



Heavy Vehicle Operations

GUIDELINES FOR ASSESSING THE SUITABILITY OF ROUTES FOR RESTRICTED ACCESS VEHICLES

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FOREWORD

This revised version of the guidelines is similar in technical content to the previous version, but incorporates a number of amendments and clarifications in the following areas:

- Bridge width requirements (page 4);
- Overhead clearance (page 4);
- Rural road widths (page 5), specifically for very low volume roads (Appendix B Section B on page 24);
- Provision for overtaking (page 9);
- Grade requirements (page 11);
- Turning at intersections (page 13);
- Railway level crossings (page 15);
- Community considerations (page 20);
- Stopping sight distance (Appendix D on page 26); and
- Route assessment form and route survey form (Appendix I on page 31).

This version has taken account of feedback to Main Roads gained from the application of these guidelines and a consultation process with stakeholders.

1. INTRODUCTION

1.1 General

These guidelines have been prepared by Main Roads Western Australia to assist Local Government, Main Roads' staff and consultants in assessing the suitability of routes proposed for the operation of Restricted Access Vehicles (RAVs) on urban, rural and townsite roads.

The guidelines provide for the assessment of routes for three levels of RAV access. These levels are grouped to cover certain sizes of vehicles, as set out in Section Two of the Main Roads WA Restricted Access Vehicles Class 2 - 3 Period Permit Operating Conditions:

- RAVs Categories 2-4 (e.g. pocket road train, B-Double, and other RAVs with a maximum length of either 25.0 m or 27.5 m);
- RAVs Categories 5-8 (e.g. rigid truck plus two dog trailers, B-double towing dog, and other RAVs with a maximum length of 36.5 m); and
- RAVs Categories 9-10 (e.g. triple road train, B-double towing two dogs, and other RAVs with a maximum length of 53.5 m).

The guidelines are intended to assist assessors in ensuring that the major relevant factors have been considered in the route assessment process.

Where quantitative limits are recommended, they are intended as a guide only and are no substitute for common sense and judgement based on experience. In certain cases, routes which do not meet the requirements outlined in this document can be accepted as RAV routes by imposing additional conditions, such as speed restrictions, curfew etc.

Should an aspect of a route clearly fail to conform to these guidelines in a manner which cannot be suitably addressed, resulting in a compromise of road safety, the route should be considered unsuitable for RAV access.

The information used in preparation of this document has been obtained from various internal and external sources and incorporates the latest reference material available at this time.

Appendix A (page 22) is a glossary of the terms used throughout these guidelines.

1.2 Assessment Requirements

Route assessment should be undertaken by a person who has experience with the heavy transport industry and a substantial knowledge of the following:

- the principles of heavy vehicle operation, including vehicle configurations, maximum dimensions and axle load limits;
- limitations on the ability of heavy vehicles to accelerate, brake, ascend grades and negotiate corners;
- heavy transport issues, legal requirements and permit systems;

- road and traffic engineering; and
- road safety concepts and principles.

When considering a potential route, the assessor is advised to initially perform a desktop assessment using all available information. In some cases this initial assessment will identify particular physical constraints, such as bridge load limits and road width deficiencies, which may render the route unacceptable without the need for further assessment.

Heavy vehicle use of a route may have some negative effects in terms of the environment, community and traffic. Assessors can recommend variations to the initially proposed route to reduce such impacts.

Note:

Before using a RAV on any road, it is necessary to obtain the approval of Main Roads Western Australia. Before making a decision on an application for route access, Main Roads may deem it necessary to do any or all of the following:

- **perform a further assessment of the route;**
- **assess the stability of the vehicle and load;**
- **assess the suitability of the road pavement;**
- **assess the suitability of all bridges on the proposed route to accommodate the specific vehicle;**
- **specify conditions of access such as speed limits, hours of operation or accreditation requirements;**
- **obtain Local Government agreement for the proposed route (for all operators); and**
- **recommend a number of road improvements as conditions of approval.**

1.3 Further Assistance

Additional information and guidance is available from Main Roads Heavy Vehicle Operations Branch Policy and Access Planning Section on telephone (08) 9311 8450.

2. SAFETY REQUIREMENTS

2.1 Bridges

2.1.1 Load Capacity

All bridges on the requested route will be assessed by Main Roads' Structures Engineering Branch, by arrangement with Heavy Vehicle Operations, where RAV impacts could be of concern.

Consultation with Local Governments is required to ensure all structures on Local Government roads have been accurately considered in the structural analysis completed by Main Roads.

2.1.2 Width Requirements

Table 1: Minimum Width between Bridge Kerbs

AADT	Minimum Bridge Width Between Bridge Kerbs m	Quality of Bridge Approaches
Less than 75	3.5*	Bridges with adequate Stopping Sight Distance (SSD)**.
75 to 150	5.3	Bridges with adequate SSD, clearly signed and road clearly marked.
	7.0	Bridges that have inadequate SSD, inadequate signage or no road markings.
150 to 500	5.8	Bridges with adequate SSD, clearly signed and road clearly marked.
	7.2	Bridges that have inadequate SSD, inadequate signage or no road markings.
More than 500	7.2	All bridges at this traffic volume

*Conditions apply; refer to 2.3.5 (page 7) and Appendix B Section B (page 24);

**RAV Stopping Sight Distance should be measured from a truck driver's eye height of 2.4 m. Minimum requirements for SSD refer to Appendix D (page 26).

2.2 Overhead Clearance

Although applicable for all vehicles, RAVs with long and high loads are particularly vulnerable to striking low overhead obstructions. Route assessments must confirm that adequate overhead clearances between the top of the RAVs and the overhead obstructions are available, as follows:

- Overhead obstructions (except power lines) - 300 mm
- Power lines - at least the minimum clearance required by telecommunications and electrical transmission cable providers, which may be more than 300 mm.

Where telecommunications and/or electrical transmission cables cross the route, the minimum overhead clearance available **must be obtained from the controllers** in Table 2 (on the following page).

Note: FOR SAFETY REASONS, NO ATTEMPT SHOULD BE MADE TO MEASURE THE HEIGHT OF OVERHEAD CABLES.

Table 2: Overhead Telecommunication and Electrical Transmission Cable Controllers

NAME	CONTACT NUMBER	AREAS OF OPERATION
Public Transport Authority	08 9326 2722	Metropolitan Passenger Rail Network
Westnet Rail Senior Signal Superintendent	08 9212 2826 0429 908 254 (AH)	Toodyay to Kalgoorlie via Northam, Great Southern, Mid West and South West
BHP BHP IOSA Inspector	0418 372 407	Newman and surrounding areas including Yandicoogina
Pilbara Iron (Hamersley and Robe)	08 9143 5432	Dampier, Tom Price, Yandicoogina, Paraburdoo, Wickham, Pannawonica, Newman area
Transalta Regional Control Centre	08 9091 0150	Norseman, Kambalda, Kalgoorlie, Leinster
Alinta Power Services Plant Manager	08 9158 1230	Port Hedland
Western Power Corporation	131 087	State wide (see note)
Telstra	1800 806 246	Metropolitan area, Widgiemooltha, Meekatharra.

(Note: If an overhead cable is not controlled by Western Power Corporation, it remains the assessor’s responsibility to confirm the available clearance from the relevant controller.)

2.3 Rural Road Widths

When the hauling unit of a RAV travels along a straight path over an uneven surface, the trailing units do not necessarily follow along the same path as the lead unit. This is defined as “off – tracking” and depends on several factors, including:

- the steering actions of the driver;
- vehicle configuration and coupling arrangements between units;
- misalignment of the axles;
- suspension (geometry, bump and roll steer effects) and tyre characteristics;
- vehicle length;
- external disturbances that include road roughness, cross-slope and side loading from wind-gusts; and
- speed of travel.

The maximum deviation in tracking over a straight section of road, when added to the width of the RAV, is termed the ‘swept width’. To safely accommodate the swept width of RAVs, adequate road width must be provided.

To assess the widths of rural roads outside townsites, tables of minimum carriageway widths and sealed widths to accommodate the swept width are listed at Appendix B (page 23 and 24). Roads outside townsites in remote areas are considered “rural” roads for width assessment purposes.

To be suitable for RAV access, a road should be sealed if AADT is over 150 and annual freight tonnage is over 300,000 tpa. The requirement for the pavement to be sealed is partly for safety reasons but more so for pavement preservation reasons. In the absence of any data, the following parameters may enable a judgement as to requiring a sealed pavement:

- uniform annual loaded RAV traffic volume more than 10 vehicles per day; or
- loaded RAV traffic volume more than 60 vehicles per day over a seasonal two month period.

When considering whether a road has adequate width, an assessment should also be made of any risks posed by:

- “blind” corners (curves);
- crests;
- pronounced cambers;
- surface roughness; and
- reduced sight distances.

Despite a road’s width being above the specified minimum in Appendix B (page 23 and 24), these factors may require additional width, application of additional RAV operating conditions, or in extreme cases, mean the route is unsuitable for RAV access.

2.3.1 Low Volume Road Width - Application of Appendix B Section A or B

In assessing road width, when traffic volume is less than 75 vehicles per day, the width of the road may either generally meet the width requirement in Appendix B Section A (page 23) or, if narrower, only generally meet the width requirement in Appendix B Section B (page 24). The assessment needs to first determine whether the road width is in accordance with Section A values, in which case RAV Operating Conditions as per Appendix G (page 29) are not mandatory. If the width fails to meet the requirement in Appendix B Section A, the width can then be assessed in accordance with Section B values, in which case RAV Operating Conditions as per Appendix G will apply.

2.3.2 Traffic Volume Consideration

It is important to use the most appropriate measure of traffic volume when applying Appendix B Section A and Section B.

For medium to high traffic roads, where AADT is more than 500, AADT will usually be a suitable measure of traffic volume. For low to medium traffic roads, where AADT is from 150 to 500, higher seasonal traffic volume may be a more appropriate measure of traffic volume. For these roads, the widths in Appendix B Section A are the relevant guidelines.

For very low traffic volume roads, where AADT is less than 75, with higher seasonal variations, obtaining a best estimate of such higher daily volumes (vpd) is recommended. Appendix B Section B only applies if AADT and any higher seasonal traffic volumes (vpd) are both less than 75. Otherwise, road width must be assessed using Appendix B Section A.

2.3.3 Assessing Route in Separate Sections

The route may be composed of a number of sections of road that vary in their standard and that would fall into different categories of RAV suitability, or require different operating conditions (e.g. for low volume roads). Width variation is a typical example of this principle. Where differing sections are reasonably long, it can be beneficial to separately assess each section as to its category of RAV access and any applicable operating conditions, i.e. assess the route by sections. Assessors should consider applying this method of assessment where there is a likely benefit.

2.3.4 Short Sections of Reduced Width

There may be short narrow sections along the route due to narrow bridges/culverts, roadside vegetation or short narrow sections of pavement. Provided narrow sections meet certain criteria, the minimum road width at such narrow sections need not be considered the actual width of the entire road for assessment purposes. In the absence of any clearly identified other risk factors, sections 2.3.5 and 2.3.6 below can be applied to assess the width deficiencies of narrow sections.

A narrow section of the road is defined as any short road section that has a width below the respective values in either of Appendix B Section A (page 23) or Section B (page 24).

2.3.5 Traffic Volume Less than 75 Vehicles per Day

This section only applies to low volume rural roads that do not meet the width requirement in Appendix B Section A, and for which the operating conditions in Appendix G (page 29) will apply to RAVs.

Where all narrow sections meet the following criteria, the minimum width of the remainder of the road can be considered to be the width of the road when assessing suitability according to Appendix B Section B, which also involves assessing the prevailing minimum sight distance and the RAV speed restriction:

- Narrow sections must not be less than 3.5 m wide;
- Each narrow section must not be more than 100 m long;
- A combination of narrow points that are all within a single 100 m length of road can be considered to be one single narrow section;
- Two adjacent narrow sections must not be within 150 m of each other;
- Continuous unbroken sight distance must extend from a point at least 150 m from each end of any narrow section through the narrow section to a point at least 150 m beyond the section, in both directions; and
- Combined length of narrow sections is no more than 10% of total road length. For the purpose of this assessment, all narrow sections shorter than 50 m shall be considered to have an effective length of 50 m.

If any narrow section fails to meet the 3.5 m minimum width criteria, the route shall be considered unsuitable for RAV access.

Where all narrow sections meet the 3.5 m minimum width criteria, but do not meet all the remaining criteria, the route shall be considered unsuitable for RAV access on a

two-way RAV traffic basis. However, the route may still be suitable for one-way RAV traffic only provided operating conditions as per Appendix B Section B (page 24) for a Type B road are applied.

2.3.6 Traffic Volume from 75 to 500 Vehicles per Day

This section only applies to low to medium volume roads that generally meet the width requirements in Appendix B Section A (page 23).

Where all narrow sections meet the following criteria, the minimum width of the remainder of the road can be considered to be the width of the road when assessing suitability according to Appendix B Section A.

- Narrow sections should not have carriageway width more than 1.3 m below Appendix B Section A values;
- For sealed road, narrow sections should not have sealed width more than 0.2 m below Appendix B Section A values;
- Each narrow section should not be more than 2 km long; and
- The combined length of narrow sections should not be more than 15% of total road length.

Similar principles may logically carry over to assessment of higher traffic volume roads; however the width deficiencies will need to be assessed on a case-by-case basis.

2.3.7 Signage

If a road is relatively narrow or has limited sight distance, assessors should consider whether the use of warning signs would improve safety. The information below gives some guidance to assessors, however assessors should consider a range of factors in each case, in judging the need for and value of warning signs.

Signage usually has the most value when warning of the presence of a reasonably significant risk that other road users may be less aware of or not expecting. Generally this principle means that a higher number of RAVs would need to be operating on such a section of road than at other points along that road or on similar roads in the area.

The need for “Trucks on Road” signs may be reduced where the following factors are present:

- roads are at least 5.5 m wide;
- roads are less than 500 m long (i.e. very short RAV access road);
- roads are only used by RAVs;
- roads have no adjoining side roads (e.g. private drive-ways);
- all other road users would be aware of RAVs operating on the road; and
- sight distance is always at least 250 m.

The assessor should note any recommended signage in the “Restricted Access Vehicles Route Assessment Form”, and when necessary as the pre-requirement of RAV access.

2.4 Townsite Road Widths

There are a number of width requirements to be considered for RAVs travelling in urban and townsite areas. As well as accommodating the additional swept width of RAVs, the width requirements for such activities as cycling and kerbside parking also need to be taken into account. The minimum road width requirements in townsite areas are listed in Appendix C (page 25).

Note: There is no 75 vehicles per day traffic volume upper limit as applies to narrower, very low volume rural roads.

The route should be further evaluated if the road width in townsite areas is less than the applicable width shown in Appendix C.

2.5 Provision for Overtaking

RAVs tend to operate at lower average speeds than light vehicles. If the road does not have sufficient overtaking opportunities, drivers of light vehicles may experience delays behind slower moving RAVs and in some cases may form “queues” of vehicles waiting to overtake. This may cause driver frustration and thereby increase the risk of drivers attempting to overtake when it is not safe. Therefore it is essential, from a road safety perspective, to have adequate overtaking opportunities on a RAV route.

It is recommended that AADT figures are used to assess overtaking opportunities, but the assessor should consider the impact of seasonal traffic during the assessment as the AADT could be less than seasonal peak traffic volume.

The volume of traffic and percentage of RAVs on the route affects the requirement for overtaking opportunities. To assess suitability of overtaking, an AADT derived using the Passenger Car Equivalence (PCE) factors (table 3) shall be used. PCE factors represent the equivalent number of light vehicles for a particular type of RAV or general access heavy vehicle. The use of PCE factors provides a derived AADT value that can then be used to better assess overtaking opportunities.

Table 3: Passenger Car Equivalence Factors for RAVs

Vehicle Types		PCE Factors on Flat Terrain	PCE Factors on Rolling Terrain
Austroads Class 2		1	1.3
Austroads Class 3 to 5		2	3.5
Austroads Class 6 to 9		2.5	5
Austroads Class 10	RAVs Categories 2-4	4	10
Austroads Class 11	RAVs Categories 5-8	4	10
Austroads Class 12	RAVs Categories 9-10	9	22

The suitability criteria for provision of overtaking opportunities are shown in Table 4 (on the following page). In all cases, the assessment of steep ascending grades in Section 2.6.1 (page 11) must be performed separately.

Table 4: Suitability Criteria for Overtaking Opportunities

AADT (Derived using PCE Factors)	Maximum AVERAGE distance per overtaking opportunity	Maximum distance between any two overtaking opportunities	Notes
500 or below	N/A	N/A	Provision of additional opportunities is usually not justified.
501 to 1000	15 km	30 km	
1001 to 1800	8 km	15 km	
1801 and above	5 km	10 km	At AADT > 2700, additional opportunities that exceed the criteria may be necessary.

If the road or highway does not meet these criteria, consideration shall be given to:

- whether access could be granted under curfew; and
- whether access could be granted at particular times of the year when the traffic volumes are lower.

For sections of road to be suitable for overtaking, there must be adequate overtaking sight distance. Overtaking sight distance is made up of two parts, being:

- Establishment distance - The length of clear visibility ahead in which a driver can establish that an overtaking opportunity exists and commence the overtaking manoeuvre.
- Continuation distance - The length of road ahead in which clear visibility remains available for a driver to complete the overtaking manoeuvre, or abandon the manoeuvre if necessary.

The percentage of road available for overtaking should include those lengths where the required minimum establishment distance is available in conjunction with the required minimum continuation distance, as shown in Table 5.

Table 5 Minimum 'Establishment' and 'Continuation' Sight Distances for Overtaking

Road Section Operating Speed (km/h)	Assumed Truck Speed (km/h)	Establishment Sight Distance (m)			Continuation Sight Distance (m)		
		RAVs Categories 2-4	RAVs Categories 5-8	RAVs Categories 9-10	RAVs Categories 2-4	RAVs Categories 5-8	RAVs Categories 9-10
70	60	600	640	690	320	360	420
80	69	740	790	860	400	450	510
90	77	890	950	1040	470	530	620
100	86	1070	1130	1240	560	630	740
110	94	1290	1310	1440	680	730	860

To measure the available sight distance for overtaking, a lower eye height of 1.05 m (for car driver) is recommended. Given this low eye height, most car drivers cannot adequately distinguish difference in sight distance for values greater than about 1000 m. Therefore, listed sight distance values greater than 1000 m can be assumed to be satisfied whenever the actual sight distance exceeds 1000 m.

2.6 Steep Ascending Grades

2.6.1 RAVs Losing Speed on Grades

The speed of RAVs ascending long and steep grades can be reduced to the extent that the speed differential is hazardous for vehicles approaching from behind. If possible, steep ascending grades should have overtaking lanes.

In some cases where an overtaking lane is not provided, the drivers of faster following vehicles may become frustrated and attempt an overtaking manoeuvre when unsafe to do so. Situations where RAV speeds fall to 40 km/h is considered the threshold at which drivers will seek to overtake a slower vehicle regardless of whether or not adequate sight distance is available.

Where grades, or consecutive combinations of varying grades, are longer than the distances in Table 6, it is recommended that the grade should have an additional climbing lane for RAVs.

Table 6: Maximum Distances (m) of Uphill Travel before Speeds are Reduced to 40 km/h

Grade %	RAVs Categories 2-4		RAVs Categories 5-8		RAVs Categories 9-10	
	80 km/h Approach Speed	100 km/h Approach Speed	80 km/h Approach Speed	100 km/h Approach Speed	80 km/h Approach Speed	100 km/h Approach Speed
3	*	*	*	*	1080	1650
4	950	1410	900	1350	690	1110
5	640	980	610	960	520	840
6	480	760	470	750	410	680
7	390	630	380	620	340	570
8	330	530	320	530	290	490

* RAV can maintain a higher speed than 40 km/h on these grades.

2.6.2 Grades Requirements to Avoid RAVs Stalling

For a route to be suitable for RAVs access there must be no steep grades that are in excess of the limits in Table 7.

Table 7: Grades Limits for RAVs

	Sealed Roads	Gravel Roads
RAVs Categories 2-4	8%	5%
RAVs Categories 5-8	6%	4%
RAVs Categories 9-10	5%	3%

2.7 RAV Acceleration Lanes

2.7.1 Length of Acceleration Lane

The following requirement for length of acceleration lane only strictly applies to situations where:

- the acceleration lane onto a highway or main road with a speed limit of at least 80 km/h and an AADT derived using the Passenger Car Equivalence factors (Table 3 page 9) is more than 1000; and
- there is no overtaking lane on the through road to overtake the RAV at or near the point of entry.

In other cases, it may still be desirable to apply the requirement.

To avoid an undue hazard or obstruction to traffic, the length of any acceleration lanes provided on the route should be sufficient to allow RAVs, when fully loaded, to accelerate to within 70% of the operating traffic speed at the point where the lane merges with the through road. Table 8 shows the minimum length of acceleration lane for different vehicles and conditions.

Table 8: Minimum Length (m) of Acceleration Lane:

80 km/h Speed limit through road (i.e. required entry speed for RAV is 56 km/h)

Average gradient of entry lane (%)	Downhill			Level	Uphill	
	-4	-2	-1		1	2
RAVs Categories 2-4	190	270	350	510	1090	*
RAVs Categories 5-8	200	280	370	570	1500	*
RAVs Categories 9-10	220	330	460	790	*	*

110 km/h Speed limit on through road (i.e.: required entry speed for RAV is 77 km/h)

Average gradient of entry lane (%)	Downhill			Level	Uphill	
	-4	-2	-1		1	2
RAVs Categories 2-4	410	630	910	1620	*	*
RAVs Categories 5-8	420	670	970	1870	*	*
RAVs Categories 9-10	470	760	1180	*	*	*

* It is not possible to accelerate from rest up to the required speed within a distance of 2000 m.

2.7.2 Signage

There shall be adequate signage, in conformity with Main Roads standards, on the through road to warn other traffic that trucks regularly merge onto the through road from the acceleration lane. Where this does not already exist, the assessor shall note the need for signage in the “recommendations” of the assessment form.

The point where the acceleration lane merges into the through road shall be visible at an adequate distance along the through road to ensure that there is enough time for other traffic to slow down or stop if required. Sight distance along the through road to the merge point needs to be assessed for both RAVs and light vehicles travelling on the through road.

Stopping sight distances for RAVs are shown in Appendix D (page 26). Minimum visibility distances for light vehicles (cars) on the through road are shown in Table 9.

Table 9 Minimum visibility distances for light vehicles on the through road

Speed limit on the through road	Minimum stopping sight distance for light vehicles on the through road
80 km/h	105 m
110 km/h	190 m

2.8 Turning at Intersections

It is essential that intersections can be safely negotiated, with minimal or no interference to other traffic.

2.8.1 Vehicle Speed While Negotiating the Turn

The vehicle turning radius is directly related to the maximum turning speed of the vehicle as shown in the table at Appendix E (page 27).

- For intersections where the vehicle must always stop before turning (e.g.: at a Stop sign), a turning speed of 15 km/h or less is generally sufficient.
- For intersections where the vehicle rarely or never needs to stop before turning, a speed of 20 km/h or 30 km/h could be assumed.
- Where following traffic is likely to be slowed as a result of the RAV turning off a high traffic road, a high turning speed (30 km/h or greater) is desirable, to minimise disturbance to traffic.

2.8.2 Turning Clearances

Appendix E (page 27) shows the approximate envelope of the turning vehicle and can be used as a quick check to determine whether the cornering radii are adequate. Where there is any possibility that the RAV may have insufficient clearance from kerbs or other nearby objects, standard turning templates shall be used to accurately check the swept path of the RAV. The appropriate turning template shall be superimposed over a suitably scaled drawing of the intersection and any clearance problems shall be noted on the assessment form. As a rule:

- The wheel paths of the rear trailer of the RAV must not come any closer than 200 mm from the face of any kerb;
- No part of the vehicle shall overhang a kerb;
- If there is no kerb (such as a gravel road), the edge of the road formation can be taken as the kerb;
- The overhang path must not come any closer than 200 mm to a nearby object;
- For a left turn, the wheel paths must not cross into the path of oncoming traffic. An exception is for a left turn into a road with single broken central line marking or no central line marking, where encroachment over the centreline may be acceptable where traffic volumes are low (e.g. AADT / vpd less than 250) and the sight distances to all directions of the intersection are adequate according to Appendix D (page 26).

Turning templates for RAVs can be obtained from Main Roads' website: www.mainroads.wa.gov.au under *Standards > Main Roads Drawings > Guidelines Drawings*. A list of the drawing numbers is attached at Appendix F (page 28).

2.8.3 Approach Sight Distance

The route shall be rejected if the driver of a RAV, approaching the intersection, has insufficient visibility to observe another vehicle at or within the intersection, and stop if necessary. The table in Appendix D (page 26) shows appropriate stopping sight distances for RAVs, given the vehicle type, speed and the gradient of the road.

Routes having intersections with lower than recommended approach sight distances can still be accepted with RAV operating speed restrictions. In applying operating speed restrictions, the intersection approach sight distances must then meet the minimum requirements in Appendix D at the reduced RAV speed. The maximum speed restriction should not be more than 20 km/h less than the posted speed on the route, or 30 km/h less in 110 km/h zones.

If the visibility of an intersection can be improved to an acceptable level by vegetation control, temporary speed control signs, or lower speed zones, the assessor may recommend this as a pre-requirement for RAV access in the Restricted Access Vehicle Route Assessment Form. No RAV access is permitted without prior confirmation that improved sight distance meets the minimum requirements in Appendix D.

2.8.4 RAVs at Signalised Intersections

The route shall be rejected if the traffic signals are not visible to the operator of the approaching RAV from the distance shown in Appendix D for the applicable vehicle type, speed and gradient of the road. Alternatively, the route can be accepted if advance yellow flashing warning signs are installed to Main Roads standards, and can be viewed by drivers at the distance from the intersection shown in Appendix D.

Minimum phase timings at signalised intersections should be checked to ensure that adequate allowance has been made for the desirable braking distances and slower acceleration rates of RAVs. Also, the additional length of RAVs needs to be taken into account in regard to any adverse lane queue and vehicle storage impacts.

2.8.5 Signage

Assessors should consider safety at intersections where RAVs will be turning onto through roads. The use of warning signs can improve safety. The information below gives some guidance to assessors, however assessors should consider a range of factors, in each case, in judging the need for and value of warning signs.

If the sight distance at an intersection does not meet the minimum requirements in Appendix D, then through roads speeds must be reduced in order to meet Appendix D values. There shall also be adequate signage of "Trucks Entering" or "Trucks Crossing", in conformity with AS 1742 or Main Roads standards, to warn other traffic of the truck operation at the intersection.

If the RAV operation will not be contained to brief seasonal periods only, permanent warning signs should be considered. If the bulk of RAV use will be contained to brief seasonal periods then the use of temporary warning signs may well be more appropriate.

The assessor shall note the need for signage in the “recommendations” of the Restricted Access Vehicles Route Assessment Form.

2.9 Railway Level Crossings

The various operational requirements at railway crossings are described in Main Roads ‘*Railway Crossing Protection in Western Australia*’ (Main Roads website: www.mainroads.wa.gov.au under *Standards > Road and Traffic Engineering > Geometric Design > Railway Crossing*).

The following points highlight the main considerations for RAVs at railway crossings for the various levels of protection.

2.9.1 Inadequate Approach Stacking Distance

Inadequate approach stacking distance occurs where the distance between the railway and a nearby intersection is insufficient to enable a vehicle to stop at the crossing without impeding the traffic flow at the intersection.

Approach Stacking Distance is measured from the vehicle stopping line at the railway crossing to the nearest shoulder edge of the crossroad. The vehicle stopping line at a railway crossing is normally indicated by a painted line or, in the absence of a marked line, assumed to be 3.5 m back from the nearest rail.

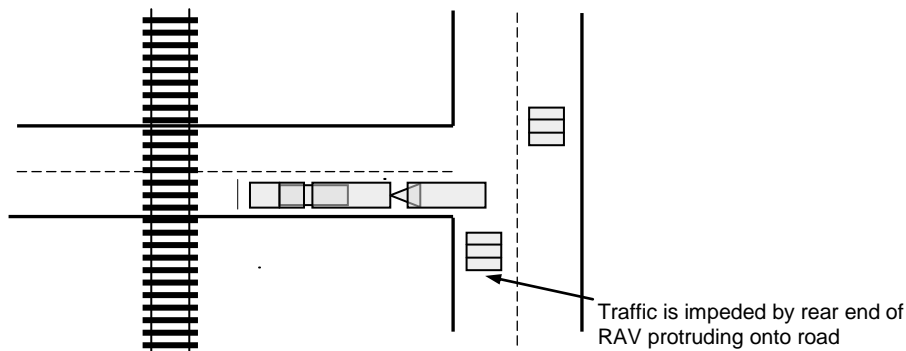


Figure 1: Examples of Inadequate Approach Stacking Distance

2.9.2 Inadequate Departure Stacking Distance

Inadequate departure stacking occurs when part of a vehicle would encroach within 3.5 m of the railway track while stopped to give way to traffic on the priority road of an intersection located beyond the crossing. A possible exception is in cases where the intersection is controlled by traffic signals that are coordinated with the operation of the railway crossing signals.

Departure Stacking Distance is measured from the vehicle stopping line at the intersection to within 3.5 m of the nearest railway track. In the absence of marked

lines, the stopping line can be taken as 2.0 m from the edge of the through lane (if there are edge lines) or the edge of the seal.

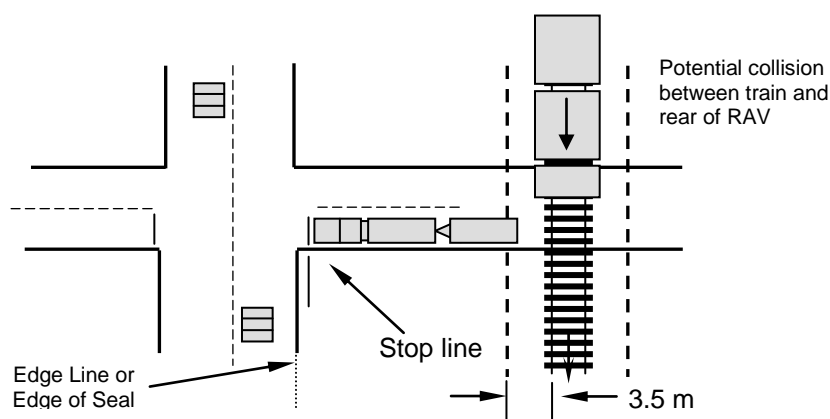


Figure 2: Examples of Inadequate Departure Stacking Distance

2.9.3 Criterion for Assessing Whether Stacking Distance is Adequate

A clearance of 3.5 m is required when assessing the available stacking distance. Therefore the following criterion shall be applied to Approach Stacking Distance (see 2.9.1) and Departure Stacking Distance (see 2.9.2):

Where SD = Stacking Distance (Approach or Departure, as the case may be), and

L = overall combination length of the RAV

Recommended criterion for pass: **$SD \geq L + 3.5 \text{ m}$**

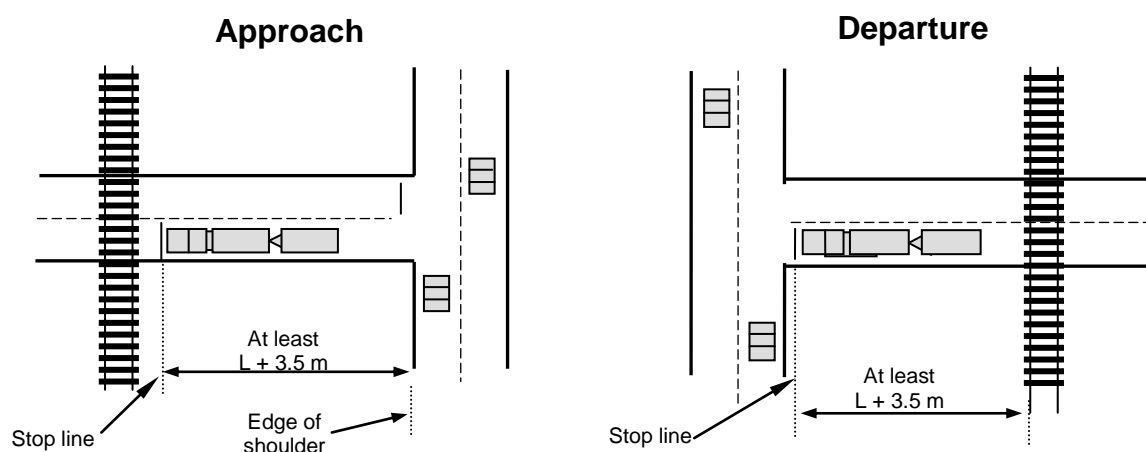


Figure 3: Examples of Adequate Stacking Distances

The assessor must clearly identify all crossings with less than 3.5 m clearance on stacking distance in the assessment report.

An exception may be considered on low traffic volume road and low rail traffic by applying other conditions such as speed restrictions and curfew. In these cases, a safety margin of less than 3.5 m, but not less than 2 m, may be allowed, dependent on the approval of the railway access provider and Main Roads' Road Safety Manager.

2.9.4 RAVs at Crossings Protected by Give Way Signs

The driver approaching a railway crossing protected by Give Way signs needs to be able to see the train from a sufficient distance down the road that would allow time to stop the RAV if required. This distance must meet the minimum requirements in Appendix D (page 26). A railway crossing protected by Give Way signs also requires that sufficient sideways visibility is available for a RAV driver, after having stopped at the crossing. The sight distance from the railway crossing stop line along the railway and the visibility angle of the driver to the approaching trains must be assessed according to the requirements for Give Way sign protection, in Main Roads guidelines for *'Railway Crossing Protection in Western Australia'*.

When measuring the available sight distance to all directions, a truck driver's eye height of 2.4 m is recommended. This also applies to sections 2.9.5 and 2.9.6.

2.9.5 RAVs at Crossings Protected by Stop Signs

The driver approaching a railway crossing protected by Stop signs needs to be able to see the signs from a sufficient distance down the road to stop the RAV as required. This visibility must meet the minimum requirements in Appendix D. Meanwhile, the railway crossing protected by Stop signs also requires that sufficient sideways visibility is available for RAV drivers, after having stopped at the crossing. The sight distance from the railway crossing stop line along the railway and the visibility angle of the driver to the approaching trains must be assessed according to the requirements for Stop sign protection, in Main Roads guidelines for *'Railway Crossing Protection in Western Australia'*.

2.9.6 RAVs at Railway Crossings Protected by Flashing Lights

The visibility of the primary flashing lights and advance flashing yellow warning signs displays on the approach to crossings must be assessed so that the driver can safely stop if required. The sight distance to the flashing lights, or alternatively the advance flashing yellow warning signs must meet the minimum requirements in Appendix D.

The timing delay between the flashing lights and the boom arms must be sufficient to allow the RAV to pass over the crossing without striking the boom arms. If the delay is not sufficient, the railway access provider should be advised and the railway access provider must provide their concurrence that the RAV operation will meet the railway safety requirement.

2.10 Off-Road Parking

In rural and remote areas the route should have adequate off-road truck parking facilities at sufficient spacing along the route. Definitions of "Rural Area" and "Remote Area" roads are given in Appendix A (page 22).

In any one direction of travel, the maximum spacing for off-road parking facilities is:

- Rural Area roads - 80 km
- Remote Area roads - 120 km

Adequate off-road parking facility is defined as any:

- service station or roadhouse, (or other commercial establishment), with provision for public truck parking;
- signed parking bay, truck bay, rest area; or
- designated road train assembly area;

where:

- minimum stopping sight distances (measured from a truck driver's eye height of 2.4 m) to the entry/exit points for traffic travelling on the through road are in accordance with Appendix D (page 26); and
- the full length of the RAV can be parked without encroachment onto the carriageway. Minimum clearance distances are shown in Table 10.

Table 10 Minimum Clearance from Edge of Pavement for Parked RAV

Speed Limit (km/h)	Minimum Clearance from edge of pavement * (m)
60	5
70	5.7
80	6.2
90	7.6
100	8.8
110	11

* For parking facilities located on the outside of a curve, add a further 1.6 m to the normal minimum clearance.

Depending on the frequency of trucks using the truck parking bays or road train assembly areas, the requirement of other facilities such as rubbish bins, tables and chairs and toilets needs to be considered. The assessor should also consider the likelihood of more than one RAV using the parking facility at any given time. This will depend on the volume of heavy vehicles on the proposed route.

More information about off-road parking facilities can be obtained from Main Roads Website: www.mainroads.wa.gov.au under *Standards > Road and Traffic Engineering > Roadside Items > Roadside Stopping Places*.

2.11 Other Road Users

The key issues here are whether RAV operation will be highly incompatible with, or pose new risks to other road users that may not be familiar with or could be more vulnerable to RAVs. Road users that should be considered when assessing suitability include:

- pedestrians (especially where there are school crossings);
- cyclists;
- tourists and recreational users (who may be unfamiliar with the conditions);
- school buses (where the frequent stopping and turning by buses and the presence of children on or adjacent to the road can pose potential hazards); and
- farmers moving farm machinery and implements.

Safety is the major factor for consideration. If crash history data is available, it may be useful to investigate whether certain times of the day engender particular risks, while at other times the risk is significantly lower. In these cases, it may be warranted to recommend that the RAV only use the route during the low-risk hours.

RAVs can affect the flow of other traffic. Numbers of RAVs can reduce the speed of other traffic and in worst cases frustrate other motorists. Assessors should examine the traffic flow on the route and recommend solutions to reduce risks resulting from traffic disruption.

Vehicles towing caravans or trailers are a significant issue in that they can find it difficult to pass RAVs. This situation is more prevalent during school holidays. Therefore the assessor should consider the impact of seasonal traffic changes during the assessment.

To address any safety concerns, the assessor should initially consider recommending special operating conditions, such as the use of headlights when travelling through townsites, reduced speeds, curfew times, etc (see Appendix G on page 29). Warning signs may also be a means of reducing safety risk for other road users (refer to Sections 2.3.7 and 2.8.5) but only in addition to the application of the above operating conditions.

If safety issues for other road users, which would result from RAV operation, are identified as major and cannot be suitably addressed, the route should be considered unsuitable for RAV access.

2.12 Slowing and Stopping

The ability of vehicles to safely pull off the carriageway, e.g. to allow following vehicles to pass or to make repairs, should be examined. Continuous sections of the route with narrow shoulders and/or deep drains should be noted and comments made on any safety implications.

3. COMMUNITY CONSIDERATIONS

Assessors need to consider potential community impacts as part of assessing route suitability.

3.1 Noise

The assessor shall consider whether the introduction of the RAVs onto the route has potential to cause a significant noise impact by considering the following:

- Areas sensitive to road traffic noise, including residences, schools and hospitals.
- The likely number of RAVs in comparison to existing number of large trucks (3 or more axles).
- Factors contributing to noise generated by RAVs such as gradients (higher speeds or use of engine braking systems), acceleration/deceleration areas (higher engine speeds, gear changing or use of engine braking systems), and road pavement irregularities (body rattle).
- Factors mitigating the impact of noise from RAVs such as distance to residences and any screening of residences by hills, cuttings or walls.

The main criterion for noise impact assessment is the change in the numbers of large trucks (3 or more axles) on the route. Doubling RAV numbers can be considered as the start of a significant noise change while quadrupling can be considered as very significant change. On very low volume roads, introducing RAVs may significantly increase numbers of large trucks, but overall truck numbers may still remain low enough so as not to cause a significant noise impact.

Consideration should also be given to potential noise impacts near a truck parking area. In particular, the noise generated by refrigerated trailers should be taken into account as these trucks are required to keep their cooling compressors running all night.

Where noise impacts are expected to be significant the assessor shall consider options for mitigating noise impact, such as:

- approved noise reduction request signs;
- a curfew for RAVs during night time hours;
- consideration of alternative routes;
- noise certification of RAVs as a condition of access; and
- speed restrictions.

Where noise impacts are expected to remain significant, after implementation of mitigation actions, Main Roads will consult with the relevant Local Government and/or the local community, and may undertake a noise impact study of the route.

3.2 Vibration

Where the RAV route passes close to abutting development there may be adverse impacts upon people and property due to vibration.

The assessor shall consider whether the introduction of the RAVs onto the route has potential to cause significant vibration impact by considering:

- distance to buildings and their use and condition;
- road roughness; and
- uneven drainage gullies and manhole covers.

Where vibration impacts are expected to be significant the assessor shall consider mitigative options such as road surface improvements and alternative routes.

3.3 Smell

Some types of RAV, such as stock trucks, produce undesirable odours. The effect is greatest when these vehicles remain in communities whilst on route, such as when held up in traffic and at intersections. Assessors shall consider this aspect and make recommendations to reduce such problems, such as modifications to the proposed route.

3.4 Dust

Where the RAV route passes close to abutting development there may be adverse impacts upon people and property due to dust, especially where a route is unsealed.

The assessor shall consider whether the introduction of the RAVs onto the route has potential to cause significant dust impact by considering:

- distance to buildings and their use;
- likely numbers of RAVs using the route; and
- likelihood of significant amounts of dust being produced by RAVs.

Where dust impacts are expected to be significant the assessor shall consider mitigative options such as alternative routes, possibility of sealing road sections and speed restrictions.

3.5 Community Consultation

In line with Government policy, Main Roads may require a route that has been given a favourable assessment using these guidelines to undergo a community consultation phase. Main Roads, with input from the relevant Local Government, will determine the need for community consultation on a case-by-case basis.

In such cases the requirements of Main Roads Document, *Community Involvement Long Vehicle and Road Train Routes* will apply (Main Roads website: www.mainroads.wa.gov.au under *Heavy Vehicles > Policy/planning > Policy Documents*).

APPENDIX A - GLOSSARY OF TECHNICAL TERMS

AADT: (see 'vpd' defined below)	Annual Average Daily Traffic is determined by the total yearly two-way traffic volume divided by 365, expressed as vehicles per day.
Carriageway Width:	That portion of a road or bridge devoted particularly to the use of vehicles that is between guide posts, kerbs or barriers where these are provided, inclusive of shoulders and auxiliary lanes.
High Speed Off Tracking:	High speed off tracking is defined as the degree to which the rear unit of a combination vehicle tracks outboard of the hauling unit during high speed turns or when travelling straight under the influence of pavement crossfall.
Passenger Car Equivalence:	Passenger Car Equivalence (PCE) factors are a relative measure of the traffic flow impedance effects of different vehicle types. The PCE factor for a particular vehicle type is the equivalent number of passenger cars (AUSTROADS Vehicle Class 1) that would have the same impedance effect as a single vehicle of that type.
Restricted Access Vehicle (RAV):	Restricted Access Vehicles (RAV) consists of all combinations of vehicles exceeding 19 metres in length or 42.5 tonnes gross mass including B-Doubles, road trains and truck-and-trailer combinations.
Remote Area roads:	All roads in the country road network, other than Rural Area roads.
Rural Area roads:	All roads in the Great Southern, South West, Wheatbelt South and Wheatbelt North Regions, as well as the coastal corridor of the Mid West Region.
Seal width:	Width between edges of sealed surface or between edge lines (where installed on undivided carriageways), whichever is less.
Swept Path:	The area that is traced by the extremities of the bodywork of a vehicle while turning.
Swept Width:	The radial distance between the innermost and outermost turning paths of a vehicle.
vpd - vehicles per day (see 'AADT' defined above)	The number of vehicles observed passing a point on a road in both directions for 24 hours. (It is a measure of daily traffic volume, often more relevant to low volume, Local Government roads, typically rural roads in these guidelines. 'vpd' can differ from AADT in being a better measure of traffic volume during periods of more intensive RAV usage or seasonal tourist traffic.)

APPENDIX B SECTION A – RURAL ROAD MINIMUM WIDTHS

	60 to 70 km/h		80 to 100 km/h	
	Carriageway Width* (m)	Sealed Width** (m)	Carriageway Width* (m)	Sealed Width** (m)

0 to 150 AADT / vpd ***

RAVs Categories 2-4	7.6	3.3	7.9	3.4
RAVs Categories 5-8	7.7	3.4	8.0	3.5
RAVs Categories 9-10	8.2	3.8	8.6	3.9

150 to 500 AADT / vpd

RAVs Categories 2-4	7.6	5.6	7.9	5.9
RAVs Categories 5-8	7.7	5.7	8.0	6.0
RAVs Categories 9-10	8.2	6.1	8.6	6.4

500 to 1 000 AADT

RAVs Categories 2-4	7.9	6.1	8.2	6.4
RAVs Categories 5-8	8.0	6.2	8.3	6.5
RAVs Categories 9-10	8.6	6.6	9.0	6.9

More than 1 000 AADT

RAVs Categories 2-4	9.6	6.8	9.9	7.1
RAVs Categories 5-8	9.7	6.9	10.0	7.2
RAVs Categories 9-10	10.6	7.6	11.0	8.0

* The carriageway widths given in the above table should be used for assessing usable width on gravel roads.

** A road should be sealed if AADT over 150 and annual freight tonnage over 300,000 tpa. In the absence of any data, the following parameters may be a guide:

- uniform annual loaded RAV traffic volume more than 10 vehicles per day; or
- loaded RAV traffic volume more than 60 vehicles per day over a seasonal two month period.

*** When the road width is below the above values and traffic volume is no more than 75 vpd, the route may be suitable for RAVs Categories 2-4 or RAVs Categories 5-8 access as a low volume road. Refer to Appendix B Section B on the following page.

APPENDIX B SECTION B – RURAL ROAD MINIMUM WIDTHS LESS THAN 75 VEHICLES PER DAY

NB: This section is not to be used for assessing routes for RAVs Categories 9-10.

Type A Road (suitable for two-way RAV traffic)

	40 km/h	60 km/h
	Carriageway Width (m)	Carriageway Width (m)

Sight distance above 250 m

RAVs Categories 2-4	5.8	6.1*
---------------------	-----	------

Sight distance below 250 m

RAVs Categories 2-4	6.1	6.4*
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Operating conditions 1, 2, 3, 4, 5, 7 and 8 will apply automatically as a condition of permit (refer to Appendix G on page 29);

*If a road is at least 1.0 m wider than these widths, an 80 km/h speed restriction should be considered. A speed restriction above 80 km/h should only be considered if the road is sealed, has good sight distance and presents no significant safety concern.

Type B Road (unsuitable for two-way RAV traffic)

	40 km/h
	Carriageway Width (m)
RAVs Categories 2-4	3.5

Type B Roads suitability is also subject to traffic volume and road length requirements below:

Daily Traffic Volume	0 to 15 vpd	16 to 30 vpd	31 to 50 vpd	51 to 75 vpd
Max Road Length	5.0 km	2.0 km	1.5 km	1.0 km

Operating conditions 1, 2, 3, 4, 5, 6, 7 and 8 will apply automatically as a condition of permit (refer to Appendix G)

APPENDIX C – TOWNSITE ROAD MINIMUM WIDTHS

Feature	RAVs Categories 2-4		RAVs Categories 5-8		RAVs Categories 9-10	
	60 - 70 km/h	80-100 km/h	60 - 70 km/h	80-100 km/h	60 - 70 km/h	80-100 km/h
(Undivided carriageway – 2 Way) Width between sealed edge and road centre (m)						
basic	3.2	3.5	3.3	3.7	3.6	4.1
with marked separation line	3.5	3.8	3.6	4.0	3.9	4.4
with on-road cyclists	4.7	5.5	4.8	5.7	5.1	6.1
with regular parallel parking	5.7	NA	5.8	NA	6.1	NA
with regular angle (45°) parking	9.2	NA	9.3	NA	9.6	NA
(Divided carriageway – single lane) Width between sealed edge and edge of median or traffic island (m)						
basic	3.5	3.8	3.6	4.0	3.9	4.4
with on-road cyclists	5.0	5.8	5.1	6.0	5.4	6.4
with regular parallel parking	6.0	NA	6.1	NA	6.4	NA
with regular angle (45°) parking	9.5	NA	9.6	NA	9.9	NA
(Undivided carriageway – 2 lanes) Width between sealed edge and road centre (m)						
basic	6.6	7.0	6.7	7.1	7.0	7.5
with on-road cyclists	8.1	9.0	8.2	9.1	8.5	9.5
with regular parallel parking	9.1	NA	9.2	NA	9.5	NA
(Divided carriageway – 2 lanes) Width between sealed edge and edge of median or traffic island (m)						
basic	6.6	7.0	6.7	7.1	7.0	7.5
with on-road cyclists	8.1	9.0	8.2	9.1	8.5	9.5
with regular parallel parking	9.1	NA	9.2	NA	9.5	NA
(Multiple Lane Carriageways – 3 or more lanes) Width of additional through lane (m)						
basic	3.2	3.4	3.3	3.5	3.4	3.6

APPENDIX D – STOPPING SIGHT DISTANCES

Operating Speed km/h	Downhill			Level	Uphill		
	-9%	-6%	-3%		3%	6%	9%

RAVs Categories 2-4

60	*	*	120	109	101	94	89
70	*	*	151	137	126	118	111
80	*	*	184	167	154	143	135
90	*	*	218	198	183	171	161
100	*	*	255	232	214	200	188

RAVs Categories 5-8

60	*	*	136	120	109	101	94
70	*	*	172	152	138	127	119
80	*	*	211	187	169	156	145
90	*	*	252	224	202	186	173
100	*	*	*	261	237	218	203

RAVs Categories 9-10

60	*	*	152	131	117	107	99
70	*	*	194	167	149	135	125
80	*	*	*	206	183	166	153
90	*	*	*	247	220	199	184
100	*	*	*	294	261	237	218

* RAVs would need to descend in low gear to prevent overrun. “TRUCKS USE LOW GEAR” signs in conformity with AS 1742 must be installed on these grades approximately 100 m before the start of the descent.

The above values have been derived using formula given in Austroads Rural Road Design Guidelines with following factors:

	RAVs Categories 2-4	RAVs Categories 5-8	RAVs Categories 9-10
Reaction Time	2.5 s	3.0 s	3.5 s
Deceleration Rate (d)	0.24 g	0.22 g	0.20 g

APPENDIX E – VEHICLE PATH TURNING RADII

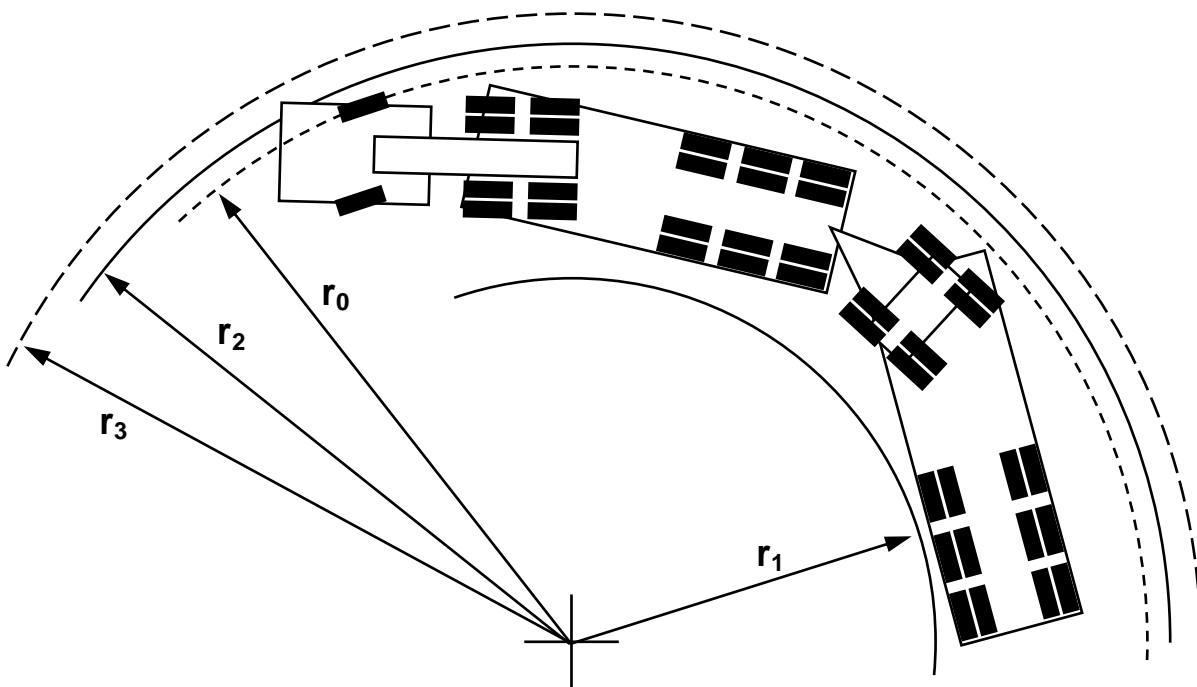
Vehicle Type	Maximum Speed km/h	r_0	Minimum r_2	Minimum r_3	Maximum r_1 (m) for angle of turn					
		m	m	m	30° turn	60° turn	90° turn	120° turn	150° turn	180° turn
RAVs Categories 2-4	0-5	15	15.6	16.5	9.8	9	7	6.1	5.5	5
	5-15	20	20.6	21.5	14.9	13.7	12.9	12.5	12.2	12.1
	20-30	30	30.6	31.5	25.3	24.4	24.3	24.1	24	24
RAVs Categories 5-8	0-5	15	15.6	16.5	9.3	7.2	5.5	4	Not suitable for on-road situation	
	5-15	20	20.6	21.5	14.4	12.6	11.6	10.8	10.2	9.9
	20-30	30	30.6	31.5	24.8	23.7	23.1	23	22.9	22.9
RAVs Categories 9-10	0-5	15	15.6	16.5	8.5	5.8	3.4	1	Not suitable for on-road situation	
	5-15	20	20.6	21.5	13.8	11.4	9.5	8.1	7	6.1
	20-30	30	30.6	31.5	24.2	22.4	21.4	21	20.8	20.7

r_0 = Radius of outside front wheel path

r_1 = Maximum radius of inner kerb = Radius of inside rear wheel path - 0.2 m

r_2 = Minimum radius of outer kerb = $r_0 + 0.2$ m

r_3 = Minimum clearance radius for front overhang = Path of front overhang + 0.2 m



APPENDIX F – LIST OF STANDARD TURNING TEMPLATES

MRWA Drawing No.	Amendment No.	Description
9320-0256		Semi Trailer + 1 Trailer R = 15
9320-0257		Semi Trailer + 1 Trailer R = 18
9320-0258		Semi Trailer + 1 Trailer R = 20
9320-0259		Semi Trailer + 1 Trailer R = 25
9320-0260		Semi Trailer + 1 Trailer R = 30
9320-0261		Semi Trailer + 2 Trailers R = 15
9320-0262		Semi Trailer + 2 Trailers R = 18
9320-0263		Semi Trailer + 2 Trailers R = 20
9320-0264		Semi Trailer + 2 Trailers R = 25
9320-0265		Semi Trailer + 2 Trailers R = 30
9320-0336		Single Unit + 1 Trailer R = 15
9320-0337		Single Unit + 1 Trailer R = 18
9320-0338		Single Unit + 1 Trailer R = 20
9320-0266		Single Unit + 1 Trailer R = 25
9320-0267		Single Unit + 1 Trailer R = 30
9320-0268		Single Unit + 2 Trailers R = 25
9320-0271		Single Unit + 2 Trailers R = 30
9320-0270		Single Unit + 3 Trailers R = 25
9320-0271		Single Unit + 3 Trailers R = 25
9320-0272	2	B Double R = 15
9320-0273	1	B Double R = 18
9320-0274	1	B Double R = 20
9320-0275	1	B Double R = 25
9320-0276	1	B Double R = 30

An electronic copy of the above turning templates is available on Main Roads website: www.mainroads.wa.gov.au under *Standards > Main Roads Drawings > Guidelines Drawings*.

APPENDIX G – OPERATING CONDITIONS

Main Roads will apply the operating conditions below, as a condition of permit, to very low traffic volume roads when the road's width does not meet the minimum requirements in Appendix B Section A.

These and other similar operating conditions may be applied to the assessment of other roads.

1. Operation during day light hours only.
2. No operation on unsealed road segment when visibly wet.
3. Headlights to be switched on at all times.
4. Speed restriction. *
5. Direct radio contact must be maintained with other RAVs to establish their position on or near the road (suggested UHF Ch 40).
6. Road not to be entered until driver has established by radio communication that there is no other RAV on the road travelling in the opposing direction.
7. School bus curfews, as specified in LG approval letter, must be observed.
8. Current written approval from the road owner (e.g. LG or CALM), to use the road, must be carried in the vehicle and produced on demand.

For Type A Road (refer to Appendix B Section B on page 24), Operating conditions 1, 2, 3, 4, 5, 7 and 8 will apply automatically as a condition of permit;

For Type B Road (refer to Appendix B Section B), Operating conditions 1, 2, 3, 4, 5, 6, 7 and 8 will apply automatically as a condition of permit.

*40 km/h or 60 km/h as determined from Appendix B Section B.

APPENDIX H – LIST OF STANDARD WARNING SIGNS

Sign Name	Sign No.	Drawing No.	Remarks
Trucks (Crossing or Entering)	W5-22A-D	-	AS1742.2
Road Trains Entering 250 m	MR-WM-3	9120-231	Main Roads Standards
Road Trains Crossing 250m	MR-WM-4	9120-232	Main Roads Standards
Truck Route	MR-WM-45	9848-0420	Main Roads Standards
Trucks Use Low Gear	G9-23A-C	-	AS1742.2
End Truck Low Gear	MR-RM-22	200531-0004	Main Roads Standards
Residential Area Reduce Truck Noise	MR-GM-25	200531-0040	Main Roads Standards

As a general rule, the above Main Roads Standards signs should only be used where there is no suitable sign contained in AS 1742 for the particular circumstances to be signed, or where Main Roads practice differs from that contained in AS 1742.

The electronic copies of Main Roads signage drawings and guidance upon Main Roads practice can be obtained from Main Roads website: www.mainroads.wa.gov.au under *Standards > Road and Traffic Engineering > Traffic Management > Signs Index*. Additional information and guidance is available from Traffic Engineering Standards Manager of Main Roads Road and Traffic Engineering section on telephone 138138 or by e-mail enquiries@mainroads.wa.gov.au.

APPENDIX I – ROUTE ASSESSMENT FORM

This appendix contains the forms for use in assessing RAV routes in accordance with the requirements set out in these Guidelines.

RESTRICTED ACCESS VEHICLE ROUTE ASSESSMENT FORM

The assessor shall fill out Section A and carry out a desktop assessment first using all available information on the proposed route from sources such as IRIS.

Section A

AADT or **Daily Traffic Volume** including Seasonal Peak: _____

Assessor:

Name: _____	Name: _____
Position: _____	Position: _____
Employer: _____	Employer: _____
Phone: _____	Phone: _____
Date: _____	

RAV Details:

Class: _____	Length: _____ m
Category: _____	Width: _____ m
Product/Restrictions: _____	Height: _____ m

Route Assessed:

Operator/LG Requesting: _____ Built Up area: Yes: No:

Road Name/Number: _____ LG No: _____

From: _____ To: _____

SLK from: _____ SLK to: _____ Distance: _____ km

Is the route a school bus route? Yes: No:

Section B

Bridges Details:

Criteria	Bridge 1	Bridge 2	Bridge 3	Bridge 4
Structure No:				
Location: SLK				
Legal Posted Load Limited: Tonnes				
Width between kerbs: m				
Shoulder Width: m				
Central Line Markings Yes/No				
Sight Distance: SLK Reducing/Increasing m				
Height of Bridge Railing: m				

Meets guidelines requirements Yes: No:

Overhead Clearance:

A: Overhead obstructions that are not cable or power line B: Cable or power line

Criteria	Overhead Obstruction 1	Overhead Obstruction 2	Overhead Obstruction 3	Overhead Obstruction 4
Types (A or B)				
Minimum Clearance (mm)				
Meets guidelines requirements Yes: <input type="checkbox"/> No: <input type="checkbox"/>				

Rural Road Width:

Criteria	Road Section 1	Road Section 2	Road Section 3	Road Section 4	Road Section 5	Road Section 6
Road Surface						
Carriageway Width (m)						
Sealed Width (m)						
Length (km)						
Sight Distance always over 250 m Yes/No						
Meets Guidelines Requirements						

The width of _____ m can be regarded as the road width when applying Appendix B

Section A Section B, Type A Road Section B, Type B Road

Width assessed as following speed-width category in Appendix B:

Section A 60-70 km/h 80-100 km/h or Section B 40km/h 60 km/h

Townsite Road Width:

The road is a _____ choose from below (A) to (F)

- A: Undivided Carriageway – suitable for one-way traffic only
- B: Undivided Carriageway – suitable for two-way traffic
- C: Undivided Carriageway – two lane each way D: Divided Carriageway – single lane
- E: Divided Carriageway – two lanes F: Divided Carriageway – three lanes

on-road cyclists regular parallel parking regular angle parking

(a) Lane Width: _____ m (b) Shoulder Width: _____ m

c) Kerb Drop off: _____ m (d) Reserved Width _____ m

Meets guidelines requirements Yes: No:

Overtaking Opportunities:

Maximum average distance between overtaking opportunities: _____ km

Maximum distance between overtaking opportunities: _____ km

Meets guidelines requirements Yes: No:

Steep Ascending Grade: (only grades 3% or above for unsealed roads, 5% or above for sealed roads)

Criteria	Grade 1	Grade 2	Grade 3	Grade 4
Road Surface (Unsealed or Sealed)				
Gradient (%)				
Length (m)				

Meets guidelines requirements Yes: No:

Acceleration Lane:

Criteria	Acceleration Lane 1	Acceleration Lane 2	Acceleration Lane 3
Average Gradient of Entry Lane (%)			
Length of Acceleration Lane (m)			
Approach Sight Distance to the merge point (m)			

Meets guidelines requirements Yes: No:

Intersections:

All intersections have been checked with Turning Template: Yes: No:

All needed intersection drawings are attached: Yes: No:

Meets guidelines requirements Yes: No:

Railway Crossings:

Rail usage: freight / passenger / other _____ **Train Speed:** _____ km/h

The railway crossing is protected by:

- (1) Give Way sign; (2) Stop sign;
- (3) Flashing lights; (4) Flashing lights with boom;
- (5) Advance warning flashing amber lights; or (6) No protection.

If the railway crossing is protected by Give Way signs or Stop signs, then

Sight Distance Measured Facing SLK Decreasing to LHS _____ m to RHS _____ m

Sight Distance Measured Facing SLK Increasing to LHS _____ m to RHS _____ m

The angle between the railway line and the road: _____ °

Assessor Declaration: (Assessors to complete)

I hereby declare that:

1. I have assessed this route in accordance with all requirements and procedures in Main Roads Western Australia *Guidelines for Assessing the Suitability of Routes for Restricted Access Vehicles*, and
2. the information provided on this form and the attached documents is true and correct to the best of my knowledge.

Print Name: _____	Print Name: _____
Representing: _____	Representing: _____
Signed: _____	Signed: _____
Date: _____	Date: _____

Main Roads Regional Manager Endorsement:

I hereby endorse the route's suitability for RAV access as follows:

The route is unsuitable for RAV access.

The route is suitable for RAV access - specify whether option (A) or (B):

(A) For the following categories:

RAV Categories 2-4 RAV Categories 5-8 RAV Categories 9-10

(B) The route is suitable for RAV access under the standard conditions for a Low Volume road:

Type A Road Type B Road

RAV Categories 2-4 RAV Categories 5-8

Under the following specific operating conditions:

Print Name: _____	Signed: _____
Date: _____	

