



APPENDICES

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APPENDICES

APPENDIX 1 PEDESTRIAN CHARACTERISTICS

A1.1 Older pedestrians

The ageing process generally causes people's physical, cognitive and sensory abilities to deteriorate, and more than 50 percent of the over-65s in New Zealand consider themselves to have some form of impairment [142]. Regular walking is an especially valuable form of exercise for this age group, but as age increases so does the severity of the consequences of traffic crashes [46, 76, 122].

Characteristics of older pedestrians		
Characteristic	Resulting in	Impacting on
Reduced range of joint motion	Slower walking speed.	<ul style="list-style-type: none"> • Crossing times. • Mean journey length.
Vision problems, such as reduced acuity and poor central vision	Reduced ability to scan the environment.	<ul style="list-style-type: none"> • Ability to detect and avoid objects. • Sign legibility. • Kerb detection. • Crossing locations. • Trip hazards. • Maps.
Limited attention span, memory and cognitive abilities	Needing more time to make decisions, difficulties in unfamiliar environments, lack of understanding of traffic signals.	<ul style="list-style-type: none"> • Positive direction signage. • 'Legibility' of streetscape. • Consistency of provision.
Reduced tolerance for adverse temperature and environments	Preference for sheltered conditions.	<ul style="list-style-type: none"> • Route location and exposure.
Decreased agility, balance and stability	Difficulties in changing level.	<ul style="list-style-type: none"> • Provision of steps/ramps. • Kerb height. • Gradients. • Handrails. • Surface quality.
Increased fear for personal safety and security	Fear of using all or part of a route.	<ul style="list-style-type: none"> • Lighting. • Surveillance. • Lateral separation from cars. • Provision of footpath. • Traffic speed and density.
Slower reflexes	Inability to avoid dangerous situations quickly.	<ul style="list-style-type: none"> • Crossing opportunities.
Reduced stamina	Shorter journeys between rests.	<ul style="list-style-type: none"> • Resting places. • Shelter.
Reduced manual dexterity and co-ordination	Reduced ability to operate complex mechanisms.	<ul style="list-style-type: none"> • Pedestrian-activated traffic signals.
[10, 13, 66, 122, 127, 139]		

A1.2 Child pedestrians

Children are a major road user group and face specific challenges when walking.

They have significantly different characteristics from adults, not only in physical build but also in developmental maturity. As non-drivers, they may rely more on walking trips for independent travel in their community, including to public transport. However, their restricted abilities and lack of experience mean they are at increased risk of injury. They tend also to trust that others will protect them, and can be overconfident in many circumstances [13].

Characteristics of child pedestrians		
Characteristic	Resulting in	Impacting on
Shorter height	Reduced ability to see over the tops of objects.	<ul style="list-style-type: none"> Sight lines and visibilities.
Reduced peripheral vision	Reduced ability to scan the environment.	<ul style="list-style-type: none"> Sign legibility. Kerb detection. Crossing locations. Trip hazards.
Limited attention span and cognitive abilities	Inability to read or understand warning signs and traffic signals.	<ul style="list-style-type: none"> Positive direction signage. 'Legibility' of streetscape. Use of symbols.
Less accuracy in judging speed and distance	Inopportune crossing movements.	<ul style="list-style-type: none"> Provision of crossing facilities.
Difficulty localising the direction of sounds	Missing audible clues to traffic.	<ul style="list-style-type: none"> Need to reinforce visual information.
Unpredictable or impulsive actions	Poor selection of routes and crossings.	<ul style="list-style-type: none"> Lateral separation from cars. Provision of footpath. Traffic speed and density. Barriers.
Lack of familiarity with traffic patterns and expectations	Lack of understanding of what is expected of them.	<ul style="list-style-type: none"> Complexity of possible schemes.
[10, 13, 66, 127, 139]		

A1.3 Mobility-impaired pedestrians

Mobility-impaired pedestrians are commonly thought of as using devices to help them to walk, ranging from canes, sticks and crutches to wheelchairs, walkers and prosthetic limbs. However, a significant proportion of those with mobility impairments do not use any visually identifiable device [13].

Characteristics of mobility-impaired pedestrians		
Characteristic	Resulting in	Impacting on
Extra energy expended in movement	Slower walking speed.	<ul style="list-style-type: none"> Crossing times. Journey length. Surface quality.
Use of mobility aids	Increased physical space and good surface quality needed.	<ul style="list-style-type: none"> Footpath width. Footpath condition. Obstructions. Step depth. Gaps/grates.
Decreased agility, balance and stability	Difficulties in changing level.	<ul style="list-style-type: none"> Provision of steps/ramps. Kerb height. Gradients. Handrails. Surface quality.
Reduced stamina	Shorter journeys between rests.	<ul style="list-style-type: none"> Resting places. Shelter.
Reduced manual dexterity and coordination	Reduced ability to operate complex mechanisms.	<ul style="list-style-type: none"> Pedestrian-activated traffic signals.
[10, 13, 66, 122, 139]		

A1.4 Sensory-impaired pedestrians

Sensory impairment is often mistaken as being a complete loss of at least one sense, but a partial loss is far more common [66]. Vision impairment mainly affects pedestrians' abilities, although to some extent hearing and proprioception (the ability to sense the location of parts of the body) can have an effect [13].

Characteristics of sensory-impaired pedestrians		
Characteristic	Resulting in	Impacting on
Reduction in hearing ability	Missing audible clues to traffic.	<ul style="list-style-type: none"> • Need to reinforce visual information.
Lack of contrast resolution	Reduced ability to distinguish objects.	<ul style="list-style-type: none"> • Sign legibility. • Small changes in level.
Reduced vision	Reduced ability to scan the environment.	<ul style="list-style-type: none"> • Kerb detection. • Crossing locations. • Trip hazards. • Consistency of streetscape.
Severe vision impairment	Use of mobility aid, guide dog and/or tactile feedback to navigate.	<ul style="list-style-type: none"> • Streetscape legibility. • Tactile paving use.
[10, 13, 66, 122, 139]		

A1.5 Wheeled pedestrians

Wheelchair and mobility scooter users can legitimately use the pedestrian network, but in many ways their characteristics are very different from those of walking pedestrians. This means the network has to function differently when taking these users into account.

Characteristics of wheeled pedestrians		
Characteristic	Resulting in	Impacting on
More susceptible to effects of gravity	Slower speeds travelling uphill, faster speeds travelling on level surfaces or downhill.	<ul style="list-style-type: none"> • Route gradients. • Interaction with walking pedestrians.
Chair/scooter width effectively increases the width of the pedestrian	Greater width required to use a route or pass others.	<ul style="list-style-type: none"> • Route widths (including across roads). • Street furniture placement. • Passing places on narrow routes.
Reduced agility	Increased turning radius (and turning circle).	<ul style="list-style-type: none"> • Places to turn around. • Horizontal alignments. • Surface quality.
Reduced stability	Greater potential for overbalancing.	<ul style="list-style-type: none"> • Upstands/sudden changes in gradient. • Crossfall. • Maximum forwards and sideways reach to pedestrian-activated traffic signals.
User is seated	Eye level lower.	<ul style="list-style-type: none"> • Location of pedestrian-activated traffic signals. • Position of signs.
[10, 13, 66, 122, 139]		

APPENDIX 2 ISSUES TO ADDRESS IN DISTRICT PLANS

The following issues should be considered in district plan policies:

Issue	Comments
Environmental design	The nine basic requirements for walkable communities (connected, legible comfortable, convenient, pleasant, safe, secure, universal and accessible—see section 4.2) should be incorporated into district plan policies. The underlying principle is that pedestrians should not be delayed, diverted or placed in danger. Crime Prevention Through Environmental Design (CPTED) principles [107] should also be applied to all new development.
Development type and density	Mixed and/or higher density development should be favoured in policies, particularly close to public transport routes, interchanges and the urban core.
Development of unused land	If an application for a new development involves apparently unused land (including road reserves), the site should be checked over a suitable period to check whether pedestrians use the land on a casual basis. If they do, any adverse impacts of the development on walking should be identified and, where possible, mitigated..
Connected pedestrian routes	Every new development should form part of a connected pedestrian network. It should link obvious trip ends, such as residential with shops, supermarkets, public spaces and community services. District plan policies should not permit layouts that include circuitous routes and cul-de-sacs that have no alternative outlet for pedestrians.
Footpath provision	District plans should specify the circumstances where footpaths are required, along with any design standards for footpaths.
Driveways	Driveways should be located as far from street intersections as possible to avoid confusion for pedestrians over the intended path of drivers. The number of driveways crossing footpaths should be minimised and sharing of driveway access between properties encouraged.
Internal layout	Internal site layouts should encourage vehicles to exit sites in a forward direction. They should minimise interaction between pedestrian access and vehicle movement.
Design standard	District plans should positively encourage walking, and all new pedestrian infrastructure should be provided to a standard higher than the permissible minimum.
Public Transport	District plans should allow for more intensive development around public transport nodes and interchanges, and encourage pedestrian friendly access routes. For new developments, ensure route layouts permit public transport to efficiently serve the area and provide shelters, seating and pedestrian signage.
Parking	District plan policies should provide guidance on providing and managing parking spaces.
Workplace travel plans	District plan policies should require workplace travel plans to be developed for all new developments that are major traffic generators. These should promote alternative travel choices to, and reduce reliance on, single-occupancy private car use.
Gated communities	Gated residential communities can be a barrier to pedestrian routes and should be discouraged. Where one is proposed, pedestrian access through it should be maintained. In the unlikely event that this is not feasible, existing formal or informal pedestrian routes should not be blocked.
Monitoring pedestrian activity	Every scheme or strategy to help pedestrians should have a clear set of objectives, set out in district plans. Effective monitoring is necessary to track progress in meeting those objectives and to establish trends.
Maintaining a pedestrian envelope	District plans should require facility standards to be maintained including clearing public and private vegetation to maintain the pedestrian envelope, the visibility of signage and the visibility of vehicles at crossing points.

APPENDIX 3 SIGNFACE DESIGN DETAILS

Design issue	Appropriate standard
Design issue	Appropriate standard
Letter height	Equivalent to at least 1% of the distance from which the message will usually be read, subject to a minimum letter height of 22 mm.
Width to height ratio of characters	Between 3:5 and 1:1.
Stroke width to height ratio	Between 1:5 and 1:10, preferably in the band 1:6 to 1:8.
Horizontal spacing between characters	Between 25% and 50% of the characters' width.
Horizontal spacing between words	Between 75% and 100% of the characters' width.
Vertical spacing between lines	At least 50% of character height.
Font	Preferred fonts are Arial, Times New Roman and Helvetica Medium. Title case lettering should be used (upper case letter at the start, followed by lower case letters), with Arabic numerals where necessary.
Wording used	Use clear and concise language. Keep punctuation to a minimum. Walking times to destinations should be included.
Use of symbols	Any symbols should be nationally or internationally recognised and used consistently. Routes suitable for the mobility impaired should be marked using the international disabled access symbol.
Alignment	For directions to the left or straight ahead, words should be aligned to the left. Text should only be aligned to the right where the direction indicated is also to the right.
Contrast	Use light-coloured characters or symbols on a dark background. A matt [42] or eggshell finish [7] must be used. There must be a high contrast between the sign and its mounting (if any).
Lighting	Signs should be evenly lit over their entire surface. All characters should be embossed rather than engraved.
[7, 10, 42, 128, 134]	

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