Raised Safety Platforms (Speed tables) – Practice Note 02

1. Purpose

This Practice Note (PN) identifies acceptable profiles and uses for raised safety platforms (also known as RSPs or speed tables) in all road contexts within the Auckland Transport System. It has been produced because current standards in AT TDM Engineering Design Code – Traffic calming and in AC Code of Practice for Land Development and Subdivision (AC CPLDS) do not cover all uses of RSPs. Recent use of RSPs for road safety measures have shown that some profiles, suitable for other contexts, may not be safe and effective when used on higher-speed roads where they are not part of an extended traffic calming scheme. Therefore, new detailed standards must be set and followed so that installations of RSPs on all road types are safe for all users.

This approach applies to RSP works covered by:

i) the Land Development Engineering Approval (ENG) process;

ii) any AT approved works programme/ project involving upgrading and redevelopment of road infrastructure works;

iii) third party developed roads and other infrastructure to be vested to AT;

iv) retrofit alteration of RSPs that are considered high priority due to risk to road users;

v) any other Auckland Council (AC) or AT approval process which involves RSPs;

in a manner that:

- All infrastructure complies with AT's and AC's safety requirements;
- Transport infrastructure complies with AT's Transport Design Manual requirements;
- Implementation comes into effect immediately on the signed date shown at the end of this PN.

This Practice Note does not apply to speed humps, speed cushions or vehicle crossing ramps.

2. Scope

This Practice Note applies to:

- All AT projects initiated after implementation of this PN.
- All Consents or ENGs lodged after implementation of this PN.
- Any AT project commenced but not yet constructed or any Consent or ENG lodged with Auckland Council:
  - If the Manager – Design & Standards considers that a safety issue would arise if the design is not changed
  - and if it is practicable to change the design prior to construction
  - and the cost of changing the design can be agreed to.
- Any review of the safety of an existing RSP.

3. Revised Standards

3.1 Uses of raised safety platforms

Raised safety platforms covered by this Practice Note are flat-top speed tables, raised intersections and Swedish tables (other vertical features such as speed humps and speed cushions are not included). They can be used in the following situations, among others:

- Mid-block zebra and signalised crossings
- Approaches to signal-controlled intersections

raised intersections (priority, roundabout or signalized)

- Pedestrian crossings over left-turn slip lanes
- Pedestrian crossings adjacent to roundabouts
- Entries to roundabouts where speed reduction is not otherwise sufficient
- Approaches to pedestrian crossings, where it is not possible to place the crossing on a speed table
- Crossings over side roads at intersections
- Approaches to schools and other high-risk portions of a road
- Any of the cases above as part of a traffic calming sequence to achieve low speeds (in this case, location and spacing are to be in accord with TDM Engineering Design Code – Traffic Calming or AC CPLDS Section 3.7 Traffic Calming)

Raised safety platforms are likely to provide greatest benefit at these locations:

- High Risk intersections
    - identified in Road to Zero national list
    - Urban KiwiRAP ie high risk rating: high collective / personal risks / vulnerable road user risks etc.
- High place significance
    - town centres / schools / mixed use arterials / large foot and cycle traffic generators such as transport hubs
    - current primary walking network shown in Future Connect: high conflicts between people outside vehicles and traffic
- High conflict areas:
    - Zebra crossing / signalised mid block crossing
    - Side road treatment

Raised safety platforms can affect flow of traffic, safety and comfort of some users and response times for emergency services. Their use must be reviewed by AT Subject Matter Experts when they are proposed on bus routes, freight routes or FENZ critical routes. Alternative safety treatments may be necessary in some of these cases.

3.2 Context

Vision Zero acknowledges human error and fragility but doesn’t accept that death or serious

injury should be inevitable or an acceptable outcome of travelling on the transport network. This is based on the harm minisation approach. AT has adopted Vision Zero, committing to safety as a critical priority for investment and decision making. The Guiding Principle: Design for Safety requires the greatest Safe System alignment possible and ensuring that each project is contributing sufficiently to maximise the safety return. Primary safe system treatments such as raised safety platforms at intersections, raised crossing facilities and speed management devices are some the most effective safety interventions to achieve a safe system outcome in the urban network. The purpose of these devices is to reduce both the likelihodd and severity of crashes by managing a safe interaction speeds at locations with conflicts between different road users.

Raised Safety Platforms (RSPs) are vertical deflection devices used to reduce the maximum comfortable operating speed for vehicles to acceptable Safe System collision speeds, particularly at intersections and mid block signalised crossings.

On arterial roads, ramp profiles are typically more comfortable than those used for local area wide treatment on residential streets, reflecting the buses, trucks, and emergency services that use these roads. More comfortable ramp profiles may still achieve Safe System speeds, when other contextual factors such as signals, traffic, and the presence of other road users are considered together. These more comfortable ramp profiles are also less likely to create annoyance and community backlash, particularly when used repeatedly along a corridor.

The purpose of these vertical deflection devices is to have a physical effect to signal to drivers that they are about to enter a conflict area where slowing to Safe and Appropriate speed is required for harm minimisation but without unduly impacting comfort and speed of motorists. A mean speed of 30 km/h at these conflict areas should be targeted to achieve the safe system outcome in most urban situations where there are people travelling outside vehicles. A mean speed of 40 or 50 km/h may be acceptable where there is little exposure of people outside vehicles to harmful conflicts. This may be achieved through a combination of physical effect and visual factors, such as traffic signals, advance warning signs and the presence of other road users.

Recent Austroads research finds that other road design features can help to slow vehicles. The change in traffic control at the intersection or crossing itself would support reducing the speed of traffic and hence we are not relying on the vertical devices alone. They are intended to change all drivers' behaviour and to slow down traffic to a more uniform speed, hence it is concluded that adoption of a profile to achieve a sufficient vertical acceleration will result in effective lowering of operating speed.

3.3 Profile

A range of different context cases are given. For each context, one of the specified profiles must be used. A profile not in accord with Table PN02-1 may only be used if it is approved through review of a Departure from Standard application:

- in a constrained location

- on arterial or collector roads within 30 km/h speed zones
- for testing a new item.

The profiles are applicable to lifeline emergency use on FENZ, freight and PT routes. All FENZ critical routes are to be treated as arterial roads for profile selection.

Swedish tables are preferred where practicable.

Contexts are given as a typical category of road combined with the target safe speed at the RSP. The speed limit or approach design speed must not be greater than 20 km/h above the speed at RSP. Design speed lower than the speed limit may be used where geometric features constrain approach speed. RSPs should not be used where the design speed is greater than 60 km/h.

Table PN02-1

Context		Profile			
Category – Future Connect	Target Speed at RSP (km/h)	**Nominal grade**	**Approach ramp**	**Top (2)**	**Departure ramp**
Arterial or Collector	50 	1:25	1900 x 75	6000	3000 x 75 (1)
		1:25	1900 x 75	6000	1900 x 75
	40 	1:20	1500 x 75	6000	3000 x 75 (1)
		1:20	1500 x 75	6000	1500 x 75
	30 	1:15	1150 x 75	4000	3000 x 75 (1)
		1:15	1150 x 75	6000	1150 x 75
Collector – no bus service	30 	1:15	1500 x 100	4000	4000 x 100 (1)
		1:15	1500 x 100	6000	1500 x 100
Local – bus service	30 	1:15	1150 x 75	4000	3000 x 75 (1)
		1:15	1150 x 75	6000	1150 x 75
Local – no bus service (4)	30 	1:15	1500 x 100	4000	4000 x 100 (1)
		1:15	1500 x 100	4000	1500 x 100
Local – no bus service (5)	25 	1:10	1000 x 100	4000	4000 x 100 (1)
		1:10	1000 x 100	4000	1000 x 100

1. Swedish table profiles. Departure ramp length is the minimum, height is the maximum
2. Top dimension may be extended through an intersection, if the entire intersection is to be raised.
3. Ramp profiles are given as length and height in mm relative to the mean gradient of the road surface in the centre of each traffic lane over a length of 2.0 m adjoining the toe of the ramp.
4. Use where design speed of the road is 40 or 50 km/h or where the speed limit is 30 km/h but without other traffic calming.
5. Use in conjunction with traffic calming and the speed limit or design speed is 30 km/h.

3.4 Road gradients

The profiles in Table PN02-1 can be used on any road with a straight gradient up to 10%, except for those marked Note (5).

For a road gradient between 7% and 10%, the approach ramp length must be extended such that the gradient of the ramp does not exceed 17%.

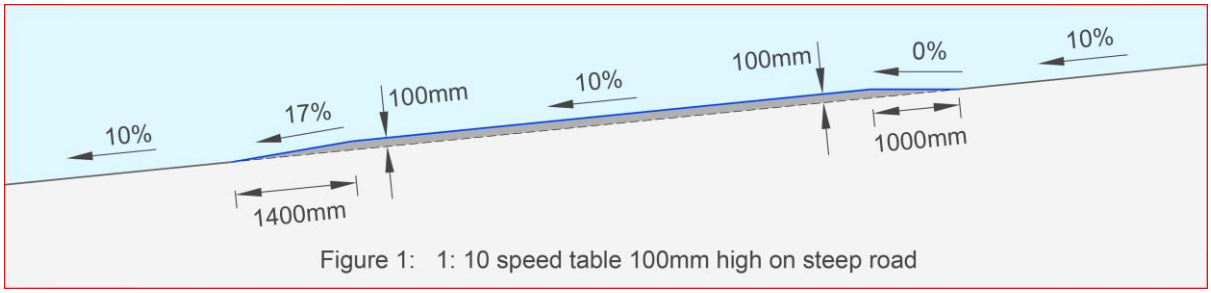


Figure 1: 1: 10 speed table 100mm high on steep road

Where the vertical alignment is on a crest curve, the ramp profile must be as specified. The change of grade between the vehicle path adjoining the ramps and the table top must not exceed 5%. A change of grade within the length of the table top is acceptable, preferably near the middle of it.

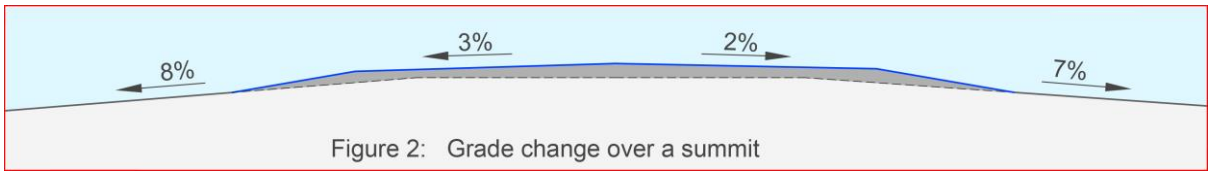


Figure 2: Grade change over a summit

Where a table is used as a crossing point, the longitudinal grade of the table top also forms the crossfall of the crossing. The width of the crosswalk must have a crossfall of not more than 3%. The grade of the table top either side of the crosswalk can change by up to 5% from the crosswalk grade.

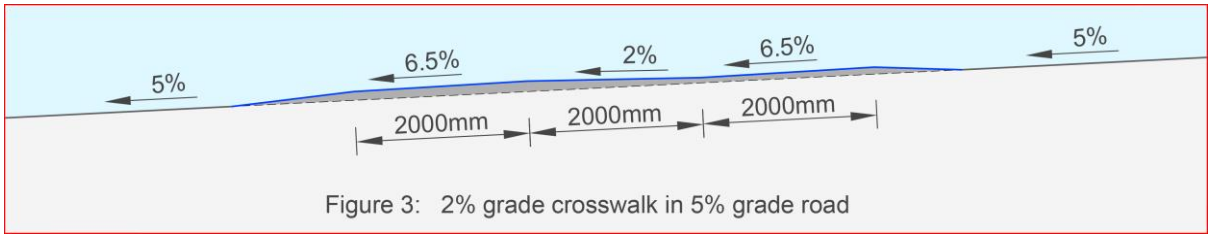


Figure 3: 2% grade crosswalk in 5% grade road

The cross-sectional grade of the table at the top of a ramp must match as closely as practicable to the grade of the road surface at the toe of that ramp. Where necessary, the grade may change between each of the traffic lanes to achieve this, most commonly at the centreline of the road.

Swedish table departure ramps (1) may be extended or their height reduced to grade smoothly into the adjoining road surface.

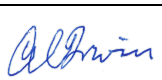
4. Definitions

Term	Definition
Raised Safety Platform	Either a speed table or a Swedish table as defined below. A raised safety platform is a class of *road hump* as controlled by the Land Transport Rule Traffic Control Devices 2004.
Speed table	A raised portion of roadway formed to reduce the speed of drivers as they approach or cross it, to manage speed at a conflict point or on a length of road where a steady, reduced speed is required. Formed with an approach ramp at a straight grade steeper than the adjoining road, with a table top that may include a crossing for people on foot or on bikes, and a departure ramp at a straight grade descending to the adjoining road.
Swedish table	A speed table with a departure ramp that allows a smooth transition from a table top to the adjoining road.

5. Supporting Information

Supporting documents	• Auckland Transport – Transport Design Manual • Auckland Council Code of Practice for Land Development and Subdivision Chapter 3: Transport
Related documents	• New Zealand's first raised safety platforms | Waka Kotahi NZ Transport Agency (nzta.govt.nz) • Case study - raised safety platforms (nzta.govt.nz) • Effectiveness and Implementation of Raised Safety Platforms (queenslandwalks.org.au) • Road Design Note 03-07 - Raised Safety Platforms - VicRoads

6. Approval

Practice Note Contact	Andy Irwin Principal Specialist Transport Design		22/08/2022
Endorsed by:	Irene Tse Technical Lead Road Safety Engineering		22/08/2022
Authorised by	Chris Beasley Design and Standards Manager		24/08/2022
Effective date	28/08/2022		

AT reserves the right to review, amend or add to this Practice Note at any time upon reasonable notice to users of the Transport Design Manual and related documents.