**USES**

Kerb extensions and bays may be formed to provide:

- pedestrian crossing points
- local area traffic management
- parking bays
- amenity planting areas
- bus kerb extensions and inset bays
- swales or other storm water control devices.

Kerb extensions must not cause hazards for road users, particularly for cyclists. Also pay attention to road marking, signage and lighting as they may need improvement.

### 8.2.4 Rural roads

Kerbs and channels will generally only be required in rural areas:

- Where grades are steeper than 8%
- In cuttings to minimise earthworks
- In areas of potential instability
- To direct water to suitable discharge points
- At signed or marked bus stops to provide a platform for passengers to board or alight from a bus.

# 09 Vehicle crossings

**DEFINITION**

Vehicle crossings provide a way for vehicles to enter and exit land next to the road boundary. They are located between the edge of the roadway and the road corridor boundary, across footpaths or berms. Vehicle crossings must not compromise the design criteria for existing or future bus facilities, footpaths or cycleways.

**UNITARY PLAN**

Any vehicle crossing must comply with controls in The Auckland Unitary Plan or hold valid a Resource Consent.

**CROSSING TYPES**

All vehicle crossings must be designed in accordance with the relevant Vehicle Crossing (VC) drawing contained in the Engineering Design Code - Standard Engineering Details.

**WIDTHS**

A driveway crossing must be no wider at the boundary than it needs to be, e.g.

- A two-way driveway in a residential zone that is 5.5m wide will require the crossing to be 5.5m at the boundary or may be narrowed to 2.75m if there are passing places with clear sight lines.
- One way access in a centres/mixed use zone may only need to be 3m wide.
- Access to a car park or petrol station that also provides truck delivery access should restrict the width available for car access by means such as over-run paving, to manage turning speed, vehicle path and safety of footpath users.

**DESIGN VEHICLE**

Design Vehicles should be selected from Section 4.2 according to land use.

The standard design vehicle for residential vehicle crossings is the 85%ile car. Note that a larger vehicle may be desirable, depending on land-user specific requirements, such as a boat trailer.

Where an oblique change of grade occurs that differs between the left and right wheel tracks of the Design vehicle, any wheel of the vehicle must be not more than 120 mm above or below a plane defined by the surface level at the locations of the other three wheels.

**GEOMETRY**

Crossing flare should be optimized to produce the minimum turning speeds and swept paths for the road environment.

**PRIORITIES**

The pedestrian path through route should be continuous in grade, cross-fall, colour and texture across the driveway, with no tactile warning indicators; the vehicle crossing and driveway must be considered subservient to the pedestrian through route.

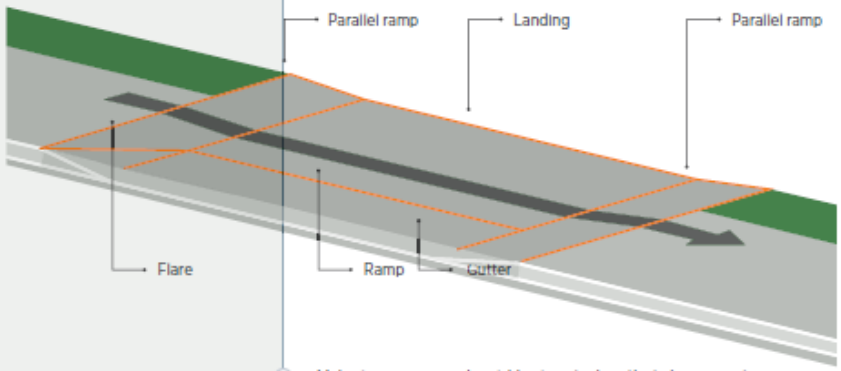
**PATH THROUGH-ROUTE**

The levels and width of the pedestrian through route should not be altered, except that the width may be reduced to not less than 0.9 m where necessary to provide the vehicle ramp down to the channel line.

Path crossfall should be 1-2% where possible, or within ± 3% where constrained.

For steep driveways requiring a change in the level of the footpath through the crossing, footpath ramps either side of the crossing should not exceed a grade of 8%. If this is not possible, the grade should not exceed 12% and the level difference at this grade should not exceed 75 mm. Check surface water flow depth to avoid flood nuisance.

**Figure 3** Dropped footpath for steep driveway




**LOCATION**

Vehicle crossings should be located so that drivers entering and leaving have adequate sight distances along the adjacent footpath, cycleway and road.

**ROAD CHANNEL**

Where adjoining kerbline has a drainage channel, the channel profile shall be continued across the vehicle crossing.

If existing precast concrete kerbing can be removed without disturbing the existing channel, the channel may be retained for residential crossings.

In all other cases, existing channel must be removed and the adjoining road edge reinstated.

**INFRASTRUCTURE**

Infrastructure such as catchpits, poles, fences and manholes must be at least 1 m from any part of a vehicle crossing. Avoid affecting existing infrastructure if possible.

Any infrastructure that cannot be avoided will require mitigation measures. If network utilities are affected, approval from the relevant Network Utility Operator is required (or from Auckland Transport's Business Technology team as appropriate).

**RETAINING STRUCTURES**

Driveway designs should take all reasonable measures to reduce the need for retaining structures or level adjustments. However, should this be considered too onerous, any proposed structure will be subject to an encroachment notice. In this case, all future maintenance, renewal, removal costs, etc. must be borne by the property owner and placed as an encumbrance on the property file.

**GRADE**

Consideration shall also be given to the grade of the driveway to help prevent vehicles scraping and storm water entering the driveway.

If existing road crossfall exceeds 3%, the grade of the 900 mm ramp from the channel shall be reduced from 15 % so that the grade change at the channel does not exceed 18%.

**STORM WATER CONTROL**

Vehicle crossings over roadside drains must be designed and constructed in accordance with Road Drainage chapter

**SURFACE WATER FLOW**

The driveway should ramp down from the footpath across the kerb line to the channel invert with a freeboard of 200mm (i.e. height above the channel) to contain storm water within the road. Development or redevelopment of a vehicle crossing must not result in changing the flow of surface water in the roadway, unless alternative drainage is provided. Care should be taken to avoid flow from the roadway discharging onto property if it does not currently do so, or from adjoining land into the roadway. Where surface water discharges from the roadway onto adjoining land as overland flow, this must not be reduced or redirected to another property without Resource Consent.

**CATCHPITS**

Catchpits should not be located within the width of a vehicle crossing. Where a proposed crossing affects an existing catchpit, the catchpit shall be relocated to the side of the crossing. In any event the catchpit must be installed in a bus and cycle friendly manner.

**SCOUR AND EROSION**

Where the vehicle crossing is in a rural environment, no silt, gravel or debris of any kind may run from the property onto the roadway or into drains.

**PRIVATE DRIVEWAYS**

Any private driveways must be designed following the appropriate grades for private driveways in The Auckland Unitary Plan.

**REDUNDANT CROSSINGS**

If a vehicle crossing is made redundant by the alteration to land next to the road boundary, the property owner must be required to give up the licence or permit associated with that crossover. The crossing should then be replaced to match the existing footpaths and kerbs.



# 10 Intersection design & types

## 10.1 General principles

**USRDG INTERSECTION PRINCIPLES**

Good intersection design is based on sound geometric design and user criteria where safety is a primary consideration.

Intersections principles are:

- As compact as possible
- Part of a multi-modal network
- Integrate time and space
- Intersections are shared spaces
- Design for context

See the USRDG for more detail on these.

**DESIGN APPROVAL**

The designer must provide evidence that the design will meet capacity, safety and turning movements of intended vehicles and all other road users.

**TRAFFIC MODELLING**

Traffic modelling must show that the design can mitigate the effects of existing traffic and that generated by new development unless directed otherwise by Auckland Transport Planning and Investment Division. Where applicable, consideration should be given for future network traffic change, with an appropriate design year to be approved by Auckland Transport. The assessment could include intersection modelling, using appropriate software.

**INTERSECTION CAPACITY**

Where AT set target capacities for a route, or intersections on a route, new intersection design should provide capacity appropriate for the network locally. Generally, capacity should be consistent with that of adjoining intersections except where improvements to these are planned through a network plan, structure plan or project.

**INTERSECTION SAFETY**

Proposed intersections must be evaluated using the Safe System Assessment Framework. Intersection type and layout should ensure survivable conflicts while providing the required Level of Service for all user types.

**CORNER KERBLINES**

While catering for appropriate design and check vehicles, urban corner kerblines should be kept compact to minimise vehicle speeds and pedestrian crossing distances.

Kerblines should be designed to suit the effective swept path of design and check vehicles, tracking in accord with the Design Control section above.

The Compound Corner template, contained in the Engineering Design Code - Design Toolbox shows how corner kerblines can be designed for many urban local streets, collector and commercial streets. Urban Arterial streets may require specific design using the same principles: