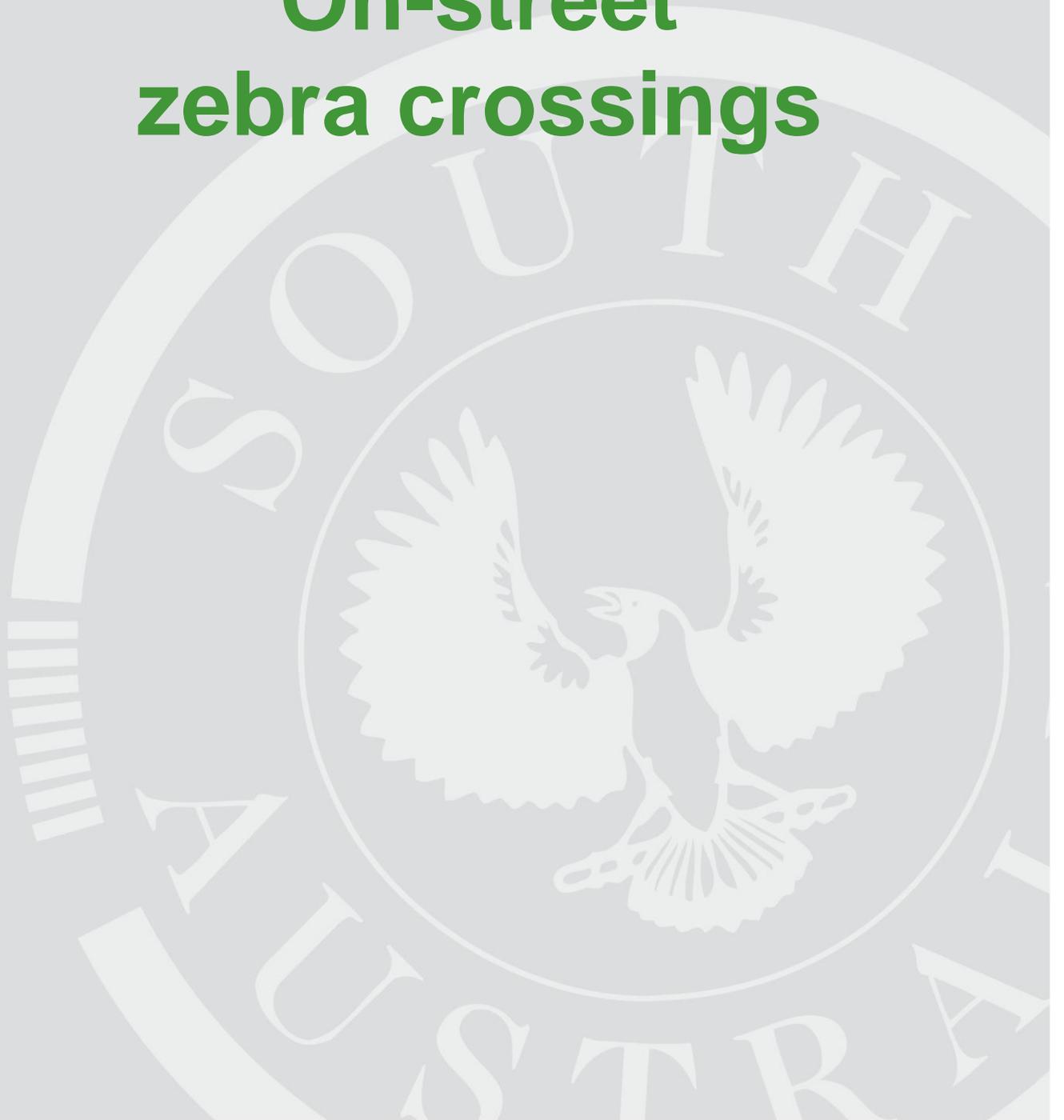


On-street zebra crossings





TRAFFIC MANAGEMENT Operational Instructions

On-street zebra crossings — 10.6

AMENDMENT RECORD

<i>Version</i>	<i>Page</i>	<i>Date</i>	<i>Amendment Description</i>	<i>Name</i>
1	All	11/02/14	Draft	A. Borowski
2	All	4/12/14	Draft	R. Zeitz
3	All	1/5/15	Incorporated Zebra Crossing reference Group's comments and reviewed draft against safe system principles	R. Zeitz
4	4	7/5/15	Stated the road authority's responsibility, modified bicycle lane and ramp criterion, amended Section 7 and Appendix A	R. Zeitz
4	All	25/5/15	Authorised	DBW
5	4, 5, 6, 7, 8	4/08/17	Updated for Road Traffic (Road Rules Ancillary and Misc Provisions) Regulations 9A and 9B; clarified the use of mean speed data when assessing speeds on approach to crossing; advance warning pavement symbols in bicycle lane added; use of W6-2 sign amended to be consistent with figure; requirement for separate approval where a bicycle lane is present removed.	I. Hunt
6	4, 7, 8	8/07/19	Additional commentary in relation to crossings near intersections; Updated Section 6 – Lighting to reflect AS 1158.4 Preface	I. Hunt

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Manager, Traffic Services

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10.6

1. Scope

This Operational Instruction specifies the requirements for installing zebra crossings on South Australian roads. The zebra crossing as specified in Australian Standards AS 1742.10 shall not be installed.

When used in accordance with this Operational Instruction, these traffic control devices may be installed under the Minister's *Instrument of General Approval and Delegation to Council*, or the *Instrument of Authorisation and Delegation* to the Unit Manager, Traffic Solutions. Traffic control devices which vary from this Operational Instruction require the separate approval of the Manager, Traffic Services for each location prior to installation.

Council must obtain agreement and authorisation from DPTI if it plans to install a zebra crossing on a road under the care, control and management of the Commissioner of Highways.

NOTE: Refer to the *Code of Technical Requirements* for a zebra crossing in a road-related area or for a zebra crossing on a raised section of road (wombat crossing).

2. Background

Zebra crossings were phased out from South Australian roads in the 1970s because of their poor safety record, and generally replaced by pedestrian actuated crossings.

The Local Government Association (LGA) at its meeting on 13 April 2012 agreed to request the State Government to include the use of zebra crossings on roads of a type to be agreed between the State Government and the LGA. As a result, the LGA established a reference group to develop guidelines for the safe use of 'on-street' zebra crossings. This group was represented by the LGA, Department of Planning, Transport and Infrastructure (DPTI), Light Regional Council, The Barossa Council, City of Onkaparinga, City of Prospect, Adelaide City Council (ACC), and the LGA Mutual Liability Scheme.

This Operational Instruction incorporates the group's deliberations, and findings from site inspections of various rural town main streets in a number of council areas, and City of Adelaide's *Pirie Street Zebra Crossing Trial* report dated July 2014.

3. Purpose and operation

A zebra crossing is a pedestrian crossing. It is a facility for pedestrians to cross the road with priority over drivers.

Drivers are legally required to give way to a pedestrian or rider of a bicycle on or entering the crossing, and must drive at a speed to stop safely before the crossing, if necessary (Australian Road Rule 81 *Giving way at a pedestrian crossing*, Road Traffic (Road Rules Ancillary and Miscellaneous Provisions) Regulations 9A and 9B). There is no requirement for drivers to wait for pedestrians to clear the crossing.

This Operational Instruction incorporates Safe System principles. For the safety of pedestrians, it is important that zebra crossings are used in a low speed environment (where speeds are typically 30 km/h or less) because unlike signalised pedestrian

crossings, drivers have to see a pedestrian or rider of a bicycle on or entering the crossing to respond accordingly. For this reason, it is important for drivers to see a pedestrian or rider of a bicycle on or entering the crossing, and for a pedestrian or rider of a bicycle to see approaching vehicles before commencing to cross, and during crossing (queuing traffic and the median layout may obscure visibility).

The effect of a zebra crossing on the flow of vehicular traffic, including the length of queuing, depends on the combination of the frequency of pedestrians using the crossing, and the vehicle flow rate. This can have detrimental safety effects on and near the crossing as well as along the road for all road users. Therefore, the suitability of a zebra crossing should be determined for the particular location.

4. Description

A zebra crossing consists of a row of equally spaced parallel white stripes running lengthwise along the road surface and extending across the width of the road, with Pedestrian Crossing signs (R3-1) displayed to both directions of travel. Alternating flashing twin yellow signals may be installed to supplement the signs.

Pavement markings

The parallel white stripes shall be approximately 600 mm wide and not less than 8 m long. The length shall be not less than 10 m long if there is a bicycle lane at the crossing, adjacent to a traffic lane. The stripes shall be placed approximately parallel to the centreline of the road with gaps of approximately 600mm between stripes. The crossing is usually at right angles to the centreline of the road but it may be angled by not more than 30 degrees to suit local circumstances.

Signs

The R3-1 sign shall be installed on both sides of the road at or in the immediate vicinity of a zebra crossing as shown in Figure 5.3. The R3-1 sign may need to be repeated overhead if there is insufficient visibility of roadside-mounted signs.



R3-1

No Stopping signs (R5-35) or a continuous yellow line on the road adjacent to the kerb or edge of pavement shall be used to prohibit drivers from stopping before and after a zebra crossing. Figure 1 shows the minimum length of the no stopping prohibition required by the Australian Road Rules. This length shall be increased if the sight distance between approaching drivers and pedestrians or riders of bicycles, who are about to use the crossing, is inadequate. Based on the sight distance requirements, the minimum length can be reduced if kerb extensions are used with the crossing, or there is indented parking adjacent to the crossing.



R5-35

5. Requirements

The following are the requirements for the installation of on-street zebra crossings.

- (a) A low speed environment with mean speeds in the order of 30 km/h or less (based on engineering judgement) should occur 30 m to 50 m before the crossing on each approach. This should be created when existing conditions are unsuitable.

Where mean speeds prior to the installation of the crossing are greater than 30 km/h, post-installation monitoring shall be conducted to confirm whether speeds

have sufficiently reduced to meet this requirement, or identify the need for subsequent measures to reduce speeds.

- (b) A zebra crossing shall not be installed on roads subject to a speed limit greater than 50 km/h.
- (c) The crossing should be located where concentrations of pedestrians naturally cross the road, including any latent demand. This may be achieved by redesigning approaches to funnel pedestrians to the crossing.
- (d) No more than one lane (unless section 5(f) applies) or one line of traffic in any one direction shall be encountered by a pedestrian using a crossing. This can be achieved by such measures as narrowing the lane (consider widths of 2.7 m or less), blocking a parking lane with a kerb extension, or installing kerbs or other physical devices to prevent drivers passing to the left on unkerbed roads.
- (e) There shall be adequate sight distance between approaching drivers and pedestrians about to use the crossing so that drivers can stop safely to give way to pedestrians on the crossing. Stopping restrictions or kerb extensions may be used to achieve the sight distance. Sight distance requirements are provided in Austroads *Guide to Road Design Part 4A: Unsignalised and signalised intersections*. Unless parking control signs permit otherwise, the Australian Road Rules prohibits drivers from stopping 20 m before and 10m after the crossing.
- (f) Two lanes may be installed in any one direction at a zebra crossing when one of those lanes is a bicycle lane.

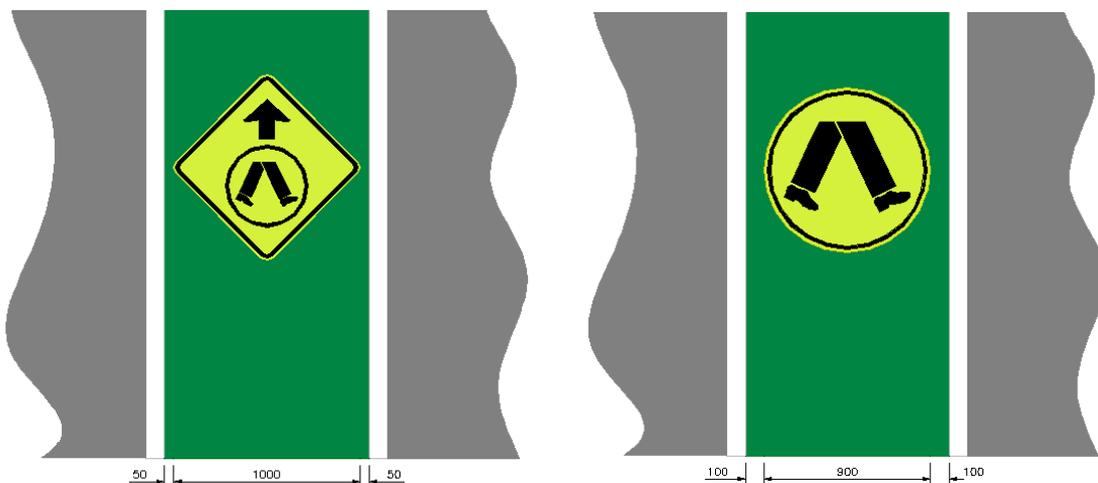
10.6

The line marking of the bicycle lane shall not be marked through the crossing. A gap of 1 m from the parallel white stripes of the crossing shall be provided.

The width of the bicycle lane may be a minimum of 1 m on the approach to the zebra crossing, and the other lane 2.7 m wide or less to maintain the low speed environment.

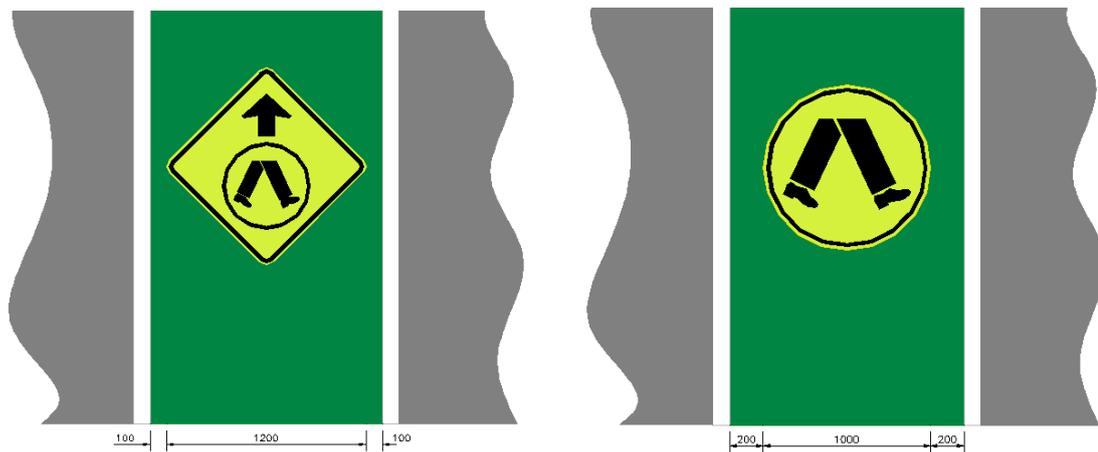
Advance warning of the zebra crossing shall be provided in the bicycle lane in the form of pavement marking of the Pedestrian Crossing (R3-1) and Pedestrian Crossing Ahead (W6-2) symbols.

The W6-2 pavement marking shall be installed 24 m in advance of the crossing. The R3-1 pavement marking shall be installed 4 m in advance of the crossing. Dimensions of these markings are shown in Figures 5.1 and 5.2 for varying widths of bicycle lane.



Note: Green coloured pavement in this figure is for illustrative purposes only and is not a mandatory requirement for bicycle lanes on the approach to zebra crossings. The requirements for the use of green coloured pavement in bicycle lanes are specified in DPTI *Operational Instruction 9.3 Distinctive Coloured Pavement – Bicycle Lanes*

Figure 5.1 W6-2 and R3-1 pavement symbols for 1.2 m bicycle lane



Note: Green coloured pavement in this figure is for illustrative purposes only and is not a mandatory requirement for bicycle lanes on the approach to zebra crossings. The requirements for the use of green coloured pavement in bicycle lanes are specified in DPTI *Operational Instruction 9.3 Distinctive Coloured Pavement – Bicycle Lanes*

Figure 5.2 W6-2 and R3-1 pavement symbols for 1.5 m bicycle lane

These pavement markings shall be skid and slip resistant to the requirements of *AS 4049 Paint and related materials – Pavement marking materials* and the DPTI *Pavement Marking Manual* so as not to cause a hazard for road users. Pavement marking shall comply with DPTI *Master Specification Parts R45 and R46*.

As the pavement marking is intended to replicate the R3-1 and W6-2 warning signs, the colour of the pavement marking should match the *AS 1906 Fluorescent Yellow Green* sign colour. Pantone 396C is considered to be a suitable match. If the symbol is produced with pavement marking paint in accordance with DPTI *Master Specification Part R45*, the use of *AS 2700 Golden Yellow, Y14* is permissible.

- (g) The minimum width of the crossing, which is defined by the length of the white stripes, shall be 8 m.

If there is a bicycle lane on the approach to the crossing the minimum width shall be 10 m to increase the sight distance between cyclists and pedestrians near the crossing since an adjacent motor vehicle will obstruct the visibility of each other.

- (h) The ramp from a footpath to the crossing should be located centrally to the crossing. Its minimum width shall be 1.8 m. The outer edge of the ramp (inclusive of any wings) shall terminate at least 1 m from either end of the crossing. The location of the ramp and crossing pavement markings is dependent on the physical site conditions and pedestrian desire lines.

The zebra crossing markings indicate the closest point for drivers to stop to give way to pedestrians. If there are safety reasons where it is necessary to further separate drivers from pedestrians, this is achieved by adjusting the width of the crossing relative to the width of the ramp.

Fencing or other measures on the roadside to guide pedestrians physically to the ramp may be needed. Where there are no kerbs, these requirements shall apply to the pedestrian path leading to the crossing.

- (i) A Pedestrian Crossing Ahead sign (W6-2) shall be used in advance of zebra crossings where visibility of R3-1 signs are obstructed or a bicycle lane is at the crossing.
- (j) The crossing shall not be installed on slip lanes.
- (k) Where a crossing is installed in the vicinity of an intersection, the risks associated with locating the crossing near the intersection need to be addressed. These include:

- (i) the potential for blocking of the intersection when drivers give way to pedestrians on the crossing,
 - (ii) the interaction between the give way requirements at the intersection and the crossing, and
 - (iii) the potential for queued vehicles to block visibility of pedestrians on or approaching the crossing.
- (l) The crossing should not be installed where drivers may inadvertently queue over the crossing. Consider the impacts between vehicle and pedestrian volumes at the location.
- (m) Continuously operating twin alternating flashing yellow signals may supplement the Pedestrian Crossing sign (R3-1) where:
- (iv) it is necessary to increase the visibility of the crossing, or
 - (v) the AADT is greater than 5000 vehicles, or
 - (vi) the crossing is located near a school and is supervised by monitors.
- (n) This Operational Instruction applies for a typical two-way road. Where the crossing is to be installed on a one-way road, the above requirements shall apply to that direction, and the traffic control devices not applying to the direction of travel should be omitted.

6. Lighting

The Preface of *AS/NZS 1158 Lighting for roads and public spaces* states:

The function of lighting at pedestrian crossings is to illuminate the crossing, the immediate verge and any pedestrian at or on the crossing, so that the crossing and pedestrian are highly conspicuous to approaching vehicular traffic... . Accident studies have shown that specifically lighting pedestrian crossings can significantly reduce the night accidents associated with them.

Considering the safety benefits for pedestrians, it would be preferable that lighting be provided at all crossings on Category V and P roads unless there are specific reasons not to install lighting. Nevertheless, whether a particular crossing, normally not controlled by traffic signals and generally of the type known and marked as a zebra crossing, will or will not be lit, will be determined by the road controlling authority.

Lighting complying with the requirements of *AS/NZS 1158 Lighting for roads and public spaces* shall be provided before the zebra crossing is fully installed and operational. A decision to not provide lighting at the crossing must be accompanied with a comprehensive risk assessment.

7. Pedestrian survey

A detailed survey of pedestrian and vehicle movements should be undertaken to justify the installation and to determine the optimum location of a pedestrian crossing. Refer to Appendix A for guidance.

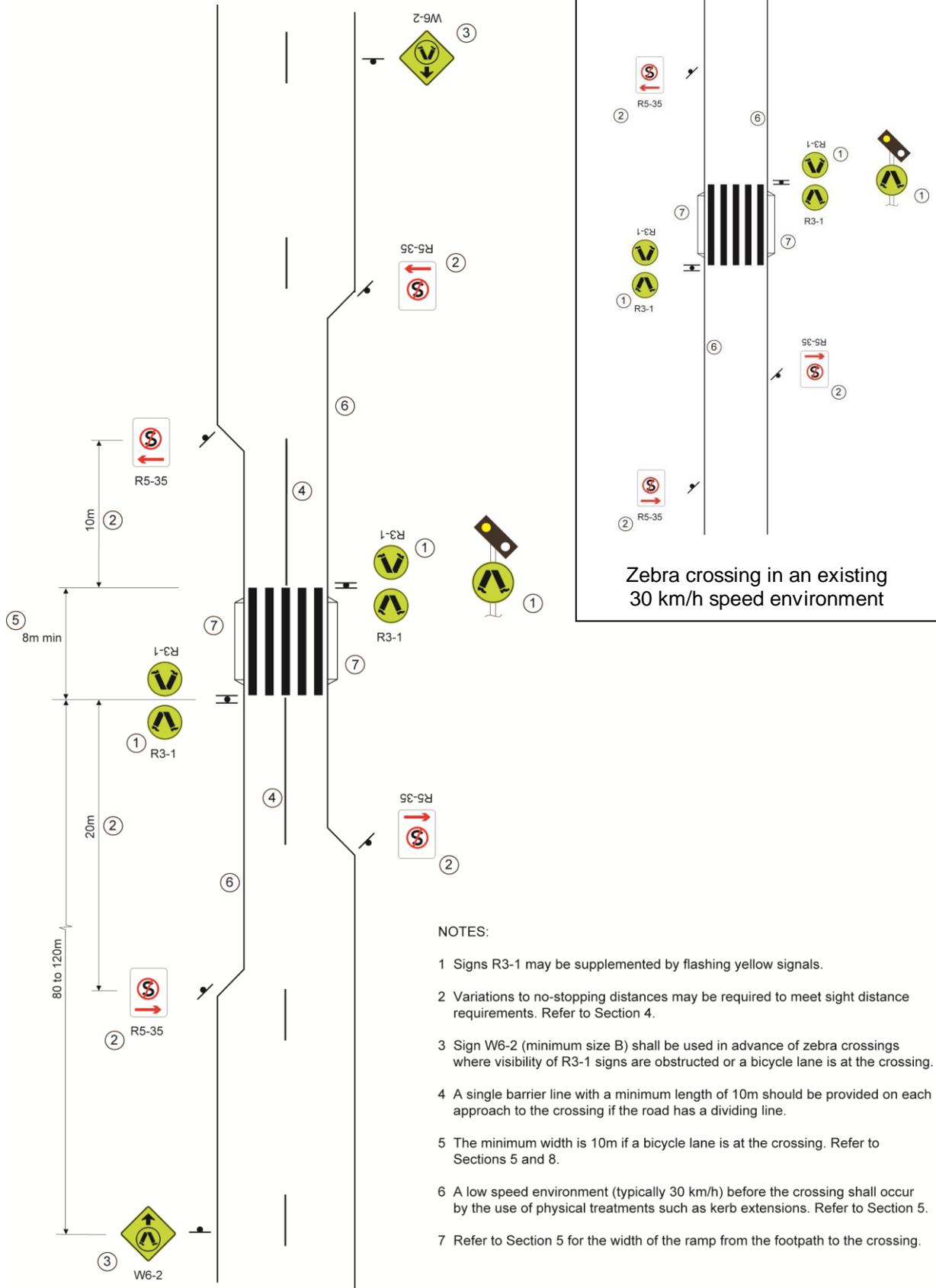


Figure 5.3 Zebra crossing details

References

- Australian Standards 1742.10 *Manual of Uniform Traffic Control Devices Part 10: Pedestrian Control and Protection*, 2009
- DPTI *Code of Technical Requirements (the Code)*
- DPTI *Pavement Marking Manual*
- *Australian Road Rules*
- Austroads *Guide to Road Design Part 4: Intersection and Crossings – General*, 2009
- Austroads *Guide to Road Design Part 4A: Unsignalised and signalised intersections*, 2010
- Austroads *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*, 2007
- Adelaide City Council, *Pirie Street Zebra Crossing Trial* report, July 2014

10.6

Appendix A Pedestrian and vehicle survey

These surveys are usually conducted for the continuous period from 8:00am to 6:00pm on a typical weekday, but may be extended if the time of peak pedestrian movement is outside that period.

The section of road under consideration is divided into zones of approximately 30m in length.

The numbers of pedestrians categorised according to type (such as Adult / Adult with bike / Child / Child with bike / Older person / Person with a disability etc) crossing the road in each zone are counted and the totals recorded for each 15 minute period.

When the category includes 'bike', only those who cross the road are counted; not those riding along the road or footpath.

Young children, the elderly and people with a disability should be given greater recognition in the pedestrian surveys by weighing their numbers. The observed numbers of:

- (a) children under 10 year old who are not accompanied by an adult,
- (b) older people who may exhibit a degree of frailty or difficulty in crossing the road in a timely manner,
- (c) people recognised as having a disability should be weighted by being multiplied by a factor of 1.5.

The number of vehicles travelling along the road is also recorded, by direction of travel, for each period.

In assessing the survey to decide whether a pedestrian crossing is justified and to determine its location, the numbers of pedestrians crossing the road in the same three adjacent zones in each of two separate hours are totalled. The combined two-way vehicle volume in each corresponding hour is used on roads without a median. If there is a median, subject to engineering judgement, the highest flow in one direction is used.

These following numerical guidelines may assist in assessing the demand or suitability for a crossing.

- (a) In two separate one hour periods of any day (including Saturday and Sunday):
 - (i) 40 or more pedestrians per hour actually cross the road and could reasonably be expected to use the crossing; and
 - (ii) 200 or more vehicles per hour pass the site where the pedestrians cross during the same two hours.

or

- (b) During eight hours of any day:
 - (i) An average of 20 or more pedestrians per hour cross the road (a total of 160 or more in eight hours) and could reasonably be expected to use the crossing; and
 - (ii) An average of 200 or more vehicles per hour pass the site during the same eight hours (a total of 1600 or more in eight hours).

Judgement should be used when applying these numerical guidelines to ensure the best overall pedestrian safety and traffic management solution for the site.