Sunshine Coast

Open Space Landscape Infrastructure Manual

Fences and gates

Information sheet (INFO)

Also see:

Technical drawing index (DWGS)

Sunshine Coast COUNCIL

Embellishments

April 2022

Contents page (continued)

Information sheets

1.0 Overview

This category of the LIM has been developed to provide guidance for the design and construction of fences and gates.

This category addresses the following:

- **Fences and gates for Environmental Reserves**
  - **Standard**
  - **Specific purpose such as:**
    - Fauna fences and gates
    - Wetlands fencing.
- **Fences and gates for Parks and Gardens**
  - **Standard**
  - **Specific purpose**
    - Playground fences and gates
    - Dog off leash parks fences and gates
    - Stormwater infrastructure.
  - **Other options**
  - **Materials, fixings and finishes.**

Important notes:

- This resource does not try to replicate all of the provisions of Legislation, Australian Standards (AS) and corporate documentation in words and pictures, nor does it seek to define their requirements.
- Please refer to the relevant authority websites for updated information and current document distribution dates. These documents are subject to amendments from time to time.
- Product design, manufacture and installation requires appropriately qualified professional, fabricators and installers to provide site specific solutions.

2.0 Location and open space function

Desired standards of service (DSS)

DSS provide a guide, at a strategic level, for the desired standards required for Council land, infrastructure and natural assets, being purchased, contributed, developed or managed.

SC Environment and Liveability Strategy (ELS)

The ELS contains the DSS for open space and provides a guide to what type of park/reserves are suitable for the various categories of embellishment.

Refer to *SC ELS 2017 Part C.*

The ELS provides guidance, specifically for Open Space (including Environment Reserves). The DSS for each theme includes:

- introduction of categories
- guidelines – to be applied in planning, design and management
- category standards – detailed description and standards /requirements for each category.

The DSS may also include:

- land suitability – land requirement criteria and constraints
- category directions – specific planning directions
- summary of the DSS (Coastal, Open Space and Social Infrastructure) – a quick reference to provision rates and standards
- embellishments (environment reserves and open space) – tables providing standard embellishments applicable to these categories which help inform acceptable activities/infrastructure needs.

SC Recreation Parks Plan (RPP)

The RPP provides a more detailed guide for the location, quantity, distribution and size of embellishments for Recreation Parks.

Refer to *SC RPP 2021-2031*.

The RPP provides guidance for the location of activities and embellishments in relation to:

- **appropriate activity** and **level of embellishment** for each park type
- **quantity** (recommended number of facilities in each locality, recommended number of associated embellishments for each category)
- **distribution** (catchment for provision of activity where relevant)
- **size** (optimal space requirement where relevant).

Open Space Landscape Infrastructure Manual (LIM)

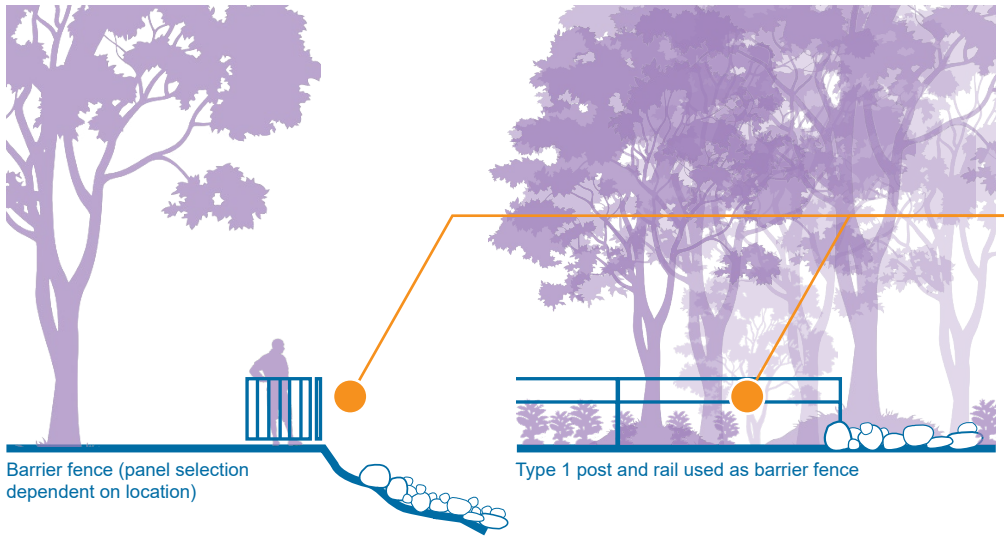
Once the location/requirements are decided, the LIM provides guidance for the design and delivery.

3.0 Quick reference guide

Post and rail fences

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.



Barrier fence (panel selection dependent on location)

Type 1 post and rail used as barrier fence

Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where separation, protection or demarcation of boundary limits is required
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)

Post and rail fence requirements

- Design must restrict unauthorised access by motorbikes or motor vehicles
- Post and rail fence panels can be used as 'barrier' and or 'perimeter' fences – case by case basis. Engineering certification may be required
- Where gates are required, match fence material where possible
- Natural elements may be used to create / contribute to a barrier fence (i.e. vegetation, stones / boulders)
- Materials selection should consider – the level and type of use, potential unlawful entry and adjacent fence material
- Post tops – all timber post tops to be angled at 15 degrees to prevent water damage. Galvanised post tops to be capped
- Rails – all timber rails to have arrissed edges for safety and superior finish, all galvanised top rails to be welded to galvanised posts

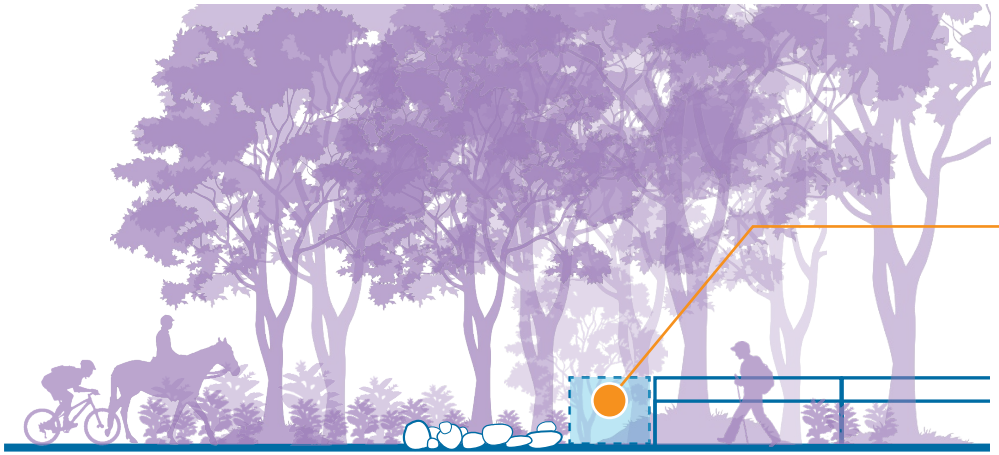
Finished surface and fixing method

- All footings must be designed and installed to engineer's specifications

Chicane gate and horse step overs

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.



dashed blue box is a chicane gate system *OR* a horse step over

Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where separation, protection or demarcation of boundary limits is required
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)

Chicane gate systems and horse step over requirements

- Design must restrict unauthorised access by motorbikes or motor vehicles
- Must allow access for pedestrians, bike riders and horse and rider
- Materials selection should consider – the level and type of use, potential unlawful entry and adjacent fence material
  - Gates / step over, must appropriately match the adjacent fence material or natural elements (i.e. vegetation, stones, boulders)
- Post tops – all timber post tops to be angled at 15 degrees to prevent water damage. Galvanised post tops to be capped
- Rails – all timber rails to have arrissed edges for safety and superior finish, all galvanised top rails to be welded to galvanised posts
- Chicane gate designs must ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings)

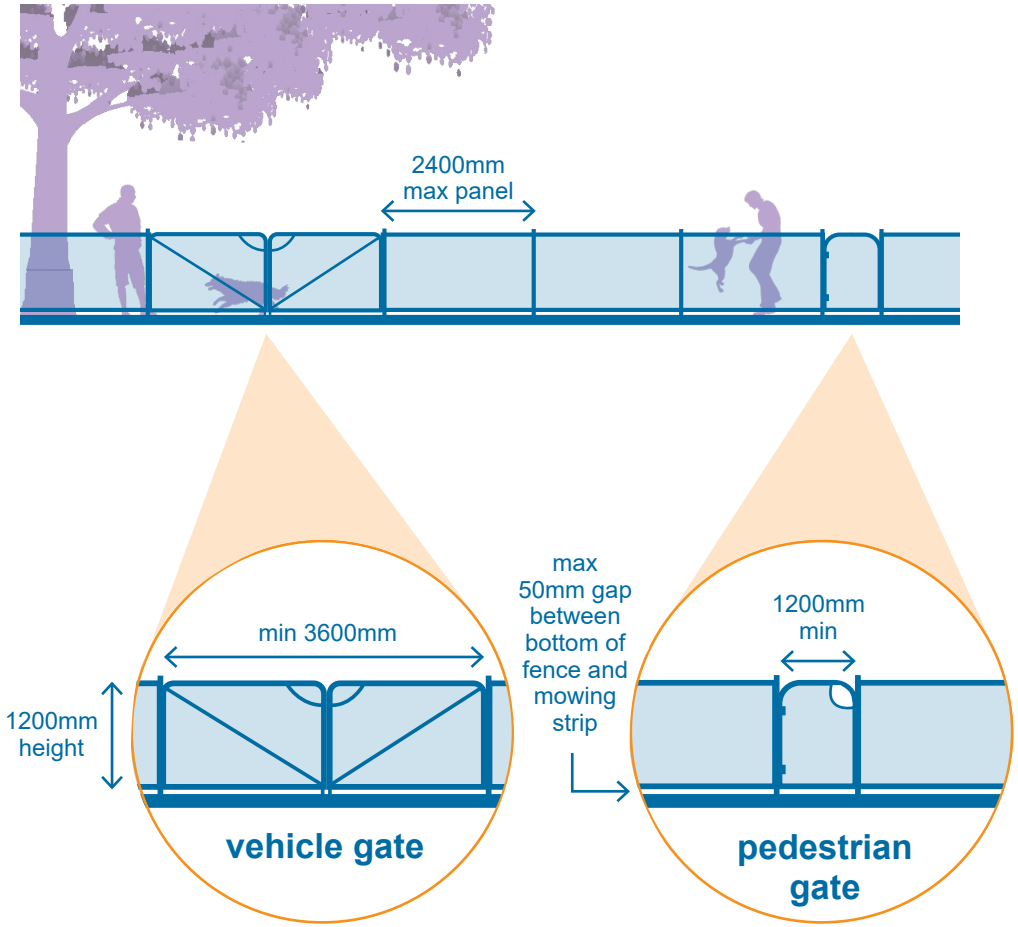
Finished surface and fixing method

- All footings must be designed and installed to engineers specifications

Dog off leash parks fence and gates

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.



Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where separation, protection or demarcation of boundary limits is required
- Locate away from potential conflict areas (i.e. playground)
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings)

Fence panel requirements

- Hot dipped galvanised CHS frame, heavy duty PVC coated black wire mesh
- Concrete mowing / anti dog digging strip centred directly under fenceline to prevent dog digging and escapes
- Gaps in mesh and under fence *must not allow* a small dog to escape

Pedestrian gate requirements

- Must match fence panels
- Install minimum 2 x entry points, must be visible from all areas of park
- Each entry point must have dual gate entry system (2 x gates per entry), gates open both directions
- Lock – 'D' latch with 100mm opening in chain wire, operation of gate both sides
- Concrete mowing strip centred under fenceline

Vehicle gate requirements

- Must match fence panels
- Lock – Parks 30 key. Provide either a single or two separate keyed locks to be operated by council and emergency services. Incorporate loop latch over both gates for security and stability with anti-vandal locking mechanism
- Concrete mowing / anti dog digging strip centred directly under fenceline and reinforced for vehicle load
- Include a recessed hole for pad-bolt pin (one per gate)

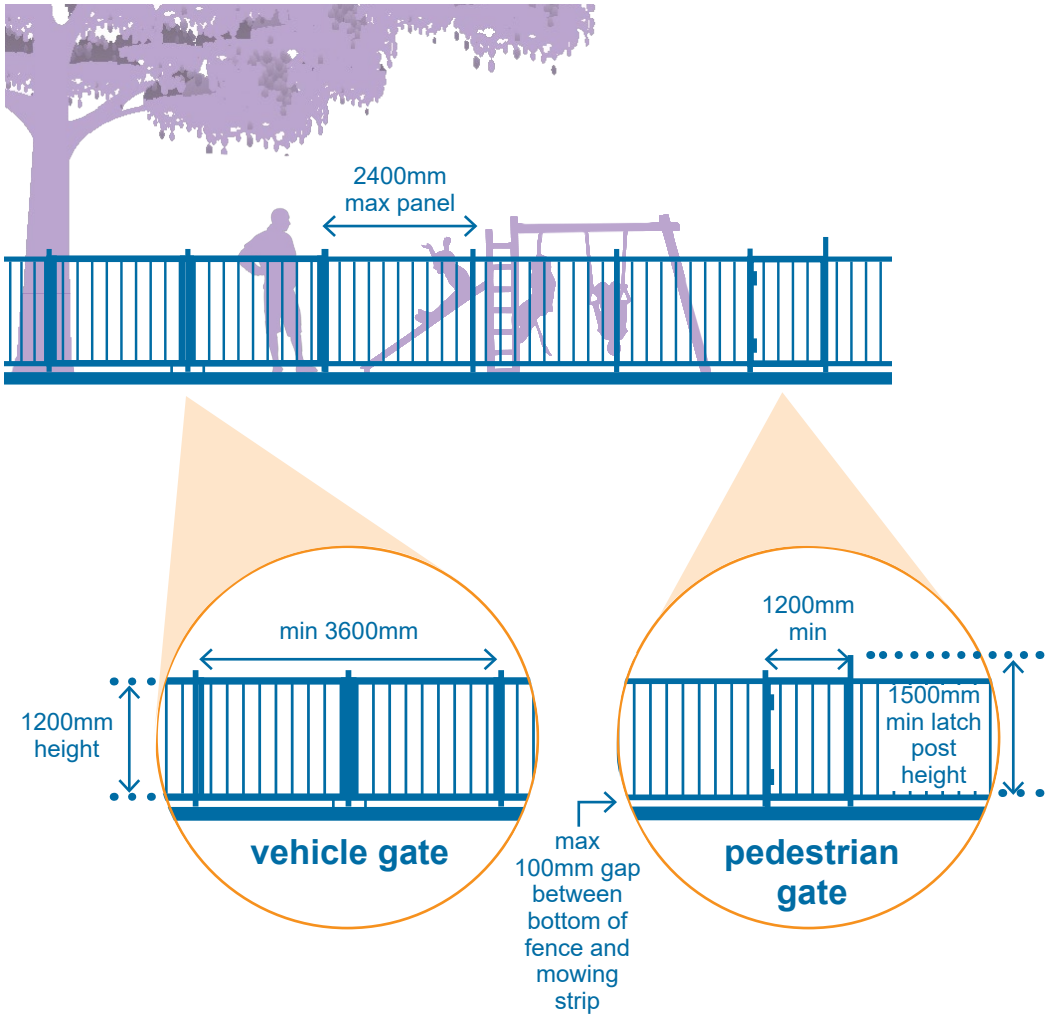
Finished surface and fixing method

- All footings and concrete mowing strip must be designed and installed to engineers specifications

Play spaces fence and gates

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.



Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where separation, protection or demarcation of boundary limits is required
- May be located adjacent to a potential risk / conflict (i.e. busy roads)
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)

Fence panel requirements

Design requirements:

- Fence fixtures – MUST meet *AS 1926.1:2012* (hinges, latches, height requirements, etc.)
- Fence materials – MUST be extra heavy duty, suitable for public open space use. **Standard residential pool fencing is NOT to be used for any council facility**

- Aluminium powder coated (black panels and timber look posts), all posts capped.
- Ensure there are no entrapment or crushing points – i.e. square flat top and bottom rails (no partial bound openings), appropriate gaps at gate openings
- Signs attached should not have sharp edges or create footholds
- Concrete mowing strip centred directly under fenceline

Pedestrian gate requirements

- Must match fence panels
- Install 1,2 or 3 entry points (varies), must be visible from all playground areas
- Gate must open inwards only and be self latching
- Lock – child safety top latch Magnalatch (or equivalent)
- Brace each corner of gate (as welds are prone to becoming weak)

Vehicle gate requirements

- Must match fence panels
- Lock – Parks 30 key. Provide either a single or two separate keyed padlocks to be operated by council and emergency services. Include a drop bolt on each gate. Include removable post (match panel posts) in a sleeve between the two gates, inset in an in-ground sleeve. Gates to lock to removable post
- Concrete mowing strip centred directly under fenceline and reinforced for vehicle load Include a recessed hole for pad-bolt pin (one per gate)

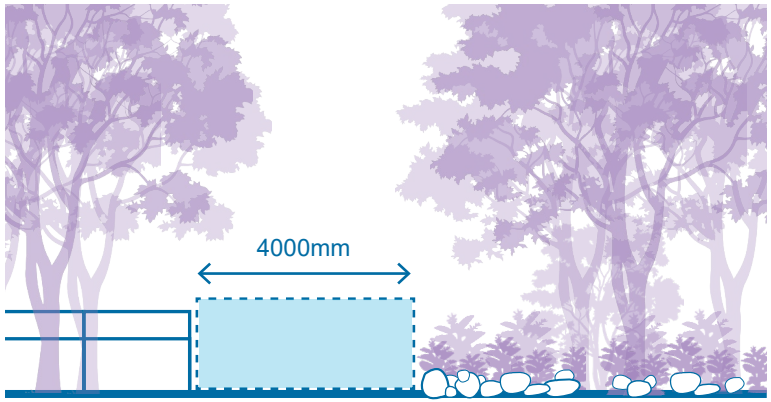
Finished surface and fixing method

- All footings and concrete mowing strip must be designed and installed to engineers specifications

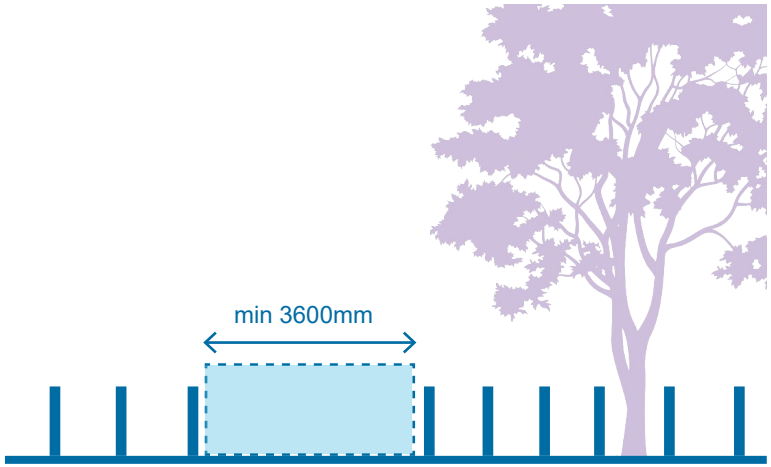
Vehicle gates (excluding for use for playground and dog fence areas)

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.



typical 'super heavy duty' scenario – Environmental Reserve



typical 'standard CHS' scenario – Park

Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where controlled vehicle access is required
- Ensure the gate opening area is not restricted by obstructions (trees) and allows adequate circulation space for the vehicle
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings)

Vehicle gate (super heavy duty) requirements

- Design must restrict unauthorised access by motorbikes or motor vehicles
- Constructed with heavy duty materials and hinged to open both ways where possible to facilitate entry. All ends to be capped
- Lock – Parks 30 key. Provide lock shrouds around locking mechanism to be operated by council and emergency services, determine by site. Lock system to provide provision for up to two (min) or four separate keyed access points
- Provide sufficient overhead space and width for large vehicles (fire trucks)
- Locate gate with a connecting barrier fence or natural elements (i.e. vegetation)

Vehicle gate (standard CHS) requirements

- Design must restrict unauthorised access by motorbikes or motor vehicles
- Constructed with CHS material and hinged to open both way where possible to facilitate entry. All ends to be capped
- Lock – Parks 30 key. Provide lock shrouds around locking mechanism to be operated by council and emergency services, determine by site. Lock system to provide provision for one (min) or two separate keyed access points
- If gate is wider than 4.5m structural supports are required
- Provide sufficient overhead space for large vehicles (fire trucks)
- Locate gate with a connecting barrier fence or natural elements (i.e. vegetation)

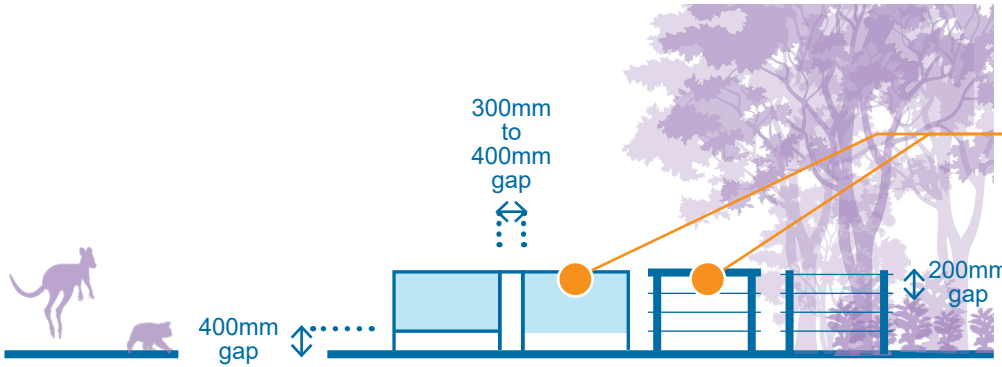
Finished surface and fixing method

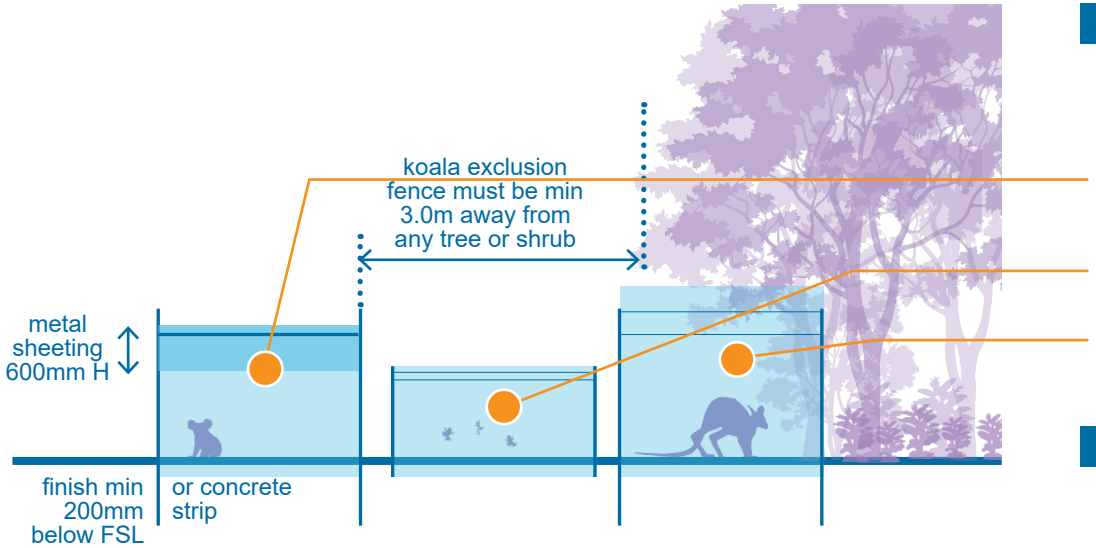
- All footings must be designed and installed to engineers specifications

Fauna fencing

Embellishments should be designed / selected and installed as follows:

1. Fit for purpose, appropriately positioned and accessible.
2. Durable, robust and safe (suitable for corrosive environments).
3. Vandal resistant with parts that are easily replaceable.
4. Easy to maintain (with appropriate warranty and workmanship).
5. Comply with relevant standards / legislation / corporate documents / approvals.





Note: Further guidance and clarification of the content on this page, can be found in the relevant sections of this information sheet.

Planning / design / positioning

- Locate where native fauna require protection / direction
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards)
- In accordance with *Fauna Management Plan* (where required)
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings)

Fauna friendly fence requirements

- Correct fence type must be selected for the identified native fauna species
- Design must allow fauna to move through, across and or over in both directions
- Plant trees and shrubs close to fence or overhanging the fence
- Plastic coated wire is preferred
- Fire break close to a fence is not preferred
- Install signs advising of fauna presence

Fauna exclusion fence requirements

- Design must contain the targeted fauna or re-direct fauna to safe areas. Fence and gate panels must not contain any gaps, to contain animals safely. Matching vehicle gates, subject to site requirements
  - **koala exclusion fence** – coated PVC chain wire fence, posts, galvanised flat sheet powder coated mounted at top, all end caps welded, min O/A height 1.5m (prefer 1.8m)
  - **frog exclusion fence** – shade cloth (green or black knitted above 80% weave), posts O/A height min 1.2m from finished ground level to base of bend
  - **kangaroo exclusion fence** – chain wire fence, posts, all end caps welded, must contain a 'floppy top' design, min O/A height 1.8m (prefer 2.0m)

Finished surface and fixing method

- All footings and optional concrete mowing strip must be designed and installed to engineers specifications

4.0 Site planning

Best practice guidance for site planning includes:

Decision framework

There are a range of Australian Standards / best practice guidelines, relating to this category. Key documents are referenced throughout and in the *9.0 Recommended standards* section.

Clear zone requirements

Road clear zone requirements are to be considered as per Transport and Main Roads *Road Planning Design Manual:*

- Clear zones are to be free of non-frangible objects.
- Fences and gate materials must not create a spearing hazard if impacted by a vehicle.

Site decisions

All decisions, including the location of fences and gates must be made in conjunction with council, including officers from SCC Parks and Gardens, and/or Environmental Operations (determined by site location), and Transport Infrastructure Management.

Users

Consult with council stakeholders, neighbouring properties and identified park users in the planning stage of a project.

Site conditions

Consider the physical characteristics of a site and requirements of the activities to be conducted:

- location of utilities
- flood immunity requirements.

Existing uses (ie. events, recreational use)

The design must not impede or prevent existing uses. Consider the following:

- **Recreational uses** – Circulation for recreational uses such as:
  - watercraft activities unloading and launching
  - play space user circulation between equipment and fences.
- **Events use** – Access for events, such as regular events (festivals) and infrequent events or activities (weddings).
  - SCC locking systems are temporarily replaced with special event locking mechanisms.
  - Community volunteers hold a special key for the duration of an event.
  - Must consider safe operation for use by community volunteers.

Wildlife

Consider the movements of wildlife. Design the fence so that it does not create a barrier to wildlife (such as koalas) or to seasonal wildlife (such as nesting turtles).

- The design should not impact adversely on wildlife.
- Design fences to keep native wildlife out of danger zones (i.e. road corridors, housing estates).
- Do not select barbed wire for fences as it poses a significant risk of entanglement and death for wildlife.

See *Environmental Reserves – Fauna Fencing* (this category) for further guidance.

Trees

For fences and gates construction near established trees, refer to *AS 4970:2009 Protection of trees on development sites*. Consult a qualified arborist to determine:

- Tree protection zones
- Construction offsets
- Where there is a potential for tree root impacts, use tree safe techniques such as vacuum excavation.

See *LIM Preliminaries – Site set up (including Tree protection)* for further guidance.

Co-location of facilities

- Facilities, including parking and pathways, are often already established and need to be considered in the determination of fence and gate location.

Safety

- Safety clearances must be met.
- Adopt principles of *Crime Prevention Through Environmental Design (CPTED) Guidelines for Queensland.* Locate fences and gates to allow users to feel safe, and to provide an opportunity for casual surveillance.
  - Facilitate natural surveillance by people within an area.
  - Enable overlooking by retaining line of sight for people outside of the public place.
  - Fences are to be visually and climatically permeable.

Potential site conflicts

Locate fences and gates away from:

- High use bikeways, busy roads and steep slopes, to avoid accidents.
- Avoid interfering with other open space users. Fences and gates installed too close to the edge of pathways will interrupt the free flow of pedestrian / cyclist traffic.
- Hazards such as waterways, fire and flood prone areas, sewers and stormwater drains, underground services.

Overland flow

When installing fences to protect environmental reserves and open spaces where there is an overland flow path, a rural type standard fence must be installed. The fence must have adequate spacing of chain wire or wire / timber rails to limit the amount of debris build up and to ensure the overland flow path remains unobstructed.

Consider the following:

- Avoid fencing an overland flow path (where possible).
- The selective placement of fencing is governed by the *Queensland Urban Drainage Manual (QUDM)* and SCC *Local Law 3: (Community Health and Environmental Management) 2011 (Part 5 Community safety hazards)*.
- The Local Law 3 states a community safety hazard is:
  - Works that have restricted or redirected the flow of stormwater over land in a way this is likely to cause the water to collect and to:
    - become stagnant, or
    - cause damage to the environment, property or infrastructure, or
    - cause harm or injury to a person or animal.

Fence design to prevent flood damage

Where there is a need to fence an area that experiences flooding, erect a rural type timber post and wire fence with the following design inclusions:

- Where possible reduce fence resistance to flood waters by constructing up-slope from the lowest point of an overland flow path.
- Construct the fence at right angles to the direction of flow to reduce damage.
- Increase fence post resistance to overturning by:
  - positioning posts closer together per length of fence to provide a greater resistance to flow **and,**
  - ensuring posts are set deep and well secured to ensure they are less likely to be pushed over in a flood event.
  - desirable post positioning is to the high sides of an overland flow path, not in the centre of the depression.
- Timber posts with a large cross sectional area have a greater resistance to overturning in wet ground.
- Timber posts with a larger below ground surface area, increase contact with the soil.
- Maintain wire tension to promote vibration, which assists in reducing debris load.
- Construct fences with less vertical height (where possible). The taller the fence the less stable it becomes during flood events.

Note:
Fences across an overland flow path are generally not supported

Coastal management

The environment must be considered and protected before any development or construction is undertaken. Consider that:

- an appropriate barrier treatment may assist to minimise negative impacts on the coastal environment.
- fences near beaches should be planned and designed to protect the surrounding environment whilst providing a safe path of travel for pedestrians.
- fences near beaches must be designed to consider seasonal pathways for marine animals such as turtles (*See LIM Beach infrastructure*).

The Sunshine Coast has over one hundred kilometres of coastal foreshores which council manages. Council has developed a coastal planning and management framework that delivers policy and planning tools to support protection and sustainable use of our beaches, headlands and estuaries.

- These environments are highly valued for their cultural, ecological and recreational functions.
- Unless carefully designed and constructed, infrastructure in and adjacent to waterbodies can exacerbate erosion issues.
- The *Shoreline Erosion Management Plan* (SEMP) provides an action plan that describes coastal processes and identifies council controlled assets exposed to erosion threats.

See the following LIM categories for further guidance:

- *LIM Beach infrastructure*
- *LIM Environmental management of fauna and flora.*

Planning for future works

- Co-locate embellishments requiring similar services eg. water, to reduce infrastructure, where possible.
- Where underground utilities are installed, set brass markers to concrete slab edges to indicate the location.
- Consider installation of additional conduits under concrete slabs for future provision, where utilities (eg. electrical, water) and irrigation systems are planned. Ensure additional conduit is capped to prevent ingress of water and debris.
- Consider climate change impacts on embellishment location and construction [1].
    - In coastal areas, or near waterways, design should consider rise in sea level predictions, storm tide, salt inundation and severe storm events.
    - Positioning should also consider flooding, seasonal/ephemeral water bodies and water table changes.
    - Near bushland areas, design should consider the occurrence of bushfires.

1 Sunshine Coast Environment and Liveability Strategy 2017

5.0 Design requirements

Best practice guidance for the design, manufacture and installation of embellishments includes:

Good design

See the following corporate documents to identify relevant project design requirements:

Sunshine Coast Planning Scheme regulates the way land, buildings and structures are used and developed on the Sunshine Coast. It outlines a range of design outcomes for new development.

Sunshine Coast Design contains 10 design principles that guide good project planning and design outcomes, that are appropriate for the Sunshine Coast.

Open Space Landscape Infrastructure Manual (LIM)

Introduction and design principles, including:

- Introduction, strategic and planning framework
- Design principles eg. Sustainability, CPTED, Accessibility.
- Relevant standards / guidelines

Preliminaries including:

- Environmental management of fauna and flora
- Site set up (including tree protection)
- Tree sensitive design (existing and new trees).

Embellishment requirements

1 Fit for purpose, appropriately positioned and accessible

- Universal access.
- Comfortable and suitable for the average person.
- See *7.0 Positioning guidance* and *8.0 Equal access requirements.*

2 Durable, robust and safe (suitable for corrosive environments)

- Made from materials that will be durable and can be suitably protected from exterior elements, such as salt spray and UV exposure.
- Robust and sturdy to withstand constant public use and be resistant to vandalism.
- Fixings are to be 316 marine grade stainless steel (unless otherwise stated).

3 Vandal resistant with parts that are easily replaceable

- Tamper proof fixings should be used.
- Graffiti protection coatings applied (where applicable).
- Fire retardant (where applicable).

4 Easy to maintain (with appropriate warranty and workmanship)

- Warranties should be as listed below.
- Easily repairable or replaceable.
- Sourced locally and use standard fittings.
- Reputable suppliers should be used who keep a supply of stock parts on hand for the life of the product.
- Use sustainable materials, although sustainability needs to be considered over the lifetime of the embellishment.
- Install on paved, concrete or other hard surfaces (where applicable).

5 Comply with relevant standards / legislation / corporate documents / approvals

- Manufactured to engineering specifications (where applicable).
- See *9.0 Recommended standards*.

Warranty and asset life

Product / embellishment	Warranty (minimum)	Asset life (typical useful life)
Bayco sighter wire (or equivalent)	10 years	10 years
Recycled plastic	10 years	25 years [2]
Aluminium	5 years	20-30 years [2]
Timber	Varies	20 years [2]
Steel	5 years	25 years [2]

2 Sunshine Coast Council Asset Management Plan 2017/18-2022/23 – Parks and Gardens (figure is based on current data, subject to change)

Fences and gates

Once the location of the fences and gates has been decided, based on the ELS and RPP guidance, consider the appropriate embellishment level to suit the selected site.

Design considerations:

- All open spaces should include universal access (eg. ensure the operation of gates caters for equal access).
- Consider the method of safe operation associated with fences and gates (ie. size, weight, material and method of safe operation).
- Select appropriate fence type for the purpose.
- Vehicle / maintenance access – typically all standard vehicle gates are minimum 3.6m clearance for maintenance vehicles and emergency services (4.0m clearance for environmental reserves). This clearance may require increasing in the following situations:
  - the restricted manoeuvring area on site, requires a larger turning circle.
  - non-standard wide/heavy machinery with frequent use, i.e. beach access and maintenance.

Fences and gates design

Fences

Fences are installed to provide separation, protection or demarcation of boundary limits by creating a localised barrier, or to fully enclose a perimeter.

Fences deliver outcomes such as:

- Human or animal exclusion
- Security / direction
- Safety / site protection
- Boundary demarcation.

Fences at the side of a path used by cyclists are desirable where:

- there is a steep batter or large vertical drop close to the path.
- the path is adjacent to an arterial road and it is necessary to restrict cyclist access to the road.
- a bridge or a culvert exists on a path.
- a hazard exists adjacent to a bicycle facility.
- cyclists are likely to be 'at speed' at an intersection between paths or around a path terminal [3].

3 Austroads Guide to Road design Part 6a

Gates

Gates are installed to provide authorised pedestrian, equestrian and vehicle access, to restrict unauthorised access and to direct toward approved entry and exit points.

Gates must provide access for:

- pedestrians, equestrians, mobility devices and / or assistance animals
- authorised maintenance / emergency vehicles / temporary event vehicles
- farm stock and native fauna.

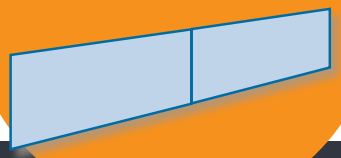
Gates must not conflict with:

- passing pedestrian traffic
- passing human powered vehicles such as bicycles / wheelchairs
- passing motor vehicles
- motorised vehicles such as mobility scooters.

Barrier fence vs perimeter fence

Fence

Role
Barrier fence



A barrier fence is made up of one or more than one fence panels installed to demarcate an area or provide protection for an area or for a user. A barrier fence provides:

- safety from known hazards such as open drains.
- clear identification of a border between two areas which require separation such as a road reserve and natural bushland.
- pedestrian or vehicle safety.
- pedestrian or vehicle guidance and direction to identify an entry or exit.
- protection for flora and fauna habitat.
- protection for wetland infrastructure.

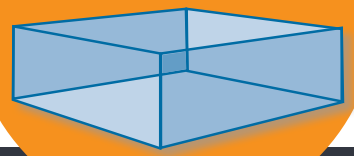
Protection from hazards may arise where there is a risk of:

- falling from a height.
- falling due to steep grade.
- falling onto an adverse surface such as rock, concrete or swiftly flowing water.
- environmental damage such as erosion.
- damage to places of cultural or heritage importance.
- quantifiable risk at a site.

It is preferred to install handrails and balustrade on safety barriers in high profile locations, such as at district and Council wide parks.

See *LIM Handrails and Balustrades* for further guidance

Role
Perimeter fence



A perimeter fence is installed to surround and enclose an area. The area is only accessible through pedestrian and vehicle gates .

Perimeter fences are typically used to create areas, such as playgrounds, dog off leash parks, sports grounds, to separate areas of competing functions and to prevent unauthorised access to infrastructure which contains fragile ecosystems or elements of risk. They are designed to:

- enclose the whole or part of an area.
- protect / separate competing use areas, which may contain risk.
- include gates where required to prevent unauthorised access.

Competing use areas which may require separation include:

- natural, semi-natural or planted areas and play spaces.
- spaces for low level interaction with the environment and bicycle paths.
- areas for picnics and public gatherings and areas for sports and games.
- playgrounds / play spaces and dog off leash areas.
- dog off leash areas and pathways.
- exercise equipment and dog off leash areas.
- Install perimeter fences in combination with natural elements where possible to prevent vehicles entering parks or open spaces. Select:
  - Vegetation (trees and shrubs)
  - Stone barriers (boulders).

MUST be designed following a risk analysis and certification by a professional Engineer, where applicable

Refer the following documents:

- *Austroads Guidelines*
- *AS 2156 Walking Tracks Part 1 Classification & Signage*
- *AS 2156 Walking Tracks Part 2 Infrastructure Design.*

Where a perimeter fence crosses an overland flow path refer to:

- *Queensland Urban Drainage Manual (QUDM)*
- *Local Law 3: Community Health and Environmental Management (Part 5 Community safety hazards).*

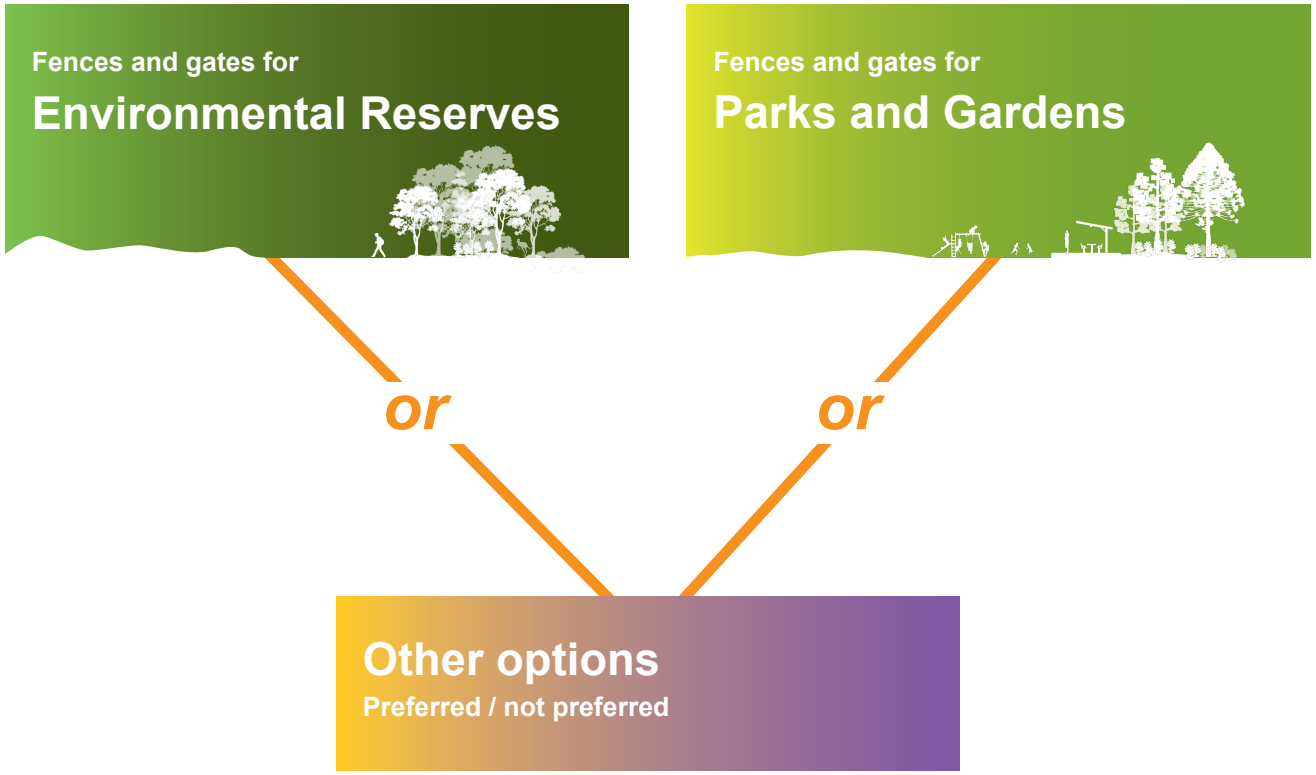
Selecting an appropriate fence and gate category

Fences and gates fall into the following categories:

- Environmental reserves
- Parks and gardens; ***or***
- Other options that may be considered.

Fences and gates designed for parks and gardens may be installed at environmental reserves and vice versa.

- Special use fences and gates (such as, at stormwater infrastructure and wetlands) must be designed and engineered to suit the purpose.
- Approval must be obtained from the asset custodian.



Note:
Further technical information for Sport will be incorporated at a later date. In the interim, the basic Recreation / Landscape information can be adapted to suit the site specific solution required.

Fences and gates for Environmental Reserves

Fences and gates installed in environmental reserves provide:

- protection of recognised wildlife habitat
- protection of sensitive ecosystems.
- the direction of stock to water.
- restriction of unauthorised access by motorbikes or motor vehicles.
- containment, protection or redirection of pedestrians or native fauna.
- exclusion of threats to native wildlife posed by motorised traffic, feral animals.
- hazard protection barrier.

Parks and Gardens fences may be used at parks and gardens.
Environmental reserve fences and gates may be used at environmental reserves.
Fences and gates must be designed to suit the application. Engineering certification may be required.
Approval must be obtained from the asset owner / custodian.

Standard

Post and rail fences

Provide a visual barrier to deter pedestrian access.
Provide vehicle exclusion. Provide demarcation.

Chicane gates

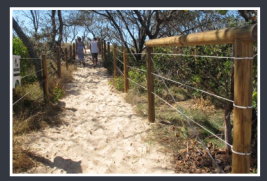
Provide gate design to suit a variety of post and rail fence types.
Provide pedestrian access.

Vehicle gate (super heavy duty)

Provide access for approved vehicles to enter an otherwise restricted area (maintenance and emergency vehicles)

examples

Special purpose



Beach access and habitat protection fences

Provide protection from pedestrians for dunal areas and fauna habitat.
Prevent entry by feral predators and unauthorised vehicle access.

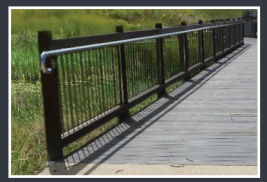
Horse step overs

Provide access for horse and rider, pedestrians and cyclists.
Prevent unauthorised vehicle access.

Fauna fences

- ***Fauna friendly fences*** – allow fauna to move freely through, over or under.
- ***Fauna exclusion fences*** – designed to keep fauna out of danger zones such as road corridors, densely populated developments and land used for stock or crop farming.

examples



Wetlands fencing
(matching vehicle gates where required)

Fencing located around wetlands and other waterbodies to create a visual and physical barrier are installed to:

- prevent unauthorised entry.
- provide a visual deterrent and to prevent accidental falls.

example

Post and rail fences

Purpose

Post and rail fences are typically installed to create a barrier to deter pedestrian access. They may also be installed to prevent unauthorised vehicle access as well as providing demarcation for a protected area.

Planning

Consider the following when selecting fence locations:

- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).

Design

Design the post and rail fence to include the following:

- Post and rail fence panels can be used as 'barrier' and or 'perimeter' fences – case by case basis. Engineering certification may be required.
- Ensure the fence is installed with an access gate or opening (pedestrian and or vehicle) where required).
- Post tops – all timber post tops to be angled at 15 degrees to prevent water damage. Galvanised post tops to be capped.
- Rails – all timber rails to have arrissed edges for safety and superior finish, all galvanised top rails to be welded to galvanised posts.
- All footings must be designed and installed to engineer's specifications.

Materials selection should consider:

- the level of use.
- any potential unlawful entry.
- adjacent fence material.

Post and rail fences can typically be constructed of various materials to complement the surrounding environment. If a gate(s) is installed, ensure materials and components complement or match the fence materials.

Natural elements may also be used to create / contribute to a barrier fence, such as strategically positioned vegetation, trees, stones or boulders.

See the following for further guidance:

- *Figure 1: Typical standard range*
- *Alternatives p45-47.*

Please note:

The 'beach access and habitat protection fences' are specific purpose post and rail fences that provide protection from pedestrians for dunal areas and fauna habitat. They also prevent entry by feral predators and unauthorised vehicle access.

See the following for further guidance:

- A summary of other post and rail based fence designs can be found below (p21). Beach access and habitat protection fences.
- See *LIM Beach infrastructure*

Galvanised post and rail

Timber post and galvanised rail

Timber post and rail

Figure 1: Typical standard range
(for guidance only – site specific design required)

Chicane gates

Purpose

Chicane gates are installed to provide pedestrian and bicycle access for areas that are protected by either a barrier or perimeter fence. The gate also restricts unauthorised motorbike and vehicle access. The gate is designed to suit a variety of post and rail fence types.

Environmental reserves which contain recreational trails, use a chicane gate system to restrict access.

Key attributes:

- The chicane gate is typically designed to create an ‘s’ or a ‘u’ shape turn designed to restrict unauthorised vehicle entry.
- The chicane gate may be positioned alongside a vehicle access gate or at a permitted trail access.
- Some chicane gates may also include a separate horse step-over. See horse-steps overs below.

Planning

Consider the following when selecting gate locations:

- Position near level areas at entry and exit.
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).

Design

Design chicane gates to include the following:

- Ensure there are no entrapment or crushing points (i.e. provide appropriate gaps at gate openings).
- Gates with hinges should be designed to swing both inwards and outwards.
- Where trails are multi-use, gates must provide sufficient width (1.6m absolute minimum) for pedestrians, cyclists, horse and rider.
- Consider installing reflectors or wrapping reflective tape around the top of a gate where there may be insufficient luminance contrast between the background and the gate.
- Ensure the gate is installed with a fence (one or more fence panels) either side or position natural elements such as vegetation or boulders on both sides of the gate to ensure vehicle exclusion.
- Signs may be fixed to the gate where required.
- Post tops – all timber post tops to be angled at 15 degrees to prevent water damage. Galvanised post tops to be capped
- Rails – all timber rails to have arrissed edges for safety and superior finish, all galvanised top rails to be welded to galvanised posts
- All footings must be designed and installed to engineers specifications.

See *Figure 2: Typical chicane gates*.

Materials selection for a chicane gate should consider:

- level of use
- any potential unlawful entry
- adjacent fence material.

Chicane gates are typically constructed of galvanised steel for durability and they may act as a neutral material that can complement the adjoining fence.

‘Walk-thru’ open area entry / exit point

Galvanised post and rails in a ‘u’ shape

Vertical galvanised posts

Traditional system - timber post and rail in a ‘s’ shape

Figure 2: Typical chicane gates
(for guidance only – site specific design required)

Vehicle gate ('super heavy duty')

Purpose

A vehicle gate is designed to provide approved vehicle access. Where unauthorised vehicles enter a protected area (such as an environmental reserve), they can cause irreversible damage to the trail network and to flora and fauna habitat.

A super heavy duty vehicle gate are installed as barrier to deter unauthorised vehicles (such as motorbikes or motor vehicles) where passive surveillance is infrequent, and at sites which display evidence of unapproved vehicle access.

Alternative vehicle gate

Not all sites have low surveillance or are targeted for entry by unauthorised vehicles. Where this is the case, and a high standard finish is not required, consider a standard vehicle access gate. See parks and gardens vehicle gate ('standard CHS').

Planning

Consider the following when selecting gate locations:

- Direct access from the nearest road.
- Locate along a fence line with easy access. Consult SCC Parks and Gardens – Operations to determine their preferred location.
- Ensure the gate does not open cross a footpath or provide no conflict with other activities.
- Sufficient overhead clearance for crane truck delivery such as components for shelters, barbecues, park furniture.
- Where a vehicle gate is accessed via a sealed road, paint a yellow 'no stopping' line across the entry to prevent vehicles parking and blocking the gate.
- Locate vehicle gate at a site easily accessible from a road. Ensure there is sufficient parking area for approved vehicles to temporarily park (outside of the gate), prior to entry. Ensure the parked vehicle does not interrupt the normal flow of on-road traffic.
- Ensure the gate swing area is not restricted by trees and allows adequate circulation space for entering vehicles. The gate location must be free of tree roots.
- Locate gate with a connecting barrier fence or natural elements (i.e. vegetation)
- Gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).

Design

Design the vehicle gate to include the following:

- Minimum 4.0m clear space for approved maintenance and emergency vehicles. Provide sufficient overhead space for large vehicles (fire trucks).
- Hinged swing system which opens inwards to the fenced area, or both ways where possible. Manufactured with two hinges for safe operation. Ease of operation to comply with health and safety requirements.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- All ends to be capped.
- All footings must be designed and installed to engineers specifications.

Consider the following when selecting gate materials:

- level of use, any potential unlawful entry and adjacent fence materials.

'Super heavy duty' gates are typically constructed of galvanised steel for durability and to complement adjoining fence materials.

Locks and keys

Vehicle gates must be secured by:

- A padlock operable by both council and external parties such as emergency services.
- Provide either a two (minimum) or a four separate keyed access to suit the location such as Council, emergency services, other utility service providers.
  - A four lock access requires an extra plate on the inside of the lock box.
  - Provide a shroud around each locking mechanism for weather proofing and to prevent vandalism.
  - Padlock and SCC Park 30 key – contact SC Environmental Operations for further information.

See *Figure 3: Vehicle access gate 'super heavy duty'.*

Note:

For the most appropriate / preferred location for vehicle access, gates, consult SCC Environmental Operations for environmental reserves.

Figure 3: Vehicle access gate 'super heavy duty' (inset: lock system) (for guidance only – site specific design required)

Beach access and habitat protection fence

Purpose

Fences installed at coastal environments (such as a beach access) have been designed for a site specific purpose such as dune stabilisation or habitat protection.

Some of these fence types may also be suitable for environmental reserves.

Planning

The figure below demonstrates fence design for beach access and habitat protection. These fences are detailed in *LIM Beach infrastructure.*

Design

- **Post and plastic filament** – designed to clearly mark boundaries and to deter access to private land or sensitive areas such as:
  - dunal areas that require re-establishment after a storm event.
  - dunal areas chosen by nesting turtles.
- **Post and rail** – designed for public amenity areas and heavily used access tracks.
- **Post and rail with plastic filament** – designed to restrict pedestrian access and reduce impact on vegetation within coastal or other areas.
- **Post and rail with cloth and coated mesh** – designed to trap sand and protect pathways and sensitive dune areas from sand build up and sand blow.
- **Post and rail with coated mesh (fauna friendly)** – protection fence designed to prevent impact on vegetated coastal areas or the like and to restrict access from pedestrians and unwanted animals such as dogs.

See the following for further guidance:

- *Figure 4: Typical beach access and habitat protection fence.*
- *LIM Beach infrastructure f*or post and rail fencing, typically installed at beach accesses and dunal protection fencing.

Note:
This category does not detail the fence types shown below
See LIM Beach infrastructure for further guidance


Post and plastic filament


Post and rail


Post and rail with plastic filament


Post and rail with cloth and coated mesh


Post and rail with coated mesh (fauna friendly)

Figure 4: Typical beach access and habitat protection fence
(for guidance only – site specific design required)

Horse step overs

Purpose

Horse step overs (cavalletti) are used at specific environmental reserve trail entry points, to restrict unauthorised vehicle and motor cycle access, while allowing pedestrians, bike riders and horse rider entry.

Key attributes:

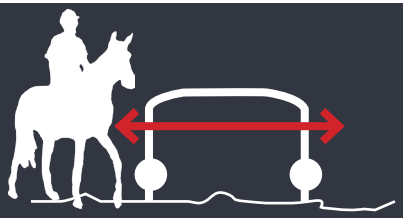
- A cavelletti is comprised of horizontal rails (single or double) at horse knee height, spaced a 'horse step' length apart.
- A horse can step over each rail in turn to pass through and or over the cavelletti.
- A pedestrian can step over the horizontal barrier and individuals riding mountain bikes, can lift their bike over.

See *Figure 5: Typical horse step overs.*

Planning

Step over design should consider the following:

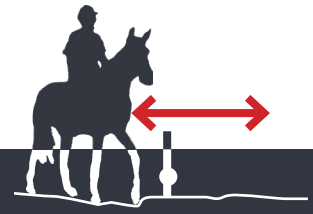
- Install at a trail suitable for horse riding, and where there is a likelihood of unauthorised vehicle access.
- Before and after the step over must have near level ground to provide an even surface for horse and rider.
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).



Double step over

Preferred at locations where there are known unauthorised vehicles entry attempts and or at locations with infrequent use or low visual surveillance. A double step over should comprise:

- 2 x horizontal rails installed at a height which is comfortable for a horse to step over (maximum 350mm above ground level)
- 2 x horizontal rails set apart minimum 1200mm.
- Width for step-over is a minimum 1750mm clear to allow for horse and rider.
- Side fence or other barrier (boulders or vegetation) is a minimum 1.0m high.



Single step over

Preferred at locations where there is frequent use / high visual surveillance. A single step over should comprise:

- 1 x horizontal rail installed at a height which is comfortable for a horse to step over (maximum 350mm above ground level)
- Side fence or other barrier (boulders or vegetation) is a minimum 1.0m high.

Design

Design the horse step over to include the following:

- Materials should complement any existing fence and the surrounding environment.
- Ensure the step over is installed with a fence (one or more fence panels) either side, or position natural elements (such as vegetation or boulders) to prevent unauthorised vehicle entry.
- Signs may be fixed to the gate posts where required (no sharp edges which could injure horse or rider).
- Post tops – all timber post tops to be angled at 15 degrees to prevent water damage. Galvanised post tops to be capped.
- Rails – all timber rails to have arrissed edges for safety and superior finish, all galvanised top rails to be welded to galvanised posts.
- All footings must be designed and installed to engineers specifications.

Consider the following when selecting materials:

- the level of use.
- any potential unlawful entry.
- adjacent fence materials.

Horse step overs are typically constructed of galvanised steel and or timber for durability and to complement adjoining fence materials.

- Materials selection should consider – the level and type of use, potential unlawful entry and adjacent fence material
  - Gates / step over, must appropriately match the adjacent fence material or natural elements (i.e. vegetation, stones, boulders).

Timber post and step over

Galvanised post and timber step over

Galvanised post and step over

Figure 5: Typical horse step overs
(for guidance only – site specific design required)

Fauna fences overview

Fauna movement incorporates the daily travel for food, shelter and water, which often places native wildlife in conflict with traffic, humans, domestic pets and predators.

- Typically fences are needed on the margins of major reserves, especially where the reserve is close to major roads.
- In many situations there is a need for a fence to aid native wildlife to move safely through / over a landscape where there may be high risk to safety and survival.

Installation of the correct fence type is dependent upon:

- the type of native fauna present.
- the surrounding landscape.
- risk factors such as traffic, heavily built-up areas and the presence of feral animals.

Fauna fences are designed to suit the following needs:

- Fauna friendly fences – allow fauna to move freely through, over or under.
- Fauna exclusion fences – keeps fauna from entering harmful environments.

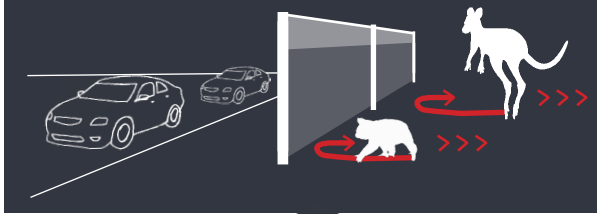
Fauna friendly fences

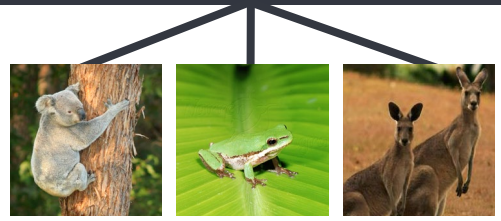
A fence that enables fauna to pass through, over or under. The fence does not disrupt the native wildlife feeding, breeding, social patterns or migration.

OR

Fauna exclusion fences

Fences installed to keep fauna from entering harmful environments.





Fauna friendly fences

Purpose

Fauna friendly fences allow native wildlife to maintain movement throughout their habitat. These fences can significantly add to the ability of movement for species such as; koalas, possums, wallabies, kangaroos, echidnas and bandicoots, to survive in urban areas.

Unsuitable fencing can present an obstacle to fauna movement:

- Barbed wire used in fencing poses a significant risk of entanglement and death for walking, jumping, flying and gliding fauna.
- Fences erected across fauna corridors and habitat can create barriers which disturb feeding, breeding, social patterns and migration.

Fauna friendly fences generally do not cater for individual fauna species, rather a variety of similar sizes, behaviours and modes of mobility. However specialised fences may be required for specific fauna applications.

See *Figure 6: Typical fauna friendly fences*.

Planning

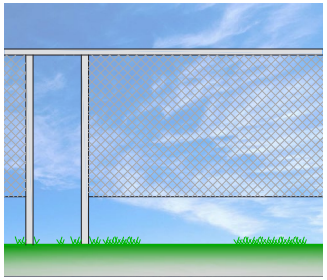
Prior to installing a fence, consider:

- the management intent of the site.
- *Fauna Management Plan* requirements.
- the species of native animal(s) present.
- the requirements for movement around /within site.
- the type of fauna fence which will best protect those species present.
- Fences adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).

Design

Fauna fence design must consider the following:

- The fence must allow fauna to move through or across and over, in two directions.
  - Minimum gap of 200mm between horizontal elements. This gap creates a ladder structure that is easily climbable.
  - Design to incorporate horizontal / vertical gaps a minimum of 300-400mm between the finished ground level or between vertical post. This gap is suitable for a range of fauna such as wallabies to pass underneath or past without harm. If larger animals, such as eastern grey kangaroos are present, larger gaps may be needed.
- **Do not use barbed wire for any fence**. Select another fencing material or use plain wire such as nylon sighter wire (no steel), or glow in the dark material.
- Many animals have difficulty seeing wire fences. Improve visibility by using plastic coated wire (typically blue or white) or attaching reflective material along the top wire.
- Fire breaks that have been cleared close to or against exclusion fences can deter smaller fauna from crossing. Fire breaks close to fauna friendly fence is not preferred.
- The movement of wildlife can be assisted by planting native trees and shrubs both sides of a fence line.
- Overhanging tree limbs or vine growth can assist in the safe passage by fauna.
- Sections of fence could be removed and replaced with vegetation for integration of the fence with the natural environment.
- All footings must be designed and installed to engineers specifications.



Galvanised post and chain mesh wire

Timber post with wire

Post and rail with plastic filament (*LIM Beach infrastructure*)

Tree stump against fence

Figure 6: Typical fauna friendly fences
(for guidance only – site specific design required)

Additional elements to aid koala populations

Some fence designs can trap koalas and leave them vulnerable to attack by predators, such as the domestic dog. They may also restrict or create a barrier for koala access to food and shelter.

Koala friendly fence designs are simply items used to aid fauna to climb over existing fences to maintain movement between habitat areas.

- The fence should be easily scalable by koalas and other arboreal fauna.
- Select materials that can be easily gripped such as timber fences with round rails and posts, or chain wire mesh infill.
- Any material attached to the fence is to be webbed or latticed to provide footholds for koalas.
- Incorporate trees or sturdy shrubs up against the fence to allow easier climbing and to provide shelter for koalas.
- Larger and wider panels at the top of the fence can create a walkway to keep koalas off the ground and away from predators such as dogs.
- The placement of a pole on an angle against a fence can allow movement for koalas and other fauna and provide a quick escape when needed.

See *Figure 6: Typical fauna friendly fences – tree stump against fence* (previous page)

Additional measures to protect native fauna

Consider the following supplements to fences and gates:

- Traffic calming structures, such as road speed humps.
- A reduction in speed limits.
- MUTCD (Manual of Uniform Traffic Control Devices) signs warning about the presence of fauna in the area.
- Installation of signs advising local residents and visitors about native wildlife (such as a koala movement, crossing area). The sign provides awareness for local residents to restrain dogs particularly between the hours of 6pm and 6am.
- Supplementary plates installed directly under the wildlife warning sign.

See the following further guidance*:*

- *Figure 7: MUTCD wildlife warning road signs.*
- *LIM Preliminaries – Environmental management of fauna and flora*

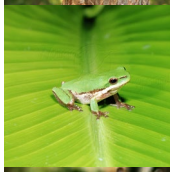
Figure 7: MUTCD wildlife warning road signs
(not to scale – for guidance only – site specific design required)

Fauna exclusion fences

Fauna exclusion fences are installed to prevent native wildlife movement from a safe area into an area which may bring harm to the animal.

This fence type is often used where a bushland parcel (habitat area) is adjacent to a major road corridor or urban development. The fence can be used to 'funnel' or redirect native wildlife towards a suitable or safe crossing point.

There are a variety of fauna exclusion fences designed specifically for different animal groups:



Koala exclusion fence – designed to restrict and direct the movement of koalas and other arboreal fauna**,** (creatures who spend the majority of their lives in trees, such as possums) away from danger zones.	p29
Frog exclusion fence – designed to restrict the movement of frogs to keep them within a safe zone.	p30
Kangaroo exclusion fence – designed to restrict and direct the movement of kangaroos and wallabies from danger areas such as roads.	p31

Overall planning considerations

When designing an exclusion fence the following must be considered:

- Exclusion fence is most effective when used in conjunction with culverts and land bridges.
- Chain wire mesh placed beneath the fence may be required to prevent animals such as echidnas from burrowing beneath the fence.
- Chain wire or coated mesh size must be an appropriate aperture size (pitch) for the identified fauna species.
    - Material with a range of mesh spacing to accommodate a variety of animal species and sizes, may also be selected to provide a variation of gaps to prevent some animals (such as wild dogs) entry, while allowing smaller animals entry (such as echidnas).
- Bushfire can be devastating for native fauna. When providing security / exclusion fences, escape routes must be planned for fauna to use in the event of a bushfire.
- The fence must be maintained. Fallen trees, erosion and vandalism can create breaches for fauna to escape into a danger zone.

Koala exclusion fence

Purpose

Koala exclusion fences are installed to prevent koala movement from a safe area into an area which may pose a risk of death or injury.

Threats to koalas include:

- Loss of habitat.
- Fragmentation of habitat.
- Injury / death by the motor vehicle.
- Injury / death by domestic dog attack.
- Increased disease due to stress caused by the above.

Design considerations:

Specialised fencing to prevent koalas from entering areas of danger should consist of the following design elements:

- Select Colorbond (or equivalent), with the smooth metal positioned at the top of the fence
  - The sheeting provides a slippery, non grip surface, which prevents koalas or other arboreal fauna from climbing over.
  - Colorbond sheeting is to be a minimum 650mm high. Overall fence height must be at least 1.5m above ground level.
  - A natural light colour for the smooth metal sheeting should be selected to complement the environment such as, Colorbond 'pale eucalypt', 'wallaby', 'mangrove', 'gully' (or equivalent).
- No gaps at the base of the fence panelling.
  - Consider using a concrete strip along the entire length of the fence to prevent burrowing with chain fence set 50mm into the strip ***or***
  - For greater stability and strength without a concrete strip. Create a double layer of chain wire mesh at the base of the fence at least 300mm height as well as setting the fence into the ground 200mm.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- Position the fence at least 3.0m away from any tree or sturdy shrub from which a koala could jump to the top of the fence.
  - Existing trees can be shielded from koala access by applying a smooth metal tree guard around the trunk.
- Pedestrian and vehicle gates installed where required. Continue the same design as the fence panels to ensure uniformity of design. (Hot dipped galvanised CHS posts, PVC coated black or green wire mesh laced to posts, galvanised flat sheet (colorbond or perspex), mounted at top).
- Minimum height of fence to be 1.5m (prefer 1.8m).
- All footings and optional concrete mowing strip must be designed and installed to engineers specifications.

See *Figure 8: Typical koala exclusion fence*.

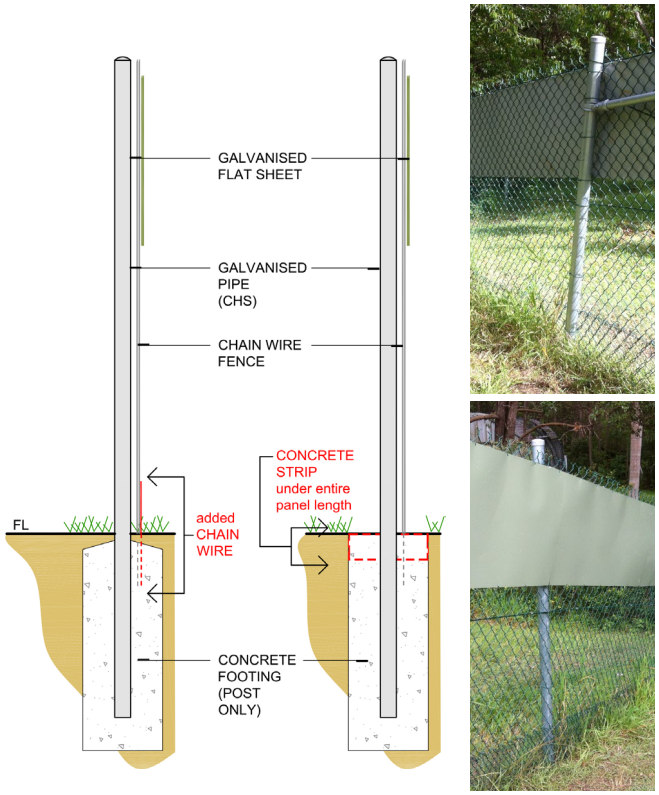


Figure 8: Typical koala exclusion fence
(not to scale – for guidance only – site specific design required)

Frog exclusion fence

Purpose

Frog exclusion fencing is used to prevent frogs venturing out of a safe area and entering a hazardous area, such as a construction zone or road corridor.

Design considerations:

The fence must comprise the following elements:

- Prior to installation of frog fence, identify the frog species at risk. This will determine the height of the fence. Height is determined by species of frog. Some frogs have the ability to jump to heights of almost 1.2m (preferred minimum fence height).
- All pedestrian / vehicle gates must continue the same design as the fence to maintain the level of protection the fence provides and to maintain a consistent appearance.
- The length of the fence must be sufficient to confine frogs inside the safe zone, created by the fence barrier.
- Must contain no gaps to ensure fence and gate keep the identified frog species inside the designated safe environment.
- Posts which support the barrier membrane should curve in towards the area which is deemed safe.
- The barrier membrane (green or black knitted shade cloth, above 80%) should be attached to the curved posts to create an overhang. The overhang at the top of the fence barrier is key in preventing frogs from climbing over.
- The barrier membrane is to extend 200mm below the finished ground level to prevent burrowing frogs from venturing outside the safe zone.
- Vegetation must be kept a minimum 1.0m clear of the inside of the fence – the safe zone. This is to prevent any frog using the vegetation to climb over the fence.

See *Figure 9: Typical frog fence*.

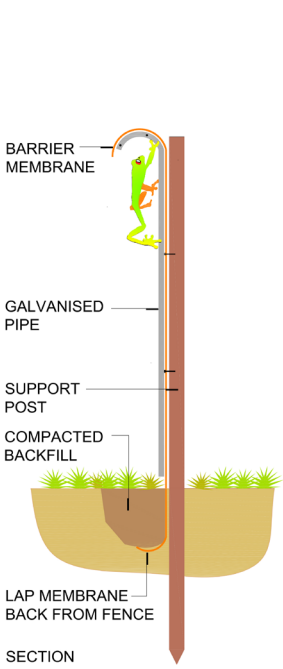


Figure 9: Typical frog fence
(not to scale – for guidance only – site specific design required)

Kangaroo exclusion fence

Purpose

An exclusion fence specifically designed for kangaroo and wallaby species, may be erected for the following reasons:

- To reduce potential conflict between kangaroos and humans in urban areas. Kangaroos have been known to cause significant damage to property and to people.
- To protect and redirect kangaroo and wallaby species from entering road corridors.
- To provide a safe habitat area for native wildlife, away from predators such as wild dogs.
- To prevent wild dogs and kangaroos from entering land used for crops and grazing.

Design considerations:

The design should consider the following:

- Barbed wire is ***not*** to be used.
- All pedestrian / vehicle gates must continue the same design as the fence to maintain the level of protection the fence provides and to maintain a consistent appearance.
- Superior quality galvanised chain wire mesh, galvanised steel posts, hold down pipes and wire cable, with all caps welded. (The average weight of a male grey kangaroo is approximately 66kg).
- The overall height of the fence must be at least 1.8m above ground level as the average grey kangaroo can stand to almost 2.0m tall.
- Fences must maintain clear sight lines for motorists.
- Fences must be clearly visible to kangaroos. The most common damage occurs at dusk and dawn when the mammals are on the move. If the fence is not visible to the kangaroo, it may cause damage to the animal.
- When movement of a kangaroo is obstructed by a fence that they cannot crawl through or under, they are likely try to jump over it. They do this by moving as close to the fence as possible and then they make an almost vertical jump. To prevent the kangaroos from getting close enough to position themselves to jump over the fence, the top part of the fence must be sloped inwards at an angle of approximately 45 degrees.
- Design must contain a ‘floppy top’.
- The use of a fence apron is recommended to deter burrowing and digging.
  - **added chain wire mesh** hinged to fence panels (preferred method). The separate length apron typically sits 200mm above ground and below.
  - **concrete strip** below the entire length of fence panels, 250mm W x 100mm H.
  - **fence panel extended below** surface level (not preferred). This method may cause unnecessary force on the fence panels, effecting the useful.

See *Figure 10: Typical kangaroo and wallaby exclusion fence*.

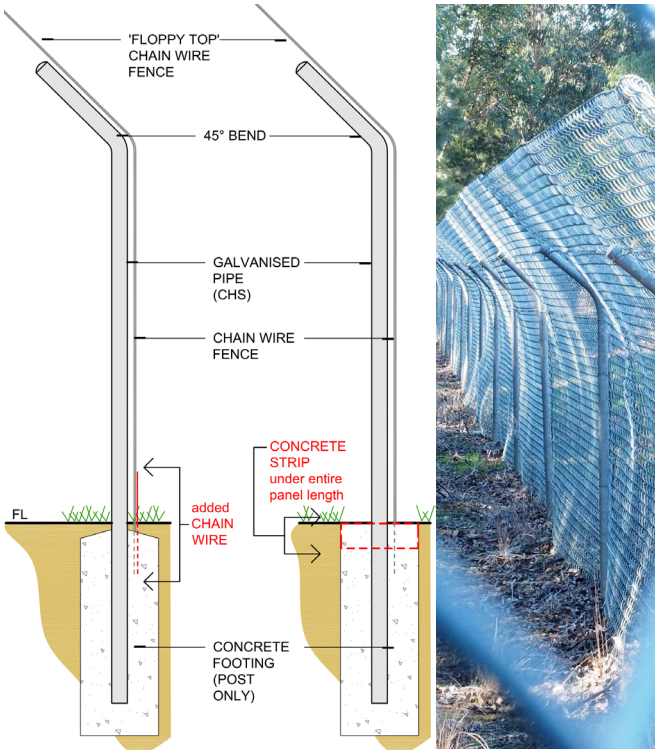


Figure 10: Typical kangaroo and wallaby exclusion fence
(for guidance only – site specific design required)

Wetlands fencing

Purpose

Fencing at and around wetlands and other waterbodies to create a visual and physical barrier are installed to:

- prevent unauthorised entry.
- provide a visual deterrent and to prevent accidental falls.

Planning

Consider which type of fence is best suited to the level and usage at the site:

- **Perimeter fence** design (typically installed to secure a site – creates both a visual and a physical barrier. The perimeter fence is a closed loop with keyed maintenance gate entry by authorised personnel only. This fence type excludes access by unauthorised vehicles and pedestrians.
- **Barrier fence** design (typically installed where there is a risk of falls – creates a visual barrier. The fence is open ended.

Note:
Standard residential pool or any other residential fencing is NOT to be used for any council facility. Construction details must be engineered to suit the application.

Design considerations:

Wetland **perimeter fence** must include the following attributes:

- Designed to keep unauthorised people from entering.
- Must be designed by a suitably qualified engineer.
- Fence must comply with the appropriate standards and guidelines and consider site conditions and requirements.

Wetland **barrier fence** must include the following attributes:

- Designed to provide a highly visible barrier.
- Must be designed by a suitably qualified engineer.
- Fence must comply with the appropriate standards and guidelines and consider site conditions and requirements.

All fencing around wetlands must comply with all standards and guidelines. Liaise with a stormwater engineer for advice.

See the following for further guidance:

- *Figure 11: Wetland fencing examples*
- *9.0 Recommended Standards.*

Figure 11: Wetland fencing examples
(for guidance only – site specific design required)

Fences and gates for Parks and Gardens

Fences and gates installed in parks and gardens provide:

- Boundary division
- Separation of conflicting activities
- Safe play areas for children
- Defined areas for animals and handlers
- Defined areas for sports ground playing fields
- Restriction of unauthorised vehicles such as motorbikes or motor vehicles.
- Hazard protection barrier – any fence panel may be used to create a barrier. Fence panel selection should complement the existing site.

Parks and Gardens fences may be used at environmental reserves.
Environmental reserve fences and gates may be used at parks and gardens.
Fences and gates must be designed to suit the application. Engineering certification may be required.
Approval must be obtained from the asset owner / custodian.

Standard


example

Bollard and rail barriers

Provide basic vehicle exclusion

Provide demarcation ~~for~~ of an area


example

Vehicle gate (standard CHS)

Provide access for maintenance and emergency vehicles to enter an otherwise restricted area

Special purpose


example

Dog off leash park fences and gates
(matching pedestrian and vehicle gates)

- A defined off-leash area where animals and handlers can interact, exercise and play, without the limit of a restraining lead.
- A defined area to safely contain animals and limit interaction with other recreation park users, passing pedestrians, human powered and motorised vehicles.


example

Playground fences and gates
(matching pedestrian and vehicle gates)

Playground boundary demarcation to contain users within a safe play area:

- A defined area of safe play for child and carer.
- A defined area to protect against hazards such as animals, other recreational activities, busy roads, human powered and motorised vehicles.


example

Stormwater infrastructure
(matching vehicle gates where required)

Fencing located around stormwater inlets / outlets to create a visual and physical barrier are installed to:

- prevent unauthorised entry.
- provide a visual deterrent and to prevent accidental falls.

Bollard and rail barriers

Purpose

Bollard and rail barriers prevent unauthorised vehicle access and provides demarcation for a protected area.

Bollard and rail barriers are installed to create visual barriers to protect against activities such as:

- children from running out onto a busy roadway located near a park.
- to direct pedestrian movement to a safe road crossing / specific location.

Planning

Only install bollard and rail fences when natural elements such as tree planting and placed boulders are not appropriate.

Design considerations:

Bollard and rail barrier design should include the following:

- Minimum gap between single barriers 1.5m.
- Bollards to be recycled material or hardwood timber.
- All footings must be designed and installed to engineers specifications.

The barrier material should blend with the surrounding environment.

- Ensure the barrier is installed with a vehicle gate or opening where required.
- If a gate(s) is installed, ensure materials and components complement the fence materials.

Materials selection should consider:

- level of use.
- any potential unlawful entry.
- adjacent fence material.

Bollard and rail barriers are constructed from various materials to complement the site, such as recycled plastic, hardwood timber and stainless steel or hot dipped galvanised.

See *Figure 12: Typical examples of bollard and rail barriers*.

Barrier placement directs pedestrians to safe road crossings

The gaps between barriers allow entry / exit and reduce pedestrian speed

Figure 12: Typical examples of bollard and rail barriers
(for guidance only – site specific design required)

Vehicle gate ('standard CHS')

Purpose

A vehicle gate is designed to provide approved vehicle access. Where unauthorised vehicles enter a protected area (such as park), they can cause irreversible damage.

A standard CHS vehicle gate is installed as barrier to deter unauthorised vehicles (such as motorbikes or motor vehicles). Where there is infrequent casual surveillance, a more robust design may be required (see vehicle gate 'super heavy duty').

Planning

Consider the following when selecting gate locations:

- Direct access from the nearest road.
- Locate along a fence line with easy access. Consult SC Parks and Gardens Operations to determine their preferred location.
- Ensure the gate does not open cross a footpath or provide no conflict with other activities.
- Sufficient overhead clearance for crane truck delivery such as components for shelters, barbecues, park furniture.
- Where a vehicle gate is accessed via a sealed road, paint a yellow 'no stopping' line across the entry to prevent vehicles parking and blocking the gate.
- Locate vehicle gate at a site easily accessible from a road. Ensure there is sufficient parking area for approved vehicles to temporarily park (outside of the gate), prior to entry. Ensure the parked vehicle does not interrupt the normal flow of on-road traffic.
- Ensure the gate swing area is not restricted by trees and allows adequate circulation space for entering vehicles. The gate location must be free of tree roots.
- Locate gate with a connecting barrier fence, bollards or natural elements (i.e. vegetation)
- Gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).

Design considerations:

- Minimum 3.6m clear space for approved maintenance and emergency vehicles.
- Hinged swing system which opens inwards to the fenced area, or both ways where possible. Manufactured with two hinges for safe operation. Ease of operation to comply with health and safety requirements.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- All ends to be capped.
- All footings must be designed and installed to engineers specifications.

Consider the following when selecting gate materials:

- level of use, any potential unlawful entry and adjacent fence material.

Vehicle gates (standard CHS) should be constructed of galvanised steel (after fabrication) components for durability and to complement adjoining fence materials.

Locks and keys

Vehicle gates must be secured by:

- A padlock operable by both council and external parties such as emergency services.
- Provide either a single key access within a lock shroud, or two separate keyed access points within two separate lock shrouds, on one same gate.
  - Provide a shroud around each locking mechanism for weather proofing and to prevent vandalism.
  - Padlock and SCC Park 30 key – contact SC Parks and Gardens – Operations for further information.

See *Figure 13: Typical vehicle gate ('standard CHS').*

Note:

For most appropriate / preferred location for vehicle access gates, consult SC Parks and Gardens – Operations

Figure 13: Typical vehicle gate ('standard CHS')
(inset from left: single lock system, two lock system)
(for guidance only – site specific design required)

Note:
'Dog off leash fences' can also be adapted to suit alternate purposes, such as sports ground fences

Dog off leash fences and gates

Note: This section should be read in conjunction with:

- *LIM Dog exercise areas (DEAs)*

Purpose

A dog off leash perimeter fence is installed to create a safe and secure area for handlers to take dogs to play and exercise. The fenced environment aims at preventing dogs from escaping without a handler and preventing unattended dogs from entering.

Planning – site locations for DEAs

Consider the following when selecting site locations:

- Locate away from potential conflict areas (i.e. playgrounds, picnic facilities).
- Positioning of fences and mowing / anti dog digging strips must take into account natural drainage lines and overland flows to prevent trapping of water and ponding.
- Locate entry fences and gates at an elevated area (high point) to minimise the chance of being waterlogged or washed away in flood events.
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).
- Pedestrian gates - a minimum of two, dual gate entry and exit systems are required.
- Vehicle gate – all perimeter fences must have a vehicle gate. Maintenance and emergency access must be provided.
- Design the fenced area to maximise the length for a dog run.
- Ensure embellishments (i.e. seats), are not positioned too closely to a fence, that they can be used as leverage to jump the fence.
- A minimum of 2.5m wide clear turf area is to be provided (where possible) around a fenced area to allow for deck mowers and maintenance – maximum grade 1:4.

Design considerations (fence panel):

- A minimum of 1.2m high panel with a maximum gap of 50mm between the bottom rail and the top of the concrete mowing strip, to prevent small dogs escaping or unwanted dogs entering.
  - A site specific risk assessment should be conducted on the height of the fence to ensure it prevents dogs escaping. Options include a cranked fence or increasing the fence height.
- Reshaped ground level to minimise steps in the fence height.
- Concrete mowing / anti dog digging strips centred directly under the fence to help prevent dog escapes (tunnelling / digging).
- Gaps in mesh must not allow a small dog to escape.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- All footings must be designed and installed to engineers specifications.
- Chain wire mesh fence (black) must be laced at every crossover to prevent clothing entrapment. All ends to be capped.

See *Figure 14: Typical DEA fence*

Figure 14: Typical DEA fence
(for guidance only – site specific design required)

Site considerations for pedestrian gates

Consider the following when selecting gate locations:

- A minimum of two, dual gate entry and exit systems are required. They are essential to allow for leashing and to prevent accidental escape.
  - Gates must be visible from all areas of fence park to ensure a safe exist route can be seen if an emergency occurs.
  - After entry into the first gate, the dog handler is able to unleash / leash the dog safely in a fully enclosed space.
  - The second gate is then opened to release the dog into the exercise area or exit the space.
  - Gate entries must be located to minimise the possibility of dogs escaping and running towards other activity areas, such as playgrounds, roads and sports fields.
  - Ensure fenced enclosures have a minimum of two pedestrian gates on opposite sides of the park. If one gate is blocked, the other gate provides an alternate exit. More than one entry and exit may avoid potential conflicts between dogs.
- A hard, level surface area is preferred through gate thresholds and to seating nodes, to provide equal access. Where possible connect to existing pedestrian pathways.
- Provide pedestrian gate access from a car park into the dog off leash park.
- Ease of removal of waste services bins for emptying to collection trucks.

Design considerations (pedestrian gate):

- Continue the same design as the fence to maintain the level of protection the fence provides and to maintain a consistent appearance.
- Pedestrian gates should have a minimum clear opening of 850mm and circulation space as per *AS 1428.1 – Design for Access and Mobility* set.
- All gate material must be heavy duty commercial grade, suitable for use in public areas.
- Gates are to open both ways if possible and select a 'D' latch system with 100mm opening in chain wire for easy of operating the gate from both sides. Install heavy duty commercial grade hinges and latches to pedestrian gates.
- Install gates and latches at a height that is wheelchair accessible. All ends to be capped.

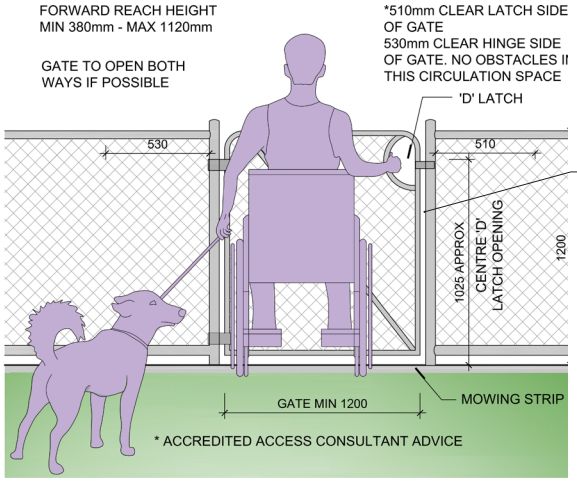


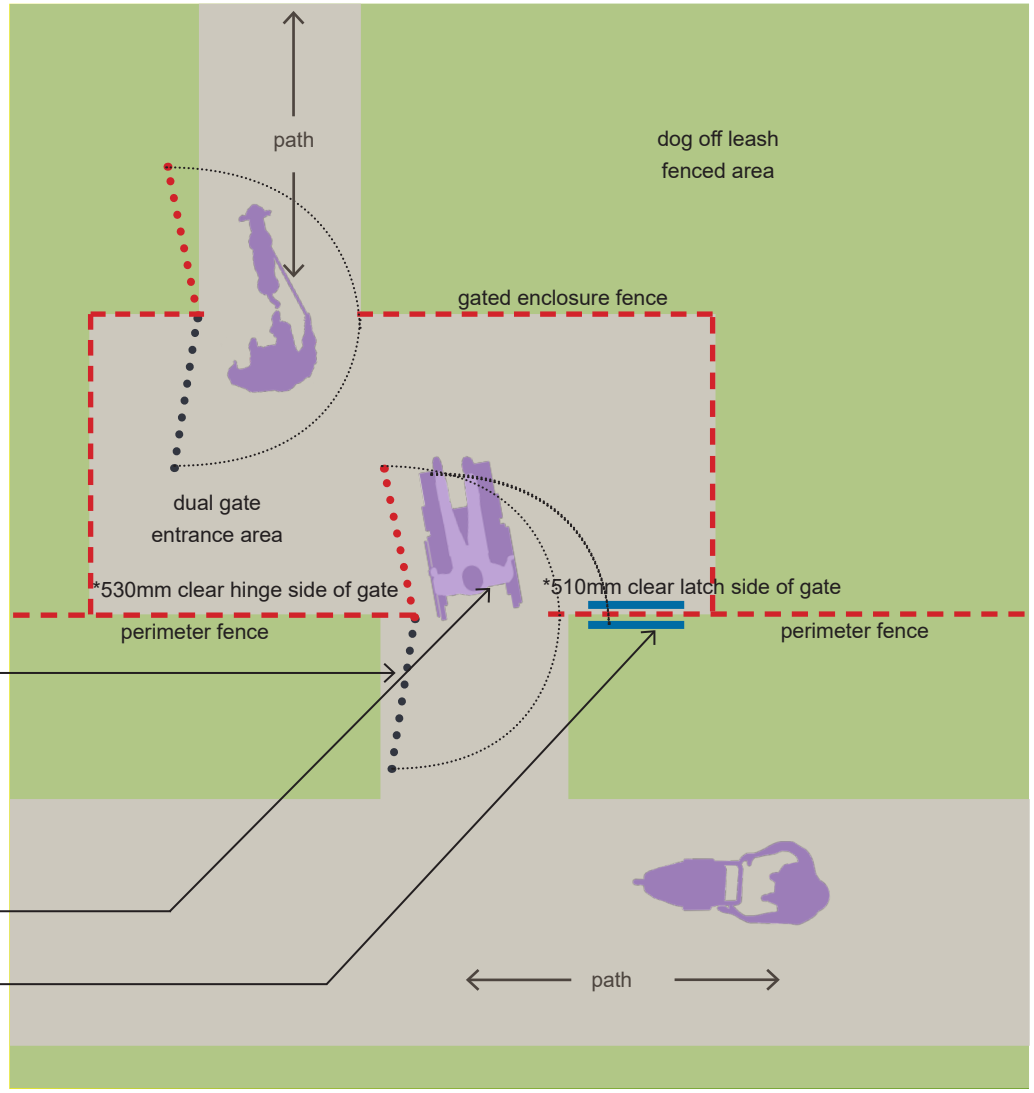
Figure 15: Typical pedestrian gate with 'D' latch
(not to scale – for guidance only – site specific design required)

- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
  - Ensure a minimum gap width of 12mm on both sides of any gate, hinge side and latch side, to prevent crushing of fingers.
- Minimum height 1.2m and minimum 1.2m clear width.
- Provision for wheelchair circulation:
  - 510mm clear distance along a fence to any obstacle (on the latch side of gate).
  - 530mm clear distance along a fence to any obstacle (on the hinge side of gate).
  - Allow adequate wheelchair circulation space between gates.
    - 1540W x 2070mm for >90 - 180° turn
    - 2450W x 2450mm for 1 360° turn.

See the following for guidance:

- *Figure 15, 16 and 17.*
- *LIM Signage – Parks and gardens suite* for regulatory sign requirements.

Figure 16: Typical standard pedestrian gate for a dog off leash dual gate entry
(for guidance only – site specific design required)



Primary dual entry gate system

Minimum gate width 1200mm

*510mm minimum clearance latch side of gate

*530mm minimum clearance hinge side of gate

Gate opens both ways

*Minimum 2450 x 2450mm area for a 360° wheelchair turn (to operate gate and read sign)

Regulatory signs required to show clear instruction for safe use within the fenced area.

For further guidance regarding sign content and positioning refer to *LIM Signage - Parks and Gardens suite* (7.0 Regulatory signs - Dog off leash)

*accredited access consultant advice

Figure 17: Typical plan – standard pedestrian gate, dual entry gate system
(not to scale – for guidance only – site specific design required)

Site considerations – vehicle gate

Consider the following when selecting gate locations:

- All perimeter fences must have a vehicle gate. This provides access for approved vehicles (such as maintenance and emergency services).
  - Vehicle gates must provide easy and direct access from the nearest road. They must ensure suitable set-down and clearance requirements for maintenance vehicles and associated activities.
  - Ensure there is sufficient parking area for approved vehicles to temporarily park (outside of the gate), prior to entry. Ensure the parked vehicle does not interrupt the normal flow of on-road traffic.
  - Emergency vehicle access must be provided.
- Locate along a fence line with easy access. Consult SCC Parks and Gardens Operations to determine their preferred location.
- Ensure the gate does not open cross a footpath or provide no conflict with other activities.
- Sufficient overhead clearance for crane truck delivery such as components for shelters, barbecues, park furniture.
- Where a vehicle gate is accessed via a sealed road, paint a yellow 'no stopping' line across the entry to prevent vehicles parking and blocking the gate.
- Locate vehicle gate at a site easily accessible from a road. Ensure there is sufficient parking area for approved vehicles to temporarily park (outside of the gate), prior to entry. Ensure the parked vehicle does not interrupt the normal flow of on-road traffic.
- Ensure the gate swing area is not restricted by trees and allows adequate circulation space for entering vehicles. The gate location must be free of tree roots.

Design considerations (vehicle gate):

- The double vehicle gate should be fabricated to match the fence panels, to maintain the same level of protection the fence provides, as well as maintaining a consistent appearance.
- Double gate system – minimum 3.6m wide clear space for approved vehicles.
- Double hinged swing system which opens into the fenced area, or both ways where possible.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- All ends to be capped.
- Where a mowing / anti dog digging strip is used directly under a vehicle access gate, it must be extra thickness reinforced concrete to withstand vehicle loads.
- All footings must be designed and installed to engineers specifications.

Use heat shrink tubing over chain to minimise scratching of the fence panel

Locks and keys

Vehicle gates must be secured by:

- A padlock operable by both council and external parties such as emergency services.
- Provide either a single key access or two separate keyed access points.
  - Padlock and SCC Park 30 key – contact SC Parks and Gardens – Operations for further information.
  - Vehicle gates must incorporate a latch and accommodate a chain with heat shrink tubing cover and an anti-vandal, Sunshine Coast council locking mechanism.
- The mowing / anti dog digging strip directly under the gate must include a recessed hole for the padbolt pin (one per gate) to slide into. This provides both lockable security and stability for the gates.

See *Figure 18: Typical vehicle access gate for DEA*.

Figure 18: Typical vehicle access gate for DEA
(inset: lock system)
(for guidance only – site specific design required)

Play space fence and gates

Note: This section should be read in conjunction with:

- *LIM Play spaces*

Purpose

Play space fence, most commonly referred to as 'playground perimeter fence' is installed to create a safe environment for play.

When does a play space require fencing

Play spaces should be considered for fencing where they are located as follows:

- Within 20m of a hazard, for example:
  - near a Transport and Main Roads (TMR) road.
  - at council roads over 50 km/h or high volume roads (refer to SCC Transport Infrastructure Management for traffic parameters).
  - a car park.
  - a commuter bikeway.
  - permanent or potential water bodies, including drains. Urban waterways and stormwater drainage systems can represent a significant safety risk during storms and times of flood. Risks associated with urban waterways and stormwater drainage systems shall be managed in accordance with QUDM (See also *LIM Landscape drainage*).
- Considerations should also be made in situations where there is a need to separate play spaces from other activities:
  - formalised dog off leash parks.
  - formal sports areas.
- All abilities play spaces are to be fully fenced.
- Where retaining walls are constructed, there may be a requirement for a barrier fence with balustrade. Where a difference in height from the top of the retaining wall to the ground or a lower level is 1.0m or more, or where the 'height of effective fall' *(see AS 2156.2:2001)* determines a balustrade, a minimum 1.0m high barrier is required.

Alternative options to full fencing

- Partial fencing may be considered for certain situations including:
  - formal sports areas adjacent to play spaces.
  - commuter cycleways.
- Vegetation may be used as a visual deterrent. In some situations this may be suitable, provided plantings around hazards maintain sight-lines for CPTED and safety.
  - Vegetation would be suitable for separating low risk areas such as sports, however water bodies must have a clear line of sight for parent and carer surveillance.

Note: Standard residential pool fencing is NOT to be used for any council facility. Australian Standards for Swimming pool safety are to be referenced for design purposes only.

Planning – site considerations

Consider the following when selecting locations:

- Mowing strips and fences must take into account natural drainage lines and overland flows to prevent trapping of water and ponding.
- Fences and gates must enable easy access and surveillance by parents and carers.
- The size of the playground perimeter fence will be determined by the activities within.
- Locate entry fences and gates at an elevated area (high point) to minimise the chance of being waterlogged or washed away in flood events.
- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).
- Pedestrian gates – 1, 2 or 3 (varies) pedestrian gates are required.
- Vehicle gate – all perimeter fences must have a vehicle gate. Maintenance and emergency access must be provided.
- Ensure embellishments (i.e. seats), are not positioned too closely to a fence, that they can be used as leverage to jump the fence.
- A minimum of 2.5m wide clear turf area is to be provided (where possible) around a fenced area to allow for deck mowers and maintenance – maximum grade 1:4.

Design considerations (fence panel):

- The design of play space safety fencing (i.e. height, gap sizes and latch requirements) is to be in accordance with *AS 1926.1:2012 Swimming Pool Safety Part 1: Safety barriers for swimming pools.* Whereas the pool safety standards are designed to prevent young children entering pool areas, the play space fence design aims to prevent young children from exiting play spaces without parental supervision.

Note: Standard residential pool fencing is NOT to be used for any council facility. Australian Standards for Swimming pool safety are to be referenced for design purposes only.

- Materials manufactured for fence construction are to be **extra heavy-duty** and suitable for public open space use:
  - Extra heavy duty strength aluminium is required to prevent accidental damage and vandalism to fence components.
  - Panels must be black powder coated, or 2 pack epoxy (where the fence is exposed to a marine environment).
    - Balusters should be maximum 85mm between uprights (allows for flex) to comply with playground standards. Square or round balusters with square flat top and bottom rails.
  - Posts are to be timber look powder coated aluminium (preferred) or black powder coated. Timber posts are not preferred due to ongoing maintenance requirements.
- Only ‘flat top’ fence profiles are to be used to prevent clothes entrapment or injury. The fence profile is to be free of entrapment sites, which may be present with a partially bound opening on the top rail.
- Signs attached to a fence should not have sharp edges or create a foothold.
- Mowing strips and fences:
  - Must allow for natural drainage lines and flows.
  - Concrete mowing strip is to be installed, centred directly under fence line.
  - Maximum 100mm gap underneath fence bottom rail.

See *Figure 19: Typical playground fence*

Figure 19: Typical playground fence
(for guidance only – site specific design required)

Site considerations – pedestrian gates

Consider the following when selecting gate locations:

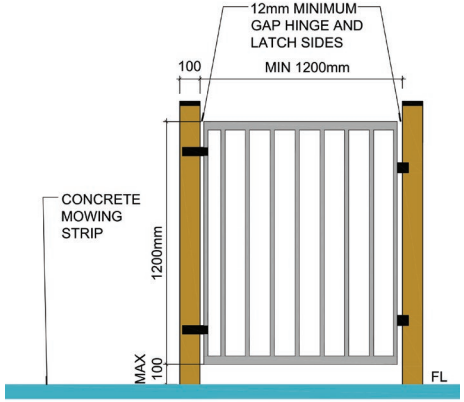
- In most fenced areas two pedestrian gates should be installed for safety. If one gate is blocked at any time, the other gate provides an emergency exit.
  - Small fenced areas (such as local parks), install one pedestrian gate.
  - Large fenced play spaces, such as an all abilities play space (AAPS), install two to three pedestrian gates.
- A hard, level surface area is preferred through gate thresholds and to seating nodes, to provide equal access. Where appropriate connect to existing pedestrian pathways.
- Provide pedestrian gate access from a car park into the play space.
- Gates must provide easy access and enable surveillance by parents and carers.
- Ease of removal of waste services bins for emptying to collection trucks.

Design considerations (pedestrian gates):

- Continue the same design as the fence to maintain the level of protection the fence provides and to maintain a consistent appearance.
- Pedestrian gates should have a minimum clear opening of 850mm and circulation space as per *AS 1428.1 – Design for Access and Mobility* set.
- Recess the pedestrian gate inwards (where possible) to direct children safely into the playground area. Gate to open inwards to keep children in the playground area (opposite to pool safety standards).

- All gate material must be heavy duty commercial grade, suitable for use in public areas.
- Install heavy duty commercial grade 'self closing' hinges and 'self latching' pool safety latches to pedestrian gates as per *AS 1926.1:2012 Swimming Pool Safety – Safety barriers for swimming pools.* Consider three hinges due to a high incidence of breakage.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
  - Ensure a minimum gap width of 12mm on both sides of any gate, hinge side and latch side, to prevent crushing of fingers.
- Brace each corner of gate (as welds are prone to becoming weak), ensure footholds are not created.
- Provision for wheelchair circulation:
  - 510mm clear distance along a fence to any obstacle (on the latch side of gate).
  - 530mm clear distance along a fence to any obstacle (on the hinge side of gate).
  - Allow adequate wheelchair circulation space between gates.

See *Figure 20*: Typical playground / play space pedestrian gate



Locks for pedestrian gates

It is recommended that gates to all abilities play spaces (AAPS) incorporate a dual locking mechanism.

- In the first instance a child safety top latch Magnalatch (or equivalent) shall be installed at a minimum height of 1.5m above ground level.
- A secondary lock may also be installed (product name / height of installation to be determined). This lock may utilise the Master Locksmith Access Key (MLAK key) to enable a person seated in a wheelchair or a person of short stature to open the gate. Ensure reach ranges and force to operate mechanisms are within the allowable dimensions and operational requirements of *AS 1428 – Design for Access and Mobility.*
- An extra plate attachment is required on the gate to stop excessive strike on a Magnalatch (or equivalent).

Note: Standard residential pool fencing is NOT to be used for any council facility. Australian Standards for Swimming pool safety are to be referenced for design purposes only.

Figure 20: Typical playground / play space pedestrian gate
(inset: magnalatch or equivalent) (for guidance only – site specific design required)

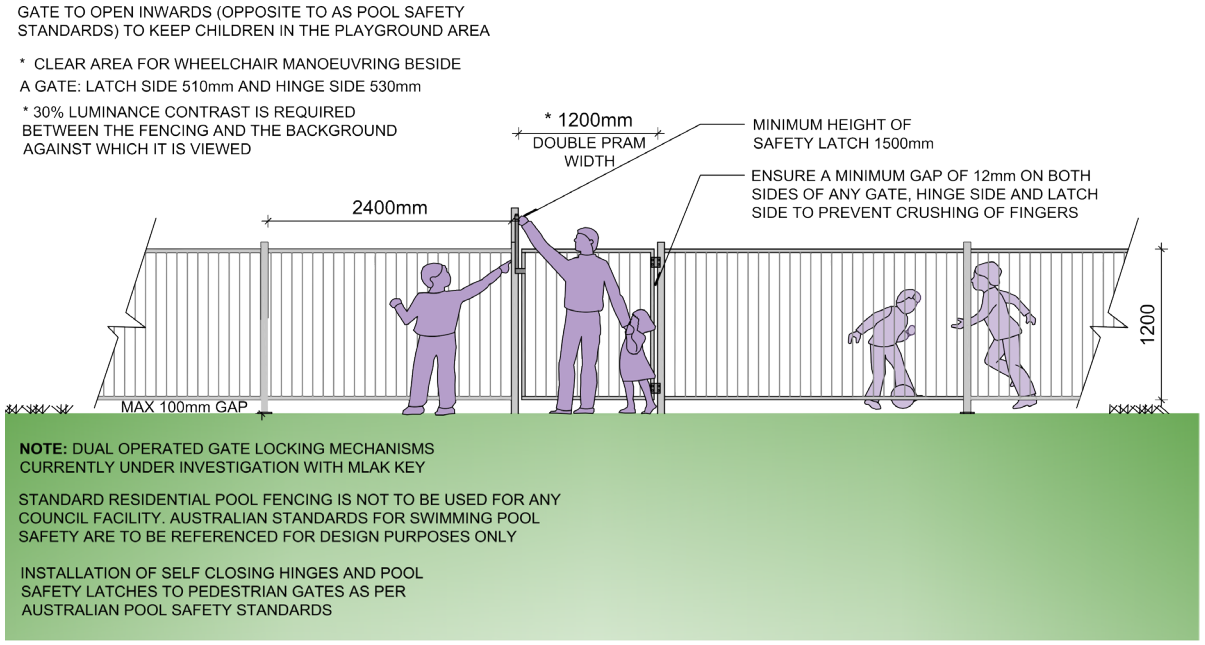
Keys for specialised playground equipment

The MLAK (Master Locksmiths Access Key) is a key which fits a universal lock system to enable people with disabilities 24 hour a day access to public facilities such as:

- Playground Liberty Swing.
- Changing Places public toilets – fully accessible facilities with change tables and hoists for people with severe or profound disability.

Council currently provides these keys free of charge to families and community groups.

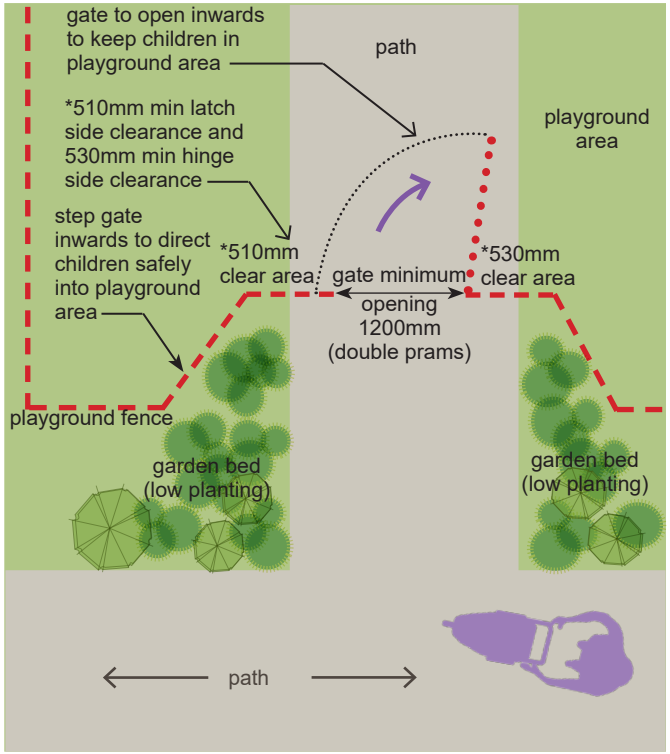
See *Figure: 21* and *Figure: 22*.



* accredited access consultant advice

Figure 21: Elevation – Playground fence and pedestrian gate – including dual operating system
(not to scale – for guidance only – site specific design required)

Note: Standard residential pool fencing is NOT to be used for any council facility. Australian Standards for Swimming pool safety are to be referenced for design purposes only.



*accredited access consultant advice

Figure 22: Plan – Playground fence and pedestrian gate
(not to scale – for guidance only – site specific design required)

Note: Standard residential pool fencing is NOT to be used for any council facility. Australian Standards for Swimming pool safety are to be referenced for design purposes only.

Site considerations – vehicle gate

Consider the following when selecting gate locations:

- All perimeter fences must have a vehicle gate. This provides access for approved vehicles (such as maintenance and emergency services).
  - As per *AS 4685.0*, maintenance access must be provided to the site and to the equipment, surfacing, planting, etc. Truck access will be required for replenishment of loose-fill safety surfacing. Ensure adequate space for vehicle manoeuvring within a fully fenced play space, to allow access to; landscaping areas, turf, kick and throw areas, toilet, shelters and barbecues.
  - Vehicle gates must provide easy and direct access from the nearest road. They must ensure suitable set-down and clearance requirements for maintenance vehicles and associated activities.
  - Ensure there is sufficient parking area for approved vehicles to temporarily park (outside of the gate), prior to entry. Ensure the parked vehicle does not interrupt the normal flow of on-road traffic.
  - Emergency vehicle access must be provided.
- Locate along a fence line with easy access. Consult SC Parks and Gardens Operations to determine their preferred location.
- Ensure the gate does not open cross a footpath or provide no conflict with other activities.
- Sufficient overhead clearance for crane truck delivery such as components for shelters, barbecues, park furniture.
- Where a vehicle gate is accessed via a sealed road, paint a yellow 'no stopping' line across the entry to prevent vehicles parking and blocking the gate.
- Ensure the gate swing area is not restricted by trees and allows adequate circulation space for entering vehicles. The gate location must be free of tree roots.

Design considerations (vehicle gate):

- Continue the same design as the fence to maintain the level of protection the fence provides and to maintain a consistent appearance.
- Double gate system – minimum 3.6m wide clear space for approved vehicles.
- Hinged swing system which opens into the fenced area, or both ways where possible.
- Install heavy duty commercial grade hinges and latches.
- Ensure there are no entrapment or crushing points (i.e. appropriate gaps at gate openings).
- Where a mowing strip is used directly under a vehicle access gate, it must be extra thickness reinforced concrete to withstand vehicle loads.
- All footings must be designed and installed to engineering specifications.

Locks and keys

Vehicle gates must be secured by the following:

- Provide either a single or two separate keyed padlocks to be operated by council and emergency services.
  - Padlock strips must be included on each gate panel.
  - The gate design is to include a drop bolt on each gate panel. See *Figure 23: Typical vehicle gate.*
- The gate system must include a removable post between the two gate panels. The post must be identical to those used for the surrounding fence panels.
  - The removable central post is to sit inside a sleeve, which is inset into a footing.
  - The removable central post must include throw loops designed to receive the padlock strips.
  - Padlock single staple with two haps system. Hasp must be bolted to each gate end post with single staple bolted to removable post. Padlock operated by Parks 30 key – contact SCC Parks and Gardens Operations for advice.

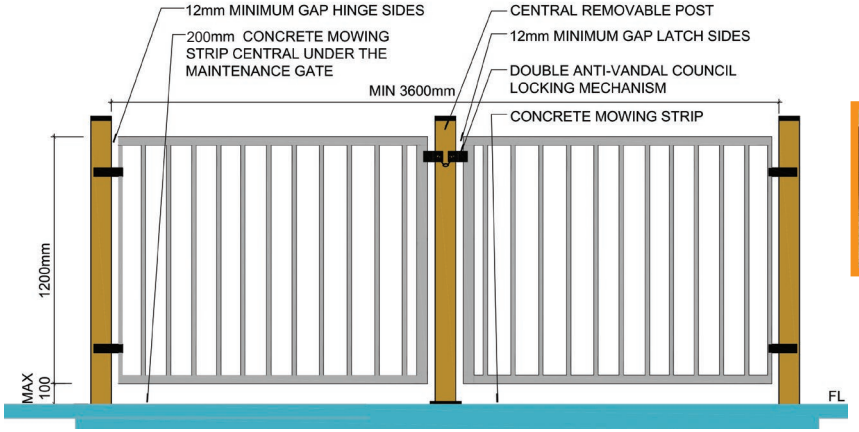


Figure 23: Typical vehicle gate (inset: two lock system) (for guidance only – site specific design required)

Stormwater infrastructure

Planning

The use of fencing to reduce the risk of unauthorised entry of a stormwater infrastructure area is only acceptable if all other ways of providing a safe environment have been exhausted.

Fencing around stormwater infrastructure is not aesthetically pleasing and can encourage anti-social behaviours. **It is not the desired outcome.** In many scenarios a less invasive solution can be achieved if planned for well; resulting in improved open space for both the stormwater function and recreation function.

See *LIM Water sensitive urban design (WSUD)* which sets out how to plan and design for stormwater infrastructure (with case study examples) while having a positive impact on the surrounding open space.

If fencing in unavoidable, consider which type of fence best suited to the possible risk at the site:

- **Perimeter fence** design (typically installed to secure a site) – creates both a visual and a physical barrier. The perimeter fence is a closed loop with keyed entry maintenance gate, by authorised personnel only. This fence type excludes access by unauthorised vehicles and pedestrians.
- **Barrier fence** design (typically installed to prevent the risk of falls) – creates a visual warning barrier. The fence is open ended.

Note:

Standard residential pool or any other residential fencing is NOT to be used for any council facility. Construction details must be engineered to suit the application.

Design considerations:

Stormwater **perimeter fence** must include the following attributes:

- Designed to keep unauthorised person from entering a site or being swept into the pipe network.
- Must be designed by a suitably qualified engineer.
- Fence must comply with the appropriate standards and guidelines and consider site conditions and requirements.

Stormwater **barrier fence** must include the following attributes:

- Designed to provide a highly visible barrier.
- Must be designed by a suitably qualified engineer.
- Fence must comply with the appropriate standards and guidelines and consider site conditions and requirements.

All stormwater fencing must comply with the standards and guidelines. Liaise with a stormwater engineer for advice.

See the following for further guidance:

- *Figure 24: Stormwater infrastructure examples*
- *9.0 Recommended Standards.*
- *LIM Water sensitive urban design (WSUD).*

Figure 24: Stormwater infrastructure examples
(for guidance only – site specific design required)

Other options

Alternatives to fences

The following alternative gates are discussed in further detail in the Table 2:

- **Barrier planting**
  - Planting of trees, shrubs and ground covers
  - Strategic tree planting (with stakes) or tree guards
- **In-situ bollards**
- **Boulders set in place.**

See Table 1: Alternative to installing fences for further guidance.

Alternatives to gates

The following alternative gates are discussed in further detail in the Table 3. Some alternative types are NOT preferred, except where specified for a particular application:

- **Removable bollards** (Not preferred. Only install where a high level of finish is required. Approval is required).
- **Slip rail** (NOT to be used unless there is limited space for a swing gate).
- **Chain gate** (must NOT be installed).

See Table 2: Alternative to installing gates for further guidance.

Table 1: Alternatives to installing fences

Product Photo (examples only)	Alternative to fence		Application	Key considerations
	Barrier planting	**Planting trees, shrubs and ground covers**	• To prevent unauthorised vehicles entering an area. • Provides a visual and physical barrier, that compliments the natural environment. • Environmentally friendly	• Plant tree species of an adequate height and maturity to deter vehicles (ensure CPTED sightlines are maintained for safety and security). • Select vegetation that will grow to create a barrier. • Refer *LIM Planting* for further guidance.
	Barrier planting	**Strategic tree planting**	• To prevent unauthorised vehicles entering an area. • Provides a visual and physical barrier that compliments the natural environment. • Sustainable	• Plant tree species of an adequate height and maturity to deter vehicles (ensure CPTED sightlines are maintained for safety and security). • Tree guards and tree stakes may be useful as a further deterrent. Consider adding delineators to stakes / tree guards to alert vehicles to the presence of a barrier. • Refer *LIM Planting* for further guidance.
	**Boulders**		• To prevent unauthorised vehicles entering an area. • Provides a visual and physical barrier, that compliments the natural environment. • Eco-friendly	• Refer *LIM Planting* for further guidance on boulders (weight requirements, placement, etc.).
	**In-situ bollards**		• To prevent unauthorised vehicles entering an area. • Provides a visual and physical barrier, whilst maintaining uninterrupted path of travel for pedestrians. • Low visibility alternative to fencing	• Consider adding delineators to alert pedestrians / vehicles to the presence of a barrier. • Refer *LIM Bollards* for further guidance

Table 2: Alternatives to installing gates

Product Photo (examples only)	Alternative to vehicle gates	Application	Key considerations	Outcome / recommendation
 	**Removable bollards** (includes drop down bollards)	• Prevents unauthorised vehicles entering an area, whilst providing access for approved vehicles (i.e. maintenance and emergency) • Provides a visual and physical barrier, whilst maintaining an unrestricted path of travel for pedestrians	Not preferred for vehicle access at most locations. Consider the size, material and method of safe operation. Lifting may require an aid. 'Removable bollards' versus 'hinged vehicle gates': • Hinged vehicle gates provide a superior solution to workplace health and safety issues (heavy lifting, reduced twisting and turning). • In some instances, a hinged vehicle gate has the potential to interrupt the flow of pedestrian traffic and is therefore not appropriate for the particular site. Where the site requires an uninterrupted path for pedestrians, while providing access for approved vehicles and keeping unauthorised vehicles out, a removable bollard (or drop down bollard) may be appropriate. • Hinged vehicle gates offer a better solution where there are events in open space areas. Community members may require temporary vehicle access to the park (by using an events key) • In some instances, a hinged vehicle gate may not be practical due to the lack of opening arc space. • Some sites may require a higher level finish, where approved by asset custodian. Where a removable bollard may be considered, please note the following: • Drop down bollards may provide a superior alternative (refer *LIM Bollards* for further guidance). • Consider the size, material and method of safe operation for a removable bollard. • Where removable bollards (or drop down bollards) are installed in place of a vehicle gate, consider adding delineators to alert vehicles to the presence of a barrier. • Where a removable bollard (or drop down bollard) is to be installed on a pathway, refer *LIM Bollards* for further guidance.	**Not preferred.** **Only install where a high level of finish is required.** **Approval is required**
 	**Slip rail**	• Prevents unauthorised vehicles entering an area, whilst providing access for approved vehicles (i.e. maintenance and emergency)	'Slip rail' versus 'hinged vehicle gates': • Slip rail gates present workplace health and safety issues (heavy lifting, restrictive twisting and turning movements). • Hinged vehicle gates provide a better solution where there are 'events' in open space areas, community members may require temporary vehicle access to the park (by using an events key). • In some instances, a hinged vehicle gate may not be practical due to the lack of opening arc space. • Both a hinged vehicle gate and a slip rail gate, have the potential to interrupt the flow of pedestrian traffic and is therefore not appropriate for the particular site. Where the site requires an uninterrupted path for pedestrians, while providing access for approved vehicles and keeping unauthorised vehicles out, a removable bollard (or drop down bollard) may be appropriate. Where it is identified that a slip rail gate may be considered, please note the following: • Ensure that the slip rail is able to slide completely through to allow for clear vehicle entry / exit. Ensure there are no barriers adjacent to the gate that would prohibit the rail to slide to its full extent (i.e. obstructions such as boulders, bollards and trees). • Consider installing the adjacent bollards with a top groove so the slide rail can be slid directly across to rest on them, to prevent the end dropping on the ground. • Consider the size, material and method of safe operation of the slip rail gate.	**Not preferred.** **Only install this gate type where there is insufficient space for a 'swing' gate** **Approval is required**
	**Chain gate**	• Chain between posts / bollards **MUST NOT be installed**	• Low visibility – a chain is not readily visible. • Safety risk – a galvanised or stainless steel chain is generally set at a height where it may pose a risk of falls or trip hazard for pedestrians, particularly people with low vision.	**MUST NOT be installed** 

6.0 Materials, fixings and finishes

Best practice guidance for the selection of materials, fixings and finishes.

Overview

A fence may comprise posts of timber, concrete, bricks, metal or recycled materials connected by wire, netting, rails, or boards.

Fence structures may include embankment, strategic tree planting, hedge, creeks, cattle grids or anything that forms part of an enclosure.

Materials selection will reflect the following considerations:

- Open space classification to inform the design standard.
- Adjacent fence type.
- Level of use.
- Any potential unlawful entry.

All materials, fixings and finishes must be made from robust heavy duty materials (not standard residential pool fencing), vandal and corrosion resistant (particularly in coastal areas) and suitable for use in public places.

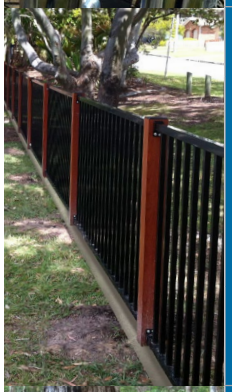
All stainless steel

- Use high grade (extra heavy duty) commercial components to achieve a strong and resilient fence which resists bending deformation due to impact and repeated manipulation.
- All wire fences must be commercial grade, looped at each strand.
    - Mesh and chain wire should be uniquely strung, so that if a section is damaged, it can be replaced without affecting the whole fence.
- Fences and gates which are located in aggressive coastal environments or waterlogged areas, require materials which provide operational and maintenance benefits.
    - Materials must be manufactured and constructed to operate in exposed, high energy environments to achieve the required design life, and provide 'very long term' (*ISO 12944-1*) corrosion resistance.
    - Steel coating systems must be in accordance with *AS 2312 – Protection of structural steel against atmospheric corrosion* for the CS-M Zone as per *AS 4312 – Atmospheric corrosion Zones.*
    - Match or exceed the requirements noted in *Table SC6.14.8A* of the Sunshine Coast Council Planning Scheme policy for development works.
    - Where metallic surfaces are painted following the above treatment, this is to be done with a 2-pack epoxy paint.
    - Powdercoating of steel work is not accepted.
- Council fences and gates are predominantly constructed from one or more of the following (specialised fauna fences may use other materials):
    - 316 marine grade stainless steel East of the Bruce Highway.
        - Supply is to be by an ASSDA (Australian Stainless Steel Development Association) SSSR (Stainless Steel Specialist Register) accredited business, or equivalent.
        - For high use pedestrian areas or where a high level of finish is required.
        - All stainless steel elements must be treated with a clear surface protectant to protect against discolouring and tea staining.
    - Galvanised steel (hot dip galvanised after fabrication) hinterland areas West of the Bruce Highway.
        - Galvanised welded PVC coated wire mesh infill for fences and gates.
        - For play spaces and environmental reserves.
- Marine grade aluminium, powder coated (not swimming pool fence) all areas.
    - Extra heavy duty strength aluminium is required to prevent accidental damage and vandalism to fence components.
    - To limit galvanic corrosion provide an insulating layer between different metals.
    - Aluminium timber look posts may be used with gloss finish aluminium baluster.
- Hardwood timber (appropriate species and treatment) to approved areas.
    - Approval is required from SCC Parks and Gardens and / or SCC Environmental Operations, depending on the location.
- Recycled plastic bollard posts with horizontal rails made from recycled plastic or galvanised steel.
- Manufactured to engineering specifications (where applicable).

See the following for further guidance:

- *LIM Bollards*
- *Table 3: Fences and gates materials key considerations* for a full list of materials.

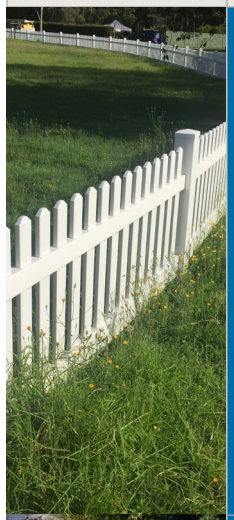
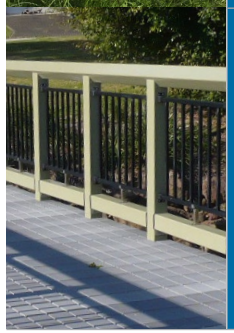
Table 3: Fences and gates materials key consideration

Material photo (examples only)	**Material**	**Definition**	**Recommended installation sites**	**Key considerations**
	316 Marine grade stainless steel	Stainless steel refers to a group of corrosion resistant steels containing a minimum 10.5% chromium. Resistance to corrosion is due to the naturally occurring chromium rich oxide film present on the surface of the steel.	high use and high profile locations, coastal environments – for a superior finish	preferred for use in areas which are subject to corrosive marine environments (particularly coastal, east of Bruce Highway).
				316 marine grade has a greater resistance to salt corrosion than other grades of stainless steel. The smoother the surface, the better the corrosion resistance.
				highly reflective in full sun, may cause glare problems for people with low vision.
				supplier is to be an ASSDA (Australian Stainless Steel Development Association) SSSR (Stainless Steel Specialist Register) accredited business. All stainless steel elements must be treated with a clear surface coating to protect against discolouring and tea staining.
				stainless steel horizontal wire barrier is not preferred due to increased maintenance (tension tightening)
	Aluminium (including wood look aluminium)	Aluminium is a light malleable ductile silvery-white metallic element that resists corrosion.	high profile locations, parks and gardens	select where high corrosion resistance is required together with low maintenance and minimal whole of life costs. **Do not use standard residential aluminium pool fence for any council facility.**
				powder coating can improve appearance. 'Wood look aluminium' is a powder coat - low maintenance, does not need repainting, and will not split, rot or crack (aluminium which is powder coated creates a hard finish that is tougher than conventional paint).
				can be manufactured and delivered in sections ready for installation
				susceptible to galvanic corrosion where different metals are in contact. Provide an insulating layer to prevent electrical contact between different metals. This will inhibit the process of galvanic corrosion.
				posts are to be commercial grade high strength (not standard residential pool fencing). round tube baluster is preferred 100mm x 100mm x 5.0mm aluminium posts are preferred for strength.
	Galvanised steel	Hot dipped galvanising (total immersion in molten zinc of all fabricated pieces after market) provides durability, longevity and sustainability.	low profile locations, environmental reserves	hot dipped galvanised (after market) steel is robust, durable and can be moulded into different shapes.
				hot dipped galvanisation is to occur after fabrication (after market) to limit rust at weld points.
				fixings are readily available and can be supplied as ready to install modular systems or cut to size.
				useful where a high level finish is not required. Can be painted with a 2-pack epoxy paint to suit individual sites and improve appearance. **Powdercoating of steel work is not accepted**.
				may be used as support posts for stainless steel rails and wire infill.
				cost effective method of creating a boundary.
				suitable for sun or shaded locations, minimal maintenance
				round section tube with thicker wall is preferred over square section tube

continued... **Table 3: Fences / gates materials key consideration**

Material photo (examples only)	**Material**	**Definition**	**Recommended installation sites**	**Key considerations**
	Timber (new and recycled)	Timber is workable, readily available, rust and corrosion free, durable and easily repaired / replaced.	suitable for low profile areas or where appearance of fence requires a 'natural' look, such as beach accesses environmental reserves and parks and gardens	requires ongoing maintenance (generally staining or painting). Durability of timber is dependent upon the species selected.
				preferred to be installed where there is sunlight to prevent mould build-up and deterioration
				combustible - ignites and burns slowly
				suitable for fence posts
				to determine the most suitable timber species for a particular application, consider aesthetics, price, availability, size limitation, ecological impact, hardness, stability and function.
				preferred material for both posts and rails for medium to low use coastal areas such as small beach access points.
				suitable material for large lengths of fence.
				H4 dipped pine with either CCA preferred (or ACQ) treatment. F14 H4 dipped pine (where subject to extreme wetting). Supplier to provide Safety Data Sheet (SDS) for both products. Timber preservation only works on sapwood. It has no effect on the heartwood of timber. The majority of council post and rail fences are constructed using treated pine with CCA preservative, which is the preferred material (where the timber is not in frequent and intimate contact with the public).
				CCA and ACQ treated pine: preferred timber finish is (non-polyurethane) Ultradeck or Lanotec (or equivalent). Painted timber finish is preferred for local parks to reduce maintenance.
				pre-treatment of exposed end grain seals to posts and rails: use Selleys Aquadhere (or equivalent). timber deterioration over time is usually due to rot or attack by living organisms
				all fixings such as, nails, bolts, screws, plates, must be 316 marine grade stainless steel.
				it is preferred that wire strung between posts is "Bayco Sighter Wire" or equivalent to increase visibility

continued... **Table 3: Fences / gates materials key consideration**

Material photo (examples only)	**Material**	**Definition**	**Recommended installation sites**	**Key considerations**
	Recycled plastic	Recycled plastic is 'second use' reprocessed waste plastic material. Sources include industrial waste, post consumer plastics and retail plastic waste.	Sports grounds - cricket pitches	can be installed in shaded areas – resists mould build-up.
				suitable for corrosive environments.
				long lasting, durable and can be recycled.
				termite, micro-organism and moisture resistant.
				low maintenance, does not need repainting, and will not split, rot or crack.
				deemed to be environmentally desirable over more classic materials.
				NOT regarded as structural or load-bearing.
				while recycled plastic resists combustion, it may be subject to burning when fuel is applied, and where there is little or no opportunity for passive surveillance.
				raw materials include: • LDPE Low density polyethylene (shrink wrap) • MDPE medium density polythene (pipe and tube) • HDPE high density polythene (bottles and crates) • PP Polypropylene (industrial scrap).
	Fibre reinforced plastic (FRP)	Recycled plastic compounded using reinforcing fillers such as resin and glass fibres to give load-bearing characteristics in certain circumstances.	high profile areas in coastal in environmental reserves and parks and gardens	can be installed in shaded areas – resists mould build-up.
				suitable for corrosive environments.
				long lasting, durable, combustible and can be recycled.
				termite, micro-organism and moisture resistant.
				low maintenance, does not need repainting, and will not split, rot or crack.
				deemed to be environmentally desirable over more classic materials.
				does not sustain combustion.
				limit the length of members to maintain structural characteristics.

continued... **Table 3: Fences / gates materials key consideration**

Material photo (examples only)	**Material**	**Definition**	**Recommended installation sites**	**Key considerations**
	Wood plastic composite (WPC)	Wood plastic composite is manufactured from a mixture of recycled wood-flour and recycled plastic (resins).	high profile areas in coastal in environmental reserves and parks and gardens	provides an organic feel and look of natural timber – natural wood grain surface appearance and it is free of knots and splinters.
				one lineal metre of WPC contains approximately 37 two litre recycled milk bottles (HDPE) and two kilograms of recycled pine waste.
				100% recyclable.
				free of solvents, glue or other environmentally. Damaging additives.
				light, rigid, easy to handle and install.
				can be sanded to remove surface marks or graffiti.
				resistant to insects, fungi, rot, water penetration and ultra-violet radiation.
	Knitted shade cloth	Knitted shade fabric used for the control of shade, temperature, wind and windblown sand	beach accesses, environmental reserves	does not sustain combustion. Is suitable for projects requiring fire retardant properties.
				contains no toxic by-products that can be released upon incineration or recycling.
				roll is 1.8m wide - excess fabric bury into line trench and backfill on outside

Barbed wire is *NOT* to be used

Council DOES NOT endorse the installation of barbed wire fences or electrification of fences.

Each year thousands of wildlife such as, gliders, owls, birds and bats, face permanent disability or death from entanglement on barbed wire fences. In many cases barbed wire does not perform an essential function and can be replaced with other types of animal friendly wire.

To prevent potential harmful impacts on fauna from barbed wire and electrified fences. The following is recommended:

- Removal is the most desired option, particular if it is not currently serving a purpose.
- Replacement of the top strand of barbed wire with Bayco sighter wire (or equivalent), as this is where most entanglement occurs.
- Alternative fences using Bayco sighter wire (or equivalent) unless it compromises stock containment.
- Consider glow in the dark fence materials.

Bayco sighter wire is a polymer monofilament which is light, strong, flexible and non-corrosive and is available in 4.0mm to 5.2mm diameter.

7.0 Positioning guidance

Best practice guidance for the way embellishments are placed or arranged, includes:

Site setout

Fences are normally constructed on a property boundary line to define differing uses such as between parks and open spaces and road reserve. They may be built off the boundary line where physical features of the land prevent it, or where competing uses within an area necessitate specific delineation.

Consider the following:

- Fences and gates adjacent to roadways, must comply with road related standards and guidelines (clear zones, spearing hazards).
- Positioning of fences, gates and mowing strips must take into account natural drainage lines and overland flows to prevent trapping of water and ponding.

Fences

- Fences around park activity areas and park perimeters should be installed within garden beds where possible to reduce maintenance.
- Retain existing views
- Avoid obscuring seated height views with fence rails where possible.
- Consider CPTED principles to reduce crime by providing enhanced 'passive surveillance' for open space areas.
- Retain sight lines for supervision near activity areas, such as playgrounds, dog exercise areas (DEAs) and sporting fields.
- As an integral part of a project, incorporate low level planting to soften fences (where possible).
- Ensure embellishments (i.e. seats), are not positioned too closely to a fence, that they can be used as leverage to jump the fence.

Gates – pedestrian

- Pedestrian gates are to be located at the safest point of entry and exit, positioned to allow unobstructed views of oncoming pedestrian, cyclist and vehicular traffic.
- Ease of removal of waste services bins for emptying to collection trucks.
- Proximity of gates to amenities buildings to enable cleaning service vehicle and personnel access to the facility which is to be cleaned.
- Install gates to provide the most direct pedestrian access from connecting of pathways.

Gates – vehicle access

- Vehicle gates are to be positioned on a fence line or recessed into a park or open space, in the most suitable place for ease of access for maintenance, waste removal and emergency vehicles.
- For the most appropriate placement of vehicle access gates consult the appropriate SCC department.
- Gates are to provide clear vehicle access, free of obstructions such as trees, garden beds and furniture.
- Where a vehicle gate is accessed via a sealed road:
    - paint a yellow 'no stopping' line across the entry to prevent vehicles parking and blocking the gate.
    - install 'emergency and maintenance vehicle only' signs to each end of a parking bay near the gate entry.
- Vehicle gates (where concreted under) are to include a trafficable reinforced vehicle crossover. Some locations may require a more heavy duty vehicle crossing. Consider the following:
    - large trucks to top up playground surfacing.
    - excavators used for beach sand nourishment.
    - crane trucks for replacement of superseded shelters and installation of beach access stairs.
    - trucks used for garden maintenance delivery of mulch and soil.
    - waste removal services trucks.
    - cleaning services vehicles.
- Where maintenance vehicles are repeatedly crossing a formal pathway, it must be strengthened / upgraded to withstand the load of plant vehicles.
- Consider future design for pedestrian and cycle facilities when locating gates.
- Install lightweight removable bollards in place of a maintenance gate when the following occurs:
    - a pathway runs immediately parallel to other pavement areas.
    - there is insufficient space for a gate system.
    - the gate system will impact passing pathway foot traffic (the gate will open across the pathway).

See the following for further guidance:

- *Figure 25 and 26: Typical provision for maintenance vehicles.*
- *LIM Bollards.*

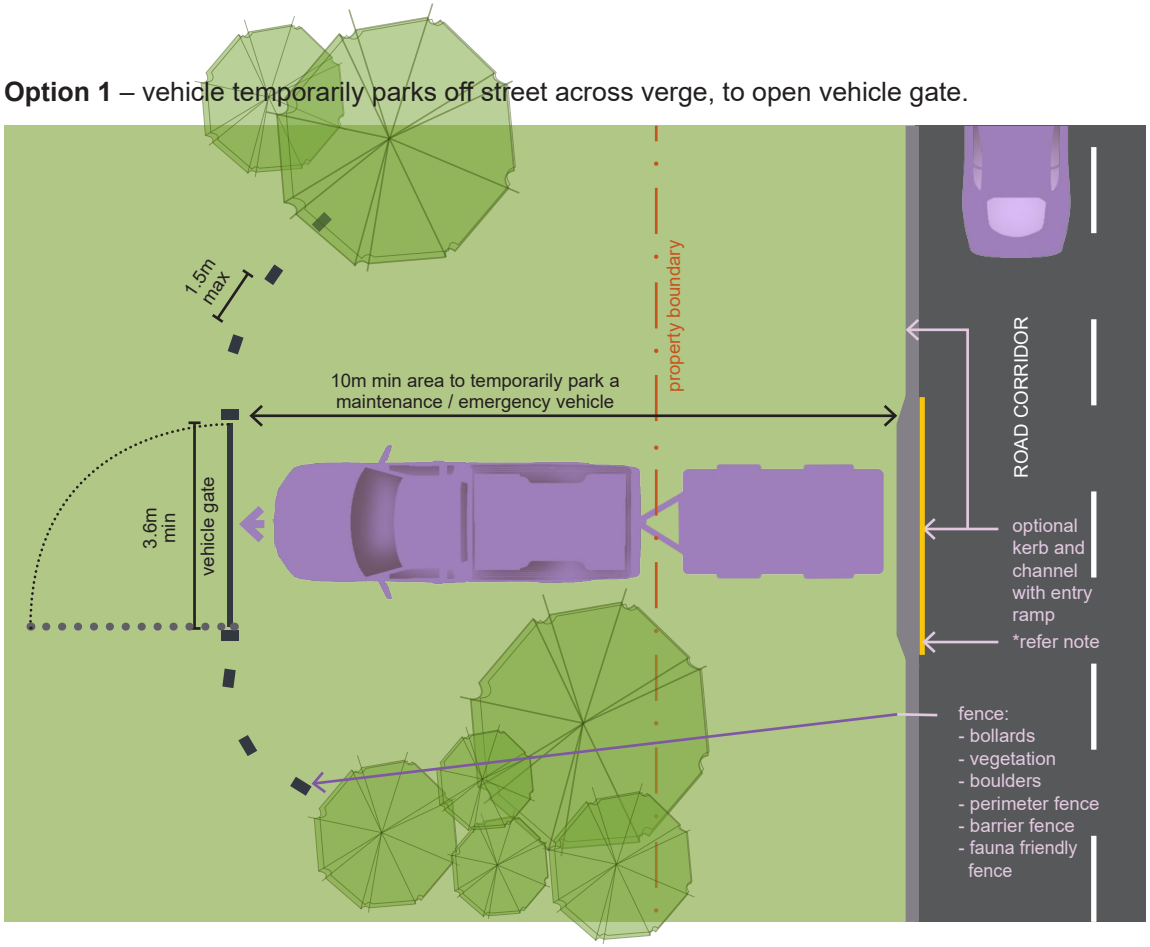
Maintenance vehicles

The following diagrams illustrate possible maintenance gate configurations which allow safe parking of a maintenance vehicle, and exit of the vehicle to open a gate (Options 1 and 2). Options 3 and 4 illustrate removable bollards employed as a maintenance gate.

See *Figure 25* and *26:Typical provision for maintenance vehicles*.

* Note:
At sites where there may be ongoing vehicles blocking the driveway access, consider a yellow 'no stopping' line marking across the driveway to prevent vehicles blocking the entry.

Option 1 – vehicle temporarily parks off street across verge, to open vehicle gate.



Option 2 – vehicle temporarily parks on street in restricted parking bay, to open vehicle gate.

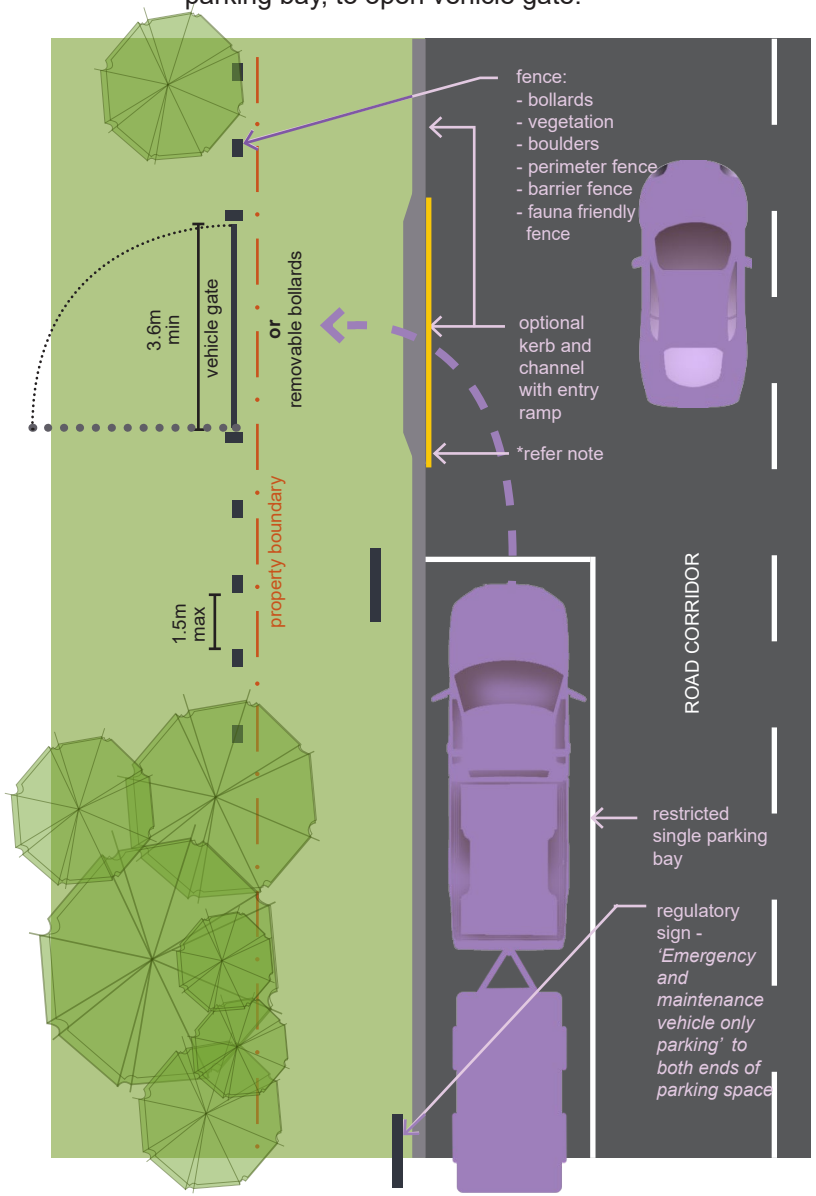


Figure 25: Typical provision for maintenance vehicles *(Option 1, 2)*
(not to scale – for guidance only – site specific design required)

Option 3 – vehicle temporarily parks on street to open vehicle gate.
(Note: a gate has not been used as it would interrupt pathway movement when open)

Option 4 – vehicle temporarily parks on street in restricted parking bay to operate removable bollards
(Note: a gate has not been used as it would interrupt pathway movement when open)

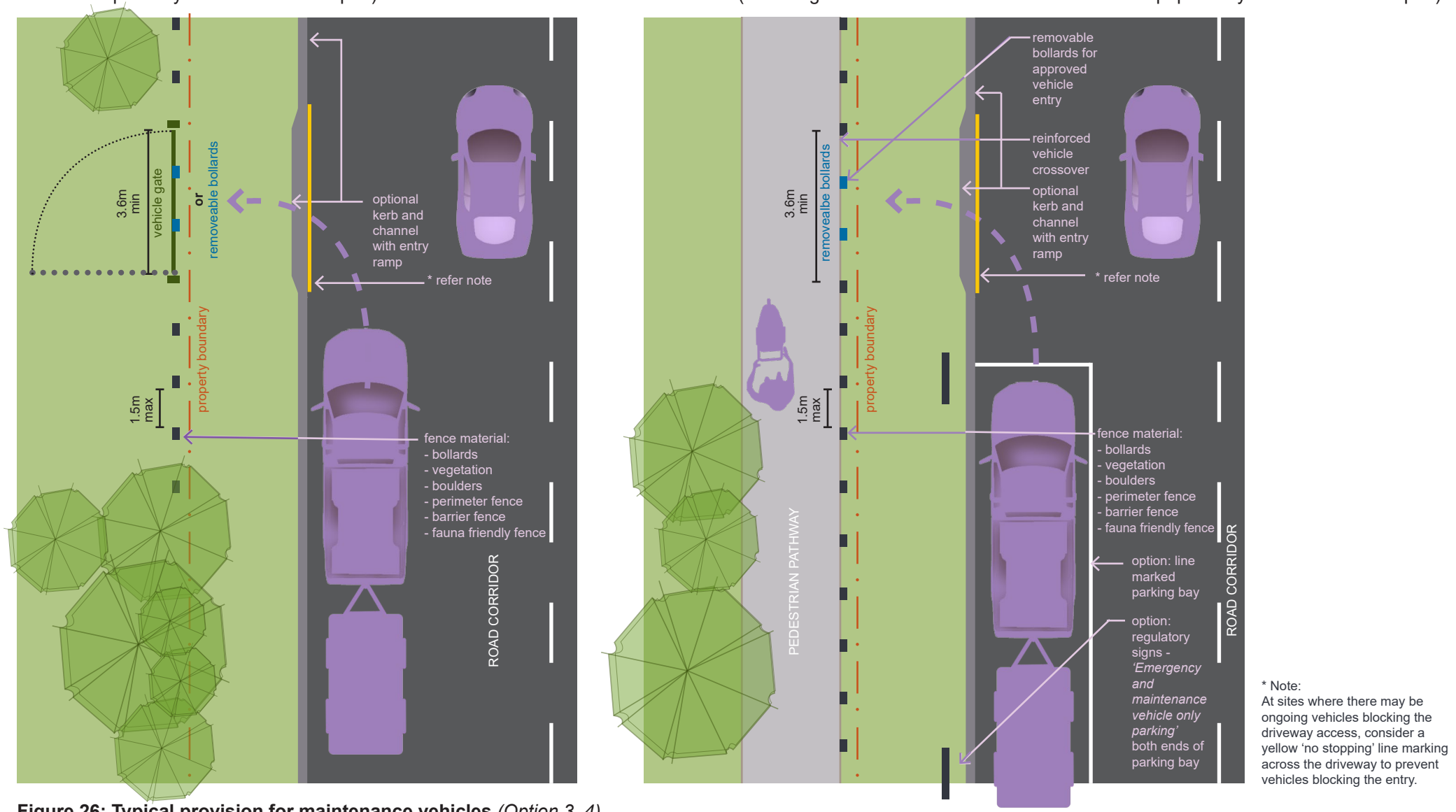


Figure 26: Typical provision for maintenance vehicles *(Option 3, 4)*
(not to scale – for guidance only – site specific design required)

* Note:
At sites where there may be ongoing vehicles blocking the driveway access, consider a yellow 'no stopping' line marking across the driveway to prevent vehicles blocking the entry.

Clearances

See *Table 4: Positioning guidance offsets* for further guidance:

Table 4: Positioning guidance offsets

Embellishment	Distance from	Minimum distance	Reason
Fences and gates	established Trees	Tree Protection Zones (TPZ) varies See *LIM Vegetation Management* (under Preliminaries)	avoid excavation near tree roots
Maintenance gate	between gate posts	3.6m min	clear vehicle access
	fence post both sides	12mm	to prevent finger entrapment
Gap between fence and FL – playground	bottom of fence and top of concrete strip / finished level (FL)	100mm max	to provide a secure environment where children cannot crawl under the fence
Gap between fence and FL – dog off leash park		50mm max	to prevent small dog escapes
Fences and gates	fence or gate componentry	ensure min 12mm gap both sides of any gate, hinge side and latch side	prevent finger entrapment hazards / crushing of fingers
	any other item	2.5m	for deck mower clearance (where possible). Avoid creating small difficult to mow areas
Pedestrian gate	fence post both sides	12mm	to prevent finger entrapment
	between gate posts	1.0m	clear pedestrian / mobility device access
	latch side gate post	510mm	clear of obstacles for wheelchair manoeuvre
	hinge side gate post	530mm	
Fence	seat located in a dog off leash park	2.0m	to prevent dog escapes
	seat located in a fenced play space		to prevent a child from climbing over the fence
Fence (smooth)	pathway	300mm	cyclist and pedestrian safety

8.0 Equal access requirements

Implement equal access for all users by adopting the following principles:

***The Disability Discrimination Act (DDA)* defines 'premises' as the whole of the built environment and includes existing buildings, new or proposed buildings, transport systems, car parks, pathways, and public parks and gardens.**

Note:
Consult an access consultant accredited by the Association of Consultants in Access Australia (ACAA)

Elements required for equal access

- Embellishments must be designed in accordance with *AS 1428 Design for Access and Mobility.*
- Ensure that gates are connected to a continuous accessible path of travel (CAPT), to enable equal access for people who are blind or have low vision and for people who use wheelchairs, mobility aids or assistance animals. Ensure that the path connects to an equal access car park space.
- Latches and gates should be set at a height which is available to people who use wheelchairs or mobility devices.
- Latches and hinges must include minimum 12mm offset from gate posts both sides, to prevent finger entrapment.
- Pedestrian gates should open both ways if possible (with the exception of play space gates).
- Install a paved entry and gate system sufficiently wide enough for wheelchair access (1.2m minimum).
- Avoid finished height difference between a shelter slab and adjoining surfaces to prevent trip hazards and to prevent 'tramlining' of pram, bicycle and wheelchair wheels.
- Provision for wheelchair circulation:
  - 510mm clear distance along a fence to any obstacle (on the latch side of gate).
  - 530mm clear distance along a fence to any obstacle (on the hinge side of gate).
  - Allow adequate wheelchair circulation space between gates.
  - There must be no obstacles within this wheelchair manoeuvre area.

Visual / sensory wayfinding

- For people with a vision impairment, provide a minimum 30% luminance contrast between objects and the background they are viewed against, for ease of identification.
  - Where luminance contrast may not be achieved (such as grey aluminium furniture on grey concrete), luminance contrast can be addressed by introducing colour into the ground surface providing a minimum 30% luminance contrast with the embellishment base, resulting in the embellishment being more visible for people who have low vision.
- Consider designing nodes with a contrasting coloured concrete, or a variation in surface texture, to enable people with a disability to identify the location of embellishments along a pathway.
- A brightly coloured entry gate will accentuate a gate position and assist people with low vision.
- The gate must be highly visible in prevailing light conditions such as full shade, partial shade, full sun and partial sun.
- Where a gate is in a full sun location, select materials that minimise glare (such as reflection off mirror finish stainless steel).

9.0 Recommended standards

Embellishment design, manufacture and installation require an appropriately qualified professional to provide site specific solutions.

Where Australian Standards or part thereof have been adopted by legislation, they are a legal requirement.

Embellishments should satisfy the following requirements, including but not limited to:

Note:
Please refer to the relevant authority websites for updated information and current document distribution dates. These documents are subject to amendments from time to time.

Legislation

Refer Legislation for guidance.

Australian Standards / industry guidelines

To install fences and gates, apply the overarching and specific standards and guidelines for the intended use.

- Design for the highest order of needs at each site.
- Design for site specific physical features.
- Analyse risks associated with fence application to determine barrier requirements.
- Refer to the full standard or guideline for a complete list of requirements.

Note:
Standard residential pool fencing, or any other residential fencing, is NOT to be used for any council facility.
Designers must select heavy duty fence materials.

Note:
If the fence type selected, is intended for purposes other than originally specified, it MUST BE ENGINEERED TO SUIT the individual application / site requirements

National Construction Code (NCC)

Fences and gates shall be developed in accordance with the *NCC (current edition):*

- *Building Code of Australia (BCA) Volumes 1 and 2*
- *Plumbing Code of Australia (PCA) Volume 3.*

Safety in design (SiD)

Include Safety in Design (SiD) principles to eliminate, or if not reasonably practical, minimise risks to health and safety throughout the design, construction and life of the embellishment.

See *Legislation – Work Place Health and Safety Act 2011* for additional safety guidance.

General

Gates and handrail

- *AS 1428.1:2009 Design for access and mobility Part 1: General requirements for access – new building work.* Handrail and gate design.

Barrier offset

- Austroads Guide to Road Design – Part 6A: Pedestrian and cyclist paths. Lateral clearance of 0.5m (absolute minimum) is required between a path and any obstacle.

Walking tracks

- *AS 2156.1:2001 –Walking Tracks Part 1 – Classification and signage.* Classification system to determine barrier type.

Barrier design

- *AS 2156.2:2001 –Walking Tracks Part 2 – Infrastructure Design.* Barrier design to protect against falls such as at an embankment, waterbody, drainage infrastructure.

Play space / playgrounds

Protection against entrapment

- *AS 4685.1:2014 Playground equipment and surfacing – General safety requirements and test methods (EN 1176.1:2008 MOD).*

Child entrapment protection design features

- *AS 1926.1:2012 Swimming Pool Safety Part 1: Safety barriers for swimming pools.*

Finger entrapment

- *HB 296 3.21:2008 – Product Safety Framework Part 3.21: Gaps and openings – Finger entrapment.*

See LIM Play spaces for further guidance.

Dog exercise areas (DEAs)

Perimeter DEA fencing and gates are to be designed in accordance with best practice and overarching standards.

See Dog off leash parks for further guidance.

Fauna fences

Fauna protection perimeter and barrier fences, pedestrian and vehicle gates

- *Department of Transport and Main Roads Fauna Sensitive Road Design Manual Vol 2.*

Fauna barrier fence

- *Austroads Guide to Road Design – Part 6B: Roadside Environment*.

Stormwater, wetlands and drainage basins

Perimeter and barrier exclusion fences

- *IPWEAQ Queensland Urban Drainage Manual 2017.*

Drainage basin barrier fences

- *Austroads Guide to Road Design – Part 6B: Roadside Environment.*

Pedestrian, cyclist and roadside fence

Barrier and perimeter fence

- *Austroads Guide to Road Design – Part 6A: Pedestrian and Cyclist Paths*.

Roadside barrier design

- *Austroads Guide to Road Design – Part 6B: Roadside Environment*.

Roadside clear zone

- *Department of Main Roads Road planning and Design Manual Chapter 8 Safety Barriers and Roadside Furniture*.

See *Paths, trails and tracks* for further guidance.

Foot bridges, cycleways, light traffic bridges

Roadside clear zone

- *Transport and Main Roads Manual – Design Criteria for Bridges and Other Structures. February 2018*.

See *LIM Pedestrian bridges* for further guidance.

Stairs and canoe launching platforms

Guardrailing

- *AS 1657:2018 – Fixed platforms, walkways, stairways and ladders – Design, construction and installation.*

See *Waterways (watercraft facilities)* for further guidance.

Materials and finishes

Timber

- *AS 1604:2012 – Specification for preservation treatment – Sawn and round timber* set. Specifies timber treatment.

Steel

- *AS 2837:1986 – Wrought alloy steels – Stainless Steel Bars and Semi-Finished Products. Requirements for wrought stainless steel for engineering purposes supplied as hot rolled and cold finished.*
- *AS / NZS 4680:2006 – Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.* Requirements and tests for hot-dip zinc coatings (galvanised steel).
- *AS 1725:2010 – Chainlink fabric security fences & gates*. Design of chain wire fences.

Aluminium

- *AS / NZS 1866:1997 – Aluminium & aluminium alloys – Extruded rod, bar, solid and hollow shapes.* Specifies requirements for aluminium and aluminium alloy extruded rod, bar, solid and hollow products for general engineering purposes.
- *AS 3715:2012 – Metal finishing –Thermostat powder coating for architectural applications for aluminium and aluminium alloys.* Specifies requirements for powder coating architectural aluminium.

Designing for access and inclusion

- *AS 1428 Set – Design for Access and Mobility*. Design requirements for new building work to provide access for people with disabilities. This Standard is referenced in legislation.

Designing for safety (CPTED)

- *Queensland Government – Crime Prevention through Environmental Design (CPTED) – Guidelines for Queensland, 2007.* Provides guidelines about designing a safe environment to assist in the prevention of the opportunity for crime.

Erosion and sediment control

- *Erosion and Sediment Control, International Erosion Control Association (IECA), 2008.* International Erosion Control Association Best Practice Erosion and Sediment Control (BPESC) documents.

Trees

- *AS 4373:2007 – Pruning of Amenity Trees.* Specifies methods for pruning trees and gives guidance on correct and uniform practices.
- *AS 4970:2009 – Protection of Trees on Development Sites.* Provides guidance on the principles for protecting trees on land subject to development.

Approvals / authorised person

Assessable development

- Where a fence is deemed 'assessable development' it requires building approval from a private building certifier and must meet all of the requirements of the *Building Regulation 2006*, the *Building Code of Australia (current edition)* and the *Sunshine Coast Planning Scheme 2014*:
  - Building approval is required for any fence that is higher than 2.0m above the natural ground level. This may include a combined retaining wall and fence.

Coastal management district

- Ensure appropriate environmental approvals are obtained and the conditions observed where any building work is proposed in the Coastal Management District.
- Consult with Queensland Government Department of State Development, Infrastructure and Planning (DSDIP) – State Assessment and Referral Agency (SARA) for application forms, guidelines and information sheets.

Other

- Ensure all relevant approvals are obtained from the appropriate governing bodies and all conditions are observed.
- Department of Transport and main Roads (DTMR) approval is required for works near state controlled roads. This applies to any part of the road reserve including pathways, kerb and channelling, nature strip and traffic island.

SC Council additional requirements

Corporate documents

Refer *Overview of corporate documents* for guidance.

Corporate liaison

Developer delivered assets

- SCC Development Services – all works associated with any development application.

Council delivered assets

- SCC Parks and Gardens – recreation parks, amenity reserves, linear parks, landscape corridors, sports grounds and recreation trails enquiries relating to asset management, business planning and direction.
- SCC Environmental Operations – recreation trails, foreshore infrastructure, environment reserves, constructed waterbodies and wetlands.
- SCC Design and Placemaking Services – recreation parks, amenity reserves, linear parks, landscape corridors, sports grounds, specific purpose (sports), recreation trails and streetscape / centres enquiries relating to design.
- SCC Sport and Community Venues – sports ground planning and asset management.
- SCC Transport Infrastructure Management – technical and design solutions to facilitate ongoing management and safe operations of road and assets. Water management and drainage solutions.

10.0 Sustainability

Refer *Design principles – Sustainability* for guidance.

11.0 Project management and maintenance

Best practice guidance for documentation.

Documentation

The submission of design documentation and technical specifications for each item (where applicable), is to include, but not be limited to:

- **approvals, searches, compliant drawings and documentation** – written compliance with relevant legislation, Australian Standards and corporate documents (including specifications and access and mobility requirements)
- **preliminary site setup** (refer LIM category) – compliance with safety, tree protection, erosion and sediment control measures
- **technical information** – the manufacturer's product, installation, inspection, warranties and maintenance information
- **materials** – specification of materials
- **schedule of finishes**
- **engineered design and any required certifications**
- **unusual requirements** for handling or installation and competency requirements
- **workplace health and safety plan**, where applicable
- **environmental management plan (EMP)** and / or **erosion and sediment control plan**, where applicable.

Practical completion – technical information to be supplied

At practical completion, the contractor must supply technical specifications, including but not limited to:

- **certification** – inspections, final approvals and documentation
- **as constructed drawings** and specifications which should detail the location of any sub-surface services (e.g. drainage, electrical)
- **operational manuals** – inspection / maintenance details including parts and service manuals, and manufacturer's guarantees
- **construction** and / or **maintenance tools** including non-standard maintenance tools for bolt tightening and replacement parts
- **all required signage** should be installed prior to hand-over of the asset, where applicable
- **manufacturer's guarantees / warranties** and any other documents or items, including quality management compliance and accreditation.

Note:

As-constructed drawings and ADAC file must be submitted at practical completion. GIS require this information to update their records on the asset register and other sources.

Maintenance period and / or defects liability period

Developer delivered assets

The development maintenance period and requirements are nominated in the conditions of approval (decision notice).

Council delivered assets

The maintenance period and requirements are nominated in the letter of appointment of contractor (contract).

Prior to the end of the pre-determined maintenance period or defects liability period, a **'pre-handover inspection'** should be conducted by an authorised council officer. The following items will apply:

- *Compliance Audit*
- *Rectification Action Plan (RAP)* is provided identifying any faults and non-compliance
- *RAP* items are to be rectified prior to handover.

Sunshine Coast Open Space Landscape Infrastructure Manual DISCLAIMER

Acknowledgements
Council wishes to thank all contributors and stakeholders involved in the development of this document.

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