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#### Chapter 10 – Park 'n' ride infrastructure



### 10.1 Introduction

10.1.1 Overview of the Park 'n' ride infrastructure chapter The Park 'n' ride infrastructure chapter is a referenced component of the overarching *Public Transport Infrastructure Manual (PTIM)*.

This *Park 'n' ride infrastructure* chapter is to be used in conjunction with:

- **PTIM, Background and application,** which establishes the rules for application of the entire *PTIM*
- **PTIM, Planning and design,** which provides the overarching design guidelines and principles for public transport infrastructure across Queensland
- **PTIM, Supporting access infrastructure,** which details the supporting access infrastructure required to support public transport stops, stations and related facilities
- **PTIM, Branding, theming and signage,** which provides branding, theming and signing that should be used for identifying coherent public transport infrastructure throughout Queensland
- **PTIM, Bus station infrastructure,** which informs infrastructure design by providing a clear and consistent set of principles and guidelines for bus stations throughout Queensland
- **PTIM, Rail station infrastructure,** which informs infrastructure design by providing a clear and consistent set of principles and guidelines for rail stations throughout Queensland

External to the *PTIM*, the following document should be referred to when planning and designing new or upgraded park 'n' ride infrastructure:

• Queensland Rail, *Station Design Manual*, which provides specific design guidelines for park 'n' ride at rail stations.

For information on further resources to support the planning and design of park 'n' ride commuter parking, please refer to the *PTIM*, *Background and application*.

### 10.1.2 Purpose and objectives

The Park 'n' ride infrastructure chapter will inform infrastructure design by providing a clear and consistent set of principles and guidelines for park 'n' ride commuter car parks across the TransLink network.

It will ensure that a high standard of infrastructure is planned and delivered with a focus on customers so that it meets the needs and objectives of the TransLink passenger transport system and passenger expectation. Ultimately, high-quality and consistent infrastructure will provide customers with a transport system that is coherent, functional and encourages passenger use.

The objectives of this chapter are to:

- ensure best practice infrastructure design is applied consistently across the State
- outlines the preferred requirements for park 'n' ride design
- detail requirements for compliance with relevant standards and regulations
- ensure the delivery of accessible infrastructure
- ensure the delivery of functional, fit-for-purpose and flexible (that is, able to accommodate changing needs and contexts of the community and surrounding land uses) park 'n' ride infrastructure.

# 10.2 Application of the Park'n' ride infrastructure chapter

### 10.2.1 Intended audience

### 10.2.2 Application of this chapter

This chapter is intended for use by professionals in the transport planning and delivery industry. This generally involves, but is not limited to, designers, planners, engineers, architects, developers, contractors, private operators and others involved in the planning, design and delivery of park 'n' ride projects in Queensland. This may involve professionals charged with protecting the State's existing and future transport infrastructure assets.

This chapter must be used in conjunction with overarching applications of the *PTIM*.

This chapter should be referred to before starting to plan new park 'n' ride or upgrades to existing park 'n' ride commuter car parks, and should be referred to when assessing development applications impacting on State's transport infrastructure.

It details TransLink's requirements for the planning and design of park 'n' ride infrastructure across the TransLink network.

TransLink, in partnership with the local government, relevant stakeholders including the asset owner and delivery partners, shall be consulted early regarding the project requirements and design considerations for both new park 'n' ride infrastructure and upgrade of existing facilities.

### 10.2.3 Planning legislation, policies and guidelines

See *PTIM*, *Background and application* for specific detail on relevant planning references, particularly national guidance including *Australian Standards* and Austroads publications and guides.

# 10.3 Principles of park 'n' ride planning

Park 'n' ride can be the first and last contact customers have with the public transport network on their journey. If a new park 'n' ride is to be developed or expansion to existing facilities is proposed, it should contribute to the long-term strategic planning intent for the public transport network, immediate precinct and surrounding community. If planned well, park 'n' ride can:

- increase the accessibility, attractiveness and usage of public transport
- cater for customer needs enabling community access to services and increased social interaction
- extend the reach of the public transport network to generate new users, particularly in areas not well served by public transport, responding to that the diverse mobility needs of customers, population densities and land use patterns
- make public transport a more attractive option for those who don't currently use it, or for those with mobility challenges
- directly integrate into the surrounding area, minimising impacts on land use and infrastructure (including pedestrian and bicycle path networks)
- reduce car parking demand in major destinations served by the public transport network, reducing congestion on roads.

Factors that can influence use of park 'n' ride:

- existing or proposed public transport services
- demand of the facility, including the profile over the duration of the day
- location of park 'n' ride
- convenience of access in relation to the path of the customer journey
- perceived safety
- efficiency of the public transport network.

### 10.3.1 Type of park 'n' ride

Park 'n' ride will typically be designed in three different configurations:

- at-grade
- multi-storey
- with mixed-use development (for example, transit-oriented development (TOD), shopping centre, office, community facilities etc.)

The appropriate configuration of park 'n' ride is subject to potential demand, site-specific requirements, land area constraints, surrounding existing and future land uses, and network strategy, with TransLink providing final advice on form and function.

All park 'n' ride should utilise urban design and landscaping treatments to enhance integration with the immediate site context (including streetscape and natural features of the site), and minimise visual impacts.

Refer to Table 10.1 for different types of park 'n' ride configurations, and the specific considerations that are related to each.



#### Table 10.1:

Park 'n' ride types

Туре	Description	Specific considerations
At-grade	Typically large, ground	ease of constructability
	level parking areas.	<ul> <li>opportunity for horizontal or vertical expansion in future stages as demand increases/land uses change over time</li> </ul>
		<ul> <li>opportunity for multi-use flexibility i.e. community markets on weekend etc.</li> </ul>
		<ul> <li>opportunity to be re-developed as surrounding land uses change over time</li> </ul>
		<ul> <li>proximity of stop / station</li> </ul>
		<ul> <li>consider pedestrian access walking distance and directness of path to stop/station</li> </ul>
		<ul> <li>impacts on existing infrastructure.</li> </ul>
Multi-storey	Multi-storey car park.	<ul> <li>greater capacity of parking provision when land area is constrained</li> </ul>
		<ul> <li>vertical circulation requirements for both vehicles and pedestrians to be considered i.e. ramps, stairs, lifts etc.</li> </ul>
		<ul> <li>ensure direct access from parking bays to stop/station is available</li> </ul>
		<ul> <li>opportunity for cycle enclosure/hub within structure (if no available at stop/station)</li> </ul>
		<ul> <li>minimised exposure to climate and weather for public transport customers</li> </ul>
		<ul> <li>Crime Prevention Through Environmental Design (CPTED)/ personal safety needs differ</li> </ul>
		• opportunity for future implementation of smart carparking systems i.e. overhead vacant space guidance.
Mixed-use/	Park 'n' ride located	can be at-grade or multi-storey form
TOD	within/adjacent to mixed- use development/TOD.	<ul> <li>located within/adjacent to mixed-use development precinct</li> </ul>
		<ul> <li>may be basement parking under or enclosed by mixed-use development</li> </ul>
		<ul> <li>ensure priority and safety is given to customers accessing the public transport network</li> </ul>
		<ul> <li>ensure park 'n' ride clearly designated for public transport customers</li> </ul>
		<ul> <li>greater street activation to be promoted.</li> </ul>
		Refer to <i>PTIM, Planning and Design</i> Appendix 2-A for detailed information on integrating park 'n' ride with TOD.

### 10.3.2 Other park 'n' ride types

#### 10.3.2.1 Temporary park 'n' ride

A park 'n' ride is considered 'temporary' if that park 'n' ride is designed and constructed with the intention that it will be removed, or otherwise not used, at a point in time after installation and commissioning. Temporary park 'n' ride may be required during:

- upgrade construction works to an existing park 'n' ride
- an event (for example, sporting event and concerts).

Where temporary park 'n' rides are proposed, TransLink would encourage consultation with relevant stakeholders to determine level of patronage, location and duration the temporary facility will be required.

When a park 'n' ride is to be utilised on a temporary basis, it should continue to be designed in accordance with *Disability Standards* and *Australian Standards*, particularly in regard to accessible design, access and egress design, internal layout and circulation, lighting, CCTV, parking aisle and bay dimensions, and designing for persons with disability.

#### 10.3.2.2 Event impacts on park 'n' ride

The following will need to be considered for the design of park 'n' ride when it is known that they could be utilised for events i.e. sporting, concerts etc.:

- level of infrastructure required to cater for event parking demand
- overflow parking: where this is to be located and how it will be managed
- understanding the roles and responsibilities of asset owners, operators, and event organisers etc.



### 10.3.3 Universal design

The philosophy of universal design considers the access outcomes for TransLink customers:

- the whole journey for the customer, regardless of preference or ability, to and through public transport
- infrastructure is continuously accessible
- customers can have direct access to the public transport network
- customers have confidence that the infrastructure will have no barriers to access, and provide what they need for a seamless, continuous journey.

TransLink recognises the importance of providing appropriate accessibility for customers as part of their door-to-door journey. Enabling a customer to navigate a continuously accessible path as part of the 'journey' helps to create an accessible network.

The Whole Journey: a guide for thinking beyond compliance to create accessible public transport journeys (Commonwealth of Australia, 2017) assists in enabling people with disability to genuinely participate in the community by promoting the importance of considering the accessibility of the whole passenger transport journey. TransLink sees this guide as a very important document and application of the principles presented in the guide will help to improve the accessibility of our customers' passenger transport journeys.

TransLink requires that the relevant standards and guidelines for disability access are followed, along with the engagement of relevant disability reference groups, where required. The legislative requirements of the Commonwealth *Disability Discrimination Act 1992 (DDA*) sets out the responsibilities of the Department with regards to access to public transport, with the specifics and details given in the *Disability Standards*:

- Disability Standards for Accessible Public Transport 2002 (DSAPT or Transport Standards)
- Disability (Access to Premises Buildings) Standards 2010 (Premises Standards)

#### 10.3.4 Roles and responsibilities

TransLink's role with respect to the planning and delivery of park 'n' ride infrastructure across the state is to provide guidance on:

- planning and designing park 'n' ride infrastructure that meets passenger demand
- integrating with other public transport infrastructure and services
- designing accessible park 'n' ride facilities that are easy to access and can be used by all commuters
- achieving a consistent look and feel across the network
- meeting specific needs of customers in accordance with TransLink's modal hierarchy (refer to *PTIM*, *Supporting access infrastructure* Section 3.1.2).

TransLink, in partnership with the local government and relevant stakeholders including the asset owner and delivery partners, shall be consulted early on the project requirements and design considerations for both new infrastructure and upgrade of existing facilities.

When the park 'n' ride is associated specifically with a rail station, Queensland Rail, will be a key stakeholder and will need to be consulted early in the planning and design phase. Queensland Rail, will work in partnership with TMR to facilitate access to the site, provide advice on specific park 'n' ride design, infrastructure and operational requirements (i.e. confirm if there is a need for staffing and/or maintenance parking bays, branding requirements, lighting, fencing, security requirements etc.), standards to be adhered to and relevant approvals.

# 10.4 Park 'n' ride environment

10.4.1 Understanding existing and future customers

#### 10.4.1.1 Customer outcomes

TMR are focussed on achieving the following customer outcomes:

- 1. *Accessible, convenient transport:* Access and use of the public transport network should be accessible, convenient, direct and legible.
- 2. **Safe journeys for all:** Customers should feel comfortable and safe when using park 'n' ride infrastructure.
- 3. **Seamless, personalised journeys:** Park 'n' ride infrastructure is to be designed for the customer and should be convenient and responsive to their individual needs and expectations. Design of public transport infrastructure is to consider all modes of access to ensure a seamless interchange and journey for the customer.
- 4. *Efficient, reliable and productive transport for people and goods:* Ensures local access and integration with all modes is achieved and customers are able to move efficiently through public transport infrastructure.
- 5. **Sustainable, resilient and liveable communities:** Providing a balance between movement and place can create vibrant places for the community. Park 'n' ride infrastructure should be designed as sustainable, long term assets that are fit-forpurpose now and into the future, and adaptable to change.

#### 10.4.1.2 Who uses park 'n' ride

In order to provide an enjoyable, safe and comfortable customer experience, an understanding of who the customers are and their differing expectations and needs is required. Table 10.2 provides examples of the specific elements that differ between users to guide early planning and design outcomes. It is noted however that as a minimum, all users, regardless of their ability or how frequently/infrequently they use the public transport network, require the following:

- short and direct paths to stop/station
- minimal physical barriers to reach stop/station
- minimised need to cross roads
- ease of circulation to/through park 'n' ride
- Crime Prevention Through Environmental Design (CPTED)/ personal safety.

#### Table 10.2:

Customer expectations and needs Customer type Example(s) Customer expectation or needs Regular peak-hour commuters Customer who travels frequently to efficient entry and exit with work or education using the public priority access transport network that has strong minimise queues and delays familiarity with stop/station and high frequency trunk services routes through/via development. real-time journey information. • **Off-peak travellers** May include retired passengers, available parking • university students, families clear and legible wayfinding • travelling with children, employees and information. working shift or outside of regular business hours. First-timers / infrequent users clear and legible wayfinding May include tourists, business and information from the travellers, interstate guest visiting external road network, stop/ family. station precinct and within park Customers might have luggage, 'n' ride prams or items unable to move • clear sight lines to stop/station easily. entry and ticket facilities, ticket office etc. People with a disability Customers who are deaf, hard or accessible parking hearing, blind or have low vision, short and direct access to stop/ customers with cognitive disability, station permanent or temporary mobility clear and legible wayfinding disabilities. • and information. Staff allocated parking On-site personnel, maintenance facilities for staff staff etc. allowance for loading/servicing or operational access.

### 10.4.2 Understanding the site

When selecting a site/location, the following should be considered:

- current and future passenger demand
- staging
- integration with current and future land use
- integration with other modes
- land constraints
- land ownership
- environmental factors
- access
- proximity of land to the stop/station for a new facility.

#### 10.4.2.1 Existing and future demands

TransLink will provide final advice on determining need and provision for park 'n' ride infrastructure. Generally, the type and scale of park 'n' ride infrastructure will primarily be based upon existing and future demands, informed by land use, network strategy, available space and site development planning. To ensure the design caters for existing and future park 'n' ride passenger demands, the following should be considered:

- opportunities for accommodating future growth as demand increases with changing land use
- opportunities for staging the delivery of infrastructure
- determine if there is a need for separated entry/exit vehicle crossovers etc.

### *10.4.2.2 Understanding future public transport services*

Design of park 'n' ride to consider:

- additional kerbside space to accommodate additional/future public transport services
- ensure the location of permanent elements does not impede plans to upgrade or expand public transport infrastructure
- integration with public transport stop/station so that public transport capacity, operations and internal circulation requirements can be maintained or enhanced
- changes in the park 'n' ride network that may affect future site demands (for example, new facilities or expansions in other locations along the trunk public transport line).

#### 10.4.2.3 Staging

A park 'n' ride development may be delivered in stages to suit various delivery mechanisms or potential for changes in capacity and/or site configuration at the stop or station. The project should prepare a strategic staging plan early in the planning process to protect for these anticipated changes.

Where horizontal expansion is planned:

- prepare a property procurement plan to ensure strategic land assembly
- clearly identify the future requirements under the development assessment process to protect the requirement and facilitate land assembly
- ensure that high-quality pedestrian access to the stop or station is provided
- assess the impact of the changes on surrounding local and internal traffic networks
- consider park 'n' ride layout design which can be seamlessly expanded into the next stage of development.

Where vertical expansion is planned:

- protect for a suitable column grid, footings and service utility connections based upon structural requirements for the number of levels that are to be constructed
- protect for vertical vehicle movement infrastructure (ramps) and ensure that they will be aligned with internal and/or external road networks
- protect for vertical person movement infrastructure (lifts, overpasses, stairs and escalators) and ensure that they will be aligned with stop or station pedestrian networks and design requirements
- assess and offset the impact of the additional infrastructure against long-term at-grade pedestrian and cycle connections to the stop or station
- plan for the operation of the park 'n' ride during construction stages.

It is also important to manage the intermittent peaks in demand as a park 'n' ride approaches capacity or while being constructed. Consider options for overflow parking that does not impact other stop or station access modes or affect safe and efficient movements in the immediate local area.

#### 10.4.2.4 Integration with land use

The planning and design phase should identify any particular customer needs associated with nearby existing and planned land uses and how they can be addressed while still prioritising access to public transport.

For example:

- should park 'n' ride be planned with adjacent mixeduse development, immediate priority should be given to creating developments with active street frontages that are walking and cycling friendly.
- where future demand is uncertain or likely to be highly variable then consider shared allocation arrangements on a physical or temporal basis, for example, with:
  - parking purposes for other land uses that have complementary demand profiles
  - other complementary activities such as community markets
  - informal parking
  - operational facilities such as bus layover and stabling.

Where shared use of the park 'n' ride facility is expected or if the facility is not solely owned by TMR, consider:

- how the planning and design elements prioritise and promote the public transport function of park 'n' ride above other private vehicle functions
- ensuring the visual design clearly demonstrates that the park 'n' ride facility is available for customers wishing to access the public transport network
- the legibility, accessibility, and consolidation of park 'n' ride as opposed to a piecemeal design, particularly when park 'n' ride is provided within a TOD project.

Refer to *PTIM, Planning and design* Appendix 2-A for detail regarding integration with TOD.

### 10.4.2.5 Integration with other modes

Access connections to public transport infrastructure should be accessible, convenient, direct and legible to encourage public transport usage.

The design of park 'n' ride infrastructure should support TransLink's access hierarchy to public transport, prioritising access for walking, cycling, bus feeder services, taxi and kiss 'n' ride first. Where there is a need to balance park 'n' ride with a significant proportion of other access modes, extensive care is needed to ensure that the impact of the park 'n' ride is absolutely minimised. This can be done through design at the site (e.g. priority crossings, high quality bicycle parking, and/or high-quality interchange facilities). However, it is also likely to require considerations beyond the park 'n' ride's boundary (e.g. improvements to infrastructure or services). This is necessary to balance the unavoidable impacts of an expanded park 'n' ride (e.g. desire to switch to driving) with a need to support these sustainable modes for their full journey.

The design of park 'n' ride infrastructure should allow for seamless passenger movement between modes and services to encourage public transport use and to maximise the quality of the customer experience.

Refer to drawing in *PTIM*, *Supporting access infrastructure* Appendix 3-A that illustrates the overarching design principles for supporting access infrastructure including park 'n' ride.



*Figure 10.1 – TransLink access hierarchy* 

The integration between park 'n' ride infrastructure, all access modes and stations is to consider the following:

- minimising and mitigating the creation of residual spaces between facilities and components using alignment and urban and landscape design treatments
- maintaining visual connection between decision points, dwell-points and activity points
- maintaining environmental quality by protecting from inter-facility impacts on micro-climate (shading, wind and solar access, air quality)
- minimise need for physical barriers between modes
- **pedestrians:** Pedestrian infrastructure should be considered in terms of:
  - interface between the park 'n' ride, station and the wider pedestrian network
  - pedestrian access through the park 'n' ride and to the station, including vertical circulation (i.e. stairs, ramps, lifts, escalators etc.)
  - where possible, take advantage of site topology to incorporate ramps and overpasses rather than lifts and stairs
  - existing and future pedestrian demand.

To provide clear, convenient and accessible links within and to the park 'n' ride, analysis should be carried out to determine anticipated pedestrian desire lines and associated demands. This will inform where access paths and crossing points are to be provided and the minimum widths to cater for pedestrian demand.

- cycling: Integrating cycling access with public transport dramatically increases the catchment areas of the public transport network. All interface points between local bicycle networks and TransLink infrastructure (including cycle storage) must be functionally seamless and focus should always be on integrating with existing infrastructure. Connections must be direct, and legible with safe and convenient crossings
- **feeder services**: Design of park 'n' ride should consider nearby public transport stops and feeder services to ensure that passengers can access this public transport infrastructure conveniently and safely, minimising the need to cross roads
- taxi facilities: As a key part of a balanced transport network, taxi facilities should be integral to public transport infrastructure. The primary integration issue is to ensure passengers can easily identify the

taxi facility location upon exiting the station, and that the park 'n' ride does not conflict with access to the taxi facility

• **kiss 'n' ride**: Park 'n' ride should include kiss 'n' ride facilities as passenger set-down facilities maximise access to the station for all users. Connections between kiss 'n' ride infrastructure and stop/station facilities should be accessible, direct, legible, and incorporate CPTED principles. Kiss 'n' ride infrastructure should be located in close proximity to stop/station and should not interrupt bicycle movements minimising the need to cross cycle paths. Kiss 'n' ride should have direct access where possible, from the road network to minimise delay to pick-up/drop-off.

For detailed guidance refer to the *PTIM*, *Supporting* access infrastructure chapter.

#### 10.4.2.6 Land constraints

Design needs to consider land constraints in determining size, configuration and function of the infrastructure. Additionally, park 'n' ride infrastructure should not consume more space than needed for effective operations.

Where land is readily available (for example greenfield sites) it should be preserved to provide for short and long-term demand. Consideration should also be made for the use of suitable brownfield sites particularly where land is the property of the State.

### 10.4.2.7 Cultural and heritage places

Existing sites may contain components or structures of cultural or heritage significance. Such sites may require particular investigation and attention in the facility design. Sites with cultural features or significance may require permission or approval prior to commencement of any planning and design work. TransLink recommends an appropriate level of assessment is undertaken by an expert assessor.



## 10.5 Functional design guidelines for park 'n' ride

10.5.1 Wayfinding and signage

### 10.5.2 Safety and security

Signage forms a major component of design to assist with navigation to and around park 'n' ride infrastructure. Logical information, wayfinding signage and overall facility signage is important to achieving a consistent and recognisable public transport system.

When developing a park 'n' ride, the design should incorporate public transport signage and wayfinding:

- to ensure that customers can easily recognise and find their way to public transport facilities, including fare machines and ticket offices
- where line-of-sight to nearest decision point can be achieved considering signage height, colour contrast and orientation
- using universal/international symbols and indicators.

For further details of TransLink's signage requirements, refer to the *PTIM*, *Branding*, *theming and signage*.

### Infrastructure is designed to provide passive surveillance and deter undesirable behaviour

The physical environment of kiss 'n' ride facilities must be designed to minimise the possibility of crime, property damage and anti-social behaviour associated with people gathering in public spaces. Creating defensible spaces that allow for surveillance from outside and within the facility will promote safe environments and will attract greater public use. Refer to the current version of the Queensland Government's *Crime Prevention Through Environmental Design* guidelines.





*Figure 10.2 – Passive surveillance example* 

Design of park 'n' ride should encourage passive surveillance. Park 'n' ride design should, for example, minimise visual obstructions, avoid planting or landscaping that can compromise passive surveillance, and ensure the location of bicycle parking/ motorcycle parking is close to main pedestrian paths or locations with adequate passive surveillance.

### 10.5.3 Climatic comfort and weather protection

Resilience to weather and climate should be considered when planning and designing park 'n' ride infrastructure, with highquality climatic comfort and weather protection for customers accessing and utilising park 'n' ride facilities.

In developing the design of park 'n 'ride facilities, the following should be considered:

- any structures/shelters within the park 'n' ride or for pedestrians accessing the park 'n' ride, must provide sufficient physical width, length and height to achieve high-quality climatic comfort and weather protection for passengers
- consideration must be given to the management of sun, wind, rain, heat (including heat island effects within car park), glare and humidity.

An appropriate climate analysis should be included within the planning and design of park 'n' ride infrastructure to inform appropriate facility orientation and suitability for specific locations.

Design and delivery of park 'n' ride infrastructure will focus on sustainability through:

- facility design that is fit for purpose now and into the future, and adaptable to change
- contributing to attractive community spaces and a local sense of place
- commitment to a low environmental footprint and whole-of-life approach through all design, construction and maintenance activities
- increasing visibility of sustainable features and undertaking a participatory approach to design to improve community awareness and support.

Refer to PTIM, Planning and design for further details.

10.5.4 Sustainable assets

# 10.6 Specific considerations for park 'n' ride

## 10.6.1 Functional and simple layout

Maintain simplicity and develop a functional park 'n' ride infrastructure design that provides efficient movement, is easy to interpret and minimises conflict between users.

Park 'n' ride should consider all users, for example persons with disability and mobility impairments, staff and maintenance vehicles and emergency access. The resultant design should provide a legible and pleasant environment, minimising conflict between users. Informal park 'n' ride activity should be discouraged, particularly where safety, amenity and intrusion issues are likely to occur.

The design of a park 'n' ride should:

- first consider the area needed and circulation requirements of supporting access infrastructure in order of priority as per TransLink's access hierarchy (i.e. walking, cycling, feeder services, taxi and kiss 'n' ride facilities prior to park 'n' ride)
- clearly identify entry and exit points from the road network that minimises impact on other modes of access (i.e. pedestrian and cycling infrastructure)
- provide clear and legible wayfinding and information, particularly to highlight that car parking area is provided for public transport users
- provide legible and clear circulation through the car park, allowing for the progressive filling of parking bays
- provide parking bay size and aisle widths appropriate for anticipated vehicle turnover

- include additional park 'n' ride bays for people with mobility impairments or other disabilities where:
  - demand is likely to approach or exceed capacity
  - higher than average demand might be expected (for example, a station serviced by routes that link to major clinical or community health facilities, or services for people with a disability).
- consider the use of a controlled access when conflicting volumes of users, regardless of mode, are high
- identify the need for operational requirements that could potentially share the site such as bus layovers and drivers amenities
- provide prominent and direct path to stop/station for safety and comfort of pedestrians
- minimise the need for the circulation roadway to cross pedestrian paths and cycle paths/lanes
- be accessed from arterial roads. If they are to be provided via local streets, the physical length required for access of this use should be minimised and preferably contained to short sections that relate directly to the stop/station facility
- include CCTV and lighting. Design of park 'n' ride should avoid park 'n' ride light spill impacts on the adjoining properties.

### 10.6.2 Visibility from the road network

Not all stations are easily accessible by private vehicle for most of their potential catchment. This can be due to poor road connections or simply because customers are unaware of the facility as it is not located on their commuting route or is difficult to see.

As such, direct access to and from arterial, sub arterial or distributor roads is preferred for park 'n' ride facilities:

- the use of controlled movements at access points should be assessed where the ratio of traffic volume (park 'n' ride and passing traffic) and road capacity prevents efficient and safe vehicle ingress and egress
- where demand is likely to peak sharply, consider the impact of queuing at entry and exit points.

Additionally, signage or access improvements should be considered where access or visibility of the facility is poor.

The overall impact of park 'n' ride should not negatively impact on the surrounding local area's character and sense of place. Park 'n' ride infrastructure can be designed to enhance and create attractive community places that support and promote economic development for the community. The design of park 'n' ride infrastructure must not hinder this relationship and should complement its surrounding local environment.

Therefore, consider specially designing park 'n' ride facilities so they are landscaped to help them integrate with the surrounding environment. For example, retaining or reinstating existing trees as shading elements within a car park can reduce heat island effects whilst minimising the day-to-day visual impact for customers and passers-by. For multi-storey car parks consider how the façade design can enhance the visual impact of the park 'n' ride facility.



### 10.6.3 Visual impacts

#### 10.6.4 Flexible design

There is a need to ensure park 'n' ride infrastructure is designed in an agile manner that can adapt to changes in the adjacent road network, land use development and associated demands and for changed transport customer behaviours. The design of park 'n' ride should consider:

- how planned road network changes could impact access/ egress from park 'n' ride facility
- incorporating flexible design space to ensure it does not prevent future upgrade to multi-storey design
- future incorporation of demand management measures, including for example, access control at entry/exit points, improved access and integration with other modes and public transport services, and encouraging more sustainable modes of transport for access
- opportunities for future implementation of smart carparking systems i.e. vacant space guidance
- opportunities for future re-development i.e. integration with adjacent planned development/land use proposals
- incorporating proof-of-concept and other agile design approaches i.e. greater electric vehicle use may require charging stations at park 'n' ride, vehicle sharing parking spaces may need to be incorporated
- accommodating first and last mile trips solutions, including micro-mobility i.e. e-scooter
- providing designated storage areas may be required around stops/stations for docked and undocked micro-mobility/ rideable technology.

A summary of management arrangements should be prepared that clearly outlines responsibilities, exemptions, procedures and cost allocations associated with the management, operation and maintenance of the park 'n' ride facility.

For details on requirements refer to PTIM, Planning and Design.

Consider any additional requirements (lighting, fencing, security etc.) for park 'n' ride infrastructure when the associated station has 24/7 operating hours or first to last service hours of opening.

Rail replacement bus arrangements are to be considered when designing and planning park 'n' ride infrastructure. Replacement services can be expected during interruptions (e.g. planned maintenance, track closure, or unplanned disruption) or to supplement rail services.

Refer to *PTIM*, *Bus station infrastructure* and *PTIM*, *Rail station infrastructure* for further detail regarding any additional requirements and considerations when designing park 'n' ride infrastructure adjacent to public transport stations.

### 10.6.5 Asset management

### 10.6.6 Station operations

# 10.7 Park 'n' ride components

This section details the components that need to be included at park 'n' ride facilities. TransLink in partnership with Local Government and Queensland Rail shall be consulted on infrastructure component inclusions for each park 'n' ride as each will have their own specific requirements or specifications.

These are detailed in Table 10.3 where:

- **M** is mandatory (component must be included)
- **P** is preferred (components will be included unless justification is provided and approved by the provider of the park 'n' ride in response to site constraints)
- **S** is site-specific response (component may be required or desirable subject to specific site function and/or requirements)
- **O** is optional (component may be optional or applicable to specific regions across the State)
- - is not applicable (component does not apply to the park 'n' ride type).

#### Table 10.3:

Park 'n' ride infrastructure components

Category	Park 'n' ride component	Facility requirements
Parking types	Accessible bays	Μ
	Motorcycle bays	Р
	Staff/maintenance bays	Р
	Other bay types: i.e. emergency, senior citizens, prams etc.	0
Supporting access	Cycle enclosures/storage and end-of-trip facilitates	Р
facilities	Other public transport (for example bus stop)	S
	Taxi	Р
	Kiss 'n' Ride	Ρ

ConnectivityAccessible clear path of travelMConnecting footpath to/from station/stopMConnecting cycle parking/storage to/from station/stopMConnecting cycle parking/storage to/from local cycleMInformationMWayfinding and signageMNetwork informationSReal-time informationSSafety and securityFencingPerformationSCarl park lightingMFencingPCPTED PrinciplesMCall point (must coincide with CCTV)SSecurity identified surface transport operations (SISTO)SOther customer facilitiesSShopping trolley bay(s)/storageSEnvironmental treatmentsPEnvironmental treatmentsSMoise attenuationSStormwater managementMMoise attenuationSStormwater managementSMoise attenuationSStormwater managementSMaintenance accessSStation servicing (i.e. waste, retail etc.)SStation servicing (i.e. waste, retail etc.)S	Category	Park 'n' ride component	Facility requirements
Connecting footpath to/from station/stopMConnecting cycle parking/storage to/from station/stopMConnecting cycle parking/storage to/from local cycleMConnecting cycle parking/storage to/from local cycleMInformationMWayfinding and signageMRegulatory signageMNetwork informationSReal-time informationSSafety and securityCar park lightingFencingPCHED PrinciplesMSecurity camera/CCTVMCall point (must coincide with CCTV)SCall point (must coincide with CCTV)SSecurity identified surface transport operations (SISTO)SShopping trolley bay(s)/storageSShopping trolley bay(s)/storageSSecurity cameral sustainable design initiativesPInvironmental treatmentsSRuhosen transport operationsSStormwater managementMMoise attenuationSStormwater management facility/servicesSStation servicing (i.e. waste, retail etc.)S	Connectivity	Accessible clear path of travel	Μ
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Station servicing (i.e. waste, retail etc.) S		Maintenance access	S
		Station servicing (i.e. waste, retail etc.)	S

## 1.7.1 Component requirements and design considerations

Table 10.4 provides technical guidance for the design considerations, requirements and standards to be adopted. Key stakeholders are to be consulted with early during design, such as park 'n' ride asset owners and local authorities to ensure the appropriate standards are being applied.

When designing park 'n' ride infrastructure adjacent to a rail station, reference will also need to be made to the Queensland Rail, *Station Design Manual* requirements.

#### Table 10.4:

Design considerations for park 'n' ride infrastructure

Element	Minimum requirement	Design consideration
Parking layout Parking layout eleme roadway/ramp width width, height clearan gradients) are to be accordance with Aus AS/NZS 2890.1, AS 2 NZS 2890.6.	Parking layout elements (for example, roadway/ramp width, parking aisle width, height clearance, ramp gradients) are to be designed in accordance with Australian Standards AS/NZS 2890.1, AS 2890.2 and AS/ NZS 2890.6.	When determining spatial requirements of the park 'n' ride, first consider area needed and circulation requirements of supporting access infrastructure in order of priority as per TransLink's access hierarchy (i.e. walking, cycling, feeder services, taxi and kiss 'n' ride facilities prior to park 'n' ride).
	Use speed bumps ( <i>AS/NZS 2890.1</i> Type	<ul> <li>be legible and consolidated</li> </ul>
	1 for at-grade, Type 2 for multi-storey) to limit vehicle speeds when parking aisle length is greater than 100m.	<ul> <li>avoid "X" shaped intersections within car park module and avoid where possible the use of blind (doed and aicles)</li> </ul>
Ensure design envelope of parking bays is kept clear of columns, walls and obstructions as per <i>AS/NZS</i> <i>2890.1</i> . Blind aisles, if provided, are to be a maximum length of six 90° spaces plus 1m, unless turnaround provision included.	Ensure design envelope of parking bays is kept clear of columns, walls and obstructions as per <i>AS/NZS</i> 2890.1.	<ul> <li>minimise the mixing of traffic (between access modes and between land uses) when park 'n' ride is associated with mixed-use developments or is a shared facility</li> </ul>
	<ul> <li>consider the largest design vehicle expected within car park (liaise with TransLink and service operator to confirm)</li> </ul>	
		<ul> <li>use space efficiently. For example, TransLink prefers the use of 90° car parking bays in large areas</li> </ul>
		<ul> <li>facilitate progressive filling of spaces in a way that avoids the need for re-circulation to search for vacant spaces</li> </ul>
		<ul> <li>utilise gentle vehicle ramps within multi-storey car park structures, potentially through ramped floors, to protect against the impact of lift failure.</li> </ul>

Element	Minimum requirement	Design consideration
Parking bays	Parking bay size or envelope is to be designed in accordance with <i>AS/NZS 2890.1</i> User Class 1.	<ul> <li>motorcycle parking bays are to be located where passive surveillance can be achieved, preferably close to the stop/station entrance.</li> </ul>
	The desired minimum width of 90° car parking bays is 2.5m.	Liaise with TransLink and service operator to confirm:
	Service vehicle bays to be designed in	<ul> <li>staff and maintenance bay dimensions</li> </ul>
	accordance with AS 2890.2.	<ul> <li>any additional requirements for non-regular</li> </ul>
	As per Queensland Rail, <i>Station Design</i>	parking, pram parking etc.
	provided at rail station park 'n' ride, should equate to 5% of total parks,	<ul> <li>the number and type of maintenance vehicle bays required</li> </ul>
	with a minimum of two and maximum of 20.	<ul> <li>the use of wheelstops. Queensland Rail preference at rail station park 'n' ride is to avoid</li> </ul>
	If wheelstops are provided, they are to be designed in accordance with <i>AS/ NZS 2890.1</i> .	the use of wheelstops. For all other park 'n' ride, wheelstops can be provided to control vehicle overhang over pedestrian access paths; prevent contact with a high obstruction; or prevent encroachment into adjacent parking bay.
Accessible parking bays	Persons with disability (PWD) parking to provided at 1 space per 50 total parking spaces as per the	<ul> <li>PWD parking provision to be determined based on total number of car parks provided in the whole park 'n' ride as per below example:</li> </ul>
	Building Code of Australia (National Construction Code Volume 1).	An existing park 'n' ride of 130 spaces over two car parking areas, including 2 PWD spaces, is to
	As per Queensland Rail, <i>Station Design</i> <i>Manual,</i> rail station park 'n' ride are to provide a minimum of two PWD bays.	be expanded by an additional 42 car parks. To determine the new minimum requirement of PWD the following calculation is carried out:
	PWD bays to be designed as per AS/	130 (existing) + 42 (new) = 172 parking spaces
	NZS 2890.6.	172/50 = 3.44 PWD bays
		Round up to nearest integer, a minimum of four PWD parking spaces must be provided within the expanded park 'n' ride within close proximity to the station entrance.
		<ul> <li>where multiple park 'n' ride sites are provided at a stop/station, PWD parking should be provided where short and direct access to the stop/station entry point is available i.e. can be provided in multiple parking areas</li> </ul>
		<ul> <li>where accessible bays are away from the building, rest areas should be provided in accordance with DSAPT</li> </ul>
		<ul> <li>a continuous accessible path of travel between stop/station and PWD parking bays is required.</li> </ul>

Element	Minimum requirement	Design consideration
Access cross- over	<ul> <li>Access type and width:</li> <li>dependent on largest design vehicle, number of vehicles within car park and the hierarchy of the frontage road</li> <li>to be determined using AS/NZS 2890.1 and AS 2890.2.</li> <li>Minimum queuing distance to be determined using AS/NZS 2890.1 to minimise spill back to adjacent road network.</li> <li>Access surface/design to be compliant with local government standards requirements.</li> </ul>	<ul> <li>access to park 'n' ride facilities are to be easily recognisable by road users</li> <li>access between different uses (i.e. park 'n' ride, bus feeder, mixed-use development, TOD development etc.) should be separated to minimise conflict between users</li> <li>TransLink prefers vehicle entry and exit paths to be separated (i.e. entry/exit paths separated by a traffic island when provided at a single access point)</li> <li>queued vehicles at park 'n' ride entry are oriented away from the immediate vicinity of the stop or station</li> <li>protect for the potential implementation of demand management devices, such as boom gates and payment/validation infrastructure, at park 'n' ride entry points.</li> </ul>
Access paths (pedestrians and cyclists)	<ul> <li>preferred minimum width of access paths is 1.8m for pedestrians only, and 2.5m when shared with cyclists</li> <li>access paths to be consistent with Austroads and Australian Standards based on anticipated demand</li> <li>access paths to be compliant with AS 1428.1 where applicable (i.e. access provided from PWD bays)</li> <li>where parking bays and circulation paths are at different grades, additional path width is to be provided to accommodate kerb ramps as per Australian Standards</li> <li>preferred access path surface treatment is to be as per asset owner requirements i.e. IPWEAQ Standard Drawing RS-065 when located within TMR/Queensland Rail property or local government standards if located on council land/road reserve.</li> <li>access path slip resistance to be</li> </ul>	<ul> <li>minimise need for vehicles accessing the park 'n' ride to cross paths with cyclists and/or pedestrians</li> <li>avoid the need for cyclists and pedestrians to use parking aisles for access to end-of-trip amenities</li> <li>where a cycle access path runs parallel at- grade with a park 'n' ride access road, provide additional dedicated lane width</li> <li>facilitate safe and direct pedestrian access to the stop or station, noting TransLink prefers that pedestrian access paths be located between parking bay rows on the non-trafficked side of the bays</li> <li>park 'n' ride entry and exit points should be located adjacent to or near pedestrian crossings that provide direct access to the primary stop or station entry point</li> <li>avoid sharp turns and maintain sightlines (consider the visibility of objects such as poles, stop bars, handrails, barriers and sign posts)</li> <li>under no circumstances should cycle paths be led through shared zones for accessible park 'n' ride bays</li> </ul>

Element	Minimum requirement	Design consideration
Pedestrian crossings (external)	<ul> <li>Refer to TMR Manual of Uniform Traffic Control Devices, Part 10, Pedestrian Control and Protection, Austroads Guide to Traffic Management, and Australian Standards etc. for design requirements of pedestrian crossing facilities</li> <li>refer to Austroads Australasian Pedestrian Crossing Facility Selection Tool [v2.1.2] to inform pedestrian crossing facility type.</li> </ul>	<ul> <li>at-grade pedestrian crossings are preferred where safety and relative priority can be maintained</li> <li>uncontrolled crossings (i.e. zebra crossings and shared zones), are preferred except where safety or capacity concerns exist</li> <li>traffic should be diverted or de-prioritised where there are pedestrian concentrations. Where controlled crossings are necessary, this can be achieved by giving priority to the pedestrian movement and minimising waiting times for pedestrians.</li> </ul>
Kiss 'n' ride	<ul> <li>kiss 'n' ride is to include passenger set-down and pick-up bays designed in accordance with <i>AS 2890.1</i> parallel parking bay requirements and dependent on the aisle width and one-way/two-way operation</li> <li>design pedestrian and vehicle waiting areas and pedestrian access paths as per <i>Australian Standards</i></li> <li>meet the requirements of <i>AS/NZS 2890.6</i> for accessible bays i.e. 7.8m x 3.2m parallel parking bay with adjacent shared area</li> <li>include provision of shelter with seat within waiting area of kiss 'n' ride facility.</li> </ul>	<ul> <li>minimise inter-modal traffic and local traffic movements</li> <li>cycle paths should avoid interaction with kiss 'n' ride bays and any shared areas associated with accessible kiss 'n' ride bays</li> <li>where possible, segregate kiss 'n 'ride bays and their through-lanes from other traffic</li> <li>provide direct connections to public transport infrastructure that are accessible, direct and legible and incorporate CPTED principles</li> <li>be located at or near pedestrian crossings which then provide direct access to the primary stop/ station entry point</li> <li>have priority over park 'n' ride for proximity to the stop/station</li> <li>PWD bays must be located as close as possible to the stop/station entrance and incorporate appropriate accessibility design features, such as kerb ramps, shelter and direct access.</li> <li>For further detail on designing kiss 'n' ride, refer to <i>PTIM, Supporting access infrastructure.</i></li> </ul>
Traffic impact	Traffic impact assessment, where required, should be carried out by a qualified engineer as per TMR's <i>Guide</i> <i>to Traffic Impact Assessment</i> .	Traffic generated by increasing or adding park 'n' ride to a station may need to be analysed to ensure any impacts on the surrounding road network can be appropriately mitigated. Liaise with TransLink to confirm the level of assessment required.

Element	Minimum requirement	Design consideration
Wayfinding and signage	The design of park 'n' ride, even when privately owned, must demonstrate consistency with TransLink and Queensland Rail design, branding and signage. Refer to <i>PTIM, Branding,</i> <i>theming and signage</i> and Queensland Rail's <i>Station Design Manual</i> . For customer specific guidance refer to TransLink <i>Rail Station Signage Manual</i> and <i>Bus Station Signage Manual</i> . For regulatory signs guidance refer to the TMR <i>Queensland Manual</i> <i>of Uniform Traffic Control Devices</i> <i>(MUTCD)</i> and <i>AS 1742</i> .	<ul> <li>incorporate signage and wayfinding as part of the overall signage plan for stop/station:         <ul> <li>ensuring that public transport information is provided in advance of decision points between the park 'n' ride and the stop or station</li> <li>ensuring customers can easily recognise and find their way to the stop/station</li> <li>considering need for wider precinct wayfinding signage to enhance legibility of access to the site</li> <li>considering signage height, colour contrast, orientation, using universal/international symbols and indicators.</li> </ul> </li> </ul>
Pavement surface and markings	<ul> <li>Pavement marking to be provided in accordance with TMR <i>Queensland MUTCD</i> and <i>AS 1742</i>.</li> <li>Flexible asphalt pavement is the preferred pavement treatment for park 'n' ride.</li> <li>Pavement design to be as per Austroads <i>Guide to Pavement Technology</i> and TMR <i>Pavement Design Supplement</i>.</li> <li>Pavement design for the facility must take due consideration of the following:</li> <li>pavement design life is for 20 years, whereby it is fit for purpose and performs its function without the need for replacement or major maintenance</li> <li>traffic volumes entering the facility including type of vehicles accessing the facility (including any services vehicle requirements)</li> <li>geotechnical conditions. Appropriate geotechnical investigation should be undertaken to inform pavement design and identify any latent conditions.</li> </ul>	<ul> <li>surfacing material should be selected for: <ul> <li>ease of cleaning</li> <li>slip resistance in all weather conditions</li> <li>avoidance of pooling or collection of detritus or other unwanted debris</li> </ul> </li> <li>typically pavements should be designed to withstand occasional limited use by heavy vehicles. Areas where this is not reasonable should be clearly signed or made inaccessible to such vehicles</li> <li>where the park 'n' ride involves the redevelopment of an existing site, considerations must be given for utilisation of existing pavements taking account of existing pavement of parking bays and clarity of pavement markings, materials, cost, constructability, operational and maintenance requirements.</li> </ul>

Element	Minimum requirement	Design consideration
Fencing	When designing a park 'n' ride adjacent to a rail station, refer to Queensland Rail's <i>Station Design Manual</i> for detailed fencing requirements compliant with the rail operator's requirements.	<ul> <li>liaise with TMR for further guidance and assessment requirements for fencing, barrier and edging for park 'n' ride infrastructure</li> <li>fencing needs to consider interface with adjacent properties (for example, Queensland Rail's land) and need to protect users or direct to safe crossing locations.</li> </ul>
Lighting	<ul> <li>lighting is to be provided at all pedestrian areas and circulation roads within public transport infrastructure and parking facilities. Lighting levels are required to meet the appropriate <i>Australian Standards</i> application within <i>AS/NZ</i> 1158.3.1 2005 – Lighting for roads and public spaces</li> <li>when designing a park 'n' ride adjacent to a rail station, refer to Queensland Rail's <i>Station Design Manual</i> for detailed lighting requirements compliant with the rail operator's requirements.</li> </ul>	<ul> <li>lighting along pedestrian circulation paths should be consistent with all other pedestrian paths</li> <li>minimise light spill to neighbouring properties by using spill guards</li> <li>minimise light spill from headlights into adjacent properties and businesses that operate at night: <ul> <li>adopt appropriate fencing, such as double pailing</li> <li>use plantings and circulation road/parking aisle geometry as the preferred treatment methods</li> <li>avoid glare screens except where other options are not available</li> <li>where glare screens are approved for use, ensure that they match the design theming and standards applied to the stop or station architecture.</li> </ul> </li> <li>consider lighting needs inside a multi-storey park 'n' ride including: <ul> <li>seasonal impacts on maintaining access for natural light</li> <li>the impact on visual sightlines and reflectivity from headlights and down-lights.</li> </ul> </li> </ul>
Noise	Noise levels during operation and construction should comply with the relevant requirements of the Environmental Protection Act 1994, Environmental Protection (Noise) Policy 2008, Australian Standard AS2107:2016, TMR's Road Traffic Noise Management Code of Practice Volumes 1 to 3 and local authority policy and design standards.	<ul> <li>minimise reverberation and vibration from vehicle and vocally-generated noise</li> <li>avoid surfaces and devices such as speed bumps that may cause wheel squeal or excessive noise</li> <li>locate noisy operational equipment away from adjacent residential or business properties, or sound-proof the plant housing.</li> </ul>

Element	Minimum requirement	Design consideration
Security and safety	When designing a park 'n' ride adjacent to a rail station, refer to Queensland Rail's <i>Station Design</i> <i>Manual</i> for detailed surveillance requirements compliant with the rail operator's requirements.	<ul> <li>liaise with TMR for further guidance and assessment requirements for security and safety</li> <li>apply CPTED principles to maximise pedestrian safety, visual integration and the use of security infrastructure (for example, security cameras).</li> <li>park 'n' ride facilities and connecting paths must be specifically covered by security infrastructure (for example security cameras) with the ability to survey movements between public transport platforms and the park 'n' ride.</li> </ul>
Stormwater drainage	Stormwater drainage should generally be designed in accordance with the requirements of <i>Queensland Urban</i> <i>Drainage Manual (QUDM)</i> and the site specific requirements and conditions of the relevant local authority. When designing a park 'n' ride adjacent to a rail station, refer to Queensland Rail's <i>Station Design</i> <i>Manual</i> for detailed stormwater drainage infrastructure requirements.	<ul> <li>effective management of stormwater is a key consideration of the design in order to ensure that the quality and quantity of run-off is not adversely affected by the park 'n' ride facility</li> <li>the key influences on the development of design of the stormwater include: <ul> <li>site levels</li> <li>minimise the impact on the existing stormwater flow regime</li> <li>the location of a suitable lawful point of discharge</li> </ul> </li> <li>stormwater drainage from parking areas should be captured and treated prior to release into local stormwater systems</li> <li>consideration of low maintenance stormwater treatment and storage facilities</li> <li>if practical, structures should capture stormwater and rainfall for re-use on-site</li> <li>avoid field inlet pits for drainage within circulation aisle/road and access paths.</li> </ul>
Landscape treatment	<ul> <li>landscaping treatments are to:         <ul> <li>respond to the local landscape character of the area</li> <li>meet the planting requirements of the local authority</li> <li>meet the required offsets for utilities (both above ground and underground)</li> </ul> </li> </ul>	<ul> <li>provide a planting strategy that assists with wayfinding and legibility of place</li> <li>tie-in landscaping treatments with the existing landscape palette of the area for design consistency</li> <li>consider opportunity to increase shade by adding trees where possible, to provide better user experience</li> </ul>

Element	Minimum requirement	Design consideration
Landscape treatment (continued)	<ul> <li>be unlikely to interfere with pedestrian movement, parking aisles, circulation road or parking bay integrity or intrude upon the travel path at ground level (for example, low groundcovers or native grasses where vehicle overhang is required at parking bays)</li> <li>be consistent with local flora (use local genetic populations in natural areas of significant ecological value)</li> <li>provide shading by proposing trees around stops/stations and pedestrian areas</li> <li>comprise plants that are drought-resistant, low maintenance and robust.</li> </ul>	<ul> <li>avoid plants that are:</li> <li>toxic, highly allergenic or noxious weeds</li> <li>known to produce thorns, barbs, stings or noxious secretions</li> <li>known to attract dangerous fauna</li> <li>likely to cause CPTED issues by creating hideaway spots.</li> </ul>
General civil	<ul> <li>carry out "Dial Before You Dig" enquiries to understand existing utility infrastructure (i.e. gas, stormwater, electricity, telecoms, water, sewer) connections at the site at the commencement of planning and design project</li> <li>geotechnical investigation should be considered to inform the design of earthworks, pavements, in-ground structures, in-ground infrastructure</li> <li>traffic islands should have acceptable kerb height where overhang is designed as per Austroads and Australian Standards.</li> </ul>	<ul> <li>flooding levels of the site should be considered in the planning and design of park 'n' ride</li> <li>site levels must take consideration of interfaces with existing levels, accessibility requirements, provision for surface water run-off and impacts on existing public utility plant and infrastructure.</li> <li>upon identification of public utility plant, in- ground services investigation (including ground penetrating radar and/or potholing) should be undertaken to verify location and identify any potential clashes with design.</li> </ul>