Warburton Mountain Bike Trail
Environmental Effects Statement Technical Report
Aboriginal and historic heritage

Prepared for AECOM

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Executive summary

Overview

Warburton Mountain Bike Destination ('the Project') is a proposed world class mountain biking destination centred around Warburton, approximately 70 km east of Melbourne. The proponent for the project is Yarra Ranges Council.

The Project Area comprises 61 trails which consist of a 20 metre corridor within which the exact final trail alignment would be established.

Under section 4 of the *Environment Effects Act 1978* (EE Act), the project requires an Environment Effects Statement (EES) to be prepared to allow stakeholders to understand the likely environmental impacts of the project and how they are proposed to be managed.

Biosis Pty Ltd was commissioned to undertake an Aboriginal and historic cultural heritage impact assessment to inform the EES. This technical report presents the findings of the assessment and is an attachment to the EES.

With the implementation of the mitigation measures recommended throughout this assessment, potential adverse impacts on Aboriginal and historic cultural heritage have been minimised, and will continue to do so through the implementation of the Cultural Heritage Management Plan (CHMP), Permit/Consent and planning permit management condition.

Existing conditions

CHMP 15276 is currently in preparation for the Project Area, and a Historic Survey Report is in preparation to establish the nature and location of historic sites within the Project Area.

The CHMP identified no previously registered Aboriginal cultural heritage places within the Project Area from alignments 1-66. Due to the landform characteristics such as steep erosional slopes and thick undergrowth, the Project Area is likely to have been unsuitable for occupation, and not conducive for the deposition and accumulation of archaeological material. Sensitive landforms within the Project Area, such as mountain tops, ridgelines, gentle sloping hills, flood plains and waterways have been identified through the CHMP process and are targeted for survey during the Standard Assessment.

No intangible Aboriginal cultural heritage relating to the Project Area (identified through consultation with Aboriginal stakeholders) has been identified at present, however a Cultural Values Recording is underway with the Registered Aboriginal Party (RAP) for the region, Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC).

The Historic Survey Report identified a total of five listed heritage sites within the Project Area, Victorian Heritage Inventory (VHI) and Heritage Overlay (HO) sites. A number of historic features such as water races, tramways and mining sites were also identified from historical sources and the field survey and are thought to have potential to contain archaeological artefacts or features.

Impact assessment

An iterative assessment was undertaken to evaluate potential impacts associated with the project, considering the existing conditions within the Project Area and associated construction and operational activities.

Potential impacts investigated included the following:

- Construction activities impacting registered and/or unidentified Aboriginal cultural heritage places.
- Construction activities impacting intangible cultural heritage values.
- Construction activities impacting archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains.
- Construction activities directly or indirectly impacting listed and/or unlisted historic heritage sites.
- Operation activities directly or indirectly impacting registered and/or unidentified Aboriginal cultural heritage places.
- Operation activities directly or indirectly impacting listed and/or unlisted historic heritage sites.
- A comparison of Trail 1 to Trails 45, 46 and 47.

Construction activities impacting registered and unidentified Aboriginal cultural heritage places

The construction of the trails will require excavation to maximum depths of 800 millimetres, which has the potential to impact on registered and unidentified Aboriginal places within the Project Area. Aboriginal places are afforded statutory protection under the *Aboriginal Heritage Act 2006*. At the time of writing, CHMP 15276 is still in progress. However, no registered Aboriginal places are located within the Project Area at this stage, and an assessment of the Project Area landforms indicate that the steep eroding slopes were not conducive for human occupation, which is supported by the results of other CHMP assessments undertaken in proximity to the Project Area.

Construction activities impacting intangible cultural heritage values

The construction of the Project has the potential to impact and alter the landscape and values that may be associated with intangible Aboriginal heritage. Currently, Cultural Values Recording is underway with WWCHAC to investigate and record intangible values associated with the Project Area.

Construction activities impacting archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains

The excavation works for the Project have the potential to alter the landscape and impact sensitive landforms which contain potential for Aboriginal cultural heritage. Sensitive landforms within the Project Area include waterways, mountain tops, ridgelines, gentle sloping hills and flood plains. These sensitive landforms within the Project Area have been targeted for survey during the Standard Assessment stage of CHMP 15267 with no Aboriginal material culture found. While this does not eliminate the possibility of Aboriginal material culture being present in these landforms, it does show that there is lower likelihood than anticipated. Therefore, this lowers the risk of harming unknown Aboriginal places.

Construction activities directly or indirectly impacting listed and unlisted historic heritage sites

There are currently five listed heritage sites (three VHI and two HO) which are traversed by the Project, and therefore have the potential to be impacted during construction works, specifically excavation. The VHI sites are afforded statutory protection under the *Heritage Act 2017*. There are two of Heritage Overlay sites traversed by the Project Area. These HO places are afforded protection under the *Planning and Environment Act 1987* and planning approval would normally be required, however, an amendment to the planning scheme is currently being processed that once approved would satisfy the need for a permit.

Areas and points of archaeological potential were identified during the preparation of the historic report. Mitigation measures have been developed for works conducted in these places, with contingency measures for anything that is found.

Operation activities directly or indirectly impacting registered and unidentified Aboriginal cultural heritage places

It is anticipated that the development of the trails will encourage more people to the area and therefore in proximity to Aboriginal places that would normally receive no visitors. The advent of increased visitor traffic may result in human impacts, such as vandalism, accidental harm and the removal of Aboriginal cultural heritage material, to unregistered Aboriginal places that may be present within the Project Area.

Operation activities directly or indirectly impacting listed and unlisted historic heritage sites

It is anticipated that the development of the trails will encourage more people to the area and therefore to listed historic sites that would normally receive no visitors. The advent of increased visitor traffic may result in human impacts, such as vandalism, accidental harm and the removal of archaeological objects, to listed and unlisted historic sites within the Project Area.

A comparison of Trail 1 to Trails 45, 46 and 47

A review of the data from both the Historic report and the CHMP indicated that there was no discernible difference between Trail 1 and Trails 45, 46 and 47 relating to Aboriginal cultural heritage. Trail 1 has the potential to have greater impact than Trails 45, 46 and 47 to historic heritage.

Management of potential impacts

Potential impacts on Aboriginal and historic cultural heritage due to the project would be avoided, mitigated or managed to required standards through the recommended mitigation measures.

The CHMP assessment will provide management conditions for the management of Aboriginal cultural heritage and sensitive landforms which will mitigate impact during the construction and operation phase. In addition, the CHMP will contain contingency measures for the management of unexpected finds located during construction or operation activities, compliance responsibilities, custody of Aboriginal cultural heritage and dispute resolution pathways. To mitigate the risk of harm to impacts to intangible heritage, Cultural Values Recording is ongoing with WWCHAC to document Indigenous cultural values within the Project Area.

Consent applications will be made for the three VHI sites located within the Project Area. These applications, which are approved by Heritage Victoria (HV), will allow disturbance to the sites and provide mitigation measures. A Planning Scheme Amendment is currently in preparation that will fulfil the Yarra Ranges Council Heritage Overlay permit requirements. The A Planning Scheme Amendment application will include management measures. These measures will be included in the CEMP, along with an unexpected find protocol to manage chance finds during construction.

Detailed design of the trails will also assist in mitigating impacts to unlisted heritage sites such as water races, tramways and mine sites and to areas of archaeological potential. The design and construction of trails in these areas will be undertaken to minimise impacts to the ground surface using the micro-siting procedure outlined in the CEMP, and archaeological monitoring of works will be undertaken.

To manage the risk of human impacts to historic cultural heritage (such as vandalism, collection of artefacts) during the operation of the trail, checks of known historic sites and features should be carried out as part of trail upkeep. Signage at trail heads alerting people to stay to track will also assist in managing human impacts. The management conditions of the CHMP will manage operation impacts to Aboriginal cultural heritage.

When complete, the preparation of the CHMP, Cultural Values Recording, Permit and Consent applications and planning applications will have enabled the identification of cultural heritage values within the relevant Activity Areas and supported the development of management conditions and mitigation measures to avoid or minimise impacts on these values.

Abbreviations

ACHRIS	Aboriginal Cultural Heritage Register and Information System
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CHS	Cultural Heritage Sensitivity
DBYD	Dial Before You Dig
DPC	Department of Premier and Cabinet
EE Act	*Environment Effects Act 1978*
EES	Environment Effects Statement
EMM	Environmental Management Measures
EPBC Act	*Environment Protection and Biodiversity Act 1999*
FP-SR	First Peoples – State Relations (formerly Aboriginal Victoria)
GMU	Geomorphological Unit
HA	Heritage Advisor
HO	Heritage Overlay
HV	Heritage Victoria
ICOMOS	International Council on Monuments and Sites
LDAD	Low Density Artefact Distribution
MMBW	Melbourne and Metropolitan Board of Works
MNES	Matters of National Environmental Significance
NHL	National Heritage List
NOI	Notice of Intent
PGC	Primary Grid Coordinate
RAP	Registered Aboriginal Party
VAHR	Victorian Aboriginal Heritage Register
VHI	Victorian Heritage Inventory
VHR	Victorian Heritage Register
WWCHAC	Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation

Glossary

Aboriginal place	Aboriginal place is defined under Section 5 of the *Aboriginal Heritage Act* 2006
AECOM	AECOM, the EES author for the Project.
Alluvial terrace	A platform created from deposits of alluvial material along river banks.
Archaeology	The study of the remains of past human activity.
Artefact scatter	A scatter of cultural material. Aboriginal artefact scatters are defined as being the occurrence of five or more items of cultural material within an area of about 100 square metres. Artefact scatters are often the only physical remains of places where people have lived camped, prepared and eaten meals and worked.
Environmental management measure	Approaches, requirements or actions to avoid, mitigate or manage potential adverse impacts.
Complex Assessment:	Subsurface testing in areas of Aboriginal archaeological potential that forms part of a Cultural Heritage Management Plan.
Construction	All temporary works during the construction phase.
Design	The design, not reference design or preliminary design.
Desktop Assessment:	A review of relevant background information that forms part of a Cultural Heritage Management Plan.
Formal tool	An artefact that has been shaped by flaking, including retouch, or grinding to a predetermined form for use as a tool. Formal tools include scrapers, backed pieces and axes.
Geocentric Datum of Australia 1994 (GDA94)	A system of latitudes and longitudes, or east and north coordinates, centred at the centre of the earth's mass. GDA94 is compatible with modern positioning techniques such as the Global Positioning System (GPS). It supersedes older coordinate systems (AGD66, AGD84). GDA94 is based on a global framework, the IERS Terrestrial Reference Frame (ITRF), but is fixed to a number of reference points in Australia. GDA94 is the Victorian Government Standard and spatial coordinates for excavations, transects and places in CHMP documents.
Hearth	Usually a sub-surface feature found eroding from a river or creek bank or a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.
Heritage place	A place that has aesthetic, historic, scientific or social values for past, present or future generations – ' ...this definition encompasses all cultural places with any potential present or future value as defined above' (Pearson & Sullivan 1995)
Isolated artefact	The occurrence of less than five items of cultural material within an area of about 100 square metres. It/they can be evidence of a short-lived (or one-off) activity location, the result of an artefact being lost or discarded during travel, or evidence of an artefact scatter that is otherwise obscured by poor ground visibility.
Landholder	Includes both owners and occupiers.
Low Density Artefact Distribution (LDAD)	Specific form of artefact scatter defined by an artefact density of less than 10 artefacts per square metre, where a place extent cannot be identified.

Map Grid of Australia (MGA)	The official coordinate projection for use with the Geocentric Datum of Australia 1994 (GDA94).
Pre-contact	Before contact with non-Aboriginal people.
Post-contact	After contact with non-Aboriginal people.
Project Area	Includes full extent of both the project construction and operation corridors.
Project	The Warburton Mountain Bike Destination.
Scarred tree	Scars on trees may be the result of removal of strips of bark by Aboriginal people e.g. for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide hand and toe holds for hunting possums and koalas. Some scars may be the result of non-Aboriginal activity, such as surveyors' marks.
Scoping requirements	The EES Scoping requirements for the Project issued by the Department of Environment Land, Water and Planning in October 2020.
Sensitivity buffer	The buffer that is placed around Aboriginal places or waterways to create an 'are of cultural heritage sensitivity' which is one of the two triggers for a mandatory CHMP under the *Aboriginal Heritage Act 2006*.
Significance	The importance of a heritage place or place for aesthetic, historic, scientific or social values for past, present or future generations.
Standard Assessment	A ground survey of the entire Cultural Heritage Management Plan Project Area to identify surface Aboriginal cultural heritage material and confirm landforms of archaeological potential.
Yarra Ranges Council	Yarra Ranges Council, the proponent for the Project.

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1 Introduction

1.1 Purpose of this report

The Warburton Mountain Bike Destination ('the project') is a proposed world class mountain biking destination centred around Warburton, approximately 70 km north east of Melbourne. It consists of up to approximately 177 kilometres of mountain bike trails providing a variety of mountain bike experience to suit all levels of riding.

Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within this region which would also support the economy of the township and the health and well-being of its residents. It seeks to create iconic trails eligible for International Mountain Bike Association Gold Ride Centre status which would position Warburton as an internationally significant mountain bike destination.

On 21 May 2020, The Victorian Minister for Planning issued his decision that an Environment Effects Statement (EES) is required under the *Environment Effects Act 1978* (EE Act). On 16 June 2020 the Commonwealth Department for Agriculture, Water and Environment issued a decision that the Project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and that the Project will be assessed under the assessment bilateral agreement with the State of Victoria.

The purpose of this report is to assess the potential Aboriginal and historic heritage impacts associated with the Project to inform the preparation of the EES required for the Project.

1.2 Why understanding Aboriginal and historic cultural heritage is important

Aboriginal cultural heritage and historic cultural heritage are shaped by their cultural, social, historical, political, economic and physical contexts and therefore, provide meaningful links to Australia's history and culture.

Identifying and investigating Aboriginal cultural heritage in conjunction with the Traditional Owners of the land helps to give people a sense of their own culture and can reconnect them and preserve links to the past land use of Victoria.

The significance of a historic site extends through its use and associations; the best way to understand the potential impacts of the Project on historic site significance is to collate and analyse site specific information.

Once Aboriginal cultural heritage and historic heritage within the Project Area is understood, appropriate mitigation or avoidance strategies can be constructed in a meaningful and respectful way and incorporated into the Project.

2 Scoping requirements

2.1 EES evaluation objectives

The *Scoping Requirements for Warburton Mountain Bike Destination Environment Effects Statement* ('scoping requirements') by the Minister for Planning set out the specific environmental matters need to be addressed by Yarra Ranges Council in order to satisfy the Commonwealth and Victorian assessment and approval requirements.

The scoping requirements include a set of evaluation objectives. These objectives identify the desired outcomes to be achieved in managing the potential impacts of constructing and operating the Project in accordance with the *Ministerial guidelines for assessment of environmental effects under the EE Act*.

The following evaluation objective is relevant to the Aboriginal and historic heritage study:

- Avoid, or minimise where avoidance is not possible, adverse effects on Aboriginal and historic cultural heritage.

2.2 EES scoping requirements

The aspects from the scoping requirements relevant to the evaluation objective are shown in Table 1, as well as the location where these items have been addressed in this report.

Table 1 Scoping requirements relevant to Aboriginal and historic heritage

Aspect	Scoping requirement	Section adddressed
Key Issues	• Destruction or disturbance of sites or places of Aboriginal or historical cultural heritage significance. • Potential for indirect impacts on sites or places of Aboriginal or historical cultural heritage significance close to the project area. • Potential impacts on intangible Aboriginal cultural heritage values associated with the project area and surrounds.	Section 9 &10 (Impact assessment)
Existing environment	• Review and assess previous studies, registers, geomorphology, landform and land use history to identify areas of known Aboriginal cultural heritage and model areas with the potential to contain Aboriginal cultural heritage. • Review land use history, previous studies and registers to identify areas of known historical cultural heritage values and assess the potential for the Project to contain unregistered historical cultural heritage sites. • Describe the extent, nature and significance of any Aboriginal cultural heritage sites or areas of sensitivity potentially impacted by the project area (including	Section 7 (Existing conditions)

Aspect	Scoping requirement	Section adddressed
	associated infrastructure or ancillary works) through consultation and investigations to the satisfaction of the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation, ensuring adequate field assessments are conducted to verify the findings of any desktop studies. • Identify and document any known and previously unidentified places and sites of historical cultural heritage significance within the project area and its vicinity, including any necessary field investigations to supplement past studies. Assessments are to be undertaken in accordance with the Heritage Act 2017 and Heritage Victoria's Guidelines for Conducting Archaeological Surveys (2020) or updates. Maps of site extents showing their proximity to proposed works are to be provided. • Identify any known or previously unidentified intangible Aboriginal cultural heritage values associated with the project area.	
Mitigation measures	• Describe and evaluate potential and proposed design and construction mitigation methods to avoid adverse effects on Aboriginal and historical cultural heritage, and where avoidance is not possible, to minimise adverse effects. • Develop a CHMP to the satisfaction of the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation. • • Develop an archaeological management plan and ance finds procedure to manage historic heritage investigation/excavation etc.	Section 8 (Risk assessment) Section 9 &10 (Impact assessment) Section 12 (Mitigation)
Likely effects	• Assess the potential direct and indirect effects of the project on Aboriginal cultural heritage values, and whether they can be avoided. • Assess the potential direct and indirect effects of the project on sites and places of historical cultural heritage significance, having regard to the Guidelines for Investigating Historical Archaeological Artefacts and Sites (Heritage Victoria 2015) or updates. • Consider the potential for indirect impacts to cultural heritage sites located in proximity to the construction footprint which may result from increased public access and visitation to project areas. • Assess the potential direct or indirect effects on any intangible Aboriginal cultural heritage values associated with the project area.	Section 9 &10 (Impact assessment)
Performance criteria	• Outline how implementation of proposed commitments to mitigate and manage residual effects on sites and places of historical heritage significance	Section 12 (Mitigation)

Aspect	Scoping requirement	Section adddressed
	will be monitored, including site investigation and recording procedures. • Outline how compliance with conditions of any required statutory approvals (i.e. consents/permits/ CHMP) will be managed and monitored. • Outline and evaluate the need for additional management and/or monitoring measures, further to those presented in the draft CHMP, to manage risks of effects on sites and places of Aboriginal cultural heritage significance, as part of the EMF.	

2.3 Linkages to other technical reports

This report has no interdependencies with other EES technical reports.

3 Project description

3.1 Project overview

The Project is a proposed world-class mountain biking destination centred around Warburton, approximately 70 kilometres north-east of Melbourne as shown in Figure 1.

The Project Area discussed in this assessment refers to the alignments of all the proposed mountain bike trails, along with a 10 metre wide buffer on either side.

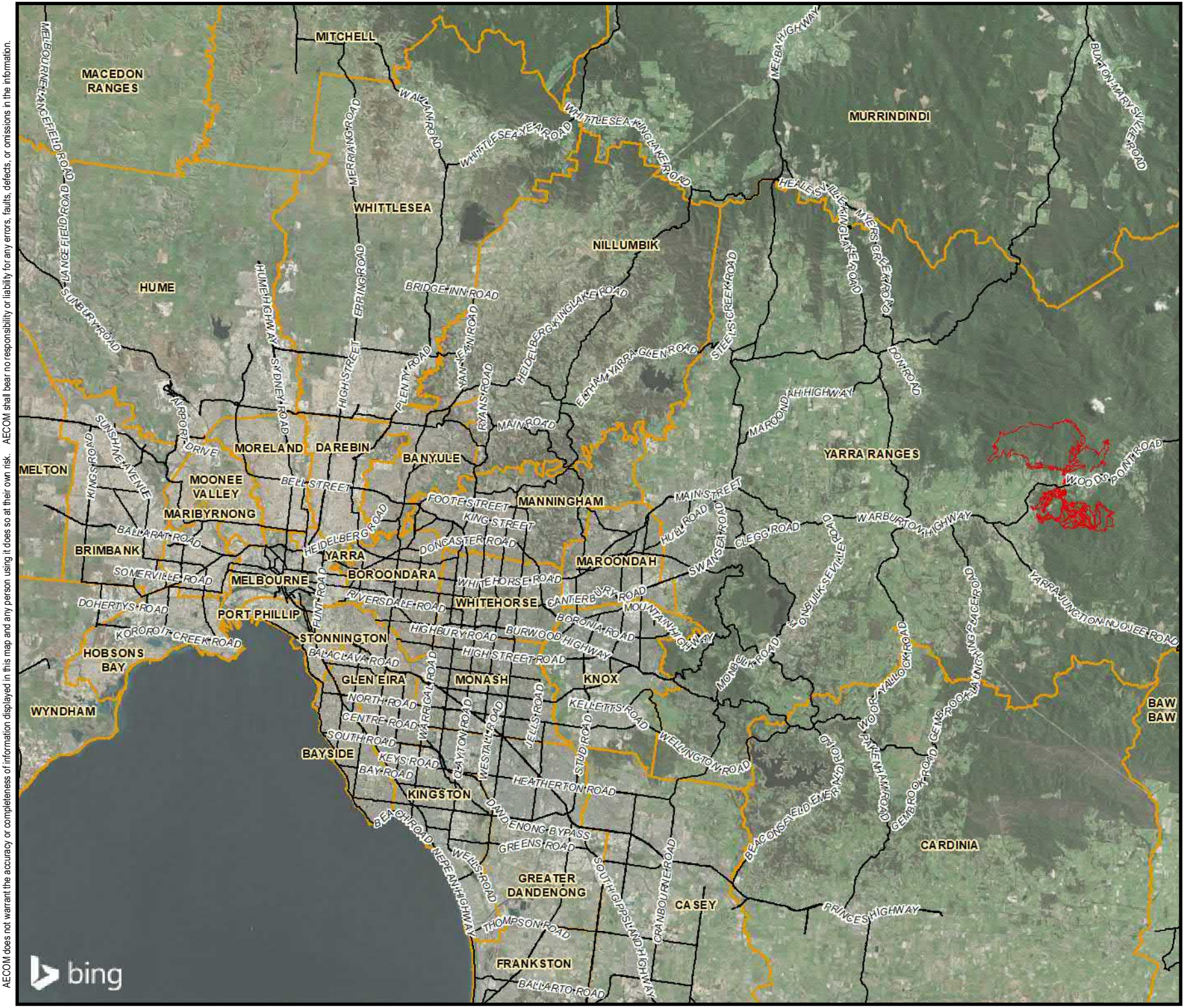
A significant informal network of mountain bike trails currently exists within the region and there is evidence of increasing use of these trails by local and visiting riders. Mountain biking in this locality started around 15 years ago and was concentrated in the Yarra State Forest in the vicinity of Mount Tugwell.

Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within the region which would also support the region and 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 approximately 177 kilometres of mountain bike trails providing a range of mountain bike experience to suit all levels of riding as shown in Figure 2. The project also includes a new Visitor's Hub and main trail head at the Warburton Golf Course and other trail heads at Mt Tugwell, Mt Donna Buang and Wesburn Park.



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PROJECT ID	60636618
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LAST MODIFIED	brierej 15 JUL 2021

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Coordinate System: GDA2020 MGA Zone 55

0 3,750 7,500 15,000

metres

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LEGEND

- Project Tracks and Trails
- LGA Boundaries

Warburton Mountain Bike Destination Project in relation to Melbourne

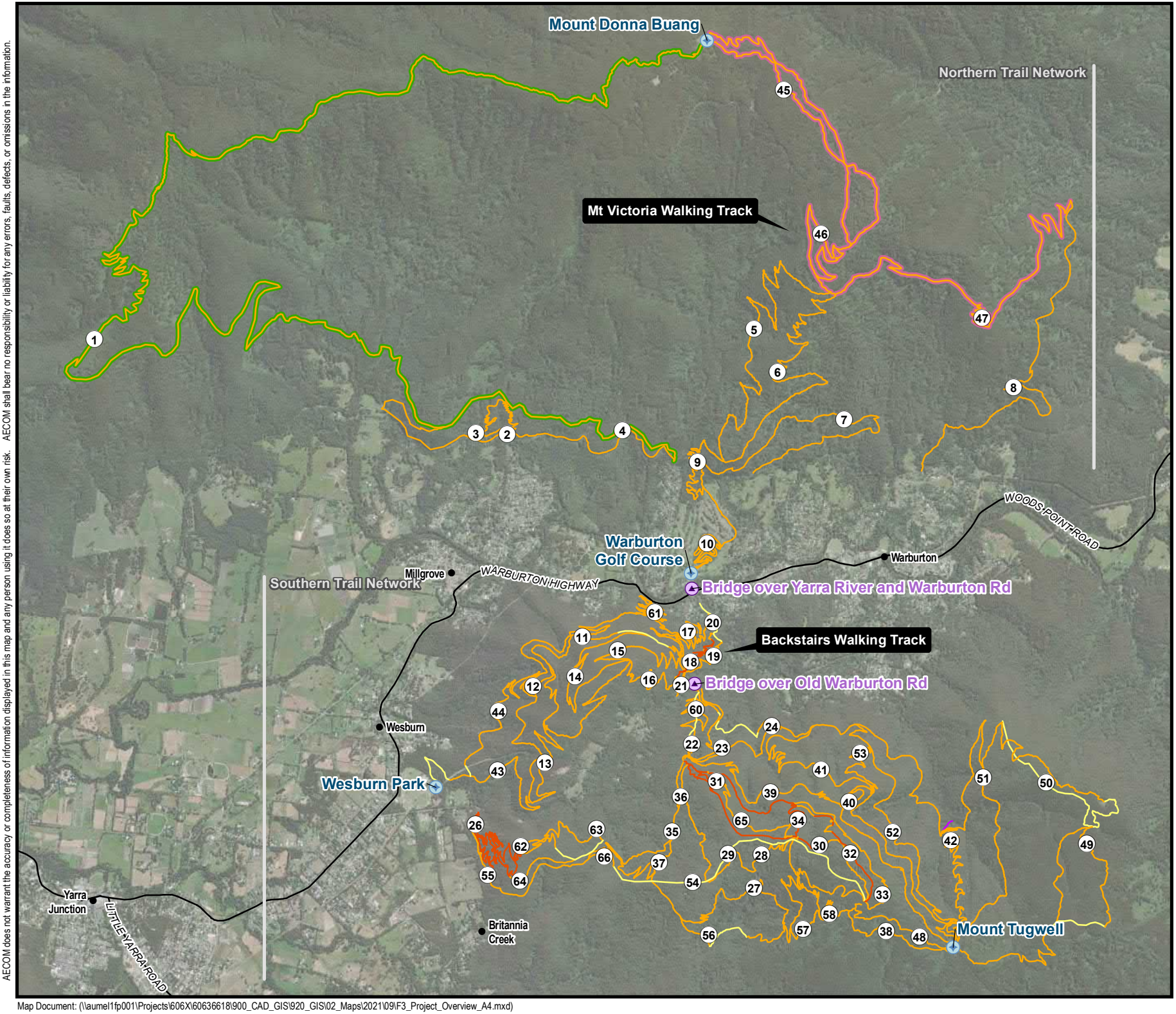
Yarra Ranges Council

Warburton Mountain Bike Destination

Warburton, Victoria

Figure F1

Map Document: (\\aumel1fp001\Projects\606X\60636618\900_CAD_GIS\920_GIS\02_Maps\2021\07\Overview\F1_Site_Location_A4.mxd)



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Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000 2,000

metres

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LEGEND

- Localities
- Trail Head
- Span Bridge Locations
- Proposed MTB Trail - existing track
- Proposed MTB Trail
- Existing MTB Trail
- Proposed WalkingTrail
- Trail 1
- Alternatives to Trail 1

Project Overview

Yarra Ranges Council

Warburton Mountain Bike Destination

Warburton, Victoria

Figure F3

Map Document: (\\aumel1fp001\Projects\606X\60636618\900_CAD_GIS\920_GIS\02_Maps\2021\09\F3_Project_Overview_A4.mxd)

3.2 Project Development

It is recognised that there are opportunities to avoid and minimise environmental impacts during the many stages of project development. During project inception and early design development stages of the project, decisions on the location of the project, its design and construction techniques have enabled impacts to be significantly avoided and minimised in accordance with the hierarchy presented in Figure 3.

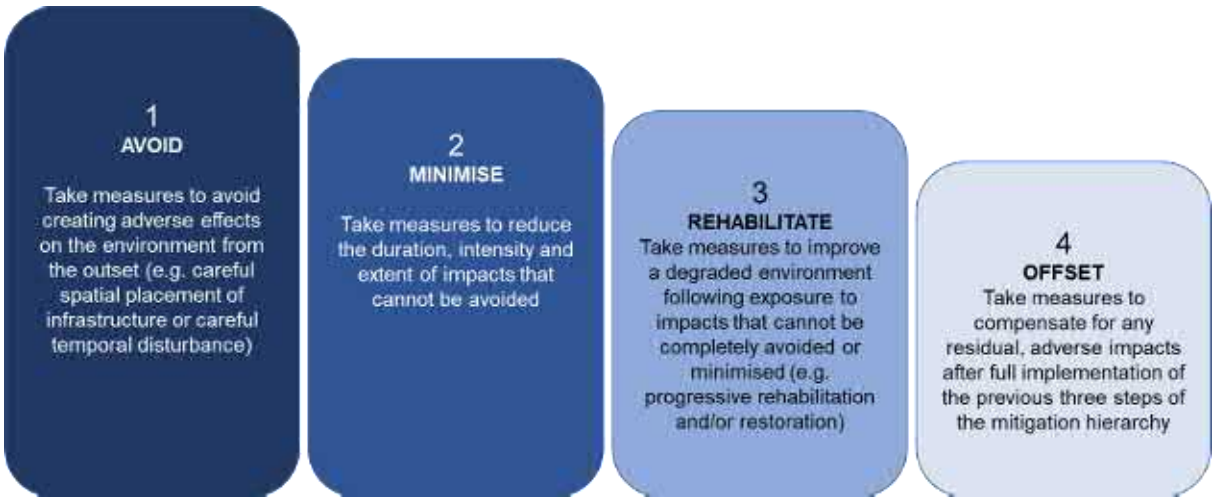


Figure 3 Mitigation hierarchy

Avoidance of impact has been a key focus of development of the trail network and has culminated in the preparation of a project description which is found at Chapter 3 of this EES. A description of how avoidance of impact has informed the design in relation to heritage can be found at Section 6.3.

Examples of this include the decision to design waterway crossings without directly impacting waterways, creating trails on previously disturbed areas wherever possible and adoption of a construction technique which avoids impacts to large trees.

After opportunities to avoid impact were exhausted, minimisation and rehabilitation measures were developed. These are described in the construction and operation impact assessment sections below.

3.3 Main Project components

The main project components proposed are as follows:

- Upgrade of existing mountain bike trails - approximately nine kilometres (five per cent of project length).
- New mountain bike trails – up to approximately 164 kilometres (92 percent of project length).
- Upgrade of existing vehicle tracks - upgrade approximately four kilometres (two per cent of project length).
- New Visitor's hub and main trail head at the Warburton Golf Course and new trail head facilities at Mt Tugwell, Mt Donna Buang and Wesburn Park. An additional network access point to the network would be provided at Dee Road.

The network would comprise of 61 trails, each with a length of between 100 metres and 22 kilometres. Each trail has a trail difficulty rating assigned, ranging from easy over intermediate, to difficult and extreme. Some of the trails are returning loops, while others are point-to-point trails. All trails have also been categorised into

six different styles including, adventure, air flow, downhill, flow country, gravity and wilderness, as described in the project description chapter of the EES.

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

The trails would have a bench width of approximately 1.2 metres with a ride line of approximately 400-1200 millimetres except for the trail on Cemetery Track. The development footprint to be assessed is based on a maximum width of two metres (one metre for the trail corridor with a trail buffer of 0.5 metres on each side). A head-height clearance of 2.5 metres has been assumed.

The trail network would include built form elements such as bridges, platforms, culverts, rock armour, jumps and berms. Minimal signage is proposed to be associated with the trail and trail heads and this would consist of small maps at strategic intersections and along with safety and name signage. Some trail sections would include elevated structures and drainage works to avoid and minimise impacts to waterways and associated biodiversity values.

The grade of individual trail sections would vary according to the local topography. Typically, the maximum trail grade would be less than 15%, with most of the trails having grade under 10%.

The new Visitor's Hub and main trail head is proposed to be developed at the south of Warburton Golf Course, where the existing carpark is to be upgraded and extended to accommodate around 180 cars with room for future expansion if required. A new shelter and a bike wash down station would be established for the use of mountain bike riders. Run-off 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 Visitor's Hub would be the main trail head and would allow direct access to the north and south trail zones.

Three other trail heads are proposed as follows:

- A new trail head would be established on top of Mt Tugwell, off Mt Bride Road and would include a carpark, a bus turnaround bay, a bike wash down station, toilets and picnic area.
- The existing trail head at Mt Donna Buang would be upgraded with improvements to the car park, toilets and picnic area and installation of a bike wash down station.
- An additional 120 car parks would be established at Wesburn Park to facilitate access to connecting trails.

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

3.4 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 socioeconomic 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.

Further information on this work is provided in the EES Chapter 4 – Project development and alternatives.

The investigations identified trail 1, nicknamed Drop A-K as a candidate for consideration of alternative alignments.

Trail 1 is approximately 23 kilometres in length and traverses the Yarra Ranges National Park from the summit of Mount Donna Buang travelling in a westerly direction through forested land alongside Road 2 before meandering generally south east through forested land towards the Warburton township, also intersecting Woi-wurrung State Forest.

The project identified an alternative to this trail, being the combination of trail 45, trail 46 and trail 47, with a combined length of approximately 15 kilometres, as shown in Figure 2.

Trails 45 and 46 are within the Yarra Ranges National Park and commence at the summit of Mount Donna Buang, following a south easterly direction through forested land towards the Warburton township, before tying into trails 5 and 6. Trail 47 commences at Mount Donna Buang Road and travels east within the National Park to tie into trail 8. The trails are respectively of length 4 kilometres (trail 45), 5.5 kilometres (trail 46) and 5.6 kilometres (trail 47).

3.5 Project timing

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

- Project development and approval: 2020-late 2021.
- Project construction: progressively from early 2022 depending on funding.
- Project operations and maintenance: staged opening during 2022 and beyond depending on funding.

3.6 Project Area

The Project Area is located 70 kilometres north-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 and Mount Tugwell. The landscape surrounding the proposed mountain bike trail is heavily forested and mountainous. In some cases, proposed trails would be isolated from roads, emergency tracks and other public infrastructure. The Project Area comprises 66 trails which consist of a 20 metre corridor within which the exact final trail alignment (1.2 metres wide) would be established.

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 and Mount Tugwell. Some sections of the southern trails would cross into natural feature reserves and freehold land.

The proposed trails would intersect four private landholdings and run within 100 metres of a further eight private residences. Traversing Mount Donna Buang, Mount Little Joe, Mount Tugwell and the O'Shannassy Aqueduct, the proposed trails intersect with a range of existing recreation uses including bushwalking, horse riding, motocross and 4WDing. The proposed development of the main trail head at Project would result in an intersection between the Project and the Warburton Golf Course.

Maps showing 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.

4 Legislation, policy and guidelines

4.1 Legislation, policy and guidelines

A number of legislative, policy, guidance and standard documents were found to be relevant to this Aboriginal and historic heritage impact assessment and are discussed further in this report. The key legislation, policy and guidelines that apply to the Aboriginal and historic impact assessment for the Project are summarised in Table 2. Further detail is provided in Section 4.2 to 4.4.

Table 2 Key legislation and policy applicable

Legislation/policy	Relevance to this impact assessment
Environment Protection and Biodiversity Act 1999	The Act is the Commonwealth's principal environmental protection and biodiversity conservation legislation. It includes the protection of National Heritage places, one of nine Matters of National Environmental Significance (MNES) protected under the Act. National Heritage places include natural, historic and indigenous places of outstanding heritage value. The Act states that 'controlled' actions, i.e. actions that are determined as likely to have a significant impact on a MNES, are subject to assessment and approval under the Act.
Environment Effects Act 1978	The Act establishes a process to assess the environmental impacts of a project. If applicable, the Act requires that an EES be prepared by the proponent. The EES is submitted to the Minister for Planning and enables them to assess the potential environmental effects of the proposed development.
Aboriginal Heritage Act 2006* and *Aboriginal Heritage Regulations 2018	Purpose of the Act is to provide protection for Aboriginal cultural heritage and Aboriginal intangible heritage in Victoria.
Heritage Act 2017* and *Heritage Regulations 2017	Purpose of the Act is to provide protection and conservation of the cultural heritage of the State of Victoria.
***Planning and Environment Act 1987* and relevant planning schemes**	Use and development of the land for the project requires planning approval in accordance with the Yarra Ranges Planning Scheme (YRPS). A planning scheme amendment (PSA) is proposed in accordance with 20(4) of the P&E Act to introduce an incorporated document and the application of a Special Controls Overlay. The P&E Act also requires any PSA to be consistent with the Upper Yarra Valley and Dandenong Ranges Regional Strategy Plan (Regional Strategy Plan).
Traditional Owners Settlement Act 2010	The Act allows for out-of-court settlements of native title in Victoria. The Act provides a framework for agreements between Victorian Traditional Owners and the State to recognise Traditional Owners' relationships to land and provide them with certain rights on Crown land.

4.2 Commonwealth legislation, policy and guidelines

Table 3 summarises the relevant Commonwealth legislation that applies to Aboriginal and historic heritage, as well as the implications and required approvals for the Project.

Table 3 Commonwealth legislation and associated information on Aboriginal and historic heritage

Legislation/policy	Implications for the Project	Approvals required, if applicable
Environment Protection and Biodiversity Act 1999	The Project must identify and assess the potential impacts to any Aboriginal cultural heritage places within the Project Area that are listed as places of National Heritage, Commonwealth Heritage and World Heritage. If the Project could have a significant impact on a National Heritage Place, the Project must be referred to the Australian Government Minister for the Environment to determine whether or not it will need formal assessment and approval under the EPBC Act.	**Aboriginal cultural heritage** As there are no Aboriginal cultural heritage places currently listed on the National Heritage List (NHL), Commonwealth Heritage List (CHL) or the World Heritage List (WHL) within the Project Area, no approvals are required by the Project with regard to Aboriginal cultural heritage under the EPBC Act. **Historic heritage** As there are no historic heritage places currently listed on the NHL, CHL or the WHL within the Project Area, no approvals are required by the Project with regard to Aboriginal cultural heritage under the EPBC Act.

4.3 Victorian legislation, policy and guidelines

Table 4 summarises the relevant Victorian legislation that applies to Aboriginal and historic heritage, as well as the implications and required approvals for the Project.

Table 4 Victorian legislation and associated information on Aboriginal and historic heritage

Legislation/policy	Implications for the Project	Approvals required, if applicable
Planning and Environment Act 1987 and relevant planning schemes	Where Aboriginal or historic cultural heritage places are specified in the Schedule to the planning overlay, planning approval may normally be required.	**Aboriginal cultural heritage** There are no Aboriginal cultural heritage places currently listed on the relevant Heritage Overlays within the Project Area. Therefore, no approvals are required by the Project with regard to Aboriginal cultural heritage under the *Planning and Environment Act 1987* and relevant planning schemes. **Historic heritage**

Legislation/policy	Implications for the Project	Approvals required, if applicable
		There are two Heritage Overlays intersecting with the Project Area. A permit under the *Planning and Environment Act* is normally required if Heritage Overlay places are located within the Project Area, however, an amendment to the planning scheme is underway that will fulfil this requirement.
Environment Effects Act 1978	A CHMP must be undertaken when an EES is required under the *Environment Effects Act 1978.* As a CHMP was already in progress for the Project, this has no implications for the Project. Please note, under Section 8C of the *Environment Effects Act 1978*, a CHMP for the Project cannot be approved until after the Minister releases the EES assessment under the Act. The EES and Minister's assessment informs the decision-makers of the CHMP.	**Aboriginal cultural heritage** A CHMP must be prepared and approved.
Aboriginal Heritage Act 2006 and ***Aboriginal Heritage Regulations 2018***	Under Section 49 of the Act, a CHMP is required if a proponent or other person is required to prepare an EES for the works. In addition to this requirement, the proposed works trigger a mandatory CHMP under Section 46(a) (the regulations require the preparation of the plan for the activity) of the Act. Under Section 7 of the Regulations, a CHMP is required if all or part of the Project Area is within an area of cultural heritage significance (CHS) and is a high impact activity.	**Aboriginal cultural heritage** CHMP 15276 has been prepared to manage Aboriginal cultural heritage within the Project Area (refer Section 6) and will be lodged for approval following the Minister's assessment of the EES.
Traditional Owners Settlement Act 2010	Once recognised by State Government as the Traditional Owner under the Traditional Owner Settlement Act, Registered Aboriginal Party (RAP) status will automatically be awarded to the group for the area of land that is the subject of the application and subsequent negotiations. As such, the correct group must be properly consulted regarding works and activities that will or are likely to impact Aboriginal cultural heritage within the Traditional Owner-settlement	**Aboriginal cultural heritage** Addressed by the CHMP. No Recognition and Settlement Agreements or Indigenous Land Use Agreements are present within the Project Area.

Legislation/policy	Implications for the Project	Approvals required, if applicable
	claim area. Any Recognition and Settlement Agreement or Indigenous Land Use Agreement on any Crown Land needs to be considered.	
Heritage Act 2017* and *Heritage Regulations 2017	Where previously unrecorded places or archaeological sites (which are more than 75 or more years old) are identified, registration is required. Where listed places or archaeological sites are identified, approval may be required. Permit for Victorian Heritage Register (VHR) places must be obtained from Heritage Victoria (HV). Consent for Victorian Heritage Inventory (VHI) sites must be obtained from HV.	**Historic Heritage** Under Section 93 of the *Heritage Act 2017* the Executive Director may issue a permit authorising works in relation to a Victorian Heritage Register site and under Section 124 issue a consent authorising works in relation to a Victorian Heritage Inventory site. Under the *Heritage Act 2017*, a Permit or Application for Consent must be submitted to HV for any impacts to VHR or VHI sites which are impacted by the Project. Three Consent applications are required to be completed for the Project.

4.3.1 Aboriginal Victoria key guidelines

Key First Peoples – State Relations (FP-SR) (formerly Aboriginal Victoria) guidelines and practice notes used for this assessment and the CHMP include:

- Guide to Preparing a Cultural Heritage Management Plan (Aboriginal Victoria 2016).
- Guide to Drafting Enforceable Conditions and Contingency Plans (Aboriginal Victoria 2015a).
- Practice Note: Subsurface Testing (Aboriginal Victoria 2015b).

4.3.2 Heritage Victoria key guidelines

Key HV guidelines and practice notes used for this assessment and the previous Preliminary Desktop include:

- Guidelines for Conducting Historical Archaeological Surveys (Heritage Victoria 2020).
- Guidelines for Investigating Historical Archaeological Artefacts and Sites (Heritage Victoria 2015).

4.4 Additional cultural heritage criteria

4.4.1 World Heritage List

A declared World Heritage property is an area that has been included in the World Heritage List (WHL) or declared by the Minister to be a World Heritage property. World Heritage properties that are nominated for the WHL are only included after they have been assessed as representing the best examples of the world's cultural and natural heritage.

4.4.2 National Heritage List

The National Heritage List (NHL) includes natural, historic and Aboriginal cultural heritage places of outstanding heritage value.

4.4.3 Commonwealth Heritage List

The Commonwealth Heritage List (CHL) includes natural, Aboriginal and historic cultural heritage places on Commonwealth lands and waters, or under Australian Government control. These places reflect Australia's development as a nation, and are connected to defence, maritime safety, communications, customs and other government activities.

4.4.4 Register of the National Estate

The Register of the National Estate (RNE) is a list of important Indigenous, natural and historic sites throughout Australia. It was a statutory register until February 2012. From February 2012 all references to the RNE were removed from the EPBC Act and the *Aboriginal Heritage Act 2006*. The RNE is now maintained as a publicly available non-statutory archive.

4.4.5 National Trust

The National Trust is a community-based, non-government organisation, and has no statutory power.

4.4.6 The Burra Charter

The Burra Charter for the conservation of places of cultural significance (Australia ICOMOS 2013) sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance including owners, managers and custodians. The Charter provides specific guidance for physical and procedural actions that should occur in relation to significant places. A copy of the charter can be accessed online at http://icomos.org/australia.

5 Consultation

Development of the Project and preparation of the EES have been informed by consultation with stakeholders and the community. Table 5 lists specific community and stakeholder feedback and how this feedback has been considered by the Project or in the Aboriginal and historic heritage impact assessment.

Table 5 Stakeholder engagement undertaken for Aboriginal and historic heritage

Community and stakeholder feedback
Consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC) RAP: • Consultation with the RAP (WWCHAC) is undertaken at all stages of the preparation of the CHMP process. An inception meeting is held after the background research is completed to discuss the nature of the Project as well as land use history and the results of previous research in the area. After the Standard Assessment a second meeting is held to discuss the findings. After the Complex Assessment a final meeting is held to discuss the results of the assessment and any management conditions that may be required by the RAP. The relevant RAP group are invited to send field representatives to participate in the fieldwork components of the CHMP (Standard and Complex Assessments). • As the CHMP has not yet been completed, consultation with WWCHAC is still underway. • Full details of consultation with WWCHAC is contained within the CHMP. • Recording of intangible heritage has been carried out with WWHCAC Elders, with an inception meeting, site visit and workshop completed as part of program of cultural value recording. The outcomes of this consultation will be presented to WWCHAC in the form of an independent report. • For additional details relating to WWCHAC consultation, please see Section 6.2.1.1.5.
Consultation with HV: • Consultation regarding the project and the management of historic sites has been undertaken with Heritage Victoria throughout the project. This has included site visits by Heritage Victoria archaeologists. • A site card for Lady Hopetoun Mine was submitted to HV following the results of the Historic Survey Report. The site was determined to meet the threshold policy to be listed on the VHI as Lady Hopetoun Mine (H8022-0138). • Site cards for the Evans Reward Mine, (VHI H8022-0136), Anderson's Mill (VHI H8022-0135) and Hermon's sawmill and tramway (VHI H8022-0137) were submitted and added to the VHI following additional survey for the modified trail design. A site card was submitted for Yankee Jim Hydraulic Sluicing Work, but HV determined that this did not meet the threshold required for the VHI.
Community consultation: • During the development of the historic survey report (Biosis 2019), consultation was attempted with the local historical group. However, this group declined to participate**.**

Community and stakeholder feedback

- **Consultation was undertaken with members of the public who expressed the following concerns:**
  - **Concerns that the project would impact protected heritage structures and that historic sites are being abandoned by Yarra Ranges Council**. This concern has been addressed through appropriate mitigation measures developed in consultation with Heritage Victoria with further details being available in Sections 9.5 and 9.6.
  - **Concerns about locating the trails near Yarra Yarra Hydraulic Gold Sluicing Company and O'Shannassy aqueduct sawmill and tramway site**. This concern has been addressed through appropriate mitigation measures developed in consultation with Heritage Victoria with further details being available in Section 9.5.1.1.

6 Method

6.1 Overview of method

This section describes the method that was used to assess the potential impacts of the Project. Figure 4 shows an overview of the assessment method. A risk-based approach was applied to prioritise the key issues for assessment and inform measures to avoid, minimise and offset potential effects.

The approach used in the assessment has been guided by the evaluation framework that applies to the Project (that is, existing regulatory framework of relevant legislation and policy) as well as the scoping requirements, set by the Victorian Minister for Planning, incorporating input from the Commonwealth Department of Agriculture, Water and Environment in relation to matters of national environmental significance (MNES).

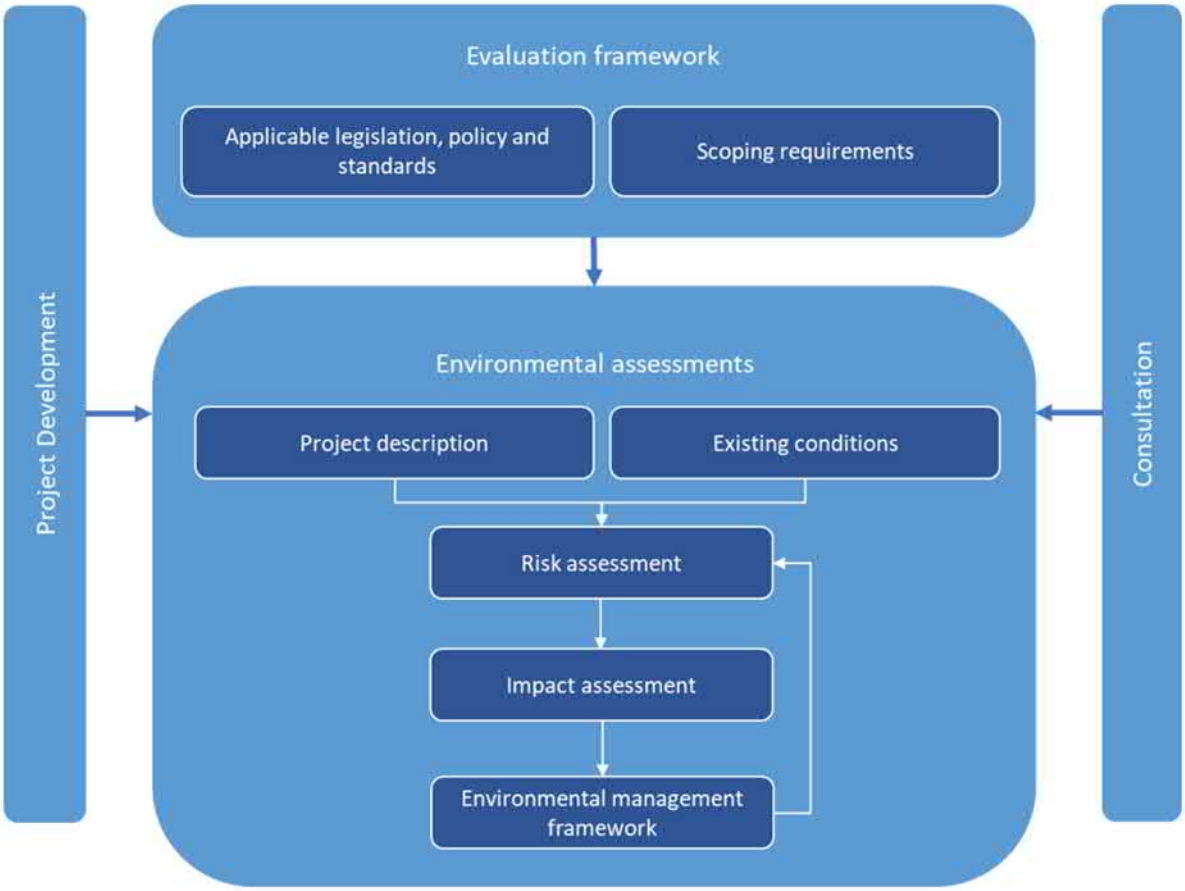


Figure 4 Overview of the EES assessment framework

The environmental assessment undertaken encompasses consideration of physical systems, ecological systems, human communities, land use effects and economic effects as relevant to the Project. It has been undertaken using a precautionary approach according to the following steps:

- Characterisation the existing environmental conditions.

- Review of the Project design and the proposed construction and operation activities in the context of the existing conditions to determine the location, type, timing, intensity, duration and spatial distribution of Project components and activities in relation to sensitive receptors.
- An initial risk assessment to evaluate the likelihood and consequence of proposed Project activities in the context initial mitigation measures to determine the relative importance of environmental risks associated with the Project.
- Assessment of potential direct and indirect environmental impacts to analyse the spatial and temporal extent, magnitude and nature of the potential impacts giving consideration to the sensitivity and significance of affected receptors.
- Evaluation of the predicted outcomes against applicable legislation, policy and standards.
- Evaluation of the potential for cumulative impacts caused by impacts of the Project in combination with impacts of other projects that are taking place or are proposed nearby.
- Identify mitigation measures where necessary, to address potentially significant environmental effects.
- Identification and evaluation of the residual environmental effects including magnitude, duration and extent, taking into account the proposed mitigation measures and their likely effectiveness.

Based on the findings of the environmental assessments, an environmental management framework has been established to monitor and evaluate environmental management and contingency measures in relation to the residual environmental effects. The environmental management framework specifies the committed mitigation and management measures and describes the roles and responsibilities for implementation throughout Project construction, operation and decommissioning. The environmental management framework is described fully in Chapter 15: Environmental management framework.

The specific methods adopted during the key steps are described in the sections below.

A cumulative impact assessment has been undertaken on a project level. No major projects where there is potential for impacts to overlap temporally and spatially have been identified. Accordingly, no cumulative impacts with other projects are anticipated. A separate cumulative impact assessment for Aboriginal cultural heritage is contained within CHMP 15276.

6.2 Existing conditions

A comprehensive assessment was undertaken to understand the existing conditions of the Project Area to inform the environmental impact assessment for the works. This assessment incorporated the following studies. The geographic region and Activity Area are shown in Map 1. The Study Area used as part of the historic heritage assessment is shown for context.

6.2.1 Aboriginal cultural heritage

6.2.1.1 Cultural Heritage Management Plan

CHMP 15276 is being prepared for the Project and in consultation with WWCHAC. Information collected during preparation of this CHMP was reviewed in conjunction with updated information where required, to describe the Aboriginal cultural heritage within the Project. The following aspects have been discussed and assessed to characterise existing conditions and inform the risk and impact assessments:

- Landforms and geomorphology.

- Historical environment.
- Historical and ethno-historical accounts of Aboriginal people.
- Land use history.
- Previous archaeological assessment undertaken within CHMP 15276 Activity Area.

Cultural heritage management plan methodology

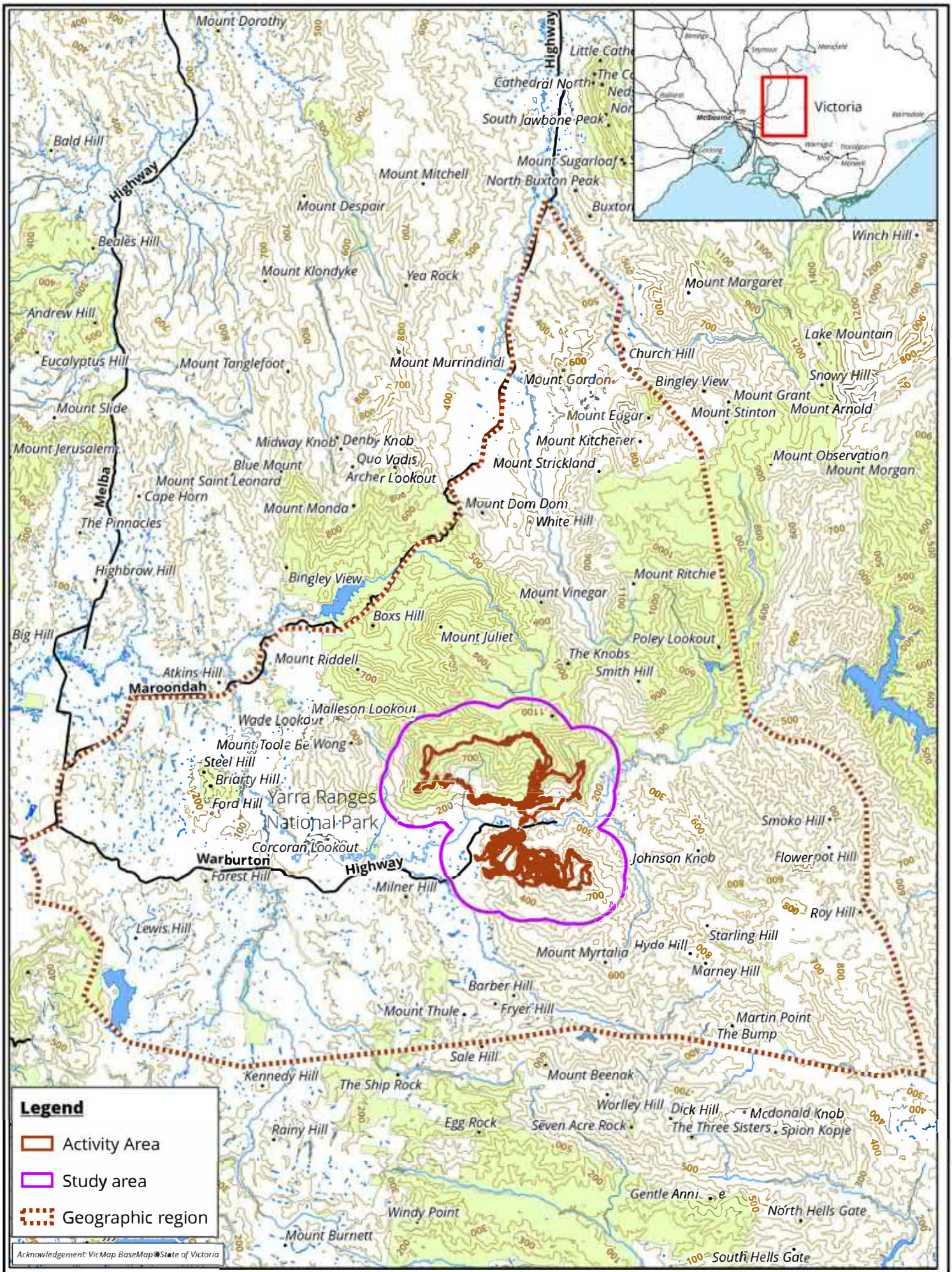
A CHMP comprises three assessment levels:

- Desktop Assessment (background research)
- Standard Assessment (ground survey)
- Complex Assessment (excavation)

The three-tiered framework for the assessment of Aboriginal cultural heritage allows for the characterisation of the existing environment and the identification of Aboriginal cultural heritage places. As such, the extent, nature and significance of identified Aboriginal places can be established, from which mitigation measures can be constructed to guide the proposed works.

Throughout the description of the CHMP, the terms Activity Area and geographic region are used. The Activity Area describes the area that is under assessment for the CHMP and all management conditions pertain to this area. No works associated with the Activity may be conducted outside the Activity Area. The way in which the Project Area differs from the Activity Area is that the Project Area covers the current trail alignment with the 10 metre buffer either side (see Section 3.6), while the Activity Area covers this are plus all previous trail alignments with the 10 metre buffer.

A geographic region is an area which, based on background research, is deemed to be likely to contain similar Aboriginal places as the Activity Area. This is used for a basis for database searches and the results of this are used to develop the predicative model for what is likely to be present in the Activity Area.



Map 1 Activity Area and geographic region of CHMP 15276

biosis

Matter: 34179,
Date: 20 July 2021, Checked by: DC, Drawn by: LW, Last edited by: lwilson
Layout: 34179_EES_M1_Locality
Location: P:\33800s\33805\Mapping\33805_Warburton_EES_Figures_Heritage_EES.aprx

0 1 2 3 4 5
Kilometres

N

Scale: 1:280,000 @ A4
Coordinate System GDA 1994 MGA Zone 55

Further detail of the three-tiered framework is outlined below:

6.2.1.1.1 CHMP Desktop Assessment methodology

The CHMP Desktop Assessment is a review of relevant background information for the Project Area (Trails 1 - 66). The Desktop Assessment for the CHMP involved the following tasks:

- Determination of a geographic region for search parameters.
- Environmental and ethnographic data retrieval from the relevant databases and sources.
- Aboriginal archaeological report and Aboriginal place data retrieval from the Victorian Aboriginal Heritage Register (VAHR).
- Examine historic map sources and aerial imagery to identify land use history.
- Undertake a 'Dial Before You Dig' search to identify existing utilities.
- A thorough review of the above information to identify landforms of Aboriginal cultural heritage potential.
- Map all recorded Aboriginal places and landforms with Aboriginal cultural heritage potential.
- Development of an Aboriginal place prediction model. The place prediction model is based on the review of the geographic region, including its environment, recorded Aboriginal places, previous archaeological assessments and information on the activities of Aboriginal people. This existing regional information is used in order to target landforms which may have archaeological potential. The geographic region is an arbitrary sized area selected to represent a range of landforms and resources that would have been accessible from the Project Area prior to European settlement.

6.2.1.1.2 CHMP Standard Assessment methodology

The CHMP Standard Assessment is a ground survey of the CHMP Project Area to identify surface Aboriginal cultural heritage material and confirm landforms of archaeological cultural potential. The objectives of the Standard Assessment are to:

- Identify and record any surface Aboriginal cultural heritage material.
- Identify landforms with the potential for subsurface Aboriginal cultural heritage material.
- Assess whether a Complex Assessment level is required.

6.2.1.1.3 CHMP Complex Assessment methodology

The CHMP Complex Assessment is undertaken to establish the stratigraphy and archaeological sensitivity of the landforms identified during the Desktop and Standard Assessments, as well as determining the extent of Aboriginal places recorded within the Project Area. The objectives of the Complex Assessment are to:

- Target subsurface testing in areas of archaeological cultural potential within each landform type present – 1x1 metre hand excavated test pits.
- Sampling subsurface testing of the remainder of the Project Area – 500x500 millimetre hand excavated shovel test pits.
- Record subsurface conditions, including stratigraphy and disturbance.
- Record Aboriginal places.
- Compare the results with the Aboriginal place prediction model.

- Complete associated reporting.

6.2.1.1.4 Spatial prediction model

6.2.1.1.4.1 Method

Spatial modelling for Aboriginal cultural heritage potential in the Activity Area is mapped in Map 4. To assess the potential of environmental features and landforms for Aboriginal cultural material, this spatial predictive modelling was undertaken in ArcGIS using Spatial Analyst tools to compare, analyse and overlay numerous environmental and topographic datasets. Four main datasets were considered during the modelling process. These include:

- Proximity to natural water sources.
- Existence of remnant vegetation.
- Local high points.
- Slope classes.

All of these layers are weighted and ranked according to an equivalent but arbitrary scale of 0-3, with '3' being areas most likely to support Aboriginal places and '0' being very unlikely to support Aboriginal places. Once all of the 4 component layers are added together into a single layer, zones of high, moderate and low archaeological potential were developed. Areas of high potential scored between 6-10 (red on Map 3), moderate potential scores between 3-6 (yellow on Map 3) and low potential scored between 0-3 (blue on Map series 4). In this map, areas with a low cumulative score have a lower likelihood of containing Aboriginal places, blue being the lowest and red being the highest level of archaeological potential.

It is important to note that the purpose of this model is to make some broad predictions about the Activity Area based on generalisations in order to inform more detailed and targeted investigations. It cannot account for more specific phenomena which might actively contribute or detract from the areas suitability for Aboriginal places, such as areas which had ceremonial significance.

6.2.1.1.4.1.1 Natural Water Sources

The model uses the VicMap Hydro 1:25,000 vector watercourse lines and waterbody polygons datasets and applied the following processes:

- The watercourses and waterbodies are filtered to remove any man-made waterways as designated by the 'Origin' field of the VicMap data
- The watercourses and waterbodies are buffered by 200 metres
- The watercourses and waterbodies are merged into a single dataset
- The water dataset is converted to a raster of grid size 25 metres x 25 metres
- The raster cells are reclassified to an overall 'hydro score' by assigning a score of 5 to rivers, swamps, lakes and sections of streams mapped as an area rather than a centre line; a score of 4 to streams, 3 to pondages and 0 to all other areas.

6.2.1.1.4.1.2 Modelled remnant vegetation

The model uses the Department of Environment and Primary Industries modelled Ecological Vegetation Classes polygon dataset from 2005 as displayed on the Biodiversity interactive mapper. The following processes are applied:

- The polygons are converted to a raster of 25 metres x 25 metres cell size.
- The raster cells are reclassified to a 'Veg score' value by assigning a score 3 to all areas containing remnant vegetation and 0 to all other areas.

6.2.1.1.4.1.3 Local high points

- The DEM described above is converted into a flow accumulation model, showing the total catchment area for water flow at each point in the landscape.
- Areas of 0 flow are extracted into a separate layer. As they have no other land flowing into them, this means they stand above all other land in the immediate area.
- The 0 flow areas model is filtered so only a significant amount of connected land is considered to represent hills and ridgelines.

6.2.1.1.4.1.4 Unsuitable slopes

- A slope model was created using a 1 arc second (~30 metres x 30 metres cell size) Digital Elevation Model (DEM) acquired from Geoscience Australia.
- The slope model is reclassified into slope categories according to Speight's slope classes.
- Any slopes classified as being very steep or greater are assigned a negative value as these slopes are likely to be too steep to support Aboriginal places.

The prediction model acts as a guideline for designing further research strategies and identifies key points for consideration during the targeted inspection.

A map showing the predictive model can be seen in Map 3.

6.2.1.1.5 Consultation

Consultation with the Registered Aboriginal Party (RAP) or Tradition Owners (TOs) is undertaken at all stages of the preparation of the CHMP process. An inception meeting is held after the background research is completed to discuss the nature of the Activity as well as land use history and the results of previous research in the area. After the Standard Assessment a second meeting is held to discuss the findings. After the Complex Assessment a final meeting is held to discuss the results of the assessment and any management conditions that may be required by the RAP. The relevant RAP are invited to send field representatives to participate in the fieldwork components of the CHMP (Standard and Complex Assessments).

6.2.1.1.6 Reporting and contingency planning

CHMP 15276 has been prepared for the Project to comply with AV's relevant practice notes and guidelines, to meet the requirements of the *Aboriginal Heritage Regulations 2018*. The CHMP:

- Provide information on the nature of the proposed works.
- Describe any and all consultation that has occurred with stakeholders throughout the assessments.
- Review background information via a Desktop Assessment.
- Present the methodology and results of the field assessments (Standard and Complex).
- Assess the cultural heritage significance of the Aboriginal cultural heritage findings.
- Assess the impact of the intended development on any Aboriginal places.
- Assess the cumulative impacts against Aboriginal places in the region.

- Present conditions for management and/or mitigation where required, in accordance with current conservation practice and the conservation principles contained within the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter.
- Present contingency plans for:
  - Compliance responsibility.
  - Dispute resolution.
  - Reviewing and remedying compliance/non-compliance.
  - Notification and management of unexpected Aboriginal cultural heritage findings during the works.
  - Custody of Aboriginal cultural heritage.
  - Notification and management of an unexpected discovery of suspected human remains during the works.

6.2.1.1.7 Aboriginal cultural heritage place significance assessment criteria

The below criteria is used to determine the scientific significance of Aboriginal places recorded during the CHMP process. Assessment of the heritage significance of an Aboriginal place is undertaken to make decisions about the best way to protect and manage the identified place. The assessment of significance can be complex and include a range of heritage values. The heritage values are broadly defined in the Burra Charter, the set of guidelines on cultural heritage management and practice prepared by the Australia ICOMOS, as the 'aesthetic, historic, scientific or social values for past, present or future generations' (Australia ICOMOS 2013, pp. 21). Many Aboriginal places also have significance to a specific Aboriginal community.

Although there are no formal guidelines for the assessment of significance of Aboriginal places in Victoria, the definition of 'cultural heritage significance' under Section 4 of the *Aboriginal Heritage Act 2006* includes:

- Archaeological, anthropological, contemporary, historical, scientific, social or spiritual significance.
- Significance in accordance with Aboriginal tradition.

Significance is based on the capacity of Aboriginal places to provide us with historical, cultural or social information.

The scientific significance of the Aboriginal places recorded during the CHMP assessments will be evaluated. The methodology used for this scientific significance assessment, derived from Bowdler (1981), is based on scores for:

- Research potential, divided into place contents and place condition; and
- Representativeness of an Aboriginal place.

Place contents refer to cultural materials and organic remains associated with human activity at an Aboriginal place. Place condition refers to the degree of disturbance to the contents of an Aboriginal place at the time it was recorded. The representativeness of an Aboriginal place is assessed by whether the place is common, occasional, or rare in a given region. It is noted that assessments of representativeness are subjectively biased by current knowledge of the distribution and number of Aboriginal places and varies from place to place depending on the extent of archaeological research.

The determination of scientific significance for an Aboriginal place is expressed as a statement of significance. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category is presented in Table 6.

The scientific significance assessment for scarred trees varies from the significance assessment outlined above because a scarred tree has no place contents rating (a tree either is, or is not, a scarred tree). The place condition and representativeness ratings used for scarred trees are indicated in Table 7 and overall scientific significance ratings for scarred tree places are based on a cumulative score for place condition and representativeness.

Representativeness refers to the regional distribution of scarred trees and is assessed on whether the place is common, occasional or rare in a given region. Representativeness should take into account the type and condition of the scar(s)/tree and the tree species involved. Scarred tree criteria are presented in Table 7.

Table 6 Scientific significance assessment criteria

Place Contents	Place Condition	Representativeness	Overall Significance
0 - No cultural material remaining.	**0** - Place destroyed.		
1 - Place contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.	**1** - Place in a deteriorated condition with a high degree of disturbance; some cultural materials remaining.	**1** - Common occurrence	**1 - 3** - Low
2 - Place contains a larger number, but limited range of cultural materials; and/or some intact stratified deposit remains; and/or rare or unusual example(s) of a particular artefact type.	**2** - Place in a fair to good condition, but with some disturbance.	**2** - Occasional occurrence	**4 - 6** - Moderate
3 - Place contains a large number and diverse range of cultural materials; and/or largely intact stratified deposit; and/or surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.	**3** - Place in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were deposited.	**3** - Rare occurrence	**7 - 9** - High

Table 7 Scarred tree scientific significance assessment criteria

Place Condition	Representativeness	Overall Significance
1 - Poorly preserved tree scar	**1** - Common occurrence	**1 - 2** - Low
2 - Partly preserved tree scar	**2** - Occasional occurrence	**3 - 4** - Moderate
3 - Well preserved example of a scarred tree	**3** - Rare occurrence	**5 - 6** - High

6.2.1.2 Intangible Aboriginal cultural heritage

As part of the preparation of this EES, WWCHAC were consulted specifically on intangible cultural heritage for the Warburton Mountain Trail Project Area and Warburton surrounds. As part of this assessment the following activities were carried out by representatives from Biosis, Yarra Ranges Council and WWCHAC:

- Project Establishment meeting – introduction to project and initial feedback from WWCHAC on cultural values for the Warburton area.
- Site visit – Visit with WWCAHC Elders to key points in the Warburton area such Mt Donna Buang and Mt Tugwell to discuss further cultural values.
- Workshop – Meeting with WWCHAC to discuss the outcomes of the site visit and put forward any key cultural values and recommendations for future consultation with WWCHAC as well as the discussion of any potential impact to intangible heritage known or unknown.

The report of the cultural heritage values recording is in preparation. It is unknown at this stage if the report will be included in this Technical Report or CHMP 15267.

6.2.2 Historic heritage

A Historic Survey Report was prepared by Biosis (Biosis 2019). This assessment has considered the background history to the area, conducted targeted surveys to determine the likely survival of historic features and historical archaeological sites, and provides management recommendations for conserving cultural heritage values in the Project Area.

6.2.2.1 Desktop Assessment methodology

The Desktop Assessment was prepared to outline the historical heritage liabilities in relation to the Project under the *Heritage Act 2017* and *Planning and Environment Act 1987*. The Desktop Assessment, in relation to historic heritage, involved the following tasks:

- Provide information on the nature of the proposed works.
- Review background information via a Desktop Assessment.
- A review of the study area using the VicPlan database. The study area comprises of the project area with a two kilometre buffer.
- A review of the following registers and sources:
  - Victorian Heritage Register
  - Victorian Heritage Inventory
  - Local Government Heritage Overlays and/or Planning Schemes
  - Local Government heritage studies
  - Historical plans, maps and aerial imagery
  - Heritage assessments and studies
  - Other historical records
- Assess the cultural heritage significance of the historic heritage findings.
- Assess the impact of the intended development on any historic sites.
- Present recommended conditions for avoidance, management and/or mitigation where required.

Following the Desktop Assessment, a determination of likely historic sites in the Project Area was made. Historic sites include those on the above registers and those identified in the Desktop Assessment and regional searches that have the potential to yield information about Victoria's past.

6.2.2.2 Site inspection methodology

The aim of a survey was to identify any historical sites within the Project Area and record them in accordance with standards detailed in Heritage Victoria's (2015, 2020) technical guides.

As the survey area was densely vegetated and very steep in places, it was recognised that pedestrian survey of the entire extent of the mountain bike trails was not going to be practical, and so the aims were modified to provide a viable survey coverage and useful results. Therefore the aims were as follows:

- Inspect areas of different terrain and vegetation types to determine the character of the area.
- Inspect all locations where proposed trails intersect with known historical or archaeological features, including tramways, sawmills and mining areas.
- Survey identified historic features and locations to determine if any surviving fabric of features exist.

Locations of potential historic features were identified in historical research and plans as potential areas of archaeological sensitivity. These were plotted on base plans for use in the field, and the co-ordinates loaded onto a DGPS unit. These locations were then inspected on foot from the nearest accessible road or four wheel drive track.

Waypoints and Tracks were plotted with hand held GPS, and digital images taken of the general location and any visible evidence of archaeological features or potential artificial landforms, such as tramway alignments or sluice banks.

DGPS and photo locations were plotted on base plans with overlaid historical data, to assess whether likely historical features had been identified.

6.2.2.3 Consultation

Consultation regarding the project and the management of historic sites has been undertaken with Heritage Victoria throughout the project. This has included site visits by Heritage Victoria archaeologists.

A site card for Lady Hopetoun Mine was submitted to HV following the results of the Historic Survey Report. The site was determined to meet the threshold policy to be listed on the VHI as Lady Hopetoun Mine (H8022-0138).

Site cards for the Evans Reward Mine, (VHI H8022-0136), Anderson's Mill (VHI H8022-0135) and Hermon's sawmill and tramway (VHI H8022-0137) were submitted and added to the VHI following additional survey for the modified trail design. A site card was submitted for Yankee Jim Hydraulic Sluicing Work, but HV determined that this did not meet the threshold required for the VHI.

6.3 Avoidance and design

The ability to avoid impacts (in accordance with the mitigation hierarchy) is greatest early in the project when key decisions are made regarding project location, design and construction approach. These key initiatives are set out in the project development chapter of the EES. The key decisions made from the outset that have served to avoid and mitigate potential impacts on cultural heritage are presented in this section, preceding the assessment that is presented for the project.

An extensive ground-truthing process of the trails was undertaken in 2016, that involved on-ground assessment of a 20m wide corridor of the proposed trail alignments with teams of trail designers, ecologists,

heritage consultants, land managers, council officers, Wurundjeri and species experts. During the ground-truthing process considerable care was taken to identify important values and plan for their protection. This resulted in many changes to alignments and contributed to the development of the Cultural Heritage Management Plan, Historic Heritage Report and construction methodologies that accompanied the project referrals. Further refinement of the alignment corridor pre-construction would further avoid impacts to important values, in consultation with appropriate environmental, species or heritage experts

Relevant to this topic, the following measures have been adopted in relation to the design, construction and operation of the project to avoid and minimise impacts:

- The alignment of the individual trails has been guided by the location and extent of both Aboriginal and historic heritage places that are present in the vicinity.
- Regarding Aboriginal cultural heritage, no Aboriginal places have been identified, therefore, no alternatives have needed to be considered.
- Regarding historic heritage, the trail alignment has been altered to avoid some historic places identified, notably the Old Warburton Cemetery and Yankee Jim Creek Gold Sluicing area.
- The micrositing procedure outlined in the CEMP will seek to avoid any unexpected archaeological discoveries.

6.4 Risk assessment

6.4.1 Risk overview and purpose

An environmental risk assessment has been completed to identify environmental risks associated with construction and operation of the Project. The risk-based approach is integral to the EES as required by section 2.1 of the Scoping Requirements and the *Ministerial guidelines for assessment of the environmental effects under the Environment Effects Act 1978*.

Specifically, the EES risk assessment aimed to:

- Provide a consistent evaluation tool that is used for all assessments to systematically rate the key issues associated with the Project.
- Identify key risks associated with the Project that may require further examination through the detailed impact assessments.
- Inform Project development and/or development of measures to avoid, mitigate and manage environmental impacts.

The risk assessment process adopted is consistent with AS/NZS ISO 31000:2018 Risk Management Process. The following tasks were undertaken to identify, analyse and evaluate risks:

- Use existing environmental conditions and identify applicable legislation and policy to establish the context for the risk assessment.
- Develop likelihood and consequence criteria and a risk matrix.
- Consider construction, operational and decommissioning activities in the context of existing conditions to determine risk pathways.
- Identify standard controls and requirements to mitigate identified risks.
- Assign likelihood and consequence ratings for each risk to determine risk ratings considering design, proposed activities and standard mitigation.

The assessment of risk combines the consequences of a threat and the likelihood of that consequence occurring, resulting in an overall risk rating. Any risk with an overall rating of medium or above requires further analysis in line with the avoid, minimise or manage hierarchy.

Risk can be defined as a combination of:

- The magnitude of potential consequences of an event occurring.
- The likelihood of the consequence event occurring.

6.4.2 Assigning a consequence level

Consequence refers to the outcome of an event affecting an asset, value or use. Table 8 presents the consequence framework describing the consequence levels from 'insignificant' to 'severe'. The consequence criteria have been developed in the form of Project-wide criteria rather than discipline specific, to enable a consistent assessment of consequences across a range of potential environmental effects.

Consequence criteria is assigned based on the maximum credible consequence of the risk pathway occurring. Where uncertainty regarding consequences existed, a conservative approach to assessing risk has been adopted.

Consequence criteria considered the following characteristics:

- Spatial extent of impact.
- Duration and reversibility of potential impacts.
- Sensitivity and significance of the receiving environment.
- Magnitude, or severity of potential impact.

Each risk pathway will be assigned a level of consequence taking into account the guidance in Table 8. That consequence level, together with the likelihood level will be used to determine a risk rating in accordance with the risk matrix presented in Section 8.

Table 8 Aboriginal and historic heritage consequence criteria

Level	Criteria
Insignificant	• No detectable changes or very short-term and localised. • Readily reversible (insignificant) impact (<1 year for recovery). • Resilient or highly disturbed receiving environment or population. • No observable impact to tangible and intangible heritage values, sites remain intact and unaffected.
Minor	• Short-term localised detectable changes. • Impact likely to be readily reversible (within 5 years for recovery). • Resilient or disturbed receiving environment or population. • Low degree of disturbance or low degree of observable impact to locally significant heritage values. No impact to state or nationally significant heritage values.
Moderate	• Short or medium-term detectable changes at a number of locations within the Project Area. • Impact likely to be medium-term and reversible (5–10 years for recovery). • Undisturbed receiving environment or population. • Limited degree of impact to heritage values of state or local significance.

Level	Criteria
Major	• Long-term changes that are significant regionally • Impact likely to be medium to long-term and potentially irreversible (> 10 years to recover). • Sensitive receiving environment or population. • High degree of impact to heritage values of State or local significance.
Severe	• Permanent changes that are significant at a State or Commonwealth level. • Impact likely to be long-term and irreversible. • Highly sensitive receiving environment or population. • Very high degree of heritage destruction or loss of heritage values.

6.4.3 Assigning a likelihood level

'Likelihood' is the combination of the chance of an event and the chance of the identified consequence occurring. The likelihood criteria range from 'rare' where the event and consequence may occur only in exceptional circumstances to 'almost certain' where the event and consequence is expected to occur in most circumstances. Likelihoods are assigned for the maximum credible consequence according to the levels presented in Table 9.

Table 9 Likelihood approach

Level	Description
Rare	The event could occur but only in exceptional circumstances
Unlikely	The event could occur but is not expected in the course of normal circumstances
Possible	The event may occur in the course of normal circumstances
Likely	The event will probably occur in the course of most normal circumstances
Almost Certain	The event is expected to occur in the course of most normal circumstances

6.4.4 Risk matrix

Risk is defined as combination of the likelihood of an event occurring and the consequence of that event occurring. A risk rating was determined by these factors using the risk matrix, presented in Table 10.

Table 10 Risk matrix

		Consequence rating				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood rating	Rare	Very Low	Very Low	Low	Medium	Medium
	Unlikely	Very Low	Low	Medium	Medium	High
	Possible	Very Low	Low	Medium	High	High
	Likely	Low	Medium	High	High	Very High
	Almost certain	Low	Medium	High	Very High	Very High

When risks are rated as medium or above, the impacts associated with the risk pathway are assessed in an increasing level of detail and will prompt further exploration of potential mitigation and management actions to reduce the overall impact.

6.5 Impact assessment

This study has assessed the impacts of construction and operation of the Project on Aboriginal and historic heritage assets and values to be protected.

The impact assessment is based on the assessment of Aboriginal and historic cultural heritage through the 'Section 61 Matters' part of the CHMP as well as Historic Survey Report. These reports characterised the existing environment, identified Aboriginal and historic cultural heritage places/sites and defined their extent, nature and significance from which impacts were assessed and mitigation measures were developed to guide the proposed works.

The impact assessment has involved identifying the nature and extent of any direct and indirect impacts that the project may have on cultural heritage. The level of assessment undertaken for each issue was informed by the risk assessment step described in Section 6.4.

Where the environmental impacts were identified as potentially significant, mitigation measures have been proposed. Mitigations have been identified in accordance with the mitigation hierarchy. Where possible, changes to the project design have been made in order to avoid impacts as the first priority (refer to Section 6.3), or if not feasible, minimise or reduce the level of impact. Each of the Aboriginal and historic cultural heritage places/sites present in the project area were considered with regards to the potential worst-case impact that would result from construction and operation of the trails, in order to propose mitigation measures to reduce residual impacts to low.

The risk assessment has been central to the development and planning process for the Project. The risk based approach is integral to the preparation of the EES as required by the scoping requirements in Section 2.

As CHMP 15276 is still ongoing, this impact assessment therefore does not review all Aboriginal places as they are still under assessment.

6.6 Assessment of alternatives to Trail 1

The assessment of the identified alternative to trail 1 (the combination of trail 45, trail 46 and trail 47) contained in this report included the following tasks:

- Describe the existing conditions relevant to trail 1 and the alternative to trail 1
- Identify the residual environmental impacts determined for construction and operation of trail 1 and the alternative to trail 1
- Undertake a comparative analysis of trail 1 and the alternative to trail 1
- Identify the preferred trail for each discipline based on the comparative analysis.

6.7 Limitations, uncertainties, assumptions

The following limitations, uncertainties and assumptions apply to this assessment:

- CHMP 15276 is in draft form at the time of completing this report. Consultation regarding mitigation measures has been undertaken with WWCHAC, with these to be confirmed at future meetings. There

is potential that changes will be requested at the time of evaluation which may alter the requirements within the management conditions, and the impacts to the Aboriginal places.

The details of draft CHMP 15276 utilised in this assessment is as follows:

- Biosis Pty Ltd 2021 (in progress). Warburton Mountain Bike Hub Master Plan, Warburton, Victoria Cultural Heritage Management Plan 15276, Report for Yarra Ranges Council, Authors: Oataway, K, Strickland, J & Thomson, M, Port Melbourne.

- At the time of writing, Cultural Values Recording has been undertaken with WWCHAC with the report in preparation.

6.8 Inputs from other EES technical reports

At this stage of reporting, no linkages to other EES technical reports are known.

7 Existing conditions

The existing conditions of the Aboriginal and historic cultural heritage environment being considered throughout this assessment are described in this section.

7.1 Aboriginal cultural heritage

The information presented here has been developed through the preparation of CHMP 15276. This CHMP is currently underway in consultation with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC).

7.1.1 Search of the Victorian Aboriginal Heritage Register

The VAHR contains information on all recorded Aboriginal cultural heritage within Victoria. It is accessed via the Aboriginal Cultural Heritage Register and Information System (ACHRIS), a web based tool with restricted access.

A search of the VAHR was undertaken by Jocelyn Strickland, Biosis Pty Ltd on 21 September 2017. An additional search was undertaken by Elise Nuridin, Biosis Pty Ltd on 18 June 2019. Additional searches were undertaken by Daniel Carpenter of Biosis Pty Ltd on 24th November 2020, 16th February 2021 and 24th May 2021.

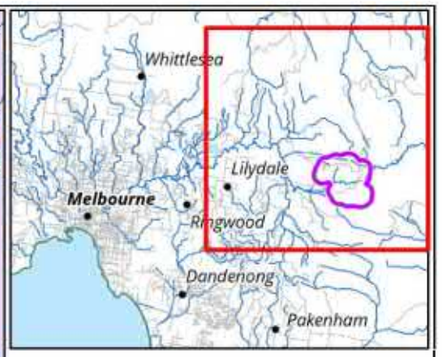
7.1.2 Geographic region

As part of the CHMP process, a geographic region is defined to provide parameters for background information searches. The geographic region for the Activity Area has been selected to represent a range of landforms and resources that would be accessible from the Activity Area. The geographic region is mostly defined by waterways within the region and roadways, encompassing the *Plateaux and broad ridges (Strathbogie, Koetong-Shelly, Errinundra, Kinglake, Olinda)* third tier geomorphological unit 1.2.1 as well as *Low relief landscapes at low elevation (Cann River to border, Silvan, Templestowe)* (geomorphological unit 1.3.1), *Terraces, fans and floodplains (Kiewa Valley, Wonnangatta Valley*; geomorphological unit 1.3.3), *Erinundra escarpment; Genoa, Mitchell, Moroka gorges and Snowy River* gorges; geomorphological unit 1.4.3) and *Escarpments and gorges (Mt Buffalo escarpment/gorge,* as well as the *Deeply dissected ridge and valley landscapes (headwaters of major rivers such as the Wonnangatta, King and Kiewa Rivers Mt. Coopracambra*; geomorphological unit 1.4.4). This geographic region has been chosen based on the geomorphic unit on which the Activity Area is located and on waterways which have long been established as being associated with high potential for significant Aboriginal cultural heritage material. The Aboriginal places recorded within the geographic region can be indicative of the types of Aboriginal places that could be present within the Activity Area.

The northern border of the geographic region follows the alignment of Maroondah Highway from Lilydale, through the Yarra Ranges National Park to Buxton before turning to the south following the Buxton-Marysville Road, and the courses of the Stevenson River, O'Shannassay River, McMahons Creek and Bernie Creek to the La Trobe River. The course of the La Trobe River makes up the southern border of the geographic region to Powelltown where the geographic region crosses an arbitrary line across the landscape before turning to the north at Lyrebird Gully Creek and Olinda Creek. The western border of the geographic region follows these two aforementioned creeks to Lilydale where the Maroondah Highway is once again encountered.

The geographic region encompasses several named waterways including Yarra River, Tugwell Creek, Cemetery Creek, and Yankee Jim Creek. A total of 19 named waterways flow through or are located within 200 metres of the Activity Area alone. The geographic region is approximately 48 kilometres north/south by 48 kilometres east/west.

The geographic region is shown in Map 2.



Legend

- Activity Area
- ★ Victorian Aboriginal Heritage Register (VAHR) place
- Study area
- Geographic region

Geomorphological units

- 1.1.1 Summit plateaux
- 1.2.1 Moderate elevation plateaux and broad ridges
- 1.2.2 Enclosed landscapes of low relief
- 1.3.1 Low relief landscapes at low elevation
- 1.3.3 Low elevation terraces fans and floodplains
- 1.4.2 Prominent summits between 500 and 1200 m
- 1.4.3 Escarpments and gorges
- 1.4.4 Deeply dissected ridge and valley landscapes
- 1.4.5 Moderately dissected ridge and valley landscapes
- 3.1.3 Moderate elevation basalt residuals

Map 2 Geographic region

0 2 4 6 8 10

Kilometres

Scale: 1:190,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M2_GeoRegion
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

7.1.3 Aboriginal places in the geographic region

A search of the VAHR identified a total of 76 Aboriginal places, including 117 components, within the geographic region. The majority of the recorded Aboriginal places were recorded within close proximity to waterways within the geographic region.

Artefact Scatters are the dominant place type within the geographic region accounting for 38.16% (n=29) of places, followed by Scarred Trees (n-23, 30.26%) and Low Density Artefact Distributions (LDADs) (n=14, 18.42%) (Table 11).

The majority of these Aboriginal places are located within the western extent of the geographic region, mostly within areas of cleared land associated with pastoral use or residential and recreational development. The largest concentration of Aboriginal places have been registered close to Healesville, which lies approximately 10 kilometres to the north-west of the Activity Area. The eastern half of the geographic region is mostly comprised of dense forest and mountainous terrain, and has a significantly less amount of previously registered Aboriginal places.

Table 11 Aboriginal place types within the geographic region

Place Type	Number of places	% of total
Artefact Scatter	29	38.16%
Scarred Tree	23	30.26%
Low Density Artefact Distribution	14	18.42%
Object Collection	4	5.26%
Aboriginal Historical Place	2	2.63%
Earth Feature	2	2.63%
Aboriginal Ancestral Remains (Burial)	1	1.32%
Quarry	1	1.32%
Grand Total	76	100.00%

There are five Aboriginal places within 1 kilometre of the Activity Area, which are discussed below. Of these Aboriginal places, (Mt Tugwell 1; VAHR 8022-0027) is located less than 50 metres from the Activity Area. This means the Activity Area lies within the area of cultural sensitivity associated with this place.

All of these Aboriginal places are located within close proximity to waterways. The Aboriginal places listed below give a good representation of place types found within the geographic region, especially around the waterways closest to the Activity Area, and can help predict the potential for cultural heritage material within the Activity Area. The Aboriginal places are summarised below, in order of proximity to the Activity Area.

Mt Tugwell 1 (VAHR 8022-0027) is an artefact scatter located approximately 20 metres to the north and south of a bend in the trail assessment corridor, to the south of Cumming Spur Road and west of Morris Gully. The artefact scatter was recorded during du Cros' survey (1988) of the Upper Yarra Valley and consists of one quartz flake and one quartz flaked piece recorded on the top of Mount Tugwell.

Old Warburton 1 (VAHR 8022-0019) is an artefact scatter located approximately 90 metres to the east of one of the proposed mountain bike trails within the Activity Area, to the south of Yankee Jim Creek and west of Main Creek. The artefact scatter that was recorded in 1987 as part of the survey of the Upper Yarra Valley and Dandenong Ranges (du Cros 1988) as a surface scatter located over an area of 10 metres by 2.5 metres and

consisted of a quartz retouched scrapper and other non-specific quartz artefacts. The surface scatter was recorded in a cleared area of undeveloped land on a landform that was recorded as mountain top – level ground of undeveloped land located on a ridgetop. The preservation of the artefact scatter was recorded as poor and threatened by erosion and vehicles.

Mt Little Joe 1 (VAHR 8022-0023) is an artefact scatter located approximately 120 metres to the west of one of the proposed mountain bike trails within the Activity Area, to the south of the Yarra River. The artefact scatter was recorded during the aforementioned survey undertaken by du Cros. This Aboriginal place consists of three quartz artefacts: one flaked and two flaked pieces that were recorded on the hill slope of Mount Little Joe.

Warburton Scar Tree (VAHR 8022-0115) is a deceased scar tree with a girth of 5 metres at 1.5 metres high. It has a single scar with dimensions of 0.83 metres long, 0.24 metres wide at 1.5 metres high and is noted to be in fair condition. It was recorded as part of CHMP 13373.

4 Woods Point Road LDAD (VAHR 8022-0118) is a single crystal quartz flake found at 0.25 metres depth during the Complex Assessment of CHMP 14665. The maximum dimension was 13 millimetres and no cortex or use ware was noted.

7.1.3.1 Summary

There are 76 previously registered Aboriginal places, including 117 components, within the geographic region. The majority of these places have been recorded in close proximity to waterways. There is a significantly larger number of Aboriginal places registered within the western half of the geographic region as opposed to the eastern half. This may be a reflection of past archaeological assessments being focused on areas of development, rather than on an actual absence of places within the eastern half of the geographic region.

There are five Aboriginal places within 1 kilometre of the Activity Area. These Aboriginal places primarily contain stone artefacts manufactured from quartz. These artefacts have been recorded on a variety of landforms: flood plains, ridgetops, hill slopes as well as level ground on mountain tops; representing the various landforms that were utilised by Aboriginal people in the past. All of the Aboriginal places summarised above were also found within close proximity to watercourses.

7.1.4 Previous archaeological studies in the region

A search of the VAHR identified a total of 95 previous archaeological assessments undertaken within the geographic region (Table 12). The most common assessments are Complex Assessment CHMPs, making up 49.47% of the total (n=47), followed by Surveys (23.16%; n=22) and Desktops or Papers or Due Diligences or Others (12.63%; n=12).

Table 12 Archaeological assessment types within the geographic region

Assessment Type	Number of Assessments	% of Total
CHMP Complex Assessment	47	49.47%
Survey	22	23.16%
Desktop or Paper or Due Diligence or Other	12	12.63%
CHMP Standard Assessment	7	7.37%
Site Specific Investigation (not excavation)	4	4.21%
Test Excavation and Survey	1	1.05%

Assessment Type	Number of Assessments	% of Total
CHMP Desktop Assessment	1	1.05%
Salvage Excavation	1	1.05%
Total	95	100.00%

Numerous Complex Assessment CHMPs and surveys have been undertaken within close proximity to the Activity Area and are discussed below. The previous assessments can help to inform the predictive model as part of this assessment, as the geomorphology, landforms, soil, etc. are similar to those of the Activity Area.

Regional Studies

Du Cros (1988) undertook an archaeological survey (35) of the Upper Yarra Valley and the Dandenong Ranges in order to locate and record Aboriginal places and generate models of Aboriginal land use. The current Activity Area is located in what du Cros called the Eastern Zone, a 1,643 square kilometre area of forested mountainous terrain ranging from 200-1,500 metres in altitude. Landscape units in the Eastern Zone were categorised as mountain and ridge tops, mid-slopes and major creeks and rivers. The mountain and ridge tops included the Warburton Ranges and the Donna Buang Ranges, in which the current Activity Area is located, as well as the source of the Yarra and Thompson Rivers. A total of 10 Aboriginal places were recorded within the Eastern Zone as part of this survey. Ground surface visibility was poor across the area and may account for the low numbers of Aboriginal places identified. The mountains and ridge slopes contained most of the level and gently sloping ground and also had the better ground surface visibility as well as the highest number of Aboriginal places recorded within this landform unit. Artefact scatters, Old Warburton 1 (VAHR 8022-0019) and Mt Tugwell 1 (VAHR 8022-0027) were recorded within this landform unit. No Aboriginal places were recorded in the mountain slopes landscape unit, where ground visibility was poor due to the extremely rugged and thickly forested areas, especially on slopes with a southerly aspect. Three Aboriginal places were recorded along the major rivers and creeks within the mountainous Eastern Zone. An exposure around the granite valley formation in Britannia Creek, located approximately 1.7 kilometres to the south of the Activity Area was examined; however, no suitable shelters or evidence of Aboriginal occupation was noted.

Bird (1993) undertook a Desktop Assessment (971) on the archaeology of the Central Highlands, however this report was not completed. Based on previous archaeological surveys of forested areas, Bird stated that a number of general statements can be made about the distribution of cultural heritage material in forests:

- Terrain is a significant factor with Aboriginal places occurring more commonly on flat or gently sloping ground.
- The greatest concentration of Aboriginal places is often found associated with creeks, rivers and swamps as well as adjacent forest slopes.
- The type of forest can be significant with drier more open forest appearing to be the focus for Aboriginal occupation although Bird states that this may have more to do with easier access than differences in resource availability. Wet sclerophyll forest and rainforest are more difficult to exploit due to dense vegetation cover.

Bird separated the Central Highlands study area into eastern and western zones based on landforms, excluding the volcanic plains. Steep mountains and rugged topography dominated the eastern zone that included areas of high plateaus and alpine and sub-alpine vegetation. The western zone was characterised by steep mountains to moderate to gentle hills and alluvial plains associated with major rivers. Most of the data available to Bird related to the western zone. Very few Aboriginal places were recorded in the eastern zone. This indicated the importance of watercourses and wetlands in Aboriginal settlement.

Unfortunately there is a dearth of historical documentation on how Aboriginal communities used the forest resources. It is often assumed that densely forested rugged regions would have played a marginal role in Aboriginal occupation; however, there would have been regional variation. Historical data does however suggest that the Woiwurrung and Bunurong focused more on the coastal wetlands and rivers, with marginal use of the Central Highlands. The historical model suggested by Bird states that:

- The resources of the forested uplands were marginal in terms of the seasonal round flowed by the Kulin speaking groups.
- The ranges were visited in the winter months by groups of men hunting for lyre bird tails.
- More diverse groups would have sporadically visited the ranges in the summer to exploit a variety of plants and animals.

Bird went on to suggest that Aboriginal places in the forested uplands will be mainly confined to access routes and resource rich areas such as swamps.

Local Studies

Murphy and Morris (2008) undertook a CHMP Standard Assessment (10234) prior to the construction of fuel breaks, located approximately 5 kilometres to the east of the current Activity Area. The Desktop Assessment concluded that the Activity Area contained ridgelines and flat to gently sloping land near waterways, landforms that have demonstrated archaeological potential in the wider region. The Standard Assessment noted that no area of undisturbed, intact landform was identified within the Activity Area. Past ground disturbance was attributed to road construction, past mining and logging activities as well as historic bushfires. No Aboriginal cultural heritage material was identified during the Standard Assessment. As there was an extremely low potential for Aboriginal cultural heritage material to be present within the Activity Area, it was deemed that a Complex Assessment was not required.

Bell (2010) undertook a CHMP Standard Assessment (11368) prior to works associated with a proposed tourist facility at 3185 Warburton Highway, located approximately 460 metres to the north of the currnet Activity Area. The Desktop Assessment concluded that artefact scatters were the most likely place type to be encountered on ridgelines, mountain tops, creek banks, valley floors and gentle slopes. The Activity Area only consisted of gently rising slopes. No Aboriginal cultural heritage material was identified during the Standard Assessment. While ground surface visibility was generally poor, the geology, geomorphology and land-use history of the Activity Area suggested that there was low potential for Aboriginal cultural heritage material to be present within the Activity Area. As such, a Complex Assessment was not required.

Williamson (2011) undertook a CHMP Standard Assessment (11424) prior to the construction of a proposed 265 metre long section of walking track linking the two O'Shannassay Aqueduct Road service roads, located approximately 1.2 kilometres to the east of the current Activity Area. The Activity Area was located on a moderately to steeply sloping ground on the lower slopes of Mount Victoria. Ground disturbance was noted from the construction and maintenance of the existing aqueduct road. Few cultural heritage places have been identified within the region. Due to the landforms within the Activity Area it was concluded that there was low potential for Aboriginal cultural heritage material to be present. Nevertheless, a ground survey was undertaken. No Aboriginal cultural heritage material was identified during the Standard Assessment. It was concluded that Aboriginal movements through the region would have been more restricted to the adjacent ridgelines outside of the Activity Area and closer to the nearby Yarra River. Due to the results of the Desktop and Standard Assessments, the entirety of the Activity Area was assessed as having low potential for Aboriginal cultural heritage material; therefore a Complex Assessment was not required.

Day (2012) undertook a CHMP Complex Assessment (12208) prior to the construction of a supermarket at 3464-3470 Warburton Highway, located approximately 220 metres to the south of the current Activity Area. The Desktop Assessment concluded that the reason for the absence of Aboriginal occupation within

Warburton and the Upper Yarra Region was due to the limited and seasonal use of the highland areas as well as the lack of comprehensive archaeological studies within the region. No Aboriginal cultural heritage material was identified during the Standard or Complex Assessments. Excavations undertaken during the Complex Assessment recorded shallow clay subsoils with sporadic fill material to a depth of 400-700 millimetres across the Activity Area. The assessment concluded that while the predictive model for Aboriginal cultural heritage material within the Eastern Uplands is low to moderate, the field assessment for CHMP 12208 is low.

Kaskadanis (2015) undertook a CHMP Complex Assessment (13373) prior to the installation of a high pressure gas main between Millgrove and Warburton. Aspects of this CHMP were undertaken within Dammans Road, an area also included as part of the current Activity Area. Research undertaken as part of the Desktop Assessment concluded that scarred trees may be present in remnant, mature native vegetation, earth features may be present in areas such as the plains adjacent to the Yarra River and Aboriginal ancestral burials have the highest potential to be present within the plains and terraces formed by the Yarra River and its tributaries. Warburton Scar Tree (VAHR 8022-0115), was recorded on the northern banks of the Yarra River during the Standard Assessment. Five areas of archaeological potential were identified during the Standard Assessment, one of which, the lower valley and drainage of Mount Donna Buang, is located directly north of the current Activity Area at Marlino Avenue. Another is the open gentle sloping area at Waterloo Avenue, located approximately 160 metres north of the current Activity Area. Observations made at the time of the Standard Assessment noted that Dammans Road, which part the current Activity Area traverses, is located within an the valley base and lower slopes of Mt Donna Buang. A mix of alluvial and colluvial deposits was noted. The road was cut into the original landform but it also considerably built up above any potential flooding from the Yarra River. The north side of Dammans Road is bounded by residential development including modified gardens. The south of the road contains numerous riparian small, medium and large tress (eg Manna Gums, Mountains Grey Gums), shrubs, native and exotic grasses, all situated along the river corridor. Nearby Marlino Avenue and Waterloo Road were both identified as areas of Aboriginal archaeological potential as they are located at the base of a valley and the lower slope of Mount Donna Buang. Marlino Avenue was also noted as being dissected by a creek.

Excavations for the Complex Assessment consisted of an open 1x1 metre test pit and 16 mechanical test pits. No Aboriginal cultural heritage material was identified during the Complex Assessment. Five mechanical test pits were excavated along Waterloo Road targeting the elevated flat area. All five of the test pits consisted of a gravel surface and road base that was overlying natural soil profiles characteristic of the local geology. The average depth of these test pits was 0.82 metres with all soil profiles being consistent with gravel road and base overlying a deep brownish – yellow friable clay with frequent occurrence of granules and pebbles and increasing in stiffness downwards (170 millimetres to 880 millimetres) that was in turn overlying a firm, indurated dark reddish-brown clay with rare occurrences of granules and pebbles. Excavations along Waterloo Road confirmed that natural soil profiles are present beneath the road. Six mechanical test pits were excavated along Marlino Avenue that targeted the lower slopes and valley base of Mount Donna Buang. The average depth of the test pit was 0.55 metres. The landform located here was summarised as consisting of the gravel road and base with varying thickness (on average 200-300millimetres below the surface) that was overlying a reddish-brown friable silty clay with frequent inclusions of granules, pebbles and cobbles that was overlying a firm reddish-brown clay with rare occurrences of cobbles and boulders. Excavations along Marlino Avenue show that shallow stony soils are located beneath the road surface, with larger cobbles and boulders occurring at the base that is surrounded by clay. No Aboriginal cultural heritage material was identified; however, natural soils profiles are present beneath the road surfaces.

Matic (2017) undertook a CHMP Complex Assessment (14665) prior to the development of a camping and caravan park at 4 Woods Point Road, located adjacent to the current Activity Area along Woods Point Road. The Desktop and Standard Assessments concluded that the Activity Area had undergone limited, localised disturbance in the past. During the Complex Assessment a 1x1 metre test pit and 13 500x500 millimetre

shovel test pits were excavated across the Activity Area. A single broken crystal quartz flake was identified at depths between 200 to 300 millimetres. No further Aboriginal cultural heritage material was encountered. The soil profiles were fairly consistent throughout the excavation and consisted of a very dark brown greyish brown silty loam overlying a reddish brown silt that was overlying a dark yellowish brown silty clay. It was concluded highly likely that further components of the recorded LDAD site would be present within a subsurface context within the activity area; however, it was unlikely that this material would not be in high enough concentrations that test pits and shovel test pits would be able to identify the components. A single Aboriginal cultural heritage place was registered as a result of the Complex Assessment (4 Woods Point Road LDAD; VAHR 8022-0118). The artefact was collected upon completion of the fieldwork. Cultural Heritage Awareness Training was to be carried out as a cultural heritage management condition prior to commencement of ground breaking works.

Goldfarb et al (2018) undertook a CHMP Complex Assessment (15077) prior to the development of a sewerage network located at Yarra Junction and Wesburn, located approximately 1.2 kilometres west of the current Activity Area. The activity involved the construction of approximately 8 kilometres of sewer. The Desktop Assessment revealed that sections of the Activity Area would have been a favourable location for Aboriginal occupation and resource procurement due to the availability of food and fresh water. Low ground visibility was noted over much of the Activity Area during the Standard Assessment, resulting in low overall effective survey coverage. This was mainly due to thick groundcover across the Activity Area. Disturbance associated with road construction and property development was also noted within the Activity Area. No Aboriginal cultural heritage material was identified as part of the Standard Assessment, however four areas with archaeological potential were identified, largely within undisturbed contexts.

The Complex Assessment included the excavation of five 1x1 metre test pits and 10 500x500 millimetre shovel test pits. The subsurface testing revealed a typical soil profile consisting of a shallow layer of clayey topsoil, overlying hard clays. Significant amounts of disturbance were noted in the majority of the tested locations, in association with roadway construction, residential development and the installation of underground services. No Aboriginal cultural heritage material was identified as part of the Complex Assessment, and the Activity Area was assessed as being of low archaeological sensitivity overall.

Miriams et al (2020) prepared a CHMP (17149) prior to the construction of additional car parking for a walking track. The Desktop, Standard and Complex Assessments showed that the area had been disturbed and that no Aboriginal material culture was present. Management conditions were for cross-cultural trainings sessions for workers onsite, for RAP (WWCHAC) inspections and for a hard copy of the CHMP to remain onsite for the duration of the Activity.

Summary of previous archaeological studies

The previous archaeological assessments show that the wider region in which the current Activity Area is located contains a significant variation in landform types, from floodplains to steep slopes and ridge lines. Archaeological assessments undertaken within forested areas in the wider region indicates that archaeological potential is highest on ridgelines that would have been used by Aboriginal people as access routes, flat to gently sloping land near waterways, and areas around natural flora and fauna resources, such as swamps.

Historic land use practices, such as mining and logging have had an effect on the surrounding landscape as well and would have truncated or destroyed any Aboriginal cultural heritage material if present. Subsurface testing undertaken as part of CHMP 13373 within the current Activity Area, found no Aboriginal cultural heritage material; however, natural soils were identified beneath the road surface.

7.1.5 Historical and ethno-historical accounts

For the purposes of this assessment, information about Aboriginal Victorian pre and post contact history has been sourced from nineteenth and twentieth century primary and secondary ethnographic/historical records.

7.1.5.1 Linguistic boundaries and social organisation

Prior to European colonisation, the Victorian landscape was delineated by socio-dialectical groups who shared a common language and who as a group identified as owning particular areas of land, with individually owned tracts of country. This was a system of spatial organisation based on land tenure (Clark 1990).

Aboriginal groups mapped natural features as boundaries for their ranges, estates and economic territories. The *Woiwurrung* occupied the Yarra and Maribyrnong watersheds that were bounded by the Dividing Ranges to the north, from Mount Baw Baw westward to Mount William and Mount Macedon, and bounded by the west by the Werribee River (Figure 5) (Clark 1990).

Land ownership and access rights or responsibilities centred on the smaller named groups that formed the broader language grouping. These groups are often called 'clans' or 'local descent groups', however as Wesson (2000, pp. 8) reasons, they are better described as 'named groups', as the membership structure of these groups, and their degree of division from other groups, could vary. In most instances, primary allegiance was owed to this named group, although this could vary according to context and location. Commonly, named groups were led by senior elders who exercised internal political and religious authority, as well as being recognised as their spokesperson when dealing with other groups (Atkinson & Berryman 1983). Particularly influential group leaders could also assume authority over the leaders of other culturally affiliated groups (Wesson 2000).

The *Woiwurrung* consisted of four clans, with three additional patrilines. Each of these were responsible for particular areas of land; the members of which shared historical, genealogical and religious identities. The named group who occupied the Project Area were the *Wurundjeri william* who held land along the Plenty and Yarra Rivers. The name *Wurundjeri willam* means white gum tree dwellers (Clark 1990, pp. 385).

Social activity involving neighbouring named or socio-dialectical groups was usually held in warmer periods, held at the intersection of group boundaries and arranged by a person assigned the responsibility of travelling between groups to organise the time, place, and events of the meeting. This person could speak a number of different dialects and acted as intermediaries in negotiations between the groups. Activities would include sports and dancing, with up to 500 men, women and children attending (Atkinson & Berryman 1983).

The succession or inheritance of lands and named-group estates could occur in a number of ways. Individuals and groups could inherit lands from their father, their mother, through their birthplace, conception place, the burial place of their ancestors, and through totemic connection (Wesson 2000). Access rights also crossed generations and marriage partners. Howitt (1904, pp. 311) wrote that:

> The right to hunt and to procure food in any particular tract of country belonged to the group of people born there, and could not be infringed by others without permission. But there were places which such a group of people claimed for some special reason, and in which the whole of the tribe had interest. Such a place was the stone quarry at Mt. William near Lancefield, from which the material for making tomahawks was procured. The family proprietorship in the quarry had wide ramifications... when neighbouring groups wished for some stone they sent a messenger to Bill-billeri saying that they would send goods in exchange for it, for instance, skin-rugs.

People would often travel or reside in the territory of another named-group so that they could fulfil religious or family obligations, or exercise the privilege, granted to them by family or moiety associations, of exploiting the resources of another estate (Barwick 1984). For daily activities and the exploitation of local estates, people

are thought to have travelled in small residential units or extended family groups - often termed bands (Wesson 2000).

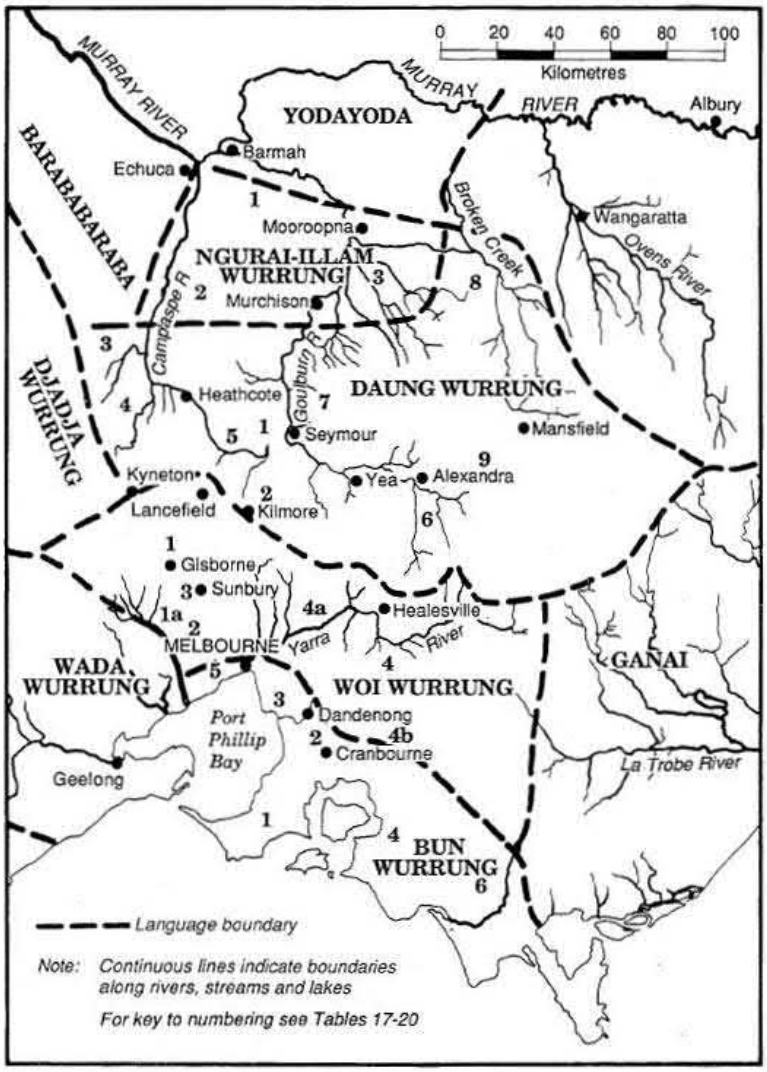


Figure 5 East Kulin language areas and clans, with Woi Wurrung in the centre (Clark 1990)

7.1.5.2 Moiety affiliation

A further level of social organisation was moiety affiliation. Membership to a named group is variably defined by a localised matrilineal or patrilineal descent group, with female members of the group partnering with men outside of their group (exogamous) and across moiety lines; however they maintained an identity of belonging to their father's group. Men then had to adhere to certain duties such as providing food to their father-in-law. Social engagement could be influenced by appropriate conduct between family members, for example men had avoidance behaviours they had to adhere to in the presence of their mother-in-law, and there were other speech or special duties which were expected in family relationships (Atkinson & Berryman 1983). The *Wurundjeri willam* were part of the waa moiety (Barwick 1984).

7.1.5.3 Religion

Knowledge of Aboriginal religion was recorded and maintained through visual and oral tradition which ensured the maintenance of social structures through generations. Such knowledge was not always readily

shared with non-Indigenous social observers and as such limited written versions from early settlers, explorers or government employees exist for Victoria. Ceremonies were occasionally performed to entertain Europeans however the meaning behind these performances was never fully explained (Robinson 1840). Private ceremonies and locations, such as age initiations were actively kept secret (Presland 1994).

Pre-contact Aboriginal burial customs vary greatly across Victoria. Burials are often identified in softer alluvial sands containing one or two interments. Although a burial site that was used over thousands of years and contained hundreds of people has been recorded along the Murray River (Pardoe 1988).

The Aboriginal Ancestral Remains (burials) within the wider geographic region are associated with the Aboriginal Historical Place Coranderrk Cemetery (VAHR 8022-0038). This cemetery was part of Coranderrk Station that originally consisted of 2,300 acres that now consists of a half-acre cemetery (Goulding 1988).

7.1.5.4 Economy and resource utilisation

Certain individuals within Aboriginal groups had responsibilities assigned to them for the management of natural resources. Anthropogenic manipulation of the environment was observed by the first Europeans within northern Victoria, for example fire regimes which cleared tracks also aided in hunting and dissuaded settlers from entering Aboriginal territory (Atkinson & Berryman 1983).

Canoes were cut from the bark of river red-gums and box trees with stone axe heads in spring to early summer, shaped over a fire, seasoned in the sun, then the end blocked with clay (Edwards 1975). Hooped nets made from fibre were used to catch crayfish, yabbies and fish, while cross-line nets were strung low above the water for catching ducks or below the water to catch schools of fish (Gott 1991). Line nets were also used to catch emus and kangaroos; a strategically placed group of people drove the animals towards the nets. Reed spears with hafted bone, carved barbs, stone pieces or hardened wooden points set into the head were used for catching larger marsupials. Oven mounds (cooking pits), were then constructed to bake the game or large volumes of vegetables (Atkinson & Berryman 1983).

The *Woiwurrung* used the indigenous flora and fauna to make reed necklaces, arm and forehead bands made from waterfowl feathers, belts made from animal skin and hair and the men passed a bine through their septum (Presland 1994).

The Wurundjeri are known to have travelled to the Bolin Swamps near Templestowe to catch eels. Another swampland was located at the Tarrawarra Flats near Watts River at Healesville (du Cros 1988).

7.1.6 Historical accounts of Aboriginal people

The rapid spread of European colonisation altered Victorian Aboriginal society. The increased presence of settlers resulted in dispossession of Aboriginal people from their traditional land and diminished access to resources. These factors combined with population decline from introduced diseases and conflict, transformed Aboriginal society.

At the time of European settlement, there were three *Ngurungaeta*, or clan head, that controlled the vast territory held by the *Wurundjeri willam* including Billibellary (1799-1846) who was one of the signatory to Batman's Treaty. In 1852, he was succeeded by his son Wonga (1824-1874), who remained the clan head until his death (Barwick 1984).

In 1839 an Aboriginal Protectorate Scheme was established in Victoria; the Protectorates provided religious instruction, rations, homes and medical care to Aboriginal people whilst recording population information (Broome 2005). Official inquiries into the welfare of Aboriginal people were held in 1849 and again in 1858. Although informants at the inquiries remarked on the rapid fall in the Aboriginal population, it was a number of years before any action was taken. The latter inquiry led to the formation of the Aboriginal Protection Board in 1860 which encouraged Aboriginal people to move onto reserves (Edwards 1988). In 1869, the

Aborigines Act was passed to give the Governor of Victoria power to dictate where Aboriginal people could reside, what activities they could undertake on and off reserves and the authority to take charge of Aboriginal children (Edwards 1988).

In 1859 Simon Wonga approached Chief Protector of Aborigines, William Thomas, with a request for land on behalf of his Taungurung kinsmen. After petitioning the government, the Acheron Station was established on land to the north of the Cathedral Range that same year. A short year later, after land had been cleared and fenced, and crops sowed, the Government ordered the people move to Mohican Station, located eight kilometres to the south of Acheron. Despite protests they were forced to move and the government took over Acheron (Deadly Story 2021).

In 1862 John Green, General Inspector, applied for the *Woiwurrung* and *Taungurung* to re-establish Acheron Station. The 40 men, women and children walked from Yering to Acheron, cutting a track through the forest, over the Yarra Ranges that would become known as the Black Spur trail. Upon arrival at Acheron it was discovered that squatters had settled in the area. With nowhere else to go, the *Woiwurrung* and *Taungurung* families set up camp at the confluence of the Yarra Rover and Badger Creek. They named the camp *Coranderrk* after the *Woiwurrung* name for the native flowering Christmas Bush located in the area (Nanni & James 2013). By 1870 Coranderrk had become a large village with a bakery, school and butcher. In 1876, the Government recommended that the people on the now known Coranderrk Mission be moved *for the benefit of their health* (Anonymous 1876). The people of the Mission fought for years to retain their home. The Aborigines Protection Act of 1886 resulted in the removal of much of the Mission's workforce. As a result, the community struggled to sustain themselves and the station lands were reduced to 2,400 acres. In 1917, the State Government decided to close all but the Lake Tyres Mission in Gippsland. The Aboriginal community at Coranderrk resisted and in 1924 the government finally agreed to six people remaining at the Mission. By this time the Aboriginal people living at the Mission had developed strong ties with the land and family that were buried at the cemetery. The cemetery was handed back to the Wurundjeri community in 1988 (State Library of Victoria 2019).

7.1.7 Landforms and geomorphology

An understanding of landforms and geomorphology within the Project Area is important for understanding the likelihood of Aboriginal cultural heritage places to be present, as well as the types of Aboriginal places most likely to occur within the Project Area. A review of the CHMP prepared for the Project found that the landforms (geomorphological units (GMUs)) within the Project Area are as follows:

- *Plateaux and broad ridges (Strathbogie, Koetong-Shelly, Errinundra, Kinglake, Olinda)* (GMU1.2.1).
- *Low relief landscapes at low elevation (Cann River to border, Silvan, Templestowe)* (GMU 1.3.1).
- *Terraces, fans and floodplains (Kiewa Valley, Wonnangatta Valley)* (GMU 1.3.3).
- *Escarpments and gorges (Mt Buffalo escarpment/gorge, Erinundra escarpment; Genoa, Mitchell, Moroka gorges and Snowy River gorges* (GMU 1.4.3).
- *Deeply dissected ridge and valley landscapes (headwaters of major rivers such as the Wonnangatta, King and Kiewa Rivers Mt. Coopracambra)* (GMU 1.4.4).

The Project Area is located within the East Dissected Victorian Uplands geomorphic division characterised by diverse landforms that were cut into Lower Palaeozoic sedimentary rocks and granites. The Uplands formed between 300 and 150 million years ago, following a period of erosion that formed a low-lying flat surface (Agriculture Victoria 2021). Generally speaking, the dissected uplands consist of steep sided valleys on either side of an alluvial valley floor. Soils on the slopes are mostly young due to the continuous movement of material downslope while soils within the alluvial flats are thin gradational and often stony again due to the continuous downwards movement (Cochrane, Quick, & Spencer-Jones 1995).

The northern terminus of the Project Area is located on Mount Donna Buang that is capped with Devonian acid volcanics that include rhyolite, rhyodacite, ignimbrite and tuff and is part of the Marysville Igneous Complex of Upper Devonian age. The volcanic rock rhyodacite is typically light to dark grey depending on the degree of crystallization (ibid).

The underlying geology of Mount Tugwell is of the Warburton Granodiorite, a granite intrusion of fine-grained and equiangular biotite graniodiorite that is medium grey in colour and is of Late Devonian age (ibid).

The underlying geology of Mount Little Joe is of the Humevale Siltstone (Dxh) of Lower Silurian to Lower Devonian Age. The lithology of this geological unit contains a variety of rock types. From Seville to Warburton, the sequence consists of well-bedded fossiliferous siltstones that become coarser towards the top. The presence of fossils suggests that this was formed from shell rich mud pellets. Weathered siltstones are chocolate brown to pale brown in colour and can also include grey to white and are very friable (Vandenberg 1971).

Within the foot slopes of Warburton and along the Yarra River valley floors and tributaries are deposits to accumulated colluvial and alluvial deposits of Quaternary age. The local colluvium consists of gravel, sand, clay and rubble, and includes channel deposits. The local alluvium consists of gravel, sand and silt and includes deposits of low terraces and alluvial floodplain deposits.

To the south of Warburton Highway is the underlying geology of unnamed felsic dyke; large rock deposits that formed from magma of plutonic or intrusive origin. There are also thin sheets of magma that solidified along cracks through older rocks closer to the surface. Magma rock that cuts across sedimentary beds are classified as dykes. Felsic dykes consist of fine to coarse-grained, glassy to porphytic, greenish-grey to reddish soils, and variable assemblages of quartz, feldspar and hornblende in a glassy groundmass (Cochrane, Quick, & Spencer-Jones 1995).

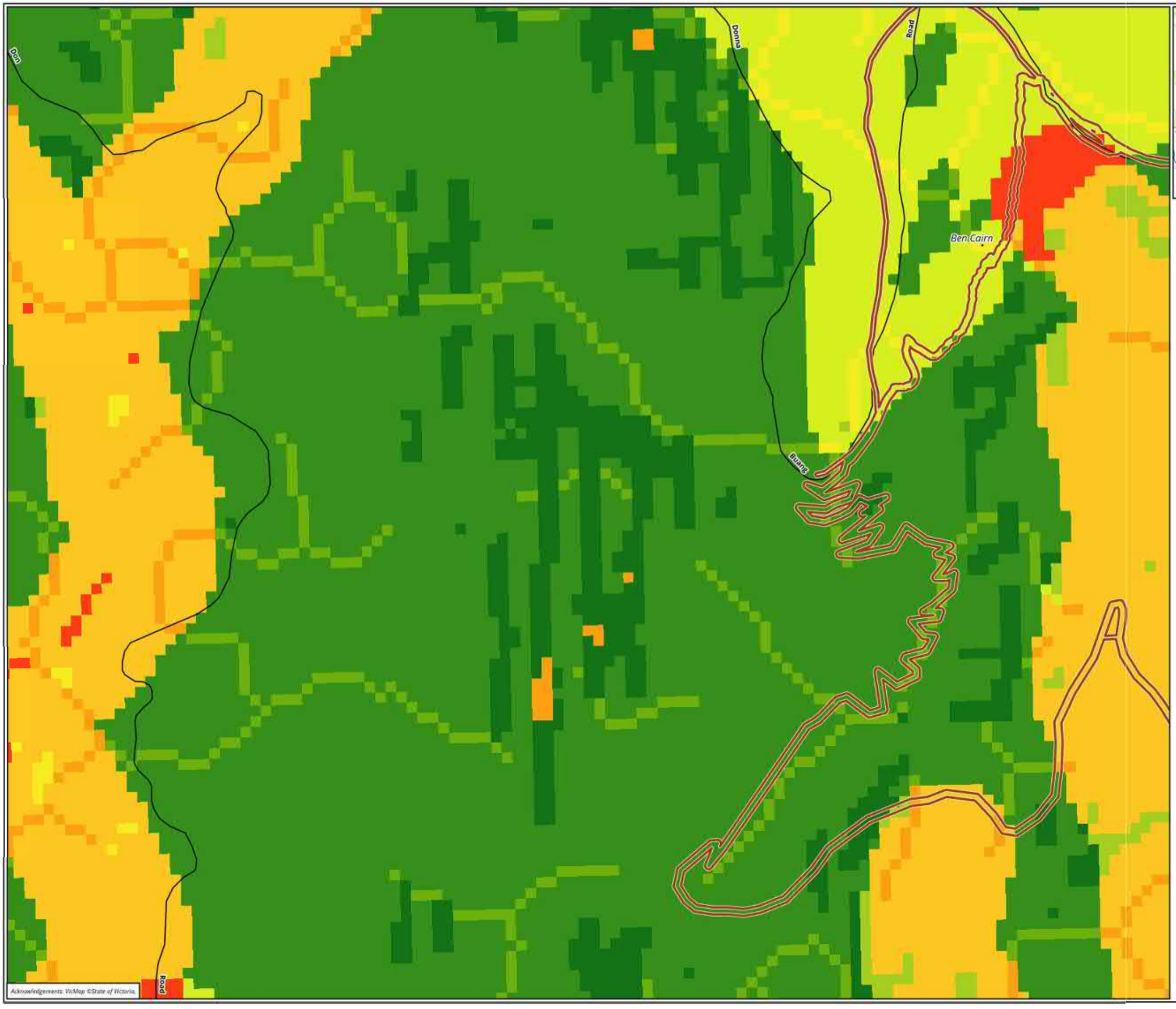
The soils most commonly encountered on the mountain and ridge tops within the Project Area are humic-rich, loamy alpine soils. Most of the sources of the tributaries of the Yarra are located on the ridges and plateaus within the mountains and ridge tops in this region (du Cros 1988). Du Cros noted that the mountain slopes have the same soil profile as that of the mountain and ridge tops; however, they are much shallower here due to the continuous movement of soil downslope as mentioned above. Vegetation on the mountain slopes is denser especially in gullies and on slopes with a southerly aspect (ibid).

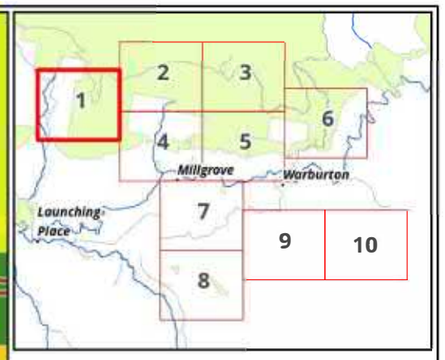
The topography of the Project Area consists of dissected ranges, ridges, valleys and plains. The summit of Mount Donna Buang is 1,250 metres above sea level. Adjacent to this to the west is Ben Cairns with a summit of 900 metres above sea level. These hills slope towards the Yarra River and Warburton. Within the southern aspect of the Project Area is Mount Little Joe, 440 metres above sea level and Mount Tugwell, 780 metres above sea level. Many creeks and tributaries flow downslope for the upper slopes of the surrounding hills of Mount Donna Buang, Mount Little Joe and Mount Tugwell.

From the review of the geomorphological units it can be seen that the landform where the Project Area is located is an elevated area characterised by mountains, streams, escarpments and gorges. Elevation levels are generally between 500 and 700 metre elevation, with steep slopes and ridges. Due to the elevation, there are extremes in temperature including snow in the winter which is not conducive to year-round habitation. There are numerous waterways present including Yarra River, Tugwell Creek, Cemetery Creek, and Yankee Jim Creek and many unnamed waterways. The combination of steep slopes with seasonal downpours washes away much of the sediment, leading to poor Aboriginal place preservation.

7.1.8 Land use history

A land use history analysis can be found in Section 7.2.2.





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Activity Area

Predictive model

High

Low

Map 3.1 Desktop assessment results – Predictive Modelling

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Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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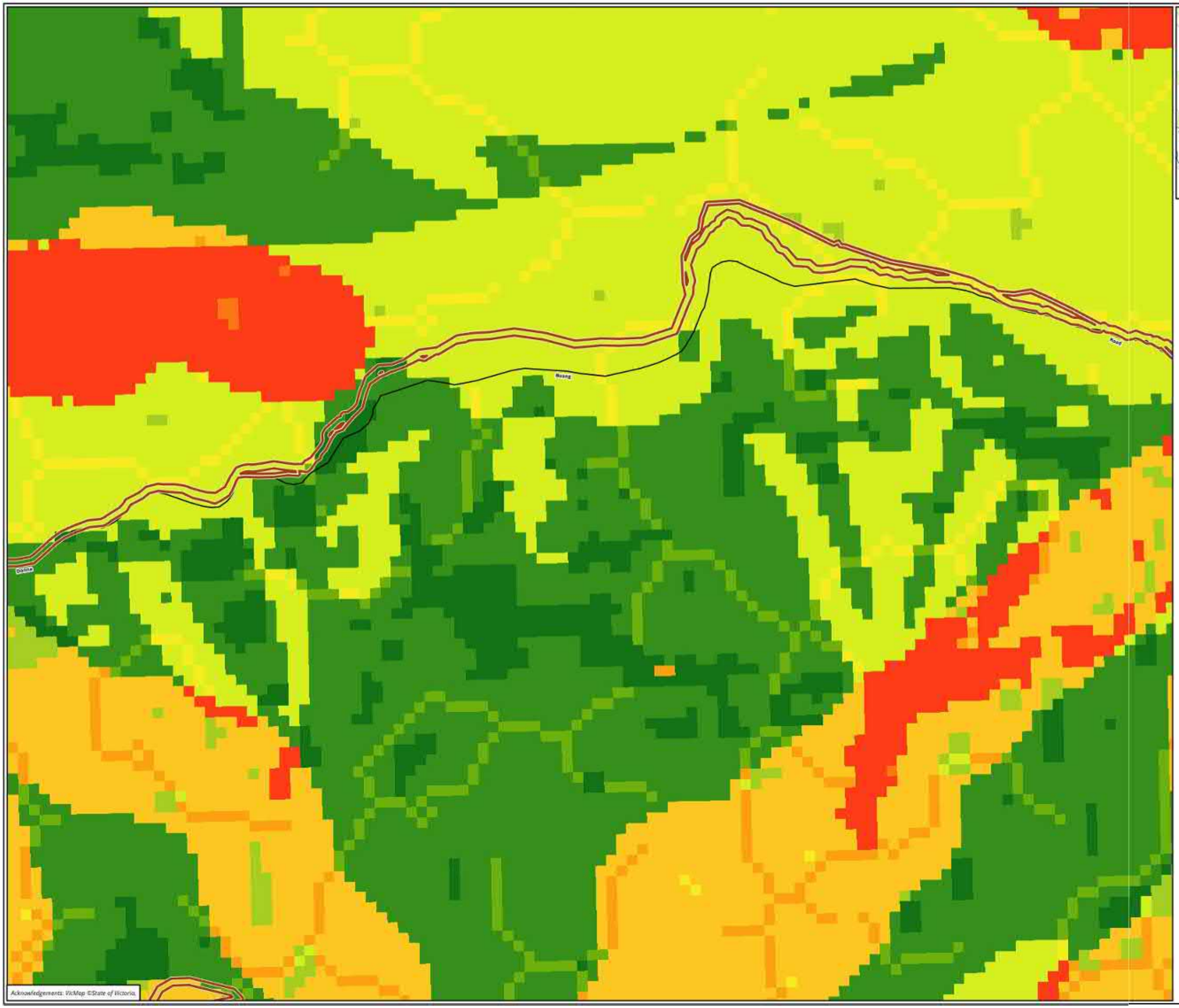

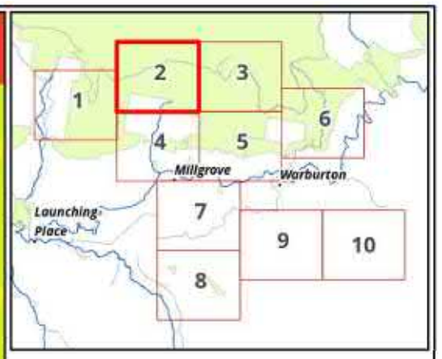

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Activity Area

Predictive model

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Map 3.2 Desktop assessment results – Predictive Modelling

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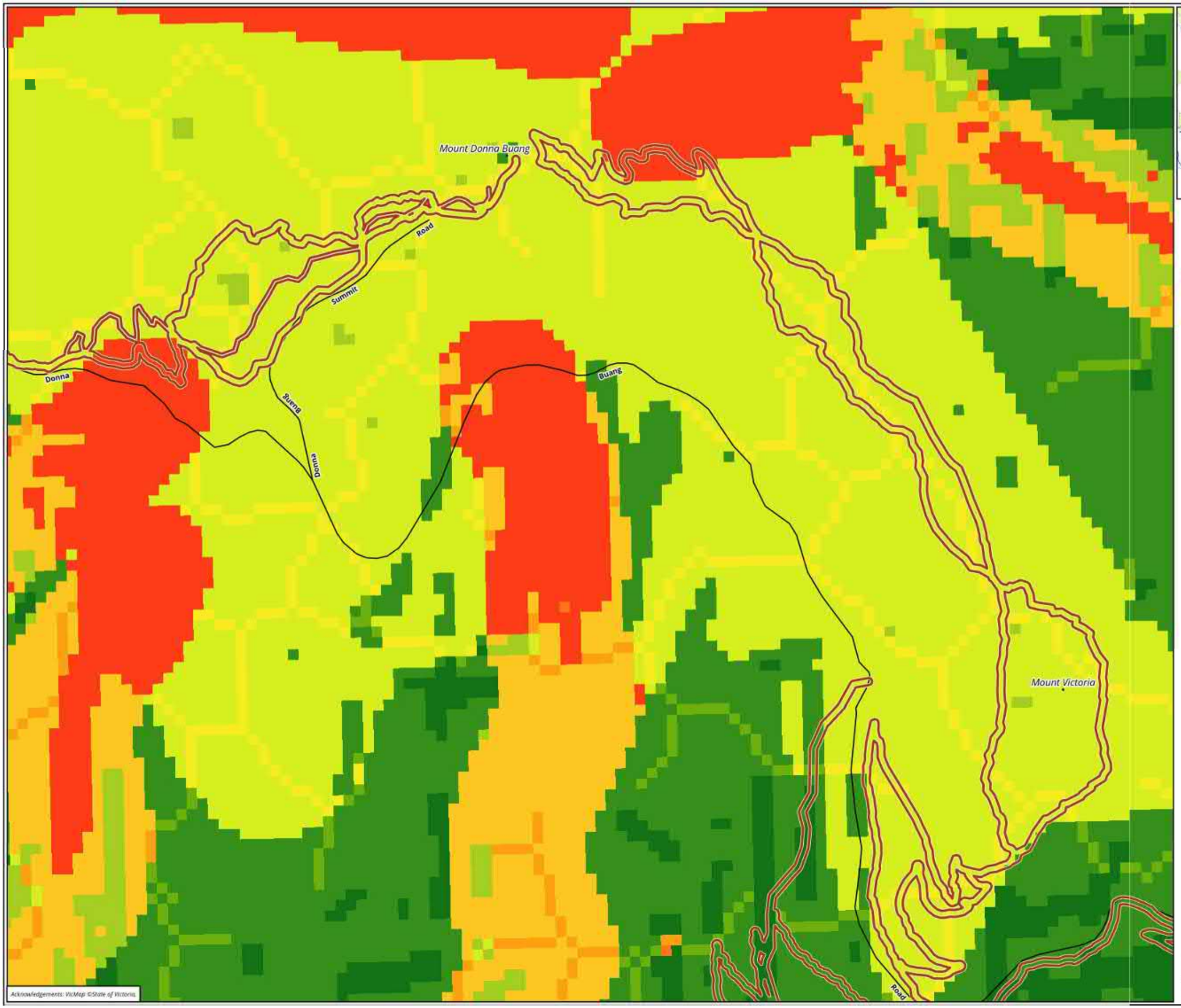

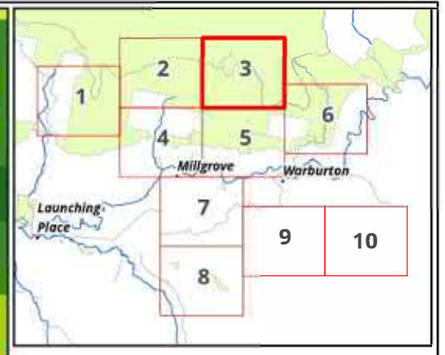

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Activity Area

Predictive model

High

Low

Map 3.3 Desktop assessment results – Predictive Modelling

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Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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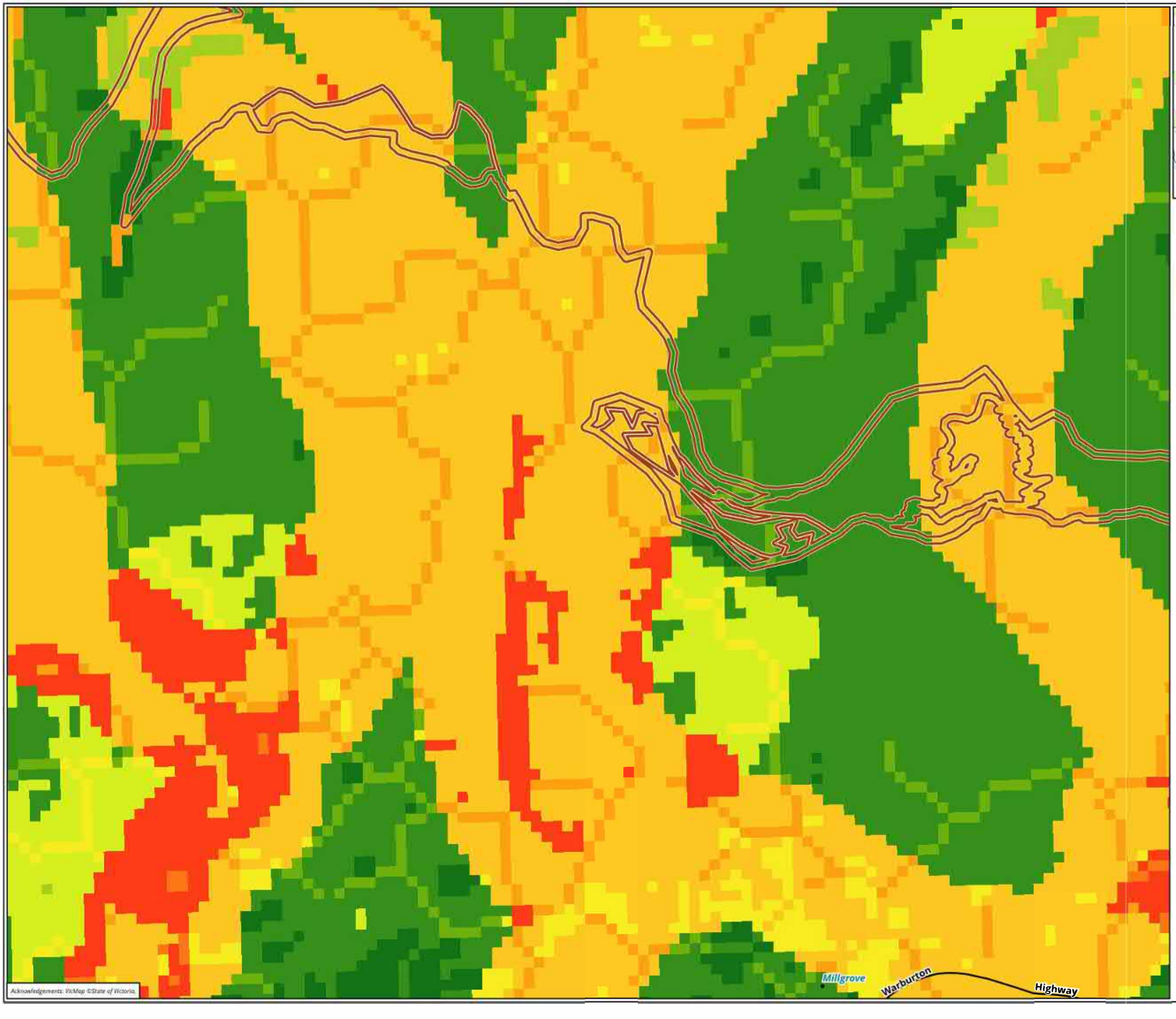

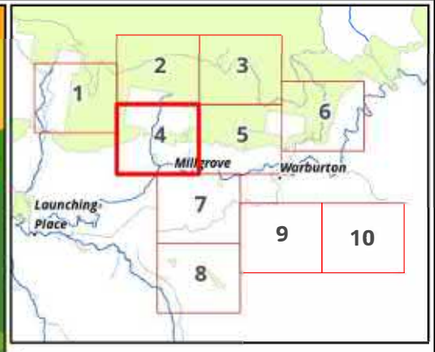

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Activity Area

Predictive model

High

Low

Map 3.4 Desktop assessment results – Predictive Modelling

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Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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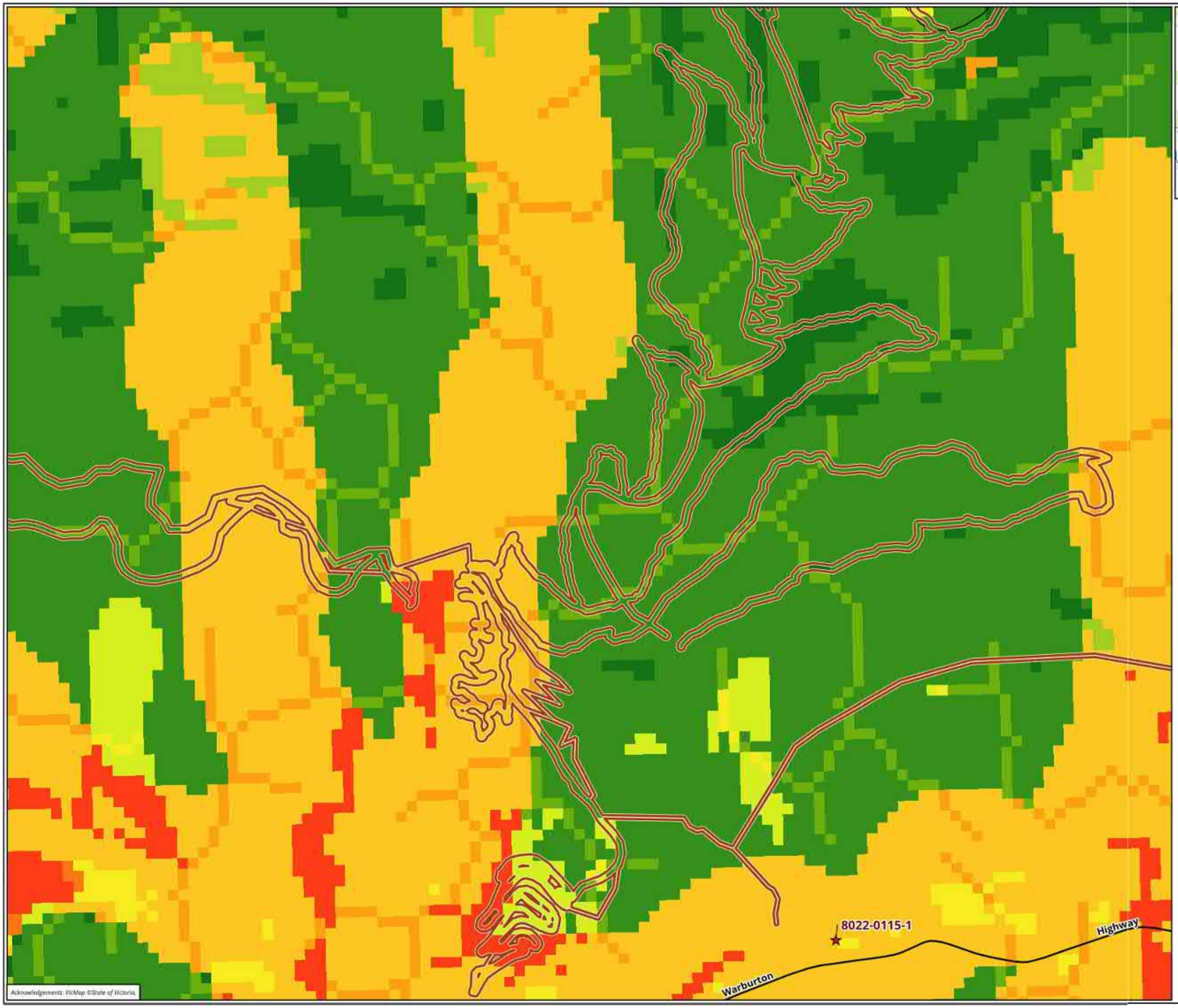

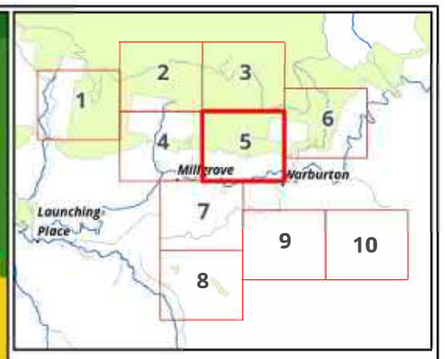

Legend

- Activity Area
- Victorian Aboriginal Heritage Register (VAHR) Place within 200 m

Predictive model

- High
- Low

Map 3.5 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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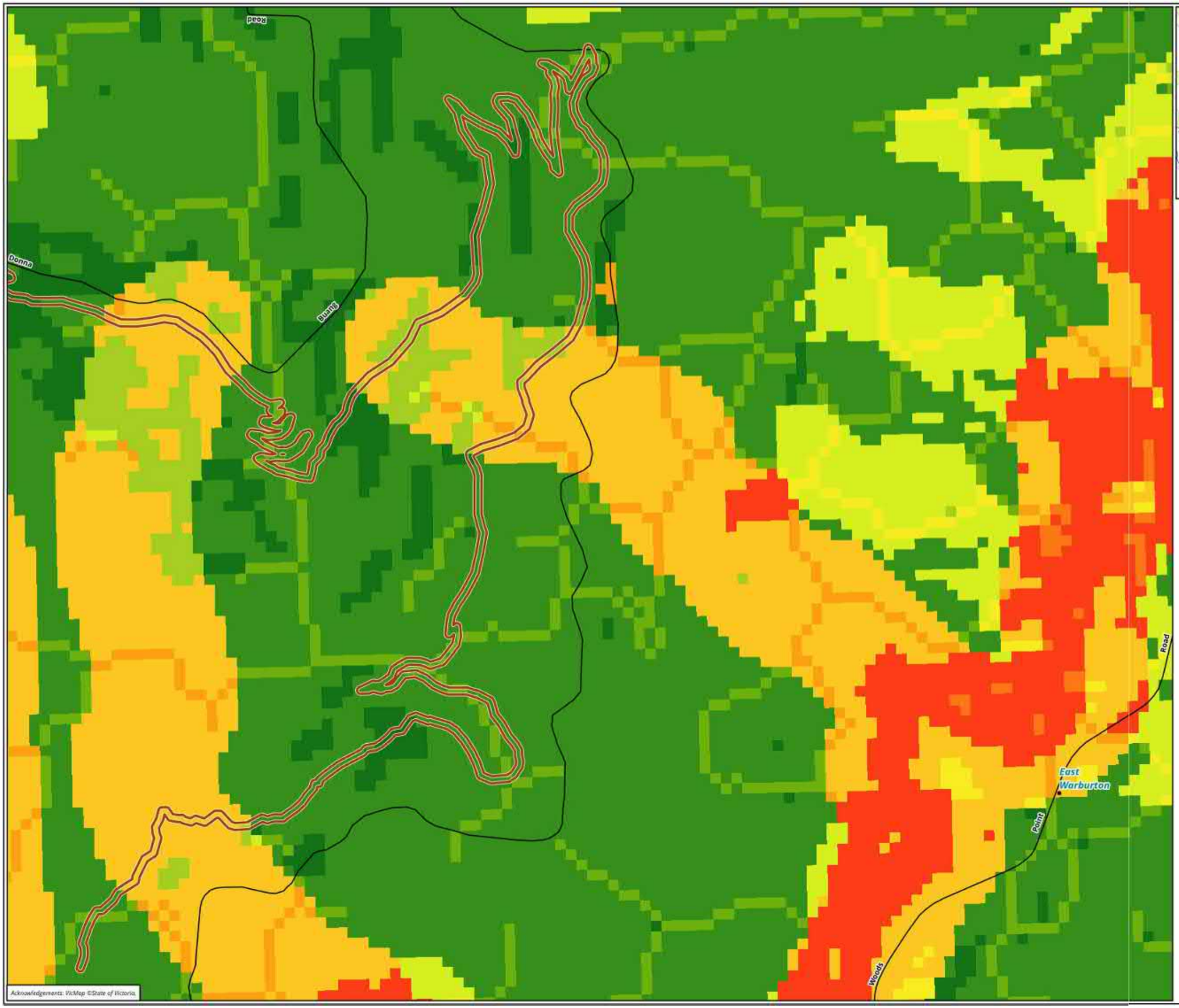

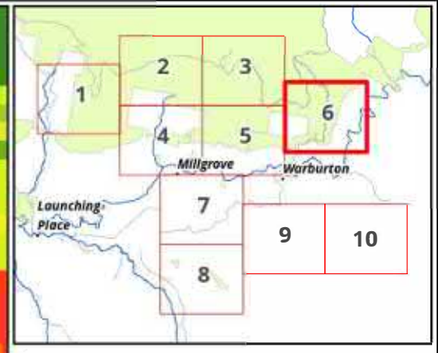

Legend

Activity Area

Predictive model

High

Low

Map 3.6 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M3_PredictiveModel
Project: P:\33800s\33805\Mapping\
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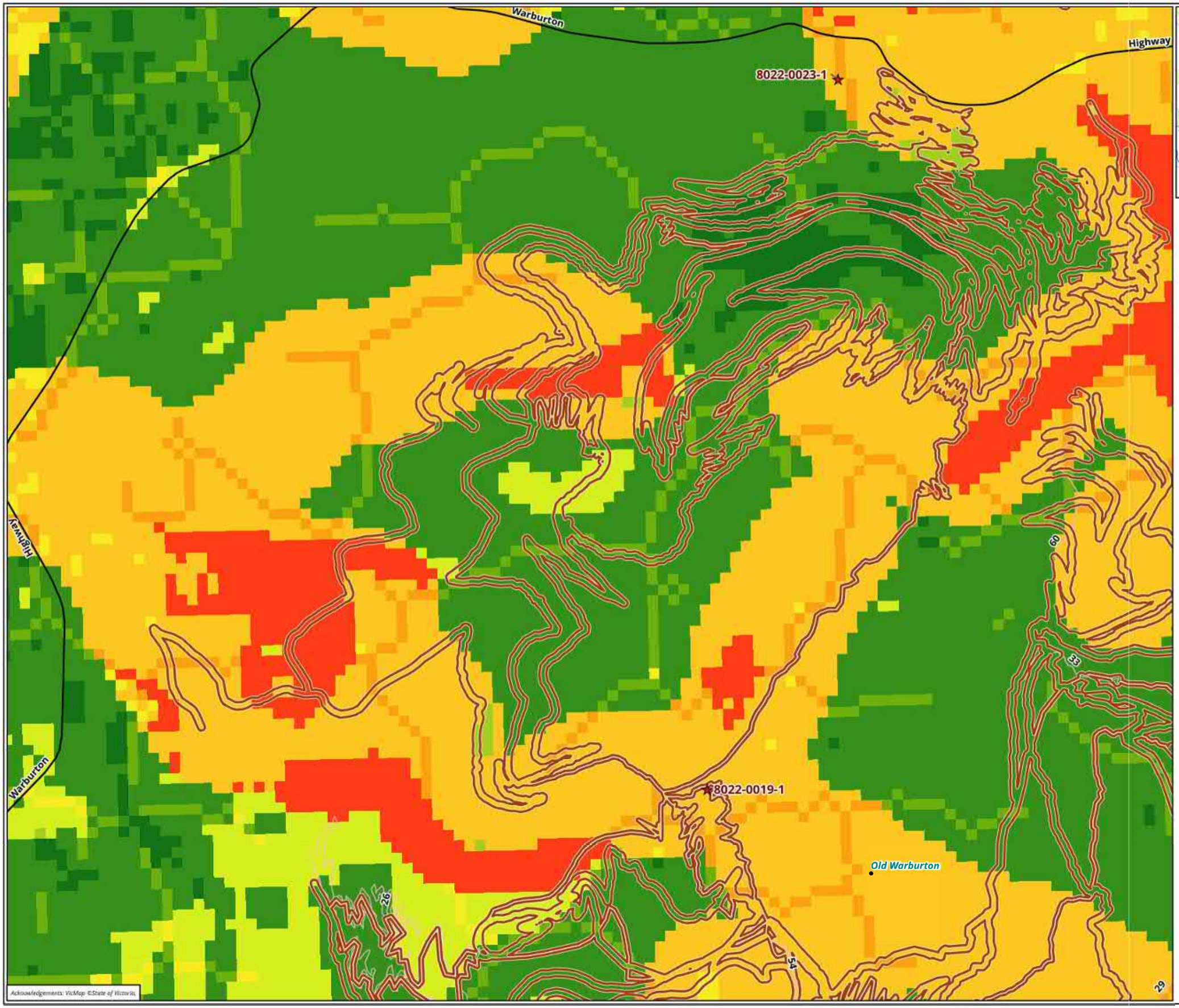

Legend

- Activity Area
- ★ Victorian Aboriginal Heritage Register (VAHR) Place within 200 m

Predictive model

- High
- Low

Map 3.7 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
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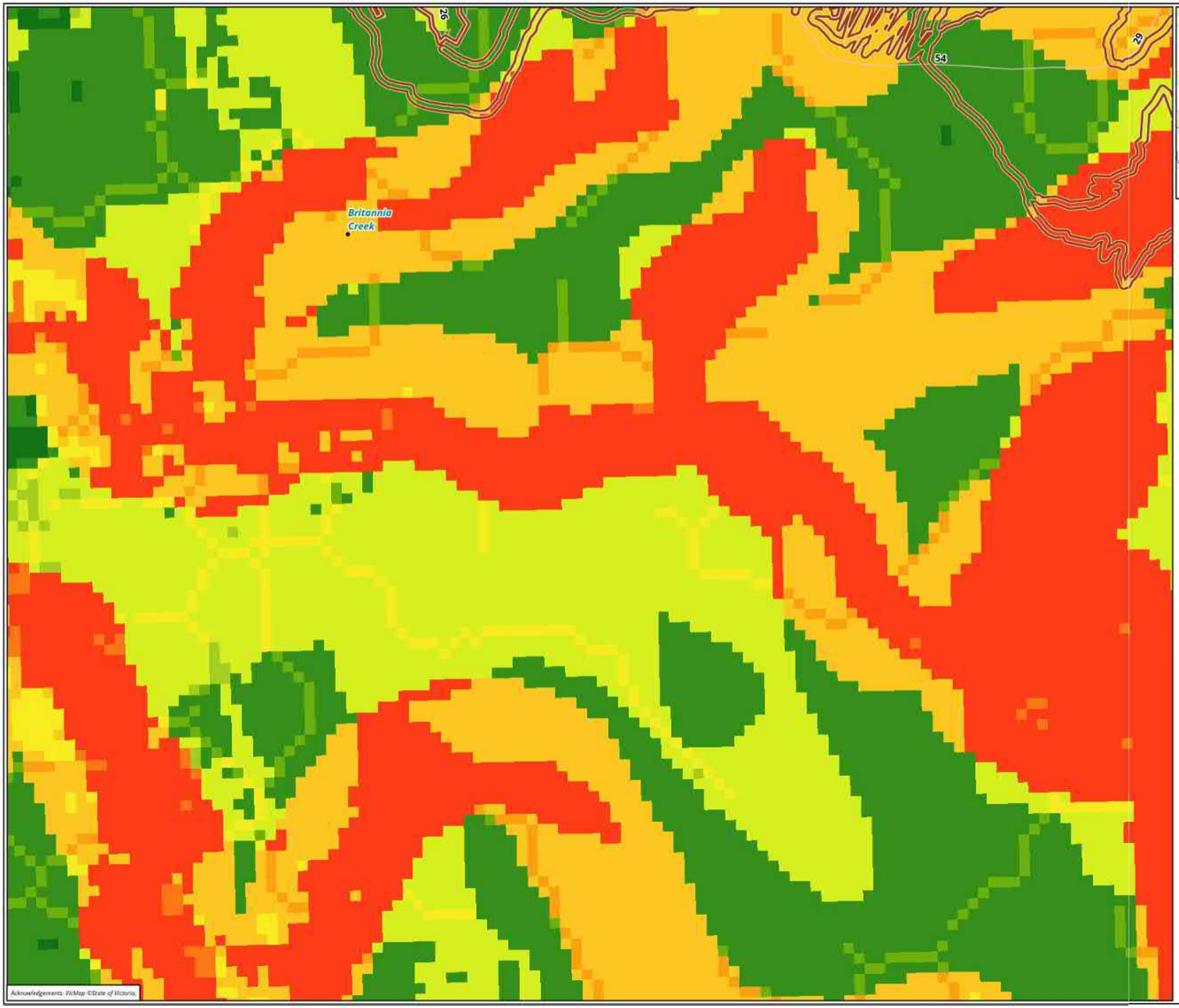

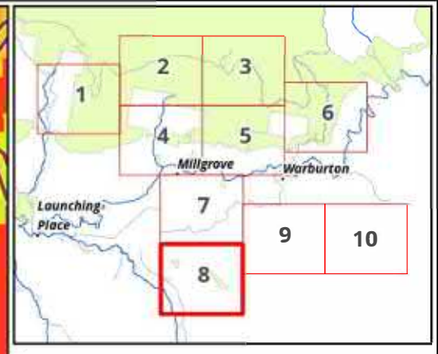

Legend

Activity Area

Predictive model

High

Low

Map 3.8 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
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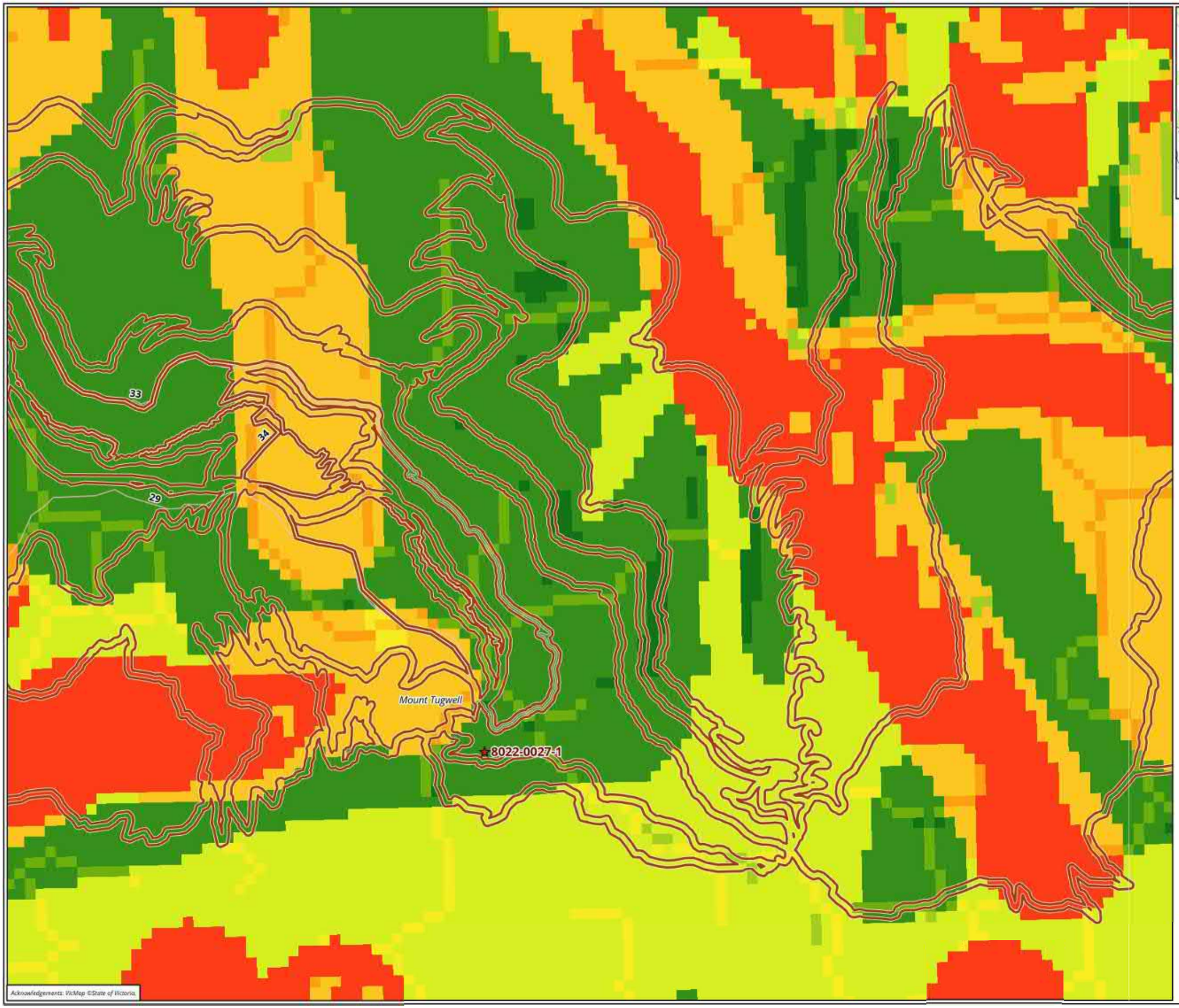

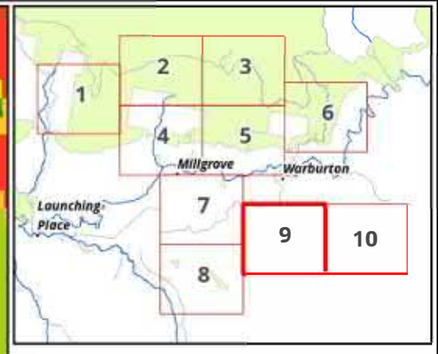

Legend

- Activity Area
- ★ Victorian Aboriginal Heritage Register (VAHR) Place within 200 m

Predictive model

- High
- Low

Map 3.9 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

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Matter: 34179,
Date: 20 July 2021,
Prepared for: DC. Prepared by: LW, Last edited by: lwilson
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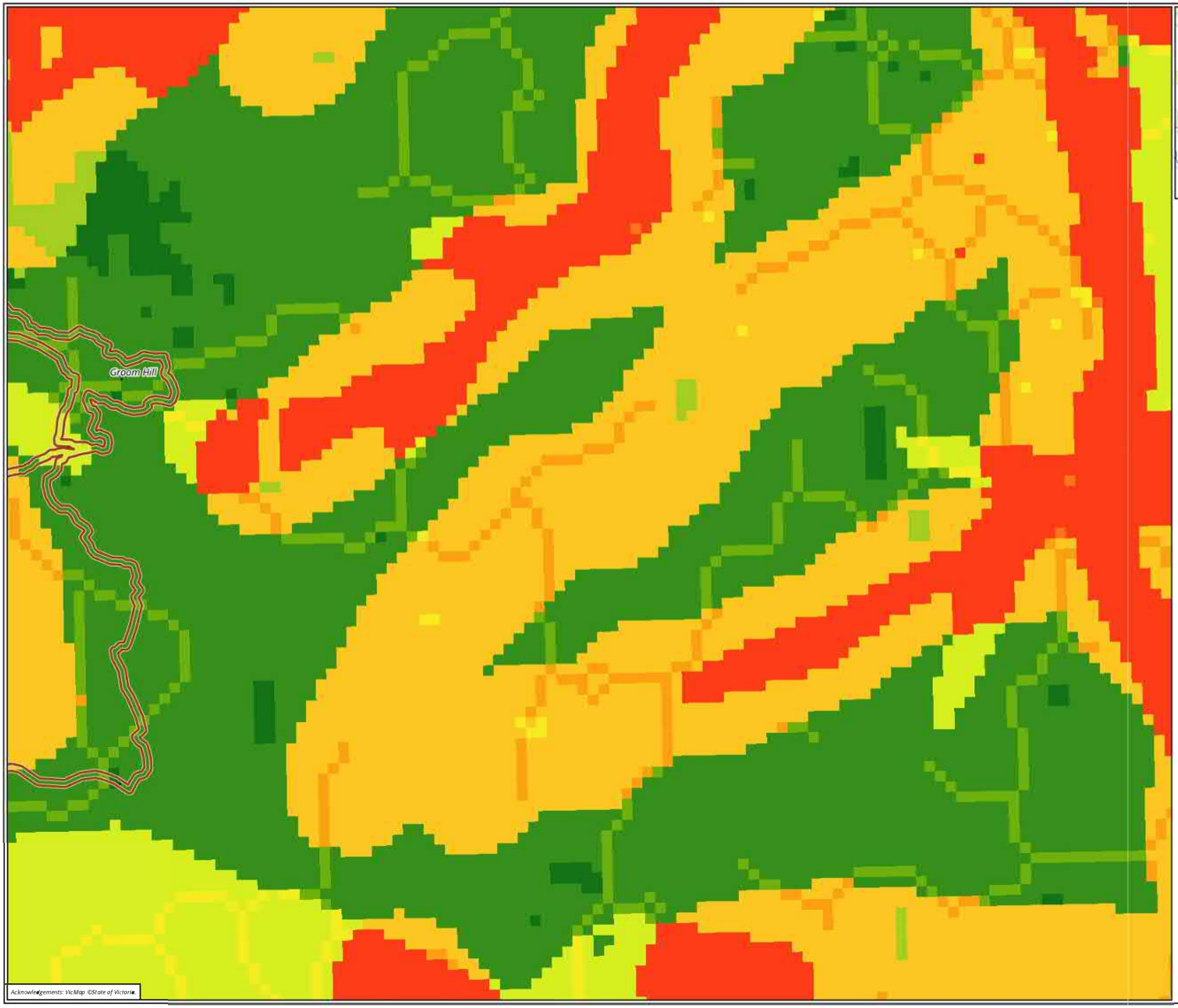

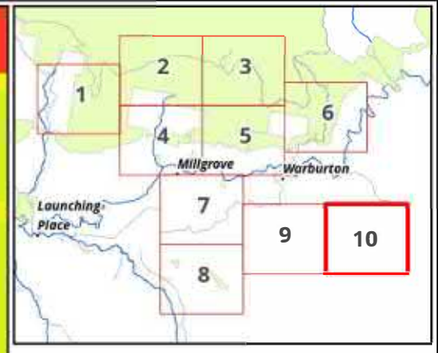

Legend

Activity Area

Predictive model

High

Low

Map 3.10 Desktop assessment results – Predictive Modelling

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

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Matter: 34179,
Date: 20 July 2021,
Prepared for: DC. Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M3_PredictiveModel
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

7.1.9 Conclusions from Desktop Assessment

The background research revealed that no Aboriginal places are present within the Project Area as of 24 May 2021. Previous archaeological assessments undertaken within the Upper Yarra Valley have found that the rugged terrain and thickly wooded slopes are landforms that possibly would not have been utilised by Aboriginal people. Within forested areas, the potential for Aboriginal cultural heritage material will be located on generally flat ground such as that of ridge tops, between ridges, and on creek and river flats, most likely near to permanent water sources and other areas of flora and fauna.

Historic land use practices, such as mining and logging have had an effect on the surrounding landscape and would have truncated or destroyed any Aboriginal cultural heritage material if present. A previous CHMP (13373) undertook subsurface testing along Dammans Road within the current Project Area, as well as adjacent streets. Prior to more modern development, the adjacent Marlino Avenue would have been located at the base of a valley and is dissected by a creek. Nearby Waterloo Road was located on an elevated gentle sloping plain located on the lower slope of Mount Donna Buang. No cultural heritage material was found within these areas; however, natural soils profiles were recorded beneath the road surfaces.

As previous regional and local archaeological assessments have shown, areas within the current Project Area that consist of steeply sloping, heavily vegetated land, have low potential for Aboriginal cultural heritage material.

The construction of the O'Shannassy Aqueduct, with open channels excavated to a depth of 1 metre would have truncated or destroyed any Aboriginal cultural heritage material. Areas of the current Project Area within the alignment of the O'Shannassy Aqueduct will therefore have an extremely low potential to contain Aboriginal cultural heritage material.

7.1.9.1 Prediction statement

Based on the above review of the geographic region, including its environment, recorded Aboriginal places, previous archaeological assessments and information on the activities of Aboriginal people, a place prediction statement has been developed. This utilises the existing regional information in order to target landforms which might have archaeological potential during the Standard Assessment. The place prediction statement acts as a guideline for designing the ground survey strategy and identifies key points for consideration.

Therefore the Aboriginal place types likely to be found within the Activity Area are:

- **Artefact distributions** consisting of one or more stone artefacts are associated with tool production, domestic activities and resource procurement. Artefact scatters are the most prevalent Aboriginal place type within the wider geographic region and have been recorded on a variety of landforms including flood plains, ridgetops, hill slopes as well as level ground on mountain tops. Three artefact scatters (VAHR 8022-0019, -0023 & -0027) and one LDAD (VAHR 8022-0118) have been recorded within 1 kilometre of the Activity Area, all of which were recorded within close proximity to watercourses. Waterways, mountain tops, ridgelines, gentle sloping hills and flood plains are all landforms that are present within the Activity Area; therefore there is potential for Aboriginal cultural heritage material to be present. Artefact scatters are less likely to be present within extremely rugged and thickly forested areas.
- **Scarred trees** represent cultural modifications of trees to obtain the bark for use as shelters, canoes and shields. Widespread removal of native forest has resulted in little remnant vegetation; scarred trees may occur where mature remnant vegetation exists. There are 23 scarred trees recorded within the geographic region. The Activity Area is thickly covered with vegetation as well as creeks, rivers and tributaries, where scarred trees have the highest potential to occur. Logging and planting activities as well as bushfires will have had an effect on the vegetation within the Activity Area; however scarred trees have the potential to be present in areas of mature indigenous vegetation.

The results of the Desktop Assessment have indicated that it is reasonably possible for unidentified Aboriginal cultural heritage material to be within the Activity Area. For completion of this CHMP, it is therefore necessary to undertake a Standard Assessment.

7.1.10 Standard Assessment/Survey

7.1.10.1 Methodology

The Standard Assessment comprised vehicle reconnaissance and targeted ground survey to assess land forms, ground conditions, current and previous land use, and the potential for surface and subsurface cultural heritage. It also included auger testing to assess the nature of the subsurface deposits.

The initial Standard Assessment was completed on the 16 and 20 October 2017. The ground survey was supervised by Kym Oataway (HA, Biosis Pty Ltd) with the involvement of Brendan Wandin and Sean Wandin (Field Representatives, WWCHAC). Following the completion of the initial Standard Assessment, an addition 30 kilometres of proposed mountain bike trail was added to the Activity Area. These areas were surveyed on the 4 and 5 December 2017 supervised by Kym Oataway and Phillip Liro (HAs, Biosis Pty Ltd) with the involvement of Sean Wandin, Shane Nicholson and Ann-Maree Chandler (WWCHAC). A further trail alignment variation was proposed in early 2021 which was surveyed by Phillip Liro (HAs, Biosis Pty Ltd) with the involvement of Sean Wandin and Anne-Maree Chandler on the 15 and 16 April 2021.

7.1.10.2 Results

For the purpose of the Standard Assessment, the Activity Area was divided into survey units with corresponding mountain bike trail (MTB) numbering (Table 13). These Survey Units are based on the landforms noted within the Activity Area and are detailed below in Map 4. The mountain bike trail numbering is shown in Map 4. Some of the proposed mountain bike tracks overlap multiple survey units but they are still part of a singular track design.

Table 13 Description of survey units in the Activity Area

Survey Unit	MTB track numbers	Land Use	Features	Size (ha)
Survey Unit 1 – Mount Donna Buang	1, 45, 46, 47.	Timber, gold mining, public assess State Park	Steep slopes and thick vegetation including Mountain Ash, Snow Gum, soft fern and other rain forest understorey.	46.35
Survey Unit 2 – O'Shannassay Aqueduct to Warburton	2, 3, 4, 5, 6, 7, 8, 9, 10, 46.	Aqueduct, mining, residential	Flat to undulating landscape along O'Shannassay Aqueduct trail and into the township of Warburton.	22.69
Survey Unit 3 – Mount Little Joe	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 43, 44, 60, 61, 62.	Timber, gold mining	Steep slopes, thick vegetation cut by existing vehicle access/4WD tracks. Pre-existing MTB tracks.	40.75
Survey Unit 4 – Mount Tugwell	24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 63, 64, 65, 66.	Timber, gold mining	Steep slopes, thick vegetation cut by existing vehicle access/4WD tracks. Pre-existing MTB tracks.	56.77

7.1.10.2.1 Survey Unit 1 – Mount Donna Buang

Three rounds of survey were conducted on Mount Donna Buang coinciding with variations to the MTB track alignments. The initial survey was completed on 16 October 2017. As new tracks were added a follow up survey was conducted with supporting auger results along an east to west alignment on 04 December 2017. When a variation to the tracks was made a final survey was conducted on 15 April 2021 with additional auger results along a north-west to south-east alignment for MTB tracks 45, 46 and 47 (see Table 14). The auger results were consistent through the survey periods with shallow organic clayey silts and black clays present atop granitic boulders and rocks to depths of 400 millimetres. The thick forest shrub and understory was consistent throughout survey periods preventing access to locations away from pre-existing trails or disturbances from resort construction and maintenance. Towards the culmination of track 46 and 47 significant disturbance associated with the telecom tower and base station is encountered as part of the ski resort and tourism development. No Aboriginal cultural heritage was identified.

7.1.10.2.2 Survey Unit 2 – O'Shannassay Aqueduct

Two rounds of survey were conducted on O'Shannassay Aqueduct coinciding with variations to the MTB track alignments. The initial survey was completed on 17 October 2017. As new tracks were added a follow up survey was conducted with six auger results along a south-east to north-west alignment on 05 December 2017. The auger results were consistent for the landform with consistent clays being identified below 100 millimetres (see Table 14).

7.1.10.2.3 Survey Unit 3 – Mount Little Joe

Three rounds of survey were conducted on Mount Little Joe coinciding with variations to the MTB track alignments. The initial survey was completed on 17 October 2017. As new tracks were added a follow up survey was conducted with supporting auger results (see Table 14) along an east to west alignment on 05 December 2017. When a variation to the tracks was made a final survey was conducted on 15 April 202. The existing auger results completed during the second round of surveying are within a close enough proximity and accurately identified the stratigraphic profiles for altered tracks MTB 55, 62, 63, 64 and 66. The augers show consistent results through the survey periods with shallow organic clayey silts and brown clays present atop granitic boulders and rocks to depths of 400 millimetres. The thick forest shrub and understory was consistent throughout survey periods preventing access to locations where track variations are relatively minor and away from pre-existing trails or disturbances from existing mountain bike track construction and maintenance.

No Aboriginal cultural heritage was identified.

7.1.10.2.4 Survey Unit 4 – Mount Tugwell

Three rounds of survey were conducted on Mount Tugwell coinciding with variations to the MTB track alignments. The initial survey was completed on 17 October 2017. As new tracks were added a follow up survey was conducted with supporting auger results (see Table 14) along an east to west alignment on 05 December 2017. When a variation to the tracks was made a final survey was conducted on 16 April 2021 with additional auger results along a north to south alignment for MTB tracks 49 and 50. Track 51 was not accessible due to significant slope descending from the road access. The majority of track alterations follow the main access roads and descend from them which were viewed but not tested due to slope and access issues. The auger results were consistent through the survey periods with shallow organic clayey silts and brown clays present to depths between 250 to 2500 millimetres depending on the slope location. The deep auger up to 2500 millimetres is due to a deeper mid slope sediment accumulation corresponding with a water run off allowing for deeper sandy clay sediments to build. The thick forest shrub and understory was consistent throughout survey periods preventing access to locations away from pre-existing trails.

No Aboriginal cultural heritage was identified.

7.1.10.2.5 Auger Probes

Table 14 Results of auger probes

Survey Unit 1	Survey Unit 2	Survey Unit 3	Survey Unit 4
Transect 1 Auger probe 1: Located at the summit of Mount Donna Buang was completed during a dry summer season and is representative for all east to west transect augers. **0-50mm:** Moist slightly silty clay friable with a gradual contact. Grasses and rootlets. Very dark grey brown 10yr 3/2 with a pH of 6. No artefacts. **50-370mm:** Dry friable clay base. Granite rock inclusions. Yellowish brown 10yr 5/4 with a pH of 6. No artefacts.	**Transect 2 Auger probe 1:** Located at the midslope of Mount Donna Buang adjacent to the golf course was completed during a dry summer season and is representative for all east to west transect augers through the clearing. **0-100mm:** Moist, slightly silty clay, friable with gradual contact. Grasses and rootlets. 10yr 4/3 Brown with a pH of 5.5. No artefacts. **100-300mm:** Dry friable clay base. 10yr 5/3 Brown with a pH of 5.5. No artefacts.	**Transect 4 Auger probe 3:** The auger probes were conducted during the second stage of survey in summer and are within close proximity to the MTB alterations where they move into steeper slopes and thicker forest scrub. Auger probe 3 is representative of all the auger probes conducted and is a good representation of the sediments across all the track alteration within this vicinity. **0-50mm:** Minor washout silts on clay with gradual contact. Leaf matter and minor gravels. 10yr 3/3 dark brown with a pH of 6.5. No artefacts. **50-400mm:** Dry friable clay base with a brown 10yr 5/4 sediment and a pH of 6.5. No artefacts.	**Auger Probe 101:** **0-300mm:** Damp soft fine grained silty clay with an abrupt contact. Leaf and organic matter with grass rootles. 10yr 2/2 very dark brown with a pH of 5. No artefacts. **300-1000mm:** Damp soft fine grained sandy clay with a gradual contact. 5yr 4/3 reddish brown with a pH of 5. No artefacts. **1000-2500mm:** Dry soft medium grained slightly sandy clay base. Sterile mountain geology. 5yr 4/3 reddish brown with a pH of 5.
Auger Probe 100: Located at the start of MTB tracks 45 and 46 at the start of the midslope falling south easterly downhill. Completed during winter season and is representative for all north west to south east augers. **0-200mm:** Damp soft silty clay with a gradual contact. Organic matter from forest scrub. Very dark brown 10yr 2/2 with a pH of 5. No artefacts. **200-250mm:** Damp soft slightly silty clay base. Significant granite rock. Very dark brown 10yr 2/2 with a pH of 5. No Artefacts.			**Auger probe 104:** **0-50mm:** Damp soft fine grained silty clay with an abrupt contact. Leaf and organic matter with grass rootles. 10yr 2/2 very dark brown with a pH of 5. **50-280mm:** Damp soft fine grained slightly sandy clay base. Root preventing further auguring. 5yr 4/3 reddish brown with a pH of 5.

7.1.10.3 Conclusions from Standard Assessment

While the area has been intensively modified by gold mining, timber and milling industries and large scale bush fires such as Ash Wednesday, thick native Mountain Ash, Snow Gum and rainforest understorey vegetation remains across the Activity Area replaced with exotic grasses only within the township of Warburton. Major disturbance activities noted across the area include the construction of the O'Shannassay Aqueduct, the installation of the large Melbourne Water Pipeline and the construction of roads and utilities.

The auger probes found that much of the landscape across Mount Donna Buang, O'Shannassay Aqueduct, Mount Little Joe and Mount Tugwell shared a common landform stratigraphy and soil structure. All locations showed evidence of erosion and top soil stripping with very little to no evident A-Horizons present. The Activity Area is largely dominated by a B-Horizon clay base with overlaying vegetation. Mount Tugwell and Mount Little Joe showed some silt wash and silty clays beginning to form a topsoil before reaching the uniform clays identified across the varying sections of the Activity Area.

No Aboriginal cultural heritage was located during the ground survey. The locations of close by (located more than 20 metres from the extent of the Activity Area) artefact scatters were examined, with artefactual material unable to be relocated. None of these place lie within the proposed construction footprint and no registered Aboriginal places will be impacted by the proposed works. One area of archaeological potential was identified within Survey Unit 2 along the northern boundary of the Golf Course. This location was identified as being of moderate archaeological potential as it is a cleared section of the proposed trail which does not show any signs of disturbance other than tree clearance, and includes a crest above Ythans Creek (which flows year round) with a gentle slope to the east. This is in contrast to much of the Activity Area across Survey Units 1, 3 and 4 which include steep slopes, thick undergrowth and damp, eroding soils.

While there have been few similar archaeological investigations to have occurred across Mount Donna Buang, Little Joe and Tugwell, the results of the current Standard Assessment can be compared to those of other investigations which have occurred across the Victorian Alps where steep inclines and thick forestation are common factors to consider in Archaeological investigations. Marshall et al (1999) noted during their Mount Buller Alpine Survey, that the Mount was contained on an incline which was unsuitable for occupation and not conducive for the deposition and accumulation of archaeological material, a conclusion that can be applied to almost all of the current Activity Area except for small isolated sections where the construction of underground water pipelines and the O'Shannassay Aqueduct has occurred.

Area of archaeological potential

At the conclusion of the Standard Assessment Kym Oataway, Philip Liro (HA, Biosis), Sean Wandin, Anne-Maree Chandler and Brendan Wandin (Field Representatives, WWCHAC) discussed the Activity Area and any areas which may contain archaeological potential.

It was suggested that an area noted by the field representatives as being of potential would be the peak of Mount Donna Buang as it would have given past Traditional Owners excellent views over the valley, however appeared to have been highly disturbed for snow related recreation activity.

One area was identified as being of moderate archaeological potential during the Standard Assessment, an approximately 100 metre section of land within Survey Unit 2, along the northern boundary of the golf course. Unlike much of the Activity Area in Survey Units 1, 3 and 4, this section of the Activity Area was noted as consisting of a crest above Ythans Creek to the west, and a gentle (rather than steep) slope to the east. This land has previously been cleared for a proposed Eco lodge, and has undergone relatively low levels of disturbance in comparison to the remainder of Survey Unit 2. In addition, the ground surface appeared to be relatively intact based on the results of auger testing in relation to other auger results and was therefore thought likely to contain any in situ cultural material which may exist within the area.

It was agreed that the area would likely only have low archaeological potential for low density artefact distributions and was mentioned mainly as a result of the lack of other viable testing areas noted throughout the entire Activity Area.

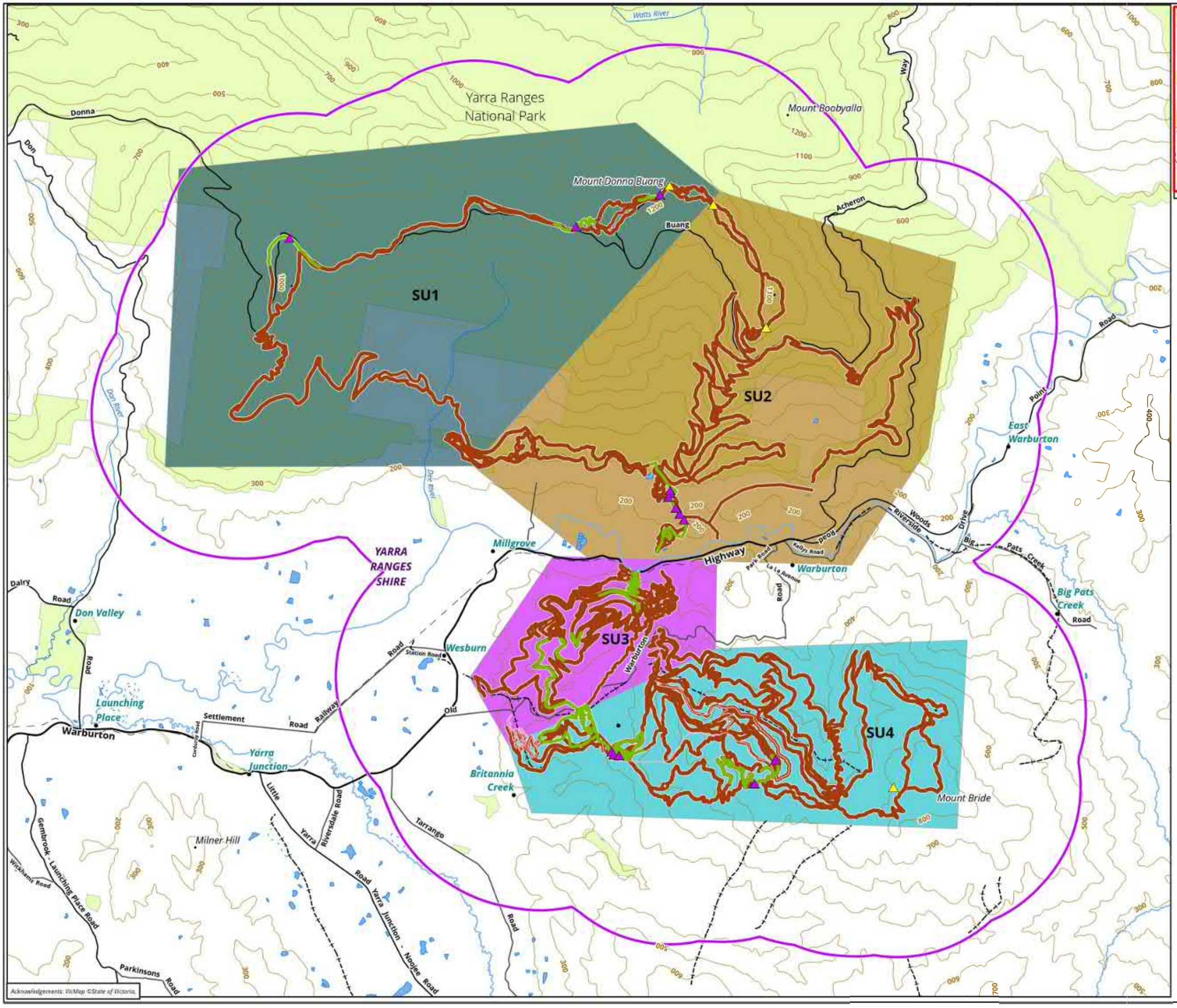
No additional areas of archaeological potential were noted during the most recent survey on the 15 and 16 April 2021.

Aboriginal places

No Aboriginal places were identified within the Activity Area during the Standard Assessment.

Culturally sensitive areas not to be impacted by the activity

No culturally sensitive areas were identified within the current Activity Area.


Yarra Ranges National Park
Mount Donna Buang
Mount Boobyalla
SU1
SU2
SU3
SU4
YARRA RANGES SHIRE
Warburton
Millgrove
Don Valley
Launching Place
Wesburn
Yarra Junction
Britannia Creek
East Warburton
Big Pats Creek
Milner Hill
Mount Bride
Tarrango
Donna
Buang
Acheron
Way
Road
Highway
Dairy
Settlement
Railway
Old
Little
Riversdale
Gembrook - Launching Place Road
Parkinsons
Yarra Junction - Noojee Road
Woods
Riverside
Drive
Pats Creek
Point
Park Road
Kellys Road
La La Avenue
Station Road
Dairy Road
Don River
Watts River
Yarra
Warburton
Dairy Road
Settlement Road
Old Railway Road
Little Yarra Riversdale Road
Gembrook - Launching Place Road
Wickhams Road
Parkinsons Road
Yarra Junction - Noojee Road
Tarrango Road
Woods Riverside Drive
Big Pats Creek Road
Park Road
Kellys Road
La La Avenue
Station Road
Coldwell Road
Warburton Highway
Don River
Watts River
Mount Donna Buang
Mount Boobyalla
Britannia Creek
Mount Bride
East Warburton
Launching Place
Millgrove
Warburton
2
3
4
5
6
7
8
9
10
11
Legend
Activity Area
Auger probe
Auger probe - additional
Study area
Area of Ground Survey
Survey Unit (SU)
1 – Mount Donna Buang
2 – O'Shannassay Aqueduct
3 – Mount Little Joe
4 – Mount Tugwell
Map 4.1 Results of the Standard Assessment - overview
0 500 1,000 1,500 2,000 2,500
Metres
Scale: 1:50,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55
N
Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
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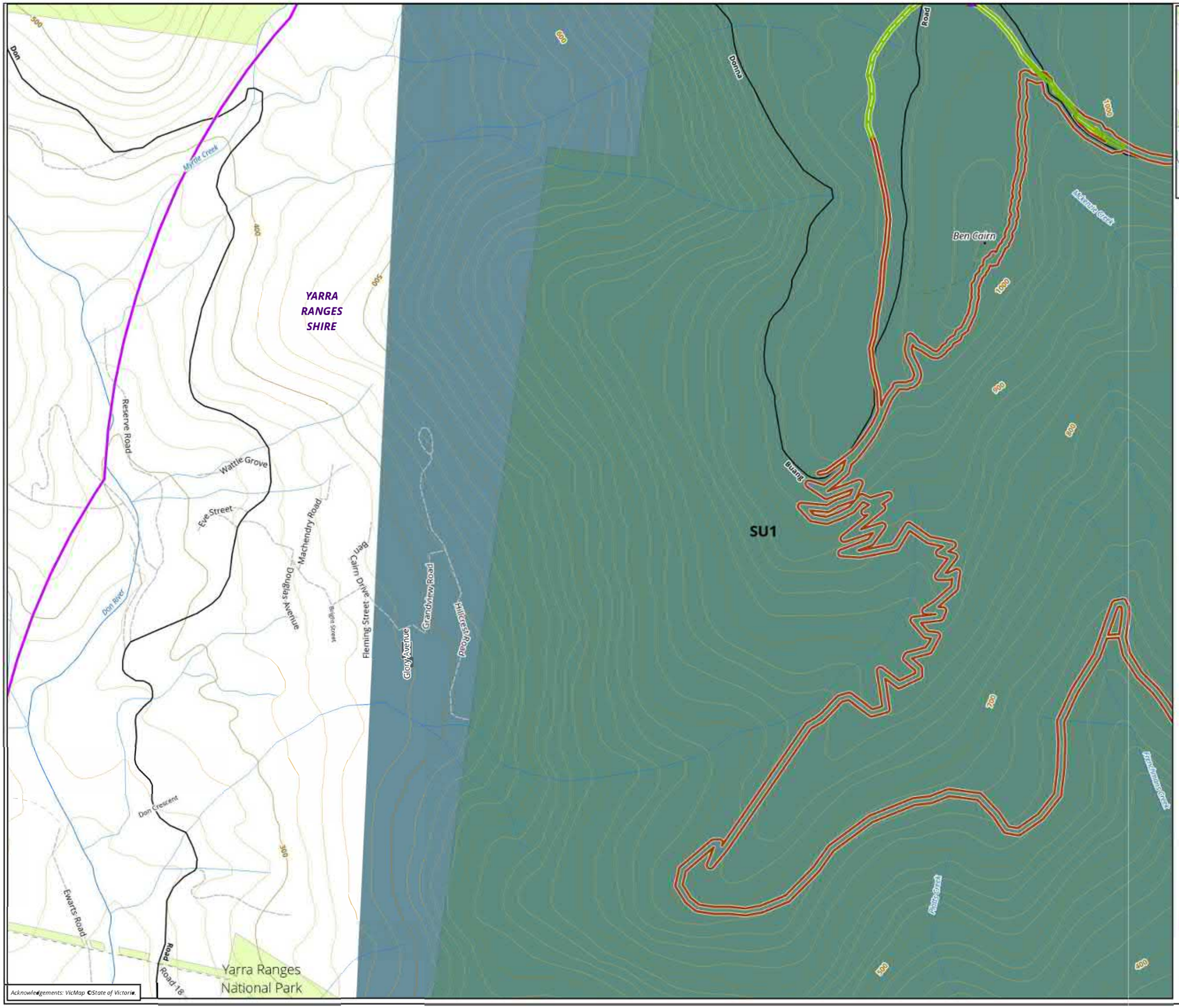
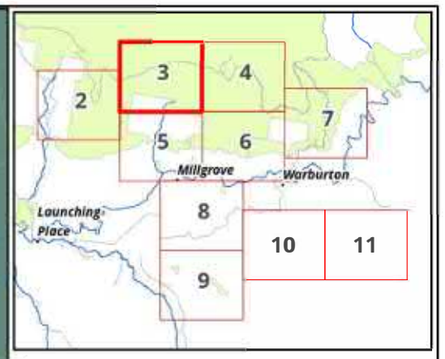


Map 4.2 Results of the Standard Assessment



Legend

- Activity Area
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 1 – Mount Donna Buang

Map 4.3 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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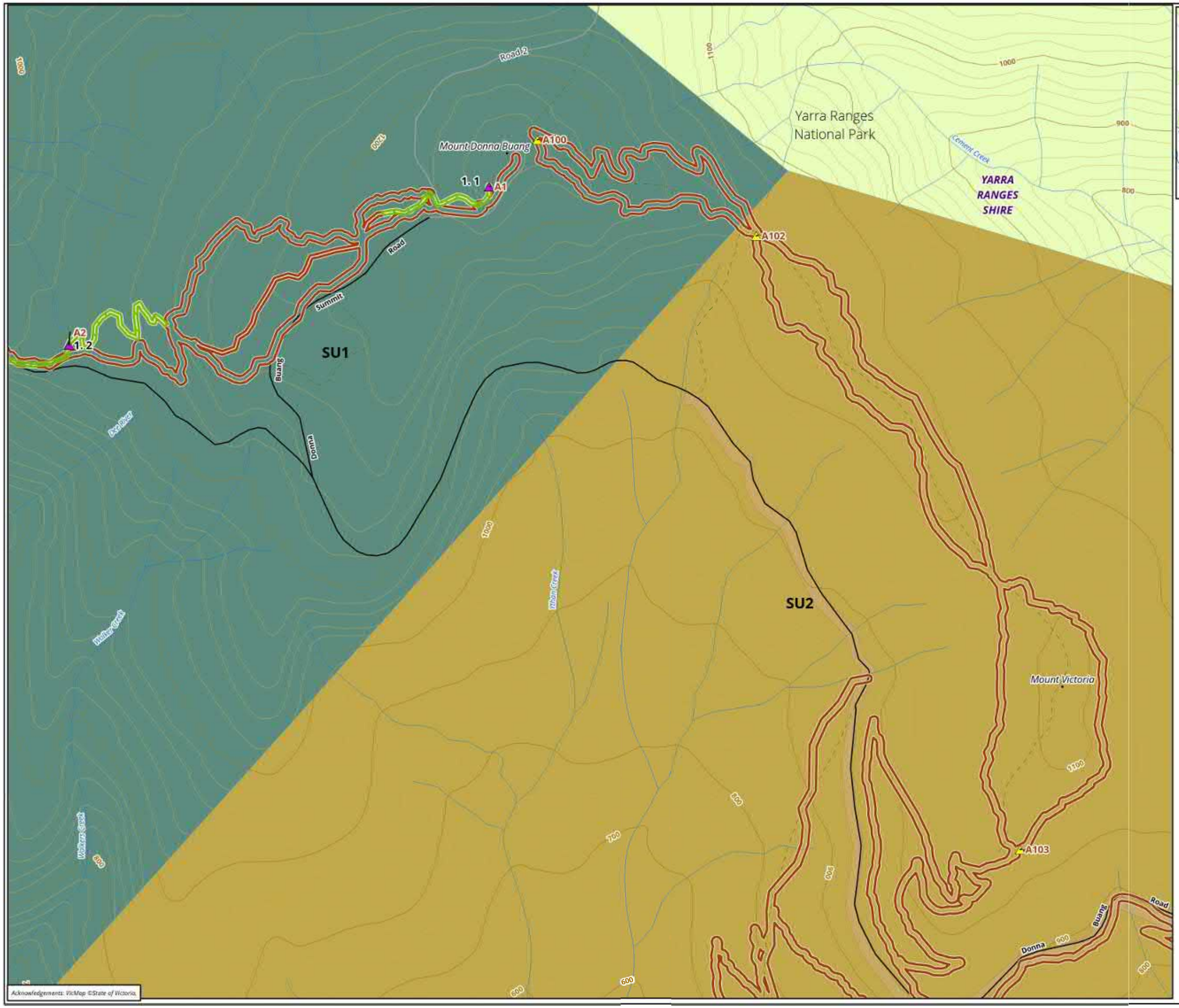

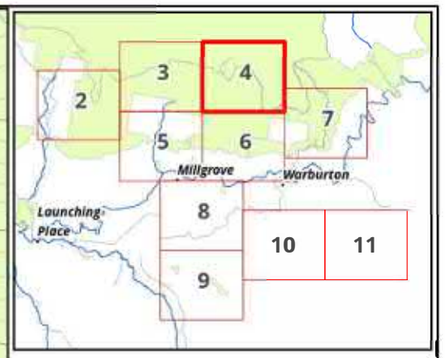

Legend

- Activity Area
- Auger probe
- Auger probe - additional
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 1 – Mount Donna Buang
- 2 – O'Shannassay Aqueduct

Map 4.4 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

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Matter: 34179,
Date: 20 July 2021,
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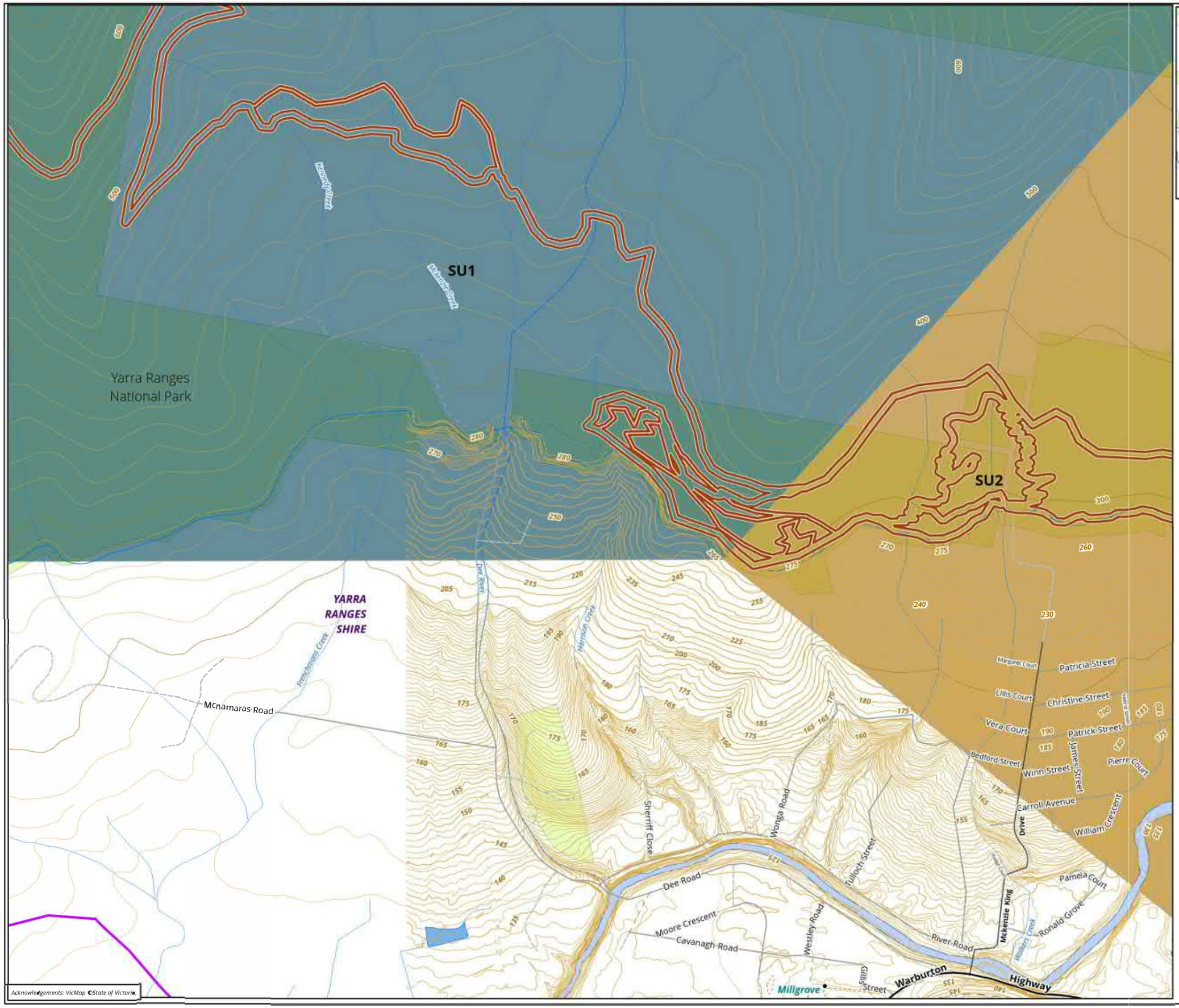
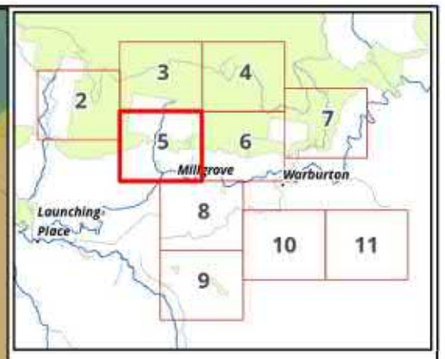




Legend

- Activity Area
- Study area

Survey Unit (SU)

- 1 – Mount Donna Buang
- 2 – O'Shannassay Aqueduct

Map 4.5 Results of the Standard Assessment

0 100 200 300 400 500

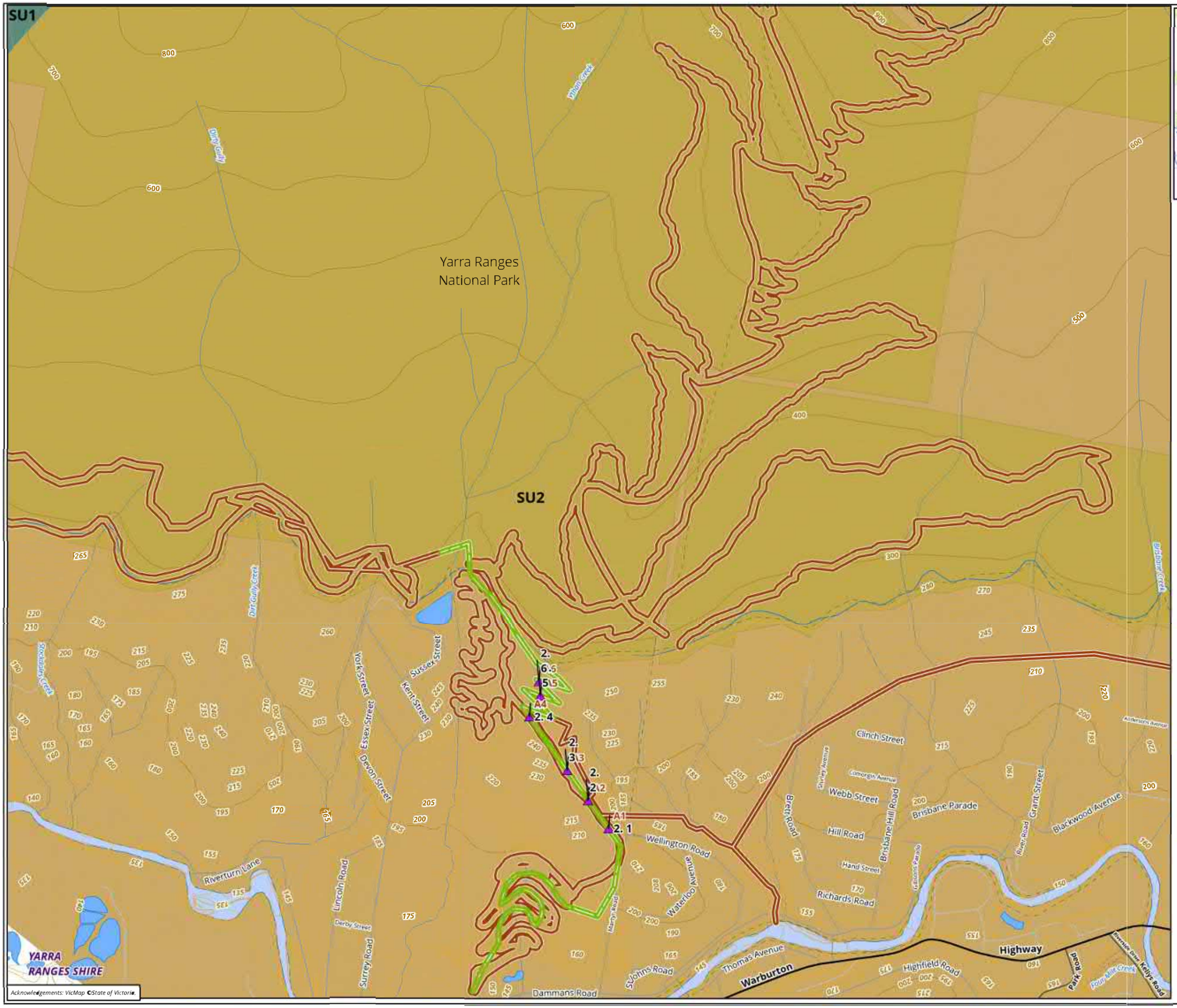
Metres

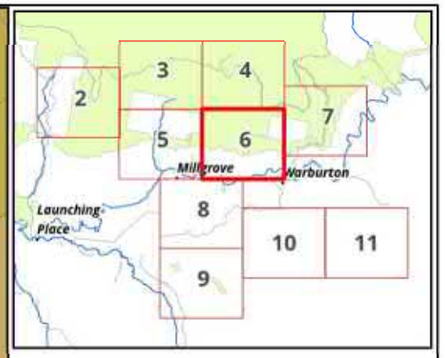
Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
Project: P:\33800s\33805\Mapping\33805_Warburton_EES_Figures_Heritage_EES.aprx





Legend

- Activity Area
- Auger probe
- Auger probe - additional
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 1 – Mount Donna Buang
- 2 – O'Shannassay Aqueduct

Map 4.6 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
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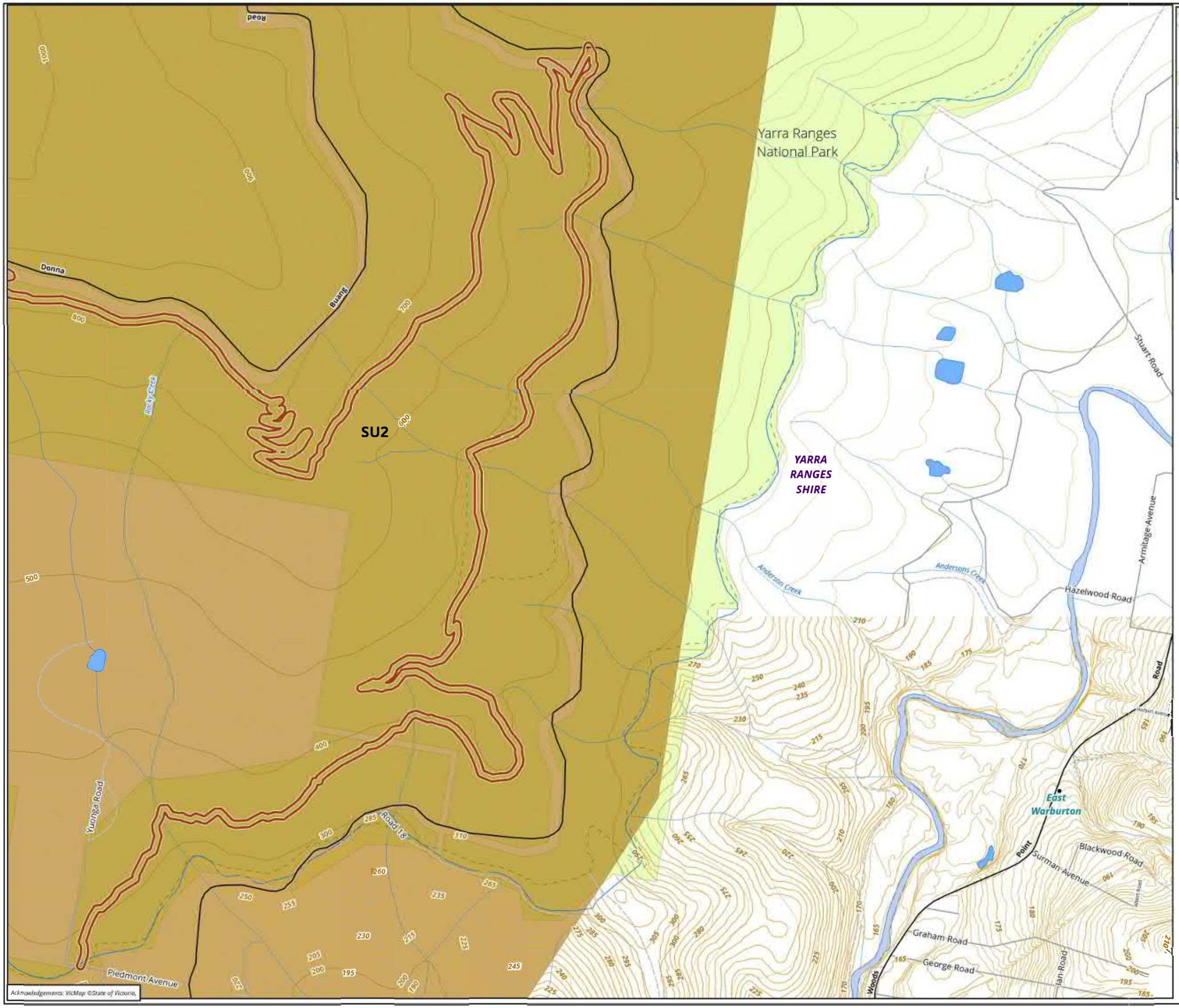
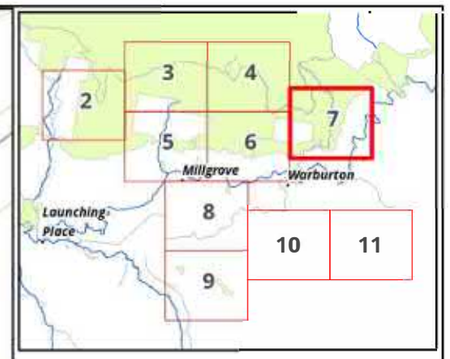
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx





Legend

- Activity Area
- Study area

Survey Unit (SU)

- 2 – O'Shannassay Aqueduct

Map 4.7 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
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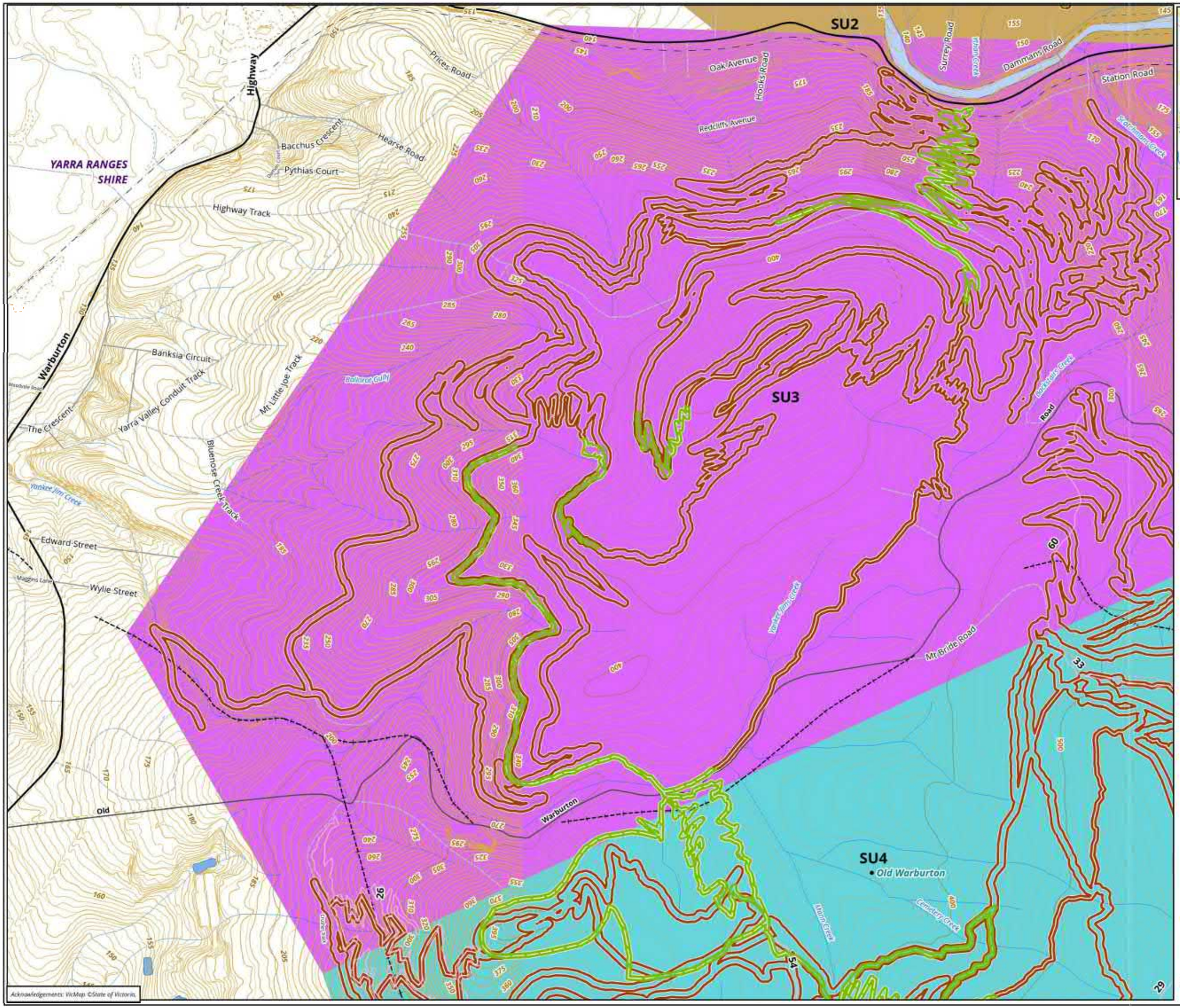
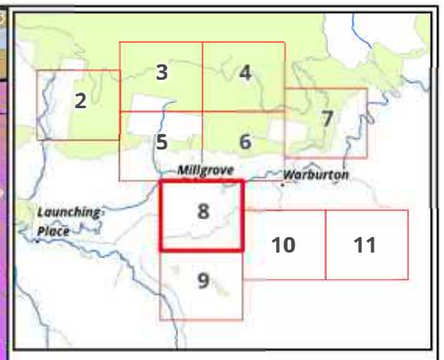
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx





Legend

- Activity Area
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 2 – O'Shannassay Aqueduct
- 3 – Mount Little Joe
- 4 – Mount Tugwell

Map 4.8 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
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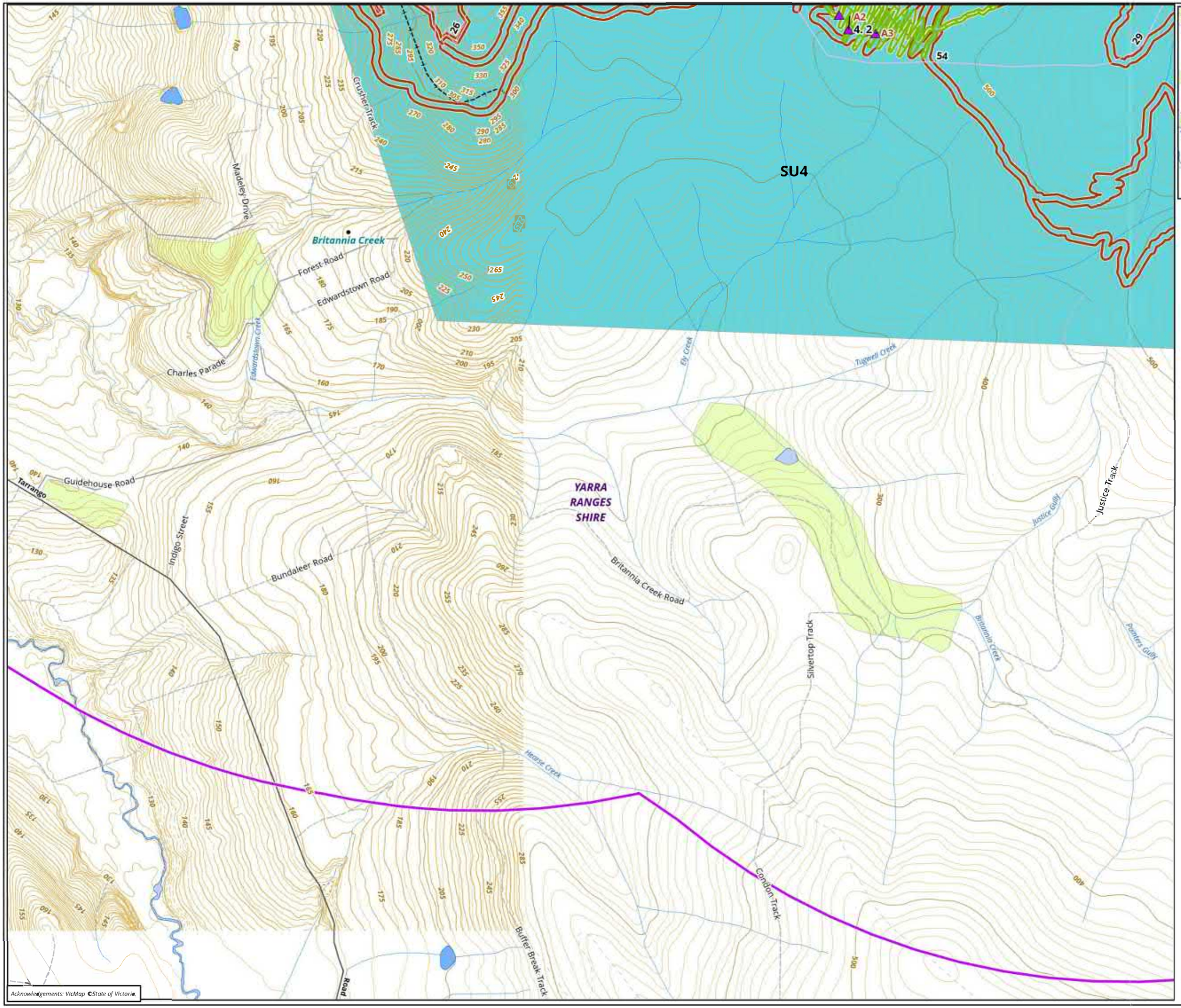
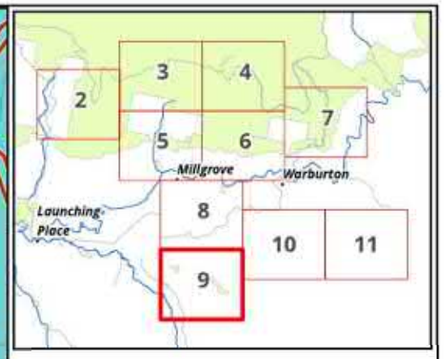




Legend

- Activity Area
- Auger probe
- Auger probe - additional
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 4 – Mount Tugwell

Map 4.9 Results of the Standard Assessment

0 100 200 300 400 500

Metres

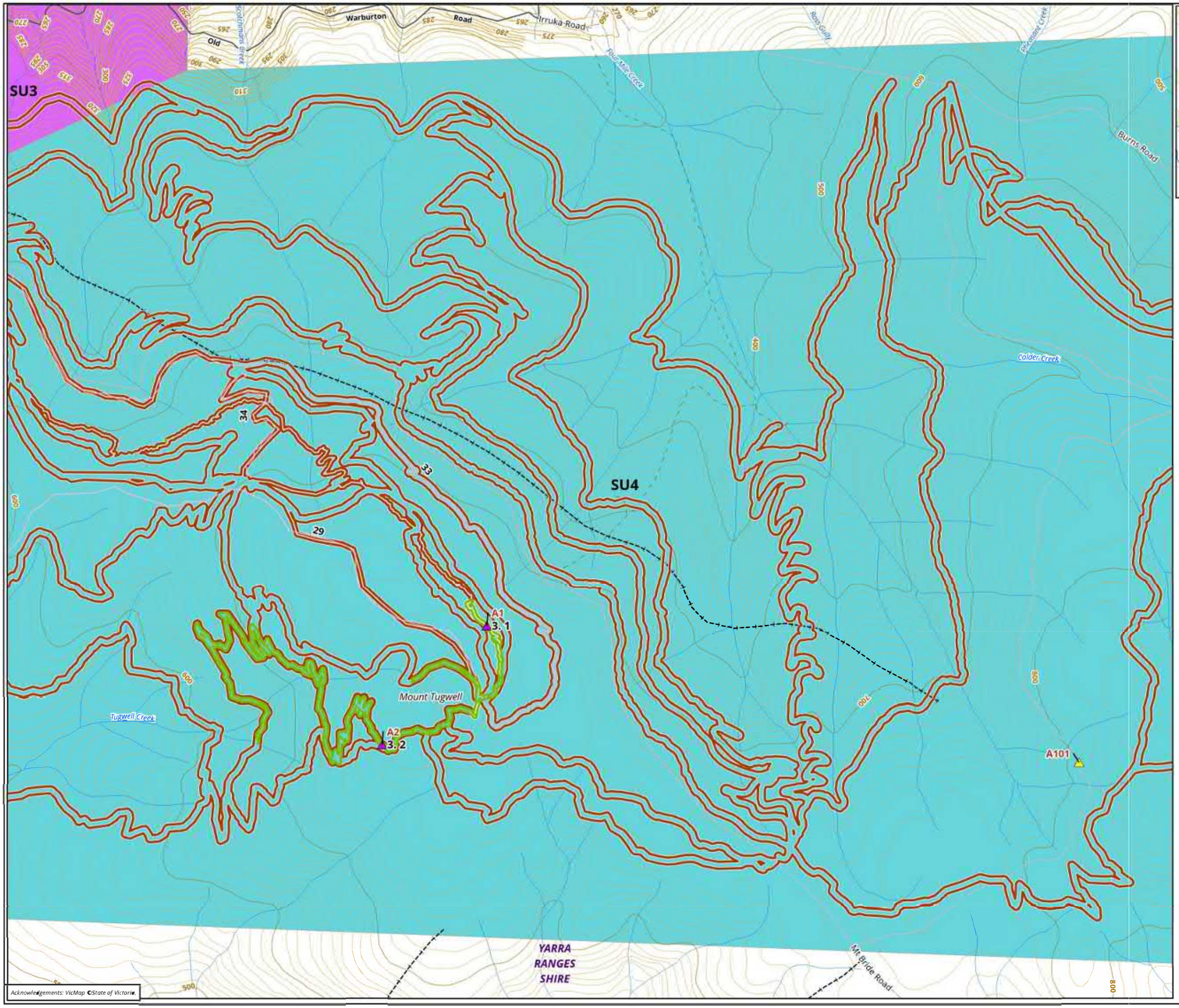
Scale: 1:10,000 @ A3

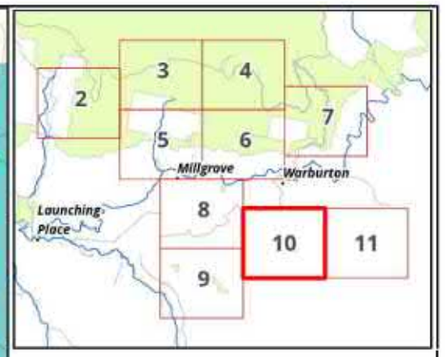
Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx





Legend

- Activity Area
- Auger probe
- Auger probe - additional
- Study area
- Area of Ground Survey

Survey Unit (SU)

- 3 – Mount Little Joe
- 4 – Mount Tugwell

Map 4.10 Results of the Standard Assessment

0 100 200 300 400 500

Metres

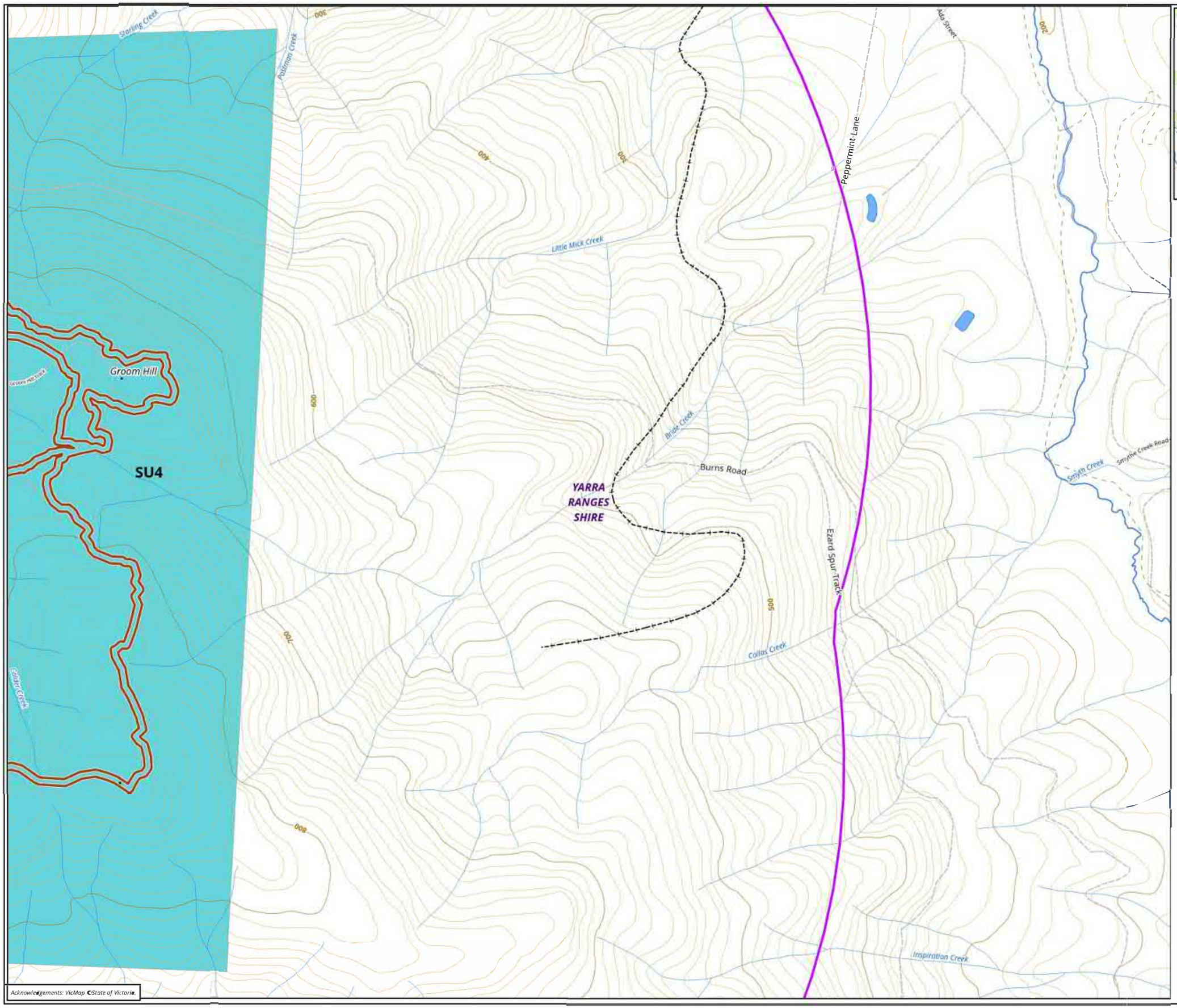
Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx



Legend

- Activity Area
- Study area

Survey Unit (SU)

- 4 – Mount Tugwell

Map 4.11 Results of the Standard Assessment

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M4_StandardAssessment
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

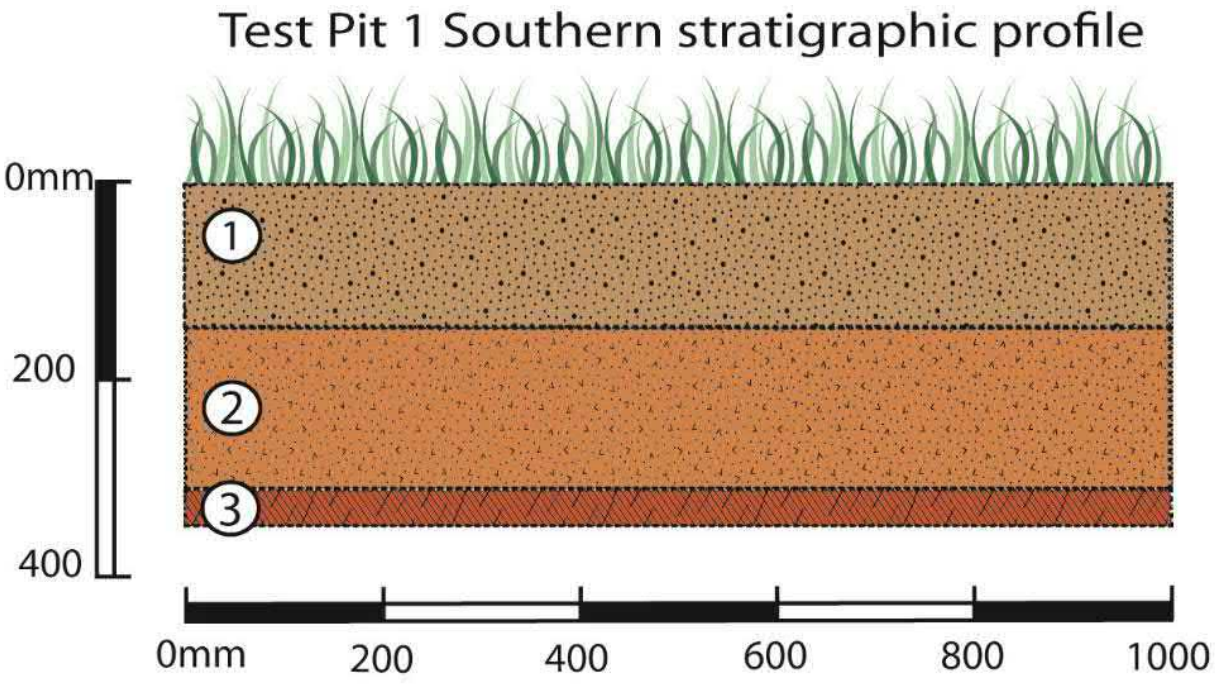
7.1.11 Complex Assessment/Archaeological Excavations

Following the Standard Assessment conducted on the 4 and 5 December 2017 a systematic methodology of manually excavated Test Pits and Shovel Test Pits was proposed to investigate the landform and deeper silty deposits identified in Survey Unit 2 by the auger probes. The locations of subsurface testing targeted the mid slope crest, close proximity to Ythan creek and the south-easterly hill slope towards a dissecting gully and the Yarra River (Map 5).

The Complex Assessment was completed on 23 January 2018. The subsurface testing was supervised by Philip Liro and Wendy Morrison, Biosis Pty Ltd with the involvement of Sean Wandin and Garry Galway, Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC).

A total of eight 50x50 centimetre shovel test pits and one 1x1 metre test pit were excavated along the proposed mountain bike trail alignment. The mid slope crest showed evidence of deeper silty deposits in test pit 1 (Figure 6) and STPs 1 and 2 merging into the clay base. These upper layer deposits were gradually thinning out down the slope of the landform showing a rising clay base along STPs 3 through 6. STP 7 and 8 show a significantly shallow clay base at a depth of 110 millimetres with little to no upper layer silty deposits. This is indicative of sheet wash erosion and prior land use aiding in stripping the sediments down slope. As the clay base denotes a sterile layer there is very low potential for Aboriginal cultural heritage material to be identified along the prominent down slope gradient and gully region. The test pit on the mid slope crest showed evidence of potential brick clays being eroded down the mountain, indicating that potential Aboriginal cultural heritage material would also be eroded down towards the creeks and gully's rather than being present on the mid slope.

CHMP 15276 is ongoing and it is possible that the WWCHAC Elders will require further Complex Assessment prior to discussing management condition and evaluating the CHMP.



Context 1: 0 - 130mm: Dry, fine-medium grained, friable clayey silt with a gradual contact. Grasses, rootlets and bugs. 10yr 4/4, pH 5.

Context 2: 130 -300mm: Dry, fine grained silty clay with orange clayey nodules and merging contact. Tree roots. 10yr 3/4, pH 5.5.

Context 3: 300+mm: Dry clay base with dense stoney clay nodules. 10yr 3/4, pH 5.5.

Figure 6 Stratigraphic illustration of Test Pit 1

Previous archaeological assessments identified during the Desktop Assessment have shown landforms that consist of steeply sloping or heavily vegetated land, are of low potential to contain Aboriginal cultural heritage material. The Complex Assessment generally confirmed the conclusions from the Standard and Desktop assessments with subsurface testing showing low potential with stripped surface deposits along the slope.

No Aboriginal cultural heritage material was found during the Complex Assessment.

The Complex Assessment has determined that the Activity Area has very low archaeological potential for Aboriginal cultural heritage material due erosion profiles, prior land use and landform characteristics.

Legend

- Activity Area
- Study area

Subsurface testing - no artefact

- Shovel Test Pit
- Test Pit

Map 5 Results of the Complex Assessment

0 50 100 150 200

Metres
Scale: 1:4,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

biosis

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Matter: 34179,
Date: 20 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_MS_ComplexAssessment
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

7.1.12 Conclusions from CHMP 15276

The Desktop Assessment has revealed five Aboriginal place located within 1 kilometre of the Project Area. Previous archaeological assessments undertaken within the Upper Yarra Valley have found that the rugged terrain and thickly wooded slopes are landforms that possibly would not have been utilised by Aboriginal people. Within forested areas, the potential for Aboriginal cultural heritage material will be located on generally flat ground such as that of ridge tops, between ridges, and on creek and river flats, most likely near to permanent water sources and other areas of flora and fauna.

Historic land use practices, such as mining and logging have had an effect on the surrounding landscape and would have truncated or destroyed any Aboriginal cultural heritage material if present. A previous CHMP (13373) undertook subsurface testing along Dammans Road within the current Activity Area, as well as adjacent streets. Prior to more modern development, the adjacent Marlino Avenue would have been located at the base of a valley and is dissected by a creek. Nearby Waterloo Road was located on an elevated gentle sloping plain located on the lower slope of Mount Donna Buang. No cultural heritage material was found within these areas; however, natural soils profiles were recorded beneath the road surfaces.

As previous regional and local archaeological assessments have shown, areas within the current Activity Area that consist of steeply sloping, heavily vegetated land, are of low potential to contain Aboriginal cultural heritage material.

The construction of the O'Shannassy Aqueduct, with open channels excavated to a depth of 1 metre would have truncated or destroyed any Aboriginal cultural heritage material. Areas of the current Activity Area within the alignment of the O'Shannassy Aqueduct will therefore have an extremely low potential to contain Aboriginal cultural heritage material.

The Standard Assessment (ground survey) was a combination of vehicular and pedestrian survey as well as auger testing. Ground surface visibility was generally quite poor with dense vegetation in much of the Project Area. The Standard Assessment did not identify any Aboriginal material culture. One area of archaeological potential was identified near the golf course as likely being undisturbed.

The Complex Assessment (archaeological excavations) targeted the area of potential near the golf course that was identified during the Standard Assessment. A total of nine trenches were excavated; eight 500x500 millimetre STPs and one 1x1 metre Test Pit. The Complex Assessment showed that the areas excavated displayed signs of erosion brought about by natural occurrences combined with historic gold mining practices. It is likely that if any Aboriginal material culture is present it has likely been washed down the slopes and is not present on the upper or mid-slopes. The excavations did not locate any Aboriginal material culture and the Complex Assessment determined that it is unlikely that Aboriginal material culture is present within the Project Area.

CHMP 15276 is ongoing and as the alignment of the trails has changed several times since the Standard and Complex Assessments. Consultation with the WWCHAC, the Registered Aboriginal Party for the Project Area will occur throughout the process to ensure that their views are taken into account and appropriate management conditions are put in place. The WWCHAC will also determine if further Complex Assessment is required.

7.1.13 Intangible heritage

Cultural significance is embodied in the place: in its tangible or physical form, in the wider cultural landscape that it is located in, in the ways in which the place is used or interacted with, and in the associations, stories, and meanings of the place to the people and community it holds significance for.

The concept of cultural significance is used in Australian heritage practice and legislation to encompass all of the cultural values and meanings that might be recognised in a place. Cultural significance is often defined as the sum of the qualities or values that a place has with particular reference to the five values – aesthetic, historic, scientific, social and spiritual – that are listed in the Burra Charter (Australia ICOMOS 2013).

The three key values in relation to Aboriginal cultural heritage assessments are the social, spiritual and historic. Social or cultural value refers to the associations that a place has for a particular community or cultural group and the resulting social or cultural meanings that it holds for them. It can encompass traditional, historical or contemporary associations. Spiritual value is often subsumed within the category of social or cultural value. It refers more specifically to the intangible values and meanings embodied or evoked by a place to a specific cultural group and that relate to that group's spiritual identity or traditional practices.

Intangible (non-material) Aboriginal cultural heritage as identified through consultation with Aboriginal stakeholders and historical research is recorded as part of the CHMP process. The input of Aboriginal stakeholders and knowledge holders has been limited to those who engaged through the consultation process.

As part of the recording of cultural values, a project establishment meeting was held on 17 March 2021 via teleconference. This meeting was held with the WWCHAC Elders, a WWCHAC heritage advisor, Yarra Range Council representatives and a Biosis Heritage Advisor. The meeting functioned as an introduction of the Wurundjeri Elders to construction project and provided the first opportunity to provide feedback of the cultural values for the Warburton area.

A site visit to the Project Area was carried out by WWCHAC Elders, a WWCHAC heritage advisor, Yarra Range Council representatives and a Biosis Heritage Advisor on the 30 April 2021. The utilisation of the landscape by Aboriginal people was heavily discussed with traditional plant knowledge provided by WWCHAC. As part of this visit, the Elders were asked to provide any oral traditions or stories that may have been passed down to them for the area and were documented by the Biosis Heritage Advisor.

Following the site visit to Warburton area, a workshop was held with WWCHAC Elders, a WWCHAC heritage advisor, Yarra Range Council representatives and a Biosis Heritage Advisor on 18 May 2021. The workshop comprised of additional discussions about the cultural values of the region and discussed ways for WWCHAC to be involved in the project once the mountain bike trail is operational.

Although no specific stories or oral traditions were known by the Elders for the specific Warburton area, utilisation of the abundant natural resources in the region and the significant vantage point such Mt Donna Buang now has intangible values to their decedents. Further to this, in recent times the dispossession of the land with the arrival of Europeans has formed a historical narrative for the region for the Wurundjeri Woi-wurrung people. A full report of this is currently in preparation and will detail the nature of the consultation and the intangible values documented that will aid the development in preserving the cultural values of region.

7.2 Historic heritage

The objective of the study is to assess the historic cultural heritage potential of the Project Area, record any historical sites that are present and to develop recommendations to ensure best cultural heritage practise is maintained.

When new development is proposed, it must be established whether there are any historical sites within the project area and how they might be impacted. Therefore, background research in to regional history and previously recorded historical sites can inform the likelihood of sites being in the project area.

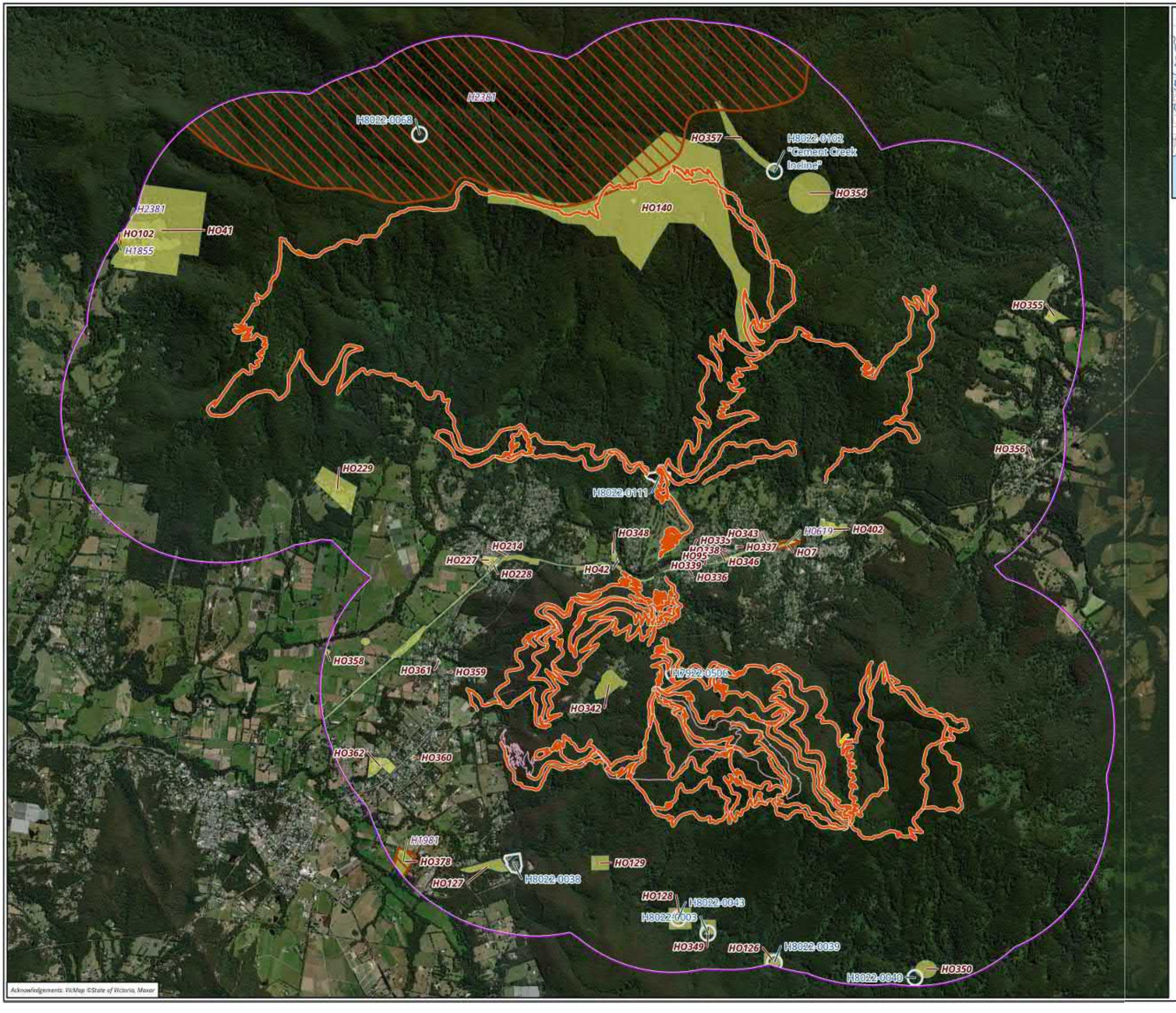
7.2.1 Search of the VicPlan database

On 6th July 2021 a search of the study area using the VicPlan database was conducted by Daniel Carpenter of Biosis Pty Ltd. This shows that a total of 36 Yarra Ranges Heritage Overlay Places, eight VHI places and four VHR places are present within the study area. The majority of these are not intersected by the project area and will not be impacted by the proposed development. The results of this search can be seen in Table 15 and Map 6.

Table 15 Results of Vicplan search on 6th July 2021

Yarra Ranges Heritage Overlay	
Place name	**HO Number**
Sanitarium Health Food Company & Signs	HO7
Harcourts'	HO42
'Coonara'	HO41
Gainsborough Store	HO95
Britannia Creek Weir and Falls	HO129
Myrtle Creek Bridge	HO102
Cuming-Smith & Co Wood Distillation Works	HO127
Britannia Creek Tramway Sawmill Site 2	HO126
Yellands Seasoning Kilns	HO128
Mount Donna Buang-Bridle Tracks & Road	HO140
Millgrove WW1 Avenue of Honour	HO228
Lilydale – Warburton Railway	HO214
Inverarity Mill	HO227
Cottage: Palloti College	HO229
Isaac's Cottage	HO355
The Buller Barn	HO359
Lace and Things Shop	HO346
Cement Creek Cottages	HO354
Cement Creek Tramway Incline	HO357
Warburton East Public Hall	HO356
Warburton Hotel	HO361
Maize Silos	HO358
Wesburn Cemetery	HO362
Camp Eureka	HO378
Brisbane Hill Rd Bridge	HO337
La La siding, Turntable and Crane	HO343
School Teachers House (Former)	HO335
The Alpine Retreat Hotel	HO336
Warburton Mechanics Institute	HO338

Warburton Swing Bridge, Tennis Courts, Club house and Rotunda	HO339
Yarra Yarra Hydraulic Gold Sluicing Company. Old Warburton Road	HO342
Warburton Hospital and Gardens	HO402
Thek's Guest House	HO360
Richard Stockdale House	HO348
Yelland No. 2 Timber Mill site	HO349
Maroondah Water Supply System (Upper and Central Sections)	HO429
Victorian Heritage Inventory (VHI)	
Place Name	**VHI Number**
Cement Creek Incline Warburton	H8022-0102
Yelland 2	H8022-0003
Brittannia Creek Tramway Wood Distillation Factory	H8022-0038
Britannia Creek Tramway Sawmill Site 2	H8022-0039
Yellands Seasoning Kilns	H8022-0043
Bjorksten Creek Tramline	H8022-0068
Lady Hopetoun Mine	H8022-0138
O'Shannassy Aquaduct Sawmill Site	H8022-0111
Victorian Heritage Register	
Place Name	**VHR Number**
Sanitarium Health Food Company & Co.	H0619
Maroondah Water Supply System (Upper & Central)	H2381
Bridge Over Myrtle Creek	H1855
Camp Eureka	H1981



Legend

- Proposed MTB trail
- Proposed Walking Trail
- Study area
- Victorian Heritage Inventory
- Victorian Heritage Register
- Heritage Overlay

Map 6 The study area with all HO, VHI and VHR places shown

0 0.5 1 1.5 2

Kilometres

Scale: 1:47,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 21 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M6_Heritage
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

7.2.2 Land Use History

7.2.2.1 Exploration and European settlement

European surveyors and explorers were drawn to the Yarra River, as the most substantial waterway in the Port Phillip District, commencing with Charles Grimes in 1803 who followed it only as far as a rock ledge forming falls near Queen Street. Knowledge of the mountain forests in the Upper Yarra came only after settlers travelled up the River to the Warrandyte area by 1837, McMahon Creek in 1839 and the headlands in 1844 and 1845. A survey of the area undertaken by McComb in 1838 noted that no Aboriginal people were seen during the Yarra River survey; however scarred trees were observed indicating that they had been present.

The Ryrie brothers arrived in the Upper Yarra Valley in the 1830s, driving their cattle from the Monaro plateau in New South Wales. In 1837, William Ryrie established the 43,000 acre Yering Station that extended from Acheron, north of the Divide, to Lilydale. His brother, Donald ran a 16,000 acre out-station from Healesville along the Yarra Valley to Launching Place and Warburton, including the surrounding ranges (O.C.R 1953).

In 1845 Robert Hoddle conducted a survey of the Loddon that included a search for the source of the Yarra River and mapped the region. Hoddle's Creek is named after him. The first freehold land was not taken up in the Warburton area until 1871, as the major rush moved towards Woods Point and beyond, and the workings along Yankee Jims Creek became more permanent.

7.2.2.2 Gold

Gold mining commenced in the Upper Yarra in 1859 following an earlier discovery in Emerald. The gold rush began at Britannia Creek at the junction with the Little Yarra River that soon established the township of Britannia near the present village of Wesburn, (formerly known as West Warburton). A small township provided miners with relief from carrying provisions on their back. Several stores and a warden's office existed at the junction of Britannia Creek and the Little Yarra River.

Yankee Jim's Creek goldfield opened in 1859, with the area renamed Warburton in 1863 after the Gold Warden for the district, Charles Warburton Carr. In 1860, the mining population consisted of around 500 miners who rushed to Big Pat's Creek upon the discovery of gold. Yankee Jims Gold field, was established in around the same time. It was named after a colourful American James McAvoy (1831-1884) who made a fortune from mining in the area.

The mining was mainly for alluvial gold in the deep deposits along the Yarra and its tributaries and creeks (as opposed to reef). The deposits were reported to be "of the most substantial character", with the wash being two feet (600 millimetres) thick at a depth of 70 feet (21 metres) resting on a granite bottom with nuggets of up to 7 ounces (200 grams) in weight (Parkinson 2017). The first quartz prospecting claim was registered in 1863 at Yankee Jim's Creek (The Warburton District Progress Association 2017). In order to supply water to the gold fields for sluicing, an open channel was cut from Starling's Creek to the diggings at Old Warburton with extra water being diverted from Four Mile Creek. In 1864 a major diversion scheme was established that exposed the creek bed of the Yarra River by tunnel through what is known as the Great Peninsula (Department of Natural Resources & Environment 1999).

In 1870 a waterwheel was built at Warburton to drive a battery to crush gold bearing rock (Plate 1, Plate 2). This was located at the Shining Star mine near Mount Little Joe, one of the few reef mines (Parkinson 2017). Walter Fisher a master carpenter from Walhalla, was commissioned to build a large over-shot wheel to drive a crushing battery. A water race was constructed around the hillside to deliver water from the upper section of Big Pat's creek to supplement the water from Yankee Jim's creek. On completion of the project the wheel was "christened" with a bottle of whisky and set in operation (Geof 2019); ('The Water Wheel Gold Crusher Mill at Old Warburton', 1904).

Miners then turned to hydraulic sluicing to extract remaining alluvial gold in deep deposits and surface soils, creating huge man-made gorges, some of which are 30 metres deep adjacent to Yankee Jim's Creek (L.G. 1937). In 1873 a hydraulic sluicing operation was commenced by the Warburton Hydraulic gold Mining company whose race carried water for approximately seven miles to elevations of around 320 feet above the claim. In 1876 this company erected a 1,000 feet, 50 foot high flume across Warburton saddle.

Plate 1 Watermill and house at Old Warburton, 1904

Plate 2 Shining Star mine water wheel

The Yarra Yarra Hydraulic Gold Sluicing Company re-worked areas of Yankee Jim's Creek in the 1870s and 1880s. They constructed five miles (8 kilometres) of water races extended from Big Pat's Creek and delivered 2,300 litres of water per minute. The company was sluicing through 30 feet of old alluvial workings, timbered shafts and drives to access the creek bed. A water wheel was also constructed on along Yankee Jim's Creek to drive the company's battery. Gideon Scott Lang, was holder of the mining lease in 1873. He was a pastoralist and author and "an adventurous and enterprising pioneer", who was involved in the mining venture at Old Warburton. The company was suspended in 1884, three years after its founder's death (Context Pty Ltd 2000).

Hydraulic sluicing was also taking place at Starvation and Hoddles Creeks at this time (Plate 4). By the early 1880s most of the sluicing companies had exhausted their land. The last two surviving companies were Britannia Hydraulic Sluicing and Warburton Hydraulic Sluicing. In order to access deposits, these companies cut deep drainage culverts, known as tail-races, through solid granite boulders. Operations at both of these companies ceased in 1884. Plate 3 shows the landholdings around Old Warburton, including the line of the water race.

Only minor hydraulic works were mentioned within the historic record from 1884 to the early 20th century, when brief hydraulic operations were carried out at McMahon's and Hoddles Creeks in 1906-1907 (Department of Natural Resources & Environment 1999).

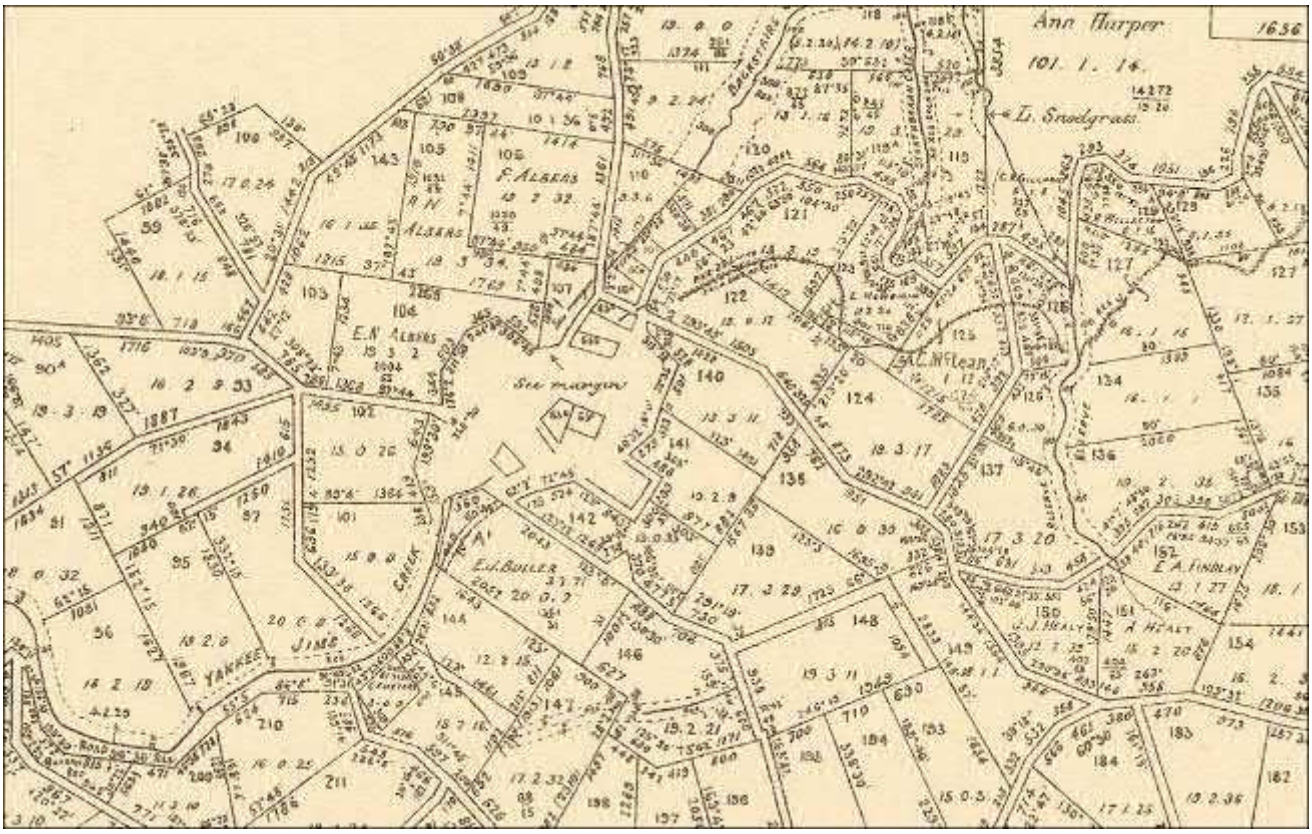


Plate 3 Warburton County of Evelyn,(Department of Lands and Survey, Melbourne 1949)

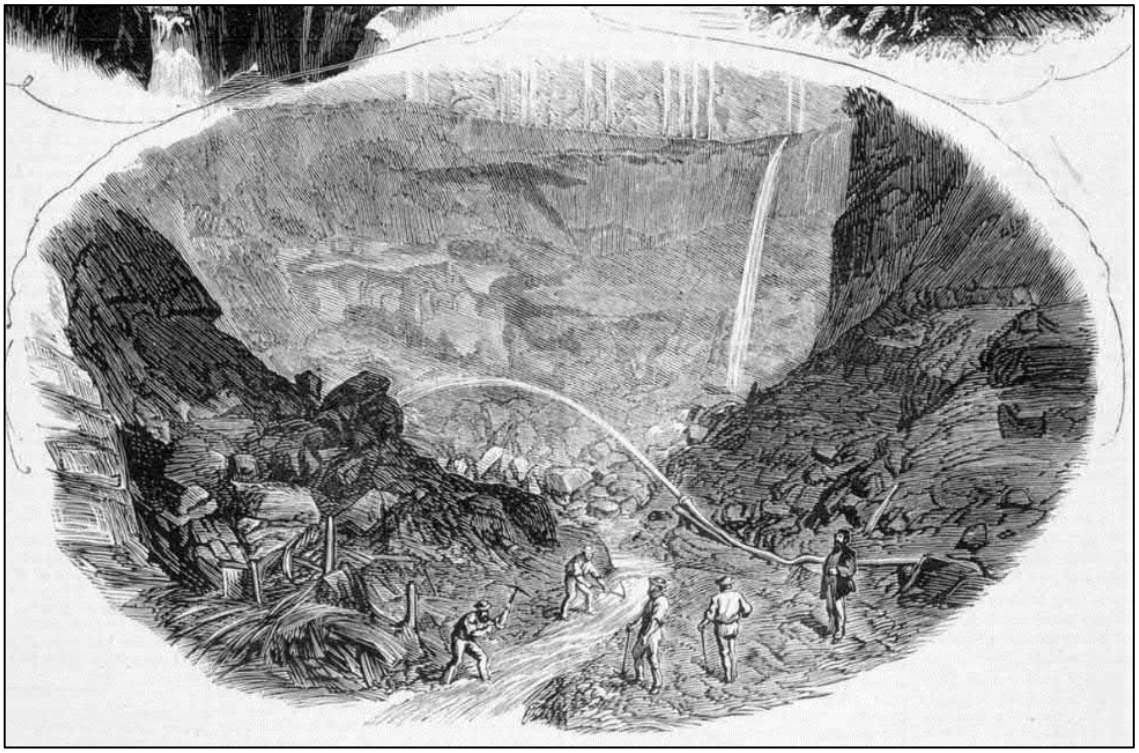


Plate 4 Hydraulic sluicing for alluvial gold at Warburton (Calvert 1875)

Quartz reefing began around Britannia Creek in 1860. During this time, miners opened up reefs across the Upper Yarra Goldfields. Quartz mining within the area was always a small-scaled operation. The largest of

these was the Golden Bower and Star Quartz at Donovan's Creek. In 1874 a small rush at the junction of McMahon's Creek and the Yarra led to the establishment of Reefton. New reefs were discovered at Hoddles Creek in 1878, where the Pigtail Company established a battery, pump and winding gear. Also at this time, the Muddy Creek Company cut a six mile water race to supply its battery at McMahon's Creek. By the early 20th century, small scale mining operations consisted of the Evans Reward Mine and Lady Hopetoun in Warburton, Hoddles Creek Mine at Hoddles Creek and Mountain Queen at McMahon's Creek. Most of these operations were no longer in existence by 1910 (Department of Natural Resources & Environment 1999).

During the 1870s and 1880s deep lead mining was carried out at Yankee Jim's and Hoddles Creeks. The Melbourne Quartz and Alluvial GMC, the London Company and the City of Melbourne Company worked Hoddles Creek. The Melbourne Quartz and Alluvial GMC drained their working using horse and whim. None of these operations were successful. With the gold in Old Warburton exhausted, miners moved on to Woods Point where larger reefs were being worked. By the 1890s most of the 'easy' gold had been found and many of the miners left the area (Parkinson 2017).

7.2.2.3 Roads and Townships

Routes to the goldfields were created along the steep ridges into the dark gullies throughout the district. Bullock drays and pack horses would transport materials into the diggings. One such route became known as *Back Stairs Creek* (possibly located within the present project area) from the staircase looking effect that the horses had worn into the steep sides of the creek. Another track was opened up between Reefton along the Great Dividing Range from Marysville to other gold mining towns in Matlock and Wood's Point. These tracks and routes helped in opening up the Upper Yarra for settlement (The Warburton District Progress Association 2017).

Plate 5 Old Warburton - selections on Upper Yarra (Folwarczny 1884)

The settlement at Yankee Jims may have first been known as Warburton, but it became Old Warburton when the main town shifted to the new road alignment to an area previously known as Scotchman's Creek (Plate 5). A cemetery was reserved at Old Warburton (Plate 8), located on the south side of Old Warburton Road. It is understood that a number of burials were interred here before the settlement diminished and the cemetery

was no longer visited or maintained. The reserve subsequently regrew with thick native forest indistinguishable from the forest reserves in the vicinity.

A liquor licence was issued to Edward Buller in 1864 and his hotel helped to serve the needs of the mining community. There is purported to have been a Police Barracks Site, School, a Post Office Site, Guest House, several private homes and a number of mines including the Yarra Yarra Gold Sluicing Company Works and Water Race, the Shining Star Mine Site, the Lady Hopetoun Mine Site (*Old Warburton Township Site*, 2019). However, by 1869, few miners remained at Yankee Jim's with only a small settlement of about 12 buildings and a few huts left until 1926 when most of the remaining buildings were destroyed by bushfires.

The Lady Hopetoun Mine (Plate 6) was established in about 1889, when W Wye found gold at the head of Scotchman's Creek and formed a small company called the Lady Hopetoun gold Mining Company which was managed by Mr W Murphy. They initially drove a tunnel into the hill side and flowed this with another 75 feet lower down, and erected a 10 head battery, which was run by water from the 'old water race' which they cleaned out ('GOLD-MINING AT WARBURTON', 1891). The mine had to cut through granite boulders to reach the dyke 5 feet wide, while the cost of the race was put at £10,000. However, in October 1890 the shareholders met to consider winding the company up (Anon. 1890).

Plate 6 Lady Hopetoun Mine (Station Mural from photograph)

A Mr Wildman guided the Upper Yarra tourist club to the site in 1891 ('WARBURTON', 1891) and the area remained a local scenic spot for some time, as indicated by postcards of the nearby Lady Hopetoun Fern Gully (Plate 7).

J. Houston was managing in July 1891. In 1892 a third tunnel was being driven and the tramway was being repaired due to having been damaged by floods. In 1892, the company appears to have foundered with the Sherriff's Office taking court action (Anon. 1892), and by 1905 the mine appears to have been idle. The mine was described as 'long abandoned' when it was still being visited in the late 1930s (L.G 1937).

Plate 7 Lady Hopetoun Fern Gully c.1907 (State Library Victoria H96.200/2004)

Warburton went through a period where guest houses, close to the railway line, provided accommodation for city holiday makers until the railway line closed in 1965. Today the area is served with hotels, motels, conference centres and bed and breakfast accommodation. Warburton, nestled between mountains, has become a new centre of tourism.

Roads were constructed into the mountains, initially to access gold mining areas, then for timber extraction and finally for tourism. The Country Roads Board built a hut on the Ben Cairn road, while the Melbourne Walking Club, University Ski Club and Ski Club of Victoria (formed 1924) also built huts near Mt Donna Buang. A number of steep tracks were constructed up the mountain side, evidently replacing the previous timber incline tramways, and as motoring gained popularity the Donna Buang Road was progressively upgraded. The locations of former tracks, roads and huts are shown on Plate 9.

Plate 8 **Warburton Parish Plan showing Old Warburton Cemetery and landholdings**

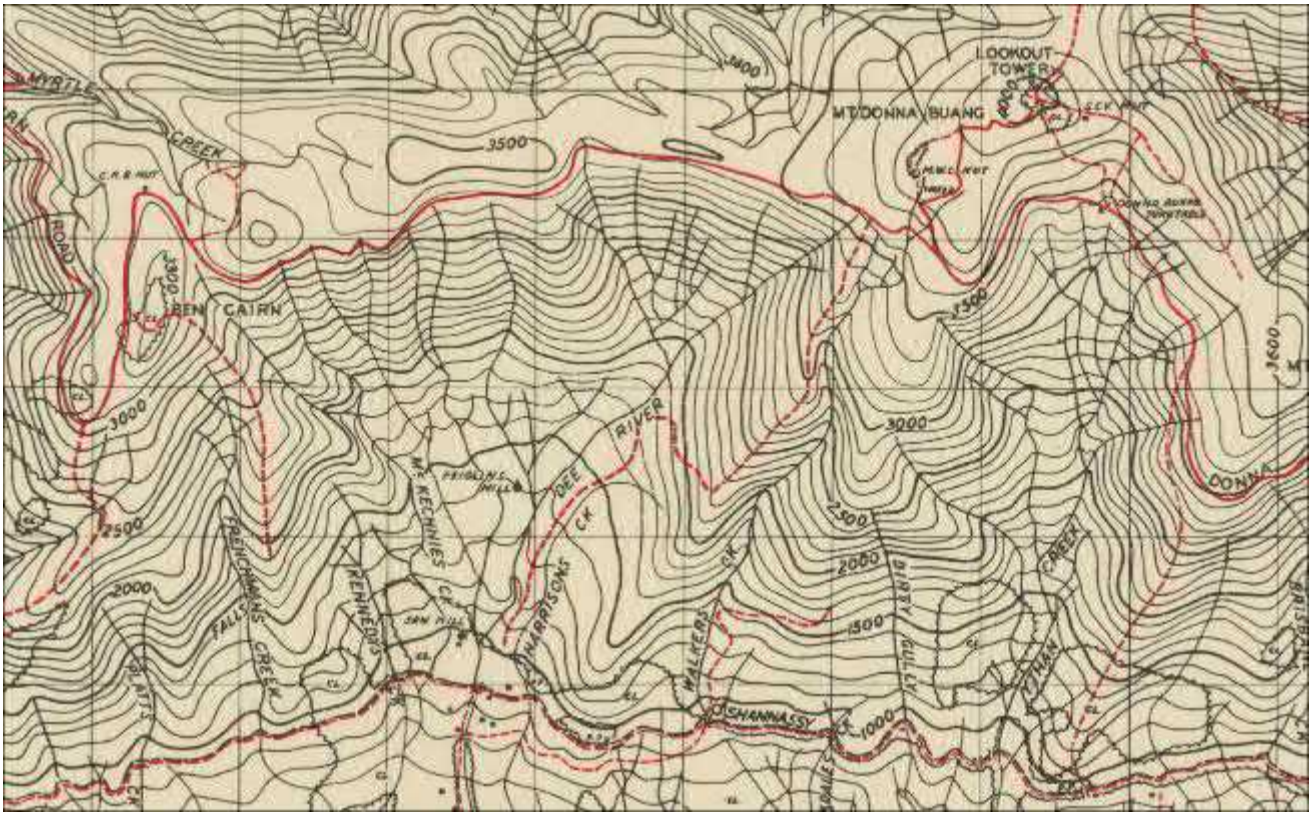


Plate 9 **Mt Donna Buang Area, Parishes of Yuonga and Glenwatts (Department of Crown Lands and Survey 1957)**

7.2.2.4 Timber

The gold mining boom in the region, increased the need for timber that was the impetus for the logging industries in the Yarra Ranges. The goldfields in Bendigo and Ballarat stripped the landscape of the local timber supplies that led to opening up large tracts of land in the Yarra Ranges and the establishment of the West Gippsland sawmills as well as the railway line from Melbourne to Warburton. Wagon loads of timber were taken over bush tracks to Lilydale where the railway line started.

In 1901 the railway line was extended to Warburton that helped strengthen the growing timber industry. Sawmills and timber tramways were constructed throughout the area that fed to the train line that supplied timber to Melbourne. These narrow gauge lines (Plate 10, Plate 13) were called tramways due to an Act of Parliament preventing anyone other than the government from operating train lines (Parkinson 2017). The main tramways were located from Mount Bridge, in Yankee Jim's Creek Gully, and along Britannia Creek that carried timber to Wesburn. The rail line to Warburton ceased operations in 1965 and is now the Warburton Rail Trail.

Plate 10 Timber tramway along Yankee Jim Creek (Padula, 2018)

Several timber mills were located in the Wesburn Area, to the west of Warburton as well as on the slopes of Mount Little Joe, Bride, Myrtalia and Tugwell as well as within Britannia Creek and Yankee Jim's Creek Gully within Old Warburton. The primary timber mills were the Cameron and Co Warburton Sawmill that operated from 1889-1900 on Old Warburton Road near Yankee Jim's Creek. This was later owned by Laudehr, Gillis and Ewart from 1924-1929. The main tramways were from Mt Bride, in Yankee Jim's Creek Gully, and along the Britannia Creek Rd, carrying timber to the railhead at Wesburn. Laudehr's Pioneer Sawmills was in operation

between 1900 and 1910 and was located on Cemetery Creek that flows through the present project area. Henry Hermon erected two or three separate mills on Four Mile Creek near La La Falls and near the summit of Mount Bride and R. Platt and Co had a mill on Mount Bride Road (Padula 2018a).

The timber industry started in Warburton as gold ran out. Axemen cut wagon loads of palings which were taken over rough bush tracks to Lilydale, which was the railhead at the time.

Steam and diesel engines were used to power the sawmills and haul the logs. In some cases the logs were lifted by cable and pulley high above the ground to transport them to the tramways, where narrow gauge engines hauled them to mills and railheads. In more remote areas, horses were used to pull empty bogies up graded tines. When loaded, the logs would run downhill under the control of braking systems. The mills provided work for all who wanted it and towns (such as Powelltown) sprang up around the mills. Some of the timber tramways still remain open to walkers but chainsaws, bulldozers and timber jinkers replace the old method of getting timber.

Some of the main mills included Cameron and Co. "Warburton Sawmills", which was situated on Yankee Jim's Creek, on Old Warburton Rd (1889-1900) and later owned by Laudehr and Gillis and Ewart (1924-1929). Laudehr's Pioneer Sawmills, were constructed near Old Warburton in 1900, and then moved south to the slopes of Mt Tugwell in 1910. Parbury rebuilt the "Brookfield" mill on the site now in the Golf Course, in 1905, possibly reusing Anderson's 1901 mill. Slocum and Walker operated a number of mills, including one at the head of the Dee River 1907-12, and another near the aqueduct at the end of McKenzie King Driver, which had been commenced by Henry in 1906. Feiglins Mill was located near the Dee River on the slopes of Ben Cairn (McCarthy 2001).

Plate 11 Cable hauled incline tramway Warburton 1907 (Padula 2018a)

Plate 12 Ben Cairn incline crossing Mt Baw Baw road (Padula 2018a)

Plate 13 Timbert tramway crossing over O'Shannassy Aqueduct (Padula 2018a)

Plate 14 Anderson's Mill bush tram, 1906 (Padula 2018a)

Located within the present day Warburton was the Anderson Sawmill, which was in operation from 1901 to 1905 and then taken over by a Mr Parbury in 1905, and became the Brookfield Sawmill (Plate 15). Timber from the mill were transported by tramway (Plate 14) over the Yarra in order to meet the railway. The mill was built on the north side of the Yarra River, situated near the bottom of the present day Warburton Golf Course. Logs were delivered to the mill from the near the summit of Mount Donna Buang, crossing a concrete bridge spanning the O'Shannassy Aqueduct (discussed below). The tramway was dismantled in 1929, following the closure of the mill in 1928 and severe damage caused by a storm in 1927. However, the tramway may have been reconstructed for Horner's Mill at the top of the line in the 1930s (Padula 2018a). Anderson's Avenue, which runs off Yuonga Road recalls the mill's owner.

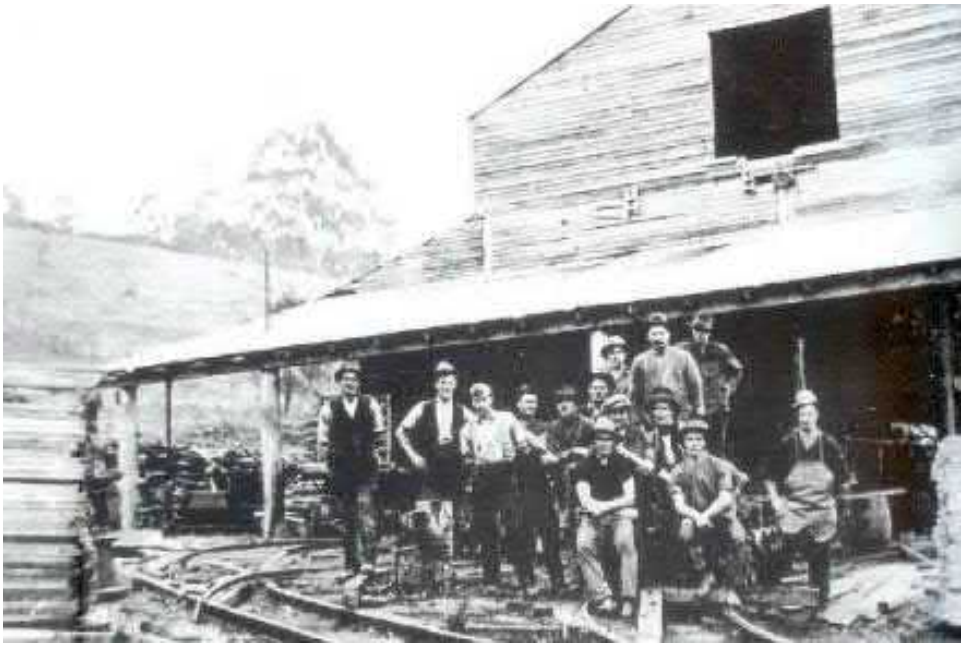


Plate 15 Parbury's Brookfield Mill, 1922 (Padula 2018a)

Slocumb and Walker ran several sawmills which cross the project area. The first was in operation from 1907 to 1912, north of the Yarra River. A smaller mill was located on Scotchman's Creek, only in operation from 1919 to 1920 (Padula 2018b).

The Enterprise Mill was one of the largest sawmills constructed in the Warburton area, situated on the slopes of Mount Victoria, above the Warburton township. It commenced business as the Enterprise Sawmilling Company in 1922. Ownership changed to Cuning, Smith and Company in 1925, and continued business until 1932. Logs were transported to the mill along a tramway down from Cement Creek. Once sawn the timber continued along the tramway, which crosses twice through the current project area, until reaching the La La siding (Padula 2018c).

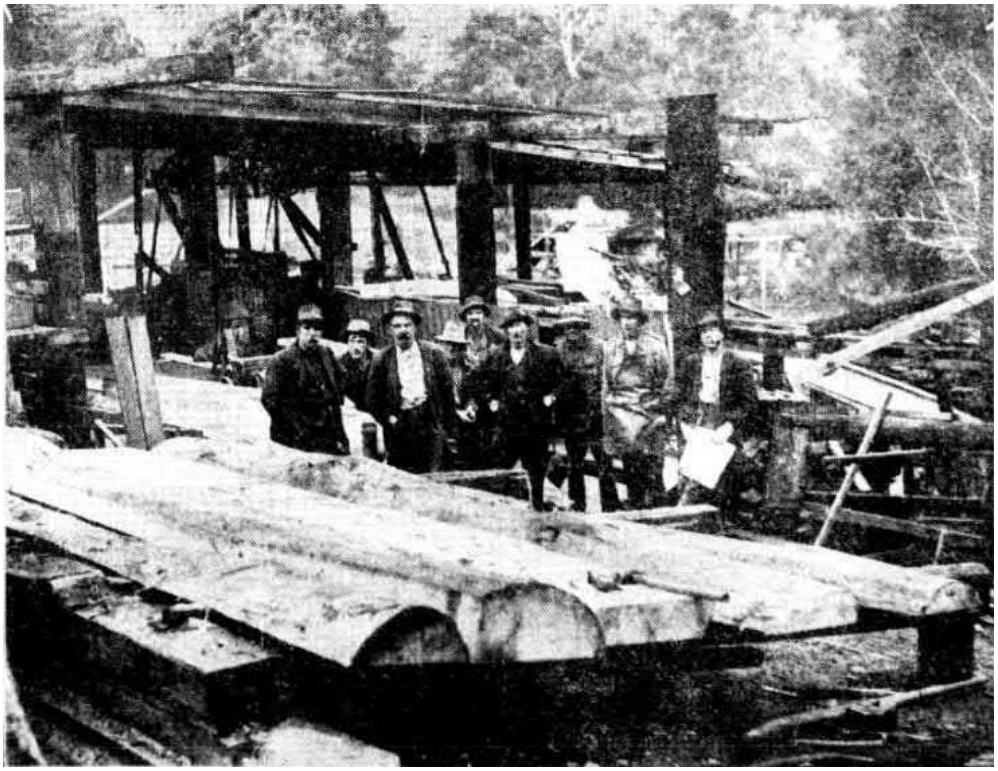


Plate 16 Parbury's Mill following damage by a cyclone ('TORNADO DAMAGES SAWMILL AT WARBURTON', 1927)

7.2.2.5 Water supply

By the early 20th century there was an increased demand for water to be supplied to the growing City of Melbourne. The O'Shannassy Aqueduct was designed in 1911 and constructed by 1914. The first step for the construction of the aqueduct was the clearing of forest trees. The channel for the aqueduct was largely dug by hand, with the aid of horse drawn scoops. The open channel was 2.81 metres wide at the top and 1.026 metres deep and was founded on the underlying solid clay base. An access track running parallel to the open channel was constructed using the excavated material that was then fitted with rails that enabled the workers access to the site as well as the delivery of construction materials by horse drawn carriages (*The Aqueduct*, 2017).

The aqueduct was to carry water from the O'Shannassy Reservoir in the Yarra Ranges to the Silvan Dam holding Reservoir in Silvan (Plate 16). The aqueduct consisted of 37 kilometres of open or covered concrete channels with three tunnels and 40 kilometres of steel pipes and delivered 20 million gallons of water daily (Rithie 1934) (Plate 17). Many of the logging trails and tramways intersected the aqueduct where concrete

bridges with rails were constructed for access to the logging trains and farming properties. The aqueduct was decommissioned in 1997 and is now a walking/cycling trail (Padula 2017).

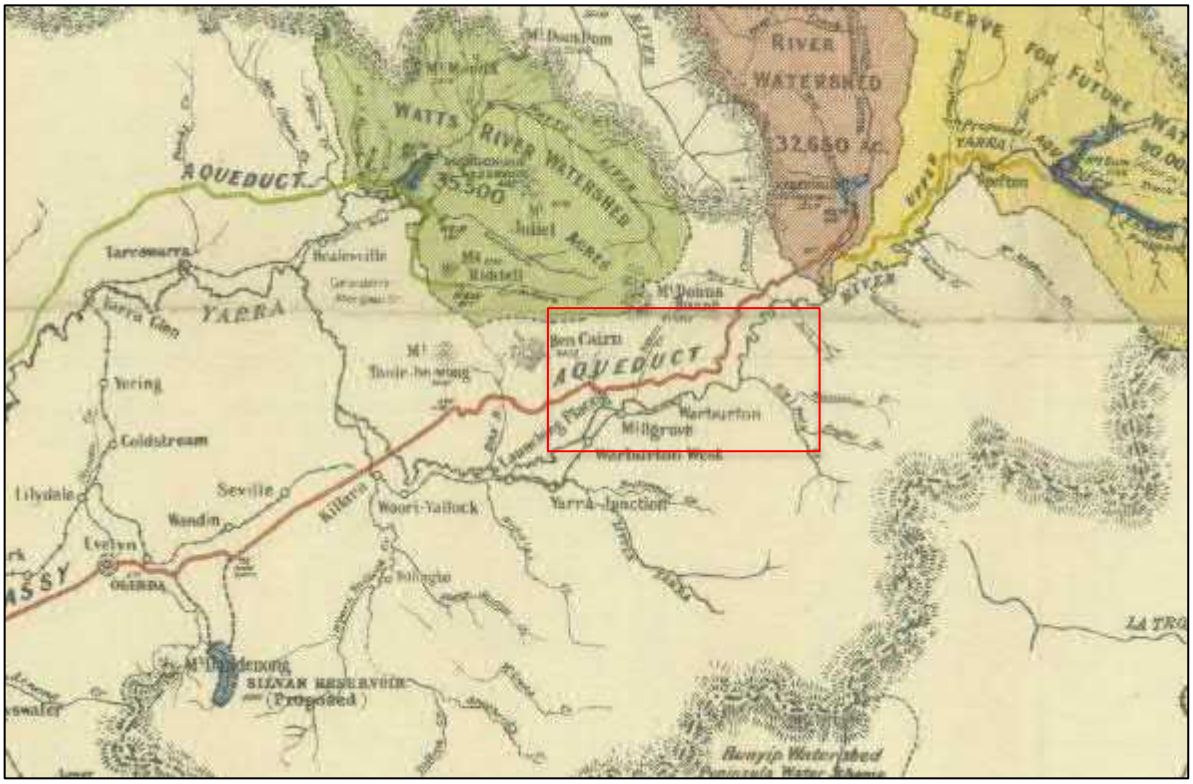


Plate 17 **1922 mapping showing an excerpt fo the O'Shannassy Aqueduct route (Melbourne and Metropolitan Board of Works, Water Supply Division 2017). Approximate location of Project Area in red.**

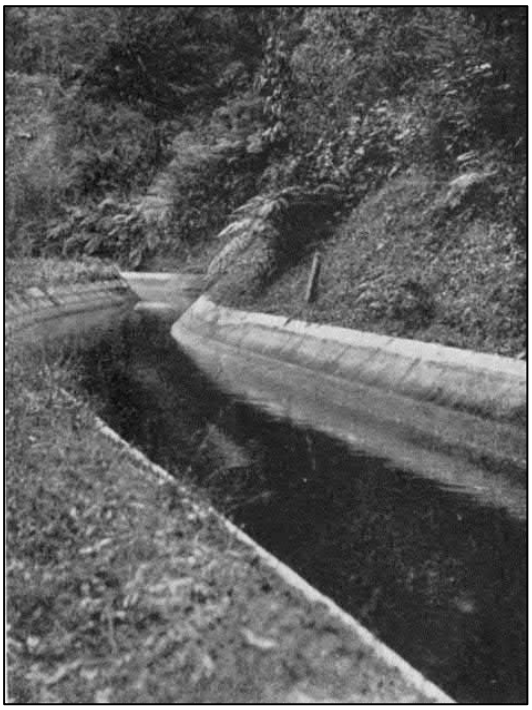


Plate 18 **The O'Shannassy Aqueduct in Warburton (accession no. H96. 136/17) ('Photographic Souvenir of WARBURTON', 1930)**

7.2.2.6 Bushfires

Documented bushfires have occurred in Warburton throughout the 20th century. In late January of 1926 fires began on Mount Donna Buang that burnt slowly in the hills. In February the small individual fires had come together as well as winds of up to 97 kilometres per hour spread the fires through the Dandenong Ranges and much of Gippsland to Mallacoota. The fires devastated an area of 390,000 hectares with Warburton and Powellton being two of the worst affected places (NFSA 2017). In 1939, what became known as the Black Friday bushfires, is one of the worst on record. Strong winds and drought conditions swept the fires across large parts of Victoria. An area of almost 2 million hectares was burned across the state and townships destroyed, including parts of Warburton. A total of 71 lives, 69 sawmills and over 1,000 homes were lost as well as 575,000 hectares of reserved forest and 780,000 hectares of forested Crown land (Forest Fire Management Victoria 2017). In 1983, the Ash Wednesday bushfires also devastated Warburton. Over 100 fires started on this day that destroyed over 40,000 hectares in Warburton alone (Forest Fire Management Victoria 2017). These fires have had a devastating effect on the preservation of built heritage across the project area.

7.2.2.7 Recreation

During the late 1920s and 1930s, Mount Donna Buang was a popular ski resort that contained a ski lodge, cafes, a ski hire, and 6 runs that cut through the forest. Skiing first took place on Mount Donna Buang in 1924 by the president of the Warburton Progress Association who invited some skiers to inspect the mountain. The ski party thought that the mountain had potential and it was agreed that a ski run would be cleared. In 1925 a ski party went up the mountain to determine the best route up the mountain as well as the best areas to ski and how to carry the equipment on a pack horse. It was reported that the walking track was too steep and the newly built ski slope was too narrow to be considered safe. By 1927, conditions for skiing had improved however, the road to get there was either a 12 mile long well graded road or a four mile long very steep bridle track (Sisson 2015).

The first ski run was constructed in the summer of 1924-1925. The run was a 130 metre long and 2.5 metres wide that was widened to 40 metres in 1929. This initial run was renamed the Main Run as more runs were cut through the forest. In 1932-1933 another ski run, 20 metres wide and 41 metres long was created to the south of the Main Run. By 1934 there were two properly built runs on the mountain, one that was 130 metres long with a 21 degree slope and the other shorter but steeper. An increasing number of tourists to the area was the impetus needed to construct further runs and to widen and extend the existing runs. The ski runs were created by clearing any vegetation in the area. Explosives were often used in order to clear the runs of rocks and tree stumps (ibid).

In 1937 there were six ski runs down the mountain. Unfortunately, these names and locations have been lost. However, Sisson (2015) used 1944 aerial photographs and pedestrian survey undertaken in 2011-2014 to determine the likely locations of each ski runs as follows:

- The Main Run was located behind the present day toilet block with a staircase placed down the middle.
- A slope to the north of the Main Run.
- A slope to the south of the Main Run.
- A slope heading north from the summit tower that later became a firebreak. The walking track to Boobyalla Saddle follows this course.
- The present day walking track that descends from the summit towards 10 Mile.

- The fire break to the southwest that ran roughly parallel to the top 800 metres of the summit road.

The 1939 bushfires and the start of the Second World War brought skiing on Mount Donna Buang to a decline (ibid). Modern Improvements from the 1960s on saw the road to the summit sealed and improved. Part of the Old Donna Buang Road in the final section was completely realigned, with some sections of the old route forming car parks.

7.2.3 Previous assessments

7.2.3.1 Archaeological and heritage studies

Few archaeological or heritage assessments have been undertaken within the forested areas around Warburton. An archaeological survey was undertaken in 1988 by Hillary du Cros (1988). This was focussed on Aboriginal heritage, but also discussed historical heritage in the area.

While there have been a number of published histories of Warburton and surrounds, there has been little investigation of potential archaeological values in the forested areas. An exception is the work of the Light Railways Research Society, which has published extensively on timber tramways and sawmills in the region. Among their studies of relevance to the present investigations are listed Table 16.

Table 16 Previous research conducted

Author	Title	Light Railways edition
K. McCarthy	Federal Timber Company – Warburton, Victoria	63, January 1979
K. Train	Federal Timber Company – Warburton Victoria	64, April 1979
Chas Bevan	W. Richards & Sons' Tramway, Warburton	85, July 1984
WRR Johnson & John Buckland	From Warburton to Powelltown. A Tramp Along Timber Tramways	137, July 1997
Mike McCarthy	Warburton Logging Tramways	146, April 1999
Colin Harvey	Starvation Creek Tramway, East Warburton (LR 85)	230, April 2013
AP Winzenreid	Brittania Creek: Wood Distilling in the Warburton District	95, January 1987
Mike McCarthy	Mountains of Ash. A History of the Sawmills and Tramways of Warburton & District	163, February 2002
Wayne Chynoweth	Frame found at Warburton	26, Summer 1969

The stage 1 of the Yarra Ranges Heritage study was conducted in 1999 to identify places of potential heritage value and develop a background thematic history for the municipality. However this study does not appear to have involved extensive field survey to the level likely to identify and document heritage places in the project area (Context Pty Ltd 2000).

7.2.4 Site prediction

Based on the assessment of historical and heritage studies and an understanding of past land uses in the Project Area, it is considered there is a high potential for historic archaeological sites and other heritage places to be present in the Project Area.

The dense vegetation and steepness of the terrain precluded a systematic survey of the entire project area, but the availability of mapping data for historic sawmill, tramway mining and other historic sites allows an approximate location to be determined for many of these places.

7.2.5 Fieldwork

7.2.5.1 Survey coverage

A number of factors hinder the identification of cultural heritage material. Ground surface visibility can be defined as how much of the ground surface is visible and what other factors (such as vegetation, gravels or leaf litter) may limit the detection of cultural heritage material (Burke & Smith 2004). The higher the level of ground surface visibility, the more easily cultural heritage material can be identified (Ellender & Weaver 1994).

Overall, ground surface visibility was only about 5%. Much of the area of investigations, not only had zero visibility, but regrowth eucalypt forest, tree ferns, bracken and dense weed cover such as blackberry obscured the landform as well.

Additional assessment was made by matching proposed routes with the existing informal trail alignment as shown in the online trail mapping and confirmed on ground. This provided potential hot spots where existing trails provided surface visibility and potential impacts could be assessed. Existing cycle routes tend to use four wheel drive track and roads. The O'Shannassy Aqueduct is used by walkers and cyclists, while steep tracks running down the mountain are generally used by walkers only.

The informal cycle tracks currently in use, tend to be in the southern part of the project area around Mt Little Joe and Mt Torbreck. The former timber tramways do not appear to be utilised for the current informal trails, and are not intended to be used for the new construction.

7.2.5.2 Results

An initial survey was completed by Gary Vines (Heritage Advisor, Biosis Pty Ltd) with assistance from Zac Carter (Biosis Pty Ltd) on the 15 and 16 January 2019. Subsequent surveys were completed by Gary Vines on 10th February 2021, 23rd April 2021 and 30th of April 2021.

While much of the project area was heavily vegetated and so survey results must be qualified, several specific historic features, some of which correspond to known historic places and activities, were identified. These are mapped in Map 7 and discussed below.

7.2.5.2.1 Yarra Yarra Hydraulic Sluicing works

The Yarra Yarra Hydraulic Sluicing Company undertook works in previously mined areas along creeks in the Old Warburton area. One area is included in the Yarra Ranges Heritage Overlay (HO342) which is located near the junction of Old Warburton Road and Mt Bride Road. However further evidence of gold working by sluicing methods can be seen along several of the tributary creeks both upstream and downstream of the Heritage Overlay area (Plate 18). One such location is just off the south side of the Old Warburton Road immediately east of the Cemetery reserve (see Plate 19).

A VHI site record was submitted to Heritage Victoria to cover the surveyed extent of the Yankee Jim Hydraulic Sluicing works, but HV determined that this did not meet the threshold required for the VHI.. This extended across the existing HO342, and also upstream and along the adjacent Mann Creek and Cemetery Creek branches to the south.

Plate 19 Sluiced bank on tributary to Yankee Jim Creek (G.Vines 15/01/2019)

7.2.5.2.2 Yankee Jim Mine and Water Race

The Yankee Jim Mine may refer to the alluvial workings along the creek or possibly the water powered crushing works located on the creek.

The creek bank in the Old Warburton area is heavily eroded, and deeply incised. Vegetation on the banks is very dense. No clear evidence of the mine or crushing plant was noted during the survey, although uneven ground with pits and mounds could be seen in most of the alluvial areas.

A geocaching site was established in the area, with concrete foundations noted, which were described as remnants of the Shining star mine. However, it is unclear if this actually depicts structures on Yankee Jim Creek.

The water race that fed the sluicing works and water-powered crushing plant at Yankee Jim Creek can be traced along the northern slopes of the ranges running between Mt Bride Road and Old Warburton Road, and extending as far as Big Pats Creek to the south-east (Plate 20, Plate 21). The race is formed by an earth cut channel about 500mm wide and 500mm deep with an equivalent bank. It is intersected by various tracks running down off the range including the walking track to La La Falls (Plate 22).

A site card was submitted to Heritage Victoria for inclusion on the Victorian Heritage Inventory, however, this did not meet the threshold to be added.

Plate 20 Looking east along water race near Yankee Jim's Creek sluicing area (G.Vines 15/01/2019)

Plate 21 Possible mining remains near Old Warburton (Geof 2019)

Plate 22 La La Falls track crossing remains of Yankee Jim water race. (G.Vines 30/4/2021)

7.2.5.2.3 Old Warburton Cemetery

The site of the Old Warburton cemetery lies between the Yankee Jim Creek and Mineshaft Hill Track. The site is mostly steeply sloping, with only small areas with less than 15 degrees slope and is densely vegetated with regrowth native Eucalypt forest and understorey plants, so it is difficult to identify any areas that may have burials. It is understood that there were several internments in the cemetery before it was closed and abandoned.

One unusual feature was a large single tree fern growing on an exposed north-west facing ridge some distance from any gulley (Plate 23). While isolated tree ferns can be found throughout the forest, they generally occur in the wetter gullies and more sheltered sites. They do, however, tend to colonised artificial depressions such as drains and other excavations, so it is possible this fern has grown on one of the grave sites. Proposed mountain bike trails have been routed to avoid the area identified as the cemetery on cadastral maps.

Plate 23 Single isolated tree fern on exposed ridge in the cemetery reserve (G.Vines 15/01/2019)

7.2.5.2.4 Mt Donna Buang sites.

Several hut sites are known from historic maps along the Mt Donna Buang road and near the summit. These include the Melbourne Walking Club, hut, Ski Club of Victoria, University Ski Club and Country Roads Board hut. The former Donna Buang Road to the summit followed a different alignment. The general location of these was inspected during the survey, however dense vegetation precluded identification of any historic features.

Probably locations of the hut sites are shown in Plate 9. Note that the proposed mountain bike trails do not impact on these sites.

7.2.5.2.5 O'Shannassy aqueduct

The O'Shannassy aqueduct is highly intact and visible, having been decommissioned in the late 1990s, and originally constructed to a high standard. The concrete lined channel has level areas on either side along with a maintenance track (Plate 24). At regular intervals, concrete and steel cross drains take surface runoff into the channel to capture rainwater from the slopes of Mt Donna Buang, without causing erosion of washing soil into the channel. Other cut off drains direct surface water away from the channel to avoid contaminating it, and siphons are constructed under the aqueduct to allow streams to pass.

The Victorian Heritage Inventory site H8022-0111 O'Shannassy aqueduct sawmill and tramway site, identifies one section of the channel and associated structures. These may in part relate to the former timber tramway incline that crossed the aqueduct. There were also other inclines crossing the aqueduct at various points (Plate 26).

The O'Shannassy trail access carpark at the north end of Dee road appears to be at the site of a former MMBW maintenance camp. This area has a number of levelled benches and large concrete foundations

remaining from former buildings (Plate 25). The Henry and Walker tramway can be discerned running across the site.

Plate 24 Surface diversion channel at O'Shannassy aqueduct (G.Vines 16/01/2019)

Plate 25 Concrete block at O'Shannassy Aqueduct car park (G.Vines 16/01/2019)

Plate 26 Concrete bridge over O'Shannassy Aqueduct at Andersons Tramway crossing (G.Vines 1/11/2019)

7.2.5.2.6 Mining, tramways and sawmill sites

The routes of a number of timber tramways can be discerned by subtle land forms resulting from excavation of level benches and cuttings across the hillsides. The tramways took a number of forms, some with relatively level formations snaking around the contours of the hillsides, while other cable hauled inclines followed straight steep routes directly up the slopes. The inclines are generally harder to identify as slippage of soil and tree-root throw on the steep slopes tends to destroy any formation (Plate 27, Plate 28).

The tramway around the base of Mt Little Joe is clearly evident with tracks following it in part, while Laudehr and Platt's tramways running either side of the Cemetery Reserve can be traced in part, although the historic tramway alignment has been disturbed by four wheel drive tracks, breaking the ground surface in these areas.

A number of other mine and sawmill sites have been identified in the general region, but as these were not within the proposed mountain bike trail route, they were not inspected. They have been mapped on Map 7. These include the Evans Reward Mine to the east of the project area, the Wesburn Water Race to the west, and a number of sawmill sites throughout the region.

Plate 27 Mining bench near Backstairs Creek (G.Vines 15/01/2019)

Plate 28 Tramway formation near Yankee Jim Creek along the east side of the Old Warburton Cemetery Reserve (G.Vines 15/01/2019)

7.2.5.2.7 Lady Hopetoun mine

The site of the Lady Hopetoun Mine (H8022-0138) is marked on Geovic mapping, but appears to be slightly off the actual location. Site inspection revealed extensive areas of benching on the steep slopes, at least two levels of tramway and/or water race, and the excavation for a mine adit (Plate 28, Plate 29), and rock and earth spoil heaps extending north from the mine, standing up to 20 metres above the bottom of the gully. The mine is known to have been supplied with water from a renovated race, which is clearly that constructed originally for the Yankee Jim Mine, and this is clearly on the upper level.

The level areas appear to relate to both the Yankee Jim water race and access tracks, as well as an area to the east of the mine which may have been a bench for a building site. However, cadastral mapping of the water race does not match the location of features found during the survey. The fact that the plotted alignment of does not follow the contours suggests that the cadastral map is inaccurate. Map 7 shows the location of the surveyed features, as well as the alignment of the water race as shown on the parish plan (see Plate 3).

Plate 29 Looking towards collapsed adit at Lady Hopetoun Mine (compare with Plate 6)

7.2.5.2.8 Evans Reward mine

The Evans Reward Mine was located on the east side of Backstairs Creek, below the present Old Warburton Road. The mine operated an adit to the south cut through the grey granite, with spoil dumped into the creek valley. Various spoil and rock heaps can be discerned along with terraces and cuts into the hill side that are probably the sites for former machinery and buildings. However, very heavy undergrowth and the effect of erosion and root throws from fallen trees obscures the features (Plate 30, Plate 31). Some fragments of glass and ceramics of late nineteenth century date are present.

A site card was submitted to Heritage Victoria for inclusion on the Victorian Heritage Inventory and registered as VHI H8022-0136.

Plate 30 Backstairs track near Evans Reward Mine (G.Vines 30/4/2021)

Plate 31 Spoil heaps from Evans Reward Mine (G.Vines 30/4/2021)

7.2.5.2.9 Anderson/Parbury mill & tramway

The Anderson/Parbury Mill and Tramway are in the direct vicinity of the Victorian Heritage Inventory place H8022-0111 O'Shannassy Aqueduct Sawmill Site. This area was reinspected to determine potential impacts, and upon reinspection it became clear that O'Shannassy Aqueduct Sawmill Site may have been incorrectly registered. This area straddles the O'Shannassy aqueduct and includes a large dam. Discernible features include various rough rock piles and the formation of former tramlines. The tramlines run up and down the slope along the gully of Ythan Creek, on the east side of the creek. The formation is about 3 metres wide with earth and rock embankments and spoil.

None of the identified features suggested a sawmill site, as these are generally characterised by large level platforms with trenches for the saw pits and sawdust removal, and obvious benches for the log landings and transfer platforms (Plate 32, Plate 33, Plate 34, Plate 35). The piles of rock identified on the VHI site card as walls are more likely to be spoil heaps created when the pine forest was planted, as none of these were in forms characteristic of sawmill or other building sites. The work of the Light Railways Research Society (McCarthy 2001) in mapping sawmills in the area, draws extensively from Forest Commission records and it is unlikely that a saw mill was located here and not recorded by the FCV.

Anderson's sawmill was located at the bottom of this tramway in 1901, and was probably reused for Parbury's mill in 1905. Later, Horner's Mill was established at the top of the incline tramway, operating from 1932 to 1937 processing regrowth Mountain Ash and Black Wattle. It is more likely therefore, that the VHI listed area was used for transferring logs and later sawn timber from the incline tramway, to Parbury's Tramway, and later to road vehicles.

The site of Andersons/Parbury's mill is recognisable to the north-east of the gold clubrooms on the southern edge of the patch of bushland. Here concrete foundations, rail lines and machinery bases are evident on either side of Ythan Creek (Plate 36, Plate 37). A large electric motor and what appears to be a steam condenser chest sits on one of the slabs (Plate 36). It is known that Parbury had installed a Pelton wheel and electricity generator to drive the mill and incline haulage, and so this is likely to be the remains of this installation. About 10 metres to the north in the forested area a terrace is discernible that Is likely to be part of the mill platform. To the west of this a section of 80lb rail was found but undergrowth obscures most of the ground.

On the basis of this inspection, a site card was submitted to Heritage Victoria for inclusion of Anderson's Mill on the Victorian Heritage Inventory with the historic site allocated VHI H8022-0135.

Plate 32 Alignment of Anderson / Parbury tramway looking south from near aqueduct (G.Vines 1/11/2019)

Plate 33 Rock piles in opine forest near Andersons Tramway (G.Vines 1/11/2019)

Plate 34 Section of Andersons Tramway within golf course (G.Vines 30/4/2021)

Plate 35 Section of Andersons Tramway within golf course (G.Vines 30/4/2021)

Plate 36 **Machinery and concrete foundations from Anderson's and Parbury's mill on the golf course (G.Vines 30/4/2021)**

Plate 37 **Section of rail and level platform at Andersons mill (G.Vines 30/4/2021)**

7.2.5.2.10 Hermon's mills and tramway

Henry Hermon established a number of mills in the Warburton area (Figure 7), progressively moving his operations further towards the east as the forests were cut out. In 1901 he erected a sawmill at the headwaters of Four Mill Creek near Mt Bride, which was connected by a tramway and in 1909 he built another small mill near the La La Falls known as the "No 6 Mill". The No 6 mill closed down in 1916 and the Mt Bride mill closed in 1910.

A log tramway alongside the Four Mile Creek carried timber to the La La sidings on the Warburton railway. It forms the La La Falls walking track for much of its length today (Plate 38, Plate 39).

A site card was submitted to Heritage Victoria and approved for inclusion on the Victorian Heritage Inventory (VHI H8022-0137).

Plate 38 La La Falls track following the formation of Hermon's Tramway (G.Vines 30/4/2021)

Plate 39 Possible site of Hermon's Mt Bride Mill near Burn Road

Figure 7 Location of Hermon's Mt Bride Mill and Tramway

7.2.6 Summary of listed heritage places within the Project Area

There are two recorded Yarra Ranges Heritage Overlay (HO) places and three Victorian Heritage Inventory places located within the Project Area. The location and description of each place are listed below.

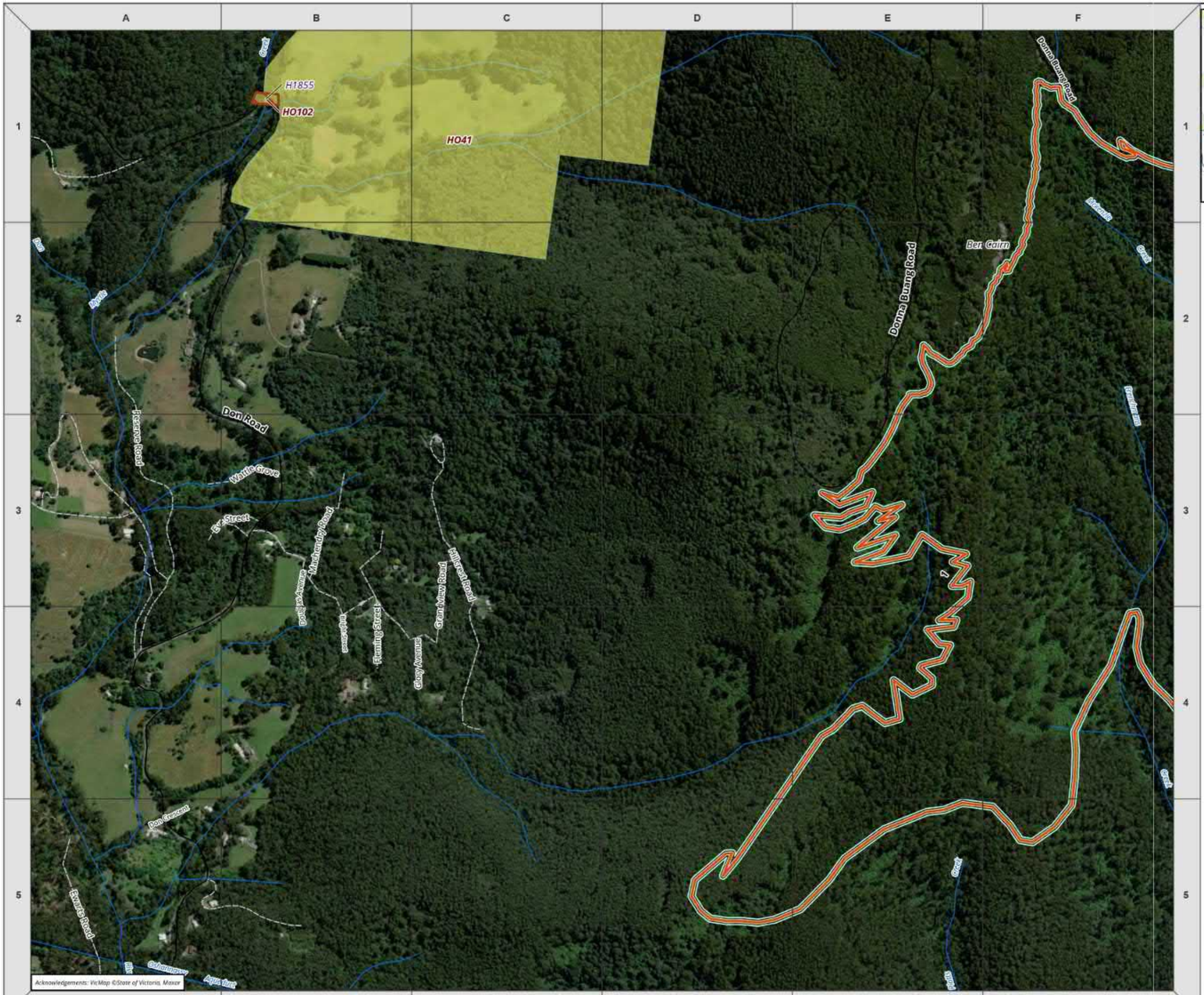
Mount Donna Buang-Bridle Tracks and Road (HO140) comprises of bridle tracks, walking tracks and road access to Mount Donna Buang near Warburton. Bridle tracks cut to help locals and visitors access Mount Donna Buang date from as early as 1912, and were developed into the present access road. They later became an important Upper Yarra Valley beauty spot and recreational area.

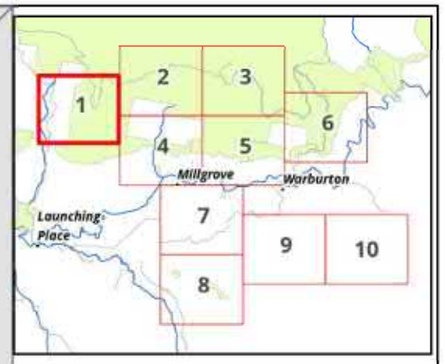
Lilydale – Warburton Railway (HO214) is a linear feature, originally with rail track running from Lilydale to Warburton. The rail track has been removed however sections of the railway reserve between Launching Place and Warburton East have been developed as the 'Centenary Trail', consisting of 12 kilometres of pathway. The area illustrates the impact of the railway on the development of the upper section of the Yarra Valley, particularly for timber utilisation and its community use and association.

O'Shannassy Aqueduct Sawmill Site (H8022-0111) is located on Sussex Street in Warburton. The site is described as being established in September 1901 by three sawmillers; Anderson, Richards and Robinson, who set up their plants in the area. Over the years, the site was used by several sawmilling businesses and a log tramway was extended for logs from Mount Donna Buang. (Note that subsequent investigations suggest that this was a tramway and log transfer site rather than a sawmill. The actual Anderson / Parbury Brookfield Sawmill (as it was known) was located down the hill further along the tramway in what is now the Warburton Golf Course. A separate VHI site record has been submitted for this site.)

Lady Hopetoun Mine (H8022-0183) is located to the south of the Old Warburton Road and approximately 1.3 kilometres to the north-east of the Old Warburton Cemetery. It was established in 1889 when gold was found at the head of Scotchman's Creek. A battery was run from a repurposed earlier water race. The mine had ceased operations by 1905 and a report of a visit in in the 1930s described the mine site as 'long abandoned'.

Anderson's Mill (H8022-0135) is located to the north of the Yarra and 1 kilometre south of O'Shannassy Aqueduct Sawmill Site (H8022-0111) within the bounds of the golf club. IT is characterised by concrete foundations, rail lines and machinery bases with possible subsurface deposits.





Legend

- Proposed MTB trail
- Project area
- Victorian Heritage Register
- Heritage Overlay

Hydrology

- Waterway

Map 7.1 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

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Matter: 34179,
Date: 22 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M7_Identified
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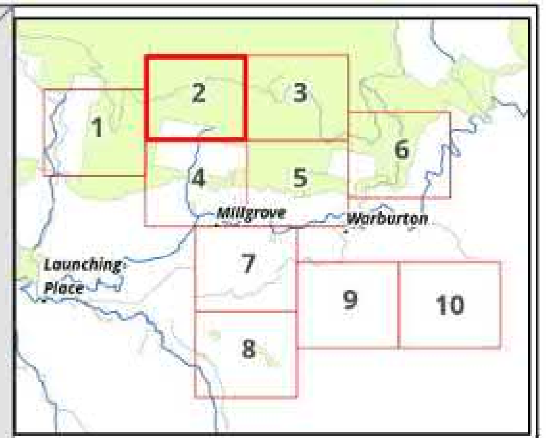

Legend

- Proposed MTB trail
- Project area

Historic places

- Sawmill
- Former tramway
- Point of archaeological potential
- Victorian Heritage Register
- Heritage Overlay

Hydrology

- Waterway

Map 7.2 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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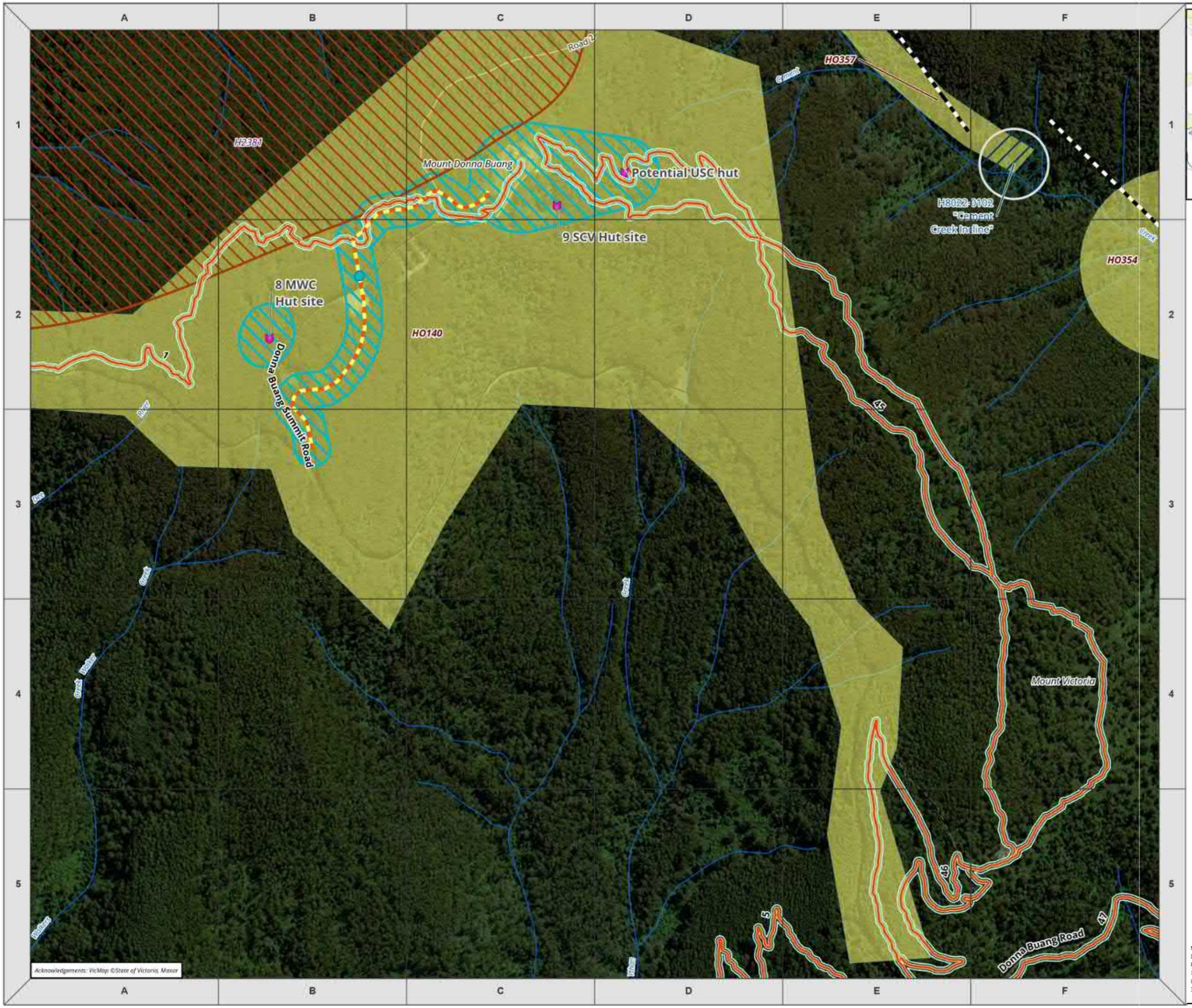

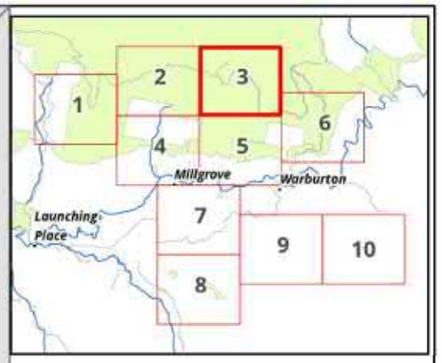

Legend

- Proposed MTB trail
- Project area

Historic places

- Identified heritage location
- Former road alignment
- Former tramway
- Point of archaeological potential
- Area of archaeological potential
- Victorian Heritage Inventory
- Victorian Heritage Register
- Heritage Overlay

Hydrology

- Waterway

Map 7.3 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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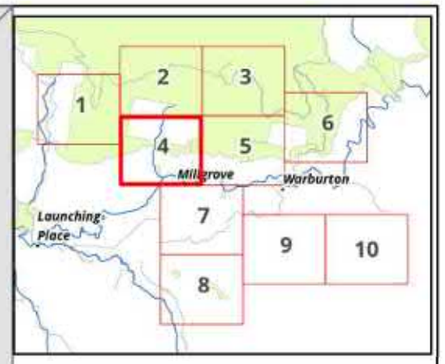

Legend

- Proposed MTB trail
- Project area

Historic places

- Identified heritage location
- Sawmill
- Former tramway
- Point of archaeological potential
- Area of archaeological potential
- Heritage Overlay

Hydrology

- Waterway
- River
- Lake

Map 7.4 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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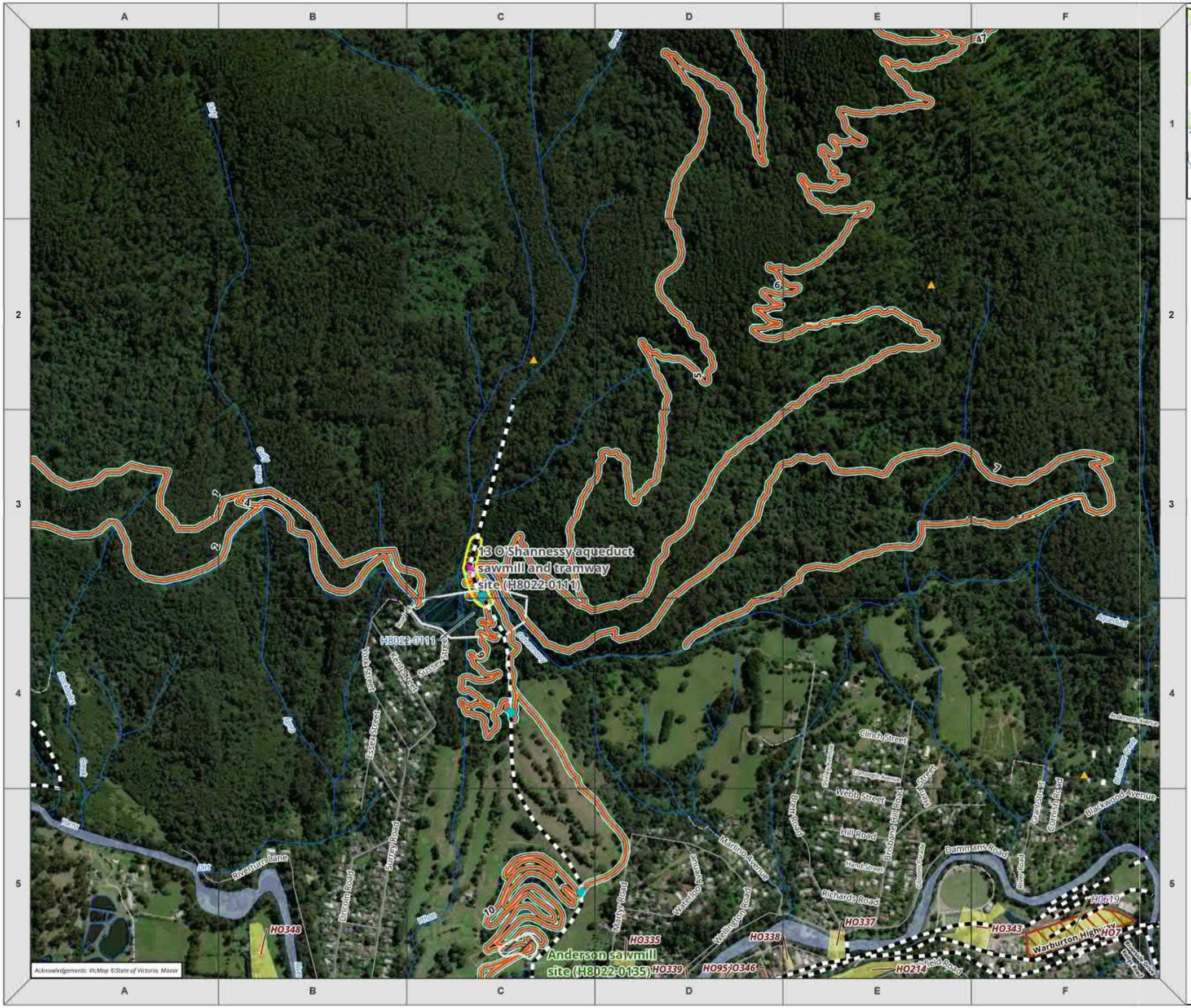

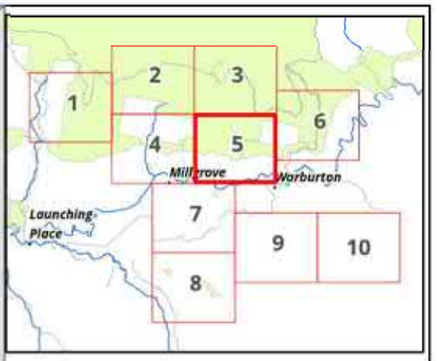

Legend

- Proposed MTB trail
- Project area

Historic places

- Identified heritage location
- Sawmill
- Former tramway
- Point of archaeological potential
- Proposed Victorian Heritage Inventory
- Victorian Heritage Inventory
- Victorian Heritage Register
- Heritage Overlay

Hydrology

- Waterway
- River
- Lake

Map 7.5 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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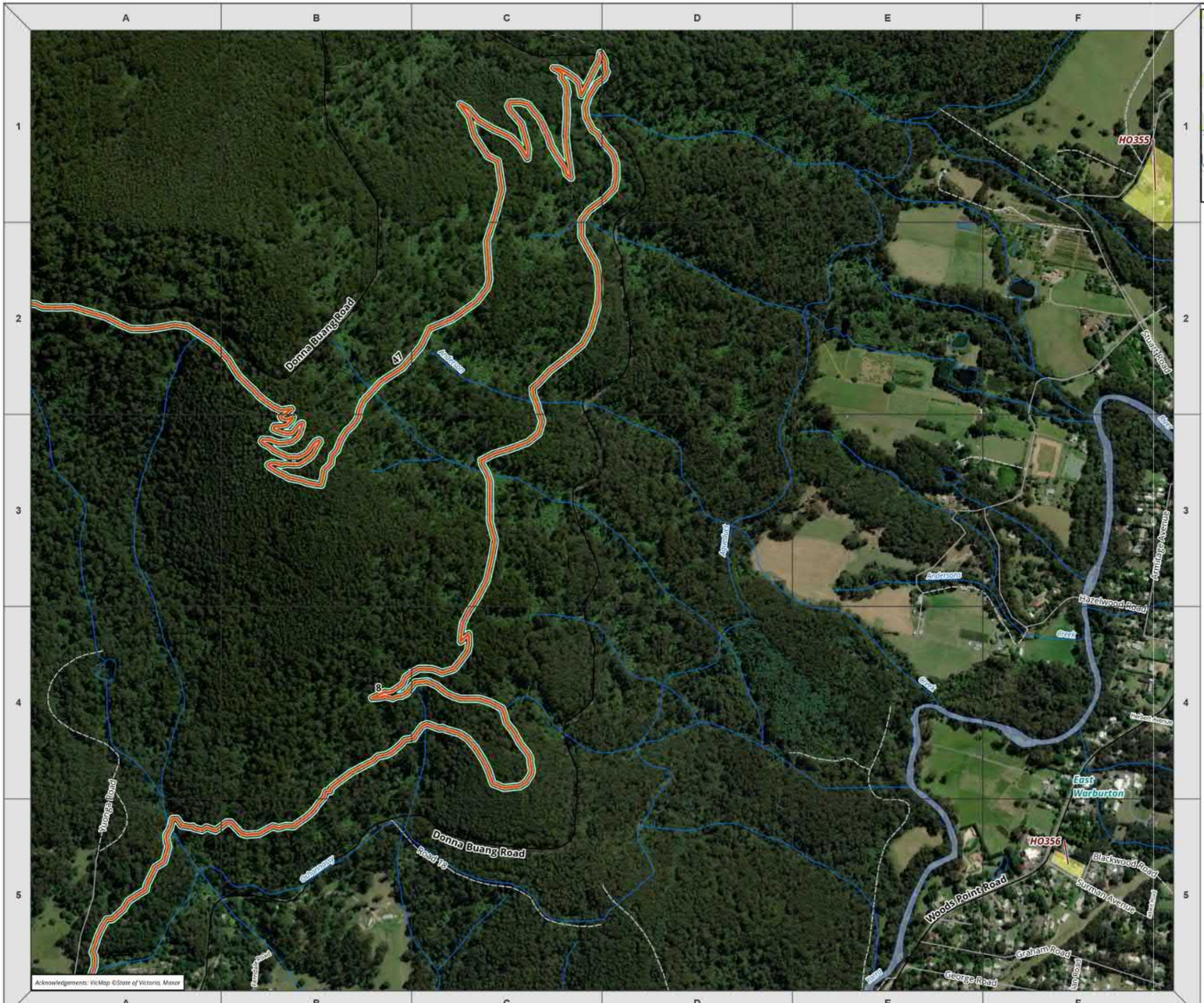

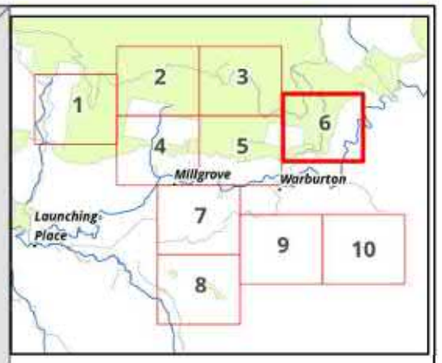

Legend

- Proposed MTB trail
- Project area
- Heritage Overlay

Hydrology

- Waterway
- River
- Lake

Map 7.6 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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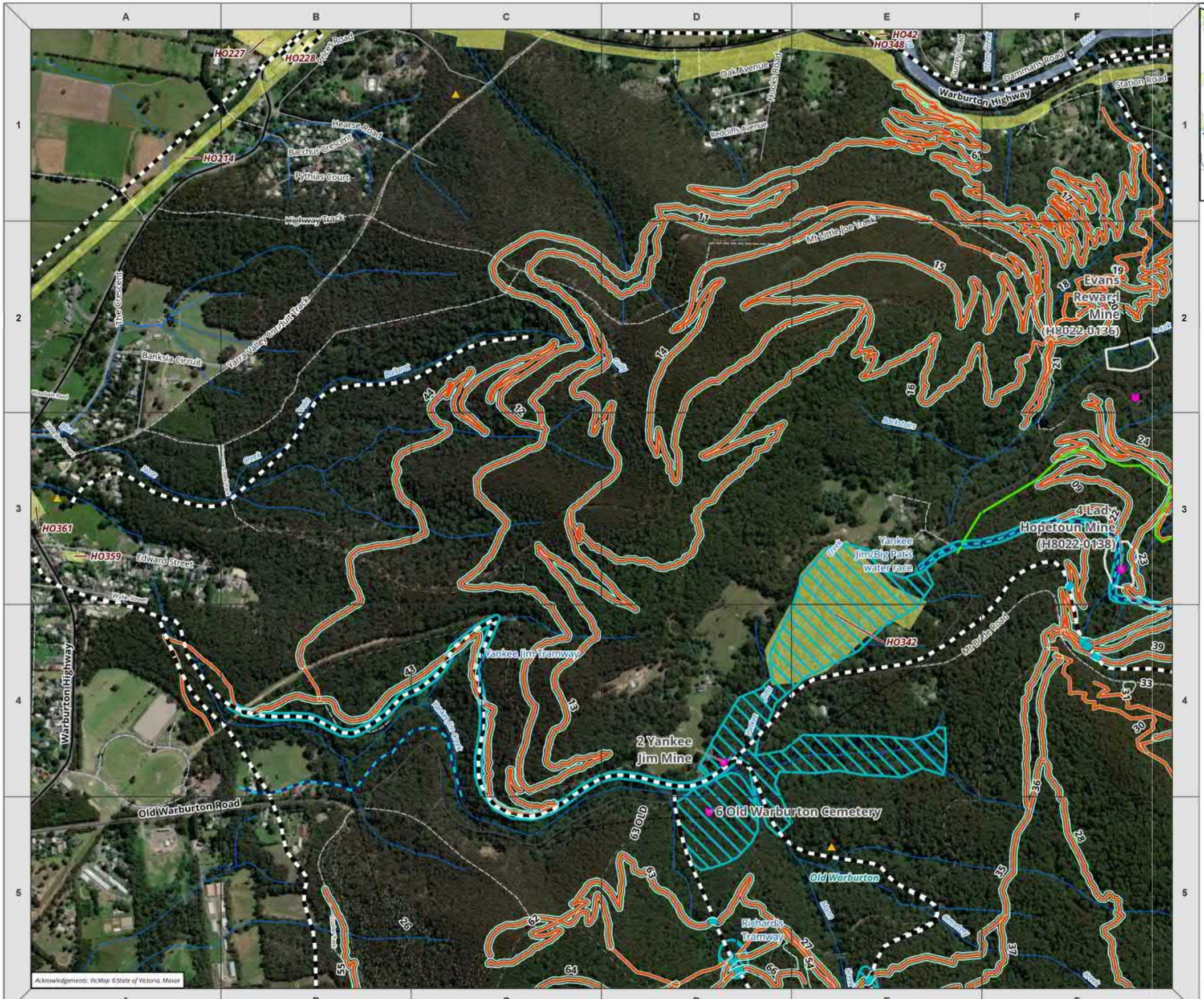

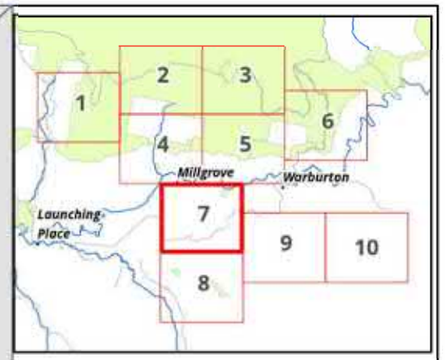

Legend

- Proposed MTB trail
- Project area

Historic places

- Identified heritage location
- Sawmill
- Former water race
- Former tramway
- Point of archaeological potential
- Old Old Warburton Road
- Area of archaeological potential
- Victorian Heritage Inventory
- Heritage Overlay

Hydrology

- Waterway
- River
- Lake

Map 7.7 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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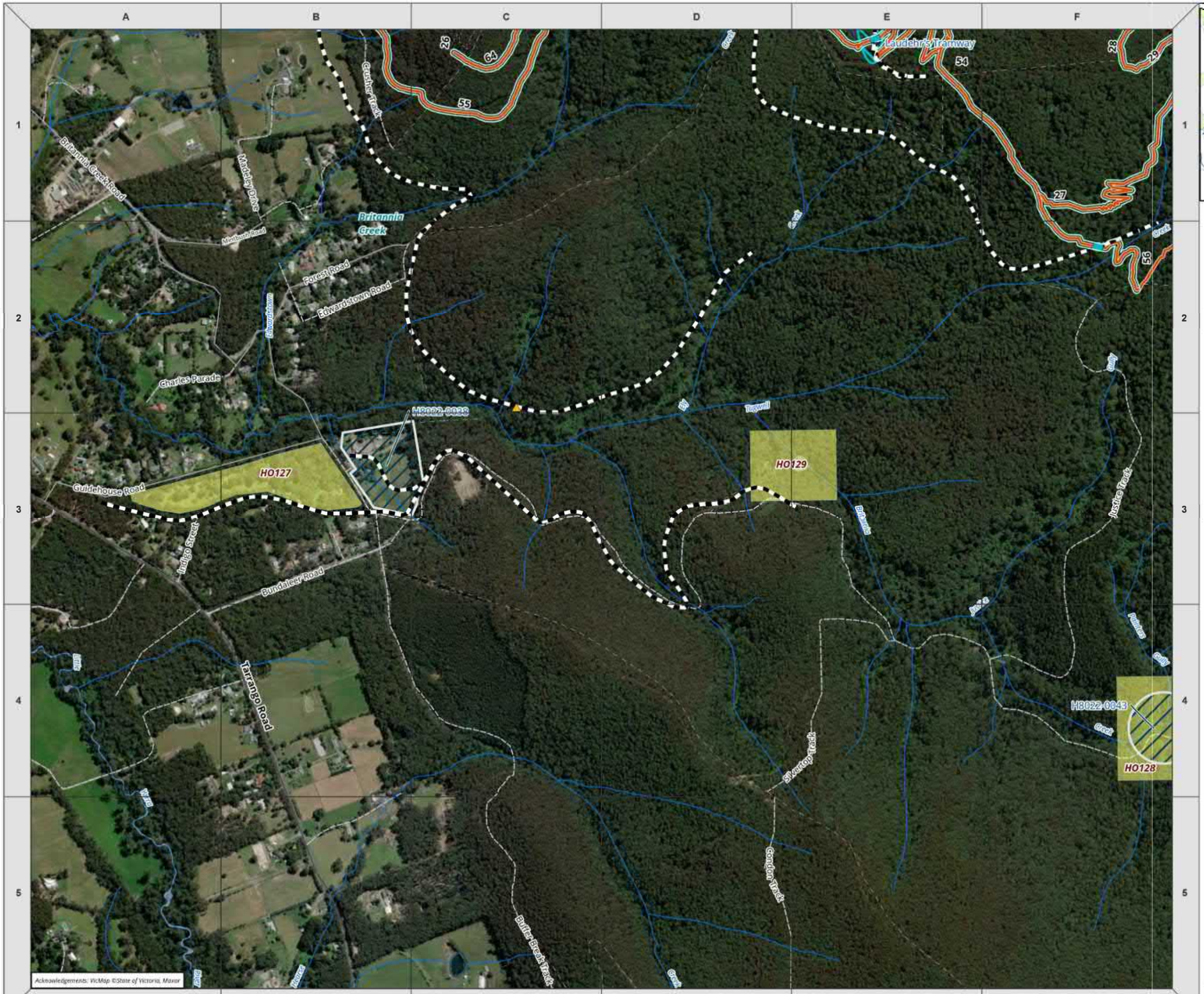

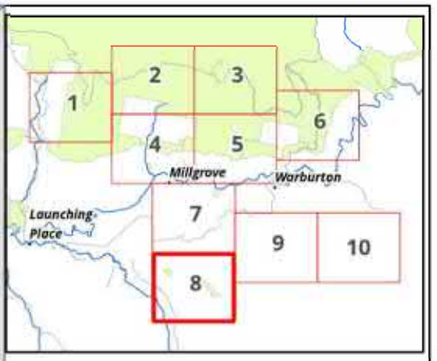

Legend

- Proposed MTB trail
- Project area

Historic places

- Sawmill
- Former tramway
- Point of archaeological potential
- Area of archaeological potential
- Victorian Heritage Inventory
- Heritage Overlay

Hydrology

- Waterway
- River
- Lake

Map 7.8 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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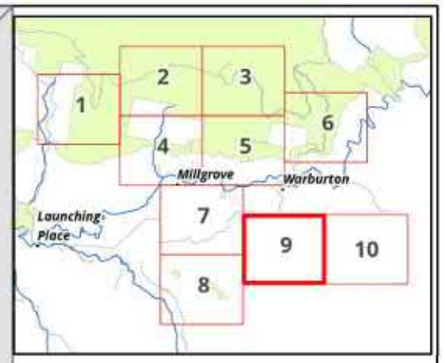

Legend

- Proposed MTB trail
- Proposed walking trail
- Project area

Historic places

- Sawmill
- Former water race
- Former tramway
- Point of archaeological potential
- Old Old Warburton Road
- Area of archaeological potential

Hydrology

- Waterway

Map 7.9 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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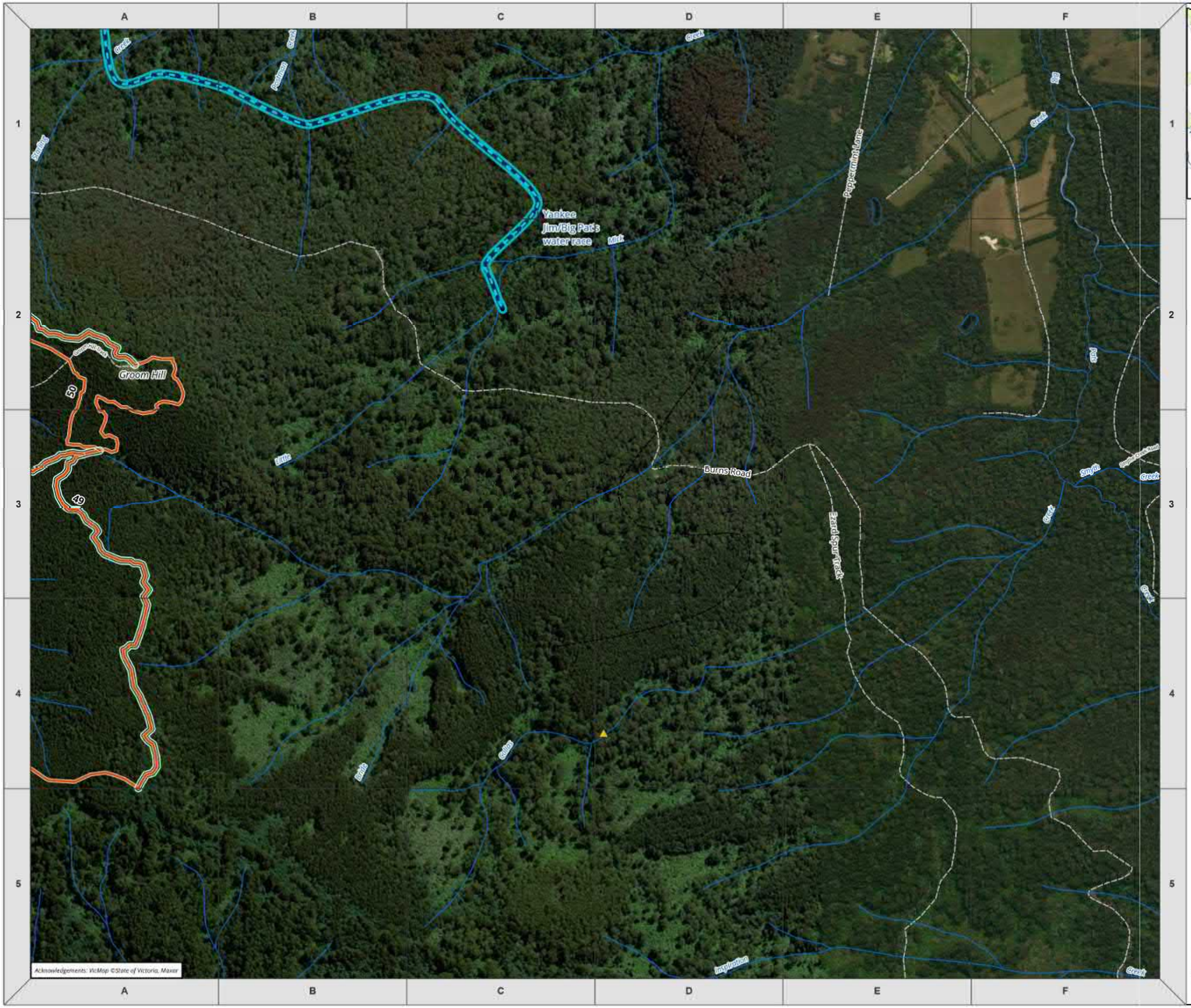

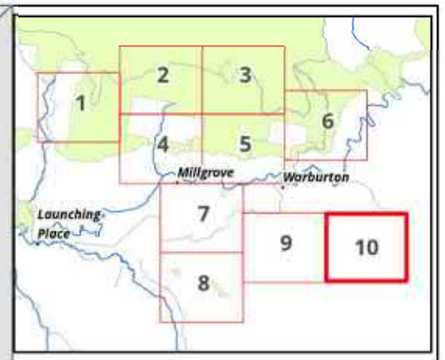

Legend

- Proposed MTB trail
- Project area

Historic places

- Sawmill
- Former water race
- Area of archaeological potential

Hydrology

- Waterway
- River
- Lake

Map 7.10 Location of historic sites within project area

0 100 200 300 400 500

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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8 Risk assessment

A risk assessment of Project activities was performed in accordance with the methodology described in Section 6.4. The risk assessment has used a risk-based approach to prioritise the focus of the impact assessments and development of mitigation measures. The risk pathways link Project activities (causes) to their potential effects on the environmental assets, values or uses that are considered in more detail in the impact assessment. Risks and residual risk were assessed for the construction and operation phases of the Project.

The identified risks and associated residual risk ratings are listed in Table 17.

Where the initial Aboriginal cultural heritage risk ratings were categorised as medium or higher, risks were a focus of the impact assessment however additional mitigation measures have not been developed. This is due to WWCHAC being the appropriate decision maker in relation to the protection and mitigation of Aboriginal cultural heritage as part of the CHMP process. As such, the CHMP will contain further mitigation measures once approved, and it is not considered that further mitigation is required as part of this document.

It should be noted that a CHMP gives permission to harm Aboriginal cultural heritage places, with the overall harm to the place minimised through mitigation works (e.g. salvage). These mitigation measures do not remove the risk to the identified Aboriginal cultural heritage, as the physical remains of the Aboriginal cultural heritage place will be removed/destroyed through those measures and therefore do not lower the risk rating when risk assessing. Enacting the mitigation measures does allow for the physical remains of an Aboriginal cultural heritage place to be fully recorded, analysed and data lodged with VAHR so that the details of place are available to the Traditional Owners, and can be used for future research.

The residual risk takes into account that greater impact is likely during the construction phase of the project with the operation phase considered to be less intrusive. As the CHMP has not yet been approved by the statutory authorities, the management conditions to mitigate the risk and residual risk to Aboriginal places are in draft form and are likely to change.

Table 17 Aboriginal and historic heritage risks

Risk ID	Potential threat and effects on the environment	Risk rating	Residual Risk Level
Construction			
HR01	**Registered Aboriginal cultural heritage places** Construction activities impact registered Aboriginal cultural heritage places resulting in loss of heritage value.	Low	Low
HR02	**Unidentified Aboriginal cultural heritage places** Construction activities impact unidentified Aboriginal cultural heritage places resulting in loss of heritage value.	Low	Low
HR03	**Intangible cultural heritage values** Construction activities impact intangible cultural heritage values, resulting in loss of heritage value.	Low	Low
HR04	**Archaeologically sensitive landforms** Construction activities impact archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains.	Low	Low
HR05	**Listed historic heritage sites** Construction activities directly or indirectly impact listed historic heritage sites.	Medium	Low
HR06	**Unlisted historic heritage sites** Construction activities directly or indirectly impact unlisted historic heritage sites.	Medium	Low
Operation			
HR07	**Registered and unidentified Aboriginal cultural heritage places** Operation activities directly or indirectly impact listed historic heritage sites.	Medium	Low
HR08	**Listed and unlisted historic heritage sites** Operation activities directly or indirectly impact listed historic heritage sites.	Medium	Low

*final risk rating is subject to review following CHMP approval

9 Construction impact assessment

This section discusses the potential impacts of the Project as a result of construction activities and the associated mitigation measures that aim to reduce impacts to as low a level as possible. Mitigation measures referred to are defined in Section 12.

The impact assessment to this place is based on predictive modelling only, as it is unknown what archaeology is present until excavation has occurred. Additional consultation is required with the WWCHAC Elders before CHMP 15276 can be finalised. Any management of existing or proposed VHI sites is subject to management conditions placed on consents by Heritage Victoria.

9.1 Construction activities impact registered Aboriginal cultural heritage places resulting in loss of heritage value

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres. No previously recorded Aboriginal places are located within the Project Area.

To mitigate the risk to any potential identified Aboriginal cultural heritage places, the management conditions of CHMP 15276 must be implemented and complied with (HM01). The management conditions for CHMP 15276 will be developed through consultation with WWCHAC. These management conditions become legal requirements following the approval of the CHMP under the Victorian *Aboriginal Heritage Act 2006*.

With the implementation of the CHMP management conditions, it is expected that residual impacts to identified Aboriginal cultural heritage places would low. This is because there are no recorded Aboriginal places within alignments 1-66.

9.2 Construction activities impact unidentified Aboriginal cultural heritage places resulting in loss of heritage value

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres.

A Standard Assessment was undertaken for the majority of the alignment and no Aboriginal places were identified during this assessment. This can be due to a number of factors such as poor ground surface visibility, soil deposition and also lack of appropriate habitable landform. Aboriginal places may be identified during the construction phase of the Project when excavations occur.

To mitigate the risk to unidentified Aboriginal cultural heritage places, the contingency plans within the CHMP must be implemented in the result of an unexpected find during construction (HM01). The contingency measures provide for matters in relation to Section 61 of the *Aboriginal Heritage Act 2006* (whether the activity can avoid harm or minimise harm to Aboriginal cultural heritage), including:

- Resolution of any disputes between the proponent and the RAP in relation to the implementation of the CHMP or the conduct of the activities.
- Mechanisms for reviewing compliance with the CHMP and remedial actions for non-compliance.

- Management of any Aboriginal cultural heritage that may be found during the construction, operation and decommissioning of the Project.
- Notification of the discovery of Aboriginal cultural heritage found during the construction, operation and decommissioning of the Project in accordance with the *Aboriginal Heritage Act 2006*.

The residual impact to unidentified Aboriginal cultural heritage places is considered low as the nature of the terrain is not conducive to accumulation of Aboriginal cultural material and therefore impact to unidentified Aboriginal places is unlikely. The management conditions and contingency measures of CHMP 15276 would ensure that any Aboriginal places that may be identified during construction works are appropriately managed in a WWCHAC-approved manner, further lowering the residual impact.

9.3 Construction activities impact intangible cultural heritage values, resulting in loss of heritage value

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres. Vegetation removal will also take place that may have the potential to alter landscapes that may be associated with intangible cultural values.

It is expected that impacts will occur through the removal of native vegetation and disruption of animal habitat. These natural resources were noted as having intangible value to the Wurundjeri Woi-wurrung people. The intangible values lie in the knowledge of the Wurundjeri people being within the Warburton region in the past, present and future. As the impacts are considered low with vegetation to be reinstated where possible, the impacts to intangible heritage is considered low. The residual impact of the construction as a result is also considered low.

To mitigate the risk to intangible cultural heritage values, the management conditions and contingency plans within CHMP 15276 must be implemented (HM01). A Cultural Values Recording carried out with WWCHAC documented Indigenous cultural values within the Project Area and this must also be completed (HM02). A report on the cultural values is in preparation for the Project Area that will assist in managing these values and provide recommendations on future community engagement.

The residual impacts of construction work for the Warburton Mountain Bike Trail to the intangible cultural heritage is considered low as the intangible values relate predominantly to prior usage of natural resources in the landscape or the history of the land. The natural resources and history of the land form this intangible connection are still abundant within the landscape and as such even with the proposed development will still retain their cultural and historic values. The development itself seeks to integrate the advice and values of the WWCHAC Elders and community in preserving these cultural values.

9.4 Construction activities impact archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres. These have the potential to alter the landscape and impact sensitive landforms which are known to contain potential for Aboriginal cultural heritage. Sensitive landforms within the Project Area include waterways, mountain tops, ridgelines, gentle sloping hills and flood plains.

To mitigate the risk to archaeologically sensitive landforms, the management conditions and contingency plans within CHMP 15276 must be implemented (HM01). With the implementation of the CHMP management conditions, it is expected that impacts significant landforms would be minimised to as low a level as possible, due to the low degree of disturbance to potentially significant landforms following their investigation and lack of previously recorded Aboriginal places associated with these landforms in this location. Therefore, the residual impacts after the application of HM01 will be low.

9.5 Construction activities directly or indirectly impact listed historic heritage sites

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres.

There are currently five listed heritage sites which are within the Project Area and will be impacted during construction works. Three of these are VHI sites which are afforded statutory protection under the *Heritage Act 2017*. There are two Heritage Overlay sites within the Project Area.

9.5.1 Victorian Heritage Inventory places within the Project Area

Consent approval from Heritage Victoria is required if any ground disturbing works are carried out within the extents of the Victorian Heritage Inventory (VHI) places. Such works might involve excavation, construction of bridges, or other ground disturbance works. If existing road or track crossings within the sites can be utilised, or if works are confined to only removing vegetation, then these works may be exempted. It will be necessary to consult Heritage Victoria to determine if an exemption is appropriate.

9.5.1.1 O'Shannassy Aqueduct Sawmill Site (H8022-0111)

The O'Shannassy Aqueduct Sawmill site was reassessed and found to represent only a tramway include and possible log transfer site but was not a sawmill. Discussions with Heritage Victoria are currently underway to reduce the registration size and change the description based on this new information. Despite this, the legislative requirements still remain the same until this change is made by Heritage Victoria.

Trails are required in this location as part of the project due to an existing bridge providing access to the area. Avoidance of the VHI place was not possible due to the steepness of the terrain in the vicinity and possible environmental impacts such as erosion if the trail alignment was moved.

Impacts to this place prior to the introduction of mitigation measures may include:

- The disturbance of archaeological features such as foundations of structures.
- The disturbance of archaeological deposits such as rubbish dumps including bottles, ceramics or other discarded materials.
- Damage or removal of archeologically sensitive landforms such as benching for structures or tramways.

These impacts would result in the loss of the potential of the site to yield archaeological information and the ability to recognise the site.

A Heritage Victoria Consent application must be applied for prior to undertaking works within the bounds of this place. Mitigation measures will be addressed by the nominated heritage consultant/archaeologist and subject to the conditioning of the relevant Heritage Act 2017 approval. These measures may include:

- Archaeological excavation prior to construction works commencing.

- Inductions for the trail construction team.
- Archaeological monitoring during construction works, with the supervising archaeologist empowered to stop works or redirect the trail alignment using the micro-siting procedure outlined in the CEMP.
- An unexpected finds protocol.

The residual impact after the application of mitigations measures is considered to be low, as it will result in the avoidance of archaeological features, deposits and landforms, or if this is not possible, the archaeological recording of the site prior to disturbance.

9.5.1.2 Andersons Mill (H8022-0135)

The Anderson Mill site within the Golf course includes features such as levelled benches rails, machinery and concrete foundations which may be impacted by the proposed works to the extent that clearance of vegetation and minor earthworks within surface soils that may expose archaeological remains.

Avoidance has been considered, however, a realignment of the trail would require encroaching on the golf course which would cause impact to an existing recreation facility.

Impacts to this place prior to the introduction of mitigation measures may include:

- The disturbance of archaeological features such as foundations of structures.
- The disturbance of archaeological deposits such as rubbish dumps including bottles, ceramics or other discarded materials.
- Damage or removal of archeologically sensitive landforms such as benching for structures or tramways.

These impacts would result in the loss of the potential of the site to yield archaeological information and the ability to recognise the site.

A Heritage Victoria Consent approval must be applied for prior to undertaking works within the bounds of this place. Mitigation measures will be addressed by the nominated heritage consultant/archaeologist and subject to the conditioning of the relevant Heritage Act 2017 approval. These measures may include:

- Archaeological excavation prior to construction works commencing.
- Inductions for the trail construction team.
- Archaeological monitoring during construction works, with the supervising archaeologist empowered to stop works or redirect the trail alignment using the micro-siting procedure outlined in the CEMP.
- An unexpected finds protocol.

The residual impact after the application of mitigations measures is considered to be low, as it will result in the avoidance of archaeological features, deposits and landforms, or if this is not possible, the archaeological recording of the site prior to disturbance.

9.5.1.3 Lady Hopetoun Mine (H8022-0138)

The Lady Hopetoun Mine site includes levelled benches from former buildings, tramways and works areas, extensive mullock heaps and rock dumps which may be impacted to the extent that clearance of vegetation and minor earthworks within surface soils that may expose archaeological remains.

The Lady Hopetown mine was located and registered through the development of the Warburton MBT with studies funded by the proponent. The trail alignment was deliberately placed in this location as there are

opportunities for public interpretation of the site. Therefore, avoidance has not been considered desirable and the mitigation measures undertaken in consultation with Heritage Victoria will serve to protect the site.

Impacts to this place prior to the introduction of mitigation measures may include:

- The disturbance of archaeological features such as foundations of structures.
- The disturbance of archaeological deposits such as rubbish dumps including bottles, ceramics or other discarded materials.
- Damage or removal of archeologically sensitive landforms such as benching for structures or tramways.

These impacts would result in the loss of the potential of the site to yield archaeological information and the ability to recognise the site.

A Heritage Victoria Consent approval must be applied for prior to undertaking works within the bounds of this place. Mitigation measures will be addressed by the nominated heritage consultant/archaeologist and subject to the conditioning of the relevant Heritage Act 2017 approval. These measures may include:

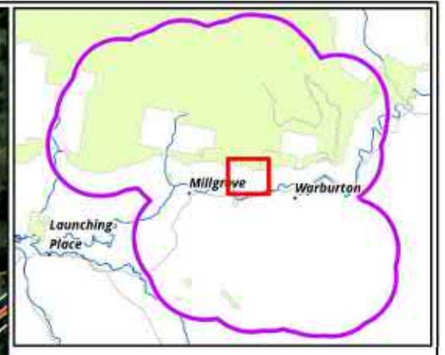
- Archaeological excavation prior to construction works commencing.
- Inductions for the trail construction team.
- Archaeological monitoring during construction works, with the supervising archaeologist empowered to stop works or redirect the trail alignment using the micro-siting procedure outlined in the CEMP.
- An unexpected finds protocol.

The residual impact after the application of mitigations measures is considered to be low, as it will result in the avoidance of archaeological features, deposits and landforms, or if this is not possible, the archaeological recording of the site prior to disturbance.

13 O'Shannessy aqueduct sawmill and tramway site (H8022-0111)

H8022-0111

Anderson sawmill site (H8022-0135)



Legend

- Proposed MTB trail
- Study area
- Project area

Historic places

- Identified heritage location
- Former tramway
- Proposed Victorian Heritage Inventory
- Victorian Heritage Inventory
- Heritage Overlay

Map 8 Impact to O'Shannassy Aqueduct Sawmill Site (H8022-0111) and Andersons/ Parbury Sawmill (H8022-0135)

0 50 100 150 200 250

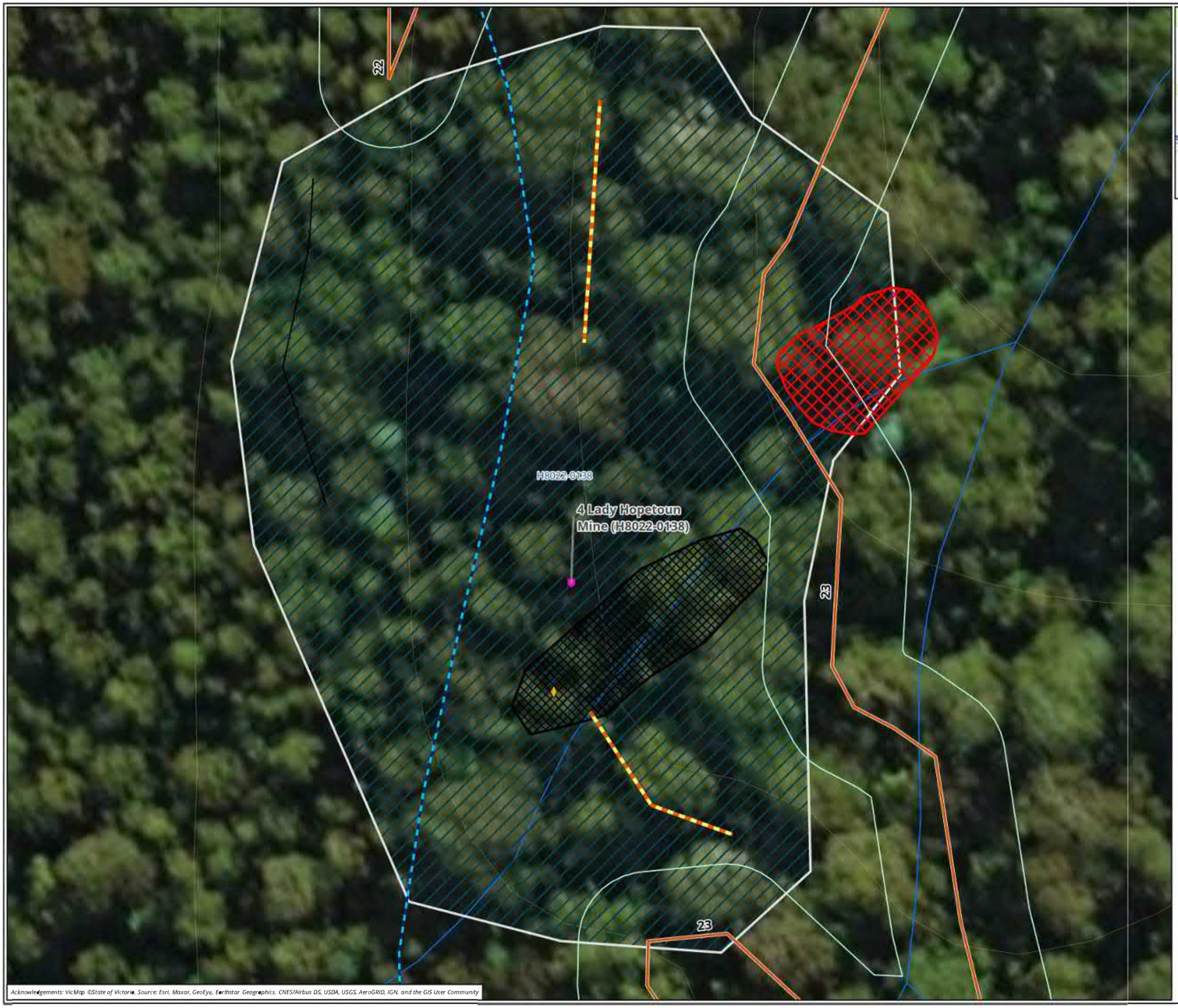
Meters

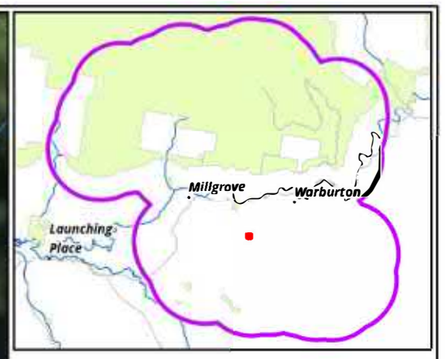
Scale: 1:5,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 34179,
Date: 22 July 2021,
Prepared for: DC, Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M8_MillSite
Project: P:\33800s\33805\Mapping\33805_Warburton_EES_Figures_Heritage_EES.aprx





Legend

- Proposed MTB trail
- Study area
- Project area

Historic places

- Identified heritage location
- Adit
- Bench
- Race
- Former road alignment
- Spoil run
- Rock spoil
- Victorian Heritage Inventory

Map 9 Location of Lady Hopetoun Mine features (VHI H7922-0506)

0 5 10 15 20 25

Meters

Scale: 1:500 @ A3

Coordinate System: GDA 1994 MGA Zone 55

biosis

N

Matter: 34179,
Date: 22 July 2021,
Prepared for: DC. Prepared by: LW, Last edited by: lwilson
Layout: 34179_EES_M9_LadyHopetounMine
Project: P:\33800s\33805\Mapping\
33805_Warburton_EES_Figures_Heritage_EES.aprx

9.5.2 Yarra Ranges Council Heritage Overlay places within the Project Area

The proposed trail alignments pass through two Yarra Ranges Council Heritage Overlay places (HO). Normally a permit would be required, however, an amendment to the planning scheme is currently in preparation which will fulfil this requirement.

It is not anticipated that construction activities will impact archaeological features, deposits or land forms except in areas of archaeological potential, which are discussed in Section 9.6, or VHI areas which are discussed in Section 9.5. Therefore, the anticipated impact pre-mitigation is low.

Mitigation measures will be the same as the unexpected finds procedure found in Section 9.6.3. The residual impact will remain low. The two heritage overlay places that are intersected by the Project Area are:

- Mount Donna Buang-Bridle Tracks & Road (HO140)
- Lilydale – Warburton Railway (HO214)

It has not been possible or desirable to avoid these places as both are critical parts of the trail. Mount Donna Buang-Bridle Tracks & Road (HO140) runs from the summit of Mt Donna Buang in the location of Trail 1 which is considered to be the primary trail of the project. The Lilydale – Warburton Railway (HO214) is the location of the Warburton Rail Trail. The mountain bike trail intersecting this is required in order to connect the two trails.

9.6 Construction activities directly or indirectly impact unlisted historic heritage sites

To facilitate the construction of the trails, excavation may be required to bench steep slopes, shape trail features and provide for drainage. It is anticipated that excavation would take place within a 1.5 to 2.4 metre corridor to maximum depths of approximately 800 millimetres. There are currently a large number of unlisted heritage sites which are traversed by the Project, and therefore have the potential to be impacted during construction works.

9.6.1 Areas of archaeological potential within the Project Area

Areas of archaeological potential are where a trail alignment intersects an unlisted historic place of archaeological potential that has been identified during the preparation of the historic survey report. The identified unlisted heritage places that are intersected by the Project Area are shown on Map 7 and in Table 21. These places are:

- Laudehr's Tramway
- Hut sites and Mt Donna Buang Rd
- Henry (1907) and Slocumb & Walker (1907-12) mill and tramway site
- McKechnies Mill
- MMBW Worksite
- Yankee Jim Tramway
- Mt Bride Tramway
- Yankee Jim Sluicing Area and Yankee Jim/Big Pat's Water Race
- Richard's Tramway

Impacts to this place prior to the introduction of mitigation measures may include:

- The disturbance of archaeological features such as foundations of structures.
- The disturbance of archaeological deposits such as rubbish dumps including bottles, ceramics or other discarded materials.
- Damage or removal of archeologically sensitive landforms such as benching for structures or tramways.

These impacts would result in the loss of the potential of the site to yield archaeological information and the ability to recognise the site.

Mitigation measures have been put into place in HM05 which includes the preference for vegetation removal only, and if this is not possible and ground disturbing works must take place, the requirement for archaeological monitoring. The residual impact to areas of archaeological potential would be low as the significance of the impact would-be greatly reduced or eliminated with the implementation of HM05.

9.6.2 Points of archaeological potential within the Project Area

Points of archaeological potential are where a trail alignment intersects a linear unlisted historic place of archaeological potential such as a tramway. The identified unlisted heritage places that are intersected by the Project Area are shown on Map 7 and in Table 21. These places are:

- Richard's Tramway
- Yankee Jim Tramway
- O'Shannassey Tramway
- McKechnies Tramway
- Henry Tramway

As there are a number of these linear unlisted historic places in the area and they are mostly quite long, it has not been possible to avoid them.

Impacts to these places prior to the introduction of mitigation measures may include damage or removal of the archeologically sensitive landforms. The area also has potential to have undocumented structure foundation and archaeological deposits and therefore the construction could impact these places resulting in significant damage.

Mitigation measures have been put into place in HM05 which includes the preference for vegetation removal only, and if this is not possible and ground disturbing works must take place, the requirement for archaeological monitoring. The residual impact to areas of archaeological potential would be low as the significance of the impact would-be greatly reduced or eliminated with the implementation of HM05.

9.6.3 Protection of unexpected finds under the *Heritage Act 2017*

The potential impact without the implementation of mitigation measures could include the damage or destruction to unknown historic sites through the construction process. Impacts to this place prior to the introduction of mitigation measures may include:

- The disturbance of archaeological features such as foundations of structures.
- The disturbance of archaeological deposits such as rubbish dumps including bottles, ceramics or other discarded materials.
- Damage or removal of archeologically sensitive landforms such as benching for structures or tramways.

These impacts would result in the loss of the potential of the site to yield archaeological information and the ability to recognise the site.

To mitigate this impact HM05 has been developed that will inform workers of the presence of archaeological sites through the induction process and manage unexpected finds through the contingency measures. The *Heritage Act 2017* protects all historic archaeological places and relics over 75 years old whether or not they are included on the VHI and provision for this is made in HM05.

The residual impact will be low, as workers will understand what to be aware of during construction works and the contingency measures will employ the micro-siting procedure outlined in the CEMP.

10 Operation impact assessment

This section discusses the potential impacts of the Project as a result of operation of the Project and the associated mitigation measures that aim to reduce impacts to as low a level as possible. Mitigation measures referred to are defined in Section 11.

10.1 Operation activities directly or indirectly impact registered and unidentified Aboriginal cultural heritage places

It is anticipated that the development of the trails would encourage more people to the area and therefore in proximity to Aboriginal places that would normally receive no visitors. The advent of increased visitor traffic may result in human impacts, such as vandalism, accidental harm and the removal of Aboriginal cultural heritage material, to unknown Aboriginal places within the Project Area.

To mitigate impact, all management conditions and contingency measures of CHMP 15276 would be followed (HM01). The residual impact will be lower impact, and compliance with management conditions and contingency measures will ensure that management of unexpected finds are managed with the participation and approval of the WWCHAC.

10.2 Operation activities directly or indirectly impact listed and unlisted historic heritage sites

It is anticipated that the development of the trails would encourage more people to the area and therefore to listed historic sites that would normally receive no visitors. The advent of increased visitor traffic may result in human impacts, such as vandalism, accidental harm and the removal of archaeological objects, to listed and unlisted historic sites within the Project Area.

To manage the risk of unintentional human impacts, signage at trail heads would be installed to indicate the presence of historical features and sites to the public, and a warning to stick to the designated trails. Monitoring or checks of known historic sites and features should be carried out as part of general trail upkeep (HM06). With the implementation HM06, impacts would be minimised and the residual impact considered low.

11 Assessment of alternative to Trail 1

As a review of alternatives, a comparison of the impacts of Trail 1 to Trails 45, 46 and 47 has been performed. Table 18 shows the comparison of the trails. A table showing a comparison of all trails can be found in Appendix 3.

When comparing the results of the CHMP between trails relating to Aboriginal heritage it can be seen that there is little difference between them. All are of low sensitivity without any recorded Aboriginal places. The results of the auger testing in both areas indicated homogeneous soil profiles. The recording archaeologist noted that all trails were on the edge of a steep ridge that was difficult to access, would have contained little in terms of resource and would have poor place preservation due to natural impacts. The length of Trail 1 (22,260 metres) is significantly longer than Trails 45, 46 and 47 (15,183 metres), and therefore is more likely to cause harm to unknown Aboriginal places. However, given that all four of the trails have been deemed unlikely to have Aboriginal places present, regarding Aboriginal heritage, there is no discernible differences between the trails.

Regarding historic heritage, Trail 1 is deemed to be of high sensitivity and intersects HO 140 and numerous places of archaeological potential. Trails 45, 46 and 47 were noted to be of moderate sensitivity and both also intersect HO 140. Trail 1 is also significantly longer than Trails 45, 46 and 47. Therefore, regarding Historic heritage Trails 45, 46 and 47 will have less impact than Trail 1.

Micro-siting as detailed in the CEMP will be undertaken to avoid archaeological deposits or features within the Activity Area of CHMP 15276.

Table 18 Comparison of assessments of Aboriginal heritage between Trail 1 and Trails 45, 46 and 47

	Trail 1	Trails 45, 46 and 47
Trail length (metres)	22,260	15,183 (Trail 45 = 4,057, Trial 46 = 5,510 and Trail 47 = 5,616)
Aboriginal heritage	Low sensitivity area	Low sensitivity area
Historic heritage	High sensitivity area: • Within HO 140 area • Intersects two areas of archaeological sensitivity associated with hut sites • Intersects area of archaeological sensitivity associated with sawmill • Intersects water race and three tramways • Proximity to hut sites	Moderate sensitivity area: Trails 45 and 46 intersect HO 140. Trail 47 does not intersect any known historic heritage places.

12 Summary of mitigation and contingency measures

Mitigation measures have been developed in accordance with the mitigation hierarchy and consideration of the level of potential impact. The focus of these mitigation measures is firstly avoiding impacts where possible (building upon the avoidance measures included in the design), and secondly, implementing project-specific measures to achieve acceptable outcomes for Aboriginal and historic heritage.

For mitigation relation to potential impacts to Aboriginal cultural heritage, the management conditions and contingencies will be developed in consultation with the WWHCAC through the preparation of CMP 15276.

The Warburton MBT Heritage Impact Statement (HIS) details specific management conditions for each historic place or area of archaeological potential as well as contingencies for unexpected finds.

Where it was deemed necessary, mitigation measures include monitoring of construction and implementation of contingency actions should standards be exceeded.

The mitigation measures that have been recommended to avoid, mitigate or manage Aboriginal and historic cultural heritage impacts associated with the Project are defined in Table 19.

Table 19 Mitigation measures relevant to Aboriginal and historic cultural heritage

Mitigation I.D	Mitigation measure	Stage
HM01	Comply with all management condition and contingencies of CHMP 15276. Management measures (not confirmed at this stage) are likely to include inductions to construction crews undertaking ground disturbing works, compliance checks before and during and after the Project construction. The CHMP also includes contingency plans in the case of unexpected finds.	Construction/ Operation
HM02	Complete the Cultural Values Recording report	Construction/ Operation
HM03	To mitigate potential harm to VHI sites, the following protocol must be followed: • Limit works to the removal of vegetation if possible. This must be inspected by a suitably qualified and experienced archaeologist after vegetation clearance is complete. • If limiting works to vegetation clearance is not possible the second preference is to build up the ground over the VHI site extent. Sourcing of earth for this purpose is subject to the same mitigations measures referred to in this table. • If ground disturbing works are proposed within the bounds of VHI sites, consent approval must be obtained from Heritage Victoria prior to their commencement.	Construction/ Operation

HM04	An amendment to the Planning Scheme is currently in preparation that, if approved, will satisfy the requirement for a planning permit for Heritage Overlays. Where an area of archaeological potential has been identified within the bounds of a Heritage Overlay, the mitigation strategies for 'Unknown historic heritage sites and identified areas of archaeological potential' still applies (HM05). If archaeological features are uncovered during works within a Heritage Overlay, the contingency measure in HM05 applies.	Construction
HM05	To mitigate possible impact to unknown historic sites and identified areas of archaeological potential, the following protocol would be followed. The Areas of Archaeological Potential and Points of Archaeological Potential are shown on Map 7. **<u>Inductions</u>** All workers involved in developing the trail must undertake a heritage induction prior to commencing works. This induction will be presented by a suitable experienced and qualified archaeologist. The induction will included the following topics: • A brief history of the area and types of sites that are present • The existence of the EES and the management conditions • Landforms and artefacts that may be present that would indicate an archaeological site • The contingency measures that need to be followed in the case of an unexpected find **<u>Areas of Archaeological Potential</u>** Areas of identified archaeological potential will be subject to the following protocol. • All works must be conducted according to the CEMP, including the micro-siting procedure outlined within • Limit works to the removal of vegetation if possible. This must be inspected by an archaeologist after vegetation clearance is complete • If works cannot be limited to vegetation removal and ground disturbing works must take place, the works must be supervised by an archaeologist • If archaeological features are uncovered during works, the contingency protocol must be followed **<u>Point of Archaeological Potential – Tramway</u>** • All works must be conducted according to the CEMP, including the micro-siting procedure outlined within • Limit works to the removal of vegetation if possible. This must be inspected by an archaeologist after vegetation clearance is complete • If works cannot be limited to vegetation removal and ground disturbing works must take place, the works must be supervised by a suitably qualified and experienced archaeologist • If archaeological features are uncovered during works, the contingency protocol must be followed	Construction/ Operation

	Contingencies The following contingency measures would be undertaken if archaeological features or artefacts are found during construction works. • Stop works if archaeological features are uncovered during construction works • Recording the features/artefacts by a suitable qualified and experienced archaeologist • Using the micro-siting procedure outlined in the CEMP to realign the trail if possible • Submission of a site card to Heritage Victoria (HM03 will then apply) • Abide by all conditions on HV site card	
HM06	Signage would be installed in accordance with the Warburton MBT CEMP and the management conditions of any consents from Heritage Victoria. Monitoring or checks of known historic sites and features would be carried out as part of general trail upkeep during operation.	Operation

It is noted that specific measures, including relevant monitoring, recording and contingencies would be required as conditions of the CHMP under the *Aboriginal Heritage Act 2006* and Consent applications under the *Heritage Act 2017*. It is up to the proponent to ensure compliance with conditions.

13 Conclusion

The purpose of this report is to assess the potential Aboriginal and historic cultural heritage impacts associated with the Warburton Mountain Bike Destination to inform the preparation of the EES required for the Project. A summary of the key assets, values or uses potentially affected by the Project, and an associated assessment of traffic and transport impacts and recommended mitigation measures, are summarised below.

13.1 Existing conditions

CHMP 15276 is currently in preparation for the Project Area, and a Historic Survey Report was prepared to establish the nature and location of historic sites within the Project Area.

The CHMP identified no previously registered Aboriginal cultural heritage places within the Project Area from alignments 1-66. Due to the landform characteristics such as steep erosional slopes and thick undergrowth, the Project Area is likely to have been unsuitable for occupation, and not conducive for the deposition and accumulation of archaeological material. Sensitive landforms within the Project Area, such as mountain tops, ridgelines, gentle sloping hills, flood plains and waterways have been identified through the CHMP process and are targeted for testing during the Complex Assessment.

No specific intangible Aboriginal cultural heritage places or oral traditions relating to the Project Area (identified through consultation with Aboriginal stakeholders) has been identified, however, connection to land in the distant past with the utilisation of natural resources as well as more recent historical narrative of the removal of the Wurundjeri Woi-wurrung people through the arrival of European is considered to have intangible values and as such of continued importance to the Wurundjeri Woi-wurrung people.

The Historic Survey Report identified a total of five listed heritage sites within the Project Area, including VHIs sites as well as HO sites. A number of historic features such as water races, tramways and mining sites were also identified from historical sources, including areas of archaeological potential. The field survey did not identified any archaeological remains at these locations, however, there is still potential for them to occur.

13.2 Impact assessment findings

A risk assessment was carried out as part of this Aboriginal and historic cultural heritage impact assessment to identify potential construction and operational risks and risk pathways and assign consequence and likelihood ratings, to determine key areas of potential impact.

Impacts during the construction process, specifically the excavation of the Project Area to bench steep slopes, shape trail features and provide for drainage, have the potential to impact on Aboriginal and historic cultural heritage. These construction works also have the potential to alter the landscape that may be associated with Aboriginal heritage.

Based on trails 1-66, no Aboriginal places have been recorded within the Project Area, however Aboriginal places may be identified during the construction phase of the Project when excavations occur.

There are currently five listed heritage sites (VHI and HO sites) which are traversed by the Project, and therefore have the potential to be impacted during construction works. In addition, a number of unlisted heritage sites and features have been recorded within the Project Area such as water races, tramways and mining sites and which the trails are expected to intersect.

It is anticipated that the development of the trails will encourage more people to the area and therefore to Aboriginal places and historic sites that would normally receive no visitors. The advent of increased visitor traffic may result in human impacts, such as vandalism, accidental harm and the removal of archaeological objects, to listed and unlisted historic sites within the Project Area.

13.3 Mitigation and contingency measures

The CHMP assessment will provide management conditions for Aboriginal cultural heritage places and sensitive landforms which will mitigate harm during the construction phase. In addition, the CHMP will contain contingency measures which will include the management of unexpected finds located during construction or operation activities, compliance responsibilities, custody of Aboriginal cultural heritage and dispute resolution pathways.

To mitigate the risk of harm to impacts to intangible heritage, Cultural Values Recording was carried out with WWCHAC providing Indigenous cultural values within the Project Area, with the report still in preparation. The intangible value for the Project Area is related to the natural resource utilised by the WWCHAC people within the region and history of the land through their prior disposition during and post European arrival. Minimisation of the impacts and renewal of these natural resources and preservation of historic knowledge and continued education of the larger community of these historic events will reduce the residual impacts to cultural values by the development.

Consent applications will be made for the three VHI sites located within the Project Area if ground works are proposed within the extent of the VHI places and micro siting cannot avoid them. These applications, which are approved by HV, will allow disturbance to the sites and provide mitigation measures. Detailed design and efforts to avoid excavation within the curtilage of listed historic heritage sites will assist in managing impacts during the construction phase of the Project. A planning scheme amendment is in preparation that will fulfil the requirement for Yarra Ranges Council permits for the two HO areas within the Project Area.

The micro-sting procedure outlined in the CEMP will also assist in the mitigating impacts to unlisted heritage sites such as water races, tramways and mine sites and to areas of archaeological potential. Micro-siting during the construction of trails will be undertaken to minimise impacts to the ground surface.

To manage the risk of human impacts to historic cultural heritage (such as vandalism, collection of artefacts) during the operation of the trail, checks of known historic sites and features should be carried out as part of trail upkeep. Signage at trail heads alerting people to stay to track will also assist in managing human impacts.

When complete, the preparation of the CHMP, Cultural Values Recording and Consent applications will have enabled the identification of cultural heritage values within the Project Area and supported the development of management conditions, recommendations and mitigation measures to avoid or minimise impacts on these values.

13.4 Summary of residual impact

Based on the implementation of the mitigation measures described above, the following residual impacts on Aboriginal and historic cultural heritage have been identified:

- **Construction activities impact registered Aboriginal cultural heritage places resulting in loss of heritage value**: CHMP 15276 has shown that no registered places are within the project area, therefore there will be no residual impact.
- **Construction activities impact unidentified Aboriginal cultural heritage places resulting in loss of heritage value**: the preparation of CHMP 15276 and compliance with its management conditions

will leave a low risk of unidentified Aboriginal cultural heritage places being impacted. The preliminary results of CHMP 15276 have shown that there is a low probability for Aboriginal places to be present within the project area and compliance with the management conditions and contingencies set by WWCHAC Elders will ensure that any unexpected finds are appropriately managed with an impact level that is acceptable to the WWCHAC.

- **Construction activities impact intangible cultural heritage values, resulting in loss of heritage value:** WWCHAC have stated through the cultural values recording that native flora has intangible cultural value due to Wurundjeri people's use of these resources. Impact to native flora will be minimal, with much of it being reinstated after works. Compliance with the management conditions and contingency measures of CHMP 15276 will serve as mitigation. Therefore the residual impact will be low.
- **Construction activities impact archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains**: the preparation of CHMP 15276 and compliance with its management conditions will leave a low risk of archaeologically sensitive landforms being impacted. The management conditions and contingency measures will ensure any impacts are managed with the consent of WWCHAC.
- **Construction activities directly or indirectly impact listed historic heritage sites**: the applications for consents from Heritage Victoria and compliance with any management conditions as well as compliance with the CEMP will leave low residual impact.
- **Construction activities directly or indirectly impact unlisted historic heritage sites**: the inductions, contingency measures and compliance with the CEMP result in construction activities having a low residual impact to unlisted historic heritage.
- **Operation activities directly or indirectly impact registered and unidentified Aboriginal cultural heritage places**: CHMP 15276 has shown that no registered places are within the project area, therefore there will be no residual impact to registered places. The management conditions and contingencies of CHMP 15276 will lower the impact to unidentified Aboriginal places.
- **Operation activities directly or indirectly impact listed and unlisted historic heritage sites**: the installation of signage will serve to mitigate the impact of operational impact to listed and unlisted historic heritage places, leaving the residual impact as low.

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Appendix 1

The risk pathways define the cause and effect topics relevant to cultural heritage is based on an understanding of the existing conditions and the Project activities. The risk pathways are provided in Table 20.

The risk assessment was determined using the risk matrix developed for this EES. The risk matrix is shown in Table 10.

Table 20 Risk pathways

Risk No.	Staging		Risk pathway	Initial mitigation measure and management measures	Initial risk			Additional mitigation and management measures	Residual risk		
	Construction	Operation	Cause/ Effect		Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level
HR01	C		**Registered Aboriginal cultural heritage places** Construction activities impact registered Aboriginal cultural heritage places resulting in loss of heritage value.	**HM01** – Comply with all management condition and contingencies of CHMP 15276.	Moderate	Rare	Low	N/A	Moderate	Rare	Low
HR02	C		**Unidentified Aboriginal cultural heritage places** Construction activities impact unidentified Aboriginal cultural heritage places resulting in loss of heritage value.	**HM01** – Comply with all management condition and contingencies of CHMP 15276.	Moderate	Rare	Low	N/A	Moderate	Rare	Low

HR03	C		**Intangible cultural heritage values** Construction activities impact intangible cultural heritage values, resulting in loss of heritage value.	**HM01** – Comply with all management condition and contingencies of CHMP 15276. **HM02** – Complete the Cultural Values Recording report.	Moderate	Rare	Low	N/A	Moderate	Rare	Low
HR04	C		**Archaeologically sensitive landforms** Construction activities impact archaeologically sensitive landforms including waterways, mountain tops, ridgelines, gentle sloping hills and flood plains.	**HM01** – Comply with all management condition and contingencies of CHMP 15276.	Moderate	Rare	Low	N/A	Moderate	Rare	Low
HR05	C		**VHI sites** Construction activities directly or indirectly impact VHI listed historic heritage sites.	**HM03** - To mitigate potential harm to VHI sites, the following protocol must be followed: • Limit works to the removal of vegetation if possible. This must be inspected by a suitably qualified and experienced archaeologist after vegetation clearance is complete • If limiting works to vegetation clearance is not possible the second preference is to build up the ground over the VHI site extent. Sourcing of earth for this purpose is subject to the same	Major	Likely	Medium	N/A	Moderate	Rare	Low

				mitigations measures referred to in this table. • If ground disturbing works must take place within the bounds of VHI sites, Consent would be obtained from HV in advance. All management condition in the consent must be followed.							
HR06			**HO sites** Construction activities directly or indirectly impact HO listed historic heritage sites.	**HM04** - An amendment to the Planning Scheme is currently in preparation that, if approved, will satisfy the requirement for a planning permit for Heritage Overlays. Where an area of archaeological potential has been identified within the bounds of a Heritage Overlay, the mitigation strategies for 'Unknown historic heritage sites and identified areas of archaeological potential' still applies (HM05). If archaeological features are uncovered during works within a Heritage Overlay, the contingency measure in HM05 applies.	Major	Likely	Medium		Moderate	Rare	Low
HR07	C		**Unknown historic heritage sites and identified areas of archaeological potential** Construction activities directly or indirectly impact unlisted historic heritage sites or noted areas of archaeological	**HM05** – to mitigate possible impact to unknown historic sites and identified areas of archaeological potential, the following protocol would be followed. The Areas of Archaeological Potential and Points of Archaeological Potential are shown on Map 7.	Moderate	Possible	Medium	N/A	Moderate	Rare	Low

			potential.	**Inductions** All workers involved in developing the trail must undertake a heritage induction prior to commencing works. This induction will be presented by a suitable experienced and qualified archaeologists. The induction will included the following topics: • A brief history of the area and types of sites that are present • The existence of the EES and the management conditions • Landforms and artefacts that may be present that would indicate an archaeological site • The contingency measures that need to be followed in the case of an unexpected find **Areas of Archaeological Potential** Areas of identified archaeological potential will be subject to the following protocol. • All works must be conducted according to the CEMP, including the micro-siting procedure outlined within • Limit works to the removal of vegetation if possible. This must be inspected by an archaeologist after vegetation clearance is complete							

- If works cannot be limited to vegetation removal and ground disturbing works must take place, the works must be supervised by an archaeologist
- If archaeological features are uncovered during works, the contingency protocol must be followed

Point of Archaeological Potential – Tramway

- All works must be conducted according to the CEMP, including the micro-siting procedure outlined within
- Limit works to the removal of vegetation if possible. This must be inspected by an archaeologist after vegetation clearance is complete
- If works cannot be limited to vegetation removal and ground disturbing works must take place, the works must be supervised by a suitably qualified and experienced archaeologist
- If archaeological features are uncovered during works, the contingency protocol must be followed

Contingencies

				The following contingency measures would be undertaken if archaeological features or artefacts are found during construction works. • Stop works if archaeological features are uncovered during construction works • Recording the features/artefacts by a suitable qualified and experienced archaeologist • Using the micro-siting procedure outlined in the CEMP to realign the trail if possible • Submission of a site card to Heritage Victoria (HM03 will then apply) • Abide by all conditions on HV site card							
HR08		O	**Registered and unidentified Aboriginal cultural heritage places** Operation activities directly or indirectly impacting Registered and unidentified Aboriginal cultural heritage places	**HM01** – Comply with all management condition and contingencies of CHMP 15276.	Moderate	Possible	Medium	N/A	Moderate	Rare	Low

HR09		O	**Registered and unidentified historic heritage sites** Operation activities directly or indirectly impacting Registered and unidentified Aboriginal cultural heritage places	**HM06** - Signage would be installed in accordance with the Warburton MBT CEMP and the management conditions of any consents from Heritage Victoria.	Moderate	Possible	Medium	N/A	Moderate	Rare	Low

Appendix 2

Table 21 Location of impacts (refers to Map 7)

Location ID	Place type	Trail number	Registration number (if applicable)	Place name	Sheet number	Grid reference
1	PoAP	56		Richard's Tramway	7.8	F2
2	PoAP	27		Richard's Tramway	7.7	D5
3	PoAP	35		Yankee Jim Tramway	7.7	E5
6	PoAP	63		Richard's Tramway	7.7	D5
7	PoAP	39		Yankee Jim Tramway	7.7	F4
8	PoAP	39		Yankee Jim Tramway	7.9	A2
9	PoAP	39		Yankee Jim Tramway	7.9	A2
10	PoAP	39		Yankee Jim Tramway	7.9	A2
11	PoAP	24		Yankee Jim Tramway	7.7	F4
12	PoAP	23		Yankee Jim Tramway	7.7	F4
13	PoAP	22		Yankee Jim Tramway	7.7	F3
14	PoAP	10		O'Shannassey Tramway	7.5	C5

16	PoAP	9		O'Shannassey Tramway	7.5	C4
17	PoAP	2		McKechnies Tramway	7.4	D3
18	PoAP	3		McKechnies Tramway	7.4	F3
19	PoAP	3		McKechnies Tramway	7.4	F3
20	PoAP	3		McKechnies Tramway	7.4	F3
22	PoAP	2		McKechnies Tramway	7.4	F3
24	PoAP	1		Henry Tramway	7.2	B3
25	PoAP	1		Henry Tramway	7.4	B1
26	PoAP	1		Henry (1907) and Slocumb & Walker (1907-12) mill and tramway site	7.4	C2
27	AoAP	39		Mt Bride Tramway	7.9	D4
28	AoAP	41		Mt Bride Tramway	7.9	D5
29	AoAP	52		Mt Bride Tramway	7.9	E5
30	AoAP	1		MWB Hut sites and Mt Donna Buang Rd	7.3	B1, B2, C1 and C2
31	AoAP	45		Yankee Jim/Big Pat's Water Race	7.3	D1
32	AoAP	46		Hut sites	7.3	D1
33	AoAP	9		O'Shannassey Tramway	7.5	C4

34	AoAP	1		McKechnies Mill	7.4	F3
35	AoAP	3		McKechnies Mill	7.4	F3
36	AoAP	27		Laudehr's Tramway	7.7	D5
37	AoAP	35		Laudehr's Tramway	7.7	E5
38	AoAP	43		Yankee Jim Tramway	7.7	B4 and BC
39	AoAP	63		Richard's Tramway	7.7	D5
40	AoAP	55		Richard's Tramway	7.7	D5
41	AoAP	66		Richard's Tramway	7.7	D5
42	AoAP	1		Henry (1907) and Slocumb & Walker (1907-12) mill and tramway site	7.4	B1
43	AoAP	2		MMBW site	7.4	D2 and D3
44	AoAP	22		Yankee Jim/Big Pat's water race	7.7	F3
45	AoAP	23		Yankee Jim/Big Pat's water race	7.7	F3
46	AoAP	24		Yankee Jim/Big Pat's water race	7.9	A1 and B1
47	AoAP	41		Yankee Jim/Big Pat's water race	7.9	A1 and B1
48	AoAP	52		Yankee Jim/Big Pat's water race	7.9	B1 and C1
49	AoAP	42		Yankee Jim/Big Pat's water race	7.9	D2

50	Proposed VHI (change to existing VHI extent)	9	H8022-0111	O'Shannessy aqueduct sawmill and tramway site	7.5	C3
51	HO	45	HO140	Mount Donna Buang-Bridle Tracks & Road	7.3	D1 and D2
52	HO	46	HO140	Mount Donna Buang-Bridle Tracks & Road	7.3	E4 and E5
53	HO	1	HO140	Mount Donna Buang-Bridle Tracks & Road	7.2 and 7.3	E2 (7.2) and A2, B1, B2 and C1 (7.3)
54	HO	11	HO214	Lilydale – Warburton Railway	7.7	E1
55	HO	61	HO214	Lilydale – Warburton Railway	7.7	E1
56	VHI	1	H8022-0111	O'Shannassy Aqueduct Sawmill Site	7.5	C4
57	VHI	2	H8022-0111	O'Shannassy Aqueduct Sawmill Site	7.5	C4
58	VHI	7	H8022-0111	O'Shannassy Aqueduct Sawmill Site	7.5	C4
59	VHI	9	H8022-0111	O'Shannassy Aqueduct Sawmill Site	7.5	C4
60	VHI	23	H8022-0138	Lady Hopetoun Mine	7.7	F3
61	VHI	62	H8022-0135	Anderson's Sawmill	7.5	C5

Appendix 3

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
1	Descends from the summit of Mt Donna Buang to the O'Shannassy Aqueduct.	• Low sensitivity area: – No recorded places or potential	• High sensitivity area: – Within HO 140 area – Intersects two areas of archaeological sensitivity associated with hut sites – Intersects area of archaeological sensitivity associated with sawmill – Intersects water race and three tramways – Proximity to hut sites	Moderate
2	Mostly flat trail running parallel to O'Shannassy Aqueduct from the top of the Golf Course to Dee Rd car park and then climbing up to meet trail 1	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects area of archaeological sensitivity associated with MMBW works site – Intersects two tramways	Moderate
3	Loop trail located between trail 1 and 2. Roughly 50% climbing and 50% descending.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway	Moderate
4	Short climbing link between trail 2 and 1.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
5	Gravity trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Proximity to VHI sawmill and tramway site	Low
6	Gravity trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
7	Loop trail, starting and finishing on O'Shannassy Aqueduct.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Proximity to VHI sawmill and tramway site	Low
8	Easy descending trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
9	Loop trail located on private property above golf course.	• Low sensitivity area: – No recorded places or potential	• High sensitivity area: – Intersects VHI sawmill and tramway site – Intersects area of potential	Moderate
10	Golf course loop. Concept only.	• Low sensitivity area: – Complex testing (CHMP 15276) undertaken in proximity after area of potential recorded, no places found and potential resolved	• High sensitivity area: – Intersects VHI sawmill and tramway site – Intersects area of potential associated with sawmill	Moderate
11	First loop on Mt Little Joe. Starts on rail trail. Finishes at bottom of Backstairs Track.	• Moderate sensitivity area: – Proximity to VAHR 8022-0023 (80m from sensitivity buffer)	• Moderate sensitivity area: – Within HO 214 area	Moderate
12	Second loop on Mt Little Joe. Traverses western side of Mt Little Joe. Starts and finishes on trail 11.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
13	Third loop on Mt Little Joe. Starts and finished on trail 12. Provides access to Old Warburton Rd via the existing access track, plus connections down into Wesburn.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Proximity to area of archaeological potential and tramway site	Low

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
14	Loop to summit of Mt Little Joe. Starts on trail 13 and finishes on trail 11. Traverses the eastern and western faces of Mt Little Joe and provides access to proposed Mt Little Joe viewing platform and trails 15 and 16.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
15	Descending trail on the north/east face of Mt Little Joe. Starts on trail 14. Finishes on trail 11.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
16	Descending trail on the east face of Mt Little Joe. Starts on trail 14. Finishes at Backstairs trail junction.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
17	Climbing link trail from Warburton Chalet into trail network. Starts at the chalet and finishes on trail 11.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
18	Descending trail through Backstairs corridor. Starts at Backstairs junction. Finishes on trail 20.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
19	Descending trail through Backstairs corridor. Starts at Backstairs junction. Finishes on trail 20.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Proximity to tramway site – Proximity to HO 214 area	Low
20	Descending trail through Backstairs corridor.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway site – Proximity to HO 214 area	Moderate

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
21	Access trail between Backstairs junction and vehicle access track. Mostly flat.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
22	Climbing trail from Old Warburton Rd up to Edwardstown Rd.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects water race site and tramway site – Proximity to area of archaeological potential associated with Lady Hopetoun Mine site	Moderate
23	Descending trail from Edwardstown Rd to Old Warburton Rd.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects water race site – Proximity to area of archaeological potential associated with Lady Hopetoun Mine site	Moderate
24	Descending trail from Edwardstown Rd to Old Warburton Rd.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects water race site and tramway site	Moderate
25	Link trail from Old Warburton Rd to Hey Hey My My.	• Moderate sensitivity area: – Proximity to VAHR 8022-0019 (within 50m buffer)	• Moderate sensitivity area: – Intersects two areas of archaeological sensitivity associated with Yankee Jim mine – Intersects area of archaeological sensitivity associated with cemetery – Intersects area of archaeological potential associated with Laudehr tramway Old Warburton – Intersects tramway – Proximity to two tramways	Moderate
26	Existing MTB trail - Hey Hey My My	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
27	Main climbing trail to summit of Mt Tugwell.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway site – Intersects area of archaeological potential associated with Laudehr tramway Old Warburton	Moderate
28	Descending trail from summit of Mt Tugwell. Finishes at Edwardstown Rd.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
29	A-line style jump track using top portion of Cemetery Track, before finishing on trail 28.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
30	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Top Track). Finishes at Edwardstown Rd.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
31	Alternate end section on 30.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
32	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails. Finishes on trail 33.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway site	Moderate
33	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Matt's Track). Finishes at Edwardstown Rd.	• Moderate sensitivity area: – Proximity to VAHR 8022-0027 (19m to sensitivity buffer)	• Low sensitivity area: – No recorded or potential sites	Moderate
34	Link trail between trails 30 and 32.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
35	Link trail from Edwardstown Rd to Mineshaft Hill area.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway site – Intersects area of archaeological potential associated with Laudehr tramway Old Warburton	Moderate
36	Link trail between trails 28 and 35.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
37	Link trail between trails 27 and 35.	• Low sensitivity area: – No recorded places or potential	• Low sensitivity area: – No recorded or potential sites	Low
38	Link trail between summit of Mt Tugwell and Mt Tugwell trailhead.	• Moderate sensitivity area: – Proximity to VAHR 8022-0027 (60m to sensitivity buffer)	• Low sensitivity area: – No recorded or potential sites	Moderate
39	Long climbing trail, from Edwardstown Rd to Mt Tugwell trailhead, running parallel just below Mt Bride Rd, finishing at Mt Tugwell trailhead.	• Low sensitivity area: – No recorded places or potential	• Moderate sensitivity area: – Intersects tramway site	Moderate
40	Link trail between trails 40 and 42.	• Low sensitivity area, no survey undertaken: – No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
41	Long descending trail from Mt Tugwell trailhead, running parallel below Mt Bride Rd, finishing on trail 24.	• Low sensitivity area, no survey undertaken: – No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
42	Long descending trail from Mt Tugwell trailhead wrapping around onto Mt Bride. Finishes on trail 41.	• Low sensitivity area, no survey undertaken: – No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects water race and tramway site	Moderate

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
43	Gentle descending trail into Wesburn Recreation Reserve. Uses portion of old tramway.	• Low sensitivity area, no survey undertaken: – No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
44	Climbing trail out of Wesburn Recreation Reserve.	• Low sensitivity area, no survey undertaken: – No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
45	Eastern slope of Mt Donna Buang	• Low sensitivity area, no survey undertaken:	• Moderate sensitivity area, upper 500m surveyed – Within HO 140	Moderate
46	Eastern slope of Mt Donna Buang	• No recorded places or potential	• Moderate sensitivity area, 500m surveyed – Within HO 140	Moderate
47	Near Donna Buang Road	• Low sensitivity area, no survey undertaken	• Low sensitivity area – No recorded or potential sites	Low
48	East of Mt Tugwell	• Moderate sensitivity area: – Proximity to VAHR 8022-0027 (20m to sensitivity buffer)	• Low sensitivity area – No recorded or potential sites	Moderate
49	Mt Bride to Groom Hill	• Low sensitivity area, no survey undertaken:	• Moderate sensitivity area – Hermon's Mill 50 m off trail	Moderate
50	Along Groom Hill ridge	• No recorded places or potential	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
51	Zigzag descent north of Mt Tugwell to trail 42	• Low sensitivity area, no survey undertaken:	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
52	Hillside north of Mt Bridge Rd	• No recorded places or potential	• Low sensitivity area – No recorded or potential sites	Low

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
53	Zigzag descent to trail 52	• Low sensitivity area, no survey undertaken:	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
54	Headwater of Mann Creek	• No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
55	Link from Hey Hey My My to Trail 66	• Low sensitivity area, no survey undertaken:	• Low sensitivity area – No recorded or potential sites	Low
56	South of Tugwell Creek	• No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate
57	South-west of Mt Tugwell	• Low sensitivity area, no survey undertaken:	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
58	South side of Mt Tugwell	• No recorded places or potential	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
59	Link to Lal Lal Falls Walk and Four Mile Creek	• Low sensitivity area, no survey undertaken:	• Moderate sensitivity area, no survey undertaken – Intersects tramway site and near aqueduct	Moderate
60	Descent from Mt Bridge Rd to Old Warburton Rd	• No recorded places or potential	• Moderate sensitivity area – Intersects tramway site aqueduct and near Evans Reward mine	Moderate
61	Descent from Trail 11 to Station Rd	• Low sensitivity area, no survey undertaken:	• Moderate sensitivity area – Intersects rail trail HO241	Moderate
62	South-east of Mineshaft hill	• No recorded places or potential	• Low sensitivity area, no survey undertaken – No recorded or potential sites	Low
63	Top of Mineshaft hill	• Low sensitivity area, no survey undertaken:	• Moderate sensitivity area – Vicinity of gold mining area	Moderate

Trail ID	Trail description	Aboriginal Cultural Heritage	Historical Heritage	Priority for investigation of alternatives
64	Link from Hey Hey My My to Trail 25	• No recorded places or potential	• Low sensitivity area – No recorded or potential sites	Low
65	Descent from Mt Tugwell to north-west to join trail 31	• Low sensitivity area, no survey undertaken:	• Low sensitivity area – No recorded or potential sites	Low
66	Connecting trails 54 and 55 at headwater of Edwardstown Creek	• No recorded places or potential	• Moderate sensitivity area, no survey undertaken – Intersects tramway site	Moderate