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Guide

Pedestrian Crossing Guideline

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Preface

Pedestrian crossings, often referred to as zebra crossings, provide an opportunity for people to cross a road safely and on demand.

Pedestrian crossings are one of a suite of treatments that can be used on the road network. Used appropriately, they can improve safety, amenity, priority, and legibility for pedestrians. They can also be used in a variety of ways to achieve council's movement and place vision for an area or length of road.

Transport for NSW utilises a warrant system to determine if a pedestrian crossing is warranted at a specific location on roads operated by the NSW Government (*Supplement to Australian Standard AS 1742.10-2009*). This warrant system is not mandatory for use on non-arterial roads operated by local government.

This guideline is being released as an interim measure while other related documents, including movement and place guidance, are being developed by Transport for NSW. It is not meant to comprehensively describe all aspects of planning, evaluating, and implementing pedestrian crossings.

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1 Scope

This document provides issues for consideration for local governments who choose to develop their own pedestrian crossing policy. Locally developed policies should aim to address the specific characteristics within individual local government areas and help councils to achieve their place-making visions. This guideline is not mandatory.

2 Application

This document is intended to be used by local governments to guide the development of pedestrian crossings.

3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

Australian standards

AS/NZS 1158.4 *Lighting for roads and public spaces – Part 4: Lighting of pedestrian crossings*

AS 1428 (series) *Design for access and mobility*

AS 1742.10 *Manual of uniform traffic control devices – Part 10: Pedestrian control and protection*

Transport for NSW standards

Supplement to Austroads Guide to Road Design Part 4: Intersections and Crossings – General

Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections

Supplement to Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings

Supplement to Austroads Guide to Traffic Management Part 7: Traffic Management in Activity Centres

Supplement to Austroads Guide to Traffic Management Part 8: Local Area Traffic Management

Supplement to Austroads Guide to Traffic Management Part 10: Traffic Control and Communication Devices

Supplement to Australian Standard AS 1742.10-2009, Manual of Uniform Traffic Control Devices – Part 10: Pedestrian control and protection

TDT 2002/12c *Stopping and Parking Restrictions at Intersections and Crossings*

TDT 2011/01a *Pedestrian Refuges*

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TDT 2013/05 *Continuous Footpath Treatments*

TTD 2014/005 *Statutory 10 m No Stopping at Unsignalised Intersections Review Checklist*

TTD 2016/001 *Design and Implementation of Shared Zones Including Provision for Parking*

TTD 2020/03 *Shared Environment Intersection Treatment*

Legislation

Road Rules 2014 (NSW)

Other referenced documents

Austroads 2020, AGRD04-17 *Guide to Road Design Part 4: Intersections and Crossings – General*

Austroads 2020, AGTM06-20 *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management*

Austroads 2020, AGTM07-20 *Guide to Traffic Management Part 7: Activity Centre Transport Management*

Austroads 2020, AGTM08-20 *Guide to Traffic Management Part 8: Local Street Management*

Austroads 2020, AGTM10-20 *Guide to Traffic Management Part 10: Transport Control – Types of Devices*

Austroads 2020, AP-R611-20 *Integrating Safe System with Movement and Place for Vulnerable Road Users*

Austroads 2021, AGRD04A-17 *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*

Austroads 2021, *Pedestrian Facility Selection Tool*

Healthy Streets Ltd 2022, *Healthy Streets Design Check* (Australia)

This spreadsheet-based document is available from https://www.healthystreets.com

NSW Government, *Movement and Place Framework*

The framework is available at https://www.movementandplace.nsw.gov.au

NSW Government, *Practitioner's Guide to Movement and Place*

This is part of the NSW *Movement and Place Framework*. The framework is available at https://www.movementandplace.nsw.gov.au

TfNSW, 2020, *Future Transport Strategy 2056*

4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document.

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AGRD Austroads Guide to Road Design

AGTM Austroads Guide to Traffic Management

TfNSW Transport for NSW

warrant criterion used to determine whether the installation of a traffic control device can be justified

5 Legislation

Pedestrian crossings are regulatory traffic management devices. NSW Road Rule 81 defines what a pedestrian crossing is and requires that drivers must drive at a speed that will allow them to give way to people on a pedestrian crossing, including stopping if required. The Rule also states that drivers must give way to anyone on a pedestrian crossing.

NSW Road Rule 82 stipulates that a driver must not pass or overtake another driver, driving in the same direction, who has stopped to give way to a person on a pedestrian crossing. Taking a Safe System approach, NSW practice is to install 20 m long double barrier lines on each approach to the pedestrian crossing and not to install pedestrian crossings on roads with more than one lane of traffic in any direction.

NSW Road Rule 234 states that a person must not cross a road within 20 m of a pedestrian crossing other than at another crossing. It also requires that people do not stay on the pedestrian crossing for longer than necessary to cross the road.

NSW Road Rule 172 defines the statutory NO STOPPING areas as 20 m before a pedestrian crossing and 10 m after a pedestrian crossing when the pedestrian crossing is not at an intersection. The NSW *Road Rules* allow for the statutory NO STOPPING areas to be altered if another rule applies; for example, the application of parking when kerb extensions have been installed.

5.1 Strategic alignment

The information included in this guideline aligns with key NSW Government strategies such as *Future Transport 2056* and the NSW *Movement and Place Framework*.

The NSW *Movement and Place Framework* offers new ways of planning, operating, and managing public spaces, including roads and road related areas. There is significant emphasis in this guideline on how to apply movement and place approaches and principles when considering suitable pedestrian treatments, and specifically pedestrian crossings.

See Appendix A and Appendix B for more information on *Future Transport 2056* and NSW *Movement and Place Framework*, respectively.

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6 Guidelines

6.1 Guidelines for all pedestrian crossings

The minimum criteria set out for pedestrian crossings in AS 1742.10 are:

- non-arterial road
- 50 km/h or less
- no more than one lane of moving traffic on each approach
- adequate sight distances (refer to Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*)
- adequate kerb ramps (refer to AS 1428)
- adequate lighting (refer to AS/NZS 1158.4).

6.1.1 Identifying movement and place characteristics

Legally, a person is not permitted to cross the road within 20 m on either side of a regulatory crossing. Therefore, pedestrian and vehicle movements need to be understood to ensure the installation of a pedestrian crossing does not reduce pedestrian safety and/or amenity at a particular location. Common locations where pedestrian crossings are considered include near school gates, main street areas, and community centres.

While minimum vehicle volumes are not required to justify the installation of a pedestrian crossing on a non-arterial road, traffic characteristics (such as vehicle type and volumes, 85th percentile speeds, flow dynamics, and frequency/duration of suitable gaps and crash data) should be observed to inform decision-making about whether a pedestrian crossing is the most suitable treatment at a location to solve a problem and contribute to the location's desired movement and place outcomes.

Refer to the *Practitioner's Guide to Movement and Place* for more detailed information on understanding the movement and place characteristics of a road or street and its surroundings.

6.1.2 Pedestrian demand calculation

Local governments may choose to use TfNSW's warrants outlined in the *Supplement to Australian Standard AS 1742.10-2009*. However, the threshold of combined pedestrian and vehicle volumes required by the TfNSW warrants may be difficult to achieve on local or sub-arterial roads.

As an alternate to the TfNSW warrants, councils may use the following pedestrian demand calculation:

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- In each of two separate one-hour periods in a typical day, the pedestrian flow per hour (P) crossing the road is, or is expected to be, equal to or greater than 20.
- Children and elderly or mobility impaired pedestrians count as two pedestrians.

6.1.3 Road safety audits

If there is any doubt or contention over safety aspects of a proposed pedestrian crossing, a road safety audit is recommended. The audit will provide an independent assessment of issues and help to determine whether the proposal poses an unacceptable road safety risk.

6.1.4 Local Traffic Committee

Pedestrian crossings on roads and road-related areas (such as council-managed car parks) are regulatory devices therefore they are subject to Local Traffic Committee processes.

TfNSW supports a flexible, context-sensitive approach by local governments. However, councils should demonstrate they have undertaken appropriate consultation and technical and design assessments, can provide supporting data, and have addressed foreseeable risks prior to seeking consideration from the Local Traffic Committee.

6.2 Pedestrian desire lines

Installing the crossing on the pedestrian desire line is one of the most important considerations when deciding the location of a pedestrian crossing. Utilising the pedestrian desire line means the crossing will seamlessly fit into people's trips, meeting their needs and achieving compliant crossing behaviour.

If a discrete desire line cannot be identified, look at existing and future trip generators, such as schools, shops, parks, and bus stops, which will help to determine an appropriate location for the crossing. If, by using the pedestrian desire line, the pedestrian crossing does not meet essential safety criteria, such as sight distances, consider whether complementary treatments may be used to mitigate the risks and retain the desire line. Consider also, the broader network and whether a precinct-wide approach needs to be taken to make the area more pedestrian friendly if that is the desired function of the street.

6.3 Sight distances

Sight distances represent the distance/s at which road users must be able to see each other or a pavement marking, sign, and so on, in order to react appropriately, including stopping, to avoid a crash. Adequate sight distances are essential safety criteria for pedestrian crossings. They are related to vehicle approach speeds and are the reason for statutory NO STOPPING zones on approach/departure to pedestrian crossings. Refer to Austroads *Guide to Road*

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Design Part 4A: Unsignalised and Signalised Intersections and TfNSW technical direction TDT 2002/12c for more information on sight distance.

Kerb extensions or blisters and raised crossing thresholds may also improve sight distances at a crossing (refer to Appendix D for complementary treatments).

6.4 Vertical and horizontal curves

Where pedestrian crossings are proposed on or near vertical or horizontal curves, sight distances still apply but practitioners may also need to take into account the risk of vehicle rear-end crashes and include suitable mitigating treatments.

6.5 Lighting

Adequate lighting at pedestrian crossings is particularly important as they are in operation at all times and clear visibility is essential to ensure drivers are able to give way to people on the crossing at any time (refer to AS/NZS 1158.4).

Daytime shadowing may also affect visibility and should be taken into account when considering risk factors.

6.6 Pedestrian crossings at intersections

Pedestrian crossings may be installed at intersections where there is a genuine need based on guidance in this document. Careful consideration needs to be given to the installation of pedestrian crossings at intersections. Pedestrian crossings should not be used just to reinforce NSW *Road Rules* 72 or 73 (which require drivers turning into a side street or slip lane to give way to people who are crossing the side street or slip lane at or near the intersection).

Overuse of pedestrian crossings may lead to diminished safety because drivers ignore or no longer see them. Alternate treatments should be first investigated. Pedestrian crossings can be provided by exception to address safety risks at intersections where safe driving compliance to the road rules is inconsistent.

6.7 Pedestrian crossings and patterned pavements

Pedestrian crossings are first and foremost a pedestrian safety device. NSW Road Rule 81 defines a pedestrian crossing as a place with white stripes on the road surface that run lengthwise, of approximately equal length and parallel to one another for the width of the crossing. A key attribute of a pedestrian crossing is that it is universally recognisable and understood as a pedestrian safety and traffic management device.

For these reasons, pedestrian crossings must not be installed in conjunction with patterned pavements or street art. A monochrome background road surface may be installed as an alternative to asphalt, for example a terracotta pavement finish (see Figure 1).

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Figure 1 – Pedestrian crossing with terracotta coloured pavement, Katoomba Street, Katoomba

6.8 Identifiable walking routes

In addition to safety and prioritisation purposes, pedestrian crossings may be installed to improve the legibility of key walking routes that are likely to attract a diverse demographic, for example to a swimming pool, library, theatre, or sports ground. In such cases, directional signs and wayfinding elements should also be installed to improve the customer's experience (see Figure 2). Refer to AS 1742.10 and AGTM10-20 for more information on wayfinding.

Figure 2 – Pedestrian way finding, Cleveland Street (left) and Darling Harbour (right)

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7 Guidelines for developing local government pedestrian crossing policies

Council officers involved in the design, planning, and implementation of pedestrian crossings should be aware of how the four street environments in the NSW *Movement and Place Framework* are being applied in their area of operations.

These guidelines in Sections 7.1 to Section 7.4 demonstrate how the vision for a road or street can help to inform decision making around how to implement pedestrian crossings in contextually relevant ways.

7.1 Main roads

Vision:

- The road environment is visually appealing and sits well in its context.
- Land uses are buffered by vegetation in the verge and set back from the road.
- Properties have primary frontages and vehicle access from other streets where appropriate.
- Efficient movement of people and goods is prioritised, especially via public transport, freight, and private vehicles.
- Active transport is provided on separated paths within the road reserve or alternatively along adjacent streets. Crossings are provided on key desire lines to enable people to cross the road safely.
- The speed limit is >50 km/h.

With respect to pedestrian crossings:

- Warrants should be used as per the *Supplement to Australian Standard AS 1742.10-2009.*
- Pedestrian (zebra) crossings will only be permitted by exception.
- Signalised or grade separated crossings are more suitable options.

7.2 Main streets

Vision:

- The street environment is highly amenable for people, and there are places along the street to stop and rest.
- Mixed land uses including shops and services cater to a range of everyday needs.
- Properties have active frontages to the street and are serviced via a rear lane where possible.

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- Efficient movement of people and goods are prioritised, especially via walking, cycling, and public transport. Crossings are provided at street level and are frequently spaced.
- Public transport routes include both rapid transit (potentially including light rail) and local routes.
- Freight and servicing are enabled in appropriately sized vehicles for the context. Private vehicle movements may be enabled at a moderate speed and volume.
- The speed limit is ≤50 km/h.

With respect to pedestrian crossings:

- The pedestrian demand calculation recommended in this guideline should be used.
- They should be located as close as possible to major attractors or where high proportions of vulnerable pedestrians might be expected. For example, near schools, medical centres, government services.
- The suggested spacing between crossing points is 40 m to 100 m.
- Raised pedestrian crossings should be used to manage speed and pedestrian prioritisation.
- Refuges should be used to provide pedestrian staging areas.
- Pedestrian crossings should not be used purely to reinforce NSW *Road Rules* 72 and 73.
- Consider complementary treatments, as required, that may help to manage speed and prioritisation.

7.3 Local streets

Vision:

- The street environment is highly amenable for people to enjoy local activities.
- There are localised mixed land uses, often with a predominance of residential dwellings of a variety of types.
- Properties have active frontages to the street. Priority streets for walking and cycling are serviced via a rear lane where possible.
- Walking, cycling, and access to public transport is prioritised. The street is easy to cross mid-block and intersection design minimises crossing distances.
- Freight and servicing is enabled in appropriately sized vehicles for the context. Private vehicle movements may be enabled at a low to moderate speed and volume.
- The speed limit is ≤50 km/h, preferably 30 km/h.

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With respect to pedestrian crossings:

- The pedestrian demand calculation should be used as recommended in this guideline.
- Unless the street space is shared, continuous footpaths should be used at intersections wherever possible.
- Pedestrian crossings should be used sparingly, generally only on key walking routes or close to significant attractors – the road environment should be designed and managed to make it easy for pedestrians to move freely.
- The suggested spacing between crossing points is 100 m to 200 m.
- Both raised or at grade pedestrian crossings should be taken into account.
- Pedestrian crossings should be utilised to enforce road rules (for example, rules 72 and 73) as an exception only if other treatments are unsuitable.
- Local area traffic management schemes and alternate treatments should be taken into account where possible, for example, road narrowing, pedestrian refuges.
- Hierarchy of crossing treatments for intersections:
    a. shared environment / shared zone
    b. continuous footpath treatment
    c. pedestrian crossing
    d. kerb extensions
    e. pedestrian refuge
    f. no treatment.

7.4 Civic spaces

Vision:

- The street is a most amenable environment for people to spend time and enjoy a wide range of activities.
- There are a variety of destination attractions of local, district, or regional importance.
- Properties have active frontages to the street and are serviced via a rear lane or shared space where possible.
- Walking, cycling, and access to public transport is prioritised. The street is easy to cross throughout its length.
- Freight and servicing is enabled in appropriately sized vehicles for the context. Private vehicle movements may be enabled at a low speed and volume.

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- The speed limit is ≤30 km/h, preferably 10 km/h to 20km/h.

With respect to pedestrian crossings:

- The pedestrian demand calculation recommended in this guideline should be used.
- They should be located as close as possible to major attractors.
- Suggested spacing between crossing points: 40m to 60 m. Crossing spacing less than 40 m should be reconsidered as a shared zone (where pedestrian crossings are not required because the entire zone provides pedestrian priority).
- Both raised or at grade pedestrian crossings should be taken into account.
- Pedestrian crossings should be utilised to enforce road rules (for example, 72 or 73) as an exception only if other treatments are unsuitable.
- Complementary treatments that may help to manage speed and prioritisation should be taken into account.
- Hierarchy of crossing treatments for intersections:
    1. shared environment / shared zone
    2. continuous footpath treatment
    3. pedestrian crossing
    4. kerb extensions.

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Appendix A Strategic alignment with Future Transport Strategy 2056

The NSW Future Transport Strategy 2056 states:

> "In an age of uncertainty, setting a vision and guiding principles allows us to be flexible and adapt to change as we create the future transport network.
>
> Our population is forecasted to increase to around 12 million people by 2056; freight volumes are estimated to double in the Greater Sydney area and increase by 25 per cent in regional and outer metropolitan NSW; and the passenger network is preparing for over 28 million trips a day. This means planning for the future has never been more important. While recent events, such as COVID-19, impacted demand and mobility patterns, particularly for public transport trips, long-term expectations still forecast a significant increase in demand for transport.
>
> Future Transport 2056 outlines six state-wide principles to guide planning and investment. These are aimed at harnessing rapid change and developing new technologies and innovation to support a modern, innovative and resilient transport network."^

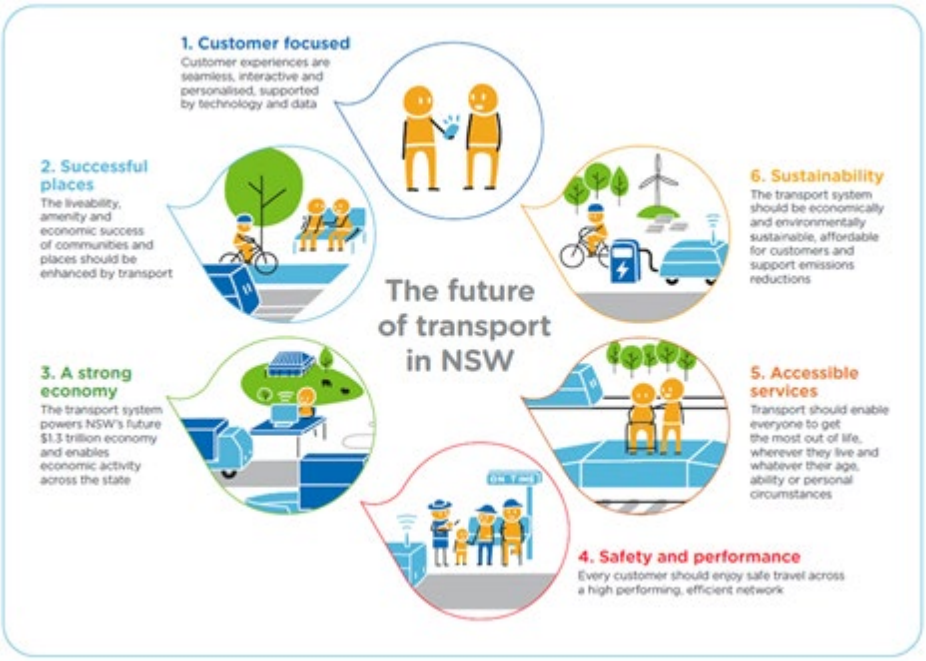

Figure 3 – NSW Future Transport Strategy, November 2020.

^ Downloaded from https://future.transport.nsw.gov.au/future-transport-strategy, accessed on 26 April 2022.

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This guideline will help local governments to apply the six principles in relation to pedestrian crossings as follows:

- Customer focused: Appropriately placed pedestrian crossings are focused on the needs of pedestrian customers, particularly children, the elderly, and mobility impaired pedestrians, balanced with other community needs; for example, freedom of pedestrian movement, the movement of goods and services, and parking.
- Successful places: Places are successful when people are able to interact and move about comfortably. Appropriate pedestrian facilities, including pedestrian crossings, can facilitate pedestrian movements and help to prioritise active transport modes, particularly around civic spaces.
- A strong economy: Research shows that active transport choices contribute significantly to the economy; for example reduced transportation costs for households, reduced wear and tear on roads, people-friendly places boost tourism, and people on foot or on bicycle tend to spend more money in local areas.
- Safety and performance: Appropriately placed pedestrian crossings improve the safety and amenity of pedestrian trips. There may also be indirect local safety and performance benefits because areas that are designed for pedestrian safety tend to have lower speed limits and more controlled motor vehicle movements. The passive surveillance attributes of active transport can also enhance general community safety.
- Accessible services: Environments that are designed with pedestrians in mind tend to be both more diverse and inclusive, providing a wide range of services, commercial and retail businesses, and social, cultural, and entertainment activities within walkable distances of local centres.
- Sustainability: Walking is our natural and most sustainable mode of transport. Networks that encourage walking and bicycle riding will contribute significantly to sustainable community outcomes such as reduced vehicle emissions, reduced reliance on private motor vehicles, individual and community health benefits, and resilience as we face the challenges presented by climate change, global economic uncertainty, and health crises.

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Appendix B Strategic alignment with the Movement and Place Framework

The NSW *Movement and Place Framework* states:

> "Movement and Place is a multi-disciplinary, place-based approach to the planning, design, delivery and operation of transport networks. It recognises and seeks to optimise the network of public spaces formed by roads and streets and the spaces they adjoin and impact.^
>
> Our roads and streets are key public spaces for our communities – places where people spend time and socialise – enabling activities that add vitality to neighbourhoods. Aligning movement and place in the design of roads and streets can give users of all ages and abilities better, safer and healthier travel options while creating appealing places where people want to live.^
>
> Regardless of their name ('road', 'street' or 'highway') or hierarchy ('State', 'regional' or 'local'), the movement functions and place qualities of roads and streets combine to create different types of street environments.*
>
> Each type of street environment has typical characteristics. However, this does not equate with a set of rules, assumptions or planning outcomes. The complex nature of our transport networks and our customers' needs means that every road and street is different, and should be considered individually within its own context.*"

Figure 4 – Classifying street environments

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^ https://www.movementandplace.nsw.gov.au/about/about-movement-and-place, accessed 26 April 2022.

* https://www.movementandplace.nsw.gov.au/place-and-network/classifying-street-environments, accessed 26 April 2022.

The NSW *Movement and Place Framework* describes each of the street environments as follows (https://www.movementandplace.nsw.gov.au/place-and-network/classifying-street-environments, accessed 26 April 2022):

- Main roads: These roads and routes are central to the efficient movement of people and goods. They include motorways, primary freight corridors, major public transport routes, the principal bicycle network and key urban pedestrian corridors. Their place activity levels are less intense. However, these roads and routes can have significant meaning to local people.

  To support these roads and routes we need to prioritise their strategic movement functions. We can limit negative impacts to place qualities or community severance through their planning, design and operation.

- Main streets: These streets are some of the most vibrant places in our cities and towns. They have both significant movement functions and place qualities. Balancing the functions of these streets is a common challenge.

  To support main streets we need to improve place qualities while providing access for walking and cycling and safe, low-speed environments, while also allowing for the efficient movement of people and freight. Trade-offs and compromises may be required.

- Local streets These are the majority of the streets in our communities. They often have important local place qualities. Activity levels are less intense than for civic spaces, but these streets can have significant meaning to local people. Town and village main streets are usually 'local streets'.

  To support these streets we need to provide access for walking, cycling, and private vehicles; safe, low-speed environments; easy access to public transport; and access for local deliveries while limiting through-traffic.

- Civic spaces: These streets are at the heart of our communities and have a significant meaning, activity function, or built environment. They are often in our major centres, tourist and leisure destinations, and community hubs. They are places for people, with a priority on place.

  We need to support the place quality of these street environments by giving priority to pedestrians; providing safe, low-speed environments; managing freight and deliveries; providing easy access to cycle routes and public transport; and limiting through-traffic.

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B.1 Implementing the road classification system

Under the NSW road classification system, state roads are owned and operated by Transport for NSW. Regional and local roads are owned and operated by local governments, although TfNSW may have a significant interest in the operation of a local or regional road if it adversely impacts the operation of an adjoining state road.

Road classification determines the appropriate authority for a road. Local roads are primarily designed and delivered by local governments. State roads and, to a lesser extent, regional roads will be co-designed and delivered by council and TfNSW.

B.2 Implementing street identification using movement and place

As distinct from road classification, *street identification* involves using the Movement and Place core process to identify the character and function of streets and roads. This uses the four street environments: civic spaces, main streets, local streets, and main roads. Street identification applies universally to state, regional, and local roads.

Taking a movement and place approach enables state and local authorities to identify the desired character and function of a street or road rather than accepting a default perception of character and function based on the road's state, regional, or local classification. Local governments are empowered to be the primary authority for all local roads. TfNSW will take a collaborative approach with local governments for state roads, and to a lesser extent, regional roads, to ensure that the appropriate street environment is implemented successfully – especially where state and regional roads have civic space, main street, or even local street significance.

B.3 Integrating movement and place with safe system

Safe system is the philosophy that underpins the design and delivery of all road projects in NSW. The intent of safe system is to provide a forgiving environment and road system that, when crashes do occur, they do not result in death or serious injury.

Place making aspects of movement and place are designed to encourage vulnerable road user activity. It is imperative that movement and place activities integrate with safe system approaches.

In 2020, Austroads produced a report which will help to transform roads for the safe use of pedestrians and bicycle riders: *Integrating Safe System with Movement and Place for Vulnerable Road Users*, AP-R611-20.

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B.4 Implementing pedestrian crossings using the Movement and Place core process

A pedestrian crossing is not an outcome in itself; rather it is a tool to help fix a safety or movement problem, or to help prioritise movements to achieve the movement and place vision for an area or length of road. All road and related treatments need to help fulfil the movement and place vision for the street in its place context.

These six steps (covered in Table 1) assume that the road identification (state, regional, or local) for a given section of street has been established.

Table 1 – Steps to implement pedestrian crossings using the Movement and Place core process

Step	Description
1 Establish the scope, vision, objectives and evaluation criteria	Relevant strategies and plans should be identified that determine the vision, objectives, and evaluation criteria for a street. For example, this can include state and local planning policies such as a district plan, local strategic planning statement, or place plan. This vision-setting material may have established the street identification as either a civic space, main street, local street, or main road. If not, then the street identification can be determined after conducting a place and movement analysis. Establishing the vision for a street in its place context provides a clear direction when considering what street design changes can be made to achieve this vision.
2 Understand place	Understanding place involves considering how a street looks and functions in its current state, and what might need to change to achieve the vision for this place. For example, the vision for a local centre may be for this to be a place for people. A main street in this centre could be compared against this vision by considering how safe, comfortable, and inviting this street is for people to dwell, to walk and cycle, or to catch public transport. This place analysis can consider street design details such as spatial allocation in the street, pedestrian crossings, and other public domain considerations.
3 Understand movement	As with place, understanding movement also involves comparing movement in the street between its current state and the vision for its future state. Using the main street example above, a council may determine that people need to be able to walk more freely, including when crossing the street. Vehicle movements may still be a component in the movement function of the street, however, to achieve the vision, the safety and comfort of walking and cycling movements must be prioritised.
4 Overlay and discuss conflicts, issues, and opportunities	Keeping the vision clearly in mind, the current and desirable movement and place characteristics should be reviewed to identify gaps between the existing state and what needs to change to achieve the vision. This can include street identification if this has not already been previously established by an existing strategy or plan for the place.

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Step	Description
5 Develop options	A set of options that will help to achieve the vision should be developed. All proposed options should align with the overall vision for the location and will address real or perceived conflicts, road safety issues, legibility, priority, and so on. The final proposed treatment or design should be checked to ensure it matches the desired character and function of the street. If not, then the options again should be reviewed again, including wider network treatments wherever necessary, to ensure the desired street function and operating environment is achieved.
6 Choose the preferred option	Option/s based on the established vision, objectives, and evaluation criteria should be chosen. In this main street example, this is where it is decided that a pedestrian crossing is an appropriate improvement because it aligns with the vision for the place. Once a pedestrian crossing has been determined to be the most suitable solution, there is a technical framework which informs the location, design, and layout of the crossing, and complementary treatments that may be considered to mitigate risks or to enhance pedestrian outcomes and place-making aspirations.

B.5 Strategic alignment with the Healthy Streets Design Check Australia tool

When taking a movement and place approach, the *Healthy Streets Design Check Australia* tool can be utilised to determine how healthy a street is for people. This qualitative assessment can be used in a variety of ways to achieve community visions for creating healthier streets and more vibrant places.

There are 10 healthy streets indicators for all the ways that streets influence people's health, and pedestrian crossings significantly improve the health of a street in a number of ways. Pedestrian crossings make a street easier to cross, they invite more people to walk, and they help people feel safer and more relaxed when they do.

The appropriate siting and design of pedestrian crossings can have a strong influence in a street's healthy streets design check score. When we improve this score, we demonstrate that we have enabled people to engage in healthier activities in everyday life.

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Appendix C Technical framework

C.1 Australian standards

AS 1742.10 Manual of uniform traffic control devices – Part 10: Pedestrian control and protection

The installation of a pedestrian crossing is an implicit social contract between pedestrians, drivers and road authorities / governments.

A pedestrian crossing indicates to pedestrians a safe place to cross the road and tells them they have legal right of way. Drivers are required to approach the crossing looking for pedestrians and at a speed at which they can stop if required. Road authorities / governments must ensure they install pedestrian crossings in a way that meets the expectations of pedestrians and drivers; an essential part of this is ensuring pedestrians and drivers are able to see each other.

The situational, line marking, signage and lighting requirements set out in AS 1742.10 are designed to meet the expectations of pedestrians and drivers and, taking a Safe System approach, provide an environment in which pedestrians and drivers are best able to see each other and negotiate access to the space occupied by the pedestrian crossing, including on dark, rainy nights when pedestrians are wearing dark clothing.

The key situational criteria for pedestrian crossings as set out in AS 1742.10 are:

- non-arterial road
- 50 km/h or less
- no more than one lane of moving traffic on each approach
- adequate sight distances (refer to Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*)
- adequate kerb ramps
- adequate lighting.

AS/NZS 1158.4 Lighting for roads and public spaces: Lighting for pedestrian crossings

AS/NZS 1158.4 provides the minimum lighting requirement for pedestrian crossings.

C.2 NSW Supplements to the Australian Standards

The NSW supplements to the Australian standards have been written expressly for use by Transport for NSW on state roads. Local governments are not required to adhere to the supplements.

Supplement to Australian Standard AS 1742.10-2009, Manual of Uniform Traffic Control Devices – Part 10: Pedestrian control and protection – The pedestrian crossing warrants

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described in the *Supplement to Australian Standard AS 1742.10-2009* are not required for pedestrian crossings on roads that meet the situational criteria set out in AS 1742.10; that is, non-arterial road, speed limit less than or equal to 50 km/h and only one moving traffic lane in each direction.

A pedestrian demand is required to justify the installation of a pedestrian crossing. The pedestrian demand may already exist or may be anticipated, for example, because of land use changes, development, or place-making activities where reprioritisation of pedestrian and vehicle movements is desirable.

The supplements may also include enhanced practices that are not mandatory for local governments but are strongly recommended, for example, in relation to pedestrian crossings: using double barrier lines on approach and installing kerb ramps that extend the full length of the crossing.

C.3 Austroads guides

The Austroads guides are national guidelines established by state road authorities (or equivalent) in Australia and New Zealand and are skewed towards state road application. However, there are several guides that are applicable to the design and management of main streets, local roads and civic spaces and include guidelines relevant to pedestrian crossings.

AGTM06-20 – describes the appropriate use of, and design of, the various intersection types and the techniques that need to be applied if efficient and safe intersections are to be provided to the road user. All categories of road use – including cars, trucks, public transport, motorcycles, cyclists, and pedestrians, including people who have disability or mobility difficulty, are addressed.

Pedestrian crossing information in Part 6 is primarily applicable to main roads but some concepts can be adapted for intersections and crossings on local roads, main streets and civic spaces.

AGTM07-20 – outlines the planning and management of centres typified by high levels of internal activity and interaction, especially by people on foot. It addresses the need to obtain a balance between providing for vehicular access and providing for pedestrian, cyclist, and public transport needs without compromising the functionality of a site. It outlines operational and physical measures to provide for movement to and within such centres, either as part of their planning or in their day-to-day management.

Pedestrian crossing information in Part 7 is primarily applicable to civic spaces and main streets.

AGTM08-20 – outlines the principles and practice of influencing driver behaviour on local and residential streets – both directly by physical changes to the environment, and indirectly by influencing driver perceptions of what is appropriate behaviour. It shows ways to reduce traffic

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volumes and speeds in local streets, to increase amenity, incorporate localised place-making, and to improve safety and access for residents, especially pedestrians and cyclists.

Pedestrian crossing information in Part 8 is primarily applicable to local streets but some concepts or treatments may be adapted for civic spaces or main street design and management.

AGTM10-20 – outlines the tools that are required for traffic management and traffic control within a network. It covers the various control devices used to regulate and guide traffic, including signs, traffic signals, pavement markings, delineators, and traffic islands. It provides advice on the functions, suitability and correct use of devices to create a more efficient and safer road traffic environment for all users in permanent or temporary situations.

Pedestrian crossing information in Part 10 is primarily applicable to local streets, main streets and civic spaces.

AGRD04-17 – outlines information that is common to the geometric design of all at-grade intersections. It contains information on the types of intersections, the road design considerations for intersections and the design process for the development of an intersection layout. Guidance is also provided for pedestrian, cyclist, and rail crossings.

AGRD04A-17 – provides equations for sight distances.

Pedestrian Facility Selection Tool – designed to help practitioners select the most appropriate type of pedestrian crossing based on walkability, safety, and economic outcomes. The tool may not deliver a definitive answer; instead it informs decision-making with a range of suitable options to which the practitioner can then apply local context to determine the preferred option.

C.4 NSW Supplements to the Austroads guides

The Supplements to the Austroads Guides have been written expressly for use by Transport for NSW on state roads. Local governments are not required to adhere to the Supplements but, where appropriate, adoption of enhanced practice is encouraged.

Per the Austroads guides listed in Appendix C.3, the relevant Austroads supplements are:

- *Supplement to Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*
- *Supplement to Austroads Guide to Traffic Management Part 7: Traffic Management in Activity Centres*
- *Supplement to Austroads Guide to Traffic Management Part 8: Local Area Traffic Management*
- *Supplement to Austroads Guide to Traffic Management Part 10: Traffic Control and Communication Devices*

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- *Supplement to Austroads Guide to Road Design Part 4: Intersections and Crossings – General*
- *Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*.

C.5 TfNSW technical directions

The following technical directions provide some technical guidance related to pedestrian crossings as well as illustrating some alternate treatments that may be considered when exploring treatment options for a specific location:

- TTD 2020/03 *Shared Environment Intersection Treatment*
- TTD 2016/001 *Design and Implementation of Shared Zones Including Provision for Parking*
- TTD 2014/005 *Statutory 10 m No Stopping at Unsignalised Intersections Review Checklist*
- TDT 2013/05 *Continuous Footpath Treatments*
- TDT 2011/01a *Pedestrian Refuges*
- TDT 2002/12c *Stopping and Parking Restrictions at Intersections and Crossings.*

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Appendix D Complementary treatments to improve pedestrian safety and amenity

D.1 Multiple pedestrian crossings

In high pedestrian activity areas, for example in civic spaces and main street environments, for example, shopping precincts, schools, hospitals, and other high place valued locations, multiple pedestrian crossings may be desirable. The recommended minimum distance between crossings is around 40 m. If a practitioner determines that crossings can be justified at less than 40 m apart, they should consider whether a shared zone or other pedestrian prioritisation / vehicle restriction treatment would be more appropriate at that location.

D.2 Pedestrian crossing with kerb blisters or kerb extensions

Table 2 – Pedestrian crossing with kerb blisters or kerb extensions

Figure 5 – Kerb blisters, Jacksons Road, North Narrabeen	**Figure 6 – Kerb extensions, Katoomba Street, Katoomba**
Kerb blisters are structures used to locally narrow the carriageway. The advantage of kerb blisters over kerb extensions is that they generally have minimal impact on drainage therefore may present a simpler option for some councils to implement.	Kerb extensions are a local widening of the footpath generally used to assist pedestrians to cross the road by narrowing the width of the carriageway. Because kerb extensions are contiguous with the adjacent footpath they must be designed and constructed taking into account local drainage issues.

Kerb blisters and kerb extensions narrow the crossing distance for pedestrians and improve visibility between pedestrians and drivers.

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Kerb blisters and kerb extensions alone may not result in vehicle speed reduction. However, if the kerb blisters or kerb extensions significantly narrow the traffic lanes, some speed reduction may be achieved at the crossing point.

Depending on the width of the kerb blisters or kerb extensions, and therefore the effect on sight distances, the statutory no stopping distances may be reduced by permitting parking closer to the crossing.

Kerb blisters and extensions may be landscaped to improve the aesthetics of the street environment. Care must be taken to ensure foliage does not obscure pedestrians.

D.3 Pedestrian crossing with refuge

A refuge in the middle of a pedestrian crossing may be desirable in locations where there are high numbers of more vulnerable pedestrians such as young children or elderly pedestrians, or where there are high volumes of traffic. The refuge can simplify the cognitive load for the pedestrian because they only have to concentrate on one direction of vehicular travel at a time.

Refuges alone may not result in vehicle speed reduction. Some speed reduction may be achieved if the refuge creates a significant narrowing of traffic lanes. Kerb extensions along with the refuge may also help to achieve reduced vehicle speeds.

Figure 7 – Pedestrian crossing with refuge, Jacksons Road, North Narrabeen. Refuges are often supplemented with kerb blisters or extensions

D.4 Raised pedestrian crossings

Where speed or visibility, including visibility of children and/or elderly or mobility impaired pedestrians, may pose a safety risk, the pedestrian crossing may be raised. Refer to AS 1742.10 for more detail on raised (wombat) pedestrian crossings. Raised crossings are

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preferred to speed humps as they directly control the speed of the vehicle at the crossing point and may help to reduce the number of vertical displacements required on a length of road.

Figure 8 – Raised pedestrian crossing, Parramatta Station, Parramatta. A kerb extension has been installed on one side of the crossing to narrow the width of the crossing and to provide pick-up/drop-off bays close to the station entrance.

D.5 Raised safety platforms at intersections

The purpose of raised safety platforms is to reduce crash risk and severity at intersections. Where there is sufficient pedestrian activity, pedestrian crossings can be installed on the raised safety platform, preferably across each leg of the intersection if local traffic movements permit.

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Figure 9 – The Avenue and Frances Street, Randwick. Pedestrian crossings were only installed on two legs of this intersection because the drop-off/pick-up queues at the local school were extensive and impacting on state road movements nearby.

D.6 Pedestrian crossings at shared paths

In NSW, bicycle riders are not legally allowed to ride across a pedestrian crossing. Bicycle riders will generally not dismount despite the law. In recognition of this, it is preferable to provide suitable facilities rather than taking an enforcement mentality. Therefore, to enable bicycle riders to cross without dismounting, space can be allocated beside the pedestrian crossing.

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Figure 10 – Pedestrian crossing with bicycle space allocated beside it, Chippendale Way, Chippendale.

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D.7 Summary of complementary pedestrian crossing treatments

Table 3 – Complementary pedestrian crossing treatments

Pedestrian crossing and complementary treatments	Pedestrian crossing	Kerb extensions	Refuge	Speed humps	Raised crossing	Raised safety platform	Shared path
Sample photograph							
Main purpose	Basic regulatory device	Shortens crossing width Improves sight distances	Staging space for pedestrians	Traffic calming	Traffic calming and pedestrian safety	Traffic calming through intersection	Allocates space for bicycles which may/may not be regulatory
Pedestrian	Provides on-demand priority for pedestrians wanting to cross the road	Shortens crossing width	Simplifies crossing decisions for pedestrians	Nil	Improves visibility and amenity	Improves visibility and amenity	Nil
Driver/vehicle	Must approach, looking for pedestrians and be prepared to stop / give way	Retain some parking	Lateral deflection	Vertical displacement Drivers slow to go over hump/s	Vertical displacement Drivers slow at crossing	Vertical displacement Driver slows through intersection	Drivers tend to give way to bicycles as well as pedestrians

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Pedestrian crossing and complementary treatments	Pedestrian crossing	Kerb extensions	Refuge	Speed humps	Raised crossing	Raised safety platform	Shared path
Vehicle speed on crossing	No impact on vehicle speed unless a pedestrian is present	No or minimal impact	No or minimal impact	Probable reduction	Reduction	Reduction	Depends on what other complementary treatments are installed
Buses	Nil	Minimum 3 m lane widths may need to be retained	Minimum 3 m lane widths may need to be retained	Can cause discomfort to bus passengers. Too many speed humps on a bus route may affect bus journey times	Can cause discomfort to bus passengers. Too many raised crossings on a bus route may affect bus journey times	May cause discomfort to bus passengers.	Depends on what other complementary treatments are installed
Drainage	Nil	Can be constructed with no or minimal drainage impact	Nil	Minimal	Potential issues	Potential issues	Depends on what other complementary treatments are installed

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Appendix E Summary of pedestrian facilities

Table 4 – Pedestrian facilities

	No treatment	Pedestrian Refuge	Kerb extensions	Continuous footpath	Shared environment	Pedestrian crossing	Signals	Overpass/ underpass	Shared zone
Sample photo									
Regulatory	– Pedestrians wait for gaps in traffic. At intersections, turning vehicles must give way to pedestrians.	No. Refuges simplify the crossing task for pedestrians by providing a staging area and allowing them to concentrate on one direction at a time.	No. Kerb extensions narrow the carriageway reducing pedestrians' exposure to vehicles. Often installed in conjunction with refuges.	Yes. Footpath is a road related area. Vehicles entering a road related area must give way to pedestrians in the area.	Yes, when marked with GIVE WAY or STOP lines. Right of way for pedestrians. Four-way intersection for bicycles and vehicles.	Yes. Drivers must give way to pedestrians on the crossing. Pedestrians must not cross within 20 m either side of the crossing.	Yes. Designed to provide time separated pedestrian and vehicle movements. Warrants apply for the use of signals in NSW.	No. Used on main roads where vehicle volumes and/or speeds are incompatible with at-grade pedestrian movements.	Yes. Generally speed restricted to 10 km/h. Pedestrians have priority; drivers must give way to any pedestrian in the area.

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	No treatment	Pedestrian Refuge	Kerb extensions	Continuous footpath	Shared environment	Pedestrian crossing	Signals	Overpass/ underpass	Shared zone
Comment	Baseline scenario. Represents the bulk of the network at intersections and mid-block.	Suitable at locations where there are sizeable gaps in traffic but more vulnerable or mobility impaired pedestrians may need a sense of security.	Suitable for pedestrian desire lines that do not warrant a formal crossing.	Suitable for locations where pedestrian ownership of the space is prioritised.	Designed for separated path crossings. A level of ambiguity causes drivers to pause and think.	Provides a visible, legal, on-demand crossing point for pedestrians.	Generally used on heavily trafficked roads where there is strong competition between road users and conflict risk is high.	Generally used where there is a strong desire line across a heavily trafficked road and at-grade crossings are not an option.	Suitable for locations where pedestrian ownership of the space is prioritised and/or there is no effective footpath.
Safety risks	Issues can arise when roads become more heavily trafficked and/or heavily parked. Long straight sections of road encourage speeding and may need to be calmed.	Risk to pedestrians is reduced compared to baseline. Risk if refuge not wide enough to accommodate regular bicycle users.	Risk to pedestrians is reduced compared to baseline.	Risk to pedestrians is reduced compared to baseline. Vehicles will slow to traverse the footpath. There need to be gaps in traffic and low speed limits to mitigate vehicle-vehicle crash risks.	Main risk is between bicycle riders and other vehicles entering the space. They need to negotiate priority. Low risk to pedestrians.	Risk that drivers do not give way to pedestrians. Can be misleadingly associated with high crash risk due to high pedestrian usage/exposure at crossings.	Risk that drivers do not stop or they encroach into the crossing. Risk from filtering traffic if permitted to turn through the crossings.	Virtually no risk from vehicles. Personal safety risks to pedestrians.	Low speed limit, pedestrian prioritisation and constrained traffic environment designed to reduce all road safety risks.

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