

TRUNK ROAD INFRASTRUCTURE STANDARD No. 01

ROAD PLANNING

Supplement to Austroads Guide: Road Transport Planning



ACT
Government

Territory and Municipal Services

Publication Number:	<i>TRIS 01</i>	
Date of Effect:		
Supersedes:		
Endorsed By:		
Approved By:		

DOCUMENT INFORMATION

Document Title	Trunk Road Infrastructure Standard No. 01 Road Planning
Next review date	
Key words	

REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
1.0				

Z

PREFACE

The Austroads series of Guides for provision and management of road and transport infrastructure provides a level of consistency across all jurisdictions in Australia and New Zealand. All road authorities have agreed to adopt the Austroads Guides as the primary technical reference, together with the relevant Australian and New Zealand Standards.

The Australian Capital Territory has adopted the Austroads Guides, and has issued a revised series of documents to reflect this development in standards and specifications for practice in the ACT. This present document is part of the ACT Trunk Road Infrastructure Standard (TRIS) series spanning the broad scope of road infrastructure development in the ACT:

- TRIS 01 – Road Planning
- TRIS 02 – Road Design
- TRIS 03 – Traffic Management
- TRIS 04 – Road Safety
- TRIS 05 – Asset Management
- TRIS 06 – Pavement Design
- TRIS 07 – Bridges and Structures
- TRIS 08 – Road Tunnels
- TRIS 09 – Project Delivery
- TRIS 10 – Project Evaluation

Each of the TRIS documents indicates adoption of the relevant Austroads Guide, sets out specific requirements for implementation in ACT, and calls up more detailed Specifications.

This ACT Trunk Road Infrastructure Standard No.01 - ROAD PLANNING constitutes a supplement to the

AUSTROADS GUIDE TO ROAD TRANSPORT PLANNING

The Territory and Municipal Services Directorate accepts the principles and general guidance in the Guide to Road Transport Planning. This Trunk Road Infrastructure Standard is issued to clarify any exceptions or additional requirements for implementation in the ACT, and to identify relevant complementary documents.

The planning and design of the road network in the ACT must be implemented in general accordance with the Austroads Guide above, and in accordance with specific provisions of this Trunk Road Infrastructure Standard.

Where any differences in practice exist between the Austroads Guide and this Trunk Road Infrastructure Standard, the latter will prevail.

CONTENTS

PREFACE.....	3
CONTENTS.....	4
1 GENERAL	5
2 GENERAL PRINCIPLES	5
3 REFERENCE DOCUMENTS.....	6
3.1 GUIDELINES.....	7
3.2 RELATED TECHNICAL SPECIFICATIONS.....	8
3.3 LEGISLATIVE DOCUMENTS.....	8
4 SUPPLEMENTARY MATERIAL.....	8
5 ROAD HIERARCHY.....	9
6 ROAD NETWORK FEATURES.....	10
6.1 LAYOUT AND DESIGN.....	10
6.2 ROAD RESERVE.....	10
6.3 DESIGN SPEED.....	11
6.4 INTERSECTIONS.....	11
6.5 TRAFFIC NOISE.....	11
6.6 TRANSPORT MODELLING	12
7 REFERENCE LIST	13
8 STANDARD DRAWINGS.....	14

I GENERAL

Two main areas of road planning relate to arterial routes and to residential developments. The former is the major distribution system to the local street network for the latter. Movement within the road network ranges from the higher level arterial or trunk roads to lower level streets and places. Specific planning requirements for development works are covered within the draft [Estate Development Code DV306](#).

This document covers road planning primarily for the arterial road systems, down to the sub-arterial level. Some guidance for lower level roads and streets is given in context as related to design, safety and traffic management issues. For detailed consideration of road planning issues related to land use developments, reference must be made to the [Estate Development Code](#) and associated documents under the [Territory Plan](#).

The scope of material in this present document is limited to road planning for general traffic across all transport modes, including pedestrians. It makes reference to the role of bus transport but does not cover details of public transport services.

Details of public transport services are included in the policy document [Transport for Canberra – Transport for a Sustainability City](#) (March 2012).

2 GENERAL PRINCIPLES

The road transport network should reflect a broad land use / transportation strategy, and its development should translate that strategy into a series of routes and elements for movement that address issues including:

- Environmental sustainability
- Demography and demographic trends
- Neighbourhood identity
- Integration of movement modes
- Recreational / community needs
- Strategic residential planning
- Public transport issues
- Pedestrian and cyclist requirements
- Access for disabled persons.

A key guiding principle is that movement around the city by walking, cycling, public transport and driving should be easy and accessible. Priority should be given to the needs of transport modes in the following order of precedence:

- Walking
- Cycling
- Public Transport
- Commercial Vehicles
- Private cars.

Major roads and intersections are the core elements of the road transport network, forming links between the various land uses and communities. Their function is to provide a safe, reliable, efficient, convenient transport route for all types of vehicles and cyclists. The development of major roads has significant potential for impacts on the environment and local topography, and road planning should address such issues as:

- Noise levels at adjacent communities.
- Impact on sensitive heritage, cultural and archaeological areas.
- Impact on flora and fauna.
- Requirements to accommodate pedestrian and cycling routes so that pedestrian / cyclist and vehicle conflicts are minimised.
- Operational costs and costs to manage the road system.
- Air quality.

Planners and designers should ensure that the road network complies with the strategic planning requirements contained in the relevant reference documents, the Austroads Guides, and the ACT Infrastructure Standards and Technical Specifications.

3 REFERENCE DOCUMENTS

The primary reference documents for road planning in ACT are as follows:

- Road Transport (General) Act 1999
- Road Transport (Safety and Traffic Management) Act 1999
- Road Transport (Mass, Dimensions and Loading) Act 2009
- Road Transport (Safety and Traffic Management) Regulation 2000
- Legislation Act 2001
- Planning and Development Act 2007
- Australian Capital Territory (Planning and Land Management) Act 1988
- Public Roads Act 1902
- Disability and Discrimination Act 1992
- Territory Plan 2008
- Estate Development Code
- National Capital Plan
- ACT Sustainable Transport Plan 2004
- Transport for Canberra – Transport for Sustainability (March 2012)
- ACT Planning Strategy.

Details for all reference documents other than legislation are given in the Section 7 Reference List.

Territory Plan

The Territory Plan is the key statutory planning document in the ACT, providing the policy framework for the administration of planning in the ACT. The purpose of the **Territory Plan** is to manage land use change and development in a manner consistent with strategic directions set by the ACT Government, Legislative Assembly and the community. It must not be inconsistent with the **National Capital Plan**.

The statutory requirements for the **Territory Plan** are set out in the **Planning and Development Act 2007**.

The object of the **Territory Plan** is to ensure, in a manner not inconsistent with the **National Capital Plan**, the planning and development of the ACT to provide the people of the ACT with an attractive, safe and efficient environment in which to live, work and have their recreation.

The **Territory Plan** includes a statement of strategic directions, definition of zones and precincts in the ACT, objectives and development tables applying to each zone, structure plans and concept plans for the development of future urban areas, and a series of general, development and precinct codes for assessment of developments.

Estate Development Code

This code (currently in draft, **DV 306**, as a variation to the **Residential Subdivision Development Code** under the **Territory Plan**) applies to all proposals in the ACT for the subdivision of land requiring the preparation of an estate development plan.

This code provides additional planning, design and environmental controls to support the objectives of the relevant zone. It will be used by ESDD to assess development applications for estate development plans. It also offers guidance to applicants preparing estate development plans.

DV 306 is to enable endorsement of development proposals, clarify the roles of ESDD, government agencies and service providers in the process, and provide some measure of certainty to the applicant.

From the road planning perspective, **DV 306** sets out detailed road layout and design features and requirements for road networks in estate developments. It is a prime reference for road planning and design in ACT at the local streets level.

National Capital Plan

The **National Capital Plan**, developed under the **Australian Capital Territory (Planning and Land Management) Act 1988** is the strategic plan for Canberra and the Territory. Its objective is to ensure that Canberra and the Territory are planned and developed in accordance with their national significance. This recognises the value of the unique purpose, setting, character and symbolism of Australia's national capital.

The plan sets out the planning principles and policies for Canberra and the Territory, and detailed conditions of planning, design and development for designated areas because of their particular importance to the special character of the national capital. Planning and approval of development within designated areas is the responsibility of the National Capital Authority (NCA).

ACT Sustainable Transport Plan

The **Sustainable Transport Plan** for the ACT sets a direction and policy framework to achieve a more sustainable transport system for the ACT over the next 25 years. The vision is for the city to have more transport choice and equitable access. The plan aims to reduce the overall cost of the transport system while maintaining high levels of accessibility.

Under the plan, Canberra will achieve a transport system that has lower overall costs, particularly lower greenhouse gas emissions, lower air pollution, reduced accidents and lower health costs, and provides more transport options for the community. The plan seeks to maintain the high levels of accessibility that Canberra enjoys by achieving a shift towards more use of walking, cycling and public transport.

Transport for Canberra – Transport for Sustainability (March 2012)

Transport for Canberra - Transport for Sustainability (March 2012) builds on the 2004 Sustainable Transport Plan and complements the draft 2011 ACT Planning Strategy (formerly the Canberra Spatial Plan) to promote a shift to a more sustainable Canberra with more sustainable transport. It will be the foundation for transport planning for the next 20 years.

Transport for Canberra - Transport for Sustainability (March 2012) has been prepared in conjunction with the ACT Planning Strategy so important relationships between land use and transport can be used to support a shift to more sustainable transport and a more sustainable Canberra. It sets a new policy direction for transport addressing:

- Transport and land use integration through Frequent Network of public transport
- Social inclusion and transport disadvantage
- Active travel to make walking and cycling the easiest travel options
- Strategic management of the road network, parking, motorised vehicles and freight
- Travel demand management across all modes of transport (pedestrians, cyclists, motorcyclists, cars, public transport, freight) including transport pricing
- Transport system performance measurement and reporting, including new mode share targets.

3.1 GUIDELINES

The primary technical guidance is set out in the **Austroads Guide to Road Transport Planning**. It is a single-volume document which is structured as follows:

- Section 1 – Introduction
- Section 2 – Elements of Good Transport Planning
- Section 3 – ATC National Guidelines for Transport System Management
- Section 4 – Survey of Road Transport Planning in Australia and New Zealand
- Section 5 – Benchmarking to Best Practice of Road Transport Planning.

The Guide provides an introduction to transport planning and identifies the critical elements necessary for good transport planning. It addresses the concepts of route and link planning with a focus on road transport. It also examines current road transport planning processes and guidelines within jurisdictions.

The Guide is a complementary document to the **National Guidelines for Transport System Management**, which provides high level guidance on transport planning, for all transport modes, at network and corridor level.

The **Austroads Guide to Project Evaluation** is also an important handbook for the road transport practitioner because it deals with the road project evaluation process in its entirety.

Some aspects of road and transport planning are also addressed in the following Austroads Guides:

- Austroads Guide to Road Design
- Austroads Guide to Road Safety
- Austroads Guide to Traffic Management.

3.2 RELATED TECHNICAL SPECIFICATIONS

There are no general detailed requirements for processes or procedures for road planning in ACT prescribed directly in **Trunk Road Infrastructure Technical Specification** documents. For implementation in specific areas such as pavement design, structures, road design, traffic management and safety management, reference is to be made to the relevant **Trunk Road Infrastructure Standards**, and the Technical Specifications to which they refer.

The Austroads Guides and the ACT Specifications refer to the requirements of relevant Australian Standards.

3.3 LEGISLATIVE DOCUMENTS

4 SUPPLEMENTARY MATERIAL

The following tabulated material indicates elements of the implementation of road planning in ACT, as they relate to the content of the Austroads Guide to Road Transport Planning. The table provides advice on any additional ACT requirements, or exceptions, to the provisions of the Guide. Complementary documentation is also indicated where relevant.

Subsequent sections of this document outline specific features of road network planning and development to be addressed in the ACT. Reference is made to other Trunk Road Infrastructure Standards for details where necessary.

SUPPLEMENT TO THE AUSTROADS GUIDE TO ROAD TRANSPORT PLANNING PUBLICATION DATE: 2009		
The guide develops a map of jurisdictional road transport planning processes with a particular focus at the road route and link level. It provides a best practice framework against which current road transport planning practice in Australasia may be assessed. It includes the results of consultation with relevant government authorities, a survey of current practice and a review of relevant literature from Australia and overseas. The guide discusses elements and current trends in transport planning, and best-practice principles required to achieve environmentally and socially sustainable transport solutions.		
Guide Reference Section	ACT Practice, Complementary Material, or Departures	Date
General	This Guide is adopted, with no exceptions in principle for the practice in ACT.	
Policy and strategy responsibility 2.2, 4.4	<p>Responsibility for road planning in the ACT is shared between</p> <ul style="list-style-type: none"> • Environment and Sustainable Development Directorate (ESDD) and • Territory and Municipal Services Directorate (TAMS). <p>Co-operation with the National Capital Authority (NCA) is also necessary, since ACT roads must comply with Commonwealth planning guidelines from the NCA. The NCA is responsible for the Parliamentary Triangle area within the ACT, and holds planning and works approval for 'designated areas' under the National Capital Plan and reflected in the Territory Plan. NCA's approval is mandatory prior to any works within the designated area.</p> <p>For estate developments, guidance and requirements for planning and design of local road networks and streets is set out in the Estate Development Code (DV 306).</p>	

5 ROAD HIERARCHY

The classification of roads in the ACT is based on a formal road hierarchy. The classification fundamentally relates to the predominant function of a road and to the extent it serves the two basic purposes of the road network – the movement of traffic and access to property.

There are two primary types of roads within the ACT road network – trunk roads (arterial roads) and local roads (major collector roads, minor collector roads, and access streets).

A hierarchical road network is essential to maximise road safety, amenity and legibility and to provide for all road users. Each class of road in the network serves a distinct set of functions and is designed accordingly. The design should convey to motorists the predominant function of the road. A road's physical characteristics and traffic volume will reflect its function and role in the network.

The road classifications used are as follows:

Arterial Roads

Arterial roads predominantly serve longer distance travel within a district and through traffic from one district to another, and form the principal avenues of communication for metropolitan scale traffic movements. They include limited access roads and parkways (or freeways) having full access control and grade separated inter-sections. A small number have higher levels of property access for urban design reasons, for example Northbourne Avenue, or reflect the planning and design parameters of the time of their construction, for example, Limestone Avenue. Traffic capacity is a function of the design of the road rather than being constrained by environmental objectives.

Major Collector Roads

Major collector roads collect and distribute traffic within residential, industrial and commercial areas. They form the link between the primary network and the roads within local areas and should carry only traffic originating or terminating in the area. The volume of traffic carried is constrained by environmental objectives - safety and traffic noise - rather than road geometry and reflects the limited area that they serve. Direct property access is still permissible but the level of traffic may dictate that access and egress arrangements should be such that vehicles can exit properties in a forward direction.

Minor Collector Roads

Minor collector roads collect and distribute traffic from access streets, linking to the major collector roads within the neighbourhood. They can also provide secondary connections direct to the external arterial road network. Traffic volumes are compatible with direct property access.

Access Streets

Access Streets provide access but do not accommodate traffic generated by sites in other streets, excluding rear lanes.

For further information on functional road hierarchy, refer to:

- [Austroads Guide to Traffic Management](#)
- [Trunk Road Infrastructure Standard 03](#)
- [Austroads Guide to Road Design](#)
- [Trunk Road Infrastructure Standard 02](#)
- [Estate Development Code DV306](#)

6 ROAD NETWORK FEATURES

6.1 LAYOUT AND DESIGN

The design features of each type of road convey to the road user its primary functions and encourage appropriate behaviour. This can be achieved by complying with the following requirements wherever possible:

- Traffic volumes and speeds on any road should be compatible with the functions of that road.
- The road network should ensure that no road links with another road which is more than two levels higher or lower in the hierarchy. In exceptional circumstances roads may link with others that are more than two levels apart, however, no access street or local street should have access to an access-controlled arterial road.
- The external road network should be designed and located to provide routes which are more convenient for potential through traffic within the residential network. Major roads should be provided at intervals of no more than 1.5km and should be complete and of adequate capacity to accommodate through network movements. The internal road system should not provide through routes that are more convenient than the external road network.
- The length of a major collector road within a development should be minimised.
- The maximum length of an access street should ensure its status as a residential place is retained, where the traffic, in terms of speed and volume will enable the integration of pedestrian, bicycle and vehicular movements. This length will also ensure that residential convenience is not unduly impaired as a result of speed restraints.
- Where access streets form part of a pedestrian or bicycle network, access links should provide suitable connectivity with adjoining access streets or open space systems so as to ensure such pedestrian and bicycle networks are functionally efficient.
- It is preferred that the residential road network should be such that speed control is inherent in the layout design, with curves and some intersection types providing speed calming rather than devices such as raised platforms or chicanes.
- Connections between internal roads should be T-junctions or controlled by roundabouts.
- The road layout should conform to the requirements of the external road network and satisfy the transport provisions of an outline plan.

6.2 ROAD RESERVE

The road reserve must provide for all functions that the road is expected to fulfil, including safe and efficient movement for all users (including commercial vehicles, buses, bicycles and pedestrians), provision for parked vehicles, and provision for public utilities.

Road reserves for arterial and collector roads, and roads in Town Centres and Industrial Areas, should be designed for the predicted ultimate traffic volumes, accepted levels of service at intersections and accommodation of users including cyclists and commercial vehicles. Traffic analysis and pedestrian / cycling network master plans are required to identify planning requirements. In the case of Town Centres and Industrial Areas road planning should address provision of parking, bus facilities, waste collection, heavy vehicle access and appropriate facilities for pedestrians.

The planning of major roads in green field areas should consider fencing requirements such as:

- Ultimate residential fencing at the road boundary to suit noise attenuation and privacy requirements.
- Adjustments to rural fencing to accommodate interim land uses.

The road layout and reservation should also comply with the following:

- The carriageway width must allow vehicles to proceed safely at the operating speed intended for that level of road in the network and with only minor delays in the peak period. This must take into consideration the restrictions caused by parked vehicles where it is intended or likely that this will occur on the carriageway. Vehicles include trucks, emergency vehicles and, on some roads, buses.
- The safety and convenience of pedestrians and cyclists where it is intended they use the carriageway must also be assured by providing sufficient width or Trunk Paths. For arterial roads where network planning for cyclists and pedestrians is not fully developed, the cross section and road reserve width should consider allowing provision for a trunk path on one side and a footpath on the other.
- The carriageway width should also provide for unobstructed access to individual blocks where permitted in residential areas. Drivers should be able to comfortably enter or reverse from a block in a single movement, taking into consideration the possibility of a vehicle being parked on the carriageway opposite the driveway.

- Appropriate verge width should be provided to enable the safe location, construction and maintenance of required footpaths and public utility services. Wherever possible, services should be located in shared trenches.
- The verge, when considered in conjunction with the horizontal alignment and permitted fence and property frontage treatments, should provide appropriate sight distances, taking into account expected speeds and pedestrian and cyclist movements.
- Stopping sight distances and intersection sight distances, provided by the verge, should be based on the design speeds for each road type in residential areas.

For detailed design requirements for development works, refer to:

- [Estate Development Code DV306](#)
- [Development Infrastructure Standards](#).

For further information on road reserve design features, including verges and roadside areas, refer to:

- [Austroads Guide to Road Design](#)
- [Trunk Road Infrastructure Standard 02](#).

For further advice on allocation of road reserve space to road users, refer to:

- [Austroads Guide to Traffic Management](#)
- [Trunk Road Infrastructure Standard 03](#).

6.3 DESIGN SPEED

From a road planning perspective it is important that the road hierarchy and road layout are developed in an integrated manner to ensure the design speeds can be maintained without undue artificial treatments. DV306 provides detailed requirements for design speeds for local roads.

Adoption of a low design speed discourages speeding. However, where vertical or horizontal curves of low design speed are located in otherwise high speed sections the result is a potentially dangerous section of road. On low standard roads, operating speeds will tend to be in excess of arbitrary speed standards. Attention should be given to ensuring that potentially hazardous features are visible to drivers, and adopting traffic engineering measures which will assist.

For further information on application of the design speed concept, refer to:

- [Austroads Guide to Road Design](#)
- [Trunk Road Infrastructure Standard 02](#).

6.4 INTERSECTIONS

The layout of intersections and roundabouts shall comply with the requirements of the relevant Austroads Guides.

At major intersections there are many factors that impact on the assessment of treatment solutions. Whether traffic signals or a roundabout are suitable involves both road planning and engineering design.

In local residential streets, minor roundabouts with central islands and splitter islands that are trafficable by commercial vehicles are acceptable in low volume environments.

The provision of vehicle access points to properties close to intersections and roundabouts also needs to be carefully examined. Operational and safety considerations, particularly in high volume roads, may warrant restrictions on access. Satisfying sight distance criteria may not be sufficient.

For further information on the selection of intersection treatments and their geometric design, refer to:

- [Austroads Guide to Traffic Management](#)
- [Trunk Road Infrastructure Standard 03](#)
- [Austroads Guide to Road Design](#)
- [Trunk Road Infrastructure Standard 02](#)

6.5 TRAFFIC NOISE

During planning for new or upgraded roads, consideration should be given to possible intrusion of traffic noise into adjacent residential areas and other noise-sensitive land use areas. Predictions of future traffic noise levels should be determined using models and performance criteria acceptable to ESDD.

Noise forecasting modules associated with strategic transport models (such as EMME) or other local area models (such as Paramics) are not generally accepted for analysis of the noise impacts from traffic on individual road links or at specific sites. Their capability is limited to more general comparisons between/among towns and cities.

Where unusual site conditions exist, noise monitoring at the site, or at a proxy site, may need to be considered to assist in forecasting future traffic noise levels.

Road planning and noise analysis should be undertaken in an integrated manner so that the selection of road reserve width allows the most economical form of noise barrier where required, to be considered. The investigation of the most appropriate means for achieving a reasonable level of noise in affected areas while minimising the cost of noise attenuation should form part of the planning process for a district, particularly in determining the width of road reservations for different classes of roads.

Factors considered might include additional land take for an increased reservation width, provision of mounds and barriers and urban design requirements. In some circumstances, special construction techniques for affected buildings may be appropriate. These matters should normally be addressed during the planning process rather than during the design phase, although it may be necessary to refine approaches to noise attenuation during design.

For further information on noise attenuation in road planning and design, refer to:

- [Austroads Guide to Road Design](#)
- [Trunk Road Infrastructure Standard 02.](#)

6.6 TRANSPORT MODELLING

Transport modelling will occasionally be needed to help quantify the impacts for various future urban planning situations, such as:

- Considering options for new arterial or sub-arterial road connections.
- Testing new road layouts for large sub-division areas or town centres.
- Analysing strategic transport policy changes (ie mode split to public transport, etc).
- Considering the traffic impacts of large developments in a dense network situation eg new retail centre in Civic).
- Testing of options for traffic calming (LATM) to determine impacts and effectiveness of changes.

Transport models are commonly used to forecast future traffic flows, for economic analysis of major transport infrastructure projects and to estimate greenhouse gas emissions. There are several computer software packages available that offer the capability to undertake a wide range of analyses at the strategic level. Some include the capability to model networks at a finer level of detail than at the strategic level and some are designed with local area modelling as their primary focus. A combination of models (ranging from 'strategic' to 'local area') may be necessary to predict future traffic volumes for a particular purpose.

Transport modelling should be undertaken by appropriately trained and experienced personnel. The interpretation of model outputs should be undertaken by transport professionals experienced in the use of the particular software package and familiar with the program limitations.

For transport network modelling, computer software packages suitable for forecasting future traffic flows and public transport are available. The ACT Transport Planning and some transport consultants in Canberra currently maintain a Strategic Model using software package EMME. The ACT model is updated and calibrated regularly in line with the ABS Census years using the ABS journey to work, travel surveys, traffic volume and public transport data.

Micro simulation models for some of the city/town centres have been developed based on the Paramics model, which is especially suited to smaller networks with substantial detail modelled. Currently micro simulation models for City, Gungahlin Town Centre, Flemington Road and Northbourne Avenue are available with ACT Transport Planning. This type of model is suited to testing the impact of individual development proposals or land use policy changes on the road infrastructure at a fine level of detail. The model is often

used in combination with one of the strategic models for more detailed analyses of future localised traffic flows. SIDRA computer package is used to model intersection performance for future developments.

Before transport modelling is carried out, designers and practitioners should consult with the ACT Transport Planning on:

- The currency of input data (for example, population, employment, retail space, school enrolments and other factors),
- Model calibration details,
- Existing networks and any changes to them prior to the commencement of modelling, and
- Assumptions about future road links to be included in networks for future years

Other software packages, such as EMME/2 and Tranplan could also be used for these purposes. Other models may be found useful for forecasting traffic volumes on networks, but care needs to be taken in the selection and calibration of such models.

Several dense network models for some of the town centres such as Civic, Tuggeranong and Belconnen have been developed based on the Paramics traffic model, which is especially suited to smaller networks with substantial detail modelled, such as each individual intersection. This model is suited to testing the impact of individual development proposals or land use policy changes on the road infrastructure at a fine level of detail. The model is often used in combination with one of the strategic models for more detailed analyses of future localised traffic flows. Other models with a “local area” or “sub-district” capability, including TRIPS, may provide suitable alternatives to Paramics.

Before traffic modelling is carried out, designers and practitioners should consult with ESDD on:

- The currency of input data (for example, population, employment, retail space, school enrolments and other factors),
- Existing networks and any changes to them prior to the commencement of modelling, and
- Assumptions about future road links to be included in networks for future years.

The modelling needs to be appropriate for the level of assessment involved; for example, broad or strategic modelling that examines the network impacts, or fine grained modelling that considers the impact of intersections in some detail.

7 REFERENCE LIST

ACT Government 2012, *Territory Plan*, ACT Government, Canberra, ACT.

ACT Government 2012, *Transport for Canberra: Transport for a sustainable city*, ACT Government, Canberra, ACT.

ACT Government 2004, *The sustainable transport plan for the ACT*, ACT Government, Canberra, ACT.

ACT Government 2012, *ACT Trunk Road Infrastructure Standards*, ACT Government, Canberra, ACT.

ACT Government 2012, *ACT Trunk Road Infrastructure Technical Specification*, ACT Government, Canberra, ACT.

ACT Planning and Land Authority 2011, *ACT Estate Development Code – DV 306*, ACT Government, Canberra, ACT.

Australian Transport Council (ATC) 2006. *National Guidelines for Transport System Management*, ATC, Canberra, 2006

Austroads 2008. *Guide to Project Evaluation, Parts 1-8, AGPE08*, Austroads, Sydney, NSW.

Austroads 2009. *Guide to Road Design, Parts 1-8, AGRD09*, Austroads, Sydney, NSW.

Austroads 2009. *Guide to Road Safety, Parts 1-9, AGRS09*, Austroads, Sydney, NSW.

Austroads 2009. *Guide to Road Transport Planning, AGTP09*, Austroads, Sydney, NSW.

Austroads 2009. *Guide to Traffic Management, Parts 1-13, AGTM09*, Austroads, Sydney, NSW.

National Capital Authority 2011, *National Capital Plan*, Australian Government, Canberra, ACT.

8 STANDARD DRAWINGS