



HIGH-USE DRIVEWAY TREATMENT FOR CYCLE PATHS AND SHARED PATHS

Design guidance note

NZ TRANSPORT AGENCY

1 AUGUST 2019

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BACKGROUND

Over recent years there has been significant investment in urban cycling infrastructure in New Zealand, and uptake in people choosing to cycle. A key challenge when it comes to implementing cycle paths and shared paths is moving through commercial areas with multiple busy access points (ie driveways, see

Figure 1). The same issues are faced with high use accesses in non-commercial areas.

Even some of the best international cycle paths located next to roadways still face the challenge of being interrupted by multiple access points, with implications for rider safety, enjoyment, efficiency and comfort. In New Zealand, when we move people to dedicated cycle paths next to roadways, we know that one of the most common risks is from vehicles turning into and out of accessways. There is limited national design guidance for commercial access treatments. Christchurch City Council offers some guidance.¹



An example of a near miss between a cyclist (taking evasive action, swerving away from the motorist) as a motorist enters the cycleway (Source: WSP Opus)

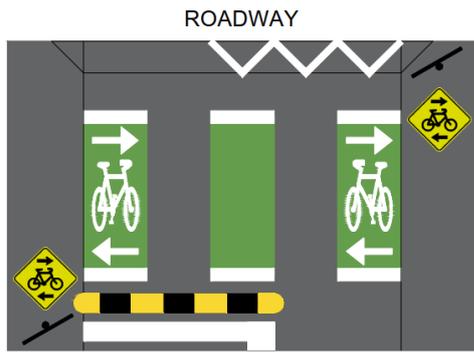
An example of a cyclist taking evasive action as a motorist stops over the cycleway (Source: WSP Opus)

Figure 1: Examples of common conflicts at accessways (left and right)

PURPOSE

This design guidance note provides a treatment solution for commercial and high-use access points on cycleways and shared paths. This treatment has been evaluated and found to improve safety via more consistent and slower speeds as well as improved stopping behaviour and reductions in near misses (see Figure 2 and Table 1).

¹ Christchurch City Council (2016). Major Cycleway Design Guide. <https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/cycling-network-guidance/Major-Cycleway-Design-Guide-Best-Practice-Guide-Chch-City-Council.pdf>



Driveway treatment solution diagram

Feature	Intuitive cue to motorist
Zebra crossing style bars	Signal that motorist must yield
Judder bar/limit line	Reinforces the need to stop and identifies ideal stopping location
Green colour	Raising expectation of a high cyclist presence
Cyclist symbol with arrows	Indicates cyclist priority use of the space, and direction of cyclist movements

Purpose of each design element

Figure 2: Example of the treatment solution (left) and the rationale behind why it works (right)

Table 1: Behavioural success indicators

Success metric	Baseline	Final solution	Relative improvement
Correct motorist stopping behaviour (prior to cycleway)	40%	70%	+75%
Increased motorist caution (stopping prior to cycleway when no cyclist present)	5%	16%	+220%
Cyclist change in 85 th percentile speed	33kph	24kph	-27%
Near miss rate (although these are small frequencies, from n=14 to n=2)	8%	2%	-75%

APPROPRIATE CONDITIONS OF USE

The access treatment identified has been set up for areas.

Accessway width

Where the width is 3.1m (or more).

Area wide treatment

Consider based on land use, especially where there are multiple commercial (or high use) access points, or where there may be a higher number of novice riders, eg nearby schools.

Single use treatment

High use accesses, including commercial, recreational or residential (e.g. locations with more than 10 residential properties accessing the same driveway).² Consideration should also be given to higher risk accesses, e.g. those with poor sight-lines.

For lower width accesses, typical residential or other low use / risk accesses consider marking the cycleway with the cycle symbol with arrows on a single block of green paint (see Figure 3).

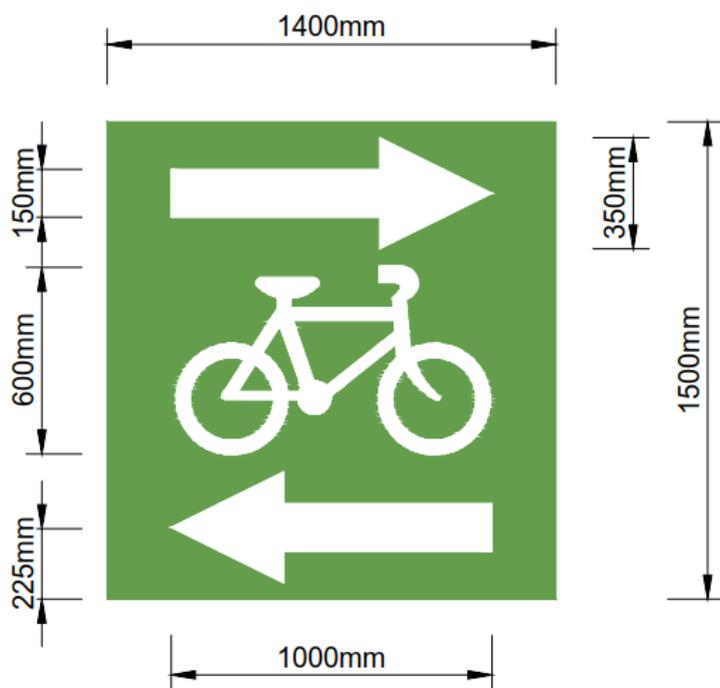


Figure 3: Example treatment for lower width accesses (i.e. where the total width is under 3.1m wide)³

² Note: Christchurch guidance recommends 3 residential properties as a threshold for applying the cycleway symbol with arrows, 10 residences is used here as the next threshold (which equates to about 100 trips per day), but this could be evaluated more closely.

³ Source: NZ Transport Agency Technical Note: TN02. Interim guidance: Separated cycleways at side roads and Driveways (April 2016).

DETAILED DESIGN ELEMENTS

Green bar markings

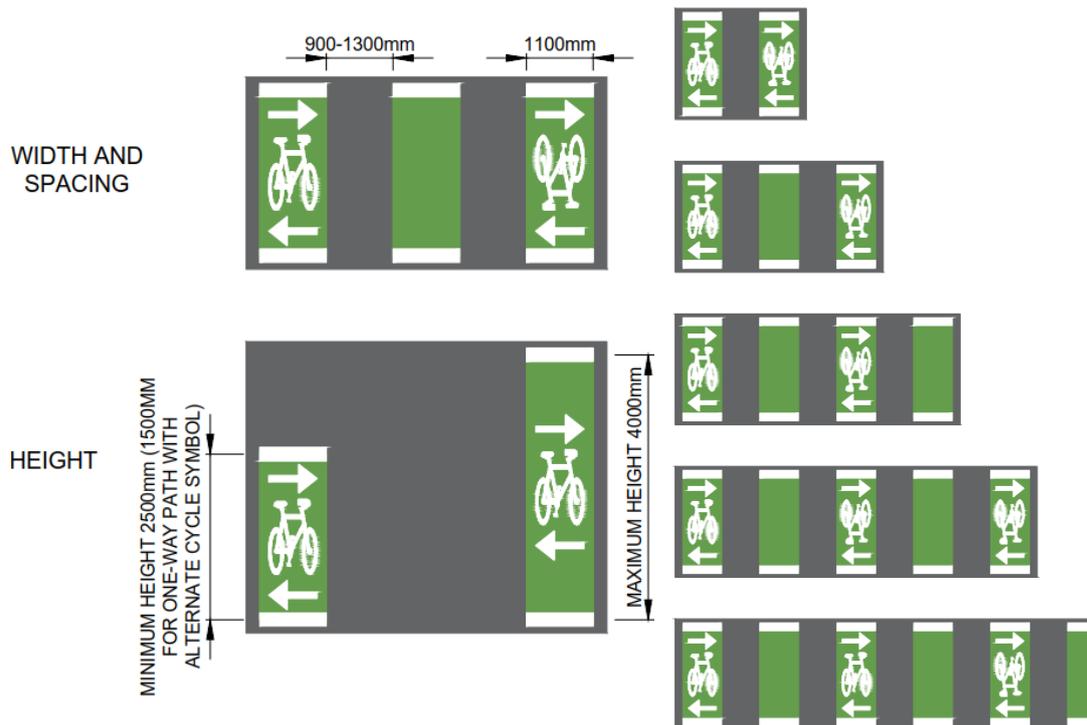
See Figure 4, left)⁴.

- Bars are 1.1-1.2m wide and there should be a minimum of two bars⁵.
- The gap between bars can be used to accommodate different driveway widths (Minimum gap = 0.8m, Maximum gap = 1.2m), but the gap should be consistent across each accessway
- Bar height should align with the cycleway width (between 1.5-4.0m).
- The minimum bar height with the elongated cycle symbol is 2.5m, for narrower path widths, a non-elongated cycle symbol can be used, which narrows the bar height to 1.5m (however, designers should consider any impact on the driver viewing angle).⁶

Use of cycle symbol with arrows

See Figure 4, right and Table 2.

- Placed at minimum every second green bar.
- Cycle marking should be facing the exiting driver on the left, and entering driver on the right (assuming it is not an entry or exit only driveway).



⁴ The important aspect when covering the width of the driveway is not to lose the feel of the pedestrian crossing shape (as that is what motorists associate with vulnerable road user priority)

⁵ For driveways less than 3.1m width consider marking the cycleway with the cycle symbol with arrows indicating the direction of movement as per Section 3.

⁶ The use of a bar height that is less than the width of the path can have a benefit of channelling cyclists into the centre of the path and away from encroaching vehicles and other hazards (such as vehicle crossing ramps). However, the lower bar height may result in reduced visual impact on entering and exiting drivers. These trade-offs and others should be considered when selecting a bar height.

Figure 4: Bar width spacing and height ranges (left) and common bar and cycle symbol configurations (right⁷)

Table 2: Number of bars based on accessway width

Green Bars	Total marking width (minimum)	Total marking width (maximum)	Applicable for access width ranges (m)
2	3.1	3.5	3.0 – 4.5
3	5.1	5.9	4.5 – 7.0
4	7.1	8.3	7.0 – 8.5
5	9.1	10.7	8.5 – 11.0
6	11.1	13.1	11.0 – 13.5

SUPPORTING MEASURES

Signage, limit line, speed hump

For exiting motorists consider signage and stopping location (see Figure 5):

- Cycle Signage (WU61): Shows the movement of cyclists and provides redundancy in the design (e.g. if markings are worn down)
- Limit lines and speed humps: Improve stopping compliance and lower speed. Consider sight distances (including to traffic in the live lane when selecting the placement of these devices).

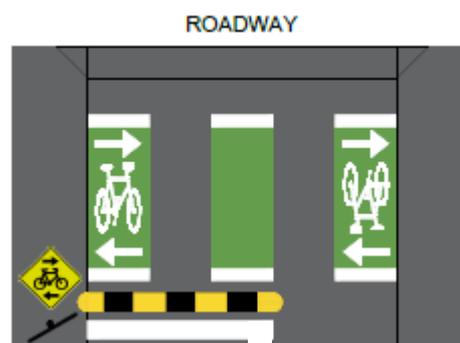


Figure 5: Exiting motorist options

Right turn in movements

Right turn in movements⁸ into commercial accesses should be considered for removal, as these are a high-risk movement.

Where these cannot be removed consider signage and median treatments:

- Signage treatments: To increase alertness to cycle movements for the right turn motorist (see Figure 6)
- Median treatments: To encourage motorists to pause during 90 degree turning movements (for example, painted right turn arrow with limit line in median).
- Kerb treatment: Painted marking to reinforce kerb gradient and encourage lower entry speeds (see Figure 6).

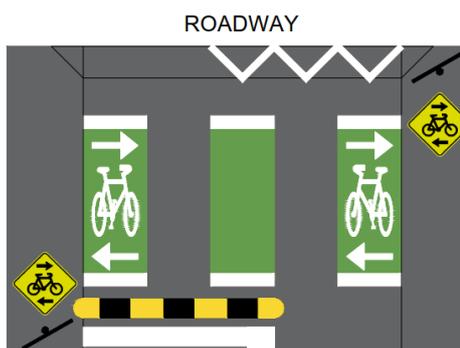


Figure 6: Right turn in movement options

⁷ Note these figures are indicative and intended to show the layout only, refer to section 7 for the marking specifications

⁸ Left-turn in movements typically have better visibility of cyclists and road users are not distracted by looking for a gap in traffic, so the pavement markings alone should be sufficient.

DIFFERENT LAYOUT OPTIONS

Options for the application of the treatment to different cycleway types and shared paths are outlined in Table 3 and Figure 7.

Table 3: Cycleway type and conditions with treatment elements to consider

Cycleway type	Cycleway use conditions	Treatment elements
Bi-directional cycleway	Base condition (no right turn movements into access)	<ul style="list-style-type: none"> Green bar markings. Cycle symbol with two-way arrows. Speed bump. Limit line. Bi-directional cycle signs (WU61) facing vehicles exiting.
	Right turn in movements allowed	<ul style="list-style-type: none"> Base condition (top). Bi-directional cycle signs (WU61) facing vehicles turning right in. Median stop line treatment for vehicles turning in (where space is available). Yellow paint markings at kerb to emphasise kerb gradient
	Adjacent pedestrian path	<ul style="list-style-type: none"> Base condition (top) with speed bump and limit line removed.
Single direction cycleway		<ul style="list-style-type: none"> Move to single arrow indicating the direction of movement

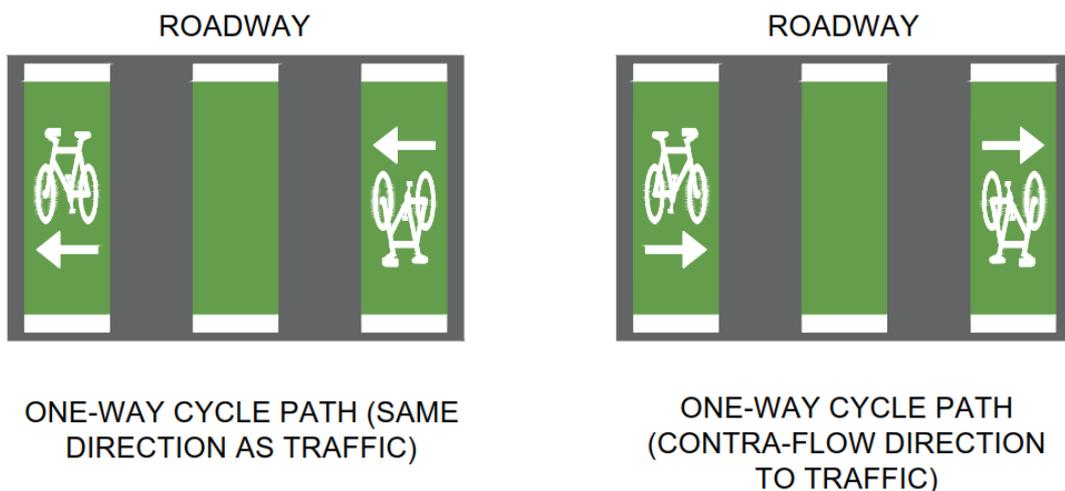


Figure 7: Treatment examples for one-way cycleways

MARKINGS AND SIGNS SPECIFICATIONS

Green colour

Recommend use of G26 Apple Green.⁹

Marking durability

Recommend long-life materials, such as: spread and sprinkle (1.5mm thick paint, with coloured aggregate) or Thermoplastic (binder, pigments, aggregate mixed together). For application advice see also [NZTA P33](#), as the warranty period for coloured surfaces outlined here is 5 years).¹⁰

Marking dimensions

Are outlined in Figure 8 below. The cycle symbol and arrows are as per the Traffic Control Devices Amendment 2019,¹¹ which is replicated below for reference (see Figure 9).

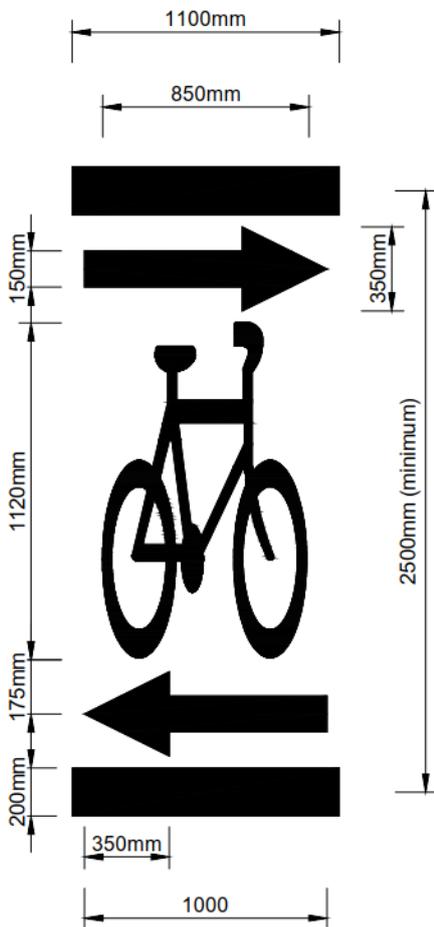


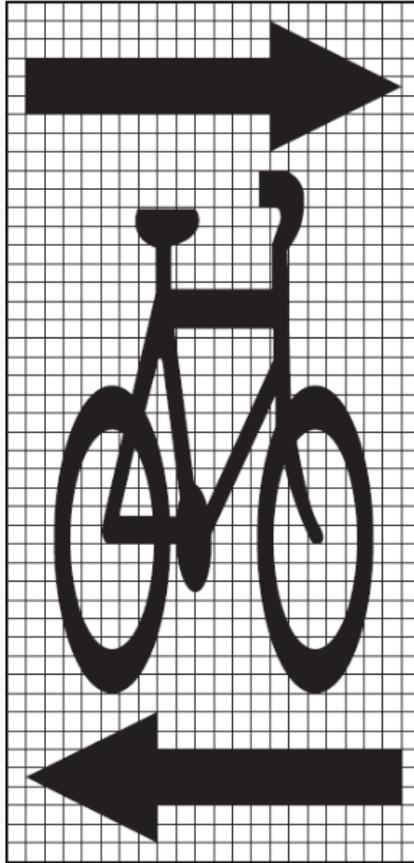
Figure 8: Access marking treatment dimensions for cycleway

⁹ Alternatives like Emerald Green can become dark under yellow light sodium lighting.

¹⁰ <https://www.nzta.govt.nz/assets/resources/specification-for-coloured-surfacings-p33/NZTA-P33-Coloured-surfacings-May-2017.pdf>

¹¹ <https://www.nzta.govt.nz/resources/rules/traffic-control-devices-amendment-2019/#schedule-2>

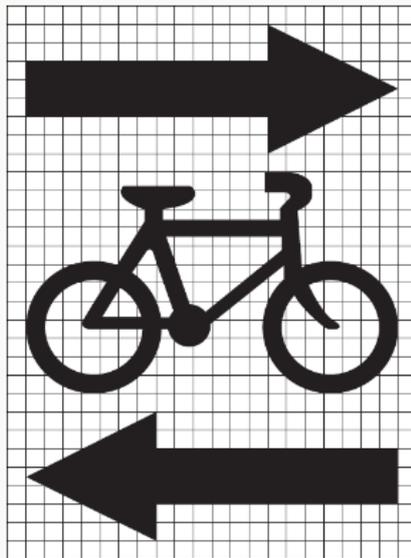
M2-3C: Cycle path or shared path crossing driveway.



Grid size: 50mm minimum

Note: For a one-way path, either arrow may be omitted and the cycle symbol may be reversed so that the remaining arrow and the cycle symbol indicate the direction of travel.

M2-3D: Cycle path or shared path crossing driveway – alternative for narrow paths.



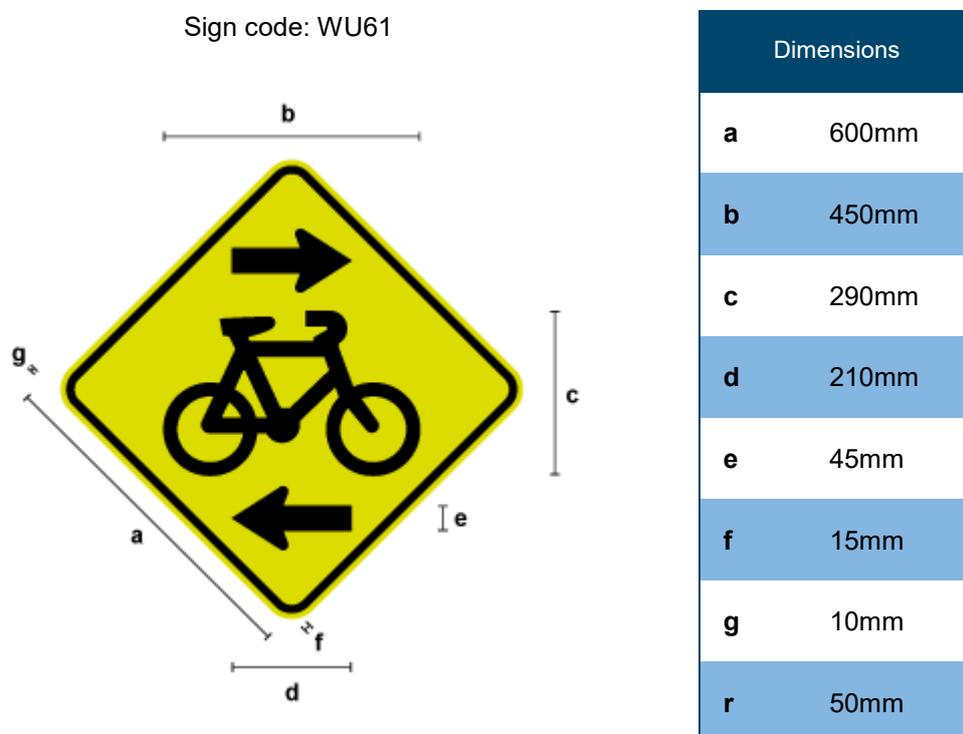
Grid size: 50mm minimum

Note: For a one-way path, either arrow may be omitted and the cycle symbol may be reversed so that the remaining arrow and the cycle symbol indicate the direction of travel.

Figure 9: Extracts from gazette notice 2017-au1804

Sign specification

Signs should be considered to complement the markings. We recommend WU61 signs be placed to optimise viewing for exiting and entering accessway users (see Figure 10).



Note: Either arrow may be omitted with the remaining arrow and the cycle symbol indicating the direction of travel on a one-way path.

Figure 10: Sign WU61 (with dimensions: Source NZTA)¹²

¹² <https://www.nzta.govt.nz/resources/traffic-control-devices-manual/sign-specifications/view/1144?category=&term=wu61>