



Road Signing Principles

Solve it with signs. It's so simple!



Thuan Nguyen



Rob Morgan

Do we still need road signs?

Key benefits:

- Local content and information
- Local restrictions e.g. height/weight restrictions
- Emergency situations
- Legal requirements
- Warning and information



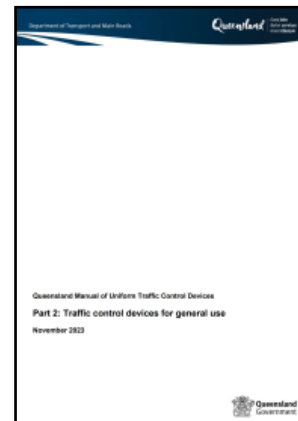
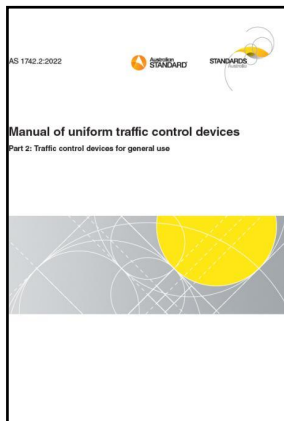
Autonomous Vehicles

- Vehicles 'reading' the road
- Sensors interpreting various signs, lines and pavement markings
- Important to ensure consistency is achieved today



Standards and Guidelines

- Australian Standard AS 1742
Manual of Traffic Control Devices series (15 parts)
 - > AS 1742.2 Traffic Control Devices for General Use
- State/Territory supplements to AS 1742
- Austroads Guide to Traffic Management



Australia's MUTCD

AS 1742, with AS 1743 and AS 1744

Brown = recently new

Green = current reviews

- AS 1742 Part 0 (2023): Glossary of Terms
- AS 1742 Part 1 (2021): General introduction and index of signs
- AS 1742 Part 2 (2022): Traffic control devices for general use
- AS 1742 Part 3 (2019): Traffic control for works on roads
- AS 1742 Part 4 (2020): Speed controls
- AS 1742 Part 5 (2017): Street name and community facility name signs
- AS 1742 Part 6 (2014): Service and tourist signs
- AS 1742 Part 7 (2016): Railway crossings
- AS 1742 Part 8 (1990): Freeways (*Rescinded and incorporated in Parts 2 & 15*)
- AS 1742 Part 9 (2018): Bicycle facilities
- AS 1742 Part 10 (2024): Pedestrian control and protection
- AS 1742 Part 11 (2016): Parking controls
- AS 1742 Part 12 (2017): Bus, transit, tram and truck lanes
- AS 1742 Part 13 (2023): Local area traffic management
- AS 1742 Part 14 (2014): Traffic signals
- AS 1742 Part 15 (2019): Direction signs, information signs and route numbering



Signing and Pavement Markings

Key Principles



Principle No. 1

Understand their purpose

Signs and lines are there for a purpose.

What is that purpose?

The primary aim of all
traffic control devices
must be to reduce uncertainty

to paraphrase Cumming (1964)

Principle No. 1

To reduce uncertainty



Country #1

Both prohibitory and mandatory signs use red

Images © Rob Morgan



Country #2



Principle No. 2

Understand road users' needs

For a traffic sign to be effective, the intended road user must successfully pass through the following four stages, often as a consequence of a single glance (Lay 2004):

1. Detect the sign. This means it must be:
 - Visible
 - Conspicuous

2. Read the sign. This means it must be:
 - Legible at an adequate distance
 - Able to be read within the time available

3. Understand the sign. This means it must be:
 - Comprehensible
 - Unambiguous
 - Precise

4. Act on the sign's message or instruction.
 This means the information on the sign must be:
 - Credible
 - Correct
 - Appropriate
 - Timely



Principle No. 3

Don't just buy Part 1,
with its list and
pictures of all the signs

AS 1742

- AS 1742 Part 0 (2023): Glossary of Terms
- AS 1742 Part 1 (2021): General introduction and index of signs
- AS 1742 Part 2 (2022): Traffic control devices for general use
- AS 1742 Part 3 (2019): Traffic control for works on roads
- AS 1742 Part 4 (2020): Speed controls
- AS 1742 Part 5 (2017): Street name and community facility name signs
- AS 1742 Part 6 (2014): Service and tourist signs
- AS 1742 Part 7 (2016): Railway crossings
- AS 1742 Part 8 (1990): *Freeways (Rescinded and incorporated in Parts 2 & 15)*
- AS 1742 Part 9 (2018): Bicycle facilities
- AS 1742 Part 10 (2009): Pedestrian control and protection
- AS 1742 Part 11 (2016): Parking controls
- AS 1742 Part 12 (2017): Bus, transit, tram and truck lanes
- AS 1742 Part 13 (2023): Local area traffic management
- AS 1742 Part 14 (2014): Traffic signals
- AS 1742 Part 15 (2019): Direction signs, information signs and route numbering



Visible

Principle No. 4



Image © Tuan Nguyen



Image © Rob Morgan

Road signs need to be where drivers expect to see them, clear of obstructions, visible in all conditions

Visible



Images © Rob Morgan

Principle No. 4



Road signs need to be where drivers expect to see them, clear of obstructions, visible in all conditions

Conspicuous



Images © Rob Morgan

Principle No. 5

- Luminance
- Size
- Edge contrast
- Graphic boldness
- Relevant to the tasks a driver is anticipating



Legible

Principle No. 6



Legible
at the
required
distance



Message Length & Layout

Principle No. 7

Able to be read within the time available



Image © Thuan Nguyen



Message

Length & Layout

Principle No. 7



Image © Thuan Nguyen

Able to be read within the time available

Message spacing



Image © Rob Morgan

Able to be read within the time available

Comprehensible

Principle No. 8



The message needs to be comprehensible



Images © Rob Morgan



Any symbols need to be comprehensible



Symbols need to be tested

Unambiguous Principle No. 9



Image © Rob Morgan

Does ONLY mean the left lane is a trap lane?

CityLink goes to the airport. Is that the same exit?

Unambiguous Principle No. 9



Is Simpson Barracks straight ahead?

This problem arose entirely because the (common) correct standard sign type was not used



Unambiguous

Principle No. 9



Images © Rob Morgan

Beautifully centred



Need to understand the underlying human factors

Precise

Principle No. 10



Image © Rob Morgan

You must 'unfamiliarise' yourself

Precise does not mean complicated



Credible

Principle No. 11



That's
km/h

Credibility relates to a road user's previous experience

Image © Rob Morgan

Credible

Principle No. 11



Image © Rob Morgan

Credibility relates to a road user's previous experience



Correct

Principle No. 12



Images © Thuan Nguyen

‘Correct and consistent’ reduces uncertainty

Correct

Principle No. 12



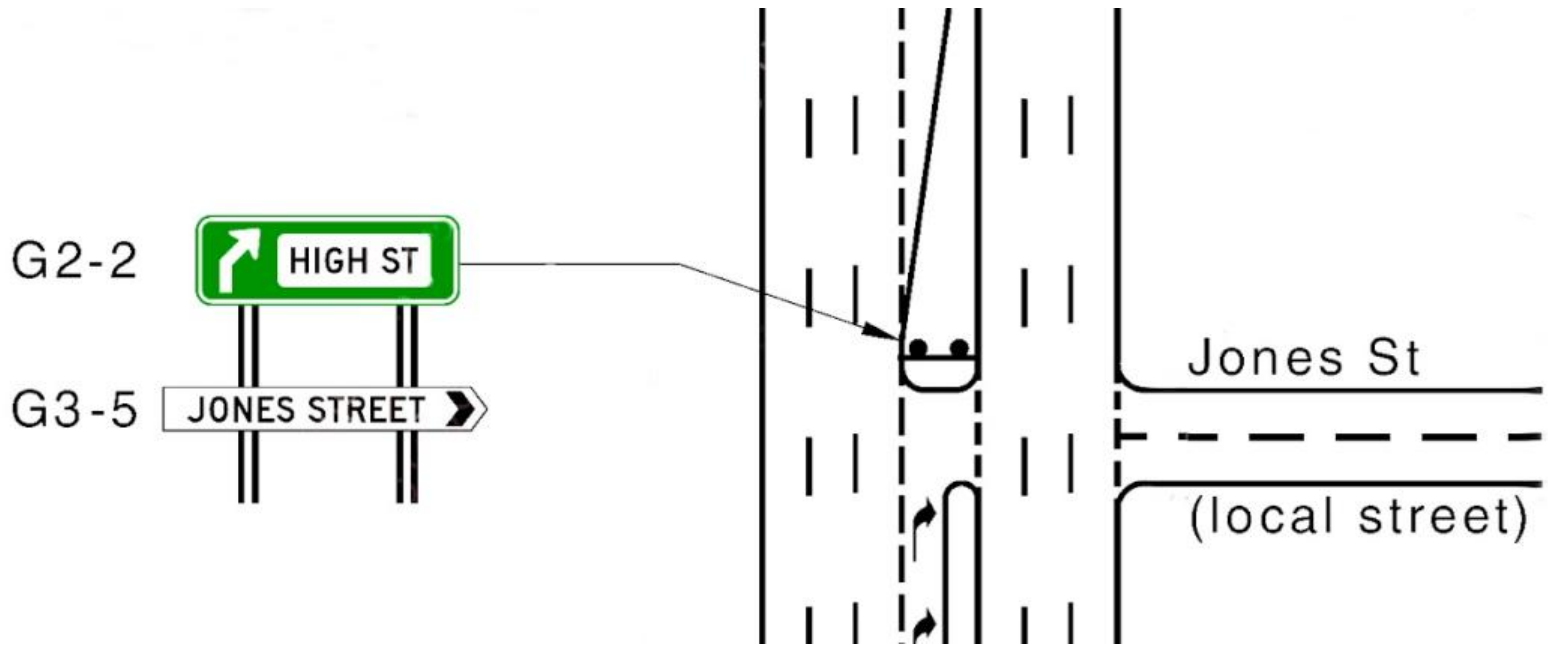
Image © Rob Morgan

One way to be correct is to use standard signs in the ways that are intended for their use



Correct

Principle No. 12



One way to be correct is to use standard signs in the ways that are intended for their use

Correct

Principle No. 12



Image © Rob Morgan

One way to be correct is to use standard signs in the ways that are intended for their use

Appropriate

Principle No. 13



Image © Rob Morgan

- Is the purpose of the sign clear; does it actually fulfill that purpose?
- Is the sign needed?
If it's a warning sign, is it actually necessary, or is the hazard obvious from the distance where action is required?
If it's a regulatory sign, is the regulatory requirement already obvious?
- Does the sign increase certainty, or sufficiently reduce uncertainty?
- Will it command respect?
(or is it likely to be ignored?)
- Are any adverse consequences likely?
- Does it meet all the previously discussed requirements?

Timely

Principle No. 14



Image © Rob Morgan

In sufficient time for road users to act

Timely & Message Length

Principle No. 14 Principle No. 7



Images © Thuan Nguyen



In sufficient time for road users to *read it*, then act

Timely

Principle No. 14



Image © Rob Morgan

Not so early that it is forgotten
(The Give Way intersection is 40 m after the railway)

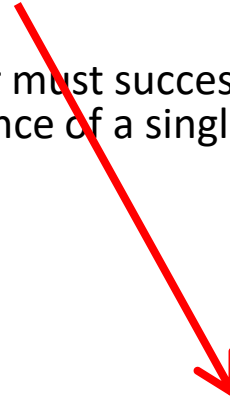


Principle No. 2

Understand road users' needs

For a traffic sign to be effective, the intended road user must successfully pass through the following four stages, often as a consequence of a single glance (Lay 2004):

1. Detect the sign. This means it must be:
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4. Act on the sign's message or instruction.
This means the information on the sign must be:
 - Credible
 - Correct
 - Appropriate
 - Timely



Understanding
the underlying
human
factors
issues

But wait –

there's more !

Complying with the MUTCD (AS 1742)



Image © Thuan Nguyen



W3-2



Images © Thuan Nguyen

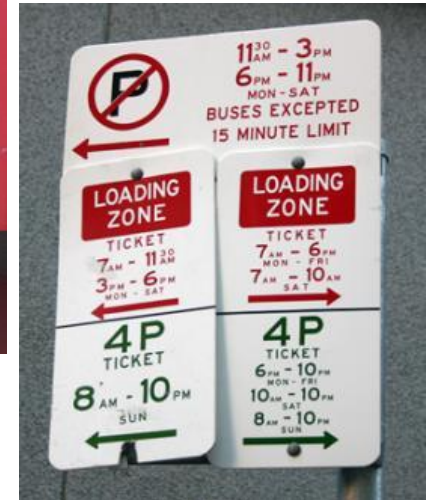


Consistent



W3-3





Images © Rob Morgan



Consistent



Use the same standard sign for the same message

None of these differences are noticed by road users !

Consistent



A few other **Key Topics**

- Intersection controls
- Horizontal curves and Hazard markers
- Pedestrian facilities
- Bicycle facilities
- Warning signs: don't use when not needed;
more warning signs is not 'better'
- Direction signs
- Parking controls



Intersection Controls

A road will intersection with another road!

Three key intersection controls:

- Sign-controlled (Give Way/Stop)
- Roundabouts
- Traffic signal controlled



Sign Controlled Intersections

- GIVE WAY sign is used at un-signalised and non-roundabout intersections with four or more legs, and at slip lanes
- GIVE WAY signs are not generally required at minor T-intersections if the ‘T-intersection rule’ operates satisfactorily



R1-2



Image © Thuan Nguyen



STOP Signs

- ***STOP signs are provided ONLY where the intersection sight distance is substandard***
- Overuse of STOP sign reduces sign effectiveness and credibility



R1-1



Image © Thuan Nguyen

STOP Signs Warrant

See AS 1742.2:2022 Clause 2.5.3

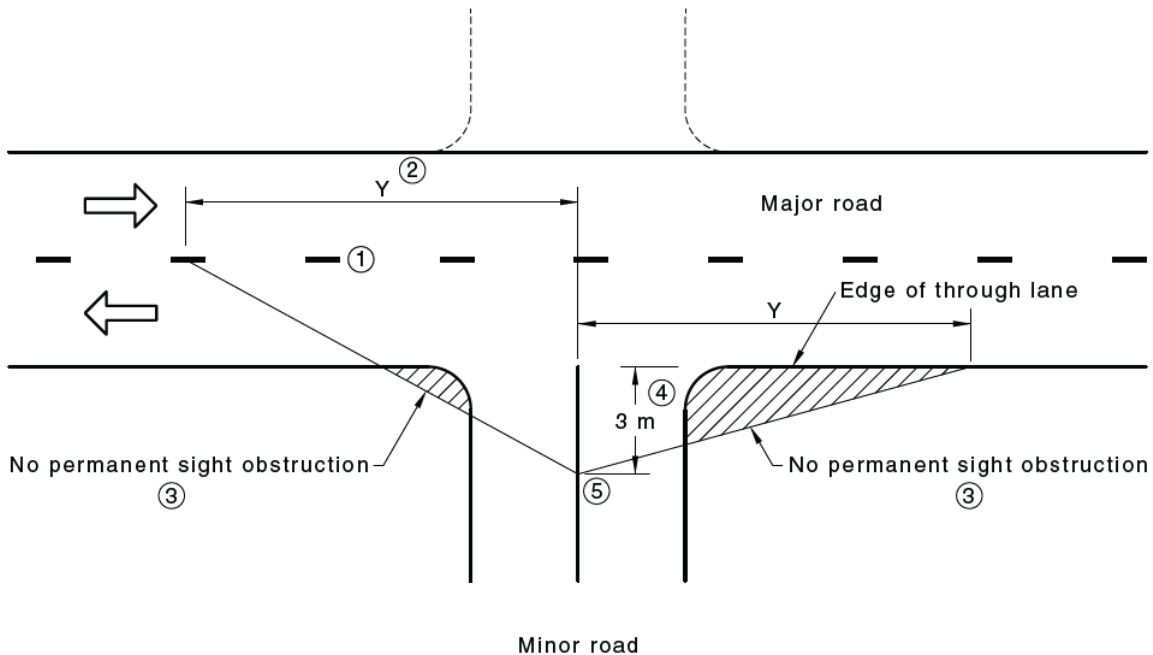


Table 2.2 — Sight distances for use of STOP signs

Major road speed, km/h (see Note 1)	Distance along major road: Y, m (see Note 2)
30	15
40	25
50	30
60	45
70	60
80	70
90	80
100	90
110	120
120	150

NOTE 1 The posted or default speed limit is used, unless the 85th percentile speed is significantly higher.

NOTE 2 The distance value Y along the major road, and the distance along the minor road shown in Figure 2.2 are empirically based. The distances are specific to the warrant for the use of STOP signs and independent of the values for stopping, safe intersection and minimum gap sight distances given in Austroads Guidelines.

Stop Signs Warrant



Source: NearMap



Source: NearMap





Image © Thuan Nguyen



Image © Thuan Nguyen

Roundabout Control Signs

- Erected on all approach legs, and located as near as practicable to the associated holding line
- Placed on both sides where there are two or more lanes



Image © David Nash



Roundabout Control Signs



Image © Thuan Nguyen

Horizontal Curves

- Horizontal curve is considered substandard if advisory speed is at least 15 km/h less than the 85th percentile speed on the immediate preceding section of road
- Advisory speed = comfortable negotiating speed in good conditions

Horizontal Curves



Treatments:

- Guideposts, lines and retroreflective raised pavement markers (RRPMs)
- Warning and advisory speed signs
- Curve alignment markers (CAMs)

Hazard Markers

- Indicates a hazard on or along the road that drivers need to avoid such as:
 - Road narrowing
 - Terminus of a road
 - Lateral shift
 - Curves
 - Kerb outstands
 - Roundabout central island
 - Splitter islands



CAMs vs. Hazard Markers



Image © Thuan Nguyen



CAMs vs. Hazard Markers



Image © Thuan Nguyen

Pedestrian Facilities

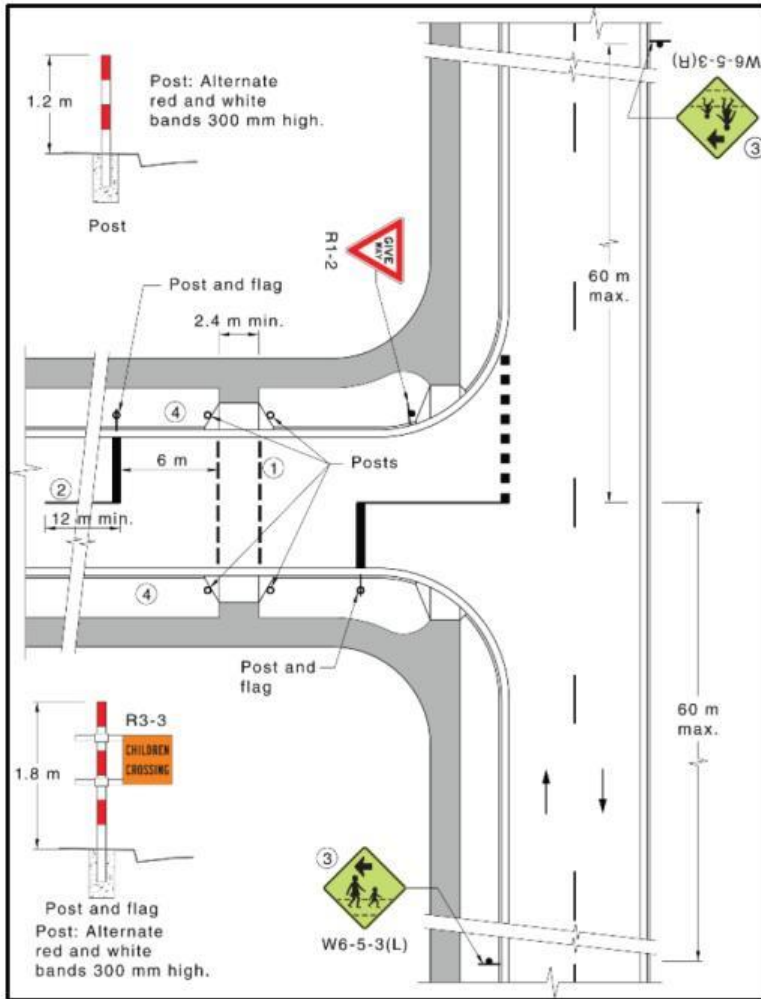
Updated edition
published in
Sep/Oct 2024

- See AS 1742.10 Pedestrian Controls
- Wombat crossing is safer than Zebra crossing
- Not suitable for high-speed multi-lane roads



Image © Thuan Nguyen

Pedestrian Facilities



Updated AS 1742.10
published in Sep/Oct 2024



W6-15-1



W6-15-3(L)



W6-3

③

W8-22



Pedestrian Facilities



Image © Thuan Nguyen

Pedestrian Facilities

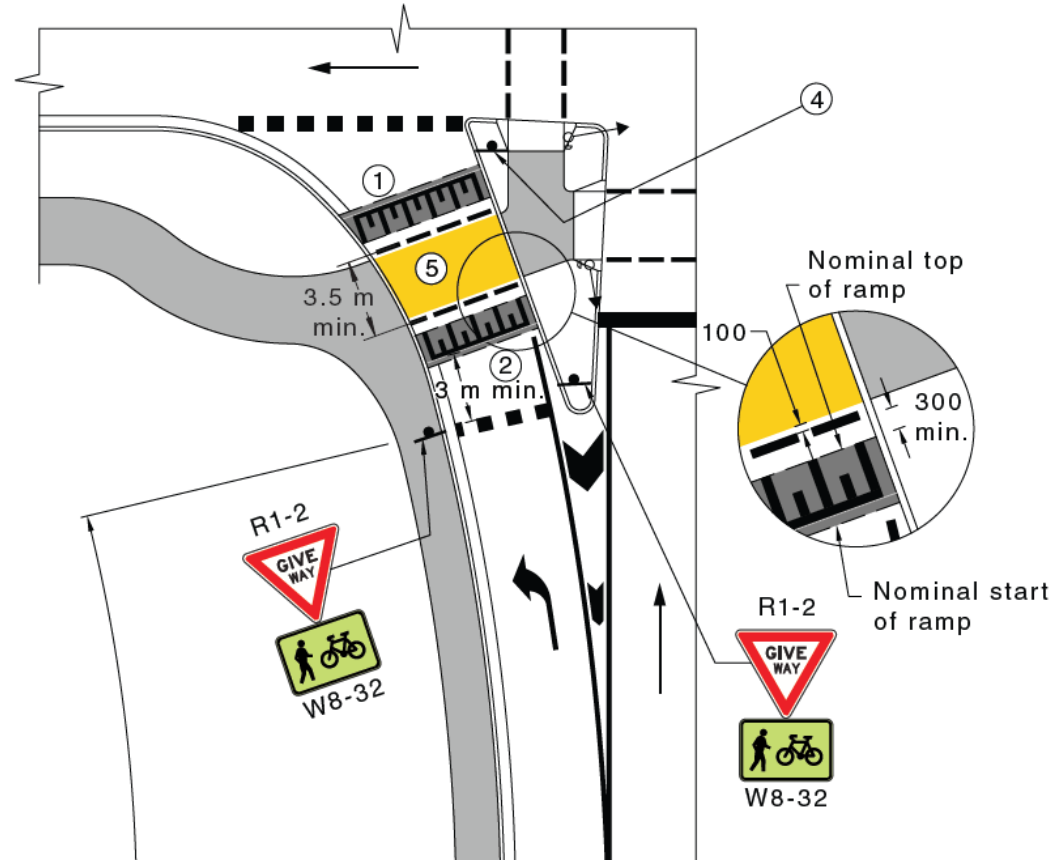
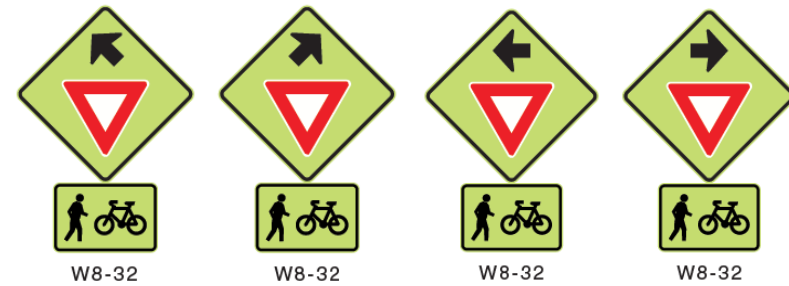


Image © Thuan Nguyen



Bicycle Facilities

- See AS 1742.9
Bicycle Facilities
- Updated signing for Priority
(Shared Use)
Path crossing in
AS 1742.10
Pedestrian
Facilities



Sign Colours

- **Fluorescent yellow-green:** Regulatory and warning signs (including their supplementary plates) for the protection of pedestrians
- **Fluorescent orange:** Roadwork signs that relate to people working on the road, CHILDREN CROSSING flags and hand STOP banner at children's crossing
- **Fluorescent yellow:** Roadwork signs, route numbers on direction signs
- See AS 1742.1 General introduction and index of signs



Sign Colours



Image © Thuan Nguyen



Image © Thuan Nguyen



Image © Rob Morgan



Warning Signs

- See AS 1742 Part 2 (and the other parts)
- Distances
- When to use them
- Special intersection treatments



Warning Signs

Read the details

(AS1742 Part 2)



(c) *FORD (W5-6)*



W5-6

The FORD (W5-6) sign shall be used to warn of a ford as specified in [Clause 4.9.1\(b\)](#).

Depth Indicator (G9-22) signs and the ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21-1 or G9-21-2) sign (see Items (i) and (j)) shall be used with this sign.

(d) *FLOODWAY (W5-7-1) and FLOODWAYS (W5-7-2)*



W5-7-1



W5-7-2

The FLOODWAY (W5-7-1) sign shall be used to warn of a floodway as described in [Clause 4.9.4](#).

Depth Indicator (G9-22) signs and the ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH (G9-21-1 or G9-21-2) sign (see Items (i) and (j)) shall be used with this sign.

The FLOODWAYS (W5-7-2) sign may be used in conjunction with the NEXT x km (W8-17-1) sign (see Item (l)) to warn of a number of floodways on the road at spacings not exceeding 2 km, see [Clause 4.9.4\(b\)](#).

Distances

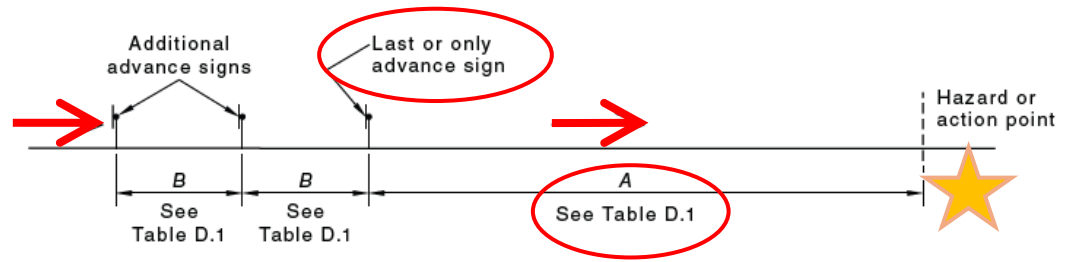


Figure D.1 — Advance sign distances

Dimensions in metres

Table D.1 — Location of warning signs in advance of a hazard

Dimension	Situation	V ₈₅ , km/h			Typical examples
		< 75	75–90	> 90	
Dimension A	(i) Must or may need to stop	80–120	120–180	180–250	Give Way Sign Ahead (W3-2) Stop Sign Ahead (W3-1) T-intersection (W2-3) FLOODWAY (W5-7) LOW CLEARANCE_x m (W4-8)
	(ii) Significant speed reduction required	60–80	80–120	120–180	Signs in the Turn Sign Zone, see Figure 4.1 Slippery (W5-20) Roundabout ahead (W2-7)
	(iii) Low to moderate speed reduction required – or no speed reduction	40–60	60–80	80–120	Signs in the Curve Sign Zone, see Figure 4.1 Aircraft (W5-3) Divided road (W4-4) Intersection warning signs located on straight major road
Dimension B	Position of any additional warning sign in advance of sign at Dimension A.	50	60	70	-

NOTE Values for Dimensions A and B in this Table are to be used unless a different value is specified elsewhere in this Standard in a particular case.

Distances

– see Table D.1
in Appendix D

(AS1742 Part 2)



Warning Signs

- **Use them when needed**
(Provide advice that is required to avoid uncertainty)

BUT

- **Don't use them when not needed**
(Avoid stating the obvious)
(Avoid sign clutter)
(Avoid making decisions from Risk Aversion)

Warning Signs

When to use them

(AS1742 Part 2)

NOTE 1 A one-lane bridge is one that meets the width limitations specified in [Clause 4.5.2.2](#). The maximum width between edge lines is 4 m.

NOTE 2 Width Marker (D4-3) signs are required in accordance with [Clause 4.5.7.2\(c\)](#).

NOTE 3 The use of the Narrow Bridge (W4-1) and ONE LANE (W8-16) signs is given in [Clauses 4.5.6.3\(a\)](#) and [4.5.6.3\(f\)](#), respectively.

NOTE 4 The STOP HERE ON SIGNAL (R6-6) sign is required if the position at which the vehicle must stop is not readily apparent, see [Clause 4.12.2\(c\)](#).

NOTE 5 Used only if sight distance to the signals is less than the lower limit for Dimension A.

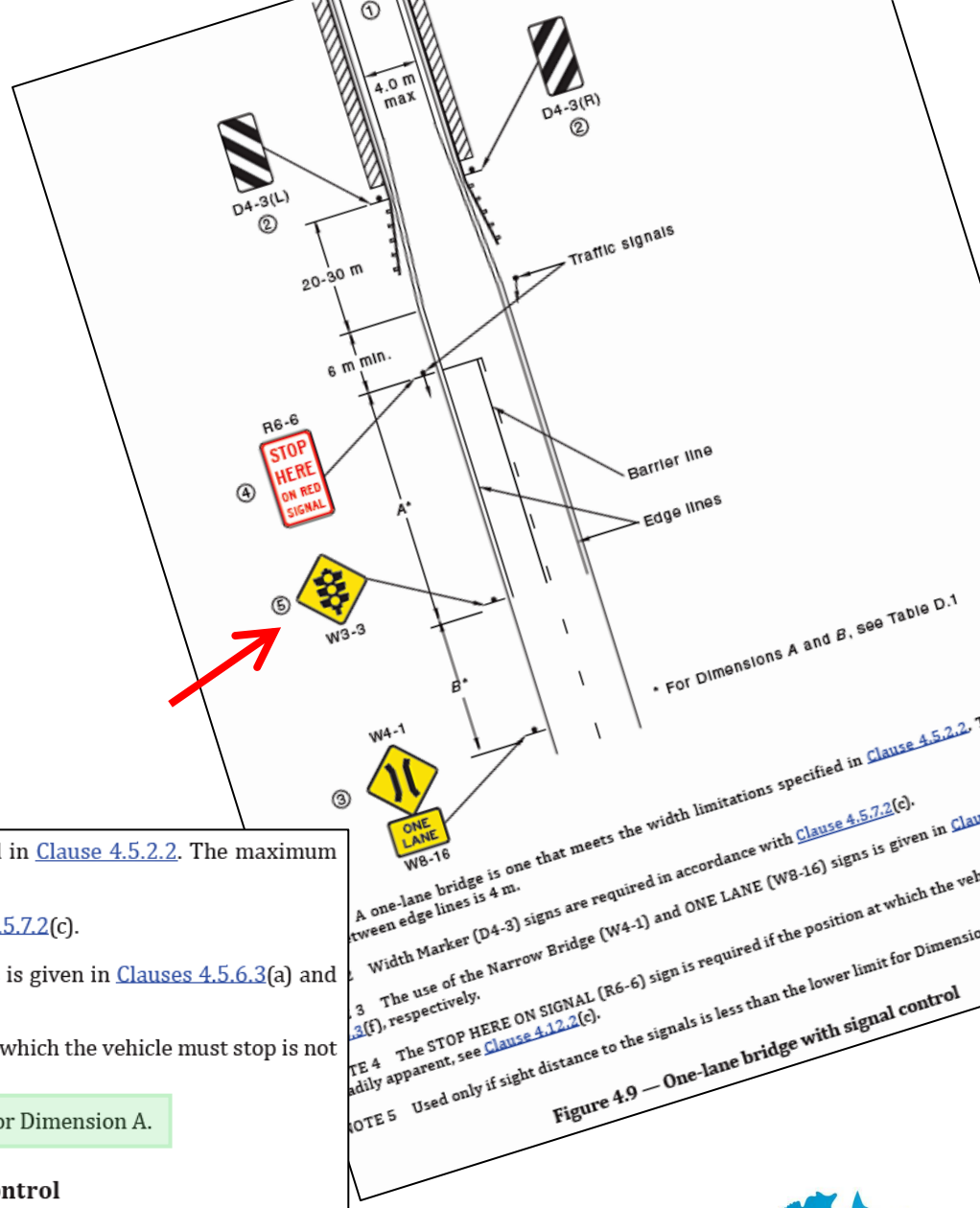


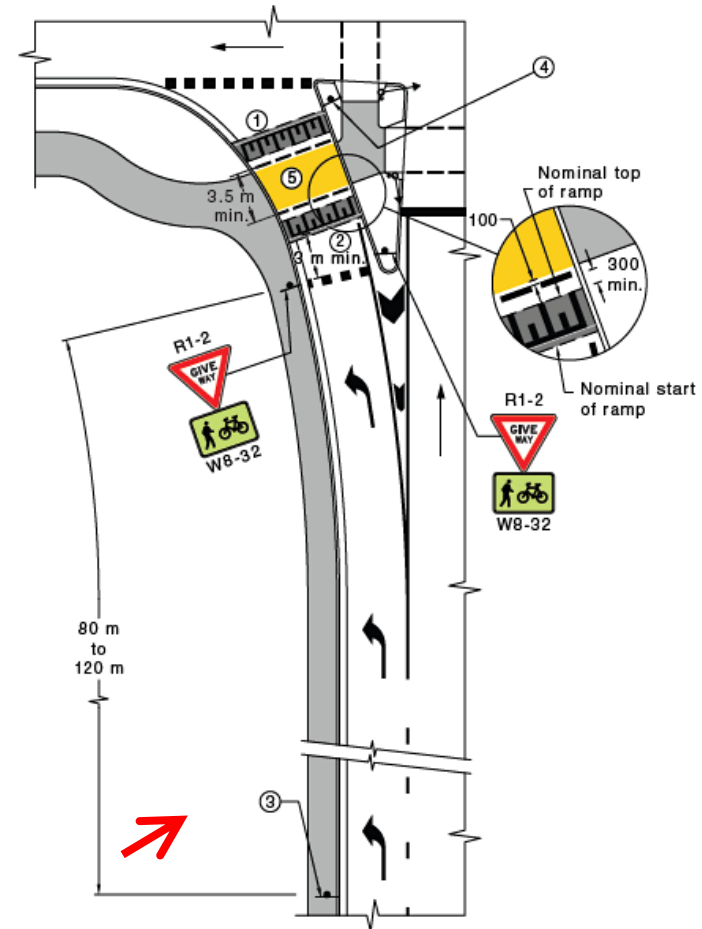
Figure 4.9 — One-lane bridge with signal control



Warning Signs

When to use them

(AS1742 Part 10 - 2024)



NOTE 1 For details of markings at the crossing, see [Clause 6.5](#). For advice on the separation of the crossing from the give way line, refer to *Austrroads Guide to Road Design, Part 4: Intersections and Crossings: General*.

NOTE 2 The give way line is located 3 m before the ramp markings.

NOTE 3 The W6-14-2(L) and W8-32 sign assembly is used in advance of the crossing where permitted by

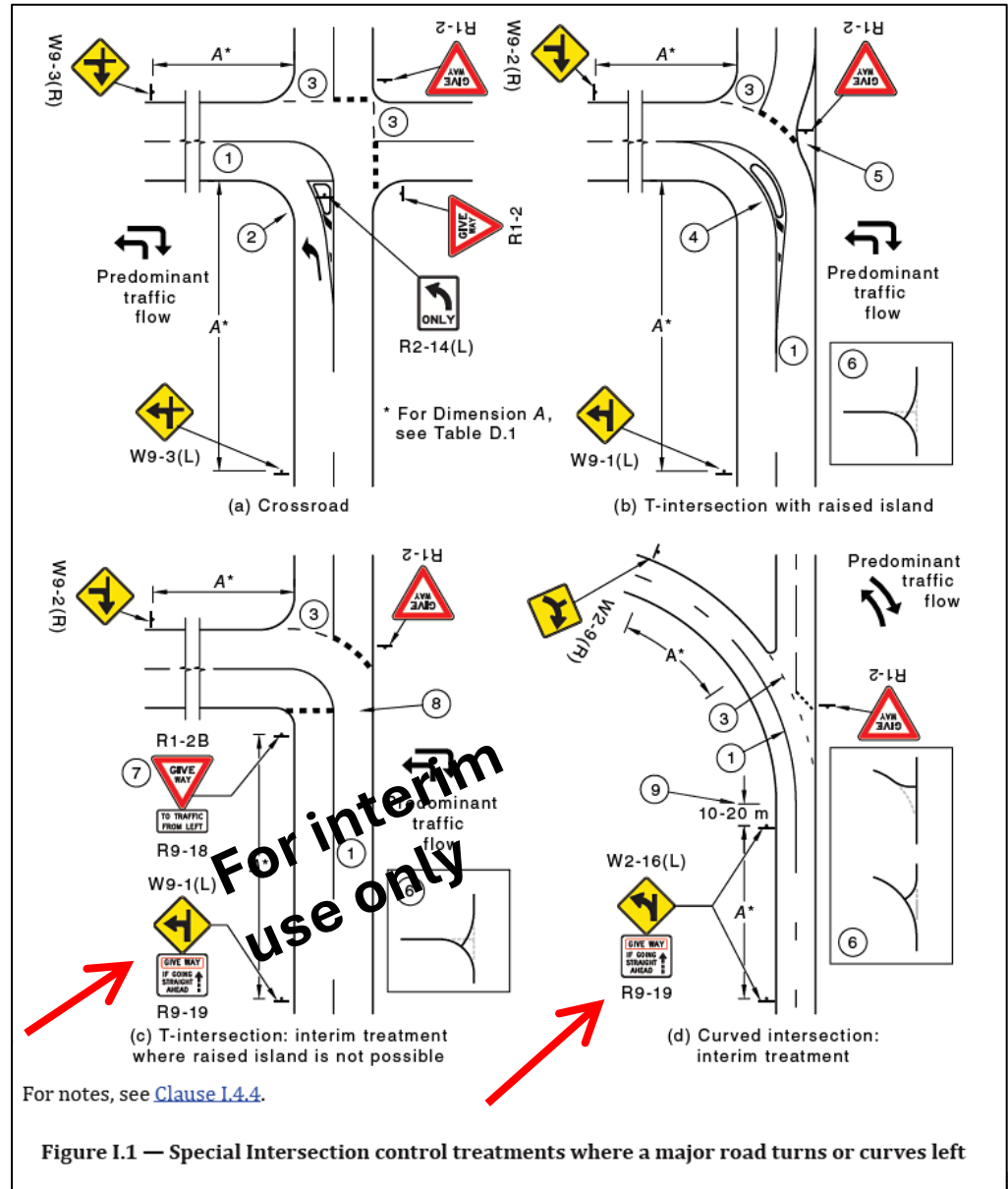


NOTE 3 The W6-14-2(L) and W8-32 sign assembly is used in advance of the crossing where permitted by [Clause 11.2\(c\)](#). If required, the W8-31 sign is located here and is mounted below the W8-32 sign, see [Clause 11.2\(e\)](#).

Figure 6.2 — Priority path crossing on a raised platform at a left turn slip lane

Appendix I (AS1742 Part 2)

Special
Intersection
Control
Treatments



Direction Signs

- See AS 1742.15 Direction Signs, Information Signs and Route Numbering
- Correct information is displayed and in correct location
- Correct colours, panel design and sign sheeting material
- Elements to be visually well proportioned
- Keep the message simple, the less information shown, the better!

Direction Signs

Keep the message simple!



Direction Signs



Image © Thuan Nguyen



Image © Thuan Nguyen



Direction Signs



Image © Thuan Nguyen



Image © Thuan Nguyen

Direction Signs



Image © Rob Morgan

Image © Thuan Nguyen



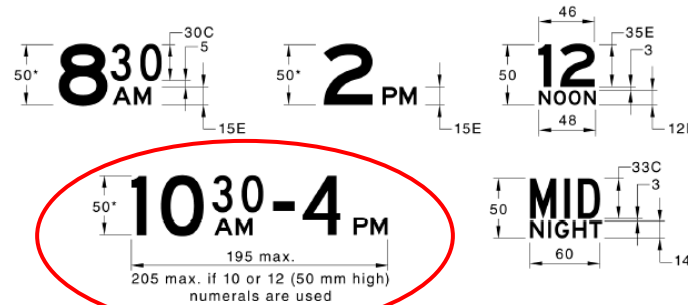
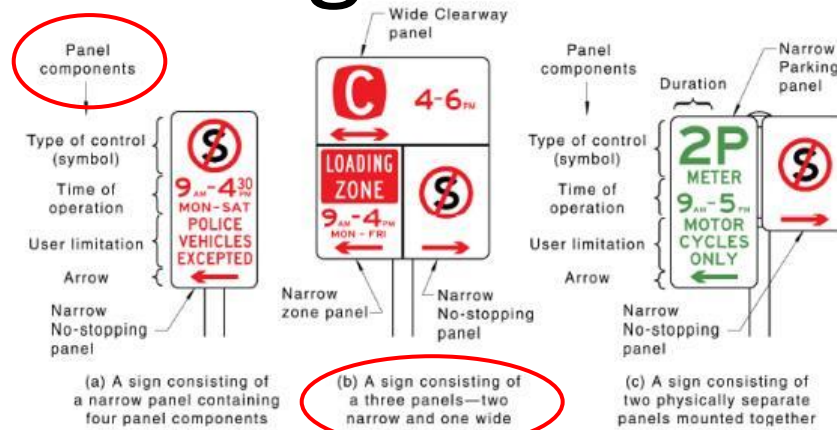
Parking Control Signs

AS 1742 Part 11

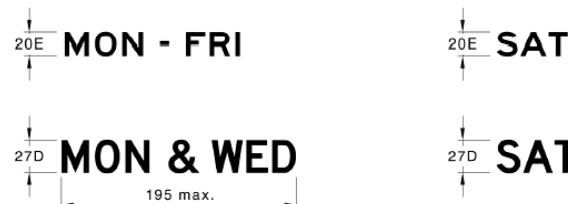
(AS1742 Part 10 - 2024)

This part has far more design detail than the other parts

Currently being reviewed:
send us any comments



* Use series E except for 10 and 12 (50 mm high) which are series D.



Parking Control Signs

Keep the message simple!



Parking Control Signs

Proposed updates to AS 1742.11:

- EV parking control signs



- Parking on verge



- Parking for motorcyclists



More information

Delve into AS 1742

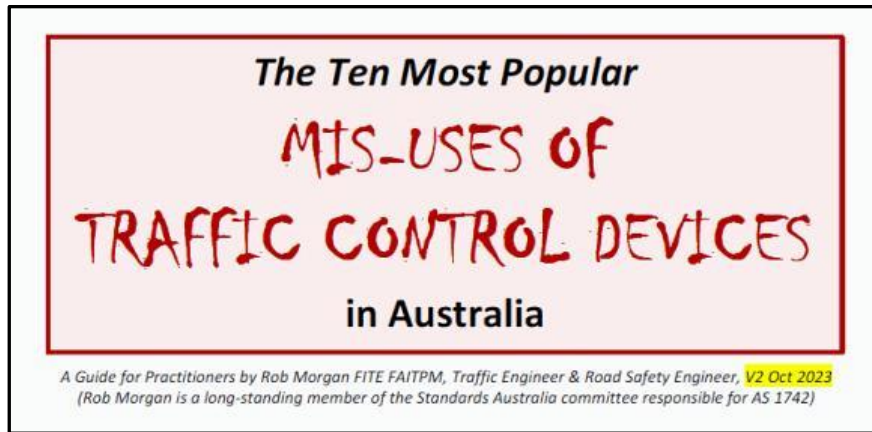
Start with Part 2

Print out a copy
and make notes



More information

1.



2.



Go to robmorgan.com.au > Free Downloads

or directly:

<https://sites.google.com/view/robmorgan/free-downloads>

More information

Traffic Engineering Fundamentals: Signs and Lines
training at Safe System Solutions Pty Ltd
(www.safesystemsolutions.com.au/training-workshops)



More information

'Phone a friend'

Thuan



thuan.nguyen@
safesystemsolutions.com.au

0431 757 757

Rob



rob@robmorgan.com.au

0419 884 269



Road Signing Principles

Solve it with signs. It's so simple!