

Design Plan

Balmattum Reserve Mountain Bike Trail Network



Document History and Status

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Executive Summary

This report has been compiled by Natural Trails on behalf of Stantec (for Strathbogie Shire Council) in relation to the proposed development of Mountain Bike (MTB) trails around Balmattum Reserve on the eastern fringe of the Euroa township. It follows phone discussions, a site visit, and analysis of the relevant' documentation supplied.

The proposed development is in relation to the Balmattum Reserve, on the eastern outskirts of Euroa, and adjacent to the Hume Highway, as outlined below (Figure 1). The land is currently under the tenure of Parks Victoria, with the potential to transfer to Strathbogie Shire Council if developed further.

This Design Plan has been developed to make the best use of the available land and provide a sustainable trail network that uses industry best practice for trail design while minimising ongoing maintenance requirements and multi user conflict.

It has been designed to enhance the current walking trails within the reserve and build on the existing shared pathways linking Euroa township to the Reserve area. The purpose is to provide both health and recreation for local residents, as well as a product that will encourage and promote tourism in the area. Several trails have been identified for potential as accessible trails for adaptive mountain bikes. The inclusion of these trails will enhance and broaden the user experience of the trail network

The outcome is to create a trail network of around 14km in total length on top of the existing walking trails and access roads.

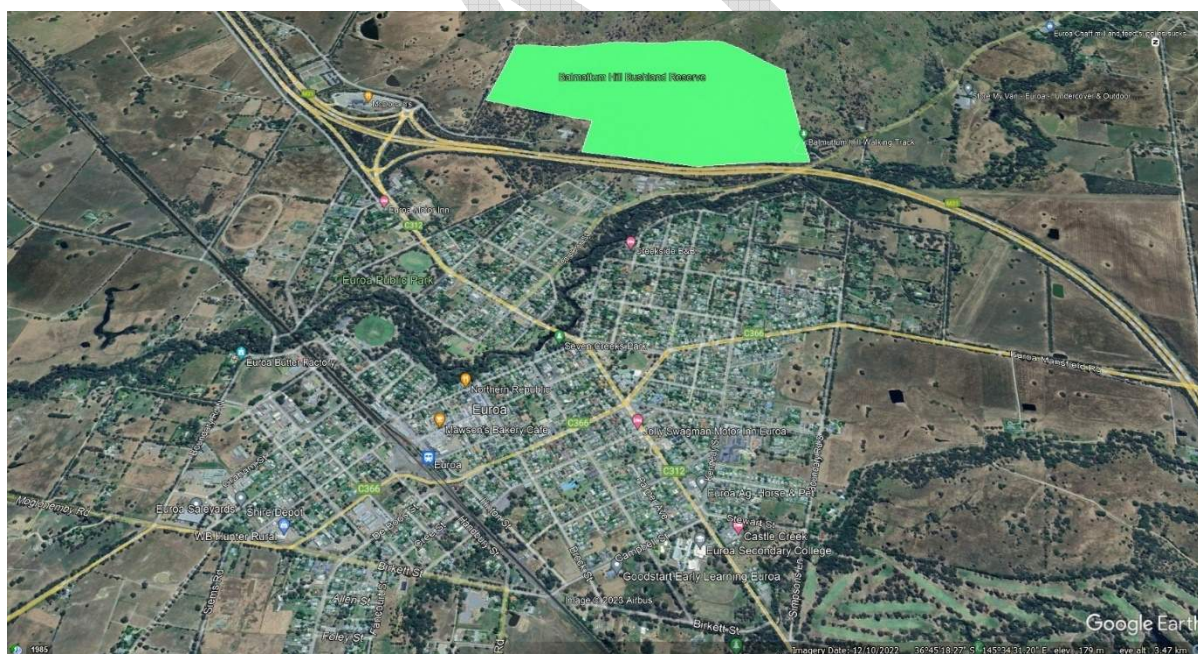


Figure 1 – Proposed site – Balmattum Reserve MTB Network

Leveraging Mountain Biking

Mountain biking is considered one of the fastest growing recreational sport in Australia. The ability of landowners and land managers to engage with this market and provide a product that is attractive and encourages travel and overnight stays is critical to leveraging mountain biking to enhance social and economic growth.

There are numerous examples of other areas across Australia that have embraced mountain biking to address social and economic issues. Some of the best examples of this is Derby in Tasmania, Bright in Victoria and Jindabyne in NSW.

Each of these towns recognised the benefits that mountain biking could provide to their communities and aggressively pursued trail developments to achieve their goals.

The Trail Design Concept

This design plan outlines the potential to create a new trail network that provides a mixture of cross-country and descending MTB trails that are linked by either climbing trails or existing access roads. The plan allows multi use by walkers and riders by combining single use trails for minimal conflict, combined with existing shared use trails.

The concept as outlined will ideally include the existing shared use trails from both the Creekside Caravan Park to the south and the existing path to the highway service centre to the north, as they provide the easiest access to the area from town.

Given the existing walking trail trailhead to the south is very small (3-5 parking spaces), the entry at the northern end of the reserve off Crosby Lane has a reasonably large and level area which could be used to provide additional carparking, trail head, and associated facilities. Alternatively, riders could park and ride from the town centre to encourage patronage of local businesses.

An existing vehicle track along the western boundary will provide a dual direction / shared use trail, as well as maintenance and emergency access.

Trail Construction

The trail construction strategy for the project allows for newly proposed works to be constructed by professional trail builders with the use of machinery (small excavator) and / or hand tools.

Trail construction in the lower elevations should be easier due to flatter terrain and more consistent soil. Construction in upper elevations will be slow and difficult due to the steeper side slopes and prevalence of rock and large boulders throughout the terrain.

Potential exists for members of the local cycle group to be part of the construction works to gain the skills and experience to better manage and maintain trails post construction, and to provide local employment in the project. This combination of professional builders and local labour workers has been successfully used on other similar projects.

Maintenance

As trails are organic even the best designed trails will require some ongoing maintenance (including vegetation pruning). The creation of a 'Trail Stewardship' utilising local volunteer labour to undertake regular maintenance tasks could be utilised in conjunction with Council oversight via a Memorandum of Understanding (MOU). This scenario is based on successful models used in other trail networks throughout Australia. Funding for this work could come from income generated by events, business partnerships / sponsorship, and ongoing financial sponsorship from council.

Next Steps

The next steps to progress this project are:

- Establish a Project Delivery Committee to manage the tasks required to deliver the project
- Further consultation with key stakeholders
- Undertake any further Master Planning, REF and Business Case assessment as required
- Identify and secure funding to deliver the project
- Develop MOU and tender documentation to support the project strategy

Conclusion

The Balmattum Reserve MTB development is an opportunity to leverage off current tourism products and to help provide a long-term economic driver to ensure the viability and sustainability of the township.

This community-based project will still requiring some further planning, assessment and land access approvals to be 'shovel-ready', but has the potential to be fully constructed within the next two years if suitable funding can be sourced.

Background

Balmattum Reserve Mountain Bike Trail Network

The proposed network is to be located on the eastern fringe of the Euroa township, with access via vehicle or bicycle directly from town. The proposal includes the area known as the Balmattum Reserve, adjacent to the Hume Highway.

The highest point is located at the peak of the existing Balmattum walking track (360m above sea level), sloping down to the north and west to a low point of 190m. This provides a potential elevation drop for trails of approximately 170 vertical metres.

The terrain is relatively steep and open at higher elevations suitable for more experienced riders, with milder slopes and scattered mature trees at lower slopes suitable for beginner trails (see Map 1 – Terrain Layout). Large rock outcrops are predominant throughout the steeper areas of the terrain. Several natural ephemeral gullies exist on the land tenure. Soil type is a decomposed granite base with lower areas having a top layer of heavier loam soil. Excavation for trail surface should expose the granite soils which is a suitable mix for construction purposes.

Current development consists of an access / fire road along the western border of the area (white trail on Figure 1 – Terrain Layout), a formal walking track and trailhead area in the southern part of Reserve (orange alignment on Figure 1), and an existing but overgrown walking track loop through the centre of the Reserve (Pink alignment in figure 1).

An existing but unmaintained 4wd / ATV track runs parallel to the main walking track, however it is poorly formed and eroded in many sections and undefined / overgrown in other sections. It was most likely used for access in either the construction or previous maintenance for the walking track. Several informal 4wd tracks also exist in the northern area of the reserve.

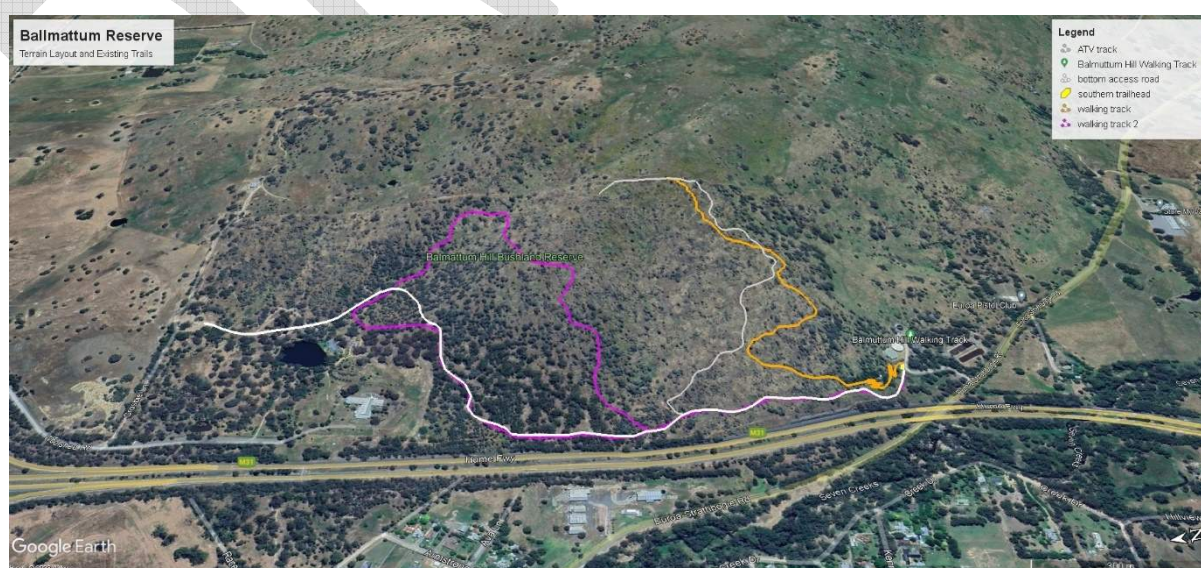


Figure 1 – Terrain Layout

Proposed Development

This Design Plan has been developed to make best use of the available land, minimise the conflict with other users. It will provide a sustainable trail network that uses industry best practice for trail design, minimising ongoing maintenance requirements while providing the best possible rider experience and tourism product.

The network has been designed to create a Trailhead area based at the northern entrance to the reserve due to both its relatively flat nature and ease of access from town.

Current Status

This Design Plan has been developed to provide a high-level outline of the scope of work for the Balmattum Reserve Trail Development Project and a cost estimate to deliver the project.

The primary purpose of the Design Plan is to secure the following:

- Gain buy-in and approval from the major landowners involved in the project.
- Educate stakeholders and government agencies on the opportunities associated with the development of mountain bike infrastructure in the region
- Engage local business owners and individuals to identify and promote opportunities associated with mountain bike development in the region
- Secure funding to deliver the project
- Establish governance arrangements for the ongoing management and maintenance of the trail network and associated facilities.
- Provide scope of works and construction methodology to assist in planning and development of the Master Plan

The Opportunity

Proximity of Trails to Township

Euroa is located in an area where business owners along with the local and Victorian Government recognise the opportunities to enhance and make the region economically sustainable through the development of tourism infrastructure projects.

The trail network has the potential to leverage off existing town infrastructure and services currently available, potentially extending duration of stay of current visitors. Being on a major tourism and highway route between Sydney and Melbourne, it also has the potential to capture MTB tourists passing through the township.

The close proximity of the township to the reserve is also a significant benefit, as the trails would be easily accessible using existing road and shared pathway network.

Adventure Tourism Synergies

The Balmattum Reserve MTB trail network will cater to all skill levels and will provide both residents and tourists with improved outdoor recreation opportunities.

The trail network will complement existing summer activities and will also provide an additional economic opportunity for tourism during winter months.

The development of a trail network in the region will help boost visitation numbers next summer and into the future as the trail network will be accessible all year round. In addition, the construction effort will utilise local labour and materials, injecting much needed funds into the township.

Trail Network

The Mountain Bike Trail Network could use the township of Euroa as the central hub, supplemented by onsite parking, with on-road and shared pathway links to the trail network. The aim is to have a network of around 14km in total length.

The trail network is being designed with a focus on the conventional mountain bike market however the trails will also be suitable for eMTB (electric pedal assisted) mountain bikes, with the potential for trails in the lower slopes to be accessible for adaptive bikes. Most trails will be single direction (one way) to minimise rider conflict.

The trail alignments have been established using principles from the Auscycling (formerly Mountain Biking Australia) Australian Trail building Guidelines (2019) for sustainable trail design and construction.

The trails are designed to follow the natural terrain, topography and contours of the terrain to provide the best rider experience possible, to manage rider speed, to avoid excessive braking and to optimise the long-term sustainability of the trail network.

Balmattum Reserve MTB Trail Network

The proposed Balmattum Reserve Trail network is composed of the following elements:

Existing -

- 1.8km of dual direction access road along the western boundary that connects the proposed northern trail head to the existing walking trail carpark (Map 2 – Overview – white alignment)
- 1.2km of ATV access Track from access road to top of main walking trail (Map 2 – Overview – grey alignment)
- 1.3km of main walking trail and 2.77km of secondary walking trail (Map 2 – Overview – orange and pink alignments)

Proposed -

5.66km of new one-way beginner cross country MTB trails to be constructed using either hand-built trail combined with machine-built trail features (berms and jumps), or wider machine-built trail (for adaptive use) (Map 2 – Overview – light and dark green alignments)

5.17km of new one way intermediate / advanced descending / flow type trails to be constructed using a combination of hand-built trail combined with machine-built trail features (berms and jumps). These will incorporate optional lines around features and rock outcrops to allow for rider progression. (Map 2 – Overview – light and dark blue alignments)

3.07km new Climbing trail for primary rider access to higher elevations. This trail will also provide options to exit the climb earlier to access trails at lower elevations (Map 2 – Overview – yellow alignment)

Total new MTB Trail proposed is 13.9km

Several trails have been identified for potential as accessible trails. These will be machine built to wider trail tread of min 1500mm to accommodate adaptive mountain bikes.

The following ancillary works / features are proposed for the network:

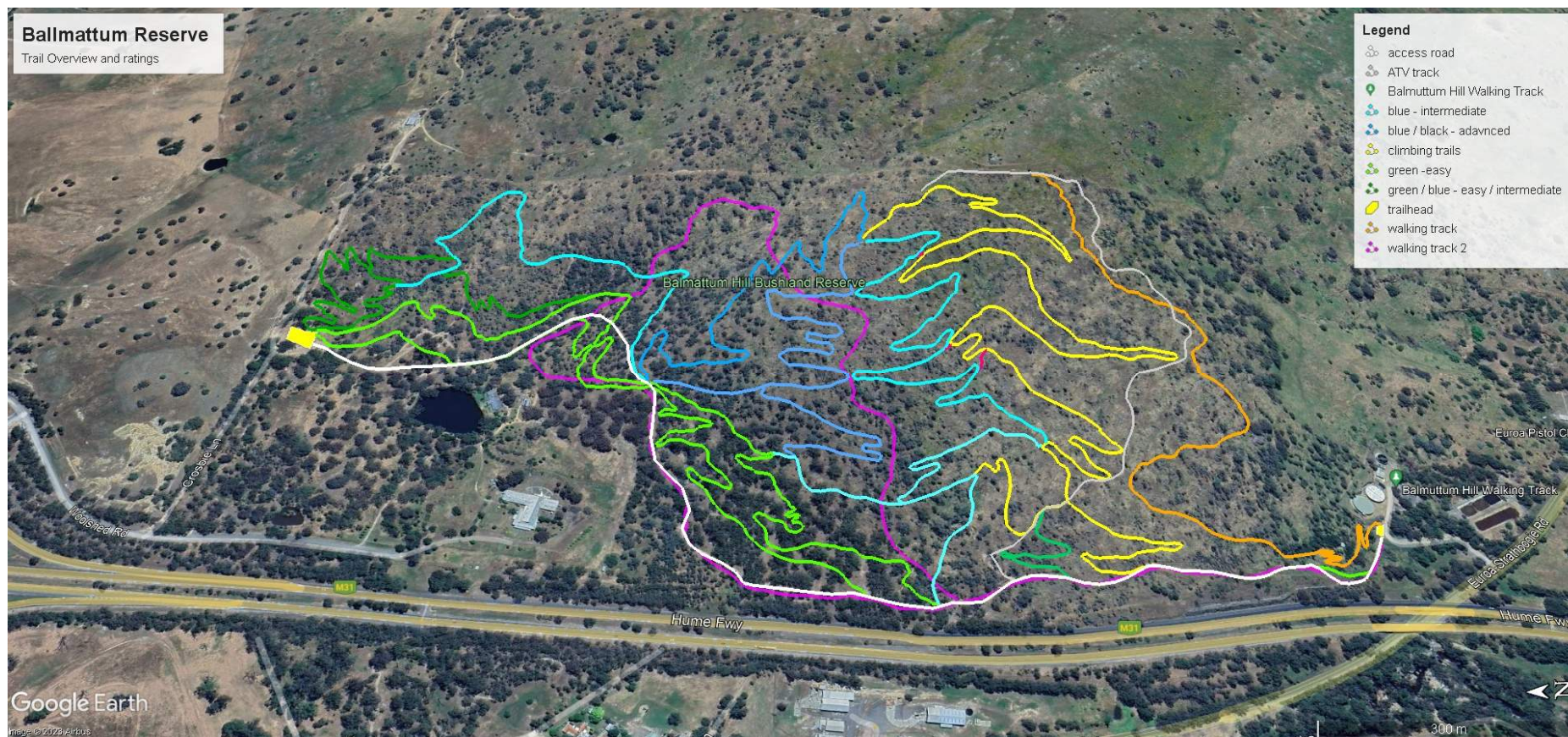
New Trailhead carpark and related infrastructure (e.g. toilets, seating, shelter) at northern end of Reserve adjacent and accessible from Crosby Lane.

Trailhead information, interpretive and warning / emergency main signage

Interpretive signage where applicable

Emergency, warning and wayfinding signage throughout trail network.

Map 2 – Overview and Rating





Trail Design and Development Considerations

General Considerations

The trail network has been designed to deliver the following:

- An interconnected network that works with the natural landscape

- Riding experiences for all ages and levels of riding ability

- Alignments that showcase the natural and historical features of the region

The proposed trails are indicative alignments which will require further ground truthing and marking as part of the next phase of the project.

Trail Design Standards

The trail networks will be designed in accordance with the requirements of the Australian Mountain Bike Trail Guidelines (MTBA 2019).

Safety Considerations

The following safety issues have been considered during the design of the trail network:

- Trails where possible will be one way to minimise rider conflicts. This also allows for optimum trail design to suit the direction of use.

- Walking trail crossing points – crossing points have been located where there is good line of sight. These will be restricted access roads and designated points, with signage used at crossing points to make walkers and riders aware of the safety issues. Trails will be designed to slow riders to walking pace as they approach the trail crossing.

- Traffic at trail heads – the new trail head has been located where there is adequate room for carparking spaces and potential toilet facilities. Riders would be encouraged to use new trailhead or park and ride from township. The existing trailhead would be signposted for walking trail parking only.

- Emergency points – emergency location signage will be installed throughout the trail network to allow riders to convey their location to emergency services.

- Emergency services access – emergency services will be consulted to identify access locations for emergency services to reach injured or unwell riders.

A risk register will be developed as part of the master planning to capture all identified risks and the control measures that will be implemented to eliminate or mitigate the risks.

Trail Heads and Parking

Trail heads are important as they allow information to be shared with riders about what to expect on the trail network as well as notifying riders of any hazards or trail changes that have occurred.

An existing Trail head for the walking trail exists at the southern entrance of the reserve off Euroa Strathbogie Rd (Figure 2 – Existing Trailhead). This area is quite small with parking for 3-5 cars only and shares its access road with the adjacent water treatment plant. The trailhead has minimal signage and no ancillary facilities such as toilets or seating. The area is however serviced from the township via an existing shared pathway next to Seven Creek.

Potential exists for a secondary Trail head at the northern end of the reserve off Crosby Lane to service the MTB trails (Figure 3 – Proposed Trailhead). This area is directly accessible from the service centre exit of the Hume Highway at Euroa and via an existing shared pathway from town the service centre.

Ideally, trailheads should have the following facilities:

- Trail map information and warning signs
- Carparking areas
- Shuttle pick up / drop off areas
- Picnic tables with shelters
- Bike racks and bike repair stands
- Toilet facilities



Figure 2 – Existing Trailhead – Balmattum walking track

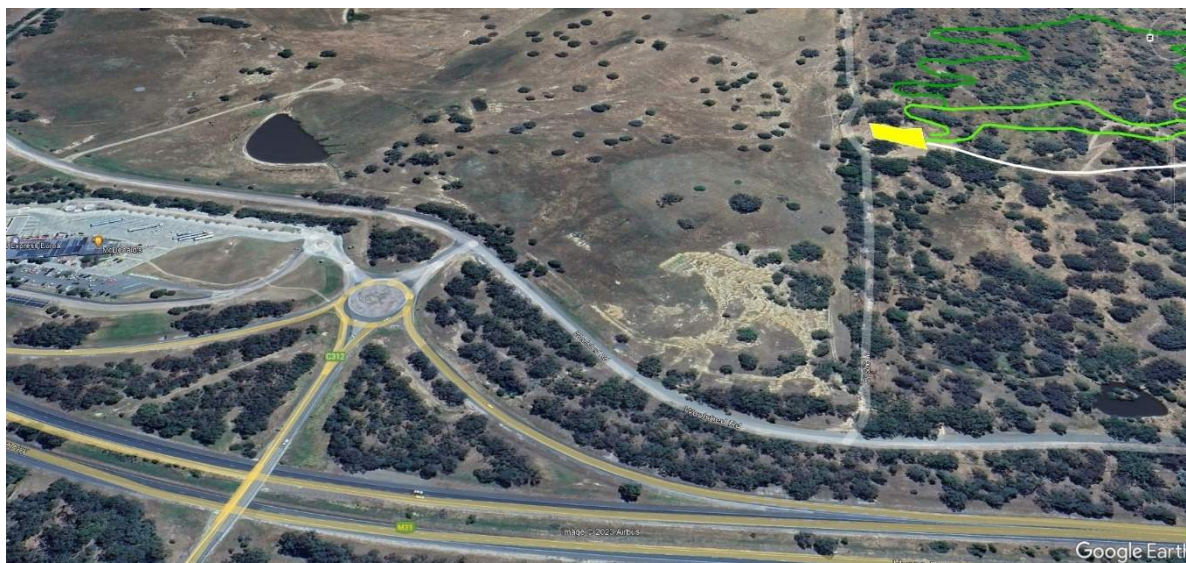


Figure 3 – Proposed Trailhead – Crosby Lane

Walking and MTB Trail Crossings

Internal walking trail crossings will be required at several locations throughout site. Where possible crossings will be located where both walkers and riders have good lines of sight and will include warning signage for both users.

MTB trails in these areas will be designed to slow riders down before crossing to minimise conflict.



Typical trail crossing warning signage – Eden NSW

Signage

Signs will be used throughout the trail network to provide direction, manage behaviour, inform users of hazards and to expedite emergency service response.

A trailhead sign is to be installed at carpark to provide overall trail information and specific warning information. Smaller node and wayfinding signs will assist with navigation throughout the network.

Potential exists to expand on existing interpretive signage located on the main walking trail throughout the network.

Main trailhead sign

Located at the trailhead (Figures 2 and 3) to the network, it conveys all the necessary information to navigate the network and understand the rules of use for the facility. It contains:

- overall trail map
- explanations of trail names / profiles / difficulty ratings
- rules of the trail and code of conduct
- navigational directions and riding options
- general warning and emergency procedures
- stakeholder / sponsor information



Example of Main Trailhead Signage – Eden NSW

Directional Node signage

Located at main trail intersections, these smaller signs convey the following

- -location within the general area on a condensed map
- -navigational directions to other areas / trails
- - emergency / stakeholder information



Example of typical Node Directional signage – Narooma NSW

Wayfinding Signage

Located at the beginning and end of each trail, and at trail intersections, they convey the following:

- trail name and rating
- directional information
- emergency information
- usage information



Example of typical Wayfinding signage – Narooma NSW

Interpretive signage

- Located throughout the network, it conveys information in relation to either;
 - Cultural heritage
 - European and local heritage
 - Flora and fauna species



Interpretive signage on main walking Track – Balmattum VIC

Roadside signage

Located on public roads at main entrances to the network, it conveys information in relation to:

- Turning points off roads into trailhead areas and carparks

These are generally mounted on existing street sign posts and will require input and approval from council for location and installation on local roads, or state authority for main roads and highway.



Example of directional roadside signage – Eden NSW

Adaptive Mountain bikes

Several trails have been designed for use with adaptive mountain bikes. These are bikes that are designed to assist people with mobility issues to participate in mountain biking activities.

They are generally wider (often with 3-4 wheels) for assistance with balance, and electric motor assisted due to weight and user mobility issues.

Trails designed for their use are also generally wider (1500mm minimum) and have turns with a longer radius to suit turning circles.



Trail Furniture

Trail furniture includes seats, shelters, bike racks, and other structures that will enhance the end user experience of the trail network.

Where possible, trail furniture will be constructed using steel and other non-combustible materials.

Trail furniture should be designed to be consistent with relevant authority requirements.



Example of trail seating and shelter – Shoalhaven NSW

Trailhead toilets

Example below of a prefabricated double toilet block structure used extensively through NSW State Forests. They utilise a 5500L concrete collection well for each toilet block and are disabled access compatible.



Example of a composting toilet block structure. These are designed for remote areas where pump out maintenance option is not suitable. It uses a heat and ventilation composting method to manage solids. Click link for further info
<https://www.ecoflo.com.au/cms/#!/Kazuba-STK-System-ex-Pedestal/p/69380081>



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Economic Benefits

While a formal economic analysis has not been undertaken for the project, a number of known direct and indirect economic benefits are likely to be created during and post construction.

Potential locally supported direct business activities include but are not limited to:

- Bike retail; repair; hire
- Shuttle service; pick up and transfer services
- Tours; guiding; skills coaching

Indirect business opportunities include but are not limited to;

- Accommodation
- Food Outlets
- Complementary activity provision

Governance Arrangements

Effective governance will be critical for the successful delivery and ongoing management of the Balmattum Reserve Mountain Bike Trail Network.

As the trails will be constructed on government managed land it will require an MOU or lease agreement between Council and Parks Victoria.

A MOU agreement may also be required with the local cycling group for ongoing maintenance of the trail network post construction.

Planning and Delivery Governance

Effective project planning and delivery governance will be essential for securing funding for the project and to successfully deliver the scope of work.

A Project Delivery Committee should be formed to finalise planning activities, to secure funding and to manage the delivery of the project.

The Project Delivery Committee should include the following representatives:

Parks Victoria

Strathbogie Shire Council

Local cycle user group

A charter should be developed for the committee to define the overarching purpose of the group and to provide structure and guidance to making decisions to achieve project outcomes.

Ongoing Governance Arrangements

The operation and management of the Balmattum Reserve MTB trail network will be an ongoing undertaking.

An operational structure that should be considered is the formation of a 'Trail Stewardship' approach where a not for-profit organisation is established to provide direction and ongoing maintenance of the trail network.

A similar body has been established for mountain bike trails in the Jindabyne area.

The [Jindabyne Trail Stewardship](#) has successfully established itself and now manages over 100kms of trail, directly employing and 2-3 people on a part time basis.

MOU agreements between the cycling group and key stakeholders is key to ongoing success of the project.

Revenue from possible sponsorship / partnerships with local and other business, as well as support from council should adequately fund the ongoing maintenance of the network.

Implementation Planning

Risk Management

Identifying and managing project risks will be essential for the proactive management of issues and the successful delivery of the project.

Project risks include:

- Stakeholder support for the project
- Failure to secure funding to deliver the project
- Environmental and Aboriginal Cultural Heritage factors that affect project delivery
- Contracting strategies to support the project
- Lack of suitable resources to deliver the project
- Ongoing management and maintenance requirements

A project risk register should be developed and maintained for the duration of the implementation phase of the project.

Stakeholder Engagement

Stakeholder engagement will be critical to the successful delivery of the project. Stakeholders who have the potential to impact (positively and negatively) on the delivery of the project must be identified, their perspectives understood, and strategies developed to enhance their involvement in the project outcomes.

A Stakeholder Engagement Plan should be developed to capture stakeholder engagement requirements and to manage issues as they arise.

Review of Environmental Factors

A Review of Environmental Factors including ecological and cultural assessments, will be required before construction work can be undertaken on this project.

Consideration should be given to the environmental benefits of trail network in relation to access to areas to improve weed control and for future fire management activities.

Aboriginal Cultural Heritage Assessments

Aboriginal Cultural Heritage Assessments will be required before construction can commence.

The Project Delivery Committee will work collaboratively with the traditional owners to confirm Cultural Heritage values for the area and to manage any impacts to Cultural Heritage values as a result of construction activities.

Where feasible, heritage values could be incorporated into interpretive signage throughout network.

European and Local Heritage Assessments

European and Local Heritage Assessments may be required before construction can commence.

The Project Delivery Committee will work collaboratively with the necessary groups and authorities to confirm Heritage values for the area and to manage any impacts to Heritage values as a result of construction activities.

Where feasible, heritage values could be incorporated into interpretive signage throughout network.



Blockwork found on site visit east of main access road – Balmattum VIC

Planning Approvals

The Project Delivery Committee will be required to identify approval requirements for the project.

An approvals register should be developed to capture approval requirements and to monitor progress.

Construction Program

The project has been divided into the following construction packages:

Package 1 – Planning and approvals

Package 2 – Trail Construction

Table 2 Trail Network Construction Timeframe Estimate

Project Timeframe		
Element	Unit / Assumption	Estimate
Master planning and approvals	Ground Truthing, REF, Mapping, Document Preparation	12 weeks
Trail Construction (14km)	Trail Construction @ 75m p/day	37 weeks

Construction Delivery Considerations

This project has been conceived and designed to provide the greatest benefit to the local and regional economy and boost the broader economic sustainability of the region.

To achieve these outcomes, wherever possible, local contractors (for the supply of machinery / materials) and locally sourced labour should be utilised to deliver the project.

Due to the specialised nature of trail construction, the project will need to engage the skills of a suitably qualified professional trail builder to oversee and manage the design and delivery of the project. This trail builder can be supported by local labour.

Similar projects have seen the use of professional trail building companies to provide overall project management, construction systems and on-ground supervision and an experienced machine operator / team leader to manage each trail crew.

Within each crew, local labour is then sourced and trained in trail building and land management techniques. The benefit of this approach is that these locals acquire the skills to manage and maintain trails after construction is completed.

Trail Construction Methodology

Trail Construction Methods

The following is a list of the common types of methods used in the construction of mountain bike trails. The methods are designed to meet both the IMBA (International Mountain Biking Association) and Auscycling guidelines for sustainable trail construction. These are designed to ensure trails are built to meet the highest standard for sustainability, erosion control, low maintenance, and ride quality.

Hand Built Trail

This method is used primarily in areas where the natural terrain is more suitable for trail use as is. It is the lowest impact and but most labour intensive form of trail construction. The most important element is ensuring the designed alignment meets sustainable guidelines.



'Bunty's Trail' - Mill Creek area, Jindabyne NSW

Installation of new trail alignments via the following methods:

Clearing / pruning of 1.2m wide trail corridor and 2.5m corridor ceiling. All cut vegetation will be docked into smaller manageable pieces and dispersed along the trail corridor, covering exposed soil on the low side of the trail as part of the revegetation process.

Hand digging and raking / brush cutting of min 600mm wide trail tread to expose soil required for trail tread.

Hand tool shaping where required, to establish drainage / grade reversals and trail features. Hand digging generally utilises a full bench cut technique whereby trail is cut into the hill, and excess soil is removed and used in other areas to accentuate high points in the trail.

Mechanical compaction with hand tools where required to stabilise soil.

Excavated Trail / Berms

This method is used where the natural terrain is not as suitable (e.g. steeper side slope, rock outcrops) and requires more significant shaping to create a suitable trail surface.



'Mill Creek Trail' - Lake Jindabyne Shared Trail Network, Jindabyne NSW

Installation of new trail via the following methods:

Clearing / pruning of 1.2m wide trail corridor and 2.5m corridor ceiling. All cut vegetation will be docked into smaller manageable pieces and dispersed along the trail corridor, covering exposed soil on the low side of the trail as part of the revegetation process.

Excavating the trail bench will consist of a cut-to-fill technique, digging soil from the upslope and spreading on the downslope to create a firm and stable bench for the excavator to operate on safely.

The upslope batter will range from 150mm up to 600mm high, depending on the side slope gradient. Where side slope gradient is steeper, the low side fill will be compacted by the excavator bucket and then track rolled to ensure adequate stability and compaction is achieved.

The cut-to-fill process isn't just two-dimensional, soil is also taken from the low points in between grade reversals and dragged along the trail to accentuate the high points of grade reversals. This results in large grade reversals/rollers that will endure erosion and rider wear and still remain in place for adequate drainage.

Depending on the style of trail, finished trail width is generally 1-1.2m wide.

In the low points between grade reversals, a minimum two percent crossfall 'Out Slope' is required to prevent pooling of surface water run-off.

It is important to also include 'In Slope' in certain sections to promote rider flow and make the trail feel intuitive to the rider, giving them confidence that the trail will not suddenly change direction and cause loss of traction.

Once the excavator has created the desired trail shape, hand tools will be used by the trail crew to groom and finalise the trail shape.

Trail crew focus on removing small rocks and roots and compact the trail by using tamping techniques or utilizing a vibrating plate compactor when there is adequate moisture in the trail surface.

Final revegetation of disturbed areas around trail tread with thatch sourced on site.

Watercourse rock armouring

This is a technique used to stabilise and harden the trail surface in a variety of scenarios. Typically used in low points of the trail where water is either present or there are signs of seasonal water flow, rock armouring can also be used on steeper gradients to prevent braking abrasion. It is imperative to use substantial size rocks to ensure they are not dislodged or move when ridden over.



'Power Up Trail' – Eden MTB Park, NSW

Key points when rock armouring are as follows:

Rocks will be harvested from within the trail corridor, large rocks will be stockpiled as the excavator moves along the alignment. Rocks will be transported with the assistance of lifting aids and power carriers to get them to rock armour locations.

Rocks need to be placed in a brickwork style pattern, ensuring joints are tight on the ride line and staggered. Larger keystones will be laid in the lowest point and at each end to assist with stabilising the rock armoured section.

It is preferable to begin in the lowest point and radiate outwards, this promotes better stabilisation of the rocks and ensures they will stay in place.

The desired trail shape needs to be considered. The finished surface should blend with the trail surface and take into consideration compaction and weathering. If rock armouring a gully, there needs to be a smooth transition that promotes rider flow and allows water to continue through the gully without impeding natural flow.

Smaller rock or soil can be utilised to infill joints between larger rocks.

At least two metres of rock armour should be installed beyond a wet crossing to ensure the trail surface doesn't suffer from water carry out from riders.

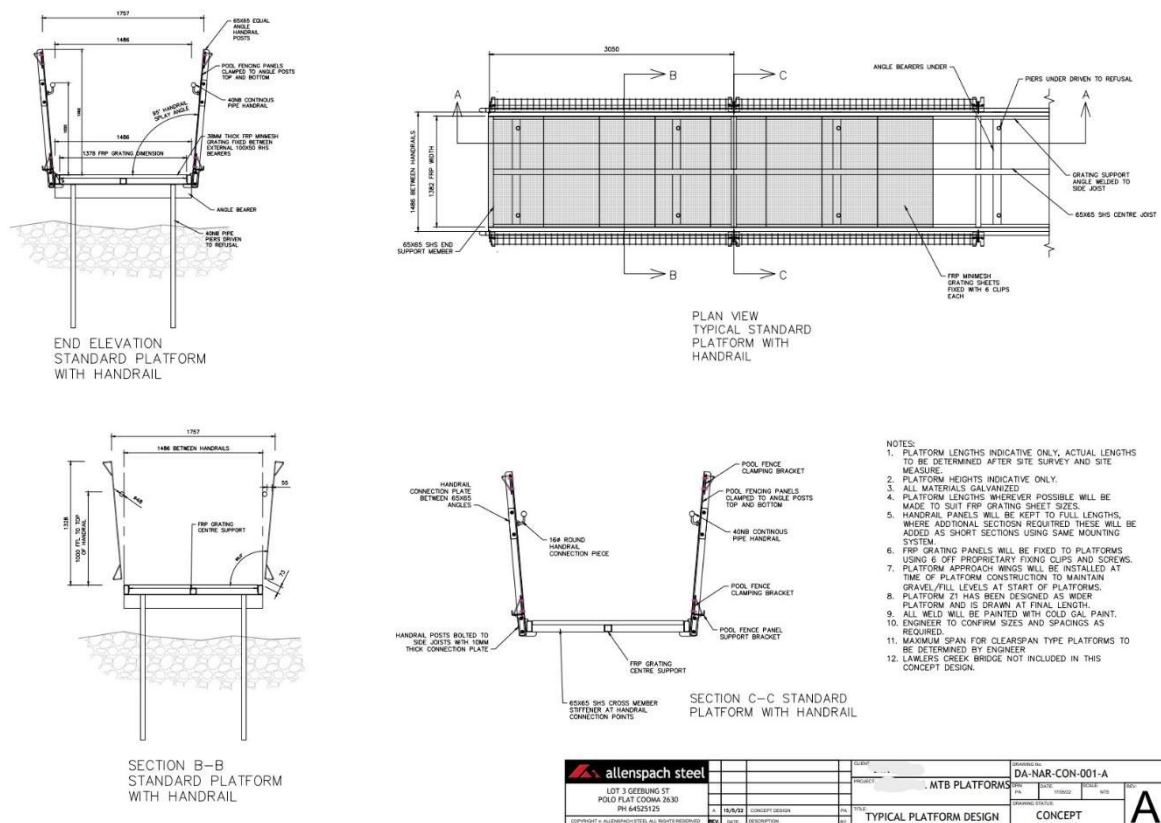
A small depression and rock 'lip' is created on the uphill side of the rock armour to allow some water to pool above the site following rain events. This has been shown to help create a positive habitat for certain fauna species.

Raised Platforms

Used in wet areas, gully crossings or areas where other methods not suitable (e.g. very steep slopes). Platforms with a fall zone to the side higher than 900mm will generally require the addition of a handrail.



Example of platform with both footing and clear span sections – Narooma NSW



Typical platform structure specification drawing

Typical construction procedures for structures includes the following:

- Excavate trail alignment on approach and departure from structure position to allow easy access for trades and engineers
- Install environmental protection measures
- Engage a geotechnical engineer and structural engineer to design structure foundations and structure
- Import materials via trail alignment or helicopter
- Construction of foundation/piers
- Install foundation protection measures, such as rock walling, if necessary
- Construct structure from ground up to deck level
- Install handrails where required
- Finish trail approaches to suit final decking height

Next Steps

Establish Project Delivery Committee

In order to manage the tasks required to deliver this project, it is recommended that a Project Delivery Committee is established.

The committee may also include a representative from the body that is providing funding for the project.

Master Planning Development

Following this Design plan, the master plan stage will involve the following activities:

- Stakeholder review and design amendments
- Additional ground truthing of proposed new alignments
- Audit of individual trail construction requirements
- REF and cultural assessments where required
- Identification of approval requirements
- Confirming requirements and locations for trail head signage and other infrastructure changes
- Refining project estimates
- Refining construction methodologies and timeframes
- Refining contractor and supplier strategies
- Undertaking financial analysis
- Developing Master Planning documentation and maps.

Identify and Secure Funding

The Project Delivery Committee will be required to work with local stakeholders, the NSW Government and the Federal Government to identify funding opportunities to deliver the project.

Funding will be required for the following stages:

Construction package delivery

Develop Tender Documentation

Depending on the project delivery strategy and procurement governance arrangements, tender packages will be required for the following:

Trail design and construction activities – includes overarching project management

Design, supply and installation of infrastructure including access roads, trailhead (including carpark and toilet facilities).

Design, supply and installation of any trail structures, signs, or trail furniture

Supply of miscellaneous materials – rock, fill material, fuel, vegetation management, reveg planting, tools, etc.

Tender packages should stipulate that wherever possible the majority of services and materials should be sourced from the Strathbogie Shire region.

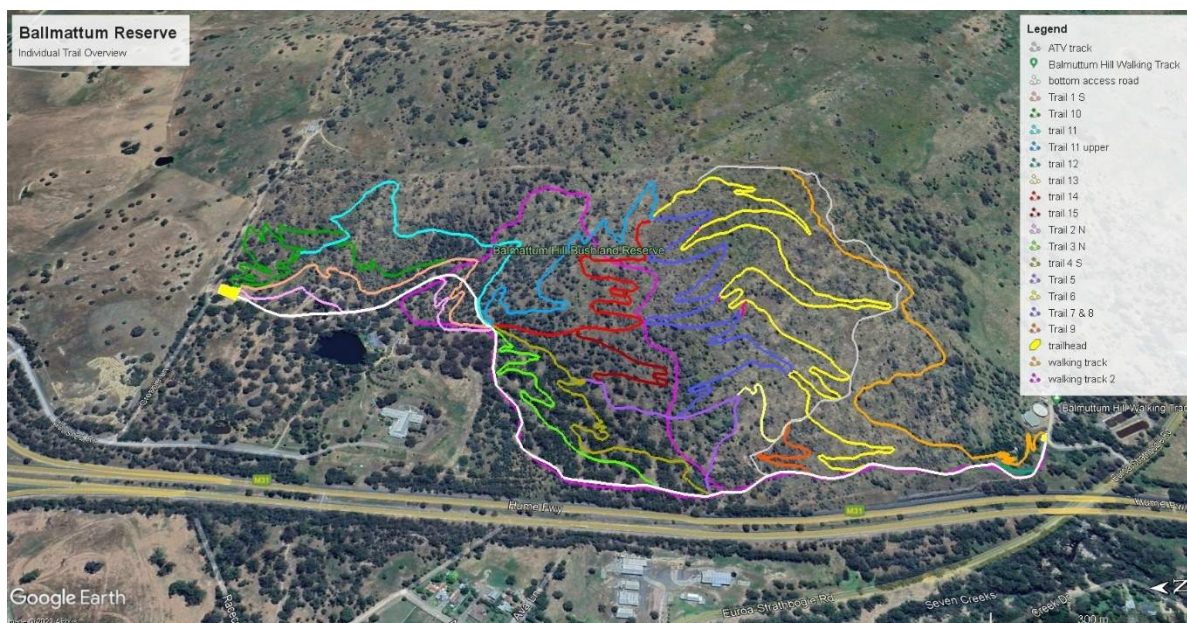
References

The following documents were used as references for the development of this Concept Plan:

Australian Mountain Bike Trail Development Guidelines (MTBA 2019)

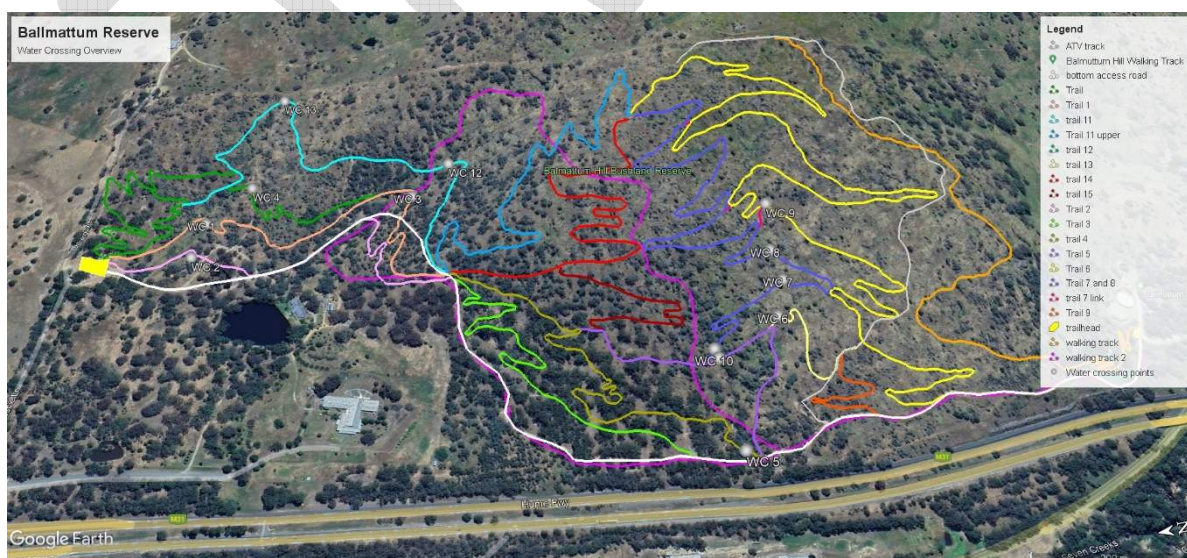
Appendix A – Individual Trail Assessments

Trail Overview



Water Crossings

Below map outlines the locations of the identified water crossing points within the network. Identification of the proposed crossings is outlined in table below, and within the individual trail descriptions.



Water Crossing (WC) Point Table

Water crossing (WC) #	Trail #	Distance (estimate) Metres	Crossing type
1	1	4	platform
2	2	5	platform
3	1	6	Platform - clear span
4	10	5	platform
5	4	5	platform
6	13	5	platform
7	8	6	platform
8	7	6	platform
9	6	4	platform
10	5	3	Rock armour
11	8	3	Rock armour
12	11	4	Rock armour
13	11	4	Rock armour
Total		61m	47m - platform 14m - rock armour

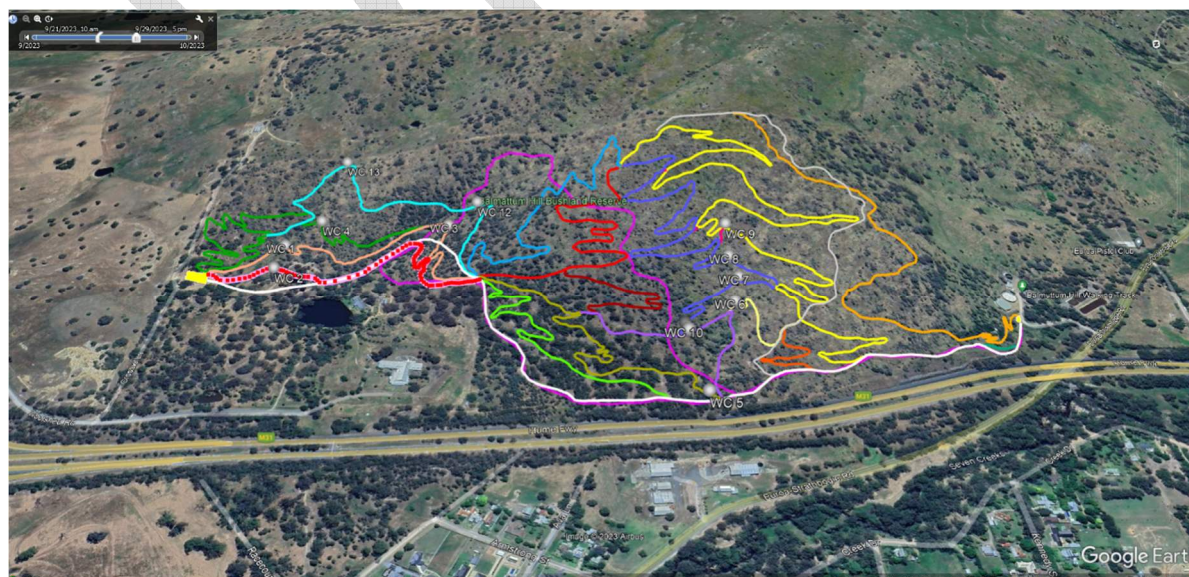
Trail 2

Trail Type	XC – Descending (accessible trail)
Trail Rating	green
Trail Length	0.8km
Elevation	Descent 50m / ascent 15m
Trail Description	<p>Easy XC type trail return to Northern trailhead. Connection of return Trails 4,11 (upper), 14 to trailhead. Or combined with Trail 1 for beginner loop from trailhead.</p> <ul style="list-style-type: none"> • 1.5m wide tread • Machine built through open terrain • Machine built features and berms • 5m platform with 2 handrails (WC 2) over gully at northern end • Utilises 200m section of access road and existing gully crossing in middle section

Elevation Profile – Trail 2



Trail Location – Trail 2



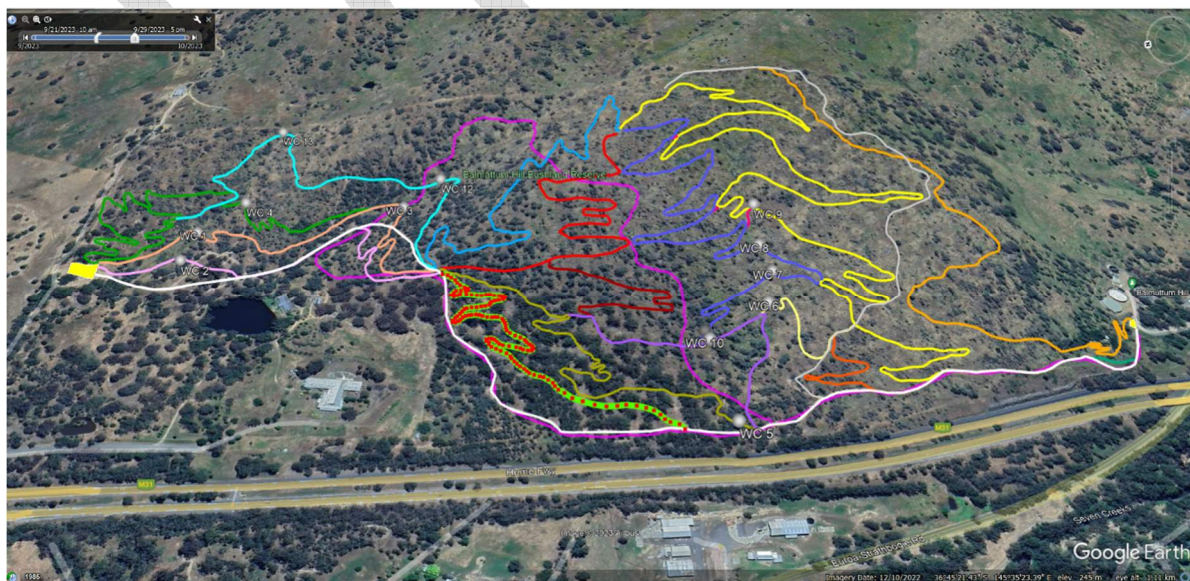
Trail 3

Trail Type	XC – Climbing (accessible trail)
Trail Rating	Green
Trail Length	0.8km
Elevation	Descent 28m / ascent 68m
Trail Description	<p>Easy XC type trail towards northern trailhead in lower area of network. Off access road or as a return to trailhead from Trails 4 or 5. Easier climb to bypass steep section of access road.</p> <ul style="list-style-type: none"> • 1.5m wide tread • Hand built through open flatter terrain • Machine built in steeper terrain and berms

Elevation Profile – Trail 3



Trail Location – Trail 3



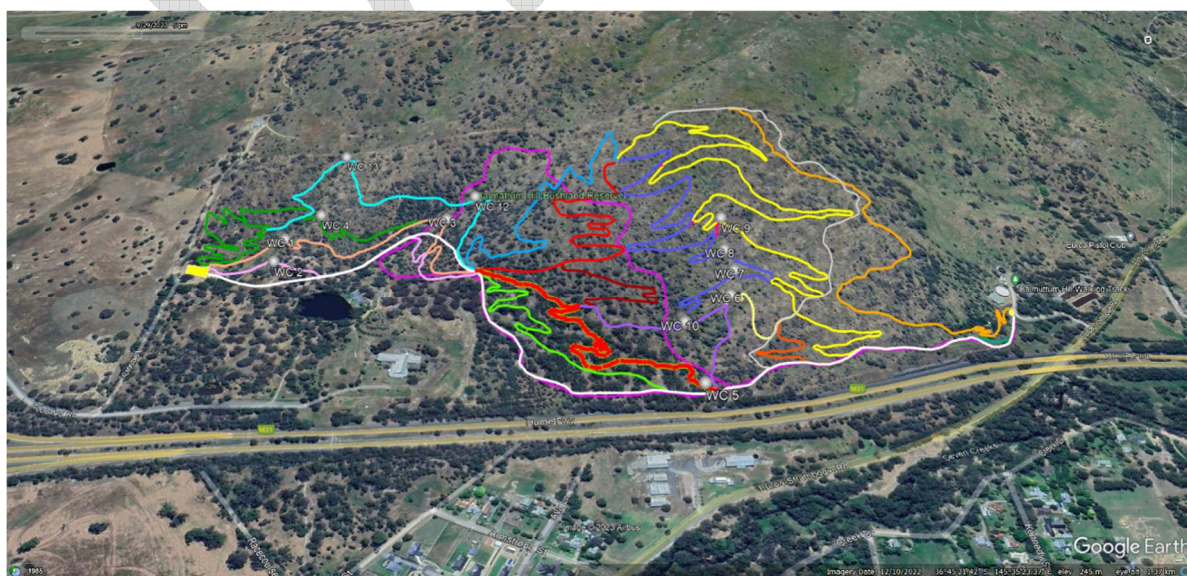
Trail 4

Trail Type	XC / Flow - Descending (accessible trail)
Trail Rating	green
Trail Length	0.9km
Elevation	Descent 68m / ascent 27m
Trail Description	<p>Easy XC / flow type trail away from norther trailhead in lower area of network. Off access road / trail 1 into wider network, or as a return loop from trailhead with Trails 1,2,3. Connection at mid-point to trail 5 for larger features.</p> <ul style="list-style-type: none"> • 1.5m wide tread • Introductory flow features / jumps • Hand built trail • Machine built features and berms • 4m platform (WC5) through gully at southern end

Elevation Profile – Trail 4



Trail Location – Trail 4



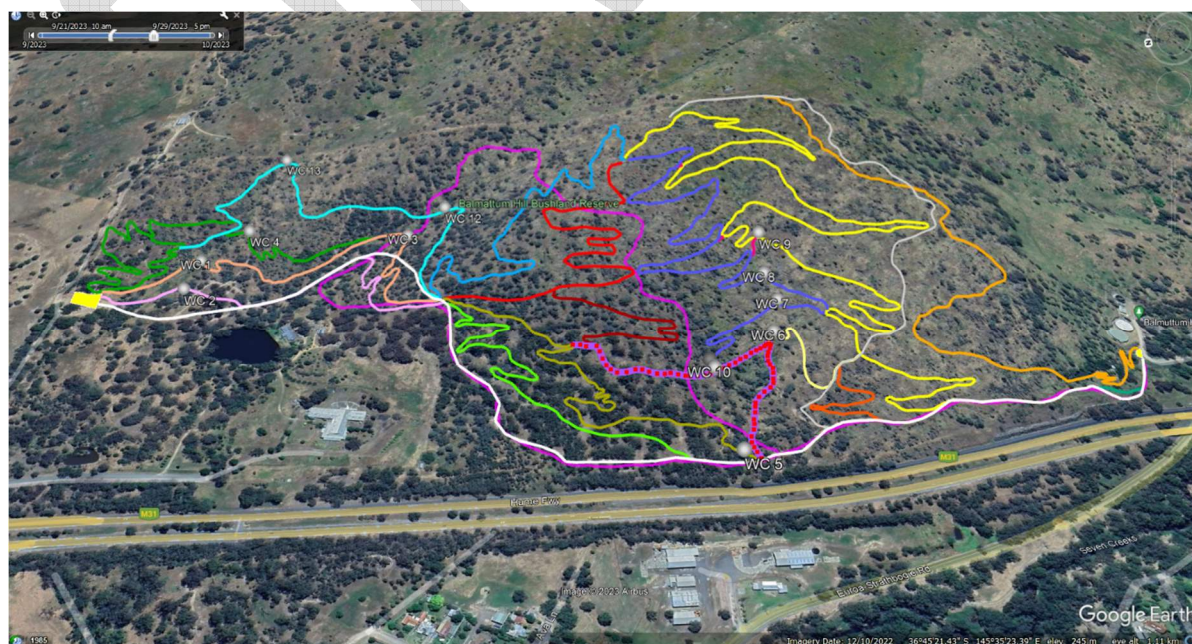
Trail 5

Trail Type	Flow / Jump - Descending
Trail Rating	Blue
Trail Length	0.55km
Elevation	Descent 49m / ascent 17m
Trail Description	<p>Intermediate flow type trail option off Trail 4, which finishes at the same location. Provides the end connection to Trails 8 and 15, or a link to main climb via connection to Trail 13 climb.</p> <ul style="list-style-type: none"> • 1.2 – 1.5m wide tread • Machine built trail • Machine built jump features and berms • Jumps to be rollable with optional lines where feasible • 3m rock armoured crossing (WC 10) through ephemeral gully

Elevation Profile – Trail 5



Trail Location – Trail 5



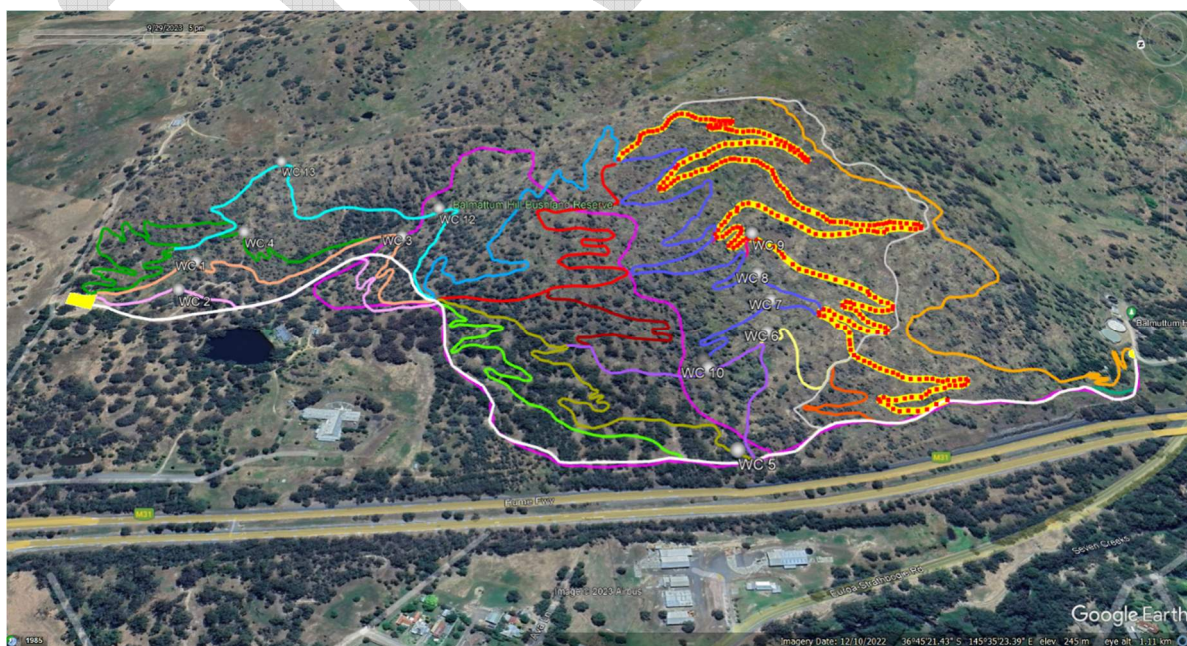
Trail 6

Trail Type	XC - Climbing
Trail Rating	Green / blue
Trail Length	2.77km
Elevation	Descent 84m / ascent 197m
Trail Description	<p>Main climb to the upper elevation of network. Starts off the main access track near the southern end of network but can be connected from the northern end either via access road, or following trails 1-4-5-13. Optional short linking sections connecting to trails 7 and 8 allow for shorter climbing options.</p> <ul style="list-style-type: none"> • 600-900mm wide tread • Hand built through open terrain • Machine built steeper terrain and switchbacks • 4m platform at WC 9 on optional connecting link to trail 7 • May be further requirement for minor rock armoring in 3 unidentified ephemeral crossing points above WC9 (6m total)

Elevation Profile – Trail 6



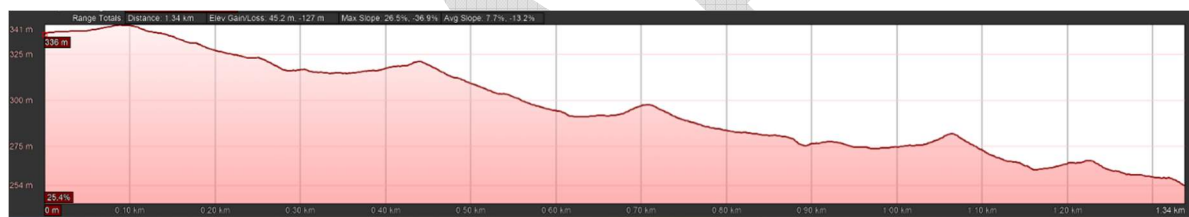
Trail Location – Trail 6



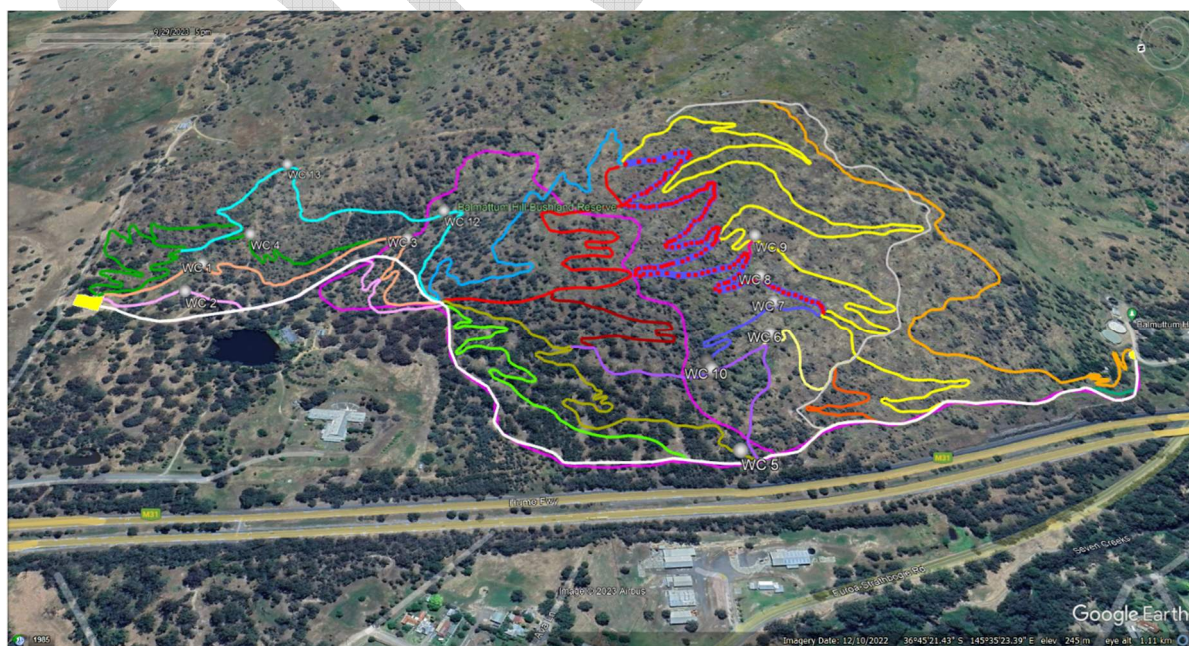
Trail 7

Trail Type	XC / flow - Descending
Trail Rating	blue
Trail Length	1.34km
Elevation	Descent 127m / ascent 46m
Trail Description	<p>Intermediate technical / flow type trail on southwestern face from high point in the network of climbing trail 6, as well as sorter loop connections at lower elevations. Also connects with trail 14 at 2 points for optional lines, and with trail 8 and 5 for longer descending.</p> <ul style="list-style-type: none"> • 600-900mm wide tread • Hand built through open / flatter terrain • Machine built through steeper / rockier terrain • Machine built features and berms • 6m platform crossing (with Handrail) at WC8

Elevation Profile – Trail 7



Trail Location – Trail 7



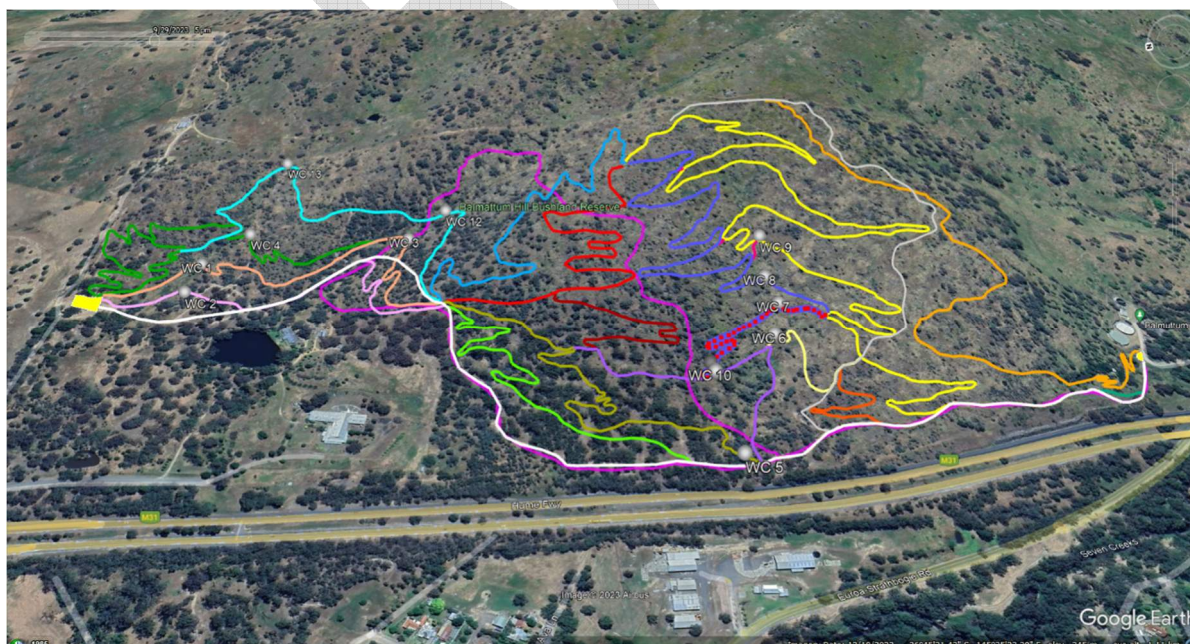
Trail 8

Trail Type	Flow - Descending
Trail Rating	Blue
Trail Length	0.35km
Elevation	Descent 40m / ascent 12m
Trail Description	<p>Intermediate flow type trail from end of trail 7, also connects with trail 5 for longer descending.</p> <ul style="list-style-type: none"> • 900 - 1200mm wide tread • Machine built throughout • Machine built features and berms • 6m platform crossing (with Handrail) at WC7 • Possible 3m rock armouring at WC11

Elevation Profile – Trail 8



Trail Location – Trail 8



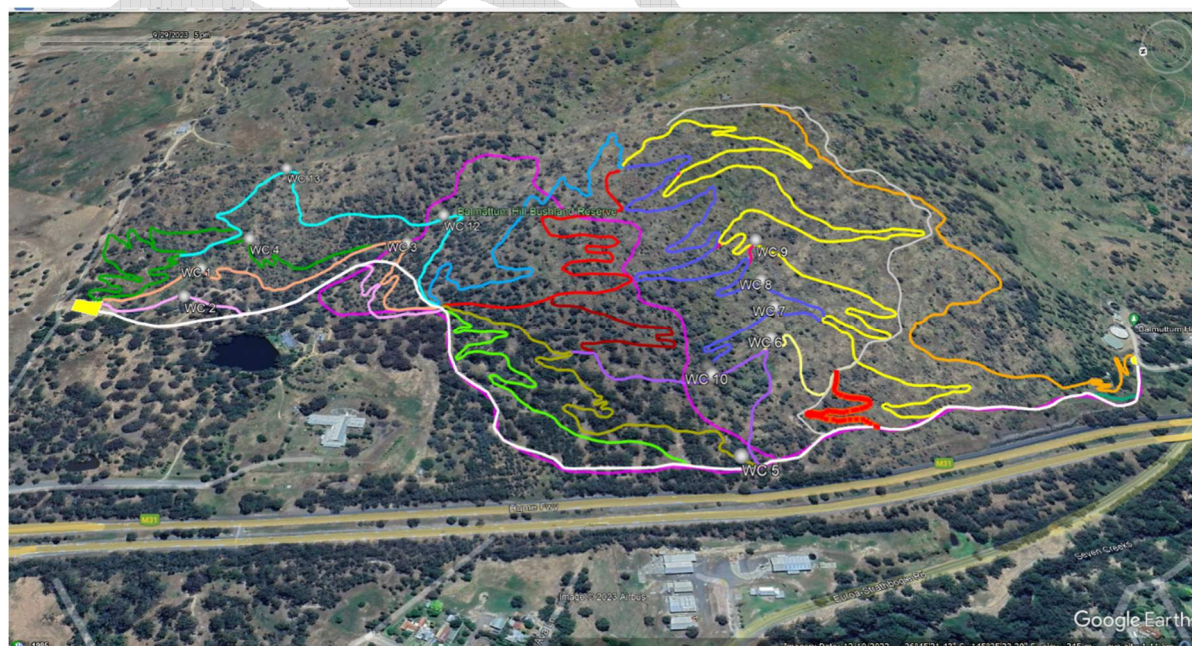
Trail 9

Trail Type	Flow - Descending
Trail Rating	Green / blue
Trail Length	0.3km
Elevation	Descent 27m / ascent 10m
Trail Description	<p>Easy / intermediate flow type trail in lower slopes at southern end of network. Connection off either lower section of main climb or via trail 13 climb.</p> <ul style="list-style-type: none"> • 900-1200mm wide • Machine built trail • Machine built smaller features and berms • First 20m of trail on ATV track

Elevation Profile – Trail 9



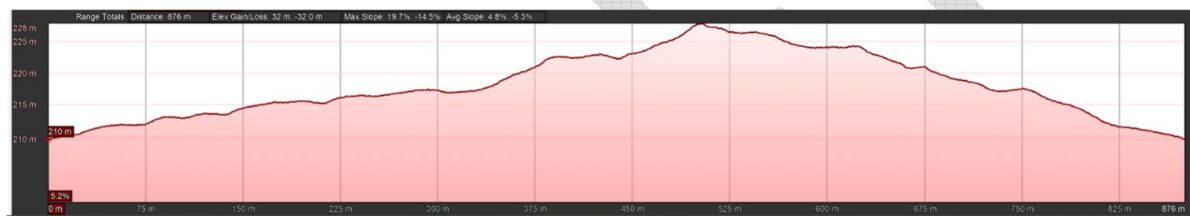
Trail Location – Trail 9



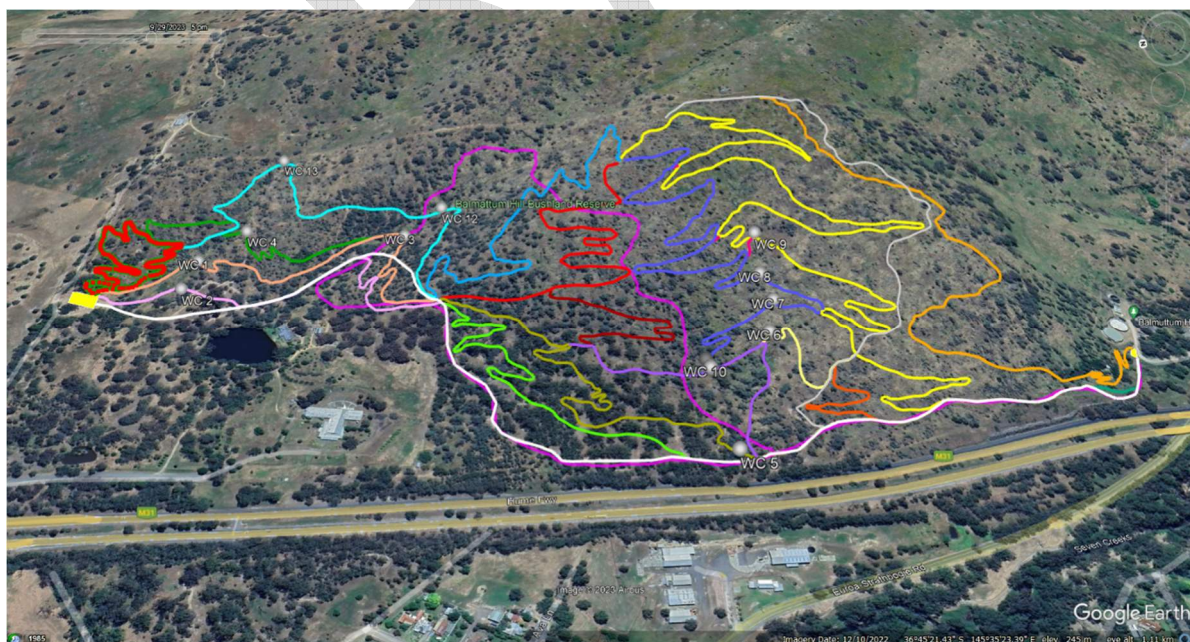
Trail 10 (Trails 10A and 10B)

Trail Type	XC - Descending and climbing loop
Trail Rating	Green / blue
Trail Length	0.68km
Elevation	Descent 32m / ascent 32m
Trail Description	<p>Easy / intermediate short XC type loop trail from northern trailhead. Connects to trail 10B at high point for connection to the wider network.</p> <ul style="list-style-type: none"> • 600-900mm wide tread • Hand built trail • Machine built features and berms

Elevation Profile – Trail 10A



Trail Location – Trail 10A

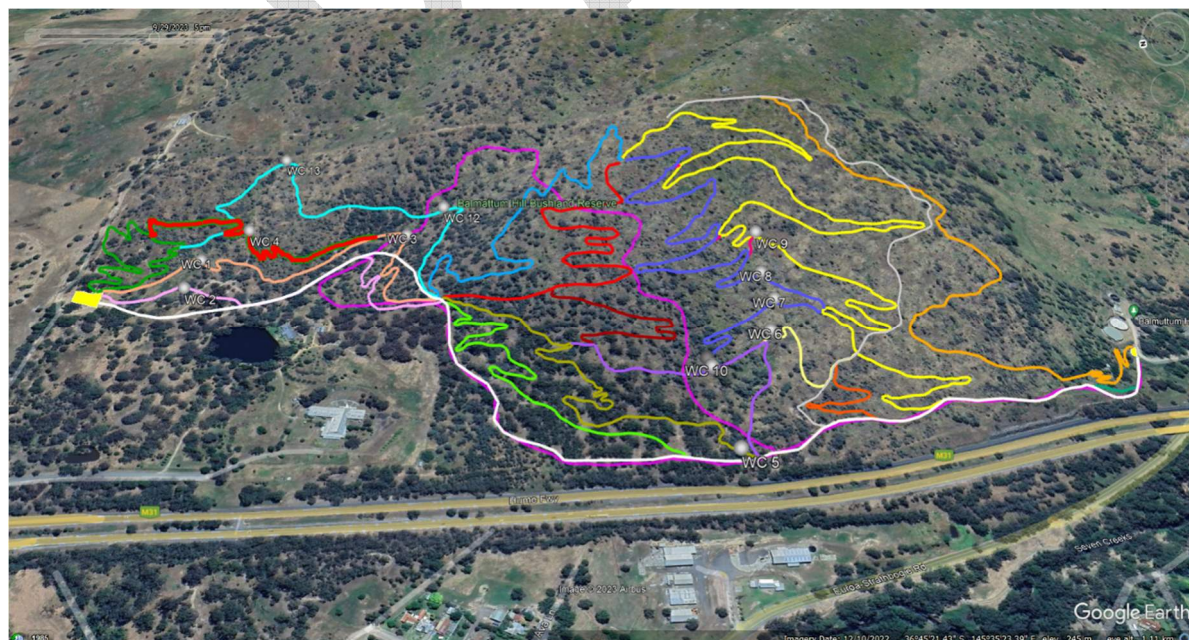


Trail Type	XC – descending and climbing
Trail Rating	Green / blue
Trail Length	0.63km
Elevation	Descent 20m / ascent 31m
Trail Description	<p>Easy / intermediate XC type trail from high point on Trail 10A. Connects to Trail 1 onto the wider network. Shares a short 20m section with Trail 11 Lower</p> <ul style="list-style-type: none"> • 600-900mm wide tread • Hand built trail • Machine built features and berms • 5m platform (1200mm wide) with 1 handrail at WC4

Elevation Profile – Trail 10B



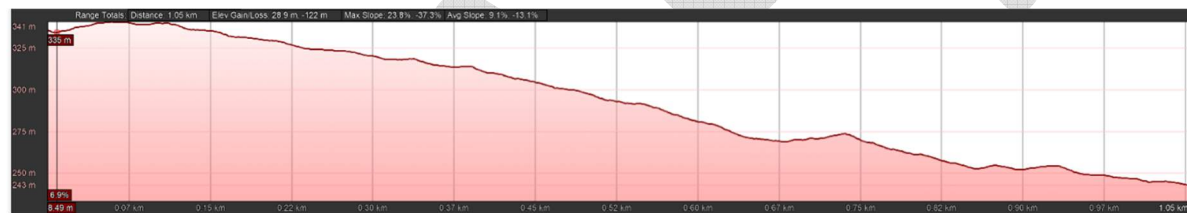
Trail Location – Trail 10B



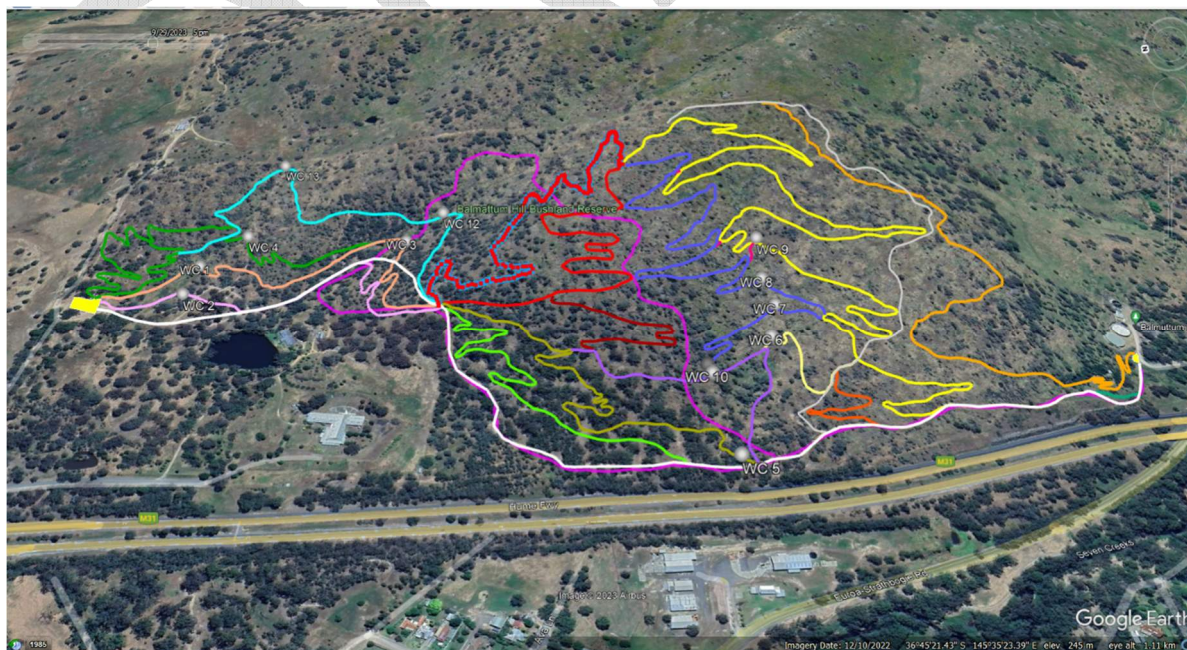
Trail 11 (trails 11 upper and lower)

Trail Type	All Mountain / technical - Descending (Trail 11 Upper)
Trail Rating	Blue / black
Trail Length	1.06km
Elevation	Descent 122m / ascent 29m
Trail Description	<p>Intermediate / advanced technical type trail from high point in network down the steeper / rockier northwestern face. Ends intersection with trails 1,2,3,4,14 or continue via Trail 11 Lower back to trailhead.</p> <ul style="list-style-type: none"> • 450 – 900mm wide trail tread • Hand built through rocks where required • Machine built elsewhere • Machine built features and berms

Elevation Profile – Trail 11 Upper



Trail Location – Trail 11 Upper

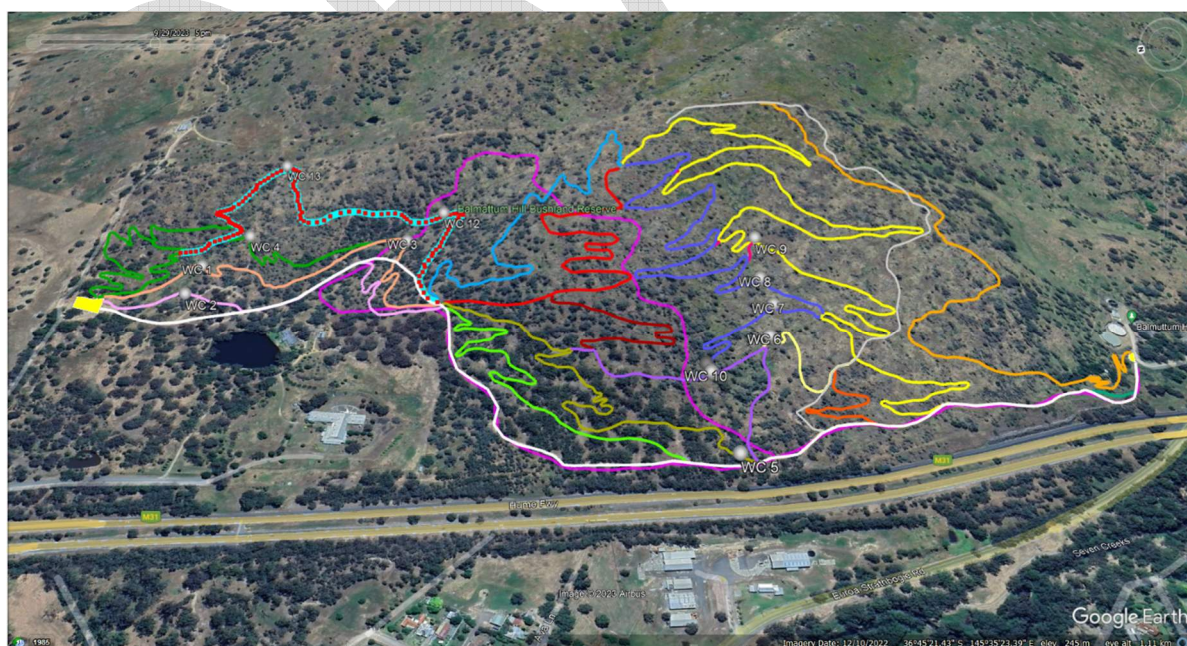


Trail Type	All Mountain / flow -Descending (Trail 11 lower)
Trail Rating	blue
Trail Length	1.03km
Elevation	Descent 68m / ascent 47m
Trail Description	<p>intermediate flow type trail with some technical and uphill sections from intersection with Trails 1,2,3,4,14. Extension of Trail 11 Upper or optional harder / longer trail back to northern trailhead.</p> <ul style="list-style-type: none"> • 600-900mm trail tread • Hand built through open terrain • Mb features and berms • 2 x 4m rock armoured crossings at WC12 and WC13

Elevation Profile – Trail 11 Lower



Trail Location – Trail 11 Lower



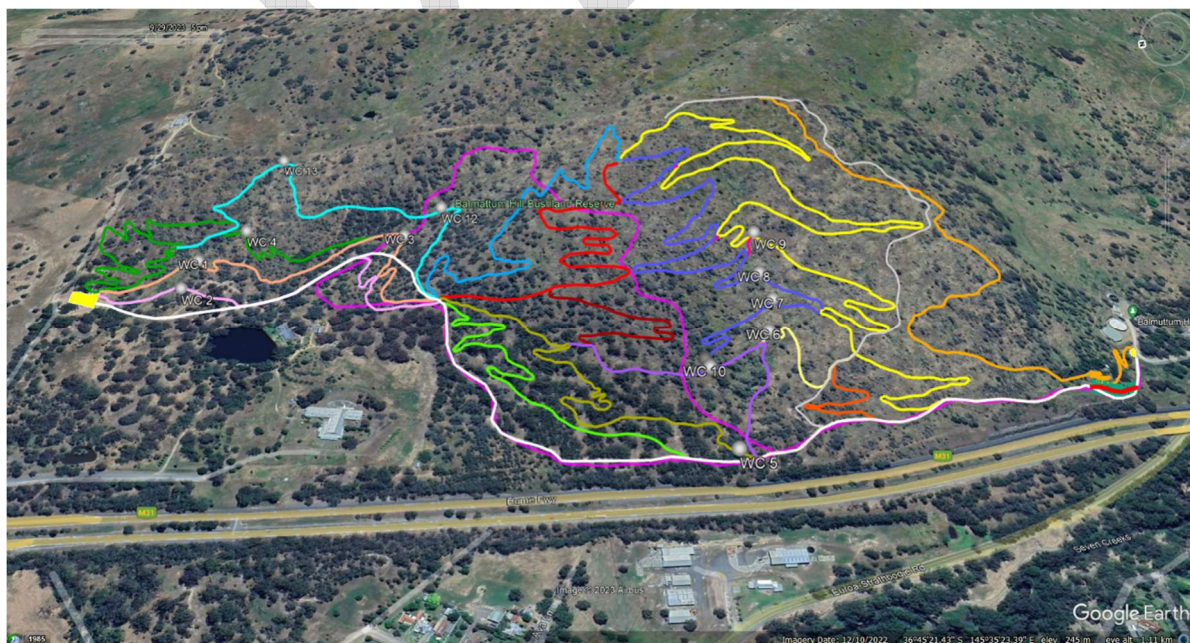
Trail 12

Trail Type	XC – dual direction (accessible Trail)
Trail Rating	green
Trail Length	0.08km
Elevation	Descent 10m / ascent 2m
Trail Description	<p>Easy dual direction XC connector trail at southern end of Reserve. Designed to bypass steep section of access road from southern trailhead.</p> <ul style="list-style-type: none"> • 1500mm wide trail tread • Machine built trail

Elevation Profile – Trail 12



Trail Location – Trail 12



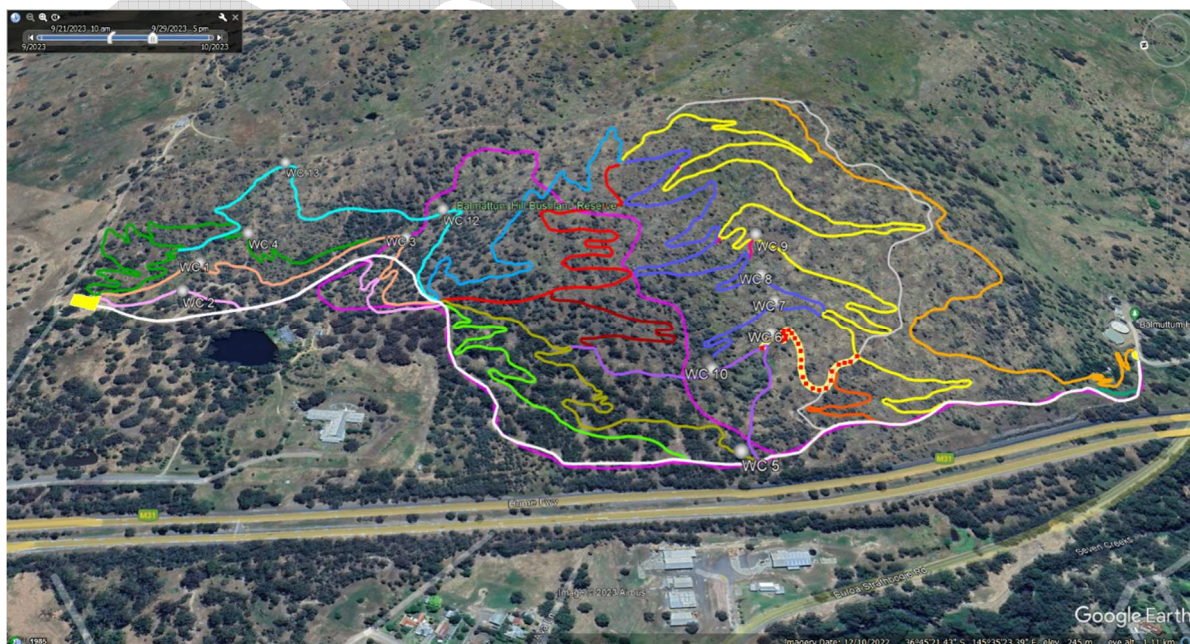
Trail 13

Trail Type	XC - Climbing
Trail Rating	Green / blue
Trail Length	0.3km
Elevation	Descent 20m / ascent 26m
Trail Description	<p>Intermediate climbing type trail connecting Trail 5 up to main climbing trail or on to Trail 9. Connects to main climb via 20m section of ATV track.</p> <ul style="list-style-type: none"> • 450-900mm wide trail tread • Hand built through open terrain • Machine built features and berms • 5m platform at crossing WC6

Elevation Profile – Trail 13



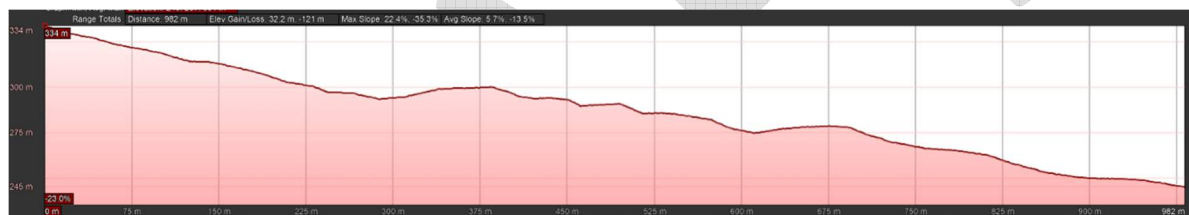
Trail Location – Trail 13



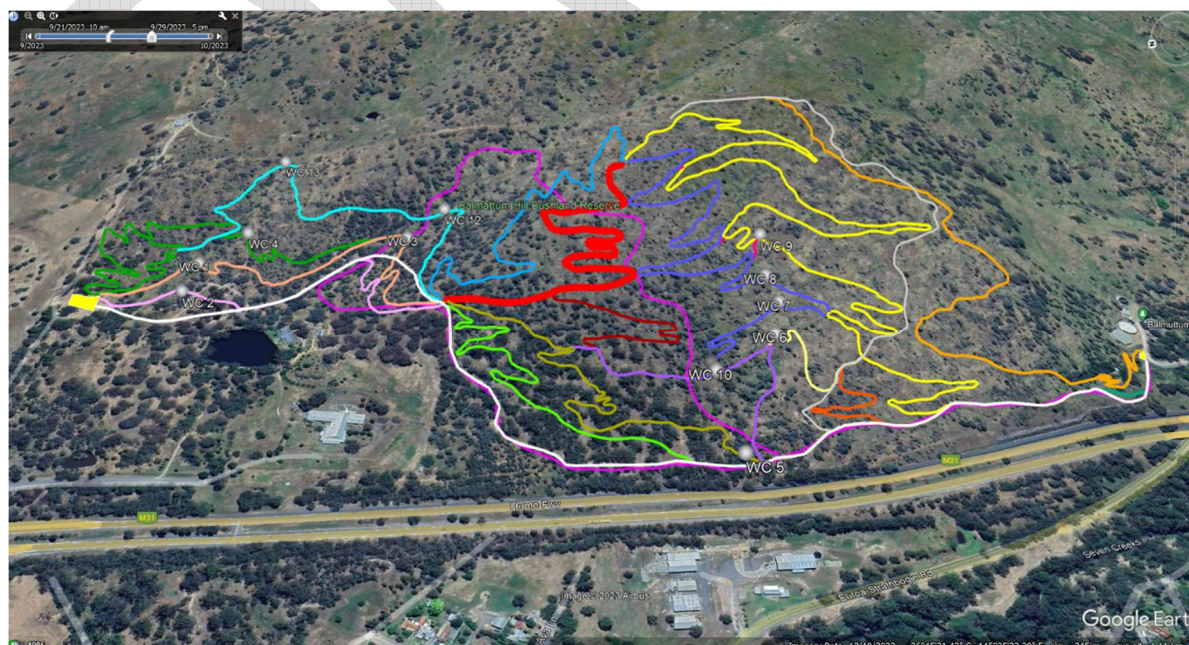
Trail 14

Trail Type	DH / all mountain - Descending
Trail Rating	Blue / black - Black
Trail Length	0.98km*
Elevation	Descent 121m / ascent 32m*
Trail Description	<p>Intermediate / advanced technical type trail from high point in network down the steeper / rockier western face. Ends at intersection with trails 1,2,3,4,14 or connects to Trail 5 via Trail 15 for continued descending to access road. Potential to construct optional lines through numerous rock outcrops.</p> <p>* Guide only, requires further ground truthing for optional lines</p> <ul style="list-style-type: none"> • 450 – 900mm wide trail tread • Hand built through rocks where required • Machine built elsewhere • Machine built features and berms • Potential rock armouring on optional lines

Elevation Profile – Trail 14



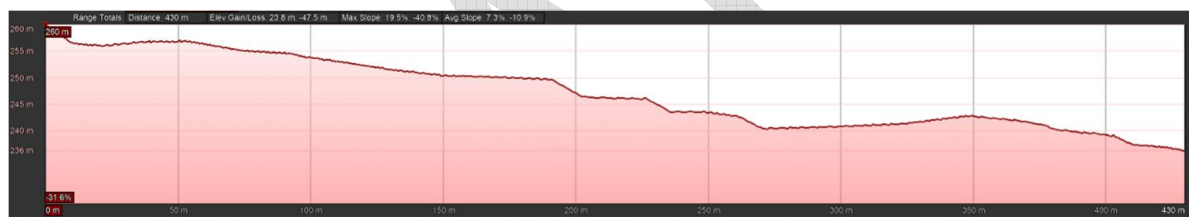
Trail Location – Trail 14



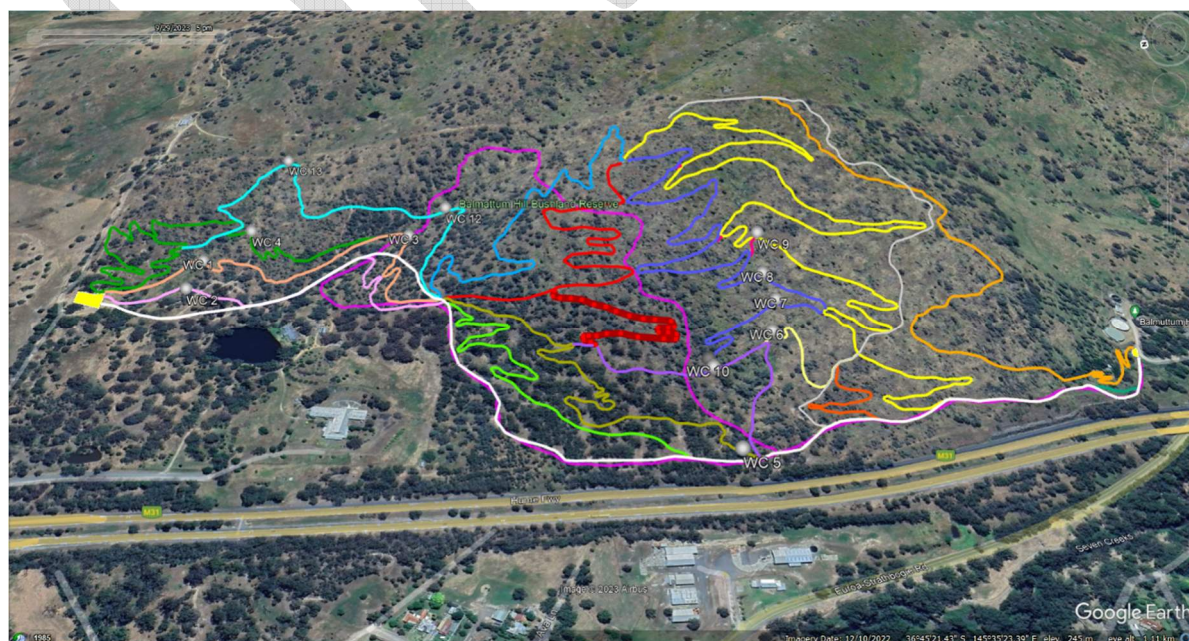
Trail 15

Trail Type	DH / Flow - Descending
Trail Rating	Blue / black - Black
Trail Length	0.43km*
Elevation	Descent 48m / ascent 23m
Trail Description	<p>Intermediate / advanced DH / flow type trail of Trail 14 down the steeper / rockier western face. Connects to Trail 5 for continued descending to access road. Potential to construct optional lines through numerous rock outcrops.</p> <p>* Guide only, requires further ground truthing for optional lines</p> <ul style="list-style-type: none"> • 450 – 900mm wide trail tread • Hand built through rocks where required • Machine built elsewhere • Machine built features and berms <p>Potential rock armouring on optional lines</p>

Elevation Profile – Trail 15



Trail Location – Trail 15



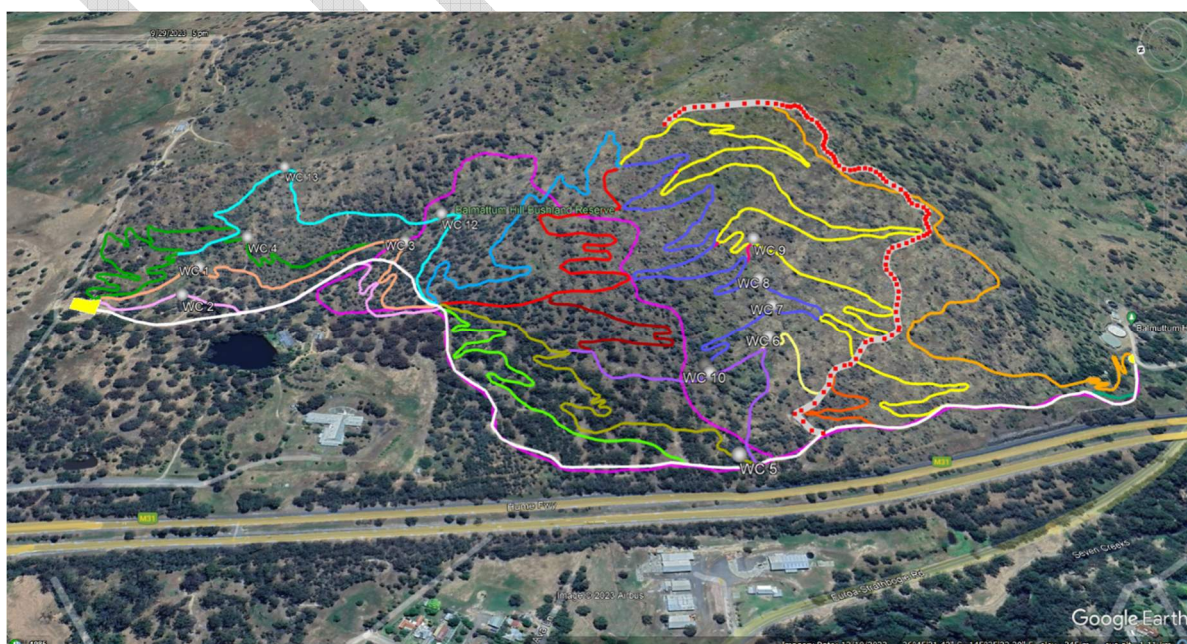
ATV Track

Trail Type	Access road
Trail Rating	N/A
Trail Length	1.14km
Elevation	Descent 16m / ascent 168m
Trail Description	<p>Existing track from access road up to seat at top of main walking trail. Requires extensive repair / reshaping for lower half of trail, and vegetation clearing /reinstating on upper half.</p> <p>Potential for use by ebikes or ATV shuttle service for access to top of network</p> <ul style="list-style-type: none"> • 2.4m wide tread • Machine built / repairs • Hand clearing only where required • Extension north beyond top of walking trail is new trail requiring new construction for access to MTB trails.

Elevation Profile – ATV Track



Trail Location – ATV Track



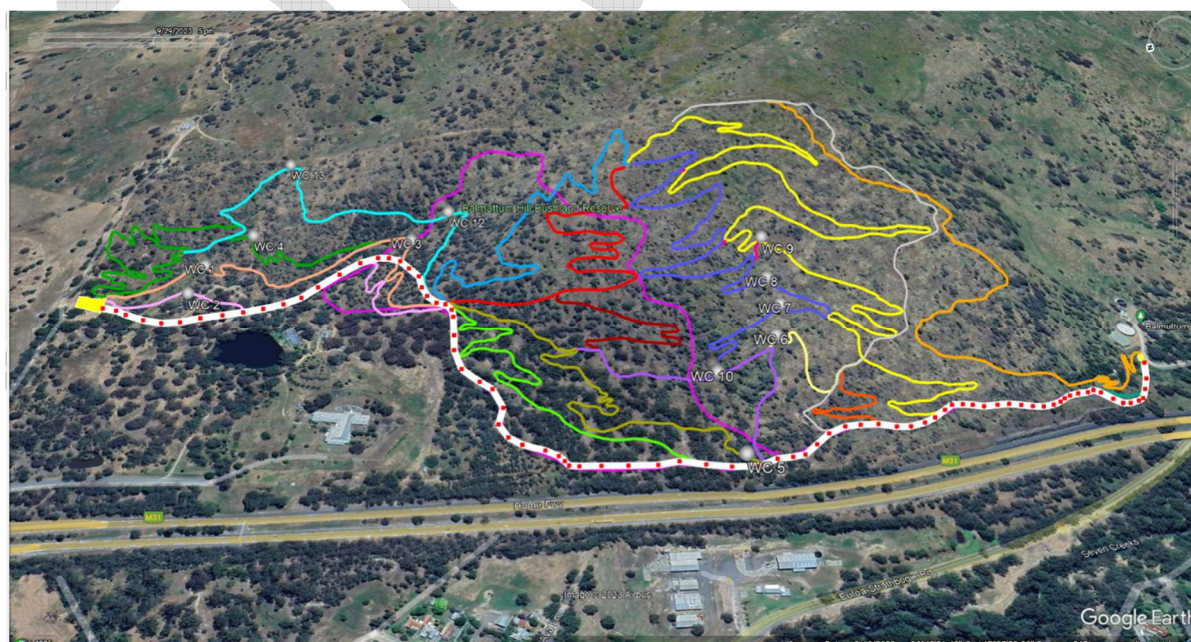
Access Road

Trail Type	XC – access road (Dual Direction)
Trail Rating	green
Trail Length	1.8km
Elevation	Descent 76m / ascent 77m
Trail Description	<p>Existing track from southern trailhead to northern trailhead along Western boundary of Reserve. Connecting shared use trail to broader network, with bypass trails (trails 2,3,12) around steep sections.</p> <p>Requires extensive repair / regrading in some sections. Existing gully crossing require importation of rock material to stabilise.</p> <ul style="list-style-type: none"> • 2.4m wide tread • Machine built / repairs • Importation of rock fill material required

Elevation Profile – Access Road



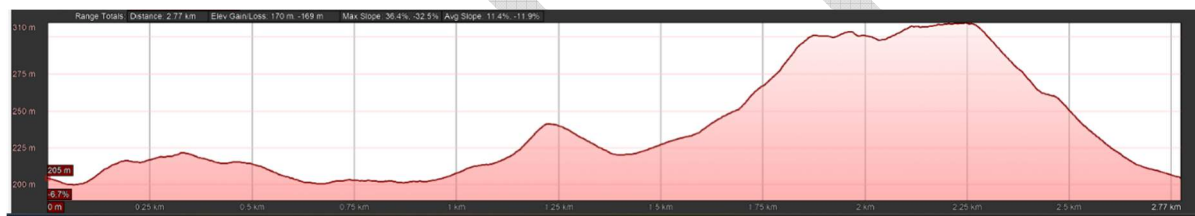
Trail Location – Access Road



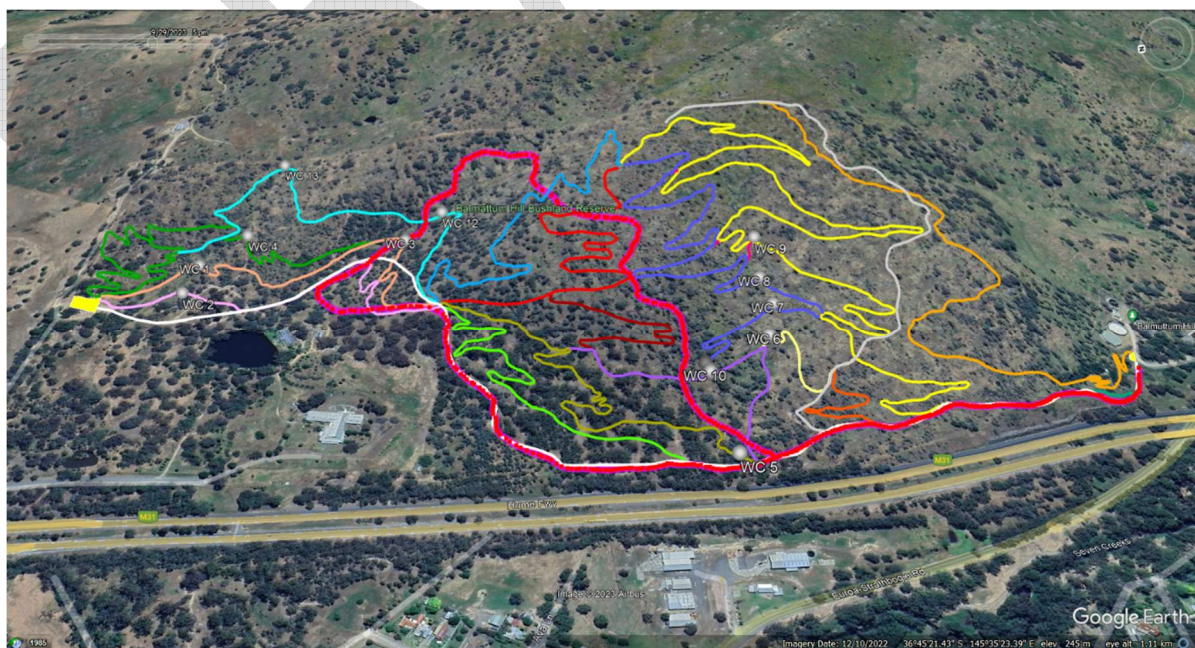
Existing Walking Trails

Trail Type	Walking – secondary walking trail
Trail Rating	Class 4
Trail Length	2.77km
Elevation	Descent 163m / ascent 170m
Trail Description	<p>Existing trail not audited or repairs costed as not part of this scope of work.</p> <p>However, through general observation, is mostly overgrown and hard to navigate, with deep erosion present on steeper fall line sections of trail.</p>

Elevation Profile – Secondary Walking Trail



Trail Location - Secondary Walking Trail

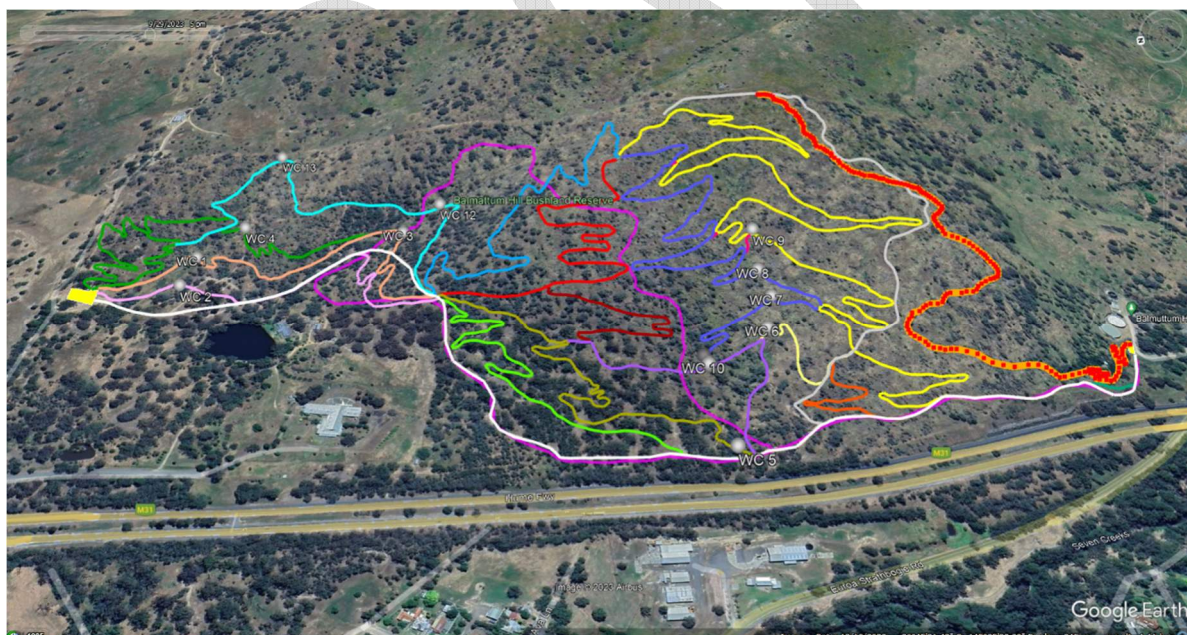


Trail Type	Walking – main walking trail
Trail Rating	Class 3
Trail Length	1.33km
Elevation	Descent 23m / ascent 183m
Trail Description	<p>Existing trail not audited or repairs costed as part of this scope of work.</p> <p>However, through general observation, generally on ok condition, requiring periodic corridor vegetation cutting. Some deep erosion present on steeper fall line sections of trail.</p>

Elevation Profile – Main Walking Trail



Trail Location - Main Walking Trail



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Appendix B – Photos



Photo 1 – Site Overview – Southern aspect



Photo 2 – Proposed northern trailhead area



Photo 3 – Site Overview – North Eastern Aspect

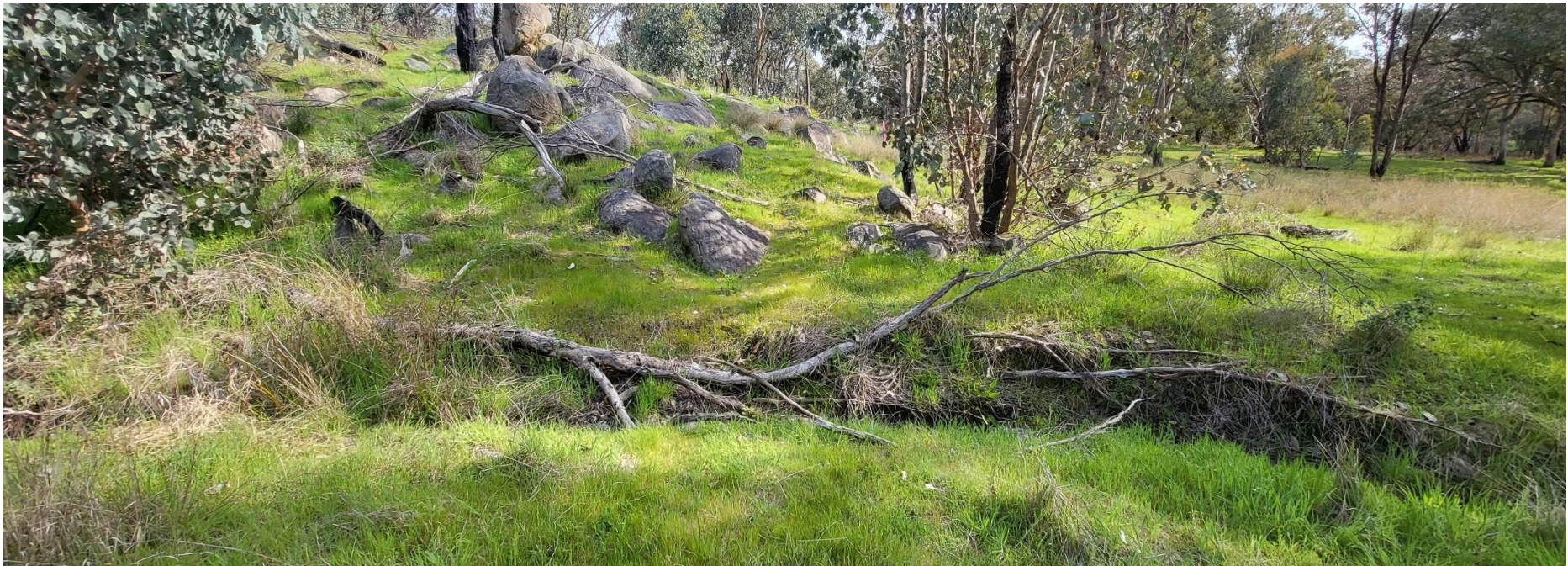


Photo 4 – typical gully crossing requiring platform structure (WC 1)