Proposed Transport Plan Change Auckland Unitary Plan

Transportation Technical Report

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Prepared by:	**Mat Collins and Monique van Wyk**
Reviewed by:	**Bronwyn Coomer-Smit**

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SUMMARY OF THIS REPORT

The purpose of this Plan Change

The purpose of this Plan Change is to amend the Auckland-wide provisions of the Auckland Unitary Plan, Operative in Part (AUP), relating to pedestrian and vehicle accessways to residential dwellings, parking spaces, and rear sites in the residential zones. This includes the following Chapters of the AUP

- Chapter E24: Lighting (E24)
- Chapter E27: Transport (E27)
- Chapter E38: Subdivision – Urban (E38).

The objective of this Plan Change is to ensure that pedestrian access, and safety are prioritised in the medium and high density residential zones and that the efficiency and convenience of accessways for all transport user groups are improved, for all types and scales of residential development anticipated by these zones.

The Plan Change will support the social and economic well-being of the community. Health and safety will be improved by providing safe and convenient pedestrian and vehicle accessways to meet the current and future needs of residents. Adverse effects on users and the adjacent neighbourhood are avoided or mitigated and land is used efficiently.

The rationale for the Plan Change

Since the AUP became operative in part in November 2016 Auckland Council (Council) staff have recorded errors relating to technical matters and anomalies. Some of these were addressed through clause 20A amendments and by 3 Plan Changes to improve existing provisions and content. Council staff have continued to collate qualitative issues with the AUP, including issues arising from the implementation of the AUP.

Issues have been raised regarding the performance and usability of the residential private driveway provisions in Chapter E27: Transport and Chapter E38: Subdivision - Urban. These issues relate to the safe and efficient use of private accessways and are as follows.

- Issue 1: Design of accessways for pedestrians
  - Inadequate minimum pedestrian access width
  - Inadequate separation of pedestrian accesses from trafficable areas
  - Steep pedestrian access gradients and steps within pedestrian accesses
  - Obstruction of pedestrian accesses
  - Inadequate provision of pedestrian accesses in accessways serving larger numbers of residential units
- Issue 2: Design of accessways for vehicles
  - Inadequate speed management measures

- Whether vehicle accessways are designed for Fire and Emergency New Zealand (FENZ) vehicles, as required by the Building Code and recommended in FENZ guidance
- Inadequate consideration of heavy vehicle access
- Inadequate consideration of loading needs
- Lack of integration between E27 and E38 regarding the minimum inside turning radius at accessway bends
- Inadequate consideration of driver sight lines at vehicle crossings
- Consideration of minimum carriageway widths for larger residential developments

- Issue 3: Miscellaneous issues
  - Lack of integration between E27 and E38 regarding minimum legal width of accessways
  - Lack of integration between E27 and E38 regarding maximum accessway length
  - Lack of integration between E27 and E38 regarding the provision of utility strips
  - No requirement within E27 or E38 to provide berms.

These issues can generally be attributed to the following causes

- Misalignment between E27 and E38
- The operative provisions of E27 not being fit for purpose for pedestrian safety and efficiency, loading and heavy vehicle access, in private accessways
- The scale of residential development is beyond the scope of the operative E27 provisions for private accessways, resulting in poor outcomes for residents.

Summary of recommended options

Flow has worked collaboratively with a range of Subject Matter Experts from the Council and Auckland Transport, along with undertaking our own research. To address these matters in the AUP we recommend that

- amendments are made to the objectives and policies to ensure the policy framework enables the proposed changes described below
- the standards, matters of discretion, and assessment criteria that apply to private accessways are amended, to effectively address pedestrian safety and efficiency, loading and heavy vehicle access requirements
- the existing development thresholds (which we relate to “tiers” in this report) at which requirements for private accessways are applied are amended and expanded.

Table S1 presents our recommended amendments to the operative tiers, which we discuss further in Section 3, and are summarised as

- Adding “dwellings” as a threshold to several existing and new standards under E27.6, in conjunction with the existing parking space thresholds

- Minor amendments to Tier 1[1] and Tier 2[2] parking space thresholds to align with the residential zone standards for Mixed Housing Suburban and Mixed Housing Urban which permit up to 3 dwellings per site and to reinforce the Medium Density Residential Standards (MDRS) amendments to the Resource Management Act 1991 enabling higher densities to be achieved.
- Minor amendments to Tier 2[3] and Tier 3[4] rear site thresholds to align with the residential zone standards for Mixed Housing Suburban and Mixed Housing Urban which permit up to 3 dwellings per site and to reinforce the MDRS amendments to the Resource Management Act 1991 enabling higher densities to be achieved
- Introducing an upper threshold for parking spaces for Tier 3[5]
- Introducing a fourth Tier to E27.6 to address higher intensity developments that make use of private accessways.

Table S1: Recommended amendments to the thresholds applied to residential development in E27.6 and E38.8.1.2

Tier	E27.6 (several standards)		E38.8.1.2 Access to rear sites	
	operative	proposed	operative	proposed
1	1 – 2 parking spaces	1 – 3 parking spaces; or 1 – 3 dwellings	1 rear site	1 rear site
2	3 – 9 parking spaces	4 – 9 parking spaces; or 4 – 9 dwellings	2 – 5 rear sites	2 – 3 rear sites
3	10 or more parking spaces	10 – 19 parking spaces; or 10 – 19 dwellings	6 – 10 rear sites	4 – 10 rear sites
4	N/A	20 or more parking spaces; or 20 or more dwellings	N/A	N/A

Table S2 presents our recommended solutions to each of the key issues, which include

- Developing Practice Notes to assist Planners and Transport Engineers with the application of the operative provisions of E27 and E38
- Amendments to E27 to align with the operative provisions of E38
- Amendments to E27 and E38 to improve the pedestrian safety and access outcomes of the operative provisions, loading, and heavy vehicle access
- Additions to E27 to reflect our recommended 4 Tier approach to private accessway design.

Our recommended amendments to the AUP provisions are attached to Council Section 32 report.

[1] Tier 1 threshold is at present an accessway providing access to 1 or 2 onsite parking spaces
[2] Tier 2 threshold is at present an accessway providing access to between 3 and 9 onsite parking spaces
[5] Tier 3 threshold is at present an accessway providing access to 10 or more onsite parking spaces
[5] Tier 3 threshold is at present an accessway providing access to 10 or more onsite parking spaces
[5] Tier 3 threshold is at present an accessway providing access to 10 or more onsite parking spaces

Table S2: Recommended amendments to the thresholds applied to residential development in E27.6.4.3 and E38.8.1.2

Issue	Summary	Operative provisions		Rationale for the change	Recommendation	Reference in this report
		Chapter E27	Chapter E38			
Issue 1A: Inadequate minimum pedestrian access width	The operative provisions provide for a 1.0m pedestrian access in some private accessways. This does not provide sufficient space for safe and efficient access for all potential users (e.g. people with prams and young children, people in wheelchairs, people with bulky goods/items, and different users passing each other). A pedestrian access width of at least 1.8m is required for two wheelchairs to pass each other and should be considered to allow for equitable access.	Table E27.6.4.3.2 Vehicle crossing and vehicle access widths T149 -T151 apply to residential zones T149 & T150 have no requirements for pedestrian access for rear sites, serving 1or 2 parking spaces or 3-9 parking spaces respectively T151 requires a 1.0m pedestrian access for rear sites, which may be located within the formed driveway, for accessways that serve 10 or more parking spaces No requirement for separation of pedestrian accesses at any scale of development	Standard E38.8.1.2.1 Access to rear sites (1) Access to rear sites limited to no more than 10 sites (3) Accessways serving six or more rear sites must provide separate pedestrian access, which may be located within the formed driveway (4)(a) requires accessways that, where a pedestrian access is required it must be at least 1 metre wide (b) can include a service strip and (c) be distinguished from the carriageway through the use of a raised curb or different surface treatment	The operative provisions of E27 and E38 are not fit for purpose in terms of minimum pedestrian access width for residential accessways. A minimum width of 1.8m is required to provide access for people of all ages and abilities. While we see a benefit in applying this to all situations where a pedestrian access is required within a private accessway, we recommend that a 1.35m width is required for Tier 3 developments, which is sufficient to allow two abled bodied people to pass each other.	Require pedestrian accesses to be wider, separated from trafficable areas, not exceed maximum gradients, avoid obstructions, and make connection to individual dwellings. Add a new Objective E27.2.(5A) Amend Table E27.6.4.3.2 Amend Standard E27.6.4.3.(1) Add new Table E27.6.4.3.3 Add new Standard E27.6.6 Amend Matter of discretion E27.8.1(9) Amend Assessment criteria E27.8.2(8) Amend Standard E38.8.1.2	Section 6
Issue 1B: Inadequate separation of pedestrian accesses from trafficable areas	Where a pedestrian access is provided in a private accessway, the operative provisions allow this to be located within the carriageway. This also permits vehicles to manoeuvre/reverse over pedestrian accesses. This does not adequately provide for the safety of pedestrians and increases the risk of driveway related injuries			The operative provisions of E27 and E38 are not fit for purpose in terms of providing safe pedestrian accesses for people of all ages and abilities. We consider that pedestrian accesses require physical separation (e.g. by providing a kerb) from trafficable areas, to achieve a high level of safety for pedestrians and provide for access for people of all ages and abilities, in accordance with Policies B23.2.(1)(d) and B2.3.2.(2)(a). Tier 1 and 2 see no change, as there is currently no requirement to provide pedestrian access.		Section 7
Issue 1C: Inadequate maximum pedestrian access gradient	The operative provisions do not specify maximum pedestrian access gradients for pedestrian accesses within private accessways. The maximum gradient permitted for private accessways is too steep to allow access for all potential users (e.g. people with prams and young children, people in wheelchairs, people with bulky goods/items).	No maximum pedestrian access gradient specified	No maximum pedestrian access gradient specified	The operative provisions of E27 and E38 are not fit for purpose in terms of providing pedestrian access gradients that are accessible for people of all ages and abilities. Maximum pedestrian access gradient guidance, to provide access for people of all ages and abilities, is required. Tier 1 and 2 see no change, as there is currently no requirement to provide pedestrian access.		Section 8
Issue 1D: Inadequate protection of pedestrian accesses from obstructions	The operative provisions do not require that pedestrian accesses within private accessways provide a clear corridor. Obstructions such as lighting poles, letter boxes, and utility boxes are sometimes located within the pedestrian access, obstructing pedestrian movement. This puts the safety of pedestrians at risk when having to navigate into the carriageway to avoid obstructions and also limits access to some users through the reduced effective width of the pedestrian access.	No clear corridor requirement for pedestrian accesses	No clear corridor requirement for pedestrian accesses	The operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that pedestrian accesses within private accessways are designed to be free from obstructions. We consider that the AUP should identify that pedestrian accesses be designed to be free of obstructions, to achieve a high level of amenity and safety for pedestrians and provide for access for people of all ages and abilities. Tier 1 and 2 see no change, as there is currently no requirement to provide pedestrian access.		Section 9

Table S2: Recommended amendments to the thresholds applied to residential development in E27.6.4.3 and E38.8.1.2

Issue	Summary	Operative provisions		Rationale for the change	Recommendation	Reference in this report
		Chapter E27	Chapter E38			
Issued 1E: Inadequate provision of pedestrian accesses	The operative provisions do not anticipate larger residential developments, and do not require each dwelling to be connected to a pedestrian access. This does not adequately allow for the safe movement of pedestrians at large developments and exposes them to an increased risk of serious injury by having to navigate within trafficable areas.	Table E27.6.4.3.2 (T151) requires a 1.0m pedestrian access for rear sites for accessways that serve 10 or more parking spaces	Standard E38.8.1.2.(3) requires accessways serving six or more rear sites to provide separate pedestrian access.	The operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that pedestrian accesses within private accessways are provided for larger developments that have higher risks associated with pedestrian and vehicle conflicts due to the increased demand for the accessway. We consider that minimum requirements for the need to provide a pedestrian access should be included in the AUP to ensure safe access for people of all ages and abilities. Tier 3 sees no change. This tier already requires the provision of pedestrian access. Tier 4 requires the pedestrian access to be connected to every dwelling, to ensure a continuous and convenient route for pedestrians.		Section 10
Issue 2A: Inadequate speed management measures	The operative provisions do not require speed management measures for private accessways. Longer private accessways without speed management measures can encourage higher vehicle speeds. This increases the safety risks for all users. Speed is a major factor in the severity of injury and likelihood of death when a driver of a vehicle collides with a pedestrian. Impact speeds should be limited to no more than 30 km/hr, to reduce the likelihood of serious injury or death for pedestrians.	None	Table E38.8.1.2.1 Note 1 identifies that, for accessways greater than 50 metres in length, speed management measures should be considered	The operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that vehicle speeds within private accessways are controlled to below 30 km/hr. We consider that the AUP should identify that speed management measures should be provided in private accessways, to achieve a high level of safety for pedestrians and provide for access for people of all ages and abilities.	Require speed management measures for accessways 30m or longer. Amend Standard E27.6.4.3.(1) Add new Table E27.6.4.3.3 Amend Matter of discretion E27.8.1(9) Amend Assessment criteria E27.8.2(8) Amend Standard E38.8.1.2	Section 11
Issue 2B: Fire and Emergency New Zealand (FENZ) vehicle access	The operative provisions do not reference The New Zealand Building Code (NZBC) and FENZ F5-02 GD Designers' guide to firefighting operations Emergency vehicle access in terms of requirements and guidance for fire fighting vehicle access to buildings. Of interest to private accessways are the maximum gradient and minimum widths needed to enable safe and efficient emergency services access. This results in inefficiencies in the design process through design changes. It also poses a risk that designs do not meet the necessary requirements, impacting the response time of emergency vehicles due to restricted access.	Table E7.6.4.3.2 specifies minimum formed access widths, some of which do not meet the NZBC minimum requirement of 4m for fighting vehicle access. Table E27.6.4.4.1 Gradient of vehicle access specifies a maximum gradient of 1:8 where a vehicle access is used by heavy vehicles, which meets the maximum gradient specified in FENZ guidance.	None	The operative provisions of E27 are sufficient to allow for consideration of firefighting vehicle access, however, we consider that the AUP should outline the requirements of the Building code. We recommend that a Practice Note is developed and distributed to Planners and Transport Engineers that outlines the requirements of the Building Code, and that a Note is added to E27 and E38 highlighting the consideration of the Building Code.	Add a Note to E27.6.4.3 and E38.8.1.2. Auckland Council action: A Practice Note is developed and distributed to Planners and Transport Engineers that outlines the requirements of the Building Code in terms of emergency vehicle access.	Section 12

Table S2: Recommended amendments to the thresholds applied to residential development in E27.6.4.3 and E38.8.1.2

Issue	Summary	Operative provisions		Rationale for the change	Recommendation	Reference in this report
		Chapter E27	Chapter E38			
Issue 2C: Inadequate consideration of heavy vehicle access	The operative provisions do not require consideration of waste collection from within private accessways. This has led to safety and operational issues for waste collection with inefficient space for waste vehicles to turn around to avoid reversing from the accessway onto the road.	None	None	The operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that heavy vehicles can safely enter and exit private accessways, where required.	Require heavy vehicles to enter and exit residential sites in a forward direction and control the extent of reversing within the site. Require a pedestrian access if heavy vehicle access is required. Amend Standard E27.6.3.4. Add a new Standard E27.6.3.4A Amend Matter of discretion E27.8.1(9) Amend Assessment criteria E27.8.2(8)	Section 13
Issue 2D: Inadequate consideration of loading	The operative provisions do not require consideration of loading spaces for residential development under 5000 m^2. Loading/unloading for light service vehicles (e.g. couriers and taxis) typically occurs within the site through informal parking within private accessways, however the removal of parking minimums from the AUP is likely to result in more residential developments without parking, and therefore private accessways, resulting in a lack of space within the site for informal loading.	Up to 5000 m^2 - No loading required. Greater than 5,000m^2 dwellings up to 20,000m^2 – 1 loading space Greater than 20,000m^2 up to 90,000m^2 – 2 loading spaces Greater than 90,000m^2 - 3 spaces plus space 1 for every additional 40,000m^2	None	The removal of parking minimums from the AUP will see an increase in the number of residential developments without parking. This removes the ability for light vehicles to informally load within a private accessway, and can lead to safety and operational issues, with light service vehicles blocking public roads while loading / unloading.	Require a small loading space for residential development that otherwise does not provide vehicle access Amend Table E27.6.2.7 Amend Table E27.6.3.2.1 Amend Standard E27.6.3.3 Amend Standard E27.6.3.5 Amend Assessment criteria E27.8.2(7) Amend Assessment criteria E27.8.2(8)	
Issue 2E: Inconsistency with the minimum inside turning radius	The operative provisions of E27 are not consistent with E38. One objective of this Plan Change is to ensure consistency between E27 and E38.	None	Table E38.8.1.2.1 identifies a minimum inside turning radius for bends of 6.5m	One of the objectives of this Plan Change is to integrate the provisions of E27 and E38.	Amend Standard E27.6.4.3.(1)	Section 15
Issue 2F: Inadequate consideration of driver sight lines at vehicle crossings	The operative provisions do not require consideration of driver's sight lines at the site boundary, to pedestrians and vehicles within the legal road. This does not adequately provide for the safety of all road users and increases the risk of incidents occurring, particularly for pedestrians on pedestrian accesses that might be located close to the site boundary.	None	None	Driver to pedestrian sightlines should be considered during the subdivision and/or land use consent stage, however we found that including this as a standard or rule could conflict with privacy requirements and land ownership challenges. In our opinion driver to driver sight lines are already well observed by transport professionals. Driver to driver sight lines should be contained within the road corridor, and are therefore not affected by activities within private property.	No change.	Section 16

Table S2: Recommended amendments to the thresholds applied to residential development in E27.6.4.3 and E38.8.1.2

Issue	Summary	Operative provisions		Rationale for the change	Recommendation	Reference in this report
		Chapter E27	Chapter E38			
				Further, sight lines are addressed by Auckland Transport vehicle crossing application process.		
Issue 2G: Minimum carriageway widths	Are the operative provisions for carriageway widths for private accessways appropriate? Should carriageway width requirements be based on the number of dwellings and/or parking spaces?	Serves 1 or 2 parking spaces: 2.5m provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3m Serves 3 to 9 parking spaces: 3.0m provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3.5m Serves 10 or more parking spaces: 5.5m (providing for two way movements). The formed width is permitted to be narrowed to 2.75m if there are clear sight lines along the entire access and passing bays at 50m intervals are provided.	Serves 1 rear site: 2.5m Serves 2 – 5 rear: 3.0m Serves 6 – 10 rear sites: 5.5m	We consider that the carriageway widths specified in the operative provisions are appropriate. We consider that the thresholds for carriageway widths should be based on parking spaces (for E27) and rear sites (for E38), and that "dwellings" does not need to be introduced as a threshold for carriageway width. However, Table E27.6.4.3.2 should be amended to identify that the specified minimum and maximum width of vehicle crossings at site boundaries excludes the width required for pedestrian accesses.	Consequential change to Table E27.6.4.3.2.	Section 17
Issue 3A: Minimum legal width of accessways	The operative provisions of E27 are not consistent with E38. We understand that this can lead to a lack of consideration of the requirements for private accessways, in the instance that land use consent is sought before subdivision consent.	None	Table E38.8.1.2.1 identifies minimum legal accessway widths of 3.0m – 6.5m	Consequential change resulting from our recommendation to increase the minimum pedestrian access width from 1m to 1.35m.	Amend Standard E27.6.4.3.(1) Amend Standard E38.8.1.2	Section 18
Issue 3B: Maximum accessway length			Table E38.8.1.2.1 identifies maximum accessway lengths of 50m – 100m	Although one of the objectives of this Plan Change is to align E27 with E38, in our view controls on the length of private accessways are better addressed through a wider consideration of the matter of public vs private ownership of accessways	No change	Section 19
Issue 3C: Provision of utility strips			Table E38.8.1.2.1 identifies minimum service strips widths of 0.5m – 1.0m.	One of the objectives of this Plan Change is to integrate the provisions of E27 and E38, however it was decided that E27 deals with transport matters only and should not address utility matters.	No change.	Section 20
Issue 3D: Provision of berms	E27 or E38 do not currently require berms. The lack of a berm can lead to pedestrian access obstructions.	None	None	We consider that the requirement for berms is a result of other design aspects, rather than a requirement in themselves. The need for pedestrian access separation, locations for bins and lighting poles, provision for utility strips, etc., can all result in a requirement for a berm.	No change.	Section 21

Table S2: Recommended amendments to the thresholds applied to residential development in E27.6.4.3 and E38.8.1.2

Issue	Summary	Operative provisions		Rationale for the change	Recommendation	Reference in this report
		Chapter E27	Chapter E38			
				However, we recommend that these issues are dealt with directly rather than through a requirement to provide a berm within private accessways		

CONTENTS

APPENDICES

1 BACKGROUND FOR THE PLAN CHANGE AND PURPOSE OF THIS REPORT

Flow Transportation Specialists Ltd (Flow) has been engaged by Auckland Council (Council) to assist with a Plan Change to amend the Auckland Unitary Plan, Operative in Part (AUP) Auckland-wide Chapters E24 Lighting, E27 Transport and E38 Subdivision-Urban provisions relating to pedestrian and vehicle accessways to residential dwellings, parking spaces and rear sites in the following residential zones:

- Mixed Housing Suburban
- Mixed Housing Urban
- Terrace Housing and Apartment Buildings.

The objective of the Plan Change is to ensure that pedestrian access and safety are prioritised, and that the efficiency and convenience of the use of accessways for all transport user groups are improved, for all types and scales of residential development anticipated by these zones.

This Plan Change will support the social and economic well-being of the community. Health and safety will be improved by providing safe and convenient pedestrian and vehicle accessways to meet the current and future needs of residents and visitors. Adverse effects on users and the adjacent neighbourhood are avoided or mitigated and land is used efficiently.

As part of the proposed Plan Change, Council is developing provisions to

- provide safe and convenient pedestrian access to dwellings with no vehicle access
- require accessible parking so that people with disabilities can take place in everyday life
- ensure the loading/unloading of goods can occur in a manner that does not compromise the safe and efficient functioning of the road network including accessways
- cater for emerging changes in transport, including greater use of e-bikes, micro-mobility devices and electric vehicles.

Flow has worked closely with these other Council teams to ensure the proposed standards common to our workstream align.

Parallel to this Plan Change, Council's Infrastructure and Environmental Services (I&ES) team is currently preparing a technical guidance document for residential land development, including guidance on private accessway design and construction. As this document is still in development and has not been notified for public consultation, we have not referred to it in our report, however we have aligned our recommendations in this report with the I&ES workstream. We expect that reference to the technical guidance document will be introduced into the AUP during a future plan review.

1.1 Rationale for this Plan Change

Through monitoring of resource consent applications for accessways and experience implementing the AUP Transport and Subdivision – Urban provisions of the AUP, Council has identified issues with some of the outcomes of these provisions. The following subsection discuss these two sources in more detail.

1.1.1 AUP Section 35 Monitoring: B2.3 A quality built environment July 2022 Technical report

Council is required under Section 35(2)(b) of the RMA to monitor the effectiveness and efficiency of policies, rules or other methods in its policy statement or plan, and to publish the results every five years.

Residential quality was the focus of AUP Section 35 Monitoring: B2.3 A quality built environment July 2022 Technical report[6] (s35 B2.3 A quality Built Environment monitoring report). The research outcomes from this monitoring provided a 'snapshot' of emerging issues and trends in residential development and AUP implementation. This led to the selection of topics for further investigation that are the subject of a potential plan change.

Private road infrastructure was identified as one of the topics for further monitoring. In particular, poor-quality access ways, including access to rear sites, was highlighted as an issue under Theme 6 (Supporting safe access and travel choice) of the s35 B2.3 A quality Built Environment monitoring report. This issue was also identified in the AUP Issues Register which was compiled by Auckland Council to monitor issues arising from the implementation of the AUP.

1.1.2 AUP Issues Register

Since the AUP became operative in part in November 2016, Council staff have recorded errors relating to technical matters and anomalies. Some of these were addressed through clause 20A amendments and by 3 Plan Changes to improve existing provisions and content.

Council staff have continued to collate qualitative issues associated with the AUP, including issues arising from the implementation of the AUP. Issues have been raised regarding the performance and usability of the residential private driveway provisions in Chapter E27: Transport and Chapter E38: Subdivision - Urban of the AUP. Issues relate to the safe and efficient use of private accessways and include the following.

- Issue 1: Design of accessways for pedestrians
  - Inadequate minimum pedestrian access width
  - Inadequate separation of pedestrian accesses from trafficable areas
  - Steep pedestrian access gradients and steps within pedestrian accesses
  - Obstruction of pedestrian accesses
  - Poor provision of pedestrian accesses in accessways serving larger numbers of residential units
- Issue 2: Design of accessways for vehicles
  - Inadequate speed management measures
  - Whether vehicle accessways are designed for Fire and Emergency New Zealand (FENZ) vehicles, as required by the Building Code and recommended in FENZ guidance
  - Inadequate consideration of heavy vehicle access

[6] Auckland Unitary Plan Section 35 Monitoring: B2.3 A quality built environment, July 2022, Technical Report TR2022/11, Plans and Places Department, Auckland Council

- Inadequate consideration of loading needs
- Lack of integration between E27 and E38 regarding the minimum inside turning radius at accessway bends
- Poor driver sight lines at vehicle crossings
- Review of carriageway widths specified in the operative provisions

- Issue 3: Miscellaneous issues
  - Lack of integration between E27 and E38 regarding minimum legal width of accessways
  - Lack of integration between E27 and E38 regarding maximum accessway length
  - Lack of integration between E27 and E38 regarding the provision of utility strips
  - No requirement within E27 or E38 to provide berms.

These issues can generally be attributed to the following causes

- Misalignment between E27 and E38 - Urban
- The operative provisions of E27 not being fit for purpose for pedestrian safety and efficiency, servicing, loading and heavy vehicle access, in private accessways
- The scale of residential development is beyond the scope of E27 Standards for private accessways, resulting in poor outcomes for residents.

This report addresses the transport planning and transport engineering aspects of these issues, in the context of the objectives, policies, standards, matters of discretion and assessment criteria of E27 and E38.

1.2 Relevant AUP Objectives and Policies

A key aspect of this Plan Change has been the consideration of whether E27 and E38 are fit for purpose in terms of providing for pedestrian safety and access in private accessways. We note that E24 has also considered pedestrian safety and access, as detailed in the accompanying S32 report.

As part of our consideration of pedestrian safety and access, we have referred to the following policies in RPS B2. Tāhuhu whakaruruhau ā-taone - Urban growth and form[8], in particular B2.3.2.(1)(d), B2.3.2.(2)(a) and B2.3.2.(2)(b)

- B2.3.2 Policies (A quality built environment)

  (1) Manage the form and design of subdivision, use and development so that it does all of the following:

  (a) supports the planned future environment, including its shape, landform, outlook, location and relationship to its surroundings, including landscape and heritage;

  (b) contributes to the safety of the site, street and neighbourhood;

[8] Auckland Unitary Plan: Regional Policy Statement – Urban growth and form, available online at https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20B%20RPS/B2%20Urban%20Growth.pdf

(c) develops street networks and block patterns that provide good access and enable a range of travel options;

(d) achieves a high level of amenity and safety for pedestrians and cyclists;

(e) meets the functional, and operational needs of the intended use; and

(f) allows for change and enables innovative design and adaptive re-use.

- *(2) Encourage subdivision, use and development to be designed to promote the health, safety and well-being of people and communities by all of the following:*

  (a) providing access for people of all ages and abilities;

  (b) enabling walking, cycling and public transport and minimising vehicle movements; and

  (c) minimising the adverse effects of discharges of contaminants from land use activities (including transport effects) and subdivision.

2 DISCUSSION OF PLAN CHANGES 4, 14, AND 16

In preparing this technical report, we have considered aspects of Plan Change 4 (PC4), Plan Change 14 (PC14) and Plan Change 16 (PC16) as they relate to this Plan Change. We discuss these matters in the following subsections.

2.1 Plan Change 4: Corrections to technical errors and anomalies in the Auckland Unitary Plan

Among multiple proposed amendments to the AUP, PC4 sought to include dwellings as a threshold to E27.6.4 as follows

- E27.6.4.3.2 (T151) Vehicle crossing and vehicle access widths serves 10 or more car parking spaces or 6 or more dwellings

The rationale for this change was to seek to correct a discrepancy between what was included in Council's closing statement evidence for the Proposed Auckland Unitary Plan (PAUP) but was omitted from the Independent Hearing Panel (IHP) and subsequent versions of the provisions.

The use of 'dual' triggers of parking provision and dwellings was intended to align the vehicle access width standards with the revised and more flexible framework for providing on-site parking where in some situations there is no minimum parking requirement. For example, in situations where less on-site parking is provided relative to the number of dwellings, a narrower vehicle access may be adequate to serve the development.

The s42a report supported dwellings as a trigger, but recommended that a single trigger should be used, being "dwellings" for residential zones and "parking spaces" for all other zones[9].

The Commissioners rejected the s42a recommendation, on the preference for retaining parking thresholds. The Commissioners considered that where on-site parking is provided then the number of parking spaces served is the more appropriate measure to determine access widths. Further, the number of parking spaces required in developments by the AUP is set by reference to the number of dwellings thus there is a logical progression between dwelling units, number of on-site parking spaces and vehicle access widths[10].

We note that minimum onsite car parking requirements have been removed from the AUP. As such, there is likely to be a higher number of developments with low or no onsite parking provision. Flow's research into vehicle trip generation rates for medium density residential development indicates that these developments have a similar peak hour vehicle trip rate to medium density development with higher parking provision (refer to Section 4.1). Further, we note that private accessway design requires consideration of all users, including pedestrians and service vehicles, which are not necessarily correlated with onsite car parking provision.

[9] s42a report – Paragraphs 23.4 – 23.16
[10] PC4 Decision – Paragraph 124

As such, we consider it appropriate to include dwellings as a threshold in E27.6.4, alongside the operative parking space thresholds. We discuss this matter further in Section 3.

2.2 Plan Change 14: Improving consistency of provisions for Auckland-Wide and Overlays

Among multiple proposed amendments to the AUP, PC14 sought to amend standard E27.6.4.3.2 address several matters

2.2.1 Pedestrian access in residential zones

- Proposed amendment to address pedestrian access in residential zones: E27.6.4.3.2 Vehicle crossing and vehicle access widths requires a 1m pedestrian access for rear sites when serving 10 or more car parking spaces. This may be located within the formed driveway
- This was to address an inconsistency with the subdivision standards E38.8.1.2(3)-(4) as they require separate pedestrian access to be provided along accessways serving six or more rear sites in residential zones
- There were no submitters on this topic, and the proposed amendment was made operative.

2.2.2 Vehicle access width

- Proposed amendment: E27.6.4.3.2 Vehicle crossing and vehicle access widths permits the formed access width (rather than the vehicle crossing width) to be narrowed to 2.75m if there are clear sight lines along the entire access and passing bays at 50m intervals are provided
- The previous rule of allowing the width vehicle crossings to be reduced to 2.75m created an inadequate width to accommodate the number of vehicle movements anticipated to enter and exit sites
- The wording of the previous rule included phrases such as ‘may’ and ‘can be provided’ which could be interpreted to mean that aspects such as passing bays do not actually have to be provided when narrowing vehicle crossings
- There were no submitters on this topic, and the proposed amendment was made operative.

2.2.3 Vehicle access corridor width

- Proposed amendment: E27.6.4.3.2(T151) Vehicle crossing and vehicle access widths requires access serving 10 or more car parking spaces, require that the formed width be contained within a corridor clear of buildings, at least 6.5m in width
- Standard E27.6.4.3.2(T151) requires access serving 10 or more car parking spaces to have a minimum formed width of 5.5m, but there is no requirement for the access to be contained within a wider corridor clear of buildings
- This standard is inconsistent with the Standards E27.6.4.3.2(T149) and (T150) for access serving fewer car parking spaces and the urban subdivision standards in E38 which do require this wider corridor clear of buildings

- This wider corridor is typically used for a service strip where network utilities and other services can be accessed for ongoing repair and maintenance. It can also be used to provide pedestrian access and landscaping elements alongside the formed accessway
- This omission could potentially result in developments being served by services and network infrastructure that are not readily accessible for repair and maintenance
- There was one submission in support of this amendment, and two submissions in opposition.

The PC14 s42a[11] report concluded that

- there are no matters for discretion or assessment criteria related to achieving the corridor's function as a service strip
- additional building clearance for emergency vehicles was not necessary
- pedestrian access proposed as part of PC14 can be accommodated on the shared driveway.

The Commissioners supported the s42a report recommendation.

In our view, there was insufficient consideration of the effect on pedestrian safety that can result from the operative provisions of E27 and E38 allowing the pedestrian access to be within the vehicle carriageway. We consider that in some situations, pedestrian accesses require separation from trafficable areas and discuss this matter further in Sections 5 and 7.

2.3 Plan Change 16: Improving Consistency of Provisions for Zones

Among multiple proposed amendments to the AUP, PC16 sought to amend assessment criteria H6.8.1(2)(k) for dwellings in the Terrace Housing and Apartment Building (THAB) zone to include 'the extent to which the necessary storage and waste collection and recycling facilities is provided in locations conveniently accessible and screened from streets and public open spaces'. The s32 report considered the following

- The AUP had no effective requirement for solid waste separation, storage and collection for multi-unit residential developments within the THAB zone
- There are multiple Council bins required for each dwelling, each needing a space either on a site, at each dwelling, or collectively, and space at roadside for safe collection without clutter or blocking traffic and pedestrians
- Auckland Transport has concerns with the pavement clutter and road obstruction if many units put out bins on narrow streets, and access requirements for waste collection vehicles
- Auckland Council Waste Solutions Unit is concerned that the Solid Waste Bylaw is not effective in relation to multi-unit apartment developments
- Similar assessment criteria exist in the Mixed Housing Suburban (MHS) and Mixed Housing Urban (MHU) zones for 4 or more dwellings, however for THAB, it would be assessed for all new dwellings given their restricted discretionary activity status.

[11] s42a report – Paragraphs 15.1.1 to 15.1.11

The PC14 s42a[12] report concluded that

- This requested change would make the assessment criteria for the THAB zone inconsistent with the similar assessment criteria that already exists in the MHS and MHU zones
- This issue is instead monitored under s35 requirements, with any change being addressed as part of a future process.

The Commissioners supported the s42a report recommendation.

As discussed in Section 1.1, through monitoring of resource consent applications for accessways and experience implementing the AUP Transport and Subdivision – Urban provisions of the AUP, Council has identified issues with some of the outcomes of these provisions including waste storage and collection. As part of this report, we have considered waste collection as it relates to private accessways, which we have coordinated in with proposed amendments to Chapter H5 Residential – Mixed Housing Urban Zone and H6 Residential – Terrace Housing and Apartment Buildings Zone, which are being progressed by a separate Council team.

Section 13 of our report discusses heavy vehicle access to private accessways, with the amendments to Chapter H5 and H6 dealing with matters relating to waste storage and collection.

[12] s42a report – Paragraphs 15.1.1 to 15.1.11

3 COUNCIL RESIDENTIAL REAR SITE MONITORING DATA

To assist with this Plan Change, Council has collated data from approved resource consents within Auckland. Flow has assisted Council's Plans and Places staff with the analysis of this data, which we have summarised in our **AUP E27 and E38 Rear site monitoring data** report (Council's Rear Site Monitoring report) dated 2 August 2022 and attached to Councils Section 32 report.

We provide a brief summary of the data in the following subsections, and refer extensively to analysis in the Rear site monitoring report in the following sections of this technical report.

3.1 Rear site monitoring data sources

Resource consents for assessment were drawn from two sources

- Consented developments data set – LINZ for parcel titles issued between November 2016 and November 2020
- Consented developments data set (Urban Design Unit).

The LINZ data set provides an accurate and precise method to identify parcels associated with a private way as it identifies parcel titles that are likely to have a share in an access lot i.e., private ways that were also consented with a subdivision resource consent. The output parcel titles were then linked to a relevant resource consent granted under the AUP and the corresponding medium or high density zone. In terms of limitations, the data only shows resource consents that

- were involved a subdivision consent under s11 of the Resource Management Act 1991 (RMA); and
- have been issued a new parcel title.

To include more recently consented examples of private ways in the sample data, a data set from the Urban Design Unit (UDU) was also utilised. UDU provides specialist urban design input into resource consents where an application is for ten or more new dwellings. The extract period for the UDU data set was April 2018 to May 2021. Council's internal monitoring system was used to manually confirm that consent was granted.

The data collected included information such as

- Vehicle access widths, gradients, and manoeuvring areas
- Pedestrian access widths, separation, and gradients
- Parking and loading provision.

3.2 Sample size

Combined, the LINZ and UDU data sets generated 173 resource consent decisions in the THAB zone and 425 in the MHU and MHS zones. A sample size was determined, with advice from Council's Research and Evaluation Unit (RIMU), using a relative standard error of 10, representing 10% uncertainty. This resulted in a requirement to analyse 81 resource consent decisions in the MHU and MHS zones and 64 in the THAB zone. The zones were sampled separately to ensure that trends for parking and building

typology in the THAB zone could be captured under a separate sample that was representative of the THAB zone.

For each sample, the full data set was set to a random order, and the required sample size then taken from the start of the randomised list. Where a resource consent decision was not suitable for analysis, it was discarded, without affecting the total sample size. The randomised list was worked through until the original sample size was met. This means that the sample size represents less than 10% uncertainty, because the required sample size was not reduced in proportion to the resource consent decisions that were suitable for analysis as those that were unsuitable were identified.

A resource consent decision was considered to be not suitable for analysis if

- The resource consent decision was granted prior to April 2018, prior to consent order being issued affecting residential zone provisions for the number of dwellings per site requiring a resource consent and associated matters of discretion and assessment criteria
- The resource consent had not yet been granted
- The resource consent was found not to include a private way consented under the AUP that served more than 10 dwellings or sites
- A s127 variation for a resource consent that did not change the number of dwellings
- The sole function of the private way was vehicular access to basement parking.

3.3 Limitations and caveats

Due to the small sample size, the data is not meant to be statistically significant, rather to provide a qualitative insight to the aspects of residential development which are relevant to this report. It contributes to the evidence base of this report, but does not form the sole evidence base for it.

The data has not been derived independently, as it presents Council's perspective on the information gathered only, and does not (for example) include the perspective of the development sector or residents living within the developments identified as part of the sample

4 THE TIERED APPROACH TO ACCESSWAY REQUIREMENTS

During our review of the key issues identified regarding the performance and usability of the residential private driveway provisions in Chapter E27: Transport and Chapter E38: Subdivision - Urban of the AUP, we identified that changes to the existing tiered structure of E27.6.4.3 and E38.8.1.2 are required.

At present this tiered approach for Chapter E27: Transport is:

- Tier 1: The accessway serves 1 or 2 parking spaces
- Tier 2: The accessway serves 3 or 9 parking spaces
- Tier 3: The accessway serves 10 or parking spaces

For Chapter E28: Subdivision, this tiered approach is:

- Tier 1: The accessway serves 1 rear site
- Tier 2: The accessway serves 2-5 rear sites
- Tier 3: The accessway serves 6-10 rear sites

In our view, change is required to this tiered approach to ensure that pedestrian access and safety are prioritised, and that the efficiency and convenience of accessways for all transport user groups are improved, for all types and scales of residential development anticipated.

The following subsections outline our discussion of the tiered approach to accessway requirements, which should be read in conjunction with our discussion of individual "Issues" discussed in later sections of this report. As part of our consideration of this matter, we have investigated

- vehicle trip generation rates for medium density dwellings, investigating developments with normal parking provision (1 or more car parking space per dwelling) and low parking provision (less than 1 car parking space per dwelling)
- Medium Density Residential Standards, included in the Resource Management (Enabling Housing Supply and Other Matters) Amendment Bill
- data from consented developments within Auckland
- the extent to which each "Issue" has a relationship with the existing tiered structure of E27.6.4.3 (which has tiers based on parking spaces) and E38.8.1 (which has tiers based on the number of rear sites).

4.1 Vehicle trip generation research

Standard E27.6.4 Access is based on the number of onsite car parking spaces provided by developments. This varies according to the scale of development with no maximum limit on the number of parking spaces to be served by an accessway.

In February 2022 car parking minimums were removed from the AUP. This mandatory change was required under the National Policy Statement on Urban Development.

This creates a risk that the AUP may underestimate the accessway requirements for large developments with low parking provisions per dwelling.

To better understand the link between the parking provisions of residential development and the vehicle trip rates, we completed an assessment of trip rates for medium density residential developments with different levels of parking provision per dwelling[13].

We sourced trip generation rates from RTA[14] and TRICS[15]

- The RTA vehicle trip rates were used to estimate trip rates related to developments with normal parking provisions (assumed to be greater than 1 parking space per dwelling for this assessment)
- TRICS provides a database of trip rates for different types of existing developments with varying parking provisions and was used to determine trip rate estimates for developments with normal and low parking provisions (less than 1 parking space per dwelling).

No medium density residential data was available from the Australia and New Zealand TRICS dataset. The Australia and New Zealand dataset was therefore only used to estimate normal parking provision vehicle trip rates from the residential dwellings dataset (dwellings with 1 or more parking space per dwelling). With no information available on parking provisions, we assumed that these dwellings had normal parking provisions since most of the existing New Zealand residential developments generally have at least 1 parking space per dwelling.

Representative trip rates from the UK and Ireland TRICS database were used to determine the trip rates for low parking provision developments. The TRICS search parameters used to identify representative sites for low parking provisions are:

- Residential Land Use
- Medium density developments (Flats, terraced and semi-detached units)
- Less than 1 parking space per dwelling
- Suburban areas.

The TRICS dataset provides a breakdown of hourly trip rates for different modes of transport. The modes considered in this assessment are

- cars
- taxis
- light goods vehicles (LGVs), such as couriers and e-commerce pickup/delivery.

Trip rates for residents and visitors were estimated from the car trip rate data. Light service trip rates were estimated based on a combination of the trip rates for taxis and LGVs.

[13] Note: Aspects relating to residential developments with no parking provision are being addressed by a separate Council Plan Change
[14] Roads and Traffic Authority NSW, Guide to Traffic Generating Developments, 2002
[15] TRICS version 7.9.1, Platform for Trips Database

The peak hour trip rates for the respective transport modes were determined from the peak hour corresponding to the overall vehicle trip rate. We note that the light service peak hour generally does not overlap with the resident and visitor peak hour.

Trip rates were provided per dwelling and were converted to a trip rate per parking space, using the number of dwellings and parking spaces available at each development.

Different trip rates were calculated for semi-detached and walk-up type developments. These trip rates were used to calculate the average trip rates for medium density developments with low parking provision (less than 1 parking space per dwelling).

The estimated peak hour trip rates for medium density developments based on dwellings and on provided parking spaces are summarised in Table 1.

Table 1: Researched peak hour trip rates

Development type	Vehicle trip rate per dwelling (veh/hr/dwelling)		Vehicle trip rate per parking space (veh/hr/parking space)	
	Residents and visitors	Light service	Residents and visitors	Light service
Medium density (low parking)	0.35	0.1	0.55	0.16
Medium density (normal parking)	0.54	0.003	0.54	0.003

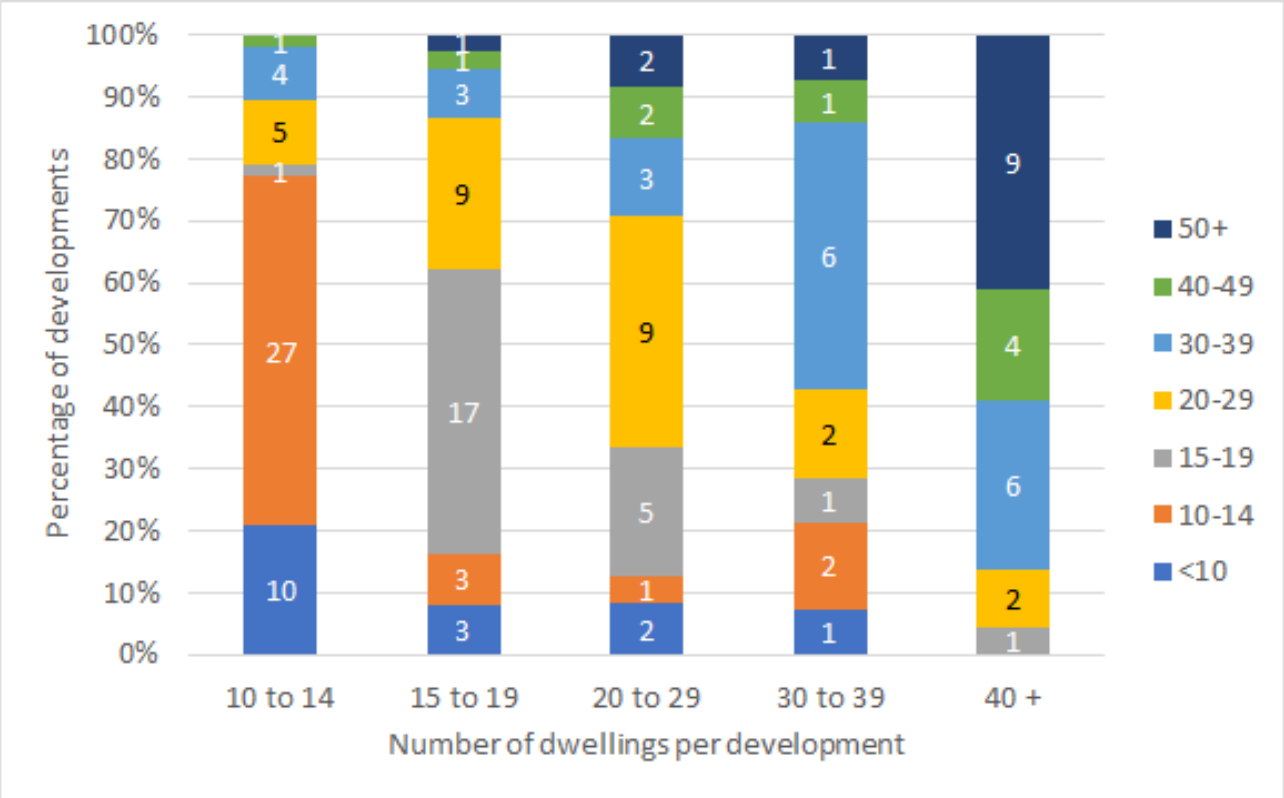
Key observations from the trip rate estimates based on the number of dwellings and car parking spaces are summarised below.

- Resident and visitor trip rates per dwelling for low parking provision are lower than dwellings with normal parking provisions (0.35 veh/hr/dwelling vs 0.54 veh/hr/dwelling respectively)
- Resident and visitor trip rates per parking space for developments with low parking provision are equivalent to developments with normal parking provision (0.55 veh/hr/space vs 0.54 veh/hr/space respectively)
- Light service trip rates for low parking provision developments are higher than normal parking provision developments (0.1 veh/hr/dwelling vs 0.003 veh/hr/dwelling)
- The peak hour light service trips did not coincide with the peak hour for residential and visitor trips

Data from Council's Rear Site Monitoring report (discussed in Section 3) relating to the provision of car parking is shown in Figure 1, which shows that

- between 40 % - 60 % of developments have parking provision equal with the number of dwellings across all development scales
- a small proportion of developments provide parking of less than 0.5 parking space per dwelling
- a small proportion of developments provide parking of 2 or more parking spaces per dwelling.

Figure 1: Percentage split of number of parking spaces by dwellings per development



Based on the above assessment, we conclude that

- parking spaces have a direct correlation with vehicle trips generated during commuter peak hours for medium density residential development, regardless of the ratio of parking per dwelling. I.e. a parking space tends to generate around 0.55 vehicle trips in the peak hour, regardless of how much parking is provided
- the ratio of parking provision per dwelling in medium density residential development has a direct correlation with vehicle trips generated during commuter hours. I.e. a higher parking provision per dwelling generates more vehicle trips in the peak hour
- While a lower provision of parking results in a higher light service vehicle trip rate, these trips are generated outside of the peak commuting period, and are of a lower volume than resident and visitor trips
- Consented developments in Auckland typically provide around 1 parking space per dwelling, although there is a notable proportion of developments that provide less than 0.5 parking space per dwelling or more than 2 parking spaces per dwelling.

We conclude that "parking spaces" is an appropriate metric to use when determining traffic effects in private accessways. However, we discuss "dwellings" as an additional metric to determine other effects (such as pedestrian safety and access) in the following subsections.

4.2 Consideration of Medium Density Residential Standards (MDRS)

The Resource Management (Enabling Housing Supply and Other Matters) Amendment Bill amends the Resource Management Act 1991 to rapidly accelerate the supply of housing where the demand for

housing is high. This will help to address some of the issues with housing choice and affordability that Aotearoa New Zealand currently faces in its largest cities.

One aspect of the Bill is that Council is required to adopt the MDRS, which will enable higher densities to be achieved.[16].

4.3 Data relating to consented residential development in Auckland

Council has investigated the number of developments with private accessways falling into a range of sizes (based on dwelling numbers), consented between October 2016 and March 2022[17]. This data[18] is provided in Table 2 and in summary shows that

- most consents granted from 2016 to 2022 are for smaller developments (1 to 3 dwellings) and represent 83.5% of the total consents granted
- more than 94% of consents granted are for developments with less than 10 dwellings
- exactly 97% of consents granted are for developments with less than 20 dwellings.

Table 2: Total Number of New Dwelling Consents by Development scale (October 2016 – March 2022)[19]

Development Size (No. of Dwellings)	Total Number of Consents	Percentage of Consents
1 to 3	3,682	83.47%
4 to 9	473	10.72%
10 to 14	84	1.90%
15 to 19	40	0.91%
20 to 29	39	0.88%
30 to 39	27	0.61%
40 to 49	15	0.34%
50 to 59	13	0.29%
60 to 69	13	0.29%
70 to 79	5	0.11%
80 to 99	8	0.18%
100 to 199	9	0.20%

[16] Fact Sheet: Resource Management (Enabling Housing Supply and Other Matters) Amendment Bill, available online at https://www.hud.govt.nz/assets/News-and-Resources/News-Articles/Final-fact-sheet-19-10-2021.pdf
[17] Source: Auckland Unitary Plan Resource Consents Database: unitaryplan@aucklandcouncil.govt.nz
[18] Note: Due to the small sample size, the data is not meant to be statistically significant, rather to provide a qualitative insight to the aspects of residential development which are relevant to this report. It contributes to the evidence base of this report, but does not form the sole evidence base for it. The data has not been derived independently, as it presents Council's perspective on the information gathered only, and does not (for example) include the perspective of the development sector or residents living within the developments identified as part of the sample.
[19] Note: Residential - Large Lot zone is not included in this dataset as it is not defined as a "relevant residential zone" so therefore does not need to incorporate MDRS

200+	3	0.07%
Total:	4,411	100%

4.4 How do the key issues of this Plan Change relate to the number of parking spaces or dwellings?

As discussed in Section 1.1, Council has identified a number of issues relating to private accessways. We discuss these issues in detail in later sections of this report, but for the purposes of considering how these issues relate to the existing residential development assessment tiers in E27 (based on the number of parking spaces) and E38 (based on the number of rear sites) we have summarised them in Table 3.

Table 3: Key issues, and how they relate to the number of parking spaces or dwellings in a development

Issue	How does this issue relate to the number of car parking spaces or dwellings provided	Conclusion	Threshold
Issue 1A: Inadequate minimum pedestrian access width	Some relationship with the number of parking spaces, resulting from increasing need for pedestrian separation from traffic. High relationship to the number of dwellings, resulting from increasing need for pedestrian safety and access.	Minimum pedestrian access widths are dictated by minimum width for passing when pedestrian flows are less than 50 persons per minute	Increase the minimum width of pedestrian access required by the operative provisions. Provide pedestrian accesses widths that cater for all ages and abilities for 20 + dwellings or 20 or more parking spaces
Issue 1B: Inadequate separation of pedestrian accesses from trafficable areas	High relationship with the number of parking spaces, resulting from increasing need for pedestrian separation from traffic. High relationship to the number of dwellings, resulting from increasing need for pedestrian safety and access.	Pedestrian access separation requirements should be determined by parking and dwelling numbers.	Where a pedestrian access is required by the operative provisions
Issue 1C : Inadequate maximum pedestrian access gradient	No relationship to the number parking spaces. High relationship to the number of dwellings, resulting from increasing need for pedestrian safety and access.	Pedestrian access gradient requirements should be determined by dwelling numbers	Where a pedestrian access is required by the operative provisions
Issue 1D: Inadequate protection of pedestrian accesses from obstructions	No relationship to the number parking spaces. High relationship to the number of dwellings, resulting from increasing need for pedestrian safety and access.	Prevention of pedestrian access obstruction should be determined by dwelling numbers.	Where a pedestrian access is required by the operative provisions
Issued 1E: Inadequate provision of pedestrian accesses	Some relationship with the number of parking spaces, resulting from increasing need for pedestrian separation from traffic. High relationship to the number of dwellings, resulting from increasing need for pedestrian safety and access.	The number of pedestrian accesses provided should be determined by the number of dwellings and number of parking spaces.	Pedestrian accesses to connect directly to each dwelling when there are 20 or more dwellings or more than 20 parking spaces.
Issue 2A: Inadequate speed management measures	Some relationship with the number of parking spaces and dwellings. High relationship with accessway length.	Speed management measures should be determined by accessway length.	Any accessway more than 30m long.
Issue 2B: Fire and Emergency New Zealand (FENZ) vehicle access	No relationship with number of parking spaces, high relationship with number of dwellings.	Requirements are determined by the Building Code	No change to operative provisions.
Issue 2C: Inadequate consideration of heavy vehicle access	Limited relationship with number of parking spaces, high relationship with number of dwellings.	Heavy vehicle access requirements are primarily driven by waste collection requirements.	Introduce a standard to address access and safety when heavy vehicle access is required. New waste provisions are proposed for residential land-use chapters.
Issued 2D: Inadequate consideration of loading needs	High relationship with number of dwellings, when vehicle access is not otherwise provided.	Loading consideration needed when vehicle access is not otherwise provided.	10 or more dwellings should provide loading for a light vehicle (e.g. courier or taxi).
Issue 2E: Inconsistency with the minimum inside turning radius	Some relationship with number of parking spaces and number of dwellings.	Update E27 to match the requirements of E38.	No consequential change to operative provisions.
Issue 2F: Inadequate consideration of driver sight lines at vehicle crossings	High relationship with the number of parking spaces, resulting from increasing need for pedestrian separation from traffic. Low relationship to the number of dwellings.	Driver to pedestrian sightlines should be determined by parking space numbers, however private space and land ownership issues make a standard or rule impractical.	No change to operative provisions.
Issue 2G: Are the operative provisions for carriageway	High relationship with the number of parking spaces, as peak hour trip generation is closely linked to parking supply.	Carriageway width should be determined by parking spaces. For subdivision without an accompanying land use consent,	No change to operative provisions.

Table 3: Key issues, and how they relate to the number of parking spaces or dwellings in a development

Issue	How does this issue relate to the number of car parking spaces or dwellings provided	Conclusion	Threshold
widths for private accessways appropriate?	Low relationship with number of dwellings, as this tends to influence light service vehicle generation, which tends to occur outside of commuter hours.	the number of rear sites is a suitable alternative metric to parking spaces.	
Issue 3A: Minimum legal width of accessways	High relationship with the number of parking spaces and the number of dwellings, as the overall width requirements are dictated by requirements of individual elements.	Minimum legal width of accessways should be determined by the sum of the individual components.	Amend operative minimum legal width due to consequential changes to pedestrian accesses.
Issue 3B: Maximum accessway length	High relationship with the number of parking spaces and the number of dwellings, as both aspects have a direct relationship to the total number of trips generated by a development.	In our view controls on the length of private accessways are better addressed through a wider consideration of the matter of public vs private ownership of accessways	No change to operative provisions
Issue 3C: Provision of utility strips	No relationship to number of parking spaces, high relationship to number of dwellings.	E27 deals with transport matters, it was determined that it would not be appropriate to include utility matters in E27.	No change to operative provisions.
Issue 3D: Provision of berms	Some relationship with the number of parking spaces and the number of dwellings.	The need for a berm tends to be directed by other requirements (such as infrastructure provision, waste bin collection, etc) rather than a transport specific need for the berm as a stand-alone requirement	No change to operative provisions

4.5 Summary – Recommended tiers

In summary

- The number of parking spaces is an accurate determinant of the peak hour vehicle trip generation for a medium density residential development. We therefore recommend retaining this within the operative provisions of E27.6.4
- MDRS will enable higher densities to be achieved. We recommend
  - reducing the threshold in E38.8.8.1 between tier 2 and 3, from 5 rear sites to 3 rear sites
  - increasing the threshold in E27.6.4 between tier 1 and 2, from 2 parking spaces to 3 parking spaces
- In regard to the various design thresholds contained in E27 for residential development
  - providing an upper limit to Tier 3 residential developments, of 19 parking spaces or 19 dwellings. We note that only 2.8% of residential developments consented between 2016 and 2022 have between 10 and 19 dwellings
  - creating a Tier 4 residential development threshold, which we recommend as 20 or more parking spaces or 20 or more dwellings. We note that only 3% of residential developments consented between 2016 and 2022 have more than 20 dwellings.
- Pedestrian safety and accessibility are relatively independent of the number of parking spaces and dwellings, as these requirements tend to be determined by minimum recommendations for all ages and abilities. However, this needs to be balanced against the ability of developments to comply with these requirements. We therefore recommend that developments of
  - 10 – 19 dwellings (2.8% of total developments) provide some compliance to these minimum requirements, where the operative provisions already require a pedestrian access to be provided
  - 20 + dwellings (3% of total developments) provide greater compliance to these minimum recommendations, as these developments will have a higher pedestrian demand.
- Heavy vehicle access requirements for residential sites are primarily driven by waste collection requirements. We recommend that this is addressed through specific waste provisions within residential land-use chapters, and that a new standard is introduced to E27 addressing matters relating to safety and access when heavy vehicle access within a residential site is required
- The number of dwellings is a suitable determinant for when loading requirements should be considered, when a development otherwise does not provide for vehicle access. We recommend that developments between 10 dwellings and 5,000m^2 GFA, that don't otherwise provide for vehicle access, provide a loading space for a light service vehicle (taxis and couriers, as discussed in Section 4.1).

We discuss these recommendations in further detail in later sections of this report.

5 ISSUE 1: INADEQUATE PROVISION FOR PEDESTRIANS WITHIN PRIVATE ACCESSWAYS

We have investigated issues relating to pedestrian safety and accessibility that are defined in the B2.3 A quality built environment monitoring undertaken by Council, discussed in Section 1.1, including reviewing recent research by Council and Auckland Transport.

In summary

- New Zealand has the highest rate of vehicle-related child pedestrian accidents in the developed world and are the leading cause of paediatric death and serious injury in New Zealand
- There is no national database for recording driveway run over incidents, with the systems to review and record non-traffic deaths (deaths not on public roads) being inconsistent and less well developed with systems to review traffic deaths (deaths on public roads
- Reporting of harm to pedestrians within public roads, via the Crash Analysis System, is undercounted by almost 9 times
- Shared accessways result in a threefold increase in risk of driveway run-overs due to the greater number of users and a greater number of children present on the driveway
- The lack of dedicated pedestrian accesses within driveways, separate from vehicles, results in a twofold increase in risk of driveway runovers
- Driveways exceeding 12 metres in length result in twofold increase in risk for driveway runovers.

We discuss the research in the following subsections. We note that in this report we have generally used the following terminology

- “footpath” for footpaths within the public road
- “pedestrian access” for footpaths within private sites.

5.1 Council’s s35 B2.3 A quality Built Environment monitoring report

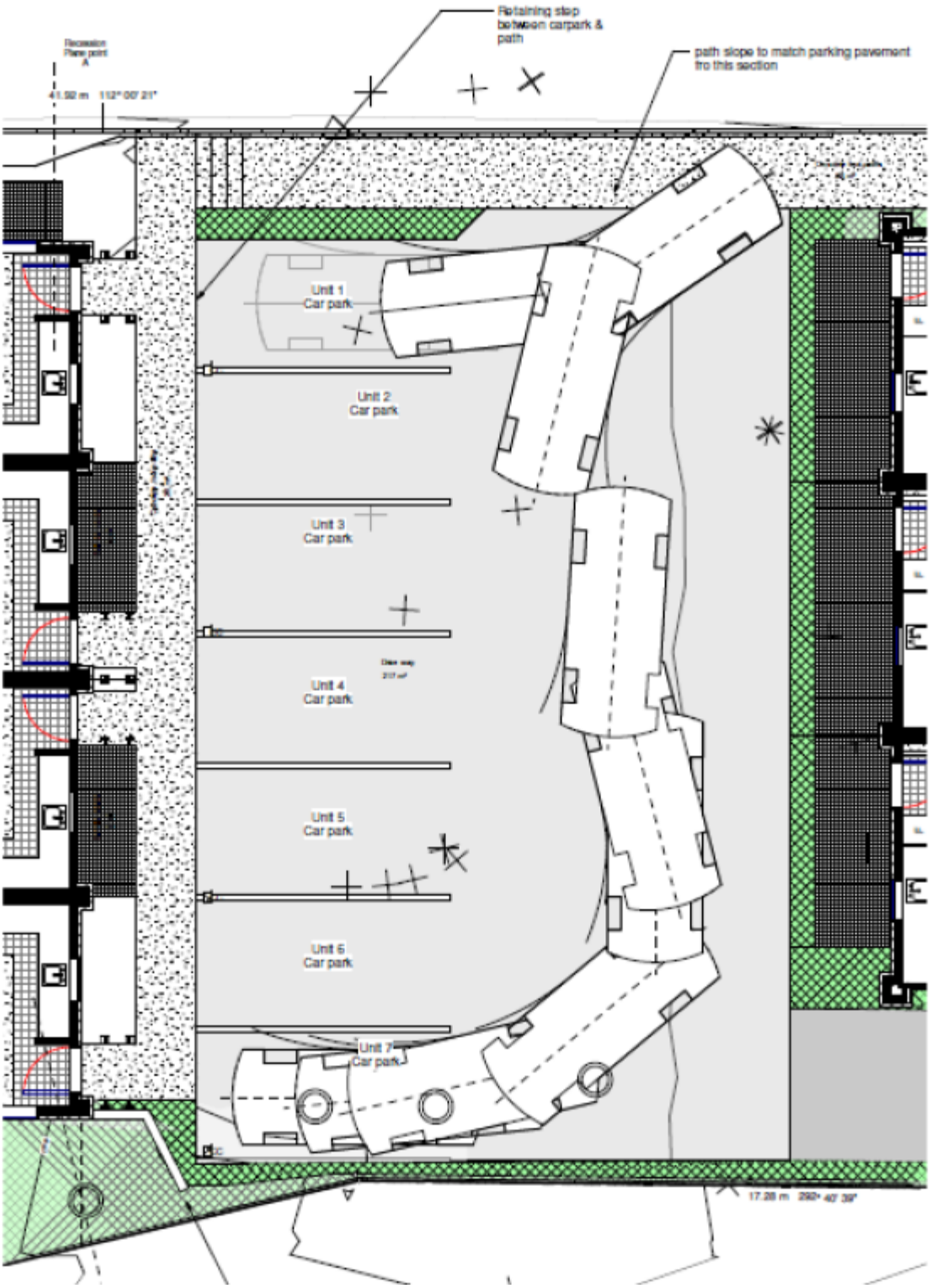
Council’s s35 B2.3 A quality Built Environment monitoring report considered pedestrian safety within residential developments (refer Theme 6 Indicator 11).

It highlights that pedestrian safety is a particular concern given the high incidence of driveway accidents involving pedestrians (particularly children). The vehicle access and parking arrangements influence the site layout, access to dwellings and level of pedestrian safety.

It found that 45 per cent of footpaths were located in the reversing space of cars, an example of which is reproduced below in Figure 2. Site visits undertaken by Council staff provided the opportunity to assess the effectiveness of footpaths within sites in the residential zones. Those footpaths that were level with driveways, relying on a change of colour or surface quality did not provide the same level of pedestrian safety as those with a formed and raised footpath with a kerb.

The s35 B2.3 A quality Built Environment monitoring report concluded that the AUP is not adequately managing on-site pedestrian safety effectively or efficiently in respect to pedestrian access and circulation within the site.

Figure 2: Vehicle tracking over footpath, sourced from Council s35 B2.3 A quality Built Environment monitoring report



Amongst other recommendations, Council's s35 B2.3 A quality Built Environment monitoring report recommended that

- addressing pedestrian safety for developments of four or more dwellings with car parking
- require a safe separate raised footpath (with kerb) of a specified width with adequate space for two people to pass (e.g. 1.5-1.8m)
- Additional criteria in the transport provisions to address site access or transport limitations which can require substantially more on-site vehicle access and manoeuvring space
- Review access provisions to prioritise pedestrian safety.

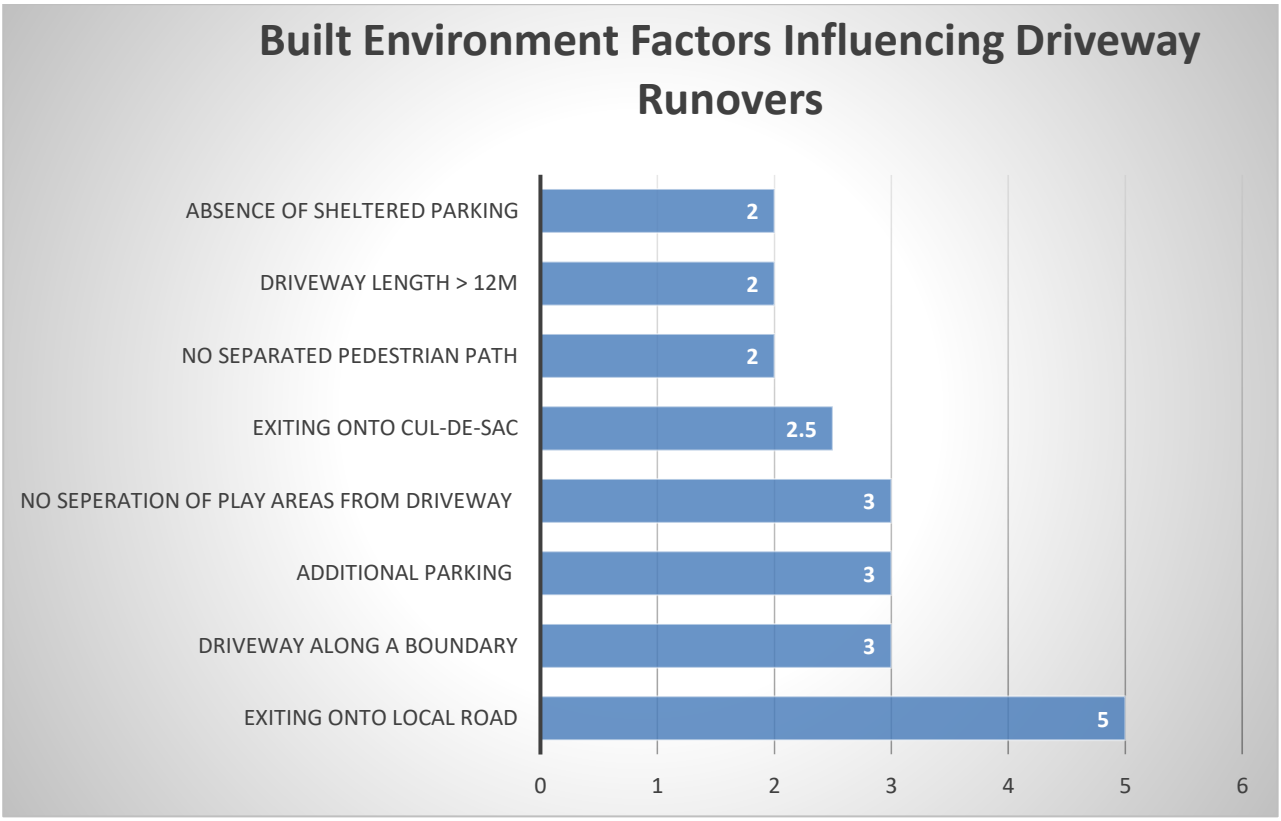
This technical report responds in part to those recommendations.

5.2 Literature review by Council staff

A literature review of child safety in New Zealand, undertaken by Council staff (attached in Appendix A) found that

- New Zealand has the highest rate of vehicle-related child pedestrian accidents in the developed world and are the leading cause of paediatric death and serious injury in New Zealand
- Every 2 weeks a child is hospitalised with significant trauma to the head, chest and lower limbs from driveway injuries, and on average 4 children per year are killed. Of all child pedestrian injuries in the Auckland region, 25% occur on private driveways
- The majority of children (64%) are aged between 0-2 years, with Māori and Pacific Island children significantly over-represented with 66% of incidents. The majority of drivers are the child's parent (49%), with the remaining being other relatives (17%), neighbours (13%) and visitors (21%). The majority of driveway run overs are reversing (68%)
- Driveway runovers are thought to occur as a result of an interaction between human factors (supervision of child, driver behaviour), vehicle factors (visibility, reversing aids) and environmental factors (property design including driveway design and driveway surroundings)
- There is no national database for recording driveway run over incidents, with the systems to review and record non-traffic deaths (deaths not on public roads) being inconsistent and less well developed with systems to review traffic deaths (deaths on public roads)
- Nearly a quarter of drivers have been reported as seeing the child in a safe position in the house, at the front door or in the garden away from the rear of the vehicle, prior to them reversing. The prevalence of large vehicles including 'people movers', SUVs and four wheel drive type vehicles is also thought to be a contributing factor. As vehicles increase in size, the reversing visibility decreases, resulting in blind spots of more than 27 square metres for some of these vehicles (State Insurance, 2005)
- Figure 3 identifies the built environment factors that were found to be significant contributors to driveway run over incidents in a range of residential settings including standalone dwellings; rear lot battle-axe subdivision; and more recent infill subdivision and development, and their influence is shown as a 'fold increase'.

Figure 3: Factors influencing driveway runovers



The above factors can be explained as follows.

- Research indicates that driveways exiting onto smaller, local roads, such as suburban streets or cul-de-sacs, is associated with a fivefold increase in run-over risk compared to exiting onto busier, arterial roads. This is thought to be primarily due to drivers being overconfident or complacent when using driveways on local roads and drivers concentrating more when exiting onto busier roads because they aware of a greater number of hazards
- Private driveways result in a threefold increase in risk of driveway run-overs due to the greater number of users and a greater number of children present on the driveway
- The lack of dedicated pedestrian accesses for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers
- Driveways exceeding 12 min length result in twofold increase in risk for driveway runovers
- The presence of additional parking on property, connected to but separate from the driveway results in a threefold increase in risk, due to the additional manoeuvring required. This is a critical finding given the current development trend of communal car parking areas, and lack of dedicated paths not only on the driveway but around the parking areas. The absence of sheltered parking also results in a twofold increase in risk which may result in more rapid entry of the driver to the vehicle, reducing the time to scan for children
- A lack of separation/fencing of outdoor play areas from driveways results in a threefold increase in injury risk
- It is considered however that having a fenced outdoor area doesn't necessarily prevent children from playing in private driveways or car parking areas, which could be seen to be a desirable space

to ride bikes, skateboards etc. In the context of a reduction in private outdoor living areas, and the useability of these outdoor living spaces for play activities (due to e.g. decking, planting, services etc), it is likely that private driveways and communal car parking areas will continue to be desirable play spaces for children

- The literature notes the increased risk of run-overs attributable to driveways being positioned on the property boundaries, with a threefold increase in risk, most likely because drivers must concentrate intently on avoiding a property fence and any vegetation.

Kāinga Ora in partnership with Safekids Aotearoa have implemented an award-winning driveway safety programme since 2013 which focuses on separating child play areas from driveways in properties where there are young children under the age of 5. They have also developed design guidelines[20] to ensure driveway safety is taken into consideration when building or redeveloping a property, in recognition of the property design risk factors outlined above.

The driveway design guidelines have 3 key principles, and the last 2 principles are of particular importance to this Plan Change

- Provide a secure play area for children that is separated from the driveway
- Provide pedestrians with safe access to the building that is separated from the driveway and vehicles
- Provide clear lines of sight for vehicles when entering and exiting the property.

Councils' Urban Design Unit recommends that Council actively discourage residential development and subdivision layouts that increase the risk of driveway runovers and prioritise the safety of children and other vulnerable users. Changes to subdivision and neighbourhood designs to separate the movements of young children and vulnerable users from vehicles will be the most effective measure to reduce the incidence of low speed vehicle run overs[21] . Councils' Urban Design Unit made the following recommendations, which are relevant to this Plan Change.

- Require dedicated and grade separated pedestrian accesses on at least one side of a shared driveway and on both sides for larger scale developments, of sufficient width to cater for a range of users (1.8m). Consideration of gradient, cross fall and passing places should also be required. Examples of non-grade separated and grade separated pedestrian accesses are shown in Figure 4 and Figure 5 respectively
- Require dedicated and grade separated pedestrian accesses around communal car parking areas, which link dwellings to the main pedestrian access
- Require assessment of pedestrian safety risk factors in the design of private driveways including driveways which exit onto local roads and cul-de-sacs; driveway length; driveways located along a boundary; and additional parking connected to the driveway as part of matters of discretion and assessment criteria.

[20] A Guide to Driveway Safety for Property Owners. Developed by Housing New Zealand in partnership with Safekids Aoteoroa, New Zealand Transport Agency, New Zealand Police and Roadsafe Nelson Bays
[21] Australian Government, Department of Infrastructure and transport. 2012. Child pedestrian safety: 'driveway deaths' and' low speed vehicle run-overs', Australia 2001-2010.. Information Sheet 43.

Figure 4: Example of a non-separated pedestrian access obstructed by parked vehicles (Aporo Tawhito Lane, Henderson)

Figure 5: Example of a pedestrian access vertically separated from the carriageway with a curb (Carder Court, Hobsonville)

Further discussion of these issues is contained in the specialist report ***Pedestrian Access Routes to Dwellings - Issues, Analysis & Recommendations in support of Proposed Plan Change 79: Transport Chapter***, prepared by Auckland Council's Design Office TĀMAKI MAKAURAU DESIGN OPE.

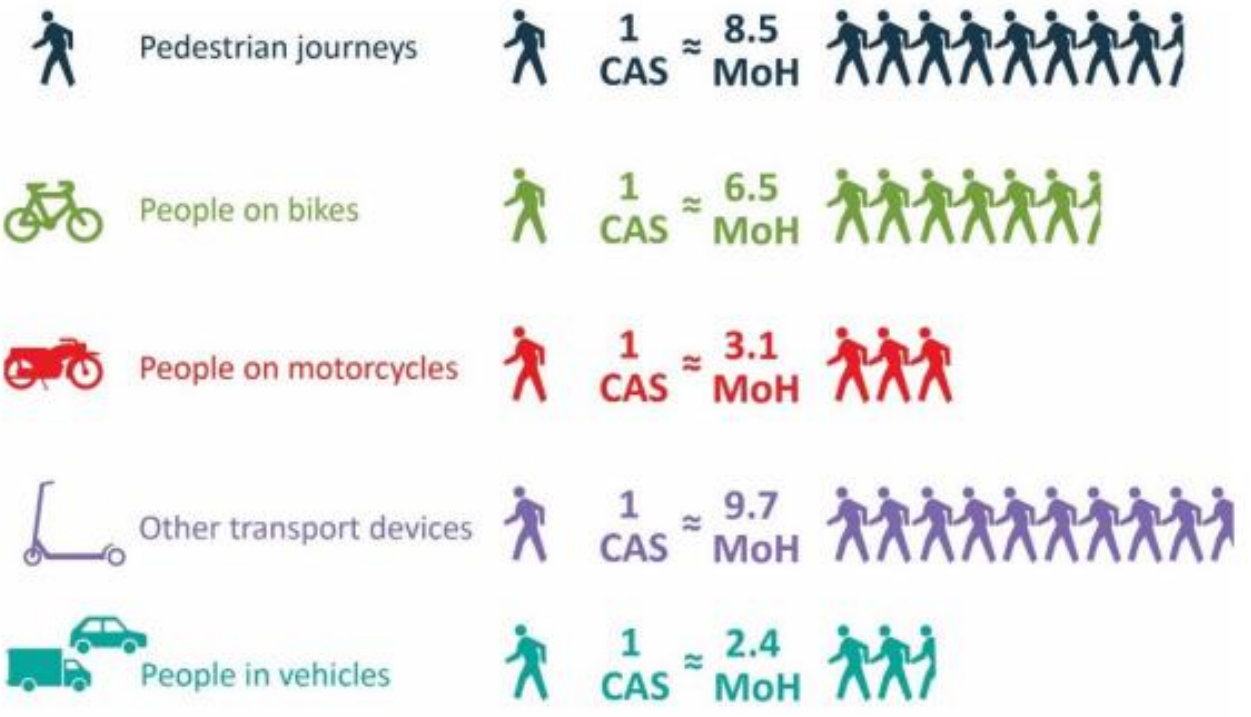
5.3 Auckland Transport research into the reporting of harm to road users

A report commissioned by Auckland Transport[22] has identified that reporting of harm to cyclists within public roads is undercounted by 6 times, and harm to pedestrians undercounted by almost 9 times, as shown in Figure 6.

The report found that slips, trips and falls are the primary cause of serious injury for pedestrians and cyclists, with harm involving light vehicles being the second highest category, as shown in Figure 7.

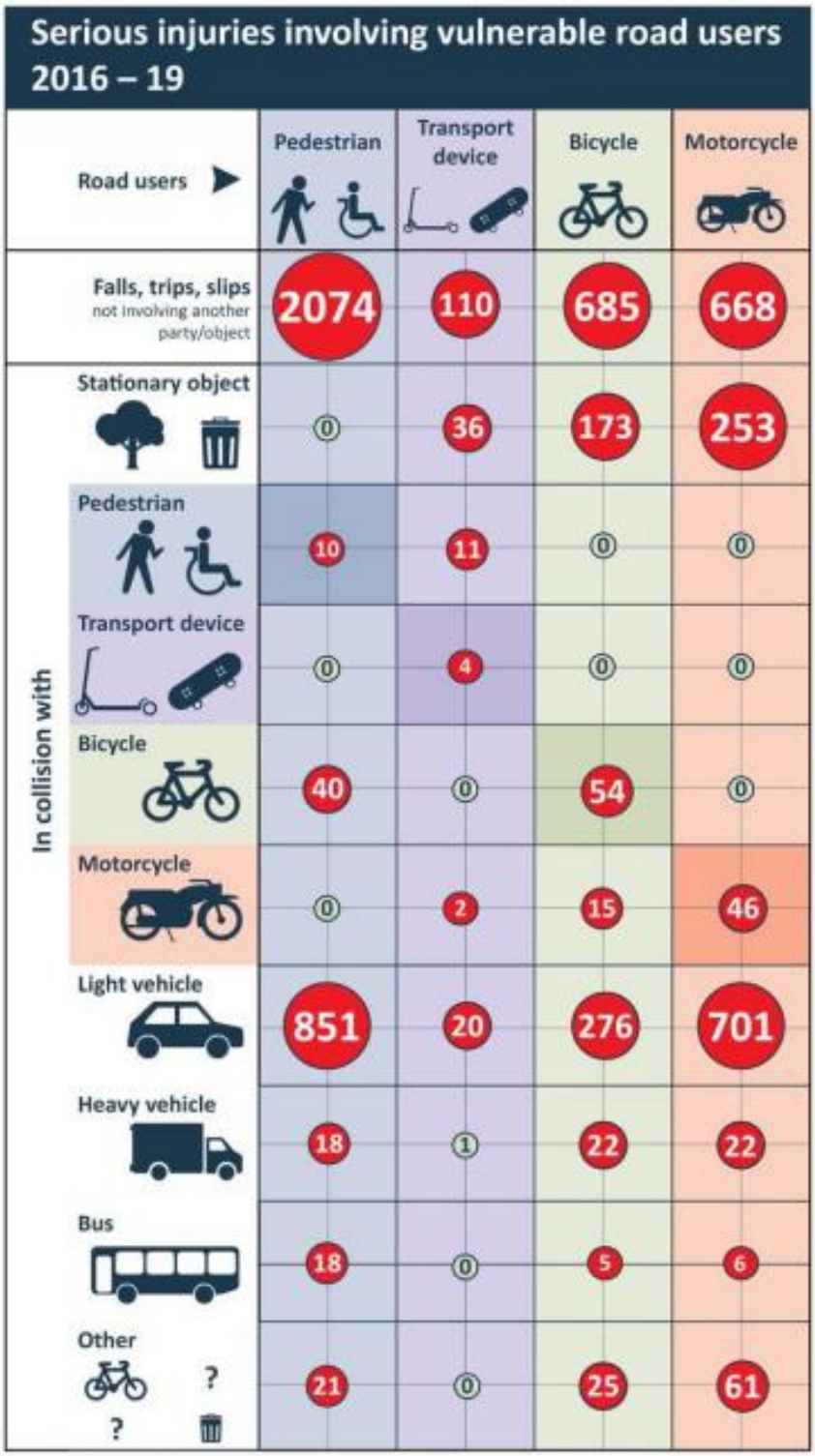
The report concludes that improving road and path quality and maintenance would greatly reduce the trauma from pedestrian-only injuries. It recommends a focus on speed management, better active modes (walking, cycling, and transport device modes) crossing facilities, and better facilities along key routes.

Figure 6: Under reporting of road user harm within public roads, Crash Analysis System (CAS) vs Ministry of Health (MoH) data[23]



[22] Safety of people travelling outside: Deep dive review, Viastrada, May 2021, accessed 5/5/22, available online at https://s3.documentcloud.org/documents/21825272/at-crashes-vulnerable-users-deep-dive-march-2021.pdf
[23] Reproduced from Safety of people travelling outside: Deep dive review, Executive Summary , Viastrada, May 2021,

Figure 7: Who is being injured in crashes, and who is involved[24]



[24] Reproduced from Safety of people travelling outside: Deep dive review, Figure 6, Viastrada, May 2021,

6 ISSUE 1A: INADEQUATE MINIMUM PEDESTRIAN ACCESS WIDTH

The AUP identifies the requirement for pedestrian accesses within private accessways in E27 and E38.

- Table E27.6.4.3.2 requires a 1.0m pedestrian access for rear sites, which may be located within the formed driveway, for accessways that serve 10 or more parking spaces
- Standard E38.8.1.2.(3) and (4) require
  - accessways serving 6 or more rear sites must provide separate pedestrian access, which may be located within the formed driveway
  - that the pedestrian access must be at least 1.0m wide and be distinguished from the carriageway, and that it may include the service strip.

6.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the operative provisions of E27 and E38 adequate to ensure that pedestrian access widths are appropriate for all users?

6.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Auckland Transport: Transport Design Manual – Engineering Design Code
- Waka Kotahi Pedestrian Network Guidance (2021)
- Auckland Council Urban Design specialist advice
- Case studies.

We discuss relevant aspects of these references in the following subsections. In summary, we found that for public footpaths,

- for footpaths with lower pedestrian flows (up to 50 pedestrians/min), the minimum footpath width is determined by user type, with the need to design for people pushing prams, using wheelchairs or mobility devices, being the determining factor
- for footpaths with higher pedestrian flows (more than 50 pedestrians/min), widths beyond the minimum of 1.8m are determined by the number of pedestrians per minute. It is unlikely that private accessways will generate pedestrian flows of more than 50 pedestrians/min
- the minimum width for a public footpath is 1.5m, and this is only acceptable where there are constraints preventing a 1.8m width. In this instance, passing bays at least 1.8m wide and 2.0m long should be provided at a maximum of 50m intervals to allow wheelchair or pram users to pass each other
- the minimum width needed for two able bodied pedestrians to pass each other is 1.35m
- 42% of consented developments of 10 or more dwellings provided footpaths with less than 1.35m width, and an additional 6% provided no footpath at all (including some with 40 or more dwellings).

6.2.1 Auckland Transport: Transport Design Manual – Engineering Design Code

Auckland Transport's Transport Design Manual (TDM) Engineering Design Code: Footpath Pedestrian Facilities and Public Realm[25] sets out design standards for pedestrian access.

The TDM states that footpaths within private accessways may be designed according to the principles in the document and is therefore considered a relevant reference for this Plan Change.

Section 3 of the Engineering Design Code: Footpath Pedestrian Facilities and Public Realm states that urban footpath widths should be wide enough for use by all user groups, including people

- On foot, some with visual impairments using a cane or walking with a guide dog
- In wheelchairs or on mobility scooters
- Using small wheel devices, such as children's bicycles permitted for footpath use
- Pushing a pram.

Table 1 of the Engineering Design Code: Footpath Pedestrian Facilities and Public Realm identifies a minimum pedestrian "through route" or formed footpath width of 1.8m for local roads in residential areas.

6.2.2 Waka Kotahi Pedestrian Network Guidance (2021)

The Waka Kotahi Pedestrian Network Guidance (2021)[26] demonstrates best practice for planning, designing and creating walkable communities throughout New Zealand and provides guidance on the minimum footpath widths for residential areas, which is of relevance to private shared accessways and hence this Plan Change.

The guidance states that the appropriate width of footpaths will depend on factors that include urban design and pedestrian comfort objectives, land use interaction, available corridor width, and multi-modal level of service (LOS) analysis.

It identifies a minimum footpath width of 1.8m for residential areas, with an absolute minimum width of 1.5m (only acceptable in existing constrained conditions). Where the footpath width is less than 1.8m, it recommends that passing places should be provided at a maximum spacing of 50m to allow two wheelchairs or pram users to pass each other[27].

[25] Auckland Transport Engineering Design Code: Footpath Pedestrian Facilities and Public Realm Version 1: Section 5.3 Longitudinal Gradients. Available online at https://at.govt.nz/media/1985456/5794-tdm-engineering-design-code-footpath-pedestrian-facilities-and-public-realm-version-1.pdf

[26] Waka Kotahi Pedestrian network guidance, available online at https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/

[27] Waka Kotahi Pedestrian network guidance: Footpath width, available online at https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/design/paths/footpath-design-geometry/footpath-width/

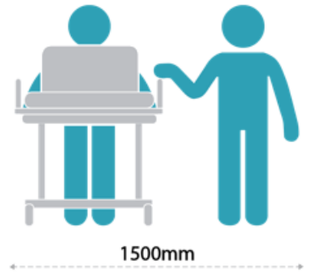
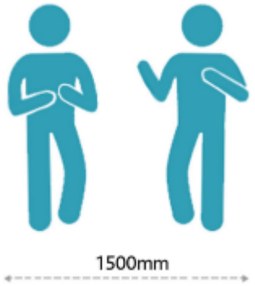
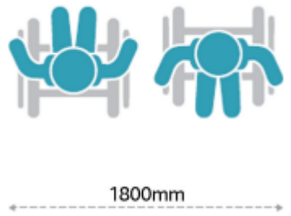
6.2.3 Auckland Council Urban Design specialist advice

The Auckland Design Manual provides minimum accessible space dimensions for various footpath users, with the intent that these are used to design spaces that accommodate and meet the needs of all Aucklanders. Council's urban design team has developed examples of potential users of pedestrian accesses within private accessways, shown in Figure 8[28]. Of note

- 1.35m footpath width is required for two able bodied pedestrians to pass each other (675mm each)
- 1.5m footpath width is required for an able-bodied pedestrian and a wheelchair user to pass each other
- 1.8m footpath width is required to allow a wheelchair user to turn around
- 1.8m footpath width is required to allow two wheelchair users to pass each other
- Mobility scooters users, pram users, and pedestrians using walker frames or other walking aids have similar width requirements as wheelchair users.

[28] Adapted by Council staff from the Auckland Design Manual: Accessible space dimensions, available online at https://content.aucklanddesignmanual.co.nz/design-subjects/universal_design/Documents/Accessible_Space_Dimensions.pdf

Figure 8: accessible space dimensions

 Person walking	 Person on a wheelchair	 Person with a shopping trolley	 People moving furniture	 Couple walking	 Two Paramedics and Stretcher
 Person with a cane	 Person on an electric mobility scooter	 Person with grocery crate	 Person with groceries	 Person with a bike	 Turning circle of a wheelchair
 Person with a twin stroller	 Person with walking frame	 Person with crutches	 Person with a dog	 People communicating with each other (sign language)	 Two people in wheelchairs passing each other

6.2.4 Data from Council's Rear Site Monitoring

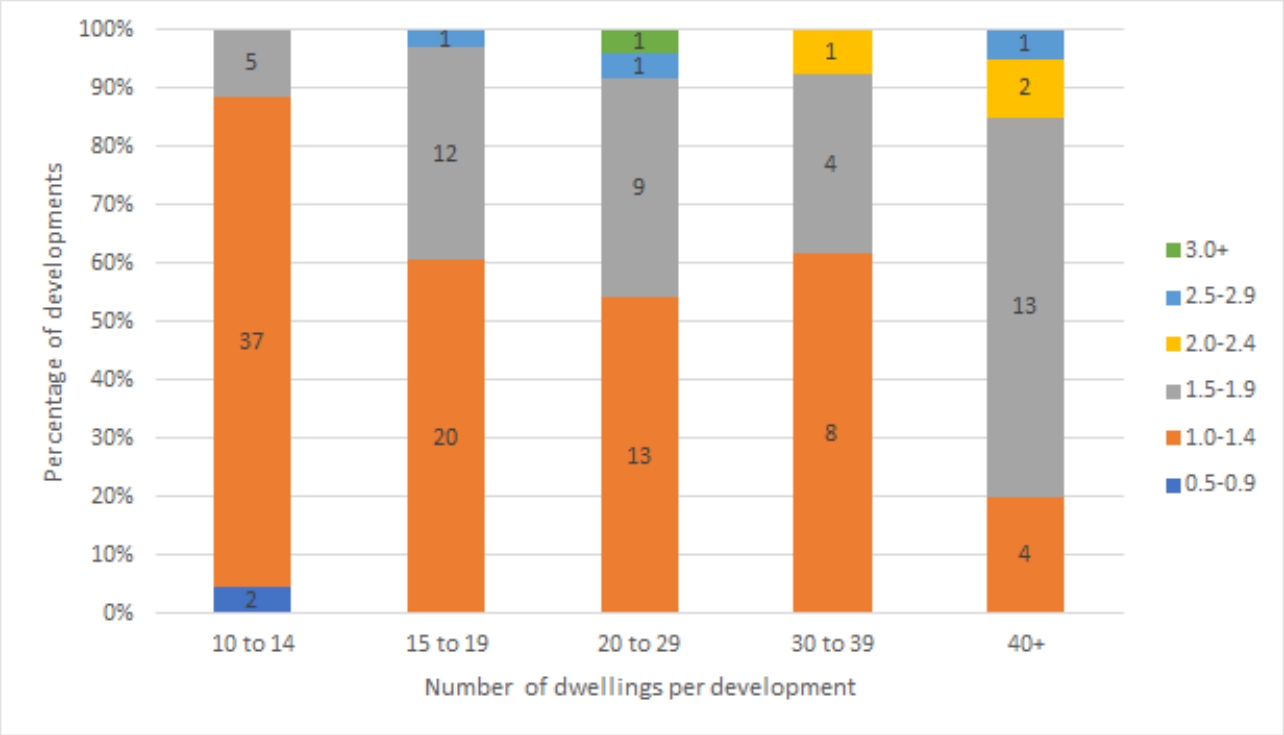
Data from Council's Rear Site Monitoring (discussed in Section 3) relating to the provision of pedestrian accesses within private accessways is shown in Table 4 and Figure 9. This shows that

- 31% of developments provided a footpath at least 1.5m wide
- Developments with between 10 to 39 dwellings accessed by a single accessway predominantly had pedestrian access widths between 1.0 – 1.4 m.
- Footpath widths between 1.5-1.9 m were most common for developments with more than 40 dwellings per development with more than 80 % of pedestrian accesses being wider than 1.5 m.
- The data showed only 2 non-complying developments with pedestrian access widths under 1 m wide.

Table 4: Breakdown of sampled resource consent footpath widths

Footpath width	Number of developments consented	Percentage of consented developments
0.5-0.9 m	2	1%
1.0-1.4 m	87	60%
1.5-1.9 m	36	25%
2.0-2.4 m	4	3%
2.5-2.9 m	3	2%
3.0+ m	1	1%
Unknown	1	1%
N/A	11	8%
Total	145	100 %

Figure 9: Footpath Width (m) by Number of Dwellings per Development (Percentage of developments)



6.2.5 Case studies

BUN60340161: 79 College Road, St Johns

This consent was for 81 residential units, with multiple private accessways, as shown in Figure 10.

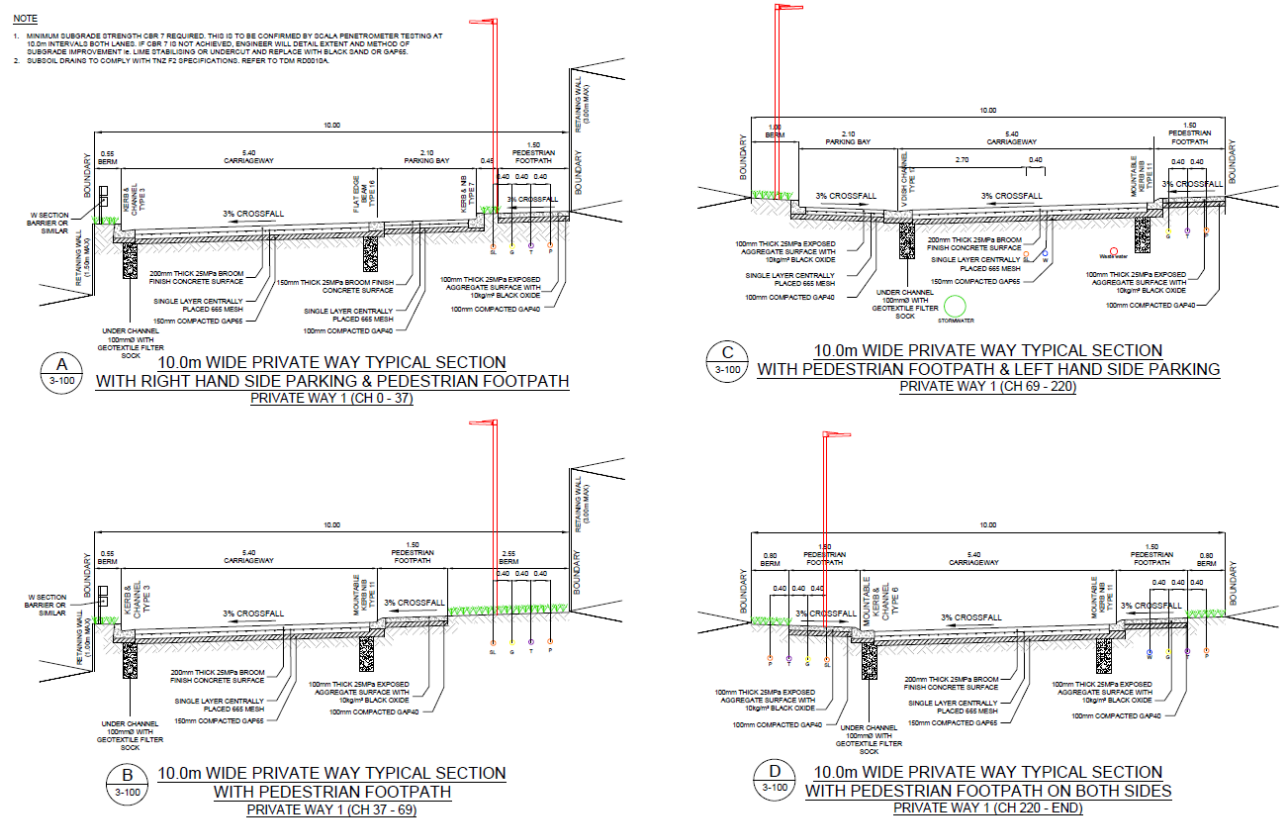
Figure 10: 79 College Road accessway layout

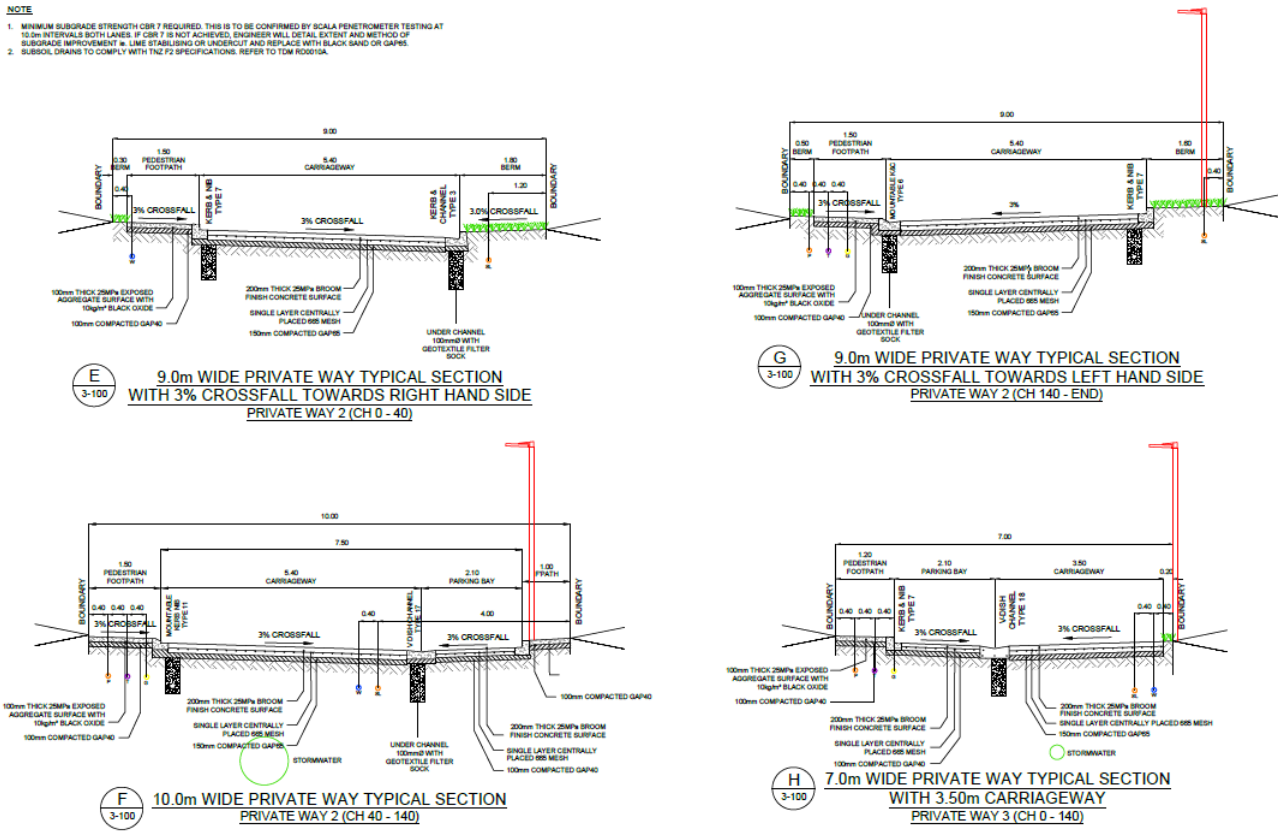
Figure 11 shows examples of the cross sections of the private accessways. The following matters are relevant to the discussion of footpath widths.

- Pedestrian accesses were generally only provided on one side of each private accessway, with widths varying from 1.0 – 1.5m and serving between 21 – 41 residential lots
- Some pedestrian accesses were obstructed by lighting poles
- Accessways ranged from 50m – 230m in length
- Pedestrian accesses would be obstructed by waste bins on collection days.

While this development complied with the footpath width requirements of E27 and E38 many private accessways did not provide sufficient width to accommodate people of all ages and abilities. Most private accessways served far more than 10 rear lots and/or 10 car parking spaces, and therefore were well in excess of the upper thresholds for private accessways specified in E38.

Figure 11: 79 College Road typical private accessway cross sections





6.3 Consideration of options to address this issue

We have considered the following options outlined in Table 5.

Table 5: Consideration of options – Minimum pedestrian access width

Option	Discussion
1: Do nothing	We rejected this option. The evidence identifies that the minimum width for publicly accessible footpaths is 1.8m, and that this should only be reduced to 1.5m with passing bays if site constraints dictate. A minimum width of 1.35m is required to allow two able bodied people to pass each other. The operative provisions allow a 1.0m wide pedestrian access, which is significantly less.
2: Increase the minimum pedestrian access width specified in the operative provisions to be consistent with the footpath requirements on public roads	We rejected this option. While we consider that the operative provisions are not consistent with Policies B2.3.2.(1)(d) and (2)(a) and (b), in our view requiring a minimum pedestrian access width of 1.8m for all situations where E27 and E38 require a pedestrian access may be onerous and difficult to achieve for smaller brownfield sites.
3: Retain the existing E38 provision of 1m width for developments between 6 – 10 rear site. Amend	We rejected this option.

E27 to match these requirements and introduce new pedestrian access widths for developments exceeding 10 dwellings depending on the scale of the development.	The operative provisions do not adequately provide for pedestrian access and we consider that this is inconsistent with Policy B2.3.2.(2)(a) and (b).
4: Increase the existing minimum pedestrian access width from 1.0m to 1.35m. Add a new requirement in E27 for a 1.8m pedestrian access for private accessways serving more intensive residential development (20 or more dwellings or 20 or more parking spaces).	We accepted this option. The existing minimum width of 1.0m does not provide for access for all ages and abilities. We consider that a minimum width of 1.35m is required and will provide improved accessibility for pedestrians. Further, we consider it appropriate for larger residential developments to provide pedestrian accesses that are consistent with public road standards due to the increased exposure of pedestrians to higher traffic volumes leading to increased safety risks. This will ensure that safe pedestrian access is provided for all ages and abilities.

6.4 Conclusion

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of minimum pedestrian access width for residential accessways.

A minimum width of 1.8m is required to provide access for people of all ages and abilities, in accordance with Policy B2.3.2.(2). While we see a benefit in applying this to all situations where a pedestrian access is required within a private accessway, we recommend that it is only required for developments with more than 20 dwellings.

For developments between 10 – 19 dwellings we recommend that a minimum width of 1.35m is required. This is sufficient to allow two able bodied people to pass each other. We expect that the pedestrian and vehicle traffic volumes for developments with less than 20 dwellings are likely to be low, and therefore a reduced safety risk posed if able bodied pedestrians have to navigate into the carriageway to pass mobility impaired pedestrians.

We recommend the following amendments E27 and E38

- Amend Table E27.6.4.3.2 (T151) to remove reference to pedestrian access
- Add Standard E27.6.6.3 to identify minimum pedestrian access width of
  - 1.35m for residential developments of 10 – 19 dwellings or 10 – 19 parking spaces
  - 1.8m for residential developments of 20 or more dwellings or 20 or more parking spaces
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility
- Amend E38.8.1.2(4)(a) to require a minimum pedestrian access width of 1.35m and correct nomenclature (use of “metre” is inconsistent with other aspects of E27 and E38).

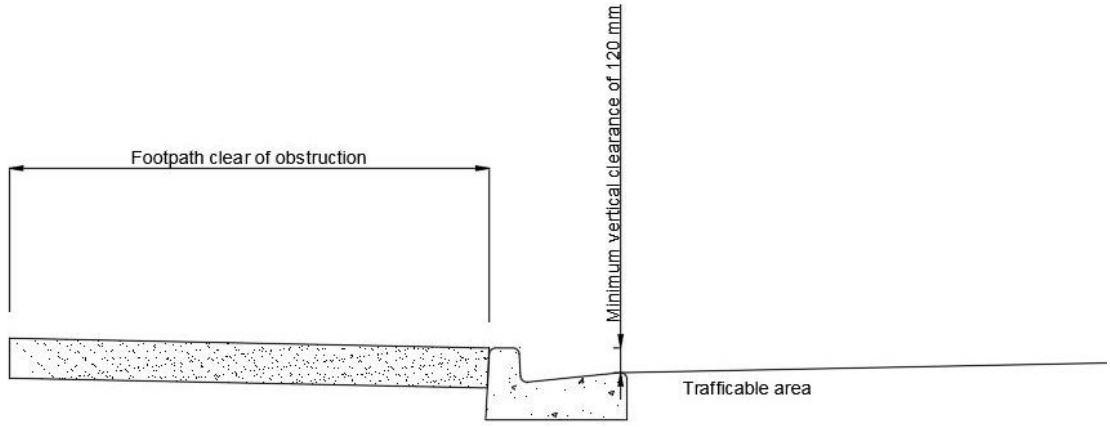
7 ISSUE 1B: INADEQUATE SEPARATION OF PEDESTRIAN ACCESSES FROM TRAFFICABLE AREAS

The AUP identifies that, where pedestrian accesses are required within private residential accessways, the pedestrian access does not require separation from trafficable areas.

- Table E27.6.4.3.2 (T151) identifies that pedestrian accesses may be located within the formed driveway
- Standard E38.8.1.2.(4)(c) identifies that pedestrian accesses may be distinguished from the vehicle carriageway through the use of a raised curb or different surface treatment.

When pedestrian accesses are separated from trafficable areas, this is typically achieved using a kerb and channel, as shown in Figure 12. The height of the kerb is generally at least 120mm (Auckland Transport Type 3 kerb and channel[29]).

Figure 12: Vertical separation of pedestrian accesses



7.1 Problem statement

We have considered the following aspects of the existing provisions.

- Does the lack of physical separation of pedestrian accesses within private accessways lead to adverse pedestrian safety outcomes?

7.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Auckland Transport (AT): Transport Design Manual (TDM) – Engineering Design Code
- Waka Kotahi Pedestrian Network Guidance (2021)

[29] Auckland Transport Kerb and Channels Standard Engineering Details, available online at https://at.govt.nz/media/1982218/kerb-design.pdf

- Auckland Design Manual
- Research regarding run over accidents in driveways
- Safekids New Zealand Position Paper: Child driveway run over injuries
- Data from Council's Rear Site Monitoring.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- physical separation of footpaths is seen as a necessity in some design guidance documents, however other documents allow for non-separation where vehicle speeds are less than 30 km/hr
- even at slow speeds, children can be seriously injured or killed by vehicles, and the separation of footpaths from vehicle areas reduces the risk to children
- the lack of dedicated footpaths for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers
- most consented developments of between 10 and 19 dwellings have unseparated pedestrian accesses on one side of the carriageway
- around half of consented developments with 20 or more dwellings provide pedestrian accesses that are separated from the carriageway.

7.2.1 Auckland Transport: Transport Design Manual – Engineering Design Code

The AT TDM Engineering Design Code: Footpath Pedestrian Facilities and Public Realm[30] does not anticipate footpaths that are not physically separated from trafficable areas. Section 3 identifies that they *may* be separated by kerbs or road margins (our emphasis added), however we interpret the "may" as the TDM providing examples of "how" to separate, and not an indication of whether separation is optional. The TDM does not address private vehicle and/or pedestrian accessways.

7.2.2 Waka Kotahi Pedestrian Network Guidance (2021)

The Waka Kotahi Pedestrian Network Guidance (2021) safe system design[31] states that the design of places where pedestrians are present should align with Safe System principles. In general, safe system aligned measures for pedestrians either

- separate pedestrians from motor vehicles and other high-speed traffic (including cyclists), or
- ensure impact speeds in the case of a collision are no greater than 30km/h.

[30] Auckland Transport Engineering Design Code: Footpath Pedestrian Facilities and Public Realm Version 1: Section 3: Footpaths & pedestrian facilities. Available online at https://at.govt.nz/media/1985456/5794-tdm-engineering-design-code-footpath-pedestrian-facilities-and-public-realm-version-1.pdf

[31] Waka Kotahi Pedestrian network guidance, available online at https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/design/pedestrian-design-principles/safe-system-design/

7.2.3 Auckland Design Manual

The Auckland Design Manual[32] references the Global Street Design Guide for design guidance on footpaths. This resource identifies that footpaths should be delineated by a vertical or horizontal separation from moving traffic to provide adequate buffer space and a sense of safety for pedestrians[33].

7.2.4 Research regarding run over accidents in driveways

As discussed in Section 5, the lack of dedicated footpaths for pedestrians, separate from vehicles, has been found to result in a twofold increase in risk of driveway runovers.

7.2.5 Safekids New Zealand Position Paper: Child driveway run over injuries

The Safekids New Zealand Position Paper: Child driveway run over injuries[34] discusses the factors contributing to injury and death of children from vehicles in private driveways. It notes that injuries from vehicles moving at slow speed over children on private driveways is a persistent problem in New Zealand. It found that separating the pedestrian pathway led to a reduction in the risk of driveway injury.

7.2.6 Data from Council's Rear Site Monitoring

Data from Council's Rear Site Monitoring (discussed in Section 3) relating to the provision of pedestrian accesses within private accessways is shown in Table 6 and Figure 13. This shows that

- 52% of developments analysed provided separation via different surface materials
- 12% of developments analysed provided separation via raised kerbing
- 7% of developments analysed provided separation via landscaping
- 1% of developments analysed provided separation via railing or balustrade
- 1 % of developments analysed provided separation via a combination of methods
- 1% of developments analysed provided separation via paint markings.

Table 6: Breakdown of sampled resource consent footpath separation from carriageway

How is footpath differentiated	Number of developments consented	Percentage of consented developments
N/A	35	24%
Different surface material	76	52%
Railing or balustrade	2	1%
Raised kerbing	17	12%

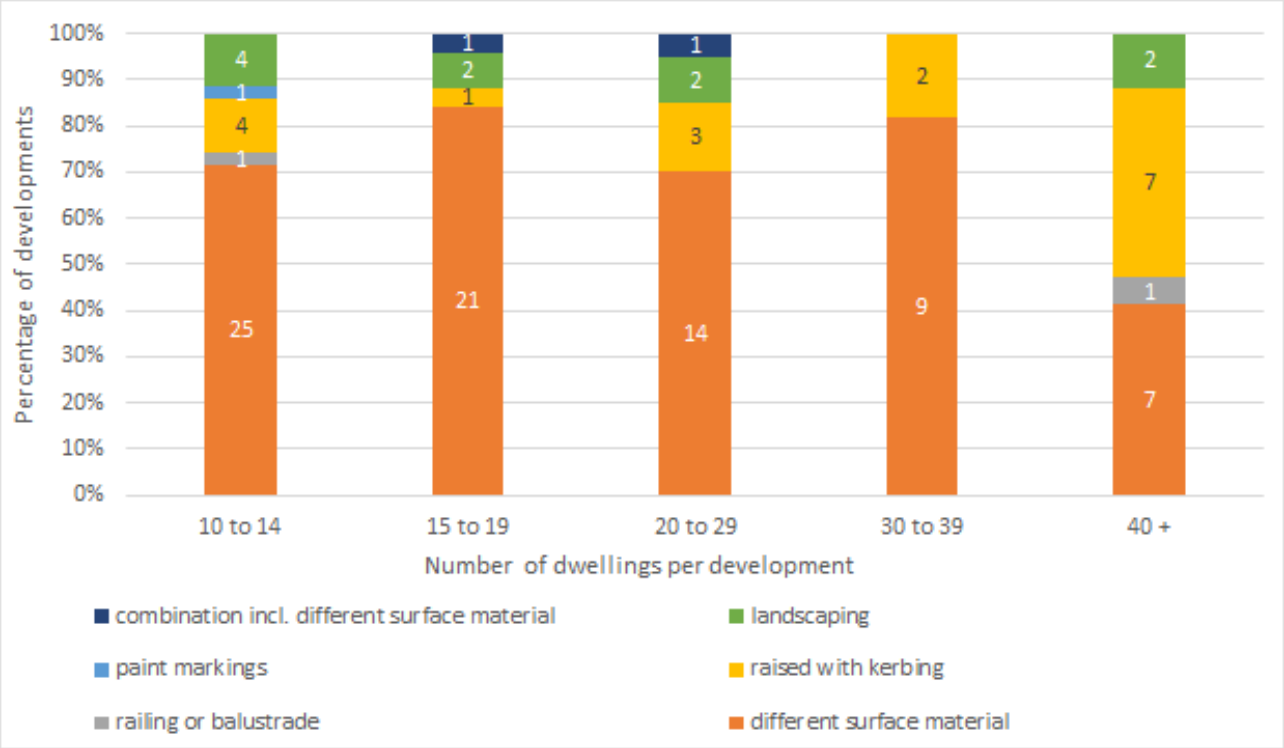
[32] Auckland Design Manual: Street Design, available online at https://www.aucklanddesignmanual.co.nz/streets-and-parks/street-design

[33] Global Street Design Guide, available online at https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/designing-for-pedestrians/sidewalks/design-guidance/

[34] Safekids New Zealand (2011) Safekids New Zealand position paper: Child driveway run over injuries, available online at https://media.starship.org.nz/download-safekids-position-paper-child-driveway-run-over-injuries-2011%3E%3E/Safekids_NZ_Position_Paper_Child_Driveway_Run_Over_Injuries_FINAL_Web.pdf

Paint marking	1	1%
Landscaping	10	7%
Combination (including different surface material)	2	1%
Unknown	1	1%
No footpath	1	1%
Total	145	100 %

Figure 13: Data of pedestrian access provision within private accessways for consented developments



7.3 Consideration of options to address this issue

We have considered the following options outlined in Table 7.

Table 7: Consideration of options – separation of pedestrian accesses

Option	Discussion
1: Do nothing	We rejected this option. Lack of separation results in negative safety and amenity outcomes for pedestrians. This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).
2: Amend the operative provisions to require separation for all pedestrian accesses within private accessways, when a pedestrian	We accepted this option. This reduces the risk of pedestrian injury due to run-overs.

access is required by the operative provisions.	
3: Introduce a new requirement for pedestrian access separation only for private accessways serving larger residential developments.	We rejected this option. Providing separation only for larger developments results in negative safety and amenity outcomes for pedestrians that fall under the threshold, but still require a pedestrian access. This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).

7.4 Conclusion

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of providing safe pedestrian accesses for people of all ages and abilities. We consider that pedestrian accesses should be separated from trafficable areas (including carriageways and manoeuvring spaces), to achieve a high level of amenity and safety for pedestrians and provide for access for people of all ages and abilities, in accordance with Policies B23.2.(1)(d) and B2.3.2.(2)(a).

We recommend the following amendments E27 and E38

- Amend Table E27.6.4.3.2 (T151) to remove reference to pedestrian access.
- Add Standard E27.6.6.3 to identify that pedestrian access must be vertically separated from trafficable areas (including manoeuvring areas associated with parking).
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility.
- Amend E38.8.1.2.(3) and (4) to require that the pedestrian access is separated from trafficable areas, and reference Standard E27.6.6.3.

8 ISSUE 1C: INADEQUATE MAXIMUM PEDESTRIAN ACCESS GRADIENT

The AUP identifies maximum vehicle accessway gradients, which are reproduced in Table 8.

Table 8: Maximum accessway gradients (operative provisions)

Maximum Gradient	E27	E38
1:4 (25%)	1 rear residential site Table E27.6.4.4.1(T156A)	1 rear residential site Table E38.8.1.2.1
1:5 (20%)	Any other residential activity Table E27.6.4.4.1(T157)	2 to 10 rear residential sites Table E38.8.1.2.1
1:8 (12.5%)	Any Vehicle access used by heavy vehicles Table E27.6.4.4.1(T158)	N/A

Neither Chapter identifies maximum gradients for pedestrian accesses.

8.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the operative provisions of E27 and E38 adequate to ensure that pedestrian access gradients are appropriate for the types of users?

8.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Ministry for the Environment: National medium density design guide
- Auckland Transport: Transport Design Manual – Engineering Design Code
- Waka Kotahi Pedestrian Network Guidance (2021).

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- the maximum recommended pedestrian access gradient for private residential development is 1:20 (5%)
- the maximum footpath gradient for public roads is 1:12.5 (8%)
- rest areas should be provided for footpaths with a gradient exceeding 1:33.3 (3%), and the acceptable maximum length of a continuous grade decreases with increasing gradient
- steps are good for reducing the distance pedestrians have to walk in areas with steep terrain (compared to a switchback ramp), but are a barrier to people with impaired mobility or people with pushchairs. There should be a step-free option wherever steps are provided.

8.2.1 Ministry for the Environment: National medium density design guide

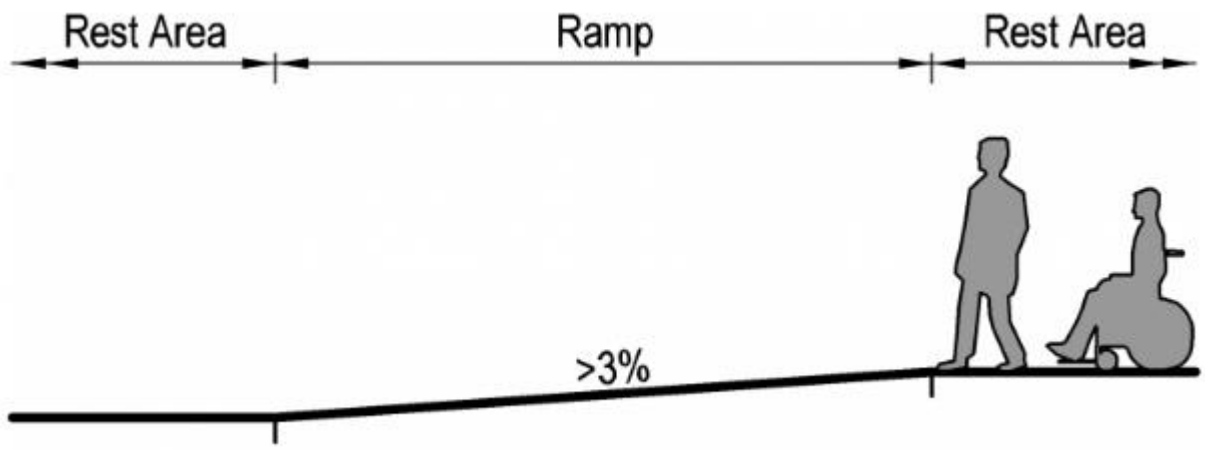
The National medium density design guide[35] provides guidance for the design and development of medium-density housing in Aotearoa New Zealand, particularly small-scale property owners or those with limited experience in more complex residential developments.

In Section 1 it recommends that entrance pedestrian accesses to residential developments have a gradient of less than 1:20 (5%).

8.2.2 Auckland Transport: Transport Design Manual – Engineering Design Code

The AT TDM Engineering Design Code: Footpath Pedestrian Facilities and Public Realm[36] states that the maximum gradient for new footpaths is 1:12.5 (8%). The Design Code intensifies that, for footpaths exceeding gradients of 3%, rest areas should be provided as summarised in Table 9 and shown in Figure 14.

Figure 14: Example of rest areas, required when footpath gradients exceed 3%



8.2.3 Waka Kotahi Pedestrian Network Guidance (2021)

The Waka Kotahi Pedestrian Network Guidance provides best practice for planning, designing and creating walkable communities throughout New Zealand. Guidance on the maximum gradients for footpaths areas are provided and are of relevance to private shared accessways.

[35] Ministry for the Environment: Ngā tohutohu hoahoa ā-motu mō te wharenoho mātoru-waenga National medium density design guide. Available online at https://environment.govt.nz/assets/publications/national-medium-density-design-guide-31May2022.pdf

[36] Auckland Transport Engineering Design Code: Footpath Pedestrian Facilities and Public Realm Version 1: Section 3.4 Footpath gradients. Available online at https://at.govt.nz/media/1985456/5794-tdm-engineering-design-code-footpath-pedestrian-facilities-and-public-realm-version-1.pdf

The Waka Kotahi Pedestrian Network Guidance (2021)[37] identifies that, for footpaths exceeding gradients of 3%, rest areas should be provided, as summarised in Table 9. Further, it recommends that footpaths do not exceed 1:12.5 (8%). It notes that steps are good for reducing the distance pedestrians have to walk in areas with steep terrain (compared to a switchback ramp) but are a barrier to people with impaired mobility. There should be a step-free option wherever steps are provided.

A summary of Auckland Transport standards and Waka Kotahi guidance is provided in Table 9.

Table 9: Maximum pedestrian rest area spacing

Maximum Gradient	Auckland Transport standard	Waka Kotahi Guidance
1:33.3 (3%)	No rest area required	No rest area required
1:25 (4%)	120m between rest areas	19m between rest areas
1:20 (5%)	45m between rest areas	15m between rest areas
1:16.7 (6%)	N/A	13m between rest areas
1:14.3 (7%)	N/A	11m between rest areas
1:12.5 (8%)	N/A	9m between rest areas
1:10 (10%)	9m between rest areas, by departure from standard only	N/A
1:8 (12.5%)	3m between rest areas, by departure from standard only	N/A

8.3 Consideration of options to address this issue

We have considered the following options outlined in Table 10.

Table 10: Consideration of options – maximum pedestrian access gradient

Option	Discussion
1: Do nothing	We rejected this option. The gradient permitted by the operative provisions is too steep for some users (e.g. people with prams and young children, people in wheelchairs, people with bulky goods/items). This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).
2: Amend the operative provisions to identify a maximum pedestrian access gradient, when a pedestrian access is otherwise required by the operative provisions.	We accepted this option. We recommend a maximum gradient of 1:12.5 (8%) and identify the requirement for rest areas where pedestrian accesses exceed a gradient of 1:33.3 (3%). Where the pedestrian access includes steps, a step-free option must be provided.

[37] Waka Kotahi Pedestrian network guidance, available online at https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/design/paths/footpath-design-other-elements/ramps-and-stairs/

Table 10: Consideration of options – maximum pedestrian access gradient

Option	Discussion
	This is consistent with AT and Waka Kotahi design guidance, and ensures that pedestrian accesses can be accessed by users with mobility impairments.
3: Introduce new provisions in E27 that require maximum pedestrian access gradients only for more intensive development.	We rejected this option. The gradient permitted by the operative provisions is too steep for some users (e.g. people with prams and young children, people in wheelchairs, people with bulky goods/items). This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).

8.4 Conclusion

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of providing pedestrian access gradients that are accessible for people of all ages and abilities. We consider that the AUP should identify a maximum pedestrian access gradient, to provide access for people of all ages and abilities, in accordance with Policy B2.3.2.(2).

We recommend the following amendments E27 and E38

- Add Table E27.6.6.2 to identify
  - a maximum permitted pedestrian access gradient of 1:20 (5%) over a maximum length of 45m
  - a maximum permitted pedestrian access gradient of 1:12.5 (8%) over a maximum length of 9m
  - a requirement for rest areas at either end of these gradients.
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility.
- Amend E38.8.1.2.(4) to reference Standard E27.6.6.3.

9 ISSUE 1D: INADEQUATE PROTECTION OF PEDESTRIAN ACCESSES FROM OBSTRUCTIONS

The AUP identifies that clear corridors must be provided for vehicle accessways.

- Table E27.6.4.4.2 identifies that minimum formed access widths are
  - (T149) 2.5m for 1 – 2 parking spaces provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3m
  - (T150) 3.0m for 3 – 9 parking spaces provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3.5m.

Neither E27 nor E38 identify a requirement for clear corridor widths for pedestrian accesses.

9.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the operative provisions of E27 and E38 adequate to ensure that pedestrian accesses are designed to be clear of obstructions and trip hazards?

9.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Auckland Transport: Transport Design Manual – Engineering Design Code
- Waka Kotahi Pedestrian Network Guidance (2021)
- Case studies.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- developments are being consented with obstructions in pedestrian accesses, such as letter boxes and lighting poles and bins (refer to Section 13 for our discussion of waste collection)
- this results in obstacles and trip hazards for pedestrians.

9.2.1 Auckland Transport: Transport Design Manual – Engineering Design Code

The AT TDM Engineering Design Code: Footpath Pedestrian Facilities and Public Realm[38] provides minimum footpath dimensions and indicates that a footpath of at least 1.8m wide is required for through routes. Obstructions such as poles should be relocated where practicable. The width of pedestrian accesses may only be reduced where existing site constraints do not allow widening to be achieved. The through route must be kept clear of obstructions to allow path users to pass.

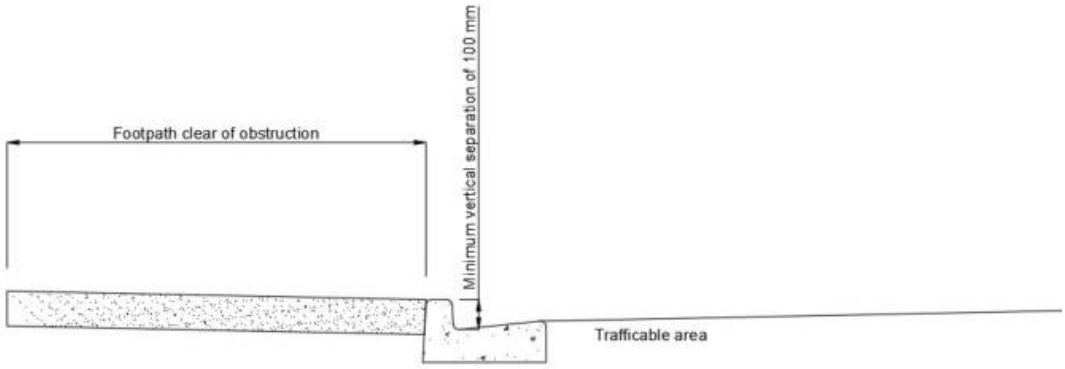
[38] Auckland Transport Engineering Design Code: Footpath Pedestrian Facilities and Public Realm Version 1: Section 5.3 Longitudinal Gradients. Available online at https://at.govt.nz/media/1985456/5794-tdm-engineering-design-code-footpath-pedestrian-facilities-and-public-realm-version-1.pdf

9.2.2 Waka Kotahi Pedestrian Network Guidance (2021)

The Waka Kotahi Pedestrian Network Guidance (2021)[39] provides pedestrian planning principles and design guidance to allow for the safe and obvious movement of all users. The principles related to obstructions of pedestrian accesses are summarised below

- Pedestrian routes should be free from obstacles and trip hazards
- Footpath dimensions and geometry should provide access for all
- Sufficient width should be allowed for different users to pass each other, at least 1.8 m width is required for two wheelchairs to pass each other comfortably.

Figure 15: Footpath cross section that should be free from obstruction



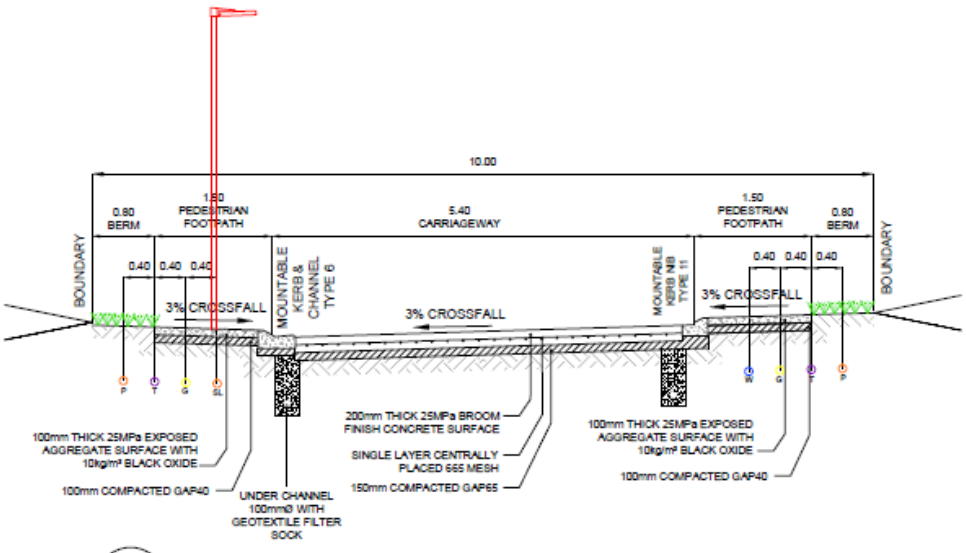
9.2.3 Case studies

We understand from Council staff that residential developments are being consented with letter boxes, light poles, and other obstructions within the pedestrian access. Examples are shown in Figure 16 and Figure 17. While these developments comply with the pedestrian access requirements of E27 and E38, the obstructions limit the function of the pedestrian accesses.

[39] Waka Kotahi Pedestrian network guidance, available online at https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/

Figure 16: Example of pedestrian access obstruction due to lighting column and letterbox, Tokai Place, Glen Eden

Figure 17: Example of pedestrian access obstruction due to lighting column, 79 College Road, St Johns



9.3 Consideration of options to address this issue

We have considered the following options outlined in Table 11.

Table 11: Consideration of options – Clear corridor requirements for pedestrian accesses

Option	Discussion
1: Do nothing	We rejected this option. This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).
2: Amend the operative provisions to identify a horizontal clear corridor requirement for all pedestrian accesses within private accessways	We accepted this option. The operative provisions are failing to ensure that pedestrian accesses within private accessways are free from obstructions and trip hazards.
3: Amend the operative provisions to identify a vertical clear corridor requirement for all pedestrian accesses within private accessways	We rejected this option. Vertical obstructions are not an identified issue for consented developments.

9.4 Conclusion

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that pedestrian accesses within private accessways are designed to be free from obstructions. We consider that the AUP should identify that pedestrian accesses are designed to be free of obstructions to achieve a high level of amenity and safety for pedestrians and provide for access for people of all ages and abilities in accordance with Policies B2.3.2.(1)(d) and (2)(a).

We recommend the following amendments E27 and E38

- Add Standard E27.6.6.3 to identify that pedestrian accesses must be designed to be clear of obstructions.
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility.
- Amend E38.8.1.2.(4) to reference Standard E27.6.6.3.

10 ISSUE IE: INADEQUATE PROVISION OF PEDESTRIAN ACCESSES

The AUP identifies that pedestrian accesses should be provided as follows.

- Table E27.6.4.3.2 for accessways that serve 10 or more parking spaces
- Standard E38.8.1.2.(3) for accessways serving six to ten rear sites.

Neither Chapter identifies a requirement for pedestrian accesses based on accessway length, or situations where pedestrian accesses should be provided on both sides of the accessways.

10.1 Problem statement

We have considered the following aspects of the existing provisions

- Should private accessways provide a pedestrian access when the accessway exceeds a certain length?
- Should private accessways provide a pedestrian access on both sides of the accessway when the accessway serves a certain number of dwellings or car parking spaces?

10.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- NZS4404:2010 - Land Development and Subdivision Infrastructure
- Safety research
- Data from Council's Rear Site Monitoring.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- NZS4404:2010 recommends that a footpath is on both sides of an accessway, when the accessway serves more than 20 dwellings, or is more than 100m long
- Even at slow speeds, children can be seriously injured or killed by vehicles, and the separation of footpaths from vehicle areas reduces the risk to children
- The lack of dedicated footpaths for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers
- Driveways exceeding 12 metres in length result in twofold increase in risk for driveway runovers
- The majority of developments with 10 or more dwellings provide a pedestrian access on one side of the carriageway
- However, very few developments provide pedestrian accesses on both sides of the carriageway, even those serving 20 or more dwellings.

10.2.1 NZS4404:2010 Land Development and Subdivision Infrastructure

NZS4404:2010 Table 3.2 – Road Design Standards identifies that footpaths should be provided on both sides of a public road when the road serves more than 20 dwellings, or is more than 100m long

(Suburban Live and Play, Primary access to housing, 1 – 200 dwelling typology). Section 3.3.16 notes that Table 3.2 should be used as a guide for the design of private accessways.

10.2.2 Research regarding run over accidents in driveways

As discussed in Section 5

- the lack of dedicated footpaths for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers
- driveways exceeding 12 metres in length result in twofold increase in risk for driveway runovers.

10.2.3 Data from Council's Rear Site Monitoring

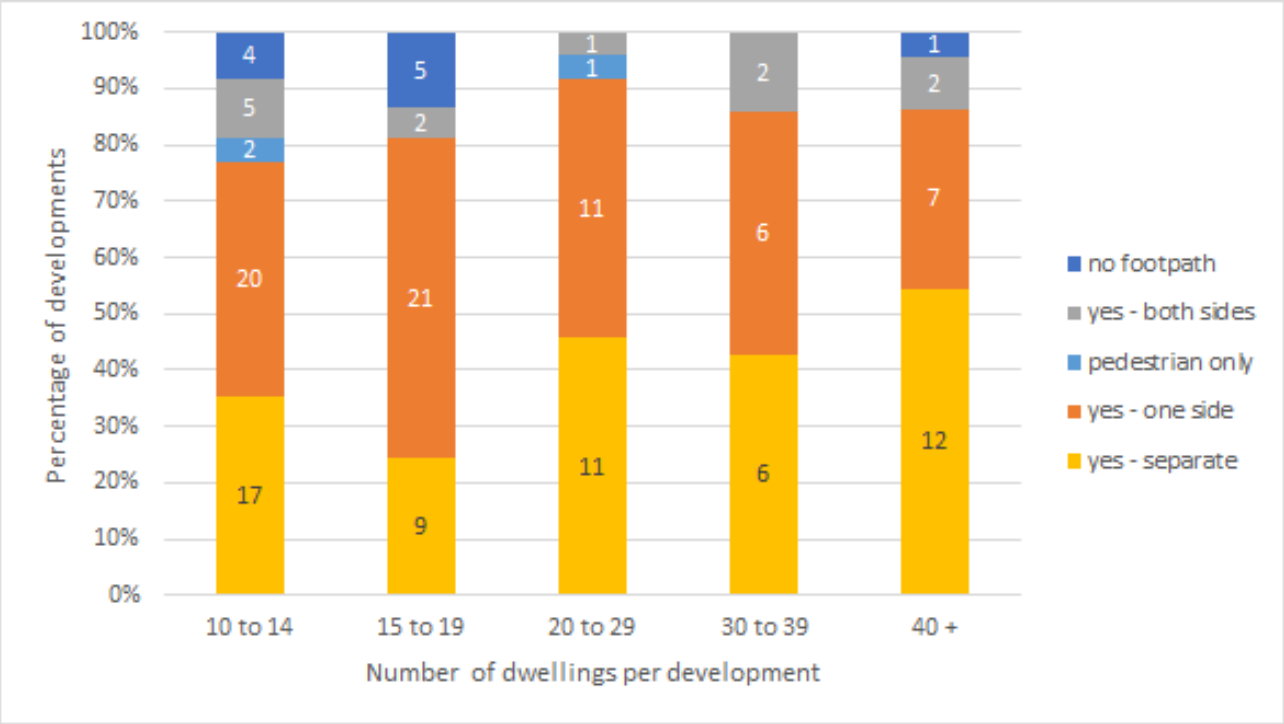
Data from Council's Rear Site Monitoring (discussed in Section 3) relating to the provision of pedestrian accesses within private accessways is shown in Table 12 and Figure 18. This shows that

- 7% of developments provided no pedestrian access at all, including one development of more than 50 dwellings
- The majority of developments with 10 or more dwellings provide a pedestrian access on one side of the carriageway
- Very few developments provide pedestrian accesses on both sides of the carriageway, even those serving 20 or more dwellings.

Table 12: Breakdown of sampled resource consent footpath provision

Footpath provision	Number of developments consented	Percentage of consented developments
No footpath	10	7%
Footpath on one side	65	45%
Footpath on both sides	12	8%
Separated footpath	55	38%
Pedestrian only access	3	2%
Total	145	100 %

Figure 18: pedestrian access provision vs developments of different sizes



10.3 Consideration of options to address this issue

We have considered the following options outlined in Table 13.

Table 13: Consideration of options – pedestrian access provision

Option	Discussion
1: Do nothing	We rejected this option. This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).
2: Amend the operative provisions to identify a requirement that pedestrian accesses connect to every dwelling, when more than 20 dwellings or parking spaces are served.	We accepted this option. The operative provisions are failing to ensure that pedestrian accesses are provided on both sides of private accessways for larger developments. This option ensures that every dwelling has access to a pedestrian access. For instances where dwellings are only on one side of an accessway, only one pedestrian access would be required. However, when dwellings access on both sides of an accessway, a pedestrian access would be required on either side.
3: Amend the operative provisions to identify a requirement for a pedestrian access when the accessway is more than 100m long.	We rejected this option. Investigations into child safety have linked the length of accessways and the lack of pedestrian accesses with increased risk of serious injury and death. However, our amendments proposed in Section 6 and Section 11, which introduce improved design standards when pedestrian accesses are required, and better speed

	calming measures to control driver speeds and awareness, will improve pedestrian safety within longer accessways.

10.4 Conclusion

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that pedestrian accesses are provided in all situations where they would otherwise be expected.

We consider that the AUP should identify that pedestrian accesses connect to every dwelling for accessways that serves more than 20 dwellings or 20 car parking spaces. We consider that this achieves a high level of amenity and safety for pedestrians and provide for access for people of all ages and abilities in accordance with Policies B2.3.2.(1)(d) and (2)(a).

We recommend the following amendments E27 and E38

- Add Standard E27.6.6.3 to identify that pedestrian accesses must connect to all dwellings, where an accessway serves 20 or more dwellings or 20 or more parking spaces.
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety, accessibility, and desire lines.

11 ISSUE 2A: INADEQUATE SPEED MANAGEMENT MEASURES

The AUP identifies that speed management measures should be considered as follows

- Table E38.8.1.2.1 Note 1: For accessways greater than 50 metres in length speed management measures should be considered.

Chapter E27 makes no reference to speed management measures for accessways.

11.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the operative provisions of E27 and E38 adequate to ensure that vehicle speeds in longer accessways are controlled to a safe limit?

11.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Auckland Transport: Transport Design Manual – Engineering Design Code
- Waka Kotahi Guidance
- Research regarding run over accidents in driveways
- Councils' Waste Planning Specialists
- Council research on average residential site width, depth and area within walkable catchments
- Research paper - Investigating speed patterns and estimating speed on traffic calmed streets.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- Driveways exceeding 12 metres in length result in a twofold increase in risk for driveway runovers
- Speed is a major factor in the severity of injury and likelihood of death when a driver of a vehicle collides with a pedestrian
- Impact speeds should be limited to no more than 30 km/hr, to reduce the likelihood of serious injury or death for pedestrians
- Even at slow speeds, children can be seriously injured or killed by vehicles (refer to Section 7)
- Speed management measures should be spaced at no more than 60 m spacing to encourage driver speeds of 30 km/hr. Spacing of around 30m is required to achieve speeds of around 20 km/hr
- Council research to identify the length of a typical residential site within the walkable catchments of Rapid Transit Network (RTN) stations in Auckland identified that 92% of sites are less than 50m in length
- Councils' Waste Planning Specialists identified that any speed calming measures within private accessways need to consider heavy vehicle access, where on site waste collection is required.

11.2.1 Auckland Transport: Transport Design Manual – Engineering Design Code

The AT TDM Engineering Design Code: Traffic Calming[40] identifies the maximum spacing of speed management devices to control vehicle speeds to around 30km/h as follows

- Speed humps, raised table, chicane (one lane flush) – 60m spacings
- Chicane (one lane raised) and roundabouts – 100m spacing.

The TDM further notes that the following measures are not effective for 30km/h speed environments

- Chicane (two way)
- Traffic islands
- Build-outs or side islands.

11.2.2 Waka Kotahi Guidance

The Waka Kotahi Speed Management guide toolbox[41] summarises treatments for accessway speed management to ensure the speed is kept below 50km/h.

No information on the recommended spacing of these treatments is provided, but reference is made to the Auckland Transport guidance provided above.

11.2.3 Research regarding run over accidents in driveways

As discussed in Section 5, driveways exceeding 12 metres in length result in a twofold increase in risk for driveway runovers.

11.2.4 Input from Councils' Waste Planning Specialists

Councils' Waste Planning Specialists identified that any speed calming measures within private accessways need to consider heavy vehicle access, where on site waste collection is required.

11.2.5 Council research on average residential site width, depth and area within walkable catchments

Council has undertaken research[42] to identify the width, length and area of a typical residential site within the walkable catchments of Rapid Transit Network (RTN) stations in Auckland, to inform Council's relevant work streams to amend the AUP to fulfil the requirements of Policy 3 of the National Policy Statement on Urban Development (NPSUD). This research is attached as Appendix B.

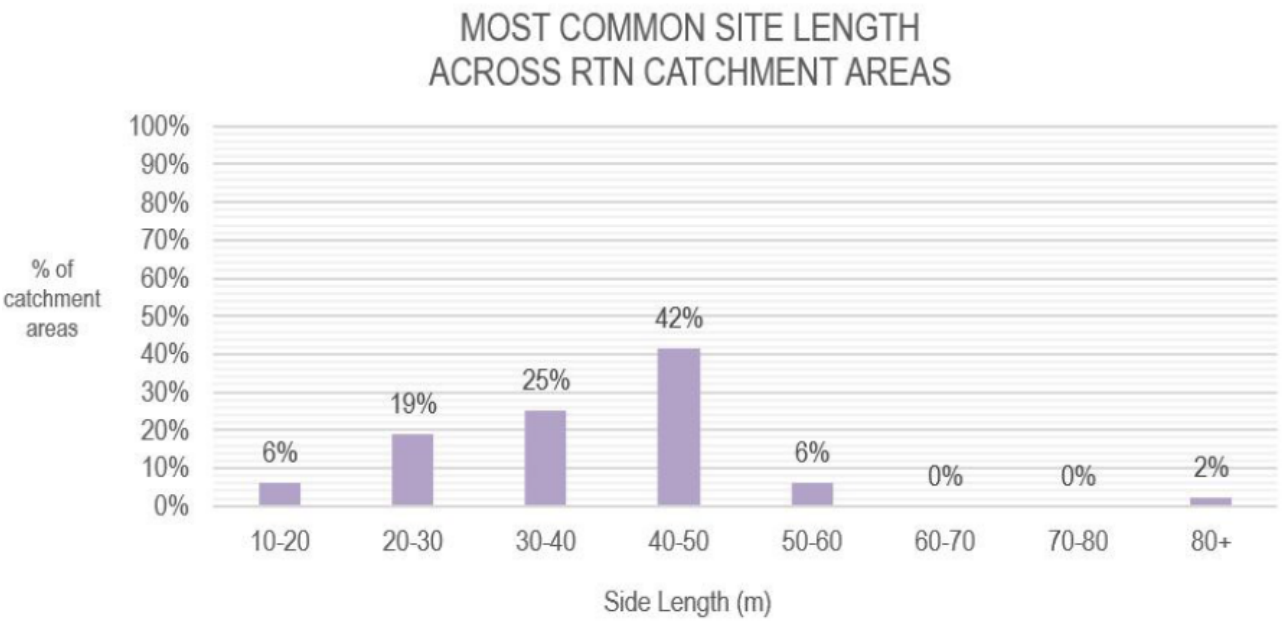
The data for site length is reproduced in Figure 19. The most common site length (42%) of the residential freehold sites throughout the walkable catchments is between 40m and 50m, and only 8% of sites are more than 50m in length.

[40] Auckland Transport Engineering Design Code: Footpath Pedestrian Facilities and Public Realm Version 1: Section 2 Planning the use of traffic calming. Available online at https://at.govt.nz/media/1985457/5794-tdm-engineering-design-code-traffic-calming-version-1.pdf

[41] Waka Kotahi Speed Management Guide, Volume 2: toolbox – how to implement treatments and activities, 2016. https://www.nzta.govt.nz/assets/Safety/docs/speed-management-resources/speed-management-toolbox-and-appendices-201611.pdf

[42] Width of an average or 'typical' residential site within walkable catchments in Auckland", Council research, dated April 2022

Figure 19: Site side access length across rapid transit network catchment areas



This research is important when considering the spacing at which speed management measures should be implemented. Using 60m spacing, as per Auckland Transport standards, would only capture around 2% of sites.

11.2.6 Research paper - Investigating speed patterns and estimating speed on traffic calmed streets[43]

This research was undertaken by students and staff at Canterbury University and presented at the Institute of Professional Engineers New Zealand (now Engineering New Zealand) conference in March 2011.

It examines the speed profiles of individual vehicles on traffic-calmed streets, in order to provide a better understanding of how drivers react to calming devices over an extended street length and to find ways of estimating speeds along traffic-calmed streets.

Results indicated that traffic-calmed streets do not necessarily promote low speed environments, with larger spacing between devices producing higher driver speeds.

The relationship between speed and spacing between calming devices was best explained through linear regression modelling. Eight pairs of speed humps and nine pairs of speed tables were studied to derive equations that could be used to predict the 85th percentile (V_{85}) and mean speeds (V_{mean}) midway between these devices. The average device operating speed was set as the intercept, where spacing is effectively zero. Data was from streets that had a 50 km/h speed limit.

[43] Investigating speed patterns and estimating speed on traffic calmed streets, B. Daniel, A. Nicholson and G. Koorey, available online at https://ir.canterbury.ac.nz/bitstream/handle/10092/6294/12637252_Daniel__Basil.pdf?sequence=1&isAllowed=y

Figure 20 and Figure 21 below have been reproduced Figures 4 and 5 from the research, with permission from the authors.

These figures show the regression lines and equations established for speed humps and speed tables respectively. These models demonstrate that vehicle speeds, midway between devices, increase as more space is provided between devices. The speed-spacing model indicates spacing of around 30m between devices, to achieve mean operating speeds of around 20 - 30 km/hr.

Figure 20: Speed-spacing model for speed humps, reproduced from "INVESTIGATING SPEED PATTERNS AND ESTIMATING SPEED ON TRAFFIC-CALMED STREETS"

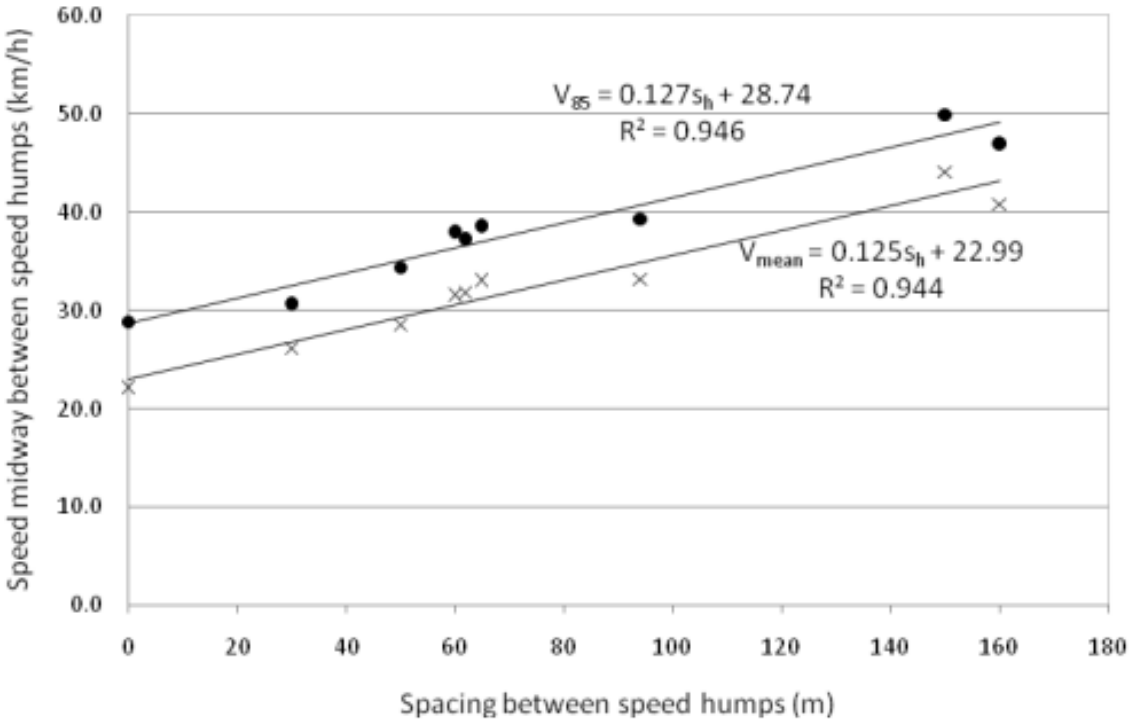


Figure 4: Speed-spacing model for speed humps

Figure 21: Speed-spacing model for speed tables, reproduced from "INVESTIGATING SPEED PATTERNS AND ESTIMATING SPEED ON TRAFFIC-CALMED STREETS"

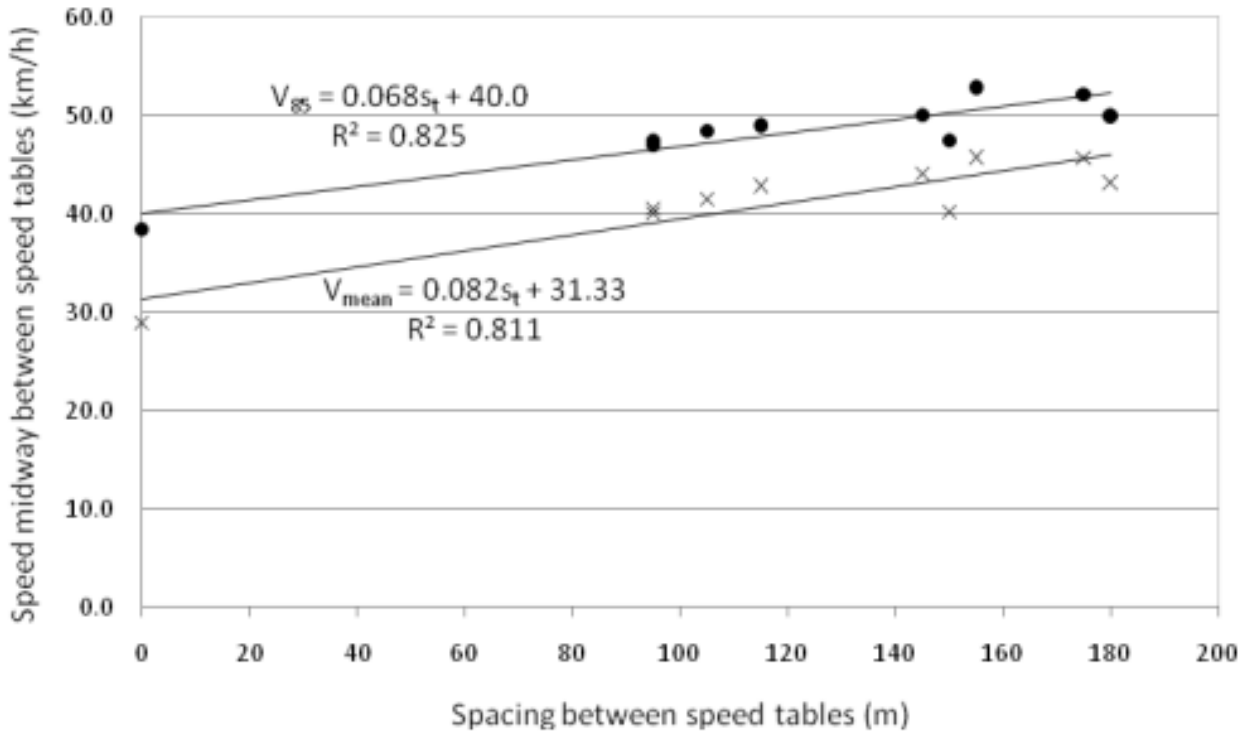


Figure 5: Speed-spacing model for speed tables

11.3 Consideration of options to address this issue

We have considered the following options outlined in Table 14.

Table 14: Consideration of options – speed management measures

Option	Discussion
1: Do nothing	We rejected this option. Longer accessways without speed management measures can encourage higher vehicle speeds and result in negative safety and amenity outcomes for pedestrians. This is inconsistent with Policies B2.3.2.(1)(d) and (2)(a).
2: Amend E27 to reflect the consideration given to speed management in E38	We rejected this option. The operative provisions of E38 are not directive, and only require consideration of speed management.
3: Amend E27 and E38 to require speed management at a maximum of 30m spacing to achieve a maximum operating speed of less than 30 km/hr.	We accepted this option. This provides for pedestrian safety and amenity and supports access for all ages and abilities. While guidance recommends 60m spacing of devices to achieve a 30 km/hr speed, we recommend that 30m spacing is adopted to achieve speeds lower than 30 km/hr. We consider it

Table 14: Consideration of options – speed management measures

Option	Discussion
	appropriate to design private accessways to operate at less than 30 km/hr. Further, to reduce the risk of injury to pedestrians on the public footpath, we recommend that the first speed management device is located not more than 15m from the site boundary with the legal road.

11.4 Conclusion

Speed is a major factor in the severity of injury and likelihood of death when a driver of a vehicle collides with a pedestrian. Impact speeds should be limited to less than 30 km/hr, to reduce the likelihood of serious injury or death for pedestrians.

We conclude that the operative provisions of E27 and E38 are not fit for purpose in terms of ensuring that vehicle speeds within private accessways are controlled to less than 30 km/hr. We consider that the AUP should identify that speed management measures should be provided in private accessways, to achieve a high level of amenity and safety for pedestrians and provide for access for people of all ages and abilities in accordance with Policies B2.3.2.(1)(d) and (2)(a).

We recommend the following amendments E27 and E38

- Add Table E27.6.4.3.3 identifying speed management requirements for accessways exceeding 30m in length.
- Add a Note below Table E27.6.4.3.3 identifying the need to consider heavy vehicle requirements when designing speed management measures.
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility.
- Remove Table E38.8.1.2.1 Note 1.
- Amend Standard E38.8.1.2. to reference Table E27.6.3.3.

12 ISSUE 2B: FIRE AND EMERGENCY NEW ZEALAND (FENZ) VEHICLE ACCESS

The New Zealand Building Code and FENZ Guidance Document F5-02 CD Designers' guide to firefighting operations[44] identify gradient and formed access width requirements in situations where firefighting vehicle access is required.

Chapters E27 and E38 do not reference these requirements.

12.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the provisions of E38 adequate for rear sites where FENZ fire appliance access is required?
- Are the provisions of E27 adequate for residential development using private accessways where FENZ fire appliance access is required?

12.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- FENZ Guidance Document F5-02 CD Designers' guide to firefighting operations
- New Zealand Building Code (Building Code)
- Case studies.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- FENZ access gradient requirements allow for a maximum gradient of 1:5, where 1:8 cannot reasonably be achieved. This is consistent with Table E27.6.4.4.1 (T158) which permits a maximum gradient of 1:8 where heavy vehicle access is required.
- FENZ guidance and Building Code C/AS1 6.1 specify a minimum formed accessway width of 4.0m. Table E27.6.4.3.2 and Table E38.1.2.1 permit formed widths less than 4.0m
- FENZ guidance and Building Code C/AS1 6.1 specify a minimum vertical clearance of 4.0m. Table E27.6.4.3.5 and Table E38.1.2.1 permit a vertical clearance of 3.8m
- FENZ requires sufficient an inside during radius of 6.3m. This aligns with Table E38.8.1.2.1, which permits a minimum radius of 6.5m
- In some instances, resource consents are approved and at the subsequent building consent stage it is identified that the development provides less than 4.0m formed width where fire service vehicle access is needed

[44] Fire Emergency New Zealand, Designers' guide to firefighting operations – Emergency vehicle access, F5-02 GD, accessed online at https://www.fireandemergency.nz/assets/Documents/Business-and-Landlords/Building-and-designing-for-fire-safety/F5-02-GD-FFO-emergency-vehicle-access.pdf

- While the Building Code specifies minimum formed widths and vertical clearances in C/AS1, following an Acceptable Solution or Verification Method is not mandatory, and alternative approaches can be assessed on a case by case basis.

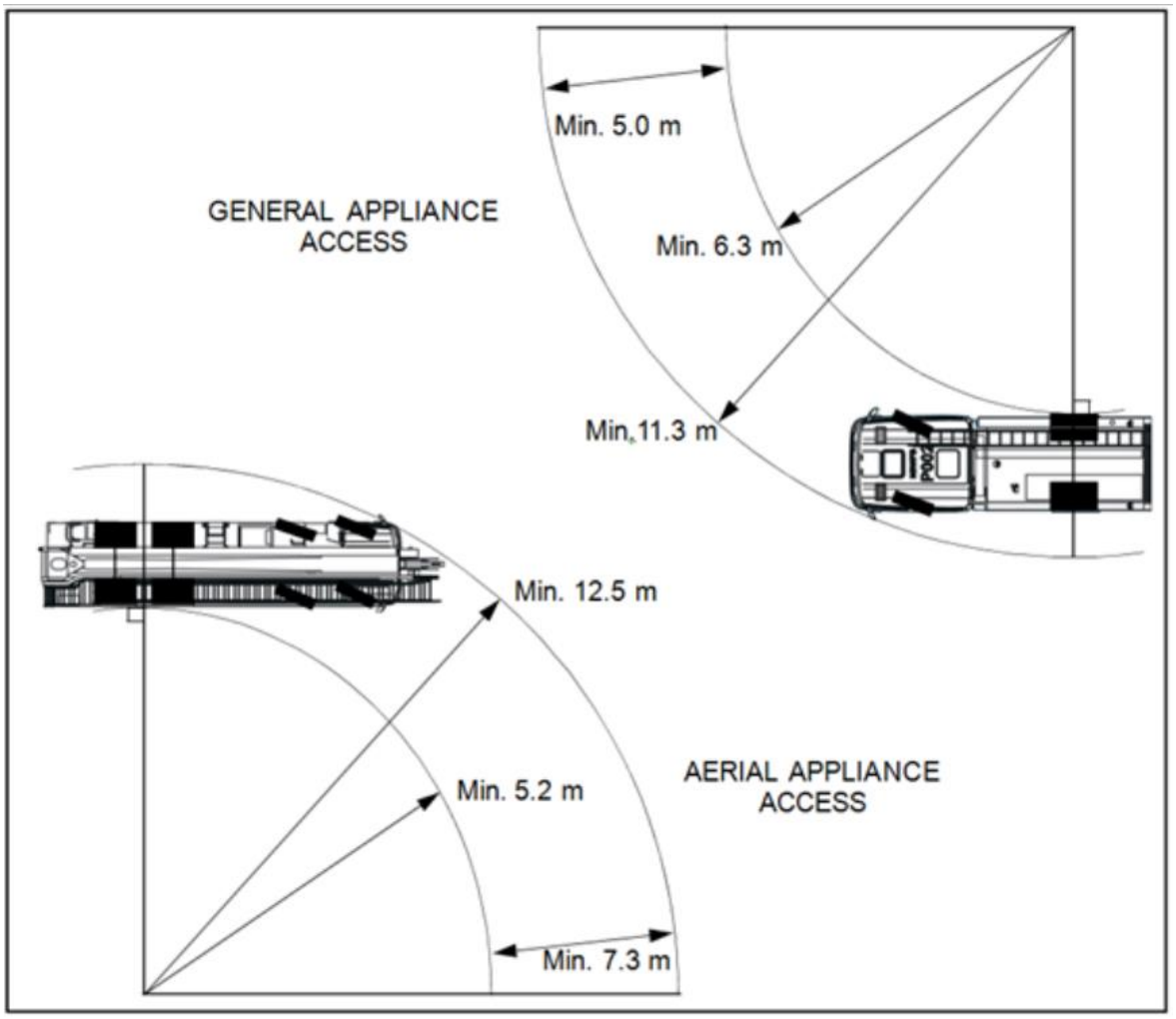
12.2.1 FENZ F5-02 CD Designers' guide to firefighting operations

The FENZ guide[45] provides access requirements for emergency vehicles to access the site and carry out their operations. Key requirements are summarised below.

- Access widths – minimum of 4 m. Width can be reduced to 3.5m at the entrance, provided that no tight turns are required
- Manoeuvring space – Turn around areas should be sufficient so that emergency vehicles do not have to do multi-point turns. Where the carriageway is curved, allowance should be made for expected body swing radii as shown in Figure 22
- Gradients – FENZ vehicles can negotiate a maximum accessway gradient of 1:5, however, gradients of 1:8 or lower are preferred for straight ramps. Curved accessways in plan view should not exceed a gradient of 1:10. Transitions in accessway ramps should be provided between changes in gradient exceeding 1:8
- Clearance heights – Unobstructed clearance heights of at least 4m is required along accessways to allow for vehicles to pass openings.

[45] Designers' guide to firefighting operations Emergency vehicle access F5-02 GD, available online at https://www.fireandemergency.nz/assets/Documents/Business-and-Landlords/Building-and-designing-for-fire-safety/F5-02-GD-FFO-emergency-vehicle-access.pdf

Figure 22: FENZ guidance on turning radii



12.2.2 New Zealand Building Code

The Building Code is contained in regulations under the Building Act 2004. The Building Act governs the building sector and sets out the rules for the construction, alteration, demolition and maintenance of new and existing buildings in New Zealand. All building work in New Zealand must comply with the Building Code (applicable at the time of building), even if it doesn't require a building consent.

Acceptable Solutions and Verification Methods are produced by the Ministry of Building, Innovation and Employment (MBIE) and, if followed, must be accepted by a building consent authority (BCA) as evidence of compliance with the Building Code. Following an Acceptable Solution or Verification Method is not mandatory. They can also be useful when demonstrating how proposed building work will comply as an alternative solution and can be used in part or in comparison alongside other evidence.

Building Code C: Protection from Fire sets out the safety objectives for people, other property and firefighting applied to clauses C2 to C6 of the Building Code. This clause provides objectives that apply to clauses C2 to C6 to: (a) safeguard people from an unacceptable risk of injury or illness caused by fire, (b) protect other property from damage caused by fire, and (c) facilitate firefighting and rescue operations. Of relevance is Clause C5 – Access and safety for firefighting operations.

C/AS1 sets out acceptable solutions for buildings with sleeping (residential) and outbuildings for compliance with NZ Building Code Clauses C1-C6 Protection from Fire and applies to detached dwellings with a single household unit, such as stand-alone houses; low rise multi-unit dwellings where each household unit has its own escape route; and attached townhouses.

Clause 6 sets out fire service vehicular access including:

> *6.1 Fire service vehicular access*
>
> *6.1.1 If buildings that contain multi-unit dwellings with more than 2 units are located remotely from the street boundaries of a property, pavements situated on the property and necessary to be used for vehicular access to a hard-standing within:*
>
> *i) 75 m of any point in any unit contained in the building except if there is a sprinkler system complying with NZS 4515, and*
>
> *ii) 20 m of any inlets to fire sprinkler or building fire hydrant systems, shall*
>
> *a) Be able to withstand a laden weight of up to 25 tonnes with an axle load of 8 tonnes or have a load-bearing capacity of no less than the public roadway serving the property, whichever is the lower, and*
>
> *b) Be trafficable in all weathers, and*
>
> *c) Have a minimum width of 4.0 m, and*
>
> *d) Provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.*

C/AS2 also sets out acceptable solutions for residential units not included in C/AS1 such as apartment buildings and multi-unit buildings where they share escape routes. This has slightly different requirements namely there is no 75m rule. All buildings require a hard stand area within 20m of the fire access into the building and the inlets for sprinklers or hydrants etc.

12.2.3 Case studies

LUC60329130 – 7 McAnnalley Street, Manurewa

This consent was for a five storey apartment complex with 121 residential units, and a one way vehicle accessway, as shown in Figure 23. It was approved on 11 March 2019.

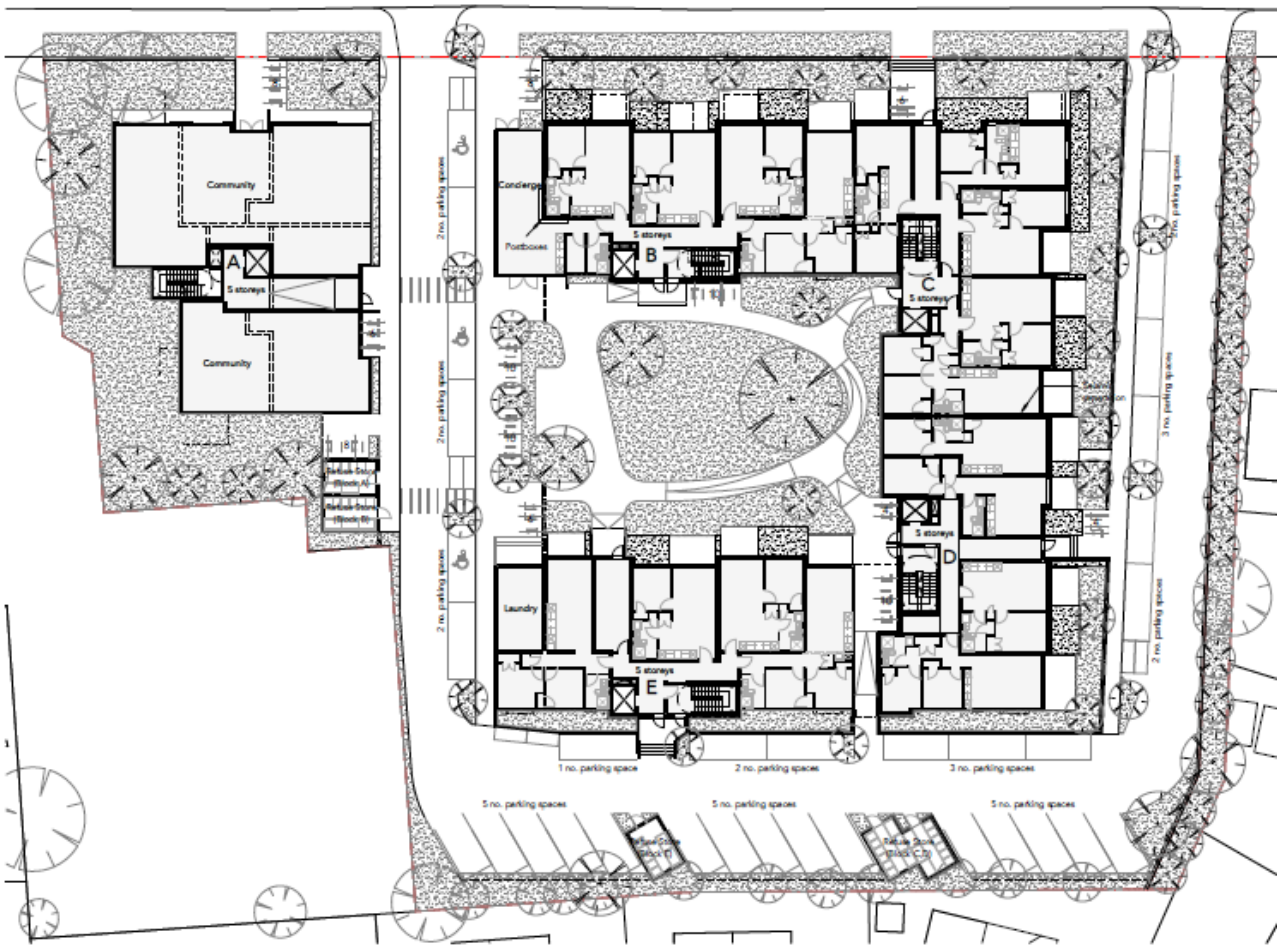
It included the following Restricted Discretionary Activities (relevant to transport matters)

- The proposed development in this case exceeds 100 dwellings (T1). An activity exceeding the trip generation standards set out in Standard E27.6.1 is a Restricted Discretionary Activity under Rule E27.4.1(A3).
- Construction or use of a vehicle crossing where a Vehicle Access Restriction applies under Standards E27.6.4.1(2) or E27.6.4(3) is a Restricted Discretionary Activity under Rule E27.4.1(A5).

The eastern-most vehicle crossing is located within 10m of the intersection of McAnnalley Street and Gallaher Street.

- Parking, loading and access which is an accessory activity but which does not comply with the standards for parking, loading and access is a Restricted Discretionary Activity under rule E27.4.1(A2) The following standards are not complied met:
  - E27.6.2.5 (T81) in relation to required bicycle parking rates. 127 spaces are required and 90 spaces are provided.
  - E27.6.2.7 (113) in relation to minimum loading space requirements. One loading space is required and no loading space is provided.
  - E27.6.4.3.2 in relation to vehicle crossing and access widths (151). A minimum width of 5.5m is required and two crossings with 4m wide access widths are provided.

Figure 23: LUC60329130 - 7 McAnnalley Street site plan

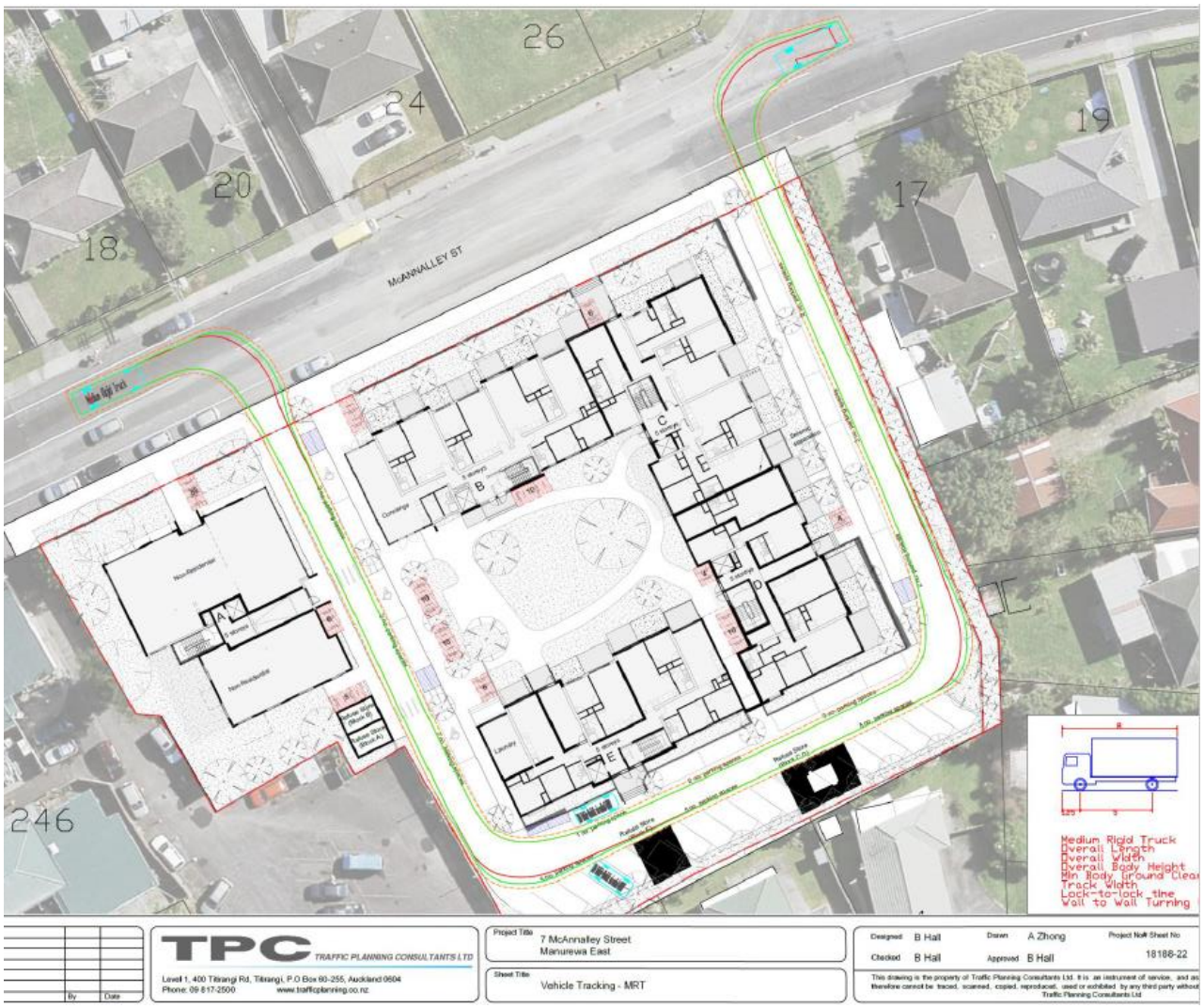


During the resource consent application, consideration was given to accommodating an 8m rigid truck through the site, as shown in Figure 24.

During the subsequent Building Consent application it was identified that the accessway did not provide for a 4m wide formed accessway, to allow FENZ vehicle access within 20m of the fire sprinkler inlet, as required by C/AS6.1.1.(ii).

However, we understand from Council's Building Consents Specialists that there are alternatives to solutions when these types of issues occur. This may involve a fairly simple risk assessment to prove that the noncompliance with C/AS6 is a low risk at the lower end or require more extensive solutions such as additional fire protection measures to achieve compliance.

Figure 24: LUC60329130 - 8m truck tracking assessment



12.3 Consideration of options to address this issue

We have considered the following options outlined in Table 15.

Table 15: Consideration of options – FENZ vehicle access

Option	Discussion
1: Do nothing	We rejected this option. Council has identified issue with some consents being granted without considering firefighting vehicle access.
2: Amend the operative provisions to require compliance to NZBC requirements for FENZ access	We rejected this option. The NZBC provides acceptable solutions but is not prescriptive. Alternative approaches are possible. It would

Table 15: Consideration of options – FENZ vehicle access

Option	Discussion
	not be appropriate to include standards/rules relating to NZBC acceptable solutions.
3: Amend the operative provisions to reference FENZ guidance for access.	We rejected this option This is a guidance document only, therefore the AUP should not require compliance to it. Further, Council has received legal advice that the AUP cannot require higher standards than what are required by the Building Code.
4: Issue a Practice Note on the requirements of the Building Code and FENZ access guidelines.	We accepted this option. We consider that there is sufficient scope in E27.6.4.4 to consider gradients for accessways that require FENZ access. Further, we consider that the Building Code provides discretion for infringements on the minimum accessway width of 4m. We recommend that a Practice Note is developed and distributed to Planners and Transport Engineers that outlines the requirements of the Building Code and FENZ access guidelines and relate these to the operative provisions of E27.
5: Add a Note to E27 and E38 to identify requirements of the Building Code.	We accepted this option. E27 currently uses this approach to identify Building Code requirements for accessible parking. Council has received legal advice confirming that the following Note would be acceptable. Note: Where vehicle accessways are provided, consideration of fire emergency vehicle access is required by the New Zealand Building Code Clause C6.

12.4 Conclusion

We recommend that

- A Practice Note is developed and distributed to Planners and Transport Engineers that outlines the requirements of the Building Code.
- Add a Note to E27.6.4.3 and E38.8.1.2 identifying that, where vehicle accessways are provided, consideration of fire emergency vehicle access is required by the New Zealand Building Code Clause C6.

13 ISSUE 2C: INADEQUATE CONSIDERATION OF HEAVY VEHICLE ACCESS

Council's Waste Strategy identifies gradient, formed access width, and manoeuvring requirements for private accessways.

Chapters E27 and E38 do not reference these requirements.

13.1 Council's s35 B2.3 A quality Built Environment monitoring report

Council's s35 B2.3 A quality Built Environment monitoring report considered the location and appearance of on-site waste management (refer Theme 5 Indicator 10).

It found that managing household waste efficiently and effectively within sites, for collection and to meet waste reduction objectives is essential for multi-dwelling residential developments. The amount of waste storage – whether it's in individual rubbish bins or a combined collection, is a significant factor in addressing Council objectives with regard to amenity, waste reduction, and traffic congestion, amongst others. Poor on-site waste management can negatively affect hygiene and safety, building appearance and pedestrian movement on public footpaths on collection days.

Site visits by Council staff were an opportunity to see some well managed on-site waste collection areas. Conversely, those developments without any rubbish management were found to lack on-site space for storing waste bins, causing blocked pedestrian walkways and clutter property entrances, leading to adverse safety and amenity issues.

Although not assessed specifically, site visit observations showed kerbside space issues for multi-dwelling developments. The number of waste bins were located on footpaths and obstructed pedestrian movement, as shown in Figure 25. This was exacerbated for rear site developments which did not have adequate site frontage and kerb space to locate bins for collection.

Council's s35 B2.3 A quality Built Environment monitoring report concluded that

- waste management is a significant issue both in terms of on-site storage, residents' access and the method of waste collection
- it is also significant in terms of service, value for money, and meeting waste reduction objectives
- the AUP is not sufficiently effective in providing standards needed to address the management of on-site waste or collections.

Amongst other recommendations, Council's s35 B2.3 A quality Built Environment monitoring report recommended that

- Develop a new standard for managing residential waste on all residential zone sites – including but not limited to bin storage location, screening, hygiene, access and collection of waste bins. The standard should also include a minimum separation distance between dwellings and communal waste storage areas for hygiene safety (including odour). There should be consideration for how rubbish would be collected within the site using private collections or on street public collections (including for rear sites), and public street kerb space for council streetside collections relative to the scale of development.

This technical report, specifically the following sub-sections, respond in part to that recommendation.

Figure 25: Council staff site visit photos, showing obstruction of pedestrian areas[46]

13.2 Problem statement

We have considered the following aspects of the existing provisions

- Are the provisions of E27 adequate for residential development using private accessways where waste vehicle access and manoeuvring is required?

13.3 Evidence base and reference material

The following information sources have assisted with our consideration of the problem statement

- Research regarding run over accidents in driveways
- Data from Council's Rear Site Monitoring
- Council's s35 B2.3 A quality Built Environment monitoring report
- Input from Council Waste Planning Specialists
- Case studies
- Waste management provisions for Australian cities
- Workshops with Councils' Quality Built Environment team and Auckland Transport.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- The lack of a dedicated pedestrian accesses for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers

[46] Council's s35 B2.3 A quality Built Environment monitoring report, July 2022, Figure 30.

- When on site waste collection is required, the design of private accessways needs to include consideration of heavy vehicle access and pedestrian safety
- Around 54% of consented developments of 10 or more dwellings did not provide a turning head or ability for a heavy vehicle to drive through the private accessway
- Most developments of less than 20 dwellings do not identify the method of waste collection, or the location of the waste collection point, as part of the resource consent application
- The overwhelming majority of developments of 20 or more dwellings rely on waste collection within private accessways, or within the individual site
- Australian cities require residential developments to
  - design for on-site waste collection at a set threshold (varies from 7 dwellings to 55 dwellings)
  - avoid reversing onto or off the site, and to minimise reverse manoeuvring within the site when on-site collection is required
  - design for a waste collection vehicle between 8m and 10m in length

13.3.1 Research regarding run over accidents in driveways

As discussed in Section 5, the lack of dedicated pedestrian accesses for pedestrians, separate from vehicles, has been found to result in a twofold increase in risk of driveway runovers.

13.3.2 Data from Council's Rear Site Monitoring

Data from Council's Rear Site Monitoring (discussed in Section 3) relating to the provision for vehicles to enter and exit the private accessway in a forward direction is presented in Table 16 and Figure 26. Data relating to waste collection method for developments with 10 or more dwellings are shown in Figure 27 and Figure 28.

- 54% of consented developments of 10 or more dwellings did not provide a turning head or ability for a vehicle to drive through the private accessway
- Most developments of less than 20 dwellings do not identify the method of waste collection, or the location of the waste collection point, as part of the resource consent application
- Most developments of 20 or more dwellings use private waste collection services
- The overwhelming majority of developments of 20 or more dwellings rely on waste collection within private accessways, or within the individual site
- Very few developments of 20 or more dwellings rely on waste collection within the legal road.

Table 16: Breakdown of sampled resource consent turning head provision

Provision of turning head	Number of developments consented	Percentage of consented developments
Turning head provided	67	46%
No turning head provision	78	54%
Total	145	100 %

Figure 26: Percentage of provision for manoeuvring/turning or thoroughfare vs % Development scale

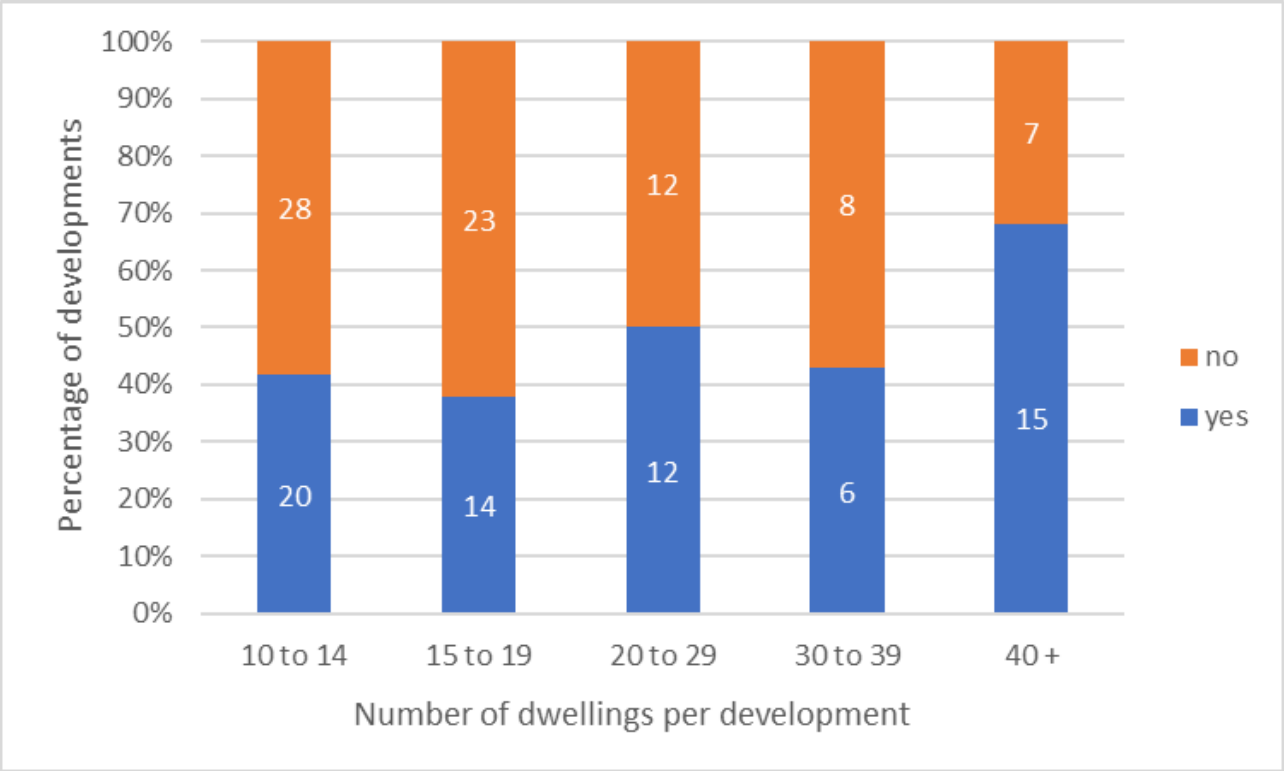


Figure 27: Method of waste collection for developments of different sizes

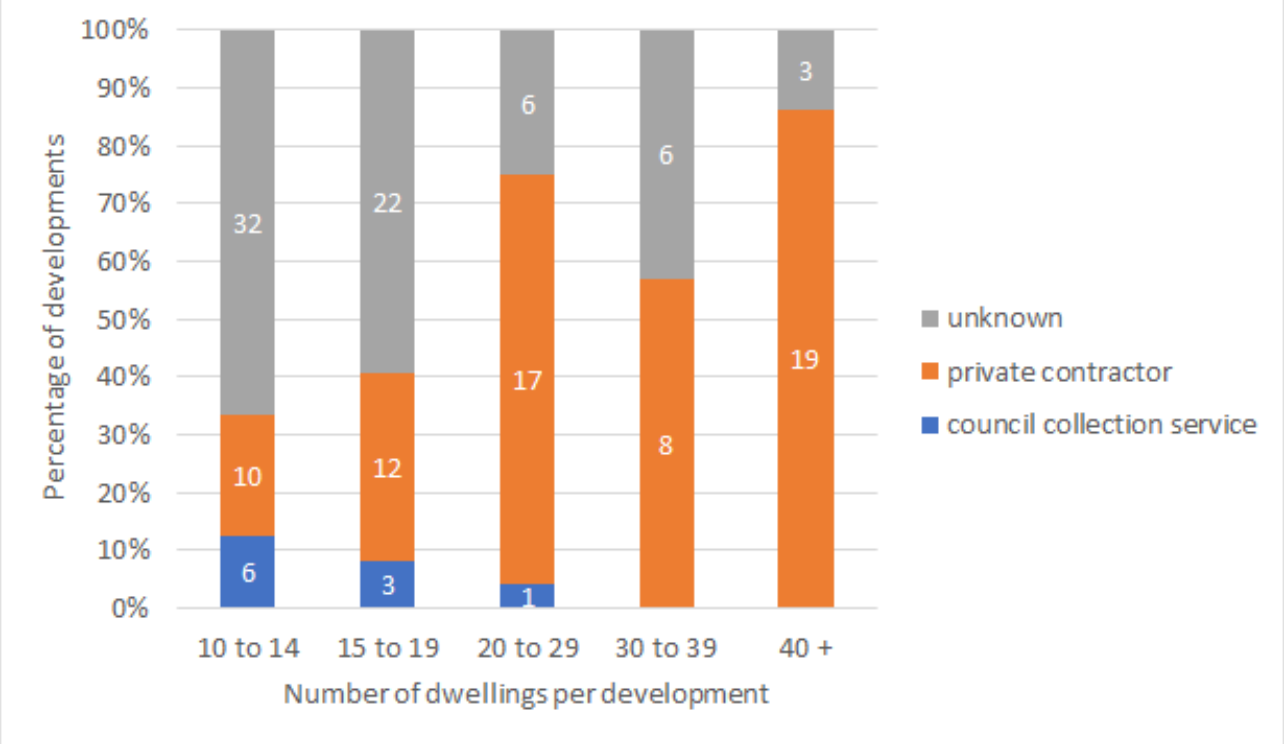
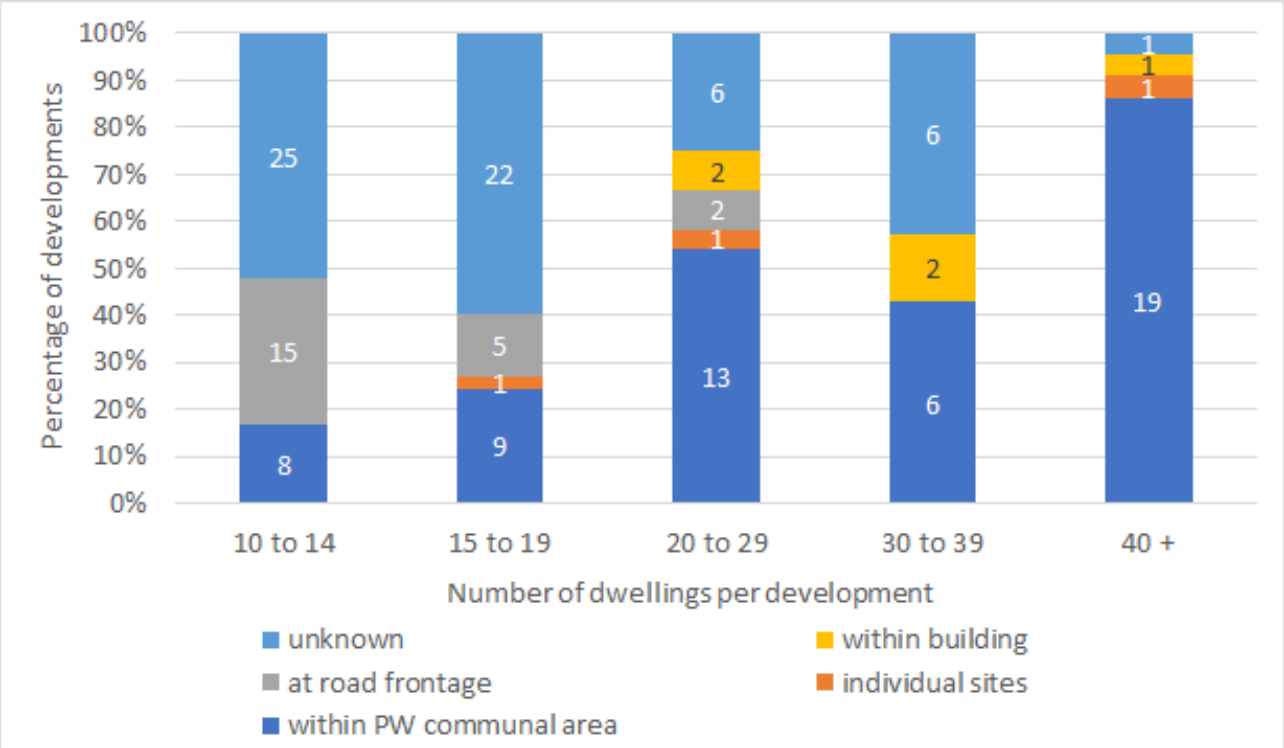


Figure 28: Location of waste collection point for developments of different sizes



13.3.3 Case studies

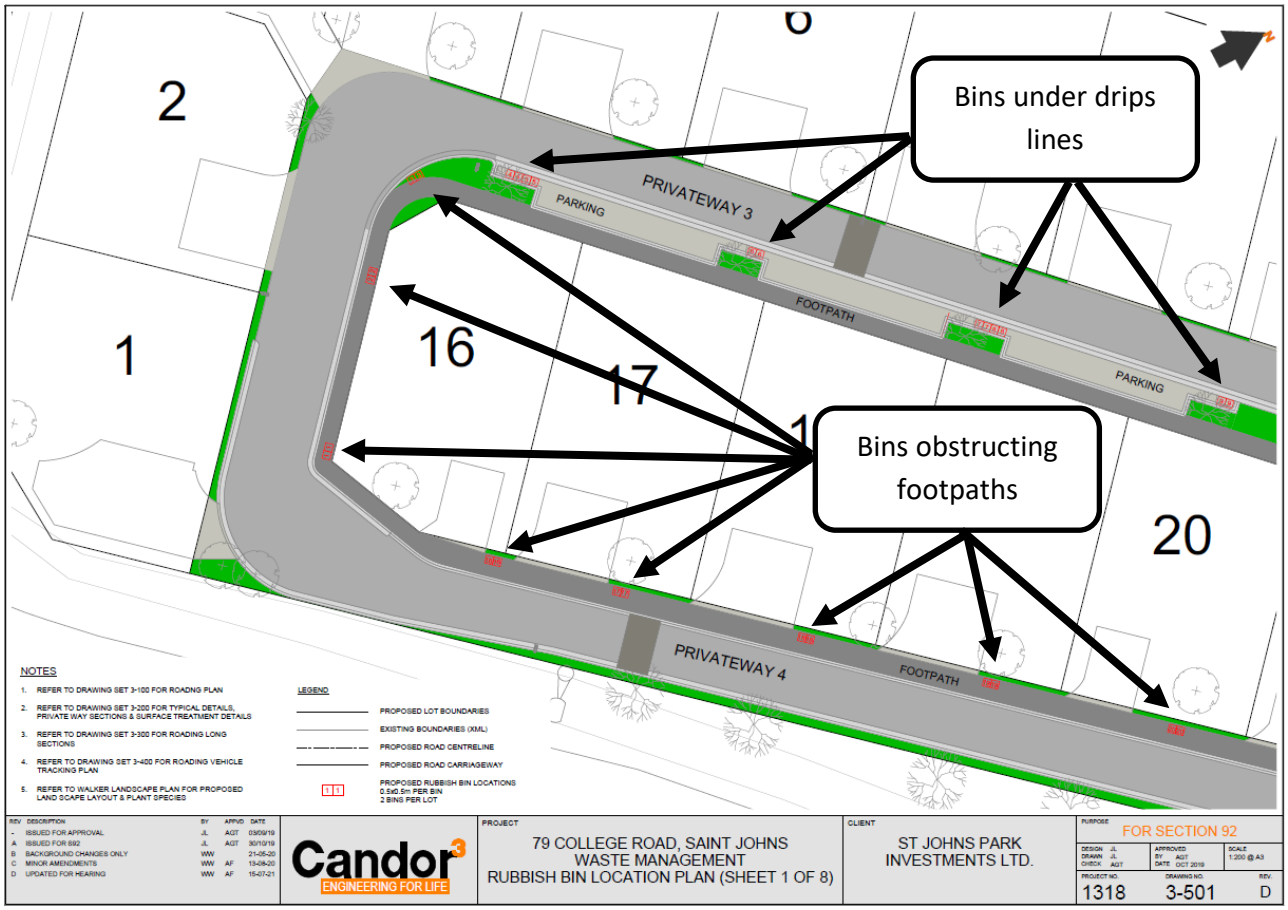
BUN60340161: 79 College Road, St Johns

This consent was for 81 residential units, with multiple private accessways, as discussed in Section 6.2.5.

Figure 29 shows a sample of the waste collection plan, key issues include

- waste collection bins located within the pedestrian access, obstructing pedestrian movement
- waste collection bin located within the drip line of trees.

Figure 29: 79 College Road bin location plan



Purei Rise, Flatbush

Purei Rise is an approximately 8m wide private accessway serving 20 dwellings, as a rear service lane (as shown in Figure 30 and Figure 31). Council's Waste Specialist has advised that

- Residents have their bins in areas accessing from the rear lane
- There is insufficient space within the rear lane to accommodate the waste bins on collection day, without obstructing waste vehicle access
- As a result, residents are required to take their bins to Aklander Rise or Piwari Place for kerb side collection, which is a distance of up to 70m
- Similar issues are experienced at Rorida Lane, Berm Lane, and Fluvial Lane in Flatbush.

Figure 30: Council GIS image of Purei Rise

Figure 31: Streetview image of Purei Rise, November 2019, Google

Brandon Road, Glen Eden

The 27A Brandon Lane development has recently lodged with Council, and at the time of writing this report it is being reviewed by Council specialists. The application proposes a 20-lot residential development on a rear site with no vehicle access. The development has a private accessway approximately 40 m long from the public road. The site location and development layout are shown in Figure 32 and Figure 33.

The proposed waste collection method for the development requires the waste truck driver to park the waste truck on the road, collect the bins from the individual lot bin storage areas, wheel them to the truck for emptying, and return them to the bin storage areas. Council's Waste Specialist has advised that the proposal would result in a very high labour input, which will be on charged to residents.

Figure 32: 27A Brandon Road site extent

Figure 33: 27A Brandon Road development layout

29 Smythe Road, Henderson

This consent was for medium density housing without vehicle access. The consented documents were not available for our review, and we are unsure whether waste collection was considered during the consent application . We understand that waste collection involves the waste collector parking within the road and wheeling waste bins to and from the collection truck. Figure 34 shows a photograph taken by Council staff, showing there is no parking available for the waste collection truck, with the driver choosing to obstruct the footpath. Note that we have chosen to obscure the waste management truck company logo and registration.

Figure 34 - Council staff site visit, 29 Smythe Road

13.3.4 Waste management provisions for Australian cities

We investigated how Australian cities manage waste collection in residential developments. Australia was chosen as it operates a similar planning system to New Zealand. A comparison of the subject cities is provided in Table 17. We note that the City of Sydney, City of Melbourne, and City of Perth only cover the City Centre and inner-city suburbs. Brisbane City Council covers roughly half of the Brisbane urban area, only excluding the outermost suburbs

Table 17: Comparison of Australian cities

Local Authority	Population	Area (ha)
City of Sydney	248,736	2,674
City of Melbourne	183,756	3,735
Brisbane City Council	1,272,999	134,272
City of Perth	30,971	1,372
Auckland Council	1,571,718	494,113

A summary of waste management requirements for each city is provided in Table 18, in summary Australian cities require residential developments to

- design for on-site waste collection at a set threshold (varies from 7 dwellings to 55 dwellings)

- avoid reversing onto or off the site, and to minimise reverse manoeuvring within the site when on-site collection is required
- design for a waste collection vehicle between 8m and 10m in length.

Table 18: Comparison of waste management requirements for Australian cities

Waste management requirement	City of Sydney	City of Melbourne	Brisbane City Council	City of Perth
Truck size	Length: 9.25m Width: 2.6m Height: 3.8m[47]	Length: 8.8m Width: 2.6m Height: 4m[48]	Length: 10m Width: 2.5m Height: 3.8m[49]	Length: 8m Width: 2.6m Height: 2.8m[50]
Reverse manoeuvring	Entry and exit of a collection vehicle from a site is to be in a forward direction, minimal reversing is allowed within the site but must be detailed in the development's traffic management plan.[51]	Not stated	Layouts that require a collection vehicle to reverse more than two truck lengths (20m) are to be avoided. If a temporary turn around is provided, an easement in favour of Brisbane City Council will be required over any turning area within the site.[52] On local, neighbourhood, district, or suburban roads, the collection vehicle may reverse onto the site in a single movement and leave the site facing forwards. For arterial roads, collection vehicles must enter and leave the site facing forwards.[53]	Collection vehicles are preferred to enter and exit the site in a forward direction with limited reversing (max 3 point turn).[54]
Thresholds for on-site collection	7 dwellings and above, or when kerbside presentation exceeds one third of the property frontage.[55]	55 dwellings and above, or if the collection frequency is greater than once per week. Developments with 5 dwellings and above need to provide communal bins and may be placed on kerbside if less than 55 dwellings.	10 dwellings and above, or where the road verge is not properly shaped to the appropriate gradient and width standards.[56]	Not stated

[47] City of Sydney Guidelines for Waste Management in New Developments 2018, Reference C. Retrieved from https://www.cityofsydney.nsw.gov.au/development-guidelines-policies/guidelines-waste-management-new-developments

[48] City of Melbourne Guidelines for Waste Management Plans 2021, s8. Retrieved from https://www.melbourne.vic.gov.au/sitecollectiondocuments/waste-management-plan-guidelines.pdf

[49] Brisbane City Council City Plan 2014, Schedule 6.26, Table 3. Retrieved from https://cityplan.brisbane.qld.gov.au/eplan/#Rules/0/269/1/0/0

[50] City of Perth Waste Guidelines for All Developments 2019, pg. 7. Retrieved from https://perth.wa.gov.au/en/building-and-planning/planning-and-building-applications/waste-guidelines-for-developments

[51] City of Sydney Guidelines for Waste Management in New Developments 2018, Section A(3.12&3.13). Retrieved from https://www.cityofsydney.nsw.gov.au/development-guidelines-policies/guidelines-waste-management-new-developments

[52] Brisbane City Council City Plan 2014, Schedule 6.26, s3(6). Retrieved from https://cityplan.brisbane.qld.gov.au/eplan/#Rules/0/269/1/10374/0

[53] Brisbane City Council City Plan 2014, Schedule 6.26, s4.2(5&6). Retrieved from https://cityplan.brisbane.qld.gov.au/eplan/#Rules/0/269/1/10374/0

[54] City of Perth Waste Guidelines for All Developments 2019, pg. 6. Retrieved from https://perth.wa.gov.au/en/building-and-planning/planning-and-building-applications/waste-guidelines-for-developments

[55] City of Sydney Guidelines for Waste Management in New Developments 2018, Section A(3.5). Retrieved from https://www.cityofsydney.nsw.gov.au/development-guidelines-policies/guidelines-waste-management-new-developments

[56] Brisbane City Council City Plan 2014, Schedule 6.26, s4(3)(b). Retrieved from https://cityplan.brisbane.qld.gov.au/eplan/#Rules/0/269/1/10374/0

13.3.5 Input from Councils' Waste Planning Specialists

In conjunction with Councils' Waste Planning Specialists, we have identified that the design of private accessways to allow for on site waste collection (whether undertaken by public or private collection service) should consider the following

- Pedestrian safety is a priority where trucks are loading and manoeuvring, separation between pedestrians and trucks is critical. Also refer to Sections 5 and 7 for a discussion of pedestrian safety outcomes in private accessways
- If there are individual waste bins per dwelling, this requires adequate consideration of spaces within communal areas (often this is within the private accessway) for placement of bins on collection days
  - Typically, 0.5 m^2 space is required per bin per dwellings
  - The gradient of the collection space should be no more than 1:10, to avoid bins tipping or moving
  - Bins should be able to be placed in a location that does not obstruct pedestrian or vehicle movement
  - Not located under the drip line of trees or within rain gardens.
- If there are communal bins, this requires adequate consideration of spaces within communal areas (often this is within the private accessway) for storage on waste collection days
  - Truck parking and manoeuvring space in close proximity to communal bins
  - Communal bin located near to the front of the site to minimise truck movements within the site
- Sufficient formed accessway to allow for access, loading and manoeuvring for a heavy vehicle
  - Manoeuvring space to allow a truck to enter and exit the site in a forwards direction, with minimal onsite reversing required
  - A maximum accessway gradient of 1:8
  - A 5m wide workspace, additional to the vehicle width, for trucks equipped with sidearm bin loading
- Waste collection can require up to three different trucks per collection, for rubbish, recycling and food waste.

Councils' Waste Planning Specialists identified that site waste collection is often required for developments of 10 or more dwellings[57] and rear sites with multiple dwellings. They confirmed that

- smallest waste truck that is currently operated by private contract services is around 7.2 – 7.3m long, shown in Figure 35

[57] Auckland Council's Waste management and Minimisation Bylaw 2019 Subpart 3 identifies responsibilities for owners of multi-unit development (10 units or more) to provide adequate areas for storage and collection of disposed of or discarded material. Available online at https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/bylaws/docswasteminmgmtbylaw/waste-management-minimisation-bylaw-2019.pdf

- Council contracted services are typically a 10.3m long truck, shown in Figure 36.

Figure 35: Example of a 7.3m long waste truck

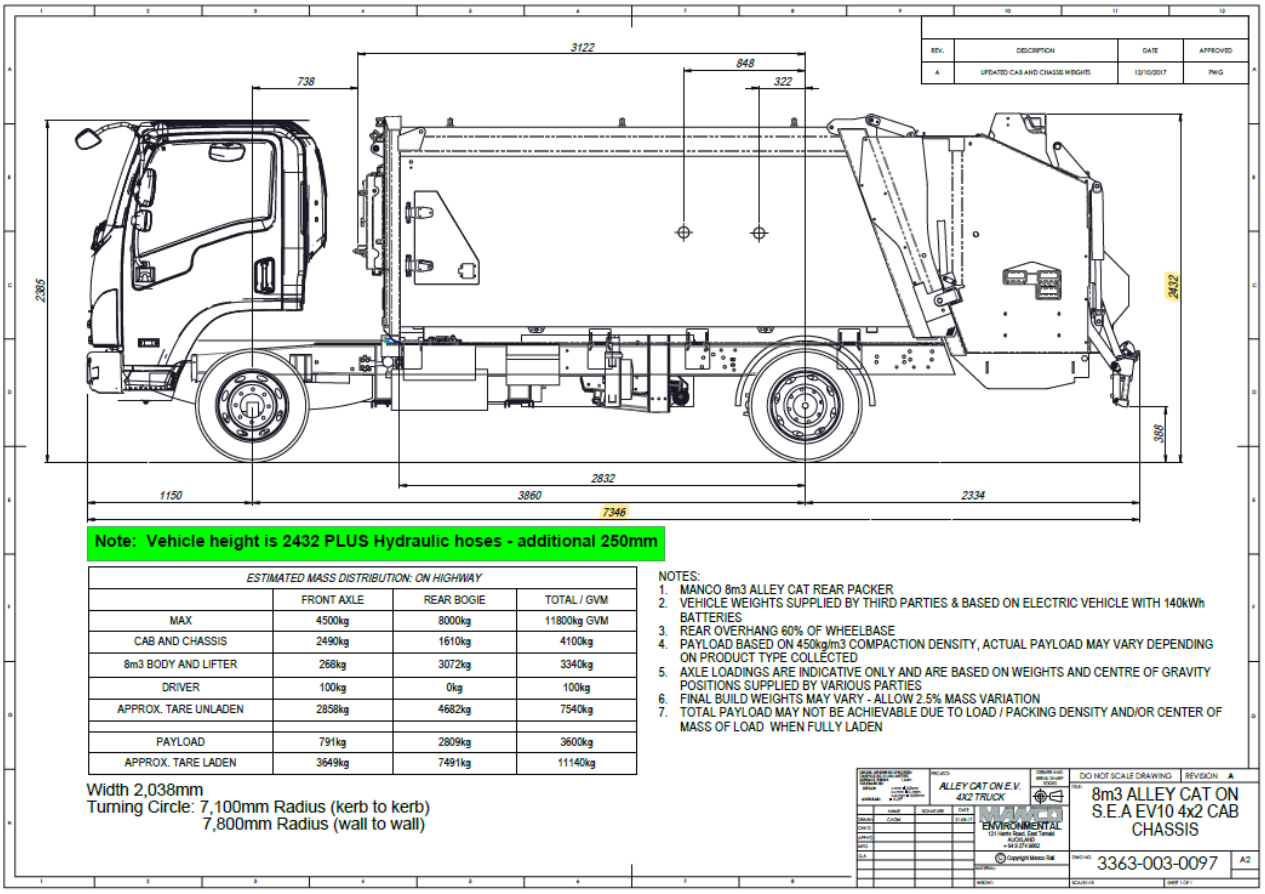
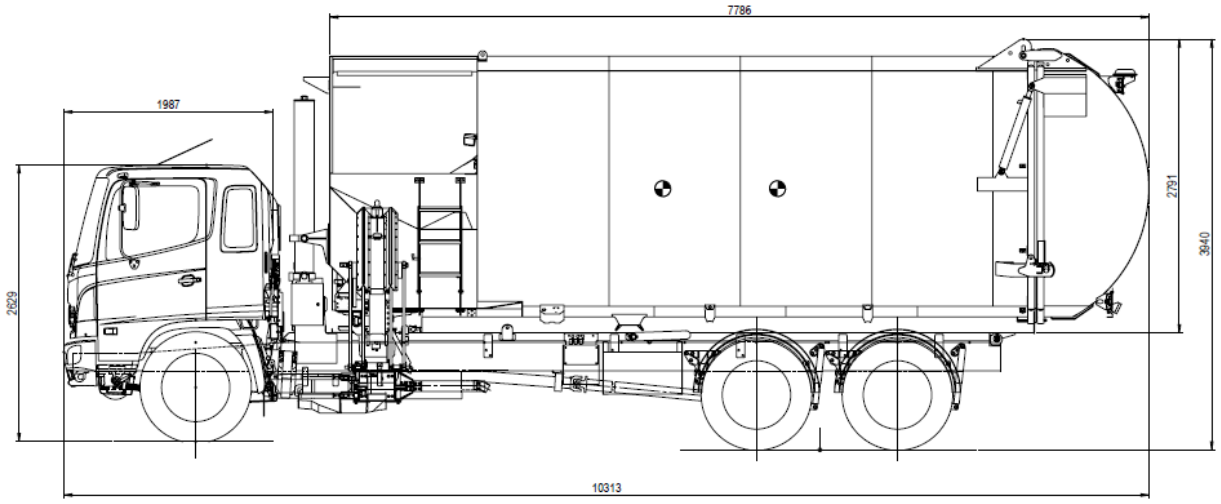


Figure 36: Example of a 10.3m long waste truck



13.3.6 Input from Councils' Quality Built Environment team and Auckland Transport staff

Several workshops were held with Councils' Quality Built Environment team, Waste Specialists, and Auckland Transport staff. The key purpose of these workshops was to balance the competing demands

of maximising site yield (by avoiding on-site waste collection) and minimising on-street effects (by avoiding on-street waste collection).

The Quality Built Environment team tested multiple residential scenarios for a "typical site" (18m site frontage and 45m site depth), using the following inputs from Flow

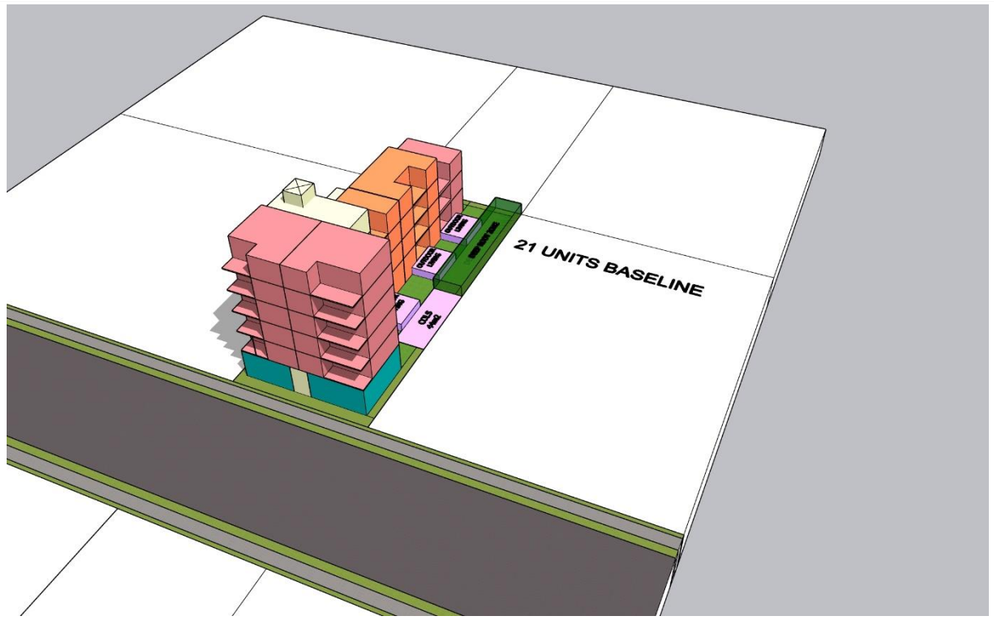
- Heavy vehicle dimensions of 7.2m, 8m, and 10.3m
- On site manoeuvring to avoid reversing onto/off the site
- Thresholds at which on-site waste collection is provided (10, 20, and 40 dwellings).

Examples of scenario testing are shown in Figure 37.

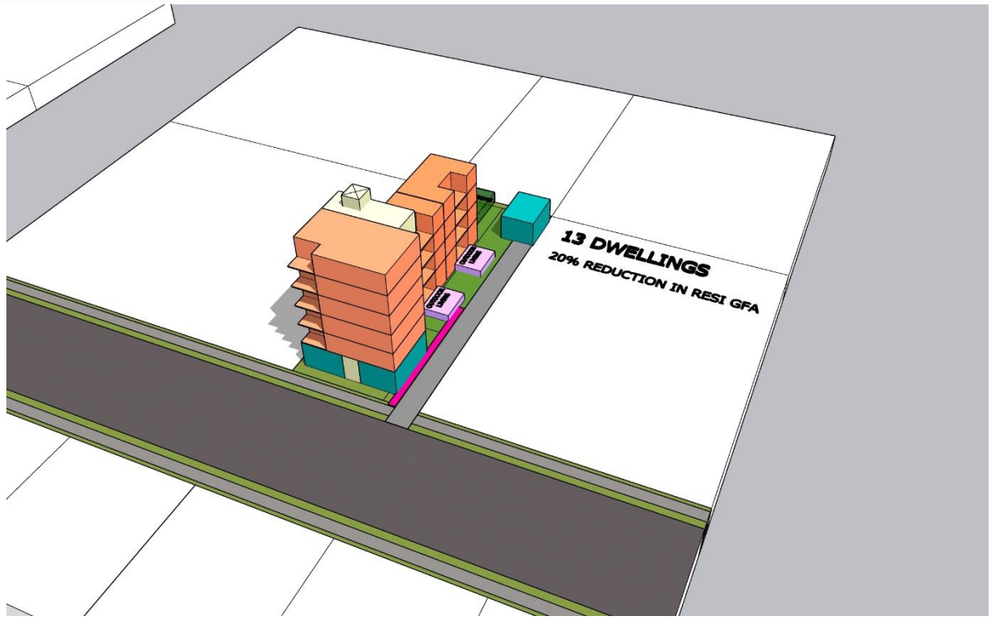
Through these workshops, participants agreed that

- An 8m rigid truck was an appropriate design vehicle, when on-site waste collection was required
- Waste collection needed to be considered on a site by site basis, rather than setting rigid thresholds at which on-site waste collection was required. The following examples demonstrate situations where rigid thresholds would not address the tension between maximising site yield and minimising on-street effects
  - Developments with small road frontages (e.g. development of rear sites) where the threshold for on-site collection would be quite low
  - Existing high density developments, where on-street collection of communal waste bins is occurring in a satisfactory way.

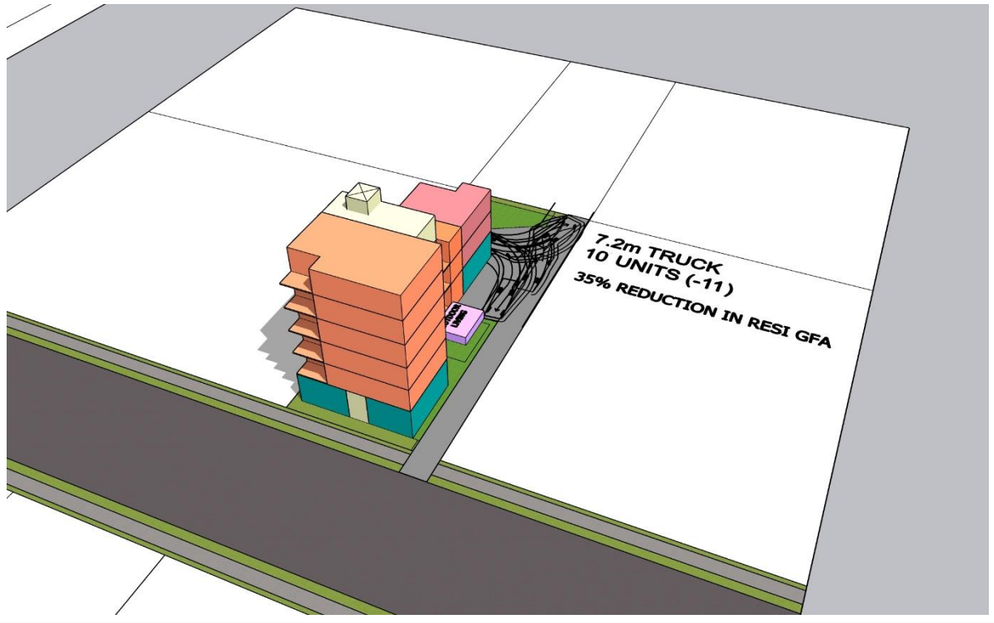
Figure 37 - Waste truck access, apartment typology testing



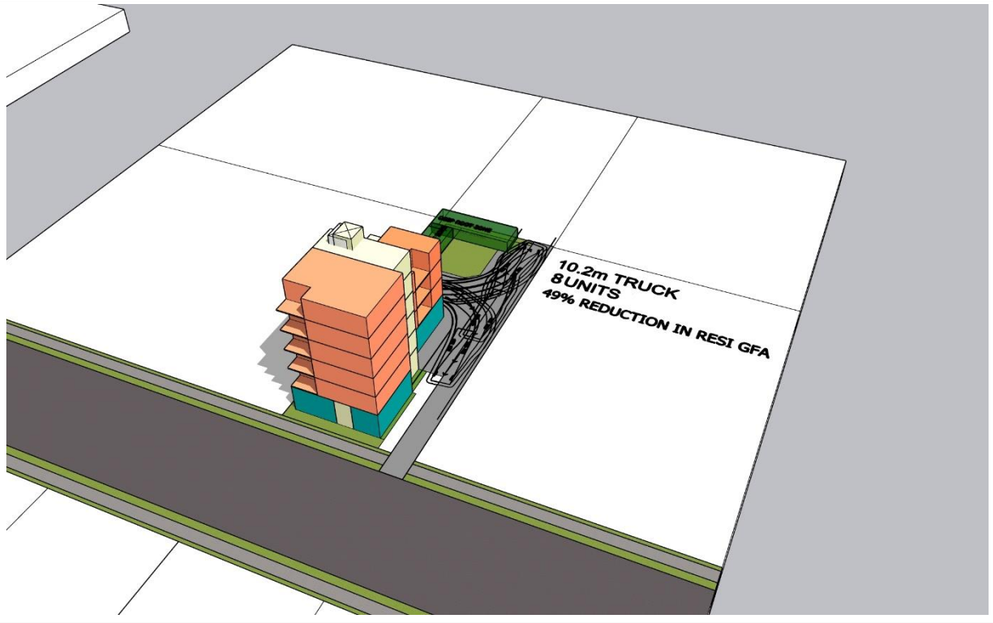
Baseline scenario – no vehicle access



Scenario 1 – 3.5m wide vehicle accessway with no turning head



Scenario 3 - 3.5m wide vehicle accessway with turning head for 7.2m rigid truck



Scenario 3 - 3.5m wide vehicle accessway with turning head for 10.2m rigid truck

13.4 Consideration of options to address this issue

We have considered the following options outlined in Table 19.

Table 19: Consideration of options – waste vehicle access and loading

Option	Discussion
1: Do nothing	We rejected this option. We have identified that the operative provisions do not adequately respond to private accessways that require on site waste collection.
2: Amend the matters of discretion in E27 and E38 to allow consideration of waste vehicle access for private accessways	We rejected this option. In the instance that a private accessway complies with the standards of E27.6.4, consideration of waste vehicle access may go unaddressed
3: Introduce a Standard in E27 to set thresholds at which residential developments must provide for on-site waste collection.	We rejected this option While our initial preference was to establish thresholds for on-site waste collection within E27, subsequent scenario modelling and consideration of case studies demonstrated that this method was too blunt to allow an appropriate balance between maximisation of site yield and minimisation of on-street effects.
4: Introduce Standards to Chapter H5 and Chapter H6 to allow determination of when on-site waste collection is required. Introduce a Standard in E27 to address access and safety outcomes when heavy vehicle access within a residential site is required.	We accepted this option. Following scenario testing and workshopping with Councils' Quality Built Environment team and Waste Specialists, and Auckland Transport staff, this was adopted as the preferred approach.

13.5 Conclusion

Adequate consideration of waste collection for residential development is not well addressed by the operative provisions of E27. Waste collection needs to balance the competing demands of maximising site yield (by avoiding on-site waste collection) and minimising on-street effects (by avoiding on-street waste collection), and any new provisions to the AUP need to allow these demands to be balanced on a site by site basis.

When on-site waste collection is required, the safety of pedestrians and manoeuvring requirements for heavy vehicles are key transport matters that need to be considered. A lack of separation between pedestrians and vehicles within private accessways is a major factor in the likelihood of injury or death for pedestrians. Likewise, waste vehicles have limited visibility when reverse manoeuvring, and therefore reversing within the site should be minimised and reversing into/out of the site should be avoided.

We recommend the following amendments

- Introduce new Standards to Chapter H5 and Chapter H6, requiring the assessment of waste collection for residential development (note: these Standards are discussed by other Council specialists)
- Introduce Standard E27.6.3.4A to identify the following design requirements when heavy vehicle access is required within a residential site
  - provide sufficient space must be provided on the site so an 8m heavy vehicle does not need to reverse off the site or onto or off the road, with a maximum reverse manoeuvring distance within the site of 12m
  - provide a separated pedestrian access
- Amend Standard E27.6.3.4 to identify that space must be provided on the site so vehicles do not need to reverse off the site or onto or off the road from any site where Standard E27.6.3.4A applies
- Amend Matters of Discretion E27.8.1.(9) and Assessment Criteria E27.8.2.(8) to include consideration of pedestrian safety and accessibility.

14 ISSUE 2D: INADEQUATE CONSIDERATION OF LOADING

Chapter E27 does not provide specific loading space requirements for residential developments and specifies loading space requirements for residential activities of 5000 m^2 GFA, or more.

14.1 Problem statement

We have considered the following aspects of the existing provisions

- With parking minimums now removed from the AUP, are the provisions of E27 adequate to address loading requirements?

14.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have considered

- Consequential effects of the removal of parking minimum rates from the AUP
- Light service vehicle delivery rates for medium density residential developments
- Light service vehicle dimensions, manoeuvring and loading requirements.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- Residential developments with low parking provision tend to generate more light service vehicle trips per dwelling, compared with residential developments that have a higher provision of parking
- The removal of parking minimums from the AUP will reduce the opportunity for informal light service vehicle loading within private accessways
- The appropriate dimensions for a light service vehicle loading space are 6.4m deep by 3.5m wide with a 2.8m vertical clearance.

14.2.1 Light service vehicle delivery rates for medium density residential developments

As discussed in Section 4.1, our vehicle trip generation research found that light service vehicle trip rates (e.g. courier, e-commerce collection/delivery, taxis) for residential developments with low parking provision are higher than residential developments with higher parking provision (0.1 veh/hr/dwelling vs 0.003 veh/hr/dwelling respectively).

14.2.2 Consequential effects of the removal of parking minimum rates from the AUP

The operative provisions of E27 do not require consideration of loading spaces for residential development less than 5000 m^2 GFA. Currently loading/unloading for light service vehicles typically occurs within residential sites through informal parking within private accessways, without the need for an allocated loading space.

However, the removal of parking minimums from the AUP is likely to result in more residential developments without parking, and therefore without private accessways. This will result in a lack of space within the site for informal loading when vehicle access is not otherwise provided for.

14.2.3 Designing for light service vehicles

To assist our consideration of the design requirements for light service vehicles, we have referred to

- Auckland Transport's Transport Design Manual: Engineering Design Code Urban and Rural Roadway Design
- Typical light service vehicle dimensions.

The Urban and Rural Roadway Design code identifies a 6.4m van as the "design vehicle" for local roads. The dimensions and tracking requirements of this vehicle are shown in Figure 38 and Figure 39.

For context, we have included exterior dimensions for a range of light service vehicles that are common in New Zealand in Table 20.

Table 20 Light service vehicle exterior dimensions

Make and Model	Overall length (m)	Overall width without mirrors (m)	Overall height (m)
Ford Transit 350E Van[58]	5.981	2.059	2.443 – 2.533
Ford Transit 350E Van High Roof[59]	6.704	2.059	2.715 – 2.778
Toyota ZX Panel Van[60]	5.915	1.950	2.280
Volkswagen Crafter 35 MWB High Roof[61]	5.986	2.040	2.590
Mercedes Sprinter Panel Van Medium Wheelbase High Roof[62]	5.932	2.020	2.667

We conclude that a loading bay of the following dimensions will cater for most light service vehicles

- Loading bay length of 6.4m
- Loading bay width of 3.5m (to allow approximately 1.5m additional width for loading/unloading from side doors of light service vehicles)
- Loading bay vertical clearance of 2.8m.

[58] Ford Transit 350L Van 2022 model, available online at https://www.ford.co.nz/commercial/transit-cargo/models/350l-van-medium-roof-rwd-automatic-fnz/?intcmp=vhp-return-model

[59] Ford Transit 430E Van 2022 model, available online at https://www.ford.co.nz/commercial/transit-cargo/models/430E-van-high-roof-RWD-automatic-fnz/?intcmp=vhp-return-model

[60] Toyota Hiace ZX Panel Van 2023 model, available online at https://www.toyota.co.nz/new-car/hiace/HIACE-HLPA-SI4/?skuCode=HIACE-HLPA-SI4-058-11#specifications

[61] Volkswagen Crafter 35 MWB High Roof 2022 model, available online at file:///C:/Users/Mat.Collins/OneDrive%20-%20Flow%20Transportation%20Specialists%20Limited/Desktop/Crafter%2035%20Van%20MY22%20Spec%20Sheet%20-%2010%20Mar.pdf

[62] Mercedes Sprinter Panel Van Medium Wheelbase High Roof 2022 model, available online at file:///C:/Users/Mat.Collins/OneDrive%20-%20Flow%20Transportation%20Specialists%20Limited/Desktop/Mercedes-Benz-Sprinter-Tech-Data-Brochure-April-2022.pdf

Figure 38: Auckland Transport 6.4m van tracking curve

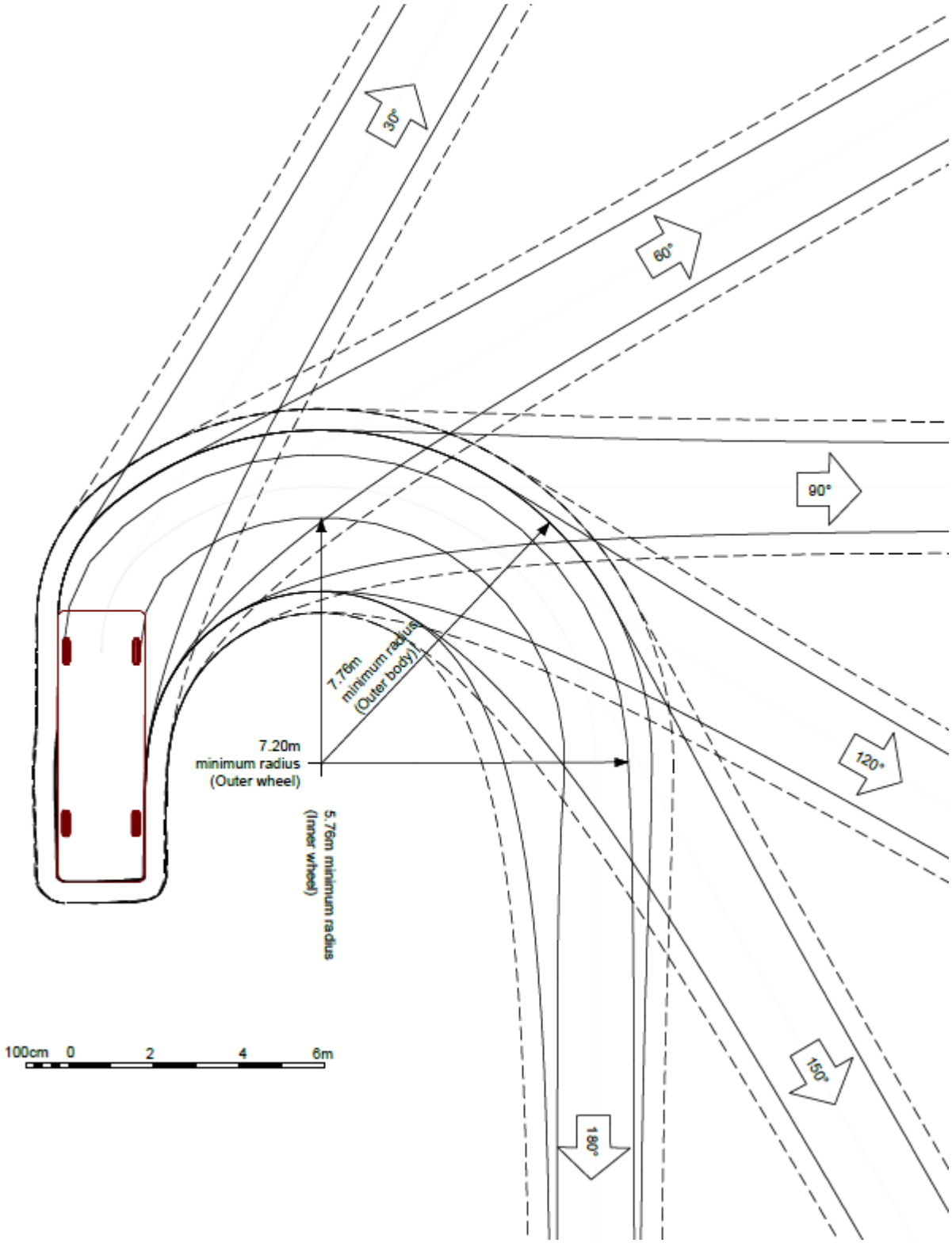
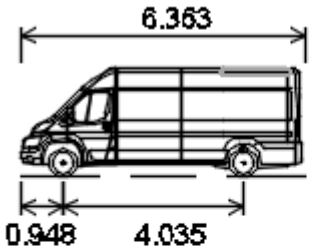


Figure 39: Auckland Transport 6.4m van dimensions and tracking specifications



Delivery Van

Overall Length	6.363m
Overall Width	2.050m
Overall Body Height	2.432m
Min Body Ground Clearance	0.206m
Track Width	1.810m
Lock to Lock Time	4.00s
Kerb to Kerb Turning Radius	7.200m

14.3 Consideration of options to address this issue

We have considered the following options outlined in Table 21.

Table 21 Consideration of options – loading space requirements

Option	Discussion
1: Do nothing	We rejected this option. The removal of minimum car park rates will reduce the opportunity for informal loading for light service vehicles in residential developments. This will result in safety and efficiency effects for the adjacent transport network.
2: Reduce the GFA threshold at which a heavy vehicle loading space is required for residential developments	We rejected this option. Following workshops with Council's Quality Built Environment team and Auckland Transport specialists, we considered that heavy vehicle access within a residential site of "typical dimensions" (18m road frontage, 45m site depth) would have an excessive effect on development yield.
3: Add a new provision to require a small loading space, suitable for light service vehicles, for developments between 10 dwellings and 5000m^2 GFA	We accepted this option. Following workshops with Council's Quality Built Environment team and Auckland Transport specialists, we considered that a small loading bay, suitable for a light service vehicle, can be accommodated within a residential site of "typical dimensions" (18m road frontage, 45m site depth) without overly impacting on development yield.

	As informal loading can occur within private accessways, we consider that the small loading space is only required for residential developments that otherwise do not provide vehicle access. Further, when dwellings have direct pedestrian access to a public road, we consider that loading can occur within the public road for these dwellings.

14.4 Conclusion

We make the following recommendations

- Amend Table E27.6.2.7 to identify that
  - Dwellings that have individual pedestrian access directly from a public road or otherwise provide vehicle access should be excluded from the requirement for a light service vehicle loading space
  - Residential developments greater than 9 dwellings up to 5,000m^2 GFA that do not provide individual pedestrian access or vehicle access should provide a light service vehicle loading space
  - Residential greater than 5,000m^2 should provide a loading space(s) in accordance with operative Rules
- Amend Table E27.6.3.2.1 to identify that a light service vehicle loading space should be at least 6.4m wide and 3.5m wide, to accommodate a 6.4m van
- Amend Standard E27.6.3.3 and add Figure E27.6.3.3.3 and Figure E27.6.3.3.4 to identify design specifications for a 6.4m van
- Amend Standard E27.6.3.5 to identify that a light service vehicle loading space should have a vertical clearance of at least 2.8m.

15 TOPIC 2E: INCONSISTENCY WITH THE MINIMUM INSIDE TURNING RADIUS

Chapter 38 Subdivision – Urban: Table E38.8.1.2.1 identifies a minimum inside turning radius of 6.5m for bends in accessways for rear residential sites. However, there is no minimum inside radius identified in Chapter E27.

15.1 Problem statement

We have considered the following aspects of the existing provisions

- Is the absence of a minimum inside radius from E27 creating issues during resource consenting?

15.2 Consideration of options to address this issue

We have considered the following options outlined in Table 22.

Table 22 Consideration of options – Minimum inside turning radius

Option	Discussion
1: Do nothing	We rejected this option. One of the objectives of this Plan Change is to align E27 with E38.
2: Introduce a requirement for a minimum inside radius for accessways into E27	We accepted this option. In instances where land use consent proceeds subdivision consent, there is the potential that the minimum inside radius for accessways can go unaddressed. One of the objectives of this Plan Change is to integrate the provisions of E27 and E38.
3: Delete the requirement for a minimum inside turning radius from E38	We rejected this option. Following engagement with Council subdivision and development engineering specialists, we deemed it inappropriate to remove the minimum inside turning radius from E38.

15.3 Conclusion

One of the objectives of this Plan Change is to integrate the provisions of E27 and E38. We recommend the following amendments E27

- Amend Standard E27.6.4.3 to reference the minimum inside turning radius contained within Table E38.8.1.2.1.

16 ISSUE 2F: INADEQUATE CONSIDERATION OF DRIVER SIGHT LINES AT VEHICLE CROSSINGS

Traffic movements to and from site entrances on frontage roads need to be accommodated safely and efficiently. This entails providing safe sight distances to public footpaths and roads for drivers exiting a driveway. Adequate sight distance is primarily required

- To ensure adequate visibility between vehicles leaving a driveway and pedestrians on the footpath, to avoid injury to pedestrians or obstruction of the footpath
- For a driver emerging from a driveway to adequately judge an acceptable gap in the traffic.

E27 and E38 do not have rules or standards relating to driver sight lines at vehicle crossings, other than for road/rail level crossings. E27 includes safe sight distances as a matter of discretion for any activity or development which infringes the standards for design of parking and loading areas or access, or where a vehicle crossing is proposed where a Vehicle Access Restriction applies.

16.1 Problem statement

We have considered the following aspects of the existing provisions

- Does the AUP allow for appropriate consideration of sight lines at vehicle crossings?

16.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- AUSTROADS Guide to Road Design Part 4A (AGRD04A-17)
- RTS-6
- Auckland Transport vehicle crossing permit requirements.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- AUSTROADS Guide to Road Design Part 4A (AGRD04A-17) and RTS-6 specify minimum driver to driver sight distances for property accesses, ranging from 47m – 115m for typical urban roads
- RTS-6 recommends minimum sight distances for driver to pedestrian visibility at vehicle crossings
- Auckland Transport requires a property owner to demonstrate that safe sight distances are provided when applying to build or alter a vehicle crossing
- Sight distances for driver to pedestrian visibility at vehicle crossings can require lines of sight over third party land, and/or can conflict with operative AUP provisions such as Outlook space requirements
- In our experience, driver to driver sight lines are typically considered and adequately addressed, however driver to pedestrian sight lines can go unaddressed during the resource consent process

- Speed management measures close to the site boundary will assist with controlling vehicle speeds and support driver to pedestrian sightlines (refer to Sections 5 and 11 for discussion of pedestrian safety risks at site crossings and speed management measures, respectively).

16.2.1 AUSTROADS Guide to Road Design Part 4A (AGRD04A-17)

Chapter 3 of AGRD04A-17 discusses sight distance guidance for intersections and property accesses. Of relevance is Safe intersection sight distance (SISD), which is demonstrated in Figure 40. Section 3.4 of AGRD04A provides SISD for property entrances, which we have reproduced in Figure 41.

In summary

- Section 3.4 of AGRD04A recommends SISD of between 47m – 89m for a typical urban road (40km/hr – 60 km/hr design speed).

Figure 40: Demonstration of SISD, from AGRD04A Figure 3.2

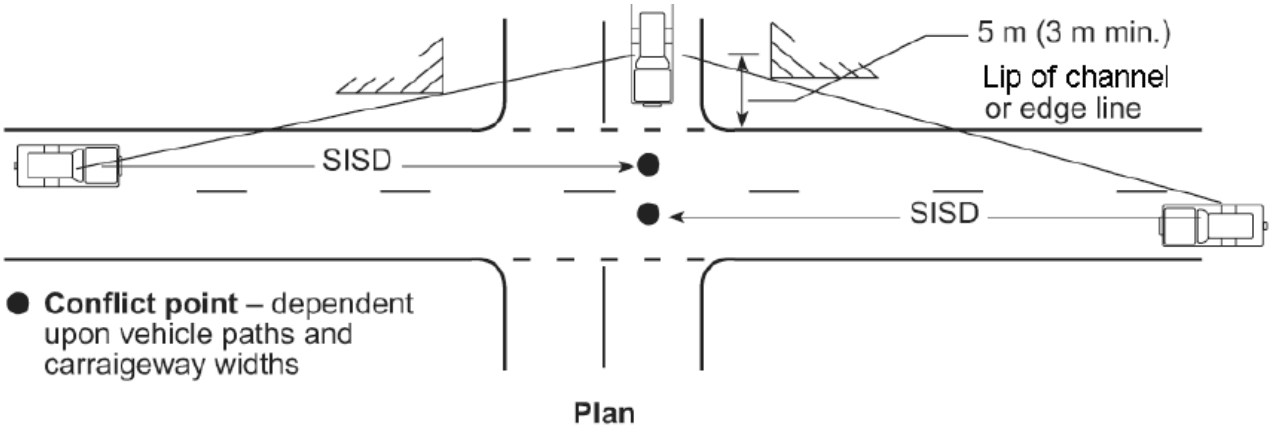


Figure 41: SISD values for property entrances, with an observation time of 1.5sec, reproduced from AGRD04A Table A9

Table A 9: Minimum EDD safe intersection sight distance and corresponding crest vertical curve size for sealed roads with level grades for the norm-day base case using an observation time of 1.5 seconds

Design speed (km/h)		Based on norm-day safe intersection sight distance[1] $h_1 = 1.1$ $h_2 = 1.25$ $d = 0.46$[2] $O_T = 1.5$ sec					
		$R_T = 1.5$ sec		$R_T = 2.0$ sec		$R_T = 2.5$ sec	
		SISD (m)	K	SISD (m)	K	SISD (m)	K
40		47	2.4	53	2.9	–	–
50		63	4.2	70	5.2	–	–
60		81	7.0	89	8.5	–	–
70		100	10.7	110	12.9	–	–
80		121	15.7	133	18.7	–	–
90		144	22.2	157	26.2	169	30.5
100		169	30.4	183	35.6	197	41.2
110		195	40.6	211	47.2	226	54.3
120		–	–	240	61.3	257	70.1
130		–	–	271	78.2	289	89.0
Do all of the crest curve sizes listed provide acceptable car check case capability[3]	Norm-night[4]	Yes ($d = 0.46$, $h_1 = 0.65$ m, $h_2 = 1.25$ m, $O_T = 0.6$ sec)					
	Mean-day	Yes ($d = 0.41$, $h_1 = 1.1$ m, $h_2 = 1.25$ m, $O_T = 1.7$ sec)					
	Mean-night[4]	Yes ($d = 0.41$, $h_1 = 0.65$ m, $h_2 = 1.25$ m, $O_T = 1.2$ sec)					

1 *If the average grade over the braking length is not zero, calculate the safe intersection sight distance values using the correction factors in Table A 5 (or use Equation 2 in Section 3.2.2) by applying the average grade over the braking length.*

2 *On any horizontal curve with a side friction factor greater than the desirable maximum value for cars, calculate the stopping sight distance with the coefficient of deceleration reduced by 0.05.*

3 *This part of the table identifies whether the crest curve sizes listed provide acceptable check case capability in accordance with Section A.2.5, Subsection 'Application of the Check Cases'. The minimum capabilities listed for the check cases assume the same combination of design speeds and reaction times as those listed in the table, except:*

- *where particular check cases use a different speed according to Table A 1*
- *where particular check cases use a different reaction time according to Note 5 of Table A 5 of Appendix A of AGRD Part 3 (Austroads 2016b).*

4 *Drivers will usually be alerted by the glow from the other vehicle's headlights before seeing the vehicle.*

Notes:
Combinations of design speed and reaction times not shown in this table are generally not used.
The crest vertical curve sizes are based on the sight distance being less than the length of the crest curve.

16.2.2 RTS-6

RTS-6[63] is published by Waka Kotahi and is intended to give guidelines than can be incorporated into district plans for the control of the location of vehicle driveways on the road network.

[63] Guidelines for visibility at driveways RTS 6, published by Waka Kotahi, available online at https://www.nzta.govt.nz/assets/resources/road-traffic-standards/docs/rts-06.pdf

RTS-6 Table 1, reproduced in Figure 42, provides minimum sight distances for driver to driver visibility at vehicle crossings, which we have reproduced in Figure 42. This recommends minimum sight distances of between 30m – 115m for a typical urban road (40km/hr – 60 km/hr design speed).

RTS-6 Figure 5 provides minimum sight distances for driver to pedestrian visibility at vehicle crossings, which we have reproduced in Figure 43. This demonstrates that a 2.5m x 5m visibility triangle should be provided at vehicle crossings. We note that the pedestrian visibility splay requires clear line of sight over third party land, in the instance that the accessway is located along the site boundary with the neighbouring property.

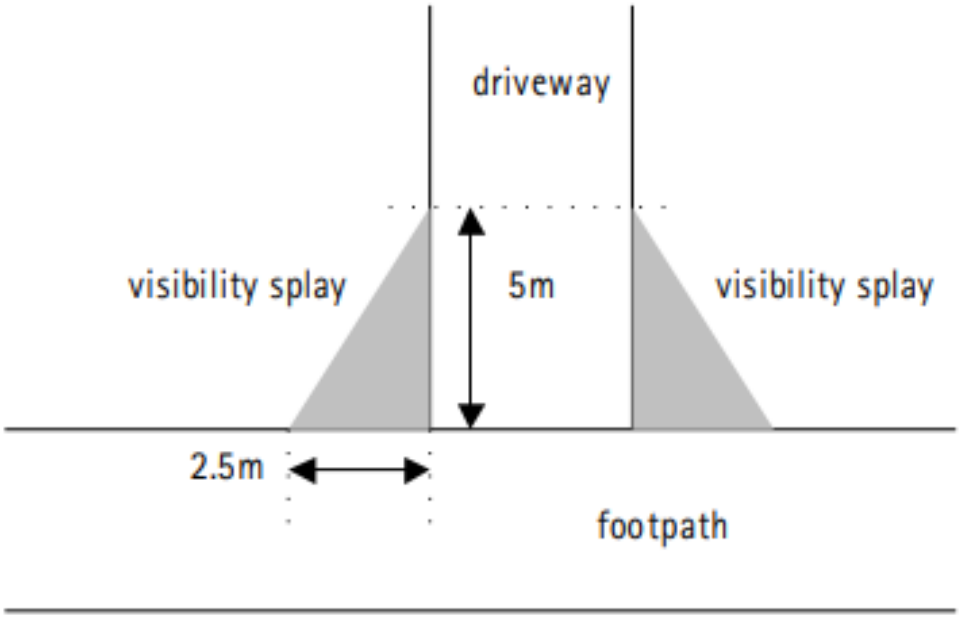
Figure 42: Vehicle crossing sight distances, reproduced from RTS-6 Table 1

		Minimum sight distance (metres)**		
		Frontage road classification		
Driveway classifications	Operating speed (km/h)*	Local	Collector	Arterial
Low volume	40	30	35	70
Up to 200 vehicle manoeuvres per day	50	40	45	90
	60	55	65	115
	70	85	85	140
	80	105	105	175
	90	130	130	210
	100	160	160	250
	110	190	190	290
	120	230	230	330
High volume	40	30	70	70
More than 200 vehicle manoeuvres per day	50	40	90	90
	60	55	115	115
	70	85	140	140
	80	105	175	175
	90	130	210	210
	100	160	250	250
	110	190	290	290
	120	230	330	330

* Operating speed = 85th percentile speed on frontage road. This can be taken as the speed limit plus 15% if survey data are not available.

** Distances are based on the Approach Sight Distance and Safe Intersection Sight Distance tables in NAASRA, *Intersections at Grade* [1] assuming reaction times of 1.5 seconds on local roads with operating speeds up to 60 km/h and 2.0 seconds for all other speeds and all collector and arterial roads.

Figure 43: RTS-6 Figure 5 showing sight line requirements between drivers and pedestrians



16.2.3 Auckland Transport vehicle crossing application requirements

Auckland Transport requires property owners to seek approval from Auckland Transport before building or changing a vehicle crossing[64]. Minimum sight line requirements are not specified, although the technical minimum standards identify that the vehicle crossing must have adequate sight distances[65].

16.3 Consideration of options to address this issue

We have considered the following options outlined in Table 23.

Table 23: Consideration of options – driver sightlines at vehicle crossings

Option	Discussion
1: Do nothing	We accepted this option.
2: Introduce a requirement for a minimum driver to driver sight lines at vehicle crossings	We rejected this option. In our view driver to driver sight lines are already well observed by transport professionals. Driver to driver sight lines should be contained within the road corridor, and are therefore not affected by activities within private property. Further, sight lines are addressed by Auckland Transport vehicle crossing application process.

[64] Auckland Transport vehicle crossing application, available online at https://at.govt.nz/about-us/working-on-the-road/vehicle-crossing-application/

[65] Auckland Transport vehicle crossing technical minimum standards, available online at https://at.govt.nz/media/1974725/vehicle-crossing-technical-minimum-standards.pdf

Table 23: Consideration of options – driver sightlines at vehicle crossings

Option	Discussion
3: Introduce a requirement for minimum driver to pedestrian sightlines at vehicle crossings	We rejected this option. The operative provisions of E27 do not allow consideration of sight distances, if the vehicle crossing is a Permitted Activity. In our experience, driver to pedestrian sight lines may not be assessed through the consenting process, which can result in negative safety outcomes. However, the pedestrian visibility splay can require clear line of sight over third party land, in the instance that the accessway is located along the site boundary with the neighbouring property. We therefore considered it was not appropriate to introduce a standard for driver to pedestrian sight lines.

16.4 Conclusion

We conclude that the operative provisions of E27 and E38 do not adequately address driver to pedestrian sight lines at vehicle crossings. However, due to the potential for the pedestrian visibility splay to conflict with third party land, we do not recommend introducing new provisions to E27 or E38.

17 ISSUE 2G: CARRIAGEWAY WIDTHS

The AUP identifies the minimum formed access widths for residential developments

- Table E27.6.4.3.2: minimum formed access widths of
  - Serves 1 or 2 parking spaces: 2.5m provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3m
  - Serves 3 to 9 parking spaces: 3.0m provided it is contained within a corridor clear of buildings or parts of a building with a minimum width of 3.5m
  - Serves 10 or more parking spaces: 5.5m (providing for two way movements). The formed width is permitted to be narrowed to 2.75m if there are clear sight lines along the entire access and passing bays at 50m intervals are provided.
- Table E38.8.1.2.1: minimum legal width of
  - Serves 1 rear site: 2.5m
  - Serves 2 – 5 rear: 3.0m
  - Serves 6 – 10 rear sites: 5.5m.

17.1 Problem statement

We have considered the following aspects of the existing provisions

- Are the operative provisions for carriageway widths for private accessways appropriate?
- Should carriageway width requirements be based on the number of dwellings and/or parking spaces?
- Are the operative rules for vehicle crossing widths appropriate?

17.2 Evidence base and reference material

To assist with our consideration of the problem statement, we have referred to

- Auckland Transport: Transport Design Manual – Engineering Design Code
- Vehicle trip generation research, as discussed in Section 4.1.

We discuss relevant aspects of these references in the following subsections. In summary, we found that

- Auckland Transport recommends that local roads have a carriageway of at least 5.4m, with 6.0m preferred
- Resident and visitor trip rates per dwelling for developments with low parking provision are lower than dwellings with normal parking provisions (0.35 veh/hr/dwelling vs 0.54 veh/hr/dwelling respectively)
- Resident and visitor trip rates per parking space for developments with low parking provision are equivalent to developments with normal parking provision (0.55 veh/hr/space vs 0.54 veh/hr/space respectively.

17.2.1 Auckland Transport: Transport Design Manual – Engineering Design Code

Auckland Transport's Transport Design Manual (TDM) Engineering Design Code: Urban and Rural Roadway Design[66] sets out design standards for public road lane widths in Table 6. It identifies that local roads should have lane widths of a minimum of 2.7m, with 3.0m preferred. This equates to a two-way carriageway width of at least 5.4m, with 6.0m preferred.

17.3 Consideration of options to address this issue

We have considered the following options outlined in Table 24.

Table 24: Consideration of options – carriageway width

Option	Discussion
1: Do nothing	We rejected this option.
2: Amend the minimum formed widths specified in E27 and E38	We rejected this option. The carriageway widths specified in the operative provisions fall within the minimum lane widths identified in Auckland Transport's engineering standards.
3: Include "dwellings" as a determinant of carriageway width for E27, instead of or in conjunction with "number of parking spaces".	We rejected this option. Our research into vehicle trip generation rates for residential developments shows a high correlation between parking spaces and peak hour vehicle trip generation. However, the correlation between dwellings and peak hour vehicle trip generation is limited.
4: Amend operative rules to address consequential changes from our recommended amendments for footpath separation.	We accepted this option. As discussed in Section 7.4, we recommend that pedestrian accesses be separated from vehicle accesses. This requires a consequential change to Table E27.6.4.3.2 to identify that the specified minimum and maximum width of vehicle crossings at site boundaries excludes the width required for pedestrian accesses.

17.4 Conclusion

We consider that the operative provisions of E27 and E38 in terms of formed accessway widths for residential developments are appropriate. However, as a consequence of our recommendation that pedestrian accesses should be separated from vehicle accesses, Table E27.6.4.3.2 should be amended to identify that the specified minimum and maximum width of vehicle crossings at site boundaries excludes the width required for pedestrian accesses.

[66] Auckland Transport Engineering Design Code: Urban and Rural Roadway Design Version 1: Section 7.4 Lane widths. Available online at https://at.govt.nz/media/1985454/engineering-design-code-urban-and-rural-roadway-design-version-1.pdf

18 ISSUE 3A: MINIMUM LEGAL WIDTH OF ACCESSWAYS

The AUP identifies the minimum legal width of accessways to rear sites

- Table E38.8.1.2.1: minimum legal width of
  - 3.0m where the total number of rear sites served is 1
  - 3.5m where the total number of rear sites served is between 2 – 5.
  - 6.5m where the total number of rear sites served is between 6 – 10.

There is no reference in E27 regarding minimum legal widths.

18.1 Problem statement

We have considered the following aspects of the existing provisions

- Does the lack of a minimum legal width requirement in E27 lead to unintended outcomes, where accessways do not provide sufficient legal width if land use consent proceeds subdivision consent?
- Are changes to E38 required as a consequence of other recommendations that we have made in this report?

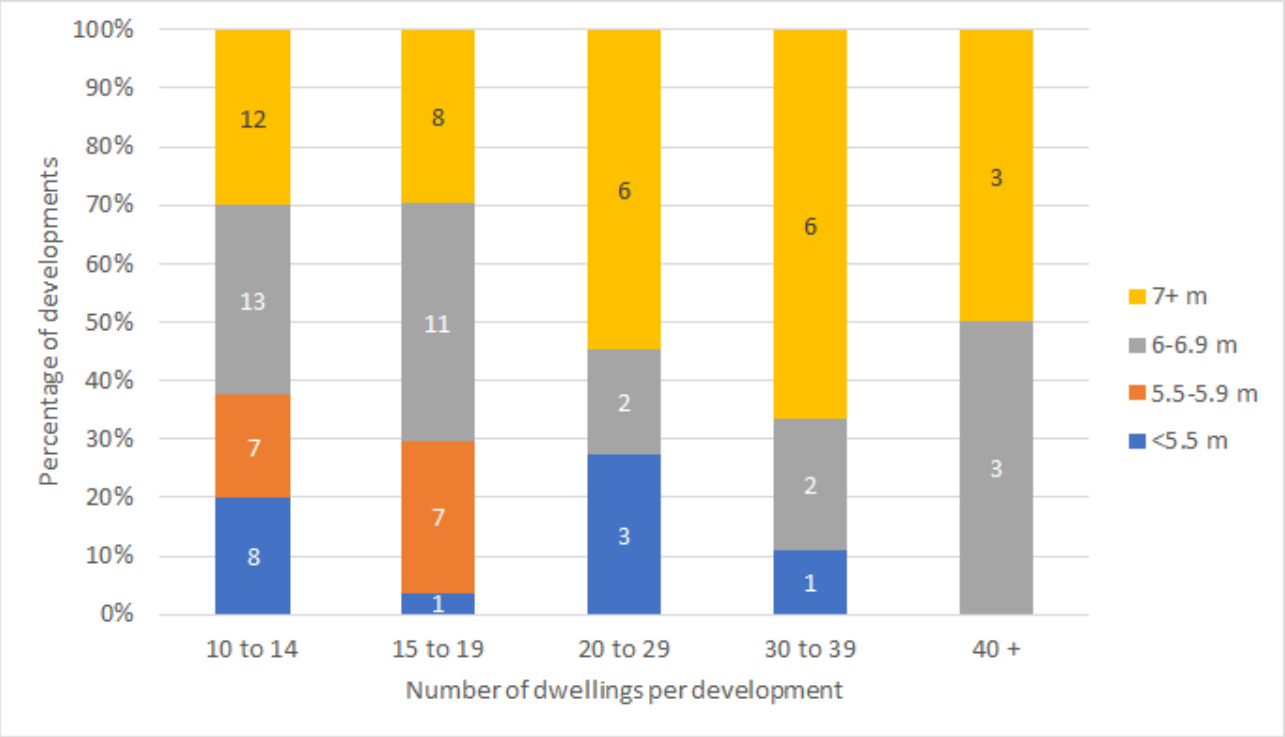
18.2 Evidence base and reference material

Data from Council's Rear Site Monitoring (discussed in Section 3) relating to legal accessway widths are presented in Table 25 and Figure 44. It shows that over 29% of developments of more than 10 dwellings provided less that the minimum required legal access width of 6.5m. We understand that this tends to be due to existing boundary constraints for brownfield sites, rather than new subdivision activity.

Table 25: Consideration of options – minimum legal accessway width

Accessway width	Number of developments consented	Percentage of consented developments
Less than 5.5 m	13	9 %
5.5 – 5.9 m	14	10 %
6 – 6.9 m	31	21 %
7 m or greater	35	24 %
N/A	52	36 %
Total	145	100 %

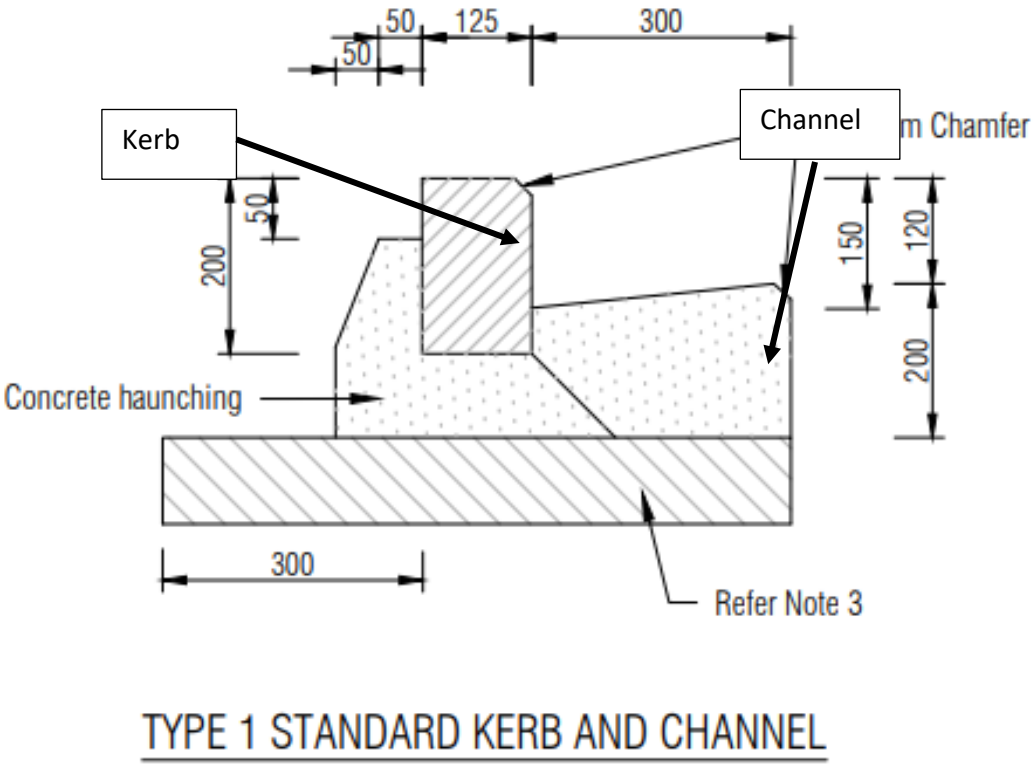
Figure 44: Percentage of accessway widths by scale of development



The following recommendations in our report will have a consequential effect on the minimum legal width of accessways

- Increasing the minimum width of pedestrian accesses to 1.35m for accessways serving 10 to 19 car parking spaces or 10 to 19 dwellings (refer to Section 6)
- Increasing the minimum width of pedestrian accesses to 1.8m for accessways serving 20 or more car parking spaces or 20 or more dwellings (refer to Section 6)
- Requiring that pedestrian accesses are vertically separated from trafficable areas (refer to Section 7). The minimum width of a kerb (for vertical separation of pedestrian accesses) is 125mm, as shown in Figure 45. This width is additional to the footpath width and the formed vehicle access width, although the channel can be considered part of the formed vehicle width.

Figure 45: Standard kerb[67], showing a horizontal with of 125mm



18.3 Consideration of options to address this issue

We have considered the following options outlined in Table 26.

Table 26: Consideration of options – minimum legal accessway width

Option	Discussion
1: Do nothing	We rejected this option. One of the objectives of this Plan Change is to align E27 with E38.
2: Reflect E38 requirements in E27	We rejected this option. Other recommendations in our report have a consequential effect on the minimum legal widths specified in E38.
3: Update E38 to incorporate consequential amendments of this Plan Change and reflect these in E27.	We accepted this option.

18.4 Conclusion

We recommend that

[67] Auckland Transport Kerbs and Channels Standard Engineering Details, available online at https://at.govt.nz/media/1982218/kerb-design.pdf

- Table E38.8.1.2.1 is updated to require a minimum legal width of 6.975m for accessways serving 5 – 10 rear sites (a 1.35m footpath, a 0.125m wide kerb, and a 5.5m wide formed vehicle access)
- Amend Standard E27.6.4.3 to reference the minimum width requirements of Table E38.8.1.2.1.

19 ISSUE 3B: MAXIMUM ACCESSWAY LENGTH

The AUP identifies the maximum length of accessways to rear sites

- Table E38.8.1.2.1 Maximum length of 50m for 1 to 5 rear sites, and a maximum length of 100m for 6 to 10 rear sites.

Chapter E27 does not specify maximum lengths for private accessways.

19.1 Problem statement

We have considered the following aspects of the existing provisions

- Does the lack of a maximum accessway length requirement in E27 lead to unintended outcomes, where accessway lengths exceed the maximums identified in Table E38.8.1.2.1, if land use consent proceeds subdivision consent?
- What are the transport effects of longer accessways?

19.2 Consideration of options to address this issue

In our view, the transport effects of developments incorporating longer accessways can be managed through

- Providing separated pedestrian accesses (refer to our discussion in Section 7)
- Providing speed management measures (refer to our discussion in Section 11).

In our view controls on the length of private accessways relate to the question of whether accesses should be vested as a public road, in particular the matter of the wider connectivity of the transport network. The formation of private accessways, rather than vesting these accessways as public roads, limits the connectivity and resilience of the transport network.

While we consider that controls on accessway length are appropriate, in our view this issue is better addressed through a wider consideration of the matter of public versus private ownership of accessways.

We have considered the following options outlined in Table 27.

Table 27: Consideration of options – maximum accessway length

Option	Discussion
1: Do nothing	We accepted this option. While one of the objectives of this Plan Change is to align E27 with E38, in our view this issue is better addressed through a wider consideration of the matter of public vs private ownership of accessways.
2: Reflect E38 requirements in E27	We rejected this option. As discussed above, we consider that the immediate transport effects of longer accessways can be mitigated

Table 27: Consideration of options – maximum accessway length

Option	Discussion
	through the provision of separated pedestrian accesses and speed management measures.
3: Amend E38 to remove the controls on maximum accessway length.	We rejected this option. As discussed above, we consider there is merit in controlling the maximum length of accessways. Vesting of accessways as a public road improves the wider connectivity and resilience of the transport network.

19.3 Conclusion

Although one of the objectives of this Plan Change is to align E27 with E38, in our view controls on the length of private accessways are better addressed through a wider consideration of the matter of public vs private ownership of accessways.

20 ISSUE 3C: PROVISION OF SERVICE STRIPS

The AUP identifies the requirement for utility strips in accessways to rear sites

- Table E38.8.1.2.1: minimum service strips width of
  - 0.5m where the total number of rear sites served is between 1 – 5.
  - 1.0m where the total number of rear sites served is between 6 – 10.

There is no reference in E27 regarding the provision of utility strips.

20.1 Problem statement

We have considered the following aspects of the existing provisions

- Does the lack of a requirement for utility strips in E27 lead to unintended outcomes, where utility strips are not provided if land use consent proceeds subdivision consent?

20.2 Consideration of options to address this issue

Following discussion with Council's subdivision and development engineering specialists, we understand that the minimum service strips widths within E38.8.1.2.1 as sufficient for developments exceeding 10 rear sites.

Further, advice from Council's planning specialists indicates that it may not be appropriate to include utility matters within E27.

We have considered the following options outlined in Table 28.

Table 28: Consideration of options - provisions of utility strips

Option	Discussion
1: Do nothing	We accepted this option. While one of the objectives of this Plan Change is to align E27 with E38, we consider that E27 should be focused on transport matters and not include utility matters.
2: Reflect E38 requirements in E27	We rejected this option.

20.3 Conclusion

While of the objectives of this Plan Change is to align E27 with E38, we consider that E27 should be focused on transport matters and not include utility matters.

21 ISSUE 3D: PROVISION OF BERMS

The AUP does not require berms within private accessways.

21.1 Problem statement

We have considered the following aspects of the existing provisions

- Does the lack of a requirement for a berm within private accessways lead to poor outcomes for users?

21.2 Consideration of options to address this issue

We have considered the following options outlined in Table 29.

Table 29: Consideration of options – accessway gradients for vehicles

Option	Discussion
1: Do nothing	We accepted this option.
2: Introduce a new requirement for the provision of berms within private accessways	We rejected this option. We consider that the requirement for berms is a result of other design aspects, rather than a requirement of themselves. The need for pedestrian access separation, locations for waste bins and lighting poles, provision for utility strips, etc can all result in a requirement for a berm. However, we recommend that these issues are dealt with directly rather than through a requirement to provide a berm within private accessways.

21.3 Conclusion

While we consider that berms within private accessways can be beneficial, the need for a berm tends to be directed by other requirements (such as infrastructure provision, waste bin collection, etc) rather than a transport specific need for the berm as a stand-alone requirement.

We therefore recommend that these issues are dealt with directly rather than through a requirement to provide a berm within private accessways.

APPENDIX A A literature review of child safety in New Zealand: Auckland Council

Memo

17.01.2022

To: Michele Perwick, Celia Davison, Plans & Places

CC: Nicole Miller, Urban Design Unit; Sanjay Bangs, Plans & Places

From: Melanie McKelvie, Team Leader Design Review, Urban Design Unit

Subject: Driveway Safety Research and Recommendations for Privateways Workstream

Introduction

New Zealand has the highest rate of vehicle-related child pedestrian accidents in the developed world and are the leading cause of paediatric death and serious injury in New Zealand. A low-speed motor vehicle injury sustained by a child in a private driveway is referred to as a 'drive-over', 'rollover', 'back-over', or ‘runover’.

Every two weeks a child is hospitalised with significant trauma to head, chest and lower limbs from driveway injuries, and on average four children per year are killed. Of all child pedestrian injuries in the Auckland region, 25 percent occur on private driveways.

The majority of children (64%) are aged between 0-2 years, with Maori and Pacific Island children are significantly over-represented with 66% of incidents. The majority of drivers are the child’s parent (49%), with the remaining being other relatives (17%), neighbours (13%) and visitors (21%). The majority of driveway run overs are reversing (68%).

Driveway runovers are thought to occur as a result of an interaction between human factors (supervision of child, driver behaviour), vehicle factors (visibility, reversing aids) and environmental factors (property design including driveway design and driveway surroundings). Most driveway injury research to date has focused on clinical case descriptions, injury management, the demographics of affected children and vehicle characteristics. However more recent research in 2010 by Shepherd et al focussed on the influence of the built environment (property and subdivision design) on driveway runovers. This and other recommendations have helped inform work by SafeKids Aotearoa; Starship Children’s Hospital; Accident Compensation Corporation (ACC) and Kainga Ora to reduce driveway runover incidents.

Key Statistics

There is no national database for recording driveway run over incidents, with “the systems to review and record non-traffic deaths (deaths not on public roads) being inconsistent and less well developed with systems to review traffic deaths (deaths on public roads). As a result, children and young people on farms, off road in all terrain vehicles or in driveways may die

with no organisation maintaining a systematic overview of the whole picture"[1]. As a result, research undertaken has relied upon hospital admission data, coroners reports and media reporting for their data. The key statistics from a literature review include:

- Driveway runovers are the leading cause of paediatric death & serious injury in New Zealand with 4 children are killed and more than 17 hospitalised per year (1 nearly every two weeks) with significant trauma to head, chest and lower limbs;
- 66% of children run over are 0-2 years old;
- 49% of the drivers are the victims parent; 17% other relatives; 13% neighbours and 21% visitors;
- 68% of run overs are reversing, 32% forward;
- Maori and Pacific Island children are significantly over-represented with 66% of incidents, with lower socio-economic groups having over five times the risk.

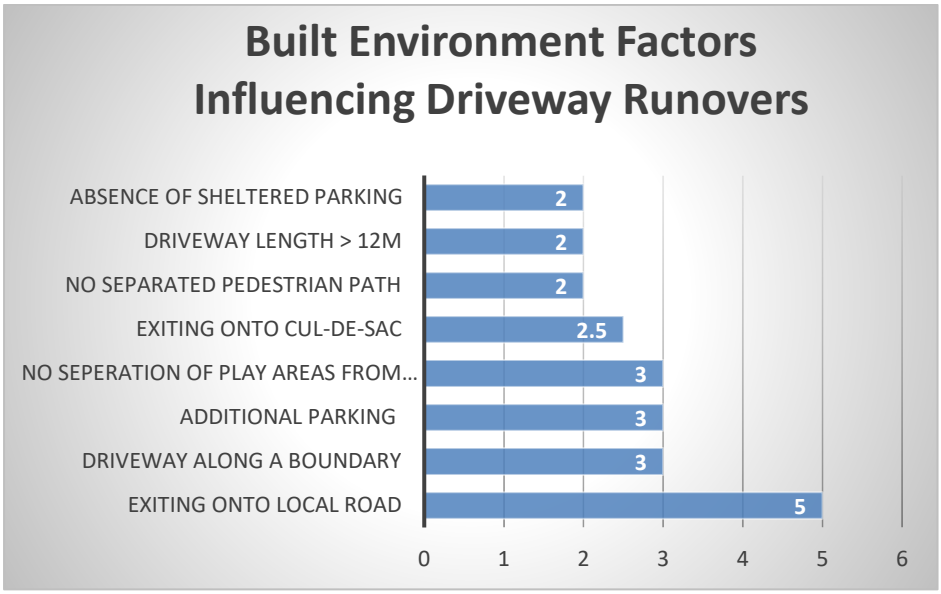
Nearly a quarter of drivers have been reported as seeing the child in a safe position in the house, at the front door or in the garden away from the rear of the vehicle, prior to them reversing[2]. The prevalence of large vehicles including 'people movers', SUVs and four wheel drive type vehicles is also thought to be a contributing factor. As vehicles increase in size, the reversing visibility decreases, resulting in blind spots of more than 27 square metres for some of these vehicles (State Insurance, 2005).

Built Environment Design Factors & Driveway Runovers

International and New Zealand research indicates that the built environment has significant effects on child safety. The Auckland-based study[3] by Shepherd et al, was designed to investigate the possible contribution of a range of built environment factors to the risk of runovers and was conducted over a four year period. It was acknowledged that driver behaviour and supervision of children are also critical and have subsequently been targeted in campaigns by Safekids, Kainga Ora and other organisations. The recommendations have also been incorporated in the Standards New Zealand "Safety in the Home" Handbook (SNZ HB 4102:2011).

The graph below identifies the built environment factors that were found to be significant contributors to driveway run over incidents in a range of residential settings including standalone dwellings; rear lot battle-axe subdivision; and more recent infill subdivision and development, and their influence shown as a 'fold increase':

[1] Child and Youth Mortality Review Committee, Te Ròpù Arotake Auau Mate o te Hunga Tamariki, Taiohi. 2009. *Fifth Report to the Minister of Health: Reporting mortality 2002–2008.* Wellington: Child and Youth Mortality Review Committee.
[2] Murphy F, White S, Morreau P. Driveway-related motor vehicle injuries in the paediatric population: a preventable tragedy. NZ Med J 2002:115
[3] Shepherd, M, Austin, P & Chambers, J 2010, 'Driveway Runover, the Influence of the Built Environment: A Case Control Study', *Journal of Paediatrics and Child Health*, vol. 46, no. 12, pp. 760-767.



Graph 1: Built Environment Factors Influencing Driveway Runovers (data obtained from Shepherd et al, 2010).

1. **Driveway exiting onto a local road**

   Research indicates that driveways exiting onto smaller, local roads, such as suburban streets or cul-de-sacs, is associated with a fivefold increase in run-over risk compared to exiting onto busier, arterial roads[4]. This is thought to be primarily due to drivers being overconfident or complacent when using driveways on local roads and drivers concentrating more when exiting onto busier roads because they aware of a greater number of hazards.

2. **Shared Driveways**

   Shared driveways result in a threefold increase in risk of driveway run-overs due to the greater number of users and a greater number of children present on the driveway.[5]

Photo 1: Border Rd, Henderson

[4] Ibid
[5] Ibid

It is also reported that the risk of a young child being run over by a vehicle moving at low speed would be increased in circumstances where more vehicle movements occur, such as in shared driveways and where there are many visitors[6]. It was also noted that areas used by vehicles were also used by children for play as part of their routine daily activities. This is especially dangerous as vehicles can arrive and leave unexpectedly. Any increase in vehicle speed will further increase the risks.[7]

3. **Dedicated Pedestrian Paths**

The lack of a dedicated footpaths for pedestrians, separate from vehicles, results in a twofold increase in risk of driveway runovers[8].

Photo 2: Garelja Rd, Henderson

4. **Driveway Length**

Driveways exceeding 12 metres in length result in twofold increase in risk for driveway runovers[9]. Thought to be related to vehicle speeds that can be achieved on longer driveways. It is noted that driveway accidents are uncommon in Europe and it is thought that long driveways and a high proportion of subdivided properties contribute to higher incidence in NZ[10].

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[6] Child and Youth Mortality Review Committee, Te Ròpù Arotake Auau Mate o te Hunga Tamariki, Taiohi. 2011. *Low Speed Run Over Mortality.* Wellington: Child and Youth Mortality Review Committee.

[7] Ibid

[8] Shepherd, M, Austin, P & Chambers, J 2010, 'Driveway Runover, the Influence of the Built Environment: A Case Control Study', *Journal of Paediatrics and Child Health*, vol. 46, no. 12, pp. 760-767.

[9] Ibid

[10] Austin, P; Shepherd, M & Chambers J, 2010. Housing and Driveway Design : as if children matter. 5th Australasian Housing Researchers' Conference, University of Auckland, New Zealand, 17 Nov 2010 - 19 Nov 2010. National Institute of Creative Arts and Industries, University of Auckland.

5. **Absence of sheltered parking and presence of additional parking areas**
The presence of additional parking on property, connected to but separate from the driveway results in a threefold increase in risk[11], due to the additional manoeuvring required. This is a critical finding given the current development trend of communal carparking courts, and lack of dedicated paths not only on the driveway but around the parking areas. The absence of sheltered parking also results in a twofold increase in risk[12] which may result in more rapid entry of the driver to the vehicle, reducing the time to scan for children.

Photo 3: Aporo Tawhito Lane, Henderson (private lane)

Photo 4: Freida Henare Lane, Henderson (private lane)

[11] Shepherd, M, Austin, P & Chambers, J 2010, 'Driveway Runover, the Influence of the Built Environment: A Case Control Study', *Journal of Paediatrics and Child Health*, vol. 46, no. 12, pp. 760-767.
[12] Ibid

6. **Separating driveways from the dwelling and play areas**

A lack of separation/fencing of outdoor play areas from driveways results in a threefold increase in injury risk[13].

It is considered however that having a fenced outdoor area doesn't necessarily prevent children from playing in shared driveways or carparking areas, which could be seen to be a desirable space to ride bikes, skateboards etc. In the context of a reduction in private outdoor living areas, and the useability of these outdoor living spaces for play activities (due to e.g. decking, planting, services etc), it is likely that shared driveways and communal carparking areas will continue to be desirable play spaces for children.

7. **Lack of dedicated play areas for children**

The literature notes that there is a clear correlation between the lack of a dedicated child play area on a property, and the incidence of driveway run-overs. Research indicates that where there is an absence of sufficient lawns for children to play on, the driveway, carport or vehicle turning area becomes their primary area of play. From the 1990's the communal space of many developments in the form of terraces and small apartment buildings, is dominated by car manoeuvring (and reversing) areas; there are no separate pedestrian routes through the site to the street and the provision of separated children's play areas is non-existent[14].

Photo 5: Opaheke Rd, Papakura. Decked outdoor living space with no dedicated space for children to play, with large carpark and shared driveway/manoeuvring space adjacent.

[13] Roberts, I et al, 1995, Driveway related child pedestrian injuries, *Pediatrics*, 95 (3), 405 - 408

[14] Shepherd, M, Austin, P & Chambers, J 2010, 'Driveway Runover, the Influence of the Built Environment: A Case Control Study', *Journal of Paediatrics and Child Health*, vol. 46, no. 12, pp. 760-767.

8. **Driveways on property boundaries**

The literature[15] notes the increased risk of run-overs attributable to driveways being positioned on the property boundaries, with a threefold increase in risk, most likely because drivers must concentrate intently on avoiding a property fence and any vegetation.

Photo 6: Gladfield Lane, Te Atatu Peninsula

Kainga Ora Driveway Design Guidance

Kainga Ora in partnership with Safekids Aotearoa have implemented an award-winning driveway safety programme since 2013 which focuses on separating child play areas from driveways in properties where there are young children under the age of 5. They have also developed design guidelines[16] to ensure driveway safety is taken into consideration when we are building or redeveloping a property, in recognition of the property design risk factors outlined above.

The driveway design guidelines have three key principles[17]:

1. Provide a secure play area for children that is separated from the driveway;

2. Provide pedestrians with a safe route to the building separated from the driveway and vehicles;

3. Provide clear lines of sight for vehicles when entering and exiting the property.

[15] Ibid

[16] A Guide to Driveway Safety for Property Owners. Developed by Housing New Zealand in partnership with Safekids Aoteoroa, New Zealand Transport Agency, New Zealand Police and Roadsafe Nelson Bays.

[17] Ibid

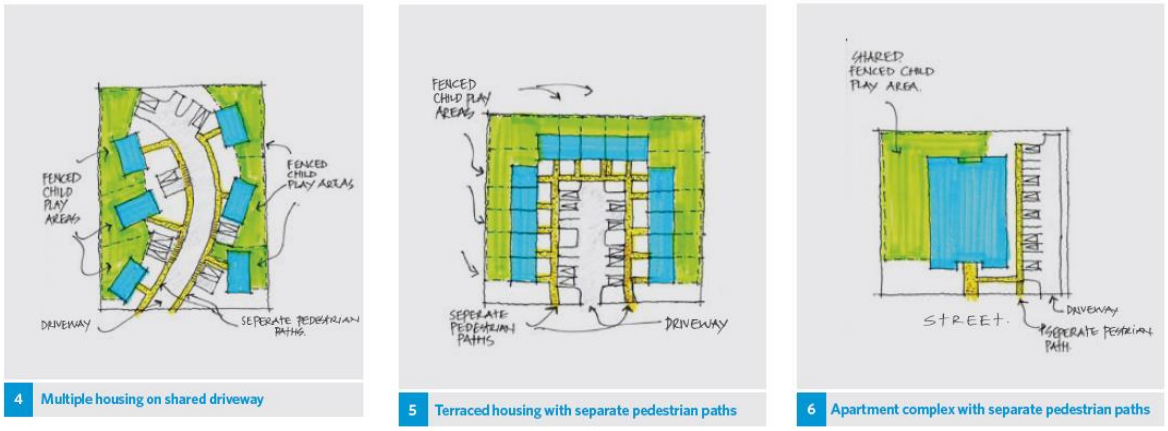


Figure 1: Recommendation for separate Pedestrian Paths for Multi-Unit housing, terraced housing and apartments[18]

Additional guidance and design tips are provided including:

- Ensure front or main entry doors from the house do not open directly onto the driveway, carparking or next to a garage door;
- When considering the location of pedestrian access routes, consider the range of users on site including families with large numbers of young children, the mobility impaired (users of wheelchair and mobility scooters, or the frail and elderly) as well as the type of vehicles accessing the site (cars, bicyclists, motorcycles, people movers, removal vans, rubbish collection trucks and emergency vehicles).
- Pedestrian access routes should consider safety issues such as using non-slip surfaces and night-time lighting, and using the principles of Crime Prevention Through Environmental Design (CPTED).

Safety in the Home Handbook – Standards New Zealand (SNZ HB 4102:2011)

SNZ HB 4102:2011 is a guide to reducing injuries through home design, building and maintenance, developed in partnership with a wide range of organisations and contains specific guidance on site layout including vehicle access. Reference is also made to the Shepherd et al research findings in respect of increased risk factors arising from the built environment.

The guide states that driveways and parking areas should be separated from children's play areas and separated pathways provided. Further recommendations are made in respect of avoiding driveways adjacent to a boundary; fencing and visibility; level crossings and driveway widths.

[18] Source - Ibid

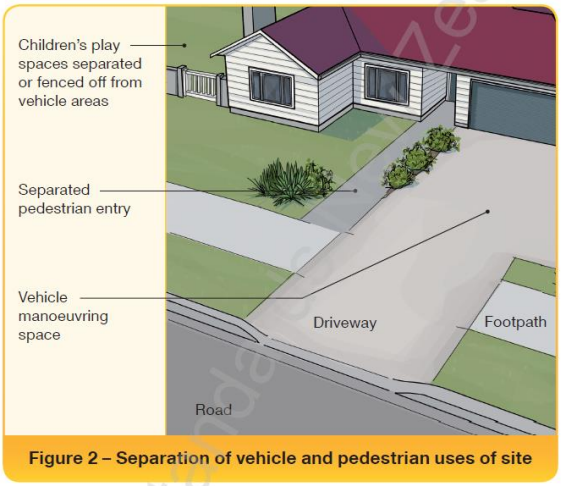


Figure 2 – Separation of vehicle and pedestrian uses of site

REDUCING THE RISK OF CHILD DEATH AND INJURY IN DRIVEWAYS

According to recent research, the risk of child death and injury from being driven over by a slow-moving vehicle is increased with:

(a) a driveway length of greater than 12 m

(b) more parking areas on the property (accessed from the driveway)

(c) a driveway running along the property boundary

(d) a driveway exiting directly onto a local road or cul de sac.

The presence of a separate pedestrian pathway to the home is associated with a decreased risk in child death and injury.

Source: Shepherd, M. et al 'Driveway runover, the influence of the built environment: a case control study'. Journal of Paediatrics and Child Health. December 2010.

Figure 2: SNZ HB 4102:2011 – Section 1.13. Vehicle Access Recommendations

Implications of NPSUD & RMEHS Act 2021

Research has identified that the intensification of existing urban areas, with long shared driveways and the replacement of outdoor areas with dwellings, results in the built environment factors that contribute to driveway runovers.

The National Policy Statement on Urban Development and the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 provide for greater intensification within the existing residential zones. This includes removal of carparking minimums; no minimum density controls; and provision for three dwellings as a permitted activity within zones which previously unable to be redeveloped or subdivided - notably the Single House Zone. This combined within the more relaxed 'Medium Density Residential Standards' will likely result in an increase in infill/rear lot development and larger scale developments which rely on shared driveways, with a corresponding increase in the built environment outcomes which contribute to driveway runover incidents.

It is also noted that whilst the NPSUD does not require any onsite parking, developer preference and market demands are resulting in the majority of developments still providing for at least one onsite carpark. These are increasingly provided in the form of communal carparking courts to provide for more affordable housing options, and footpath provision through and around these spaces is not managed by the AUP currently.

Recommended Footpath Width

It is recommended that a minimum footpath width of 1.8m is provided on at least one side of the carriageway, and on both sides for larger scale residential developments. This width is consistent with the Auckland Transport Transport Design Manual and the Waka Kotahi Pedestrian Network Guidance (2021).

Auckland Transport: Transport Design Manual – Engineering Design Code

The TDM Engineering Design Code: Footpath Pedestrian Facilities and Public Realm[19] sets out design standards for pedestrian access including various street types according to the adjacent lane use. It states that footpaths must be provided on both sides of the road for new subdivisions in brown and greenfield areas. Footpaths or 'through routes" in suburban street zones "*provide a path for path for pedestrian movement that is clear of obstacles, facilitating through access for people walking along a street, regardless of age and abilities. It must be wide enough to allow two wheelchair users or people pushing prams to pass one another*." The TDM states that footpaths within private accessways may be designed according to the principles in the document, and given the scale and intensity of development we are now seeing accessed from private accessways, it is considered that this is an appropriate response.

The TDM states that urban footpath widths should be wide enough for use by all user groups, including people:

- On foot, some with visual impairments using a cane or walking with a guide dog,
- In wheelchairs or on mobility scooters,
- Using small wheel devices,
- Pushing a pram.

Urban footpaths are expected to be constructed on both sides of the road in line with the minimum standards, with a 1.8m footpath required for local roads in residential areas:

TABLE 1 MINIMUM URBAN FOOTPATH ZONE DIMENSIONS

Location	Maximum pedestrian flow	Zone				Total
		Kerb	Street Furniture/ front berm	Through route	Frontage/ back berm	
Main Street, Mixed use & Centres	80p/min	0.15m	2.5m	2.4m +	1m (paved)	6.05m+
Alongside parks, schools and other major pedestrian generators						
Outside and around public transport hubs						
Out-of-centre arterial	60p/min	0.15m	2.2m	1.8m	1m	5.15m+
Neighbourhood Collector						
Local roads in residential areas	50p/min	0.15m	2.2m	1.8m	1m	5.15m

Waka Kotahi Pedestrian Network Guidance (2021)

The Waka Kotahi Pedestrian Network Guidance (2021), states that the appropriate width of footpaths will depend on factors that include urban design and pedestrian comfort objectives, land use interaction, available corridor width, and multi-modal level of service (LOS) analysis.[20] The table below has minimum widths that apply to typical conditions:

[19] https://at.govt.nz/media/1985456/5794-tdm-engineering-design-code-footpath-pedestrian-facilities-and-public-realm-version-1.pdf

[20] Footpath width | Waka Kotahi NZ Transport Agency (nzta.govt.nz)

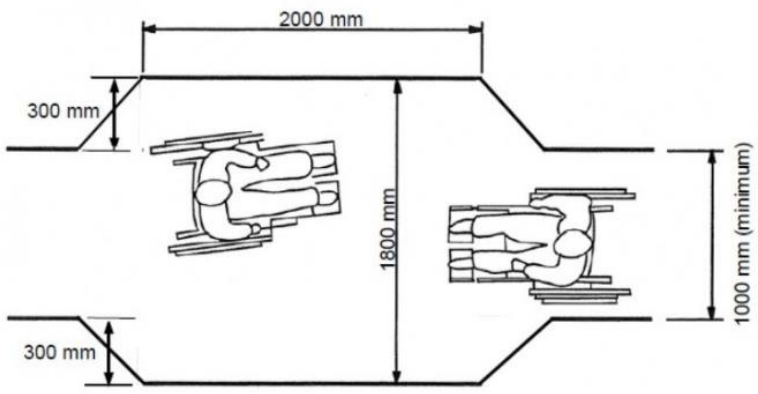
Table: Minimum footpath dimensions

Location (place type)	Maximum flow (p/min)[1]	Zone				Total (m)
		Kerb (m)	Street furniture if provided[2] (m)	Through route (m)	Frontage[3] (m)	
Local streets in residential areas	50	0.15	0.9	1.8	0.15	3.0

The Waka Kotahi Pedestrian Network Guidance states that where a 1.8m footpath cannot be provided, and there is no option to reallocate space from e.g. the berm or carriageway, then passing places should be provided. This however should only be provided where it is not possible to widen the footpath over a longer distance, and should not be a low-cost alternative to a full-width footpath. Passing places enable:

- two wheelchairs or pram users to pass each other
- walking pedestrians to pass stationary pedestrians

To allow two wheelchairs to pass comfortably, a clear width of 1.8m is required as shown in the figure below.



Passing places should be installed as follows:

Table: Installing passing places

Reason	Passing place dimensions	Location and spacing
Wheelchair users	Minimum footpath through zone width 1.8m Minimum length 2.0m (see figure above).	At least every 50 m, and preferably more frequently, where the footpath is less than 1.5m wide.
Passing pedestrians	Minimum footpath through zone width 1.8m. Minimum length equivalent to the average group of obstructing pedestrians, plus at least 1.0m.	As required, according to the RCA's assessment of where pedestrians may wait.

Conclusion & Recommendations

Research has shown that the driveways on which run-over injuries occur are characteristically shared, do not provide for dedicated pedestrian paths, extend through the property and are desirable as child play areas. These factors maximise exposure of children and other vulnerable users to vehicles.

It is recommended that Council actively discourage residential development and subdivision layouts that increase the risk of driveway runovers and prioritise the safety of children and other vulnerable users. Changes to subdivision and neighbourhood designs to separate the movements of young children and vulnerable users from vehicles will be the most effective measure to reduce the incidence of low speed vehicle run overs[21]. The following recommendations are made:

1. Require outdoor living spaces and adequate play areas for children, and the separation of these (through fencing or other means) from driveways, carparks and manoeuvring areas;

2. Require dedicated and grade separated pedestrian footpaths on at least one side of a shared driveway and on both sides for larger scale developments, of sufficient width to cater for a range of users (1.8m). Consideration of gradient, cross fall and passing places should also be required;

3. Require dedicated and grade separated pedestrian footpaths around communal carparking areas, which link to the main pedestrian footpath;

4. Require assessment of pedestrian safety risk factors in the design of shared driveways including driveways which exit onto local roads and cul-de-sacs; driveway length; driveways located along a boundary; and additional parking connected to the driveway as part of matters of discretion and assessment criteria.

[21] Australian Government, Department of Infrastructure and transport. 2012. Child pedestrian safety: 'driveway deaths' and' low speed vehicle run-overs', Australia 2001-2010.. Information Sheet 43.

REFERENCE LIST

A Guide to Driveway Safety for Property Owners. Developed by Housing New Zealand in partnership with Safekids Aoteoroa, New Zealand Transport Agency, New Zealand Police and Roadsafe Nelson Bays

Austin, P; Shepherd, M & Chambers J, 2010. Housing and Driveway Design : as if children matter. 5th Australasian Housing Researchers' Conference, University of Auckland, New Zealand, 17 Nov 2010 - 19 Nov 2010. National Institute of Creative Arts and Industries, University of Auckland.

Australian Government, Department of Infrastructure and transport. 2012. Child pedestrian safety: 'driveway deaths' and' low speed vehicle run-overs', Australia 2001-2010.. Information Sheet 43.

Child and Youth Mortality Review Committee, Te Ròpù Arotake Auau Mate o te Hunga Tamariki, Taiohi. 2009. *Fifth Report to the Minister of Health: Reporting mortality 2002–2008.* Wellington: Child and Youth Mortality Review Committee.

Davey, Jeremy, Freeman, James, Dingle, Genevieve, Clark, Michele, Johnston, Trisha, Woods, Shelley, & White, Jill (2007) The Prevalence and Characteristics of Paediatric Driveway Accidents in Queensland. Journal of the Australasian College of Road Safety, 18(2), pp. 34-40.

Hunter, John; Poulgrain, Hayley & Campbell, Maxine, 2009. Accidental child driveway runovers : exploring Waikato data and the efficacy of existing responses. Report, University of Waikato 2009

Hsiao, K; Newbury, C; Bartlett, N; Dansey, R; Hammil, J & Morreau P, 2009. Paediatric driveway run-over injuries: time to redesign? The New Zealand Medical Journal, Vol 122 No 1298; pp.17-24

Kainga Ora. Keeping your children safe on driveways, Fact Sheet, Retrieved 11.01.2021. https://kaingaora.govt.nz/assets/Tenants-and-communities/Documents/Driveway-Safety-factsheet.pdf

Kainga Ora, November 2013. A guide to driveway safety for property owners. Retrieved 11.01.2022. https://kaingaora.govt.nz/assets/Tenants-and-communities/Documents/A-guide-to-driveway-safety-for-property-owners-brochure.pdf

Murphy F, White S, Morreau P. Driveway-related motor vehicle injuries in the paediatric population: a preventable tragedy. NZ Med J 2002:115.

Roberts, Ian, Norton, Robyn & Jackson, Rodney. Driveway-Related Child Pedestrian Injuries: A Case-Control Study. Pediatrics Vol. 95(3), pp 405-408.

Safekids New Zealand (2011). Factsheet: Child Driveway Runover Injuries. Retrieved 11.01.2022. https://media.starship.org.nz/download-child-driveway-run-over-injuries-factsheet%3E%3E/Child_driveway_run_over_injuries_2011_letterhead.pdf

Safekids New Zealand (2011) *Safekids New Zealand position paper: Child driveway run over injuries.* Auckland: Safekids New Zealand. Retrieved 11.01.2022.

https://media.starship.org.nz/download-safekids-position-paper-child-driveway-run-over-injuries-2011%3E%3E/Safekids_NZ_Position_Paper_Child_Driveway_Run_Over_Injuries_FINAL_Web.pdf

Safekids Aotearoa, Starship Foundation, ACC (2021). Driveway Runovers Reference Card. Information Sheet. Retrieved 11.01.2022: https://media.starship.org.nz/download-driveway-runover-reference-card/0061_ReferenceCard_A4_DrivewayRunovers_4.0.pdf

Shepherd, M, Austin, P & Chambers, J 2010, 'Driveway Runover, the Influence of the Built Environment: A Case Control Study', *Journal of Paediatrics and Child Health*, vol. 46, no. 12, pp. 760-767.

Standards New Zealand, 2011. Safety in the Home Handbook. A guide to reducing injuries through home design, building and maintenance. SNZ HB 4102:2011.

State Insurance. (2005) State insurance reversing visibility index results summary [Chart]. Retrieved January 15, 2010.

University of Waikato, 2014. The built environment, Hamilton City Council policies and child driveway safety : a balancing act. Report.

APPENDIX B Width of an average or 'typical' residential site within walkable catchments in Auckland", Council research, dated April 2022)

Width of an average or 'typical' residential site within walkable catchments in Auckland

UDU research
April 2022

Researcher: Jess Romhany
Reviewed by: Eva Zombori

1. Research objective

The objective of this research was to identify the width, length and area of a typical residential site within the walkable catchments of Rapid Transit Network (RTN) stations in Auckland, to inform Council's relevant work streams to amend the Auckland Unitary Plan Operative in Part (AUP OP) to fulfil the requirements of Policy 3 of the National Policy Statement on Urban Development (NPSUD).

Policy 3 of the NPSUD requires that:

> "*In relation to tier 1 urban environments, regional policy statements and district plans enable:*
>
> *(a) in city centre zones, building heights and density of urban form to realise as much development capacity as possible, to maximise benefits of intensification; and*
>
> *(b) in metropolitan centre zones, building heights and density of urban form to reflect demand for housing and business use in those locations, and in all cases building heights of at least 6 storeys; and*
>
> *(c) building heights of least 6 storeys within at least a walkable catchment of the following:*
>
> *(i) existing and planned rapid transit stops*
> *(ii) the edge of city centre zones*
> *(iii) the edge of metropolitan centre zones; and*
>
> *(d) in all other locations in the tier 1 urban environment, building heights and density of urban form commensurate with the greater of:*
>
> *(i) the level of accessibility by existing or planned active or public transport to a range of commercial activities and community services; or*
> *(ii) relative demand for housing and business use in that location."*

Council sought legal advice to clarify what 'enable' means in the context of the NPSUD. Council was advised by DLA Piper, dated 11 August 2021, that "…*our view is that the Council can give effect to Policy 3 if, in a location, building heights of at least 6 storeys are enabled as a permitted activity or controlled activity on a typical site in the location."*

2. Research methodology

This research used the RTN walkable catchment boundaries that were set by the Geospatial Team of Plans and Places. We looked at all 45 walkable catchments, including the eight Metropolitan Centres.

To determine what a ‘typical’ site was, the research applied the mode average methodology separately for the three attributes, that is the value that appears most frequently in a dataset.

GIS data of all sites within the walkable catchments was obtained from the Geospatial Team of Plans and Places. This data was first filtered by zone, site width and property ownership type. With the application of these filters the sites that were analyzed were all sites that were zoned residential in the AUP OP (SH, MHS, MHU and THAB), sites that had a minimum of 7m width or more, sites that had a frontage to the street and sites that were freehold. Some sites with an area less than 100m^2 were excluded from the analysis as these are not suitable for residential development (e.g. forms part of berm, road verge).This methodology therefore excluded all sites that were not residential, parts of sites that formed a driveway to a rear property and sites that have multiple buildings on them owned by multiple owners.

The same methodology was applied to identify the ‘typical’ site size, using the same GIS data.

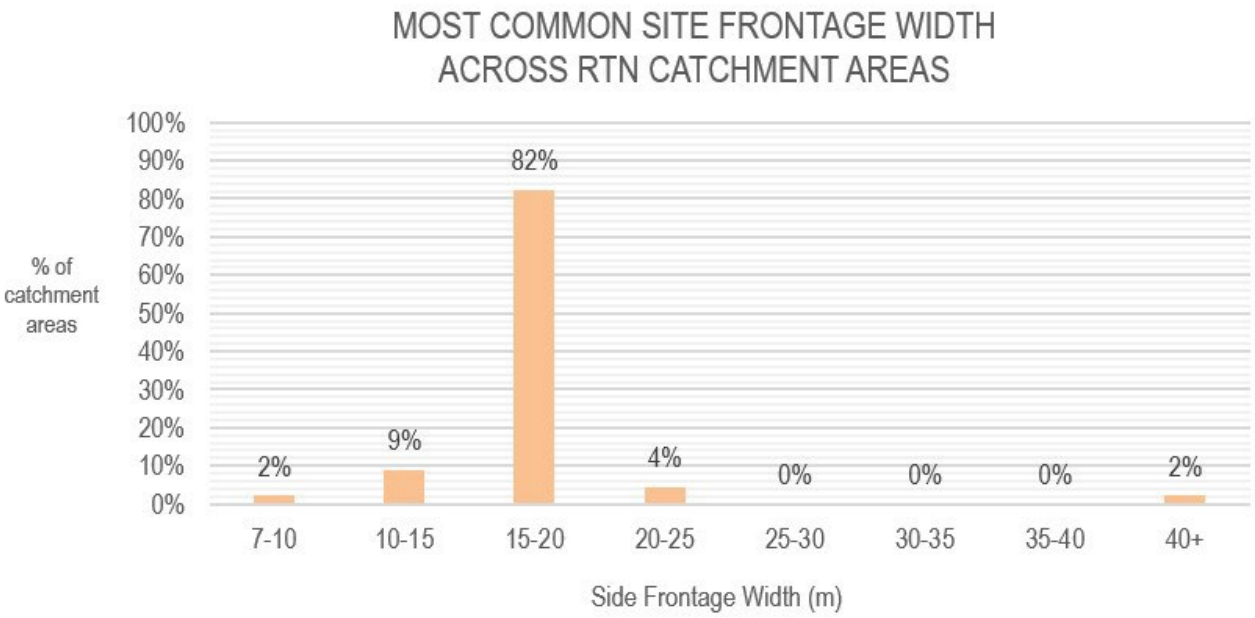
To identify the ‘typical’ site length, after filtering the data in a same way as before, a calculation of site area divided by site width was applied to obtain the data for site length for each individual residential zoned site. This calculation provided an approximate site length. Since not all sites are regular in shape, the site length is an estimation, and it is likely that there are some discrepancies. Sites with less than 10m length were also excluded from the calculation.

3. Findings

The research findings are organized into three categories: an overall mode average of site width, site area and site length throughout all walkable catchments. The findings broken down by individual RTN walkable catchments are attached in **Appendix 1**.

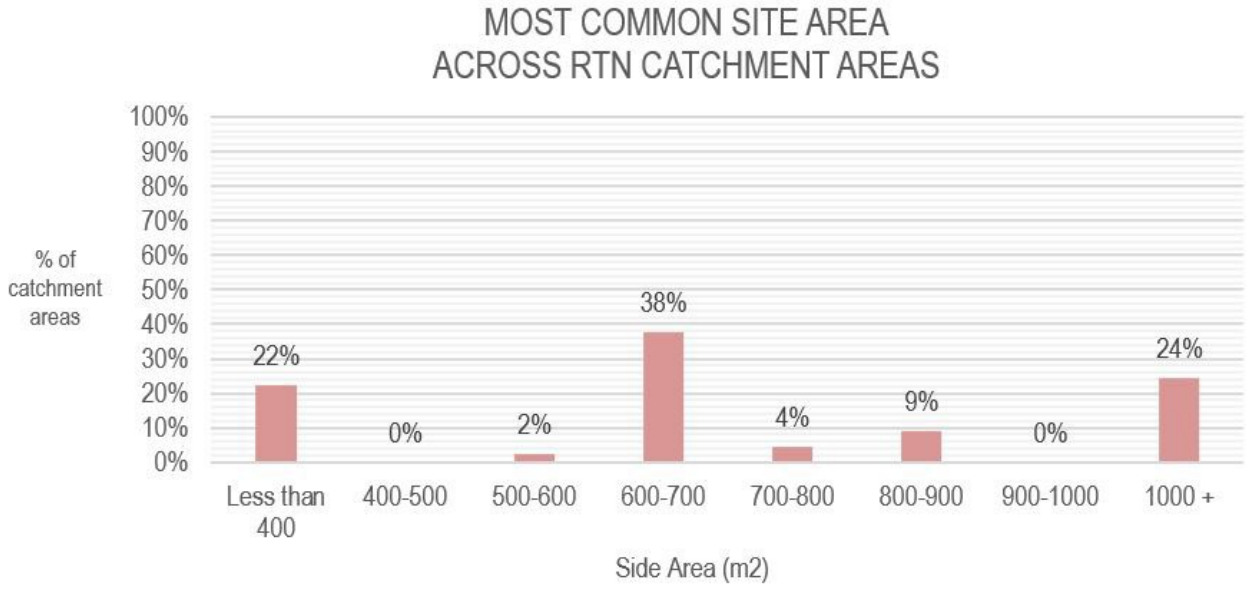
a. Typical site width - walkable catchment-wide result

.
The most common site width (82%) of the residential freehold sites throughout the walkable catchments is between 15m and 20m.



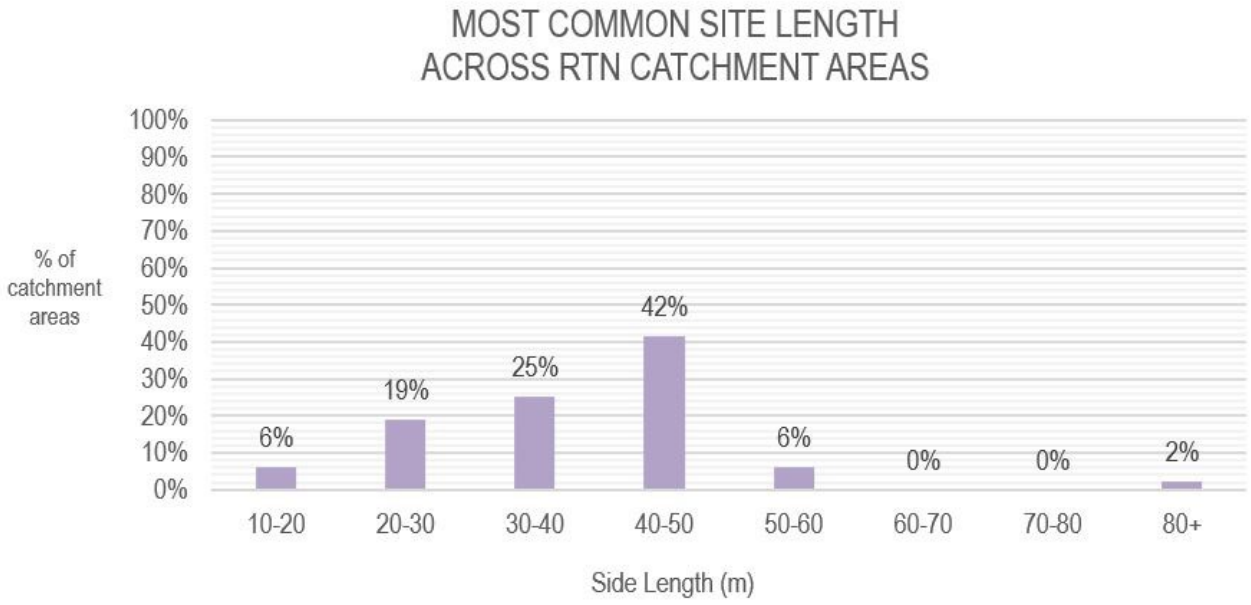
b. Typical site area - walkable catchment-wide result

The most common site area (38%) of the residential freehold sites throughout the walkable catchments is between 600m^2 and 700m^2.



c. Typical site length - walkable catchment-wide result

The most common site length (42%) of the residential freehold sites throughout the walkable catchments is between 40m and 50m.



4. Summary

The majority of the sites within walkable catchments that are subject to Policy 3 of the NPSUD and therefore are required to accommodate at least 6-storey high buildings:

- have between 15m and 20m site width at their road frontage
- are sites between 600m^2 and 700m^2 in area, and
- have between 40m and 50m site length.

It should be noted that these findings are not intended to determine the width, height and area of a single ‘typical’ site. These findings do not mean that a ‘typical’ or average residential site is in fact 15m-20m wide, 45m-50m long and 600-700m^2 in area. These average values for width, height and area need to be considered as separate findings, which can only be used to inform modelling to determine the suitable zone standards that enable the construction of 6+ storey high buildings on a ‘typical’ site in the walkable catchments in Auckland. Further, it should be noted that these results are based on calculations from given GIS data and not data that we have researched independently. This is an internal document only; any publication outside Auckland Council would require appropriate peer review prior to publication.