



**Engineering Guidelines for  
Subdivisions and Development**

**Part 2  
Roads  
2014**

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## **PART 2 – DESIGN OF ROADS**

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## 1. INTRODUCTION

This section of the Engineering Guidelines for Subdivisions and Developments outlines Council's recommended practice for the design of rural and urban roads. It is in no way a comprehensive 'Design Manual' and it is to be read in conjunction with and as a supplement to referenced standards.

The Subdivision and Development Guidelines comprise the following:

Part 1 General Requirements

**Part 2 Roads**

Part 3 Stormwater Drainage

Part 4 Water Reticulation

Part 5 Sewerage Reticulation

Part 6 Landscaping, and Measures for Erosion, Sedimentation and Pollution Control

Part 7 Testing.

## 2. URBAN ROADS

The following section applies to the provision of roads in urban areas, the classification of these roads as urban will be a determination of the Council.

### 2.1 PLANS

A1 Plans should include the following:

- Cover sheet with locality plan and drawing list;
- Lot Boundaries and Numbers;
- Road Centreline Chainages, Radii, Tangent Points and Deflection Angles;
- Benchmarks at spacing's of 100 metres within the development site;
- Street Names and North Point;
- Bar Scales;
- Existing surface levels, features services and structures;
- Proposed Service Crossings;
- Road Reserve and Carriage width;
- Australian Height Datum;
- A schedule of symbols;
- Radii on Kerb Returns and Kerb Lines;
- Vehicular Crossings;
- Contours and Finished Surface Levels on Lot Corners;
- Details of abutting roads and streets necessary to ensure matching in of levels and grades; and
- 1:500 Scale.

Infrastructure service design is not to be undertaken in isolation rather as an integrated approach that anticipates conflict. For complex intersections where there is potential for service conflict, show service levels in section.

## 2.2 CENTRELINE LONGITUDINAL SECTION

The centreline longitudinal section should include the following:

Scales 1:500 horizontal; 1:100 vertical

- Chainages;
- Reduced level of existing surface and of design level of road, left and right kerbs where variations in crossfall occur and building lines;
- Design grades;
- Length of vertical curves; and
- Existing and proposed services.

Longitudinal levels at:

- 20 metre intervals on straight grades;
- 5 metre intervals in vertical curves; and
- At all intermediate changes of grade.

Longitudinal sections and cross sections should be taken along existing intersecting roads (approx. 50 metres) to enable kerb returns, dish crossings and drainage design.

## 2.3 CROSS SECTIONS

Cross sections are to be viewed from the direction of increasing chainage. Information to be provided as follows:

- 20 metre intervals;
- Natural scales of 1:100;
- Chainage;
- Reduced levels of existing surface; and
- The design level and cross fall of pavement;

Typical cross sections shall provide information as follows:

- Type of kerb & channel;
- Batters of cuttings and embankments are to be shown beyond the property alignment;
- Depth and type of material in each layer of pavement;
- Type of surfacing;
- Subsoil drainage (if required);
- Pavement and nature strip crossfalls;
- Footpath offset;
- Service corridors;
- Landscaping;
- Road width between inverts;
- Centreline; and

- Road crown.

## 2.4 KERB RETURNS

Kerb profiles should be shown for all kerb returns, cul-de-sac bulbs and turning tees.

A scale of 1: 200 horizontally and 1:20 vertically is suggested. Levels at  $\frac{1}{4}$  points. Kerb return radius shall be 7.5 metres in residential streets and 12 metres for industrial areas. Where bus routes are provided vehicle-turning paths shall be provided for at intersections.

## 2.5 STANDARD ROAD CLASSIFICATIONS AND ASSOCIATED WIDTHS

The guidelines below are **not** to be considered as inflexible development standards. The principles detailed in the Australian Model Code for Residential Development (1995) are generally supported. Accordingly, developers/subdividers are advised that Council will consider and, to some degree, encourage departures from the below guidelines where it can be clearly established such departures:

- Improve environmental and water quality outcomes;
- Improve landscaping and urban design outcomes;
- and
- Are regarded as contributing to the amenity of the area.

Changes to road width standards, should be considered in the context of an integrated approach:

- New Urbanism Principles;
- Land-Use Strategies;
- Master Plan's for towns; and
- Subdivisional Master Plans.
- For road widths narrower than six metres Council reserves the right to consider these on a case-by- case basis.

The road hierarchy comprises; Arterial; Collector; Local access; Cul-de-sac and minor access.

**Table 2.1 – Road Standards, Urban Street Network**

<b>Classification of Road</b>	<b>Arterial</b>	<b>Collector</b>	<b>Local Access</b>	<b>Cul-De-Sac &amp; minor access</b>
Maximum traffic Volume (vehicles/day)	5000-7000	3000	1000	150
Number of dwellings	500-750	300	100	15
Carriageway Width (m)	13	11	8	6
Footway Width (m)	2 x 5.5	2 x 5.5	2 x 3.5 or 2x 5.5	2 x 3.5
Road Reserve (m)	24	22	15 or 19	13
Lane Provision	2 Moving Parking	2 Moving Intermittent Parking	2 Moving Intermittent Parking	2 Moving Intermittent Parking
Maximum desirable speed (km/h)	40-60	30-50	20-30	15-25
Maximum design speed (km/h) (for sight distance calculations)	60	60	40	30
Footpaths	Both sides	Both sides	One side	Not required
Cycle Ways	2.5m wide shared cycleway footpath on one side	Marked	On road shared	On road shared
Kerb and Channel	150 mm high integral barrier	Integral barrier or semi mountable	Integral barrier or semi mountable	Semi mountable

Roads used as bus routes are usually designed to local distributor standards, i.e. 13 metre carriageway width or provision for two moving and two parking lanes. Where bus routes are provided in low traffic environments then consideration may be given to a reduction in width and or the provision of indented bus bays, however such approval will only be considered on a case-by-case basis.

Standard road widths are measured between kerb inverts as shown on the standard drawings.

On street paved or sealed parking, at the rate of one car per two lots, being provided off the carriageway, within street reserves where street pavement is less than eight metres and the street provides access to more than eight dwellings. Details are to be incorporated in Construction plans.



## 2.6 KERB AND CHANNEL

All urban streets are to have sealed pavement with kerb and channel.

Alternative kerb and gutter treatments that achieve water sensitive urban design outcomes are encouraged subject to prior approval as part of concept development.

The design of kerb and channel shall comply with drainage requirements of Australian Rainfall and Runoff.

Kerb types are as shown on Council's Standard Drawings.

Variations are subject to Council approval.

## 2.7 ROAD SURFACING

All new roads should be 10/7 two coat sprayed seals with the following exceptions:

- Widening of existing roads - Seal to match the existing;
- Industrial subdivisions or developments requiring heavy vehicle access - 40mm Asphaltic Concrete (AC);
- Court bowls - 40mm Asphaltic Concrete (AC); and
- Highways - to be determined in consultation with the RMS.

## 2.8 ACCESS AND VEHICULAR CROSSINGS

Unless kerb is of a mountable type approved by Council, vehicle-crossovers are to be provided into each allotment and are to be in accordance with Council Standards and are to be within the following width ranges. Vehicle crossovers for subdivision are to be provided at the time of house construction.

**Table 2.2 Vehicular Crossings**

	Minimum Width (m)	Maximum Width (m)
Residential Crossing	3	7.5
Light Industrial Crossing	3.6	8
Heavy Industrial	3.6	12

**Note:** Widths are at the property boundary and do not include splays.

Where kerb and gutter is provided:

- Access and vehicular crossovers are to be a minimum of 1000 mm clear of all drainage structures on the kerb and gutter and are not to interfere with the existing public utility infrastructure, including council drainage structures. Where driveway impacts on these structures it is to be located clear of the driveway;
- Where kerb and gutter is not required by Council construct concrete vehicular access to the lot incorporating a preferred 375 mm diameter concrete stormwater pipe and concrete headwalls. Where it is impractical to construct a 375 mm pipe, a reduced pipe size or concrete dish crossing may be considered subject to approval on a case-by-case basis;

- Property access is to provide for forward entry and exit for other than single residential development;
- Access to adjacent properties may be fully combined or alternatively separated by a minimum distance of two metres;
- Access to residential corner allotments shall be at least six metres from the road intersection property boundary;
- The portion of the crossing that passes through the footpath is to be designed to AS 1428 'Design for Access and Mobility';
- A design car template should be used to check access;
- On steeper sites that includes battle axe blocks the design and construction of the driveway is to account for stormwater;
- Bridge type gutter crossings are not permitted;
- Multiple driveways to each lot are discouraged and require specific approval, and
- Road access to cuttings is to be clear of services located in the embankment.

## **2.9 STAGED ROAD CONSTRUCTION**

Where roads are constructed in stages as part of staged subdivision development, a permanent type barricade is to be constructed at the end of each stage to warn motorists of the dead-end and prevent their passage beyond. Such barricades are to be removed when it is safe for through traffic to use this road and approval from Council has been received in writing.

The barricade should be made from a D4-2-1 Chevron or similar (refer AS 1743 - 2001).

## **2.10 ROAD CROSSINGS**

All conduit trenches should be at a grade of not less than 1% and should be clearly located on relevant drawings. Trench backfill is to be compacted gravel or 3% cement stabilised sand to Subgrade level.

## **2.11 TRAFFIC GENERATION**

A local area traffic management plan shall be provided for the subdivision as part of the agreed Master Plan. This plan shall detail average annual daily traffic volumes (AADT), within the subdivision, assess the impacts of traffic on the surrounding street network. Where adverse impacts are identified traffic mitigation measures shall be implemented.

Qualified traffic consultants shall determine projected traffic volumes that account for existing traffic patterns, predicted future development and associated traffic generation.

In the absence of sophisticated traffic modelling, an assessment of trip traffic generation shall be based on 10 vehicle trips per allotment per day.

## **2.12 PAVEMENT DESIGN**

### **2.12.1 Flexible Pavements**

Road pavement design shall be based on the provision of flexible road pavements as follows:

- Australian Road Research Board 'Pavement Design for Light Traffic: a supplement to the AUSTRROADS pavement design guide'; and
- Classified Road and Industrial road pavements are to be designed in accordance with 'A guide to the Structural Design of Road Pavements' AUSTRROADS.

A minimum design life of 20 years should be used to determine the pavement thickness.

Designers are to submit traffic loading calculations based on Australian Road Research Board 'Pavement Design for Light Traffic: a supplement to the AUSTRROADS pavement design guide'.

Design Subgrade CBR values should be determined by either Geotechnical Engineering Consultants and/or agents of an N.A.T.A. registered laboratory. The investigation will include 'logging' of test holes to a depth not less than 1 metre below design Subgrade levels (unless rock is encountered). Soil samples should be taken at the design depth and CBR tests undertaken after soaking the samples for four days.

The frequency of test holes should be in accordance with Australian Road Research Board 'Pavement Design for Light Traffic: a supplement to the AUSTRROADS pavement design guide'.

A copy of the site investigation report including test results should be submitted with the pavement design and the Engineering Drawings.

The minimum pavement thickness shall be 200 mm for roads and 150 mm for carparks.

### **2.12.2 Rigid Pavement Design**

Requires approval prior to the commencement of design.

## **2.13 SUBSOIL DRAINAGE**

Subsoil drainage, if required, is to be provided as per the Standard Drawing and is to be drained to an appropriate stormwater pit. Flushing points are to be provided at all upstream ends. The minimum grade for subsoil drainage is 1:250 with an absolute minimum grade of 1:300.

## **2.14 GEOMETRIC STANDARDS**

The geometric design of arterial roads is to be based on the current AUSTRROADS design standards for urban roads for an 80 km/hour travel speed.

The design of all other urban roads is to provide smooth, safe trafficable horizontal and vertical alignments, adequate sight distance with consideration being given to the road classification requirements, pedestrian access to each allotment, provision for utilities and stormwater drainage.

The design speed to be used for a particular road is as per Table 1 –Road Standards for the

Urban Street Network.

For design speeds up to 60 km/hour, the use of transition curves is not considered necessary.

The minimum radius of horizontal curves is: -

**Table 2.3 Minimum Radius of Horizontal Curves**

Minimum Deflection Angle	Minimum Radius (m)
75°	20
60°	33
40°	65
30°	75
20°	100

Where the deflection angle is 90° and travel speed is not an issue, the size of the horizontal curve is to be related to the turning requirements of vehicles such as single unit trucks (removalist vans and garbage trucks). Details on the relationship between speed, radius and tangent lengths are referred to in AMCORD.

## 2.15 VERTICAL ALIGNMENT

The maximum permissible grade on an arterial road is to be 8%, with a minimum grade of 0.5%.

The maximum permissible grade on all other roads is to be 16% for a maximum distance of 50 metres and 12% where the length of straight grade exceeds 50 metres. The minimum grade is 0.33%.

A maximum permissible grade of 10% (1 to 10) should be used adjacent to street intersection, locations of poor visibility, horizontal curves of radius 15 metres or less and at cul-de-sacs. Turning circles in cul-de-sacs on steep grades should have grades less than 5%.

Council's drainage requirements on steep grades may involve special structures and extensive piping through easements. Refer also to AR&R limitations on velocities.

Kerb and channel is to have a desirable minimum grade of 0.50% (1 in 200) with an absolute minimum of 0.33% (1 in 300). Saw tooth shaped profiles that are reliant upon pipe drainage are discouraged. Special consideration is required for directing of the major flow path of water to designed flow paths.

Roads are to be designed to provide accessibility to the adjacent footpaths in accordance with AS 1428.2 – 1992 Design for Access and Mobility.

Grades through intersections are not to exceed 4% to provide for stationery vehicles queued at intersections.

## **2.16 VERTICAL CURVES**

Vertical curves are to be provided at all changes of grade and where practical should coincide with the horizontal curvature. The values given in 'Guide to Road Design -Part 3 – Geometric Design' are applicable to urban conditions in the relevant ranges.

Eccentric vertical curves will only be accepted in difficult design situations with prior written approval.

## **2.17 PAVEMENT CROSSFALLS**

The normal crossfall on bituminous pavements should be 3%.

The maximum crossfall permitted is 6% and will occur in super-elevated curves sideling land and road intersections.

Super-elevation of horizontal curves is to be based on the current AUSTRROADS design policy for urban roads.

## **2.18 OFFSET CROWN**

The crown may be shifted towards the higher side of the road. The crown should be not closer to the kerb line than 2.0 metres to ensure that the kerb retains capacity to transport stormwater flows. The designer is to assess the storm water capacity of the system.

## **2.19 SPLIT LEVEL CARRIAGEWAYS**

Use of split-level carriageways are not permitted.

## **2.20 BATTERS**

All roads should be cleared full width and 0.5 metres inside the lot boundaries, or to a sufficient width to include cut and fill batters.

Footpaths reserves should be formed so as to extend 0.3 metres past the road alignment into the adjacent allotments to enable fences to be constructed at road level. Road batters should lie wholly within the adjacent allotments commencing 0.3 metres beyond road boundaries.

- Such batters should be 1 vertical to 6 horizontal to allow for safe maintenance. Steeper batter slopes of 1 vertical to 4 horizontal are a minimum requirement; and
- Where the developer provides special treatments to these batter slopes that reduce maintenance and occupational health and safety issues, then steeper slopes may be tolerated subject to Council approval.

## **2.21 BATTER ENCROACHMENT**

Where any cutting or filling undertaken by a developer, whether shown on the plan or not, encroaches on any private or crown property, is retained by an existing structure, or could possibly undermine or remove the support of any existing structure, the developer should either:

- a. Take out an easement of support over such batter in favour of Council and pay such compensation as may be satisfactorily arranged with the owner or decided by a judicial body; or
- b. Construct an engineer designed retaining wall.

## **2.22 ROAD EMBANKMENTS**

Road embankments exceeding two metres in height, (measured vertically from the top of batter to the intersection of a batter line) sloping steeper than or equal to one vertical to four (4) horizontal with the natural surface should be protected by means of a safety fence. Safety fences should not be used on road boundaries opposite residential allotments.

## **2.23 ROAD RESERVE BOUNDARIES**

Road boundaries may be curved, but where they are to be fenced as chords, these should be not less than six metres. Where a number of such chords occur adjacent to each other, they should, as far as possible, be practically equal.

## **2.24 CUL-DE-SACS, Y-HEADS AND T-HEADS**

- Demonstrate compliance with the turning path requirements for service vehicles;

- The kerb line radius of a cul-de-sac should not be less than 9.5 metres;
- Special provision should be made to take drainage from down hill cul-de-sacs through easements or drainage reserves that accommodate extreme flood events via underground drainage or via overland flow paths. The capacity of the major drainage system should be the 1 in 100 year ARI stormwater event. As there is potential for upstream stormwater pits to block allow for overland flow paths of water through public owned land and reserves rather than private property;
- Safety in design principles require street lighting to be located to improve the safety and the illumination of any pathways or reserves;
- Y heads & T heads are to be minimum length of 13 metres from the centreline intersection to end; and
- Design intersections that provide for solar orientation of blocks.

## 2.25 PATHWAYS, LANES AND FOOTPATHS

### 2.25.1 Definitions

**A Lane** is a public road of width greater than three metres but not greater than six metres and is to be used primarily for access to the rear of premises.

**A Pathway** is a public road of width three metres or less. The maximum width to be adopted for pathways is three metres and is primarily for the use of pedestrians and/or cyclists.

**A Footpath Reserve** is that part of a public road exclusive of the carriageway and in the case of residential roads may not be less than two metres in width. Residential roads are public roads used primarily for access to residences.

### 2.25.2 Lanes

Lanes dedicated to the public as access from or between roads, or as access to public gardens and recreation space should be cleared, formed, graded, sealed, kerb and channelled and drained and be suitable for vehicular access. In general, the maximum permissible grade to be used in lanes should be 15%.

### 2.25.3 Pathways

Pathways dedicated to the public as access from or between roads, or as access to public garden and recreation space should be designed in accordance with 'safer by design principles'. These pathways should be clear and provide uninterrupted lines of sight with lighting located at the ends of the pathway.

In general, the maximum permissible grade to be used in pathways should be 15%.

The maximum permissible grade to be used in pathways providing access to public gardens and reserves shall be 7%.

#### **2.25.4 Footpaths,**

##### **Pedestrian Access and Mobility**

Footpaths are required as part of subdivision development as per Table 2.1. These footpaths are to be provided consistent with the requirements of Council's Pedestrian Access and Mobility Plan.



**Table 2.4 Footpath Requirements**

Footpath Width	1.5 metres
Shared footpaths and cycle ways	2.5 metres
Footpath materials	Reinforced concrete SL72 125 mm thick, at time of subdivision.
Location of the footpath	300 mm from the property boundary
Requirement for footpath	Refer to Table 2.1 Road Standards for the Urban

Design in accordance with AUSTRROADS 'Guide to Road Design Part 6A. – Pedestrian and Cyclist Paths'.

Perambulator ramps should be provided at all kerb crossings.

The requirement for footpaths is dependent on road classification and Council planning for footpaths and cycle ways.

Design is to be in accordance with Australian Standard AS 1428 – 'Design for Access and Mobility'.

#### **Footpath Crossfalls**

In areas where the footpath reservation is to be totally paved from the top of the kerb to the adjacent boundary, the crossfall is to be 1 in 50 towards the kerb (2%).

In areas where the footpath is unpaved or partially paved, crossfall from kerb to the adjacent boundaries is to be 1 in 35 towards the kerb (3%). Alternative treatments that achieve water sensitive urban design outcomes are encouraged subject to prior approval as part of the concept design development. The design of footpath crossfalls shall comply with the drainage requirements in Australian Rainfall and Runoff. 1% ARI flows shall be contained within the road reserve, public reserves or piped.

Vehicle access is to be checked using standard vehicle templates.

## **2.26 CYCLEWAYS**

Cycleways are to be provided in accordance with Council's cycleway plan that encourages alternative forms of transport. Cycleways shall be designed in accordance with AUSTRROADS 'Guide to Road Design Part 6A. – Pedestrian and Cyclist Paths'.

## **2.27 STREET SIGNS**

Street signs are to be erected at all street intersections and are to be in accordance with Councils standard drawings and requirements.

## **2.28 HALF WIDTH CONSTRUCTION**

Where proposed subdivisions or developments front an existing sealed road and the existing pavement is of adequate strength and the vertical alignment is satisfactory, the existing pavement may be retained. The remainder of the half width construction is to be carried out to the equivalent standard of full width construction.

Should the Council determine the existing pavement to be unsatisfactory, then the pavement construction is to be extended to the road centreline.

In all cases, the new seal should extend to the road centreline to avoid irregularities.

Any unsealed road must be sealed to a minimum width of 6m as per this manual for the entire length of the development.

## **2.29 INTERSECTIONS**

- Intersection design should be based on the 'AUSTRoads Guide to Road Design – Part 4 - Intersections and Crossings – General';
- 'T' junctions should be adopted in preference to four-way intersections. Where staggered 'T' junctions are to be provided, the intersecting roads should be located a minimum distance of two times stopping distance for the travel speed along the through-road (1.5 second reaction time);
- Roads should intersect at not less than 70°;
- The minimum centreline spacing between intersections is 50 metres in urban areas;
- Four-way intersections or cross intersections shall be designed with roundabouts; and
- Where intersections are in a configuration likely to cause traffic problems, the construction of traffic islands, or such traffic facilities are required to provide traffic control and safety.

## **2.30 TURNING MOVEMENTS FOR DESIGN VEHICLES**

Turning movements shall be provided for the design vehicle. Prior to commencement of design process consultation is required with Council to determine the design vehicles for the different street classifications. The fire emergency services vehicle is frequently the design vehicle.

Vehicle turning movements must allow for left turn from the left lane without crossing lanes for design vehicles. Where requested, traffic movement paths shall be presented using such packages as 'Autoturn' or similar. Clearance of 500 mm shall be provided to the total swept path.

## **2.31 LOCAL AREA TRAFFIC MANAGEMENT**

Traffic Management devices are to be designed in accordance with AUSTRoads publication 'Guide to Traffic Management Part 8: Local Area Traffic Management' may be required as a condition of Development Consent. Alternatively, developers may elect to

install these devices where appropriate. The use and installation of the devices should be in accordance with Australian Standard 1742.13- 2009 - Local Area Traffic Management.

### **2.32 GUIDE POSTS**

Guideposts and protection fencing are to be provided in accordance AS 1742, AUSTRROADS and RMS guidelines.

### **2.33 SIGNPOSTING AND PAVEMENT MARKINGS**

Signposting and pavement markings are to be provided where required in accordance with "Manual of Uniform Traffic control Devices" Roads, Intersections, Traffic Control Devices, Cycle Ways and Car Parks in accordance with AS 1742 Parts 1-13 and the guidelines.

### **2.34 CAR PARKING**

Car parking is to be provided in accordance with

- DCP and LEP;
- AUSTRROADS 'Guide to Traffic Management Part 11 – Parking'; and
- AS 2890.

Indented parking will only be considered as part of an integrated solution that enhances environmental and aesthetic outcomes such as for water sensitive urban design and entry features.

The developer is responsible for providing parking associated with the development onsite. Parking on the street is regarded as being additional to development generated parking and is for general public parking.

All car parking and manoeuvring surfaces are to be bitumen sealed or equivalent.

### **2.35 FLOODING**

The design of the road system must account for the major flow paths associated with flood events as the piped stormwater drainage networks typically account for flow paths of water during minor events, the flow path of water during major events frequently involves the road network. In particular intersections shall be designed to direct the major flow path of water in accordance with an approved subdivision master plan.

Road longitudinal section sag points must direct flows to major open channels or intersections. Sag points mid block are discouraged and will only be approved if consistent with an agreed drainage master plan. Direction of water to cul-de-sacs, Y-heads and T-heads is discouraged.

## **2.36 EARTHWORKS**

In all new development areas lot filling is to ensure that finished surface levels are 300 mm above the 1% ARI flood levels. Where infill development occurs consult with council regarding local requirements and council flood policies.

Fire trails are to be graded to divert stormwater and graded to divert waters away from residential properties to either drainage reserves or road reserves.

Filling of depressions requires consent, as there is potential to redirect the major flow path of water and for subsequent land settlement. Earthworks are to be in accordance with AS 3798 'Guidelines on Earthworks for Commercial and Residential Development'.

## **2.37 TESTING OF ROADS**

All pavement courses, surfacing and Subgrade are to be tested in accordance with an approved testing regime and are to demonstrate that the pavement meets the requirement of the specification.

Refer to part 7 Testing.

## **2.38 STREET LIGHTING**

Comply with the current Australian Standard as is to provide for pedestrian and vehicular movements.

Lighting designs are to be prepared by consultants approved for lighting design by the energy authority and Council.

## **2.39 ROAD SAFETY AUDITS**

A road safety audit may be required to be undertaken of the road design to provide documentary evidence that the road design has taken into account risk and safety issues.

# **3. RURAL/RURAL RESIDENTIAL ROADS**

In addition to the forgoing section relating to urban road design this section applies to the provision of roads and access to rural and rural residential areas. Council is responsible for making the determination of areas where rural residential design standards apply.

## **3.1 DEFINITIONS, QUALIFICATIONS AND EXPERIENCE**

New road widths require discussion with Council and should generally be in accordance with the following:

**Table 3.1 Rural/Rural Residential**

<b>AADT</b>	<b>ROAD RESERVE</b>	<b>CARRIAGEWAY</b>	<b>SHOULDER</b>	<b>FORMATION</b>
<0-20	20	6.0	1.2	8.4
20-200	20	6.5	1.2	8.9
200-1000	20	6.5	1.8	10.1
>1000 (and all B double routes)	25	7.0	1.8	10.6

**Note:**

- In all cases AADT is that predicted at the end of the design period (usually 20 years);
- The designed pavement thickness is to extend for the full formation; and
- The road reserve width is nominal only and consideration is to be given to the extent of cut and fill batters, catch drains, intersection layout requirements, and provision for public utilities adjacent to the road reserve boundary. A minimum allowance of three metres from the batter point to the boundary is to be provided.

### **3.2 PLAN**

Plans should be drawn at a scale of 1:1000 and show lot boundaries and numbers, road centreline chainages, radii and bearings, road names, locality sketch and a north point. Road numbering shall be in accordance with rural addressing principles.

Plans should show the following;

- The location and reduced level of the bench marks used in the survey works;
- The location of vehicular entrances;
- Existing drainage structures;
- Trees;
- Public utilities;
- Schedules including location and reduced levels of recovery pegs and/or control points for co-ordination surveys; and
- All datum references referred to Australian height datum.

### **3.3 LONGITUDINAL SECTION**

A longitudinal section of the centreline of the roads should be supplied at scales of:

- 1:1000 horizontal; and
- 1:100 vertical.

The longitudinal section of the centreline of roads should show:

- Chainages;
- Reduced level of existing surface and of design level of road;
- Design grades;
- Length of vertical curves;
- Have done drainage information; and

- Extent of roadworks.

Longitudinal levels are to be at:

- 40 m intervals along straight alignments and horizontal curves exceeding R1000 m;
- 20 m intervals for horizontal curves between R 150 m and R 1000 m;
- 10 m intervals for horizontal curves less than R 150 m; and
- All intermediate changes of grade.

Longitudinal sections and cross sections should be taken along existing intersecting roads for a sufficient distance to enable design requirements to be satisfied.

### **3.4 CROSS SECTIONS**

Cross sections are to be at:

- 40 m intervals along straight alignments and horizontal curves exceeding R1000 m;
- 20 m intervals for horizontal curves R1000 and less;
- All culvert sites; and
- The SS, TS, TP and SC of each horizontal curve.

The scale should be 1:100 natural.

Cross sections should not be terminated at the property alignment but should be levelled sufficiently beyond the road boundaries to enable batters of cut and fill to be shown.

Cross sections should show:

- Chainages;
- Reduced level of existing surface;
- Design surface levels on the road centreline;
- Cross falls;
- Centreline offsets;
- Lateral dimensions if pavement and formation widths vary; and
- Batter slopes that vary from those shown on the typical cross section.

Typical cross sections shall show:

- Pavement details;
- Typical width;
- Subsoil drainage; and
- Road surfacing.

### **3.5 PAVEMENT DESIGN**

Road pavements are to be designed in accordance with the Australian Road Research Board Publications:

- Rural Residential Pavement design for local traffic: a supplement to the AUSTROADS pavement design guide; and

- Rural Sealed Local Roads Manual.

A minimum design life of 20 years should be used to determine the pavement thickness.

Designers are to submit traffic loading calculations.

Design subgrade CBR values should be determined by either Geotechnical Engineering Consultants and/or agents of a NATA registered laboratory. The investigation will include "logging" of test holes to a depth not less than one metre below design subgrade levels (unless rock is encountered). Soil samples should be taken at the design depth and CBR tests undertaken after soaking the samples for four days.

The frequency of test holes should be in accordance with 'Pavement Design For Local Traffic: a supplement to the AUSTRROADS Pavement Design Guide'.

A copy of the site investigation report including test results should be submitted with the pavement design and the Engineering Drawings.

The minimum acceptable pavement depth is 200mm.

### **3.6 GEOMETRIC STANDARDS**

The Geometric design of rural roads is to be based on AUSTRROADS – 'Guide to Road Design - Part 3 – Geometric Design'.

The design speed to be used for a particular road should be the legal road speed limit for that road.

### **3.7 SIGHT DISTANCE**

Adequate horizontal and vertical sight distance should be provided for the design speed in accordance with 'Guide to Road Design -Part 3 – Geometric Design'.

Vehicular access to properties is not permitted where the design stopping sight distance is unavailable. Where practical, the horizontal and vertical curves should coincide.

### **3.8 VERTICAL ALIGNMENT**

The maximum permissible grade on an arterial road is to be 8%.

The maximum permissible grade on all other roads is to be 16% for a maximum distance of 150 metres on straight alignment.

The maximum permissible grade of 10% (1 in 10) should be used adjacent to street intersections, locations of poor visibility, horizontal curves of radius 15 metres or less and at cul-de-sacs. Turning circles in cul-de-sacs on steep grades should have grades less than 5%.

### **3.9 PAVEMENT CROSSFALLS**

The normal crossfall on bituminous pavements should be 3% and the normal crossfall on unsealed shoulders should be 4%.

The maximum crossfall permitted is 6% and will occur on super-elevation curves and road intersections.

### **3.10 CLEARING AND GRUBBING**

All road reserves should be cleared approximately 0.5 metres beyond the extent of roadworks. All trees to be removed must be clearly marked on the plan with a diameter of the canopy and the trunk represented diagrammatically on the plan. Native and threatened species impacts are to be identified and are subject to approval.

### **3.11 VEHICULAR ACCESS**

Roads should be located and designed so that vehicular access can be readily obtained at every lot of a subdivision. Where the natural surface slopes steeply to or from the road, the access to each lot should be given special consideration. Preference for limitation of the number of access points to the road network.

Access to rural properties shall provide safe access and egress, having regard to fire risk.

The driveway access is to be all weather sealed construction from the edge of the existing road to the property boundary. Where there is a sealed road, the first 10m shall be sealed.

All vehicle access is to be 4.88 metres minimum wide culverts.

End walls to be trafficable when located within a clear zone (refer to RMS standard drawings).

Hydraulic capacity shall be a minimum of 1 in 5 years.

Install a 375 mm minimum diameter pipe culvert in the table drain.

Calculate pipe flows in the drain and provide capacity for 1 in 100 year overland design flows. For flows in excess of the pipe capacity check flow path to ensure that risk to the public and physical assets is minimised or eliminated. Major flow path of water are to be clear of the edge of gravel and sealed roads.

### **3.12 BUS ROUTES**

Where there is potential for future access by school bus services turning provision is required.



### **3.13 GUIDE POSTS**

Guideposts and protection fencing are to be provided in accordance AS 1742, AUSTRROADS and RMS guidelines.

### **3.14 ROAD NAME SIGNS**

Road name signs are to be manufactured to accord with Council's Standard and should be erected at all intersections. The road name and colour of signs are to be in accordance with an approved sign location drawing.

### **3.15 INTERSECTIONS**

'T' junctions should be adopted in preference to four-way intersections. Where staggered 'T' junctions are to be provided Intersection design should be based on AUSTRROADS publication 'Guide to traffic engineering practice part 5 intersections at grade'.

Roads should intersect at not less than 70°.

Where intersections are in a configuration likely to cause traffic problems, the construction of traffic islands, or such traffic facilities as required providing traffic control and safety.

### **3.16 PUBLIC UTILITIES**

All public utilities in subdivisions should be provided underground. An early approach is to be made to those authorities for their requirements regarding conduits, contributions, layout plans and other relevant details.

The location of proposed conduits beneath the carriageway is to be shown on the plans. Location markers are to be installed following completion of works and attached to kerb where kerb exists.

### **3.17 STEEP GRADES**

Where grades exceed 6%, a one-coat bitumen seal is to be provided on the road shoulders. Where shoulders are sealed, edge line marking is to be provided.

Where the grade of the table drain exceeds 6% and scouring is likely, a concrete lined drain is required.

Where the terrain permits, batters in the region of 4 horizontal to 1 vertical are desirable. Proposed batters of greater slope than 4 horizontal to 1 vertical require separate approval.

### **3.18 SIGNPOSTING AND PAVEMENT MARKINGS**

Signposting and pavement markings in accordance with Australian Standard AS 1742 - Manual of Uniform Traffic Control Devices", are to be provided where required.

### **3.19 FIRE TRAILS**

Fire trails are to be provided as part of an integrated network that improves community safety from the risk of fire.

Fire trails are to have a desirable maximum grade of 1 in 200. In localised sections steeper grades will be permitted with these sections requiring erosion treatment of gutters and drains.

### **3.20 ROAD SURFACING**

The carriageway of Rural/Rural Residential roads should be sealed to a minimum standard of 10/7 two coat spray bitumen seal.

The shoulder adjacent to a barrier centreline is to be widened to 3.0 metres.

Application rates of aggregates and binder, and the Average Least Dimension of aggregates, shall be submitted for approval prior to commencement of sealing on-site.

### **3.21 DUST SUPPRESSION**

Consideration is on a case-by-case basis having regard to

- Existing impacts on buildings within 100 metres;
- Potential future impacts;

### **3.22 CAUSEWAYS AND FLOODING**

Rural roads that include causeway crossings require calculation of flows and recurrence interval of events. Direction from Council will be required on the design criteria and risk assessment approach required.

### **3.23 EROSION PROTECTION**

Where water is concentrated such as for piped culverts design outlet systems that minimise erosion potential.

### **3.24 SPLAYS AT INTERSECTIONS**

Provide splays at intersections.

### **3.25 RURAL ROAD DESIGN PHILOSOPHY**

Rural road pavements are typically elevated in comparison to urban pavements, which are depressed to provide for the major flow path of surface water.

### **3.26 GUARDRAILS**

Provide in accordance with AUSTROADS standards.

### **3.27 MAINTENANCE**

The road reserve area shall be constructed with batter and drain slopes that permit routine access for mowing. This requires desirable minimum batter slopes of 4 horizontal to 1 vertical.

### **3.28 STANDARD DRAWINGS**

All work is to be in accordance to approved Council Standard Drawings.

### **3.29 RURAL ADDRESSING**

Signs are to be manufactured and placed in accordance with Council's Rural Addressing specifications

Rural Addressing numbers will be issued for each property by Council.

## **4. DRAWINGS**

**Table 4.1 Standard Drawings**

<b>No.</b>	<b>Description</b>	<b>Drawing No.</b>
1	Standard Kerb Profiles	STD-R-10
2	Australian Standard Kerb Profiles Acceptable for use in the City of Albury.	STD-R-11
3	Standard Perambulator Ramp on New Construction	STD-R-20
4	Standard Residential Invert on New Construction	STD-R-30
5	Standard Residential Crossing including Removal of Kerb	STD-R-31
6	Standard Residential Invert on Existing Construction	STD-R-35
7	Joining of Residential Crossing onto Existing Drive Invert	STD-R-32
8	Joining of Residential Crossing onto Existing Invert (Pre 1993 Standard)	STD-R-36
9	Standard Light Industrial Crossing	STD-R-33
10	Standard Heavy Industrial Crossing	STD-R-34