Operational Instruction

2.37

Traffic Control Signs, Remote Area Unsealed Roads

Government of South Australia
Department of Planning, Transport and Infrastructure

Traffic Control Signs, Remote Area Unsealed Roads - 2.37

AMENDMENT RECORD

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1. Scope

This document has been prepared to assist the Department of Planning, Transport and Infrastructure (DPTI) and other authorised road authorities provide traffic control signs to assist in ensuring the safe and efficient movement of road users on unsealed roads under their care, control and management in the remote areas of South Australia. It describes requirements for traffic control signs for general use (regulatory, warning and guide signs) and sets out the way they are applied between and at intersections. It addresses a number of common situations including substandard horizontal and vertical curves, approaches to structures and obstructions, changes in road formation width, steep grades and water crossings.

It is important to understand that this document does not cover other traffic control devices such as traffic islands, traffic signals, pavement markings etc. or the more novel and complex traffic management issues that arise from time to time. Nor does it address issues such as road design, construction or pavement maintenance practices. Assistance with such issues is available from the Traffic and Access Standards Section (TASS), DPTI.

This instruction focuses on three basic categories of remote area unsealed roads: Primary, Secondary and Minor outback roads. A definition of these categories with some examples is shown in Appendix A.

This document should be used in conjunction with the "Code of Technical Requirements for the Legal Use of Traffic Control Devices in SA", the Australian Standard's "Manual of Uniform Traffic Control Devices" (AS1742 Parts 1, 2, 3, 4, 5, 6 and 7), the AARB's "Unsealed Roads Manual" and the SA Local Government Association's "Managing Unsealed Roads in South Australia (2002)".

2. Background

Certain road authorities may be required to follow the documents mentioned above in a Notice from the Minister for Transport or the Commissioner of Highways (Chief Executive, DPTI).

However, most of these documents have been developed for higher traffic volume sealed urban and rural roads in mind. Consequently, there has been some difficulty in applying the requirements in them and in some cases it is not just practical to do so, primarily because of the extremely long distances, the very low traffic volume nature of roads and the limited available resources.

3. Legal Responsibilities

It should be noted that road authorities have significant legal responsibilities associated with managing roads. In fact, failure to comply with these responsibilities can result in significant penalties including fines and imprisonment.

4. Prerequisite Traffic Engineering Requirements Definitions

In applying this instruction to a new or existing road, it may be necessary to know the following:

- Stopping Sight Distance (to a feature or hazard)
- Approach Speed
- Comfort Speed (through a feature or hazard)
- Reduction speed

4.1 Definitions

4.1.1 Stopping Sight Distance

The stopping sight distance is the sight distance required by an average driver (car or truck, depending on requirements) travelling at a given speed, to react or stop before striking an object on the road.

As unsealed road conditions vary so much it is difficult to assign figures in scientific terms. However, the figures in Table 1 below have been determined using the coefficient of friction for unsealed roads from the Austroads "Guide to Road Design – Part 3 Geometric Design (2010)" taking into consideration the types of conditions most often experienced.

The figures in the table may need to be increased where there is a significant downhill gradient or where it is known that the type of road surface has an unusually poor coefficient of friction.

If the clear and unobstructed sight distances below are not available to a hazard then some form of corrective action should be programmed to improve sight distance, to at least meet these figures where possible.

Approach Speed (km/h)	<40	40-60	60-80	>80
Stopping Distance (metres)	60	100	150	230

Table 1 –Stopping Sight Distance

4.1.2 Approach Speed

Approach speed is defined as the 85th percentile speed of vehicles travelling on that section of road.

The approach speed can be measured or estimated by an operator observing the general behaviour of a number of motorists travelling on that section of road and then confirming that figure by travelling that same section of road at what has been estimated to be the average speed of the faster group of vehicles.

Wherever possible the estimated approach speed should be measured or estimated 300 – 500 metres in advance of the feature or hazard so that the resultant speed is not influenced by the feature.

NOTE: In confirming such a figure, the operator should not drive any faster than any legal speed limit, although it may be appropriate to estimate a higher value.

4.1.3 Comfort Speed

Comfort speed is the estimated speed that is determined to be a speed at which the road feature or hazard can be negotiated safely and comfortably. It is the speed at which a prudent driver will drive through the hazard under normal road and environmental conditions.

The comfort speed should be assessed by an experienced operator in a similar manner to the approach speed. The operator should drive through the feature or hazard a number of times in a vehicle similar to the type of vehicle know to be or expected to be used by road users along that section of road. For example, if the road experiences a predominance of standard two-wheel drive family sedans, then the comfort speed should be estimated using a family sedan.

It should be noted that the above method for determining both the estimated approach speed and the comfort speed through a feature or hazard are not scientifically based. However, if the methods are applied consistently, preferably by the same operator in each area, then the resulting relatively consistent and credible signing treatments applied should assist the road users in safely driving through the local road network.

4.1.4 Reduction Speed

Reduction speed is the difference between the approach speed and the comfort speed. It may be expressed as a speed or as a percentage reduction.

5. Advance Warning of Hazards

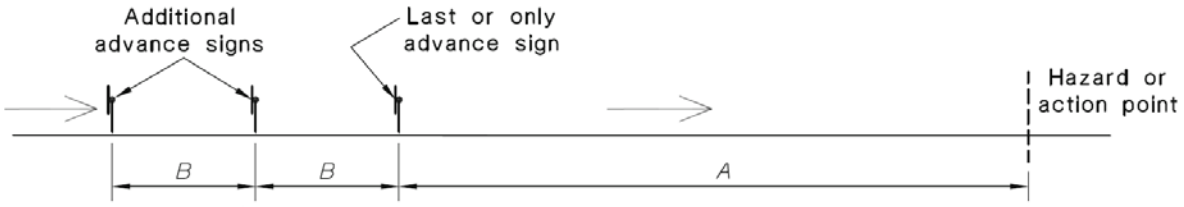
For “standard” signs, the size of signs and the distance ahead of the hazard or feature at which signs should be placed are normally dependent upon the approach speed. However, for simplicity of maintenance and without compromising road safety, it is considered that one universal sign size, known as “B” size in the Australian Standards, can be applied to the network regardless of the speed of road users.

The distances signs should be placed from the hazard or road feature, which will vary according to the local speed, are shown in Table D1 of AS1742.2-2009.

All non-standard signs (standard signs consisting of regulatory, warning, temporary or hazard type signs such as those listed in AS1743-2001) or site specific signs (TES signs) will be provided by TASS, DPTI. Such signs will be designed specifically to suit a specific location and speed environment.

Signs would normally be installed in advance of an intersection or hazard at the distances shown in the Appendix D AS1742.2-2009 (attached as Appendix C in this instruction) for sealed roads. However, due to many of the variables of unsealed roads as mentioned previously, the distance a sign should be installed in advance of an intersection or hazard is based on the stopping sight distance A (Table 2).

Where it becomes necessary to convey two or more different messages at the one location, separate signs are to be located a minimum of 0.6V + 25% apart (where V is the approach speed and the 25% is an additional stopping factor for unsealed roads).



Approach Speed V (km/h)	<40	40-60	60-80	>80
Distance A (metres)	60	100	150	220
Distance B (metres)	30	40	60	80

Table 2 – Sign installation distance in advance of an intersection or hazard

6. Application of Treatments Between Intersections

6.1 Speed Limits

In South Australia the default speed limit for roads in remote non built-up areas is the general rural limit of 100km/h while for built-up areas is the general urban limit of 50km/h.

Speed limit signs (R4-1) shall never be displayed for the general rural limit or any other speed limit over 50km/h on unsealed roads. For the use of speed limit signs to indicate the general urban limit or any other limit lower than 50km/h, advice should be sought from TASS, DPTI.

R4-1(50)

Shown in the photograph below is a speed limit sign (80km/h) being used without authorisation. The use of the sign is not permitted as it could lead motorists to believe that the limit has been set by the road authority as a “safe” speed under all road and environmental conditions. Speed limits must not be displayed in these cases but rather the road user must determine the most appropriate speed for the prevailing conditions. If necessary, standard warning signs highlighting the specific conditions requiring the lower speed should be used. For hazards not addressed in this document assistance may be sought from TASS, DPTI.

Photo 1 – Incorrect placement of speed sign

The END SPEED LIMIT sign (R4-12) shall be used at the start point of a section of road covered by the default rural speed limit where it is not desirable to indicate the speed limit i.e. at the end of a rural urban speed limit (AS1742.4-2008 Clause 3.1.2(b)).

R4-12(50)

6.2 Regulatory Sign (other than speed limits and road closures)

There should be no need to apply regulatory restrictions to road users between intersections. However, if a genuine need has been identified, the matter should be discussed with TASS, DPTI prior to installation. Other than for the Regional Manager, Northern and Western Region, DPTI, in most cases the approval of the Manager, TASS, DPTI will be required. Before such approval can be given, a traffic impact statement endorsed by a recognised traffic engineering practitioner must be submitted.

6.3 Curves

It is generally only necessary to provide warning of curves that are "substandard". A substandard curve on an unsealed road could be considered to be one where the difference between the approach speed and the comfort speed is 15km/h or greater on the immediate preceding section of road (AS1742.2-2009 clause 4.4.1).

Table 3 indicates the treatments that should be provided on curves to warn road users of the curve and its severity. It should be noted that the treatments for curves should be provided regardless of the sight distance available.

Speed Reduction	Treatment Primary, Secondary Roads	Treatment Minor, Access Roads
<15 km/h	Guide posts only	None
>15 km/h but <25 km/h	Curve sign and guide posts	Guide posts only
>25 km/h but < 50%	Turn sign and guide posts	Guide posts only
> 50%	Turn sign with CAMS (no guide posts)	Turn sign and guide posts

Table 3 – Treatment for Curves

When used, guide posts shall be placed on the outside of curves to delineate the path through the curve. It is preferable to provide several posts, spaced evenly at a nominal spacing of about 40m, starting and finishing at the tangent points. A minimum of three posts should be installed on a curve. On tighter and shorter curves this may require post spacing to be reduced to as little as 10m.

Photo 2 – Correct guide post installation and curve sign not required

When posts are provided on the outside of curves, two posts should also be provided on the inside to highlight the tangent pints. An example of a good treatment is shown in photo 3 below. On the longer curves, 300m or more in length, an additional post may be installed at the apex.

Photo 3 – Correct installation of guide posts and curve sign

Very slight curves that do not require a reduction in speed to negotiate need not be treated with either signs or guideposts. Curve and/or turn signs (W1 sign series), and chevron alignment markers (CAMS) in lieu of guide posts, should be provided in accordance with Table 3.

Where a series of closely spaced curves, some or all of which require signing treatment, a single WINDING ROAD sign (W1-5) may be installed in advance of the first curve in the group from each direction, instead of treating each curve individually. If the group of

curves cover a distance greater than 1km, a distance plate NEXT … km (W8-17-1) shall be used in conjunction with this sign.

Turn signs *Curve signs*

W1-1 W1-2 W1-3 W1-4 W1-5 W1-7

Turn and Curve Signs (left or right available)

Advisory speed signs (W8-2) ***must not be used*** on unsealed roads because it can not reasonably be expected that the desirable speed will remain constant over time and that it will not be subject to significant variations due to changes in the surface conditions caused by weather or pavement wear.

W8-17-1 *D4-6 (CAMS)* *W8-2*

Signs should be installed in accordance with distances shown in Table 2, measured from the tangent of the curve.

Photo 4 – Incorrect placement of advisory speed sign

6.4 Crests

Crests are vertical curves on roads that would, if the road were sealed, be treated with no overtaking zones (also known as barrier lines). For unsealed roads of all categories, CREST signs (W5-11) should be installed if the minimum sight distances in Table 4 are not met.

Note: it is important to remember that sight distance must be measured from heights of 1.05m from the ground on each approach (driver eye height to driver eye height, for a sedan vehicle).

In the example below, crest signs are required because 300m of sight distance at the estimated approach speed of 100km/h could not be achieved at the 1.05m driver eye height.

Photo 5 – Crest signs required

Approach Speed (km/h)	<40	40-60	60-80	>80
Minimum Sight Distance (1.05m – 1.05m)	120	180	240	300

Table 4 – Minimum Sight Distance for Crests

Signs should be installed in accordance with distances shown in Table 2, measured from the top of the crest.

6.5 Dips

Outback roads may have many depressions in the road surface. They range from deep short dips to long shallow depressions. Most are associated with waterways with unpredictable flooding frequencies.

It has been practice to install floodway signs at most watercourse crossings in remote areas. However, it would appear from a road user's perspective, better to provide an indication of the nature of the hazard usually created by the depression, rather than the indication that it might on rare occasions have water present. It is also apparent that in most cases of flooding, the road user would already be aware of the possibility of flooding by the prevailing weather conditions and other cues. So it is proposed that in most cases dip signs be used instead of floodway signs.

Photo 6 – DIP signs required

The DIP sign (W5-9) shall be used to warn of any sharp depression in the profile of the road is sufficient enough to cause:

- A hazardous situation,
- Considerable discomfort to the passengers,
- Shifting of the cargo,
- Deflection of a vehicle from its course when travelling at the approach speed.

No signs will be necessary for depressions where the reduction speed is 15km/h or less (refer to Section 4.1.4).

Where two or three dips exist in very close proximity, that is less than the distance in Table 2, a single DIP sign may be installed in advance of the first dip from each direction, rather than signing each individual hazard. Where a series of dips exist over a short distance but with spacing greater than Table 2, then a distance plate NEXT … km (W8-17-1) may be provided below the DIP sign.

W5-9

Guide posts should be provided at start and end of each dip on each side of the road (a total of 4 posts).

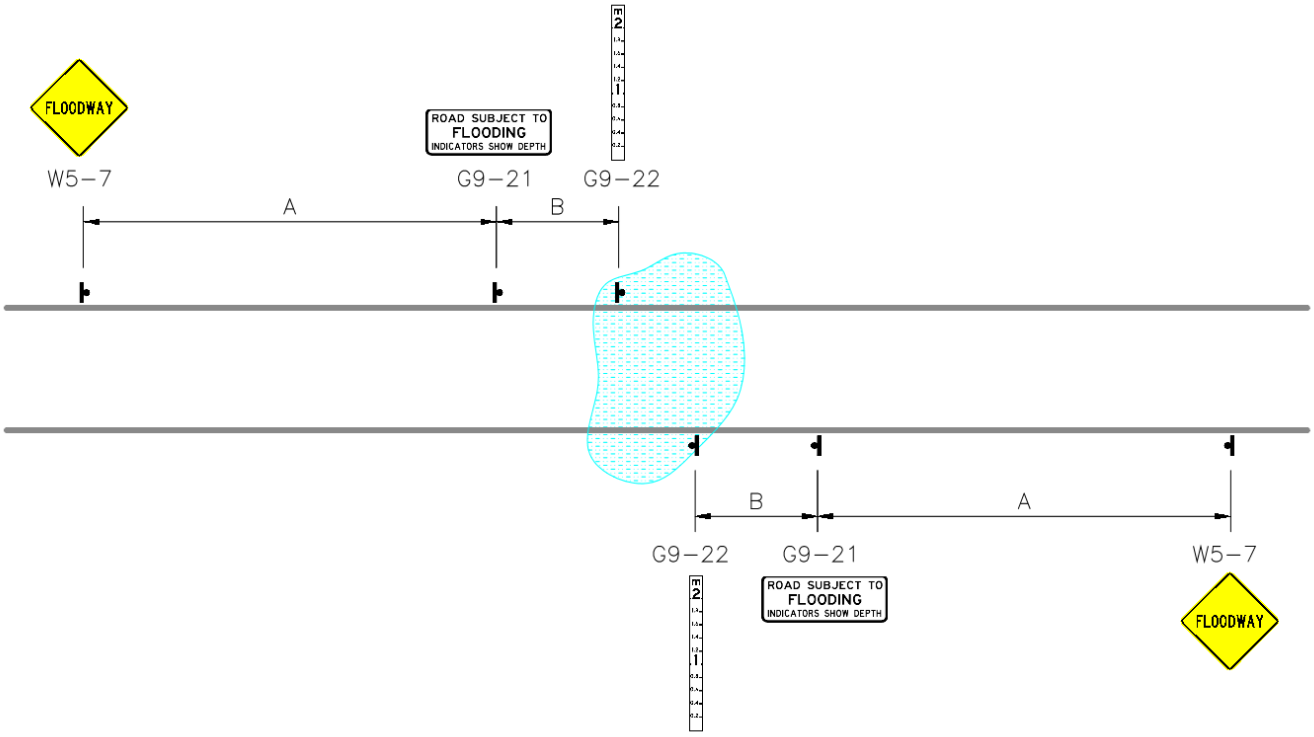
Where a section of road contains a combination of crests, dips and curves and is over a kilometre in length, TES 17105 may be installed in advance of the first hazard at distance A, as shown in Table 2.

TES 17105

6.6 Water Courses

Floodways (sections of road where water may flow for short periods in time of flood but the road remains trafficable with care) and **Fords** (short sections of road or a concrete watercourse crossing where water is expected to flow all year round except during prolonged dry periods) should be signed with FLOODWAY (W5-7) or FORD (W5-6) signs respectively to warn road users of the possibility of encountering water.

The Australian Standards requires that, in addition to the standard approach warning signing, ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH sign (G9-21) and DEPTH INDICATOR (G9-22) signs also be provided on floodways and fords. While it may be possible to vary the standard requirements for remote areas to eliminate the need for these additional signs, it is considered that to do so may place road users at an increased risk if they were to attempt to cross without knowledge of the water depth. So it is considered that all genuine water courses should be provided with the full treatment similar to that shown in the diagram.



For Dimensions A and B, see Table 2

Typical Floodway layout

Where there are a number of floodways at intervals not exceeding 2.0km, then a FLOODWAYS or a FORD sign combined with a distance plate NEXT … KM (W8-17-1) and a single ROAD SUBJECT TO FLOODING, INDICATORS SHOW DEPTH sign may be used in advance of the first floodway or ford in each direction, and DEPTH INDICATOR signs located at each point.

6.7 Road narrows

Where a significant narrowing of the road pavement occurs ROAD NARROWS (W4-3) signs should be installed in accordance with distances shown in Table 2, measured from the narrowing. Other treatments such as a tapered line of guide posts or width markers at the narrowest point could be considered but should not normally be necessary.

W4-3

6.8 Narrow Bridges

Warning of narrow bridges should be provided by installing NARROW BRIDGE (W4-1) in accordance with distances shown in Table 2, in advance of the bridge. On approaches where a bridge:

- is less than 5.5m in width, or
- is significantly narrower (more than 2.0m) than the approach road width.

W4-1

In both of the above cases WIDTH MARKERS (D4-3) may be installed in the same manner as that for grids (refer to Section 6.10) Width markers may also be installed without NARROW BRIDGE signs at bridges that are narrower than the approach road but do not meet the requirements for advance warning signs.

D4-3

Where the bridge is narrower than 5.0m in width, ONE LANE (W8-16) supplementary signs should be provided below the NARROW BRIDGE signs.

W8-16

6.9 Railway Level Crossings

Railway level crossings should be treated as shown in AS1742.7-2007. It is important to remember that as traffic volumes are very low and sight distances are usually good, it is often the case that the minimum treatments suggested in the standard would provide adequate warning.

6.10 Grids

The GRID sign (W5-16) shall be used to warn of a stock grid on the road. All grids shall be provided with advance warning signs, guide posts and hazard markers in accordance with the diagram.

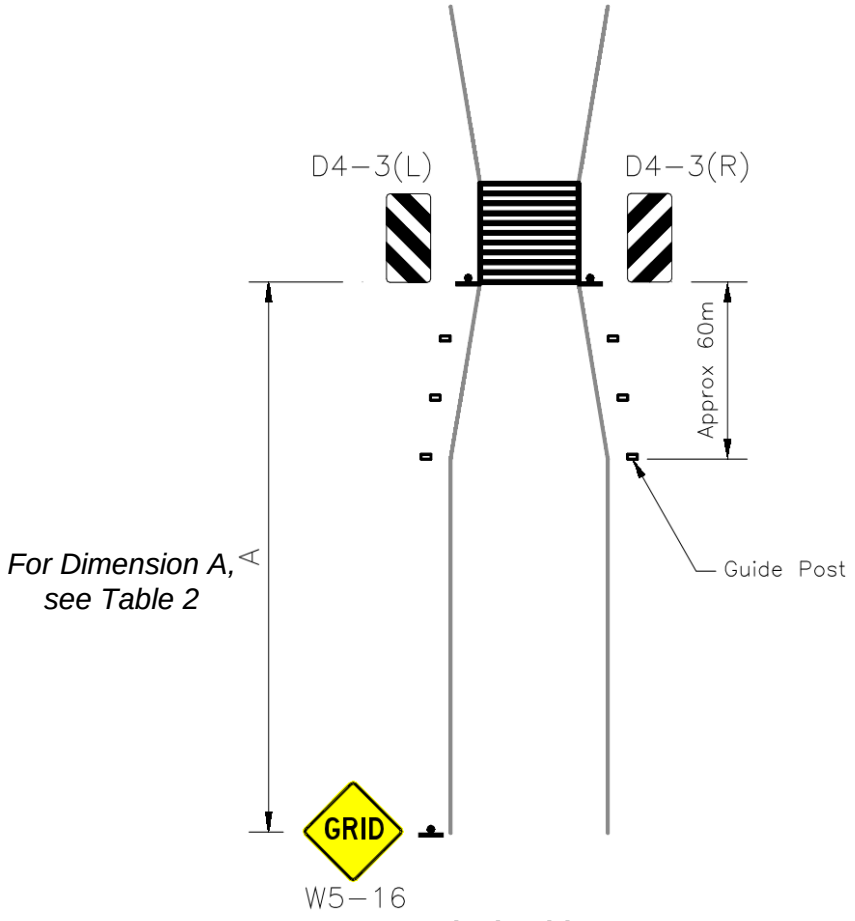
W5-16

In most cases, the grid is narrower than the road formation. The guide posts are intended to delineate the pathway while the hazard markers indicate the *exact* width of the grid.

It is important that the three guide posts and the hazard markers on the grid form a taper from the road formation edge to the narrowest point over the grid. The hazard markers should be low and placed laterally, such that the roadside edge of the marker is exactly in line with the edge of the travelled path over the grid.

Where the grid is narrower than 5.0m in width, ONE LANE (W8-16) supplementary signs should be provided below the GRID signs.

Photo 7 – Correct guide post installation at a grip



Typical Grid Layout

6.11 Stock Races

Stock races (used instead of grids in some cases) may be treated in the same manner as narrow bridges. Refer to Section 6.8.

6.12 Stock, Native and Ferrel Animals on Roads

Roads in remote areas are typically unfenced. Stock and other animals travel great distances for food and water. In view of this, it is very difficult to identify and sign every specific location where stock may be encountered crossing or wandering along a road. It is also apparent that Stock and Kangaroo warning signs have been installed in the past at inappropriate locations or in areas where stock now no longer congregate. The inappropriate use of such signs has served to reduce the credibility and effectiveness of such signs.

Photo 8 – Stock on road

In fact, it would be impossible to sign every location where animals may be encountered on a road. Even attempting to do so could be counterproductive because it may lead road users to believe that animals may only be expected where such individual signs exist.

Road users must therefore be expected to understand that there is a possibility of encountering animals at any time while driving on unfenced roads. This expectation certainly exists in the minds of road users familiar with remote area travel. Even tourists unfamiliar with travelling in the outback are warned in tourist brochures, maps and other information of the dangers of encountering animals on the road.

So, for remote areas it is preferred to reinforce the information and expectation road users already have about animals by installing general information warning signs.

An attempt has been made by other authorities (including on DPTI maintained roads) to warn road users of animals by installing non-standard warning signs, usually near pastoral lease boundaries. Unfortunately these signs are too small to safely comprehend and are usually installed in conjunction with grid treatments; locations at which road users are and should be concentrating on negotiating the grid.

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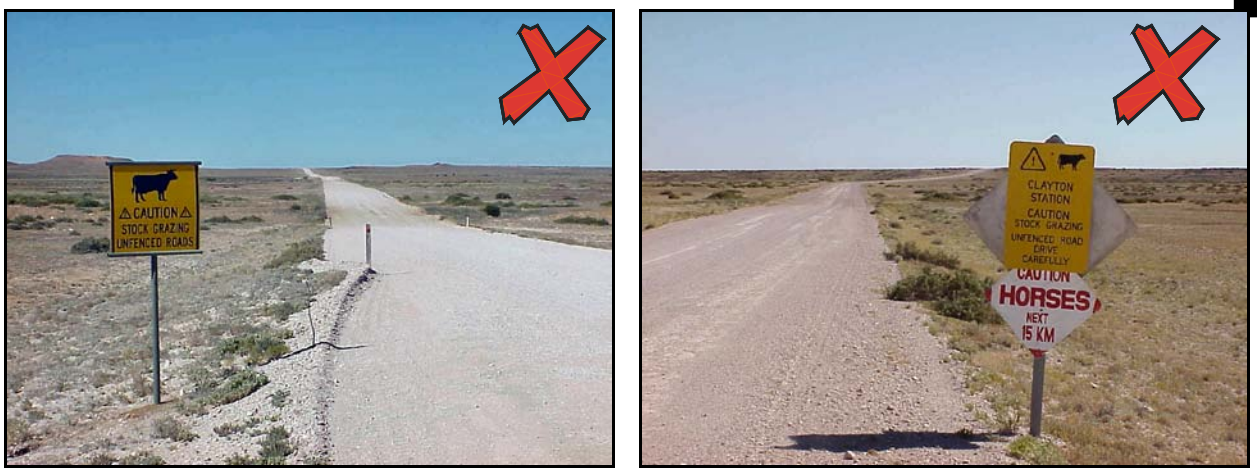

Photos 9 and 10 – Non-standard stock warning signs

It is considered that the standard sign STATION NAME, UNFENCED ROAD, WATCH FOR WANDERING STOCK sign (TES 15006 and TES 15007) shown below, be provided on the high speed sealed network and on Primary Outback roads (refer to Appendix B), where one should be placed at the start of the road where it leaves the sealed network and one at each station boundary change.

Sign Dimensions (mm):
15006/7A = 2250 x 1800
15006/7B = 3000 x 2100
15006/7C = 2250 x 1650

NOTE: *TES 15007 shows a standard cow only warning symbol and is to be used on unfenced roads north of the Dog Fence*

TES 15006 – Watch for Wandering Animals warning sign

Smaller, un-named signs (TES 19000 and TES 19001) shown below, are to be provided at the start of Secondary and Minor Outback roads (refer to Appendix B) where they leave the sealed network (or where the unfenced section begins) or a Primary Outback road.

Sign Dimensions (mm):
19000/1 = 2250 x 1350

NOTE: *TES 19001 shows a standard cow only warning symbol and is to be used on unfenced roads north of the Dog Fence*

TES 19000 – Watch for Wandering Animals warning sign

Where a grid or other feature exists at the boundary, the erection of a small 'Station Name' sign (use G6-2, refer to Section 6.15) may be installed.

It should be noted that all existing non-standard signs such as those shown in the photos above and existing standard signs installed at individual sites where animals are no more likely to be than in general, should be removed.

6.13 Stock Droving

For issues relating to stock droving south of the Dog Fence, refer to the Stock on Road Guidelines (DOCS_AND_FILES-#2002795-Tass Publications Stock_on_Road_2006).

6.14 Hazardous Wildlife

Hazardous wildlife signs shall be used to warn road users of the unexpected presence of wild animals on the road which may be hazardous to road users. Hazardous wildlife signs consist of the following animals; kangaroo, camel, emu, wild horse, koala and wombat.

Signs shall be used only where hazardous wild animal activity is most likely to occur. Distance plates shall not be used with theses signs except for short distances over which animal activity is known to be continuous.

W5-29 W5-44 W5-45 W5-46 W5-47 W5-48

Hazardous Wildlife Warning Signs

Where there are two or more types of animal that may be a hazard at a particular location, the WILD ANIMALS sign (W5-49) may be used. The alternative of using the WILD ANIMALS sign is to sign only the animal of greatest threat even though other kinds may be a potential hazard.

W5-49

Note: this Instruction does not specify symbolic warning signs for small animals. Refer to AS1742-2009 Appendix H for signs for wildlife awareness.

6.15 Geographical Features

Remote areas are particularly hazardous to stranded or injured road users. There is also a noticeable absence of features of reference in the case of incidents. For this reason it is considered important to sign as many features as possible.

G6-2 beneath a standard warning sign

A GEOGRAPHICAL FEATURE (G2-6) sign should be used where possible. It can be installed independently or, in the case of a feature already warning signed it can be attached below the standard warning sign.

Access to Homesteads (as described in "Treatments at Intersections" refer to Section 7.3.7) should also be signed with the appropriate property name.

6.16 Kilometre Plates (also known as Distance Markers)

KILOMETRE PLATES (G10-3) are more important on unsealed roads in remote areas than they are on sealed, higher volume roads. As well as providing information to road users regarding the long distances to travel, they also provide a useful reference point to the location of an accident which can be reported to authorities.

Consequently, KILOMETRE PLATES should be installed on all primary outback roads at maximum intervals of 5km. They should indicate a distance to the next major destination at which some form of service is available.
The location shown on the plates must coincide with the destinations shown on direction signs along that road, if such signs exist.

G10-3

The KILOMETRE PLATES are installed 'back-to-back' with zero/five increments installed on the left hand side of the road running in the direction of the road (according to DPTI's road centreline system). The accurate distance to townships or communities in the opposite direction shall be shown on the reverse side. It is important that the distance information shown on the signs is accurate.

6.17 Guide Posts

Guide posts are *not* normally required on straight lengths of road. However, they are required on **all** curves/turns and on the approaches to grids.

They should also be installed in pairs, one each side of the road formation at culverts and other potentially hazardous obstacles to highlight a "drop off" which may cause vehicle damage or injury to road users.

6.18 Temporary Hazards

Road users need to be warned of any temporary traffic hazards such as that shown in photograph 11. The standard for 'Works on Roads' (AS1742.3-2009) recommends the use of TRAFFIC HAZARD signs (T1-10) signs as a temporary measure, with either the road to be repaired within 24 hours or a sign to be placed which advises of the nature of the hazard.

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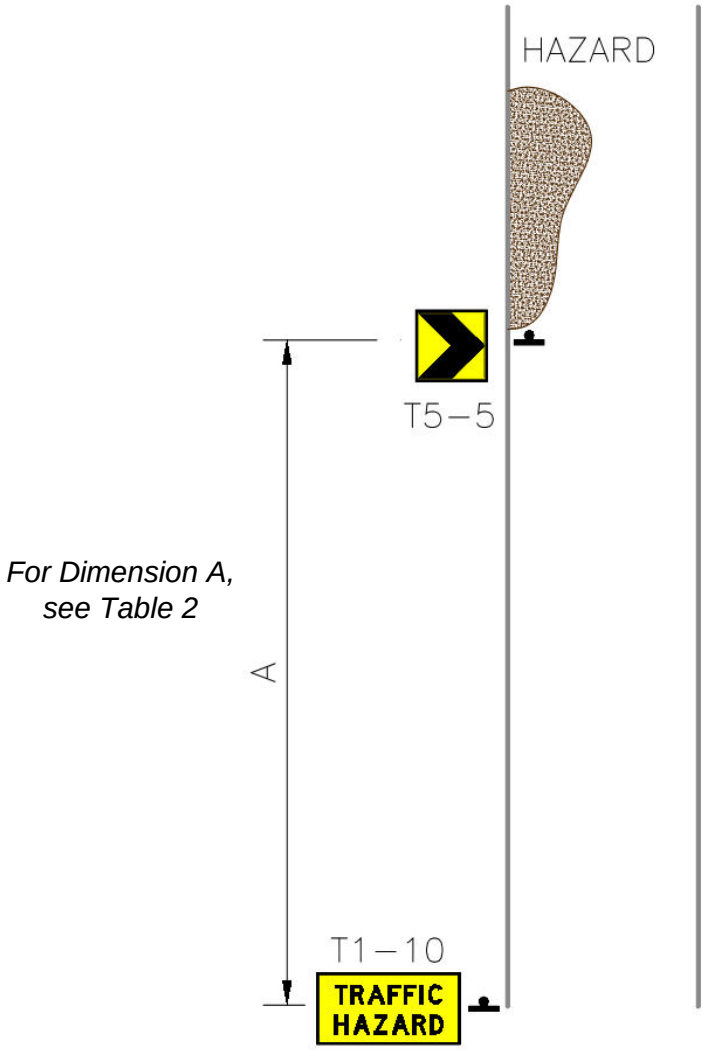
T1-10

In remote areas this 24 hour time requirement is, in most cases, unrealistic. However, it is considered appropriate and reasonable that the TRAFFIC HAZARD sign be displayed in advance of the hazard as soon as possible after the damage is seen or reported. Additional devices such as one or more TEMPORARY HAZARD MARKERS (T5-5) may also be necessary to define the actual hazard until such time as the road can be repaired.

T5-5

An attempt has been made to highlight the hazard in the photo below with a wooden stake and small piece of fluorescent tape. This treatment is considered inadequate.

Photo 11 – Inadequate warning for temporary traffic hazards



Typical Hazard Layout

Road users should also be warned of temporary water hazards, except those at floodways which are provided with flood indicators and signs, with WATER OVER ROAD signs (T2-13). The signs should be displayed as soon as possible after flooding and removed as soon as possible after the hazard has cleared. The TEMPORARY HAZARD MARKER (T5-5) is not generally used with WATER OVER ROAD signs.

T2-13

To enable these signs to be carried by Regional and Maintenance officers, lighter versions of the signs, made from a light polycarbonate material for ongoing use or a flute board material such as “Corflute” for short term or disposable use.

6.19 Advertising Signs

Information to road users about the services available in local communities can play an important role in road safety. Providing the information in the form of roadside traffic signs as a supplement to information on road maps and tourist brochures can assist in reducing driver fatigue and frustration, while increasing the confidence of drivers and the enjoyment of passengers, particularly when travelling in remote areas.

However, such signing has often been left to private business operators to provide in the form of commercial “advertising”. These signs are inconsistent in design, usually contain third party “sponsorship” advertising, are often unsympathetic to local environment and are distracting and therefore potentially hazardous to road users. Such signs can also ‘hide’ DPTI signs installed for road safety as shown in the photo 12.

Photo 12 – Unacceptable advertising sign

Operational Instruction 19.6 Roadside Advertising in Unincorporated Areas, clearly states that such private advertising is not permitted in most cases and should be removed. In regard to this document, it is clear that such signing should at least be removed where it is unsightly, is difficult to read or where it could potentially cause a hazard to road users. Of particular concern are advertising signs that resemble traffic control devices, as can be seen in photo 13, as it is illegal under the Planning Act and the Road Traffic Act.

Photo 13 – Unacceptable advertising sign

6.20 Township Entrance Signs

These signs are not DPTI signs. They are usually provided by the South Australian Tourist Commission (SATC) or by a local community group. While DPTI supports the use of such signs, it is important that they be spaced well clear (Distance B in Table 2) from other signs and are located such that they do not interfere with DPTI maintenance activities.

The Region should be involved in the selection of a site for each sign, taking into consideration road safety and maintenance issues. In view of the potential litigation issues, the most appropriate approach is for DPTI to take responsibility for the sign and the location and seek recovery of costs from the SATC or local community group. DPTI should always retain the right to remove, relocate or insist on changes to the sign as it deems necessary.

Photo 14 – Acceptable town entrance sign, however placement of signs are too close and there are numerous non-standard signs.

7. Application of Treatments At Intersections

7.1 Regulatory Signs

STOP or GIVE WAY signs shall only be installed on the side road (or minor road) approaches to intersections.

GIVE WAY signs (R1-2) shall be provided at any three-way intersection where the layout of the road is such that it is not clear how or whether the T-intersection rule would operate, for example at a Y-intersection.

R1-2

STOP signs (R1-1) shall only be installed on side (or minor road) approaches where the sight distance restrictions in AS1742.2-2009 Clause 2.5.3 are met. It is very unlikely that any intersection in remote areas will require STOP signs.

R1-1

Before either STOP or GIVE WAY signs (or any other regulatory signs) are installed, altered or removed, a Traffic Impact Statement, endorsed by a Recognised Traffic Engineering Practitioner must be prepared. The Regional Manager may then authorise the installation on behalf of the Commissioner of Highways with the endorsement of the Manager, TASS. Further information on the authorisation of traffic control devices is available from the Unit Manager, Traffic Regulations and Standards, TASS.

Photo 15 – STOP signs should not be installed as there is excellent sight distance in each direction.

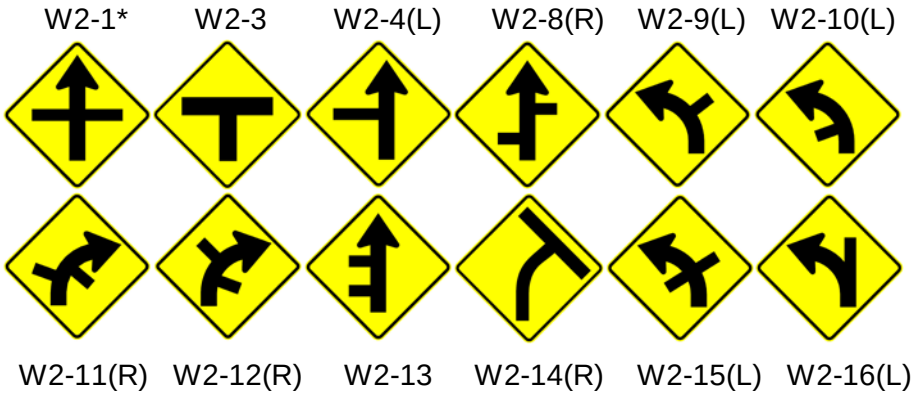
7.2 Intersection Warning Signs

On main roads, generally the continuing road, warning signs should only be installed on the approaches to intersections where there is insufficient sight distance to a vehicle about to enter the intersection from an intersecting road. Each main road approach should be considered separately, as a sign may not be necessary on both approaches. Notwithstanding the above, signs may also be required where the importance of the intersection or an unusual intersection layout is not readily discernible.

Warning signs should not be used where direction signs, other traffic control devices or geometric cues give sufficient information to ensure road users would be aware of the existence of the intersection.

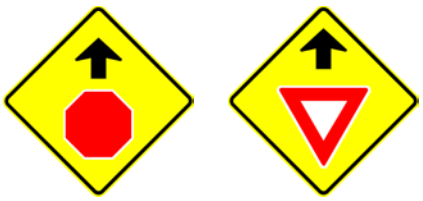
Where side roads intersect main roads on curves and safe stopping sight distance is not available, combination curve and intersection signs may be used.

However, it is important to note that, in most cases in remote areas, intersection warning signs, whether the intersection is on a straight or a curve, are unlikely to be required.



For the full list of current intersection signs refer to AS1742.2-2009 and DPTI's Standard Sign Index http://www.dteiapps.com.au/signindx/

On approaches controlled with either STOP or GIVE WAY signs, intersection warning signs shall not be used. Instead, in exceptional circumstances only, such as where less than stopping sight distances exist to STOP or GIVE WAY signs, or where the existence of the STOP or GIVE WAY are unexpected, STOP SIGN AHEAD or GIVE WAY SIGN AHEAD (W3-1 or W3-2) may be used.



W3-1 *W3-2*

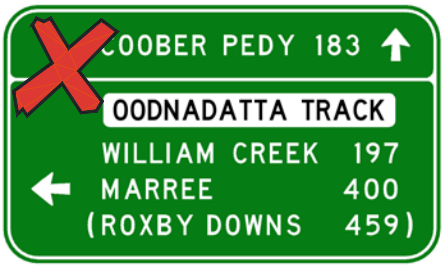
It should be noted that turn and curve warning signs in the W1 series are not to be used. Refer to Section 6.1.4 for use of the W1 Series. Where side road intersections exist on curves, it will not normally be necessary to warn of the intersection because stopping sight distances will be available. However, where stopping sight distances is not available to the intersection from the main road, combination curve and intersection signs in the W2 series, may be required.

**NOTE: For cross road intersections without a give way or stop sign control, cross road signs shall not indicate priority i.e. arrowhead and narrower side roads. In such cases cross road warning sign TES 18903 shall be provided.*

7.3 Guide Signs

Guide signs are important to unfamiliar road users by providing route names and some information about destinations. They act as a valuable supplement to other information carried by road users, such as maps and printed tourist promotional material.

Existing REMOTE AREA DIRECTION signs will be replaced with signing treatments more in line with Australian Standards. More information is available from TASS.



Remote Area Direction Sign

Guide signs can be divided into 4 main categories:

- Direction Signs
- Tourist Signs
- Service Signs
- Information Signs

These signs are generally specific to each location. The signs are allocated a specific "TES" asset number and are designed individually by TASS to suit each location specified by the Region.

The first three categories of signs listed above provide information to road users regarding destination and route name (white legend on green background), tourist information (white legend on brown background) and service facilities (white legend on blue background). The information may be provided separately, although wherever possible a single sign with all of the information should be provided.

The need for direction, tourist and service signs varies with the functional characteristics of the intersecting roads. When deciding on the destinations and other information for direction signs, it is important to be consistent with information provided on other signs within the total road network.

7.3.1 Advance Direction (AD) Signs

ADVANCE DIRECTION signs shall be installed on all approaches of National Highway, State Arterial, Primary and Secondary outback road intersections. They may also be installed on Primary and Secondary outback road approaches to other unsealed roads but are rarely required on the other lower category road approaches to intersections in remote areas. AD's shall not have more than three destinations or two destinations plus a road name, shown in any one direction.

Advance Direction Sign

7.3.2 Intersection Direction (ID) Signs

INTERSECTION DIRECTION signs are primarily used as a supplement to AD signs. They are installed at the intersection to indicate the point of turn.

Intersection Direction Sign

They may also be installed (without AD signs) at intersections of roads of lesser categories. A maximum of three destinations or two destinations plus a road name may be shown on an ID sign. If AD signs have been provided, the information shown on the ID sign shall match that shown on the AD sign. ID signs may also be used in conjunction with Service signs and Tourist signs.

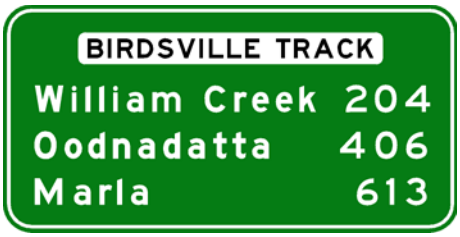
Intersection Direction Sign with distances

In remote areas only on Minor outback roads, where it is not intended to install a REASSURANCE DIRECTION (RD) sign on the exit of an intersection, distances may be included on the ID sign. However, where it is intended to indicate more than three destinations or two destinations plus a road name, RD signs and standard ID signs (without distances) shall be provided.

FINGERBOARDS (FB) signs should generally not be installed with ID signs. If necessary, FB signs may be installed on a different corner of the intersection. FB signs are discussed below.

7.3.3 Reassurance Direction (RD) Signs

REASSURANCE DIRECTION signs shall be installed on the exit of National Highway, State Arterial, Primary and Secondary outback road intersections. They shall also be installed on the exits of townships on National Highway, State Arterial, Primary and Secondary roads.

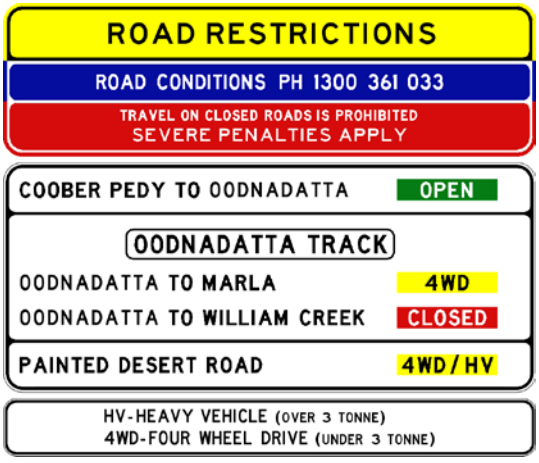


Reassurance Direction Sign

They shall indicate distances to destination along the route, to a maximum of five destinations, which have at least the basic services, specifically food, fuel, accommodation and amenity services.

7.3.4 Remote Area Road Restrictions Warning Signs

REMOTE AREA ROAD RESTRICTIONS WARNING signs are signs advising road users of the accessibility of rural roads in remote areas (e.g. open/closed roads, or roads accessible to 4WD or heavy vehicles only). Such signs shall only be installed on primary access road entry points from the sealed National and State road networks, exit points from Primary unsealed roads and exits from remote townships (e.g. Oodnadatta, Maree etc).



Remote Area Road Restrictions Warning Sign

7.3.5 Service Signs

SERVICE signs indicate services available in townships or local communities. In most cases, SERVICE signs will be installed within towns to give direction to services that are away from the main road. They are not normally required for facilities which are on the main road because those business operators have the opportunity to advertise on their premises directly to passing traffic. SERVICE signs may be installed either alone or in the case of major intersections, in conjunction with AD and ID signs.

Service Sign (G7-3-4)

NEXT SERVICE X KM signs should not be used where RD and ID signs have been installed. Existing signs should be removed where possible.

'Next' Service Sign

7.3.6 Tourist Signs

TOURIST signs indicate tourist attractions of a relatively high quality. To qualify for signing they must meet the guidelines set down by the SATC in the "Tourist Signposting Policy". The policy includes information about funding and maintenance responsibility.

Tourist Sign with Service Supplementary Plate

TOURIST signs must also conform to certain National Standards such as AS1742.6-2004 which covers issues such as too much information, correct letter sizes and the use of colour and symbols. Such signs as the two below are clearly non-standard.

Photo 16 – Non-standard Tourist sign (too much information and wrong font size)

Photo 17 – Non-standard Tourist sign (handmade sign, non compliance to Spec.)

TASS is available to assist the Region in determining individual issues relating to tourist signing and will coordinate the preparation of tourist sign designs where necessary.

7.3.7 Fingerboard (FB) Signs

FINGERBOARD (G3-SA6) signs, e.g. Homestead Fingerboard signs, Service Fingerboard signs, Tourist Fingerboard signs, Direction Fingerboard signs.

Homestead FB signs are used to indicate the most direct access to homesteads. Homestead FB signs are to be black legend on white background.

The TOURIST and SERVICE FB signs may be used on Primary outback roads to indicate places of lower significance than those included on TOURIST and SERVICE signs. They may also be used along the minor road route from Primary outback roads where the larger TOURIST and SERVICE signs have been provided. TOURIST FB signs to be white legend on brown background. SERVICE FB signs to be white legend on blue background.

DIRECTION FB signs may be used instead of AD, ID and RD signs on minor roads or on Primary outback roads to indicate locations along side roads of a lesser category. DIRECTION FB signs to be white legend on green background.

7.3.8 Remote Area Information Signs

REMOTE AREA INFORMATION signs remind drivers of the special hazards associated with travelling on unsealed roads in remote areas. Although the signs are large, they display too much information to be read and understood by drivers as they pass by. Consequently they must be positioned such that drivers can “pull-over” in front of the sign to read the information.

It is suggested that the signs only be used at the start of Primary outback roads where they exit from the National Highway and sealed State Arterial road network.

TES 10753

8. Installation and Maintenance of Traffic Control Devices

To avoid interference with road maintenance activities such as grading, signs should be installed away from the road formation edge laterally approximately 1.5m. Due to the variable nature of the ground it is important that signs be installed with concrete footings where possible.

To avoid bolt home elongation caused by sign vibration, all C size warning signs shall be constructed of 2.0mm aluminium substrate or be strutted (in accordance with current DPTI sign manufacturing specification – Master Specification Part 248 Supply of Signs and Supports). All signs must be bolted firmly to posts.

Warning signs should be installed at a height of approximately 1.3m to the bottom of the *main* sign. Supplementary sign plates installed below the main sign may be lower. In pedestrian areas, e.g. on footpaths in townships, signs shall be mounted at a height of at least 2.0m to the bottom of the signs, including any additional supplementary plates.

Width markers on obstructions shall be installed low and directly in line with the edge of the obstruction.

Maintenance procedures for road signs (and other traffic control devices) should be in accordance with the standard Maintenance Contract Specification. Signs should be regularly inspected. In addition, particular attention should be paid to issues specific to unsealed roads, listed below:

- Missing signs must be replaced as soon as possible and loosely attached signs should be re-attached firmly to avoid wind movements further loosening bolts or enlarge bolt holes.
- Sign posts should be maintained to a truly vertical position with all sign level.
- Dirt, diesel exhaust and other contaminates can significantly reduce the effectiveness of road signs, particularly at night. Signs should be cleaned in accordance with manufacturer's specifications.
- Signs installed in accordance with this guideline, will be necessary for the safe movement of traffic. Any signs which are missing or are damaged or signs that cannot be effectively cleaned must be replaced as soon as practicable.
- Guide posts and their delineators provide important delineation through or past a hazard. They should be maintained, cleaned, straightened or replaced where necessary. Vegetation around the base of the guide post should be cleared.
- Vegetation growth can obscure road signs. Vegetation should be removed or the sign relocated.

8.1 Examples of poor installation and maintenance of signs

Photo 18 – Wrong hazard markers used and signs in very poor condition

Photo 19 – Sign in very poor condition

Photo 20 – Signs installed too close and speed de-restriction is not to be used in SA

Photo 21 – Signs installed too close

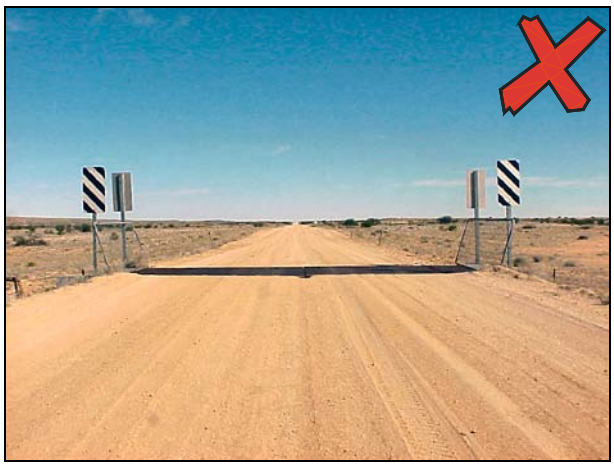


Photo 22 – Hazard boards installed too high, both are left construction markers and signs not in line laterally with obstruction

Photo 23 – Sign missing and post installed too close to road edge

Appendix A Outback Roads Classifications (Knet# 2131460)

PRIMARY OUTBACK ROAD

- Primary Access to Regional Centres
- Primary Access to Major Industrial/Mining Areas
- Major Freight Route
- Major Interstate Tourist/Commuter Route

Standards
- Formed and sheeted 10m width
- 1.5 – 2.5m table drain
- Drainage structures to allow short term closures only
- Full signage and delineation
- Rest areas/truck parks 80 – 120km apart

SECONDARY OUTBACK ROAD

- Primary Access to Communities
- Secondary Access to Regional Communities
- Moderate Freight Route
- Major State or Minor Interstate Tourist Route
- Access to Essential Services, eg. airstrips

Standards
- Formed 9m width
- Sheeted in boggy and/or rough areas
- 1.5 – 2.5m table drain
- Drainage structures to allow moderate term closures only
- Full signage
- Delineation on curves

MINOR OUTBACK ROAD

- Secondary Access to Communities
- Seasonal/Infrequent Freight Route
- Minor Tourist Route
- Property Access Collector Route

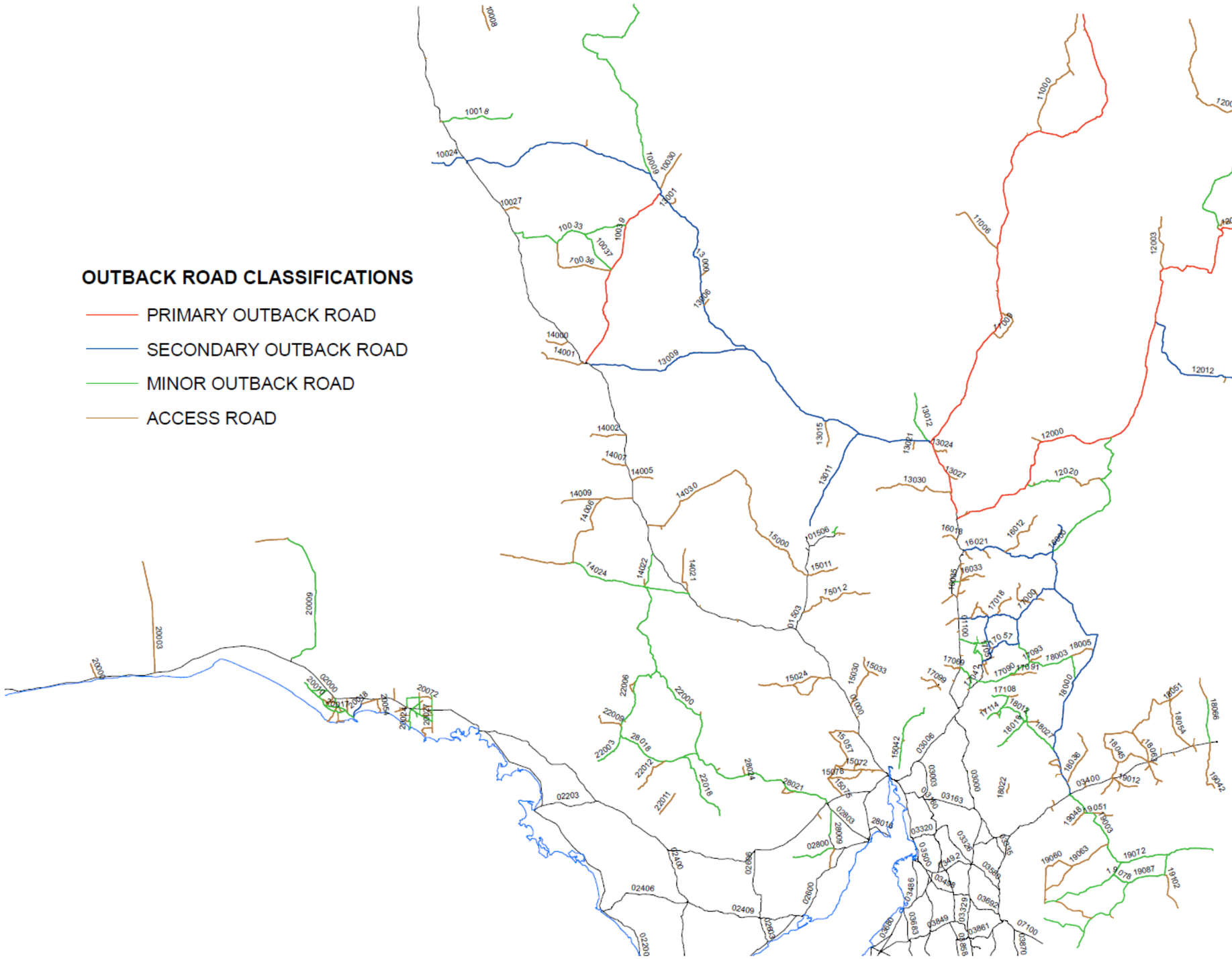
Standards
- Formed 8m width
- Sheeted in boggy and/or rough areas
- Drainage from formation
- Warning signage
- Delineation on curves

ACCESS ROAD

- Local Access to Dwellings, Tourist Attractions and Non-essential Fascilities
- Restricted Tourist Route

Standards
- Graded 6m width
- Drainage from surface where possible
- Hazard warnings

Appendix B Outback Road Classification – Map of Network (KNet# 3960265)



Appendix C Installation and Location of Signs

Table D1 from AS1742.2-2009

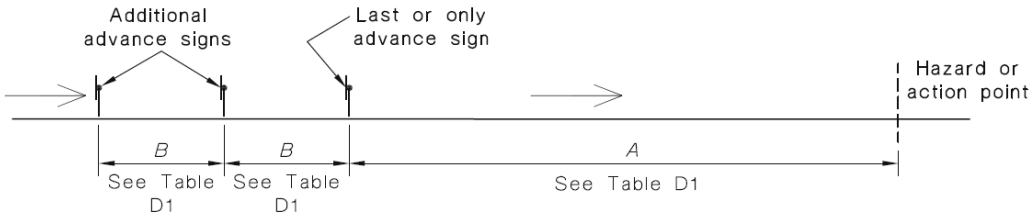


FIGURE D1 ADVANCE SIGN DISTANCES

TABLE D1

LOCATION OF WARNING SIGNS IN ADVANCE OF A HAZARD

metres

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	W3-2 Give Way Sign Ahead W3-1 Stop sign Ahead W2-3 T junction (sign on minor road) W5-7 FLOODWAY W4-8 LOW CLEARANCE _·_ m
	(ii) Significant speed reduction required	60–80	80–120	120–180	Signs in the Turn Sign Zone in Figure 4.5 W5-20 Slippery W2-7 Roundabout ahead
	(iii) Low to moderate speed reduction required – or no speed reduction	40–60	60–80	80–120	Signs in the Curve Sign Zone in Figure 4.5 W5-3 Aircraft W4-4 Divided road 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.