



ACT
Government

Transport Canberra and
City Services

Guidelines for Transport Impact Assessment

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Document Information

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Note: The current version of this document is on the TCCS intranet. Printed copies may be out of date, please check before using

List of Acronyms

ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority (an entity within the EPD)
DA	Development Application
EIS	Environmental Impact Statement
EPD	Environment and Planning Directorate
GFA	Gross Floor Area
LOS	Level of Service
PVAC	Parking and Vehicle Access General Code
STP	Sustainable Transport Plan
TCCS	Transport Canberra and City Services (formerly TAMS)
TAR	Transport Assessment Report
TDM	Travel Demand Management
TEF	Transport Effects Form
TIA	Transport Impact Assessment

1. Introduction

1.1 Policy Context

The ACT Government released the Transport for Canberra policy in 2012 as the foundation for transport planning in the ACT to 2031. The policy identifies a number of key actions to support uptake of sustainable modes of transport including public transport, walking and cycling in Canberra. Through the policy, the government committed to mode share targets for public transport of 16% of all work trips, and 7% each for walking and cycling by 2026, from a combined level of 15.4% in 2006. These mode share targets were originally identified in the 2004 Sustainable Transport Plan (STP).

1.2 Definition of Transport Impact Assessment

Transport Impact Assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. The assessment not only includes general impacts relating to transport management (road efficiency and safety) but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

1.3 Purpose of the Guideline

This guideline should be used in conjunction with the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development. The Austroads guide provides guidance related to how a transport impact assessment should be undertaken, particularly with regard to traffic issues. As it is intended to be multi-jurisdictional, it is general in nature. This ACT guideline will be known as the Transport Impact Assessment Guidelines (TIA Guidelines). The TIA Guidelines provide practitioners and stakeholders involved in land-use and transport planning a reference document for managing transport impact assessments resulting from land-use development proposals. The TIA Guidelines will promote a common understanding of the process aligned with the national transport management guidelines and be tailored to the statutory requirements, policies and strategies of the ACT. Unlike the Austroads guide, it is focused on what is required rather than on how to conduct an assessment.

Specifically, this TIA Guidelines aim to:

- outline the necessary matters to be considered in a TIA and provide a more transparent process
- ensure that sustainable transport goals and strategies are incorporated into the TIA process; and
- provide development thresholds to indicate when larger development proposals need a TIA.

The TIA process will most commonly be applied to merit-track and impact-track development applications. In the case of impact-track DAs, the TIA should be undertaken in conjunction with an Environmental Impact Statement (EIS) where relevant.

1.4 Sustainable Transport Objectives

A key stage of the TIA guide as mentioned above is the way in which sustainable transportation objectives are considered in the Transport Assessment Report (further discussed in Section 5). The relationship between land use and transport is of fundamental importance to the completion of transport impact assessments. TIAs should address the key sustainable transport objectives as referenced in the Transport for Canberra policy and should specifically identify how the proposed development will support those objectives.

1.5 Scope of the Guideline

The need for a TIA is dependent on the location, type and size of the development and the ability of road network to handle transport generated by the development.

The scope of the TIA includes:

- identification of impacts resulting from specific land use proposal;

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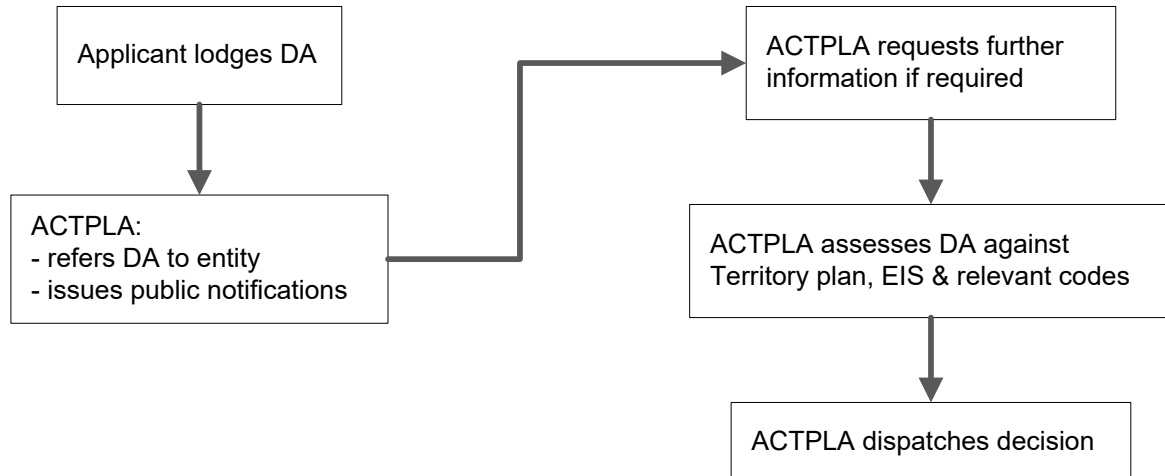
- assessment of the scale of the development proposals and provision of development thresholds;
- management of transport impacts through existing infrastructure, provision of additional infrastructure or modifying the development proposal;
- alignment of the assessment with the existing territory policies and plans; and
- preparation of the transport assessment report.

All elements required to assess transport management of developments, such as access and transport movement, safety and environmental considerations, should be included whether specifically identified in the TIA Guidelines or not. Depending on the size of the developments, the impact on the road network in the district may be required.

2. Threshold for Requiring a TIA

This guideline should be considered during the development application approval process in the ACT for merit or impact track applications. The development application process is summarised in Figure 2.1.

Figure 2.1: Development application approval process in the ACT



This process applies to Estate Development Plans (EDPs). EDPs are lodged as Development Approvals and agencies are consulted by the proponent prior to lodgement. Proponents should note that:

- the preparation of a concept plan occurs prior to an EDP requiring transport assessment for which a transport assessment will provide useful background information; and
- guidelines exist for the preparation of EDPs.¹

Not all development applications require a TIA. The appropriate Territory Plan codes identify the thresholds for TIA's. The need for a TIA is included in the General Development Controls within the Territory Plan.

2.1 Intent and Criteria

The intent of Element 4 – Parking and Site Access within the General Development Controls is to provide for safe, convenient access to meet the needs of all users and visitors. The criteria that should be considered include:

- The road network can accommodate the amount of traffic that is likely to be generated by the development;
- Safe and convenient movement of public transport passengers, pedestrians and cyclists is provided;
- to provide for safe and efficient access, circulation and parking facilities for vehicles, cyclists and pedestrians; and
- to ensure that parking facilities do not detract from streetscape amenity and surveillance of the street.

¹ See <http://www.actpla.act.gov.au> and search "EDP Guidelines"

2.2 Threshold and Criteria

Table 2.1 provides the relevant thresholds, rules and criteria to support the transport assessment.

Table 2.1: Thresholds, Rules and Criteria²

Rules		Criteria
4.1 Transport Impact		
<p>Where the proposed development is expected to generate in excess of 10 vehicle trips per hour in the peak period, the proposed development will be endorsed by the Department of Transport Canberra and City Services (TCCS) stating that transport impacts have been adequately assessed in accordance with the current version of the <i>ACT Transport Impact Assessment Guidelines</i>.</p> <p>For individual land uses, the following can be taken to indicate the extent of development which will generate 10 peak period vehicle trips per hour:</p>		Existing and future transport and access networks and infrastructure can accommodate the number of vehicular and non-vehicular trips that are likely to be generated by the development
Land Use	Scale of Development	
Residential Zones Single Dwelling Housing Multi-unit Housing	10 dwelling units 17 dwelling units	
Commercial Zones City Centre Precinct Town Centres Precinct Group Centres Precinct Local Centres Precinct	Varies. Use 10 vehicle trips per hour	
Commercial Accommodation Offices Medical/Dental Centre Day Care Centre	17 rooms 1000 m ² GFA 7 employees 2 employees	
Industrial Zones General Industrial	1000 m ² GFA	
Community Facility Zone and Parks and Recreation Zone Offices Outdoor Recreation Facility	1000 m ² GFA 1 playing surface with stadia seating less than 50 people	
Indoor Recreation Facility Community Activity Centre	650 m ² GFA 650 m ² GFA	

It should be noted that the Rule does not specify the scope or level of TIA that is required in any specific circumstance.

² Reference documents: NSW Guide to Traffic Generating Developments (2002) and Austroads Guide to Traffic Management Part 12 Traffic Impacts of Development

3. Establishing the Type of Assessment Report Required

The Territory Plan requires a transport assessment to be completed for all but very small developments as identified in Element 4 of the various Territory Plan codes. The type and scope of a transport assessment can be determined by a number of factors, including but not limited to:

- the size and nature of the proposed development;
- location;
- catchment;
- the surrounding road network;
- public transport; and
- accessibility for pedestrians, cyclists and people with disabilities.

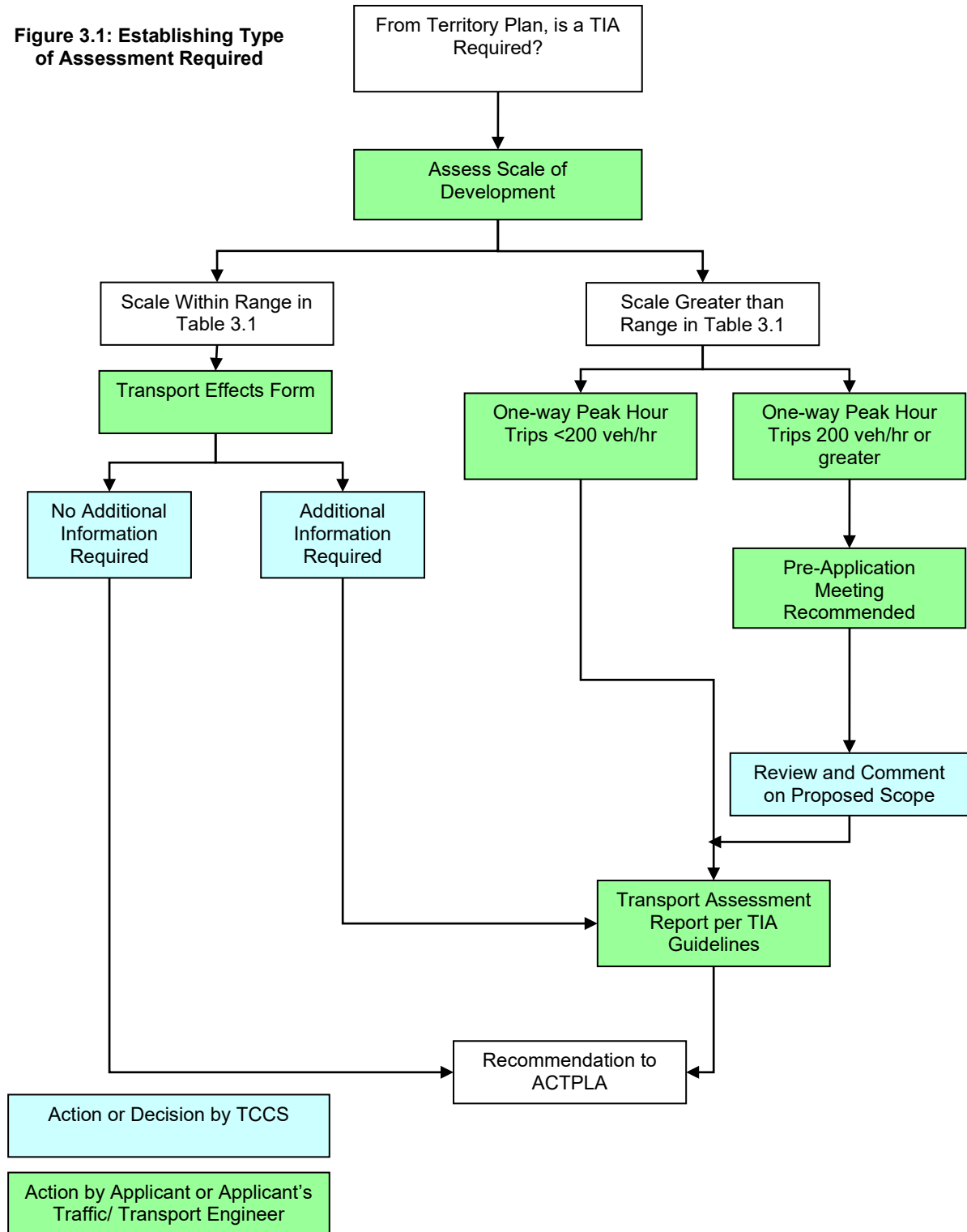
For the purpose of transport assessments in the ACT, the primary factor to be used to determine the type of assessment is the scale of proposed development, with vehicle trip generation used to define scale for larger and/or more complex assessments.

Two types of assessments have been identified:

- **Transport Effects Form (TEF)** – The form is to be used for small, basic developments that will have minimal transport effects. The form is intended to collect generally factual (rather than interpreted) information about the development and can be completed by the applicant with little or no assistance from a traffic engineering professional. The information will be used by TCCS staff to confirm that the effect of the proposed development on the transport system will be minimal. In rare situations where there is insufficient information to adequately understand the effects, the applicant may be requested to complete a full Transport Assessment Report. Although the intention is that the TEF can be completed by the applicant without professional assistance, a development applicant should seek professional guidance on site planning and design elements, including accesses, parking and on-site circulation for all modes.
- **Transport Assessment Report (TAR)** – A transport assessment report presents the findings of a thorough transport assessment based on these guidelines. This level of assessment would normally be undertaken by a traffic/ transport engineering professional as it requires judgement and interpretation of results. Reporting can, and should follow the provided standardised template. For straightforward, moderate scale developments a transport assessment report should be prepared in accordance with these guidelines. For larger developments it is advisable for the applicant's engineer to meet with TCCS staff at the pre-application stage (i.e. prior to lodging the development application) to discuss transport impact assessment scope, using these guidelines as the basis. The transport assessment report will then be prepared based on these guidelines and the scope discussed at the pre-application meeting.

Figure 3.1 summarises the process for establishing the type of assessment required.

Figure 3.1: Establishing Type of Assessment Required



3.1 Transport Effects Form

Table 3.1 outlines the scale of developments for which a transport effects form is sufficient as a TIA. Under most circumstances, the effects will be easily defined from the form and no further assessment will be required. However, there may be rare situations where additional information or expanded analysis is required for even a small scale development. Those situations will be determined by TCCS staff and may require specific assessment to address identified issues, or elevate the assessment to a Transport Assessment Report.

Table 3.1: Maximum Threshold for Use of Transport Effects Form

Land Use	Range for Which a Transport Effects Form is Acceptable
Airport	TEF not applicable
Animal care facility	less than 40 animal capacity
Automatic Teller Machine (ATM)	less than 4 ATMs
Boarding house	less than 60 beds
Boomgate	TEF not applicable
Bulk landscape supplies	less than 1250 m ² GFA
Car park	less than 50 car park spaces
Caravan park/camping ground	less than 90 caravan sites
Civic administration	less than 800 m ² GFA
Club	less than 300 m ² GFA
Commercial Accommodation Use (generation for restaurant/bar to be accounted for separately)	less than 60 rooms/units
Community Use	
Child care centre	less than 10 child places
Community activity centre	less than 800 m ² GFA
Community Theatre	less than 50 seats
Cultural facility	less than 800 m ² GFA
Educational establishment	less than 100 students
Health Facility	less than 20 staff
Hospital	less than 40 beds
Place of worship	less than 60 seats
Corrections facility	TEF not applicable
Craft workshop	less than 2000 m ² GFA
Drink establishment	less than 300 m ² GFA
Drive-in cinema	TEF not applicable
Emergency services facility	less than 3 emergency vehicles
Freight transport facility	less than 3 ha land area
Funeral parlour	less than 60 seats
General industry	TEF not applicable
Group or organised camp	less than 60 camper capacity
Hazardous industry/waste facility	TEF not applicable
Home business	less than 3 employees
Incineration facility	TEF not applicable
Indoor entertainment facility	less than 800 m ² GFA
Industrial trades	TEF not applicable
Landfill site	TEF not applicable
Land Management Facility	less than 800 m ² GFA
Light industry	TEF not applicable
Liquid fuel depot	TEF not applicable
Mining industry	TEF not applicable
Mobile home park	less than 60 sites
Movie Theatre	TEF not applicable
Multi-unit housing	less than 60 dwellings
Municipal depot	TEF not applicable
Non-Retail Commercial Use	less than 800 m ² GFA
Office	less than 800 m ² GFA
Outdoor recreation facility/Playing fields	2 or fewer playing surfaces (fields)
Overnight camping area	less than 60 campsites
Place of assembly	Capacity less than 50 occupants
Plant and equipment hire establishment	less than 800 m ² GFA
Public transport facility	TEF not applicable
Recyclable materials collection/recycling facility	TEF not applicable
Residential Use	
Multi unit housing	less than 60 units

Residential care accommodation	less than 40 units
Retirement complex	less than 60 units
Single dwelling housing	less than 40 units
Supportive housing	less than 40 units
Restaurant	less than 300 m ² GFA
Scientific research establishment	less than 800 m ² GFA
Service station	TEF not applicable
Serviced apartment	less than 60 dwellings
Shop	
Bulky goods retailing	less than 800 m ² GFA
Department store	less than 800 m ² GFA
Personal service	less than 500 m ² GFA
Supermarket	less than 300 m ² GFA
Take away food shop	less than 300 m ² GFA
Stock/sale yard	TEF not applicable
Store	less than 2 ha land area
Tourist facility	TEF not applicable
Transport depot	TEF not applicable
Vehicle Sales	less than 1500 m ² GFA
Veterinary hospital	less than 20 staff
Warehouse	less than 2000 m ² GFA
Waste transfer station	TEF not applicable
Zoo	TEF not applicable

*This list was selected based on Part 13 of the Territory Plan: Definitions and modified for use in this guide.
Table only applies to developments requiring an assessment of transport impacts as defined in Table 2.1*

3.2 Transport Assessment Report

For developments greater than the range indicated in Table 3.1, a Transport Assessment Report (TAR) will be prepared in accordance with this TIA Guidelines. Where the total trip generation is expected to be high (e.g. greater than 200 one-way vehicle trips) it is recommended that the applicant's traffic/ transport engineer meet with TCCS staff during the pre-application phase. The topics of discussion may include confirmation of:

- Trip generation estimates;
- Intersections and network links to be assessed;
- Peak hours and horizon periods; and
- General approach to modelling and assessment

Although these items are all included in the TAR, assessments of larger or more complex developments will benefit from early discussion on these items prior to the start of the assessment.

In all cases, developments that require a variation in the Territory Plan will require a TAR.

4. Transport Effects Form

A Transport Effects Form (TEF) is an easy to use form that can be completed by a development applicant to provide basic information about the transport-related aspects of the proposed development. In most situations, a TEF will satisfy the requirement for a transport impact assessment as required in the General Development Controls for developments within the range defined in Table 3.1. The completion of a TEF does not remove the need for all relevant Territory Plan codes and rules to be met, nor does it preclude the need to complete other forms and provide additional information that may be required for the Development Approval (DA) process.

A sample form is attached as Appendix A. The contents of the form are described below.

Industrial and institutional land use will require completion of a full TAR and are therefore not discussed in this section.

4.1 Development Details

The site will need to be described with the suburb name and number of section and block, which should also be labelled on the site plan.

A site plan should be provided showing:

- Access / egress points for private vehicles, pedestrians, cyclists, service / delivery vehicles;
- Location of the building(s);
- Parking lot layout including dimensions of parking stalls and widths of aisles and locations of bicycle parking;
- Widths of vehicle access / egress points; and
- Adjacent streets (labelled).

It is not necessary for the site plan to be elaborate. Similar plans will need to be submitted for other components of the development application process and should be readily available.

The scale of development should be described using the following general measures:

- Retail, office, institutional uses – gross floor area (m²)
- Residential – number of dwelling units
- Accommodation – number of rooms
- Medical / dental centre – number of employees
- Day care centre – number of employees

It may be appropriate to describe the size of the development using more than one descriptor – more information is better than less.

The hours of operation should be described, along with the best available estimates of traffic through the day. This may be achieved through descriptions of staff shifts, percentage of sales by time of day or other similar description. The information needs to be indicative only.

Describe the existing use of the site.

Note when the development will be complete and operational / occupied.

4.2 Surrounding Road Network Details

The streets that are adjacent to the site should be noted, as well as the number of lanes on each road (separated into through lane and turning lanes). If a road has a non-traversable median, this should be noted as well as openings in the median. The distance from access points to the nearest adjacent access and to the nearest intersection should be estimated (from existing maps, or readily available services such as Google Earth. ACT Traffic Control Devices (TCD) drawings and other asset information can be accessed on-line, through ProjectWise portal. The web site address,

http://www.tams.act.gov.au/Development_and_Project_Support/projectwise-and-wae-portal has the process to access the ACT data, including the information on getting the access licence.

The TCD data access directory in ProjectWise is “TCCS-0006-TRAFFIC CONTROL DEVICE GRID INVENTORY”

4.3 Traffic Distribution

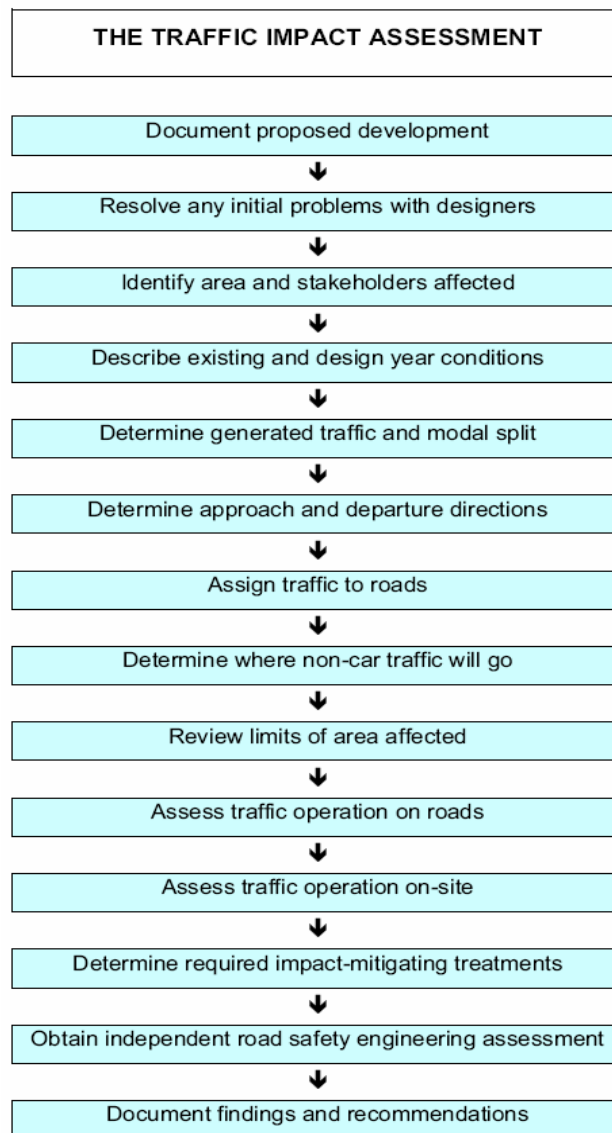
The direction from which people will come to visit the site should be estimated. This does not need to be detailed and can be a simple locality plan with trip distribution estimates annotated on the plan. The traffic distribution could be described based on existing information such as current *ACT Census of Population and Housing* or existing traffic volumes on the adjacent street. The distribution patterns are intended to be indicative only and based on the applicant’s knowledge of the expected use of the site. A plan of traffic distribution is required to demonstrate how traffic generated by the development will travel to and from the development via the proposed or existing access point.

If the applicant is aware of elements of the development proposal that will encourage use of modes other than private vehicles, these should be highlighted. There should be no need for the use of traffic models or advanced trip distribution / mode split estimating techniques to complete the TEF.

5. Transport Assessment Report

This section outlines the items to be assessed in preparing a Transport Assessment Report (TAR). These items are presented in a manner that is closely aligned with the steps for a Traffic Impact Assessment (TIA) as presented in Austroads “Guide to Traffic Management – Part 12: Traffic Impacts of Developments”. These ACT guidelines are not intended to instruct traffic/ transport engineering professionals on how to conduct a transport assessment, but to define what should be assessed and presentation of outcomes. For guidance on how assessments should be undertaken, the Austroads guide should be referenced. The steps as presented in the Austroads guide are summarised in Figure 5.1. The scope and detail of the assessment may vary with the scale of development, but the process and general matters for assessment will be the same for all.

Figure 5.1: The Steps in a Traffic Impact Assessment



Source: Austroads “Guide to Traffic Management – Part 12: Traffic Impacts of Developments” (sections refer to the sections of the Austroads document)

5.1 Other Relevant Plans

While a TAR is a planning document, it is more detailed and based on more specific information than a strategic transport plan. Strategic transport plans prepared for the area encompassing the proposed development should be used as the basis for the TAR. The TAR will build upon strategic planning and is expected to demonstrate how the proposed development, along with impact mitigation, will support strategic and other relevant plans.

Similarly, previous urban planning such as concept plans or other related plans should also be referenced. In some cases previous planning documents may include much of the information required for the TAR, in which case the TAR may simply reference the previous work and provide context relevant to the proposed development. If two or more developments within an area are being assessed simultaneously, it would be beneficial for those completing each assessment to discuss these assumptions, approaches and respective findings to provide a level of consistency.

The Transport for Canberra policy must specifically be referenced in the TAR. The TAR shall demonstrate how the proposed development supports implementation of the Transport for Canberra policy, as well as how the proposed development supports sustainable transport modes (public transport, walking and cycling) other than single occupant vehicles.

5.2 Proposed Development Description

The proposed development should be fully described with a focus on access, site circulation and parking issues for all modes of travel.

The nature of all activities proposed on the site should be described in terms of the scale (retail floor area, number of dwelling units, etc.). For sites that are currently occupied, the difference between the existing use and proposed use should be highlighted.

Access points should be described and characterised as general access/egress points or for delivery or service vehicles. Access and egress for pedestrians and cyclists should be described with some discussion of how the development will encourage travel by means other than single occupant vehicles. A site plan is to be provided, showing all elements of the proposed development at a scale that clearly illustrates access, circulation and parking dimensions.

5.2.1 Site Layout Considerations

On-site circulation needs to be described in detail, outlining:

- Facilities for public transport (interchanges if appropriate, bus stop locations, pedestrian connections to bus stops, safe pedestrian routes between bus stops and key destinations on-site, appropriately designed internal roads to support buses, bus priority routes, provisions for buses at access points to the site);
- Delivery and service vehicles (off-street loading areas, provisions to prevent trucks from reversing onto roadways, on-site routing to minimise interactions with other traffic, pedestrians and cyclists, demonstration that trucks can adequately manoeuvre);
- Pedestrian and cyclist facilities (on site bicycle parking facilities, end-of-trip active travel facilities, locations for secure bicycle parking, pedestrian crossings of internal roadways, illustration of key on-site pedestrian destinations, signage and delineation of pedestrian and cycling routes on-site, specific provisions for pedestrian and cyclist safety, consideration of pedestrian safety through car parking areas);
- Vehicle movements (hierarchy of on-site circulation routes, methods to promote low-speed travel, safety at site-access points, demonstration that vehicles can properly manoeuvre on-site).

5.2.2 Parking

The total number of car parks should be identified, including parking rules, fees and other considerations. The development description should explain how the on-site parking layout (both car parking and bicycle parking) will facilitate safe pedestrian and cyclist movements.

5.2.3 Travel Demand Management (TDM)

The proposed site elements and activities intended to reduce reliance on single occupant vehicles are to be described. These possible measures could include shared vehicle use, shared parking opportunities, behavioural measures such as TravelSmart (www.travelsmart.gov.au) and site layout to support walking, cycling and public transport as appropriate. Inclusion of TDM will be a critical element of the development and an important factor in the development approval process.

5.2.4 Study Area Definition

The extents of the study area are to include:

- **Road Links** – all road links within 2km travel distance of any access point to the development and any arterial or collector road on which the development will increase traffic by more than 100 vehicles per hour in any lane.
- **Intersections** – all signalised intersections and all other intersections with an arterial road connecting to road links within the study area. In civic/town centres, the intersections considered need only extend to the first intersection with an arterial roadway.
- **Public Transport** – public transport with stops within 800m of the proposed development.
- **Walking and Cycling Routes** – facilities, services and infrastructure within 800m of the proposed development.

Although the study area may encompass several roads and intersections, the developer's traffic/transport engineer should apply professional judgement in determining the level and type of assessment for each component of the study area.

For roadways with high capacity, but low existing volumes, a case can be made for reducing the detail of the assessment beyond 2km. There will rarely be a need to study beyond 5km from the site, regardless of the increase in traffic, except for very large developments.

For larger developments the extent of the study area will depend on several factors and should be discussed with TCCS staff. Rationale for the selection of the extent of the study area should be documented in these cases.

The study area for public transport, walking and cycling are intended to capture existing and future facilities and connections that are close to the site. Facilities beyond 800m, representing approximately 10 minute walking time, are too far to reasonably influence travel patterns.

It is recognised that the study area selection will in fact occur after some assessment has been completed. Thus, the selection process is somewhat iterative as an initial study area may need to be expanded (or potentially reduced) as the analysis proceeds.

The study area should be shown on a key plan.

5.3 Existing and Design Year Conditions

5.3.1 Existing Conditions

Site Location and Environs - The description of site location and environs should provide local context. In addition to describing the current location and conditions of the site, the report should describe existing connections to adjacent properties, how people and vehicles currently access the site and the existing on-site circulation.

<p>Key References</p> <p>Road Network</p> <ul style="list-style-type: none"> • Trunk Road Infrastructure Standards, Municipal Infrastructure Standards and relevant Austroads Guidelines • ACT Road Hierarchy Map • Relevant Concept Plans <p>Current Zoning and Rules</p> <ul style="list-style-type: none"> • ACT Territory Plan <p>Public Transport</p> <ul style="list-style-type: none"> • Action (bus service) - Routes and Services <p>Cycling and Walking Network</p> <ul style="list-style-type: none"> • Municipal Infrastructure Standards Part 5 – Active Travel Facilities Design • Canberra and Queanbeyan Cycling and Walking Map • Active Travel Infrastructure Practitioner Tool (available on-line, currently http://activeinfrastructure.net.au/practitioner-tool/) <p>Will be incorporated with ACTMAPi</p>

Land Use - The description of existing land use will include:

- *Current Activity* – describe what the site is currently used for
- *Land Use Currently Approved in the Territory Plan* – indicate the uses that would be permitted on the site under existing planning controls.
- *Adjacent Land Use* – describe the land use for the surrounding area within approximately 800m of the site boundaries.

The land use description should describe the current activity and the types of uses that would be permitted with existing consents. This recognises that some sites may currently be underutilised based on existing rules. The description of adjacent land uses should also indicate existing and potential uses in the area under current regulations. The land use description should reference the appropriate sections of the ACT Territory Plan.

Transport Network - The physical elements of the existing transport network are to be described as well as the role and function of each element within the overall transportation system. Table 5.2 summarises the information that should be described.

Table 5.2: Existing Transport Network Descriptions

Element	Descriptors to be Included
Roads	Functional classification Strategic importance Existing laning and traffic control Access management On-street parking Posted speed limit Intersection type with traffic control and laning Designated routes (e.g., heavy vehicle routes)

Walking	Footpaths Pedestrian crossings and controls Other pedestrian facilities of note Lighting
Cycling	Cycling lanes, paths End of trip facilities (e.g., lockers)
Public Transport	Routes Frequencies Transport interchanges Bus lanes (exclusive, priority, etc) Location of stops Passenger facilities at stops (e.g., seat) Path access and distance to stops Park and ride facilities Bike and ride facilities
Taxis	Taxi stands

Parking – For sites that are currently developed, and for expansions to existing developments, the existing parking conditions should be described. Adjacent on-street parking as well as nearby off-site parking should be identified along with parking restrictions, fees and known issues.

Existing Traffic Flows - Intersection peak hour turning movements should be collected for all intersections within the study area. Existing flows may be determined from surveys or previous studies. If previous survey data is used, count data should be no more than three years old, and then only if there have been no significant land use or transportation network improvements since the turning movement count data was collected. Existing turning movement and link peak hour volumes, including proportions of heavy vehicles, should be summarised in a table and / or shown on a diagram.

Key References
Existing Traffic

- Various traffic volume surveys and traffic signals data – SCATS (TCCS – Roads ACT)

Existing base traffic should include counts or estimates of traffic currently generated on the site if not a greenfield site. Where appropriate, historical counts should also be referenced to illustrate growth rate, seasonal variations and other traffic characteristics that are not apparent from a single traffic count.

Known traffic operational issues should be noted.

Key References
Road Safety

- Crash history and rankings (TCCS Roads ACT)

Road Safety – The safety performance on the existing network should be reviewed. If a previous safety assessment has been conducted in the study area, black spots should be noted. If no assessment has been completed, collision data for a five-year period should be collected from ACT TCCS and reviewed to identify locations within the study area that may be of concern. It may be appropriate to consult with police and ACT TCCS staff to identify known safety problem locations.

5.3.2 Study Period

The transport assessment will be conducted for peak hourly conditions, which should consider adjacent street peak hour traffic and the peak hour(s) for development generated traffic as follows:

- Residential, Office, Industrial, Institutional Uses – weekday AM and PM peak hours of adjacent street traffic.
- Retail, Restaurant, Entertainment – weekday PM peak hour and Saturday afternoon peak hour of adjacent street traffic.
- Surveys are to be carried out so as to be representative, e.g., school holidays, public holidays, December / January to be avoided unless there is a specific reason.

For all land uses, the peak hour of the proposed development, if different than the peak hour of adjacent street traffic, should also be included.

If both the generated traffic and adjacent street traffic volumes are lower in one peak hour than the other, a lower level of detail may be appropriate for the lower-volume peak hour. Seasonal variation in traffic should also be considered, such as for tourism-oriented businesses that may be busier during school holidays.

The appropriate study period for larger, mixed use developments will need to be determined based on the land uses within the development, the interactions between the activities and the surrounding adjacent land uses.

5.3.3 Design Year

In most cases, the assessment should be conducted for the proposed opening day and opening day plus 10 years. For larger developments, it is important that assessments be completed for each phase of the development, as phasing will often include temporary mitigation measures. For most developments however, a 10-year horizon is generally sufficient.

5.3.4 Future Base Conditions

Future Land Use - Consented future land use within the study area should be identified and quantified. Other land use changes identified at the strategic level should also be identified. It is not necessary to consider potential developments that are “rumoured” or are not yet in the development approval process, although it may be worthwhile to note other potential developments.

Future Transportation Facilities – Future transportation network changes that will significantly affect traffic flows within the study area should be noted. There should be differentiation between those improvements that have been included in the ACT capital works programme and those that only referred to in long-term strategic plans.

Future Base Traffic Flows – If a previously completed approved transport assessment is available within the study areas, it should be used for the future base traffic flows (without the development). Use of a previously approved assessment provides a degree of consistency among transport assessment reports. If no appropriate report is available, the future base traffic flows for the design year must be forecast. An industry standard transport model should be used as a basis for the forecast. The design year volumes may need to be interpolated between the modelled years. The model should also be checked for consistency with consented land use and future transport facilities.

The local zone structure of the model will need to be closely investigated and adjustments to the assignment made as appropriate to reflect the actual transport network.

It is good practice to perform a check of forecast volumes using a second method such as application of historical growth factors or manually “growing-up” existing volumes to new land use. The second method does not need to provide an exact replication of results, but should demonstrate reasonableness. Where limited data is available, sensitivity tests of growth rates may be appropriate.

The future base traffic flows should be shown on a plan for each of the critical peak hours.

Key References

Future Transportation Facilities

- ACT Strategic Public Transport Network Plan – (2009) (Environment and Planning Directorate (EPD) – Strategic Planning)
- Transport for Canberra (2012)
- Intertown public transport routes (ACTPLA – Territory Plan)

Future Base Traffic Flows

- Canberra Strategic Transport Model (EMME model)

Future Land Use

- Canberra Strategic Transport Model (EMME model)

Transport Modelling

<http://atap.gov.au/tools-techniques/travel-demand-modelling/>
 *Assumption of future land use, road network upgrades and key model parameters need to be obtained from EPD Strategic Planning.

5.3.5 Provision of Data

The ACT Government supports proponents by providing transport data from actual surveys and strategic transport model outputs held by the Territory. The proponents are encouraged to send the request for data through the ACT Government officer responsible for the project.

The model outputs comprise congestion plots, flows of vehicles and passengers and other lane characteristics around the area. The base model scenario was calibrated based on land-use data from the ABS Census, traffic statistics and road network characteristics. In simulating future traffic conditions, the model considered forecast land use developments including population, employment, retail space and enrolments, likely future transport network (road, public transport and cycle networks) and other transport cost assumptions.

The proponent may need to undertake further transport modelling including microsimulation and intersection modelling to meet the desired requirements to support the proposed development in the project scenario.

5.4 Traffic Generation and Modal Split

5.4.1 Traffic Generation

Estimates of traffic generation can be based on published trip generation databases or surveys of comparable developments. For residential traffic generation, rates are to be sourced from the Estate Development Code (EPD). In all cases, the estimate should be presented as a range of potential traffic generation. It is expected that assessment will be conducted for a most probable and for a high trip generation estimate within the range. In addition to the peak period traffic generation, as described in the Austroads Guide to Traffic Management, the daily traffic generation should also be presented. A comparison of total site traffic generation with and without the development should be provided.

If surveys of comparable developments are undertaken, the results are to be provided to the ACT using the form provided in Appendix B. The ACT Government will retain the right to use and publish trip generation data derived from these surveys.

In most cases, trip generation will only need to be estimated for the full build out of the development. For larger, phased developments, the estimated generation for each phase will be provided.

5.4.2 Modal Split

Adjustments in trip generation for modal split will be directly related to the activities, programs and facilities provided on-site to encourage travel by means other than single occupant vehicles. Outside of the CBD, the assessment will need to show that the development will feature significant changes from normal practices to encourage modal shift in order to apply reductions to the traffic generation estimate. The assessment will also need to demonstrate that there is sufficient facility and capacity within the public transport, pedestrian or cycling network to support the proposed modal shift. In all cases the report should document how the proposed development will support travel demand management and encourage travel by means other than single occupant vehicles.

5.5 Approach and Departure Directions

For most developments, trip distribution can be determined on the basis of existing travel patterns and broad socioeconomic data to approximate origins and destinations.

For larger developments, more rigour is required. If a marketing assessment has been completed for the proposed development, trip distribution estimates should be consistent with the marketing study results. Census Journey to Work (ABS) data should also be examined. An origin-destination table should be generated for large developments.

Trip generation estimates should differentiate between primary trips and pass-by trips. In most cases, diverted link trips will come from outside the study area and can be treated as primary trips. Pass-by trips should however be considered.

Table C8 1 of the Austroads Guide to Traffic Management – Part 12: Traffic Impact of Developments provides pass-by rates for some developments. For large developments, estimated pass-by traffic should be compared with the existing flows on the street from which the pass-by traffic will be drawn to ensure the pass-by estimate is reasonable. This is particularly important where the existing adjacent street traffic volume is low.

If internal trips have been estimated, the internal origins and destination trip ends need to be clearly identified.

It may be appropriate to generate separate trip distribution tables for primary and pass-by trips. Delivery and service vehicles will also need to be separately distributed.

5.6 Traffic Assignment

Traffic should be assigned to the network within the study area using manual methods or with the assistance of a traffic model. While the ACT EMMEmodel may be used for assistance, it is a strategic transport model and is not appropriate for assignment of localised traffic. If a manual method is used, short time paths are most appropriate. This means traffic may need to be reassigned if high delays are predicted along the preferred route. If a microsimulation model is used, assignment may be based on shortest generalised cost or shortest time paths. The use of microsimulation models is highly recommended for large developments on complex or congested signalised networks.

5.7 Non-Vehicular and Public Transport Travel Routes

The routes for cycling, pedestrians and public transport need to be identified, with broad base estimates of travel demand. The trip generation, distribution and assignment estimates do not need to be as rigorously defined as vehicle traffic. Where public transport routes will not enter the site, the walking routes between development and appropriate public transport stops should be identified and discussed.

5.8 Operation and Service Assessment

Key References

Operation and Service Assessment

- ACT Bus and Taxi Shelter Signage Master Plan (ACTPLA)
- Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis
- Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings
- Transport for Canberra (EPD)
- Parking Action Plan (EPD)
- Car Parking Surveys (for City and Town Centres and selected other centres) (EPD)

5.8.1 Intersections (including site accesses)

Analyses are to be undertaken in accordance with Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis. The impact threshold for intersections is Level of Service (LOS) D or better for individual movements and full intersections based on the Highway Capacity Manual. Also, the 95th percentile queue should not extend beyond the available storage for right turn slot (the parallel length of the turn slot excluding the taper) or beyond the next adjacent intersection for any lane.

Sidra Intersection software is recommended for assessment of intersection performance. The ACT Guideline for Sidra Analysis is provided in Appendix C. If other methods are used, compliance with the Guideline for Sidra Analysis should be applied to the greatest degree practical.

5.8.2 Road Links

Road links should operate at LOS D or better. Specific information and related to Level of Service considerations is provided in the Austroads Guide to Traffic Management Part 3.

5.8.3 Public Transport

Additional traffic should not cause bus average travel speeds to drop below 40 km/h for Rapid Services (including traffic control delays and dwell time at bus stops) and 20 km/h for Frequent Local Service. Existing bus shelter facilities and bus bays should be reviewed to determine adequacy for increased public transport demand.

5.8.4 Pedestrians and Cyclists

There should be no decline in travel time or distance for pedestrians or cyclists as a result of the proposed development. Where vehicular access is proposed across an existing or proposed main community route or main on-road route, priority will be given to the main route. Refer Active Travel Infrastructure Practitioner Tool (available on-line, currently

<http://activeinfrastructure.net.au/practitioner-tool/>

Will be incorporated with ACTMAPI), and look at opportunities to improve active travel.

5.8.5 Parking and Service Vehicles

Parking for vehicles and bicycles provided on-site should be consistent with Territory Plan and bicycle parking code requirements for the appropriate zone. Notwithstanding the Territory Plan requirements, if a development will rely on off-site parking to meet demands, an assessment of off-site parking supply and occupancy within relevant distances specified within the PVAC will be required. Where off-site parking is to be relied upon, the traffic assignment should be adjusted to reflect the off-site parking. In the CBD and some centres, this may not be practical. In these cases the traffic engineer should provide an assessment that demonstrates that off-site parking can be adequately accommodated having regard to the requirements in Section 1.4 of the Parking and Vehicular Code.

Key References

- ACT Parking & Vehicular Access General Code
- Bicycle Parking General Code

5.8.6 Road Safety

An assessment of potential road safety issues associated with the development is to be provided.

Road Safety Audits are not normally required to support a transport assessment report. However, for developments that will add further traffic to identified black spots, or for which the new development will likely add complexity to the road network, a Road Safety Audit may be appropriate. The potential need for a Road Safety Audit should be addressed in the Scope Development Report, including a proposed site-specific threshold for a RSA, which will be agreed upon by ACT TCCS.

For large area structure plans, the internal road network should be assessed in the same manner as off-site roads and intersections.

5.8.7 Environmental Capacity

Estimates of noise and air quality effects are to be provided. The TIA is not intended to replace the Environmental Impact Statement review of noise and air quality effects. As such, the estimates do not need to be exhaustive. For air quality estimates, most traffic models can generate reasonable estimates. For noise, a general review of noise generators based on expected traffic mix, locations of critical receptors and potential noise mitigation factors.

5.9 On-Site Circulation and Access Assessment

Key References

Territory Plan compliance and Non-Vehicular Best Practices

- Bicycle Parking General Code (Territory Plan Code)
- Parking and Vehicular Access General Code (Territory Plan Code)
- Municipal Infrastructure Standards Part 5: Active Travel Facilities (TCCS)
- ACT Planning Guidelines for Access and Mobility (ACT PLA)
- Transport for Canberra (EPD)
- ACTNOWaste Development Control Code for Best Practice Waste Management in the ACT
- Car parking surveys – for city and town centre and selected other centres (EPD)
- ACT Parking Action Plan (EPD)
- ACT Freight Strategy (EPD)
- Master Plans (EPD)

Sight distance and other geometric design elements of accesses and parking layout are to be evaluated in accordance with Parking and Vehicular Access Code of the Territory Plan. The assessment should provide commentary on the efficiency and safety of the circulation and access beyond a simple comparison against Code requirements.

Provisions for delivery and service vehicles should be assessed. The number of service vehicles and the nature of activities should be considered. For example, for garbage collection, on-site and adjacent kerbside collection options should be reviewed, including the applicability of kerbside waste collection facilities and their effect on site access and visibility. Internal road layouts should facilitate service vehicles entering and leaving the site, without the need to reverse. In general, all vehicles should travel to and from the development site in a forward direction. Where relevant, there should be provisions for pick-up and drop-off areas and for short-term “parking”, such as for couriers.

The assessment will include a compliance review of Territory Plan codes for bicycles,

parking, vehicular access as well as a comparison with current plans and best practices relative to pedestrians, cyclists and travel demand management.

5.10 Reporting of Impacts

A summary table should be provided that shows all impacts as defined above, with comparisons against existing and future conditions with and without the development. In some cases, impact thresholds may only be reached when a high estimate of traffic generation is used, but not the most probable traffic generation estimate. These impacts should be specifically noted. Also, it is useful to note conditions where impact thresholds have not been met, but could be met with minor changes to assumptions.

5.11 Impact-Mitigating Treatments

The potential impacts resulting from the development should be carefully reviewed. Not all impacts require mitigation. However, in most cases, it should be an objective of the transport assessment report to recommend mitigation that will improve conditions so that there are no residual impacts. In doing so, the overall performance within the study area needs to be considered. For example, improving performance of a minor movement at the expense of the major flows within the network may not represent the best overall solution.

Pedestrian, cycling and public transport impacts should receive precedence over general vehicle impacts. This means that it may be appropriate for general traffic to incur reasonable delays to improve the efficiency and safety of pedestrian, cycling and public transport operations. For large developments which will attract public transport buses onto the site, the transport assessment report will identify the works required to minimise delays to buses entering and leaving the site, or interchanges associate with the site.

If off-street parking impacts are identified, alternate parking facilities and/or mitigation to discourage off-site parking will need to be proposed.

Although, not strictly related to impact mitigation, the need for temporary traffic management and possible approaches should be noted, particularly for those developments with new vehicle accesses for arterial roads.

Mitigation should not rely on the ACT implementing any works except those are currently in the ACT capital works programme.

5.12 Documentation

The Transport Assessment Report should be prepared in accordance with the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Developments. Reports submitted to the ACT must include a completed Technical Completeness Checklist (Table A 1 of Appendix A – Austroads Guide to Traffic Management Part 12).

Appendix A - Transport Effects Form



ACT Government
**ACT Transport Canberra
and City Services**

**TRANSPORT
EFFECTS
FORM**

Provide the Proposal Number to which this application relates:

20

Development/Site Location Details

If more than one lease/site, attach the following detailed for each lease/site

Block

Section **Unit (if applicable)**

Suburb

District

Street Number

Street name

Postcode

Attach a detailed site plan that includes the following as a minimum (if a site plan has previously been submitted for the development application that includes all necessary information, attach that plan).

- Access / egress points for private vehicles, pedestrians, cyclists, service / delivery vehicles;
- Location of the building(s);
- Parking lot layout including dimensions of parking stalls and widths of aisles;
- Widths of vehicle access / egress points; and
- Adjacent streets (labelled).

Fully describe the proposed development (or reference the Development Application)

Scale of Development (see TIA Guide, Section 4.1)

Proposed Land Use or Activity

Scale/Size

If appropriate, further describe the scale/size of the development:

Describe the operating hours

Existing Use of the Site (pre-development):

Expected proposed development completion or occupancy:

Surrounding Road Network (see TIA Guide, Section 4.2)

Complete for each road adjoining the development site:

Road Name			
Number of Lanes	Through Lanes	Right Turn Lanes	Left Turn Lanes
Distance to Nearest Access		Distance to Nearest Intersection	
Road Name			
Number of Lanes	Through Lanes	Right Turn Lanes	Left Turn Lanes
Distance to Nearest Access		Distance to Nearest Intersection	
Road Name			
Number of Lanes	Through Lanes	Right Turn Lanes	Left Turn Lanes
Distance to Nearest Access		Distance to Nearest Intersection	
Road Name			
Number of Lanes	Through Lanes	Right Turn Lanes	Left Turn Lanes
Distance to Nearest Access		Distance to Nearest Intersection	

Traffic Distribution (see TIA Guide, Section 4.3)

Please attach a locality plan with trip distribution estimates annotated on the plan.

Please describe how the trip distributed estimates were derived:

Appendix B - Trip Generation Form



**ACT Territory and Municipal Services
TRIP GENERATION DATA FORM**

Land Use/Building Type:	
Name of Development:	
Location (address):	
Day of Week:	
Date (dd/mm/yyyy):	
Description of the Development:	

	Actual	Estimated	Actual	Estimated
_____ (1) Employees (number)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (2) Persons (number)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (3) Total Units (number)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (4) Occupied Units (number)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (5) Gross Floor Area (m2) (% of development occupied _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (6) Net Rentable Area (m2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (7) Gross Leasable Area (m2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ (8) Total Hectares (% developed _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			(9) Parking Spaces (% occupied _____)	<input type="checkbox"/>
			(10) Beds (% occupied _____)	<input type="checkbox"/>
			(11) Seats (number)	<input type="checkbox"/>
			(12) Vehicle Fuelling Positions / Servicing Positions	<input type="checkbox"/>
			(13) A.M. Peak Hour Volume of Adjacent Street Traffic	<input type="checkbox"/>
			(14) P.M. Peak Hour Volume of Adjacent Street Traffic	<input type="checkbox"/>
			(15) Other	<input type="checkbox"/>
			(16) Other	<input type="checkbox"/>



**ACT Territory and Municipal Services
TRIP GENERATION DATA FORM**

Other Data (complete as much information as is known)

Vehicle Occupancy	AM Average		PM Average		Other Peak Average
Public Transit Proportion	AM Peak %		PM Peak %		Other Peak %
Carpool / Vanpool Proportion	AM Peak %		PM Peak %		Other Peak %
Employees by Shift	First Shift Start Time		First Shift End Time		Number of Employees
	Second Shift Start Time		Second Shift End Time		Number of Employees
	Third Shift Start Time		Third Shift End Time		Number of Employees
Parking Cost On-Site	Hourly		Daily		

Transportation Demand Management information:

At the time of the study, was there a TDM program at this site that may have impacted the trip generation characteristics?

- Yes
 No

If yes, please check the appropriate boxes and attach any additional information that may help quantify the impact of the TDM program on trip generation at this site.

- | | | | |
|---|--|--|--|
| <input type="checkbox"/> Public Transit Service | <input type="checkbox"/> Employer Support Measures | <input type="checkbox"/> Public Transit and Ridesharing Incentives | <input type="checkbox"/> Variable Work Hours |
| <input type="checkbox"/> Carpool Program | <input type="checkbox"/> Preferential HOV Treatments | <input type="checkbox"/> Tolls and Congestion Pricing | <input type="checkbox"/> Telecommuting |
| <input type="checkbox"/> Vanpool Program | <input type="checkbox"/> Bicycle / Pedestrian Facilities and Site Improvements | <input type="checkbox"/> Parking Supply and Pricing Management | <input type="checkbox"/> Other: |



**ACT Territory and Municipal Services
TRIP GENERATION DATA FORM**

Summary of Driveway Volumes

	Average Weekday						Saturday						Sunday					
	Enter		Exit		Total		Enter		Exit		Total		Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks
24-Hour Volume																		
AM Peak Hour of adjacent street traffic <i>Time:</i>																		
PM Peak Hour of adjacent street traffic <i>Time:</i>																		
AM Peak Hour of generator <i>Time:</i>																		
PM Peak Hour of generator <i>Time:</i>																		
Weekend Peak Hour of generator <i>Time:</i>																		



**ACT Territory and Municipal Services
TRIP GENERATION DATA FORM**

Hourly Driveway Volumes (in 15-minute intervals)

AM Period	Enter		Exit		Total		Mid- day Period		Enter		Exit		Total		PM Period		Enter		Exit		Total		
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	
Start																							

Survey conducted by:

Name:

Organisation:

Address:

City/State/Postcode:

Telephone:

Email:

Appendix C - ACT Sidra Analysis Guidelines

DRAFT V 1.0 - GUIDELINES FOR SIDRA ANALYSIS

Purpose

The TCCS is currently reviewing the Guidelines For SIDRA Analysis to assist the traffic & transport practitioners for intersection modelling.

Background

For SIDRA modelling purpose, TCCS has adopted the Roads and Maritime Services (RMS) NSW Traffic Modelling Guidelines (version 1.0, 2013) as its primary technical reference, unless and otherwise specified explicitly in this note. It is advised that the practitioners to refer Chapter 14 in this document and Appendix E on gap acceptance parameters.

Traffic Modelling Guidelines (RMS, 2013):

<http://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/technical-manuals/modellingguidelines.pdf>

If a Sidra parameter is not mentioned within the guideline then the default value should be used. If practitioner wish to adopt alternative settings and/ or parameters, their use should be noted and justified in accompanying traffic study report.

Traffic Counts

The time when the traffic counts were taken (i.e. 1st Week March 2016) and any assumptions regarding turning proportions should be noted. For modelling existing conditions, if the traffic counts are greater than 1 year old a growth rate should be applied to the counts. The growth rate is to be determined from historical traffic counts where possible otherwise a base growth rate of 2% per annum can be used.

Traffic Signals

For existing sites:

- a) Model and calibrate the base models. Use these base models to test the proposed options and to compare the existing intersection performance.
- b) Use the data available in SCATS summaries available from Roads ACT, for current signals controller settings such as cycle length, phase timings, minimum green, inter green and pedestrians times, movement coordination
- c) Use SCATS traffic counts if available from Roads ACT
- d) Adopt 'fixed' time traffic signals controller.

For new or proposed upgraded sites:

- a) Consult Roads ACT to confirm signals controller information such as cycle time, phasing and sequence, minimum green, inter green (Yellow/ Red), and pedestrians clearance times (walk + clearance).
- b) The intersection performance should be assessed against to the future design years and satisfy the following performance criteria:

SIDRA output parameter	New Signals
Degree of Saturation	≤ 0.9
Level of Service (LOS) – Delay RTA NSW method	“E” or better

For complex intersections such as median approaches (Northbourne Avenue/ Bunda Street/ Rudd Street), staggered intersections, closely spaced intersections, the practitioners/ modellers are suggested to discuss and confirm with Roads ACT on the methodology, before undertaking modelling.

Reporting Requirements

- a) Electronic SIDRA Intersection Project (.SIP) files for base case and all scenario models.

b) Electronic SIDRA output files should include:

- a. Intersection geometry
- b. Movement summary
- c. Lane summary
- d. Phasing summary

c) Traffic data and Signals controller info (SCATS summaries) used for modelling

Design drawings/ plans for proposed intersection treatments showing the geometry layouts