Guidelines for trail planning, design and management

A toolkit for state and local government agencies, community groups and investors on how to plan, manage and market exceptional trail experiences.

Acknowledgements

These guidelines have been prepared with the support of the nine local governments within Barwon South West Region, Great Ocean Road Regional Tourism as well as the Regional Development Australia, Regional Development Victoria and Parks Victoria.

Photos:

Tourism Victoria

Tourism Australia
Great Walks of Australia –
The Great Ocean Walk by Bothfeet

Traditional Owner acknowledgment

Trails across the State of Victoria traverse the traditional lands of many Aboriginal groups. The land has special cultural significance for the Traditional Owners who have always had a spiritual relationship with their country. This relationship remains strong and important to the people today. The agencies responsible for producing theses guidelines recognise and respect the connection between Traditional Owners and their country.

The project team wishes to acknowledge TRC Tourism Pty Ltd for their assistance in the development of the Guidelines.

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Introduction

What is a recreational trail?

The Victorian Trails Strategy 2014-2024 defines a trail as "an established path, route or track which often traverses natural areas and is used by people for non-motorised recreation, such as walking, running, cycling and mountain bike and horse riding".

In most cases, recreational trails are used for non-motorised recreational pursuits such as walking, cycling, horse riding, canoeing or scuba diving. However, in some circumstances, trails can be designed for use by small wheeled vehicles such as motorised wheelchairs to enable access for people with mobility impairments.

The Barwon South West region has a mix of trails and mountain bike hubs and the landscapes and environments within which these trails sit vary significantly. They include urban areas, native forests, pine plantations, areas of high rainfall, seasonal watercourses and rugged coastlines. Importantly, the majority of trails are focused around areas of environmental and cultural interest or near major population centres.

The trails are key attractions for domestic and international visitors and support healthy lifestyles of the region's local communities.

What and who are these guidelines for?

While it is acknowledged that the Barwon South West region has a strong and varied network of trails, there are many aspects of the existing trail system that can be improved through enhancements to trail design, better linkages between trails and other community assets and attractions, consistent trail policy, management, marketing and support for on-going development of the network.

Trail users are becoming more discerning and have high expectations about their trail experience, which means that quality infrastructure and services and marketing and promotion activities are becoming increasingly important and the user experience is central to each element of trail design and management.

These guidelines have been prepared to provide a comprehensive and coordinated document to assist the planning, development, construction, management, and promotion of regional trails in the Barwon South West Region.

The guidelines will be of particular interest and assistance to:

- parks and reserve managers (e.g., local councils and state government departments)
- trail builders including volunteer groups
- trail managers
- trail users
- clubs and associations that use trails
- owners of land through which trails pass.

Structure of these guidelines

These guidelines have been structured into 12 chapters.

Chapters 1 – 7 (Part A) provide a concise overview of trail categories and types of users, and information on the legislative and strategic planning context for planning, developing and managing trails in Barwon South West region. These chapters 'set the scene' for the chapters 8 – 12 (Part B) which provide more specific detail and guidance for new trail proposals and the maintenance of existing trails.

It is recognised that not all of the content within these guidelines will be relevant for every new or existing trail. Rather, it is intended that the reader will select what they need from the information presented and seek additional information from the references provided.

Part A. Trail Planning Guidelines

The planning guidelines contribute to the development of exceptional trail experiences by assisting agencies, investors and groups to consider all aspects of trail planning at the initial concept stage including guiding principles, legislative and policy framework, feasibility assessment, community engagement, governance arrangements, marketing and branding as well as monitoring and review mechanisms.

ELEMENT 1 – Background and guiding principles

ELEMENT 2 – Legislation and policy

ELEMENT 3 – Trail concept and feasibility planning

ELEMENT 4 – Management models

ELEMENT 5 – Marketing and branding

ELEMENT 6 – Community and stakeholder engagement

ELEMENT 7 – Monitoring and review

Part B. Detailed Design Guidelines

The design guidelines build on the planning guidelines and provide advice on how to apply the relevant standards and design principles to develop, manage and maintain high quality trails.

ELEMENT 8 – Trail classification and standards

ELEMENT 9 – Building successful trails

ELEMENT 10 – Maintaining successful trails

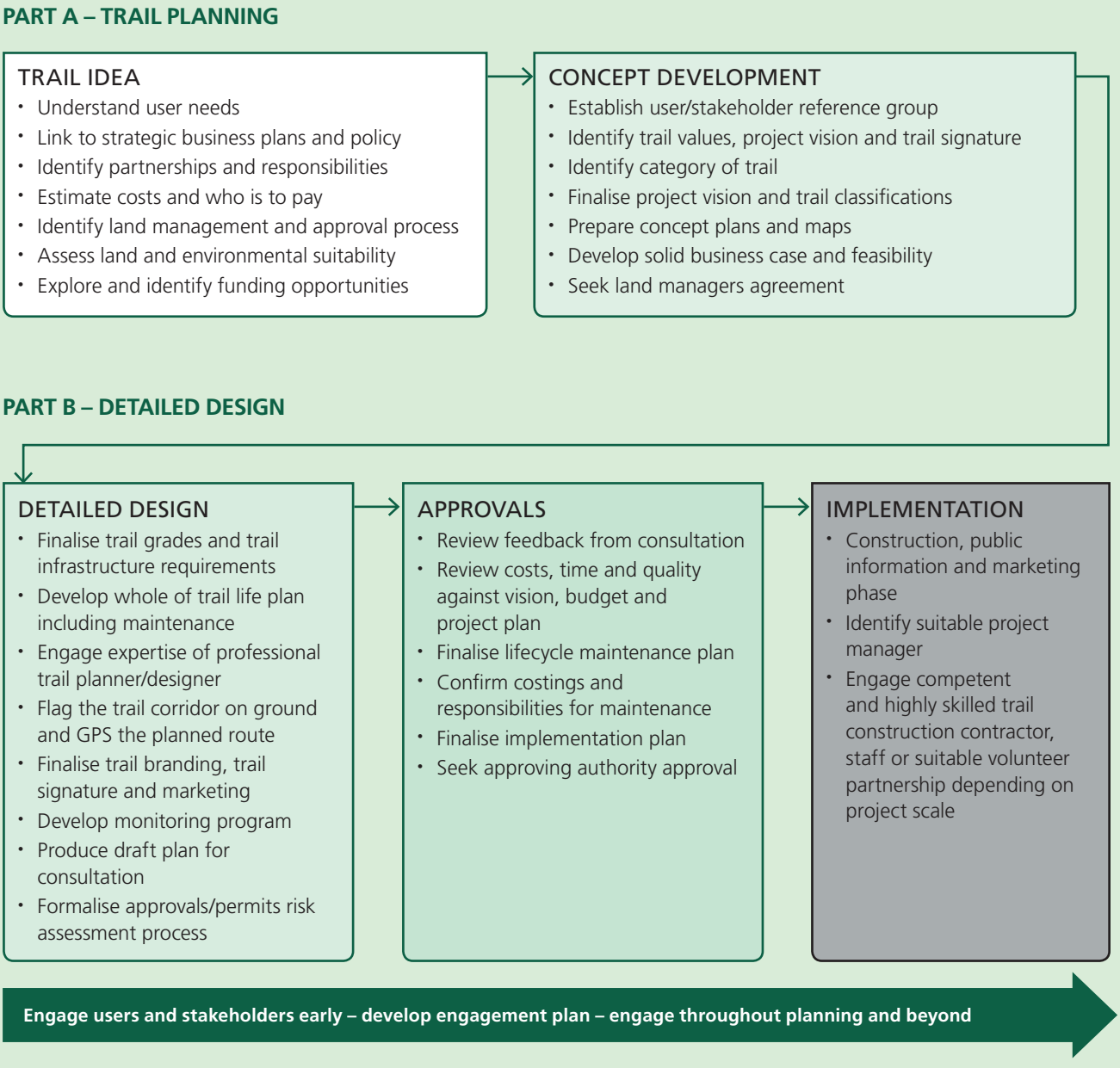
ELEMENT 11 – Education and interpretation

ELEMENT 12 – Orientation and safety

Steps in the trail planning and design process

These guidelines have been developed around the trail planning and design process outlined in Figure 1. The trail planning and design checklist on the next page also provides a useful reference to ensure all steps are undertaken.

Figure 1: Trail Planning – A step by step process that can be applied to differing scale trail planning initiatives



Trail planning and design checklist

The following checklist can be used for planning and constructing trails in Barwon South West Region. The content of these guidelines provide guidance under each of the major headings.

Checklist for trail planning, design and management for Barwon South West Region	Tick ✓
1. Guiding Principles (Element 1)	○
Ensure the trail is sustainable and user focused	○
Identify the trail category and characteristics of the trail	○
Define the user experience	○
2. Legislative and policy requirements (Element 2)	○
Check legislative and strategic context of trail	○
3. Trail concept and feasibility planning (Elements 3–7)	○
Identify the target market	○
Undertake preliminary consultation with land manager, local council and relevant Government agencies	○
Prepare a project plan	○
Identify potential partners	○
Assess the supply and demand for recreational trails in the area	○
Seek 'in-principle' endorsement from land manager, local council and relevant Government agencies	○
Undertake consultation with the community and users (Element 5)	○
Decision to proceed with feasibility assessment	○
Prepare Feasibility Study:	○
Determine the need of the trail	○
Identify likely patterns of usage and needs of user groups including infrastructure such as toilets etc.	○
Provide details of planning process including required approvals	○
Identify connections and linkages to other trails, facilities and tourist attractions	○
Identify partnerships, funding options and management model (Element 4)	○
Estimate likely community support	○
Address environmental matters	○
Address cultural and heritage considerations	○
Undertake on-ground assessment	○
Prepare concept design	○
Consider management and maintenance matters (Element 10)	○
Estimate the likely cost of construction and ongoing management	○
Identify funding opportunities and commercial partners (Element 4)	○
Conclusion – is the trail feasible or not?	○
Seek in principle approval from land managers and other relevant authorities	○
4. Detailed Design (Element 8 and 9)	○
Determine the trail system – loop or linear?	○
Confirm classification	○
Confirm if single or shared use	○

Checklist for trail planning, design and management for Barwon South West Region	Tick ✓
Identify the route of the trail on a topographical map	◯
Determine the surface of the trail	◯
Follow the contours	◯
Ensure erosion control	◯
Avoid areas of environmental and cultural significance	◯
Consider safety issues (Element 12)	◯
Determine trail markers and information signage (Element 11 and 12)	◯
Consider other facilities such as toilets, shelters etc.	◯
5. Management and maintenance (Elements 7 and 10)	◯
Confirm partnership agreements	◯
Develop management plan and maintenance schedule (Element 10)	◯
Monitor and evaluate the trail (Element 7)	◯
6. Marketing, communications and interpretation planning	◯
Prepare communications plan and marketing strategy (Element 5 and 6)	◯
Prepare interpretation plan (Element 11)	◯
Confirm signage system and develop signage plan (Elements 11 and 12)	◯
7. Obtain Approvals	◯
Undertake environmental assessments as required	◯
Obtain formal approval from land manager / owner	◯
Obtain required development approvals from the local council	◯
Obtain necessary permits from government agencies	◯

PART A –
Trail Planning Guidelines

These guidelines contribute to the development of exceptional trail experiences by assisting agencies, investors and groups to consider all aspects of trail planning at the initial concept stage including guiding principles, legislative and policy framework, feasibility assessment, community engagement, governance arrangements, marketing and branding as well as monitoring and review mechanisms.

ELEMENT 1
Background and guiding principles

1.1 Why have recreational trails?

The demand for recreational trails is growing. National physical activity trends indicate that participation in unstructured recreational activities is increasing. Walking for exercise is already the most popular recreational activity in the region and cycling the fourth most popular of fifty different recreational activities.

Recreational trails offer a diverse range of benefits to our communities and the environment. Social health, physical fitness, environmental management and awareness, cultural preservation and the economy can all benefit from the effects and experiences offered by recreational trails. The main benefits can be summarised as follows:

- Community and social benefits – providing opportunities for families and friends to enjoy time together and enhancing quality of life
- Economic benefits – increased tourism revenues, greater business investment and enhanced property values
- Educational benefits – providing an outdoor classroom for nature, culture and history
- Environment benefits – enhanced environmental awareness, improved understanding of our natural heritage, and stewardship of the environment
- Health and fitness benefits – improved health and physical well-being for both individuals and communities, reduced health care costs, and enhanced productivity
- Heritage and cultural benefits – recognition and respect for Aboriginal culture and historical values
- Transportation benefits – greener transportation and commuting use of trails contributing to reduced greenhouse gas emissions and improved health and wellness of individuals.

Further information – Benefits of Recreational Trails

Trails contribute to community health and wellbeing by improving the liveability of communities and attracting visitors. They are also recognised for providing opportunities for significant economic, business, employment and tourism growth. Follow the links for more information:

http://www.ausport.gov.au/__data/assets/pdf_file/0018/436122/ERASS_Report_2010.PDF

http://www.transport.vic.gov.au/__data/assets/pdf_file/0011/83981/Cycling-strategy-Cycling-into-the-Future-Dec-2012.pdf

http://www.tourism-intelligence.co.uk/intelligence-guides

1.2 Different types of trails

The *Victorian Trails Strategy 2014–2024*[1] seeks to develop a number of well-developed trails and tourism products that will be sufficiently competitive to attract the interest of international and domestic markets and provide benefits for communities. This means that the trails need to be carefully planned to meet the expectation of consumers or users.

The strategy establishes three categories for trails based on their significance as (i) local/regional (ii) state or (iii) national/international trails (refer Table 1). The trail categories are determined by characteristics that focus on the trail's ability to demonstrate sustainability, experiential quality, attraction to visitors, generation of economic benefits and contribution to the lifestyle, health and social well-being of Victorians.

The consumer expectations and infrastructure requirements associated with each trail category are described in Table 2 together with the standards prescribed by the Australian Walking Track Grading System (refer Element 8).

1 State of Victoria 2014, *Victorian Trails Strategy 2014–2024*

1.3 Understanding the principles for trail planning and management in Barwon South West

Prior to the consideration of a new trails initiative – either improving an existing trail or constructing a new one – it is important to ensure that the proposal is both sustainable and accessible. Adherence to these two 'guiding principles' will assist in attracting a desired user group, minimise the likelihood of environmental damage and maximise opportunities for funding.

Sustainable

It is fundamentally important that trails are socially, economically and environmentally sustainable. It is vital, therefore, that high quality recreational experiences are developed in landscapes that are capable of supporting them. The conservation and enhancement of natural areas, protection of biodiversity and raising environmental awareness should underpin the development of the trail network. This can be achieved through appropriate trail design, location selection and ongoing management. Trails must also be economically and socially sustainable.

The development of our trails must also take into account the sensitivities and desires of our local communities.

A strong focus on engagement is essential – trail users and the local community are central to trail development. A strategic and planned approach to engagement will enable effective debate and collaboration and generate trust, goodwill and contribute to ongoing support.

In order to achieve a network of sustainable trails, it may be necessary to review the location, design, management and use of existing trails prior to the consideration of new trail projects.

Accessible and user focussed

Intertwined with the objective of sustainability is the need for trails to be accessible and user focussed. Trail development should commence with the end product in mind and with a focus on developing trails that are usable by as many participants as possible and incorporating the principles of Universal Design (refer Critical Trail Tip 1 and Appendix 1).

Accessibility is determined by:

- proximity to local communities and visitor attractions
- proximity and linkages to transport facilities such as railway stations or road network providing access to the trail
- existing or proposed linkages to other trails and the wider trails network
- proximity to natural attractions such as scenic views, native vegetation, waterfalls, lakes, coastline, etc.
- presence of existing facilities that may support or facilitate use of the trail such as car parks, toilets, picnic facilities, camping sites, tourist information centres, cafés, tour operators, etc.

The visitor experience is central to trail design and trails should be designed for target markets on each trail. Consumer expectations need to match the realities of defined trail categories, with trail design being appropriate for the expected volume of users and planned to protect trail and environmental values.

Proposals for new trails, or upgrades to existing trails, should clearly demonstrate that they meet at least half of the accessibility determinants expressed above. This will assist in the promotion of the trail to prospective users and local businesses and ensure that any associated economic and social benefits are shared amongst our communities.

Critical Trail Tip 1 – Universal Design Principles

Universal Design allows everyone, to the greatest extent possible, and regardless of age or disability, to use buildings, environments and services without the need for specialised or adapted features. It helps to provide more inclusive environments than relying on minimum standards prescribed in codes and standards.

Trail planning and design should aim to incorporate the Universal Design Principles as much as possible. The level to which these principles can be incorporated should be considered in the context of physical setting of the trail and the experience being offered. The Universal Design Principles are:

- Equitable use (Be Fair) – the design does not disadvantage or stigmatise any group of users
- Flexibility in use (Be Included) – the design accommodates a wide range of individual presences and abilities
- Simple and intuitive use (Be Smart) – use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level
- Perceptible Information (Be Independent) – the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
- Tolerance for error (Be Safe) – the design minimises hazards and the adverse consequences do accidental or unintended actions
- Low Physical effort (Be Active) – the design can be used efficiently and comfortably, and with a minimum of fatigue
- Size and Space for Approach and use (Be Comfortable) – appropriate size and space is provided for approach/ reach/ manipulation, and use, regardless of the user's body size, posture, or mobility

For more information go to: www.universaldesign.com

Adapted from 1997 NC State University, The Seven Principles of Universal Design

Table 1: Characteristics and attributes of trail categories[2]

Type of Trail	Attributes
International and national significant trails	
• World-class trail experiences located within the natural and cultural landscapes of Victoria, with the highest standard of management and promotion. • Support high yield trail-based tourism products including accommodation. • Destinations in their own right, attracting international and interstate visitors. • May include major trail hubs that attract high international and interstate use, high level competitions and events.	• Exemplars of the competitive strengths of Victoria and Australia as a trail destination. • Uniquely representative of Victoria's natural and cultural landscape values. • High priority government support at the State level for trail development and management and listed as a priority within State plans and strategies. • Support viable high yield trail-based accommodation and associated products and services. • Higher levels of interstate visitation than State significant trails (see description below) and significant international visitation interest and appeal. • Directly and indirectly provide economic benefits to the State.
State significant trails	
• Significant trail experiences, representative of Victoria's varied landscapes, with a high standard of management and promotion. • Support a range of trail-based products and a motivator for intrastate and interstate visitation. • May attract some international visitors. • May include some major trail hubs and may attract high level competitions and events.	• Representative of the region's and/or Victoria's natural and cultural landscapes. • Government support at a regional level within regional plans and strategies. • Support viable trail-based and associated regional tourism products, services and programs. • Significant intrastate and interstate visitation, interest and appeal. • Directly or indirectly provide economic benefits to a region and/or the State.
Regional and local significant trails	
• Regional and local trails and facilities used regularly by regional and local residents for recreation, transport, health and wellbeing. • May attract some regional and intrastate visitors primarily for independent trail-based recreation activities. • May include some local trail hubs.	• Many are located within close proximity to residential areas, and are often connected to community services and open space areas. • Representative of the region's natural and cultural landscapes. • Provide access to a diversity of trails of varying difficulty, length and type. • Provide opportunities for different trail-user groups for active recreation, health and wellbeing. • Be recognised by local residents as a popular trail and/or trail network and frequented by people from the surrounding region.

2 State of Victoria 2014, *Victorian Trails Strategy 2014–2024*

Table 2: Consumer expectations and infrastructure requirements of Victorian international, domestic, intrastate and local community trails

Essential components ✓ Optional components O

Consumer expectations (Variety, challenge and sustainability)	International/ National Trails	State Trails	Regional and local trails	Trail planning considerations	Trail infrastructure elements
Spectacular settings and encounters with wildlife	✓	✓	O	Identify and protect unique settings and wildlife encounters	Present experiences that are world class, protect values and sustainably connect visitors with unique experiences
Showcase Australian unique nature, culture and landscape	✓	✓	O	Connect with nature, culture and landscape and maximise the trail's wow factor	Provide exciting view and observation opportunities whilst protecting landscape, environmental and cultural values through risk assessment and innovative trail design using positive trail control points
Nature based adventure experience	✓	O	O	Integrate excitement, fun and a sense of wildness into the trail experience	Retain strong and sustainable connections with nature through enjoyable and challenging experiences on all trails and ensure user comfort and safety corresponding to trail grade
Step on and step off opportunity	✓	O	O	Provide opportunity to leave and connect with long distance trail at sites that enhance experience	Link stepping off opportunity with towns, accommodation, transport, trail hubs and visitor experiences including side trips
Information – web site access	✓	✓	O	Provide high quality information on trails via web sites	Web site information to include trail maps, trail history, features, amenities, facilities at various sites, safety and etiquette tips which should include incident warning information (e.g. bushfires)
Maps, guides and on site information	✓	✓	O	Key information for trail users on site and through web sites	Web sites, access through phones and through a range of on-site information at trail heads, trails section signs and at sites. Level of information should correspond to trail grade
Accessibility through tourism providers	✓	✓	O	Cater for variety of trail user types and promotion of tourism opportunity	Trail head and step on and off points are planned to link in with tourism operators, accommodations, visitor sites and public transport

Consumer expectations (Variety, challenge and sustainability)	International/ National Trails	State Trails	Regional and local trails	Trail planning considerations	Trail infrastructure elements
Accessible transport and vehicle parking	✓	✓	✓	To promote equity, healthy communities and connecting to nature ensure access to public transport where possible	Consider transport links, suitable parking and consideration of local residents views
Proximity of local and regional trails for local users	O	O	✓	Ensure ease of access and ensure user considerations to maximize use	Trail head placement at appropriate stepping on and off point for local users with consideration for current and future parking and access requirements and impacts on neighbours
Accommodation and associated products and services	✓	✓	O	Link range to trail users needs and accessibility	A range of accommodation linked to users requirements, on and off trail and linked to existing and future transport and business opportunities
Sustainable and low environmental and cultural impact	✓	✓	✓	Protecting trail and community values while encouraging travel through the landscape	Sustainable trail principles through appropriate design, use of control points, good construction linked to ongoing maintenance. Ensure enjoyable and challenging experiences on all trails linked to trail grades
Trail based events	O	O	O	Encourage and enable sustainable event opportunities that promote trails values	Events should reflect trail objectives and trail infrastructure should be planned for future use, trend changes and consideration of land management legislations and policy
Short walk component	✓	✓	✓	Options for short walk components of significant trails	Plan to enable short walks to be taken on day or multi day walks, consider access points and opportunity to include people with disabilities including wheelchairs linked to trail grades
Day walks	✓	✓	O	Important component of trail mix providing enjoyable and challenging experiences	Design to accommodate variety of users and develop trail according to agreed trail grade and clearly informing users of trail class and expectations
Multi Day walks	✓	O	O	Can be the most challenging and rewarding with opportunity to engage with wild areas and landscapes	Critical planning and design ensures challenge, reward and connection with landscape, strong focus on appropriate trail grades, consideration of accommodation types and strong links to partnerships and industry providers

1.4 Different types of trail experiences

Following consideration of the type of trail proposed (local, regional or national) together with an assessment against the 'guiding principles' of sustainability and accessibility, it is necessary to think about the type of recreational users who will be attracted to the trail and the type of trail experience it will offer. The types of users will strongly influence the design of the trail in terms of width, materials, slope, degree of difficulty and linkages to other attractions and services.

Trails can be designed to accommodate a broad range of user groups with varying interests and needs or, alternatively, for a small sector only. Proponents of trails should carefully consider the range of users envisaged and then design the trail and experience accordingly. Potential experiences may include:

Walking

A 'walker' broadly describes anyone who travels by foot on recreational trails. Walking includes all forms of recreational walking and experiences from a leisurely stroll in the local park to strenuous treks across rugged terrain. Walking may also involve exercising dogs, nature appreciation or overnight stays.

Walkers use both urban and rural trails. Urban walkers use trails within suburban reserves, linear parks and along transport corridors, the majority of these types of walkers use trails for fitness and social reasons.

Walkers in rural areas often seek a variety of trail experiences including more challenging trails that visit interesting natural features. They may be self-sufficient and carry adequate clothing, food and water for sustained and demanding walks. As fitness and expertise increase, these walkers often seek experiences in more remote and difficult terrain.

Running

Runners like to use a variety of trails ranging from urban, hard paved trails to more challenging experiences in rural areas often associated with hills. Trail running has grown in popularity and includes activities such as orienteering and rogaining.

Cycling

Cycle Touring

Cycle touring involves road and off-road riding. It includes day and overnight trips undertaken by local riders and intrastate, interstate and international visitors. The focus is on cycling that draws visitors away from home to start and finish. It involves using a car or other transport to take bikes to a destination for riding. It includes riding for fun, exercise, social occasions, challenge, events, training, and to explore a region[3].

Mountain Biking

Similar to walkers, there is a range of sub-groups that sit under the broad heading of mountain bike riders:

- Family, occasional or beginner mountain bike riders who generally seek short loops on fairly level terrain, with some challenges to introduce them to off-road cycling
- Cross-country riders that seek moderate to very challenging terrain, often on single track trails and like to get away from busy trails to areas of more solitude.
- Downhill riders or downhillers who seek steep challenging terrain and obstacles that appear unusable to outsiders. These riders are generally supported by an uplift service such as a shuttle service or chair lift.
- All Mountain/Trail Riders combine cross country and downhill terrain. These riders are now the largest segment of the MTB enthusiast market both in terms of bike sales and riding numbers.

Horse Riding

Horse riders can be divided into a number of sub-groups:

- Recreational or 'weekender' riders who exercise their horses and ride in attractive rural settings for a few hours to a day-long ride.
- Endurance riders undertake competitive rides and like very large circuits to train on but events are usually held on temporary loops.
- Long distance riders are generally non-competitive riders who often travel long distances along linear trails or on daily loops of up to 30 kilometres from a base. Their trail experience can range from overnight to rides that last a number of weeks.

Water based activity

A variety of water based trails suited to canoeists, kayakers, snorkellers, scuba divers provide experiences which can be stand-alone water based or they can be complemented by land based trails as a walker or rider. The path of the water, its inherent features and the surrounding environment guide these types of trail users. In some locations, land managers may provide direction, interpretive and safety information signs. Access points, including boat ramps, secure car parking, campsites accessible by water only, require due consideration when formalising water based trails[4].

3 TRC 2014 Barwon South West Cycle Tourism Strategy

4 Recreation and Sport SA 2007

ELEMENT 2
Legislation and policy

2.1 Overview of planning framework

All state and local governments and delegated land managers must act in a manner consistent with legislation, regulations and local laws. These will affect the planning, development, use, management and maintenance of proposed and existing trails. The regulatory framework will influence the location, construction and ownership as well as the ongoing management and maintenance of trails.

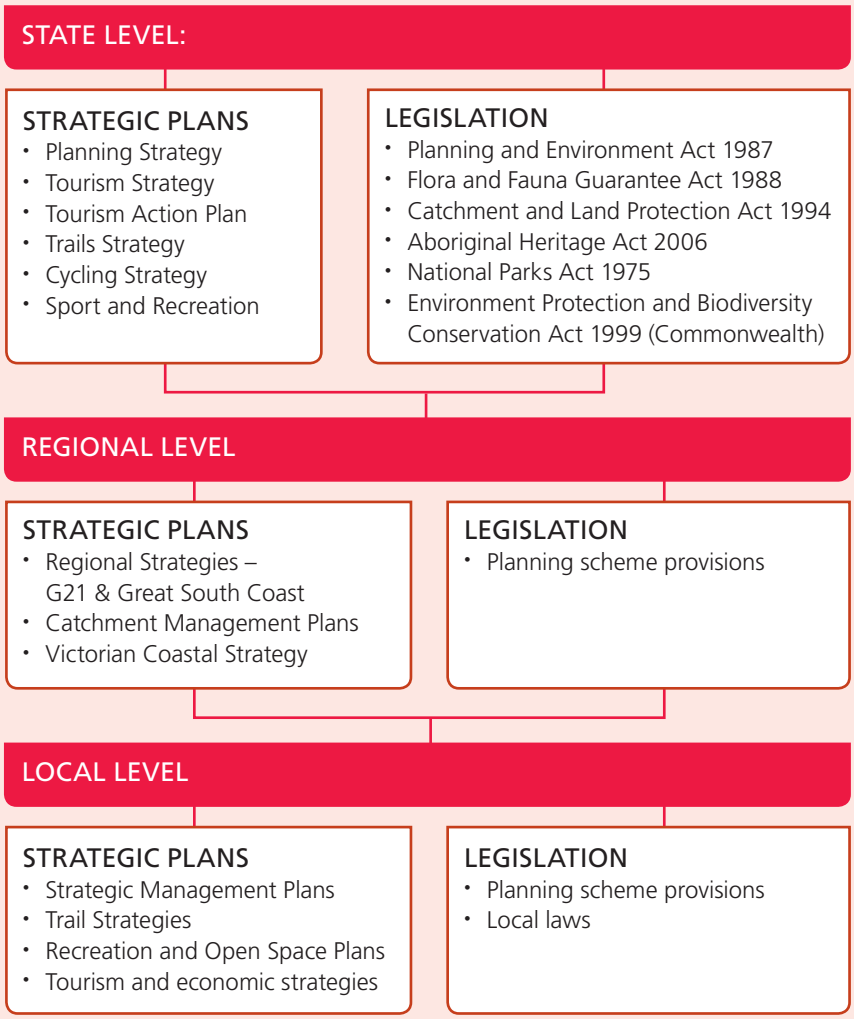
Trail development and maintenance is a significant investment. Successful and sustainable trails require clarity and certainty in the pre-planning phase as to who is responsible for what, particularly in the case of multi-tenured trails.

In the pre-planning phase for trails the distribution of responsibilities, ongoing resourcing, maintenance, safety and liability arrangements at local, state and national level must be agreed to and confirmed by all parties. A significant responsibility of trail managers is to review and, where applicable, apply or comply with legislation and government policy.

Figure 2 illustrates the hierarchy and interaction between the levels of government, its various strategic plans and the legislation relevant to trail proposals.

A more comprehensive description of potential triggers, relevant legislation and policy, responsible agencies and web site links is provided in Appendix 2.

Figure 2: Planning hierarchy in Barwon South West Region



2.2 Victoria's Planning scheme

In Victoria, the *Planning and Environment Act 1987* controls land use and development activities within a municipality through the local planning schemes. Local planning schemes contain state and local planning policies, zones and overlays and other provisions that determine how land can be used and developed. Any new use or development must comply with the relevant planning scheme.

A copy of every planning scheme in Victoria is available at: www.dtpli.vic.gov.au and search for 'planning schemes'.

A useful planning resource can be found at: www.dtpli.vic.gov.au and search for 'a guide to the planning system.

Town planners in each local council can also provide information on the policy and planning relevant controls to the area.

2.3 Zones and overlays

Broadly, planning 'zones' and 'overlays' contained in the planning scheme zones contain a purpose statement and a set of requirements about the use and development of land. This information will indicate if a planning permit is required and the matters that the Responsible Authority (normally the council) must consider before deciding whether to grant a permit.

There are specific "public land zones" which are used to regulate Crown land. The land includes national parks, state forests, coastal crown land and land reserved under the *Crown Land (Reserves) Act 1978*. By and large, national parks are zoned Public Conservation and Resource Zone (PCRZ) or Public Park and Recreation Zone (PPRZ). It is not unusual for Crown land regulated by one of the "public land zones" to also be regulated by one or more overlays. The requirements of these overlays also need to be considered in addition to any requirements under a zone.

Land, including Crown land, may also be subject to a planning overlay which may relate to such things as bushfire management, matters of environmental significance, erosion management, significant landscapes, heritage or vegetation which may impose permit requirements and conditions over and above zoning and other planning scheme controls.

2.4 Coastal public land

On coastal public land the *Victorian Coastal Strategy 2008* and the *Siting and Design Guidelines for Structures on the Victorian Coast* will apply. Further information can be found on the Victorian Coastal Council website: www.vcc.vic.gov.au and on the DTPLI website: www.dtpli.vic.gov.au and search for 'coastal planning'.

2.5 Native vegetation removal

Local planning schemes contain provisions to ensure that the permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity. Native vegetation controls must also be considered in the context of bushfire response and emergency management.

A planning permit is required to remove native vegetation (including dead vegetation) under Clause 52.17. All permit applications that include native vegetation removal are assessed against the Native Vegetation Framework. The Native Vegetation Framework aims to achieve a net gain in extent and quality of native vegetation through: avoiding impacts, minimising removal, and providing for vegetation offsets through compensatory planting.

Native vegetation removals are administered by the Victorian Government. It is reasonable that any proponent will require practical advice and feedback as to how to meet native vegetation requirements (including offset metrics) to the satisfaction of the public land manager.

2.6 Other relevant legislation

Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* provides for the protection and conservation of listed State significant threatened native flora, fauna and ecological communities from potentially threatening processes. Protected areas such as national parks provide key habitat for threatened communities.

A suite of Victorian Government policies, regulations and programs address how native vegetation is to be considered. These ensure that maintaining biodiversity is a primary consideration in decisions about whether to permit the removal of native vegetation. Where clearing is permitted the objective is no net loss in the contribution made by native vegetation to Victoria's biodiversity. The current native vegetation guidelines, biodiversity information tools and regulatory documents are available at: www.dse.vic.gov.au/land-management/land/nativevegetation-home

Environmental Effects Act 1978

The *Environmental Effects Act 1978* provides for the referral and, if necessary, assessment of projects that have the potential to have a significant effect on the environment. When the preparation of an Environmental Effects Statement (assessment) is required under the Act, the Minister for Planning's assessment of the project informs and guides other statutory approval decisions.

Victorian Aboriginal Heritage

The *Aboriginal Heritage Act 2006* provides for the protection and management of Victorian Aboriginal cultural heritage, and has processes linked to the planning scheme. The Act sets out requirements to manage activities on land that may harm Aboriginal cultural heritage. Further information on Aboriginal Heritage: Office of Aboriginal Affairs www.dpc.vic.gov.au/index.php/aboriginal-affairs/aboriginal-affairs-overview

Matters of national environmental significance

The *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) provides for the protection of the environment, especially matters of national environmental significance. Guidance on matters of national environmental significance and when a referral and potential approval under the Act is required is provided in the Matters of National Environmental Significance, Significant Impact Guidelines, issued by the Commonwealth in 2009. These can be found on the website: www.environment.gov.au/epbc/publications/nes-guidelines

Critical Trail Tip 2 – Planning approvals

- All planning approvals for all sectors of a trail project should be obtained prior to construction commencing. Planning and approvals process can be lengthy and sometimes the level of information required can appear frustrating and be costly. However, such approvals are essential when considering agency responsibilities and long-term trail management responsibilities.
- It is not recommended seeking approvals for a trail on a stage-by-stage basis as this cannot guarantee that the full length of the trail can adhere to the relevant approvals and planning controls.
- There are different types of approvals required, including from local, state and federal Governments. Each land owner or manager may be subject to different approvals and controls relevant to their land. Early engagement with the local planning authority to understand the scope of approvals required is essential. Especially where tails are proposed through environmentally sensitive areas or potentially hazardous areas such as within or across railway corridors.

Trail planning and works that may trigger legislation, policy or agreement or require appropriate Government involvement – For more information see Appendix 2.

Trail Activity	Commonwealth Environmental Protection	Victorian Government	Local Government
Planning on or near areas of environmental significance protected under EPBC Act	✓		
Alignment on Commonwealth land	✓		
Activities and events on or near areas of environmental significance	✓	✓	✓
Removal of vegetation for trail construction or maintenance		✓	✓
Planning or development on Crown or public lands	✓	✓	✓
Planning or development on Aboriginal traditional lands		✓	
Construction where there is potential for disturbance to cultural heritage sites or items		✓	
Infrastructure development construction where actions could affect Native Title		✓	
Infrastructure development and construction where actions could affect or require Local Government services			✓
Responsibility of trail managers in relation to management of land and catchments		✓	✓
Planning or undertaking trail works in the vicinity of waterways		✓	✓
Planning or undertaking trail works in the vicinity of the coast		✓	✓
Planning and undertaking works within land incorporated within Local Planning Schemes		✓	✓

Useful references

Strategy and Policy

The Victorian Trails Strategy 2014-2024 and Victoria's Regional Tourism Strategy 2013-2016 provide the policy and strategic direction for trails within Victoria. The Barwon South West Regional Trails Master Plan (2009) and Barwon South West Regional Trails Strategy (2014) are useful references for the development of trail experience in Barwon South West Region. For more information go to

http://www.tourism.vic.gov.au/about/strategies-and-publications.html

http://www.colacotway.vic.gov.au/Page/page.asp?Page_Id=2668&h=1

ELEMENT 3
Trail concept and feasibility planning

3.1 Introduction

Comprehensive trail planning will seek to ensure that the trail is sustainable from an environmental, social and economic point of view from the outset (refer Element 1).

3.2 Preparing a trail project plan

Following consideration of the trail planning principles and the legislative and policy context, the next step in the process is to prepare a clear project plan so that the trail project is properly scoped. The project plan should cover the following areas:

- the background and perceived need for the trail
- the overall trail purpose, aims and objectives
- description of the trail
- any potential partners for development of the trail (government or private sector)
- the intended user groups
- community engagement and opportunities for involvement in management of the trail
- any background studies or reports relating to the proposed trail or location
- the estimated cost, timing and staging of the development of the trail
- any potential agency or community support that may be available
- roles and responsibilities of organisations involved in the project and project governance arrangements.

3.3 Identify project partners

At this stage it is important to establish a project working group or steering committee to help manage and coordinate the trail planning process. The group should be based on the agreed project governance structure with a clear understanding of the purpose of the group. It should provide a focal point for key individuals who are keen for the trail project to proceed and should include land managers, user groups, local or regional tourism organisations, representatives of local businesses and potential investors. Wide representation will result in more effective and successful trail planning and greater community ownership of the final project.

During this early planning stage, it is vitally important that the working group clearly identify the intended users of the trail and test whether the proposal will meet their needs. Specifically, the group should seek answers to the following questions:

- the need for the trail from a social, environmental and economic perspective
- support given to the trail proposal by local, regional and state strategic plans
- any issues that neighbouring property owners may have with the proposal and mechanisms to resolve those issues
- any up-front financial contributions that may be requested from local and state government agencies
- the ongoing cost of the proposal in relation to maintenance and management.

If there is some doubt about the ability of the proposed trail to clearly address these matters, the merits of the proposal should be reconsidered.

3.4 Endorsement from local government and land managers

While a representative of the local Council may have been involved in preliminary discussions about the trail project, it is important that formal endorsement be given. The Council's endorsement could include a resolution of support for the project, or take the form of a broader agreement concerning the development and maintenance of the trail.

3.5 Undertake community engagement

It is best to involve the community and interested stakeholders as early as possible in the trail planning stage. The investment of time and energy in community consultation is necessary to develop community support and ownership of the project. Ideally the project plan will have identified a consultation strategy to inform and involve the community. Element 6 provides more information about community engagement.

Critical Trail Tip 3 – Review existing trail provision in the region

Prior to the development of a trail project, try to get a comprehensive picture of other trails in the area. One of the first questions that Council, land managers and State Government officials will ask is "Is there demand for this trail?" Without any credible evidence to suggest that a new trail is needed and will be used, it is unlikely that it will be supported.

This step may identify a number of underutilised or run-down trails already in the area that could be improved at a much lower cost than the construction of a new trail.

Ongoing maintenance is a critical component. Part of the assessment of viability is to clearly establish what agency or organisation is responsible for the upkeep of the trail, a realistic assessment of life cycle maintenance resources required and opportunities for maintenance partnerships and revenue generation to offset maintenance costs.

3.6 Decision to proceed

A decision on whether or not to proceed further with the trail proposal including the expenditure of more time, energy and money on a feasibility study should be made at this point. In addition, the option of abandoning the proposal in favour of upgrading an existing trail before deciding upon developing a new trail should also be considered.

3.7 Feasibility study

A well-researched feasibility study should be prepared in order to attract investment and other support for the trail proposal. A feasibility study will refine the concept of the trail and then test that concept to determine if it will 'perform' both practically and financially. Ideally the feasibility study should be prepared by people with skills in economics, recreation or tourism planning, engineering and landscape architecture.

The elements that should be included in a trail feasibility study will depend on the size and scale of the project, but the following topic headings can be used as a guide:

1. *Introduction and background*: How did the project come about? What is the proposed location? What type of recreational user is the trail designed for?
2. *Supply and demand*: Is there a demonstrable need for this trail? Are there other trails in the Barwon South West region which may be more appropriate or could be upgraded to meet the demand?
3. *Planning process*: Has the project been identified as a priority in any recreational plan, open space strategy plan or any other local/ regional/ state strategic plan? Has the local Council and/or land manager given their endorsement for the project? What approvals are necessary? Have they been granted or are there barriers that may complicate the approval process?
4. *Connections*: How will the project provide linkages between towns or community facilities, other trails, as well as areas of natural, cultural, historical, or recreational significance?
5. *Partnerships*: How will the project demonstrate cooperation or partnerships between trail users, trail groups, private interests within the area and public agencies? What type of funding has been secured? Has 'in-kind' labour or other support been secured?
6. *Management and maintenance planning*: How will the trail be managed and maintained and what is the management model for the trail as outlined in Chapter 4. Who will undertake and pay for ongoing operation and maintenance costs? How will the trail be monitored to measure benefits?
7. *Community input and support*: Can the project demonstrate that it has support from the local community, trail user groups, community leaders, service organisations, recreation and environmental groups, schools, commercial tourism businesses and other non-Government groups? What methods have been used to gain knowledge of this support?
8. *Environmental matters*: How will the project protect and improve areas of environmental significance? How will it contribute to an improved knowledge of the environment and what interpretive material will the project provide?
9. *Cultural and heritage considerations*: How will the project recognise and reflect any Aboriginal and other local cultural and heritage factors?
10. *Trail access and trail sharing opportunities*: Does the project accommodate a range of trail users (e.g. walking, cycling, horse riding, people with mobility impairments and educational purposes)? How will the different users share the trail?
11. *On ground assessment*: Has a preliminary assessment been made in relation to the 'on ground' conditions? Have constraints and opportunities been identified and the proposed corridor identified in accordance with sustainable trail design principles outlined in Chapter 9?
12. *Concept design*: What are the physical specifications of the trail: length, width, surface materials, drainage, trail heads, interpretive signage and trail markers? What are the required standards of construction?
13. *Capital Cost*: What is the expected capital cost for the construction of the trail project? How will the construction of the trail be funded?
14. *Funding*: What funding opportunities are available? Can 'in-kind' support be provided from community organisations? Does the project satisfy the requirements of the funding organisations?
15. *Conclusion*: Why should the project proceed? What are the strengths and weaknesses of the project? What is required for the project to proceed?

3.8 Leveraging funding and investment

Investment in trails can be sought from a number of sources.

Potential avenues include:

- Federal, state and local government agencies that often have a core responsibility for trails developed for tourism recreation, health and wellbeing
- Community organisations that are important partners to local and state governments and have a proven reputation for being able to attract grant funding, sponsorship and membership fees for trail development and maintenance but most do not have the capacity to provide total maintenance – typically, the land manager(s) still need to play a role.

It should be noted that investment in capital development and major upgrades/extensions is easier to obtain than ongoing operational funds. The costs of ongoing maintenance and replacement of trail infrastructure (e.g. bridges, signs) are often underestimated or, in the case or infrastructure replacement, often ignored until failure. As part of the budget considerations the useful life and replacement of structures needs to be considered.

While sourcing funding for the construction and ongoing maintenance for the trail may seem a daunting prospect the best approach is to develop an investment strategy based on a mixture of available grants, in-kind support and other funding sources such as revenue from user fees or camping fees where possible. For example, an investment strategy may focus on applying for three or four different grants from government departments, together with assistance from the local Council and in-kind support from the community, local businesses and user groups. Such an approach will reduce the amount of money requested from each government department and, therefore, improve the chances of success.

Some of the funding options suited to different trails are indicated below (✓✓✓ = highly suitable and potential for major contribution, ✓ = least suitable/ minor contribution, × = unlikely):

Funding Source	Iconic trails with strong tourism component	Community trails for recreation, health, wellbeing, civic amenity	Mountain bike parks (urban, resort-based or rural)	Rail Trails
Land manager/ government funds	✓✓✓	✓✓	✓✓	✓✓✓
Grants direct to agency	✓✓✓	✓✓	✓✓	✓✓✓
Grants via a trails trust, incorporated society, foundation in partnership with land management agency	✓✓✓	✓✓	✓✓	
Philanthropic donations	✓✓	✓✓	✓✓	✓✓
Sponsorship	✓	✓✓	✓✓	✓
Fee for use	✓✓✓	×	✓✓	
Camping fee contribution	✓✓✓	✓	×	×
Commercial tour operator contribution for trail use	✓✓✓	×	✓✓✓ (having State, National or International significance)	✓✓
Information sales (guide book)	✓✓✓	×	✓	✓
Merchandise	✓✓✓	×	×	✓

It is also useful to break the project into stages such as; feasibility study; concept design; and construction. It may also be possible to stage the construction of the trail over a number of years. In this way, an initially large cost can be broken down into smaller 'bite-size' chunks which may be more palatable to funding agencies. Staging a project will also reduce the level of perceived risk associated with the project as each stage will only proceed once the previous stage has been successfully completed.

When seeking investment, it is important to consider the range of possible grants that might be suitable. Given the close link trails have with the health and tourism and the natural environment, funding from these agencies at a local, regional, state and federal level are becoming more and more common.

When preparing an investment strategy and when writing applications for grants, it is very important that consideration be given to the strategic objectives of the relevant government department. The application should clearly articulate how the project will help the department to further its goals and, ideally, should demonstrate links to relevant strategic plans.

It is useful to consult with government representatives responsible for allocating funding and involving peak user group(s) at this stage to understand the assessment process

In addition to the potential sources of funding described in this section, many alternative grants which should be considered can be found at the following websites

http://www.grantslink.gov.au

http://www.vic.gov.au/grants.html

Active in Parks – A Healthy Parks Healthy People program

Active in Parks is the flagship program of the People and Parks Foundation. Piloted between 2011 and 2013, with the support of the Medibank Community Fund, Parks Victoria and Barwon Medicare Local, the programs' initial goal was to get Barwon residents healthy active and outdoors. This program has now expanded across Australia and grants are available to support local councils and community groups help their residents get active. For more information go www.activeinparks.org

ELEMENT 4
Management models

4.1 Introduction

A trail management regime needs to be considered and established as part of investment strategy (refer Element 3). Too often, the management model is decided towards the end of building a new trail or when an existing trail becomes too much of a financial burden and things have to change.

There is no one model that fits every situation. The ultimate test of whether the management regime is working or not lies in its sustainability. If the trail experience being provided is not being compromised through lack of funding or organisational, commercial and community engagement, then it is probably sustainable. A range of models may suit different trail scenarios (refer Table 3) and each model has its advantages and disadvantages (refer Table 4).

Trail projects inevitably involve a range of partners regardless of the management model. These could include:

- Local government (if not already the primary land manager)
- state or federal government departments
- conservation and environmental groups: both state and local
- other user groups or potential user groups, including 'peak bodies'
- education institutions, including local schools or universities
- training agencies
- volunteer groups (Service clubs, Green Army, Conservation Volunteers Australia)
- Seniors groups
- health agencies (Active in Parks, the Heart Foundation)

4.2 Partnership agreements

It is crucial to establish the different roles and responsibilities involved in the trail where there is more than one manager. An agreement should be drafted which:

- identifies the tasks likely to be involved in the future management of the trail
- identifies the capabilities and capacities of each group (specific skills, construction assistance, administration time, fund management, etc.)
- identifies constraints and limitations involved (lack of skills, resource shortages, statutory responsibilities, etc.)
- identifies roles (such as tool manager; maintenance coordinator; brochure distributor, etc.)
- identifies how 'gaps' are going to be filled.

Table 3: Examples of Management Models

Model	Features	Examples	Scenarios where this could be applied
Agency sole managed	One or more federal or state government agencies, or local authority manages the trail exclusively. Commercial licenses for guided tours, accommodation or other services may or may not be provided. Ultimate responsibility lies with the management agency. These trails are typically all on public land although small sections of private land are sometimes involved through easements over title. Little or no volunteer involvement.	• Great Ocean Walk • Warrnambool Foreshore • Geelong Waterfront • Overland Track • Larapinta Trail • All New Zealand Great Walks	Mostly public land in remote location Limited capacity or interest from volunteers, user groups or local community Could be a pioneering development project where government takes the risk and lays the enabling infrastructure for other parties to invest over time Complex destination where competing land uses could jeopardise the recreation opportunity, hence need for strong, executive decision-making powers to protect recreation and open space values
Partnerships	Multiple variations exist including (i) vesting and control from a land management agency to a Committee of Management (ii) agency trail maintenance with foundation/trust/ incorporated society assisting with maintenance, funding and expansion of trail network (iii) land management agency as primary trail manager with assistance from volunteers drawn from trail users	• Bellarine Rail Trail • You Yangs • Forrest • Port Fairy to Warrnambool Rail Trail • Surf Coast Walk • 12 Apostles Trail • Old Beechy Rail Trail • Great South West Trail • Munda Biddi Trail, WA • Bibbulman Track, WA • Queenstown Trails Network, NZ	Capacity and willingness from community, recreation or other groups exists to share maintenance and development Where funding from a single source is constrained Mixed land tenure may require a partnership in order to guarantee access over private land
Private	Trails over mostly private land managed by land owners	• Banks Peninsula Track, NZ • Tora Walk, NZ	Where public lands in the region do not have potential for quality trails Where other trails in the region offer the same type of experience, private trails can more easily differentiate the experience and potentially attract new markets

Table 4: Advantages and disadvantages of various management models

Model	Advantages	Disadvantages
Agency sole managed	• Clear role and responsibility • Can enable quick decision-making but not always • Easier to apply consistent service standards although not guarantee	Consumer and tourism industry vulnerable to agency performance Limited ability to leverage funding and broader community support
Partnerships	• Leverages a broader support base for maintenance, development, funding, expansions, events • Shares risk • Forces stakeholders to enter into management agreements so that roles and responsibilities are clear	Stakeholders can be 'held to ransom' if partners do not perform Roles and responsibilities can become confused Some agencies struggle to change organisational culture towards working in partnership
Private	• No political or democratic interference with decision-making • Can respond quickly to market preferences • Offers a different experience for consumers who are used to only publicly administered trails	Trail can close without public consultation or notification Vulnerable to economic conditions Generally only capable of catering to a small volume of visitors (group sizes typically less than 20)

MANAGEMENT MODEL EXAMPLES

The Bibbulmun Foundation

The Bibbulmun Track Foundation is an example of a partnership model. It shares management of the Bibbulmun Track in partnership with Department of Parks and Wildlife in Western Australia. The Foundation has a broad membership with volunteers taking responsibility for maintenance of sections of the track. The incorporated Foundation attracts grants and donations in its own right as well as raising funds through guided activities and events focusing on the track. The Foundation has paid employees coordinating activities and fund raising.

Go to www.bibbulmuntrack.org.au for more inspiration.

Great Alpine Road Marketing Inc.

Great Alpine Road Marketing Inc was established as an incorporated body representing a series of shires, Regional Tourism Organisations and other operators along the 400km of the Great Alpine Road in Victoria. The group coordinated the further development and promotion of this significant touring route during its formative years including establishing consistent infrastructure and signage on a range of land tenures. Funding came from contributions from partners as well as grants that were committed to implementing the development and marketing strategies for the benefit of all parties. Without incorporation, funds would need to have been managed within member agencies.

Queenstown Trails Network

The Queenstown Trails network is an example of a successful trails partnership approach. It is quite possibly the most successful example of sustainable and collaborative trail development and management in New Zealand. The business model consists of a Queenstown Trails Trust whose role is to (i) provide leadership and advocacy and raise funds for trail construction (ii) mobilise the community and business sector to provide support in-kind, to establish new services for the trails (shuttles, bike hire and repair, cafés, packaged experiences with other activities), negotiate access over private land and provide sponsorship (iii) market and promote the trails and (iv) collaborate with the two main agencies, Department of Conservation and Queenstown Lakes District Council, for ongoing maintenance of the trails network. The Trails Trust drives strategy and direction the two agencies provide maintenance services, often with the assistance of the Friends of the Trails Trust (community volunteers). There is a common brand approach to way finding, although the two agencies have retained their corporate colour scheme for trailhead and other key directional signs. Marker posts, bollards and all marketing collateral (trail maps, brochures, website) have one common look and feel.

The Trust has two part-time staff, an office in Queenstown and a small operating budget funded through investments created over 2005 – 2006 and from surpluses from the Motutapu Cycle Event, owned by the Trust. These provide the Trust with an ongoing, sustainable source of funding for its operation.

Go to www.queenstowntrail.co.nz for more inspiration.

Milford Track

The Milford Track is a good example of an agency sole managed model. New Zealand's Department of Conservation (DOC) manages the 53km track, undertaking all maintenance and development work. There are no volunteers or community groups involved. Freedom walkers stay in huts provided by DOC. Those walking with Ultimate Hikes, the only commercial operator on the Milford Track, stay in private lodges. A substantial portion of Ultimate Hike's license fees, go towards track maintenance. Ultimate Hikes guide approximately 6,000 private clients on the Milford Track per year. A similar number walk the track independently. The same management model is also used on the Routeburn Track where Ultimate Hikes is also the sole commercial provider of overnight hikes.

Banks Peninsula Track, New Zealand

The Banks Peninsula Track is a leading example of a private trail. It is a collaboration of five farming families located near Akaroa, one hour's drive from Christchurch. Group size is limited to 12 persons. A portion of revenue is put towards the maintenance of the trail and facilities. This is the responsibility of the seven shareholder properties. Decision – making is by consensus. A concession is held by the Banks Peninsula Track company, to access protected areas managed by DOC. Now in its 25th year, it has become a multi-million dollar operation and the most successful of its kind in New Zealand.

Go to www.bankstrack.co.nz for more inspiration.

ELEMENT 5
Marketing and branding

Trail users are likely to come from two key groups: those living locally, who can access the trail directly or almost directly from home, and those living further a-field (usually in the city) who will travel to the area to use the trail (or to use the trail as part of a broader visiting experience). Marketing your trail to these trail users is an essential component of trail planning.

5.1 Communication planning

The best communications start with some good planning. The first step is to put yourself in the shoes of your audience. What do they need to know, and want to hear? What's their preferred way of receiving information? What will stop them listening to what you have to say? And how will you know that they have got the message?

A communications plan is a useful tool that will help ensure communication about the trail is audience-focused

Understand Your Objectives

Step 1. Be clear about your overall communication objectives. What do you want to achieve, when and why? Record your overall objectives in your plan.

Understand Your Audiences

Step 2. Now identify and list your different audiences. This can initially seem quite difficult: For all but the simplest communications plan, it's good to use Stakeholder Analysis to help you do this. Stakeholder Analysis helps you identify who to communicate with and why.

Step 3. Now drill down into your communication objectives and clarify specific objectives for each audience. A good way to do this is to think about the audience's needs – what do they need and want to know from you? List all the objectives (there may be several) for each audience in your plan.

Plan Communications Messages and Channels

Once you have clarified your objectives and identified the different audiences you need to communicate with, it's time to plan the communications – that means working out the messages needed to meet your objectives and when and how these will be delivered.

Before starting on the detail of your plan, first jot down all the possible communications channels you could use. Think broadly and creatively! You probably already use lots of great ways to communicate, and some new ones may help get your message across.

Here is a list to get you started:

- Agency web page and partner organisations web page
- Radio
- Brochure
- Newspaper
- Social media (Facebook, etc.)
- Email
- Newsletter
- Community Notice boards
- Launch event
- Other Print media

To plan out the message for each audience, start by thinking about the broadest audience groups first. As you consider each audience in turn, ask the following questions:

- What does the audience need and want to know?
- When do we need to communicate?
- What is the regular or preferred channel for reaching this audience?
- For this specific audience and message, what is the most effective way to get your message across?

Several messages over time may be required to meet the objectives of each audience. Make sure the messages you plan "add up" to meet the audience's objectives.

Monitor Effectiveness

It's good to get feedback on the communications you have planned and implemented. Ask people from different audiences how you are doing. Check they understand the messages you need them to hear. By getting timely feedback, you can tune any future communications that you have planned to better meet people's needs or fill any gaps so far.

5.2 Marketing to visitors

If the majority of trail users are likely to come from elsewhere and are not local residents, then marketing and branding of your trail are best left to the experts. However there are four easy steps to consider before putting the right marketing approach into place.

1. Understand your consumers – who are they and what are their experience preferences?
2. Clarify the trail experience for these consumers – what exactly are you trying to sell to them?
3. What information channels do they commonly use?
4. How can you best tap into those channels and provide content that it is directly relevant to your target market?

Then, surround yourself with the best people who know how to reach these consumers. That will usually be a marketing specialist within your organisation or your local or regional tourism board, or Tourism Victoria. Ask them to assist you with a marketing plan for the trail or trail network.

If tourists are likely to be a key user group, local accommodation outlets and regional tourism boards should be involved in the promotion of the trail. The trail should be promoted as an integral part of the regional visitor experience, and should be woven into those other products which attract people to the area. Developing this integrated approach to marketing is likely to return greater benefits than any means of promoting the trail itself.

Understanding your target market is vital to delivering compelling trail experiences and positioning it within the marketplace.

You will also need to consider how you will use social media in your marketing, your communication with visitors, customers and clients. Figure 3 provides a useful insight into the visitor decision making process and how you can engage with them about your trail/s and entice them to visit the Barwon South West region using social media.

5.3 Marketing to locals

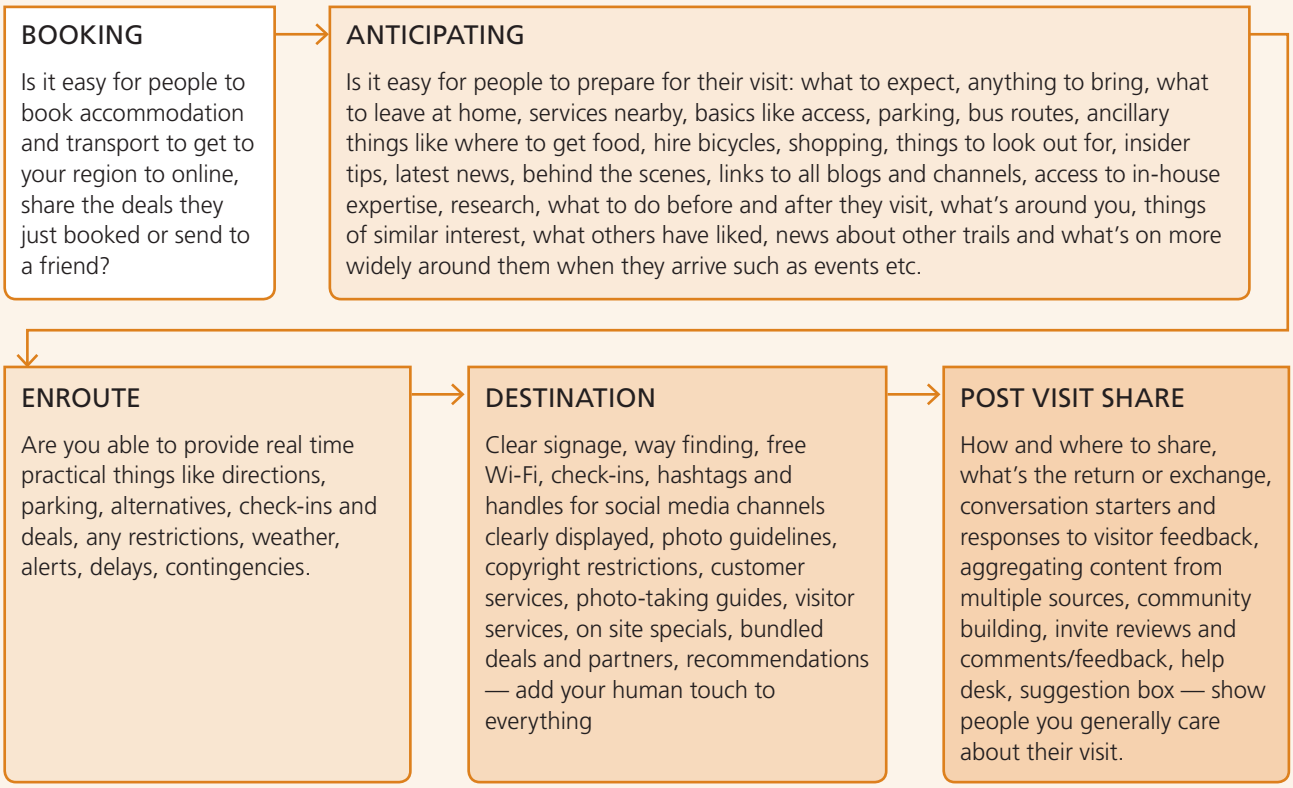
On the other hand, if trail users are expected to be mainly local people, the following list of potential actions (in addition to, or instead of those above) should also be considered:

- Contact the Active in Parks Programs Coordinator (activeinparks.org) to discuss ways in which the organisation can support and encourage your community to get active outdoors on your trails
- Deliver a copy of a trail brochure or ebrochure to all households within a comfortable distance from any point of the trail encouraging them to use the trail and invite their friends and relatives to experience it with them
- Ensure the brochure is widely distributed to local relevant retail outlets.
- Prepare a press release for local papers at least once a year relating to the trail, and encourage local papers to come out and take a photograph. Releases could relate to the construction program, to an annual maintenance weekend or busy bee, to an organised group event on the trails, or to any other activity or event relating to the trails.
- Organise an annual 'event' on the trail – perhaps a complete ride or walk of the route – and publicise it locally through local papers and radio and social media
- Publicise the scheduled maintenance activities.
- Form a 'Friends of...' group, and undertake maintenance activities and fun walks/rides, especially for young people and new residents.

The Barwon South West Trails Marketing Plan 2014[5] is a useful reference document to commence your marketing plan. Table 5 presents an extract from that plan showing how you need to segment trail users and understand their needs before trying to market to them.

5 TRC Tourism 2015, Barwon South West Marketing Plan, Jindabyne

Figure 3: The customer journey – using social media to entice visitors to your trail



Critical Trail Tip 4 – Marketing trails

Do

- Make sure the trail experience matches the motivation, skills and recreation preferences of the consumer
- Seek expert advice for marketing and branding your trail
- Maximise the use of social media
- Collaborate with your local Regional Tourism Board, tourism operators and recreation groups
- Monitor the impact of marketing activities to see what is working and what is not

Don't

- Go it alone
- Live in hope that the trail matches consumer expectations – find out!

The Victorian Trails Strategy 2014 – 2024 contains a number of strategic directions relevant to marketing particularly (i) the provision of high quality information about trails through the development of the Victorian Trails website, which will promote Victorian trails to local, national and international audiences, and provide information that assists locals and visitors in planning and maximising their trail experiences; and (ii) consumer research and promotion.

For more information go to http://www.tourism.vic.gov.au/about/strategies-and-publications.html

Table 5: Market segments and their preferences

AUDIENCE	EXPERIENCE PREFERENCES	TRAIL PREFERENCES
SINKS/ DINKS	• Short breaks accessible from Melbourne. • Different immersive, authentic, less discovered experiences.	• Short and day soft adventure on longer trails • Trail experience packages with character accommodation.
Young Families	• Indulgent short breaks for parents accessible from Melbourne • Family holidays with activities for young children	• Short and day trails near accommodation. • Easy short trails suitable for children near activity areas.
Older Families	• Short breaks for parents accessible from Melbourne. • Family holidays with opportunities for everyone.	• Short and day trails near accommodation. • Accessible short, day and overnight trails with on-trail/nearby attractions.
Mid-life Households	• Day, short breaks and longer holidays. • New experiences outside comfort zone. • Also relaxation, indulgence.	• Range of preferences for short, day and overnight trails. • Supported soft adventure on overnight trails.
Retirees	• Authentic experiences 'off the beaten track'. • May be constrained by financial and physical capability.	• Short and day trails in a range of standards, with potential for overnight trails (depending on physical capability and interest).
Experience Seekers	• Authentic and adventurous experiences that enable them to immerse themselves in and learn about places and cultures. • Range of price points.	• Iconic and other immersive, soft adventure trails – day and multi-day. • Some may travel to the region specifically to do a particular trail(s). • Character accommodation. • Guided experiences at different price points and trail experience packages.
Experienced Bushwalkers	• Immersive experiences, often remote and/ or challenging.	• Interesting and challenging trails, including short and long multi-day walks. • Prepared to be self-sufficient.
Mountain Bikers	• Novice/Family riders – well formed trails with flat to low gradients, e.g. rail trails. • MTB enthusiasts – single track with a variety of gradients and difficulties	• A to B riders – scenic countryside with variety/ attractions, cafés, character budget to mid-range accommodation. • Easy to hard options on single-track. Gravel or dirt roads OK but not highest preference.
Local Residents	• Short weekday outdoor recreation and longer weekend and holiday period experiences.	• Short and day trails accessible from home or by driving. • Provide access to points of interest, beaches and circuits for local recreation.
Schools	• Short and day adventures as part of outdoor and environmental education programs.	• Easy to medium grade short and day trails easily accessible from adventure/school camp locations. • Trails in places that contribute to the educational experience – e.g. interpreted environmental & cultural stories.

AUDIENCE	EXPERIENCE PREFERENCES	TRAIL PREFERENCES
Groups	• Coach tour, business, special interest or conference groups seeking to see the sights or conduct group activities to complement their visit or for team building.	• Short trails to points of interest. • Short to half day excursions suitable for all group members and allowing group interaction. • Trails need to be accessible with coach parking and near to conference facilities and accommodation.
Event Participants	• Short and long activities such as charity walks, trail running events, cycling events.	• Range of appropriate trails with points accessible to organisers and spectators. • Close to accommodation and transport.
Cycle Tourers	• Easy to moderately challenging road and hard-packed, well-formed off-road trails. Weekend road cyclists with fitness and challenge as key motivators.	• Day and overnight trail rides. • Access to public transport or shuttle services with cafés and points of interest essential for bulk of the market. • Safe roads and responsible drivers. • Cafés desirable but not essential.

ELEMENT 6
Community and stakeholder engagement

6.1 Introduction

The planning, development and management of trails involves a number of organisations, groups and individuals who have an interest or who may become partners in the project. Projects that include genuine and transparent consultation are more likely to be successful as stakeholders may test ideas or options and often contribute advice and influence producing a mutually acceptable outcome. Trail projects that seek and deliver the needs of the trail users and target markets are likely to be successful. The identification of stakeholders and analysing their influence is a fundamental step which allows for development of appropriate methods of engagement. User satisfaction will be a key measure of the success of the trail.

To create sustainable trails, planning, development and maintenance is dependent on stakeholders working together. Depending on the complexity of the trail or project, organisations involved may include federal, state and local government, regional tourism boards, peak bodies, special interest organisations, volunteers and the private sector and business operators.

Good early engagement will allow debate and ensure collaborative decisions are made and will generate trust, goodwill and contribute to future support. Early engagement can avoid the trap where decisions are made early, in isolation and often result in much energy and political capital being used in defending unsupported decisions. Engagement early on will also establish the foundation for community, business and partner agency support for trail monitoring, lifecycle maintenance and other community led assistance.

6.2 Planning your approach

An important consideration in any trail process is the development of an engagement plan that clearly reflects the objectives of the trail planning process and the desired level of public participation.

The International Association for Public Participation has developed a useful spectrum (Figure 4) that sets out the various levels of communication, consultation and involvement and the promise being made to the public at each participation level. The Spectrum is widely used and is a useful inclusion within community engagement plans.

Figure 4: Public Participation Spectrum IAP2[6]

Increasing Level of Public Impact

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public participation goal	To provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decision.	To work directly with the public throughout the process to ensure that public issues and concerns are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
Promise to the public	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will look to you for direct advice and innovation in formulating solutions and incorporate your advise and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
Example Tools	• Fact sheets • Websites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen Advisory committees • Consensus-building • Participatory decision-making	• Citizen juries • Ballots • Delegated decisions

6 International Association for Public Participation 2015

An example of a staged approach to community and stakeholder engagement has been provided in Figure 5. The stages allow for flexibility and progress from purpose setting and identifying the preferred agency or organisational approach, the scope and what's in and what's out (e.g. the negotiables), to the setting of clear objectives to guide and measure the process. The identification of stakeholders is a fundamental step which allows for the development of appropriate methods of engagement. A good process should provide a clear understanding of the stakeholder views on which management decisions can be made and which require further discussion.

Figure 5: Example of engagement strategy components

SCOPE

Identify the purpose e.g. to engage with trail users to ensure we get the best trail that suits the needs of the users

→

APPROACH

Includes consultation obligations which could include agency commitments e.g. early and ongoing engagement and what is and not negotiable

→

OBJECTIVES

To guide consultation, e.g. We will ensure that we understand the aspirations of the potential trail users

↓

STAKEHOLDER ANALYSIS

Identify who are likely to have an interest, their likely issues and interests and identify the contribution they will make the delivery of the project

→

ENGAGEMENT METHODS / TOOLS

Identify best method of engaging with stakeholders through phases of the project

→

RECORD AND EVALUATION

Managing responses and ensure feedback

Evaluate results of engagement process and input into the process

Feedback to stakeholders

Common methods for engaging with stakeholders vary according to the intended purpose and outcomes required. Some simple methods commonly used for trail consultation are shown in Table 6.

Table 6: Common methods for engaging with stakeholder on trails

		OBJECTIVE												
		Provide information	Maintain awareness/ Updating information	Identify concerns and issues	Develop objectives / Issues	Develop options	Test ideas / Prioritise options	Build relationships and involvement	Achieve consensus	Reach large numbers of stakeholders	Reach people who don't readily participate	Influence small groups / individual contact	Obtain input into decision making	Satisfy statutory requirements (e.g. veg clearance)
	Advertisement / Media	■	■							■	■			■
	Letter / phone call	■	■	■				■		■	■	■		■
	Newsletter / Brochure	■	■				■			■	■			
	Internet	■	■	■			■			■	■		■	
	Signs/ Maps / Models	■	■							■				
	Public Display / Exhibition	■	■	■			■	■		■	■		■	■
	Meeting with key individuals	■	■	■	■	■	■	■	■			■	■	
	Submissions from stakeholders			■	■	■		■		■		■	■	■
	Telephone Hotline	■	■	■	■	■	■	■		■	■	■	■	
	Surveys	■		■			■			■	■		■	
	Presentations to existing groups	■		■			■	■	■			■		
	Local community group meetings	■	■	■	■	■	■	■	■			■		
	Public meetings	■		■			■	■	■	■			■	■
	Community event	■	■	■	■	■	■	■		■	■	■	■	
	Open day information session	■	■	■				■		■	■	■		

Further information – Community engagement

The following website contains a valuable list of tools for assisting in the planning, implementation and evaluation of community engagement activities: http://www.dse.vic.gov.au/effective-engagement

ELEMENT 7
Monitoring and review

7.1 Introduction

Trails change with time as do trail experiences and expectations. Some changes to the physical trail are obvious, and will be noticed either by users or as part of the regular maintenance program. Some are less obvious and may not be noticed until they become an issue. The process of change can be quite subtle and, given that it can occur over extended time periods, can be hard to notice.

Monitoring should measure the trail users experience and whether the original vision for the trail and environmental values are being maintained. This monitoring approach provides the tool that will identify priorities for trail maintenance and enable trail managers to direct valuable resources to priority works.

Keeping accurate records is an important component of any monitoring program. This will include talking to trail users. They will know what problems are developing and where. Mechanisms to encourage feedback from trail users should be developed. This could include:

- the erection of signs encouraging feedback via telephone numbers and email addresses
- a website where users can log on and report issues
- phone numbers on brochures and maps.
- simple questionnaire or online survey

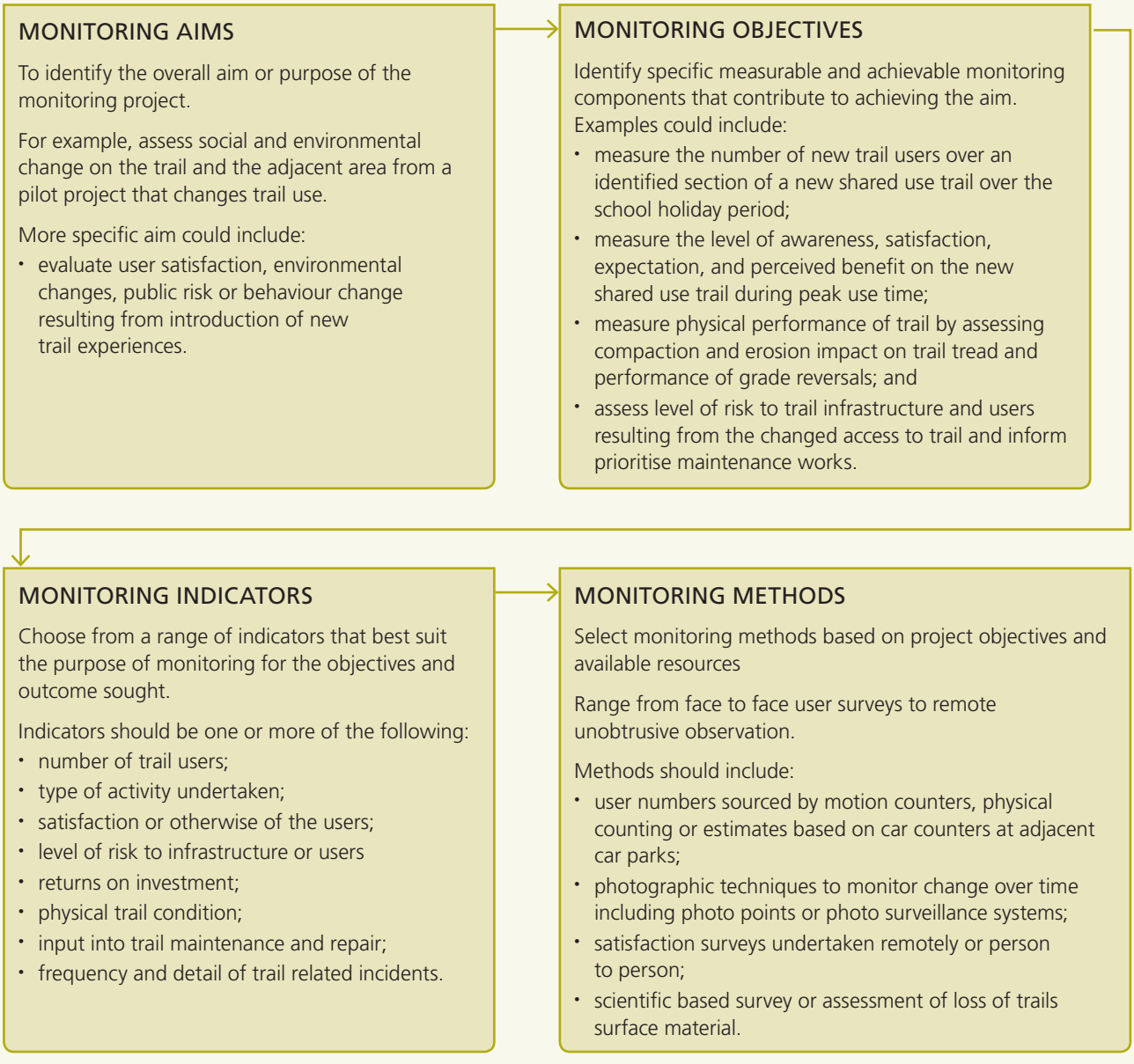
Ideally, a program of monitoring and evaluation should be built into the planning phase for the trail. Many grant funding agencies will respond positively to the inclusion of such a program as it gives them reassurance that the future is of the trail will be considered and reported on.

7.2 Recommended approach

The trail monitoring program in Figure 6 shows the relationship between the components of the monitoring program and how a structured monitoring program can assist managers in implementing change.

This is the recommended approach for trail monitoring in Barwon South West.

Figure 6: Trail monitoring program for Barwon South West



PART B –
Detailed Design Guidelines

These guidelines build on the trail planning guidelines and provide advice on how to apply the relevant standards and design principles to develop, manage and maintain high quality trails.

ELEMENT 8
Trail classification and standards

8.1 Introduction

This section of the guidelines provides guidance on how to design and construct sustainable trails. It assumes that a decision has been made on who the target user group(s) will be and that various alternative options have been explored as discussed in Part A. Most of the information relates to providing trails in natural settings, although some of the guidelines and references are applicable to creating trails in urban settings.

8.2 Australian walking track grading system

Trail grading systems are used to categorise the relative technical difficulty of recreation trails. These systems are used to assist trail users make informed decisions; encourage visitors to use trails that match their skill level; manage risk and minimize injuries; improve the outdoor experience for a wide variety of visitors; and aid in the planning of trails and trail networks..

The application of the Australian Walking Track Grading System is a two-step process. The first step is a technical grading of the walk. The land manager determines a walk's grade of difficulty using descriptors taken from the Australian Standard 2156.1-2001 Walking Tracks – Classification and Signage. The second step is the development of a "plain English language" description to describe the walk to the public.

Under the system, walking trails are graded on a difficulty scale from grades one to five.

Grade One is suitable for the disabled with assistance

Grade Two is suitable for families with young children

Grade Three is recommended for people with some bushwalking experience

Grade Four is recommended for experienced bushwalkers, and

Grade Five is recommended for very experienced bushwalkers

Critical Trail Tip 5 – Australian walking track grading

Further information about the Australian Walking Track Grading System is available through the link below.

http://www.depi.vic.gov.au/forestry-and-land-use/visiting-parks-and-forests/visiting-state-forests/activities/australian-walking-track-grading-system

8.3 Cycling standards

Developing high quality networks and facilities for cyclists, as well as ensuring that all local planning and transport plans are fully integrated and address the needs of cycling are also critical components of any cycling strategy.

Guidance is now available through a series of Austroads Guides. The Cycling Aspects of Austroads Guides (2014) contains information that relates to the planning, design and traffic management of cycling facilities, an overview of planning and traffic management considerations and cross-references to other Austroads Guides and texts. The document is intended as a guide for engineers, planners and designers involved in the planning, design and construction of cycling facilities. It consolidates and summarises the information in current Austroads Guides, in particular the Guide to Road Design and the Guide to Traffic Management.

https://www.onlinepublications.austroads.com.au/items/AP-G88-14

The Guide to Road Design – Part 6A: Pedestrian and Cyclist Paths (Austroads 2009m) should be used for guidance on the planning, design and construction of paths. This document consolidates information relating to on-road bicycle facilities and provides a summary of key design information for cyclist paths, including intersections of paths with roads. http://bcs.asn.au/austroads_cycling.pdf

Vic Roads have produced a series of Cycling Notes addressing shared bicycle/pedestrian path design and other matters relating to cycling. For more information go to http://www.vicroads.vic.gov.au

Critical Trail Tip 6 – Cycle paths

There are a range of resources available to ensure cycle paths are designed and built to Australian Standards AS 1742.9 – Manual of uniform traffic control devices – Bicycle Facilities. These resources should be used in conjunction with the Infrastructure Design Manual which documents Council's requirements for the design and development of infrastructure and to ensure minimum design criteria are met in within the partner agencies (IDM Board 2013).

These resources are important tools to guide the sustainable and safe development of bicycle trails for cyclists, pedestrian and other users. The characteristics, attributes and principles of good design adopted within these documents are reflected in excellent trails.

Other useful references include

http://www.vicroads.vic.gov.au/Home/Moreinfoandservices/Bicycles/StrategicDirectionsForCycling/BicycleFacilityDesignStandards.htm

https://www.onlinepublications.austroads.com.au/items/AGRD

http://www.bicyclecouncil.com.au

http://www.vicroads.vic.gov.au/NR/rdonlyres/D5725F80-B383-4093-805C-FA25DFE122DC/0/tr1999020.pdf

https://www.onlinepublications.austroads.com.au

8.4 Standards for rail trails

Rail trails are shared-use paths developed on abandoned railway corridors and used for walking, cycling and horse riding. Most trails have a gravel or dirt surface suitable for walking, mountain bikes and horses and some are sealed for touring bikes. Following the route of the railways, they cut through hills, under roads, over embankments and across gullies and creeks and often link remnant vegetation in farming areas and contain valuable flora and fauna habitat which together with attractive rural landscapes and linking to towns they make great places to walk, cycle or horse ride. Great rail trails in Australia and overseas link landscape, natural features, wineries and other attractions with towns and great places to stay.

All railway land in Victoria is owned by the government corporation VicTrack, a State owned enterprise with an independent Board with a dual reporting line to the Minister for Public Transport and the Treasurer. VicTrack works closely with other agencies and departments, rail and tram operators and local councils and community groups to support transport, government and community priorities.

VicTrack no longer surrender unused railway land back to the Crown so all new rail trails will be on land leased from VicTrack with most rail trails managed by a local committee of management for a community reserve appointed by the Minister under the *Transport Integration Act 2010*[7].

Most lines had their rails and sleepers removed shortly after decommissioning and often bridges have been removed or require upgrading. The establishment of bridges and trail surface are one of the major infrastructure considerations in developing a rail trail. Clear understanding of Infrastructure requirements and maintenance is a major consideration in the feasibility planning process for rail trails. Treatment may require remediation of contaminated sites where this is public risk and most trails will require development of signs, fencing, and public access including car parks, public safety issues, risk assessment and the development of a code of conduct for users.

Rail Trails Australia provide information for the development of feasibility studies and infrastructure, examples of infrastructure requirements and Australian and international case studies. For more information go to:

https://www.railtrails.org.au/management-resources/rail-trail-establishment-guidelines

7 Rail Trails Australia 2014

8.5 Standards for mountain bike trails

The Mountain Bike Trail Difficulty Rating System (TDRS) was adapted by IMBA from the international Trail Marking System used in ski areas throughout the world. Agencies and trail managers are adopting this type of system. The system best applies to mountain bikers, but has also been modified to be applied to other trail users including horse riding.

Two versions of the Trail Difficulty Rating System (TDRS) have been developed; one version for the land manager, which includes quantitative measures against criteria such as trail gradient and width and a second version for users e.g. by replacing quantitative measures with descriptions (e.g. describe slope rather than define as a % gradient).

The IMBA Trail Difficulty Rating System can:

- help trail users make informed decisions
- encourage visitors to use trails that match their skill level
- manage risk and minimise injuries
- improve the outdoor experience for a wide variety of visitors
- aid in the planning of trails and trail systems.

The TDRS includes five levels of difficulty from easiest white circle to extremely difficult double black diamond as shown in Appendices 2 and 3. There are four measurable criteria to determine the ratings including:

- tread width
- tread surface
- trail grade
- natural obstacles and technical trail features

It is important as with most examples of trail development and construction that trail users and riders are consulted as to how they would rank the trails The two versions have been attached in the Appendix 4 and can be viewed together with advice to land managers on how to rate trails in the IMBA publications Trail Solutions and Managing Mountain Biking[8].

8 IMBA 2012

ELEMENT 9
Building successful trails

9.1 Introduction

This section provides guidance on how to design and construct sustainable trails in Barwon South West Region. It assumes that a decision has been made on who the target user group(s) will be and that various alternative options have been explored. Most of the information relates to providing trails in natural settings, although some of the guidelines and references are applicable to creating trails in urban settings.

The guidelines can be applied to both single-use (walking, cycling, horse riding) and shared-use (any combination of walking, cycling or horse riding). In addition to these guidelines, it is strongly recommended that trail designers consult other recognised texts identified in these guidelines.

There are a number of different trail possibilities, options, and characteristics, as outlined in previous sections of the guidelines (see Appendix A for different trail classes). Most of the following information relates to the creation of shared-use trails for walkers, cyclists and horse riders. Where there are particular requirements relating to a specific user group or sub-group these have been identified and highlighted.

The concept and definition of sustainable trails has been discussed in previous sections of these guidelines. It is worth reiterating that sustainable trails do not require extensive infrastructure. They make the most of the natural features of an area without introducing infrastructure that may compromise the natural appeal and character of the area: the reason users are attracted to trails in the first place. An important 'rule of thumb', therefore, is to plan the route so that the need for infrastructure, such as bridges, switchbacks, retaining walls, etc., is minimised. This will not only minimise associated visual and environmental impacts, it will also mean a cheaper trail to build and maintain.

9.2 Trail systems

Generally, it is preferable to design a trail system with loops that offer a number of options and a variety of experiences while preventing the need to back track. A stacked trail loop system will provide opportunities to design trails that appeal to different user groups: the core trail, which leads from the trail head, can be wide, smooth, open and flowing; while other loops branching from it can be narrower and more challenging. Intersections should occur on relatively level ground and where there is good visibility.

Linear trails generally connect two distant points, often providing an off-road alternative for users and extending over considerable distances. Because of the distances involved it may be necessary to utilise existing low traffic roads and/or unmade road reserves[9]. Because of the potential for conflict with other road users it will be necessary to identify the nature and volume of other road users to determine their suitability. Unmade road reserves or disused railway lines offer excellent opportunities for linear trails.

Descending trails with an uplift service (e.g. shuttle or chairlift) are an increasingly popular style of linear trail. Once the domain of "Downhill" mountain bike trails this style of trail has become increasingly popular with the dominant "All Mountain" mountain bike market in recent years and is the focus of many high profile mountain bike trails around the world.

9.3 Single or shared-use

The planning and design phase should clearly determine whether the trail is intended for single or shared-use. While trails can be designed to accommodate a range of users, this will depend on a number of factors including demand, cost, access and land suitability. The universal design principles described in Element 1 are a key consideration in trail design. Shared-use of trails will encourage greater usage and allow increased access for a wider section of the population. As an example, the introduction of mountain bikes on to a range of fire access tracks in South Australian Parks has provided, with appropriate design, the opportunity for a range of new visitors to engage in physical activity and enjoy parks close to where they live.

9.4 Designing sustainable trails

The International Mountain Bicycling Association (IMBA) identifies core elements for a sustainable trail which are successfully applied to a range of trail types. The core elements need to be balanced equally in the development a trail and if any one element is overemphasised at the expense of the other there could be significant damage to the environment, provide an unsafe or negative experience, or impact financially or practically on trail maintenance. Sustainable trails should have very little impact on the environment; resist erosion through proper design, construction and maintenance and blend with the surrounding area[10].

9 Sustainable Recreational Trail Guidelines South Australia

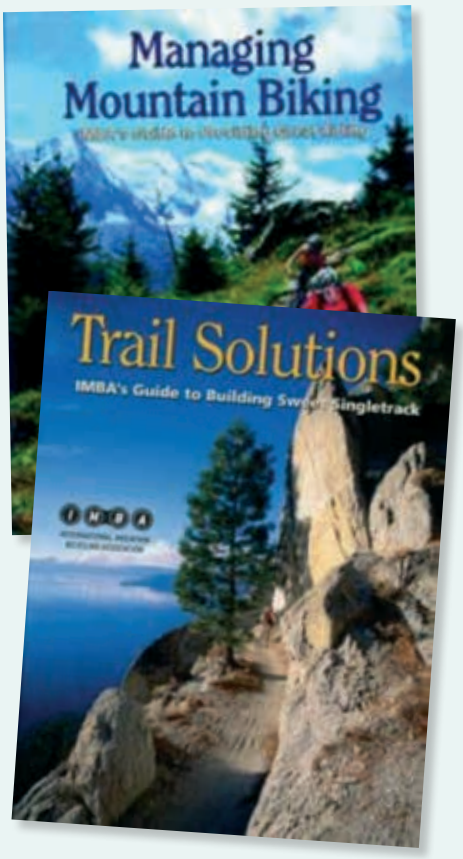
10 IMBA, 2004

Critical Trail Tip 7 – Principles of sustainable trails

An ideal trail will simultaneously incorporate the five sustainable trail principles.

1. Maximum Sustainable Grade
2. The 10-Percent Average Guideline
3. The Half Rule
4. Grade Reversals
5. Outslope

For further information go to: https://www.imba.com/resources/trail-building/designing-and-building-sustainable-trails



Building successful sustainable trails requires a high level of expertise and understanding of design. Across Australia a number of skilled trail designers, builders and practitioners have constructed a range of excellent trails based on these principles. When developing trail projects it is recommended that the expertise of these recognised trail builders be sought.

To further understand the technical aspects used by these designers in the development of trails and to assist future trail developers we recommend sourcing the IMBA publications in particular Trail Solutions IMBA's Guide to Building Sweet Singletrack (2004). For further information go to https://www.imba.com/resources/trail-building/designing-and-building-sustainable-trails

9.5 Maximum sustainable trail grades

Generally, an average trail grade of 10 % or less is most sustainable (refer Figure 7) and this is known as the 10% Average Guideline.[11]

Maximum grade is the steepest section of trail that is more than about 3 meters in length. When designing a trail, it is essential to determine early in the process the precise maximum trail grades the trail will be able to sustain in the local conditions. This target figure will help guide the layout and ensure sustainability. Although maximum sustainable grade is typically about 15 to 20 percent, it is site specific and fluctuates based on several factors. The variables to be considered when setting the maximum trail grade include:

- **Half Rule** – A trail's grade shouldn't exceed half the grade of the sideslope, it is considered a fall line trail

Note: the maximum sustainable grade on a gentle hillside will be half the grade of the sideslope.

- **Soil Type** – There are many types of soil and each has different qualities of cohesion and drainage. Some soils will support steeper trail grades than others.
- **Rock** – Trail grades can be steeper on solid rock. However, steep earthen sections between rocks may need to be fortified or armoured to prevent soil loosening and erosion.
- **Annual Rainfall Amount** – Trails in regions with either very high or very low annual rainfall may need to be designed with gentler trail grades. Lots of rain can lead to water –caused erosion. Low rain levels can lead to very dry and loose tread surfaces.
- **Grade Reversals** – A grade reversal is a short dip followed by a rise, forcing water to drain off the trail. It is an essential technique for preventing water from channelling down the trail. Frequent grade reversals will allow for slightly steeper trail grades (refer Figure 8).
- **Types of Users** – Trails restricted to relatively low-impact visitors such as hikers and mountain bikers can sustain maximum grades as high as 15 to 25% for short distances depending on soil and rainfall. Trails open to visitors with higher impact, such as horses or motorised users should have more gentle maximum grades.
- **Numbers of Users** – Trails with high anticipated use may need shallower maximum trail grades.
- **Difficulty Levels** – Trails with a higher level of technical challenge may incorporate steeper grades, but construction techniques such as frequent grade reversals and armouring may be necessary to ensure sustainability.

11 IMBA 2004

Calculating the maximum sustainable trail grade is a complicated process that requires a high level of trail building knowledge and experience. When in doubt, design trails with conservative grades until you have had the opportunity to observe the effect of a variety of trail grades in your location. For further information go to https://www.imba.com/resources/trail-building/designing-and-building-sustainable-trails.

9.6 Gathering information

Prior to commencing the design process, it is important to collect as much information as possible about the land. Typically this will include and involve:

- maps showing cadastral boundaries, topographic features such as drainage lines and contours
- land ownership and adjacent land uses, including opportunities for linkages to surrounding areas
- location and type of vegetation, soils and other natural features (e.g. rare or threatened species, important habitat, cultural heritage areas, Phytophthora risk areas, etc.)
- aerial photographs
- planning control provisions

9.7 Identifying control points

This information can then be used to identify control points. These are places of interest that trail users will be attracted to (desirable) or should avoid (inappropriate). They will dictate where the trail should commence and finish, the location of parking areas, structures, slopes for turns or switchbacks, and road or watercourse crossings.

Desirable Control Points	Inappropriate Control Points
Scenic overlooks; long distance views	Environmentally sensitive areas(e.g. wildlife habitat, rare plant species)
Waterfalls and other water features	Low lying wet/boggy areas
Rocky outcrops	Steep side slopes
Historical sites	Water crossings and riparian zones
Geological monuments	Sensitive archaeological sites
Archaeological sites	Known weed infested or diseased areas
Existing access points, roads or other trails	Inappropriate soils (e.g. loose sand, boggy clays)
	Water crossings present particular challenges to trail designers: ideally, water crossings should be avoided if possible.

9.8 Sustainable trails follow the contours

The most sustainable trails are those that have a low overall grade (less than 10%, or a one in 10 change in elevation) to minimise the potential for water erosion. Combined with an outslope, or 'crossfall' on the trail path which slopes gently away from the high side, and regular grade reversals or undulations, this will ensure that water flows across and not along the trail. If steeper sections are unavoidable they should be as short as possible (not exceeding 20 metres in length) and have a maximum gradient no more than 50% of the fall line gradient. Steep sections should be preceded and followed by a grade reversal to shed water away from the trail. Consider armouring the trail tread with rock to minimise the potential for erosion.[12]

9.9 Grade reversals

A grade reversals is where the trail has to be briefly reversed (i.e. a climb briefly goes down, or a descent briefly goes up) to help divert water off the trail. A trail along a steep slope may require grade reversals every 10-15 metres, depending on soil type and rainfall. Incorporating grade reversals will avoid the need to build water-diversion devices later. They also break up a climb or descent and can provide recovery sections for users. Regular changes in grade will also assist in controlling excessive speeds by mountain bike riders. Grade reversals are also beneficial before and after steep sections, with smooth transitions between different grades; and at the approach to a watercourse, to disperse water and silt away from the watercourse.

12 Government of South Australia 2007

9.10 Trail flow

Mountain bike riders tend to travel faster than walkers and horse riders and therefore trails designed for them should have a certain tempo or rhythm (referred to as flow). Contour trail designs can have three basic types of flow: open and flowing, tight and technical or hybrid (a combination of both).

Open and flowing trails have wide smoother surfaces, long sight lines, sweeping turns and appeal to less skilled cyclists or those who enjoy travelling fast. Tight and technical trails have sharper turns, narrower and rougher surfaces, and sometimes include obstacles. By their very design these trails dictate that users slow down. Hybrid trails blend the features of both with transitions between the different sections. Transitions should occur gradually with good sightlines or on top of hills to minimise the need for heavy braking and skidding. The trail flow should be planned to suit the host environment. In grassland and open woodland areas users are likely to short-cut tight corners, so open and flowing trails are preferable. In more densely vegetated areas sight lines are more limited, so it's best to keep user speeds down with tight and technical trails.

In wooded areas open and flowing trails can safely be incorporated if gradients are shallower and/or trails are single direction and single use. Many mountain bike trails are in densely wooded areas and are fast flowing trails, and it is important to consider this in the detailed design stage.

Take advantage of the topography to improve drainage

9.11 Trail surface

While a natural surface for recreational trails may be appropriate in many situations, the application of an artificial trail surface (e.g. bitumen, crushed rock, sand) may be required if anticipated user numbers are high or sections of the natural surface is loose or prone to instability. The type of surface will also depend on who the primary users will be. For example, for more technical trails, it may be preferable to leave natural obstacles such as rocks and tree roots provided that they are not safety hazards or will contribute to erosion. On bench-cut trails, it's usually preferable to remove rocks on the inside edge of the tread, otherwise users will be forced to the outside edge, possibly resulting in tread widening or break down.

Large, rounded, flat and stable rocks should generally be kept in place to assist with tread stability.

If a trail is to be surfaced with gravel then angular fragments (e.g. crushed rock) is recommended over rounded fragments (e.g. naturally formed gravel) as the angular fragments will typically bed in and form a more secure surface, whereas the rounded fragments will become loose and 'skatey'.

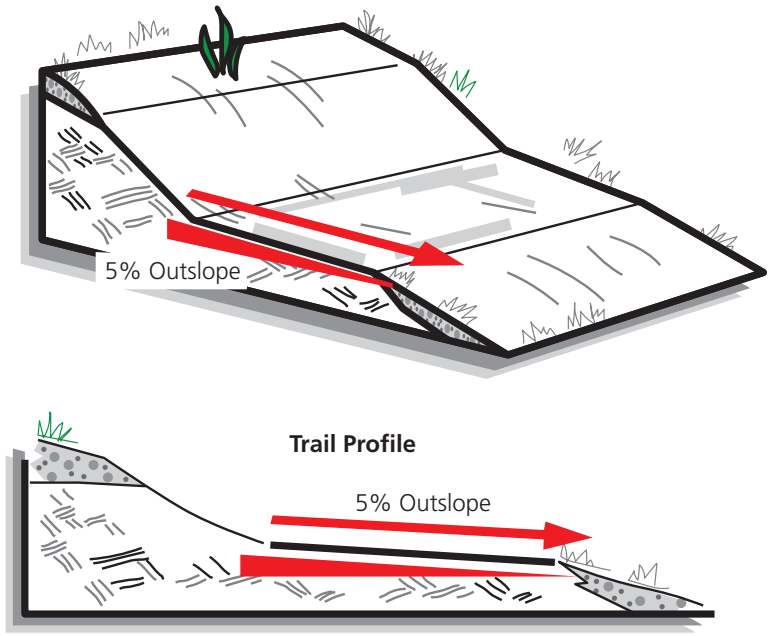
Ultimately, the trail should be the 'path of least resistance' even in difficult terrain. This will ensure that users do not leave the trail and form new, easier routes.

9.12 Surface water control

Diverting surface water off the trail is of the highest priority in achieving sustainable trails. Running water will erode the tread and support structures and result in the deposition of sedimentation. Standing water can result in soft boggy conditions, and tread and support structure failure. The most effective way to address these risks is through designing contour trails and frequently outsloping the tread. Other drainage treatments include grade or drain dips and waterbars.[13]

13 Government of South Australia 2007

Figure 7: Outslope



It is noted that completely outsloping trails will not provide enjoyable (e.g. flow) and safe (e.g. off camber turns) mountain bike trails. Instead a mixture of inslope and outslope is required, where frequent outslope sections are provided at low points in the trail to shed water off the trail (i.e. outslope at the base of grade reversals and other low points at regular intervals).

9.13 Watercourse crossings

Water crossings are a critical element of trail design and construction. A water crossing is the site where the trail may have the greatest impact on water quality and the site where water has the greatest potential to damage the trail. Stone armouring is a commonly utilised and sustainable method for crossing shallower and/or periodic creek crossings. With this in mind, it is always preferable to avoid establishing new water crossings by utilising existing crossings where possible. If a new crossing is unavoidable, it is important to seek professional advice from a suitably qualified Engineer in relation to the design and construction of any structure proposed to be built over or through a watercourse and reference to the relevant Australian Standards such as *AS 2156.2-2001 Walking Tracks – Infrastructure*

For trails running alongside watercourses, the impacts on water quality and the riparian zone (i.e. the land along the edge of a watercourse) will be minimised by building trails on gentle slopes and directing water flow off the trail and away from the watercourse.

9.14 Low lying and boggy terrain

Low lying and boggy sections should be avoided if possible because surface water will not adequately drain away from the tread. If there is no other option then consider the need for a boardwalk or a raised reinforced tread, such as armouring. Another alternative is to consider the use of geo-textile materials that allow drainage, separate the underlying soil from the tread surface and reinforce the trail tread15. In some circumstances, rubber mats may be an appropriate, relatively inexpensive alternative which keeps the surface of the trail solid without intensifying erosion.[14]

14 Government of South Australia 2007

Critical Trail Tip 8 – Contour trails

A contour trail is a path that gently traverses a hill or sideslope. It's characterized by a gentle grade, undulations called grade reversals, and a tread that usually tilts or outslopes slightly toward the outer edge at the low points in the trail, i.e. that usually tilts or outslopes slightly towards the outer edge at the low points in the trail.. These features minimize tread erosion by allowing water to drain in a gentle, non-erosive manner called sheet flow. When water drains in thin, dispersed sheets, dirt stays where it belongs - on the trail.

1. Do everything you can to keep the water off the tread, and users on it
2. Build on the contour and use frequent grade reversals - surf the hillside
3. Follow the half-rule: A trail's grade shouldn't exceed half the grade of the sideslope
4. Maximum grade should be 15 percent (except for natural or built rock structures)
5. Average grade should stay under 10 percent (with grade reversals)
6. Route trails to positive control points (viewpoints, water, other attractions)
7. Use bench-cut construction, and excavate soil from the hillside
8. For reroutes, reclaim old trail thoroughly - the visual corridor as well as the trail tread
9. For highly technical trails where grade will sometimes exceed 15 percent, use natural rock, rock armouring or other rock features to add challenge and improve sustainability.

Figure 8: Average trail segment grade (included here)

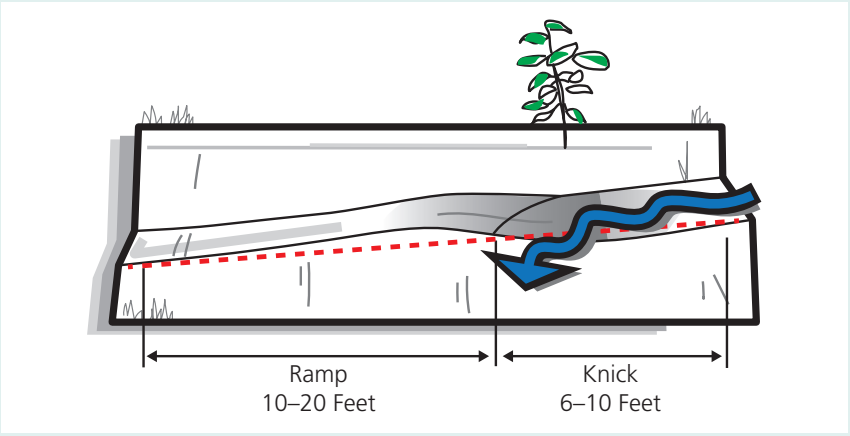
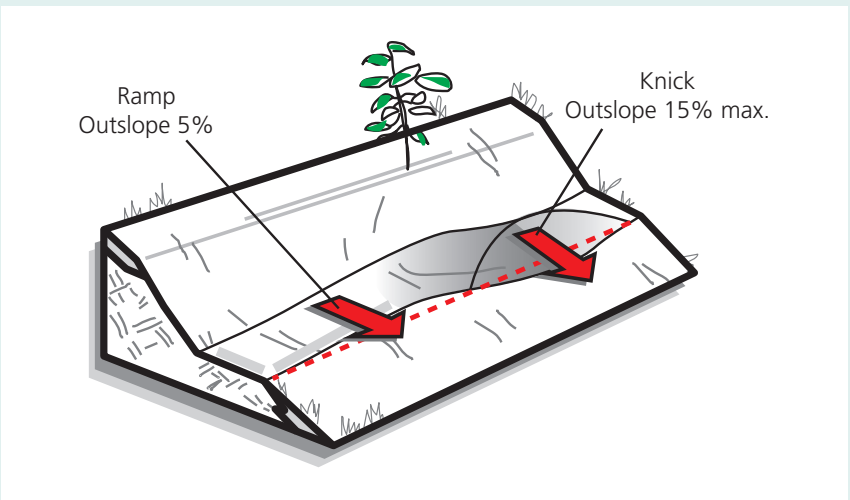


Figure 9: Grade reversal



9.15 Designing cycling paths

The design and development of cycle paths on hardened surfaces requires significant design and engineering due to the interaction with other traffic and users and potential for high speeds. This section provides a guide to what is expected in the construction of these trails. Much of the advice included here is provided by Cycling Aspects of Austroads Guides (2014) a very useful resource for those contemplating the development of cycle paths. Specialised assistance should be sought in the construction of these trails. For further information go to http://www.austroads.com.au/road-operations/bicycles/resources/cycling-aspects-to-austroads-guides

Key design criteria for formed cycle pathways discussed in the Austroads guide include:

Path width – generally shared paths are preferred Table 7 shows desirable widths and acceptable ranges of width for shared use paths. Greater width may be developed where it is needed (e.g. very high demand that may also result in overtaking in both directions).

Table 7: Shared path widths

	Path width (m)		
	Local access path	Commuter path	Recreational path
Desirable minimum width	2.5	3.0	3.5
Minimum width – typical maximum	2.5(1)–3.0(2)	2.5(1)–4.0(2)	3.0(1)–4.0(2)

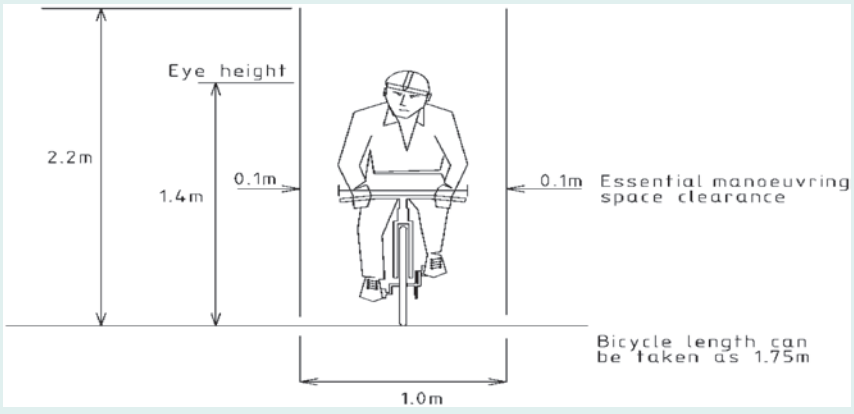
1 A lesser width should only to be adopted where cyclist volumes and operational speeds will remain low.

2 A greater width may be required where the numbers of cyclists and pedestrians are very high or there is a high probability of conflict between users (e.g. people walking dogs, roller bladers and skaters etc.).

Source: Austroads (2009f) Figure 7.4.

Space to Ride – The bicycle design shown in Figure 9 provides the basis for the design of the bicycle facilities. It is important for designers to understand the basis of the design including clearance requirements.

Figure 10: Clearance requirements for cyclists from Austroads 2014



Smooth surfaces – Many touring bicycles have narrow tyres inflated to high pressure to reduce drag and have no suspension system. A smooth surface is therefore desirable for bicycles to be used effectively, comfortably and safely. Surfaces used for cycling should desirably be smoother than those for motor vehicles and there are considerations for maintenance e.g. debris washing onto paths or pot holes and cracks can create a hazard particularly for high speed riding.

Speed maintenance – For bicycles to be most effective as a means of transport cyclists must be able to maintain speed without having to slow or stop often.

Bicycle routes, especially off-road, should be designed for continuous riding, minimising the need to slow or stop for any reason including steep gradients, rough surfaces, sharp corners, obscured sight lines, intersections, or to give way to other people because the width available is too narrow.

Sight lines – It is important that appropriate sight lines are provided so that cyclists can stop in the event that a hazard exists on the path (e.g. mud deposited during inundation, potholes due to washouts, broken glass, and fallen tree limbs).

Designers should therefore resist the temptation to provide curves that are smaller than necessary (e.g. to create an artificially winding path for aesthetics or urban design reasons). It is much better for the safety of path users if larger curves with greater sight distance are provided.

Connectivity – Cyclists need to be able to undertake and complete meaningful trips by bicycle. For recreation it may be from a visitor centre to a visitor attraction or from a transport hub to a tourist attraction or in an urban setting from home to work or the shops. Bicycle routes comprising roads and paths should combine to form an effective, convenient and safe network.[15]

9.16 Designing coastal trails

Coastal locations are generally characterised by stable and unstable dunal systems and fragile vegetation and micro-environments. They are also landscapes that are highly valued by the community and susceptible to visual intrusion. Given these sensitivities, additional care needs to be taken in the planning, design and construction phases to minimise environmental and visual impacts.

Factors to consider include[16]:

- Avoid locating trails in unstable dunal systems, or where the construction of the trail is likely to contribute to such conditions.
- Consider the ecological sensitivity of the area and the potential impact on habitat, breeding locations, animal movement patterns, etc.
- Consider the use of raised boardwalks or 'sand ladders' to allow for shifting sand levels, the protection of sensitive vegetation, animal movement and stormwater flows.
- Minimise visual intrusion by keeping structures low to the ground and using materials that blend with the landscape and are durable.
- Ensure that the location of the trail will not encourage traffic onto sensitive areas.
- Provide for controlled access points to/from the beach and inland areas.
- Consider potential visual impacts, not only from the land, but also from the water and beach. Avoid locating extensive infrastructure in visually prominent locations such as cliff tops, headlands, the terminal vistas of adjacent roads, etc.
- Use materials for the trail tread surface that are appropriate to the site context and anticipated user demands, and consider ongoing maintenance requirements. Paved or other sealed surfaces may be appropriate in built up, heavily trafficked areas.
- Natural surfaces may be more appropriate in more natural contexts.
- Explore opportunities for incorporating other infrastructure requirements (e.g. gross pollutant traps) into the trail design process.
- Don't over-engineer: minimise visual intrusion by keeping structures, earthworks, vegetation clearance, trail widths, signage, etc. to a minimum.
- Incorporate a sense of place into the design. Reflect the unique features and character of an area by using local materials, interpreting the history of the area, public art, signage, furniture, etc.

9.17 Designing urban trails

Given the range, fitness levels and number of users that are likely to be attracted to an urban trail, safety considerations take on greater importance. Similarly, access for a wider range of user groups, including those with mobility impairments, is likely to have a greater influence on the design of the trail than would be the case in a remote area.

With this in mind, it is important that urban trails are designed in accordance with recognised traffic engineering standards and that special consideration is given to the following[17]:

- Trail surface: Bitumen is often the most suitable surface for heavily utilised shared use trails as it provides an even and durable pathway which can be easily repaired.
- Trail width: A minimum 3m wide trail is recommended for a heavily used trail in order to minimise the chance of conflict between users. Such a width is especially important if the trail is used by cyclists for commuting and where pedestrians and cyclists commonly travel in both directions. Line marking should also be considered to separate users travelling in opposite directions
- Safety: Urban trails are often used by young children learning to ride as well as parents with prams. The design of the trail should take into account the likely inexperience and vulnerability of some users by considering 'worst case scenarios'.
- Steeply sloping trails located near creeks and lakes should be avoided or carefully addressed with specific design solutions. Similarly, blind corners which can obscure views of oncoming, fast-moving cyclists should be avoided. Special consideration should be given to the safety aspects of bridges, boardwalks and sections

15 Austroads 2014
16 Government South Australia 2007
17 Government South Australia 2007

of the trail located on elevated land. Access for emergency vehicles such as ambulances should also be provided.

- Lighting: It may be appropriate to light some sections of the trail, especially in close proximity to areas which people congregate at night such as shopping centres and large reserves. Other measures should be adopted to improve the safety of users such as removing thick vegetation close to the trail behind which people can hide and maintaining clear and open lines of sight.
- Signage: A signage strategy should be developed to clearly mark the trail, inform users of their responsibilities and identify interpretation opportunities
- Interface with traffic: Any point where the trail crosses a public road or interacts with traffic must be designed carefully and in accordance with recognised engineering standards.
- Provision of facilities: The location, size and design of facilities associated with urban trails are important considerations. People will be more likely to use the trail if well-designed facilities such as parking areas, seating placed at regular intervals, toilets and picnic areas are provided. Where possible, use should be made of existing facilities.
- Environmental: Urban trails are often located in environmentally degraded areas such as alongside weed invested creeks. While the construction of the trail may be the catalyst to achieve environmental rehabilitation, it is important than an ongoing maintenance regime is established. This should include the regular slashing and removal of weeds, revegetation initiatives and the monitoring of water quality.

For further information go to http://www.austroads.com.au/road-operations/bicycles/resources/cycling-aspects-to-austroads-guides

9.18 Managing user conflicts

On-trail conflicts often develop when information provision and education is inadequate. Sometimes conflict can occur between legitimate users, while on other occasions it may be between the legitimate user group or groups and 'illegal' users. In both cases, information and education are the key tools for trail managers and enforcement should only be used as a last resource.

Single-use trails should be clearly signposted as such at all access points. Brochures, maps and media material should also reinforce the message that this is a single-use trail. It is extremely helpful to explain why this is the case. For example, it may be that the trail passes through land that has limitations on access due to its tenure, or the nature of the environment or the trail design itself may preclude some users.

Shared-use trails should have built-in the provision of adequate information during the planning phase. Common guidelines should be developed for 'who gives way to whom' on shared use trails. Signage and information reinforcing these rules of trail etiquette should be prominent on the trail and in any public information. If conflict develops, it is worth getting the different groups together to talk about their issues and potential solutions. It may be that the conflict is identifying some weakness in the trail design.

9.19 Other support facilities

Other various support facilities may be required for trail users. These needs will vary depending on the nature of the trail, the user group(s), and the location of the trail. If possible, it may be preferable to align the trail so that it connects with already existing facilities to avoid duplication and additional costs. Generally these facilities should be located at control points.

Parking facilities for cars may need to be provided at the trail head. If so, the range of considerations will include:

- the expected volume of traffic likely to be generated at peak periods
- safe and convenient access from the adjoining road network, as well as suitable
- circulation space
- surface preparation of the car parking area to minimise runoff, dust, and boggy
- conditions
- landscaping to minimise the visual impact.

Watering points and drinking water may need to be provided and it is important to consider the ongoing maintenance requirements if water tanks are needed to ensure a reliable, all-year water supply. Trail users can also be directed to trail friendly businesses where free drinking water is available.

Any shelters provided should be designed, sited and constructed to minimise their visual impact and minimise ongoing maintenance requirements. The shelter could double as a location for interpretive or directional signage.

9.20 Toilets

The provision of toilet facilities should, generally, relate to the anticipated number of users of the trail and its proximity to urban areas or other recreational and visitor attractions. Preferably, toilets should be provided at trail heads, which, in an urban setting, are often ideally located at a larger reserve containing other structured and unstructured recreational facilities. In rural settings, trail heads which are located within townships, settlements, visitor information centres or other tourist attractions provide an opportunity to take advantage of existing toilet facilities. Where new toilet facilities are required, the visual impact of structures, access for maintenance, and the proximity of to watercourses should be considered.

9.21 Camping

Camping facilities may be appropriate on long distance trails. Factors to consider in planning for such facilities will include:

- minimising visual impacts: choose already cleared areas if possible
- the need for level ground that drains well
- the need for vehicular access by maintenance crew, emergency services or commercial operators
- whether the levels of usage or local climatic conditions along the trail justify the provision of huts or shelters
- the potential for vandalism of camping areas and associated facilities
- the need for associated facilities such as toilets, water, etc. If facilities are not provided at camping areas (particularly water and toilets), this should be clearly stated on any relevant signage, maps or promotional material associated with the trail
- distances between camping areas: typically, distances between camping areas will be determined by the terrain of the trail, availability of existing infrastructure and the location of townships or attractions along the route

For further information on facility design go to:

http://www.vcc.vic.gov.au/assets/media/files/sitingdesignguidelines.pdf

http://www.designmanual.com.au/download-idm

ELEMENT 10
Maintaining successful trails

10.1 Introduction

Even the best constructed trail will require maintenance if it is to remain sustainable. This section identifies the factors affecting the maintenance of trails and the principles of maintenance planning. The content in this section is strongly linked to Element 6 – Trail Monitoring and Review (refer Element 6).

Ongoing trail maintenance is a crucial component of an effective management program. Typical/common trail maintenance rates for unsealed trails are $1,000 to $1,500 per kilometre; or 2% to 6% of the capital cost of the trail depending on weather, soil type, construction standards and use. The opportunity exists to minimise future maintenance demands through careful planning, good initial construction and foresight. A clear, concise trail management plan should be prepared to direct priorities and resources.

10.2 Trail management plan

A trail management plan should include hazard identification and risk assessment approach to monitoring trails and be undertaken by trained trail maintenance staff. Defining the level of service required to maintain a trail is an important component of a management plan. The Level of Service is the defined service quality for a particular class of trail against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost. The trail manager and associated partners must determine the level of service and the quality and cost standards for each trail under their management. This is a key process in the development of maintenance plan and is shaped by community need - as identified through ongoing community engagement activities, and agency priorities.

The risk assessment should measure the condition of the trail against the walking trail or cycling classification and level so service to ensure the trail meets the expectation of the user, the duty of care of the trail manager, reflect the trail vision and protect the trail and environmental values. The plan should identify the priorities for trail maintenance and enable trail managers to direct resources to priority works.

A trail management plan should include the following elements as a minimum:

- philosophical background to trail development
- a statement of guiding principles (class, category, etc.)
- trail construction 'standards'
- target user groups and user experiences
- levels of service
- risk management policy
- hazard inspection timetable
- promotional and interpretation policy
- group usage policy and guidelines
- annual trail maintenance program
- clarification of management roles and responsibilities
- promotional mapping and brochures: guiding principles
- fire management and emergency evacuation procedures.

A timetable and process for reviewing and updating the plan should be set, with annual reviews and three (or five) year updates recommended.

The trail management plan must outline a professional program of management and must clearly define who is responsible for what. In many cases trail projects involve a number of land managers and it is therefore crucial that all organisations know and agree what their role and responsibility is.

A useful example is the Goulburn River High Country Rail Trail Management Plan

http://www.murrindindi.vic.gov.au/Things_to_see_and_do/Great_Victorian_Rail_Trail

Table 8 provides a guide for trail maintenance and indicates factors affecting trails and considerations for trail managers. It is not a definitive list and is to be used to assist managers in the development of specific integrated trail maintenance programs. The table has been provided in two parts due to the quite different requirements between natural earth trails and formed trails such as those constructed from bitumen.

Table 8: Factors affecting the maintenance of natural surface trails

Trail factors	Maintenance issue	Risk implications	Maintenance implications	Maintenance strategy
Trail purpose standards and grades	Maintenance will need to ensure trails are maintained to the defined walking trail grades or mountain bike trail types and difficulty rating system levels (see Element 7) AS 2156 sets out minimum inspection frequencies for each class of trail Defined levels of service are a useful mechanism to determine maintenance levels	Duty of care is required to ensure trails are maintained to grades/ standards. Users have chosen trails based on their level of comfort and approach to risk	Higher level of maintenance diligence will be required for trails with significant infrastructure e.g. level one walking trails with sealed paths and bridges	Trail maintenance programs to be developed that reflect the consideration of the user and trail grades/standards
Trail surface	Trail surface design and construction has greatest influence on maintenance and trail class/standards	Poor surface design increases duty of care issues and impacts on management resources and user satisfaction	Trails with steep gradient, poor water management or do not fit grade/standards will be a maintenance and management burden	Good trail surface will lessen maintenance. Poorly designed trail surface will require upgrade or consider decommission
Environmental considerations	Trail surface design and construction has significant influence on environmental protection particularly where trails and trail users access sensitive areas	Risk of impact on ecosystems and habitats if trails poorly designed and maintained e.g. runoff impacting on vegetation or users off trail	Good trail design will reduce runoff and being well designed will encourage users to remain on the trail and not create new trails or desire lines	Environmental protection key consideration in trail management. Sustainable trails will protect the environment poorly planned, constructed or maintained trails in sensitive areas are unacceptable
Vegetation	Vegetation provides the landscape setting and enhances the trail corridor major effect on trail however	Encroaching veg can be a risk to users level of risk relates to what is appropriate for trail class/standard	Overhanging veg can affect user experience and push users off trail tread, creating new trails, braiding and risk. Veg management needs to be effective but not excessive	Major maintenance impact on trails. Treatment needs to be effective and lasting e.g. sympathetic trim to base of stem in defined trail alignment area. Requires site specific vegetation management policy
Water	Water in wet areas if not managed effectively has the greatest impact on trail sustainability	Can create significant damage to tracks affecting all areas of risk including political risk from trail closures	If trails not well designed lots of rain can lead to water – caused erosion. Low rain levels can lead to very dry and loose tread surfaces	In regions with either very high or very low annual rainfall trail may need to be designed with gentler trail grades to reduce trail maintenance. Focus on effective trail design for water management

Trail factors	Maintenance issue	Risk implications	Maintenance implications	Maintenance strategy
Displacement	Movement of trail material through use wearing trails and causing trail shape change.	Change in trail shape can increase risk of damage and user satisfaction and risk issues	Increased maintenance requirement if not rectified	Greater displacement of material and trail shape change can be due to increased or change in use. May require monitoring of trail use and upgrade
Compactions	Pressure on trail material can be a track formation strategy or from traffic. Unplanned will change trail tread shape	When unplanned can increase risk of damage, user satisfaction and risk issues	Compaction when unplanned can change trail profile and create rut encouraging water flow where it is not wanted resulting in damage	Compaction of path material when planned and undertaken by builders correctly is effective. When unplanned will cause maintenance issues consider upgrade
Trail users	Well-designed trails will be appreciated by users and be used in the manner intended	Trail users choose and use trails to the grade/standard that fits their comfort and ability and expect the trail condition and maintenance to fit	Maintenance should be commensurate with the class/standard of the trail. Trail users will expect the trail and trail information to be provided and maintained	When planning for trails as discussed in Element 3 class/ standard of trail and expectation of the users is an important consideration as is maintenance.
Budget and resources	Trail managers need to plan for resources required for the maintenance of sustainable trails	Risk will increase where resources are not available or resources cannot keep up with trail maintenance commitments	Resources should be available to manage the trails sustainably and commensurate with the class/standard of trails	Resources can include volunteers and trail users working under and agreed maintenance plan. Strategic approach required for long term maintenance and upgrades
Trail infrastructure	Other than trail tread there is often significant investment e.g. bridges, signs and car parks	Significant potential risk which requires monitoring, documentation and addressing of issues associated with built infrastructure	Often requires technical assistance often beyond local resources to ensure built infrastructure is checked and maintained to standards	Trail infrastructure should be used on trails that fits with the class/ standard of the trail. Need to allow for life cycle maintenance of infrastructure. Strong link to duty of care
Knowledge, skills and expertise	Training and development of key staff and volunteers in contemporary trail management vitally important	Key staff are fundamental in ensuring user satisfaction, duty of care and effective maintenance	Staff and volunteers are the eyes and ears of trails. Effective training and understanding of trail design principles is essential	Trail management includes a focus on skill development to ensure effective maintenance programs are delivered. Use of skilled trail contractors is also a wise investment for upgrades

Table 9: Factors affecting the maintenance of smooth surface trails (usually bitumen) – Cycle Routes and Grade 1 Walking Trails

Trail factors	Maintenance issue	Risk implications	Maintenance implications	Maintenance strategy
Trail purpose standards and grades	Cycling touring routes will require different approach due to types of users and high speed cycles. Sealed Grade 1 walking trails are built to provide recreation access for people with disabilities	Potential for speeds 30 km/h and greater on down slopes and interaction with road traffic and other users. Standards for people with disabilities need to be maintained to ensure safe access	Maintenance of trail that to standards for trails designed for use by cyclists and a variety of users including people with disabilities	Effective trail maintenance programs need to be developed that reflect the enjoyment and consideration of the users, trail grades/ standards, the potential for high speed mixing with other users and interaction at intersections with vehicle traffic
Trail surface, alignment and clearance	Smooth surface with clear sight lines, and clearance are required for safe enjoyable use	High speed, interaction with other users and disabled access require clear focus on maintenance	Focus on cracks, pot holes, breaking trail edge encroaching vegetation, and debris on trail.	A strong commitment to programmed maintenance including monitoring to be applied to these trails due to trail activity and financial investment in the trail
Trail infrastructure	Orientation and safety signs and associated infrastructure to be maintained to the appropriate standards for trail grade	Nature of potential use including speed and interaction with other users and traffic requires maintenance of signs and other infrastructure to high standard	Monitoring and quick attention to orientation and safety signs and other safety features e.g. condition of bridges and fencing important. Maintenance of infrastructure important to protect asset and ensure users respect and enjoy trail experience	Development of systems for the monitoring and maintenance of trail infrastructure to ensure standards are maintained for the life cycle of the trail important trail assets
Budget and resources	Trail managers need to be aware of ongoing costs of maintaining smooth surface trails to ensure standards and safety are maintained	Appropriate funding critical for trail maintenance and to ensure duty of care	Maintenance planning including a strong monitoring component should be applied to ensure the identification of priority safety and user enjoyment issues are addressed within budget constraints	Strong commitment to strategic monitoring and maintenance is a key factor in the planning of future trails. Repair and replacement costs need to be considered in business planning and life cycle planning for future trails of this kind.
Knowledge, skills and expertise	High level of expertise required in the monitoring and development of systems to prioritise maintenance works	Training and development of staff and volunteers in monitoring systems and initiating repairs will contribute to the safety and enjoyment of trail users	Development of committed and enthusiastic monitoring and maintenance resource is vital. Explore opportunities for trail users and stakeholders to be involved in aspects of protection of the trail and the experience	Explore opportunities for long term monitoring and maintenance program involving trail partners and users which include training and skill development.

10.3 Hazard assessment

Hazard inspection is crucial to the ongoing management program of a trail. Not only will this play an obvious part in defining maintenance activities and/or management decisions, it will be vital in dealing with any liability claim which may arise in the future. The identification of hazards, the controls in place and treatments (risk management audit) is an integral process to trail management. Annual reviews are desirable.

Typical items to include on a hazard/risk Inspection form could include:

- adequacy of warning (and other) signage, especially at road crossings
- dead trees and/or overhanging limbs
- slippery rock or clay sections
- exposed tree roots or other significant 'tripping' threats
- security of viewing platforms and other structures.

Risk management assessment (in accordance with *AS/NZS ISO 31000:2009 Risk Management*) should be applied to the wider range of trail risks including asset management, human resources, financial resources, OHS, communication, and contract management.

10.4 Plant diseases and weeds

Areas that are infected by diseases such as *Phytophthora cinnamoni (PC)* should be managed and monitored by avoiding contact with and transfer of affected soils and by implementing hygiene programs to prevent its introduction and spreading.

It's always preferable to locate trails away from affected areas. If this isn't possible, introduce measures such as the use of boardwalks or modified trail surfaces, such as rock and crushed gravel, to prevent soil transfer. It may also be necessary to install hygiene stations for the washing of shoes and bikes as entry and exit points. Provide information for trail users on adopting appropriate hygiene practices at key locations.[18]

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ELEMENT 11
Education and interpretation

11.1 Planning trail interpretation

Trails present outstanding opportunities for education and interpretation. People involved in enjoyable choice-driven activities are open to learning, or at least to being informed. This section provides useful information to help you produce successful interpretation for trails and maximise the use of limited resources.

Planning is the bedrock of good interpretation. Interpretive planning happens at many different scales - from a whole region to a single display. Remember your interpretive plan will have to fit in with any business, marketing or visitor management plans that may exist for the region or area within which the trail is located. An interpretation plan should include the following elements as a minimum:

What are your objectives?

Objectives state clearly what your interpretation is to achieve. You might have some emotional objectives, behavioural objectives or even promotional objectives. They should be specific, measurable and achievable. Objectives are essential to justify the resources to be spent on the interpretation, and are a critical reference for your future evaluation.

Who should be involved in the interpretive process?

It is important that the right people are involved in the interpretive planning process. There may be several agencies, aboriginal traditional owners, local communities and voluntary groups who should be involved. If so, you will need to decide how they can have an input. At the other end of the scale, only one person may be needed to plan a simple piece of interpretation.

What are you interpreting?

Think carefully about what you want to interpret. The key question is: What is special about the trail, features of the trail or area through which is passes? In addition, you should also consider: What visitor facilities (like car parks, access, signage and toilets) are already provided, or will be in future? What other interpretation is available in the area? What staff, money and other resources are available?

Who are you interpreting for?

It is essential to understand your visitors so that your interpretation is relevant to them. Who are your visitors? Why do they come? How many are there? How often do they come? Where are they from? What interests them? How long do they stay?

For example, if you have lots of families and school groups you could do something specific for children or if you have international visitors you could translate some of your interpretation.

What stories do you want to tell?

It is helpful to refine what you want to communicate into 'themes'. These are the ideas that you want visitors to take away with them. Themes should be stated as complete sentences that contain one main idea. You might interpret several main themes at a single site. As a guide, you should be able to complete the following sentence for each theme: "The thing I want people to take away from this interpretation is....."

What media will you use?

It is only at this stage that you should choose your media. Let your aims, resources, audience, site characteristics, themes and objectives determine what media you use, not the other way round.

How will your interpretation be implemented?

You'll need to cost and timetable the interpretation, and identify who will manage it. Consider what can be done in house and what will need to be contracted out. Interpretation is a skilled process and you should chose writers and designers with experience of producing good quality work. Do not be tempted to write material yourself without adequate training. See the guidance notes on interpretive writing for more detailed help.

How will it be monitored and evaluated?

It is important to assess whether your interpretation meets the objectives you set. Some evaluation can be undertaken as you develop the interpretation to test its effectiveness. Otherwise, you should check how well it's working once installed. Any changes should feed into your next interpretive programme. See the guidance notes on evaluating interpretation for more detailed help.

How will it be maintained?

It is important to have clear responsibilities for maintaining and eventually replacing the interpretation. Maintenance might include things like clearing vegetation around a panel, cleaning panels, and making sure that they are in good condition following major weather events such as flood or bushfire.

11.2 Producing interpretive panels

Before you design and produce an interpretive panel it, you must make sure that a panel really is the best solution for your interpretation objectives. Well produced and sited panels can be extremely effective but badly produced and wrongly sited panels are often counterproductive.

Good interpretive panels use an imaginative combination of text and visuals to tell a story about an object or place. Contrast this with an information panel which only contains instructions or directions. Here are guidelines:

Keep it simple – The best panels are often the simplest. A single panel should communicate one or two main messages. Panels that try to do too much will be ignored. As a guide, you should aim for a maximum of 200 words per panel, and a simple and attractive design.

Layer your message – Layering makes your message more accessible to everyone. Research shows that people look at adverts (and panels) in the following order:

1. The headline (use minimum 12mm, 60-72 point text size)
2. The main picture
3. Sub headings (use minimum 8mm, 48-60 point text size)
4. Bullet points
5. Further illustrations (use minimum 5mm, 24 point text size)
6. The main text (use minimum 5mm, 24 point text size)

Critical Trail Tip 9 – Creating great interpretive panels

Follow these simple steps to producing better interpretive panels.

Text

- People decide in seconds whether they will read your panel so it must look attractive and be accessible at a glance.
- Write in a lively and conversational style in short sentences and paragraphs.
- Avoid jargon and technical terms.
- Relate to your audience by referring to them as 'you'.
- Use active rather than passive verbs (e.g. 'we manage' is far better than 'this site is managed by').
- Use metaphors, analogies and comparisons Use humour, poetry and prose.
- Show your text to someone who doesn't know the subject to see whether your message is coming across loud and clear.

Visuals

Visuals can be photographs, drawings or illustrations. They have important roles in communicating with your audience.

- Visuals should illustrate something the visitor can't already see for themselves.
- Drawings are often better at illustrating something than photos.
- All illustrations should have a clear relationship with the text.
- All illustrations should be clearly labelled or annotated.
- Allow sufficient time and money to research and source visuals. Commission drawings if necessary and pay copyright fees.

Maps

- If a map is needed on an interpretive panel it must be clear and easily understood.
- Make sure you have copyright clearance for the map.
- Only include information that is really necessary.
- Make sure the map is large enough for the panel.
- Make sure the design is clear and easily understood. Consider using an oblique '3-D' map if possible.

Design and production

- Always involve your designer at the earliest stage and provide them with all relevant information about your panel such as why, who for, the site layout etc.
- At an early stage you should decide what materials you want to use for the panel by considering what will best enhance the on-site experience and blend with the surroundings.
- A number of production techniques are available depending on your design, budget and desired lifespan of the panel. Most manufacturers can provide up-to-date technical advice on each technique they offer.
- Make sure your panel is properly maintained by keeping its surfaces clean, tightening all fittings and cutting encroaching vegetation etc.

ELEMENT 12
Orientation and safety

12.1 Using signs to communicate

AS 2156.1 - 2001 Walking Tracks: Classification and Signage provides a classification system for walking tracks. The Standard also provides guidance on the design, fabrication and use of trail markers, and information signs to be used for walking trails. This section provides further information on trail signage.

Visitors want signs to direct, inform and to help interpret their surroundings. Personal contact is the most desirable form of communication but it is neither possible nor desirable to manage trails in such a way that all messages are conveyed personally. As signs are almost always one-way forms of communication they will only be effective if they:

- are clearly written with a simple message
- meet the primary needs of the visitor
- are easily absorbed and understood
- are aesthetically sympathetic
- meet the needs of the land management agency

The trip cycle is a useful way of placing the visitor in the visiting cycle when planning visitor information and interpretation.

The trip cycle consists of:

- pre-trip – before leaving for the trail destination;
- orientation – while in the general area of the trail;
- on-trail – while engaging in the trail activity; and
- post-trip – after completing the activity.

Sign classes include

- Orientation
- Risk
- Management
- Interpretation (refer Element 11)

Table 10: Types of trail messages used for trail signage

Information Messages	There are many safety and management messages that must be communicated to trail user. Since each trail has its own set of issues, the messages must be made relevant to each particular trail. The more developed and lower grade/standard of walking trail will need to have more information available than will the higher grade, more remote tracks.
Basic trail information	There is basic information that should be presented for all trails either in pre-trip information, web sites, guide books, or via sign systems. Basic information includes the trail name grade and distance, and any major hazards. The more significant and highly developed, walking trails (Class 1-4) walks should also have some interpretative descriptions of the track. It is recommended that the standard walking track Department of Sustainability and Environments (2010) Sign Manual be used as a consistent standard for basic trail information signs and the sign standards provided in the Cycling Aspects of Austroads Guides (2014) be used for cycling paths.
Safety messages	Warning signs are vital where there is a reasonably foreseeable risk, even if it may be remote; and where a hazard might not be obvious to a visitor (DSE 2010). When considering the use of warning signs or other warning messages it is advisable that agencies and community trail builders seek advice from qualified risk assessors as to the best approach to minimize risk.

12.2 Sign systems

A sign system is a means of communicating messages to visitors in a structured, organised way. Once established, a system of standard sign designs allows extension and updating and moreover, instant recognition of each sign as part of the system. A sign system depends on uniform and consistent application of pictograms, lettering, words and forms regardless of location and differing environments. However, any sign system, no matter how well designed, no matter how carefully explained, will fail if the spirit of the system is not adhered to.

12.3 Walking track classification and signage

AS 2156.1 - 2001 Walking Tracks: Classification and Signage provides guidance on the design, fabrication and use of trail markers, and information signs to be used for walking trails.

In relation to trail markers, the key recommendations of AS 21.56.1 – 2001 are:

- directional arrows should be positioned on a square background of a minimum of 90mm by 90mm
- directional arrows should either be at ninety or forty-five degree angles only

- trail markers should be designed for durability and should be made of either aluminium alloy (at least 1.6mm thick) or galvanised steel (at least 1mm thick)
- markers should have a reflective finish to assist with night-time identification and should be of a colour that is clearly visible within the landscape while also considering the effects of weathering (e.g. blue, yellow, orange and red)
- the intervals at which trail markers are placed should be in accordance with trail classification and local site conditions such as vegetation, topography and weather
- trail markers should be placed at a consistent height above ground (between 0-2 metres) and should relate to topographical conditions

It is important that trail markers are clearly visible from the point of view of the trail user. The dimensions and colours of directional arrows as well as the installation height and frequency of markers should be designed to ensure that trail users are easily able to find their way. This is equally applicable in both urban and rural setting

AS 2156.1 – 2001 also provides guidance on the design of signs which provide information in relation to advisory notes, description of the trail, interpretation of attractions, relevant regulations and warnings. More commonly known as interpretive or education signs (refer Element 11), information or orientation signs are an essential element of trail design and, while they should be individually tailored to suit the particular purpose and geographical circumstances of the trail, should include information about:

- required equipment and safety precautions (e.g. footwear, hat, water supply, etc.);
- the classification of the trail and a description of the skill and fitness level required to complete the trail;
- environmental and cultural sensitivities such as habitat areas and places of Aboriginal significance;
- dangerous places, obstacles and other elements along or adjoining the trail including warnings;
- behavioural considerations;
- distance and estimated completion time for the trail (including whether it is one-way or return);
- topographical and climatic conditions that should be considered prior to departure;
- availability of facilities such as toilets;
- opening and closing times of the trail; and
- the overall route of the trail (e.g. maps at the trail head and at key locations).

12.4 Sign plans

The provision of information and the consistent presentation of messages in a systematic way require a level of planning. The development of a sign plan for a trail or network of trails will vary in complexity depending on the trail objectives, messages and the extent of trail infrastructure.

Table 11: Principles for trail sign planning

Major Trailheads	Major trailheads are located at central locations including visitor centres, major car parks and visitor information centres or park offices. They communicate key trail information to visitors including trail grades, enabling selection of a trail best suited to the user's ability and interests and may provide interpretation. Visitors are also directed to specific trailheads from this point. Major trailheads may not be appropriate or easily accommodated in some locations e.g. in some parks or on private land and trail grades will have influence on appropriateness of major trail heads, with higher grades (e.g. grade 4 and 5) major trail heads may not be appropriate on any but significant nationally or state important trails on most local trails minor trailheads will suffice. The minimum amount of trail information on a trail head should include: • Trail name • Trail type (e.g. loop, one way) • Distance in kilometres • Time to complete • Gradient • Quality of path • Symbol displaying trail grade (e.g. hiking, or mountain bike difficulty) • Relevant safety information
Minor Trailheads	Located to identify the start point for trails or can be used as sectional trail heads on long distance trails to signify and provide information for the forthcoming section. They communicate the distance, classification, duration, terrain and safety information to the user (as above for major trail head). These trailheads usually deal with one trail but may include information for up to three trails on one sign. The function of trailhead signs is to orientate visitors and help them select a suitable trail. They are not intended to be interpretive but should provide a guide to the challenges and expectations for the trail ahead.
Trail Markers	Rudimentary paintwork on rocks or metal plates nailed to trees are techniques previously used to mark trails. These inappropriate techniques do not reflect where we are going with trails and are not considered adequate to manage safety of trail users. Markers are exposed to extreme conditions such as the wind and salt of coastal areas and the intense heat of the arid inland and fires. There is also the ongoing challenge of fixing trail markers where they are most needed to be seen for example in rugged mountain ranges. The Department of Sustainability and Environment (2010) established design standards for use in public land under their management which are suitable for other agencies across Victoria. These signs compliment a range of trail information and direction signs across Australia that comply with Australian Standards Walking Trail Classification and Signage (AS 2156.1). These signs are generally unobtrusive yet visible, durable, and require little maintenance.
Risk Management Signs	The trail manager in consultation with risk managers should decide if there is a need for the risk sign to be placed on the trail and the decision will be influenced by the grading of the trail for example a Grade 5 trail will attract self-reliant walkers who would be advised of what to expect on the trail and would not necessarily expect or need cliff edge warning signs whereas a Grade one or two trail would need to provide a higher level of awareness on the trail. Risk signs are not the only course of action as other actions or combinations of actions such as removing the risk, or separating the user from the risk may lower the risk to an acceptable level. Risk signs can be basic standard recreational warning symbols (presented by a yellow triangle with black symbols and borders) or with increasing risk can be a more detailed sign using danger and warning headers with three potential messages to mitigate risk which include: • a signal (DANGER or WARNING headers) • a statement of the exact nature of the risk • how to avoid the risk (optional)

The DSE Signage Manual (2010) provides a useful resource to guide the development of trail sign systems

Examples of Standard Trail Infrastructure from DSE Signage Manual

Figure 11: Site Entrance

REC 04

PRINTED

OFF SHELF

Site Entrance

- Third level signage for DSE forest areas
- Used at entrance points to picnic areas and camping grounds managed by DSE
- Generally read from low speed vehicles
- Can accomodate standard Recreation off–shelf symbol
- *Note: Do not add 'Picnic Area', 'Camping Area' to the site name. Promoted activities / facilities are explained by use of symbols*

Figure 12: Trackhead for pedestrians & horse riders

REC 05

OFF SHELF

Trackhead for pedestrians & horse riders

- Used at entrance points to recreational tracks for walking & horse riding managed by DSE
- Generally read by walkers and not from vehicles
- Includes track name & descriptive information for users
- Can accomodate standard Recreation off–shelf symbols
- The sign panel able to be used (i.e. aluminium or timber) depends on the panel height. Refer Step 3–REC 05

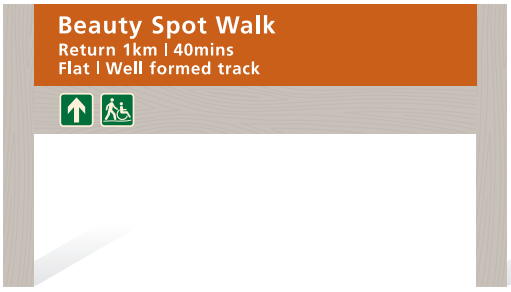


Figure 13: Directional / Information for pedestrians, mountain bikes & horse riders

REC 07

OFF SHELF

Directional / Information for pedestrians, mountain bikes & horse riders

- To be used along walking tracks, mountain bike tracks and horse trails
- Read by walkers, horse & mountain bike riders
- Can accomodate standard Recreation off–shelf symbols
- No text

Figure 14: Information Shelter Board

REC 11

PRINTED

Information Shelter Board

- Used to deliver general visitor information (area map, local info, things to see and do) at visitor sites and at trackheads
- Generally read by pedestrians
- Designed to fit within DSE standard information shelter
- Refer to STEP 3–REC 11 for example

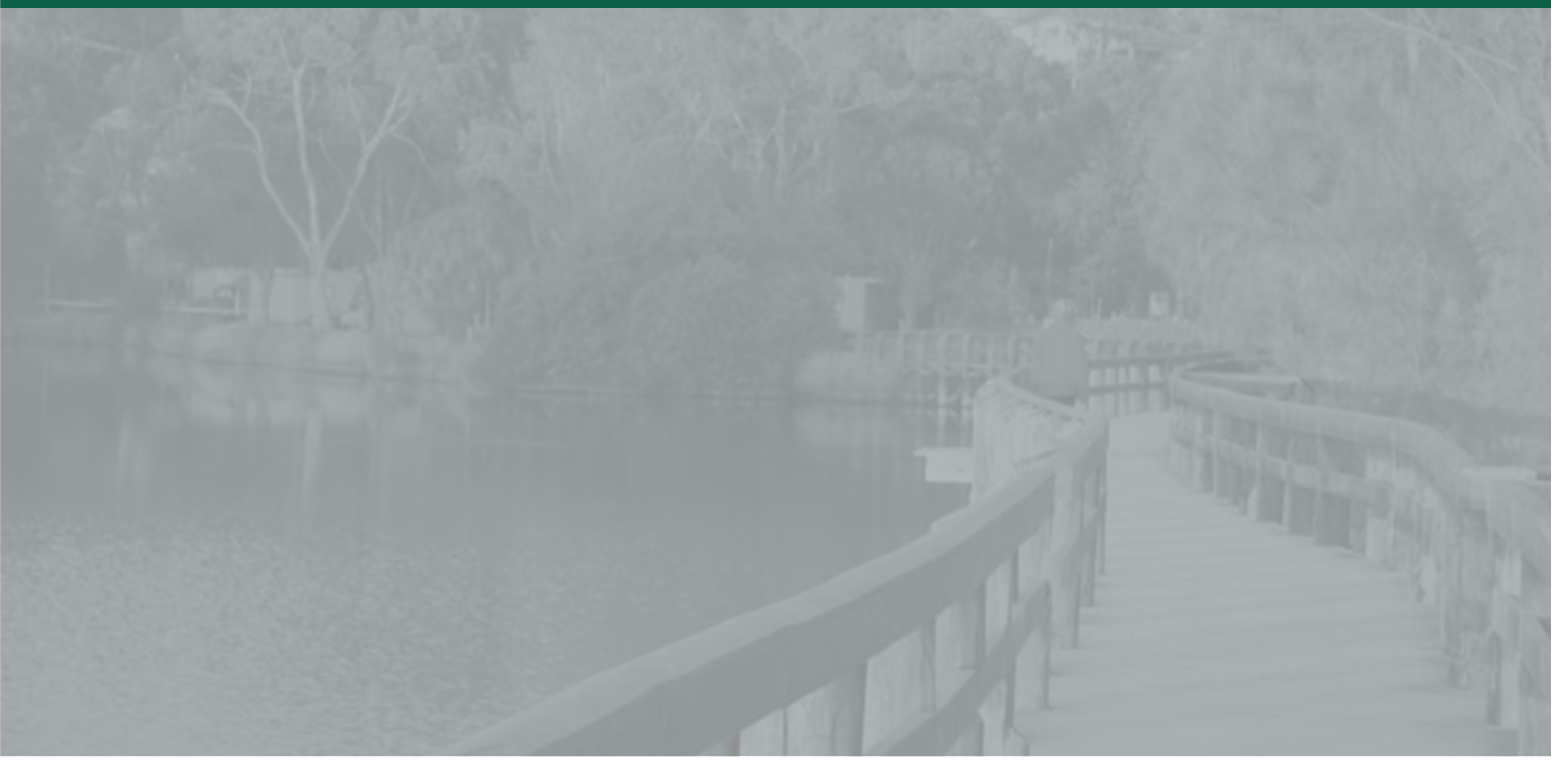
Examples of simple and intuitive use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level

Figure 15: Risk symbols (DSE 2010)

Figure 16: More detailed risk (Danger and Warning) signs (DEH 2009).

Appendices



APPENDIX 1
The Seven Principles of Universal Design

Principle	Definition	Guideline
1. **Equitable Use**	The design is useful and marketable to people with diverse abilities.	1a. Provide the same means of use for all users: identical whenever possible; equivalent when not. 1b. Avoid segregating or stigmatizing any users. 1c. Provisions for privacy, security, and safety should be equally available to all users. 1d. Make the design appealing to all users.
2. **Flexibility in Use**	The design accommodates a wide range of individual preferences and abilities.	2a. Provide choice in methods of use. 2b. Accommodate right- or left-handed access and use. 2c. Facilitate the user's accuracy and precision. 2d. Provide adaptability to the user's pace.
3. **Simple and Intuitive Use**	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	3a. Eliminate unnecessary complexity. 3b. Be consistent with user expectations and intuition. 3c. Accommodate a wide range of literacy and language skills. 3d. Arrange information consistent with its importance. 3e. Provide effective prompting and feedback during and after task completion.
4. **Perceptible Information**	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	4a. Use different modes (pictorial, verbal, tactile) for improving on redundant presentation of essential information. 4b. Provide adequate contrast between essential information and its surroundings. 4c. Maximize "legibility" of essential information. 4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions). 4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.
5. **Tolerance for Error**	The design minimizes hazards and the adverse consequences of accidental or unintended actions.	5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded. 5b. Provide warnings of hazards and errors. 5c. Provide fail safe features. 5d. Discourage unconscious action in tasks that require vigilance.
6. **Low Physical Effort**	The design can be used efficiently and comfortably and with a minimum of fatigue.	6a. Allow user to maintain a neutral body position. 6b. Use reasonable operating forces. 6c. Minimize repetitive actions. 6d. Minimize sustained physical effort.
7. **Size and Space for Approach and Use**	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.	7a. Provide a clear line of sight to important elements for any seated or standing user. 7b. Make reach to all components comfortable for any seated or standing user. 7c. Accommodate variations in hand and grip size. 7d. Provide adequate space for the use of assistive devices or personal assistance.

APPENDIX 2
Policy and Legislation Relating to Trail Development

Planning and Construction – Potential Triggers	Relevant Legislation and Policy	Agency Responsible	Contact resources
Australian Government			
• Trail alignment planning on or near areas of environmental or cultural significance • Removal of vegetation for trail construction or maintenance • Trail alignment on Commonwealth land • Trail activities and events on or near areas of environmental significance	**Commonwealth Environmental Protection** Matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and relevant to trails may include: • National heritage places • Migratory species protected under international agreements and wetlands of international importance (listed under the Ramsar Convention) e.g. catchments of Port Phillip and Western Port (including Port Phillip Bay [Western Shoreline] and Bellarine Peninsula Ramsar wetland and Western Port Ramsar wetland) • Listed threatened species and ecological communities • The environment, where actions proposed are on, or will affect Commonwealth land and the environment • The environment, where Commonwealth agencies are proposing to take an action.	Matters of national environmental significance protected under the EPBC Act Australian Government Department of the Environment	http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/what
Victorian State Government			
• Removal of vegetation for trail construction or maintenance	**Native Vegetation Protection** In Victoria, a permit is required to remove, destroy or lop native vegetation. These regulations are known as the Native Vegetation Permitted Clearing Regulations The interaction of trail users with natural areas is one of the major attractions for trail users, the appropriate integration of trails within areas of native vegetation should be done do reduce the impact on vegetation and enhance the trail experience The removal of native vegetation is primarily regulated by the Victoria Planning Provisions	State of Victoria	http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/native-vegetation/native-vegetation-permitted-clearing-regulations http://www.legislation.vic.gov.au

Planning and Construction – Potential Triggers	Relevant Legislation and Policy	Agency Responsible	Contact resources
• Trail planning or development on public lands	**Public Land Management** The State Government manage areas of Crown land that include parks and reserves, State forests, waterways, coasts and marine environments. Railway land in Victoria with the exception of some land owned by Parks Victoria and DEPI is owned by the Government Corporation VicTrack. Local government also has a significant role by being appointed by the Environment Minister as Committee of Management. Likewise other incorporated bodies such as GORCC can also be appointed as Committee of Management. In addition, many areas of Crown land on stream frontages have been leased to adjacent private landowners who have management responsibilities for this Crown land and who would need to be consulted and negotiated with should new trails cut through land that they manage. Approval will be required to develop a trail on public land and to undertake trail – based events on public land. Heritage sites that occur on crown land need to be considered i.e. the presence of heritage listed train stations and other railway features on railway lines. The *Heritage Act 1995* needs to be considered. *Environment Protection Act 1970* outlines objectives relating to the quality of land, water, air etc. This Act, as well as subordinate legislation such as State environment protection policies and statutory guidance on construction activities all applies to trails occurring on all land in Victoria. The *Catchment and Land Protection Act 1994* provides specific legislative requirements on all land managers in relation to the management of their land. This includes the management of noxious pest plants and animals The *Water Act 1989* has critical requirements in relation to works on waterways i.e. the construction of bridges over waterways on trails The *Planning and Environment Act 1987* which outlines the State Planning Policy Framework which oversees all land use in Victoria The *Coastal Management Act 1995* has responsibility for the protection of coasts and would apply to planning for trails in the coastal zone.	State of Victoria	http://parkweb.vic.gov.au http://www.depi.vic.gov.au

Planning and Construction – Potential Triggers	Relevant Legislation and Policy	Agency Responsible	Contact resources
• Trail planning or development on Crown or public lands • Trail planning or development on Aboriginal traditional lands • Trail construction where there is potential for disturbance to cultural heritage sites or items	**Traditional Owners and Cultural Heritage** Planning and development of a trail project will require consideration of Aboriginal Heritage and may require consultation with Traditional Owners. The *Victorian Aboriginal Heritage Act 2006* provides for the protection and management of Victoria's Aboriginal heritage with processes linked to the Victorian planning system. The Act provides: • the introduction and management of a system of Registered Aboriginal Parties that allows for Aboriginal groups with connections to country to be involved in decision making processes around cultural heritage • the establishment of Cultural Heritage Management Plans and Cultural Heritage Permit processes to manage activities that may harm Aboriginal cultural heritage • a system of cultural heritage agreements to support the development of partnerships around the protection and management of Aboriginal cultural heritage • strong provisions relating to enforcement of the Act – including Aboriginal Heritage Protection Declarations and stop orders • powers for Inspectors and increased fees and charges for breaches of the Act	State of Victoria	http://www.dpc.vic.gov.au/index.php/aboriginal-affairs/about-the-office-of-aboriginal-affairs-victoria http://www.justice.vic.gov.au/home/your+rights/native+title/ http://www.justice.vic.gov.au/utility/contact+us/native+title+unit.shtml http://assets.justice.vic.gov.au/justice/resources/6e1e10b1-cb83-4d6e-aefe-16376db6b909/factsheetfgunditjmaranivetitleclaims.pdf
• Trail or infrastructure development construction where actions could affect Native Title	**Native Title** Native Title is recognised through a determination made by the Federal Court of Australia and will vary for each Aboriginal group because it comes from the traditional laws and customs of the group. • It exists alongside, and is subject to, the rights of other people in the same area • It can be extinguished because of certain actions, inconsistent with native title law, that the government may have taken (or allowed others to take) over a particular area of land Before commencing a trail project consideration of Native Title should be undertaken to ensure Native Title Rights and agreements are honoured and to ensure any actions undertaken in the development of a trail do not affect native title law.	State of Victoria	

Planning and Construction – Potential Triggers	Relevant Legislation and Policy	Agency Responsible	Contact resources
Local Government			
• Trail or infrastructure development construction where actions could affect or require Local Government services • Trail or infrastructure development construction where actions could change land use • Trail or infrastructure development construction where infrastructure is complex and requires standards including Infrastructure Design Specifications	Local Government has significant responsibility for the assessment, approval or referral of development applications. Prior to commencing a trail project the relevant Local Government authority should be contacted for advice. **Public Land Management** Local government has a role in managing areas of public land and in some cases has a significant role being appointed by the Environment Minister as Committee of Management for land. Other Incorporated bodies can also be appointed as Committee of Management. In addition, many areas of Crown land on stream frontages have been leased to adjacent private landowners who have management responsibilities for this Crown land and who would need to be consulted and negotiated with should new trails cut through land that they manage. Any future trail development needs a thorough assessment of land tenure and ownership. **Infrastructure and Services** Local Government maintain significant infrastructure, provide a range of services and enforce various laws for their communities. Local Government are responsible for the development of and maintenance of infrastructure on all land outside of the public land managed by State Government agencies. The Guide to Road Design – Part 6A: Pedestrian and Cyclist Paths provides guidance for road designers and other practitioners on the design of paths for safe and efficient walking and cycling.	Local Government Authority for the area	http://www.dpcd.vic.gov.au/localgovernment http://www.dpcd.vic.gov.au/planning/planningapplications http://www.austlii.edu.au/au/legis/vic/consol_act/rma2004138/ http://www.designmanual.com.au/files/IDM_Version_4.2_Final_1_November_2013.pdf https://www.onlinepublications.austroads.com.au/items/AGRD06A-09

Planning and Construction – Potential Triggers	Relevant Legislation and Policy	Agency Responsible	Contact resources
	Planning and Land Use The planning and construction of trails may require a change of land use, due to the new use on land (e.g. where it may create a demand for car parks), may be considered development of land or require the clearance of native vegetation. Even minor matters may need a planning permit and trail planners or managers should consult with your local council who can offer advice about local or state government policy guidelines. Local Planning Schemes, which implement the State Planning Policy Framework. There are many overlays that will influence the location, siting and construction of future trails, as well as the requirement to gain planning and/or building permits. Local Government has developed the Infrastructure Design Manual (IDM) which sets out the engineering requirements for the development of urban infrastructure. It gives clear and consistent direction towards the engineering requirements that will satisfy council strategies and policies. The IDM has an urban focus and does not provide standards for trails other than the most urban Class 1 trails, some cycling trails and infrastructure associated interface such as road design, bridges and car parks. Trail design should always refer to the trail vision and urban infrastructure may not fit with trail vision or grade. This IDM was originally prepared by the Cities of Greater Bendigo and Greater Shepparton and the Shire of Campaspe. Their joint initiative was one which recognised the benefits of municipalities working together towards consistent requirements and standards for the design and development of Infrastructure. Since the preparation of the Manual many other Councils have adopted the Manual. An online Infrastructure Design Manual (IDM) has been adopted by the IDM Board which is updated periodically.		

APPENDIX 3
MTB Trail Difficulty Rating System (for users)

	Very easy  White Circle	Easy  Green Circle	Intermediate  Blue Square	Difficult  Single Black Diamond	Extreme  Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of unavoidable obstacles. Short sections may exceed these criteria. Frequent encounters are likely with walkers, runners, horse riders and other cyclists.	Likely to be a single trail with moderate gradients, variable surface and obstacles.	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles.	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles.
Suitable for	Beginner/ novice cyclists. Basic bike skills required. Suitable for most bikes.	Beginner/ novice mountain bikers. Basic mountain bike skills required. Suitable for off-road bikes.	Skilled mountain bikers. Suitable for mountain bikes.	Experienced mountain bikers with good skills. Suitable for better quality mountain bikes.	Highly experienced mountain bikers with excellent skills. Suitable for quality mountain bikes.
Fitness Level	Most people in good health.	Most people in good health.	A good standard of fitness.	Higher level of fitness.	Higher level of fitness.
Trail Width	Two riders can ride side by side.	Shoulder width or greater.	Handlebar width or greater.	Can be less than handlebar width.	Can be less than handlebar width.
Trail Surface and obstacles	Hardened with no challenging features on the trail.	Mostly firm and stable. Trail may have obstacles such as logs, roots and rocks.	Possible sections of rocky or loose tread. Trail will have obstacles such as logs, roots and rocks.	Variable and challenging. Unavoidable obstacles such as logs, roots, rocks drop-offs or constructed obstacles.	Widely variable and unpredictable. Expect large, committing and unavoidable obstacles.
Trail Gradient	Climbs and descents are mostly shallow.	Climbs and descents are mostly shallow., but trail may include some moderately steep sections.	Mostly moderate gradients but may include steep sections.	Contains steeper descents or climbs.	Expect prolonged steep, loose and rocky descents or climbs.

APPENDIX 4
MTB Trail Difficulty Rating System (for managers)

	Very easy  White Circle	Easy  Green Circle	Intermediate  Blue Square	Difficult  Single Black Diamond	Extreme  Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles. Short sections may exceed these criteria. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a single trail with moderate gradients, variable surface and obstacles. Dual use or preferred use Optional lines desirable	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles. Single use and direction Optional lines XC, DH or trials	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction Optional lines XC, DH or trials
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	Climbs and descents are mostly shallow. Less than 5% average.	Climbs and descents are mostly shallow, but may include some moderately steep sections. 7% or less average.	Mostly moderate gradients but may include steep sections. 10% or less average.	Contains steeper descents or climbs. 20% or less average.	Expect prolonged steep, loose and rocky descents or climbs. 20% or greater average
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 10%	Exposure to either side of trail corridor includes downward slopes of up to 20%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall
Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.	Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks. Avoidable, rollable obstacles may be present. Unavoidable bridges 900mm wide. Short sections may exceed criteria.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks. Avoidable obstacles to 600mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Large, committing and unavoidable obstacles to 380mm (15") high. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm or narrower. Width of bridges is unpredictable. Short sections may exceed criteria.

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