Table 2: Process

	Transport Agency			Planning Authority
	VICROADS	DEPARTMENT OF TRANSPORT	COUNCIL	GAA/LGA
PRE-PLANNING				
	• Review the PSP project plan • Consider resource availability • Provide preliminary background material or conduct studies			• Prepare PSP schedule
SET THE SCENE				
Context Analysis** (Data collection, gaps analysis, constraints, opportunities)	• Each agency as appropriate, to provide network context information including			• Set overall Context. Refer to Growth Area Framework Plans • Prepare background reports
	• Road management strategies and data	• Public Transport Network information, project proposals and patronage data	• Road management strategies and data	
CREATE THE STRUCTURE				
Preliminary Urban Structure - **Develop road and public transport networks**	• Each agency as appropriate, to contribute to the development of appropriate declared and local road networks including intersections, public transport network and bicycle network and to consider the relationship to land uses • Sign off by Regional Director / Planning Director / Council as appropriate.			• Respond to the context, create the transport network • Get sign off for Preliminary Urban Structure
MAKE THE PLACE				
Final Urban Structure, Transport Plan. Detail the elements	• Contribute to the development of the transport plan and cross section details on relevant roads			• Finalise urban structure, transport plan and cross sections • Consider DCP
	• Arterial/connector intersections • Arterials, bicycle network • Major Traffic Control devices	• Railway improvements, bus routes, bicycle network	• Arterial/connector intersections • Local Roads including local arterials • Bicycle network	
CHECK THE PLAN				
Review Final Urban Structure Confirm that the network elements are appropriate for future needs	Each agency to confirm as appropriate: • cross sections on declared and local roads and intersections suit forecast traffic volumes and surrounding land uses • cross sections on connectors are suitable for buses • public transport infrastructure suits future needs • cycling infrastructure is provided and appropriate • appropriateness of Transport Plan • Sign off by Regional Director / Planning Director / Council as appropriate			• Produce final Urban Structure, including Transport Plan • Consider DCP • Get sign off for Final Urban Structure

**VicRoads to provide information on existing and future Declared Arterial roads, AMP classifications, current and future strategic studies, development priorities, management strategies for relevant arterials, Network Operating Plans, Principal Bicycle Network, freight routes, traffic volumes, etc.

Department of Transport to provide information on existing and future Principal Public Transport Network, existing and future local bus services, relevant current and future strategic studies, proposed rail & station improvements, funding priorities, cycling projects, etc

Local Government Authority to provide information on management strategies for relevant local arterial roads and local roads, relevant transport strategies and policies, cycling strategy, funding priorities, traffic volumes, etc.

PSP NOTES

Our Roads: Connecting People

growth areas AUTHORITY

ROAD NETWORK & CROSS SECTIONS

The Precinct Structure Plan (PSP) notes are a series of documents that supplement the PSP guidelines, providing direction to key stakeholders and organisations responsible for preparing precinct structure plans. These will be updated from time to time.

Objective:

To provide guidance for developing road cross sections for PSPs that consider competing transport and community ideals and to provide balanced outcomes and promote more sustainable travel modes.

INTRODUCTION

The GAA is working with Councils and other stakeholders to plan the suburbs of the 21st Century and beyond. These suburbs will be great places to live, offering the vital services and opportunities Melbourne's growing population needs.

The road network provides the basic framework of any new suburb and must meet a wide range of needs. Intelligent road network design combines road types and functions that together build a network that meets everyone's needs.

Roads must provide for safe and efficient movement by cars and trucks, buses, bicycles and pedestrians. They must have space for services and high quality landscaping. Most roads also need to provide space for parking and access to houses and businesses.

The urban design of roads sets the visual scene for a suburb. Think of well known streets such as Acland Street, or the Champs Elysee and it is the public space, not the road way that instantly springs to mind. As we build new communities, we create opportunities to make roads recognised and valued by local families and the community by including landscaping and avenue tree planting. Roads are expensive and take up a lot of space and should be no wider than required so as to help housing affordability.

CONTEXT

This document provides guidance and direction about the road network hierarchy and road cross sections in Melbourne's growth areas. It is complementary to Growth Area Framework Plans which identify basic arterial road networks in growth areas.

The note describes the outcomes sought for a road network, its structure and staging, together with example cross section requirements. It also provides a process for developing a road framework for a PSP.

This note is intended to be a starting point for developing a road network. Reference should also be made to the PSP guidelines and various technical standards, strategies and guidelines published by relevant authorities. Variations may be required for such things as atypical infrastructure needs (e.g. earthworks batters, trunk utilities, etc).

If we can develop streets that are attractive public spaces, community-building places, then we will have successfully designed one third of the city and will have an immense effect on the rest.

Allan Jacobs, "Great Streets" (1995)

DESIGN PRINCIPLES

The *Transport Integration Act 2010* states that the transport system should provide for the effective integration of transport and land use and facilitate access to social and economic opportunities.

Roads are a key element of the transport system and urban development. They serve a range of functions including: property access and parking, vehicular and pedestrian travel and space for utilities. Roads are a key element of public space and sense of shared community. They are the most visible part of our new suburbs, significantly influencing aesthetics, driver behaviour, quality of life and amenity. Road network design must balance these outcomes safely, effectively and efficiently.

Design of roads requires striking a balance between various functions; in some instances, pedestrian or bicycle movements should be prioritised, while in others public transport or freight traffic priority may be critical.

While roads need to cater for traffic, the number and type of lanes and the width of road reserve should be appropriate, taking into account: safety, traffic volumes, desirable speed, role in the network, pedestrian accessibility, housing density, land use efficiency and urban design requirements.

Although roads are predominantly used by cars, they must also provide for other users, including pedestrians, on-road cyclists, buses and freight. Connector streets and arterial roads must also support the safe and efficient movement of buses and access for passengers.

Finally our roads are the most visible part of our cities. They must be attractive, and add to the enjoyment of living in and visiting a suburb.

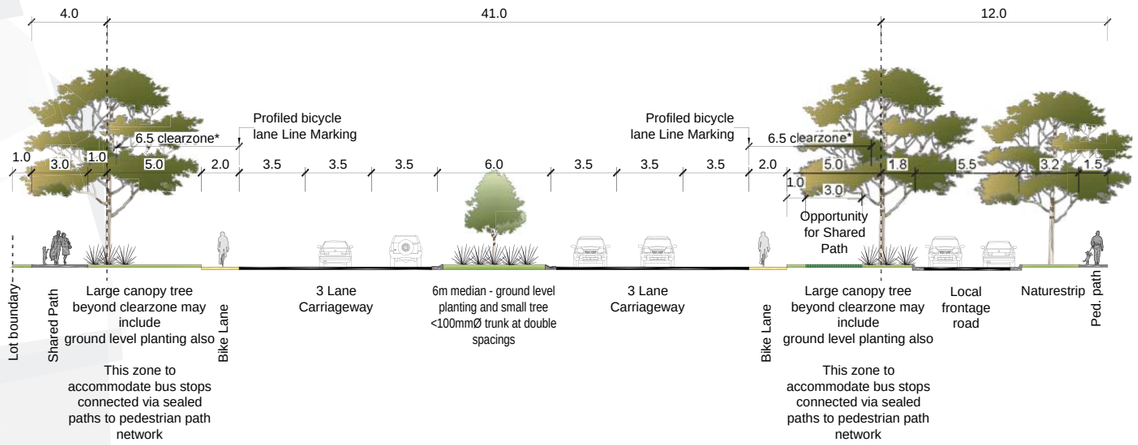
OUTCOMES

Streets should be attractive and be designed to meet the needs of all users. All streets should provide an environment that is safe for all road users. They should provide the following outcomes:

Roadside

- A safe environment for users;
- A sense of pedestrian scale with a high level of amenity;
- Quality urban design and look and feel good;
- Space for canopy style street trees;
- Support for adjacent land uses and pedestrian and cyclist movement;
- Water sensitive design features where appropriate;
- Space for pedestrians on both sides of the street, bus stops and shelters, seating, street lighting and utility services;
- Safe property access from local streets and connectors,
- Definition to streets through appropriate kerbing, and
- Orderly onstreet parking (avoid illegal parking on nature strips).

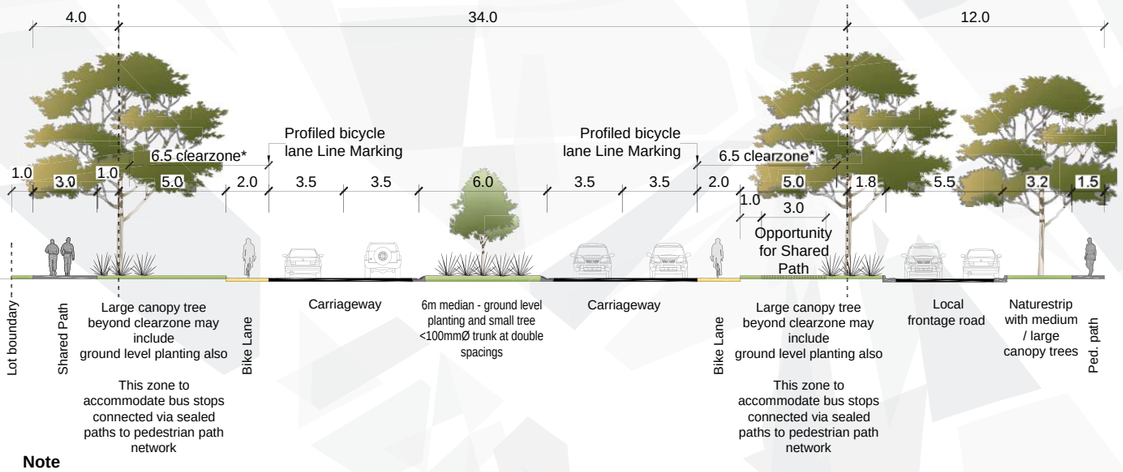
Figure 10: Demonstration Example - 6 Lane Primary Arterial 41m >40000 vpd



Note

- Includes typical residential frontage roads each side
- investigation and use of physical barriers such as wire rope fencing is encouraged to enable more extensive canopy tree planting.
- *Clearzone assumes 80km/h speed limit >5,000 VPD
- Reservation width will be affected by clearzone & service infrastructure clearance requirements

Figure 9: Demonstration Example - 4 Lane Secondary Arterial 34m 12000-40000 vpd



Note

- Includes typical residential frontage roads each side
- investigation and use of physical barriers such as wire rope fencing is encouraged to enable more extensive canopy tree planting.
- *Clearzone assumes 80km/h speed limit >5,000 VPD
- Reservation width will be affected by clearzone & service infrastructure clearance requirements

Pedestrians

- Continuous footpaths on both sides of all streets and roads;
- Regular crossing points, shade and rest points;
- Provision for users of all abilities;
- Pedestrian priority in areas of high foot traffic, (eg town centres - also known as activity centres and schools); and
- An attractive appearance to improve amenity and encourage walking.

Cyclists

- Bicycle priority treatments over motorised traffic where appropriate;
- On-road bicycle lanes on all connector streets and arterial roads to facilitate travel by cyclists;
- Appropriate separation from motor vehicles on high demand cycle routes;
- On declared arterial roads, VicRoads may have additional requirements;
- Where provided, shared landscape trails on local and connector streets will complement the off road network of shared paths (see Figure 5 for example on connector street);
- Off road shared paths may also be needed on arterial roads; and
- Safe road crossing facilities.

Public Transport users

- Bus routes planned for relevant connectors and arterial roads;
- Roads to cater for bus routes shall be designed to accord with the Department of Transport's Public Transport Guidelines for Land Use and Development;
- Bus priority treatments where appropriate;
- Roadside infrastructure to provide safe and accessible DDA compliant bus stops; and
- Safe crossing points to bus stops where appropriate.

Private motor vehicle users

- High mobility for through traffic with adequate capacity and speeds on arterial roads; and
- High accessibility for local traffic, with a fine-grained local road network, frequent intersections and good property access.

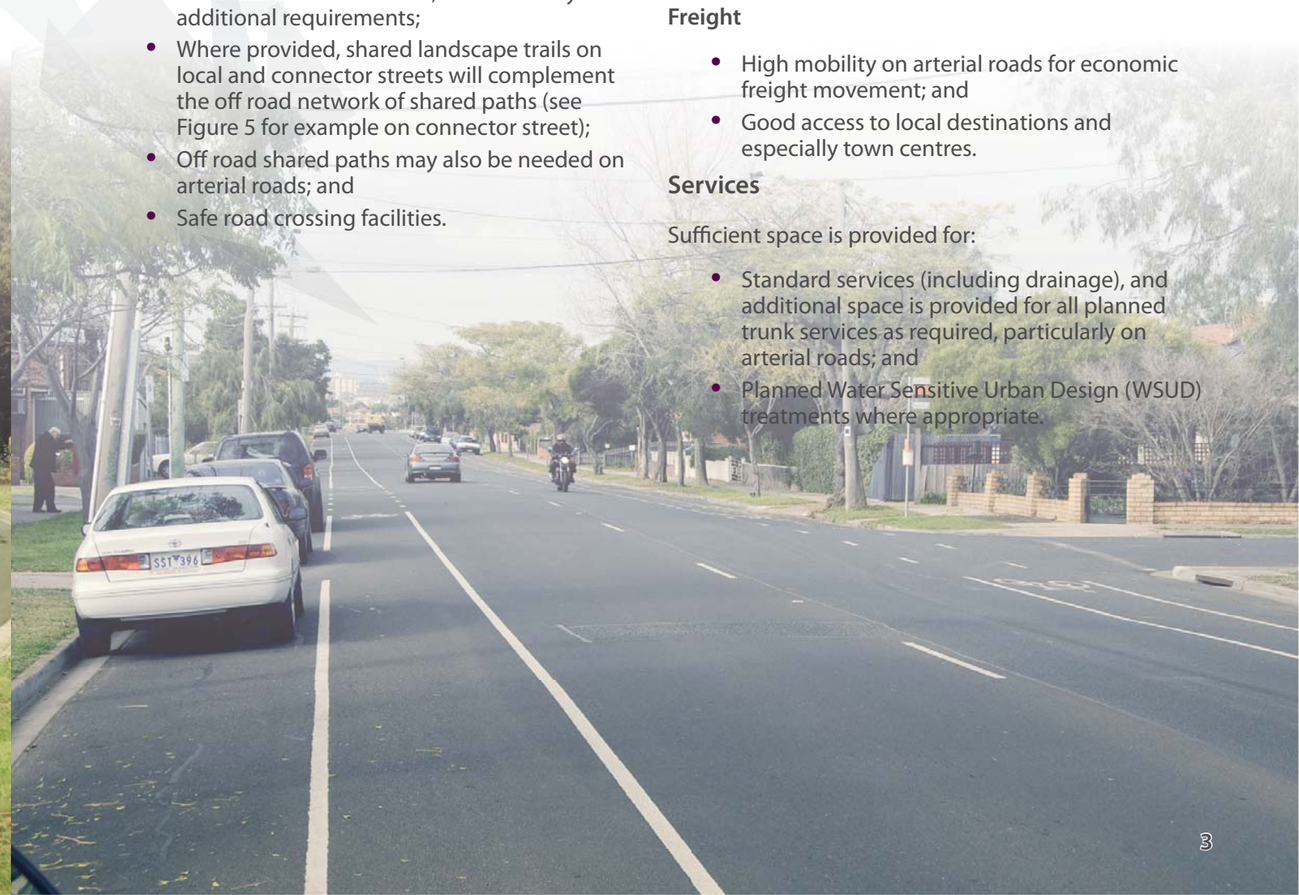
Freight

- High mobility on arterial roads for economic freight movement; and
- Good access to local destinations and especially town centres.

Services

Sufficient space is provided for:

- Standard services (including drainage), and additional space is provided for all planned trunk services as required, particularly on arterial roads; and
- Planned Water Sensitive Urban Design (WSUD) treatments where appropriate.



NETWORK DEVELOPMENT

Network Components

The road network consists of various types of streets performing different functions and having different characteristics. Achieving the appropriate balance of network elements, including arterials, connectors and local streets is key to successfully delivering liveable urban communities (See Fig 1 and Table 1). Base arterial road networks are shown in the Growth Area Framework Plans.

A 1.6 km (1 mile) arterial road grid should form the basic structure of all growth area precinct structure plans. The mile grid has long been a feature of Melbourne's development and has demonstrated good performance and flexibility.

Strategic Arterials (Primary or Declared Arterials)*

Arterials typically form part of the local community boundary and cater primarily for strategic, higher volume and longer distance through traffic, freight, public transport and cycling. Primary arterials will normally comprise four to six lanes and have higher speed limits of 70 – 80 km/hr.

The State Government has a consistent management approach to the Strategic Arterial network and developed access management policies and management practices accordingly. These include the SmartRoads operating plans which aim to improve the efficiency of the road network for all transport modes, make the most of our existing road space, guide planning into the future and encourage smarter road sharing.

- Arterials may provide entry points to larger developments such as public facilities and shopping centres;
- New activity centres should abut, but must not straddle, arterials;
- The movement of people and goods should be prioritised on arterials;
- Some arterials will also be SmartBus routes carrying higher order bus services; and
- On existing declared arterials, VicRoads may have additional requirements (e.g. cycling infrastructure) than mentioned in this PSP note and must be consulted.

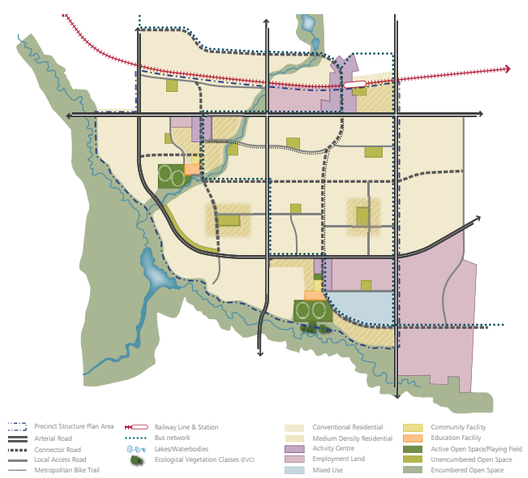
Local Arterials (Secondary Arterials)*

In some circumstances, an arterial may not have a strong through traffic role. These streets carry higher traffic volumes than connector streets and typically appear on a traditional 1.6 km (1 mile) grid.

Local arterials normally have two to six trafficable lanes, with a speed limit of 60 – 70 km/hr. Some road space may be dedicated to prioritise public transport services and bicycle movement.

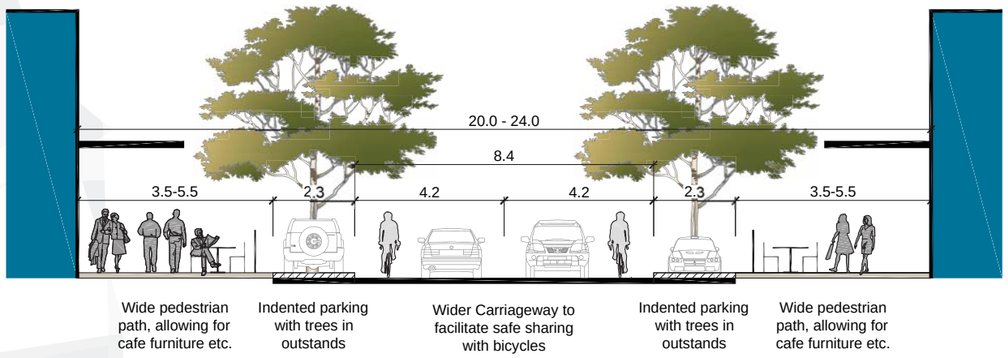
- Local arterials are more likely than declared arterials to provide entry points to larger developments such as public facilities and shopping centres and provide for priority public transport services and for bicycles; and
- Activity centres should abut, but normally not straddle, local arterials.

Figure 1: Example Future Road Network

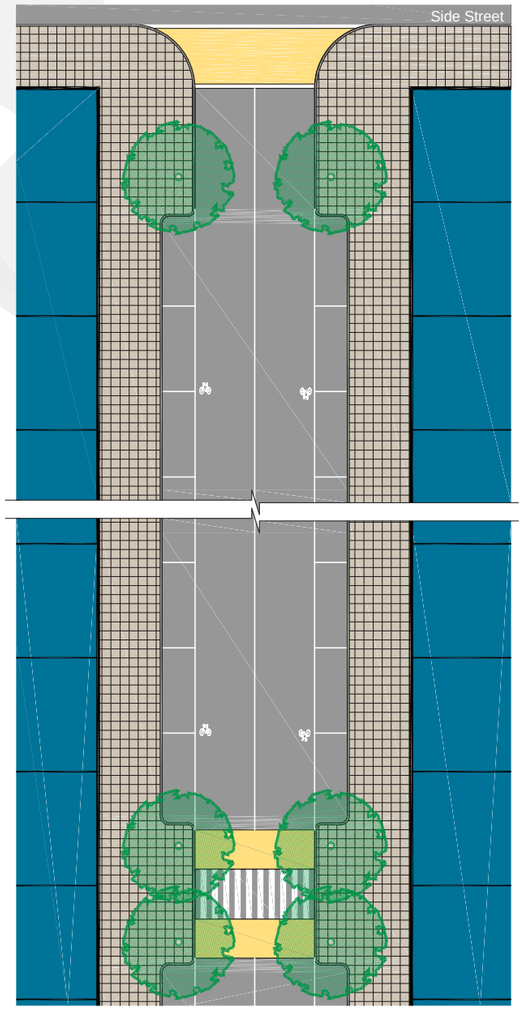


* Clause 56 indicates arterials will carry more than 7,000 vpd. This note provides a refined hierarchy to allow the more responsive development of land use and transport interactions to support the integration objective of the Transport Integration Act (2010).

Figure 8: Demonstration Example - Connector Street - Main Street for LTC 20-24m 3000-7000 vpd



Section



Plan View

An undivided connector road through the Local Town Centre (LTC) must have a cross section containing a parking lane of 2.3m, a bicycle lane of 1.7m and a traffic lane of 3.5m for each direction of travel (as in "Undivided Connector Road - A" of the *Public Transport Guidelines for Land Use and Development 2008)*, unless otherwise approved in writing by the Director of Public Transport.

The Director may approve an alternative cross section providing a parking lane of not less than 2.3m and a shared bicycle/traffic lane of not less than 4.2m for each direction of travel (as in "Undivided Connector Road - B" of the Guidelines). This option is shown here.

A request to construct an alternative cross section may be made where a main street Local Town Centre (LTC) with retail and commercial development on both sides of the connector road is proposed and:

1. a bus service is not expected to utilise that segment of the LTC connector (e.g. an alternative route is proposed); or
2. a bus service is expected to utilise that segment of the LTC connector and:

- pedestrian accessibility and safety is the primary transport objective,
- there will be no prejudicial impact on public transport services,
- the connector does not form part of the Principal Public Transport Network,
- the connector is expected to carry three (3) services or less per hour each way under current bus service provision standards,
- the posted speed limit is proposed to be 40km/h or lower,
- the length of the "Undivided Connector Road - B" section is less than 250m and
- there is no proposal to locate a use which would generate significant volumes of bicycle traffic such as a school, community facility, sporting facility or place of assembly, in or adjacent to the LTC and a nearby alternative cycling route is available.

Note:

- Final design of LTC main street will occur as part of LTC urban design framework
- A design speed environment of 40km/h should be provided

Figure 6: Demonstration Example - Access Street - Industrial 22m up to 3000 vpd

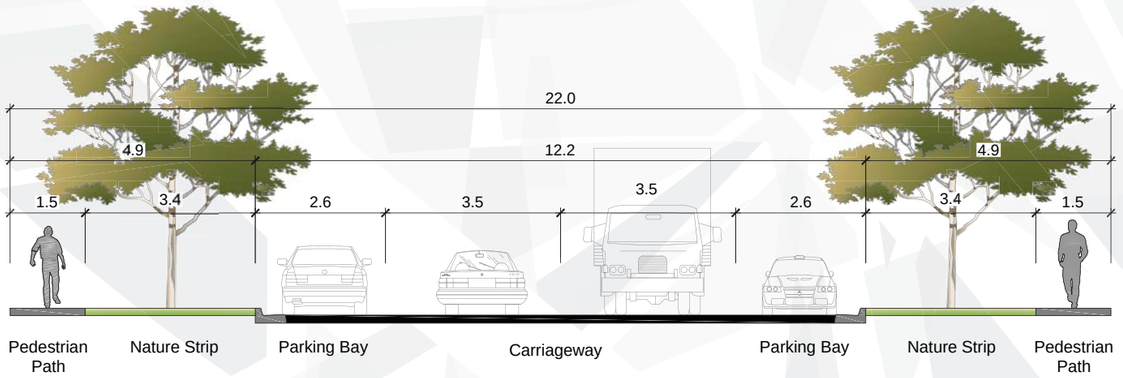
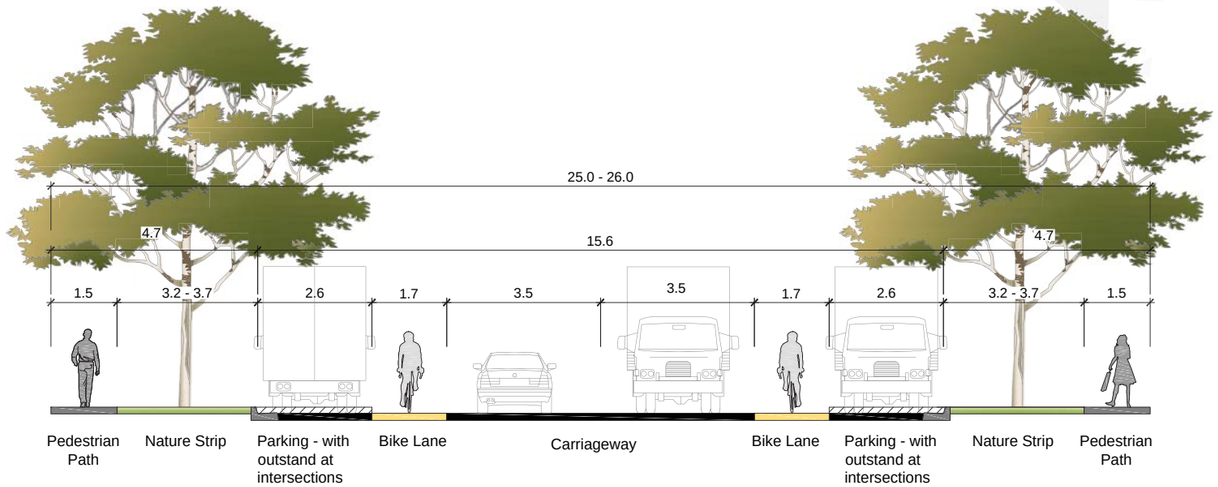


Figure 7: Demonstration Example - Connector Street - Industrial 25m From 3000 vpd



Connectors

The primary purpose of a connector street is to connect neighbourhoods and to link local streets to the arterial road network. These streets will have a single lane in each direction with a speed limit of 50 km/hr and typically be spaced centrally within the standard 1.6 km (1 mile) road grid (i.e. approximately 800m from each arterial). Access for pedestrians and cyclists should be prioritised on connectors.

- Connector streets should provide for up to approximately 7,000 vpd and when volumes exceed this, additional links to the arterial network may be required (this may include minor street intersections or additional connector level links);
- Connector streets typically intersect with arterial roads at controlled intersections (traffic signals or roundabouts);
- Schools, shops and local facilities including Local Town Centres (LTCs), also known as Neighbourhood Activity Centres (NACs), are typically anchored to connectors and the cross section is wide enough to accommodate buses, DDA compliant bus stops, on-street bicycle lanes and parking lanes; and
- Connector streets should have bus-friendly intersection traffic management or priority discontinuities (such as a "staggered T" intersection or a roundabout) at a maximum 400m spacings to manage vehicle speeds.

Local access streets

Local access streets consist of lanes, loops and through streets between connector streets. They may also incorporate short culs-de-sac that support pedestrian connectivity. Local access streets have a single carriageway, with the traffic lanes often remaining unmarked, and a maximum speed limit of 50 km/hr.

- Street length should generally be limited to approximately 240m; (see Clause 56 of VPP's)
- A grid street and block pattern should be used to promote accessibility, choice of route, connectivity and continuity of route;
- Some schools, shops and local facilities gain access from key local access streets; and
- These streets are not normally used for bus routes or dedicated bicycle lanes.

Local Network Staging

Precincts develop in stages and PSPs should consider sequencing implications in the design of road networks. Staging of subdivisions should provide for the timely connection of road links, especially the connector street network, to the arterial road network, to enable timely transport connections (i.e. bus, cycling and walking).

In circumstances where the Department of Transport proposes to run buses before the network is completed, provision of interim connections permitting bus access should be made. This could take the form of temporary parking bans or other measures to ensure 3.5m lanes are available for buses.

Figure 4: Demonstration Example - Connector Street - Residential 25m Typically 3000-7000 vpd

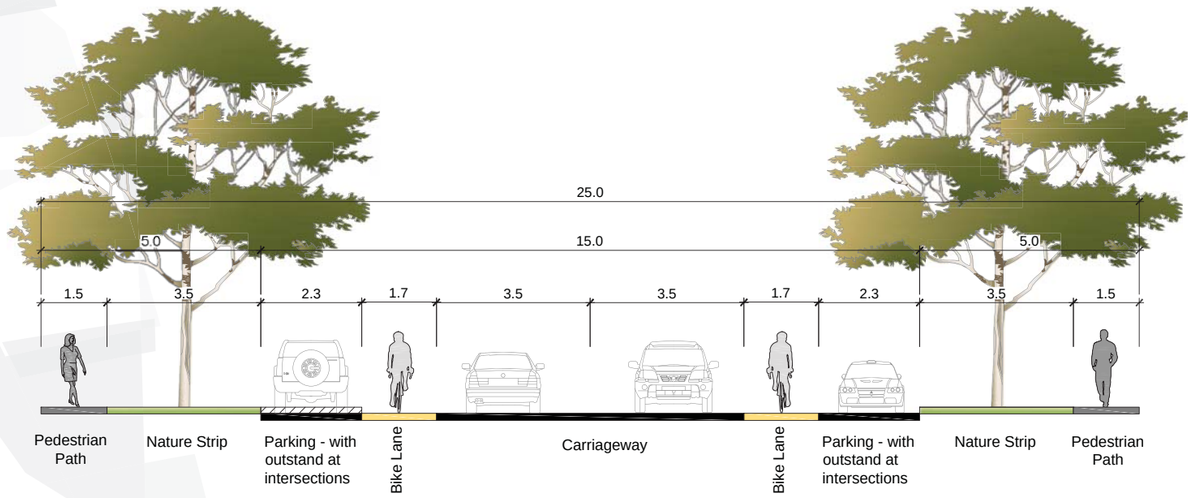
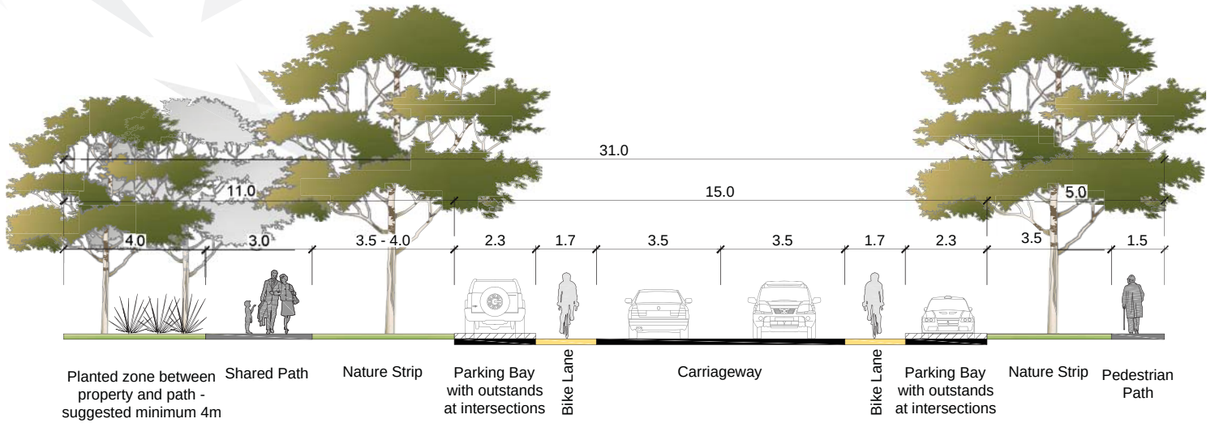


Figure 5: Demonstration Example - Connector Street - Residential with Shared Landscaped Trail 31m Typically 3000-7000 vpd



Note
Shared landscaped trails to be used along targetted strategic streets, connecting key destinations and activities.
Where they are used, a minimum appropriate offset from property boundaries, to allow for sufficient sight-lines, is required.
Measures to reduce the frequency and number of vehicle crossings, and the frequency of street intersection should also occur along these trails.

Figure 2: Demonstration Example - Access Place/Access Street Level 1 16m <2000 vpd

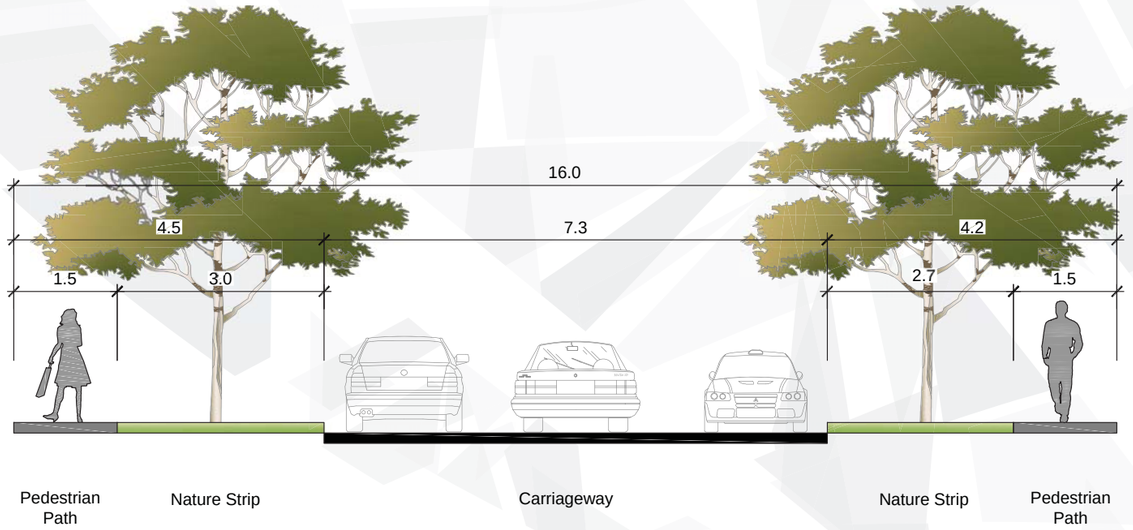
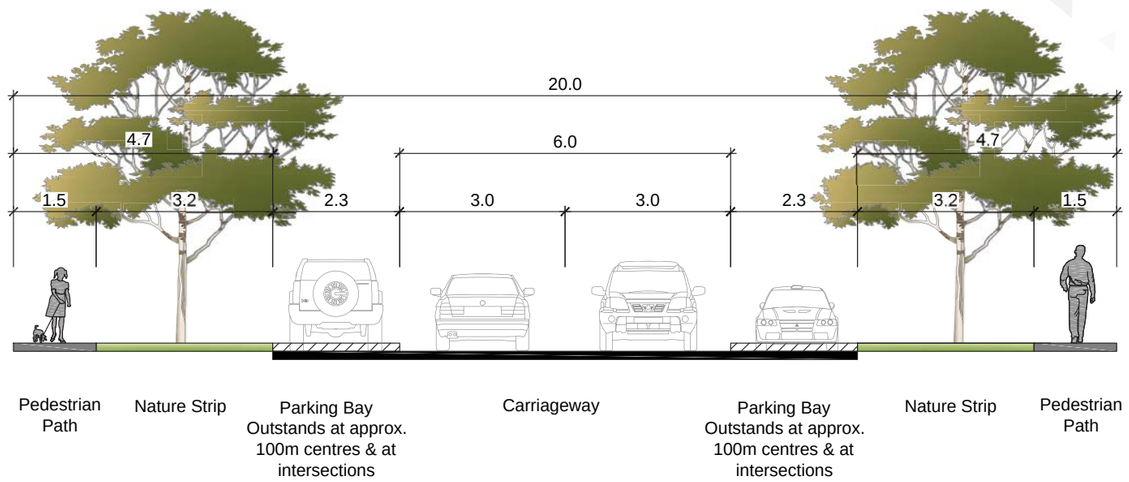


Figure 3: Demonstration Example - Access Street Level 2 20m 2000-3000 vpd



DESIGN PRINCIPLES

The transport system should be safe and support health and well being. (Transport Integration Act, 2010)

The roadside should:

- Have a sense of pedestrian scale and provide a high level of amenity;
- Provide a combination of landscape elements to benefit pedestrians and other users and provide clear definition of the street; and
- Provide dedicated space for bus stops, shelters, and furniture, as well as lighting and utility services.

The Public Transport system depends on the safe and efficient movement of buses and access for passengers.

The design of roads should:

- Balance and support the needs of all users, including walking and cycling. Priority should be given to transport modes on the basis of route function;
- Provide orderly on street parking on local streets, including connector streets. On street parking is not generally provided on arterial roads;
- Provide for on-road commuter and recreational cycling as appropriate;
- Provide the minimum appropriate number and width of trafficable lanes, based on safety, traffic volumes and speeds;
- Limit the use of medians on local streets to reduce road corridor width;
- Favour pedestrians in the design of town centres and local streets by giving priority to walkability and pedestrian access;
- Provide safe, efficient and functional intersections for all road users;
- Cater for appropriate vehicles for the function of the street or road, potentially including buses and service vehicles.

Table 1: Design Elements

The table below demonstrates the application of the above design principles to the network components. It provides guidance for the development of a Precinct Structure Plan.

The function of the street in the hierarchy shall determine its cross sectional requirements. Volumes shown are typical and indicative only. Clause 56.06 of the VPP's details many of the elements and allows some discretion in its application. Street design should consider these options as appropriate, within the context of the relevant PSP.

	Access Street Level 1	Access Street Level 2	Connector Street	Connector Street in Local Town Centre	Secondary Arterial**	Primary (declared) Arterial***
Typical Reservation	• 16m	• 20m	• 26-28m	• 20-24m	• 34m	• 41m
Priority	• Pedestrians/cyclists	• Pedestrians/cyclists	• Pedestrians/cyclists	• Pedestrians	• Movement of people and goods	• Movement of people and goods
Posted speed	• 50 km/hr	• 50 km/hr	• 50 km/hr	• 40 km/hr	• 60-70 km/hr	• 70-80 km/hr
Desired Travel Speed*	• 30 km/hr	• 40 km/hr	• 50 km/hr	• 30 km/hr	• 60-70 km/hr	• Consult with VicRoads
Approx vehicles/day	• Up to 2,000	• 2,000 – 3,000	• 3,000 – 7,000	• 3,000 – 7,000	• 12,000 – 40,000	• More than 30,000
Direct lot access	• Yes	• Yes	• Yes	• Yes	• Limited	• No
Paths	• Footpaths 1.5m minimum on both sides of the street	• Footpaths 1.5m minimum on both sides of the street • 2.0m for key high pedestrian locales	• Footpaths 1.5m minimum on both sides of the street • 2.0m for key high pedestrian locales	• Up to 3.5 - 5.5m in high pedestrian zones	• Footpaths 1.5m minimum on both sides of the street • Frequent connections via open space links and frontage streets, coordinated with bus stops	
Nature strip	Provide for: • Approx 3m width • Medium canopy trees • Kerbs - consider urban design, street definition, orderly parking, WSUD and other issues as appropriate • Street lighting • Minimise lighting and tree foliage conflict through appropriate placement and design • Minimise utility and tree root conflict through selective tree choice and appropriate placement and design	Provide for: • Minimum 3.2m width • Medium/large canopy trees • Kerbs - consider urban design, street definition, orderly parking, WSUD and other issues as appropriate • Street lighting • Minimise lighting and tree foliage conflict through appropriate placement and design • Minimise utility and tree root conflict through selective tree choice and appropriate placement and design	Provide for: • Minimum 3.5m – 4m width • Large canopy trees • Kerbs - consider urban design, street definition, orderly parking, WSUD and other issues as appropriate • Street lighting • Minimise lighting and tree foliage conflict through appropriate placement and design • Minimise utility and tree root conflict through selective tree choice and appropriate placement and design • Provide space for Federal Disability Discrimination Act (DDA) compliant hardstand areas at bus stops	Provide for: • Up to 5.5m width • Canopy trees appropriate to activity centre function and amenity within verge, kerb outstands or within parking bays. • Kerbs - consider urban design, street definition, orderly parking, WSUD and other issues as appropriate • Street lighting (consider supplementary pedestrian lighting in activity centres) • Minimise lighting and tree foliage conflict through appropriate placement and design • Minimise utility and tree root conflict through selective tree choice and appropriate placement and design • Provide space for Federal Disability Discrimination Act (DDA) compliant hardstand areas at bus stops • Shelter by shop verandas	Provide for: • Minimum 5m width • Large canopy trees • Semi mountable kerbs and/or suitable WSUD treatments • Street lighting (consider supplementary pedestrian lighting in activity centres) • Minimise lighting and tree foliage conflict through appropriate placement and design • Minimise utility and tree root conflict through selective tree choice and appropriate placement and design • Provide additional space for planned trunk services as required • Provide space for Federal Disability Discrimination Act (DDA) compliant hardstand areas at bus stops • Consider indented bus bays only to provide for bus layovers or safer stopping conditions	
Bicycle facilities	• No	• Not usually provided • Consider 1.5m lanes where high bicycle volumes expected (e.g. to fill gap in off-road network) • Shared paths (3.0m wide) on identified strategic bicycle network routes only (shared landscaped trails)	• 1.7m wide on road bicycle lanes • Shared paths (3.0m wide) on identified strategic bicycle network routes only (shared landscaped trails)	• 4.2m shared bicycle and traffic lane • No shared path	• 2.0m wide on road bicycle lanes both sides, preferred as standard • On declared arterial roads, VicRoads may have additional or alternative requirements and should be consulted • 3.0m min off-road shared paths both sides, offset from property boundary can also be provided (use frontage roads as appropriate). Segregate pedestrian and bicycle paths where appropriate.	
Trafficable lanes	• Not marked • 7.3m carriageway width	• 1 lane in each direction • 3.0m lane width – no buses expected • Provide wider lanes in industrial precincts	• 1 lane in each direction • 3.5m lane width – potential bus route • Road cross sections may vary along a road length (e.g. cross section differs through activity centre and residential area)	• 4.2m shared bicycle and traffic lane • Design to reduce vehicle speeds to 40 km/hr (preferably 30 km/hr), and manage traffic speed accordingly	• Minimise pavement width to support the required number of lanes. • 3.5m lane width	
Parking lane	• Included in road carriageway width	• Parallel on-street parking (2.3m) • Consider wider parking lanes in industrial precincts • Consider indented parking with kerb outstands at pedestrian crossing and planting locations, and at intersections	• Parallel on-street parking (2.3m) • Consider wider parking lanes in industrial precincts • Consider indented parking with kerb outstands at pedestrian crossing and planting locations, and at intersections	• Parallel on-street parking (2.3m) • Consider indented parking with kerb outstands at pedestrian crossing and planting locations, and at interesections • Consider angle parking in activity centres • Consider tree planting in parking lane	• Typically not provided • Consider indented parallel on-street parking (2.3m wide) adjacent to Activity Centres	• Not provided
Medians	• No	• No	• Consider targeted use e.g. entry treatments, activity centres, higher volume roads etc. • Use up to a 2.5m width to facilitate pedestrians • Use a 6.0m width to facilitate vehicle movements • Intermediate widths should not be used to avoid confusion regarding intent of median use. • Consider incorporation of WSUD	• Consider use of medians • Consider incorporation of WSUD	• Use medians on arterials • Median widths must be sufficient to provide for protected right turns (usually 6m minimum) • Consider incorporation of WSUD	

* Clause 56 = Target Speed
** Secondary arterials will typically be managed by local government
*** Ultimately, primary arterials will typically be managed by VicRoads