Technical Requirements

Active Transport Investment Program

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Queensland Government

Contents

Introduction

The Active Transport Investment Program (ATIP) funds cycling facilities that encourage more people of all ages and abilities to cycle more often. To increase cycling participation, facilities need to be comfortable, low-stress, convenient, direct, safe and competitive with other modes of travel. In order to achieve this, these technical requirements outline the desirable and minimum standards for cycling infrastructure projects funded through the ATIP.

These technical requirements only relate to projects delivered through the ATIP and are in line with Austroads guidance. However, to support the program intent, the ATIP technical requirements generally seek a higher standard of provision because the ATIP funds principal cycle networks and future cycling demand is expected to be high.

The technical requirements also exclude certain treatments and design values that are unlikely to support the program intent. They also incorporate a number of learnings and clarifications resulting from previous cycling infrastructure projects.

An eligibility requirement for all projects funded through the ATIP is that the design must conform to these technical requirements.

Eligibility

Unless otherwise noted by these technical requirements, the ATIP accepts treatments and design values set out for bicycle facilities in the reference documents listed in *Table 1*.

Designs incorporating treatments described in *Traffic and Road Use Management Manual Volume 1 Part 10 Section 7-1 – Bicycle lane separation devices* and *Traffic and Road Use Management Manual Volume 1 Part 8 – Advisory Bicycle Lanes and Cycle Streets* are specifically being targeted by the ATIP. Additional assistance in the design and evaluation of these innovative treatments will be made available through the ATIP.

Alternative standards, guidelines and innovative treatments not covered by the reference documents will be assessed on a case by case basis.

The following treatments are not eligible for funding by the ATIP:

- Bicycle Awareness Zone treatments (with the exception of circumstances identified under the Bicycle Lanes section);
- Part-time bicycle lanes; and
- Construction of shared paths less than 2.5m wide (as a stand-alone treatment).

Table 1 - Reference documents

Road Planning and Design Manual (RPDM)	Available at www.tmr.qld.gov.au.
Traffic and Road Use Management Manual (TRUM)	Available at www.tmr.qld.gov.au.
TMR Guidelines for road design on brownfield sites	Available at www.tmr.qld.gov.au.
TMR Design criteria for bridges and other structures	Available at www.tmr.qld.gov.au.
Queensland Manual of Uniform Traffic Control Devices (MUTCD), Part 9 Bicycle Facilities	Available at www.tmr.qld.gov.au.
TMR Traffic Control signs (TC signs)	Available at www.tmr.qld.gov.au.
TMR Cyclist and Pedestrian Guidelines	Available at www.tmr.qld.gov.au.
TMR Traffic engineering Technical Notes	Available at www.tmr.qld.gov.au.
Austroads Guides to Road Design, Traffic Management and Road Safety	Available at www.austroads.com.au
Australian Standard 3996 Access Covers and Grates	Available at www.saiglobal.com.
Australian Standard 1428 Design for Access and Mobility	Available at www.saiglobal.com.

Performance requirements

Facilities delivered through the ATIP must be fit for purpose, direct, safe, attractive, and coherent, ensuring that

- Facilities are transport-oriented and allow people using bicycles to comfortably access meaningful destinations,
- Road users are not exposed to crash forces that would lead to fatal and serious injury outcomes, consistent with the Safe System Approach adopted in *TMR Road Safety Policy*

The *TMR Selection and Design of Cycle Tracks Guideline* provides comprehensive design guidance consistent with these requirements.

Directness, comfort and coherence generally lead towards solutions within road corridors. This requires careful consideration of crossing and intersection treatments and physical separation from motorised traffic to maintain safety and attractiveness. Making a direct facility safer is often easier than making a safe facility more direct.

On-road facility requirements

Bicycle lanes

In some environments the attractiveness and perceived safety provided by a visually separated (e.g. line marking only) bicycle lane may not be enough to encourage new riders. Physical separation from motorised traffic assists in limiting perceived safety issues in road environments with higher traffic speeds and volumes. Physical separation can be achieved by:

- "hardening" a bicycle lane with a physical device, refer *Traffic and Road Use Management Manual Volume 1 Part 10 Section 7-1 – Bicycle lane separation devices*;
- establishing a Cycle Track, refer *TMR Selection and Design of Cycle Tracks Guideline;* or
- establishing a path (incorporating priority crossings to maintain safety and directness).

ATIP funding is specifically targeted at delivering a high proportion of projects that incorporate physical separation from motorised traffic. As such, projects which seek to achieve physical separation in the appropriate context will be more likely to secure ATIP funding.

Bicycle lanes established under ATIP shall conform to the widths specified in *Table 2*. Minimum width bicycle lanes should only be considered at localised constrictions such as drainage grates or where significant constraints restrict relocation of the kerb line.

Bicycle lane set out shall be based on the alignment of the adjacent traffic lane, not the kerb alignment.

Urban traffic lanes may need to be marked less than 3.5m wide in order to establish a bicycle lane. There is limited evidence to support wide traffic lanes in urban areas. Refer to the *RPDM* and *Guidelines for road design on brownfield sites* for further detail.

Table 2 –ATIP Bicycle lane widths (Based on AGRD Part 3, Table 4.18)

Posted speed limit	Minimum width for ATIP projects	Desirable width for ATIP projects
40km/h or less	Consider Advisory Bicycle Lanes or Cycle Street (Refer TRUM Volume 1 Part 8)	Consider Advisory Bicycle Lanes or Cycle Street (Refer TRUM Volume 1 Part 8)
50km/h	1.2m	2.0m (Physical separation possible consider TRUM Volume 1 Part 10 section 7-1)
60km/h	1.5m	2.0m (Physical separation, refer TRUM Volume 1 Part 10 section 7-1)
70km/h	1.8m	2.0m (Physical separation, refer TRUM Volume 1 Part 10 section 7-1) or path.
80km/h or higher	2.0m (Physical separation possible consider TRUM Volume 1 Part 10 section 7-1)	2.0m (Physical separation, refer TRUM Volume 1 Part 10 section 7-1) or path.

Bicycle Awareness Zone (BAZ) treatments do not provide separation between motor vehicles and people riding bikes. The ATIP will only consider funding BAZ treatments in exceptional circumstances where a road or bridge section is highly constrained and where traffic speeds and volumes are low. Refer *TRUM Volume 1 Part 10 Section 6.5-1* for more information.

Bicycle lanes and on-street parking

Limitation of on-street parking on arterial roads improves safety, reduces motor vehicle congestion and permits separation of bicycles from moving traffic.

Locating parking adjacent to a separated bicycle lane (bicycles positioned kerbside) is an efficient method to protect people riding bikes from moving traffic. This also enables clearway operation to provide motor vehicle capacity when needed and parking off-peak while safely providing a safe full time facility for people riding bikes, for more detail refer *Austroads Guide to Road Design Part 3 Figure 4.32*. Projects proposing this arrangement will be more likely to secure ATIP funding.

The ATIP will only accept projects proposing on-street kerbside car parking adjacent to a bicycle lane when the minimum dimensions set out *Table 3* are achieved. Typically, this can only be achieved with pavement marking of the parking bays as well as marking of the bicycle lane and the door zone. In some cases, this may require the narrowing of existing parking bays and adjacent traffic lanes.

Table 3 – Bicycle lanes and on-street parking dimensions

Parking bay width	Door zone buffer	Bicycle lane width
2.1m minimum	0.6m minimum	Refer Table 2 (above)

Where minimum widths cannot be achieved, on-street parking should be removed, indented or reconfigured to position people riding bikes kerbside. Projects considering parking rationalisation should consider demand, turnover and utilisation within the entire walkable catchment of the project site. *Table 4 - Relationship between length of time parked and distance walked* provides a general indication of walkable catchment related to parking duration. Construction costs related to indenting parking must be fit for purpose to attract ATIP funding. Improvements to paths and crossings may be a justifiable ancillary project inclusion to promote walking from parking in nearby underutilised parking in side streets.

Table 4 - Relationship between length of time parked and distance walked[1]

Parking duration	Distance Walked (m)	Minutes Walked (at 1.2m/s)
less than ¼ hr	66	1
¼ hr to ½ hr	100	2
½ hr to 1 hr	121	2
1 hr to 2 hrs	150	3
3 hrs and over	183	4

Intersections

ATIP requirements for providing for cyclists at intersections are directness, safety and comfort. These requirements are often addressed by providing priority for bicycle riders and pedestrians at intersections. Designing to ensure appropriate vehicle speeds, so that people are not exposed to crash forces that would lead to fatal and serious injury outcomes, is consistent with the Safe System Approach and an ATIP requirement. The following TMR Guidelines should be referred to for further information:

- *Selection and Design of Cycle Tracks,* Section 4.2 provides comprehensive guidance on a variety of intersection treatments.
- *Raised Priority Crossings for Pedestrian and Cycle Paths* provides guidance for shared path crossings at side roads, roundabouts, and slip lanes.
- Where slip lanes must be retained, wombat (raised zebra) crossings shall be considered before a 2-aspect signal crossing. refer *Raised Priority Crossing Guideline* Section 2.6.3
- *Providing for People Walking and Riding at Roundabouts* provides guidance on a variety of treatments at roundabouts.

Drainage and Utilities

Drainage is an essential design component to ensure road and path longevity and safety, guidance relating to bicycle aspects of drainage design is covered in Austroads Guide to Road Design Parts 5, 5A and 6A.

Flow depth and velocity checks should be checked at transverse drainage for path user safety.

Steel in the travelled way can be a slip resistance safety issue for people riding bikes. The ATIP requires that covers located in the travelled way provide equivalent slip resistance to surrounding surfaces in all weather conditions. Concrete infill covers are a good way to ensure durable slip resistance.

Drain grates and utility covers should comply with *Australian Standard 3996 Access Covers and Grates*. Works to update non-compliant gully grates should be considered as part of ATIP projects.

Where possible, new gullies in urban areas should be recessed into the kerb to allow the grate to line up with the lip of channel.

Where bicycle lanes are retrofitted on streets with encroaching grates, use of desirable width bicycle lanes along the street will ensure that minimum bicycle lane widths are provided between the edge of grate and the bicycle lane marking. Existing stormwater gullies could also be reconstructed to reduce grate interaction with the bicycle lane.

[1] Derived from A Comprehensive Parking Survey of the St. Louis, Missouri Central Business District. St. Louis, Mo.: Missouri State Highway Department, 1950.

Off-road requirements

Paths

In order to achieve the program intent, key path design criteria are set out in *Table 5*.

Table 5 - Key shared path design criteria for ATIP projects

Path design criteria	Minimum value	Desirable value	Rationale
Width (m)	2.5	3.0	3.0m wide paths have 50% greater capacity than 2.5m wide paths and generate fewer path user complaints.
Design speed on midblock level grade (km/h)	25	30	Appropriate for commuter use. Design speed should vary dependant on gradient and intersection priority.

A reduction in these design criteria values may be considered at localised constraints such as significant poles or structures. This must be explicitly documented as to why a better facility standard cannot be achieved, submitted to TMR and accepted through the design approval process to retain ATIP funding.

Provision of paths both sides of urban arterial and collector roads[2] may provide a case for reduced path widths, particularly when co-located with bicycle lanes.

Intersections of paths with paths should include 2.5 metre corner radii or a chamfer of equivalent size.[3]

Path must be designed to provide unobstructed sight lines. Intersection visibility splays[4] and visibility requirements for two-way paths[5] must be considered in addition to other general visibility checks.

Where an existing path is to be widened, longitudinal joints in paths should only be considered where a physical divider, such as a kerb, can be used to cover this joint.

Transverse joints shall be designed to be smooth, this is usually achieved through sawcut joints[6] or using a proprietary jointing system.

Where possible, pathways should be positioned so they are clear of the roots of established trees. In constrained locations where paths will be within the root zone of trees, pathway joint systems between slabs should be used to minimise any displacement of slabs that could form a hazard.

Where a significant number of people walking and cycling are expected, a segregated path may be required to maintain an appropriate level of service[7]. TMR *Selection and Design of Cycle Tracks Guideline* provides additional guidance on segregated paths and path treatments at intersections with side streets.

Where a warning colour is used at an intersection with another path, crossings or driveway, green surfacing shall only be used on a path designated BICYCLE ONLY. Green surfacing should not be used on shared paths to avoid any confusion regarding facility designation. Coloured surface treatments should be used sparingly. Other treatments such as exposed aggregate surfacing may offer sufficient visual and tactile differentiation at a lower whole of life cost.

Shared path signage is not necessary as Queensland road rule 250 permits people to ride on footpaths.

Paths intersecting with driveways should be constructed to provide a smooth joint between the two facilities using measures to control joint displacement such as dowels or other proprietary devices. Where existing driveways do not meet the cross-fall requirements of proposed shared paths, they should be reconstructed to join smoothly to the pathway grade and cross-fall. Where driveways are being installed or reconstructed, the kerb crossing should not include a vertical lip at the invert. Sight lines between drivers entering or exiting

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[2] Refer to Table C1 2, Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017)
[3] Refer section 6.4, Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017)
[4] Refer Figure 6A-2, TMR RPDM edition 2 Volume 3 Part 6A (2020)
[5] Refer section 5.7.1, Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017)
[6] Figure C 4, Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling (2017)
[7] Refer Section 5.1, TMR RPDM edition 2 Volume 3 Part 6A (2020)

driveways, and path users should also be provided. On commercial driveways further treatments to reinforce low vehicle speeds and reinforce priority may also be required. Driveways should be delineated to maintain the appearance of the path being continuous through the driveway.

Field inlets and/or cross drainage may need to be considered to prevent paths being submerged during rainfall and reduce collection of debris on the path, slip resistance issues and ongoing maintenance.

Transitions between on-road and off-road facilities

Transition ramps should be considered for cycle route connections between roadway corridor and parkland or off-road corridors. The additional off-road option allows people riding bikes to choose which facility they use based on their confidence and the traffic level at the time. Existing driveways constructed without a vertical lip may function as a transition ramp. For detail on bicycle specific transition ramps refer *Austroads Guide to Road Design Part 3 (2016) Figure 4.36.*

Objects adjacent to paths

A 1.0 metre clearance should be provided from the edge of cycle-able surface of any bikeway or shared pathway to any potentially hazardous object adjacent to a path.

Fencing, balustrades and vegetation shall be placed to ensure unobstructed sight lines are available.

Selection of vegetation adjacent to paths should consider the effects of leaf, seed and other plant debris on path slip resistance and maintenance. Planting of vegetation adjacent to paths must ensure clearances and sight lines are easily maintained as the planting matures.

Designing to minimise the extent of fencing is recommended. Landscaping or low shrubbery is a desirable alternative to fencing in many situations.

Fencing is intended to protect path users from hazards however it does not necessarily need to follow the edge of path. For example, fencing the headwall and wings of a culvert protects path users from the hazard while maximising clearance to the path. Fencing constructed directly adjacent to the path shall incorporate flared terminals, refer TMR *Guideline on Fencing and edging treatments for cycling infrastructure* for details.

Fencing incorporating vertical bars is not considered smooth as rubrails are only partially effective at preventing adult or children riding bikes from engaging with the vertical elements of the fence. Fence types with openings of 25mm or less are considered to have smooth features. Smaller apertures are more desirable and may be required if anti-climb features are required. The smoothest side of fence products should face towards the path such as in Figure 1.

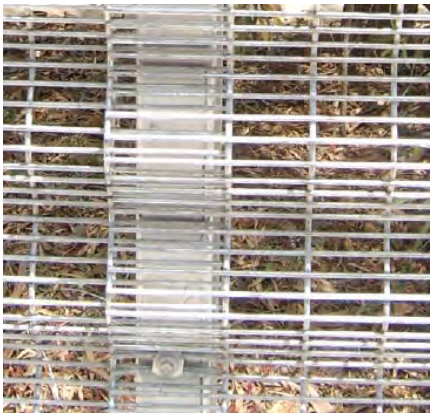

Figure 1 - Closely spaced mesh fencing

Fencing with continuous smooth profiles can eliminate the offset top rail requirement on bicycle paths as pedals will not be caught on the tightly spaced horizontal wire. This should also have the benefit of reducing the cost of the fencing. This modified weldmesh can also be formed with the edges rolled at the top and bottom to further increase strength and remove the need for top or bottom rails. *Austroads Guide to Road*

Design Part 6A Section 5.5.3 notes the projecting deflection rail is not required when snag-free infill panels are provided, this is the preferred full barrier fencing style on ATIP projects.

There is often a need for fencing of pathways across bridges, particularly where pathways pass close to the back of w-beam guardrail. If w-beam is located within 1.0 metre of the path edge it should be treated to minimise path user collision severity. Fencing needs to be designed to ensure it does not interfere with guardrail effectiveness in the event of a motor vehicle collision. The path should diverge away from the guardrail as soon as practicable to minimise the amount of path with clearance constraints and the need for fencing.

Access management

Access management devices such as bollards and fencing deflection rails shall not be used as slow points or force riders to dismount to safely navigate through the treatment.

Access management treatments at path terminals should only be considered if there is infrastructure along the pathway, such as light weight bridges, that could be damaged by unauthorised access by a motor vehicle. Where access management devices are required, they shall be placed in the safest location possible (for example, in a visible location clear of curves and steep grades) and be implemented to maintain path capacity and minimise conflict between path users. Clear opening width shall be not less than 1.6m and approach delineation shall be marked from 5-10m on approach to any potentially hazardous feature.

Protection of structures from authorised motor vehicle access should be managed by load limit signage.

TMR *TRUM Volume 1, Part 6: Intersections, Interchanges and Crossings Section 8.2.2-1* provides further guidance on safe vehicle restriction treatments for bicycle paths and shared paths.

Document control sheet

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact: TMR.Cycle.Grants@tmr.qld.gov.au

Version history

Version no.	Date	Changed by	Nature of amendment
0.1	29.10.14	Tamara Smith	Initial version
0.2	15.01.15	Kendrick Benson	Technical review.
0.3	13.05.15	Mark McDonald	Technical review.
0.4	27.05.15	Tamara Smith	New template.
0.5	08.07.15	Mark McDonald	Incorporated review comments
0.6	16/9/16	Mark McDonald	Incorporated innovative treatment provision, corner radii clarification and minor edits to path side object section.
0.7	26/9/16	Mark McDonald	Incorporated separation preference and intent.
1.0	21/6/17	Mark McDonald	Unified requirements for Grants and Works programs
1.1	21/8/18	Mark McDonald	Annual review. Updated references & fencing recommendations
1.2	26/9/19	Mark McDonald	Annual review. Access management clarification of requirements
1.3	17/12/19	Mark McDonald	SDCT update. Clarification Drainage section.
1.4	24/11/2020	Mark McDonald	Integrating Technical note to guideline update and recent RPDM publication (path visibility splay). Clarifications to Intersections, Drainage, Transition and Access Management sections.

Document sign off

The following officers have **approved** this document.

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