Technical Note 170

Township Entry Treatment

January 2022

Queensland Government

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1 Introduction

A Township Entry Treatment (TET) is a speed management measure that involves providing physical measures at the transition from a high-speed rural environment to a lower-speed environment that coincides with entering a township. TETs – also known as Gateway Entry Treatments (GETs) – have been used since the 1980s in New Zealand and the United Kingdom and have been proven to reduce vehicle speeds and crash rates by enhancing drivers' awareness of the changing environment. TETs are effective where drivers fail to sufficiently reduce their speed at the transition from the high-speed to the lower-speed environment.

Figure 1 – Township Entry Treatment examples

2 Scope

This document sets out the guidelines for implementation of the TET and includes:

- identification and warrants of TET sites
- assessment of potential TET locations
- design guidelines for the installation of a TET, and
- support and references for further reading.

3 Application

This technical note is applicable to the site assessment and installation of TETs on state-controlled roads. The aim of this technical note is to assist professionals / practitioners in improving road safety by outlining best practices for the installation of TETs.

4 Referenced documents

Table 4 provides details of documents referenced in this technical note.

Table 4 – Referenced documents

Reference	Title
1	National Road Safety Strategy. *National Road Safety Strategy 2021–2030*. Infrastructure and Transport Ministers (2021).
2	Charlton, S. G., & Baas, P. H. (2006). *Speed change management for New Zealand roads*. Wellington: Land Transport New Zealand.
3	Department of Transport and Main Roads. (2015). *Safer Roads, Safer Queensland – Queensland's Road Safety Strategy 2015–2021*. Brisbane: Queensland Government.
4	Devon County Council. (1991). *Traffic Calming guidelines*. Exeter.
5	Elvik, R., Christensen, P., & Amundsen, A. (2004). *Speed and Road Accidents – An Evaluation of the Power Model*. Oslo: Institute of Transport Economics.
6	Makwasha, T., & Turner, B. (2013). *Evaluating the use of rural-urban gateway treatments in New Zealand*. ARRB Group.
7	Taylor, M. C., Lynam, D. A., & Baruya, A. (2000). *The Effects of Driver's Speed on the Frequency of Road Accidents*. Berkshire: Transport Research Laboratory.

5 Rationale

The relationship between reduced vehicle speeds and improved road safety – both in terms of reducing crash rates and the severity of crashes – has been well-concluded through a number of studies (*The Effects of Driver's Speed on the Frequency of Road Accidents, Speed and Road Accidents – An Evaluation of the Power Model*). Therefore, it is considered that there are safety benefits that can be achieved through the provision of treatments to ensure vehicle speeds are appropriately reduced when transitioning from a high-speed to lower-speed environment.

Such benefits have been documented internationally through the use of TETs – or similar – as follows:

- a before and after analysis of 102 sites across New Zealand's road network found that TETs reduced crashes by 26% with a 23% reduction in fatal and serious crashes (*Evaluating the use of rural-urban gateway treatments in New Zealand*), and
- a before and after analysis of 56 sites across the United Kingdom found that TETs reduced injury crashes by 20–25% and reduced all fatal and serious injury crashes by 33–50% (*The Effects of Driver's Speed on the Frequency of Road Accidents)*.

The Queensland Government, in conjunction with all the Australian states and territories, committed to moving towards eliminating deaths and serious injuries on the Australian road network (*National Road Safety Strategy 2021–2030*) by adopting the Safe Systems approach to road safety. This approach was further exemplified in the *Safer Roads, Safer Queensland: Queensland's Road Safety Strategy 2015–2021*. The Safe System approach is based around a holistic view of the transport system and includes four key pillars: safe roads and roadsides, safe vehicles, safe road users and safe speeds. Therefore, the safety benefits through the installation of TETs is consistent in ensuring vehicle speeds are safe and appropriate in accordance with the *Strategy*.

6 TET installation

Installation of a TET may be considered at any arterial road through a township where there is a concern over road safety risk. The risk may be related to observed crashes, identified infrastructure deficiencies, significant presence of vulnerable road users or poor compliance with the speed limit.

A TET should be installed prior to entering a township which is defined as having been named and where there is a speed differential of 20 km/h or higher between speed zones.

Practitioners may use any or a combination of criteria to determine or justify the need of TET installation. A TET should be considered if:

- there is a poor compliance of speed limit in the township
- the township has a history of a high rate of crashes
- significant infrastructure deficiencies are observed on the section of road passing through the township, or
- vulnerable road users are present.

A number of standard methods or practices may be applied, for example, to determine the existence of poor compliance of speed limit, high crash risks or infrastructure deficiencies, depending on their availability.

It is noted that a key concept of the Safe Systems framework is to proactively address locations of high crash potential. As such, while the crash history may be considered as a trigger for TETs, in keeping with the Safe System framework, it is recommended the installation of a TET could be considered even without a demonstrated crash history.

7 Site assessment

The following shall be considered when locating the TET.

7.1 Multiple 20 km/h speed limit reductions

TETs shall be provided in isolation and shall not be provided in series (that is, more than one TET at a single entry point to a township). In situations where the speed limit along a state-controlled road is progressively reduced (for example, from 100 km/h to 80 km/h and then from 80 km/h to 60 km/h), the TET shall be installed at the later speed limit reduction, except in the following situations / circumstances:

- where there is a higher crash rate within the intermediate speed zone when compared with the first kilometre of the later speed zone, OR
- where there is a higher Fatal or Serious Injury crash rate within the intermediate speed zone when compared with the first kilometre of the later speed zone, OR
- where land uses within the intermediate speed reduction zone are expected to generate a high level of vulnerable road users (for example, people walking, people riding bikes).

In addition to these, it should be noted that Buffer Zones are not recommended in Queensland in accordance with the Queensland *Manual of Uniform Traffic Control Devices* (MUTCD) Part 4 *Speed Controls*. Accordingly, where an intermediate speed zone has been provided and there is no change in the speed environment between the higher and intermediate speed zones, the intermediate speed zone should be removed and a Speed Limit AHEAD (G9-79) sign should be provided.

7.2 Speed zones on state-controlled roads through rural towns

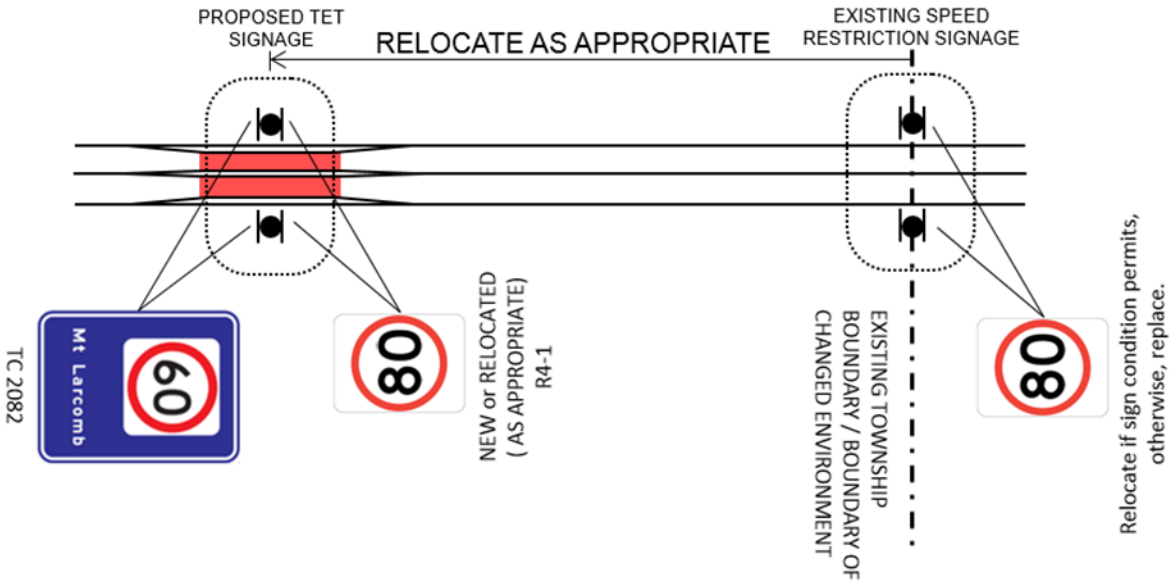
Where the existing speed limit through a rural town is 60 km/h, it shall be assessed against the criteria in Section 7.2.4 of the Queensland MUTCD Part 4 *Speed Controls* to determine if the speed limit

should be reduced. This must be assessed before the TET is installed so that the TET signs are showing the appropriate speed limit.

7.3 Distance to changed environment

Based on the speed limit setting principles outlined within the department's MUTCD Part 4 *Speed Controls*, the placement of a Speed Restriction sign is to coincide with the changed speed environment. Appropriately locating the TET is important to ensure that drivers react and vehicle speeds are reduced at the critical point (that is, at the existing Speed Restriction sign). As such, the TET Speed Sign as part of TET shall be installed at the location of the existing Speed Restriction sign to replace it; however, if the existing location is found to be unsuitable for TETs, a TET should be relocated upstream as appropriate in advance of the location of the existing Speed Restriction sign that it is intended to replace as shown in Figure 7.3.

Figure 7.3 – Location of TET with respect to changed environment



7.4 Adequate sight distance

The effectiveness of a TET relates to its ability to create a visual impact indicating a change in environment to the approaching motorists; therefore, when installing a TET, it is important that the TET is within the approaching driver's field of vision and unobstructed by any features of the road (that is, horizontal curves, vertical curves, and so on).

To ensure that there is adequate sight distance to the TET, the TET shall be visible to approaching drivers for no less than the Stopping Sight Distance (SSD) of the design speed. The SSD should be measured along the centre of the lane between the TET Speed Restriction sign and the approaching vehicle.

7.5 Sight distance impacts

The TET is designed to create a visual threshold highlighting the changed environment by introducing vertical features to the roadway – see Section 8.5 and Section 8.6 of this technical note. As such, these vertical features may obstruct sight distances to nearby elements of the road.

When selecting the site of the TET, practitioners should be aware of potential access driveways, service roads, intersections, parking bays, pedestrian crossings, and so on that may be present at the

location of the TET. It is important that the existing features of the road corridor be considered when locating the TET such that the TET and its associated elements do not impact any existing sight distances. As such, prior to the design and installation of the TET practitioners should be aware of any sight distance requirements of nearby road elements that may be impacted by the TET.

8 Design and dimensions of TET

The department has developed the following three TET options for use within the Queensland road network:

- **Centreline TET** – comprising two lanes of traffic separated by a barrier line (for example, single barrier line, one direction barrier line or double barrier line) – see Figure 8(a) for an example or a Centreline TET
- **Painted Median TET** – comprising two lanes of traffic separated by a painted median – see Figure 8(b) for an example of a Painted Median TET, and
- **Wide Centreline TET** – comprising two lanes of traffic separated by a wide centre line on approaches to a painted median TET – see Figure 8.1(c) for a schematic example of a Wide Centreline TET.

Kerb extensions or raised islands are not recommended to create throttles at TET. They might be hazardous to fast-moving vehicles.

Figure 8(a) – Centreline TET

NOTE: RRPMs are not shown in the above Figure

Figure 8(b) – Painted Median TET

The following sections present the components of the TET types.

8.1 Threshold selection and design

If a Wide Centreline Treatment (WCLT) is present on an approach to the TET, WCLT shall be supplemented with a painted median at the TET as shown in Figure 8.1(c).

The selection of the TET is to be based upon the overall seal width (refer to (C) in Figure 8.1), as follows:

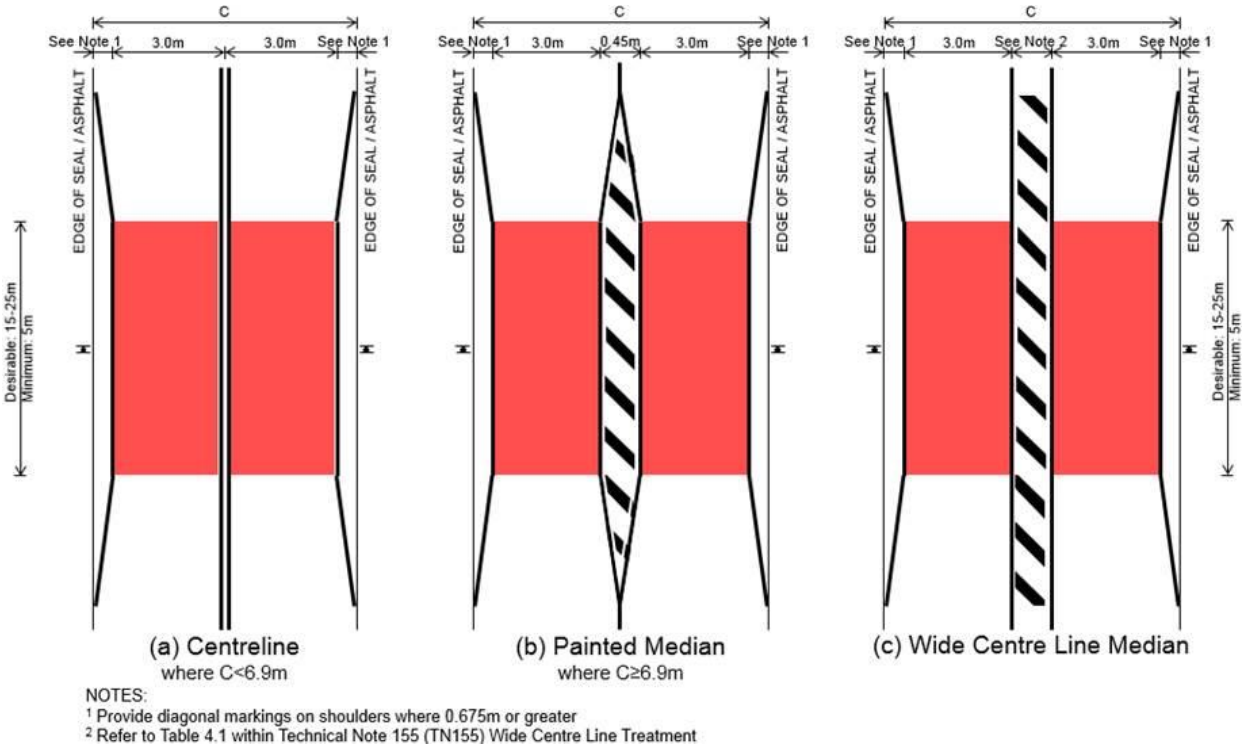
- when the seal width (C) is less than 6.9 m wide, a Centreline TET shall be installed, and
- when the seal width (C) is equal to or greater than 6.9 m wide, a Painted Median TET shall be installed.

The traffic lanes when travelling through the threshold treatment should be 3.0 m wide; however, a design check (for example, swept path analysis) shall be undertaken prior to the installation of the TET to ensure that the appropriate design vehicles can pass without conflict when travelling through the TET. This is particularly important when the location of TET on curves cannot be avoided.

In terms of length, it is desired that the threshold be 15–25 m long; however, in constrained situations, the length of the threshold treatment may be reduced to a minimum of 5 m.

Figure 8.1 graphically presents the above dimensional requirements.

Figure 8.1 – Threshold selection and design

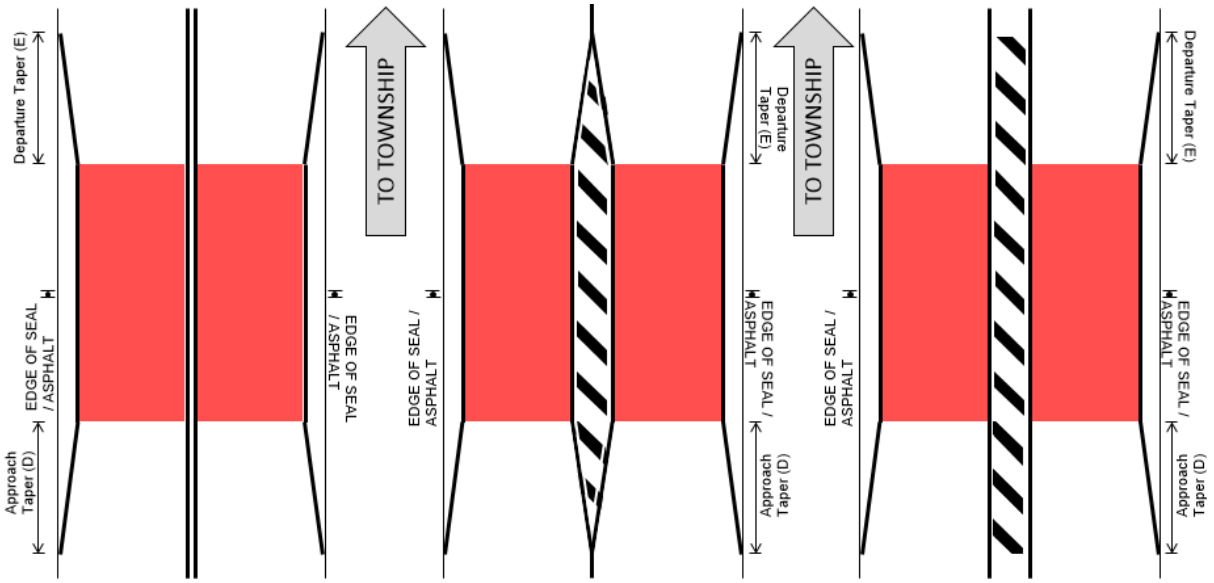


NOTES:
[1] Provide diagonal markings on shoulders where 0.675m or greater
[2] Refer to Table 4.1 within Technical Note 155 (TN155) Wide Centre Line Treatment

8.2 Approach and departure tapers

The lengths of the approach taper (D) and departure taper (E) for the TET options are depicted within Figure 8.2. The approach and departure taper lengths shall be equivalent in metres to the speed limit in the corresponding speed zones as depicted: for example, a TET installed on approach to a township with a speed reduction from 80 km/h to 60 km/h shall have approach and departure tapers of 80 m and 60 m long respectively.

Figure 8.2 – Approach and departure tapers



8.3 Pavement markings

All pavement markings shall be designed and installed in accordance with Section 5 of the Queensland MUTCD Part 2 *Traffic Control Devices for General Use*. Please refer to the following sections of the Queensland MUTCD Part 2 for the pavement markings:

- Centreline for Centreline TET – Section 5.3
- Painted Median for Painted Median TET – Section 5.5.1.4
- edge lines for the TET types where the shoulder is less than 0.675 m – Section 5.3.5, and
- diagonally-painted shoulders for both TET types where the sealed shoulder width is equal to, or greater than 0.675 m – Section 5.5.1.3.

Cold applied plastic pavement marking as per Technical Specification MRTS45 *Road Surface Delineation*, Section 6.1.6 is preferred over water-based paint for TETs, due to its benefits of increased visibility and longevity.

In addition to the above, Retroreflective Raised Pavement Markers (RRPMs) in accordance with Sections 5.6.2 and 5.6.5 within the MUTCD Part 2 shall be provided.

Additionally, no overtaking zones shall be established through the TET. On approach (inbound and outbound) and departure (inbound direction only) sides of the TET, no overtaking zones shall be no less than the requirements provided within the department's MUTCD Part 2, Table 5.1.

8.4 Lane pavement treatments

Lane pavement treatments may provide further safety benefits by increasing the visual impact of the TET and improving driver awareness of the changing speed environment.

There are three options for lane pavement treatments:

1. red coloured pavement surfacing (refer to Transport and Main Roads Technical Specification MRTS110 *Coloured Surface Treatments*), or
2. speed limit pavement numerals (for lower speed approach / inbound direction only, refer to MUTCD Part 4, Section 6), or
3. no lane pavement treatment.

The coloured pavement surfacing should be applied in accordance with best practice to ensure TET coloured surface treatments are durable and have adequate skid resistance. Refer to MRTS110 for further information. For details regarding the colour specification, refer to Section 7.3 in MRTS110.

Coloured surfacings generally exhibit satisfactory performance when they are placed over concrete or dense graded asphalt that is in good condition. Caution should be exercised when placing coloured surfacings over other surfacing types (such as sprayed seals) as Transport and Main Roads has limited experience with their use in these applications. Coloured surfacings should not be applied to:

- open graded asphalt, or
- existing surfaces that are heavily oxidised, cracked, crack sealed, rutted, deformed or have a flushed / bleeding appearance.

For further advice, please contact the Principal Engineer (Asphalt and Surfacings) at TMRRoadSurfacings@tmr.qld.gov.au, from Engineering and Technology's Pavements, Research and Innovation Unit.

8.5 Signage

Signage at the TET shall include the following signage located centrally along the threshold treatment:

- a TET Speed Sign (Type TC2082) on each side of the roadway facing drivers entering the township, and
- a Speed Restriction (Type R4-1) sign on each side of the roadway facing drivers exiting the township.

Size B TC2082 sign should be used except where the physical space constraints of the roadside do not allow size B to be used. If this is the case, size A should be used.

It is important that drivers be aware that they are approaching a township, therefore a key element of the TET Speed Sign is that the name of the town be as large as possible to ensure greatest visibility of the township is achieved.

Use of 'Welcome to' on TC2082 should be used unless considered unsuitable in context with specific town welcome signage that is already in place.

8.6 Supplementary traffic calming treatments

International studies have shown that speed reductions at a TET can be momentary unless the downstream road conditions reinforce the lower speeds with additional visual and/or physical road conditions (*Speed change management for New Zealand roads*). Additional traffic calming measures may be installed to improve the effectiveness of the TET. Additional measures may include:

- reduced traffic lane widths
- traffic deflections horizontal (for example, chicanes and/or roundabouts)
- traffic deflections vertical (for example, humps, raised platforms, wombat crossings, raised intersections)
- maintained visual narrowing including measures that help to ensure the optical width (*Traffic calming guidelines*) – that is, the distance between vertical objects – of a road is less than the height of the objects
- introducing parking lanes, and/or
- planting – all plantings must be frangible and only installed downstream of TETs, they must not impact on the visibility of TETs. Maintenance of plants will be the responsibility of council or Transport and Main Roads, taking all necessary safety precautions with respect to traffic management and workplace health and safety.

It is also noted that the installation of a TET does not preclude the provision of other service and tourist (Township entry related) signs as per Australian Standard AS 1742 *Manual of Uniform Traffic Control Devices Part 6 Tourist and Services Signs* and Queensland MUTCD Part 6 *Tourist and Services Signs*.

8.7 Stakeholders engagement

Key stakeholders including the local government, local Member of Parliament and the Queensland Police Service should be informed of new TET installation projects in their area. Stakeholder engagement offers significant opportunity for Members of Parliament and regional councils to engage with their communities and discuss the safety benefits of TETs and improving road safety in their area.

9 Further advice

For further advice or to provide feedback on this Technical Note please contact:

Unit – Safer Roads team
Email – SaferRoads@tmr.qld.gov.au

13 QGOV (13 74 68)
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