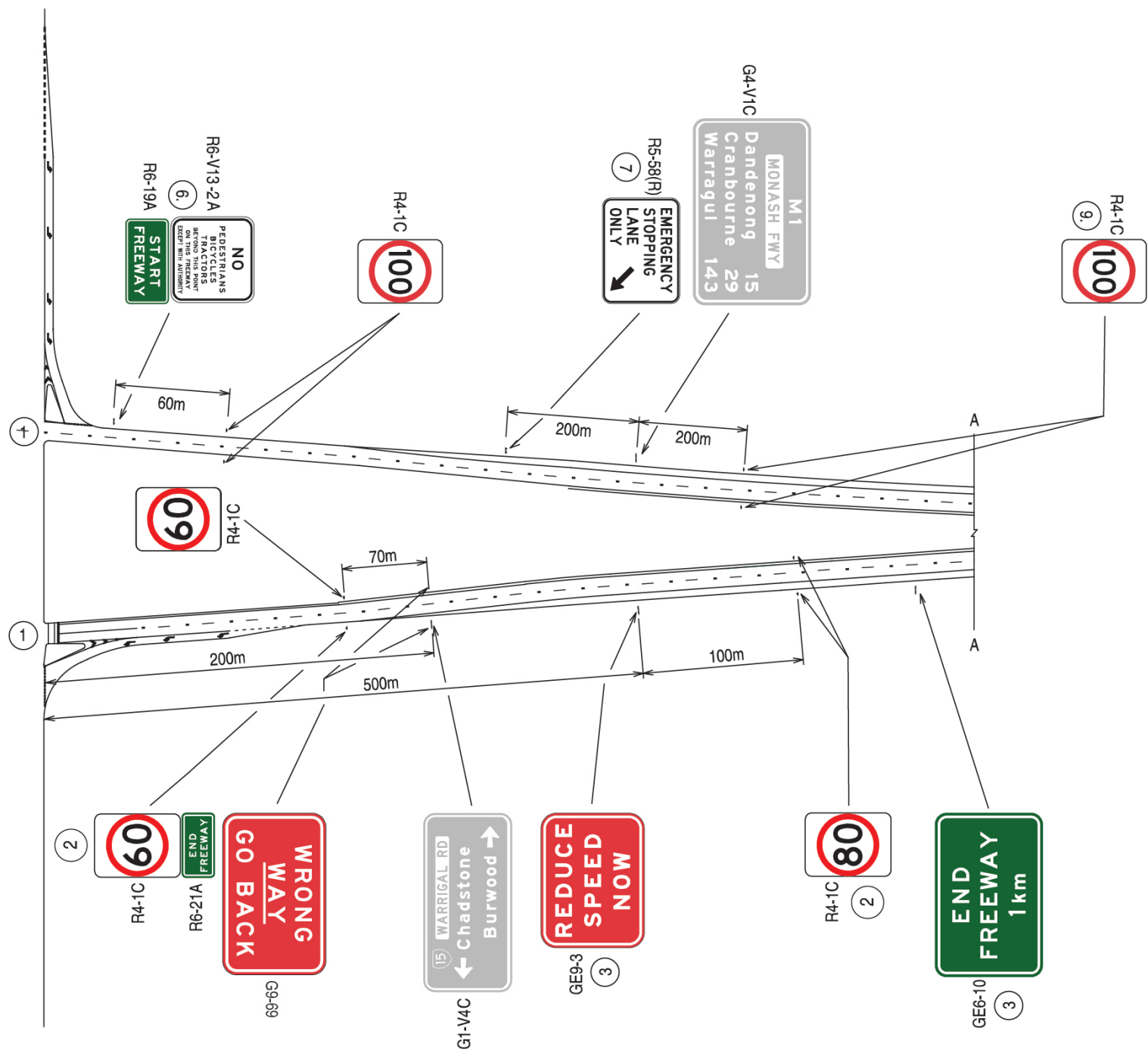


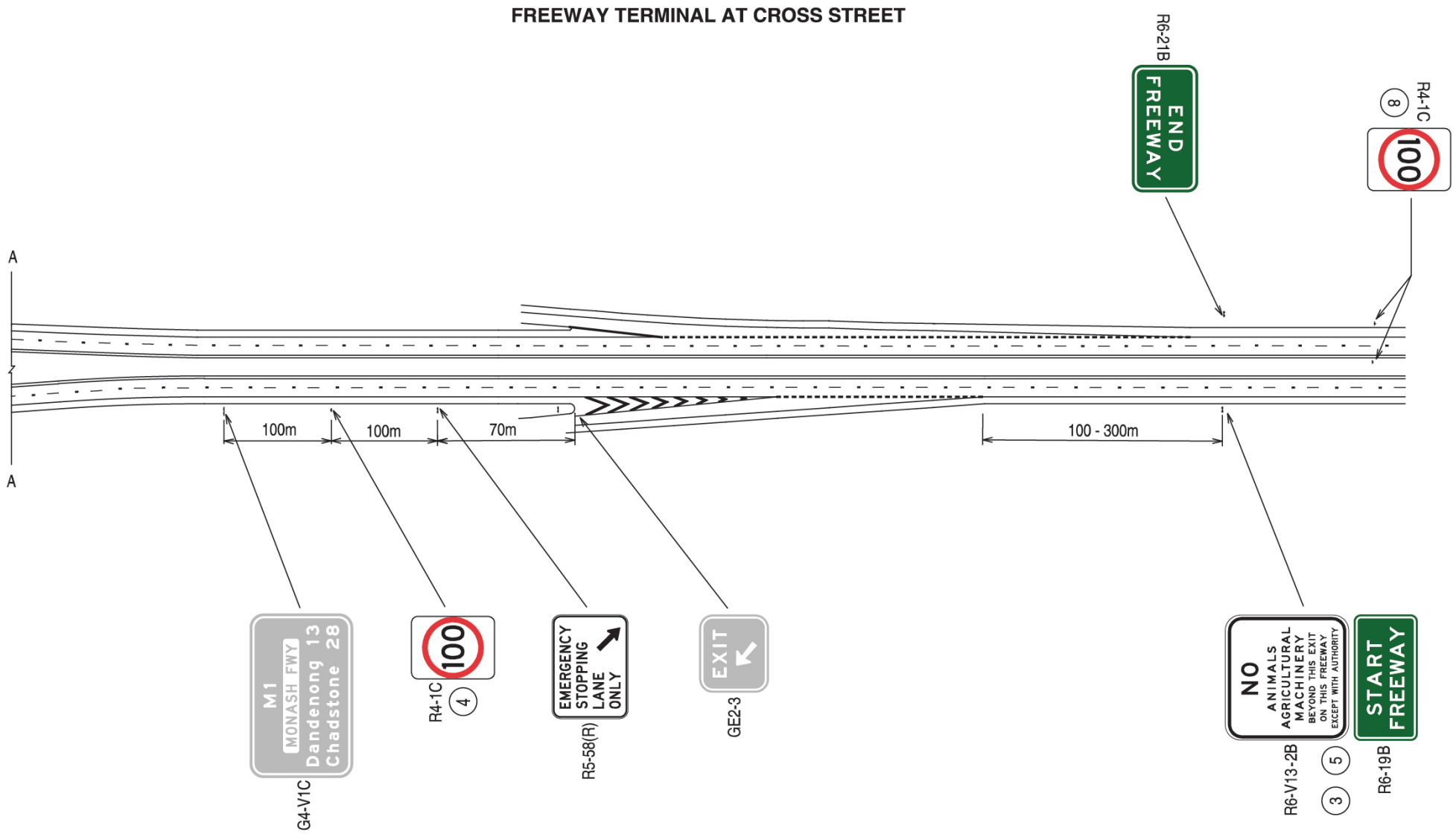
Figure 13: Treatment at two-lane exits and entries

Notes to Figure 13:

1. *Detail A is an alternative treatment where the left lane becomes a trap lane for the exit.*
2. *For lower speed environments (e.g. 80 km/h) refer to Austroads Guide to Road Design Part 4C: Interchanges for linemarking dimensions.*
3. *Green RRPMS adjacent to the left shoulder are to extend to the exit nose from a point 160 m prior to the start of the exit taper. Refer to Clause 5.6.5 in this Supplement for general limits of green, red and yellow RRPMS at other locations.*
4. *150 mm continuous line, RRPMS at 12 m spacing.*
5. *Pavement arrows in the trap lane comprise “straight” arrows inclined at 15 degrees to the lane line, spaced at 50 m intervals (a minimum of seven arrows is normally provided). Special combined left and through arrows are to be placed in the second lane. For arrow details, refer to Clause 5.5.2.5 of AS 1742.2:2009. The arrows are to be supplemented by LEFT LANE MUST EXIT signs (R2-19).*
6. *LEFT LANE MUST EXIT signs (R2-19) are provided as follows:*
 - *Where the left exiting lane develops to the left of the through lane, the first sign shall be located 100 m beyond the end of the tapered diverge area to ensure drivers do not mistake the left through lane as the “MUST EXIT” lane*
 - *Where the left through lane continues into the exit ramp (refer Detail A), the first sign is located at the start of the continuity line. Subsequent signs are at a spacing of approximately 300 m.*
 - *The last LEFT LANE MUST EXIT sign (R2-19) is placed at the start of the continuity line at the exit.*
7. *Treat the end of the added lane as a lane drop (refer to Clause 4.7.5.2).*



FREEWAY TERMINAL AT CROSS STREET



FREEWAY TERMINATES BUT DIVIDED ROAD CONTINUES

Figure 14: Freeway terminal

Notes to Figure 14:

- 1. Cross road signing is to be adapted from Figure 7 and Figure 8 or Figure 10 (urban situation).**
- 2. Install speed zone buffer zone signs in accordance with VicRoads Speed Zoning Guidelines.**
- 3. These signs may need to be duplicated in the median or overhead mounted (refer to Clauses 3.6 (a) and (b) of AS 1742.2:2009).**
- 4. Location of speed zone repeater signs may vary due to the location of direction and other signs. The need for subsequent speed zone repeater signs beyond this point should be assessed taking into account the proximity to adjacent interchanges and associated speed zone signing.**
- 5. The prohibition sign is located 100 m to 300 m in advance of the start of the exit taper. Ensure it does not obstruct the exit direction sign. Refer to Clause 3.4.3 (a) of this Supplement regarding alternative wording of the sign (R6-V13 series) in this location. This sign assembly may need to be located closer to the cross road and duplicated if necessary to permit drivers of prohibited classes of traffic to read the sign in time and to take appropriate action.**
- 6. This sign assembly may need to be located closer to the cross road and duplicated if necessary to permit drivers of prohibited classes of traffic to read the sign in time and to take appropriate action.**
- 7. Located at or just beyond the start of shoulder, but at least 70 m from the speed restriction sign.**
- 8. D size sign is used where speed reduction is required, e.g. 110 km/h to 100 km/h or 100 km/h to 80 km/h.**
- 9. Speed restriction signs will be required at this location, together with repeater signs, if the freeway has a different speed zone to the adjacent section of road. Refer to VicRoads Speed Zoning Guidelines.**

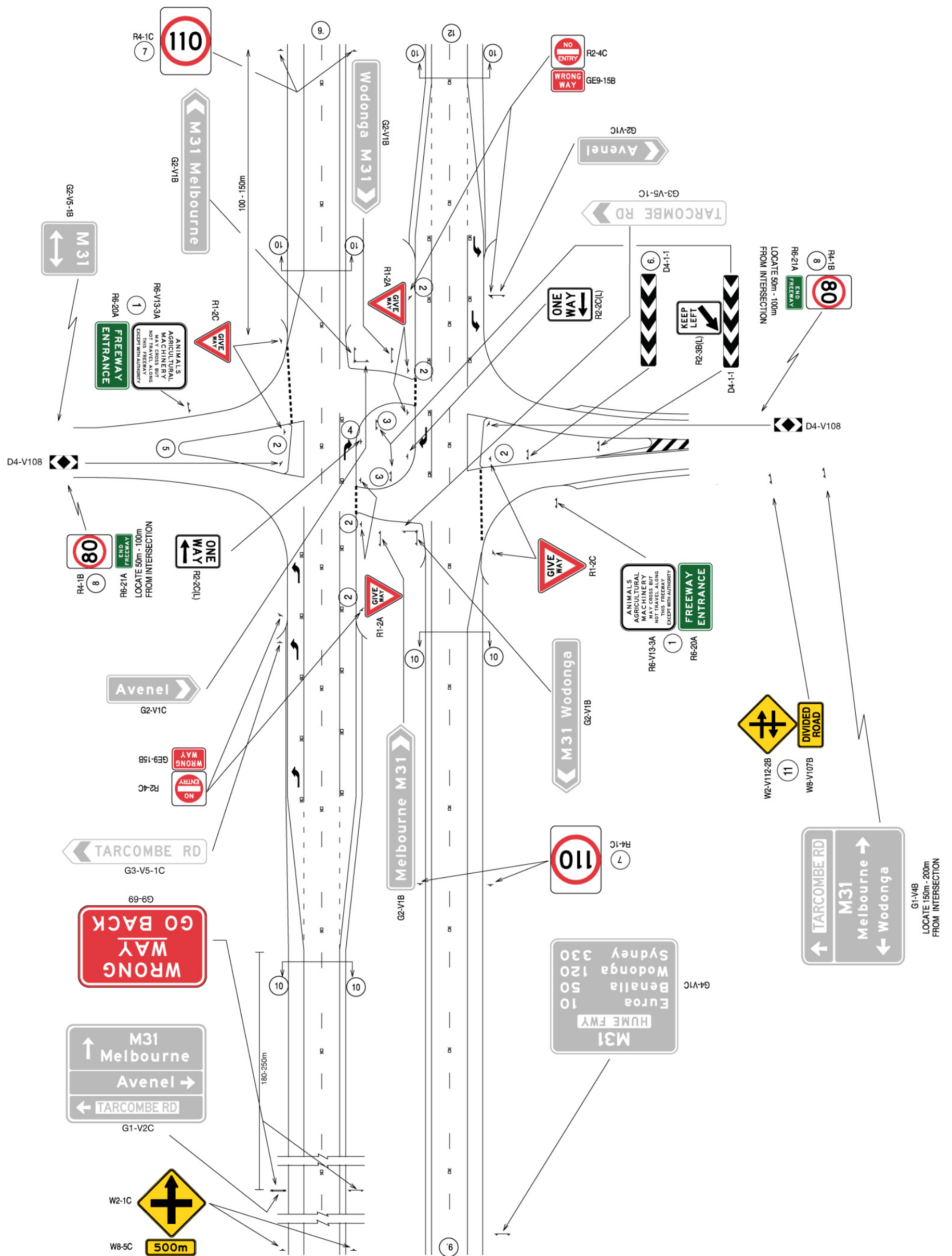


Figure 15: Rural freeway intersection at-grade

Notes to Figure 15:

- 1. Refer to Clause 3.4.3 (a) of this Supplement for the use of the prohibition sign.**
- 2. These signs must be located where they do not obstruct driver sight lines.**
- 3. KEEP LEFT sign and hazard marker(s) may be required at this location only if the pavement through the median opening is not readily visible to drivers.**
- 4. Additional right turn pavement arrows should be provided when the central island of the wide median intersection is more longitudinal than that shown in Figure 14.**
- 5. Similar signing arrangement is also required on this approach to those shown on the opposite side of the road.**
- 6. Additional hazard marker(s) may be required to emphasise the curve on large splitter islands, or to provide extra warning of the intersection.**
- 7. Requirements for speed zone repeater signs beyond this point should be assessed taking into account the proximity of adjacent interchanges and normal repeater sign spacing requirements from VicRoads Speed Zoning Guidelines.**
- 8. For requirements and locations of speed zone signs, refer to VicRoads Speed Zoning Guidelines.**
- 9. Installation of "EMERGENCY STOPPING LANE ONLY" signs shall be provided at the spacing indicated in Clause 3.5 (c) of AS 1742.2:2009 and in the Supplement for rural conditions.**
- 10. Limit of red and yellow RRPMS.**
- 11. Install divided road warning sign assembly (W2-V112-2) in accordance with Clause 2.9.2.3 (a) of this Supplement.**
- 12. Signing arrangement on this approach is the same as to what is shown for the opposing approach.**

Clause 4.2.2 – General treatment

Refer below for additional guidelines regarding the installation of guide posts in Victoria.

The guidance given in Clause 4.2.2.1 of AS 1742.2:2009 regarding the location of guide posts along the edge of a rural road (based on the width of the road) shall be followed in addition to the guidance below.

Guide posts are installed on all rural M, A, B and C Routes.

On rural divided roads, guide posts are always installed on the left hand side of the roadway. Guide posts may be installed on the right hand side where:

- the adjacent roadway is at a lower level and safety barrier is not warranted, but post delineation at night will provide a higher level of driver comfort where the median falls away from the edge of the roadway
- on the approach and through a left hand curve of radius < 1000 m
- the abutting environment is heavily vegetated. Typically this will occur where two-lane two-way sections of road have been duplicated to freeway standard.

It is recommended that guide posts also be installed on other rural roads as follows:

- all sealed roads
- all unsealed roads where AADT exceeds 100 vpd
- at any location, isolated or continuous, where post delineation is considered necessary.

On other roads (including in urban areas), guide posts shall be used where the road environment appears rural in character (i.e. unsealed shoulders, open drains) and minimal street lighting is provided.

Clause 4.2.2.4 – Urban roads—divided and one-way roadways

On urban freeways, guide posts are installed on the left hand side if the freeway is unlit.

Clause 4.2.4 – Guide posts

Culvert marker posts

On rural roads and urban roads that are rural in characteristic, special posts are to be erected at the edge of the road formation above culvert inlets and outlets. The purpose of these posts is to allow for easy identification of culverts for maintenance purposes. A black marking (e.g. a permanent sticker or tape) 150 mm deep is added 50 mm from the top of all culvert marker posts as shown in Figure 16. Where an existing standard guide post (i.e. one that is used for delineation purposes) is located in the vicinity (e.g. within 5 m) of the culvert, the black marking shall be placed 100 mm from the bottom of the reflector.

For details regarding the installation and spacing of culvert marker posts, refer to Clause 4.2.4.4 (f) of this Supplement and in AS 1742.2.

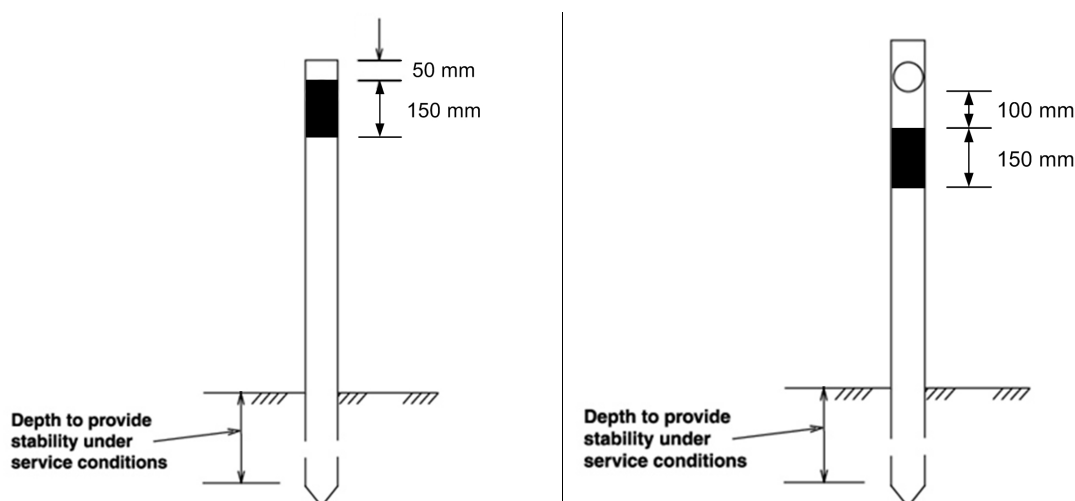


Figure 16: Culvert marker post and standard guide post with culvert marker

Clause 4.2.4.1 – General

The installation of guide posts should be checked at night to ensure that these objectives are met. Effective delineation is particularly important at night and in the wet, as other visual cues are diminished.

Guide posts are not used when a safety barrier is installed at an offset less than 4 m from the traffic lane.

Guide posts are provided on the left hand side of rural freeways and may also be used on the right hand side on left hand curves where added delineation is required.

Guide posts are not generally provided on urban freeways but may be used on unlit sections where enhanced delineation is required, e.g. to fill in gaps between long lengths of delineated safety barrier and on the outside of curves where drivers would otherwise perceive a lack of delineation.

Clause 4.2.4.2 – Design and construction of guide posts

Refer below for additional information regarding the selection of guide post type in Victoria.

General

The type of guide post to be used is based on:

- the requirement that all posts should respond in a safe manner when struck, and not present a further danger in their damaged condition
- “whole-of-life” cost considerations taking into account the cost to supply, install and maintain the posts,
- an assessment of the rate of replacements based on the risk of a post being hit by traffic, as outlined in the Risk Classification section below
- VicRoads policy to encourage recycling and reuse of materials wherever practicable,
- ensuring that successive posts closer than 60 m are of the same type, and
- VicRoads Standard Specification requirements.

Risk classification

Locations can be classified as High Risk, Medium Risk or Low Risk Hit Areas depending on traffic volumes and geographical/design characteristics.

- High Risk Hit Areas (e.g. on tight curves, turn slots etc.)
 - Posts made from recycled rubber (or similar material), high rebound material, or having a hinged arrangement at ground level, and which are capable of self-straightening more than three times, are appropriate.
- Medium Risk Hit Areas (e.g. short straights and where shoulders are narrow)
 - Posts made from “Post Consumer” recycled plastic (or similar material), capable of restraightening two to three times are appropriate.
- Low Risk Hit Areas (e.g. on long straights and sweeping curves i.e. radius > 1000 m)
 - Posts do not need to be of a restraightening or reboundable type.

The design requirements of a guide post in Victoria are shown in the Figure below.

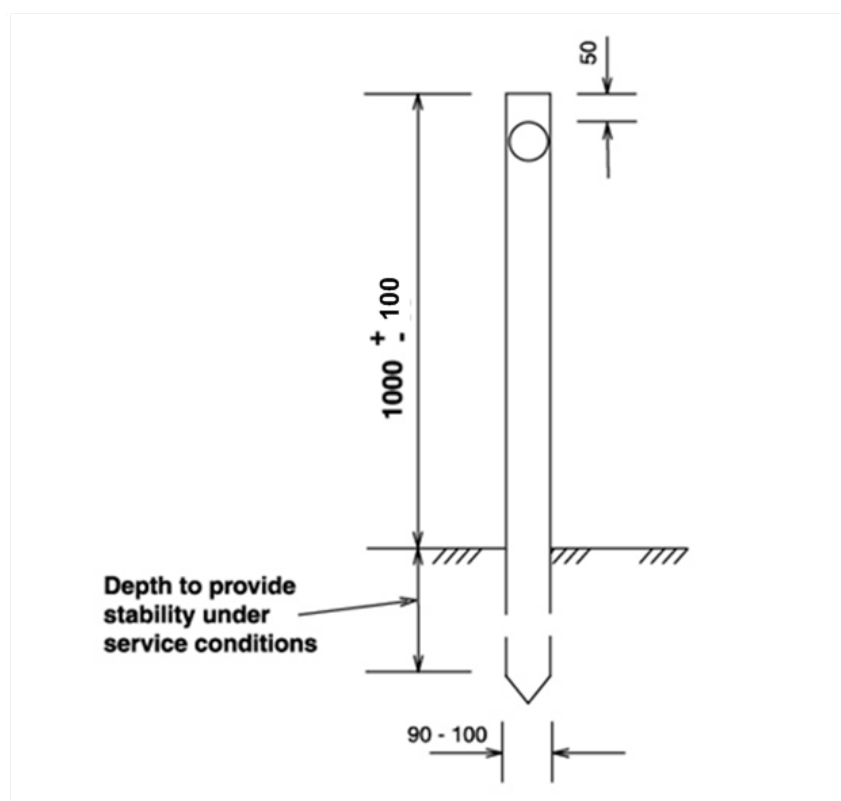


Figure 17: Typical guide posts

Clause 4.2.4.3 – Siting and alignment

Guide posts are normally located 150 mm clear of the outer edge of shoulder, or if located on a kerbed road, approximately 600 mm behind the face of kerb. They are set to the heights indicated in Figure 12.

On curves, guide posts should be located a consistent distance from the edge of pavement so as to form a smooth line around the curve.

Clause 4.2.4.4 (a) – On straight sections

In Victoria, the spacing of guide posts may be:

- increased to 300 m as per the requirements of AS 1742.2:2009. However, this is only applicable for rural C Routes
- reduced to 90 m on sections of heavily trafficked roads, where drivers are required to drive on low beam for the majority of the route, or where safety barrier is located at an offset from the traffic lane greater than 4 m
- reduced to 60 m in areas subject to frequent fogs.

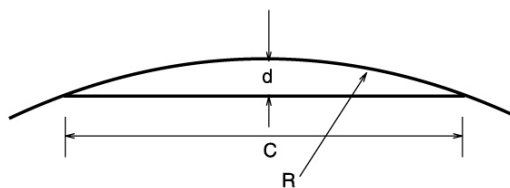
Clause 4.2.4.4 (b) – On curves

Note that in Victoria, the spacing of guide posts may be reduced to 60 m in areas subject to frequent fog.

The spacing of guide posts on curves is determined using Table 4.1 of AS 1742.2:2009 and the following procedure:

- Obtain the radius of the circular portion of the curve either from construction plans if available, or if not, by measuring the central offset from a chord of known length approximately ($\pm 20\%$ accuracy will suffice). Use either the marked dividing line or edge of seal as a guide, and apply the following formula:

$$\text{Radius } R = \frac{C^2}{8d} + \frac{d}{2}$$



Notes:

1. 2nd term above ($d/2$) is negligible for radii $> 100 \text{ m}$

2. Recommended chord lengths (C):

$R < 200 \text{ m}$, $C = 50 \text{ m}$

$R = 200 \text{ to } 600 \text{ m}$, $C = 100 \text{ m}$

$R > 600 \text{ m}$, $C = 200 \text{ m}$.

Desirable accuracy of measurement of $d = \pm 0.1 \text{ m}$

- Locate the first post on the outside of the curve at the point where the centre line shift from the approach straight is 0.5 m (transitioned or plain circular curves). This point can be estimated by eye where plans are not available.
- Continue spacing around the outside of the curve in accordance with the spacing given in Table 4.1 of AS 1742.2:2009, terminating at the point at the far end of the curve which is nearest to where the 0.5 m centre line shift from the approach straight occurs for the opposite approach.
- Locate a post on the inside of the curve opposite both the first and last post on the outside of the curve. Locate intermediate posts on the inside of the curve in accordance with Table 4.1 of AS 1742.2:2009, ensuring that as far as practicable each inside post is opposite an outside post.
- Locate a further pair of posts (one on each side of the road) at each end of the curve at a spacing equal to twice the outside-of-curve spacing shown in Table 4.1 of AS 1742.2:2009, in advance of (or beyond) the first and last posts previously located, where the curve radius is less than 2000 m.

Clause 4.2.4.4 (d) – In cuttings

Guide posts are always continued through cuttings at the spacing specified for straights and curves.

Clause 4.2.4.4 (f) – Bridges and culverts

At culverts, the design of culvert marker posts shall be in accordance with Clause 4.2.4 of this Supplement (i.e. with black marking).

DEPARTURE

Where the kerbing or headwall of the culvert is at least 4 m from the edge of the running lane, the additional culvert marker posts specified in AS 1742.2:2009 Clause 4.2.4.4 (f) items (i) and (ii) are still required. In this case, the guidance in (i) and (ii) is to be followed, but posts are to be installed at the edge of the road formation, parallel to the kerbing or headwall of the culvert.

Where multiple guide posts are installed at culverts that are 5 m or more in length in the direction of travel, only the guide post on each left-hand approach is to be a culvert marker post.

At locations where a safety barrier is installed, the culvert marker should be installed behind the safety barrier. However, it may be necessary to install the post at an alternative location to ensure its conspicuity.

Table 4.1 – SPACING OF GUIDE POSTS ON CURVES

Table 4.1 of AS 1742.2:2009 has been adopted for use in Victoria, in conjunction with the guidance provided in Clause 4.2.4.4 of this Supplement.

Additional notes to Table 4.1:

- Where the radius of an existing curve is not available from records, it may be determined approximately as given in Clause 4.2.4.4 (b) of this supplement.
- For delineator spacing on safety barriers, refer to Clause 4.2.5.4 (b) of this Supplement.

- In Victoria, the spacing of guide posts can be reduced to 60 m in areas subject to fog, or 90 m where drivers generally use low-beam. The maximum spacing of guide posts adjacent to a safety barrier is 90 m.

An existing installation which has posts within a spacing accuracy of $\pm 20\%$ of Table 4.1 may be regarded as satisfactory.

Where a side road or private entrance enters on the back of a curve, the spacing may need to be adjusted or extra posts installed to ensure that a gap which may confuse motorists is not left in the delineation pattern.

Clause 4.2.5.1 – General

Delineator shape and size

Delineators may be either:

- 80 mm diameter circular corner-cube type conforming with the “Retroreflectors – Discrete Device Type” delineator as specified in Section 2 of AS/NZS 1906.2:2007.
- 100 square cm of Class 1A retroreflective material conforming with the “Retroreflectors – Sheeting Type” delineator as specified in Section 3 of AS/NZS 1906.2:2007. The nominal dimensions of retroreflective material shall be 50 mm wide x 200 mm depth. The area of retroreflective material may be reduced to 5000 mm squared (minimum) when located on wire rope safety barrier posts. Delineators made from reflective sheeting shall be manufactured and placed on posts such that the sheeting manufacturer’s preferred orientation for optimum performance is followed.

Delineators of other shapes may be approved from time to time for special purposes, provided they conform to the relevant Australian Standard.

Delineators on flexible posts are vulnerable to breakage or fracture in a high energy knockdown and require frequent inspection to detect damage.

Clause 4.2.5.2 – Colour

Additional delineator colours in Victoria are described below:

- Green delineators are used to define the location of informal truck parking areas.
- Blue delineators are used to locate access to water points.

Clause 4.2.5.4 (a) – On guide posts

In Victoria, the top of the delineator shall be 50 mm below the top edge of the post and shall be attached by vandal proof and weather proof means.

Furthermore, extraneous delineators that are not part of the installations to assist ongoing guidance along a route need to be reviewed, and if these are distracting, cause confusion or upset the regularity or clarity of the pattern, their removal should be considered.

Examples of extraneous delineation include:

- delineators on trees, poles, private driveway entrances, etc.
- delineators on fixed objects close to the carriageway which should instead be treated with width markers (refer to Clause 4.6.7.2 (c) of AS 1742.2:2009)
- Use of two or more red, white or yellow delineators facing the same direction on any one guide post or bridge end post.

Where delineation of driveways in rural areas is required, provision of retroreflective Roadside Mail Box or property numbers mounted on frangible or otherwise non-hazardous posts may be considered.

The rear of guide posts on one-way roads shall not have a reflective delineator installed.

Clause 4.2.5.4 (b) – On guard fence, safety barrier or bridge rail

In Victoria, the installation and spacing of delineators on guard fence, concrete and wire rope safety barriers and bridge rail shall comply with the AS 1742.2 Clause 4.2.5.4(b) and the following information.

The rear of delineators on one-way roads shall not have a reflective material installed.

Delineator spacing

Provided that the maximum spacing in Table 2 is not exceeded, delineators may be spaced at multiples of:

- the post spacing of guard fence and wire rope safety barriers
- the unit length of concrete safety barriers.

Table 2: Maximum delineator spacing for safety barriers and bridge rails

Distance from safety barrier to edge of traffic lane	Maximum Delineator Spacing	
	Curve 100 m radius or less	Straight or curve > 100 m radius
More than 4 m	No delineators on safety barrier – guideposts only	
Between 2 m and 4 m	20 m	
Less than 2 m	5 m	10 m

On guard fence and concrete safety barriers

Delineators protrude above the top line of guard fence and concrete safety barriers, attached using appropriate mounting arrangements that:

- are vandal proof and weather proof
- minimise injury risk to motorcyclists.

Delineators should not be set into the fold of guard fence safety barriers.

An appropriate mounting arrangement for guard fence safety barriers is illustrated in Figure 18.

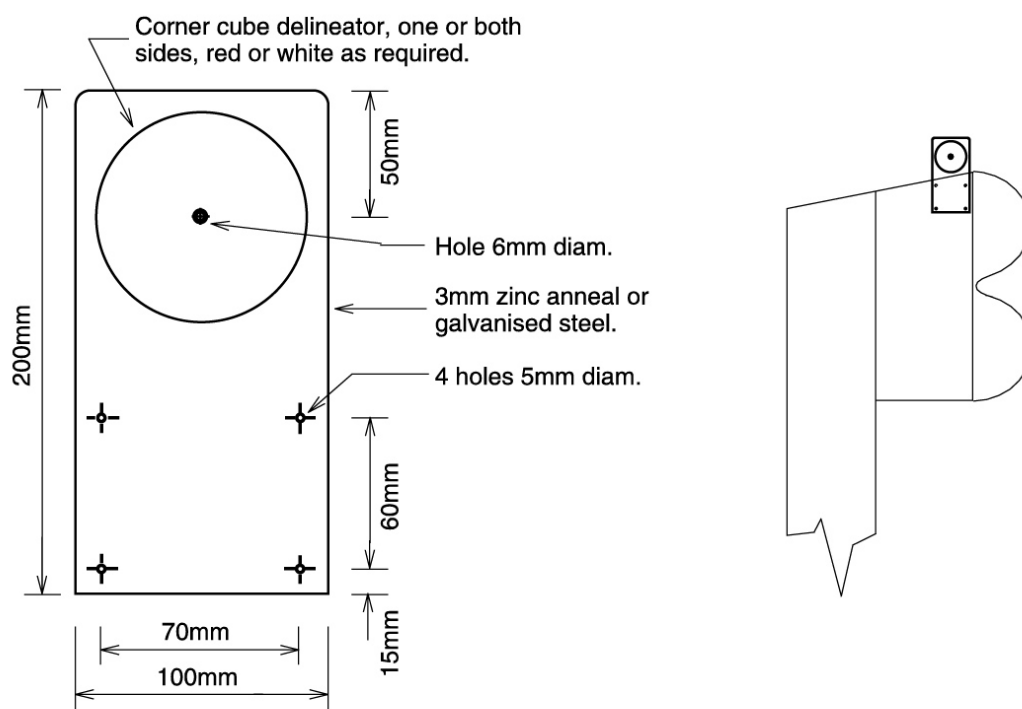


Figure 18: Guard fence mounting plate example for corner-cube delineators

On wire rope safety barriers

Delineators (generally “sheeting type”) with a minimum area of 5000 mm squared are provided at the top of wire rope safety barrier posts (commonly 100 mm x 50 mm to fit within the post cap dimensions).

On bridge rails

Delineators are mounted on bridge rails using appropriate mounting arrangements, except that a suitable alternative arrangement is used when the bridge rail acts as a handrail. The vertical mounting height of delineators should be compatible with those on the approach safety barrier.

On flared approach sections

If the start of a flared safety barrier approach is within 4 m of the traffic lane, a delineator is installed on the start of the flare. Otherwise, no delineators are required on the flared approach section.

Clause 4.2.6 – Snow poles

A delineator is provided on each side of the pole at the mid-height. The delineator may be placed higher on the pole to improve visibility.

G9-V114 series signs are mounted on snow poles. Refer to Clause 4.11.2 of this Supplement.

Clause 4.4.7 – Signs

The diagrammatic warning signs (e.g. curve sign) in Section 4 of AS 1742.2:2009 are a generalised representation of the alignment; no attempt should be made to show greater detail or a variation in detail as this may mislead drivers. Except as described Clause 2.9.2 of AS 1742.2:2009, the diagrammatic illustration of any change in the horizontal alignment of a road should be limited to these signs.

Clause 4.4.7.3 – Curve (W1-3)

On curves where the radius of the curve decreases as the curve progresses, a Curve Tightens warning sign (W3-V112) may be used. This sign assembly generally consists of an advisory speed supplementary sign (W8-2) (refer to Clause 4.4.6 of AS 1742.2:2009) and a Curve Tightens supplementary sign (W8-V125)

The following criteria shall be met for the use of this sign:

- two adjacent curves in the same direction (compounding curves) where the radius tightens so that the comfortable negotiating speed of the second curve is at least 20km/h less than the first curve
- the smaller radius curve is hidden from the approach to the larger radius curve.



W3-V112



W8-2



W8-V125

Clause 4.4.7.6 – Hairpin Bend (W1-7)

The Loop (W1-V50) sign may be used where the use of the Hairpin Bend sign (W1-7) is judged to be misleading or provides inadequate information to a driver on loop ramps on freeways and other similar standard roads where a loop turns through approximately 270 degrees (typically over or under the approach road).



W1-V50

The Advisory Speed sign (W8-2) should be used with this sign, using the same conditions as in AS 1742.2:2009 Clause 4.4.7.6.

Clause 4.4.7.9 – WINDING ROAD ENDS x km (G9-17)

Sign G9-17 is generally used on lengths of winding road in excess of 8 km.

Clause 4.4.7.10 – Tilting Truck (symbol) (W1-8)

The W1-8 sign is intended as a last resort when other signs have not been effective or remedial improvements cannot be made to the road.

The sign may be used on approaches to problem curves or at intersections, but only when:

- all other curve warning devices have been provided and an engineering assessment of road conditions has been carried out to assess remedial action to the road (i.e. skid resistance, roughness, superelevation, grade and presence of kerbing or guard fence)
- a history of truck overturns persists after the above measures have been implemented
- the advisory speed shown on the sign reflects requirements for trucks (i.e. it would not be appropriate to use values obtained directly from the ball bank indicator method).

When considering the installation of this sign, the information contained in the Austroads Guide to Road Design Part 3 Geometric Design (2010) - Appendix D2 shall be taken into account.

A “history” of truck overturning is considered to exist when three accidents have occurred. However, the installation of this sign may be warranted prior to an accident history being established where:

- there are factors which suggest that curve warning devices or improvement to road conditions may not resolve the problem
- it is intended as a temporary remedial action prior to permanent works being implemented.

Clause 4.4.7.11 – Chevron Alignment markers (D4-6)

On all roads, Chevron Alignment markers should only be used where curve or turn warning signs and posts or other delineation (Clause 4.2.4 and Clause 4.2.5 of AS 1742.2:2009) already exist, but are not adequate by themselves.

In Victoria, the markers are erected at a height of approximately 1.2 m (but may be increased to 1.5 m to improve visibility where there is a preceding crest or other visual impairment) and placed as close to the roadway on the outside of the curve as practicable, within the lateral clearance limits given in Appendix D2.3.2 and Appendix D2.3.3 of AS 1742.2:2009. Mounting shall be such that their tops form a smooth line around the curve.

The markers should be angled towards oncoming traffic so that they are at right angles to an approaching vehicle at the limit of visibility of the marker (subject to the requirements of Figure D3 of AS 1742.2:2009). On larger radius curves, they may be mounted back to back, as shown below.

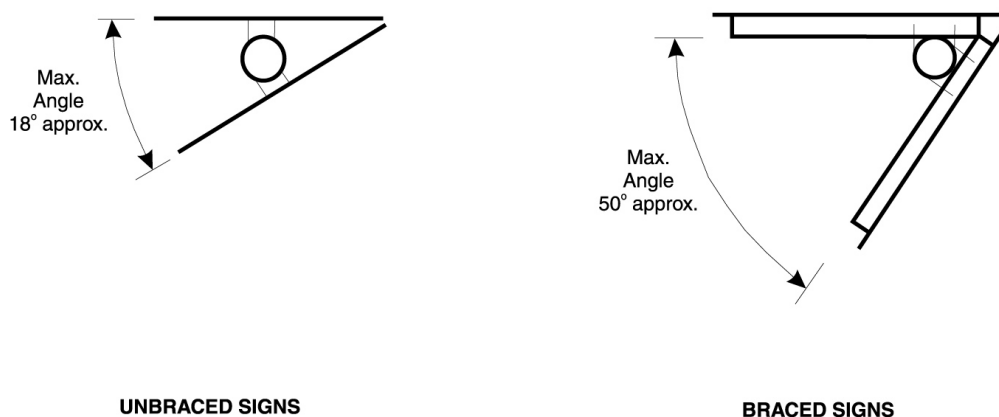


Figure 19: Maximum angle of sign installation

Chevron Alignment marker with advisory speed

A combination Chevron Alignment marker with advisory speed sign (sign D4-V110) may be used for tightly spaced reverse curves where a reverse curve warning sign and supplementary advisory speed sign has been provided (refer to AS 1742.2 Clause 4.4.7.4), and there is a need to reinforce the advisory speed through the second curve.

The following conditions shall be met for the use of this sign:

- The advisory speed is significantly less than the posted speed limit (e.g. 45 km/h advisory in a 100km/h zone).
- The comfortable negotiating speed of the first curve is higher than the second curve (e.g. equal or greater than 15km/h).
- As per Clause 4.4.7.4 of AS 1742.2, the advisory speed used with the reverse curve warning sign is set for the most substandard curve – in this situation, it is the second curve.
- Drivers are approaching the second curve at an unacceptably high speed.



D4-V110

Alternative Chevron Alignment marker designs

It is best practice to use the standard Chevron Alignment marker sign as the black and yellow colour scheme is highly recognisable to drivers. Any deviation from this design may cause confusion as drivers may not understand the non-standard variation of the sign, and could be dangerous in areas where drivers are concentrating on negotiating the road alignment (e.g. at curves).

Where a safety assessment has been conducted and it is found that the (standard) Chevron Alignment marker sign is ineffective, the following treatments should be considered:

- removing vegetation or other visual obstructions around the Chevron Alignment marker to improve sight distance to the sign
- ensuring the correct advance curve warning signs are used (refer to Clause 4.4.7 of AS 1742.2:2009)
- using a larger size Chevron Alignment marker.

In exceptional circumstances where the above does not improve conspicuity of the Chevron Alignment marker, alternative designs may be considered. The process of using of a non-standard design involves:

- photographic evidence showing that the standard Chevron Alignment marker cannot be readily seen by drivers
- documenting the reason why at this particular location, a variation to the design of a Chevron Alignment marker is required.

The following non-standard design may be considered:

- placing the standard Chevron Alignment marker on a red backing board
- alternative colours to the yellow component of the standard sign may be used, subject to consultation and approval from the VicRoads – Network Standards team.

Clause 4.5.4.1 – CREST (W5-11)

Table 2.3 of AS 1742.2:2009 should be used to determine if a vertical curve is substandard.

Clause 4.5.4.3 – Road Hump (W5-10)

Sign W5-10 is the only sign, which shall be used to indicate a hump, ramp or other rise in the road profile, no matter what the profile is. Other non-standard signs (e.g. depicting a flat-topped ramp) shall not be used for this purpose. Where there is a hump combined with another slowing device combined, it is usually more useful for motorists to warn of the hump, rather than the other component.

W5-10 may also be used in conjunction with supplementary signs W8-16 'ONE LANE' where the road hump narrows to one lane, or W8-3 'ON SIDE ROAD' (arrow) to warn of road humps in an intersecting street.

The Road Humps Ahead (W3-4) sign shall be used to warn of a series of road humps installed for traffic control purposes as set out in AS 1742.13:2009 Clause 2.4 and 4.3.3.



W3-4

Table 4.5 – SIGNS FOR USE ON APPROACHES TO STRUCTURES AND OBSTRUCTIONS—SIZE TABLE

Additional signs used in Victoria are shown in Table 3.

Table 3: Additional signs used in Victoria for use on approaches to structures and obstructions

Sign	Sign number	Size (mm)
LOW BRIDGES - HEIGHT CLEARANCE	G9-V138	Varies
END LOAD LIMIT	R6-V5	A – 600 x 800 B – 900 x 1200
Bidirectional Hazard markers	D4-V105	A – 450 x 300 B – 600 x 400
	D4-V108	1000 x 500
Distance xx km (supplementary)	W8-V6	A – 600 x 200 B – 750 x 250 C – 900 x 300

Clause 4.6.3.2 – Height restrictions

Advance warning on a freeway for a cross road with low clearance

Where an exit ramp leads to a cross road which has a height restriction, the restriction shall be indicated to drivers approaching along the freeway, if the cross road is liable to be used by vehicles of an unacceptable height. Signing for this purpose shall be provided in advance of the exit, at the exit and at the ramp terminal. Suitable signing should also be installed in advance of a previous exit if that exit provides a reasonable alternative route (refer to detour signing in Clause 4.6.6.2 of AS 1742.2:2009).

Where all reasonable routes from the exit have a height restriction, the signing on the freeway shall incorporate a visual warning system (e.g. flashing lights) to be activated by any vehicle of unacceptable height that approaches along the freeway. This is required to avoid high vehicles proceeding along the exit ramp to a place where they cannot be accommodated.

Advice about the height restriction shall incorporate the standard “Low Clearance ... m” sign (R6-11) or “Clearance ... m” sign (R6-12). The advice should take the form of an inset on an advance exit and exit direction signs and/or a diagrammatic supplementary sign. As the resulting signs include a greater amount of legend for drivers to comprehend, legend sizes must be adequate for this purpose.

The installation of signing schemes on freeways associated with Low Clearance signs requires the approval of the Director – Network Policy and Standards.



GE1-V11 (Modified)

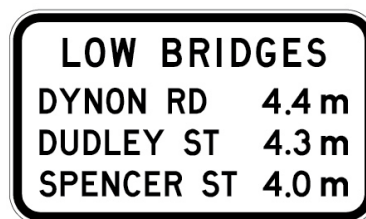
Clause 4.6.6 – Signs for approaches to structures and obstructions

Additional signs may be considered to provide advance information for truck drivers approaching structures that have reduced clearance or a load limit. These are detailed below.

LOW BRIDGES (G9-V138)

Sign G9-V138 LOW BRIDGES – HEIGHT CLEARANCE should be provided on routes used by significant numbers of trucks to advise truck drivers of the height restrictions that exist on other roads in the area, and of the magnitude of the restriction.

The G9-V138 sign may be used in conjunction with signs that provide information on suitable alternative routes (refer to detour signing in Clause 4.6.6.2 of AS 1742.2:2009) or signs that provide additional information warning of the nature of the restricted clearance.



G9-V138

END LOAD LIMIT (R6-V5)

On a section of road that is subject to a load limit, the END LOAD LIMIT sign (R6-V5) shall be used at the end of the section of road unless other circumstances make the end point obvious. Refer to Clauses 4.6.6.1 (d) and 4.6.6.1 (e) of AS 1742.2:2009 for Load Limit signs. This sign may be used instead of an assembly consisting of an END supplementary sign and a R6 series Load Limit sign (as described in AS 1742.2 Clause 4.6.6.1 (f)).



R6-V5

Clause 4.6.6.1 (c) – NO OVERTAKING ON BRIDGE (R6-2)

The R6-2 sign is not required at a bridge wider than 6 m if a barrier line is marked along the bridge in accordance with the warrants for 'no overtaking' zones (refer to Clause 5.3.4 of AS 1742.2:2009).

Clause 4.6.6.1 (e) – GROSS LOAD LIMIT x t (R6-4), OVERALL LENGTH LIMIT x m (R6-33)

The GROSS LOAD LIMIT sign (R6-4) is used to put into effect a load limit imposed under the Transport (Compliance and Miscellaneous) Act 1983 or the Local Government Act 1989. It shall only be used to protect the road from damage by trucks.

For all other purposes, restrictions on the mass of vehicles (other than on bridges) shall be signed using the Truck Prohibition sign (R6-10-2) with any applicable supplementary signs (refer to AS 1742.12:2000).

The proposed use of sign R6-4 on any road should be submitted to the relevant VicRoads Regional Director for reference to the Truck Operations Committee for consideration.

Clause 4.6.6.1 (g) – LOW CLEARANCE . . . m (R6-11)

The vertical clearance shall also allow for the additional clearance required for long vehicles passing through a sag curve.

The heights shown on the signs shall be checked whenever roadworks may have altered the clearances. When placing signs on railway structures, liaison with the responsible rail authority will be required.

The C size sign is used where there is especially acute danger of a high load striking the structure.

Clause 4.6.6.1 (h) – CLEARANCE x m (R6-12)

The vertical clearance shall also allow for the additional clearance required for long vehicles passing through a sag curve.

The figures shown on the signs shall be checked whenever roadworks may have altered the clearances. When placing signs on railway structures, liaison with the responsible rail authority will be required.

The CLEARANCE x.x m sign (R6-12) is erected on structures where the signed vertical clearance is greater than 4.6 m and generally not more than 5.3 m. Signs are only required for clearances greater than 5.3 m in exceptional circumstances (e.g. Over Dimensional routes).

Advance warning and detour signs are not required with the CLEARANCE x.x m sign (R6-12).

Clause 4.6.6.2 (b) – DETOUR FOR HIGH, HEAVY, LONG, WIDE VEHICLES (G9-5-1, G9-5-2, G9-5-3, G9-5-4)

At locations that are critical to the operation of the road network (e.g. on the approaches to a freeway or major urban arterial road), it may be decided to install a height detection device. The Director – Network Policy and Standards shall be consulted regarding the design of these devices.

In some cases, trams pass under low bridges resulting in that part of the road having a vertical clearance that is less than that available in other traffic lanes, due to the existence of overhead electric wires. In such instances, it may be desirable to consult the VicRoads – Network Standards team regarding the provision of special signs.

Clause 4.6.6.3 (a) – Narrow Bridge (W4-1)

At any bridge only capable of safely carrying a single line of traffic, more positive traffic control such as regulatory signs, traffic signals (or flagmen during works) may be required at locations with high two-way traffic volumes in addition to the ONE LANE (W8-16) sign.

Clause 4.6.6.3 (c) – LOW CLEARANCE x m (W4-8)

The supplementary sign x.x km (W8-V6) may be mounted below the sign to provide advance warning to an obstruction where access to intermediate areas is available prior to reaching the obstruction.

Distances are normally shown in multiples of 0.5 km on the W8-V6 supplementary sign (for distances of 1 km and above).



W8-V6

For signs warning of low clearance to roadside vegetation, refer to Attachment C of this Supplement.

Clause 4.6.7.1 – General

Hazard markers should not be used at any obstruction with which there is low probability of a collision, or which is readily visible itself, or is more appropriately delineated by other signs or devices. Overuse or inappropriate use of hazard markers, with or without other delineating devices can create confusing delineation arrays and reduce their effectiveness at more critical locations. The total effect of such devices at any location should be checked by an on-site inspection, preferably at night, to ensure that traffic paths are clearly delineated.

Special hazard marker shapes should be used only where a standard shape will not fit a particular situation.

Size should be chosen so that the marker can be placed in the median, at recommended horizontal clearances without being bent. The bending of markers reduces the retroreflective performance for approaching drivers.

Hazard markers are normally erected 500 to 700 mm above the pavement level, measured to the underside of sign. Adjustment of the height or location of such markers may be required where:

- the approach conditions will require the markers to be raised or located to give sufficient advance sight distance to the intersection, e.g. at a crest
- the hazard markers located in the vicinity of intersections obscure sight distance to opposing or intersecting traffic streams or pedestrian movements.

Hazard markers in vulnerable locations should be erected on easily replaceable frangible posts, see Appendix D4.5 of this Supplement.

Clause 4.6.7.2 (a) – Unidirectional Hazard marker (D4-1-1, D4-1-2)

An A size sign is generally used. However, if greater conspicuity is required, a B size sign should be used instead.

Unidirectional hazard markers (both types) are specifically used:

- on the central island of a roundabout to face entering traffic
- to delineate the curved approach just prior to entering an intersection, including on a splitter island
- to form an extra-wide two-way hazard marker for T-intersection sight boards, by placing two one-way markers end to end, as shown in Figure 1 - types 3, 4 and 5. The D4-1-1 chevron hazard marker shall be used at all median islands and other central carriageway obstructions which are at least 2.2 m wide underneath KEEP LEFT signs (R2-3) where the KEEP LEFT sign alone is not sufficient to delineate the median or splitter island.

The D4-1-2 chevron hazard marker is specifically used:

- at median islands and other central carriageway obstructions which are less than 2.2 m wide
- to delineate a splitter island on a curved approach to an intersection where the larger sign, D4-1-1, is inappropriate.

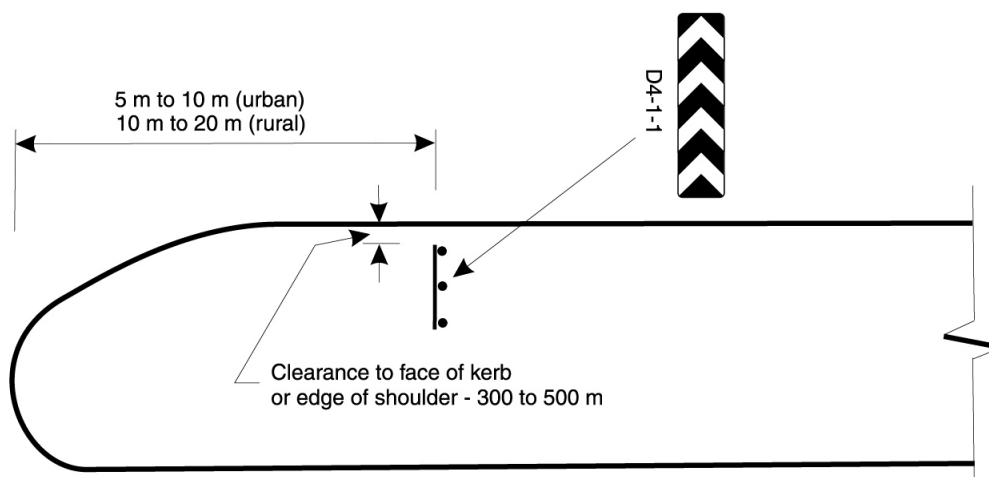


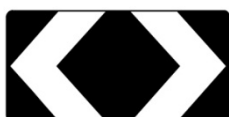
Figure 20: Use of one-way hazard markers at exposed median ends wider than 2.2 m

Clause 4.6.7.2 (b) – Bidirectional Hazard markers (D4-2-2, D4-2-3)

DEPARTURE

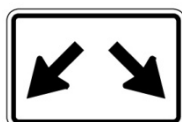
The D4-2-2 two-way hazard marker is not used in Victoria because it does not provide clear directional indication for drivers.

The following types of two-way hazard markers are used in Victoria:



D4-V108

1000 x 500 mm



D4-V105

**A – 450 x 300 mm
B – 600 x 400 mm**

The A size D4-2-3 marker is used at exposed ends of raised medians, median islands, separators, or other central carriageway obstructions at least 2.4 m wide. The B size D4-2-3 is used where a larger hazard marker is required for enhanced conspicuity. The D4-2-3 may also be used in conjunction with the D4-1-1 chevron marker to form an extra-wide two-way hazard marker for a T-intersection sight board, as shown in Figure 1 - type 5 (in Clause 2.11.2 of this Supplement).

The D4-V108 marker is used where the median width is between 1.6 and 2.4 m.

Where the island or separator is narrower than 1.6 m, the central obstruction arrow board D4-V105 is used. The A size D4-V105 is generally used. However, if greater conspicuity is required, a B size sign should be used instead.

Clause 4.6.7.2 (c) – Width marker (D4-3)

a) At bridges

Width markers are used at bridges in accordance with the following guidelines:

- Two-way unkerbed approaches (typically rural)
 - where the clearance to the bridge kerb or non-frangible obstruction from the edge of the running lane is less than the shoulder widths given in Tables V4.1 and V4.2 of VicRoads Supplement to Austroads Guide to Road Design Part 3: Geometric Design (2012).

- Two-way kerbed approaches (typically urban)
 - where the width between kerbs on the approach is greater than that on the bridge
 - where there are non-frangible vertical obstructions less than 600 mm clear behind the bridge kerb.
- Two-way unsealed approaches
 - any bridge less than 2 m wider than the approach pavement or running portion of the formation.
- One-way approaches (typically on freeways)
 - any bridge where full approach shoulder width is not carried across the bridge.

For the above cases, markers are always placed on both sides of the road, including sites where the guide for a marker is met on one side only. The markers are located in front of, and as near as practicable to the bridge end post with inner edges approximately 300 mm clear of the line of the kerb face, or if unkerbed, flush with the inner edge of the end post, see Figure 21.

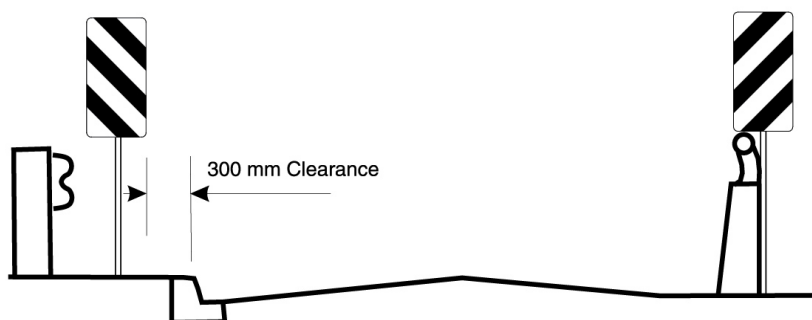


Figure 21: Location of width markers on bridge approaches

The size of markers to be used is as follows:

- A Size - rural areas where traffic volume is less than 300 vpd
- B Size - all other cases.

Bridge width markers may be omitted on roads carrying less than 50 vpd.

b) At underpass piers

Width markers are used at underpass piers or similar carriageway constrictions when the width between obstructions is less than the approach formation width (which includes shoulder and verge). The markers should be placed on or just in front of the obstructions, with the inner edge flush with the inner edge of the obstruction.

c) At other vertical obstructions

As per the guidance in AS 1742.2:2009 Clause 4.6.7.2 (c), the left-hand marker is used where traffic passes to the right of the obstruction, and vice versa. Special markers may be designed where the size or shape of the standard marker is inappropriate. For treatment of obstructions in the centre of the carriageway, e.g. bridge piers, refer to Clause 4.6.7.2 (b) of AS 1742.2:2009.

Table 4.6 – SIGNS FOR APPROACHES TO CHANGES IN PAVEMENT WIDTH AND LANE REDUCTIONS—SIZE TABLE

Additional signs used in Victoria are shown in Table 4.

Table 4: Additional signs used in Victoria for use on approaches to changes in pavement width and lane reductions

Sign	Sign number	Size (mm)
DIVIDED ROAD 2 KM AHEAD	G9-V108	A – 1000 x 1000 B – 1400 x 1400
LEFT LANE ENDS xxx m	G9-V119	1600 x 2400
LEFT LANE ENDS MERGE RIGHT	G9-V120	B – 2025 x 1350 C – 2700 x 1800 D – 3600 x 2400
LANE ENDS MERGE RIGHT	GE9-V22-1	3600 x 1880
4 LANE UNDIVIDED ROADWAY	W4-V102	A – 750 x 750 B – 900 x 900 C – 1200 x 1200

Clause 4.7.2 – General treatments at lane reductions (merges)

Additional guidance regarding the use of pavement merge arrows is found in Clause 5.5.2.4 of this Supplement.

A standard zip-merge after a signalised intersection and the use associated signs is shown in Figure 25.

Figure 4.19 – TRANSITION FROM FOUR-LANE DIVIDED TO FOUR-LANE UNDIVIDED ROAD

For best practice, Figure 22 should be used instead of Figure 4.19 in AS 1742.2:2009. Figure 22 provides further information regarding the use of W4-V102 warning signs.

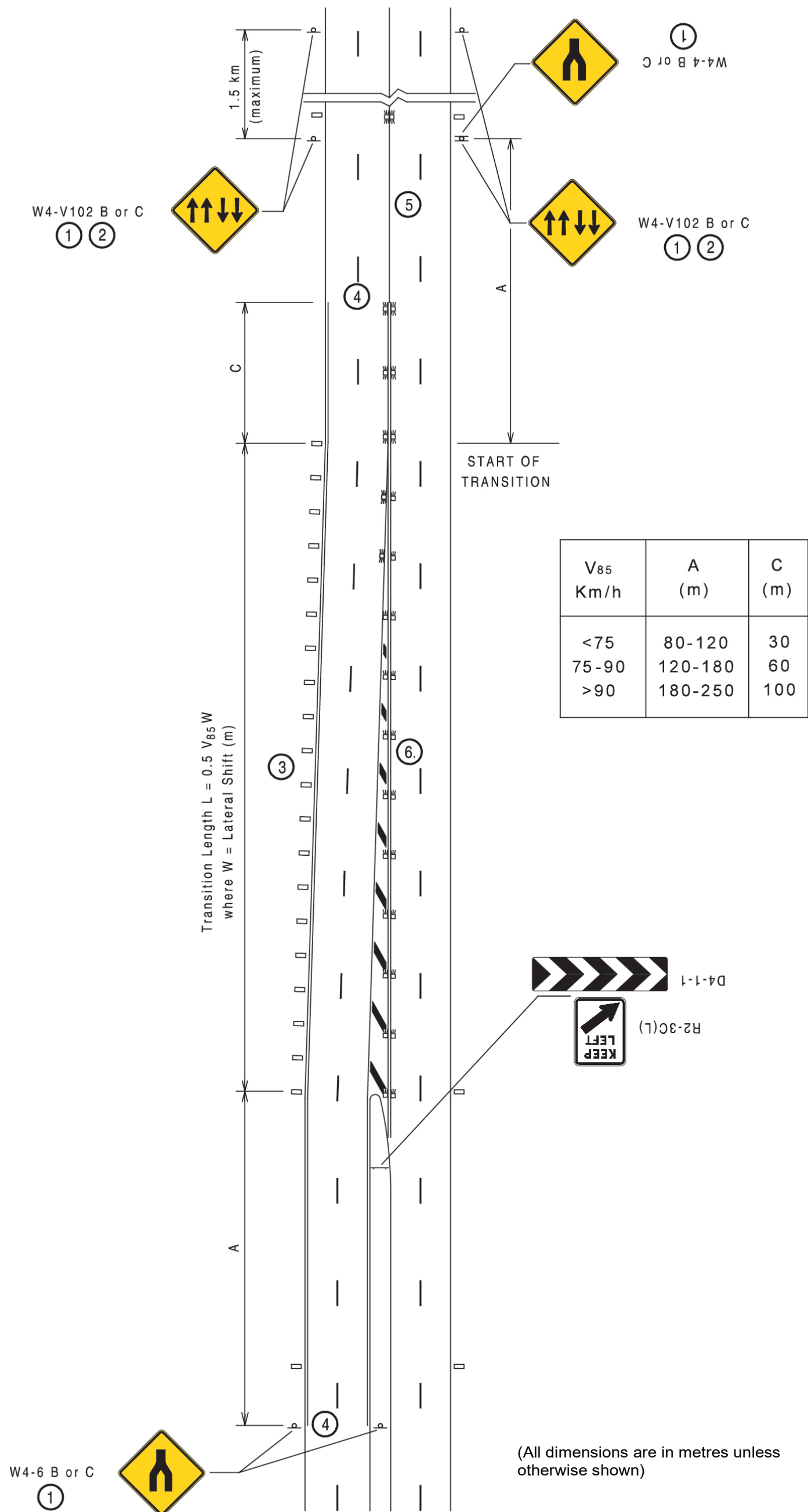


Figure 22: Transition from four-lane divided to four-lane undivided road

Notes to Figure 22:

- 1. Use a C size sign where $V85 \geq 75$ and a B size sign where $V85 < 75$, unless larger signs are warranted for conspicuity.**
- 2. Leaving the duplicated roadway, the size of the first pair of W4-V102 signs are C size where $V85 \geq 75$ and B size where $V85 < 75$, unless larger signs are warranted for conspicuity. Subsequent signs are normally B size. Further signs may be required at a spacing of approximately 4 km, where there are sections of stage-built duplication interspersed with two-way sections of road. Pavement arrows may also be installed to reinforce lane discipline adjacent to these signs on these interspersed sections of two-way road.**
- 3. Guide posts and delineators are installed at a spacing of 12 m through the transition. These may not be necessary where the road is kerbed and there is street lighting. Where the edge of roadway is unkerbed, guide posts are located at the outer edge of the shoulder, refer to Clause 4.2.4.2 of AS 1742.2:2009 regarding guide post type selection.**
- 4. The minimum length of edge line for unkerbed roadway = $A+L+C$. Install red and yellow RRPMS where warranted in accordance with Clause 5.6.5.2 of AS 1742.2:2009.**
- 5. A 150 mm continuous barrier line would normally be installed with double RRPMS (refer to Clause 5.3.3 of AS 1742.2:2009 and Figure 60).**
- 6. See Clause 5.6.5 of AS 1742.2:2009 and Figure 60 of this Supplement for the use of coloured RRPMS in a gore area.**

Figure 4.20 – TRANSITION FROM FOUR-LANE DIVIDED TO TWO-LANE UNDIVIDED ROAD

For best practice, Figure 23 should be used instead of Figure 4.20 in AS 1742.2:2009. Figure 23 provides further information on the use of warning and overtaking signs beyond the transition point.

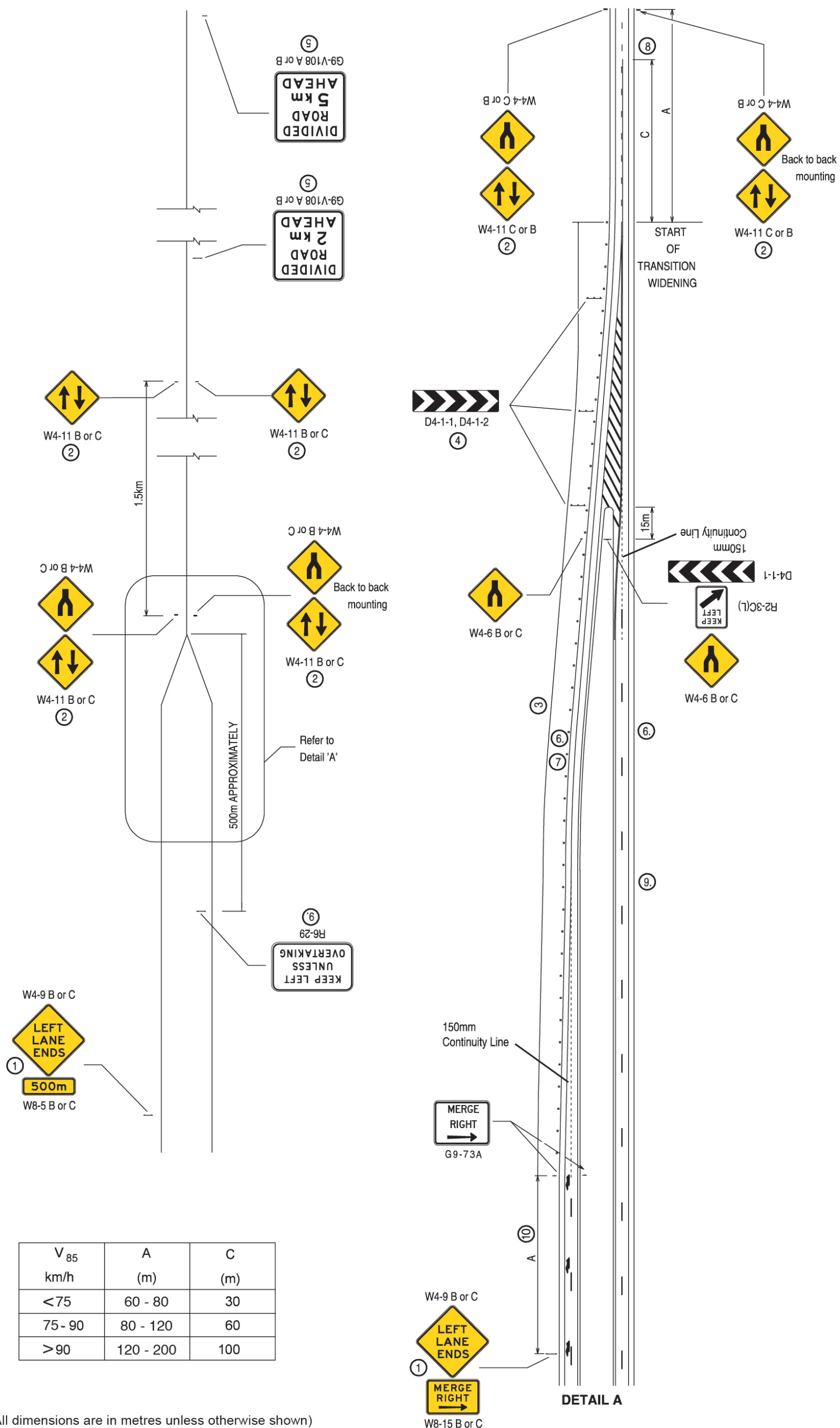


Figure 23: Transition from a four lane divided to a two lane two way undivided road

Notes to Figure 23:

1. *W4-9, W8-5 and W8-15 signs are C size where $V85 \geq 75$ and B size where $V85 < 75$, unless larger signs are warranted for conspicuity.*
2. *Leaving the duplicated roadway, the first pair of W4-11 signs are C size unless D size is warranted. Further signs may be required at a spacing of approximately 4 km where there are sections of stage-built duplication interspersed with two-way sections of road. Pavement arrows may also be installed to reinforce lane discipline adjacent to these signs on these interspersed sections of two-way road.*
3. *Guide posts and delineators are at a spacing of 12 m through the transition. These may not be necessary where the road is kerbed and there is street lighting. Where the edge of the roadway is unkerbed, guide posts are located at the outer edge of shoulder, refer to Clause 4.2.4.2 of AS 1742.2:2009 regarding guide post type selection.*
4. *Hazard markers are used where additional delineation of the alignment through the transition is required.*
5. *These signs are not generally required in an urban area. In a rural area, use the 5 km sign, unless that point is in an urban area or is on a divided road. Use the 2 km sign where the 5 km sign has not been used, or on a high volume route. The A size sign is normally used unless roadway conditions warrant a larger sign size for conspicuity.*
6. *RRPMs are not shown but shall be installed in accordance with Clause 5.6.5 of AS 1742.2:2009 where painted edge lines are installed. RRPMs are not installed adjacent to kerbed roadways, typically in urban areas.*
7. *Where general warrant is for a 100 mm edge line, this may be increased to 150 mm on the outside of the curve over the lane drop transition from divided to undivided.*
8. *The limit of edge lines when not warranted on continuing roadway.*
9. *Install "Keep Left Unless Overtaking" (refer to Clause 4.13.5 of this Supplement), speed zone and repeater signs as required.*
10. *Three merge arrows are marked equally spaced in accordance with Clause 5.5.2.4 of AS 1742.2:2009.*
11. *A barrier line is installed if "no-overtaking" zone warrants are met, refer to Clause 5.3.3.2 of AS 1742.2:2009.*

Transition from freeway to two-lane two-way undivided road

Figure 24 shows the layout of signs and markings for a lane drop where freeway conditions end and the road continues as a two-lane, two-way road.

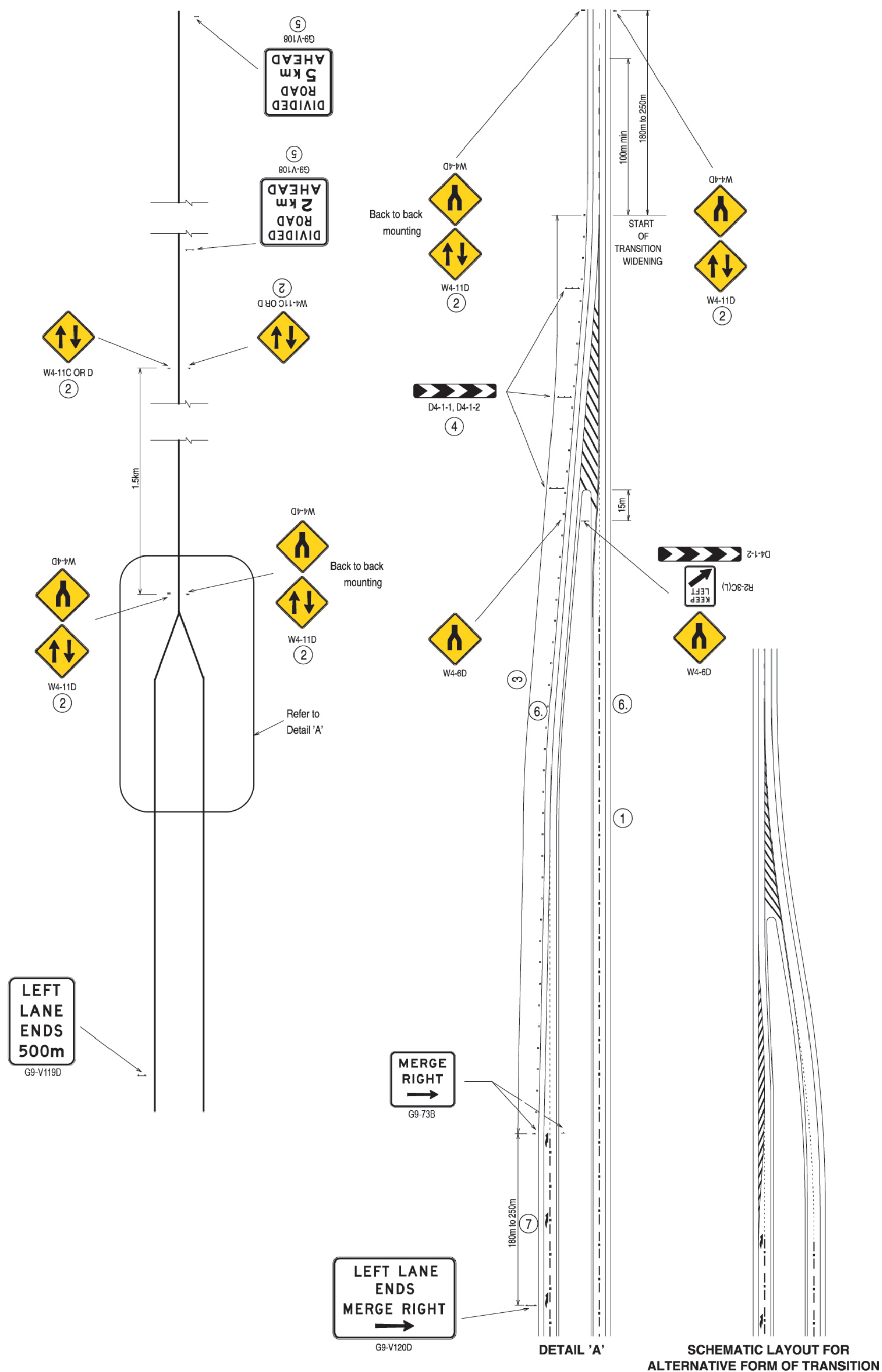


Figure 24: Transition from Freeway to Two-Lane Two-Way Undivided Road

Notes to Figure 24:

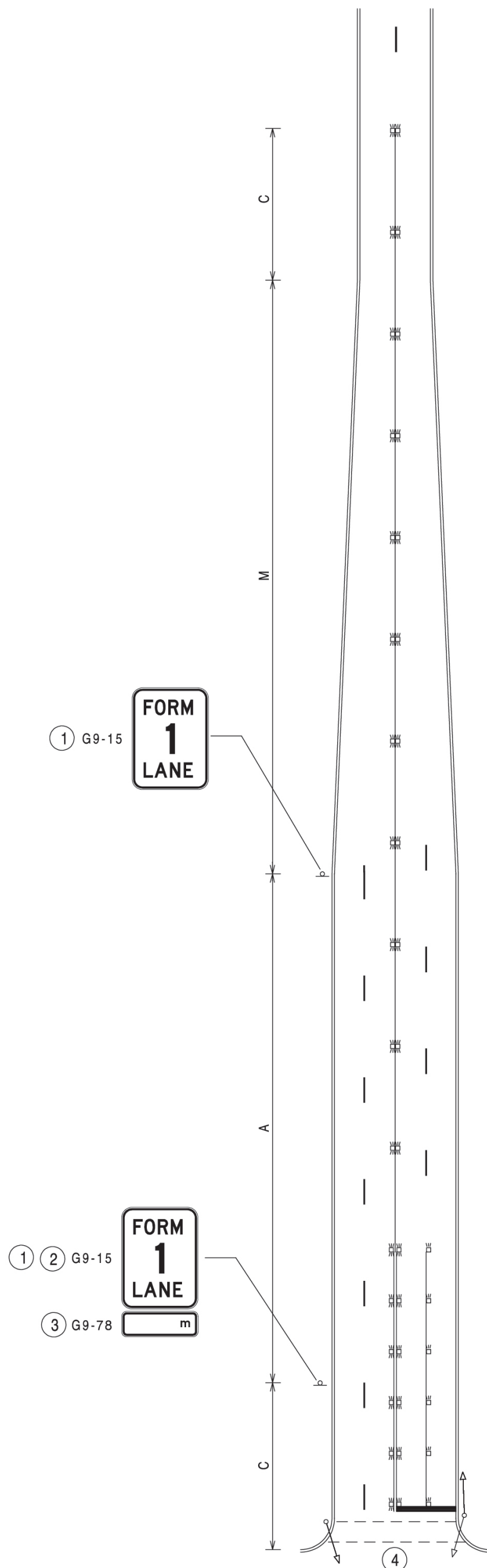
1. **EMERGENCY STOPPING LANE ONLY**, speed zone and repeater signs, **START FREEWAY**, **END FREEWAY** and **Prohibition** signs shall be installed generally in accordance with requirements outlined in Clause 3.8 of AS 1742.2:2009 (and Supplement). It should be noted that the **Prohibition** signs will need to be located beyond a point where an alternative route is available for prohibited classes of vehicle.
2. Leaving the freeway, the pair of **W4-11** signs are **D** size. Subsequent pairs are normally **C** size unless **D** size is warranted. Further signs may be required at a spacing of approximately 4 km, where there are sections of stage-built freeway interspersed with two-way sections of road. Pavement arrows may also be installed to reinforce lane discipline adjacent to these signs on these interspersed sections of two-way roads.
3. Guide posts and delineators at a spacing of 12 m through the transition are required.
4. Hazard markers installed where additional delineation of alignment through the transition is required.
5. Use the 5 km sign, unless this sign would be located in an urban area, or would be located on a divided road, in which case only the 2 km sign is used. On high volume routes, the 2 km sign may be used in addition to the 5 km sign.
6. **RRPMs** are not shown but shall be installed in accordance with Clause 5.6.5 of this Supplement.
7. Three merge pavement arrows are installed and are equally spaced between the “**LEFT LANE ENDS MERGE RIGHT**” sign and “**MERGE RIGHT**” sign, refer to Clause 5.5.2.4 of AS 1742.2:2009.

Clause 4.7.5.1 – Signs for zip-merge

A zip-merge is where a road narrows and neither of the lanes is deemed to end; therefore drivers are required to merge in turn under rule 149 of Road Safety Road Rules 2009.

On freeway on-ramps, B sized signs are used with one sign is located on each side of the ramp.

A standard zip-merge after a signalised intersection and the use associated signs is shown in Figure 25.



V ₈₅ Km/h	A (m)	C (Minimum) (m)	M (m)
< 75	60 - 80	30	90
75 - 90	80 - 120	60	120

(All dimensions are in metres unless otherwise shown)

Figure 25: Lane drop beyond signalised intersection

Notes to Figure 25:

1. *Where two or more lanes are continuing, replace '1' with the appropriate number of lanes e.g. FORM 2 LANES (G9-16) where there are two lanes continuing.*
2. *Where there is insufficient distance to meet the minimum requirements for A and C, this advance sign may be omitted.*
3. *The distance shown on the supplementary plate (G9-78) should match the actual distance between the two signs to the nearest 20 m.*
4. *Intersection layout and approach markings are indicative only.*

Clause 4.7.5.2 – Signs for lane changes

These signs shall be used whenever the number of marked lanes for travel in one direction reduces from two lanes to one lane, from three to two lanes and so forth. Continuity lines are used to inform drivers that the left lane is about to end and of the required action. Drivers should thus be aware of the need to give way whilst changing lanes, as required under rule 148 of Road Safety Road Rules 2009.

The signs are also used in conjunction with the LEFT LANE ENDS (W4-9) and MERGE RIGHT (W8-15) warning signs. The Left Lane Ends (W4-9) sign is used on all roads other than freeways where the left lane is terminated and traffic must merge. Sign W8-15 shall only be installed in conjunction with the LEFT LANE ENDS sign W4-9 at the second sign assembly at a lane drop.

Standard arrangements for lane change manoeuvres and the use of MERGE RIGHT signs and their associated signs are shown in Figure 23.

For freeways, where practicable, a reduction in the number of traffic lanes should be arranged so that:

- the lane drop occurs on the left side of the carriageway, so that traffic in the terminating lane must merge into the lane on its right
- two consecutive lane drops are separated, so that adequate distance is available for effective signing
- a lane drop in the vicinity of an entry ramp occurs in advance of the ramp. If it occurs after the entry ramp, adequate distance should be provided between the end of the ramp taper and the start of the taper for the lane drop, so as to provide for effective signing
- a lane drop in the vicinity of an exit ramp (other than a left trap lane on a two lane exit - refer to Clause 3.8 of AS 1742.2:2009 and Supplement) shall occur at least 150 m beyond the exit nose
- where a lane drop occurs such that the adjacent right lane cuts across in front of the left terminating lane (i.e. geometrically, the left lane appears to be the continuing lane) then the alternative linemarking arrangements shown in Figure 24 shall be adopted.

Signs and markings used for a mid-block lane drop are as follows:

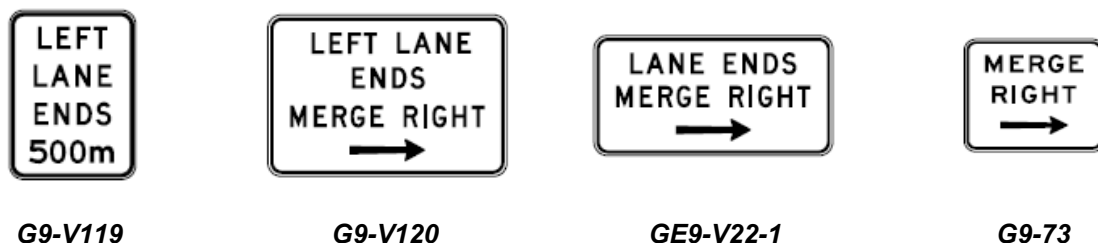
- The LEFT LANE ENDS 500 m (G9-V119) sign is located approximately 500 m from the start of merge taper, to give the first warning of the lane drop. Due to site constraints, the distance may be reduced to an absolute minimum of 300 m in exceptional circumstances.
- The LEFT LANE ENDS MERGE RIGHT (G9-V120) sign is located 180 to 250 m from the start of the merge taper. Alternatively, at this point, the LANE ENDS MERGE RIGHT (GE9-V22-1) sign is used where the opportunity exists to place the sign directly above the terminating lane, e.g. on a sign gantry in the vicinity of an exit.
- Three equally spaced merge pavement arrows shall be marked in the lane which ends. The first one shall be at the G9-V120 sign and the third one shall have its point at the start of the merge taper (see Figure 26 for pavement marking details).

Where the lane drop occurs in the vicinity of an exit ramp, the signing and markings is modified from the mid-block treatment as follows:

- The location of the first sign must be located clear of any advance exit signs and a change in text is required to indicate the appropriate advance distance e.g. 400 or 300 m.

- The second sign (GE9-V22-1) is overhead mounted on the exit ramp gantry which supports the exit direction and through direction signs. The GE9-V22-1 sign shall be mounted over the lane that terminates.
- The merge pavement arrows (refer to Clause 5.5.2.4 of AS 1742.2:2009) start beyond the exit nose. Three equally spaced arrows are marked between the nose and the MERGE RIGHT G9-73 sign.

In all cases, the MERGE RIGHT sign (G9-73) is placed at the start of the merge taper.



For guidance on the appropriate sign size to use, refer to Appendix B3 of this Supplement. In particular, refer to (c) in Appendix B3 of this Supplement for sign sizes for G9/GE9 signs.

Typical layouts for freeway lane drops are shown in Figure 24 and Figure 26.

A lane drop along an entry ramp is described in Clause 4.7.5.1 of AS 1742.2:2009.

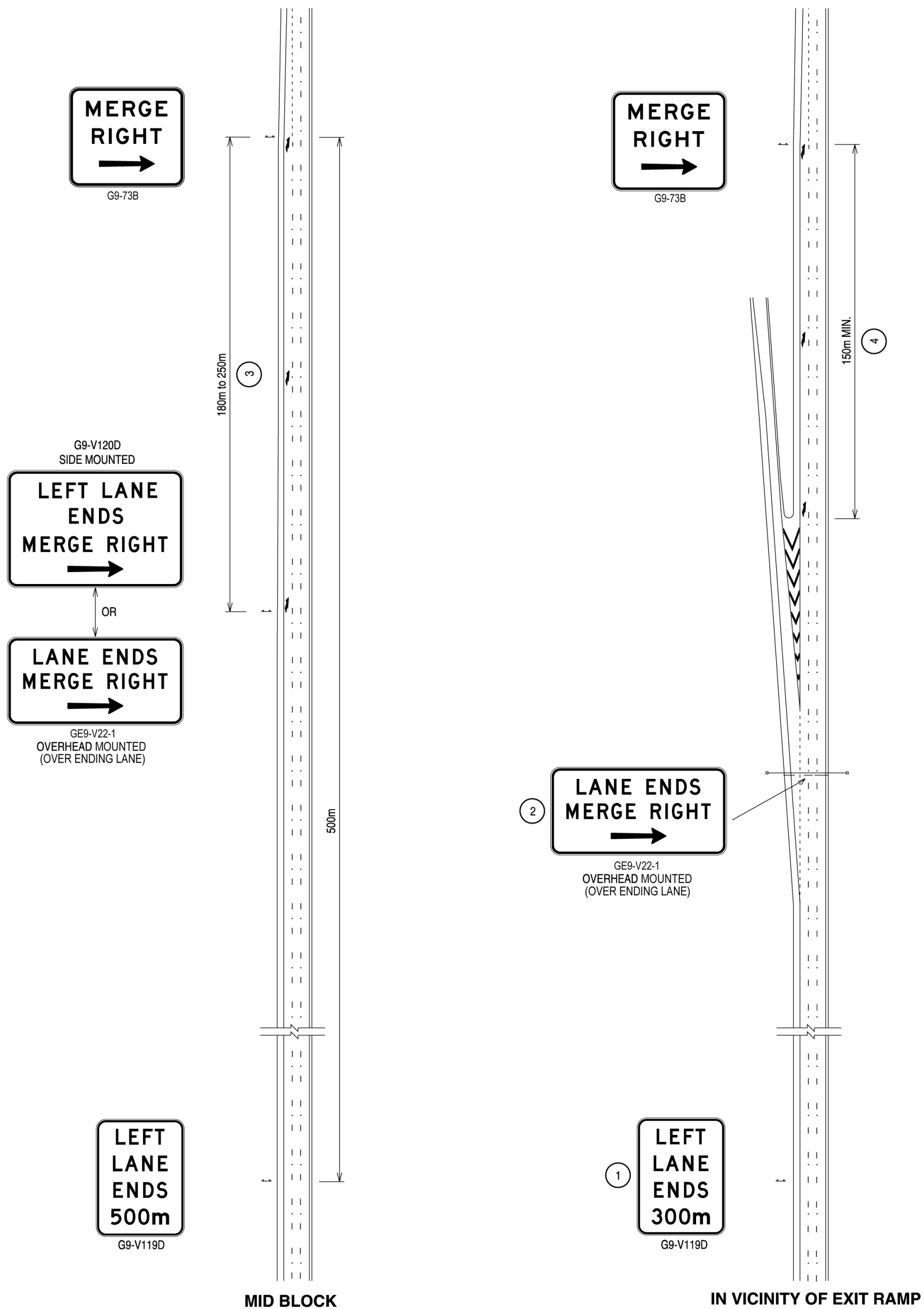


Figure 26: Lane Drop on Freeway

Notes to Figure 26:

1. Location of G9-V119 “LEFT LANE ENDS x m” sign will need to be adjusted to avoid conflict with advance exit “LEFT LANE” sign in urban situations. The desirable distance between signs is 250 m. To achieve this, the distance shown on the sign will usually be 300 or 400 m and should match the actual distance to the start of the taper to the nearest 100 m.
2. Refer to information above for the use of sign GE9-V22-1 “LANE ENDS MERGE RIGHT” in the vicinity of an exit ramp. The gantry shall be located to ensure GE9-V22-1 “LANE ENDS MERGE RIGHT” sign is mounted directly over the left through lane. The GE2-V1 exit direction sign is centrally mounted over the exit ramp lane.
3. Three merge arrows are marked equally spaced.
4. Three merge arrows equally spaced. First merge arrow located beyond nose and last merge arrow adjacent to sign G9-73.

Clause 4.7.5.4 - Signs at the beginning and end of divided roads

DIVIDED ROAD x km AHEAD

The DIVIDED ROAD x km AHEAD sign (G9-V108) shall be used on two-lane two-way sections of rural road in advance of freeway/M Route conditions to reduce the incidence of possibly unsafe overtaking manoeuvres. The 2 km sign is used where it is not practical to install a 5 km sign (i.e. the location of the sign would be on a divided road or within a township), or in addition to a 5 km sign to emphasise the message on a high volume route, refer to Figure 24.

For sign details, refer to sign G9-V108 DIVIDED ROAD x KM AHEAD in the VicRoads Supplement to AS 1743.



G9-V108

Clause 4.7.5.4 (a) – Divided Road (W4-4)

For a shorter length of median (including sections less than 300 m long to one side of a major intersection), sign W4-5 (Island) may be more appropriate.

The W4-4 sign may be repeated on the right side of the carriageway if it is likely that a hazardous situation might not otherwise be appreciated by an overtaking driver.

Sign W4-4 is also used at transitions from freeways and M Routes to undivided roads, as illustrated in Figure 24. The D size sign is used in these applications.

The supplementary START sign (W8-V100) shall not be used in conjunction with the W4-4 sign.

Clause 4.7.5.4 (c) – End Divided Road (W4-6)

Sign W4-6 should be used to give warning of the end of a divided road where the length of the median meets the requirements for sign W4-4. It shall not be used to indicate a reduction in lane or carriageway width.

The W4-6 sign may be repeated on the right side of the carriageway if it is likely that a hazardous situation might not otherwise be appreciated by an overtaking driver.



W4-6

Sign W4-6 is also used at transitions from freeways and M Routes to undivided roads, as illustrated in Figure 24. The D size sign is used in these applications.

The supplementary END sign (W8-V101) shall not be used in conjunction with the W4-6 signs.

Clause 4.7.5.4 (d) – Two-way (W4-11)

In addition to the guidance provided, this sign shall be used:

- beyond the end of a divided road, as illustrated in Figure 23, to emphasise and further remind drivers that the carriageway has changed from one-way to two-way
 - They shall be installed in all cases in rural areas where the length of divided road exceeds 1 km (nose to nose).
 - One sign is located 200 to 300 m beyond the end of the median, typically on the reverse side of the right hand Divided Road (W4-4) sign, and a further sign at a distance of approximately 1.5 km beyond the first, unless it is in a built-up area or further divided road intervenes.
 - On rural A and B Routes, the C size sign is used for the first set of signs and D size signs at the termination of M Routes.
 - On freeways, the D size sign is used for the first pairs of signs, and C size is used for subsequent pairs, unless D size is warranted.
- where a carriageway is designed or normally used for one-way traffic, but as a temporary measure, is used for two-way traffic. On high volume rural roads, the D size sign should be used.

Sign W4-V102 shall be used where four lane two way traffic conditions exist as a substitute for the W4-11 sign.



W4-V102

The regulatory Two-Way sign (R2-11) is not used for the above purposes, but is used to legally permit two-way traffic on a service road or other carriageway to the right of centre.

Clause 4.8.1 (a) – Overtaking Lanes

The lanes are usually at least 1 km in length.

Overtaking lanes are signed and marked to encourage all traffic in the first instance to use the left lane. The use of overtaking lanes is illustrated in Figure 27 of this Supplement (instead of AS 1742.2:2009 Figure 4.21). Size A signs may be used where there is insufficient room at the site to accommodate a B size sign.

Clause 4.8.1 (b) – Climbing Lanes

The arrangement of signs for a climbing lane is shown in Figure 28 of this Supplement (instead of AS 1742.2 Figure 4.22).

Figure 30 shows the layout of signs and markings for a typical start to a climbing lane on a freeway. The layout is similar to that applied on other types of divided roads, i.e. slow vehicles only are encouraged to use the left lane. As far as practicable, climbing lanes should be started and finished clear of entry or exit ramps.

Should it be observed that slower vehicles (notably heavy vehicles) are not moving left, consideration may be given to installing a Trucks Prohibited sign, applicable to all lanes except the slow lane and the next lane to its right (refer to AS 1742.12:2000 for details).

The end of the climbing lane is treated as a lane drop (refer Figure 28 of this Supplement).

Clause 4.8.1 (c) – Turnouts

It is preferable to have turnouts at frequent intervals along hilly or mountainous roads (say 4 km), but the spacing usually varies markedly because of site constraints.

The length of the turnout does not necessarily enable the slow vehicle to maintain its speed and may require it to almost stop, in order to allow other vehicles to overtake.

Figure 29 shows typical dimensions and a signing scheme for slow vehicle turnouts.

DEPARTURE

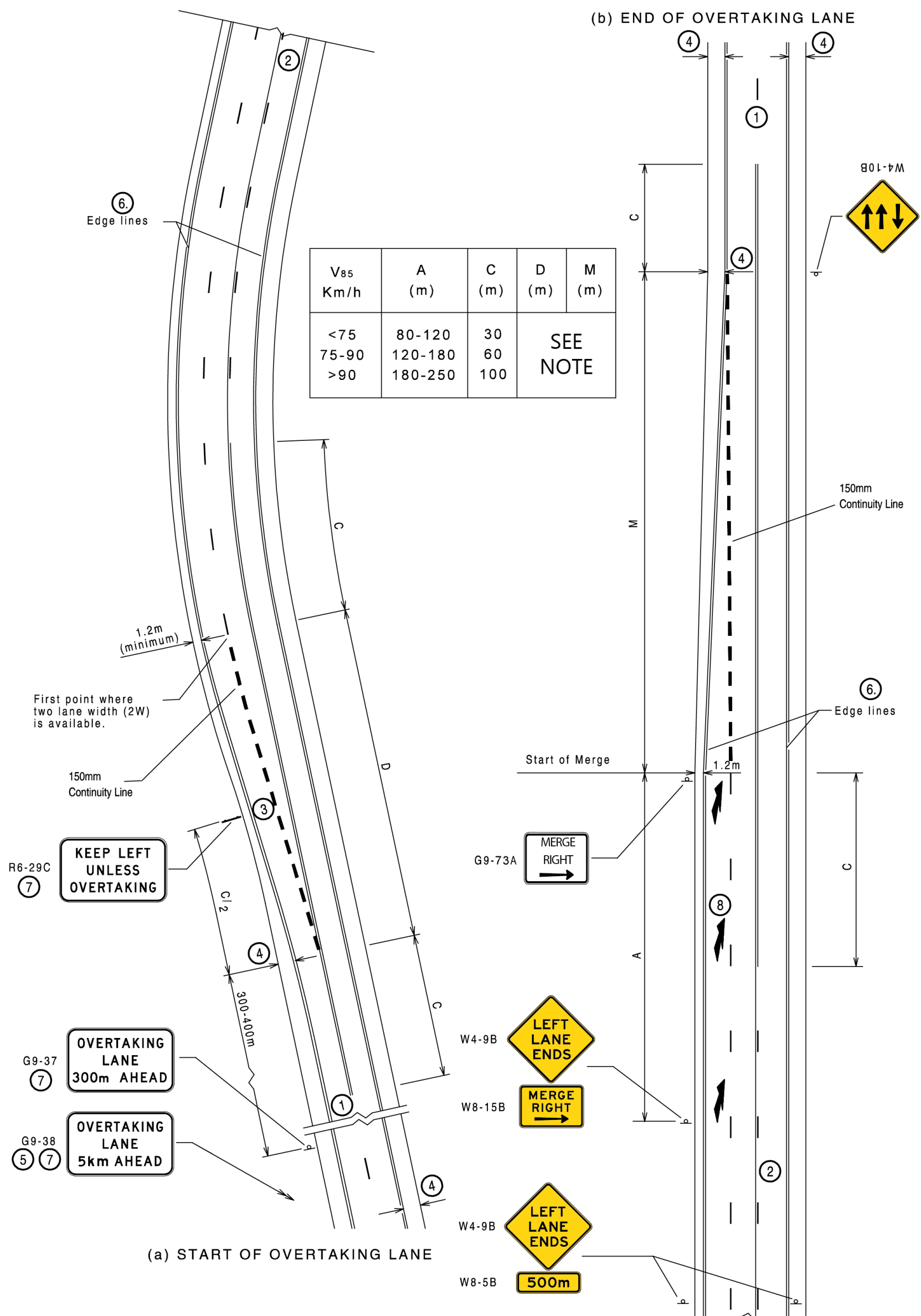
In cases where the parallel section of lane is less than 60 m long, the LEFT LANE ENDS and MERGE RIGHT sign assembly should not be provided. This is based on the assumption that the entire length of such a short lane would be seen by the driver of an approaching slow vehicle, and that the vehicle would have to almost stop in the lane and give way when re-joining the traffic stream.

Where parking is likely to occur in or adjacent to a slow vehicle turnout and cause operational problems, No Stopping signs may be provided to prohibit parking.

Figure 4.21 – OVERTAKING LANES ON TWO-LANE RURAL ROADS

The following figure (Figure 27) provides additional information to Figure 4.21 in AS 1742.2:2009.

For best practice, Figure 27 should be used instead.



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

Figure 27: Overtaking lane on two-lane two-way rural road

Notes to Figure 27:

1. *The separation line is continued as barrier line if no-overtaking zone warrants are met; refer to Clause 5.3.3.2 of AS 1742.2:2009.*
2. *The separation line marking for a single lane direction changes to a double barrier line where “no-overtaking” zone warrants are met. Note particularly the requirements of Clause 5.3.3 of AS 1742.2:2009. Where overtaking lanes in opposite directions overlap one another, the separation line will always be a double barrier line, regardless of the overtaking sight distance. Where an overtaking opportunity is provided within 5 km downstream, a barrier line shall be installed (refer to Clause 5.3.3.1 of AS 1742.2:2009). A minimum distance of 350 m should be provided for a one way barrier line.*
3. *Where practicable, mark the continuity and edge line to provide a smooth alignment into the left lane, rather than a sudden change in direction.*
4. *Minimum shoulder width as per Austroads Guide to Road Design Part 3, Section 4.3 (2010) and Table V4.2 of VicRoads Supplement to Austroads Guide to Road Design Part 3 (2012).*
5. *The G9-38 sign should always be provided 5 km in advance of the overtaking lane, except where such sign locations occur in a built-up area or on a divided road. A further optional sign may be provided at 2 km on high volume routes, or where the 5 km sign cannot be used.*
6. *Edge lines are always placed over the length of each taper plus a further 100 m at each end of each taper. They are placed over the whole section when approved for the remainder of the route.*
7. *Where space is insufficient, a sign with a smaller legend may be installed instead.*
8. *Three merge arrows are marked equally spaced in accordance with Clause 5.5.2.4 of AS 1742.2:2009.*

Figure 4.22 – TYPICAL TREATMENT FOR CLIMBING LANES ON DIVIDED ROADS AND TURNOUTS

Figure 28 and Figure 29 provide additional information to Figure 4.22 in AS 1742.2:2009. Figure 30 outlines signing arrangements on climbing and added lane on freeways.

For best practice, these figures should be used instead of Figure 4.22. Figure 28, Figure 29 and Figure 30 also show the use of Victoria specific signs not covered in Figure 4.22.

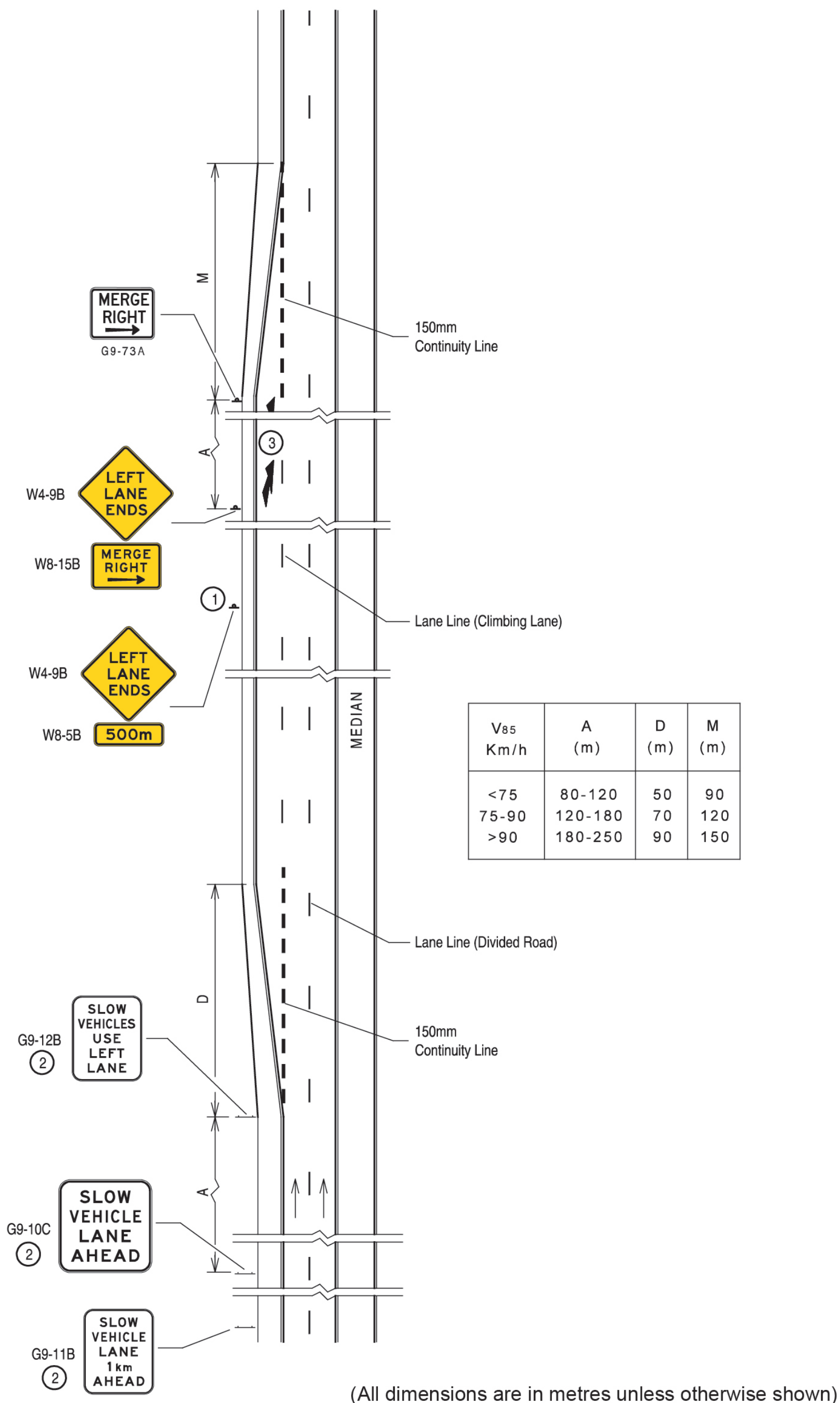


Figure 28: Typical treatment for climbing lanes on divided roads

Notes to Figure 28:

- 1. Use where the left climbing lane is more than 1km.**
- 2. Use A size signs on low speed approaches or where there is insufficient space for the standard size.**
- 3. Three merge arrows are marked equally spaced in accordance with Clause 5.5.2.4 of AS 1742.2:2009.**

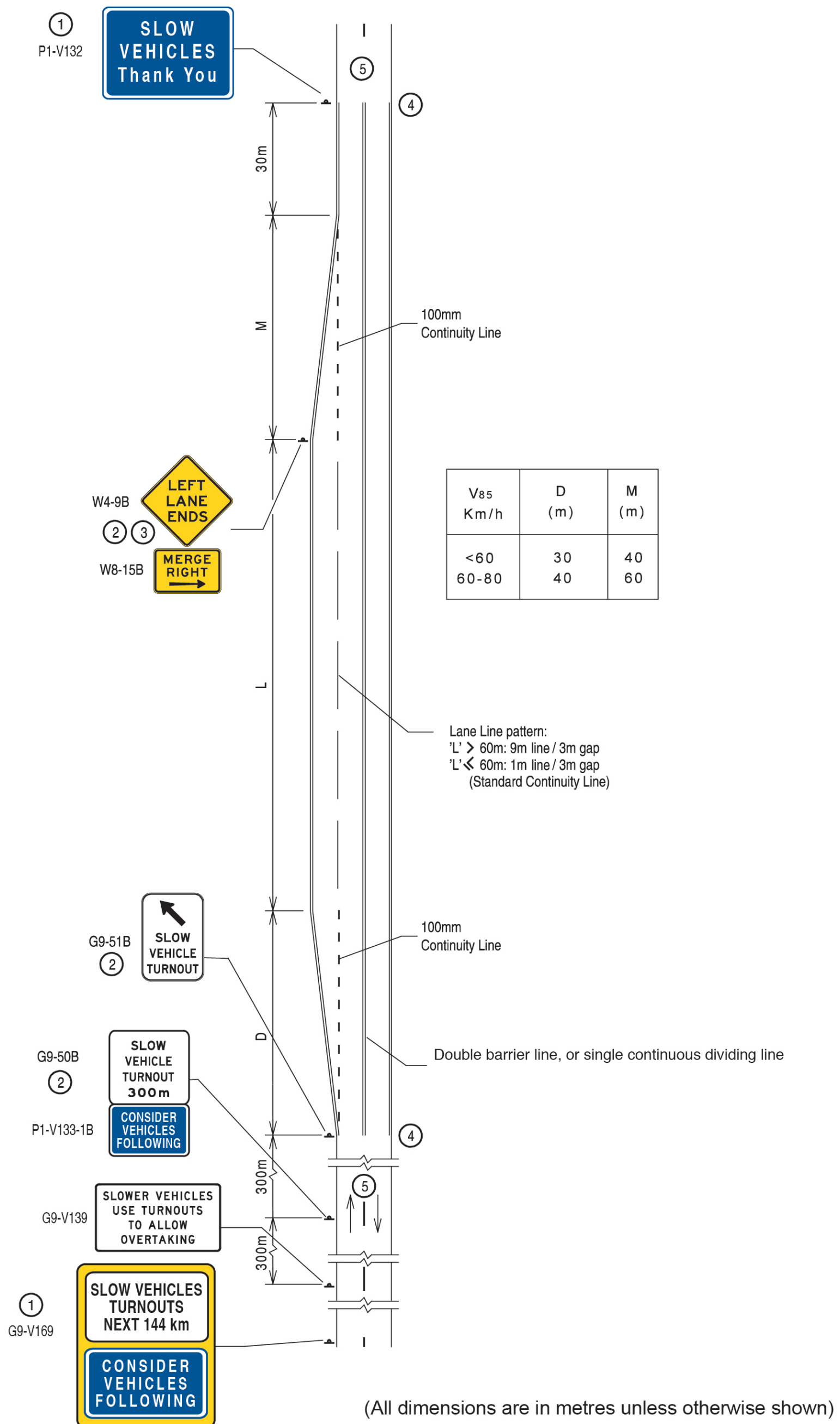


Figure 29: Typical treatment for slow vehicle turnouts

Notes to Figure 29:

- 1. *These signs are provided where there is a group of turnouts and the G9-V169 is located approximately 1 km in advance of the first turnout.***
- 2. *Use A size signs on low speed approaches or where space for the erection of the sign is limited.***
- 3. *This sign is to be provided when L exceeds 60 m.***
- 4. *As a minimum, edge lines are to be provided between limits shown***
- 5. *Dividing line continued as barrier line if “no-overtaking” zone warrants are met, refer to Clause 5.3.3.2 of AS 1742.2:2009.***

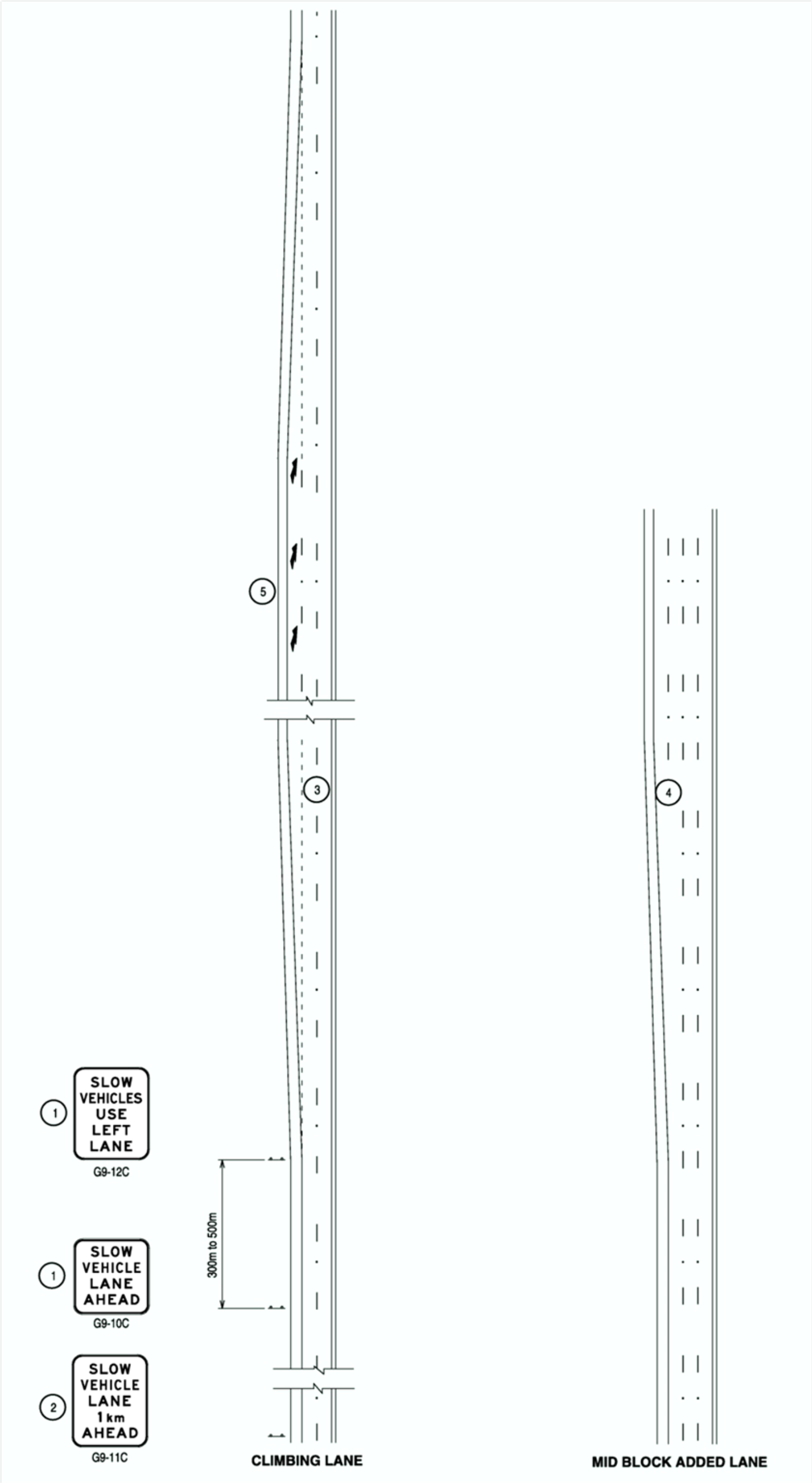


Figure 30: Climbing and added lane on Freeways

Notes to Figure 30:

1. *These signs are installed where an additional lane is provided as a climbing lane for slow vehicles.*
2. *In urban and outer urban areas, this sign is only required under heavy mix traffic conditions.*
3. *A continuity line is installed where it is intended that specific users (i.e. slow vehicles) are required to enter the auxiliary lane. It is intended that the majority of traffic will use the adjacent through lane and the slow moving vehicles will make a conscious decision to cross the continuity line and enter the left lane.*
4. *A continuity line is not required at the taper where a mid-block added lane is provided for general capacity requirements. Signs are not installed for this treatment.*
5. *Signs and markings for a lane drop, as per Clauses 4.7.5.2 and 5.5.2.4 of AS 1742.2:2009.*

Clause 4.8.2 (b) – Lane allocation (W4-10)

Where turning traffic from an overtaking lane constitutes a hazard, sign W4-V101 may be installed in advance of the access point. Line marking using combination through and turn arrows shall be provided at the access point with generally two additional combination arrows on its approach. The W4-V101 sign shall normally be located adjacent to the first combination pavement arrow approached by the driver.



W4-V101

Clause 4.8.2 (c) – SLOW VEHICLE LANE AHEAD (G9-10), SLOW VEHICLE LANE x km AHEAD (G9-11)

For best practice, the SLOW VEHICLE LANE AHEAD sign (G9-10) should be placed in accordance with Figure 28 (non-freeway roads) or Figure 30 (freeways and M Routes) to advise drivers of slow vehicles in advance to prepare to move into the slow lane.

The SLOW VEHICLE LANE 1 km AHEAD advance warning sign (G9-11) is only required under heavy mixed traffic flow to advise all drivers that slow moving trucks will shortly clear the main freeway lanes.

Clause 4.8.2 (e) – OVERTAKING LANE x m AHEAD (G9-37), OVERTAKING LANE x km AHEAD (G9-38)

Sign G9-37 is normally located 300 to 400 m in advance of the start of the diverge taper.

Sign G9-38 is used wherever it is considered desirable to advise drivers, well in advance, of the existence of overtaking opportunities downstream. This sign is therefore always used on A Routes, and generally on B Routes, as a means of encouraging drivers to wait until they reach the extra lane before overtaking. The distances shown will normally be 2 or 5 km.

The G9-37 and G9-38 signs are not used where a climbing lane (i.e. slow vehicle lane) is provided on a divided road. In addition, the G9-38 sign shall not be erected in a built up area.

Clause 4.8.3 – Signs for turnouts

In addition to the SLOW VEHICLES signs, signs G9-V169 and P1-V132 are used where a group of turnouts is provided. A group is defined as three or more turnouts with not more than 10 km between successive turnouts. Where successive turnouts are more than 10 km apart, they shall be signed individually or as separate groups.

The G9-V139 sign is installed to promote the use and better understanding of slow vehicle turnouts. They shall be installed:

- beyond the first G9-V169 sign "... TURNOUTS NEXT XX km" on a particular route; and
- nominally 300 m in advance of the G9-50 sign "... TURNOUT 300 m" at isolated turnouts or, where a series of turnouts is provided, at the first turnout beyond a major intersection, i.e. where a significant volume of traffic could join the route.

Refer to Figure 22 in this Supplement for signing arrangements.

For sign details, refer to the relevant sign in the VicRoads Supplement to AS 1743.

Clause 4.9.3 (a) – Steep Climb (W5-13)

The W8-17-1 supplementary sign may be used with the W5-13 sign to indicate the length in km over which the road condition occurs, commencing close to the sign.

Where the hazard occurs over a long distance, i.e. over 5 km, consideration should be given to the use of repeater signs.

Clause 4.11.2 – Hazard warning signs

Additional signs used in Victoria

a) Sections of road subject to ice snow

Sign G9-V113-1 is erected at key locations on roads leading into Alpine areas to instruct drivers to drive slowly because ice, frost or snow may be encountered.

At specific known points of hazard within the section of signed road, warning signs indicating that the surface is slippery may be necessary. On high speed roads it is often desirable, depending on the extent of the hazard, to erect a composite sign with flashing lights (see Appendix E of AS 1742.2:2009). These signs may also include a variable message panel. The variable signs should only be installed with the approval of the Director – Network Policy and Standards.



G9-V113-1

b) Snow pole signs

G9-V114 series signs are mounted on snow poles in alpine areas (refer to Clause 4.2.6 of AS 1742.2:2009). They are installed so that the maximum spacing between signs is 500 m. There are two types of signs:

- G9-V114(L) (KEEP RIGHT OF POLES) is installed facing traffic where the pole is on the left side of the driver.
- G9-V114(R) (KEEP LEFT OF POLES) is installed facing traffic where the pole is on the right side of the driver (KEEP LEFT).

Where the maximum spacing cannot be met, additional signs should be installed.

The two signs are generally installed back-to-back on the same pole.



G9-V114(L)



G9-V114(R)

c) Concealed Entrance

Signs warning drivers of concealed entrances should only be considered as a last resort. In many cases, they provide limited road safety value as drivers can become complacent if they very rarely encounter a vehicle entering or exiting via the private access. Furthermore, the use of these signs may give property owners a false sense of security by giving the impression that their responsibility to enter the road safely has in some way been reduced.

Where there is a concealed entrance to a property, the following treatments should be considered first:

- relocation of the driveway or private access
- turning restrictions
- improvements to sight distance such as vegetation trimming
- bank/cutting soil removal
- alteration and/or relocation of property fencing
- shoulder acceleration or deceleration areas.

Installation of the sign may be considered only if the sight distance is so poor (even after other treatments mentioned above are applied) that a vehicle cannot slow to the speed of a turning or entering vehicle (e.g. sight distance is so poor that 85th percentile speeds could not be reduced to 20 km/h (speed of turning vehicle) in the distance available).



W5-V135

Clause 4.11.2.3 – GRAVEL ROAD (W5-19)

The W5-V102 may be used to warn drivers at the approach to a permanent section of rough surface. The sign should be used in conjunction with a 'NEXT xx km' supplementary sign (W8-17-1).



W5-V102

Clause 4.11.2.4 – Slippery (W5-20)

This sign may be installed in conjunction with flashing lights in extremely severe conditions as outlined in Appendix E of AS 1742.2:2009.

In addition, the 'WHEN ICY' (W8-V118) supplementary plate may be used in conjunction with this sign. Refer to Clause 4.11.2.10 of this Supplement for details.

Clause 4.11.2.6 – Stock (W5-38)

Sign W5-38 shall be used to warn of a permanent stock crossing. It shall be erected together with the supplementary sign W8-22 'CROSSING AHEAD'.

The complete signing requirements for stock crossings, stock droving and stock grazing are set out in Traffic Engineering Manual Volume 3, Part 2.5 – Manual for Traffic Control at Stock Crossings.

Other stock warning signs have been developed for specific purposes; refer to the VicRoads Supplement to AS 1743.

Clause 4.11.2.7 – Hazardous wildlife

The need for hazardous wildlife signs to warn road users should be determined from:

- consultation with a senior Department of Environment, Land, Water and Planning biodiversity officer to ascertain wildlife numbers and movement patterns and frequency (contact details: <http://www.delwp.vic.gov.au/about-us/contact-us>)
- reputable sources of recorded wildlife incidents (police, council rangers, maintenance supervisors, wildlife protection groups, etc.).

Signs should not be considered where they may be detrimental to road safety, e.g. where the erection of a koala warning sign may lead to drivers travelling at unacceptably low speeds looking for koalas.

Where more than one wildlife species could be encountered along a section of road, the species that is most prevalent should be shown on the sign. This does not preclude the signing a different species, e.g. wombat, within a long section of road substantially signed for kangaroos.

Supplementary distance sign W8-17-1 'NEXT xx km' may accompany the hazardous wildlife warning sign when the hazard exists over a length of more than 1 km. Signs may be repeated every 3 to 5 km if wildlife presents a hazard to road users over a long distance.

Additional hazardous wildlife warning signs may also be used as described below.

Horses (W5-V111)

Sign W5-V111 shall be used to warn of the presence of a horse and rider. It should only be used where there is a recognised concentration of horse movements, e.g. adjacent to pony clubs or horse trails.

Due care is needed in approving the use of this sign as indiscriminate use will undermine the effectiveness of the sign. Refer to Clause 4.11.2.7 of this Supplement for guidance on determining the need for this animal warning sign.



W5-V111

Deer (W5-V134)

Sign W5-V134 shall be used to warn of the presence of deer. It should only be used where there is a recognised concentration of deer movements, e.g. adjacent to State Forests with a high deer population and a high risk of collisions between vehicles and deer.

Due care is needed in approving the use of this sign as indiscriminate use will undermine the effectiveness of the sign. Refer to Clause 4.11.2.7 of this Supplement for guidance on determining the need for this animal warning sign.



W5-V134

Clause 4.11.2.9 – FIRE STATION (W5-36), AMBULANCE STATION (W5-37)

The use of warning signs on the approaches to fire and ambulance stations should be considered in consultation with the emergency service authority and taking into account the following guidelines.

On the approaches to fire and ambulance stations where emergency vehicle traffic signals are not provided, but where the presence of the station might not be obvious to the approaching motorist:

- Warning signs W5-36 and W5-37 respectively may be used to warn motorists that emergency vehicles may enter the road ahead.
- If a fire station and an ambulance station are located on the same site or adjoining sites, then warning sign W5-V121 may be displayed.
- Instead of the above signs, the use of an active warning sign W5-V122 (refer to Appendix E of AS 1742.2:2009) may be considered if at least five emergency departures per week are frequently made from the station, and at least one of the following circumstances also applies:
 - At least 3000 vpd use the road.
 - The available sight distance between an approaching car and an emergency vehicle entering the road is less than the minimum “safe intersection sight distance” as prescribed in Section 5.3 of Austroads Guide to Road Design Part 3 for the typical operating speed of the road. For comparison with the required minimum safe intersection distance, the available sight distance should be determined assuming:
 - The emergency vehicle to be positioned on the access road/driveway such that the driver is 5 m from the centre of the nearest lane, with a driver’s eye height of 1.15 m (i.e. allowing for the emergency vehicle to be a car, station wagon, etc, rather than, necessarily, a higher vehicle).
 - The approaching car is in the lane which results in the least sight distance to the emergency vehicle, with the car driver’s eye height taken as 1.15 m.
 - A substantial amount of roadside signage could significantly reduce the likelihood of an approaching driver observing an emergency vehicle entering the road.
 - A detailed risk assessment, which might include relevant documented hazard/incident reports, indicates a substantial risk of conflict between road traffic and entering emergency vehicles.

An active warning sign may also be provided as an interim measure where emergency vehicle traffic signals are warranted.



W5-V121

Clause 4.11.2.10 – WHEN WET (W8-7), WHEN FROSTY (W8-8), UNDER SNOW (W8-9) ON BRIDGE WHEN FROSTY (W8-29)

Warning signs for icy road surface conditions shall be installed in accordance with the VicRoads Black Ice Management Policy. The basic sign for this application is the Slippery sign (W5-20) with the 'WHEN ICY' supplementary plate (W8-V118).

If the section of road subject to icy conditions is on a bridge, the 'ON BRIDGE WHEN ICY' supplementary plate (W8-V122) should be used instead. To enable the sign to be hidden from view during the warmer months, it may be mounted on a yellow backing board and hinged so that it can be folded closed. This version is sign W5-V129.

Where an active warning sign is justified, the version of the sign with flashing yellow lights (W5-V116) may be used. The flashing yellow lights shall be activated by an ice detection system, which should also incorporate data communications with the Traffic Management Centre (refer to AS 1742.2:2009 Appendix E).



Clause 4.11.2.17 – Tram (W5-41)

A Tram Terminus sign (W5-V104) sign may also be used at locations where a tram route ends.

Sign W5-V110 may be installed above or beside a tram track to advise tram drivers of the appropriate speed at which to negotiate sections of track.

The sign consists of the tram symbol and the speed value to the nearest 5 km/h. These signs do not include a 'km/h', as this may create confusion or uncertainty regarding the speed limit or general safe speed on that section of road to other road users.

Supply and erection of these signs is the responsibility of the relevant tramway authority.



Clause 4.11.2.18 – Fallen Rocks (W5-42)

A Fallen Rocks sign shall only be installed at sites assessed as a HIGH or VERY HIGH risk in accordance with the Australian Geomechanics Society 'Practice Note Guidelines for Landslide Risk Management 2007' (<http://australiangeomechanics.org/resources/downloads/>).

Where a sign is warranted, the following is required:

- Sign W5-42 is used in conjunction with a W8-V127 supplementary sign (installed underneath).
- Signs are installed on the both approaches to the rockfall site.
- The left version of the sign is to be used when the rockfall is to the left of the driver and right version when it is to the right of the driver.



W5-42(L)



W5-42(R)



W8-V127*

***Note:** Formerly known as W5-V109

Clause 4.11.3.4 – Stock AHEAD (T1-19)

Sign T1-19 is for use as part of temporary stock crossing signing, or may be used in association with other signing for droving or grazing of stock.

Use of this sign is detailed in Traffic Engineering Manual Volume 3, Part 2.5 – Manual for Traffic Control at Stock Crossings.

Clause 4.11.3.5 – Changed traffic conditions signs

The T1-21, T1-22, T1-23 and T1-33 signs should be removed four to eight weeks after works are completed. This period may be extended to three months in special circumstances.

These signs should not be used to indicate intermediate stages, particularly when traffic is being diverted from one carriageway to another on a duplication project. Special signing indicating which carriageway is in use may be required, especially for side road approaches.

Clause 4.13 – MISCELLANEOUS SIGNS

a) Truck advisory routes

Advisory truck route signs are used to encourage trucks to use alternative routes which direct them away from sensitive areas such as residential, shopping or school precincts. The installation of these signs should only be considered following an engineering evaluation and consultation with the Truck Operations Committee. Refer to AS 1742.12 regarding the use of regulatory No Trucks sign R6-10-2.

The G9-V145 ADVISORY TRUCK ROUTE sign is provided at strategic locations to encourage trucks to use a designated truck route.

Sign G9-V146-1 is placed at intersections where the advisory truck route changes direction and sign G9-V146-2 is placed at appropriate intervals on straight sections of road to reassure truck drivers that they are following the designated route.



G9-V145



G9-V146-1



G9-V146-2

b) Truck engine brake sign

Refer to Attachment D for use of truck engine brake signs.

c) No Motorcycle Lane Filtering and End No Motorcycle Lane Filtering

Refer to Clause 2.8 of this Supplement for details regarding the use No Motorcycle Lane Filtering signs in between intersections.

Clause 4.13.2 – Two-way (R2-11)

The two-way sign (R2-11) should be provided at each end of a two-way service road and repeated on each side of each intersection or separator opening.

Sign R2-11 is covered in rules 98, 132 and 136 of the Road Safety Road Rules 2009.

Clause 4.13.4 – MEDIAN TURNING LANE (R6-30)

The MEDIAN TURNING LANE sign (R6-30) is used to indicate a marked median lane on undivided roads to define a central strip for use by turning traffic from either direction to execute a right turn. The use of a median turn lane sign should only be considered where it is impractical to restrict, control or separate turning movements by alternative traffic management treatments.

Care is needed in the use of this treatment because of the potential for head-on conflicts and collisions to occur. Therefore, its use should be limited to built-up areas on roads with a speed limit of 80 km/h or less and is only suitable for access to local streets and private entrances.

The Median Turning Lane Sign (R6-30) is normally used in conjunction with head to head lane arrow markings.

These treatments are used:

- at staggered T-intersections where right turn movements overlap and there is a common section of median where opposing right turn movements conflict. This treatment typically occurs as an extended median break where there is a narrow median with sufficient width for one lane only
- on an undivided road where there is a significant volume of turning traffic and it is impractical to install a central median island with indented turn lanes. Typically these treatments are installed in a low speed environment where there is direct access from abutting residential development, and the road is a collector or sub-arterial road
- as a staged interim treatment prior to constructing a central median with indented turning lanes
- where the carriageway operates under peak hour tidal flow arrangements, but it is desired to reserve the centre lane for right turning traffic in off-peak periods. In this case, the sign should be internally illuminated with the message visible only when switched on, and mounted above the lane in conjunction with lane control signals.

Median turning lanes are described in rule 86 of the Road Safety Road Rules 2009. This states that a driver entering a median turning lane must give way to any oncoming vehicle already in the lane. The rule also states that a median turning lane is defined by the presence of a median turning lane sign and/or lane arrows indicating that vehicles travelling in either direction in the lane must turn right.

Sign R6-30 is also covered in rule 86 of the Road Safety Road Rules 2009.

Median Turning Lane Sign Installation

- Typical positioning of this sign along a route would be at the start of a section of road with a median turning lane with additional signs just beyond each important intersection, and thereafter at a spacing no greater than 500 m.
- It is preferable that signs be placed centrally on a raised island at the beginning of a section of a median turning lane. Intermediate signs on multi-lane roads should be mounted on central raised islands, while roads with only one through lane for each direction may have side mounted signs. Some situations may allow for overhead positioning of signs.

- The Median Turning Lane sign should be placed at a height of approximately 1.5 m when mounted centrally on a raised island and generally used in conjunction with KEEP LEFT sign (R2-3(L)) at the start of the treatment, or one-way hazard marker (D4-1-2) at intermediate locations. Signs mounted on the side of the road should be at a height of 2.0 or 2.2 m, depending on whether parking is permitted (refer to Appendix D2.3 of AS 1742.2:2009).

For required linemarking and pavement markings, refer to Clause 5.5 of this Supplement. For raised pavement markers, refer to Clause 5.6.5 of this Supplement.

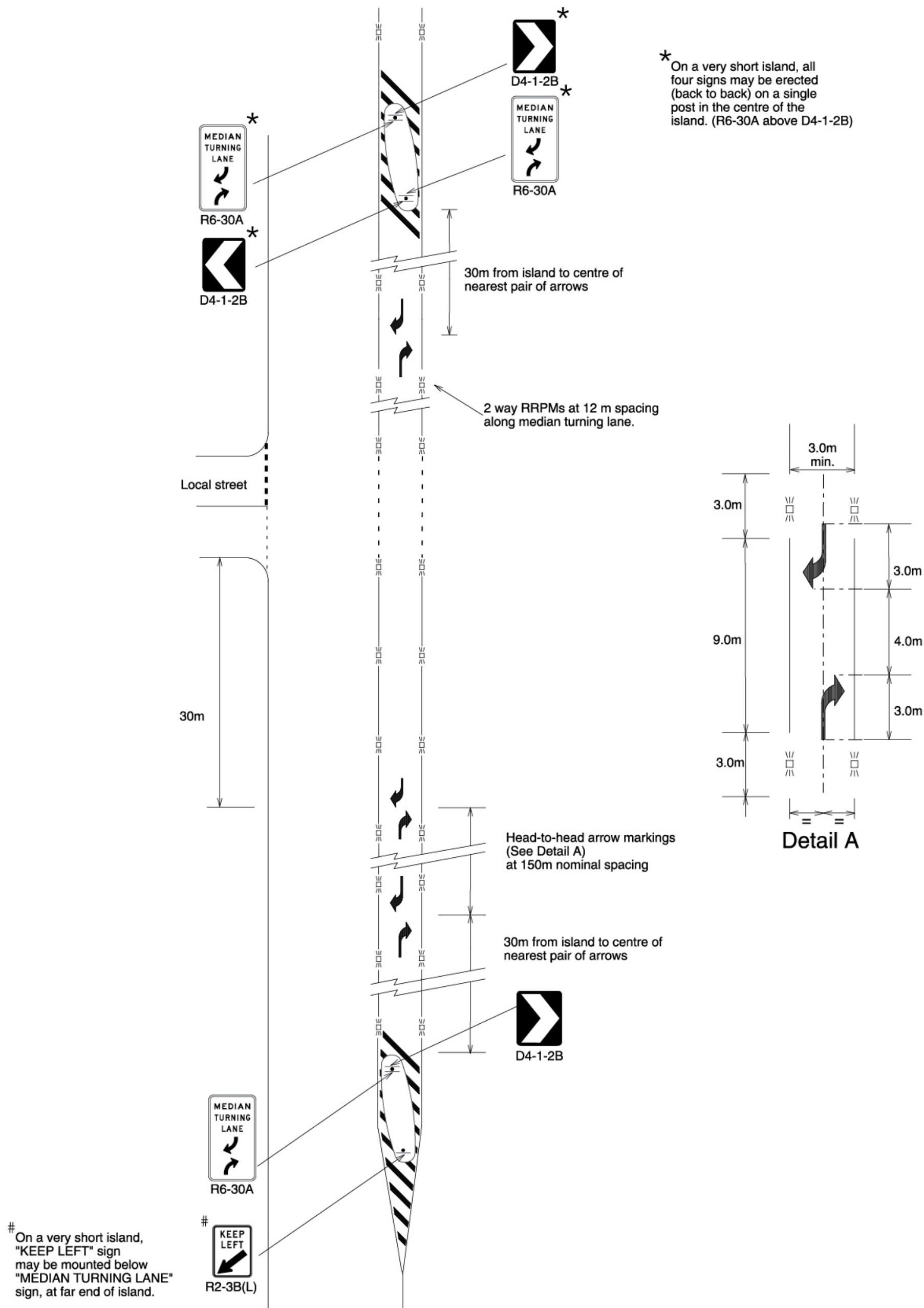


Figure 31: Median turning lane - typical layout

* On a very short island, sign R6-30A may be erected above back to back D4-1-2B signs on a single post in the centre of the island.

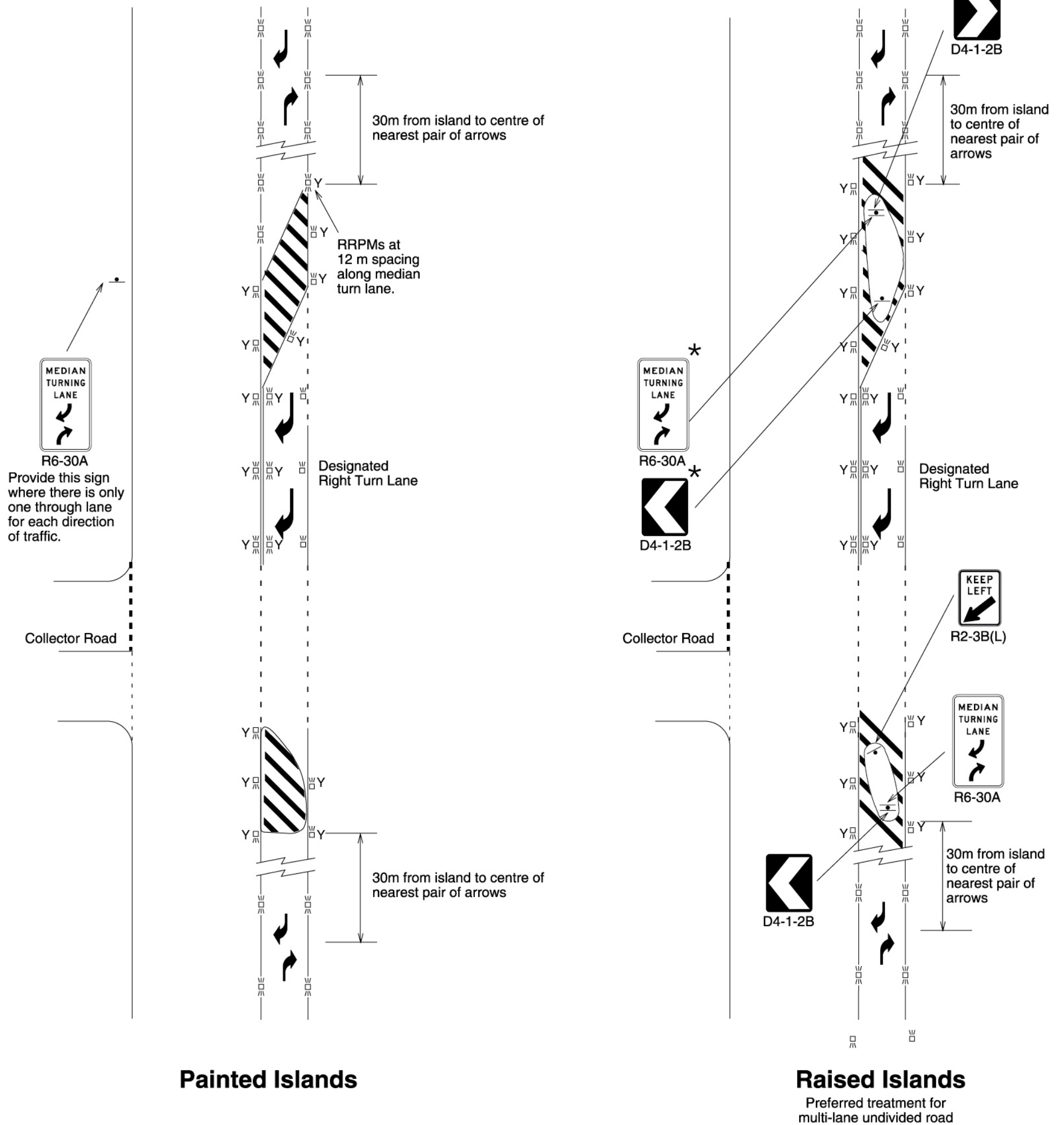


Figure 32: Median turning lane - typical treatments at collector road intersections

Clause 4.13.5 – KEEP LEFT UNLESS OVERTAKING (R6-29), END KEEP LEFT UNLESS OVERTAKING (R6-32)

The Road Safety Road Rules 2009 require drivers to keep out of the right lane on a multi-lane road where speed zones are greater than 80 km/h, unless the roadway is congested or the driver is avoiding an obstruction. The rule does not apply to drivers who are turning right or overtaking other vehicles.

The KEEP LEFT UNLESS OVERTAKING sign (R6-29) is therefore no longer required to be installed on these roads, and existing signs shall be removed as they become ineffective through damage or ageing.

As a result, this sign is no longer generally used on freeways, with the exception of sections of freeway that have permanent or temporary speed limits of 80 km/h or less.

On multi-lane roads, the KEEP LEFT UNLESS OVERTAKING sign (R6-29) is used where the speed limit is 80 km/h or less, and it is considered necessary to regulate the use of the right lane by traffic.

For other situations where this sign is used, refer to Clauses 4.7.2 and 4.8.1 (a) of this Supplement. Use of the sign may also be appropriate where:

- it can be applied over a considerable length of road
- traffic volumes are 6,500 - 30,000 vpd and there is a low incidence of right turning traffic using the centre lane
- large vehicle drivers are causing operational problems or frustration to other motorists by continually occupying the right lane or all lanes simultaneously.

Use of the sign is inappropriate where:

- there are many intersections along the road or large numbers of turning vehicles
- there would be insufficient capacity to be able to reserve the right hand lane for overtaking vehicles for substantial parts of the day
- the traffic volume is generally in excess of 30,000 vpd.

On divided roads and freeways, the signs should be located in the median (when space is available) so that they are more readily seen by drivers to whom the instruction is directed.

Clause 4.13.7 – Emergency Median Crossing (GE9-23)

a) Excepted vehicles

Excepted vehicles at emergency median crossings

Emergency median crossings on freeways can create problems due to unauthorised and unsafe use by the public. They shall therefore be signed using a No U-turn sign (R2-5) and exception sign (R9-V100) to enable enforcement and to reinforce their use by authorised vehicles only. The exception supplementary sign (R9-V100) shall be installed beneath the R2-5 sign for this purpose.



R2-5



R9-V100

Where it is desired to allow VicRoads contractors to U-turn on rural freeways, an additional supplementary sign with the message 'VICROADS CONTRACTORS EXCEPTED' (using the R9-V100 design) may be installed at selected median openings. However, it is preferred that existing interchanges and/or at grade intersections with other roads should be the location where U-turn movements are performed. Where a U-turn by a VicRoads contractor is to be allowed, the Regional Office shall carry out an appropriate safety assessment of the median opening ensuring that the U-turn can be made safely and inform the contractor of the safety requirements when taking the movement.

Openings on urban freeways

Open median crossings are not provided on urban freeways that have narrow medians consisting only of a safety barrier and shoulders. These treatments have retractable median openings (normally closed) and signs are therefore not required.

In addition, signs are not installed at emergency median gates in concrete barriers as the gates are normally closed and only opened in emergency situations.

Openings on rural freeways

b) Median Opening Marker (GE9-23, GE9-V23-3)

Emergency median openings on rural freeways are marked by Median Opening Marker GE9-V23-3 (advance) and GE9-23 (position) signs. These signs are located in the median of the freeway to enable the crossing point to be located by authorised users. These signs shall not be used on urban freeways.



GE9-V23-3



GE9-23

c) Emergency Vehicle Access Marker (GE9-V23-1, GE9-V23-2)

Emergency access points at the side of rural freeways are marked with the emergency vehicle access markers GE9-V23-1 and GE9-V23-2. They indicate a weakened section of fence or a locked gate. The GE9-V23-2 sign is located on the left side of the freeway 10 m in advance of the access point with an arrow to indicate its direction. The GE9-V23-1 sign is attached to the freeway boundary fence or gate, facing the freeway traffic.



GE9-V23-1



GE9-V23-2

Figure 33 shows the layout of signs for a typical urban and rural freeway median break, and for an emergency access point on a rural freeway. Note that a minimum of three yellow retroreflective raised pavement markers is installed to delineate the location of the crossing point at night.

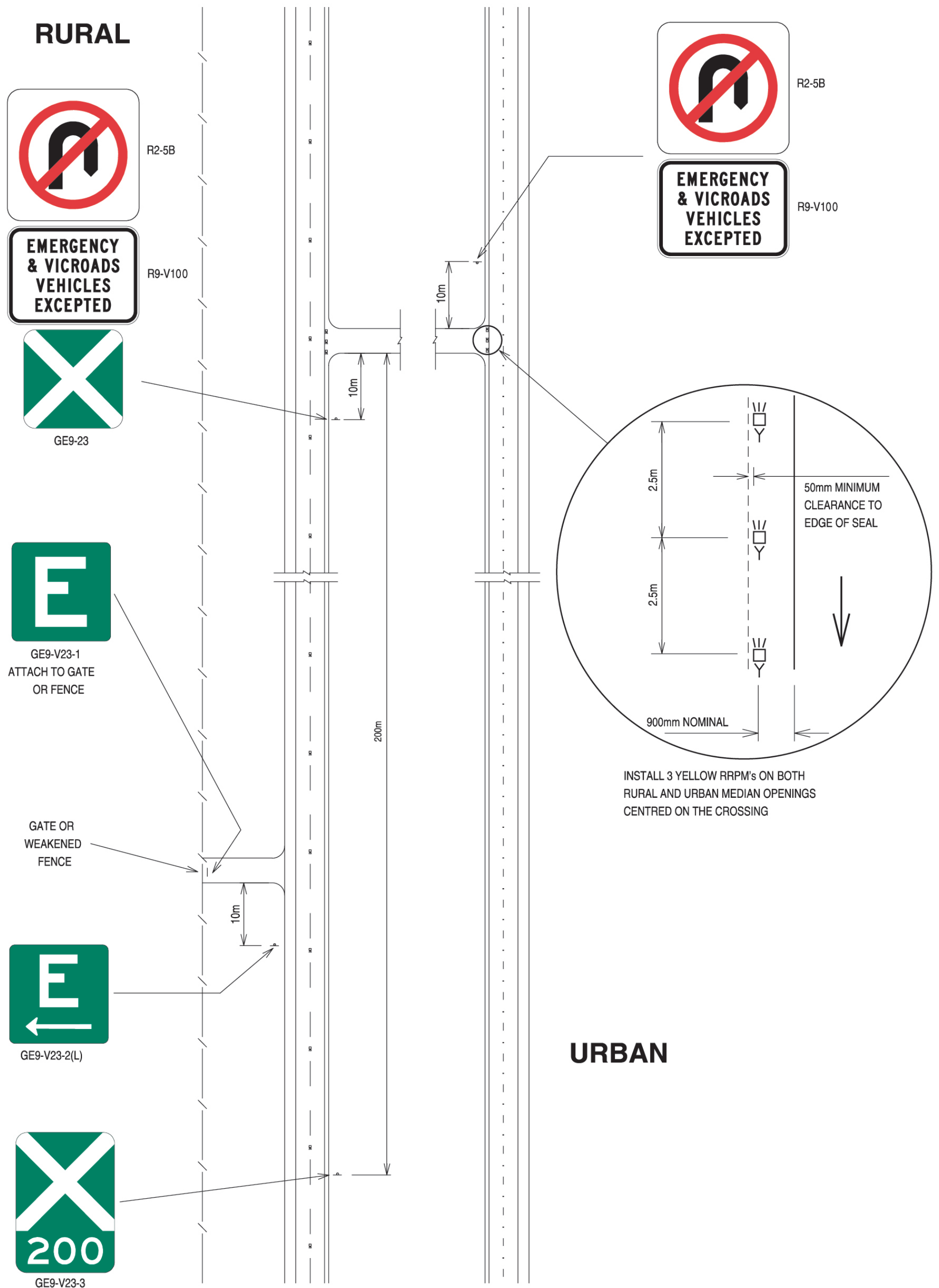


Figure 33: Signs at median breaks and emergency access points

Clause 4.13.8 – Checking station entry signs

TRUCKS MUST ENTER sign (R6-27) shall be used in conjunction with other directional information where it is required that trucks must enter an area. BUSES MUST ENTER sign (R6-18) shall be used similarly where buses are required to enter. Care is required in the placement and information given on the sign, as it instructs drivers to 'enter' and not to 'exit' or 'turn' off the road they are on.

These signs may be consolidated where it is required to direct trucks and buses to enter a designated area (e.g. at a weighbridge site).

Signs used to direct vehicles into VicRoads weighbridges on divided roads, multi-lane undivided roads and two-lane two-way roads are described below and are shown in Figure 34.

a) Weighbridge signs on divided or multi-lane undivided roads

- A 2 km advance sign (R6-V104) is provided to advise drivers that the weighbridge is open, and to enable truck and bus drivers in the middle lane adequate time to change to the left lane. A second advance sign (R6-V103) is provided 1 km from the weighbridge, which instructs truck and bus drivers that they should be in the left lane.
- Sign R6-V102, ALL TRUCKS AND BUSES MUST ENTER is placed at the weighbridge entrance.

b) Weighbridge signs on undivided two-lane two-way roads

- On these roads, it is unnecessary to instruct truck and bus drivers to be in the left lane. Consequently, a R6-V104 sign modified to read 1 km is used for advance notice that the weighbridge is open, and a R6-V102 sign is used at the entrance to the weighbridge.
- The signs are hinged vertically so that the OPEN message is not visible when the weighbridge is closed. It is superfluous to display the word CLOSED and preferable to display a road safety message on the (otherwise) blank sign.
- At critical locations, such as heavily trafficked truck routes, it may be considered necessary to install electronic signs. The Director – Network Policy and Standards shall approve the sign face design of such signs.

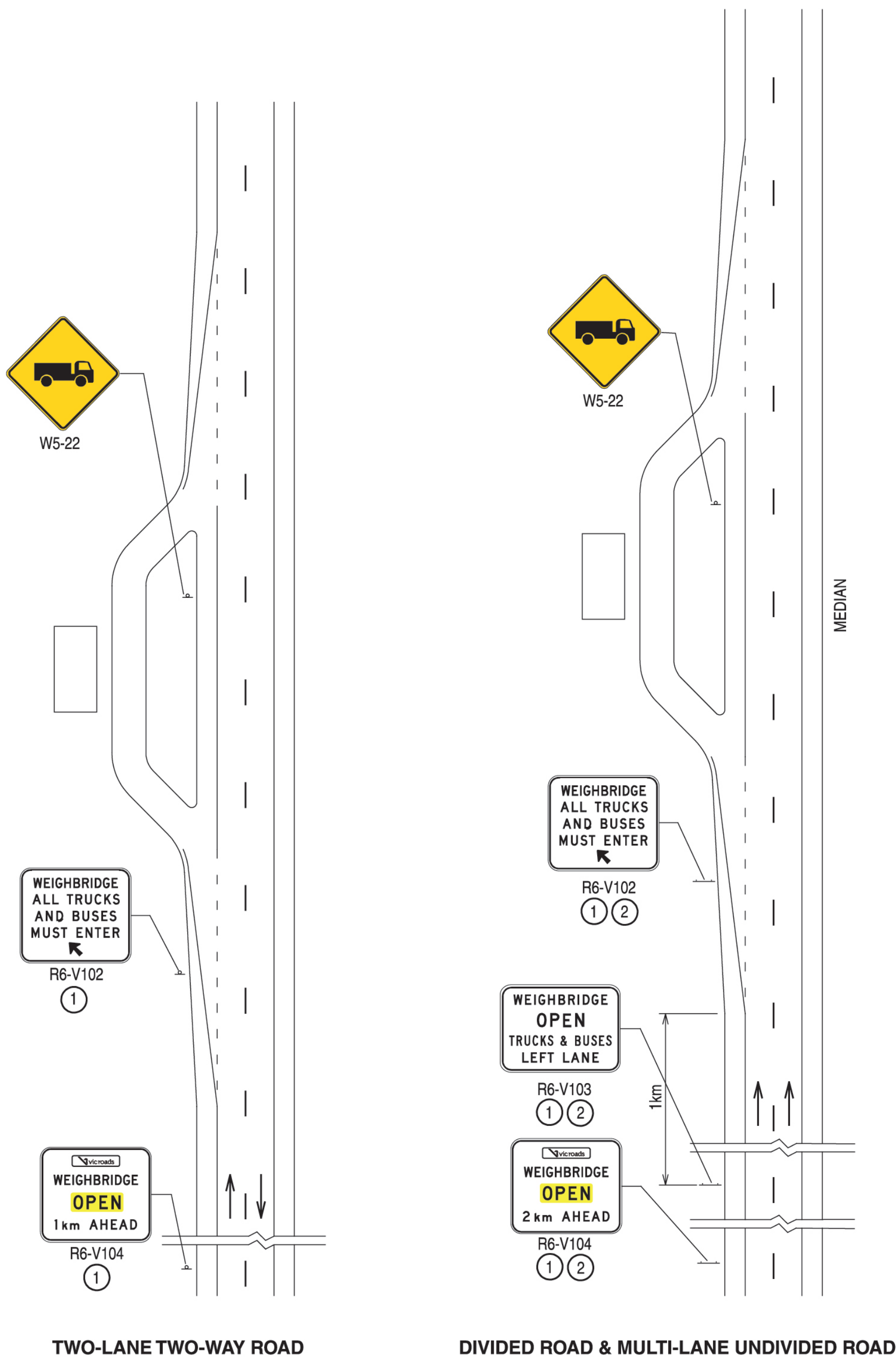


Figure 34: Typical signing treatments at a weighbridge

Notes to Figure 34:

1. For folding signs, it is recommended that a road safety message is displayed when the sign is in the closed position to reduce the possibility of graffiti.
2. The A size sign may be used where approach speeds are < 80 km/h.

Clause 4.14 – USE OF FLASHING LIGHTS WITH WARNING SIGNS

The use of flashing lights with warning signs is subject to approval by the Director – Network Policy and Standards.

Flashing lights shall only operate when the hazardous condition occurs.

Examples of sign assemblies utilising flashing lights are:

- W3-V101 Signals Ahead (refer to Clause 7.2.2 of Supplement to AS 1742.14:2014)
- W5-V122 Fire Station warning sign (refer to Clauses 7.1 and 7.2.2 of Supplement to AS 1742.14:2014)
- W5-V116 Slippery - Ice warning sign (refer to Clause 4.11.2.10 of this Supplement)
- W5-V131 Stock Crossing Ahead warning sign (refer to Traffic Engineering Manual Volume 3, Part 2.5 – Manual for Traffic Control at Stock Crossings).



W5-V116



W5-V131



W3-V101



W5-V122

The W3-V110 standard drawing provides a generic template for vehicle activated warning signs with an internally illuminated flashing message; refer to the VicRoads Supplement to AS 1743 for the drawing. This template should be used for any approved new sign assembly that consists of a variable or flashing message.

Clause 5.2.2 – Removal of markings

The removal of pavement markings can result in a different surface texture of the pavement, with the removed pavement markings becoming visible under various conditions such as a wet road surface or sun glare. This can cause confusion for road users by providing incorrect or confusing delineation, particularly when the removed marking becomes more visible to road users than the new marking.

The removal of pavement markings and placement of a new marking needs to be carefully planned and undertaken.



Figure 35: Removal of pavement markings using High Pressure Water Blasting

South Gippsland Highway at Dandenong Bypass, completed in June 2008 (courtesy of Roadline Removal Australia).

a) Planning

Construction and maintenance planning should consider the following:

- Work should be planned to avoid shifting of any pavement markings where practicable.
- Work requiring multiple changes to pavement markings should consider the use of temporary pavement markings to minimise residual marks on the pavement.
- If changes to pavement markings are unavoidable, it may be appropriate to consider resurfacing and the trade-off between cost and ensuring clear and unambiguous delineation at the completion of the works.
- Attention to pavement markings on either side of the works is also required to ensure continuity from the driver's perspective.
- Previous pavement markings will typically reflect through reseals, so the previous pavement markings should be removed if they will not be reinstated in the same positions after resealing.

Consideration should be given to undertaking a Road Safety Audit to assess the risks associated with visibility of removed markings.

b) Treatment methods

Selection of an appropriate removal treatment method is important to avoid ambiguous or confusing delineation. There are a number of methods available to remove or cover pavement markings, a range of which are detailed below. Practitioners should select the method that is deemed to be the most suitable for the specific situation. Table 5 provides a summary of treatment effectiveness.

High pressure water blasting

High pressure water blasting can be used on most road surfaces. It removes all pavement marking materials generally with minimum damage to the road surface. This treatment uses water pressurised at up to 280 MPa (40,000 psi) in conjunction with blasting heads. The force of the water delivered literally “knocks” the markings off the pavement. The quantity of water used is typically in the range of 4 to 14 litres per minute. Removal rates can be in the order of 1 km/h depending on the type of pavement. The more sophisticated systems have the heads mounted on a trolley with control of nozzle orientation, height from the pavement surface, and the travel speed of the cleaning heads over the pavement.

Some systems also include the vacuum removal of the water and removed materials. The recovered water and materials are recycled through a filtering process that removes the paint and other material before reusing the water.

In many cases, high pressure water blasting leaves minimal damage to the surface, but care needs to be taken especially when used on old or open textured surfaces.

Grit blasting

This treatment can be used on all road surfaces and utilises a dry blasting technique with slag as the abrasive agent. In most cases, there is minimal damage to the road surface using this method. Grit blasting creates some dust, and the dust and residual material can be picked up using a suction sweeper, or using a shovel and broom.

Grit blasting creates a significant amount of noise, so consideration should be given to the locations and times when this method is used.

Shot blasting

Shot blasting is similar to grit blasting but uses a small steel shot rather than grit. It can be used on most road surfaces and removes all pavement marking materials but can cause damage to open graded asphalt. Also, it may be less effective on fresh sprayed seal surfaces where the shot particles and relatively lively bitumen can have a tendency to “ball up” and block equipment. There is likely to be some minor marking of the road pavement using this method.

Shot blasting is less noisy and cleaner than grit blasting but consideration should still be given to the locations and times when this method is used.

Soda blasting

Soda blasting involves the removal of pavement markings by water blasting using carbonated soda as the cutting agent. This can be used on all road surfaces and involves minimal marking of the road pavement. VicRoads' experience with the use of this method is limited.

This method appears to be effective at removing paint but there are concerns regarding its effectiveness at removing some materials such as cold applied plastic.

With this method, new pavement markings cannot be applied immediately after the treatment as the road surface is left in a wet condition. However, this can be overcome by blacking out the old pavement markings with a temporary treatment, installing the new pavement markings and then removing the old (blacked out) pavement markings at a later date.

Soda blasting creates a significant amount of noise, so consideration should be given to the locations and times that this method is used.

Grinding

Grinding involves the removal of pavement markings using a grinding machine. This method can be used on most asphalt surfaces. It generally causes some damage to the road surface. Where grinding has been used, the road surface becomes indented and can hold water, making it easily discernible in some conditions. This may cause the removed markings to be mistaken for actual pavement.

Grinding creates a significant amount of noise, so consideration should be given to the locations and times that this method is used.

Grinding on open graded, UTA and sealed asphalt does not completely remove the pavement markings and can weaken the structure of the surface, which can result in ravelling and potholes.

Grinding on sprayed seal surfaces can also leave some poor results, not completely removing the lines and also damaging or removing parts of the top layer of seal.



Figure 36: Examples of ineffective removal of redundant lines using grinding process.

Strip sealing

Strip sealing involves covering existing pavement markings, generally with a small sized sprayed seal. Strip sealing is effective on existing sprayed sealed surfaces, especially in rural areas with low to moderate traffic volumes (i.e. < 5000vpd) where painted pavement markings are normally used. Either an emulsion or hot bitumen can be used. However, hot bitumen generally provides better results. Special care needs to be taken when strip sealing over thermoplastic pavement markings or highly reflective painted markings.

When carrying out strip sealing over thermoplastic pavement markings, consideration should be given to a two-stage treatment such as initially using a blasting process to partially remove the thermoplastic and then completing the treatment with a strip seal.

When strip sealing over existing painted lines that are highly reflective (i.e. glass bead retention is high), then it is recommended that the existing line be covered with a minimum 10 mm sized strip

seal. Alternatively a two-part process similar to that described above can be utilised to remove the paint and glass beads prior to covering the markings with a strip seal.

Strip sealing is not considered an effective permanent treatment on asphalt surfaces where traffic volumes are higher, as the seals are difficult to manage under heavy traffic and there is a texture difference between the strip seal and the existing asphalt.

Blacking out

Blacking out involves covering the pavement markings with either a black paint and grit or a black long life material and grit. Blacking out is not strictly a removal method. Blacking out is a temporary option when immediate removal is not possible. It can be used for all road surfaces and pavement marking materials. However, under traffic, the life expectancy can be as little as two to three weeks for black paint and around two to three years for black long-life material. Under certain conditions the “blacked out” pavement can be mistaken for pavement markings. Blacking out is only recommended as a temporary treatment (i.e. less than three months).

It is important to assess the risks associated with this treatment. Although it may only be used for a temporary treatment, it may create significant issues and its use should be assessed based on the level of risk of possible delineation confusion.

Table 5: Summary of methods for removing and covering of pavement markings

Method	Effectiveness
High pressure water blasting	<ul style="list-style-type: none"> the preferred long-term method a skilled operator is required capable of consistently removing most types of road marking with minimal damage to the road surface may damage surfacing with loosening or removal of smaller aggregate with the manually directed head units, the results are highly dependent on the pavement surface conditions and the clean-up methods used
Grit blasting (dry)	<ul style="list-style-type: none"> effective for removing all pavement marking materials on all road surfaces; causes minimal damage to road surface the treatment creates substantial noise leaves residue after removing the pavement markings.
Shot blasting (dry)	<ul style="list-style-type: none"> can damage road surfaces and may cause significant damage to open graded asphalts not effective on some fresh sprayed seal surfaces not useful for removing long life markings.
Soda blasting (wet)	<ul style="list-style-type: none"> effective for painted pavement marking material on all road surfaces limited effect on some material such as cold applied plastic causes minimal damage to road surface the treatment creates substantial noise new markings may not be able to be placed immediately due to wet road surface.

Method	Effectiveness
Grinding	<ul style="list-style-type: none"> • suitable for small jobs • effective for removal of all pavement marking materials on most asphalt road surfaces • causes damage to road surface and not appropriate on sprayed seals or ultra-thin asphalt • damaged pavement can be mistaken for pavement markings under certain conditions • the treatment creates substantial noise.
Strip sealing	<ul style="list-style-type: none"> • effective for removing all pavement marking materials on low to moderately trafficked sprayed seal surfaces • does not damage road surface • after some wear previous pavement markings may become visible again under certain conditions • not appropriate for asphalt surfaces.
Long life black out	<ul style="list-style-type: none"> • should only be used as a temporary treatment • the treated area can be mistaken for pavement markings under certain conditions • does not damage road surface • effective for temporarily covering pavement marking materials on all road surfaces.

c) Temporary pavement markings

Effective temporary pavement marking products are available. These products may be a cost effective and practical solution to provide temporary pavement markings when staging construction works.

During the 2006 Commonwealth Games in Melbourne, there was a need for temporary lines to guide buses around the city to various venues but only for the relatively short duration of the games. The solution in this case was to use a removable pavement marking paint that was able to be washed away after the application of a reactivating agent that dissolved the paint. At present, this system is only available on special order and it is a relatively expensive option.

d) Temporary Yellow Linemarking for Worksite Traffic Management

Guidance on temporary yellow linemarking for worksite traffic management is available in *Traffic Engineering Manual Volume 3, Part 2.20 – Temporary Yellow Linemarking for Worksite Traffic Management*.

Clause 5.2.3 – Limitations

Pavement markings have the following additional limitations:

- Markings cannot be relied upon to give long range (run-off-road) delineation under all conditions.
- Transverse and word/symbol markings need to be greatly elongated to be seen, read and understood by drivers.
- Off-line viewing of elongated markings may cause the message to be so distorted as to be illegible.

Clause 5.2.6 – Colours

Yellow markings are also used in the following circumstances:

- Markings to control the movement of vehicles on tram tracks.
- Boxed pavement markings at railway level crossings and tram level crossings in accordance with Clause 3.6 of AS 1742.7:2007.
- Centre lines and edge lines on major roads in snow areas above 1,000 m elevation.

Clause 5.2.8 – Profile line marking

a) Description and Use

Profiled lines are primarily used as a road safety treatment to alert drivers that they may have inadvertently strayed out of a marked lane. They reduce run-off-road crashes when used as profile edge line, and they reduce head-on and run-off-road to the right collisions when used as profile dividing line.

Profile lines may also be used as bicycle lines to provide increased separation between cyclists and vehicles in an adjacent traffic lane.

The pattern and dimensions of the profile line should have the same widths and patterns as the lines they are replacing or being added to. The pattern and dimensions of the line and bars are given in Table 6.

Table 6: Profiled edge lining pattern and dimensions

Line Type	Patterns and Dimensions
Profile Edge Line	<p>Diagram showing the pattern and dimensions for a Profile Edge Line. It consists of a series of vertical bars. The first bar is labeled '8mm high bars'. The gap between the first and second bar is labeled '200mm gap'. The width of the bars is labeled '50mm wide'. The length of the bars is labeled '150mm long'.</p>
Profile Dividing Line	<p>Diagram showing the pattern and dimensions for a Profile Dividing Line. It consists of a series of vertical bars. The first bar is labeled '8mm high bars'. The gap between the first and second bar is labeled '200mm gap'. The width of the bars is labeled '50mm wide'. The length of the bars is labeled '100mm long'.</p>
Profile Bicycle Line	<p>Diagram showing the pattern and dimensions for a Profile Bicycle Line. It consists of a series of vertical bars. The first bar is labeled '5-6mm high bars'. The gap between the first and second bar is labeled '200mm gap'. The width of the bars is labeled '50mm wide'. The length of the bars is labeled '100mm long'.</p>

b) Profile edge lines

Profile edge lines should be used as a road safety treatment when the traffic flow is 2000 vpd or greater and either of the following criteria is met:

- The run-off-road casualty crash rate per 10 km per year is greater than 0.3, and the road is in a rural area:
 - in a speed zone of 100 km/h or greater, or
 - where a specific site problem warrants a speed zoning less than 100 km/h.
- A particular section of road has a significant and specific fog problem.

The criteria in Table 7 should be considered in planning the installation of profile edge lines.

Table 7: Criteria for profile edge lines

Criteria	Comment / Information
Absolute minimum width for a two-lane (one or two-way) carriageway should be 7 m with a minimum sealed shoulder width of 0.5 m on each side (minimum total sealed width of 8 m)	Profile edge line is most effective when there is sufficient sealed shoulder width to enable the driver to recover control of the vehicle. These minimum sealed widths are also required so that the profiled edge line is not damaged by excessive trafficking, shoulder maintenance and pavement deterioration.
Desirable minimum width for a two-lane (one or two-way) carriageway should be 7 m with a minimum sealed shoulder width of 1 m on each side (minimum total sealed width of 9 m)	Where the pavement width does not meet the absolute minimum criteria, shoulder sealing should provide minimum 1 m sealed shoulders (with a 7 m carriageway width)
Pavement and sealed shoulder should be in good condition	To prevent rapid deterioration of the profile edge line by either breaking away or punching into the surface
No plan to reconstruct or widen the pavement within 2.5 years	
Minimum continuous length of road for profile edge lines should be 1 km	
Profile edge line should be applied to both edges of the carriageway, including divided roadways	
Do not to install profile edge lines in lower risk locations if residential properties are within 150 m of the road and concerns about noise would be expected	Profile edge lines emit an audible sound that may be a nuisance to residents near to the road

c) Dividing Lines

When profile dividing lines are used, all dividing lines and barrier lines are to be profiled.

d) Bicycle Lines

For the use of profiled lines at bicycle lanes, refer to the VicRoads Supplement to AS 1742.9:2000.

e) Other uses

Other uses of profile line marking require the approval of the Director – Network Policy and Standards.

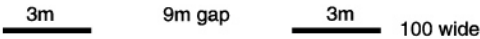
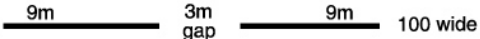

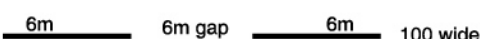
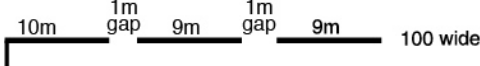

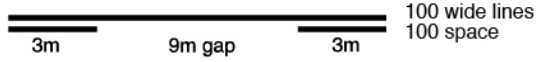

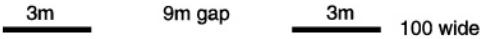

Clause 5.3 – LONGITUDINAL LINES


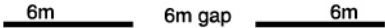
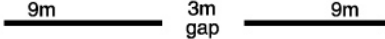
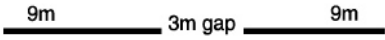



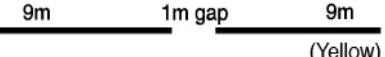


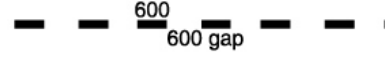
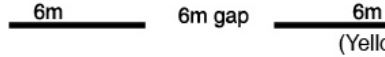
Clause 5.3.1 – General


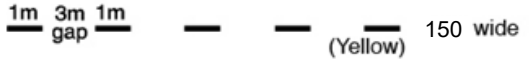
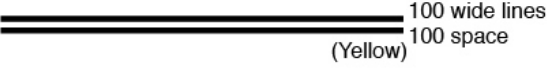

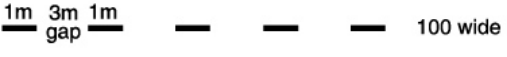
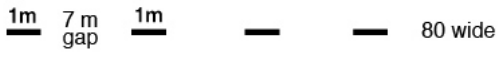

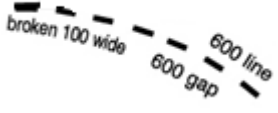
The pattern and dimensions of longitudinal lines used in Victoria are shown in Table 8 below. Guidelines for their use are included in the following Clauses.

Alternative line patterns in high speed areas (80 km/h or greater) are subject to the approval of the Director – Network Policy and Standards.

Table 8: Summary of longitudinal lines used in Victoria

USE	PATTERN AND DIMENSIONS
Dividing Lines – Clause 5.3.2	
Two-lane Two-way (standard)	 100 wide
Two-lane Two-way (special purpose)	 100 wide
Multi-lane undivided	 150 wide
Special Purpose – reversible traffic lanes	 100 wide
Special Purpose – narrow intersection approach with parking	 100 wide
Barrier Lines – Clause 5.3.3	
Single	 100 or 150 wide
Double one-way	 100 wide lines 100 space
Double two-way	 100 wide lines 100 space
Lane Lines – Clause 5.3.4	
Standard broken	 100 wide
Standard continuous	 100 wide

USE	PATTERN AND DIMENSIONS
Special Purpose – full time special use lanes and complex entry & exit lanes on freeways	 150 wide
Special Purpose - reversible lanes	 100 wide
Special Purpose – various uses (see Clause 5.3.4 below)	 100 wide
Special Purpose – part time special use lanes & auxiliary freeway lanes	 150 wide
Edge Lines – Clause 5.3.5	
Standard – default	 100 wide
Standard – freeways and ‘M’ routes, ‘A’ routes in rural areas	 150 wide
Special Purpose – parking control & snow areas where parking prohibited	 100 wide (Yellow)
Special Purpose - snow areas where parking permitted	 100 wide (Yellow)
Continuity Lines – Clause 5.3.6	
Standard	 100 wide
Special Purpose – Freeways and Special Use	 150 wide
Median openings Right side of approach at STOP / GIVE WAY signs	 150 wide
Tram & Tramway Lines – AS 1742.12 & VicRoads Supplement	
Broken type	 100 wide (Yellow)

USE	PATTERN AND DIMENSIONS
Full-time or Part-time Tram Lane	 150 wide (Yellow)
Continuity Line for Part-time Tram Lane	 150 wide (Yellow)
Tramway	 100 wide lines 100 space (Yellow)
Bicycle Lane Lines – AS 1742.9 & VicRoads Supplement	
On-road lane line	 100 wide
Continuity line for (i) signalised intersections (ii) across diverges and merges	 100 wide
Broken off-road dividing line	 80 wide
Continuous off-road dividing line	 80 wide
Turn Lines – AS 1742.14 & VicRoads Supplement	
Broken turn line for normal use	 broken 100 wide 600 gap 600 line

Notes:

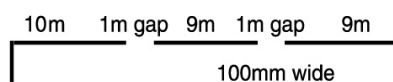
1. **Combinations of profiled lines are not detailed in this table. Where profiled lines are used, they shall have the same line widths and patterns as those lines they are replacing. Refer Clause 5.2.8 of AS 1742.2:2009 and this Supplement**
2. **RRPMs are not shown in line patterns. Refer to Clause 5.6 of AS 1742.2:2009 and this Supplement.**
3. **All dimensions in millimetres unless otherwise shown.**

Clause 5.3.2.2 – Two-lane, two-way roads

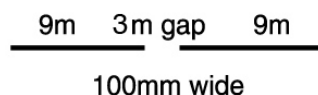
a) General

If it is intended that U-turns be prohibited under rule 132 (2A) of the Road Safety Road Rules 2009, a barrier line should be used in place of a dividing line.

b) Special purpose dividing lines



On street approaches to STOP or GIVE WAY markings at intersections where it is only a one-lane approach, and parking allowed but less than 3 m is available between dividing line and parked vehicles.



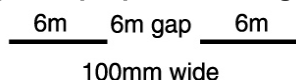
Where additional delineation is required and a barrier line would be too restrictive (does not prohibit overtaking and U-turns).

Clause 5.3.2.3 – Multi-lane roads

a) General

If it is intended that U-turns be prohibited under rule 132 (2A) of the Road Safety Road Rules 2009, a barrier line should be used in place of a dividing line.

b) Special purpose dividing lines



Used in conjunction with reversible lanes, may be lane or dividing lines depending on time of day.

Clause 5.3.2.4 – Guides for the use of dividing lines

Dividing lines should be used:

- On all rural A, B and C Routes with sealed width of 5.5 m or more.
- On urban arterial roads and rural roads with sealed width of 5.5 m or more, where traffic volumes exceed the following:
 - arterial urban roads: 2500 AADT
 - rural roads: 300 AADT

The above is subject to:

- Sealed pavements less than 6.2 m wide should only have dividing lines if the shoulders have adequate width and strength to cope with the higher shoulder usage that might be expected as a consequence of a dividing line.
- At bridges less than 5.5 m between kerbs, the dividing line is discontinued 20 m to 30 m from each abutment (AS 1742.2:2009, Clause 4.6.2.2).
- The practicality of maintaining pavement markings on short isolated lengths of rural roads remote from other markings should be considered.

Clause 5.3.3.1 – General

a) Single barrier lines

A 100 mm wide single barrier line may be used in the following situations:

- On long lengths of winding road in hilly or mountainous terrain where speeds are relatively low, and which would otherwise require double barrier lines.
- At isolated curves and crests on narrow rural roads not meeting the dividing line width guideline (Clause 5.3.2 of AS 1742.2:2009), but where barrier lines would be warranted on sight distance criteria, and shoulders are of an adequate standard.
- Where the demand for gaps in double barrier lines (for property access) would otherwise destroy the integrity of the double barrier line. As a guide, this applies if there are more than 10 breaks in a 500 m length of road.

- To delineate curves, crests and islands on otherwise unmarked narrow residential and collector streets, where parking is not to be allowed adjacent to the dividing line.
- On one lane approaches to traffic signals and roundabout holding lines. A 100 mm wide line (normally 30 m in length) is marked on two-way roadways.
- On one lane approaches to STOP or GIVE WAY markings. A 100 mm wide lane (normally 30 m in length) is marked, but may restrict parking. A dividing line with 1 m gaps as shown in provides an alternative.

A 150 mm wide single barrier line may be used in the following situations:

- On multi-lane urban two-way carriageways where overtaking and U-turns are to be prohibited.
- Urban locations where a double barrier line is required, but is not practical because of the frequency of driveways.

Clause 5.3.3.3 – Location and setting out

A modified sight distance check is required to establish a no overtaking zone at right-hand curves for traffic in the single lane direction (refer to Figure 37). The check is needed to reduce the possibility of a head-on collision in the centre lane by two opposing vehicles commencing overtaking manoeuvres simultaneously.

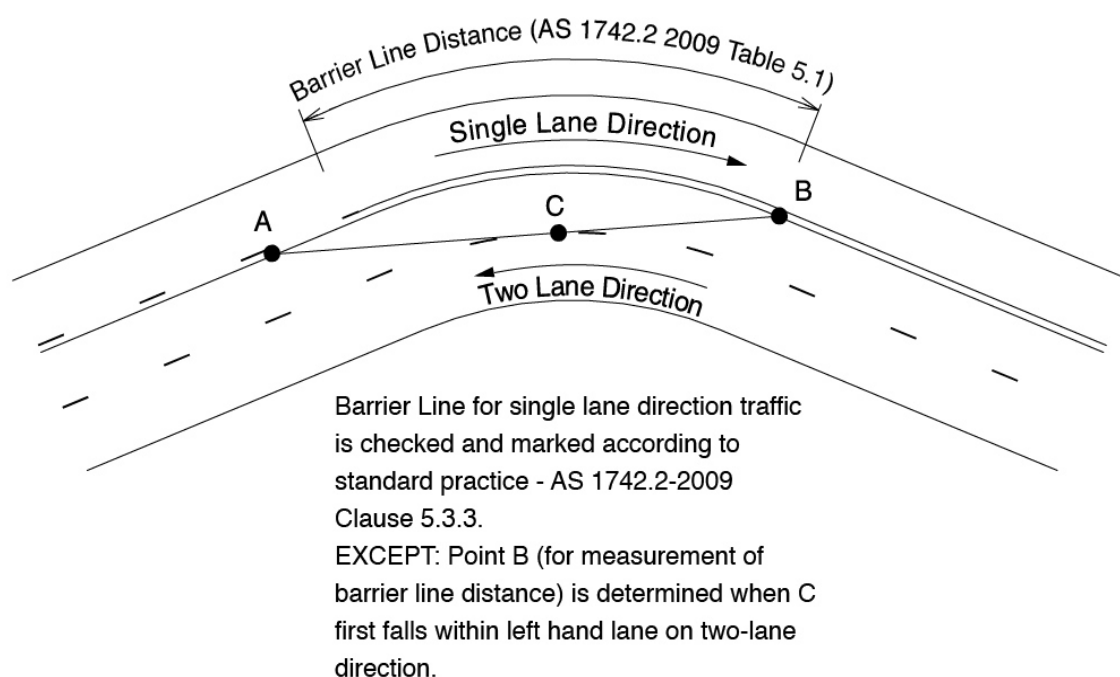
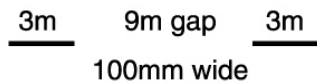


Figure 37: Special barrier line requirement for right-hand curves at overtaking lane sections

Clause 5.3.4 – Lane lines

Lane lines separate traffic flows travelling in the same direction. The colour of the lines is white unless otherwise noted or required by another part of AS 1742 or VicRoads Supplement.

a) Standard broken lane lines



Except where an alternative lane line is required, standard broken lane lines are used on roadways in both urban and rural situations that provide sufficient width for two or more lanes of traffic moving in the one direction.

Urban two-way roadways with a continuous width of 12.5 m or greater should be lane lined, or may be marked with parking lanes where appropriate.

On a road without lane lines, passing a vehicle on the left is illegal unless the vehicle is indicating to turn right (see rule 141(1) of the Road Safety Road Rules 2009).

b) Standard continuous lane lines

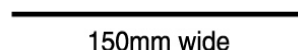


100mm wide

Standard continuous lane lines wide are used in the following situations:

Usage	Notes
To separate lanes on approaches to traffic signals and stop / give-way / roundabout holding lines.	The normal length of these lines is 30 m but this may be modified in accordance with e) below.
To separate a through lane and an auxiliary (acceleration, deceleration or turning) lane on roads other than freeways.	To avoid continuous lane lines which unnecessarily or inappropriately prevent lane changing, alternative lane lines may be used – refer to e) below A continuity line is used across the lead-in tapers as described in Clause 5.3.6 of AS 1742.2:2009 – the length is determined from e) below
To separate traffic lane from full time parking lane or bicycle lane	Parking lane – refer to AS 1742.11 Bicycle lane – refer to AS 1742.9
To separate traffic lane from full-time and part-time tram lanes.	As detailed in AS 1742.12 and VicRoads Supplement to AS1742.12 – colour is yellow
To designate where lane changing is prohibited	e.g. through sharp curves, over crests or through other changes in the alignment of lanes

c) Special purpose continuous lane lines

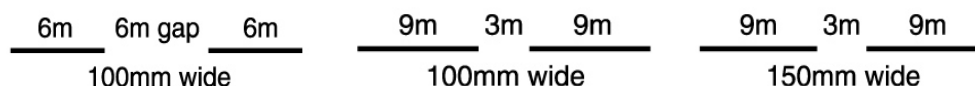


150mm wide

Special purpose continuous lane lines (150 mm wide) are used in the following situations:

Usage	Notes
To separate a general traffic lane from a full-time special purpose lane such as a bus or transit lane.	As detailed in AS 1742.12 and VicRoads Supplement to AS 1742.12
On a freeway, to separate: <ul style="list-style-type: none"> a through/optional exit lane and an exit-only lane a through lane and an “added lane” on two-lane entrance ramps 	

d) Special purpose broken lane lines



Special purpose broken lane lines 100 mm wide with 6 m line and 6 m gap are used in the following situations:

Usage	Notes
To separate traffic lane from full-time and part-time tram lanes.	As detailed in AS 1742.12 and VicRoads Supplement – colour is yellow
To separate non-reversible and reversible lanes	

Special purpose broken lane lines 100 mm wide with 9 m line and 3 m gap are used in the following situations:

Usage	Notes
In place of long sections of continuous lane lines separating a through lane and a turning lane or an auxiliary lane more than 30 m in advance of intersections.	To be used in accordance with e) below
To discourage lane changing in tunnels and at other locations	One RRPM is placed midway in each gap when used on freeways in tunnels, refer to Clause 5.6.2 of AS 1742.2:2009
To designate lanes within a roundabout, the lines being marked within the circulating roadway to beyond the exit point of the roundabout	Refer to Figure 48 and Figure 49 in Clause 5.4.2 of this Supplement for further details of roundabout markings
To separate through lanes from two-way median turn lanes	Refer to AS 1742.2:2009, Clause 4.13.4
To separate the far right lane at a signalised intersection from the traffic lane to its left on a tram route where a tram track is shared with the far right traffic lane	Refer to Figure 8 and Figure 9 of the VicRoads Supplement to AS 1742.12

Special purpose broken lane lines 150 mm wide with 9 m line and 3 m gap are used in the following situations:

Usage	Notes
To separate a general traffic lane from a part-time special purpose lane such as a bus and transit lane.	Refer to AS 1742.12
To separate a through lane and auxiliary lane on freeway exit ramps	

e) Exceptions to the use of standard lane lines

Rule 147 of the Road Safety Road Rules 2009 prohibits drivers on a multi-lane road from moving from one marked lane to another marked lane across a continuous line separating the lanes (with exceptions as defined).

For turning lanes that are particularly short or long, a continuous lane line may be too restrictive having regard to rule 147 and a balance may be required between the lengths of continuous lane line, continuity line and special purpose broken ("9 x 3") lane line. The lengths of these respective

lines should be calculated in accordance with Table 9. This Table is not applicable for posted speed limits less than 50 km/h.

Table 9: Lengths of continuous lane lines, continuity lines and “9 x 3” lane lines

Turning Lane Length ¹ (m) (TLL)	Continuous Lane Line Length ² (m)	Continuity Line Length ³ (m)	“9 x 3” Lane Line Length ⁴ (m)
Up to 55 m	10	TLL – 10	
55 to 75 m	TLL – 45	45	
75 to (S+30) m	30	TLL – 30	
(S+30) to (2S+60) m	TLL – S	S	
> (2S+60) m	S	S	TLL – 2S

Notes to Table 9:

1. Total length from stop/holding line (or splitter island chevron) to start of taper
2. Measured from stop/holding line or splitter island chevron
3. Measured from start of turning lane taper
4. Connects continuous lane line and continuity line
5. “S” = posted speed limit in km/h

Application of Table 9 produces the short and long turning lane outcomes shown in Figure 38 and Figure 39 respectively.

A worked example of Table 9 calculations is shown in Figure 40.

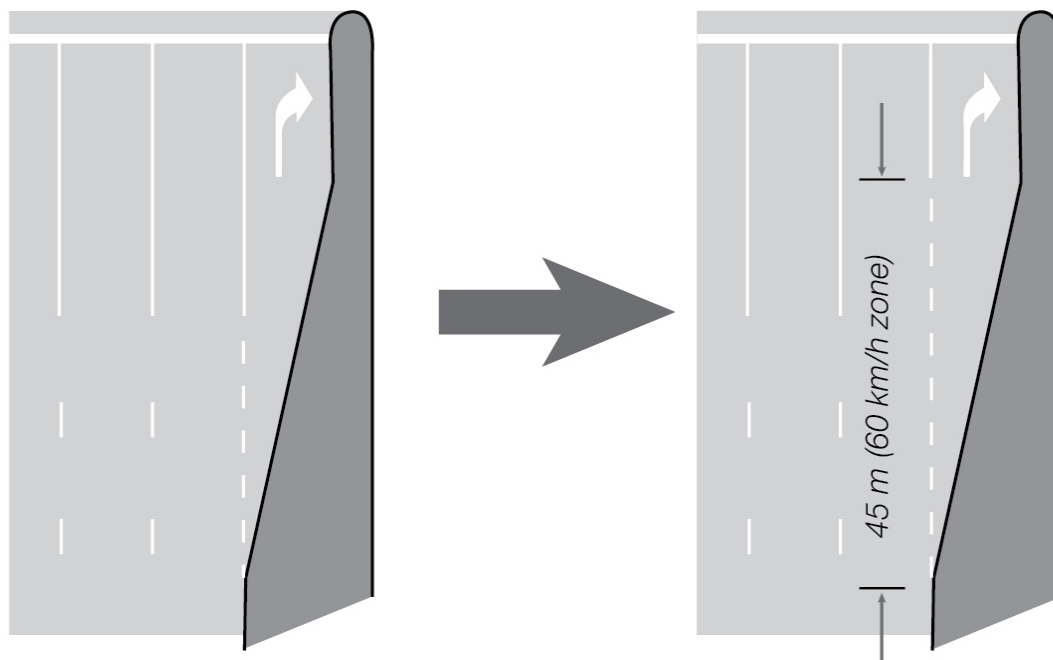


Figure 38: Short turning lanes – minimum continuity line provided, continuous lane line shortened

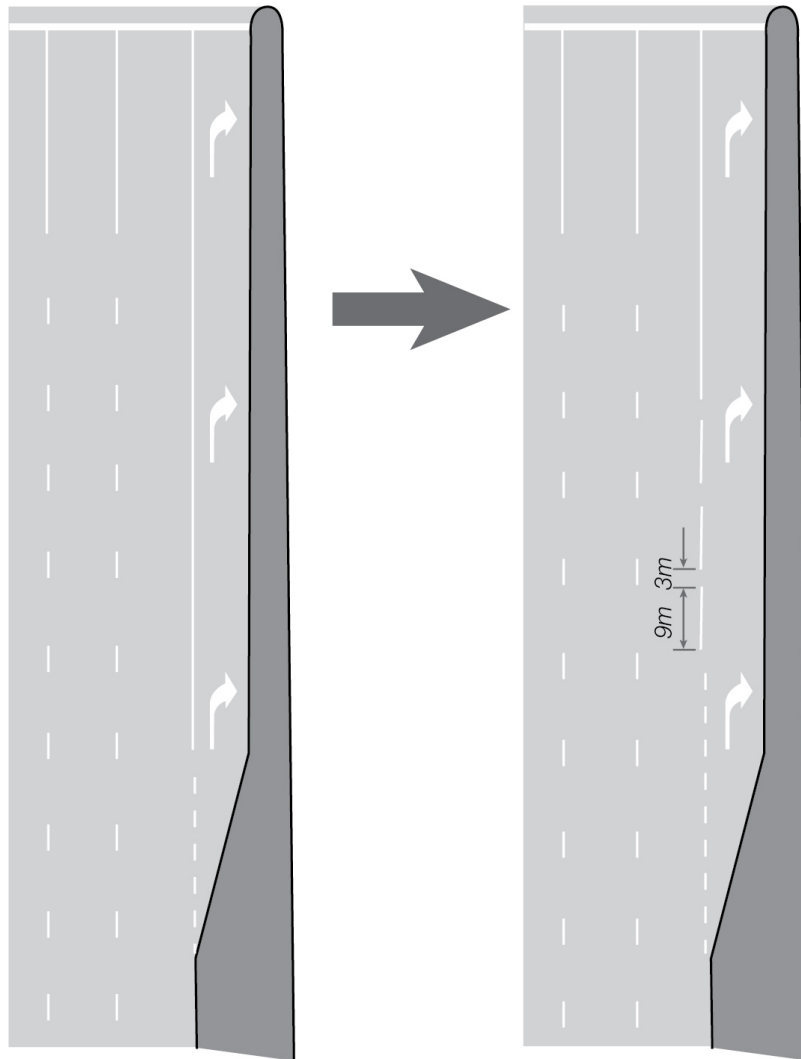


Figure 39: Long turning lanes – special purpose broken (“9 x 3”) lane line provided

Note: Refer Clause 5.5.2 of this Supplement for arrow pavement marking locations.

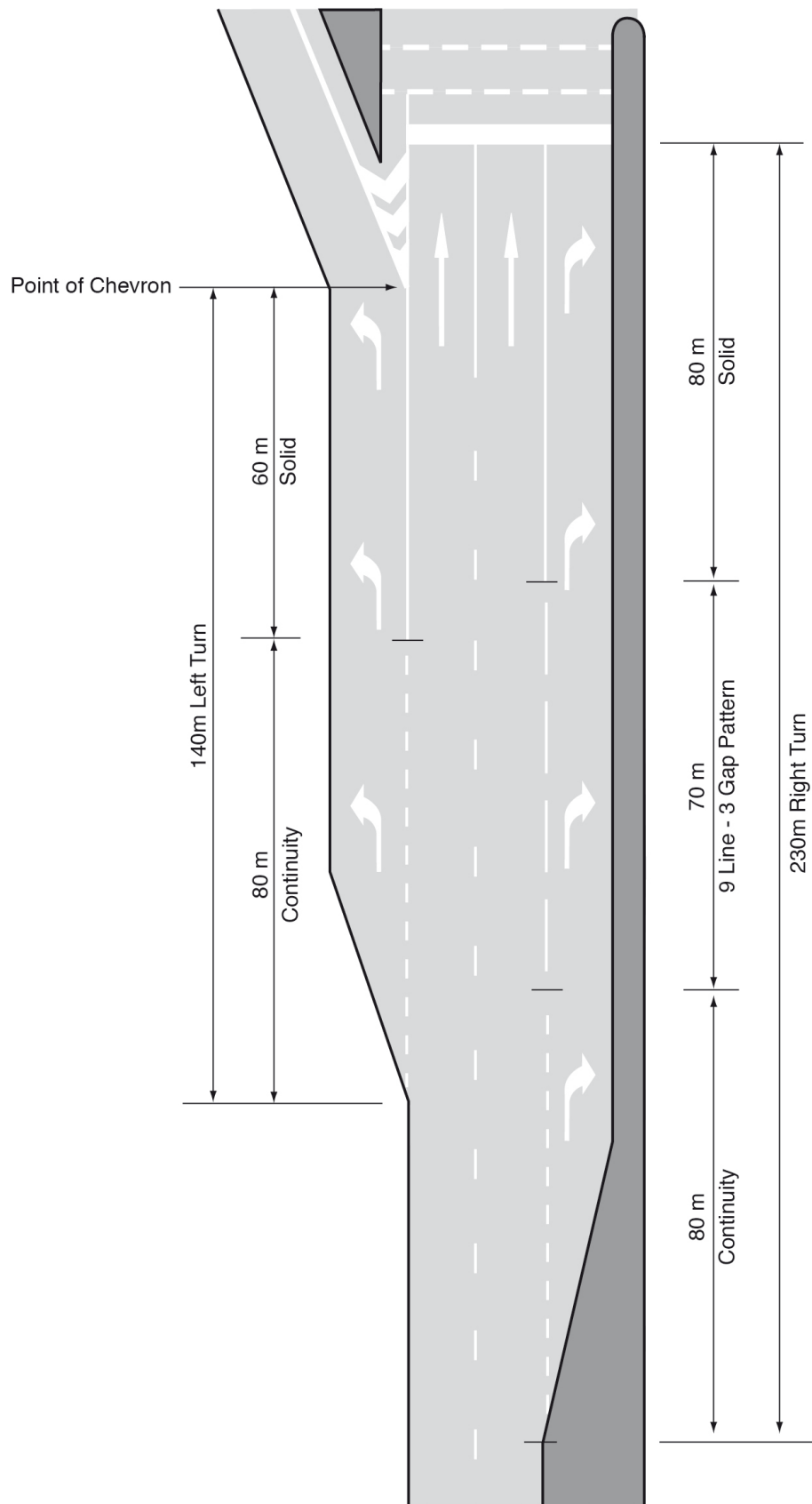


Figure 40: Example of lane lines adjacent to turn lanes for 80 km/h speed zone based on Table 9

Note: Refer to Clause 5.5.2 of AS 1742.2:2009 for arrow pavement marking locations.

f) Lane lines between turning lanes

The lane line between adjacent turning lanes should be continuous lane line/s for the first 30 m back from the transverse stop line, with the remaining lane lines to be the standard broken lane line pattern (100 mm wide, 3 m line with 9 m gap) as shown in Figure 41.

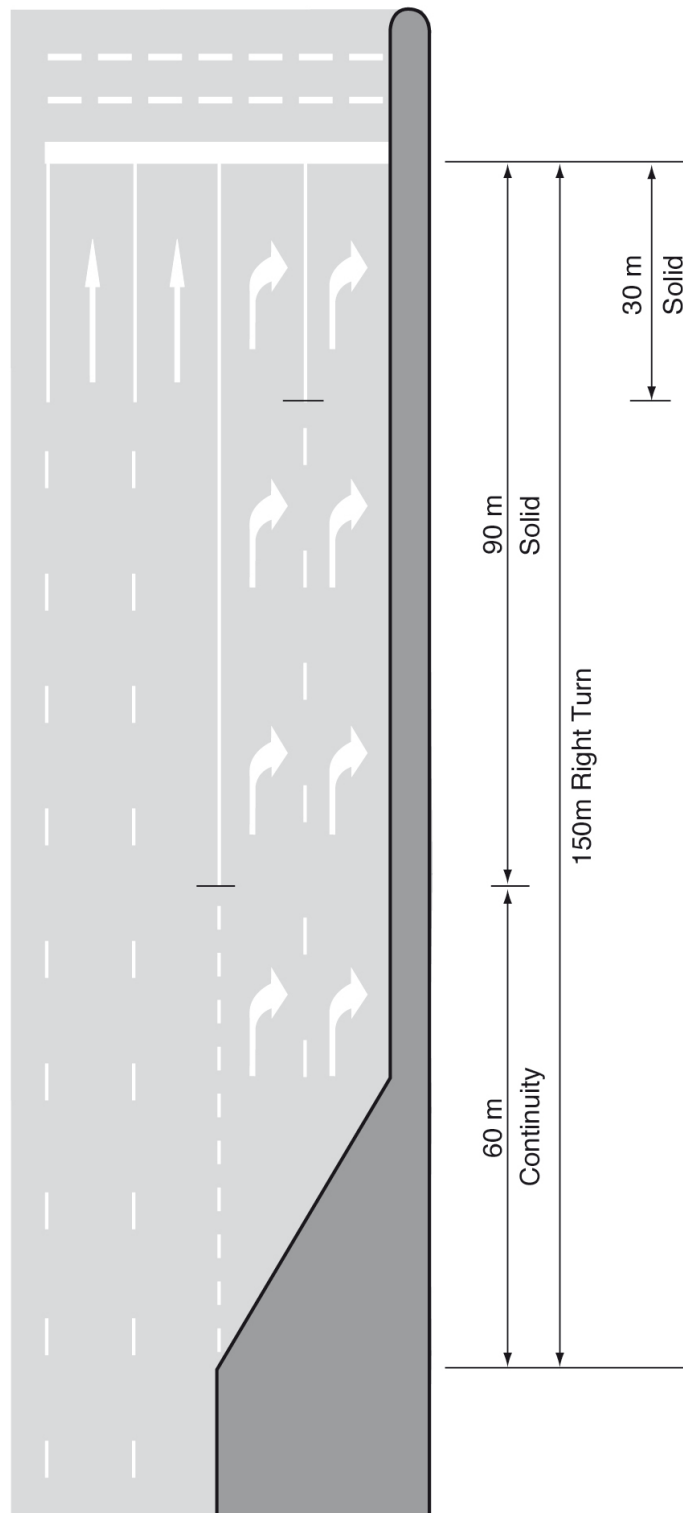


Figure 41: Example of lane lines between adjacent turning lanes for 60 km/h speed zone

Note: Refer to Clause 5.5.2 of AS 1742.2:2009 for arrow pavement marking locations.

g) Lane lines on freeways

In general, the standard broken lane line pattern (100 mm wide, 3 m line with 9 m gap) is used on freeways and ramps.

A 150 mm continuous lane line is used between an auxiliary lane and the adjacent through lane over the distance where drivers are expected not to change lanes as follows:




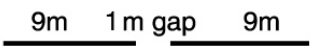
- in conjunction with a trap lane at an exit ramp, as illustrated in Figure 13 (Clause 3.8 of this Supplement),
- where an added lane commences from an entry ramp, as illustrated in Figure 13, so that drivers can clearly see the continuation of the added lane and there is no need to merge,
- in advance of where two main carriageways diverge at a freeway to freeway interchange, as illustrated in Figure 17 of the VicRoads Supplement to AS 1742.15:2007.

Where lane changing on urban freeways is to be discouraged but not prohibited, a special purpose broken line (100 mm wide, 9 m line with 3 m gap) may be used.

Clause 5.3.5 – Edge lines

Table 10 and the information below provide further guidance on the use of edge lines in Victoria.

Table 10: Overview of edge lines

Patterns and Dimensions	Usage
 100mm wide	Normal use
 150mm wide	Freeways, M Routes, rural A Routes and special uses lanes
 100mm or 150mm wide	Yellow edge line may be used: (i) to ban parking (ii) in snow areas where parking is prohibited
 (Yellow) 100mm wide	Yellow edge line in snow areas where parking is permitted.

Edge lines should not be painted on a two-way carriageway unless it has a dividing or barrier line and has a sealed width of at least 6.2 m.

The minimum length of an edge line should be 500 m, and wherever practical, edge lines should be placed on both sides of the carriageway.

Edge lines are placed:

- on all M, A and B Routes in rural areas
- on all urban freeways including ramps
- on C Routes with a sealed width of at least 6.2 m and with dividing or barrier lines. Edge lines can still be placed when the sealed width is less than 6.2 m wide for small sections (not over 1 km in length), provided that the sealed width is not less than 5.9 m.

Gaps should be left in edge lines at all intersections with minor roads which have no controlled intersection markings. A standard continuity line may be placed across the gap if delineation is required, or to continue a bicycle lane through the intersection in accordance with the Road Rules.

Edge lines may be placed on roads additional to those above in accordance with the following guidelines:

- Rural municipal roads:
 - AADT 2000 or greater
 - AADT 1000 or greater, and the average annual rainfall exceeds 1000 mm, or where the road is subject to fog or wet days of appreciably greater than average frequency
 - truck volumes of 200 vpd or greater.
- Urban arterial roads:
 - unkerbed roads carrying at least 2500 vpd
 - roads in unlit or poorly lit areas where there is a kerb immediately adjacent to the running lane, and there is a need for extra delineation
 - kerbed arterial roads where the edge of the running lane is more than 1 metre from the kerb.

A continuous yellow edge line is a regulatory line which can be used to ban stopping and parking as an alternative to No Stopping signs in accordance with rule 169 of the Road Safety Road Rules 2009. This rule applies to yellow edge lines marked adjacent to kerbs, or at the edge of traffic lanes.

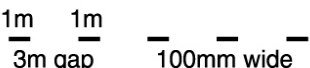
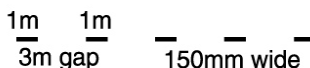
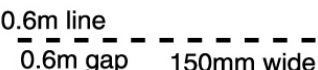
Yellow edge lines are used in areas subject to snow but if it is intended to allow parking in these areas, the edge line will need to be a broken pattern of 9 m line and 1 m gap. Yellow edge lines are located as for white edge lines. However, they may be applied on a sealed road of any width, with or without a marked barrier or dividing line, and there is no minimum length required for the line.

Clause 5.3.6 – Continuity lines

Table 11 and the information below provide guidance on the use of continuity lines in Victoria.

The former 'statcon' linemarking style is now referred to as an 'intersection continuity line', 'median opening continuity line' or both depending on the location of the continuity line.

Table 11: Continuity Lines used in Victoria

Patterns and Dimensions	Usage
	Standard continuity line
	Freeway and special use continuity line (i) All freeway usages (ii) Locations on roads other than freeways where special emphasis of the line is needed
	Intersection continuity line and median opening continuity line (formerly known as 'statcon' lines)

a) Standard continuity lines

Standard continuity lines are used:

- Across the entry taper of right and left turn lanes (see Figure 38, Figure 39, Figure 40 and Figure 41). The length of continuity lines should be determined from Table 9.
- At a mid block lane drop on urban roads (excluding freeways):
 - at the end of added lane treatments
 - where a lane drop occurs beyond a signalised intersection, or a roundabout where the speed limit is greater than 80 km/h.
- At the merge and diverge tapers of slow vehicle turnouts (see Figure 29).
- Where there is a need to define the edge of a through carriageway or lane at a point where some traffic may turn or diverge across it, and no other markings, such as intersection or median opening continuity type lines, are provided.

- At exits from turning roadways, continuity lines are used instead of intersection continuity line markings where the line would be longer than 50 m (see Figure 43(4));
- Where a bicycle lane is marked to continue through an unsignalised intersection.
- To continue a bicycle lane across the entry point of an auxiliary lane or a merge at the end of an auxiliary lane.
- To define short sections of two-way median turn lanes, and across local street openings where two-way median turn lanes are installed (refer to Clause 4.13.4 of this Supplement).

Cases where a continuity line is **not** marked in the merge area beyond intersections include:

- lane drops along freeway entrance ramps
- a lane drop on the departure side of a roundabout or on the departure side of a signalised intersection where the speed limit is 80 km/h or less.
- the departure side of a Type AUR (auxiliary) right turn treatment (see Figure 63).

b) Freeway and special use continuity lines

Freeway and special use continuity lines are used as follows:

- along freeways (as illustrated in Figure 7, Figure 9, Figure 1312 and Figure 1213 in Clause 3.8, and Clause 5.7.1 of this Supplement) at:
 - interchanges across entry and exit ramps to and from the freeway ramps
 - across the entry point to auxiliary lanes at two-lane exits
 - in the merge area at freeway lane drops
 - across the entry point to a climbing lane for slow vehicles
 - at other locations on freeways where there is a need to define the edge of a through carriageway at a point where traffic may diverge across it (i.e. at a bifurcation).

Note: a standard continuity line is used on at-grade intersections on rural freeways (see Figure 15) and for intersection markings at freeway terminals.

- on roads other than freeways, the 150 mm special purpose line shall be used:
 - at the merge and diverge areas of overtaking lanes, climbing lanes and transition treatments where a lane drop occurs as illustrated in Figure 23, Figure 27 and Figure 28,
 - at other locations where specific emphasis of the line is needed to address a safety or operational issue.

c) Intersection continuity lines and median opening continuity lines

The former 'statcon' linemarking style is now referred to as an 'intersection continuity line', 'median opening continuity line' or both depending on the location of the continuity line.

A continuity line with 600 mm line and gap and 150 mm wide are used:

- across the entrance into the minor road as a continuation of the STOP and GIVE WAY intersection markings as per Clause 5.4.4 of AS 1742.2:2009
- at median openings and outer separators, as illustrated in Figure 43 and Figure 44
- across high entry angle left turn roadways where the opening is less than 50 m in length, refer Figure 43 (4).

These markings are installed to provide continuity of the driving line for the through traffic as an extension of the kerb line. This is particularly important in the case of wide or flared intersections, and those on the outside of curves.

These continuity lines are **not** provided:

- between a continuity line across the entrance of a side road and a left turn auxiliary lane (see Figure 43(4) in Clause 5.4.2 of this Supplement), except where the continuity line across the entrance of a side road is a prolongation of the kerb defining the through carriageway (see Figure 43(1) in Clause 5.4.2 of this Supplement);
- at exits from turning roadways where the continuity line is longer than 50 m.

Clause 5.3.9 – Longitudinal lines at intersections and roundabouts

Barrier lines may be used as dividing lines in the following additional cases:

- On approaches to right turn lane treatments as detailed in Clause 5.6.5 of this Supplement.
- To mark the dividing line on the approaches to traffic signals and STOP and GIVE WAY controlled on undivided roads which have multiple lane approaches (e.g. to prevent turns into driveways adjacent to the intersection).

A special purpose broken dividing line (9 m line with 1 m gaps) may be used to allow parking between the dividing line and the kerb (parking is prohibited where 3 m or less would remain between the dividing line and the parked vehicle under the rule 208(6) of the Road Safety Road Rules 2009).

Clause 5.4 – TRANSVERSE LINES




Clause 5.4.1 – General

Under the Road Safety Road Rules 2009, generally both signs and linemarking have legal significance. However, where a sign or linemarking are required to be installed and it is possible to do so, both a sign and linemarking shall be used, as both serve a specific purpose as follows:

- The sign provides better conspicuity under adverse road conditions (i.e. linemarking can be undetectable in dark and/or wet conditions). The sign is retroreflective and can be seen from a greater distance,
- The linemarking provides guidance to the driver on where to stop prior to entering an intersection, and reduces the possibility of inadvertently entering or stopping within the intersection.

As well as gravel roads, an exception to the above is in low speed off-road environments, i.e. car park aisles where markings may be used without signs. In these cases, the erection of signs may be undesirable, or in many cases impractical. Yellow markings may also be considered in an off-road environment if white would not provide sufficient contrast to the pavement colour, i.e. on concrete surfaces.

Table 12: Summary of Transverse lines used in Victoria

Use	Pattern and Dimensions	Refer Section
At STOP Sign (stop line)		Clauses 5.4.3, 5.4.4
At GIVE WAY Sign (holding line)		Clauses 5.4.2, 5.4.4
At Roundabout Sign (holding line)		Clauses 5.4.2, 5.4.4

Note: All dimensions in millimetres unless otherwise shown.

Clause 5.4.2 – Give-way lines

On an intersection approach controlled by a GIVE WAY sign and/or a give-way line, the width of the give-way line is 300 mm. An intersection continuity line is provided across the right hand side of the approach.

The width of the line at a roundabout is 400 mm.

Clause 5.4.3 – Stop lines

On an intersection approach controlled by a STOP sign (not including at traffic signals or at a railway crossing), the width of the stop line is 300 mm.

Clause 5.4.4 – Positioning of lines at STOP and GIVE WAY signs

The installation of give-way and stop lines for various additional situations is illustrated in Figure 42 (note the right hand side intersection continuity lines). Applications of these general principles at other intersections, median openings and outer separators are illustrated in Figure 43, Figure 44, Figure 45, Figure 46 and Figure 47.

Similar principles should be applied to other cases, for example, two-way service road intersections and various service road termination layouts.

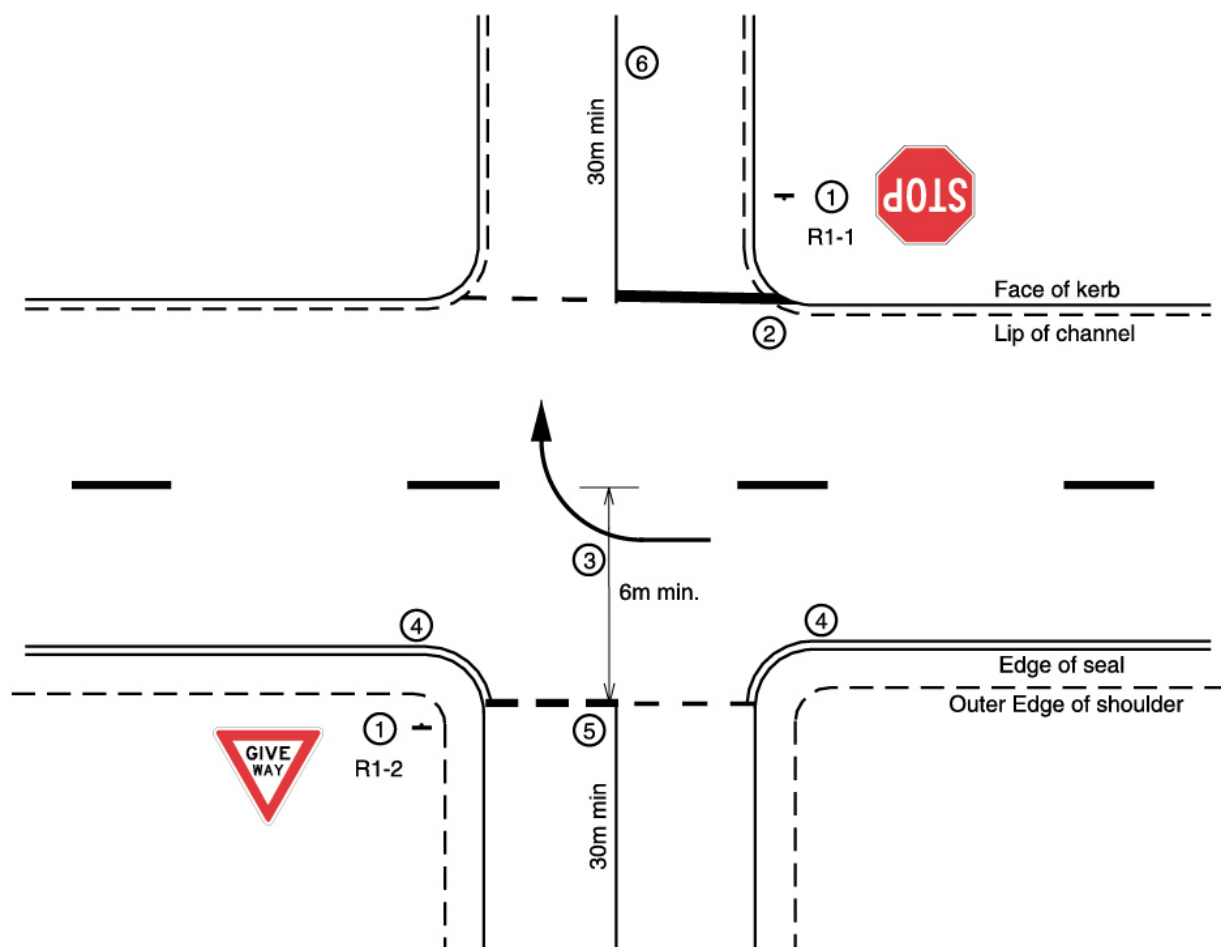


Figure 42: Typical controlled intersection treatments

Notes to Figure 42:

1. For guidelines on the correct use of STOP or GIVE WAY signs, refer to Clause 2.5 of AS 1742.2:2009. Each sign is located as near as practicable to and not more than 9 m in advance of the stop/holding line.
2. On kerbed carriageways the normal location of a stop/holding line is with the front edge of line (edge nearest traffic lane) aligned with the face of kerb. Refer to Clause 5.4.3 for dimensions of lines.
3. On unkerbed carriageways at cross roads where right turns are made in the direction of the arrow, this distance should be at least 6 m to permit a through vehicle to pass a right turning vehicle without risk of colliding with a vehicle waiting at the holding line. On multi-lane carriageways, this distance is generally 5 m.
4. Where an edge line is provided, it should be continued around the corner to meet the holding line marking.
5. Where a side road is generally unsealed, it is preferable that the approach be sealed for a short distance to ensure that dirt will not be carried onto the stop/holding line. If this is not possible, the stop/holding line may be omitted.

6. *A side road dividing line is provided if the remainder of the side street has a dividing line marked, or if the width between kerbs, or seal width measured 10 m back from the stop/holding line, is 6 m or more, refer to Clause 5.3.9 of AS 1742.2:2009. Where parking is to be allowed adjacent to the line, and less than 3 m clear distance will exist between the centre line and a parked car, a broken dividing line shall be used (refer to Clause 5.3.9 of this Supplement).*

a) Kerbed carriageways

On kerbed carriageways, give-way and stop lines are generally located so that the leading edge (i.e. the edge nearer the major road) forms a prolongation of the face of the kerb, as illustrated on the “Stop” side in Figure 42.

Where traffic islands are installed, the leading edge of the stop or give-way line forms a prolongation of the painted outline of the adjacent island, in line with the kerb, as shown by the stop line in Figure 43 (4).

Stop or give-way lines may be set back from the line of the kerb defining the through carriageway if there is a sound reason to do so, such as large vehicles requiring additional space to turn into a side road. Stop or give-way lines may also be located to suit the geometry of specific intersection layouts (e.g. wide median treatments on rural freeways).

Where there is a left turn auxiliary lane on the major road, an adjacent continuity line across the entrance into the minor road is marked as a prolongation of the kerb as illustrated in Figure 43 (1) and Figure 43 (4).

At modified or complex intersections, stop or give-way lines may be curved or angled where required to maintain the width and alignment of the major road, as illustrated in Figure 45 and Figure 46.

b) Unkerbed carriageways

Two-lane two-way

On unkerbed two-lane two-way roads, the leading edge of a give-way or stop line should be located a minimum of 6 m from the separation line (or nominal centre line) of the major road as illustrated on the “Give Way” side in Figure 42.

The minimum distance of 6 m is to permit a through vehicle to pass to the left of a right turning vehicle on the through carriageway without the risk of colliding with a vehicle waiting to enter from the side road. To cater for different shoulder widths:

- For A Routes, the stop or give-way line will be in line with the outer edge of shoulder.
- For B Routes, the stop or give-way line will be placed approximately 0.7 m behind the outer edge of shoulder.

Multi-lane

On multi-lane roads (Figure 47 (3)), a minimum distance of 5 m should be adopted from the adjacent lane line to the leading edge of the stop or give-way lines.

The minimum distance of 5 m provides a satisfactory balance between clearance to high speed traffic on the major road, sight distance from the holding line, and the minimisation of crossing distance.

For 3.5 m wide traffic lanes on the major road (e.g. M Route), this minimum distance has the effect of locating the holding lines 1.5 m behind the edge line. On an M Route the holding lines will therefore be placed near the centre of the sealed shoulder.

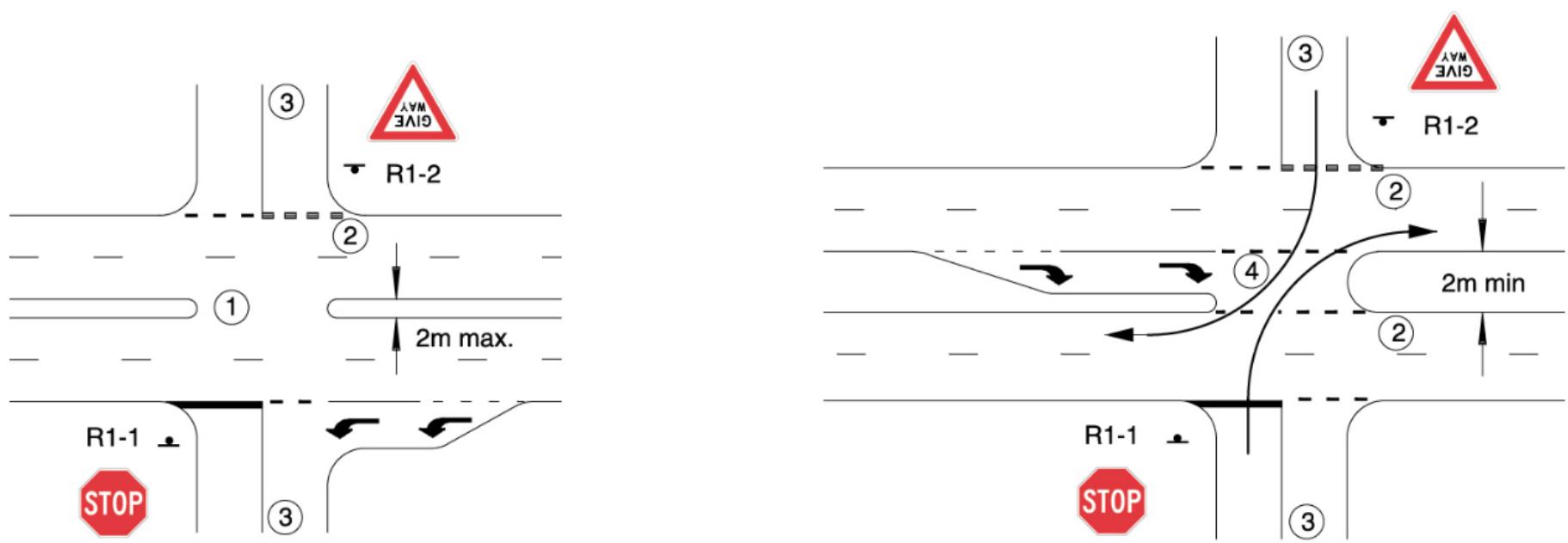
Where a bicycle lane is adjacent to the near traffic lane, or a sealed shoulder used frequently by bicycles, the minimum distance should be increased to 6 m.

General

At exits from turning roadways where markings are longer than 50 m, “standard” continuity lines are used instead of stop or give-way lines, as illustrated in Figure 43 (4).

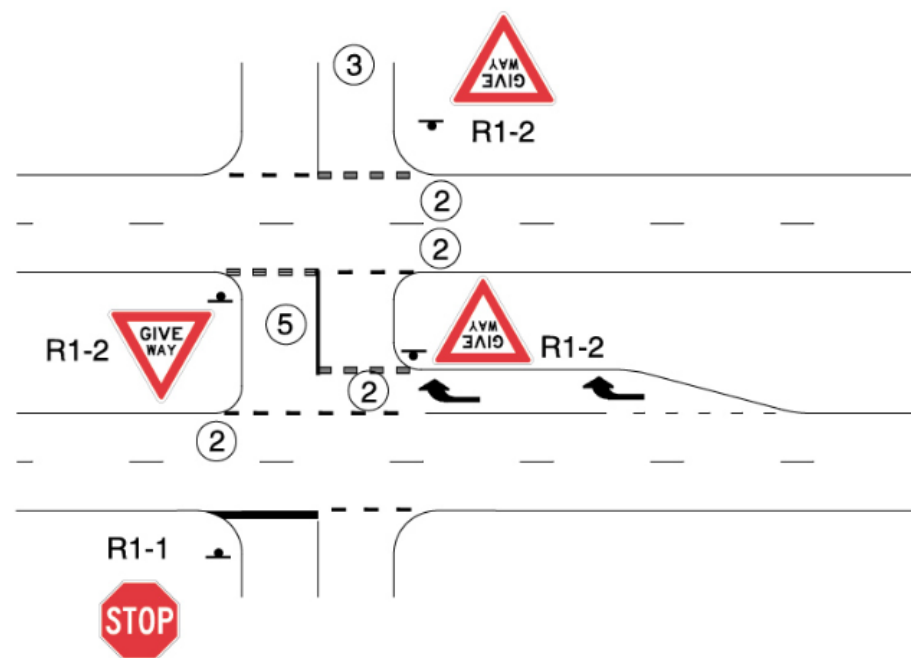
Where the minor road is unsealed, stop or give-way lines are not installed, however where edge line markings are provided, a standard continuity line may be painted as noted in Clause 5.3.5 of AS 1742.2:2009.

Where a left turn auxiliary lane exists, and no traffic island exists in the side road, an intersection continuity line is not provided across the entrance into the minor road, as illustrated in Figure 47 (2).

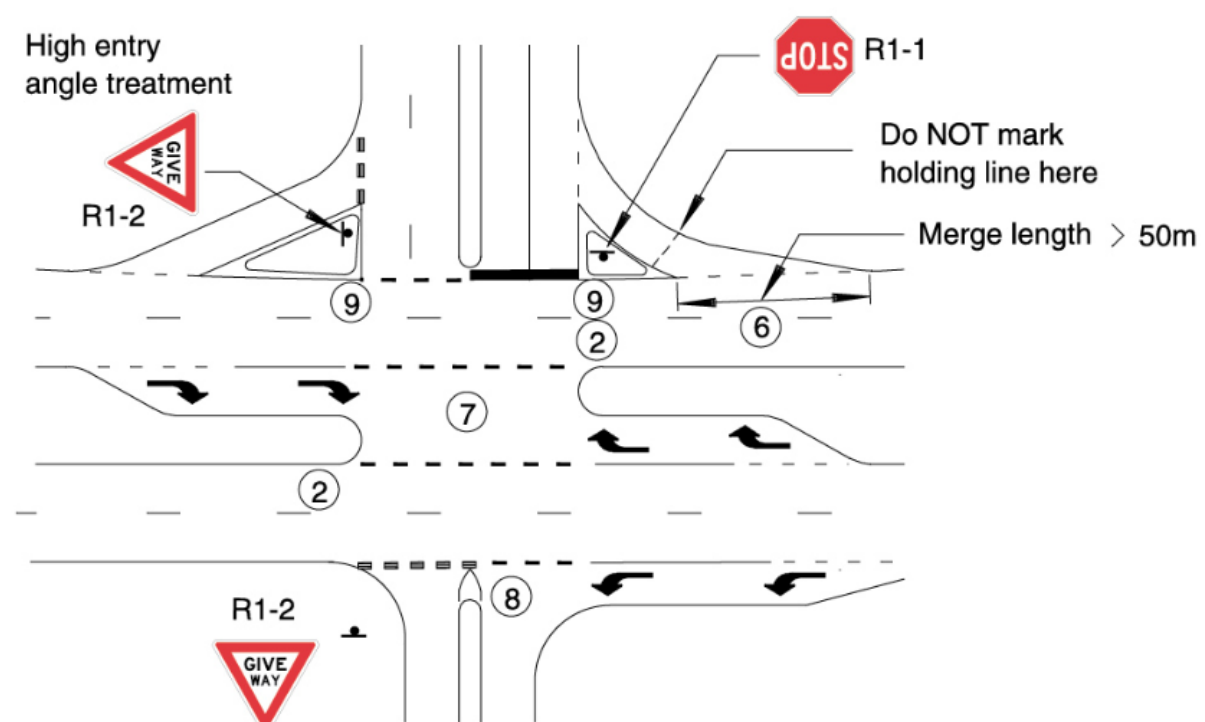


(1) Median up to 2m wide

2) Median wider than 2m and diamond turns can be made



(3) Median where diamond turns cannot be made

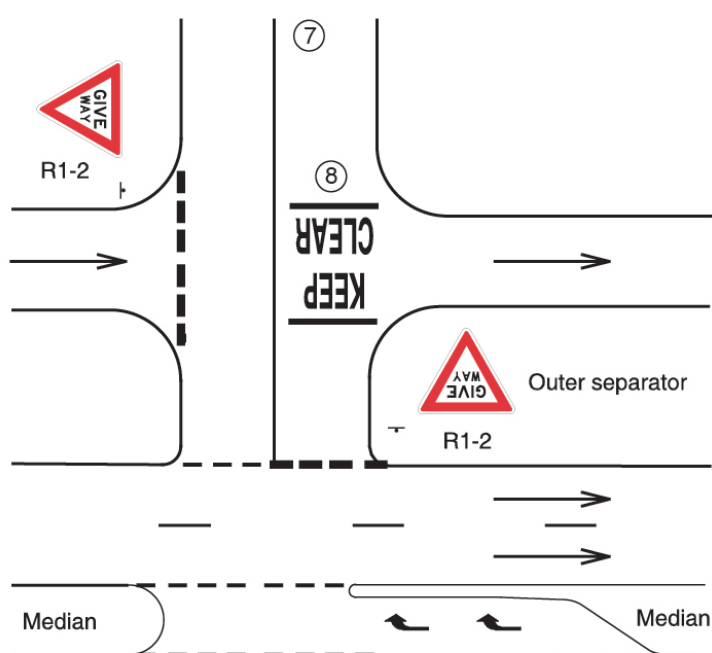


(4) Treatment where side road divided

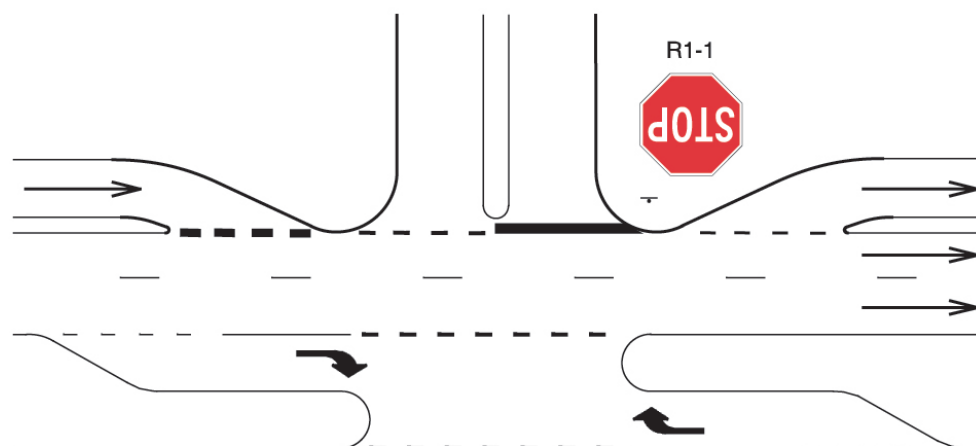
Figure 43: Signs and markings at kerbed median openings

Note to Figure 43:

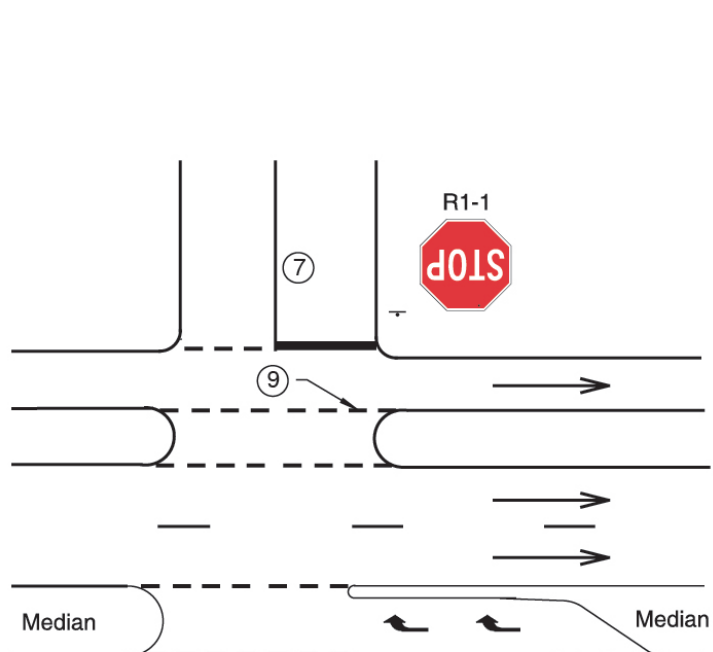
- 1. Long openings may require pavement delineation, especially if on a curve or crest. Use 'standard' type continuity lines in the prolongation of each median kerb in such cases.**
- 2. Locate stop/holding lines and intersection continuity lines as shown in Figure 42. The leading edge of the median opening continuity line at a median opening (i.e. edge nearer the major road) also forms a prolongation of the face of kerb. An exception to this is where a painted edge line is installed along the median where associated markings at median openings shall be a prolongation of the edge line.**
- 3. A side road centre line is provided if the remainder of the side street has a separation line marked, or if the width between kerbs, or seal width measured 10 m back from stop/holding line, is 6 m or more. The line may be extended beyond 30 m if the approach is curved, or on a crest, or if there is some other unusual geometric feature. Where parking is to be allowed adjacent to the line, and less than 3 m clear distance will exist between the centre line and a parked car, a broken centre line shall be used (refer to Clause 5.3.9 of this Supplement).**
- 4. For this case to apply (Example (2)), there must be sufficient clearance for opposing right-turners to pass when simultaneously following a diamond turn pattern.**
- 5. The central line is a 150 mm unbroken line.**
- 6. Where a merge length is less than 50 m, the continuity line pattern is the 600 mm line, 600 mm gap and 150 mm wide. If a merge length is greater than 50 m, use the "Standard" type (1 m line, 3 m gap, and 100 mm wide). These are illustrated in Table 11.**
- 7. Median treatment as in Examples 1, 2 or 3 as appropriate.**
- 8. Approach island or median nose set back. Mark a 100 mm wide outline between the end of the stop/holding line and the island/median nose.**
- 9. Controlled intersection markings are a prolongation of the painted island outline, Example 4.**



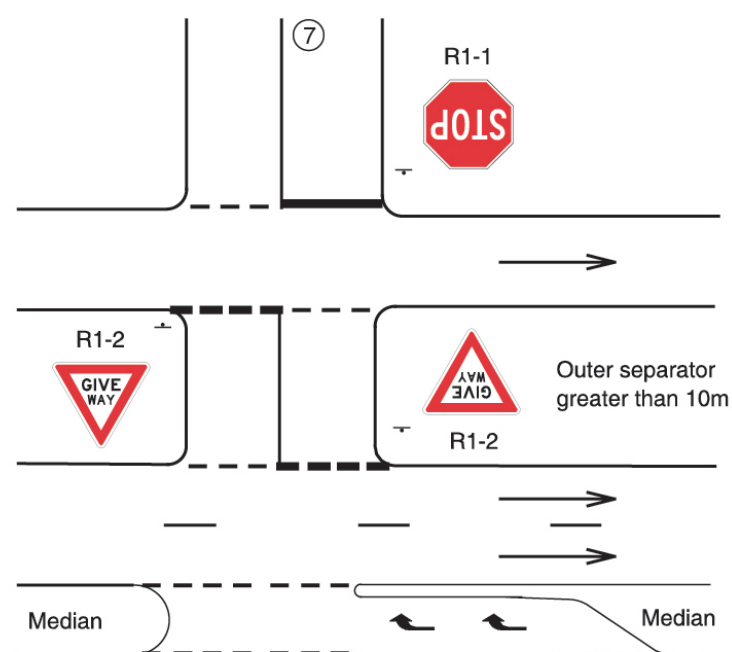
Case 1: Priority to side road over one-way service road



Case 2: Priority to side collector road over one-way service road

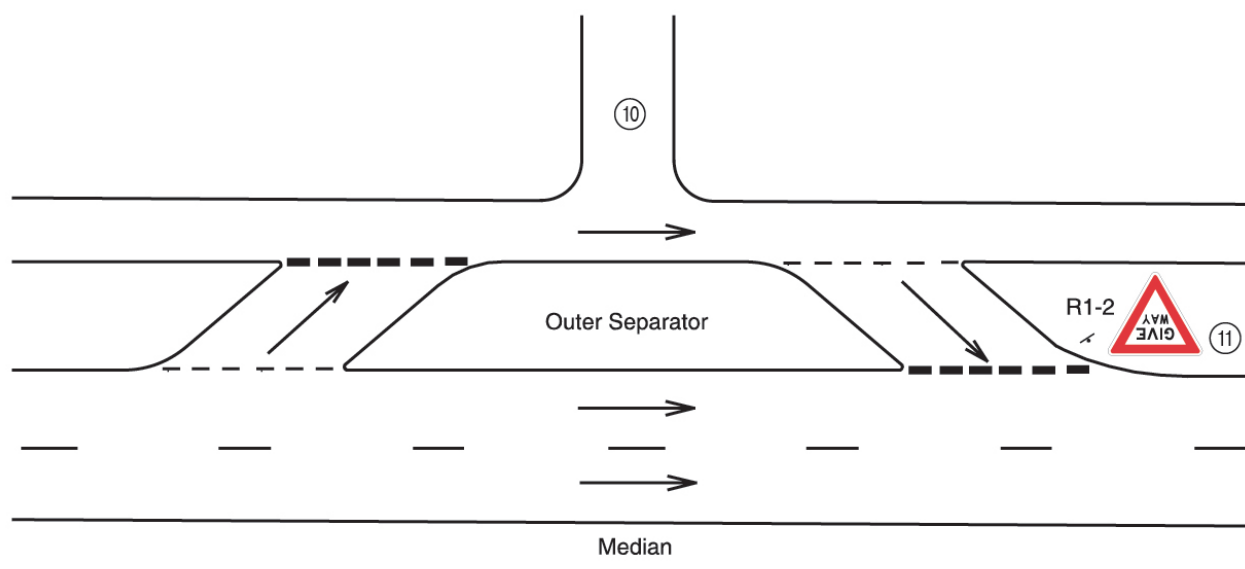


(a) Outer separator up to 10m wide



(b) Outer separator wider than 10 m

Case 3: Priority to one-way service road



Case 4: Outer separator openings not at side road

Figure 44: Signs and markings at kerbed outer separator openings

Notes to Figure 44:

1. **Figure 44 illustrates four cases for signing and marking at outer separator openings on one-way service roads. Guides for the use of each case are as follows:**

2. **Case 1: Opening at Side Road - Priority to Side Road over Service Road**

This treatment may be used at a local road where the one-way traffic volume entering from the side road is relatively low but is greater than the service road volume. It may also be considered where the service road volume is the higher, but contains a significant proportion of through traffic which should be discouraged from using the service road, or where the outer separator is so narrow that there is inadequate storage area for a vehicle between the through carriageway and the service road. In general, it would be preferable to provide a physical narrowing of the service road at the intersection in these cases.

3. **Case 2: Opening at Service Road Terminations**

These treatments are often used where the side road is a collector road carrying a substantial traffic volume. They are treated as illustrated in this example.

4. **Case 3: Opening at Side Road - Priority to Service Road**

This treatment should be used where the conditions for Case 1 do not apply. If Case 2 applies, consideration should be given to whether the outer separator opening opposite the side road should be closed.

5. **Case 4: Openings Not at Side Road**

These are treated as illustrated.

6. **It should be noted that two-way service road intersections need to be considered on their merits in individual cases.**

Specific Notes:

7. **A side road centre line is provided if the remainder of the side street has a separation line marked, or if the width between kerbs, or seal width measured 10 m back from stop/holding line, is 6 m or more. The line may be extended beyond 30 m if the approach is curved, or on a crest, or if there is some other unusual geometric feature. Where parking is to be allowed adjacent to the line, and less than 3 m clear distance will exist between the centre line and a parked car, a broken centre line shall be used (refer Clause 5.3.2 of AS 1742.2:2009).**
8. **The pavement marking KEEP CLEAR may be required if service road traffic has difficulty in negotiating queues of side road traffic waiting at the main carriageway entry point, refer to Clause 5.5.2.6 of AS 1742.2:2009. The marking should not be used unless there is space between it and the main carriageway stop/holding line for at least one vehicle to store.**
9. **Omit this median opening continuity line if outer separator is less than 2 m wide.**
10. **T-intersection rule under Road Safety Road Rules 2009 would normally apply at this intersection. Intersection signs and markings may not therefore be required.**
11. **Sign must be angled to ensure that it creates no confusion for traffic on the main carriageway.**

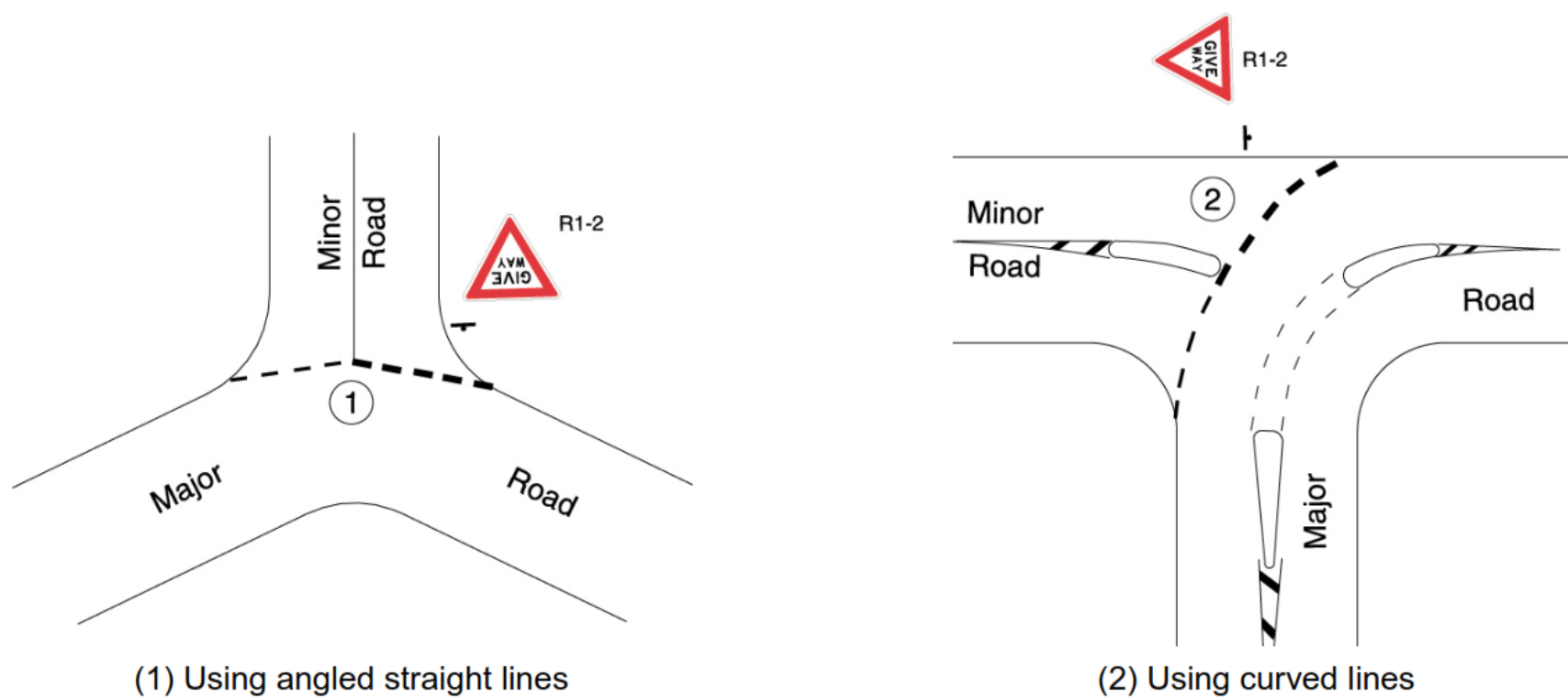


Figure 45: Modified intersection (examples)

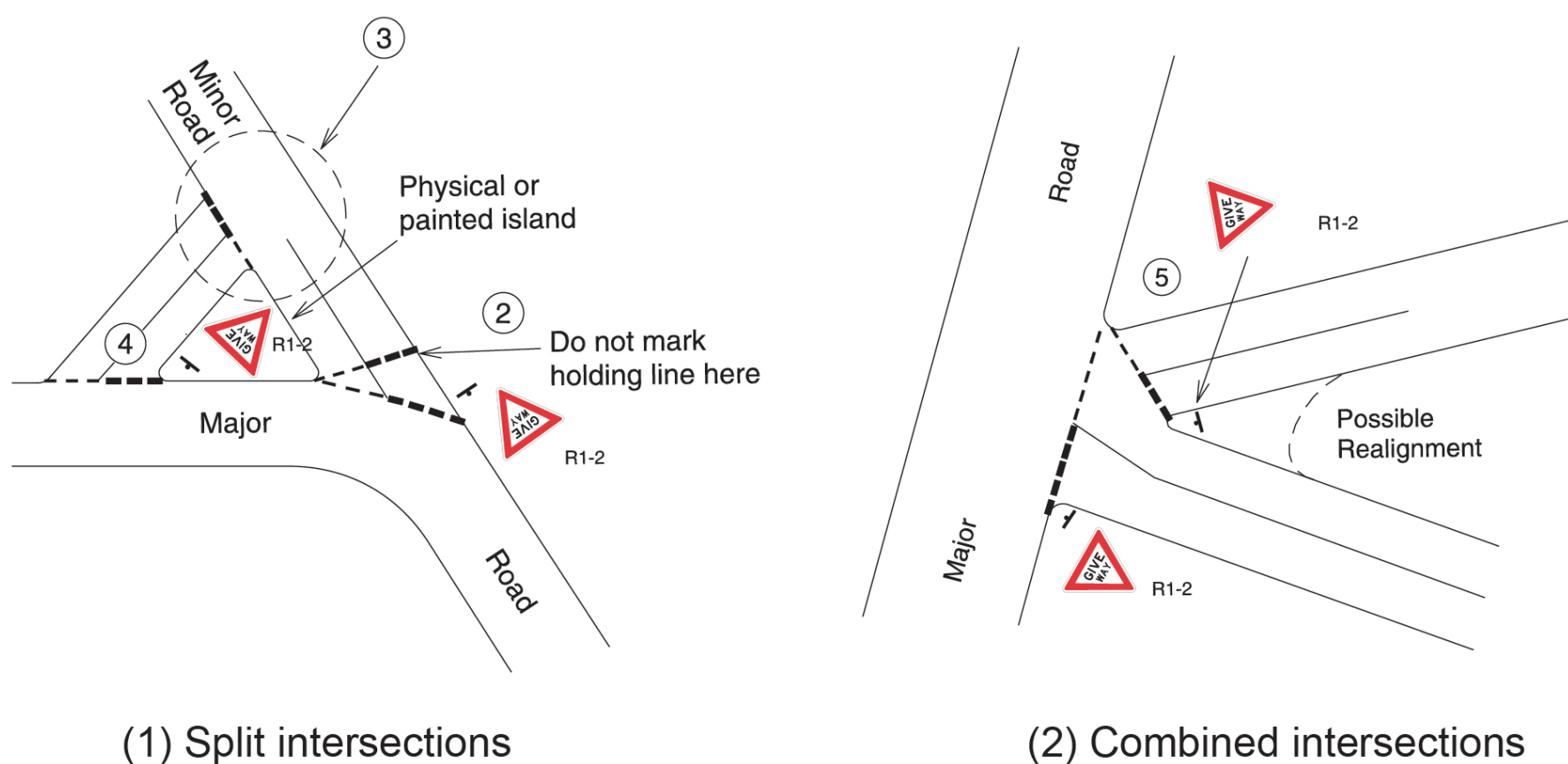
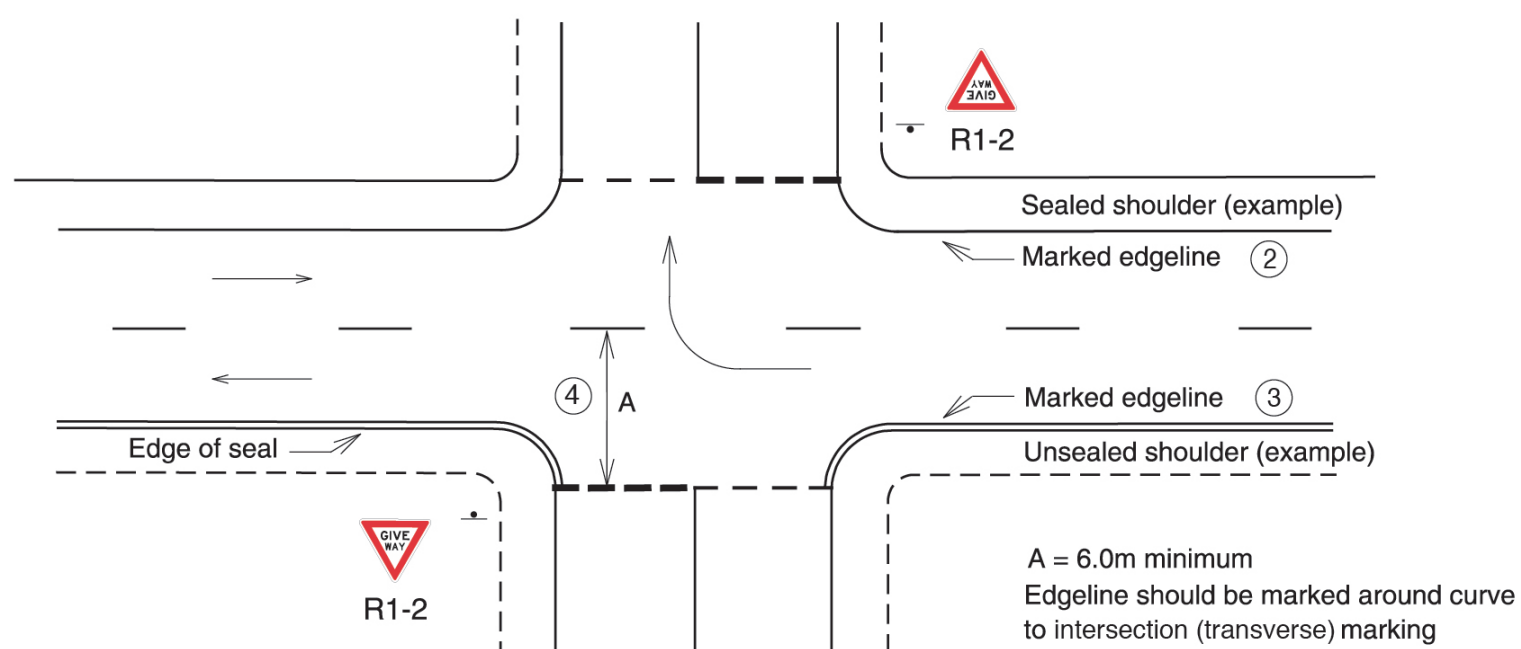


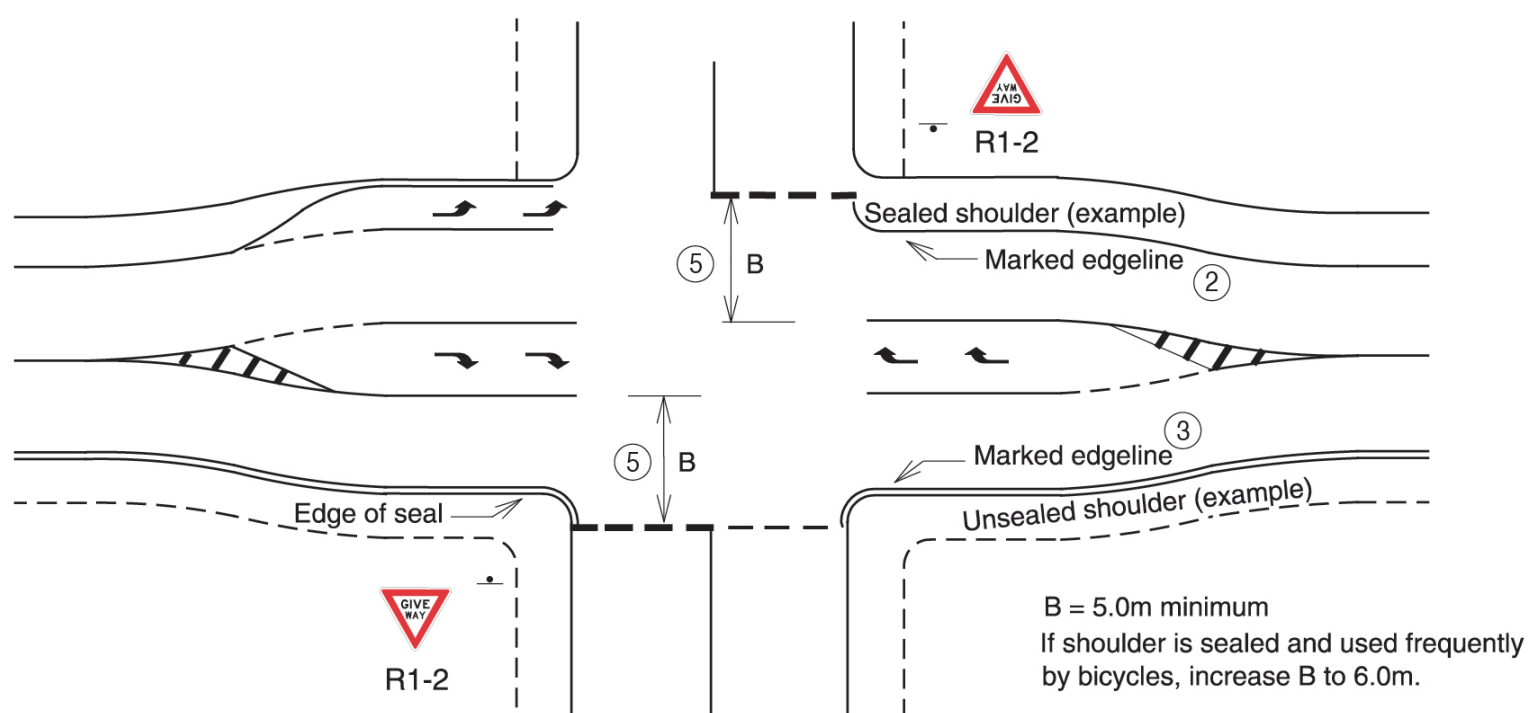
Figure 46: Complex intersections (examples)

Notes to Figure 45 and Figure 46:

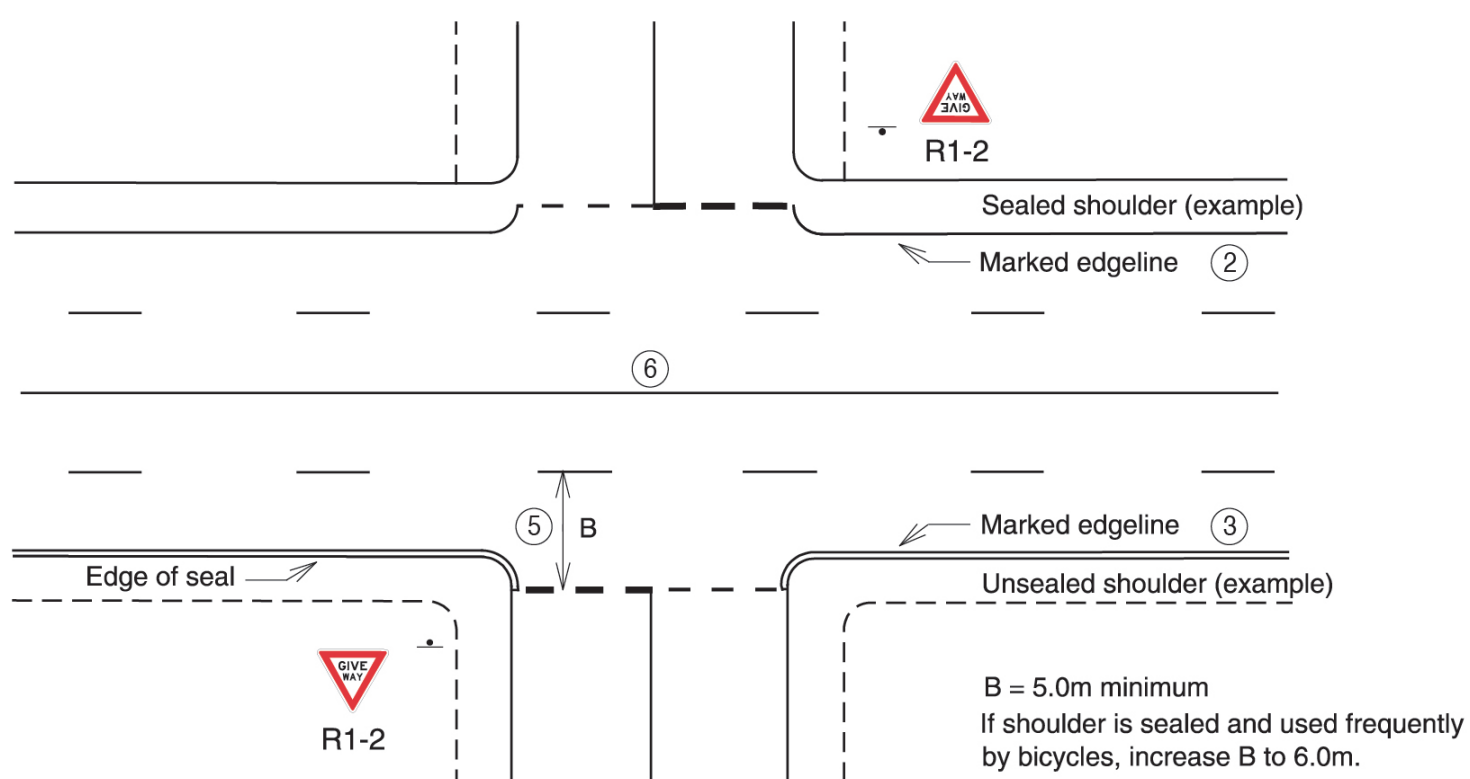
1. Where kerbs on the major road are not directly aligned, the linemarking must be aligned in a way which does not create a hazard by narrowing the major road width through the intersection (i.e. having the continuity line and holding line marked in a straight line may squeeze the major road width on the bend).
2. Where a minor road intersects the major road on a bend, the stop/holding line must be marked to follow the alignment of the major road around the bend.
3. Where there is a third intersecting point at a complex intersection, it must be marked for a priority arrangement appropriate for volumes and site conditions. Consideration may be given to the use of markings without a sign at such locations.
4. This treatment is generally only suitable in local road networks. Where the major road carries a significant volume of traffic (e.g. arterial road or important collector road), consideration should be given to a realignment of the minor road to create one intersection only.
5. Where a second intersection of minor roads occurs close to the intersection of a minor road with the major road, the intersection points should be separated, and consideration given to realignment of a minor leg or reshaping of the intersection.



(1) Standard two-lane, two-way major road



(2) Right turn lane marked on major road



(3) Multi-lane major road

Figure 47: Unkerbed cross roads

Notes to Figure 47:

General:

1. *These arrangements are applicable where there is no central island on the minor road, and also apply to T-intersections.*

Special Notes:

2. *Where an edge line is provided, it should continue around the corner to the intersection (transverse) marking.*
3. *An edge line may or may not be marked adjacent to an unsealed shoulder.*
4. *At cross roads where right turns are made in the direction of the arrow, this distance should be at least 6 m to permit a through vehicle to pass a right turning vehicle without risk of colliding with a vehicle waiting at the holding line. If at a T-intersection, adopt 5 m as per Note 5 (this note applies only where pavement is unkerbed).*
5. *Minimum distance of 5 m creates a setback for the holding line to achieve a balance between clearance to the major road traffic lane, sight distance, and the crossing distance for vehicles leaving the side road.*
6. *Median may exist in this situation.*

c) Roundabout Markings

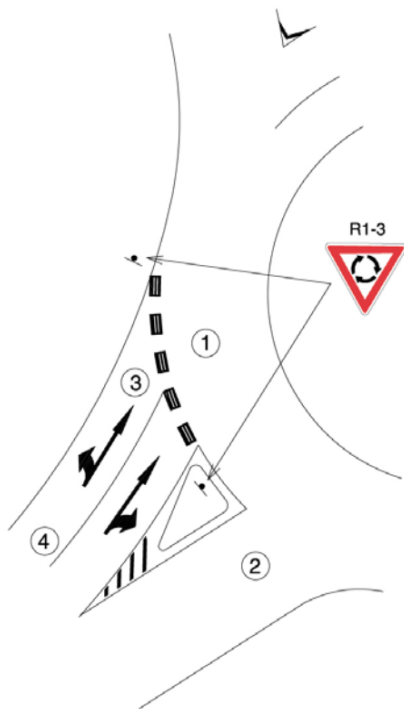
The pattern and dimensions for holding lines at roundabouts are shown in Clause 5.4.2 of this Supplement. Holding lines at roundabouts are installed in accordance with the principles that apply to other intersection types. The leading edge of the holding line forms a prolongation of the kerb and the painted outline of the traffic island on the approach, as illustrated in Figure 48.

Application of general linemarking principles to various roundabouts is illustrated in Figure 49.

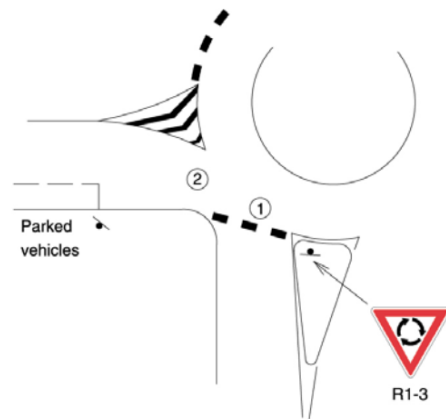
For roundabouts, no line is marked across the exit from the roundabout, but exit linemarking is installed on multi-lane roundabouts, as illustrated in Figure 49 - see also Clause 5.3.6 of AS 1742.2:2009. It is also essential that pavement arrows be provided on all multi-lane approaches to roundabouts to promote lane discipline within the roundabout in accordance with Clause 5.5.2 of AS 1742.2:2009.

Refer to AS 1742.15:2007 for a typical signing and linemarking arrangement for roundabouts.

Provision for cyclists at roundabouts is discussed in detail in the Austroads Guide to Road Design Part 4B Section 5.3 (2011).



(1) Medium to large roundabouts

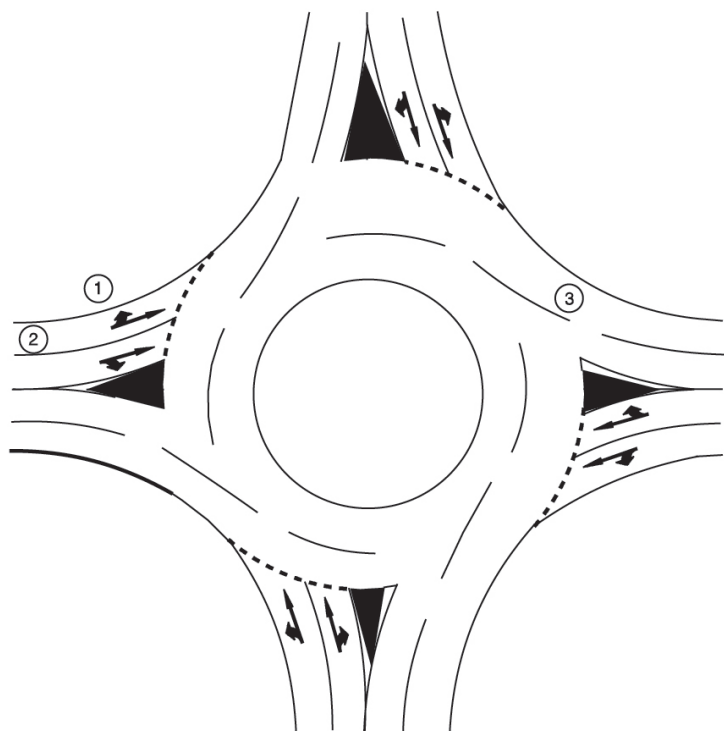


(2) Small and mini roundabouts

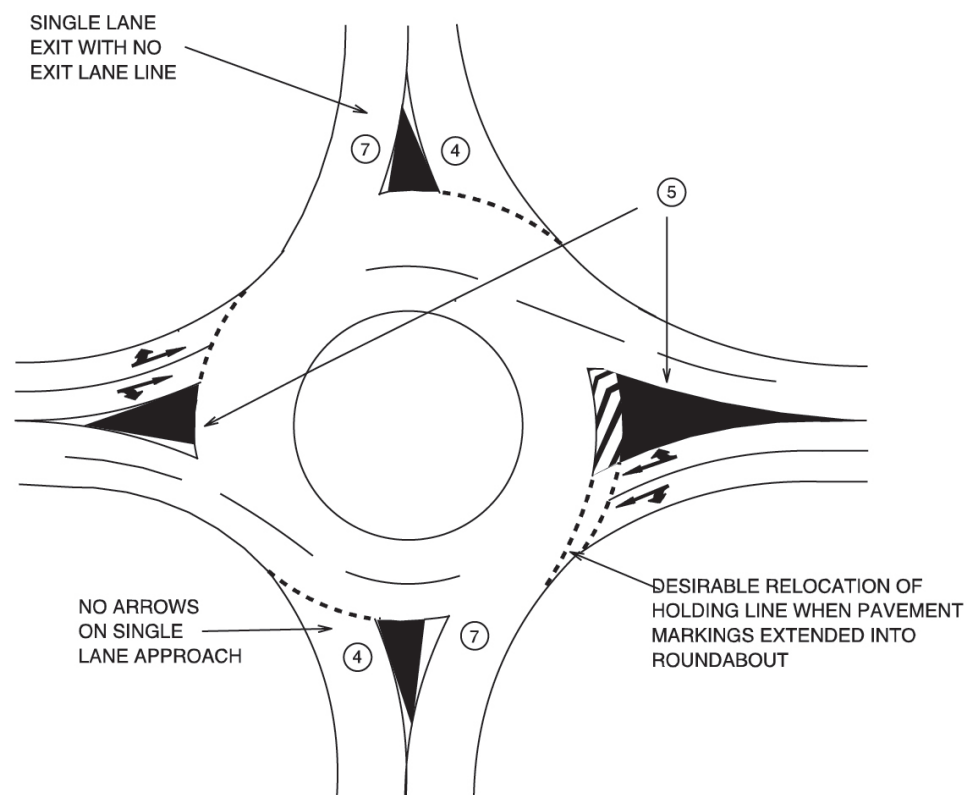
Figure 48: Roundabout holding lines

Notes to Figure 48:

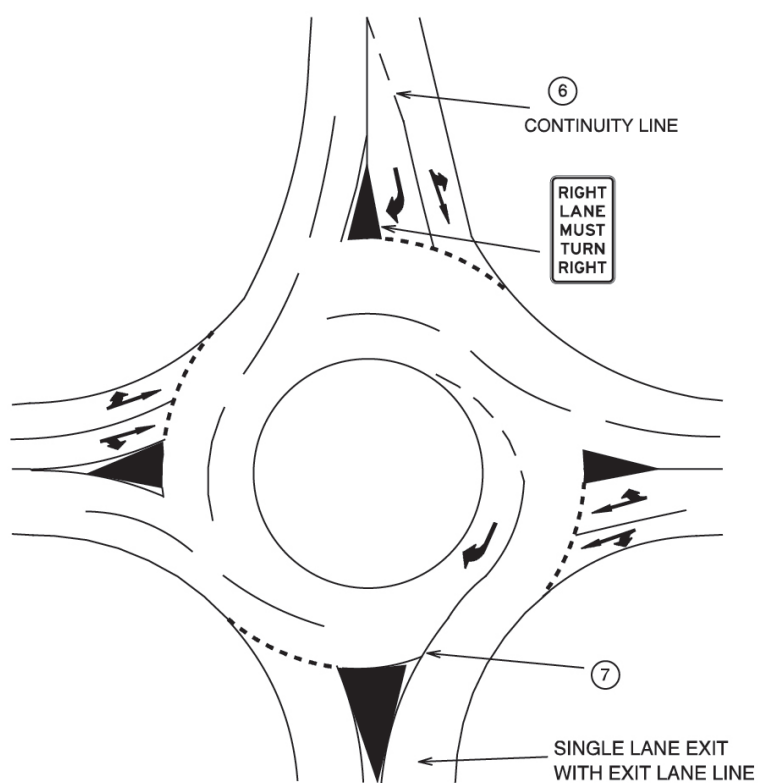
1. *The holding line curve radius and location shall provide a smooth guiding line for circulating traffic to follow into the next exit (except where inappropriate at small and mini T-intersection roundabouts, see Example (2)).*
2. *Continuity lines are not to be marked across exits.*
3. *Pavement arrows are installed on all multi-lane approaches, except at T-intersections as shown in Figure 49, Example (7).*
4. *Continuous lane lines on approaches are 30 m minimum length and may be extended to beyond the approach curve when necessary for delineation.*



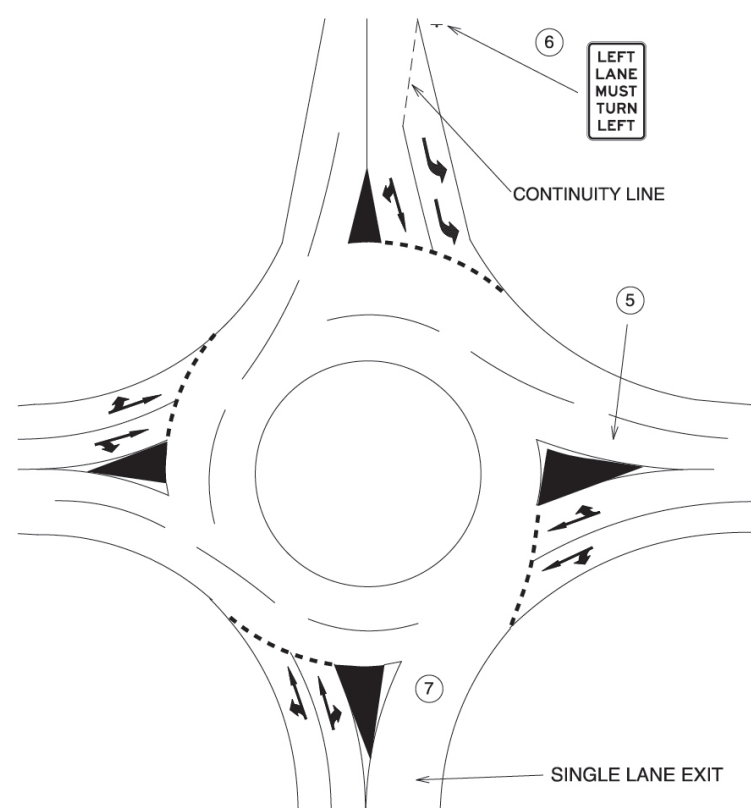
Example (1): Typical multi-lane roundabout showing two-lane approaches and two-lane exit



Example (2): Typical multi-lane roundabout showing two single lane approaches and two single-lane exits

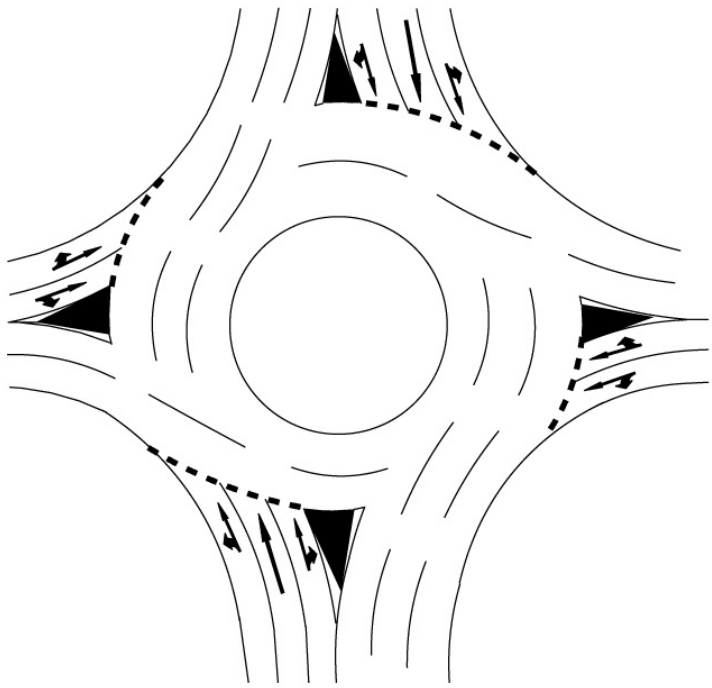


Example (3): Typical multi-lane roundabout showing two approach lanes, one exit lane, and featuring an exclusive right turn lane

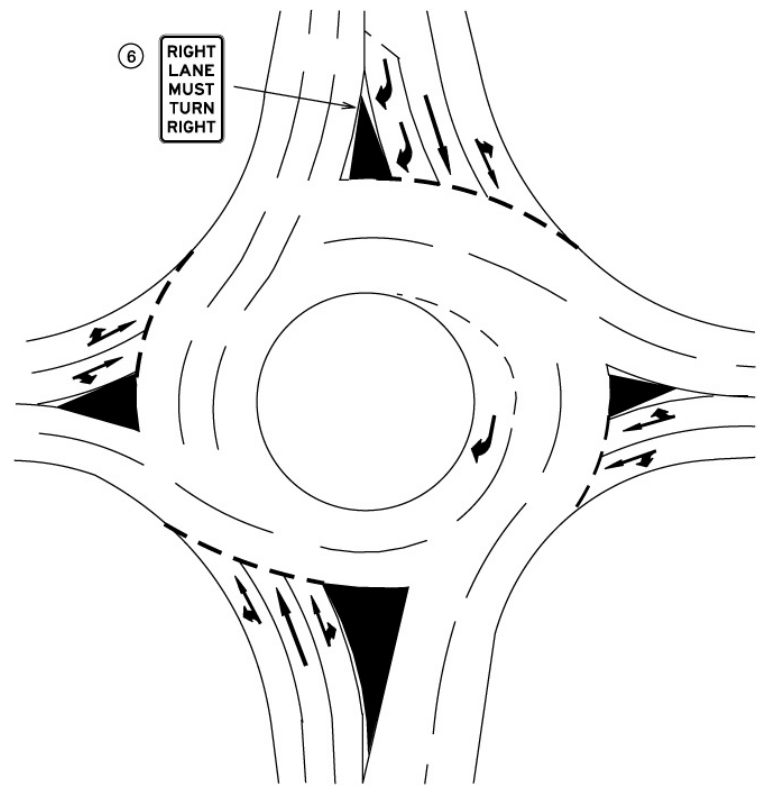


Example (4): Typical multi-lane roundabout showing two approach lanes, one exit lane, and featuring an exclusive left turn lane

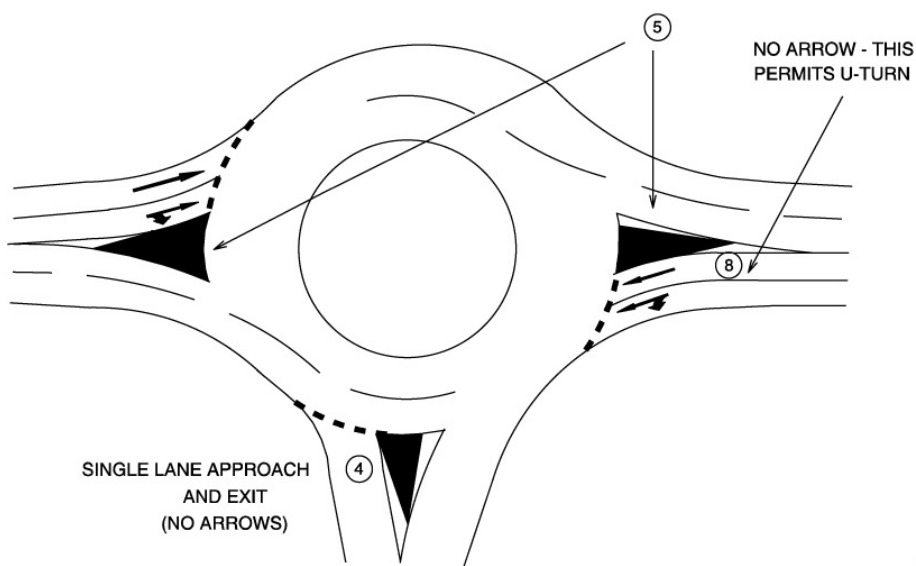
Figure 49: Typical roundabout layouts (schematic diagrams only)



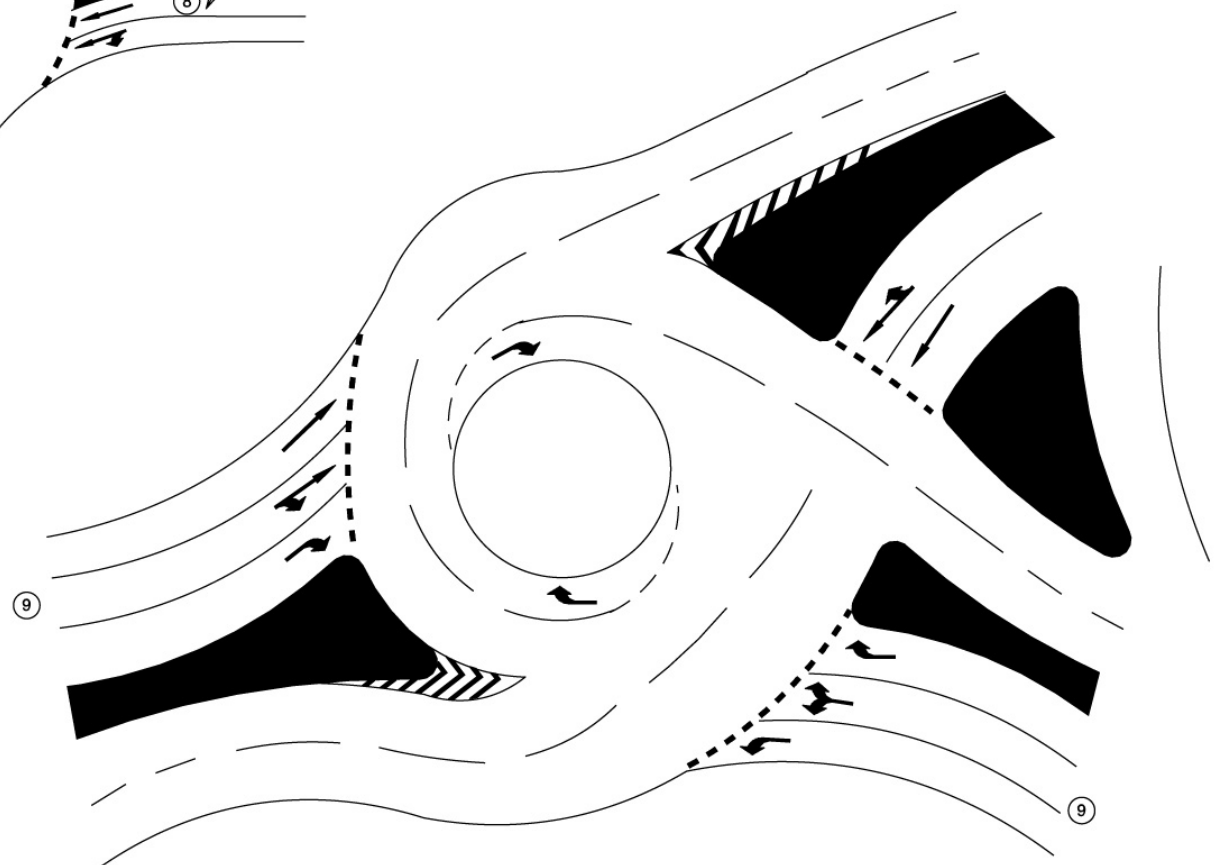
Example (5): Typical multi-lane roundabout showing two 3-lane approaches and two 2-lane approaches



Example (6): Typical multi-lane roundabout showing two 3-lane approaches & two 2-lane approaches featuring an exclusive right turn lane



Example (7): Typical multi-lane roundabout at t-intersection single lane on stem of T



Example (8): Typical multi-lane roundabout featuring spiral markings

Figure 49 (cont.): Typical roundabout layouts (schematic diagrams only)

Notes to Figure 49:

1. *Location and number of arrows similar to conventional pavement arrow requirements (refer to Clause 5.5.2.3 of AS 1742.2:2009) with the direction of the arrow for the through movement parallel to the approach lane lines.*
2. *Use curved lane lines on approaches.*
3. *Exit lane lines consist of 9 m long continuous lines with 3 m gaps, 100 mm wide. For information on setting out exit lane markings, see Attachment A of this Supplement.*
4. *Single lane approaches do not need lane arrows.*
5. *Multi-lane roundabouts with single lane exits should be designed so that these islands extend into the roundabouts, with due consideration being given to the turning space requirements of larger vehicles. Where the roundabout is modified to overcome an operational problem, the island may be extended into the circulating roadway using pavement markings, see Example (2).*
6. *Where an approach lane is limited to a single movement, a continuity line should be placed across the beginning of the lane and ' - LANE MUST TURN - ' (R2-9) signs provided in addition to the pavement arrows.*
7. *Single lane exits generally do not have exit lane lines. An exception is shown in Example (3).*
8. *Multi-lane approaches have lane arrows on all lanes (except for T-intersections, see Example (7)).*
9. *On complex layouts, lane diagrammatic signs should be used to promote lane discipline, refer to Clause 2.3.4 of AS 1742.15:2007 (sign G9-43).*

Clause 5.5 – OTHER MARKINGS

Clause 5.5.1.1 – General

Diagonal and chevron markings are used to delineate painted traffic islands, medians and separators. They are also used on the approaches to raised islands and other obstructions.

To meet the Road Safety Road Rules 2009 definition of a 'painted island', a flush treatment must contain "stripes or chevrons in white or another colour that contrasts with the colour of the road". It is not good practice to have an outline of an island without the stripes or chevrons as this could be ambiguous under the Road Rules and it would not be clear to drivers what movements are permitted across the flush treatment.

The spacing between diagonal bars or chevrons will depend on the total length of the marking, i.e. closer spacing on shorter markings. A guide for the appropriate sizes of diagonal bars and chevrons, and the spacing between them is given in Table 13. In no case should more than 25% of the pavement area within the marked island be painted.

Typical examples of the application of diagonal and chevron markings with appropriate outlines are illustrated in:

- Figure 50 - Low speed roads,
- Figure 51 - High speed roads,
- Figure 52 - Shoulders,
- Figure 53 - Painted islands,
- Figure 54 - Diagonal median markers,
- Figure 55 - Diagonal median markers at intersections.

Outline markings are as shown in Figure 50, Figure 51 and, for a typical painted island, in Figure 53. Line dimensions are:

- single unbroken: 150 mm wide;
- double barrier line: standard dimensions, refer to Clause 5.3.3.1 of AS 1742.2:2009.

A lead-in barrier line marking of minimum length, as given in Table 14: Length of lead-in barrier line at diagonal and chevron markings, should be installed at each painted island and obstruction approach marking. The barrier line may need to be extended or converted to a two-way barrier line if the warrants for a "no overtaking" zone (Clause 5.3.3 of AS 1742.2:2009) are met on that section of road.

Table 13: Guide for the size and spacing of diagonal bars and chevrons

Total Length of Marking(m)	Spacing Between Bars or Chevrons (mm)	
	Low Speed (80 km/h or less)	High Speed (more than 80 km/h)
<5.7	2100	-
5.7 to 22.5	3500	-
>22.5	5000	-
<10.5	-	4000
>10.5	-	6000

Note to Table 13:

1. For long lengths of median or shoulder markings, the gaps between markings may range between 5 and 20 m for low speed and up to 40 m for high speed.

Table 14: Length of lead-in barrier line at diagonal and chevron markings

85th percentile speed (km/h)	Length of Barrier Line X in Figure 51
Up to 70	36
80 to 90	60
>90	96

Clause 5.5.1.2 – Markings on splayed approaches

Diagonal and chevron markings on splayed approaches should be installed as per Figure 50 and Figure 51. These figures replace Figure 5.4 (a) and (b) in this Clause.

Note that barrier lines shall not be used in conjunction with chevron markings. Chevron markings indicate that drivers may pass to either side. Under rule 134 of the Road Safety Road Rules 2009, vehicles are not permitted to travel to the right of a barrier line.

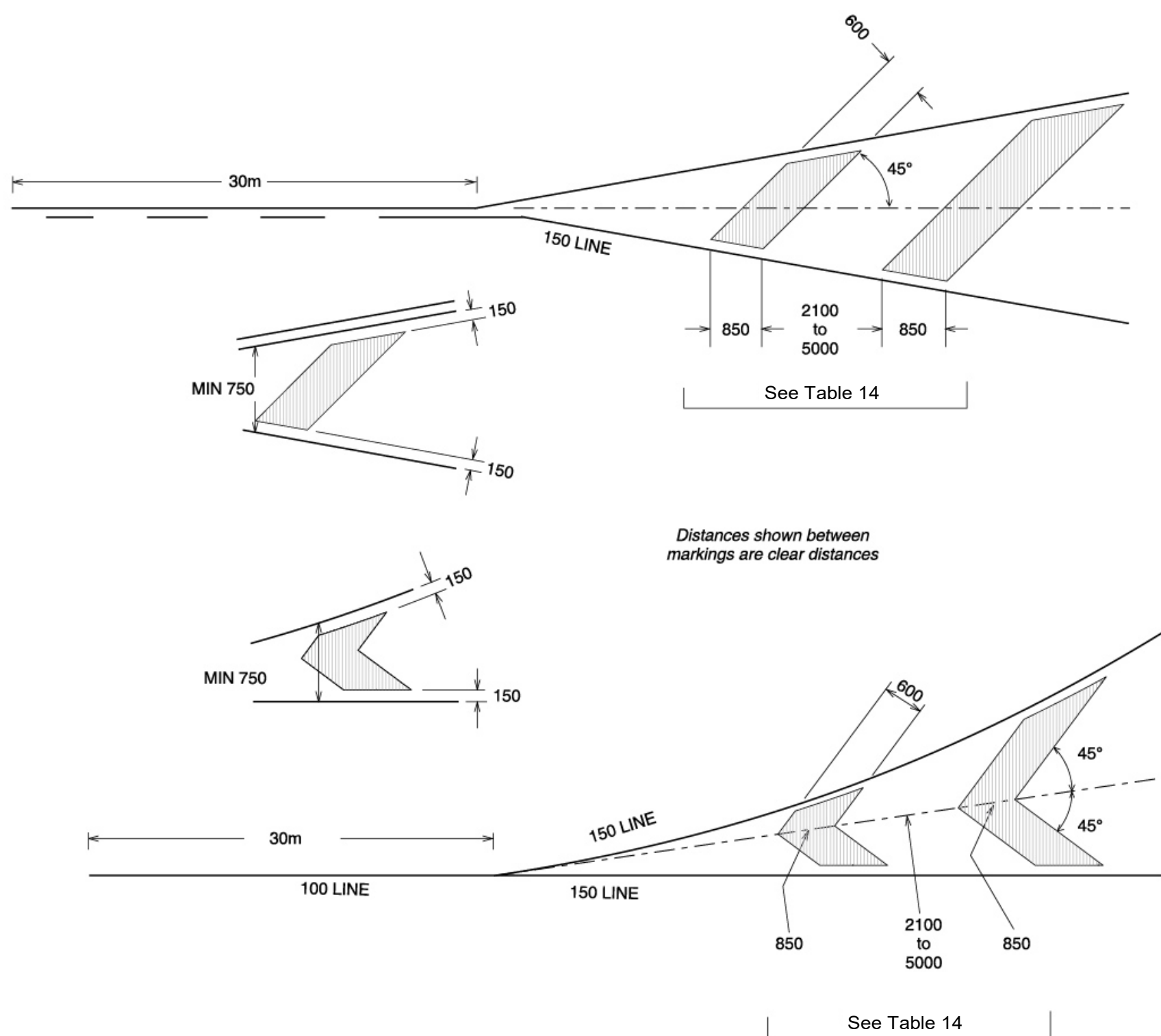


Figure 50: Diagonal and chevron markings - low speed roads (80 km/h or less)

Note: All dimensions in millimetres unless otherwise shown.

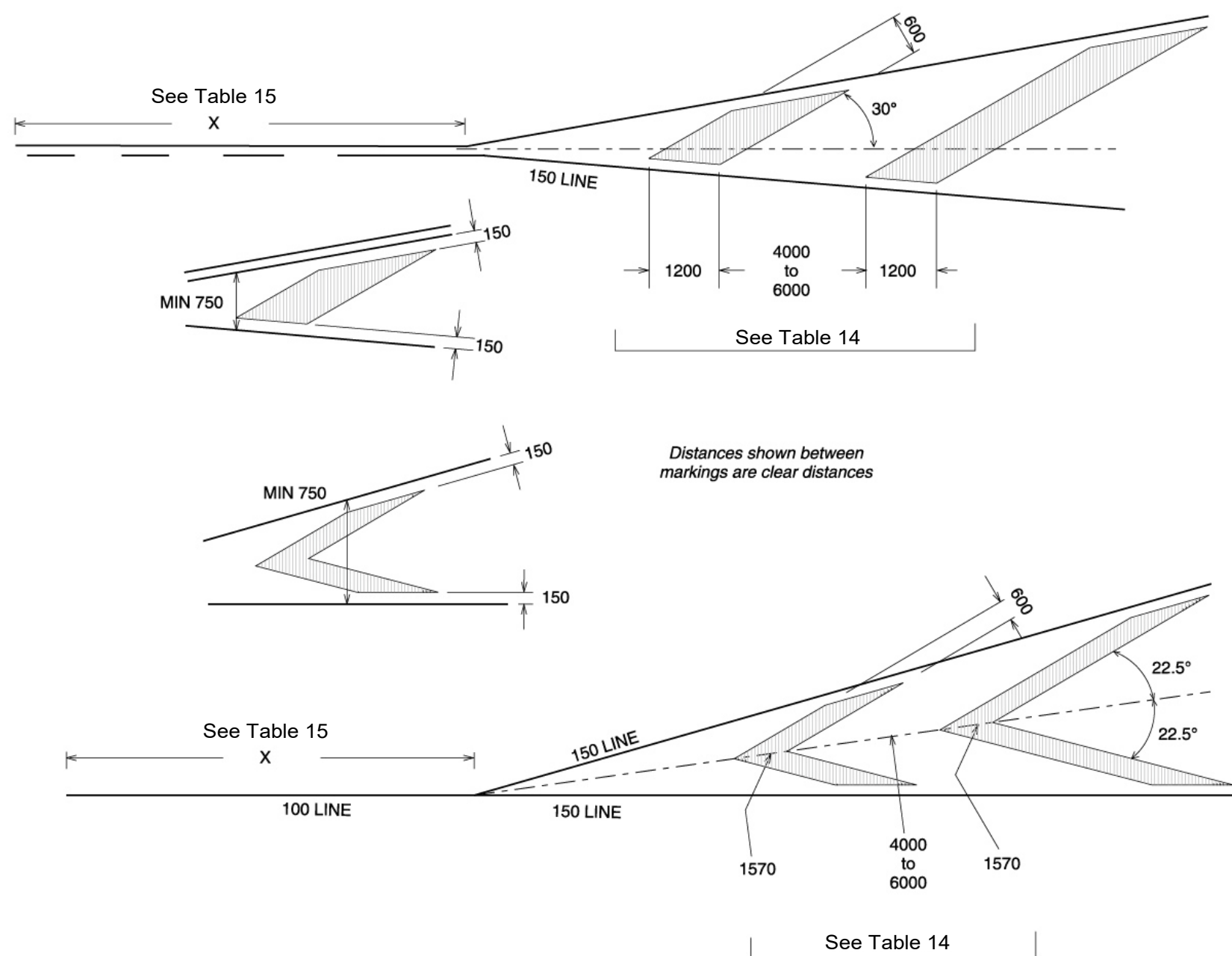


Figure 51: Diagonal and chevron markings - high speed roads (more than 80 km/h)

Note: All dimensions in millimetres unless otherwise shown.

Clause 5.5.1.3 – Diagonal markings on shoulders

Diagonal markings on shoulders should be installed as per Figure 52. This replaces Figure 5.5 in Clause 5.5.1.3 of AS 1742.2:2009.

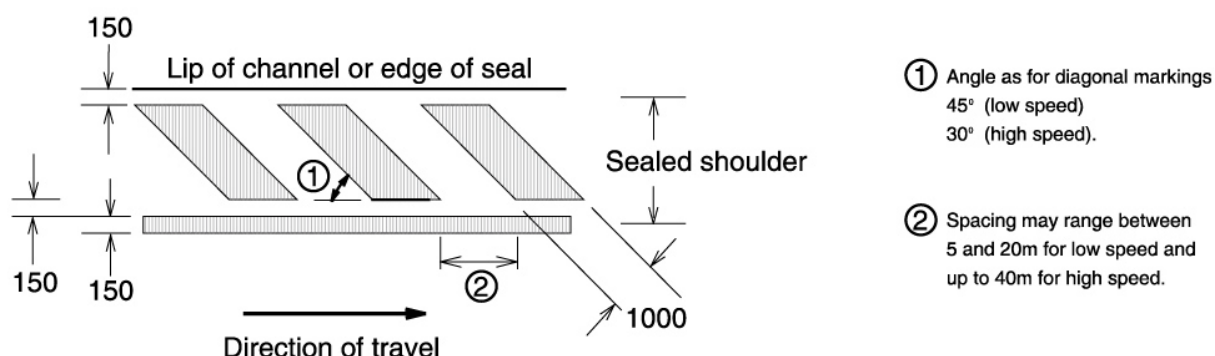


Figure 52: Shoulders

Note: All dimensions in millimetres unless otherwise shown.

Clause 5.5.1.4 – Painted islands and median strips

a) Lead-in dividing line

The lead-in dividing line, as shown in Figure 53, may be replaced by a single continuous dividing line if it matches the mid-block dividing line.

Figure 53 replaces Figure 5.6 (b) in this Clause 5.5.1.4 of AS 1742.2:2009.

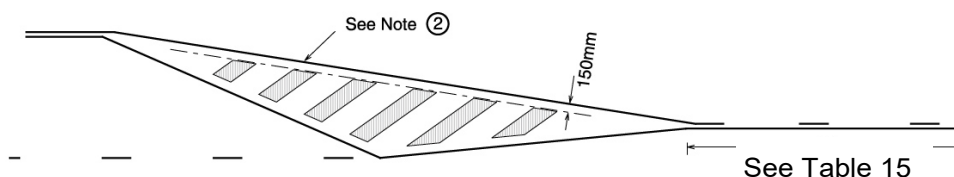


Figure 53: Painted island markings

Notes to Figure 53:

1. Example only, applicable to right-turn lane treatments.
2. Refer to Clause 5.5.1.1 of this Supplement for discussion on alternative line types.
3. Diagonal markings size, spacing and angle as in Figure 50 (low speed) or Figure 51 (high speed).
4. All dimensions in millimetres unless otherwise shown.

b) Diagonal median markings

Diagonal median markings should be installed as per Figure 54. Figure 54 replaces Figure 5.6 (c) in Clause 5.5.1.4 of AS 1742.2:2009.

In addition, nominal gaps of 6 m may be left in the diagonal markings at minor side streets. Diagonal markings are omitted from the gaps and the outline marking replaced by a “standard” continuity line for the length of the gap. The pattern is centred within the gap. Refer to Figure 55 for typical treatments.

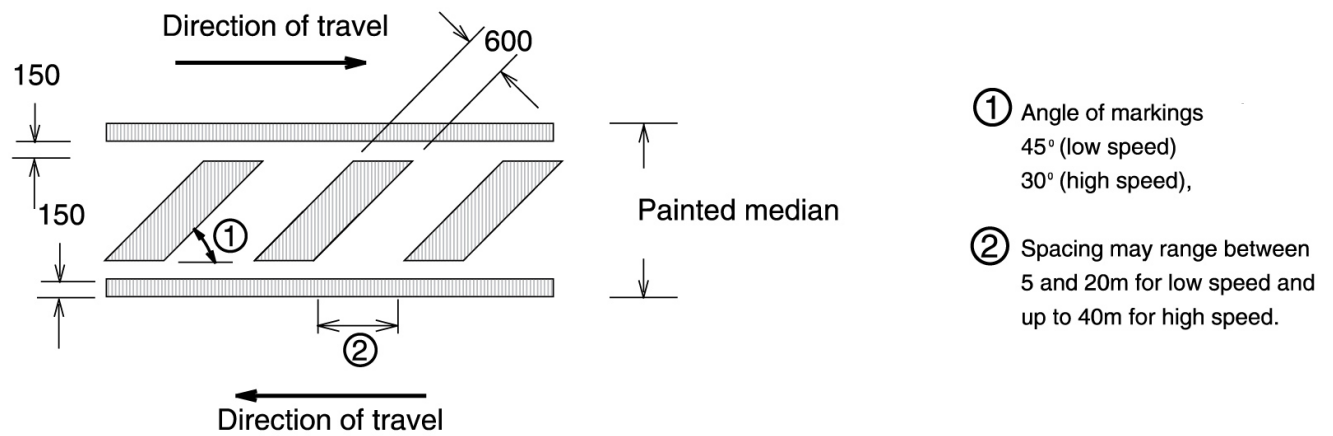


Figure 54: Diagonal median marking

Note: All dimensions in millimetres unless otherwise shown.

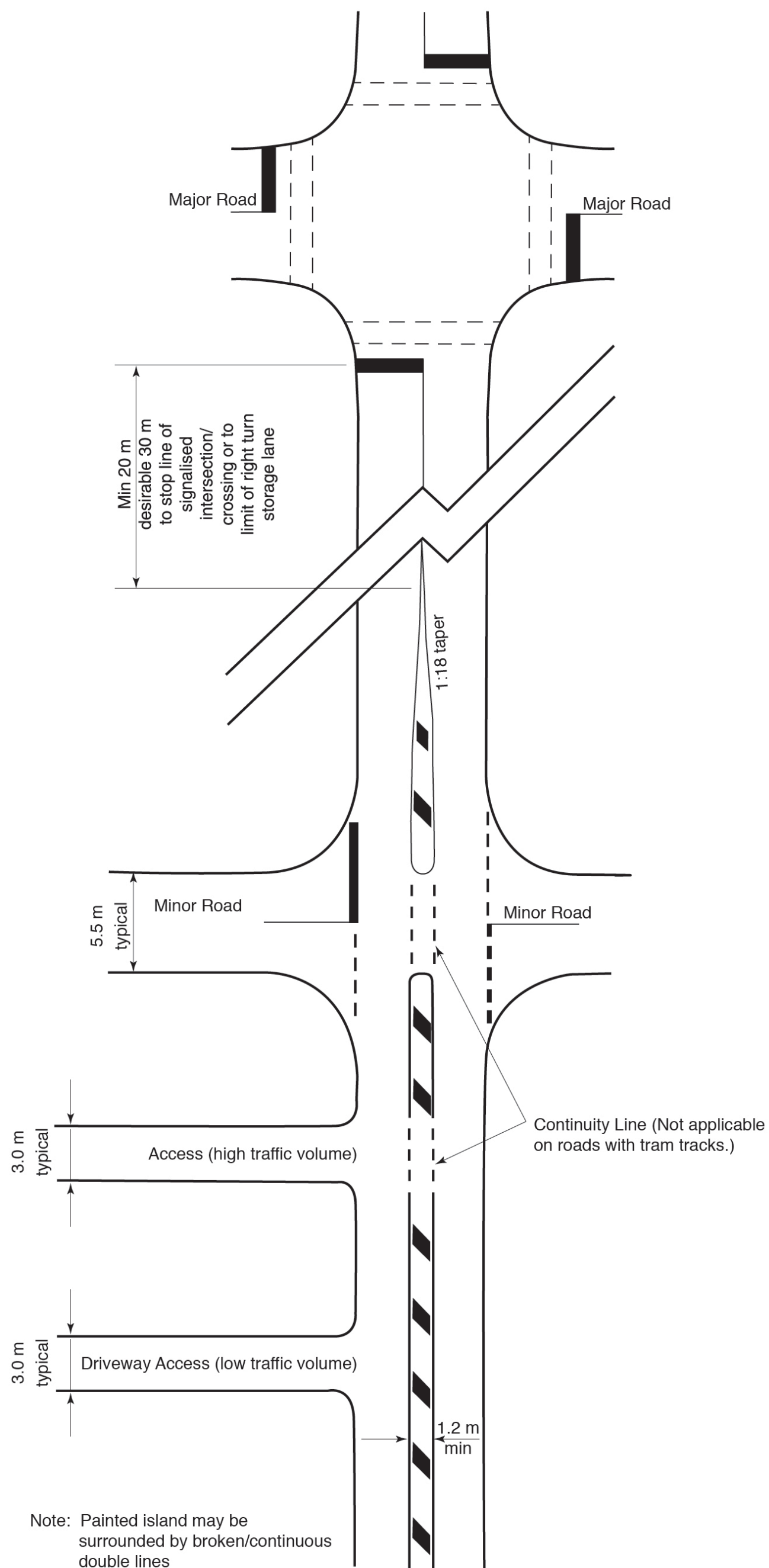
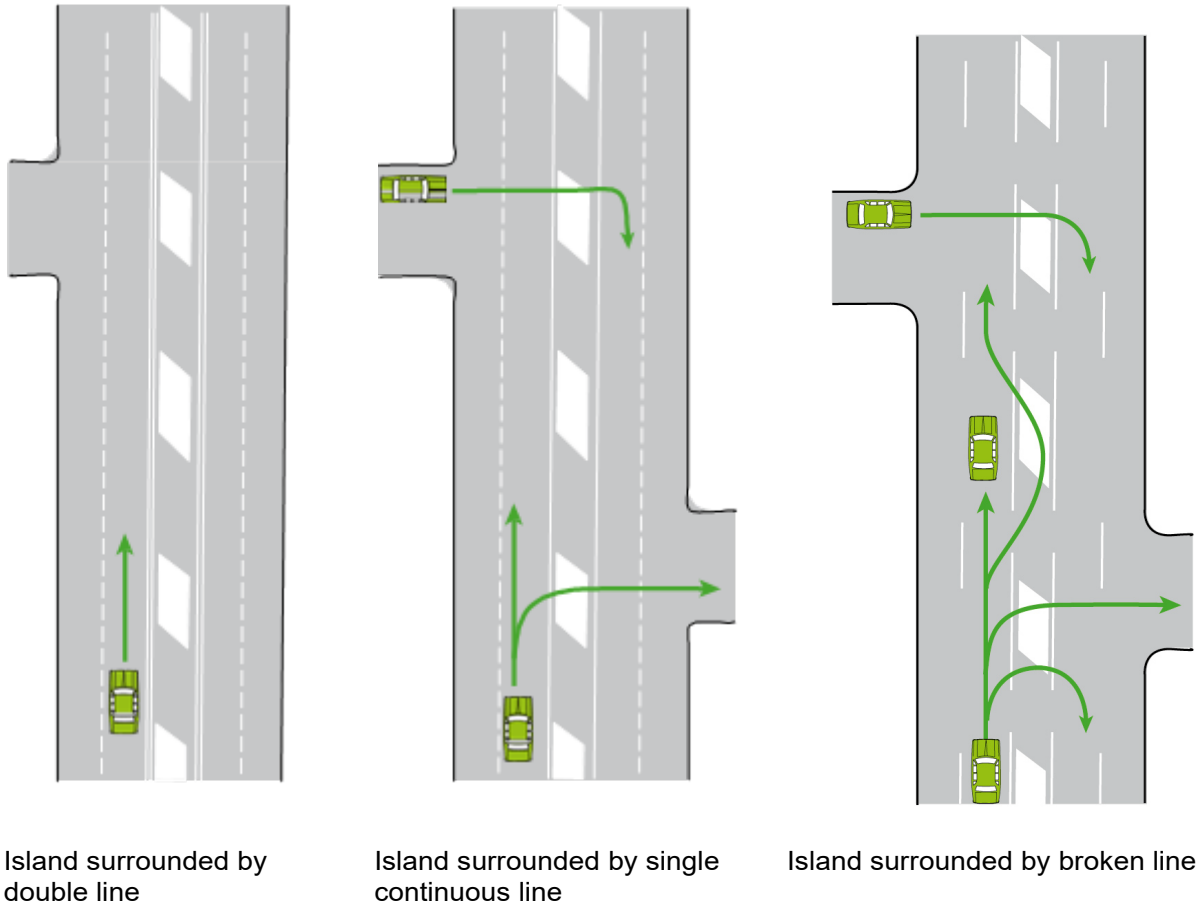


Figure 55: Typical layout for diagonal (flush) median markings at intersections / accesses

c) Painted island permitted movements

The movements permitted over painted islands are dependent on the type of line surrounding the island as indicated in Figure 56.



Drivers may drive up to 50 m on the painted island after entering or before leaving the road, or to enter a turning lane that begins immediately after the painted island (Road Safety Road Rules 2009 – rule 138 (2))

Figure 56: Painted islands and permitted movements

d) Median turning lane pavement markings

Pavement markings for median turning lanes are shown in Figure 31 and are installed in accordance with the following guidelines:

- Median turning lanes should be at least 3.0 m wide.
- Edges of the lane are marked with:
 - 100 mm wide 9 m line with 3 m gap where the lane length is greater than 50 m
 - 100 mm wide standard continuity line where the lane length is up to 50 m
- At intersections with local streets, continuous lines are replaced with continuity lines to the prolongation of the local road kerbs.
- Head to head arrow markings are painted:
 - at a nominal spacing of 150 m between arrow pairs (this spacing should be reduced at significant bends/crests if necessary to ensure that motorists can always see at least one pair of arrows)
 - with an initial set of arrows 30 m after the start of the median turning lane
 - no closer than 30 m to a local street intersection

- at 75% of the normal size of standard turning lane arrows (3 m long) as shown in Detail A of Figure 31.
- Where indented turning lane treatments are provided at the intersection of collector roads and side roads with higher turning volumes, the pavement markings should be as shown in Figure 32.

Clause 5.5.2 – Messages on pavements

In special circumstances, approval may be given by the Manager – Network Standards for the installation of other word or symbol markings, but such approval will only be granted where it can be shown that conventional traffic signs or markings will not be effective. If other markings are approved, the letters should conform to Clause 5.5.2.2 of AS 1742.2:2009.

Clause 5.5.2.3 – Intersection arrows

a) General

Pavement arrows should generally be used in the following circumstances:

- On single and two-lane approaches to intersections, arrows are generally used only where there are full-time regulatory restrictions applicable to one or more movements that a driver might otherwise expect to be able to make.
- At signalised intersection approaches having four or more lanes, arrows are placed in all lanes
- At unsignalised intersections, arrows are placed only in the exclusive turning lanes (if any). They are not provided in the through lanes.
- If wrong-way movement into a carriageway is a demonstrated problem, arrows may be painted in all lanes on that approach despite the foregoing.

b) Principles

In addition to the guidance provided, the following principles shall also be adopted:

Turning lanes

- Where the lane is not controlled by a stop or give-way line and there is no channelisation of the turn, the front arrow is placed 6 m back from the projection of the kerb line of the intersecting road.
- Where the turn is channelised, (i.e. slip lane) the front arrow is placed at the diverge point.
- For continuous lanes which become exclusive turning lanes, the rear arrow should be placed far enough in advance of the turn location so as to be in advance of the normal maximum queue length, but no further than any upstream intersection.
- For continuous lanes which become shared through and turn lanes, but which are not the left-most or right-most lane at the turning point, the rear arrow should be placed far enough in advance of the turn location so as to be in advance of the normal maximum queue length, but no further than any upstream intersection.

Through lanes

- Multiple straight arrows may be used to indicate a lane where a turn which a driver might otherwise expect to be able to make is banned in accordance with full-time regulatory restrictions, or where it would otherwise be permitted.
- Multiple straight arrows may also be used where an intersection approach is sharply curved or on a summit vertical curve in order to provide advance information to drivers.

At Roundabouts

- Arrows are not used at single lane roundabouts.
- On the approach lanes to a multi-lane roundabout, lane arrows are placed 3 m to 6 m back from the give way line.
- A second set of arrows is generally located 25 m in advance of the front set of arrows.
- Additional sets of arrows may be installed, at a spacing of approximately 25 m, where abnormal lane arrangements apply and the maximum queues or curves or crests are likely to obscure the second set of arrows.

c) Multi-lane roundabouts

Intersection arrows are painted on multi-lane approaches to roundabouts. Arrows are used in all lanes to ensure that drivers pass through the intersection in the correct lanes, and that conflict due to lane changing is minimised, refer to Clause 5.5.2.3 of AS 1742.2:2009.

d) Freeway exit ramp terminals

On approaches to signalised freeway exit ramp terminals, intersection arrows shall always be marked, refer to the figures in Clause 3.8 of this Supplement. At unsignalised freeway exit ramp terminal approaches, arrows may be provided to assist in deterring drivers from making wrong way movements onto the ramp.

e) Signalised intersections with four or more lanes

Intersection arrows are placed in all lanes to ensure that drivers pass through the intersection in the correct lanes, and to make multiple turn lanes (where provided) more clearly defined against the through lanes.

f) Additional arrows

Additional arrows may be considered on approaches to intersections and roundabouts to improve lane discipline if the intersection is hidden beyond a curve or crest, or arrows are obscured by queued traffic. Signs of the type G9-V43 should also be considered in these cases (refer to Clause 2.3 of AS 1742.15:2007).

g) Angled arrows

In special circumstances, through pavement arrows may need to be angled to take into account a skewed road alignment such as:

- where there is a need to differentiate between lanes to be used for a standard left turn and those to be used for a diverge to the left
- where lanes on the approach to a multi-lane roundabout do not “line up” with the appropriate lanes within the roundabout.

Clause 5.5.2.4 – Lane change arrows

Lane change (‘merge’) pavement arrows as illustrated in Figure 5.11 shall be painted:

- where the left lane ends on overtaking lane and climbing lane treatments, see Figure 27 and Figure 28
- at transitions from a multi-lane road or freeway to a two-lane two-way road, see Figure 23 and Clause 3.8 of this Supplement
- where the left lane of a high speed multi-lane road or freeway is discontinued and standard “LEFT LANE ENDS” signing is provided as shown in Figure 26 and Figure 28
- on freeway to freeway connecting roadways.

Merge arrows are not generally required in the urban area due to the lower speed environment. They may be considered in the following cases if the location of the lane termination is unclear due to sight distance constraints, or if they would improve an existing operational problem:

- on lane drops immediately beyond signalised intersections
- on lane drops on freeway entrance ramps.

Figure 5.9 – INTERSECTION PAVEMENT ARROWS – COMMON TYPES

Additional notes to Figure 5.9:

- On high speed roads, the length of arrows may be increased where it is deemed necessary to emphasise lane use.
- In designing longer arrows, the width of the grid squares is to remain constant at 100 mm, whilst the height of the grid squares is increased to suit the length of arrows required.
- For narrow lanes, the minimum clearance from the point of a turn arrow to the lip of kerb or marked edge line shall be 150 mm.
- Left turn arrows are the mirror image of right turn arrows.

Figure 5.10 – INTERSECTION PAVEMENT ARROWS – SPECIAL TYPES

Figure 57 further enhances the guidance provided in Figure 5.10.

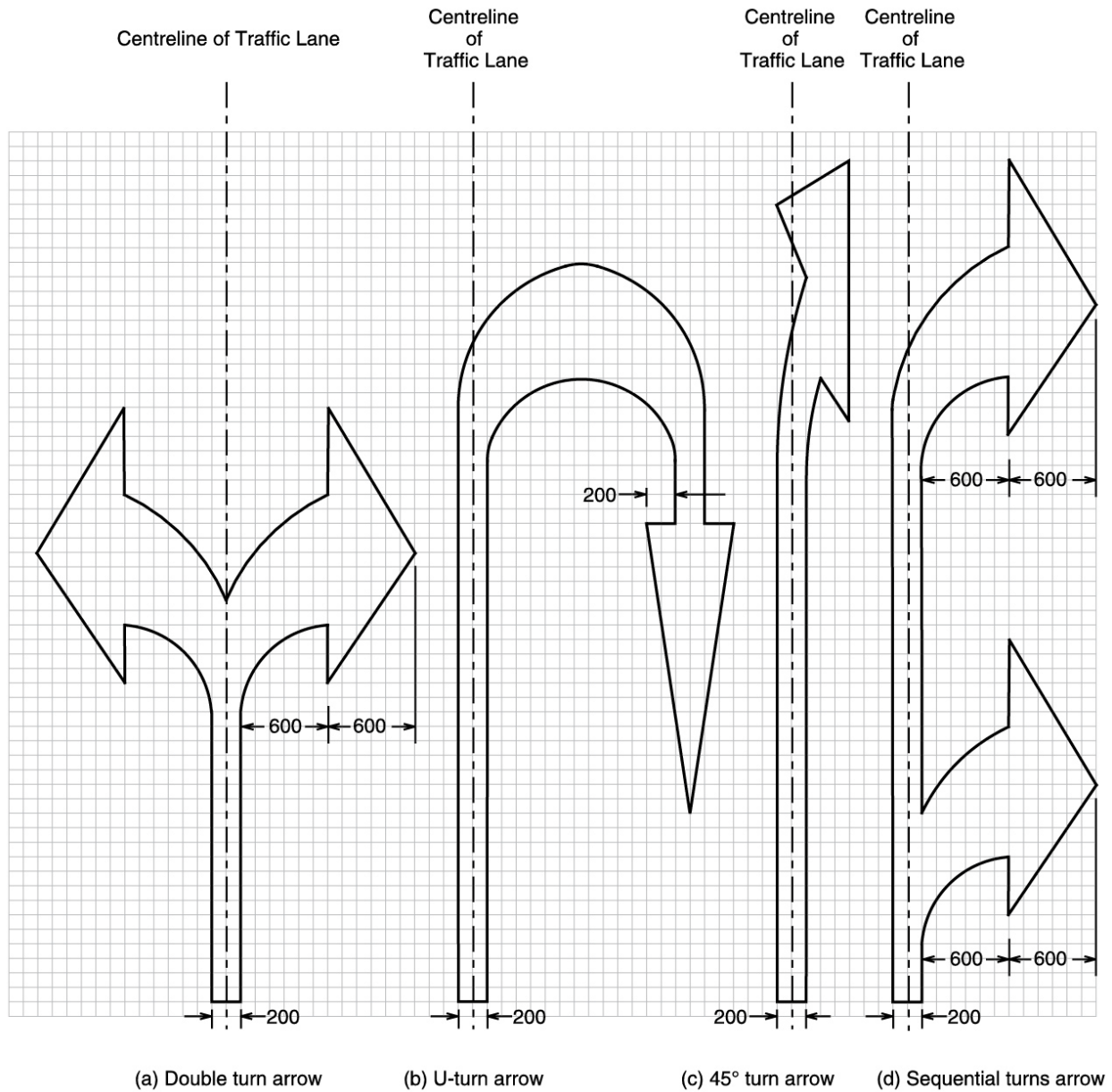


Figure 57: Intersection pavement arrows - special types

Notes to Figure 57:

1. Minimum length of arrow which is the standard for urban arterial roads is:
 - Double turn arrow = 4 m
 - U-turn arrow = 5 m
 - Sequential turns and 45 degree turn arrows = 6 m.
2. In designing longer arrows, the width of the grid squares is to remain constant at 100 mm, whilst the height is increased to suit the length of arrow required.
3. Left turn arrows are the mirror image of right turn arrows.
4. All dimensions in millimetres unless otherwise shown.

Figure 5.11 – LANE CHANGE PAVEMENT ARROWS

Lane change pavement arrows should be positioned centrally within the traffic lane and generally not closer than 0.6 m to the edge of the lane.

Clause 5.5.2.6 – KEEP CLEAR marking

A KEEP CLEAR marking supplements rule 128 of the Road Safety Road Rules 2009, which is a general road rule prohibiting blocking intersections. Compliance with this road rule is higher where a KEEP CLEAR marking is provided. However, its overuse may leave the impression that, without the marking, it is permissible to remain stationary within an intersection.

A KEEP CLEAR marking is generally provided to:

- allow emergency vehicles to egress their depot or station
- prevent queuing across tram tracks where there is a regular problem for trams, and at median crossings of separated tramways.

A KEEP CLEAR marking should only be provided to mitigate safety or traffic congestion issues at an intersection, by achieving greater compliance with Rule 128, or elsewhere, by facilitating the movement of vehicles into abutting properties where the numbers or size of vehicles may be significant.

When assessing the requirement for a KEEP CLEAR marking, the following aspects need to be considered:

- Where traffic in two lanes is stationary while the far third lane is free flowing, there can be a higher risk of “right turn against through” traffic accidents due to the visibility of drivers being obstructed by the stationary queue of traffic.
- A KEEP CLEAR marking is primarily for the operational and safety benefits of major road traffic. The greatest benefits are where the intersection regularly needs to be kept clear for right turning vehicles from a major road into a side road, generally where there is no dedicated right turn lane on the major road (refer to Figure 58).
- A KEEP CLEAR marking for the benefit of side road traffic entering a major road should only be considered in exceptional circumstances, such as where a reasonable volume of traffic from a side road needs to cross multiple one way traffic lanes on the major road to access a nearby right hand turn lane.

A KEEP CLEAR marking should be marked in each individual lane, as shown in Figure 5.13 of AS 1742.2:2009.

Where an existing KEEP CLEAR marking crosses multiple lanes and the intersection or road is being resurfaced, replacement markings should conform to Figure 5.13 of AS 1742.2:2009, unless only a portion of the KEEP CLEAR marking is removed, in which case the marking should be reinstated to match the remaining portion.

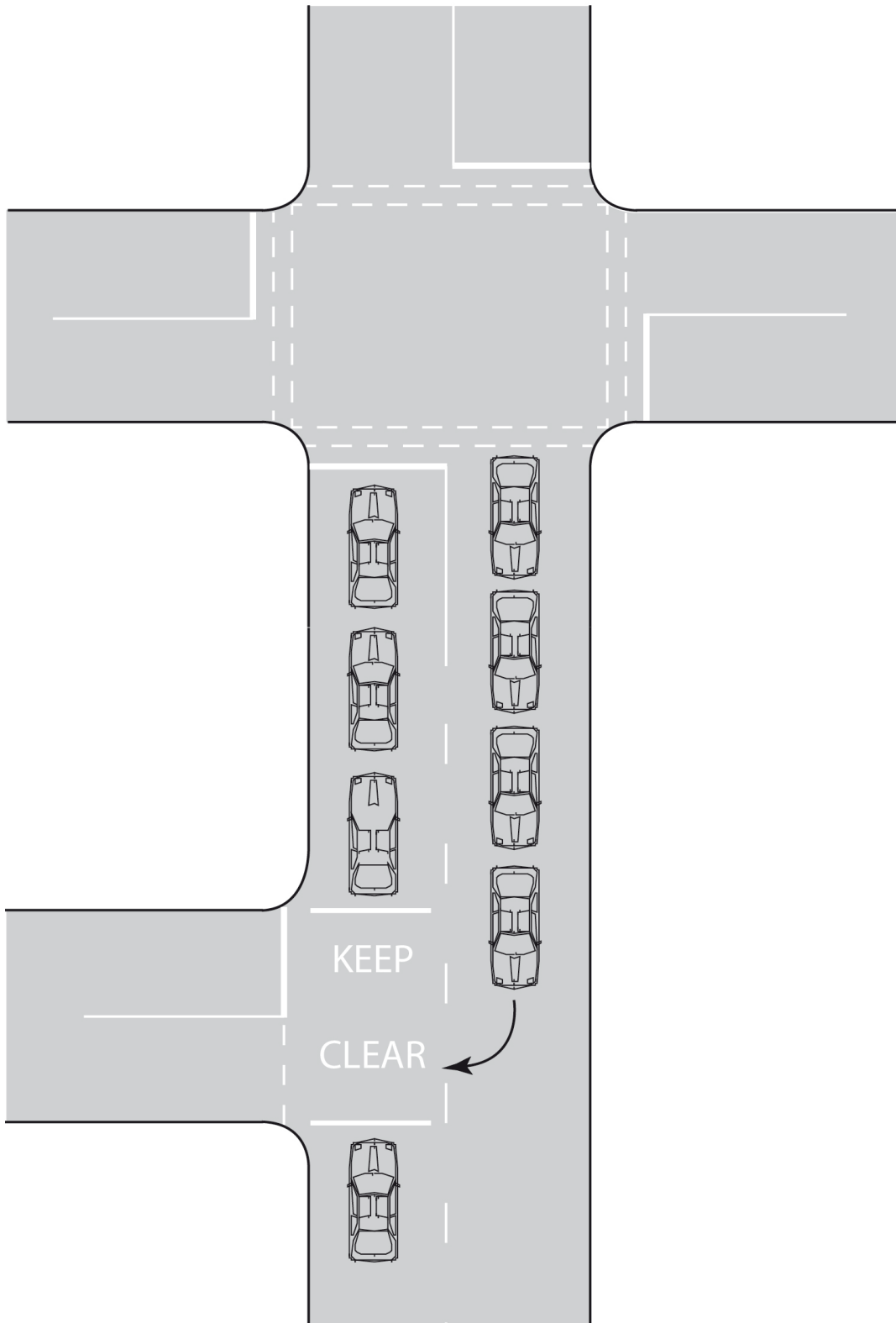


Figure 58: Example location of a “KEEP CLEAR” marking

A KEEP CLEAR marking that does not meet this guideline should be allowed to wear out and should not be reinstated when a road is resurfaced.

Clause 5.6 – RAISED PAVEMENT MARKERS









Clause 5.6.5 – Application of raised pavement markers

a) General

Application of raised pavement markers, principally to augment painted lines, is subject to the following guidelines and special approvals where indicated.


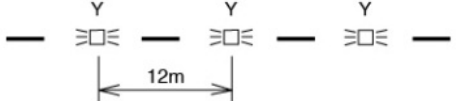
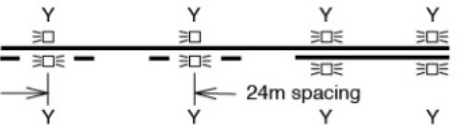
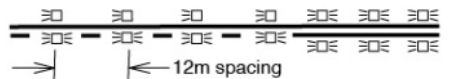
It is preferred that the Victoria symbols shown in Table 15 be used to denote RPMs on pavement marking layout plans. However, the symbols shown Table 5.4 of AS 1742.2:2009 may also be used.

Table 15: Notation of raised pavement markers on drawings

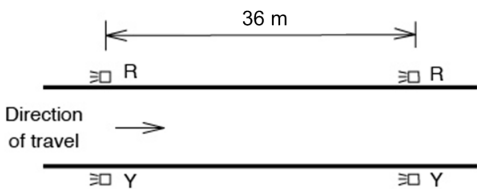
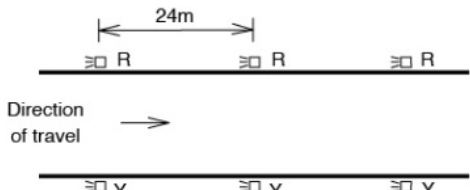
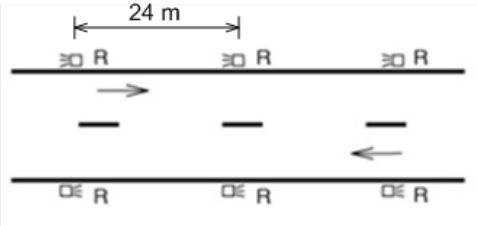
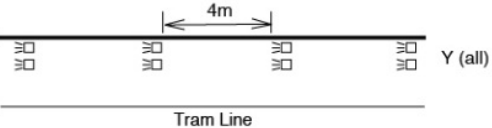
	One-way RRPM
	Two-way RRPM
	Non-reflective (NRPM)
	White
	Yellow
	Red
	Green
	Blue

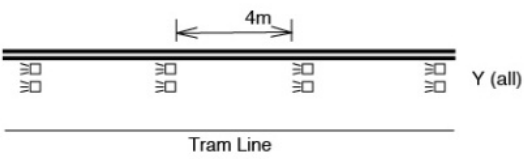
Unless covered specifically in another Table or Figure in this Clause, the use, colour and spacing of markers to supplement painted lines should conform to Table 16.

Table 16: General use, colour and spacing of raised pavement markers

Line Type	Pattern and Spacing	Usage
Dividing lines (for both two-lane, two-way and multi-lane roads)		Standard use
		Substandard curves or curves 400 m radius or less, plus last 100 m of approach tangent
Barrier lines (double one-way and double two-way)		Standard use.
		Substandard curves or curves 400 m radius or less, plus last 100 m of approach tangent.

Line Type	Pattern and Spacing	Usage
Barrier lines (single)		Two-way undivided roads.
		Substandard curves or curves 400 m radius or less, plus last 100 m of approach tangent. Where higher standard of delineation required in urban areas.
Broken lane lines (standard and special purpose)		Normal use.
		Urban freeways and ramps. Substandard curves or curves 400 m radius or less, plus last 100 m of approach tangent.
		Reversible lane lines. Refer to Clause 5.3.2 of AS 1742.2:2009.
		Two-way median turn lanes. Refer to Clause 4.13.4 of AS 1742.2:2009.
Continuous lane lines (standard)		Approaches to signalised intersections, generally only first 30 m. Refer to Figure 61.
		Defining left and right turn lanes at un-signalised intersections. Where solid line length is less than 36 m adopt 6 m spacing. Adjusting to 150 mm solid lane lines on freeways, e.g. at two-lane entry and exit ramps. Refer to Figure 13.
Lane guidance through intersections	Non-reflective pavement markers. Refer to Clause 5.6.5.2 of AS 1742.2:2009 and Figure 61	Signalised intersections
	Retroreflective raised pavement markers Refer to Figure 62	Unsignalised intersections
	Retroreflective raised pavement markers Refer to Figure 63	Painted Island Right Turn Treatments
	Retroreflective raised pavement markers Refer to Figure 64	Wide median treatments (rural)

Line Type	Pattern and Spacing	Usage
	Retroreflective raised pavement markers Refer to Figure 65	Roundabout
Edge lines		One-way roadway normal use. Refer to Clause 5.6.5.2 of AS 1742.2:2009.
		Urban freeways and ramps Curves of radius 200 m or less, plus 100 m of approach tangent. Red markers maybe used on the left side of the two-lane, two-way roads where warranted by crash records. As a safety initiative may be reduced to 12 m or 6 m for especially hazardous situations.
		Two-way roadways RRPMs on right hand edge line must not be visible to on-coming traffic
Edge lines	<p>Special situations:</p> <ul style="list-style-type: none"> Install RRPMs on the inside of edge lines in areas where chevron or diagonal pavement markings are installed or where there is insufficient available width for the installation of RRPMs associated with the edge lines at converging or diverging lanes. RRPMs are generally not required where kerbs are installed. RRPM spacing may be reduced to 12 m, and in some cases 6 m, over relatively short lengths of road where especially hazardous situations exist. Provide RRPMs as shown in at transitions from a duplicated roadway to undivided road RRPM spacing may be reduced to 12 m on urban freeways where: <ul style="list-style-type: none"> the horizontal curve radius is less than 1000 m a higher standard of delineation is warranted by crash records or operational experience 	
Full-Time Tram Lane Lines		Yellow RRPMs at 4 m spacing (with yellow painted line). Refer to VicRoads Supplement to AS 1742.12:2000, Clause 5.5

Line Type	Pattern and Spacing	Usage
Tramway Lines		Yellow RRPMS at 4 m spacing (with double yellow lines). Refer to Supplement to AS 1742.12:2000 Clause 5.5.
Diagonal and Chevron Approach Markings	Refer to AS 1742.2:2009 Clause 5.6.5.2 (f)	Approaches to painted island and obstructions.
Diagonal Markings in Painted Median Strips	Refer to AS 1742.2:2009 Clause 5.6.5.2 (f)	Supplement diagonal markings in painted continuous median strips
Painted Island Right Turn lane Treatments	Refer to Figure 63.	
Splitter Island Delineation	Generally 6 m spacing. Refer to Figure 65 and Figure 66.	Supplement painted markings adjacent to splitter islands
Rural Freeway Step Out Exit Ramp Delineation	Refer to Figure 68	Green RRPMS on rural freeway exits
Freeway median breaks and emergency access points	Refer to Figure 33.	3 Yellow RRPMS on median openings.

Notes to Table 16:

1. RRPMS are not used to supplement continuity lines except as detailed in Clause 5.3 of AS 1742.2:2009 for freeway applications.
2. RRPMS are not used in snow areas to supplement yellow edge lines, to avoid damage by snow clearing equipment.
3. Yellow RRPMS shall not be placed along the right hand edge line of two-way roadways.
4. Yellow RRPMS are not used to supplement the separation kerb of a tramway.

b) Positioning of markers

Raised pavement markers should be positioned as follows:

- for full-time tram lane lines and tramway lines:
 - on the tram track side of the line, 50 mm clearance between edge the line and the first yellow RRPM, and 100 mm gap between the first and second yellow RRPM, or.
- for other continuous lines (including dividing lines, barrier lines, lane lines, edge lines and outlines of painted islands):
 - 50 mm clearance between the edge of a RRPM and the continuous line.

c) Rural and urban freeways

The combinations of longitudinal and profiled lines and RRPMS on rural and urban freeways are shown in Table 17.

Table 17: Longitudinal lines and RRPM patterns and dimensions on freeways

Line Type	Pattern and Spacing	Usage
Lane lines		Rural freeways and ramps White RRPMs
		Urban freeways and ramps White RRPMs
		Exclusive exit lane (e.g. left lane becomes a dedicated exit lane) - lane line between the exclusive exit lane and through lane White RRPMs
		Unbroken, e.g. at two lane entry and exits White RRPMs
Edge lines (2)		Rural freeway carriageways and ramps Red RRPMs(left side) Yellow RRPMs (right side)
		Urban freeway carriageways and Ramps Red RRPMs (left side) Yellow RRPMs (right side)
Profiled edge lines		Safety initiative, subject to warrants
Continuity lines		Across merge and diverge areas
Step-out markings		Approaching rural exit (note 2) Green RRPMs Rural Exits
Median openings		Yellow RRPMs (note 3)

Notes to Table 17:

- 1. The spacing may be reduced where additional prominence of edge linemarking is required.**
- 2. For use of edge lines on ramps, see Figure 12.**
- 3. For spacing and set out details, see Figure 68.**
- 4. For spacing and set out details, see Figure 33.**

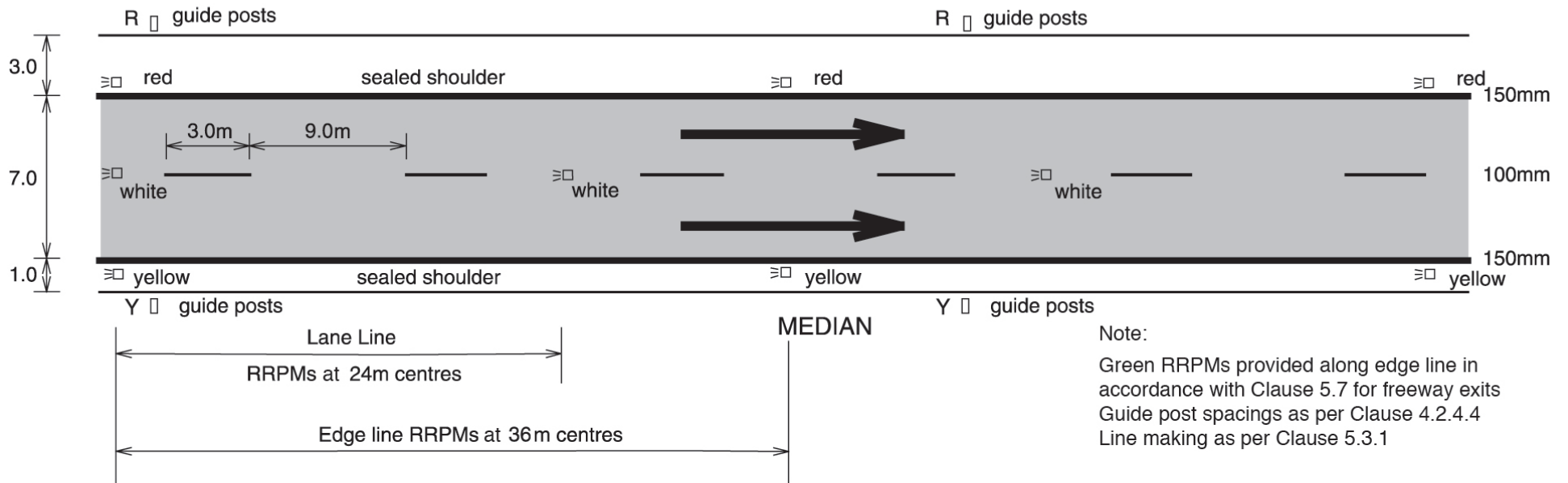
d) Other rural roads

RRPMs are required on:

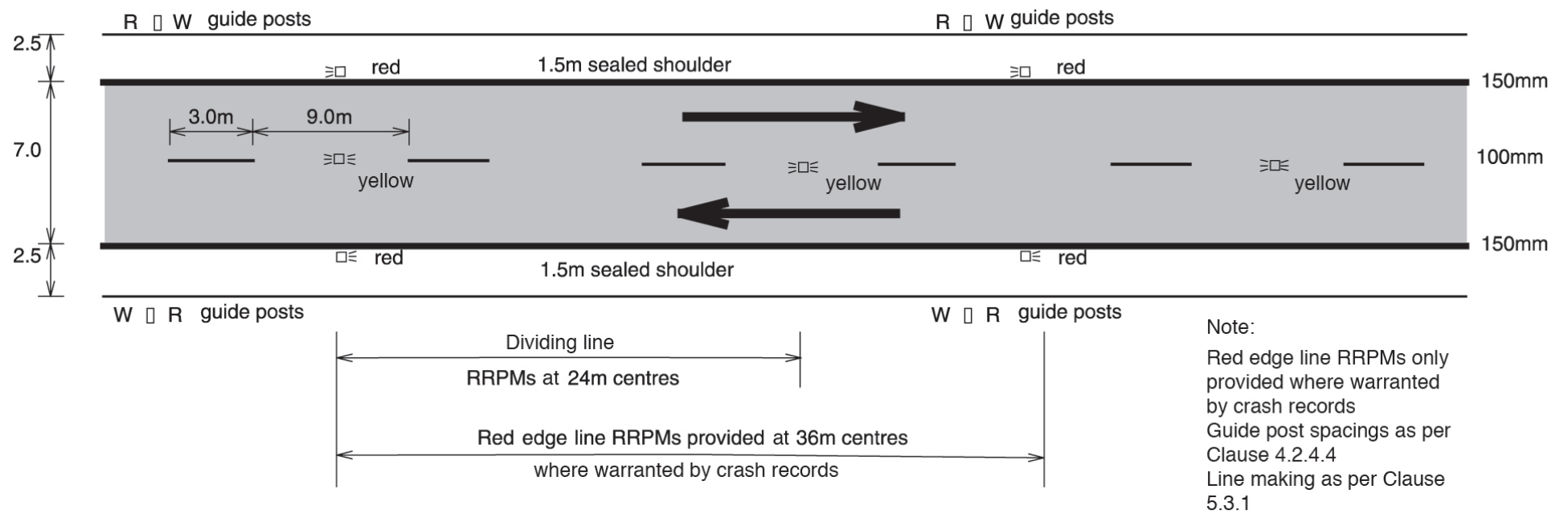
- M Routes
 - The lane lines of all M Routes and edge lines of M Routes which have a rural cross section.
- A Routes
 - The dividing and barrier lines and lane lines of all A Routes. Red RRPMs are only provided along edge lines of A Routes where a need can be demonstrated through crash records.
- B Routes
 - The dividing and barrier lines and lane lines as needed to meet safety criteria. Red RRPMs are only provided along edge lines where a need can be demonstrated through crash records.
- C Routes
 - where warranted by crash records on dividing lines and edge lines where there is sufficient pavement to install the RRPMs on the left of the edge line, i.e. between the edge line and edge of seal (approximately 200 mm required)
 - where there are significant traffic volumes (AADT is 500 or greater), including large numbers of heavy vehicles (AADT is 200 or greater)
 - where the road is subject to frequent or heavy fog and/or wet days of appreciably greater than average frequency
 - where the installation of RRPMs will address safety concerns regarding the lack of visibility of linemarking during low light conditions.

The use of RRPMs on these roads is shown in Figure 59.

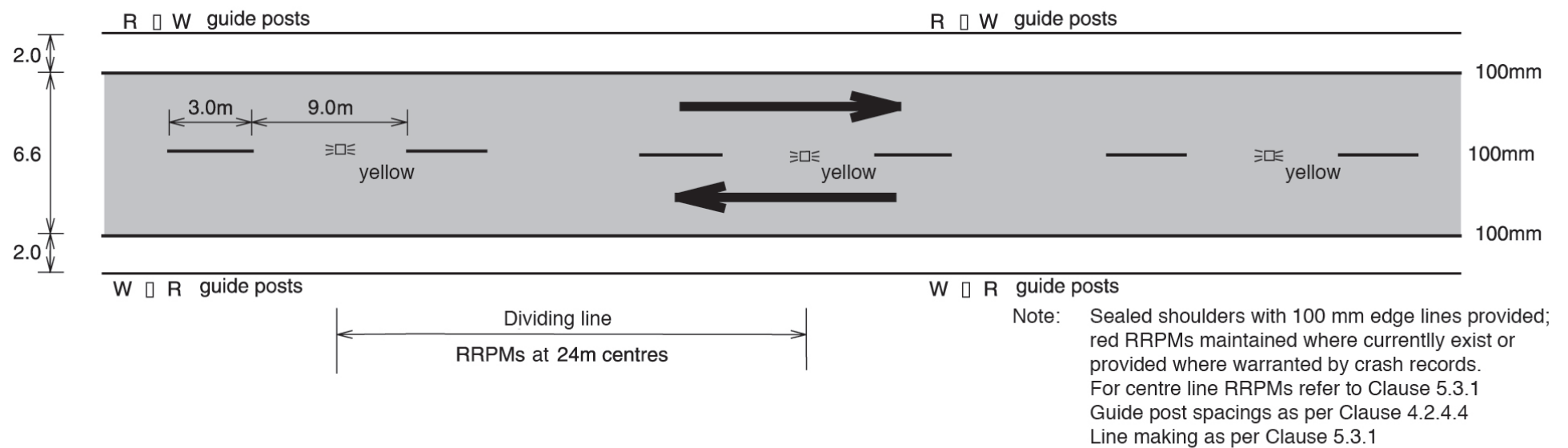
'M' ROAD



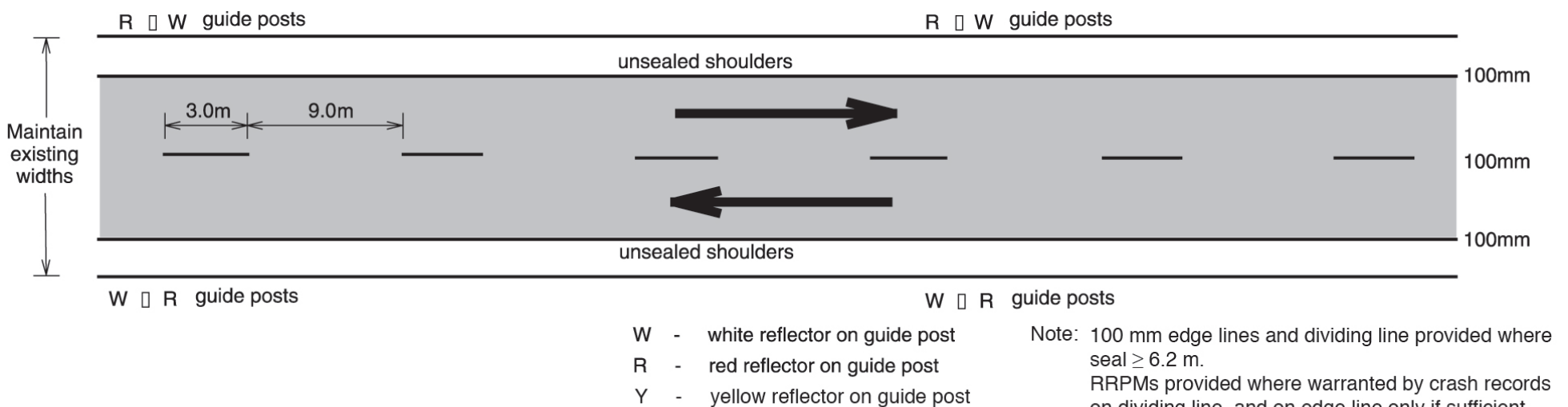
'A' ROAD



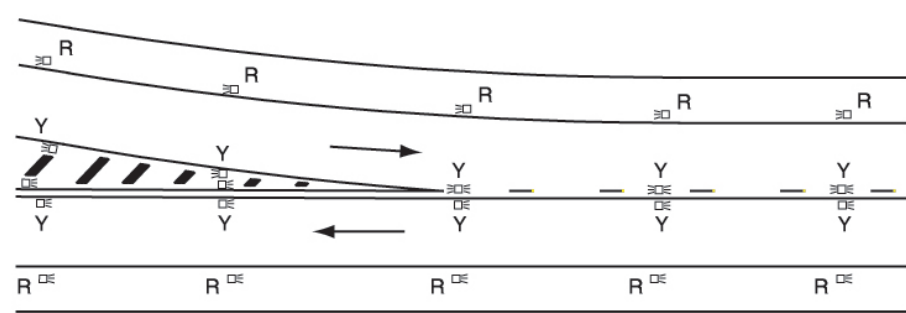
'B' ROAD



'C' ROAD



Note: All dimensions in millimetres unless otherwise shown.



Detail A

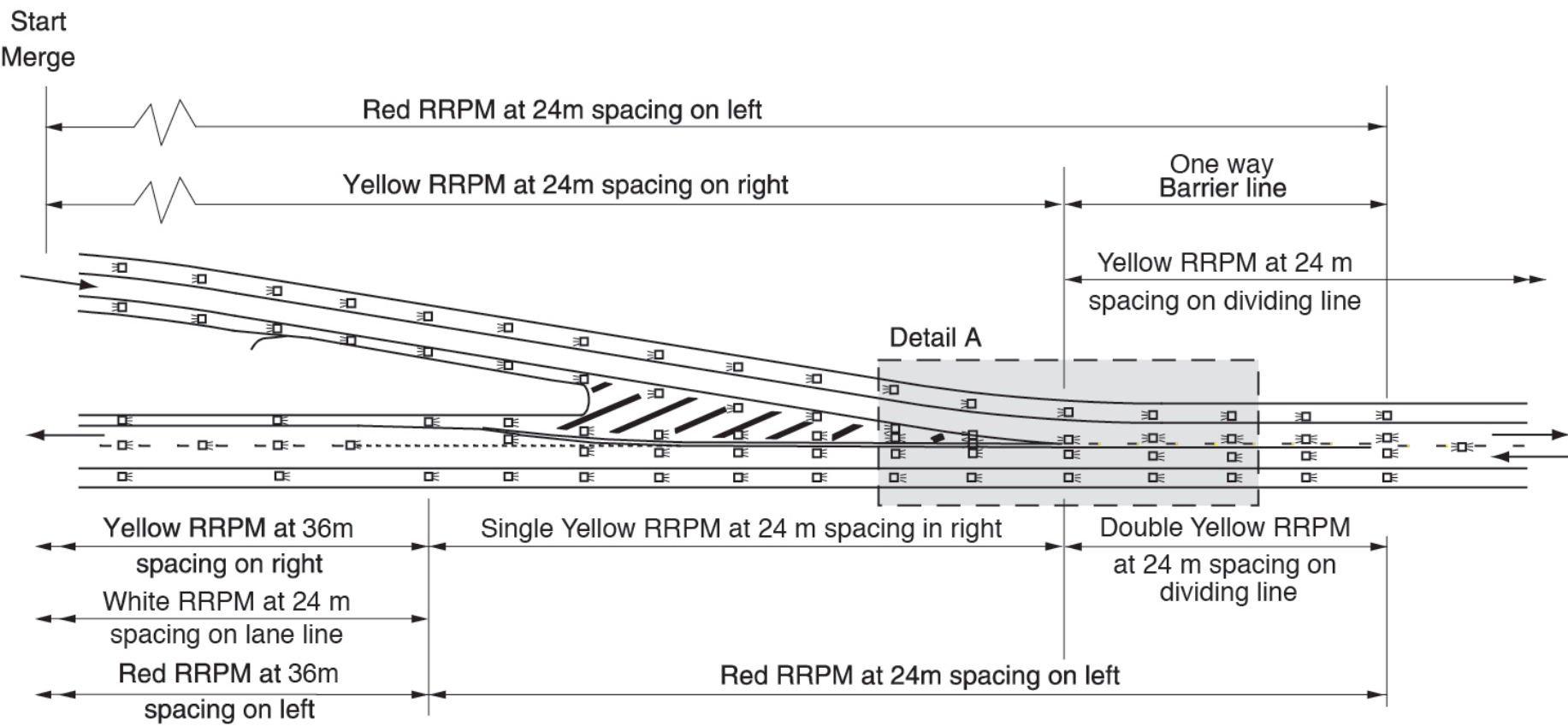


Figure 60: Use of red and yellow RRPMs at transition from duplicated roadway to undivided roadway

e) Other urban roads

RRPMs should be used on:

- arterial roads in the metropolitan area and roads of similar status in provincial cities.
- collector roads with significant traffic volumes
- other roads where deemed necessary to improve conspicuity of linemarking.
- isolated treatments:
 - curves of radius 1500 m or less and deflection angle 10 degrees or greater, plus spirals (if any), and 100 m on each approach tangent in rural areas where:
 - AADT is 1000 or greater
 - AADT is 500 or greater and above average rainfalls, or where the road is subject to fogs or wet days of appreciably greater than average frequency.
 - straights of 500 m or less joining any two curves which have been treated as isolated treatments

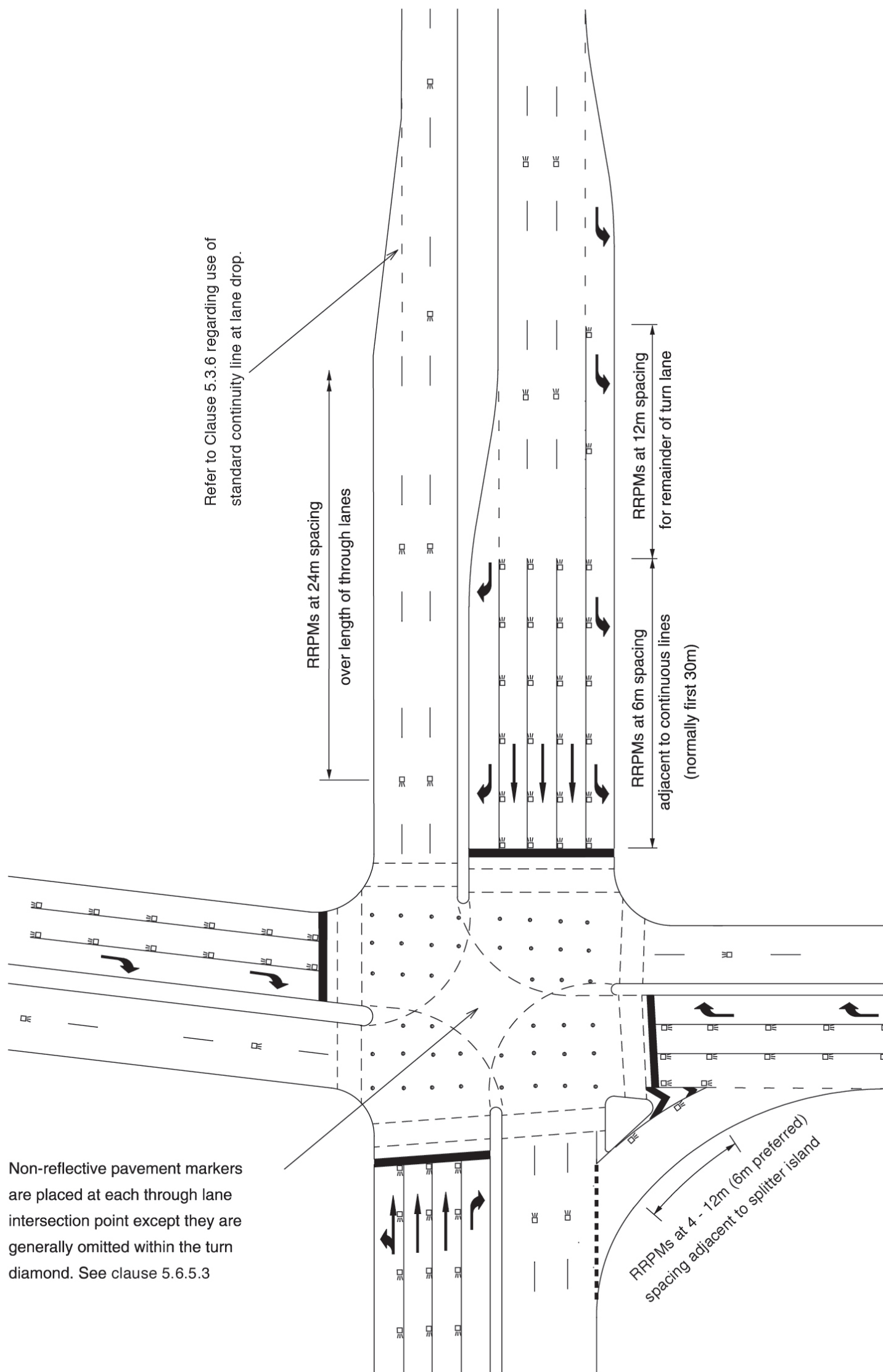


Figure 61: Use of RRPMs and NRPMS at signalised intersections

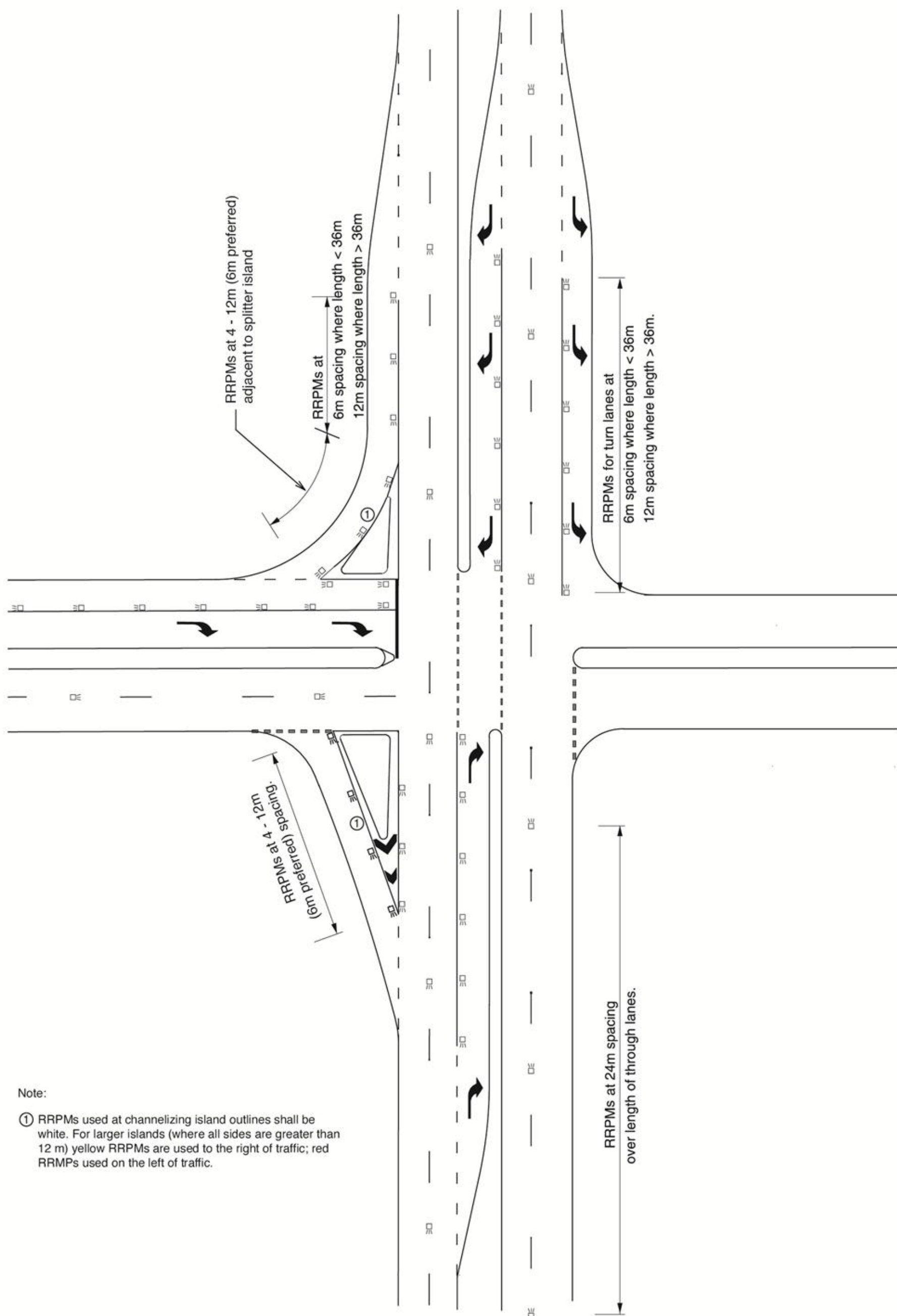


Figure 62: Use of RRPMs at unsignalised intersections

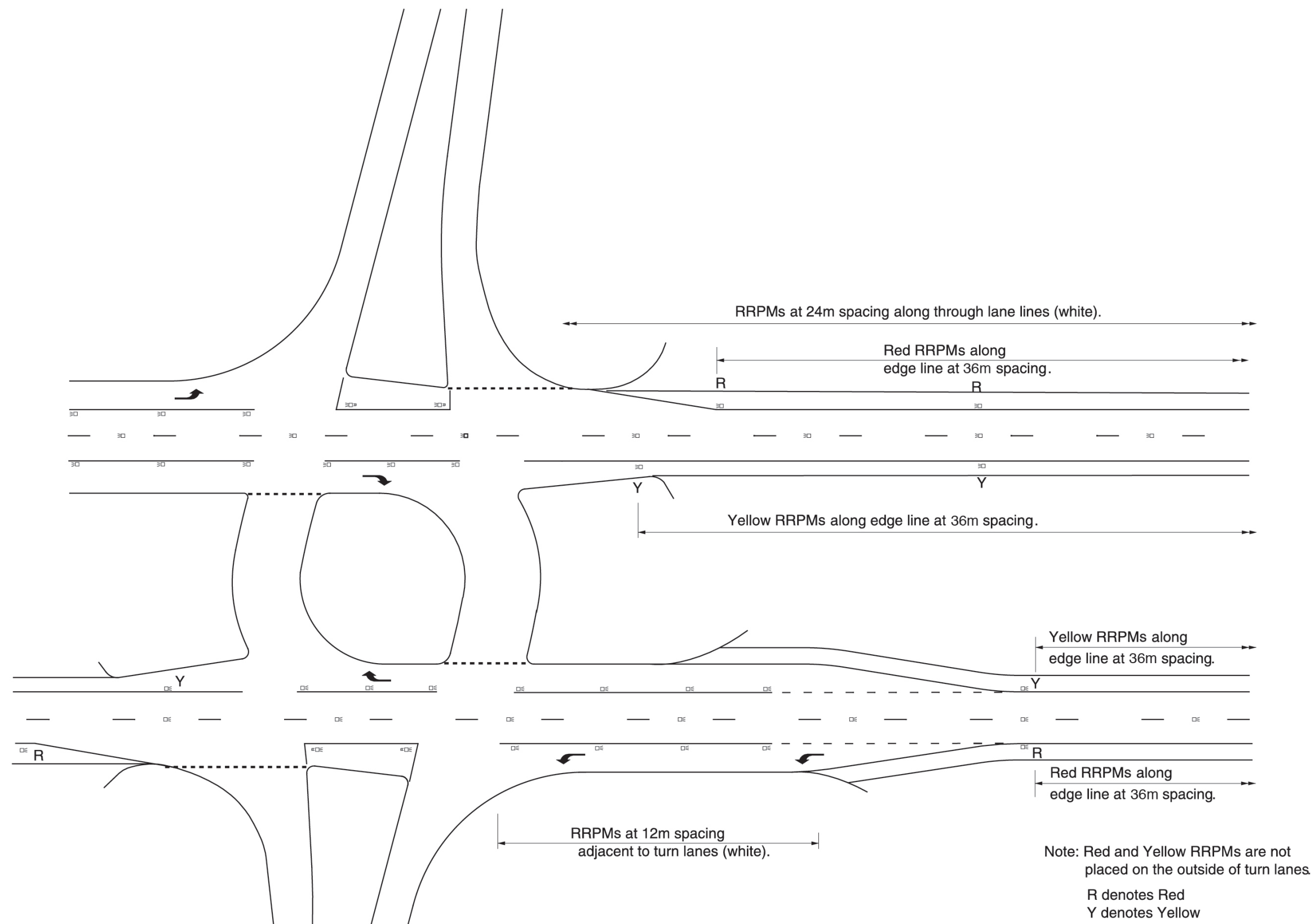


Figure 64: Use of RRPMs at a typical wide median treatment

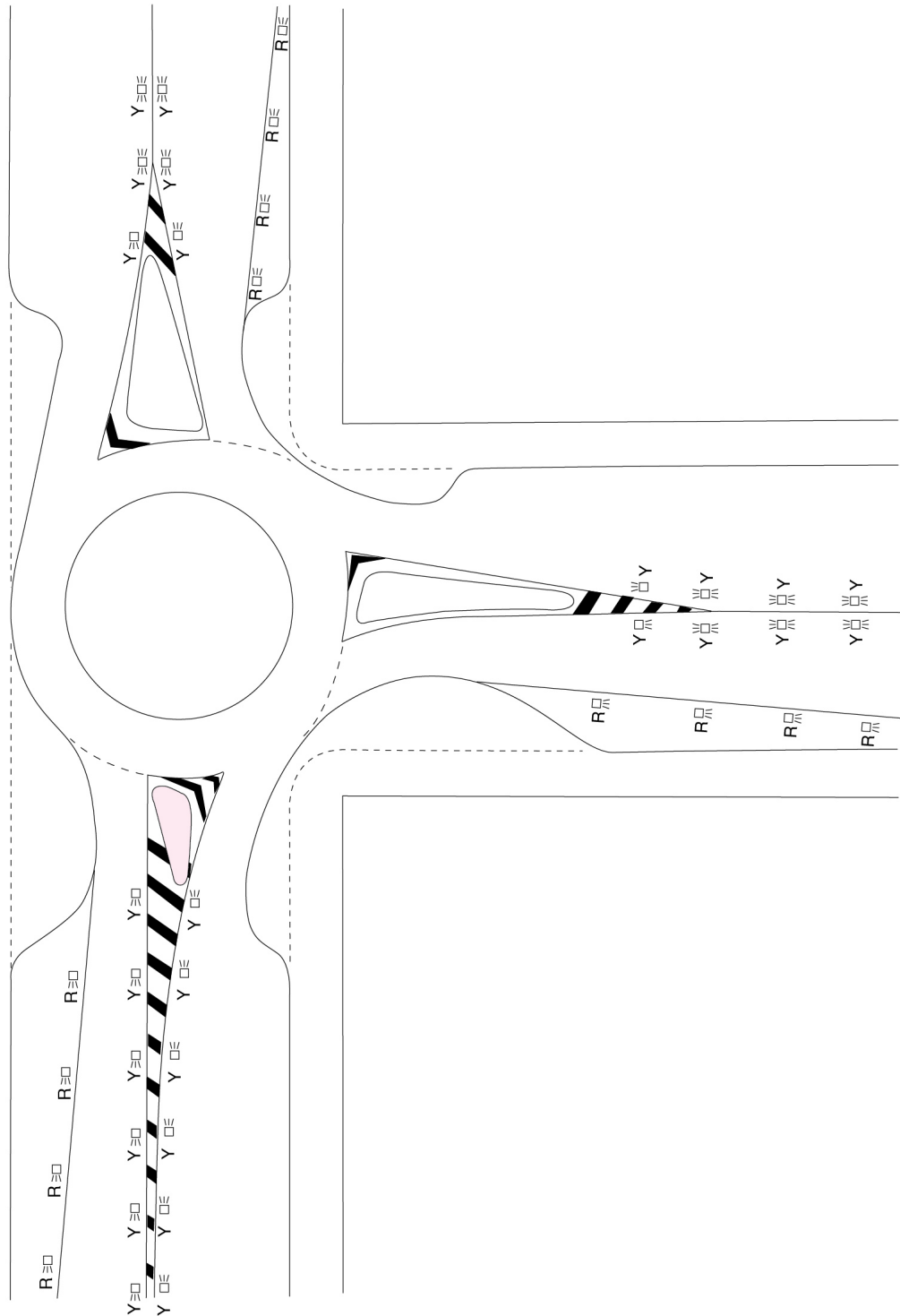


Figure 65: Use of RRPMs at small roundabouts

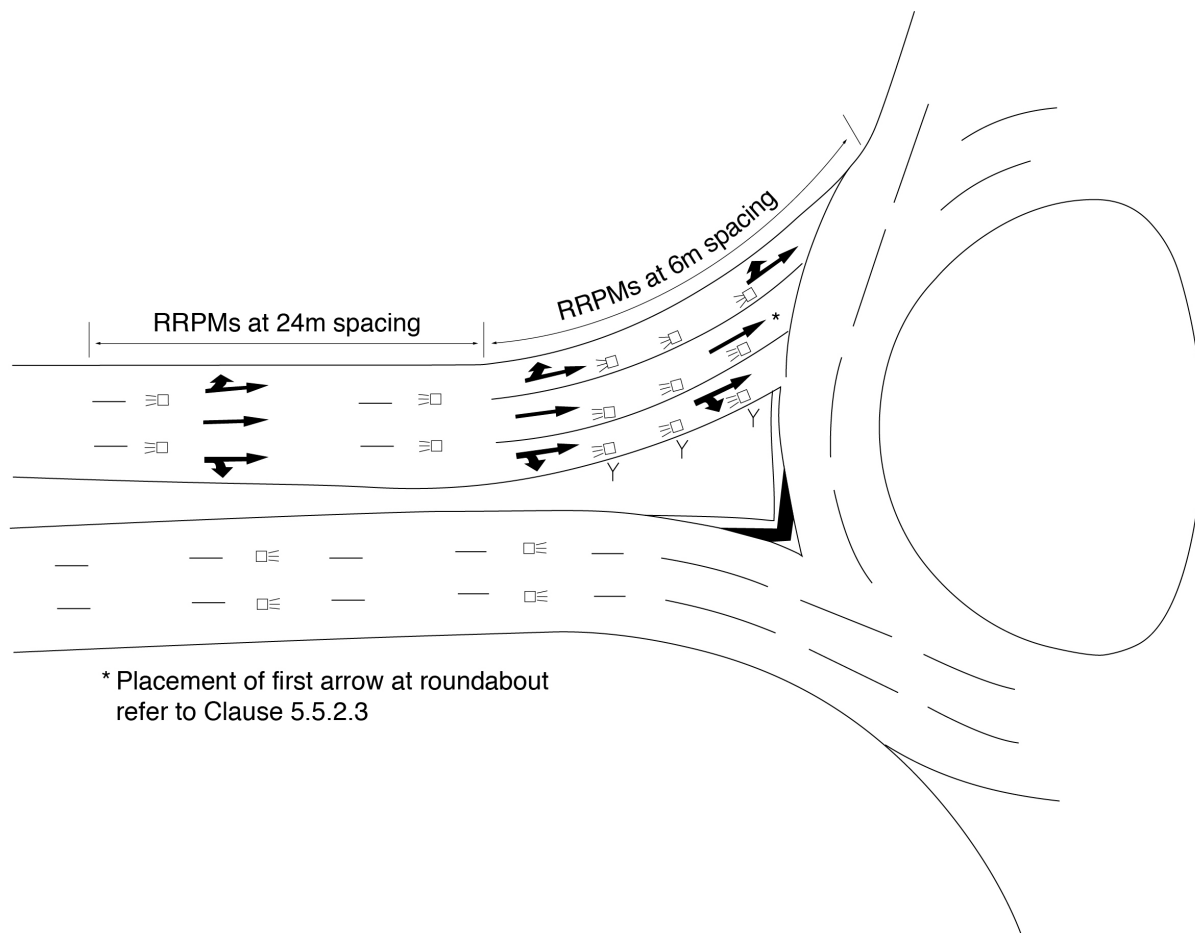


Figure 66: Use of RRPMs at large roundabouts

f) Internally illuminated pavement markers

General

Internally illuminated pavement markers (IIPMs) are self-illuminating pavement markers, designed to provide enhanced road and lane delineation.

IIPMs are generally for use as an alternative device to retroreflective raised pavement markers (RRPMs) when considered appropriate after an engineering assessment, and only after a conclusion is reached that linemarking to an appropriate standard and RRPMs would not provide the required delineation.

When used, IIPMs are to be in accordance with the requirements for RRPMs, including colour and configuration requirements (as detailed in Clause 5.6.2 of AS 1742.2:2009).

In general, IIPMs should be used for:

- Delineation applications where RRPMs are normally used, but extra conspicuity is required, for example:
 - delineation of curves, crests or on/off freeway ramps where vehicle head lights would not adequately illuminate RRPMs because of road alignment, particularly in fog prone areas;
 - warning of 'hazards' such as traffic islands or median strips
 - Delineation in tunnels.
- Where delineation is only required part-time for specific circumstances, for example:
 - delineation of merge tapers at commencement of part-time tram lanes
 - lane controls such as contra-flow and tidal flow treatments to supplement overhead signals (subject to the approval of Director – Network Policy and Standards).

The approval of the Director – Network Policy and Standards is required for the use of IIPMs for specific traffic management applications not covered by the uses listed above or that differ the provisions of AS 1742.2:2009 or this Supplement.

When a new IIPM installation is proposed, a maintenance regime should be considered to ensure that delineation is maintained if IIPMs fail, are damaged or are stolen.

Products available

Various products are available that will respond or self-activate in response to environmental or other predetermined conditions. The markers have one or more internal LED(s) that operate based on factors such as:

- Failing light - illuminates when ambient light levels fall below a pre-set level.
- Moisture - various products are available that illuminate whenever fog, rain or mist is present.
- Ice - illuminates at temperatures low enough to allow the formation of ice on the road surface.

The LEDs can be solar powered or mains powered (either hard wired or inductive).

IIPMs are available as either surface mounted models, (similar to non-reflective pavement markers (NRPM) or retroreflective raised pavement markers (RRPMs)), or flush (inset) mounted.

Evaluation

Through the use and installation of IIPMs, it has been determined that:

- generally the markers responded to environmental conditions as intended
- the markers are more visible than conventional retroreflective raised pavement markers at all but wide angles
- the markers were subject to theft and vandalism.

g) Water point markers

Blue RRPMs are used to assist firefighting and other emergency vehicles to locate water filling points on either side of the road. This is particularly important during night conditions and for emergency vehicles foreign to the area. Double blue RRPMs are always used, ideally positioned as shown in Figure 67, at a 100 mm to 150 mm offset from either:

- a) the centre line on two-way roads on the side nearer the water point; or
- b) the lane line nearest to the kerb on multi-lane roads on the side nearer the water point.

These markers are placed by the relevant water authority and when re-sheeting occurs, their locations should be recorded so that they can be accurately replaced upon completion of the works.

Further information can be found in the joint Metropolitan Fire Brigade and Country Fire Authority publication titled "Identification of Street Hydrants for Firefighting Purposes" (https://www.cfa.vic.gov.au/ArticleDocuments/550/identification-street-hydrants-for-firefighting-purposes_july-2019.pdf).

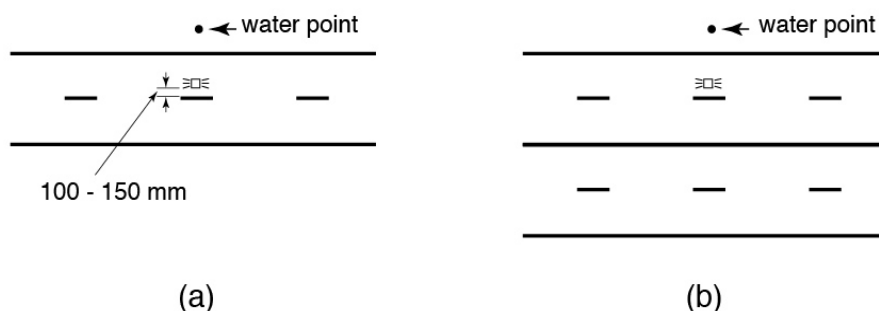


Figure 67: Location of blue water point markers

Clause 5.7.1 – Entrance and exit ramp layouts

This Clause should be read in conjunction with Clause 5.7.4 below.

Pavement markings for standard single lane entry ramps and for urban exit ramps are shown in Figure 12.

Green RRPMS are installed at all rural and urban single lane exit ramps, including access to rest areas, truck parking bays, service centres and weigh bridge stations, to supplement red and yellow markers as generally shown in Figure 68. On two-lane exits, green RRPMS extend over the length of the auxiliary lane.

Green RRPMS are to commence 160 m in advance of the exit lane and extend over its full length, ending opposite the ramp nose. Spacing of green RRPMS is to follow the standard spacings for edge line RRPMS.

Clause 5.7.3 – Expressway exit lane arrows

The combination left/through expressway exit lane arrow shall not be used at conventional, single lane exit ramps, however oblique arrows are used in conjunction with step-out markings, as shown in Figure 68.

Figure 13 in Clause 3.8 of this Supplement shows a two lane exit with expressway exit lane arrows.

Clause 5.7.4 – ‘Step-out’ marking

The ‘step-out’ markings to be used at exits in rural areas are shown in Figure 68.

Step-out markings and green RRPMS are used at all rural freeway exit ramps, including those providing access to rest areas, truck parking bays and weigh bridge stations. Step-out markings and green RRPMS shall not be used on at-grade intersections.

For new designs, the marking shall be designed with an exit lane width of 3.5 m (minimum). Step-out markings may be retrofitted at existing freeway exits provided that the existing shoulder is at least 3 m wide and a minimum 2.7 m exit lane width is provided.

The treatment may also be used at urban and outer urban exits at sites where:

- drivers are confusing the ramp for the left through lane, due to horizontal right hand curvature and may be inadvertently led off the freeway
- vertical and horizontal alignment creates problems with drivers identifying an exit point such as at crests or left hand curves
- queuing of exit traffic may otherwise extend into the through lane.

Step-out markings shall not be used as a means of providing for queuing traffic in the design of a new exit ramp. It is important that adequate queuing length is provided clear of the freeway carriageway.

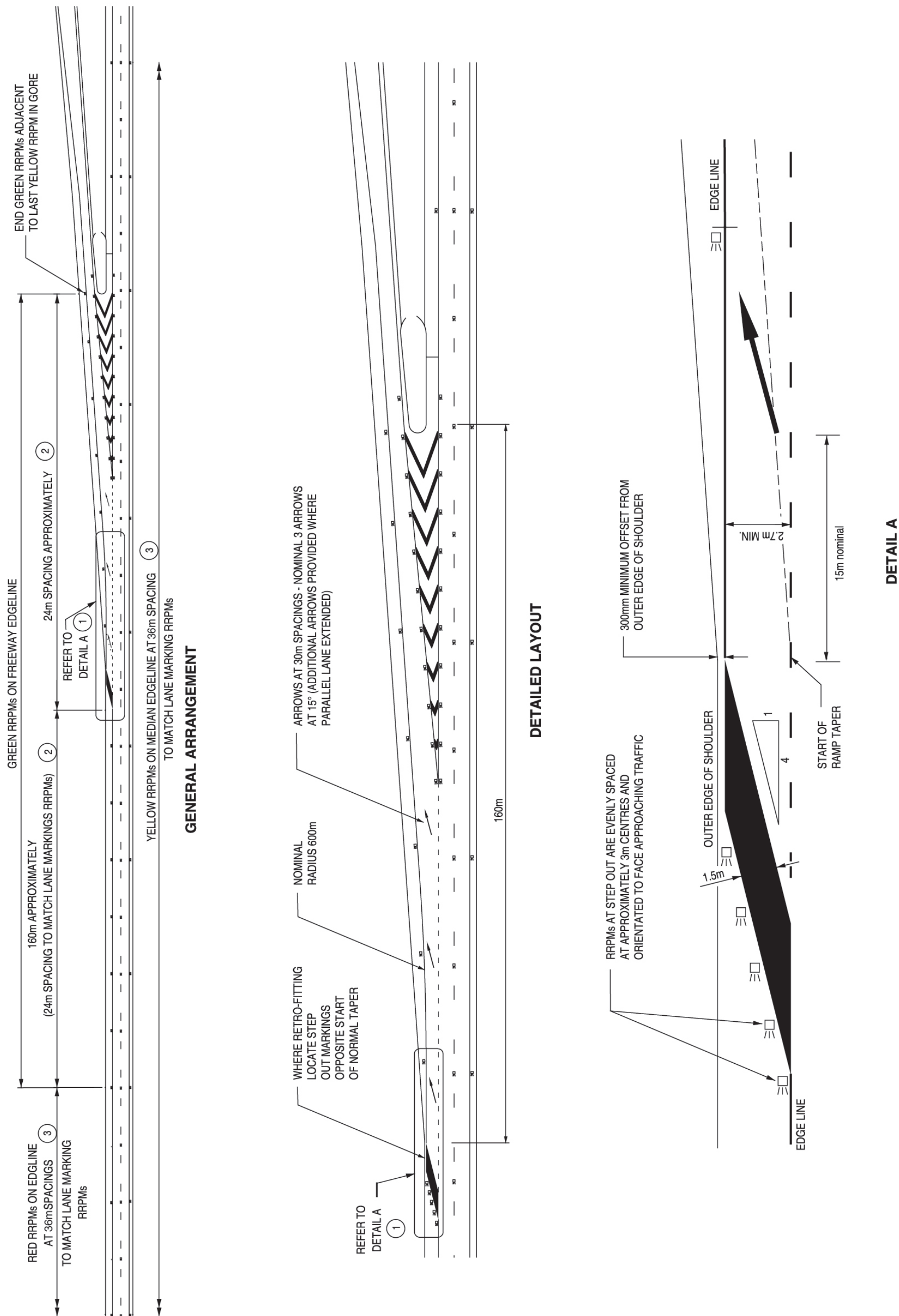


Figure 68: Rural freeway step-out exit ramp markings

Notes to Figure 68:

1. Step-out markings are not normally installed at urban interchanges.
2. Where an auxiliary lane is provided, green RRPMS are to commence 160 m in advance of the exit lane and extend over its full length, ending opposite the ramp nose as per the standard treatment.
3. Adopt 24 m spacing for red and yellow RRPMS on curves less than 2000 m radius on rural freeways.

B3 – GENERAL PRINCIPLES FOR SIZE SELECTION

a) Regulatory Signs

Table 18 below provides further guidance on typical uses of the various sizes available for regulatory signs. The largest available size sign is used on freeways.

Table 18: Size selection for regulatory signs

Sign Series	A size (1)	B size	C side (2)
R1 Movement Series	General urban and rural use, unless B or C size is required	Locations with V85 > 70 km/h (4) Urban locations on roads with a wide appearance or where oversize would reduce infringements	Locations where smaller sizes are not conspicuous in relation to their background or excessive lateral offset Locations with a history of failure of drivers to obey signs
R2 Direction Series	Urban use only, on roads of a local traffic function	Generally on roads with a through traffic function and where V85 > 70 km/h (4)	At major rural intersections with divided roads
R3 Pedestrian Series	For general use	Locations with V85 > 70 km/h (4)	
R4 Speed Series	See AS 1742.4		
R5 Parking Series	See AS 1742.11		
R6 Miscellaneous Series	For general use	Where A size is not sufficiently conspicuous or lacks compliance	Generally only used for vehicle prohibitions on freeways
R7 Exclusive Lane Use Series	C size is minimum available	Use D size where V85 > 70 km/h (4)	Use E size on wide, high speed roads and freeways
R8 Bicycle/ Pedestrian Series	General use on bicycle paths	General use on bicycle lanes	Only in special circumstances requiring high visibility. See AS 1742.9
R9 Supplementary Series	Width to match main sign	Width to match main sign	Width to match main sign

Notes to Table 18:

1. For some signs, the minimum size available is B or C size. These signs include Direction Series (No Entry, No U-Turn and No Left (Right) Turn signs) and Exclusive Lane Series signs.
2. D and E size signs are available for certain sign types and are used where greater conspicuity is required.
3. In some cases, treatments shown in figures contained in AS 1742:2010 (and the relevant VicRoads Supplements) may indicate the minimum size sign to be used for specific application. AS 1742 may indicate the minimum size sign to be used for specific applications.
4. V85 denotes the 85th percentile speed.

b) Warning Signs

To achieve adequate prominence and legibility, warning sign sizes should be selected from Table 19, except where otherwise indicated in the text for specific sign types.

The largest available size sign is normally used on freeways.

Table 19: Guide for Selection of Warning Signs

Environment	Size Code (1)	
	Minimum	Available Oversize (2)
URBAN		
Residential and collector streets	A (3)	B
Arterial roads	B	C
RURAL (85th percentile speed)		
Speeds below 75 km/h	A (3)	B
Speed between 75 km/h and 95 km/h	B	C
Speeds above 95 km/h	C	D

Notes to Table 19:

1. Size Code for diamond warning signs:

A = 600 x 600 mm

B = 750 x 750 mm

C = 900 X 900 mm

D = 1200 x 1200 mm

2. The supplementary sign size must match the size code and colour (e.g. fluorescent yellow-green) of the parent sign.

3. Oversize signs may be required for any of the following reasons (see also Appendix D2.3 of this Supplement regarding duplicate signs):

- in an especially hazardous situation
- where extra prominence is required against a background of competing visual stimuli (urban or rural)
- where the sign is mounted overhead
- where there are more than two lanes in direction of travel
- the standard size is shown by experience to be inadequate.

4. "A" size is available only for signs with symbols or short word legends. Use "B" size if no "A" size sign is available.

c) Traffic Instruction Signs (including G9 and GE9 series signs)

The largest available sign sizes should be used for traffic instruction signs on freeways.

If extra legibility distance or prominence is required on account of the importance of the message, location of the sign, or environmental distraction, either a larger standard sign may be selected, or a special oversize sign may be designed for the purpose. The design and letter size selection principles described in AS 1743 and the VicRoads Supplement should be used in the design of special oversize signs.

APPENDIX C – ILLUMINATION AND REFLECTORIZATION OF SIGNS

C3 – MEANS OF ILLUMINATION

Illumination of signs by a light within or behind the sign face requires the approval of the Director – Network Policy and Standards.

The use of Class 1W retro-reflective material for overhead mounted signs is preferred over the illumination of such signs from the front as it provides wider viewing angles and gives the sign the necessary prominence and legibility. When there is a proposal to illuminate overhead signs under special circumstances, approval from the Director – Network Policy and Standards is required.

C4 – MEANS OF REFLECTORISATION

A list of approved retroreflective sheeting materials for use on road signs is contained in VicRoads Standard Specification Section 860 - Manufacture of Road Signs. The list of approved sheeting materials can also be found in Road Design Note 06-11

(<https://www.vicroads.vic.gov.au/~media/files/technicaldocuments/standards-and-supplements/roaddesignnote061-acceptedretroreflectivesheetingmaterials.ashx>).

Table 1 in the VicRoads Supplement to AS 1742.1:2014 provides guidance to the class of retroreflective sheeting that should be specified for road signs. Higher class materials may be considered in special circumstances.

APPENDIX D – INSTALLATION AND LOCATION OF SIGNS

D2.1 – General

a) General

A sign should be located so that:

- it is as near as practicable to the edge of carriageway, consistent with Figure D2 and that minimises dirt accumulation
- it can be seen by the driver in time for the appropriate response to be made or action to be taken
- it is clear to approaching drivers as to which intersection or part of an intersection the information or instruction on a sign pertains
- it is not obscured by natural or man-made features, or by other road furniture and stands out from the background

Manufacture of signs shall conform to the requirements of the current version of VicRoads Standard Specification Section 860 – Manufacture of Road Signs, available on the [VicRoads website](#).

Erection of signs shall conform to the requirements of the current version of VicRoads Standard Specification Section 714 - Sign Installation available, on the [VicRoads website](#).

b) Installation of supplementary signs

Supplementary signs shall be installed so that both the parent sign and supplementary sign are fully visible. The bottom of the parent sign shall not be covered by the top of the supplementary sign or vice versa, nor shall there be any noticeable vertical separation between the parent and supplementary signs.



D2.2 – Longitudinal placement

a) Visibility distance

Non-symbolic signs should be visible to drivers, and distinguishable from the background, at a distance at least equal to the legibility distance of the letters on the sign. This visibility distance in metres should be at least 0.75 x Letter Height (in mm) but should not be less than the legibility distance determined from Table A1 of AS 1742.1:2014.

b) Multiple messages and signs

Generally, there should not be more than one sign of a particular type on each post, except where one sign supplements another (e.g. advisory speed signs with curve warning signs), or where route or directional signs must be grouped.

Where there is a need for closely spaced signs of separate hazards or hazards and intersections, the signs should always be mounted on separate posts and separated by a longitudinal distance not less than distance “B” in Table D1). The first sign should refer to the hazard or hazard first encountered. Where two hazards are substantially coincidental, the most important or potentially hazardous of the two should be indicated on the second sign.

An exception is when two warning signs relate to the same hazard and both signs may be erected on the same post.

D2.3 – Lateral placement and height

Duplicate signs may be provided on the right hand side of the carriageway in the following cases:

- for additional emphasis of an especially hazardous situation
- on a multiple lane carriageway
- for signs of special significance to overtaking drivers, e.g. Start Divided Road.

In urban areas and on freeways, some warning signs may require overhead mounting to achieve adequate prominence.

Clause D2.3.1 General

When locating signs at intersections, median openings, separator openings and the like, signs should not obstruct intersection sight distance to oncoming traffic for drivers about to enter or cross the major road carriageway. The sight distance for the appropriate “stop” or “give way” condition is determined from Section 3 of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010). Small signs erected parallel to the major road will not necessarily obstruct the view.

Signs may be raised or lowered to improve intersection sight distance, considering the needs of all road users, including trucks, bicycles, motorcycles, and pedestrians.

Provision for the “stop” condition is also desirable at signalised intersections to provide for safe operation in the event of signal failure.

D2.3.2 – Lateral placement – rural / D2.3.3 – Lateral placement – urban

On freeways and roads in rural areas, any sign which does not have posts considered as frangible (see Tables D2 and D3 in AS 1742.2:2009) must either be protected by an appropriate barrier or be located outside of the clear zone requirements, as determined from Austroads Guide to Road Design, Part 6 and VicRoads Supplement.

D2.3.4 – Height – rural / D2.3.5 – Height – urban

Selection of the appropriate mounting height for a sign should consider the following factors:

- On rural roads, it should be low enough to lie within the headlight beam at night, but high enough to avoid collecting excessive dirt from passing traffic.
- In urban areas, it should be high enough to avoid being obscured by other traffic or parked cars, or being a hazard to pedestrians.

The minimum mounting heights measured from the lower edge of the sign or group of signs on the one mounting, to the level of the nearest edge of the road to which the sign applies, are given in Table 20.

Table 20: Minimum mounting heights for side mounted signs

Case	Applies to:	Minimum mounting height
(a)	Rural Roads: All signs except as in (e) to (i)	1.5 m
(b)	Urban Roads: Kerbside with no parking	2.0 m
(c)	Urban Roads: Kerbside with parking	2.2 m
(d)	All signs on medians or traffic islands except as in (e), (f) and (h)	1.5 m
(e)	All intersection direction signs except where sight obstruction problems dictate special mounting heights	2.0 m (or 2.2 m, see (c))
(f)	Hazard marker signs (except where used as T-intersection sight boards, see (a), (b) or (c)) Keep Left signs on local urban roads (mounting heights shall be increased to 1.5 m in other locations, refer to Figures 13.1 and 13.2 in Volume 2 Chapter 13 of this manual)	0.5 m to 0.7 m
(g)	Signs suspended above footways, i.e. substantially over the normal pedestrian path - height above foot-way level	2.5 m
(h)	Signs mounted on breakaway posts larger than 50 mm nominal bore pipe. Height above ground level at base of post	2.2 m
(i)	Freeway signs in excess of 2 m ² in area, except as in (h)	1.5 m

Note to Table 20:

1. *The maximum mounting height for signs should not significantly exceed the heights in Table 20 unless required for visibility, say over a crest, i.e. signs should not be mounted too high just to alleviate the need to cut the tops off the posts.*

D2.3.6 – Overhead mounting

The minimum vertical clearances from the highest level of the road surface to the underside of an overhead sign are shown in Table 21.

Table 21: Minimum vertical clearances

	Non-Over Dimensional route	Over Dimensional route
Nominal Clearance	5.3 m	5.8 m
Design Clearance	5.4 m	5.9 m
Clearance to Structure	5.5 m	6.0 m

Notes to Table 21:

1. *These clearances apply to the road between the kerbs, or where no kerbs exist, to the sealed width of the road.*
2. *The nominal clearance is the clearance that should be maintained even if the road is resurfaced.*
3. *The design clearance is the clearance that should be designed for to allow 100 mm for future resurfacing that may raise the height of the pavement.*
4. *The Clearance to Structure is the minimum clearance to the underside of a bridge or gantry beam or cantilever outreach that may be supporting the sign. However, further requirements for the Clearance to Structure may override these minima, such as the 'VicRoads Supplement to the Austroads Guide to Road Design', the 'VicRoads Supplement to the Austroads Guide to Bridge Technology' and the Australian Standard Bridge Design Set AS5100 Set-2007.*
5. *The nominal and design clearances also apply to the underside of any lamps mounted below a sign.*

D2.4 – Overhead signs

a) General

Overhead signs are normally mounted on sign support structures that need to be adequately protected or located beyond the clear zone. Foundations for overhead sign structures may interfere with underground services in urban areas. Overhead sign structures are generally many times more costly than side mounted signs.

It may be possible to mount smaller signs on existing service poles or modified traffic signal mast arms (see below).

Overhead signs are generally used for:

- indicating low clearance under structures (signs mounted directly on the structure)
- Merge Left signs at the start of tram lanes (signs usually mounted on the overhead wires).

Overhead signs are generally required on freeways where:

- signs would otherwise be partially or fully hidden from view for its full legibility distance by natural or man-made features
- there is insufficient room for side mounting
- required by Clause 3.2 of the VicRoads Supplement to AS 1742.15:2007.

Overhead signs may be appropriate on roads other than freeways, where:

- it is necessary to provide lane indications above lanes, including
 - at a wide urban intersection approach where there are several route options available to traffic
 - where it is necessary to depict separate arrows for lane discipline
 - special lane use signs (Transit, Bus Lane, Tram Lane signs)
- side mounted signs in commercial districts or other locations cannot be located in a sufficiently conspicuous or unobstructed position, having regard to the importance of the sign
- there is insufficient space to locate a side mounted sign (wide or narrow format), or where side mounting would be otherwise impracticable or environmentally undesirable
- it is advantageous to mount signs on an existing or proposed structure over the road.

b) Lateral placement and hazard reduction

It is not normally practicable to design supports for overhead signs to be frangible. As such, overhead sign supports will generally be protected by an appropriate barrier or will be located outside of the clear zone, as determined from Austroads Guide to Road Design, Part 6 and VicRoads Supplement.

c) Supports for overhead signs

Supports for overhead signs fall into the following categories:

- cantilever supports
- 'butterfly' (double cantilever) supports
- gantry supports
- existing structures
- joint-use structures.

The first three categories are illustrated in Figure 69 below.

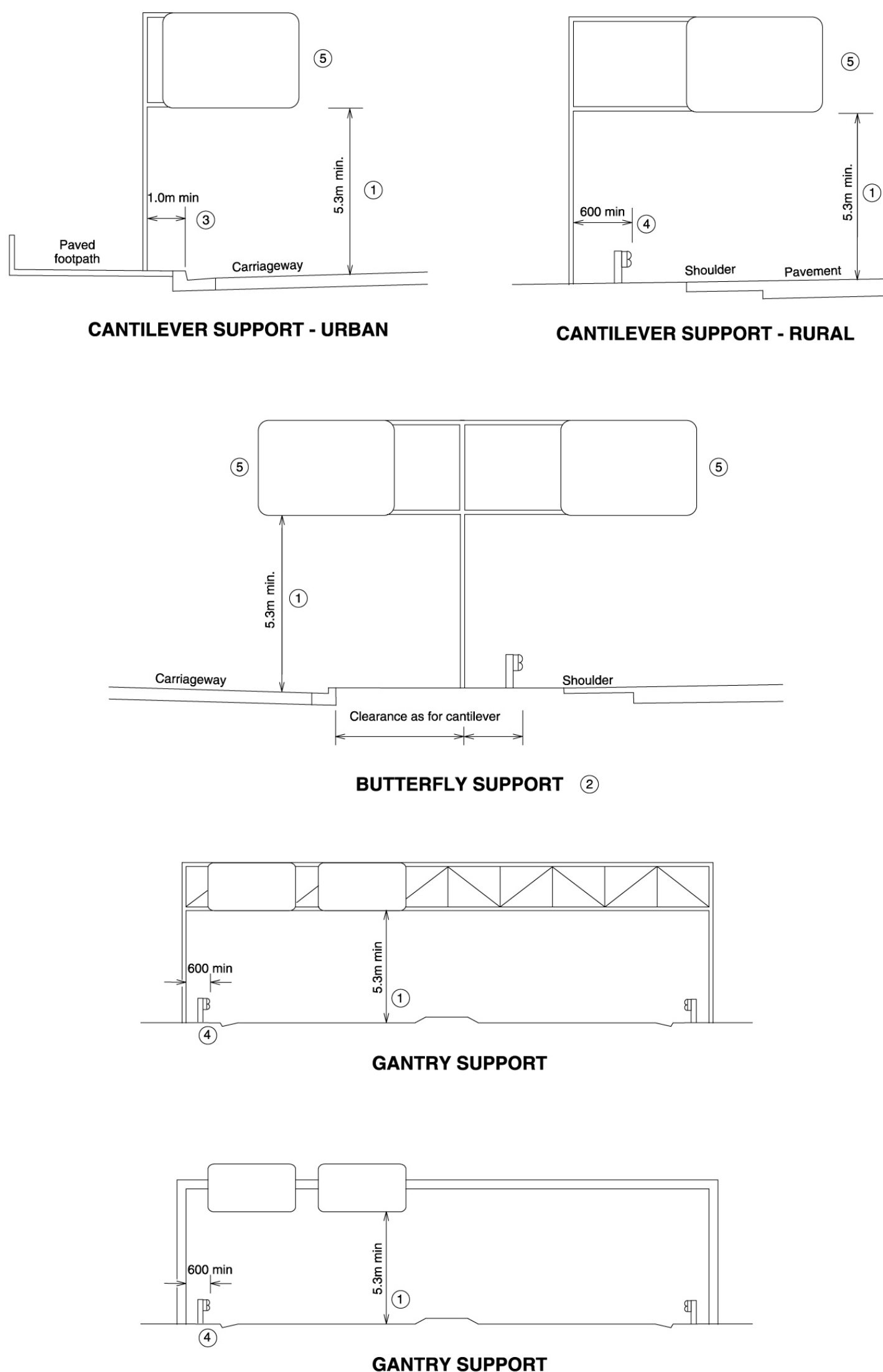


Figure 69: Typical structures to support overhead signs

Notes to Figure 69:

1. The minimum clearance shall apply to lighting brackets or other fixtures when these project below the sign. Design clearance is 5.4 m – refer to Clause D2.3.6 of AS 1742.2:2009.
2. Butterfly signs are not to be used in the gore of freeway exit ramps.
3. Absolute minimum clearance – refer to the 'Lateral Clearance and Shielding of Sign Supports' section above.
4. Guard fence posts should not be located immediately adjacent to vertical support to allow for post deflection when the rail is struck – refer to the 'Lateral Clearance and Shielding of Sign Supports' section above.
5. For cantilever or butterfly mounted signs, desirably the centre of the sign shall be located over the edge line or face of kerb as a minimum. Refer to the 'cantilever structures' section below.

Cantilever structures

Cantilever structures are generally appropriate for signs up to about 15 m², with the total outreach measured from the column centre up to about 6 m. Major structures are required where the sign size exceeds approximately 1.6 m². For smaller signs, traffic signal mast arms modified for sign attachment should be considered.

Cantilever structures can also be used as joint-use structures incorporating overhead or side mounted traffic signals, street lighting and flashing warning devices.

For cantilever mounted direction signs the centre of the sign should be located directly over the edge line or face of kerb where there is no shoulder. The centre of the sign may be up to 3 m to the left of the edge line or line of kerb, provided:

- there is no obstruction to the visibility of the sign from any approach lane for at least 320 m in advance of the sign
- there are no more than three lanes in the direction approaching the sign.

Butterfly structures

“Butterfly” or double cantilever structures are most commonly used where cantilever signs in a median can be combined as one structure that provides signing for opposing directions of travel.

Butterfly structures are not preferred in bifurcation areas if protective barriers are only required for such structures. Gantry structures are preferred in such locations.

Gantry structures

Gantry structures are used where it is necessary to erect two or more sign panels side by side over a carriageway, or where it is necessary to give individual directional indications above carriageway lanes. They may also be used to carry lane control signals. Sign heights normally used on gantry structures are between 1.8 and 2.4 m.

Where two or more overhead signs are to be erected on the one gantry, overall appearance and aesthetics should be considered as follows:

- if the height of adjacent signs is within 20%, the height of the taller sign should govern the height of the other sign(s)
- all signs should have appropriate and consistent letter heights, letter series and spacing
- all signs should be mounted with their lower edge at the same level

Existing structures

Wherever practicable, overhead signs should be placed on existing overpasses or other structures when these are located in favourable positions.

The sign face should be as close to square as practicable to the line of sight from an approaching driver. An alignment more than 15 degrees from the square should be avoided. Where the alignment is more than 10° from square, the text on the sign face should be designed with the widest letter series and letter spacing.

Where the structure is more than 15 degrees skewed to the road centre line, attaching an outreach sign to the structure should be considered.

Joint-use structures

Overhead sign supports may be designed as joint-use structures to also carry side or overhead mounted traffic signals or street lighting brackets on extension columns. Such structures will normally require a special design for a particular purpose.

(See also ‘Special Procedures’ in D4.5 below for additional information on joint-use supports for side mounted signs).

Requests for the design of overhead sign structures should be referred to the Principal Bridge Engineer. Such requests should include a plan showing the detailed cross-section of the road at the sign site (1:100 natural scale or larger), and including:

-
- Diagram illustrating the cross-section of a road profile, showing dimensions and elevations.
- Dimensions:**
- Top horizontal dimensions: 1.3 and 5.7.
 - Vertical dimensions on the right: 2.4 and 5.5 min.
 - Horizontal dimensions at the base: 3.7, 0.5, 2.75, and 3.5.
 - Horizontal dimension from the centerline to the start of the 3.7 segment: 1.2.
- Elevations (from left to right):**
- 73.935
 - 73.487
 - 73.377
- Labels:**
- 2 to 1 (Slope ratio)
 - Post Centre line
 - CD3 (Center of Deformation)
- Ch 18800 - West Bound**

Figure 70: Typical outline plan for a major sign structure

Additional notes to Figure D2:

- For the (a) Side mount – kerbed roads (urban) Barrier kerb example, the sign should be set back sufficiently so that a high vehicle close to the kerb will not hit the sign due to pavement crossfall near the kerb or other factors.
- For the (b) Side mount – unkerbed roads (rural) Behind safety barrier example, the spacing may be reduced to 300 mm in urban areas as long as the sign post is clear of guard fence posts.

D3 – SIGN ORIENTATION

FIGURE D3 – METHOD OF AVOIDING SPECULAR REFLECTION ON A ROAD SIGN

Additional note to Figure D3:

- RIGHT-HAND curves greater than 1500 m radius are treated the same as straights.

D4 – SIGNPOST SELECTION

D4.1 – General

a) Requirement for posts and fittings

To determine the required posts and fittings for a side-mounted sign:

- locate the sign accurately, both laterally and longitudinally (Appendix D2.3.2, D2.3.3 and D2.2 of AS 1742.2:2009 and this Supplement) and obtain ground levels under the sign relative to the nearest carriageway edge
- determine the mounting height relative to the carriageway edge (see Appendix D2.3.4 and D2.3.5 of AS 1742.2:2009 and this Supplement) and calculate the height of the sign above ground level
- determine the number of posts required (see Appendix D4.5 of AS 1742.2:2009 and this Supplement), noting that up to four posts may be used for very wide signs
- determine the post type and size required (see Appendix D4.5 of AS 1742.2:2009 and this Supplement)
- calculate the overall length of post required (see Appendix D4.5 of AS 1742.2:2009 and this Supplement)
- determine the type and number of fittings required (see b) below).

Note also that special procedures are applicable in certain cases (see Appendix D4.5).

b) Selection and number of sign post fittings (additional)

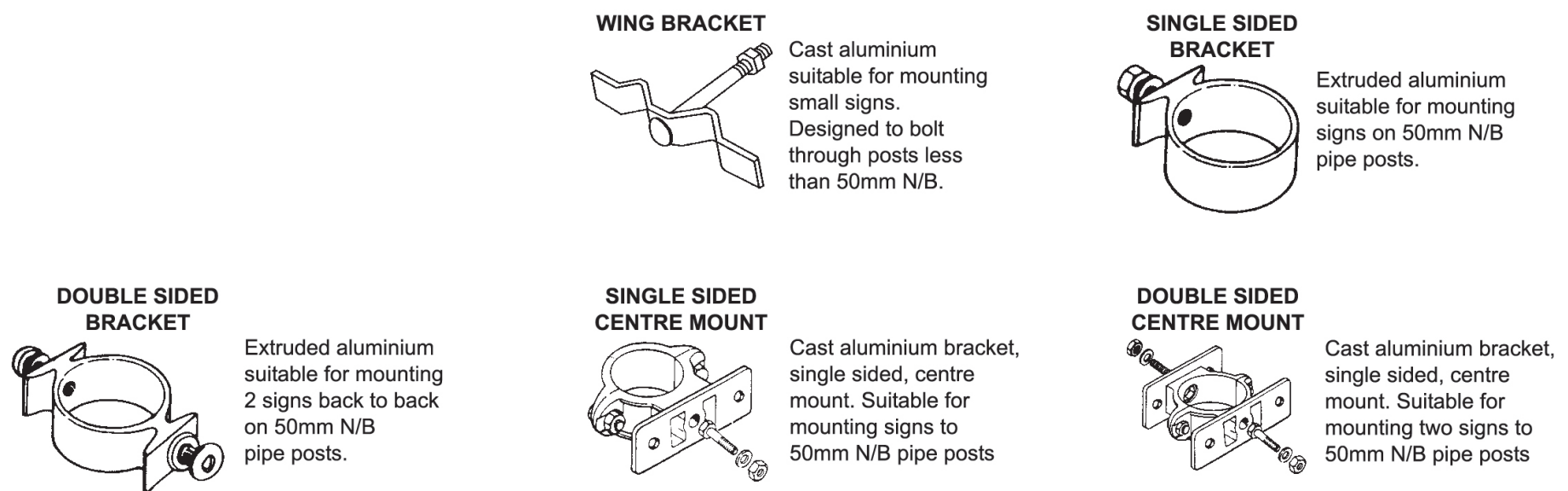
Examples of sign post fittings and their uses are shown in Figure 71.

Some of the fittings illustrated in are proprietary designs. Other fittings that have the same performance may be substituted for them.

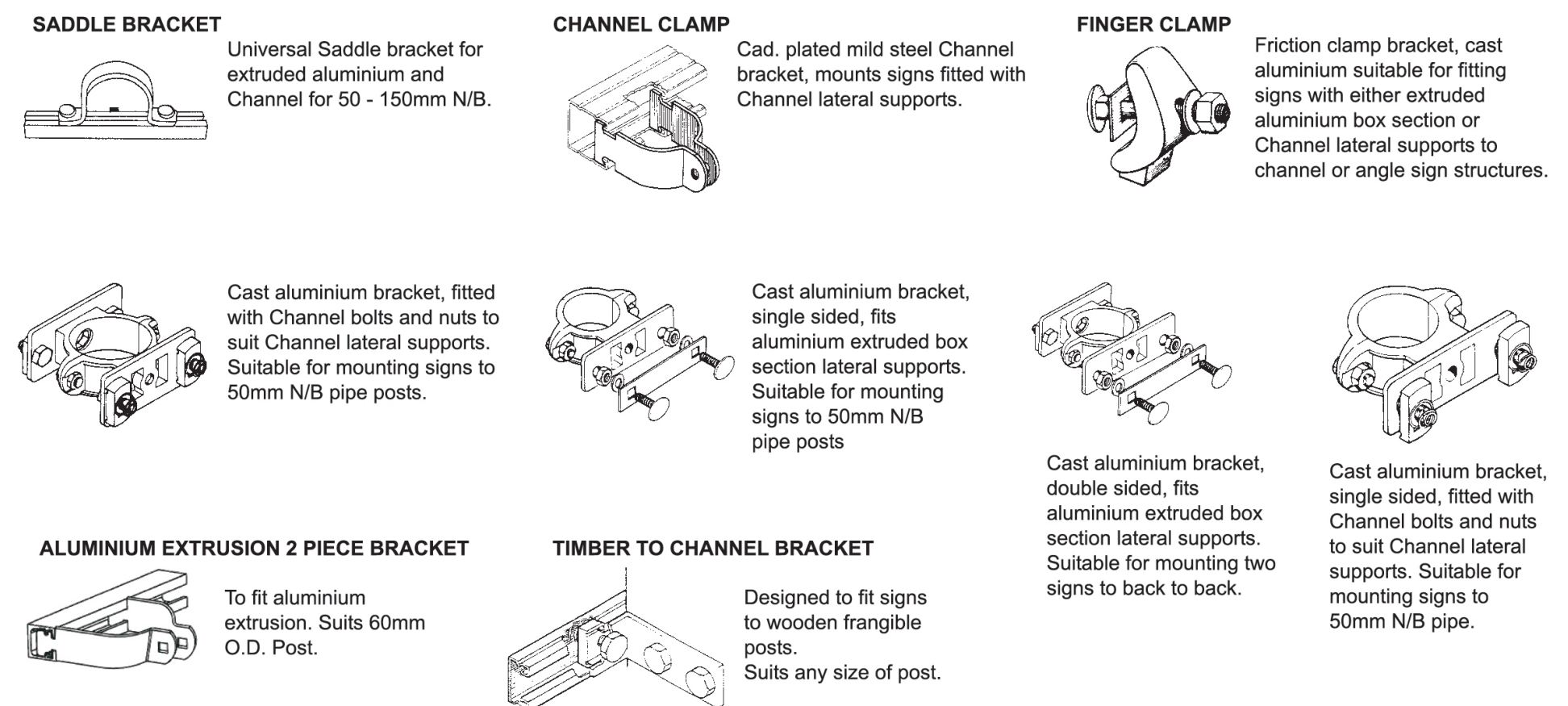
To select the type and number of fittings required:

- determine whether the sign will be stiffened on the back with “Unistrut” channel or similar. In general:
 - the following permanent sign blanks are stiffened:
 - rectangular, square and octagonal signs wider than 700 mm
 - diamond warning signs 750 x 750 mm and larger
 - triangular signs wider than 750 mm
 - 1800 x 300 mm hazard markers are not stiffened
- determine whether back to back mounting of two signs is required
- select an appropriate fitting from that matches the type and size of post being used
- determine the number of fittings required for each separate sign on the basis of:
 - one fitting per post for signs up to 200 mm in depth
 - two fittings per post for signs 201 to 900 mm in depth
 - three fittings per post for signs 901 to 1200 mm in depth
 - one extra fitting per post for each 400 mm increment or part thereof above 1200 mm.

For Unbraced Signs



For Strutted or Braced Signs



Banding for Large Diameter Poles

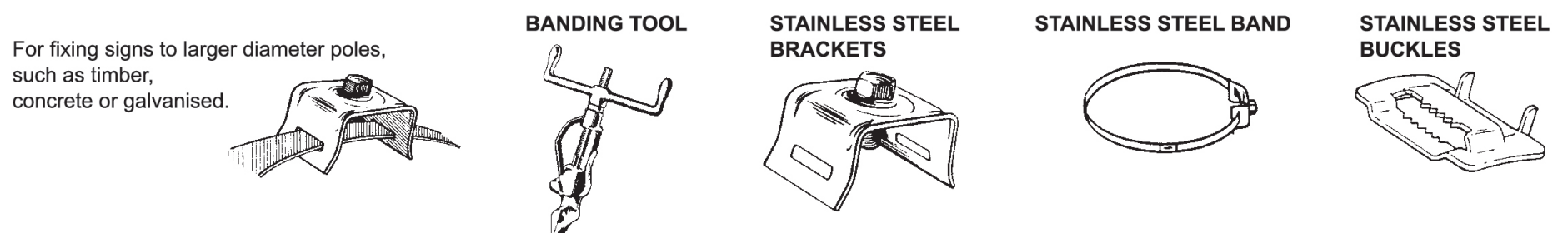


Figure 71: Sign post fittings

D4.3 – Large non-frangible posts

Any sign with large non-frangible posts (see Tables D2 and D3 in AS 1742.2:2009) must either be protected by an appropriate barrier or be located outside of the clear zone requirements, as determined from Austroads Guide to Road Design, Part 6 and VicRoads Supplement.

D4.4 – Large frangible posts

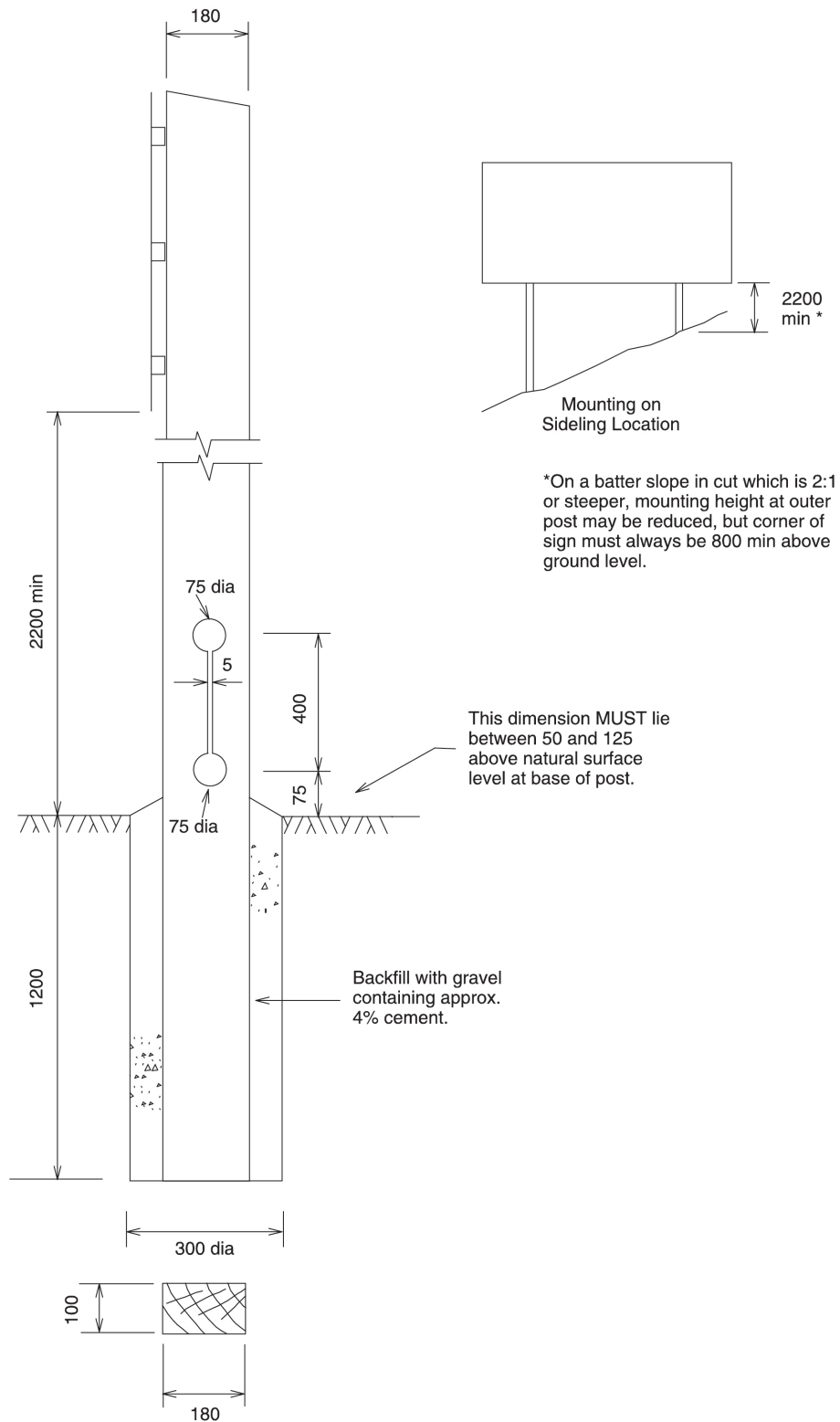


Figure 72: 180 X 100 mm frangible hardwood sign post

Note: All dimensions in millimetres unless otherwise shown.

D4.5 – Sign post selection guide

a) Number and spacing of posts

The number of posts used to mount signs is generally as follows:

- single post mounting
 - square or rectangular signs up to 900 mm wide
 - diamond signs with side dimension up to 900 mm (i.e. C size)
 - large signs, in special circumstances (see 'Special Procedures' below).
- two post mounting
 - all signs wider than 900 mm or a C size diamond sign, except as noted below, or in 'Special Procedures' below
 - the spacing of posts is desirably 0.6 times the sign width.
- three post mounting
 - acceptable alternative to two posts mounting for signs 3.65 m or wider
 - the spacing is 0.45 times the sign width (1.6 m minimum)
 - for wide signs it will frequently be more economical and less hazardous to use three smaller posts than two larger posts.
- four post mounting
 - applicable only to very wide signs, 4.5 m or wider.
 - the minimum post spacing should be 1.3 m.

b) Post type and size

Details of standard post types and sizes, and the purposes for which each are used, are given in Table 22.

To determine the size and type of post required, refer to Figure D5 of AS 1742.2:2009 or Figure 73 below. Post types shown to the left of the Figure 73 graph may be used wherever non-frangible posts can be used according to Appendix D of AS 1742.2:2009 or this Supplement. For signs in exposed positions where frangible posts are required, the types shown to the right of the Figure 73 graph should be used.

c) Post length

The length of post required is the sum of:

- the signboard depth less 50 mm (clearance at top of sign)
- the mounting height, adjusted for the difference between the pavement level and ground level at the base of the post
- depth of the post into the ground from Table 22.

Where applicable, a standard length should be selected from Table 22, which retains the above dimensions within their permissible ranges. If this is not practicable, a special length may need to be ordered. Timber posts and the larger sizes of steel and aluminium posts are ordered to the exact desired length.

Table 22: Standard sign post types and uses

Post Type	Normal Usages	Standard Length	Depth in Ground (1)	Frangible
32 NB gal tube (2.0 wall) Note (2) & (5)	Low mounted hazard marker (Clause 4.6.7 of AS 1742.2:2009)	1625 mm	500 - 700 mm	Note (3)
32 NB gal tube (2.0 wall) Note (2) & (5)	Kilometre plate marker (Clause 5.2 of AS 1742.15:2007)	2165 mm	550 - 650 mm	Note (3)

Post Type	Normal Usages	Standard Length	Depth in Ground (1)	Frangible
50 NB gal tube (3.2 wall) Note (2) & (5)	General use for side mounted signs, except where larger or special post required. 1, 2, or 3 post mounting	2800 mm 3200 mm 3700 mm 4600 mm	600 mm (min) 1000 mm (min)	Note (3)
80 NB gal tube (3.2 wall) Note (2) & (5)	Medium-large signs in protected locations. or 3 post mounting	Length to order	900 to 1200 mm	No Note (4)
100, 125 and 150 NB gal tube (3.5 wall) Note (2) & (5)	Large signs in protected location (2, 3 or 4 post mounting). Single post mounting in urban areas where $85 \leq 60$ km/h (see Appendix D4.5 of this Supplement)	Length to order	1200 to 1400 mm	No Note (4)
180 x 100 mm frangible hardwood Figure 6.2	Medium-large signs in exposed locations, generally freeways and rural areas only. 2 or 3 post mounting.	Length to order	1200 mm	Yes Note (4)

Notes to Table 22:

- Depths may need to be increased in soft ground to ensure post stability.**
- Galvanised steel tubes used for sign posts are to be made from C350 grade steel. Tube sizes are specified by the nominal bore (NB) and the wall thickness, both in mm. Figure 73 assumes a tube wall thickness as noted in the above table. However, a lighter gauge 50 NB tube with 2.3 mm wall thickness, may be used to support signs of area up to 0.8 m² per post at sign centroid heights of up to 2.2 m. This tube will thus be suitable for single post mounting of small signs, and for multiple post mountings of wider but relatively shallow signs such as intersection direction signs.**
- Posts of 50 mm nom. bore or less are not breakaway types, but are considered light enough to present a minimal hazard to out-of-control vehicles.**
- Timber or aluminium frangible posts are generally not appropriate for use in urban areas (freeway main carriageways and ramps excepted) where roadside space is restrictive and pedestrian activity exists. As far as practicable, steel posts up to 100 mm nom. bore should be used in lieu. In especially vulnerable locations, post size is desirably limited to 80 mm.**
- A galvanised square tube, of equivalent strength to the circular tube sizes shown in the above table, may be used as an alternative type of sign post.**

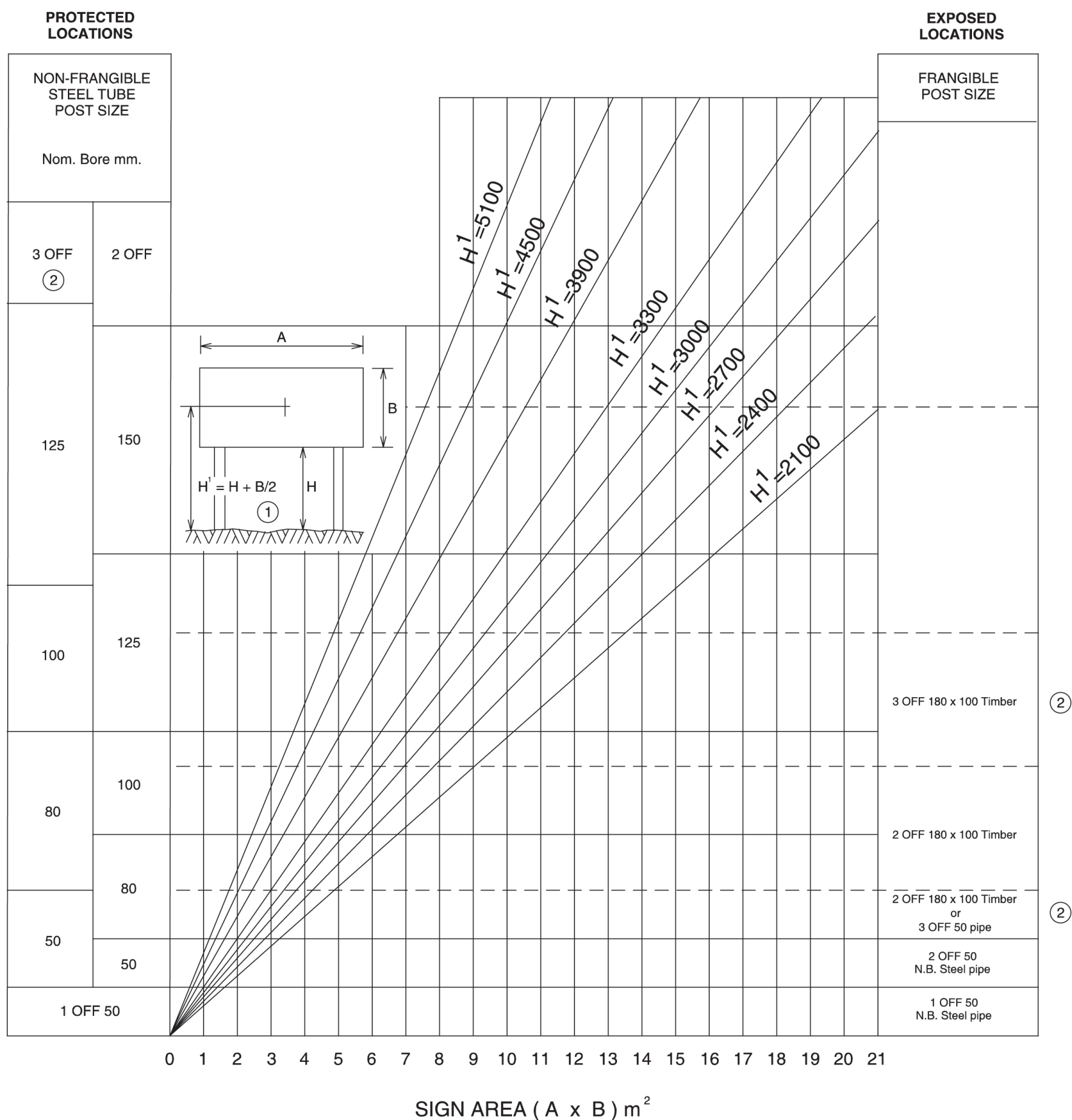


Figure 73: Sign post selection guide

Notes to Figure 73:

1. Dimensions *H* and *H1* relate to ground surface below the sign. On uneven ground, *H* = height of the longest post.
2. See details above ('Number and Spacing of posts) for three post mounting conditions.
3. See Note (4) to Table 22 regarding the use of frangible posts in urban areas.
4. The use of Slip Base Strutted Aluminium Posts has been discontinued
5. All dimensions in millimetres unless otherwise shown

Special procedures

a) Posts in sockets

Where a sign is to be erected in paved areas or in a location where it could be expected to be struck from time to time by vehicles, such as on an urban median end; or where it may need to be removed occasionally to accommodate the swept path of Over Dimensional vehicles when turning, the post should be inserted into a socket cast into the ground. Suitable socket sizes for posts are shown in Table 23.

Table 23: Post and Socket sizes

Post Size	Socket Size
32 mm nom. bore pipe (hazard markers)	50 mm nom. bore pipe
50 mm nom. bore pipe	65 mm nom. bore pipe

The socket should be set into the ground to the same depth as the post would otherwise have been set and should protrude approximately 50 mm above an earth surface, or 25 mm above a concrete or bitumen surface.

The socket may be blocked off so that the sign post penetrates a minimum of 450 mm into the socket. The sign post should be securely fixed into the socket by an approved vandal proof method.

b) Single post mounting for large signs

The mounting of large signs on two posts in some locations in urban areas, for example, above a footpath, may present a problem in that the structure may be aesthetically displeasing, or one of the posts may be an obstruction to pedestrians or otherwise difficult to site.

Designs for standardised single post, side mounted sign structures utilising 114 mm, 140 mm or 165 mm OD galvanised steel posts are provided in Attachment B to this Supplement. The designs are suitable for mounting heights (ground to lower edge of sign) up to about 2.6 m, and subject to certain signboard shape limitations (width/depth ratio), the post may be offset by up to 400 mm from the edge of the sign.

Typical maximum signboard sizes which may be mounted this way on a 165 mm post can be estimated from Figure 74 for post offsets of 0 m and 1 m.

Single post mountings for large signs are more costly than a conventional two-post mounting and are not frangible.

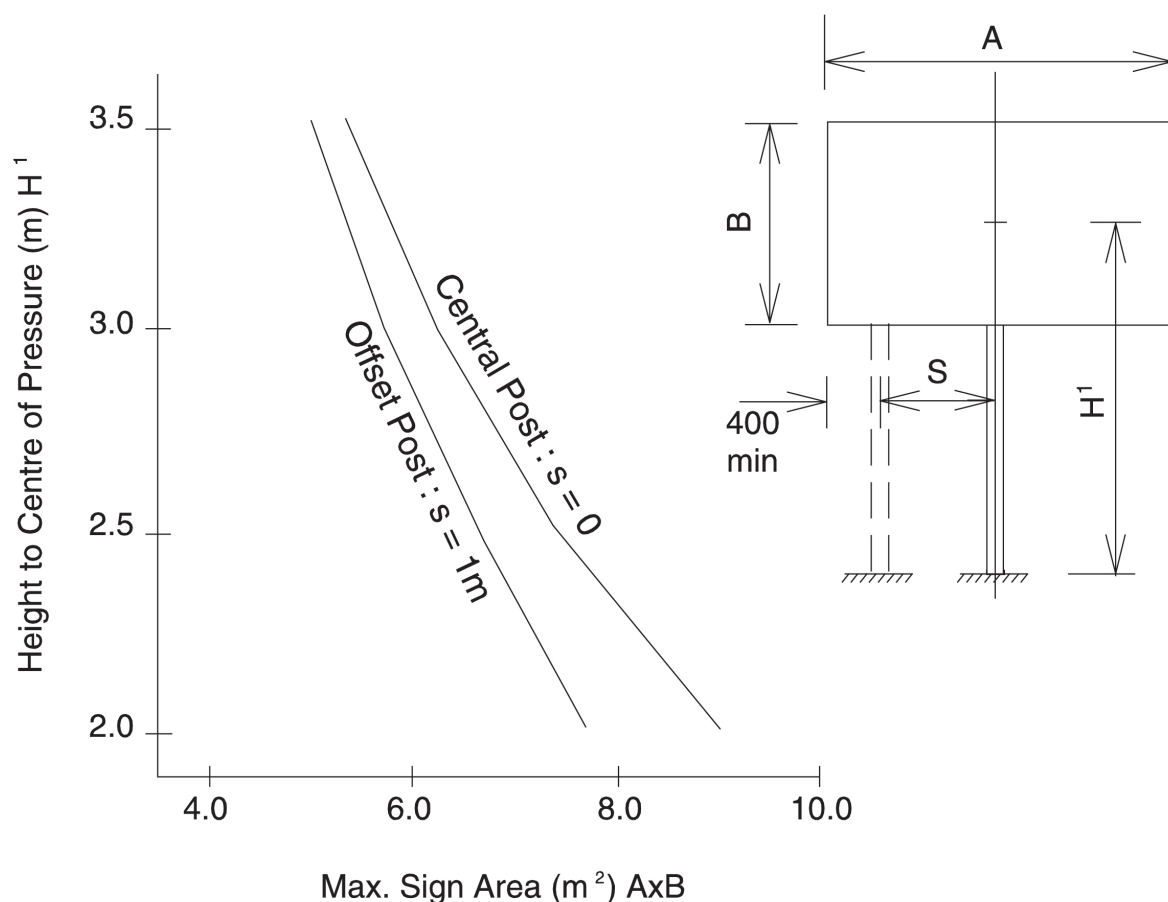


Figure 74: Maximum sign board sizes on standard single post support

c) Joint-use supports for side mounted signs

Wherever practicable in urban areas, existing roadside poles, lighting columns, traffic signal pedestals, etc. should be used for the mounting of signs to reduce the proliferation of poles in the road environment as much as possible.

Small signs, generally not more than 0.3 m² in area, may be attached to electricity distribution poles, tramway poles, lighting columns and signal pedestals or mast arms by banding.

Larger signs may require that the pole be checked structurally for the added loading of the sign, or may require the design of special joint-use supports. The latter will normally apply where traffic signal pedestals are to be used. Large signs will rarely be permitted on electricity distribution poles.

In most cases, larger signs will need specially designed attachments for fitting the sign to the pole.

A structural engineer should be consulted where special structures or attachments, or checks on existing structures, are required.

Typical maximum signboard areas which may be attached to joint-use structures are shown in Table 24.

Table 24: Use of joint-use supports for side mounted signs

Type of Signal Pedestal	Maximum signboard area
Standard 114 mm OD signal pedestal	1.0 m ²
Special 165 mm OD signal pedestals	2.7 m ²
Joint use traffic signal/lighting column or traffic signal mast arm	1.6 m ² less the area of any traffic signal target boards facing in the same direction

d) Colour of sign supports

Sign supports are normally left unpainted, except as follows:

- Sign supports on declared roads (along with traffic signal pedestals) may be painted where requested by Councils or developers provided that they agree to meet all associated costs, including maintenance. This is conditional upon the Council/developer entering into an agreement to reinstate the poles to their original condition in the event that the Council/developer discontinues its own colour scheme.
- In isolated situations, posts may need to be painted in order to reduce any undesirable aesthetic effects using an approved neutral colour (e.g. at channelised intersections).
- Un-galvanised steel posts and all overhead or high mounted sign structures are either painted an approved neutral colour or finished with a zinc-in-silicate coating.
- Timber posts in urban areas may be painted an approved neutral colour on aesthetic grounds.

APPENDIX F3 – EQUIPMENT

The ball bank indicator is the preferred equipment to determine the advisory speed on horizontal curves in Victoria. However, alternative equipment may be considered if the results delivered by the equipment are reliable. Such equipment includes the Hawkeye 2000 Gipsi-Trac Geometry Package, which is available from ARRB (<https://www.arrb.com.au/Equipment-services/Hawkeye-2000-Series/H2000-Gipsi-Trac.aspx>).

APPENDIX H – SIGNS FOR WILDLIFE AWARENESS

Injured Wildlife signs are installed in rural areas to assist road users with a means of reporting injured wildlife to wildlife rescue organisations. These signs should only be used where there is a specific wildlife issue in an area and the service is considered beneficial to road users.

a) VicRoads policy on Injured Wildlife signs

The following requirements shall be met for the implementation of Injured Wildlife signs:

- The proponent group requesting the signs must be listed on the DELWP website as a recognised 'Wildlife Rehabilitator Organisation' (<https://www.wildlife.vic.gov.au/sick-injured-or-orphaned-wildlife/sick-injured-or-orphaned-wildlife>)
- The proponent group must agree in writing to comply with the conditions applied by the road authority. These conditions include, but may not be limited to:
 - The proponent group shall be responsible for the installation, maintenance, operation and removal of the signs including all associated costs.
 - A sign plan shall be submitted to the road authority as part of the submission
 - A record of sign locations shall be maintained by the proponent and made available to the road authority on request.
 - Signs shall be designed, manufactured, located and mounted as specified by the road authority and road authority's standards.
 - The contact number shall be the same number listed as on the DELWP website for the proponent group. It is preferred that only one contact number cover as large an area as possible, i.e. should apply over a large region or at least over a long section of road.
 - The proponent shall provide a near seven-day, 24-hour emergency phone service.
 - The proponent organisation shall indemnify the road authority from any claims associated with its activities on the road authority's roads relating to roadside assistance to injured animals. An example of an indemnity clause is:

"Where permission is given by (road authority name) for the erection of signs, (proponent name) agrees to indemnify and keep indemnified (road authority name) for any claims regarding personal injuries, fatalities or property damage caused to members of (proponent name), and any third party arising out of activities carried out by (proponent name) on that road."

- Safe operating procedures shall be developed, maintained, stored and implemented when attending to injured animals at roadside locations. This includes:
 - The use of high visibility safety jackets by attendants that conforms to the relevant Australian Standard.
 - The use of a single flashing yellow light mounted on the roof of a vehicle when in attendance to incidents.
 - Adequate traffic control arrangements.
- Injured Wildlife signs shall be not be placed unnecessarily close to another Injured Wildlife sign.
- The road authority reserves the right to take possession of the Injured Wildlife signs at its discretion where the road authority considers that these policy objectives are not being met. This may include:
 - where the proponent group and/or wildlife rescue service ceases to operate
 - the sign is in poor condition and/or beyond its useful life span (nominally 8 years)
 - the sign is required to be removed for operational reasons.



Figure 75: Example of different Injured Wildlife signs and contact numbers on the same road potentially leading to confusion

b) Signage requirements



Injured Wildlife signs shall comply with the following requirements:

- W8-V115 series signs shall be used with the message 'Injured Wildlife' with a contact number listed at the bottom of the sign (refer to Figure 76).
- The size of the sign shall be the same as the parent Hazardous Wildlife warning sign (e.g. where an 'A' size Hazardous Wildlife Warning Sign is used, the Injured Wildlife sign will also be 'A' size).
- The arrangement of the sign shall be in accordance with Table 25



Figure 76: Injured Wildlife sign (W8-V115)

Table 25: Provision of assistance for injured wildlife signs

Sign Arrangement 1	Sign Arrangement 2
	
Installed as a supplementary plate under a Hazardous Wildlife warning sign	Installed as an additional supplementary plate under a Hazardous Wildlife warning sign assembly

ATTACHMENT A - SPOTTING FOR PAVEMENT MARKINGS

a) General

This Attachment shows the method of spotting using either paint or temporary markers where new or replacement markings are to be installed.

The spots or other prescribed marks serve two functions:

- to indicate the line pattern or type of marking required
- to indicate the precise location of the marking or alignment of the line.

Spots should be placed accurately in the desired position and successive spots for longitudinal lines shall not vary in lateral tolerance by more than 25 mm with respect to each other to ensure that the line when painted will be straight or on a smooth curve.

b) Longitudinal lines

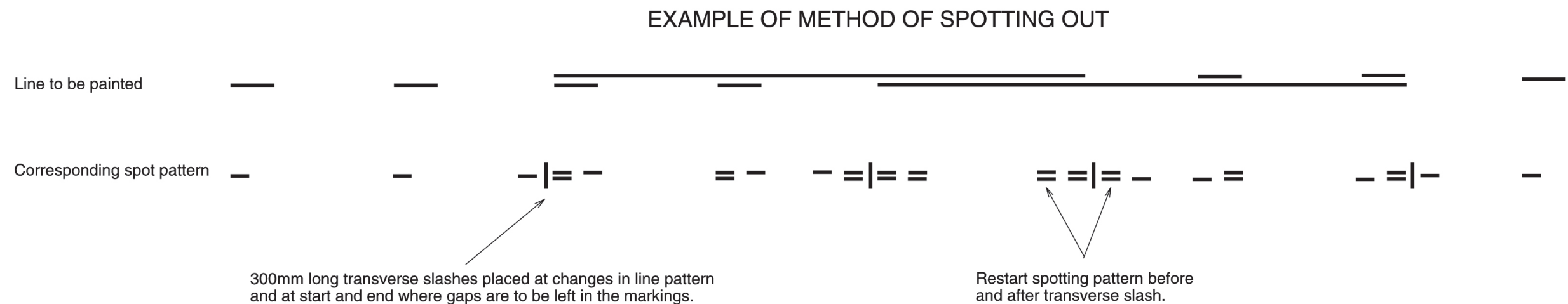
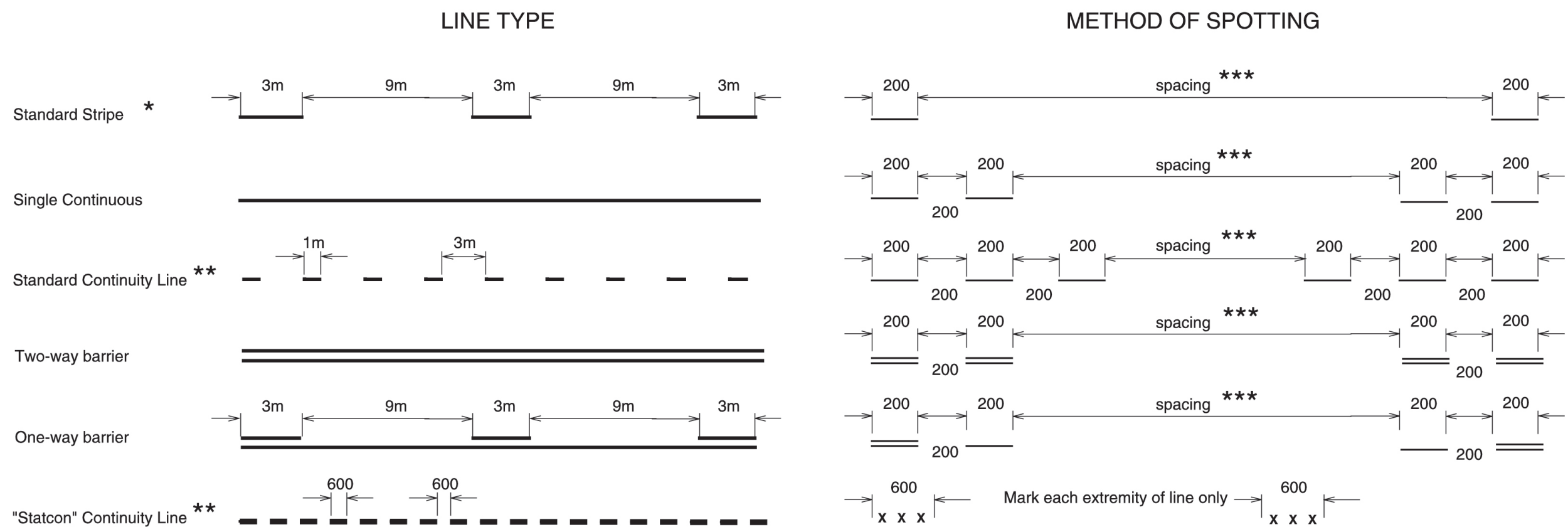
Longitudinal lines are spotted out as shown Figure 77 for paint and Figure 78 for temporary markers. An example of how temporary markers should be placed is shown in Figure 79.

Where paint is used for spotting out, each spot should be a minimum of 30 mm wide and 200 mm long. Spots, or groups of spots, should not be more than

- 24 m apart on rural roads
- 12 m apart on urban roads and on curves of less than 150 m radius on any road.

A transverse line approximately 300 mm long shall be painted at each place where the line pattern changes, and at the beginning and end of any gap to be left in the line. Where temporary markers are used, additional temporary markers offset from the main pattern may be installed as an alternative to painting a transverse line.

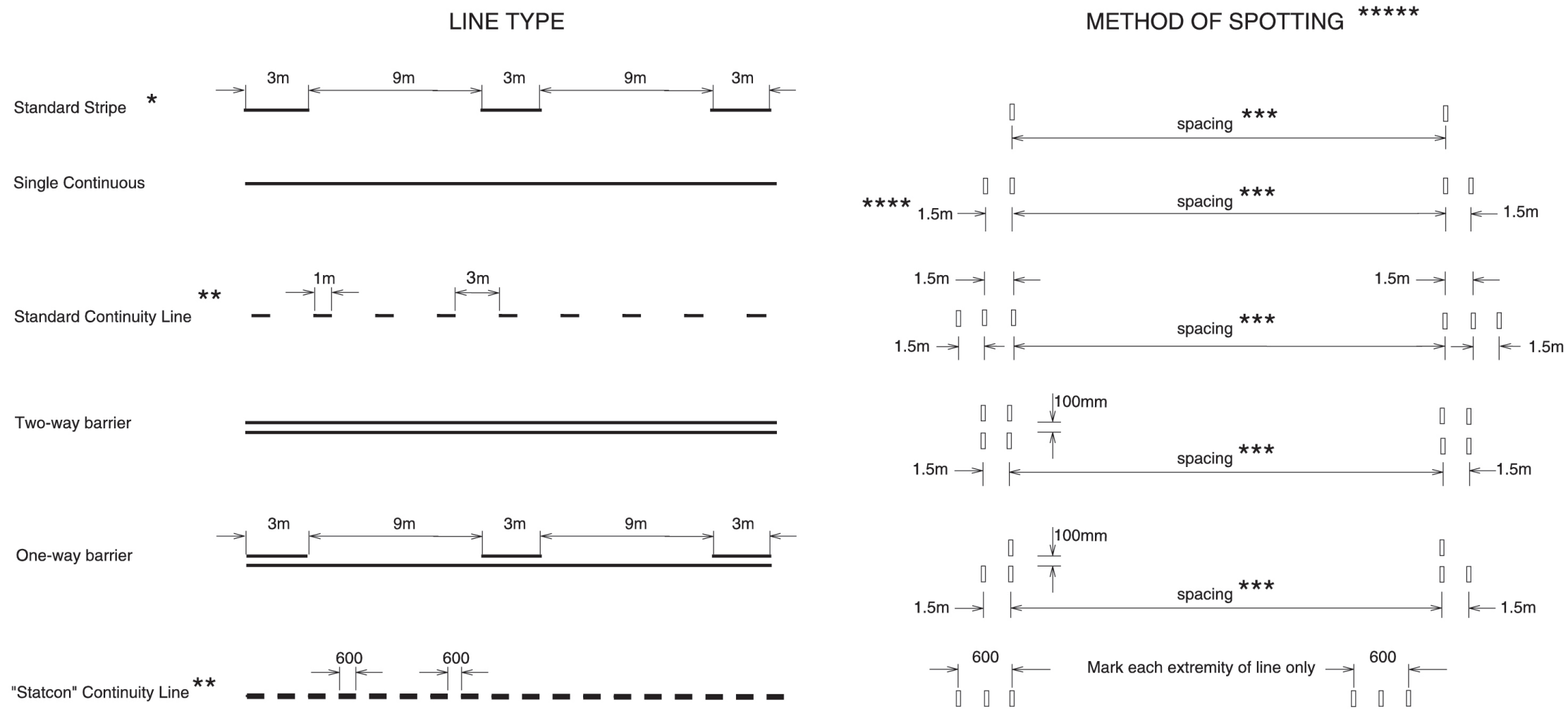
Where it is intended to re-establish barrier lines, it should be confirmed that existing lines conform to Clause 5.3.3 of AS 1742.2:2009.



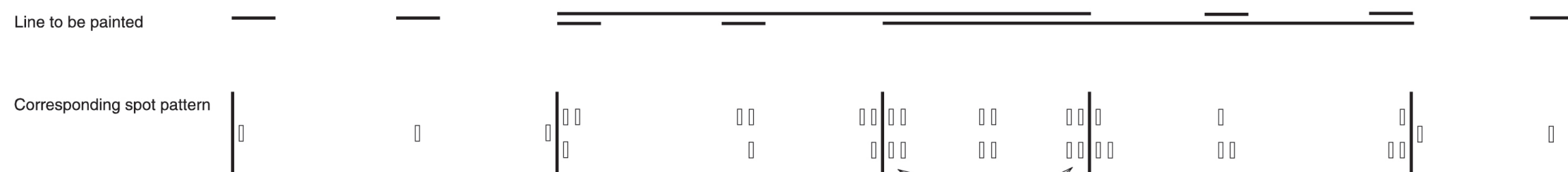
- * Spotting for other separation line pattern (ie. 6m/6m) is the same as for 3m/9m line pattern. Requests for linemarking shall indicate pattern required.
- ** See Figure 84 or spotting at controlled intersections.
- *** 24m on straights on rural roads, 12m in urban areas and curves less than 150m radius.

Figure 77: Spotting out for linemarking using white paint

Note: All dimensions in millimetres unless otherwise shown



EXAMPLE OF METHOD OF SPOTTING OUT



- * Spotting for other separation line pattern (ie 6m/6m) is the same as for 3m/9m line pattern. Requests for linemarking shall indicate pattern required.
- ** for spotting at controlled intersections.
- *** 24m on straights on rural roads, 12m in urban areas and curves less than 150m radius
- **** 1.5m gap between temporary markers may be varied subject to prior approval..
- ***** Temporary Markers are to be removed on completion of linemarking and installation of RRPM's

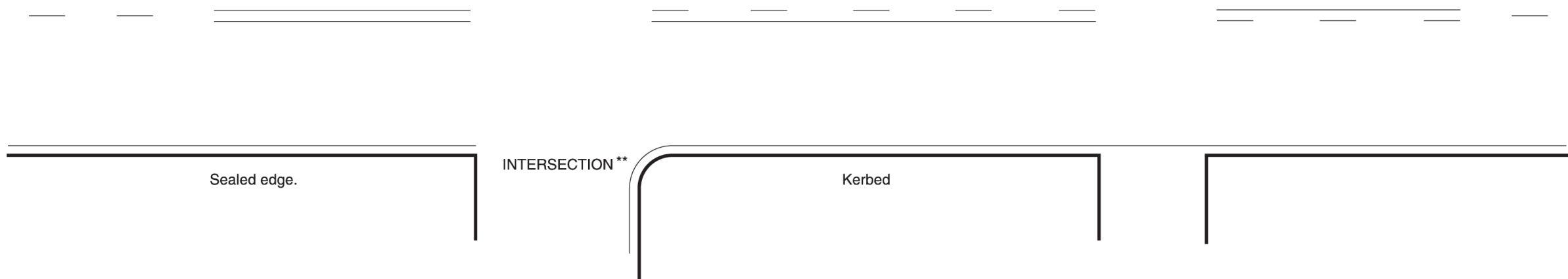
Restart spotting pattern before and after transverse slash.

300mm long transverse slashes placed at changes in line pattern and at start and end where gaps are to be left in the markings.
(Note use of additional temporary markers offset from main spotting pattern is permitted subject to approval.)

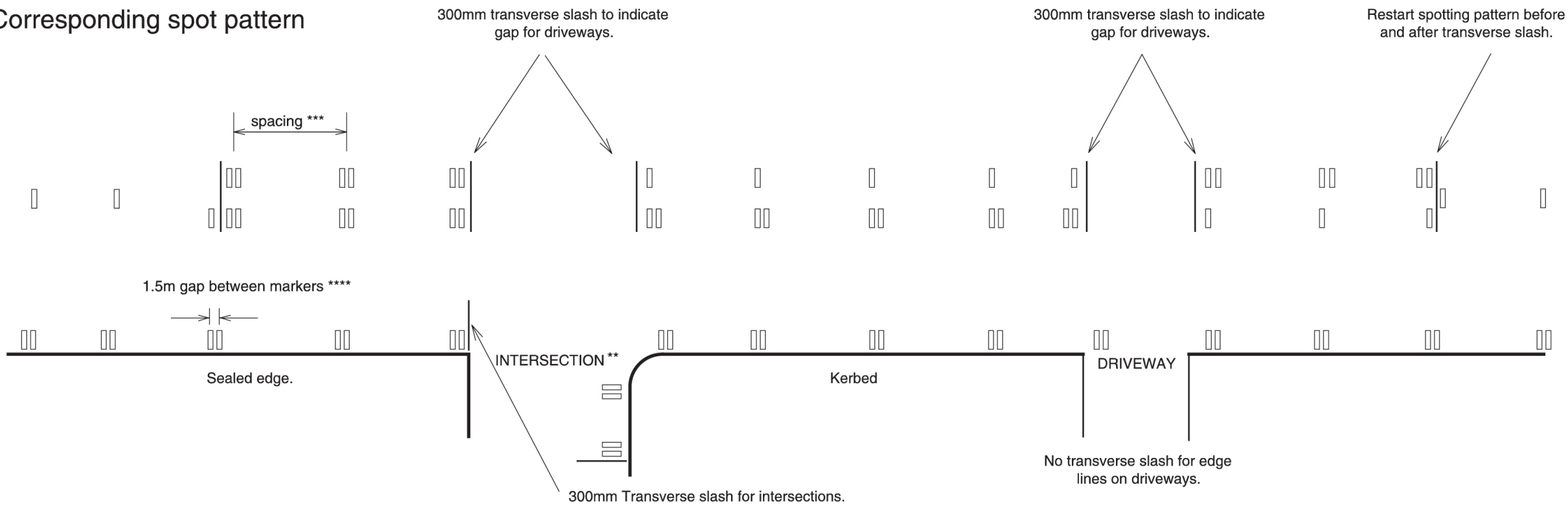
Figure 78: Spotting out for linemarking using temporary markers

Note: All dimensions in millimetres unless otherwise shown

Line to be painted



Corresponding spot pattern



- ** See Figure 84 for spotting at controlled intersections.
- *** 24m on straights on rural roads, 12m in urban areas and curves less than 150m radius
- **** 1.5m gap between temporary markers may be varied subject to prior approval..

Figure 79: Spotting out for linemarking example of temporary marker placement

c) Transverse markings and pavement arrows

Stop, crosswalk lines and pavement arrows should be spotted out as shown in Figure 80.

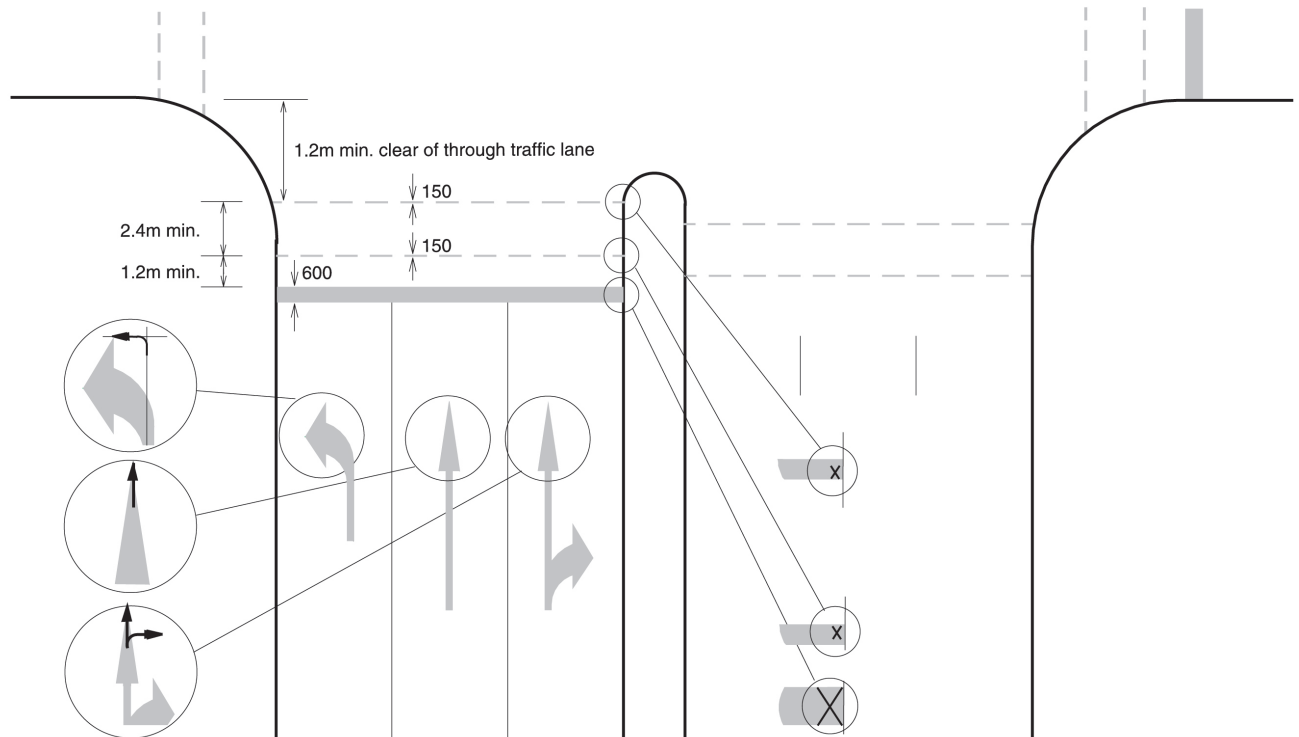


Figure 80: Spotting out transverse markings and pavement arrows

Note: All dimensions in millimetres unless otherwise shown

Markings at unsignalised intersections require the spots shown in Figure 81. Continuity lines at median and separator openings are spotted similarly to the outer line at each end, but the central spot is not required.

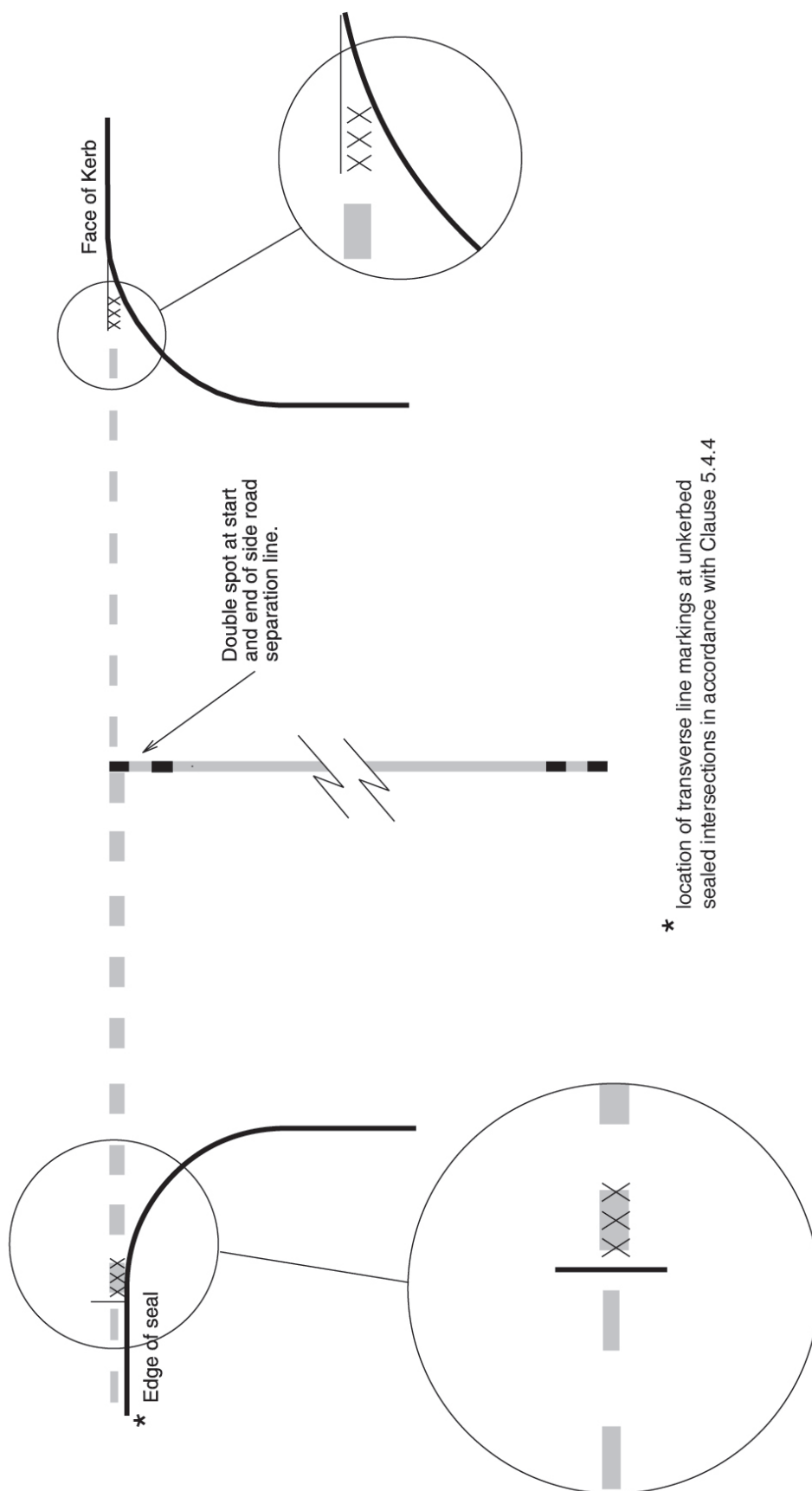


Figure 81: Spotting out for markings at unsignalised intersections

d) Setting out pavement markings at roundabouts

General

Pavement markings at roundabouts are described in Clause 5.4.2 of AS 1742.2:2009.

When setting out pavement markings, one through path at a time should be spotted out. Spots up to 50 mm are used for the initial setting out of the alignment, and converted to proper spots (min 30 mm wide, 200 mm long) when the pattern is established, ready for linemarking.

Approach markings

On multi-lane roundabout approaches, a solid separation line normally extends 30 m back from the holding line.

The alignment of these approach markings are spotted so that the lane widths are suitably distributed, i.e. say 3.5 m left, 3.8 m right. The right hand lane is normally widest as this inside lane has the smaller radii, therefore requiring a greater swept path.

In setting the alignment for the approach lanes, the entry lanes shall align with the appropriate lanes in the circulating carriageway, i.e. for two lane roundabouts, the left lane does not point towards the right lane and the right lane does not point to the central island.

Circulating lane width

A minimum desirable circulating lane width is 3.8 m (with an absolute minimum of 3.5 m). In determining suitable lane widths in the circulating carriageway, the widths of the departing carriageway should be taken into account so that:

- Large circulating lane widths should not lead into very narrow departure lanes.
- A painted extension to the splitter island may be required to reduce the outside lane width. The “swept path” of the existing roundabout is generally free of loose stones. An unswept area can generally be chevroned out of the marked traffic lanes.

At this stage, spotting out of the circulating lanes is only carried out between the central island and the splitter island, including any new painted extension to the splitter islands.

Exit lane width and lines

On multi-lane roundabouts, the exit lane widths should generally be evenly split, with slightly more width given to the lane with the greatest deviation. In determining suitable exit lane widths, a gradual transition shall be provided from the throat opening at the exit point and the departing carriageway.

Small spots are then used to connect the circulating lane lines with the exit lanes in a smooth “S” curve.

Similarly, the painted extension of the splitter island is connected to the prolongation of the kerb face of the departing carriageway using a smooth curve. This will be the inside edge of the roundabout holding line.

Using the above set out points, the “exit lane line pattern” (9 m line, 3 m gap) can then be spotted out.

In setting out these markings, avoid the exit lane lines appearing as a solid line entirely across the entry lanes.

Two lane roundabouts

Set out a 3 m wide gap centred on the intersect of the dividing line of the approach markings of the entering carriageway and the exit lane line in the circulating roadway.

From this gap establish a 9 m line, 3 m gap pattern along the spotted centre line of the circulating roadway in either direction as follows:

- The start of the exit pavement marking is not to intrude into the lane of the previous exit point and may be up to 1 m clear of this traffic lane. If this results in a first line of the exit marking being less than 6 m, then reduce the adjacent 9 m line to achieve a minimum of 6 m for the first line,
- On the departure side, the exit line marking pattern (9 m line, 3 m gap) may revert back to the standard lane line pattern (3 m line, 9 m gap) on entering the departing carriageway, but allowing a minimum of one full spiral line marking pattern beyond the departing throat opening.

The above procedure is repeated for the other legs of the roundabout.

Three or more lane roundabouts

Where there are three or more entry lanes, the 3 m wide gap is centred on the intersect of alignment of the dividing line of the left hand entering carriageway and the circulating roadways with the exit pattern extending in either direction from this gap.

Approach arrow markings

Relevant pavement arrows shall be spotted in accordance with Section 3 above, with the tip of the first arrow being 3 m from the holding line, and the next bank of arrows being 15 m back, as per the standard arrow spacing (refer to Clause 5.5.2.3 of AS 1742.2:2009).

If the continuous lane line on the approach to the roundabout extends beyond 30 m, additional sets of arrows shall be provided, taking into account spacing requirements of 15 to 25 m as outlined in Clause 5.5.2.3 of AS 1742.2:2009.

Finalising layout markings

All redundant spots shall be blacked out.

The roundabout should be driven from all approaches in all lanes to ensure a smooth driving line. Lane widths should be checked for buses and trucks as appropriate.

Review the markings in the daylight if spotted at night. Traffic should be following the spotted markings and any noted deviations from those markings corrected.

e) Raised pavement markers

Spotting out is not normally required for retroreflective raised pavement markers (RRPMs) when they are used to supplement painted markings. The only requirement is that installation of the painted markings is complete before the RRPMs are laid.

Spotting for non-retroreflective raised pavement markers (NRPMs) used within intersections in accordance with Clause 5.6.5.2 of AS 1742.2:2009 and this Supplement, or elsewhere where they are not directly associated with a painted line, comprises a roughly circular spot approximately 50 mm diameter at each marker position. Such spots should be accurately located to a tolerance of 25 mm.

f) Marking location of reseals

At locations where it is desired to leave a length of longitudinal line unpainted because of imminent reseal, or a need to remove the line in the near future, the section should be marked by painting yellow arrows on the pavement as shown in Figure 82.

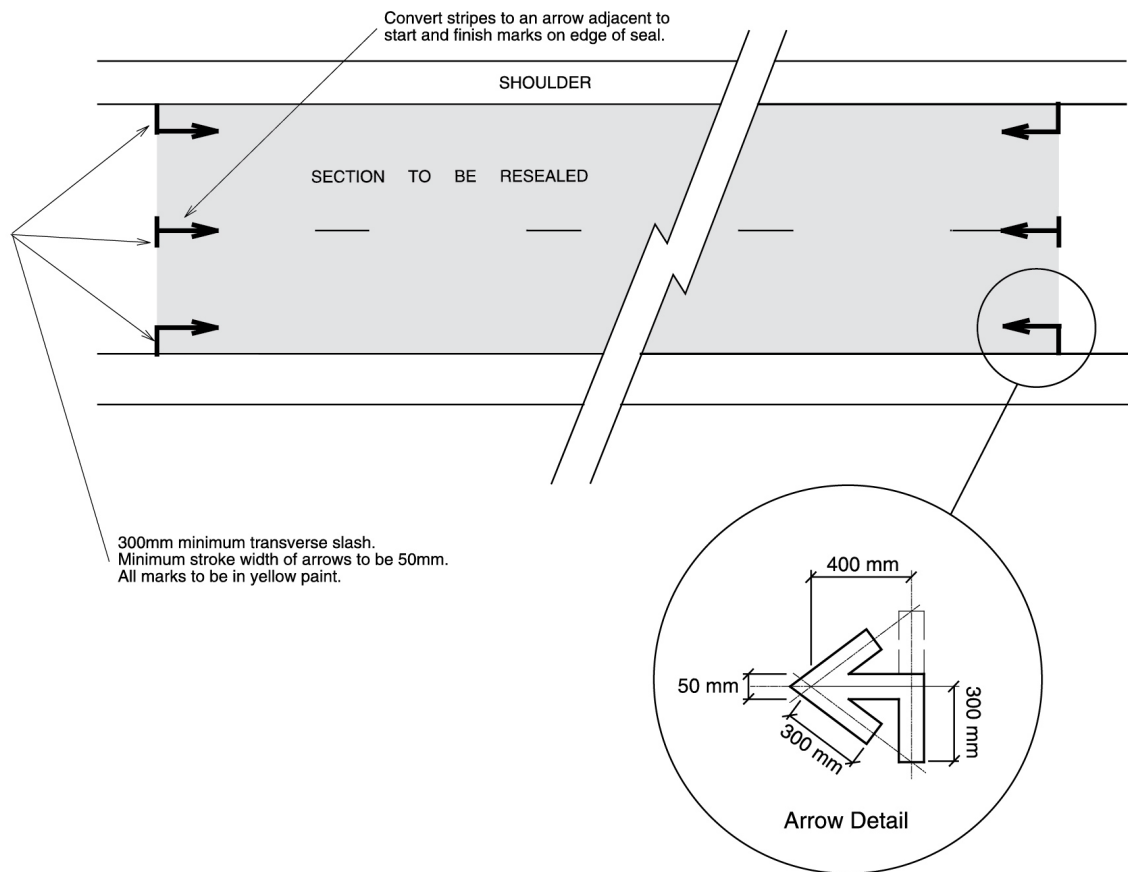


Figure 82: Standard marking for location of reseals

ATTACHMENT B – DESIGN STANDARDS FOR SINGLE POST MOUNTING OF LARGE SIGNS

a) General

The following charts are used to determine whether a sign can be mounted on a single post utilising 114 mm, 140 mm or 165 mm OD galvanised steel posts.

b) Post size selection procedure

With reference to Figure 83:

- Determine the area of the sign ($A \times B$) and mounting height "H1".
- Determine the offset "S" and select the appropriate Figure 84, Figure 85 or Figure 86, rounding up to the next whole number offset.
- Determine the post size by projecting horizontal and vertical lines for the calculated mounting height and sign area. The post size required is the one above the intercept point.

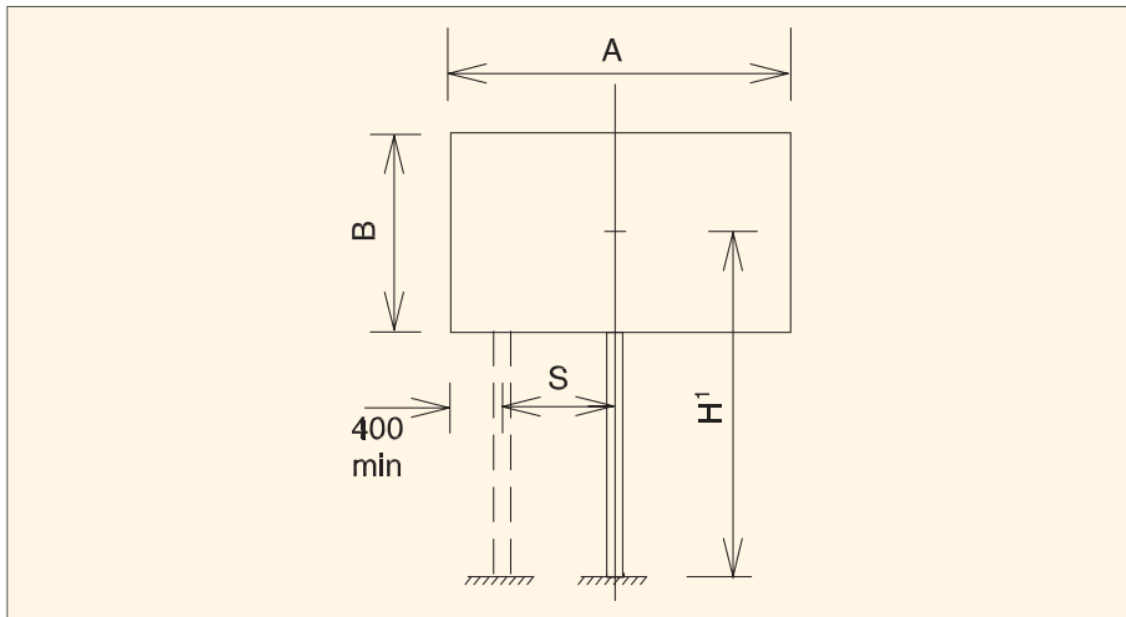


Figure 83: Typical single post mounting arrangement

CENTRAL POST (S=0)

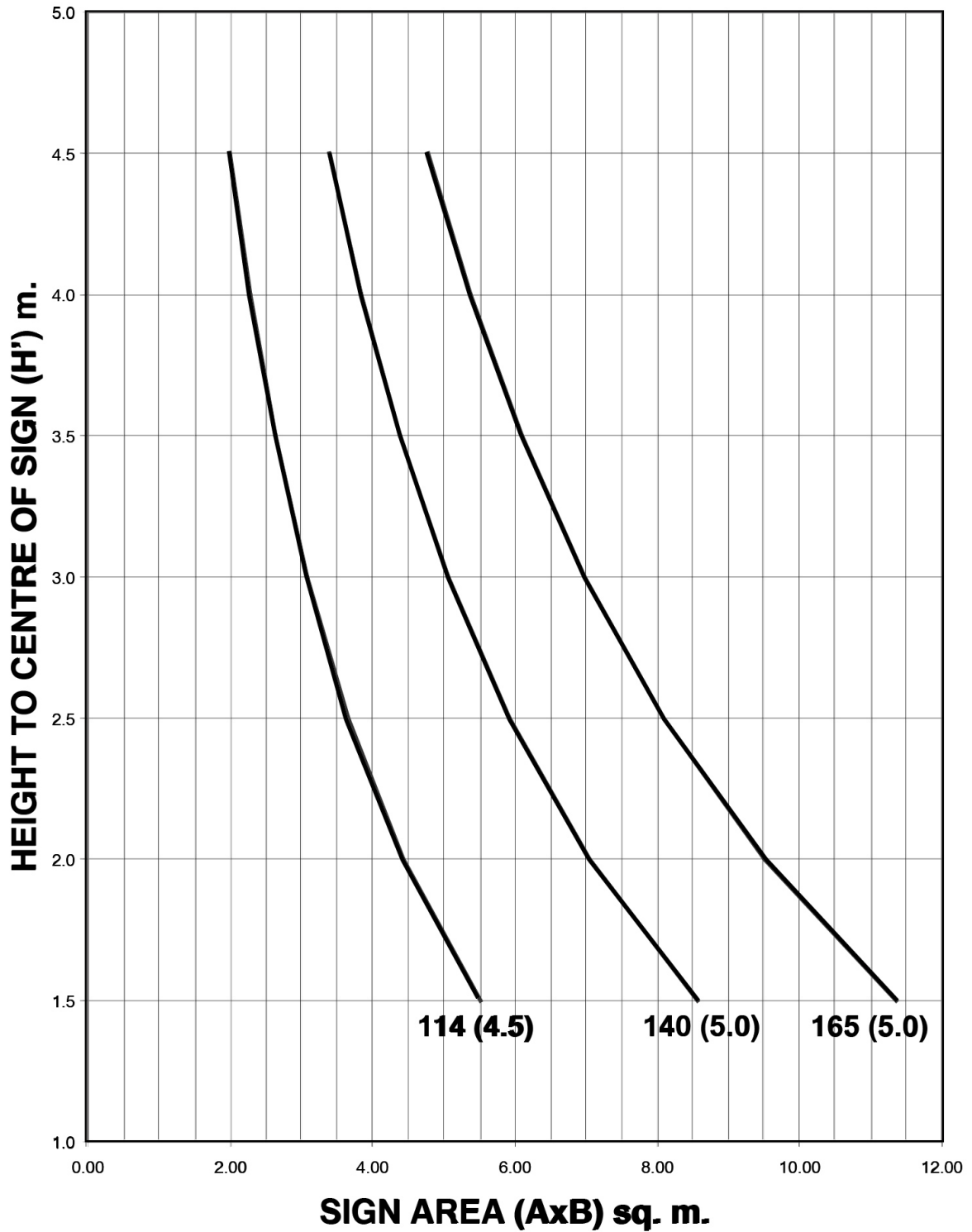


Figure 84: Post size selection – zero offset

OFF CENTRE OR OFFSET POST (S=1m)

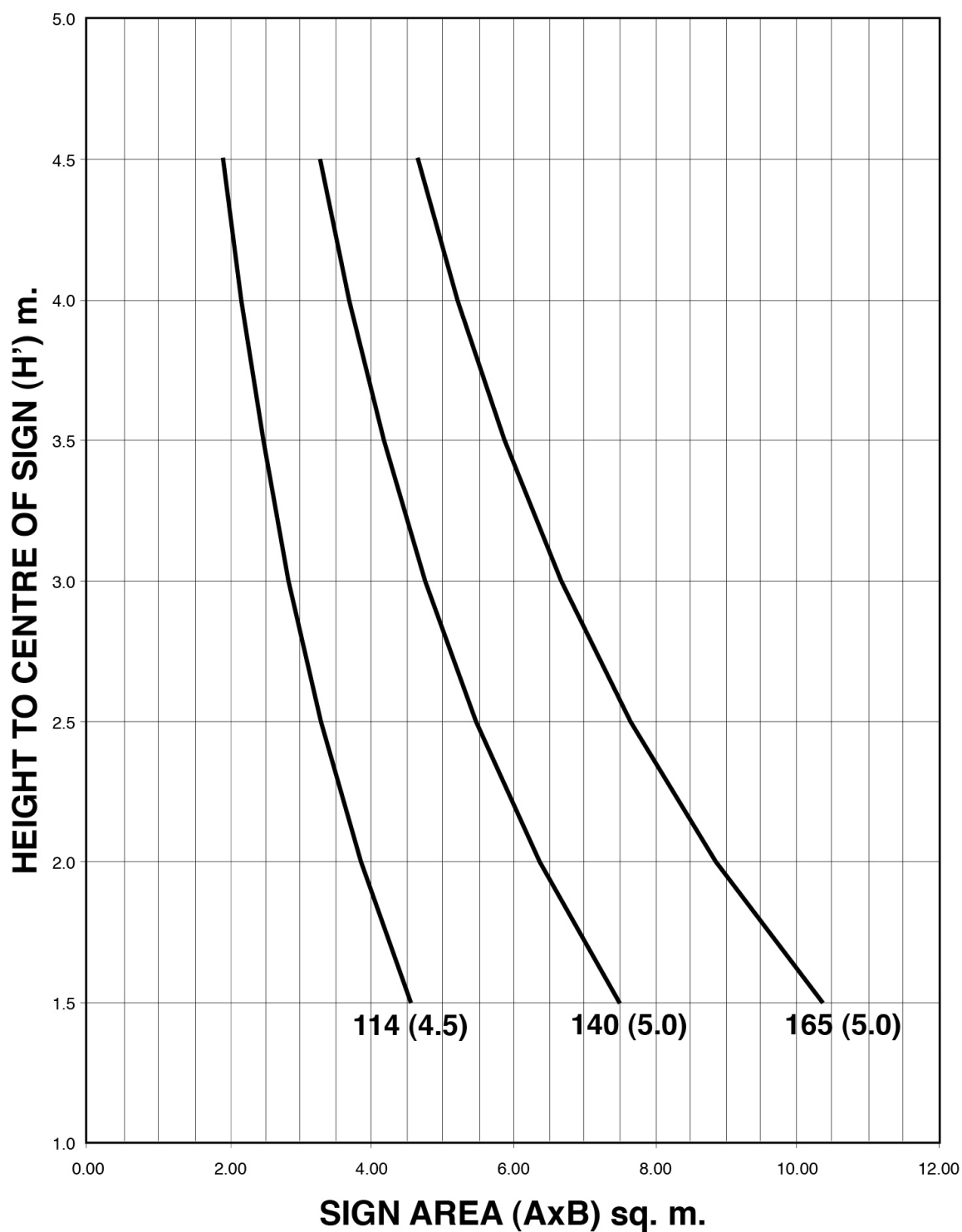


Figure 85: Post size selection – 1 m offset

OFF CENTRE OR OFFSET POST (S=2m)

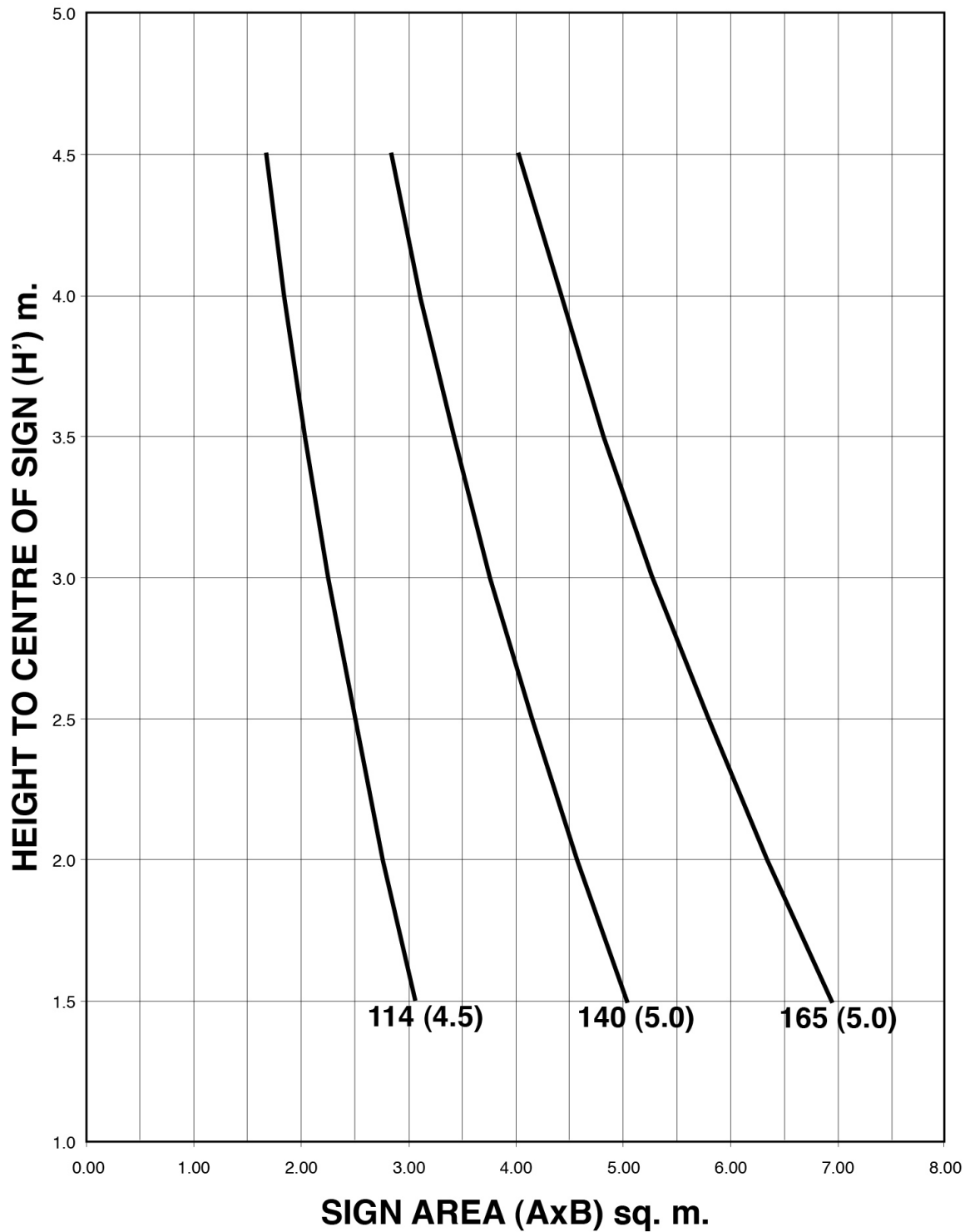


Figure 86: Post size selection – 2 m offset

c) Channel size selection procedure

Single post mounted signs require larger horizontal sign stiffening sections as these signs are cantilevered.

- Determine the outreach – the horizontal distance from the centre of the post to the furthest edge of the sign.
- For the sign depth "B", determine from Figure 87 the number and size of stiffening sections required.

Upon erection of the sign, the 41 mm x 41 mm channel section transport bracing shall be retained, but cut to provide 50 mm clearance inside the top and bottom edges of the sign.

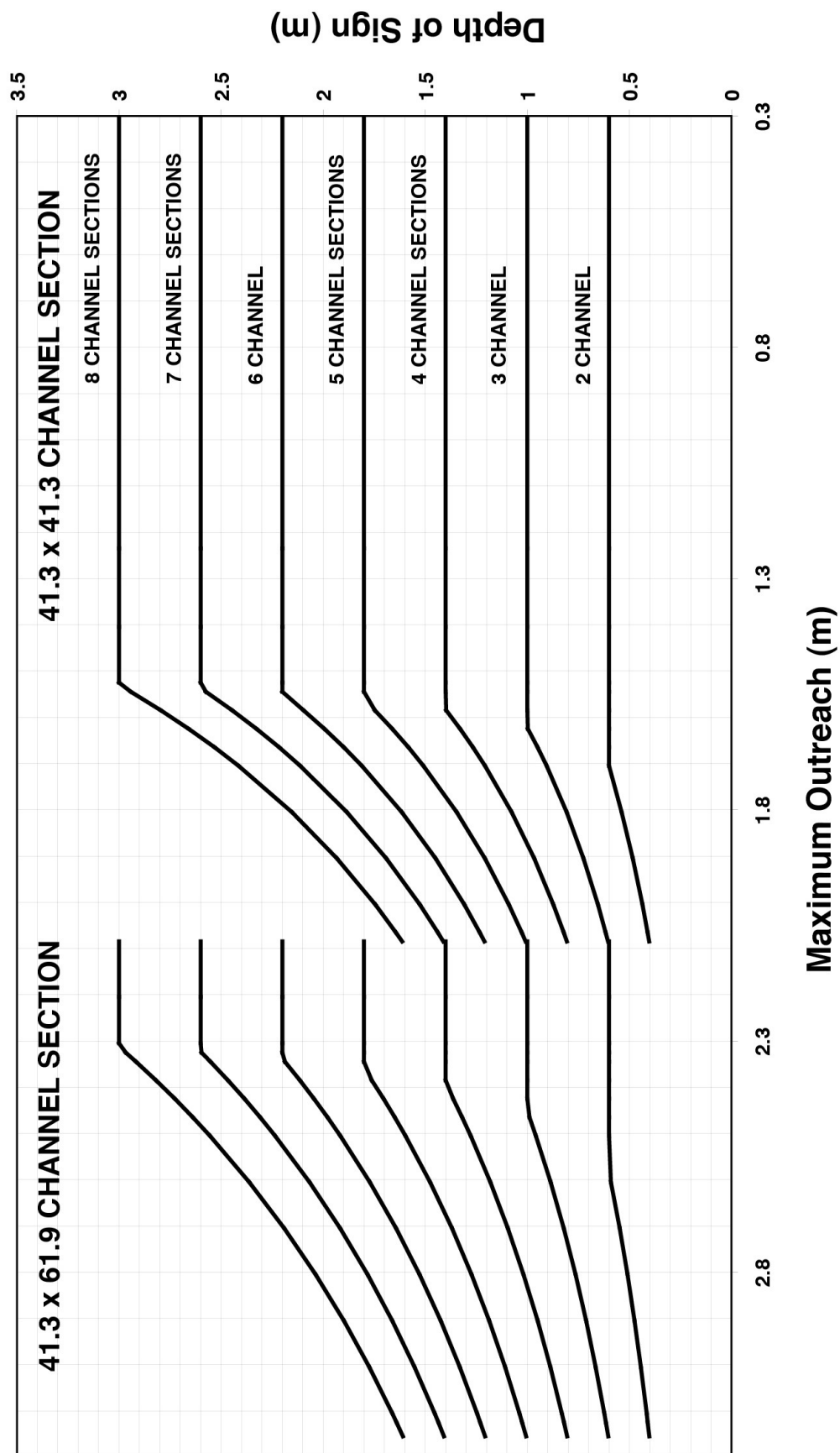


Figure 87: Channel size selection

d) Maximum sign areas

Table 26 shows the maximum sign areas that can be supported for various post sizes, taking into account the mounting height and offset mounting arrangement.

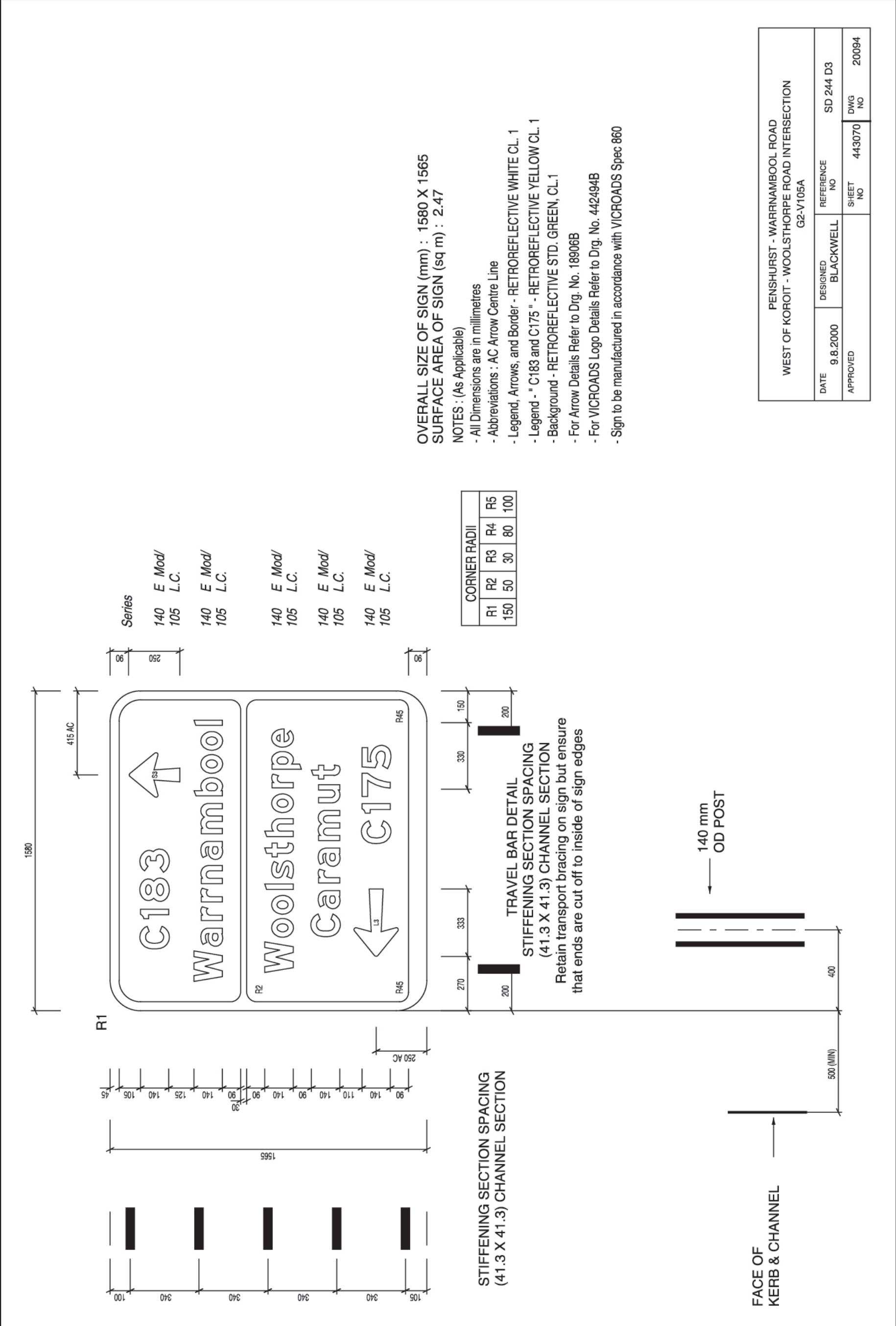
Table 26: Maximum sign area for single post support signs (m²)

Post	165 CHS			140 CHS			114 CHS		
Height (m)	Offset (m)								
	0.0	1.0	2.0	0.0	1.0	2.0	0.0	1.0	2.0
1.5	11.36	10.36	6.94	8.57	7.50	5.03	5.51	4.56	3.06
2.0	9.51	8.86	6.35	7.05	6.37	4.57	4.43	3.85	2.77
2.5	8.09	7.65	5.79	5.92	5.48	4.16	3.66	3.29	2.50
3.0	6.98	6.68	5.28	5.06	4.76	3.78	3.08	2.84	2.26
3.5	6.10	5.88	4.82	4.39	4.17	3.44	2.64	2.47	2.04
4.0	5.38	5.22	4.41	3.84	3.69	3.13	2.28	2.17	1.85
4.5	4.78	4.66	4.04	3.39	3.28	2.85	1.99	1.91	1.67

e) Typical and standard drawings

Table 26 shows the maximum sign areas that can be supported for various post sizes, taking into account the mounting height and offset mounting arrangement.

Figure 88 shows typical sign manufacturing drawings that include details of horizontal stiffening sections and transport bracing. Standard drawings for General Arrangement, Sign Mounting Brackets and Post and Footing details are included as Figure 89, Figure 90 and Figure 91 respectively.



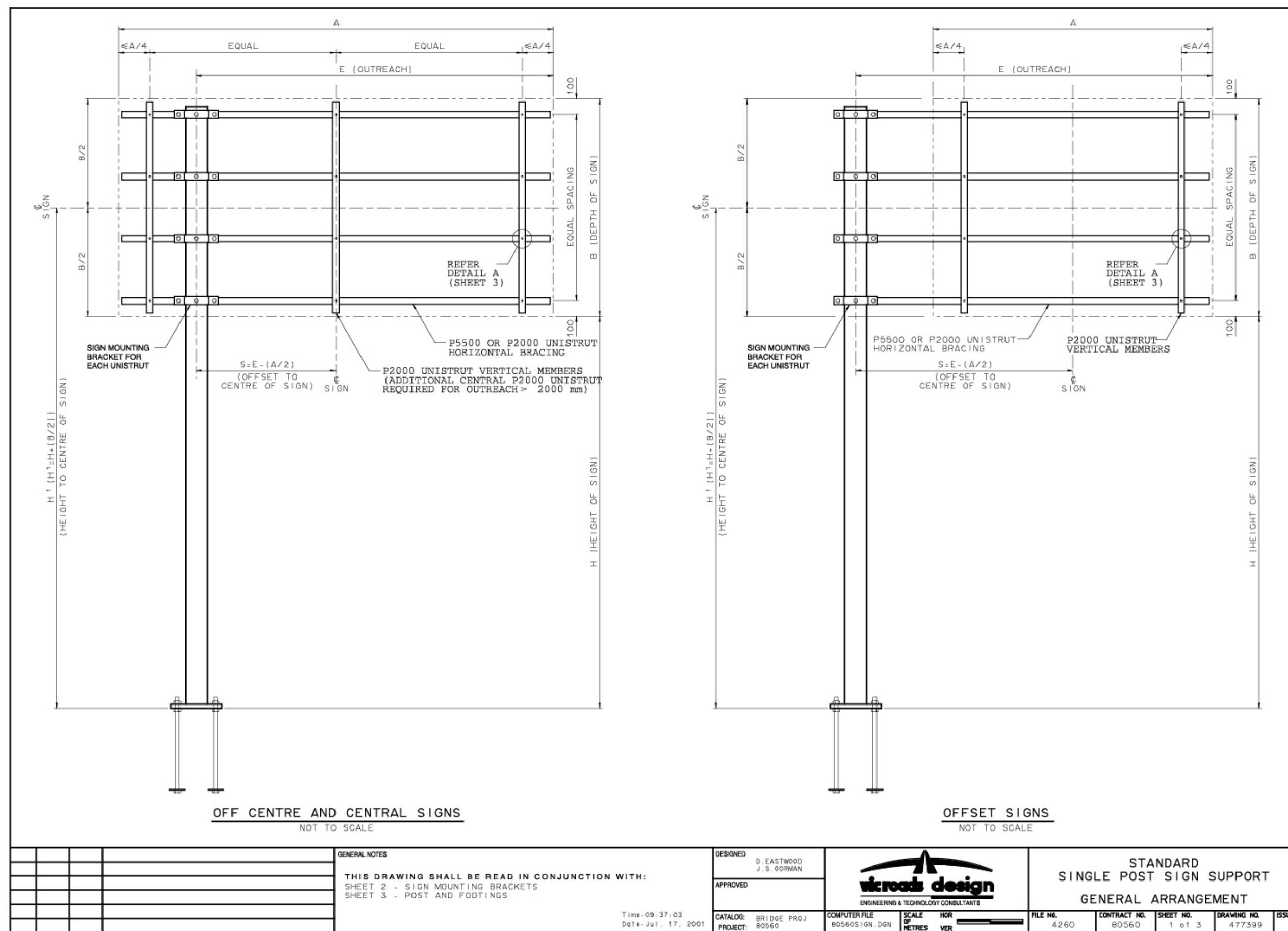
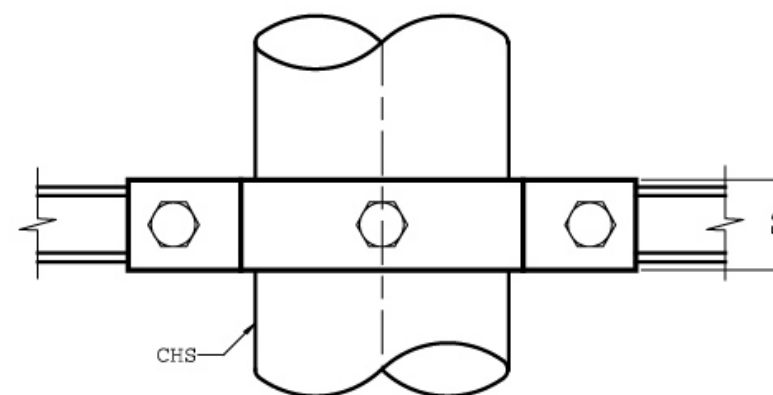
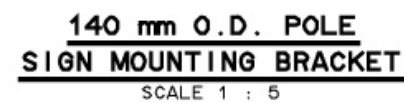
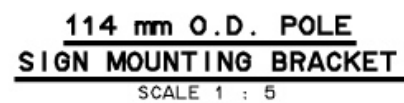


Figure 89: Standard single post sign support general arrangement



TYPICAL ELEVATION
114, 140 AND 165 mm O.D. POLE BRACKET
SCALE 1 : 5

219

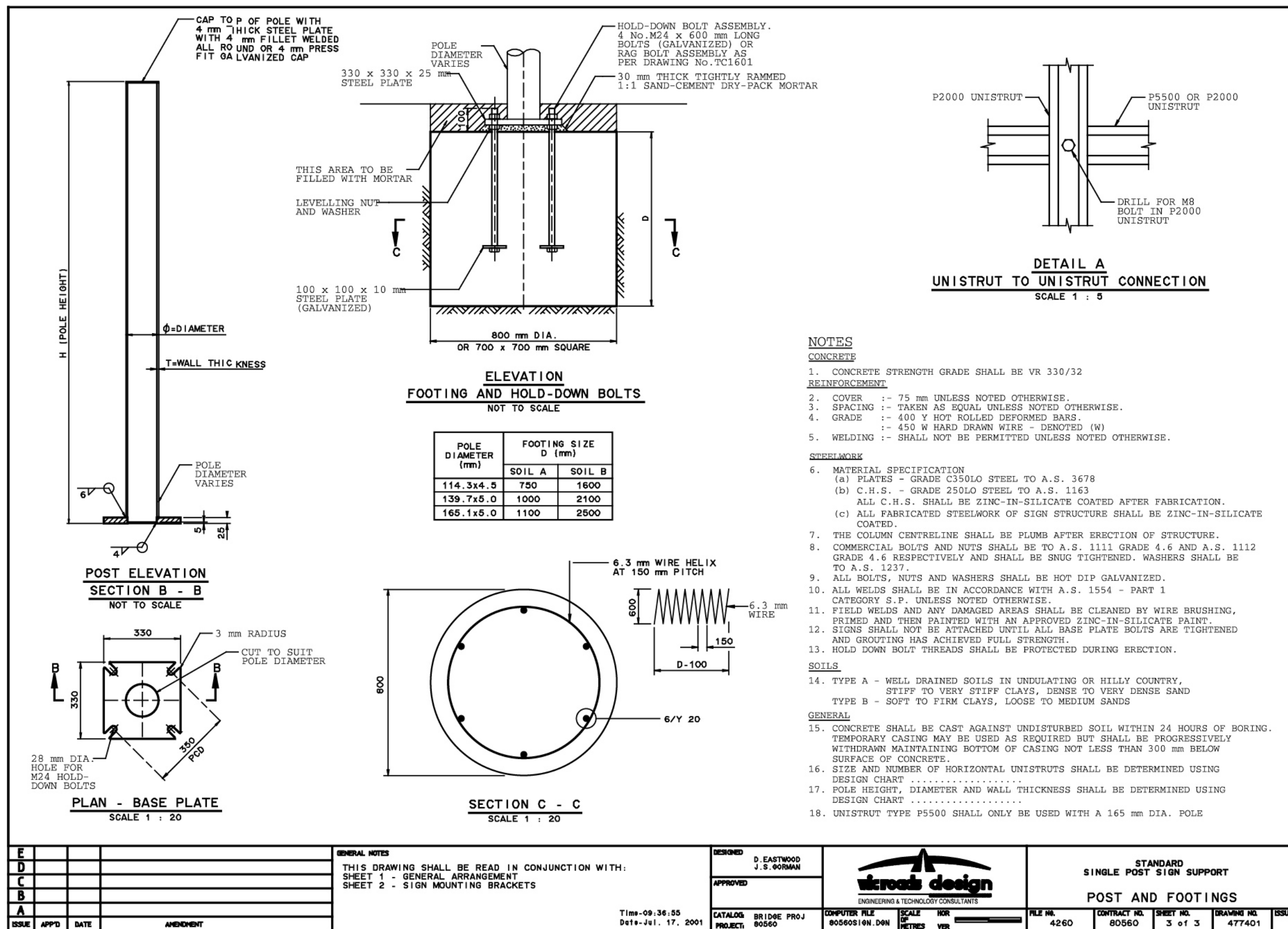


Figure 91: Standard single post sign support post and footings

ATTACHMENT C - LOW CLEARANCE TO ROADSIDE VEGETATION

The W4-8 'LOW CLEARANCE x.x m' sign may also be used to warn drivers on sections of road with low vegetation clearance, in accordance with this Attachment.

a) Permitted use

The W4-8 sign can be used in situations where:

- the measured vegetation clearance is less than 4.5 m height over traffic lanes and/or the trafficable portion of shoulders
- the minimum signed clearance will be greater than 2.5 m.

The signs shall show the measured clearance in m, rounded down to the nearest 0.1 m less another 0.4 m to allow for future pavement resurfacing, vegetation growth and sagging wet vegetation.

The circumstances in which the sign is used include:

- where resourcing constraints prevent the works being completed. However, the site must be placed on a priority list of works to be completed when resourcing permits. The site should be temporarily signed with the signs in place ideally for no more than three years and removed after treatment
- where the ramifications of vegetation removal are significant e.g. areas covered by overlays, socially sensitive or where a permit is unlikely to be issued. The site should be permanently signed and maintained at the signed clearance.

b) Prohibited use

Warning sign W4-8 is not suitable and shall not be used:

- within 100 m of an intersection with an arterial road to allow for appropriate sight distance and passage for all vehicles at intersections
- within 20 m of an intersection with a local road to allow for appropriate sight distance and passage for all vehicles at intersections
- on pedestrian/bicycle paths managed by VicRoads, which already have a minimum vegetation clearance of 2.5 m
- on specified Over Dimensional routes, which require a higher vegetation clearance to accommodate the passage of oversize vehicles
- where the lane configuration would make it impossible to maintain passage for all vehicles, e.g. roads where there is one lane in each direction.

In these situations, vegetation clearance shall be maintained as specified under the relevant Road Management Plan.

c) Signage required

The coloured background of this sign and any accompanying supplementary sign shall be yellow.

On urban roads sign W4-8 'LOW CLEARANCE x.x m' may be accompanied by a supplementary sign R7-3, 'LEFT or RIGHT LANE', where the reduced clearance only applies to one lane.

On rural roads sign W4-8 may be accompanied by a supplementary sign W8-17 'NEXT xx km' where the reduced clearance exists over 1 km.



W4-8



R7-3 (L)**



W8-17-1

** Modified R7-3, is black lettering on yellow background

d) Installation details

Sign W4-8 'LOW CLEARANCE x.x m' should be placed at the beginning of the reduced clearance and repeated on the departure side of each intersection with an arterial road. Where there has not been a repeater sign in the previous 2 km, consideration should be given to repeating the sign after an intersection with a high volume collector road.

On multi-lane roads with a median where the reduced clearance applies to the right lane and/or shoulder, the sign should be placed on the right side of the carriageway.

On rural roads where the low vegetation clearance exists over a long distance and sign W4-8 is accompanied by supplementary distance sign W8-17 'NEXT xx km', sign W4-8 may be repeated every 3 to 5 km.

The measured clearance should be the minimum clearance between the paved surface and any vegetation greater than a 30 mm diameter. For roads with a kerb, this includes 1 m behind the kerb; however the measured clearance should still be measured from the level of the paved surface as shown in Figure 92 below.

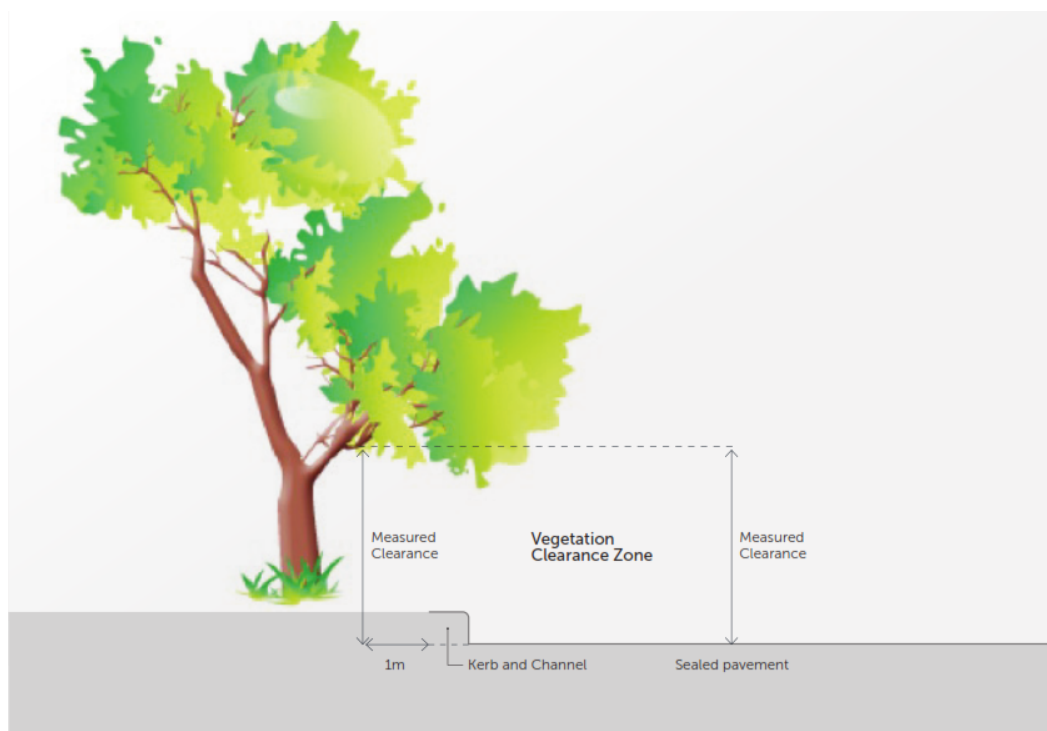


Diagram not to scale

Figure 92: Measured clearance to roadside vegetation

ATTACHMENT D – TRUCKS AVOID USING ENGINE BRAKES SIGN

a) Introduction

The use of noisy engine brakes in built-up areas can be a community issue.

Signs are just one means of trying to reduce noise from engine brakes. Other strategies being pursued involve regulation, enforcement and design rules for heavy vehicles. There has been no objective study of the effectiveness of signs in reducing noise from truck engine brakes.

Not all engine brakes are excessively noisy – many fitted are reasonably quiet. As an integral part of a truck's braking system, it is inappropriate to advise truck drivers not to use a component of their brakes at locations where a safe stop may be required.

The G9-V164 'TRUCKS AVOID USING ENGINE BRAKES' sign has no regulatory force; it is advisory only.

In this Attachment, trucks are defined as those being Class 3 or above in the Austroads Vehicle Classification system.

b) Guidelines for use

General

The G9-V164 signs may be considered where there have been complaints about noisy engine brakes, but they should not be placed:

- within 300 m in advance of a requirement for traffic to stop or slow (e.g. signals, roundabout, stop or give way signs, curves, road sections commonly subject to congestion or downhill grades)
- where they may impact on sight distance requirements at intersections, to traffic signs or devices, or to other road users, such as pedestrians
- where the 12-hour truck volume is at less than 60 at night (7pm to 7am) or at less than 500 during the day (7am to 7pm).

Over-use of signs will reduce their effectiveness. Careful consideration should be given to the need for the sign.

Within urban areas

For a particular stretch of road, the distance between consecutive signs should be at least 5 km.

Entry to rural towns

Only one sign should be used on each entrance to a rural town.

For a particular stretch of road, the distance between consecutive signs should be at least 10 km.

G9-V164 signs should only be considered if there are at least 25 residential buildings within 100 m from the edge of the road through the town.

c) Funding and approval

Proposals for Truck Engine Brake signs on Freeways or declared Arterial Roads shall be approved by the relevant VicRoads Region in accordance with these guidelines.

Signs on Freeways should be funded by VicRoads and signs on other roads should be funded by the relevant municipal council or community group.

d) Existing signs

Existing signs should be reviewed and, if required, replaced with signs conforming to these guidelines.

e) Sign design

The G9-V164 sign is to be used (VicRoads Standard Drawings 453660A and 453661A, refer to the VicRoads Supplement to AS 1743).



G9-V164

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Directorate: Road and Traffic Engineering

Approved by:



David Barton

Chief Engineer – Roads

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Amendment Record

Edition / Revision	Page(s)	Issue Date	Amendment Description
Edition 1 Revision 3	118	October 2021	Removal of temporary yellow lines guidance (now contained in TEM Volume 3 Part 2.20)
Edition 1 Revision 2	90	December 2017	Updated Figure 27
Edition 1 Revision 1	119 206 65	June 2017	Updated temporary yellow lines guidance Updated signs for wildlife awareness guidance Changed delineator spacing on safety barriers and bridge rails (Table 2)
AS 1742.2:2009 – Edition 1	All	October 2015	First Edition

Previous versions of this document are available on request by contacting the VicRoads – Network Standards team.

For enquiries regarding this supplement, please contact the VicRoads – Network Standards team via tem@roads.vic.gov.au.