
Facility Guide

First Edition



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Foreword

Riding a bike is a great Australian pastime. It is one of our favourite things to do with more than 4.6 million Australians riding a bike every week. We believe in the fundamental joy and positive power of cycling.

Riding a bike improves our own health and wellbeing and strengthens our connection to the community. Learning how to ride a bike sets children up for healthy, happy and active lives. Bikes make our cities and towns more livable; they contribute to our economic prosperity and help deliver better outcomes for the environment.

No matter where, how or why Australians choose to get on a bike, they want great, safe places to ride. We are launching the AusCycling Facility Guide to help meet this need.

Our suburbs and towns need to provide opportunities for sport and recreational riding that encourage community activity and promote participation. They need facilities that inspire competition and celebrate sporting excellence. And we know that traffic-free places to ride are essential to engage the broader community and especially younger children and those less confident.

This guide is aimed at clubs, councils and anyone who wants to improve the riding opportunities in their community. It provides an introduction to common cycling disciplines and the facilities they use and provides some guidelines on design that will promote safety, inclusivity and a great experience for all users.

If you want great, safe places to ride in your suburb or town, we hope that this guide will start you off in the right direction.



Marne Fechner
CEO, AusCycling



With Thanks

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Some of the amazing photos in this publication have been provided by: Lachlan Ryan; Tristan Croll; MA Coventry; Clint Trahan; Lloyd Armstrong; Alexander Polizzi; Josh Chadwick; Con Chronis; Craig Dutton; Craig Martin; and AusCycling staff photographers.

Disclaimers

This document contains comments of a general nature only and is not intended to be relied upon as a substitute for professional advice. AusCycling will not be responsible for any loss or damage suffered by any entity or person doing anything, or failing to do anything, because of any material in this document. Any opinions, findings, conclusions, or recommendations expressed in this document are guidelines only and should not be expressly relied upon.

How to use these Guidelines

The purpose of the Guidelines is to provide key stakeholders – state and local governments; facility managers; planners, designers and builders; and cycling clubs – with a document that provides general guidance and advice on the most common types of cycling facilities.

The sheer complexity of designing and building cycling facilities makes it impossible to provide a definitive set of requirements and designs. Each location and facility will have a unique set of circumstances that need to be understood to determine the most appropriate design.

The Guidelines should be used to ensure the right questions are being asked in the design process so that the end result is a high-quality facility that:

- ensures the safety of all riders, officials, spectators and other users of the facility;
- meets the needs of riders of all abilities, ages and backgrounds;
- is able to host an appropriate range of training, competition and events;
- maximises the utility of the investment in the facility and its value to the community; and
- has secured its long-term sustainability by considering economic, social and environmental factors.

The Guidelines are divided into four parts:

State of play

Outlines the context of cycling in contemporary Australia and encourages readers to consider its impact on the design of their project. It includes a broad description of the various cycling disciplines and what they entail.

Design principles

Outlines universal design principles that should be considered in the design of any project.

Project planning

Outlines the typical stages in planning, designing and constructing a new cycling facility.

Guidelines

Provides the minimum essential standards of the playing area for the major cycling disciplines as well as supporting infrastructure that should be included in a project. The standards are drawn from a range of existing sources and best practices from within AusCycling and from other governing bodies.

AusCycling's role, venue approval and homologation

AusCycling is the national sporting organisation (NSO) for all forms of cycling in Australia and is the Australian representative of the UCI – cycling's world governing body.

Our role includes promoting safe and fair competition at all levels and for all participants, and our goal is to ensure all Australian communities have access to great places to ride.

We are providing these guidelines to assist anyone designing a new cycling facility. However, they are not intended as a single and complete source of all design guidance, requirements, or considerations. They also do not consider cycling that occurs outside of a purpose-built facility, including road and gravel cycling races on public roads.

We strongly recommend all project managers consult with AusCycling at the start of their project.

We can provide technical assistance on project design, advice on getting the most out of your facility, and recommendations on how to select design and construction contractors that are experienced in delivering excellent cycling projects.

All new or substantially changed cycling facilities must be approved by AusCycling prior to being available for competition or events through a process known as homologation.

While homologation occurs at the completion of a project, engagement with AusCycling during the design stage will ensure that it is a smooth process and doesn't involve potentially costly rectification of design problems after construction has commenced.

Facilities that are to be used for international competition are also required to be approved by the UCI. Early engagement with AusCycling will ensure that the UCI approval process also runs smoothly.

Due to the changing nature of mountain bike trails and race-specific course design, course approval for mountain bike races takes place immediately prior to each race. Similarly, approval for temporary road courses on public roads takes place immediately prior to each race.

AusCycling is also able to conduct ad hoc facility audits at the request of the facility owner to provide advice on risk management and operational issues.

Details of the homologation process are contained in Annex A including a schedule of relevant fees. AusCycling typically conducts this work on a cost-recovery basis.

Further information is available by contacting AusCycling at facilities@auscycling.org.au.



State of play



01

Cycling in Australia

Riding a bike is a great Australian pastime.

In 2021, 4.6 million Australians rode a bike at least once per week. The previous year, Australians bought 1.7 million new bikes.

AusCycling supports a network of more than 450 community cycling clubs that cater to 54,000 members with organised rides, social events, training and racing.

Cycling is great for our communities.

It generates health benefits of \$1.58 for every kilometre cycled. For every \$1 invested in cycling infrastructure, around \$5 is returned in the form of health benefits.

It's a social activity that promotes community cohesion and volunteerism.

Cycling is great for businesses and jobs.

Cycling contributes around \$16.8 billion to the Australian economy, including \$6.3 billion in direct contribution and more than 34,000 direct jobs.

To take advantage of these benefits and further grow participation, Australian communities need great, safe places to ride.



Cycling disciplines

Road cycling

Road cycling encompasses a range of events that are conducted mostly on sealed or paved roads. Events may be conducted on open or closed public roads or on purpose-built circuits, or on a combination of these.

Road cycling was first included on the Olympic Games program in 1896 and was first included in the Paralympic Games program in 1984.



Road race — A mass-start event that can be conducted over a distance ranging from 5km to 280km (depending on the level of competition) with the winner being the first to cross the finish line. Road races are usually conducted on open or closed public roads as laps of a circuit, point-to-point or an out-and-back route.



Criterion — A mass-start event conducted over multiple laps of a short, often-technical circuit of between 800m and 3km with the winner being the first to cross the finish line. Criterion races are usually conducted on purpose-built circuits or closed road circuits.



Time Trial — An event in which an individual rider or a team of riders sets out to complete a set road course in the shortest amount of time. Time trials are usually conducted on open or closed public roads.

Track cycling



Track cycling encompasses a wide variety of different events that are conducted on a velodrome. Track cycling is an Olympic and Paralympic sport, although the specific disciplines included at each Games have varied.



Riders in track cycling typically use specific “track bikes” that have a single, fixed gear and no brakes. At the start of races, riders may be held in position by a coach or other holder, may start with their rear wheel supported by a starting gate, or may hold themselves up with the outside railing of the velodrome.

Track events are typically classified as either sprint events or endurance events.



Sprint events include individual and team sprints, individual time trial and keirin. These events can be highly tactical and require riders to generate a lot of power over a short distance.

Endurance events include the individual and team pursuit, as well as the points race, Madison, scratch, handicap, elimination and omnium. These events are typically over longer distances, require riders to put out sustained power and reward aerodynamic efficiency.

BMX Racing and Freestyle



BMX Racing is held on a purpose-built track that includes jumps, rollers and berms. Up to eight riders start each race from gates at the top of a starting hill with the winner being the first to cross the finish line at the other end of the track. BMX Racing has been an Olympic sport since 2008.



BMX Freestyle is an event in which riders compete to perform the best jumps and tricks on their bikes. There are several sub-disciplines:

Park — refers to riding on a course of ramps and jumps similar to a skate park

Street — refers to using urban infrastructure like stairs, rails and benches to perform tricks

Flatland — refers to riding without any external features on which to perform tricks

In competition, tricks are given a score based on difficulty and execution with the highest score winning. BMX Freestyle was included in competition at the Tokyo 2020 Olympic Games.

Mountain bike



Mountain biking encompasses riding any bike off road and over rough terrain. Modern mountain biking focuses primarily on riding purpose-built singletrack with features that might include rocks, roots, berms and jumps.



Cross-country (or 'XC') encompasses a number of mass-start events in which riders compete to be the first across the finish line. Cross-country events come in a range of lengths, from cross-country short-track ('XCC'), cross-country Olympic ('XCO') and cross-country marathon ('XCM').



Gravity events are those in which riders compete to descend a trail in the shortest period of time. Downhill (or 'DHI') races occur over a single, highly-technical trail. Gravity enduro (or 'GE') races comprise multiple timed downhill sections with untimed transition sections that must also be ridden.



Four Cross and Dual Slalom are short head-to-head races between four and two riders, respectively. Courses typically include jumps, berms and other features, with the first rider across the finish line winning.

Pump track and slopestyle

Mountain biking includes a number of emerging disciplines that reflect its diversity and the innovation of riders. Two of the more common emerging disciplines are pump track racing and slopestyle.



A pump track is a small circuit or track that comprises rollers and berms to be navigated without pedaling. Riders 'pump' their bike to gain momentum and races are conducted either with individual timed runs or head-to-head if the design of the track allows.



A slopestyle course comprises a series of jumps or features on which riders compete to do the best tricks. Riders are scored on the difficulty and execution of each attempt at the course, with the highest score winning.

Cyclo-cross



Cyclo-cross is a mass-start discipline in which riders compete over a set number of laps of an off-road circuit. Unlike mountain biking, cyclocross riders use road-style bikes with a maximum allowable tire size (e.g. 33mm for international level races).

Cyclo-cross courses are typically temporary and set up to include sections of grass, dirt and/or sand. Courses will include both man-made and natural obstacles, such as steep climbs, off-camber slopes, and stairs. It is common for riders to dismount and run over harder obstacles.

Gravel Racing

Gravel racing is a relatively new discipline that is similar to road racing but occurs largely on unpaved gravel roads. It is typically a mass-start event with distances akin to a road race (5km to 250km, depending on the level of the event) and riders use road-style bikes with wider tires.



Gravel riding and racing has become increasingly popular in recent years as it is easier to host events on unpaved roads as they have simpler traffic management requirements. Riders often choose gravel cycling as unpaved roads have less motor vehicle traffic.

Trials

Observed Trials is a unique cycling discipline in which riders compete to maneuver their bikes over a series of challenging obstacles without putting a foot or other body part on the ground.



Riders take turns to attempt each section and will gain points if they touch the ground (or 'dab') or exceed the time limit. The winner is the rider with the fewest points after a set number of attempts at each section.

Para-cycling



Many cycling disciplines welcome riders with disabilities who can ride and compete on traditional bikes, or on modified bikes, trikes, recumbent or tandem bikes that meet their needs.

Para-cycling events have traditionally focused on seven road and track cycling events, some of which have been included in Paralympic Games since 1984, World Championships since 1994, and the Commonwealth Games since 2014.



Riders compete in one of 14 classifications based on the type of equipment they are using and their functional capacity.



More recently, adaptive mountain bikes have made various mountain bike disciplines (including cross-country and downhill) available for para-cyclists.



Design and planning principles



Design and planning principles

AusCycling is committed to supporting a network of community cycling facilities that are designed, built and operated in a way that maximises their value to the community; promotes good social and health outcomes; and which are environmentally, socially and economically sustainable in the long term.

The principles below have been informed by a range of approaches and frameworks that are commonly used to enable community planning, consideration of community needs and the achievement of long-term sustainability.

AusCycling has adopted these design principles to reflect its broader overall objectives and will have regard to these principles when deciding whether to endorse a project.

Design for maximum appeal and utilisation

Cycling facilities should be designed and located to maximise their utilisation and their ability to serve as wide a variety of users as possible. There will continue to be pressure to ensure facilities are sustainable from either a commercial or a social perspective (ensuring a case can be made that the health, physical, mental wellbeing, community connection and other benefits to the community justify the initial and ongoing investment in the venue).

The vibrancy of a venue creates a self-fulfilling prophecy whereby more people at a venue creates more excitement, energy and interest which in turn will attract more people. Cycling has the opportunity to be at the forefront of community sport venue design to optimise community outcomes and long-term venue sustainability.

Co-location

Cycling facilities should be co-located with other complementary activities where possible, as this will increase activity, utilisation and sustainability. Creating hubs for activity also allows for greater investment in supporting infrastructure that can service the needs of different user groups resulting in cost efficiencies across supporting infrastructure, i.e. more and diverse user groups can all be serviced by amenities such as toilets, changerooms, canteen, pavilion, storage, etc.

Commercial sustainability

Venues should be planned and developed with a revenue-generating mindset (not necessarily a profit mindset). This focus will provide venue operators with a range of options to commercialise the asset that can then be used for ongoing maintenance, developments, and upgrades. The ambition for the cycling infrastructure is to not be reliant on government grants to fund facility maintenance and operations.

Network planning

Not every cycling facility needs to be able to do everything and service everyone, but there are a set of minimum requirements needed to maximise utilisation. Planning for a cycling facility must consider the broader network as opposed to planning for the facility in isolation. It is important to consider the surrounding amenity to not duplicate existing provision (unless a clear supply and demand imbalance exists) and understand the profile and requirements of the local community the venue will service.

A well-planned network of facilities should have a mix of different infrastructure types and an even spatial distribution that services regional and local demand.

Capability agnostic and flexibility

All cycling facilities should meet the needs of diverse abilities and cohorts and consider the principles of universal design (see universal design section below). To ensure venues are well-utilised, they should have the ability to service the maximum number of people possible and adapt to specific occasions and customer segments. For example, a facility could transform from a 'come and try' venue for a 5-year-old's first experience of riding a bike to staging local events for adults and, in some instances, national or even international events.

Environment and climate

The development and use of cycling facilities must be consistent with the environmental and heritage values of the places in which they are located. This is particularly important where facilities share natural environments, such as mountain bike trail networks.

Climate change will continue to have a profound impact on the way people participate in sport and recreation, and the provision of facilities. Land available for cycling facilities is often at a higher risk of natural disaster.

New initiatives will continue to be developed to reduce the impact of sport on the environment and to ensure that sport infrastructure is sustainable in the long term, including the ability to withstand major weather events such as floods and cyclones.

Planning for new or upgraded facilities must consider the disaster risk. Facility designs and management arrangements should be adapted to mitigate and manage risk and resilience needs to be built into facility design from the start.

Universal design

Universal design is a thinking process focused on creating an inclusive society.

AusCycling welcomes members from all sectors of the community and expects affiliated clubs, club members and facility managers to do the same.

The design of a cycling facility should ensure that all members of the community are afforded reasonable opportunity to use the facility as either a participant, official, volunteer or spectator.

The seven principles of universal design are:

Equality of use	All people can use the design independently on the same basis as others.
Flexibility in use	The design integrates the capacity to change to meet individual needs.
Simple and intuitive	The users understand how to use elements in the fit-out without needing instruction and training.
Perceptible information	The information is presented in a way to enable all to comprehend and understand.
Tolerance for error	Adjustments enable gross movement capacity rather than fine motor skills.
Low physical effort	Design is not dependent on strength and dexterity.
Size and space for approach and use	Allows for all mobility aids to safely navigate the space.

In deciding to endorse a project to build a new cycling facility or upgrade an existing facility, AusCycling will have regard to whether the project addresses the principles of universal design.



Project planning



Planning process

To ensure the design of new and upgraded cycling facilities is consistent with AusCycling's design principles and facility guidelines, we recommend project managers use a robust planning process.

The planning process should ensure that project managers seek appropriate data and insights to inform their designs, consult with relevant stakeholders, consider a rigorous analysis of the available options and establish ongoing management and operating arrangements to ensure the project is a success.

The following table details AusCycling's six-stage planning process. This process can be followed for any project, including designing and building new facilities and upgrading existing facilities.

Planning Stage	Key considerations
1. Needs analysis	<ul style="list-style-type: none"> • Analysis of current and future trends at the macro and local level • Assessment of local area supply and demand dynamics • Stakeholder consultation to identify specific local issues and requirements • Document the case for investment
2. Project feasibility & site analysis	<ul style="list-style-type: none"> • Project options and feasibility assessment to determine the ROI/ROO of the project and how the project will meet the needs of the community • Site assessment (i.e. technical) to determine realistic options for consideration • Project plan and working group created to guide and progress the project • Feasibility, business case or options assessment to be undertaken • Stakeholder consultation with funders, tenants/neighbours, community, LGAs and other key organisations/representatives
3. Business model	<ul style="list-style-type: none"> • Propose and assess various business models to determine optimal operational and governance structure • Assess the pros and cons of each of the models and assess relative to the overarching objectives of the project
4. Design and budget	<ul style="list-style-type: none"> • Engage technical experts to design the facility • Contemplate the key design principles to ensure the project maximises utilisation and long-term sustainability • Cost the various design options • Obtain all relevant planning approvals
5. Construction and contractor management	<ul style="list-style-type: none"> • Manage the procurement process (ideally with the appointment of a project manager) • Agree technical specifications and project budget • Agree timeframes and roles/responsibilities • Project hand-over at completion of construction process including funding acquittals
6. Facility/Venue operations	<ul style="list-style-type: none"> • Operational responsibilities allocated • Operating budget signed off • Management reporting process implemented • Public facility launch

Facility hierarchy

Facility hierarchies serve as a useful framework to:

- provide guidance and advice on the key attributes for different types of venues;
- provide clarity on the role of different types of venues; and
- determine the ability of venues to host different levels of events.

Each of the different cycling disciplines has a slightly different hierarchy structure. These are summarised and explained in the following table.

Critical in the design of the hierarchies is the layering from one level to the next. The philosophy of the hierarchy is that each venue can service the needs of the local community and people of all abilities. As additional attributes are added to the venue, it's able to service more diverse capabilities and host different types of events.

Hierarchy	Description and purpose/role
BMX Racing tracks	
Community/Club	<p>A BMX Racing track that serves the local community and is readily accessible to the public, either as an open facility or through membership of a local BMX club.</p> <p>Primary infrastructure is the track, with typically limited supporting infrastructure that serves only the basic needs of clubs, members, participants, and the broader community. A focus is on supporting all-abilities riding, local participation and club-level racing and events.</p>
National	<p>A BMX Racing track that can accommodate the needs of the community but is known for its suitability for elite racing and capacity to host national- and international-level events.</p> <p>Tracks of this type will typically not be available to the public except through organised club events, training and racing. Primary infrastructure is the track, with a higher level of supporting infrastructure that serves major events.</p>
BMX Freestyle parks	
Community/Club	<p>Typically a facility that serves the local community and is readily accessible to the public. BMX Freestyle often uses facilities originally designed for skate boarder, scooters and other users (ie skate parks).</p>
National	<p>Primary infrastructure is the freestyle park, with typically limited supporting infrastructure. Facilities at this level can be used for competition and events, but their primary purpose is usually to foster local participation.</p>

Hierarchy	Description and purpose/role
Velodromes	
Community/Club	<p>Typically a facility that comprises an outdoor velodrome that services the local community and is readily accessible to the public. It may also be the base for a local club, host local events and service a range of abilities.</p> <p>Primary infrastructure is the velodrome, with typically limited supporting infrastructure that services only the basic needs of clubs, members, participants, and the broader community. Outdoor velodromes tend to be constructed from concrete.</p> <p>Historically, velodromes have been built around the outside of a sporting oval to create a 'flat track' of 400m or more. This is no longer recommended as the track and oval can't be used simultaneously and it requires balancing the needs of different users.</p> <p>Tracks vary in length from 250m to 400m or more. Shorter tracks have steeper banked turns and are more suited to high-performance riding, athlete development and competition.</p>
National	<p>A showpiece venue that stages significant events and national or international competitions. Typically an indoor velodrome with a focus on high performance and elite competition. Indoor tracks are typically built from specialty woods.</p> <p>The facility is usually supported by a wide variety of high-quality infrastructure for athletes, officials and spectators.</p>
Mountain bike trails	
Community/Club	<p>A small- to medium-sized trail network that serves the needs of the local community and has limited scope to attract visitors from outside the region. The focus of facilities at this level is to support local participation and club-level racing. Community/club level trail networks typically have limited supporting infrastructure, although improving supporting infrastructure is often an important step in increasing facility usage.</p> <p>Facilities at this level are unlikely to be operated on a commercial footing and have a high reliance on MTB clubs and volunteer organisations to manage and maintain the trails.</p> <p>Common challenges with facilities at this level may include complications with land tenure, management arrangements and securing resources for maintenance and further development.</p>
Regional/National	<p>A medium- to large-sized trail network that serves the needs of the regional community and attracts visitors from other regions. Regional/National level trail networks typically have a higher level of supporting infrastructure to accommodate recreational users and, potentially, events and racing.</p> <p>Facilities at this level are more likely to be operated on a commercial footing, with professional trail builders being engaged to conduct maintenance and build new trails.</p>

Hierarchy	Description and purpose/role
Criterion circuits	
Community/Club	<p>A purpose-built and traffic-free asphalt circuit to accommodate criterium racing and wide variety of other uses. Facilities are likely to have supporting infrastructure to service the needs of one or more local cycling clubs and their members.</p> <p>Facilities are likely to be open for public use at any time they are not occupied with organised training and racing and are suitable for all kinds of bike riding, skating and human powered vehicles (HPV).</p>
National	<p>Most national- and international-level criterium racing occurs on closed road circuits that are temporarily set up for an event to ensure maximum public profile, broadcast options and accessibility for spectators. Where this occurs, AusCycling works closely with event organisers to ensure the course is safe and provides a good experience for riders, officials and spectators.</p> <p>Racing at this level can also occur on purpose built criterium circuits with the same specifications as community/club level circuit.</p>



Guidelines

04

BMX Racing

BMX Racing takes place on a 300–450m track. The riders begin from a ramp (or 'start hill') that contains a starting gate, then ride through various-sized jumps and banked corners ('berms') that comprise the track.

A critical part of building a BMX track is designing the jumps and berms. Well-designed BMX tracks can service all riding abilities, from children who have just learnt to ride through to aspiring and elite athletes competing at the national and international level.

A BMX track should provide a technical challenge appropriate for the ability of the riders. The track, especially for community/club facilities, should safely accommodate beginner and intermediate riders. National facilities, although more challenging, should not be so difficult that the focus of riders is on surviving the track rather than racing each other.

When commissioning a BMX track, project managers should ensure they engage a qualified and experienced track builder who is able to design and shape track features to ensure they are safe and provide a good riding experience. AusCycling can assist project managers in selecting a qualified track builder.

Projects should be set up to ensure a new BMX track can be tested and adjusted, if necessary, prior to it being approved by AusCycling and put into use. Contracting arrangements with a track builder should allow for this to happen towards the end of the construction project.

BMX track - venue requirements

To balance the necessary safety requirements with the ambition to optimise the experience for all levels of riders, the following design considerations are important:

- Tracks should be located on flat ground, slightly sloped in the direction of the track, with the maximum height difference between the first and last straights being two (2) metres.
- Tracks should be oriented to minimise the impact of prevailing wind direction on riders while they are in the air and reduce the effect of late afternoon sun on riders' vision.
- The length and width of the track is sufficient for riders to realistically pass each other. The starting straight should allow fair competition between the riders, regardless of their starting gate.
- Jumps are designed to allow for recovery from errors, in particular those due to over-jumping or under-jumping. Harder sections of track should be opt-in, with the most obvious path being easier for less skilled riders.
- Fall hazards are avoided or protected (avoid overly steep banks on the backsides of corners or along the edges of the straights, or include fall protection).
- Flat working space that is free of obstacles and tripping hazards is included around the outside edges of the track (extending at least two metres from the outside boundary line), and between any parallel straights.
- Evacuation of injured riders from the infield and any point along the track must be possible while minimising the need to cross the racing surface of the track.

Venue attribute	Community/Club	National	Commentary
Track infrastructure			
Start hill	2m, 3m or 5 m (multiple options are possible)	5m or 8m (multiple options if an 8m is built, with permanent shelter for riders)	Temporary extensions can increase the size of a start hill for major events (e.g. from 5m to 8m) as bigger start hills are unsuitable for beginner riders.
Track length	300–450m	300–450m	Measurement is taken along the center line of the track and includes deviations due to dips and jumps.
Track width (minimum)	<ul style="list-style-type: none"> Start hill: 10m First straight: 8m First corner: 6m All other straights and corners: 5m 	<ul style="list-style-type: none"> Start hill: 10m First straight: 8m First corner: 8m All other straights and corners: 6m 	Further details are set in the 2017 UCI BMX Track Guide.
Length of first straight	Recommended: 70m	Recommended: 70m	
Minimum stopping distance after the finish line	35m	35m	
Site area for track (minimum)	0.6ha	0.6–1.0ha depending on preferred configuration	Form and layout of a track can conform to the shape and size of the land on which it is built, but priority should be given to a track design that promotes good and safe racing rather than compromising to fit an available space.
Ancillary infrastructure			
Toilets	Yes	Yes	
Changerooms	No	Yes	
Storage	Yes	Yes	Appropriate storage for club supplies and equipment including bikes, protective gear, spare parts and tools.
Kiosk	No	Yes	

Venue attribute	Community/Club	National	Commentary
Lighting	Recommended	Yes	
	<p>A minimum lighting standard of 200 lux G0.5 U1. Lighting should provide an even spread over the surface of the track.</p> <p>Elite-level racing and television broadcast requires a higher lighting standard (500-1400 lux).</p>		Lighting makes a track available for more hours of the day and can significantly improve usage.
Spectator Capacity	200+ people	500+ people	Shaded areas are important for spectator comfort, but not mandatory.
Staging/Marshalling Area	Yes	Yes, with shelter for riders	Located close to the start hill, with sufficient space to organise, brief and hold riders prior to their race.
Warm-up Area	No	Yes	An area suitable for riders to warm up or cool down. Positioned suitably close to the Staging/Marshalling Area.
First Aid	Yes	Yes	
Car Parking	Subject to local planning requirements	Subject to local planning requirements	

BMX track – case studies



Community/Club – Castle Hill BMX Track, New South Wales

The Castle Hill BMX Track is located in the Fred Caterson Reserve precinct in the Sydney suburb of Castle Hill. It is a community/club standard track that hosts regular racing up to and including the NSW State BMX Championships.

The track is 312m long with a 3.5m start hill and four straights. There is a permanent shelter protecting the start gate, a nearby asphalt warm-up area and lighting to provide for nighttime and low-light use.

The track occupies around 0.8ha and is supported by facilities such as car parking that serves the whole sporting precinct. The track is open to the public.



National – Shepparton BMX Club, Victoria

The Shepparton BMX Club track is located in the sports precinct at John McEwan Reserve in Shepparton, Victoria. It is an international standard supercross track that has hosted numerous elite-level events, including a round of the 2020 UCI BMX Supercross World Cup.

The track is 385m long and configured in a standard layout with two starting hills (5m and 8m) and split second and third straights. It occupies around 1.3ha of land measuring 85m x 140m.

The track is supported by a range of high-quality facilities including permanent shelter over the start hill, an adjacent velodrome for warm-up, toilets and changerooms, and substantial open areas for staging events.

The track is a closed facility that is only available to be ridden during club events, racing and training.

Reference documents

2017 UCI BMX Track Guide

<https://www.uci.org/docs/default-source/official-documents/bmx-official-documents/uci-bmx-track-guide-2017-v-final.pdf>

BMX Freestyle

BMX Freestyle ('FS') riding can be divided into categories based on where the riding takes place, i.e. Park, Street, Bowl, Dirt and Flatland. This guide deals only with BMX Freestyle Park as this style of riding is dependent on having access to a specific facility, while Street and Flatland can occur in impromptu settings and is an Olympic discipline.

BMX Freestyle Park takes place in a purpose-built square or rectangular "park" that includes a range of features such as: quarter pipes, jumps, ramps and step-ups.

- Box Jumps / Step Up Boxes
- Hips
- Spine Ramps
- Quarter Pipes

Most community- and club-level riding takes place in skate parks and other facilities not specifically designed for BMX Freestyle, but which already include a selection of these features. These features can be included in most skate parks and clever design can ensure a skate park is suitable for a wide variety of abilities and users, including BMX Freestyle, skate boarders, roller skaters and scooter riders.

Community and club-level facilities tend to have smaller features (e.g. 4ft box jumps and 5-6ft quarter pipes) and closer spacing between them. Some skate parks that include a selection of these smaller features may be suitable for local and state competitions, but are unlikely to allow elite riders to perform at their best.

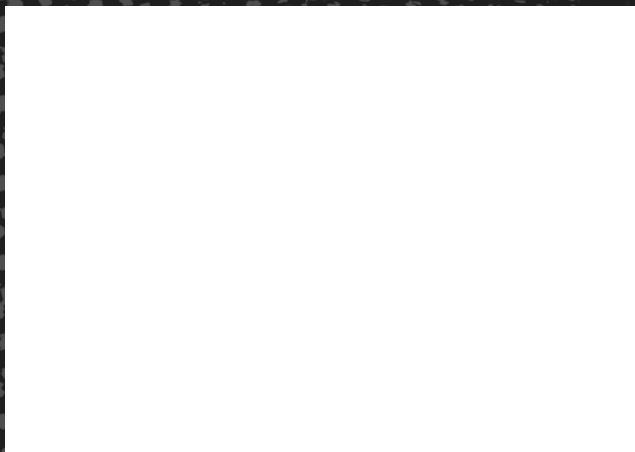
Elite competition benefits from being held on purpose-built BMX Freestyle parks with a scale and range of features that allow riders to attempt higher-difficulty tricks with a greater margin of safety. Features on an elite course will include larger versions of those features outlined above (e.g. box jumps & spines would be at least 6ft tall and quarter pipes are likely to range from 6-10ft tall).

The most critical element of any BMX Freestyle park is the design and layout of the features. This must be done by a qualified and experienced park designer. Key considerations should be rider safety and a layout that allows riders to be creative with their choice of lines and tricks.

BMX Freestyle – venue requirements

Venue attribute	Community/Club	National	Commentary
Track infrastructure			
Size	Minimum 15m x 25m, maximum length 60m		
Safety zone	2m surround all edges of the park, with barriers protecting any raised edges or drops		
Surface material	Concrete, wood or other hard surface that provides sufficient traction	Wood	Restrictions apply to any painted signs or logos on the park surface.
Obstacles	Minimum of 3	A greater number of elements, often placed in a manner that allows for transfers between them.	
Ancillary infrastructure			
Toilets	Yes	Yes	
Changerooms	No	Yes	
Storage	No	Yes	
Judging area	No	Yes	Where a venue is to be used for competition, it should have a tower for judges to observe each rider. This can be a temporary structure.
Spectator Capacity	No	Yes	Spectators must be kept a minimum of 2m from the edge of the park.

BMX Freestyle – case studies



Community/Club – Crestmead PCYC Skate Park, Queensland

This skate park is in the City of Logan, south of Brisbane. It is a typical suburban concrete skate park built in the late 1990s that was expanded in 2022 to provide a more advanced layout that caters for all abilities.

The expansion has made the skate park more suitable for BMX freestyle. It includes a range of new features including a step-up box jump, multiple hips and quarter pipes. The new features provide riders more areas to jump and perform tricks, while also improving the flow of the skate park (reducing the amount of time the riders have to slow down after obstacles). The expansion included the installation of lighting to allow for the skate park to be used at night.

The skate park occupies around 2,500 square meters of space within Crestmead Park and leverages a range of other facilities at the park including toilets, shelters, picnic tables and barbeques, and off-street parking.



National – National BMX Freestyle Park, Queensland

Located on the Gold Coast, the National BMX Freestyle Park is a purpose-built facility designed by Hurricane Parks.

The park measures 46m x 31m and includes features such as quarter pipes, step-ups, box jumps, bowls and transfers. Its modular design allows the layout of features to change and provide new training and competition environments for riders.

The park forms part of the AusCycling BMX Freestyle Training Centre and will continue to be developed into an event and competition venue.

Reference documents

2022 UCI BMX Freestyle Park Guide
https://assets.ctfassets.net/76117gh5x5an/6SrhuN4IrnHptgfMdqw0iU/14845c37983d08a3b5f5db79b281635a/2022_UCI_BMX_Freestyle_Park_Guide_vFinal_2022.06.10.pdf

Velodrome

Track cycling takes place on a velodrome (a banked track) and involves various types of races generally split between sprint and endurance categories. Elite track cyclists are capable of reaching speeds well over 70km/h and velodromes must be designed with safety as a priority.

Velodromes can be indoors or outdoors, with the latter being far more common. Indoor velodromes require a substantial capital cost and are typically limited to major cities and built to accommodate significant international events such as the Olympic, Paralympic and Commonwealth Games.

Outdoor velodromes have been built in many suburban and regional communities and are the foundation of track cycling at a club level in Australia.

The other major classification for a velodrome is its length. Velodromes can be between 133 and 500 metres, depending on the available space and intended use, among other considerations.

Shorter tracks require a higher degree of banking to accommodate a tighter turning radius. A track of 250 metres has become a standard for elite-level racing and is found at most indoor and many outdoor velodromes in Australia, but other options can also be suitable.

Longer tracks have less or no banking on the corners ('flat tracks') and can be ridden by riders with a greater range of abilities and can accommodate non-specialised bikes (i.e. a standard road bike). Tracks of around 400 metres are common and are often found around the outside of sporting ovals, although this is no longer recommended.

Track – venue requirements

Indoor and outdoor velodromes share most of the same technical requirements. Differences are largely confined to track material (timber in the case of indoor velodromes; concrete, asphalt or synthetic surfaces for outdoor velodromes) and the range and quality of supporting infrastructure.

Velodromes have detailed design requirements which are set out in the UCI regulations for track cycling, listed under 'Reference documents' below. The following general requirements are provided as a guide only:

- The velodrome track shall consist of two curves connected by two parallel straight lines. The entrance and exit of the bends shall be designed so that the transition is gradual.
- The length of the track must lie between 133 metres and 500 metres. The length of a track shall be such that a whole number of laps or half laps shall give precisely one kilometre. For example, four laps of a 250-metre track, three laps of a 333.3-metre track or two and a half laps of a 400-metre track.
- The width of the track must be constant and proportional to its length. Minimum widths are listed below.

The banking of the track shall be determined by considering the radius of the curves and the maximum speeds achieved for the level of racing that will occur at that facility. For example, for international level racing a maximum speed in the range of 85–110km/h should be assumed. For community/club level racing, a maximum speed of at least 75km/h should be assumed.

Length of track	250m	285.714m	333.33m	400m
Radius of bends	19–25m	22-28m	25-35m	28-50m
Width	7–8m	7–8m	7–9m	7-10m
Maximum number of riders	24	28	36	44

- A rideable area sky-blue in colour known as the “blue band” must be provided along the inside edge of the track.
- A safety zone and safety fence (or other safety arrangements) must be provided inside the track. A safety fence must also be provided along the outside edge of the track.
- A standard set of line markings must be provided along (longitudinal) and across (perpendicular) the track, including: a measuring line, sprinters’ line, stayers’ line, finish line, 200-metre line, and pursuit lines.

Venue attribute	Community/Club	National	Commentary
Type of facility	Likely an outdoor velodrome	An indoor velodrome	
Track length	133–500m	Typically 250m	
Track width	Minimum 5m	Minimum 7m	
Surface	The surface of the track shall be completely flat, homogenous, non-abrasive and non-slip. Any line markings must be painted using non-slip paint. Typically concrete, asphalt, or other	Timber	Surfaces choice should be driven by the ability to accommodate wet weather, safety, and wear and tear
Track access	Across the track in controlled circumstances, such as through secure gates	Through an access tunnel underneath the track	
Site area for track (est. minimum)	330m track: 1.3ha 400m track: 2.1ha	250m track: 1.2ha	

Venue attribute	Community/Club	National	Commentary
Ancillary infrastructure			
Lighting	<p>Not required unless the track is to be used at night or in low-light conditions. Given available daylight hours, the provision of lighting will result in far greater use of a velodrome.</p> <p>During training and racing, vertical lighting must be at least 300 lux.</p>	<p>During training sessions, vertical lighting must be at least 300 lux.</p> <p>Competition lighting requirements vary between 500 and 1400 lux depending on the level of racing and whether it is being broadcast.</p>	<p>Where possible, lighting should be provided as this extends the hours the facility can be used.</p> <p>Lighting systems must include emergency lighting that activates immediately on failure of the main system.</p>
Spectator capacity	150 people	500+ people	
Toilets	Yes	Yes	
Changerooms	No	Yes	
Storage	Yes	Yes	
Kiosk	No	Yes	
First Aid	Yes	Yes	

Track – case studies



Community/Club - Hawthorn Velodrome, Victoria

Hawthorn Velodrome is an outdoor velodrome located at Patterson Reserve in eastern Melbourne. It is 330 metres long with a track surface of asphalt and has shallow banking on the corners. As a result, it is an appropriate venue for a wide range of users and is open to the public for recreational riding. Due to its excellent universal access and flat corners, Hawthorn Velodrome is regularly used by para-athletes.

A fence surrounds the outside of the velodrome which protects riders and spectators and controls access across the track. The track is unlit.

Hawthorn Velodrome has basic, but good quality supporting facilities including toilets and a pavilion with spectator amenities.



National - Anna Meares Velodrome, Queensland

The Anna Meares Velodrome is an international-standard indoor velodrome in Brisbane, built to host the 2018 Commonwealth Games track program.

Anna Meares Velodrome is a 250-metre timber track with 43.9-degree banking on the corners. It is an elite-level training and competition facility and is only available for use through organised sport.

The velodrome has 1,500 permanent seats and can accommodate up to 5,500 spectators for special events. It has excellent supporting infrastructure including broadcast-standard lighting.

Reference documents

UCI Regulations, Part 3 Track Races, Chapter 6 Velodromes
<https://www.uci.org/regulations/3MyLDDrwJCJJ0BGGOFzOat>

Mountain bike

Mountain bike trails can be found in many of our parks, forests and bushland. Trails should be planned and built as part of a network that offers a cohesive riding experience and is served by one or more defined trailheads.

Many of Australia's best-loved trail networks began their life as informal trails and have been developed and expanded over decades. It is critical that existing informal trail networks go through a process of formalisation, with suitable land tenure and management arrangements put in place. Only once this has been done can trails be properly planned, maintained and supported with ancillary infrastructure.

Trail types and difficulty rating system

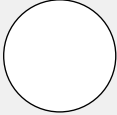






AusCycling has adopted eight different trail types which are detailed in the table below:

Type	Description
Cross-country (XC)	Primarily singletrack-oriented with a combination of climbing and descending, and natural trail features of varying technicality. Cross-country trails appeal to the majority of the market and can also cater for timed competitive events. Typically, bikes are lightweight with shorter travel dual suspension or have no rear suspension.
Flow (FL)	Flow trails typically contain features like banked turns, rolling terrain, various types of jumps and consistent and predictable surfaces. Flow trails do not contain abrupt corners or unforeseen obstacles. Bikes are typically light-medium weight with medium-travel dual suspension.
All Mountain (AM)	Similar to cross-country and primarily singletrack-oriented, with greater emphasis on technical descents, with non-technical climbs. All-mountain trails can cater for timed competitive events. Bikes are typically lightweight with medium-travel dual suspension.
Gravity / Enduro (GE)	Like All Mountain with greater emphasis on steep, fast, technical descents. Gravity / Enduro trails can cater for timed competitive events. Gravity / Enduro trails appeal to more experienced riders who enjoy technical descents but are still happy to ride back to the top of the trail. Bikes are typically medium- to long-travel dual suspension and are built for strength.
Downhill (DH)	Purely descent-only trails with emphasis on speed and technical challenge and focus on skill development. These trails can cater for timed competitive racing. Downhill trails typically appeal to the more experienced market. However, green (easy) downhill trails are emerging to cater for all experience levels. Downhill trails usually require uplift to the trailhead via chairlift or vehicle shuttling. Bikes are designed for descending and are typically long-travel dual suspension and built for strength, not weight reduction.
Freeride (FR)	Typically, descent-focused trails with emphasis solely on technical challenge and skill development. Trails feature both built and natural technical features with a focus on drops and jumps. Trails appeal to the more experienced market and cater for competitions where manoeuvres and skills are judged. Bikes are typically medium- to long-travel dual suspension and are built for strength.

Type	Description
<p>Park (PK)</p>	<p>Built feature environments with an emphasis on manoeuvres, skill development and progression. They appeal to a wide market, including youth, and can cater for competitions where aerial manoeuvres are judged. Can include Jump and Pump tracks and Skills Parks. Typically, dirt surfaced but can include hardened surfaces. Bikes are typically built for strength, with short-travel suspension.</p>
<p>Touring (TO)</p>	<p>Typically, long-distance riding on reasonably uniform surface conditions and lower grades. Touring trails are dual-direction linear trails or long-distance circuits with a focus on reaching a destination. Touring trails can include rail trails, access/fire roads and singletrack. While there is a limited market for long-distance mountain biking, trails can be ridden as shorter sections at a time, making them accessible to all. If carrying panniers, bikes are usually robust with limited suspension. However, for short sections or day trips, most mountain bikes are suitable.</p>

The Trail Difficulty Rating System (TDRS) developed by the International Mountain Bicycling Association (IMBA) provides seven levels of difficulty for mountain bike trails. The TDRS enables visitors to understand the nature of the trail before beginning their ride and allows them to plan their ride for enjoyment, appropriate level of challenge and safety.

Trail ratings can be communicated in several ways. Pre-visit information may include a more detailed description of the ratings, while a shorter description is required for trailhead signage and maps. Rating colours should be used on all on-trail directional signage.

Difficulty Symbol	Short Description
	<p>Very easy</p> <ul style="list-style-type: none"> • Wide trail with a gentle gradient smooth surface and no obstacles • Suitable for beginner cyclists with basic bike skills, and most bikes
	<p>Easy</p> <ul style="list-style-type: none"> • Wide trail with a gentle gradient smooth surface • Some obstacles such as roots, logs and rocks • Suitable for beginner cyclists with basic mountain bike skills, and off-road bikes
	<p>Easy with Intermediate Sections</p> <ul style="list-style-type: none"> • Likely to be single track with a moderate gradient, variable surface and some obstacles • Some obstacles such as roots, logs and rocks • Suitable for mountain bikers with mountain bikes
	<p>Intermediate</p> <ul style="list-style-type: none"> • Single trail with moderate gradients, variable surface and obstacles • May include steep sections • Suitable for skilled mountain bikers with mountain bikes
	<p>Intermediate with Difficult Sections</p> <ul style="list-style-type: none"> • Suitable for competent mountain bikers, used to physically demanding routes • Expect large and unavoidable obstacles and features • Challenging and variable with some steep climbs or descents and loose surfaces
	<p>Difficult</p> <ul style="list-style-type: none"> • Suitable for experienced mountain bikers, used to physically demanding routes • Navigation and personal survival skills are highly desirable • Expect large, dangerous and unavoidable obstacles and features • Challenging and variable with long steep climbs or descents and loose surfaces • Some sections will be easier to walk
	<p>Extreme</p> <ul style="list-style-type: none"> • Suitable for highly experienced mountain bikers, used to physically demanding routes • Navigation and personal survival skills are highly desirable • Severe constructed trails and/ or natural features, all sections are challenging • Includes extreme levels of exposure and / or risk • Expect large and unavoidable obstacles and features • Some sections will be easier to walk

Further information on the design of mountain bike trails is available in the Australian MTB Trail Guidelines published by AusCycling.

Mountain bike – venue requirements

Mountain bike trail networks should be planned and built to accommodate a wide variety of users, including casual, recreational and competitive sport riders.

In many cases, the needs of recreational and sport riders will overlap and a trail network can be easily built to meet the needs of both styles of riding.

The following table sets out broad requirements for hosting mountain bike races:

Venue attribute	Community/Club	National	Commentary
Trail infrastructure			
Downhill	Trail that follows a descending route with a maximum 3,500m length and 5 minutes duration. Trail should contain a variety of terrain with a mixture of fast and technical terrain that tests a rider's technical skills and physical ability.		This is a minimum requirement from the UCI for downhill MTB racing.
	Typically a length of around 2 minutes with suitable difficulty level for intermediate riders.	Typically a length of around 3 to 4 minutes with suitable difficulty level for elite riders.	This is a general guide to downhill MTB racing at the community/club level and the elite (at a regional or national) level.
	Terrain with around 150m elevation drop is preferred.	Terrain with 300–400m elevation drop is preferred.	
Cross-country Olympic	Undulating loops of 4–6km that include a variety of terrain, climbing and descending, and technical sections. Paved or tarred roads should account for no more than 15% of the course.		This is a minimum requirement from the UCI for cross-country Olympic MTB racing.
	Track difficulty suitable for riders of all abilities.	Track difficulty suitable for intermediate and elite riders, with suitable A and B lines.	This is a general guide to cross-country Olympic MTB racing at the community/club level and the elite (at a regional or national) level.
Ancillary infrastructure			
Shuttle/uptift	Optional - safe shuttle option with pick-up and drop-off points	Safe and efficient shuttle option (or other uplift) with pick-up and drop-off point and capacity for 100 riders and their bikes per hour	Shuttles may be provided on a commercial basis, ad hoc during events only, or through self-shuttle. Regardless of the arrangements, the focus should be on safe pick-up and drop-off points and traffic management.
Trail access	Suitable access for emergency vehicles and personnel	Suitable access for emergency vehicles and personnel, broadcast equipment and spectators	Trail access for emergency personnel is critically important and should be considered during the initial design phase of any new trail development.

Venue attribute	Community/Club	National	Commentary
Event space	Small space for officials, volunteers, and rider support	Large space for event village, spectators, race teams and officials	Event space is necessary to host any event and the quality and size of the event space will often determine the level of event that can be hosted.
Toilets	Yes	Yes	Access to toilets is a critical factor in encouraging more women and girls to take up mountain biking. Toilets are a minimum requirement for any trailhead.
Drinking water	Yes	Yes	Potable water is important but can be difficult to provide in remote locations. Where there is no potable water at a trailhead, this should be clearly stated on any websites or guides.
Changerooms	No	Yes	Inclusive changerooms are a valuable addition to any significant trail network.
Storage	Yes	Yes	All facilities should have storage for trail maintenance and repair equipment. Regional/National level facilities would benefit from storage for event and club equipment.
Bike workshop area/bike wash	Yes	Yes	All facilities should consider installing a work stand with tools to allow riders to make basic repairs and adjustments to their bikes.
Kiosk/retail outlet	No	Yes	Regional/National level facilities will benefit from a concession at which riders can buy refreshments, snacks and critical spare parts like tubes and CO2 canisters.

Venue attribute	Community/Club	National	Commentary
Car Parking	Yes	Sufficient for major events (100+ cars)	Car parking should be designed to prevent people from parking on local roads, impacting neighbours and obstructing local traffic.
Signage, train map and wayfinding	Yes	Yes	All mountain bike trails should be suitably signposted and mapped to make wayfinding easy and to provide critical location information for an emergency response.

For recreational riding, the Australian Mountain Bike Trail Guidelines provide a categorisation structure for mountain bike facilities based on their size, quality and level of supporting services and facilities. An example of some of the criteria is below.

	National	Regional	Local
Minimum length of singletrack	>80km	20-80km	<20km

The Guidelines also makes an assessment on:

- Trail difficulty and quality
- Services and retail offerings
- Accommodation options
- Amenities, uplift, signage and wayfinding
- Community support and marketing

Adding to the Australian Mountain Bike Trail Guidelines framework, it may be useful to also consider the following competition requirements as a guide for trail networks:

	Local	Regional/National
Approximate length of singletrack	<20km	>20km
	Ancillary infrastructure to host community/club level downhill and/or cross-country races (as above)	Ancillary infrastructure to host regional, national or international downhill and/or cross-country races (as above)

Mountain bike - case studies



Community/Club – Majura Pines, ACT

Majura Pines is a community/club level mountain bike trail network in the north-east of Canberra. It is located in a working pine plantation that is managed by the ACT Parks and Conservation Service. Trail maintenance is largely conducted by volunteers from the Majura Pines Trail Alliance and occasionally supplemented by commercial trail builders.

Majura Pines comprises around 20km of cross-country and gravity trails over a site of approximately 91 hectares and with an available elevation of around 150 metres.

Trails are equally divided in difficulty between beginner (green), intermediate (blue) and advanced (black). Additional riding options include a dirt jump park, a pump track and a beginner area.

Majura Pines has basic, but good quality supporting facilities including parking, toilet and signage.

Majura Pines regularly hosts club-level racing with numerous course options available. For example, it can accommodate a downhill track of 1.2km and 135m descent, taking club riders between two-and-a-half and three minutes to complete. It can also accommodate cross-country courses, a typical one being around 6km with 90m of elevation difference.



Regional/National – Mystic Park, Victoria

Mystic Park is a national-level mountain bike park in Victoria's High Country near Bright. It is located in an active pine plantation managed by HVP Plantations, which licensed Alpine Community Plantation (ACP) to oversee the mountain bike trails. Trail maintenance is conducted by professional trail builders, with ACP collecting revenue from a commercial shuttle service, road access permits and other sources.

Mystic Park comprises around 50km of trails with an available elevation of around 465 metres. It has trails with a range of difficulties, although the most common are intermediate trails.

Mystic Park has a good range of supporting facilities including a commercial shuttle, parking, toilets, picnic area, signage, and a mechanic station. It connects via trail to Bright's town center, where riders can find bike shops, hospitality and accommodation.

Mystic Park has hosted the Australian Mountain Bike Championships on numerous occasions and contains national-level downhill and cross-country courses. For example, the 2020 Australian Downhill MTB Championships were raced on a course of around 2km and 450m descent, taking elite riders around four minutes to complete.

The 2020 Australian Cross-country MTB Championships were raced on a course of around 4km with 150m in elevation gain, taking elite riders around 14 minutes to complete a lap.

Adaptive mountain biking

Adaptive mountain biking (‘aMTB’) encompasses a broad range of riders who cannot ride a standard two-wheeled mountain bike and require adapted equipment, trails and amenities to suit their physical, intellectual, neurological and/or sensory abilities. Many styles of adaptive mountain bikes are available, each designed to meet a rider’s specific need.

Readily established adaptive equipment includes: handcycles, recumbent leg-cycles and tandem bikes. (Note: not all people with a disability require the use of adaptive equipment. Many may be physically capable of riding a standard, unmodified mountain bike).

The Australian Adaptive Mountain Bike Guidelines were created in 2018 by Break the Boundary to help improve accessibility and inclusion for aMTB. The guidelines set out the adaptive trail rating system (‘ATR’) which rates a trail and its supporting infrastructure (e.g. parking, toilets) to assess its suitability for aMTB. The two-part rating system considers the following elements:

Trail Features	Trail Amenities
Width	Parking
Gradient	Toilets
Turning Radius	Walkways
Technical Features	Signage
Camber	End-of-trip Facilities

AusCycling recommends that any trail network manager considers the inclusion of adaptive-suitable mountain bike trails and supporting infrastructure in their facility. For further information, Break the Boundary can be contacted at www.breaktheboundary.com.au.

Reference documents

The following documents should be referred to for further information about the technical requirements and design and construction considerations for mountain bike trails:

Australian Mountain Bike Trail Guidelines

<https://auscycling.org.au/page/about/publications>

IMBA Trail Rating Difficulty System

<https://www.imba.com/resource/trail-difficulty-rating-system>

IMBA Guidelines for a Quality Trail Experience

<https://www.imba.com/resource/guidelines-quality-trail-experience-gqte>

Australian Adaptive Mountain Bike Guidelines

<https://breaktheboundary.com.au/resources/guidelines/>

criterium

Criterium circuits are among the most flexible and useful cycling facilities. While their primary design is to accommodate criterium racing, they are traffic-free paved circuits that are attractive for a wide range of users, including learn-to-ride and participation programs, recreational riding, and other sports like triathlon, roller skating and roller skiing.

As well as focusing on the technical and safety requirements of criterium racing set out below, the design of a criterium circuit should focus on creating a facility that is attractive to a wide range of users and, if possible, allow for multiple groups to safely use the circuit at the same time. One way to achieve this is to create multiple loops that can be used independently or as a single long circuit.

Most purpose-built criterium circuits fall into the Community/Club category. National- and international-level criterium racing tends to occur on temporary, closed road circuits often located in the centre of town to ensure high profile for television broadcasts and accessibility for spectators. These guidelines are limited to the design of purpose-built criterium circuits.

The technical specifications for temporary circuits are similar and AusCycling will work with event organisers to ensure temporary circuits are fit for purpose.

Criterium – venue requirements

Safety considerations for criterium circuits fall within two broad categories: requirements to keep riders, officials and spectators safe during racing; and factors to manage the interaction of a criterium circuit with other nearby facilities.

It is important to recognise that criterium races can occur at relatively high speeds. Riders can maintain more than 55km/h on the flat, with higher speeds on descending slopes. Purpose-built criterium circuits must be designed to accommodate these high operating speeds safely, with major factors being the gradient of any descending slope, corner radiuses and lines of sight.

Due to their shape and length, criterium circuits often occupy space alongside one or more other sporting or recreational facilities. As local populations increase, facilities become busier and managing the movement of people, pets and balls around the circuit becomes more important.

Signage to direct pedestrians; barriers to prevent wayward balls, pets and children; clear lines of sight; and management of pedestrian flow into controlled crossing points are essential and should be considered at the earliest stages of design.

Venue attribute	Community/Club	National	Commentary			
Track infrastructure						
Length	800m – 3km		Multiple loops that allow different lengths and multiple groups at the same time are ideal.			
Width	A minimum width of 6m, except for the finishing straight, which shall be a minimum of 8m wide for the last 200m before the finish line.		If racing is to occur in both directions (not essential but a useful option to provide variety for riders) allow width of 8m for at least 200m either side of the finish line.			
Gradient (recommended maximum)	3%. Higher gradients make for faster descending speeds and must not lead into sharp corners or other obstacles.		Higher gradients can be mitigated utilising a combination of superelevation (banking), larger corner radiuses, additional track width, and/ or a clear escape route or recovery area adjacent to the outside of the curve.			
Corner radius	Must cater to the maximum expected rider speed without requiring riders to brake aggressively before the corner. Consideration should be given to the context of the corner in the circuit.		Further guidance on horizontal curvature is available in Part 5.3 of the Guide to Road Design Part 6A: Paths for Walking and Cycling from Austroads listed below.			
Minimum radius of horizontal curves						
Speed (km/h)	Superelevation (%)					
	0	2	3	4	5	6
	Minimum radius (m)					
20	10	10	9	9	9	9
30	25	24	23	22	21	21
40	50	47	45	43	42	41
50	94	86	82	79	76	73

Venue attribute	Community/Club	National	Commentary
Line of sight	<p>Users must have sufficient line of sight to stop safely in case of an incident.</p> <p>Safe stopping sight distances are a factor of expected speed, the grade of the circuit and the coefficient of friction for the surface circuit.</p>		<p>Further guidance on calculating line of sight requirements is available in section 5.7.1 of the Guide to Road Design Part 6A: Paths for Walking and Cycling from Austroads listed below.</p>
Surface	<p>Hot mix asphalt - fine gap graded asphalt with a maximum 5mm aggregate size and machine laid.</p> <p>Circuit edges should be smooth and free of defects (eg grooves, ruts, or steps) which could affect the stability of cyclists or cause wheel damage.</p> <p>Designs should consider suitable drainage, including:</p> <ul style="list-style-type: none"> • Water must drain off the road and not pool (2% – 4% crossfall recommended) • Suitable protection to prevent sand or other debris from being deposited on the circuit • Ensuring gutters/channels provided at stormwater drainage pit inlets are smooth and flat • Ensuring utility service covers, grates, drainage pits, etc can be safely negotiated by cyclists 		
Barriers/fencing	<p>Barriers are only required if a hazard exists adjacent to the circuit.</p> <p>The minimum height of a barrier is 1.2m. A higher barrier $\geq 1.4\text{m}$ should be considered where it is protecting users from a very severe hazard.</p> <p>Care must be taken in selecting the form of either partial or full barrier fencing so to not cause a hazard to cyclists. Cyclists' deflection rails may be necessary to enable a cyclist to deflect off a smooth horizontal rail between the cyclist's shoulder and elbow (ie between 1.2 and 1.4m from path surface) so that handlebars (typically around 1.0m from surface level) do not get caught in the barrier. The terminal treatment of the barrier also needs to be considered to avoid it being a hazard to cyclists.</p>		
Finishing line	<p>The finish line should be located on a section of circuit that is flat or slightly uphill. A downhill finish is not advised as riders will approach the finish at too great a speed.</p> <p>Extra care should be given to managing pedestrian access around the finish line and barriers should be considered where high pedestrian activity is expected.</p>		

Venue attribute	Community/Club	National	Commentary
Obstacles	No obstacles (e.g. trees, posts or road furniture) can be within 2m of the circuit edge unless there is a safety barrier in place.		
Lighting	<p>Not required unless the track is to be used at night or in low-light conditions. Given available daylight hours, the provision of lighting will result in far greater use of a criterium circuit.</p> <p>For training and racing, tracks are to have a minimum average of 200 lux with G0.5 U1. The lighting should be even on the track surface.</p> <p>Light poles must be at least 2m from the edge of the circuit and, if necessary, padded.</p>		<p>Where possible, lighting should be provided as this extends the hours the facility can be used.</p> <p>Lighting systems must include emergency lighting that activates immediately on failure of the main system.</p>
Ancillary infrastructure			
Electricity	Yes		Power points should be available to both the outside and inside of the circuit to allow for the operation of timing and race management equipment.
Drinking water	Yes		
Spectator capacity	Yes		A dedicated spectator area with sufficient shade and universal access is essential. Additional amenities, such as seating and public BBQs, will increase recreational use.
Toilets	Yes		
Changerooms	Yes		
Storage	Yes		Sufficient storage for club and event equipment, tools and spare parts.
Kiosk	Yes		
First aid	Yes		
Car parking	Yes		A flat parking area that allows riders to load and unload their bikes safely. Sufficient parking to prevent the need for people to regularly park in adjoining streets.

Criterion – case studies



Community/Club – Wagga Wagga Multisport Cycling Complex, NSW

The Wagga Wagga Multisport Cycling Complex is a cycling precinct on the outskirts of Wagga Wagga that includes a criterium circuit, outdoor velodrome, BMX track, dirt jumps, bike education area and the trailhead for mountain bike trails in the nearby Pomingalarna Reserve.

The criterium circuit comprises three loops that total 1.5km and can be run in multiple configurations. One of the loops has lighting, allowing it to be used at night.

The complex has an excellent range of high-quality supporting infrastructure, including toilets and changerooms, a kiosk, multi-purpose community building, storage, car park and spectator area with shade and BBQ facilities.

The criterium circuit is used for club racing, with major events attracting riders from around the state.

Reference documents

UCI Cycling Regulations – Part 2 Road Races
<https://www.uci.org/regulations/3MyLDDrwJCJJ0BGGOFzOat#part-ii-road-races>

Guide to Road Design Part 6A: Paths for Walking and Cycling, Austroads 2021
https://austroads.com.au/publications/road-design/agrd06a/media/AGRD06A-17_Guide_to_Road_Design_Part6A_Paths_for_Walking_and_Cycling_Ed2.1.pdf

Pump Tracks and Cyclo-cross

Pump Tracks

A track that consists of rollers and steep turns in various sizes and shapes. The rollers and turns are used to generate speed by pumping the bike, not by pedalling. A pump track is built in a way that promotes technical skills. Large flat sections that promote pedalling are to be avoided.

As with BMX Racing tracks, the shape of rollers and turns in a pump track are critical to how it rides, including the overall safety of the track. Care should be taken to engage a qualified and experienced track builder and for contracting arrangements to allow for testing and adjustment of the track during and at the completion of construction.

Cyclo-cross

A cyclo-cross course is typically temporary and can be easily formed from existing roads, paths and public spaces. It shall include road, country and forest paths and meadowland alternating in such a way as to ensure changes in the pace of the race and allowing riders to recuperate after difficult sections.

The course shall be usable in all circumstances, whatever the weather conditions. Clay or easily flooded areas and agricultural land should be avoided. Races are conducted over a number of laps of a circuit. The circuit combines a number of different elements such as short, steep ascents and obstacles where the cyclist carries the bicycle.

The course must form a closed circuit of a minimum length of 2.5km and maximum 3.5km and must be at least 3m wide, of which at least 90% shall be rideable. The UCI Regulations provide course requirements beyond the scope of this document.



Annex

Annex A – Venue Approval

Venue approval, as part of upgrading an existing venue or building a new venue, typically includes some or all of the following steps:

- Consider upgrading or building new venue
- Contact AusCycling to discuss initial concepts
- AusCycling to assign technical representative to project
- AusCycling to review initial plans
- Project development
- AusCycling to review final plans
- Project approval
- Construction commences
- Regular project updates
- Mid-project site visit by AusCycling
- Practical completion of project
- Final site visit and venue approval by AusCycling

The following fees are applied to each stage of venue approval:

(fees current at 1 January 2023 and include GST)

Step	Club/Community facilities	National facilities and above
Initial plan review	\$550	\$1,100
Final plan review	\$550	\$1,100
Site visit, including audits of existing venues	\$880 plus travel costs	\$2,750 plus travel costs
Final venue approval with site visit and report	\$2,200 plus travel costs	\$5,500 plus travel costs



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