North Ayrshire Council
Comhairle Siorrachd Àir a Tuath

North Ayrshire Supplementary Street Design Guide

Appendix D – Speed Reduction Measures

Version 1: 2023

Version Control

Issue	Date	Nature of Change/Pages Affected
Version 1	xxxxxxx	Issue of Supplementary Street Development Guide

Contents

Figures

1.1 Introduction

Streets and spaces need to meet people's needs for walking, cycling, playing and generally being outside - as well as moving around by car. In most areas traffic travelling at 30mph speed immediately outside homes is generally not safe or desirable and new developments are to be designed to 20mph maximum or less to prevent this.

The Scottish Government's 'Designing Streets' policy is clear that for residential streets, a maximum design speed of 20 mph should be an objective.

The Scottish Government's 'Designing Streets' policy stipulates that "designers should aim to create streets that control vehicle speeds naturally by well-crafted design from the outset rather than through unsympathetic speed reduction measures added at the end of the design process". Although not exhaustive, typical examples of speed restraint measures that may be incorporated into the design are set out in this Appendix.

Forward visibilities should not be so excessive as to encourage high vehicle speeds.

Why Reduce Development Speeds?

Prior to the introduction of Designing Streets most new developments were designed around vehicle access. Although not intended, the dimensions for turning heads, road widths and road junctions has "fixed" the plot sizes and density for residential development. The result is development of uniform character dominated by roads, where buildings are located in whatever shaped spaces are left behind after the streets and access roads have been designed. This vehicle access based starting point does not make or shape characterful external spaces.

Better, more sustainable development design controls traffic impact and speed by design. Well-designed new developments create streets which are "places" and where driver behaviour is controlled by the built form. Designers can design access routes through:

- Locating buildings first and designing traffic access to accommodate them; designers should refer to "Designing for Streets" which recommends "swept path analysis" - a method used to determine access widths and turning spaces for vehicles based upon first principles rather than standard templates.
- Using alternatives to standard adopted roads and footpaths such as "shared surfaces" where pedestrians and traffic share the same access routes.
- Providing drivers with "clues" as to the type of location they are in and thus allowing them to gauge an appropriate speed. For example, through the use of local road narrowing at entries to a new development, gateway features which clearly signal development type, changes in texture of the road surface when moving from one area to the next and a hierarchy of materials linked to different types of public realm.
- Considering street dimensions and geometry to control traffic speed; the use of the sharp bends, junctions, and road width can reduce traffic speed for example, within Type 4 Streets a change in direction is recommended every 30 metres.

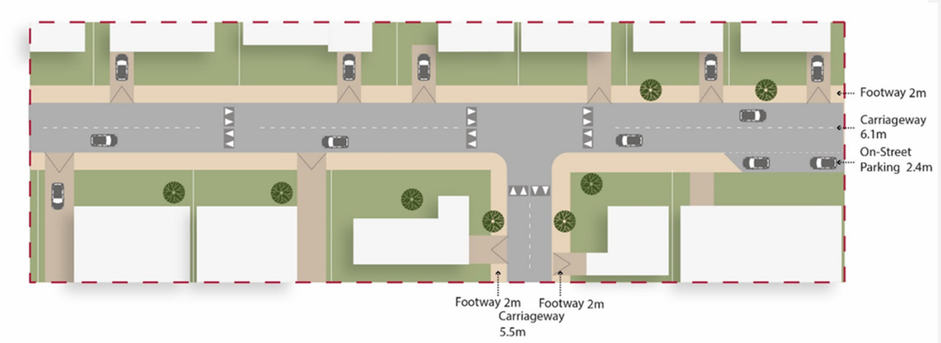


Figure 1 – Street Design – No Deflection

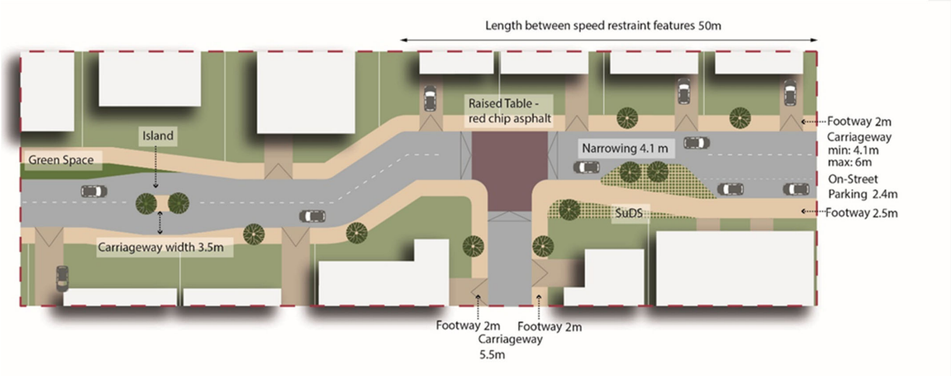


Figure 2 – Street Design – Clear Deflection

1.2 Speed Reduction – Design Considerations

Complementary features to streets can help to reduce speeds by giving emphasis to calming measures that are incorporated into the design. This can affect the behaviour of drivers, cyclists and pedestrians in the following ways:

- **Visual narrowing** - by making the road appear narrower and more enclosed by bringing planting, walls or tall objects close to the road,
- **Perception of speed** - by increasing a sense of speed by, for example, adjusting the spacing of avenue trees,
- **Emphasising changes in road function -** by changing the type of the landscape treatment, altering the perceived scale of spaces or changing materials or colours to underline a transition in the nature of the road,
- **Accentuating speed reduction measures-** by concentrating the deployment of complementary features at the speed reduction measures; and
- **Directing or segregating road users -** by directing pedestrians to crossing points, forming physical barriers where necessary or helping delineate footpaths, footways, cycle tracks and carriageways.

Figure 3 – Narrowing as Speed Reduction Measure (Visual Cue) in North Ayrshire

Three categories of complementary features can be identified as follows:

- **Vertical features** - such features would include bollards, pillars, walls, raised planters, rails and fences. Other types of street furniture such as road signs, lighting columns and pillar boxes can fulfil the same function while avoiding street clutter. Vertical features can be used to restrict unsafe vehicle manoeuvres, channel pedestrians to crossing points and prevent parking on the footway.
- **Planting** - trees, shrubs and ground cover can all be utilised as complementary features in speed reduction design. Trees can be effective in creating an obvious visual narrowing, located minimum 5m away from carriageway edge. Simplicity in design, using a limited number of species is recommended for any shrub and ground cover specification.
- **Change in surface** to paved material can heighten awareness of speed reduction measures. Within paved carriageways the colour of paving can be used to create the same contrasting effect. Textural contrast can also be achieved by changing the paving materials, e.g., from blocks to setts or in the laying of the paved materials (to be kept to a minimum). Different paving surfaces can be used to either highlight an appropriate route for vulnerable road users or alternatively to deter pedestrians from walking on a part of the footway.

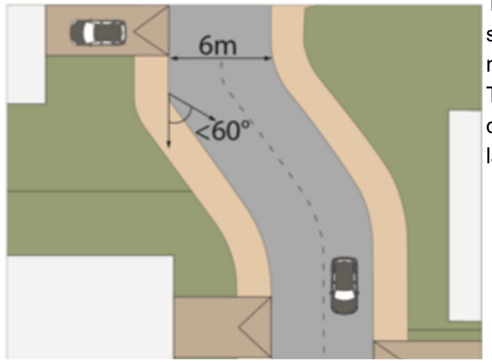
Psychology and perception – play a strong part in influencing driver behaviour. Street features and human activity can influence the speed at which people choose to drive. Features likely to be effective include:

- Edge markings that visually narrow the road – speed reduction is likely to be greatest where the edging is textured to appear unsuitable on which to drive.
- Reduced carriageway width.
- Physical features in the carriageway.
- Features associated with potential activity in, or close to, the carriageway, such as pedestrian refuges.
- On-street parking, particularly when the vehicles are parked in blocks on alternate sides of the street, either in echelon formation or perpendicular to the carriageway.
- The types of land use associated with greater numbers of people, for example shops, schools, and places of work.
- Landscaping.

1.3 Methods of Speed Reduction

To ensure that the design speeds identified for each type of street are not exceeded, it is necessary to design speed restraint measures into the development, which are self-enforcing and do not encourage uncontrolled parking. The speed of vehicles is the key factor in improving road safety and minimising future potential accidents. The list below is not exhaustive, and developers can make suggestions for speed reduction methods.

Lateral Shift



These should be tighter than the minimum specified for each street type, down to a minimum centreline bend radius of 7.5m. The deflection should be minimum 60 degrees with a mountable shoulder to enable larger vehicles to overrun.

Figure 4 – Lateral Shift Diagram

Bend

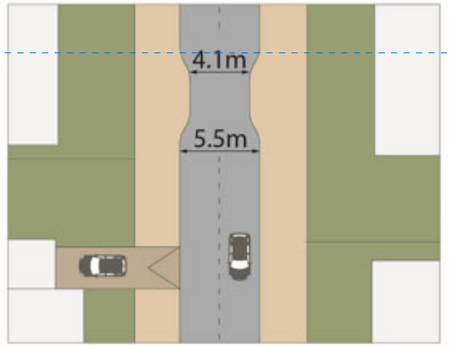
These should be tighter than the minimum specified for each street type, down to a minimum centreline bend radius of 7.5m. The deflection should be greater than 45 degrees with a mountable shoulder to enable larger vehicles to overrun.

a. Deflection greater than 45°.
b. Centre-line bend radius less than minimum specified for road type.

Figure 5 – Street Bend Diagram

Narrowing

The narrowing of the carriageway to 4.1m (3.7m min) for at least 10m will cause drivers to wait for oncoming traffic to pass. A narrowing should be wide enough for service vehicles without requiring a mountable surface shoulder. This measure is less effective when vehicle flows are low and should be limited to Type 1 and 2 Streets.



a. Minimum 10m long with 4.1 minimum width shown.

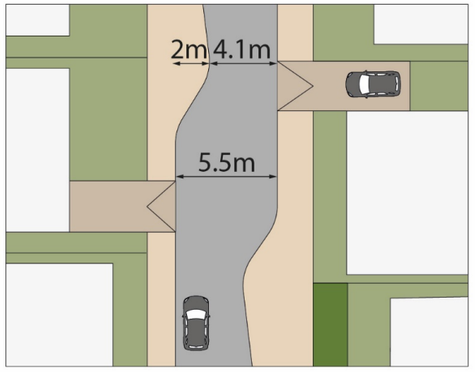
b. Over-run areas to be considered for larger vehicles.

Figure 6 – Street Narrowing Diagram

Commented [DH(M/R)1]: Can the corners be curved, similar to Figure 6

Chicane

To be effective, the lateral displacement of the running lane must be at least 2m and the length of the displacement no greater than 10m. A reduction of carriageway width to 2.75m at the entrance and exit of the chicane is acceptable, but an overrun area will be necessary to provide a 3.5m to 3.7m wide path for service vehicles.

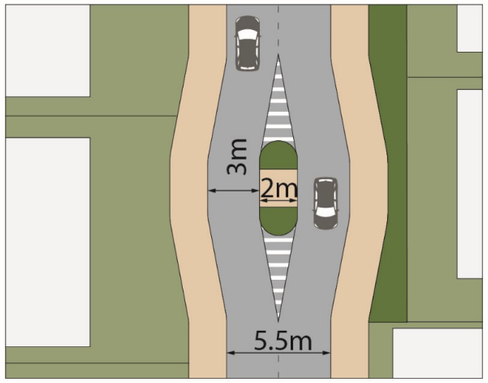


a. Red and white posts and verge markers or alternative vertical indicator, if required.
b. 5.5m maximum and 4.1m minimum carriageway width as shown
c. Normal road width
d. Maximum length of displacement 10m

Figure 7 – Street Chicane Diagram

Island

An island should result in a lateral displacement of the running lane of at least 3.25m. The island may be any shape, subject to the minimum dimensions given below. Mountable shoulders may be used to enable the passage of service vehicles, but no vehicle should be able to overrun the centre of the island. Mountable shoulders to be:

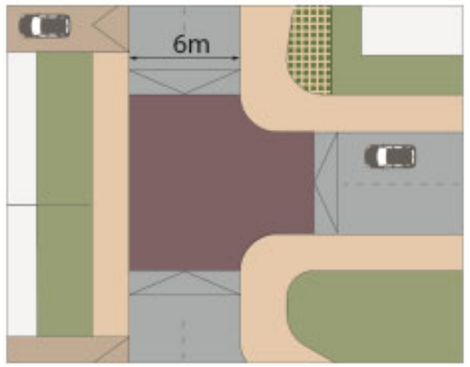


a. Low shrub planting could be incorporated to prevent over-run.
b. 7.1m radius.
c. 2m radius.
d. Upstand to prevent vehicle overrunning.
e. Normal road width shown.
f. Over-run areas to be considered for larger vehicles.

Figure 8 – Street Island Diagram

Raised Table

A raised table crossing should be installed where there is a high degree of pedestrian attraction and raised to provide a raised/ continuous footway. They should be clearly visible and installed at right angles to the direction of travel and suitable for any road width.



a. Low shrub planting could be incorporated to prevent over-run on pedestrian spaces.
b. Normal road width.
c. No upstand surface level with pedestrian footways.
d. Running surface can change materials as visual cue of road level change e.g., red chip with asphalt.
e. Requirement for bollards on the corner.
f. Ramps to respond to levels required.
g. Asphalt with red chip.

Figure 9 – Raised Table Diagram