



EES chapter 3 – Project description

Warburton Mountain Bike Destination

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3.0 Project description

This chapter describes the design, construction and operation of the Warburton Mountain Bike Destination (the project). The project, as described in this chapter, is the basis for the impact assessments presented in this environment effects statement (EES).

There is no plan to decommission the mountain bike trails and associated infrastructure once built. Therefore, decommissioning of the project has not been included as part of the EES.

3.1 Warburton Mountain Bike Destination

3.1.1 Project overview

The project is a proposed world-class mountain biking destination centred around Warburton, approximately 70 kilometres east of Melbourne as shown in Figure 3-1. A significant informal network of mountain bike trails currently exists within the region and there is evidence of increasing use of these trails by local and visiting riders. Mountain biking in this locality started around 15 years ago and was concentrated in the Yarra State Forest in the vicinity of Mount Tugwell.

Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within the region which would support the region through stimulating the visitor economy and improving the health and well-being of its residents. The project would create iconic trails eligible for International Mountain Bike Association Gold Level Ride Centre status which would position Warburton as an internationally significant mountain biking destination.

The project objectives are to:

- Facilitate tourism growth and associated positive economic and jobs growth in the Yarra Valley region
- Create iconic mountain bike trails eligible for International Mountain Bike Association Gold Ride Centre status
- Create spectacular riding experiences that have a competitive advantage over existing mountain bike destinations and leverage Warburton's beautiful township, rural valley and surrounding forested slopes
- Enhance the health and well-being of the community
- Maintain the significant biodiversity and heritage values within the project area and provide opportunities for the community to connect with and appreciate their importance.

The project consists of up to 177 kilometres of mountain bike trails providing a range of mountain bike experiences to suit all levels of riding, as shown in Figure 3-2. The project also includes a new Visitor's Hub and main trail head at the Warburton Golf Course and other trail heads at Mount Tugwell, Mount Donna Buang and Wesburn Park as shown in Figure 3-2.

Separate to this project, a Master Plan is being prepared for the wider development of Wesburn Park.

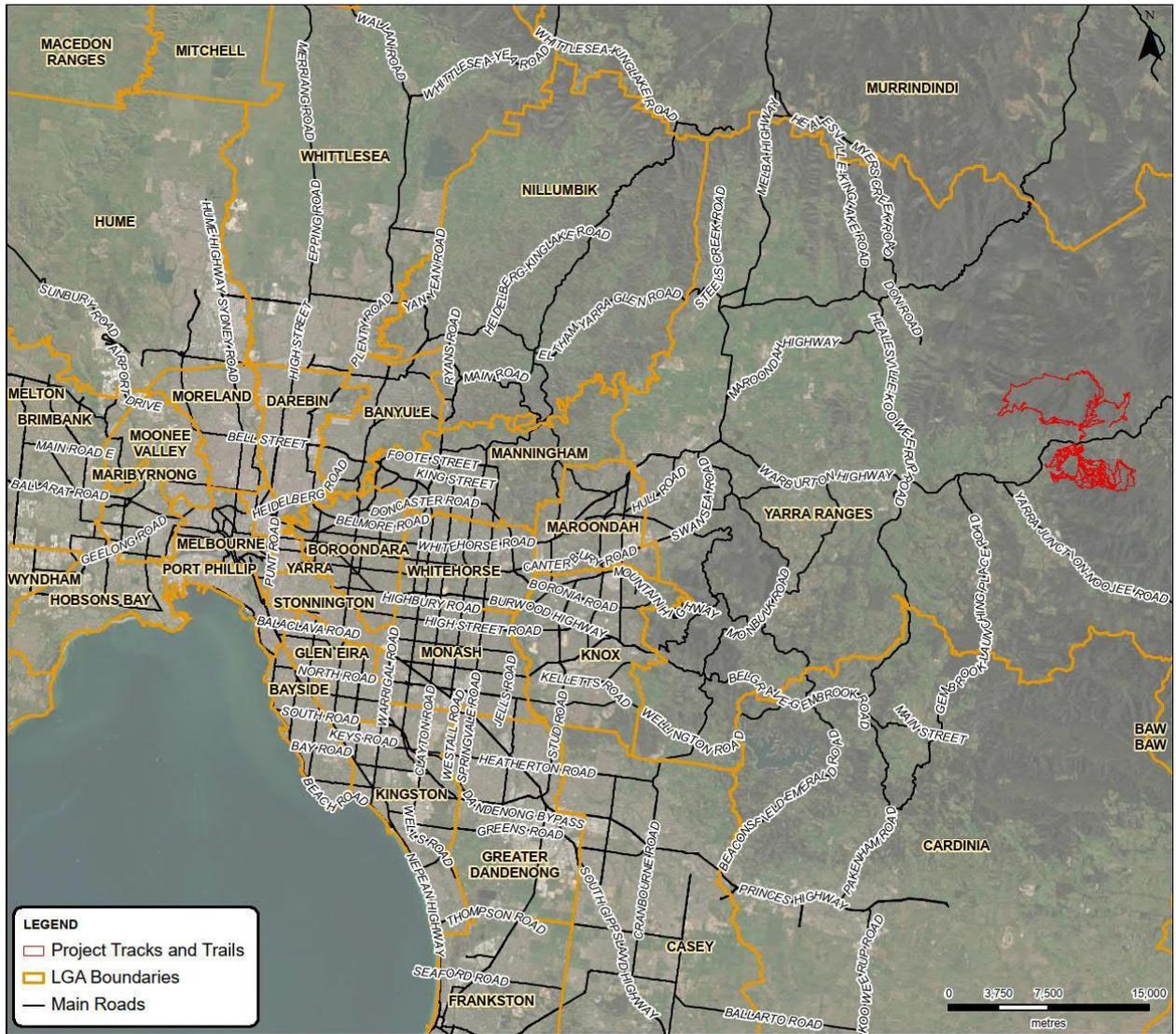


Figure 3-1 Warburton Mountain Bike Destination location in relation to Melbourne CBD

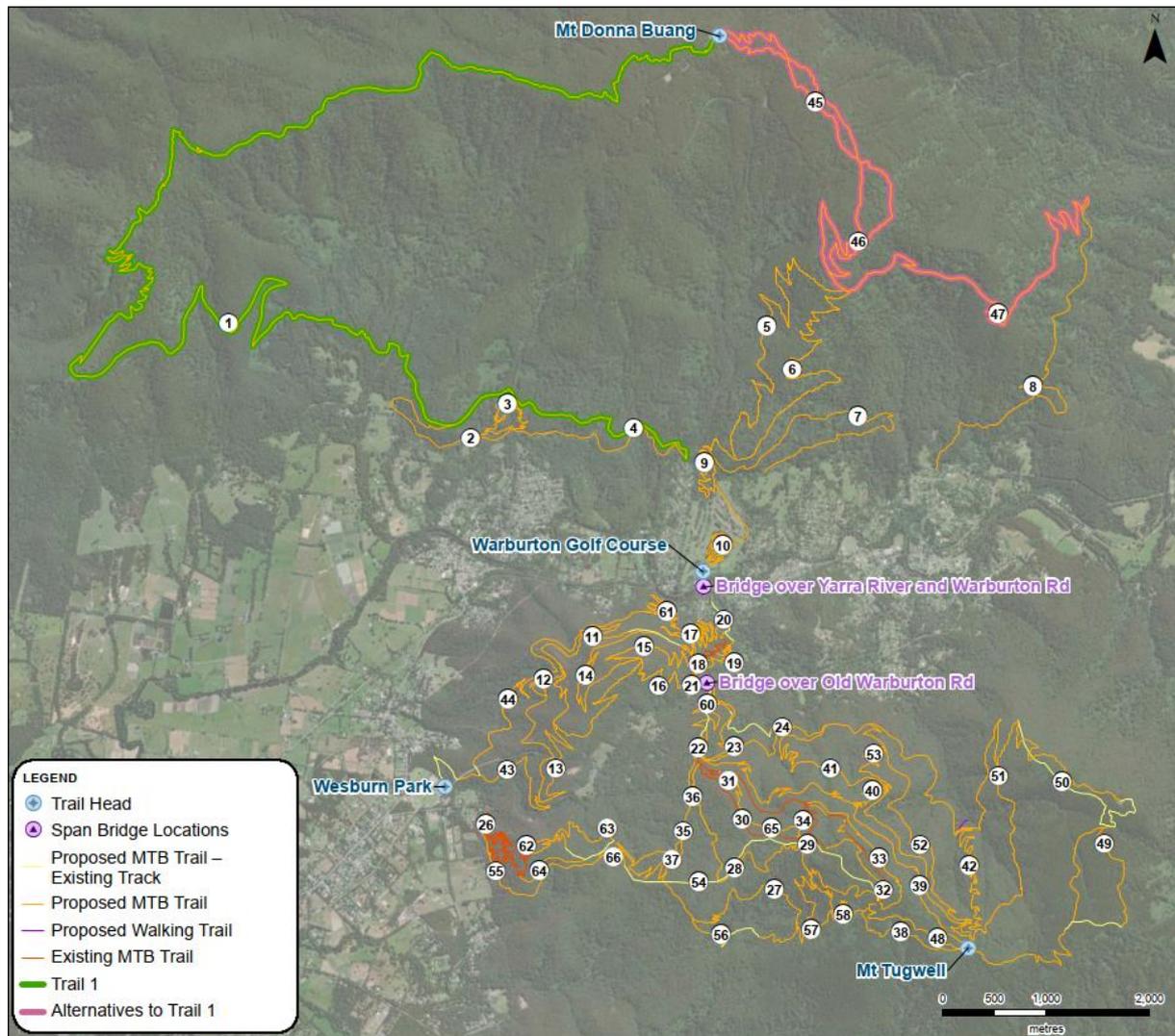


Figure 3-2 Project overview

3.1.2 Main project components

The main project components proposed are as follows:

- The mountain bike trail network, consisting of:
 - Upgrade of existing mountain bike trails – approximately 12 kilometres (seven per cent of project length)
 - New mountain bike trails – up to 155 kilometres (87 per cent of project length)
 - Existing vehicle roads and tracks to be incorporated into the mountain bike trail network - approximately 10 kilometres (six per cent of project length)
- Two new significant bridges, as follows:
 - Yarra River Bridge (shared use), crossing over the Yarra River, Warburton Highway and Dammans Road
 - Old Warburton Road Bridge (mountain bike use only), crossing over Old Warburton Road
- New Visitor's Hub and main trail head at the Warburton Golf Course, new trail head facilities at Mount Tugwell, Mount Donna Buang and Wesburn Park (which includes an additional 120 car parking spaces). An additional network access point to the network will be at Dee Road, which is an established access point for the O'Shannassy Aqueduct Trail.

These components are discussed in more detail in terms of their design, construction and operation in Sections 3.2, 3.3 and 3.4.

3.1.3 Project timing

The timing of the key project phases is proposed as follows:

- Project development and approval: mid 2022
- Project construction, Stage 1 (approximately 110 kilometres): progressively from mid-2022
- Project operations and maintenance: staged opening during 2022 and beyond.

The construction phase of the project is separated into Stage 1 and Stage 2. Construction Stage 1 is fully funded however, Stage 2 is subject to acquiring funding. Stage 1 would involve the construction of 110 kilometres of trails from early 2022 and would take approximately 18 months. Stage 2 is subject to funding and would take approximately 12 months to construct. The exact trails and infrastructure to be delivered under each stage has not yet been determined and will be finalised once the final design has been approved and costed.

The timeframes for planning, construction and operation of the project are shown in Figure 3-3 below.

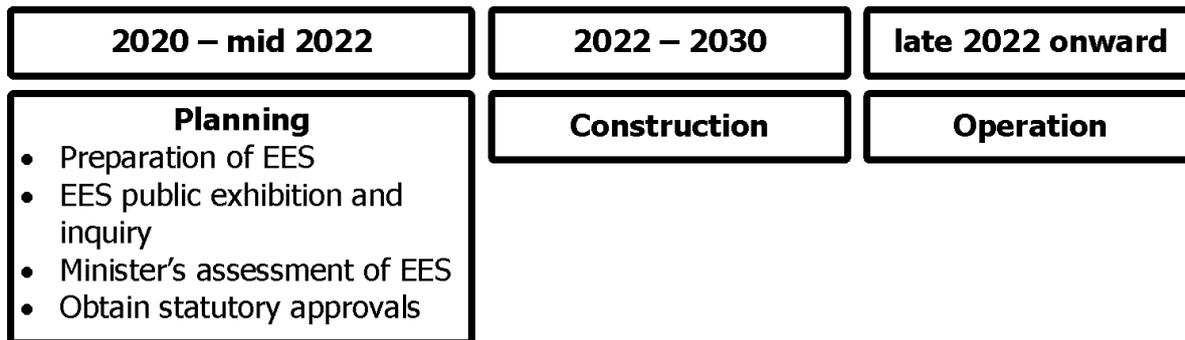


Figure 3-3 Project timeline

3.1.4 Project area

The project area is located 70 kilometres east of Melbourne in the Yarra Ranges and is centred around the township of Warburton. The project area extends across Mount Donna Buang, Mount Little Joe, Mount Tugwell, and Mount Bride. The landscape surrounding the proposed mountain bike trail is heavily forested and mountainous. In some cases, proposed trails would be isolated from roads, and other public infrastructure.

The northern section of the project area is located to the north of the Warburton Highway within the Yarra Ranges National Park. This area includes Mount Donna Buang. Some sections of the northern trails would cross into the Woi Wurrung State Forest, road reserves and freehold land within the Warburton Golf Course. The southern section of the project area is located to the south of the Warburton Highway within the Yarra State Forest. This area includes Mount Little Joe, Mount Tugwell and Mount Bride. Some sections of the southern trails would cross into natural feature reserves and freehold land. The national park and state forest boundaries are shown in Figure 3-4.

The proposed trails would intersect seven private landholdings and run within 100 metres of a further 29 private residences. Traversing Mount Donna Buang, Mount Little Joe, Mount Tugwell, Mount Bride and the O’Shannassy Aqueduct Trail, the proposed trails intersect with a range of existing recreation uses including bushwalking, trail running, hunting, horse riding, recreational motorcycle riding and four-wheel driving. The proposed development of the main trail head would result in an intersection between the project and the Warburton Golf Course.

Maps showing other features such as planning overlays and zones, nearby residences, businesses, waterways and waterway crossings are provided in **Attachment I: Map Book, Chapter 9: Surface water, groundwater and geotechnical hazards** and **Chapter 11: Land use and planning**.

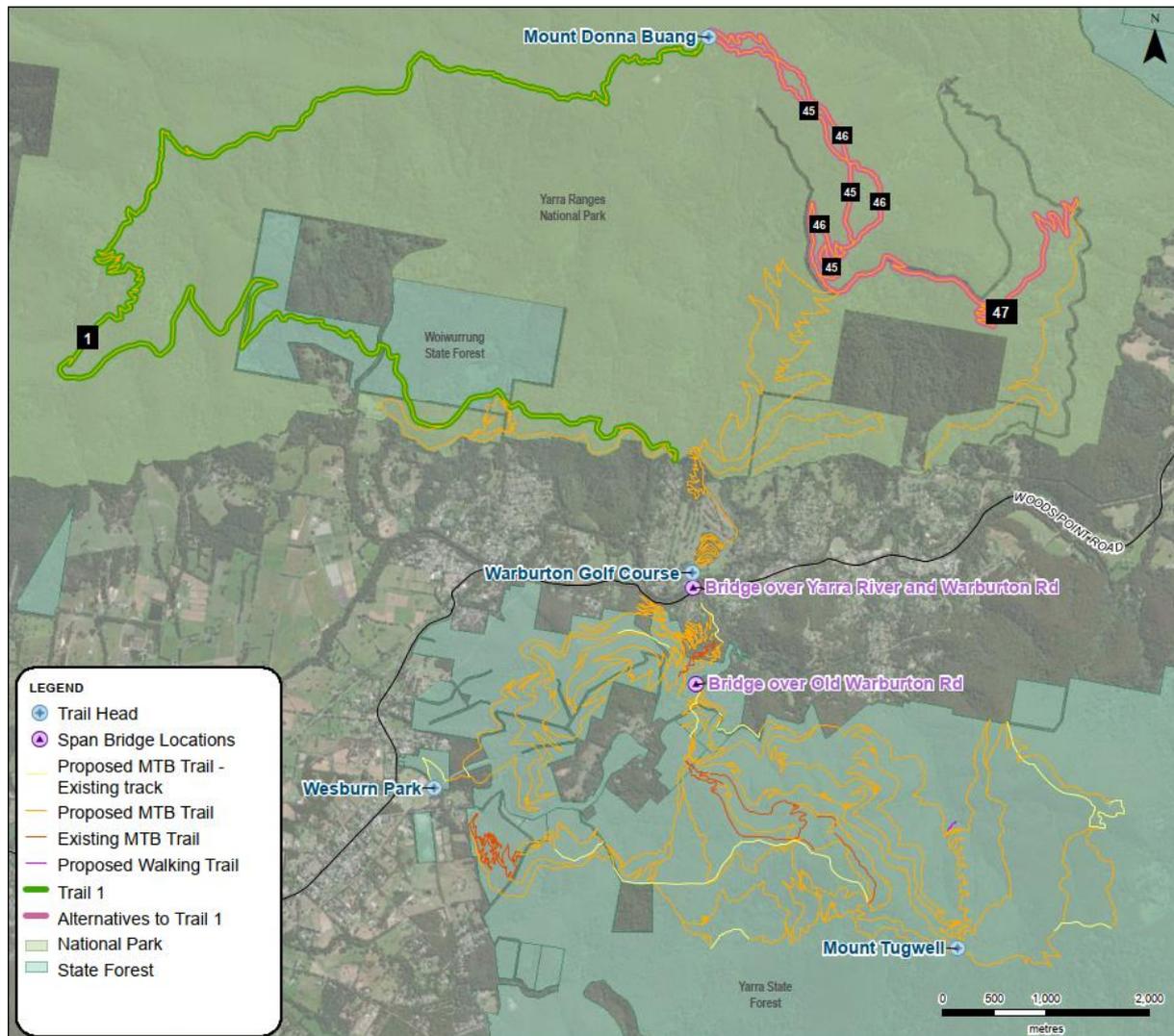


Figure 3-4 Key features of the project area

3.2 Project design

3.2.1 Mountain bike trail network

The project is anticipated to consist of up to 177 kilometres of mountain bike trails providing a range of mountain bike experiences to suit all levels of riding. A particular focus of the design has been the incorporation of trails and infrastructure that will support bringing new participants to the sport and encourage females and families to engage.

The trail network is made up of up to 61 trails, each ranging in difficulty from easy to extreme, as shown in Figure 3-5 and described in Table 3-1. Some of the trails are returning loops, while others are point-to-point trails. The trails have also been categorised into six different styles including, adventure, air flow, downhill, flow country, gravity and wilderness as shown in Table 3-1. A summary of each style is provided below:

- **Adventure:** One of the world's most prolific trail styles, traditionally referred to as cross-country, adventure trails are the most popular gateway trail for all levels of mountain bike riders. They have a free-flowing style and maximise use of the natural terrain with contour-hugging designs that allow riders to feel confident, while also providing options and features for extra challenge.
- **Air flow:** Developed by World Trail, air flow trails combine everything we love about Enduro and gravity trails – magnifying pure flow, creating exciting line choices, transfers and safe jumping options. Sculptured jumps, berms, rollers abound, but obstacles are usually rollable, putting the emphasis on rider safety, skill progression and undeniable fun.
- **Downhill:** Of all the trail styles, downhill trails are generally the steepest, most raw and challenging. They are the domain of long-travel, design-specific mountain bikes and Union

Cycliste Internationale (UCI) sanctioned racing. With minimal benching, steep erratic features, off-camber, large transfer and high-risk options, these trails are generally shorter, more aggressive and suited to the more experienced riding.

- **Flow country:** A descending trail style, flow trails offer a constant undulation of groomed rollers, berms, and achievable obstacles. The tyre-hugging trajectory sending riders on a sculptured luge ride through the bush. They create a sensation of speed and rhythm, require minimal decision-making and maximise the ability to feel in control and have fun.
- **Gravity:** Offering a mix of flow, air flow and downhill, gravity trails embrace the raw beauty of the terrain in an exciting and challenging descent. They will often provide multiple line choices and a variety of features, and may include occasional short uphill sections.
- **Wilderness:** these trails are similar to adventure style trails. Located in remote settings, wilderness trails take advantage of the raw natural beauty of diverse landscapes giving riders a unique, immersive and memorable experience. They are generally narrow, longer-distance trails with a focus on ensuring the trail provides an opportunity for riders to challenge themselves over an endurance distance while finishing with a huge smile and desire to do it all over again.

The northern trail network (located on the north side of the valley) consists of around 36 per cent of the trails. The southern trail network (located on the south side of the valley) consists of around 64 per cent of the trails.

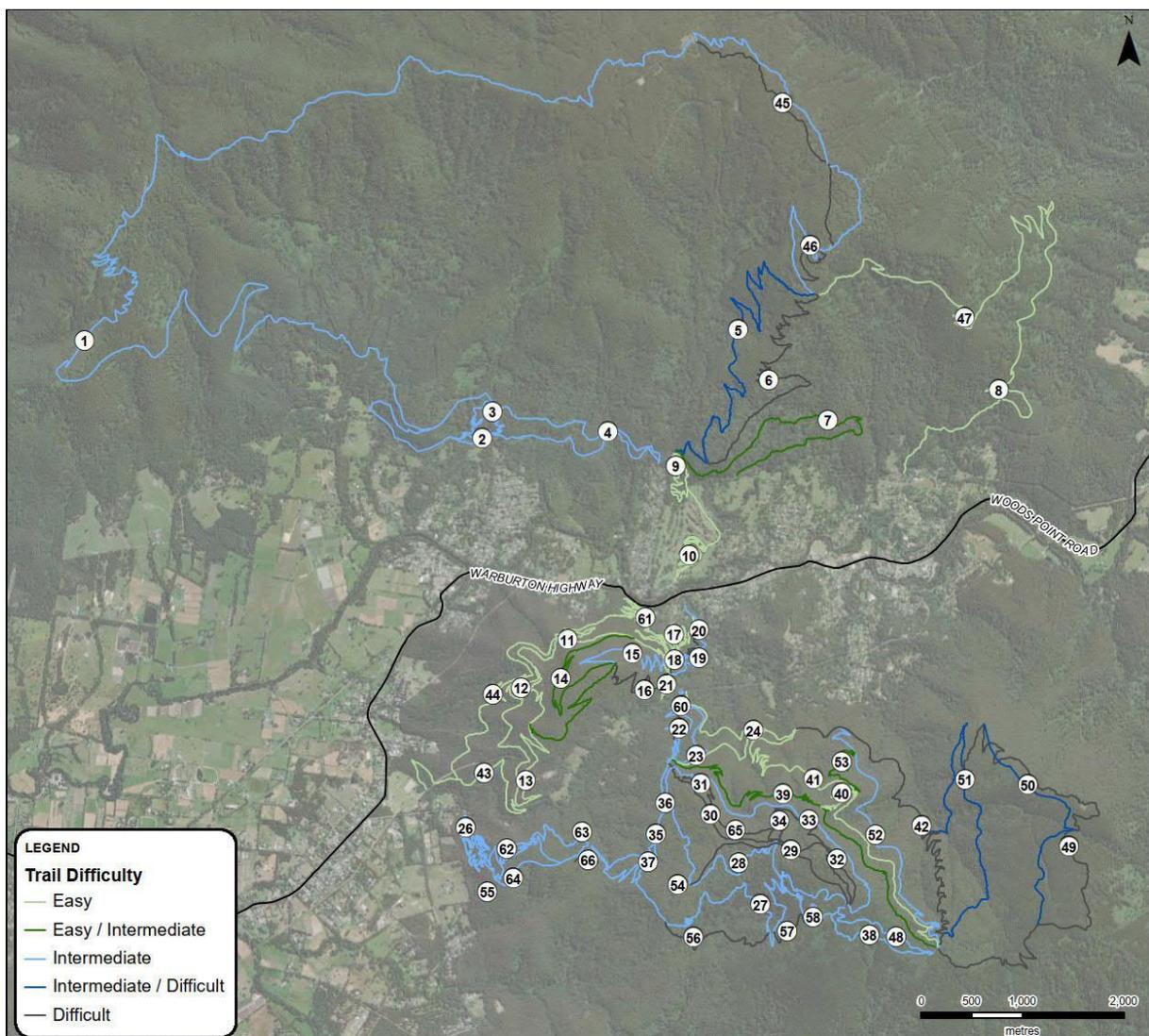


Figure 3-5 Trail sections and difficulty rating

Table 3-1 provides an overview of the trail length, style, difficult rating and a description of the trail. Note that during the design development process, Trail 25 was removed from the proposed trail network. Additionally, Trail 59 represents a short walking track down to La La Falls from Trail 42.

Therefore, there is a total of 61 proposed mountain bike trails, covering a distance of up to 177 kilometres.

As introduced in **Chapter 1: Introduction**, Trails 45 – 47 with a combined length of approximately 15 kilometres are assessed within the EES as an alternative to Trail 1 which has a length of approximately 23 kilometres. Trails have not been renumbered and for ease of reading will be referred to as 1-66.

Table 3-1 Mountain bike trail section details

No.	Length (m)	Notes	Trail style	Proposed trail difficulty rating
1	22540	Drop-a-K - Descends from top of Mount Donna Buang to Warburton Golf Course.	Wilderness	Intermediate
2	4534	Undulating trail running parallel to O'Shannassy Aqueduct linking to Dee Rd car park and then to Drop-a-K.	Adventure	Intermediate
3	2580	Loop trail located between Trail 1 and 2.	Adventure	Intermediate
4	92	Short link between Trail 1 and 2.	Adventure	Intermediate
5	5586	Gravity trail from Mount Donna Buang Rd down to O'Shannassy Aqueduct.	Gravity	Intermediate / Difficult
6	4700	Gravity trail from Mount Donna Buang Rd down to O'Shannassy Aqueduct.	Gravity	Difficult
7	4006	Loop trail, starting and finishing on O'Shannassy Aqueduct.	Adventure	Easy / Intermediate
8	4888	Easy descending trail from Mount Donna Buang Rd down to O'Shannassy Aqueduct.	Flow	Easy
9	1975	Loop trail located on private property (Eco Lodge) above golf course.	Adventure / Flow	Easy
10	3804	Golf course loop. Concept only.	Adventure / Flow	Easy
11	5806	First loop on Mount Little Joe.	Adventure / Flow	Easy
12	2829	Second loop on Mount Little Joe.	Adventure	Easy
13	4488	Third loop on Mount Little Joe.	Adventure	Easy
14	4720	Loop to summit of Mount Little Joe.	Adventure / Flow	Easy / Intermediate
15	1921	Descending trail on the north/east face of Mount Little Joe.	Gravity	Intermediate
16	1549	Descending trail on the east face of Mount Little Joe.	Gravity	Difficult
17	2606	Climbing link from old Warburton Chalet into trail network.	Adventure	Easy
18	805	Descending trail through Backstairs corridor.	Gravity - existing hand-built trail (some features to be re-built) ¹	Difficult
19	794	Descending trail through Backstairs corridor.	Gravity - existing hand-built trail	Intermediate

¹ Note that some features will be rebuilt on existing trails to bring them in line with current design standards. Refer to Section 3.2.1.2 and 3.3.1.1 for further information about the type of work that would be undertaken

No.	Length (m)	Notes	Trail style	Proposed trail difficulty rating
			(some features to be re-built)	
20	1431	Descending trail through Backstairs corridor.	Flow	Intermediate
21	503	Access linkage between Backstairs trail junction and vehicle track.	Adventure	Easy
22	2790	Climbing linkage from Old Warburton Rd crossing up to Edwardstown Rd.	Adventure	Intermediate
23	1305	Descending trail from Edwardstown Rd to Old Warburton Rd crossing.	Flow	Intermediate
24	2647	Descending trail from Edwardstown Rd to Old Warburton Rd crossing.	Flow	Easy
26	5144	Existing mountain bike trail - Hey Hey My My	Adventure - existing hand-built trail (some features to be re-built)	Intermediate
27	7462	Main climbing trail to summit of Mount Tugwell.	Adventure	Intermediate
28	4636	Descending style descending trail from summit of Mount Tugwell.	Flow	Intermediate
29	2084	A-line style jump track using top portion of Cemetery Track.	Air Flow	Difficult
30	3031	Gravity descent from summit of Mount Tugwell using mix of new and existing mountain bike trails (Top Track).	Gravity - existing hand-built trail (some features to be re-built)	Difficult
31	580	Alternate end section on 30.	Gravity - existing hand-built trail (some features to be re-built)	Difficult
32	1665	Gravity descent from summit of Mount Tugwell using mix of new and existing mountain bike trails.	Gravity - existing hand-built trail (some features to be re-built)	Difficult
33	3266	Gravity descent from summit of Mount Tugwell using mix of new and existing mountain bike trails (Matt's Track).	Gravity - existing hand-built trail (some features to be re-built)	Intermediate
34	645	Linkage trail between 30 and 32.	Gravity - existing hand-built trail (some features to be re-built)	Difficult
35	1701	Linkage from Edwardstown Rd into Mineshaft Hill area.	Adventure	Intermediate
36	149	Linkage between trails 28 and 35.	Adventure	Intermediate
37	416	Linkage between trails 27 and 35.	Adventure	Intermediate
38	1575	Linkage between summit of Mount Tugwell and Tugwell trail head.	Adventure	Intermediate

No.	Length (m)	Notes	Trail style	Proposed trail difficulty rating
39	5208	Long climbing trail, from Edwardstown Rd to Mount Tugwell Trail Head, parallel below Mount Bride Rd.	Adventure	Easy / Intermediate
40	1109	Link trail between 40 and 42.	Flow	Easy
41	5848	Descending trail below Mount Bride Rd.	Flow	Easy
42	5410	Long descending trail from Tugwell trail head wrapping around onto Mount Bride.	Wilderness	Intermediate / Difficult
43	2479	Gentle descending trail into Wesburn Rec Reserve. Uses portion of old tramway.	Adventure	Easy
44	2592	Climbing trail out of Wesburn Rec Reserve.	Adventure	Easy
45	4060	Alternative to Trail 1. Commences at the summit of Mount Donna Buang, moderate with steep sections it flows down the southern fall of the ridgeline joining up with Trails 5 & 6.	Wilderness	Difficult
46	5511	Alternative to Trail 1. Commences at the summit of Mount Donna Buang, moderate with steep sections winds down the northern fall of the ridgeline, under Mount Victoria, joining up with Trails 5 & 6.	Wilderness	Intermediate
47	5617	Alternative to Trail 1. Commences at Mount Donna Buang Rd, moderate with steep sections, joining up with Trail 8.	Adventure	Easy
48	1283	Forms a loop between the summit of Mount Tugwell and the Mount Tugwell trail head on Mount Bridge Rd.	Adventure	Intermediate
49	7043	Climbs to the top of Mount Bride, before a flowing descent and short climb to reach Groom Hill. Descends from Groom Hill to eventually merge onto Trail 42.	Wilderness	Difficult
50	2821	Less challenging option to Trail 49, avoiding summits of Mount Bride and Groom Hill, eventually merging onto Trail 49.	Wilderness	Intermediate / Difficult
51	4059	Descending trail starting at Mount Tugwell shuttle drop-off on Mount Bride Rd and finishes on Trail 42.	Gravity	Difficult
52	3754	Starts at Mount Tugwell shuttle drop-off and merges onto Trail 42, 4 km and 400 m of descent	Flow	Intermediate
53	1320	Short descending link trail, starting at junction of 40 and 41, and dropping down onto 52.	Flow	Easy / Intermediate

No.	Length (m)	Notes	Trail style	Proposed trail difficulty rating
54	1170	Continues from Trail 29, repurposes the steep and deeply eroded lower section of Cemetery Track.	Air flow / Gravity	Extreme
55	2045	Starts at shuttle drop-off and junction at Edwardstown Rd and Cemetery Track, descends down to Crusher Track next to the end of Hey Hey My My in Wesburn.	Gravity	Extreme
56	1598	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Adventure	Difficult
57	713	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Adventure	Difficult
58	211	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Adventure	Difficult
60	529	Climbing trail near Old Warburton as an optional A-line climb on Trail 22, follows an existing management vehicle track.	Adventure	Difficult
61	1567	Contingency trail providing exit onto Warburton-Lilydale Rail Trail just near Trail 11 start.	Adventure	Easy
62	678	Extends Hey Hey My My to the top of Mineshaft Hill, where it also links into Trail 63.	Adventure / Flow	Intermediate
63	2184	A loop trail that connects Mineshaft Hill with Old Warburton Road and Edwardstown Road.	Adventure	Intermediate
64	785	Descending trail from Edwardstown Rd/Cemetery Track, connecting directly to the top of the descending portion of Trail 26.	Flow	Intermediate
65	1359	Descending trail between existing trails 30 and 33, above Mount Bridge Rd, and connecting into the end of Trail 31.	Gravity	Difficult
66	306	Existing motorbike trail. Provides short connection between 54 and 55, allowing riders to bypass the trail head / junction area at Cemetery Track / Edwardstown Rd.	Gravity	Difficult
TOTAL	192511			

3.2.1.1 Alternative to Trail 1

During the project development process, consideration was given to feasible trail alternatives for key trails where there is potential for significant environmental impact.

Through a screening process that focussed on ecological, heritage and socio-economic factors, the need to investigate alternative trail alignments was identified in order to ensure a network design that minimises the potential for significant environmental impact. A framework was developed to rate each trail according to the priority for further examination of alternatives. The trails could be given a rating of

low, moderate, high or very high. The framework is detailed in **Attachment II: Alternatives Assessment Report**. Under the framework, any trail assigned a very high or high priority would be subject to further consideration of alternatives.

The investigations identified Trail 1, with a length of 23 kilometres and vertical drop in elevation of over a kilometre, as requiring consideration of alternative alignments. Subsequently, an alternative to this trail, being the combination of Trail 45, Trail 46 and Trail 47 with a combined length of 15 kilometres, was identified.

3.2.1.2 Upgrades of existing mountain bike trails

Approximately nine kilometres of mountain bike trails existing in the vicinity of Mount Tugwell are proposed to be upgraded and incorporated into the designated Warburton Mountain Bike Destination trail network. These trail sections are shown in Figure 3-2.

The existing mountain bike trails would be upgraded to bring them in line with current design standards. This would involve enhancements to improve stormwater flow off the trails which would reduce sediment flow off the track, and augmentations to improve safety and enhance the experience for the rider by improving the flow of the trail.

The construction activities proposed to enable these upgrade works are described in Section 3.3.1.1.

3.2.1.3 New mountain bike trails

Up to 155 kilometres of the mountain bike trails proposed for the project would be new bike trails. The following sections describe the design development of the new mountain bike trails, as well as the key features of the network's design, including trail dimensions, elevated structures and run-off management.

3.2.1.3.1 Design development

Since 2016 the design of the network has resulted in a progressive development of concepts, designs and re-designs. The concept design development was informed by desktop assessments and consultation with relevant stakeholders on known environmental, social and heritage values in the region. Since then, the detailed design has been developed and informed by extensive ground-truthing of the proposed alignments.

Conceptual alignments were carefully investigated in the field by trail designers and technical experts within a 20-metre corridor 'ground-truthed' by walking the trail length. The design principles applied during the ground-truthing works included:

- Where practicable, align trails on old benches/old roads or other disturbance corridors, which are reasonably common in areas that have a history of mining or logging.
- Minimise the use of switchback corners to minimise construction footprints.
- Avoid excessively flat or steep areas.
- Use the terrain to its maximum. The final shape and feel of the trail is dictated by the terrain, so any interesting shapes or features that are present in the landscape should be capitalised on where possible.
- Trails designed in accordance with Australian Mountain Bike Trail Guidelines (MTBA, 2019), and International Mountain Bike Association Trail Construction Guidelines.

The detailed design walkovers resulted in some changes to conceptual alignments in response to on-ground conditions. At some locations, the terrain offered unexpected challenges which force the trail to be modified for environmental, safety, budgeting or other reasons. At other locations, where constraints were not identified, the terrain offered unexpected opportunities, which encouraged the trail alignment to be modified to maximise the experience of the user by making the most of the existing terrain (and thereby avoiding the need for significant excavation or soil disturbance).

The EES is based on the detailed design of the mountain bike trail network which represents a 20-metre corridor within which the exact final trail alignment would be established.

The process for micro-siting the final trail location within the 20-metre detailed design corridor would be undertaken as part of the pre-construction activities, as described in Section 3.3.1.2.1.

3.2.1.3.2 Trail dimensions

The mountain bike trails would have a bench width of approximately 1.2-1.4 metres with a ride line within the range of approximately 400 to 1200 millimetres except for the trail on Cemetery Track

(which uses a current forest road that will be repurposed and therefore offers an opportunity for a wider footprint). Figure 3-6 shows some typical mountain bike trails and Figure 3-7 shows a typical cross section.



Figure 3-6 Typical mountain bike trail (courtesy of World Trail)

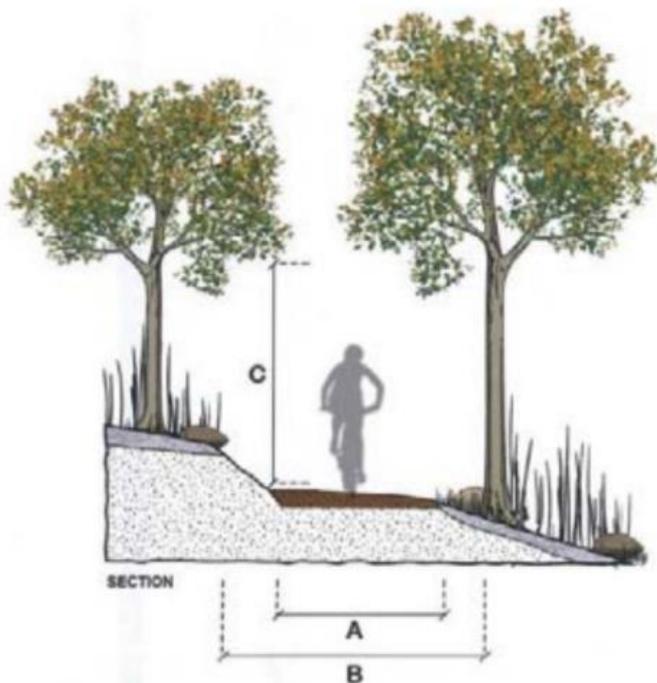


Figure 3-7 Typical mountain bike trail cross section

The typical mountain bike trail dimensions would consist of (as shown in Figure 3-7):

- A: Bench width (or trail width) of between 1.2 and 1.4 metres

- B: Total average impact width of between 1.2 metres and 3.3 metres
- C: Vegetation clearance height of 2.5 metres.

The gradient of individual trail sections would vary according to the local topography and the style and difficulty of the trail. Typically, the maximum trail gradient would be less than 15 per cent, with the majority of the trails under 10 per cent.

The activities proposed to construct the new mountain bike trails are described in Section 3.3.1.

3.2.1.3.3 Elevated structures

Elevated structures would be used to enable the mountain bike trail to cross over all waterways and can be used in sensitive areas such as soft ground or rocky terrain. The structures would comprise small bridges and boardwalks that vary in size and height depending on the existing terrain and would typically be less than one metre above the ground level.

The locations of the elevated structures proposed for the project are provided in Figure 3-8.

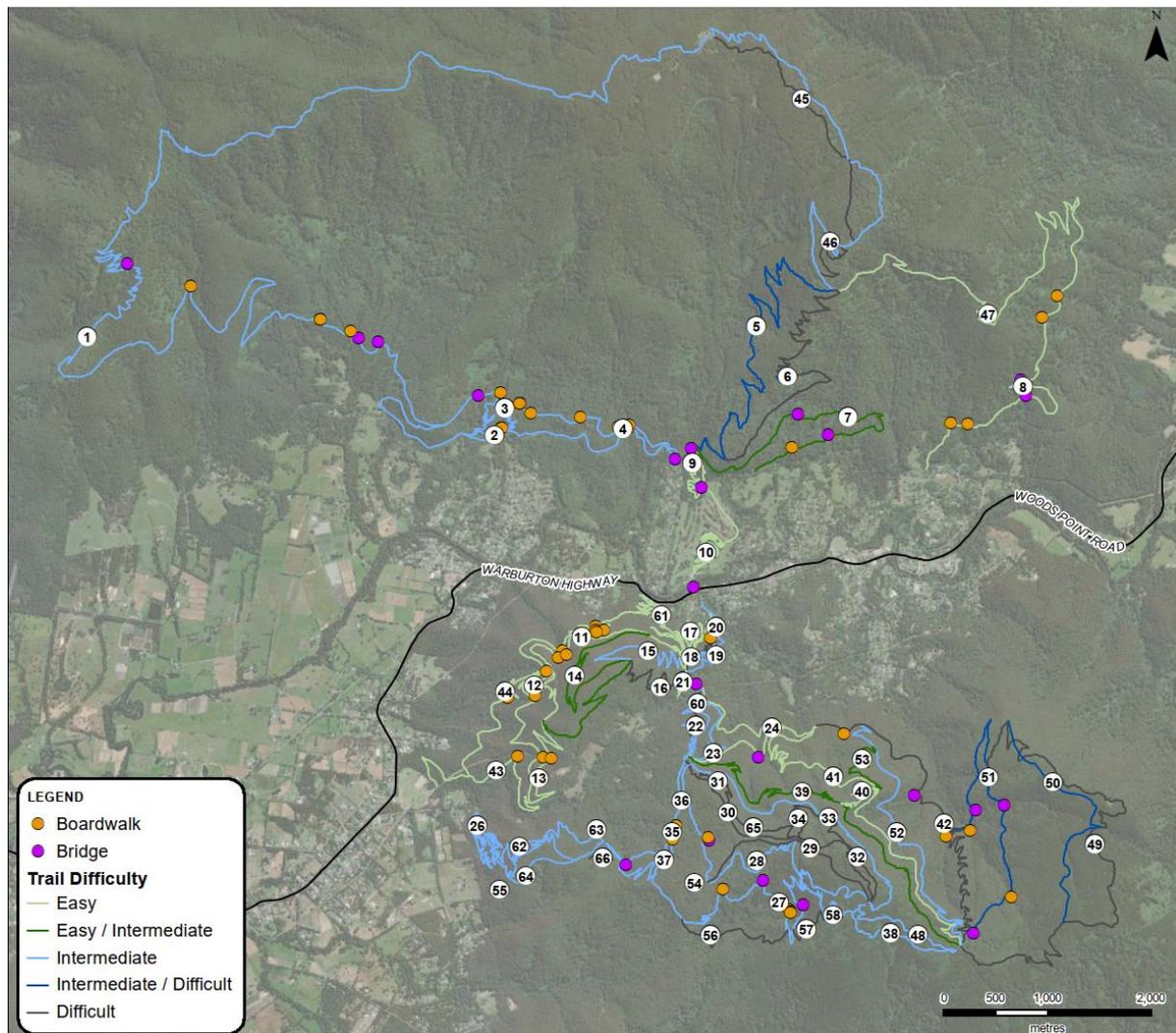


Figure 3-8 Elevated structure locations

The activities proposed to construct the elevated structures are described in Section 3.3.1.2.4.

3.2.1.3.4 Longer span bridges

Two longer span bridges are proposed crossing over significant roads and waterways, comprising the following:

- Yarra River Bridge (shared use), which would allow mountain bikers to cross over the Yarra River and Warburton Highway and Dammans Road safely, connecting the northern and southern trail networks. It would also provide access to and from the main trail head located adjacent to the existing Warburton Golf Course, as well as Warburton township. The bridge is proposed to be a combined suspension and truss bridge spanning approximately 121 metres in total.

- Old Warburton Road Bridge (mountain bike use), which would allow mountain bikers to cross over Old Warburton Road safely. The bridge is proposed to be a truss-style shared use bridge spanning approximately 23 metres across the Old Warburton Road and uphill ground slope.

The locations of these bridges are shown in Figure 3-9, with an anticipated cross-section of the Yarra River Bridge shown in Figure 3-10.

The design of Old Warburton Road Bridge ramp has been curved to avoid impacts on nearby trees.

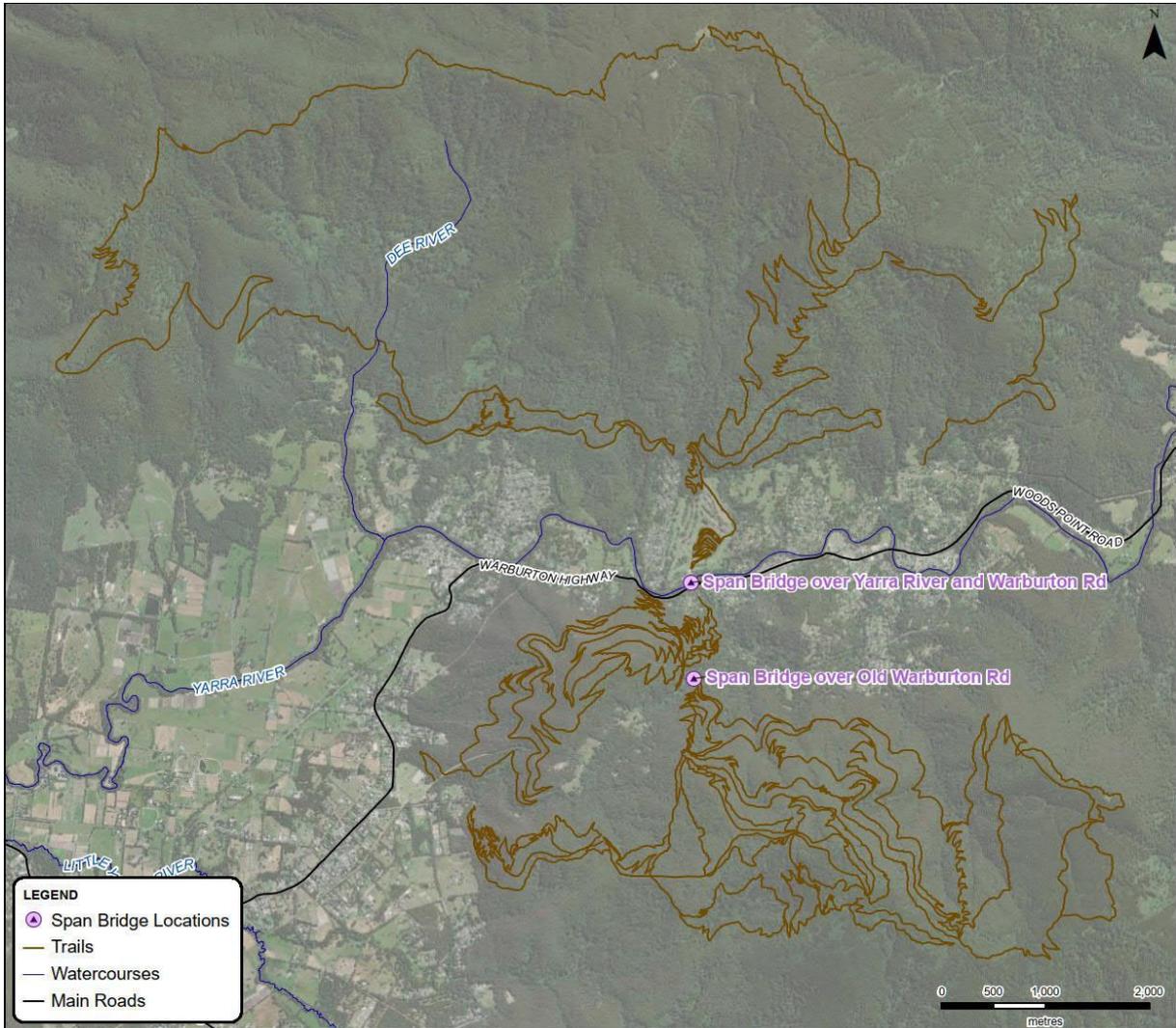


Figure 3-9 Location of two longer span bridges

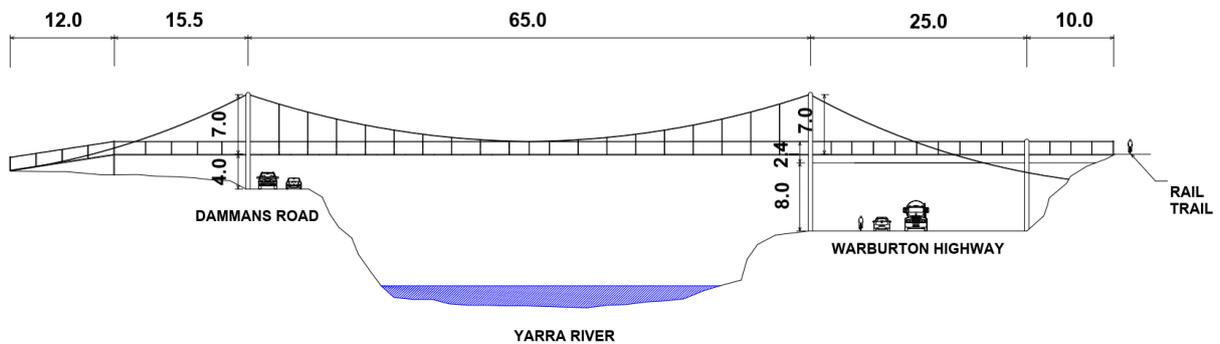


Figure 3-10 Yarra River Bridge concept design

3.2.1.3.5 Runoff management and erosion prevention

To design and implement a successful mountain bike trail, one of the most important factors to consider is long-term sustainability. Management of runoff and erosion is critical to trail sustainability. The overall objective is for water to be shed off the side of the mountain bike trails at controlled increments along the trails.

Some rules and techniques for trail design to manage runoff and erosion for long-term sustainability that would be adopted by the project include:

- The trail would be out sloped where possible. That is, it would slope gently (no more than five per cent) down towards the lower, outside edge of the trail. This allows water flowing down the hillside to shed across the trail, rather than being channelled along the trail.
- Grade reversals are critical for sustainable trails and provide exciting features and undulations to the trail. A grade reversal is essentially a point where the trail changes from downhill to uphill. Any water flowing downhill along the trail reaches the grade reversal and is forced off the trail. At the lowest point of the grade reversal, the edge of the trail would be scalloped out to ensure that there is a wide, clear outlet for the water.
- The trail gradient is how steep the trail rises or falls over a specific distance. In terms of trail gradient, there are two key guidelines to follow when building mountain bike specific trails:
 - The 'Half Rule', which states that the trail's grade should not exceed half of the grade of the hillside or slope that the trail traverses. For example, if the trail is cut into a 20 per cent slope, the trail gradient should not exceed 10 per cent. If a grade does exceed half the side slope, it is considered a fall-line trail. Instead of shedding across the trail, water will run along the trail, displacing soil and causing erosion.
 - The '10% Average Guideline' states that generally, an average trail grade of 10 per cent or less is the most sustainable.

3.2.1.4 Existing vehicle roads and tracks

Approximately four kilometres of existing vehicle roads and tracks are proposed to be incorporated into the designated Warburton Mountain Bike Destination trail network. These trail sections are shown in Figure 3-2 as 'access tracks'.

The existing vehicle roads and tracks are gravel tracks currently open to public access, but with limited use. Mineshaft Hill Track would be used to provide connectivity between a number of the new or upgraded mountain bike trail sections and no construction activities are required to incorporate it into the network.

Cemetery Track, south of Edwardstown Road is proposed to be closed to public access and repurposed as a mountain bike trail. The track is currently extensively damaged by recreational vehicle use, causing significant environmental impact and making it impassable to DELWP management vehicles. The mountain bike trail construction on this section will address significant erosion issues and provide for land manager access.

3.2.2 New Visitor's Hub and trail heads

The new Visitor's Hub and main trail head is proposed to be developed on the southern side of Warburton Golf Course, where the existing car park would be upgraded from the current capacity of approximately 30 to accommodate around 215 cars with room for future expansion if required. The Visitor's Hub would be collocated with the main trail head and would allow direct access to the northern and southern mountain bike trail networks. Other facilities would include a shuttle bus shelter, toilet and shower facilities, picnic tables, comprehensive visitor information that is related to the mountain bike trails and bike wash bays.

Three other trail heads are proposed as part of the project (with locations shown in Figure 3-2 above):

- A new trail head would be established on top of Mount Tugwell, off Mount Bride Road and would include formalised car parking (pick up and drop off only) for seven cars including one disabled access car park, a bus turnaround bay, a bike wash down station, toilets and picnic area.
- The existing visitor node at Mount Donna Buang would be integrated into the network, with the existing car park to be used for shuttle bus drop-offs, minor upgrades to existing facilities and installation of a bike wash down station.
- Wesburn Park existing facilities will provide an additional access point to the network, in particular being suitable for additional parking and for accommodating mid-week visitation such as school

groups or larger groups. As part of the project, an additional 120 car parking spaces will be delivered to help reduce parking pressures in Warburton. A bike wash down bay, signage, shuttle bus area and minor upgrades of existing facilities would also be undertaken as part of the project.

The layouts of the facilities are provided in Figures 3-11 through to 3-14.

Drainage would be upgraded at trail head locations to meet current Melbourne Water requirements.

As a separate project, a Master Plan is being prepared for the wider redevelopment of Wesburn Park. The works required for the redevelopment are not proposed as part of the Warburton Mountain Bike Destination and therefore not assessed as part of the EES. It is anticipated that as part of the Warburton Mountain Bike Destination, a bike wash down station would be installed at Wesburn Park.

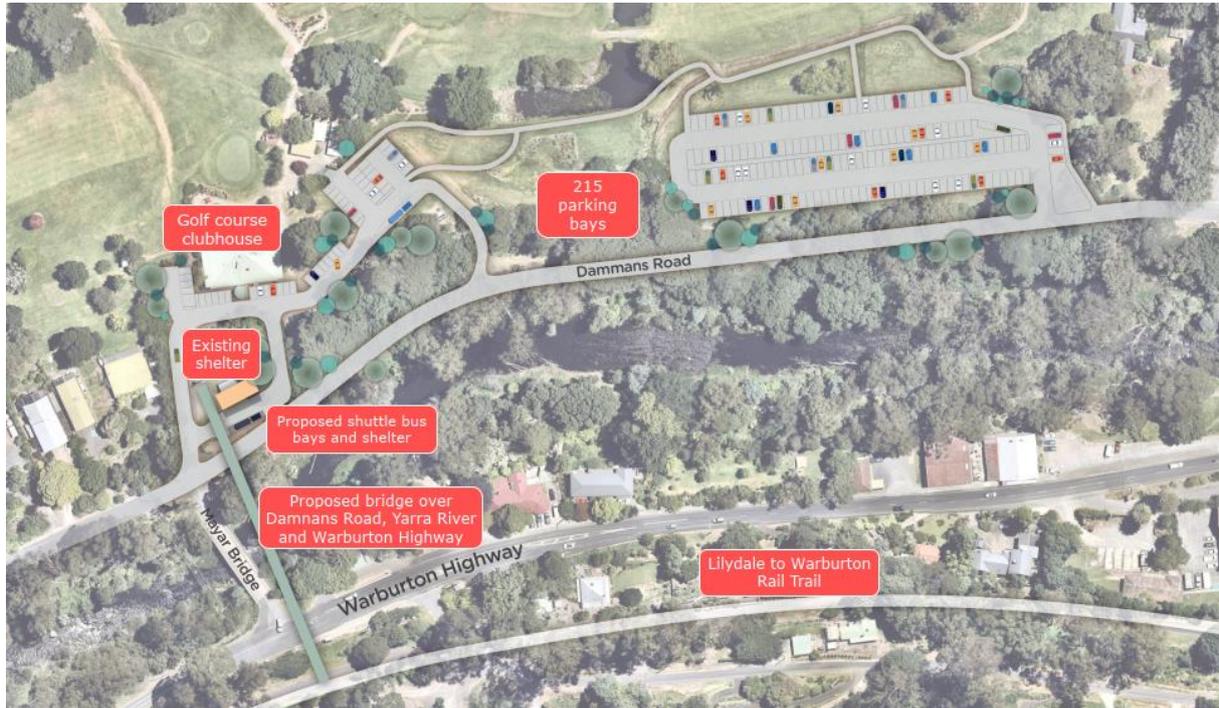


Figure 3-11 Main trail head location at Warburton Golf Course

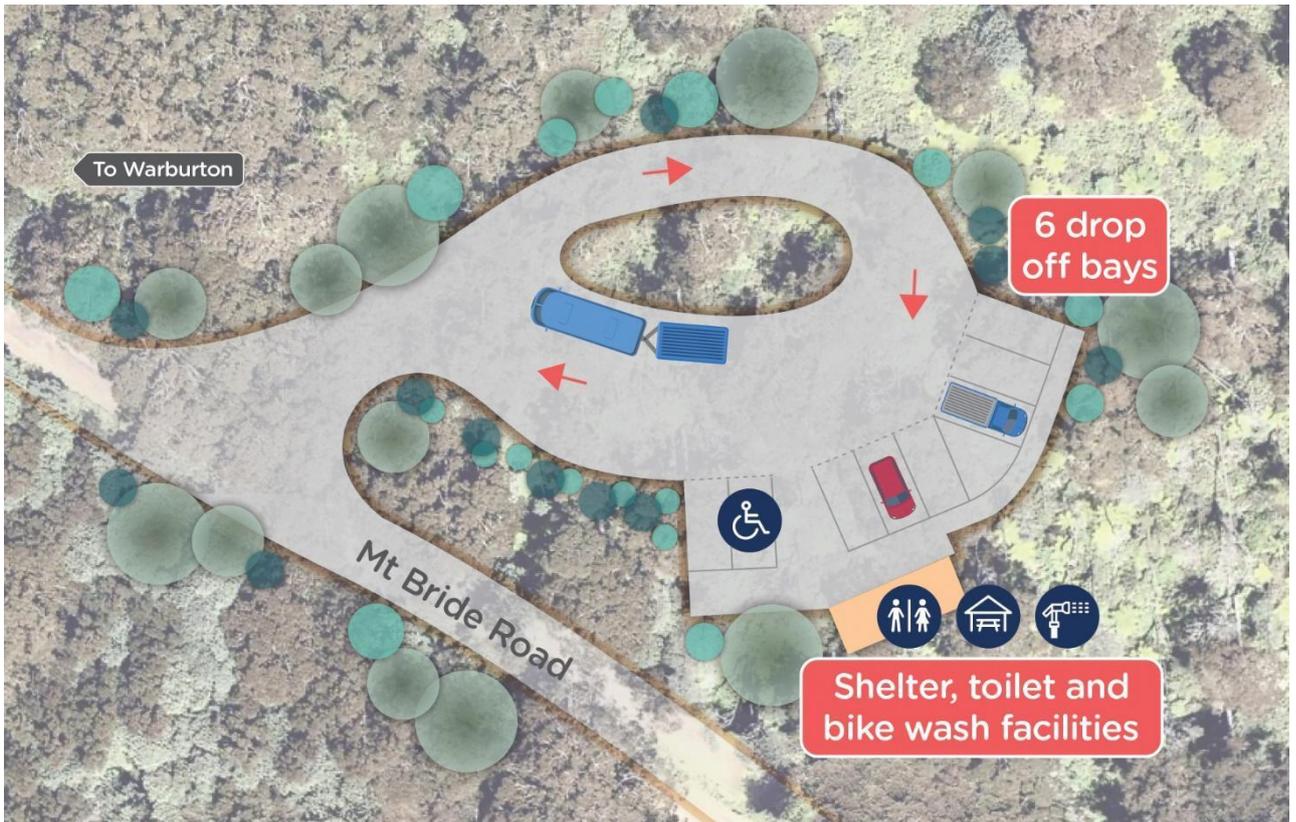


Figure 3-12 New trail head location at Mount Tugwell

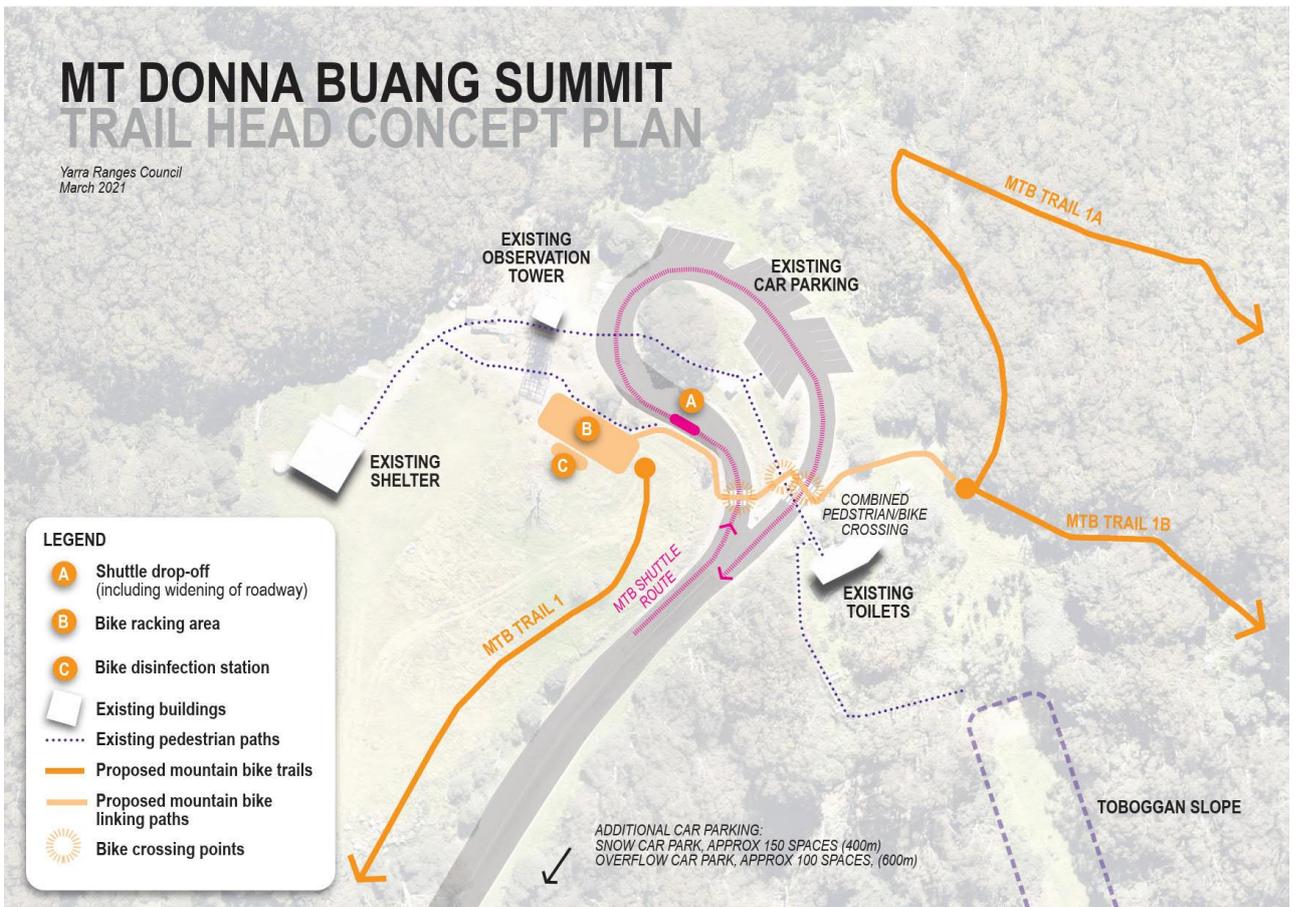


Figure 3-13 New trail head infrastructure at Mount Donna Buang

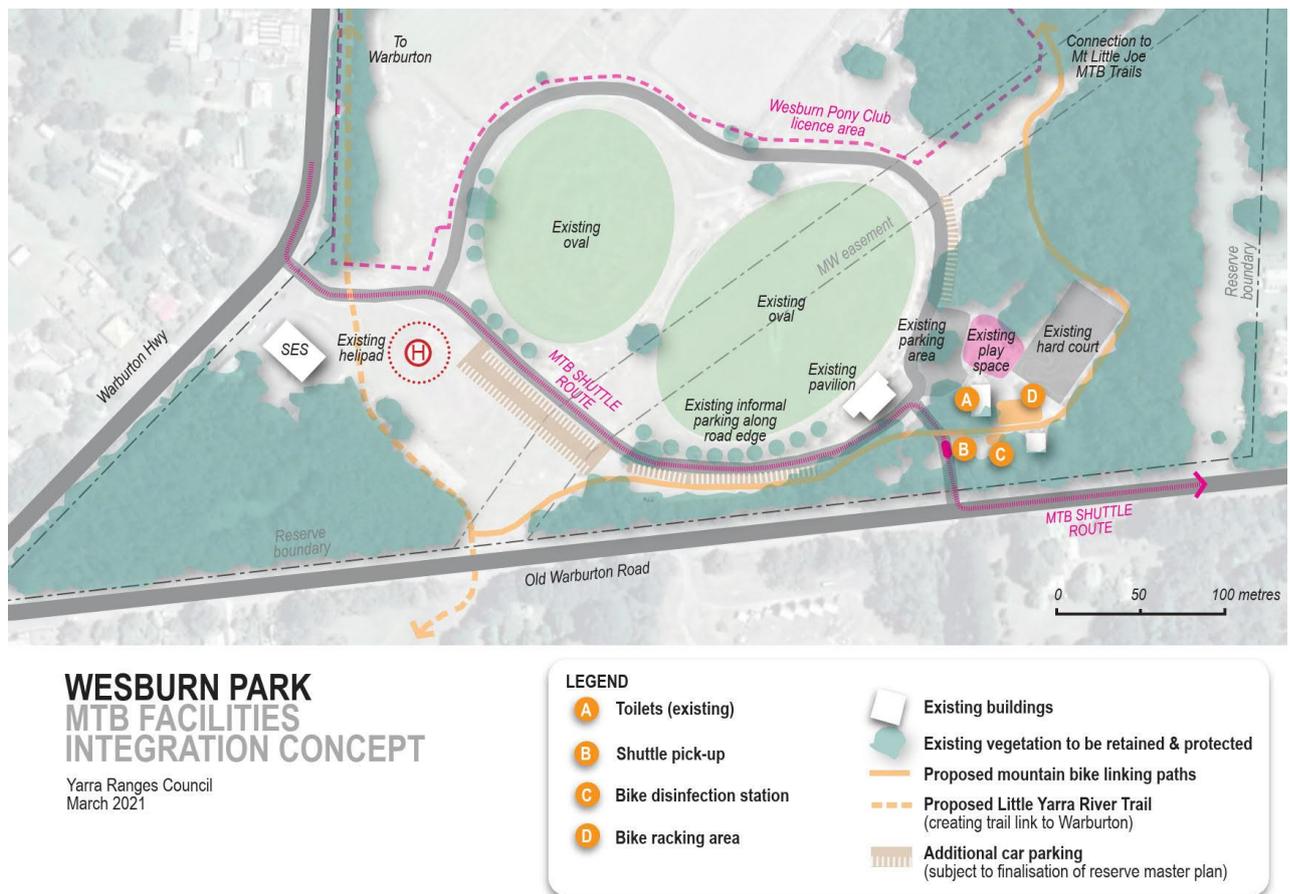


Figure 3-14 New trail head infrastructure at Wesburn Park

3.2.3 Ancillary infrastructure and upgrades

To support the key project components outlined above, a number of other upgrades or modifications to the existing landscape are proposed, as discussed in the following sections.

3.2.3.1 Mountain bike trail signage

Minimal signage is proposed along the trails and at the trail heads to facilitate public safety and wayfinding. This would consist of small maps and information signs at strategic intersections and name signage.

3.2.3.2 Road upgrades for shuttle services

The existing surface of Mount Bride Road, Edwardstown Road and Cemetery Track (north of Edwardstown Road) would be improved where necessary to accommodate shuttle bus traffic. The roads are currently gravel, and these would be resurfaced with gravel where needed to improve road strength for the shuttle buses. Therefore, the works would be similar to routine maintenance works. No widening of the existing roads would be required.

3.3 Project construction

3.3.1 Mountain bike trail network

3.3.1.1 Upgrades of existing mountain bike trails

Approximately nine kilometres of existing mountain bike trails would be upgraded to bring them into line with current design standards. This would involve minor modifications to better manage stormwater reducing sediment flow off tracks and to enhance the experience for the rider by improving the flow of the trail.

The upgrades of existing trails would typically involve:

- Removal of soil that has built up on the lower edge of the existing trail to fix drainage lines and recreate the out slope along the edging.

- Resurfacing of trails to remove puddles and drainage lines formed by water erosion. This can be done by draining and drying trail, filling in depressions and compacting and smoothing the surface.
- Reshaping sections of the trail to improve drainage, safety or rider experience.

Many of these activities would be undertaken using hand tools (such as a rake, hoe, shovel and/or mattock), and would be similar to the maintenance activities described in Section 3.4.4.3.

In some areas, an excavator will be used to make alignment changes or reshape the trail to meet current design standards for the trails (given some of these were created 15 years ago). These activities would be undertaken in line with the activities described for the construction of new mountain bike trails in Section 3.3.1.2.

3.3.1.2 New mountain bike trails

3.3.1.2.1 Micro-siting of the trails

Prior to the construction of new mountain bike trails, an inspection would be undertaken to determine the exact alignment of the trail within the 20-metre corridor. The purpose of this would be to identify any specific environmental values to be protected and to discuss and agree on specific construction treatments and alignments.

Where environmental or heritage values have been identified within (or in proximity to) the corridor for a proposed trail, the relevant experts would undertake a trail inspection (for example, a botanist would be present to help identify threatened flora sites). The environmental value would be visually identified and marked as an exclusion zone. The exact alignment would then be designed around the exclusion zone, including allowing for an adequate buffer between the mountain bike trail and environmental value.

The micro-siting stage would include the identification of a final route around large trees so that these can be retained. It would also involve micro-siting in accordance with the existing contours, to make the most of the existing terrain and avoid the need for significant excavation or soil disturbance.

3.3.1.2.2 Trail types

Once the micro-siting has been completed, and the final alignment marked, construction of the mountain bike trails would commence.

The trails would generally be constructed as one of the following four trail types:

- **Standard excavation trail** would be used most commonly and involve cutting a path into the existing slope. Cut and fill techniques are used to create a smooth soil path. Standard excavation trails can be constructed using hand tools, mini excavators, or a combination of both.
- **Elevated structures** would consist of built-up decking that is used to avoid and minimise impacts to waterways and associated biodiversity values by traversing over them on a raised platform.
- **Rock armoured surfaces** would be used generally on steep gradients, where the soil would otherwise likely be displaced by water or trail users, leading to erosion. The armouring would also be used when crossing potential wet areas where there is no stream flow or indicator vegetation, however, the ground may seasonally soften. By hardening the base of the trail where it crosses the potential wet area, users can still use the trail without it becoming boggy or muddy.
- **Raised embankments** may be necessary for trail sections that are often wet and boggy, where tree roots run along the surface, or to improve rideability through changing the vertical alignment. This technique uses excess material that is moved along the trail to where it is required.

The construction techniques for these trail types are described in the following sections.

Other built structures such as rock walls may be used to stabilise steep slopes and batters. Rock walls are created using the rock collected during trail construction, which are then put in place as the trail is developed using an excavator.

Retaining walls would be used sparingly, only where they cannot be avoided through realigning the trail. Retaining walls would be constructed using local rock where possible, brought in along existing trails by a power carrier. If a retaining wall was required in a remote location, it would be brought in by helicopter to avoid surface impacts beyond the trail impact area.

3.3.1.2.3 Standard excavation trail construction

The following steps would be applied during construction of standard excavation trails (following micro-siting):

- Clear the construction corridor of vegetation.** The construction corridor is defined as the horizontal corridor from the top of the upslope batter to the toe of the downslope batter and the vertical corridor to about 2.5 metres high (sufficient to allow passage of the excavator) (demonstrated by the 'B' and 'C' dimensions in Figure 3-7). Clearing of the construction corridor would usually be undertaken manually using motorised tools such as brush cutters, chainsaws and hedge trimmers and hand tools like loppers, hand saws and secateurs. Large trees would not be removed, as the trail would be routed to avoid them; however, it is likely that small boughs and limbs may need to be removed. All vegetation that is removed would be cut into small pieces and dispersed throughout the surrounding area. At this stage, ground covers, herbs and grasses are left in place for later removal by the excavator.
- Cut the bench using a balanced cut and fill technique.** A balanced cut and fill construction would be used wherever possible. In this approach, the topsoil and mineral earth removed from the inner side of the bench would be used to build up the outer edge of the bench, meaning that the import of fill material would be minimised, as well as the removal of surplus material. The excavator would work forwards, cutting the bench ahead of it and then moving forward onto the bench. The bench must be wide enough and stable enough for the excavator to operate safely on. Using a rubber-tracked mini-excavator with a minimum track width of about 900 millimetres, the bench would generally be one metre in width. On steeper slopes, the outer edge of the bench may need to be retained. In mountain bike trail construction this is generally done using dry stone rock walls, built from rock sourced during the construction of the bench.
- As shown in Figure 3-15, different hill slopes would require differing amounts of excavation, with the overall width of impact varying between 1.2 metres and 3.3 metres. The depth of excavation will vary by location with the maximum expected to be around 0.8 metres (with the majority of trail excavation being less than 0.4 metres). Cut material would need to be transported along the trail from steeper trail cross slope areas. Naturally occurring rock would be used to protect the toe of the fill batter and stabilise steeper slopes where available and appropriate.
- Define the ride line by placing rocks and other obstacles as necessary.** Large obstacles (rocks) would be used in-situ or sourced from bench cut within the construction footprint and would be manoeuvred into place by the excavator. The ideal ride line is generally on the inner side of the bench, at the toe of the upslope batter, where the soil is firm and compacted. Rocks would be manually and deliberately placed to control rider speed and position riders towards the inside of the bench, away from the soft outer edge.
- Clean up the trail tread.** Loose rocks and roots would be removed, the tread compacted, and drainage managed. This step would be undertaken manually, by trail labourers working behind the excavator.

At some locations, it may not be desirable or possible to excavate the bench using an excavator, and in this case hand tools would be used to cut the bench. This can be preferred where a narrower construction footprint is required.

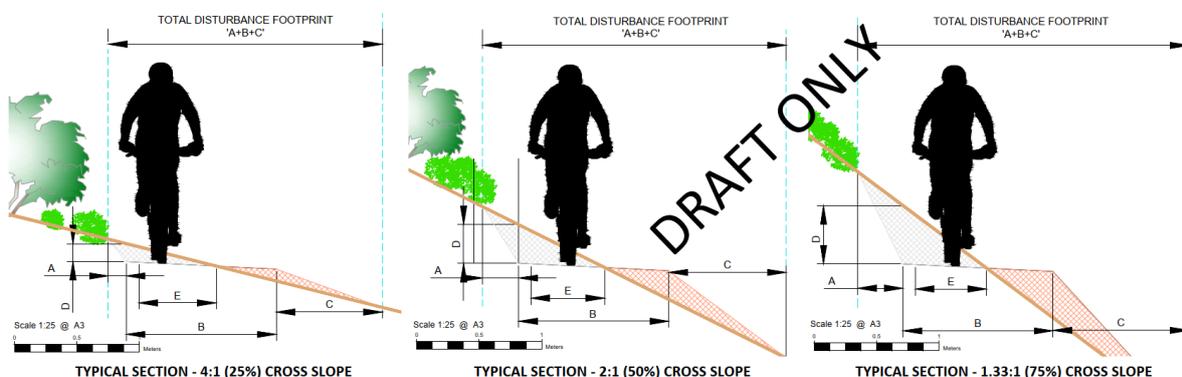


Figure 3-15 Typical sections on varying cross slopes

3.3.1.2.4 Elevated structure construction

Elevated structures including boardwalks and low-level bridges would be used where the trail crosses over a waterway or area of soft or boggy ground. All watercourse crossings would utilise these techniques to create dry wheel crossings, as shown in Figure 3-16.

The structures will vary in height above the ground, with heights typically less than one metre above the ground.



Figure 3-16 Examples of elevated structures on trails (courtesy of World Trail)

A variety of decking materials can be used, including timber, reinforced plastic mesh or steel mesh. Given the remote locations of the bridges, all materials are anticipated to be carried in along the trail by hand, requiring efficient use of materials and the need to prioritise strength over weight.

Construction methods would be chosen for environmentally sensitive areas to avoid excessive excavation, such as using hydraulically driven footing installation. Span lengths of up to five metres would be used to allow the bridges to span the streams encountered, without the need for footings within the waterways.

3.3.1.2.5 Rock armoured surface construction

Rock armouring is used to harden the trail surface, generally on steep gradients, where the soil would likely be displaced by water or trail users, or when crossing potential wet areas where there is no stream flow or indicator vegetation, however the ground may seasonally soften. By hardening the base of the trail where it crosses the potential wet area, users can still use the trail without it becoming boggy or muddy. Rock armouring would also be used on the trail entry and exit to elevated structures (see Figure 3-17).

The following steps would be applied during construction of rock armoured trails (following micro-siting):

- **Define the area where rock armouring is required.**
- **Collect suitable rocks.** Ideally, these are uncovered and placed off to the side within the construction corridor during standard trail construction for usage later. Rocks would be as large as practicable, and preferably plate-shaped to provide a flat surface.
- **Excavate soil from the area to be rock armoured,** to the approximate depth of the rocks to be used. Soil would be reused for packing in around rocks, and any surplus would be reused where appropriate along the trail.
- **Place rocks into the excavated trench,** beginning from the bottom and working uphill.
- **Use any left-over soil/rocks to pack in around the edges.**

If locally sourced rocks are not available, an alternative option is to use adjustable rock matting. It would be installed in sheets following the same process as above.

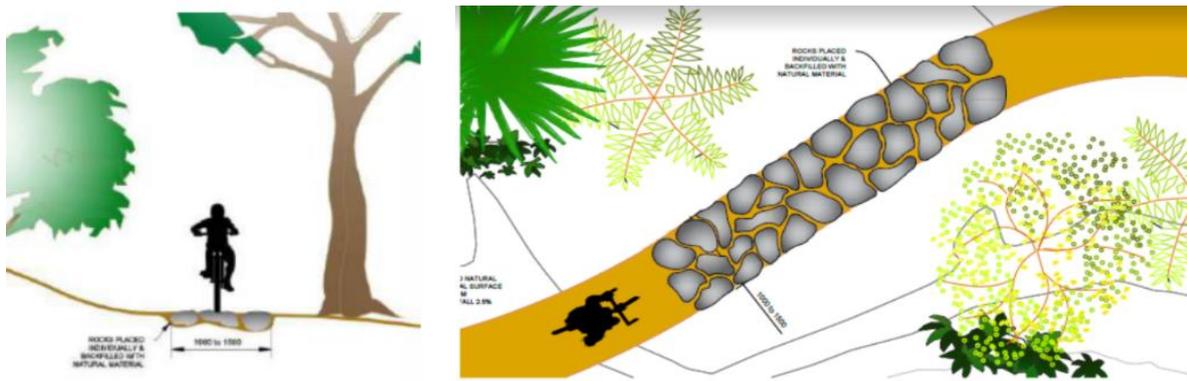


Figure 3-17 Visualisation of rock armoured trails

3.3.1.2.6 Raised embankment construction

Raised embankments would be created for trail sections that are often wet and boggy, where tree roots run along the surface, or to improve rideability through changing the vertical alignment (see Figure 3-18).

This technique uses extra ‘fill’ material to build the tread up higher. The fill material is usually sourced from another area where there is an excess of material and moved along the trail to where it is required.

Raised embankments would be constructed so that they do not impede the flow of stormwater or would have suitable drainage structures placed at the bottom of the fill material.

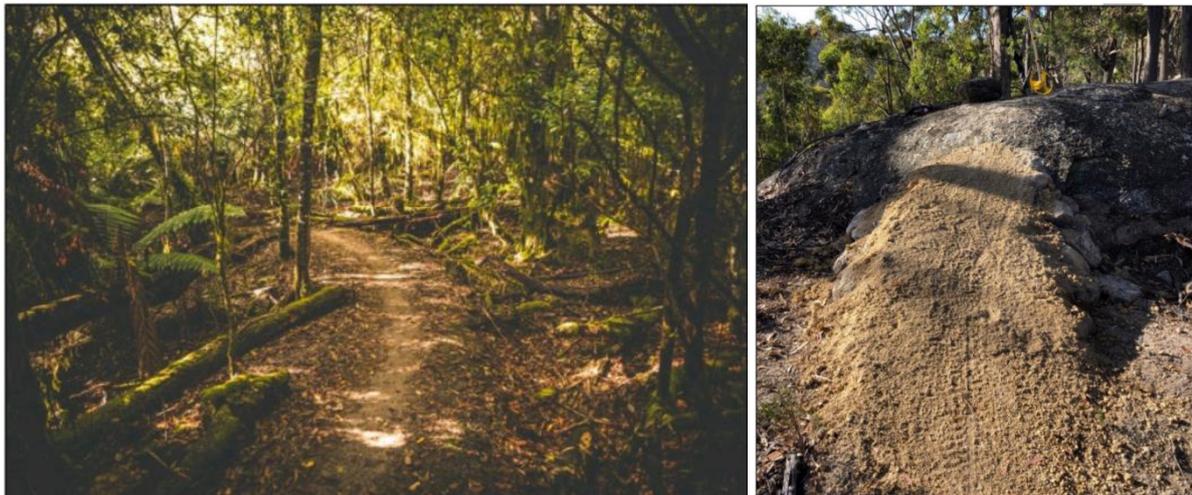


Figure 3-18 Examples of raised embankment trails

3.3.1.2.7 Tree root protection during trail construction

During design development and once micro-siting is complete, considerable effort would have gone into avoiding vegetation communities or species of high sensitivity or environmental significance. Other design measures adopted to protect tree roots include the elevated structures and raised embankments described above. Given the highly treed nature of the project area, it is impossible to avoid construction trails within the root zones of all trees.

Where the trail alignment cannot be redirected or designed to avoid impacts on exposed significant tree roots, tree root protection would be utilised. This would involve placing an additional 50 millimetres of soil over the root, followed by a layer of mesh securely pegged and topped with an additional 50-millimetre layer of soil.

3.3.1.2.8 Bridges

The construction of the Yarra River Bridge and Old Warburton Road Bridge is anticipated to take up to approximately six months.

Existing clearings on either side of the proposed bridges would be used as laydown areas, avoiding the need for vegetation clearing. Pre-fabrication of bridge components is anticipated to occur primarily

off-site at the council's existing Yarra Junction Depot. These would be trucked to the adjacent bridge laydown areas, and then assembled into position on the bridge using a crane.

No works are proposed within the Yarra River. The Yarra River Bridge pylons would be constructed on the crest of the existing river channel to avoid alterations to existing flood conveyance or behaviour.

To allow for safe construction of the bridges overhead, road closures of Old Warburton Road, Warburton Highway and Dammans Road may be required for a few hours at a time. Road closures would be minimised to the extent possible to avoid disruption for the nearby community and are anticipated to be required on two or three occasions when craning large bridge elements overhead.

To facilitate the installation of the Yarra River Bridge, one span of existing overhead power lines currently adjacent to the proposed bridge location would require undergrounding. This work would be undertaken by AusNet and would require temporary closure of one lane of traffic, with the level of disruption expected to be the same as during typical maintenance works. The works would be undertaken within the existing easement, where the wire would be dropped down the existing pole and installed within a trench between the two poles. The rest of the powerline would remain unchanged.

3.3.1.3 Existing vehicle roads and tracks

A section of Cemetery Track south of Edwardstown Road in Wesburn, an existing four-wheel drive track, would be closed to vehicles and repurposed and modified to a mountain bike trail. No other construction works are proposed to incorporate existing vehicle roads and tracks into the mountain bike trail network.

3.3.1.4 Lighting

No lighting is proposed to be installed along the mountain bike trail network.

3.3.2 New Visitor's Hub and trail heads

The construction activities for the car park at the new Visitor's Hub and main trail head to the south of Warburton Golf Course would consist of site establishment (compound/fencing), geotechnical investigations, earthworks (topsoil strip and levelling), installation of drainage, car park surfacing and marking, and landscaping. Other facilities installed would include a shuttle bus shelter, toilet and shower facilities, picnic tables, comprehensive visitor information that is related to the mountain bike trails and bike wash bays. Significant material deliveries would enter the site from the west, avoiding the need to travel through the town centre.

At the Mount Tugwell Trail Head a new car park, bus turn around bay, bike hygiene station, toilets and picnic area are proposed to be installed. The area would require clearing of existing vegetation to prepare the site for grading, although the site has been selected to minimise the need to remove trees. The gravel road surface and car parks would be installed. The toilet block and picnic area shelter would be preassembled off-site, and delivered to site by truck, requiring minimal works on site.

No significant works are proposed at Mount Donna Buang, where the existing facilities are expected to be utilised for shuttle bus drop off services. Minor upgrades to signage, car park surfacing and delineation, and upgrades to the public shelter and toilet are planned to ensure facilities are adequate for increased visitor numbers. A bike hygiene station is proposed to be installed to assist with the management of weeds, pests and pathogens. Stormwater flow is planned to be improved to reduce sediment transfer off the site.

At the Wesburn Park Trail Head, a new car park with 120 spaces, bike wash down bay, signage, and shuttle bus area would be installed and there would be minor upgrades of existing facilities.

3.3.3 Ancillary infrastructure and upgrades

3.3.3.1 Mountain bike trail signage

Signposts are expected to be minimal (for example, arrows, information, maps, trail identification numbers) and would be installed by hand using an auger and drill.

3.3.3.2 Road upgrades for shuttle services

The surface of Mount Bride Road and Edwardstown Road would be improved to accommodate shuttle traffic. The works are proposed to be undertaken by DELWP. The roads are currently gravel, and these are anticipated to be resurfaced with gravel to improve the overall road strength for the shuttle vehicles. No widening or sealing of the existing roads would be required.

3.3.4 Construction compounds

The main construction compound that will support construction activities would be located at the council's Yarra Junction Depot (or at contractor yards where appropriate). The depot would be used to store equipment/materials, for the staging and preassembly of parts, and at the project offices.

The following principles would apply to the construction works to minimise impacts and disturbance:

- Any on-site storage and structure erection works would be minimised and undertaken at the existing council depot where possible.
- Structural components would be prefabricated off-site at the council depot whenever practicable to expedite site assembly works.
- An allowance has been made for helicopter delivery of critical components, and truck deliveries of strategic materials would be used only as required.
- Construction teams would carry in each day's water, food and materials and carry out rubbish/waste.
- Works would be conducted during normal working hours so lighting will not be required.
- Laydown areas for the two main bridges over the Yarra River and Old Warburton Road already exist, and no vegetation clearing would be required.

3.3.5 Construction schedule and workforce

Trail construction is generally undertaken in teams of three to four people, with each team expected to complete between 60 and 100 metres of trail per day. Construction of the trails is anticipated to last approximately 18 months.

Up to eight teams would be dispersed across the different trail extents at any one time, each with a 1.6-tonne mini-excavator and dual cab ute with trailer. The mini excavator is left on site, and crew transport tools and fuel into the works area by vehicle or power carrier.

Construction of the Yarra River Bridge and Old Warburton Road Bridge is anticipated to take up to approximately six months.

Construction of the main trail head is expected to take approximately three months, with works at other trail heads lasting a number of weeks.

The workforce is anticipated to come from the local area, typically Warburton, with construction crew staying in Warburton.

3.3.6 Construction materials

In relation to the trail network construction, the topsoil and mineral earth removed from the inner side of the bench would be used to build up the outer edge of the bench, meaning that fill material imports and removal of surplus material would be minimised where possible.

For crossings, there would be some rock, fibreglass, reinforced plastic and timber that would be required. The amount of required materials would be in the order of several tens of tonnes over the network. Detailed design for the larger bridges is still to be undertaken, however it is expected to be light steel construction. It is likely that the material required would be in the order of magnitude of up to 100 tonnes.

There may be up to 200 tonnes of construction material required for the trail heads which would include materials such as crushed rock, concrete fixtures and cement.

Construction material would be sourced from local suppliers wherever possible.

3.3.7 Rehabilitation of disturbed areas

Following the completion of construction there will be minimal areas requiring rehabilitation as pre-fabrication would be carried out off-site using the council's existing Yarra Junction Depot. Construction of the trails, new Visitor's Hub and trail heads would be built on the construction footprint resulting in minimal areas of disturbance. Existing clearings on either side of the proposed bridges would be used as laydown areas avoiding the need for vegetation clearing. The laydown areas for the bridges will be reinstated to their original condition following the completion of construction.

3.3.8 Construction traffic

The construction workforce is anticipated to generate light vehicle movements and the movement of plant and equipment which will generate heavy vehicle movements. Construction activities that would

generate vehicle movements include construction of the trails, trail heads and shared use bridges. The total daily traffic generation during construction is anticipated to be 166 movements and a breakdown of this number is provided in Table 3-2. Further detail about transport types and routes for construction activities is provided in **Chapter 13: Transport**.

Table 3-2 Construction daily traffic generation

Construction activity	Workers required per day	Workers daily traffic generation	Plant and equipment required (one-way)	Plant and equipment daily movements
Golf Course Trail Head	8	16	13	26
Mount Donna Buang Trail Head	4	8	2	4
Mount Tugwell Trail Head	4	8	2	4
Wesburn Park Trail Head	4	8	2	4
Yarra River Bridge	4	8	2	4
Old Warburton Road Bridge	4	8	2	4
Trail construction	32	64	0	0
Total	60	120	23	46

3.3.9 Construction waste

Overall, given the modest size of construction there would be minimal waste generation caused by these activities. For the construction of the trails, the fill material generated would be reused on site where possible, which would minimise spoil that requires disposal. Other sources of construction waste would include timber, plastic and wood. The quantities of these materials would be minor and they would be recycled or disposed of as appropriate.

3.4 Project operation

3.4.1 Mountain bike trail visitation and operation

The trail network in the Yarra Ranges National Park and environmentally sensitive areas of the Yarra State Forest (such as Mount Bride summit, in proximity to known Leadbeater's Possum colonies) will be open from sunrise to sunset. Areas of the network around Mount Little Joe and Mount Tugwell will be available for night riding. The *Warburton Mountain Bike Destination Economic Assessment* (TRC, 2021) established the estimated number of visitors to the trails per year based on the likelihood of different groups visiting the trails, the average trail visits they would undertake per year and the type of visit (day or overnight). This assessment considers the visitor volumes 10 years post opening of the Warburton Mountain Bike Destination which is estimated to be 2031. These volumes are shown in Table 3-3.

Table 3-3 Anticipated visitor numbers

Visitor origin	Type of visit	2022	2026	2031
Yarra Ranges	Day	26,538	31,641	42,150
	Overnight	-	-	-
Victoria (outside Yarra Ranges)	Day	54,773	70,995	91,843
	Overnight	19,906	26,103	33,461
Interstate and overseas	Day	6,000	9,200	10,800
	Overnight	24,000	36,800	43,200
Total		131,217	174,738	221,454

Based on the modelling of trail operations, the annual number of trail users would increase from 131,217 in 2022 to 221,454 in 2031. Around two thirds would be day visitors and one third overnight visitors.

Visitor numbers are anticipated to be higher on weekends, particularly in good weather conditions. January is anticipated to be the month of peak usage at 11% of the expected annual visitation. Figure 3-19 shows the estimated annual seasonal distribution of visitors.

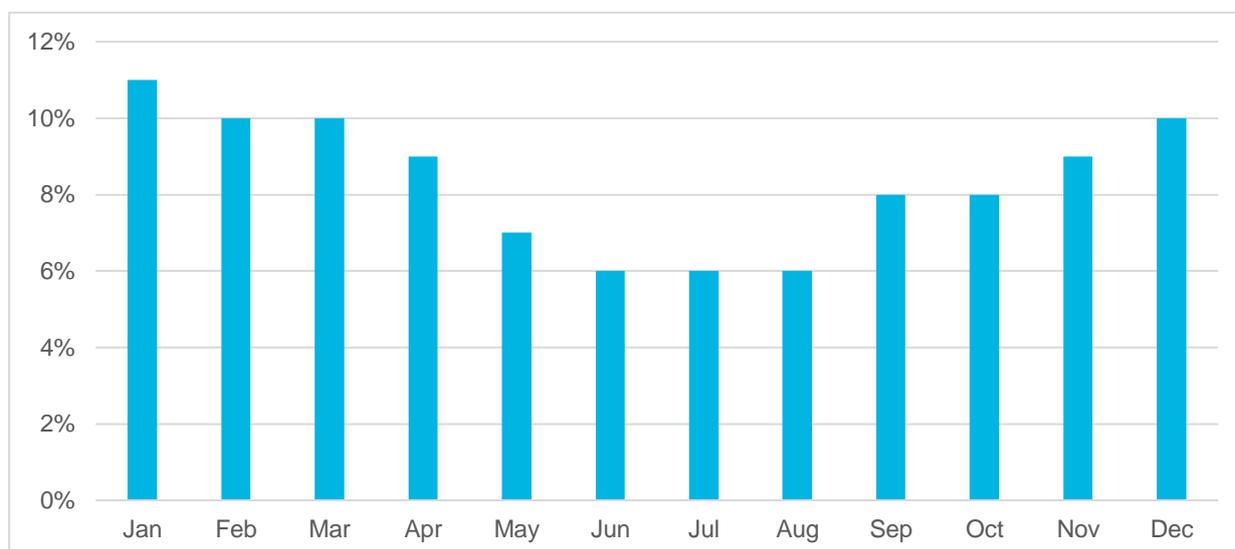


Figure 3-19 Estimated annual seasonal distribution of visitors

3.4.2 New Visitor's Hub and trail heads

3.4.2.1 Visitor centre operations

The Visitor's Hub is anticipated to be attended by two administrative staff members and would provide comprehensive visitor information that is related to the mountain bike trails.

3.4.2.2 Toilet facilities

Toilets would be available at all trail heads. The available facilities would be as follows:

- Main trail head at Warburton Golf Course would be connected to main sewer
- Visitor node at Mount Donna Buang would use a septic system
- Trail head at Wesburn Park would be connected to main sewer
- Trail head at Mount Tugwell would use a vault system.

3.4.2.3 Drinking water

Potable water would be supplied as the drinking water source for trail users.

3.4.2.4 Waste management

Adequate rubbish bins would be provided at trail heads to manage waste and litter. Signage with regards to track etiquette and littering / illegal dumping would be installed at the trail heads.

3.4.2.5 Traffic and parking

Users are anticipated to primarily access the project via Mayer Bridge and Dammans Road. This would connect them to the main trail head at Warburton Golf Course that can accommodate around 215 cars, with room for future expansion if required.

As a secondary trail head, Wesburn Park will offer 120 car parks dedicated to mountain bikers. Additional overflow parking would also be available at Wesburn Park, with limited car spaces also available at Mount Donna Buang and Mount Tugwell.

3.4.2.6 Shuttle bus services

Shuttle buses would move riders and their bikes between the trail heads at Mount Donna Buang and Mount Tugwell. Sixteen shuttles are anticipated to be provided each day (approximately every 30 minutes over eight hours), traversing the full route between the trail heads (as shown in Figure 3-20). This provides a capacity of up to 400 riders being delivered to each trail head.

The northern shuttle route follows Donna Buang Road from Warburton Highway to Mount Donna Buang Summit. The southern shuttle route follows Mount Bride Road, Edwardstown Road, Cemetery Track and Old Warburton Road before connecting to Warburton Highway.

The shuttle services are anticipated to be operated by commercial businesses with a tour operator license.

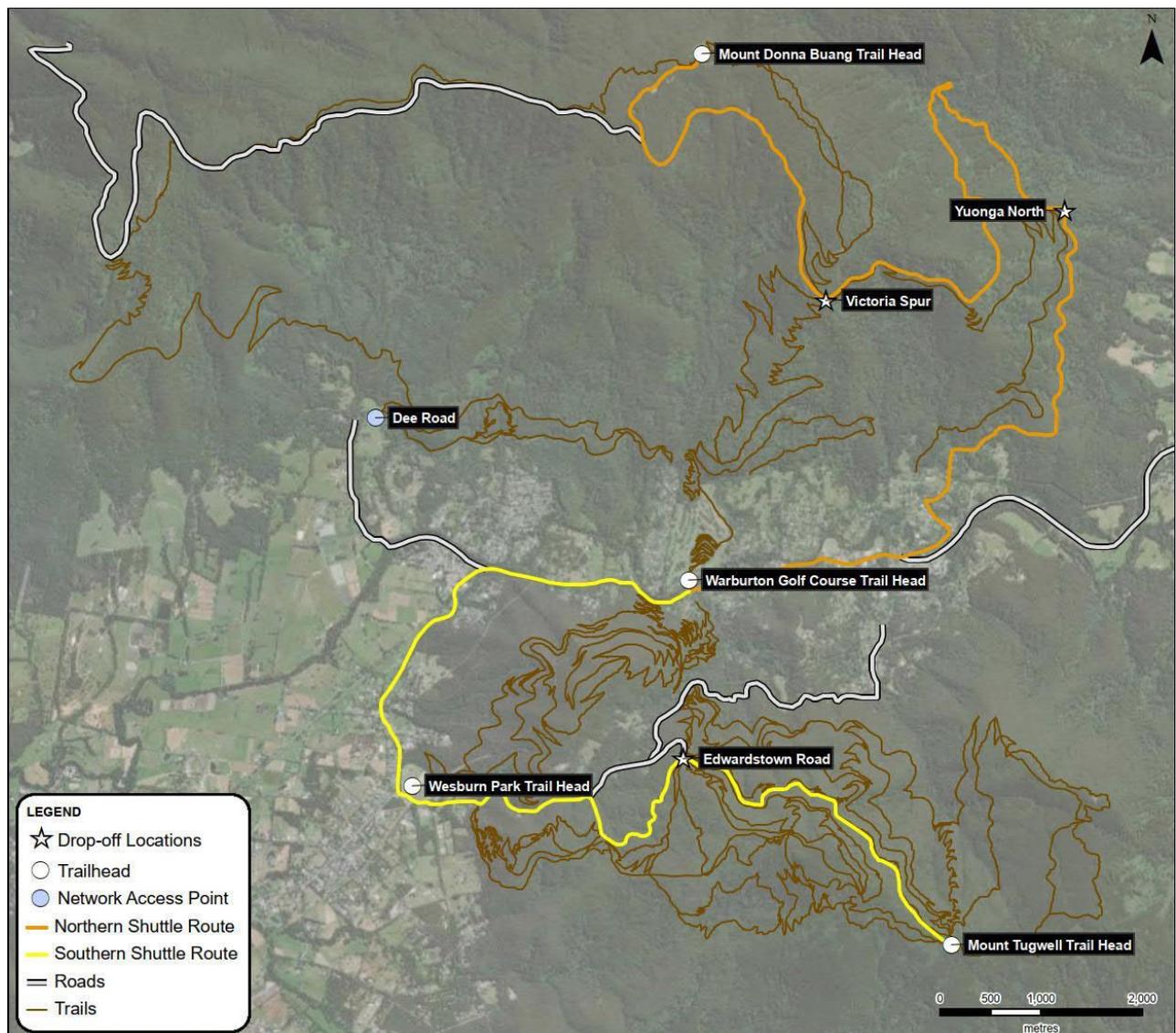


Figure 3-20 Shuttle service routes

3.4.2.7 Bike washing facilities

A Code of Conduct has been developed for the park which requires riders to keep their bike clean to reduce the spread of weeds. Bike washing and hygiene facilities would be available at the trail head locations to manage potential spread of weeds, pests and pathogens.

Hygiene stations are self-contained, low pressure, recirculating systems that are chemically dosed and provide low volume wash and treatment to prevent the spread of weeds and pathogens. These units will be positioned at Mount Tugwell and Mount Donna Buang trail heads.

Larger wash bays will be used at the Golf Course and Wesburn Park trail heads. These facilities will provide high pressure/volume wash as well as hygiene capabilities.

Runoff from the wash bays would be captured by a sump and recirculated where practicable. Excess silt and soil would be captured by a silt retention system which would also serve the car park. This system would be designed to meet Melbourne Water requirements.

The project will manage the potential risk of water contamination resulting from the recycling of water from the bike wash facilities with the installation of proven water recycling systems and these will be regularly monitored to ensure that the system is working effectively.

3.4.3 Events

It is anticipated that the mountain bike trails will attract a range of events to Warburton. Mountain bike events are diverse in nature, often being tailored to the location and community. There is significant growth in community participation events, with formalised racing participation remaining steady.

All formal events conducted on the trails will require appropriate permits from land managers. This process ensures that event organisers have taken appropriate actions to ensure environmental, safety and community risks are appropriately managed.

It is reasonable to expect that local and regional scale events will be regularly conducted throughout the year. These small-scale events are generally a single discipline and will attract mainly participants, with only a very small number of spectators or assistants.

Table 3-4 details the anticipated frequency and duration of events and the associated volume of participants, spectators and vehicles associated with the event.

Table 3-4 Anticipated events

Event type	Frequency	Duration	Participants	Spectators	Total visitors per day	Total vehicles per day
Local events	30 per year	3 hours (evenings of weekends)	300	50	350	125
Regional events	10 per year	3 – 12 hours	400	600	1000	357
State events	Every two years	3 days	1400	1600	3000	1071
National events	Every four years	4 days	2700	4500	7200	2571

International events

There is potential that the Warburton Mountain Bike Destination may attract major international events such as the UCI Mountain Bike World Cup, Enduro World Series or Crankworx. Delivery of these events would require additional investment and development of suitable infrastructure to support the event.

Attracting these events would usually have significant State or Commonwealth Government involvement and events would require extensive planning and approvals to ensure the event can be managed appropriately. Therefore, the assessment of impacts related to international events is outside of the scope of the EES.

Local, regional, state and national events are included within the scope of the EES.

3.4.4 Maintenance of trails

3.4.4.1 Operations Environmental Management Plan

An Operations Environmental Management Plan (refer to **Attachment VII: Operations Environmental Management Plan**) has been established for the project which sets out the key operational requirements for the project. The plan proposes Yarra Ranges Council to have primary responsibility for the management of the trail network. The plan sets out the monitoring, reporting and complaint management process for the project and also specifies the suggested controls to manage risks associated with cultural heritage, historic heritage, biodiversity values, landscape values and recreation values.

3.4.4.2 Inspections

Regular trail inspections would be required to identify any problems or changes to the trails that need to be repaired. Whilst mountain bike trails have been located, designed and built to avoid and minimise environmental impacts, monitoring through an effective inspection program enables unforeseen impacts to be detected and adaptive management to be adopted. All trails and associated infrastructure will be inspected at least quarterly and more frequently where required to investigate any damage caused by extreme weather events or concerns raised by stakeholders.

3.4.4.3 Maintenance works

The following maintenance activities would be undertaken proactively to maintain the trails:

- Vegetation pruning to remove vegetation that is encroaching on the trail
- Trail sweeping to remove surface deposits along the trail
- Trail edge mowing and brush cutting to keep grass from encroaching on the trail corridor

- Weed control (chipping or spraying) to prevent encroachment on the track
- Clearing of drains and debris build-up beneath bridges to ensure water flow is maintained
- Minor drainage measures to remove water that is pooling on the surface
- Minor trail repairs, such as patching of depressions or removing protrusions from the trail surface
- Measures to remedy user-created shortcuts or detours by blocking alternative routes with sticks, branches, leaf litter or rocks
- Removal of litter.

Further maintenance works are likely to be required as a result of routine trail inspections and/or for urgent repairs where issues have been identified. Maintenance works would generally be undertaken by a small team of two to three people with the appropriate skills, equipment and qualifications to undertake the required works. Temporary closure of trails may be required to undertake maintenance works.

Scheduled maintenance days will be planned on a regular basis for non-urgent works to ensure suitable resources are allocated to the works required. A summary of the typical non-urgent trail maintenance works expected is provided in Table 3-5.

Table 3-5 Non-urgent maintenance works

Problem	Solution	Tools required
Organic material and/or soil is blocking the egress of water off the track.	Remove soil and organic matter blocking the grade reversal outlet.	Shovel, rake hoe
Fallen sticks / branches / leaves obscuring the trail surface, making it slippery and hard to see trail surface.	Remove sticks / branches / leaves from the trail surface.	Leaf blower, grass rake, hand saw
Important directional or advisory signs graffitied.	Use a chemical solvent to remove spray paint.	Solvent
Important directional signposts removed.	Install new signposts or symbols (arrows, trail identification numbers etc) as required.	Solvent, auger, drill
Plants growing beside the trail are blocking the trail corridor, making it difficult to pass.	Prune/cut any vegetation protruding into the trail corridor. Pull out any plants growing on the actual trail surface.	Hand saw, chainsaw, hedge trimmer
Loose rocks in the trail head.	Remove any loose or unstable rocks from the trail surface. Fill hole with soil and compact.	Shovel, mattock.
Trail has become cupped instead of out sloped.	Remove soil that has built up on the lower edge of the trail.	Rake hoe, shovel, mattock
Handrail on bridge is showing signs of decay.	Remove old rotten handrail and fastenings and replace with new handrail and fastenings.	Drill, saw, carpentry tools.

Some works may not be able to wait until the next scheduled maintenance day and need to be undertaken urgently. These typically would pose a potential safety risk, make the trail unusable, or lead to significant damage if not rectified. Examples of works that would likely be considered urgent are provided in Table 3-6.

Table 3-6 Urgent maintenance works

Problem	Solution	Tools required
Following an extreme rain event, the trail is substantially damaged by water.	Run-off channels need to be filled in, compacted and smoothed over. Puddles need to be drained, allowed to dry, filled in, compacted and smoothed over.	Shovel, rake, rake hoe
After heavy winds or storms, trees often fall across trails.	Trees need to be cut into smaller pieces and removed. Assessments by qualified arborists may be required of trees adjacent to the trail appear to be damaged. Any trees that fall across the trail within the Yarra Ranges National Park would be removed from the trail alignment however would be left on site.	Chainsaw

Problem	Solution	Tools required
	Wherever possible, fallen trees would be incorporated into the trail and become a feature of the trail itself.	
Trail slip. Trails built alongside slopes can be prone to slipping. This usually occurs after heavy rain and can be caused by the top batter slumping onto the trail, or the lower batter slipping down the hill.	Upper batter slips can be easily fixed by removing the fallen soil and rocks and re-shaping the trail tread and batter. If the lower batter slips down the hill, the trail may need to be rebuilt with rocks or a different alignment.	Shovel, mattock, rake hoe, rake
Tree has fallen and broken a timber bridge or berm.	Cut and remove tree. Replace timber member if possible.	Chainsaw, drill, saw, other carpentry tools

3.4.4.4 Weed and pest management

Weed and pest management procedures have been established for the management of weeds and pests along the bike trails and included in **Attachment V Draft Construction Environmental Management Plan** and **Attachment VII Operations Environmental Management Plan** for the project. This will ensure the trail operator meets their obligations under *the Catchment and Land Protection Act 1994 (Vic)* (“CaLP Act”) to control weeds and pest animals.

The Victorian Government’s Invasive Plants and Animals Policy describes a four-tiered approach to managing invasive species:

- Prevention is the most cost-effective form of weed control as weeds are absent and monitoring is the control method
- Eradication of a new introduced species (smaller number of localised populations) is also good value as once eradicated; prevention is the control method – it is noted that Parks Victoria's preference is that weed control within the National Park focus on eradication wherever possible
- Containment of rapidly increasing or abundant species (many populations) is worthwhile to manage the impacts of a weed on weed free areas
- Asset based protection is the most appropriate control method when a weed is widespread and abundant.

Each weed species has a different ecology and phenology. Therefore, the best approach to control the spread of a weed and ultimately eradicate it differs from species to species. Methods such as application of weed spray, hand removal of weeds and cut and paint would be used to manage and control weeds.

Seven weed species that are present along the bike trail are declared noxious weeds under the CaLP Act:

- Spear Thistle *Cirsium vulgare*
- Common Blackberry *Rubus fruticosus* agg.
- Cut-leaf Bramble *Rubus laciniatus*
- Ragwort *Jacobaea vulgaris*,
- Hemlock Conium *maculatum*
- Tutsan *Hypericum androsaemum*
- Asparagus Fern *Asparagus scandens*.

Appropriate waste management techniques such as fitting waste containers with secure lids at all times and disposing of waste in appropriate waste receptacles would be used to ensure pest animal species are not attracted to the site.

3.4.4.5 Workforce

Up to four full time maintenance staff are anticipated to be required, typically working Monday to Friday 8am to 5pm.