



Tram Stop – Bicycle Facilities

Engineering Standard

Asset Management

CS2-DOC-003448

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1. Introduction

The primary function of bicycle facilities and related infrastructure is to provide passengers with safe, efficient and equitable infrastructure and access to Adelaide Metropolitan Railway Network (AMPRN) tram stops.

2. Purpose

The purpose of this standard is to outline the fundamental requirements for cycling access and bicycle storage at tram stop precincts.

This standard must be read in conjunction with The Rail Commissioner's tram stop standards, relevant tram system standards and The Department's Master Specifications.

3. Scope

This standard applies to all new or upgraded bicycle facilities at tram stop precincts.

Existing bicycle facilities may be rated against this standard. In the context of this standard, 'rating' is the compliance review of pedestrian access that has been designed and installed prior to this standard being published.

4. Compliance

There are 3 types of provisions contained within this standard:

1. Requirements
2. Recommendations
3. Permissions

Requirements – it is mandatory to follow all requirements to claim full compliance with the standard. Requirements are identified within the text by the term '**must**'.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred. Recommendations are identified within the text by the term '**should**'. Recommendations recognise that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied or other controls are more appropriate or better.

Permissions – conveys consent by providing an allowable option. Permissions are identified within the text by the term '**may**'.

Deviation from a mandatory requirement noted within this standard is only permitted when an Engineering Waiver has been provided and approved by Rail Asset Management

5. Related Documents

Table 1 – Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
Standard Drawing Bicycle Enclosure Detail	CS1-DRG-361822
Station Standard – Bicycle Enclosure – Card Reader Circuit Diagram	CS5-DRG-350182
Standard - Tram Stop Overpasses Tram Network	CS2-DOC-003442
Standard – Tram Stop Pedestrian Access – Tram System	CS2-DOC-003518
Public Transport Standard – Electrical Infrastructure	CS5-DOC-003511
Standard - Tram Stop Station Signage and Pavement Marking - Tram System	CS2-DOC-003445
Station Bicycle Facilities – Train System	CS1-DRG-361822
Standard - Tram Stop Shelters - Tram System	CS2-DOC-003443
Standard - Tram Stop Furniture - Tram System	CS2-DOC-003444

6. References

The following referenced documents are used by this standard for information only:

- AS 1742 Manual of Uniform Traffic Control Devices
- AS 2890.3 Parking Facilities – Bicycle Parking Facilities
- AS 3500.3 Plumbing and Drainage – Stormwater Drainage
- AUSTROADS – guide to road Design – Part3 – Geometric Design
- AUSTROADS – guide to Road Design – Part 6A - Pedestrian and Cycling Paths
- DPTI Operational Instruction 9.2 – Bicycle Lane Sighting
- Government of South Australia – 30 Year Plan for Greater Adelaide – Cycling Strategy “Safety in Numbers”
- *Disability Standards for Accessible Public Transport (DSAPT)*

7. Design Requirements

7.1. General

Bicycle facilities should be incorporated within all tram stop upgrades. Bicycle facilities at tram stops must:

1. provide adequate space to ride safely;
2. have smooth surfaces - the design of the pavement for the paths must be sealed pavements;
3. provide vertical and horizontal geometry which enables appropriate sight lines to the oncoming path surface;
4. provide connectivity to and from existing (or proposed) cycle routes;
5. be located in close proximity to tram stop platforms and adjacent the primary access path;
6. have appropriate way finding signage; and
7. locate storage facilities in a convenient location that provides passive surveillance and allows for CCTV surveillance, are well lit and offer various storage options to meet riders’ needs.

The design of bicycle facilities must take into account:

1. the functional requirements for connecting new paths to the existing path network and where paths terminate; and
2. any existing and proposed plans of the local Council.

Consideration should be available on surrounding cycle network details and future strategies to include information where applicable from:

- Active Transport – Walking and Cycling;
- Local Government; and
- Developers.

7.2. Types of Bicycle Lanes and Paths

Bicycle lanes and paths can either be on-road (lanes) or a separate facility away from the road (paths). The types of bicycle lanes and paths which generally can be provided within the tram stop precinct include:

1. exclusive bicycle lane – (on-road) usually adjacent to the kerb face and appropriately line marked;
2. bicycle/car parking lane – (on-road) adjacent to parallel parking spaces and appropriately line marked;
3. wide kerbside lane – (on-road) where a dedicated bicycle lane is not provided a wide kerbside lane can be provided to allow vehicles and cyclists to interact safely;
4. exclusive bicycle path – (off-road) separate facility for cyclists only;

5. shared use path – (off-road) generally a path that is wide enough to allow cyclists and pedestrians to share; and
6. separated path – (off-road) similar to a shared path; however the path is usually segregated either by pavement marking or by physical measures such as vertical separation.

7.3. Access to the Tram Stop Precinct

7.3.1. Grade Separated Access

Tram Stops that are grade separated from adjoining road networks should provide cycling access from the road level to the tram stop precinct. Bicycle facilities must be located as close to the vicinity of the tram stop precinct. Refer to the Austroads Guide to Road Design Part 6A for bicycle path from road to stop area.

Where stairs are provided from road level to the tram stop precinct, bike wheel channels may be provided with approval from The Rail Commissioner. Minimum stair width must be 3 m wide if a wheel channel is provided. Refer to Austroads Guide to Road Design Part 6A for bicycle wheeling ramp details.

Wheel channels must not be provided on the stairs leading to an overpass on a platform, in accordance with CS2-DOC-003442 Standard - Tram Stop Overpasses Tram Network.

7.3.2. Crossing the Rail Corridor

Where possible, cycle access must be provided so that cyclists do not have to cross the rail corridor at track level. Options may include utilising an existing road level crossing or existing/ proposed overpass.

Where there is no road level crossing or grade separated access for cyclists to cross the rail corridor, access must be integrated with the pedestrian crossings in accordance with CS2-DOC-003518 - Standard – Tram Stop Pedestrian Access – Tram System. Separate facilities across the track must not be installed specifically for cyclists.

7.3.3. Platforms

Cycling on the platforms is prohibited and therefore platforms must not form part of the cycle path or provide connectivity between cycling lanes. Where connectivity between lanes is required along the length of the platform a dedicated cycle lane separate from the platform must be provided.

7.4. Cyclist Behaviour

Cyclists are required to dismount (and walk or carry their bicycle) prior to:

1. entering a maze and whilst crossing the tracks;
2. accessing a platform and whilst traversing the platform;
3. accessing a ramp that is less than 3m wide;
4. entering a lift; and
5. climbing stairs.

7.5. Design Criteria

Bicycle lanes and paths must be provided in accordance with AS 1742.9, Austroads Guide to Road Design Part 3 – Geometric Design and Part 6A – Pedestrian and Cyclist Paths.

7.6. Bicycle Lane and Path Widths

The minimum widths of bicycle lanes and paths must be in accordance with Austroads Guide to Road Design Part 3 – Geometric Design and Part 6A – Pedestrian and Cyclist Paths respectively.

7.7. Gradients

7.7.1. Exclusive Bicycle Lanes and Paths

Bicycle lanes must match the cross fall of the adjacent road pavement and must have a minimum of 2% and a maximum of 4% crossfall.

7.7.2. Shared Use Paths

Bicycle paths which are a shared use path, and which form part of the primary access path must be provided in accordance with the Disability Standards for Accessible Public Transport (DSAPT) and CS2-DOC-003518 - Standard – Tram Stop Pedestrian Access – Tram System.

The crossfall must be a minimum of 1% and a maximum of 2.5%.

7.8. Sight Distance

Adequate sight distances must be provided for cyclists to be able to read and understand the terrain and potential conflicts well in advance. Refer Austroads Guide to Road Design Part 6A for sight distance requirements.

Application of Crime Prevention Through Environmental Design (CPTED) principles and appropriate signage and traffic control devices can also assist the cyclist in determining the road environment better, thus reducing the risk of collision or injury.

7.9. Clearances

The minimum vertical clearance for a bicycle lanes and paths must be 2.5 m above finished surface level.

The minimum clear horizontal distance from the edge of bicycle lanes and paths to any fixed object above ground level must be 500 mm (i.e. sign posts and light poles adjacent to cycle lane).

7.10. Utility Services in Cycle Paths

Pit access covers must not be placed within bicycle lanes or paths.

7.11. Pavement Design

All surfaces of bicycle lanes and paths, within the tram stop precinct and for connections to the existing cycling network, must be asphalt or concrete.

The surfacing of bicycle lanes and paths must not differ in colour from the rest of the road or path. Where differentiation of lanes and paths for traffic or pedestrian areas is required pavements markings must be in accordance with CS2-DOC-003445 Standard - Tram Stop Station Signage and Pavement Marking - Tram System.

Pavements for bicycle lanes forming part of a road must consist of the same pavement as the adjoining road pavement provided in accordance with RD-PV-D1 Pavement Design (Austroads Supplement).

Pavements for off-road bicycle paths must be provided in accordance with The Department Master Specification Part R84 Secondary Pavements.

7.12. Drainage

Bicycle lanes, paths and bicycle enclosures must be free draining and must not be subject to ponding. Appropriate drainage must be provided to drain surface water from

the lanes and paths. Drainage must be provided in accordance with AS 3500.3 Plumbing and Drainage – Stormwater Drainage and Austroads Guide to Road Design Part 6A.

The wearing course of the bicycle lanes and paths must be flush with (kerb and) gutter lips or surrounding finished surface level as appropriate.

7.13. Lighting

Lighting must be designed in accordance with CS5-DOC-003511 Public Transport Standard – Electrical Infrastructure for the following:

1. bicycle lanes;
2. bicycle paths;
3. shared use paths; and
4. bicycle facilities.

7.14. Signage and Pavement Marking

Signage and pavement marking must be provided in accordance with CS2-DOC-003445 Standard - Tram Stop Station Signage and Pavement Marking - Tram System. Pavement marking must be used to delineate bicycle lanes where applicable.

8. Bicycle Storage Facilities

8.1. Design Life

The bicycle storage facilities must be designed for a minimum operational life of 30 years.

8.2. General

Bicycle storage facilities must be provided in accordance with AS 2890.3.

Bicycle storage facilities should be provided at all new and upgraded tram stops. Table 2 below indicates the types of facilities that must be provided:

Table 2 – Bicycle Storage Facilities at Tram Stops

FACILITY	CLOSED CORRIDOR STANDARD AMENITY STOP	URBAN STANDARD AMENITY STOP	ENHANCED AMENITY STOP
Bicycle Parking Rails	Minimum of 3 at each stop	Not required unless otherwise specified	Minimum of 6 at each stop
Bicycle Enclosure	Not required *	Not required *	Bicycle enclosure to accommodate a minimum of 16 bicycles

* Note: Where car parking capacity exceeds 200 cars a bicycle enclosure to accommodate a minimum of 16 bicycles must be provided.

All bicycle facilities must be designed to reduce the potential for vandalism and must be coated with an approved anti-graffiti coating. All metal finishes must have no sharp edges, be de-burred, smooth and must provide a minimum radius of 3mm. Use of potentially reflective materials in areas that could cause glare for tram drivers must be avoided.

8.3. Bicycle Parking Rails

The number of bicycle parking rails, external to the bicycle enclosure, to be provided at tram stops must be as indicated in Table 2.

Bicycle parking rails must meet the following requirements:

1. Be weatherproof or protected against weather (roof cover required).
2. be in close proximity to the tram stop platform(s) but not be located on the platform;
3. be in a safe location not intruding bike or shared use paths;
4. be 50 mm diameter, brushed Grade 316 stainless steel 800 mm long and 750 mm high from ground level to enable the main frame and the wheel to be locked to the rail;
5. have bend radii along the top of the frame; and

The spacing between adjacent bicycle rails must be at least 1000 mm. The bicycle parking rails must be cast into concrete footings.

8.4. Bicycle Enclosures

The requirement for a bicycle enclosure and size to be provided at tram stops must be as specified in Table 2.

Bicycle enclosures must be provided in accordance with CS1-DRG-361822 Station Bicycle Facilities – Train System, and as follows:

1. be designed in a modular format so that the enclosure can be expanded to meet increased demand as required;
2. have a concrete slab floor;
3. be fully enclosed with steel welded mesh with 35% solidity, class W10Z10A in accordance with AS 4534;
4. have a 16 mm thick translucent UV protective polycarbonate roof sheeting - refer to CS2-DOC-003443 Standard - Tram Stop Shelters - Tram System for roof design;
5. incorporate lighting in accordance with CS5-DOC-003511 Public Transport Standard – Electrical Infrastructure;
6. have an outdoor grade 15 A general purpose outlet (refer to CS5-DOC-003511 Public Transport Standard – Electrical Infrastructure);
7. have dedicated 240 V electrical supply for the door control mechanism;
8. have bicycle parking rails installed where the number of rails is half the capacity (as two bicycles can be locked to one rail); and
9. have bicycle parking rails cast into concrete footings

The roof style of the bicycle enclosure should be a curved profile. Refer to drawing CS1-DRG-361822. Structural steelwork, shelter roof and drainage for the bicycle enclosure must be in accordance with CS2-DOC-003443 Standard - Tram Stop Shelters - Tram System.

If the bicycle enclosure is to be located in the car park area, protective impact absorbing bollards in accordance with CS2-DOC-003444 Standard - Tram Stop Furniture - Tram System must be placed at strategic locations around the enclosure to protect the structure from vehicle impact.

The bicycle enclosure must have only one door that opens outwards. This enclosure door must be unpowered lockable self-closing (e.g. spring loaded) that matches the cladding of the bicycle enclosure. The door must be tamperproof with latch protection or an anti-vandal door handle to prevent unauthorised access.

The enclosure door must provide the most direct path of access to and from the tram stop facilities and must have a handle on the outside. From the inside it must be

manually unlocked and opened by pressing a door release button. The door release button must not be reachable from the outside.

The door of bicycle enclosures must be locked using an outdoor rated electromagnetic door latch which unlocks from the outside via a Stationary Validator (SV), which must:

1. be mounted within the bicycle enclosure for the SV as close as practicable to the wall and on the hinge side of the main door (such that people are unable to reach the internal door handle from the access port);
2. have a dedicated 240 V power supply to the SV location and a 2–core ELV cable in communication conduit running from the SV to the door mechanism. Refer to drawing number CS5-DRG-350182: Bicycle Enclosure Card Reader Circuit Diagram; and
3. a 180 x 180mm access port in the steel welded mesh wall to facilitate people passing their hand/smartcard through the opening to access the card reader. The card reader must be mounted at 90 degrees to the access port facing away from the door. The access port must have a smooth surfaced metallic frame inserted to avoid cutting injuries when people access the card reader.

During power interruption the door lock mechanism must fail to the unlocked state and must be manually operable.

8.5. CCTV

CCTV system must be designed in accordance with PI5-DOC-003517 Public Transport Infrastructure Security Systems.

8.5.1. Bicycle Rails

Bicycle rails should be covered by CCTV surveillance. Where it is possible the bicycle rails should be covered by CCTV from the car park or the platform.

8.5.2. Bicycle Enclosures

Bicycle enclosures must consist of one fixed camera inside the enclosure and one PTZ camera located outside the enclosure.

Both CCTV cameras must be positioned to maintain coverage in accordance with PI5-DOC-003517 Public Transport Infrastructure Security Systems.