

Supplement

**Traffic and Road Use Management
Volume 1 – Guide to Traffic Management**

Part 5: Road Management (2014)

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3 Road space allocation

3.2 Allocation of road space for general traffic

3.2-1 Route Assessment Guidelines for Multi-Combination Vehicles in Queensland

Refer to “Route Assessment Guidelines for Multi Combination Vehicles in Queensland” on the Transport and Main Roads website.

3.3 Off-road space for road users

3.3-1 Pedestrian fencing

1 Use of pedestrian fencing

Pedestrian fencing might be appropriate in the following circumstances (note that pedestrian fences also provide useful guidance for vision impaired pedestrians):

- areas of heavily concentrated and vulnerable pedestrian traffic (e.g. in the vicinity of exits from schools or sporting facilities)
- at locations where there has been a history of crashes involving pedestrians crossing at inappropriate locations
- to control pedestrian movements on higher speed arterial roads with consistent and substantial pedestrian presence, particularly where alignment discontinuities and speed differentials have been noted.

1.1 Placement

Intervisibility, as well as the physical layout of the fence, is very important and should be major factors in deciding whether pedestrian fences should be installed.

Particular attention should be given to the height and placement of the fence, and to the material used in its construction, in order to minimise the potential sight obstruction between drivers and pedestrians about to cross the road. Improper installation or rehabilitation of pedestrian fences can effectively negate any potential increase in pedestrian protection and can also increase the severity of vehicle accidents.

Fencing with rigid horizontal railing, installed near roads, can be a hazard to occupants of errant vehicles. The horizontal rails can easily become detached and spear into the driving compartment.

Figure 1.1-A – Fences can be installed on medians to control pedestrian movements



Figure 1.1-B – When used at staged crossings on pedestrian refuges, fences should be aligned so that pedestrians face oncoming traffic as they are about to leave the median



Figure 1.1-C – Fencing and barriers constructed using a horizontal rail should not be used because of the risk of spearing pedestrians and vehicle occupants during a crash



Figure 1.1-D – Fencing and barriers constructed using a horizontal rail should not be used because of the risk of spearing pedestrians and vehicle occupants during a crash



Figure 1.1-E – Pedestrian fences, when installed at medians, should commence at the signal post and not encroach past the push button position





(Absence of horizontal rails and good site layout)

Figure 1.1-F – New architectural fencing treatments that incorporate horizontal rails and also tend to obscure short pedestrians



1.2 Installation and materials specification

Refer to the Galvanised Welded Mesh Fencing – Standard Drawing 1604.

Other types of fencing can be used, provided the guiding principles outlined in this technical note are observed.

2 Alternatives to fencing

Before considering the installation of new fencing, it is recommended that alternative measures should be considered to reduce risk to pedestrians. Such measures may include, but are not limited to:

- speed limit reduction
- traffic calming
- relocation of a pedestrian crossing to better fit pedestrian desire lines
- installation of a new pedestrian crossing at a desired location
- installation of kerb up stands/separators (where large vehicle turning movements takes them close to the footpath)
- installation of bollards, and
- footpath improvements and widening.

3 Pedestrian crossing facilities

Pedestrian fencing is to be installed to prevent pedestrians crossing the road at unsafe locations and guide them to safer crossing points. Pedestrian fencing must be installed with regard for the existing pedestrian desire lines and nearby land use. Fencing that appears to only restrict movement and is not self-evidently necessary will be resented. The installation of pedestrian crossing facilities along pedestrian desire lines at safe locations should be considered in lieu of installed fencing. This will result in complaints, risky crossing behaviours, vandalism and additional on-going maintenance and replacement costs. Refer to TRUM Volume 1, Part 6, Section 8 for more detailed information on pedestrian crossing facility types and application.

4 Pedestrian safety considerations

Regardless of the quality the planning and design, it is inevitable that sometimes pedestrians will purposely evade the fencing by climbing over it or walking along the road side of it, thereby potentially increasing their risk of conflict with a vehicle. It is essential, for this reason, that the road environment is as forgiving as possible.

When installed on a footpath, the distance between the traffic lane and the fence should be a minimum of 200 mm. If the fence needs to be installed any further from the traffic lane, the space should not be wide enough to encourage pedestrians to walk between the fence and the traffic lane, but just enough space for a pedestrian to shelter if caught between traffic and the fence. Where pedestrian fencing is to be installed on footpaths, consideration should be given to its potential effects on bus stop locations, on-street parking and the need to maintain adequate footpath width for pedestrians.

Similarly, when installed on a median a clearance of at least 450 mm between a pedestrian fence and a traffic lane is to be maintained. This allows refuge for pedestrians should they be standing next to the fence. Consideration should therefore be given to sight lines, when fencing is to be installed on a

median, especially at intersections where right turning vehicles on the through road may temporarily lose sight of an approaching vehicle.

A pedestrian fence is not a safety barrier and it is not designed to exhibit the characteristics of a safety barrier. If the design intent is to prevent vehicles encroaching into pedestrian operating space in a low speed environment, then vehicle resistant bollards would be recommended. The bollards will be no more than 1.2 metres apart to provide permeability to pedestrians and mobility impaired users. As these vehicle resistant bollards are designed to resist forced attack, they are unlikely to be frangible if accidentally hit.

3.3-2 Guidelines for 3-2-1 green reflector informal heavy vehicle stopping places

This supplement outlines items to consider in the provision of advance notice of informal heavy vehicle stopping places in rural areas of Queensland.

The use of '3-2-1 green reflectors' is to provide enhanced safety for all road users at stopping bays that are not formally provided or maintained by Transport and Main Roads, but show obvious signs of use by heavy vehicles.

The intent is to provide those heavy vehicles accessing informal sites with forewarning that a site is approaching so that they do not suddenly undertake braking manoeuvres that are dangerous to themselves or other vehicles in the traffic stream. This is particularly important at night.

Warrant for provision

'Green reflectors' on marker posts are intended to assist heavy vehicle drivers to stop in a predetermined manner by providing advance notice. They also direct drivers to stopping places where Transport and Main Roads determines that adequate sight distance and other basic safety provisions are provided. As the reflectors are visible both day and night, the scheme provides notice to drivers at all times.

It should be noted that the informal sites are not all-weather facilities and that these sites may not be suitable for use during or after prolonged rain. Transport and Main Roads makes no commitment to provision of facilities, maintenance or on-going access to these sites.

Informal heavy vehicle stopping places are an intermediate supplement to the existing formal Rest Area and Stopping Place network. A program to construct new or upgraded existing rest areas and stopping places is still required where there are deficiencies so that drivers can manage fatigue and where an informal site is strategically placed and well used, it may be considered for upgrading to a formal stopping bay or rest area.

As 'green reflector' sites are primarily a rural road treatment, they should not be installed on roads with high traffic volumes and high vehicles speeds where access and egress to the site will be difficult. At these locations, formal stopping bays or rest areas should be considered.

1 Installation and site selection

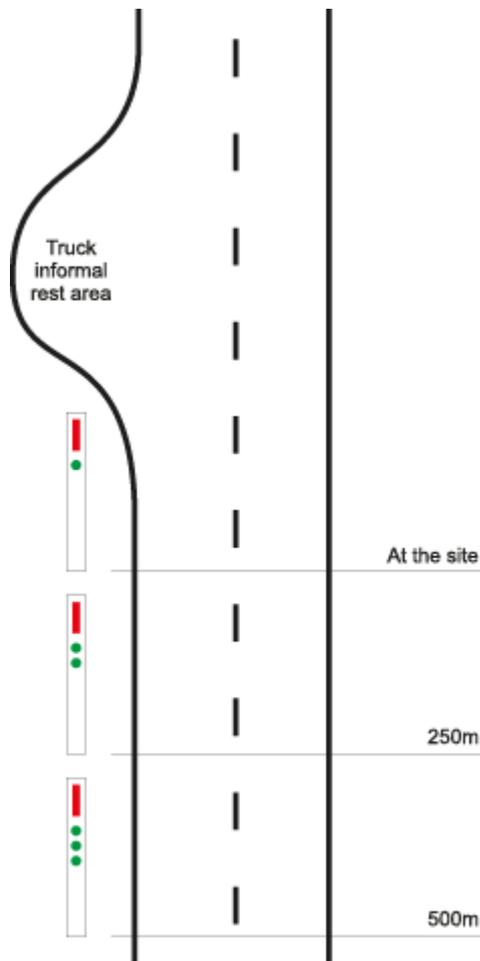
The approach to informal '3-2-1 green reflector' stopping places are denoted by a series of green reflectors placed on existing road edge guide posts.

It is important to consider the speed environment and the maximum vehicle size allowable on each particular road segment. As a minimum, however, it is recommended that the first series of three reflectors is a minimum of 500 m before the site itself in order to allow a safer stopping distance.

The system of marking sites begins with:

- three green reflectors mounted on a guide post at a minimum of 500 metres
- two green reflectors at a minimum of 250 metres
- one green reflector on the guide post immediately before the stopping place.

Figure 1 – Site selection of 3-2-1 green reflectors



Reflector placement

The green reflectors should be placed in vertical position on the guide post below the existing reflector, spacing should be clear for the drivers to be able to differentiate the number of reflectors per post.

Site condition requirement

The site requirements for the informal stopping places does not have to be similar to a formal stopping place or rest area. The site can be found as former stockpile sites that are inactive, which are located on roads that have lack of stopping areas for heavy vehicles.

The site of the informal heavy vehicle stopping place should:

- be flat, for easy access for heavy vehicles
- have no significant drop-off from the edge of bitumen of the highway to the entry/exit

- have a hard standing area sufficiently well-formed and of a reasonable standard to allow heavy vehicles to stand without damage or bogging in normal conditions
- be long enough and wide enough to accommodate one parking space for the largest heavy vehicle using that route (refer to Austroads 'Standard Design Vehicles')
- allow a truck to park safely clear of the carriageway (road edge line)
- be such that the condition of the drainage system, road edge and embankment will not be detrimentally affected by heavy vehicle movements
- be relatively remote from properties, so that noise, glare from headlights, etc., will not become an issue
- be sufficiently set back from roadside hazards, such as gullies and drops in embankments, to not prove to be an additional hazard to drivers, especially at night
- not be located at the base of hills, due to acceleration requirements of heavy vehicles.

Access to site

Appropriate sites should be easy to access with good shoulder formation and a relatively smooth transition between the highway's sealed edge and the site.

Sight distance

There should be a minimum 200 metres sight distance to each marker when undertaking the installation of these sites. A safe exit from the stopping area should be a minimum of 200 metres visual clearance, based on the largest vehicle traversing the road.

It is important that there is adequate sight distance, both on the approach to the informal heavy vehicle stopping place to allow heavy vehicle drivers to see the entrance to the stopping place and whether it is occupied, and on the departure for drivers leaving the site to enter the road. Sites should not be located on curves/bends and trees/shrubs should be trimmed where visibility is an issue.

Mainstream traffic

The informal heavy vehicle stopping place is to be located where there is adequate sight distance for through traffic to see entering, parked and exiting vehicles.

Maintenance

High usage and heavy loads can cause damage to the surface condition of informal heavy vehicle stopping places. During routine maintenance inspections, the surface condition of the sites should be periodically checked.

Checks should also be made of the condition of the guide posts and reflectors to ensure they are in place, unobscured and that defective reflectors are replaced and dirty reflectors are cleaned.

Sample assessment criteria

A sample assessment criteria provided by Transport and Main Roads' South West Region in Appendix 1, outlining the necessary context to assess each of the selected sites for the trial month.

2 Future planning and potential

There is a possibility for these sites to be used for emergency purposes, such as pull over points for movements of a wide load within a narrow road corridor or turning area for heavy vehicles during unconditional weather.

Eventually, within reason, these informal stopping sites could be upgraded as a formal rest area or stopping place with signage and proper facilities.

Upgrading of sites to 'formal' status

Where high usage is obvious, and a need is identified, consideration should be made of upgrading the site to a formal rest area or stopping place.

This will require:

- application of standards/guidelines applicable to the provision of rest areas and stopping places
- a commitment to undertake provision of improved access, facilities or maintenance as required
- registration with Corporate Mapping for inclusion in the *Guide to Queensland Roads*.

Appendix 1: Sample assessment criteria

Cunningham Highway (Ipswich to Goondiwindi) – (Eastbound)																		
Blue Reflector change to Green Reflectors																		
As at March 2012																		
Road No.	Chain	Side width gazettal	Site	DCF comments	Mini safety audit													Photo
					Minimum 200 m sight distance to each marker	Safe entry to stopping area (not too sharp)	Minimum length 28 m without tapers	No significant edge drop off	Minimum width without tapers 8 m (from edge line)	Surface reasonably flat and firm in dry weather	Not already signed as a rest area or stopping bay	No close residences	Safe exit from stopping area (sight distance min. 200 m)	Not at the base or crest of hill	Not located on curve or bend	Not at private property e.g. (servos, road-houses)		
17C	3.85	RHS	Stockpile site	Good. Green Reflectors installed on 5/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	21.01		Rogers Creek Stockpile site (LHS)	Good. Green Reflectors installed on 5/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	59.19		E/B – East of Gore (LHS)	Good. Green Reflectors installed on 5/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	65.6		(65.36) West of Gore (LHS)	Good. Green Reflectors installed on 5/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	71.89		East of Chain Ponds (LHS)	Good. Green Reflectors installed on 5/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	74.64		West of Chain ponds	Good. Green Reflectors installed on 6/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	79.17		East of Omanana (LHS)	Good. Green Reflectors installed on 6/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
	105.67		East of Inglewood (3x RHS)	Good. Green Reflectors installed on 6/3/12	√	√	√	√	√	√	√	√	√	√	√	√		
17D	37.29		Rest Area east of Yelarbon (RHS)	Good. Green Reflectors installed on 6/3/12	√	√	√	√	√	√	√	√	√	√	√	√		

Cunningham Highway (Ipswich to Goondiwindi) – Blue Reflector site assessment for proposed change to Green reflectors								
Road No.	West bound	Site direction	Tags			Comments/description Potential or existing sites	DCF comments	Other's comments
			1	2	3			
17C	21.01	Rogers Creek Stockpile site (LHS)	•	•	X	1 set of reflectors missing!	Good. Green Reflectors installed on 5/3/12	
	65.6	(65.36) West of Gore (LHS)	•	X	X	2 sets of reflectors missing!	Good. Green Reflectors installed on 5/3/12	
	71.89	East of Chain Ponds (LHS)	X	•	•	1 set of reflectors missing!	Good. Green Reflectors installed on 5/3/12	
	74.64	West of Chain ponds	2.5 •	X	•	2 sets of reflectors missing/part missing!	Good. Green Reflectors installed on 6/3/12	
	79.17	East of Omanana (LHS)	X	X	•	2 sets of reflectors missing!	Good. Green Reflectors installed on 6/3/12	

Glossary

E/B = Eastbound (Goondiwindi to Ipswich)

W/B = Westbound (Ipswich to Goondiwindi)

Sites marked in blue = Mapped Blue Reflector Sites (Ref to Blue Delineator Sites – Border District 2006 Map)

Other sites = Sites identified as potential Green Reflector Sites for informal HV Stopping Places

X = No Blue Reflectors at positions 3,2 or 1 on guide posts leading up to informal sites.

Appendix 2: Introduction of 3-2-1 green delineator

In 2007, Transport and Main Roads worked with industry to successfully introduce the '3-2-1 Blue Delineator'. These blue reflectors are used to identify informal heavy vehicle stopping places along state-controlled roads and have become an important supplement to Transport and Main Roads' formal Rest Area network.

After implementation, however, fire authorities expressed concerns about the use of blue reflectors as blue is the colour being used to identify the location of fire-fighting water sources. As a result, it has now been decided to change to a new national standard of green.

In 2011, Transport and Main Roads ran a trial of green reflectors and, after industry consultation, they were found to be easy to see in all weather conditions.

The purpose of green reflectors is to indicate to heavy vehicle drivers that a stopping place is a short distance ahead. They are intended to provide drivers with enough warning so they may stop safely if they wish to use the site.

It is important to remember, however, that these sites are informal and not part of the Transport and Main Roads Rest Area or Stopping Bay network. While they may be suitable for some vehicles to stop, check loads or, if necessary, take short-term rests, they may not be suitable for all vehicle types, and are unsealed and, therefore, likely to be unavailable in wet weather.

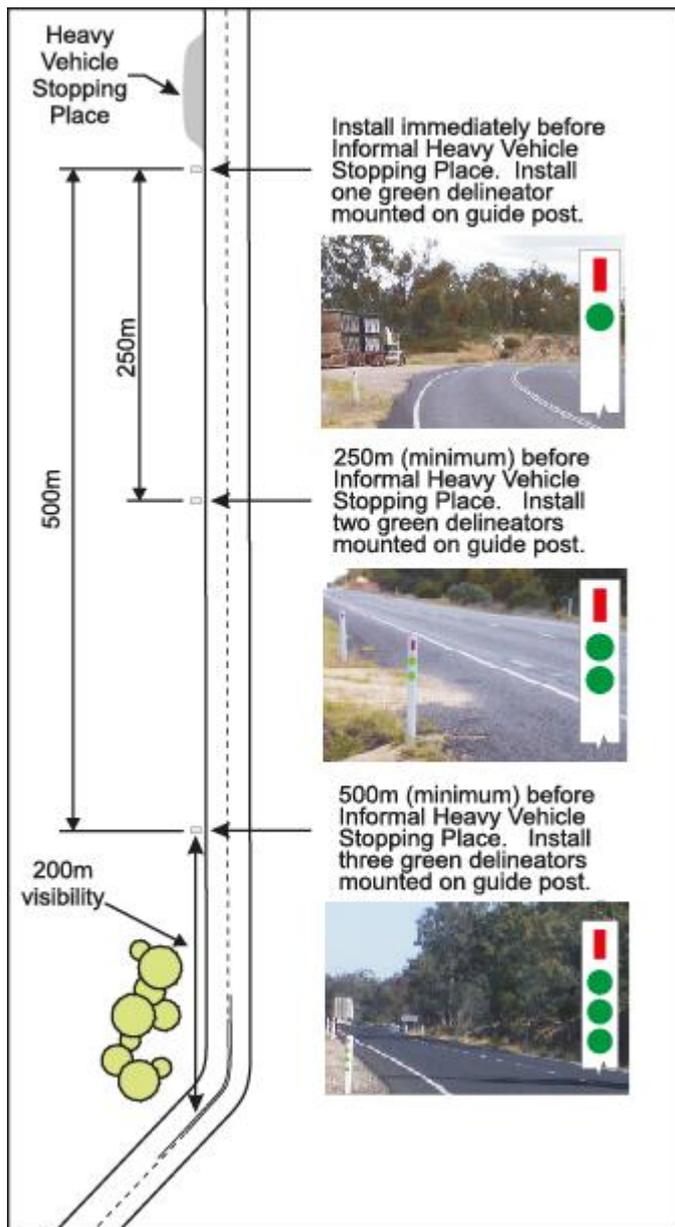
Green reflectors may be either circular or rectangular in shape, and will be placed on roadside guideposts underneath standard red reflectors.

New green reflectors are currently located along the Cunningham Highway and will be rolled out across rural Queensland, gradually replacing existing blue reflector sites.

Drivers are encouraged to use informal sites responsibly and, wherever possible, access formal Rest Areas or stopping places as a preference.

For further information, email freight@tmr.qld.gov.au

Figure A2 – 3-2-1 Green delineator set-out



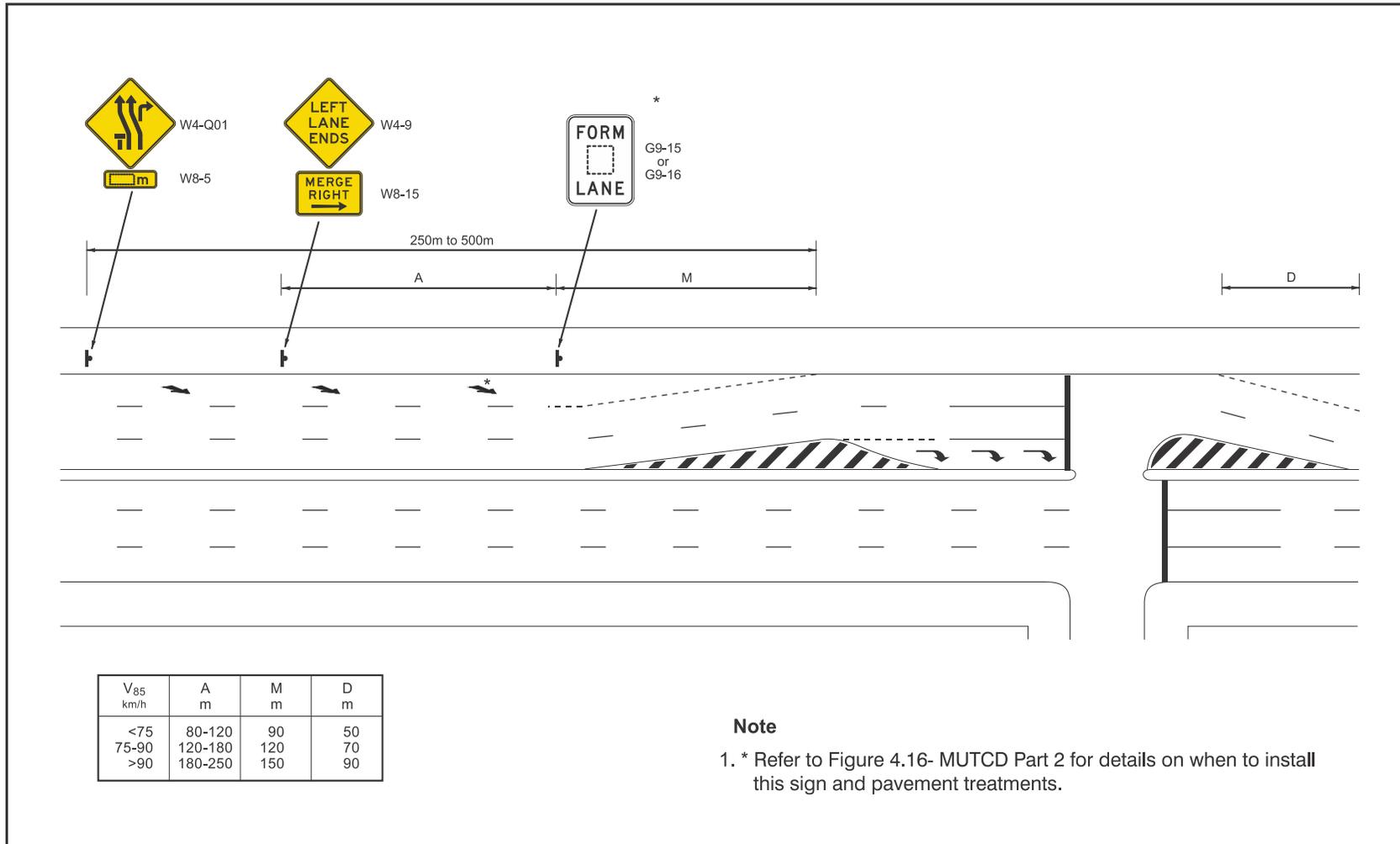
4 Lane management

4.3 Lane management practice

4.3-1 S-lane

The Transport and Main Roads regions and local governments may introduce S-lanes and associated signing along arterial roads to provide continuity of through traffic lanes at locations where separate right-turn lanes are required. The need for separate right-turn lanes is assessed by considering safety matters during off-peak periods and capacity requirements during peak periods. The supply, installation and maintenance of the S-lanes and associated signing is the responsibility of the Transport and Main Roads or local government as appropriate.

Figure 1-A – Typical layout of S-lane and associated signing



Note

- * Refer to Figure 4.16- MUTCD Part 2 for details on when to install this sign and pavement treatments.

Queensland Government Infrastructure Management & Delivery Division			ORIGINAL APPROVED AS OFFICIAL TRAFFIC SIGN PRINCIPAL ENGINEER (Traffic Engineering)		TYPICAL LAYOUT OF S-LANE AND ASSOCIATED SIGNING	TC9349		
Designed RH. 3/96.....	Checked MC. 3/96.....	Scale Not to Scale	6/9/2012 Date	<table border="1"> <tr> <td>A</td> <td>B</td> <td>C</td> <td></td> </tr> </table>			A	B
A	B	C						

Figure 1-B – Warning sign ‘S-lanes’

