



Public Transport Conveyance Manual:

Designing accessible vehicles,
vessels, aircraft and rollingstock

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Department of Transport and Main Roads – TransLink Division
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Contents

1 Background

1.1 PTCM structure.....	5
1.2 Abbreviations	5
1.3 Glossary	5
1.4 Reference materials and supporting information	6
1.5 Introduction	7
1.5.1 Purpose and objectives of the PTCM	7
1.6 Application of the PTCM	8
1.6.1 The intended audience of the PTCM	8
1.6.2 Using the PTCM.....	8
1.7 Key Elements	11
1.7.1 Overarching considerations.....	11
1.7.2 Branding, theming and signage	11
1.7.3 Disability access compliance	11
1.7.4 Human factor	11

2 Planning and Design

2.1 Introduction	13
2.2 Performance-based outcomes.....	14
2.2.1 Audience and goals.....	14
2.2.2 Defining performance-based outcomes	15
2.3 Operational considerations.....	16
2.3.1 General operational factors	16
2.3.2 Boarding/disembarking.....	16
2.3.3 Movement inside the vehicle	16
2.4 Overarching design considerations	17
2.4.1 Principles of supporting accessible conveyance design ...	17
2.4.2 Lighting.....	17
2.4.3 Why go beyond the <i>DSAPT</i> ?.....	17
2.5 Buses and Coaches.....	18
2.5.1 Boarding.....	18
2.5.2 Access paths	18
2.5.3 Manoeuvring areas and appropriate circulation space....	18
2.5.4 Allocated space and priority seating	19
2.5.5 Handrails and grab rails	19
2.5.6 Toilets	20
2.5.7 Signage and wayfinding.....	20
2.5.8 Communication	21
2.5.9 Operation.....	21

2.6 Rollingstock	22
2.6.1 Boarding.....	22
2.6.2 Access paths.....	22
2.6.3 Manoeuvring areas and appropriate circulation space ...	22
2.6.4 Allocated space and priority seating	23
2.6.5 Handrails and grab rails.....	24
2.6.6 Toilets	24
2.6.7 Signage and wayfinding	25
2.6.8 Communication.....	25
2.6.9 Operation	26
2.7 Aircraft	27
2.7.1 Independent travel	27
2.7.2 Staff training	27
2.7.3 Rest areas on long ramps	27
2.7.4 Toilets.....	27
2.7.5 Signage and wayfinding	27
2.7.6 Communication	27
2.7.7 Operation	28
2.8 Ferries.....	29
2.8.1 Boarding.....	29
2.8.2 Access paths.....	29
2.8.3 Manoeuvring areas & appropriate circulation space.....	30
2.8.4 Allocated space and priority seating	30
2.8.5 Handrails and grab rails.....	31
2.8.6 Toilets	31
2.8.7 Signage and wayfinding	31
2.8.8 Communication.....	32
2.8.9 Operation	32
2.9 Taxis	33
2.9.1 Holistic approach	33
2.9.2 Boarding	33
2.9.3 Operation.....	33

3 Appendix

3.1 Co-design.....	35
3.1.1 Introduction.....	35
3.1.2 Benefits of co-design.....	35
3.1.3 Principles of co-design	35
3.1.4 Process of co-design	36
3.1.5 Additional resources	36

Chapter 1: Background, Application and Legislation



1.1 PTCM structure

The *Public Transport Conveyances Manual* (PTCM) is relevant to developers of public transport conveyances, including those planning, designing, constructing and operating public transport conveyances. The document is split into three parts:

- **Chapter 1 - Background, Application and Legislation**
- **Chapter 2 - Planning and Design**
- **Chapter 3 - Appendix**


1.2 Abbreviations

Abbreviation	Definition
AS	Australian Standards
AS/NZS	Australian/New Zealand Standards
BCA	Building Code of Australia
DDA	Disability Discrimination Act 1992
DSAPT	Disability Standards for Accessible Public Transport 2002
NCC	National Construction Code of Australia
PTCM	Public Transport Conveyances Manual
TGSI	Tactile Ground Surface Indicator
TMR	Department of Transport and Main Roads
WAT	Wheelchair Accessible Taxi

1.3 Glossary

For full list of definition of terms in this document, see *Disability Standards for Accessible Public Transport (2002)* – Division 1.2 Meaning of important terms.

Term	Definition
Best practice	A procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption.
Co-design	Co-design is often used as an umbrella term for participatory, co-creation and open design. The co-design approach enables a wide range of people to make a creative contribution in the formulation and solution of a problem.
Futureproofing	The specific provision made for the possible expansion of services due to potential or anticipated increase (or decrease) in future passenger demand and/or function.
Equivalent Access	A process, often involving the provision of direct assistance, under which an operator or provider is permitted to vary the equipment or facilities that give access to a public transport service, so long as an equivalent standard of amenity, availability, comfort, convenience, dignity, price and safety is maintained. Equivalent access does not include a segregated or parallel service (Source: <i>Disability Standards for Accessible Public Transport 2002</i>)

Human-centred design	A design approach that aims to make transport systems usable and useful by focusing on the users, their needs and requirements. Applying these human factors, along with real-life usability knowledge and techniques ensures a whole of journey experience that is universally accessible for all people.
International symbol of access	 An internationally recognised symbol consisting of a stylised figure in a wheelchair on a plain square background. The colour of the figure is white on a blue background, with the figure facing right. When used for indicating the direction to a facility, the figure should be supplemented with an arrow facing the direction to be indicated. Blue is B21 Ultramarine. As per AS1428.1.
Tactile Ground Surface Indicator (TGSi)	Raised ground surface texture treatments (usually paving) used by people with vision impairments to navigate their way in the built environment. TGSIs provide either warning or directional information and typically consist of square tiles or pavers with raised profiles laid in logical and nominated locations.
The Transport Standards	The Disability Standards for Accessible Public Transport 2002 (<i>DSAPT</i>).
TransLink	TransLink is a division within the Department of Transport and Main Roads.
Universal accessibility	Universal accessibility is a design, facility or service which can be used/consumed by all people, including those with a disability, due to its user-centred design.
Wayfinding	Involves a range of navigation techniques to assist the independent and safe movement of people from one place to another.
Wi-Fi	Wi-Fi, is the name of a popular wireless networking technology that uses radio waves to provide wireless high-speed internet and network connections.

1.4 Reference materials and supporting information

The applicable information resources and references include (but are not limited to):

Legislation	
Commonwealth	<ul style="list-style-type: none"> Disability Discrimination Act 1992 (DDA) Whole of Journey Guide: A guide for thinking beyond compliance to create accessible public transport journeys (2017)
Standards and Supplementary Material	<ul style="list-style-type: none"> Disability Standards for Accessible Public Transport 2002 (Cth) (Transport Standards) Disability Standards for Accessible Public Transport Guidelines 2004 (No. 3) Disability (Access to Premises – Buildings) Standards 2010 (Premises Standards)
General References	<ul style="list-style-type: none"> Benefits of co-design in service design projects. International Journal of Design. Steeg, M (2011) The Co-Design Principles came out of the Fair Deal Forum in November 2016 with input from the participants and Dr Ingrid Burkett (The Australian Centre for Social Innovation).
Legislation	<p>All levels of governments have legal responsibilities to provide access to premises, goods and services for people with disabilities and older persons under the following legislation:</p> <ul style="list-style-type: none"> Disability Discrimination Act 1992 (Cth) Age Discrimination Act 2004 (Cth) Queensland Anti-Discrimination Act 1991 (Qld) <p>Complaints of discrimination may be lodged with the Queensland Human Rights Commission and the Australian Human Rights Commission.</p>

1.5 Introduction

The PTCM aims to both maximise universal accessibility when embarking or disembarking from transport conveyances and ensure ease of use and function while onboard. The document should be used as an enhancement of minimum design provisions and lists inclusions and enhancements to the planning and design requirements of the *DSAPT*.

Public transport conveyances refer to any of the following when associated with the provision of passenger transport, including, but not limited to travel on aircraft, bus, coach, ferry, taxi, rail, and tram.

Peer reviews and consultation should be sought from an accessibility expert as part of state and local government agencies or external accessibility consultant. This would be throughout the procurement process and as early in the design phase as possible.

1.5.1 Purpose and objectives of the *PTCM*

A conveyance is a crucial component of providing quality customer access, convenience, safety and comfort across public transport.

The *PTCM* provides a practical framework to ensure the state of Queensland's Department of Transport and Main Roads' (TMR) objectives are translated to the planning, design and delivery of public transport conveyances.

The objectives of the *PTCM* are to:

- Inform and guide the planning and design of public transport conveyances across Queensland by providing a clear and consistent set of principles and guidelines.
- Encourage the use of best practice guidelines in the planning and design of public transport conveyances which exceed the minimum requirements of relevant standards and regulations.
- Ensure public transport conveyances comply with relevant standards and regulations as a minimum throughout the design process, while establishing benchmarks for best practice.
- Ensure a consistent approach is applied across the state, with consideration of local climatic and environmental characteristics.
- Encourage co-design of conveyances with people who have lived experience of disability to gain an understanding of all user needs and requirements to improve the access to and experience of services. Figure 1.1 illustrates how the co-design process can be facilitated as part of an *Equivalent Access Process Map* (pictured right). This is explored further in [Chapter 3, Section 3.1 Co-Design](#).

Equivalent Access Process Map

1 DEFINE

the issue that you need to achieve compliance on

2 CONFIRM

through consultation whether the *DSAPT* relevant specifications will provide the best outcomes for passengers with disabilities

3 DECIDE

that equivalent access is the best option within *DSAPT* to achieve compliance and functionality

4 ESTABLISH

the options under assessment

5 CREATE

your assessment criteria

6 IDENTIFY

the relevant stakeholders who need to be part of the process

7 ASSEMBLE

your workshop to undertake the Equivalent Access process

8 ASSESS

the options against the assessment criteria

9 ANALYSE

the feedback from stakeholders

10 AGREE

on the optimum outcome with your stakeholders' endorsement

11 FEEDBACK

the outcomes to your broader stakeholder group

12 DESIGN

your product or service

Figure 1.1 - The equivalent access process map



1.6 Application of the *PTCM*

1.6.1 The intended audience of the *PTCM*

The *PTCM* is a reference tool for the planning, design and operation of public transport conveyances regulated by TMR.

The *PTCM* is intended for use by professionals in the public passenger transport conveyance supply industry. This generally includes, but is not limited to, designers, planners, engineers, architects, operators and other professionals involved in the planning, design and delivery of public transport conveyances in Queensland.

1.6.2 Using the *PTCM*

The *PTCM* should be referenced prior to the planning and design of new public transport conveyances and any significant redesign or retrofits of existing conveyances. It represents TMR's overarching requirements for the provisions of public transport conveyances across the Queensland network, which includes all public transport including the air service network.

TMR's strategic plan 2019-2023 illustrated in [Figure 1.2](#) and [Figure 1.3](#) highlight the objectives for *creating a single integrated transport network accessible to everyone*.

TMR, in partnership and collaboration with relevant delivery partners, stakeholders and local governments, must be consulted on the final design and deliverables for any new or upgraded conveyances.

Strategic Plan

2019–2023

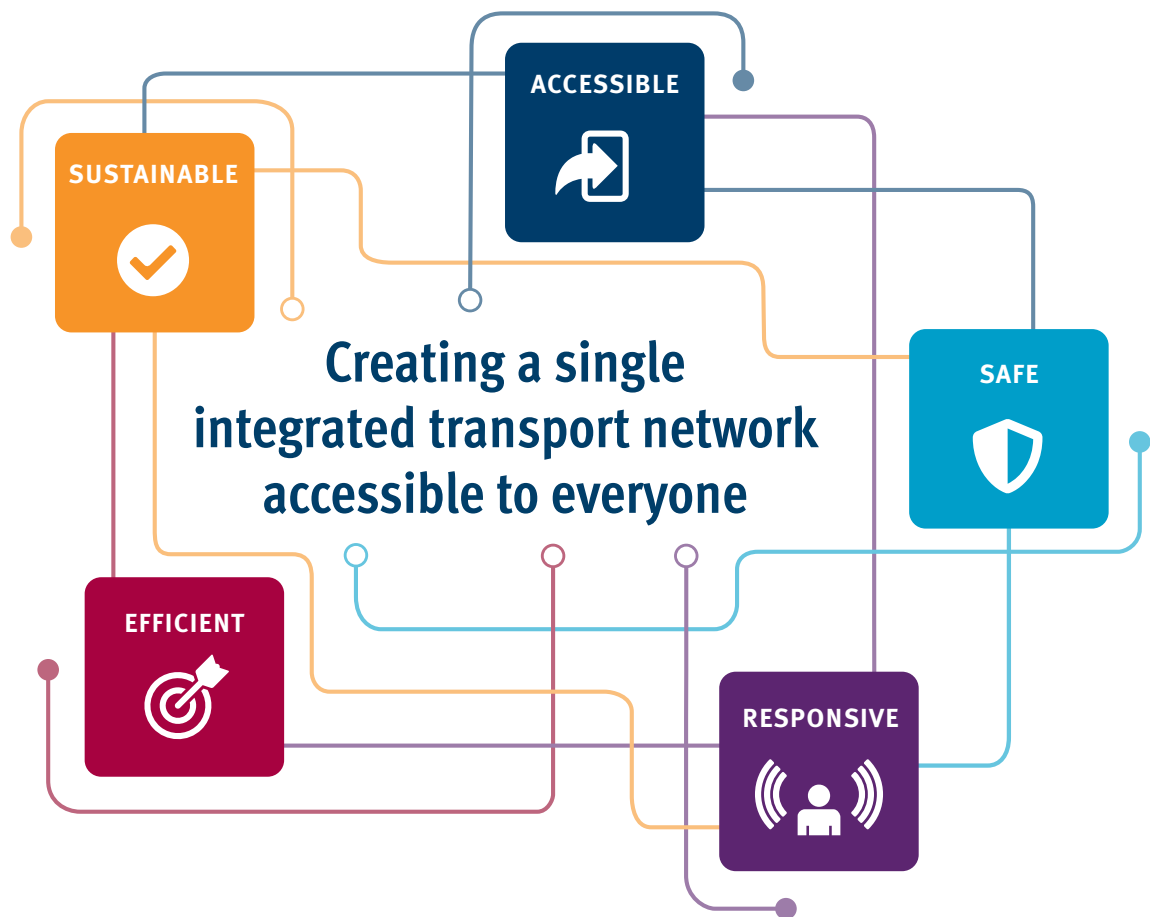







Figure 1.2: TMR Strategic Plan 2019–2023

Our vision and purpose

Creating a single integrated transport network accessible to everyone

To deliver to our customers, the Department of Transport and Main Roads (TMR) will value and support our workforce as our greatest strength. This is at the core of our ability to move towards our aspirations and is reflected throughout the Strategic Plan.

	Objectives	Success looks like	Strategies to get there	Our objectives and strategies contribute to <i>Our Future State: Advancing Queensland's Priorities</i> as follows:
 Accessible	Tailored connections for our customers and workforce to create an integrated and inclusive network	<ul style="list-style-type: none"> Improved access to the network Improved customer experience Improved inclusivity and diversity in the workforce 	<ul style="list-style-type: none"> Support Queensland communities through inclusive connections Facilitate solutions to improve accessibility and customer experience Build collaborative networks to strengthen knowledge and information flow across TMR Deliver more effective outcomes through a diverse and inclusive workforce 	<ul style="list-style-type: none"> Create jobs in a strong economy Keep Queenslanders healthy Be a responsive government
 Safe	Safe and secure customer journeys and TMR workplaces	<ul style="list-style-type: none"> Improved safety and security of the transport network Improved safety and wellbeing of our workforce Improved safety of our customers on the network Improved resilience of TMR systems 	<ul style="list-style-type: none"> Enable the safe introduction of new technologies and services onto the network Prioritise safety in all the work we do Design, operate and maintain a secure, safe, and resilient transport system 	<ul style="list-style-type: none"> Keep Queenslanders healthy Keep communities safe
 Responsive	Our network, services and workforce respond to current and emerging customer expectations	<ul style="list-style-type: none"> Improved customer satisfaction Improved workforce satisfaction Improved digital engagement 	<ul style="list-style-type: none"> Enable adaptive solutions that respond to emerging transport technologies, customer expectations and government priorities Provide easy-to-use services Provide continuous learning opportunities to support an innovative and future-ready workforce 	<ul style="list-style-type: none"> Create jobs in a strong economy Be a responsive government Keep communities safe
 Efficient	Partnerships, integration, innovation and technology advance the movement of people and goods	<ul style="list-style-type: none"> Improved reliability of the transport network Value-for-money Improved partnerships with industry, government and the community 	<ul style="list-style-type: none"> Effectively utilise assets to deliver the best network outcome Work more effectively with internal and external stakeholders to create benefits for our customers Ensure best value-for-money approach to delivery Leverage technology, data and information to enhance network and organisational performance 	<ul style="list-style-type: none"> Create jobs in a strong economy Be a responsive government
 Sustainable	Planning, investment and delivery outcomes support a more liveable and prosperous Queensland	<ul style="list-style-type: none"> Reduced waste, infrastructure and transport emissions Increased uptake of active and shared transport modes Increased fiscal sustainability of investments and services 	<ul style="list-style-type: none"> Encourage active and shared transport modes Enhance network resilience to minimise the impacts of climate change and incidents Prioritise planning and investment decisions that enhance benefits realisation Support low and zero emission transport technologies, modes and materials 	<ul style="list-style-type: none"> Create jobs in a strong economy Keep Queenslanders healthy Protect the Great Barrier Reef

Our opportunities and challenges

The following are external factors that form the sources of TMR's strategic opportunities and risks which may impact our ability to achieve our objectives. In such a large and diverse department, it should be noted what is an opportunity to some areas may be a challenge to others.

- Increasing pace of technological and social change
- Disasters and network incidents
- Changing customer and stakeholder expectations
- Unplanned economic conditions within a constrained fiscal environment
- Analysis and effective use of the increasing volume of data
- Regulatory frameworks and process limitations
- Diverse and geographically dispersed population
- Changing workforce demands



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Figure 1.3: TMR Strategic Plan 2019–2023

1.7 Key elements

1.7.1 Overarching considerations

A holistic approach should be undertaken that considers the whole journey of the user. This includes the vehicle's operational process of embarking and disembarking and the customer's utilisation of transport conveyances. As part of the whole of journey, accessible conveyances need to be supported by accessible infrastructure to ensure equitable and dignified access. Accordingly, the following points should be taken into consideration for infrastructure to coordinate appropriate access for and to all conveyances, as part of the whole journey:

- adjacent footpaths and platforms
- vehicle movement and manoeuvring requirements
- parking and passenger set-down / pick-up zones
- accessible paths of travel and appropriate shorelines
- stairs, ramps, kerb ramps, step ramps, gangways
- lifts (including platform lifts)
- waiting areas and boarding points
- general entry and exit access methods such as gates and doors
- information displays and fare payment methods
- rooms and spaces (e.g. ticket offices, check-in desks, transit lounges and concourses)
- emergency evacuations and safe havens to await rescue
- toilets
- public address systems (including hearing augmentation)
- other amenities, such as rubbish bins and water fountains.

For further information regarding appropriate infrastructure provisions and requirements refer to [PTIM, Supporting access infrastructure](#).

1.7.2 Branding, theming and signage

Public transport conveyances should be intuitive to use and easy for passengers to recognise and understand. The design should ensure:

- a look and feel consistent with other vehicles in the network
- seamless branding, theming and information between the conveyance and infrastructure
- a consistent design language that is user-friendly, familiar and instils confidence in existing and potential passengers
- use of high-quality materials with an approved, consistent colour palette to aid in wayfinding and orientation
- use of international pictograms and graphic wayfinding for people not fluent in English.

For details of TransLink's infrastructure colour palette refer to [PTIM, Branding, Theming and Signage](#) chapter.

1.7.3 Disability access compliance

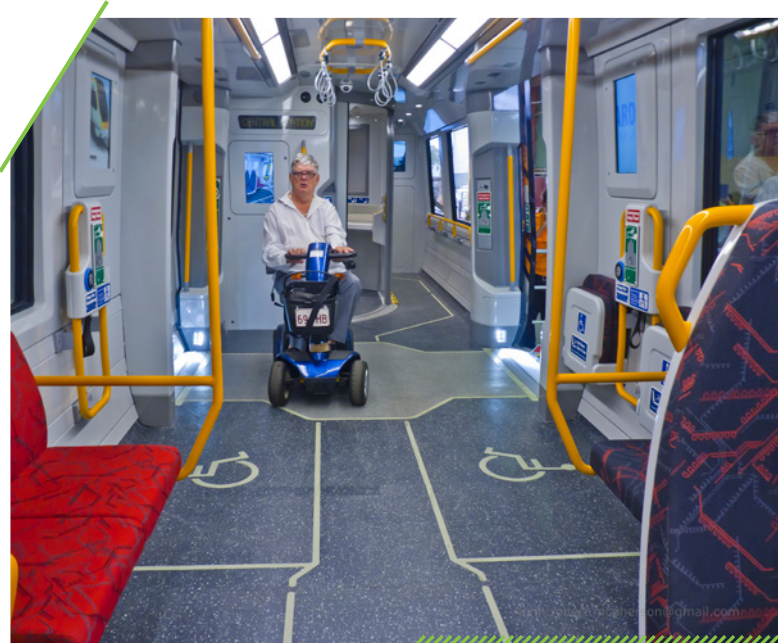
All public transport conveyances must comply with relevant minimum standards and guidelines for disability access (for example, *Commonwealth Disability Standards for Accessible Public Transport 2002*). Designs should ensure consistent layouts and design principles. For specific projects the project team must engage with relevant disability advisory groups to ensure accessibility needs are met or exceeded.

1.7.4 Human factor

TransLink aims to incorporate human factors as a key planning design principle, to ensure a comfortable and safe public transport environment for its customers. This includes:

- providing sensory cues in the environment appropriate to its primary use. For example, identifying the location of waiting space outside a toilet on a train, specific seating, or bag / luggage areas.
- defining the behavioural risk profile for an area, prioritising risk and identifying mitigation strategies for behavioural risk. For example, if legibility is a high-risk issue, mitigation can be through the scale and form of information in either audio, visual or tactile.

Public transport conveyances design and layouts need to ensure passengers and drivers feel safe using or operating public transport at any time of the day and night. Apply creative design principles to reduce the incidence and /or perception of crime and anti-social behaviour. Include the presence of surveillance mechanisms and creation of defensible spaces to act as deterrents of crimes - for example, effective lighting, enhanced visibility, clearly identifiable security cameras and surveillance signage.



Chapter 2: Planning and Design



2.1 Introduction

This section of the *PTCM* provides guidelines for planning and designing high quality and universally accessible public transport conveyances used as part of the public transport network across Queensland.

To support the creation of effective conveyances [section 2.2](#) explores the benefits of using performance-based outcomes. The co-design [section 3.1](#) follows this and explores how stakeholder involvement during the planning and design process can identify ways to improve current experiences and co-create new solutions to any barriers or issues.

[Section 2.3](#) discusses general operational considerations and principles to support the planning and design of equitable and dignified accessible transportation conveyances across all modes of travel.

Unless otherwise stated, recommendations and suggestions are based on best practice, which goes beyond the scope of the *DSAPT*. [Section 2.6](#) explains in further detail the benefits of delivering beyond the mandatory requirements.

As noted in [Chapter 1, Section 1.7.1 Overarching considerations](#), it is important to take a holistic approach to planning and designing transport services and conveyances to consider a user's whole journey.

To ensure a quality journey for passengers, design should be user-friendly and easily interfaced with the various transport modes passengers may want to use, including walking, cycling and driving.

2.2 Performance-based Outcomes

This section provides an overview of how the planning and design of transport conveyances can benefit from performance-based outcomes. It provides a framework of how the conveyance’s operational and design performance are interlinked, and a process to achieve this as part of the design and planning process.

2.2.1 Audience and Goals

The goal of planning is to determine the audience that the conveyance is to serve. This is key to evaluating the effectiveness of design decisions and performance of transport conveyances in context with the surrounding infrastructure. Planning is also crucial to identifying the design elements and decisions most likely to impact users and stakeholders, and influence project objectives.

The key factors to deliver an effective performance-based outcome needs to consider two fundamental questions:

- Whom are we serving?
- What are we trying to achieve?

As noted in [section 2.1](#) and explored further in [section 2.4.3](#), simply delivering on mandatory minimum requirements outlined in the *DSAPT* may not ensure that a transport conveyance is equitable under the DDA.

For example, a ferry conveyance may be compliant on the entrance level from a prescriptive standards perspective (such as dimensions and specifications), however if the same conveyance has a café or better views on the upper deck, that is not accessible to all customers, then this may not be considered equitable under the DDA.

Under the DDA *Section 24 Goods, Services and Facilities* it is unlawful for a person who, whether for payment or not, provides goods or services, or makes facilities available, to discriminate against another person on the ground of the other person’s disability.

Accordingly, a person could raise a complaint against the transport provider on the grounds they have discriminated against someone using a mobility aid who is unable to access the upper deck.

In this scenario the performance-based outcome could be to provide universally accessible goods, services and facilities to every passenger on all levels and replicate views to the greatest extent possible.

Another example to illustrate the importance of going beyond the mandatory requirements could be where a carriage is at full capacity and a person needs to quickly use the unisex accessible toilet. In this scenario the following points must be considered:

- How far are the accessible boarding point, priority seating and allocated spaces of the conveyance to the unisex accessible toilet on board?
- Are the signs for the accessible toilet clearly visible during peak times, while people are standing?
- Is there enough space onboard to accommodate circulation space and clear accessways as well as standing passengers while travelling to the toilet?
- Is the toilet located in a consistent location on the entire fleet/rolling stock?

Accordingly, the travel distance to toilets needs to be as short as possible from the entry point, priority seating and allocated spaces and must be consistently positioned for intuitive wayfinding purposes.

Designers and planners must also ensure sanitary facilities are fit for purpose and sufficiently provided, based on the limitation of the conveyance. Figure 2.1 provides an illustration of the performance-based design process.

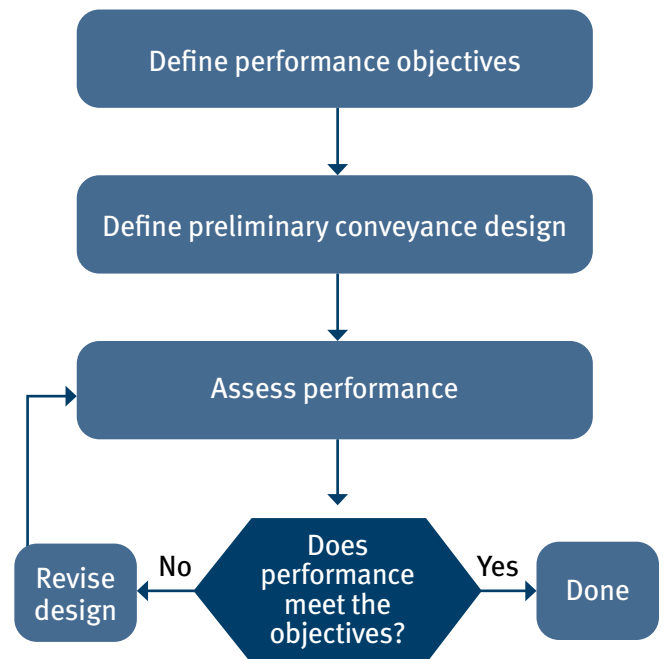


Figure 2.1 - The performance-based design process

2.2.2 Defining performance-based outcomes

When setting performance-based outcomes, it is important to clearly define the **outcome**, the **outcome measure** and the **outcome target**.

- **Outcome** is defined as the impact or change for an individual or group as the result of the service or intervention e.g. universal accessibility to a transport conveyance.
- **Outcome measure** is the method used to determine how well the outcome has been achieved e.g. a compliance score.
- **Outcome target** is the specific value attached to the measure for the purposes of determining whether satisfactory performance has been achieved. e.g. setting a minimum compliance score of 95 per cent out of 100 per cent.

It is useful to think about outcomes and measures separately when considering the framework. It may be possible to define outcomes that fully relate to the design objective, but measures may not be comprehensive in capturing all facets of an outcome.

Setting and measuring outcomes gives you more information to help you make the right decisions so you can move towards your ultimate objective.



2.3 Operational Considerations

The design of public transport conveyances needs to consider current and future capacity requirements. Even the most considered conveyance may become inaccessible during peak periods due to the volume of passengers using the service.

Provisions to protect access should be incorporated into planning, such as ways to facilitate embarking and disembarking of passengers using a mobility aid.

2.3.1 General operational factors

Frequency

May be measured by crowd modelling simulation software during real time of the expected mass motion patronage using the conveyances. The peak and off-peak frequency of services needs to be considered, as the volume of passengers can directly impact the accessibility of a conveyance.

Demand forecasting

Forecasting of the anticipated number of older people and people using mobility devices in a region by means of analysing social profiles.

Attractors

Consider adjacent and nearby attractors, infrastructures or public facilities when determining capacity and access requirements. e.g. does the conveyance provide transportation to a hospital or health precinct and require more accessible design provisions.

Operational impacts

Mobility aids, wheelchairs, prams and bicycles increase boarding times and can impact operational capacity of public transport conveyances. This needs to be considered in demand forecasting/modelling simulation.

High-quality supporting access infrastructure

Planning and design should consider the passengers whole journey, including how the conveyance is integrated to the transport infrastructure. For detailed guidance please refer to the [PTIM, Supporting Access Infrastructure](#).

2.3.2 Boarding/Disembarking

Fare collection considerations

The method of fare collection affects operational capacity of public transport. For example, prepaid ticketing procedures enable faster boarding, reduced dwell times and allow greater person throughput. Contact TransLink for preferred fare payment options.

2.3.3 Movement inside the vehicle

Design space

Seating and standing areas should be separated, so that they do not interfere with pedestrian embarking and disembarking.

Personal comfort

Seating and standing areas should be designed to be within a close range of the entry during peak periods. The conveyance circulation area must accommodate passenger movements when waiting, queuing and accessing services.

Passengers embarking and disembarking should not inhibit those already on the conveyance.

Arrangement of space

The space must be arranged to ensure the ease of passenger flow through the conveyance, as accessways can be disrupted during peak periods. The space should be large enough to accommodate the expected patronage while ensuring people with mobility devices have clear space to manoeuvre to access allocated spaces and priority seating. There should also be unimpeded access to handrails and supports.

Emergency evacuation

Considerations, including appropriate paths, exits and assembly points, should cater for the maximum volume of people using the conveyance at any one time.

Effective signage

Intuitive wayfinding and information are key consideration for public circulation and understanding of components during general travel or in an emergency. This must be reviewed in the detailed design stage, and receive approval by an emergency evacuation specialist.

2.4 Overarching Design Considerations

2.4.1 Principles of supporting accessible conveyance design

Conveyances within the Queensland network should be planned and designed to ensure a seamless and connected journey for public transport users.

When planning to support access to conveyances the following factors should be taken into consideration:

- Integration with existing transport infrastructures.
- Other supporting components.

2.4.2 Lighting

Lighting conditions, regimes and technical solutions can have significant impact on a range of individuals, including people with Autism, epilepsy, various medical conditions, as well as deaf and hearing-impaired passengers who require enough light free from glare, for lip reading.

The *DSAPT* lighting requirements for conveyances (Part 20.2 Illumination levels – conveyances) are relatively succinct:

20.2 Illumination levels – conveyances

1. Any lighting provided must comply with minimum levels of maintenance illumination for various situations shown in the notes to AS1428.2 (1992) Clause 19.1, Illumination levels.
2. Lighting should be at least 150 lux at the entrance and at the point where a passenger pays his or her fare.

However, the challenge with lighting extends beyond quantity of light into the quality of light. The Australasian Railway Association commissioned lighting research conducted by Barry Webb & Associates (Qld) Pty Limited ([the Webb Report](#)). Whilst this report focussed primarily on lighting solutions in exterior railway stations, some of these recommendations are relevant to the design of conveyances. These recommendations are outlined below:

In summary the following issues were noted as important:

- Uniformity of illuminance
- The lighting of vertical elements, as people look for larger vertical elements for wayfinding.
- Colour and reflectivity.
- Minimal change in surface colours.
- Lack of shadows.
- Expression of change of levels particularly stairs.

2.4.3 Why go beyond the *DSAPT*?

Minimum compliance with legislation is often seen as a benchmark for many organisations. Going beyond legal compliance is an approach that is not always embraced and unfortunately is usually undertaken as a reactive measure or in response to a DDA complaint.

Travel behaviour and expectations of people have changed significantly since the enactment of the *DSAPT* in 2002. In addition, the social profile of people has also changed, in which an ageing population has resulted in an increase in mobility devices such as scooters and mobility aids.

Other changes in social profile include changes in bariatric data, in which people and their devices are now larger. The size and number of allocated spaces required by *DSAPT* should be regarded as a minimum and exceeded whenever possible. Numbers of priority seats should also exceed the minimum required.

In addition, in relation to smart technology there is now an expectation for people to be able to plan their whole journey and therefore require Wi-Fi technology to facilitate this.

The previous examples highlight very valid reasons for delivering over and above the minimum compliance standards for the *DSAPT*. In accordance with the [Equivalent Access Process, figure 1.1, Chapter 1](#), the following section contains best practice examples relative to each type of conveyance.

2.5 Buses and Coaches

2.5.1 Boarding

Practical door design and boarding devices

The design of doors should ensure that:

- doors open and close in such a way that they cannot hurt anybody who is standing close by
- an auto stopping mechanism to the door is provided if an obstacle is detected
- a safety precaution such as a suitable audio and visual signal is given as a warning when they commence operation.

The deployment of boarding devices should ensure that they align with audio speakers and are by the accessible doors.

Design of entry/exit

The design of the entry and exit should ensure that:

- all passengers use the same path of access and egress to the conveyance
- vehicles where passengers must use a separate entrance and exit, at least one entrance and one exit point must provide level access to the flat floor area.
- if more than one exit is provided, all exits from the priority floor area should, where possible, comply with the priority exit requirements to ensure that all people can use any exit.
- where it is familiar practice to enter at the front door and exit at another door it is particularly important that all passengers can identify this practice.
- where the priority exit is also an entrance, it should be wide enough to allow passengers to move freely in both directions.

Consistent step heights

Steps in addition to level or ramped boarding devices should ensure consistent step heights are provided to instil familiarity and confidence to reduce the risk of tripping and time to negotiate. Step height consistency may be impacted by road shoulder camber, however can also be counteracted by vehicle kneeling.

For city services, passengers may embark/disembark from a kerb, reducing the height of the first step and/or achieving level access to the conveyance.

In rural areas and areas where a transport conveyance cannot gain access to a kerb this will not be the case and a solution, such as kneeling or auxiliary steps may be necessary.

An example of a performance-based outcome following co-design with stakeholders, such as non-for-profit groups and access advisory groups, is evident in the luminance contrast application of stair treads.

Groups have advised against luminance contrast being placed on the face of the riser of stair treads; despite this being a requirement of *DSAPT*. Co-design has highlighted this as a trip hazard and advises only luminance contrast bands to the top of the stair treads is required/best practice.

2.5.2 Access paths

It is important that a person with a disability can move freely, particularly when a single doorway is used as both priority entrance and priority exit.

To facilitate this, the access path width should be increased at floor level in the main passenger circulation area, at least to the facilities or designated spaces provided for passengers with disabilities.

The access path should not impede on the allocated space provided for a person with a disability. The aisles of conveyances should be designed to the maximum extent permitted by the wheel arches for buses.

N.B. If this cannot be achieved, direct assistance as appropriate should be provided to enable people with disabilities to have equivalent access to the maximum extent possible.



Figure 2.2 - The 'no standing area' illustrates the space which would benefit from being made as wide as possible to facilitate embarking and disembarking.

Levels of contrast on surfaces

The colour of contrasting strips should be determined based on the surrounding surfaces, including floor, steps, riser and walls. Some people with a disability require an indication of the depth of the step, to help them position their feet properly.

2.5.3 Manoeuvring areas and appropriate circulation space

Whilst minimum guidelines are set for 180-degree circulation, there is no official standard wheelchair size. With many different types and sizes of mobility devices, some that may have reclining backrests or elevating leg rests, additional space should be provided for a user to propel their mobility device with ease.

2.5.4 Allocated space and priority seating

Location of priority seats

The design of priority seats must ensure that:

- priority seats are located as close as possible to an accessible entrance, avoiding any unnecessary changes in level
- priority seating must be clearly signed, identifying those customers who have priority.
- tip-up and folding seats are never priority seats as this requires a degree of dexterity and force to use and could be unsuitable for a person with a disability. They are also unlikely to provide as much support as a fixed seat
- priority seats are fixed and distinguished and consistently coloured throughout the fleet/rolling stock
- priority seats are separate and provided in addition to allocated spaces for mobility devices to maximise availability
- allocated spaces and priority should also be in consistent locations on all fleets/rolling stock
- the travel distance from the allocated space and priority seating to the accessible unisex toilet (where provided) must be within proximity to avoid unnecessary travel distances for a person using a mobility device and people who have an ambulant disability or vision impairment
- the space beneath priority seats (if stowed) must be kept clear for assistance animals.

Spacing and design of seating

As noted above, side facing seats might not be suitable for many people due to them not being able to prevent themselves from moving sideways and are more at risk of falling from their seats during vehicle motion.

The design of allocated spaces and priority seating should ensure that:

- allocated spaces for mobility devices are provided with adequate and functional use of passive and active restraints such as anchors, belts and passive constraints such as padded rails, or upstand pegs to prevent rolling and tipping of mobility devices. These must be further refined by the co-design process.
- all priority seats have extra space, underneath the seat if stowed or adjacent to at least one priority seat for an assistance animal.

The size of an assistance animal will vary depending on the type of animal or breed; they can be as much as 1200mm when measured from the tip of the nose to the tip of the tail, and as much as 270mm across the shoulders.

A supportive seating design

People with limited strength or flexibility in their limbs are likely to use a seat by sitting first so that their body is supported. They will then move their legs gradually round until they are seated comfortably as part of the transfer process. In some cases, this is done by physically lifting the leg or legs with the hands. Where seats do not have moveable armrests, this manoeuvre is not possible.

The design of allocated spaces and priority seating should ensure that:

- for consistency, where other seats within the vehicle have been designed with armrests, priority seats should also have armrests
- all armrests within the vehicle can be folded for transfer purposes and require as minimum force as possible to move (with exception to those adjacent to the wall or another fixed barrier such as a weather shield).

Three points of contact, are preferred to allocated wheelchair spaces, these include:

- non-slip ground surface ground
- fixed grabrail and;
- an operable grabrail.

The drop down grabrail could also act as a grabrail for people who are hemiplegic, to avoid the need to turn in the opposite direction in the allocated space.

Points of Contact

There should be an allocated space, which is provided with a retractable arm so that a person in a mobility device has three points of contact rather than two. This additional grab rail would allow a person in a mobility device to steady their wheelchair, preventing rolling or tipping.

Power points

The conveyance should contain charging facilities adjacent to allocated spaces and priority seating, which can serve as a charging point for a mobility scooter and other devices.

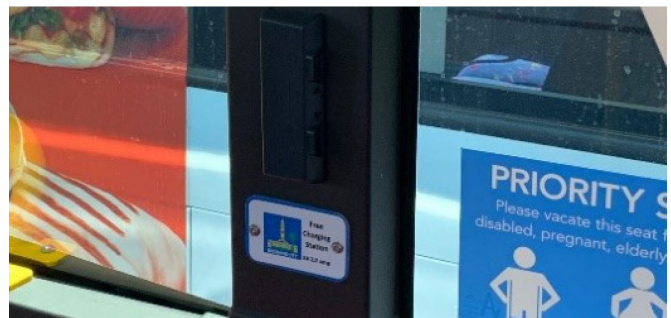


Figure 2.3 - A charging point for a Smart Phone. A recharge point for a mobility device may also be beneficial.

2.5.5 Handrails and grab rails

Handrail support from boarding to priority seating

The design of handrails and grabrails should ensure that continuous handrail or supports are provided to the maximum extent possible so that a passenger does not have to release their grip or change hands to reach another handrail.

This should pass close to the driver's cab or area where a fare may be paid and on to the priority seating area.

Straps and spherical hanging handholds are difficult for many people with disabilities to grip and these should only be used in addition to fixed grabrails. If grabrails are discontinuous there should be at least an alternative available, such as a suitable grabrail on the other side of the access path.



Contrast of handrails

The design of handrails and grabrails should ensure that:

- the handrail is not too glossy and has non-reflective finish
- handrails and handholds are always the same colour throughout the vehicle and contrast with the surrounding surfaces. This will assist people to learn a ‘language’ of colour that is consistent as they move through the vehicle or if they use the same vehicles on a regular basis
- each handrail provides the same level of contrast with the surrounding surfaces in each separate location. This will influence the choice of colour used in laminates and seat finishes.

2.5.6 Toilets

Instructions for those who have vision impairment

People with a vision impairment would benefit by being able to easily identify braille instructions of the toilet facilities.

The design of toilets should ensure that:

- the operation of the toilet facilities any automated doors/locks are clearly and succinctly documented
- clear indication is provided on how the user can call for assistance should there be an emergency
- emergency controls/call button are locatable and usable standing, seated and prone, e.g. if a passenger falls on the floor, controls can be accessed from the floor, i.e. a maximum of height of 300mm from the floor.
- the toilet can be easily opened by transport personnel from outside in the event of an emergency
- additional grabrails placed either side of the mirror, to provide support and stability for a passenger while the conveyance is in motion.

Availability of toilets

The need for toilets on shorter route services is also a priority for many people. Where no toilets are provided on board, consideration needs to be given to better toilet provision at stations and at coach stops.

To improve accessibility further, installing ambulant toilets in addition to unisex accessible toilets would enhance the minimum requirements of *DSAPT* and ease the patronage demand on conveyances for toilet facilities.

Size of toilets

The size of unisex accessible toilets in accessible buses and coaches would benefit from being increased from the minimum compliance of *DSAPT*, which is the 80th percentile (size of occupied footprint) to the 90th percentile of the most current Australian Standards for access and mobility.

As previously noted, this is to aid circulation and better accommodate the varying size of different mobility devices.

2.5.7 Signage and wayfinding

The location of priority seats

The design of the priority seats should ensure that:

- the location of priority seats is clear to all passengers; particularly to older people and people with disabilities
- all passengers are informed by signage that the seats are primarily for older people and people with disabilities
- signage clearly states that passengers should give up the seat if it is required by an older person or person with a disability or person who is pregnant.
- the signage is positioned at a height of about 1100mm measured from the floor.

Identification of the service or route number

Passengers need to be able to identify the service that they need. Accordingly, this information needs to be in a suitable position. Some passengers with a disability may have difficulty looking up if the information is too high or if the information is subject to glare, reflection or poor luminance contrast of letters, symbols and background of sign and sign background.

The design of transport information on the conveyance should ensure that:

- the destination and route number are clearly legible during day and night
- commercial advertising does not detract from destination and route number
- the destination information, is indicative of the direction of travel
- different size characters are required as a vehicle is likely to be viewed from a greater distance from the front or rear than it is from the side

The use of colour luminance contrast of characters and adjacent surfaces can assist passengers with low vision to make use of their residual vision. Other features which can assist are as follows:

- illumination of displays so that they are visible at night.
- white or bright yellow lettering on dark backgrounds
- lower case lettering in Helvetica, Arial and other Sans Serif fonts.

LED/LCD or other electronically generated characters should only be used if they can offer the same legibility, both day and night.



Figure 2.4 - Service-related signs must give the maximum contrast with their background for enhanced legibility. Left: Colour contrast between amber and white route signs. Right: Luminance contrast between amber and white route signs.

Identification of key information

Tactile information must be both in braille and in relief and is useful on buttons inside the vehicle such as the ‘stop’ button in buses.

If it is only distinguished by colour luminance from the emergency button, this can lead to confusion for passengers with vision impairments.

Symbols and signs must be kept simple and universally recognised to help people who may have intellectual disabilities to use public transport independently.

These symbols should also facilitate travelling for tourists not fluent in English.

New technologies including mobile phone apps and websites can help passengers with disabilities to plan their trips and get information during trips. This should be a complimentary option and not the only source of information.

2.5.8 Communication

Access to communication devices

Every person must have reasonable access to a communication device situated at a suitable height.

Some people with a disability may find it difficult to stretch to reach a communication device. Passengers with painful conditions that affect their joints, are likely to experience discomfort or pain if they are required to exert excessive force to operate buttons or controls.

The design of communication devices on conveyances must ensure that:

- there is contrast to the control device against its background to make it easier for partially sighted people to locate
- the communication device is not too glossy and has a non-reflective finish
- a person with a disability can signal the operator/driver to stop
- if buttons are provided, they are large in surface area, exceeding 25mm diameter, are proud of their surrounding surface and require minimum pressure to activate
- a stopping sign provides reassurance that the vehicle will stop and a warning of possible changes in speed of the vehicle
- the use of both upper and lowercase text to ensure that words are more legible to people with vision impairment through shape and recognition of the word.

Hearing augmentation

Audio information such as stop announcements and emergency alarms should be clear and easy to comprehend and be supported with hearing augmentation such as assisted listening systems or audio frequency induction loop systems.

The type of construction material used on the conveyance can help with audibility of announcements if reverberation is minimised throughout. This can be achieved using soft materials and minimising hard vertical surfaces wherever possible.

Audio informative announcements should be coordinated with the conveyance’s operation, providing those with vision impairment an audible guide to where they are and whether the vehicle is stopping/starting.

The door closing signal should be loud enough but not too shrill or disturbing as this can be disorientating for some people. Visual alarms should be considered so that people who are deaf or hard of hearing are able to understand the situation.

Emergency procedures

The emergency intercom system or alarm must be able to be operated by persons with disabilities. Instructions should be included for those with vision impairment. The use of internationally recognised symbols is useful for people not fluent in English.

2.5.9 Operation

Once the conveyance is operational, access awareness training should be provided by disability access experts/consultants to all key personnel. The training would include best practice and customer service protocols and etiquettes in assisting older people and people with disabilities.

If passengers cannot board or disembark a bus independently, operators must ensure equivalent access by direct assistance in accordance with *DSAPT* Part 33.6.

The aim of which is to determine the circulation space of the floor area by means of a mock-up environment, ideally this could be a three dimensional or two dimensional environment that requires a 90 degree turn from the entry point of the conveyance to the allocated spaces of the conveyance and then a 180 degree turn from the allocated space to the exit point.

In many cases the size of the chassis of the bus cannot be changed by the transport manufacturer, due to the spacing of the front wheel arches of the bus. Consequently, the space required for a person in a mobility device to manoeuvre cannot be increased and is restricted to a limited number of powered chairs and mobility scooters.

For potential public transport users to gain an understanding of the internal constraints of different conveyance’s access and circulation spaces, mock-ups of applicable conveyances may be provided to the following:

- suppliers of mobility scooters
- libraries
- community centres
- hospitals
- health centres
- department of transport services
- expos.

2.6 Rollingstock

2.6.1 Boarding

Practical door design and boarding devices

The design of doors should ensure that:

- doors open and close in such a way that they cannot hurt anybody who is standing close by
- an auto stopping mechanism to the door is provided if an obstacle is detected
- a safety precaution such as a suitable audio and visual signal is given as a warning when they commence operation.

The deployment of boarding devices should ensure that they align with audio speakers and are by the accessible doors.

Design of entry/exit

The design of the entry and exit should ensure that:

- all passengers use the same path of access and egress to the conveyance
- vehicles where passengers must use a separate entrance and exit, at least one entrance and one exit point must provide level access to the flat floor area.
- if more than one exit is provided, all exits from the priority floor area should, where possible, comply with the priority exit requirements to ensure that all people can use any exit.
- where it is familiar practice to enter at the front door and exit at another door it is particularly important that all passengers can identify this practice.
- where the priority exit is also an entrance, it should be wide enough to allow passengers to move freely in both directions.



Figure 2.5 - A before (left) and after (right) example of refurbished doors with colour-contrasting floor and accessible handrails. Note that the access path in the before image contrasted better with the walls.

Consistent step heights

Steps in addition to level or ramped boarding devices should ensure consistent step heights are provided to instil familiarity and confidence to reduce the risk of tripping and time to negotiate. Step height consistency may be impacted by road shoulder camber, however can also be counteracted by vehicle kneeling.

For city services, passengers may embark/disembark from a kerb, reducing the height of the first step and/or achieving level access to the conveyance.

In rural areas and areas where a transport conveyance cannot gain access to a kerb this will not be the case and a solution, such as kneeling or auxiliary steps may be necessary.

An example of a performance-based outcome following co-design with stakeholders, such as non-for-profit groups and access advisory groups, is evident in the luminance contrast application of stair treads.

Groups have advised against luminance contrast being placed on the face of the riser of stair treads; despite this being a requirement of *DSAPT*. Co-design has highlighted this as a trip hazard and advises only luminance contrast bands to the top of the stair treads is required / best practice.

Embarking/Disembarking

The guard carriage must be located centrally to align with the assisted boarding point on the platform and the accessible car. This is to allow the guard to provide trained assistance to people with hidden disabilities such as sensory or cognitive impairments to help people board and disembark and to respond to emergencies.

2.6.2 Access paths

It is important that a person with a disability can move freely, particularly when a single doorway is used as both priority entrance and priority exit. To facilitate this, the access path width should be increased at floor level in the main passenger circulation area, at least to the facilities or designated spaces provided for passengers with disabilities. The access path should not impede on the allocated space provided for a person with a disability.

The aisles to conveyances should be designed to the maximum width that the track gauge permits.

Levels of contrast on surfaces

The colour of contrasting strips should be determined based on the surrounding surfaces, including floor, steps, riser and walls. Some people with a disability require an indication of the depth of the step, to help them position their feet properly.

2.6.3 Manoeuvring areas and appropriate circulation space

Whilst minimum guidelines are set for 180-degree circulation, there is no official standard wheelchair size. With many different types and sizes of mobility devices, some that may have reclining backrests or elevating leg rests, additional space should be provided for a user to propel their mobility device with ease.



Figure 2.6 - A good example of a wide manoeuvring area, allowing passengers using a mobility aid enough access to manoeuvre even during peak periods. N.B. The international symbol of access on the floor would benefit from being the standard white on blue design as per the International Symbol of Access; to ensure this space can be universally and internationally recognised.

2.6.4 Allocated space and priority seating

Allocated spaces

The allocated spaces should have contingency to be extended beyond 800 x 1300mm, to allow for larger mobility devices and assistance animals.

Priority Seating

The priority seating and allocated seats should be separated so that they can be used at the same time as wheelchair users and mobility scooters. Priority seating must be allocated to consistent locations throughout all tram carriages, to ensure that these seats can be easily identified and located by people with a vision impairment/cognitive impairment.

Location of priority seats

The design of priority seats must ensure that:

- priority seats are located as close as possible to an accessible entrance, avoiding any unnecessary changes in level
- Priority seating must be clearly signed, identifying those customers who have priority.
- tip-up and folding seats are never priority seats as this requires a degree of dexterity and force to use and could be unsuitable for a person with a disability. They are also unlikely to provide as much support as a fixed seat
- priority seats are fixed and distinguished and consistently coloured throughout the fleet/rolling stock
- priority seats are separate and provided in addition to allocated spaces for mobility devices to maximise availability
- allocated spaces and priority should also be in consistent locations on all fleets/rolling stock
- the travel distance from the allocated space and priority seating to the accessible unisex toilet (where provided) must be within proximity to avoid unnecessary travel distances for a person using a mobility device and people who have an ambulant disability or vision impairment
- the space beneath priority seats (if stowed) must be kept clear for assistance animals.

Spacing and design of seating

As noted above, side facing seats might not be suitable for many people due to them not being able to prevent themselves from moving sideways and are more at risk of falling from their seats during vehicle motion.

The design of allocated spaces and priority seating should ensure that:

- allocated spaces for mobility devices are provided with adequate and functional use of passive and active restraints such as anchors, belts and passive constraints such as padded rails, or upstand pegs to prevent rolling and tipping of mobility devices. These must be further refined by the co-design process.
- all priority seats have extra space, underneath the seat if stowed or adjacent to at least one priority seat for an assistance animal.

The size of an assistance animal will vary depending on the type of animal or breed; they can be as much as 1200mm when measured from the tip of the nose to the tip of the tail, and as much as 270mm across the shoulders.

A supportive seating design

People with limited strength or flexibility in their limbs are likely to use a seat by sitting first so that their body is supported. They will then move their legs gradually round until they are seated comfortably as part of the transfer process. In some cases, this is done by physically lifting the leg or legs with the hands. Where seats do not have moveable armrests, this manoeuvre is not possible.

The design of allocated spaces and priority seating should ensure that:

- for consistency, where other seats within the vehicle have been designed with armrests, priority seats should also have armrests
- all armrests within the vehicle can be folded for transfer purposes and require as minimum force as possible to move (with exception to those adjacent to the wall or another fixed barrier such as a weather shield).

Three points of contact, are preferred to allocated wheelchair spaces, these include:

- non-slip ground surface ground
- fixed grabrail and;
- an operable grabrail.

The drop down grabrail could also act as a grabrail for people who are hemiplegic, to avoid the need to turn in the opposite direction in the allocated space.

Points of Contact

There should be an allocated space, which is provided with a retractable arm so that a person in a mobility device has three points of contact rather than two. This additional grab rail would allow a person in a mobility device to steady their wheelchair, preventing rolling or tipping.

Power points

The conveyance should contain charging facilities adjacent to allocated spaces and priority seating, which can serve as a charging point for a mobility scooter and other devices.

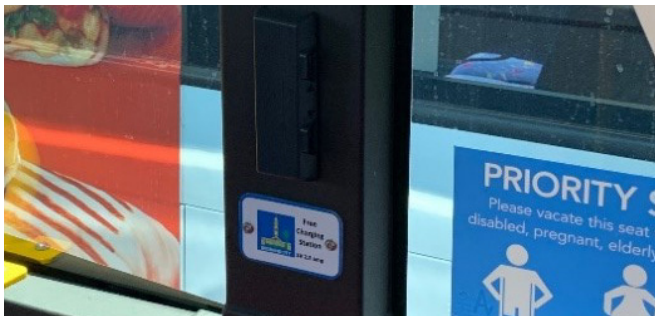


Figure 2.7 - A charging point for a Smart Phone. A recharge point for a mobility device may also be beneficial.

2.6.5 Handrails and grab rails

Handrail support from boarding to priority seating

The design of handrails and grabrails should ensure that continuous handrail or supports are provided to the maximum extent possible so that a passenger does not have to release their grip or change hands to reach another handrail.

This should pass close to the driver’s cab or area where a fare may be paid and on to the priority seating area.

Straps and spherical hanging handholds are difficult for many people with disabilities to grip and these should only be used in addition to fixed grabrails.

If grabrails are discontinuous there should be at least an alternative available, such as a suitable grabrail on the other side of the access path.

Contrast of handrails

The design of handrails and grabrails should ensure that:

- the handrail is not too glossy and has non-reflective finish
- handrails and handholds are always the same colour throughout the vehicle and contrast with the surrounding surfaces. This will assist people to learn a ‘language’ of colour that is consistent as they move through the vehicle or if they use the same vehicles on a regular basis
- each handrail provides the same level of contrast with the surrounding surfaces in each separate location. This will influence the choice of colour used in laminates and seat finishes.



Figure 2.8 – An example of consistent handrail/grabrail colour and enough contrast throughout a light rail carriage.

2.6.6 Toilets

An accessible unisex toilet should be provided to each accessible carriage rather than the minimum of one. Therefore, the accessible unisex toilets can have a left-hand and right-hand transfer combinations.

Instructions for those who have vision impairment

People with a vision impairment would benefit by being able to easily identify braille instructions of the toilet facilities.

The design of toilets should ensure that:

- the operation of the toilet facilities any automated doors/locks are clearly and succinctly documented
- clear indication is provided on how the user can call for assistance should there be an emergency
- emergency controls/call button are locatable and usable standing, seated and prone, e.g. if a passenger falls on the floor, controls can be accessed from the floor, i.e. a maximum of height of 300mm from the floor.
- the toilet can be easily opened by transport personnel from outside in the event of an emergency
- additional grabrails placed either side of the mirror, to provide support and stability for a passenger while the conveyance is in motion.

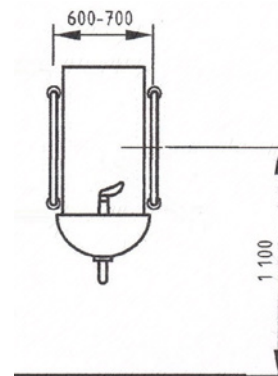


Figure 2.9 – Grabrails provided adjacent to washbasin in the unisex accessible toilet for stability while the train is in motion.

Availability of toilets

The need for toilets on shorter route services is also a priority for many people. Where no toilets are provided on board, consideration needs to be given to better toilet provision at stations.

To improve accessibility further, installing ambulant toilets in addition to unisex accessible toilets would enhance the minimum requirements of DSAPT and ease the patronage demand on conveyances for toilet facilities.

Size of toilets

The size of unisex accessible toilets in accessible ferries and accessible rail cars would benefit from being increased from the minimum compliance of DSAPT, which is the 80th percentile (size of occupied footprint) to the 90th percentile of the most current Australian Standards for access and mobility. As previously noted, this is to aid circulation and better accommodate the varying size of different mobility devices.



Figure 2.10 - Before and after example of redesigned accessible toilet facilities.

2.6.7 Signage and wayfinding

The location of priority seats

The design of the priority seats should ensure that:

- the location of priority seats is clear to all passengers; particularly to older people and people with disabilities
- all passengers are informed by signage that the seats are primarily for older people and people with disabilities
- signage clearly states that passengers should give up the seat if it is required by an older person or person with a disability or person who is pregnant.
- the signage is positioned at a height of about 1100mm measured from the floor.

Identification of the service or route number

Passengers need to be able to identify the service that they need. Accordingly, this information needs to be in a suitable position. Some passengers with a disability may have difficulty looking up if the information is too high or if the information is subject to glare, reflection or poor luminance contrast of letters, symbols and background of sign and sign background.

The design of transport information on the conveyance should ensure that:

- the destination and route number are clearly legible during day and night
- commercial advertising does not detract from destination and route number
- the destination information, is indicative of the direction of travel
- different size characters are required as a vehicle is likely to be viewed from a greater distance from the front or rear than it is from the side

The use of colour luminance contrast of characters and adjacent surfaces can assist passengers with low vision to make use of their residual vision.

Other features which can assist are as follows:

- illumination of displays so that they are visible at night.
- white or bright yellow lettering on dark backgrounds
- lower case lettering in Helvetica, Arial and other Sans Serif fonts.

LED/LCD or other electronically generated characters should only be used if they can offer the same legibility, both day and night.

Identification of key information

Tactile information must be both in braille and in relief and is useful on buttons inside the vehicle, such as the 'stop' button.

If it is only distinguished by colour luminance from the emergency button, this can lead to confusion for passengers with vision impairments.

Symbols and signs must be kept simple and universally recognised to help people who may have intellectual disabilities to use public transport independently.

These symbols should also facilitate travelling for tourists not fluent in English.

New technologies including mobile phone apps and websites can help passengers with disabilities to plan their trips and get information during trips.

This should be a complimentary option and not the only source of information.

2.6.8 Communication

Passenger emergency intercoms should be in the accessible car and allow for a person who requires emergency assistance to communicate with the guard as well as raise an alarm.

Communication from allocated space

Two international symbols of access signs should be provided outside the accessible door leading to the allocated space. One should be at eye level for wheelchair users and the other one higher for people to see from a distance. The international symbol of access should be displayed to both sides of the door of the accessible entrance for exit and approach. Passenger emergency intercoms should be in the accessible car and allow for a person who requires emergency assistance to communicate with the guard as well as raise an alarm.

Access to communication devices

Every person must have reasonable access to a communication device situated at a suitable height e.g. a call button should have tactile and braille information provided.

Some people with a disability may find it difficult to stretch to reach a communication device. Passengers with painful conditions which affect their joints, are likely to experience discomfort or pain if they are required to exert excessive force to operate buttons or controls.

The design of communication devices on conveyances must ensure that:

- there is contrast to the control device against its background to make it easier for partially sighted people to locate
- the communication device is not too glossy and has a non-reflective finish
- a person with a disability can signal the operator/driver to stop
- if buttons are provided, they are large in surface area, exceeding 25mm diameter, are proud of their surrounding surface and require minimum pressure to activate
- a stopping sign provides reassurance that the vehicle will stop and a warning of possible changes in speed of the vehicle
- the use of both upper and lowercase text to ensure that words are more legible to people with vision impairment through shape and recognition of the word.

Hearing augmentation

Audio information such as stop announcements and emergency alarms should be clear and easy to comprehend and be supported with hearing augmentation such as assisted listening systems or audio frequency induction loop systems.

The type of construction material used on the conveyance can help with audibility of announcements if reverberation is minimised throughout. This can be achieved using soft materials and minimising hard vertical surfaces wherever possible.

Audio informative announcements should be coordinated with the conveyance's operation, providing those with vision impairment an audible guide to where they are and whether the vehicle is stopping/starting.

The door closing signal should be loud enough but not too shrill or disturbing as this can be disorientating for some people. Visual alarms should be considered so that people who are deaf or hard of hearing are able to understand the situation.

Emergency procedures

The emergency intercom system or alarm must be able to be operated by persons with disabilities. Instructions should be included for those with vision impairment. The use of internationally recognised symbols is useful for people not fluent in English.

2.6.9 Operation

Once the conveyance is operational, access awareness training should be provided by disability access experts/consultants to all key personnel. The training would include best practice and customer service protocols and etiquettes in assisting older people and people with disabilities.

All passengers must be given the same level of access to information by visual and audible means. For example, travel information must be conveyed such as a passenger's whereabouts, where the train is stopping next during a public transport journey. This must be maintained as part of real-time information, which also indicates changes to the service or unexpected delays.

Operators may receive travel requests in relation to accessible travel arrangements in advance. As part of this booked service, operators must locate carers, companions or assistant animals and a person with a disability within an allocated space for a mobility device/ priority seat adjacent to a standard seat.

Conveyances that are subject to future substantial refurbishment, alteration or replacement must comply with *DSAPT* Part 32.1.

Furthermore, as part of any substantial refurbishment alteration or replacement of rolling stock; the views and advice of accessibility advisory groups as part of stakeholder engagement must be sought, as per [Figure 3.2 The Co-design process](#).

2.7 Aircraft

2.7.1 Independent travel

The provision for passengers who use a wheelchair, to independently travel, should they wish to do so.

2.7.2 Staff training

Consistent customer service policies and practices. Staff enforcing the policy that passengers with a disability should board the plane first, as well as ensuring that they return the wheelchair to the door of the aircraft during disembarkation.

2.7.3 Rest areas on long ramps

If there is no alternative other than the construction of a long ramp, such as those used to access aircraft conveyances (*figure 2.5*), level resting areas must be inserted where the wheelchair user can rest should they wish to do.



Figure 2.11 - 'Mega ramp' an alternative solution for airports without an airbridge. Adequate space should be provided in the rest areas on each level.

2.7.4 Toilets

Instructions for those who have vision impairment

People with a vision impairment would benefit by being able to easily identify braille instructions of the toilet facilities.

The design of toilets should ensure that:

- the operation of the toilet facilities any automated doors/locks are clearly and succinctly documented
- clear indication is provided on how the user can call for assistance should there be an emergency
- emergency controls/call button are locatable and usable standing, seated and prone, e.g. if a passenger falls on the floor, controls can be accessed from the floor, i.e. a maximum of height of 300mm from the floor.
- the toilet can be easily opened by transport personnel from outside in the event of an emergency
- additional grabrails placed either side of the mirror, to provide support and stability for a passenger while the conveyance is in motion.

Availability of toilets

The size of unisex accessible toilets in accessible aircraft would benefit from being increased from the minimum compliance of

DSAPT, which is the 80th percentile (size of occupied footprint) to the 90th percentile of the most current Australian Standards for access and mobility.

As previously noted, this is to aid circulation and better accommodate the varying size of different mobility devices.

2.7.5 Signage and wayfinding

Tactile information must be both in braille and in relief and is useful on buttons inside the cabin.

If it is only distinguished by colour luminance from the emergency button, this can lead to confusion for passengers with vision impairments.

Symbols and signs must be kept simple and universally recognised to help people who may have intellectual disabilities to use public transport independently.

These symbols should also facilitate travelling for tourists not fluent in English.

New technologies including mobile phone apps and websites can help passengers with disabilities to plan their trips and get information during trips.

This should be a complimentary option and not the only source of information.

2.7.6 Communication

Access to communication devices

Every person must have reasonable access to a communication device situated at a suitable height e.g. a call button on an aircraft should have tactile and braille information provided.

Some people with a disability may find it difficult to stretch to reach a communication device. Passengers with painful conditions which affect their joints, are likely to experience discomfort or pain if they are required to exert excessive force to operate buttons or controls.

The design of communication devices on conveyances must ensure that:

- there is contrast to the control device against its background to make it easier for partially sighted people to locate
- the communication device is not too glossy and has a non-reflective finish
- a person with a disability can signal the operator/driver to stop
- if buttons are provided, they are large in surface area, exceeding 25mm diameter, are proud of their surrounding surface and require minimum pressure to activate
- a stopping sign provides reassurance that the vehicle will stop and a warning of possible changes in speed of the vehicle

- the use of both upper and lowercase text to ensure that words are more legible to people with vision impairment through shape and recognition of the word.

Hearing augmentation

Audio information such as stop announcements and emergency alarms should be clear and easy to comprehend and be supported with hearing argumentation such as assisted listening systems or audio frequency induction loop systems.

The type of construction material used on the conveyance can help with audibility of announcements if reverberation is minimised throughout.

This can be achieved using soft materials and minimising hard vertical surfaces wherever possible.

Audio informative announcements should be coordinated with the conveyance’s operation, providing those with vision impairment an audible guide to where they are and whether the vehicle is stopping/starting.

The door closing signal should be loud enough but not too shrill or disturbing as this can be disorientating for some people.

Visual alarms should be considered so that people who are deaf or hard of hearing are able to understand the situation.

Emergency procedures

The emergency intercom system or alarm must be able to be operated by persons with disabilities.

Instructions should be included for those with vision impairment. The use of internationally recognised symbols is useful for people not fluent in English.

2.7.7 Operation

Once the conveyance is operational, the airline must ensure equivalent access by direct assistance to passengers in accordance with *DSAPT* part 33.6, where necessary.

Embarking and disembarking medium and large aircraft by level boarding ramps, airbridges and mobile lounges are preferred for dignity, comfort and shelter from the elements for all users. Where these are not available such as in some regional airports, a lifting device, other than that used for freight, must be provided to assist passengers with limited mobility safely on and off the aircraft. Trained service personnel should be made available to assist with the process of embarking and disembarking.

An unhindered passage of travel must be provided for passengers from the boarding point through the entrance of the conveyance (aircraft), to the passenger’s seat.

If a person with a disability is prepared and able to walk down the aisle of the aircraft, they should be permitted to do so. If not, they should be transferred into an aisle chair, from which they can transfer to their aircraft seat. Slide boards should be used if required. In the event the passenger with a disability has not been allocated a dedicated seat, the cabin crew should assist with finding an appropriate seat.

Many airlines, particularly on domestic flights, are moving towards tablets/smart technology for entertainment. This benefits passengers who are hard of hearing as instead of a screen showing ‘an announcement is being made’, the live captions of the announcement are displayed. As a best practice powered neck loops should also be provided on aircrafts.

Other factors which would benefit from being reviewed/enforced include:

- Standardising seating practices across the airline industry e.g. what specific mobility requirements should a person demonstrate if sitting in an exit row.
- Staff enforce the policy that passengers with a disability should board the plane first and return the wheelchair to the door of the aircraft during disembarkation.
- Regular refresher training for staff.



2.8 Ferries

2.8.1 Boarding

Practical door design and boarding devices

The design of doors should ensure that:

- doors open and close in such a way that they cannot hurt anybody who is standing close by
- an auto stopping mechanism to the door is provided if an obstacle is detected
- a safety precaution such as a suitable audio and visual signal is given as a warning when they commence operation.

The deployment of boarding devices should ensure that they align with audio speakers by the accessible doors.



Figure 2.12 - The gangplank provides users with a gentle gradient when embarking and disembarking, due to its convex profile and better integration with the boarding surface.

Design of entry/exit

The design of the entry and exit should ensure that:

- all passengers use the same path of access and egress to the conveyance
- vehicles where passengers must use a separate entrance and exit, at least one entrance and one exit point must provide level access to the flat floor area.
- if more than one exit is provided, all exits from the priority floor area should, where possible, comply with the priority exit requirements to ensure that all people can use any exit.

- where it is familiar practice to enter at the front door and exit at another door, it is particularly important that all passengers can identify this practice.
- where the priority exit is also an entrance, it should be wide enough to allow passengers to move freely in both directions.

Consistent step heights

Steps in addition to level or ramped boarding devices should ensure consistent step heights are provided to install familiarity and confidence to reduce the risk of tripping and time to negotiate.

An example of a performance-based outcome following co-design with stakeholders such as non-for-profit groups and access advisory groups is evident in the luminance contrast application of stair treads.

Groups have advised against luminance contrast being placed on the face of the riser of stair treads; despite this being a requirement of *DSAPT*. Co-design has highlighted this as a trip hazard and only advise luminance contrast bands to the top of the stair treads.

Embarking/Disembarking

The curved profile of some boarding ramps is too steep an angle for many mobility device users to use independently. With the assistance of co-design, the following issues should be addressed:

- provision of ramp width greater than 800mm
- a flatter convex boarding ramp with slopes along the curve of not greater than 1:8 when deployed
- seamless boarding ramp profile, upon embarking and disembarking
- more accessible handrail configuration to the boarding ramp.

2.8.2 Access paths

It is important that a person with a disability can move freely, particularly when a single doorway is used as both priority entrance and priority exit.

To facilitate this, the access path width should be increased at floor level in the main passenger circulation area, at least to the facilities or designated spaces provided for passengers with disabilities.

The access path should not impede on the allocated space provided for a person with a disability.

The aisles to conveyances should be designed to the maximum width possible

N.B. If this cannot be achieved, direct assistance as appropriate should be provided to enable people with disabilities to have equivalent access to the maximum extent possible.

Levels of contrast on surfaces

The colour of contrasting strips should be determined based on the surrounding surfaces, including floor, steps, riser and

walls. Some people with a disability require an indication of the depth of the step, to help them position their feet properly.

2.8.3 Manoeuvring areas and appropriate circulation space

Whilst minimum guidelines are set for 180-degree circulation, there is no official standard wheelchair size. With many different types and sizes of mobility devices, some which may have reclining backrests or elevating leg rests, additional space should be provided for a user to propel their mobility device with ease.

2.8.4 Allocated space and priority seating

Allocated space

The allocated spaces should have contingency to be extended beyond 800 x 1300mm, to allow for larger mobility devices and assistance animals.

Location of priority seats

The design of priority seats must ensure that:

- priority seats are located as close as possible to an accessible entrance, avoiding any unnecessary changes in level
- priority seating must be clearly signed, identifying those customers who have priority.
- tip-up and folding seats are never priority seats as this requires a degree of dexterity and force to use and could be unsuitable for a person with a disability. They are also unlikely to provide as much support as a fixed seat
- priority seats are fixed and distinguished and consistently coloured throughout the fleet/rolling stock
- priority seats are separate and provided in addition to allocated spaces for mobility devices to maximise availability
- allocated spaces and priority should also be in consistent locations on all fleets/rolling stock
- the travel distance from the allocated space and priority seating to the accessible unisex toilet must be within proximity to avoid unnecessary travel distances for a person using a mobility device and people who have an ambulant disability or vision impairment
- the space beneath priority seats (if stowed) must be kept clear for assistance animals.

Spacing and design of seating

As noted above, side facing seats might not be suitable for many people due to them not being able to prevent themselves from moving sideways and are more at risk of falling from their seats during vehicle motion.

The design of allocated spaces and priority seating should ensure that:

- allocated spaces for mobility devices are provided with adequate and functional use of passive and active restraints such as anchors, belts and passive constraints such as padded rails, or upstand pegs to prevent rolling and tipping

of mobility devices. These must be further refined by the co-design process.

- all priority seats have extra space, underneath the seat if stowed or adjacent to at least one priority seat for an assistance animal.

The size of an assistance animal will vary depending on the type of animal or breed; they can be as much as 1200mm when measured from the tip of the nose to the tip of the tail, and as much as 270mm across the shoulders.

A supportive seating design

People with limited strength or flexibility in their limbs are likely to use a seat by sitting first so that their body is supported. They will then move their legs gradually round until they are seated comfortably as part of the transfer process. In some cases, this is done by physically lifting the leg or legs with the hands. Where seats do not have moveable armrests, this manoeuvre is not possible.

The design of allocated spaces and priority seating should ensure that:

- for consistency, where other seats within the vehicle have been designed with armrests, priority seats should also have armrests
- all armrests within the vehicle can be folded for transfer purposes and require as minimum force as possible to move (with exception to those adjacent to the wall or another fixed barrier such as a weather shield).

Three points of contact, are preferred to allocated wheelchair spaces, these include:

- non-slip ground surface ground
- fixed grabrail and;
- an operable grabrail.

The drop down grabrail could also act as a grabrail for people who are hemiplegic, to avoid the need to turn in the opposite direction in the allocated space.

Points of Contact

There should be an allocated space, which is provided with a retractable arm so that a person in a mobility device has three points of contact rather than two. This additional grab rail would allow a person in a mobility device to steady their wheelchair, preventing rolling or tipping.

Power points

The conveyance should contain charging facilities adjacent to allocated spaces and priority seating, which can serve as a charging point for a mobility scooter and other devices.

2.8.5 Handrails and grab rails

Handrail support from boarding to priority seating

The design of handrails and grabrails should ensure that continuous handrail or supports are provided to the maximum extent possible so that a passenger does not have to release their grip or change hands to reach another handrail.

This should pass close to the driver's cab or area where a fare may be paid and on to the priority seating area.

Straps and spherical hanging handholds are difficult for many people with disabilities to grip and these should only be used in addition to fixed grabrails.

If grabrails are discontinuous there should be at least an alternative available, such as a suitable grabrail on the other side of the gangway or access path.

Contrast of handrails

The design of handrails and grabrails should ensure that:

- the handrail is not too glossy and has non-reflective finish
- handrails and handholds are always the same colour throughout the vehicle and contrast with the surrounding surfaces. This will assist people to learn a ‘language’ of colour that is consistent as they move through the vehicle or if they use the same vehicles on a regular basis
- each handrail provides the same level of contrast with the surrounding surfaces in each separate location. This will influence the choice of colour used in laminates and seat finishes.

2.8.6 Toilets

Instructions for those who have vision impairment

People with a vision impairment would benefit by being able to easily identify braille instructions of the toilet facilities.

The design of toilets should ensure that:

- the operation of the toilet facilities any automated doors/locks are clearly and succinctly documented
- clear indication is provided on how the user can call for assistance should there be an emergency
- emergency controls/call button are locatable and usable standing, seated and prone, e.g. if a passenger falls on the floor, controls can be accessed from the floor, i.e. a maximum of height of 300mm from the floor.
- the toilet can be easily opened by transport personnel from outside in the event of an emergency
- additional grabrails placed either side of the mirror, to provide support and stability for a passenger while the conveyance is in motion.

Availability of toilets

The need for toilets on shorter route services is also a priority for many people. Where no toilets are provided on board, consideration needs to be given to better toilet provision at stations and at coach stops.

To improve accessibility further, installing ambulant toilets in addition to unisex accessible toilets would enhance the minimum requirements of *DSAPT* and ease the patronage demand on conveyances for toilet facilities.

Size of toilets

The size of unisex accessible toilets in accessible ferries and accessible rail cars would benefit from being increased from the minimum compliance of *DSAPT*, which is the 80th percentile (size of occupied footprint) to the 90th percentile of the most current Australian Standards for access and mobility.

As previously noted, this is to aid circulation and better accommodate the varying size of different mobility devices.

Hand washing

Facilities, such as a shelf, should be provided inside the unisex accessible toilets for catheterising and to ensure privacy.

2.8.7 Signage and wayfinding

The location of priority seats

The design of the priority seats should ensure that:

- the location of priority seats is clear to all passengers; particularly to older people and people with disabilities
- all passengers are informed by signage that the seats are primarily for older people and people with disabilities
- signage clearly states that passengers should give up the seat if it is required by an older person or person with a disability or person who is pregnant.
- the signage is positioned at a height of about 1100mm measured from the floor.

Identification of the service or route number

Passengers need to be able to identify the service that they need. Accordingly, this information needs to be in a suitable position. Some passengers with a disability may have difficulty looking up if the information is too high or if the information is subject to glare, reflection or poor luminance contrast of letters, symbols and background of sign and sign background.

The design of transport information on the conveyance should ensure that:

- the destination and route number are clearly legible during day and night
- commercial advertising does not detract from destination and route number
- the destination information, is indicative of the direction of travel
- different size characters are required as a vessel is likely to be viewed from a greater distance from the front or rear than it is from the side

The use of colour luminance contrast of characters and adjacent surfaces can assist passengers with low vision to make use of their residual vision.

Other features which can assist are as follows:

- illumination of displays so that they are visible at night.
- white or bright yellow lettering on dark backgrounds
- lower case lettering in Helvetica, Arial and other Sans Serif fonts.

LED/LCD or other electronically generated characters should only be used if they can offer the same legibility, both day and night.

Identification of key information

Tactile information must be both in braille and in relief and is useful on buttons inside the vehicle such as the ‘stop’ button.

If it is only distinguished by colour luminance from the emergency button, this can lead to confusion for passengers with vision impairments.

Symbols and signs must be kept simple and universally recognised to help people who may have intellectual disabilities to use public transport independently.

These symbols should also facilitate travelling for tourists not fluent in English.

New technologies including mobile phone apps and websites can help passengers with disabilities to plan their trips and get information during trips.

This should be a complimentary option and not the only source of information.

2.8.8 Communication

Access to communication devices

Every person must have reasonable access to a communication device situated at a suitable height e.g. a call button on an aircraft should have tactile and braille information provided.

Some people with a disability may find it difficult to stretch to reach a communication device. Passengers with painful conditions which affect their joints, are likely to experience discomfort or pain if they are required to exert excessive force to operate buttons or controls.

The design of communication devices on conveyances must ensure that:

- there is contrast to the control device against its background to make it easier for partially sighted people to locate
- the communication device is not too glossy and has a non-reflective finish
- a person with a disability can signal the operator/driver to stop
- if buttons are provided, they are large in surface area, exceeding 25mm diameter, are proud of their surrounding surface and require minimum pressure to activate
- a stopping sign provides reassurance that the vehicle will stop and a warning of possible changes in speed of the vehicle
- the use of both upper and lowercase text to ensure that words are more legible to people with vision impairment through shape and recognition of the word.

Hearing augmentation

Audio information such as stop announcements and emergency alarms should be clear and easy to comprehend and be supported with hearing augmentation such as assisted listening systems or audio frequency induction loop systems.

The type of construction material used on the conveyance can help with audibility of announcements if reverberation is minimised throughout. This can be achieved using soft materials and minimising hard vertical surfaces wherever possible.

Audio informative announcements should be coordinated with the conveyance's operation, providing those with vision impairment an audible guide to where they are and whether the vehicle is stopping/starting.

The door closing signal should be loud enough but not too shrill or disturbing as this can be disorientating for some people. Visual alarms should be considered so that people who are deaf or hard of hearing are able to understand the situation.

Emergency procedures

The emergency intercom system or alarm must be able to be operated by persons with disabilities. Instructions should be included for those with vision impairment. The use of internationally recognised symbols is useful for people not fluent in English.

2.8.9 Operation

If passengers cannot board or disembark a ferry independently, operators must ensure equivalent access by direct assistance in accordance with *DSAPT* Part 33.6.

It is acknowledged that the deployable boarding ramps must function in an environment, bridging between two moving surfaces such as pontoon and ferry, based on freeboard, or height at which the ferry sits above the water line. This will vary based on the mass (passengers, luggage etc) on board the vessel. However thought should be given to minimise the gradient of the curved convex boarding ramp due to its absence of landings and the potential for hazards such as trapped limbs and pinch points.

As per Figure 1.1 in [The Equivalent Access Process, Chapter 1](#), access awareness training should be provided by disability access experts/consultants to all key personnel. The training would include best practice and customer service protocols and etiquettes in assisting older people and people with disabilities.

Once implemented, maintenance contracts and daily scheduling must be put in place. For example, regular maintenance of the boarding ramp in terms of cleaning moisture and residue to ensure slip resistance surfaces.

Ensure colour luminance contrast is maintained to all surfaces and grab rails and edges of the ramp.

2.9 Taxis

2.9.1 Holistic approach

When reviewing best practice for passenger who use an accessible taxi (often called wheelchair accessible taxi or WAT), it is important to take a holistic view of the whole infrastructure, including the customer service provided. It should be noted that people who require an accessible taxi service generally do not use taxi ranks due to the uncertainty of the availability of accessible taxi's, as well as the potential inaccessibility of the infrastructure (taxi rank). Accordingly, consistency and standard of driver assistance is extremely important.

Specific factors which should be considered/ reviewed are:

- Regular refresher training for drivers and pre-operation equipment checks before the start of their shift in an accessible taxi.
- For longer journeys, wheelchair users may prefer the first allocated wheelchair space in the WAT as this area is less susceptible to road disturbance.

The angle of the platform lift base must minimise crossfall or the driver supports the users from their back to minimise the risk of a person on a mobility device rolling backwards while the platform lift is in operation.

2.9.2 Boarding

Practical door design & boarding devices

The design of doors should ensure that:

- doors open and close in such a way that they cannot hurt anybody who is standing close by
- an auto stopping mechanism to the door is provided if an obstacle is detected
- a safety precaution such as a suitable audio and visual signal is given as a warning when they commence operation.

The deployment of boarding devices should ensure that they align with audio speakers by the accessible doors. Vehicle identification information should also be provided in tactile signage and Braille.

Consistent step heights

Steps in addition to level or ramped boarding devices should ensure consistent step heights are provided to install familiarity and confidence to reduce the risk of tripping and time to negotiate.

Step height consistency may be impacted by road shoulder camber, however can also be counteracted by vehicle kneeling.

For city services, passengers may embark/disembark from a kerb, reducing the height of the first step and/or achieving level access to the conveyance.

In rural areas and areas where a transport conveyance cannot gain access to a kerb this will not be the case and a solution, such as kneeling or auxiliary steps may be necessary.

An example of a performance-based outcome following co-design with stakeholders such as non-for-profit groups and access advisory groups is evident in the luminance contrast application of stair treads.

Groups have advised against luminance contrast being placed on the face of the riser of stair treads; despite this being a requirement of *DSAPT*. Co-design has highlighted this as a trip hazard and only advise luminance contrast bands to the top of the stair treads.

2.9.3 Operation

Once the conveyance is operational, access awareness training should be provided by disability access experts/consultants to all key personnel. The training would include best practice and customer service protocols and etiquettes in assisting older people and people with disabilities.

With an everchanging population demographic, review solutions to enable passengers who exceed the 300kg combined weight limits and allow equitable and dignified to access a vehicle.

- Review embarking/disembarking procedures for passengers using a wheelie walker to create a consistent policy.
- Create a consistent guideline around driver payment to support users who have dexterity challenges.



Chapter 3: Appendix



3.1 Co-design

3.1.1 Introduction

Co-design (also referred to participatory design) is an effective way to support the performance-based design process further and reflects a fundamental change in the traditional designer-client relationship. Co-design enables a wide range of people to make a creative contribution in the formulation and solution of a problem.

Co-design is the act of creating a design process with stakeholders, specifically within the design development process, to ensure the results meet their needs and are usable.

Co-design requires designers/planners to bring the people that the outcomes will serve into the design development process. [Figure 3.2](#) illustrates the entire design process; to ensure effective co-design, stakeholders should be involved in each of these stages.

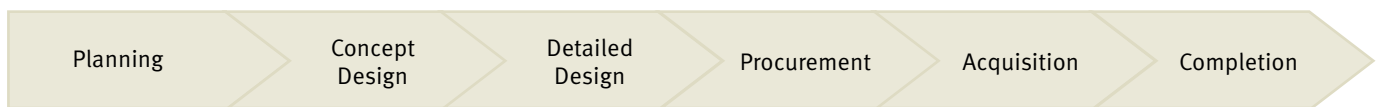


Figure 3.1 - For co-design to be effective, stakeholders should be consulted throughout this design process.

3.1.2 Benefits of Co-design

By inviting users with lived experiences, customers and other stakeholders as active co-designers, it is possible to confront any issues and develop actionable ways to improve their current experiences or co-create a new solution.

Specific benefits of co-design can include:

- Generation of better ideas with a high degree of originality and user value.
- Improved knowledge of customer or user needs.
- Immediate validation of ideas or concepts.
- Higher quality, better differentiated products or services.
- More efficient decision making.
- Lower development costs and reduced development time.
- Better cooperation between different people or organisations, and across disciplines.
- Avoiding expensive re-design or retrofitting.

The longer-term benefits include:

- Higher degrees of satisfaction of, and loyalty from, customers and users.
- Increased levels of support and enthusiasm for innovation and change.
- Better relationships between the product or service provider and their customers.
- More appropriate and accessible conveyances for the aging population.
- Better investment of funding for all customers.

3.1.3 Principles of Co-design

Below are four key principles of the co-design process:

1. Inclusive

The process includes representatives from critical stakeholder groups who are involved in the co-design project from framing the issue to developing and testing solutions. It utilises feedback, advice and decisions from people with lived or work experience, and the knowledge, experience and skills of experts in the field.

2. Respectful

All participants are experts and their input are valued and has equal standing. Strategies are used to remove potential or perceived inequality. Partners manage their own and others' feelings in the interest of the process. Co-design requires everyone to negotiate personal and practical understandings at the expense of differences.

3. Iterative

Ideas and solutions are continually tested and evaluated with the participants. Changes and adaptations are a natural part of the process, trialling possibilities and insights as they emerge, taking risks and allowing for failure. This process is also used to fine-tune potential outcomes or solutions as it reaches fruition and can later be used to evaluate its effectiveness.

4. Outcome focused

The process can be used to create, redesign or evaluate services, systems or products. It is designed to achieve an outcome or series of outcomes, where the potential solutions can be rapidly tested, effectiveness measured and where the spreading or scaling of these solutions can be developed with stakeholders and in context.

3.1.4 Process of Co-design

Co-design involves the people who are likely to be impacted by or will benefit from the process and/or the outcome, either directly or indirectly. It can include passengers, their carers, community members, researchers, consultants and staff from funding bodies (both government and non-government), potential or actual service providers.

Figure 3.2 illustrates how the co-design process can be facilitated.

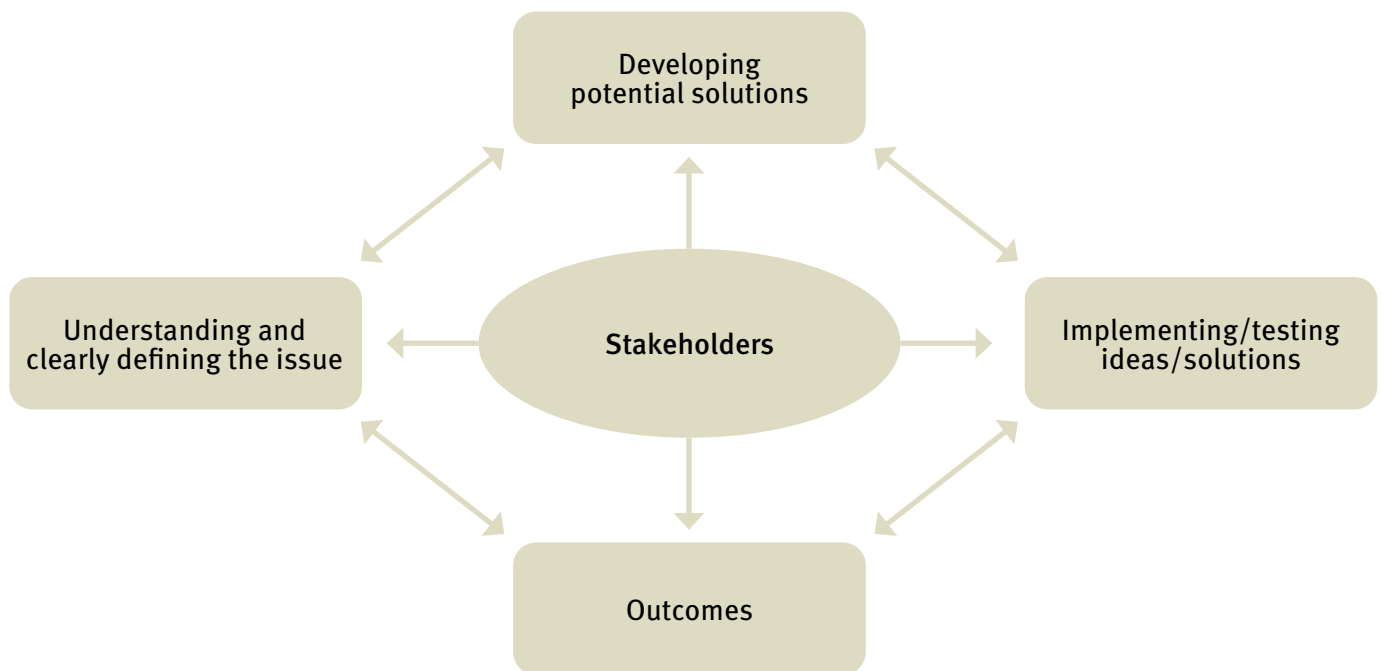


Figure 3.2 – Illustration of an effective co-design process.

An example, which may help facilitate this process are real scale models of conveyances and three-dimensional visualisation, of which may help the co-design process and public understanding. For example, prototype models of three-dimensional environments, particularly physical environments and three-dimensional visualisations may be more effective in communicating with some community user groups than two-dimensional technical drawings.

3.1.5 Additional resources

[Blomkamp, E. \(2018\). The Promise of Co-Design for Public Policy. Australian Journal of Public Administration, 77: 729-743.](#)

[Co-Design Initiative. \(2016\). Shared Perspectives on Authentic Co-design.](#)

[Steen, M., Manschot, M., & De Koning, N. \(2011\). Benefits of co-design in service design projects. International Journal of Design, 5\(2\), 53-60.](#)

[Terry, N. \(2019\). Codesign: Where do you start as a policy maker?. UK Design Council.](#)