



# Tram Stop - Pedestrian Access

## Engineering Standard

Asset Management

CS2-DOC-003518

## DOCUMENT AMENDMENT RECORD

REV	CHANGE DESCRIPTION	DATE	COMMENTS
1	Initial Issue	05/06/23	
<b>Document Review Schedule:</b>		3 yearly	

## TABLE OF CONTENTS

1. Introduction.....	5
2. Purpose .....	5
3. Scope .....	5
4. Compliance.....	5
5. Related Documents.....	5
6. References.....	6
7. Design Requirements for Access Areas.....	6
7.1. General .....	6
7.2. Access Paths .....	7
7.3. Access Ramps .....	7
7.3.1. General .....	7
7.3.2. Width .....	7
7.3.3. Handrails and Kerb Rails .....	7
7.4. Kerb Ramps .....	7
7.5. Pedestrian Crossings .....	7
7.5.1. General .....	7
7.5.2. Flangeways .....	8
7.6. Mazes.....	8
7.6.1. Passive Control Mazes .....	8
7.6.2. Active Control Mazes.....	8
7.6.3. Signaling Design for Active Control Mazes .....	8
7.6.4. Orientation .....	8
7.6.5. Sight Lines and Signal Sighting .....	8
7.6.6. Clearances .....	8
7.6.7. Track Drainage.....	8
7.6.8. Conduits.....	9
7.6.9. Fencing and Gates.....	9
7.7. Path Widths.....	9
7.8. Surfaces .....	9
7.8.1. Access Paths .....	9
7.8.2. Accessible Public Areas .....	9
7.8.3. Concrete .....	10
7.9. Pavement Design.....	10
7.10. Tactile Ground Surface Indicators.....	10
7.10.1. General .....	10
7.10.2. Warning Indicators .....	10

**7.10.3. Directional Indicators ..... 10**

**7.10.4. Construction Tolerances..... 11**

**7.11. Signage and Pavement Marking ..... 11**

**7.12. Lighting ..... 11**

**7.13. CCTV..... 11**

**7.14. Earthing and Bonding ..... 11**

## 1. Introduction

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

## 2. Purpose

The purpose of this standard is to outline the fundamental requirements for the design, construction and maintenance of pedestrian access at tram stops.

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 tram stop access provisions.

Existing pedestrian access 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.

Relevant parts of this standard must be used in the design of pedestrian access locations that are provided away from tram stops.

## 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 to and approved by Rail Asset Management.

## 5. Related Documents

Table 1 – Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
Standard for Railway Pedestrian Crossings	CS4-DOC-000446
Standard – Fencing and Gates for Rail Corridors and Facilities	CS1-DOC-000454
Station Overpasses – Tram System	CS2-DOC-003442
Drainage – Tram System Engineering Standard	CS2-DOC-003469
Public Transport Standard – Electrical Infrastructure	CS5-DOC-003511
Public Transport Infrastructure Security Systems	PI5-DOC-003517
Standard Drawing – Tram System – Pedestrian Maze Arrangement Passive Control – Standard Details	TC2-DRG-201543

Standard Drawing – Tram System – Passive Pedestrian Crossing – Single or Multiple Tracks – Signage and Pavement Marking Layout	TC2-DRG-201545
Standard Drawing – Tram System – Passive Pedestrian Crossing – Unidirectional Track – Signage and Pavement Marking Layout	TC2-DRG-201546
Standard Drawing – Tram System - Pedestrian Crossing Arrangement Active Controls – Standard Details	TC2-DRG-201547
Standard Drawing – Tram System – Pedestrian Crossing Arrangement Active Controls Autogates – Signage and Pavement Marking Layout	TC2-DRG-201548
Standard Drawing - Tram Stop - Signage Schedule - Drawing Register	CS2-DRG-365085
Standard Drawing - Tram Stop - Marginal and Island Platform Arrangements - General Layout	CS2-DRG-365079
Standard Drawing - Tram Stop - Marginal Platform – Urban Standard Amenity Shelter - General Layout	CS2-DRG-365080
Standard Drawing - Tram Stop - Island Platform – Urban Standard Amenity Shelter - General Layout	CS2-DRG-365082
Standard Drawing - Tram Stop - Marginal Platform – Closed Corridor Standard Amenity Shelter - General Layout	CS2-DRG-365274
Standard Drawing - Tram Stop - Island Platform – Closed Corridor Standard Amenity Shelter - General Layout	CS2-DRG-365275
Standard Drawing - Tram Stop - TGSi & Pavement Marking - General Layout	CS2-DRG-365084
Standard Drawing - Tubular System 1 200 mm High - Details	CS1-DRG-350242
Guidelines for Low Voltage Electrical Earthing and Bonding for the Adelaide Metro Tram Network	TP2-DOC-002020
HB 197 An Introductory Guide to the Slip Resistance of Pedestrian Surface Materials	
Disability Discrimination Act 1992 (DDA)	
Disability Standards for Accessible Public Transport (DSAPT)	

## 6. References

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

- AS 1428 Design for Access and Mobility
- AS 2876 Concrete Kerbs and Channels (Gutters)
- AS 4586 Slip Resistance Classification of New Pedestrian Surface Materials
- AS 4663 Slip Resistance measurement of Existing Pedestrian Surfaces
- AS 2700 Colour Standards for General Purposes

## 7. Design Requirements for Access Areas

### 7.1. General

A minimum of one continuous accessible path of travel (primary access path) must link all customer accessible areas of the tram stop precinct including, where incorporated:

- main public access to the tram stop;
- platforms;
- overpass structure;
- bus interchange(s);
- Drop off & Pick up; and
- accessible car parks.

The primary access path consisting of access paths, access ramps, landings, kerb ramps, pedestrian crossings, mazes, and lifts must comply with the Disability Discrimination Act (DDA) and Disability Standards for Accessible Public Transport (DSAPT) and AS 1428 Design for Access and Mobility.

Lifts must be provided in accordance with CS2-DOC-003442 Standard - Tram Stop Overpasses and CS1-DOC-002336 Lifts for Public Transport Infrastructure Engineering Specification.

## 7.2. Access Paths

Access paths (defined in DSAPT as a path that permits independent travel for all passengers within public transport premises, infrastructure or conveyances) must be provided in accordance with DSAPT.

The minimum clear width for the primary access path must be 1800 mm. All other access paths must comply with the dimensions specified in the DSAPT.

For new stops there must be resting points for passengers along an access path if the walking distance between facilities or services exceeds 60 m. Resting points must provide seating for a minimum of two people and space for one mobility aid.

## 7.3. Access Ramps

### 7.3.1. General

Access ramps must be provided in accordance with DSAPT and must be no steeper than 1:14. There must be horizontal landings minimum 1.2 m long at the top and bottom of ramps and along the ramp at intervals as noted in AS1428.

### 7.3.2. Width

The minimum clear width between handrails and between kerb rails for all ramps must be 1800 mm.

### 7.3.3. Handrails and Kerb Rails

Handrails and kerb rails must be provided in accordance with DSAPT and AS 1428 and must be installed on both sides of access ramps. The handrails must extend 300 mm past the top and bottom of access ramps but must not extend into a circulation space. The ends of handrails must be turned down at 90 degrees and constructed in accordance with AS 1428.1, Figure 15(A) Ramp Handrails – Examples of Handrail Terminations.

Where there is a background wall or fence, handrails and kerb rails must have a minimum luminance contrast of 30%.

Handrail and kerb rails must be coloured in accordance with AS 2700 – Y14 “Golden Yellow”, matt finish.

The base of the kerb rail must be at 65 mm above the ramp or landing surface, with the top at 165 mm above the finished floor surface. The kerb rail must be made of 100 mm x 50 mm RHS (rectangular hollow section) and will be vertically aligned to the edge of the handrail in accordance with CS1-DRG-350242 Standard Drawing for Tubular System 1200 mm High Details and will connect to the handrail via the 90 degree turn down to the ground.

## 7.4. Kerb Ramps

Kerb ramps must be provided in accordance with AS 1428 and the specifications of Footpath Crossings in AS 2876.

## 7.5. Pedestrian Crossings

### 7.5.1. General

All new and upgraded pedestrian crossings at tram stops must be designed and constructed in accordance with CS4-DOC-0004146 Standard for Railway Pedestrian Crossings.

#### **7.5.2. Flangeways**

Flangeways must be installed on pedestrian crossings in accordance with CS4-DOC-000446 Standard for Railway Pedestrian Crossings.

### **7.6. Mazes**

Both passive control mazes and active control mazes must comply with CS4-DOC-000446 Standard for Railway Pedestrian Crossings.

#### **7.6.1. Passive Control Mazes**

Refer to the following drawings:

- TC2-DRG-201543 Standard Drawing – Tram System – Pedestrian Maze Arrangement Passive Crossing – Standard Details

#### **7.6.2. Active Control Mazes**

In the event of power and/or mechanical failure that affects the operations of the gate, the automatic gate must be locked in the closed position, with the emergency gate locked in the open position allowing the crossing to operate as a standard passive control maze.

Refer to the following drawings:

- TC2-DRG-201547 Standard Drawing – Pedestrian Maze: Tram System – Active Crossing – Standard Details

#### **7.6.3. Signaling Design for Active Control Mazes**

A Rail Commissioner approved signaling design engineer must provide detailed signaling design and drawings associated with the Active Control Mazes.

#### **7.6.4. Orientation**

For uni-directional tracks, mazes must be oriented towards oncoming trams.

For bi-directional tracks, the mazes must be oriented towards:

1. the direction in which the oncoming tram has minimum or less sight distance (refer Clause 7.6.5 Sight Lines and Signal Sighting); or
2. the direction in which the oncoming trams predominantly travel.

#### **7.6.5. Sight Lines and Signal Sighting**

Where obstructions cannot be removed to achieve the required sight distance, active controls may be required. Refer to CS4-DOC-000446 Standard for Railway Pedestrian Crossings.

#### **7.6.6. Clearances**

Clearance to the nearest obstruction (i.e. closest edge of fence to the outside edge of rail) must be in accordance with CS4-DOC-000446 Standard for Railway Crossings and as detailed in relevant Rail Commissioner drawings.

#### **7.6.7. Track Drainage**

Drainage must be provided at rail formation level adjacent to the pedestrian crossing to allow for continuous track drainage. Refer to CS2-DOC-003469 Drainage – Tram System Engineering Standard.



**7.6.8. Conduits**

For Active Control Mazes, new conduits must be installed to service the power, lighting and signalling requirements in accordance with the signalling design.

Two spare 100 mm diameter conduits must be installed under the maze for future use.

**7.6.9. Fencing and Gates**

Refer to CS1-DOC-00454 Fencing and Gates for Rail Corridors and Facilities.

**7.7. Path Widths**

The minimum clear width (excluding TGSIs) of access paths and other paths (i.e. those not on the primary access path) must be:

- 2000 mm – for those surrounding a car park; and
- 1800 mm – for all other situations.

**7.8. Surfaces**

The surface of public access areas must be as specified in Table 2.

*Table 2 - Surface Types*

AREA	SURFACE
Platforms	Concrete or Granite / Bluestone Pavers
Primary access path	Concrete or Granite / Bluestone Pavers
Access ramps	Concrete or Granite / Bluestone Pavers
Landings	Concrete or Granite / Bluestone Pavers
Kerb ramps	Concrete
Pedestrian crossings	Asphalt
Mazes	Concrete
Other paths	Concrete or Asphalt

**7.8.1. Access Paths**

Surfaces of access paths must be free of irregularities that could restrict wheelchair movement or confuse persons using a cane.

Surfaces of the primary access paths must be slip resistant in all weather conditions to meet AS 4586, AS 4663 and HB. All surface materials must be classified as “R10” or “R11” resistant, as defined in Table 5 of AS 4586. This must be read in conjunction with HB 197.

Vertical differences in level between abutting surfaces in access paths must not exceed 3 mm in accordance with AS 1428.1 Clause 7 Floor or Ground Surfaces on Continuous Accessible Paths of Travel and Circulation Spaces.

**7.8.2. Accessible Public Areas**

Surfaces that are accessible to the public including but not limited to primary access paths and other paths must:

- be even and must not have any trip hazards;
- be free of irregularities that could trap heels;
- be safe for all users in all weather conditions and under all light conditions;
- be slip resistant in all weather conditions to meet AS 4586, AS 4663 and HB 197;
- be free draining, i.e. no ponding of water;
- have a minimum grade of 1:100;

- not exhibit sudden changes of level;
- avoid unnecessary sharp transitions in gradient, texture or colour; and
- have a smooth transition between any existing or new surface.

### 7.8.3. Concrete

All concrete surfaces must have a textured broom finish.

The broom finish must run in the same direction as the cross fall to ensure surface run off and avoid ponding of water. Consequently, the broom finish for:

- platforms – must run perpendicular to the tracks; and
- primary access and other paths – must typically run perpendicular to path of travel in order to minimise sheeting of water.

The concrete for platform surfaces and concrete footings / plinths for furniture must be coloured in accordance with CS2-DOC-003441 Platforms and CS2-DOC-003444 Furniture respectively.

All other concrete surfaces must be natural grey concrete.

## 7.9. Pavement Design

Access paths and other paths must be constructed in accordance with The Department's Master Specification Part R84 Secondary Paving.

## 7.10. Tactile Ground Surface Indicators

### 7.10.1. General

Tactile Ground Surface Indicators (TGSIs) must be provided in accordance with AS 14283.4.

TGSIs must be installed along the full width of an accessible path of travel. Concrete TGSIs must be used and must be embedded using a low shrink, high strength grout ensuring the joint is flush with the surrounding surface levels.

The infill between blocks must be grouted with no-shrink cement material and colour matched.

### 7.10.2. Warning Indicators

Warning Indicators must be installed at locations in accordance with AS1428 and relevant Department tram stop standard drawings; including, but not limited to:

- top and bottom of access ramps;
- kerb ramps;
- sides of pedestrian crossings;
- mazes;
- along the full length of the platform;
- at stairs; and
- bus stops.

### 7.10.3. Directional Indicators

No directional TGSIs must be used within the tram stop precinct.

If there is deemed a need for directional indicators in other areas of the tram stop precinct, they must be approved by Rail Asset Management and must be installed in accordance with AS 1428.4.

**7.10.4. Construction Tolerances**

The tolerances of the alignment of TGSIs must be in accordance with Table 3 and must be verified in accordance with Part PC-SI1 Site Survey.

*Table 3 - Construction Tolerances*

PLANE	DESCRIPTION	TOLERANCES
Vertical	Permissible irregularities under a 3 m straight edge	+0/-2 mm
Horizontal	Permissible irregularities under a 3 m straight edge	+0/-2 mm

**7.11. Signage and Pavement Marking**

Signage and pavement marking must be provided in accordance with CS2-DOC-003445 Tram Stop - Signage and Pavement Marking.

**7.12. Lighting**

Lighting in areas accessible to the public must be provided in accordance with CS5-DOC-003511 Public Transport Standard – Electrical Infrastructure.

**7.13. CCTV**

CCTV in areas accessible to the public must be provided in accordance with PI5-DOC-003517 Public Transport Infrastructure Security Systems.

**7.14. Earthing and Bonding**

Earthing and Bonding to be in accordance with TP2-DOC-002020 Guidelines for Low Voltage Electrical Earthing and Bonding for the Adelaide Metro Tram Network.