



**SNOWY MONARO**  
REGIONAL COUNCIL

# **ATTACHMENTS TO REPORTS**

(Under Separate Cover)

**Ordinary Council Meeting**

**15 May 2025**





**ATTACHMENTS TO REPORTS  
FOR  
ORDINARY COUNCIL MEETING  
THURSDAY 15 MAY 2025**

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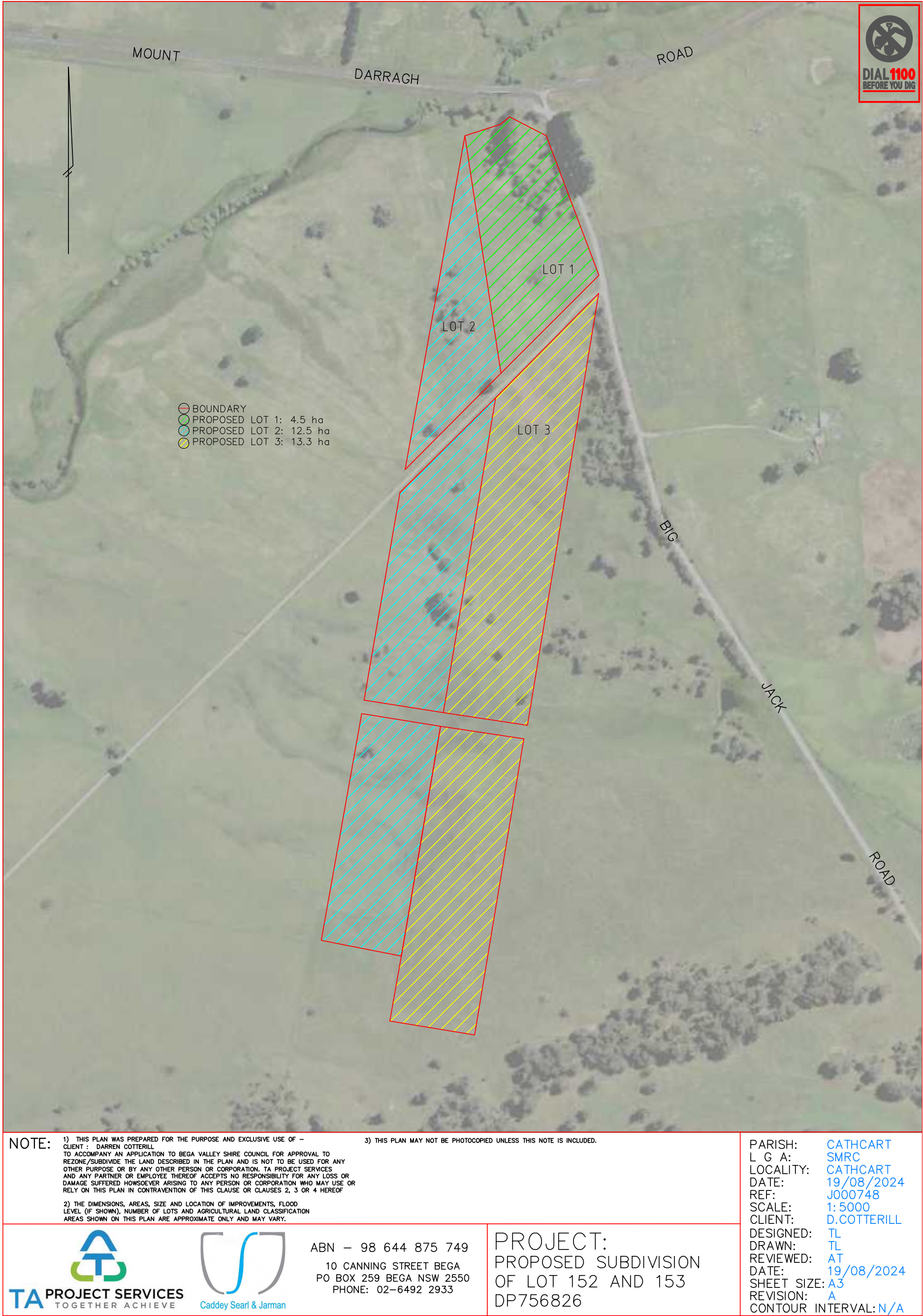
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## Statement of Environmental Effects

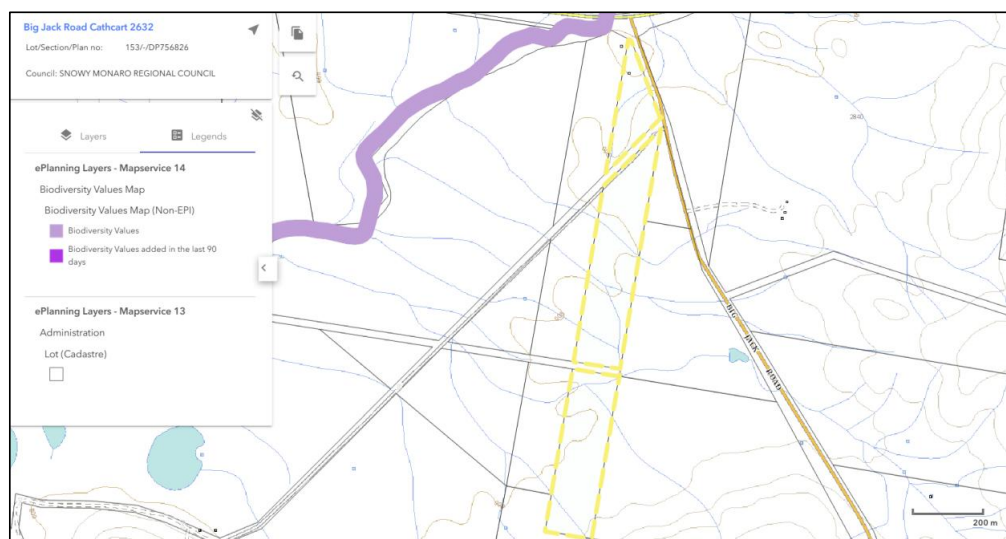
Development Application for Subdivision of Land  
Lot 152 and 153 in DP756826  
Big Jack Road, Cathcart NSW 2632

Prepared by TA Project Services  
Issued December 2024



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1.    Summary

This Statement of Environmental Effects has been prepared to accompany the lodgement of a development application for subdivision of land (2 into 3 lots) at Big Jack Road, Cathcart NSW 2632.

2.    Accompanying Design and Reports

This statement relies on the following plans prepared by TA Project Services :

Accompanying Designs			
Drawing No.	Revision	Drawing Name	Date
J000748	A	Proposed Subdivision of Lot 152 and 153 DP756826	19/08/2024

The development application is supported by the following documents:

Accompanying Documents		
Document	Prepared by	Date
Due Diligence Assessment	TA Project Services	November 2024

3.    Site Location and Context

3.1   Property Locality

The subject site, Lot 152 and 153 in DP756826 is located 74.3km southeast of the Snowy Monaro central business district (CBD) as shown in Figure 1. More specifically it is located to the southwest of the Mount Darragh Road/ Big Jack Road Intersection as shown in Figure 2.

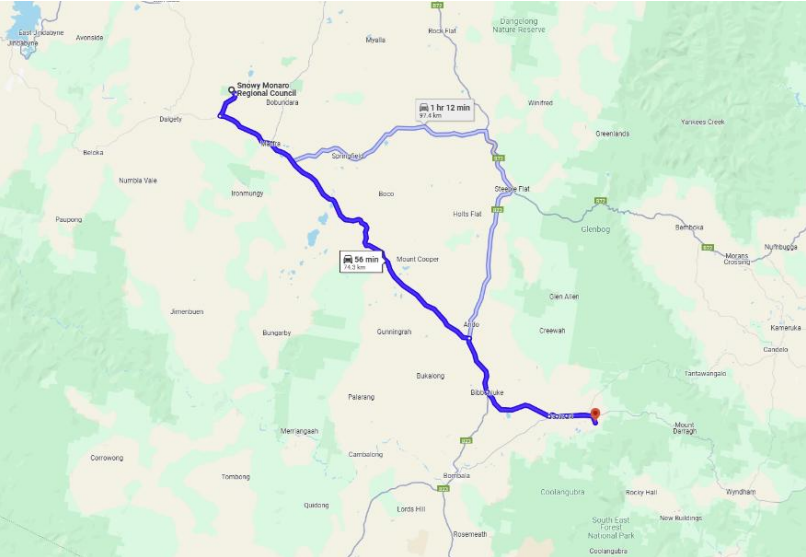


Figure 1: Site Locality Map Extract (Google Maps, 2024).



### 3.2 Property Description

The development site, Lot 152 and 153 in DP756826, addressed as Big Jack Road, Cathcart, comprises two allotments, irregular in shape with a total area of 30.3 hectares. The site currently contains farm shed structures and vegetation. Coolumbooka River is located north of the site and traverses land in a west-west alignment.

Topographically, the landform is varied and the highest point noted on the subject is 800m AHD. Mount Marshall Road traverses the site in a perpendicular alignment and dissects the middle portion of the site. On site vehicle access to the site is facilitated by Big Mountain Road and Marshall Road. Figure 2 provide aerial imagery to depict the development site.

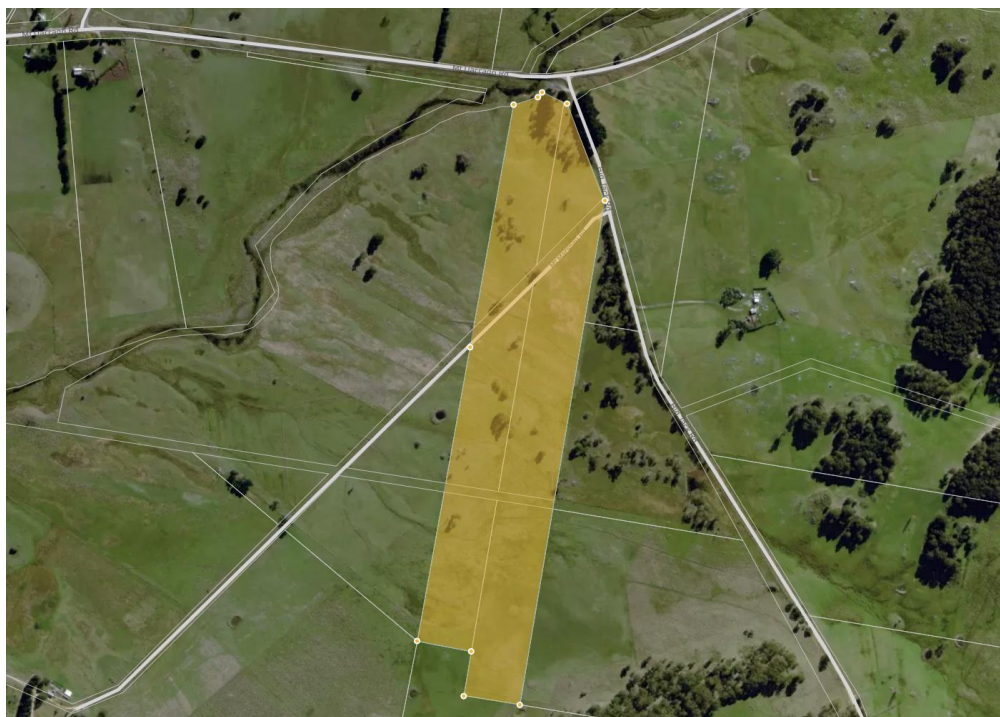


Figure 2: Site Aerial Imagery Depiction (Archistar, 2024).





3.3 Existing Development

As seen in Figure 3, Lot 152 in DP756826 contains farm shed structures. Lot 153 does not include any improvements. The land is utilised for agricultural purposes.



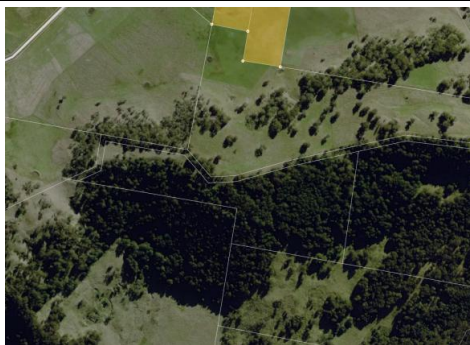


Figure 3: Existing Farm Shed Development (Google, 2024).

3.4 Surrounding Development

The immediate surrounding developments are summarised below including aerial photograph extracts:

Surrounding Developments	
Orientation	Photographs
North: <ul style="list-style-type: none"><li>• Mount Darragh Road</li><li>• Horseys Smap Creek</li><li>• Primary production land zoning</li><li>• Dwelling and ancillary domestic outbuildings</li></ul>	



Surrounding Developments	
Orientation	Photographs
<p>South:</p> <ul style="list-style-type: none"> <li>• Primary production land use zoning</li> <li>• Vegetation</li> <li>• Rural landscape zoning</li> <li>• Unimproved land holdings</li> </ul>	
<p>East:</p> <ul style="list-style-type: none"> <li>• Primary production land use zoning</li> <li>• Dwelling and ancillary structure</li> <li>• Unimproved land holdings</li> </ul>	
<p>West:</p> <ul style="list-style-type: none"> <li>• Primary production land use zoning</li> <li>• Dwelling and ancillary structure</li> <li>• Unimproved land holdings</li> <li>• Mount Marshall Road</li> <li>• Coolumbooka River</li> </ul>	

#### 4. Relevant Development History

In reviewing Council's development application record keeping system, it is noted that the site is subject to recent development application for a boundary adjustment submitted on 2 January 2024 and determined refused on 23 August 2024 due to lack of information in the original application.



5.    Proposal Summary

The proposed development is for a land subdivision which seeks to divide the two (2) existing lots into three (3) lots.

Specifically, the proposal is to create 3 separate lots for agricultural purposes. Proposed Lot 1 is 4.5 hectares in area with principal road frontage to Big Jack Road. Proposed Lot 2 is 12.5 hectares in area with principal road frontage to Mount Marshall Road. Lot 3 is 13.3 hectares in area with principal road frontage also to Mount Marshall Road.

There are currently no dwellings on either of the existing lots and it is not proposed to have a dwelling on any of the 3 proposed lots.

Figure 4 provides an extract of the proposed development plan to overviewing land subdivision.

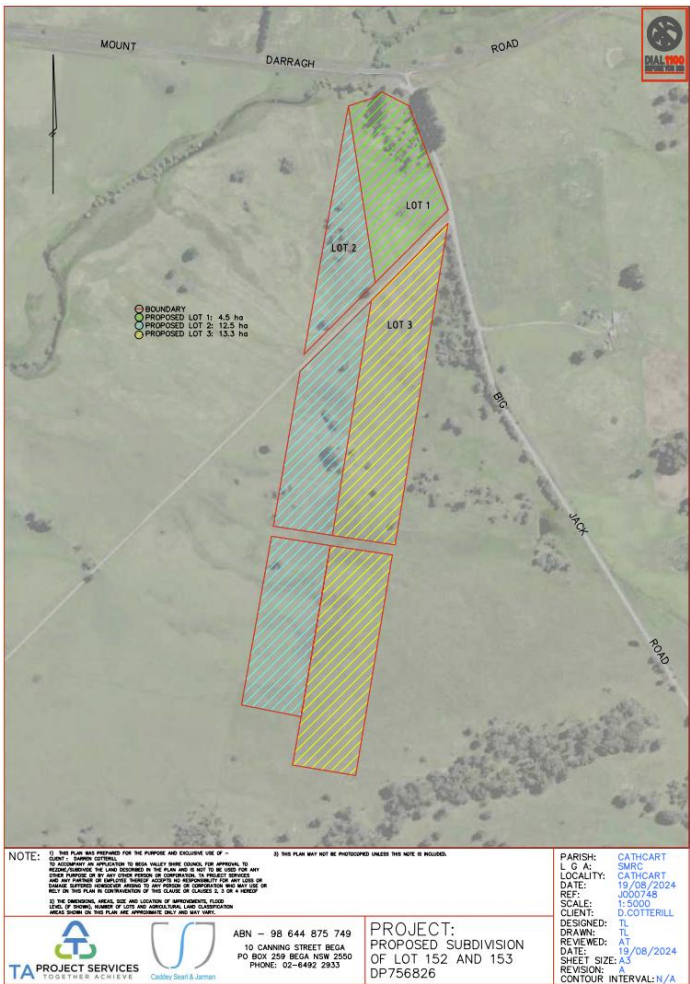


Figure 4: Proposed Development Extract (TA Project Services, 2024)



## 6. State Environmental Planning Policy Compliance

The following assessment has been carried out against the matters for consideration contained in Section 4.15 of the Environmental Planning and Assessment Act, 1979 (the "Act").

3.1 *The provisions of any environmental planning instrument Section 4.15(1)(a)(i) of the Act requires consideration of:*

(a) *the provisions of:*

(i) *any environmental planning instrument*

Compliance	
State Environmental Planning Policy (SEPP)	Applicable
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Yes
State Environmental Planning Policy (Sustainable Buildings) 2022	N/A
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008	N/A
State Environmental Planning Policy (Housing) 2021	N/A
State Environmental Planning Policy (Industry and Employment) 2021	N/A
State Environmental Planning Policy (Planning Systems) 2021	N/A
State Environmental Planning Policy (Primary Production) 2021	N/A
State Environmental Planning Policy (Resilience and Hazards) 2021	Yes
State Environmental Planning Policy (Resources and Energy) 2021	N/A
State Environmental Planning Policy (Transport and Infrastructure) 2021	N/A
State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development	N/A

### 6.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021

No clearing is proposed as part of this subdivision. Lot 152 DP756826 slightly intersects the Biodiversity Values Map at its northeastern corner (Figure 5). It should be noted that the biodiversity values in this area are associated with riparian land and function as a buffer from the creek. However, the vegetation at the point of intersection is not riparian in nature (Figure 6). As shown in Figure 7, the nearest mapped terrestrial biodiversity is approximately 800 meters from the closest property boundary.

This subdivision proposal does not include clearing, and the BMAT report identifies a clearing threshold of 10,000 m<sup>2</sup> for the property, which contains 38% native vegetation. While any future development would require a separate application, preliminary assessments indicate that clearing for infrastructure on the newly created lots could be achievable within regulatory requirements. It is noted that the proposed lots are zoned for agricultural purposes and will not contain any dwellings.



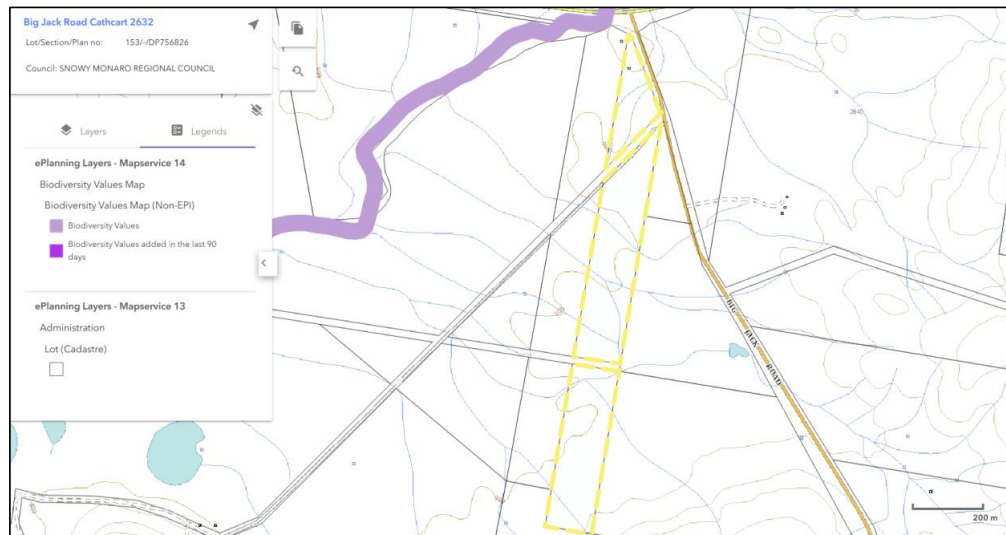


Figure 5: Biodiversity Values Map



Figure 6: Biodiversity Values – North Eastern Corner



Figure 7: Terrestrial Biodiversity Map

#### State Environmental Planning Policy (Resilience and Hazards) 2021

The proposed development for a subdivision is consistent with the relevant provisions of the SEPP. The subject site is zoned RU1 Primary Production and has been used for agricultural purposes and is proposed to continue to be used for agricultural purposes. The site is not considered to contain hazards or contamination.



## 7. Bombala Local Environmental Plan 2012

Bombala Local Environmental Plan 2012		
Clause	Provision	Compliance
2.3 Zone objectives and Land Use Table	<p><i>one RU1 Primary Production</i></p> <p><i>1 Objectives of zone</i></p> <ul style="list-style-type: none"> <li><i>• To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.</i></li> <li><i>• To encourage diversity in primary industry enterprises and systems appropriate for the area.</i></li> <li><i>• To minimise the fragmentation and alienation of resource lands.</i></li> <li><i>• To minimise conflict between land uses within this zone and land uses within adjoining zones.</i></li> <li><i>• To enable other land uses that are associated with primary industry and that require an isolated or rural location or that support the tourism industry.</i></li> </ul>	Consistent with the objectives of the RU1 Primary Production zone.



Bombala Local Environmental Plan 2012		
Clause	Provision	Compliance
2.6 Subdivision—consent requirements	<p>(1) Land to which this Plan applies may be subdivided, but only with development consent.</p> <p>Notes—</p> <p>1 If a subdivision is specified as exempt development in an applicable environmental planning instrument, such as this Plan or State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, the Act enables it to be carried out without development consent.</p> <p>2 Part 6 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 provides that the strata subdivision of a building in certain circumstances is complying development.</p> <p>(2) Development consent must not be granted for the subdivision of land on which a secondary dwelling is situated if the subdivision would result in the principal dwelling and the secondary dwelling being situated on separate lots, unless the resulting lots are not less than the minimum size shown on the Lot Size Map in relation to that land.</p> <p>Note—</p> <p>The definition of secondary dwelling in the Dictionary requires the dwelling to be on the same lot of land as the principal dwelling.</p>	<p>Consistent. Consent is being sought for subdivision of land. There are no existing dwellings on the site and none proposed.</p>






Bombala Local Environmental Plan 2012		
Clause	Provision	Compliance
4.2 Rural Subdivision	<i>(3) Land in a zone to which this clause applies may, with development consent, be subdivided for the purpose of primary production to create a lot of a size that is less than the minimum size shown on the Lot Size Map in relation to that land.</i>	Existing Lot 152 – approx 13.7ha (below minimum) Existing Lot 153 – approx 14.8ha (below Minimum) All three lots proposed are below the minimum 40 ha lot size, however, are proposed for the purposes of primary production agriculture. No dwellings exist and no entitlements are being sought.

## 8. Bombala Development Control Plan 2012

Bombala Development Control Plan 2012		
Clause	Provision	Compliance
2.2.5 Cathcart	<i>The historic village of Cathcart is located on Mount Darragh Road which connects Bombala to the coast. Originally called Taylor's Flat after it was settled in 1857 by James Taylor, Cathcart was once a thriving settlement that serviced the surrounding dairy farms with churches, sports facilities, hotels, shops and trades. A number of historic buildings remain including the heritage-listed Croft House. It now comprises two separate small lot subdivisions, one which straddles Mount Darragh Road and is partially developed and the other to the north that remains as farmland. Cathcart has a school of arts hall, service station and general store/postal agency to serve the small community. All houses are single storey and of fibre-cement or timber construction set within large open yards. The settlement is surrounded by beef cattle and sheep grazing lands, at the edge of the South East Forests National Park which covers the Great Dividing Range.</i>	Noted.
2.3.1 Site analysis		The development is for Rural Subdivision with no physical development proposed.



Bombala Development Control Plan 2012		
Clause	Provision	Compliance
2.4.2 Non-indigenous heritage	<i>A1 The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW is carried out to ensure that Aboriginal cultural heritage issues are addressed and whether the activity requires an application for an Aboriginal Heritage Impact Permit</i>	Consistent. The sites are not identified.
5.5 Sustainable Design Principles	<i>A1 An assessment of the potential impact of bushfire on property mapped as bushfire prone and of bushfire protection measures is prepared and submitted with the development application</i>	Consistent. The lots are classed as bushfire prone land however there are no dwellings proposed, and no dwelling entitlements are sought.
2.5.1 Bushfire	<i>Each lot in every subdivision must be provided with an appropriate standard of legal and practical vehicular access and access to an appropriate standard of public utility services and drainage as set out in this plan.</i>	<p>The site is Bushfire prone land mapped as Vegetation Category 3. There are no dwellings on site or proposed. The sites are all proposed to have legal and practical access.</p> 
2.5.2.7 Areas without flood risk management plans and studies	<i>Areas which are considered to be flood prone will require a flood assessment and will be assessed on a case-by-case basis. Where the likely extent of the 1:100 Average Recurrent Interval flood event is known or ascertained, the provisions of this Clause will apply to a proposed development.</i>	Not applicable. The site is not mapped as flood prone pursuant to the spatial viewer.



Bombala Development Control Plan 2012		
Clause	Provision	Compliance
2.5.3 Biodiversity, vegetation and tree removal	<i>This chapter does not regulate clearing of native vegetation and trees on rural land, which includes zones RU1 Primary Production, RU2 Rural Landscape, RU3 Forestry and RU4 Small Lot Primary Production. This clearing is managed by the Local Land Services Act. Please contact enquiry.southeast@lls.nsw.gov.au. Rural landholders in zones RU1 through RU4 should refer to the Local Land Services Act 2013 to determine requirements for native tree and vegetation removal on their properties.</i>	Not applicable. Vegetation clearing is not proposed as per the lodged development plan.
	<i>P1 The lot shape and the ratio of depth to frontage of each lot should have regard to the intended use of the land.</i>	Consistent. All lots are for the purposes of agriculture with no further development potential for dwellings.
3.2.1 Layout	<i>P2 Boundaries should be located so that the clearing and fencing of such boundaries at some future date is practical, will not cause soil erosion and will not visually disfigure the landscape</i>	Consistent. Refer to the proposed development plans.
	<i>P3 Subdivision layout seeks to retain native vegetation and preserve environmentally sensitive land</i>	Consistent. Vegetation is retained as per the proposed development plans.
	<i>P4 The future uses of the land do not compromise the agricultural capability of adjoining land or fragment agricultural land in the locality</i>	Consistent. The site is currently used for periodical grazing of livestock. The proposal is to separate the site into 3 parcels to allow for sale for a variety of different smaller scale agricultural purposes.
	<i>P5 There is sufficient demand in the locality to justify subdivision for the proposed use</i>	Consistent. Subdivision of land is permitted with consent and the proposed creation of 3 agricultural lots enables future sale to neighbouring landowners for this purpose.
	<i>P6 The proposed use requires a rural or isolated location due to the lack of availability of suitable land elsewhere in the locality and/or due to potential land use conflicts due to emissions</i>	Not applicable. The proposal is for the subdivision of land and not a use.



Bombala Development Control Plan 2012		
Clause	Provision	Compliance
4.1.3 <i>Stormwater management</i>	<i>A1 Stormwater management measures are to be in accordance with AUS_SPEC. For the purpose of rainfall estimation a 1 in 100 year average recurrence interval shall be adopted</i>	Consistent. There is no construction proposed as part of this application., Stormwater will remain as is, with no increase.
4.1.6 Land contamination	<i>A1 If the land is potentially contaminated due to a former use or is within an investigation area then a preliminary assessment must be carried out in accordance with the contaminated land planning guidelines that takes into account the extent to which it is proposed to carry out development on that land for residential, educational, recreational or child care purposes</i>	Consistent. The site is not considered to be contaminated given its use. No residential development is proposed as a result of the subdivision.

## 9. Consultant Reports

In support of the development proposal, the following consultant reports have been provided:

- Due Diligence Assessment

## 10. Environmental Planning and Assessment Act 1979 S4.15 Assessment

### Section 4.15(A) Relevant Planning Instruments

The relevant planning instruments are:

- SEPP
- LEP
- DCP

They have been considered in detail within this SEE and the documentation lodged with this application. The proposal has been shown to be generally consistent with these planning instruments. To the extent that variations arise, they have been appropriately justified.

### Section 4.15(B) Other Impacts of the Development

The relevant matters for consideration are addressed throughout this report.

### Section 4.15 (C) Suitability of the Site for the Development

The site is considered suitable for the proposed subdivision of land being located within RU1 Primary Production zone. The site's suitability has been demonstrated in this SEE.

### Section 4.15(E) Public Interest

The proposed development is permissible within the zone with development consent . As detailed within this SEE, the development is consistent with the RU1 zone objectives. Accordingly, the proposal is in the public interest.



## 11. Conclusion

This Development Application seeks approval for a two (2) into three (3) rural land subdivision with no dwellings.

The impacts of the proposed subdivision have been assessed against the requirements of Section 4.15 of the EP&A Act and have been found to be acceptable.

It is considered that the proposal would not result in any adverse impacts to the environment or surrounding locality, therefore based on the information contained within this Statement of Environmental Effects, the proposal subdivision should be supported.



## Aboriginal Cultural Heritage Due Diligence Assessment

Development Application for Subdivision of Land

Lot 152 and 153 in DP756826

Big Jack Road, Cathcart NSW 2632

Prepared by TA Project Services

Issued November 2024



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Disclaimer: This Aboriginal Due Diligence Report ('Report') is submitted to Snowy Monaro Regional Council on behalf of the applicant to accompany the development application for the subdivision at Big Jack Road, Cathcart NSW 2632.

The National Parks and Wildlife Act 1974 (NPW Act) provides that a person who exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution for the strict liability offence if they later unknowingly harm an object without an Aboriginal Heritage Impact Permit (AHIP).

As such, this report and supporting documents is submitted for review on the potential impacts to Aboriginal cultural heritage values, following the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010).

Due Diligence Code of Practise for the Protection of Aboriginal Objects in New South Wales outlines the generic due diligence process in Part 8, this is provided beneath.





### 1. Will the activity disturb the ground surface?

This Aboriginal Cultural Heritage Due Diligence Assessment has been prepared to accompany the lodgement of a development application for the subdivision of land (2 into 3 lots) at Big Jack Road, Cathcart NSW 2632. Refer to figure 1 for aerial image of site.

The proposed development is for a land subdivision which seeks to divide the two (2) existing lots into three (3) lots.

As per the aerial site photograph extract below, Lot 152 in DP756826 is improved by a farm shed and ancillary structure. Refer to Figure 2 for aerial imager extract.

The development application is for subdivision of land only and will not disturb the ground surface.

As such, the proposed subdivision will cause no disturbance to the ground surface at Big Jack Road, Cathcart NSW 2632.

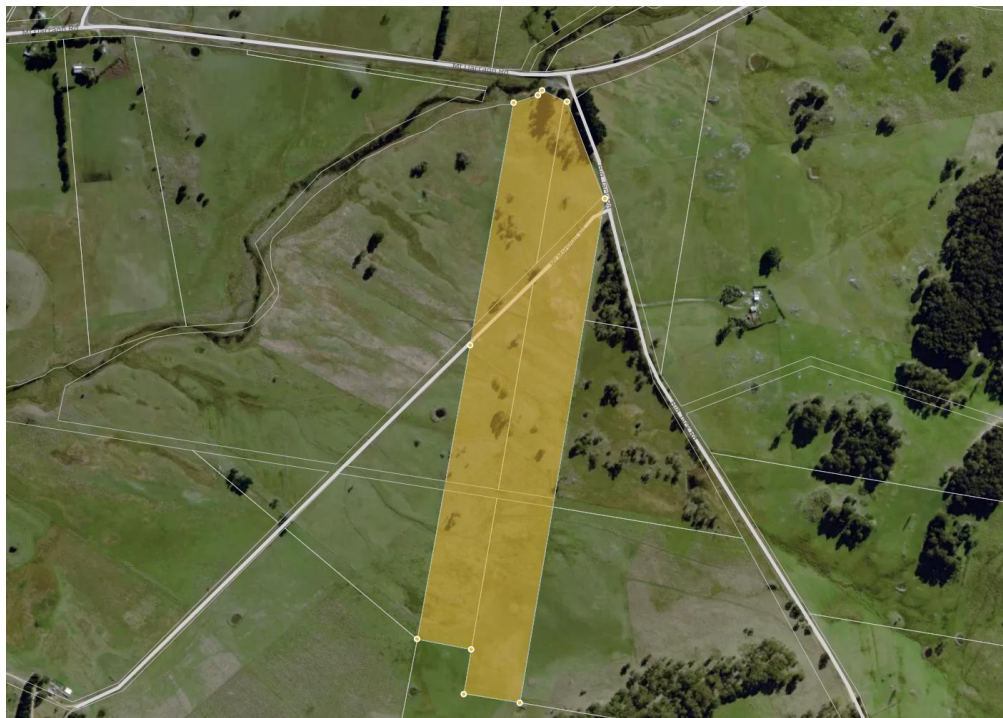


Figure 2: Site Aerial Imagery Depiction (Archistar, 2024).



Figure 3: Existing Development (Google, 2024).

## 2. Search the AHIMS database and use any sources of information of which you are already aware.

The results of a basic 200m AHIMS search indicates that there are no Aboriginal sites or places recorded or declared on or near the development site. Refer to Appendix A below.

The subject site is not within a declared Aboriginal place of significance, as listed in Schedule 5 of the snowy Monaro Local Environmental Plan 2013.

Preliminary on-site investigations have not uncovered or suggested the presence of Aboriginal objects or cultural heritage values.

## 3. Activities in areas where landscape features indicate the presence of Aboriginal objects

The works (being specific to the excavation) proposed are not:

- located within a sand dune system, or
- located on a ridge top, ridge line or headland, or
- located within 200m below or above a cliff face, or
- within 20m of or in a cave, rock shelter, or a cave mouth

The works (being specific to the excavation) proposed are:

- within 200m of waters



the development is for subdivision of land only with no excavation proposed as part of the development it is therefore unlikely that the landscape features above and any Aboriginal objects present will be impacted by the development.

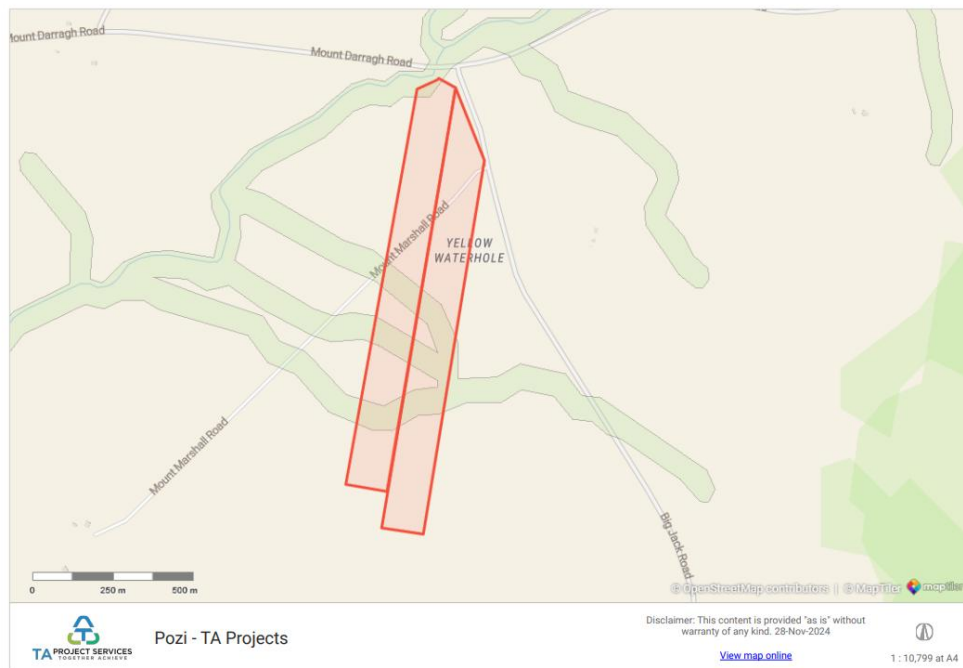


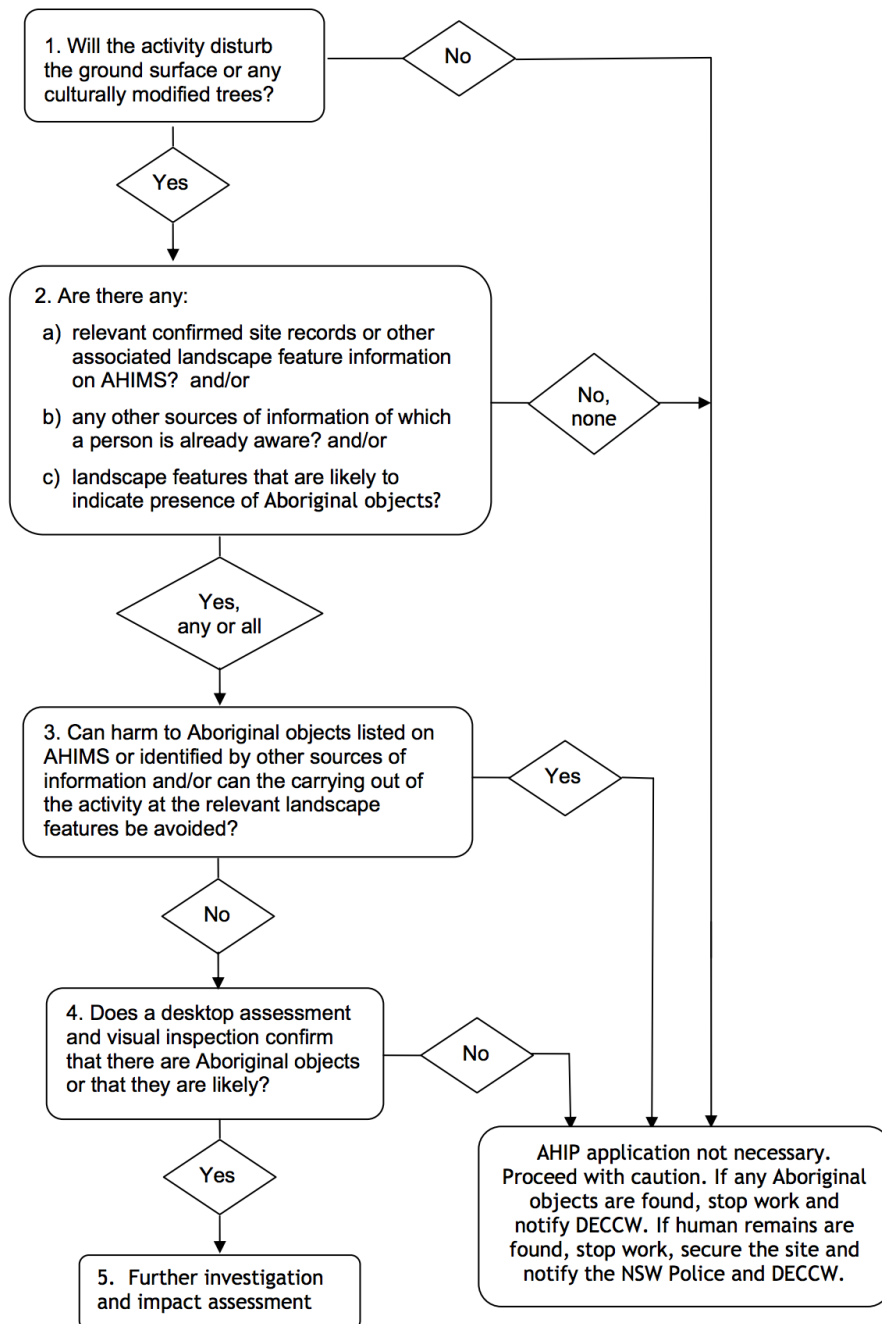
Figure 3: Riparian Lands & Watercourses

#### 4. Conclusion

It is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed development. The proposal does not seek to destroy, deface, damage or move an object from the land. The area of the proposed development is located in an existing disturbed area and unlikely to show any visual signs of objects. In the event that any burials/skeletal remains, shell middens or stone artefacts are found, all work is to cease immediately, and the relevant parties notified.



## 8 The generic due diligence process







## 5. Appendix A - AHIMS Search Results



### AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : 1  
Client Service ID : 955316

TA Project Services  
118-120 Carp St  
Bega New South Wales 2550  
Attention: Tegan Leisegang  
Email: [tegan@taprojects.com.au](mailto:tegan@taprojects.com.au)

Date: 28 November 2024

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 152, DP:DP756826, Section : - with a Buffer of 200 meters, conducted by Tegan Leisegang on 28 November 2024.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *



**AHIMS Web Services (AWS)  
Search Result**

Your Ref/PO Number : 1  
Client Service ID : 955317

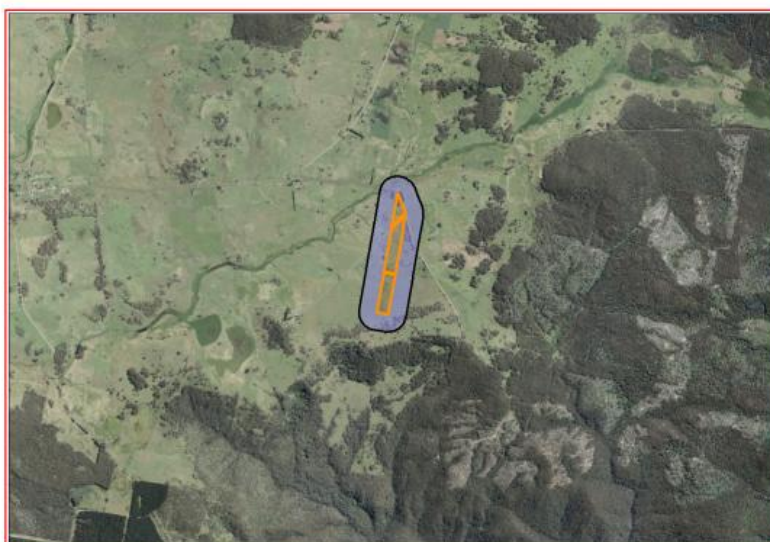
TA Project Services  
118-120 Carp St  
Bega New South Wales 2550  
Attention: Tegan Leisegang  
Email: [tegan@taprojects.com.au](mailto:tegan@taprojects.com.au)

Date: 28 November 2024

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 153, DP:DP756826, Section : - with a Buffer of 200 meters, conducted by Tegan Leisegang on 28 November 2024.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



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0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location.*

27<sup>th</sup> January 2025

Snowy Monaro Regional Council  
PO Box 714  
Cooma NSW 2630

OPPOSING SUBDIVISION LETTER

Proposed development – 2 into 3 lot subdivision for agricultural purposes

Property description – Big Jack Road Cathcart 2632  
Lot 152 DP 756826 Part L 153 DP 756826

Application No - 10.2024.312.1

Applicant's Name - T A Project Services

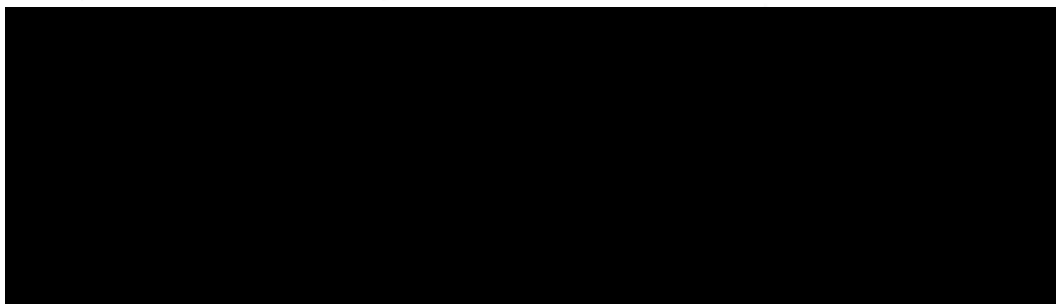
To whom it may Concern,

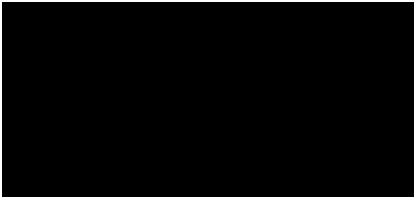
In relation to the above proposed subdivision I am writing to not object but to point out my concerns about the Division of Lot 1 which states should not have any dwelling entitlement. This section of land is clearly not being used for agricultural purposes.

My concerns are that this section of land has existing infrastructure which does not meet the requirements of the proposed subdivision.

It is currently being used as a recreational meeting place and further investigation needs to be looked at in regards to water and sewerage due to the proximity of the Coolumbooka River Cathcart.

I feel that if the current situation is allowed to continue and grow and the sale of this current subdivision Lot 1 is allowed then this will eventually have an impact on neighbouring and surrounding properties/township by means of devaluation of land.





14/2/2025

Snowy Monaro Regional Council

PO BOX 714

Cooma NSW 2630

Sent Via Email: council@snowymonaro.nsw.gov.au

Dear Snowy Monaro Regional Council,

Re: Objection to Development Application - Big Jack Rd, Cathcart, NSW 2632

Application Number: 10.2024.312.1

I am writing to formally express our strong opposition to the development application 10.2024.312.1 concerning Lot 152 DP756826 and Part Lot 153 DP756826 on Big Jack Rd, Cathcart. We believe this proposed development is intended for use as a clubhouse by the outlaw bikie gang known as the "Free Souls."

There are significant concerns regarding the current state of the premises, which appears to already function as a clubhouse. Observations indicate the presence of multiple caravans, a bar, a stage with a pole for dancing, and a drag strip. Additionally, there is evidence of a running toilet and reports of alcohol being sold through a ticketing system at various functions. Such activities are inconsistent with the zoning regulations and pose serious implications for community safety and well-being.

We are also troubled by the prevalence of illegal dwellings in the Cathcart and Creewah areas. It is disappointing that the Council has not taken adequate measures to address these non-compliant structures. Notably, another non-compliant dwelling exists on Lot 8 Section 26 DP 758239, which serves as a permanent residence equipped with a running toilet.

We urge the Council to enforce existing regulations to ensure our community remains in line with the designated zoning requirements. It is crucial for the community that the Council acts decisively in preventing developments that undermine these regulations.

Furthermore, I would like to clarify that we have never made any political donations or gifts, in accordance with Section 147 of the Environmental Planning and Assessment Act 1979.

The best way to contact us regarding this matter is via email at 

Thank you for your attention to this matter. We trust that you will consider our concerns seriously and take appropriate action regarding this development application.

Sincerely,







Ref: 10.2024.312.1

Date: 12<sup>th</sup> February 2025

Snowy Monaro Regional Council  
Town Planner- Evan Radford  
PO Box 714  
Cooma  
NSW 2650

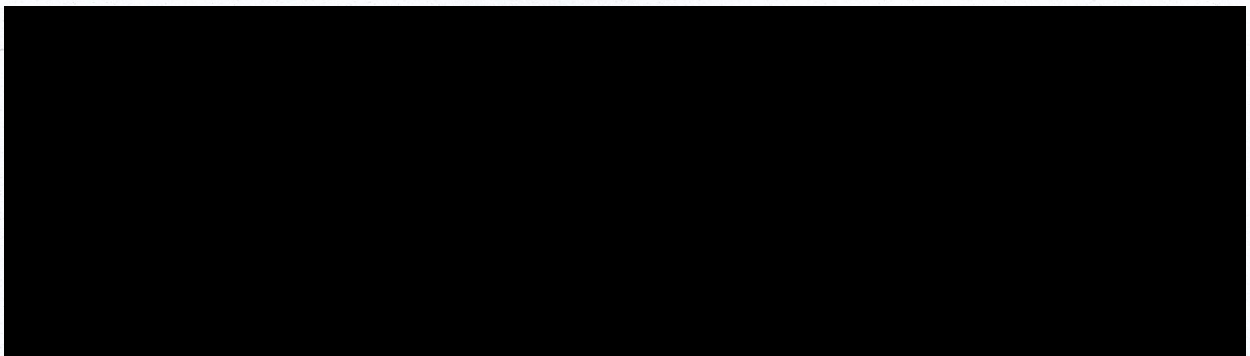
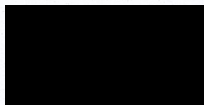
Dear Sir,

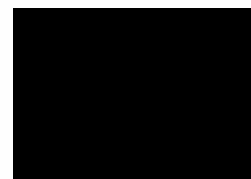
My name is [REDACTED]  
I am writing to you to express my overwhelming objection in the strongest possible terms to the proposed subdivision (Ref 10.2024.312.1). It is common knowledge what the area in the proposal is being used for, absolutely not agricultural, and in my opinion these type of people and the values they project and represent are not in keeping with the Cathcart community and ambience of the rural way of life.

Thank you for considering my objection. My preferred method of contact is



Yours sincerely,



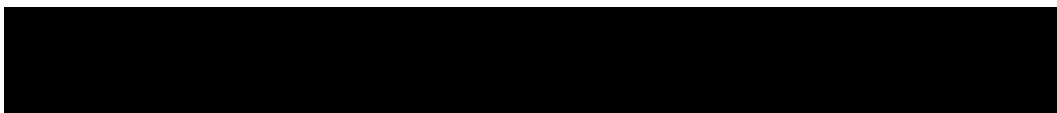


Ref: 10.2024.312.1

Date: 24<sup>th</sup> January 2025

Snowy Monaro Regional Council  
Town Planner- Evan Radford  
PO Box 714  
Cooma  
NSW 2630

Dear Evan,



I am writing this objection to the proposed subdivision DA No. 10 ref 10.2024.312.1 Big Jack Mount Road, Cathcart. I received this proposal by mail on the 20/1/25, after receiving this document I contacted other adjoining neighbours and none of them had received this document of proposal???

The application prepared by TA Project Services states "there are no current dwellings on either of the existing lots and is not proposed to have any dwellings on any of the three proposed lots" this is not true. It further states that the lots "will be specifically used for agricultural purposes" which again is not true. Both of these statements are a lie. The proposed Lot 1 is being used by an Outlaw Motorcycle Club and has been for the last 2-3 years which. There is currently a club house, two flushing toilets (how far is this from the Yellow Water Hole river?) multiple caravans and outbuildings. As far as I'm aware there is one if not two members living at Lot 1 on a permanent basis.



I strongly recommend council to investigate this matter before considering approving this proposal.

Thank you for considering my objection. My preferred method of contact is



Yours sincerely,



Ref: 10.2024.312.1

Date: 24<sup>th</sup> January 2025

Snowy Monaro Regional Council  
Town Planner- Evan Radford  
PO Box 714  
Cooma  
NSW 2630

Dear Evan,

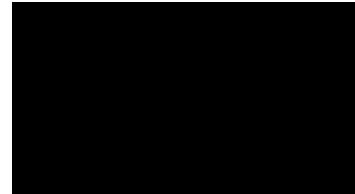
My objection to the proposed subdivision (ref 10.2024.312.1) submitted to Snowy Monaro Regional Council by TA Project Services on behalf of Darren Cotterill is all based on a lie, falsehood and misinformation. Proposed Lot 1 (4.5ha) of Big Jack Road Cathcart will not be used for agricultural purposes. It is currently being used as a 1% Outlaw Motorcycle Club house/ recreational area by the "Free Souls" Motorcycle Club and will continue to do so.

In the proposal summary it states that there are currently no dwellings on either of the existing lots and it is not proposed to have any on the three proposed lots. Again, this is not true. To the best of my knowledge, there is a large building being used as the club house, a raised platform/stage used for the purpose of live music, two flushing toilets connected to a septic tank (how far is this from the Yellow Water Hole water course?), multiple shipping containers and numerous caravans. I am also of the belief that there is at least one club member living there on a permanent basis

If this proposed development goes ahead, the 1% Outlaw Motorcycle club known as the "Free Souls" will become the free hold owners of Lot 1.

I respectfully suggest that council go and have a look at this set up before approving this proposal.

Thank you for considering my objection. My preferred method of contact is



5<sup>th</sup> February, 2025

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To Snowy Mountain Regional Council (SMRC)

**Re: Proposed Rural Subdivision 10.2024.312.1 – Big Jack Road, Cathcart NSW 2632  
– Lot: 152 DP: 756826 , Part L 153 DP 756826**

To whom it may concern,

I write in opposition to the proposal 10.2024.312.1 on the following grounds.

**Rural land fragmentation** – The Cathcart region is renowned for its high production for rural grazing applications leading the region for annualized carrying capacity, and animal productivity. On these ground it is my belief that strategically important grazing areas within the council region should be restricted from further fragmentation to preserve the agricultural economy within the region. As the stated use for the subdivision would be continued agricultural use but without a specific purpose, I would fail to see how further subdivision into smaller lots would be of agricultural benefit to the region or property holder, nor would it add to housing add support to housing supply issues within the region. I would further draw reference to the less than positive visual impact and social impact that further subdivision may have on the Bombala-Cathcart region (see Existing Use below).

**Existing use** – It appears that portions of the proposed subdivision are not currently being used for agricultural purposes. While I accept this may be a subjective assessment, I would encourage council representatives to visit the sight for their own consideration. The area appears to be occupied by a large amount of temporary/or permanent dwellings for the purpose of organizational hub/social venue for self-proclaimed ‘outlaw’ motorcycle activities presenting both a negative visual impact and fire risk to the property and surrounding environment. [REDACTED] unlawfully stopped on the Mount

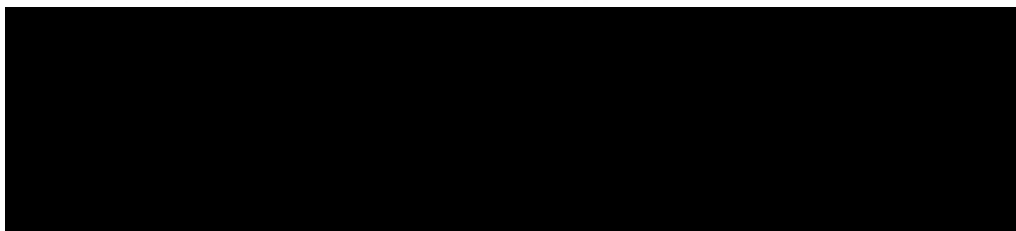
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Darragh road by existing users of the property so they can give access to processions  
motorcycles both entering and leaving the proposed subdivision site.

Please note that my preferred method of communication for this submission is via email:

[REDACTED]

[REDACTED]



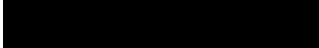

13<sup>th</sup> February, 2025

Proposed Development	2 into 3 lot subdivision for agricultural purposes
Property description	Big Jack Rd, Cathcart, NSW 2632 Lot 152 DP:756826, Part L 153 DP 756826
Development application number	10.2024.312.1

To Whom it may concern,

I write to you to voice my **strong objection** to the proposed subdivision detailed above.

This subdivision is listed as being for agricultural purposes, however this is not the case. The proposal is locally known to be for a **clubhouse for an outlaw motorcycle gang** known as the **'Free Souls'**. This motorcycle gang are known as 'one-percenters' – a reference to the fact that they are non-law-abiding bikers. In fact, structures for his purpose have already been erected on this site for some time. It is questionable if council approval has been given for these existing structures.

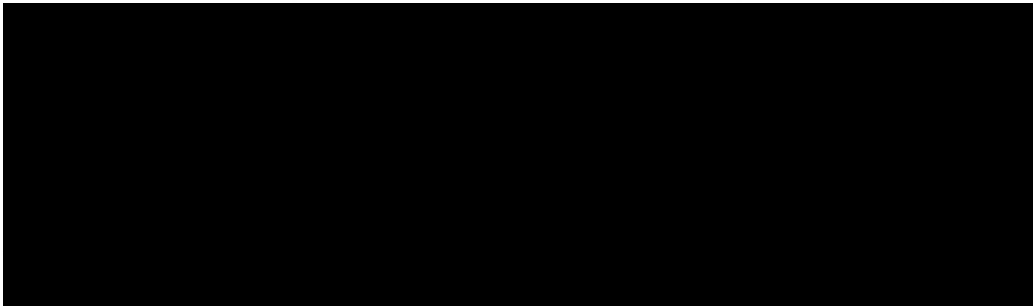
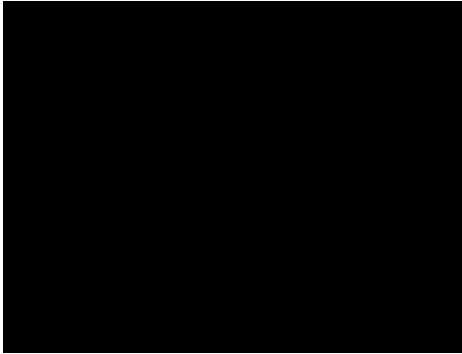
 are concerned that the proposed subdivision, and subsequent use of the site as a biker clubhouse, will introduce the criminal element into the area. 



This proposal needs to be denied on the grounds that it poses an unnecessary risk to the safety of the residents of our country community.



Please don't hesitate to contact me by email (preferred) or phone (as listed in the header) for further comment.







We object to the proposal of the new subdivision along Big Jack Road Cathcart 2632.

T A Project Services

10.2024.3121

Big Jack Road Cathcart 2632 Lot 152 DP 756826 Part L153 DP 756826



CONDITIONS OF CONSENT

10.2024.79.1

GENERAL CONDITIONS

	Condition				
ADM_01	<b>Endorsed plans and supporting documentation</b>				
	Development must be carried out in accordance with the following plans and documentation, except where amended by Council and/or the conditions of this development consent.				
	<b>Approved plans</b>				
	<b>Plan No.</b>	<b>Rev.</b>	<b>Plan Title.</b>	<b>Drawn By.</b>	<b>Date</b>
	304100133-C-2101	A	Locality Plan & Site Plan	NH	17/01/2024
	304100133-C-2110	A	General Arrangement Sheet 1 of 4	NH	17/01/2024
	304100133-C-2111	A	General Arrangement Sheet 2 of 4	NH	17/01/2024
	304100133-C-2112	A	General Arrangement Sheet 3 of 4	NH	17/01/2024
	304100133-C-2113	A	General Arrangement Sheet 4 of 4	NH	17/01/2024
	S001	B	Locality Plan	MKA	25/01/2023
	S100	B	Layout Plan & Side Elevation	MKA	25/01/2023
	S200	B	Locality Plan	MZ	25/01/2023
	S203	B	Layout Plan & Side Elevation	MZ	25/01/2023
	S600	B	Locality Plan	MZ	18/01/2023
	S603	B	Layout Plan & Side Elevation	MZ	18/01/2023
	S700	B	Locality Plan	MZ	18/01/2023

SNOWY MONARO REGIONAL COUNCIL

	Condition				
	S703	B	Layout Plan & Side Elevation	MZ	18/01/2023
	S500	B	Locality Plan	MEO	18/01/2023
	S503	B	Layout Plan & Side Elevation	MEO	18/01/2023
	Approved documents				
	Document Title.	Version Number	Prepared By.		Date
	Statement of Environmental Effects	1.0	The Environment Factor		14/11/2023
	Biodiversity Development Assessment Report	1.0	The Environment Factor		14/11/2023
	Aboriginal Cultural Heritage Assessment Report	3	Apex Archaeology		14/04/2023
	Archaeology Report	3	Apex Archaeology		14/04/2023
	In the event of any inconsistency between the approved plans and the supporting documentation, the approved plans prevail. In the event of any inconsistency between the approved plans and a condition of this consent, the condition prevails.				
	<b>Note:</b> an inconsistency occurs between an approved plan and supporting documentation or between an approved plan and a condition when it is not possible to comply with both at the relevant time.				
	Condition Reason: To ensure all parties are aware of the approved plans and supporting documentation that applies to the development.				

ADM_02	<b>Inconsistency between documents</b>
	In the event of any inconsistency between conditions of this consent and the drawings/documents referred to above, the conditions of this consent prevail.
	Condition Reason: To provide clarity where inconsistencies between documents occur.

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ADM_03	<b>Compliance with the Building Code of Australia and insurance requirements under the Home Building Act 1989</b>
	For the purposes of section 4.17(11) of the Act, the following conditions are prescribed in relation to a development consent for development that involves any building work: <ul style="list-style-type: none"> <li>a) that the work must be carried out in accordance with the requirements of the Building Code of Australia.</li> <li>b) in the case of residential building work for which the Home Building Act 1989 requires there to be a contract of insurance in force in accordance with Part 6 of that Act, that such a contract of insurance is in force before any building work authorised to be carried out by the consent commences.</li> </ul> <p>This condition does not apply:</p> <ul style="list-style-type: none"> <li>o to the extent to which an exemption is in force under the Home Building Regulation 2014, or</li> <li>o to the erection of a temporary building.</li> </ul> <p><b>Note:</b> In this condition, a reference to the BCA is a reference to that code as in force on the date the application for the relevant Construction Certificate is made.</p>
	Condition Reason: To ensure the development complies with the requirements of Clause 69 of the Environmental Planning and Assessment Regulations 2021, and Section 4.17(11) of the Environmental Planning and Assessment Act 1979, as amended.
ADM_07	<b>Aboriginal objects</b>
	No Aboriginal objects may be harmed without an approval from Heritage NSW.
	Condition Reason: To ensure compliance with the provisions of the National Parks and Wildlife Act.
ADM_08	<b>Trail And Bridge Construction</b>
	<ul style="list-style-type: none"> <li>• The developer is to ensure that the trail is constructed in accordance with methods outlined in the statement of environmental effects, attached to this development application.</li> <li>• The developer is to ensure that trail construction is in accordance with the International Mountain Bike Association (IMBA) principles of sustainable trails.</li> <li>• The developer is to ensure that the bridges/platforms proposed are constructed in accordance with approved engineering design specifications.</li> </ul>
	Condition Reason: To ensure the trails are constructed to a standard which meets the requirements of the intended use.

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OA_07	<b>Construction Certificate</b>
	Notwithstanding the issue of this development consent, separate approval for a Construction Certificate must be obtained prior to commencement.  An application for a Construction Certificate must be applied for on the NSW Planning Portal, be accompanied by the required documents and prescribed fee, and be approved prior to any works commencing.
	Condition Reason: Requirement under Clause 6.7 of the Environmental Planning and Assessment Act 1997.

OA_01	<b>Separate Section 138 Permit - Roads Act 1993</b>
	Notwithstanding the issue of this development consent, separate consent from Council under Section 138 of the Roads Act 1993, must be obtained prior to any works taking place on a public road including the construction of a new driveway access (or modification of access) and prior to the issue of an Occupation Certificate.  Applications for consent under Section 138 must be applied for on the NSW Planning Portal, be accompanied by the required attachments and prescribed fee, and approved prior to installation.
	Condition Reason: To ensure legislative compliance.

AS_01	<b>Heritage NSW</b>
	<p><b>Approved development</b></p> <p>Development must be in accordance with:</p> <ol style="list-style-type: none"> <li>Jindabyne, NSW Aboriginal Cultural Heritage Assessment Report (Apex Archaeology, 14 April 2023)</li> <li>Jindabyne, NSW Archaeological Report (Apex Archaeology, 14 April 2023)</li> <li>Pedestrian Bridges Site Plans 20-718; BR1, BR2, S500, S600, S700 (icubed consulting, January 2023) and Combined Stage 2.1 Site Plan (Stantec, 17 January 2024)</li> <li>Statement of Environmental Effects Jindabyne Shared Trails Project - Section 2.1 Kunama to East Jindabyne (The Environmental Factor, 14 November 2023)</li> </ol> <p><b>Except as amended by the following general terms of approval:</b></p> <ol style="list-style-type: none"> <li>A s.90 Aboriginal Heritage Impact Permit for the proposed works must be sought and granted prior to the commencement of works.</li> <li>The Aboriginal Heritage Impact Permit application must be accompanied by</li> </ol>

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	<p>appropriate documentation and mapping as outlined in Applying for an Aboriginal Heritage Impact Permit: Guide for applicants (2011).</p> <ol style="list-style-type: none"> <li>3. Consultation with the Aboriginal community undertaken as part of the Aboriginal Heritage Impact Permit application must be in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010.</li> <li>4. The Aboriginal Heritage Impact Permit application must be completed with reference to the requirements of the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (2011).</li> <li>5. The Aboriginal Heritage Impact Permit application must include complete records satisfying the requirements of the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (2010).</li> <li>6. Long term management of Aboriginal objects must be considered as part of the Aboriginal Heritage Impact Permit application.</li> </ol> <p>Please note that any modification of the above development that will result in impacts to Aboriginal cultural heritage must be referred to Heritage NSW to determine whether changes to these general terms of approval are required.</p> <p><b>Advice</b></p> <p>It is recommended that the following is completed prior to or with the submission of the AHIP application:</p> <ol style="list-style-type: none"> <li>1. Undertake an updated AHIMS search that is less than 12 months old</li> <li>2. Attach the AHIMS cards for newly and previously identified Aboriginal cultural heritage sites</li> <li>3. Update figures to show relevant DP/lots and any AHIMS registered or newly identified sites including their site extent</li> <li>4. Finalise the long-term management of Aboriginal objects</li> <li>5. As per the recommendation in the ACHAR a Plan of Management may be developed in consultation with the Aboriginal community for all stages of the proposed works.</li> </ol> <p><b>Aboriginal community consultation must be maintained</b></p> <p>Consultation with the registered Aboriginal parties must be maintained. We recommend updates on the project are provided to the registered Aboriginal parties every six months to ensure the consultation is continuous.</p> <p>Condition Reason: To ensure legislative compliance.</p>
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SNOWY MONARO REGIONAL COUNCIL

## BUILDING WORK

### BEFORE ISSUE OF A CONSTRUCTION CERTIFICATE

	Condition
PCC_06	<p><b>Long Service Levy</b></p> <p>In accordance with Section 6.8(1)(b) of the Environmental Planning and Assessment Act 1979, a Construction Certificate must not be issued until any long service levy payable under Section 34 of the Building and Construction Industry Long Service Payments Act 1986 (or where such levy is payable by instalments, the first instalment of the levy) has been paid.</p> <p>Payment of the levy is to be done via the Service NSW Page with receipt to be uploaded to your Construction Certificate Application on the NSW Planning Portal. <a href="#">Pay Long Service Levy (LSL)</a></p> <p>Condition Reason: To ensure legislative compliance.</p>
PCC_07	<p><b>Compliance with Australian Standards and Building Code of Australia</b></p> <p>The development is required to be carried out in accordance with all relevant Australian Standards and the requirements of the Building Code of Australia. Details demonstrating compliance must be submitted to the Principal Certifier prior to the issue of the Construction Certificate.</p> <p>Condition Reason: To ensure legislative compliance.</p>
PCC_08	<p><b>Compliance with Australian Standards and Building Code of Australia</b></p> <p>The following documentation must be submitted to the satisfaction of the Principal Certifier, prior to the granting of the Construction Certificate (where applicable):</p> <ol style="list-style-type: none"> <li>1. Detailed building plans and specifications containing sufficient information to verify that the completed building will comply with the Building Code of Australia and the relevant Australian Standards.</li> <li>2. A list of any existing fire safety measures provided in relation to the land or any existing building on the land (not applicable to dwellings or outbuildings).</li> <li>3. A list of any proposed fire safety measures provided in relation to the land or any existing building on the land (not applicable to dwellings or outbuildings).</li> <li>4. A report prepared by a professional engineer detailing the proposed methods of excavation, shoring or pile construction, and what measures are to be implemented to prevent damage from occurring to adjoining or nearby premises as a result of the proposed excavation works. (NOTE: Any practices or</li> </ol>

SNOWY MONARO REGIONAL COUNCIL

	<p>procedures specified to avoid damage to adjoining or nearby premises are to be incorporated into the plans and specifications for the Construction Certificate).</p> <p>5. Structural engineering details or design documentation including details of the following where relevant:</p> <ul style="list-style-type: none"> <li>a) Reinforced concrete strip footings</li> <li>b) Reinforced concrete raft slab</li> <li>c) Suspended reinforced concrete slabs</li> <li>d) Structural steelwork</li> <li>e) Structural timber work exceeding the design parameters of Australian Standard AS1684-1999 "Residential timber-framed construction"</li> <li>f) Upper floor joist layout</li> <li>g) Retaining walls</li> <li>h) Roof trusses</li> <li>i) Wall/roof bracing</li> <li>j) The existing structure must be certified as being structurally adequate to carry out the proposed additional loadings.</li> </ul> <p>6. Method of protecting window/door openings as required by BCA.</p> <p>7. Method of ventilating the basement car park. (NOTE: If mechanical ventilation is required, mechanical ventilation plans must be submitted that also confirm the minimum height clearance specified by AS 2890.1 – Car parking, will be achieved).</p>
	<p>Condition Reason: To ensure the design of the proposed work may be assessed in detail before construction commences and because it is in the public interest that the development complies with the appropriate construction standards, and Section 4.15(1)(e) of the Environmental Planning and Assessment Act 1979, as amended.</p>

<b>PCC_18</b>	<b>Erosion and sediment control plan</b>
	<p>Before the issue of a construction certificate an erosion and sediment control plan must be prepared by a suitably qualified person in accordance with the following documents and provided to the certifier.</p> <ul style="list-style-type: none"> <li>a) Council's relevant development control plan,</li> <li>b) the guidelines set out in 'Managing Urban Stormwater: Soils and Construction' prepared by Landcom (the Blue Book) (as amended from time to time), and</li> <li>c) the 'Guidelines for Erosion and Sediment Control on Building Sites' (Department of Planning, Housing and Infrastructure) (<i>dated 2024, as amended from time to time</i>).</li> </ul>
	<p>Condition Reason: To ensure no substance other than rainwater enters the stormwater</p>

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	system and waterways
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PCC\_19

Offset obligations Ecosystem credits

a) Before the issue of a construction certificate, the class and number of ecosystem credits in the table of ecosystem credits required to be retired - like for like - non-threatened ecological community must be retired to offset the residual biodiversity impacts of the development.

b) Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund must be provided to Council.

Ecosystem credits table

Impacted plant community type	Number of ecosystem credits	Hollow bearing trees	IBRA subregions from which credits can be used to offset the development	Trading group or like for like PCTs that can be used to offset the impacts from the development
1187 – Snow Grass – Wallaby Grass – Kangaroo Grass – Common Everlasting – Corkscrew-grass dry tussock grassland in the Monaro Region of the Southern Eastern Highlands Bioregion	18	Nil	Monaro, Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges.  Or  Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	Trading Group:  Temperate Montane Grassland - ≥ 50% - < 70% cleared group (including Tier 3 or higher threat status).

Ecosystem credits, threatened ecological community table

Impacted plant community type	Number of ecosystem credits	Hollow bearing trees	IBRA subregions from which credits can be used to offset the development	Threatened ecological community that can be used to offset the impacts from the
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					development
	1191-Snow Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	15	Yes	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges.  Or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	Monaro Tableland Cool Temperate Grassy Woodland in the Southern Eastern Highlands Bioregion  This includes PCT's: 679, 797, 802, 803, 804, 1100, 1101, 1191, 1197, 1199, 1229, 1295, 3341, 3413
	Condition Reason: To ensure the requirements of the Biodiversity Offset Scheme are achieved.				

PCC_20	<b>Offset obligations Species credits</b>			
	a) Before the issue of a construction certificate, the class and number of species credits in the table of ecosystem credits required to be retired - like for like - non-threatened ecological community must be retired to offset the residual biodiversity impacts of the development.			
	b) Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund must be provided to Council.			
	<b>Species credits table</b>			
	Impacted species credit species	Number of species credits	IBRA subregions from which credits can be used to offset the impacts from the development	Species that can be used to offset the impacts from the development
	Aprasia parapulchella	15	Any in NSW	Aprasia parapulchella
	Cercartetus nanus	6	Any in NSW	Cercartetus nanus
	Myotis macropus	6	Any in NSW	Myotis macropus

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	Phascolarctos cinereus	6	Any in NSW	Phascolarctos cinereus
	Condition Reason: To ensure the requirements of the Biodiversity Offset Scheme are achieved.			

PCC_21	<b>Construction Environmental Management Plan (CEMP)</b>
	<p>A Construction Environmental Management Plan must be developed and implemented prior to the commencement of any works, to the satisfaction of the Council. The construction environmental management plan must include the following measures, as applicable to the type of development:</p> <ul style="list-style-type: none"> <li>a) location and construction of protective fencing to the perimeter site disturbance;</li> <li>b) location of site storage areas/sheds/equipment;</li> <li>c) location of building materials for construction;</li> <li>d) location of stockpiles;</li> <li>e) provisions for public safety;</li> <li>f) dust control measures;</li> <li>g) site access location and construction</li> <li>h) details of methods of disposal of demolition materials;</li> <li>i) protective measures for tree preservation;</li> <li>j) provisions for temporary sanitary facilities;</li> <li>k) location and size of waste containers/bulk bins;</li> <li>l) details of proposed sediment and erosion control measures;</li> <li>m) provisions for temporary stormwater drainage;</li> <li>n) construction noise and vibration management;</li> <li>o) construction traffic management details.</li> </ul> <p>The site management measures must be implemented prior to the commencement of any site works and must be in place throughout the works, to the satisfaction of Council. A copy of the Construction Environmental Management Plan must be provided to Council prior to commencing site works.</p>
	Condition Reason: To ensure that appropriate measures have been considered during all phases of the construction process in a manner that maintains the environmental amenity and ensures the ongoing safety and protection of people.

SNOWY MONARO REGIONAL COUNCIL

### BEFORE BUILDING WORK COMMENCES

	Condition
PCW_01	<b>Prior to the commencement of works</b>
	No construction works approved by this consent are to commence unless the following have been satisfied: <ul style="list-style-type: none"> <li>1) A Construction Certificate has been issued by a certifying authority.</li> <li>2) A Principal Certifier has been appointed by the person having benefit of the development consent.</li> <li>3) A notice of commencement of building or subdivision works, and details of the appointed Principal Certifier (in the event that Council is not appointed), are issued to Council at least 48 hours prior to the commencement of works.</li> </ul> <p>The Principal Certifier is notified in writing of the name and contractor licence number of the owner/builder intending to carry out the approved works.</p>
	Condition Reason: To ensure legislative compliance.
PCW_03	<b>Erection of signage</b>
	A sign must be erected in a prominent position on any site on which any approved work is to be carried out: <ul style="list-style-type: none"> <li>a) showing the name, address, and telephone number of the certifying authority for the work;</li> <li>b) showing the name of the principal contractor (if any) for any demolition or building work and a telephone number on which that person may be contacted outside working hours; and</li> <li>c) stating that unauthorised entry to the work site is prohibited.</li> </ul> <p>The sign must be maintained while the approved work is being carried out and must be removed when the work has been completed.</p>
	Condition Reason: To ensure the development complies with prescribed conditions under the Environmental Planning and Assessment Regulations 2021.
PCW_21	<b>Before You Dig Australia (BYDA)</b>
	Prior to carrying out any works, a "Before You Dig Australia" enquiry should be undertaken in accordance with the requirements of Part 5E (Protection of Underground Electricity Power Lines) of the Electricity Supply Act 1995 (NSW).
	In addition the Before You Dig Australia enquiry must be current at the time of



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	undertaking the construction activity in accordance with the requirements of the Infrastructure Asset Owner.
	Condition Reason: To protect electricity assets from damage during construction works.

PCW_22	<b>Biodiversity management during construction and operations</b>
	a) Prior to the commencement of construction, provide a Biodiversity Management Plan prepared by a suitably qualified person for review and approval by Council stating commitments and harm minimisation measures to be implemented during construction. Works must not encroach into areas of retained native vegetation and habitat.
	b) A copy of the approved plan is kept on site at all times and made available to Council officers upon request.
	c) During ongoing use, all commitments in the approval Biodiversity Management Plan must be met.
	Condition Reason: To protect native vegetation during construction works.

#### DURING BUILDING WORK

Condition
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DC_01	<b>Erosion and drainage management</b>
	Erosion and sediment control works must be implemented in accordance with the endorsed erosion and sediment control plan and maintained throughout the construction process.
	Condition Reason: It is in the public interest that the development works do not damage existing Council infrastructure.

DC_02	<b>Work in areas with existing electricity infrastructure</b>
	Given there is electricity infrastructure in the area, it is the responsibility of the person/s completing any works around power lines to understand their safety responsibilities. SafeWork NSW ( <a href="http://www.safework.nsw.gov.au">www.safework.nsw.gov.au</a> ) has publications that provide guidance when working close to electricity infrastructure. These include the Code of Practice - Work Near Overhead Power Lines and Code of Practice - Work Near Underground Assets.

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	Condition Reason:
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DC_05	<b>Use of power tools – residential and village areas</b>
	The developer is to ensure that work on the development site by all persons using power tools and equipment is limited to the following hours:  <div style="display: flex; justify-content: space-between;"> <div>Monday to Friday:</div> <div>7.00am to 6.00pm</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Saturday:</div> <div>7.00am to 5.00pm</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Sunday:</div> <div>No work</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Public Holidays:</div> <div>No work</div> </div>
	Condition Reason: To ensure building works do not have adverse effects on the amenity of the area.

DC_06	<b>Principal Certifying Authority</b>
	A Principal Certifier appointed to replace another must ensure that notice of the appointment and of the approval of the appointment is given to the consent authority and Council (if not the relevant consent authority) within 48 hours of the appointment.
	Condition Reason: To ensure legislative compliance.

DC_07	<b>Inspections</b>
	All mandatory inspections required by the Environmental Planning and Assessment Act 1979 and any other inspections deemed necessary by the Principal Certifier must be carried out during the relevant stage of construction. Work must not proceed beyond each critical stage until the Principal Certifier is satisfied that work is proceeding in accordance with this consent, the Construction Certificate(s) and the Act. Council must be given 48 hours notice to undertake the inspections.
	Condition Reason: It is in the public interest that critical stage inspections be issued for these components of the development in accordance with Section 61 of the Environmental Planning and Assessment (Development and Fire Safety) Regulations 2021 as amended.

DC_08	<b>Items not to be placed on roadway</b>
	The following items must not be placed on the footpath, roadway or nature strip at any time throughout the construction process:

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	<ul style="list-style-type: none"> <li>c) building materials, sand, waste materials or construction equipment;</li> <li>d) bulk bins/waste skips/containers; or</li> <li>e) other items that may cause a hazard to pedestrians.</li> </ul>
	Condition Reason: To ensure no obstruction to the roadway.

DC_09	<b>Site maintenance</b>
	<p>The principal contractor, owner-builder or any other person having benefit of the development consent must ensure that:</p> <ul style="list-style-type: none"> <li>a) approved sediment and erosion control measures are installed and maintained during the construction period;</li> <li>b) building materials and equipment are stored wholly within the work site unless an approval to store them elsewhere is held; and</li> <li>c) the site is clear of waste and debris at the completion of works.</li> </ul> <p>Such measures will be in place throughout the construction process.</p>
	Condition Reason: To ensure public health and safety.

DC_11	<b>Archaeology – unexpected finds</b>
	<p>If any Aboriginal object(s) is discovered and/or harmed in, or under the land, while undertaking the proposed development activities, the applicant must:</p> <ul style="list-style-type: none"> <li>a) Not further harm the object(s).</li> <li>b) Immediately cease all work at the particular location.</li> <li>c) Secure the area so as to avoid further harm to the Aboriginal object(s).</li> <li>d) Notify Heritage NSW as soon as practical by calling 131 555 or emailing: <a href="mailto:info@environment.nsw.gov.au">info@environment.nsw.gov.au</a>, providing any details of the Aboriginal object(s) and its location.</li> <li>e) Not recommence any work at the particular location unless authorised in writing by Heritage NSW.</li> </ul> <p>All Aboriginal cultural heritage items must be mapped as polygons on all subdivision and operational plans to ensure these areas are not inadvertently impacted.</p> <p>If harm to Aboriginal objects cannot be avoided, an application for an Aboriginal Heritage Impact Permit (AHIP) must be prepared and submitted to Heritage NSW before work may continue.</p> <p>In the event that skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and</p>

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	NSW Police and Heritage NSW contacted.
	Condition Reason: To ensure the protection of objects of potential significance during works.

DC_12	<b>Tree protection</b>
	All required tree protection measures are to be maintained in good condition for the duration of the construction period in accordance with AS 4970-2009 and the project arborist's certification. Existing soil grades must be maintained within the fenced Tree Protection Zones, and all machinery, builders refuse, spoil and/or materials must remain outside of the fenced Tree Protection Zones.
	Council can require the project arborist to inspect, monitor, and treat trees being retained at phases of the project. All monitoring must be recorded and provided to the Principal Certifier.
	Condition Reason: To ensure trees are protected during the construction process.

DC_15	<b>Construction noise</b>
	During excavation, demolition and construction phases, noise generated from the site must be controlled in accordance with the recommendations of the approved noise and vibration management plan Statement of Environmental Effects.
	Condition Reason: To ensure works do not have adverse effects on the amenity of the area.

DC_16	<b>Cut and fill</b>
	Soil removed from or imported to the site must be managed in accordance with the following principles: <ul style="list-style-type: none"> <li>a) All excavated material removed from the site must be classified in accordance with the Department of Climate Change, Energy, the Environment, and Water NSW's Waste Classification Guidelines prior to disposal to an approved waste management facility and reported to the Principal Certifying Authority.</li> <li>b) All fill material imported to the site is to wholly consist of Virgin Excavated Natural Material (VENM) as defined in Schedule 1 of the Protection of the Environment Operations Act 1997 or a material approved under the Department of Climate Change, Energy, the Environment, and Water's general resource recovery exemption.</li> </ul>
	Condition Reason: To ensure legislative compliance.

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DC_18	<b>Protecting wastewater supply services</b>
	<p>Council's existing wastewater infrastructure including rising mains, trunk, drainage pipelines and access chambers (SMH) which are exposed, accidentally or deliberately during construction shall be protected from damage.</p> <p>Council must be informed immediately of any damage to any Council infrastructure. The damage shall be repaired/reinstated to new condition at the applicant's expense following consultation with Council.</p> <p><b>Note:</b> Repair work may require a Section 68 Application for sewerage works under the Local Government Act 1993.</p>
	Condition Reason: It is in the public interest that the development works do not damage existing Council infrastructure. Section 4.15(e) of the Environmental Planning and Assessment Act 1979.

DC_20	<b>Protecting water supply services</b>
	<p>Council's existing water supply infrastructure including rising mains, trunk and reticulation pipelines which are exposed, accidentally or deliberately during construction shall be protected from damage.</p> <p>Council must be informed immediately of any damage to any Council infrastructure. The damage shall be repaired/reinstated to new condition at the applicant's expense following consultation with Council.</p> <p><b>Note:</b> Repair work may require a Section 68 Application for water supply works under the Local Government Act 1993.</p>
	Condition Reason: It is in the public interest that the development works do not damage existing Council infrastructure and accordingly a record of existing conditions is required. Section 4.15(e) of the Environmental Planning and Assessment Act 1979.

DC_23	<b>Approved plans on site</b>
	<p>A copy of the approved and certified plans, specifications, and documents incorporating conditions of approval and certification will be kept on the site at all times during construction and will be readily available for perusal by any officer of the Council or the Principal Certifier.</p>
	Condition Reason: To ensure the works are being completed in accordance with the approved plans.

DC_24	<b>Public access and site security</b>
	It is the responsibility of the applicant to restrict public access to the building site,

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	building works or materials or equipment on the site when building work is not in progress or the site is otherwise unoccupied.
	Condition Reason: The ensure community is safe from the construction works.

DC_25	<b>Excavation</b>
	<ol style="list-style-type: none"> <li>1. The developer is to ensure that at all times all excavations and backfilling associated with the development is executed safely and in accordance with professional standards.</li> <li>2. The developer is to ensure that all excavations are properly guarded and protected at all times to prevent them from being a danger to life or property.</li> <li>3. The developer is to ensure that if an excavation associated with the development extends below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation to be made must: <ol style="list-style-type: none"> <li>a) preserve and protect the adjoining building from damage, and if necessary, underpin and support the building in an approved manner; and</li> <li>b) at least seven (7) days before excavating below the level of the base of the footings of a building on an adjoining allotment of land, give notice of intention to do so to the owner of the adjoining allotment of land and furnish particulars of the excavation to the owner of the building being erected or demolished.</li> </ol> </li> <li>4. The owner of the adjoining allotment of land is not liable for any part of the cost of the work carried out for the purposes of this clause, whether carried out on the allotment of land being excavated or on the adjoining allotment of land. An allotment of land includes a public road and any other public place.</li> <li>5. The developer is to ensure that the toe of any embankment to a site excavation is a minimum 900mm from the external walls and graded to drain all surface water away from the building. The ground level adjacent to the building is to be no less that 150mm below the top of the reinforced concrete floor slab.</li> </ol> <p>Condition Reason: To ensure the development complies with the requirements of Clause 74 of the Environmental Planning and Assessment Regulations 2021, and Section 4.17(11) of the Environmental Planning and Assessment Act 1979, as amended.</p>

DC_26	<b>Dust Control Measures</b>
	Adequate measures will be taken to prevent dust from affecting the amenity of the neighbourhood during construction. In particular, the following measures must be



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	<p>adopted:</p> <ul style="list-style-type: none"> <li>a) Physical barriers will be erected at right angles to the prevailing wind direction or will be placed around or over dust sources to prevent wind or activity from generating dust emissions,</li> <li>b) Earthworks and scheduling activities will be managed to coincide with the next stage of development to minimise the amount of time the site is left cut or exposed. All materials will be stored or stockpiled at the best locations,</li> <li>c) The surface should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs,</li> <li>d) All vehicles carrying spoil or rubble to or from the site will at all times be covered to prevent the escape of dust or other material,</li> <li>e) All equipment wheels will be washed before exiting the site using manual or automated sprayers,</li> <li>f) Gates will be closed between vehicle movements and will be fitted with shade cloth, and</li> <li>g) Cleaning of footpaths and roadways will be carried out regularly.</li> </ul> <p>Condition Reason: To reduce impact on surrounding properties during construction.</p>
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DC_27	<b>Revegetation works</b>
	<p>At the completion of site works the following landscaping works are to be carried out:</p> <ul style="list-style-type: none"> <li>a) all disturbed areas are to be weed free hay mulched;</li> <li>b) topsoil is spread over all disturbed areas with priority given to cut and fill batters;</li> <li>c) all disturbed areas are re-vegetated using drylands grass mix with a complete fertiliser.</li> </ul>
	Condition Reason: To minimise soil erosion.

### BEFORE ISSUE OF AN OCCUPATION CERTIFICATE

Condition	
POC_01	<p><b>Occupation Certificates</b></p> <p>The owner, principal contractor or owner-builder must meet all costs associated with the foregoing conditions which must be completed prior to the issue of the relevant Occupation Certificate, unless otherwise stated.</p>

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	Condition Reason: To ensure the building as has been approved for occupation.
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POC_07	<b>Completion of Engineering Works</b>
	The developer shall complete all engineering works in accordance with the conditions of this consent together with any necessary work to make the construction effective.  The costs of all engineering works shall be fully borne by the applicant/developer and any damage to Council's assets shall be made good, prior to the issue of any Occupation Certificate or commencement of the development.
	Condition Reason: : To ensure that all engineering works are to Council's satisfaction.

POC_09	<b>Waste management</b>
	All refuse, spoil and/or material unsuitable for use must be removed from the site and lawfully disposed of upon completion of the building works and prior to the issue of the relevant Occupation Certificate.
	Condition Reason: To ensure waste is disposed of lawfully.

#### OCCUPATION AND ONGOING USE

	Condition
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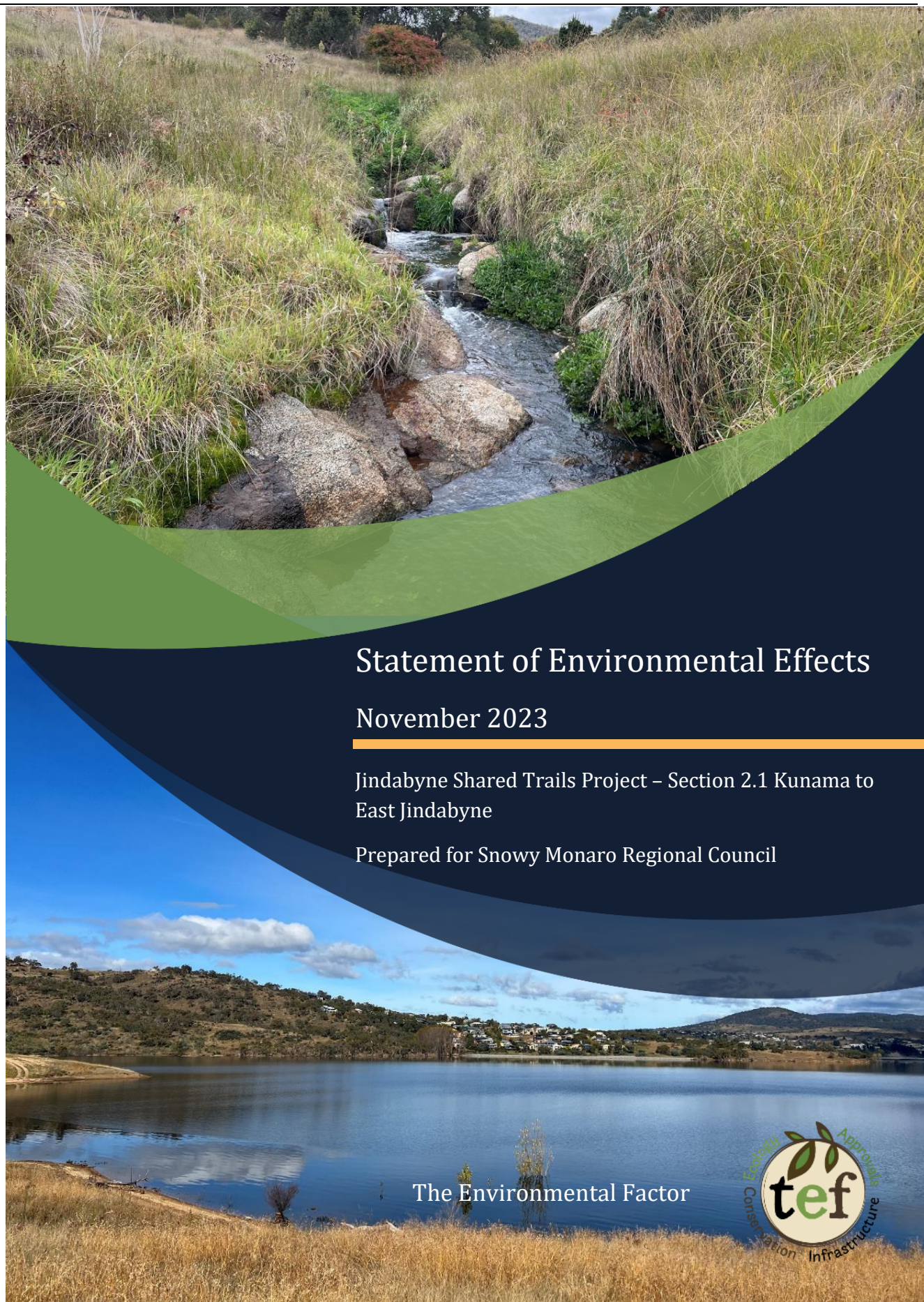
OU_01	<b>Occupation Certificate to be submitted</b>
	An Occupation Certificate must be obtained from the Principal Certifier and a copy submitted to Council (if Council is not the Principal Certifier) prior to the commencement of occupation, or use of the whole or any part of a new building, an altered portion of, or an extension to an existing building.
	Condition Reason: It is in the public interest that an Occupation Certificate be issued prior to occupation of the building in accordance with Section 4.15(1)(e) of the Environmental Planning and Assessment Act 1979, as amended.

OU_02	<b>External lighting</b>
	At all times for the life of the approved development, all outdoor lighting must not detrimentally impact upon the amenity of other premises and adjacent dwellings and must comply with, where relevant, AS1158.3-1999 Pedestrian Area (Category P) Lighting, and AS4282-1997 Control of the Obtrusive Effects of Outdoor Lighting.
	Condition Reason: To ensure legislative compliance.

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OU_28	External finishes
	The materials and colours of external features of any building, driveways, walkways, or large paved areas shall be in colours that blend with the surrounding natural materials (e.g. olive or mist green, light or slate grey, light browns) and shall be non-reflective.
	Condition Reason: To ensure the structure is in keeping with the character of the area.



## Statement of Environmental Effects

November 2023

Jindabyne Shared Trails Project – Section 2.1 Kunama to  
East Jindabyne

Prepared for Snowy Monaro Regional Council

The Environmental Factor







Statement of Environmental Effects – Kunama to East Jindabyne

## Statement of Environmental Effects – Jindabyne Shared Trails Project, Section 2.1 Kunama to East Jindabyne, NSW

### Document Verification

Revision	Author/s	Internal Review	Date	Client Review and Approval	
				Name	Date
0.1	A Uhrig, S Rivett, J Sanderson	G Stirling; E Cotterill	12/07/2022	Justin Warner	24/10/2023
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This Report has been prepared by The Environmental Factor (TEF) at the request of Snowy Monaro Regional Council (SMRC or Council) to assess the impacts arising from the proposed construction of part of the Kunama to East Jindabyne - Section 2.1 of the Jindabyne Shared Trails Project, which forms part of the Lake Jindabyne Mountain Bike Trail network surrounding Lake Jindabyne, NSW (The Proposal). This document is not intended to be utilised or relied upon by any persons other than those outlined above for assessment and consideration of the proposed trail network outlined within this report. Accordingly, TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

The information, statements, recommendations and commentary (together the "Information") contained in this report have been prepared by TEF on the basis of information provided by the Client and Proponent and from material provided by the NSW Department of Planning and Environment (DPE) and the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW), and through the survey process.

This report has been developed in accordance with the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) and the *NSW Environmental Planning and Assessment Regulation 2021* (EP&A Regulation). TEF has not sought any independent confirmation of the reliability, accuracy or completeness of this information. It should not be construed that TEF has carried out any form of audit of the information which has been relied upon.

Accordingly, whilst the statements made in this report are given in good faith, TEF accepts no responsibility for any errors in the information provided by Stantec or SMRC nor the effect of any such errors on the analysis undertaken, suggestions provided, or this report. Information contained within the Report is current as at the date of the Report and may not reflect any event or circumstances which occur after the date of the Report. Site conditions may change after the date of this report. TEF does not accept responsibility arising from, or in connection with, any change to the site conditions. TEF is also not responsible for updating this report if site conditions change.



Statement of Environmental Effects – Kunama to East Jindabyne

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## ABBREVIATIONS

Abbreviation	Description
ACHA	Aboriginal Cultural Heritage Assessment
ACT	Australian Capital Territory
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AOBV	Areas of Outstanding Biodiversity
ARA	Appropriate Regulatory Authority
ASS	Acid Sulfate Soils
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Application Report
BoM	Bureau of Meteorology
BOS	Biodiversity Offset Scheme
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water (DCCEEW).
DCP	Development Control Plan
DPI	Department of Primary Industries
DPE	Department of Planning and Environment
EEC	Endangered Ecological Community
EPA	Environmental Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPL	Environmental Protection Licence
ERSED	Erosion and Sediment
ESD	Ecologically Sustainable Development
FM Act	<i>Fisheries Management Act 1994</i>
GBD	General Biosecurity Duty



Statement of Environmental Effects – Kunama to East Jindabyne

Abbreviation	Description
<b>GHG</b>	Greenhouse Gas
<b>ICNG</b>	Interim Construction Noise Guideline
<b>KNP</b>	Kosciuszko National Park
<b>KTP</b>	Key Threatening Process
<b>LEP</b>	Local Environment Plan
<b>LGA</b>	Local Government Area
<b>MNES</b>	Matters of National Environmental Significance
<b>MTB</b>	Mountain Bike
<b>NSW</b>	New South Wales
<b>OEH</b>	Office of Environment and Heritage
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>RCP</b>	Representative Concentration Pathway
<b>RDP</b>	Rapid Data Point
<b>SEE</b>	Statement of Environmental Effects
<b>SMRC</b>	Snowy Monaro Regional Council
<b>SMSAP</b>	Snowy Mountains Special Activation Precinct
<b>TEC</b>	Threatened Ecological Community
<b>TEF</b>	The Environmental Factor
<b>WoNS</b>	Weed of National Significance



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## EXECUTIVE SUMMARY

This Statement of Environmental Effects (SEE) has been prepared by The Environmental Factor (TEF) on behalf of Snowy Monaro Regional Council (SMRC). The report presents findings of the investigations undertaken into the likely environmental impacts on both the natural and built environments, and social and economic impacts in the locality by reason of the proposed construction of 3.8 km of shared-use recreational trail extending from the Kunama Estate to East Jindabyne, NSW (hereafter 'the Proposal'). The proposed trail primarily follows the foreshore of Lake Jindabyne, splitting at the southern extent with one trail joining Lakeview Terrace and the remaining trail extending south to join up with other trails in the network. The Proposal is located within the locality of Jindabyne, immediately east of Lake Jindabyne and is accessible via a number of roads including Girvin Place, Old Kosciuszko Road and Boronga St.

This SEE demonstrates compliance with the relevant aims and objectives of the Snowy River Shire Development Control Plan (DCP), and informs the approval pathway required under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Environmental Planning and Assessment Act 1979* (EP&A Act). Council have identified that the Proposal will be assessed as Complying development under Part 4 of the EP&A Act, as 'Environmental facilities' are permissible, with development consent, in land zoned as SP1 – Special Activities, C3 – Environmental Management, RU5 – Village, RE2 – Private Recreation, and R5 – Large Lot Residential. Property acquisition is required for one property within the subject site and Council are progressing this through Public Works.

The Proposal has been designed to extend and upgrade an existing trail network, The Lake Jindabyne Trail, which currently extends from the Jindabyne township to Tyrolean Village (East Jindabyne) and forms part of the Go Jindabyne Master Plan which was announced in November 2018 aimed at turning the township of Jindabyne in NSW into Australia's premier alpine destination (Planning and Environment, NSW Government July 2019). The Lake Jindabyne Shared Trail project aims to provide a 60 km trail network around the southern half of the lake.

The alignment of the proposed trail extends 3.8 km (Figure 1) and is proposed to have maximum impact of 3 m width which includes a 0.5 m buffer on both sides.

Specifically:

- Direct impact: Construction of up to **3.8 km** of shared use recreational trail with impacts equating to a 3-metre-wide maximum area for the direct construction impact footprint, which covers a total area of **1.11 ha**, of which native vegetation equals **1.01 ha**. This includes construction of five (5) bridges crossing minor waterways along the trail.
- Indirect impact: The direct impact area sits within a 20-metre-wide corridor (10 m either side of the proposed alignment) to allow for indirect impacts, for a subject land area comprising **7.21 ha** of which native vegetation equals **6.49 ha**.

The study area is in proximity to the boundary of the 'Snowy Mountains Scheme', which is a listed heritage item on the National Heritage List (NHL) and registered as a Matter for National Environmental Significance (MNES) due to the engineering success of the scheme and as a symbol of Australian achievement. The Proposal is not being undertaken within the boundary of the heritage area and so is considered unlikely to impact upon the item.

A number of Aboriginal cultural heritage sites are known throughout the area; therefore, an Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the study area to determine if these sites can be avoided by the Proposal, or if mitigation measures are required prior to commencement of construction works on the trail. The ACHA included assessment of four (4) separate



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sections of trail that included the section being assessed in this REF. A site assessment and community consultation process were completed in line with the NSW code of practice. A total of eight (8) new Aboriginal Heritage Information Management System (AHIMS) registered sites were identified to add to the four (4) previously registered sites within the entire archaeological study area. Since Aboriginal cultural material was uncovered specifically within the study area for the Kunama to East Jindabyne proposed trail and cannot be entirely avoided by the Proposal, an application for an Aboriginal Heritage Impact Permit (AHIP) is required to permit harm to these items.

The proposed trail will complement the existing and future recreational opportunities offered in Jindabyne, contribute to the recreational value of the town and formalize a section of trail, minimizing damage caused by use of the current, unofficial goat track and crossings. Minor temporary impacts to visual amenity, traffic and noise and air quality are expected during the construction period of 20 weeks, however long term social and economic benefits are anticipated from increased tourist visitation to the area from the construction of a high standard trail network that promotes the Jindabyne area to a diverse range of potential visitors.

Due to the sensitive environment within which the development will take place, consideration of the proposal under the Biodiversity Assessment Method (BAM) has been undertaken. It has been determined that the clearing of native vegetation associated with the Proposal will exceed the threshold for participation in the Biodiversity Offset Scheme (BOS). This is outlined in more detail in the Biodiversity Development Assessment Report (BDAR), which is included as an appendix to this report. This report also details the biodiversity surveys undertaken on site including habitat identification, confirmation of vegetation community mapping, identification of Threatened Ecological Communities (TECs), collection of floristic data, as well as opportunistic threatened flora and fauna surveys.

In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Assessment Area, with the proposed trail intersecting seven (7) unnamed waterways (five 1<sup>st</sup> Order, one 2<sup>nd</sup> Order and one 3<sup>rd</sup> Order). As such, it is anticipated that construction works will occur within the defined riparian zone of several creeks. Council must gain a Controlled Activity Approval (CAA) pursuant to clause 38 of the WM Regulation before work on the creeks commences. Some areas of the subject site interact with mapped Key Fish Habitat (KFH) and five (5) bridge crossings will be constructed as part of the works. The Proposal includes dredging and reclamation works within a waterway mapped as containing KFH and as such a Part 7 permit from DPI - Fisheries must be obtained prior to commencement.

All proposed work will be completed under the guidance of a Construction Environmental Management Plan (CEMP) to manage and minimise potential environmental impacts associated with the proposed trail network. Once operational, the Proposal is not expected to cause any significant adverse environmental or community impacts. Conversely, the proposed trail network additions are anticipated to have positive long-term benefits for the region, through the provision of increasing tourism in the region by making it attractive to visitors year-round.



Statement of Environmental Effects – Kunama to East Jindabyne

## 1 INTRODUCTION

### 1.1 Overview of the Proposal

The Environmental Factor (TEF) has been engaged by Snowy Monaro Regional Council (SMRC or Council), to undertake a Statement of Environmental Effects (SEE) to consider the environmental impacts relating to the proposed activity, namely the construction of a new recreational use trail, extending approximately four (4 km) from the Kunama Estate to East Jindabyne, NSW.

The Proposal has been designed to extend an existing trail network, The Lake Jindabyne Trail, which currently exists from the Jindabyne township to Tyrolean Village (East Jindabyne), out to Hatchery Bay (Northwest of Jindabyne), and forms part of the Go Jindabyne Master Plan which was announced in November 2018 aimed at turning the township of Jindabyne in NSW into Australia's premier alpine destination (Planning and Environment, NSW Government July 2019). The Lake Jindabyne Shared Trail project aims to provide a 60 km trail network around the southern half of the lake. The trail design will target mountain bike riders, walkers and trail runners. The project will complement existing trail experiences in the region which will encourage increased visitation and provide a valuable recreation asset for the community.

Following an in-depth consultation and analysis process, the Snowy Mountains Special Activation Precinct (SMSAP) was announced in November 2019, expanding the scope of the Go Jindabyne Master Plan to encompass the wider Snowy Mountains region. The objective of the SMSAP is to increase tourism in the region by making it attractive to visitors year-round. Amongst other things, the SMSAP aims to identify opportunities to promote the development of year-round adventure and eco-tourism attractions and improve tourism amenity within the region. As part of the wider Master Plan, SMRC engaged consultants to undertake concept planning for the construction of the proposed shared-use trail from the Kunama Estate to East Jindabyne NSW.

The trail alignment is proposed to have maximum impact of 3 m width which includes a 0.5 m buffer on both sides,

Specifically:

- Direct impact: Construction of up to **3.8 km** of shared use recreational trail with impacts equating to a 3-metre-wide maximum area for the direct construction impact footprint, which covers a total area of **1.11 ha**, of which native vegetation comprises **1.01 ha**.
- Indirect impact: The direct impact area sits within a 20-metre-wide corridor (10 m either side of the proposed alignment) to allow for indirect impacts, for a Subject Land area comprising **7.21 ha** of which native vegetation equals **6.49 ha**.

The site assessed is intended to be of sufficient size and provide a cleared area for the construction of the required trail as described above, including the movement of plant and machinery, the provision for adequate water (runoff, erosion and sediment controls) management and buffer (0.5 m and 10 m either side) throughout the site, and to allow for all foreseeable direct and indirect impacts arising from the proposed works.



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The majority of the Proposal is located within Freehold land, with one parcel occurring in Local Government land, zoned SP1 – Special Activities, E3 / C3 – Environmental Management, RU5 – Village, RE2 – Private Recreation, and R5 – Large Lot Residential. Land acquisition forms part of the Proposal.

The concept design for the Proposal has been provided as Appendix A.

### 1.2 Purpose of the Statement of Environmental Effects

This SEE supports the development application (DA) to Snowy Monaro Regional Council (SMRC) to explain the likely impacts of the Proposal during construction and operation of the trail network, and the mitigation measures that will be implemented to minimise these impacts. This SEE demonstrates compliance with the relevant aims and objectives of the Snowy River Shire Development Control Plan (DCP) and informs the approval pathway required under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Environmental Planning and Assessment Act 1979* (EP&A Act).

### 1.3 Site location and description

The Subject Land covers a 3.8 km length. The proposed trail primarily follows the foreshore of Lake Jindabyne, splitting at the southern extent with one trail joining Lakeview Terrace and the remaining trail extending south to join up with other trails in the network. The proposed trail has been designed for shared use by mountain bike riders and pedestrian walkers / runners. The alignment of the proposed trail extends 3.8 km, connecting to the trail network as it travels around Lake Jindabyne (Figure 1, Plate 1). The Subject Land is zoned as follows (Figure 2).

- SP1 – Special Activities: The majority of the Subject Land where the trail runs close to the foreshore of Lake Jindabyne.
- C3 (formerly E3) - Environmental Management: Trail enters this land zoning for less than 100 m at the northern extent of the proposed trail near East Jindabyne Village.
- RU5 – Village: The trail runs through one small section of this zone with further possible in Kunama Estate towards the southern end of the trail.
- RE2 – Private Recreation: Trail bisects this zone in the middle and southern portions of the proposed trail alignment.
- R5 – Large Lot Residential: fractional encroachment of the Subject Land into this zone close to the northern end of the proposed trail in East Jindabyne Village.

The Plant Community Type's (PCTs) identified through site assessment as occurring on the site include:

- PCTID 1191 *Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion*
- PCT 0: Non-native

TEF staff undertook a site visit over two (2) days in April 2022 by Senior Ecologist Skye Rivett (BAAS 22001) and Ecologist Anna Uhrig. During the site assessment, with detailed results of the ecological site assessment findings provided in **Appendix D**.





Statement of Environmental Effects – Kunama to East Jindabyne

Table 1 Site details

Site details			
Site Address	Along the foreshore of Lake Jindabyne – east. Kunama Estate to East Jindabyne.		
Lot and DP	Lot	Plan	Tenure
	19	DP530537	FREEHOLD
	1	DP248100	FREEHOLD
	30	DP236875	FREEHOLD
	26	DP548802	FREEHOLD
	21	DP235881	FREEHOLD
	28	DP236875	FREEHOLD
	29	DP236875	FREEHOLD
	2	DP248100	FREEHOLD
	24	DP1089304	FREEHOLD
	4	DP232161	FREEHOLD
	2	DP816051	FREEHOLD
	9	DP1216028	LOCAL GOVERNMENT AUTHORITY
Closest crossroad(s)	Old Kosciusko Road, Boronga Street, Kunama Drive		
Land Zoning	<ul style="list-style-type: none"> <li>• SP1 – Special Activities</li> <li>• C3 (E3 prior to December 2021) – Environmental Management:</li> <li>• RU5 – Village</li> <li>• RE2 – Private Recreation</li> <li>• R5 – Large Lot Residential</li> </ul>		
LGA	Snowy Monaro Regional Council		
IBRA region	South Eastern Highlands		
IBRA sub region	Monaro		

Table 2 Definitions

Term	Description
Assessment Area	Includes the Subject Land plus a 500m buffer along either side of the centre line (for linear proposals); total area <b>353.40 ha</b> of which native vegetation comprises <b>60.80 ha</b> .
Subject Site	The area to be directly affected by the Proposal, including earthworks and vegetation clearing. Includes <b>3.8 km</b> of new shared use trail with a <b>3 m</b> wide maximum direct construction impact area (1.5m either side of centreline), with bridge crossings being within a 1.5 m wide direct impact, measuring <b>1.11 ha</b> of new impacts of which native vegetation comprises 1.01 ha.
Subject Land	Includes the Subject Site (as described above) and any proximal areas that could be potentially directly or indirectly impacted by the Proposal. For the purposes of this report the Subject Land has included a buffer area of 10 m either side of the centreline of the direct impact zone, measuring a combined total area of <b>7.21 ha</b> of which native vegetation equals <b>6.49 ha</b> .



Statement of Environmental Effects – Kunama to East Jindabyne

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Term	Description
Locality	Is the area within 10 kilometres of the subject site (Figure 2).

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Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Development Layout

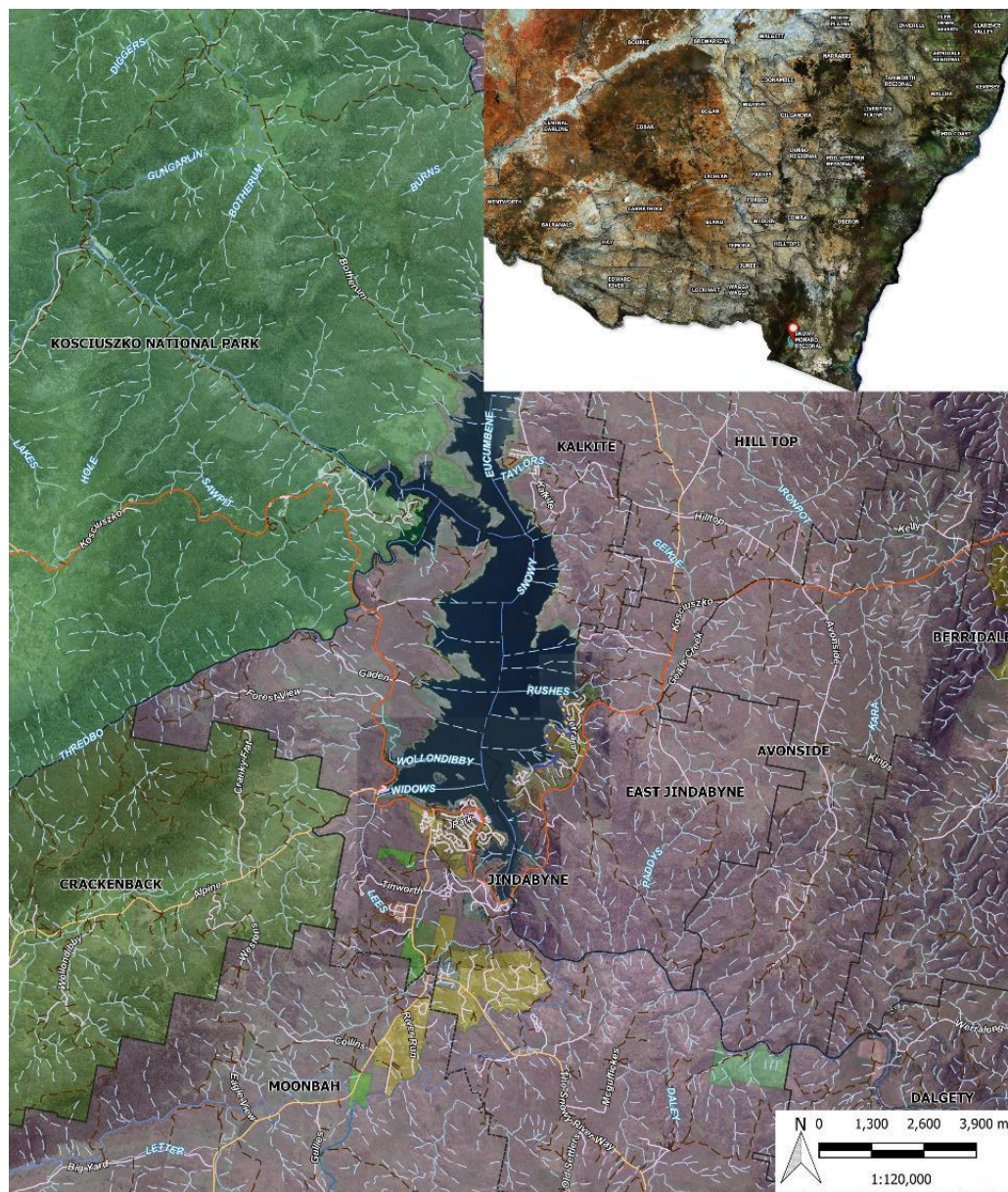
© 2023. Whilst every care has been taken to prepare this map, TEF make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason. Service Layer Credits: Source: ss-idx Spatial Portal NSW Government World Satellite Imagery, DFSI Clip&Ship Digital cadastral and topographic datasets of the Snowy Monaro LGA (NSW LPI). SMRC Stage 2.1 trail designs. NSW GDA 2020 MGA Zone 55. Author: J Sanderson. Date: 14/09/2023

Figure 1 Study area and Subject Land including proposed trail impact areas





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Section 2.1 Jindabyne Shared Trails Kunama Estate - East Jindabyne - Regional Context and Land Zoning

Legend

Subject Site	<b>Roads</b>	Track-Vehicular	Creek	B2	IN1	RE1	SP1
Subject Land	Arterial Road	<b>Waterways</b>	1st & 2nd order unnamed waterways	C1	R1	RE2	SP2
Suburb	Local Road	River	<b>Land Zoning</b>	C2	R2	RU1	SP3
	Sub Arterial Road	Gully	B1	C3	R5	RU5	

© 2022. Whilst every care has been taken to prepare this map, TEF make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason. Service Layer Credits: Source: ss-sdi NSW Government Spot 2020 Satellite Imagery, DP31 Clip8.5Ship Digital cadastral and topographic datasets of the Snowy Monaro LGA (NSW LPI) OEH EPI Land Zoning 2022. SMKC Carina Shared Trails. GDA 2020 MGA Zone 55. Author: J Sanderson. Date May 2022.



Figure 2 Regional Context and land zoning in locality



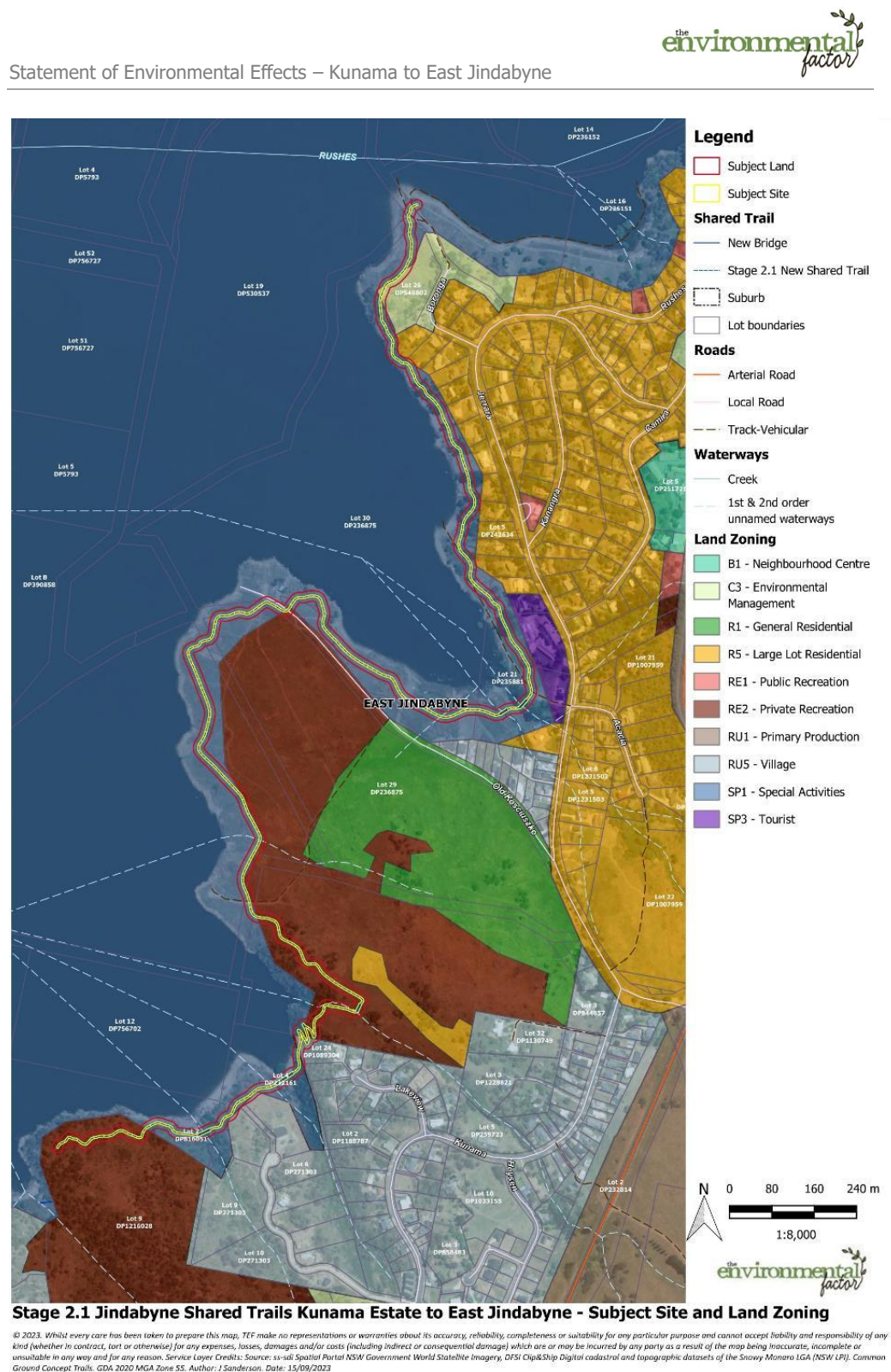


Figure 3 Land zoning in proximity to the proposed trail



## 2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 2.1 Project Overview

Snowy Monaro Regional Council (SMRC) have engaged consultants to design and construct a new shared use recreational trail, 3.8 km long, including five (5) small bridges, extending along the foreshore of Lake Jindabyne from Kunama Estate to East Jindabyne, NSW. The proposed trail has been designed for shared use by mountain bike riders and pedestrian walkers / runners. Stage 2.1 of the Jindabyne Shared Trail Network is expected to have the DA submitted by November 2023, with construction commencing in early 2023, with an anticipated twenty (20) week construction period.

### 2.2 Proposal justification and public benefits

In November 2019 the Snowy Mountains Special Activation Precinct (SMSAP) was announced, with the objective of increasing tourism in the region by making it an attractive location to visitors, year-round. Amongst other things, the SMSAP aims to identify opportunities in promoting the development of year-round adventure and eco-tourism attractions and improve tourism amenity within the region.

The Proposal aims to:

- Ensure that additional visitors from across Australia are attracted to the region.
- Ensure that once visitors are in the region they stay for longer periods of time, due to the length and variety of trails in combination with other recreational activities such as hiking, and snow sports, which supports the visitor economy as a whole.
- Encourage NSW mountain-biking tourists to stay in NSW, rather than travel to interstate destinations.
- Attract mountain biking events to the region.
- Enhance the lifestyle benefits for residents to help attract and retain a skilled workforce for the region.

Mountain biking as a recreational sport has significantly increased in popularity in recent years, and the SMRC has been investigating the 'round the lake' trail vision over the last ten (10) years. The Shared Trails project will involve extending the existing trail network to Kalkite Village on the East side of the lake and the Thredbo Valley Track to both Creel and Hatchery Bay on the West. Project funding will also cover improvements to the existing trail network along with supporting infrastructures such as car parking, trails heads and visitor day-use areas.

Lake Jindabyne Shared Trail has been awarded \$11.8 million funding by the Regional Growth-Environment and Tourism fund, funded through Restart NSW. The funding program provides funding for infrastructure that supports regional economic growth, creates local employment opportunities and drives growth in the visitor economy (SMRC, 2022).



Several options were considered for the proposed trail network including:

- When designing the trail, Council consulted with a wide range of trail planning and design consultants and considered the following factors:

- Council decided to proceed with Option C 'shared use trail' in order to cater for a wide range of users and visitors and to provide recreational facilities which are inclusive and reflect the visitor population to Jindabyne.



2.4 Construction and Operation

The following sub-chapters describe the intended construction and operation methodologies that will be implemented as part of the Proposal.

The core principle for the design of the Proposal is to construct and operate a mountain bike trail in the area with minimal impact to the surrounding native biota. The wider Jindabyne trail network has been designed to respond to current and future trends in trail style preferences which will minimize the creation of unsanctioned trails.

2.4.1 Description of trail construction works

Council is proposing the following works:

- Construction of 3.8 km of new trail including five (5) bridges over minor waterways and tributaries along the trail.
- Installation of new signage and directional arrows that comply with international standards.

Table 3 Types of works relevant to the Proposal

Types of works	Comments
New Trail Construction	<div><ul style="list-style-type: none"><li>• Clearing of understory vegetation along new trail alignment.</li><li>• Use of small excavator machinery to dig out and shape trail to desirable width and shape.</li><li>• Battering of slope to stabilize slope above and below new trail to prevent erosion.</li><li>• Distribution of seed, planting of tubestock and completion of hydromulching with appropriate native species as required to rehabilitate disturbed areas.</li></ul></div> <div></div>





## Statement of Environmental Effects – Kunama to East Jindabyne

Types of works	Comments
<b>Bridge Construction</b>	<ul style="list-style-type: none"> <li>Bridges will be supported by 125 x 6.5 SHS FRP (Fibre Reinforced Polymer) piles driven into the ground by an excavator with a vibration plate and platform. The bridge structures consist of FRP components and a CFT (Composite Fibre Technology) decking.</li> <li>Construction of the bridges will be modular in design. These modules will be lifted into place using a Bell 412 helicopter. This machine has a lifting capacity of 1.2 tonnes. There are 5 Girders for 6 x 10 m spans in total over the 5 bridges. See Appendix A for further information.</li> </ul>

**2.4.2 Operation of Kunama to East Jindabyne Trail**

The operational phase of the Proposal, considered as part of this SEE, includes assessment of impacts associated with use of the newly constructed trail once construction and landscaping/restoration works are complete including any associated amenities and landscaped areas and any cumulative impacts the Proposal is likely to have on renewable and finite resources in terms of sustainability, ecology, climate change and community.

**2.5 Design principles and investigations undertaken**

This SEE report provides a summary of the specialist investigations completed as part of design development for the Proposal. A brief overview of each assessment completed to date is provided below. These assessments have been integral in guiding the design process for the trail alignment. The core principle for the design of the Proposal is to construct and operate a series of shared use trails in the area with minimal impact to the surrounding native biota and cultural heritage. The Lake Jindabyne trail is proposed to be shared use (walking/running/cycling) dual direction.

The trail design will therefore need to meet the expectations of a wide user group. The following Australian Standard classification ratings have been adhered to in determining trail alignment, grade, width, profile and surface treatment:

- Walking/running- Grade 3 as identified in the Australian standards for walking tracks.
- Cycling- Easy- green circle as identified in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System.

This trail will be constructed with a 2-metre wide trail bed and a gravel/clay surface as it is anticipated to have a high use. Bridge crossings will have a 1.5 m wide impact area. This will ensure the trail is sustainable for a longer period of time.

The following chapters describe the specialist investigations undertaken as part of the development of this report.

**2.5.1 Aboriginal Cultural Heritage Assessment**

Known Aboriginal heritage sites fall within the Study Area; therefore, an Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the Study Area and provide further recommendations on avoiding impacts to culturally important areas. The community consultation phase of the ACHA engaged with a total of eight (8) Aboriginal people and organisations who engaged as Registered Aboriginal Parties (RAPs). All RAPs have been included in the consultation process



## Statement of Environmental Effects – Kunama to East Jindabyne

undertaken for the project, and a number of responses were received at various stages of the process. The ACHA recommends the preparation of an AHIP application prior to the commencement of works on the site. See Section 4.5 and Appendix B for more details.

**2.5.2 Biodiversity Development Assessment Report**

As the Proposal is being assessed under Part 4 of the EP&A Act, and the impact footprint area exceeds the threshold to trigger the Biodiversity Offset Scheme (BOS), the Proposal requires preparation of a Biodiversity Development Assessment Report (BDAR) and the calculation of offset obligations.

The BDAR is aimed at providing an up to date understanding of the biodiversity assets present within the Subject Land (as at November 2022, updated September 2023), which may act as constraints to the proposed development, or be impacted by delivery of the Proposal. Knowledge of these constraints can help the Client best plan for future usage of the site without significantly affecting any important ecological/biodiversity features, thereby avoiding and minimising impacts where possible, in accordance with the principles of the BC Act. This report also considers the principles for Significant Impact Criteria assessments under the EPBC Act, for the purpose of assessing the level of impact the Proposal is likely to have on threatened species, ecological communities and their habitats that are present, or likely to be present, within the Subject Land. The potential for impacts that could be characterised as serious and irreversible (aka Serious and Irreversible Impacts or SAIL) have thereby also been considered.

A detailed site inspection was undertaken by TEF ecologists to assess the ecological condition of the proposed trail network and map existing ecological features within a 20 m wide corridor of the proposed trail alignment. Surveys undertaken on site included habitat identification, vegetation community mapping, identification of Threatened Ecological Communities (TECs), collection of floristic data, as well as targeted seasonal threatened flora and fauna surveys. During field investigations, the condition and habitat values of the vegetation present were assessed in accordance with the Biodiversity Assessment Method (BAM). The full BDAR report is provided as Appendix D.

**2.6 Mitigation measures**

Throughout the environmental impact assessment undertaken in relation to the above Proposal, potential impacts on the environment were identified, in relation to the following environmental 'categories':

- Applicable Acts and legislation
- Soils and Erosion
- Waterways
- Noise and Vibration
- Air Quality
- Non-Aboriginal Heritage
- Aboriginal Heritage
- Biodiversity
- Traffic and Transport
- Socio-economic Considerations
- Waste and Resource Use
- Visual Amenity



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- Climate Change

Mitigation measures were then developed to address each of the identified impacts, to ensure that the residual impact upon the environment would not be significant. These mitigation measures form part of the Proposal and **will be implemented** as part of delivery of the Proposal. With these environmental mitigation measures, the Proposal does not have the potential to result in significant impacts within the above categories, which would have environmental, social and economic consequences for Council, as the consent authority for these works.

A summary of all mitigation measures included in this report is provided as Appendix C.



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### 3 LEGISLATIVE CONTEXT

The subject site for the Proposal is located on freehold and Council owned land within the SMRC Local Government Area (LGA). SMRC was established in May 2016, with former Council LEPs still current for the former Shire areas and as such land use within SMRC is guided by three (3) LEPs. The Proposal falls within the former Snowy River Shire LGA, therefore the Snowy River Shire LEP (2013) and DCP pertain to the Proposal.

Council have identified that the proposal will be assessed as Complying development under Part 4 of the EP&A Act, as 'Environmental facilities' are permissible, with development consent, in land zoned as:

- SP1 – Special Activities
- E3 (now Zone C3 as of December 2021) – Environmental Management
- RU5 – Village
- RE2 – Private Recreation
- R5 – Large Lot Residential

Further to the above, the following legislation, policies and guidelines applicable to the Proposal have been reviewed, and the implications have been assessed accordingly as part of this SEE.

#### 3.1 Relevant Commonwealth (Federal) Legislation

##### 3.1.1 *Environmental Protection and Biodiversity Conservation Act 1999*

The EPBC Act ensures that actions likely to cause a significant impact on Matters of National Environmental Significance (MNES) undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, undertaking or activity. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for the Environment (the 'Minister').

MNES include:

- World Heritage properties
- National Heritage places
- Wetlands of international importance
- Listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- Nuclear actions
- A water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act has been addressed in the current assessment through:

- Desktop review to determine the MNES that are predicted to occur within the locality of the proposed scheme and hence could occur, subject to the habitats present.



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- General field surveys for threatened biota and migratory species listed under the Act.
- Identification of suitable impact mitigation and environmental management measures for threatened biota, where required.
- Assessment of potential impacts on MNES, where applicable.

Potential impacts on relevant MNES must be subject to Tests of Significance pursuant to the EPBC Act Significant Impact Guidelines (DEWHA 2009). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister.

This SEE addresses the likelihood of MNES occurring within the locality of the proposed activity, and their potential to be impacted by the proposed activity (Section 4.7 and Appendix D).

### 3.2 Relevant NSW State Acts of Legislation and Related Policies

#### 3.2.1 *Environmental Planning and Assessment Act 1979 (EP&A Act) and the EP&A Regulation 2021*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the legal and policy platform for the assessment and approval of works in NSW. The Proposal constitutes Complying Development as dictated by the Snowy River Shire LEP. Complying Development requires development consent to be sought from SMRC.

As Complying Development, the project would be assessed under Part 4 Division 4.5 (d) of the EP&A Act. SMRC is required to take into consideration the matters listed under Section 4.15 of the EP&A Act when determining the development application.

All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation).

#### 3.2.2 *Snowy River Shire Local Environmental Plan 2013*

The Subject Land for the Proposal is located on Crown, Freehold and Local Government Land in the Snowy Monaro Regional Council Local Government Area (LGA).

The subject site is located on land mapped within the Snowy River Local Environmental Plan (LEP) 2013, and is located within the following land use zones:

- SP1 – Special Activities
- C3 (E3 prior to December 2021) – Environmental Management:
- RU5 – Village
- RE2 – Private Recreation
- R5 – Large Lot Residential

The majority of the Subject Land is located within land zoned as SP1 along the shore of Lake Jindabyne. The Subject Land passes through sections of land zoned RE2 in the middle and southern portions of the proposed trail and one small section of land zoned RU5 in Kunama Estate. Fractional encroachment on land zone C3 and R5 may occur in the northern extent of the proposed trail in East Jindabyne Village.



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The objectives of zone SP1 are to provide for special land uses that are not provided for in other zones, provide for sites with special natural characteristics that are not provided for in other zones, and facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.

The objectives of zone RU5 are to provide for a range of land uses, services and facilities that are associated with a rural village, protect and conserve the historical significance, character and scenic quality of rural village settings, encourage and provide opportunities for population and local employment growth, and ensure that development in village areas is compatible with the environmental capability of the land, particularly in terms of the capacity of the land to accommodate on-site effluent disposal.

The objectives of zone C3 are to protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values, provide for a limited range of development that does not have an adverse effect on those values, provide for a range of compatible rural land uses that do not have an adverse effect on the surrounding land uses or natural values and landscape setting of the area, and provide for high quality tourist development that is small scale, low impact and sympathetic to the unique landscape setting and scenic qualities of the area, including the approaches to Kosciuszko National Park.

The objectives of zone RE2 are to enable land to be used for private open space or recreational purposes, provide a range of recreational settings and activities and compatible land uses, and protect and enhance the natural environment for recreational purposes.

The objectives of zone R5 are to enable land to be used for residential housing in a rural setting while minimising impacts on environmentally sensitive locations and scenic quality, to ensure that large residential lots do not hinder the development of urban areas in the future, to ensure that development in the area does not unreasonably increase the demand for public services or public facilities, to minimise conflict between land uses within this zone and those within adjoining zones, and to provide a buffer between urban development and broad acre rural and environmental areas.

As per the LEP and EP&A Act, the Proposal can be appropriately assessed as Complying development under Part 4 of the EP&A Act, as 'Environmental Facilities' are permissible, with development consent, in land zoned as SP1, C3, RU5, RE2 and R5, unless stated as prohibited.

**3.2.3 Biodiversity Conservation Act 2016 (BC Act)**

Section 7.2 and 7.8 of the *Biodiversity Conservation Act 2016* (BC Act) states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.

The BC Act provides legal status for biota of conservation significance in NSW. It provides a framework for the Biodiversity Assessment Method (BAM) and the calculation of offset requirements for projects participating in the Biodiversity Offset Scheme (BOS).



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The BC Act aims to:

- Conserve biological diversity on a bioregional and state scale,
- Lists Areas of Outstanding Biodiversity Value (AOBV),
- Assess the extinction risk of species and ecological communities,
- Identify Key Threatening Processes,
- Slow the rate of biodiversity loss, and
- Conserve threatened species.

The study area is not listed as an AOBV. AOBV are special areas with irreplaceable biodiversity values that are important to the whole of NSW, Australia, or globally. Section 4.7 of this SEE and Appendix D addresses potential impacts to species and communities listed under the BC Act.

### 3.2.4 Biodiversity Conservation Regulatory Act 2017 (BC Regulatory Act)

The *Biodiversity Conservation Regulation 2017* (BCR Act) provides a number of considerations and practices to be implemented as part of the BC Act, as follows:

- Identifies clearing thresholds and the Biodiversity Values Map for the application of the Biodiversity Offsets Scheme (BOS)
- Outlines principles for serious and irreversible impacts (SII) to biodiversity
- Rules for meeting biodiversity offset obligations
- Biodiversity certification criteria

The BOS threshold is exceeded on land subject to clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the *Biodiversity Regulation 2017* on land identified on the Biodiversity Values Map (BVM), except where:

- The land is subject to a planning approval made up to 90 days after the land was added to the BVM; or
- If the land was already subject to planning approval when the land was added to the BVM.

The BVM shows no areas of vegetation mapped as containing High Biodiversity Values in proximity to the Subject Land.

#### Area Criteria Threshold

Native vegetation clearing thresholds as outlined in Part 7 of the *Biodiversity Conservation Regulation 2017* (Table 4) indicates when a project would need to enter the BOS according to the minimum lot sizes and the corresponding native clearing thresholds.

Field surveys confirmed that the site does contain areas of native vegetation. The clearing threshold for the site, based on the minimum lot size, is **0.25 ha**.

Table 4 Area criteria – Biodiversity Offset Scheme threshold

Minimum lot size	Threshold for clearing (ha) to enter BOS
<1 ha	>0.25
1 ha < 40 ha	>0.5



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Minimum lot size	Threshold for clearing (ha) to enter BOS
40 ha – 1000 ha	>1
>1000 ha	>2

As per the Snowy River LEP, the Proposal is being completed on land zoned SP1, C3, RU5, RE2 and R5. The minimum lot size associated with the property is 0.12 hectares. Since the Proposal's clearing requirements have been calculated as 1.01 ha, the applicable clearing threshold for native vegetation is 0.25 ha and will be exceeded by this Proposal; therefore, **participation in the BOS is required.**

#### **Areas of Outstanding Biodiversity Value**

The Subject Land is not listed as an Area of Outstanding Biodiversity Value.

#### **3.2.5 Heritage Act 1997 (Heritage Act)**

The Heritage Act seeks to identify and protect items of cultural heritage value. The Heritage Council of NSW within DPE makes decisions about the care and protection of heritage places and items that have been identified as being significant to the people of NSW.

Automatic protection is afforded to 'relics' under the Heritage Act, defined as 'any deposit or material evidence relating to the settlement of the area that comprised New South Wales, not being Aboriginal settlement, and which holds State or Local significance'. Formerly the Act protected any 'relic' that was more than 50 years old. Now the age determination has been dropped from the Act and relics are protected according to their heritage significance assessment rather than purely on their age.

Excavation of land on which it is known or where there is reasonable cause to suspect that 'relics' will be exposed, moved, destroyed, discovered or damaged is prohibited unless ordered under an excavation permit.

A search of the Snowy River Shire Local Environmental Plan (LEP 2013) heritage mapping and review of the State Heritage Inventory Database identified that there are no local or state heritage items within the subject land. The study area is in proximity to the boundary of the 'Snowy Mountains Scheme', which is a listed heritage item on the National Heritage List (NHL) and registered as a Matter for National Environmental Significance (MNES) due to the engineering success of the scheme and as a symbol of Australian achievement. The Proposal is not being undertaken within the boundary of the heritage area and so is considered unlikely to impact upon the item.

#### **3.2.6 Fisheries Management Act 1994**

The *Fisheries Management Act 1994* (FM Act) aims to conserve threatened species, populations and ecological communities of fish and marine vegetation native to NSW and to promote ecologically sustainable development, including the conservation of biological diversity. It also aims to reduce the threats faced by native fish and marine vegetation in NSW.

Section 220ZZ of the FM Act states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV) as defined by the BC Act, and





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- Species, populations or ecological communities, or their habitats as listed under the FM Act, and whether there is likely to be a 'significant effect' on those species, populations or ecological communities

If a planned development or activity is likely to have an impact on an aquatic threatened species, population or ecological community this must be taken into account in the development approval process. If the impact is likely to be significant, as determined through a Test of Significance, participation in the BOS is required.

Council will need to seek a Part 2 or Part 7 Fisheries Management Act (FM Act) permit for works to be completed if the waterway is mapped as supporting Key Fish Habitat, if the Project includes:

- Activities involving dredging and reclamation work (Part 7 permit)
- Activities temporarily or permanently obstructing fish passage (Part 7 permit)
- Using explosives, electrical devices or other dangerous substances in a waterway (Part 2 permit)
- Harming marine vegetation

Permits are required for works within a third order (or higher) streams (based on the Strahler system of stream order classification), and first and second order streams that are known or likely to be habitat for listed threatened species, populations or communities.

The Subject Land encompasses one waterway marked as Key Fish Habitat as well as Lake Jindabyne occurring along the western boundary of the Subject Land, with mapped areas of KFH encroaching onto the trail. Up to five (5) bridge crossings will be constructed as part of the works. The works will require consideration under the FM Act and as works are proposed in areas marked as KFH; a Part 7 permit will be required to allow for dredging and/or reclamation and the obstruction of fish passage during construction.

### 3.2.7 Water Management Act 2000

The *Water Management Act 2000* (WM Act), administered by the Water division of NSW Department of Industry - Lands and Water, aims to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It provides formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses as well as to provide for protection of catchment conditions.

Council must be aware of and comply with s 91E(1) under the WM Act in relation to all controlled activities that it carries out in, on or under waterfront land (cl 41 *Water Management (General) Regulation 2018*). In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Assessment Area, with the proposed trail intersecting seven (7) unnamed waterways (Figure 7). As such, it is anticipated that construction works will occur within the defined riparian zone of several waterways. Council must gain a Controlled Activity Approval (CAA) pursuant to clause 38 of the WM Regulation before work commences.

### 3.2.8 Guidelines for Instream Works on Waterfront Land

The guidelines relate to the design and construction of works within a watercourse or on waterfront land. The design and construction of works within a watercourse or adjoining waterfront land should protect and enhance water flow, water quality, stream ecology and existing riparian vegetation.



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Impacts on the hydrologic, hydraulic and geomorphic functions of a watercourse should also be minimised.

All waterfront land disturbed by the works should be rehabilitated in such a way that the integrity of the watercourse and its riparian corridor is restored or rehabilitated. Refer to the guidelines for further information on actions that should be taken while completing construction works within a watercourse or on waterfront land.

### 3.2.9 NSW Guidelines for controlled activities on waterfront land (NSW DPI 2021)

Any works proposed within the defined riparian zone of a creek are to be carried out in accordance with the WM Act. Works undertaken on waterfront land (i.e. near a river, lake or estuary) require a controlled activity approval under Section 91 of the WM Act, unless defined as exempt. In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Assessment Area, with the proposed trail intersecting seven (7) unnamed waterways (Figure 7). As such, it is anticipated that construction works will occur within the defined riparian zone of several waterways. Council must gain a Controlled Activity Approval (CAA) pursuant to clause 38 of the WM Regulation before work commences.

NSW DPI Water guidelines recommend riparian buffer distances to protect and maintain water quality and habitat. Recommended buffer distances are tabled below (Table 5). Works are not to be carried out within the Total Riparian Zone as described below. Development which encroaches within these riparian buffer distances are recommended to be offset using the 'averaging rule' outlined by NSW DPI Water.

Table 5 Riparian corridors based on stream order (NSW DPI)

Stream order	Vegetated Riparian Zone (each side of watercourse) (m)	Total Riparian Zone (m)
1 <sup>st</sup>	10	20 + channel width
2 <sup>nd</sup>	20	40 + channel width
3 <sup>rd</sup>	30	60 + channel width
4 <sup>th</sup>	40	80 + channel width

### 3.2.10 Policy and guidelines for fish habitat conservation and management (NSW DPI 2013)

The Policy and Guidelines for Fish Habitat Conservation and Management (2013) provides classification of Key Fish Habitats based on the characteristics of the waterway present.

Key Fish Habitats are further categorised according to 'sensitivity', with Type 1 containing Highly Sensitive habitat, Type 2 containing Moderately Sensitive habitats and Type 3 containing Minimally Sensitive habitats.

### 3.2.11 Managing Urban Stormwater: Soils and Construction

The document *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom 2004 "The Blue Book") outlines the basic principles for the design and construction of erosion and sediment (ERSED) control measures. Volume 1 – *Soils and Construction* and Volume 2A – *Installation of services* provide additional guidance for the management of water on construction sites.



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These documents are relevant to the proposed development, as they provide guidance on the configuration of ERSED controls required during the construction and commissioning phases.

**3.2.12 NSW Biosecurity Act 2015 (Biosecurity Act)**

The *NSW Biosecurity Act 2015* (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act, the responsibilities for weed management by public and private landholders are consistent, reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Priority weeds observed on site are described in Section 4.7 and Appendix D. Council should also be aware of and follow requirements outlined in the Snowy Monaro Local Weed Management Plan (2020).

**3.2.13 Local Land Services Act 2013 (LLS Act)**

The *Local Land Services Act 2013* (LLS Act) includes the management of natural resources in the consideration of the principles of Ecologically Sustainable Development (ESD).

Vegetation clearing provisions are considered under Part 5A of the LLS Act. The LLS Act regulates the clearing of native vegetation on all land in NSW mapped as Category 2 – Regulated Land as mapped on the Native Vegetation Regulatory Map. It does not include Excluded Land and Category 1 Exempt Land mapped on the Native Vegetation Regulatory Map.

Vegetation clearing which does not require development consent under the EP&A Act is considered for approval by the Native Vegetation Panel under the LLS Act.

Review of the Native Vegetation Regulatory map confirmed that the Subject Land contains Land Excluded from the LLS Act.

**3.2.14 Local Land Services Amendment Act 2016 (LLSA Act)**

The *Local Land Services Amendment Act 2016* (LLSA Act), which amended the *Local Land Services Act 2013*, authorised the making of the Land Management (Native Vegetation) Code 2018 (Div 5, Sch 1 of the LLSA Act). The aim of the Code is to authorise clearing of native vegetation on Category 2 regulated land under certain conditions and provide for the establishment and maintenance of set aside areas.

Review of the Native Vegetation Regulatory map confirmed that the Subject Land contains land excluded from the LLS Act. No clearing of land is proposed within areas mapped as Category 2 – Vulnerable Regulated Land, Consequently, the clearing regulations under Part 14 of the LLSA Act do not apply (Appendix D).



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### **3.2.15 National Parkes and Wildlife Act 1974**

The NPW Act provides for the statutory protection of Aboriginal cultural heritage places, objects and features. This legislation aims to protect and preserve Aboriginal heritage values.

Part 6 of this Act refers to Aboriginal objects and places and prevents persons from impacting on an Aboriginal place or relic, without consent or a permit.

Known Aboriginal heritage sites fall within the study area; therefore, an Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the study area and provide further recommendations on avoiding impacts to culturally important areas. The ACHA was prepared in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (April 2011); the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, April 2010) (the ACHRS); and the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (September 2010) (the Code of Practice). Section 4.6 and Appendix B provide further detail.

Section 4.6 and Appendix B further considers potential impacts on Aboriginal Heritage associated with the Proposal and provides additional recommendations to ensure compliance with relevant acts of legislation.

### **3.2.16 Roads Act 1993**

The Roads Act regulates the use and management of public roads. Section 138 of the Roads Act requires that consent of the appropriate Roads Authority is obtained for certain work undertaken in, on or over a public road. Under Section 138 of the Roads Act:

- (1) A person must not,
  - (a) erect a structure or carry out a work in, on or over a public road, or
  - (b) dig up or disturb the surface of a public road, or
  - (c) remove or interfere with a structure, work or tree on a public road, or
  - (d) pump water into a public road from any land adjoining the road, or
  - (e) connect a road (whether public or private) to a classified road,

Otherwise than with the consent of the appropriate roads authority.

- (2) A consent may not be given with respect to a classified road except with the concurrence of Transport for New South Wales (TfNSW).

No roads are being impacted as part of the proposed works and therefore TfNSW will not need to be consulted.

### **3.2.17 Crown Land Management Act 2016 (CLM Act)**

The objectives of the Crown Land Management Act 2016 (CLM Act) are:

- a) To provide for the ownership, use and management of the Crown Land of NSW, and
- b) To provide clarity concerning the law applicable to Crown Land, and



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- c) To require environmental, social, cultural heritage and economic considerations to be taken into account in decision-making about Crown Land, and
- d) To provide for the consistent, efficient, fair and transparent management of Crown Land for the benefit of the people of New South Wales, and
- e) To facilitate the use of Crown land by the Aboriginal people of New South Wales because of the spiritual, social, cultural and economic importance of land to Aboriginal people and, where appropriate, to enable the co-management of dedicated or reserved Crown land, and
- f) To provide for the management of Crown land having regard to the principles of Crown land management.

Where work is proposed on Crown land, the proponent of the proposed activity, must, obtain a right of access to the Crown land in accordance with the CLM Act.

Work is not proposed to be undertaken on Crown Land, therefore approval from the NSW Crown Lands Department (Crown Lands) **is not required**.

**3.2.18 Rural Fires Act 1997**

The RF Act came into force in 1997 to establish the NSW RFS and define its functions; to make provisions for the prevention, mitigation and suppression of rural fires; to repeal the Bush Fires Act 1949; to amend certain other Acts; and for other purposes. The objectives of this Act are to provide:

- (a) For the prevention, mitigation and suppression of bush and other fires in local government areas and other parts of the State.
- (b) for the co-ordination of bush fire fighting and bush fire prevention throughout the State, and
- (c) for the protection of persons from injury or death, and property from damage, arising from fires, and
- (d) for the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and
- (e) for the protection of the environment by requiring certain activities referred to in paragraphs (a)–(c1) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the *Protection of the Environment Administration Act 1991*.

Section 63(1) and 63(2) of the *Rural Fires Act 1997* stipulate it is the duty of a public authority to take all practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of a bushfire on or from any land vested in or under its control or management.

Parts of the study area are mapped as being within a designated bush fire prone area.

**3.2.19 Protection of the Environment Operations Act 1997 (POEO Act)**

The POEO Act is the key piece of environment protection legislation administered by the EPA. The POEO Act regulates pollution of water and soil, as well as acoustic disturbances and emissions to air.

The EPA is an independent statutory authority and the primary environmental regulator for NSW. The POEO Act regulates and requires licensing for environmental protection, including for waste generation and disposal, and for water, air, land and noise pollution.

As such, the EPA is the appropriate regulatory authority (ARA) for the activities specified in Schedule 1 of the POEO Act (scheduled activities). In most cases, local Councils are the ARA for non-scheduled



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activities, except activities undertaken by a public authority, which the EPA will regulate, or where a public authority has been declared the ARA (see Chapter 7: Part 1 - *Protection of the Environment Operations (General) Regulation 2009* or POEO Reg). The EPA licenses scheduled activities. In general, local Councils can regulate non-scheduled activities through notice and enforcement powers in their LGA. However, the EPA can issue a Licence to regulate water pollution from a non-scheduled activity. If it does, the EPA becomes the regulator for all environmental impacts from the activity under the POEO Act instead of the local council.

The classification of offences as Tier 1, 2 or 3 under the POEO Act, are as follows:

- Tier 1 offences are considered the most serious offences. These are the willful or negligent disposal of waste causing or likely to cause harm to the environment (section 115), willfully or negligently causing a substance to leak, spill or otherwise escape in a manner that harms or is likely to harm the environment (section 116), and the willful or negligent emission of an ozone-depleting substance in breach of the Ozone Protection Regulations in a manner that harms or is likely to harm the environment (section 117).

Tier 1 offences can attract penalties of up to \$5 million and 7 years jail.

- Tier 2 offences are set out according to the medium involved. Water pollution is prohibited under section 120. It is a defence in any court proceedings for water pollution that an Environment Protection Licence (EPL or Licence) or the regulations regulated the pollution and that the conditions attached to the Licence or the regulations were not contravened. Air and noise pollution offences are also captured under the legislation and relevant regulations. Waste offences include littering, unlawful transporting of waste and permitting land to be used unlawfully as a waste facility.

Land pollution is prohibited under section 142A. It is a defence in any court proceedings for land pollution that an EPL or the regulations regulated the pollution, and that the conditions of the Licence were not contravened. Other defences include defences related to use of pesticides and fertilisers.

The maximum penalties for the Tier 2 offence of failing to notify a pollution incident are \$2 million in the case of a corporation and \$500,000 in the case of an individual. The maximum penalties for Tier 2 offences other than failure to notify pollution incidents are \$1 million in the case of a corporation and \$250,000 in the case of an individual. Further daily penalties apply to continuing offences.

- Tier 3 offences are dealt with by penalty notices (sometimes known as 'on-the-spot fines' or 'penalty infringement notices'). These notices impose a fine that can be paid or can be defended in court.

The maximum possible penalty that a penalty notice can impose may not exceed the maximum penalty that can be imposed by a court for the offence. The *Protection of the Environment Operations (General) Regulation 2009* lists the Tier 2 offences that can be dealt with by penalty notice.

Consideration of impacts associated with Noise and Vibration (Section 4.3), Soils and Erosion (Section 4.1) and Surface and Groundwater (Section 4.2) are considered herein, with mitigation measures to prevent Offences under the POEO Act.



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### **3.2.20 SEPP (Biodiversity and Conservation) 2021**

Chapter 3 of the Biodiversity and Conservation SEPP aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline-

- (a) By requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat, and
- (b) By encouraging the identification of areas of core Koala habitat, and
- (c) By encouraging the inclusion of areas of core Koala habitat in environment protection zones.

Chapter 3 of the Biodiversity and Conservation SEPP only applies to activities being undertaken in land zoned RU1 Primary Production, RU2 Rural Landscape and RU3 forestry in a local government area specified in Schedule 1 of the now repealed SEPP Koala Protection 2021.

Part 3.2 of the SEPP applies to land in which a development application has been made and has an area of more than 1 hectare. The legislation requires that before a council may grant consent to a development application, the council must be satisfied as to whether or not the land is 'Potential Koala Habitat' or 'Core Koala Habitat'.

- Potential Koala habitat means areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.
- Core Koala habitat is defined as "an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population".

Where Core Koala habitat occurs, the Biodiversity Conservation SEPP requires that a Koala Plan of Management be prepared in accordance with Part 3.3 of the SEPP.

In addition, the Koala is listed as an endangered species under both the BC Act and the EPBC Act, and thus requires assessment under these Acts. This has been undertaken in Section 4.7, and consideration of the SEPP has been given to assist with assessment of likelihood of impact arising from the Proposal, i.e. whether the area contains 'Potential' or 'Core' Koala habitat. Consideration for Koala has also occurred through preparation of the BDAR (Appendix D).

The Likelihood of Occurrence (LOO) Assessment concluded that the risk of impact to this species as a result of the proposed works is Low, therefore a Test of Significance has not been completed for Koala and a Koala plan of management is not required.

## **3.3 Community and agency consultation**

### **3.3.1 Stakeholder Consultation**

Council will consult with water utilities, businesses, landowners and residents with potential to be impacted by the Proposal throughout the design and construction phases. Regular updates via Council's website and direct consultation with landholders and the community will occur.



### **3.3.2 Private landowner consent**

Property acquisition is anticipated to be needed under the current Proposal and Council are progressing this through Public Works. Vehicles and construction plant may have to traverse private property to access parts of the site, and discussion with affected residences and businesses as relevant regarding reinstatement of areas within private sections post completion of the construction phase is recommended. Council is to maintain contact with private landholders along the trail route, due to the nature of the works and the impacts to residents.

### **3.3.3 Aboriginal Community Consultation**

An Aboriginal community consultation process was undertaken to assist in the heritage assessment of the Study Area. Aboriginal consultation was completed by Apex Archaeology in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010*. A total of eight Aboriginal people and organisations expressed interest in the process and engaged as Registered Aboriginal Parties (RAPs). These were:

- Bega Local Aboriginal Land Council
- Ngarigo/Djirringanji Elders
- Gunjeewong Cultural Heritage Aboriginal Corporation
- Didge Ngunawal Clan
- Corroboree Aboriginal Corporation
- Maria Williams
- Ramsay Freeman/Snowy Mountains Indigenous Elders Group
- Woka Aboriginal Corporation

Information on the Proposal was provided to the RAPs, including location, scale, proposed development plans, timeframes, methodologies and any other relevant details relating to the Proposal. RAPs are then invited to share information about the cultural significance of the Study Area, which was then used to inform the cultural assessment process. The draft ACHA report was then provided to all RAPs for their review and comment; with all submissions received included in the final document (Appendix B).

### **3.3.4 Mitigation of impacts during construction and operation**

The assessment completed within this SEE has concluded that socio-economic impacts associated with construction of the trails are expected to be positive for the general community. Some private property owners may experience noise and visual disturbance during construction and operation of the trail.

Positive socio-economic benefits are expected for the region generally from the construction of the trails. It is expected that the Proposal will attract additional tourists and visitors to the area, while also providing local residents with a high quality trail network for recreation and leisure activities. This is expected to bring positive social and economic benefits to the wider area.

As noted in the Executive Summary, and in the mitigation measures developed for the Proposal (Appendix C), all work would be completed under the guidance of a CEMP to manage and minimise potential environmental impacts associated with the work. Additionally, once operational, the Proposal is not anticipated to result in any significant environmental or community impacts.





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The CEMP will list the responsibility of SMRC, the Project Management Officer (PMO) and the appointed Contractor(s) to develop and distribute notification to local residents before, during and after the construction period. The adequate notification period for residents is fourteen (14) days prior to works commencement.

Table 6 Proposed local resident notifications

Impact/mitigation	Stakeholder	Notifications
<b>Noise, dust, water</b>	Adjacent residential landowners	<ul style="list-style-type: none"> <li>• Notifications to adjacent landowners; traffic management plans, noise monitoring protocols, water monitoring protocols, working hours</li> <li>• Person to person contact to notify landowners of any dust anticipated to settle in adjacent pools, houses and potential water quality impacts.</li> </ul>
<b>Traffic and access</b>	Local traffic accessing residences along the route and users of the walking trail.	Advertisement in local papers (Monaro Post) advising of changed traffic conditions and delivery of construction loads. Notice of anticipated walking track closures.
<b>Working hours</b>	Local residents	Letterbox drop of notification listing working hours, and measures to manage local impacts; lighting, truck deliveries and noise onsite



## 4 ENVIRONMENTAL ASSESSMENT

This chapter describes the potential key environmental impacts associated with the Proposal during both construction and operation and the site-specific Environmental Mitigation measures which are to be implemented as part of the Proposal to ameliorate any potential impacts identified. A summary of the Environmental Mitigation measures has been provided as Appendix C.

### 4.1 Soils and Erosion

#### 4.1.1 Existing environment

Much of the trail occurs along an existing informal walking track formed by people over time. Erosion and weeds occur along the length of the proposed trail with some inlets, waterway crossings and foreshore particularly degraded (Plate 2 Plate 3). The majority of the trail remains intact due to sandy rocky soils and abutting vegetation.

##### **Mitchell Landscape Soils**

*Jindabyne Plains* NSW Landscape soil type dominates the Subject Land. This soil type occurs on wide open valleys and plains at a general elevation of 800 to 900m with surrounding low ranges and rounded peaks to 1100m on massive Silurian-Devonian granite and granodiorite, characterised by shallow gravelly loams and extensive red and yellow texture-contrast soils on slopes, two (2) or three (3) terraces marginal to the main streams with dark coloured gritty uniform loams and clays in alluvium. Dry tussock grassland of rough and variable spear grasses (*Austrostipa variabilis*) with Kangaroo Grass (*Themeda triandra*) on valley floors, patches of open Snow Gum (*Eucalyptus pauciflora*) and Black Sallee (*Eucalyptus stellulata*) woodland on hills, open forest of Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalyptus blakelyi*), with mixed understorey on moister ranges merging with adjacent landscapes (DECC 2002).

##### **Acid Sulphate Soils**

Acid sulphate soils (ASS) are generally only considered a problem along the coastal areas of NSW where ASL <10 m and around wetlands of inland NSW. Inland acid sulphate soils have also been associated with discharging saline groundwater; however, their occurrence is limited.

Cq (p4) and Aq (p4) acid sulphate soils (ASS) occur throughout the study area. Specialist soil testing may need to be carried out in order to determine the types and quantities of these soil types present and their likely effect on the proposed works (Figure 5).

Cq (p4) and Aq (p4) denotes the following:

- C = Extremely low probability of occurrence. 1-5% chance of occurrence in mapping unit with any occurrences in small, localised areas
- A = High probability of occurrence, > 70 % chance of occurrence in mapping unit.
- q = ASS1 generally within upper 1 m in wet / riparian areas with Kandosols, Ferrosols, Tenosols, Rudosols and Podisols (Isbell 1996)
- (p) = potential ASS (sulphidic material)
- (4) = No necessary analytical data are available, and classifier has little knowledge or experience with ASS, hence classification is provisional.

denotes the following:



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### ***Australian Soil Classification***

The study area is mapped as Dermosols and ‘water’ according to the Australian soils classification (Figure 6). Dermosols are defined by their structured B2 horizon and lack of a strong texture contrast between the A and B horizons. They are typically moderately deep and well drained soils found in wetter areas in eastern Australia, particularly the mountainous high rainfall zones of south-eastern Australia. Dermosols are known to support a wide range of land uses including cattle and sheep grazing of native pastures, forestry and sugar cane. Cereal crops, especially wheat, are commonly grown on the more fertile Dermosols.

### ***4.1.2 Potential Soils and Erosion Impacts – Construction***

The potential impacts relating to soils and erosion as a result of the construction of the Project include:

- Approximately 3.8 km of track to be built or reconstructed is proposed, which equates to approximately 1.11 ha of ground disturbance with a direct construction impact footprint of a maximum of up to 3 m. This ground disturbance may directly result in erosion impacts due to the exposure and mobilisation of soils during construction, particularly where the trail crosses waterways.
- Ground disturbance increasing the risks of erosion and therefore sediment migration offsite into waterways immediately adjacent to the study area. This could result in an impact to water quality, resulting in Pollution of Waters (an offence under s120 POEO Act), if appropriate erosion and sediment (ERSED) controls are not implemented and maintained, particularly where the subject site meets Lake Jindabyne.
- The compaction of soils, by movement of plant and other heavy vehicles through the site during construction. This could hinder rehabilitation (i.e. revegetation) post completion of works, leaving surfaces liable to erosion in the longer term.
- Pollution of soils on site, associated with the spill of hydrocarbons generated from construction plant and equipment.
- The duration and intensity of rainfall during and after construction of the trails will greatly influence the potential impacts to soils, particularly on the steeper slopes, with contingency planning and preparation required to ensure these risks are minimised.
- High winds have the potential to create dust/sedimentation/deposition issues during the construction phase. There is potential for erosion if work sites are left exposed for long periods without adequate safeguard measures to prevent runoff/wind erosion.

### ***4.1.3 Potential Soils and Erosion Impacts – Operation***

Potential impacts relating to soils and erosion as a result of the operation of the Proposal include:

- Increase in sediment loads in adjacent waterways due to track surface water runoff and erosion as a result of heavy rainfall and storm damage, particularly on steeper and looser slopes if trails are not constructed and maintained appropriately.
- Soil compaction of areas surrounding trails due to trail users going off trail for example to look at views or to avoid obstacles, if the design does not adequately allow for this.



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Plate 2 Largely formed track along trail length



Plate 3 Vehicle access points along some sections of the trail.

Table 7 Soils and Erosion impacts summary table

Description	Y	N	Comments
Are there any known occurrences of salinity or acid sulfate soils in the area?	X		Yes, see Figure 5. Cq (p4) acid sulphate soils (ASS) occur throughout the study area, which are denoted as potentially an extremely low probability of ASS. Aq(p4) are denoted as high probability of occurrence.
Does the Proposal involve the disturbance of large areas (e.g. >2 ha) for earthworks?		X	Vegetation clearing of groundcover Ground disturbance of approximately 1.11 ha.
Does the site have constraints for erosion and sedimentation controls such as steep gradients, narrow corridors or is located on private property?	X		The site follows along the foreshore of lake Jindabyne.

#### 4.1.4 Environmental Mitigation measures – Soils and Erosion

The Environmental Mitigation measures for Soils and Erosion are considered part of the Proposal and must be implemented. Mitigation measures to be implemented and maintained for Soils and Erosion include:

##### Construction

- No vegetation outside the approved direct impact footprint is to be harmed or removed; vegetation that is not approved for clearance is to be protected to ensure soils are not exposed unnecessarily.
- Soil and Erosion Siltation control plan to be developed
- All areas where groundcovers/vegetation are required to be removed will require careful management during construction due to the higher erosion risks, including Erosion and sediment (ERSED) control measures are to be implemented and maintained to:
  - Prevent sediment moving off-site and sediment laden water entering any drainage lines, drain inlets, or dams and
  - Reduce water velocity and capture sediment on site.



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- ERSER controls are to be installed prior to the commencement of works and checked and maintained on a regular basis (including clearing of sediment from behind barriers).
- Hatchery Bay Rd is to be rectified prior to works commencing, with eroded areas rehabilitated and stabilized.
- ERSER control measures are not to be removed until the works are complete, and areas are stabilised.
- Monitoring and response actions with regards to ERSER controls will need to be incorporated within the Construction Environmental Management Plan (CEMP) for the Proposal when prepared.
- Vehicles are to use existing roadways and all-weather access where possible to prevent additional damage to the site, and to reduce the risk of tracking of sediments offsite. Works areas are to be stabilised using the most appropriate combination of the following measures, as soon as possible following disturbance:
  - Hydromulching, turfing or seeding with appropriate species as outlined in the Landscape Works Drawings; and/or
  - Resealing exposed areas with appropriate material, e.g. concrete, road base or asphalt.
- Sediment fences/strawbale filters or equivalent must be installed wherever water is predicted to enter/exit the works area.
- Landscaping to occur in high traffic areas/ areas where trail users are likely to stop for a break, to minimize erosion in these areas.
- The maintenance of established stockpile sites during construction is to be in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) (Landcom 2004).
- Stockpiles are recommended to be formed in accordance with the Blue Book Standard Drawing 4-1, and offsite where possible. Materials are to be reused onsite where appropriate for stabilization works, e.g., re-spreading of topsoil to enable rapid rehabilitation.
- Topsoil and subsoil are to be separated and protected from degradation, erosion or mixing with fill or waste, and reused on site wherever possible. Where onsite reuse cannot be accommodated, soils materials should be put to beneficial reuse elsewhere.
- If contaminated soils are encountered during construction, a site assessment is to be completed in accordance with Schedule A 'Recommended general process for assessment of site contamination' (NEPM 1999).
- If contaminated soils are encountered, they will be managed (and if necessary excavated, contained, treated and disposed of) in accordance with the law and relevant EPA and Council guidance.
- All chemical usage and storage during construction is to be in line with legislated requirements, to prevent Pollution of Land, which is prohibited under Section 142 A of the POEO Act.



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***Operation***

- Monitoring of the site is to be undertaken to ensure ERSER controls remain in place until the site is re-stabilised, and to ensure no sediment is washed into any waterways following construction and before revegetation efforts are completed.
- Maintenance of vegetative cover on all exposed surfaces outside of the trail to be undertaken to ensure the stability of soils on site into the future.
- Monthly monitoring of the trails is to be undertaken to note any erosion or groundcover disturbance - side trails or washouts are to be rectified immediately.

**Given the outlined mitigation measures for Soils and Erosion will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Soil and Erosion.**





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Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Location Map - NSW (Mitchell) Landscape Soils and IBRA Subregions

Legend

<span style="border: 1px solid green; padding: 2px;"> </span> Assessment Area	<span style="border: 1px solid black; padding: 2px;"> </span> Lot boundaries	<span style="border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> Local Road	<b>Waterways</b>	<b>NSW (Mitchell) Landscapes</b>
<span style="border: 1px solid red; padding: 2px;"> </span> Subject Land	<b>Roads</b>	<span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Track-Vehicular	<span style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></span> Creek	<span style="background-color: #4682b4; width: 20px; height: 10px; display: inline-block;"></span> Estuary/Water Added
<span style="border: 1px dashed black; padding: 2px;"> </span> Suburb	<span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Arterial Road	<span style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></span> 1st & 2nd order unnamed waterways	<span style="background-color: #4682b4; width: 20px; height: 10px; display: inline-block;"></span> Jindabyne Plains	

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Figure 4 Mitchell Soil Landscapes occurring within a 5km radius of the subject site

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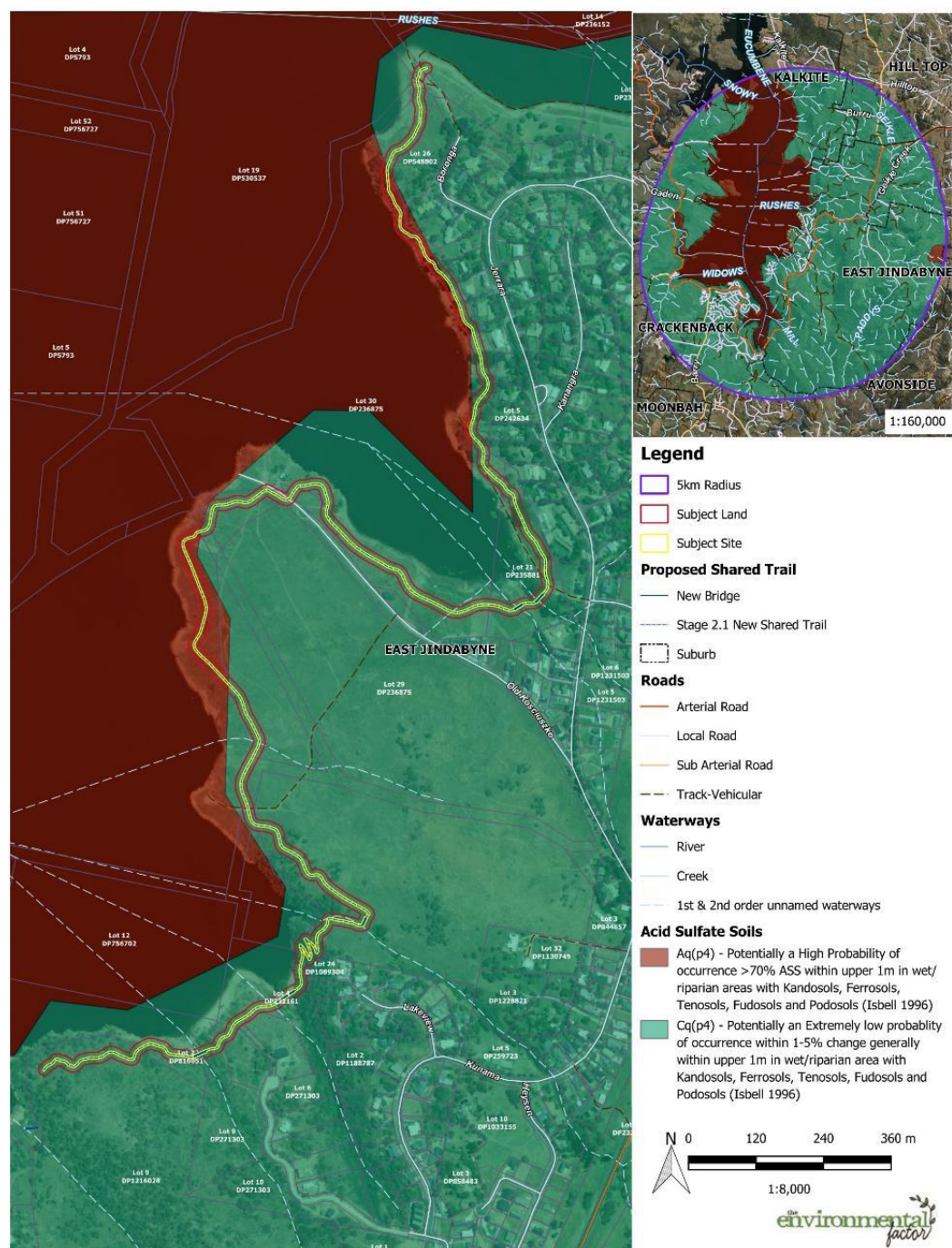
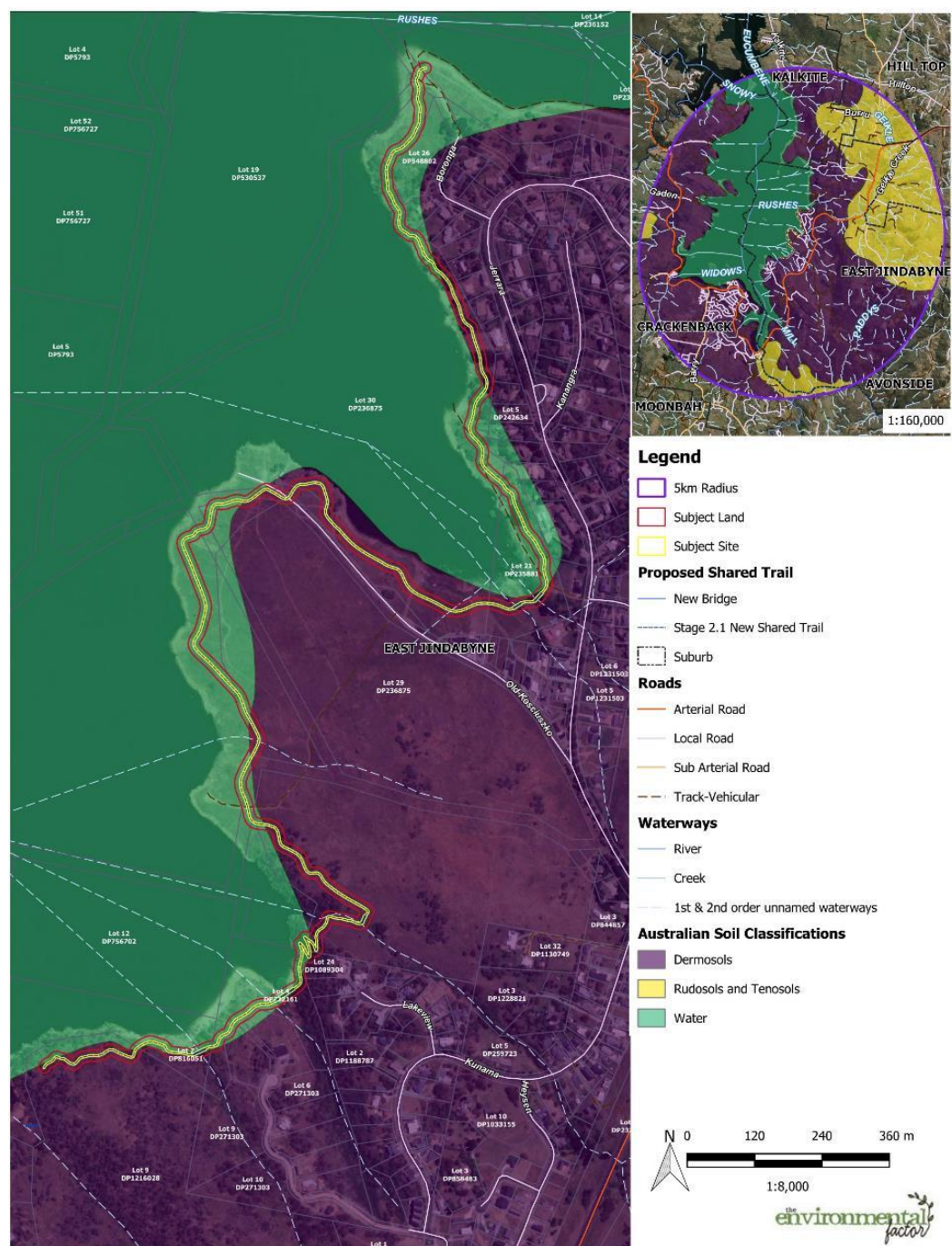


Figure 5 Acid Sulfate Soils potential mapped as occurring within 5 km of the study area



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Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Australian Soil Classifications within a 5km radius of the Proposal Location

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Figure 6 Australian Soil Classifications within 5 km radius of study area



## **4.2 Surface and groundwater**

### **4.2.1 Existing environment**

In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Subject Land, with the proposed trail intersecting seven (7) unnamed waterways (five (5) 1st Order, one (1) 2nd Order and one (1) third Order Figure 4). Key Fish Habitat (KFH) is mapped along the edge of Lake Jindabyne which forms the western portion of the Assessment Area, and along one unnamed creek (Figure 7). The trail also interacts with some areas of KFH along the Lake edge towards the northern portion of the proposed trail near East Jindabyne Village.

Lake Jindabyne (a mapped wetland) is a large man-made lake, formed following the damming of the Snowy River in the 1960s. The main purpose of the dam is for the generation of hydro-electricity, with Lake Jindabyne one of sixteen (16) dams comprising the Snowy Mountains Scheme, operated by Snowy Hydro Limited. At the time of surveys, the lake was high, with some foreshore sections completely underwater (Plate 4).

The Snowy River inlet, submerged channel and outlet to Lake Jindabyne forms part of the Endangered Aquatic Ecological Community of the Snowy River Catchment in NSW listed under the FM Act. No direct impacts to Key Fish habitat or the Snowy River Catchment EEC are considered likely from the Proposal. Minor impacts to drainage lines will occur in some areas where the trail crosses these waterways. The proposed trail alignment has been designed with the intent to minimise the number of substantial waterway crossings required.

### **4.2.2 Potential Surface and Groundwater Impacts – Construction**

Potential impacts to downstream surface waters, namely Lake Jindabyne, relate directly to erosion and increased sedimentation during construction and operation. There is also the potential for spills of fuels and other contaminants arising from use of plant and machinery, which could enter surface waters during any works completed in proximity to drainage lines and waterways.

Construction of the Proposal has the potential for the following surface and groundwater related impacts:

- Potential increase in erosion and sediment pollution loads from earthworks and construction activities.
- Potential for spills of fuels and other contaminants during construction which enter waterways.
- Potential to encounter sub surface waters during trail construction.

However, nearby surface waters are anticipated to remain unaffected provided that the mitigation measures outlined in Section 0 are adhered to.

The relevant permits and approvals relating to construction within riparian area/waterways apply – refer section 3.

### **4.2.3 Potential Surface and Groundwater Impacts – Operation**

Operation of the Proposal has the potential for the following surface and groundwater related impacts:

- Impacts to instream features increasing erosion potential along ephemeral waterways.



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- Increase in sediment and pollution loads in adjacent creek lines and waterways due to increase in visitors and associated use issues including potential impacts on water quality through trail runoff containing suspended solids, rubbish from visitors, and other pollutants from discarded equipment/visitor items.
- Potential reduction in the groundwater recharge area as a result of increased hard surface areas, including trails, roads and other site facilities.
- Potential increase in runoff resulting in larger flows in waterways.



Plate 4 Lake Jindabyne in close proximity to the trail.



Plate 5 Several waterways pass through the trail alignment

Table 8 Waterways impacts summary table

Description	Y	N	Comments
<b>Are the works located within or adjacent to a waterbody or wetland?</b> Waters are defined under <i>Protection of the Environment Operations Act 1997</i> and water land and wetlands under section 198A of the <i>Fisheries Management Act 1994</i> and include rivers, streams, lakes, lagoons and constructed waterways, and dams.	X		A number of creeks and unnamed waterways occur within the study area and Lake Jindabyne is located adjacent (west) of the trail.
<b>Is a Fisheries Permit required?</b> Part 7 Fisheries Permits are automatically required for any third order (or higher) stream under the <i>Fisheries Management Act 1994</i> (FM Act).	X		The trail interacts with KFH in numerous areas and requires construction of bridges across these areas – a Part 7 Fisheries permit will be required.
<b>Will the proposed works be undertaken on a bridge?</b>	X		Yes, the construction of five (5) bridge crossings are included in the scope of works.



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Description	Y	N	Comments
Are the works likely to require the extraction of water from a local water source (not mains)?		X	Not expected
Is the site identified as High or Moderate Groundwater Vulnerability?		X	See Figure 7
Are the proposed works likely to have an effect on the surrounding water quality? This can include sediment migration, dust, and potential risks of fuel or chemical spills, to both surface and ground waters.		X	Potential for dust deposition in Lake Jindabyne and sediment migration off-site is low. Provided that the Mitigation measures outlined in Section 4.2.4 are adhered to, potential risk of fuel or chemical spill is low.
Does the Proposal involve connection to, and use of a substantial volume of water from, any part of a water supply system owned by a Council?		X	A water cart may be required to dampen soils during construction activities; water would be transported to site from an approved Council source. Construction and operation are not anticipated to consume substantial volumes from Council's supply system.
Does the Proposal involve the connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by Council	X		Proposal does not include the connection to, or the substantial impact on the capacity of, any part of a sewerage system owned by Council.
Is the Proposal likely to have a substantial impact on stormwater management services provided by Council		X	Proposal is not anticipated to have a substantial impact on a Council stormwater management service.
Are the works being carried out on flood liable land? (Written notification to the State Emergency Service may be required if the activity is a relevant provision under Division 1 (2.13) of the Transport and Infrastructure SEPP)	X		Works are not proposed directly within an area of flood prone land.
Is the Proposal being carried out on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program?		X	Works are not being carried out on land within a coastal vulnerability area.

**4.2.4 Environmental mitigation measures – Surface and groundwater**

The Environmental mitigation measures for Surface and Groundwater are considered part of the Proposal and must be implemented. Mitigation measures to be implemented and maintained for Waterways include:

**Construction**

- Appropriate ERSED controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter the tributaries to significant regional waterways, or groundwater.
- All litter, including cigarette butts and food wrappers, are to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase.
- Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 metres from drains, drainage lines or waterways.





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- Vehicle wash-down and/or cement truck washout (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off.
- All construction works are to be undertaken during periods of low predicted rainfall.
- Segregate and stockpile topsoil removed from the area a minimum of 40 m from any waterway and use measures such as silt fences and holding ponds to prevent stockpile runoff from entering waterways.
- Minimise the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch, or installing erosion control blanket as appropriate.
- Ensure soils/sediment disturbed by construction works do not migrate into creeks by strategic placement of sediment filters in conjunction with the abovementioned soil stabilisation techniques.
- Biosecurity and water health protection measures should be implemented throughout the construction phase, including
  - Machinery should arrive on site in a clean, washed condition, free of fluid leaks, pests and/or weeds/spores.
  - Regular weed control should be undertaken in disturbed areas throughout the construction period to prevent weed spread into waterways, if notifiable/listed weed material is present (unlikely).
  - Ensure all pesticide/herbicides used are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.
- Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).
- A Soil and Water Management Plan will be developed as part of the CEMP for the project, detailing:
  - Water quality parameters
  - Appropriate monitoring locations and frequency
  - Location and types of ERSSED controls
  - Proposed revegetation and stabilisation measures to be undertaken.

**Operation**

- Continue to undertake a water quality and quantity monitoring program in line with Council's requirements until all sites are completely stabilised; monitoring should include details of proposed baseline and downstream water quality following any heavy rainfall.
- Subject land rehabilitation, including removal of weeds and installation of ERSSED controls, to be undertaken to ensure soil stability and prevention of sediment runoff from the site into the future.
- Monitor Lake Jindabyne and waterways following opening of trail – observe for changes to Lake foreshore, excess rubbish, people going off-trail and damaging vegetation and other damaging activities. Rectify these promptly.



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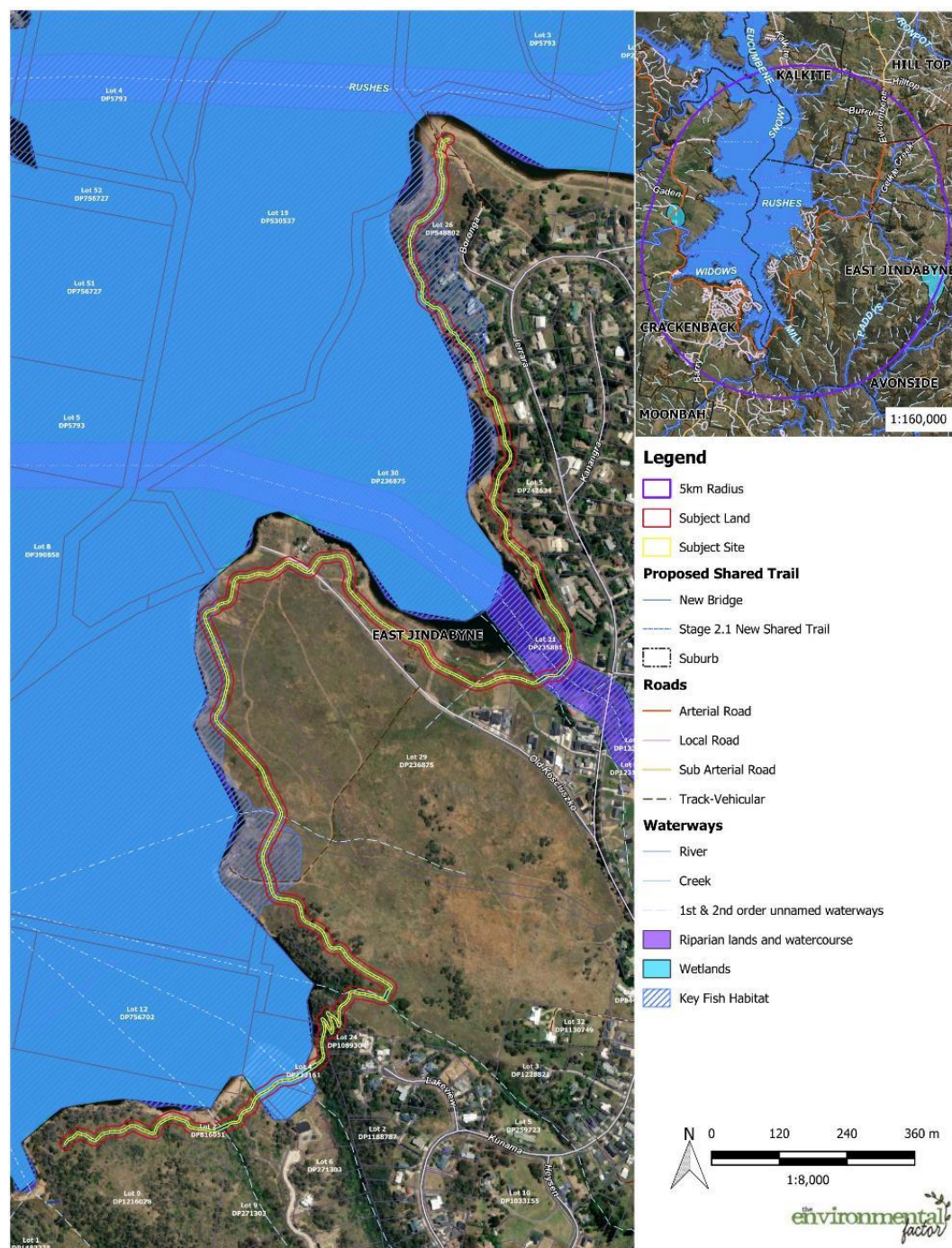
Statement of Environmental Effects – Kunama to East Jindabyne

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**Given the outlined mitigation measures for Surface and Groundwater will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Surface and Groundwater.**



Statement of Environmental Effects – Kunama to East Jindabyne



**Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Ground and Surface Water within a 5km radius of the Proposal Location**

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**Figure 7 Waterways, Riparian corridors and Key Fish Habitat within a 5 km radius of the subject site.**





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### 4.3 Noise and Vibration

#### 4.3.1 Existing environment

The study area occurs near Mount Kosciusko Road, identified as an arterial road linking Jindabyne with Cooma, and passes alongside residential properties and roads. This area is subject to differing intermittent levels of noise and vibration impacts from a variety of sources, including vehicular and human traffic occurring within the roadways and tracks, public area, trail users, residents, farming machinery and activities, wildlife and inclement meteorological conditions.

Cars and trucks travelling along urban roads were observed to cause the main noise disturbance on site as noted during the April 2022 site visit. Wildlife (birds), recreational users and meteorological noises were also apparent. Noise observations made were anecdotal only, as no noise recording devices were used.

#### 4.3.2 Potential Noise and Vibration Impacts – Construction

The construction phase of the trail network would involve the operation of a number of small plant and machinery for trail construction. These would have associated noise and vibrational impacts which could affect nearby receivers including trail network users, local residents and native biota. The main noise impacts will arise from excavator and machinery use, helicopter and 4WD's. The Proposal is anticipated as having a lengthy construction period of approximately twenty (20) weeks.

Noise impacts to the local community and other sensitive receivers will be limited to standard work hours and construction activities will be completed in accordance with best practice methods as outlined in the Interim Construction Noise Guideline (ICNG).

#### 4.3.3 Potential Noise and Vibration Impacts – Operation

The operational stage of the trail network is not considered likely to increase noise to a significant extent along the bike trail network. However, increased human and vehicular traffic within the study area as a result of increased visitor numbers to the area is likely to increase noise levels within these areas. It is likely that anthropogenic noise levels will increase and may be noticed by residents that have backyards that back onto the trail.

Table 9 Noise and Vibration impacts summary table

Description	Y	N	Comments
<b>Are there any noise sensitive areas near the location of the proposed works?</b> i.e. < 500m at nearest point, that may be affected by the works e.g. church, school, hospital, residences	X		Yes, several private residences are near the trail network, some within 40 m (Figure 8, Figure 9 ). These will experience noise impacts during construction and operation.
<b>Are the proposed works going to be undertaken during standard working hours detailed below?</b> <b>Monday – Friday:</b> 7:00am to 6:00pm <b>Saturday:</b> 8:00am to 1:00pm <b>Sunday and Public Holidays:</b> No work	X		Proposed construction hours are as follows: <ul style="list-style-type: none"> <li><b>Normal construction</b> Monday to Friday: 7:00 am – 6:00pm Saturday: 8:00 am – 1:00 pm</li> <li>Sundays and Public Holidays No Work</li> </ul>



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Description	Y	N	Comments
Is any explosive blasting required for the proposed works?		X	No need for blasting has been identified prior to the preparation of this SEE.
Is there potential for ongoing operational noise to be generated post completion of works?		X	The proposed trail network will not generate any significant increase in operational noise. Some increase to anthropogenic noise levels anticipated.

**4.3.4 Environmental mitigation measures – Noise and Vibration**

The following mitigation measures for Noise and Vibration are part of the Proposal and must be implemented and maintained. Mitigation measures to be implemented and maintained for Noise and Vibration include:

**Construction**

- Noise emissions should be considered in terms of the Interim Construction Noise Guideline (ICNG) (Department of Energy and Climate Change (DECC) 2009)
  - Noise impacts to local residents will be limited to recommended standard working hours as detailed in the Interim Construction Noise Guideline 2009 (ICNG). All activities and project works, including the arrival and departure of vehicles delivering or removing materials to or from the site, shall be carried out between the hours of:
 

7:00am to 6:00pm Monday to Friday,  
8:00am to 1:00pm Saturdays, and  
No work Sunday and Public Holidays
- Community consultation to notify residences, stakeholders and community groups of the intention to undertake the proposed works by Council at least five (5) days prior to works commencing. Communication must inform residents of planned construction activities, time periods and expected durations, potential impacts, proposed mitigation measures and contact details of site management.
- Communication of intentions and timeframes to neighbouring properties will minimise misconceptions, uncertainty and negative reactions to noise. The site supervisor should supply a contact number to aid in community liaison.
- All noise and vibration complaints are to be handled in a timely manner and monitoring is to be implemented in response to any complaints received.
- Any high noise activities will be carried out in continuous blocks followed by appropriate respite periods.
- Setbacks from properties are to be observed wherever possible, to increase the distance between sensitive receivers and construction activities.
- The appointed contractor will incorporate Noise and Vibration Management strategies in the CEMP, and suitably induct all staff operating machinery on the site to ensure the standard working hours are adhered to, and that machinery movement (revving, reverse beepers) is kept to a minimum. This management plan must include the general noise and vibration management practices (AS 2436-2010).
- High noise generating activities, such as jack hammering, should be carried out in continuous blocks, not exceeding 3 hours with a minimum respite period between blocks of one hour.



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- Simultaneous operation of high-level noise generating machinery should be avoided by operating at contrasting times or increasing the distance between the plant and the nearest identified receiver.
- Low-pitch tonal beepers should be installed where possible and reversing minimised on site.
- All engine covers are to be closed and machines that are not in use, shut down.
- Noise monitoring to occur in response to any complaints received.
- High noise generating activities should be planned to occur during times of low visitation rates to Jindabyne (i.e. during the school term).
- All work is to be completed during standard working hours, in accordance with the Interim Construction Noise Guideline (ICNG).
- Machinery and plant to be switched off when not in use.
- Unidirectional driving is recommended wherever possible, to limit the use of reverse alert beepers.
- Works should be timed to avoid prime breeding season (Spring) for the majority of native species residing in the area which may be sensitive to noise and vibration during breeding and fledging.
- Strong community reaction may occur where the noise levels reach 75 dB, known as the highly noise affected level. If this level is reached, respite periods may be enforced, and community consultation is to occur to determine least sensitive periods and/or if the community is prepared to accept a longer construction period in exchange for restrictions on construction times.

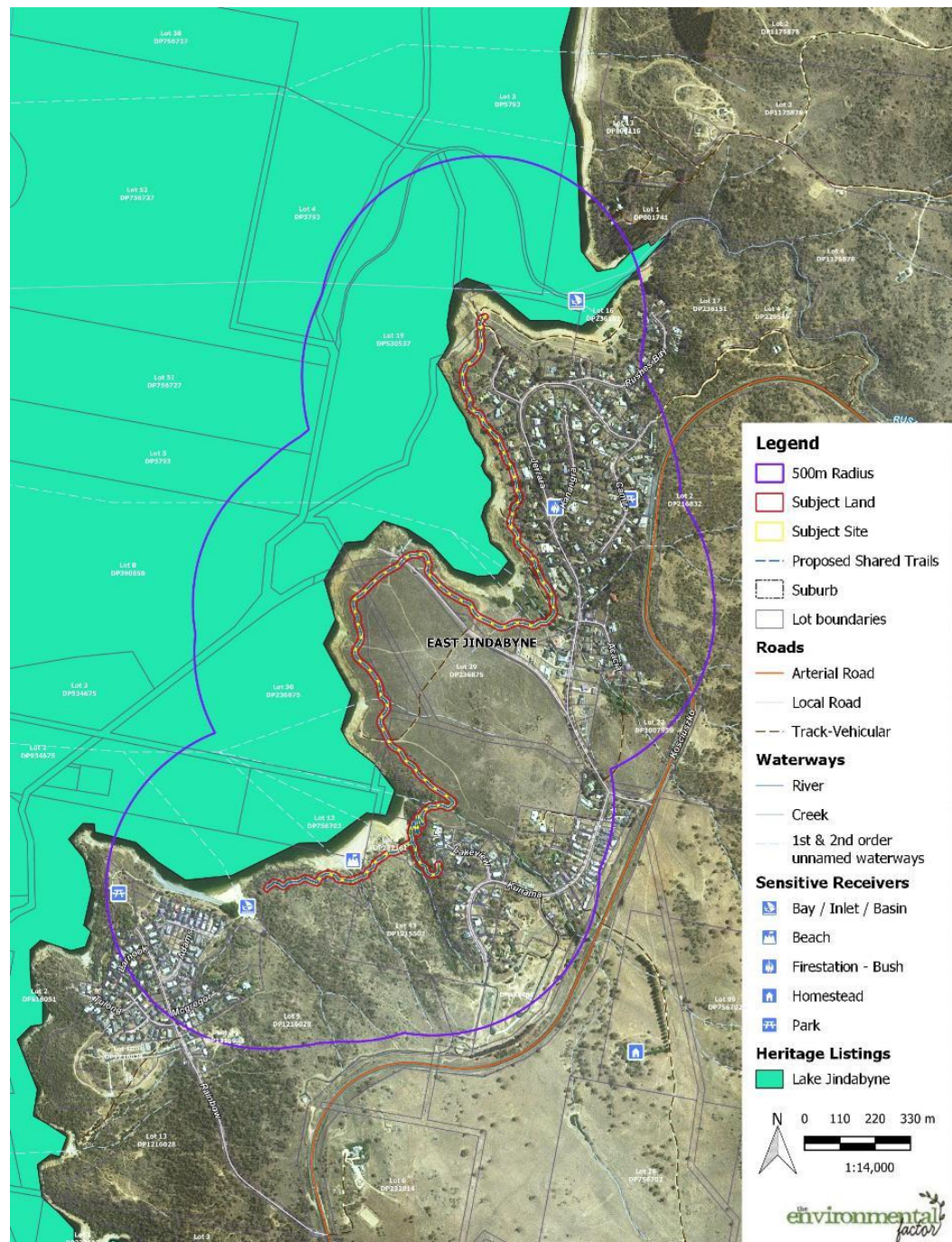
**Operation**

No further mitigation measures were considered necessary for the operational phase of the Proposal.

**Given the outlined mitigation measures for Noise and Vibration will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Noise and Vibration.**



Statement of Environmental Effects – Kunama to East Jindabyne



**Section 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Sensitive Receivers and Heritage Listings within a 500m Radius of the Proposal location**

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Figure 8 Sensitive receivers within a 5 km radius of the proposal





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#### 4.4 Air Quality

##### 4.4.1 Existing environment

Long-term meteorological data for the surrounding area is available from the Bureau of Meteorology (BoM) operated weather station at the Cooma Airport (Station number 94921). The Cooma Airport weather station is located approximately 31 kilometres east of Jindabyne and records observations of a range of meteorological data including temperature, humidity and rainfall, wind speed and wind direction.

Temperature data recorded at the Cooma Visitor Centre indicates that January is the hottest month of the year, with a mean daily maximum temperature of 27.5°C. July is the coolest month with a mean daily maximum temperature of 11.5°C. November is the wettest month with an average rainfall of 62.6 mm falling over 7.7 days. According to long-term records, there are on average 69 rain days per year, with a mean annual rainfall of approximately 538 mm. The potential for moisture deficit in the warmer months increases the dust erosion potentials of exposed areas and therefore has important implications for fugitive dust control during the construction phase.

Survey conditions on site during surveys were generally warm and calm with cool mornings and some afternoon showers on the 27<sup>th</sup> of April. Weather conditions in Cooma prior to the site visit were cool to mild with a minimum of 0.1 degrees and a maximum of 17.4 degrees, and minimal rain was recorded in the three (3) days leading up to the site visit (Table 10).

Table 10 Weather conditions preceding and during field surveys (weather station: Cooma Airport AWS 070217, Bureau of Meteorology 2021).

Date (2021)	Temperature (°C)		Total Rain (mm)	Average wind Speed km/hr (3pm)
	Minimum	Maximum		
24/04/21	0.1	15.9	0.2	20
25/04/21	0.1	16.4	0.2	20
26/04/21	3.5	17.4	0.2	30
27/04/22	5.4	14.9	0	44
28/04/22	10.4	17.8	0.6	28
29/04/22	5.0	21.2	0.2	35

No detailed studies of air quality have been conducted within the area. Vehicle emissions do not cause any localized (anecdotal) problems within Jindabyne as the concentration of these is relatively low.

Jindabyne and the surrounding area generally enjoy clean air; a lack of heavy industry and a low concentration of vehicles ensures that pollutant levels are relatively low. The primary air pollution emissions sources that contribute to existing ambient air quality levels in the Jindabyne area include:

- Wind generated dust from exposed areas within the locality
- Dust emissions from agricultural activities
- Dust entrainment due to vehicle movements along unsealed and sealed town and rural roads with high silt loadings
- Diesel and petrol fuel combustion emissions from road and non-road sources



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- Seasonal emissions from household and business wood burning
- Episodic emissions from dust storms and vegetation fires (local and regional).

**4.4.2 Potential Air Quality Impacts – Construction**

The primary air quality pollutants likely to be generated by the proposed construction activities are expected to be particulate matter (dust) and gaseous pollutants generated by the construction vehicles and machinery.

The volume of dust generated would depend on a number of factors including the type of machinery used; construction techniques; prevailing weather conditions; soil type; time since last rainfall; and, the cumulative effect of other construction activities, and background air quality, in the locality.

Some sensitive receivers have the potential to be negatively affected by changes in air quality due to construction activities, however, it is anticipated that the impacts to air quality caused by construction will be low and of short duration, provided management measures are implemented as described below (Section 4.4.4).

**4.4.3 Potential Air Quality Impacts – Operation**

The operational stage of the trail network is not considered likely to increase dust or impact air quality to a significant extent along the bike trail network. However, increased vehicular traffic within the study area around associated carparks, and recreational facilities is likely to have some impact on air quality within these areas, particularly during peak times.

Table 11 Air Quality impacts summary table

Description	Y	N	Comments
Are the proposed works likely to result in large areas (>2ha) of exposed soils?		X	Direct impacts to approximately 1.11 ha.
Are there any dust sensitive receivers located within the vicinity of the proposed works (<500m away at nearest point) during the construction period (i.e. church, school, hospital, residences)?	X		Up to twenty-three (23) residences may be impacted as a result of the trail construction and operation. Impacts are predicted to be minor, with dust impacts potentially occurring on very dry and windy days.
Is there likely to be an emission to air of dust, smoke, steam or vehicle emissions?	X		Yes, though minimal; the study area and locality contain fine, friable soils likely to result in dust emissions once disturbed. Mitigation measures should effectively ameliorate any emissions if correctly adhered to. Vehicle emissions are likely to be moderate.

**4.4.4 Environmental mitigation measures – Air Quality**

The following mitigation measures for Air Quality are part of the Proposal and must be implemented. Mitigation measures to be implemented and maintained for Air Quality are as follows:

**Construction**

- Council must undertake community engagement and liaison, to set expectations for the works schedule and likely impacts arising as part of the works – particularly with property owners



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who occur directly adjacent the subject site that may be subject to reduced air quality during construction activities.

- Dust generating activities should be avoided during periods of high wind.
- Visual dust monitoring should occur and dampening of exposed soils should be completed during weather conditions conducive to visible dust formation.
- Ensure access permissions are granted to an adequate water supply on the construction site for effective dust/particulate matter suppression/mitigation. If synthetic dust suppressants are used, they must be biodegradable in nature and non-toxic for waterways.
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces progressively, and as soon as practicable.
- Only remove vegetation/ground cover in small areas during works.
- Vegetation and other materials are not to be burnt on site.
- Construction plant and equipment should be maintained in a good working condition in order to limit impacts on air quality through vehicle emissions.
- Construction plant, equipment and personnel vehicles to utilise existing roads and site access where available, to minimise dust emissions associated with traversing unsealed roads.
- Fuel operated plant and equipment should not be left idle when not in use.
- Regular site inspections will be undertaken as part of air quality monitoring, and inspection results recorded by Council's Principal Contractor.
- Any dust complaints received during construction will be duly investigated in accordance with Council's requirements under the POEO Act.
- Any exceptional incidents that cause dust and/or air emissions, either on or off site, will be recorded, and the action taken to resolve the situation recorded in the logbook.

**Operation**

- Continue to undertake air quality and quantity monitoring program in line with Council's requirements until all sites are completely stabilised; monitoring should include details of proposed baseline and air quality following any extended dry periods.
- Any complaints regarding air quality from the operation of the trails should be investigated and managed accordingly.
- Subject site rehabilitation, including removal of weeds, to be undertaken to ensure soil stability and prevention of dust generation from the site into the future.

**Given the outlined mitigation measures for Air Quality will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Air Quality.**





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#### 4.5 Non-Aboriginal Heritage

##### 4.5.1 Existing environment

Jindabyne and the surrounding Snowy Mountains region has a rich cultural history, traditionally home to the Ngarigo and Walgal people, with Europeans settling in the 1840s. The discovery of gold in the 1860s in nearby Crackenback increased prosperity in the region, with the population of Jindabyne increasing to 300 residents in the 1960s prior to the damming of the Snowy River, which was completed in 1967. The construction of the dam resulted in the flooding of the original Jindabyne township, which was relocated to its current location. With the advent of snow sports growing in popularity, Jindabyne has experienced a population boom, with the population now estimated at 4,333 in 2020 (SMRC, 2021) Jindabyne has experienced year on year population growth, and far exceeds the average growth rate for Regional NSW.

The construction of the Lake Jindabyne dam wall is an historically significant event, forming one of the 16 dams that comprise the hydroelectricity Snowy Scheme. With nine power stations, 80 km of aqueducts and 145 km of interconnected tunnels, the Snowy Scheme is described as ‘one of the civil engineering wonders of the modern world’ (Snowy Hydro, 2021). A search of the Heritage Council of NSW administered heritage databases and the Snowy River Shire LEP returned several records of historical heritage sites within 1 km of the study area, including the Lake Jindabyne Conservation Area, the Strzelecki Monument, Memorial Hall, St Columbkille’s Church and Hall, St Andrews Uniting Church, St Andrews Anglican Church, and Jindabyne Winter Sports Academy (Figure 8).

The study area is also in proximity to the boundary of the ‘Snowy Mountains Scheme’, which is listed on the National Heritage List and considered to be of national significance due to the engineering success of the scheme and as a symbol of Australian achievement. The works themselves are outside the boundary of the item.

##### 4.5.2 Potential Non-Aboriginal Heritage – Construction

Due to the study area being located in previously disturbed land, it is highly unlikely that any further items of non-Aboriginal Heritage would be discovered while constructing the proposed shared use trail. There is however always potential for the works to uncover unanticipated finds. The mitigation measures outlined in section 4.5.4 provide additional protection and further decrease the risk of any such damage.

##### 4.5.3 Potential Non-Aboriginal Heritage – Operation

No damage or interference to any items or places of Non-Aboriginal Heritage are expected during operation of the proposed MTB trail.

Table 12 Non-Aboriginal Heritage impacts summary table

Description	Y	N	Comments
Are there any items of non-Aboriginal heritage located within the vicinity (500 m) of the proposed works?	X		The study area is directly east of the boundary of the ‘Snowy Mountains Scheme’, which is listed on the National Heritage List.



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Description	Y	N	Comments
If yes, list the item(s) and their heritage significance (i.e., s170 register, Council Register, State Heritage Register, National Heritage Register).	X		National Heritage Database – Matter of National Environmental Significance.
Is the development on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property (if so, consultation is required with the World Heritage Advisory Committee and Heritage NSW),		X	Proposal is not located in proximity to the Willandra Lakes Region World Heritage Property.
Is the Proposal likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential?		X	Not anticipated.
Is further assessment of the potential impact on a listed heritage item required? And has this assessment been provided along with written notification to the local Council for the area in which the heritage item is located?		X	No further assessment required.

**4.5.4 Environmental mitigation measures – Non-Aboriginal Heritage**

The following mitigation measures for Non-Aboriginal Heritage are part of the Proposal and must be implemented and maintained. Mitigation measures to be implemented and maintained for Non-Aboriginal Heritage are as follows:

**Construction**

- The proposed works must be contained to the area assessed during the construction. If the proposed location is amended, further archaeological assessment may be necessary to determine if the proposed works will impact any items of historical significance.
- If archaeological remains or items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the material/find and Council's Manager Strategic Planning and Environmental Officer are to be contacted immediately. Any historical objects must be reported to Heritage NSW.
- Council's workers and all staff must be made aware of the heritage sites and place that occur within the area and all care must be taken to avoid interference with and damage to these sites.



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- Heritage sites must be clearly fenced/flagged with removable flagging or other temporary means to delineate their presence and in order to prevent them being harmed during the construction process.

***Operation***

No additional mitigation measures were deemed necessary during operation of the Proposal

**Given the outlined mitigation measures for non-Aboriginal Heritage will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to non-Aboriginal Heritage.**



## 4.6 Aboriginal Heritage

### 4.6.1 Existing environment

The traditional custodians of the Snowy Monaro region are the Ngarigo people, with the nomenclature of 'Jindabyne' derived from the Aboriginal word meaning 'valley'. Archaeological surveys in the region have revealed a number of significant sites throughout, indicating a long and rich cultural history. A large number of the Ngarigo people now live outside of the region due to the impact of colonisation, however, it is recognised that the Ngarigo people maintain strong spiritual and cultural connections to the high country (ACT Government, 2001).

A number of Aboriginal cultural heritage sites are known throughout the area; therefore, an Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the study area to determine if these sites can be avoided by the Proposal, or if mitigation measures are required prior to commencement of construction works on the trail. The ACHA included assessment of four (4) separate sections of trail that included the section being assessed in this REF. A site assessment and community consultation process were completed in line with the NSW code of practice. A total of eight (8) new Aboriginal Heritage Information Management System (AHIMS) registered sites were identified to add to the four (4) previously registered sites within the entire archaeological study area.

An Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the potential for impact on Aboriginal sites.

### 4.6.2 Potential Aboriginal Heritage Impacts – Construction

Aboriginal heritage sites within the subject site cannot be entirely avoided by the Proposal. If works were to proceed without first moving registered objects, it is very likely they would be disturbed by any excavation works and potentially buried and lost. The ACHA report provides nine (9) recommended actions that must be taken before any works can commence on the site (Appendix B).

In addition, there is still the possibility of encountering unexpected archaeological items during construction, particularly during construction of new sections of trail. Section 4.6.4 outlines the mitigation measures that must be adhered to should any suspected Aboriginal heritage items be encountered during construction work.

### 4.6.3 Potential Aboriginal Heritage Impacts – Operation

Once constructed, the trail network is not considered likely to impact on any tangible expressions of Aboriginal cultural heritage.

Table 13 Aboriginal Heritage impacts summary table

Description	Y	N	Comments
Are the works likely to disturb previously undisturbed areas of the landscape? Check for good camping sites (flat, near water, availability of bush foods), mountain ridges, spurs or vantage points or rocky outcrops that may have ceremonial significance, and the presence of stone tools, shells or other evidence of human occupation.		X	No – previously disturbed land.
Has an AHIMS register search been conducted?	X		Refer to ACHA (Appendix B)
Are there any known items of Aboriginal Heritage near the works area (< 1km)?	X		Yes, refer Appendix B.



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Description	Y	N	Comments
Is consultation with stakeholders required? E.g. the Local Aboriginal Land Council	X		Refer ACHA- Appendix B
Is a National Parks and Wildlife Act Section 90 Permit (Aboriginal Heritage Impact Permit – AHIP) required for Aboriginal items potentially impacted by the works?	X		Cultural material is present within the study area and cannot be avoided, therefore an application for an AHIP is required to permit harm to these items.

**4.6.4 Environmental mitigation measures – Aboriginal Heritage**

The following mitigation measures for Aboriginal Heritage are part of the Proposal and must be implemented and maintained. Mitigation measures to be implemented for Aboriginal Heritage are:

- All staff and visitors should be inducted to site to ensure they are aware of the possible presence of sensitive Aboriginal heritage items located within the vicinity of the work site, and the protective measures that should remain in place throughout the works.
- Should unanticipated archaeological material be encountered during site works, all work must cease, and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.
- If sub-surface Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Council's Manager Strategic Planning and Manager Environment or an archaeologist are to be contacted immediately. Works in the vicinity of the find must not re-commence until clearance has been received from those Council officers and the NSW Office of Environment & Heritage. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works.
- All nine (9) recommendations outlined in the ACHA report must be followed to ensure impact on registered AHIMS sites is avoided and known sites that cannot be avoided are relocated per appropriate cultural protocols.

Given the outlined mitigation measures for non-Aboriginal Heritage will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to non-Aboriginal Heritage.



#### **4.7 Biodiversity**

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and MNES listed under the EPBC Act that may be affected by the Proposal. The results of the desktop assessment were then used to guide on site field investigations. In addition, GIS mapping was completed prior to surveys being undertaken to inform ecologists of the habitats and vegetation likely to be on site and to provide a visual representation of vegetation communities present within the study area, as well as any previous records of threatened species recorded.

TEF field ecologists completed site visits on the 28<sup>th</sup> – 29<sup>th</sup> of April 2022, with additional seasonal targeted threatened species surveys undertaken in September and November 2022, and September 2023.

During the initial site assessment in April 2022 opportunistic records of species and PCT's were recorded as they were encountered, with a total of seven (7) BAM Plots completed throughout the Subject Land to verify on-ground vegetation condition and PCT type, with results detailed in the associated Biodiversity Development Assessment Report (BDAR). During the remaining site visits in September and November 2022 and September 2023 targeted seasonal surveys were undertaken. Further detail on the methodology used to complete on-ground ecological assessments of the site can be found in (Appendix D).

##### **4.7.1 Existing Environment**

The Subject Land sits entirely within the South Eastern Highlands IBRA region which includes most of the ACT and extends south through NSW into Victoria. The region is characterized by a temperate climate, with significant areas in the north and south at higher elevations having a montane climate with milder summers. Altitude and climate strongly influence the unique assemblage of flora and fauna found in the region; there are approximately one hundred and eleven (111) threatened species found in the Snowy Monaro IBRA subregion. There are several national parks and reserves near the study site that are important refugia for local biodiversity- Kosciuszko National Park and the Ramsar listed Blue Lake.

##### ***Vegetation Present in the Subject Land***

The following PCT's were confirmed as present within the Subject Land:

- PCT 1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion
- PCT 0: Non-native

Native vegetation occurred primarily as small patches of remnant woodland surrounded by larger disturbed areas of derived grassland and shrubland with varying levels of weed encroachment and disturbance. Residential areas also encroach into the northern portion of the Subject Land, with planted mixed native and exotic gardens and landscaped areas occurring within this part of the site.

One (1) Threatened Ecological Communities (TEC) was recorded as occurring within the Subject Land during surveys. PCT 1191 was confirmed as occurring within the Subject Land as Grassy Woodland and





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Derived Grassland in degraded condition. This PCT aligns with the listed Threatened Ecological Community (TEC) *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion* listed as Critically Endangered under the BC Act.

In addition, onsite surveys confirmed that there are five (5) vegetation zones occurring within the Subject Land:

- Zone 1: PCT 1191 Good - Moderate
- Zone 2: PCT 1191 Derived Grassland Good - Moderate
- Zone 3: PCT 1191 Derived Grassland Moderate - Degraded
- Zone 4: Planted Mixed Native/Exotic Gardens
- Zone 5: PCT 0 Non-Native

### Flora

A total of one hundred and eighteen (118) species were recorded within the vegetation plots completed and incidental species observed on site, consisting of fifty-seven (57) native species and sixty-one (61) exotic species, including eighteen (18) High-Threat Exotics (HTE). The field data collected is available in Appendix D.

Dominant canopy species recorded throughout the Subject Land included Snowgum (*Eucalyptus pauciflora*) with Black Sallee (*Eucalyptus stellulata*) occurring in small isolated patches immediately adjacent the Subject Land. Ribbon Gum (*Eucalyptus viminalis*) was also observed in more restricted areas outside the Subject Land in isolated water courses.

The dominant mid stratum species recorded throughout included Silver Wattle (*Acacia dealbata*), Tree Violet / Gruggly Bush (*Melicytus angustifolius subsp. divaricatus*), *Cassinia longifolia* and *Pimelea pauciflora*.

The ground stratum contained a mixture of grasses and forbs including the grasses Snow Grass (*Poa sieberiana*), Kangaroo Grass (*Themeda triandra*), Kneed Spear-grass (*Austrostipa bigeniculata*), Common Wheat Grass (*Anthosachne scabra*) and Wallaby Grasses (*Rytidosperma* spp.). Forbs included Kidney Weed (*Dichondra repens*), Native Geranium (*Geranium solanderi*), Stinking Pennywort (*Hydrocotyle laxiflora*), Sheep's Burr (*Acaena ovina*), Fuzzweed (*Vittadinia cuneata*) and Native Bluebell (*Wahlenbergia communis*).

### Exotic and Planted Native Vegetation

The Subject Land and surrounding areas have experienced a high proportion of disturbance from historic land management (clearing and grazing), more recent recreational use, and ongoing grazing by both feral and domestic animals. This disturbance has likely encouraged the proliferation of common exotic species including woody weeds and pasture species within the site.

A diversity of exotic species were identified across the site including a high number of listed HTE's as well as planted native and exotic garden and landscaping species. Weed cover and diversity ranged from low-moderate to high throughout the Subject Land, with dense infestations of some weeds, including extensive areas of Mulleins (*Verbascum* spp.), Fleabane (*Conyza* spp.) and Cotoneaster



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(*Cotoneaster* spp.), St John's Wort (*Hypericum perforatum*), Phalaris (*Phalaris aquatica*), Scotch Thistle (*Onopordum acanthium*), Briar Rose (*Rosa rubignosa*), and Blackberry (*Rubus fruticosus* sp. agg) present in more open and disturbed areas. Planted exotic garden species also occur within the northern portion of the site in residential areas.

Weeds listed as High Threat Exotics, WoNS, and/or Priority Weeds for the South East region, including the Snowy Monaro Regional Council area, are listed in Appendix D.

**Fauna**

A total of sixty-nine (69) fauna species were recorded within the Subject Land during surveys. This included four (4) native mammals, seven (7) exotic mammals, forty-seven (47) native bird species, three (3) exotic bird species, four (4) native amphibians, three (3) native reptiles and one (1) native crustacean. A full list of species is provided in Appendix D.

The site contained a diverse array of native fauna with evidence of abundant bird, native macropod and wombat activity evident throughout the Subject Land. No recent grazing by livestock was evident within the Subject Land. Evidence of feral rabbits, goat and fox was present in some areas of the Subject Land.

No threatened flora species were recorded as occurring within the Subject Land during seasonal targeted surveys, and no previous records for threatened flora species occur within the Assessment Area. However, a number of threatened species are recorded as occurring within the broader locality (BioNET 2021). The Subject Land is subject to ongoing disturbance through human activity and mowing near residential areas, as well as high levels of weed encroachment throughout, limiting the quality and areas for threatened flora to persist.

Three (3) species of threatened fauna listed as Vulnerable under the BC Act were recorded as occurring within the Subject Land during surveys:

- Gang-gang Cockatoo, *Callocephalon fimbriatum*
- White-fronted Chat, *Epthianura albifrons*
- Flame Robin, *Petroica phoenicea*

An additional twenty-eight (28) threatened fauna species are recorded as occurring within the broader locality (BioNET 2021; Appendix D).

**4.7.2 Potential Biodiversity Impacts – Construction**

Clearing of understorey shrubs, groundcover and possible disturbance to habitat resources including logs, burrows, minor waterways and rocks within the direct impact zone during the construction of the trail is anticipated.

Up to **1.01 ha** of native vegetation comprising TEC, **0.08 ha** of planted mixed native and exotic vegetation, and **0.02 ha** of non-native vegetation is anticipated to be directly impacted as a result of the Proposal. The removal of this vegetation and habitat material along a linear 3m wide trail corridor will permanently reduce foraging and breeding habitat for some species of native fauna in a minor capacity, including threatened species, known for with the potential to occur within the Subject Land,



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disturb and expose soils, and may impact the movement of water through the Assessment Area as the Subject Land includes gentle and steeper gradients across the hillslope. This disturbance will occur throughout the Subject Land for the duration of construction works and is expected to reduce to a maximum operational width of 2 m of ongoing disturbance.

No mature trees will be impacted as part of the Proposal. Consequently, no tree hollows or larger nesting sites will be lost. Shrubs will be cleared along the new length of trail (3m wide impact area), impacting potential nesting and foraging resources for some smaller bird species. Rocks and logs occurring within the Subject Land may be moved or otherwise impacted, disturbing potential habitat for ground dwelling fauna, however large amounts of these resources occur within the broader locality and will not be impacted by the Proposal. A number of wombat burrows occur within the Subject Land; however, most will not be directly impacted as they are adjacent the proposed Subject Site / direct impact area.

Indirect impacts caused by trail construction works have the potential to impact on up to **5.48 ha** of native vegetation comprising TEC and known and potential habitat for threatened fauna species. Presence of vehicles, machinery and staff within and surrounding the Subject Land may temporarily increase localised disturbance to terrestrial species that feed or breed in the area during construction works. Sedimentation during trail construction work may migrate into drainage lines and adjacent waterways including Lake Jindabyne. Indirect impacts to vegetation communities within the Subject land may also occur through increased activity causing dust settling on foliage and potential for the introduction of weeds or other pathogens. Key Threatening Processes (KTP) relating to the Proposal can be seen in Table 14 below.

The trail has been designed to avoid impacting habitat features present within the Subject Land as far as practicable, however disturbance to some of these features are likely to still occur through vehicle and human movement, noise and air quality (dust) impacts, which may result in short and long-term effects to some localised fauna species inhabiting the Subject Land due to habitat removal and disturbance. The strict adherence to mitigation measures outlined in 4.7.4 will further reduce any potential impacts to individual fauna that may be present during construction works.

Areas outside the Subject Land will remain largely consistent with conditions currently on site, however it is recommended that weed management measures be undertaken throughout the Subject Land; areas outside the Subject Land have not been factored into this assessment, as impacts are not anticipated to extend beyond the 10 m indirect impact buffer extending on either side of the proposed trail.

The current Proposal has the potential to result in one (1) Serious and Irreversible Impacts (SAIL) to the following threatened biota:

- Monaro Tablelands Cool Temperate Grassy Woodland TEC

Potential SAIL's to this TEC within the Subject Land are restricted to small patches of moderate to degraded woodland and derived grassland areas already exposed to ongoing disturbance and moderate to high levels of weed encroachment surrounded by urban development.



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The Proposal has the potential to contribute to **four (4)** prescribed impacts:

- 1) Impacts of development on the habitat of threatened species or ecological communities associated with:
  - Rocks, including rocky habitat or outcrops
- 2) Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range
- 3) Water quality, water bodies and hydrological processes that sustain threatened species and TECs.
- 4) Impacts of vehicle strike on threatened species or on animals that are part of a TEC including:
  - Species that form part of the Monaro Tablelands Cool Temperate Grassy Woodland TEC.

The anticipated impacts of prescribed impacts are considered to be minor and are not anticipated to result in additional impacts significantly beyond that which already occur on site, due to the current land use and condition. Specific minimisation and mitigation measures are provided to reduce the impacts of these prescribed impacts.

All existing creeks and drainage lines within the Subject Land are already disturbed and degraded, due to historic clearing, erosion and weed encroachment as well as current disturbance through human activity. Therefore, no significant impact on these features is considered likely as a result of the Proposed works.

No direct impacts to the Snowy River Catchment EEC are considered likely from the Proposal. Minor impacts to drainage lines and KFH will occur in some areas where the trail crosses these waterways. The proposed trail alignment has been designed with the intent to minimise impacts to waterways or interactions with the Lake.

Significant Impact Criteria Assessments, in accordance with the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria Guidelines* (DEWHA, 2009) were not considered necessary for the Proposal. Consequently, a Referral to the Environment Minister is not required for this Proposal beyond the requirements for offsetting obligations.

A number of mitigation measures and recommendations (See Section 4.7.4) have been made to help minimise impacts of the Proposal and to protect the remaining biodiversity attributes of the Subject Land and broader Assessment Area should the Proposal proceed.

Table 14 Key Threatening processes related to the Proposal

KTP	Status	Comment
Invasion of plant communities by perennial exotic grasses	BC Act	There is the potential for perennial exotic grasses to further invade native vegetation adjacent the study area through disturbance during construction of the Proposal. Mitigation measures outlined in Section 4.7.4 below are likely to effectively limit the operation of this KTP.



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KTP	Status	Comment
Infection of native plants by <i>Phytophthora cinnamomi</i>	BC Act; EPBC Act	Construction and operation activities have the potential to introduce the root-rot fungus <i>Phytophthora cinnamomi</i> into the broader study area, which could lead to dieback of vegetation. Mitigation measures are likely to effectively limit the operation of this KTP.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	BC Act	Construction and operation activities have the potential to introduce Myrtle Rust to the study area. Mitigation measures are likely to effectively limit the operation of this KTP.
Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis	BC and EPBC Act	Construction and operation activities have the potential to introduce Chytrid fungus to the Subject Land. Mitigation measures are likely to effectively limit the operation of this KTP.
Removal of dead wood and dead trees	BC Act	The proposal may result in the removal of some dead wood. Dead wood, branches and logs are present within the woodland areas and provide habitat and shelter for some species. These are to be retained onsite.
Clearing of native vegetation	BC Act	Up to 1.01 ha of native vegetation may be impacted/removed as a result of the trail construction, with most of this being understorey vegetation.

### 4.7.3 Potential Biodiversity Impacts – Operation

Potential impacts to biodiversity from operation of the trail include further disturbance and possible mortality/injury to native fauna from the presence of mountain bikers and increased vehicular activity, accumulation of discarded waste in and around the trail network, the introduction of weeds and other pathogens to the site, erosion impacts from lack of trail maintenance and disturbance to native vegetation from riders deviating from the approved trail alignment.

Table 15 Biodiversity impacts summary table

Description	Y	N	Comments
Are the proposed works likely to involve the removal, pruning or damage to any vegetation including, grass cover, shrubs, trees or Endangered Ecological Communities?	X		Native vegetation is to be removed/impacted to construct the trails, with up to 1.01 ha of native vegetation to be directly impacted, constituting TEC. No mature trees are to be removed.
Please list the number of trees and/or hollows to be removed as part of the proposed works.		X	No mature hollow-bearing trees are to be removed/impacted as part of the Proposal. All trees occurring within the Subject Land will be retained.



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Description	Y	N	Comments
Are the works taking place in a roadside area designated as high or medium conservation value vegetation?		X	N/A. No works proposed within roadside area.
Are there any threatened, endangered, or native flora and/or fauna located within the vicinity of the proposed works?	X		Three (3) threatened fauna species were recorded within the Subject Land during surveys. No threatened flora species were recorded within the Subject Land. A number of threatened flora and fauna species are also recorded as occurring within the locality. No significant impact to any of the species with the potential to occur is expected.

**4.7.4 Environmental mitigation measures – Biodiversity**

The Environmental mitigation measures for Biodiversity are considered part of the Proposal and must be implemented. Mitigation measures to be implemented for Biodiversity are:

**Timing of Vegetation Clearing**

- Where practicable, it is recommended to time the works outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) for species likely to utilise the site to avoid or minimise the chance of nest abandonment, injury or death to native fauna utilising the Subject Land.
- Where practicable, time works to fall outside of key pollinating and seed-setting seasons to reduce the risks of poor pollination / seed-set due to potential disruption of pollinator movements during construction activities.

**Tree Protection and Removal**

- Clearly delineate vegetation to be removed/retained with the assistance of an ecologist, or similarly qualified professional, and induct all site personnel as to the approved extent of clearing.
- Ensure all mature trees (DBH > 10 cm) are retained within direct impact areas during trail construction and that no clearing of vegetation occurs outside of the marked boundary.
- Maintain Vegetation Protection Zones outside direct impact area to avoid compaction of soils. This includes no movement of excavation machinery or parking or storing equipment outside designated clearing areas or laydown areas.
- The presence of a suitably qualified arborist is recommended during earthworks occurring near retained trees to avoid rootzones impacts.
- Where any trees requiring removal contain hollows, nests or other signs of occupation, a staged clearing approach must be undertaken where hollow limbs are removed carefully and incrementally by a qualified tree surgeon/arborist. Care should be taken to inspect limbs for fauna prior to their removal.
- Prior to clearing, a preclearance survey should be undertaken including inspection for threatened species (flora and fauna), and hollows/burrows to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present (nests or potential tree hollows) the appointed contractor would contact the project ecologist for further advice prior to clearing.





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- Ensure the presence of an ecologist or fauna spotter catcher at all times during pre-clearing and clearing activities to remove and relocate wildlife as necessary, and to attend to any wildlife that are injured as a result of works.
- Where additional vegetation removal is proposed this must first be assessed to consider the cumulative impacts against the approved clearance footprint, and if appropriate supervised by a qualified ecologist and Council's Environmental Officer.

**Waterways and Riparian Area Protection**

- Appropriate sediment and erosion controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter creek lines or waterways.
- Council and its appointed contractor should clearly mark the areas of KFH that occur within the construction area and induct all staff to ensure that impacts within these sensitive areas conform to Fisheries permit requirements.
- All litter, including cigarette butts and food wrappers, are to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase so as not to end up in waterways.
- Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 m from drainage lines or waterways.
- Vehicle wash-down (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off.
- All machinery is to be inspected and in a clean state prior to any waterways being crossed or entered during construction.
- Where possible, all construction works are to be undertaken during periods of low predicted rainfall.
- Minimize the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch or installing erosion control blanket as appropriate.
- Ensure all pesticide/herbicides used on site are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.
- Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).

**Rehabilitation**

- Revegetation activities should be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP as a record of rehabilitation efforts made. Vegetation cover should be returned to the site outside of operational footprint areas within a reasonably practicable timeframe post clearing to reduce soil exposure and loss.
- Control and management of High Threat Exotic weeds within the Subject Land is recommended to reduce the risks associated with the further spread of these species within the Subject Land and surrounding landscape, including human safety concerns with encroachment of weeds onto the track, and ongoing ecological impacts.



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- Highly eroded sections of the trail/ road (to the east) are to be rehabilitated to prevent further erosion.

**General Construction**

- Vehicles and machinery to utilise and work from existing roads, or existing cleared areas where possible, and are not to extend beyond the direct impact footprint.
- Vehicles are to be parked in designated parking areas only, or along existing roads/dirt tracks away from tree canopy/drip lines to avoid soil compaction and impacts to adjacent vegetation.
- Ensure vehicles and machinery are cleaned and checked for any traces of weeds, seeds and mud prior to entering work site to reduce the spread of weeds and disease (e.g. *Phytophthora cinnamomi*) to the site.
- Strict hygiene protocols must be followed to ensure that no environmental weeds spread around during works or are introduced to site as a result of the proposed works. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site and disposed of in accordance with Council regulations.
- All soils to be stockpiled at designated stockpile locations in a cleared area, within pre-approved zones away from waterways, drainage lines and native vegetation, and are appropriately stabilized in accordance with the 'Blue Book' (Landcom 2004).
- Any chemicals or pollutants on site to be stored appropriately in bunded areas to prevent pollution of soils or waters which may impact upon biodiversity.
- Sediment and erosion controls must be installed downslope of any disturbance areas prior to any earthworks commencing, to prevent migration of sediments down slope into adjacent waterways or off site.
- Recently disturbed soils must be stabilised progressively and promptly after works are completed to prevent erosion and consequent sediment migration.

**Operational trail use / General maintenance**

- Declared (WoNS) and Priority weeds must be managed according to requirements under the Biosecurity Act 2015. It is recommended these weeds be managed to ensure they do not spread, and where possible eradicated from the Subject Land.
- No vegetation is to be burnt; large limbs, trunks and fallen timber to be placed in adjacent areas to supplement habitat availability. Rocks to be removed from the trail should be placed in adjacent areas as appropriate.
- Smaller branches and leaves of native species only to be chipped and used on site for erosion control and within landscaped areas.
- Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.
- Implementation of speed zones within the Assessment Area as required. Speed limits are to be strictly adhered to, with driving/working on site to be avoided during dawn and dusk to reduce possible impacts on native fauna.
- Mandatory requirement that pets in the assessment area should be leashed at all times and installation of clear signage to communicate this requirement.



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- Installation of signage to educate trail users to presence of wildlife values along the trail and informing best-practice etiquette should they encounter wildlife along the trail.

**Given the outlined mitigation measures for Biodiversity will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Biodiversity.**



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## 4.8 Traffic and Transport

### 4.8.1 Existing environment

Jindabyne is situated on the Kosciuszko Road, which is an arterial road linking Jindabyne to Cooma (34km) via Berridale (30km) to the east, and links Jindabyne to the ski fields including Thredbo (35km, via Alpine Way), Perisher (33km) and Charlottes Pass (41km) to the west, with the road terminating at Charlottes Pass. Kosciuszko Road is frequented by locals and tourists, with peak visitation during the winter months.

The proposed trail occurs along Lake Jindabyne's foreshore, with several urban roads nearby. Lakeview Terrace, Old Kosciuszko Rd and Boronga Road are all roads that can be used to access this section of trail, however these access points are likely to be used primarily by locals and pedestrians, with cyclists accessing the trail from the larger/established bases.

### 4.8.2 Potential Traffic and Transport Impacts – Construction

The primary impacts on traffic associated with the Proposal are likely to be disturbance to local and tourist traffic movements along the urban roads during construction as fleet vehicles and machinery access the trail. Some restrictions to traffic and access may impact on sensitive receivers (Figure 9).

### 4.8.3 Potential Traffic and Transport Impacts – Operation

An increase in recreational users to the study area is anticipated, as such it is likely that an increase in traffic flow into and around the trail network, and possibly the township of Jindabyne, will occur as a result of the operational phase of the Proposal. Parking facilities at identified points may require expanded facilities to facilitate the increased visitation. Current high-use visitor areas (such as the points at Boronga and Old Kosciuszko Rd) may require upgrades. No major permanent detours or loss of access to businesses/ properties is expected from operation of the Proposal.

Table 16 Traffic and Transport impacts summary table

Description	Y	N	Comments
Are the proposed works likely to result in major detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access to properties or businesses?		X	Some homes and properties may have their access impacted during the construction phase as vehicles are parked/ access suburban areas. This is anticipated to be temporary and a minor impact. No road closures are required.
Will there be any permanent major detours made as a consequence of the works?		X	None anticipated.
Does the proposal involve excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the <a href="#">Roads Act 1993</a> (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath). (if so, consultation with Council will be required)		X	The Proposal does not include excavation of any footpaths or existing roads.



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Description	Y	N	Comments
Involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential (if so, consultation with Council will be required)	X		There is no temporary structures being installed or enclosing of a public place, however, traffic congestion may result from the use of public roads by construction vehicles and heavy machinery which may result in the local community who use the roads being temporarily inconvenienced.
Is the proposal likely to generate traffic that will strain the capacity of the road system in an LGA (if so, consultation with Council will be required)		X	The Proposal is anticipated to result in additional movement of construction vehicles during the construction phase. However, this is expected to be short in duration and confined to the construction period.

**4.8.4 Mitigation measures – Traffic and Transport**

The mitigation measures for Traffic and Transport are considered part of the Proposal and must be implemented. Mitigation measures to be implemented for Traffic and Transport are:

**Construction**

- Council and its appointed Contractor will consider the location of designated parking areas, stockpile locations, construction laydown sites, site offices, and access routes carefully in consideration of creating inconveniences to local residents, and to the other environmental constraints.
- Notify residents of timing of works, including erection of signage to prevent vehicles entering the study area during construction activities.
- Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised and adequately communicated to the impacted resident/property owner.
- Prior to commencement of works on site, the contractor will inform neighboring properties of proposed works, anticipated impacts and site contact information. Notification can be provided by various means including, but not limited to letterbox drops, contact via telephone, and notification of works on the Council website.
- The worksite is to remain tidy and be cleared at the end of each workday.
- Any complaints received are to be formally recorded, investigated, rectified and monitored, and forwarded to the Superintendent as soon as possible.

Given the outlined mitigation measures for Traffic and Transport will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Traffic and Transport.



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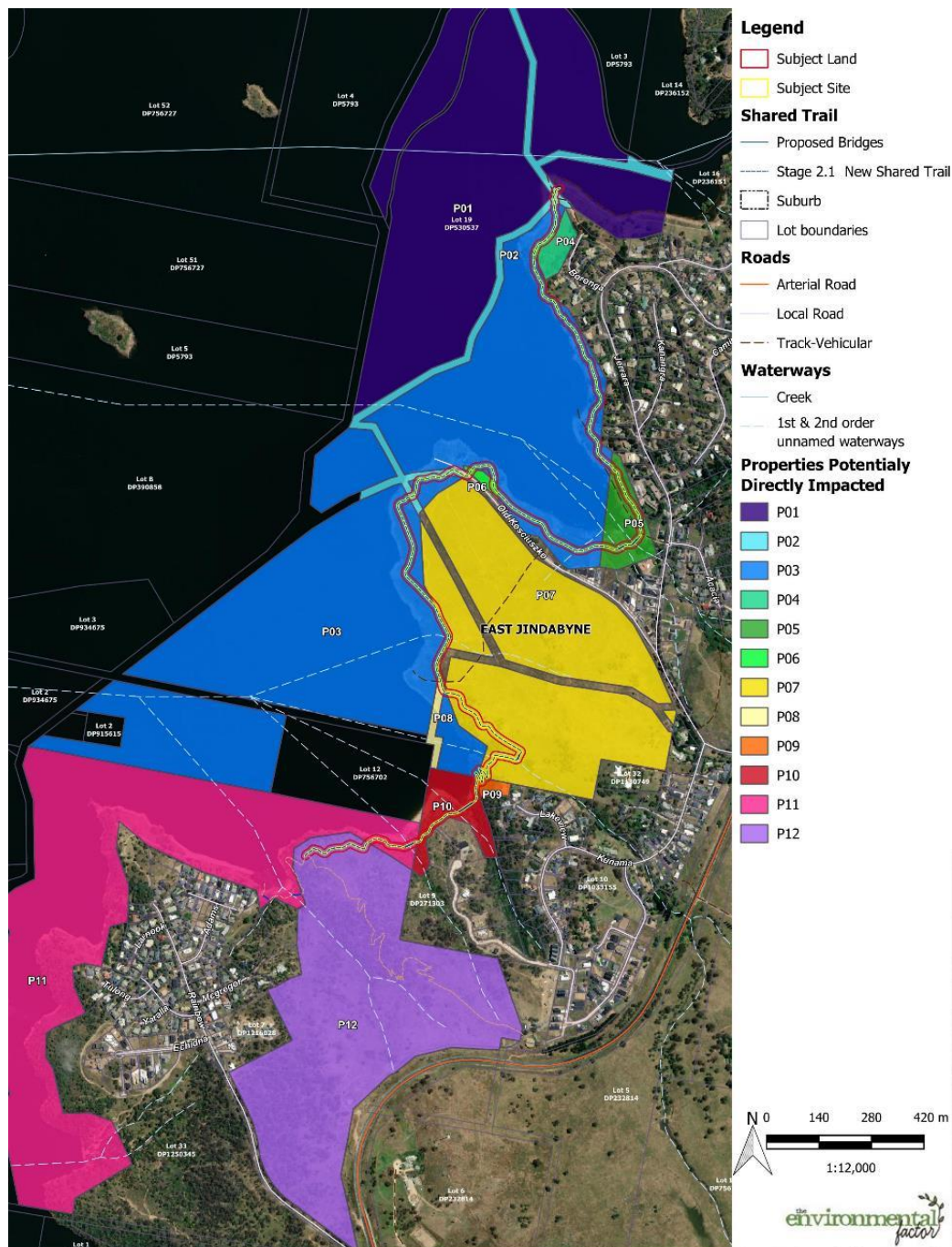


Figure 9 Properties potentially impacted by the proposed trail.





## 4.9 Socio-economic Considerations

### 4.9.1 Existing environment

Jindabyne is a rural community with an estimated population of 4,333 and a population density of 0.11 persons per hectare (SMRC 2021). The 2016 census details Technicians and Trades Workers as the top employment area for the Jindabyne region, employing 274 people (or 16.9%). The second dominant employment area is Managers (247 people or 15.2%), followed by Community and Personal Service Workers (245 people or 15.1%).

The study area is located on freehold and Local Government land. The study area is bound to the west by Lake Jindabyne, and to the east by residential housing. An existing, informal walking trail extends along much of the trail length with lookout points at the end of Boronga Rd and Old Kosciuszko Rd. The informal trail passes along the back of several residences with waterfront views of the Lake. Recreational users, walkers, fishers and canoeists were seen in the area during 2022 surveys.

### 4.9.2 Potential Socio-economic Impacts – Construction

During the construction phase of the Proposal, it is expected that local contractors from the Jindabyne region will be employed. It is anticipated that contractors will provide income to local cafes, businesses, and accommodation providers throughout the duration of the construction. Some temporary disruption to locals is expected due to noise, visual, dust and the presence of construction vehicles and machinery.

### 4.9.3 Potential Socio-economic Impacts – Operation

The operation of the trail network, as part of the overarching Go Jindabyne Master Plan is anticipated to provide positive socio-economic impacts through aiming to turn the township of Jindabyne into Australia's premier alpine destination (Planning and Environment, NSW Government July 2019). Following an in-depth consultation and analysis process, the Snowy Mountains Special Activation Precinct (SMSAP) was announced in November 2019, expanding the scope of the Go Jindabyne Master Plan to encompass the wider Snowy Mountains region. The objective of the SMSAP is to increase tourism in the region by making it attractive to visitors year-round. Amongst other things, the SMSAP aims to identify opportunities in promoting the development of year-round adventure and eco-tourism attractions and improve tourism amenity within the region.

As the popularity of mountain biking continues to grow, the positive social, health, and economic benefits have been increasingly documented. Many MTB destination case studies both nationally and internationally verify direct positive economic impacts felt within local communities from increased visitation and spending associated with the MTB trails. The trail passes through some residents 'backyards', areas which in the past have not been readily accessible to recreational users, but which may have served as a local's secret, with a low number of daily users. Opening of the trail will impact on the local residents who back onto the lake, taking away this privacy. However, it is likely that several of the impacted properties may be holiday -rentals, which may benefit from the trail.



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Table 17 Socio-economic Considerations impacts summary table

Description	Y	N	Comments
Are the proposed works likely to impact on local business, require any property acquisition, Or alter any access or parking arrangements for properties (either temporarily or permanently)?	X		Yes, property acquisition is required for one property within the subject site and is being progressed by Public Works on behalf of Council. Temporary impacts to parking may occur in residential areas.
Is the development adjacent to land reserved under the <a href="#">National Parks and Wildlife Act 1974</a> or to land acquired under Part 11 of that Act—( if so, consultation is required with the Office of Environment and Heritage),		X	Kosciuszko National Park is northwest of the study area.
Is the development on land in Zone C1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone, other than land reserved under the (if so, consultation is required with National Parks and Wildlife Act 1974the Office of Environment and Heritage),		X	The Proposal is not being completed on any land zoned C1.
Does the development comprise a fixed or floating structure in or over navigable waters— (if so, consultation will be required with Transport for NSW),		X	The Proposal does not involve any fixed or floating structures in or over navigable waters.
Is the development located on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument— (if so, consultation is required with the Secretary of the Commonwealth Department of Defence, Note— Defence communications facility buffer land is located around the defence communications facility near Morundah. See the Defence Communications Facility Buffer Map referred to in clause 5.15 of <a href="#">Lockhart Local Environmental Plan 2012</a> , <a href="#">Narrandera Local Environmental Plan 2013</a> and <a href="#">Urana Local Environmental Plan 2011</a> .		X	The Proposal is not being carried out on defence communications facility buffer land.
Is the development on land in a mine subsidence district within the meaning of the <a href="#">Mine Subsidence Compensation Act 1961</a> —(if so, consultation is required with the Mine Subsidence Board),		X	The Proposal is not being carried out within a mapped mine subsidence district within the meaning of the Mine Subsidence Compensation Act 1961.



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Description	Y	N	Comments
Is the development within a Western City operational area specified in the <a href="#">Western Parkland City Authority Act 2018</a> , Schedule 2 with a capital investment value of \$30 million or more—if so, consultation is required with the Western Parkland City Authority constituted under that Act).		X	The Proposal is not being carried out within the Western City operational area.

**4.9.4 Environmental mitigation measures – Socio-economic considerations**

The Environmental mitigation measures for Socio-economic Considerations are considered part of the Proposal and must be implemented. Mitigation measures to be implemented for Socio-economic impacts are:

**Construction**

- The construction site is to be left in a clean and tidy manner at the end of each workday.
- Disruption of traffic and property access is to be minimised wherever possible.
- Considerate construction practices are to be implemented for all aspects of the project, including but not limited to:
  - Expediting the construction period as much as practicable
  - Minimising time spent in front of private residences, businesses and/or public facilities
  - Minimising noise, air quality and traffic impacts on neighbouring properties and the wider community
  - Maintaining a tidy construction site and respecting private property
- All materials purchased for the project are to be of highest quality and as sustainable as possible, to reduce impacts to community and rate-payers through replacement of low-quality or faulty equipment in the future.
- Quality assurance is to be applied to all aspects of the project, including design and construction to ensure best value for constituents.
- Road interruptions are to be avoided and/or appropriately managed during times of increased traffic flow (school pick up and drop off/ peak tourist season or during harvest, as applicable).
- The local community is to be kept informed of work plans, and any concerns raised by the community or local businesses, or landholders are to be promptly addressed.
- Signage to be erected to notify visitors of private property and no-go areas.

**Operation**

- Erect signage to notify trail users of private properties and appropriate etiquette
- Have clear 'no-go' zones with clear signage.

Given the outlined mitigation measures for Socio-economic considerations will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Socio-economic considerations.



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#### 4.10 Waste and Resource Use

##### 4.10.1 Existing environment

Construction of the trail network would primarily rely on utilising existing materials from the site (e.g. rocks and soil). However, some additional processed materials will be required for trail and infrastructure (e.g., bridge crossings).

Anthropogenic disturbance in the form of discarded waste was observed during the site visits, however this was only minor and the area was generally clean and tidy. Rubbish was seen in Lake Jindabyne and within some of the parking areas.

##### 4.10.2 Potential Waste and Resource Use Impacts – Construction

Potential waste and resource use impacts from the construction phase of the trail network include:

- Waste generation from track network and facility construction including removed materials such as vegetation and rock.
- Use of resources for track construction including sand, gravel, timber, steel, bitumen, concrete, bridge materials.
- General construction waste including litter, packaging.
- Possible leaks and spills from equipment, and materials required for cleanup efforts.
- Generation of green waste from vegetation removed during construction.

Most construction waste to be generated is to be disposed of at the Jindabyne Landfill, with recyclable material to also be transferred to the waste facility per routine operations.

During construction a small number of light and heavy vehicles and plant will be required to convey personnel to site and undertake the works (e.g., excavation, lifting/movement of equipment and materials). Where possible, local contractors will be engaged, and construction materials sourced from recycled materials and/or locally to minimise Greenhouse Gases (GHGs) emitted as a result of the works during travel, and embodied energy in materials used as part of delivery of the project.

Given the limited space available on site, and the number of constraints including Biodiversity, Heritage, Socio-economic and Traffic and Transport as identified previously, careful planning for construction laydown areas and stockpiles will need to be undertaken.

Other than rock/fill materials and vegetative waste, the majority of the materials utilised in the activity will be non-renewable, finite resources. Their use would diminish the availability of some resources for future use and contribute to pollution and GHG emissions through both direct use of fuels and the embodied energy used in their production, and in association with the disposal of related waste products. The use of fossil fuels would also contribute to impacts on climate and local air quality.

Construction works would require:

- Concrete, fdc, steel, timber, mini mesh, and decking for bridge construction
- Select fill, where excavated material cannot be reused for trail construction
- Rocks and gravel



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Any additional material that may be required would be sourced from legally operating commercial suppliers and manufacturers within the area. Where feasible, material with recycled content will be sourced.

Energy consumption associated with the proposed works would include electricity and fuel. Any construction wastes, contaminated materials (e.g., asbestos, contaminated soil if encountered) will need to be handled carefully so as not to impact upon the community or pollute waters via the stormwater system, and to ensure Council undertakes its responsibilities as environmental custodians, and to care for the health and safety of their employees, contractors and constituents. All wastes will be managed in accordance with the POEO Act and in accordance with EPA and Council guidelines.

In order to achieve higher levels of landfill diversion, it is critical to identify what materials can be recycled and where, so that appropriate arrangements can be made with service providers – other construction wastes may need to be transported farther afield to be recycled and avoid landfill. Not identifying these reuse opportunities is likely to result in increased waste burden on local landfill.

Regional collaboration amongst Council waste authorities and other industry partners, which are currently in place, may be required to be called upon in order to maximise recycling and resource recovery efforts for the project

#### 4.10.3 Potential Waste and Resource Use Impacts – Operation

The operational phase of the trail network has the potential to have waste and resource use impacts including:

- Litter generation from visitors including track and facility users.
- Resource use from maintenance of track surfaces and weed control efforts.
- Peak waste production during events.

Table 18 Waste impacts summary table

Description	Y	N	Comments
Are the proposed works likely to generate >200 tonnes of waste material (contaminated and /or non-contaminated material)?		X	No; most excavated material will be reused in trail construction.
Are the proposed works likely to require a Licence from NSW EPA for waste?		X	No; the works do not and will not require discharges to the environment.
Will the ongoing operation of the site post completion of works generate significant amount of waste?		X	Minimal wastes will be generated, unless the infrastructure is replaced in future.

#### 4.10.4 Environmental mitigation measures – Waste and Resource Use

The Environmental mitigation measures for Waste and Resource use are considered part of the Proposal and must be implemented. Mitigation measures to be implemented and maintained for waste and resource use include:

##### Construction

- Waste management for construction projects should be undertaken in accordance with the *Protection of the Environment Operations Act 1997*, EPA and Council guidelines and *NSW Waste Avoidance and Resource Recovery Act 2001*. The objectives of the Act are:



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- To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of Ecologically Sustainable Development (ESD)
- To ensure that resource management options are considered against a hierarchy of the following order:
  1. Avoidance of unnecessary resource consumption
  2. Resource recovery (including reuse, reprocessing, recycling and energy recovery)
  3. Disposal
- To provide for the continual reduction in waste generation,
- To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste,
- To ensure that industry shares with the community the responsibility for reducing and dealing with waste,
- To ensure the efficient funding of waste and resource management planning, programs and service delivery,
- To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,
- To assist in the achievement of the objectives of the *Protection of the Environment Operations Act 1997*.
- Waste may also constitute environmental pollution, which is regulated under the *NSW Protection of the Environment Operations Act 1997*, administered by the EPA and Local Government.

**Operation**

- Routine collection of recyclables and wastes to be implemented as part of routine operation of the site once works are completed.
- Additional waste facilities to be installed to cater for increased visitation and use.

**Given the outlined mitigation measures for Waste and Resource Use will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Waste and Resource Use.**





#### 4.11 Visual Amenity

##### 4.11.1 Existing environment

The existing environment provides high quality visual amenity, as it is considered a picturesque natural environment, comprised of native vegetation, paddocks and views over Lake Jindabyne. The trail meanders along the lake, with some sections of remnant woodland providing a natural feel. The trail passes houses, backyards and urban areas in some sections, with degraded areas also visible.

##### 4.11.2 Potential Visual Amenity Impacts – Construction

The construction stage of the trail network has the potential for the following impacts on visual amenity of the study area:

- The presence of construction equipment and associated vegetation loss and soil disturbance along the trail network and associated facility areas.
- Temporary stockpiles of soil and other materials during construction.
- Presence of construction crew and machinery

Sensitive receivers in proximity to the subject site can be seen in Figure 8.

It is however anticipated that positive visual amenity will be reinstated in these sections as the trail construction works are undertaken. Some, highly disturbed/eroded areas along the trail will benefit from these works.

##### 4.11.3 Potential Visual Amenity Impacts – Operation

Operation of the trail will include the presence of a 3 m wide section of trail, with much of the length already existing as a goat track/ informal walking trail. The formalization of this trail will allow more usage and will likely increase visitation to the area, resulting in potentially decrease visual amenity for local residents but will allow tourists and locals using the trail to enjoy the visual setting of the Lake and natural surrounds. Installation of bridges and formalized trail will improve the visual amenity of the trail if completed in a design that is complimentary to the environmental surrounds.



Plate 6 View of Lake Jindabyne along most of the new trail.



Plate 7 Existing informal walking trail – to be widened and formalized.



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Table 19 Visual Amenity impacts summary table

Description	Y	N	Comments
Are the proposed works likely to have an impact on the visual amenity of the surrounding area? (i.e. removal of vegetation, stockpile sites, road widening etc.)	X		Impact to the visual amenity during construction – improvement during operation. No major impact to visual amenity along length of trail.
Will the development increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (note – the Dark Sky Region is land within 200 km of the Siding Spring Observatory.		X	The Proposal will not increase the amount of artificial light in the sky. No floodlights or installation of lighting included in the Proposal.

#### 4.11.4 Environmental mitigation measures – Visual amenity

The Environmental mitigation measures for Visual Amenity are considered part of the Proposal and must be implemented. Mitigation measures to be implemented with regards to Visual Amenity are:

##### Construction

- It is recommended that works be completed in discrete packages, to ensure visual impacts are kept to a short period, isolated to sections, and reinstated as swiftly as possible for the benefit of residents and the community.
- Considerate construction practices are to be implemented at all times, to ensure the works areas are neat and visually not offensive, including to be kept free from rubbish, and stockpile sites actively managed.
- No additional, unauthorized clearing or destruction of vegetation is to occur.
- The works area is to be kept free from rubbish and stockpile sites actively managed.
- Vehicles are to be parked in designated areas only.
- Cleared, bare patches of ground that form part of the works are to be revegetated and restored following cessation of works.
- Obvious and intrusive signs/machinery/equipment are to be removed from the site at the first opportunity.
- Appropriate consultation will continue to be undertaken to inform businesses and residents of planned works, timing, and potential visual impacts.
- Any complaints received regarding visual amenity at the site are to be dealt with and rectified as soon as possible.
- Machinery, obvious presence and worksites are to be minimized in front of houses that back on to the trail.

##### Operation

- Ensure rehabilitated areas are maintained until well established.



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- Continue to monitor the site and complete further maintenance if required.

**Given the outlined mitigation measures for Visual Amenity will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Visual Amenity.**



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## 4.12 Climate Change

### 4.12.1 Existing Environment

The closest Long-term meteorological data for the surrounding area is available from the Bureau of Meteorology (BoM) Cooma Airport weather station. The weather station is located approximately 30 km northeast of the subject land and records observations of several meteorological data including temperature, humidity and rainfall, wind speed and wind direction.

Long-term climate statistics for the area are presented in Table 20. The area has a mild climate with an average annual maximum temperature of 19.4 degrees Celsius. January is the hottest month, with a mean maximum temperature of 27.5 degrees Celsius and July is the coldest month, experiencing a mean maximum temperature of 11.5 degrees Celsius.

Rainfall is typically uniform across the seasons, with some variability experienced from year to year. November is recorded as the wettest month with an average rainfall of 62.6 mm falling, with August the driest month at 27.7 mm. The yearly average stands at 538 mm of rain.

Table 20 Long-term climate averages at the closest weather station (Cooma Airport)

Observation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<b>Mean observations</b>													
<b>Maximum Temperature (°C)</b>	27.5	26.3	23.7	19.5	15.6	11.9	11.5	13.3	16.4	19.6	22.6	25.2	19.4
<b>Rainfall (mm)</b>	56.4	61.1	59.8	38.0	30.5	40.0	28.0	27.7	33.7	44.5	62.6	56.0	538.0

### Climate Change predictions

The NSW Government Office of Environment and Heritage (OEH) AdaptNSW division 'Climate Change snapshot' for South East and Tablelands, states that the region is projected to continue to warm during the near future (2020 – 2039) and far future (2060 – 2079), compared to recent years (1990 – 2009). There is very high confidence that the average temperatures will increase across seasons. Warming is projected to be on average about 0.6°C in the near future, increasing to about 2.0°C in the far future. The number of hot days is projected to increase, and the number of cold nights is projected to decrease.

Climate change projections are presented for emission scenarios that will impact the degree to which the climate is altered in the future; each of these is referred to as a 'representative concentration pathway' (RCP) and is representative of the concentration of global GHG emissions in the atmosphere under different emissions scenarios. For example, if GHG emissions are mitigated and reduced, the scenario is for 'low emissions' and is referred to as RCP 2.6; conversely, if little effort is made to reduce emissions and the current scenario is continued globally, a 'high emissions' concentration is referred to as RCP 8.5, indicating a high concentration of GHG emissions in the atmosphere moving forward, with potentially devastating impacts by the year 2100.



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Under a high emissions scenario (RCP8.5), NSW and the ACT can expect an average annual temperature increase of around 1.4 - 2.3 °C, whereas large and sustained reductions in global GHG emissions (RCP2.6) reduce projected warming to around 0.7 - 1.4 °C.

Specifically for Cooma (the closest locality with climate analogues data available), under emissions scenario RCP 8.5 for the projected time period of 2090, an increase in temperature of 4.7 °C is expected, combined with a drop of -14 % for rainfall (Climate Change in Australia, Analogues Explorer, 2021).

The number of hot days is expected to increase in Cooma, while the number of cold nights is expected to decrease. In addition, the number of days with severe fire weather is expected to increase in Spring and Summer (NSW OEH, 2020).

Cooma is predicted to experience an increase in rainfall across Summer and Autumn, and a decrease in Spring and Winter; rainfall changes are associated with changes in extremes, such as floods and droughts (NSW OEH, 2020). The changes to water quality, potential for erosion and sediment migration, damage to infrastructure and localized flooding complications are associated with these sudden or extreme changes.

The subject site is identified as being within a designated bushfire prone area (NSW Rural Fire Service, 2021) with a harsher fire-weather climate predicted in the future (high confidence), access to water in the area, and a plan for the bush fire season will help to ensure the safety of the community.

#### **4.12.2 Potential Climate Change Impacts – Construction**

Throughout the construction phase of the project there will be use of in-demand materials. Use of these materials diminishes the availability of some resources for future use and contributes to pollution and GHG emissions through both direct use of fuels and the embodied energy used in the production of construction materials, and in association with the disposal of related waste products. The use of fossil fuels would also contribute to impacts on climate and air quality. While these impacts would be negligible on global or national scales, efficient resource use should be adopted as a general operating principle, including use of locally sourced materials and locally based construction crews to reduce 'carbon miles' and increase efficiencies.

Potential impacts on Climate change from the construction of the trail network include:

- Loss of vegetation and potential emissions associated with the decomposition of removed vegetative material.
- Emissions from machinery and plant equipment.
- Emissions inherent in materials used for construction.
- Emissions from vehicles used by construction and project management crew.

#### **4.12.3 Potential Climate Change Impacts – Operation**

Potential impacts on climate change from the operation of the trail network include emissions from the transportation of trail users to and from the site. The impacts of climate change on the operation of the trail network include damage to the trail network from extreme weather events including storm events, and damage to the trail from increased natural disasters including more frequent and severe bushfires.



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#### **4.12.4 Environmental mitigation measures – Climate Change**

**The following mitigation measures for Climate Change are part of the Proposal and must be implemented. Mitigation measures to be implemented and maintained for Climate Change include:**

##### ***Construction***

- Resource management hierarchy principles are to be followed to reduce adding to the environmental pollution contributing to climate change:
  - Avoid unnecessary resource consumption as a priority,
  - Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery),
  - Disposal is undertaken as a last resort (in accordance with the Waste Avoidance & Resource Recovery Act 2001).
- Council may elect to make a contribution to an accredited carbon offset program to offset greenhouse gas emissions.
- Quality assurance and life cycle of materials are to be considered when purchasing, to ensure the newly built infrastructure is resilient and structurally sound.
- Local resources are to be used wherever possible, to reduce waste and increase efficiencies

##### ***Operation***

- Regular maintenance of trail network and facilities to reduce degradation over lifespan.

**Given the outlined mitigation measures for Soils and Erosion will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Climate Change.**



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## 5 CONSIDERATION OF STATE AND COMMONWEALTH ENVIRONMENTAL FACTORS

This section considers the Proposal against key legislation and government policy. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

### 5.1 Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the following Matters of National Environmental Significance (MNES) are required to be considered to assist in determining whether the Proposal should be referred to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Table 21 Compliance with EPBC Act 1999

Factor	Impact
Any impact on a World Heritage property?	Nil
Any impact on a National Heritage place?	Nil
Any impact on a wetland of international importance?	Nil
Any impact on a listed threatened species or communities?	No significant impacts, refer Appendix D
Any impacts on listed migratory species?	Unlikely, refer Appendix D
Any impact on a Commonwealth marine area?	Nil
Any impact on the Great Barrier Reef Marine Park?	Nil
Does the proposal involve a nuclear action (including uranium mining)?	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil

### 5.2 Environmental Planning and Assessment Regulation, 2021 Checklist

The factors which need to be taken into account when considering the environmental impact of an activity are listed in Clause 171(2) of the *Environmental Planning and Assessment Regulation 2021*. Those factors have been taken into account when assessing the likely impacts of the Proposal on the natural and built environment in this SEE and are summarised in Table 22 below.

Table 22 Compliance with Clause 171(2) of the EP&amp;A Regulation 2021

Environmental Factor	Will there be an impact?	Comments
(a) Any environmental impact on a community?	Minor	Construction: the local community may experience minor to moderate traffic





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Environmental Factor	Will there be an impact?	Comments
		<p>delays, as well as noise, air quality and visual amenity impacts, particularly during underpass construction.</p> <p>Operation: Some residents in close proximity to the trail may experience impacts due to increased use of the trail network.</p>
<b>(b) Any transformation of a locality?</b>	No	<p>Construction: temporary impacts including presence of machinery, personnel and materials on site.</p> <p>Operation: The visual amenity, ecological and scientific value of the site will remain consistent with current conditions, post completion of the construction phase. Increase to public benefit and recreational use likely.</p>
<b>(c) Any environmental impact on the ecosystems of a locality?</b>	Yes	<p>Construction: Minor impact to groundcover of ecosystems present. Minor short-term indirect impacts to adjacent vegetation possible, not deemed significant (Appendix D).</p> <p>Operation: the use of the site is anticipated to be largely consistent with current conditions once operational – some disturbance to local fauna possible due to increased trail use.</p>
<b>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b>	Yes. Temporary	<p>Construction: minor impacts to environmental quality and value. Temporary negative impacts on aesthetic and recreational value.</p> <p>Operation: the recreational value and use of the site is anticipated to be improved once operational</p>
<b>(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present generations?</b>		Yes. AHIP required. Refer Appendix B



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Environmental Factor	Will there be an impact?	Comments
<b>(f) Any impact on habitat of any protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?</b>	Yes	<p>Construction: minor short-term impacts during construction, though these are not likely to be significant</p> <p>Operation: the use of the site is anticipated to be largely consistent with current conditions once operational</p>
<b>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b>	No	<p>Construction: minor impacts to flora and fauna during construction, though these are not likely to endanger species.</p> <p>Operation: the use of the site is anticipated to be largely consistent with current conditions once operational</p>
<b>(h) Any long-term effects on the environment?</b>	No	<p>Construction: minor impact to groundcover of ecosystems present. Minor short-term indirect impacts to adjacent vegetation possible, not deemed significant (Appendix D).</p> <p>Operation: the use of the site is anticipated to be largely consistent with current conditions once operational</p>
<b>(i) Any degradation of the quality of the environment?</b>	No	<p>Construction: minor impact to groundcover of ecosystems present. Minor short-term indirect impacts to adjacent vegetation possible, not deemed significant (Appendix D).</p> <p>Operation: the use of the site is anticipated to be largely consistent with current conditions once operational if environmental mitigation measures are implemented.</p>
<b>(j) Any risk to the safety of the environment?</b>	No	<p>Construction: not expected</p> <p>Operation: the safety of the environment will be improved due to trails being built to a standard and bridges installed at waterway crossings.</p>



## Statement of Environmental Effects - Hatchery Bay

Environmental Factor	Will there be an impact?	Comments
<b>(k) Any reduction in the range of beneficial uses of the environment?</b>	No	Construction: Minor short-term impacts due to reduced recreational amenity during construction.  Operation: increase in beneficial uses of the environment.
<b>(l) Any pollution of the environment?</b>	Minor	Construction: potential for movement of sediment and other pollutants into waterways during trail construction.  Operation: potential for sediment and other pollutants into waterways as a result of operation of the trails and increase in litter.
<b>(m) Any environmental problems associated with the disposal of waste?</b>	Negligible	Construction: not anticipated to generate large volumes of waste and so impact not deemed significant.  Operation: not anticipated to generate large volumes of waste and so impact not deemed significant. All waste to be removed from site. Potential for increase in litter due to trail use.
<b>(n) Any increased demands on resources, natural or otherwise which are, or are likely to become, in short supply?</b>	Minor	Construction: anticipated to consume some finite resources – particularly for bridge construction.  Operation: not anticipated to consume large volumes of finite resources and so impact not deemed significant.
<b>(o) Any cumulative environmental effect with other existing or likely future activities?</b>	Minor	Construction: Construction of other trails within Jindabyne, some cumulative environmental effects possible.  Operation: Additional trail operation throughout Jindabyne.
<b>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions</b>	No	Construction: not on the coast  Operation: not on the coast
<b>(q) Any applicable local strategic planning statement, regional strategic plan or district</b>	Yes	Refer to Snowy Mountains Strategic Planning Statement (Snowy Monaro



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Environmental Factor	Will there be an impact?	Comments
management plan made under Division 3.1 of the Act		Regional Council, 2020). The delivery of new and improved trail networks around Lake Jindabyne, aligns with Planning Priority 7.
(r) Any other relevant environmental factors	No	Construction: no other factors have been considered other than those listed above.  Operation: no other factors have been considered other than those listed above.

The proposal is considered to be acceptable under Part 4 of the *Environmental Planning and Assessment Act 1979* and potential impacts are expected to be minor. Accordingly, it is recommended that the Development Application be approved subject to appropriate standard conditions.



Statement of Environmental Effects - Hatchery Bay

## 6 RECOMMENDATION

This Statement of Environmental Effects (SEE) examines and takes into consideration such of the following matters as are of relevance to the development the subject of the development application, and has assessed the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality. This SEE also details the mitigation measures to be implemented as part of the Proposal that will minimise the potential environmental impacts. The assessment has concluded that the Proposal as described in this SEE, providing all proposed management measures and mitigation measures are implemented, is not likely to result in a significant impact on the environment. The Proposal is not likely to result in a significant impact on any declared critical habitat, threatened species, populations or ecological communities or their habitats. Therefore, a Species Impact Statement (SIS) is not required. As the Proposal will result in the clearing of native vegetation that exceeds the threshold outlined in the BC Regulatory Act, participation in the Biodiversity Offset Scheme is required. A BDAR has been prepared which details environmental conditions and assessments onsite.

A number of Aboriginal cultural heritage sites are known throughout the area; therefore, an Aboriginal Cultural Heritage Assessment (ACHA) has been completed to fully assess the study area. The ACHA included assessment of four (4) separate sections of trail that included the section being assessed in this REF. Since Aboriginal cultural material was uncovered specifically within the study area for the Kunama to East Jindabyne proposed trail and cannot be entirely avoided by the Proposal, an application for an Aboriginal Heritage Impact Permit (AHIP) is required to permit harm to these items.

All proposed work contemplated as part of the Proposal will be completed under the guidance of a Construction Environmental Management Plan (CEMP) to manage and minimise potential environmental impacts, particularly ecological impacts, associated with the proposed work. Once operational, the Proposal is not expected to cause any significant environmental or community impacts.

I certify that I have reviewed and endorsed the contents of this SEE document, and, to the best of my knowledge, it is in accordance with the EP&A Act and the EP&A Regulation, and the information it contains is neither false nor misleading.

Prepared by:

Reviewed and Endorsed for Certification by:

Name: S Rivett, J Sanderson, Anna Uhrig

Name: Emily Cotterill

Title: Senior Environmental Consultant, GIS Specialist, Ecologist

Title: Director and Principal Consultant

Date:

Date:

Determiner declaration and approval

I have reviewed this SEE and determine that the Proposal will not have a significant impact on the environment and can proceed subject to the controls outlined in this SEE

Name:

Title:

Date:



Statement of Environmental Effects - Hatchery Bay

## 7 REFERENCES

ACT 2001 Aboriginal People of Monaro

<https://www.snowymonaro.nsw.gov.au/DocumentCenter/Home/View/4547>

Department of the Environment and Energy, 2020 Protected Matters Search Tool for MNES listed under the EPBC Act. <http://www.environment.gov.au/epbc/protected-matters-search-tool>

Department of Planning and Environment (DPE) (2020), Go Jindabyne Master Plan, Retrieved Sept and Dec 2021 and Jan 2022 from <https://www.planning.nsw.gov.au/Plans-for-your-area/Special-Activation-Precincts/Snowy-Mountains-Special-Activation-Precinct/Go-Jindabyne-Master-Plan>

DPE Vegetation Regulatory Map <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap>

DPE Biodiversity Values Map <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap>

DPE2020 NSW Bionet Atlas <http://www.bionet.nsw.gov.au/>

DPE 2020 NSW State Heritage Register  
<http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx>

Heritage NSW AHIMS search

Landcom, 2004, *Managing Urban Stormwater: Soils and Construction Volume 1*, Landcom, Parramatta

NSW Department of Planning, Planning Portal <https://www.planningportal.nsw.gov.au/>

NSW Department of Planning and Environment, NSW National Parks and Wildlife Service, Guidelines for preparing a Review of Environmental Factors, 2022

Snowy Hydro 2021 accessed 24/09/2021 from: <https://www.snowyhydro.com.au/generation/the-snowy-scheme/>

SMRC 2021 Community Profile accessed 24/09/2021 from: <https://profile.id.com.au/snowy-monaro/population-estimate?WebID=150>

Snowy River *Development Control Plan*

Snowy River *Local Environmental Plan 2013*

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8 APPENDICES

Appendix	Description
Appendix A	– Concept Design
Appendix B	– Aboriginal Cultural Heritage Assessment Report
Appendix C	– Summary of Environmental Mitigation Measures
Appendix D	– Biodiversity Development Assessment Report



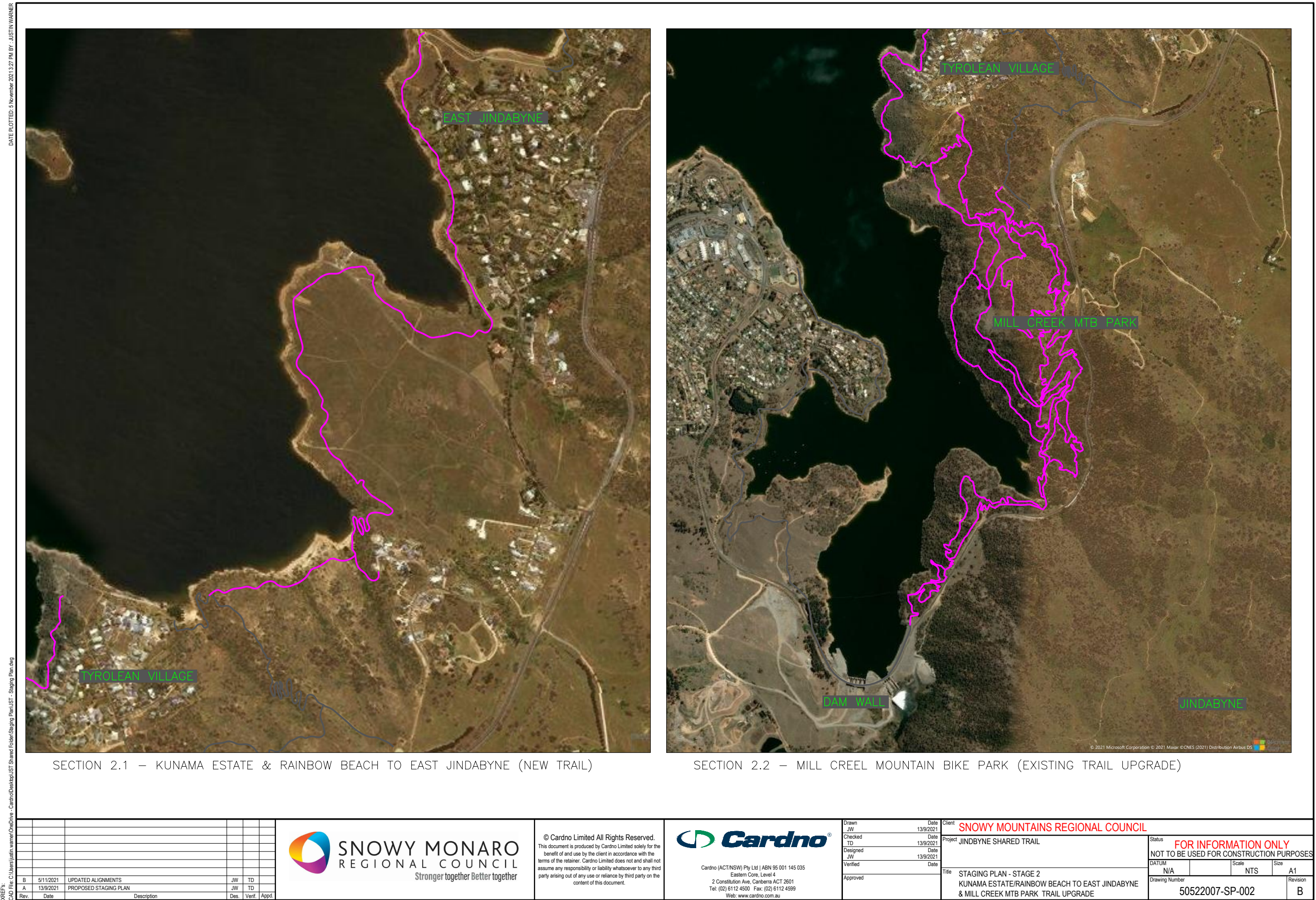


Statement of Environmental Effects – Kunama to East Jindabyne

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**Appendix A – Concept Design**







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**Appendix B – Aboriginal Cultural Heritage Assessment Report**

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### Appendix C – Summary of Environmental Mitigation Measures

#### *Soils and Erosion*

##### *Construction*

- No vegetation outside the approved direct impact footprint is to be harmed or removed; vegetation that is not approved for clearance is to be protected to ensure soils are not exposed unnecessarily.
- Soil and Erosion Siltation control plan to be developed
- All areas where groundcovers/vegetation are required to be removed will require careful management during construction due to the higher erosion risks, including Erosion and sediment (ERSED) control measures are to be implemented and maintained to:
  - Prevent sediment moving off-site and sediment laden water entering any drainage lines, drain inlets, or dams and
  - Reduce water velocity and capture sediment on site.
- ERSED controls are to be installed prior to the commencement of works and checked and maintained on a regular basis (including clearing of sediment from behind barriers).
- Hatchery Bay Rd is to be rectified prior to works commencing, with eroded areas rehabilitated and stabilized.
- ERSED control measures are not to be removed until the works are complete, and areas are stabilised.
- Monitoring and response actions with regards to ERSED controls will need to be incorporated within the Construction Environmental Management Plan (CEMP) for the Proposal when prepared.
- Vehicles are to use existing roadways and all-weather access where possible to prevent additional damage to the site, and to reduce the risk of tracking of sediments offsite. Works areas are to be stabilised using the most appropriate combination of the following measures, as soon as possible following disturbance:
  - Hydromulching, turfing or seeding with appropriate species as outlined in the Landscape Works Drawings; and/or
  - Resealing exposed areas with appropriate material, e.g. concrete, road base or asphalt.
- Sediment fences/strawbale filters or equivalent must be installed wherever water is predicted to enter/exit the works area.
- Landscaping to occur in high traffic areas/ areas where trail users are likely to stop for a break, to minimize erosion in these areas.
- The maintenance of established stockpile sites during construction is to be in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) (Landcom 2004).
- Stockpiles are recommended to be formed in accordance with the Blue Book Standard Drawing 4-1, and offsite where possible. Materials are to be reused onsite where appropriate for stabilization works, e.g., re-spreading of topsoil to enable rapid rehabilitation.



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- Topsoil and subsoil are to be separated and protected from degradation, erosion or mixing with fill or waste, and reused on site wherever possible. Where onsite reuse cannot be accommodated, soils materials should be put to beneficial reuse elsewhere.
- If contaminated soils are encountered during construction, a site assessment is to be completed in accordance with Schedule A 'Recommended general process for assessment of site contamination' (NEPM 1999).
- If contaminated soils are encountered, they will be managed (and if necessary excavated, contained, treated and disposed of) in accordance with the law and relevant EPA and Council guidance.
- All chemical usage and storage during construction is to be in line with legislated requirements, to prevent Pollution of Land, which is prohibited under Section 142 A of the POEO Act.

**Operation**

- Monitoring of the site is to be undertaken to ensure ERSED controls remain in place until the site is re-stabilised, and to ensure no sediment is washed into any waterways following construction and before revegetation efforts are completed.
- Maintenance of vegetative cover on all exposed surfaces outside of the trail to be undertaken to ensure the stability of soils on site into the future.
- Monthly monitoring of the trails is to be undertaken to note any erosion or groundcover disturbance - side trails or washouts are to be rectified immediately.

**Surface and Groundwater**

**Construction**

- Appropriate ERSED controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter the tributaries to significant regional waterways, or groundwater.
- All litter, including cigarette butts and food wrappers, are to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase.
- Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 metres from drains, drainage lines or waterways.
- Vehicle wash-down and/or cement truck washout (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off.
- All construction works are to be undertaken during periods of low predicted rainfall.
- Segregate and stockpile topsoil removed from the area a minimum of 40 m from any waterway and use measures such as silt fences and holding ponds to prevent stockpile runoff from entering waterways.
- Minimise the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch, or installing erosion control blanket as appropriate.



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- Ensure soils/sediment disturbed by construction works do not migrate into creeks by strategic placement of sediment filters in conjunction with the abovementioned soil stabilisation techniques.
- Biosecurity and water health protection measures should be implemented throughout the construction phase, including
  - Machinery should arrive on site in a clean, washed condition, free of fluid leaks, pests and/or weeds/spores.
  - Regular weed control should be undertaken in disturbed areas throughout the construction period to prevent weed spread into waterways, if notifiable/listed weed material is present (unlikely).
  - Ensure all pesticide/herbicides used are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.
- Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).
- A Soil and Water Management Plan will be developed as part of the CEMP for the project, detailing:
  - Water quality parameters
  - Appropriate monitoring locations and frequency
  - Location and types of ERSSED controls
  - Proposed revegetation and stabilisation measures to be undertaken.

**Operation**

- Continue to undertake a water quality and quantity monitoring program in line with Council's requirements until all sites are completely stabilised; monitoring should include details of proposed baseline and downstream water quality following any heavy rainfall.
- Subject land rehabilitation, including removal of weeds and installation of ERSSED controls, to be undertaken to ensure soil stability and prevention of sediment runoff from the site into the future.
- Monitor Lake Jindabyne and waterways following opening of trail – observe for changes to Lake foreshore, excess rubbish, people going off-trail and damaging vegetation and other damaging activities. Rectify these promptly.

**Noise and Vibration**

**Construction**

- Noise emissions should be considered in terms of the Interim Construction Noise Guideline (ICNG) (Department of Energy and Climate Change (DECC) 2009)
  - Noise impacts to local residents will be limited to recommended standard working hours as detailed in the Interim Construction Noise Guideline 2009 (ICNG). All activities and project works, including the arrival and departure of vehicles delivering or removing materials to or from the site, shall be carried out between the hours of:



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7:00am to 6:00pm Monday to Friday,  
8:00am to 1:00pm Saturdays, and  
No work Sunday and Public Holidays

- Community consultation to notify residences, stakeholders and community groups of the intention to undertake the proposed works by Council at least five (5) days prior to works commencing. Communication must inform residents of planned construction activities, time periods and expected durations, potential impacts, proposed mitigation measures and contact details of site management.
  - Communication of intentions and timeframes to neighbouring properties will minimise misconceptions, uncertainty and negative reactions to noise. The site supervisor should supply a contact number to aid in community liaison.
  - All noise and vibration complaints are to be handled in a timely manner and monitoring is to be implemented in response to any complaints received.
  - Any high noise activities will be carried out in continuous blocks followed by appropriate respite periods.
  - Setbacks from properties are to be observed wherever possible, to increase the distance between sensitive receivers and construction activities.
  - The appointed contractor will incorporate Noise and Vibration Management strategies in the CEMP, and suitably induct all staff operating machinery on the site to ensure the standard working hours are adhered to, and that machinery movement (revving, reverse beepers) is kept to a minimum. This management plan must include the general noise and vibration management practices (AS 2436-2010).
  - High noise generating activities, such as jack hammering, should be carried out in continuous blocks, not exceeding 3 hours with a minimum respite period between blocks of one hour.
  - Simultaneous operation of high-level noise generating machinery should be avoided by operating at contrasting times or increasing the distance between the plant and the nearest identified receiver.
  - Low-pitch tonal beepers should be installed where possible and reversing minimised on site.
  - All engine covers are to be closed and machines that are not in use, shut down.
  - Noise monitoring to occur in response to any complaints received.
  - High noise generating activities should be planned to occur during times of low visitation rates to Jindabyne (i.e. during the school term).
  - All work is to be completed during standard working hours, in accordance with the Interim Construction Noise Guideline (ICNG).
  - Machinery and plant to be switched off when not in use.
  - Unidirectional driving is recommended wherever possible, to limit the use of reverse alert beepers.
  - Works should be timed to avoid prime breeding season (Spring) for the majority of native species residing in the area which may be sensitive to noise and vibration during breeding and fledging.
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- Strong community reaction may occur where the noise levels reach 75 dB, known as the highly noise affected level. If this level is reached, respite periods may be enforced, and community consultation is to occur to determine least sensitive periods and/or if the community is prepared to accept a longer construction period in exchange for restrictions on construction times.

**Operation**

No further mitigation measures were considered necessary for the operational phase of the Proposal.

**Air Quality**

**Construction**

- Council must undertake community engagement and liaison, to set expectations for the works schedule and likely impacts arising as part of the works – particularly with property owners who occur directly adjacent the subject site that may be subject to reduced air quality during construction activities.
- Dust generating activities should be avoided during periods of high wind.
- Visual dust monitoring should occur and dampening of exposed soils should be completed during weather conditions conducive to visible dust formation.
- Ensure access permissions are granted to an adequate water supply on the construction site for effective dust/particulate matter suppression/mitigation. If synthetic dust suppressants are used, they must be biodegradable in nature and non-toxic for waterways.
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces progressively, and as soon as practicable.
- Only remove vegetation/ground cover in small areas during works.
- Vegetation and other materials are not to be burnt on site.
- Construction plant and equipment should be maintained in a good working condition in order to limit impacts on air quality through vehicle emissions.
- Construction plant, equipment and personnel vehicles to utilise existing roads and site access where available, to minimise dust emissions associated with traversing unsealed roads.
- Fuel operated plant and equipment should not be left idle when not in use.
- Regular site inspections will be undertaken as part of air quality monitoring, and inspection results recorded by Council's Principal Contractor.
- Any dust complaints received during construction will be duly investigated in accordance with Council's requirements under the POEO Act.
- Any exceptional incidents that cause dust and/or air emissions, either on or off site, will be recorded, and the action taken to resolve the situation recorded in the logbook.

**Operation**

- Continue to undertake air quality and quantity monitoring program in line with Council's requirements until all sites are completely stabilised; monitoring should include details of proposed baseline and air quality following any extended dry periods.



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- Any complaints regarding air quality from the operation of the trails should be investigated and managed accordingly.
- Subject site rehabilitation, including removal of weeds, to be undertaken to ensure soil stability and prevention of dust generation from the site into the future.

***Non-Aboriginal Heritage***

***Construction***

- The proposed works must be contained to the area assessed during the construction. If the proposed location is amended, further archaeological assessment may be necessary to determine if the proposed works will impact any items of historical significance.
- If archaeological remains or items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the material/find and Council's Manager Strategic Planning and Environmental Officer are to be contacted immediately. Any historical objects must be reported to Heritage NSW.
- Council's workers and all staff must be made aware of the heritage sites and place that occur within the area and all care must be taken to avoid interference with and damage to these sites.
- Heritage sites must be clearly fenced/flagged with removable flagging or other temporary means to delineate their presence and in order to prevent them being harmed during the construction process.

***Operation***

No additional mitigation measures were deemed necessary during operation of the Proposal

***Aboriginal Heritage***

- All staff and visitors should be inducted to site to ensure they are aware of the possible presence of sensitive Aboriginal heritage items located within the vicinity of the work site, and the protective measures that should remain in place throughout the works.
  - Should unanticipated archaeological material be encountered during site works, all work must cease, and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.
  - If sub-surface Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Council's Manager Strategic Planning and Manager Environment or an archaeologist are to be contacted immediately. Works in the vicinity of the find must not re-commence until clearance has been received from those Council officers and the NSW Office of Environment & Heritage. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works.
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- All nine (9) recommendations outlined in the ACHA report must be followed to ensure impact on registered AHIMS sites is avoided and known sites that cannot be avoided are relocated per appropriate cultural protocols.

***Biodiversity***

***Timing of Vegetation Clearing***

- Where practicable, it is recommended to time the works outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) for species likely to utilise the site to avoid or minimise the chance of nest abandonment, injury or death to native fauna utilising the Subject Land.
- Where practicable, time works to fall outside of key pollinating and seed-setting seasons to reduce the risks of poor pollination / seed-set due to potential disruption of pollinator movements during construction activities.

***Tree Protection and Removal***

- Clearly delineate vegetation to be removed/retained with the assistance of an ecologist, or similarly qualified professional, and induct all site personnel as to the approved extent of clearing.
- Ensure all mature trees (DBH > 10 cm) are retained within direct impact areas during trail construction and that no clearing of vegetation occurs outside of the marked boundary.
- Maintain Vegetation Protection Zones outside direct impact area to avoid compaction of soils. This includes no movement of excavation machinery or parking or storing equipment outside designated clearing areas or laydown areas.
- The presence of a suitably qualified arborist is recommended during earthworks occurring near retained trees to avoid rootzones impacts.
- Where any trees requiring removal contain hollows, nests or other signs of occupation, a staged clearing approach must be undertaken where hollow limbs are removed carefully and incrementally by a qualified tree surgeon/arborist. Care should be taken to inspect limbs for fauna prior to their removal.
- Prior to clearing, a preclearance survey should be undertaken including inspection for threatened species (flora and fauna), and hollows/burrows to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present (nests or potential tree hollows) the appointed contractor would contact the project ecologist for further advice prior to clearing.
- Ensure the presence of an ecologist or fauna spotter/catcher at all times during pre-clearing and clearing activities to remove and relocate wildlife as necessary, and to attend to any wildlife that are injured as a result of works.
- Where additional vegetation removal is proposed this must first be assessed to consider the cumulative impacts against the approved clearance footprint, and if appropriate supervised by a qualified ecologist and Council's Environmental Officer.



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**Waterways and Riparian Area Protection**

- Appropriate sediment and erosion controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter creek lines or waterways.
- Council and its appointed contractor should clearly mark the areas of KFH that occur within the construction area and induct all staff to ensure that impacts within these sensitive areas conform to Fisheries permit requirements.
- All litter, including cigarette butts and food wrappers, are to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase so as not to end up in waterways.
- Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 m from drainage lines or waterways.
- Vehicle wash-down (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off.
- All machinery is to be inspected and in a clean state prior to any waterways being crossed or entered during construction.
- Where possible, all construction works are to be undertaken during periods of low predicted rainfall.
- Minimize the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch or installing erosion control blanket as appropriate.
- Ensure all pesticide/herbicides used on site are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.
- Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).

**Rehabilitation**

- Revegetation activities should be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP as a record of rehabilitation efforts made. Vegetation cover should be returned to the site outside of operational footprint areas within a reasonably practicable timeframe post clearing to reduce soil exposure and loss.
- Control and management of High Threat Exotic weeds within the Subject Land is recommended to reduce the risks associated with the further spread of these species within the Subject Land and surrounding landscape, including human safety concerns with encroachment of weeds onto the track, and ongoing ecological impacts.
- Highly eroded sections of the trail/ road (to the east) are to be rehabilitated to prevent further erosion.

**General Construction**

- Vehicles and machinery to utilise and work from existing roads, or existing cleared areas where possible, and are not to extend beyond the direct impact footprint.
- Vehicles are to be parked in designated parking areas only, or along existing roads/dirt tracks away from tree canopy/drip lines to avoid soil compaction and impacts to adjacent vegetation.



Statement of Environmental Effects – Kunama to East Jindabyne

- Ensure vehicles and machinery are cleaned and checked for any traces of weeds, seeds and mud prior to entering work site to reduce the spread of weeds and disease (e.g. *Phytophthora cinnamomi*) to the site.
- Strict hygiene protocols must be followed to ensure that no environmental weeds spread around during works or are introduced to site as a result of the proposed works. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site and disposed of in accordance with Council regulations.
- All soils to be stockpiled at designated stockpile locations in a cleared area, within pre-approved zones away from waterways, drainage lines and native vegetation, and are appropriately stabilized in accordance with the 'Blue Book' (Landcom 2004).
- Any chemicals or pollutants on site to be stored appropriately in bunded areas to prevent pollution of soils or waters which may impact upon biodiversity.
- Sediment and erosion controls must be installed downslope of any disturbance areas prior to any earthworks commencing, to prevent migration of sediments down slope into adjacent waterways or off site.
- Recently disturbed soils must be stabilised progressively and promptly after works are completed to prevent erosion and consequent sediment migration.

**Operational trail use / General maintenance**

- Declared (WoNS) and Priority weeds must be managed according to requirements under the Biosecurity Act 2015. It is recommended these weeds be managed to ensure they do not spread, and where possible eradicated from the Subject Land.
- No vegetation is to be burnt; large limbs, trunks and fallen timber to be placed in adjacent areas to supplement habitat availability. Rocks to be removed from the trail should be placed in adjacent areas as appropriate.
- Smaller branches and leaves of native species only to be chipped and used on site for erosion control and within landscaped areas.
- Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.
- Implementation of speed zones within the Assessment Area as required. Speed limits are to be strictly adhered to, with driving/working on site to be avoided during dawn and dusk to reduce possible impacts on native fauna.
- Mandatory requirement that pets in the assessment area should be leashed at all times and installation of clear signage to communicate this requirement.
- Installation of signage to educate trail users to presence of wildlife values along the trail and informing best-practice etiquette should they encounter wildlife along the trail.

**Traffic and Transport**

**Construction**

- Council and its appointed Contractor will consider the location of designated parking areas, stockpile locations, construction laydown sites, site offices, and access routes carefully in



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consideration of creating inconveniences to local residents, and to the other environmental constraints.

- Notify residents of timing of works, including erection of signage to prevent vehicles entering the study area during construction activities.
- Where possible, current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised and adequately communicated to the impacted resident/property owner.
- Prior to commencement of works on site, the contractor will inform neighboring properties of proposed works, anticipated impacts and site contact information. Notification can be provided by various means including, but not limited to letterbox drops, contact via telephone, and notification of works on the Council website.
- The worksite is to remain tidy and be cleared at the end of each workday.
- Any complaints received are to be formally recorded, investigated, rectified and monitored, and forwarded to the Superintendent as soon as possible.

***Socio-economic Considerations***

***Construction***

- The construction site is to be left in a clean and tidy manner at the end of each workday.
- Disruption of traffic and property access is to be minimised wherever possible.
- Considerate construction practices are to be implemented for all aspects of the project, including but not limited to:
  - Expediting the construction period as much as practicable
  - Minimising time spent in front of private residences, businesses and/or public facilities
  - Minimising noise, air quality and traffic impacts on neighbouring properties and the wider community
  - Maintaining a tidy construction site and respecting private property
- All materials purchased for the project are to be of highest quality and as sustainable as possible, to reduce impacts to community and rate-payers through replacement of low-quality or faulty equipment in the future.
- Quality assurance is to be applied to all aspects of the project, including design and construction to ensure best value for constituents.
- Road interruptions are to be avoided and/or appropriately managed during times of increased traffic flow (school pick up and drop off/ peak tourist season or during harvest, as applicable).
- The local community is to be kept informed of work plans, and any concerns raised by the community or local businesses, or landholders are to be promptly addressed.
- Signage to be erected to notify visitors of private property and no-go areas.

***Operation***

- Erect signage to notify trail users of private properties and appropriate etiquette
- Have clear 'no-go' zones with clear signage.



Statement of Environmental Effects – Kunama to East Jindabyne

### **Waste and Resource Use**

#### **Construction**

- Waste management for construction projects should be undertaken in accordance with the *Protection of the Environment Operations Act 1997*, EPA and Council guidelines and *NSW Waste Avoidance and Resource Recovery Act 2001*. The objectives of the Act are:
  - To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of Ecologically Sustainable Development (ESD)
  - To ensure that resource management options are considered against a hierarchy of the following order:
    4. Avoidance of unnecessary resource consumption
    5. Resource recovery (including reuse, reprocessing, recycling and energy recovery)
    6. Disposal
  - To provide for the continual reduction in waste generation,
  - To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste,
  - To ensure that industry shares with the community the responsibility for reducing and dealing with waste,
  - To ensure the efficient funding of waste and resource management planning, programs and service delivery,
  - To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,
  - To assist in the achievement of the objectives of the *Protection of the Environment Operations Act 1997*.
- Waste may also constitute environmental pollution, which is regulated under the *NSW Protection of the Environment Operations Act 1997*, administered by the EPA and Local Government.

#### **Operation**

- Routine collection of recyclables and wastes to be implemented as part of routine operation of the site once works are completed.
- Additional waste facilities to be installed to cater for increased visitation and use.

### **Visual Amenity**

#### **Construction**

- It is recommended that works be completed in discrete packages, to ensure visual impacts are kept to a short period, isolated to sections, and reinstated as swiftly as possible for the benefit of residents and the community.





Statement of Environmental Effects – Kunama to East Jindabyne

- Considerate construction practices are to be implemented at all times, to ensure the works areas are neat and visually not offensive, including to be kept free from rubbish, and stockpile sites actively managed.
- No additional, unauthorized clearing or destruction of vegetation is to occur.
- The works area is to be kept free from rubbish and stockpile sites actively managed.
- Vehicles are to be parked in designated areas only.
- Cleared, bare patches of ground that form part of the works are to be revegetated and restored following cessation of works.
- Obvious and intrusive signs/machinery/equipment are to be removed from the site at the first opportunity.
- Appropriate consultation will continue to be undertaken to inform businesses and residents of planned works, timing, and potential visual impacts.
- Any complaints received regarding visual amenity at the site are to be dealt with and rectified as soon as possible.
- Machinery, obvious presence and worksites are to be minimized in front of houses that back on to the trail.

**Operation**

- Ensure rehabilitated areas are maintained until well established.
- Continue to monitor the site and complete further maintenance if required.

**Climate Change**

**Construction**

- Resource management hierarchy principles are to be followed to reduce adding to the environmental pollution contributing to climate change:
  - Avoid unnecessary resource consumption as a priority,
  - Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery),
  - Disposal is undertaken as a last resort (in accordance with the Waste Avoidance & Resource Recovery Act 2001).
- Council may elect to make a contribution to an accredited carbon offset program to offset greenhouse gas emissions.
- Quality assurance and life cycle of materials are to be considered when purchasing, to ensure the newly built infrastructure is resilient and structurally sound.
- Local resources are to be used wherever possible, to reduce waste and increase efficiencies

**Operation**

- Regular maintenance of trail network and facilities to reduce degradation over lifespan.

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Statement of Environmental Effects – Kunama to East Jindabyne



**Appendix D – Biodiversity Development Assessment Report**

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## Biodiversity Development Assessment Report

Jindabyne Shared Trails Project – Section  
2.1 Kunama Estate to East Jindabyne

Prepared for Snowy Monaro Regional  
Council

November 2023

The Environmental Factor





Biodiversity Assessment Report – Jindabyne Shared Trails

## Biodiversity Assessment Report –Jindabyne Shared Trails Project – Section 2.1 Kunama Estate to East Jindabyne

Revision	Author/s	Internal Review	Date submitted	Client Review and Approval	
				Name	Date
0.1	S Rivett; Anna Uhrig; J Sanderson	E Cotterill	15/07/2022	C McNair, J Warner	
0.2	S Rivett; J Sanderson	E Cotterill	15/12/2022	C McNair, J Warner	24/10/2023
1.0	S Rivett; J Sanderson; B Turner	E Cotterill	14/11/2023		
Certification under clause 6.15 Biodiversity Conservation Act 2016		I, Emily Cotterill (BAAS 20011), certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the Biodiversity Conservation Act 2016 (BC Act).  Signature: Date: 14/11/2023 BAM Assessor Accreditation no: BAAS 20011			

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This Report has been prepared by The Environmental Factor (TEF) on behalf of Snowy Monaro Regional Council (The Client/SMRC) in order to assess the ecological impacts arising from the proposed construction of 3.8 km of shared use recreational trail extending along the foreshore of Lake Jindabyne from Kunama Estate to East Jindabyne, NSW (The Proposal). The purpose of this report is to document the biodiversity assets found on site, to assess those that are likely to be impacted either directly or indirectly as a result of the Proposal, determine whether the Proposal is required to participate in the Biodiversity Offset Scheme (BOS), and to support the Statement of Environmental Effects (SEE) to be prepared for these works. This document is not intended to be utilised or relied upon by any persons other than the Client and their appointed contractors nor to be used for any purpose other than that articulated above. TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

The information, statements, recommendations and commentary (together the "Information") contained in this report have been prepared by TEF on the basis of information provided by the Client and from material provided by the NSW Department of Planning and the Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and through the survey process. TEF has not sought any independent confirmation of the reliability, accuracy or completeness of this information. It should not be construed that TEF has carried out any form of audit of the information which has been relied upon.

Information contained within this report is current as at the date of the report and may not reflect any event or circumstance which occurs after the date of the report. TEF is not responsible for updating this report if site conditions have changed since the time field surveys were conducted.



Biodiversity Assessment Report – Jindabyne Shared Trails

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## Abbreviations

Abbreviation	Description
<b>AOBV</b>	Areas of Outstanding Biodiversity Value
<b>ASL</b>	Above sea level
<b>BAM</b>	Biodiversity Assessment Methodology
<b>BAM-C</b>	Biodiversity Assessment Methodology Calculator
<b>BDAR</b>	Biodiversity Development Assessment Report
<b>BC Act</b>	<i>Biodiversity Conservation Act 2016</i>
<b>BOS</b>	Biodiversity Offset Scheme
<b>CEEC</b>	Critically Endangered Ecological Community
<b>DCCEEW</b>	Department of Climate Change, Energy, the Environment and Water (Formerly DAWE)
<b>DPI</b>	Department of Primary Industries
<b>DPE</b>	Department of Planning and Environment (formerly DPIE)
<b>EEC</b>	Endangered Ecological Community
<b>EPA</b>	Environmental Protection Agency
<b>EPBC Act</b>	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
<b>HTE</b>	High Threat Exotic
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>LEP</b>	Local Environment Plan
<b>MNES</b>	Matters of National Environmental Significance
<b>NSW</b>	New South Wales
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>SAII</b>	Serious and Irreversible Impacts
<b>SEE</b>	Statement of Environmental Effects
<b>SMRC</b>	Snowy Monaro Regional Council
<b>TBC</b>	To be confirmed
<b>TEC</b>	Threatened Ecological Community
<b>TEF</b>	The Environmental Factor
<b>WoNS</b>	Weeds of National Significance



## EXECUTIVE SUMMARY

The Environmental Factor (TEF) was commissioned by Snowy Monaro Regional Council (SMRC or Council), to undertake a Biodiversity Development Assessment Report (BDAR) to fully consider the potential ecological impacts arising from the construction of a multipurpose shared use recreational trail to the east of Lake Jindabyne in NSW (hereafter 'the Proposal').

The Proposal is for the construction of approximately 3.8 km of shared-use recreational trail extending from the Kunama Estate to East Jindabyne along the foreshore of Lake Jindabyne, joining up with other trails in the network to the south.

The trail alignment is proposed to have a maximum initial impact footprint of **3 m** width, reduced to an operational footprint of approximately **2 m** width along the majority of the trail.

Specifically, impacts associated with the Proposal include:

- Construction of up to **3.8 km** of shared use recreational trail within an initial 3 m wide impact area
- Installation of narrow pedestrian bridges over waterway crossings
- Total direct impact area of **1.11 ha** of which native vegetation equals **1.01 ha**

The direct impact area sites within a 20-metre-wide corridor (10 m either side of the proposed alignment) to account for anticipated indirect impacts, for a Subject Land area comprising **7.21 ha** (Figure 1). Of this, **6.49 ha** of native vegetation has the potential to be indirectly impacted.

During field investigations, the condition and habitat values of the vegetation present was assessed in accordance with the Biodiversity Assessment Method (BAM), including habitat identification, vegetation community mapping, identification of Threatened Ecological Communities (TECs), collection of floristic data, and targeted seasonal threatened flora and fauna surveys.

During field investigations, the condition and habitat values of vegetation present was assessed in accordance with the Biodiversity Assessment Method (BAM), and it was found that vegetation communities varied in condition across the site. This can be attributed to variations in impacts from existing activities, and previous and current land management practices. The native canopy layer was intact within some portions of the Subject Land, with larger areas of more open grassland and shrubland occurring throughout the majority of the Subject Land. The native shrub layer ranged from sparse to absent, while the ground layer vegetation varied from diverse native forb and grass assemblages to more degraded areas containing high levels of annual and woody exotic species. The Subject Land also contained areas of exotic vegetation in the form of degraded residential lawn, as well as areas of mixed exotic and native residential garden plantings.

A total of seven (7) BAM plots were completed across three (3) vegetation zones identified throughout the Subject Land. The analysis of floristic data collected during this survey assigned one (1) PCT to the Subject Land:

- PCT 1191: *Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion* (**6.49 ha**, as both intact woodland and derived forms)



Two (2) land use types mapped did not correspond to a Plant Community Type (PCT), consisting of mixed exotic/native planted vegetation (**0.55 ha**) and non-native areas (roads, residential areas) (**0.18 ha**).

A total of one hundred and eighteen (118) species were recorded within the vegetation plots completed and incidental species observed on site, consisting of fifty-seven (57) native species and sixty-one (61) exotic species, including eighteen (18) High-Threat Exotics (HTE).

The threatened ecological community *Monaro Tableland Cool Temperate Grassy Woodland* listed as critically endangered under the BC Act was found to occur across a large portion of the Subject Land, with **1.01 ha** to be directly impacted and an additional **5.48 ha** with the potential for indirect impacts.

A total of sixty-nine (69) fauna species were recorded during the surveys. This included four (4) native mammals, seven (7) exotic mammals, forty-seven (47) native bird species, three (3) exotic bird species, four (4) native amphibians, three (3) native reptiles and one (1) native crustacean.

Targeted surveys implementing a range of species-specific techniques, including parallel field traverses (flora), morning and afternoon area surveys and nesting site searches (diurnal birds), and spotlighting and call playback (nocturnal fauna) were undertaken within suitable habitat across the Subject Land in accordance with species specific guidelines (DEC 2004, DEWHA 2010, DSEWPC 2011, Commonwealth of Australia 2013, DPIE 2020, DPE 2022).

Three (3) species of threatened fauna listed as Vulnerable under the BC Act were recorded as occurring within the Subject Land during surveys:

- Gang-gang Cockatoo, *Callocephalon fimbriatum*
- White-fronted Chat, *Epthianura albifrons*
- Flame Robin, *Petroica phoenicea*

Additional threatened species records also exist for the broader Assessment Area (DPE 2022) with a number of other species predicted and with the potential to occur within the Subject Land based on habitat attributes present (see (Figure 9, Appendix F, Table 15 and Table 16).

The Subject Land is subject to ongoing disturbance through human activity and mowing near residential areas, as well as high levels of weed encroachment throughout. The degraded nature of the majority of the Subject Land limits availability of suitable habitat surrogates for most threatened species to persist on the site.

The current Proposal and survey effort has the potential to result in one (1) Serious and Irreversible Impacts (SAII) to the following threatened biota:

- Monaro Tablelands Cool Temperate Grassy Woodland TEC

Potential SAIIs to this TEC within the Subject Land are restricted to small patches of moderate to degraded woodland and derived grassland areas already exposed to ongoing disturbance and weed encroachment and surrounded by urban development.

The Proposal has the potential to contribute to **four (4)** prescribed impacts:



1. Impacts of development on the habitat of threatened species or ecological communities associated with:
  - Rocks, including rocky habitat or outcrops
2. Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range:
3. Water quality, water bodies and hydrological processes that sustain threatened species and TECs.
4. Impacts of vehicle strike on threatened species or on animals that are part of a TEC including:
  - Species that form part of the Monaro Tablelands Cool Temperate Grassy Woodland TEC.

The anticipated impacts of prescribed impacts are considered to be minor and are not anticipated to result in additional impacts significantly beyond that which already occur on the site, due to the current land use. Specific minimisation and mitigation measures are provided to reduce the impacts of these prescribed impacts.

The Subject Land measures a total area of **7.21 ha** with a total direct impact area of **1.11 ha**, of which **1.01 ha** comprises native vegetation and **0.08 ha** comprises planted mixed native and exotic vegetation. The threshold for clearing for the proposed trail is 0.25 ha based on a minimum lot size of <1 ha. The Proposal involves clearing to accommodate the trail and pedestrian bridges; however, the Client has committed to retaining remnant trees where these occur within the impact area. The Proposal has the potential to impact on up to **1.01 ha** of native vegetation for trail construction. As the Proposal clearing exceeds the threshold for clearing, **participation in the BOS is triggered.**

Consequently, this Proposal has resulted in a Biodiversity Credit calculation of **14** ecosystem credits and **38** species credits required to offset the Proposal.

Significant Impact Criteria Assessments, in accordance with the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria Guidelines* (DEWHA, 2009) were not considered necessary for the current Proposal. Consequently, a Referral to the Environment Minister is not required for this Proposal beyond the requirements for offsetting obligations.

A number of mitigation measures and recommendations have been made to help minimise impacts of the Proposal and to protect the remaining biodiversity attributes of the Subject Land and broader Assessment Area should the Proposal proceed.



## STAGE 1: BIODIVERSITY ASSESSMENT

The following chapters describe the Proposal context including landscape features, applicable legislation, bioregions, site features, and methods used to determine biodiversity assets present within the Subject Land and broader Assessment Area.

### 1 INTRODUCTION

The Environmental Factor (TEF) was commissioned by Snowy Monaro Regional Council (SMRC or Council), to undertake a Biodiversity Development Assessment Report (BDAR) to appraise the ecological values and constraints arising from the construction of approximately 3.8 km of multipurpose shared use recreational trail extending along the edge of Lake Jindabyne from Kunama Estate to East Jindabyne, NSW (Figure 1) (herein 'the Proposal').

The following chapters provide an overview of the Proposal, the legislative approval pathway, key terms and definitions, and the aims of the report.

#### 1.1 Overview

This report provides an assessment of potential impacts to native biota from the proposed development to a level sufficient to inform the approval pathway required under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Environmental Planning and Assessment Act 1979* (EP&A Act). The assessment and conclusions contained in this report are based on information obtained through the database searches and field surveys completed, in conjunction with the Proposal details provided by the Client. The report classifies the vegetation on site in proximity to the Proposal, and describes the potential for occurrence of threatened species, populations and communities and associated habitat features within the Subject Land.

The Subject Land is located within an area of native and modified vegetation adjacent to the foreshore of Lake Jindabyne in East Jindabyne, within the Snowy Monaro Regional Council (SMRC) Local Government Area (LGA), and is subject to the planning provisions of the Snowy River Shire Local Environmental Plan (LEP) 2013.

Land parcels within the Subject Land are zoned as follows (Figure 2):

- SP1 – Special Activities: This includes the majority of the Subject Land where the trail runs close to the foreshore of Lake Jindabyne.
- C3 (previously E3) – Environmental Management: Fractional encroachment into this zone at the northern extent of the proposed trail near East Jindabyne Village.
- RU5 – Village: The trail runs through one small section of this zone with further possible fractional encroachment in Kunama Estate towards the southern end of the trail.
- RE2 – Private Recreation: Trail bisects this zone in the middle and southern portions of the proposed trail.
- R5 – Large Lot Residential: Possible fractional encroachment of the Subject Land into this zone close to the northern end of the proposed trail in East Jindabyne Village.

Council have identified that the Proposal will be assessed as Complying Development under Part 4 of the EP&A Act, as 'Environmental Facilities' and/or recreational activities, including the upgrade and





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extension of existing bike trail networks are permissible, with development consent, in land zoned as SP1, C3, RU5, RE2 and R5.

The legislative context of the Proposal, methods used, and recommendations are included within this report.

Table 1 Site Details

Site Details			
Road or Property Lot / DP / Tenure	Lot	Plan	Tenure
	19	DP530537	FREEHOLD
	1	DP248100	FREEHOLD
	30	DP236875	FREEHOLD
	26	DP548802	FREEHOLD
	21	DP235881	FREEHOLD
	28	DP236875	FREEHOLD
	29	DP236875	FREEHOLD
	2	DP248100	FREEHOLD
	24	DP1089304	FREEHOLD
	4	DP232161	FREEHOLD
	2	DP816051	FREEHOLD
	9	DP1216028	LOCAL GOVERNMENT AUTHORITY
Closest crossroad(s)	Old Kosciusko Road, Boronga Street, Kunama Drive		
Land Zoning	SP1 – Special Activities C3 – Environmental Management RU5 - Village RE2 – Private Recreation R5 – Large Lot Residential		

## 1.2 Terms, definitions and impact areas

The key terms that are used in this report are defined in Table 2 below.

Table 2 Terms, definitions and impact areas

Term	Description
<b>Subject Site</b>	The area to be directly affected by the Proposal, including earthworks and vegetation clearing. Includes <b>3.8 km</b> of new shared use trail and installation of bridges over waterway crossings, with a 3m wide maximum direct construction impact area, for a total direct impact footprint measuring <b>1.11 ha</b> of new impacts, of which native vegetation comprises <b>1.01 ha</b> .
<b>Subject Land</b>	Includes the Subject Site (as described above) and any proximal areas that could be potentially directly or indirectly impacted by the Proposal. For the purposes of this report the Subject Land has included a buffer area of 10 m either side of the centre of the direct impact zone, measuring a combined total area of <b>7.21 ha</b> , of which native vegetation equals <b>6.49 ha</b> .



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Term	Description
<b>Assessment Area</b>	An area within 500m radius along either side of the development footprint (for linear proposals, as described in the BAM); total area <b>353.4 ha</b> , of which native vegetation comprises <b>60.8 ha</b> .
<b>The Locality</b>	The area within 10 kilometres of the Subject Land.

### 1.3 Context and Proposal description

The Proposal is for the construction of 3.8 km of new recreational use trail, extending from Kunama Estate to East Jindabyne Village, NSW. The proposed trail has been designed for shared use by mountain bike riders and pedestrian walkers / runners. The alignment of the proposed trail extends primarily along the foreshore of Lake Jindabyne, extending south to join up with other trails in the network.

The Proposal has been designed to extend an existing trail network, The Lake Jindabyne Trail, which currently exists from the Jindabyne township to Tyrolean Village (East Jindabyne), out to Hatchery Bay (Northwest of Jindabyne), and forms part of the Go Jindabyne Master Plan which was announced in November 2018 aimed at turning the township of Jindabyne in NSW into Australia's premier alpine destination (Planning and Environment, NSW Government July 2019). Following an in-depth consultation and analysis process, the Snowy Mountains Special Activation Precinct (SMSAP) was announced in November 2019, expanding the scope of the Go Jindabyne Master Plan to encompass the wider Snowy Mountains region. The objective of the SMSAP is to increase tourism in the region by making it attractive to visitors year-round. Amongst other things, the SMSAP aims to identify opportunities to promote the development of year-round adventure and eco-tourism attractions and improve tourism amenity within the region.

As part of the wider Master Plan, SMRC engaged consultants to undertake concept planning for the construction of the proposed shared-use trail between Kunama Estate and East Jindabyne Village, NSW.

The trail alignment is proposed to have maximum initial impacts of 3 m width, reduced to an operational footprint of approximately 2 m along the majority of the trail.

Specifically, the Proposal will result in the following ecological impacts:

- Direct impacts to include:
  - Construction of up to 3.8 km of shared use recreational trail within an initial 3 m wide impact area
  - Installation of pedestrian bridges over waterway crossings
  - Total direct impact area of **1.11 ha**, of which native vegetation equals **1.01 ha**
- Indirect impacts area anticipated to include:
  - Minor, secondary impacts, such as dust settling, noise and vibration, vehicle movements and / or sediment migration in runoff within a 20-metre-wide corridor (10 m either side of the proposed alignment)



- A total Subject Land area comprising **7.21 ha** of which native vegetation equals **6.49 ha** (Figure 1). Of this, **5.48 ha** of native vegetation has the potential to be indirectly impacted

The site assessed is intended to be of sufficient size and provide a cleared area for the construction of the required trail and bridges as described above, including the movement of plant and machinery, the provision for adequate water management (runoff, erosion and sediment controls) and clean water diversion throughout the site, and to allow for all foreseeable direct and indirect impacts arising from the Proposal.

The majority of the Proposal is located within Freehold land, with one (1) parcel occurring in Local Government land, zoned SP1 – Special Activities, C3 – Environmental Management, RU5 – Village, RE2 – Private Recreation, and R5 – Large Lot Residential.

Design drawings for the Proposal have been provided as Appendix A.

#### **1.4 Aims of the report and assessment principles**

This BDAR aims to provide an up to date understanding of the biodiversity assets present within the Subject Land, as at November 2022 (updated September 2023), which may act as constraints to the proposed development, or be impacted by delivery of the Proposal. Knowledge of these constraints can help SMRC best plan for future usage of the site without significantly affecting any important ecological/biodiversity features, thereby avoiding and minimising impacts where possible, in accordance with the principles of the BC Act. Where impacts to biodiversity cannot be avoided, this report describes the vegetation, habitats and features of biodiversity to be offset, and provides information on the calculated offset requirements as determined by the BAM-calculator.

This report also considers the principles for Significant Impact Criteria assessments under the EPBC Act, for the purpose of assessing the level of impact the Proposal is likely to have on threatened species, ecological communities and their habitats that are present, or likely to be present, within the Subject Land. The potential for impacts that could be characterised as serious and irreversible (aka Serious and Irreversible Impacts or SII) have thereby also been considered.

Field data was collected by Senior Ecologist and Accredited Assessor Skye Rivett (BAAS 22001), Environmental Scientist and Accredited Assessor Emily Cotterill (BAAS 20011), Senior Ecologist and Accredited Assessor Brianna Turner (BAAS 23021), Ecologist Anna Uhrig, Junior Ecologist Ben Perrott, and Environmental Consultant Graham Stirling in accordance with the Biodiversity Assessment Method (BAM). Reporting and analyses were completed by Skye Rivett, and Janet Sanderson with sign-off undertaken by Emily Cotterill (BAAS 20011) as an Accredited Assessor.



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trails



Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Location Map - NSW (Mitchell) Landscape Soils and IBRA Subregions

Legend

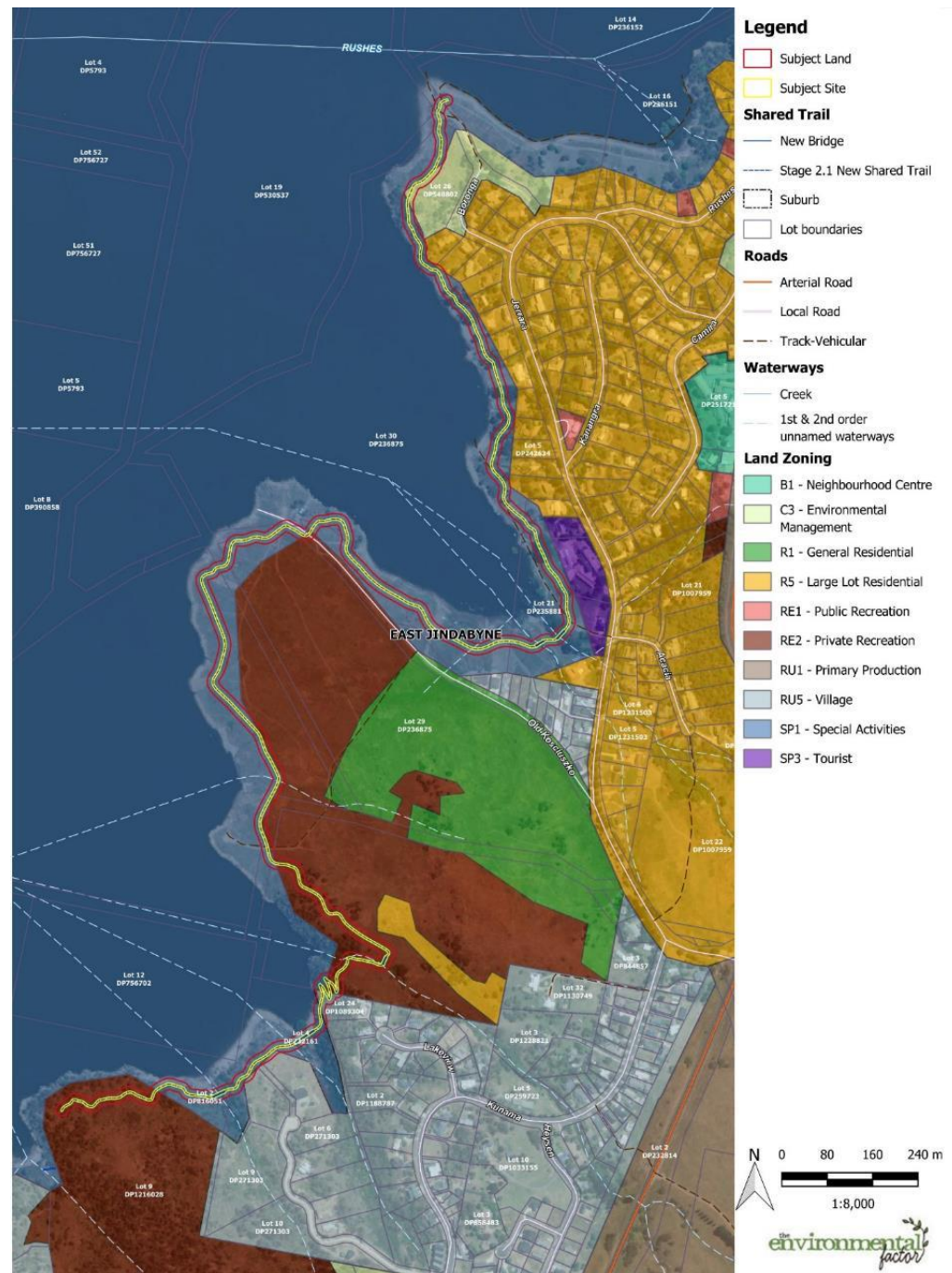
<span style="border: 1px solid green; padding: 2px;"> </span> Assessment Area	<span style="border: 1px solid black; padding: 2px;"> </span> Lot boundaries	<span style="border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> Local Road	<span style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></span> Waterways	<span style="background-color: #4682B4; width: 20px; height: 10px; display: inline-block;"></span> NSW (Mitchell) Landscapes
<span style="border: 1px solid red; padding: 2px;"> </span> Subject Land	<span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> Roads	<span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Track-Vehicular	<span style="border-bottom: 1px solid lightblue; width: 20px; display: inline-block;"></span> Creek	<span style="background-color: #ADD8E6; width: 20px; height: 10px; display: inline-block;"></span> Estuary/Water Added
<span style="border: 1px dashed black; padding: 2px;"> </span> Suburb	<span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> Arterial Road	<span style="border-bottom: 1px solid lightblue; width: 20px; display: inline-block;"></span> 1st & 2nd order unnamed waterways		<span style="background-color: #90EE90; width: 20px; height: 10px; display: inline-block;"></span> Jindabyne Plains

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Figure 1 Subject Land, Assessment Area and NSW (Mitchell) Landscapes



Biodiversity Development Assessment Report – Jindabyne Shared Trails



Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Subject Site and Land Zoning

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Figure 2 Subject Land and Land Zoning



## 2 LEGISLATIVE CONTEXT

The following legislation, policies and guidelines applicable to the Proposal have been reviewed, and the implications have been assessed accordingly as part of this BDAR.

### 2.1 Commonwealth (Federal) Legislation

#### 2.1.1 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a requirement for Commonwealth environmental assessment and approval for actions that are likely to have a significant impact on matters of national environmental significance (MNES), the environment on Commonwealth land, or actions taken on Commonwealth land MNES include:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- Nuclear actions

Federally listed threatened species and ecological communities with the potential to be impacted by the Proposal have been assessed as part of this BDAR; no significant impact to Commonwealth listed species or ecological communities is anticipated (refer Section 6, Appendix F).

### 2.2 State (NSW) Legislation, Policies and Guidelines

#### 2.2.1 *Environmental Planning and Assessment Act 1979 (EP&A Act)*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the legal and policy platform for the assessment and approval of works in NSW and aims to ensure that public authorities examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment before they undertake or approve activities that do not require development consent.

All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

The Proposal is being assessed as 'development that requires consent', in line with Part 4 Section 4.2 of the EP&A Act.

#### 2.2.2 *Fisheries Management Act 1994 (FM Act)*

The *Fisheries Management Act 1994* (FM Act) aims to conserve threatened species, populations and ecological communities of fish and marine vegetation native to NSW and to promote ecologically sustainable development, including the conservation of biological diversity. It also aims to reduce the threats faced by native fish and marine vegetation in NSW.

Section 220ZZ of the FM Act states that the determining authority must consider the effect of an activity on:



- Areas of Outstanding Biodiversity Value (AOBV) as defined by the BC Act, and
- Species, populations or ecological communities, or their habitats as listed under the FM Act, and whether there is likely to be a 'significant effect' on those species, populations or ecological communities

If a planned development or activity is likely to have an impact on an aquatic threatened species, population or ecological community this must be taken into account in the development approval process. If the impact is likely to be significant, as determined through a Test of Significance, participation in the BOS is required.

Council will need to seek a Part 2 or Part 7 Fisheries Management Act (FM Act) permit for works to be completed if the waterway is mapped as supporting Key Fish Habitat, if the Proposal includes:

- Activities involving dredging and reclamation work (Part 7 permit)
- Activities temporarily or permanently obstructing fish passage (Part 7 permit)
- Using explosives, electrical devices or other dangerous substances in a waterway (Part 2 permit)
- Harming marine vegetation (not applicable to this site)

Permits are required for works within third order (or higher) streams (based on the Strahler system of stream order classification), and first and second order streams that are known or likely to be habitat for listed threatened species, populations or communities.

The Proposal includes the construction of pedestrian bridges across two (2) waterways mapped as containing Key Fish Habitat (KFH) (Figure 3). As the trail construction works will involve works on the banks of these waterways, a s200 Part 7 Fisheries Permit under the FM Act is required prior to commencement of construction in these areas.

### **2.2.3 Local Land Services Amendment Act 2016 (LLSA Act)**

The *Local Land Services Amendment Act 2016* (LLSA Act), which amended the *Local Land Services Act 2013*, authorised the making of the Land Management (Native Vegetation) Code 2018 (Div 5, Sch 1 of the LLSA Act). The aim of the Code is to authorise clearing of native vegetation on Category 2 regulated land under certain conditions and provide for the establishment and maintenance of set aside areas.

Review of the Native Vegetation Regulatory map confirmed that the Subject Land contains land excluded from the LLS Act. No clearing of land is proposed within areas mapped as Category 2 – Vulnerable Regulated Land. Consequently, the clearing regulations under Part 14 of the LLSA Act do not apply (Appendix B).

### **2.2.4 Biodiversity Conservation Act 2016 (BC Act)**

Sections 7.2 and 7.8 of the *Biodiversity Conservation Act 2016* (BC Act) state that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.





The BC Act provides legal status for biota of conservation significance in NSW. It provides a framework for the Biodiversity Assessment Method (BAM) and the calculation of offset requirements for Proposals participating in the BOS.

The BC Act aims to:

- Conserve biological diversity on a bioregional and state scale
- Lists Areas of Outstanding Biodiversity Value (AOBV)
- Assess the extinction risk of species and ecological communities
- Identify Key Threatening Processes
- Slow the rate of biodiversity loss, and
- Conserve threatened species

Impacts to threatened species and ecological communities as a result of the Proposal are assessed in Section 6 of this report.

### **2.2.5 Biodiversity Conservation Regulatory Act 2017 (BC Regulatory Act)**

The *Biodiversity Conservation Regulation 2017* (BCR Act) provides a number of considerations and practices to be implemented as part of the BC Act, as follows:

- Identifies clearing thresholds and the Biodiversity Values Map for the application of the Biodiversity Offsets Scheme (BOS)
- Outlines principles for serious and irreversible impacts (SAII) to biodiversity
- Rules for meeting biodiversity offset obligations
- Biodiversity certification criteria

#### ***Biodiversity Values Map***

The BOS threshold is exceeded on land subject to clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the *Biodiversity Regulation 2017* on land identified on the Biodiversity Values Map (BVM), except where:

- The land is subject to a planning approval made up to 90 days after the land was added to the BVM; or
- If the land was already subject to planning approval when the land was added to the BVM.

The BVM (Appendix C) shows no areas of vegetation mapped as containing High Biodiversity Values in proximity to the Subject Land.

#### ***Area Criteria Threshold***

Native vegetation clearing thresholds as outlined in Part 7 of the *Biodiversity Conservation Regulation 2017* (Table 3) indicates when a project would need to enter the BOS according to the minimum lot sizes and the corresponding native clearing thresholds.

Field surveys confirmed that the site does contain areas of native vegetation. The clearing threshold for the site, based on the minimum lot size, is **0.25 ha**.



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**Table 3 Area criteria – Biodiversity Offset Scheme threshold**

Minimum lot size	Threshold for clearing (ha) to enter BOS
<1 ha	>0.25
1 ha < 40 ha	>0.5
40 ha – 1000 ha	>1
>1000 ha	>2

The Proposal will require direct impacts to **1.01 ha** of native vegetation. Therefore, the clearing threshold for native vegetation will be exceeded by this Proposal, and **participation in the BOS is required**.

#### **Areas of Outstanding Biodiversity Value**

The Subject Land is not listed as an Area of Outstanding Biodiversity Value.

#### **2.2.6 NSW Biosecurity Act 2015 (Biosecurity Act)**

The NSW *Biosecurity Act 2015* (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act the responsibilities for weed management by public and private landholders are consistent reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Weeds identified on site are discussed in Section 5.2.1.

#### **2.2.7 Snowy River Local Environmental Plan 2013**

The Subject Land for the Proposal is located on Crown, Freehold and Local Government Land in the Snowy Monaro Regional Council Local Government Area (LGA).

The subject site is located on land mapped within the Snowy River Local Environmental Plan (LEP) 2013, and is located within the following land use zones:

- SP1 – Special Activities
- C3 – Environmental Management
- RU5 – Village
- RE2 – Private Recreation
- R5 – Large Lot Residential

The majority of the Subject Land is located within land zoned as SP1 along the shore of Lake Jindabyne. The Subject Land passes through sections of land zoned RE2 in the middle and southern portions of the proposed trail and one small section of land zoned RU5 in Kunama Estate. Fractional



encroachment on land zone C3 and R5 may occur in the northern extent of the proposed trail in East Jindabyne Village.

The objectives of zone SP1 are to provide for special land uses that are not provided for in other zones, provide for sites with special natural characteristics that are not provided for in other zones, and facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.

The objectives of zone RU5 are to provide for a range of land uses, services and facilities that are associated with a rural village, protect and conserve the historical significance, character and scenic quality of rural village settings, encourage and provide opportunities for population and local employment growth, and ensure that development in village areas is compatible with the environmental capability of the land, particularly in terms of the capacity of the land to accommodate on-site effluent disposal.

The objectives of zone C3 are to protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values, provide for a limited range of development that does not have an adverse effect on those values, provide for a range of compatible rural land uses that do not have an adverse effect on the surrounding land uses or natural values and landscape setting of the area, and provide for high quality tourist development that is small scale, low impact and sympathetic to the unique landscape setting and scenic qualities of the area, including the approaches to Kosciuszko National Park.

The objectives of zone RE2 are to enable land to be used for private open space or recreational purposes, provide a range of recreational settings and activities and compatible land uses, and protect and enhance the natural environment for recreational purposes.

The objectives of zone R5 are to enable land to be used for residential housing in a rural setting while minimising impacts on environmentally sensitive locations and scenic quality, to ensure that large residential lots do not hinder the development of urban areas in the future, to ensure that development in the area does not unreasonably increase the demand for public services or public facilities, to minimise conflict between land uses within this zone and those within adjoining zones, and to provide a buffer between urban development and broad acre rural and environmental areas.

As an outdoor recreation facility, the Proposal is permitted with consent under all these zones.



### 3 LANDSCAPE CONTEXT

The following chapters describe the current landscape features and condition of the Subject Land and broader locality, as observed on site and according to available resources accessed at the time of assessment.

#### 3.1 Bioregions and landscapes

The Subject Land occurs within the South Eastern Highlands Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion, and contains one (1) mapped NSW Soil Landscape (previously Mitchell Soil Landscape). Details on these are provided below.

##### 3.1.1 Bioregion

A detailed description of the Subject Land IBRA sub region is provided in Table 4 below; further information can be found at:

[Bioregions of New South Wales: South Eastern Highlands \(nsw.gov.au\)](https://www.nsw.gov.au/bioregions-of-new-south-wales/south-eastern-highlands)

Table 4 Subject Land IBRA region and IBRA sub region

Category	Description
IBRA region	South Eastern Highlands
IBRA sub region	Monaro
Characteristics	<p><b>Geology</b> Block faulted ranges and closed lake basins in Silurian and Devonian acid fine grained sedimentary and metamorphic rocks with some granites. Extensive areas of thin Tertiary basalt flows over lake and river sediments.</p> <p><b>Characteristic landforms</b> Sloping plateau rising from 600 – 1300 m north to south. Structural ridges of more resistant rock. Stepped plains on basalt with intervening low areas of granite or sedimentary rocks. Numerous hallow lakes and swamps, a few permanent, many are closed basins and periodically dry. Area is in rain shadow with rainfall 450 – 700mm.</p> <p><b>Typical soils</b> Harsh yellow texture contrast soils in general. Shallow red brown to black stony loams on basalt.</p> <p><b>Vegetation</b> Snow Gum, Ribbon Gum, Candle-bark Gum, Broad-leaved Peppermint and Mountain Gum open woodlands with Kangaroo grass understorey. White Gum, Mottled Gum on hills. Brown Barrel and Black Ash forests in east with west facing patches of dwarf Casuarina heathland. Extensive grasslands of Snow Grass, Spear Grass and Wallaby Grass on the driest plains with clumps of Snow Gum amongst rocky outcrops.</p>

##### 3.1.2 NSW Landscape (Mitchell Soil)

The Subject Land is mapped as occurring on one (1) NSW Landscape): *Jindabyne Plains* (Figure 1).



*Jindabyne Plains* NSW Landscape soil type dominates the Subject Land. This soil type occurs on wide open valleys and plains at a general elevation of 800 to 900m with surrounding low ranges and rounded peaks to 1100m on massive Silurian-Devonian granite and granodiorite, characterised by shallow gravelly loams and extensive red and yellow texture-contrast soils on slopes, two (2) or three (3) terraces marginal to the main streams with dark coloured gritty uniform loams and clays in alluvium. Dry tussock grassland of rough and variable spear grasses (*Austrostipa variabilis*) with Kangaroo Grass (*Themeda triandra*) on valley floors, patches of open Snow Gum (*Eucalyptus pauciflora*) and Black Sallee (*Eucalyptus stellulata*) woodland on hills, open forest of Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalyptus blakelyi*), with mixed understorey on moister ranges merging with adjacent landscapes (DECC 2002).

### 3.2 Waterways and wetlands

In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Assessment Area, with the proposed trail intersecting seven (7) unnamed waterways. (Figure 3). Key Fish Habitat (KFH) is mapped along the edge of Lake Jindabyne which forms the western portion of the Assessment Area, and along one unnamed creek (Figure 3). The Proposal includes the construction of bridges across two (2) waterways mapped as containing Key Fish Habitat (KFH). The trail also interacts with some areas of KFH along the Lake edge towards the northern portion of the proposed trail near East Jindabyne Village.

Lake Jindabyne (a mapped wetland) is a large man-made lake, formed following the damming of the Snowy River in the 1960s (Figure 3). The Snowy River inlet, submerged channel and outlet to Lake Jindabyne forms part of the *Endangered Aquatic Ecological Community of the Snowy River Catchment in NSW* listed under the FM Act. No direct impacts to the Snowy River Catchment EEC are considered likely from the Proposal.

### 3.3 Native vegetation extent

The extent of native vegetation in the Assessment Area was mapped using the South East Local Land Services (OEH 2014) and Forest Ecosystems: Vegetation of the Southern Forests VIS ID 3858 Biometric Vegetation (OEH 2015) layers, within a 500 m buffer as specified for a linear development under the BAM. Vegetation was later verified within the Subject Land.

A total area of approximately **7.21 ha** occurs within the Subject Land with approximately **6.49 ha** of native vegetation present.

A total area of approximately **353.4 ha** occurs within a 500 m radius of the Subject Land with approximately **60.8 ha** of mapped native vegetation present.

### 3.4 Assessment of patch size and connectivity

According to the BAM, a layer of native vegetation cover (patch size) is required to be examined within a 500 m buffer (for linear proposals) around the Subject Land, to determine the vegetative context of the site. A patch, as defined by the BAM, is an area of native vegetation that:

- a) occurs on the development site or biodiversity stewardship site, and
- b) includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or  $\leq 30$  m for non-woody ecosystems).



Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.

Patch size for the Subject Land was calculated for the vegetation on the development site using the field-validated map of vegetation types identified, and aerial photography interpretation for the 500 m buffer (Figure 5) (based on OEH 2019) and broader locality (10 km). Patch size is required to be assessed as one (1) of four (4) classes per vegetation zone mapped, being <5 ha, 5-24 ha, 25-<100 ha or >100 ha.

One (1) patch of native vegetation occurs within, and extend beyond, the Subject Land. This patch includes grassy woodland and derived native grassland. Areas of grassy woodland and derived native grassland continue beyond the Subject Land and into the locality to the north, east, and south of the Assessment Area.

A total area of approximately **353.4 ha** occurs within a 500 m radius of the Subject Land with approximately **60.8 ha** of mapped native vegetation present.

The total area of the 500 m buffer around the Subject Land is equivalent to a potential native vegetation cover of **17 %**, therefore falling in the **>10 - 30%** class as defined under the BAM.

Overall, the patch extends beyond the 500 m area. However, for the purposes of this assessment, a patch size of **60.8 ha** has been used, to represent the continuous native vegetation cover within a 500 m radius.

Based upon vegetation mapping and aerial photography interpretation beyond the Subject Land, the total area of the patch of native vegetation was calculated as falling into the **25 - <100 ha** bracket.





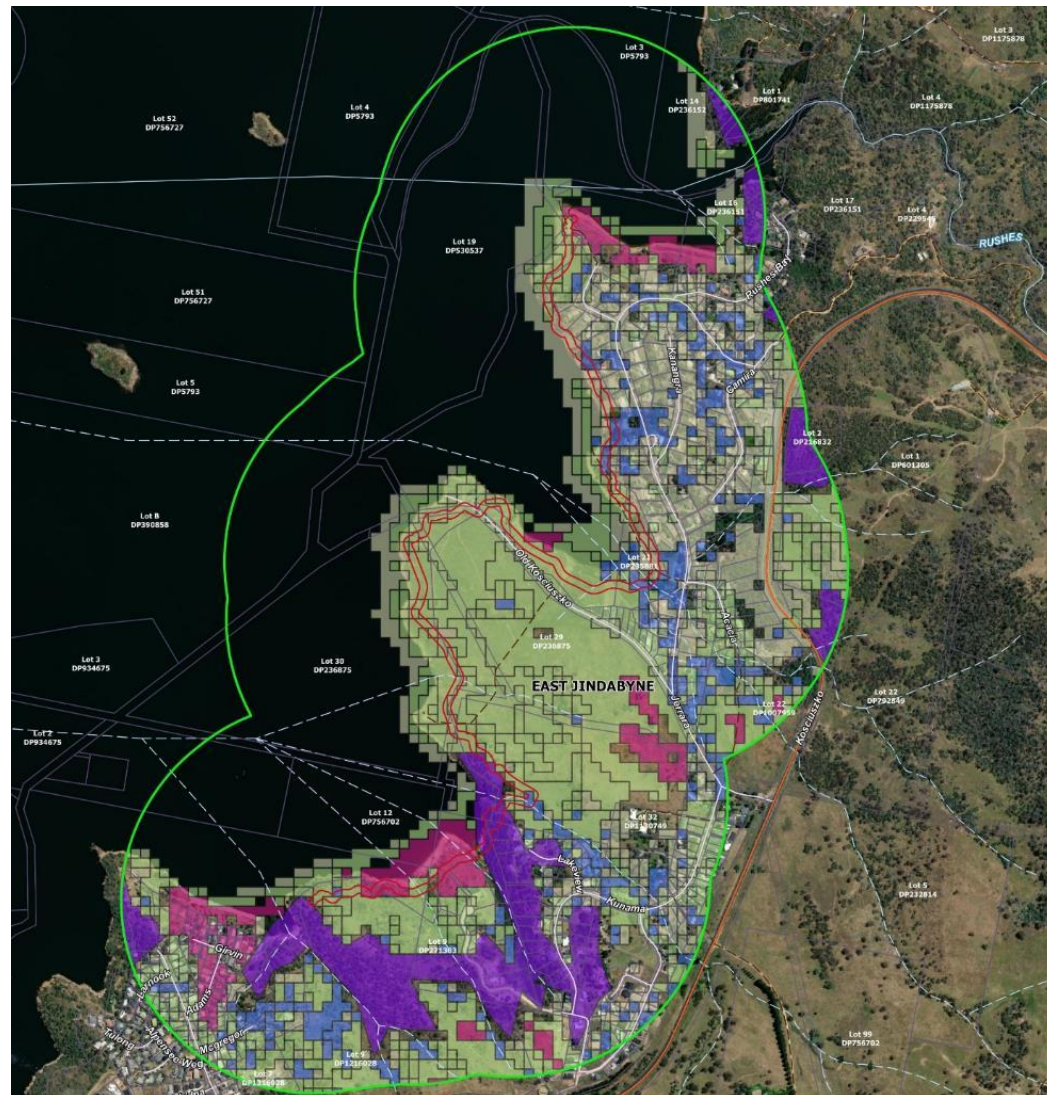
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Biodiversity Development Assessment Report – Jindabyne Shared Trails



Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Habitat Connectivity

Legend

- Assessment Area
- Subject Land
- Lot boundaries
- Roads**
  - Arterial Road
  - Local Road
- Track-Vehicular

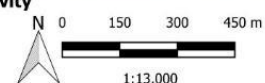
**Waterways**

- River
- Creek
- 1st & 2nd order unnamed waterways

**SELL Biometric**

- Kangaroo Grass - Snowgrass tussock grassland on slopes and ridges of the tablelands, South Eastern Highlands

- N/A
- River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands
- Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands
- Speargrass grassland of the South Eastern Highlands
- Wallaby Grass - Redleg Grass low grassland of the South Eastern Highlands



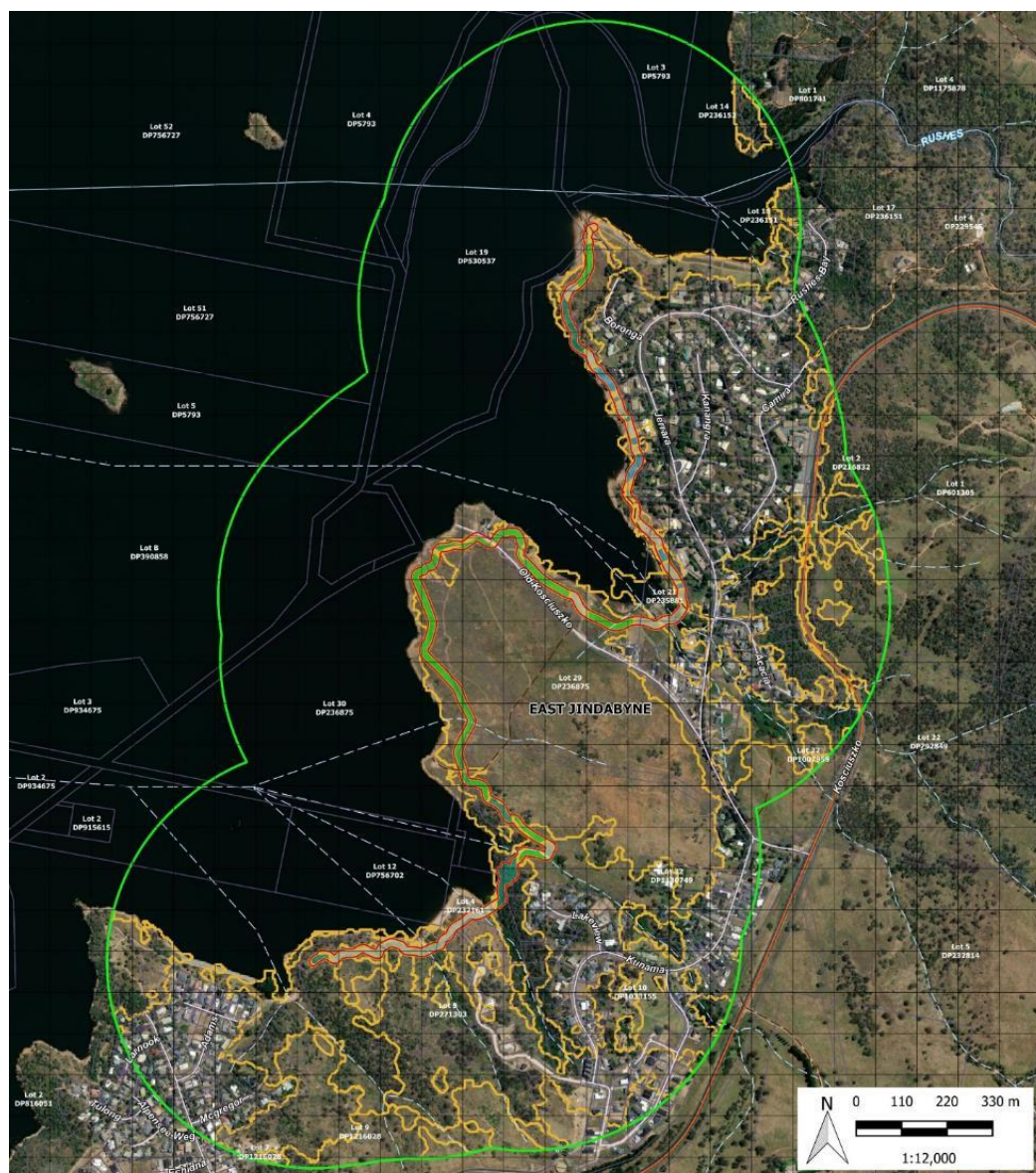
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Figure 4 Mapped Biometric Vegetation Types for the Assessment Area





## Biodiversity Development Assessment Report – Jindabyne Shared Trails



Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Vegetation Zones and Patch Size

## Legend



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Figure 5 Vegetation Zones and Patch Size



## 4 METHODOLOGY

The following chapters describe the desktop and onsite investigations completed in order to fully catalogue the predicted and actual biodiversity assets occurring on site, in order to ascertain the potential impacts to biodiversity arising as a result of the Proposal.

### 4.1 Desktop assessment

The following resources were accessed to inform the survey methodology used during field investigations, and to aid in the preparation of this BAR.

#### 4.1.1 Publications and databases

##### **Relevant State and Commonwealth Databases**

- Protected Matters Search Tool (DEECCW 2022, updated 2023)
- NSW Bionet. The website of the Atlas of NSW Wildlife (DPE 2022, updated 2023)
- NSW Scientific Committee Final Determinations
- Priority Weeds for the Snowy Monaro Regional LGA (South East) (DPI 2022)

##### **State and Federal Guidelines**

- Biodiversity Assessment Method 2020 Operational Manuals – Stage 1 and 2 (DPE 2022)
- Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC 2004)
- NSW Survey Guide for Threatened Frogs (DPE 2020)
- NSW Guideline to Surveying Threatened Plants and their Habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2020)
- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2010)
- 'Species credit' threatened bats and their habitats, NSW Survey guide for the Biodiversity Assessment Method (OEH 2018)
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2011)
- Draft survey guidelines for Australia's threatened orchids: Guidelines for detecting orchids listed as 'threatened' under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2013)

##### **Council and Cardno Documents**

- Snowy River Local Environmental Plan (LEP) 2013
- Go Jindabyne Master Plan (DPE 2019)
- Special Activation Precinct: Snowy Mountain Draft Master Plan June 2021 (DPE 2021)
- Cardno Jindabyne Shared Trails Staging Plan (2021)



#### 4.1.2 Spatial data

- New South Wales Vegetation Information System (VIS) (DPE 2021)
- Near Maps (2021)
- SIX Maps (LPI 2021)
- OEH Mitchell Landscape Soil v3.1
- CRS GDA 94 MGA zone 55
- DPE Bionet Atlas Threatened Species list
- SE Local Land Services (SE LLS) Biometric Vegetation (OEH 2014)
- Forested Ecosystems: Vegetation of the Southern Forest VIS ID 3895 (OEH 2011)
- Google Satellite Imagery 2019
- NSW Spatial Portal ss-sdi Spot 6/7 Satellite Imagery 2020

#### 4.2 Onsite Investigations and application of the Biodiversity Assessment Method

Initial site assessment was undertaken over two (2) days in April 2022. During this assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present on the Subject Land, with focus on identifying any threatened ecological communities (TEC)
- Recording a detailed list of flora species encountered on the Subject Land, including searches for locally occurring threatened species, species diagnostic of threatened ecological communities and priority weeds (High Threat Exotics or HTE)
- Recording opportunistic sightings of any fauna species, seen or heard, on the Subject Land or within the broader Assessment Area
- Identifying and recording the locations of threatened fauna habitat such as important nesting, roosting or foraging microhabitats
- Undertaking targeted searches for the habitat of any threatened and regionally significant fauna including:
  - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos, bats and arboreal mammals)
  - Caves and crevices (habitat for threatened reptiles, small mammals and microbats),
  - Termite mounds (habitat for threatened reptiles and the echidna)
  - Waterbodies (habitat for threatened fish, frogs and water birds)
  - Fruiting / flowering trees (food for threatened birds and mammals)
  - Rocky outcrops and overhangs (habitat for threatened microbats, herpetofauna and marsupials)
  - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals)
  - Any other habitat features that may support fauna (particularly threatened) species
- Assessing the connectivity and quality of the vegetation within the Subject Land and surrounding area.

Additional targeted seasonal surveys were undertaken for selected threatened flora and fauna species over four (4) weeks in September and November 2022, and one (1) additional day in September 2023,



in line with relevant NSW threatened species survey guidelines and/or EPBC threatened species survey guidelines where applicable. Survey techniques utilised included:

- Targeted flora surveys using Parallel field traverses at 5 m widths along the entire Subject Land length
- Diurnal bird surveys throughout Subject Land
- Areas searches for signs of threatened species breeding habitat and activity
- Spotlighting throughout suitable habitat within the Subject Land

Survey methods employed are described in further detail below.

#### **4.2.1 Survey of native vegetation**

##### ***Native Vegetation Assessment***

Assessment and on-ground mapping of PCTs was undertaken during field surveys. The Subject Land was traversed on foot to identify the vegetation structure, including identifying dominant species and native vegetation.

BAM plots were completed in each of the condition zones present within each PCT in the Subject Land (Table 5). The number of plots surveyed within each vegetation zone is consistent with the requirements as outlined within Table 3 of the BAM (2020).

In total, **seven (7)** vegetation plots were completed using a 20 x 50 m functional, structural and floristic plot survey method, consistent with Section 4.3 of the BAM 2020 (Figure 6). The identification of PCTs was in accordance with the NSW PCT classification as described in the BioNet Vegetation Classification database (DPE 2022) and involved the use of the database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation, and floristics of vegetation within the Subject Land and broader Assessment Area. The data for the potential PCT's were then reviewed to determine the most appropriate PCT for the vegetation communities sampled within the Subject Land. Observations of vegetation structure and composition made during surveys of the site, as well as reference to previous ecological surveys and mapping conducted within the Subject Land, also helped to inform the determination of appropriate PCTs.

Where areas outside the Subject Land were not ground-truthed as part of this survey effort, previous Biometric Vegetation Type assignment by the South East Local Land Services (SE LLS) (OEH 2014) and Forest Ecosystems: Vegetation of the Southern Forests VIS ID 3895 (OEH 2011) were used, to inform mapping and calculations within these areas only<sup>1</sup>.

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<sup>1</sup> Only verified vegetation within the Subject Land was used to inform Vegetation Integrity (VI) calculations in the Biodiversity Offset and Agreement Management System (BOAMS) and the BAM calculator.



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Table 5 Plant Community Type, vegetation zones and survey plots completed

Vegetation zone (condition)	Plant Community Type	PCT ID	Vegetation zone (ha)	Minimum number of plots required	Number of plots completed
<b>Zone 1: PCT 1191</b> <b>Good - Moderate</b> Grassy Woodland	Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	PCT 1191	1.07	1	2
<b>Zone 2: PCT 1191</b> <b>Derived Grassland</b> <b>Good - Moderate</b> Derived native grassland	Derived grassland of Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	PCT 1191	2.99	2	2
<b>Zone 3: PCT 1191</b> <b>Derived Grassland</b> <b>Moderate - Degraded</b> Derived native grassland	Derived shrub and grassland of Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion with high weed cover	PCT 1191	2.42	2	3
<b>Zone 4: Planted</b> <b>Mixed Native / Exotic</b>	Residential Landscaping plantings of mixed non-provenance species	-	0.55	N/A	(1 RDP)
<b>Zone 5: Non-Native</b>	Roads, residential / built-up areas	-	0.18	N/A	N/A
<b>Total</b>			<b>7.21</b>	<b>5</b>	<b>7</b>

**Seasonal targeted threatened flora surveys**

During the initial site assessment, the Subject Land was opportunistically surveyed for threatened flora species. Information on species with potential to occur along the trail was collated, to guide in-field identification if encountered. Locations of species found were intended to be recorded using handheld GPS units (mobile phones / tablets) equipped with the Avenza mapping software.

In addition, seasonal targeted threatened species surveys were undertaken across the entire Subject Land during September and November 2022, with additional surveys also undertaken in specific areas during September 2023 (see Figure 7 and Figure 8). The following techniques were applied within suitable habitat based on species specific survey guidelines (DPIE 2020):





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- Parallel field traverses: Two (2) to four (4) ecologists surveyed the length of the Subject Land on foot using parallel traverses spaced approximately 5 m apart throughout suitable habitat for each target threatened plant species (whole site surveyed). The length of the Subject Land was traversed, with traverses recorded on a global positioning system (GPS) using AVENZA

The following species were targeted during surveys:

Table 6 Threatened flora species surveyed

Species Name	Common Name	Survey Season
<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	September
<i>Calotis glandulosa</i>	Mauve Burr-daisy	November
<i>Commersonia prostrata</i>	Dwarf Kerrawang	September/November
<i>Discaria nitida</i>	Leafy Anchor Plant	November
<i>Dodonaea procumbens</i>	Creeping Hopbush	September/November
<i>Eucalyptus parvula</i>	Small-leaved Gum	September/November
<i>Eucalyptus macarthurii</i>	Paddy's River Box	September/November
<i>Leucochrysum albicans var tricolor</i>	Hoary Sunray	September/November
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	September/November
<i>Swainsona sericea</i>	Silky Swainson-Pea	November
<i>Thesium australe</i>	Austral Toadflax	November

#### 4.2.2 Terrestrial fauna surveys

##### Opportunistic observations

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys; for instance, fallen timber was scanned for reptiles, rock fragments and logs were lifted (where possible) to check for sheltering fauna, and habitat trees and water bodies were scanned for active and roosting birds. All species observed or heard utilising the site during surveys were identified. Any evidence of faunal activity (tracks, scats, feathers, pellets) were noted and specimens collected and sent for analysis (Scats About 2020) and identification. Disturbance along tracks caused by animals including diggings and burrows were noted and any roadkill was recorded.

##### Habitat assessment

In addition to the targeted surveys and direct observations, the following general assessments were made throughout the time spent in the field by TEF ecologists (Figure 6).

Habitat assessments on site included active searches for the following habitat features:

- Trees with bird nests or other potential fauna roosts



- Burrows, dens and warrens, bridges, culverts and hollow-bearing trees for evidence (e.g. guano or bat droppings) of roosting microbats
- Hollow-bearing trees and logs which provide refuge, nest and den sites for a range of threatened fauna species
- Koala food trees and/or evidence of scratches or scats
- Distinctive scats or latrine sites, owl whitewash and regurgitated pellets under roost sites
- Tracks or animal remains
- Evidence of activity such as feeding scars, scratches and diggings
- Leaf litter and fallen timber were inspected for reptile habitat
- Presence of potential habitat for threatened frog species

#### ***Seasonal targeted threatened fauna surveys***

A range of species-specific techniques were employed for targeted species during September and November 2022 within suitable habitat across the Subject Land in accordance with species specific guidelines (DEC 2004, DEWHA 2010, DSEWPC 2011, DPIE 2020). For threatened species observed, location was recorded using GPS or Avenza, and counts of individuals/nesting sites were undertaken as appropriate in order to determine the size and number of species present (see Figure 7 and Figure 8):

- *Diurnal Area Searches:* Suitable habitat within and immediately surrounding the Subject Land (within 100 m) was surveyed on foot over a period of five (5) days in September 2022 and one (1) day in November 2022 for signs of active nesting hollows/nesting sites and active nesting behaviour (i.e. presence of male or female and/or chicks around or within nests or hollows). Any active nests, or signs of nesting or breeding, was recorded.
- *Diurnal Bird Surveys:* Transect bird surveys were undertaken during morning and afternoon within suitable habitat throughout the Subject Land. The Subject Land was walked with all species encountered during surveys noted. Surveys were conducted over a series of five (5) days throughout September 2022 and one (1) day in November 2022.
- *Nocturnal Spotlighting:* Spotlighting was undertaken over two (2) consecutive nights in November 2022 for a duration of 30 - 60 mins per transect per night. Transects were walked throughout suitable habitat within and immediately surrounding the Subject Land, with particular emphasis placed on areas of suitable habitat containing hollow-bearing trees of suitable size for target species.
- *Nocturnal Frog Surveys:* Due to limited suitable habitat for targeted frog species within the Subject Land, surveys were conducted within areas of marginal suitable habitat (i.e. permanent water bodies, waterways) within and immediately adjacent to the Subject Land for a duration of 10 – 30 minutes per location. Call playback was used to illicit responses from targeted species, with spotlighting used to undertake visual searches within suitable niche habitats. Survey length and duration does not qualify for targeted surveys, and was used for opportunistic species encounters only.

The following threatened fauna species were targeted during surveys:



Biodiversity Development Assessment Report – Tyrolean Trails

Table 7 Threatened fauna species surveyed

Species Name	Common Name	Survey Season
<b>Diurnal Birds</b>		
<i>Calyptrorhynchus lathamii</i>	Glossy Black Cockatoo	September
<i>Petroica rodinogaster</i>	Pink Robin	September/November
<i>Callocephalon fimbriatum</i>	Gang-gang	November
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	September/November
<i>Hieraaetus morphnoides</i>	Little Eagle	September
<i>Ninox connivens</i>	Barking Owl	September/November
<b>Nocturnal Fauna</b>		
<i>Cercartetus nanus</i>	Eastern Pygmy Possum	November
<i>Phascogale cinerea</i>	Koala	September/November
<i>Petaurus volans</i>	Greater Glider	September/November
<i>Mastomys fuscus</i>	Broad-toothed Rat	November
<b>Nocturnal Frogs</b>		
<i>Litoria aurea</i>	Green and Golden Bell Frog	November



Biodiversity Development Assessment Report – Tyrolean Trails

Table 8 Survey Effort

Survey method	Description				
Survey Effort	Survey	Date (2022)	# Days	# Staff	Total hours
	Initial assessment	April 28 <sup>th</sup> and 29 <sup>th</sup>	2	2	40
	Targeted Surveys - Flora (Sept)	September 20 <sup>th</sup> , 22 <sup>nd</sup> 2022, September 11 <sup>th</sup> 2023	3	2	10.33
	Targeted Surveys - Flora (Nov)	November 7 <sup>th</sup>	1	4	8.66
	Targeted Surveys - Fauna (Sept)	September 20 <sup>th</sup> , 22 <sup>nd</sup> , 28 <sup>th</sup> , 29 <sup>th</sup> , 30 <sup>th</sup>	5	2	20
	Area Searches				
	Targeted Surveys - Fauna (Sept)	September 20 <sup>th</sup> , 22 <sup>nd</sup> , 28 <sup>th</sup> , 29 <sup>th</sup> , 30 <sup>th</sup>	5	2	20
	Diurnal Bird Surveys				
	Targeted Surveys - Fauna (Nov)	November 22 <sup>nd</sup>	1	2	1
	Area Searches / Gang Gang Surveys				
	Targeted Surveys - Fauna (Nov)	November 21 <sup>st</sup> , 22 <sup>nd</sup>	2	2	6.5
	Spotlighting				
	Frog Surveys – Fauna (Nov)	November 21 <sup>st</sup> , 22 <sup>nd</sup>	2	2	1.83
	<b>Total survey effort</b>				<b>108.32</b>
<b>BAM Plots, Rapid Data Points and PCT mapping</b>	BAM plots were strategically placed at seven (7) locations throughout the Subject Land to determine type and condition of PCT's present. PCT's were identified based on floristics present and mapped based on condition (extent of disturbance and weediness). Rapid data points were placed in areas of Planted Vegetation in residential areas to cross-check on-ground vegetation against BAM requirements and local PCTs.				
<b>Opportunistic general surveys</b>	Opportunistic and incidental observations of fauna species were recorded at all times during field surveys, with location and number of threatened species recorded. Any faunal evidence (tracks, scats, feathers, pellets) were noted. Disturbance along tracks including diggings and burrows were noted.				
<b>Habitat tree and hollow assessment.</b>	Mature trees and those containing habitat features (hollows) occurring within the Subject Land were recorded using Avenza.				
<b>Targeted Seasonal Flora</b>	Walked 5m parallel field traverses along entire trail network length and breadth.				
<b>Targeted Seasonal Fauna</b>	<p>Bird Surveys: Six (6) Targeted Bird surveys and area searches for suitable breeding habitat and signs of breeding (i.e. stick nests, presence of chicks, hollow bearing trees, signs of breeding use of resources by target species).</p> <p>Nocturnal Spotlighting: Two (2) nights, throughout suitable habitat.</p>				

#### 4.2.3 Survey conditions and limitations

Results from field investigations were influenced by the timing and duration of surveys, as well as weather conditions experienced prior to and during surveys being undertaken. Survey conditions on



## Biodiversity Development Assessment Report – Tyrolean Trails

site varied from those measured at the nearest weather station (Cooma Airport). Details are outlined in Table 9 below. Overall climate data for the months of survey at the nearest weather station (Cooma Airport) have been included in Appendix H.

Table 9 Weather conditions on site during surveys

Date of Survey	General Conditions / Temperature	Precipitation	Wind
<b>2022</b>			
28/04/2022	Clear skies, sunny, warm	Nil	Calm
29/04/2022	Cool morning, warm day	Nil	Calm, with light breeze at times
20/09/2022	Cool, clear skies	Nil	Calm
22/09/2022	Cloudy, misty morning	Rain overnight	Calm
28/09/2022	Cool, overcast	Rain	Light to moderate winds
29/09/2022	Cool, overcast	Nil	Calm
30/09/2022	Clear, warm	Nil	Calm
07/11/2022	Warm, partly cloudy	Nil	Light breeze at times
21/11/2022	Cold, partly cloudy	Light snow and sleet at times	Strong wind gusts at times
22/11/2022	Cool to warm, partly cloudy	Nil	Light to moderate winds at times
<b>2023</b>			
11/09/2023	Warm, sunny	Nil	Calm

Given the nature and timing of the surveys undertaken, it is likely that some species that occur in the Subject Land either permanently, seasonally or transiently were not detected during the survey. These species may include annual, ephemeral or cryptic flora and fauna species; nocturnal fauna; birds and frogs which call at other times of year; and mobile or transient fauna in general. The habitat assessment conducted allows for identification of habitat resources for such species, in order to assess their likelihood of occurring within the Subject Land. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values within the Proposal footprint in accordance with the BAM. This information was used to predict potential impacts of the Proposal on ecological values and to provide this as input to design development, so that impacts to native biota can be avoided, mitigated and / or offset through the BOS. Where appropriate, species with potential to occur within the Subject Land were added into the BAM Calculator (BAM-C) as Candidate Species, if not automatically included by the program. Threatened species with the



potential to utilise habitat resources on the site and were not surveyed for have remained within the BAM assessment.

Targeted surveys were conducted in accordance with survey specifications for each species. However, seasonal conditions may affect flowering times in some locations. Recent rain events meant sections of the proposed trail network were under water or eroded away at time of survey. GIS accuracy remained between 2-10 m, with surveys conducted to this level of accuracy within the trail network. All suitable habitat for threatened species within proximity to the Subject Land was surveyed in order to ensure the highest level of detection of species present. Some sections of the Subject Land bisected heavily weed infested areas, making survey within these areas limited. Areas surveyed within these sections identified limited suitable habitat for threatened species due to the heavily degraded nature of these patches.

#### 4.3 Calculation of Offset Obligation

The following assumptions were applied to the BAM-C when considering impacts from the proposal:

- Species included in the calculation of credit offset obligations were generated by the BAM calculator or added in manually based on species recorded on site during surveys, presence of records within the locality (BioNET 2021) or presence of suitable habitat with the potential to occur on the Subject Land.
- Species were excluded where appropriate based on an absence of suitable habitat surrogates (foraging and/or breeding) within the Subject Land (DPE 2022).
- With regard to future Compositional (CC), Structural (SC) and Functional Condition (FC) Scores, all trees with a DBH > 5 cm will be retained within the impact footprint. Therefore, existing scores for CC, SC and FC were retained within this class for the direct impact area, while regeneration was kept as absent for calculation of Future VI scores for direct impact (subject site) areas only.
- Threatened species with the potential to utilise habitat resources on the site, and were not surveyed for, have remained within the BAM assessment.
- No change to High Threat Weed cover was assumed within the indirect impact area of the Subject Land for calculation of future VI scores.

#### 4.4 Assessments of Significance

Assessment of the likely significance of impacts resulting from the Proposal are prepared in accordance with the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DEWHA 2013) for threatened biota known or likely to occur within the Proposal footprint, and with potential to be impacted by the Proposal, based on the results of the desktop investigations and field survey. Assessments are undertaken for those species listed under the EPBC Act which may be impacted by the Proposal that are not already covered under the BAM-C; threatened species and communities that are listed under the BC Act do not require additional assessment through Assessments of Significance for this Proposal.

All species listed under the EPBC Act with a moderate to high likelihood of impact from the Proposal have been captured within the BAM-C. Therefore, no additional Assessments of Significance were undertaken for this Proposal.





## 5 RESULTS

The following chapters describe the findings of the desktop and onsite investigations completed for the Proposal, within the categories of vegetation types, vegetation zones, vegetation integrity, flora and fauna species, weeds and threatened species.

### 5.1 Native Vegetation

Determination of the most appropriate PCTs for the vegetation communities within the Subject Land involved the use of the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions) and the native vegetation mapped on site (Table 10); vegetation formation on site, including any canopy species present within and immediately outside the Subject Land; soils, elevation and location within the landscape; and, floristic (BAM) plots completed within the Subject Land (Appendix E). The data for the potential PCTs collected on site was then reviewed against the range of potential or likely PCTs for the area, to determine the most appropriate match for the vegetation communities sampled within the Subject Land.

Biometric vegetation type mapping and Southern Forest Vegetation Types (Local Land Services 2014) were chosen as the most appropriate source of pre-existing vegetation mapping (Figure 4). The Subject Land was originally mapped as supporting five (5) Biometric vegetation types as outlined in Table 10 below.

**Table 10 Native biometric vegetation types mapped within 500 m of the Subject Land**

Biometric Vegetation Types	Area (ha)
Kangaroo Grass – Snowgrass tussock grassland on slopes and ridges of the tablelands, South Eastern Highlands	94.62
River Tussock – Tall Sedge – Kangaroos Grass moist grasslands of the South Eastern Highlands	21.37
Snow Gum – Candlebark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands	25.49
Speargrass grassland of the South Eastern Highlands	13.75
Wallaby Grass – Redleg Grass low grassland of the South Eastern Highlands	0.19
N/A Vegetation and Water	197.98
<b>Total within 500 m buffer (ha):</b>	<b>353.40</b>
<b>Total Mapped Vegetation within 500 m buffer (ha):</b>	<b>60.80</b>
<b>Total Native Vegetation within 500 m buffer (ha):</b>	<b>17%</b>

Surveys confirmed that the following PCT's were present within the Subject Land:

- PCT 1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion

Planted vegetation that did not conform to a PCT, as well as non-native areas including roads, existing trails and residential housing, were also present within the Subject Land. Further discussion on these conclusions is provided in Section 5.3 below. A map showing ground-truthed PCT distribution within the Subject Land is presented in Figure 6.



### 5.1.1 Nominated Plant Community Types for the Subject Land

Based on the assessment process described in Section 5.1 above, the PCTs in Table 11 are nominated as the most appropriate for the species assemblages present within the Subject Land.

Table 11 PCT Nominations for Vegetation Formations occurring within the Subject Land

Vegetation formation	Potential Plant Community Type	Nominated PCT & Reasoning
Grassy Woodland	Option 1: PCT 1191 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	<p>PCT 1191</p> <p>This PCT lists the dominant canopy species found within these patches, <i>E. pauciflora</i> (Snow Gum) as the dominant species for this PCT. Dominant mid layer and groundcover species found on site are also listed within the PCT species description. The descriptive attributes state the altitude range for this PCT is between 600 – 1100m, as was the case for the site, whereas PCT 1190 occurs above 1100m. This vegetation community occurs on frost-hollow flats and footslopes, as was the case on site. This PCT is listed as occurring in the Monaro region.</p>
	Option 2: PCT 1190 Snow Gum - Candle Bark shrubby open forest in valleys of the southern ACT ranges, South Eastern Highlands Bioregion	
	Option 3: PCT 1101 Ribbon Gum - Snow Gum grassy open forest on flats and undulating hills of the eastern tableland, South Eastern Highlands Bioregion	

### 5.1.2 Plant Community Type descriptions

Detailed PCT descriptions are provided below, including information on vegetation formation, class and condition.

#### Grassy Woodlands

##### **PCT 1191 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion**



Plate 1 PCT 1191

<b>Structure</b>	Grassy Woodland with sparse to dense shrub layer and a grassy understorey, also occurring as derived grassland and regrowth forms.
<b>Overstorey</b>	Snow Gum ( <i>Eucalyptus pauciflora</i> )
<b>Mid Stratum</b>	Silver Wattle ( <i>Acacia dealbata</i> ), Tree Violet / Gruggly Bush ( <i>Melicytus angustifolius</i> subsp. <i>divericatus</i> ), Sticky Everlasting ( <i>Cassinia longifolia</i> ), <i>Pimelea pauciflora</i> , and <i>Grevillea</i> sp..
<b>Ground Stratum</b>	<p>The ground stratum is dominated by a mixture of grasses and forbs including Snow Grass (<i>Poa siberiana</i>), Wallaby Grasses (<i>Rytidosperma</i> spp.), Speargrasses (<i>Austrostipa</i> spp.), Kangaroo Grass (<i>Themeda triandra</i>), Common Wheatgrass (<i>Anthosachne scabra</i>), Sheep's Burr (<i>Acaena ovina</i>), Cotton Fireweed (<i>Senecio quadridentatus</i>), Common Everlasting (<i>Chrysocephalum apiculatum</i>), Stinking Pennywort (<i>Hydrocotyle laxiflora</i>), Fuzzweed (<i>Vittadinia</i> sp.) and Native Bluebell (<i>Wahlenbergia communis</i>).</p> <p>Exotic species present include Briar Rose (<i>Rosa rubiginosa</i>), Blackberry (<i>Rubus</i> spp. agg.), Serrated Tussock (<i>Nasella trichotoma</i>), St John's Wort (<i>Hypericum perforatum</i>), Sheep's Sorrel (<i>Acetosella vulgaris</i>) and African Lovegrass (<i>Eragrostis curvula</i>) (all listed High Threat Exotic species), as well as Great Mullein (<i>Verbascum thapsus</i>) and exotic grasses such as various <i>Bromus</i> and <i>Vulpia</i> species throughout.</p>
<b>PCT number</b>	PCT 1191



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<b>PCT 1191 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion</b>	
<b>Vegetation formation</b>	Grassy Woodland
<b>Vegetation class</b>	Subalpine Woodlands
<b>Condition</b>	This PCT occurred in a variety of conditions: good to moderate woodland, with a Vegetation Integrity (VI) score of 78.6; good to moderate derived grassland condition, with a VI of 8.5; and moderate to degraded derived grassland, with a VI of 35.4.
<b>Conservation Status</b>	This PCT is associated with a Threatened Ecological Community: <i>Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion</i> (Listed BC Act; Critically Endangered). The vegetation occurring on the site is analogous to this TEC.
<b>PCT estimated remaining</b>	Approximately 5% remaining
<b>Threatened Species</b>	Gang-Gang Cockatoo ( <i>Callocephalon fimbriatum</i> ) and Flame Robin ( <i>Petroica phoenicea</i> ), listed as Vulnerable under the BC Act, are associated with this PCT and were recorded on site during surveys.
<b>Comments</b>	This PCT was dominant throughout the Subject Land, being present in both intact woodland (good to moderate) and derived scrub/grassland (good to moderate, and moderate to degraded) conditions. High levels of weeds were present throughout in varying densities.

## 5.2 Species recorded

### 5.2.1 Flora survey results

A total of one hundred and eighteen (118) flora species were recorded within the vegetation plots completed and incidental species observed on site, consisting of fifty-seven (57) native species and sixty-one (61) exotic species, including eighteen (18) High-Threat Exotics (HTE). Field data collected is available in Appendix D.

#### **Native vegetation**

The Subject Land supports one (1) remnant and regenerating Grassy Woodland type in varying conditions.

Dominant canopy species recorded throughout the Subject Land included Snowgum (*Eucalyptus pauciflora*) with Black Sallee (*Eucalyptus stellulata*) occurring in small isolated stands immediately adjacent the Subject Land. Ribbon Gum (*Eucalyptus viminalis*) was also observed in more restricted areas outside the Subject Land in isolated water courses.

The dominant mid stratum species recorded throughout included Silver Wattle (*Acacia dealbata*), Tree Violet / Gruggly Bush (*Melicytus angustifolius* subsp. *divaricatus*), *Cassinia longifolia* and *Pimelea pauciflora*.

The ground stratum contained a mixture of grasses and forbs including the grasses Snow Grass (*Poa sieberiana*), Kangaroo Grass (*Themeda triandra*), Kneed Spear-grass (*Austrostipa bigeniculata*), Common Wheat Grass (*Anthosachne scabra*) and Wallaby Grasses (*Rytidosperma* spp.). Forbs included Kidney Weed (*Dichondra repens*), Native Geranium (*Geranium solanderi*), Stinking Pennywort



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(*Hydrocotyle laxiflora*), Sheep's Burr (*Acaena ovina*), Fuzzweed (*Vittadinia cuneata*) and Native Bluebell (*Wahlenbergia communis*).

Native vegetation occurred primarily as small patches of remnant woodland (Plate 2) surrounded by larger disturbed areas of derived grassland and shrubland (Plate 3 & Plate 4) with varying levels of weed encroachment and disturbance. Residential areas also encroach into the southern and northern portion of the Subject Land, with planted mixed native and exotic gardens (Plate 5) and landscaped areas occurring within the northern portion of the Subject Land.

#### **Exotic and planted vegetation**

The Subject Land and surrounding areas have experienced a high proportion of disturbance from historic land management including clearing and grazing, and more recent residential development, recreational use, and ongoing grazing by both feral and domestic animals. This disturbance has likely encouraged the proliferation of common exotic species including woody weeds and pasture species identified within the site (Plate 6).

A diversity of exotic species was identified across the site including a high number of listed HTE's as well as planted garden and landscaping species. Weed cover and diversity ranged from low-moderate to high throughout the Subject Land, with dense infestations of some weeds, including extensive areas of Mulleins (*Verbascum* spp.), Fleabane (*Conyza* spp.) and Cotoneaster (*Cotoneaster* spp.), St John's Wort (*Hypericum perforatum*), Phalaris (*Phalaris aquatica*), Scotch Thistle (*Onopordum acanthium*), Briar Rose (*Rosa rubiginosa*), and Blackberry (*Rubus fruticosus* sp. agg) present in more open and disturbed areas. Planted exotic and native garden species also occur within the northern portion of the site within residential backyards and nearby plantings.

Weeds listed as High Threat Exotics, WoNS, and/or Priority Weeds for the South East region, including the Snowy Monaro Regional Council area, are listed in Table 12.

**Table 12 High Threat Exotic, WoNS and Priority weed species identified on site**

Scientific Name	Common Name	Status	Regional/National Listing
<i>Achillea millefolium</i>	Yarrow	HTE	-
<i>Arundo donax</i>	Giant Reed	HTE	-
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	HTE	-
<i>Cotoneaster pannosus</i>	Cotoneaster	HTE	-
<i>Crataegus monogyna</i>	Hawthorn	HTE	-
<i>Eragrostis curvula</i>	African Lovegrass	HTE	Priority Weed
<i>Hypericum perforatum</i>	St John's Wort	HTE	-
<i>Nasella trichotoma</i>	Serrated Tussock	HTE	Priority Weed
<i>Onopordum acanthium</i>	Scotch Thistle	HTE	-





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Scientific Name	Common Name	Status	Regional/National Listing
<i>Paspalum dialatatum</i>	Paspalum	HTE	-
<i>Pinus radiata</i>	Radiata Pine	HTE	-
<i>Pinus spp.</i>	Pine	HTE	-
<i>Populus nigra "Italica"</i>	Lombardy Poplar	HTE	-
<i>Pyracantha sp.</i>	Firethorn	HTE	-
<i>Rosa rubiginosa</i>	Sweet Briar Rose	HTE	-
<i>Rubus fruticosus spp. agg.</i>	Blackberry	HTE	WONS, Priority Weed
<i>Rumex acetosella</i>	Sheep Sorrell	HTE	-
<i>Vinca major</i>	Greater Periwinkle	HTE	-



Plate 2 PCT 1191 Woodland - Good to Moderate condition



Plate 3 PCT 1191 Derived Grassland - Good to Moderate condition





Plate 4 PCT 1191 Derived Grassland - Moderate to Degraded condition



Plate 5 Planted mixed Native / Exotic gardens and landscaping



Plate 6 Weed species Sweet Briar Rose (left), Blackberry (centre) and exotic pasture species



Plate 7 Disturbance areas including erosion along lake foreshore (left) and degraded creek lines and drainage channels (right)

### 5.2.2 Fauna survey results

A total of sixty-nine (69) fauna species were recorded within the Subject Land during surveys. This included four (4) native mammals, seven (7) exotic mammals, forty-seven (47) native bird species, three (3) exotic bird species, four (4) native amphibians, three (3) native reptiles and one (1) native crustacean. A full list of species is provided in Appendix D.

The site contained a diverse array of native fauna with evidence of abundant bird, native macropod and wombat activity evident throughout the Subject Land. No recent grazing by livestock was evident within the Subject Land. Evidence of feral rabbits, goat and fox was present throughout the Subject Land.

#### Fauna habitats

The Subject Land contains a variety of habitat types and resources for fauna throughout (Figure 6, Plate 8 - Plate 11), including grassy and shrubby woodlands, small and large localised rocky outcrops, partially vegetated creeks and ephemeral waterways, sandy embankments, burrows, logs, and cleared open grasslands.

Shrubby and open woodland areas provided suitable foraging and nesting habitat for a variety of woodland birds observed on the site. Canopy species including eucalypts (*Eucalyptus* spp.) and wattles (*Acacia* spp.) as well as shrubby species such as *Grevillea* sp. provide potential foraging and roosting habitat for a range of common and threatened bird and fauna species such as Gang-gang Cockatoo (*Callocephalon fimbriatum*) and Flame Robin (*Petroica phoenicea*), both observed on site, as well as microbats such as Large Bent-wing Bat (*Miniopterus orianae oceanensis*) and arboreal mammals including Eastern Pygmy-possum (*Cercartetus nanus*).

A small number of hollow's were noted within the Subject Land of varying sizes, with most low to the ground due to small tree sizes and may offer opportunistic refuge for arboreal mammals and birds species including smaller parrots.

Cleared open spaces provided foraging opportunities for marsupials, grassland birds and birds of prey. Rocky outcrops were abundant throughout the Subject Land and offer potential suitable habitat



resources for reptiles, with creek lines, ephemeral waterways and nearby Lake Jindabyne providing potential, though largely degraded, habitat for amphibians within the Subject Land.



Plate 8 Native fauna recorded on site including Gang-Gang (left), Crimson Rosella (centre) and White's Skink (right)



Plate 9 Wombat and burrow (left and centre) and Gang-Gangs (right) utilising available resources within the Subject Land



Plate 10 Structurally diverse grassland (left) and open woodland environments (right)



Plate 11 Waterbodies within the Subject Land including Lake Jindabyne (left) and creek lines (right)

### 5.3 Vegetation Zones

Onsite surveys confirmed that there are five (5) vegetation zones occurring within the subject land (Figure 5, Figure 6), as follows:

- Zone 1: PCT 1191 Good - Moderate
- Zone 2: PCT 1191 Derived Grassland Good - Moderate
- Zone 3: PCT 1191 Derived Grassland Moderate - Degraded
- Zone 4: Planted Mixed Native/Exotic Gardens
- Zone 5: PCT 0 Non-Native

Areas containing low to moderate levels of weed, including a lesser cover of High Threat Exotic (HTE) weeds, were zoned as “good to moderate” condition, with areas subject to higher disturbance and weed encroachment zoned as “moderate to degraded” condition. Areas of planted mixed native and exotic vegetation within residential garden landscaping were allocated in line with the BAM (Appendix D, BAM 2020). Areas devoid of overstorey or with regenerating midstorey species were zoned as “derived grassland”. Areas zoned as “non-native” included roads, tracks, residential housing and carpark areas.

### 5.4 Vegetation Integrity Results

The results of vegetation integrity (VI) scores produced by the BAM-C are summarised as the observed mean of all plots for composition, structure and function each vegetation zone.

Impacts to PCT’s as well as VI results from the BAM-C for the vegetation zones identified in the Subject Land are summarized in Table 13 below.

Table 13 Summary of vegetation integrity scores for vegetation zones

PCT	Vegetation Zone	CS	SS	FS	Current VI scores	Direct Impact Area (ha)	Indirect Impact Area (ha)
1191	Zone 1: Good to Moderate	78.3	100	62.1	<b>78.6</b>	0.16	0.91
1191	Zone 2: Derived – Good to Moderate	37.2	65.1	0.3	<b>8.5</b>	0.46	2.53



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PCT	Vegetation Zone	CS	SS	FS	Current VI scores	Direct Impact Area (ha)	Indirect Impact Area (ha)
1191	Zone 3: Derived - Moderate to Degraded	42.7	52.3	19.9	35.4	0.38	2.04
-	Zone 4: Planted mixed native/exotic	-	-	-	N/A	0.08	0.47
-	Zone 5: Non-Native	-	-	-	N/A	0.02	0.16
Total Area (ha)						1.11	6.11

### 5.5 Management Zones

Table 14 below details the actions proposed for each of the different management zones for the Subject Land as well as the implications for each of the ecological attributes associated with the PCTs impacted.

Table 14 Management zone approach and resulting ecological attributes

Development area	Area (ha)	Management approach	Ecological attributes to be retained
<b>Direct impact area – Trail network and pedestrian bridges</b>	<b>1.11</b>	All vegetation within lower stratum layers (shrub, ground layer and sapling trees) removed to allow for trail and infrastructure construction. Rocks to be avoided or moved to edge of trail where possible. No impact to mature trees.	Vegetation surrounding associated infrastructure to be maintained during construction and operational phase.
<b>Indirect impact area</b>	<b>6.11</b>	Recommendation for all vegetation to be subject to weed control measures to impede weed growth and enhance biodiversity values.	Biodiversity values within this zone to be maintained or enhanced through weed control measures.





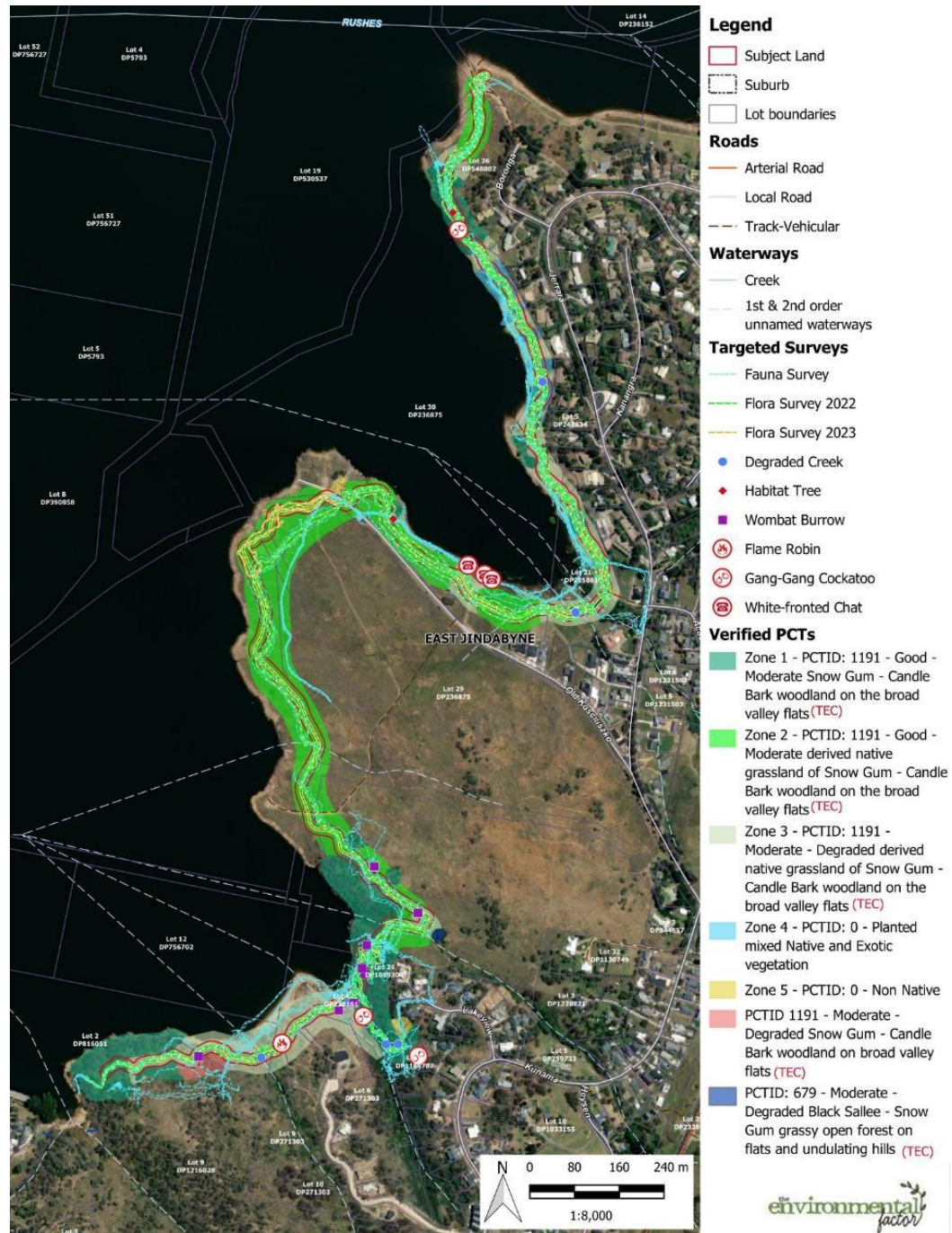
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Figure 6 Survey Effort – BAM plots, Habitat Features, Vegetation Zones, and Verified PCT's and TEC's



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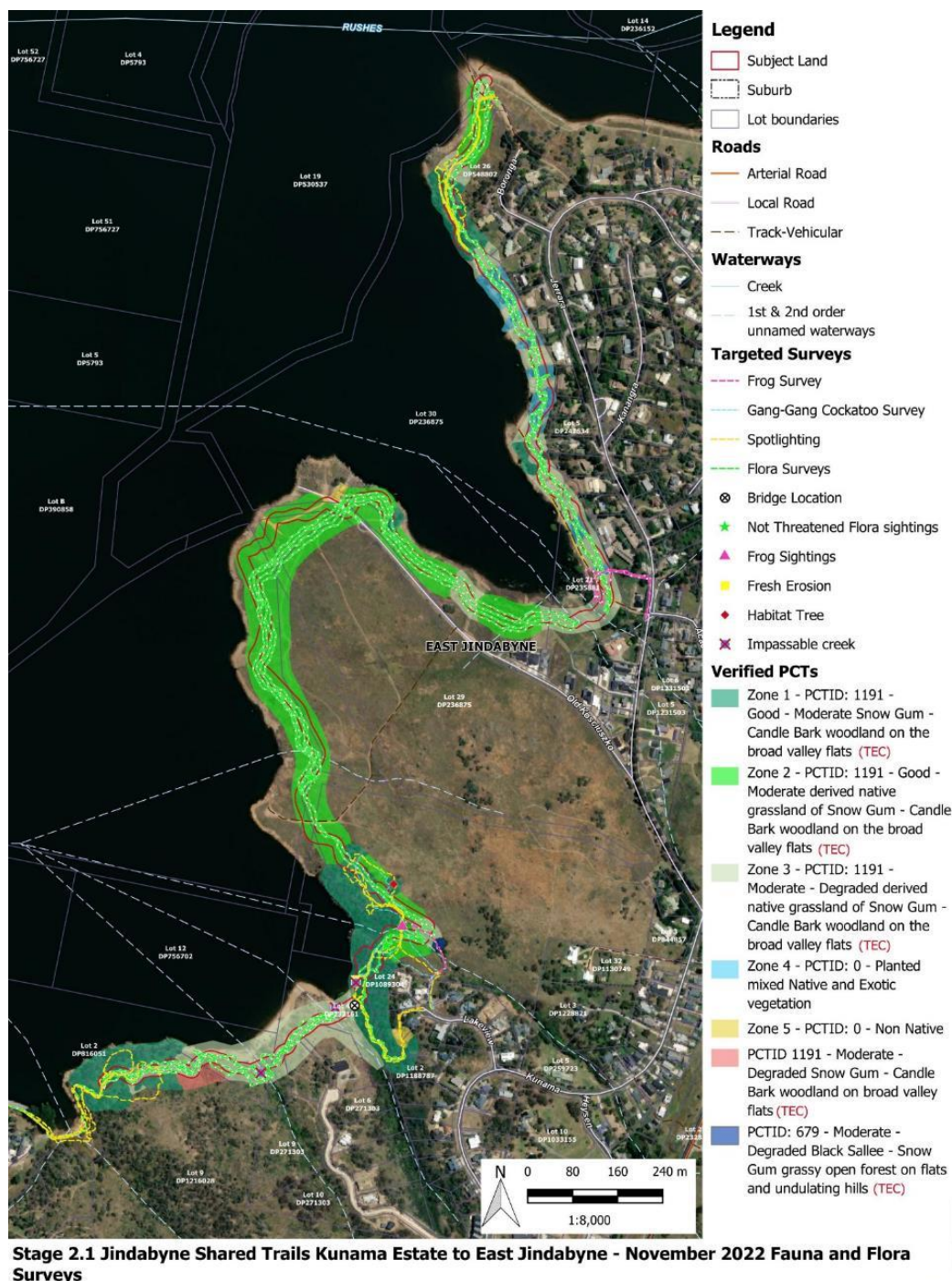
**Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - September 2022/2023 Fauna and Flora Surveys**

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**Figure 7 Survey Effort - Targeted Seasonal Surveys (September 2022 and 2023)**



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Figure 8 Survey Effort - Targeted Seasonal Surveys (November 2022)





## 5.6 Conservation significance

The following section describes the conservation significance of vegetation communities and species likely to be present within the Subject Land.

### 5.6.1 Threatened ecological communities

One (1) Threatened Ecological Communities (TEC) was recorded as occurring within the Subject Land during surveys. PCT 1191 was confirmed as occurring within the Subject Land as Grassy Woodland and Derived Grassland in a variety of conditions: good to moderate; derived grassland – good to moderate; and derived grassland – moderate to degraded.

This TEC is not listed under the EPBC Act, and as such, a Significant Impact Criteria assessment or 'Assessment of Significance' is not required for this community.

### 5.6.2 Threatened flora

No threatened flora species were recorded as occurring within the Subject Land during seasonal targeted surveys. No previous records for threatened flora species occur within the Assessment Area, however, a number of threatened species are recorded as occurring within the broader locality (BioNET 2021), including:

- Leafy Anchor Plant (*Discaria nitida*) – V, BC Act
- Mauve Burr-daisy (*Calotis glandulosa*) – V, BC and EPBC Act
- Hoary Sunray (*Leucochrysum albicans* var. *tricolor*) – E, EPBC Act
- Rough Eyebright (*Euphrasia scabra*) – E, BC Act
- Silky Swainson-pea (*Swainsona sericea*) – V, BC Act

The Subject Land is subject to ongoing disturbance through human activity and mowing near residential areas, as well as high levels of weed encroachment throughout, limiting the quality and areas for threatened flora to persist.

### 5.6.3 Threatened fauna

Three (3) species of threatened fauna listed as Vulnerable under the BC Act were recorded as occurring within the Subject Land during surveys (Figure 6, Figure 7, Figure 8):

- Gang-gang Cockatoo, *Callocephalon fimbriatum*
- White-fronted Chat, *Epthianura albifrons*
- Flame Robin, *Petroica phoenicea*

An additional twenty-eight (28) threatened fauna records occur within the broader locality (BioNET 2021; Appendix F).

Targeted seasonal surveys failed to detect breeding activity for Gang Gang's or any other targeted threatened species within the Subject Land, with Gang Gang's absent from the Assessment Area during targeted surveys. This is likely due to the species preferring higher altitude heavily timbered and mature forests for breeding (Spring and Summer), utilising lower altitudes including residential areas for foraging resources outside of the breeding season (Autumn and Winter) (DPE 2022).

### 5.6.4 'Ecosystem' and 'Species' Credit Species

Section 5 of the BAM details the process for determining the habitat suitability for threatened species.



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Under the BAM, threatened species are separated into two (2) classes, 'ecosystem' and 'species' credit species. Those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which a targeted survey has a low probability of detection, are identified as 'ecosystem' credit species. Targeted surveys are not required for ecosystem species and potential impacts to these species are assessed in conjunction with impacts to PCTs.

Threatened species where the likelihood of occurrence of a species or elements of suitable habitat for the species cannot be confidently predicted by vegetation surrogates and landscape features, and can be reliably detected by survey, are identified as 'species' credit species. A targeted survey or an expert report is required to confirm the presence or absence of these species on the Subject Land.

For some threatened species, they are identified as both ecosystem and species credit species, with different aspects of the habitat and life cycle representing different credit types. Commonly, threatened fauna species may have foraging habitat as an ecosystem credit, while their breeding habitat represents a species credit; some species credit species can be excluded in this way if they have known, limited breeding locations and / or resources.

The following sections outline the process for determining the habitat suitability for threatened species within the Subject Land, and the results of targeted surveys for candidate threatened species, if applicable.

#### **Ecosystem Credit Species**

Ecosystem credit species predicted to occur within the Subject Land are provided in Table 15. Four (4) ecosystem credit species were removed from the assessment based on the absence of suitable habitat surrogates.

**Table 15 Ecosystem Credit Species**

Common Name	Scientific Name	BC Act listing	EPBC Act listing	Maintained as Ecosystem Credit Species? Y/N
Barking Owl (foraging)	<i>Ninox connivens</i>	V	-	Y
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	-	Y
Diamond Firetail	<i>Stagonopleura guttata</i>	V	-	Y
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	Y
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	-	Y
Flame Robin	<i>Petroica phoenicea</i>	V	-	Y
Gang-gang Cockatoo (foraging)	<i>Callocephalon fimbriatum</i>	V	-	Y



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Common Name	Scientific Name	BC Act listing	EPBC Act listing	Maintained as Ecosystem Credit Species? Y/N
Glossy Black-Cockatoo (foraging)	<i>Calyptrorhynchus lathamii</i>	V	V	N – Habitat constraints, lack of habitat surrogates
Hooded Robin (south-east form)	<i>Melanodryas cucullata cucullata</i>	V	-	Y
Large Bent-winged Bat (foraging)	<i>Miniopterus orianae oceanensis</i>	V	-	Y
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Y
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	Y
Little Whip Snake	<i>Suta flagellum</i>	V	-	Y
Powerful Owl (foraging)	<i>Ninox strenua</i>	V	-	Y
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	N – Habitat constraints, vagrant
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	V	-	N – Habitat constraints, lack of habitat surrogates
Scarlet Robin	<i>Petroica boodang</i>	V	-	Y
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	Y
Spotted Harrier	<i>Circus assimilis</i>	V	-	Y
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	Y
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	Y
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	Y
White-bellied Sea-eagle (foraging)	<i>Haliaeetus leucogaster</i>	V	-	Y
White-fronted Chat	<i>Epthianura albifrons</i>	V	-	Species added
White-throated Needle-tail	<i>Hirundapus caudactis</i>	-	V	Y
Yellow-bellied Glider	<i>Petaurus australis</i>	V	V	N – Habitat constraints, lack of habitat surrogates

#### Species Credit Species



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As outlined above, species credit species are predicted in the BAM Calculator following assessment of geographic and habitat features in the credit calculator, such as site location (IBRA subregion), PCTs and condition, patch size and the area of surrounding vegetation within the 500 m buffer of the Subject Land (linear). Some species require further assessment of habitat constraints and/or geographic limitations before being confirmed as candidate species for assessment. Table 16 outlines the questions asked for these species, and whether the species is confirmed as a candidate species.

Based upon the assessment of available habitat for predicted candidate species within the Subject Land, eighteen (18) species credit species were assumed present for the Subject Land. Of these, fourteen (14) species were excluded with justifications for each provided below.

Table 16 Species Credit Species

Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
<b><i>Anthochaera phrygia</i></b> Regent Honeyeater (breeding)	CE	CE	OEH mapped important breeding sites	No	N/A	OEH mapped important breeding sites do not occur within or in proximity to the Subject Land.
<b><i>Aprasia parapulchella</i></b> Pink-tailed Legless Lizard	V	-	Rocky areas or within 50 m of rocky areas	Yes	Assumed Present	Rocky outcrops present throughout Subject Land
<b><i>Caladenia tessellata</i></b> Thick Lip Spider Orchid	E	V	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Habitat degraded – ongoing grazing and heavy weed infestation. Species not recorded within Subject Land.
<b><i>Callocephalon fimbriatum</i></b>	V	-	Hollow bearing trees.	Yes	No	<b>Targeted Seasonal Surveys.</b> No





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Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
Gang-gang Cockatoo (breeding)			Eucalypt tree species with hollows at least 3m above the ground and with hollows greater than 7 cm diameter			evidence of breeding on site. No suitable nesting trees within Subject Land
<i>Calotis glandulosa</i> Mauve Burr-daisy	V	V	South of Michelago	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land. Habitat degraded – ongoing grazing and heavy weed infestation
<i>Calyptrorhynchus lathamii</i> Glossy Black-Cockatoo (breeding)	V	V	Hollow bearing trees.  Living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground.	Yes	No	<b>Targeted Seasonal Surveys.</b> No evidence of breeding on site. No suitable nesting trees within Subject Land
<i>Cercartetus nanus</i> Eastern Pygmy-possum	V	-	None defined in BAM 2020	Yes	Assumed presence	Suitable habitat present within the Subject Land
<i>Commersonia prostrata</i> Dwarf Kerrawang	E	E	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Survey.</b> Species not recorded within



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Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
						Subject Land. Habitat degraded – ongoing grazing and heavy weed infestation
<i>Diuris aequalis</i> Buttercup Doubetail	E	V	North of Hoskintown	No	N/A	Geographical constraint: Subject Land falls outside known region
<i>Dodonaea procumbens</i> Creeping hop-bush	V	V	Cooma-Monaro Shire south of Michelago	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land. Habitat degraded – ongoing grazing and heavy weed infestation
<i>Eucalyptus aggregata</i> Black Gum	V	V	East of a line that runs north-south approx. 5km west of Bungendore	No	N/A	Geographical constraint: Subject Land falls outside known region
<i>Eucalyptus macarthurii</i> Paddy's River Box	E	E	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land. Habitat degraded – ongoing grazing and



Biodiversity Development Assessment Report – Jindabyne Shared Trails

Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
						heavy weed infestation
<b><i>Euphrasia scabra</i></b> Rough Eyebright	E	-	Montane Bogs or within 50m.	No	N/A	No suitable habitat surrogates present within Subject Land
<b><i>Haliaeetus leucogaster</i></b> White-bellied Sea-eagle (breeding)	V	M	Live or dead mature trees in suitable vegetation within 1 km of major waterbodies	Yes	No	<b>Targeted Seasonal Survey.</b> No evidence of breeding on site.
<b><i>Hieraaetus morphnoides</i></b> Little Eagle (breeding)	V	-	Nest trees - live (occasionally dead) large old trees within vegetation	Yes	No	<b>Targeted Seasonal Survey.</b> No evidence of breeding on site.
<b><i>Leucochrysum albicans</i> var. <i>tricolor</i></b> Hoary Sunray	-	E	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land.
<b><i>Miniopterus orianae oceanensis</i></b> Large (or Eastern) Bentwing Bat (breeding)	V	-	Caves, tunnels, mines, culverts or other structure known or suspected to be used for breeding including species records with microhabitat code IC  Observation type code E nest roost  With numbers of individuals >500	No	N/A	No suitable structures within close proximity to Subject Land.  No known breeding camps in proximity to Subject Land.



## Biodiversity Development Assessment Report – Jindabyne Shared Trails

Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
<b><i>Myotis macropus</i></b> Southern Myotis	V	-	Waterbodies with permanent stretches 3m or wider, including lakes.	Yes	Assumed Present	Subject Land within close proximity to major water body (Lake Jindabyne)
<b><i>Ninox connivens</i></b> Barking Owl (breeding)	V	-	Hollow bearing trees.  Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground	No	N/A	Habitat constraint: Absence of suitable hollows within Subject Land
<b><i>Ninox strenua</i></b> Powerful Owl (breeding)	V	-	Living or dead trees with hollow greater than 20cm diameter	No	N/A	Habitat Constraint: Absence of suitable hollows within Subject Land
<b><i>Petauroides volans</i></b> Southern Greater Glider	E	E	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land. Lack of suitable habitat surrogates within Subject Land
<b><i>Petroica rodingaster</i></b> Pink Robin	V	-	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land.



Biodiversity Development Assessment Report – Jindabyne Shared Trails

Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
						Lack of suitable habitat surrogates within Subject Land
<i>Phascolarctos cinereus</i> Koala	E	E	Presence of Koala use trees	Yes	Assumed Present	Suitable habitat present within woodland areas of the Subject Land
<i>Prasophyllum petilum</i> Tarengo Leek Orchid	E	E	None defined in BAM 2020	No	N/A	Lack of suitable habitat surrogates within Subject Land; habitat degraded
<i>Rutidosia leptorhynchoidea</i> Button Wrinklewort	E	E	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land.
<i>Swainsona sericea</i> Silky Swainson-pea	V	-	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded within Subject Land.
<i>Thesium australe</i> Austral Toadflax	V	V	None defined in BAM 2020	Yes	No	<b>Targeted Seasonal Surveys.</b> Species not recorded



Biodiversity Development Assessment Report – Jindabyne Shared Trails

Species	BC Act	EPBC Act	BAM habitat requirements	Maintained as candidate species?	Presence	Justification
						within Subject Land.

#### 5.6.5 'Migratory species'

Of the listed terrestrial migratory species (PMST 2021) with the potential to occur within the locality, White-throated Needletail (*Hirundapus caudactus*) was the only species to be considered to have the potential to regularly use resources within the Subject Land following the field survey and habitat assessment. This species has been captured within the BAM-C assessment, and therefore Significant Impact Criteria assessments have not been completed.

#### 5.7 Habitat connectivity

The Subject Land contains moderate to low connectivity to larger tracts of quality fauna habitat within the immediate Assessment Area, with tracts of woodland and forest extending out within the locality, providing access and throughfare for fauna (Figure 5).

The primary connectivity for terrestrial fauna is via remnant trees, shrubs and rocky outcrops. Terrestrial fauna movement is restricted within the Assessment Area by cleared land, residential development, roads and fencing, however enough scattered and larger remnant vegetation patches remain to allow fauna movement between patches for highly mobile and disturbance tolerant species.





## STAGE 2: IMPACTS ASSESSMENT

The following chapters detail the impact assessment completed for the Proposal, in order to determine whether the Proposal will be required to enter the BOS or be referred to the NSW or Commonwealth Minister for Environment for further assessment. Impacts assessed include direct and indirect impacts arising from the Proposal to native vegetation, threatened species, ecological communities and their habitats, as well as 'prescribed biodiversity impacts', Serious and Irreversible Impacts (SAII) and Key Threatening Processes (KTP).

## 6 IMPACT ASSESSMENT

### 6.1 Trigger for entry into the Biodiversity Offset Scheme

The assessment requirements of the BC Act 2016 and Biodiversity Conservation Regulation 2017 are mandatory for all development applications assessed under Part 4 of the EP&A Act. The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the Biodiversity Offsets Scheme will be triggered. The threshold has 2 elements:

- whether the amount of native vegetation being cleared exceeds an area threshold
- whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head.

If clearing and other impacts, including biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017, exceed either trigger, the Biodiversity Offsets Scheme applies to the Proposal.

#### 6.1.1 Biodiversity Values Map

The BVM (Appendix C) shows no areas of vegetation mapped as containing High Biodiversity Values in proximity to the Subject Land.

#### 6.1.2 Area Threshold Criteria

The Subject Land (total direct impact area) measures a total of **7.21 ha**. The minimum lot size for the Subject Land is **0.12 ha**, therefore a minimum lot size of **0.25 ha** has been used for this assessment.

The Proposal involves clearing of native vegetation to accommodate the trail alignment of **1.01 ha**; consequently, **the area clearing threshold is exceeded**, and the BOS applies to the Proposal.

#### 6.1.3 Areas of Outstanding Biodiversity Value

No listed Areas of Outstanding Biodiversity Value (AOBV) occur within the Subject Land or will be impacted by the Proposal.

#### 6.1.4 Assessment of Significance Threshold

As the Proposal already requires participation in the BOS based on the Area Clearing Threshold, consideration of impacts through Tests of Significance have not been progressed for species listed under the BC Act.

Species listed under the Commonwealth EPBC Act and not already covered by the BOS, were assessed for their potential to be impacted by the Proposal (Appendix F). No additional species were identified as having a Moderate to High likelihood of being impacted by the Proposal, therefore Significant Impact Criteria Assessments under the EPBC Act were not undertaken.



### 6.2 Direct impacts to native vegetation including planted native vegetation

Clearing of understorey shrubs, groundcover and possible disturbance to habitat resources including logs, burrows, waterways and rocks within the direct impact zone during the construction of the trail and bridges is anticipated. The removal of this vegetation and habitat material will permanently reduce foraging and breeding habitat for some species of native fauna present within the Subject Land, disturb and expose soils, and may impact the movement of water through the Assessment Area as the Subject Land includes gentle and steeper gradients across the hillslope. This disturbance will occur throughout the entire Subject Land for the duration of construction works, duration of which is yet to be determined, and is expected to reduce to a maximum operational width of 2 m of ongoing disturbance through trail use.

Planted, non-endemic native and exotic tree species within residential gardens offer limited, marginal foraging and roosting resources for disturbance tolerant species of threatened fauna, including Flame Robin (*Petroica phoenicea*), occurring within the locality. These patches occur within residential backyards and are subject to regular disturbance through mowing and human and domestic animal activity. No habitat features, including hollows or nests, were observed within these areas during surveys, however planted native species may offer seasonal foraging resources for pollen dependent species.

Areas outside the Subject Land will remain consistent with native vegetation condition currently on site and is recommended to be subject to weed management measures; the areas outside the Subject Land have not been factored into this assessment, as impacts are not anticipated to extend beyond the 10 m indirect impact buffer extending on either side of the proposed trail.

The BAM calculator was used to estimate future condition scores for composition, structure and function by adjusting the assemblage, growth form and functionality measures to reflect the different management zones as described above. It has been assumed that High Threat Exotic cover and abundance would remain consistent for the indirect impact area. Future condition scores are presented in Table 17.

Table 17 Change in Vegetation Integrity (VI) Score for PCTs impacted

PCT	Impact area (ha)	Current VI score	Management Zone	Future VI score	Change in VI score	Total VI Loss
PCT 1191 Good to Moderate	0.91	78.6	Indirect	78.6	0	<b>-10.9</b>
	0.16	78.6	Direct	5.8	-72.8	
PCT 1191 Derived Good to Moderate	2.53	8.5	Indirect	8.5	0	<b>-1.3</b>
	0.46	8.5	Direct	0	-8.5	
PCT 1191 Derived Moderate to Degraded	2.04	35.4	Indirect	36.8	1.3	<b>-4.3</b>
	0.38	35.4	Direct	0.8	-34.7	
	0.47	N/A	Indirect	N/A	N/A	N/A



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PCT	Impact area (ha)	Current VI score	Management Zone	Future VI score	Change in VI score	Total VI Loss
Planted mixed native /exotic	0.08		Direct			
PCT 0 Non-Native	0.16	N/A	Indirect	N/A	N/A	N/A
	0.02		Direct			

Throughout the Subject Land, the direct clearing for the shared trail would represent a permanent land management change for these areas.

### 6.2.1 Fauna habitat removal

Clearing of understorey shrubs, groundcover and disturbance to habitat resources including shrubs, logs, burrows, waterways and rocks will occur within the direct impact area (Subject Site). No mature trees will be impacted as part of the Proposal. Consequently, no tree hollows or larger nesting sites will be lost.

Shrubs will be cleared along the new length of trail and around proposed bridge structures, impacting potential nesting and foraging resources for some bird species. Rocks and logs occurring within the Subject Land may be moved or otherwise impacted, disturbing potential habitat for ground dwelling fauna, however large amounts of these resources occur within the broader locality and will not be impacted by the proposal. A number of wombat burrows occur within the Subject Land; however, most will not be directly impacted as they are adjacent the proposed subject site / direct impact area.

The trail has been designed to avoid impacting these habitat features as far as practicable, however disturbance to some of these features are likely to still occur through vehicle and human movement, noise and air quality (dust) impacts, which may result in short and long-term effects to some localised fauna species inhabiting the Subject Land due to habitat removal and disturbance.

### 6.2.2 Impacts to waterways

In addition to Lake Jindabyne, a number of creeks and unnamed waterways are mapped as occurring within the Assessment Area, with the proposed trail intersecting seven (7) unnamed waterways. (Figure 3). Key Fish Habitat (KFH) is mapped along the edge of Lake Jindabyne which forms the western portion of the Assessment Area, and along one unnamed creek (Figure 3), with the Subject Land interacting with KFH at six (6) locations along the alignment.

Lake Jindabyne (a mapped wetland) is a large man-made lake, formed following the damming of the Snowy River in the 1960s (Figure 3). The Snowy River inlet, submerged channel and outlet to Lake Jindabyne forms part of the *Endangered Aquatic Ecological Community of the Snowy River Catchment in NSW* listed under the FM Act. No direct impacts to the Snowy River Catchment EEC are considered likely from the Proposal. Minor impacts to drainage lines and KFH will occur in some areas where the trail crosses these waterways, primarily through the construction of bridges over waterways and within mapped KFH zones along the lake front. The proposed trail alignment has been designed with the intent to minimise impacts to waterways or interactions with the Lake, with large areas of mapped KFH currently dry land (at time of survey).



All existing creeks and drainage lines within the Subject Land are currently disturbed and degraded, due to historic clearing, erosion and weed encroachment as well as current disturbance through human activity. Bridge construction over waterways will incorporate the insertion of pilings outside of creek banks, and aerial placement of structures via helicopter to reduce impacts to waterways or vegetation in sensitive areas. Therefore, minimal impact on these features as a result of the Proposed works is anticipated, however some impacts to riparian areas is expected during construction.

### 6.3 Indirect impacts

It is difficult to quantify indirect impacts associated with the Proposal, however, it can reasonably be assumed that these may include similar impacts to existing disturbance based on nearby operational mountain bike trails, such as ongoing human disturbances including litter, vegetation compaction and trampling in places, noise and vibration during construction, further spread or introduction of weeds, erosion and/or sediment migration to some extent associated with the construction and/or operational phases of the project, particularly on slopes, and ongoing disturbance and impacts to fauna from increased land usage including vehicular strike, noise disturbance, domestic animal disturbance, and potential strike from bike users, particularly of smaller fauna such as reptiles basking along the trail.

Within the Subject Land, impacts arising from litter, vegetation compaction and trampling, and introduction of weeds is likely to be similar to those effects seen in other parts of the Assessment Area that contain existing trail, with a potential increase in these impacts most likely around trail hubs and residential areas during the operational phase of the Proposal, and along the sections of new trail where access is currently limited. Potential impacts to fauna from noise and vibration during construction may result in some fauna avoiding habitats directly adjacent to the Subject Site / impact area; however, a buffer of 10 m either side of the centre line has been included for indirect impacts to account for this which forms the Subject Land, noting that the equipment used for track construction will be small in size, with the magnitude of this impact expected to be low.

Existing disturbance levels within parts of the Subject Land and adjacent Assessment Area that cross or occur near existing roads, residential areas, trails and walkways that are already subject to varying levels of noise and human disturbance from ongoing construction works, vehicle traffic and recreational users, are unlikely to see a substantial increase from existing disturbance levels. Mitigation measures proposed for implementation during construction, including adherence to industry standard work times and hours, and noise level controls, should negate these impacts from increasing during the construction phase of the development.

Potential erosion and/or sediment migration experienced along the trail during the operational phase of the Proposal are likely to be akin to those experienced along existing trails within the current Jindabyne trail network and will be dependent upon a number of factors including design (i.e. gradient, direction and control of runoff), weather, trail use, and maintenance schedules. Effective track design, combined with mitigation measures proposed for implementation during construction including the use of appropriate erosion and sediment (ERSED) controls, should help to negate these impacts during the construction phase of the development. Also, erosion within creek lines will be mitigated through the use of bridges at all creek crossings.



### **6.3.1 Habitat fragmentation**

Clearing of a 3 m wide linear trail of predominately shrubs and groundcover species throughout the Subject Land is unlikely to markedly increase habitat fragmentation for this site due to the nature of the existing environment being largely cleared of overstorey and shrub species currently, and tracts of habitats present on the land immediately adjacent to the Subject Land will not be impacted.

Existing roads, fences and residential developments already intersect portions of the Subject Land and broader Assessment Area. Species that inhabit the Subject Land have been exposed to similar, existing levels of fragmentation, and so are unlikely to be further impacted by the additional fragmentation brought about by the construction of the trail.

Currently habitats outside the nominated Subject Land impact area are used by a variety of fauna species, and this is unlikely to change as a result of the Proposal. No direct obstruction to the movement of fauna species is anticipated from the Proposal. Key habitat components such as trees, burrows, and large rocky outcrops have also been retained within the Subject Land and the broader Assessment Area, with these areas anticipated to be largely unaffected by the proposed trail per current conditions.

### **6.3.2 Fauna injury and mortality**

Common fauna present within the Subject Land, e.g. reptiles, may be trapped or injured during trail construction. It is recommended that a fauna spotter/catcher be engaged to complete thorough pre-clearing surveys to locate and remove fauna if encountered throughout the entire trail.

During operation of the trail, signage alerting trail users to the presence of fauna along the trail may help to reduce potential injury or mortality to ground dwelling fauna occurring in the area, including macropods, wombats and reptiles.

Impacts to fauna from vehicle or bike strike within the operational phase of the Proposal are difficult to quantify and are subject to factors including visitor numbers and adherence to trail rules. The trail is likely to experience high levels of visitor numbers throughout the year, and this has the potential to increase with the new developments proposed for the region. Existing road speed limits throughout the Assessment Area have the potential to minimise potential vehicle strikes to close to existing levels.

Impacts to fauna from trail use is also equally difficult to quantify, with little data available to help guide predictions. Impacts are likely to be similar to those on existing trails in the area within ground dwelling diurnal species including lizards, snakes, and possibly macropods, wombats and echidnas. Impacts to fauna species during the construction phase, including noise and increases in human disturbance, are likely to occur as a result of trail construction. Mitigation measures proposed for implementation during construction including seasonal construction (i.e. timing construction activities for outside known or predicted breeding times of native species) where possible, pre-clearing surveys and fauna spotting during construction will likely help negate these impacts from occurring during the construction phase of the development.

## **6.4 Prescribed Biodiversity Impacts**

Some proposals may have impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. For many of these impacts, the biodiversity values may be difficult to quantify, replace or offset, making avoiding and minimising impacts critical.



The BC Regulation (clause 6.1) identifies actions that are prescribed as impacts to be assessed under the biodiversity offsets scheme:

- a) Impacts of development on the habitat of threatened species or ecological communities associated with
  - karst, caves, crevices, cliffs and other geological features of significance; or
  - rocks; or
  - human made structures; or
  - non-native vegetation.
- b) Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,
- c) Impacts of development on movement of threatened species that maintains their life cycle,
- d) Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or “upsidence” resulting from underground mining),
- e) Impacts of wind turbine strikes on protected animals, and
- f) Impacts of vehicle strikes on threatened species or on animals that are part of a TEC.

The Proposal has the potential to contribute to four (4) prescribed impacts (refer Figure 1 and Figure 3 - Figure 5):

1. Impacts of development on the habitat of threatened species or ecological communities associated with:
  - Rocks, including rocky habitat or outcrops

The Proposal will result in impacts to small rocky outcrops where the trail traverses these areas throughout the Subject Land. Impacts include potential movement of isolated rocks and traversing of small areas of some rocky outcrops.

2. Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range:

The Proposal will result in the removal of understorey and groundcover vegetation along the linear trail network that may result in additional localised minor fragmentation of habitat for species such as small woodland birds, including Flame Robin (*Petroica phoenicea*) recorded on the site. The Proposal will not impact on mature trees within the Subject Land, reducing risk of habitat fragmentation for canopy dependent threatened species recorded with the Subject Land or broader Assessment Area.

3. Water quality, water bodies and hydrological processes that sustain threatened species and TECs.

The Proposal may result in minor impacts to waterways traversing or adjacent the site during construction and operation of the bike trail, including establishment of waterway crossings and increased hard surface through trail and carpark construction. Impacts may include contamination and sedimentation of waterways as a result of construction and post-construction activities through riparian bank disturbance during bridge construction, and increased runoff from trails.





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No threatened aquatic species were observed to be present on site during targeted seasonal surveys, however records of Green and Golden Bell Frog (*Litoria aurea*) and Booroolong Frog (*Litoria booroolongensis*) occur over 3 km away, outside the Assessment Area.

4. Impacts of vehicle strike on threatened species or on animals that are part of a TEC including:
- Species that form part of the *Monaro Tablelands Cool Temperate Grassy Woodland* TEC.

The Proposal may result in an increased risk in vehicle strike to fauna for the duration of construction and operational activities on the site due to the increase in vehicle presence from trail users, and through increased road and bike use throughout the Assessment Area.

The anticipated impacts of prescribed impacts as a result of the Proposal are considered to be minor and are not anticipated to result in additional impacts significantly beyond that which already occurs throughout the Assessment Area due to current land use within the immediate and broader area, including extensive urbanisation and recreational activities.

It is not anticipated that the removal of 1.01 ha of predominantly groundcover vegetation along a narrow (3 m wide) linear trail will substantially impact the connectivity of local areas of habitat for threatened species or impact the movement of threatened species themselves within the landscape. Specific minimisation and mitigation measures are provided in Section 8 to reduce the impacts of these prescribed impacts.

There are no anticipated impacts to:

- Karst, caves, crevices, cliffs and other geological features of significance; or
- No wind farm or turbine strike
- No impacts of development on movement of threatened species that maintains their life cycle

Table 18 Prescribed biodiversity features

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature / are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Small rocky outcrops	Potential habitat for: <ul style="list-style-type: none"> <li>– <i>Aprasia parapulchella</i> (Pink-tailed Legless Lizard)</li> </ul>
Human-made structures	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Residential housing, existing trails and roads occur within the Assessment Area	Potential habitat for: <ul style="list-style-type: none"> <li>– <i>Myotis Macropus</i> (Southern Myotis)</li> </ul>
Non-native vegetation	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Areas of exotic vegetation occur within the Subject Land	N/A
Habitat connectivity	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Native vegetation occurs in woodland and derived grassland formation	No fragmentation of critical breeding impact of any threatened species is anticipated.



## Biodiversity Development Assessment Report – Jindabyne Shared Trails

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature / are at risk of vehicle strike
Waterbodies, water quality and hydrological processes	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Lake Jindabyne, Mill Creek, and unnamed Waterways	Lake Jindabyne is mapped as supporting Key Fish Habitat
Wind turbine strikes (wind farm development only)	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	N/A	N/A
Vehicle strikes	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Existing road and trails, and new trail	Potential habitat for: <ul style="list-style-type: none"> <li>– <i>Aprasia parapulchella</i> (Pink-tailed Legless Lizard).</li> <li>– <i>Phascolarctos cinereus</i> (Koala)</li> </ul> Known habitat for: <ul style="list-style-type: none"> <li>– <i>Petroica phoenicea</i> (Flame Robin)</li> <li>– <i>Epthianura albifrons</i> (White-fronted Chat)</li> </ul>

### 6.5 Key threatening processes

A key threatening process (KTP) is defined in the BC Act as an action, activity or Proposal that:

- Adversely affects two or more threatened species, populations or ecological communities
- Could cause species, populations or ecological communities that are not currently threatened to become threatened.

There are currently thirty-nine (39) KTPs listed under the BC Act (DPE 2021) eight (8) listed under the FM Act (DPI 2021) and twenty-one (21) under the EPBC Act (DAWE 2021). Several KTPs are listed under more than one Act.

Several KTP listed under the BC Act currently exist within the Subject Land. The Proposal has the potential to add to a number of these, including:

- Clearing of native vegetation – add
- Invasion of native plant communities by exotic perennial grass – add and/or reduce
- Removal of dead wood and dead trees - add

Several pathogens known from NSW have potential to impact on biodiversity as a result their movement and infection during construction. Of these, three (3) are listed as a key threatening process under either the EPBC Act and/or BC Act including:

- Dieback caused by *Phytophthora* (Root Rot; EPBC Act and BC Act)
- Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis (EPBC Act and BC Act)
- Introduction and establishment of exotic Rust Fungi of the order Pucciniales on plants of the family Myrtaceae (BC Act)



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While these pathogens were not observed or tested for in the Subject Land, the potential for pathogens to occur and spread through trail use should be treated as a risk of the Proposal. The most likely causes of pathogen dispersal include earthworks, movement of soil (including on boots/shoes), and attachment of plant matter and soil to vehicles (including bicycle tyres) and machinery during all phases of the project (construction and operation).



## 7 SERIOUS AND IRREVERSIBLE IMPACTS

A serious and irreversible impact (SAIL) is an impact that a consent authority considers likely to significantly increase the extinction risk of a threatened species or ecological community. The current Proposal and survey effort has resulted in one (1) potential SAIL:

1. Monaro Tablelands Cool Temperate Grassy Woodland TEC (Ecosystem Credits SAIL entity)

### 7.1 Ecosystem credits SAIL entities

#### 7.1.1 Monaro Tablelands Cool Temperate Grassy Woodland TEC

Monaro Tablelands Cool Temperate Grassy Woodland has been identified as a SAIL entity in the *Guidance to assist a decision-maker to determine a serious and irreversible impact* (OEH 2017) and within the BioNet database as an entity at risk of a serious and irreversible impact. This EEC has been listed on the following justifications:

- Monaro Tablelands Cool Temperate Grass Woodland
  - Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
  - Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size

The assessor is required to provide the following further information about potential ecological communities, as follows:

*a. the action and measures taken to avoid the direct and indirect impact on the potential entity for a SAIL.*

Large portions of the Subject Land have been mapped as supporting Monaro Tablelands Cool Temperate Grassy Woodland TEC within PCT 1191 in three (3) different conditions; 'Good to Moderate', 'Derived Grassland - Good to Moderate', 'Derived Grassland - Moderate to Degraded'. Within the Subject Land this TEC is subject to high levels of weed encroachment, including HTE, and existing human disturbances including existing trails (both formal and informal), litter, off-track vegetation trampling and fragmentation by roads and residential developments. The disturbance footprint for the bike trail has been minimised to a maximum of 3 m wide, with further disturbance to remnant vegetation minimised through prescription that no mature trees will be removed as part of trail construction, and a no-go area established beyond this for all construction and operation activities for the Proposal.

*b. the area (ha) and condition of the threatened ecological community (TEC) to be impacted directly and indirectly by the proposed development. The condition of the TEC is to be represented by the vegetation integrity score for each vegetation zone.*

Large portions of the Subject Land have been mapped as supporting Monaro Tablelands Cool Temperate Grassy Woodland TEC within PCT 1191 in in three (3) different conditions; 'Good to Moderate', 'Derived Grassland - Good to Moderate', 'Derived Grassland - Moderate to



Degraded'. Within the Subject Land this TEC is subject to high levels of weed encroachment, including HTE, and existing human disturbances including existing trails (both formal and informal), litter, off-track vegetation trampling and fragmentation by roads and residential developments. The different condition classes of Monaro Tablelands Cool Temperate Grassy Woodland have the following vegetation Integrity scores:

- PCT 1191 Good to Moderate - **VI 78.6** measuring 1.07 ha
- PCT 1191 Derived - Good to Moderate - **VI 8.5** measuring 2.99 ha
- PCT 1191 Derived - Moderate to Degraded – **VI 35.4** measuring 2.42 ha

The woodland patches of this TEC contained a largely intact canopy layer and a high - moderate diversity of species present, despite moderate - high levels of weed encroachment. Derived areas contained moderate to high levels of weed encroachment and largely had all canopy removed. Direct impacts associated with the trail network and associated infrastructure are largely to be contained to shrubs and groundcover layers within a maximum 3 m wide direct impact footprint within the Subject Land to limit the extent of works and consequent vegetation clearing, with no large trees to be impacted.

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*c. a description of the extent to which the impact exceeds the threshold for the potential entity that is specified in the Guideline for determining a SAIL.*

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Very small population size for ecological communities means communities have very high levels of either environmental degradation or disruption of biotic processes, and interactions have an increased risk of failure to sustain their characteristic native species assemblages (Keith et al. 2013). The principle would generally capture species or ecological communities listed as critically endangered under the BC Act where the reason for that listing is a very small size or very high environmental degradation and/or a very large disruption of biotic processes or interactions, respectively (OEH 2019). Within the Subject Land and Assessment Area, this TEC is subject to ongoing disturbance including weed encroachment, fragmentation and clearing from residential development and recreational activities.

Currently, thresholds for TECs have not yet been developed (OEH 2019). In the absence of thresholds, the consent authority can disregard references to considering thresholds in the OEH guidance when making their determination.

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*d. the extent and overall condition of the potential TEC within an area of 1000 ha, and then 10,000 ha, surrounding the proposed development footprint.*

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Predicted Monaro Tableland Cool Temperate Grassy Woodland Mapping (OEH 2022) based on extents for related PCTs mapped within a 1,000 ha and 10,000 ha radius is equal to **1,420.42 ha** and **10,074.31 ha** respectively. The proposed direct impacts of **0.16 ha** (PCT 1191 good to moderate), **0.46 ha** (PCT 1191 Derived - good to moderate condition) and **0.38 ha** (PCT 1191 Derived - moderate to degraded condition), with a combined total direct impact of **1.01 ha** along a linear 3 m wide trail network are not expected to significantly affect the overall condition or extent of the community occurring within either 1,000 ha or 10,000 ha surrounding the Subject Land due to existing impacts including trails, residential development



and weed infestation, and in light of recommended weed management measures for implementation.

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*e. an estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration.*

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Monaro Tablelands Cool Temperate Grassy Woodland occurs throughout the Monaro IBRA subregion, with the largest extent present within nearby Mt Kosciuszko National Park in largely good condition. Within the Assessment Area this TEC is the dominant vegetation community, being comprised of one (1) PCT that occurs onsite and covers an area of approximately **25.49 ha** woodland and **129.93 ha** of potential derived grassland (mapped), with potentially as much as **492.58 ha** occurring within the locality. The Proposed combined direct impacts to this TEC equal **1.01 ha** along a linear 3 m wide trail network, primarily consisting of derived grassland and regrowth areas in a weedy condition. Operational width of the trail is expected to be no greater than 2 m, allowing for the regeneration of this TEC along the trail edge. The condition of this TEC within the Subject Land and surrounding extant area are not expected to change considerably after the proposed development impact due to existing weed and disturbance levels present throughout the Assessment Area. Recommended weed management measures have the potential to increase the overall condition of the surrounding TEC within the vicinity of the trail network over time, if implemented.

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*f. an estimate of the area of the candidate TEC that is in the reserve system within the IBRA region and the IBRA subregion*

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Monaro Tablelands Cool Temperate Grassy Woodland community occurring within the Reserve system within the Monaro IBRA subregion includes that present within the Kosciuszko National Park which extends beyond into adjacent Subregions, with an area of approximately **6,900 km<sup>2</sup>**, containing large tracts of this TEC.

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*g. the development proposal's impact on:*

*i. abiotic factors critical to the long-term survival of the potential TEC; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns*

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The proposed trail network is not anticipated to negatively affect groundwater resources, though may impact to some extent the flow of surface waters across the landscape, particularly on sloped areas where additional compacted surfaces may increase runoff flow and direction. With design of trails to meet professional standards for surface water management, this is anticipated to be minor.

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*ii. characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants*

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The proposed trail network will see an initial removal of a maximum 3 m width footprint of understorey vegetation, including shrubs and groundcovers, with regrowth potential post construction to a maximum operational width of approximately 2 m. The trail will see the removal of shrubs and groundcovers along the linear impact area, with the majority of impacts within derived areas of this TEC limited to grasses and forbs with some scattered shrubs impacted. Within woodland areas, the high density of shrubs present will be locally impacted, however with the small, localised nature of the impacts within the woodland areas, the proportion of this stratum to be impacted it is unlikely to be significant for this TEC within the locality.

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*iii. the quality and integrity of an occurrence of the potential TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the potential TEC.*

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The Subject Land contains a high number of introduced weed species in low to high densities throughout this TEC. The proposed trail network will change the land management practices of the site within the Subject Land to a limited extent with an anticipated 2 m wide linear operational footprint and may provide a vector for weeds to enter areas that currently do not contain trails. The broader areas of this TEC are subject to existing weed encroachment threats and disturbance through existing trails, residential areas and roads throughout the Assessment Area.

Chemical exposure is considered likely to be limited to weed control measures, construction machinery and bike operating fluids (e.g. chain and brake oil). Biodegradable herbicides in combination with manual control techniques (cutting, pulling, etc.) can be used to reduce the need for chemical weed control in highly sensitive areas.

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*h. direct or indirect fragmentation and isolation of an important area of the potential TEC*

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The proposed trail network will require a maximum initial removal of a 3 m wide zone of understorey species and regrowth, with an expected maximum operational width of approximately 2 m. This level of impact is not considered likely to fragment existing habitat as it is easily traversed by species utilising the area. The site also occurs within a landscape crisscrossed with an existing trail network, roads, and residential areas, and the Proposal will not lead to the isolation of any fragment of vegetation from the surrounding TEC.

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*i. the measures proposed to contribute to the recovery of the potential TEC in the IBRA subregion.*

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The findings of this report, following desktop and field investigations, is that the Proposal must participate in the BOS as required in the BC Act and the BC Regulation. Participation in the BOS will also financially contribute to the recovery of this TEC within the broader Monaro IBRA subregion. Recommended weed control measures would also contribute to the recovery of this TEC if they were implemented.



**7.1.2 Species credit species SAI entities**

No species credit species have been identified as potential entities at risk of a serious and irreversible impact based on the Proposal.



## 8 IMPACT AVOIDANCE AND MINIMISATION MEASURES

This section of the report demonstrates the efforts taken to avoid and minimise impacts on biodiversity values in accordance with Section 8 of the BAM.

A key part of management for biodiversity is the application of the ‘avoid, minimise, mitigate and offset’ hierarchy as follows:

- 1) Avoid and minimise impacts as the highest priority;
- 2) Mitigate impacts where avoidance is not feasible or practicable in the particular circumstance; and
- 3) Offset where residual, significant unavoidable impacts would occur (if required).

Avoidance, mitigation and offset provisions for this proposal are outlined below.

### 8.1 Avoiding and minimising clearance of native vegetation and habitat

The Proposal has been designed to minimise removal of native vegetation and habitat features by restricting the direct impact footprint to a maximum width of 3 m. In addition, placement of the trail alignment through areas of exotic or planted vegetation (0.1 ha, constituting 9.9 % of the direct impact area) and derived vegetation (0.84 ha, constituting a further 83.2 % of the direct impact area) reduces the need for removal of native shrubs and overstorey or disturbance of other habitat features present in wooded areas such as logs, hollow bearing trees and litter cover. In areas where the trail alignment passes through native woodland, mature trees are expected to be retained during construction and operational phases of the trail.

### 8.2 Avoiding and / or minimising prescribed impacts

Small rocky outcrops occurring within the Subject Land will largely be avoided by the trail network, with trails placed to avoid impacts on these habitat features as far as practicable.

Runoff from the trail network has the potential to impact upon water quality within Lake Jindabyne, which forms part of the Snowy River EEC (FM Act). Installation of appropriate ERSED controls, and use of construction techniques that maintain track integrity during rain events once operational, should help maintain runoff into these waterbodies at existing levels during both construction and operational phases of the Proposal.

The vegetation across the Subject Land forms part of the *Monaro Tablelands Cool Temperate Grassy Woodland* TEC in various conditions, with all native fauna present within the site forming part of this TEC. Existing sealed and unsealed roads and trails bisect sections of this TEC within the Subject Land.

The implementation of speed zones along the trail and associated access points has the potential to minimise potential vehicle strikes, coupled with careful design of pick-up / drop-off points and car parking.

Mitigation measures proposed during the ongoing operational phase of the proposed trail include implementation of speed zones, mandatory requirements that pets in the Assessment Area should be leashed at all times, and installation of signage to educate trail users in best-practice etiquette should they encounter wildlife along the trail.



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### **8.3 Recommendations to mitigate or manage biodiversity impacts**

Recommendations to further mitigate or manage impacts resulting from the Proposal are provided below in Table 19.



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Table 19 Avoidance and Minimisation Measures

Biodiversity impact	Mitigation measure	Responsibility and timing
<b>General</b>	<ul style="list-style-type: none"> <li>Vehicles and machinery to utilise and work from existing roads, or existing cleared areas where possible, and are not to extend beyond the direct impact footprint.</li> <li>Vehicles are to be parked in designated parking areas only, or along existing roads/dirt tracks away from tree canopy/drip lines to avoid soil compaction and impacts to adjacent vegetation.</li> <li>Ensure vehicles and machinery are cleaned and checked for any traces of weeds, seeds and mud prior to entering work site to reduce the spread of weeds and disease (e.g. <i>Phytophthora cinnamomi</i>) to the site.</li> <li>Strict hygiene protocols must be followed to ensure that no environmental weeds spread around during works or are introduced to site as a result of the proposed works. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site and disposed of in accordance with Council regulations.</li> <li>All soils to be stockpiled at designated stockpile locations in a cleared area, within pre-approved zones away from waterways, drainage lines and native vegetation, and are appropriately stabilized in accordance with the 'Blue Book' (Landcom 2004).</li> <li>Any chemicals or pollutants on site to be stored appropriately in bunded areas to prevent pollution of soils or waters which may impact upon biodiversity.</li> <li>Sediment and erosion controls must be installed downslope of any disturbance areas prior to any earthworks commencing, to prevent migration of sediments down slope into adjacent waterways or off site.</li> <li>Recently disturbed soils must be stabilised progressively and promptly after works are completed to prevent erosion and consequent sediment migration.</li> </ul>	<p>Council &amp; Construction Manager</p> <p>Pre-construction, construction and post construction</p>
<b>Timing of vegetation clearing</b>	<ul style="list-style-type: none"> <li>Where practicable, it is recommended to time the works outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) for species likely to utilise the site to avoid or minimise the chance of nest abandonment, injury or death to native fauna utilising the Subject Land.</li> </ul>	Council & Construction Manager



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Biodiversity impact	Mitigation measure	Responsibility and timing
	<ul style="list-style-type: none"> <li>Where practicable, time works to fall outside of key pollinating and seed-setting seasons to reduce the risks of poor pollination / seed-set due to potential disruption of pollinator movements during construction activities.</li> </ul>	Pre-construction
<b>Tree protection and removal</b>	<ul style="list-style-type: none"> <li>Clearly delineate vegetation to be removed/retained with the assistance of an ecologist, or similarly qualified professional, and induct all site personnel as to the approved extent of clearing.</li> <li>Ensure all mature trees (DBH &gt; 10 cm) are retained within direct impact areas during trail construction and that no clearing of vegetation occurs outside of the marked boundary.</li> <li>Maintain Vegetation Protection Zones outside direct impact area to avoid compaction of soils. This includes no movement of excavation machinery or parking or storing equipment outside designated clearing areas or laydown areas.</li> <li>The presence of a suitably qualified arborist is recommended during earthworks occurring near retained trees to avoid rootzones impacts.</li> <li>Where any trees requiring removal contain hollows, nests or other signs of occupation, a staged clearing approach must be undertaken where hollow limbs are removed carefully and incrementally by a qualified tree surgeon/arborist. Care should be taken to inspect limbs for fauna prior to their removal.</li> <li>Prior to clearing, a preclearance survey should be undertaken including inspection for threatened species (flora and fauna), and hollows/burrows to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present (nests or potential tree hollows) the appointed contractor would contact the project ecologist for further advice prior to clearing.</li> <li>Ensure the presence of an ecologist or fauna spotter catcher at all times during pre-clearing and clearing activities to remove and relocate wildlife as necessary, and to attend to any wildlife that are injured as a result of works.</li> <li>Where additional vegetation removal is proposed this must first be assessed to consider the cumulative impacts against the approved clearance footprint, and if appropriate supervised by a qualified ecologist and Council's Environmental Officer.</li> </ul>	<p>Council &amp; Construction Manager</p> <p>Pre-construction &amp; construction</p>





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Biodiversity impact	Mitigation measure	Responsibility and timing
<b>Waterways and Riparian Area Protection</b>	<ul style="list-style-type: none"> <li>• Appropriate sediment and erosion controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter creek lines or waterways.</li> <li>• Council and its appointed contractor should clearly mark the areas of KFH that occur within the construction area and induct all staff to ensure that impacts within these sensitive areas conform to Fisheries permit requirements.</li> <li>• All litter, including cigarette butts and food wrappers, are to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase so as not to end up in waterways.</li> <li>• Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 m from drainage lines or waterways.</li> <li>• Vehicle wash-down (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off.</li> <li>• All machinery is to be inspected and in a clean state prior to any waterways being crossed or entered during construction.</li> <li>• Where possible, all construction works are to be undertaken during periods of low predicted rainfall.</li> <li>• Minimize the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch or installing erosion control blanket as appropriate.</li> <li>• Ensure all pesticide/herbicides used on site are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.</li> <li>• Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).</li> </ul>	<p>Council &amp; Construction Manager</p> <p>Pre-construction, construction and post construction</p>
<b>Rehabilitation</b>	<ul style="list-style-type: none"> <li>• Revegetation activities should be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP as a record</li> </ul>	Council & Construction Manager



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Biodiversity impact	Mitigation measure	Responsibility and timing
	<p>of rehabilitation efforts made. Vegetation cover should be returned to the site outside of operational footprint areas within a reasonably practicable timeframe post clearing to reduce soil exposure and loss.</p> <ul style="list-style-type: none"> <li>Control and management of High Threat Exotic weeds within the Subject Land is recommended to reduce the risks associated with the further spread of these species within the Subject Land and surrounding landscape, including human safety concerns with encroachment of weeds onto the track, and ongoing ecological impacts.</li> <li>Highly eroded sections of the trail/ road (to the east) are to be rehabilitated to prevent further erosion.</li> </ul>	Construction and post construction
<b>Operational trail use / General maintenance</b>	<ul style="list-style-type: none"> <li>Declared (WoNS) and Priority weeds must be managed according to requirements under the Biosecurity Act 2015. It is recommended these weeds be managed to ensure they do not spread, and where possible eradicated from the Subject Land.</li> <li>No vegetation is to be burnt; large limbs, trunks and fallen timber to be placed in adjacent areas to supplement habitat availability. Rocks to be removed from the trail should be placed in adjacent areas as appropriate.</li> <li>Smaller branches and leaves of native species only to be chipped and used on site for erosion control and within landscaped areas.</li> <li>Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.</li> <li>Implementation of speed zones within the Assessment Area as required. Speed limits are to be strictly adhered to, with driving/working on site to be avoided during dawn and dusk to reduce possible impacts on native fauna.</li> <li>Mandatory requirement that pets in the assessment area should be leashed at all times and installation of clear signage to communicate this requirement.</li> <li>Installation of signage to educate trail users to presence of wildlife values along the trail and informing best-practice etiquette should they encounter wildlife along the trail.</li> </ul>	<p>Council &amp; Construction Manager</p> <p>Construction and post construction</p>



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## 9 BIODIVERSITY CREDIT CALCULATIONS

Under the BOS, biodiversity credits are generated from management actions that improve biodiversity values and are used to offset the loss of biodiversity values on development sites. Credit reports generated for this Proposal have been included in Appendix G.

### 9.1 Ecosystem credits

The ecosystem credits required to offset the Proposal are provided in Table 20. A total of **14** ecosystem credits are required to offset the Proposal.

Table 20 Ecosystem credits summary

Zone	Vegetation Zone Name	TEC Name	VI Loss	Area(ha)	Biodiversity Risk Weighting	Potential SAI	Credits required
1	1191_G_M	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	10.9	1.1	2.5	True	7
2	1191_D_G_M	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	1.3	3	2.5	True	0
3	1191_D_M_D	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	4.3	2.4	2.5	True	7
Total							14

### 9.2 Species credits

The species credits required to offset the Proposal are provided in Table 21. These species have been assumed to be present based on potential habitat only. No targeted surveys have been completed to confirm these species presence within the habitat present. A total of **38** species credits are required to offset the Proposal.



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Table 21 Species credits summary

Vegetation zone name	Habitat condition (VI) loss	Area (ha) / Count (no. individuals)	BC Act status	EPBC Act status	Potential SAIL	Species credits
<b><i>Aprasia parapulchella</i> / Pink-tailed Legless Lizard ( Fauna )</b>						
1191_G_M	10.9	1.1	Vulnerable	Vulnerable	False	6
1191_D_G_M	1.3	3	Vulnerable	Vulnerable	False	2
1191_D_M_D	4.3	2.4	Vulnerable	Vulnerable	False	5
					<b>Subtotal</b>	<b>13</b>
<b><i>Cercartetus nanus</i> / Eastern Pygmy-possum ( Fauna )</b>						
1191_G_M	10.9	1.1	Vulnerable	Not Listed	False	6
					<b>Subtotal</b>	<b>6</b>
<b><i>Myotis macropus</i> / Southern Myotis ( Fauna )</b>						
1191_G_M	14.2	1.4	Vulnerable	Not Listed	False	6
1191_D_G_M	1.3	3	Vulnerable	Not Listed	False	2
1191_D_M_D	4.3	2.4	Vulnerable	Not Listed	False	5
					<b>Subtotal</b>	<b>13</b>
<b><i>Phascolarctos cinereus</i> / Koala ( Fauna )</b>						
1191_G_M	10.9	1.1	Endangered	Endangered	False	6
					<b>Subtotal</b>	<b>6</b>



## 10 CONCLUSION

TEF was commissioned by SMRC to undertake a BDAR to fully consider the potential ecological impacts arising from the construction of approximately 3.8 km of multipurpose shared use recreational trail, extending along the edge of Lake Jindabyne from Kunama Estate to East Jindabyne, NSW.

The surveys undertaken to support this assessment included habitat identification, confirmation of vegetation community mapping, identification of TECs, collection of BAM data, as well as seasonal targeted threatened flora and fauna surveys.

The analysis of floristic data collected during this survey assigned one (1) PCT to the Subject Land:

- PCT 1191: *Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion (6.49 ha, as both woodland and derived forms)*

Two (2) land use types mapped did not correspond to a Plant Community Type (PCT) being dominated by mixed exotic/native planted vegetation (**0.55 ha**) non-native areas (**0.18 ha**).

A total of one hundred and eighteen (118) flora species were recorded within the vegetation plots completed and incidental species observed on site, consisting of fifty-seven (57) native species and sixty-one (61) exotic species, including eighteen (18) High-Threat Exotics (HTE).

The threatened ecological community *Monaro Tableland Cool Temperate Grassy Woodland* listed as critically endangered under the BC Act was found to occur across a large portion of the Subject Land, with **1.01 ha** to be directly impacted and an additional **5.48 ha** with the potential for indirect impacts.

A total of sixty-nine (69) fauna species were recorded during the surveys. This included four (4) native mammals, seven (7) exotic mammals, forty-seven (47) native bird species, three (3) exotic bird species, four (4) native amphibians, three (3) native reptiles and one (1) native crustacean.

Targeted surveys implementing a range of species-specific techniques, including parallel field traverses (flora), morning and afternoon area surveys and nesting site searches (diurnal birds), and spotlighting and call playback (nocturnal fauna) were undertaken within suitable habitat across the Subject Land in accordance with species specific guidelines (DEC 2004, DEWHA 2010, DSEWPC 2011, Commonwealth of Australia 2013, DPIE 2020, DPE 2022).

Three (3) species of threatened fauna listed as Vulnerable under the BC Act were recorded as occurring within the Subject Land during surveys:

- Gang-gang Cockatoo, *Callocephalon fimbriatum*
- White-fronted Chat, *Epthianura albifrons*
- Flame Robin, *Petroica phoenicea*

Additional threatened species records also exist for the broader Assessment Area (DPE 2022) with a number of other species predicted and with the potential to occur within the Subject Land based on habitat attributes present (see Table 15 and Table 16).

The degraded nature of the majority of the Subject Land limits availability of suitable habitat surrogates for most threatened species to persist on the site.



The current Proposal has the potential to result in one (1) Serious and Irreversible Impacts (SII) to the following threatened biota:

- Monaro Tablelands Cool Temperate Grassy Woodland TEC

Potential SII's to this TEC within the Subject Land are restricted to small patches of moderate to degraded woodland and derived grassland areas already exposed to ongoing disturbance and moderate to high levels of weed encroachment surrounded by urban development.

The Proposal has the potential to contribute to **four (4)** prescribed impacts:

- 1) Impacts of development on the habitat of threatened species or ecological communities associated with:
  - Rocks, including rocky habitat or outcrops
- 2) Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range
- 3) Water quality, water bodies and hydrological processes that sustain threatened species and TECs.
- 4) Impacts of vehicle strike on threatened species or on animals that are part of a TEC including:
  - Species that form part of the Monaro Tablelands Cool Temperate Grassy Woodland TEC.

The anticipated impacts of prescribed impacts are considered to be minor and are not anticipated to result in additional impacts significantly beyond that which already occur on site, due to the current land use and condition. Specific minimisation and mitigation measures are provided to reduce the impacts of these prescribed impacts.

The Subject Land measures a total area of **7.21 ha** with a total direct impact area of **1.11 ha** including both native, planted and exotic vegetation. The threshold for clearing for the proposed trail is 0.25 hectare based on a minimum lot size of 0.12 ha. The proposal involves clearing to accommodate the trail; however, the Client has committed to retaining remnant trees where these occur within the trail impact area. The Proposal has the potential to impact on up to **1.01 ha** of native vegetation for trail construction. As the Proposal clearing exceeds the threshold for clearing, **participation in the BOS is required.**

Consequently, this Proposal has resulted in a Biodiversity Credit calculation of **14 ecosystem credits** and **38 species credits** required to offset the Proposal.

Significant Impact Criteria Assessments, in accordance with the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria Guidelines* (DEWHA, 2009) were not considered necessary for the Proposal. Consequently, a Referral to the Environment Minister is not required for this Proposal beyond the requirements for offsetting obligations.

A number of mitigation measures and recommendations (Table 19) have been made to help minimise impacts of the proposal and to protect the remaining biodiversity attributes of the Subject Land and broader Assessment Area should the Proposal proceed.





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## 12 APPENDICES

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Appendix A	Design Drawings
Appendix B	Native Vegetation Regulatory Map
Appendix C	Biodiversity Values Map and Threshold Report
Appendix D	Species Lists
Appendix E	BAM Data sheets
Appendix F	Commonwealth EPBC Threatened species likelihood of occurrence table
Appendix G	Credit Reports
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Appendix I	BDAR Assessment Checklist

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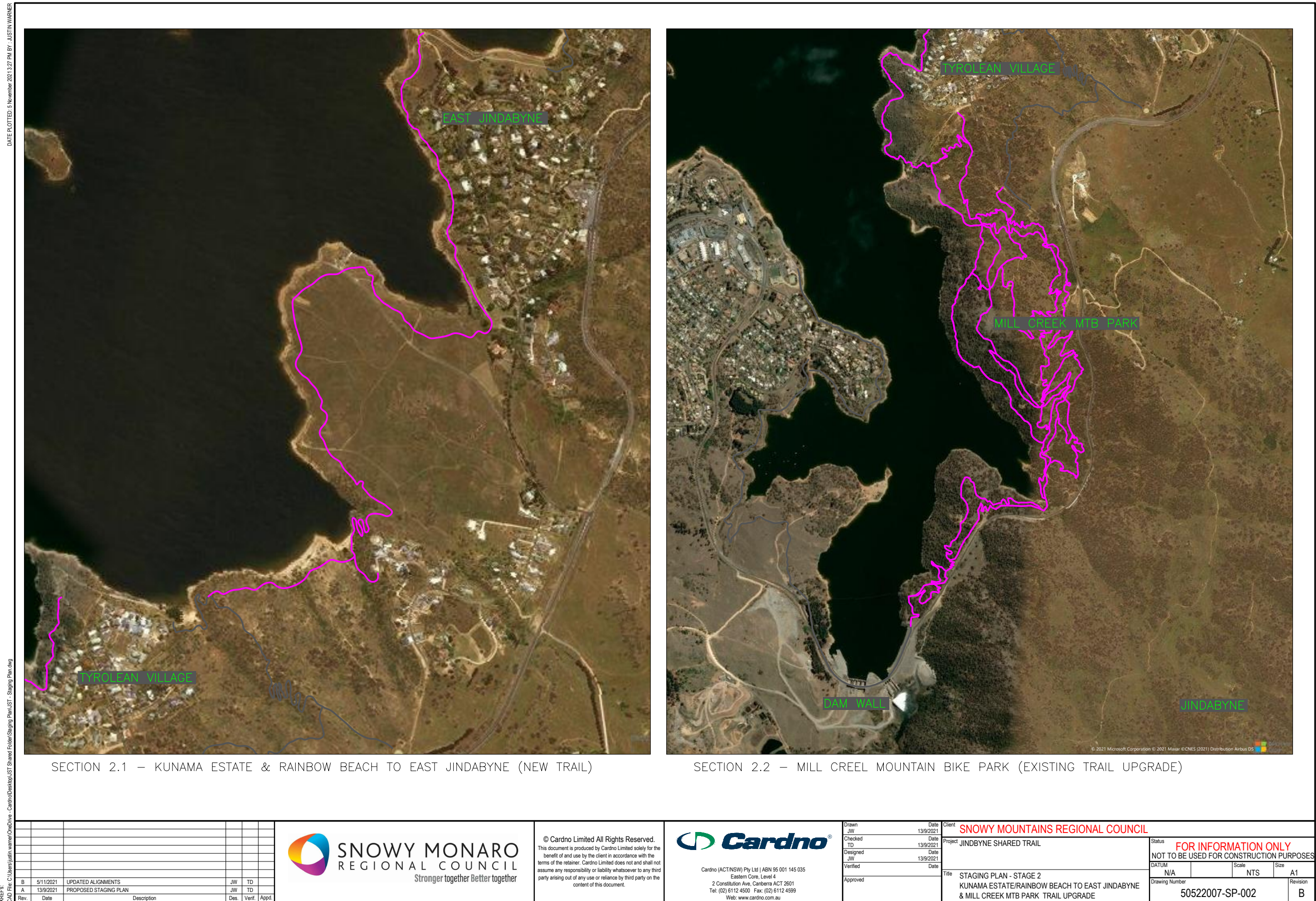
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**Appendix A – Design Drawings**



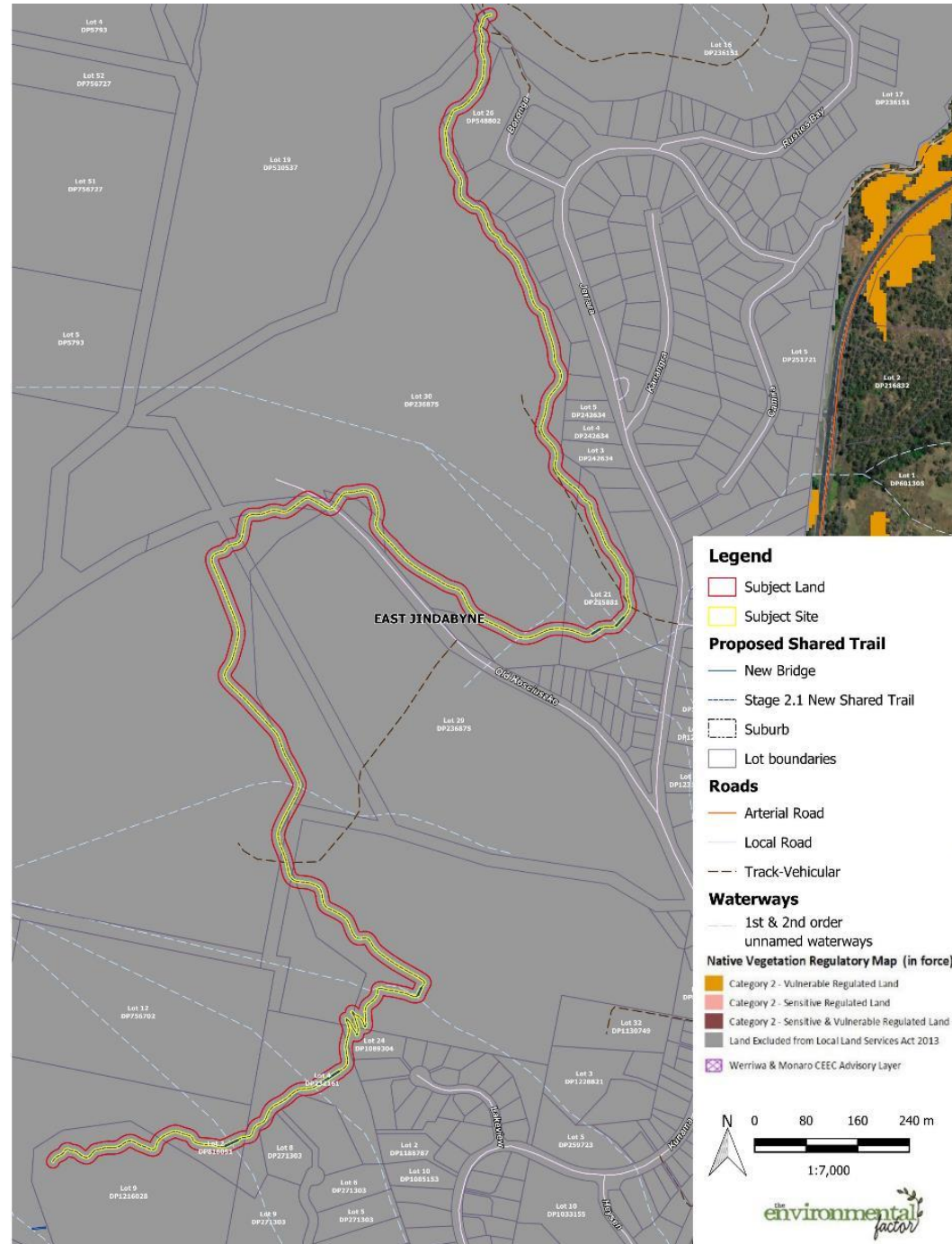






Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

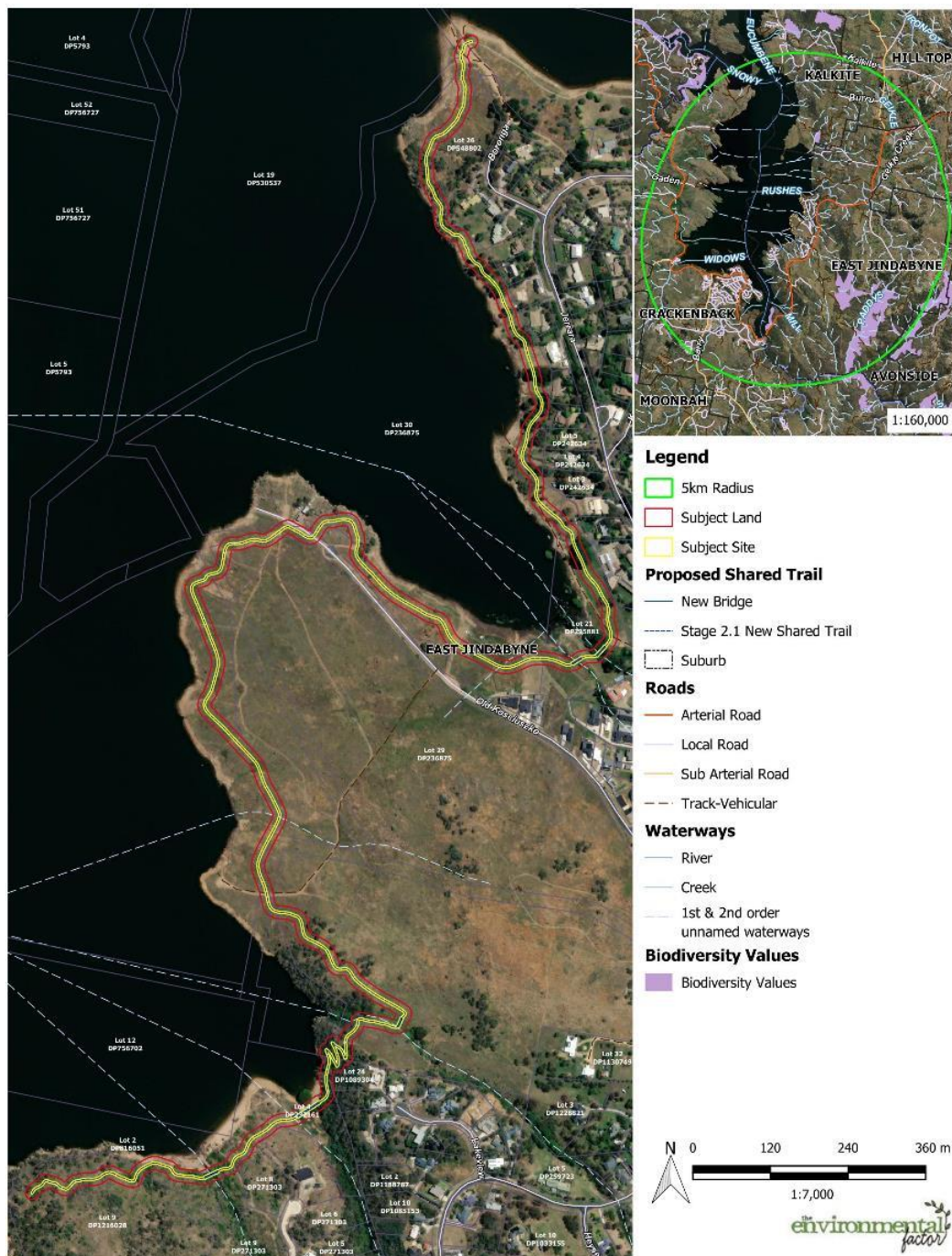
## Appendix B – Native Vegetation Regulatory Map



### Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Transitional Native Vegetation Regulatory Map

© 2023. Whilst every care has been taken to prepare this map, TEF make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason. Service Layer Credits: Source: ss-sd NSW Government World Satellite Imagery, DFSI ClipShip Digital cadastral and topographic datasets of the Snowy Monaro LGA (NSW LPI) NSW Government OEH - Native Vegetation Regulatory Map. SMARC Trail design: GDA 2020 MGA Zone 55. Author: J Sanderson. Date: 14/09/2023

## Appendix C – Biodiversity Values Map and Threshold Tool



**Stage 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Biodiversity Values Map within a 5km radius of the Proposal Location**

[illegible]



Biodiversity Assessment Report – Jindabyne Shared Trails

**Appendix D – Species Lists****Table 22 Flora recorded during surveys**

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Adoxaceae	<i>Viburnum tinus</i>	-	E	-	-
Apiaceae	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	N	-	-
Apocynaceae	<i>Vinca major</i>	Greater Periwinkle	HTE	-	-
Asparagaceae	<i>Agave americana</i>	Century Plant	E	-	-
Aspleniaceae	<i>Asplenium flabellifolium</i>	Necklace Fern	N	-	-
Asteraceae	<i>Achillea millefolium</i>	Yarrow	HTE	-	-
Asteraceae	<i>Cassinia aculeata</i>	Dolly Bush	N	-	-
Asteraceae	<i>Cassinia longifolia</i>	-	N	-	-
Asteraceae	<i>Chrysocephalum apiculatum</i>	Common Everlasting	N	-	-
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	E	-	-
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	E	-	-
Asteraceae	<i>Euchiton involucratus</i>	Star Cudweed	N	-	-
Asteraceae	<i>Hypochaeris glabra</i>	Smooth Catsear	E	-	-
Asteraceae	<i>Hypochaeris radicata</i>	Catsear	E	-	-
Asteraceae	<i>Lactuca serriola</i>	Prickly Lettuce	E	-	-
Asteraceae	<i>Onopordum acanthium</i>	Scotch Thistle	HTE	-	-
Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed	N	-	-
Asteraceae	<i>Senecio quadridentatus</i>	Cotton Fireweed	N	-	-
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	E	-	-



## Biodiversity Assessment Report – Jindabyne Shared Trails

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Asteraceae	<i>Tragopogon dubius</i>	Goatsbeard	E	-	-
Asteraceae	<i>Vittadinia cuneata</i>	-	N	-	-
Boraginaceae	<i>Echium vulgare</i>	Viper's Bugloss	E	-	-
Brassicaceae	<i>Hirschfeldia incana</i>	Buchan Weed	E	-	-
Campanulaceae	<i>Wahlenbergia communis</i>	Tufted Bluebell	N	-	-
Caryophyllaceae	<i>Petrorhagia nanteuilii</i>	Proliferous Pink	E	-	-
Caryophyllaceae	<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	E	-	-
Caryophyllaceae	<i>Scleranthus diander</i>	Tufted Knawel	N	-	-
Chenopodiaceae	<i>Einadia nutans</i>	Climbing Saltbush	N	-	-
Clusiaceae	<i>Hypericum gramineum</i>	Small St John's Wort	N	-	-
Clusiaceae	<i>Hypericum perforatum</i>	St. Johns Wort	HTE	-	-
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed	N	-	-
Crassulaceae	<i>Crassula sieberiana</i>	Australian Stonecrop	N	-	-
Cupressaceae	<i>Cupressus macrocarpa</i>	Monterey Cypress	E	-	-
Cyperaceae	<i>Carex inversa</i>	Knob Sedge	E	-	-
Cyperaceae	<i>Carex sp.</i>	Sedge	N	-	-
Cyperaceae	<i>Cyperus rotundus</i>	Nutgrass	E	-	-
Cyperaceae	<i>Schoenus apogon</i>	-	N	-	-
Ericaceae	<i>Acrotriche serrulata</i>	Honeypots	N	-	-
Euphorbiaceae	<i>Euphorbia drummondii</i>	Caustic Weed	N	-	-
Fabaceae	<i>Swainsona monticola</i>	Knotched Swainson Pea	N	-	-





Biodiversity Assessment Report – Jindabyne Shared Trails

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Fabaceae (Faboideae)	<i>Glycine clandestina</i>	Twining glycine	N	-	-
Fabaceae (Faboideae)	<i>Glycine tabacina</i>	Variable Glycine	N	-	-
Fabaceae (Faboideae)	<i>Hovea heterophylla</i>	-	N	-	-
Fabaceae (Faboideae)	<i>Trifolium arvense</i>	Haresfoot Clover	E	-	-
Fabaceae (Faboideae)	<i>Trifolium campestre</i>	Hop Clover	E	-	-
Fabaceae (Mimosoideae)	<i>Acacia dealbata</i>	Silver Wattle	N	-	-
Gentianaceae	<i>Centaurium erythraea</i>	Common Centaury	E	-	-
Geraniaceae	<i>Geranium molle</i>	Cranesbill Geranium	E	-	-
Geraniaceae	<i>Geranium solanderi</i>	Native Geranium	N	-	-
Juncaceae	<i>Juncus filicaulis</i>	-	N	-	-
Lamiaceae	<i>Marrubium vulgare</i>	White Horehound	E	-	-
Lamiaceae	<i>Salvia verbenaca</i>	Vervain	E	-	-
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	N	-	-
Malaceae	<i>Cotoneaster glaucophyllus</i>	-	HTE	-	-
Malaceae	<i>Cotoneaster pannosus</i>	-	HTE	-	-
Malaceae	<i>Crataegus monogyna</i>	Hawthorn	HTE	-	-
Malaceae	<i>Pyracantha coccinea</i>	Scarlet Firethorn	HTE	-	-
Myrtaceae	<i>Eucalyptus crebra</i> (?)	Planted	N	-	-



## Biodiversity Assessment Report – Jindabyne Shared Trails

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Myrtaceae	<i>Eucalyptus pauciflora</i>	White Sally	N	-	-
Myrtaceae	<i>Eucalyptus spp.</i>	Planted	N	-	-
Onagraceae	<i>Epilobium ciliatum</i>	-	E	-	-
Onagraceae	<i>Oenothera glazioviana</i>	-	E	-	-
Orchidaceae	<i>Diuris semilunulata</i>	Late Leopard Orchid	N	-	-
Orchidaceae	<i>Microtis unifolia</i>	Common Onion Orchid	N	-	-
Oxalidaceae	<i>Oxalis perennans</i>	-	N	-	-
Parmeliaceae	<i>Lichen</i>	-	N	-	-
Phormiaceae	<i>Dianella tasmanica</i>	-	N	-	-
Phyllanthaceae	<i>Poranthera microphylla</i>	Small Poranthera	N	-	-
Pinaceae	<i>Picea pungens</i>	Colorado Spruce	E	-	-
Pinaceae	<i>Pinus radiata</i>	Radiata Pine	HTE	-	-
Pinaceae	<i>Pinus spp.</i>	Pine	HTE	-	-
Plantaginaceae	<i>Linaria pelisseriana</i>	Pelisser's Toadflax	E	-	-
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	E	-	-
Poaceae	<i>Anthosachne scabra</i>	Wheatgrass, Common Wheatgrass	N	-	-
Poaceae	<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	E	-	-
Poaceae	<i>Arundo donax</i>	Giant Reed	HTE	-	-
Poaceae	<i>Austrostipa scabra</i>	Speargrass	N	-	-
Poaceae	<i>Avena barbata</i>	Bearded Oats	E	-	-





## Biodiversity Assessment Report – Jindabyne Shared Trails

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Poaceae	<i>Bothriochloa macra</i>	Red Grass	N	-	-
Poaceae	<i>Bromus catharticus</i>	Praire Grass	E	-	-
Poaceae	<i>Bromus diandrus</i>	Great Brome	E	-	-
Poaceae	<i>Chloris truncata</i>	Windmill Grass	N	-	-
Poaceae	<i>Cymbopogon refractus</i>	Barbed Wire Grass	N	-	-
Poaceae	<i>Dactylis glomerata</i>	Cocksfoot	E	-	-
Poaceae	<i>Dichelachne micrantha</i>	Shorthair Plumegrass	N	-	-
Poaceae	<i>Enneapogon gracilis</i>	Slender Nineawn	N	-	-
Poaceae	<i>Eragrostis curvula</i>	African Lovegrass	HTE	-	Regional Recommended Measures
Poaceae	<i>Holcus lanatus</i>	Yorkshire Fog	E	-	-
Poaceae	<i>Nassella trichotoma</i>	Serrated Tussock	HTE	WoNS	Regional Recommended Measures
Poaceae	<i>Panicum capillare</i>	Witchgrass	E	-	-
Poaceae	<i>Paspalum dilatatum</i>	Paspalum	HTE	-	-
Poaceae	<i>Phalaris aquatica</i>	Phalaris	E	-	-
Poaceae	<i>Poa sieberiana</i>	Snowgrass	N	-	-
Poaceae	<i>Rytidosperma auriculatum</i>	Lobed Wallaby Grass	N	-	-
Poaceae	<i>Rytidosperma caespitosum</i>	Ringed Wallaby Grass	N	-	-
Poaceae	<i>Rytidosperma sp.</i>	Wallaby Grass	N	-	-
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	N	-	-



## Biodiversity Assessment Report – Jindabyne Shared Trails

Family	Scientific Name	Common Name	N, E, HTE	WoNS	Priority Listing
Poaceae	<i>Vulpia bromoides</i>	Squirrel Tail Fesque	E	-	-
Poaceae	<i>Vulpia sp.</i>	-	E	-	-
Polygonaceae	<i>Rumex acetosella</i>	Sheep Sorrell	HTE	-	-
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock	N	-	-
Primulaceae	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	E	-	-
Proteaceae	<i>Grevillea lanigera</i>	Woolly Grevillea	N	-	-
Pteridaceae	<i>Cheilanthes sieberi</i>	Rock Fern	N	-	-
Ranunculaceae	<i>Clematis leptophylla</i>	-	N	-	-
Rosaceae	<i>Acaena novae-zelandiae</i>	Bidgee-widgee	E	-	-
Rosaceae	<i>Acaena ovina</i>	Acaena	N	-	-
Rosaceae	<i>Malus fusca</i>	Crabapple	E	-	-
Rosaceae	<i>Rosa rubiginosa</i>	Sweet Briar	HTE	-	-
Rosaceae	<i>Rubus fruticosus sp. agg.</i>	Blackberry complex	HTE	WoNS	Prohibition on certain dealings
Rubiaceae	<i>Galium gaudichaudii</i>	Rough Bedstraw	N	-	-
Salicaceae	<i>Populus nigra "Italica"</i>	Lombardy Poplar	HTE	-	-
Sapindaceae	<i>Acer platinoides</i>	Norway Maple	E	-	-
Scrophulariaceae	<i>Verbascum thapsus</i>	Mullein	E	-	-
Scrophulariaceae	<i>Verbascum virgatum</i>	Twiggy Mullein	E	-	-
Thymelaeaceae	<i>Pimelea pauciflora</i>	-	N	-	-
Violaceae	<i>Melicytus dentatus</i>	Tree Violet	N	-	-
#N/A	<i>Unidentified Asteraceae / Fabaceae shrub</i>	-	N	-	-



Biodiversity Assessment Report – Jindabyne Shared Trails

Table 23 Fauna recorded during surveys

Class	Scientific Name	Common Name	Exotic	BC Act	Observation Type
Amphibia	<i>Crinia signifera</i>	Common Eastern Froglet	-	-	W
Amphibia	<i>Crinia signifera</i>	Common Eastern Froglet	-	-	W
Amphibia	<i>Litoria verreauxii</i>	Verreaux's Frog	-	-	W
Amphibia	<i>Pseudophryne bibronii</i>	Bibron's Toadlet	-	-	W
Aves	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	-	-	OW
Aves	<i>Acanthiza lineata</i>	Striated Thornbill	-	-	OW
Aves	<i>Acanthiza nana</i>	Yellow Thornbill	-	-	OW
Aves	<i>Acanthiza pusilla</i>	Brown Thornbill	-	-	OW
Aves	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	-	-	O
Aves	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	-	-	OW
Aves	<i>Anas superciliosa</i>	Pacific Black Duck	-	-	OW
Aves	<i>Anhinga novaehollandiae</i>	Australasian Darter	-	-	OW
Aves	<i>Anthochaera carunculata</i>	Red Wattlebird	-	-	OW
Aves	<i>Anthus novaeseelandiae</i>	Australian Pipit	-	-	OW
Aves	<i>Aquila audax</i>	Wedge-tailed Eagle	-	-	O
Aves	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	-	-	OW
Aves	<i>Caligavis chrysops</i>	Yellow-faced Honeyeater	-	-	OW
Aves	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	-	V	OW
Aves	<i>Carduelis carduelis</i>	European Goldfinch	*	-	O
Aves	<i>Chenonetta jubata</i>	Australian Wood Duck	-	-	OW



## Biodiversity Assessment Report – Jindabyne Shared Trails

Class	Scientific Name	Common Name	Exotic	BC Act	Observation Type
Aves	<i>Chroicocephalus novaehollandiae</i>	Silver Gull	-	-	OW
Aves	<i>Cincloramphus cruralis</i>	Brown Songlark	-	-	OW
Aves	<i>Cincloramphus mathewsi</i>	Rufous Songlark	-	-	OW
Aves	<i>Corvus coronoides</i>	Australian Raven	-	-	OW
Aves	<i>Corvus orru</i>	Torresian Crow	-	-	OW
Aves	<i>Cracticus tibicen</i>	Australian Magpie	-	-	OW
Aves	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-	-	OW
Aves	<i>Eolophus roseicapillus</i>	Galah	-	-	OW
Aves	<i>Epthianura albifrons</i>	White-fronted Chat	-	V	OW
Aves	<i>Fulica atra</i>	Eurasian Coot	-	-	O
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark	-	-	OW
Aves	<i>Hirundo neoxena</i>	Welcome Swallow	-	-	OW
Aves	<i>Malurus cyaneus</i>	Superb Fairy-wren	-	-	OW
Aves	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	-	-	OW
Aves	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	-	-	OW
Aves	<i>Neochmia temporalis</i>	Red-browed Finch	-	-	OW
Aves	<i>Ocyphaps lophotes</i>	Crested Pigeon	-	-	OW
Aves	<i>Pardalotus punctatus</i>	Spotted Pardalote	-	-	OW
Aves	<i>Pardalotus striatus</i>	Striated Pardalote	-	-	OW
Aves	<i>Passer domesticus</i>	House Sparrow	*	-	OW
Aves	<i>Petroica phoenicea</i>	Flame Robin	-	V	OW
Aves	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	-	-	O
Aves	<i>Phalacrocorax varius</i>	Pied Cormorant	-	-	O
Aves	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	-	-	OW
Aves	<i>Platycercus elegans</i>	Crimson Rosella	-	-	OW



## Biodiversity Assessment Report – Jindabyne Shared Trails

Class	Scientific Name	Common Name	Exotic	BC Act	Observation Type
Aves	<i>Ptilotula penicillatus</i>	White-plumed Honeyeater	-	-	OW
Aves	<i>Rhipidura albiscapa</i>	Grey Fantail	-	-	OW
Aves	<i>Rhipidura leucophrys</i>	Willie Wagtail	-	-	OW
Aves	<i>Sericornis frontalis</i>	White-browed Scrubwren	-	-	OW
Aves	<i>Strepera graculina</i>	Pied Currawong	-	-	OW
Aves	<i>Sturnus vulgaris</i>	Common Starling	*	-	OW
Aves	<i>Todiramphus sanctus</i>	Sacred Kingfisher	-	-	OW
Aves	<i>Vanellus miles</i>	Masked Lapwing	-	-	OW
Aves	<i>Zosterops lateralis</i>	Silvereye	-	-	OW
Arthropoda	<i>Cherax destructor</i>	Dam Yabby	-	-	O
Mammalia	<i>Canis lupus familiaris</i>	Dog	*	-	O, Scat
Mammalia	<i>Capra hircus</i>	Goat	*	-	O, Scat
Mammalia	<i>Cervus unicolor</i>	Sambar	*	-	O
Mammalia	<i>Dama dama</i>	Fallow Deer	*	-	O
Mammalia	<i>Felis catus</i>	Cat	*	-	O
Mammalia	<i>Macropod sp.</i>	Unidentified macropod	-	-	Scat
Mammalia	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	-	-	O
Mammalia	<i>Oryctolagus cuniculus</i>	Rabbit	*	-	Midden, O
Mammalia	<i>Tachyglossus aculeatus</i>	Short-beaked echidna	-	-	O
Mammalia	<i>Vombatus ursinus</i>	Common Wombat	-	-	O, Scat
Mammalia	<i>Vulpes vulpes</i>	Fox	*	-	OW, Scat
Reptilia	<i>Egernia cunninghami</i>	Cunningham's skink	-	-	O
Reptilia	<i>Liopholis whitii</i>	White's Skink	-	-	O
Reptilia	<i>Notechis scutatus</i>	Tiger Snake	-	-	O



Biodiversity Assessment Report – Jindabyne Shared Trails

#### **Appendix E - BAM datasheets**





## Appendix F – Commonwealth EPBC Act Threatened Species Likelihood of Occurrence

The below map (Figure 9) and assessment includes national and state significant species from the following sources:

- DAWE database (PMST accessed December 2021).
- Search area is 10 km radius.
- Not considered further pelagic seabirds, shorebirds, sandpipers, turtles, whales, sharks - no preferred marine or coastal habitat in Subject Land.

All habitat information is taken from NSW DPE and Commonwealth DEE Threatened Species profiles (DPE 2022, DEE 2022) unless otherwise stated. The codes used in this table are:

- CE – Critically Endangered
- E – Endangered
- V – Vulnerable
- EP – Endangered Population
- C – CAMBA
- J – JAMBA
- R – ROKAMBA
- CEEC – Critically Endangered Ecological Community
- EEC – Endangered Ecological Community

The Likelihood of Occurrence (Table 26) below includes MNES and migratory species not captured in the BAM.

Table 24 Likelihood of Occurrence definitions

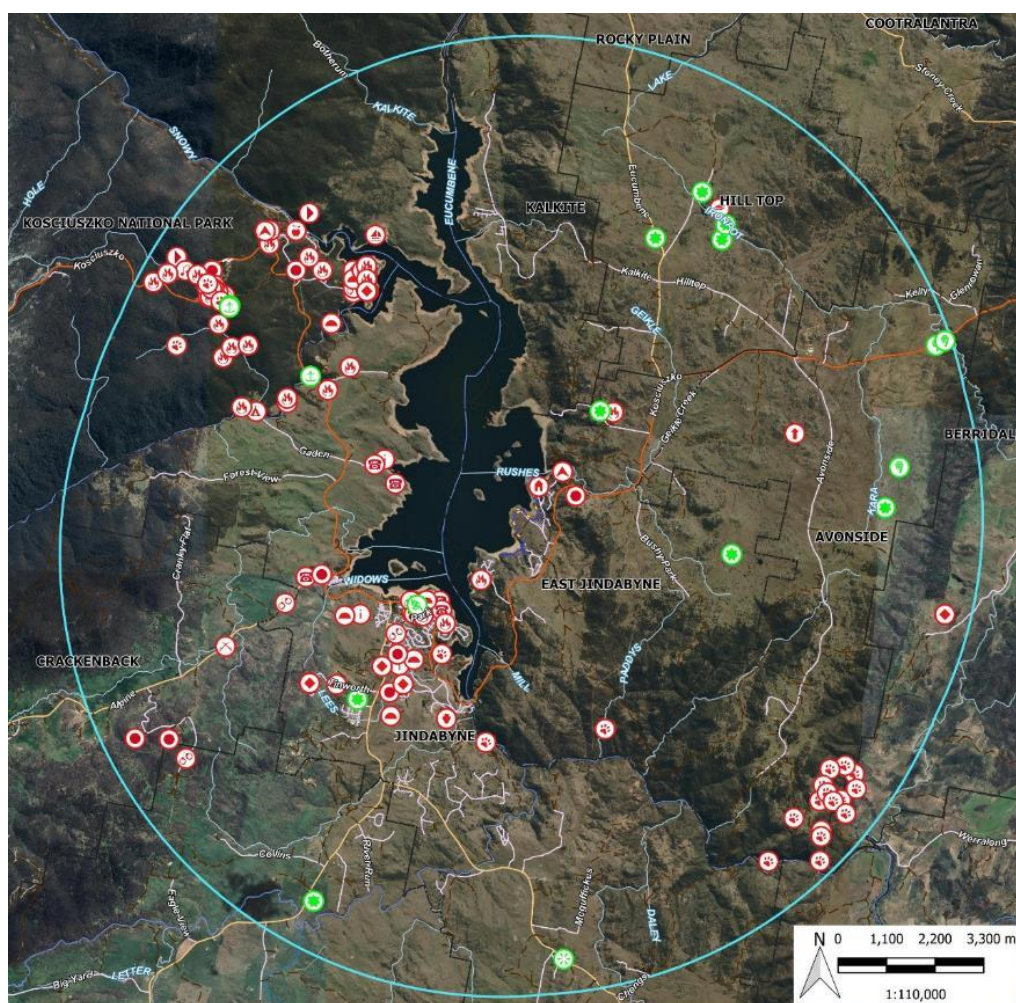
Likelihood of occurrence	Definition
<b>Known</b>	Species recorded in the Subject Land.
<b>Likely</b>	Species previously recorded within a 10 kilometre radius of the Subject Land and suitable habitat occurs within the Subject Land.
<b>Possible</b>	Species previously recorded within a 10 kilometre radius of the Subject Land but only marginal suitable habitat recorded, OR  Species not previously recorded within a 10 kilometre radius of the Subject Land, but the Proposal footprint is within the species known distribution and suitable habitat occurs within the Subject Land
<b>Unlikely</b>	Species previously recorded within a 10 kilometre radius of the Subject Land but no suitable habitat recorded.
<b>Nil</b>	Species not previously recorded within a 10 kilometre radius of the Subject Land and no suitable habitat



Table 25 Likelihood of impact definitions

Likelihood of impact	Definition
Nil	Species/ community will not be impacted by the Proposal.
Low	Species / community is unlikely to be impacted by the Proposal.
Moderate	Species / community is known or likely to occur within the Subject Land however the Proposal does not impact on important habitat resources.
High	Species / community is known or likely to occur within the Subject Land and the Proposal will impact on important habitat resources.

## Biodiversity Assessment Report – Jindabyne Shared Trails



**Section 2.1 Jindabyne Shared Trails Kunama Estate to East Jindabyne - Threatened Species within a 10km radius of the Proposal Location**

**Legend**

10km Radius	<b>Waterways</b>	Dusky Woodswallow	Large Bent-winged Bat	Silky Swainson-pea
Subject Land	River	Eastern False Pipistrelle	Leafy Anchor Plant	Southern Myotis
Subject Site	Gully	Eastern Pygmy-possum	Little Eagle	Speckled Warbler
Proposed Shared Trails	Creek	Flame Robin	Little Lorikeet	Turquoise Parrot
Suburb	<b>Threatened Species</b>	Gang-gang Cockatoo	Mauve Burr-daisy	Varied Sittella
<b>Roads</b>	Alpine Tree Frog	Green and Golden Bell Frog	Olive Whistler	White-bellied Sea-Eagle
Arterial Road	Blue-billed Duck	Grey-headed Flying-fox	Pilotbird	White-fronted Chat
Local Road	Booroolong Frog	Hoary Sunray	Rough Eyebright	White-throated Needletail
Sub Arterial Road	Brown Treecreeper (eastern subspecies)	Hooded Robin (south-eastern form)	Scarlet Robin	
Track-Vehicular	Diamond Firetail	Koala		

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**Figure 9 Threatened species recorded within 10km of the Subject Land**



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Table 26 Commonwealth species likelihood of occurrence table

Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
<b>Amphibians</b>							
<i>Litoria verreauxii alpina</i>	Alpine Tree Frog	E	V	The Alpine Tree Frog occurs in the south-eastern NSW and Victorian high country (alpine and sub-alpine zones) generally above 1100 m asl. Most locations are within National Park. Found in a wide variety of habitats including woodland, heath, grassland and herb fields. Breed in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing. It does not climb well and spends most of its time on the ground. Eats beetles, flies, spiders and moth larvae. Breeding occurs in December.	Bionet / PMST	Unlikely	Low
<i>Litoria castanea</i>	Yellow-spotted Tree frog	CE	CE	The Yellow-spotted Tree Frog has similar habitat requirements to the other two Bell Frog species, including deep pools with fringing and emergent aquatic vegetation to breed and nearby refuge habitat to shelter.	PMST	Possible	Low
<b>Birds</b>							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	-	V	Southern whitefaces live in a wide range of open woodlands and shrublands containing an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. The species forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover.	PMST	Possible – Suitable habitat occurs within the Subject Land, however species	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
						was not recorded within the site during surveys	
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. This species occupies wetland and swamp habitats, preferring the fringes of swamps and dams with a cover of grasses, reeds, scrub or woodland. Breeding occurs anytime during spring and summer when conditions are favourable. It nests on the ground amongst tall vegetation.	Bionet / PMST	Possible	Low
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Inland records are probably mainly of birds pausing for a few days during migration.	PMST	Unlikely	Low
<i>Numenius madagascariensis</i>	Eastern Curlew	-	CE	The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It	PMST	Unlikely	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
				is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia.			
<i>Grantiella picta</i>	Painted Honeyeater	V	V	A nomadic species inhabiting Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	PMST	Unlikely	Low
<i>Pycnoptilus floccosus</i>	Pilotbird	-	V	The Pilotbird is found in wet forested areas and heathland in eastern Victoria and southeastern New South Wales. It forages on the ground, turning over leaf litter using strong legs.	PMST	Unlikely	Low
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Found to forage in grassy box woodland up to 10km from the nesting site. They typically nest in colonies and return to the same location over generations. During the summer they return from wintering in northern NSW to breed, often in open box-woodland or isolated paddock trees requiring tree hollows to breed.	PMST	Unlikely	Low
<i>Lathamus discolor</i>	Swift Parrot	E	CE	In NSW, the Swift Parrot mostly occurs mostly on the coast and south west slopes. It breeds in Tasmania and returns to the south-eastern mainland to forage over the cooler months (March – October). They move across the landscape to forage on lerp infestations or an abundance of eucalypt flowers. Preferred feed trees include Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxyton and E. albens.	PMST	Unlikely	Low





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[illegible]



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
<i>Colobanthus curtisiae</i>	Curtis' Colobanth	-	V	Rare in Victoria. Recorded only from Snowy Range north of Licola, and summit areas of The Bluff, Mt Clear and Mt McDonald. This species is closely allied to <i>Colobanthus apetalus</i> and plants from alpine areas in Victoria were previously included in that species.	PMST	Unlikely	Low
<i>Diuris ochroma</i>	Pale Golden Moths	E	V	Recorded in eastern Victoria and south-eastern NSW on the sub-alpine plains of Kosciuszko National Park and the Kybean area. Occupies open grassy woodland of <i>Eucalyptus viminalis</i> , <i>E. pauciflora</i> and <i>E. parvula</i> including sub-alpine grassland.	PMST	Possible	Low
<i>Eucalyptus pulverulenta</i>	Silver-leafed Gum	V	V	The Silver-leafed Gum grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum ( <i>Eucalyptus mannifera</i> ), Red Stringybark ( <i>E. macrorhynca</i> ), Broad-leafed Peppermint ( <i>E. dives</i> ), Silvertop Ash ( <i>E. sieberi</i> ) and Apple Box ( <i>E. bridgesiana</i> ). Sometimes planted as street trees or ornamental (in private gardens), this species is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala).	PMST	Unlikely	Low
<i>Glycine latrobeana</i>	Clover glycine	CE	V	The Clover Glycine occurs mainly in grassland and grassy woodland habitats, less often in dry forests, and only rarely in heathland. Populations occur from sea level to c. 1,200 m altitude (900 m in Tasmania). In Victoria, plants grow in a range of soil types including alluvial soils, and those derived from sandstones, mudstones, granite and basalt. Soils are usually clay, but may also have high loam content. Tasmanian populations occur on a well-drained basalt, dolerite or sandstone substrates (Lynch 1994). The NSW population is in subalpine grassland (at about 1300 m asl).	PMST	Possible	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
<i>Lepidium aschersonii</i>	Spiny Pepper- cress	V	V	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Also known from the West Wyalong in the south of the State. Records from Barmedman and Temora areas are likely to be no longer present. Approximately 50% of the total <i>Lepidium aschersonii</i> recorded for Australia occurs in NSW. Found on ridges of gilgai clays dominated by Brigalow ( <i>Acacia harpophylla</i> ), Belah ( <i>Casuarina cristata</i> ), Buloke ( <i>Allocasuarina luehmanii</i> ) and Grey Box ( <i>Eucalyptus microcarpa</i> ). In the south has been recorded growing in Bull Mallee ( <i>Eucalyptus behriana</i> ). Often the understorey is dominated by introduced plants. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. Flowers from spring to autumn.	PMST	Unlikely	Low
<i>Lepidium hyssopifolium</i>	Aromatic Peppercress	E	E	A population of Aromatic Peppercress is known to occur on private property within the Bathurst area. This species tends to germinate following disturbance when open areas of bare ground provide suitable access to light without the competition from other species. It has been found within grassy Eucalypt woodlands, low open <i>Casuarina</i> woodlands as well as weed infested areas with high degradation and soil disturbance i.e. road and rail corridors.	PMST	Possible	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
<i>Pomaderris pallida</i>	Pale Pomaderris	V	V	Pale Pomaderris has been recorded from near Kydra Trig (north-west of Nimmitabel), Tinderry Nature Reserve, the Queanbeyan River (near Queanbeyan), the Shoalhaven River (between Bungonia and Warri), the Murrumbidgee River west of the ACT and the Byadbo area in Kosciuszko National Park. It is also found along the Murrumbidgee River in the ACT and has been recently recorded in eastern Victoria. This species usually grows in shrub communities surrounded by Brittle Gum ( <i>Eucalyptus mannifera</i> ) and Red Stringybark ( <i>E. macrorhyncha</i> ) or <i>Callitris</i> spp. woodland.	PMST	Unlikely	Low
<i>Prasophyllum bagoense</i>	Bago Leek-orchid	CE	CE	Currently known from a single population on land covered by a Crown Lease on State Forest near Tumbarumba on the Southern Tablelands of NSW. The species occurs over about 12 ha of sub-alpine grassy plain and wetland at an elevation of about 1100 m. Its distribution may extend into adjacent woodlands. Recent annual surveys suggest that the number of individuals emerging at the site may fluctuate seasonally, with counts ranging from about 20 to 80 in the flowering seasons of 2000 and 2003. Bago Leek Orchid is a tuberous ground orchid with leaves that normally regenerate from underground tubers each year in spring. Found in grassy, low heathland dominated by <i>Poa clivicola</i> , <i>Epacris gunnii</i> and <i>E. celata</i> on a subalpine plain bordered by Snow Gum and Mountain Gum.	PMST	Possible	Low
<i>Pterostylis oreophila</i>	Blue-tongued Greenhood Orchid	CE	CE	In New South Wales, the Blue-tongued Greenhood is known from a few small populations within Kosciuszko National Park and a population of about 40 plants (possibly now extinct) in Bago State Forest and adjoining Crown Leases south of Tumut. The known distribution includes parts of the Snowy River, Tumbarumba and	PMST	Unlikely	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
				possibly Tumut Local Government Areas. The Blue-tongued Greenhood is also known from the Australian Capital Territory (Brindabella Range) and in montane areas of far north-eastern Victoria. Grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. Less commonly grows in peaty soils and sphagnum mounds. While more frequently found in low-light conditions it appears to also be able to tolerate full sun.			
<i>Senecio macrocarpus</i>	Large-fruit Fireweed	-	V	The Large-fruit Groundsel <i>Senecio macrocarpus</i> is a small perennial plant endemic to south-eastern Australia, where it occurs in South Australia and Victoria, and formerly occurred in Tasmania. There are about 15 populations containing about 36,000 plants, although almost all plants (about 35,000) occur in just one population.	PMST	Unlikely	Low
<i>Xerochrysum palustre</i>	Swamp Everlasting, Swamp Paper-daisy	-	V	Found in swamps and bogs which are dominated by heaths. Also found in peaty soils on the edges of bog margins with a shrub or grass cover.	PMST	Unlikely	Low
<b>Mammals</b>							
<i>Mastacomys fuscus</i>	Broad-toothed Rat	V	V	The Broad-toothed Rat occurs in two widely separated areas in NSW: the wet alpine and subalpine heaths and woodlands in Kosciuszko National Park, adjacent Nature Reserves (Bimberi and Scabby NR) and State Forest (Buccleuch SF) in the south of the State, and on the Barrington Tops, north-west of Newcastle. In Victoria - South Gippsland and the Otways - and western Tasmania, it can be found in wet sedge and grasslands at lower elevations. The Broad-toothed	PMST	Possible	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
				Rat lives in a complex of runways through the dense vegetation of its wet grass, sedge or heath environment, and under the snow in winter. This relatively warm under-snow space enables it to be active throughout winter.			
<i>Pseudomys fumeus</i>	Smoky Mouse	CE	E	The Smoky Mouse is currently limited to a small number of sites in western, southern and eastern Victoria, south-east NSW and the ACT. In NSW there are 3 records from Kosciuszko National Park and 2 records adjacent to the park in Bondo and Ingbyra State Forests; the remainder are centred around Mt Poole, Nullica State Forest and the adjoining South East Forests National Park. The Smoky Mouse appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies.	PMST	Unlikely	Low
<b>Reptiles</b>							
<i>Cyclodomorphus praealtus</i>	Alpine She-oak Skink	E	E	The Alpine She-oak Skink is endemic to NSW and Victoria, where it is restricted to sub-alpine and alpine grasslands. In NSW, the Alpine She-oak Skink has only been observed within Kosciuszko National Park between Smiggin Holes and Kiandra. In Victoria, the species is found in the north east of the state, extending as far south as Lankey Plain on the Dargo High Plains. The Alpine She-oak Skink has specific habitat requirements, preferring tree-less or very lightly treed areas that contain tussock grasses, low heath or a combination of both. Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking on grass	PMST	Unlikely	Low





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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
				tussocks. In NSW, Alpine She-oak Skinks have been observed in alpine to sub-alpine grasslands in flat to gently sloping areas.			
<i>Tympanocryptis pinguicolla</i>	Grassland Earless Dragon	E	E	Historically this species extended from Cooma to the south up to Bathurst in the north, however this species has not been recorded in the Bathurst area for several decades. It is strongly associated with native grasslands occupying arthropod burrows for refuge.	PMST	Possible	Low
<i>Delma impar</i>	Striped Legless Lizard	V	V	Occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Sometimes found in modified grasslands with significant amounts of surface rocks.	PMST	Possible	Low
<b>Migratory Species</b>							
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Migratory Wetland	In Australia, the Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores. When in Australia, the population is concentrated in northern and western Australia .	PMST	Possible	Low
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE - Migratory Wetland	Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	PMST	Possible	Low



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Scientific name	Common name	BC Act Listing	EPBC Act Listing	Habitat	Nature of record	Likelihood of occurrence	Likelihood of impact
				Inland records are probably mainly of birds pausing for a few days during migration.			
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	Migratory Wetland	These birds forage on grasslands and mudflats, picking up food by sight, sometimes by probing. They mainly eat arthropods and other invertebrates. Some Asian breeders winter in southern Australia and NZ.	PMST	Possible	Low
<i>Gallinago hardwickii</i>	Latham's Snipe	-	Migratory Wetland	Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture.	PMST	Possible	Low

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#### **Appendix G – Credit Reports**

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**Appendix H – Climate Data**



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## Appendix I – BDAR Assessment Checklist

Table 27 Minimum information requirements for the Biodiversity Development Assessment Report (adapted from BAM 2020, Appendix K, Table 24)

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
Introduction	Chapters 2 and 3	<b>INFORMATION</b> Introduction to the biodiversity assessment including: <input checked="" type="checkbox"/> Brief description of the proposal <input checked="" type="checkbox"/> Identification of subject land boundary, including: <ul style="list-style-type: none"> <li>operational footprint (if BDAR)</li> <li>construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR)</li> <li>land proposed for biodiversity certification (if BCAR)</li> </ul> <input checked="" type="checkbox"/> General description of the subject land <input checked="" type="checkbox"/> Sources of information used in the assessment, including reports and spatial data			Complete
		<b>MAPS and TABLES (in document)</b> <input checked="" type="checkbox"/> Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR)			Complete
		<b>DATA (to be supplied) – N/A</b>			N/A
Landscape context	Sections 3.1, 3.2, Appendix E	<b>INFORMATION</b> <input checked="" type="checkbox"/> Identification of site context components and landscape features, including: <ul style="list-style-type: none"> <li>general description of subject land topographic and hydrological setting, geology and soils</li> <li>percent native vegetation cover in the assessment area (as described in BAM Section 3.2)</li> <li>IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))</li> </ul>			Complete As relevant; noting no SEARs for the proposal (not an EIS). No karst, caves, crevices, cliffs, or other



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Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<ul style="list-style-type: none"> <li>– rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)</li> <li>– wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))</li> <li>– connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))</li> <li>– karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))</li> <li>– areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))</li> <li>– any additional landscape features identified in any SEARs for the proposal</li> <li>– NSW (Mitchell) landscape on which the subject land occurs</li> </ul>			geological features of significance present within the Subject Land. Rocky outcrops mapped on Figure 6
		<p><b>MAPS and TABLES (in document)</b></p> <p><input checked="" type="checkbox"/> Site Map</p> <ul style="list-style-type: none"> <li>– Boundary of subject land</li> <li>– Cadastre of subject land</li> <li>– Landscape features identified in BAM Subsection 3.1.3</li> </ul> <p><input checked="" type="checkbox"/> Location Map</p> <ul style="list-style-type: none"> <li>– Digital aerial photography at 1:1,000 scale or finer</li> <li>– Boundary of subject land</li> <li>– Assessment area, (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development)</li> <li>– Landscape features identified in BAM Subsection 3.1.3</li> <li>– Additional detail (e.g. local government area boundaries) relevant at this scale</li> </ul> <p><input checked="" type="checkbox"/> Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location map include:</p> <ul style="list-style-type: none"> <li>– IBRA bioregions and subregions</li> <li>– rivers, streams and estuaries</li> </ul>			<p>Complete. No karst, caves, cliffs or other geological features of significance noted on site.</p> <p>No AOBV present on site.</p>





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Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<ul style="list-style-type: none"> <li>– wetlands and important wetlands</li> <li>– connectivity of different areas of habitat</li> <li>– karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features</li> <li>– areas of outstanding biodiversity value occurring on the subject land and assessment area</li> <li>– any additional landscape features identified in any SEARs for the proposal</li> <li>– NSW (Mitchell) landscape on which the subject land occurs</li> </ul>			
		<b>DATA (to be supplied)</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> All report maps as separate jpeg files</li> <li><input checked="" type="checkbox"/> Individual digital shapefiles of: <ul style="list-style-type: none"> <li>– Subject land boundary</li> <li>– Assessment area (i.e. subject land and 1500 m buffer area) boundary</li> <li>– Cadastral boundary of subject land</li> <li>– Areas of native vegetation cover</li> <li>– Landscape features</li> </ul> </li> </ul>			<p>Separate jpegs uploaded to BOAMS</p> <p>Shapefiles provided in geopackage uploaded to BOAMS</p>
<b>Native vegetation</b>	<b>Chapter 4, Appendix A and Appendix E</b>	<b>INFORMATION</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)</li> <li><input checked="" type="checkbox"/> Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)</li> <li><input checked="" type="checkbox"/> Review of existing information on native vegetation including references to previous vegetation maps of the subjectland and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)</li> </ul>			Table 5, Table 10, Table 11, Table 13, Section 5



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Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p><input checked="" type="checkbox"/> Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2</p> <p><input checked="" type="checkbox"/> Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)</p> <p><input checked="" type="checkbox"/> For each PCT within the subject land, describe:</p> <ul style="list-style-type: none"> <li>– vegetation class</li> <li>– extent (ha) within subject land</li> <li>– evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))</li> <li>– plant species relied upon for identification of the PCT and relative abundance of each species</li> <li>– if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))</li> <li>– estimate of percent cleared value of PCT (BAM Subsection 4.2.1(5.)) Describe the vegetation integrity assessment of the subject land, including:</li> <li>– identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)</li> <li>– assessment of patch size (as described in BAM Subsection 4.3.2)</li> <li>– survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)</li> <li>– use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))</li> </ul> <p><input checked="" type="checkbox"/> Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):</p> <ul style="list-style-type: none"> <li>– identify the PCT or vegetation class for which local benchmark data will be applied</li> <li>– identify published sources of local benchmark data (if benchmarks obtained from published sources)</li> <li>– describe methods of local benchmark data collection (if reference plots used to determine local</li> </ul>			



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p>benchmark data)</p> <ul style="list-style-type: none"> <li>– provide justification for use of local data rather than BioNet Vegetation Classification benchmark values</li> <li>– provide written confirmation from the decision-maker that they support the use of local benchmark data</li> </ul>			
		<p><b>MAPS and TABLES (in document)</b></p> <p><input checked="" type="checkbox"/> Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)</p> <p><input checked="" type="checkbox"/> Map of PCTs within the subject land (as described in BAM Section 4.2(1.))</p> <p><input checked="" type="checkbox"/> Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)</p> <p><input checked="" type="checkbox"/> Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCTs boundaries</p> <p><input checked="" type="checkbox"/> Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)</p> <p><input checked="" type="checkbox"/> Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)</p> <p><input checked="" type="checkbox"/> Table of current vegetation integrity scores for each vegetation zone within the site and including:</p> <ul style="list-style-type: none"> <li>– composition condition score</li> <li>– structure condition score</li> <li>– function condition score</li> <li>– presence of hollow bearing trees</li> </ul>			<p>Map of patch size shown on Figure 5 of BDAR as mapped Biometric vegetation within Assessment Area</p> <p>TEC mapped in Figure 6</p> <p>VI scores for vegetation zones identified in Table 13 of BDAR</p>



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<b>DATA (to be supplied)</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> All report maps as separate jpeg files</li> <li><input checked="" type="checkbox"/> Plot field data (MS Excel format)</li> <li><input checked="" type="checkbox"/> Plot field data sheets</li> <li><input checked="" type="checkbox"/> All report maps as separate jpeg files</li> </ul> Digital shapefiles of: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> PCT boundaries within subject land</li> <li><input checked="" type="checkbox"/> TEC boundaries within subject land</li> <li><input checked="" type="checkbox"/> vegetation zone boundaries within subject land</li> <li><input checked="" type="checkbox"/> floristic vegetation survey and vegetation integrity plot locations</li> </ul>			Separate jpeg files uploaded to BOAMS  Plot field data included in Appendix D – Field data. Field data not available in MS Excel format.  Digital shape files Shapefiles provided in geopackage uploaded to BOAMS.
Threatened species	Chapter 5	<b>INFORMATION</b> <p>Identify ecosystem credit species likely to occur on the subject land, including:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))</li> <li><input checked="" type="checkbox"/> justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)</li> <li><input checked="" type="checkbox"/> justification for addition of any ecosystem credit species to the list</li> </ul> <p>Identify species credit species likely to occur on the subject land, including:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)</li> <li><input checked="" type="checkbox"/> justification and supporting evidence for exclusions based on geographic limitations,</li> </ul>			Ecosystem credits supplied in Table 15 and Table 20  Species credit species supplied in Table 16 and Table 21  No expert reports used in



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p>habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)</p> <p><input checked="" type="checkbox"/> justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)</p> <p><input checked="" type="checkbox"/> justification for addition of any species</p> <p>credit species to the list</p> <p>From the list of candidate species credit species, identify:</p> <p><input checked="" type="checkbox"/> species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.))</p> <p><input checked="" type="checkbox"/> species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.))</p> <p><input checked="" type="checkbox"/> species for which targeted surveys are to be completed to determine species presence (Subsection 5.2.4(2.b.))</p> <p><input checked="" type="checkbox"/> species for which an expert report is to be used to determine species presence (Subsection 5.2.4(2.c.))</p> <p>Present the outcomes of species credit species assessments from:</p> <p><input checked="" type="checkbox"/> threatened species survey (as described in BAM Section 5.2.4)</p> <p><input checked="" type="checkbox"/> expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Section 5.2.4 and 5.3, Box 3)</p> <p>Where survey has been undertaken include detailed information on:</p> <p><input checked="" type="checkbox"/> survey method and effort, (as described in BAM Section 5.3)</p> <p><input checked="" type="checkbox"/> justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the Department's taxa-specific survey guides or where no relevant guideline has been published</p> <p><input checked="" type="checkbox"/> timing of survey in relation to requirements in the TBDC or the Department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys</p>			<p>place of survey</p> <p>Species assessed by area, not individual count</p> <p>Species polygons associated with PCT. Biodiversity risk weighting supplied in Table 20</p> <p>Survey effort provided in Table 8 and Section 4.2</p>



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p><input checked="" type="checkbox"/> survey personnel and relevant experience</p> <p><input checked="" type="checkbox"/> describe any limitations to surveys and how these were addressed/overcome</p> <p><input checked="" type="checkbox"/> Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:</p> <ul style="list-style-type: none"> <li>– justification of the use of an expert report</li> <li>– identify the expert, provide evidence of their expert credentials and Departmental approval of expert status</li> <li>– all requirements of Box 3 have been addressed in the expert report</li> </ul> <p><input checked="" type="checkbox"/> Where use of local data is proposed (BAM Subsection 1.4.2):</p> <ul style="list-style-type: none"> <li>– identify relevant species</li> <li>– identify data to be amended</li> <li>– identify source of information for local data, e.g. published literature, additional survey data, etc.</li> <li>– justify use of local data in preference to VIS Classification or TBDC data</li> <li>– provide written confirmation from the decision-maker that they support the use of local data</li> </ul> <p>Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:</p> <p>The unit of measure for each species is documented for species assessed <u>by area</u>:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)</li> <li><input checked="" type="checkbox"/> a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied</li> </ul> <p>For species assessed by <u>counts of individuals</u>:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))</li> <li><input checked="" type="checkbox"/> the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken</li> </ul>			





Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p><input checked="" type="checkbox"/> the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land</p> <p><input checked="" type="checkbox"/> Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)</p>			
		<p><b>MAPS and TABLES (in document)</b></p> <p><input checked="" type="checkbox"/> Table showing ecosystem credit species in accordance with BAM Section 5.1.1, and identifying:</p> <ul style="list-style-type: none"> <li>– the ecosystem credit species removed from the list</li> <li>– the sensitivity to gain class of each species</li> </ul> <p><input checked="" type="checkbox"/> Table detailing species credit species in accordance with BAM section 5.2 and identifying:</p> <ul style="list-style-type: none"> <li>– the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or micro habitat features are not present</li> <li>– the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map</li> </ul> <p><input checked="" type="checkbox"/> Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)</p> <p><input checked="" type="checkbox"/> Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)</p>			Tables presented in Section 9 of BDAR
		<p><b>DATA (to be supplied)</b></p> <p><input checked="" type="checkbox"/> Digital shape files of suitable habitat identified for survey for each candidate species credit species</p> <p><input checked="" type="checkbox"/> Survey locations including GPS coordinates of any plots, transects, grids</p>			Digital shape files Shapefiles provided in geopackage uploaded to



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<input checked="" type="checkbox"/> Digital shape files of each species polygon including GPS coordinates of located individuals <input checked="" type="checkbox"/> Species polygon map in jpeg format <input checked="" type="checkbox"/> Expert reports and any supporting data used to support conclusions of the expert report <input checked="" type="checkbox"/> Field data sheets detailing survey information including prevailing conditions, date, time, equipment used, etc.			BOAMS.  GPS coordinates on field sheets  Flora species polygon map provided in BDAR
Prescribed impacts	Chapter 6	<b>INFORMATION</b> <input checked="" type="checkbox"/> Identify potential prescribed biodiversity impacts on threatened entities, including: <ul style="list-style-type: none"> <li>– karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1)</li> <li>– occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2)</li> <li>– corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3)</li> <li>– water bodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)</li> <li>– protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)</li> <li>– where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)</li> </ul> <input checked="" type="checkbox"/> Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts  <input checked="" type="checkbox"/> Describe the importance of habitat features to the species including, where relevant, impacts on life-cycle or movement patterns (e.g. Subsection 6.1.3)			Prescribed impacts included in Section 6.4  <b>Proposal not a windfarm.</b>



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<p>Where the proposed development is for a wind farm:</p> <ul style="list-style-type: none"> <li>☑ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)</li> <li>☑ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)</li> <li>☑ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))</li> </ul>			
		<p><b>MAPS and TABLES (in document)</b></p> <ul style="list-style-type: none"> <li>☑ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)</li> <li>☑ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)</li> </ul>			Prescribed impacts included in <b>Section 6.4</b> <b>Habitat features included in Figure 6</b>
		<p><b>DATA (to be supplied)</b></p> <ul style="list-style-type: none"> <li>☑ Digital shape files of prescribed impact feature locations</li> <li>☑ Prescribed impact features map in jpeg format</li> </ul>			Included in shapefiles



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Table 28 Minimum information requirements for the BDAR or BCAR – Stage 2: Impact assessment (biodiversity values) (adapted from BAM Appendix K, Table 25)

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
Avoid and minimise impacts	Chapters 7	<b>INFORMATION</b>  <input checked="" type="checkbox"/> Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative: <ul style="list-style-type: none"> <li>– modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology</li> <li>– routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route</li> <li>– alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location</li> <li>– alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site</li> </ul> <input checked="" type="checkbox"/> Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2) <input checked="" type="checkbox"/> Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Section 7.2.1(3.))			Section 8 details impact avoidance, minimisation and mitigation measures proposed
		<b>MAPS and TABLES (in document)</b>  <input checked="" type="checkbox"/> Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility <input checked="" type="checkbox"/> Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation <input checked="" type="checkbox"/> Maps demonstrating indirect impact zones where applicable			Minimisation and mitigation measures presented in Section 8
		<b>DATA (to be supplied)</b> Digital shape files of: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> alternative and final proposal footprint</li> <li><input checked="" type="checkbox"/> direct and indirect impact zones</li> </ul> <input checked="" type="checkbox"/> Maps in jpeg format			Figure 1 as Subject Land containing both zones
Mitigation	Chapter	<b>INFORMATION</b>			Mitigation measures



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
and Management of Impacts	8, Sections 8.4 and 8.5	R Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including: <ul style="list-style-type: none"> <li>– techniques, timing, frequency and responsibility</li> <li>– identify measures for which there is risk of failure</li> <li>– evaluate the risk and consequence of any residual impacts</li> <li>– document any adaptive management strategy proposed</li> </ul> <input checked="" type="checkbox"/> Identification of measures for mitigating impacts related to: <ul style="list-style-type: none"> <li>– displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))</li> <li>– indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.))</li> <li>– mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)</li> </ul> <input checked="" type="checkbox"/> Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)			detailed in Section 8
		<b>MAPS and TABLES (in document)</b>  <input checked="" type="checkbox"/> Table of measures to be implemented to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility			Table 19
		<b>DATA (to be supplied) – N/A</b>			
Impact Summary	Chapter 9	<b>INFORMATION</b>  <input checked="" type="checkbox"/> Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including: <ul style="list-style-type: none"> <li>– addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land</li> <li>– addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land</li> <li>– documenting assumptions made and/or limitations to information</li> <li>– documenting all sources of data, information, references used or consulted</li> <li>– clearly justifying why any criteria could not be addressed</li> </ul> <input checked="" type="checkbox"/> Identification of impacts requiring offset in accordance with BAM Section 9.2 <input checked="" type="checkbox"/> Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.) <input checked="" type="checkbox"/> Identification of areas not requiring assessment in accordance with BAM Section 9.3			See Section 1.3 and Section 6 – Impact Assessment



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<b>MAPS and TABLES (in document)</b> <ul style="list-style-type: none"> <li>☑ Map showing the extent of TECs at risk of an SAI within the subject land</li> <li>☑ Map showing location of threatened species at risk of a SAI within the subject land</li> <li>☑ Map showing location of: <ul style="list-style-type: none"> <li>– impacts requiring offset</li> <li>– impacts not requiring offset</li> <li>– areas not requiring assessment</li> </ul> </li> </ul>			TEC (SAI) shown in Figure 6 Impacts (Offsets) shown in Figure 5. Impacts requiring offsets discussed in Section 6 and Section 9
		<b>DATA (to be supplied)</b> <p>Digital shape files of:</p> <ul style="list-style-type: none"> <li>☑ extent of TECs at risk of an SAI within the subject land</li> <li>☑ location of threatened species at risk of an SAI within the subject land</li> <li>☑ boundary of impacts requiring offset</li> <li>☑ boundary of impacts not requiring offset</li> <li>☑ boundary of areas not requiring assessment</li> </ul> <p>☑ Maps in jpeg format</p>			Discussed in Section 7
Impact Summary	Chapter 10	<b>INFORMATION</b> <p>Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:</p> <ul style="list-style-type: none"> <li>☑ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H)</li> <li>☑ change in vegetation integrity score (BAM Subsection 8.1.1)</li> <li>☑ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 9)</li> <li>☑ number of required species credits for each candidate threatened species that is directly impacted on by the</li> </ul>			Discussed in Section 5.6.4 and 9 and Table 20 and Table 21





Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		proposal (BAM Subsection 10.1.3)			
		<b>MAPS and TABLES (in document)</b> <input checked="" type="checkbox"/> Table of PCTs requiring offset and the number of ecosystem credits required <input checked="" type="checkbox"/> Table of threatened species requiring offset and the number of species credits required			Discussed in Section 5.6.4, Section 9, Table 20 and Table 21
		<b>DATA (to be supplied)</b> <input checked="" type="checkbox"/> Submitted proposal in the BAM Calculator			Submitted in BOAMS
Biodiversity credit report	Chapter 10	<b>INFORMATION</b> <input checked="" type="checkbox"/> Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)			Provided in Section 9
		<b>MAPS and TABLES (in document)</b> <input checked="" type="checkbox"/> Table of credit class and matching credit profile			Section 9
		<b>DATA (to be supplied)</b> <input checked="" type="checkbox"/> BAM credit report in pdf format			Submitted in BOAMS
Biodiversity certification offsets and strategy (biodiversity certification only)	Chapter 12 and Appendix J	<b>INFORMATION</b> Land-based conservation measures including (strategic biodiversity certification only): <input checked="" type="checkbox"/> identification of parcels subject to land-based conservation measures <input checked="" type="checkbox"/> identification of land-based conservation measures proposed for each parcel <input checked="" type="checkbox"/> supporting information to demonstrate suitability of land-based conservation measures (Appendix J) <input checked="" type="checkbox"/> credit score of land-based conservation measures (Appendix J) Biodiversity certification strategy including: <input checked="" type="checkbox"/> land proposed for biodiversity certification <input checked="" type="checkbox"/> land proposed for biodiversity conservation			N/A not a biodiversity certification project



Biodiversity Development Assessment Report – Lake Jindabyne Shared Trail

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	Comments
		<input checked="" type="checkbox"/> proposed conservation measures <input checked="" type="checkbox"/> legal mechanisms for securing delivery of proposed conservation measures <input checked="" type="checkbox"/> parties to the biodiversity certification and responsibilities, noting where biodiversity certification agreements are proposed <input checked="" type="checkbox"/> timing for delivery of conservation measures <input checked="" type="checkbox"/> funding sources for delivery of conservation measures <input checked="" type="checkbox"/> framework for monitoring, reporting or auditing implementation of conservation measures			
		<b>MAPS and TABLES (in document)</b> <input checked="" type="checkbox"/> Maps of parcels of land proposed for land-based conservation measures <input checked="" type="checkbox"/> Maps as per Appendix M as required in relation to any land-based conservation measures <input checked="" type="checkbox"/> Tables as per Appendix M as required in relation to any land-based conservation measures <input checked="" type="checkbox"/> Table of credit scores for land-based conservation measures, including scores produced by BAM and weighting adjusted scores as per Appendix J			N/A not a biodiversity certification project
		<b>DATA (to be supplied)</b> <input checked="" type="checkbox"/> Digital shape files of parcels of land proposed for land-based conservation measures <input checked="" type="checkbox"/> Maps in jpeg format			N/A not a biodiversity certification project

JINDABYNE SHARED TRAIL NETWORK, JINDABYNE, NSW

## ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

Report to Stantec on behalf of  
Snowy Monaro Regional Council

LGA: Snowy Monaro

April 2023



**APEX**  
ARCHAEOLOGY

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## EXECUTIVE SUMMARY

Apex Archaeology have been engaged to assist Stantec on behalf of Snowy Monaro Regional Council (SMRC) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of the Jindabyne Shared Trails Network. The project is located within the Snowy Monaro LGA.

This ACHA has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011); the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, April 2010) (the ACHCRs). A separate report detailing the results of the assessment prepared in line with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice) is attached as an appendix to this report.

The study area is located approximately 365km south west of Sydney, around the shores of Lake Jindabyne. This project includes Sections 1.1 (Tyrolean Village to Kunama Estate and Rainbow Beach), 1.2 (Cobbon Crescent to Jindabyne dam wall), 2.1 (Kunama Estate and Rainbow Beach to East Jindabyne) and 5.1 (Banjo Patterson Park to Cobbon Crescent).

Unsanctioned trail has been constructed within Sections 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these sections. New trails are also proposed within these sections. New trails are proposed within the other three Sections. A number of Aboriginal cultural heritage sites are known throughout the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

A total of eight Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:

- Bega Local Aboriginal Land Council (LALC)
- Ngarigo/Djirringanji Elders
- Gunjeewong Cultural Heritage Aboriginal Corporation
- Didge Ngunawal Clan
- Corroboree Aboriginal Corporation
- Maria Williams
- Ramsay Freeman/Snowy Mountains Indigenous Elders Group
- Woka Aboriginal Corporation

Consultation with the RAPs has been conducted in accordance with the Consultation Guidelines.

It was found that:



- A total of four previously identified Aboriginal sites were located within the study area.
- Eight newly identified sites were located within the trail alignment.
- One site is able to be avoided through realignment of the trail.
- Another site is able to be avoided through deletion and realignment of the proposed extension of the trail.
- Two areas of subsurface potential were noted which could not be avoided by the proposed trail alignment.
- Test excavation within these areas identified a relatively low density archaeological deposit with a total of 31 objects recovered.
- The remaining ten sites cannot be avoided by the proposed works.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.
- Collection of surface artefacts is recommended.

Therefore, the following recommendations have been made.

**RECOMMENDATION 1: APPLICATION FOR AHIP REQUIRED**

This report details the Aboriginal archaeological potential of several stages of the Jindabyne Shared Trail Network. A total of twelve previously and newly recorded sites are located within the study area. Ten of these cannot be avoided by the proposed works. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to these sites is required, and should include permission to undertake surface collection of any artefacts on the track surface within the proposed impact areas, with the items placed in a keeping place.

If the surface artefacts cannot be relocated, the AHIP should permit unmitigated impact to the site location.

**RECOMMENDATION 2: CONSERVATION OF SITES**

PAD outside of existing trails should be conserved and no impact should be permitted to these areas. This should be detailed in any Plan of Management (PoM) prepared for the trails.

**RECOMMENDATION 3: SURFACE COLLECTION**

The AHIP should permit surface collection of any artefacts visible on the surface of the existing trails prior to the commencement of upgrade or construction works. Additionally, the AHIP should permit annual surface collection of any artefacts that may wash or erode out of the berms bordering the trails within the study area.

**RECOMMENDATION 4: LONG TERM MANAGEMENT OF COLLECTED ARTEFACTS**

Management of collected artefacts should be in accordance with the wishes of the Aboriginal community, and in consultation with Heritage NSW. SMRC have indicated an intention to develop a permanent Keeping Place in Jindabyne, but until such time, it is recommended that artefacts be stored at the Jindabyne Library, which is



operated by SMRC and has capacity to care for items until such time as they can be transferred to a Keeping Place. Heritage NSW should be advised of any transferral of artefacts to a Keeping Place once established.

**RECOMMENDATION 5: PREPARATION OF MANAGEMENT PLAN**

As part of the wider Jindabyne Shared Trail Network program of works, a Plan of Management (PoM) should be developed to incorporate and consolidate all archaeological work undertaken within the trail network, so as to streamline management processes and ensure Aboriginal cultural heritage within and adjacent to the trail network footprint is respected, preserved and managed appropriately. The PoM should be developed in consultation with the Aboriginal community.

**RECOMMENDATION 6: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION**

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

**RECOMMENDATION 7: STUDY AREA BOUNDARIES**

The proposed works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present.

**RECOMMENDATION 8: STOP WORK PROVISION**

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the





assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) developed for the site.

**RECOMMENDATION 9: REPORTING**

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



Apex Archaeology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and in whose land this assessment took place, and to the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.

## DOCUMENT CONTROL

The following register documents the development and issue of the document entitled 'Jindabyne Shared Trails, Jindabyne, NSW: Aboriginal Cultural Heritage Assessment Report', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared	Reviewed	Comment	Issue Date
1 – Draft	Jenni Bate	Leigh Bate	Client review	29 January 2023
2 – Draft	Jenni Bate	Stantec/SMRC	Issue for RAPs	6 March 2023
3 – Final	Jenni Bate	RAPs	Issue of final	14 April 2023



## GLOSSARY OF TERMS

<b>Aboriginal Object</b>	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
<b>ACHA</b>	Aboriginal Cultural Heritage Assessment
<b>ACHAR</b>	Aboriginal Cultural Heritage Assessment Report
<b>ACHCRs</b>	<i>Aboriginal cultural heritage consultation requirements for proponents 2010</i>
<b>AHIMS</b>	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
<b>AHIP</b>	Aboriginal Heritage Impact Permit
<b>AR</b>	Archaeological Report
<b>ASIRF</b>	Aboriginal Site Impact Recording Form
<b>BP</b>	Before Present, defined as before 1 January 1950.
<b>Code of Practice</b>	The DECCW September 2010 <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>
<b>Consultation</b>	Aboriginal community consultation in accordance with the DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> .
<b>DA</b>	Development Application
<b>DECCW</b>	The Department of Environment, Climate Change and Water (now Heritage NSW)
<b>Disturbed Land</b>	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
<b>DPIE</b>	Department of Planning, Industry and Environment
<b>Due Diligence</b>	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the <i>National Parks and Wildlife Act 1974</i> and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
<b>Due Diligence Code of Practice</b>	The DECCW Sept 2010 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
<b>GIS</b>	Geographical Information Systems
<b>GSV</b>	Ground Surface Visibility
<b>Harm</b>	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
<b>Heritage NSW</b>	Heritage NSW within the Department of Premier and Cabinet; responsible for overseeing heritage matters within NSW
<b>ka</b>	Kiloannus, a unit of time equating to 1,000 years
<b>LALC</b>	Local Aboriginal Land Council
<b>LGA</b>	Local Government Area
<b>NPW Act</b>	NSW <i>National Parks and Wildlife Act 1974</i>
<b>NPWS</b>	National Parks and Wildlife Service
<b>OEH</b>	The Office of Environment and Heritage of the NSW Department of Premier and Cabinet (now Heritage NSW)
<b>PAD</b>	Potential Archaeological Deposit
<b>RAPs</b>	Registered Aboriginal Parties



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## 1.0 INTRODUCTION

Apex Archaeology have been engaged to assist Stantec on behalf of Snowy Monaro Regional Council (SMRC) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of the Jindabyne Shared Trails Network. The project is located within the Snowy Monaro LGA.

This report has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011); the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, April 2010) (the ACHCRs); and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). The results of the archaeological assessment are presented in the Archaeological Report (AR) appended to this report.

### 1.1 PROJECT PROPONENT

The proponent for the project is Snowy Monaro Regional Council. The SMRC representative for the project was Cherie McNair and the project manager for Stantec was Justin Warner.

### 1.2 STUDY AREA AND PROJECT BRIEF

The study area is located approximately 365 km south west of Sydney (Figure 1), around the shores of Lake Jindabyne (Figure 2).

A number of unsanctioned trails have been constructed within Stage 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these trails. New trails are proposed within the other three Sections. A number of Aboriginal cultural heritage sites are known throughout the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

### 1.3 STATUTORY CONTEXT

The Jindabyne Shared Trail has been awarded \$11.8m funding by the Regional Growth-Environment and Tourism fund through Restart NSW. The funding program provides funding for infrastructure that supports regional economic growth, creates local employment opportunities and drives growth in the visitor economy.

The project involves extension of the existing trail network, as well as improvements to the existing trail network along with supporting infrastructure such as car parking, trail heads and visitor day-use areas.



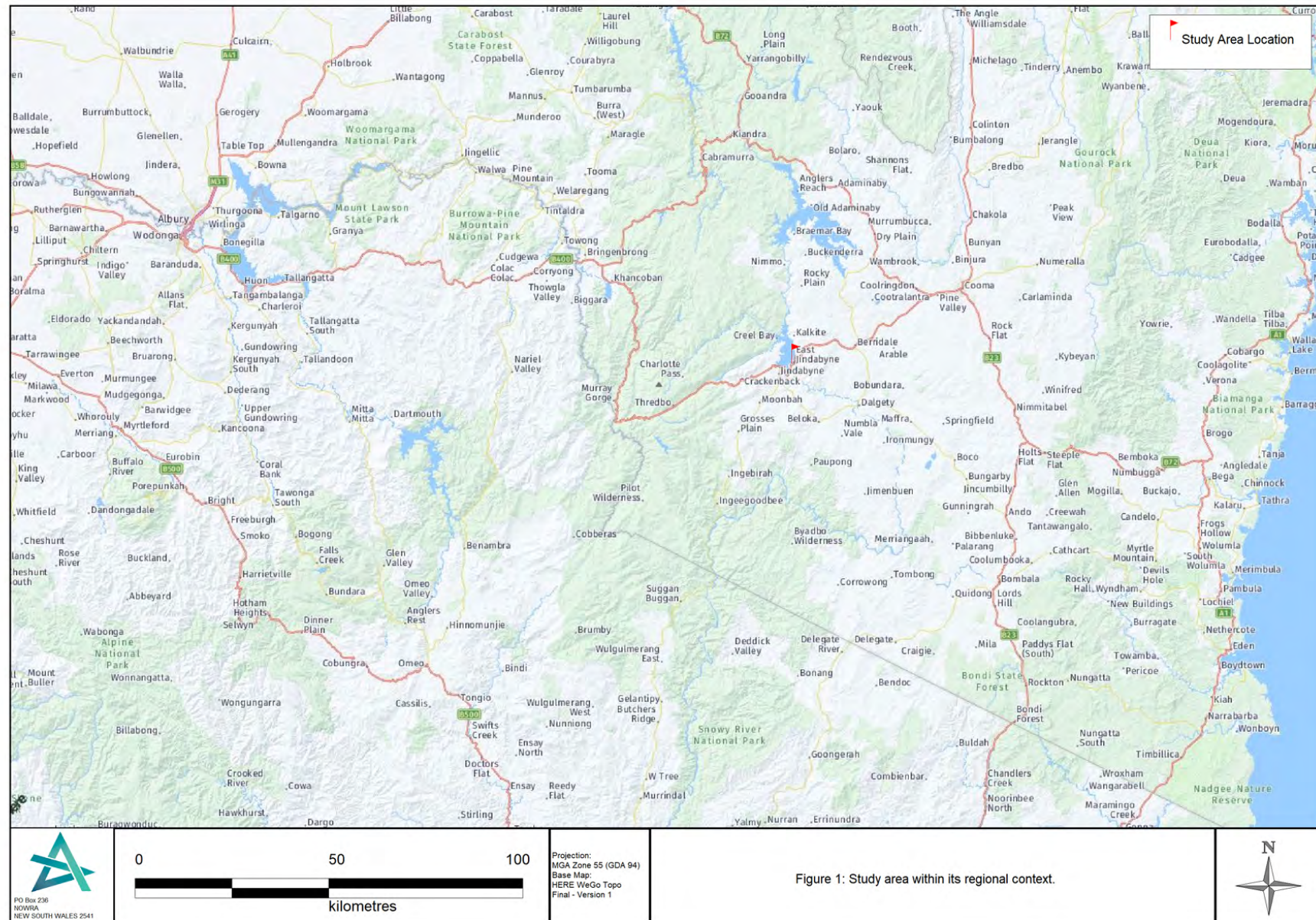
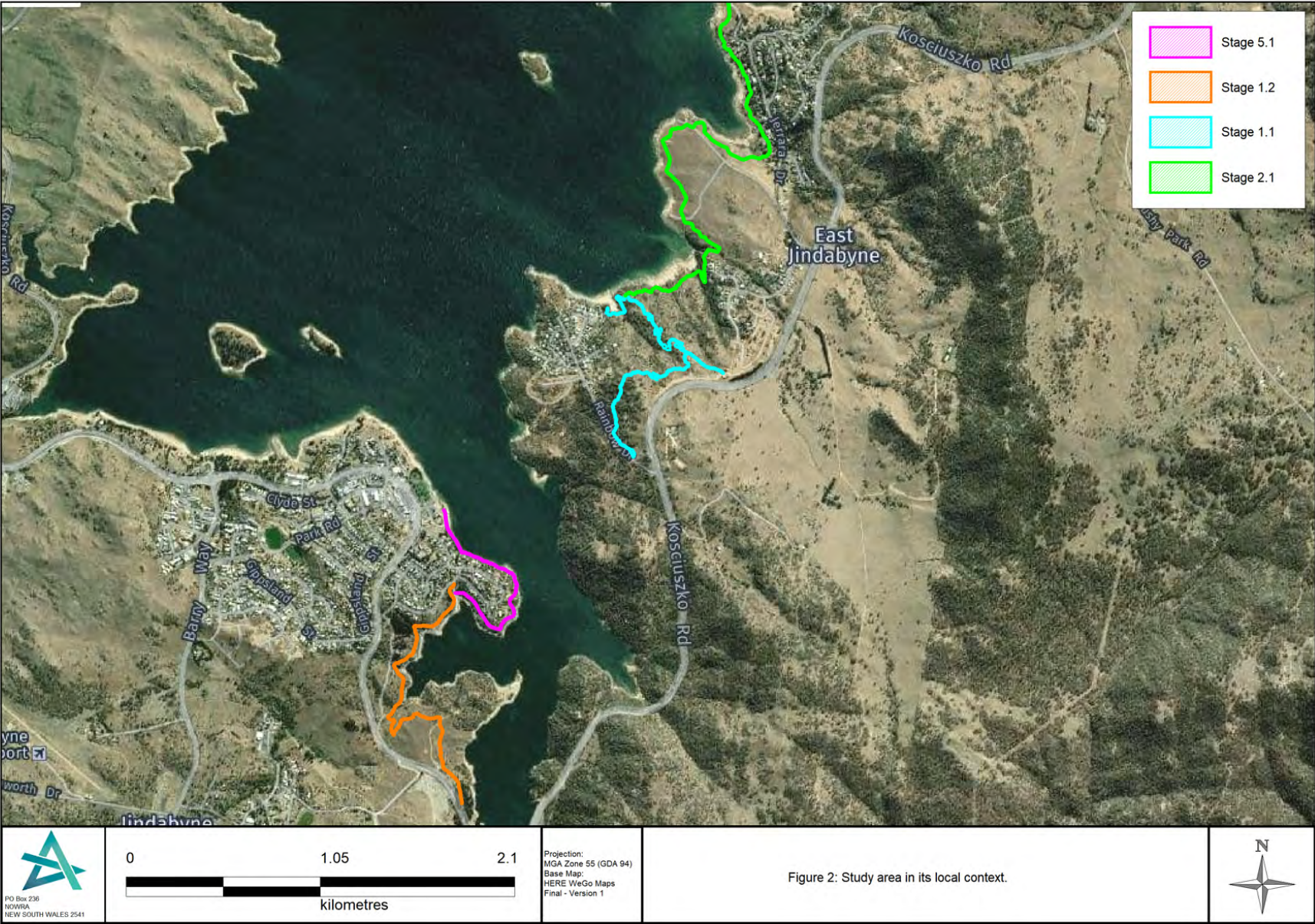


Figure 1: Study area within its regional context.







The proposed development will require a Development Application (DA) to permit the works. SMRC are the determining authority.

#### **1.3.1 NATIONAL PARKS AND WILDLIFE ACT 1974**

The *National Parks and Wildlife Act 1974* provides protection for all Aboriginal objects and places within NSW. Aboriginal objects are defined as the material evidence of the Aboriginal occupation of NSW, while Aboriginal Places are defined as areas of cultural significance to the Aboriginal community. All Aboriginal objects are protected equally under the Act, regardless of their level of significance. Aboriginal Places are gazetted if the Minister is satisfied that the location was and/or is of special significance to Aboriginal people.

Following amendments to the NPW Act in 2010, approval to impact Aboriginal cultural heritage sites is only granted under a Section 90 AHIP, which is granted by Heritage NSW of the Department of Premier and Cabinet.

#### **1.3.2 NSW NATIONAL PARKS AND WILDLIFE REGULATION 2019**

Part 5, Division 2 of the *National Parks and Wildlife Regulation 2019* addresses Aboriginal objects and places in relation to the NPW Act 1974, and outlines how compliance with relevant codes of practice can be met.

Clause 58(1) outlines the defence of low impact acts or omissions to the offence of harming Aboriginal objects, which includes maintenance works on existing roads and fire trails, farming and land management work, grazing of animals, activities on land that has been disturbed that is exempt or complying development, mining exploration work, removal of vegetation (aside from Aboriginal culturally modified trees), seismic surveying or groundwater monitoring bores on disturbed ground, or environmental rehabilitation work (aside from erosion control or soil conservation works such as contour banks).

Clause 58(4) outlines the definition of 'disturbed land', as land that "has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable".

Clause 59 relates to the notification of Aboriginal objects and sites and Clause 60 relates to the requirements for the consultation process to support an AHIP application. The regulation sets out the requirements broadly in line with those outlined in the ACHCRs.

### **1.4 OBJECTIVES OF THE ABORIGINAL CULTURAL HERITAGE ASSESSMENT**

The archaeological investigation was undertaken to meet the requirements of the Code of Practice and ACHCRs.





The purpose of the archaeological investigation is to understand and establish the potential harm the proposed development may have on Aboriginal cultural heritage within the study area, both tangible and intangible.

Aboriginal community consultation was undertaken for the project with the aim of:

- Identifying the Aboriginal community members who can speak for Country within which the study area is located;
- Involving the Aboriginal community in making decisions about the management of their cultural heritage;
- Identifying, assessing and recording Aboriginal heritage values within the study area;
- Preparing an assessment of the cultural heritage values in consultation with the Aboriginal community;
- Identifying the potential impact of the proposed development on the assessed cultural heritage values; and
- Developing conservation and mitigation strategies for these values, with the aim of minimising impacts to cultural heritage wherever possible.

In addition, this report provides a significance assessment of the identified Aboriginal heritage values, as defined by the registered Aboriginal stakeholders (RAPs) for the project. Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs.

Any development works which disturb the ground surface have the potential to impact Aboriginal archaeological deposits and therefore an assessment of whether the study area contains such deposits is required prior to the commencement of construction works. An assessment of whether the proposed development would impact these deposits (if present) is also necessary, and identification of to what extent the deposits would be impacted is also required. The degree of impact which may be allowable is determined, in part, with consideration of the level of cultural significance attributed to the cultural values of the study area, both tangible and intangible.

### 1.5 LIMITATIONS

This report relies in part on previously recorded archaeological and environmental information for the wider region. This includes information from AHIMS, which is acknowledged to be occasionally inaccurate, due to inaccuracies in recording methods. No independent verification of the results of external reports has been made as part of this report.

It should be noted that AHIMS results are a record only of the sites that have been previously registered with AHIMS and are not a definitive list of all Aboriginal sites



within an area, as there is potential for sites to exist within areas that have not previously been subject to archaeological assessment.

Field investigations for this report included survey and test excavations. The results are considered to be indicative of the nature and extent of Aboriginal archaeological remains within the study area, but it should be noted that further Aboriginal objects and sites which have not been identified as part of this assessment may be present within the wider area.

It is recognised that Aboriginal people are the primary determinants of the significance of their cultural heritage, and as such, Apex Archaeology have relied on the Aboriginal community to provide cultural knowledge regarding the site, where they are willing and able to share such knowledge. However, there may be occasions where RAPs are unwilling or unable to share cultural knowledge regarding the site and thus our assessment of significance relies on scientific assessment only.



## 2.0 ABORIGINAL CONSULTATION PROCESS

This section details the Aboriginal community consultation undertaken to assist in the heritage assessment of the study area. Aboriginal consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* was undertaken by Apex Archaeology for this project.

Aboriginal community consultation is a requirement in order to make assessments of Aboriginal cultural values, as Aboriginal people are the primary determinants of the significance of their cultural heritage and therefore Apex Archaeology cannot make a determination on the cultural significance without the input of the RAPs. Aboriginal people often have a strong connection to their Country, and to their ancestors, both past and present.

Material evidence of past Aboriginal occupation of an area is a tangible link to the intangible traditions, lore, customs, beliefs and history. These intangible values provide a sense of belonging for Aboriginal people, and cultural heritage and cultural practices are kept alive through being incorporated into everyday life, which helps maintain a connection to the past and to the present. It is a vital part of the identity of Aboriginal people.

Therefore, it is important that Aboriginal people are afforded the opportunity to understand, comment on and have input into projects that may impact areas which may be culturally sensitive, or damage items of cultural significance. The process of Aboriginal community consultation provides this opportunity, and this ACHAR details the results of the consultation undertaken for this project.

### 2.1 THE CONSULTATION PROCESS

The *Aboriginal cultural heritage consultation requirements for proponents 2010* (the ACHCRs) provide the process for undertaking consultation with the Aboriginal community. This process includes identification, registration, engagement and consultation with those Aboriginal people who may have cultural knowledge which is relevant to determining the cultural significance of Aboriginal objects and places which may be within the study area.

The ACHCRs detail a number of stages for consultation, as follows:

- Identification of those people who should be consulted for the project
- Inviting Aboriginal people to register their interest in being consulted for the project
- Providing information regarding the nature and scope of the project to the Aboriginal people who have registered an interest in being consulted – the registered Aboriginal parties (RAPs)
- Providing opportunities for RAPs to comment on the proposed methodology for cultural heritage consultation



- Presenting information about the potential impacts of the proposed development for the RAPs to comment on
- Providing opportunities for RAPs to comment on the cultural significance of the proposed development area
- Providing opportunities for RAPs to comment on the draft reports detailing the results of the archaeological and cultural assessments for the project

## 2.2 STAGE 1 CONSULTATION: COMMENCEMENT

Stage 1 requires a list of Aboriginal people who may have cultural knowledge relevant to the area to be prepared from several sources of information. The first step requires enquiries to be made of certain statutory bodies regarding whether they are aware of Aboriginal people or organisations that may have an interest in the study area, and their contact details. Any Aboriginal people or organisations identified in this step must be contacted and invited to register an interest in the project. In addition, a notification must be placed in local print media requesting Aboriginal people or organisations to register their interest in the project. A list of those who register an interest must be compiled. A minimum of 14 days from the date of the letter or newspaper advertisement must be allowed for registrations of interest.

As a result of the Stage 1 activities, a list of Aboriginal people who wish to be consulted for the project is developed. These Aboriginal people become the registered Aboriginal parties – the RAPs – for the project.

Letters requesting the details of Aboriginal people who may hold cultural knowledge relevant to the study area and who may wish to be consulted for the project were sent to several statutory agencies on 8 March 2022. Copies of these letters and responses are attached in Appendix B. These Step 1 letters were sent to the following agencies:

- Heritage NSW
- Local Land Services (LLS)
- Snowy Monaro Regional Council (SMRC)
- Bega Local Aboriginal Land Council (BLALC)
- Office of the Registrar, *Aboriginal Land Rights Act 1983 (NSW)* (ORALRA)
- Native Title Services Corp (NTSCorp)

Responses were received from Heritage NSW and Bega LALC. Heritage NSW provided a list of Aboriginal people and organisations, and Bega LALC register via phone to nominate a contact person and request involvement of their sites officer in any fieldwork for the project. These individuals and organisations identified in the above step were invited to participate in consultation for the project.

An online search of the National Native Title Tribunal (NNTT) did not identify any Native Title Applications over the study area.





The Aboriginal people and organisations identified during this initial stage were contacted via letter (email if provided or via post if no email address given) on 25 March 2022, inviting them to register an interest in the project. Registrations were accepted until 8 April 2022. This is Step 2 of Stage 1 of consultation. Copies of these letters are attached in Appendix C.

In addition, an advertisement was placed in *The Monaro Post* on 22 March 2022, inviting registrations of interest from people who may have cultural knowledge of the project area. A copy of the advertisement is attached in Appendix D.

A total of eight Aboriginal people and organisations registered an interest in being consulted for the project. The following list comprises the registered Aboriginal parties (RAPs) for the project:

- Bega Local Aboriginal Land Council (LALC)
- Ngarigo/Djirringanji Elders
- Gunjeewong Cultural Heritage Aboriginal Corporation
- Didge Ngunawal Clan
- Corroboree Aboriginal Corporation
- Maria Williams
- Ramsay Freeman/Snowy Mountains Indigenous Elders Group
- Woka Aboriginal Corporation

### 2.3 STAGE 2 & 3 CONSULTATION: PRESENTATION AND GATHERING OF INFORMATION

During Stage 2, information about the proposed project is provided to the RAPs, including location, scale, proposed development plans, timeframes, methodologies and any other relevant details relating to the project. This information can be provided in writing or at a meeting (or both), and an opportunity for the RAPs to visit the site may also be provided.

During Stage 3, RAPs are invited to share information about the cultural significance of the study area, which can assist in the assessment of the cultural significance of the Aboriginal objects and/or places within the study area. The cultural heritage assessment informs and integrates with the scientific assessment of significance and therefore can assist in the development of mitigation and management measures for the project. A methodology detailing how this information will be gathered must be provided to the RAPs for comment and a minimum of 28 days must be allowed for responses to be received. Any feedback must be considered and implemented as appropriate into the methodology.

Stage 2 and 3 can be undertaken concurrently. The information about the project and the methodology for seeking cultural knowledge can be provided in the same written documentation or at the same meeting.



Details of the proposed project and the proposed methodology for undertaking the cultural heritage and archaeological assessments for the project were provided in writing to each of the RAPs on 13 April 2022. Comments were accepted until 12 May 2022. Responses were received from the following groups or individuals:

- Gunjeewong
- Snowy Mountains Indigenous Elders Group
- Corroborree
- Didge Ngunawal Clan

Janice Williams of Snowy Mountains Indigenous Elders Group contacted Jenni Bate of Apex Archaeology via phone as she wanted to ensure the process would treat everyone with respect. JB confirmed that respect is very important and that all opinions would be respected. All other responses were favourable and endorsed the proposed methodology. No alternatives to the methodology were suggested or requested. The RAP responses are attached in Appendix E.

No other comments were received from any of the other RAPs for the project, and no specific cultural information pertaining to the study area was received from any of the RAPs for the project during this stage of consultation.

## 2.4 PROJECT UPDATES

Subsequent to the completion of the archaeological survey of the study area, as outlined in the attached AR for the project, the need for test excavation of two areas was identified. As such, an update was sent to all RAPs on 10 June 2022 noting the need for test excavation and to provide a map of the locations proposed to be investigated. It was also noted that this was likely to occur after winter to allow the ground to thaw. No responses to this update were received.

A subsequent update was sent on 29 November 2022, noting that test excavations had been further delayed by the particularly poor weather conditions in the latter half of 2022. Again, no responses to this update were received.

Copies of these updates are attached in Appendix G.

## 2.5 STAGE 4: REVIEW OF DRAFT REPORT

Stage 4 sees the preparation of the draft ACHAR, which details the results of the cultural heritage assessment. The draft is provided to the RAPs for their review and comment. A minimum of 28 days to comment on the ACHAR must be allowed. All comments must be addressed in the final document and the proponent's response to RAP comments must be included. Copies of any submissions received from RAPs must be included in the final ACHAR.

The draft report was provided to all RAPs on 6 March 2023, with comment accepted until 3 April 2023. One comment was received from Steven Johnson on behalf of Woka Aboriginal Corporation, confirming they agreed with the draft report. No other comments were received from any of the RAPs for the project.



Consultation with the Aboriginal community for this project has been conducted in accordance with the ACHCRs. A log of all correspondence is presented in Appendix A of this ACHAR. Copies of all correspondence are included in report appendices.



### 3.0 SUMMARY AND ANALYSIS OF BACKGROUND INFORMATION

This section presents information about both the physical and cultural landscape in which the study area is located, as well as previous archaeological and ethnohistorical studies, to provide context and background to the existing knowledge of Aboriginal culture in the area.

#### 3.1 DESCRIPTION OF THE STUDY AREA

This project includes Sections 1.1 (Tyrolean Village to Kunama Estate & Rainbow Beach, approximately 2.8km; Figure 3), 1.2 (Cobbon Cres to dam wall, approximately 2.2km; Figure 4), 2.1 (Kunama Estate & Rainbow Beach to East Jindabyne, approximately 3.7km; Figure 5), and 5.1 (Banjo Patterson Park to Cobbon Crescent, approximately 1.4km; Figure 6). The specific study area comprised the trail alignment with a 2m corridor.

#### 3.2 EXISTING ENVIRONMENT

The study area falls within the Jindabyne Plains of NSW, as defined by Mitchell (2002; Figure 7). The Jindabyne Plains are characterised by “wide open valleys and plains at a general elevation of 800 to 900m with surrounding low ranges and rounded peaks to 1100m on massive Silurian-Devonian granite and granodiorite. Shallow gravelly loams on slopes, extensive red and yellow texture-contrast soils on slopes, two or three terraces marginal to the main streams with dark coloured gritty uniform loams and clays in alluvium” (Mitchell 2002:138).

##### GEOLOGY, SOILS AND TOPOGRAPHY

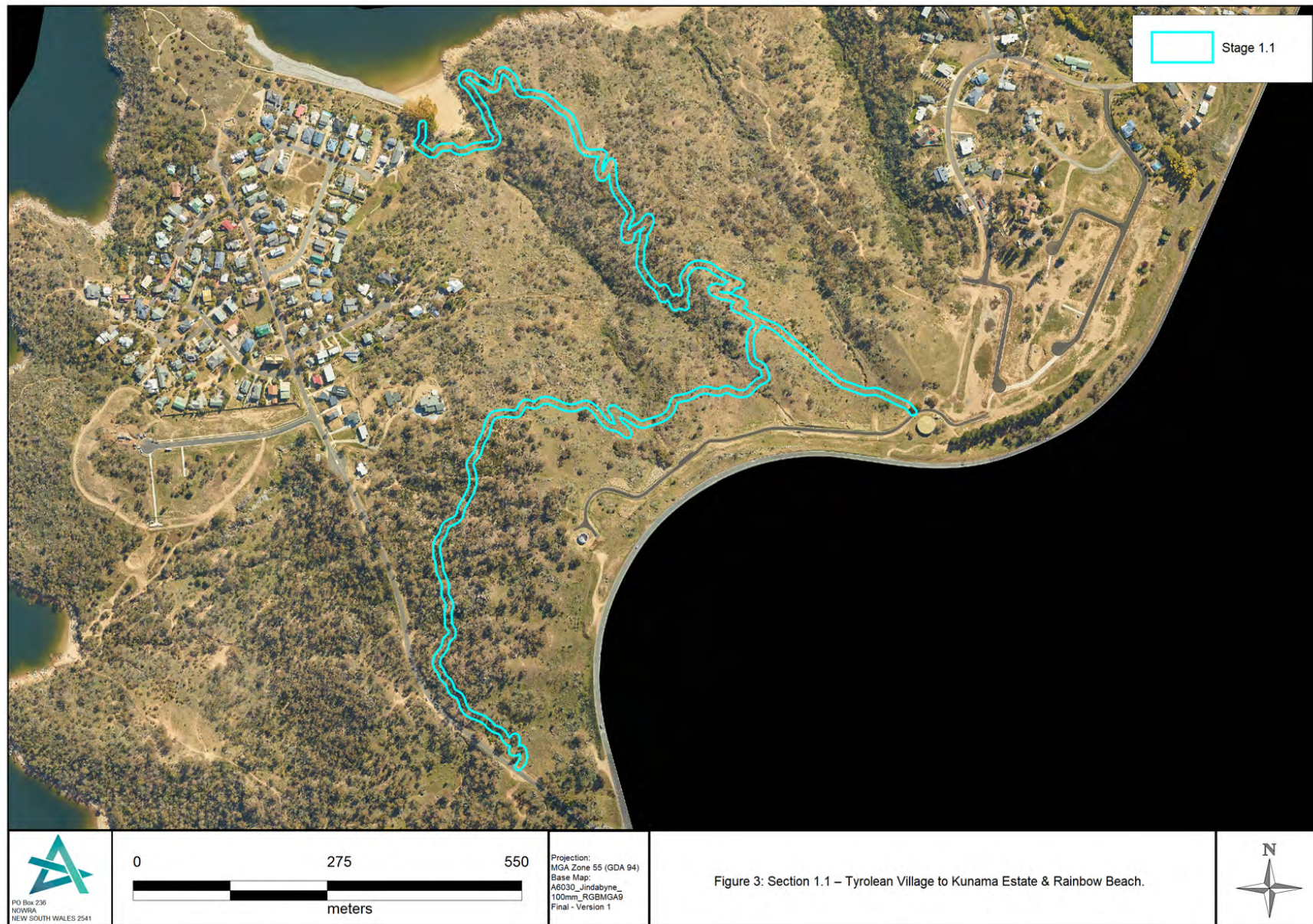
The study area is shown on the Bega-Mallacoota 1:250,000 geological map (Lewis & Glen 1995) located within the Bullenbalong Suite, specifically mapped as Sgbb, the Bullenbalong Granodiorite. The study area is located within early to late Silurian sequences as part of the Kosciusko Batholith Igneous Suites, with the Bullenbalong Suite comprising Leesville granodiorite. Basaltic volcanics are present, along with sandstones, siltstones, conglomerate and shales.

The Berridale Plateau, approximately 25km to the east, along with Mount Gilead, located approximately 20km to the south, are both a likely source of silcrete for the area (NSW Archaeology 2017; Feary & Niemoeller 2015).

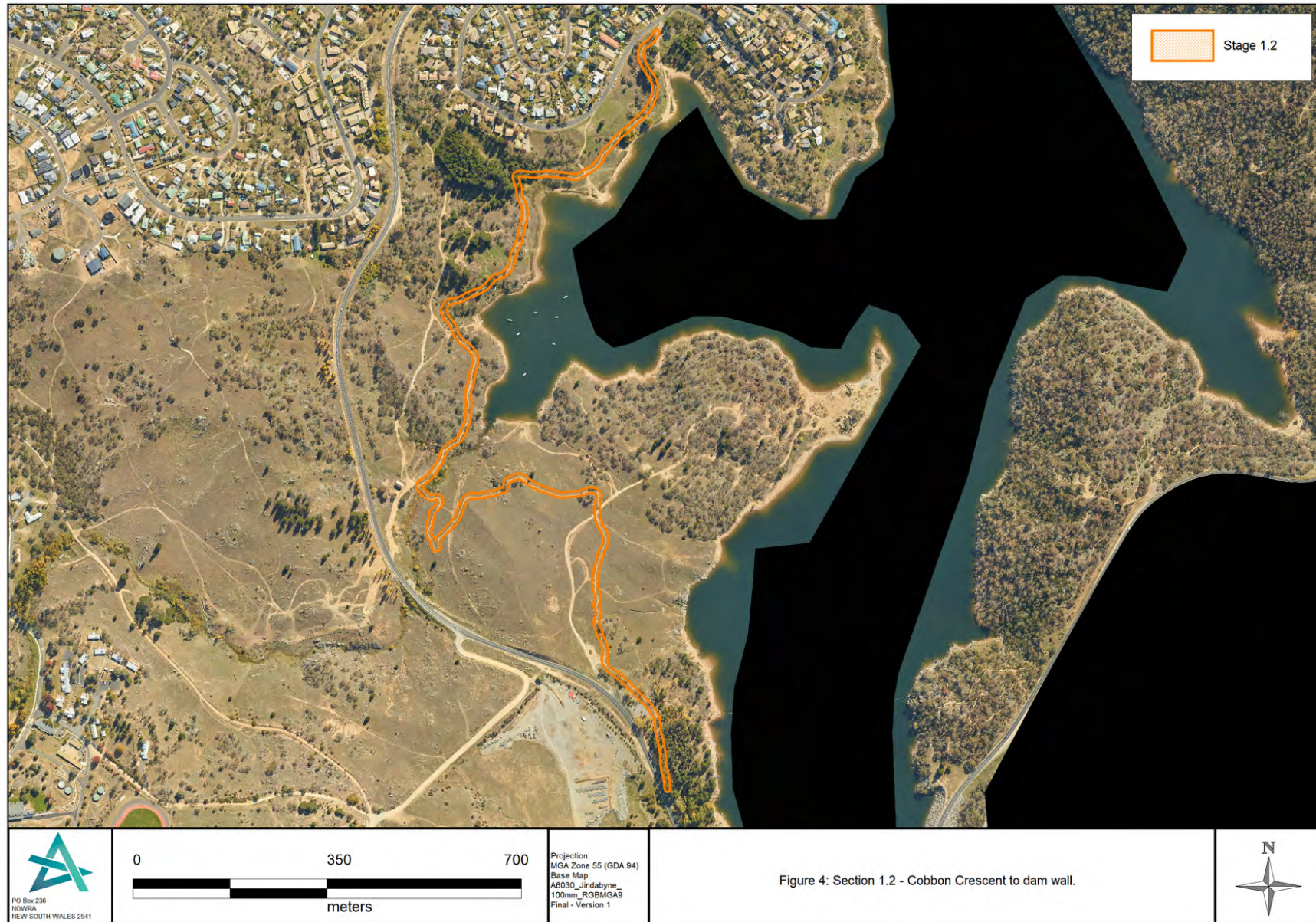
The soil regolith is mapped predominantly as R2 (Figure 8), considered to have low coherence and low sediment delivery, with sub-dominant classes of R1 (high coherence soils with low sediment delivery) and R4 (low coherence soils when wet). A small section is mapped as R1.

The study area is considered to fall within the Bullenbalong (bu) soil landscape (NSW SALIS), which comprises shallow soils on crests and slopes which are generally well drained, along with earthy sands and yellow and red earths.





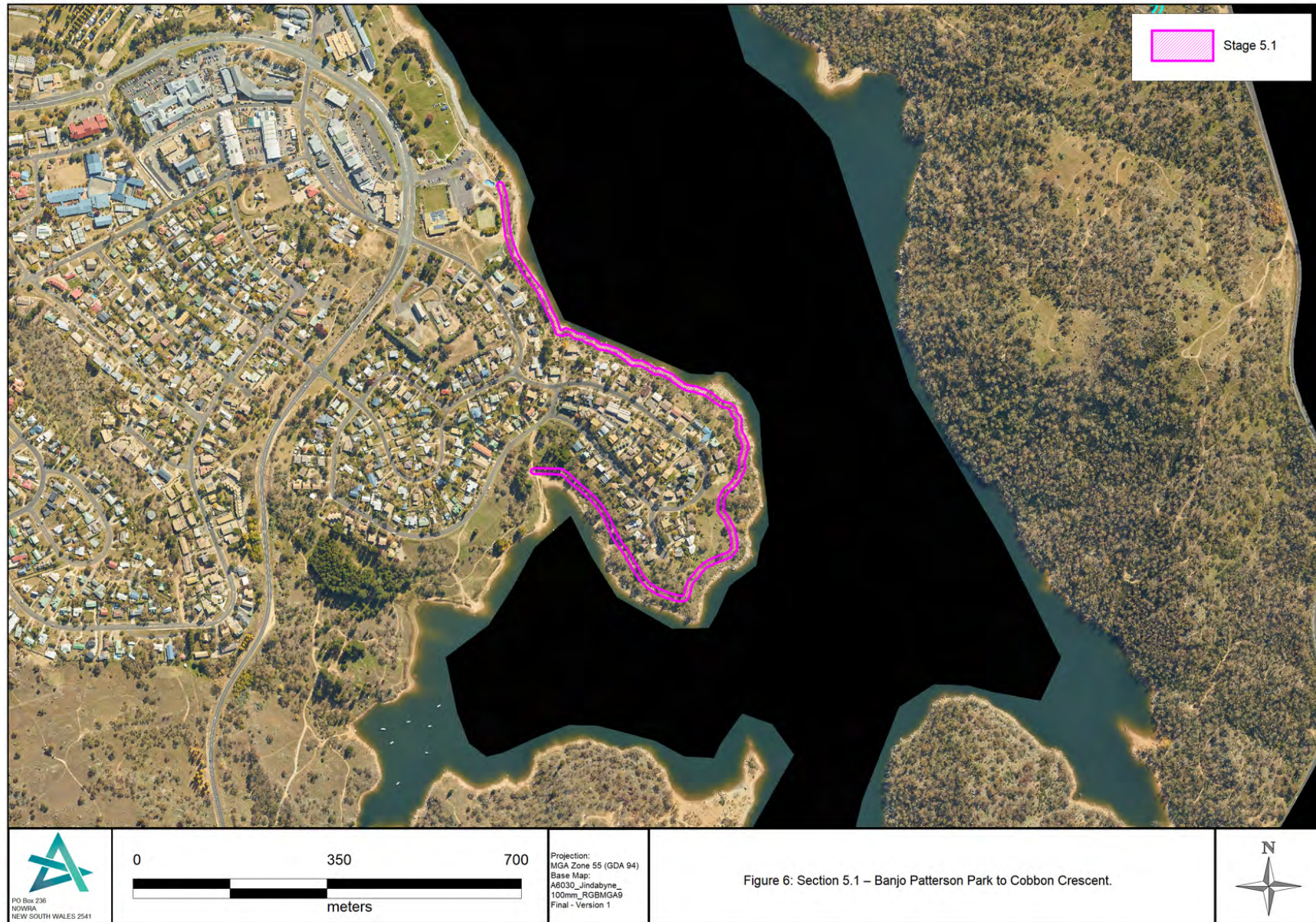












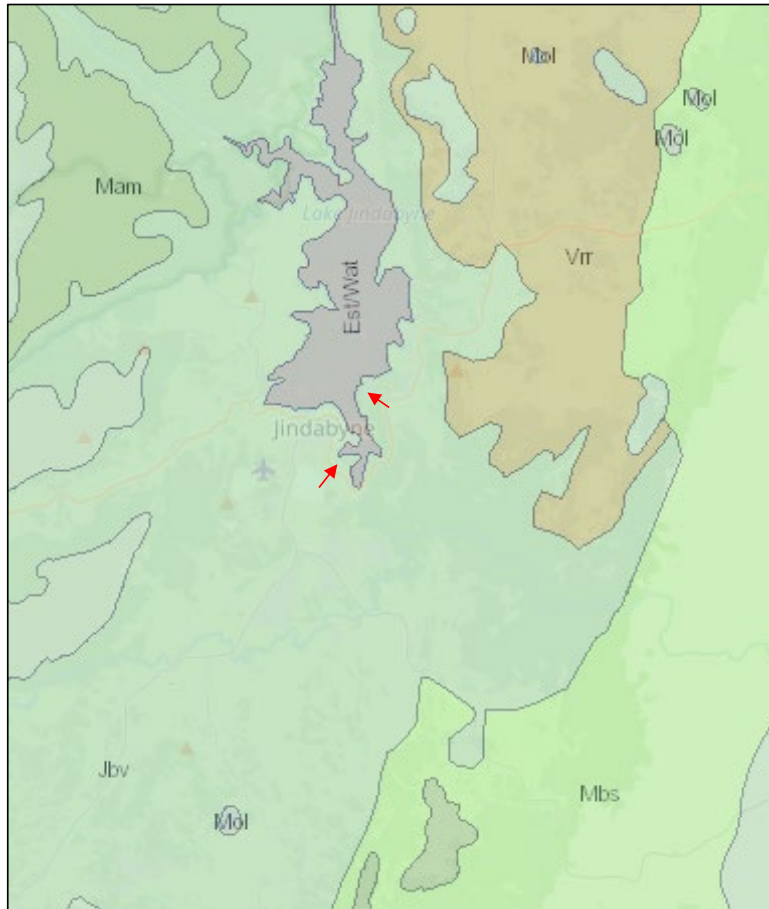


Figure 7: Mitchell Landscapes v3.1 (Source: NSW SEED). Approximate study area shown by red arrows.

Within open depressions, poorly drained yellow solodic soils are present. Overall, the soils within the study area are considered to be subject to erosion, including sheet erosion, have low fertility and shallow soils, and localised outcrops of granite.

#### TOPOGRAPHY

The study area is located within the Jindabyne Valley, originally formed by the Snowy River prior to its damming to create Lake Jindabyne. Jindabyne Valley is constricted by gorges to the north and south. Above the Full Supply Level (FSL) of Jindabyne Dam at 910.18m AHD, the topography of the study area generally consists of gently sloping flat topped ridges, becoming more undulating towards to the northern end of the study area.



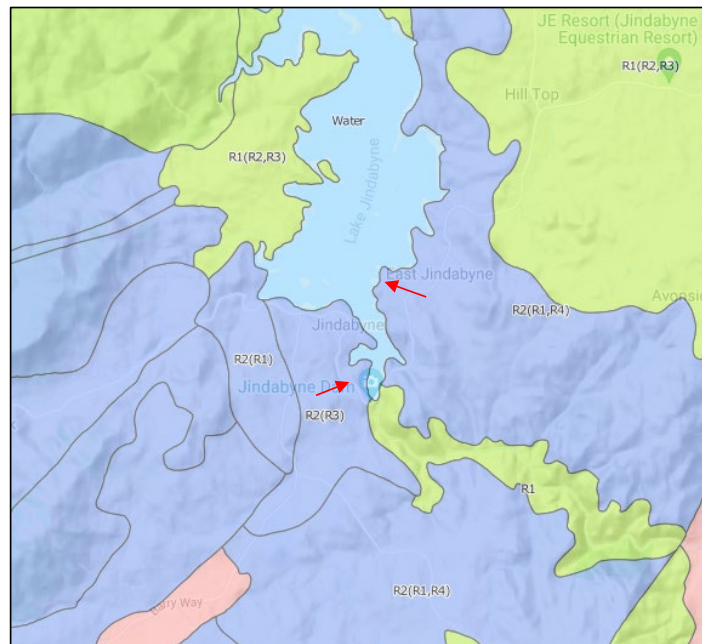


Figure 8: Soil regolith mapping. Approx study area shown by red arrows (Source: eSPADE v2.1)

Vegetation includes grassy woodland with Snow Gum (*Eucalyptus pauciflora*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*), Burgan (*Kunzea ericoides*), Silver Wattle (*Acacia dealbata*), Bossiaea (*Bossiaea buxifolia*), Snow Grass (*Poa siberiana*), Kangaroo Grass (*Themeda triandra*), Bulbine Lily (*Bulbine bulbosa*) and Rock Fern (*Cheilanthes sieberi*), among other flora species. These species would have supported a diverse range of native fauna, including small mammals such as wallabies and wombats, a variety of bird species and small invertebrates such as snakes and lizards. Both floral and faunal resources would have been exploited by the Aboriginal people in the area.

#### HYDROLOGY

The study area is well watered, with the Eucumbene River entering from the north, while the Snowy River enters from the south, and both rivers then merge within the valley with the Thredbo River which enters from the west. All rivers are defined as fourth order water courses according to the Strahler system as used by DPI Water (Figure 9). Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, ie a minor creek or ephemeral watercourse.

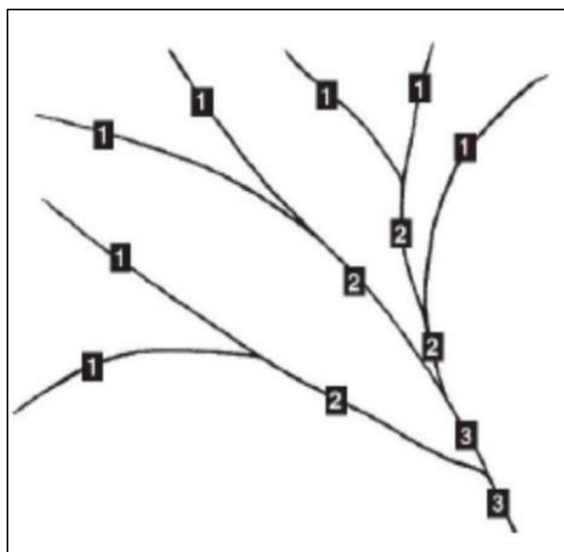


Figure 9: The Strahler system (Source: Department of Planning and Environment 2016).

### 3.3 MATERIAL EVIDENCE OF ABORIGINAL LAND USE

#### 3.3.1 AHIMS

Extensive searches over the study area were undertaken in May 2022 within 4km x 4.5km and 1.5 x 1.5 km search boxes of the study area with a total of 90 sites were identified. The results of this search are shown in Table 3 and Figure 10.

Table 1: Sites identified during AHIMS search

Site ID	Site Name	Context	Recorders
62-1-0218	CT I	Open site	Valid
62-1-0219	CT J	Open site	Valid
62-1-0024	Lake Jindabyne;J/SWS 1;	Open site	Valid
62-1-0204	Tyrolean Village Estate 17 (TVE17)	Open site	Valid
62-1-0026	Lake Jindabyne;J/SWS 3;	Open site	Valid
62-1-0029	Lake Jindabyne;J/TV 8;	Open site	Valid
62-1-0025	Lake Jindabyne;J/SWS 2;	Open site	Valid
62-1-0028	Lake Jindabyne;J/TV 5;	Open site	Valid
62-1-0027	Lake Jindabyne;J/TV 6;TVE 5;	Open site	Valid
62-1-0038	Lake Jindabyne;J/TV 10;	Open site	Valid
62-1-0037	Lake Jindabyne;J/TV 9;TVE 6;	Open site	Valid
62-1-0039	Lake Jindabyne;J/TV 7;TVE 4;	Open site	Valid
62-1-0312	IF3 (Tyrolean Village)	Open site	Valid
62-1-0209	Tyrolean Village Estate 22 (TVE22)	Open site	Valid



Site ID	Site Name	Context	Recorders
62-1-0042	Lake Jindabyne;Tyrolean Village;J/TV 3;TVE 1;	Open site	Valid
62-1-0222	CT M	Open site	Valid
62-1-0311	IF1 (Tyrolean Village)	Open site	Valid
62-1-0130	TVE_2;Tyrolean Village Estate, East Jindabyne;	Open site	Valid
62-1-0200	Tyrolean Village Estate 13 (TVE13)	Open site	Valid
62-1-0155	TVE Isolated Find 2;	Open site	Valid
62-1-0168	TVE Isolated;Tyrolean Village Estate;	Open site	Valid
62-1-0129	TVE_3;Tyrolean Village Estate, East Jindabyne;	Open site	Valid
62-1-0128	TVE_7;Tyrolean Village Estate, East Jindabyne;	Open site	Valid
62-1-0199	Tyrolean Village Estate 12 (TVE12)	Open site	Valid
62-1-0040	Lake Jindabyne;J/TV 11;	Open site	Valid
62-1-0124	TVE 8;	Open site	Valid
62-1-0125	TVE 9;	Open site	Valid
62-1-0205	Tyrolean Village Estate 18 (TVE18)	Open site	Valid
62-1-0126	TVE 10;	Open site	Valid
62-1-0041	Lake Jindabyne;J/TV 12;Mill Creek;	Open site	Valid
62-1-0201	Tyrolean Village Estate 14 (TVE14)	Open site	Valid
62-1-0203	Tyrolean Village Estate 16 (TVE16)	Open site	Valid
62-1-0202	Tyrolean Village Estate 15 (TVE15)	Open site	Valid
62-1-0206	Tyrolean Village Estate 19 (TVE19)	Open site	Valid
62-1-0208	Tyrolean Village Estate 21 (TVE21)	Open site	Valid
62-1-0065	Lake Jindabyne East 2;J/ES 2;	Open site	Valid
62-1-0067	Kunama Gallery;	Open site	Valid
62-1-0225	ASE 4	Open site	Valid
62-1-0163	IF 1;	Open site	Valid
62-1-0127	TVE 11;	Open site	Valid
62-1-0159	ASE 2;	Open site	Valid
62-1-0161	IF 3;	Open site	Valid
62-1-0283	Mills Ridge Site 2	Open site	Valid
62-1-0160	ASE 3; (Not a site)	Open site	Not a Site
62-1-0158	ASE 1;	Open site	Valid
62-1-0162	IF 2;	Open site	Valid



Site ID	Site Name	Context	Recorders
62-1-0297	TREAS 2 (The Ridge Estate Artefact Scatter 2)	Open site	Valid
62-1-0296	TREAS 1 (The Ridge Estate Artefact Scatter 1)	Open site	Valid
62-1-0298	TRE-PAD (The Ridge Estate PAD)	Open site	Valid
62-1-0377	Go Jindabyne AFT 4	Open site	Valid
62-1-0372	Golden Oldie 1	Open site	Valid
62-1-0376	Go Jindabyne AFT 3	Open site	Valid
62-1-0375	Go Jindabyne AFT 2	Open site	Valid
62-1-0373	Missing Link 1	Open site	Valid
62-1-0207	Tyrolean Village Estate 20 (TVE20)	Open site	Valid
62-1-0064	Lake Jindabyne East 1;J/ES 1;	Open site	Partially Destroyed
62-1-0366	ALP2 Cloned	Open site	Destroyed
62-1-0368	ASE10 Cloned	Open site	Destroyed
62-1-0367	ALP1 Cloned	Open site	Destroyed
62-1-0369	ASE9 Cloned	Open site	Destroyed
62-1-0287	KRA 3 (Kunama Ridge 3)	Open site	Valid
62-1-0285	KRA 1 (Kunama Ridge 1)	Open site	Valid
62-1-0286	KRA 2 (Kunama Ridge 2)	Open site	Destroyed

The following sites are within the current study area and are detailed below:

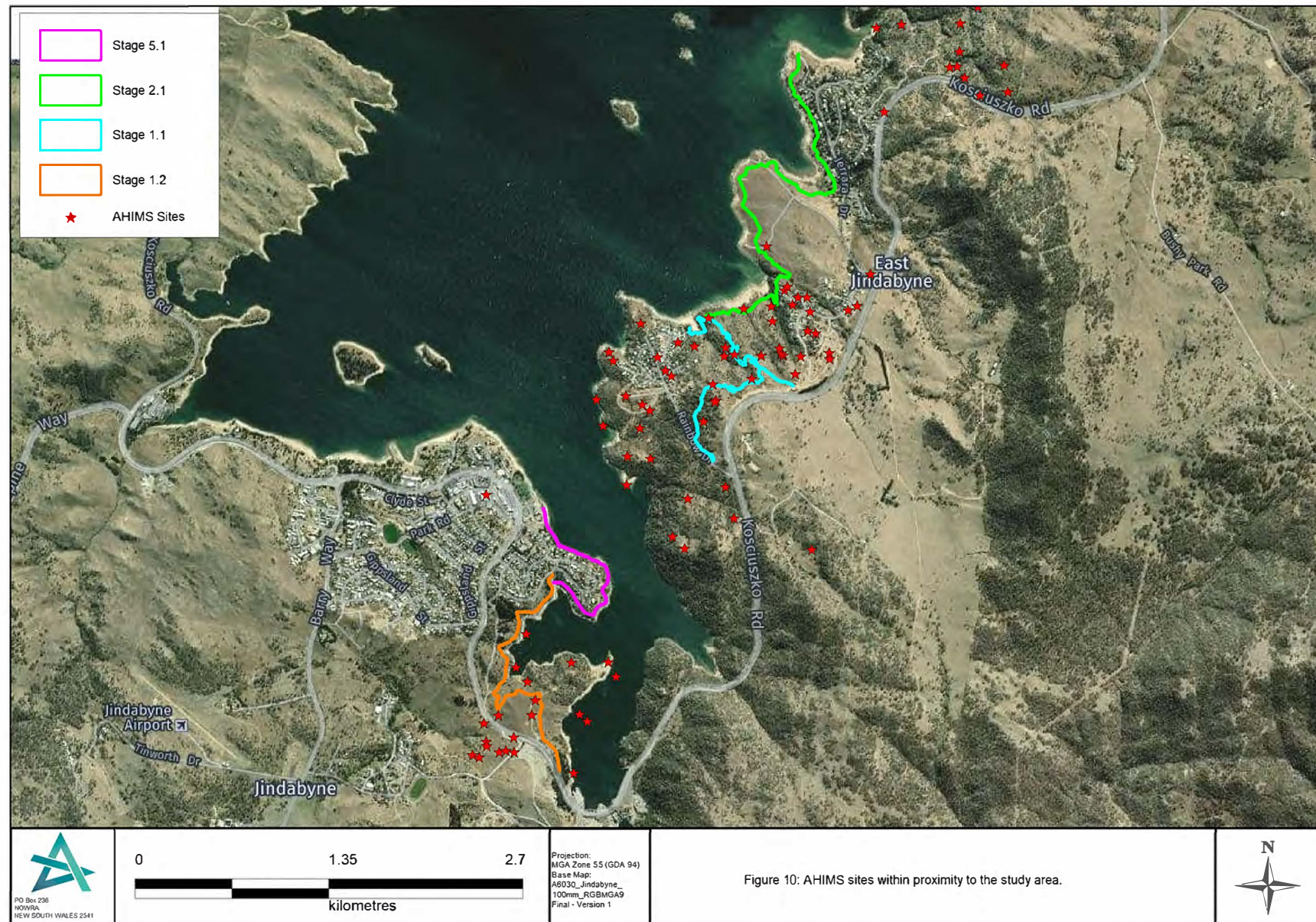
**Table 2: Sites within proximity to trails and relevant stage**

Site Name	Site Type	Trail Stage
62-1-0064	Artefact Scatter & PAD	2.1
62-1-0124	Artefact Scatter & PAD	1.1
62-1-0202	Artefact Scatter	1.1
62-1-0371	Artefact Scatter	2.1

In the wider area, sites comprise artefact deposits and areas of potential archaeological deposits (PADs). Some artefact concentrations are considered to have potential for further subsurface deposits to be present within the wider area.

It is also noted that an Aboriginal Place known as Curiosity Rocks is located on the western side of Lake Jindabyne and possesses both tangible and intangible values. The site is listed as an Aboriginal Ceremonial complex site across approximately 40 hectares. It is adjacent to a camping area and ceremonial grounds located along the traditional routes following the Snowy River, and has archaeological evidence of use by Ngarigo people. The site is outside of the current study area but reflects the importance of Aboriginal sites in the region.







### 3.3.2 PREVIOUS ARCHAEOLOGICAL ASSESSMENT

A review of previous archaeological work within the surrounding region of the study area was undertaken. A number of reports were identified from background research and the AHIMS database and are summarised below, with detailed summaries presented in Section 4.1 of the AR for the project.

**Table 3: Previous heritage assessments undertaken by archaeological consultants in the region**

Consultant	Date	Sites Identified	Region
Flood	1973	Sites throughout Southern Uplands	Southern Uplands
Chapman	1977	34 artefact sites	Lake Jindabyne
Chapman	1982	6 artefact sites	East Jindabyne
Djekic	1982	6 culturally modified trees and 4 artefact sites	Cooma to Jindabyne
Walkington	1988	None	Mill Creek
Koettig	1989	6 artefact sites and 6 isolated finds	Berridale to Jindabyne
Navin	1990	18 artefact sites	Tyrolean Village
Packard	1990	2 artefact sites	East Jindabyne
WBAS	1993	4 artefact sites	South Jindabyne
Clegg & Caldwell	1994	1 artefact site	Curiosity Rocks
Saunders	1997	7 artefact sites	Alpine Sands Estate
Oakley	1999	Resurvey of 3 WBAS sites	South Jindabyne
Saunders	2003	2 sites, one with over 100 artefacts	Rushes Creek
Biosis Research	2003	2 artefact sites and 1 PAD	Jindabyne Dam Wall
Barber	2003	11 artefact sites and 4 PADs	Jindabyne Dam
Dibden	2004	4 artefact sites	Jindabyne
Saunders	2005	3 artefact sites	Kunama Ridge
Saunders	2006	2 artefact sites and 1 PAD	East Jindabyne
Dibden	2009	2 artefact sites	East Jindabyne
Feary & Niemoeller	2015	26 new artefact sites	Kosciuszko National Park
NSW Archaeology	2017	No sites	Kosciuszko Road
Past Traces	2018	6 artefact sites	Alpine Sands
Biosis	2018	165 artefacts recovered from test excavations	Kunama Ridge
Biosis	2019	~5,000 artefacts from salvage excavation	Kunama Ridge
Feary	2018	5 artefact sites	Tyrolean to East Jindabyne
NGH Environmental	2019	128 sites	Jindabyne and surrounds
Apex Archaeology	2022	17 artefact sites	Tyrolean



### 3.4 ETHNOHISTORY

Ethnohistorical evidence is based on the reports of colonisers and do not tend to include the Aboriginal perspective, leading to a Eurocentric view of Aboriginality. Additionally, historical records can be contradictory and incomplete regarding the exact tribal boundaries and locations of ceremonial or domiciliary activities of Aboriginal people pre-contact. Phil Boot (2002:58) notes:

*The problem associated with ethnohistoric documents include their tendency to record unusual, rather than everyday events, and their focus on religious behaviour to the exclusion of woman and children (Attenbrow 1976:34; Sullivan 1983:12.4).*

According to Tindale (1974) the current study area falls within the Ngarigo tribal area and linguistic territory. His observations are an attempt to depict Aboriginal occupation at the time of European contact. This territory is described by Tindale (1974) as being within the:

*....Monaro tableland north to Queanbeyan; Bombala river from near Delegate to Nimmitabel; west to divide of the Australian Alps.*

Howitt and Matthews also place the study area with the Ngarigo territory, with Howitt (1904) describing the territory as follows:

*The Ngarigo had the Wolgal on the north, the Ya-itmathang on the northwest, the Kurnai on the west and south-west, and the Yuin or Coast Murring to the southeast. The Ngarigo in fact occupied the Monaro tableland. The name of this tribe was that of its language, and the tribespeople called themselves "Murring", that is, "men", indicating that it belonged to another nation who used that term in common.*

Howitt further described those living in the high mountains as the Bemeringal, which included the people inhabiting the Monaro tablelands. The people on the coast were described as the Katungal, and the coastal hinterland people were described as the Paiendra. Boundaries between tribes were likely fluid and altered in response to the movement of family or clan groups.

Ngarigo people would meet with other tribes along the Tumut River and then travel towards the Bogong Mountains in order to celebrate the feasting of the Bogong Moth (Flood 1973; 1980). Messages were passed between the tribes, as described by Howitt (1904):

*About the year 1840 my friend, the late Mr A.M. McKeachie, met two young men of the Ngarigo tribe at the Snowy River, near to Barnes's Crossing [near Dalgety]; one of them carried two peeled sticks each about two feet long [60cm] and with notches cut in them, which they told him reminded them of their message... their message was that they were to collect their tribe to meet those of the Tumut River [Walgalu] and Queanbeyan [Ngunawal] at a place in the Bogong Mountains, to eat the Bogong moths.*





It was considered likely that coastal tribes travelled inland to participate in the feast of the Bogong moths (Flood 1973; 1980) and there were generally cordial relations between the tribes when meeting for this purpose.

Aboriginal society in general was constructed of a hierarchy of social levels and groups, with fluid boundaries (Peterson 1976), with the smallest group comprising a family of a man and his wife/wives, children and some grandparents. The next level consists of bands, which were small groups of several families who worked together for hunting and gathering purposes. The third level comprised regional networks with a number of bands, and these bands generally shared a common language dialect and/or had a belief in a common ancestor. Networks would come together for specific ceremonial purposes. The highest level is the tribe, which is usually described as a linguistic unit with flexible territorial boundaries (Peterson 1976); although Attenbrow (2010) argues that “these groups were not tribes in the current anthropological sense of the word”.

Aboriginal people utilised a wide range of subsistence resources in the past, with ethnohistorical sources recording the diet of Aboriginal people including kangaroo, possum, kangaroo rat, lizards, birds, platypus, wallaby and a range of plants and insects as well as fish and shell fish (Pearson 1981). A wide range of native animals, including birds and reptiles, have been identified within the wider environment around Jindabyne, and are likely to have been utilised as food resources by Aboriginal people in the past.

The traditional lifestyles of Aboriginal groups depended largely on the environment in which they lived. A range of resources were available within the sub-alpine region, including possum, snakes, wallabies and kangaroos, wombats, emus, brolgas and other birds, lizards, turtles, fish, yabbies, and Bogong moths were considered an important protein source during the summer months. Plant sources such as yams, berries and seeds of grasses were also eaten, along with the native carrot, orchid tubers, native flax seeds, and fern roots. There was anecdotal evidence that the moths were cooked and pounded into cakes, which resembled lumps of fat and then smoked to preserve them for as long as possible (Flood 1973).



## 4.0 ABORIGINAL CULTURAL HERITAGE SIGNIFICANCE ASSESSMENT

### 4.1 INTRODUCTION

Cultural or social significance can be defined as relating to the spiritual, traditional, historical and/or contemporary associations and values attached to a place or objects by Aboriginal people. Further, the tangible and intangible evidence of their cultural heritage is valued by Aboriginal people as it forms an essential part of their cultural identity and their connection to Country (DECCW 2010a).

The *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010a) acknowledge that:

- Aboriginal people have the right to maintain their culture, language, knowledge and identity
- Aboriginal people have the right to directly participate in matters that may affect their heritage
- Aboriginal people are the primary determinants of the cultural significance of their heritage

Undertaking consultation with Aboriginal people ensures that potential harm to Aboriginal objects and places from proposed developments is identified and mitigation measures developed early in the planning process.

### 4.2 CRITERIA

The Burra Charter is considered an appropriate framework for the assessment of cultural heritage, which can be made based on the following assessment criteria:

- **Social value:** Also referred to as cultural value, this criterion considers the spiritual, traditional, historical or contemporary associations an area or place has for Aboriginal people
- **Historic value:** the relationship between a place and people, events, phases or activities of importance to the Aboriginal community
- **Scientific value:** assessment under this criterion considered the ability of a landscape, place, area or object to inform scientific research and/or analysis and to assist in answering research questions
- **Aesthetic value:** the ability of a place, area, landscape or object to demonstrate aesthetic characteristics, or possess creative or technical values

These should be graded so as to allow the significance to be described and compared as high, moderate or low.

### 4.3 SIGNIFICANCE ASSESSMENT

#### SOCIAL VALUE

The Aboriginal community are best placed to make a determination of the social or cultural value of the study area.



To date, no comments specifically regarding the social value of the study area have been received from the RAPs. In general, the Snowy Mountains region is considered to be of importance to the local and wider Ngarigo community, and the surface archaeological evidence of previous Aboriginal occupation of the area provides a tangible link to their past. It is likely the study area has high social significance to Ngarigo people.

#### **HISTORIC VALUE**

The Snowy Mountains have a long association with Aboriginal use, particularly with a focus on the exploitation of the Bogong moth and the reports of multiple tribes congregating to take part in the moth festivals. This association is likely to have high significance to Aboriginal people.

The study area itself is within a likely travel route from the Tumut Valley (Flood 1973:176) and thus is likely to have some significance under this criterion.

#### **SCIENTIFIC VALUE**

The archaeological assessment identified artefacts at 12 locations, including both isolated finds and artefact concentrations, and some artefact sites with associated PAD. It was noted that the existing trail network within the study area is highly disturbed, but this disturbance is discrete and constrained to the trails themselves. Artefacts were noted along several sections of trails, but were considered to be in a secondary depositional context. The artefacts themselves are of low research or educational value.

Overall, the study area is assessed as being of low archaeological and scientific significance.

#### **AESTHETIC VALUE**

Generally, aesthetic value is determined by the response evoked by a setting. The study area is considered to hold aesthetic significance with regards to Aboriginal heritage, due to its elevated position and considerable view lines from parts of the study area, although views are limited in other sections. However, the majority of the study area is minimally disturbed outside the existing trail network, providing access to intact grassy woodland vegetation. The study area is considered to have moderate to high significance under this criterion.

It is noted that Lake Jindabyne itself was created in the 1960s as part of the Snowy Mountains Scheme and as such, was not present when Ngarigo people were originally travelling through the area. The area would have had vistas over the original course of the Snowy River.

### **4.4 CULTURAL SIGNIFICANCE ASSESSMENT**

Generally, all Aboriginal sites are of high significance and importance to the Aboriginal community, both locally and more broadly. The Aboriginal social or cultural value of the study area can only be determined by the Aboriginal community





and to date, no comments have been received regarding the specific social significance of the study area.

It is acknowledged that the overall significance of a site is determined by both the cultural and scientific values of the area; with cultural values potentially extending beyond a specific study area and incorporating cultural landscapes in many cases. The cultural significance of an area can only be determined by the Traditional Owners of that area.

All cultural sites are acknowledged to be of significance to Ngarigo people, and it is likely that the overall cultural landscape within which the study area is located is of high cultural significance to Ngarigo people.



## 5.0 PROPOSED ACTIVITY

Unsanctioned trail has been constructed within Sections 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these sections. New trails are also proposed within these sections.

The trail comprises a 2m wide maximum area for the direct construction impact footprint, with the final actual trail width being 1.2m. In some isolated areas with steep terrain, construction impact will potentially be up to 3m width. The direct area assessed is a 20m wide corridor, with 10m either side of the proposed alignment, in order to allow for indirect impacts either side of the actual trail impact.

### 5.1 POTENTIAL IMPACT

A total of twelve sites are located within or immediately adjacent to the study area and proposed trail routes, including eight newly identified sites.

There are extensive existing trails within the study area which pass through areas of PAD, although the trails themselves do not retain subsurface potential. However, artefacts are known to occur on the trail surfaces and upgrade of the existing trails is likely to impact on these surface artefacts. Further, there may be artefacts present within the berms of the trails in some locations, and both upgrade works and ongoing use of the trails has potential to dislodge artefacts from the immediate surrounds of the trails.

There is potential for all sites identified within the study area to be impacted to an extent by the proposal. However, it should be noted that all sites are associated with existing disturbance and impact is ongoing through the use of the trails. Additionally, the proposal would not impact on areas of PAD outside of the existing trails.

Routes for new trail have been specifically designed to avoid areas of archaeological potential, through predictive modelling and initial constraints analysis. As such, the proposed new trail routes avoid identified areas of PAD, and are considered unlikely to impact on any Aboriginal cultural material present within the study area.

### 5.2 JUSTIFICATION

Unsanctioned trail has been created and is currently in use. The community is likely to continue using these trails. Exposed archaeological material is present on the trail surface and is being impacted by use of the trails by mountain bike riders, pedestrians, and taphonomic processes such as erosion and sheet wash. Upgrade of the trails is proposed to improve user safety and to create a “whole of lake” experience for visitors and residents in the area.

Mitigation measures are required to prevent further impact occurring to already impacted sites. New trail has been placed to as to avoid areas of archaeological sensitivity or where surface expressions of cultural material are present so as to avoid impacting these sites.



## 6.0 AVOIDING AND MINIMISING HARM

### 6.1 CONSIDERATION OF ALTERNATIVES

The study area contains twelve registered Aboriginal sites. Ten of these would be impacted to some extent during the proposed works.

A number of options have been considered as part of this assessment in order to avoid harm to the sites, as outlined below.

#### OPTION 1: DO NOTHING

The sites are all located either on or in very close proximity to existing trails throughout the area, with artefacts located on the trail surfaces. Use of these trails results in artefacts being ridden over by bike riders, or walked over by hikers. There is potential for impact to the artefacts through breakage or disturbance. There is potential for further unsanctioned trails to be constructed in areas which do not currently contain trails, which could lead to further unmitigated impact to areas of sensitivity. Leaving the trails as they are currently would result in a detrimental impact to the existing cultural heritage within the site, which would be a poor heritage outcome.

#### OPTION 2: CLOSE TRAILS

Consideration was given to the closure of the trails. However, much of the existing trail network was constructed without official permission, and local users of the trails are likely to continue to use them, despite the closure of the trails. This could also result in additional unsanctioned trail being created in additional areas, resulting in further impact to as yet unidentified sites. This would also result in a poor heritage outcome.

#### OPTION 3: REROUTING OF TRAIL

Many of the trails assessed comprise existing trail, where rerouting is unlikely to be successful as the public will continue using original trail. However, one proposed new trail was rerouted to avoid an archaeological site, allowing it to be retained in situ. This option is generally not possible in areas where trail is existing, and even if the trail is rerouted, closure and rehabilitation of existing track has potential to impact on surface artefacts which may be present. Overall, this option is generally not feasible for the proposed works.

#### OPTION 4: CONTINUE WITH CURRENT PROPOSAL

The current proposal includes upgrade of the existing tracks as necessary and creation of additional trails. These have been designed to avoid areas with potential for cultural heritage to be present, as well as the location of known sites in the area. The upgrade of existing trails would be constrained to the existing trail surface, with minimal impact outside of the already disturbed areas.

Further, creation of additional sanctioned linking trails within areas assessed as unlikely to possess archaeological potential would likely reduce the risk of further



unsanctioned trails being constructed in areas that may have potential for subsurface material to be present.

Appropriate management of the archaeological resource within the study area is considered the best outcome for the site, given the site will continue to be utilised by the public into the future. It is proposed to prepare a Plan of Management (PoM) for the trails, which would include management recommendations for the study area.

**SUMMARY:**

Option 4 is considered to be the most appropriate management option for the study area.

## **6.2 AVOIDANCE OF HARM**

A Plan of Management (PoM) is recommended to be prepared for the study area, to provide management recommendations and salvage strategies for artefacts located on the ground surface. There are artefacts on the trail ground surfaces at several locations. It is proposed to undertake a program of surface collection of these items prior to the commencement of upgrade works in the area. If at all possible, the PoM should include all stages of the Jindabyne Shared Trails to ensure the entirety of the network is managed appropriately.

Further, given the movement of the former surface of the trail to the sides to create the berms, there is potential for artefacts to wash out or be dislodged from the berms during use of trails. As such, an annual surface collection of any artefacts which may have been dislodged over the previous year by users of the trail is proposed and would be detailed in the PoM.

The PoM would also provide information regarding a cultural heritage induction for anyone who may be assisting with track management, both during upgrade works and into the future, to ensure the cultural heritage of the area is respected and managed appropriately. This should be prepared for both paid and volunteer personnel, and anyone undertaking work along the trails must be aware of their obligations regarding Aboriginal cultural heritage.

It is also recommended that consideration be given to erecting interpretive signage at certain locations along the track, outlining the Aboriginal heritage of the area to inform the community. Additionally, consideration should be given to using Ngarigo names for new tracks, to maintain that connection to Country. Both these actions should be undertaken in consultation with the Aboriginal community.

## **6.3 ECOLOGICALLY SUSTAINABLE DEVELOPMENT**

It is a requirement of Section 2A(2) of the NPW Act to apply the principles of Ecologically Sustainable Development (ESD) when considering any impact to Aboriginal objects and places. ESD integrates economic and environmental considerations, which includes cultural heritage, into decision-making processes. In



general, ESD can be achieved through consideration and implementation of two key principles, being intergenerational equity and the precautionary principle.

Intergenerational equity refers to the present generation having consideration for the health, diversity and productivity of the environment for those generations to come. In terms of Aboriginal cultural heritage, this relates to cumulative impacts to Aboriginal objects and places within a region. Intergenerational equity therefore relies on the understanding that a reduction in the number of Aboriginal objects and places within a region results in fewer opportunities for Aboriginal people to access their cultural heritage in the future. Thus, it is essential to understand what comprises the Aboriginal heritage resource, both known and potential, when assessing intergenerational equity within a region.

The precautionary principle relates to threats of serious or irreversible environmental damage, and that lack of scientific certainty regarding the degree of potential damage should not be a reason to postpone adequate reasonable measures to prevent harm to the environment. Regarding Aboriginal cultural heritage, the precautionary principle relates to where a proposed development may seriously or irreversibly impact Aboriginal objects or places, or their significance; and where there may be uncertainty relating to the integrity, rarity or representativeness of Aboriginal cultural values. The Code of Practice outlines that a precautionary approach should be taken to avoid or reduce damage to Aboriginal objects or places, with cost-effective measures implemented wherever possible. Additionally, a cumulative impact assessment should be completed to determine how the proposed development would impact the cultural resource in the wider region.

Consideration should be given to the significance of the sites present within an area, and whether they are able to transmit cultural information to future generations, or to act as teaching aids.

The study area is assessed as being of high cultural significance.

#### **6.3.1 INTERGENERATIONAL EQUITY**

When impact cannot be avoided, it is important to retain cultural information wherever possible through methods such as incorporating place names and signage within the development area, acknowledging and informing the public of the Aboriginal history of the area. This assists in maintaining intergenerational equity, through maintaining ongoing transmission of cultural knowledge to future generations.

Many of the site types within the study area are common in the region and destruction of small, dispersed sites would not impact on the knowledge of the past use of the area and the travel routes along the Snowy River. The generally small nature of the sites means they are unlikely to have significant value as teaching aids and thus do not warrant conservation on those grounds. Overall, it is considered that the impact of the destruction of these sites would be negligible with regards to the ongoing transmission of cultural knowledge to future generations, although it is acknowledged that destruction should be avoided where possible.



### 6.3.2 CUMULATIVE IMPACTS

The cumulative impact of the project on the Aboriginal cultural resource must be considered as part of an assessment, and managed appropriately and sensitively. Avoidance of impact is the best practice approach wherever possible, particularly for sites that are intact, contain high numbers of artefacts, or are considered significant to the community.

In this instance, existing trail is present throughout the study area, including through existing archaeological sites. Much of the creation of this trail was unsanctioned, and the trails will continue to be used by the public regardless of the outcome of this assessment. As such, it is considered appropriate to mitigate this impact as soon as possible.

The proposed new trails have been specifically designed to avoid impact to areas with known or assessed potential for archaeological deposit to be present. Additionally, two trails have been amended or deleted to avoid impact to cultural heritage values along the proposed alignment, allowing these sites to remain in situ. In terms of cumulative impact, the site contains evidence of Aboriginal occupation in a disturbed context, with potential for undisturbed deposits to exist outside of the proposed impact areas. As such, undisturbed areas with archaeological potential would be retained, with new trails proposed to be located in areas considered unlikely to possess archaeological potential.

Overall, it is considered that the proposal has an acceptable impact on the Aboriginal cultural heritage of the region, particularly if the proposed mitigation measures are enacted.

### 6.4 ABORIGINAL COMMUNITY INPUT

The RAPs for this project have been consulted in accordance with the requirements of the ACHCRs and their views have been incorporated into this report as appropriate. Their comments on the draft report have been sought and incorporated into the final report, which has been updated as necessary in line with their comments.





## 7.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- The statutory requirements of the NP&W Act 1974;
- The requirements of Heritage NSW;
- The results of the cultural and archaeological assessment;
- An assessment of the likely impacts of the proposed development; and
- The interests of the registered Aboriginal stakeholders and the cultural heritage record.

It was found that:

- A total of four previously identified Aboriginal sites were located within the study area.
- Eight newly identified sites were located within the trail alignment.
- One site is able to be avoided through realignment of the trail.
- Another site is able to be avoided through deletion of the proposed extension of the trail.
- Two areas of subsurface potential were noted with could not be avoided by the proposed trail alignment.
- Test excavation within these areas identified a relatively low density archaeological deposit with a total of 31 objects recovered.
- The remaining ten sites cannot be avoided by the proposed works.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.
- Collection of surface artefacts is recommended.

Therefore, the following recommendations have been made.

### RECOMMENDATION 1: APPLICATION FOR AHIP REQUIRED

This report details the Aboriginal archaeological potential of several stages of the Jindabyne Shared Trail Network. A total of twelve previously and newly recorded sites are located within the study area. Ten of these cannot be avoided by the proposed works. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to these sites is required, and should include permission to undertake surface collection of any artefacts on the track surface within the proposed impact areas, with the items placed in a keeping place.

If the surface artefacts cannot be relocated, the AHIP should permit unmitigated impact to the site location.

### RECOMMENDATION 2: CONSERVATION OF SITES

PAD outside of existing trails should be conserved and no impact should be permitted to these areas. This should be detailed in any Plan of Management (PoM) prepared for the trails.



#### **RECOMMENDATION 3: SURFACE COLLECTION**

The AHIP should permit surface collection of any artefacts visible on the surface of the existing trails prior to the commencement of upgrade or construction works. Additionally, the AHIP should permit annual surface collection of any artefacts that may wash or erode out of the berms bordering the trails within the study area.

#### **RECOMMENDATION 4: LONG TERM MANAGEMENT OF COLLECTED ARTEFACTS**

Management of collected artefacts should be in accordance with the wishes of the Aboriginal community, and in consultation with Heritage NSW. SMRC have indicated an intention to develop a permanent Keeping Place in Jindabyne, but until such time, it is recommended that artefacts be stored at the Jindabyne Library, which is operated by SMRC and has capacity to care for items until such time as they can be transferred to a Keeping Place. Heritage NSW should be advised of any transferral of artefacts to a Keeping Place once established.

#### **RECOMMENDATION 5: PREPARATION OF MANAGEMENT PLAN**

As part of the wider Jindabyne Shared Trail Network program of works, a Plan of Management (PoM) should be developed to incorporate and consolidate all archaeological work undertaken within the trail network, so as to streamline management processes and ensure Aboriginal cultural heritage within and adjacent to the trail network footprint is respected, preserved and managed appropriately. The PoM should be developed in consultation with the Aboriginal community.

#### **RECOMMENDATION 6: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION**

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

#### **RECOMMENDATION 7: STUDY AREA BOUNDARIES**

The proposed works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present.

#### **RECOMMENDATION 8: STOP WORK PROVISION**

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find



and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) developed for the site.

#### **RECOMMENDATION 9: REPORTING**

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project



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## APPENDIX A: CORRESPONDENCE LOG

Jindabyne Shared Trails Network ACHA – Consultation Log

Date	Type of Consultation	Parties Contacted	Outcome
08/03/2022	Requesting details of Aboriginal individuals or organisations with cultural knowledge of the area and who may wish to participate in consultation (Section 4.1.1 of ACHCRs)	Heritage NSW	08/3/2022 – email with list of RAPs attached
		Snowy Monaro Regional Council	No response
		Local Land Services	No response
		Bega LALC	16/3/2021 – registered by phone and advised that Donna Aldridge should be included as a primary contact and that Ronnie Thomas from the LALC is familiar with the area being assessed and they would like him to be involved in any necessary fieldwork.
		NTSCorp	No response
		ORALRA	No response
		National Native Title Tribunal	No Native Title claims registered or determined over study area.
22/3/2022	Advertisement for registrations of interest for consultation from Aboriginal people or organisations with cultural knowledge relevant to the area	The Monaro Post	22/03/22 – Online Public Notice, 30/3/2022 Published Public Notice
25/3/2022	Letters sent to identified individuals and organisations from Section 4.1.1 of ACHCRs  Letter sent via email if address provided; and by post where email not available	Bega Local Aboriginal Land Council	Already registered
		Ngunnawal Elders Corporation	No response
		Ngunawal Heritage Aboriginal Corporation	No response
		Iris White	No response
		Alice Williams	No response
		Buru Ngunawal Aboriginal Corporation (BNAC);	25/3/2022 – email received thanking Apex for the correspondence but advising that Ngunawal Country terminates at the Numeralla River on the southern boundary and as such means that it would be inappropriate for their organisation to attend for cultural consultations relating to this project. They therefore respectfully declined the offer to register.

	Konanggo Aboriginal Cultural Heritage Services	No response
	King Brown Tribal Group	No response
	Yurwang Gundana Consultancy Cultural Heritage Services	8/4/2022 – copy of email received between Snowy Monaro Council and Yurwang Gundana initially requesting registration. 18/04/2022 - subsequent copy of email received between Snowy Monaro Council and Yurwang. Yurwang advised they are withdrawing from the project as they 'misread the email and didn't know it was in the Ngarigo tribal lands so Yurwang Gundana will be withdrawing registration".
	Colleen Dixon	No response
	Gunjeewong Cultural Heritage Aboriginal Corporation	25/3/2022 – email received requesting registration
	Ramsay Freeman/Snowy Mountains Indigenous Elders Group	4/4/2022 - voice message received from Janice Williams to register for the project. 7/4/2022 – RB contacted Janice Williams as some of the voice message wasn't clear. Janice advised all correspondence for the group can be directed to her by post and any queries she can be contacted by phone.
	Matilda House (on behalf of Williams, Freeman and Simpson-Wedge families)	No response
	Yukkumbruk.	25/3/2022- Bounce Back received.
	Corroboree Aboriginal Corporation	29/3/2022- email received requesting registration and also requested that their details not be forwarded to the LALC.
	Murri Bidgee Mullangari Aboriginal Corporation.	No response
	Nundagurri Aboriginal Corporation.	No response
	Walbunja.	No response
	Goobah Development Pty Ltd.	No response

		Gunyu	No response
		Wullung	No response
		Badu	No response
		Yerramurra	No response
		Jerringong	No response
		Merrigarn Indigenous Corporation	No response
		Wingikara	25/3/2022- Bounce Back received
		Bilinga	No response
		Munyunga	No response
		Pemulwuy	No response
		Karrial	No response
		Didge Ngunawal Clan	25/3/2022 – email received requesting registration
		Ginninderra Aboriginal Corporation	No response
		Muragadi Heritage Indigenous Corporation	No response
		Thauaira	No response
		Walgala	No response
		Gadhu Dreaming.	No response
		Thunderstone Aboriginal Cultural and Land Management Services Aboriginal Corporation.	25/3/20220 'out of office reply' advising they will not return until 10 <sup>th</sup> March 2022. 28/3/20220 email received advising they will not be registering for the project as the project is outside of Ngunawal Country.
		Members of the Southern Snowy Mountains Aboriginal Community MoU Working group	No response
		Thoorga Nura	No response
		Janine Thompson	No response
		Ngurambang	No response
		Ngunawal Consultancy	No response
		Ngarigo and Djiringanj People	25/3/2022 – email received from John Dixon requesting registration and provided additional information of his connection to 'Old Munday' and outlined his

			experience as an elder with his connection with the Ngarigo land and water.
		Ellen Mundy	No response
		Oak Hill Enterprises	No response
		Adrian Brown	No response
		Konanggo Aboriginal Cultural Heritage Services	No response
		Mundawari Heritage Consultants	No response
		Guntawang Aboriginal Resources Incorporated	No response
		Maria Williams	31/3/2022 – email received requesting registration
		Clive Freeman	No response
	Additional Registrations	Woka Aboriginal Corporation	29/3/2022 – Email requesting registration and asked that details not be forwarded to the Local Aboriginal Land Council
13/04/2022	Provision of project information and methodology	Bega LALC	No response
		Gunjeewong	18/04/2022 – Email received advising the group is “happy with the proposed methodology”.
		Snowy Mountains Indigenous Elders Group	12/05/2022 – Phone call from Janice Williams, reporting on discussions with Ramsay Freeman, who was concerned that the process should treat everything with respect. JB advised that respect is very important and it is important to listen to Aboriginal people. Further explained how the consultation process works and that there would likely be meetings in future to discuss project further. JW advised she would pass information to Ramsay.
		Corroboree	20/04/2022 – Email received advising the group agrees with the information and methodology.
		Didge Ngunawal Clan	14/04/2022 – Email received advising the group is “happy with everything”.
		Ngarigo and Djiringani People	No response
		Maria Williams	No response
		Woka Aboriginal Corp	No response

10/06/2022	General update to all RAPs, advising of need for test excavation within two areas and providing map of proposed testing areas. Update noted that this would occur after winter to allow the ground to thaw and that the draft ACHA would be sent subsequently.	Bega LALC	No response
		Gunjeewong	No response
		Snowy Mountains Indigenous Elders Group	No response
		Corroboree	No response
		Didge Ngunawal Clan	No response
		Ngarigo and Djiringani People	No response
		Maria Williams	No response
29/11/2022	General update noting that test excavations had been delayed due to poor weather conditions.	Woka Aboriginal Corp	No response
		Bega LALC	No response
		Gunjeewong	No response
		Snowy Mountains Indigenous Elders Group	No response
		Corroboree	No response
		Didge Ngunawal Clan	No response
		Ngarigo and Djiringani People	No response
06/03/2023	Provision of draft report for comment.	Maria Williams	No response
		Woka Aboriginal Corp	No response
		Bega LALC	No response
		Gunjeewong	No response
		Snowy Mountains Indigenous Elders Group	No response
		Corroboree	No response
		Didge Ngunawal Clan	No response
		Ngarigo and Djiringani People	No response
		Maria Williams	No response
		Woka Aboriginal Corp	24/3/2023 – emails advising “we agree with draft”.





## APPENDIX B: STEP 1 LETTERS AND RESPONSES



PO Box 236  
Nowra, NSW 2541  
heritage@apexarchaeology.com.au  
www.apexarchaeology.com.au  
ABN 56 625 618 993

8 March 2022

**Establishing a Register of Interest for an Aboriginal Cultural Heritage Assessment – Jindabyne Shared Trails Network within the Snowy Monaro Regional Council Local Government Area.**

This letter is sent in accordance with Section 4.1.2 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRs) in order to initiate Stage 1 of the Aboriginal consultation process in relation to the above project.

Cardno on behalf of the proponent Snowy Monaro Regional Council (SMRC), has engaged Apex Archaeology to assist in preparing an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of shared trails within the Jindabyne region. The project is located within the Snowy Monaro LGA and is a component of a larger overall upgrade and extension network referred to as the Lake Jindabyne Shared Trails Network.

A number of unsanctioned trails have been constructed within this area by local mountain bike enthusiasts. SMRC have adopted the trail network and are planning to upgrade and extend the network. A number of Aboriginal cultural heritage sites are known within the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

The project is likely to require Development Approval (DA) prior to commencement. Given the known number of previously registered sites within the vicinity of the proposed works, an ACHA is considered appropriate to support the DA and to support any Aboriginal Heritage Impact Permit (AHIP) applications that may be required. The site has been identified as also having potential for subsurface archaeological deposits to be present, and the nature and extent of these deposits require investigation in order to understand and manage potential impacts on Aboriginal cultural values and to determine the requirement to apply for an AHIP.

A process of Aboriginal community consultation in accordance with the ACHCRs is being initiated by Apex Archaeology on behalf of the proponent. Apex Archaeology will be undertaking a full archaeological assessment under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.

In accordance with Section 4.1.2 of the ACHCRs, I am writing to request any information you may have regarding Aboriginal stakeholders who may have cultural knowledge relevant to determining the significance of Aboriginal objects that may be located within the study area. Any identified Aboriginal individuals or organisations will be invited to register an interest in the project and participate in the consultation process.

The project manager is Cherie McNair of SMRC, who can be contacted via email at [Cherie.McNair@snowymonaro.nsw.gov.au](mailto:Cherie.McNair@snowymonaro.nsw.gov.au)





Information regarding Aboriginal stakeholders can be sent to PO Box 236, Nowra, NSW 2541, or [rebecca@apexarchaeology.com.au](mailto:rebecca@apexarchaeology.com.au). I am available to assist with any inquiries about the process and can be contacted by telephone on 0405 236 821.

We would appreciate a response within 14 days of the date of this letter wherever possible.

Kind regards,

Rebecca Bryant



Archaeologist  
Apex Archaeology  
E: [rebecca@apexarchaeology.com.au](mailto:rebecca@apexarchaeology.com.au)  
M: [REDACTED]



---

**From:** [Jenni Bate](#)  
**To:** [Undisclosed Recipients](#)  
**Bcc:** [heritagemailbox@environment.nsw.gov.au](#); [ceo@begalalc.org.au](#); [LLS Enquiry SouthEast Mailbox](#);  
[adminofficer@oralra.nsw.gov.au](#); [information@ntscorp.com.au](#); [council@snowymonaro.nsw.gov.au](#)  
**Subject:** Jindabyne Shared Trails - Request for Aboriginal Stakeholder Details  
**Date:** Tuesday, 8 March 2022 4:34:58 PM  
**Attachments:** [21127 Jindabyne Shared Trails Agency letter.pdf](#)

---

Good afternoon,

Please find attached a letter requesting contact details for any Aboriginal people or organisations you may be aware of who may wish to participate in consultation for a proposed project in Jindabyne, NSW.

Thank you for your assistance.

Kind regards,



*Jenni Bate*  
DIRECTOR - ARCHAEOLOGIST  
0422 229 179  
JENNI@APEXARCHAEOLOGY.COM.AU  
WWW.APEXARCHAEOLOGY.COM.AU

Apex Archaeology is proud to support the [Immunisation Foundation of Australia](#) through our workplace giving program.

---

**From:** [REDACTED]  
**Subject:** RE: Aboriginal stakeholder involvement in Jindabyne shared trail project  
**Date:** Wednesday, 16 March 2022 1:34:41 PM

---

Hi Leanne,

It was lovely to chat with you this afternoon.

I appreciate you have just recently commenced this appointment. I am more than happy to answer any queries you may have regarding the consultation process we have initiated for the Jindabyne Shared Trails Network.

As discussed, I have registered Bega LALC for this project and will forward more information after the registrations for the project close in early April. I will include Donna Aldridge as the primary contact and understand Ronnie Thomas is familiar with the area being assessed and BLALC would like him to be involved in any potential fieldwork.

I have also cc'd Jenni and Leigh Bate in on this email, as they are the directors of Apex Archaeology and will be managing the overall project.

In the meantime, please feel free to contact me anytime if you have any questions whatsoever.

Warm regards,

[REDACTED]

---

**From:** Leanne Atkinson | [REDACTED]  
**Sent:** Tuesday, 15 March 2022 3:09 PM  
**To:** [REDACTED]  
**Subject:** RE: Aboriginal stakeholder involvement in Jindabyne shared trail project

Hi Rebecca,  
Please feel free to call me on my mobile. I am not back in the office until Friday so my mobile is the best option.

Regards,

[REDACTED]

Acting CEO  
Bega Local Aboriginal Land Council

[REDACTED]

[REDACTED]

PO Box 11  
Bega  
NSW 2550

**ABN** 60 937 578 961

**Office** - Level 1, 187 Carp St, Bega  
(Enter from Church St)



---

**From:** [REDACTED]  
**Sent:** Tuesday, 15 March 2022 9:50 AM  
**To:** Leanne Atkinson | Bega LALC [REDACTED]  
**Subject:** RE: Aboriginal stakeholder involvement in Jindabyne shared trail project

Hi Leanne,

I just left a message on the LALC's phone number listed on your email.

Thank you for your email. Could you please provide contact details for Ronnie Thomas so I can forward him an invitation to register for the project.

Also, could you please advise if you would like me to register the Bega LALC for this project.

Warm regards,

Rebecca

---

**From:** Leanne Atkinson | Bega LALC [REDACTED]  
**Sent:** Monday, 14 March 2022 12:46 PM  
**To:** [REDACTED]  
**Subject:** Aboriginal stakeholder involvement in Jindabyne shared trail project

Hi Rebecca,

Thank you for your email. Ronnie Thomas is the local Aboriginal man who would want to participate in this project.

Can you please let me know a timeline for the activity and next steps from your perspective?

Regards,

Leanne Atkinson  
Acting CEO  
Bega Local Aboriginal Land Council  
[REDACTED]  
PO Box 11  
Bega



NSW 2550

**ABN** 60 937 578 961

**Office** - Level 1, 187 Carp St, Bega  
(Enter from Church St)





Our reference: Doc22/178429

Rebecca Bryant  
Apex Archaeology  
PO Box 236  
Nowra, NSW 2541

10/03/2022

Dear Rebecca,

**WRITTEN NOTIFICATION OF PROPOSAL AS REQUIRED UNDER DECCW ABORIGINAL  
CULTURAL HERITAGE CONSULTATION REQUIREMENTS FOR PROPONENTS 2010**

**Subject: Jindabyne Shared Trails Network.**

Thank you for your correspondence dated 8 March 2022 to Heritage NSW (Department of Premier and Cabinet) regarding the above project.

Attached is a list of known Aboriginal parties for the proposed development at **Snowy Monaro** local Government Area that Heritage NSW considers likely to have an interest in the activity.

Please note this list is not necessarily an exhaustive list of all interested Aboriginal parties.

Receipt of this list does not remove the requirement of a proponent/ consultant to advertise in local print media and contact other bodies seeking interested Aboriginal parties, in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (April 2010).

Under Section 4.1.6. of the Consultation Requirements, you must also provide a copy of the names of each Aboriginal person who registered an interest to the relevant Heritage NSW office and Local Aboriginal Land Council (LALC) within 28 days from the closing date for registering an interest.

Please note that the contact details in the list provided by Heritage NSW may be out of date as it relies on Aboriginal parties advising Heritage NSW when their details need changing. If individuals/companies undertaking consultation are aware that any groups contact details are out of date, or letters are returned unopened, please contact either the relevant stakeholder group (if you know their more current details) and/or Heritage NSW. AHIP applicants should make a note of any group they are unable to contact as part of their consultation record.

If you have any questions about this advice, please email:

[heritagemailbox@environment.nsw.gov.au](mailto:heritagemailbox@environment.nsw.gov.au) or contact [REDACTED].

Yours sincerely

[REDACTED]

**Barry Gunther**  
**Aboriginal Heritage Planner**  
**Aboriginal Heritage Regulation Branch – South Heritage NSW**

Attachment A: Registered Aboriginal Interests DPC RAP List for the **Snowy Monaro** Local  
Government Area



## APPENDIX C: STEP 2 LETTERS AND RESPONSES



PO Box 236  
Nowra, NSW 2541  
heritage@apexarchaeology.com.au  
www.apexarchaeology.com.au  
ABN 56 625 618 993

25 March 2022

**Establishing a Register of Interest for an Aboriginal Cultural Heritage Assessment –  
Jindabyne Shared Trails Network within the Snowy Monaro Local Government Area.**

This letter is sent in accordance with Section 4.1.2 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRs) in order to initiate Stage 1 of the Aboriginal consultation process in relation to the above project.

Stantec, on behalf of the proponent Snowy Monaro Regional Council (SMRC), has engaged Apex Archaeology to assist in preparing an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of shared trails within the Jindabyne region. The project is located within the Snowy Monaro LGA and is a component of a larger overall upgrade and extension network referred to as the Lake Jindabyne Shared Trails Network.

The project is likely to require Development Approval (DA) prior to commencement. Given the known number of previously registered sites within the vicinity of the proposed works, an ACHA is considered appropriate to support the DA and to support any Aboriginal Heritage Impact Permit (AHIP) applications that may be required.

The purpose of consultation with Aboriginal people for this project is to assist the proponent in identifying Aboriginal people with cultural knowledge relevant to determining the significance of Aboriginal objects at this location.

The proponent invites Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and places within the study area to register an interest in the process of Aboriginal community consultation.

Please note that details of the Aboriginal people or organisations who register an interest in consultation will be forwarded to both Heritage NSW and the Bega Local Aboriginal Land Council (BLALC). Please advise at the time of registration if you do not wish for your details to be forwarded to either entity.

**The study area falls within Ngarigo tribal boundaries and as such, we would encourage you to consider whether it is appropriate for you to be consulted for this project.** In line with the ACHCRs, we will consult with anyone who registers for consultation as it is not our place or appropriate for us to determine Aboriginality, but please do consider if you may speak for this area before registering your interest.

The project manager is Cherie McNair of SMRC, who can be contacted via email at [REDACTED]





Information regarding Aboriginal stakeholders can be sent to PO Box 236, Nowra, NSW 2541, or [REDACTED]. I am available to assist with any inquiries about the process and can be contacted by telephone on 0405 236 821.

Registrations will be accepted until CoB **Friday 8 April 2022**.

Kind regards,

**Rebecca Bryant**

[REDACTED]

**Apex Archaeology**

**E:** [REDACTED]

**M:** [REDACTED]





From:



**Subject:** Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Friday, 25 March 2022 11:38:42 AM  
**Attachments:** [image001.png](#)  
[21127 Jindabyne Shared Trails Stakeholder Invitation.pdf](#)

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might like to take part in consultation for a project within the Snowy Monaro Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,



*Rebecca Bryant*  
ARCHAEOLOGIST

0405 236 821

[REBECCA@APEXARCHAEOLOGY.COM.AU](mailto:REBECCA@APEXARCHAEOLOGY.COM.AU)

[WWW.APEXARCHAEOLOGY.COM.AU](http://WWW.APEXARCHAEOLOGY.COM.AU)



---

**From:** [Tyronne & Bronwyn](#)  
**To:** [REDACTED]  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Monday, 28 March 2022 10:56:04 AM  
**Attachments:** [image001.png](#)

---

Hi Rebecca

We wish to confirm that Thunderstone Aboriginal Cultural Services Pty Ltd will not be registering for the project as the location is outside of Ngunawal Country.

Cheers

Tyronne

Tyronne & Bronwyn  
Thunderstone Aboriginal Cultural Services Pty Ltd



*2017 ACT NAIDOC 'Indigenous Business of the Year' Award Winner*

On Fri, Mar 25, 2022 at 11:38 AM [REDACTED] <[u](#)> wrote:

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might

like to take part in consultation for a project within the Snowy Monaro Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,



*Rebecca Bryant*  
ARCHAEOLOGIST

0405 236 821

REBECCA@APEXARCHAEOLOGY.COM.AU

WWW.APEXARCHAEOLOGY.COM.AU

---

**From:** [Corroboree Aboriginal Corporation](#)  
**To:** [REDACTED]  
**Subject:** Re: Expressed Interest- Jindabyne Shared Trails Network within the Snowy Monaro LGA  
**Date:** Tuesday, 29 March 2022 9:26:22 AM  
**Attachments:** [image001.png](#)  
[Untitled attachment 00356.html](#)  
[21127 Jindabyne Shared Trails Stakeholder Invitation.pdf](#)  
[Untitled attachment 00359.html](#)

---

Good Morning Rebecca

Please register Corroboree Aboriginal Corporation. My dad, grandparents, great grandparents and other family members have lived in the area and family currently reside in the areas and surrounding areas. We are registering in a full capacity. We are aboriginal people who are culturally aware. We have the necessary ability, awareness, experience, skills, insight and the knowledge to identify artefacts on field work. And as Aboriginal People we connect thru the land, thru our ancestors and our heritage. Therefore we are able participate on all levels. We have worked with many archaeologists across a broad landscape. We have consulted with your company on previous projects. We have all the relevant insurances and safety gear. We are all fit and adapt to a vast landscape. We have worked on projects in the area.

Contact is preferred via email: [REDACTED]. The contact number, email and contact person is also listed in the signature.

**Please do not disclose any of our details to LALC nor publish our correspondence for LALC to peruse.** Please only note our corporation details i.e. our name and only for registration purposes. As noted our details are not to be passed on/disclosed to LALC. We understand your need for confirmation of our corporations name on your lists for registered stakeholders, in that we have responded for inclusion, to participate on all levels. The use of our name as registered party, is fine, however non-disclosure of our actual correspondence, please. Just our name and contact details as registered stakeholders for your records and proponents. Thanks.

Kind regards  
Marilyn Carroll-Johnson  
Director  
Corroboree Aboriginal Corporation

[REDACTED]

Address: PO Box 3340  
ROUSE HILL NSW 2155

CAC acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, sea & community. We pay our respects to them and their cultures, to the Elders past and present, and emerging.

On 25 Mar 2022, at 11:38 am, rebecca@apexarchaeology.com.au wrote:

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might

like to take part in consultation for a project within the Snowy  
Monaro Local Government Area.

Please find attached a letter with more information and inviting you  
to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,



---

**From:** [lilly carroll](#)  
**To:** [REDACTED] [S"](#)  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Friday, 25 March 2022 11:46:13 AM  
**Attachments:** [image001.png](#)

---

Hi Rebecca

DNC would love to take part / register an interest in fieldwork that is happening in Jindabyne shared Trails network project

Kind regards  
Paul boyd & Lilly Carroll  
Directors DNC  
[REDACTED]

[Sent from Yahoo Mail for iPhone](#)

On Friday, March 25, 2022, 11:38 am, [rebecca@apexarchaeology.com.au](mailto:rebecca@apexarchaeology.com.au) wrote:

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might

like to take part in consultation for a project within the Snowy Monaro Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,



*Rebecca Bryant*  
ARCHAEOLOGIST

0405 236 821

[REBECCA@APEXARCHAEOLOGY.COM.AU](mailto:REBECCA@APEXARCHAEOLOGY.COM.AU)

[WWW.APEXARCHAEOLOGY.COM.AU](http://WWW.APEXARCHAEOLOGY.COM.AU)

---

**From:** [Shayne Dickson](#)  
**To:** [REDACTED]  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Friday, 25 March 2022 2:27:20 PM  
**Attachments:** [image001.png](#)

---

Good afternoon Rebecca,

Thank you for the invitation for Jindabyne shared trails project.  
Could you please register Gunjee Wong for this.

Kind Regards  
Shayne Dickson  
[REDACTED]

---

**From:** rebecca@apexarchaeology.com.au <rebecca@apexarchaeology.com.au>  
**Sent:** Friday, 25 March 2022 11:38 AM  
**To:** 'Undisclosed Recipients' <jenni@apexarchaeology.com.au>  
**Subject:** Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might like to take part in consultation for a project within the Snowy Monaro Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,



*Rebecca Bryant*  
ARCHAEOLOGIST  
0405 236 821  
[REBECCA@APEXARCHAEOLOGY.COM.AU](mailto:REBECCA@APEXARCHAEOLOGY.COM.AU)  
[WWW.APEXARCHAEOLOGY.COM.AU](http://WWW.APEXARCHAEOLOGY.COM.AU)

---

**From:** [john.dixon](#)  
**To:** [REDACTED]  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Friday, 25 March 2022 2:33:16 PM  
**Attachments:** [image001.png](#)  
[Untitled attachment 00073.html](#)  
[21127 Jindabyne Shared Trails Stakeholder Invitation.pdf](#)  
[Untitled attachment 00076.html](#)

---

Hi Rebecca

Thank you for your letter inviting me to register my interest.

I would like to formally register my interest in the shared trails network project within the Snowy Monaro LGA.

I am a traditional descendant of "Old Munday" the first Headman encountered by the incoming Europeans in the 1800's and he gave cultural information to the early anthropologists of the laws and customs of the Ngarigo people and the boundaries of his Ngarigo land and water.

I am an Elder and an experienced sites officer who can identify cultural items/objects and cultural landscapes and provide mitigation recommendations based on my cultural identity and beliefs.

Should you require anything further please contact me on [REDACTED]  
[REDACTED]

Thank You  
Gnublum John Dixon  
Ngarigo/Djirringanj Elder

Sent from my iPhone

On 25 Mar 2022, at 11:38 am, [rebecca@apexarchaeology.com.au](mailto:rebecca@apexarchaeology.com.au) wrote:

Good morning,

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might like to take part in consultation for a project within the Snowy Monaro Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,

---

**From:** [Maria Williams](#)  
**To:** [REDACTED]  
**Cc:** [Jenni Bate](#)  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register  
**Date:** Thursday, 31 March 2022 7:00:10 PM

---

Hi Rebecca I responded back to you to say that I was interested in participating.  
Thanks  
Maria

On Thu, 31 Mar. 2022, 5:12 pm , [REDACTED] wrote:

Hi Maria,

I think you forgot the attachment.

Would you like to register for the Jindabyne Shared Trail Network?

Warm regards,

Rebecca

---

**From:** Maria Williams [REDACTED]  
**Sent:** Thursday, 31 March 2022 2:34 PM  
**To:** [REDACTED]  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register

Please see attached

On Fri, 25 Mar. 2022, 11:38 am , [REDACTED] > wrote:

Good morning, Woul

Your details have been provided by Heritage NSW as an Aboriginal person or organisation who might  
like to take part in consultation for a project within the Snowy Monaro

Local Government Area.

Please find attached a letter with more information and inviting you to register your interest.

Registrations will be accepted until 5pm Friday 8<sup>th</sup> April 2022

Please contact me if you have any questions.

Warm regards,





---

Ramsay Freeman/Snowy Mountains Indigenous Elders Group	4/4/2022 - voice message received from Janice Williams to register for the project. 7/4/2022 – RB contacted Janice Williams as some of the voice message wasn't clear. Janice advised all correspondence for the group can be directed to her by post and any queries she can be contacted by phone.
---	--

---

**From:** [Steven Johnson](#)  
**To:** [REDACTED]  
**Subject:** Establishing a Register of Interest for an Aboriginal Cultural Heritage Assessment – Jindabyne Shared Trails Network within the Snowy Monaro Local Government Area.  
**Date:** Tuesday, 29 March 2022 9:24:52 AM

---

Woka Aboriginal Corporation  
Preservation of Culture & Heritage  
[REDACTED]

Attention: Rebecca Bryant

Re: Expressing Interest - Establishing a Register of Interest for an Aboriginal Cultural Heritage Assessment – Jindabyne Shared Trails Network within the Snowy Monaro Local Government Area.

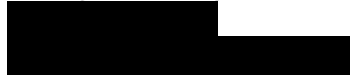
We are submitting our registration of Woka Aboriginal Corporation for full process on this project. We are all aboriginal people from all over NSW. We are all experienced Aboriginal Cultural Heritage Site Officers. We have worked on number of projects in the area. We are aware that registering for this project does not guarantee work, should field surveys, test excavations, or salvage excavations be required. However we hope you adhere to equal employment opportunities, fair work proactive and equality and share work with rotating, so all that register are equally given time to partake with our culture and heritage preservation. Some of the bigger company's are Lendlease, NBN, Rose Hill Camellia project the Metro, etc. We have worked with the National Parks & Wildlife, WaterNSW, RMS/TFNSW on for over a decade on projects. We have our history & stories passed down to us by our Elders. We have assisted in surveys, test excavations, salvage & consulting with archaeologists over a vast number of years. We are experienced in the field of identifying potential PADS, artefacts, Including our learned history and knowledge passed down to us. We appreciate the opportunity to be part of protecting and preserving our Aboriginal heritage and Culture. We are very proud of our heritage and culture passed to us by our Ancestors and our own histories . We are therefore pleased with being a part of this research and to provide our experience and knowledge.

Our organisation has the current Public liability insurance and is WHS compliant, with all member's holding white cards and required PPE.

All our members are extremely experienced in the identification of Aboriginal artefacts and have worked with numerous Archeologists in field surveys, including test and salvage excavations on fieldwork. We are very passionate about our ancestral land and our conservation of our history matters the upmost to us. We hold strong links to our ancestors, our culture and our heritage and lore. We are motivated to share our history with our current generation and future generations to pass down to our Mob.

Please note we do not want our details forwarded to LALC, please do not release our correspondence. Please register Woka Aboriginal Corporations name for this project. Please feel free to contact me if you have any questions.

Sincerely  
Steve  
Aboriginal Heritage Custodian



*We respectfully acknowledge the Traditional Owners of the lands upon which we work and pay our deep respect to Elders past, present and emerging.*

---

**Jenni Bate**

---

**From:** Cherie McNair [REDACTED]  
**Sent:** Tuesday, 19 April 2022 11:53 AM  
**To:** 'yurwang gundana'  
**Cc:** 'Jenni Bate'  
**Subject:** RE: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register

Hi Merekai,

I'm well, thanks for asking – I hope you are well too?

Thank you for letting us know you'll be withdrawing and we most certainly will let you know of any other cultural work on Ngunawal or Wiradjuri Country.

With best wishes  
Cherie

**Cherie McNair**  
Senior Project Manager



PO Box 714  
COOMA NSW 2630

[REDACTED]  
[snowymonaro.nsw.gov.au](http://snowymonaro.nsw.gov.au)

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---

**From:** yurwang gundana [REDACTED]  
**Sent:** Monday, 18 April 2022 3:26 PM  
**To:** Cherie McNair [REDACTED]  
**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register

Hi how are you?

sorry about the late reply, have a rotten time with internet lately

I've realised I've misread the email I didn't know it was in the Ngarigo tribal lands so Yurwang Gundana will be withdrawing our registration, please contact us if you have cultural work in and on Ngunawal and Wiradjuri countries

Thanks  
Merekai Bell

Yurwang Gundana Cultural Heritage Services

---

**From:** Cherie McNair [REDACTED] >

**Sent:** 08 April 2022 10:39

**To:** yurwang gundana [REDACTED]

Leigh Bate [REDACTED] >

**Subject:** Re: Jindabyne Shared Trails Network within the Snowy Monaro LGA - Invitation to register

Dear Merekai,

Thank you for your email. The registration is with the Archaeologists we have engaged for the work, Apex Archaeology. I've copied them in to the email and they will advise of next steps in the consultation. Do you represent a Ngarigo group?

Best wishes  
Cherie

Cherie McNair  
Senior Project Manager

[cid:SnowyMonaroLogo\_clear\_87475f20-44af-4059-b1e9-d983b1ff3e94.png]

PO Box 714  
COOMA NSW 2630

[REDACTED]  
Phone  
Fax (02) 6456 3337

snowymonaro.nsw.gov.au<<https://nam12.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.snowymonaro.nsw.gov.au%2F&data=04%7C01%7C%7C0607e804d4fe4d41487e08da18f8547c%7C84df9e7fe9f640afb435aAAAAAAAA%7C1%7C0%7C637849752106247718%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C3000&data=SVyescaPeTiviR0VwtZBiBoni8EMCg7rGSI99xqTpVQ%3D&reserved=0>>

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On 8 Apr 2022, at 9:58 am, yurwang gundana [REDACTED] wrote:

Hi Cherie, how are you?

Yurwang Gundana Cultural Heritage Services would like to register for the above Project

Thanks  
Merekai Bell  
Yurwang Gundana Cultural Heritage Sercies





## APPENDIX D: ADVERTISEMENT





## APPENDIX E: METHODOLOGY, COVER LETTERS AND RESPONSES

JINDABYNE SHARED TRAIL NETWORK

## METHODOLOGY AND PROJECT INFORMATION

LGA: Snowy-Monaro Regional Council

May 2022



PO Box 236, Nowra, NSW 2541 | [heritage@apexarchaeology.com.au](mailto:heritage@apexarchaeology.com.au) | [www.apexarchaeology.com.au](http://www.apexarchaeology.com.au)

ABN 56 625 618 993



Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

### DOCUMENT CONTROL

The following register documents the development and issue of the document entitled 'Jindabyne Shared Trail Network – Methodology and Project Information', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Comment	Issue Date
1 – Draft	Leigh Bate	Jenni Bate	Issue for RAP review	13 April 2022
2 – Final	Jenni Bate	RAPs	Issue of final	13 May 2022



## GLOSSARY OF TERMS

<b>Aboriginal Object</b>	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
<b>ACHA</b>	Aboriginal Cultural Heritage Assessment
<b>ACHAR</b>	Aboriginal Cultural Heritage Assessment Report
<b>ACHCRs</b>	The DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i>
<b>AHIMS</b>	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
<b>AHIP</b>	Aboriginal Heritage Impact Permit
<b>BP</b>	Before Present, defined as before 1 January 1950.
<b>Code of Practice</b>	The DECCW September 2010 <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>
<b>Consultation</b>	Aboriginal community consultation in accordance with the DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> . Consultation is not a required step in a due diligence assessment; however, it is strongly encouraged to consult with the relevant Local Aboriginal Land Council and to determine if there are any Aboriginal owners, registered native title claimants or holders, or any registered Indigenous Land Use Agreements in place for the subject land
<b>DA</b>	Development Application
<b>DECCW</b>	The Department of Environment, Climate Change and Water – now Heritage NSW
<b>Disturbed Land</b>	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
<b>DPIE</b>	Department of Planning, Industry and Environment
<b>Due Diligence</b>	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the <i>National Parks and Wildlife Act 1974</i> and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
<b>Due Diligence Code of Practice</b>	The DECCW Sept 2010 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
<b>GIS</b>	Geographical Information Systems
<b>GSV</b>	Ground Surface Visibility
<b>Heritage NSW</b>	Heritage NSW in the Department of Premier and Cabinet, responsible for heritage matters in NSW
<b>Harm</b>	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
<b>LALC</b>	Local Aboriginal Land Council
<b>NPW Act</b>	NSW <i>National Parks and Wildlife Act 1974</i>
<b>NPWS</b>	National Parks and Wildlife Service
<b>OEH</b>	Office of Environment and Heritage – now Heritage NSW
<b>RAPs</b>	Registered Aboriginal Parties
<b>SMRC</b>	Snowy Monaro Regional Council





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## 1.0 INTRODUCTION

Stantec on behalf of Snowy-Monaro Regional Council (SMRC) has engaged Apex Archaeology to assist in preparing an Aboriginal Cultural Heritage Assessment (ACHA) in advance of the proposed extension of the Jindabyne Shared Trails Network. The project is located within the SMRC local government area (LGA) and is referred to as the Jindabyne Shared Network, and is a component of a larger overall upgrade and extension project.

A process of Aboriginal community consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (the ACHCRs) has been initiated by Apex Archaeology.

The following document provides information about the project, and outlines the detailed methodology for cultural heritage assessment and field survey that Apex Archaeology will be utilising for this project, along with the proposed heritage management activities. It has been developed to address requirements of Section 4.3 in the ACHCRs. The assessment would also be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

### 1.1 STUDY AREA AND PROJECT BRIEF

The study area is located approximately 365 km south west of Sydney, around the shores of Lake Jindabyne (Figure 1). This project includes Sections 1.1 (Tyrolean Village to Kunama Estate & Rainbow Beach; Figure 2), 1.2 (Cobbon Cres to dam wall; Figure 3), 2.1 (Kunama Estate & Rainbow Beach to East Jindabyne; Figure 4), and 5.1 (Banjo Patterson Park to Cobbon Crescent; Figure 5).

A number of unsanctioned trails have been constructed within Section 1.2 (Cobbon Crescent to dam wall) by local mountain bike enthusiasts. New trails are proposed within the other three Sections. A number of Aboriginal cultural heritage sites are known throughout the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

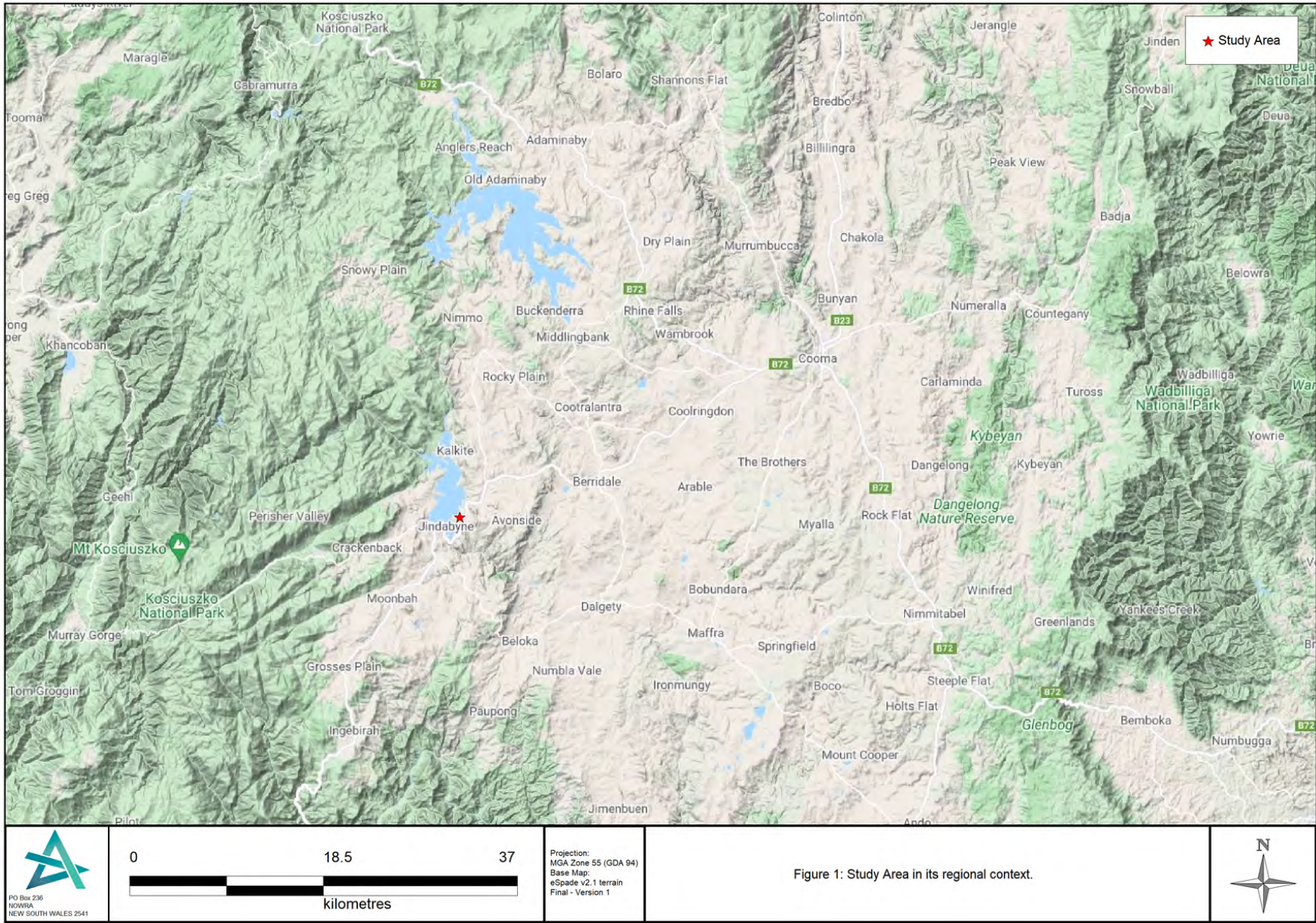






Figure 2: Section 1.1 – Tyrolean Village to Kunama Estate & Rainbow Beach



Figure 3: Section 1.2 – Cobbon Crescent to dam wall



Figure 4: Section 2.1 – Kunama Estate & Rainbow Beach to East Jindabyne



Figure 5: Section 5.1 – Banjo Patterson Park to Cobbon Crescent





## 1.2 PREVIOUS ASSESSMENTS

There have been a number of previous archaeological assessments for the broader area focusing on property and infrastructure development. These will feed into the current assessment and assist in informing the overall project and assessment process.

## 1.3 PURPOSE OF CONSULTATION

In accordance with the ACHCRs, the purpose of consultation with Aboriginal people and organisations is to:

- Understand Aboriginal people's views and concerns about the proposed project;
- Understand the Aboriginal cultural heritage values present within the area;
- Assist in gathering relevant information about the cultural significance and values of the area;
- Consider cultural and scientific significance and values as part of the design of the cultural heritage assessment methodology;
- Assist in developing cultural heritage management options and recommendations for the area; and
- To assist Heritage NSW in their consideration and determination of any AHIP application that may be required.

Please note, Section 3.4 of the ACHCRs states the following:

*The consultation process involves getting the views of, and information from, Aboriginal people and reporting on these. It is not to be confused with other field assessment processes involved in preparing a proposal and an application. Consultation does not include the employment of Aboriginal people to assist in field assessment and/or site monitoring. Aboriginal people may provide services to proponents through a contractual arrangement however, this is separate from consultation...The proponent is not obligated to employ those Aboriginal people registered for consultation. Consultation as per these requirements will continue irrespective of potential or actual employment opportunities for Aboriginal people.*

Reasonable costs will be pre-determined by Council and the relevant parties and paid by the proponent to any Aboriginal people engaged to assist with site inspections or other activities which may be required, such as survey or test/salvage excavation. However, these activities are separate to the consultation process and do not form part of the process itself. Any fees payable will be agreed upon in writing prior to the commencement of paid activities.



## 2.0 PROJECT INFORMATION

### 2.1 THE TRAIL NETWORK

The proposed trails for the project would comprise formed dirt tracks to allow safe access for all users of the tracks. It is proposed to upgrade some sections of existing trail, and create new trail within other sections. In general, trails are narrow, and are typically no more than 50cm to 1m wide. As such, the trails are minimally invasive to the surrounding area. The trail network would be used by a variety of people, including bush walkers, runners, and mountain bike riders.

Assessment of other stages of the project has been completed by other archaeological consultants, and some areas of Potential Archaeological Deposit (PAD) have been identified which are likely to extend into the current study area. As such, these are proposed to be investigated as part of this assessment.

### 2.2 COVID POLICIES

Apex Archaeology takes the safety of our staff and the wider community very seriously. All recommendations from both the NSW Government and NSW Health will be implemented as necessary, including social distancing, wearing of masks, limiting the number of participants in meetings, ensuring adequate locations for meetings are selected if they should occur, and any other restrictions that may be implemented. As such, we are encouraging communications via phone, email, post, or video conferencing as appropriate.



### 3.0 CULTURAL HERITAGE ASSESSMENT

Apex Archaeology recognises that “Aboriginal people are the primary determinants of the cultural significance of their heritage” (DECCW 2010). As such, Apex Archaeology will undertake consultation with the Aboriginal community to provide an opportunity for cultural knowledge relating to the study area to be recorded and included in the ACHA.

#### 3.1 FULL ASSESSMENT

A full assessment would comprise production of an Aboriginal Cultural Heritage Assessment Report (ACHAR) to meet the ACHCRs and the Code of Practice requirements.

The ACHAR would outline the results of the Aboriginal community consultation as well as the results of the Aboriginal archaeological assessment of the study area. The report would be prepared in order to support the AHIP application. The ACHCRs and the Code of Practice are complementary and work with each other to allow a comprehensive assessment of Aboriginal cultural heritage within an area.

#### 3.2 THE ACHCRs

The *Aboriginal cultural heritage consultation requirements for proponents* (ACHCRs) detail how consultation with the Aboriginal community is to be undertaken in order to assess the cultural significance of an area. There are four stages, as detailed below. Each stage has statutory timeframes associated to ensure sufficient time is allowed for registered Aboriginal parties (RAPs) to provide an appropriate response.

##### STAGE 1: NOTIFICATION OF PROJECT PROPOSAL AND REGISTRATION OF INTEREST

Stage 1 requires a list of Aboriginal people who may have cultural knowledge relevant to the area to be prepared from several sources of information. The first step requires enquiries to be made of certain statutory bodies regarding whether they are aware of Aboriginal people or organisations that may have an interest in the study area, and their contact details. Any Aboriginal people or organisations identified in this step must be contacted and invited to register an interest in the project. In addition, a notification must be placed in local print media requesting Aboriginal people or organisations to register their interest in the project. A list of those who register an interest must be compiled. A minimum of 14 days from the date of the letter or newspaper advertisement must be allowed for registrations of interest.

Initial letters were sent to statutory bodies on 8/3/2022. An advertisement was placed in the public notices section of the *Monaro Post* on 22/3/2022. Invitations for registrations of interest were sent to identified organisations and individuals on 25/3/2022, with registrations of interest accepted until 8/4/2022.



During this stage, it was noted that the study area was located within Ngarigo tribal lands, and potential stakeholders were encouraged to consider whether it was culturally appropriate for them to be consulted as part of this project. Two potential stakeholders declined the invitation as they represent Ngunawal people, which is outside the Ngarigo boundaries.

This stage has been completed for this project and a total of eight Aboriginal stakeholders have registered an interest in being consulted for the project.

#### **STAGE 2: PRESENTATION OF INFORMATION ABOUT THE PROPOSED PROJECT**

During Stage 2, information about the proposed project is provided to the RAPs, including location, scale, proposed development plans, timeframes, methodologies and any other relevant details relating to the project.

#### **STAGE 3: GATHERING INFORMATION ABOUT CULTURAL SIGNIFICANCE OF THE PROJECT**

During Stage 3, RAPs are invited to share information about the cultural significance of the study area, which can assist in the assessment of the cultural significance of the Aboriginal objects and/or places within the study area. The cultural heritage assessment informs and integrates with the scientific assessment of significance and therefore can assist in the development of mitigation and management measures for the project. Any feedback must be considered and implemented as appropriate into the methodology.

***In this instance Apex Archaeology is providing this document to all RAPs for this project in fulfilment of Stage 2 and 3 of the Consultation Guidelines.***

#### **STAGE 4: REVIEW OF DRAFT CULTURAL HERITAGE ASSESSMENT REPORT**

Stage 4 sees the preparation of the draft ACHA Report, which details the results of the cultural heritage assessment. The draft is provided to the RAPs for their review and comment. A minimum of 28 days to comment on the ACHAR must be allowed. All comments must be addressed in the final document and the proponent's response to RAP comments must be included. Copies of any submissions received from RAPs must be included in the final ACHAR.

### **3.3 THE CODE OF PRACTICE**

The Code of Practice provides a guideline for undertaking the archaeological and scientific assessment of Aboriginal archaeological sites within NSW. There are a number of requirements to be followed which will enable an assessment of the nature and extent of any archaeological deposits within the study area.

Previous archaeological work within an area can provide important information about the archaeological context of an area which can be used in the development of a predictive model for the specific study area, along with the ethnohistorical context of a study area. Sources of information include previous archaeological assessment reports and searches of the Aboriginal Heritage Information



Management System (AHIMS), and the results will be included in the ACHAR prepared for the project.

An understanding of the landscape context in which a study area is located can assist in the assessment of the likelihood of archaeological material being preserved (if present), and if it is likely to be present, how well it may have been preserved. It can also assist in predicting how Aboriginal people may have used the area in the past and therefore how any archaeological material may have been distributed across the landscape. A number of factors must be included, such as past land use, landforms present, geomorphic activity within the study area, any erosion, types of soils present and natural resources within the area.

Based on the information identified during the above process, a predictive model of Aboriginal land use of the area will be developed, which considers how archaeological evidence may have been distributed across the landscape. This predictive model will include an assessment of how and why Aboriginal people may have utilised the area in the past (for example, for subsistence activities, camping, ceremonial purposes, etc) and will consider both the spatial and temporal relationships of archaeological sites. Statements about the archaeological potential of specific areas within the study area will be made and presented in the ACHAR.

### 3.4 RAP INPUT

If comments are received from RAPs stating that an alternative method would be preferred for any of the following sections, these will be considered and alternatives may be proposed, with this document updated to reflect the amendments.

RAPs are under no obligation to share any cultural knowledge that they do not wish to share. It should be noted that our ultimate goal is to protect and avoid any known sites of archaeological and/or cultural significance, and if we do not know the location of these, we cannot ensure they are avoided.



## 4.0 DETAILED METHODOLOGY

Apex Archaeology has prepared detailed methodologies for the assessment of cultural significance and field survey. Methodologies for preparation of test pit locations, manual excavation of test pits, additional salvage and recording of test pits have been included in appendices.

### 4.1 CULTURAL SIGNIFICANCE

In order to gather information about the cultural significance of the study area, the following procedures will be followed for the project:

Aboriginal people who have registered an interest in being consulted for the project (registered Aboriginal parties – RAPs) may have an opportunity to visit the site and discuss the impacts that have already occurred within the site, and what is proposed as part of the development. During this visit, RAPs may have an opportunity to discuss any cultural knowledge that they may have regarding the site, should they wish to disclose such. RAPs would also have the opportunity to share knowledge either in writing or via telephone if they prefer. Additionally, requests for cultural knowledge may be made in writing.

Wherever possible, we prefer to communicate in writing, generally via email if possible. This is for a number of reasons, as follows:

- It ensures all information shared is recorded appropriately, which can be missed in phone conversations.
- It ensures all participants in consultation are able to provide a measured and considered response, rather than being 'put on the spot' by a phone call, and thus all participants can respond at their leisure within the consultation timeframes.
- It ensures consultation can be undertaken in an appropriately civil manner by all participants.

Any cultural knowledge provided by the RAPs will be treated in the manner determined by the RAPs. Any requests for knowledge to be kept confidential or restricted in terms of who may access the information would be respected. Electronic documents would be password protected where necessary to protect the integrity of the information. Information would only be included in reports where permission to include such is given.

Should you prefer to be consulted in a manner other than in writing (email or letter), please advise as a response to this document and advise your preferred manner of consultation.



#### 4.2 FIELD SURVEY

The field survey will be completed in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, September 2010) (the Code of Practice); and the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011) and *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants* (May 2011). The field survey is not intended to be an opportunity for gathering information regarding the cultural significance of the area, but rather is a scientific inspection of the area to determine if other cultural material may be present, and in turn assist the design refinement phase of the project to ensure Aboriginal sites are avoided where possible.

Appendix A outlines how the survey will be undertaken. The entirety of the proposed trail routes would be walked by archaeologists with experience in identifying archaeological sites. RAPs may be invited by Council to assist in the archaeological assessment of the area. Any remuneration for assistance during the survey phase would be discussed and agreed to in writing prior to the commencement of works.

#### 4.3 FURTHER ASSESSMENT

Under the Code of Practice, any archaeological deposits must have their nature and extent understood prior to making management decisions regarding the site, where the site is unable to be avoided. **The ultimate goal of this project is to avoid archaeological and cultural sites** wherever possible. However, there may be some sites that may not be able to be avoided by the proposal. In this event, there may be a need for further investigation to confirm the nature and extent of these sites through test excavation. In the event that test excavation is required within specific areas, a methodology for how test excavation would be undertaken is included in Appendix B. It is acknowledged that test excavation cannot be undertaken in specific situations, such as within rock shelters, and in the event this is required, an application for an Aboriginal Heritage Impact Permit (AHIP) or an approved Aboriginal Cultural Heritage Management Plan (ACHMP) would be required, depending on the project approval pathway. RAP input into either option would be sought.





## 5.0 INFORMATION SOUGHT

As required by Section 4.3 of the ACHCRs, Apex Archaeology sought the following information from all RAPs:

- feedback on the proposed methodology outlined above;
- any protocols that you would like adopted during this project to obtain and/or use cultural information;
- any Aboriginal objects of cultural significance and/or importance that you are aware of within the study area;
- any places of cultural significance and/or importance that you are aware of within the study area;
- your preference for the management of any archaeological material recovered during works (ie community repatriation, reburial on site, deposition with appropriate museum) in the event this is required;
- guidance on the protocols, sensitivity, use and/or distribution of any cultural information that you provide Apex Archaeology; and
- whether you require any further information on the project.

Comments were accepted until CoB Wednesday 11 May 2022. Three responses were received from the RAPs. All were supportive of the proposed methodology and no amendments or alterations were suggested or requested.



## 6.0 REFERENCES

DECCW 2010. *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. DECCW, Sydney South.

DECCW 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. DECCW, Sydney South.

DECCW 2010. *Aboriginal cultural heritage consultation requirements for proponents 2010*. DECCW, Sydney South.

OEH 2011. *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*. OEH, Sydney South.

Orton, C, 2000. *Cambridge Manuals in Archaeology: Sampling in Archaeology*. Cambridge University Press, Cambridge.



## APPENDIX A: DETAILED SURVEY METHODOLOGY

The survey will be undertaken in accordance with the following:

- The study area will be visually inspected by pedestrian survey;
- If stone artefacts are identified on the ground, each item will have a flag placed at its location and removed once recording is complete;
- The archaeologist will record each item as per the lithic site recording form and lithic item recording form detailed below;
- The study area will be recorded utilising survey recording forms. The following is a list of attributes that will be recorded for each area surveyed:
  - Survey area;
  - Recorder name;
  - Date;
  - Landform element;
  - Slope;
  - Distance to watercourse;
  - Vegetation;
  - Land surface;
  - Rock outcrops;
  - Detection limiting factors; and
  - Ground disturbance.
- The study area will be divided into survey units based on landform and given ratings in the following categories:
  - Survey area (as defined by the length of area surveyed multiplied by two. A participant in this instance can only see 1m either side at a time. Survey area covered increases when more participants are added);
  - Total area surveyed;
  - Percentage of sample inspected;
  - Archaeological visibility (this is a percentage of potential within the landform);
  - Surface visibility;
  - Exposure type; and
  - Effective survey coverage
- Photos of each survey unit will be taken and identifying photograph file numbers recorded on the survey recording forms.
- Aboriginal lithic site recording forms will be used to record artefact scatters and isolated finds. The following list of attributes will be recorded for each site:
  - Site Number;
  - Survey Area;
  - Date;
  - Recorder name;
  - Total number of artefacts recorded;
  - Visible extent of artefacts;
  - Extent of surface exposure;
  - GPS reading;
  - Sub-surface potential;
  - Research potential;
  - Raw stone material available;



- Ground Disturbance;
- Vegetation;
- Photographs of site; and
- Site plan.
- Each artefact will be recorded using a lithic item recording form with the following attributes recorded:
  - Artefact number;
  - Locus;
  - Colour;
  - Stone material;
  - Lithic item type;
  - Length, Width & Thickness (mm);
  - Cortex Percentage;
  - Cortex type; and
  - Comments.



## APPENDIX B: TEST EXCAVATION METHODOLOGY

The following methodology would be implemented in the event test excavations are required:

### TEST PIT LAYOUT

- Test pits will be spaced in an appropriate manner relating to the area to be sampled, considering the focussed and discrete potential impact of the trail network;
- Test pits will be oriented north – south using a handheld compass for accuracy;
- Test pits will avoid areas clearly disturbed;
- The location of the north west corner of the first test pit will be recorded by GPS, and following pits will be tied into the transect using the distance and bearing technique;
- Each test pit will have a flag placed in the north-west corner with the test square number in sequence and Easting and Northing of its location written on it, taken from the GPS coordinate for the initial pit and extrapolated based on the location of the pit in relation to the initial pit; and
- Each test pit will be planned to scale using 1mm grid paper (additional landscape features including trees, fence lines, creeks and contour lines will also be added).

### EXCAVATION METHODOLOGY

- Test pits will be 50 x 50cm;
- Initial test pits for each transect will be excavated in 5cm spits by hand using a shovel, mattock and trowel. Spit depths will be consistently checked with a hand tape measure to ensure accuracy of excavation depth. Once the first test pit has been excavated and an understanding of the stratigraphy has been obtained, following test pits for that transect will be excavated either stratigraphically, or in 5cm or 10cm depending on the nature of the deposit, at the discretion of the archaeologist;
- Test pit excavation will cease on reaching basal clay, bedrock or a culturally sterile layer, or at the discretion of the archaeologist (for example, if the deposit becomes too deep to allow excavation to continue safely);
- Test pits may be combined to form 1m<sup>2</sup> squares by digging four contiguous 50 x 50 cm test pits;
- If artefact concentrations warrant further expansion (five or more artefacts in one 1m<sup>2</sup> test pit) continuation of 1m<sup>2</sup> test pits into a 3m<sup>2</sup> open area may also be necessary should artefact concentrations warrant further investigation (this is the maximum open area allowed for under the Code of Practice). If artefact concentrations are still high once a 3m<sup>2</sup> area has been excavated then this area would be prioritised for salvage under an AHIP;
- If cultural features (e.g. knapping floors) are identified during excavation, excavation with hand tools (e.g. mattock and shovel) will cease and continue with trowel only;
- Locations of identified features will be planned onto 1mm graph paper. X, Y and Z coordinates of individual artefacts from in-situ knapping floors will be recorded prior to removal (where possible) and continuation of excavation;



- The soil from each spit will be placed in 10L plastic buckets and transported to the sieving station;
- To ensure sufficient control of each spit excavated, a bag and tag will be written to accompany the buckets from each spit. The following information will be recorded on each bag and tag: site name, date, pit location (easting & northing) and name of excavator;
- All material from each test pit will be wet sieved through table sieves (1 x 1m) with a wire mesh aperture gauge of 3mm and 5mm depending on the soil matrix;
- All material recovered from the sieving process will be checked by a qualified archaeologist with experience in artefact identification prior to being placed into the spit bag; and
- Artefact counts will be recorded for each spit.

#### RECORDING

- Each spit will be recorded on a spit sheet with the following information:
  - site name;
  - date;
  - excavator name;
  - spit number;
  - spit depth;
  - pit location (easting & northing);
  - start levels & end levels;
  - bucket count and end total bucket count;
  - soil description;
  - description of disturbance;
  - description of artefacts (material type & artefact type if in situ);
  - in situ recording of artefacts where possible (xyz coordinates); and
  - photograph details (from surface and of each spit to base).

#### ARTEFACTS

Any artefacts that are recovered from the test excavation will be analysed by an archaeologist experienced in artefact analysis and interpretation. At the conclusion of the project all artefacts will be reburied on site at a location determined in consultation with the RAPs and the client, in accordance with Requirement 26 of the Code of Practice. Artefacts will be temporarily held at Apex Archaeology's office during the analysis and stored in a lockable safe. Once the artefacts are reburied the location will be recorded and provided to AHIMS.

#### BACKFILL AND SALVAGE EXCAVATION

At the conclusion of the testing program, all test pits will either be backfilled (by collapsing the sides of the test pit in with a shovel or mattock, and/or filling with spoil or clean fill to return the pit to original ground level). If a test pit has yielded a significant artefact deposit requiring further salvage, then the pit will be securely banded off with wooden stakes and bunding so that expansion (open area excavation) can be undertaken more easily once approval has been issued.



## APPENDIX C: RAP CORRESPONDENCE



---

**From:** [Jenni Bate](#)  
**To:** [Undisclosed Recipients](#)  
**Bcc:** [REDACTED]  
**Subject:** Jindabyne Shared Trail Network - Project Information and Methodology  
**Date:** Wednesday, 13 April 2022 1:53:43 PM  
**Attachments:** [21127\\_JST Stage 3 Project Information and Methodology.pdf](#)

---

Good afternoon,

Thank you for your registration of interest in the above project. Please find attached additional information about the project, as well as the proposed methodology for undertaking the cultural heritage assessment, for your review and comment.

I would be grateful if you could provide any comment by Thursday 12 May 2022.

Please don't hesitate to contact me if you have any questions.

Kind regards,



*Jenni Bate*  
DIRECTOR - ARCHAEOLOGIST  
  
0422 229 179  
JENNI@APEXARCHAEOLOGY.COM.AU  
WWW.APEXARCHAEOLOGY.COM.AU

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ABN 56 625 618 993

13 April 2022

Janice Williams  
Ramsay Freeman/Snowy Mountains Indigenous Elders Group

**Re: Aboriginal Cultural Heritage Assessment –Jindabyne Shared Trails Network  
within the Snowy Monaro Local Government Area.**

Dear Janice,

Thank you for your registration of interest in the above project. Please find attached additional information about the project, as well as the proposed methodology for undertaking the cultural heritage assessment, for your review and comment.

I would be grateful if you could provide any comment by Thursday 12 May 2022.

Please don't hesitate to contact me if you have any questions.

Kind regards,

A black rectangular box redacting a handwritten signature.

Director/Archaeologist  
Apex Archaeology

E: [REDACTED]  
M: [REDACTED]



---

**From:** [Corroboree Aboriginal Corporation](#)  
**To:** [Jenni Bate](#)  
**Subject:** Re: Jindabyne Shared Trail Network - Project Information and Methodology  
**Date:** Wednesday, 20 April 2022 7:52:02 PM  
**Attachments:** [image001.jpg](#)  
[Untitled attachment 00847.htm](#)  
[21127\\_JST\\_Stage\\_3\\_Project\\_Information\\_and\\_Methodology.pdf](#)  
[Untitled attachment 00850.htm](#)


---

Hi Jenni  
We agree with project information and methodology

Kind regards  
Marilyn Carroll-Johnson  
Director  
Corroboree Aboriginal Corporation



CAC acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, sea & community. We pay our respects to them and their cultures, to the Elders past and present, and emerging.

On 13 Apr 2022, at 1:53 pm, Jenni Bate   
wrote:

Good afternoon,

Thank you for your registration of interest in the above project.  
Please find attached additional information about the project, as well as the proposed methodology for undertaking the cultural heritage assessment, for your review and comment.

I would be grateful if you could provide any comment by Thursday 12 May 2022.

Please don't hesitate to contact me if you have any questions.

Kind regards,

---

**From:** [lilly carroll](#)  
**To:** [Jenni Bate](#)  
**Subject:** Re: Jindabyne Shared Trail Network - Project Information and Methodology  
**Date:** Thursday, 14 April 2022 12:07:56 PM

---

Hi Jenni

I have Reviewed this methodology and is happy with everything

[Sent from Yahoo Mail for iPhone](#)

On Wednesday, April 13, 2022, 1:53 pm, Jenni Bate [REDACTED] wrote:

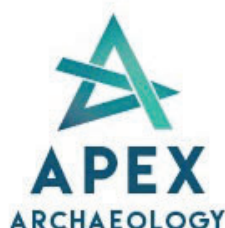
Good afternoon,

Thank you for your registration of interest in the above project. Please find attached additional information about the project, as well as the proposed methodology for undertaking the cultural heritage assessment, for your review and comment.

I would be grateful if you could provide any comment by Thursday 12 May 2022.

Please don't hesitate to contact me if you have any questions.

Kind regards,



*Jenni Bate*  
DIRECTOR - ARCHAEOLOGIST  
0422 229 179  
[JENNI@APEXARCHAEOLOGY.COM.AU](mailto:JENNI@APEXARCHAEOLOGY.COM.AU)  
[WWW.APEXARCHAEOLOGY.COM.AU](http://WWW.APEXARCHAEOLOGY.COM.AU)

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---

**From:** [Shayne Dickson](#)  
**To:** [Jenni Bate](#)  
**Subject:** Re: Jindabyne Shared Trail Network - Project Information and Methodology  
**Date:** Monday, 18 April 2022 7:54:47 AM

---

Good morning Jenni,

Gunjeewong is happy with the proposed methodology provided.

Kind Regards  
Shayne Dickson  
[REDACTED]

---

**From:** Jenni Bate [REDACTED]  
**Sent:** Wednesday, 13 April 2022 1:53 PM  
**To:** Undisclosed Recipients [REDACTED]  
**Subject:** Jindabyne Shared Trail Network - Project Information and Methodology

Good afternoon,

Thank you for your registration of interest in the above project. Please find attached additional information about the project, as well as the proposed methodology for undertaking the cultural heritage assessment, for your review and comment.

I would be grateful if you could provide any comment by Thursday 12 May 2022.

Please don't hesitate to contact me if you have any questions.

Kind regards,



*Jenni Bate*  
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## **APPENDIX F: DRAFT REPORT EMAILS AND RESPONSES**

---

**From:** [Jenni Bate](#)  
**To:** [Undisclosed Recipients](#)  
**Bcc:** [REDACTED]  
**Subject:** Jindabyne Shared Trails - draft ACHA  
**Date:** Monday, 6 March 2023 12:41:30 PM  
**Attachments:** [21127 JST Draft ACHA.pdf](#)  
[21127 JST Draft AR.pdf](#)

---

Good afternoon,

I hope you are well. As required by the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010, please find attached a copy of the draft ACHA and ATR reports for your review and comment.

We have aimed to protect sites wherever possible and to prevent further impact occurring from the proposed upgrade/formalisation of the existing trails.

I look forward to receiving any comments you may have by CoB Monday 3 April 2023. Please don't hesitate to get in touch if you have any questions or comments.

Kind regards,



*Jenni Bate*  
DIRECTOR - ARCHAEOLOGIST

0422 229 179

[JENNI@APEXARCHAEOLOGY.COM.AU](mailto:JENNI@APEXARCHAEOLOGY.COM.AU)

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ABN 56 625 618 993

6 March 2023

Janice Williams  
Ramsay Freeman/Snowy Mountains Indigenous Elders Group

**Re: Aboriginal Cultural Heritage Assessment –Jindabyne Shared Trails Network  
within the Snowy Monaro Local Government Area.**

Dear Janice,

Thank you again for your registration of interest in the above project. Please find enclosed copies of the draft reports, for your review and comment.

I would be grateful if you could provide any comment by Monday 3 April 2023.

Please don't hesitate to contact me if you have any questions.

Kind regards,

Director/Archaeologist  
Apex Archaeology

E: [redacted]  
[redacted]



**From:** [Steven Johnson](#)  
**To:** [Jenni Bate](#)  
**Subject:** Re: Jindabyne Shared Trails - draft ACHA  
**Date:** Friday, 24 March 2023 8:32:28 PM

---

Hi Jenni  
We agree with draft

Sincerely  
Steve J  
Aboriginal Heritage Custodian



*We respectfully acknowledge the Traditional Owners of the lands upon which we work and pay our deep respect to Elders past, present and emerging.*

On Monday, March 6, 2023, 12:43 pm, Jenni Bate  wrote:

Good afternoon,

I hope you are well. As required by the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, please find attached a copy of the draft ACHA and ATR reports for your review and comment.

We have aimed to protect sites wherever possible and to prevent further impact occurring from the proposed upgrade/formalisation of the existing trails.

I look forward to receiving any comments you may have by CoB Monday 3 April 2023. Please don't hesitate to get in touch if you have any questions or comments.

Kind regards,



*Jenni Bate*  
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## APPENDIX G: CONSULTATION UPDATES

---

**From:** [Jenni Bate](#)  
**To:** [Undisclosed Recipients](#)  
**Bcc:** [Leanne Atkinson](#) | [Bega LALC](#); [john dixon](#); [Shayne Dickson](#); [lilly carroll](#); [Marilyn Carroll-Johnson](#); [mariawilliams2794@gmail.com](#); [Steven Johnson](#)  
**Subject:** Jindabyne Shared Trail Network - Project Information and Methodology  
**Date:** Friday, 10 June 2022 2:35:23 PM  
**Attachments:** [21127 Test Excavation Layout.pdf](#)

---

Good afternoon,

Thank you again for your registration of interest in the above project. The survey for the Jindabyne Shared Trails project was recently completed and two areas were identified as requiring test excavation to determine if cultural deposits are present and if they can be avoided by the proposed works. These areas are shown on the attached figure, within two previously registered sites, 62-1-0124 and 62-1-0064. These test excavations will be scheduled after the winter period to allow the ground to thaw.

We will then prepare the draft ACHA report, including management recommendations, and will send that through for your review and comment in due course.

Please don't hesitate to contact me if you have any questions.

Kind regards,



*Jenni Bate*  
DIRECTOR - ARCHAEOLOGIST  
0422 229 179  
[JENNI@APEXARCHAEOLOGY.COM.AU](mailto:jenni@apexarchaeology.com.au)  
[WWW.APEXARCHAEOLOGY.COM.AU](http://www.apexarchaeology.com.au)

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10 June 2022

Janice Williams  
Ramsay Freeman/Snowy Mountains Indigenous Elders Group

**Re: Aboriginal Cultural Heritage Assessment –Jindabyne Shared Trails Network  
within the Snowy Monaro Local Government Area.**

Dear Janice,

Thank you again for your registration of interest in the above project. The survey for the Jindabyne Shared Trails project was recently completed and two areas were identified as requiring test excavation to determine if cultural deposits are present and if they can be avoided by the proposed works. These areas are shown on the attached figure, within two previously registered sites, 62-1-0124 and 62-1-0064. These test excavations will be scheduled after the winter period to allow the ground to thaw.

We will then prepare the draft ACHA report, including management recommendations, and will send that through for your review and comment in due course.

Please don't hesitate to contact me if you have any questions.

Kind regards,



Director/Archaeologist  
Apex Archaeology





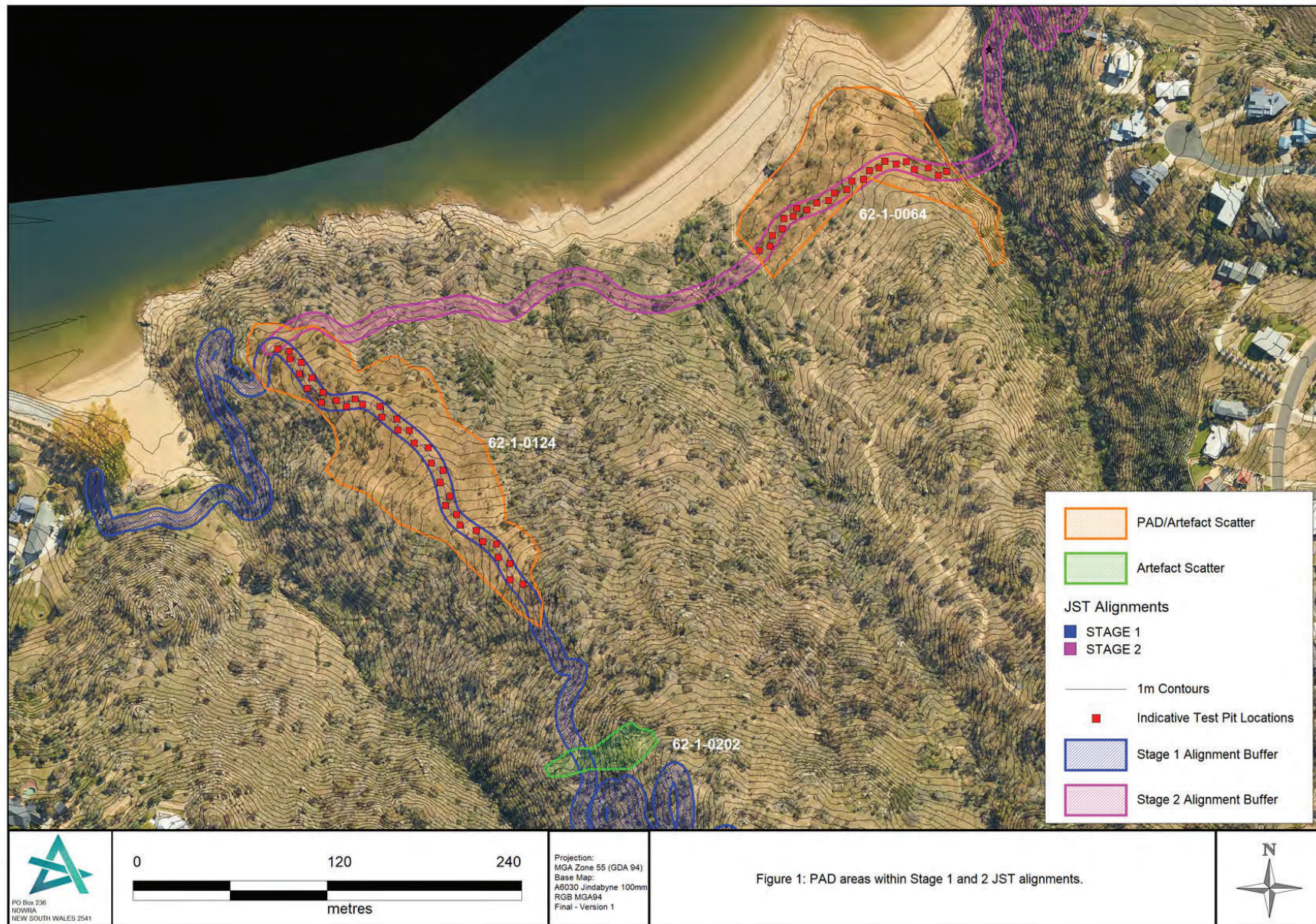


Figure 1: PAD areas within Stage 1 and 2 JST alignments.



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ABN 56 625 618 993

10 June 2022

Janice Williams  
Ramsay Freeman/Snowy Mountains Indigenous Elders Group

**Re: Aboriginal Cultural Heritage Assessment –Jindabyne Shared Trails Network  
within the Snowy Monaro Local Government Area.**

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We will then prepare the draft ACHA report, including management recommendations, and will send that through for your review and comment in due course.

Please don't hesitate to contact me if you have any questions.

Kind regards,

Director/Archaeologist  
Apex Archaeology





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**Subject:** Jindabyne Shared Trail Network - Project Update  
**Date:** Tuesday, 29 November 2022 3:14:58 PM  
**Attachments:** [image001.png](#)

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Good afternoon,

I hope you're well. This is a brief update regarding the above project to keep you informed regarding its progress. The project has been delayed due to unfavourable weather conditions during the year. We will be in touch as soon as we have more information.

In the meantime, please don't hesitate to contact me if you have any questions.

We wish you and your families a safe and happy holiday season.

Kind regards,



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Apex Archaeology wishes everyone a safe and restful holiday season. We will be closed from CoB 21 December 2022 and will reopen 9 January 2023.



## APPENDIX H: ARCHAEOLOGICAL REPORT

JINDABYNE SHARED TRAIL NETWORK, JINDABYNE, NSW

## ARCHAEOLOGICAL REPORT

Report to Stantec on behalf of  
Snowy Monaro Regional Council

LGA: Snowy Monaro

April 2023



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## EXECUTIVE SUMMARY

Apex Archaeology have been engaged to assist Stantec on behalf of Snowy Monaro Regional Council (SMRC) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of the Jindabyne Shared Trails Network. The project is located within the Snowy Monaro LGA.

This report details the results of the archaeological assessment of the site, prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). This report forms an appendix to the ACHA report prepared for the project and has been prepared to support the Development Application (DA).

The study area is located approximately 365km south west of Sydney, around the shores of Lake Jindabyne. This project includes Sections 1.1 (Tyrolean Village to Kunama Estate and Rainbow Beach), 1.2 (Cobbon Crescent to Jindabyne dam wall), 2.1 (Kunama Estate and Rainbow Beach to East Jindabyne) and 5.1 (Banjo Patterson Park to Cobbon Crescent).

Unsanctioned trail has been constructed within Sections 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these sections. New trails are also proposed within these sections.

A number of Aboriginal cultural heritage sites are known throughout the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

Survey of the trails identified that artefacts were present on several of the track surfaces and areas of Potential Archaeological Deposit (PAD) were noted along several of the trails. Options were considered for avoidance but this was not possible, so test excavation was required for these trails.

Accordingly, test excavation was undertaken within two separate areas along the trail routes within trail stages 1.1 and 2.1. A total of 15 test pits were excavated with a total of 31 lithic items recovered. This included 27 flaked artefacts, a broken manuport cobble and three other pieces of broken stone likely to have had a cultural origin. Three test pits contained high numbers of lithic items, with one containing five, another seven, and a third with eleven. Quartz was the main raw material type, likely obtained from the stony bedload of the Snowy River.

It was found that:

- A total of four previously identified Aboriginal sites were located within the study area.
- Eight newly identified sites were located within the trail alignment.
- One site is able to be avoided through realignment of the trail.



- Another site is able to be avoided through deletion and realignment of the proposed extension of the trail.
- Two areas of subsurface potential were noted which could not be avoided by the proposed trail alignment.
- Test excavation within these areas identified a relatively low density archaeological deposit with a total of 31 objects recovered.
- The remaining ten sites cannot be avoided by the proposed works.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.
- Collection of surface artefacts is recommended.

Therefore, the following recommendations have been made.

#### **RECOMMENDATION 1: APPLICATION FOR AHIP REQUIRED**

This report details the Aboriginal archaeological potential of several stages of the Jindabyne Shared Trail Network. A total of twelve previously and newly recorded sites are located within the study area. Ten of these cannot be avoided by the proposed works. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to these sites is required, and should include permission to undertake surface collection of any artefacts on the track surface within the proposed impact areas, with the items placed in a keeping place.

If the surface artefacts cannot be relocated, the AHIP should permit unmitigated impact to the site location.

#### **RECOMMENDATION 2: CONSERVATION OF SITES**

PAD outside of existing trails should be conserved and no impact should be permitted to these areas. This should be detailed in any Plan of Management (PoM) prepared for the trails.

#### **RECOMMENDATION 3: SURFACE COLLECTION**

The AHIP should permit surface collection of any artefacts visible on the surface of the existing trails prior to the commencement of upgrade or construction works. Additionally, the AHIP should permit annual surface collection of any artefacts that may wash or erode out of the berms bordering the trails within the study area.

#### **RECOMMENDATION 4: LONG TERM MANAGEMENT OF COLLECTED ARTEFACTS**

Management of collected artefacts should be in accordance with the wishes of the Aboriginal community, and in consultation with Heritage NSW. SMRC have indicated an intention to develop a permanent Keeping Place in Jindabyne, but until such time, it is recommended that artefacts be stored at the Jindabyne Library, which is operated by SMRC and has capacity to care for items until such time as they can be transferred to a Keeping Place. Heritage NSW should be advised of any transferral of artefacts to a Keeping Place once established.



**RECOMMENDATION 5: PREPARATION OF MANAGEMENT PLAN**

As part of the wider Jindabyne Shared Trail Network program of works, a Plan of Management (PoM) should be developed to incorporate and consolidate all archaeological work undertaken within the trail network, so as to streamline management processes and ensure Aboriginal cultural heritage within and adjacent to the trail network footprint is respected, preserved and managed appropriately. The PoM should be developed in consultation with the Aboriginal community.

**RECOMMENDATION 6: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION**

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

**RECOMMENDATION 7: STUDY AREA BOUNDARIES**

The proposed works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present.

**RECOMMENDATION 8: STOP WORK PROVISION**

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) developed for the site.



**RECOMMENDATION 9: REPORTING**

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.





Apex Archaeology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and in whose land this assessment took place, and to the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.

## DOCUMENT CONTROL

The following register documents the development and issue of the document entitled 'Jindabyne Shared Trail Network, Jindabyne, NSW: Archaeological Report', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Comment	Issue Date
1 – Draft	Jenni Bate	Leigh Bate	Issue for client review	29 January 2023
2 – Draft	Jenni Bate	Stantec/SMRC	Issue for RAP review	6 March 2023
3 – Final	Jenni Bate	RAPs	Issue of final	14 April 2023



## GLOSSARY OF TERMS

<b>Aboriginal Object</b>	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
<b>ACHA</b>	Aboriginal Cultural Heritage Assessment
<b>ACHAR</b>	Aboriginal Cultural Heritage Assessment Report
<b>ACHCRs</b>	<i>Aboriginal cultural heritage consultation requirements for proponents 2010</i>
<b>AHIMS</b>	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
<b>AHIP</b>	Aboriginal Heritage Impact Permit
<b>AR</b>	Archaeological report
<b>ASIRF</b>	Aboriginal Site Impact Recording Form
<b>BP</b>	Before Present, defined as before 1 January 1950.
<b>Code of Practice</b>	The DECCW September 2010 <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i>
<b>Consultation</b>	Aboriginal community consultation in accordance with the DECCW April 2010 <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> .
<b>DA</b>	Development Application
<b>DECCW</b>	The Department of Environment, Climate Change and Water (now Heritage NSW)
<b>Disturbed Land</b>	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
<b>DPIE</b>	Department of Planning, Industry and Environment
<b>Due Diligence</b>	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the <i>National Parks and Wildlife Act 1974</i> and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
<b>Due Diligence Code of Practice</b>	The DECCW Sept 2010 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
<b>GIS</b>	Geographical Information Systems
<b>GSV</b>	Ground Surface Visibility
<b>Harm</b>	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
<b>Heritage NSW</b>	Heritage NSW within the Department of Premier and Cabinet; responsible for overseeing heritage matters within NSW
<b>ka</b>	Kiloannus, a unit of time equating to 1,000 years
<b>LALC</b>	Local Aboriginal Land Council
<b>LGA</b>	Local Government Area
<b>NPW Act</b>	NSW <i>National Parks and Wildlife Act 1974</i>
<b>NPWS</b>	National Parks and Wildlife Service
<b>OEH</b>	The Office of Environment and Heritage of the NSW Department of Premier and Cabinet (now Heritage NSW)
<b>PAD</b>	Potential Archaeological Deposit
<b>RAPs</b>	Registered Aboriginal Parties



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## 1.0 INTRODUCTION

Apex Archaeology have been engaged to assist Stantec on behalf of Snowy Monaro Regional Council (SMRC) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed extension of the Jindabyne Shared Trails Network. The project is located within the Snowy Monaro LGA.

This report details the results of the archaeological assessment of the site, prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (September 2010) (the Code of Practice). This report forms an appendix to the ACHA report prepared for the project and has been prepared to support the Development Application (DA).

### 1.1 PROJECT PROPONENT

The proponent for the project is Snowy Monaro Regional Council (SMRC). The SMRC representative for the project was Cherie McNair and the project manager for Stantec was Justin Warner.

### 1.2 OBJECTIVES OF THE ARCHAEOLOGICAL ASSESSMENT

The archaeological investigation was undertaken to meet the requirements of the Code of Practice.

The purpose of the archaeological investigation is to understand and establish the potential harm the proposed development may have on Aboriginal cultural heritage within the study area, both tangible and intangible.

Any development works which disturb the ground surface have the potential to impact Aboriginal archaeological deposits and therefore an assessment of whether the study area contains such deposits is required prior to the commencement of construction works. An assessment of whether the proposed development would impact these deposits (if present) is also necessary, and identification of to what extent the deposits would be impacted is also required. The degree of impact which may be allowable is determined, in part, with consideration of the level of cultural significance attributed to the cultural values of the study area, both tangible and intangible.

As such, the objectives of the assessment are to determine whether Aboriginal cultural values exist within the study area, and whether the proposed project can avoid impact to these values, or if mitigation measures may be necessary.

### 1.3 STUDY AREA AND PROJECT BRIEF

The study area is located approximately 365 km south west of Sydney, around the shores of Lake Jindabyne (Figure 1). This project includes Sections 1.1 (Tyrolean Village to Kunama Estate & Rainbow Beach, approximately 2.8km; Figure 3), 1.2 (Cobbon Cres to dam wall, approximately 2.2km; Figure 4), 2.1 (Kunama Estate & Rainbow Beach to East Jindabyne, approximately 3.7km; Figure 5), and 5.1 (Banjo



Patterson Park to Cobbon Crescent, approximately 1.4km; Figure 6).The specific study area comprised the trail alignment with a 2m corridor.

Unsanctioned trail has been constructed within Sections 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these sections. New trails are also proposed within these sections.

A number of Aboriginal cultural heritage sites are known throughout the area and an ACHA is required to determine if these sites can be avoided by the proposed works, or if mitigation measures are required prior to commencement of works on the trail.

#### 1.4 PROJECT FRAMEWORK

The Jindabyne Shared Trail has been awarded \$11.8m funding by the Regional Growth-Environment and Tourism fund through Restart NSW. The funding program provides funding for infrastructure that supports regional economic growth, creates local employment opportunities and drives growth in the visitor economy.

The project involves extension of the existing trail network, as well as improvements to the existing trail network along with supporting infrastructure such as car parking, trail heads and visitor day-use areas.

The proposed development will require a Development Application (DA) to permit the works. SMRC are the determining authority.

#### 1.5 INVESTIGATORS AND CONTRIBUTORS

This archaeological assessment was commissioned by SMRC. Apex Archaeology thanks Alannah Dickeson and Cherie McNair of SMRC for their assistance with the project, along with Justin Warner of Stantec. Thanks are also extended to the registered Aboriginal groups for their participation and assistance with the project, with particular thanks to Ron Thomas, Charles Austin and Trent McCarthy of Bega Local Aboriginal Land Council (LALC) who assisted with fieldwork.

This report has been prepared by Jenni Bate, Director and Archaeologist with Apex Archaeology. The report was reviewed by Leigh Bate, Director and Archaeologist with Apex Archaeology. Both Jenni and Leigh have over fifteen years of archaeological consulting experience within NSW. Dr Beth White prepared the lithic analysis. She has over 30 years of archaeological consulting and lithic analysis experience. Project team roles and qualifications are shown in

Table 1.

Table 1: Project team roles and qualifications

Name	Role	Qualifications
Jenni Bate	Project Manager; Report Author; Field Inspection; Review	B.Archaeology; Grad. Dip. CHM





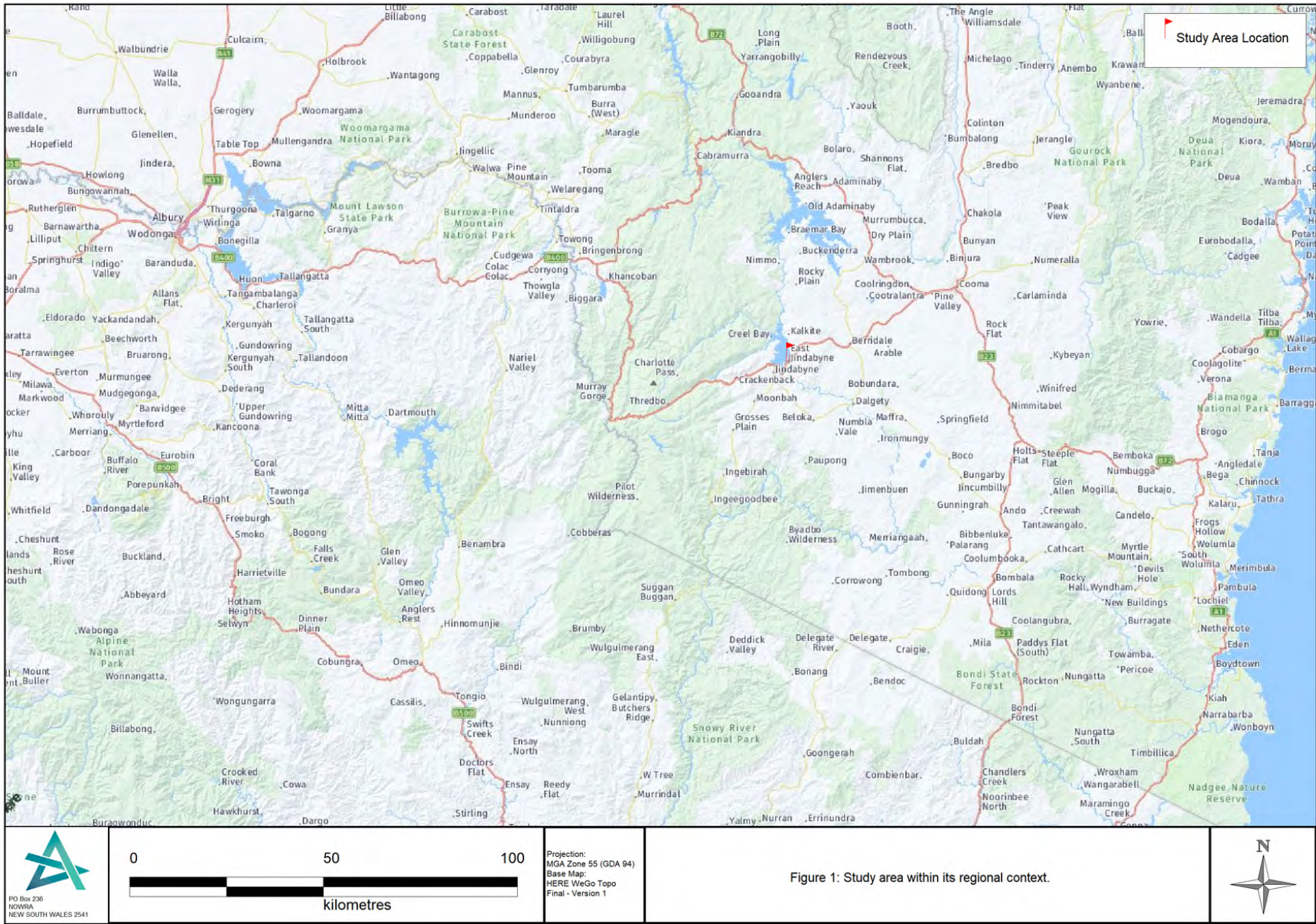
Leigh Bate	Field inspection, Report Author; Review; GIS	B.Archaeology; Grad. Dip. Arch; Dip. GIS
Dr Beth White	Lithic Analysis	BA(Hons); MPhil; PhD; MAACAI

### 1.6 LIMITATIONS

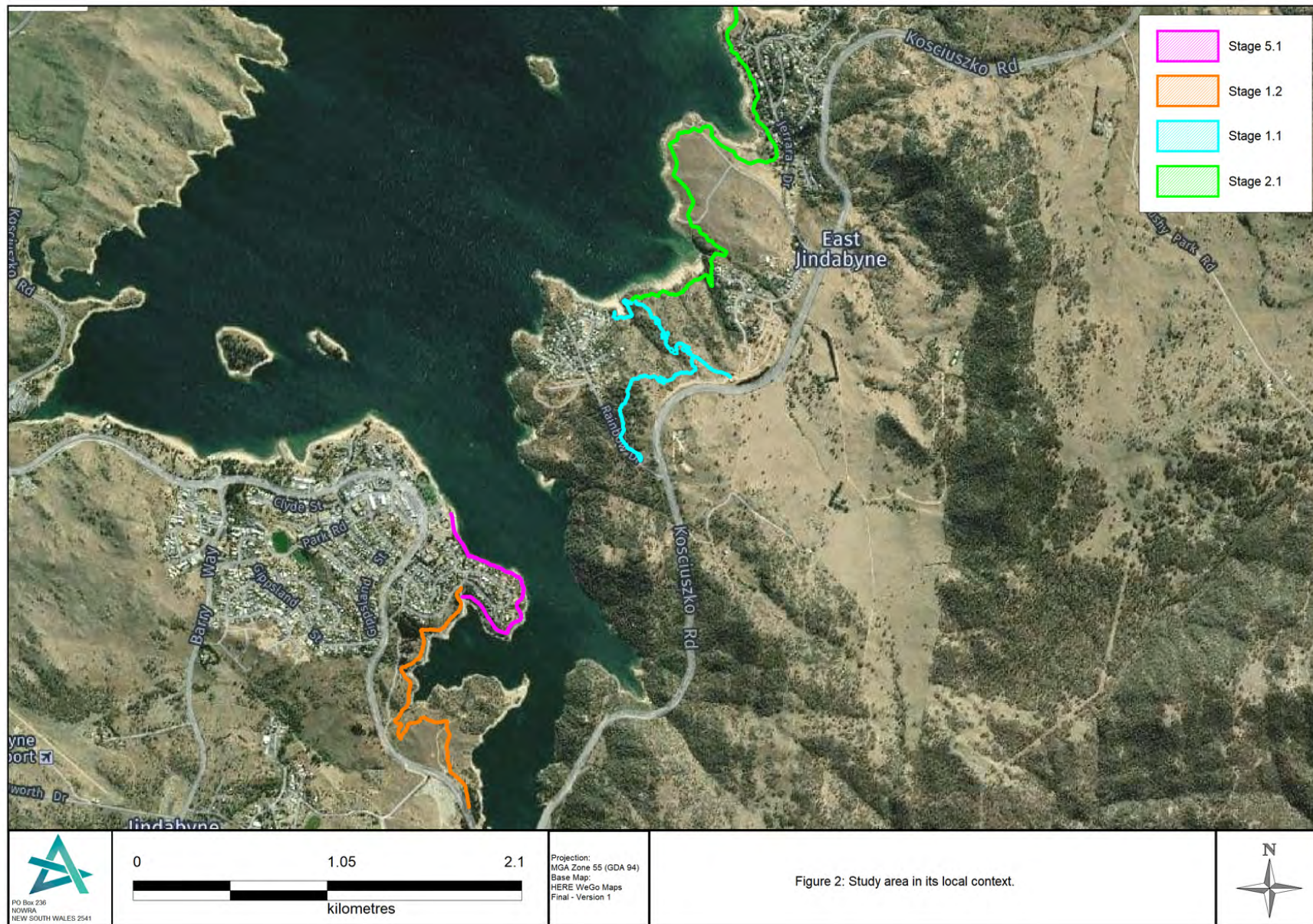
This report relies in part on previously recorded archaeological and environmental information for the wider region. This includes information from AHIMS, which is acknowledged to be occasionally inaccurate, due to inaccuracies in recording methods. No independent verification of the results of external reports has been made as part of this report.

It should be noted that AHIMS results are a record only of the sites that have been previously registered with AHIMS and are not a definitive list of all Aboriginal sites within an area, as there is potential for sites to exist within areas that have not previously been subject to archaeological assessment.

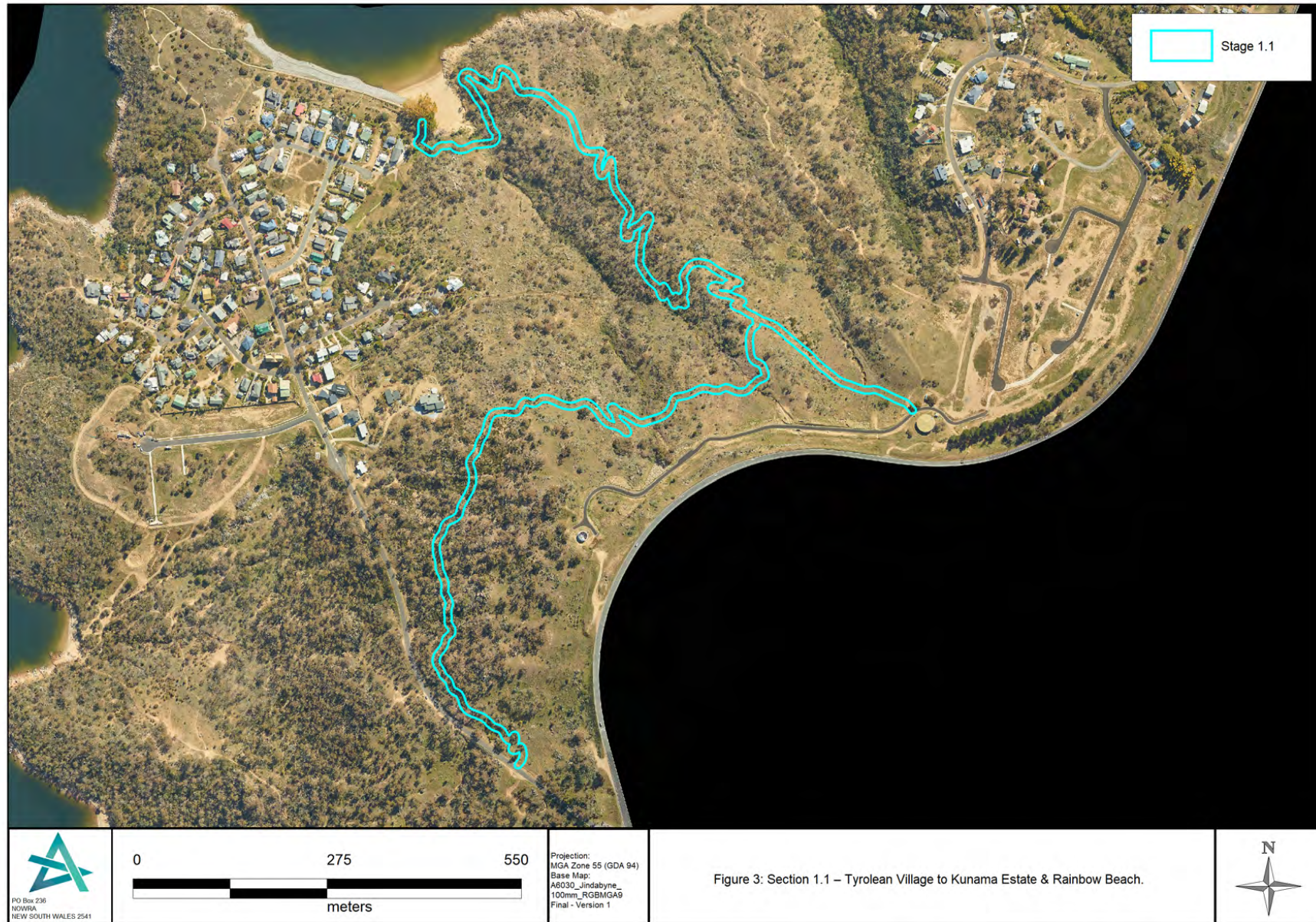
Field investigations for this report included survey and test excavation. The results are considered to be indicative of the nature and extent of Aboriginal archaeological remains within the study area, but it should be noted that further Aboriginal objects and sites which have not been identified as part of this assessment may be present within the wider area.



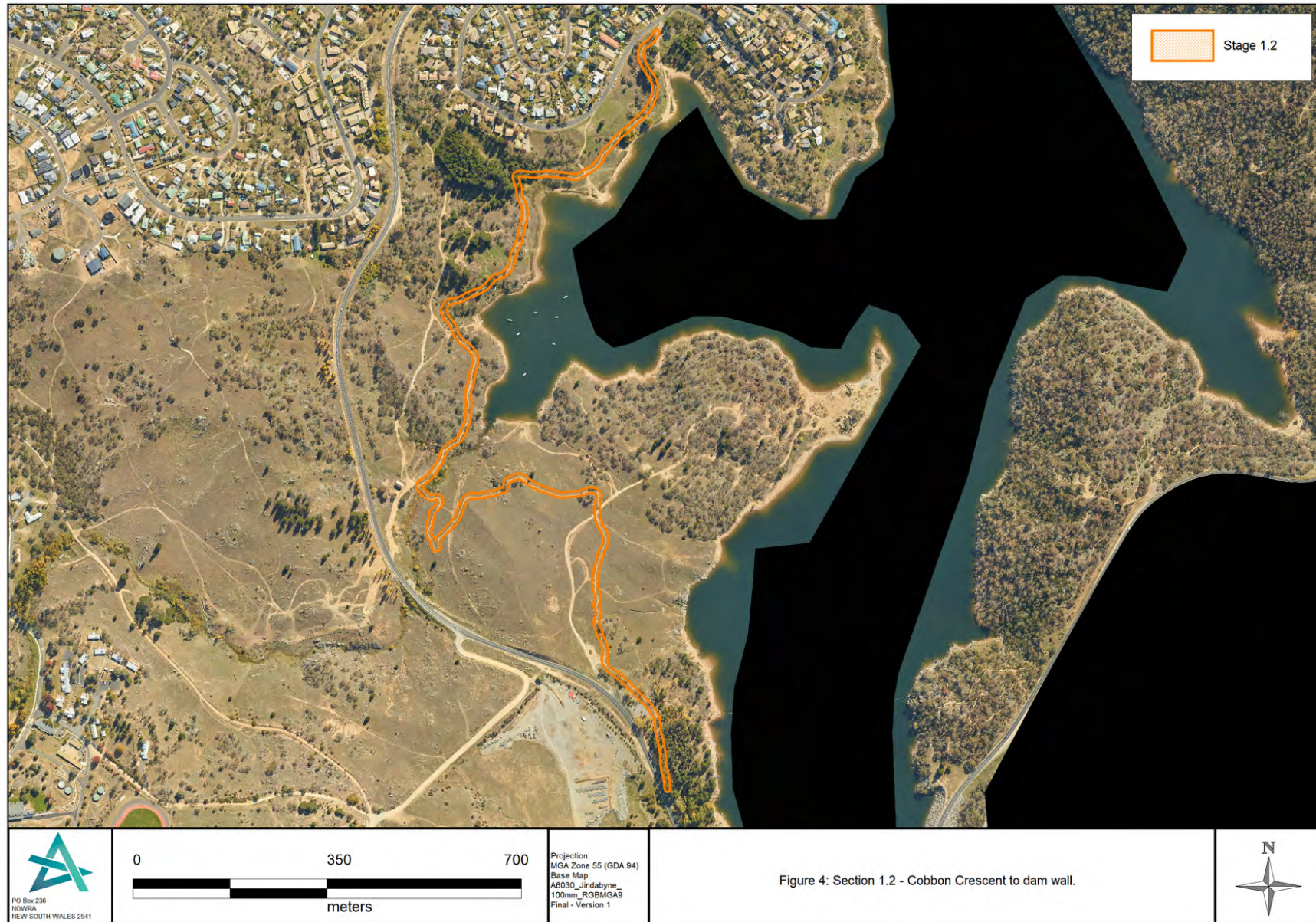








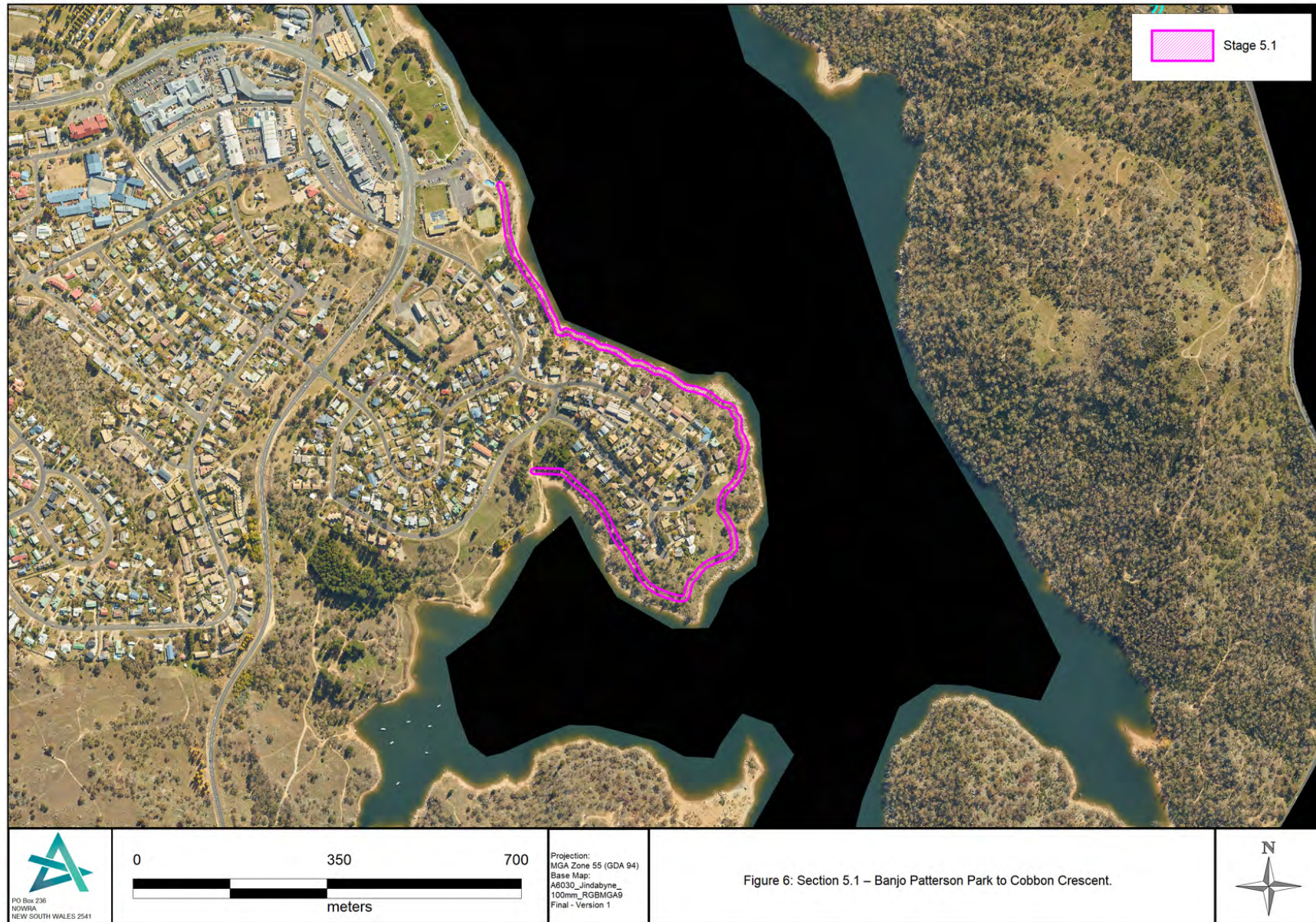
















## 2.0 STATUTORY CONTEXT

Heritage in Australia, including both Aboriginal and non-Aboriginal heritage, is protected and managed under several different Acts. The following section presents a summary of the applicable Acts which provide protection to cultural heritage within NSW.

### 2.1 COMMONWEALTH LEGISLATION

#### 2.1.1 ABORIGINAL AND TORRES STRAIT ISLANDER HERITAGE PROTECTION ACT 1984

This Act provides for the preservation and protection of injury and/or desecration of areas and objects in Australia and its waters that are of significance to Aboriginal people, in accordance with Aboriginal tradition.

Under this Act, the responsible Minister has provision to make both temporary and/or long-term declarations, in order to provide protection to areas and objects which are at threat of injury or desecration. In some instances, this Act can override State or Territory provisions, or be invoked if State or Territory provisions are not enforced. An Aboriginal or Torres Strait Islander individual or organisation must invoke the Act.

No items within the study area are listed or protected under this Act.

#### 2.1.2 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act provides protection to environmental sites of national significance, including places with cultural heritage values that contribute to Australia's national identity. The Act aims to respect the role of Indigenous peoples in the conservation and ecologically sustainable use of Australia's biodiversity, and to enhance the protection and management of important natural and cultural places. Additionally, the Act is designed to promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

The National Heritage List provides a listing of natural, historic and Indigenous places of outstanding significance to the nation, while the Commonwealth Heritage List details the Indigenous, historic and natural places owned or controlled by the Australian Government.

Under the EPBC Act, approvals are required if any action is proposed that will have (or is likely to have) a significant impact on the National Heritage values of a National Heritage place. Therefore, actions must be referred to the Australian Government Minister for the Environment and Heritage. A decision will be made as to whether the proposed action will have a significant impact on any matters of national significance.

A search of both the NHL and the CHL did not identify any items within the study area, although it is noted to be approximately 10km outside the Australian Alps



National Parks and Reserves, listed on the National Heritage List for physiological, ecological and heritage values.

### **2.1.3 NATIVE TITLE ACT 1993**

The *Native Title Act 1993*, as amended, provides protection and recognition for Native title. Native title is recognised where the rights and interests of over land or waters where Aboriginal and Torres Strait Islander practiced traditional laws and customs prior to the arrival of European settlers, and where these traditional laws and customs have continued to be practiced.

The National Native Title Tribunal (NNTT) was established to mediate native title claims made under this Act. Three registers are maintained by the NNTT, as follows:

- National Native Title Register
- Register of Native Title Claims
- Register of Indigenous Land Use Agreements.

Searching the NNTT registers allows identification of potential Aboriginal stakeholders who may wish to participate in consultation.

A search of all three registers did not identify any claims over the study area, with the nearest claim boundary approximately 75km to the east of the study area. No determined Native Title claims exist over the study area.

## **2.2 NEW SOUTH WALES LEGISLATION**

### **2.2.1 NATIONAL PARKS AND WILDLIFE ACT 1974**

The *National Parks and Wildlife Act 1974* provides protection for all Aboriginal objects and places within NSW. Aboriginal objects are defined as the material evidence of the Aboriginal occupation of NSW, while Aboriginal Places are defined as areas of cultural significance to the Aboriginal community. All Aboriginal objects are protected equally under the Act, regardless of their level of significance. Aboriginal Places are gazetted if the Minister is satisfied that the location was and/or is of special significance to Aboriginal people.

Following amendments to the NPW Act in 2010, approval to impact Aboriginal cultural heritage sites is only granted under a Section 90 AHIP, which is granted by Heritage NSW in the Department of Premier and Cabinet.

There are a number of registered Aboriginal sites within the vicinity of the study area, including an Aboriginal Place at Curiosity Rocks on the eastern side of the study area. The proposed works would not impact on Curiosity Rocks Aboriginal Place.

### **2.2.2 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979**

Under the EP&A Act, it is necessary to consider environmental impacts, including impact to cultural heritage, as part of the land use process. Local Environmental



Plans (LEPs) and Development Control Plans (DCPs) are also required to be prepared by Local Government Areas (LGAs) in order to provide guidance on the applicable level of environmental assessment. LGAs are required to maintain a list of locally significant heritage items as part of their LEP.

Under the EP&A Act, Part 3 describes the planning instruments at both local and regional levels; Part 4 relates to development assessment and consent processes, and Part 5 refers to infrastructure and environmental impact assessment.

This project will be assessed under Part 4 of the Act, with SMRC the determining authority.

### 2.2.3 SNOWY RIVER LEP 2013

The *Snowy River Local Environmental Plan 2013* (SRLEP) is the overarching planning instrument applicable to the Snowy Monaro LGA.

Clause 5.10(2) (e) identifies that no buildings may be erected on land within a heritage conservation area or which contains an Aboriginal object, without first obtaining development consent. Further, Clause 5.10(2) (c) states that archaeological sites may not be disturbed or excavated without development consent. Exceptions to the requirement for development consent are detailed by Clause 5.10(3) and include low impact activities, or activities for the maintenance of a heritage item. Clause 5.10(8) requires that the effect of any development on an Aboriginal place of heritage significance must be considered, and the Aboriginal community must be notified of any proposed developments.

Clause 5.10(8) requires that the effect of any development on an Aboriginal place of heritage significance must be considered, and the Aboriginal community must be notified of any proposed developments. This document details the notification to the registered Aboriginal community regarding the intention to develop the study area and the consultation undertaken regarding the proposed development's potential impact on Aboriginal cultural heritage in the area.

There are no heritage items, heritage conservation areas or archaeological sites identified on the LEP heritage maps within the study area, although the study area is immediately adjacent to a conservation area known as Lake Jindabyne and listed as item C4 on the LEP. Additionally, the study area is in proximity to Jindabyne Foreshore Park (151) and Strzelecki Monument (152). The potential historical heritage impact is addressed a separate Statement of Heritage Impact prepared by Apex Archaeology for this project.

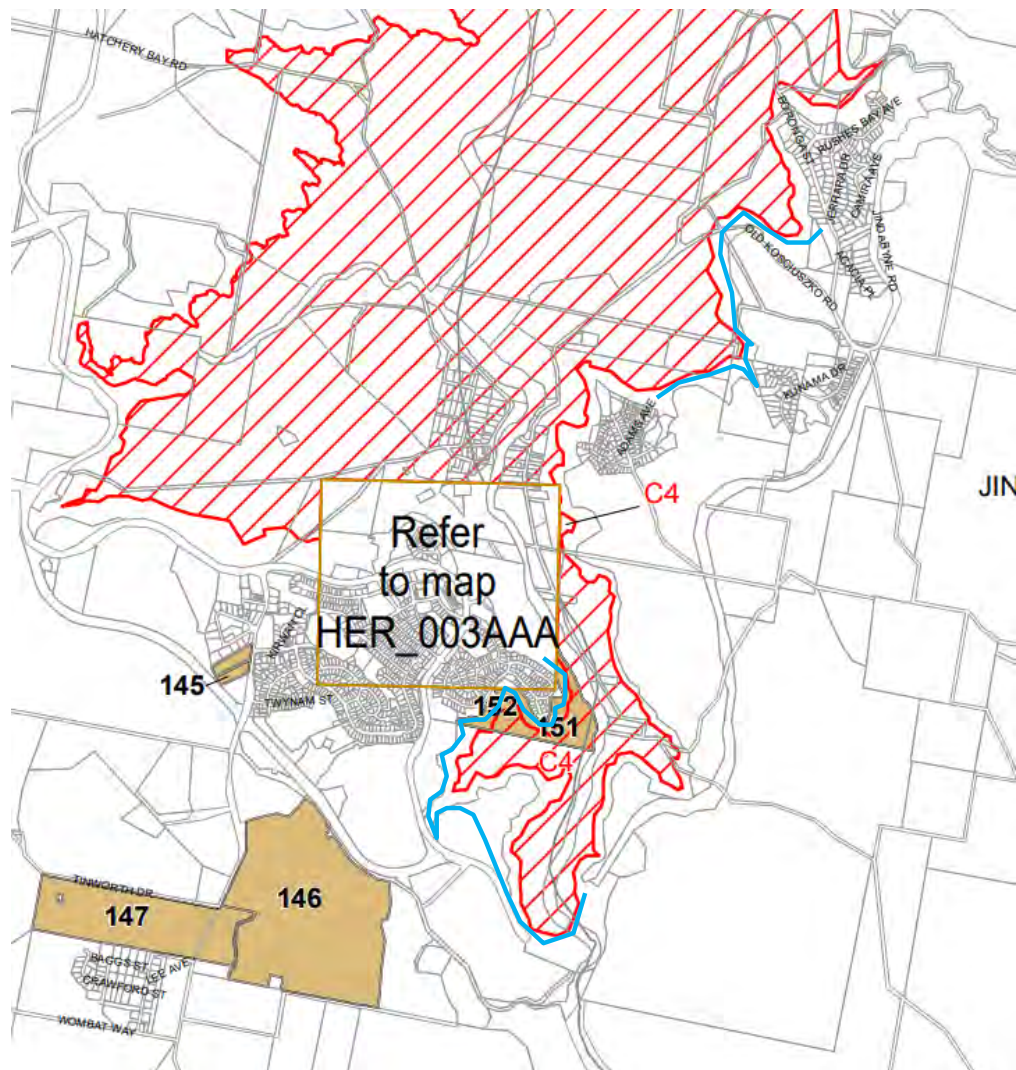


Figure 7: Snowy River LEP 2013 Heritage Map, with approximate study area outlined in blue (Source: SRLEP 2013 Sheet HER\_003A)



### 3.0 ABORIGINAL CULTURAL HERITAGE

This section presents information about both the physical and cultural landscape in which the study area is located, as well as previous archaeological and ethnohistorical studies, to provide context and background to the existing knowledge of Aboriginal culture in the area.

#### 3.1 EXISTING ENVIRONMENT

The study area falls within the Jindabyne Plains of NSW, as defined by Mitchell (2002; Figure 8). The Jindabyne Plains are characterised by “wide open valleys and plains at a general elevation of 800 to 900m with surrounding low ranges and rounded peaks to 1100m on massive Silurian-Devonian granite and granodiorite. Shallow gravelly loams on slopes, extensive red and yellow texture-contrast soils on slopes, two or three terraces marginal to the main streams with dark coloured gritty uniform loams and clays in alluvium” (Mitchell 2002:138).

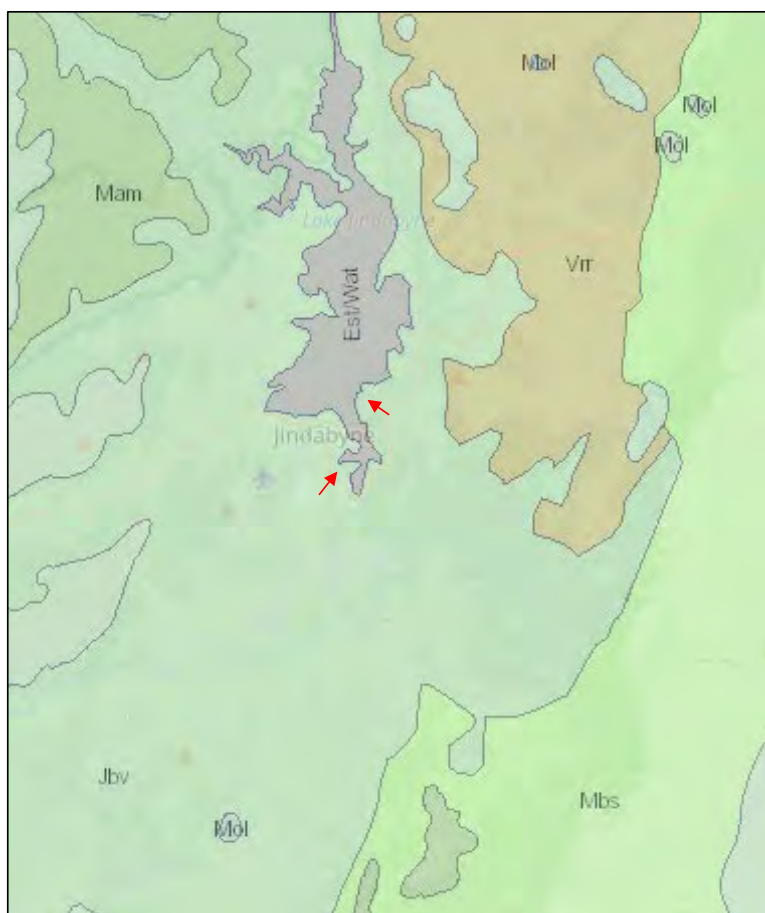


Figure 8: Mitchell Landscapes v3.1 (Source: NSW SEED). Approximate study area shown by red arrows.





#### SOILS AND GEOLOGY

The study area is shown on the Bega-Mallacoota 1:250,000 geological map (Lewis & Glen 1995) located within the Bullenbalong Suite, specifically mapped as Sgbb, the Bullenbalong Granodiorite. The study area is located within early to late Silurian sequences as part of the Kosciusko Batholith Igneous Suites, with the Bullenbalong Suite comprising Leesville granodiorite. Basaltic volcanics are present, along with sandstones, siltstones, conglomerate and shales.

The Berridale Plateau, approximately 25km to the east, along with Mount Gilead, located approximately 20km to the south, are both a likely source of silcrete for the area (NSW Archaeology 2017; Feary & Niemoeller 2015).

The soil regolith is mapped predominantly as R2 (Figure 9), considered to have low coherence and low sediment delivery, with sub-dominant classes of R1 (high coherence soils with low sediment delivery) and R4 (low coherence soils when wet). A small section is mapped as R1.

The study area is considered to fall within the Bullenbalong (bu) soil landscape (NSW SALIS), which comprises shallow soils on crests and slopes which are generally well drained, along with earthy sands and yellow and red earths. Within open depressions, poorly drained yellow solodic soils are present. Overall, the soils within the study area are considered to be subject to erosion, including sheet erosion, have low fertility and shallow soils, and localised outcrops of granite.

#### TOPOGRAPHY

The study area is located within the Jindabyne Valley, originally formed by the Snowy River prior to its damming to create Lake Jindabyne. Jindabyne Valley is constricted by gorges to the north and south. Above the Full Supply Level (FSL) of Jindabyne Dam at 910.18m AHD, the topography of the study area generally consists of gently sloping flat topped ridges, becoming more undulating towards to the northern end of the study area.

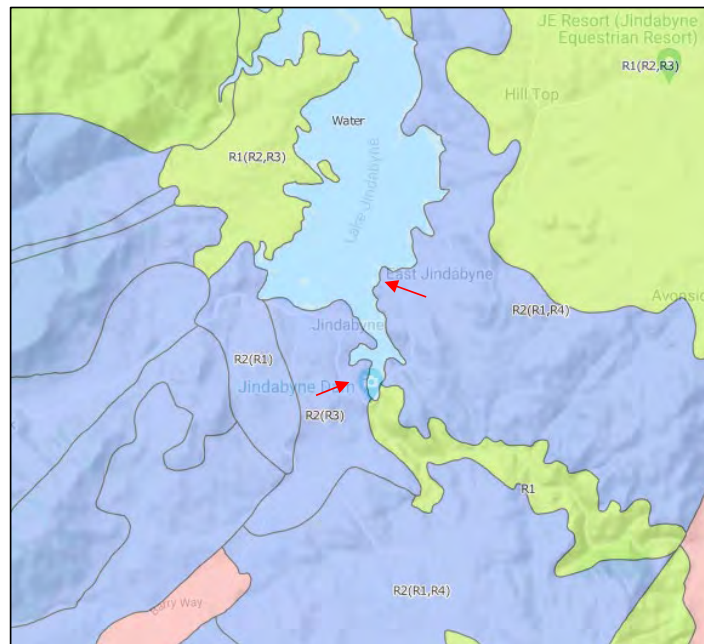


Figure 9: Soil regolith mapping. Approx study area shown by red arrows (Source: eSPADE v2.1)

#### FLORA AND FAUNA

Vegetation includes grassy woodland with Snow Gum (*Eucalyptus pauciflora*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*), Burgan (*Kunzea ericoides*), Silver Wattle (*Acacia dealbata*), Bossiaea (*Bossiaea buxifolia*), Snow Grass (*Poa siberiana*), Kangaroo Grass (*Themeda triandra*), Bulbine Lily (*Bulbine bulbosa*) and Rock Fern (*Cheilanthes sieberi*), among other flora species. These species would have supported a diverse range of native fauna, including small mammals such as wallabies and wombats, a variety of bird species and small invertebrates such as snakes and lizards. Both floral and faunal resources would have been exploited by the Aboriginal people in the area.

#### HYDROLOGY

The study area is well watered, with the Eucumbene River entering from the north, while the Snowy River enters from the south, and both rivers then merge within the valley with the Thredbo River which enters from the west. All rivers are defined as fourth order water courses according to the Strahler system as used by DPI Water (Figure 10). Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, ie a minor creek or ephemeral watercourse.



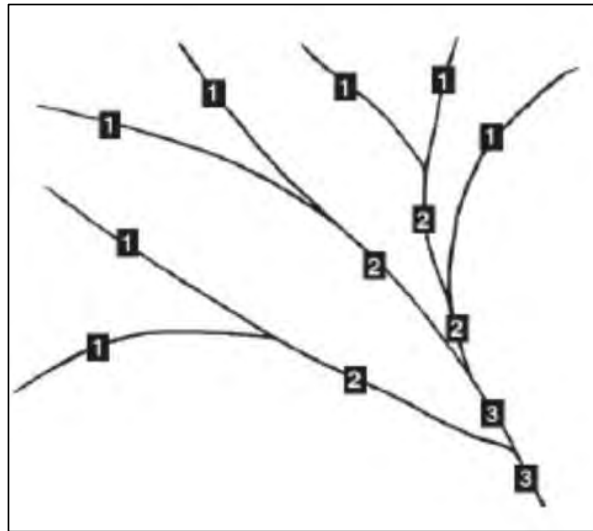


Figure 10: The Strahler system (Source: Department of Planning and Environment 2016).

#### CLIMATE

The climate of an area is relevant for determining how likely it was to be occupied by Aboriginal people in the past. Within the Snowy Mountains, snow cover and low temperatures during the winter months would have most likely meant the higher altitude areas would have been avoided by Aboriginal people. The Jindabyne area is considered to be a temperate climate zone, with mild to warm summers and cold winters. Average maximum temperatures are 18.2 degrees while minimum temperatures are 4.1 degrees, with an average rainfall of 535.3mm (BOM 2022).

The study area falls within the sub-alpine area which is described by SMRC (2022) as:

*Generally fine and sunny weather with warm to hot days and cool nights in summer and cool to warm days and cold nights in winter. As the area varies from tablelands to the highest mountains in Australia, naturally the weather conditions vary according to altitude. In the lower districts temperatures range from around 9 to 28 degrees Celsius in summer and between -5 and 16 degrees Celsius during winter. Rainfall also varies considerably between the alpine and sub-alpine areas, generally, the sub-alpine annual average is between 400 and 500mm with only an occasional snowfall.*

#### 3.1.1 RAW MATERIALS

A wide range of raw materials were selected by Aboriginal people for flaking to create stone implements. Material types ranged from high quality to poor quality for flaking purposes, depending on the geology of the area and readily available material types. The following is a description of a range of raw material types known to have been utilised by Aboriginal people for the creation of stone artefacts. Not



all occur naturally within all environments, although different resources can be identified within different regions due to trade or resource carrying (ie 'manuport' stone).

#### **BRECCIA**

Breccias are coarse, angular volcanic fragments cemented together by a finer grained tuffaceous matrix.

#### **CHALCEDONY**

Chalcedony is a microcrystalline, siliceous rock which is very smooth and can be glossy. Introduction of impurities can produce different coloured versions of chalcedony, including yellow/brown (referred to as carnelian), brown (sard), jasper (red/burgundy) and multicoloured agate. It flakes with a sharp edge and was a prized material type for the creation of stone artefacts in parts of Australia (Kuskie & Kamminga 2000: 186).

#### **CHERT**

Chert is a highly siliceous sedimentary rock, formed in marine sediments and also found within nodules of limestone. Accumulation of substances such as iron oxide during the formation process often results in banded materials with strong colours. Chert is found in the Illawarra Coal Measures and also as pebbles and colluvial gravels. It flakes with durable, sharp edges and can range in colour from cream to red to brown and grey.

#### **PETRIFIED WOOD**

Petrified wood is formed following burial of dead wood by sediment and the original wood being replaced by silica. Petrified wood is a type of chert and is a brown and grey banded rock and fractures irregularly along the original grain.

#### **QUARTZ**

Pure quartz is formed of silicon dioxide, and has a glossy texture and is translucent. Introduction of traces of minerals can lead to colouration of the quartz, such as pink, grey or yellow. The crystalline nature of quartz allows for minute vacuoles to fill with gas or liquid, giving the material a milky appearance.

Often quartz exhibits internal flaws which can affect the flaking quality of the material, meaning that in general it is a low-quality flaking material (Kuskie & Kamminga 2000: 186). However, quartz is an abundant and widely available material type and therefore is one of the most common raw materials used for artefact manufacture in Australia. Flaking of quartz can produce small, very sharp flakes which can be used for activities such as cutting plant materials, butchering and skinning.

#### **QUARTZITE**

Formed from sandstone, quartzite is a metamorphic stone high in silica that has been heated or had silica infiltrate the voids found between the sand grains. Quartzite ranges in colour from grey to yellow and brown.



#### **SILCRETE**

Silcrete is a siliceous material formed by the cementing of quartz clasts with a matrix. These clasts may be very fine grained to quite large. It ranges in colour from grey to white, brown, red or yellow. Silcrete flakes with sharp edges and is quite durable, making silcrete suitable for use in heavy duty woodworking activities and also for spear barbs (Kuskie & Kamminga 2000:184).

#### **TUFF/INDURATED MUDSTONE**

There is some disagreement relating to the identification of lithic materials as tuff or indurated mudstone. The material is a finely textured, very hard yellow/orange/reddish-brown or grey rock. Kuskie and Kamminga (2000: 6, 180) describe that identification of lithic materials followed the classification developed by Hughes (1984), with indurated mudstone described as a common stone material in the area. However, Kuskie and Kamminga's analysis, which included x-ray diffraction, identified that lithics identified as 'indurated mudstone' was actually rhyolitic tuff, with significant differences in mineral composition and fracture mechanics between the stone types. They define mudstone as rocks formed from more than 50% clay and silt with very fine grain sizes and then hardened.

The lithification of these mudstones results in shale (Kuskie & Kamminga 2000: 181) and thus 'indurated mudstone', in the opinion of Kuskie and Kamminga, do not produce stones with the properties required for lithic manufacture.

In 2011, Hughes, Hiscock and Watchman undertook an assessment of the different types of stones to determine whether tuff or indurated mudstone is the most appropriate terminology for describing this lithic material. The authors undertook thin section studies of a number of rocks and determined that the term 'indurated mudstone' is appropriate, with an acknowledgment that some of this material may have been volcanic in origin. They also acknowledge that precise interpretation of the differences between material types is difficult without detailed petrological examination, and suggest that artefacts produced on this material are labelled as 'IMT' or 'indurated mudstone/tuff'.

#### **VOLCANIC**

Both volcanic and acid volcanic stones are a used raw material type within the South Coast. Without detailed petrological analysis it can be sometimes difficult to identify the specific raw material. However, probably one of the most common and recognisable types of volcanic stone is basalt, which is commonly referred to as 'blue metal'. It is solidified lava that was produced by now extinct volcanoes and diatremes that are spread-out within the Sydney Basin. If the lava cools quickly it results in fine-grained basalt that is easily flaked or ground to make tools, implements or weapons. Tuff forms from the tiny ash particles that are also released during volcanic explosions. When it cools it hardens into a fine-grained rock called 'tuff', as discussed above.



Basalt would have been either collected from the primary deposits formed during the eruption, which would require pieces to be broken off (quarried) or it was collected in cobble-form from a creek bed or shoreline. Cobbles are referred to as secondary sources as they are formed from pieces of rock that have been dislodged from their primary source and end up in creeks and/or river systems (Petrequin 2016; Attenbrow et al. 2017). The flow of water moves them around and smooths them into water-rolled cobbles that can be transported considerable distance from the original source. Basalt was often used to make axes which were either flaked into the desired shape from quarried stone, or from cobbles which quite often only required only one end to be ground into a sharp working edge.

Basalt cobbles can be found along the banks of rivers, and in bedrock quarries within the South Coast region. Recent research undertaken by the Australian Museum and University of New England using portable XRF technology demonstrated that a number of stone axes held at the Australian Museum have been traced to these sources (Attenbrow et al. 2017).

### 3.1.2 PROCUREMENT

Assemblage characteristics are related to and dependent on the distance of the knapping site from raw materials for artefact manufacture, and different material types were better suited for certain tasks than other material types. Considerations such as social or territorial limitations or restrictions on access to raw material sources, movement of groups across the landscape and knowledge of source locations can influence the procurement behaviour of Aboriginal people. Raw materials may also have been used for trade or special exchange between different tribes.

### 3.1.3 MANUFACTURE

A range of methodologies were used in the manufacture of stone artefacts and tools, through the reduction of a stone source. Stone may have been sourced from river gravels, rock outcrops, or opportunistic cobble selection. Hiscock (1988:36-40) suggests artefact manufacture comprises six stages, as follows:

1. The initial reduction of a selected stone material may have occurred at the initial source location, or once the stone had been transported to the site.
2. The initial reduction phase produced large flakes which were relatively thick and contained high percentages of cortex. Generally the blows were struck by direct percussion and would often take advantage of prominent natural ridges in the source material.
3. Some of these initial flakes would be selected for further reduction. Generally only larger flakes with a weight greater than 13-15 grams would be selected for further flaking activities.
4. Beginning of 'tranchet reduction', whereby the ventral surface of a larger flake was struck to remove smaller flakes from the dorsal surface, with this retouch applied to the lateral margins to create potential platforms, and to



the distal and proximal ends to create ridges and remove any unwanted mass. These steps were alternated during further reduction of the flake.

5. Flakes were selected for further working in the form of backing.
6. Suitable flakes such as microblades were retouched along a thick margin opposite the chord to create a backed blade.

Hiscock (1986) proposed that working of stone materials followed a production line style of working, with initial reduction of cores to produce large flakes, followed by heat treatment of suitable flakes before the commencement of tranchet reduction. These steps did not necessarily have to occur at the same physical location, but instead may have been undertaken as the opportunity presented.

Although probably less common than the process of flaking stone to modify it, the grinding technique was used throughout NSW where suitable stone sources were available. This has been documented by early settlers particularly in the manufacture of axe heads where the end of a cobble was ground to achieve a working edge (Corkill 2005).

### 3.2 LAND USE HISTORY

#### INDIGENOUS OCCUPATION

When Aboriginal occupation of Australia is likely to have first commenced, around 60,000 years ago (Mulvaney and Kamminga 1999; Bowdler *et al* 2003; Attenbrow 2010), sea levels were around 30-35m lower than present levels, and this further decreased to up to 130m lower than present sea levels (Attenbrow 2010). Sea levels stabilised around 7-6,500 years ago, and as a result many older coastal sites would have been inundated with increasing sea levels. It is possible that areas that are now considered “coastal” would once have limited resources available to Aboriginal people, and as such would have been less likely to have been occupied or used for repeated habitation sites.

Archaeological work at the Madjedbebe site in Arnhem Land in the Northern Territory revealed evidence confidently dated to the period before 45-46 ka and possibly up to 50-55 ka (Clarkson *et al* 2015). In NSW, there is strong evidence available to support Aboriginal occupation of the Cumberland Plain region in the Pleistocene period (approximately 40 ka) and possibly earlier. Work in Cranebrook Terrace was dated to 41,700 years BCE by Stockton and Holland (1974), and a site in Parramatta within deep sandy deposits was dated to 25-30 ka (JMcDCHM 2005). Kohen’s 1984 assessment of Shaws Creek in the Blue Mountain foothills yielded ages of 13 ka, while Loggers Shelter at Mangrove Creek was dated to 11 ka by Attenbrow (1987). Deeply stratified occupation deposits at Pitt Town were dated to 39ka (Apex Archaeology 2018). These ages are obtained from both radiocarbon and optically stimulated luminescence (OSL) dating.

Some experts have cast doubt onto the assessment of the items from Cranebrook Terrace as artefactual (Mulvaney & Kamminga 1999; McDonald 2008), although they



do not doubt the results of the radiocarbon dates – it is the association of the artefacts with the dated deposits that is problematic, and Mulvaney and Kamminga (1999) consider that there are better examples of sites with more robust identification of age available. There has certainly been a great deal of research undertaken within the Sydney region in the intervening years.

During the Holocene period around 6.5ka, sea levels increased and stabilised, which led to those groups on the coastal fringes turning inland (McDonald 2008). Around 5ka a change in archaeological assemblages can be seen, with an emphasis on the use of locally available stone for artefact production. Around 4,000 years ago people began to decrease their residential mobility and inhabit certain biogeographic zone on a permanent basis (McDonald 2008).

Within the Snowy Mountains region, Aboriginal occupation has been dated to around 9,000 BP (Aplin et al 2010; Theden-Ringl 2016), as conditions became warmer in the early Holocene around 10,000 years ago following the termination of the last glaciation of the Snowy Mountains around 16,000 years ago. Josephine Flood undertook extensive surveys over the southeast Australian Alps in the 1970s, but did not locate any sites older than 4,000 years, and minimal evidence for occupation above 1200m above sea level (ASL) (Flood 1980; Kamminga 1992, 1995). Evidence of occupation at lower elevations extends back to 21,000 BP (Flood 1980) at East Gippsland, and at Birrigai in the ACT at 730m ASL dated to c.25,000 BP (Flood et al 1987).

Hunting of the bogong moth available seasonally during the summer months is documented ethnographically, but the question of the antiquity of this practice remains (Aplin et al 2010). This is particularly interesting given the high elevations favoured by the moths for aestivation sites, and the antiquity of Aboriginal occupation within similar landforms and elevations in Tasmania, dated to c.31,000 BP, throughout the Last Glacial Maximum (LGM). This included occupation of a sub-alpine landscape, and as such, it is posited that people who could successfully inhabit such an environment in Tasmania were “technologically equipped to exploit a large area of broadly similar biomes in the southeast Australian Alps, located a relatively short distance north across the exposed Bassian Plain” (Aplin et al 2010).

Excavation within a cave in the southeast Australian Alps, at 1100m ASL near Yarrangobilly Caves in NSW, identified a significant faunal deposit associated with stone artefacts. The artefact deposit was considered to represent multiple short term occupations of the cave, rather than extended occupation over a period of time. There was no evidence of the 1-3mm range of flakes, which was expected to be present if significant knapping was occurring within the cave. Radiocarbon dating of the deposits associated with the artefacts returned dates of between 9700 and 9120 cal. yr BP, being the oldest dates so far from this elevation within NSW and the ACT (Aplin et al 2010).



#### POST CONTACT OCCUPATION

Following the establishment of the first European settlement at Sydney Cove, the need for additional agricultural land was identified, as Sydney Cove was considered unsuitable for farming. By November 1788, food supplies were running low for the settlement, and an expedition led by Governor Philip set off up the Parramatta River in search of arable land. An area known as Rose Hill (now Parramatta) was settled by a small group of 11 soldiers and 10 convicts. The grain crops at Sydney Cove failed, and the settlement at Rose Hill was ordered to be used for agriculture. These crops were luckily successful, and a further settlement comprising a convict farm was established at Toongabbie.

Exploration of the wider region continued, and in 1791, expeditions travelled the Hawkesbury and Nepean areas, identifying them as likely spots for agriculture. The first land grants in the Blacktown District were made in 1791, with 13 people granted land at Prospect Hill. By 1800, the population of the Blacktown area was 16.

Further expansion occurred in the 1830s, with many new towns and villages established. The Monaro highland region was occupied by squatting runs by the late 1830s, with both sheep and cattle grazing the area. Stock were moved from the valleys, which they occupied in autumn and winter, to the higher alpine pastures in summer. This practice, known as transhumance, ceased in 1957 following acknowledgement of the damage being done to fragile ecosystems in the alpine regions.

The township of Jindabyne was established during the 1840s on the banks of the Snowy River, at the location of the main river crossing for the cattle moving between the Monaro and Gippsland.

The discovery of gold in the region in 1860 led to an increase in the population around Jindabyne, and the construction of a bridge over the river in 1893 assisted the increase further.

The area was a popular tourism destination, particularly for trout fishing which commenced in 1909 after rainbow and brown trout were released into the local waterways. Skiing resorts were also established in the area, with Perisher Blue established in 1939 and Thredbo from 1957. Both of these led to further growth in the area to support the tourism industry.

The Snowy Mountains Scheme was introduced in 1949, leading to the inundation of the original location of Jindabyne, which relocated to the current location from 1959 and officially opened in 1964. The former township was completely inundated in 1967 when the dam was completed.





#### STUDY AREA

Aerial imagery of the study area shows limited development in the area. Imagery from 1964 (Plate 1) shows the area prior to the inundation of Lake Jindabyne. The study area shows a few tracks present but no other visible development.

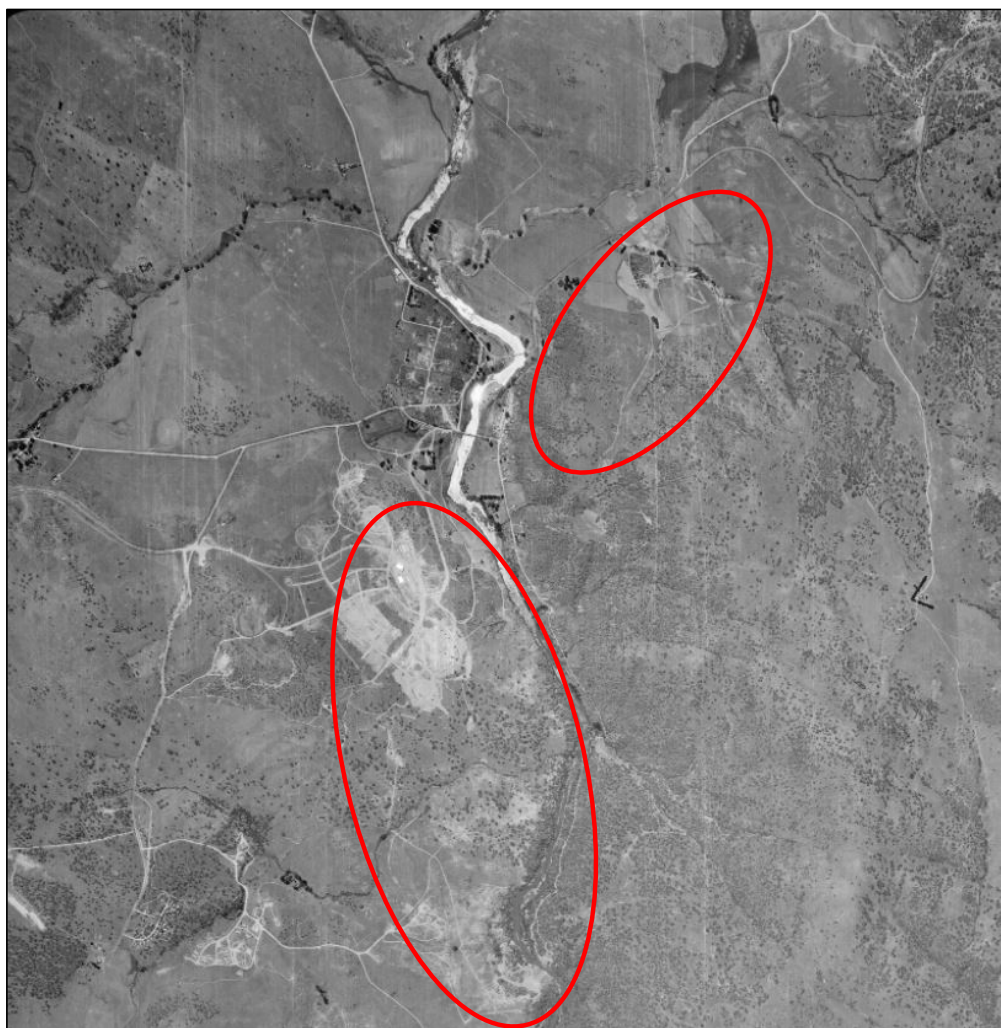


Plate 1: Aerial imagery from 1964. Approx study area circled in red

Overall, while little development has occurred within the study area since settlement of the area, disturbance in the form of infrastructure and construction of unsanctioned biking trails has occurred within the area and would have impacted the ground surface.



## 4.0 LITERATURE REVIEW

A review of previous archaeological work within the surrounding region of the study area was undertaken. A number of reports were identified from background research and the AHIMS database and are summarised below, with detailed summaries presented in Section 4.1.

**Table 2: Previous heritage assessments undertaken by archaeological consultants in the region**

Consultant	Date	Sites Identified	Region
Flood	1973	Sites throughout Southern Uplands	Southern Uplands
Chapman	1977	34 artefact sites	Lake Jindabyne
Chapman	1982	6 artefact sites	East Jindabyne
Djekic	1982	6 culturally modified trees and 4 artefact sites	Cooma to Jindabyne
Walkington	1988	None	Mill Creek
Koettig	1989	6 artefact sites and 6 isolated finds	Berridale to Jindabyne
Navin	1990	18 artefact sites	Tyrolean Village
Packard	1990	2 artefact sites	East Jindabyne
WBAS	1993	4 artefact sites	South Jindabyne
Clegg & Caldwell	1994	1 artefact site	Curiosity Rocks
Saunders	1997	7 artefact sites	Alpine Sands Estate
Oakley	1999	Resurvey of 3 WBAS sites	South Jindabyne
Saunders	2003	2 sites, one with over 100 artefacts	Rushes Creek
Biosis Research	2003	2 artefact sites and 1 PAD	Jindabyne Dam Wall
Barber	2003	11 artefact sites and 4 PADs	Jindabyne Dam
Dibden	2004	4 artefact sites	Jindabyne
Saunders	2005	3 artefact sites	Kunama Ridge
Saunders	2006	2 artefact sites and 1 PAD	East Jindabyne
Dibden	2009	2 artefact sites	East Jindabyne
Feary & Niemoeller	2015	26 new artefact sites	Kosciuszko National Park
NSW Archaeology	2017	No sites	Kosciuszko Road
Past Traces	2018	6 artefact sites	Alpine Sands
Biosis	2018	165 artefacts recovered from test excavations	Kunama Ridge
Biosis	2019	~5,000 artefacts from salvage excavation	Kunama Ridge
Feary	2018		
NGH Environmental	2019	128 sites	Jindabyne and surrounds
Apex Archaeology	2022	17 artefact sites	Tyrolean

Most sites comprised artefact sites of varying concentrations, ranging from isolated finds to high density deposits of 100 or more items in close proximity.



#### 4.1 PREVIOUS REGIONAL ARCHAEOLOGICAL WORK

An analysis of previous archaeological work within the study area assists in the preparation of predictive models for the area, through understanding what has been found previously. By compiling, analysing and synthesising the previous archaeological work, an indication of the nature and range of the material traces of Aboriginal land use is developed. An understanding of the context in which the archaeological assessment is vital, as development does not occur within a vacuum, but within a wider cultural landscape, and this must be considered during any archaeological assessment in order to develop appropriate mitigation and management recommendations.

##### FLOOD 1973

Josephine Flood's 1973 PhD thesis, *The Moth Hunters*, focused on the Southern Tablelands and Highlands of south eastern Australia, which she called the 'Southern Uplands'. The thesis focussed on the exploitation of the Bogong moth, which inhabited the area above 1200m ASL, with the aim of investigating how Aboriginal people made use of the area prior to European settlement, and whether the area had been crossed as part of the settlement of Australia by Aboriginal people. The relative paucity of Aboriginal archaeological sites within this region in order to "achieve some understanding of human adaptation to the montane environment, seasonal movement as reflected in site location and variation, trade routes and cultural areas, and economic activities as reflected in tool-use" (Flood 1973:4).

Sites throughout the Southern Uplands were investigated, some in person, and some through records. Some common characteristics were noted for sites located near Mount Kosciusko and the Snowy River, as follows:

- a) *The were all set 50-100 metres, or occasionally more, from the water's edge, well above the flood level, and away from the flies and mosquitoes of the river banks.*
- b) *They were all located on well-drained and sometimes steeply sloping ground rather than on the damper alluvial flats nearer the river.*
- c) *Most sites had a northerly or easterly aspect. This would afford protection from the westerly and southerly winds, and suggests that the camps were occupied in winter, since in winter southerly winds prevail in the valley.*
- d) *Sites tended to cluster, and the largest camps to occur, at the junction of the two rivers.*

With regards to campsites relating to the hunting of the Bogong moths, with people coming from the surrounding areas, it was noted that:

*Jindabyne...lies on the direct north-south route from the Tumut valley to that of the Snowy River, by way of Kiandra and the Eucumbene River. It would thus tend to form a major meeting place of tribes from the north, south and east (Flood 1973:176).*



Flood also noted ethnographic records of a site located in very close proximity to the current study area, as follows:

*Not far below Jindabyne, where the valley of the Snowy River somewhat narrows between rather rugged hills, used to be in olden times a favourite camping place of the natives who assembled here (even with the knowledge of some settlers) in considerable numbers, mainly for the purpose of making stone implements. A shingle bed near one of the bends in the river furnished excellent and abundant material for tomahawks amongst the flattish and more or less oval pebbles.*

*Many half finished tomahawks and pebbles, the shaping of which had just commenced, have from time to time been picked up near this locality, and some may still be found there. The blacks were not likely to encumber themselves with too much weight, and therefore only the finished articles were carried away, the unfinished being left behind to be taken in hand again on the next return to the place (Helms 1895:403, in Flood 1873:176).*

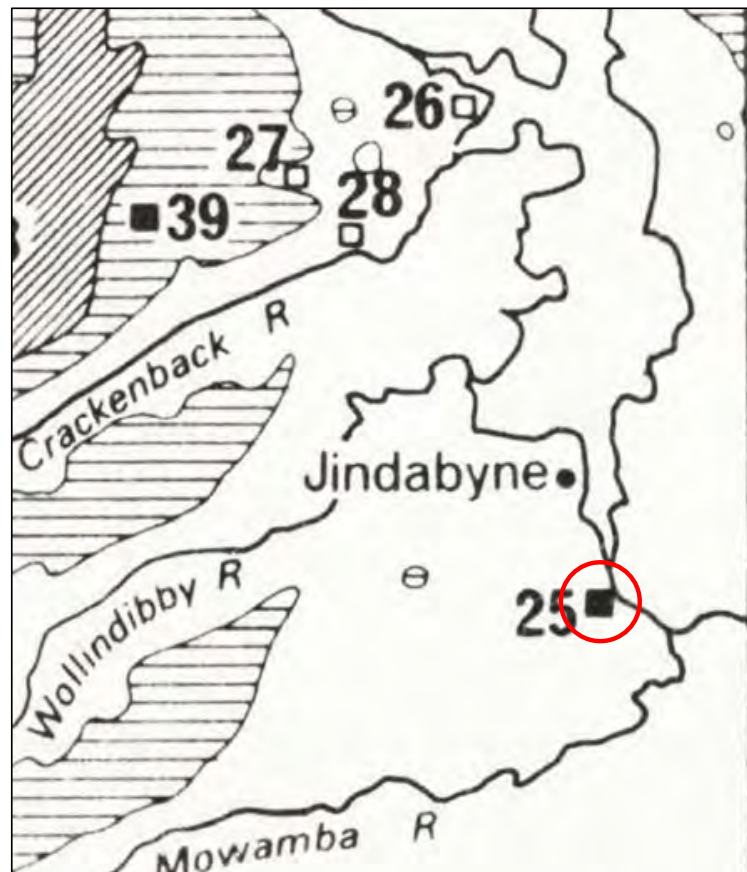


Figure 11: Location of site mentioned by Helms (1895), circled in red



Flood mentions the pebble tool factory and accompanying campsite were located as part of her thesis fieldwork. This was considered to be located between “Jindabyne and the old junction of the Wollondibby River with the Snowy River” (Flood 1973:176) and a ceremonial ground with axe grooves on two rocks was located at the junction of the two rivers. This has now been inundated by Lake Jindabyne.

A number of campsites were located within the Jindabyne valley, and along the Snowy River before the impounded waters of Lake Jindabyne, with considerably more at this location in comparison to the few identified within the Perisher valley.

It was suggested that the reason for the higher number of cases in the Jindabyne valley relate to the need for individual tribes to wait at the foot of the main range before heading to higher elevations to take part in the moth feasts, perhaps until some certain rites had been completed and they were then invited to proceed. Additionally, there is anecdotal evidence that separate groups proceeded to the higher elevations, rather than as a whole, and thus a larger body of people were gathered at the foot of the slopes for a period of time, before gradually proceeding upwards (Flood 1973).

Given the snow that covers the ground above 1525m for most of the winter months, extending down the Jindabyne itself at 915m, the Jindabyne area was considered suitable for summer and warmer month inhabitation only. The Lower Snowy River was assessed as being the most likely winter campsite for the Ngarigo. Given the relative scarcity of food within the winter months in this area, consisting mostly of riverine resources such as eels, along with game such as possum, campsites would have reflected the reliance on relatively resource rich zones such as along rivers and the dispersed nature of the camps which maximised the scarce winter resources (Flood 1973).

Overall, the settlement patten in the Southern Uplands was considered to comprise “nomadic way of life involving seasonal transhumance, but in the four winter months semi-nomadism, with movement, at least in the Snowy Mountains region, probably confined to the immediate environs of a low, comparatively frost-free valley” (Flood 1973:182).

#### CHAPMAN 1977

During historically low levels of Lake Jindabyne, Chapman undertook survey work within the areas that had been previously inundated. A total of 34 artefact scatters were recorded, with three of those containing more than 100 artefacts, and the assemblages were noted to contain a range of artefact types. Many items were formed on river pebbles. Generally, the larger sites were associated with major rivers, which have since disappeared beneath the waters of the dam. The report also mentions a record from the Australian Museum of a bora ground in association with





axe grooves which was located at the confluence of Wollondibby Creek and the Snowy River, which is listed as AHIMS site 62-1-0017.

It was noted that wave action from the waters of Lake Jindabyne had disturbed surface and eroded artefacts from the subsurface, depositing them in strands and destroying spatial relationships between the artefacts.

#### **CHAPMAN 1982**

Chapman undertook a targeted survey within East Jindabyne, resulting in the identification of six artefact concentrations. These were generally located at the break of slope or at the base of steep slopes, usually in close proximity to water courses. The assemblages contained artefacts made from river cobbles as well as silcrete.

#### **DJEKIC 1982**

During a survey for proposed transmission lines between Cooma and Jindabyne, Djekic identified six culturally modified trees, although it was noted that none were definite scarred trees, and four artefact concentrations. A subsequent salvage of one of these sites undertaken by Geering in 1982 identified that it contained over 700 artefacts, with most formed from quartz, although river pebbles were also represented within the assemblage.

#### **WALKINGTON 1988**

The proposed Mill Creek subdivision located to the south of Lake Jindabyne was subject to survey by Walkington, with no sites identified. The area was characterised by low ridges, gentle slopes, minor drainage lines and marshland.

#### **KOETTIG 1989**

The location of a proposed pipeline between Berridale and Lake Jindabyne was surveyed, with six artefact scatters and six isolated finds identified. The sites were located on slopes, spurs, crests, knolls and saddles.

#### **NAVIN 1990**

As part of the assessment of the proposed Tyrolean Village located in East Jindabyne, Navin identified 18 artefact sites. Seven of these were isolated finds and 11 were artefact concentrations. Most sites were located along ridgelines. As a result of the initial assessment, applications for permits to destroy were made. A subsequent inspection of the area in 2003 by Navin Officer recorded an additional ten small artefact scatters, as well as the originally recorded sites. It was concluded that most sites in the area comprised small, disturbed artefact concentrations and that the East Jindabyne area was relatively rich in archaeological sites.

#### **PACKARD 1990**

Assessment for the East Jindabyne sewerage scheme recorded two artefact concentrations, with one located on a low ridge and one on a gently sloping area below a steep slope.



#### **WILLIAMS BARBER ARCHAEOLOGICAL SERVICES 1993**

The survey of an area to the south of Jindabyne by Williams Barber Archaeological Services, along the Barry Way, identified four small artefact scatters, mostly of quartz artefacts. The area was considered to have low potential for additional sites to be present.

#### **CLEGG AND CALDWELL 1994**

Bega Local Aboriginal Land Council engaged Clegg and Caldwell to prepare a report assessing a large artefact scatter at Curiosity Rocks. Artefacts were recorded within an area 440m x 150m. A varied assemblage of artefacts were recovered, including grinding stones, hatchet heads, cores, blades, hammer stones, flakes, scrapers and debitage. The site is located on a low ridge crest, likely associated with a previously recorded bora ground and axe grinding grove site, which were inundated when Lake Jindabyne was created.

#### **SAUNDERS 1997**

Saunders prepared an assessment for the Alpine Sands Estate, with four artefact concentrations and three isolated finds. The artefact concentrations were assessed as being of low to medium density, and were generally located on gentle to medium sloping spur crests and side slopes of ridgelines near gullies, and two isolated finds were located on upper slopes, while one was located at the head of a major gully. A range of raw material types including silcrete, chert, quartz, volcanics and river pebbles were identified.

#### **OAKLEY 1999**

Three of the sites previously recorded by Williams Barber Archaeological Services in 1993 were inspected following apparent disturbance from grading of the track on which they had been identified. Survey of additional areas proposed for access roads was also undertaken, with no further sites identified. The site was considered to be of low archaeological potential due to the shallow soils present.

#### **SAUNDERS 2003**

Survey of a 14 hectare parcel of land near Rushes Creek was undertaken, with two sites recorded, comprising an extensive artefact concentration, and a small low density artefact scatter. The extensive site comprised over 100 artefacts which were distributed across a low gradient, north facing secondary spur crest above Rushes Creek, on the crest of a narrow ridge, over an area 170m x 100m. This site incorporated the three sites previously recorded by Chapman in 1982.

#### **BIOSIS RESEARCH 2003**

Biosis Research undertook an assessment of a proposed spillway upgrade and outlet works at Jindabyne Dam. A previously recorded site was relocated along with a new artefact concentration of 5-10 artefacts and a new area of archaeological sensitivity was identified.



**BARBER 2003**

As part of the Snowy Hydro proposal at Jindabyne Dam, Barber undertook an additional survey at Jindabyne Dam. Six sites were identified, along with an area of PAD, with a further five sites and four areas of PAD were identified on the eastern side of Kosciuszko Road, to the south of Lees Creek. A range of artefact and raw material types were identified, which were considered to be comparable to other recorded sites in the local area.

**DIBDEN 2004**

Dibden prepared an Aboriginal archaeological assessment for the proposed Leesville Industrial Estate, Jindabyne, an area of 23.9 hectares. Four Aboriginal sites were located, comprising two low density artefact concentrations, and two isolated finds. It was noted that the sites were located away from reliable water sources and concentrated resource zones, and were considered to represent the discard of artefacts during resource gathering activities away from base camp locations.

**SAUNDERS 2005**

Saunders undertook an archaeological investigation of Kunama Ridge in 2005. Following analysis of previous archaeological work in the region, a predictive model for the area was developed. Sites were predicted to be located on relatively flat, elevated, well-drained areas of ridges, spurs and knolls, and less frequently on ridgeline shoulders and creek banks. River valleys and ridgelines were more likely to be used as access routes through the ranges. In general, sites consist of low to medium density artefact scatters, and higher density sites were located closer to permanent water sources. Three low density artefact concentrations were identified during the survey. Two were located on ridgeline crests, and one within a broad depression.

**SAUNDERS 2006**

An assessment of a proposed 31 lot subdivision, the Ridge Estate in East Jindabyne, resulted in the identification of two new archaeological sites and an associated area of PAD. The study area was located on a broad spur with an open to north westerly aspect, which was generally level although some low to moderate gradient sites were noted within portions of the study area.

**DIBDEN 2009**

Dibden undertook a survey for a proposed Country Energy substation at East Jindabyne, located on a gently undulating simple slope with a north/northeasterly aspect. It was noted that the actual location of the proposed development was within a micro-topographical feature that was somewhat more level than the surrounding area, and was considered to be generally suitable for human occupation. However, it was further noted that the broader landform was somewhat amorphous and there was no immediate source of fresh water.



The survey resulted in two low density artefact concentrations, which were considered to be in line with the predictive model for the area.

#### **FEARY AND NIEMOELLER 2015**

Feary and Niemoeller prepared an ACHA for two shared paths, one within Kosciuszko National Park at Bullock Flats and proposed to extend to the Pallaibo walking track, and the other between Curiosity Rocks and Hatchery Bay. A total of approximately 25km was assessed as part of the project. A number of previously recorded sites were known to occur on or near the proposed routes, including Curiosity Rocks, which has subsequently been registered as an Aboriginal Place.

Twenty-six new sites were recorded during the site survey, with all comprising artefact sites. Most items were formed from quartz. The sites were assessed as being of low significance and an application for an AHIP to permit impact to several sites along the shore of Lake Jindabyne was recommended.

#### **NSW ARCHAEOLOGY 2017**

NSW Archaeology undertook a due diligence assessment prior to the construction of the upgrade of Kosciuszko Road between Barry Way and Alpine Way just west of Jindabyne. No previously recorded sites were located along the road and no new sites were identified during the assessment. It was recommended that the proposed upgrade works could proceed with no further assessment necessary.

#### **PAST TRACES 2018**

A proposed residential development named Alpine Sands, at Kunama Drive, East Jindabyne, was assessed by Past Traces as part of an ACHA. Two previously recorded sites were located within the study area, with three additional sites identified during the inspection. As a result, subsurface archaeological testing was undertaken within the study area. Overall, a total of six sites were identified as present within the area, with one site (62-1-0064) considered to have high cultural value. Conservation of this site was recommended through a variety of mitigation measures.

#### **BIOSIS 2018**

Biosis undertook additional survey and subsurface testing within an area along Kunama Ridge, in East Jindabyne, in order to investigate an area of PAD associated with site 62-1-0286. The PAD was considered to include the flat crest and upper slopes. No additional sites were identified during the survey and no surface artefacts associated with site 62-1-0286 were located, despite eleven artefacts being originally recorded in 2005 by Saunders.

The PAD was assessed as being relatively undisturbed and subsurface testing was undertaken within this area. A total of 165 artefacts were recovered, with three knapping floors identified. A single test pit contained 37 artefacts. Higher densities were generally located on the crest landform, with only two artefacts recovered from the mid to lower slope area. It was concluded that the crest was the focus of



occupation, and that the two items recovered on the mid to lower slopes were a result of artefact movement downslope.

#### **FEARY 2018**

Feary was engaged to prepare an ACHA for the proposed creation of approximately six kilometres of new trails, located between Tyrolean and East Jindabyne, in order to form a continuous network of trails within Council owned land. Five archaeological sites were identified within the study area, comprising three new sites and two considered to be part of previously registered sites. A number of previously recorded sites located on or close to the route could not be relocated during the survey.

The original report did not recommend test excavation as it was not considered likely that sub surface deposits with conservation potential would be present within the area, and the proposed works were considered to be able to substantially avoid the proposed activity.

Overall, it was considered that the proposed construction would avoid impact to all sites within the investigation area, aside from 62-1-0064. It was recommended to construct a raised walkway along the northern edge of the site, following issue of an approved AHIP. Furthermore, the AHIP was recommended to cover the entire route and the sites on and adjacent to the proposed trails, as there was “poor visibility along much of the route, [and] it was possible that some artefacts were not detected. Furthermore, even though sites are most likely to be small and large buffers can be established, the dispersed nature of the artefact scatters means boundaries tend to be ill defined” (Feary 2018:3).

The report was submitted to (then) OEH as part of an AHIP application, but OEH had a number of concerns regarding the report. These generally related to the consultation undertaken, the maps included, and evidence regarding why test excavation is not warranted.

As a result, an addendum report was prepared by Feary in 2020.

#### **Biosis 2019**

Biosis undertook further investigation and salvage of site 62-1-0286 within the Kunama Ridge Estate, with both mechanical and hand excavation covering 102m<sup>2</sup> within the study area, following the issue of an AHIP to permit the salvage works. Nearly 5,000 artefacts were recovered, and three stratigraphic layers were identified, with artefacts generally concentrated in spits 2 and 3 at 10-30cm depth. The majority (68%) of artefacts were recovered from spit 2 at between 10 and 20cm depth.

In contrast to the test excavations undertaken in 2017, which identified quartz as the main material type present, the salvage assemblage was predominantly silcrete (80%). The artefact assemblage was reportedly “dominated” by angular fragments and complete flakes, comprising 43% of the overall assemblage. Cores, flake



fragments, retouched flakes, hammer stone fragments and a grind stone fragment were all identified within the assemblage. The assemblage was also suggestive that the majority (97%) had been transported some distance from the original raw material source, given their lack of cortex.

There was some potential that quartz was locally sourced, but that most other material such as silcrete, quartzite, chert and rhyolite were most likely not sourced locally, and had been transported to the area; although it was considered that they were likely sourced from the Snowy Mountains.

A radiocarbon date of charcoal retrieved from the basal cultural layer was returned at c.4,000 years BP. The charcoal was not associated with a hearth, but there were in situ artefacts identified in association with the charcoal fragments.

The results of the excavation were significantly different to those of the adjacent excavations at the Alpine Sands subdivision (Saunders 2004), despite the similarity in amount excavated. The discrepancy was not fully explored in the report, but may have been that the Kunama Ridge area was more attractive for occupation than the location of the Alpine Sands area.

The site was considered to represent a high density, relatively intact Aboriginal camp site, with evidence of long term intensive backed blade production, food processing activities and other activities occurring within the site. It was considered to be well situated in the landscape to support long term occupation, due to its location on a “level crest landform overlooking where the Snowy River would have originally flowed, and a number of drainage lines are located within close proximity to the site” (Biosis 2019:62). Overall, the results were considered to substantially contribute to the archaeological record for the Alpine region of NSW.

#### **NGH ENVIRONMENTAL 2019**

NGH Environmental prepared an environment and heritage study for the Go Jindabyne 2036 Masterplan in order to provide guidance for the development of the masterplan with regard to heritage and environmental aspects. The study covered the current study area as well as a larger area.

The assessment included an intensive literature review of a range of documentation to inform the assessment, and high level mapping of potential constraints was prepared. Field work was undertaken to ground truth the heritage constraints model with regard to publicly accessible land, including within the current study area, and a number of new sites were identified and registered on AHIMS. Unfortunately, minimal information regarding the sites was available, and the site cards were not available from AHIMS for review.

#### **FEARY 2020**

An additional field survey was undertaken as the scope of the project was significantly reduced, with the shared path linking the Tyrolean and East Jindabyne



villages deleted from the proposal. Other sections of the trail were realigned in order to totally avoid the mapped extent of all recorded sites. A new site was identified during the assessment, which was located outside the development corridor. As the proposal was determined to avoid all recorded Aboriginal sites, no AHIP application was considered necessary. However, there were several concerns with the report, and SMRC elected to discontinue that specific assessment process.

#### APEX ARCHAEOLOGY 2022

Apex Archaeology were engaged to assess a number of shared trails between Jindabyne dam wall and Tyrolean Village. This included preparation of an ACHA to determine if known sites along the trail alignment could avoid these sites, or if mitigation measures were necessary. A total of seventeen Aboriginal sites were identified within the trail alignment, including several areas of archaeological potential. Many of these sites were located on trail surfaces and were under impact by use of the trails. As many trails within the study area were existing and required formalisation rather than creation, avoidance of these sites was not possible.

Mitigation measures were proposed, including application for an AHIP to permit surface collection of artefacts on the trail surface, and preparation of a management plan to guide ongoing management of the area. This was recommended to include annual surface collection along the trails, as several trails bisected areas of potential archaeological deposits and resulted in artefacts eroding onto the trails through taphonomic processes.

## 4.2 AHIMS RESULTS

Extensive searches over the study area were undertaken in May 2022 within 4km x 4.5km and 1.5 x 1.5 km search boxes of the study area with a total of 90 sites were identified. The results of this search are shown in Table 3 and Figure 12.

**Table 3: Sites identified during AHIMS search**

Site ID	Site Name	Context	Recorders
62-1-0174	Thredbo Terrace 1	Open site	Heritage Solutions-Alistair Grinbergs
62-1-0124	TVE 8;	Open site	Kerry Navin
62-1-0125	TVE 9;	Open site	Kerry Navin
62-1-0126	TVE 10;	Open site	Kerry Navin
62-1-0127	TVE 11;	Open site	Kerry Navin
62-1-0128	TVE_7;Tyrolean Village Estate, East Jindabyne;	Open site	Kerry Navin
62-1-0129	TVE_3;Tyrolean Village Estate, East Jindabyne;	Open site	Kerry Navin
62-1-0130	TVE_2;Tyrolean Village Estate, East Jindabyne;	Open site	Kerry Navin
62-1-0137	Rush's Resort 7;	Open site	Kerry Navin, Mr.Kelvin Officer



Site ID	Site Name	Context	Recorders
62-1-0064	Lake Jindabyne East 1;J/ES 1;	Open site	V Chapman,Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd
62-1-0065	Lake Jindabyne East 2;J/ES 2;	Open site	V Chapman
62-1-0066	Rushs Creek 2;J/RC 2;	Open site	V Chapman
62-1-0067	Kunama Gallery;	Open site	V Chapman
62-1-0068	Rushs Creek 3,4,5;J/RC 3,4,5;	Open site	V Chapman
62-1-0141	Rush's Resort 11;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0142	Rush's Resort 12;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0143	Rush's Resort 13;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0144	Rush's Resort 14;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0145	Rush's Resort 15;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0146	Rush's Resort 16;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0147	Rush's Resort 17;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0148	Rush's Resort 18;	Open site	Kerry Navin,Mr.Kelvin Officer
62-1-0155	TVE Isolated Find 2;	Open site	Kerry Navin
62-1-0158	ASE 1;	Open site	Ms.Trish Saunders
62-1-0159	ASE 2;	Open site	P Saunders
62-1-0160	ASE 3; (Not a site)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0161	IF 3;	Open site	P Saunders
62-1-0162	IF 2;	Open site	P Saunders
62-1-0163	IF 1;	Open site	P Saunders
62-1-0114	BLJ 5;	Open site	Margrit Koettig
62-1-0115	BLJ 6;	Open site	Margrit Koettig
62-1-0168	TVE Isolated;Tyvolean Village Estate;	Open site	Kerry Navin
62-1-0042	Lake Jindabyne;Tyrolean Village;J/TV 3;TVE 1;	Open site	Kerry Navin,John Gallard
62-1-0027	Lake Jindabyne;J/TV 6;TVE 5;	Open site	Kerry Navin,John Gallard
62-1-0028	Lake Jindabyne;J/TV 5;	Open site	John Gallard
62-1-0029	Lake Jindabyne;J/TV 8;	Open site	John Gallard
62-1-0037	Lake Jindabyne;J/TV 9;TVE 6;	Open site	Kerry Navin,John Gallard
62-1-0038	Lake Jindabyne;J/TV 10;	Open site	John Gallard
62-1-0039	Lake Jindabyne;J/TV 7;TVE 4;	Open site	Kerry Navin,John Gallard
62-1-0224	EJ 2	Open site	Ms.Trish Saunders





Site ID	Site Name	Context	Recorders
62-1-0225	ASE 4	Open site	Ms.Trish Saunders
62-1-0226	EJ 1	Open site	Ms.Trish Saunders
62-1-0199	Tyrolean Village Estate 12 (TVE12)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0200	Tyrolean Village Estate 13 (TVE13)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0201	Tyrolean Village Estate 14 (TVE14)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0202	Tyrolean Village Estate 15 (TVE15)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0203	Tyrolean Village Estate 16 (TVE16)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0204	Tyrolean Village Estate 17 (TVE17)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0205	Tyrolean Village Estate 18 (TVE18)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0206	Tyrolean Village Estate 19 (TVE19)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0207	Tyrolean Village Estate 20 (TVE20)	Open site	Navin Officer Heritage Consultants Pty Ltd, Ms.Lyn O'Brien, Past Traces Pty Ltd
62-1-0208	Tyrolean Village Estate 21 (TVE21)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0209	Tyrolean Village Estate 22 (TVE22)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0283	Mills Ridge Site 2	Open site	Doctor.Julie Dibden
62-1-0285	KRA 1 (Kunama Ridge 1)	Open site	Ms.Trish Saunders
62-1-0286	KRA 2 (Kunama Ridge 2)	Open site	Ms.Trish Saunders, Biosis Pty Ltd - Wollongong, Mrs.Samantha Keats
62-1-0287	KRA 3 (Kunama Ridge 3)	Open site	Ms.Trish Saunders
62-1-0296	TREAS 1 (The Ridge Estate Artefact Scatter 1)	Open site	Ms.Trish Saunders
62-1-0297	TREAS 2 (The Ridge Estate Artefact Scatter 2)	Open site	Ms.Trish Saunders
62-1-0298	TRE-PAD (The Ridge Estate PAD)	Open site	Ms.Trish Saunders
62-1-0311	IF1 (Tyrolean Village)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0312	IF3 (Tyrolean Village)	Open site	Navin Officer Heritage Consultants Pty Ltd
62-1-0366	ALP2 Cloned	Open site	Ms.Lyn O'Brien, Ms.Lyn O'Brien, Past Traces Pty Ltd, Past Traces Pty Ltd
62-1-0367	ALP1 Cloned	Open site	Ms.Lyn O'Brien, Ms.Lyn O'Brien, Past Traces Pty Ltd, Past Traces Pty Ltd



Site ID	Site Name	Context	Recorders
62-1-0368	ASE10 Cloned	Open site	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd
62-1-0369	ASE9 Cloned	Open site	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd
62-1-0372	Golden Oldie 1	Open site	Doctor.Sue Feary
62-1-0373	Missing Link 1	Open site	Doctor.Sue Feary
62-1-0371	Snowy Hydro Paddock 1	Open site	Doctor.Sue Feary
62-1-0374	Go Jindabyne AFT 1	Open site	Mr.Matthew Barber,NGH Heritage - Fyshwick
62-1-0401	TMTB-AS-01	Open site	Apex Archaeology,Ms.Jenni Bate
62-1-0406	TMTB-PAD-03	Open site	Apex Archaeology,Ms.Jenni Bate
62-1-0407	TMTB-PAD-04	Open site	Apex Archaeology,Ms.Jenni Bate
62-1-0408	TMTB-PAD-05	Open site	Apex Archaeology,Ms.Jenni Bate
62-1-0174	Thredbo Terrace 1	Open site	Heritage Solutions-Alistair Grinbergs
62-1-0019	Jindabyne tip turn off;	Open site	John Gallard
62-1-0022	Lake Jindabyne;J/SWS 4;	Open site	John Gallard
62-1-0024	Lake Jindabyne;J/SWS 1;	Open site	John Gallard
62-1-0025	Lake Jindabyne;J/SWS 2;	Open site	John Gallard
62-1-0026	Lake Jindabyne;J/SWS 3;	Open site	John Gallard
62-1-0229	CT A	Open site	Mr.Matthew Barber
62-1-0211	CT B	Open site	Mr.Matthew Barber
62-1-0212	CT C	Open site	Mr.Matthew Barber
62-1-0214	CT E	Open site	Mr.Matthew Barber
62-1-0215	CT F	Open site	Mr.Matthew Barber
62-1-0216	CT G	Open site	Mr.Matthew Barber
62-1-0217	CT H	Open site	Mr.Matthew Barber
62-1-0218	CT I	Open site	Mr.Matthew Barber
62-1-0219	CT J	Open site	Mr.Matthew Barber
62-1-0220	CT K	Open site	Mr.Matthew Barber
62-1-0221	CT L	Open site	Mr.Matthew Barber
62-1-0381	Lees Creek OS-1	Open site	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher
62-1-0383	Lees Creek IF-1	Open site	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher



Site ID	Site Name	Context	Recorders
62-1-0384	Lees Creek OS-3	Open site	OzArk Environmental and Heritage Management - Dubbo, Mr. Ben Churcher
62-1-0393	Lees Creek OS-4	Open site	OzArk Environmental and Heritage Management - Dubbo, Mr. Ben Churcher
62-1-0394	Lees Creek OS-5	Open site	OzArk Environmental and Heritage Management - Dubbo, Mr. Ben Churcher

The following sites are within the current study area and are detailed below:

**Table 4: Sites within proximity to trails and relevant stage**

Site Name	Site Type	Trail Stage
62-1-0064	Artefact Scatter & PAD	2.1
62-1-0124	Artefact Scatter & PAD	1.1
62-1-0202	Artefact Scatter	1.1
62-1-0371	Artefact Scatter	2.1

All sites within proximity of trails are listed as valid sites.



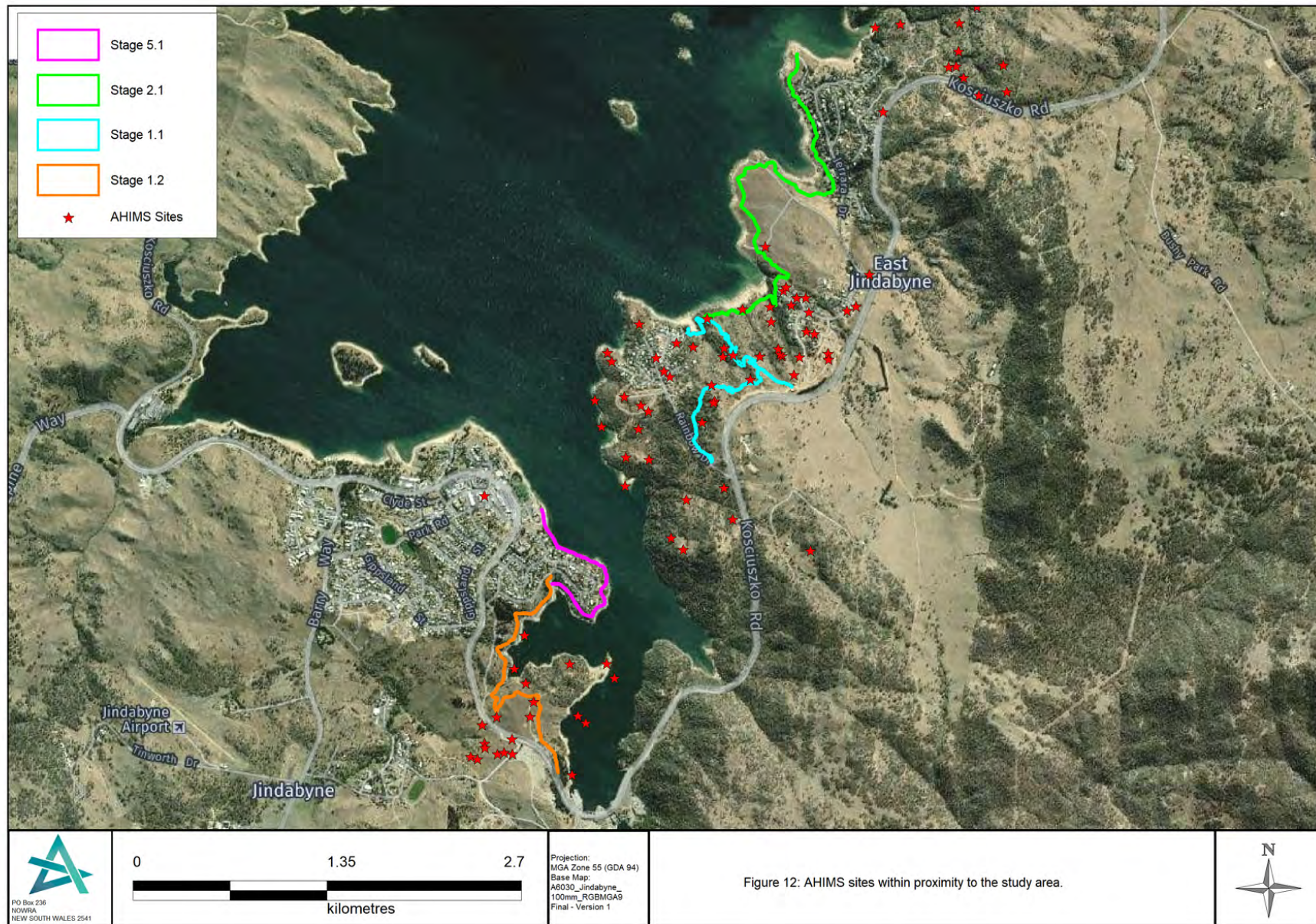


Figure 12: AHIMS sites within proximity to the study area.



### 4.3 PREDICTIVE MODEL

Based on the results of previous archaeological investigations within the wider region, a number of predictions regarding Aboriginal use of the area can be made. These predictions focus on the nature, extent and integrity of the remaining evidence.

The landscape characteristics of the area influence the prediction of the nature of potential sites within the landscape itself. Disturbance is the predominant factor determining whether or not artefacts are likely to be identified within a landscape.

In general, Aboriginal use of an area is based on a number of factors, such as:

- Proximity to permanent water sources – generally permanent or areas of repeat habitation are located within approximately 200m of permanent water;
- Proximity to ephemeral water sources – generally sites near ephemeral water sources were utilised for one-off occupation;
- Ease of travel – ridgelines were often utilised for travel during subsistence activities; and
- The local relief – flatter, more level areas were more likely to be utilised for long term or repeat habitation sites than areas of greater relief, especially if the slopes are at a distance from water.

NGH Environmental (2019) prepared a specific predictive model for the Jindabyne area as part of their Go Jindabyne assessment. Their model states archaeological sensitive landforms within the study area are likely to include:

- Elevated land situated within 2000 metres of major streams or reliable water sources;
- Elevated land situated near the confluence of major streams;
- Any elevated and reasonably flat landforms located in valley contexts on either side of Lake Jindabyne not subject to lake inundation;
- Ridge and spur crests which possess flat or gentle gradients situated within reasonable proximity (within 500m) to sources of reliable water;
- Small scale micro-topographic features of low gradient or benches on otherwise steep landforms;
- Land which contains large boulders or rock outcrops providing shelter; and
- Land which contains outcrops of stone suitable for artefact manufacture.

These predictions can be further refined for the study area, as outlined following.

#### STONE ARTEFACTS

Stone artefacts can be identified on the ground surface or within subsurface deposits. Generally, artefact concentrations are representative of debris from knapping activities, which includes flakes, flake fragments, cores, and pieces likely





to have been knapped but with no or inconclusive diagnostic features, referred to as flaked pieces. Modified artefacts can also be identified, including backed artefacts, scrapers, or edge ground axes, although these are generally a smaller proportion of the artefact assemblage. During excavation, very small debris (~3-5mm) can be identified within sieved material, and is referred to as debitage. This is indicative of in situ knapping activities.

As the detection of stone artefacts relies on surface visibility, factors such as vegetation cover can prevent their identification. Conversely, areas of exposure can assist in their identification. Within the study area, artefacts have been identified on the ground surface, although vegetation cover has reduced the archaeological visibility within this area. It is possible additional artefacts, either in isolation or in concentrations, may be identified within the study area.

Within the Jindabyne area, artefact sites are most likely to occur on broad, relatively level crests, as well as ridgelines and similar landforms. While artefacts have been identified on areas of slope, including both mid and lower slopes, these have been interpreted as secondary depositional contexts related to wash or movement from higher elevations.

#### QUARRY AND PROCUREMENT

Exposures of stone which can be exploited for the production of lithics are referred to as quarries or procurement sites. Quarries generally have evidence of extraction visible, while procurement sites can be inferred through the presence of artefactual material made from raw material sources present within the area.

Previous site records indicate that local materials such as river pebbles were utilised for the manufacture of artefacts, but there is no evidence of active quarrying of material; rather, stones for knapping were collected from the stream banks and beds for use. The underlying geology would have contained quartz, and a number of sites containing quartz artefacts have been identified in the area. Silcrete has also been identified within the study area, but may have been transported to the region from elsewhere.

#### MIDDENS

Middens are concentrations of shell, and may also contain stone artefacts, bone and sometimes human burials. These sites are generally recorded along coastal areas. Middens are formed through the exploitation of locally available species by humans for resources, and accumulation of the shell material within a specific location. Middens can range in size from small, discrete deposits, to deposits covering a large area.

Generally, middens reflect the species available in the local area. In estuarine regions, estuarine species will dominate the composition of the midden, while around headlands, rock platform species tend to dominate. Fresh water can also contain shellfish species, generally in the lower reaches of slow to moderately flowing streams. Prior to its inundation, the Snowy River was a generally fast flowing





river. Given the distance of the study area from the coast and water courses likely to bear shellfish resources, middens within the site are considered unlikely although not impossible to occur within the area.

#### **BURIALS**

Aboriginal people across Australia utilised a range of burial forms, which depended on the customs of the individual tribes. Common burial practices included inhumation, cremation, desiccation and exposure. Burials are known to occur in the wider Snowy Mountains region.

A record in 1895 of a burial site of an older man described how the grave was located on a low, elevated rise. A circular mound rose two and a half feet from the base, and was at least five feet in diameter and over six feet deep. Within this excavation, a dome-like excavation approximately three feet long by two feet high received the body. The opening was then covered by bark and grass, and sealed with flat stone slabs. Three saplings were placed within the cavity, with one at each end and the third placed in the centre once the grave was partially filled. These saplings remained visible above the ground.

The individual buried had been bound, with knees drawn up to the abdomen, elbows to the sides, and hands flat on the face. A blue blanket was then wrapped around the body, and thick fibrous bark was then wrapped over the top. It is considered likely that this burial is that recorded as AHIMS sites 62-1-0186 and 62-1-0149 (NGH 2020:96).

The soil types and underlying geology of the current study area suggests that similar burials would not be possible, due to the limited nature of excavatable soils. It is considered unlikely that burials would be present within the study area.

#### **ROCK SHELTERS**

Rock shelters are formed by rock overhangs which would have provided shelter to Aboriginal people in the past. Often, evidence of this occupation can be found in the form of art and/or artefacts. Shell, midden material, grinding grooves, pictographs (rock engravings), artworks including stencils and paintings, and potential archaeological deposits (PAD) are common features of rock shelter sites.

There are no known rock overhangs within the study area likely to contain rock shelters, and thus this site type is considered unlikely to occur.

#### **GRINDING GROOVES**

Grinding grooves are formed on sandstone exposures through the creation and maintenance of ground edge tools, such as axes and spears. Usually, stone was ground to form a sharp edge, although bone and shell were also ground to create sharp points.

Generally, fine grained sandstone was favoured for these maintenance activities, and the presence of a water source nearby or overflowing the sandstone was also favoured. Grinding grooves range from individual examples through to hundreds of



grooves within an area, sometimes arranged in a specific pattern. Horizontal sandstone was generally preferred, although there are examples of vertical grooves. There may be sandstone outcrops within the study area and thus this site type may occur.

#### SCARRED AND CARVED TREES

Scarred and carved trees are created during the removal of bark from a tree for a range of reasons, both domestic and ceremonial. This type of site can be identified within areas containing trees of the correct species and appropriate age. Deliberately scarred trees can be difficult to differentiate from naturally occurring damage to trees, and specific criteria must be considered when assessing a scar for a cultural origin. A number of scarred trees have been recorded within the area, with subsequent assessment confirming scars to not be cultural in origin.

Given the level of historical clearance and bushfires that have impacted the area in the past, the likelihood of culturally scarred trees remaining within the study area is considered low.

#### CEREMONIAL SITES

Specific places were used for ritual and ceremonial purposes, including initiation and burial practices. Secret rituals were also undertaken at specific places by specific individuals, such as at water holes and by clever men.

The landscape itself was also considered to hold significance to Aboriginal people, and the understanding of this is referred to as a sacred geography. This includes natural features which were associated with spirits or creation beings. The meaning attributed to the landscape provided Aboriginal people with legitimacy regarding their role as guardians of the places which had been created by the spiritual ancestors (Boot 2002).

Many areas within NSW are considered to be sacred to the original inhabitants. There are no known recorded sacred areas within the study area, although this does not preclude these values from existing within this location.

#### CONTACT SITES

Contact sites contain evidence of Aboriginal occupation concurrent with initial colonisers in an area. This could include evidence such as flaked artefacts formed on glass, or burials containing non-Aboriginal grave goods. Often Aboriginal camps would form around newly built towns, allowing for employment (or exploitation) of the Aboriginal people by the colonists, and also for trade to exist between the two communities. Contact sites can also occur around Aboriginal mission sites, where Aboriginal children were taken from their families to raise in the European manner. Families often camped around the mission boundaries to try to catch a glimpse of their children.

There is no known evidence of initial contact between Aboriginal people and colonists within the study area, although it may have been possible. The probability of evidence of contact sites occurring within the study area is considered low.



#### SUMMARY

In terms of the study area, sites are considered more likely to comprise stone artefact concentrations or isolated finds. There is some potential for grinding groove sites to occur where suitable outcrops of sandstone are located, and procurement sites for river pebbles may also be present within the study area.



## 5.0 FIELD WORK

### 5.1 SAMPLING STRATEGY

A sampling strategy was developed and provided to the Registered Aboriginal Parties (RAPs) as part of the consultation process completed for the ACHA. The strategy included assessment of all landforms within the study area that have the potential to be impacted by the proposed development. Areas considered likely to have archaeological potential were closely scrutinised, although the entire study area was considered.

The sampling strategy included assessment of the entirety of the study area due to the nature of the development proposal, in order to provide an accurate assessment of the study area in relation to the proposed impacts.

### 5.2 SITE INSPECTION

A site survey was undertaken in May 2022 by Apex Archaeology and Ron Thomas of Bega LALC.

### 5.3 SURVEY COVERAGE

Given the nature of the project being within linear development corridors, transects were directly attributed to the trail network stages itself. Each stage was surveyed twice. Walking the entirety in one direction then returning over the same trail to the start point.

Four routes/stages were assessed. Stage 1.1, 1.2, 2.1 and 5.1.

The survey was conducted on foot for the purposes of discovering Aboriginal objects within the study area, including areas considered to have potential for subsurface objects to be present. The survey was undertaken in accordance with the sampling strategy prepared for the project.

The survey was undertaken with two survey participants for each stage. Each participant was responsible for inspecting a 2m wide portion of the trail section walked. This meant that on each pass an area covering 4m would be observed for archaeological material.



<b>JST Stage:</b>	1.1	<b>Survey Area:</b>	Tyrolean Village to Kunama Estate and Rainbow Beach
<b>Number of Survey Participants:</b>	2		
<b>Landform Element:</b>	Hill Slope	<b>Distance to Watercourse:</b>	Intersects watercourse
<b>Slope:</b>	Moderate (>5.45°-18°)	<b>Vegetation:</b>	Cleared/Regen
<b>Detection Limiting Factors:</b>	Vegetation, Leaf Litter	<b>Ground Disturbance:</b>	Moderate
<b>Trail Length:</b>	2.7km	<b>Ground Surface Visibility:</b>	60%
<b>Total Area surveyed</b>	10,800m <sup>2</sup>	<b>Archaeological Visibility:</b>	25%



Plate 2: Stage 1.1 looking north over AHIMS site 62-1-0124.

<b>Closest AHIMS Site:</b>	On alignment AHIMS # 62-1-0124
<b>Newly Recorded Sites:</b>	JST1.1-IF-01





JST Stage:	1.2	Survey Area:	Cobbon Crescent to Dam Wall
Number of Survey Participants:	2		
Landform Element:	Hill Slope	Distance to Watercourse:	Intersects watercourse
Slope:	Gentle >1.45°-5.45°	Vegetation:	Cleared
Detection Limiting Factors:	Vegetation, Leaf Litter	Ground Disturbance:	Moderate
Trail Length:	2.1km	Ground Surface Visibility:	60
Total Area surveyed	8,400m <sup>2</sup>	Archaeological Visibility:	25



Plate 3: Stage 1.2 looking south over Lees Creek.

Closest AHIMS Site:	33m from alignment. AHIMS # 62-1-0217
Newly Recorded Sites:	JST1.2-IF-01, JST1.2-IF-02 & JST1.2-IF-03





<b>JST Stage:</b>	2.1	<b>Survey Area:</b>	Kunama Estate and Rainbow Beach to East Jindabyne
<b>Number of Survey Participants:</b>	2	<b>Distance to Watercourse:</b>	Intersects watercourse
<b>Landform Element:</b>	Hill Slope	<b>Vegetation:</b>	Cleared, Regen
<b>Slope:</b>	Moderate (>5.45°-18°)	<b>Ground Disturbance:</b>	Moderate
<b>Detection Limiting Factors:</b>	Vegetation, Leaf Litter	<b>Ground Surface Visibility:</b>	55%
<b>Trail Length:</b>	3.6km	<b>Archaeological Visibility:</b>	30%
<b>Total Area surveyed</b>	14,400m <sup>2</sup>		



**Plate 4: Stage 2.1 looking north east along sandy beach.**

<b>Closest AHIMS Site:</b>	Artefact scatter and area of PAD on the alignment AHIMS site 62-1-0064.
<b>Newly Recorded Sites:</b>	JST2.1-IF-01 & LVT-AS-01



<b>JST Stage:</b>	5.1	<b>Survey Area:</b>	Banjo Patterson Park to Cobbon Crescent
<b>Number of Survey Participants:</b>	2		
<b>Landform Element:</b>	Hill Slope	<b>Distance to Watercourse:</b>	97m to original Snowy River alignment
<b>Slope:</b>	Gentle >1.45°-5.45°	<b>Vegetation:</b>	Cleared, Residential Gardens
<b>Detection Limiting Factors:</b>	Vegetation, Leaf Litter	<b>Ground Disturbance:</b>	High (urban)
<b>Trail Length:</b>	1.4km	<b>Ground Surface Visibility:</b>	35%
<b>Total Area surveyed</b>	5,600m <sup>2</sup>	<b>Archaeological Visibility:</b>	15%



Plate 5: Stage 5.1 looking south east from the northern end of stage 5.1.

<b>Closest AHIMS Site:</b>	394m from northern start point of alignment. AHIMS # 62-1-0174
<b>Newly Recorded Sites:</b>	TS-ASPAD-01





All surveyed trails are summarised in Table 5.

**Table 5: Survey transects**

Survey Transect (Trail Stage)	Landform Element	Number of participants	Total Length
1.1	Hill Slope	2	2.7km
1.2	Hill Slope	2	2.1km
2.1	Hill Slope	2	3.6km
5.1	Hill Slope	2	1.4km

During the survey completed by the field team the study area was inspected for Aboriginal archaeological evidence. An assessment of landform element and slope was made for the study area, with the results presented in Table 6.

**Table 6: Survey unit results**

Survey Unit/ Stage	Landform Element	Slope	Vegetation	Detection Limiting Factors	Ground Disturbance
1.1	Hill Slope	Moderate	Cleared, Regen	Vegetation, Leaf Litter	Moderate
1.2	Hill Slope	Gentle	Cleared	Vegetation, Leaf Litter	Moderate
2.1	Hill Slope	Moderate	Cleared, Regen	Vegetation, Leaf Litter	Moderate
5.1	Hill Slope	Gentle	Cleared, Residential Gardens	Vegetation, Leaf Litter	High

The total survey coverage (meaning the areas physically inspected for archaeological evidence) was approximately 39,200m<sup>2</sup>. The total area of the development impact is approximately 19,600m<sup>2</sup>. A range of factors were considered and recorded during the survey, including the surface visibility (percentage of bare ground within a survey unit); archaeological visibility (amount of bare ground within an area in which artefacts could be expected to be identified if present); exposure type (A or B soil horizon) and calculations of how effective the survey coverage was. The results of the survey coverage are presented in Table 7. Given the linear nature of the proposed development a greater area was surveyed than what is proposed to be impacted.



Table 7: Survey coverage results

Survey Area/ Stage #	Total Area Surveyed (m <sup>2</sup> )	Surface Visibility (%)	Arch Vis (%)	Exposure Type (A/B)	Effective Coverage (m <sup>2</sup> )	% Effective Survey Coverage of Context
1.1	10,800	60	25	A	1,620	15
1.2	8,400	60	25	A	1,260	15
2.1	14,400	55	30	A	2,376	16.5
5.1	5,600	35	15	A	294	5.25

Surface visibility across the study areas was fairly high due to the unsanctioned trail use. Total effective survey coverage for the entire survey area was 5,390m<sup>2</sup> (Table 8).

Table 8: Total effective survey coverage results

Survey Area/ Stage #	Total Area of Development Impact (m <sup>2</sup> )	Total Area Surveyed (m <sup>2</sup> )	Mean Surface Visibility (%)	Mean Arch Vis (%)	Exposure Type (A/B)	Effective Coverage of survey area (m <sup>2</sup> ) (%)	% Effective Survey Coverage of Entire Context
1.1, 1.2, 2.1, 5.1	19,600m <sup>2</sup>	39,200m <sup>2</sup>	55	25	A/B	5,390	27.5

Effective survey coverage of the entire survey area was 27.5%.

#### 5.4 SURVEY RESULTS

The study area falls within an area of High Archaeological Potential as defined by Figure 6-2 predictive model for Aboriginal site within the Environment and Heritage Study, Go Jindabyne 2036 Masterplan, produced by NGH in 2019 (Figure 13).

The area has clearly been disturbed by unsanctioned trail building over a number of years and has been managed by numerous entities over the years. As such a number of registered and newly identified Aboriginal sites have been impacted by Mountain biking and trail stewardship practices.

Ground surface visibility (GSV) was high throughout the trail network. GSV was rated at 55% overall. No raw material sources were identified throughout the area.

Four previously recorded AHIMS sites are located within the study area. All four site locations were relocated; objects from all four sites were reidentified. Additional assessment was undertaken of the previously recorded sites to delineate site extents (surface and subsurface potential), however site extents in this instance are extremely fluid given the nature of the surface scatter locales. There are a range of



taphonomic process and site disturbance factors that will influence further artefact drift given the active and ongoing use of the site. These factors include sheet wash, erosion and trail maintenance along with repeated riding over the areas.

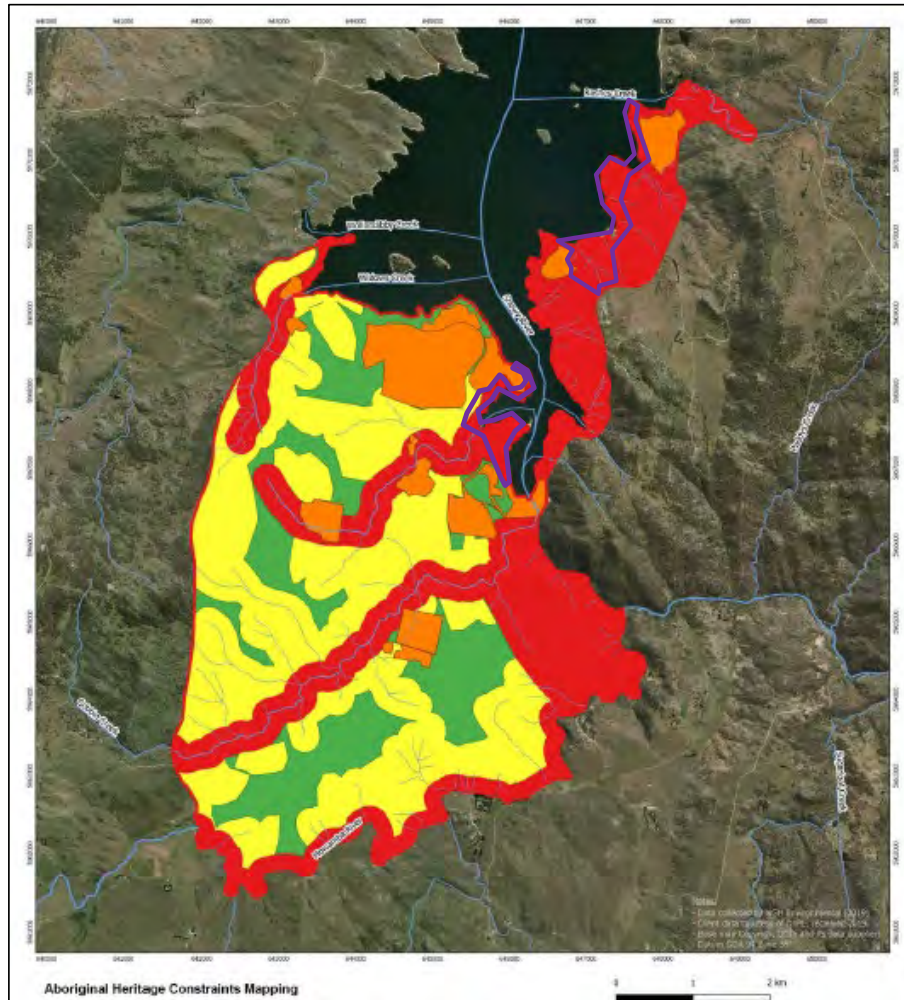


Figure 13: Predictive model for Aboriginal sites (Aboriginal Heritage Constraints Mapping). Study area outlined in purple (Source NGH 2019).

### 5.5 NEW SITES

Eight additional new sites were identified during the survey (Table 9). These comprised three isolated finds, one artefact scatter with potential archaeological deposits (PAD) and five PAD sites. Assessment of one of the isolated finds (TNTB-IF-03) identified that the site is most likely part of a previously registered site, AHIMS #62-1-0373. The indicative PAD area associated with this site has been refined and includes the newly identified isolated find. Accordingly, this site has not been



discussed as a 'new' site further within this report. All other newly identified sites have been registered as new sites with AHIMS.

Although a number of areas of PAD were identified within the study area, it should be noted that these exclude existing trails which pass through the PAD itself. None of the trails themselves were noted to have potential for subsurface archaeological deposits to be present within the existing trail surface.

**Table 9: Newly Identified sites within the study area.**

Site Name	AHIMS #	Site Type	Context
JST1.1-IF-01	62-1-0419	Isolated Find	Open
JST1.2-IF-01	62-1-0413	Isolated Find	Open
JST1.2-IF-02	62-1-0414	Isolated Find	Open
JST1.2-IF-03	62-1-0415	Isolated Find	Open
JST2.1-IF-01	62-1-0417	Isolated Find	Open
JST2.1-AS-01	62-1-0416	Artefact Scatter	Open
TS-ASPAD-01	62-1-0418	Artefact Scatter & PAD	Open
LVT-AS-01	62-1-0419	Artefact Scatter & PAD	Open

#### **JST1.1-IF-01 (AHIMS # 62-1-0412)**

This quartz isolated find was located within Stage 1.1 midslope along a ridgeline on a level area approximately 250m north of Kosciuszko Road. The artefact was located on the ground surface of an existing unsanctioned trail, and was considered to be in a disturbed, secondary depositional context.



**Plate 6: Quartz artefact associated with JST1.1-IF-01**





**JST1.2-IF-01 (AHIMS # 62-1-0413)**

This silcrete flake was located within Stage 1.2, at the base of a slope and unactioned access track leading to the shore of Lake Jindabyne. The item is in a secondary depositional context likely shifted from a point higher up the slope due to sheet wash and erosion.



Plate 7: Silcrete flake associated with JST1.2-IF-02

**JST1.2-IF-02 (AHIMS # 62-1-0414)**

One quartz flake was identified within Stage 1.2 east of Lees Creek. The item was located within existing unsanctioned trail.



Plate 8: Quartz flake associated with JST1.2-IF-02



**JST1.2-IF-03 (AHIMS # 62-1-0415)**

One silcrete flake was identified approximately 100m south east of the Lees Creek crossing within existing unsanctioned trail alignment.



Plate 9: Silcrete flake associated with JST1.2-IF-03.

**JST2.1-IF-01 (AHIMS # 62-1-0417)**

A silcrete flaked piece was identified within the existing unsanctioned alignment within stage 2.1. This alignment section was subsequently re-evaluated and realigned further east and thus this site will not be impacted by the current proposal. However it should be noted that unsanctioned MTB use may still impact this site unless closure of this section is undertaken.



Plate 10: Looking north over JST2.1-IF-01





**JST2.1-AS-01 (AHIMS # 62-1-0416)**

This artefact scatter is located just south east of the pumping station on the shore of Lake Jindabyne at the end of Old Kosciuszko Road. Two quartz flakes were identified in an area proposed for new trail alignment.



Plate 11: Looking north over JST2.1-AS-01

**TS-ASPAD-01 (AHIMS # 62-1-0418)**

This area of Artefact Scatter with associated Potential Archaeological Deposit (PAD) is located between Lake Jindabyne and an existing residence. The area has been cleared and maintained and is being used by the home owners directly south of the site within 33 Townsend Street, however the land is council owned.



Plate 12: Looking north over TS-ASPAD-01.



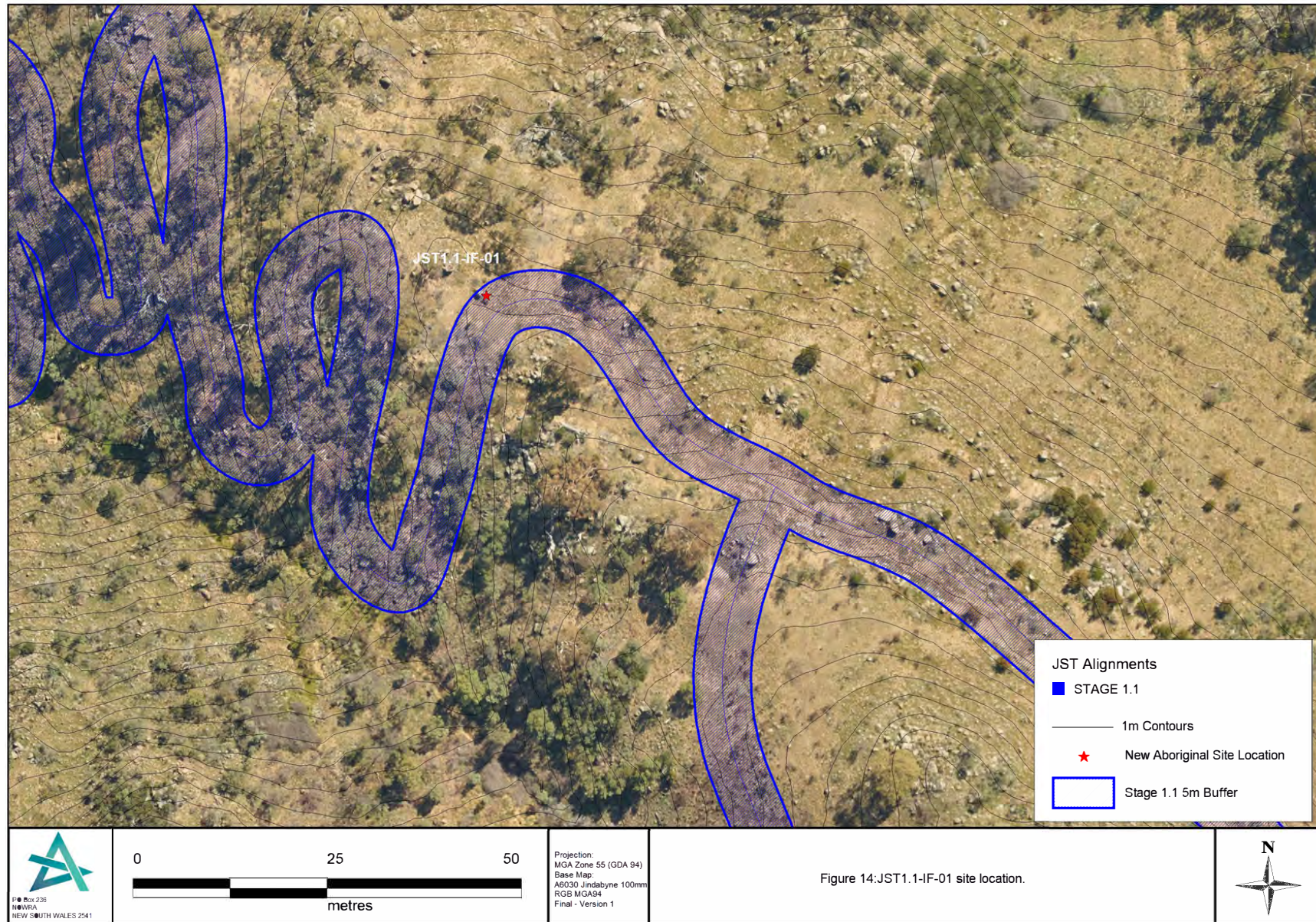
**LVT-AS-01 (AHIMS # 62-1-0419)**

This area is located just north of Lakeview Terrace behind 18 Lakeview Terrace. An unsanctioned trail has been developed by local pedestrian and MTB use through the site. Two silcrete artefacts and an area of Potential Archaeological Deposit (PAD) were identified.



Plate 13: Looking east over LVT-AS-01 with existing trail running through it.

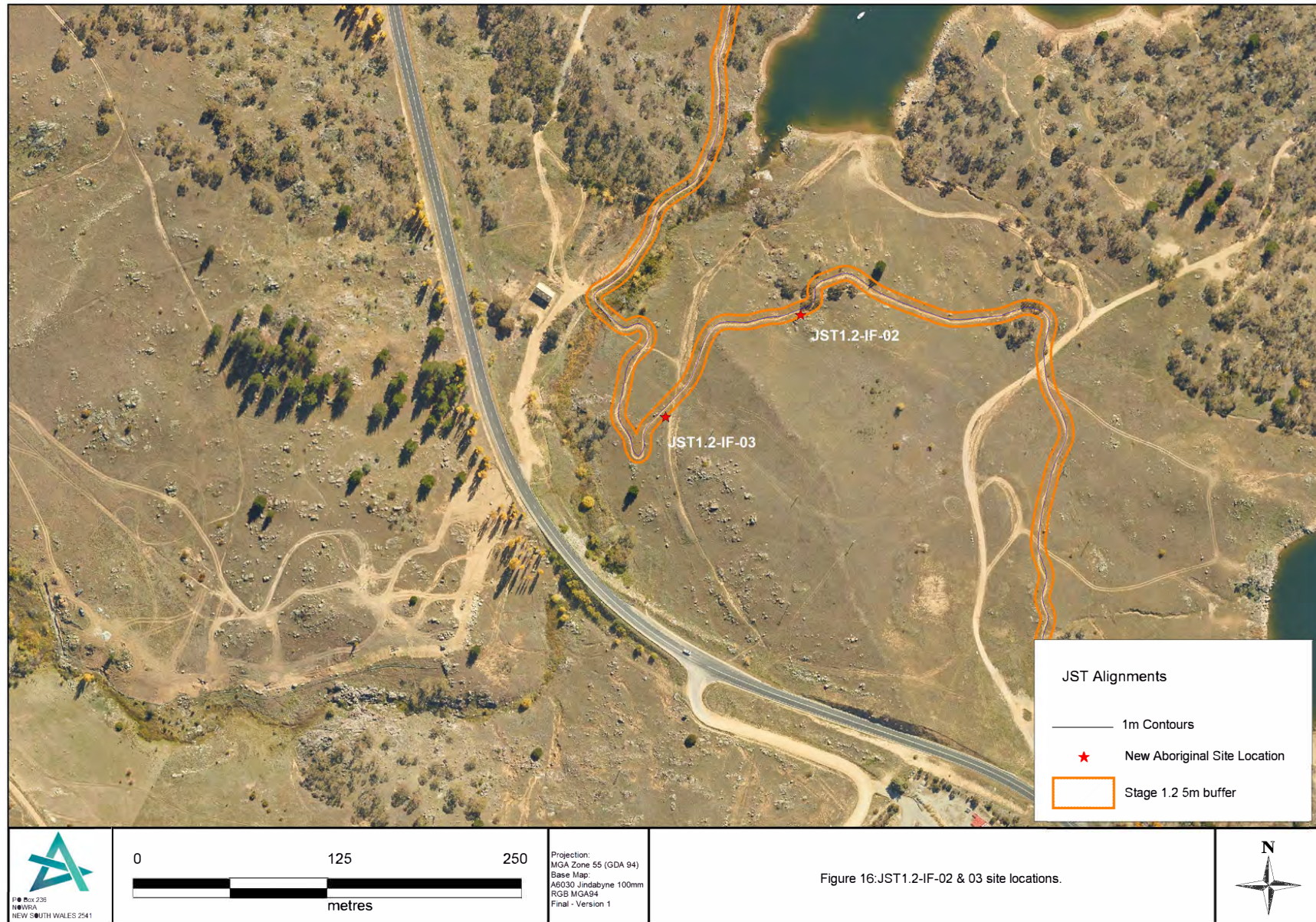








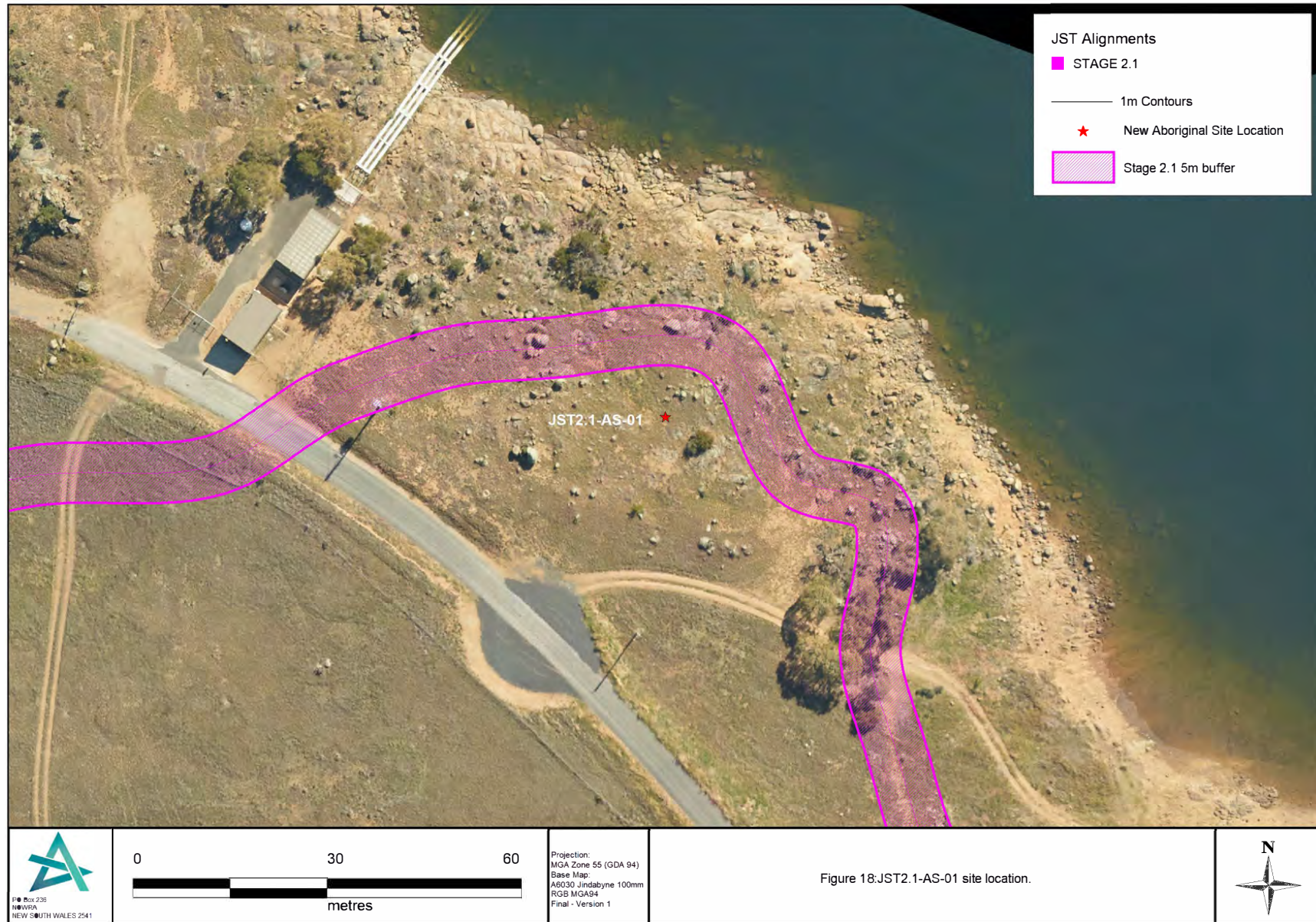








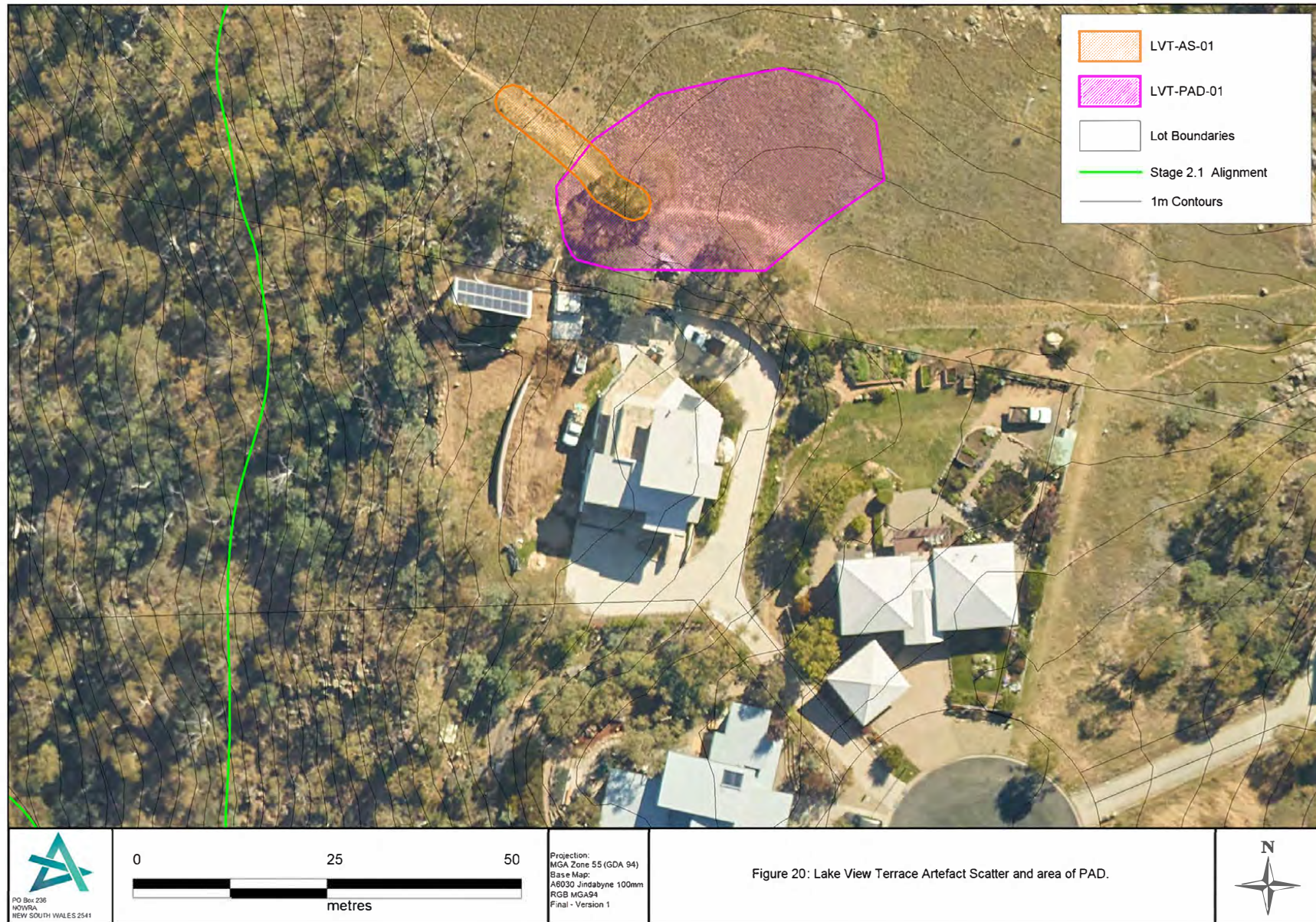
















### 5.6 DISCUSSION

The entirety of the existing/proposed trails were inspected as part of the site inspection. Based on predictive modelling and results of previous assessments in the region, there are some areas considered to retain evidence of Aboriginal occupation.

An existing unsanctioned network of trails exists within the current study area, with several areas considered to have potential for additional subsurface artefact deposits to be present. The trails themselves have generally been excavated when created, with the excavated material pushed to either side to create berms. Excavation has been to a depth of up to approximately 20-50cm in some areas (Plate 14). Usage of these tracks by bike riders, particularly when wet, further erodes and deepens the trails.



Plate 14: Looking north within stage 1.2 at unsanctioned MTB trail and level of disturbance into deposit.





Table 10: Newly identified sites

Site Name	AHIMS #	Site Type	Context
JST1.1-IF-01	62-1-0412	Isolated Find	Open
JST1.2-IF-01	62-1-0413	Isolated Find	Open
JST1.2-IF-02	62-1-0414	Isolated Find	Open
JST1.2-IF-03	62-1-0415	Isolated Find	Open
JST2.1-IF-01	62-1-0417	Isolated Find	Open
JST2.1-AS-01	62-1-0416	Artefact Scatter	Open
TS-ASPAD-01	62-1-0418	Artefact Scatter & PAD	Open
LVT-AS-01	62-1-0419	Artefact Scatter & PAD	Open

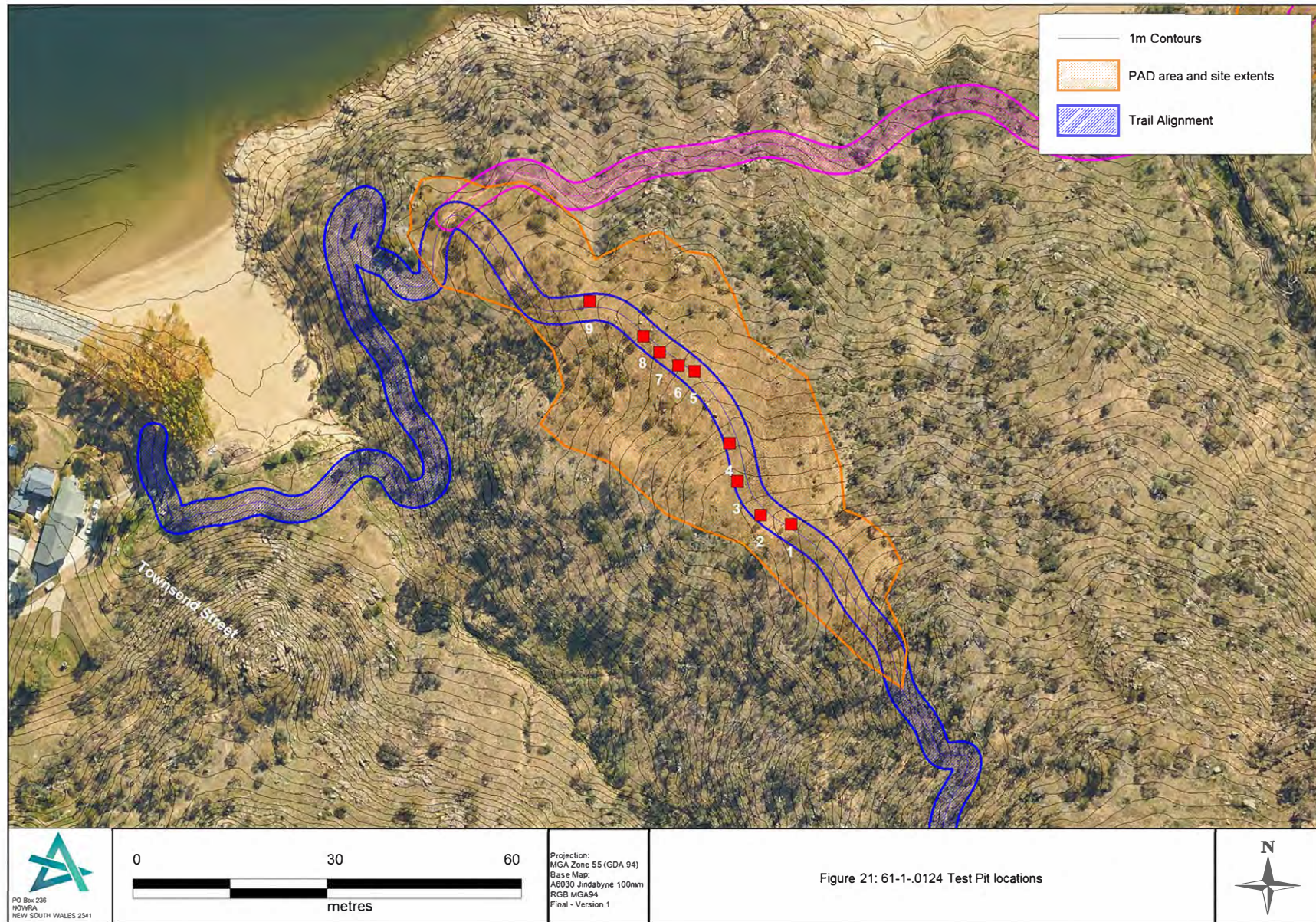
As a result, some areas to either side of the existing trail may retain potential for subsurface deposits to be present, but the trails themselves are considered unlikely to have subsurface archaeological potential within the existing disturbance corridors. However, artefacts may have been within the deposit pushed to the sides, and thus may wash onto the tracks during wet weather, or may be dislodged during use of the trails. Any PAD outside of the existing trails is likely to be constrained to relatively flat areas, on ridgelines or crests, such as shown in Figure 19 and Figure 20.

The site inspection noted deposit to be minimal to skeletal along the majority of existing trails. Any intact evidence of Aboriginal occupation of the area is considered to have been disturbed through the creation of the existing trails, although it is noted that artefacts are located on the trail surface in multiple locations. The existing trails are considered unlikely to retain subsurface deposits due to the existing levels of disturbance. Sections of stage 1.2 and 2.1 where new trail is proposed however still retain potential for sub-surface deposits to occur and thus to have potential for surface or subsurface deposits to be present, undertaking test excavation within these areas is considered warranted.

### 5.7 TEST EXCAVATION RESULTS

Two areas of proposed new trail pass through areas of Potential Archaeological Deposit (PAD), namely 61-1-0124 and 61-1-0064. One area with newly identified sub surface potential will be avoided and as such will not need further mitigation. It was necessary to determine the nature and extent of the archaeological deposits within the areas proposed to be impacted to assist in developing mitigation and management measures for the project. As a result, test excavation was undertaken within two areas, with nine 50x50cm test pits excavated at Test Area 1 (61-1-0124) as shown on Figure 21 and six 50x50cm test pits excavated at Test Area 2 (61-1-0064) as shown on Figure 22. Test pits were a maximum depth of 40cm, with an average depth of 25cm. The test pits were constrained to the trail alignment given the narrow impact corridor. A total of 31 objects were recovered during the excavation and are detailed in the following section.











## 6.0 LITHIC ANALYSIS

### 6.1 INTRODUCTION

This section has been prepared by Dr Beth White of Beth White Archaeology, and provided an analysis of Aboriginal lithic objects from a test excavation of two sites for the Jindabyne Shared Trail Network. The sites were located at Tyrolean, near Willow Bay, on the east side of Lake Jindabyne. A total of 31 objects were recovered, with 28 in site A1 and three in site A2.

These objects constituted a small sample but two notable observations arose from the analysis. Firstly, there was a suggestion that good quality materials – silcrete, fine-grained quartzite and occasionally good quality quartz – were flaked to late-stage reduction by bipolar flaking to produce flakes from very small cores. In addition a single broken backed artefact was of silcrete, suggesting use of good quality stone for formal (shaped) implements. In contrast most quartz objects were of fairly poor quality stone and some were relatively large. A few retained cortex or patinated surfaces suggesting procurement of cobbles or reef quartz. Quartz cobbles could have occurred naturally within the bedload of the Snowy River (now inundated by Lake Jindabyne), but silcrete and quartzite were probably obtained from more distant sources. There appeared to be two technological strategies in place: procurement and flaking of locally available, but often poor quality quartz, and a second strategy of more late-stage flaking of good quality silcrete and quartzite transported from further afield. The bipolar core of fairly good quality quartz indicated some cross-over of these two technological strategies.

The second, somewhat tentative finding, was that silcrete and quartzite objects occurred in the upper 20 cm of deposit while quartz objects occurred throughout the deposit down to 30 cm depth. This vertical distribution suggested change through time with quartz used during all phases of occupation but silcrete and quartzite used more often during more recent occupation. However larger numbers of objects from more extensive excavation (recovery of more lithic activities) would be needed to investigate this observation before it could be accepted as an established finding. Intriguingly a brief reworking on the Highview Estate test excavation data (CHMA 2018) suggested a similar trend.

#### 6.1.1 STUDY BRIEF AND CONSTRAINTS

The brief for this study was to record and analyse lithic objects recovered from the test excavation and to assist Apex Archaeology in their assessment. The test excavation was conducted under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).

The Code of Practice sets out requirements relating specifically to lithic objects of which requirements 18, 19 and part of 26 are most relevant to objects recovered by test excavations:





- Requirement 18 includes identifying the types of activities which were conducted and evidence for technological change over time (see below sections 6.1.2 and 6.1.3),
- Requirement 19 states that attributes to be recorded are those on the DECCW AHIMS artefact recording form. The methods used to record objects and meet this requirement are described in Appendix B.
- Requirement 26 states that a full catalogue of objects should be prepared, including photographic and drawn records for diagnostic stone artefacts if they are to be reburied. The catalogue is included in Appendix C. Photographs and drawings are included in the body of this report as relevant.

### 6.1.2 DEFINING ACTIVITIES – REQUIREMENT 18

Lithic objects resulted from sequences of actions relating to the procurement, reduction and use of stone, from when a person first picked up a rock to its moment of discard, and perhaps subject to further actions after discard (e.g. trampling, breakage, burial, reuse). The nature of activities could have varied, potentially resulting in the discard of artefacts with different attributes (Vaquero et al. 2012; Way 2018; White 2012). Literature review had previously identified the following kinds of activities which involved and/or produced stone artefacts: procurement of stone at its source (e.g. a quarry), transport, heat treatment to improve flaking qualities of the stone, reduction of cores to produce flakes, production of shaped tools (e.g. backed artefacts), hafting, tool use, maintenance (retouching) of tool edges, stockpiling, storage (or caching), recycling (reuse of previously discarded stone) and discard (White 2012). The nature of activities were potentially identifiable by technical attributes of artefacts and manuports, and by their context (where they occurred and other artefacts or items they were associated with). Small size (especially artefacts less than 10mm in maximum size) generally indicated on-site flaking while larger artefacts could have been produced by on-site flaking or carried (transported) around the landscape (White 2012).

Rock type was useful for distinguishing objects from separate activities because artefacts of different rock types must have originated from different pieces of stone. Some rock types were heterogeneous, such that different pieces of the same rock type had different grain size, inclusions, banding patterns, flowlines or flaws. Sometimes such rock types could be subdivided into separate analytical nodules (raw material units) which could assist more precise identification of separate lithic activities (Andrefsky 2009; Larson and Ingbar 1992; Way 2018; White 2012).

Conjoining (refitting objects to other objects) could have been useful because it could demonstrate that some objects came from the same piece of stone (e.g. flakes conjoined to each other or to a core or tool) or that some objects could not join due to different size, shape or other attributes. Technical traits or observations may also indicate the nature of activities such as flaking stone in different stages of reduction, different core flaking patterns, or production of distinctive tool forms such as backed



artefacts (Way 2018; White 2012). However as test pits sampled very small areas of land conjoining was of limited utility for test excavation assemblages.

A large body of literature discussed how and why people obtained lithic materials, carried them around landscapes, flaked stone to produce different kinds of tools, resharpened tools, and left objects on sites. It is now understood that such technological acts were underlain by social practices, such as how often people moved their residences, the extent of country over which people routinely travelled, and the locations and associations with other social groups with whom they traded/exchanged (e.g. Bamforth 1991; Guilfoyle 2005; Kelly 1992; Kuhn 1989; Mackay 2005; McBryde 1986; Nelson 1991). Hence comparison of test excavation data from different projects could potentially identify patterns relating to use of the larger landscape.

### 6.1.3 DEFINING TECHNOLOGICAL CHANGE – REQUIREMENT 18

Requirement 18 also states that recording should “...identify... significant changes in the technologies used to produce stone artefacts throughout time...” (DECCW 2010:28). Several sites in the region indicated that people were present prior to, and during, the Last Glacial Maximum (LGM, last Ice Age, c.22,000-18,000 cal.BP, Petherick et al. 2013) and more recently. In the Namadgi Ranges the deepest artefact at Birrigai rock shelter occurred in deposits dated to 25,750-34,600 cal BP (Flood 1973; Flood et al. 1987; Theden-Ringl 2016). An LGM age determination was obtained from Cloggs Cave in the Victorian Alps (23,590-19,500 cal BP, Flood 1973; Theden-Ringl 2016) and from the South Coast and its hinterland ranges at Bass Point (22,303-19,136 cal BP, Bowdler 1976), at Bulee Brook 2 (23,001-22,415 cal BP, Boot 1994, 2002) and at Burrill Lake (26,996-23,332 cal BP, 26,909-23,254 cal BP, Lampert 1971). In contrast, Aplin et al. (2010) noted that such sites were located below 1,000 metres AHD and that questions remained as to the antiquity of human occupation of higher country. In this regard Yarrangobilly rock shelter site Y259 was occupied on multiple occasions during the Early Holocene, between c.9,700 and 9,100 cal BP when climate was warmer and wetter.

A recent research project in the Namadgi Ranges, located c.65-120 km north-north-east of the current sites, investigated the nature of technological change (Theden-Ringl 2016, 2017). While early age determinations were obtained for Birrigai rock shelter (above), most of the lithic objects at sites with age determinations were less than 7,000 years old and most sites were occupied within the last 2,000 years. This could have reflected a combination of the nature of human occupation as well as site survival (Theden-Ringl 2016), as younger sites were more likely to have survived than older sites (Hiscock 2008). Four phases of occupation were identified: Phase 1 predated 7,800 cal BP, Phase 2 was dated between 6,700 cal BP and 4,800 cal BP, Phase 3 was short, dating from 2,100 cal BP to 1,700 cal BP, and Phase 4 was dated to less than 1,000 cal BP. Most objects were of quartz, with other lithic materials increasing slightly through time, making up less than 20% of objects at most. Cores and flakes tended to be smaller after 1,000 cal BP than before 4,800 cal BP. Four





backed artefacts dated within the last 1,000 years. A few thumbnail scrapers ranged in age from more than 4,900 years old to less than 1,000 years old. Some quartz bipolar artefacts were present in most phases, with bipolar flaking used to reduce small and/or pebble cores (Theden-Ringl 2017).

Recent excavations at Kunama Ridge, located less than 1 km and c.50 m above the current sites, identified intensive flaking of silcrete, and backed artefacts, associated with an age determination of  $4,188 \pm 17$  BP (lab code not cited) equivalent to 4,835-4,627 cal BP (Biosis 2019). This was substantially older than the backed artefacts in the Namadgi Ranges, and indicated that people used silcrete in the Jindabyne area within this time frame.

East Jindabyne and Tyrolean were generally located just below 1,000 m above sea level, within a major river valley. This landscape could potentially have retained important evidence of human occupation within the threshold of environmental zones, highly sensitive to climate change (Aplin et al. 2010).

## 6.2 ANALYSIS OF OBJECTS FROM THE CURRENT TEST EXCAVATION

### 6.2.1 LITHICS IN TEST PITS

A total of 31 cultural objects were recovered from the test excavations, consisting of 27 flaked artefacts, a broken manuport cobble and 3 other pieces of broken stone likely to have had a cultural origin. The objects occurred in six of nine test pits in A1 and in three of six test pits in A2 (Table 11). Three test pits in A1 had notable counts, being TP3 with seven objects, TP6 with five objects and TP7 with 11 objects. Objects occurred at varying depths in the deposit – high in the deposit in TP6 and middle to low in the deposit in TP3 and TP7. Based on discrete spatial location and type and nature of lithic materials, the 31 objects derived from at least 15 lithic activities (see below).

**Test pit 1.** A single quartz proximal broken flake, with new damage distally (Plate 15), was recovered from spit 3 (at least one lithic activity).

**Test pit 3.** Seven objects were recovered, including a broken silcrete backed artefact in spit 3 (Plate 16, Figure 23), and six quartz objects in spit 5 and spit 6. The quartz objects were of fairly poor quality stone and appeared to derive from a single flaking event. Substantial cortex cover occurred on two objects (Plate 17). Together the quartz objects weighed nearly 23 grams. Allowing for incomplete recovery of the flaking event and presence of cortical objects, the evidence suggested that a cobble or cobble piece was flaked at this location. As the silcrete backed artefact was higher in the deposit it may have been discarded during a more recent activity, although more extensive excavation would be needed to better assess the vertical relationships of objects at this location. The objects derived from at least two lithic activities.



Table 11 Distribution of lithic objects.

Spit	Test pit in A1									Test pit in A2						Total objects
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1						1		1								2
2					1	4						1	1			7
3	1		1				4				1					7
4							6	1								7
5			5				1									6
6			1					1								2
7																0
8																0
9																-
Total	1	0	7	0	1	5	11	3	0	0	1	1	1	0	0	31

Note to Table 11. Blue shading denotes unexcavated basal deposit.



Plate 15 Proximal broken flake of quartz #1 from TP1 spit 3.

Scale is 5mm long, subdivided into 1mm increments.



Plate 16 Proximal broken backed artefact of fine-grained silcrete #2 from TP3 spit 3.

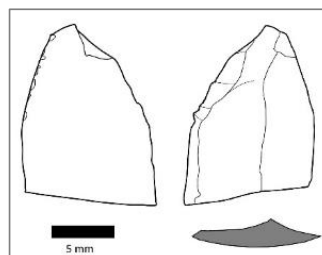


Figure 23 Proximal broken backed artefact of fine-grained silcrete #2 from TP3 spit 3.

**Test pit 5.** A single quartz proximal broken flake (Plate 18), was recovered from spit 2 (at least one lithic activity).

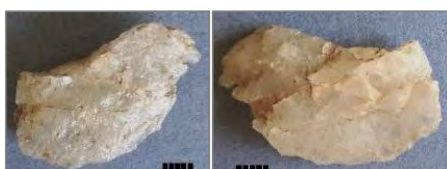


Plate 17 Quartz distal piece with dorsal cortex #4 from TP3 spit 5.

Scale is 5mm long, in 1mm increments.

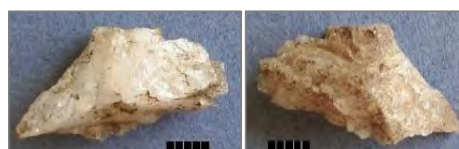


Plate 18 Proximal broken flake of quartz #9 from TP5 spit 2.

Scale is 5mm long, subdivided into 1mm increments.



**Test pit 6.** Four quartz objects and two pieces of rough silcrete (which did not appear to have been flaked) were recovered from spit 1 and spit 2. One quartz object (Plate 19) was a piece of a relatively large flake. The objects derived from at least two lithic activities.



**Plate 19: Medial flake piece of quartz #10 from TP6 spit 1.**  
Scale is 5mm long, subdivided into 1mm increments.

**Test pit 7.** Eleven objects were recovered, eight of quartz, two of silcrete and one of fine-grained grey quartzite. One pale grey-cream silcrete object (#16) was a small fragment of a broken bipolar flake. The second silcrete object was a flaked piece of similar stone. The fine-grained quartzite object was a bipolar core (Plate 20). A fairly good quality quartz object also showed bipolar flaking (Plate 21). Two broken quartz objects (Plate 22, Plate 23) measured 38 mm and 41 mm respectively, indicating that the unbroken flakes would have been even larger. The proximal broken flake (#27, Plate 23) had a brownish patinated surface on part of its dorsal indicating that it was struck from a flawed block of stone or perhaps a piece of reef quartz. A broken piece of quartz in spit 3 (#19) had a similar surface. The objects derived from at least three, possibly more, lithic activities.



**Plate 20 Bipolar core of fine-grained quartzite #20 from TP7 spit 4.**  
Scale is 5mm long, subdivided into 1mm increments.



**Plate 21 Bipolar core of good quality quartz #22 from TP7 spit 4.**  
Scale is 5mm long, subdivided into 1mm increments.



**Plate 22** Quartz medial flake piece #23 from TP7 spit 4.  
Scale is 5mm long, subdivided into 1mm increments.



**Plate 23** Quartz proximal broken flake #27 from TP7 spit 4.

**Test pit 8.** Three objects were present. A pale cream-grey silcrete distal fragment occurred in spit 1 (Plate 24), a dark very fine-grained silcrete proximal broken flake occurred in spit 4 (Plate 25) and a much larger quartz proximal broken flake, weighing 35.5g) occurred in spit 6 (Plate 26). The objects derived from at least three lithic activities



**Plate 24** Silcrete distal piece #28 from TP8 spit 1.



**Plate 25** Very fine-grained dark silcrete proximal broken flake #29 from TP8 spit 4.



**Plate 26** Quartz cortical proximal broken flake #30 from TP8 spit 6.  
Scale is 5mm long, subdivided into 1mm increments.

**Test pit 11.** A single quartz medial flake fragment was recovered from spit 3 (one lithic activity).

**Test pit 12.** A flake of good quality silcrete was recovered from spit 2 (Plate 27) (one lithic activity).



**Plate 27** Silcrete flake #32 from TP12 spit 2.  
Scale is 5mm long, subdivided into 1mm increments.



**Plate 28** Coarse quartzite manuport cobble piece #33 from TP13 spit 2.





**Test pit 13.** A piece of a coarse-grained quartzite cobble was recovered from spit 2 (Plate 28) (one lithic activity).

### 6.2.2 THE ASSEMBLAGE GENERALLY AND POTENTIAL LITHIC SOURCES

Most objects were of quartz (Table 12) and most of these were of fairly poor flaking quality material. Quartz objects varied in size, measuring up to 48 mm with the heaviest weighing 36g. The average weight of all 21 quartz objects was 5.2 g. Fewer silcrete objects were recovered and only one of fine-grained quartzite. These tended to be fairly small, with the largest measuring 34 mm and weighing 6g (Figure 1). Average weight of these nine objects was 2.1g, less half the average weight of quartz objects. The silcrete and fine-grained quartzite tended to be of good flaking quality, although one (Plate 24) had a patch of poor quality stone on the dorsal surface. The available data suggested that good quality lithic materials tended to be used for formal purposes (a backed artefact) and/or reduced to smaller sizes, and that sometimes flake production was maximised by use of bipolar flaking.

**Table 12 Lithic materials and artefact types.**

Category	Type	Quartz	Silcrete	Fine quartzite	Quartzite	Total objects
Backed proximal broken artefact			1			1
Bipolar core		1		1		2
Bipolar artefact	Proximal BF		1			1
Platform artefact	Flake	1	1			2
	Proximal BF	5	1			6
	Cone-split/right	1				1
FF/FP artefact	Medial	4				4
	Distal	2	1			3
	Flaked piece	6	1			7
Manuport broken	Cobble piece				1	1
Broken cultural material		1	2			3
<b>Total objects</b>		<b>21</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>31</b>

The objects indicated that people procured quartz as cobbles or large pebbles, possibly from the stony bedload of the Snowy River. These materials were often of fairly poor flaking quality and some objects were discarded while still quite large. A few pieces of better quality quartz were recovered; one of which was reduced to a small size (19 mm, 1.4 g) by bipolar flaking. These were either chance encounters amongst local quartz or imported from elsewhere (e.g. the Thredbo valley where good quality quartz was probably quarried (Feary and Niemoeller 2015).

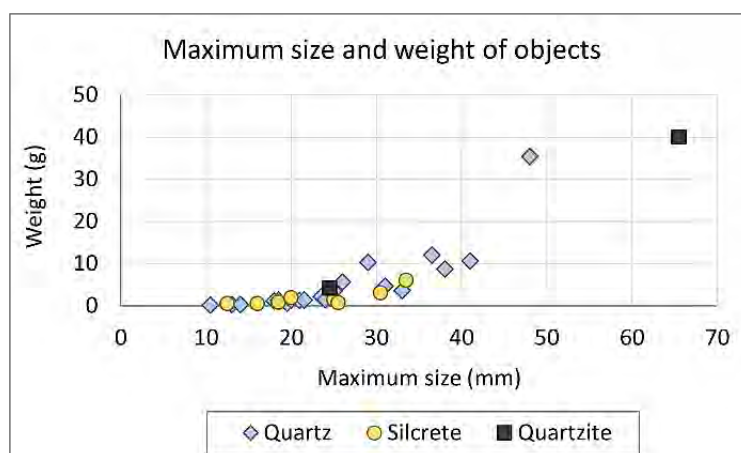


Figure 24 Size and weight of objects by lithic material.

Information on potential sources of silcrete was present in the geological literature (White et al. 1977:86-88). Taylor (1994:1) stated: "Investigations of many outcrops of silcrete (greybilly) around the Monaro ... show considerable signs of Aboriginal working of the sites for tools. Chips and core-stones of silcrete abound at many sites." This observation suggested the presence of silcrete quarries associated with silcrete outcrops in the greater region.

Outcrops of deposits including silcrete, coded as Cza, were mapped on the Berridale 1:100,000 scale geological map. The nearest mapped outcrop of Cza was located near the Jindabyne Equestrian Centre c.8.5 km north-east of the current sites. An outcrop near Little Plain was located c.12.5 km east of the current sites. Other outcrops were mapped further north and east. These mapped outcrops were closer than outcrops suggested by Bosis (2019:63), located c.20 km or more from the Jindabyne area.

Quartzite occurred naturally within the Ordovician Adaminiby Beds, which outcropped over a wide area c.10 km east of Lake Jindabyne. Almost pure quartzite occurred south-west of Cooma near the headwaters of Tinkers Creek (White et al. 1977:19), c.35km east-north-east of the current sites. Quartzite, as well as quartz-rich greywacke, siltstone and chert occurred generally within the Adaminiby Beds. An outcrop of chert occurred in the bed of the Snowy River downstream of the confluence of Kara/Ironpot Creek (White et al. 1977:19), c.11km south-east of the current sites. Small outcrops of the Adaminiby Beds also occurred west of Lake Jindabyne near the Snowy River, c.9.5km north-west of the current sites. Silcrete, quartzite, chert and other materials could potentially have been procured within one or two days walk of the current sites., although those materials would have been carried together with other equipment, small children, etc.





### 6.2.3 VERTICAL DISTRIBUTION – POSSIBLE EVIDENCE OF CHANGE THROUGH TIME

As noted above the depth of deposit varied between test pits and objects occurred at varying depths in the deposit in different test pits. Despite this variation there was a general tendency for silcrete and quartzite to occur in and above spit 4, while only quartz objects occurred in spit 5 and spit 6 (Figure 25). This distribution may not have arisen by random chance (Fisher exact test  $p=.032$ ).

Such a trend would have been consistent with regional change through time. In the Namadgi Ranges there was a slight increase in the use of non-quartz materials through time (Theden-Ringl 2017) and at Lake George people made increased use of good quality stone after c.3,000 BP (Way 2018). However, a larger number of objects (sample size), from more extensive excavation which more fully recovered more lithic activities would be needed to be confident that the deposits retained vertical evidence of change through time.

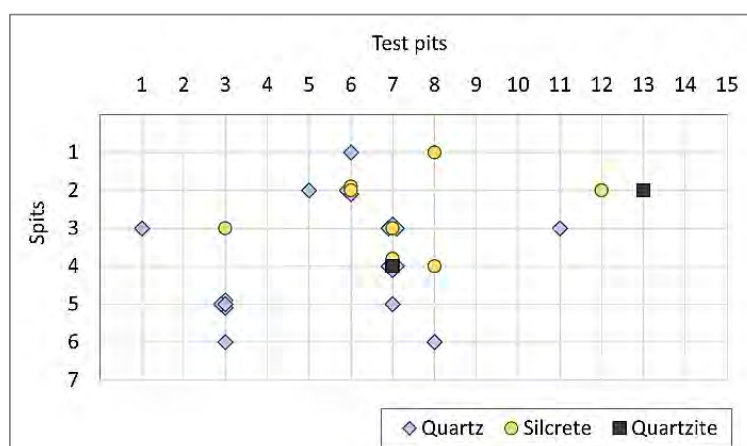


Figure 25: Lithic materials in test pits and spits.

## 6.3 COMPARISON WITH OTHER STUDIES

### 6.3.1 ARTEFACT DENSITY

A few archaeological test excavations under the Code of Practice for Archaeological Investigation (DECCW 2010), using comparable field methods, had been conducted in the Jindabyne and East Jindabyne areas. Densities of objects varied widely with some sample areas having no identified objects and others having much larger numbers (Table 13). Average densities in the current testing were consistent with results from most other test excavations (Figure 26). The crest landform at Kunama Ridge (Biosis 2017), located c.700 – 800 m upslope from A1, had a much higher average density, as did Highview site 5 located just south of Jindabyne (CHMA 2018).

Objects occurred in more than half the test pits at A1 of the current testing, with a distribution similar to that at Highview site 5 (Figure 27). At A2 objects were present in half the test pits, which was within the mid-range for the Jindabyne area.



Table 13: Average density of objects in test pits, current study compared to other test excavations.

Location or sample	Total test pits	Total area m <sup>2</sup>	Total objects	Number of pits with objects	Average objects /test pit	Reference
A1	9	2.25	28	6	3.1	This study
A2	6	1.5	3	3	0.5	
62-1-64	46	11.5	104	25	2.3	Past Traces 2019
(62-1-64) lower	9	2.25	3	2	0.3	
(62-1-64) mid	7	1.75	0	0	0	
(62-1-64) upper	8	2.0	0	0	0	
62-1-286 Kunama crest	15	3.75	157	14	10.5	Biosis 2017
62-1-286 Kunama slopes	8	2	8	3	1.0	
62-1-291 Highview 4/SU19	21	5.25	40	10	1.9	CHMA 2018
62-1-292 Highview 5/SU20	21	5.25	374 (263 in one pit, 56 in one nearby pit)	15	17.8	
62-1-355 Highview 7/SU23	4	1	2	2	0.5	
62-1-354 Highview 8/SU24	19	4.75	1	1	0.1	
62-1-353 Highview 9/SU18	6	1.5	19	4	3.2	

Note to Table 13. The average densities for Highview given here were based on the data given by CHMA (2018) but differ from the summary given by CHMA 2018:76).

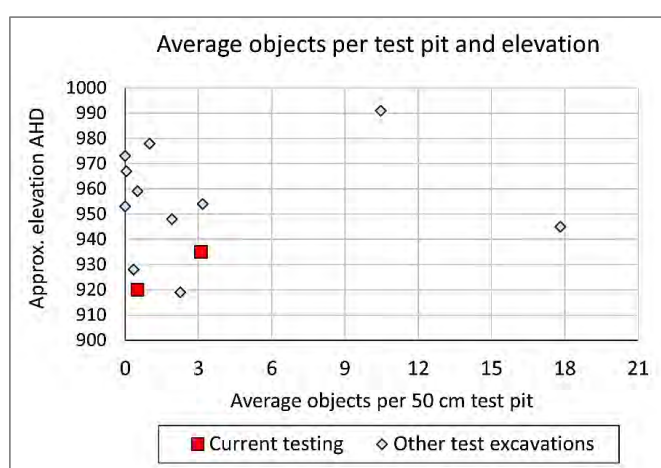


Figure 26: Average number of objects in test pits and elevation.

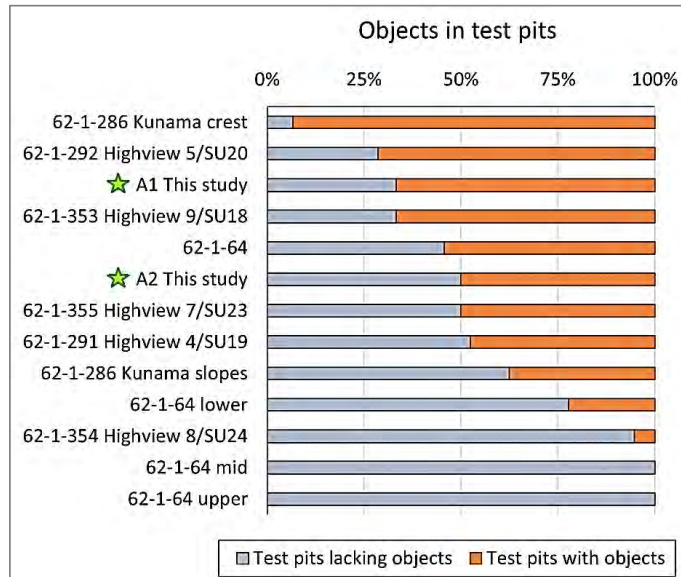


Figure 27: Proportions of test pits with or without objects.

### 6.3.2 LITHIC MATERIALS

The current assemblage consisted predominantly of quartz objects (68%) and this was also the case for site 62-1-64 (66% quartz) located on the spur immediately north of A1 and adjacent to A2 (Table 14, Figure 28, Past Traces 2019). The assemblage from Highview Estate located c.3 km south-west of the current sites (just south of Jindabyne on the west side of the Snowy River) was also dominated by quartz (c.85%, CHMA 2018).

However further east and south-east of the current sites the Alpine Sands and Kunama salvage assemblages had higher proportions of silcrete objects (Biosis 2018; Saunders 2004). Variation in the proportions of quartz and silcrete may have resulted from variation in procurement, transport and occupation. While quartz was probably available within the local area silcrete would have been carried from sources located further east and north-east. Alpine Sands and Kunama Ridge may have been occupied by people travelling from those areas, potentially during the Late Holocene.

Table 14 Lithic materials from archaeological excavations.

Location or sample	Quartz	Silcrete	Others	Total objects	Reference
<b>A1+A2</b>	21	8	2	31	This study
62-1-64	69	32	3	104	Past Traces 2019
Alpine Sands ASE1	40	87	15	142	Saunders 2004



Location or sample	Quartz	Silcrete	Others	Total objects	Reference
Alpine Sands ASE2	18	26	2	46	
Alpine Sands ASE3+5+7+8	3	4	4	11	
Kunama testing 62-1-286	88	57	20	165	Biosis 2017
Kunama salvage 62-1-286	708	3,974	242	4,925?	Biosis 2019
Highview Estate *	370	42	21	433	CHMA 2018

\* Data for broken unretouched objects only in CHMA 2018 page 81 plus data compiled from CHMA 2018 Appendix J.

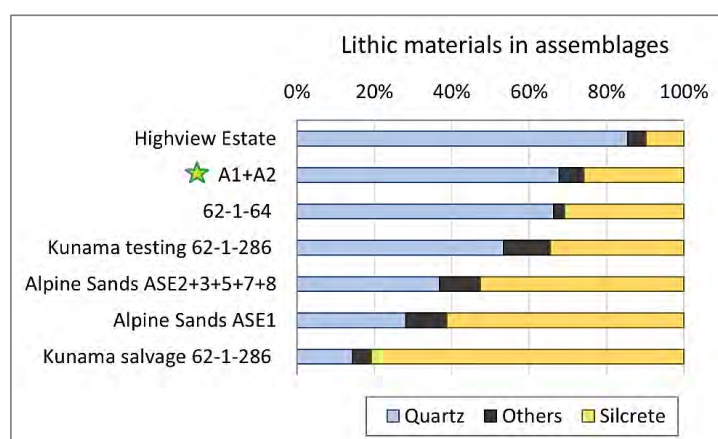


Figure 28: Proportions of lithic materials in assemblages.

### 6.3.3 VERTICAL DISTRIBUTIONS

The current test excavations found most artefacts occurred between 5cm and 25cm depth. More detailed analysis suggested a possibility that silcrete and quartzite objects occurred in the upper 20cm while quartz objects were spread vertically through the deposit with some also occurring more deeply. The data suggested a possibility that the deposits may have retained evidence of change through time; that quartz was used during all phases but silcrete and good quality quartzite was used more recently. However a larger sample size from more extensive excavation (recovering objects from larger numbers of lithic activities) would be needed to be confident of this trend.

At site 62-1-64 most artefacts occurred in the upper 15 to 20 cm of deposit (Past Traces 2019), at Kunama Ridge most occurred in the upper 30 cm of deposit (Biosis 2019) and at Highview most occurred within the upper 25 cm of deposit (CHMA 2018). These studies suggested that most objects usually occurred within the upper part of deposits. Unfortunately no other studies investigated the vertical distributions of lithic materials to assess whether deposits may have retained evidence of change through time.



A brief inspection of the Highview data (in CHMA 2018) for this study indicated that silcrete was more frequent in spits 1-4 than in spits 5-8 ( $n=39$  and  $n=2$  respectively). When compared to the total counts (spits 1-4  $n=335$  and spits 5-8  $n=101$ ) the distribution may not have arisen by random chance (chi-squared=8.5,  $df=1$ ,  $p=.006$ ). This data also suggested that there may have been increased use of silcrete during the more recent past, supporting the data from the current test excavations.

#### 6.4 DISCUSSION

The results of the test excavations confirm the presence of a relatively low density archaeological deposit associated with sites 62-1-0124 (Test Area 1) and 62-1-0064 (Test Area 2). The artefact density was noted to be higher at 62-1-0124 than at 62-1-0064, although there were higher density deposits located within the wider vicinity. Objects were predominantly formed from quartz, although silcrete and other raw material types such as quartzite were also represented.

The vertical distribution of the objects recovered from the test excavations suggested there was potential for demonstrating regional change in use of raw materials through time; however the small size of the assemblage recovered limited the conclusions that could be made regarding regional change through time.



## 7.0 SCIENTIFIC VALUES AND SIGNIFICANCE ASSESSMENT

### 7.1 INTRODUCTION

The *Aboriginal cultural heritage consultation requirements for proponents 2010* acknowledge that:

- Aboriginal people have the right to maintain their culture, language, knowledge and identity
- Aboriginal people have the right to directly participate in matters that may affect their heritage
- Aboriginal people are the primary determinants of the cultural significance of their heritage

Undertaking consultation with Aboriginal people ensures that potential harm to Aboriginal objects and places from proposed developments is identified and mitigation measures developed early in the planning process.

### 7.2 ARCHAEOLOGICAL SIGNIFICANCE

Archaeological or scientific significance relates to the value of archaeological objects or sites as they are able to inform research questions considered important to the archaeological community, which includes Aboriginal people, heritage consultants and academic researchers. The value of this type of significance is determined on how the objects and sites can provide information regarding how people in the past lived their lives. The criteria for archaeological significance assessment generally reflect the criteria of the ICOMOS Burra Charter.

### 7.3 CRITERIA

Archaeological significance is assessed based on the archaeological or scientific values of an area. These values can be defined as the importance of the area relating to several criteria. Criteria used for determining the archaeological significance of an area are as follows:

- **Research potential:** Can the site contribute to an understanding of the area/region and/or the state's natural and cultural history? Is the site able to provide information that no other site or resource is able to do?
- **Representativeness:** is the site representative of this type of site? Is there variability both inside and outside the study area? Are similar site types conserved?
- **Rarity:** is the subject area a rare site type? Does it contain rare archaeological material or demonstrate cultural activities that no other site can demonstrate? Is this type of site in danger of being lost?
- **Integrity/Intactness:** Has the site been subject to significant disturbance? Is the site likely to contain deposits which may possess intact stratigraphy?





Further, an assessment of the grade of significance is made, based on how well the item fulfils the assessment criteria. The Heritage Branch of the Department of Planning (now Heritage NSW) 2009 guideline *Assessing Significance for Historical Archaeological Sites and 'Relics'* defines the grading of significance as follows:

Table 15: Grading of significance, from Heritage Branch 2009

Grading	Justification
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness. Item can be interpreted relatively easily.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.
Moderate	Altered or modified elements. Elements with little heritage value but which contribute to the overall significance of the item.
Little	Alterations detract from significance. Difficult to interpret.
Intrusive	Damaging to the item's heritage significance.

Whilst this was developed for the assessment of significance of historical items, the criteria are applicable to archaeological significance assessments as well. It is important to note that the below assessment is specific to Aboriginal cultural heritage and does not consider the non-Aboriginal significance of the site.

## 7.4 SIGNIFICANCE ASSESSMENT

### RESEARCH POTENTIAL

The study area has some research potential. It is noted that outside of the discrete disturbance of the trails, there is potential for additional archaeological deposits in some areas, which may have greater research potential than the trails themselves. Therefore, the research potential of the site is considered low to nil within the existing trails, and low to moderate outside of the trails themselves within areas considered to comprise PAD. However, the area is generally considerably sloping, and is overall considered to have limited potential for additional significant sites not already identified to be present. Overall, the study area is considered to have low research potential.

### REPRESENTATIVENESS

The archaeological material identified within the study area is representative of low to moderate density artefact scatters across the Snowy Mountains. Outside of the existing trails, the study area generally represents the landscape of the Jindabyne region prior to colonisation.

The artefacts and site types within the study area are considered representative of that type of site within the Snowy Mountain, and as such the study area is considered a representative example of this site type.



### RARITY

Low to moderate density artefact scatters and isolated finds are a common site type within the Snowy Mountains. The study area and archaeological sites therein are not considered rare.

### INTEGRITY/INTACTNESS

The existing trails are highly disturbed, resulting in minimal integrity. Outside the existing trails, the site is relatively undisturbed and intact. Overall, the site is considered to have low to moderate integrity and intactness.

### SUMMARY

Table 16 summarises the significance of the individual sites within the study area.

**Table 16: Assessment of significance of registered sites within study area**

Site ID	Site Name	Research	Representativeness	Rarity	Integrity/intactness	Significance
62-1-0064	Lake Jindabyne East 1; J/ES 1	L	L	L	L	L
62-1-0124	TVE 8	M	M	L	L	L
62-1-0202	Tyrolean Village Estate 15 (TVE 15)	M	M	L	L	L
62-1-0371	Snowy Hydro Paddock 1	L	L	L	L	L
62-1-0419	JST1.1-IF-01	L	L	L	L	L
62-1-0413	JST1.2-IF-01	L	L	L	L	L
62-1-0414	JST1.2-IF-02	L	L	L	L	L
62-1-0415	JST1.2-IF-03	L	L	L	L	L
62-1-0417	JST2.1-IF-01	L	L	L	L	L
62-1-0416	JST2.1-AS-01	L	L	L	L	L
62-1-0418	TS-ASPAD-01	M	M	L	L	L
62-1-0419	LVT-AS-01	M	M	L	L	L

## 7.5 STATEMENT OF ARCHAEOLOGICAL SIGNIFICANCE

The study area for the Jindabyne Shared Trail Network is considered to have low to moderate archaeological significance based on its research potential, representativeness, rarity and integrity. The range and number of artefacts recovered are considered consistent with similar sites in the region and the potential for the site to contribute a greater understanding of the archaeological record is limited, given the level of work completed in the area to date and the relatively low numbers of items identified, as well as the limited nature of the proposed impact.



## 8.0 IMPACT ASSESSMENT

### 8.1 PROPOSED DEVELOPMENT

Unsanctioned trail has been constructed within Sections 1.1, 1.2, 2.1 and 5.1 of the Jindabyne Shared Trail Network by pedestrian use and local mountain bike enthusiasts, and it is proposed to upgrade and formalise these sections. New trails are also proposed within these sections.

The trail comprises a 2m wide maximum area for the direct construction impact footprint. The direct impact area is within a 20m wide corridor, with 10m either side of the proposed alignment, in order to allow for indirect impacts.

### 8.2 POTENTIAL IMPACT

A total of twelve sites are located within or immediately adjacent to the study area and proposed trail routes, including eight newly identified sites.

There are extensive existing trails within the study area which pass through areas of PAD, although the trails themselves do not retain subsurface potential. However, artefacts are known to occur on the trail surfaces and upgrade of the existing trails is likely to impact on these surface artefacts. Further, there may be artefacts present within the berms of the trails in some locations, and both upgrade works and ongoing use of the trails has potential to dislodge artefacts from the immediate surrounds of the trails.

There is potential for all sites identified within the study area to be impacted to an extent by the proposal. However, it should be noted that all sites are associated with existing disturbance and impact is ongoing through the use of the trails. Additionally, the proposal would not impact on areas of PAD outside of the existing trails.

Routes for new trail have been specifically designed to avoid areas of archaeological potential, through predictive modelling and initial constraints analysis. As such, the proposed new trail routes avoid identified areas of PAD, and are considered unlikely to impact on any Aboriginal cultural material present within the study area.

Additionally, site TS-ASPAD-01 (AHIMS # 62-1-0418) is proposed to be avoided by the trail network. New track was proposed to be constructed to extend existing unsanctioned trail, but due to the presence of the archaeological deposits in the area, this trail will not be constructed and the existing trail is proposed to be rehabilitated to prevent continued access to the area. This will allow conservation of the site in situ.

A further site, JST2.1-IF-01 (AHIMS # 62-1-0417), will be avoided through realignment of the proposed trail, allowing the item to be conserved in situ.

An additional site, LVT-AS-01 (AHIMS # 62-1-0419) was identified along an existing unsanctioned trail but is not within the portion proposed to be realigned as part of



the project. However, this site is currently being impacted by people accessing the area and mitigation measures are required to prevent further impact.

Site number	Type of harm	Degree of harm	Consequence of harm
62-1-0064	Direct	Partial	Partial loss of value
62-1-0124	Direct	Partial	Partial loss of value
62-1-0202	Direct	Partial	Partial loss of value
62-1-0371	Direct	Total	Total loss of value
62-1-0416	Direct	Total	Total loss of value
62-1-0412	Direct	Total	Total loss of value
62-1-0413	Direct	Total	Total loss of value
62-1-0414	Direct	Total	Total loss of value
62-1-0415	Direct	Total	Total loss of value
62-1-0419	Direct	Partial	Partial loss of value



## 9.0 MANAGEMENT, MITIGATION AND RECOMMENDATIONS

### 9.1 GUIDING PRINCIPLES

Wherever possible and practicable, it is preferred to avoid impact to Aboriginal archaeological sites. In situations where conservation is not possible or practicable, mitigation measures must be implemented.

*The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013* (The Burra Charter) provides guidance for the management of culturally sensitive places. The Burra Charter is predominantly focussed on places of built heritage significance, but the principles are applicable to other places of significance as well.

The first guiding principle for management of culturally significant sites states that “places of cultural significance should be conserved” (Article 2.1). A cautious approach should be adopted, whereby only “as much as necessary but as little as possible” (Article 3.1) should be changed or impacted.

Mitigation measures depend on the significance assessment for the site. Cultural significance of sites should also be considered in consultation with the Aboriginal community during community consultation.

### 9.2 OPTIONS ASSESSMENT

The study area contains twelve registered Aboriginal sites. Ten of these would be impacted to some extent during the proposed works.

A number of options have been considered as part of this assessment in order to avoid harm to the sites, as outlined below.

#### OPTION 1: DO NOTHING

The sites are all located either on or in very close proximity to existing trails throughout the area, with artefacts located on the trail surfaces. Use of these trails results in artefacts being ridden over by bike riders, or walked over by hikers. There is potential for impact to the artefacts through breakage or disturbance. There is potential for further unsanctioned trails to be constructed in areas which do not currently contain trails, which could lead to further unmitigated impact to areas of sensitivity. Leaving the trails as they are currently would result in a detrimental impact to the existing cultural heritage within the site, which would be a poor heritage outcome.

#### OPTION 2: CLOSE TRAILS

Consideration was given to the closure of the trails. However, much of the existing trail network was constructed without official permission, and local users of the trails are likely to continue to use them, despite the closure of the trails. This could also result in additional unsanctioned trail being created in additional areas, resulting in



further impact to as yet unidentified sites. This would also result in a poor heritage outcome.

#### **OPTION 3: REROUTING OF TRAIL**

Many of the trails assessed comprise existing trail, where rerouting is unlikely to be successful as the public will continue using original trail. However, one proposed new trail was rerouted to avoid an archaeological site, allowing it to be retained in situ. This option is generally not possible in areas where trail is existing, and even if the trail is rerouted, closure and rehabilitation of existing track has potential to impact on surface artefacts which may be present. Overall, this option is generally not feasible for the proposed works.

#### **OPTION 4: CONTINUE WITH CURRENT PROPOSAL**

The current proposal includes upgrade of the existing tracks as necessary and creation of additional trails. These have been designed to avoid areas with potential for cultural heritage to be present, as well as the location of known sites in the area. The upgrade of existing trails would be constrained to the existing trail surface, with minimal impact outside of the already disturbed areas.

Further, creation of additional sanctioned linking trails within areas assessed as unlikely to possess archaeological potential would likely reduce the risk of further unsanctioned trails being constructed in areas that may have potential for subsurface material to be present.

Appropriate management of the archaeological resource within the study area is considered the best outcome for the site, given the site will continue to be utilised by the public into the future. It is proposed to prepare a Plan of Management (PoM) for the trails, which would include management recommendations for the study area.

#### **SUMMARY:**

Option 4 is considered to be the most appropriate management option for the study area. Accordingly, appropriate mitigation measures are discussed following in Section 9.3.

### **9.3 HARM AVOIDANCE OR MITIGATION**

A Plan of Management (PoM) is recommended to be prepared for the study area, to provide management recommendations and salvage strategies for artefacts located on the ground surface. There are artefacts on the trail ground surfaces at several locations. It is proposed to undertake a program of surface collection of these items prior to the commencement of upgrade works in the area. If at all possible, the PoM should include all stages of the Jindabyne Shared Trails to ensure the entirety of the network is managed appropriately.

Further, given the movement of the former surface of the trail to the sides to create the berms, there is potential for artefacts to wash out or be dislodged from the





berms during use of trails. As such, an annual surface collection of any artefacts which may have been dislodged over the previous year by users of the trail is proposed and would be detailed in the PoM.

The PoM would also provide information regarding a cultural heritage induction for anyone who may be assisting with track management, both during upgrade works and into the future, to ensure the cultural heritage of the area is respected and managed appropriately. This should be prepared for both paid and volunteer personnel, and anyone undertaking work along the trails must be aware of their obligations regarding Aboriginal cultural heritage.

It is also recommended that consideration be given to erecting interpretive signage at certain locations along the track, outlining the Aboriginal heritage of the area to inform the community. Additionally, consideration should be given to using Ngarigo names for new tracks, to maintain that connection to Country. Both these actions should be undertaken in consultation with the Aboriginal community.



## 10.0 PERMIT REQUIREMENTS

### 10.1 PERMIT AREA

An application for an AHIP under Part 6 of the *National Parks and Wildlife Act 1974* is required for stages 1.1, 1.2 and 2.1 prior to the commencement of required remediation works. A shape file has been included in the AHIP application for the study area, and Figure 29 to Figure 31 shows the proposed AHIP boundaries.

The proposed AHIP boundary includes the extent of the proposed trail networks for stage 1.1, 1.2 and 2.1. An area based AHIP boundary allows for the works to be undertaken and any surface artefacts identified during the works to be collected and relocated without the requirement for an additional future AHIP application to be made. This acknowledges the potential for items that may not have been identified or visible during the initial site inspection to be collected.

### 10.2 PERMIT TYPE

This AHIP application requests a permit to allow collection surface artefacts within the proposed impact area, prior to the commencement of works. Further, the permit requests unmitigated impact to sites where surface artefacts cannot be relocated. On completion of works, sites would have ASIRFs submitted to change the site status to 'destroyed' or 'partially destroyed' rather than 'valid'. Additionally, the application requests the permit allows annual collection of any artefacts which may have been dislodged from the berms during a year of use.

### 10.3 AHIMS NUMBERS

A total of ten sites would be impacted as part of the proposed works. These sites are as follows:

- 62-1-0064
- 62-1-0124
- 62-1-0202
- 62-1-0371
- 62-1-0419
- 62-1-0418
- 62-1-0417
- 62-1-0416
- 62-1-0415
- 62-1-0414
- 62-1-0413
- 62-1-0412

These sites are shown on Figure 32 below.

### 10.4 PREVIOUS AHIPs

To the best of our knowledge, no AHIPs have been issued or refused within the specific study area, although it is noted that a number have been issued for works in the wider area.

### 10.5 RESTRICTED INFORMATION AND CONFIDENTIALITY

Aboriginal stakeholders for the project have not identified any restricted, confidential or culturally sensitive information related to the project and this AHIP application.



## 10.6 COPYRIGHT

Apex Archaeology asserts its Moral Rights in this work, unless otherwise indicated, in accordance with the Commonwealth *Copyright (Moral Rights) Amendment Act 2000*. Apex Archaeology vests copyright in all material produced in this report by Apex Archaeology (excluding pre-existing material) in Snowy Monaro Regional Council, and retains the right to use all the material produced by Apex Archaeology for our ongoing business and professional activities (including but not limited to professional presentations, academic papers and/or publications).

## 10.7 ARTEFACT MANAGEMENT

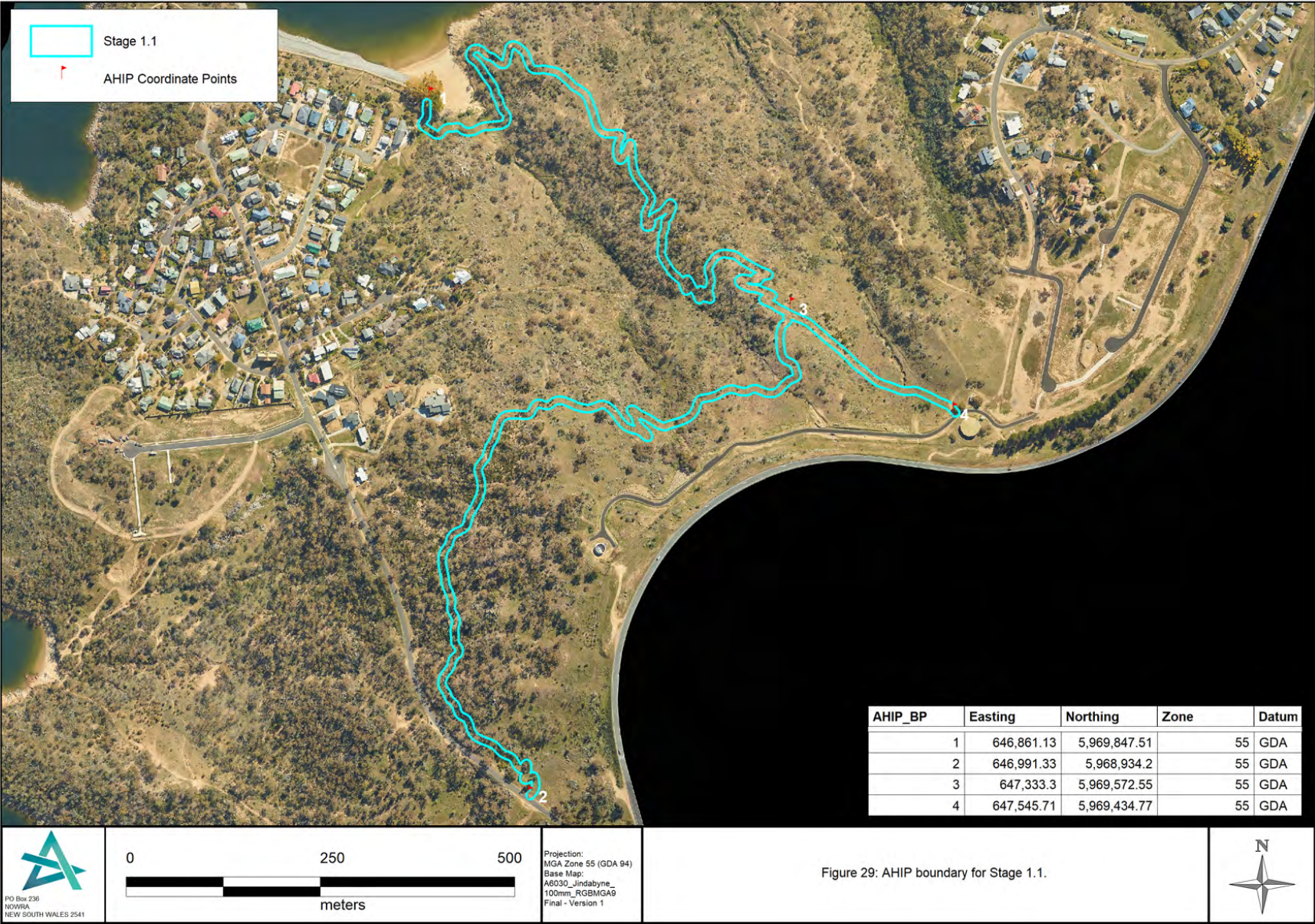
A number of potential options for the long term management of artefacts recovered during surface collection have been proposed and will be determined in consultation with the Aboriginal community, with their feedback included in the final report.

Options include:

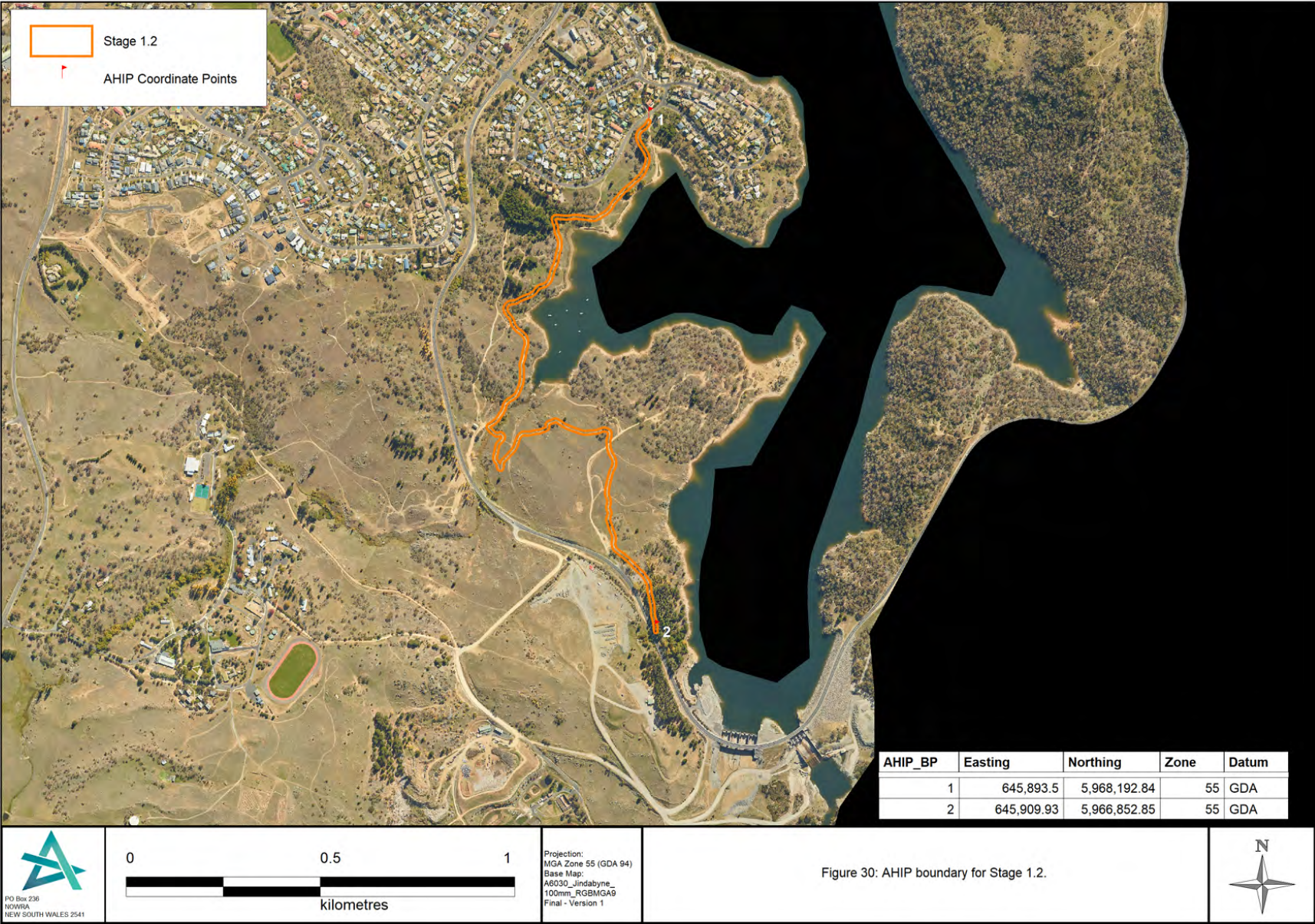
- **Reburial onsite:** discussions should be held with Heritage NSW to determine if a perpetual reburial location could be identified, with artefacts recovered during the initial collection reburied at a specific location, and additional artefacts added during annual surface collection activities. Generally, such an approach would not be permitted, as a new AHIP would be required to impact the reburial location as that becomes a new registered site location. However, this may be possible and should be explored further, should the Aboriginal community wish for the items to remain on site.
- **Keeping Place:** construction of a specific keeping place for items to be safely stored. This could be on site, such as within the maintenance shed or a specific new structure, or perhaps at the SMRC offices.
- **Care and Control:** The RAPs may wish to nominate an individual or organisation to take Care and Control of the recovered items, both during the initial collection and into the future. All RAPs would need to agree, and a formal Care and Control agreement prepared and lodged with Heritage NSW.

Following discussion with the RAPs for the project, storage in a secure location is the preferred option. Development of a Keeping Place is something SMRC are intending to develop at a later stage, but in the meantime, artefacts could be securely stored at the Jindabyne Library, which is managed by SMRC and has capacity to store collected items until such time as the Keeping Place is available to take custody of assemblages. Heritage NSW would be informed of any transference of assemblages from one place to another.

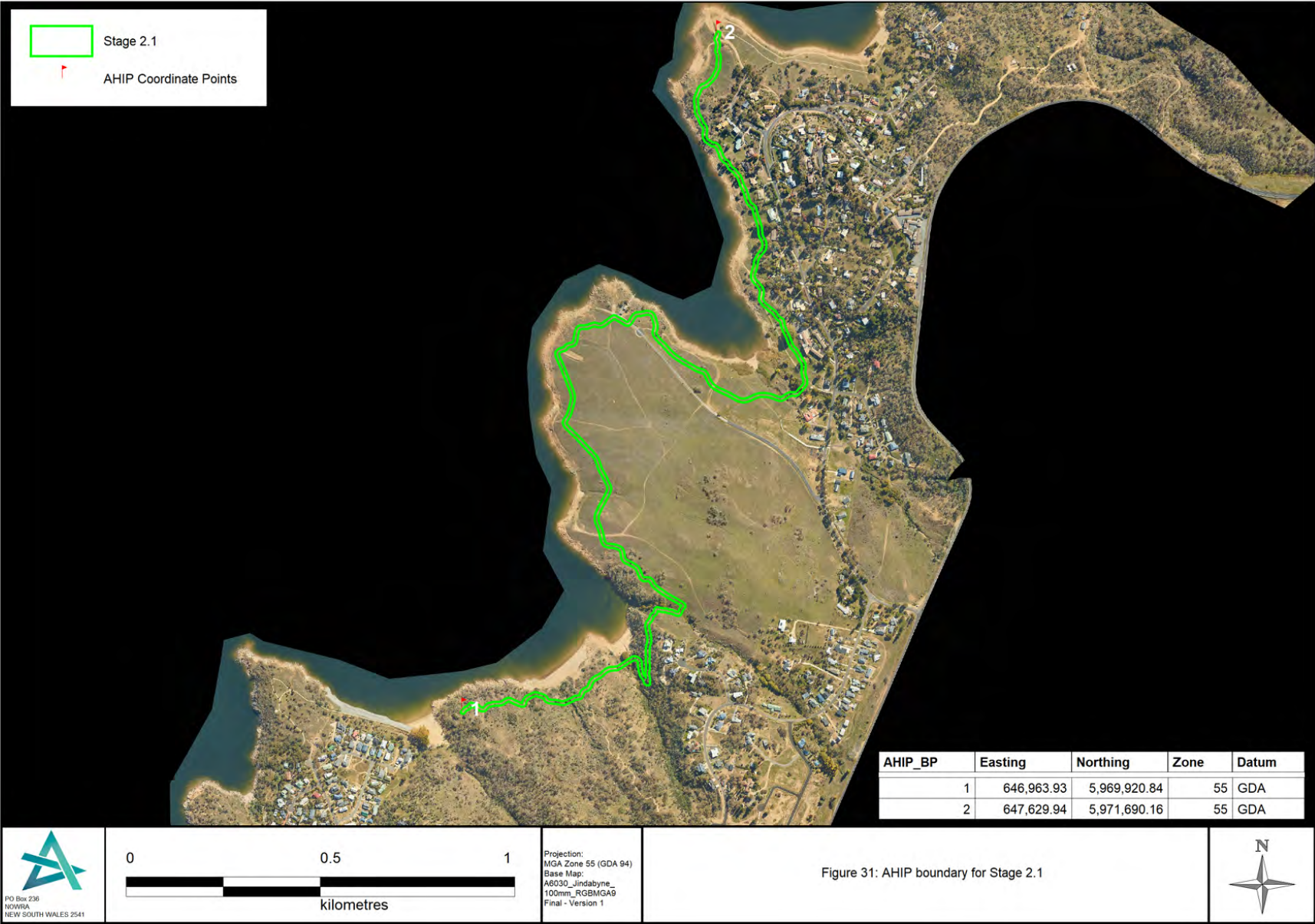




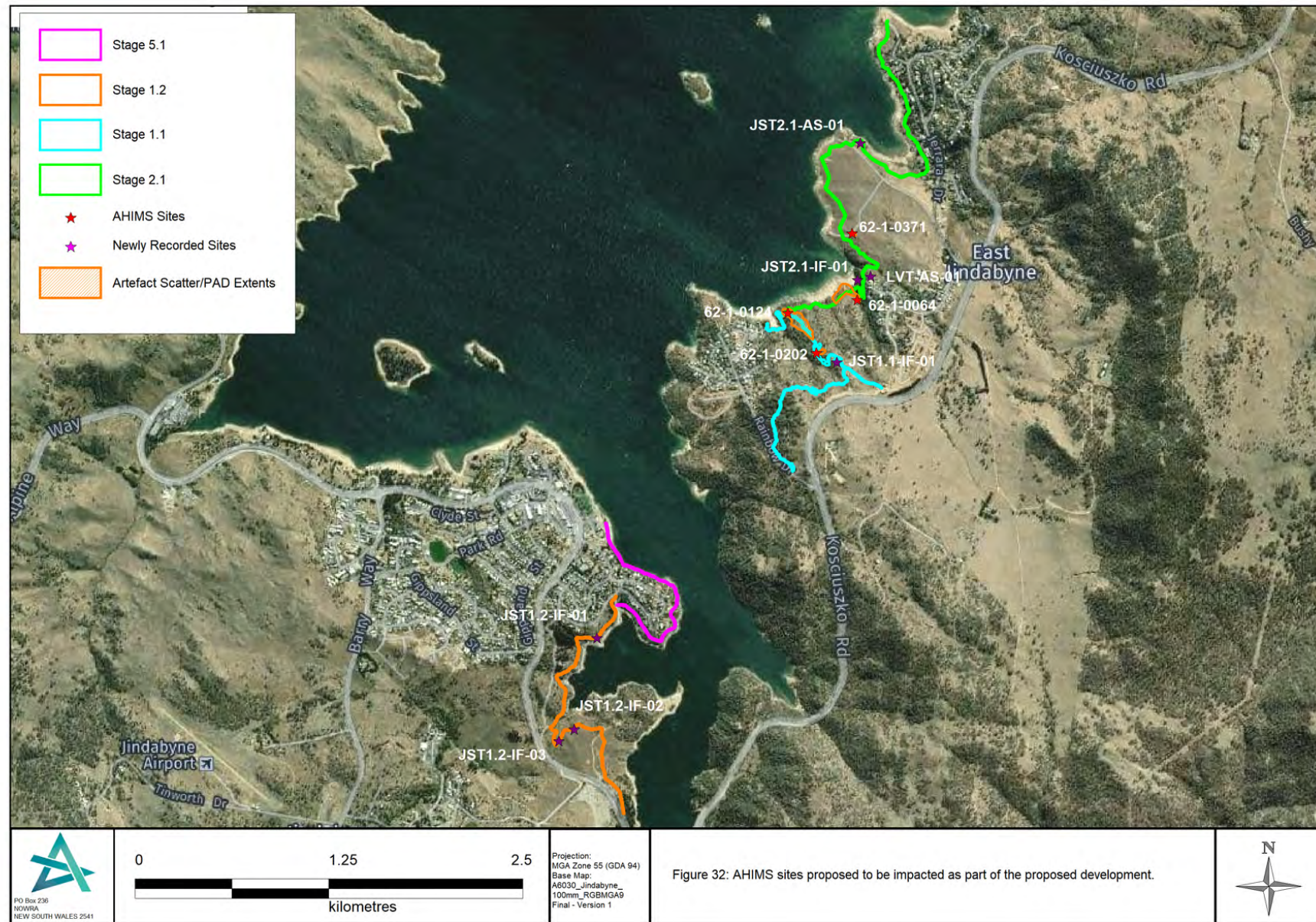














## 11.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- The statutory requirements of the NP&W Act 1974;
- The requirements of Heritage NSW;
- The results of the cultural and archaeological assessment;
- An assessment of the likely impacts of the proposed development; and
- The interests of the registered Aboriginal stakeholders and the cultural heritage record.

It was found that:

- A total of four previously identified Aboriginal sites were located within the study area.
- Eight newly identified sites were located within the trail alignment.
- One site is able to be avoided through realignment of the trail.
- Another site is able to be avoided through deletion of the proposed extension of the trail.
- Two areas of subsurface potential were noted with could not be avoided by the proposed trail alignment.
- Test excavation within these areas identified a relatively low density archaeological deposit with a total of 31 objects recovered.
- The remaining ten sites cannot be avoided by the proposed works.
- Mitigation measures have been proposed to minimise the potential impact of the works on the archaeological resource.
- Collection of surface artefacts is recommended.

Therefore, the following recommendations have been made.

### RECOMMENDATION 1: APPLICATION FOR AHIP REQUIRED

This report details the Aboriginal archaeological potential of several stages of the Jindabyne Shared Trail Network. A total of twelve previously and newly recorded sites are located within the study area. Ten of these cannot be avoided by the proposed works. Application for an Aboriginal Heritage Impact Permit (AHIP) to permit impact to these sites is required, and should include permission to undertake surface collection of any artefacts on the track surface within the proposed impact areas, with the items placed in a keeping place.

If the surface artefacts cannot be relocated, the AHIP should permit unmitigated impact to the site location.

### RECOMMENDATION 2: CONSERVATION OF SITES

PAD outside of existing trails should be conserved and no impact should be permitted to these areas. This should be detailed in any Plan of Management (PoM) prepared for the trails.





#### **RECOMMENDATION 3: SURFACE COLLECTION**

The AHIP should permit surface collection of any artefacts visible on the surface of the existing trails prior to the commencement of upgrade or construction works. Additionally, the AHIP should permit annual surface collection of any artefacts that may wash or erode out of the berms bordering the trails within the study area.

#### **RECOMMENDATION 4: LONG TERM MANAGEMENT OF COLLECTED ARTEFACTS**

Management of collected artefacts should be in accordance with the wishes of the Aboriginal community, and in consultation with Heritage NSW. SMRC have indicated an intention to develop a permanent Keeping Place in Jindabyne, but until such time, it is recommended that artefacts be stored at the Jindabyne Library, which is operated by SMRC and has capacity to care for items until such time as they can be transferred to a Keeping Place. Heritage NSW should be advised of any transferral of artefacts to a Keeping Place once established.

#### **RECOMMENDATION 5: PREPARATION OF MANAGEMENT PLAN**

As part of the wider Jindabyne Shared Trail Network program of works, a Plan of Management (PoM) should be developed to incorporate and consolidate all archaeological work undertaken within the trail network, so as to streamline management processes and ensure Aboriginal cultural heritage within and adjacent to the trail network footprint is respected, preserved and managed appropriately. The PoM should be developed in consultation with the Aboriginal community.

#### **RECOMMENDATION 6: MAINTAIN ABORIGINAL COMMUNITY CONSULTATION**

Consultation with the RAPs regarding the project should continue, in order to keep the RAPs informed about the management of Aboriginal cultural heritage within the study area. This includes notifying the RAPs when an AHIP application is lodged, and also in the event an AHIP is issued.

Consultation undertaken for this project must be maintained at least every six months in order to maintain validity. It is the Proponent's responsibility to ensure consultation remains valid. In the event a gap of more than six months occurs between consultation events, it may be necessary to restart the consultation process to support any AHIP applications that are necessary.

#### **RECOMMENDATION 7: STUDY AREA BOUNDARIES**

The proposed works must be contained within the assessed boundaries for this project. If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of this archaeological investigation, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present.

#### **RECOMMENDATION 8: STOP WORK PROVISION**

Should unanticipated Aboriginal archaeological material be encountered during site works after the recommended mitigation measures have been completed in accordance with an approved AHIP, all work must cease in the vicinity of the find



and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required.

This recommendation should be included in any Construction Environmental Management Plan (CEMP) developed for the site.

#### **RECOMMENDATION 9: REPORTING**

One digital copy of this report should be forwarded to Heritage NSW to support the required AHIP application for the project, along with required supporting documentation.

One digital copy of this report should be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS).

One copy of this report should be forwarded to each of the registered Aboriginal stakeholders for the project.



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## APPENDIX A: AHIMS SEARCHES



## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127  
Client Service ID : 684470

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
62-1-0384	Lees Creek OS-3 <a href="#">Contact</a>	GDA	55	645422	5967036	Open site	Valid	Artefact : -		
		<a href="#">Recorders</a>	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher					<a href="#">Permits</a>		
62-1-0019	Jindabyne tip turn off; <a href="#">Contact</a>	AGD	55	645500	5966800	Open site	Valid	Artefact : -	Open Camp Site	468,98821
		<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>	1824,1830	
62-1-0025	Lake Jindabyne;)/SWS 2; <a href="#">Contact</a>	AGD	55	646200	5967300	Open site	Valid	Artefact : -	Open Camp Site	
		<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>		
62-1-0381	Lees Creek OS-1 <a href="#">Contact</a>	GDA	55	645324	5966977	Open site	Valid	Artefact : -		
		<a href="#">Recorders</a>	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher					<a href="#">Permits</a>		
62-1-0211	CT B <a href="#">Contact</a>	AGD	55	645400	5966800	Open site	Valid	Artefact : 1		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0215	CT F <a href="#">Contact</a>	AGD	55	645625	5967050	Open site	Valid	Artefact : 6		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0383	Lees Creek IF-1 <a href="#">Contact</a>	GDA	55	645420	5967066	Open site	Valid	Artefact : -		
		<a href="#">Recorders</a>	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher					<a href="#">Permits</a>		
62-1-0174	Thredbo Terrace 1 <a href="#">Contact</a>	AGD	55	645350	5968550	Open site	Valid	Artefact : -	Open Camp Site	
		<a href="#">Recorders</a>	Heritage Solutions-Alistair Grinbergs					<a href="#">Permits</a>		
62-1-0221	CT L <a href="#">Contact</a>	AGD	55	645600	5967275	Open site	Valid	Artefact : 1		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0217	CT H <a href="#">Contact</a>	AGD	55	645650	5967150	Open site	Valid	Artefact : 4		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0026	Lake Jindabyne;)/SWS 3; <a href="#">Contact</a>	AGD	55	646150	5967400	Open site	Valid	Artefact : -	Open Camp Site	
		<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>		
62-1-0216	CT G <a href="#">Contact</a>	AGD	55	645500	5966900	Open site	Valid	Artefact : 4		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0024	Lake Jindabyne;)/SWS 1; <a href="#">Contact</a>	AGD	55	646000	5967000	Open site	Valid	Artefact : -	Open Camp Site	
		<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>		
62-1-0229	CT A <a href="#">Contact</a>	AGD	55	645900	5966650	Open site	Valid	Artefact : 3		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>	1824,1830	
62-1-0214	CT E <a href="#">Contact</a>	AGD	55	645400	5967050	Open site	Valid	Artefact : 10		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0212	CT C <a href="#">Contact</a>	AGD	55	645300	5967000	Open site	Valid	Artefact : 100		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0220	CT K <a href="#">Contact</a>	AGD	55	645525	5967375	Open site	Valid	Artefact : 2		102609
		<a href="#">Recorders</a>	Mr.Matthew Barber					<a href="#">Permits</a>		
62-1-0022	Lake Jindabyne;)/SWS 4; <a href="#">Contact</a>	AGD	55	645600	5967600	Open site	Valid	Artefact : -	Open Camp Site	
		<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>		

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Datum :GDA, Zone : 55, Eastings : 645310.0 - 646330.0, Northings : 5966607.0 - 5968783.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 20

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



**AHIMS Web Services (AWS)**  
**Extensive search - Site list report**

Your Ref/PO Number : 21127

Client Service ID : 684470

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
62-1-0218	CT I	AGD	55	645900	5967400	Open site	Valid	Artefact : 20		102609
	<u>Contact</u>	<u>Recorders</u>	Mr.Matthew Barber					<u>Permits</u>		
62-1-0219	CT J	AGD	55	645950	5967050	Open site	Valid	Artefact : 40		102609
	<u>Contact</u>	<u>Recorders</u>	Mr.Matthew Barber					<u>Permits</u>		

**\*\* Site Status**

**Valid** - The site has been recorded and accepted onto the system as valid

**Destroyed** - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

**Partially Destroyed** - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

**Not a site** - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Datum :GDA, Zone : 55, Eastings : 645310.0 - 646330.0, Northings : 5966607.0 - 5968783.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 20

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127  
Client Service ID : 684468

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
62-1-0296	TREAS 1 (The Ridge Estate Artefact Scatter 1) <u>Contact</u> T Russell	AGD	55	647888	5969785	Open site	Valid	Artefact : 2		100518
		<u>Recorders</u>		Ms.Trish Saunders				<u>Permits</u>	2664,2665,2667,2725	
62-1-0137	Rush's Resort 7; <u>Contact</u>	AGD	55	648770	5972340	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
		<u>Recorders</u>		Kerry Navin,Mr.Kelvin Officer				<u>Permits</u>		
62-1-0147	Rush's Resort 17; <u>Contact</u>	AGD	55	648940	5971220	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
		<u>Recorders</u>		Kerry Navin,Mr.Kelvin Officer				<u>Permits</u>		
62-1-0038	Lake Jindabyne;)/TV 10; <u>Contact</u>	AGD	55	646300	5968600	Open site	Valid	Artefact : -	Open Camp Site	
		<u>Recorders</u>		John Gallard				<u>Permits</u>		
62-1-0042	Lake Jindabyne;Tyrolean Village;)/TV 3;TVE 1; <u>Contact</u>	AGD	55	646420	5969690	Open site	Valid	Artefact : -	Open Camp Site	1998
		<u>Recorders</u>		Kerry Navin,John Gallard				<u>Permits</u>	740	
62-1-0200	Tyrolean Village Estate 13 (TVE13) <u>Contact</u>	AGD	55	646580	5969370	Open site	Valid	Artefact : -		102665
		<u>Recorders</u>		Navin Officer Heritage Consultants Pty Ltd				<u>Permits</u>	3610	
62-1-0298	TRE-PAD (The Ridge Estate PAD) <u>Contact</u>	AGD	55	647985	5970000	Open site	Valid	Potential Archaeological Deposit (PAD) : -		100461,10051 8
		<u>Recorders</u>		Ms.Trish Saunders				<u>Permits</u>	2664,2665,2667,2725	
62-1-0143	Rush's Resort 13; <u>Contact</u>	AGD	55	648630	5971690	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
		<u>Recorders</u>		Kerry Navin,Mr.Kelvin Officer				<u>Permits</u>		
62-1-0115	BLJ 6; <u>Contact</u>	AGD	55	648650	5971320	Open site	Valid	Artefact : -	Open Camp Site	1569,99585
		<u>Recorders</u>		Margrit Koettig				<u>Permits</u>	153	
62-1-0114	BLJ 5; <u>Contact</u>	AGD	55	648750	5971200	Open site	Valid	Artefact : -	Open Camp Site	1569,99585
		<u>Recorders</u>		Margrit Koettig				<u>Permits</u>	153	
62-1-0128	TVE_7;Tyrolean Village Estate, East Jindabyne; <u>Contact</u>	AGD	55	646780	5969530	Open site	Valid	Artefact : -	Open Camp Site	1998
		<u>Recorders</u>		Kerry Navin				<u>Permits</u>		
62-1-0373	Missing Link 1 <u>Contact</u>	GDA	55	647131	5968551	Open site	Valid	Artefact : 1		
		<u>Recorders</u>		Doctor.Sue Feary				<u>Permits</u>		
62-1-0202	Tyrolean Village Estate 15 (TVE15) <u>Contact</u>	AGD	55	647050	5969470	Open site	Valid	Artefact : 6		
		<u>Recorders</u>		Navin Officer Heritage Consultants Pty Ltd				<u>Permits</u>		
62-1-0374	Go Jindabyne AFT 1 <u>Contact</u>	GDA	55	648165	5971862	Open site	Valid	Artefact : -		
		<u>Recorders</u>		Mr.Matthew Barber,NGH Heritage - Fyshwick				<u>Permits</u>		
62-1-0144	Rush's Resort 14; <u>Contact</u>	AGD	55	648620	5971500	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
		<u>Recorders</u>		Kerry Navin,Mr.Kelvin Officer				<u>Permits</u>		
62-1-0372	Golden Oldie 1 <u>Contact</u>	GDA	55	646573	5968963	Open site	Valid	Artefact : 1		
		<u>Recorders</u>		Doctor.Sue Feary				<u>Permits</u>		
62-1-0199	Tyrolean Village Estate 12 (TVE12) <u>Contact</u>	AGD	55	646830	5969020	Open site	Valid	Artefact : -		
		<u>Recorders</u>		Navin Officer Heritage Consultants Pty Ltd				<u>Permits</u>		
62-1-0371	Snowy Hydro Paddock 1	GDA	55	647390	5970392	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Lat, Long From : -36.42, 148.62 - Lat, Long To : -36.38, 148.68. Number of Aboriginal sites and  
Aboriginal objects found is 70

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127

Client Service ID : 684468

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Doctor.Sue Feary					<a href="#">Permits</a>		
62-1-0366	ALP2 Cloned	GDA	55	647418	5969883	Open site	Destroyed	Artefact : -		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd					<a href="#">Permits</a>	4478	
62-1-0159	ASE 2;	AGD	55	647490	5969850	Open site	Valid	Artefact : -	Isolated Find,Open Camp Site	99356
	<a href="#">Contact</a>	<a href="#">Recorders</a>	P Saunders					<a href="#">Permits</a>	1868,1869	
62-1-0297	TREAS 2 ( The Ridge Estate Artefact Scatter 2)	AGD	55	647827	5969758	Open site	Valid	Artefact : -		100518
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Ms.Trish Saunders					<a href="#">Permits</a>	2664,2665,2667,2725	
62-1-0145	Rush's Resort 15;	AGD	55	648810	5971920	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin,Mr.Kelvin Officer					<a href="#">Permits</a>		
62-1-0146	Rush's Resort 16;	AGD	55	648920	5971400	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin,Mr.Kelvin Officer					<a href="#">Permits</a>		
62-1-0174	Thredbo Terrace 1	AGD	55	645350	5968550	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Heritage Solutions-Alistair Grinbergs					<a href="#">Permits</a>		
62-1-0037	Lake Jindabyne;)/TV 9;TVE 6;	AGD	55	646310	5968790	Open site	Valid	Artefact : -	Open Camp Site	1998
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin,John Gallard					<a href="#">Permits</a>		
62-1-0168	TVE Isolated;Tyrolean Village Estate;	AGD	55	646620	5969330	Open site	Valid	Artefact : -	Isolated Find	
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>		
62-1-0125	TVE 9;	AGD	55	646900	5969270	Open site	Valid	Artefact : -	Open Camp Site	1998
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>	4373	
62-1-0207	Tyrolean Village Estate 20 (TVE20)	GDA	55	647270	5969493	Open site	Valid	Artefact : 4		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd,Ms.Lyn O'Brien,Past Traces Pty Ltd					<a href="#">Permits</a>		
62-1-0367	ALP1 Cloned	GDA	55	647476	5969664	Open site	Destroyed	Artefact : -		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd					<a href="#">Permits</a>	4478	
62-1-0127	TVE 11;	AGD	55	647460	5969330	Open site	Valid	Artefact : -	Open Camp Site	1998,102665
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>		
62-1-0158	ASE 1;	AGD	55	647550	5969850	Open site	Valid	Artefact : -	Isolated Find,Open Camp Site	99356
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Ms.Trish Saunders					<a href="#">Permits</a>	1868,1869	
62-1-0141	Rush's Resort 11;	AGD	55	648200	5972100	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin,Mr.Kelvin Officer					<a href="#">Permits</a>		
62-1-0028	Lake Jindabyne;)/TV 5;	AGD	55	646200	5969500	Open site	Valid	Artefact : -	Open Camp Site	
	<a href="#">Contact</a>	<a href="#">Recorders</a>	John Gallard					<a href="#">Permits</a>		
62-1-0124	TVE 8;	AGD	55	646880	5969720	Open site	Valid	Artefact : -	Open Camp Site	1998
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>	4373	
62-1-0201	Tyrolean Village Estate 14 (TVE14)	AGD	55	646980	5969460	Open site	Valid	Artefact : 2		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>		

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Lat, Long From : -36.42, 148.62 - Lat, Long To : -36.38, 148.68. Number of Aboriginal sites and Aboriginal objects found is 70

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127

Client Service ID : 684468

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
62-1-0368	ASE10 Cloned	GDA	55	647463	5969699	Open site	Destroyed	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd					<u>Permits</u>	4478	
62-1-0163	IF 1;	AGD	55	647450	5969800	Open site	Valid	Artefact : -	Isolated Find,Open Camp Site	2495,99356
	<u>Contact</u>	<u>Recorders</u>	P Saunders					<u>Permits</u>	1868,1869	
62-1-0283	Mills Ridge Site 2	AGD	55	647545	5968139	Open site	Valid	Artefact : 1		99394
	<u>Contact</u> Searle	<u>Recorders</u>	Doctor,Julie Dibden					<u>Permits</u>		
62-1-0287	KRA 3 (Kunama Ridge 3)	GDA	55	647695	5969430	Open site	Valid	Artefact : 2		99708
	<u>Contact</u> Searle	<u>Recorders</u>	Ms.Trish Saunders					<u>Permits</u>		
62-1-0066	Rushs Creek 2;J/RC 2;	AGD	55	648100	5971100	Open site	Valid	Artefact : -	Open Camp Site	201,99585
	<u>Contact</u>	<u>Recorders</u>	V Chapman					<u>Permits</u>		
62-1-0068	Rushs Creek 3,4,5;J/RC 3,4,5;	AGD	55	648750	5971800	Open site	Valid	Artefact : -	Open Camp Site	201,99585,103817
	<u>Contact</u>	<u>Recorders</u>	V Chapman					<u>Permits</u>	3790	
62-1-0029	Lake Jindabyne;J/TV 8;	AGD	55	646150	5969000	Open site	Valid	Artefact : -	Open Camp Site	
	<u>Contact</u>	<u>Recorders</u>	John Gallard					<u>Permits</u>		
62-1-0312	IF3 (Tyrolean Village)	AGD	55	646400	5968980	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>	Navin Officer Heritage Consultants Pty Ltd					<u>Permits</u>		
62-1-0205	Tyrolean Village Estate 18 (TVE18)	AGD	55	646910	5969150	Open site	Valid	Artefact : 5		
	<u>Contact</u>	<u>Recorders</u>	Navin Officer Heritage Consultants Pty Ltd					<u>Permits</u>	4373	
62-1-0203	Tyrolean Village Estate 16 (TVE16)	AGD	55	646990	5969520	Open site	Valid	Artefact : 3		
	<u>Contact</u>	<u>Recorders</u>	Navin Officer Heritage Consultants Pty Ltd					<u>Permits</u>		
62-1-0226	EJ 1	AGD	55	648230	5971690	Open site	Valid	Artefact : 100		99585,103817
	<u>Contact</u>	<u>Recorders</u>	Ms.Trish Saunders					<u>Permits</u>	3790	
62-1-0224	EJ 2	AGD	55	648550	5971395	Open site	Valid	Artefact : 4		99585
	<u>Contact</u>	<u>Recorders</u>	Ms.Trish Saunders					<u>Permits</u>		
62-1-0148	Rush's Resort 18;	AGD	55	648600	5971400	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
	<u>Contact</u>	<u>Recorders</u>	Kerry Navin,Mr.Kelvin Officer					<u>Permits</u>		
62-1-0142	Rush's Resort 12;	AGD	55	648670	5971980	Open site	Valid	Artefact : -	Open Camp Site	2164,99585
	<u>Contact</u>	<u>Recorders</u>	Kerry Navin,Mr.Kelvin Officer					<u>Permits</u>		
62-1-0204	Tyrolean Village Estate 17 (TVE17)	AGD	55	646110	5969180	Open site	Valid	Artefact : 1		102665
	<u>Contact</u>	<u>Recorders</u>	Navin Officer Heritage Consultants Pty Ltd					<u>Permits</u>	3610	
62-1-0027	Lake Jindabyne;J/TV 6;TVE 5;	AGD	55	646230	5969440	Open site	Valid	Artefact : -	Open Camp Site	1998
	<u>Contact</u>	<u>Recorders</u>	Kerry Navin,John Gallard					<u>Permits</u>		
62-1-0130	TVE_2;Tyrolean Village Estate, East Jindabyne;	AGD	55	646530	5969460	Open site	Valid	Artefact : -	Open Camp Site	1998
	<u>Contact</u>	<u>Recorders</u>	Kerry Navin					<u>Permits</u>	737	
62-1-0155	TVE Isolated Find 2;	AGD	55	646620	5969330	Open site	Valid	Artefact : -	Isolated Find	

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Lat, Long From : -36.42, 148.62 - Lat, Long To : -36.38, 148.68. Number of Aboriginal sites and Aboriginal objects found is 70

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127  
Client Service ID : 684468

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>	741	
62-1-0126	TVE 10;	AGD	55	646920	5969160	Open site	Valid	Artefact : -	Open Camp Site	1998
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>		
62-1-0206	Tyrolean Village Estate 19 (TVE19)	AGD	55	647120	5969780	Open site	Valid	Artefact : 10		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>	4373	
62-1-0208	Tyrolean Village Estate 21 (TVE21)	AGD	55	647230	5969460	Open site	Valid	Artefact : 4		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>		
62-1-0064	Lake Jindabyne East 1;j/ES 1;	GDA	55	647413	5969983	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -	Open Camp Site	201
	<a href="#">Contact</a>	<a href="#">Recorders</a>	V Chapman,Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd					<a href="#">Permits</a>	4373,4478	
62-1-0065	Lake Jindabyne East 2;j/ES 2;	AGD	55	647400	5969900	Open site	Valid	Artefact : -	Open Camp Site	201
	<a href="#">Contact</a>	<a href="#">Recorders</a>	V Chapman					<a href="#">Permits</a>		
62-1-0161	IF 3;	AGD	55	647500	5969450	Open site	Valid	Artefact : -	Isolated Find,Open Camp Site	99356
	<a href="#">Contact</a>	<a href="#">Recorders</a>	P Saunders					<a href="#">Permits</a>	1868,1869,4478	
62-1-0160	ASE 3; (Not a site)	AGD	55	647550	5969620	Open site	Not a Site	Artefact : -	Isolated Find,Open Camp Site	99356
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>	1868,1869	
62-1-0162	IF 2;	AGD	55	647570	5969750	Open site	Valid	Artefact : -	Isolated Find,Open Camp Site	2495,99356
	<a href="#">Contact</a>	<a href="#">Recorders</a>	P Saunders					<a href="#">Permits</a>	1868,1869	
62-1-0285	KRA 1 (Kunama Ridge 1)	GDA	55	647709	5969795	Open site	Valid	Artefact : 9		99708
	<a href="#">Contact</a> Searle	<a href="#">Recorders</a>	Ms.Trish Saunders					<a href="#">Permits</a>		
62-1-0286	KRA 2 (Kunama Ridge 2)	GDA	55	647800	5969660	Open site	Destroyed	Artefact : 11, Potential Archaeological Deposit (PAD) : -		99708,103899, 104144,10414 9
	<a href="#">Contact</a> Searle	<a href="#">Recorders</a>	Ms.Trish Saunders,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats					<a href="#">Permits</a>	4203	
62-1-0039	Lake Jindabyne;j/TV 7;TVE 4;	AGD	55	646310	5969200	Open site	Valid	Artefact : -	Open Camp Site	1998,102665
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin,John Gallard					<a href="#">Permits</a>	3610	
62-1-0209	Tyrolean Village Estate 22 (TVE22)	AGD	55	646420	5969140	Open site	Valid	Artefact : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>		
62-1-0311	IF1 (Tyrolean Village)	AGD	55	646470	5969100	Open site	Valid	Artefact : 1		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Navin Officer Heritage Consultants Pty Ltd					<a href="#">Permits</a>		
62-1-0129	TVE_3;Tyrolean Village Estate, East Jindabyne;	AGD	55	646670	5969560	Open site	Valid	Artefact : -	Open Camp Site	1998
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Kerry Navin					<a href="#">Permits</a>	282,739	
62-1-0369	ASE9 Cloned	GDA	55	647486	5969651	Open site	Destroyed	Artefact : -		
	<a href="#">Contact</a>	<a href="#">Recorders</a>	Ms.Lyn O'Brien,Ms.Lyn O'Brien,Past Traces Pty Ltd,Past Traces Pty Ltd					<a href="#">Permits</a>	4478	

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Lat, Long From : -36.42, 148.62 - Lat, Long To : -36.38, 148.68. Number of Aboriginal sites and Aboriginal objects found is 70

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## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 21127

Client Service ID : 684468

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
62-1-0067	Kunama Gallery;	AGD	55	647400	5969900	Open site	Valid	Modified Tree (Carved or Scarred) :	Scarred Tree	201
	<u>Contact</u>							-		
	<u>Recorders</u>							<u>Permits</u>		
62-1-0225	ASE 4	AGD	55	647420	5969925	Open site	Valid	Artefact : 5		
	<u>Contact</u>							<u>Permits</u>	1868,1869	
	<u>Recorders</u>									

### \*\* Site Status

**Valid** - The site has been recorded and accepted onto the system as valid

**Destroyed** - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

**Partially Destroyed** - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

**Not a site** - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 22/05/2022 for Leigh Bate for the following area at Lat, Long From : -36.42, 148.62 - Lat, Long To : -36.38, 148.68. Number of Aboriginal sites and  
Aboriginal objects found is 70

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## APPENDIX B: METHODS OF ANALYSIS

## 5.0 Appendix 1: Methods of Analysis

Artefact recording was conducted in accordance with the Code of Practice (DECCW 2010) and the AHIMS artefact recording form (Figure 7). The AHIMS artefact recording form allows for some flexibility in artefact recording with the ability to record raw materials and artefact types which are not listed in the drop-down options.

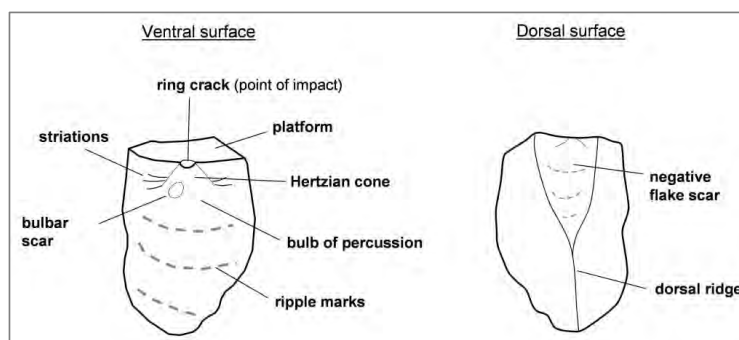
### 5.1 Artefact identification

Stone artefacts are identified using technical criteria based on stone fracture mechanics (Cotterell and Kamminga 1987; Holdaway and Stern 2004; Speth 1972). Flakes show specific technical features (Figure 8). A flake has a platform (unless crushed, see below), a point of impact (force application), a Hertzian cone and a bulb of percussion. Some flakes also have striations extending from the bulb, a bulbar (errailure) scar and ripple marks (Faulkner 1972; Speth 1972). Sometimes the platforms on flakes were crushed during knapping (Holdaway and Stern 2004:120). These features are more or less pronounced, depending on the quality of the stone, the hardness of the hammer relative to the stone, and whether an anvil was used and the manner of its use. The negative scars on cores and other retouched artefacts show some of the same technical features, but in reverse.

Bipolar flaking was useful where the angle of the striking platform and the sides of the core was 90° or greater, and for flaking small cores and pebbles. In bipolar flaking the core was placed on an anvil and hit so that the force was directed down through the rock and rebounded off the anvil, to split the core into smaller pieces (Figure 9, Hiscock 1996; Holdaway and Stern 2004). The resulting flakes and core show crushing at the end which was struck by the hammer stone and at the end which was in contact with the anvil. Bipolar flakes had sheared or compressed bulbs of percussion and sometimes had hinge bulbs or a pronounced ripple horizontally across its middle section (Cotterell and Kamminga 1987:688,698-700; de la Pena 2015).

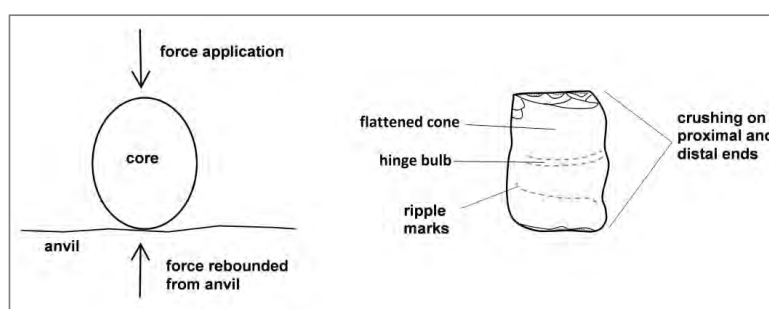
Artefacts were sometimes broken, either during flaking or afterwards by trampling, burning, modern land use or during archaeological excavation. Artefact breakage is discussed below. Fragments of broken artefacts are here counted as artefacts if they could be identified as such. Fragments of the same raw material types as artefacts which lack clearly identifiable flaked surfaces or other forms of modification (pitting, grinding) are classified as broken pieces but not counted as artefacts.

**Figure 7 Artefact recording sheet from the AHIMS site recording form.**



**Figure 8 General features of a flake.**

(After Faulkner 1972; Speth 1972).



**Figure 9 Bipolar flaking technique and bipolar flake.**

## 5.2 Artefact recording

Artefact data was entered into Microsoft's Access relational database programme for analysis.

### 5.2.1 Provenance data

The PAD, test pit, spit and depth were recorded. Each artefact in the database is assigned a number, automatically generated by the computer program, so that specific artefacts can be referred to if required.

### 5.2.2 Lithic materials

**Rock type.** The options include those on the AHIMS site form with the addition of chalcedony, IMST and unidentified:

- **Chalcedony.** A very fine-grained siliceous rock (silicon dioxide) with a waxy lustre, semi-transparent to translucent. It formed from the precipitation of silica from water, e.g. occurring in voids in igneous rocks. Agate, carnelian, jasper and onyx are varieties of chalcedony,

- FGS. Other fine-grained siliceous rocks,
- IMST. This stands for a rock type often referred to by archaeologists as indurated mudstone or silicified tuff,
- Quartz.
- Silcrete. An indurated duricrust, formed when silica cemented sediments. The grain size and vary according to the sediments in the original deposit.
- Unidentified. Rock types not identified by the analyst.

Cortex. An estimate of the extent of cortex on the dorsal and platform surfaces. Although not required on the AHIMS artefact form this variable may contribute information on the nature of stone resources and/or stage of reduction.

Flaking quality. Good quality was assigned where stone was fine grained with smooth surfaces and lacked flaws. Medium quality was assigned where surfaces were not smooth and/or where flaws interrupted the fracture path, and/or artefacts broke along flaws. Poor quality was assigned where stone was highly flawed or provided only irregular fracture surfaces.

### 5.2.3 Size and weight

Maximum size. The maximum size of artefacts along their longest dimension, recorded to the nearest 0.5mm (**Figure 10**).

Oriented length, width and thickness. For flakes and fragments of broken flakes, length is measured from the point of force application along the percussion axis to the distal end of the flake. Width is measured at right-angles to oriented length and at the midpoint of oriented length. Thickness is measured at the intersection of length and width (**Figure 10**). Cores and flaked pieces are oriented as if they are rectangular blocks and measured accordingly. Measures for broken artefacts are entered in brackets.

Weight. Weight is recorded for each artefact to the nearest 0.1g.

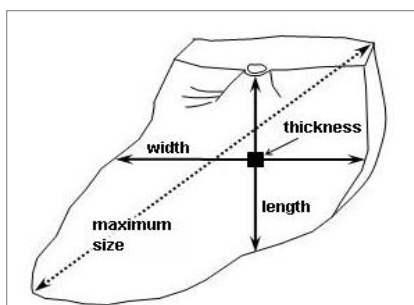


Figure 10 Maximum and oriented measures for flakes.

#### 5.2.4 Artefact Type

Artefact types identified during this study are:

- Backed artefact. A flake, a broken flake or flake fragment with blunting (vertical) retouch along one or more margins. The retouch must have occurred after the artefact was struck from its core. The retouch was usually initiated from the ventral surface. Ridge-straightening flakes are not classified as backed artefacts because the retouching occurred before the flake was detached from its core.
- Bipolar artefact. A flaked artefact which has crushing on one or both proximal and distal ends, has a flattened or compressed bulb of percussion and sheared ventral (Figure 9). The crushing and flattening of the bulb occurs because force was applied at the proximal end and rebounded through an anvil on which the distal end was rested (Cotterell and Kamminga 1987).
- Burinate core. A core with a flake body with one or more lateral or distal margins steeply retouched and with negative scars from flakes having been removed from the ventral surface or a margin (Hiscock 1993).
- Cone-split/left, Cone-split/right. Longitudinal cone-split broken flakes, left or right side. A broken flake, split vertically along its long axis, often through or close to its point of force application, bisecting the platform (Figure 11). Cone-split broken flakes may be broken distally or laterally.
- Core (functioning as a raw material supply). A piece of stone which was flaked to produce artefacts which could have been used as tools or other cores. The piece of stone may have originally been a cobble, a heat shatter or a naturally broken rock (after Gorman 1992:156; Holdaway and Stern 2004:37-38,179; Moore 2000). Cores are artefacts with negative flake scars only, or if former flakes were reduced as burinate cores, the negative scars intercept the ventral surface of the flake used as the core in such a manner as to indicate that the negative



scars were more recent in the reduction sequence than the ventral surface of the former flake. Cores are generally distinguished from other retouched artefacts by scar size and nature of retouch. Cores (as flake producers) have one or more whole or remnant flake scars, more than 10mm in size, indicating the removal of flakes which were large enough to have potentially been used as tools.

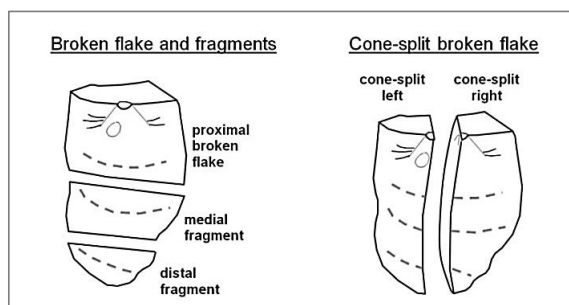


Figure 11 Flake breakage.

- Distal. A distal piece of a flake not having a platform (Figure 11). It has an identifiable ventral surface. This category includes artefacts with very heavily crushed platforms which have removed part of the bulb.
- Flake. A flake has a platform (unless crushed during knapping), a point of impact (force application, PFA), a Hertzian cone, and a bulb of percussion (Figure 8). A flake may also have striations, a bulbar scar (also called errailure scar) and ripple marks (Faulkner 1972; Speth 1972:35). These features may be more or less pronounced, depending on the quality of the stone material, the hardness of the hammer relative to the stone, and whether an anvil was used and the manner of its use.
- Flaked piece. A flaked artefact which cannot be oriented towards a particular point of force application. Surfaces show signs of flaking such as lines from shear fracture and/or ripple marks.
- Medial. A mid-section of a flake, not having a platform or distal margin (Figure 11). It has an identifiable bulbar or ventral surface.
- Proximal BF (proximal broken flake). The proximal end of a flake (Figure 11). A flake with one or more margins broken. It has a platform (unless crushed during flaking), point of force application, bulbar surface and usually ripple marks. This type includes flakes with step terminations. Some broken flakes are missing part of their proximal end but are not longitudinal cone-split broken flakes (see above) and these are classified here as broken flake/left or broken flake/right as appropriate.

- Recent fragment. A piece of stone of the same raw material type as artefacts but with fresh fracture surfaces.
- Remnant flaked surface. Fragments of broken pieces of artefacts which retain only a small area of flaked surface. The remnant flaked surface covers about half or less of the total surface area of the object.
- Retouched. The negative scars from flaking were struck from surfaces in such a way as to indicate that the retouching was more recent in the reduction sequence than the artefact being retouched. Retouching scars may have been struck from or intercept with the ventral surface of a former flake, but scars removed during core preparation (e.g. platform faceting or ridge-straightening) are excluded from this category because the preparation occurred before the flake was struck from the core. Artefacts in this category generally have small flake scars (e.g. <10mm in size). Such retouched artefacts may have been core or tool blanks, failed cores or tools, practice items or broken fragments of cores or tools which could not be classified as such.

#### 5.2.5 Cores

Additional information was recorded for cores to show how they were flaked (Baker 1992). 'Flaking pattern' is the pattern of flake removals evident on cores. The categories recorded here are unifacial, bifacial (alternating), asymmetric (including faceting) and bipolar (Figure 12). In addition, whether flakes were removed from the long axis (LA) or short axis (SA) was noted.

- Unifacial. Reduction proceeded from one face of a platform. Cores may have been rotated, showing reduction from multiple faces but the force was applied in only one direction from each platform. Flakes from unifacial flaking variously have cortical, plain, ridged or focal platforms (see below).
- Bifacial. Relatively large-sized flakes were struck from the two faces of a platform edge. A bifacial pattern of removals made use of the bulbar scar from one flake removal to give a lower platform angle for a flake removed from the alternate face of the platform edge (Witter 1990:31).
- Asymmetric. Small flakes in the form of core preparation and platform faceting were removed from the platform surface, then larger flakes were struck from that prepared surface. This pattern was associated with backed artefact production (Hiscock 1993; Holdaway and Stern 2004:205).

- **Bipolar.** The core was rested on an anvil and force applied to it at an angle close to 90°, towards the core's contact with the anvil. Force passed through the core and bounced back from the anvil. The resulting flakes and core show crushing at the end which was struck by the hammer and at the end which was in contact with the anvil (Cotterell and Kamminga 1987:688, 698-700).

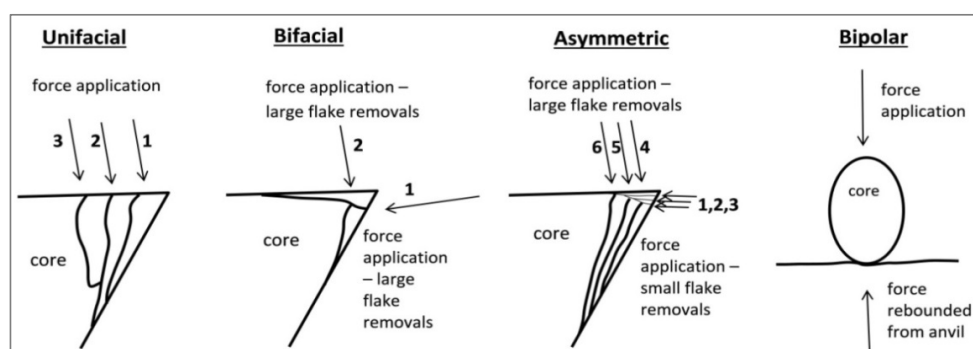


Figure 12 Core flaking patterns.

#### 5.2.6 Flake platforms

The AHIMS form includes two variables for platforms on flakes and proximal broken flakes, with 'bipolar' and 'indeterminate' repeated for both variables. The two variables are here combined into a single variable, without the need for repetition. In this single variable, all platforms are 'wide' except for those which are classified as focal. Following Holdaway and Stern (2004:373,120,123) the term 'crushed' rather than 'shattered' is used here. The types of platforms recorded here are defined as follows, and are recorded for flakes and proximal broken flakes more than 10mm in size (Figure 13).

- **Cortex.** Platform surface covered entirely with cortex or point of force application located on a cortical surface. Results from unifacial flaking.
- **Plain.** Platform surface consists of a smooth flaked surface or a flaw surface. Results from unifacial flaking.
- **Ridged.** Platform surface has a ridge formed by a remnant margin of a flake formerly struck across the core. Results from core rotation.
- **Scarred.** Platform has one or two flake scars, the points of force showing that they were initiated from blows struck from the dorsal edge of the platform surface prior to the flake being detached. Results from bifacial or asymmetric flaking.

- Faceted. Platform has many tiny flake scars on it (often visible as step terminations), also initiated from the dorsal edge of the platform. Results from asymmetric flaking.
- Focal. A very small platform, equal to or less than twice the area of the ring crack. May results from unifacial, bifacial or asymmetric flaking.
- Bipolar. Bipolar flakes and proximal broken flakes.
- Crushed or partly crushed. Platform crushed or partly crushed during knapping.
- Indeterminate. The platform surface could not be determined due to irregularities on the platform surface, or damage to the platform. If the platform is partly broken this is noted.

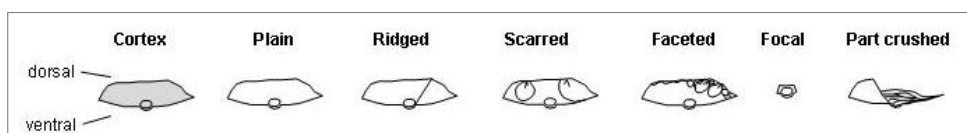


Figure 13 Flake platforms.

### 5.2.7 Flake terminations

Several types of flake terminations were recorded on flakes and distal flake fragments (Figure 14).

- Feather. The termination tapers to a thin end,
- Hinge. The termination forms a rounded end,
- Plunging. The termination removed the distal end (bottom) of a core or retouched tool.
- Step. The termination forms an abrupt, often right-angle, break. Finials are sometimes present, extending from the dorsal face of the termination. Step terminations are regarded as breaks because they cannot be consistently distinguished from other forms of artefact breakage (Holdaway and Stern 2004:116),

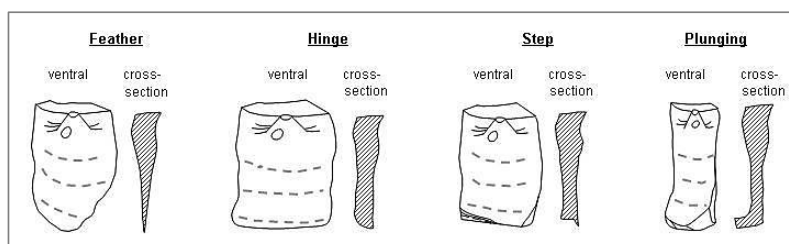


Figure 14 Flake terminations

### 5.2.8 Flake cross-section

Agreed criteria for classifying flake cross-sections are not discussed by Holdaway and Stern (2004). A set of flake cross-sections similar to those listed on the AHIMS site form is described by Koettig (1994 Vol 5:9). Koettig's categories are used here. Low angle/strong ridge is not an option on the AHIMS form, but is included as a category by Koettig and is included here. The categories used are high angle/strong ridge (HA/SR), high angle/weak ridge (HA/WR), low angle/strong ridge (LA/SR) and low angle/weak ridge (LA/WR) (Figure 15).

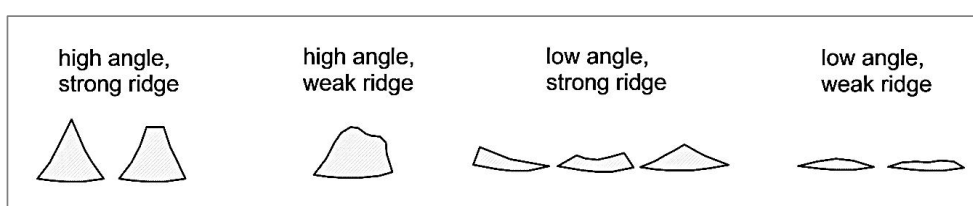


Figure 15 Flake cross-section (modified from Koettig 1994 Vol 5:9).

### 5.2.9 Backed artefact symmetry index (BASi)

Measurements are as described by Hiscock (2014). Half the chord length is divided by the length along the chord from one end of the backed artefact to the maximum width of the artefact. The index varies between 0 and 1.

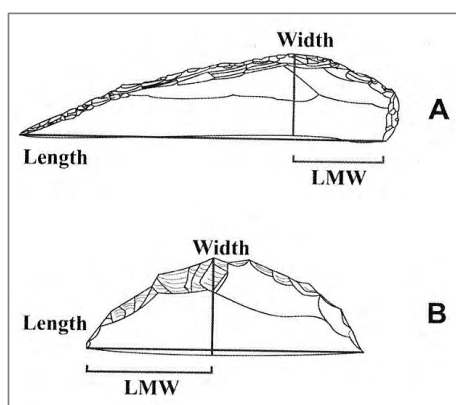


Figure 16 measurements for calculation of the backed artefact symmetry index (BASi). From Hiscock 2014.

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## APPENDIX C: ARTEFACT CATALOGUE

### 6.0 Catalogue of objects

ID	Pit	Spit	Depth	Material	Cortex	Max Size	Weight	Category	Type	Platform	Cross-section	Distal	Length	Width	Thick	Comments
1	1	3	10-15	Quartz	0	18	1.1	Platform artefact	Broken flake	irregular	la sr		(16)	13.5	3.5	new break distally
2	3	3	10-15	Silcrete	0	16	0.5	Backed broken	Broken flake	most removed	la sr		(14)	10	2	too incomplete for BASI
3	3	5	20-25	Quartz	<30	21	1.2	Platform artefact	Cone-split/ right side	(plain)	(la wr)	(feather)	17.5	(14)	2	
4	3	5	20-25	Quartz	40-60	33	3.6	FF/FP artefact	Distal		la wr	feather	(20.5)	28.5	5	
5	3	5	20-25	Quartz	40-60	29	10.3	FF/FP artefact	Flaked piece				(18)	(27.5)	(18)	1 negative scar, cortical platform, pebble/cobble piece
6	3	5	20-25	Quartz	0	31	4.7	FF/FP artefact	Flaked piece				28	11	10.5	sharp blocky fracture
7	3	5	20-25	Quartz	0	20	1.5	FF/FP artefact	Flaked piece				20	12.5	5	sharp thinner fracture
8	3	6	25-30	Quartz	0	20	1.5	FF/FP artefact	Flaked piece				20	10	5.5	sharp thinner fracture
9	5	2	5-10	Quartz	0	24	1.6	Platform artefact	Broken flake	broken			(12)	max 22	7 bulb	fragment, transverse break across bulb
10	6	1	0-5	Quartz	0	36.5	12.1	FF/FP artefact	Medial		la wr		(32)	max 36.5	11	
11	6	2	5-10	Quartz	0	21.5	1.5	Platform artefact	Broken flake	(plain)	(la wr)	(feather)	12	(18)	3	new damage central split
12	6	2	5-10	Quartz	0	10.5	0.2	FF/FP artefact	Medial						max 1.5	
13	6	2	5-10	Quartz	0	12	0.5	not artefact								bit worn
14	6	2	5-10	Silcrete	0	30.5	3.1	not flaked					(30)	(16.5)	max 5	
15	6	2	5-10	Silcrete	0	25.5	0.7	not flaked					(25)	(12.5)	1.5	
16	7	3	10-15	Silcrete	0	12.5	0.5	Bipolar artefact	Broken flake	bipolar			(10)	10	4.5	1 thin end
17	7	3	10-15	Quartz	0	23.5	2.2	FF/FP artefact	Flaked piece				23	10.5	6	tabular bit conchoidal
18	7	3	10-15	Quartz	0	14	0.4	FF/FP artefact	Flaked piece				11	11	2	
19	7	3	10-15	Quartz	0	26	5.6	not flaked					22	20	11.5	pyramid shape
20	7	4	15-20	Fine quartzite	0	24.5	4.1	Bipolar core	Indeterminate				17	22	7	1 thin end, 1 flat end
21	7	4	15-20	Silcrete	0	20	1.9	FF/FP artefact	Flaked piece				20.5	10	8	possible core fragment with 1 neg scar, tiny fragment refits
22	7	4	15-20	Quartz	0	18.5	1.4	Bipolar core	indeterminate				15	13	5	rotated LA and SA, 4 thin ends
23	7	4	15-20	Quartz	0	38	8.7	FF/FP artefact	Medial		ha sr		(33)	17	8.5	
24	7	4	15-20	Quartz	0	25	3.5	Platform artefact	Distal	part crushed	la sr	feather	19.5	17	6	poor ventral features, possible remnant platform right distal
25	7	4	15-20	Quartz	0	13	0.4	FF/FP artefact	Distal			feather	(8)	11	2	
26	7	4	15-20	Quartz	0	13	0.5	not artefact								sharp edges
27	7	5	20-25	Quartz	0	41	10.6	Platform artefact	Broken flake	scar	la sr		(36.5)	19	9	
28	8	1	0-5	Silcrete	0	18.5	0.8	FF/FP artefact	Distal		la sr	hinge	(16.5)	11.5	3	
29	8	4	15-20	Silcrete	0	25	1.6	Platform artefact	Broken flake	ridge	ha sr		(24)	10.5	4.5	
30	8	6	25-30	Quartz	>70	48	35.5	Platform artefact	Broken flake	crushed cortex	la wr		(40.5)	47	13	possible distal retouch? - step terminations dorsal
31	11	3	10-15	Quartz	0	19.5	0.6	FF/FP artefact	Medial				(19)	(9)	3.5	
32	12	2	5-10	Silcrete	0	33.5	6.1	Platform artefact	Flake	plain	la sr	feather	30	23	8.5	
33	13	2	5-10	Quartzite	>70	65.5	40.0	Manuport broken	cobble piece				(65.5)	(max 26)	max 25	fragment of curving cobble



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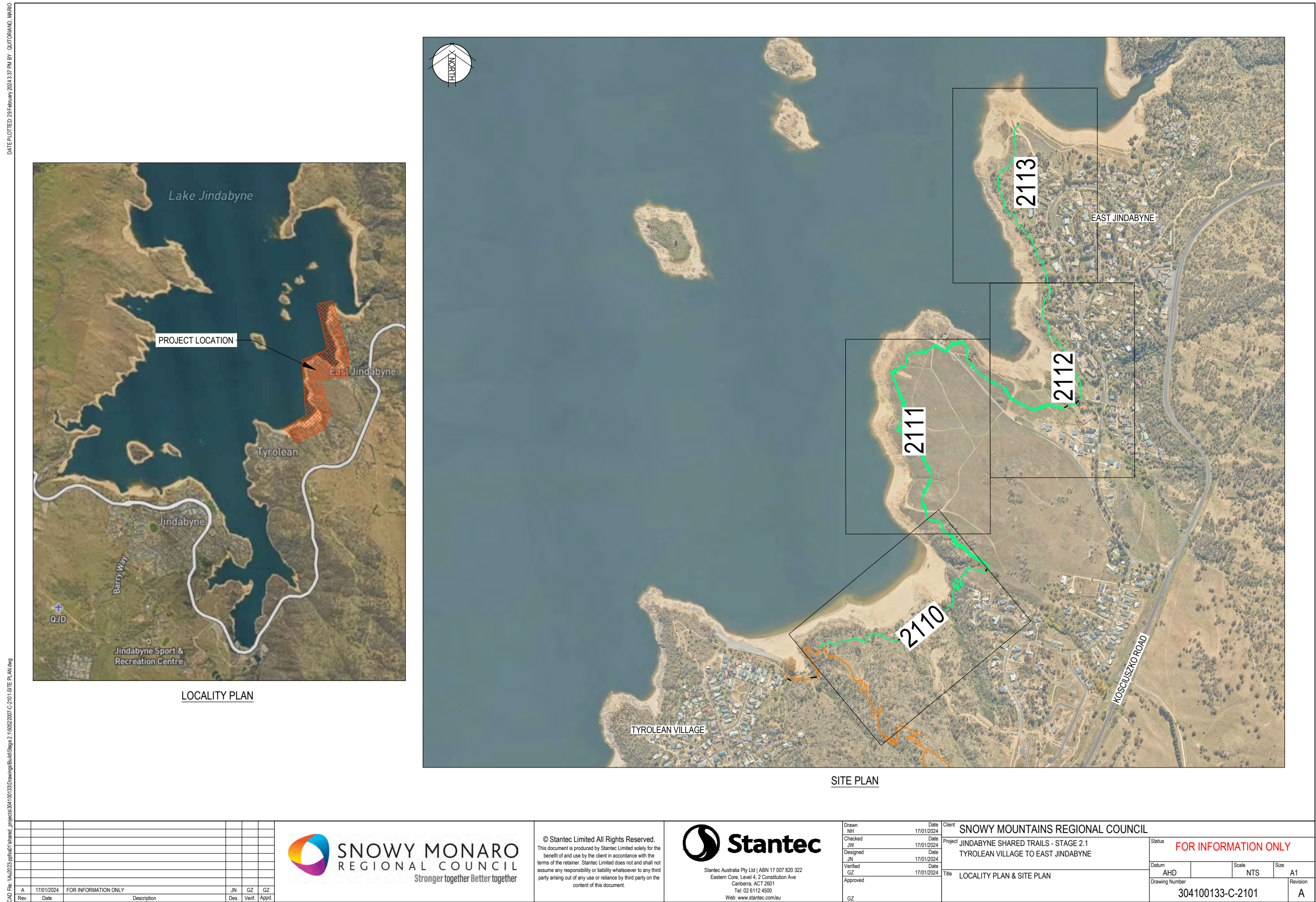
SNOWY MOUNTAINS REGIONAL COUNCIL

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TYROLEAN VILLAGE TO EAST JINDABYNE  
COVER SHEET

February 2024

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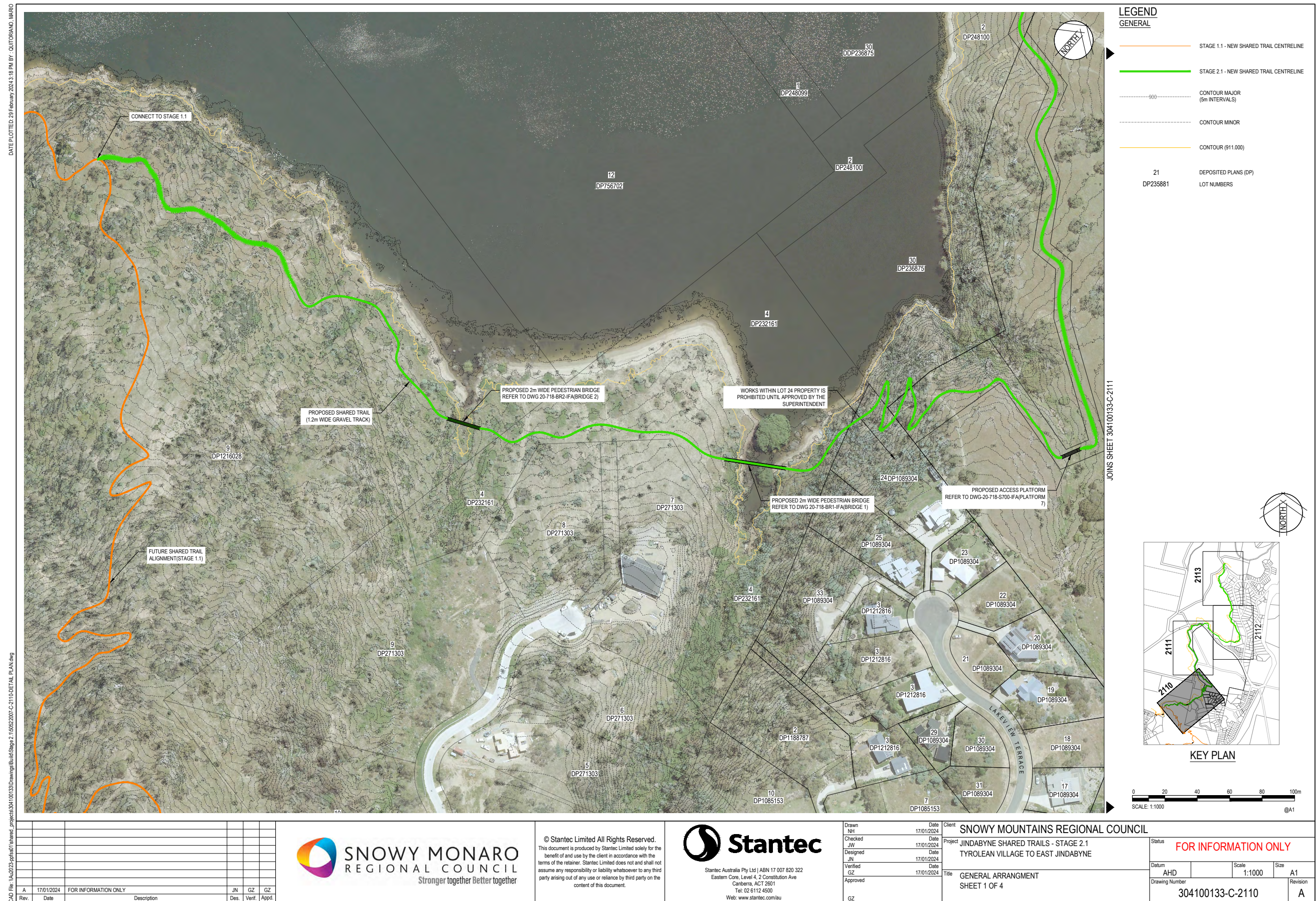


























EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL



# LOCALITY PLAN

NOT TO SCALE

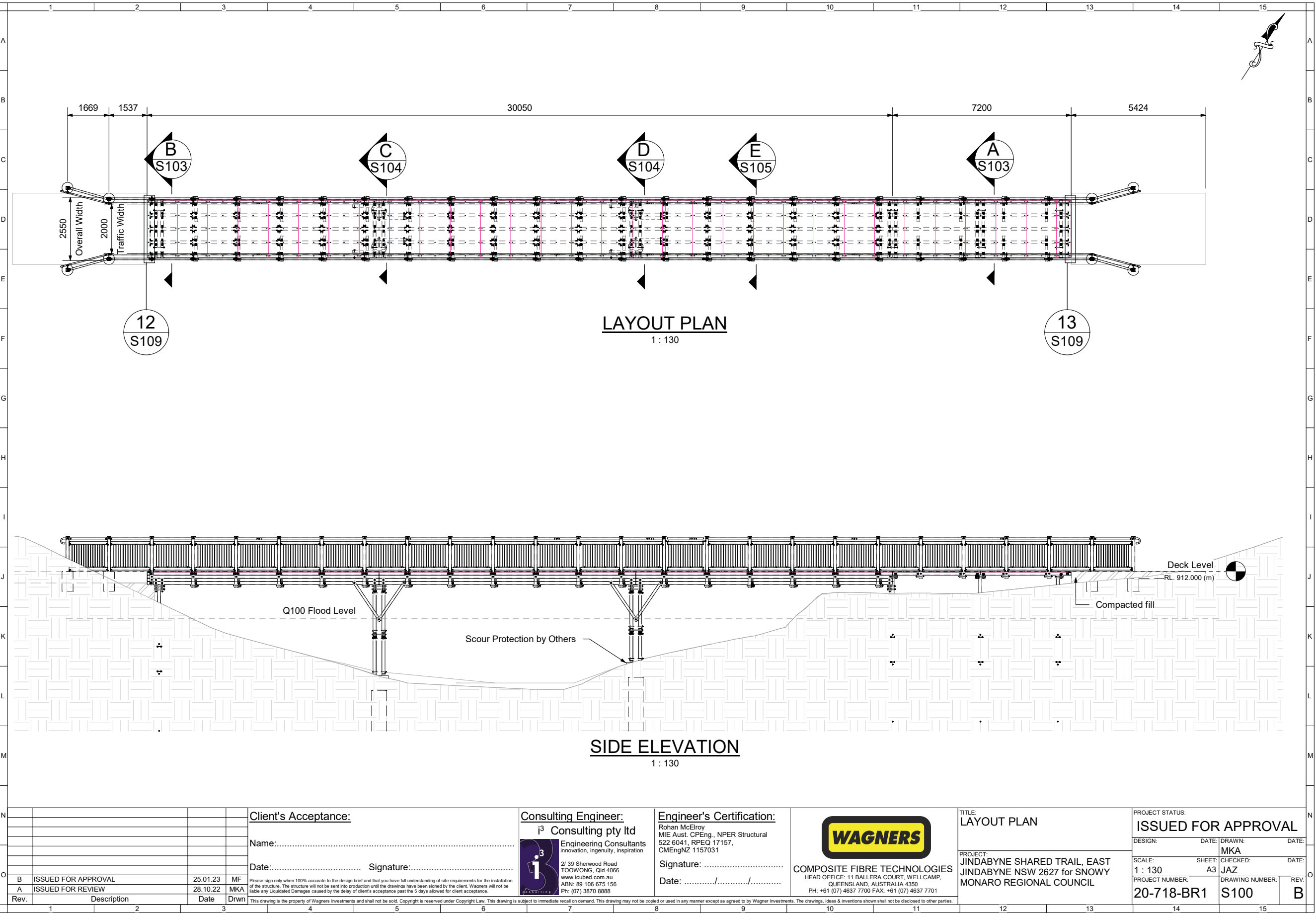
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S101	STRUCTURAL SETOUT PLAN
S102	PILE SETOUT PLAN
S103	SECTION A & B
S104	SECTION C & D
S105	SECTION E
S106	DETAIL 1 - 6
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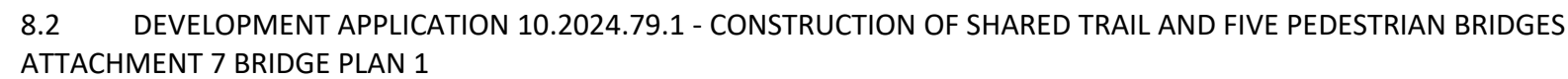
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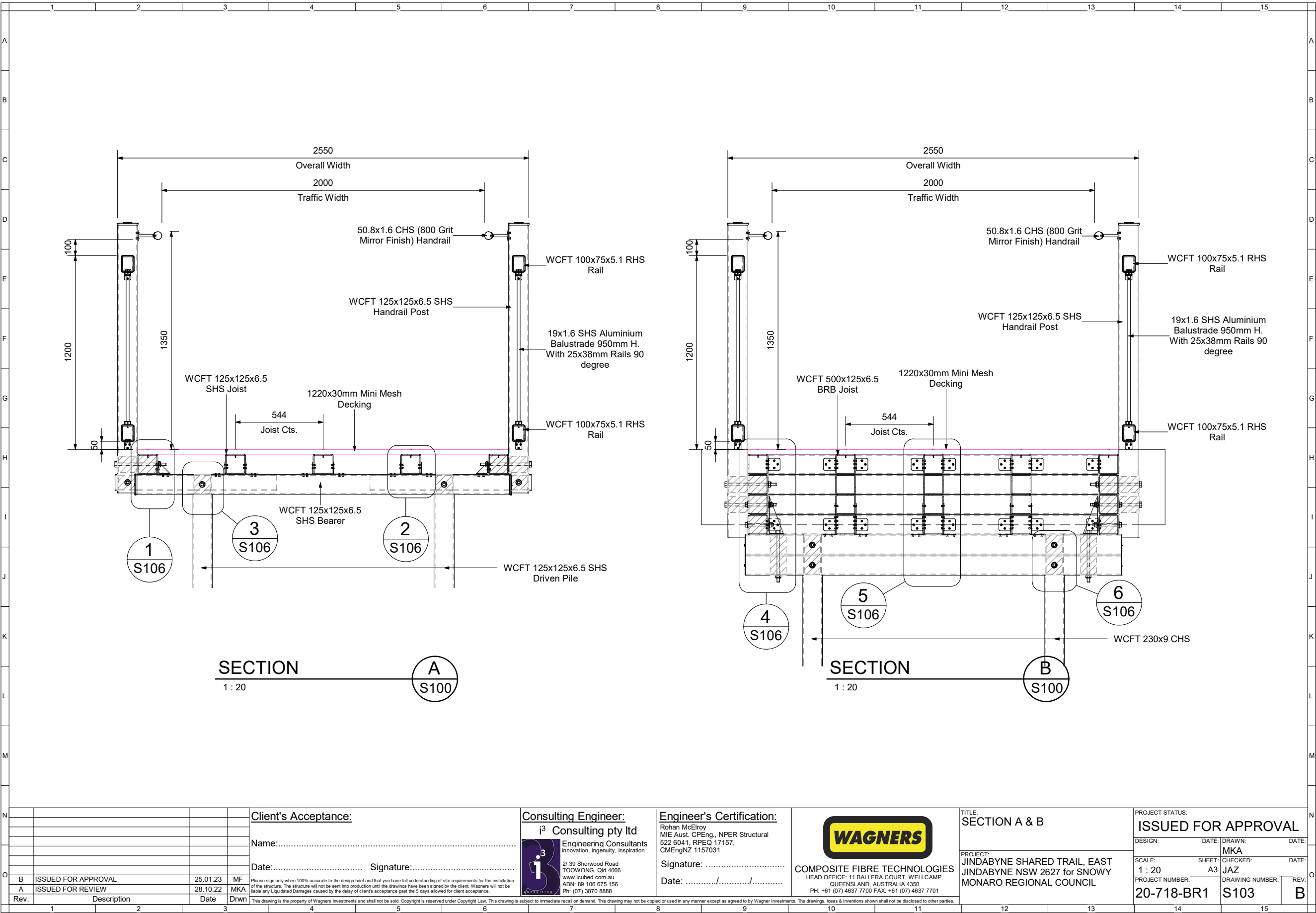


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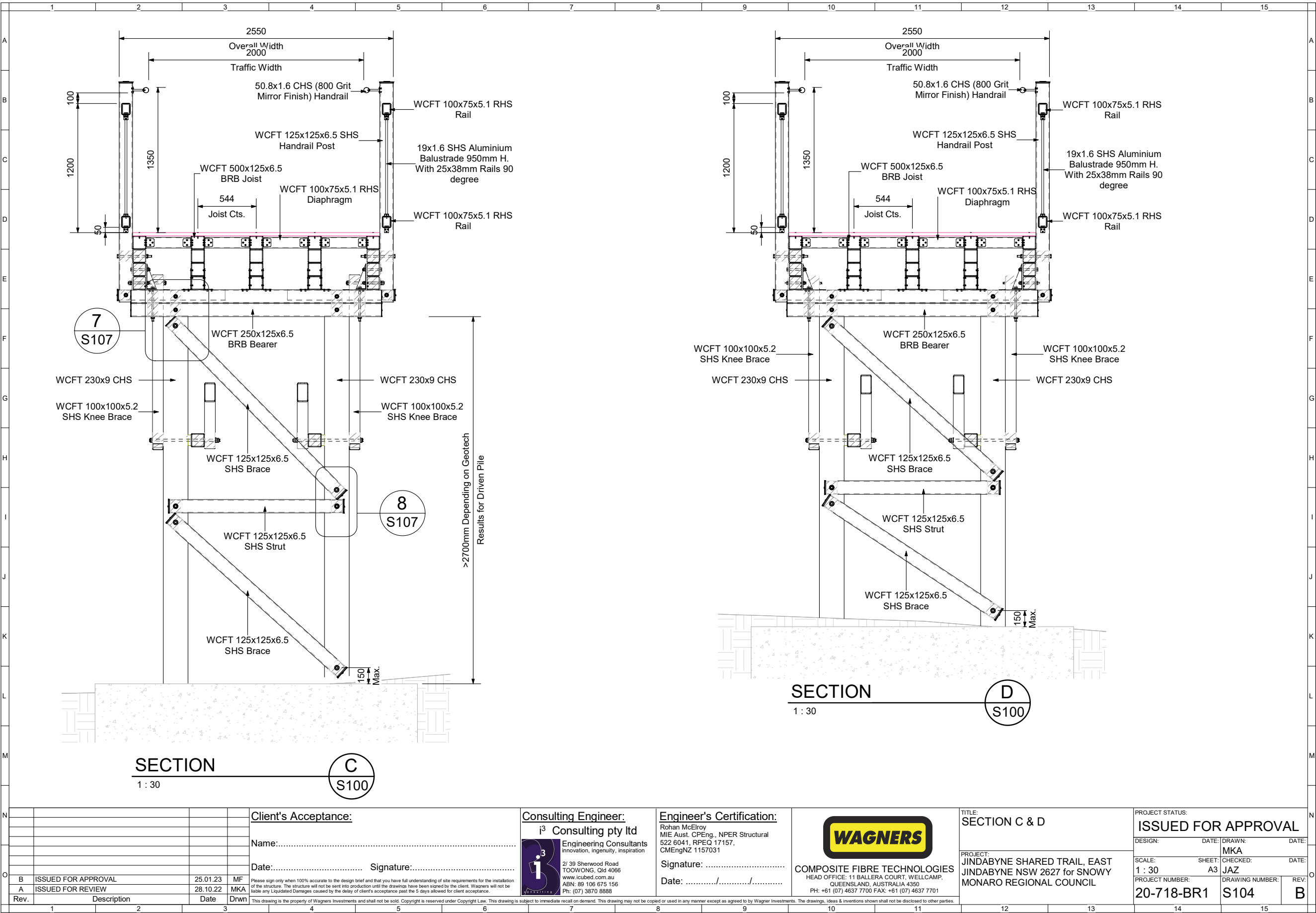


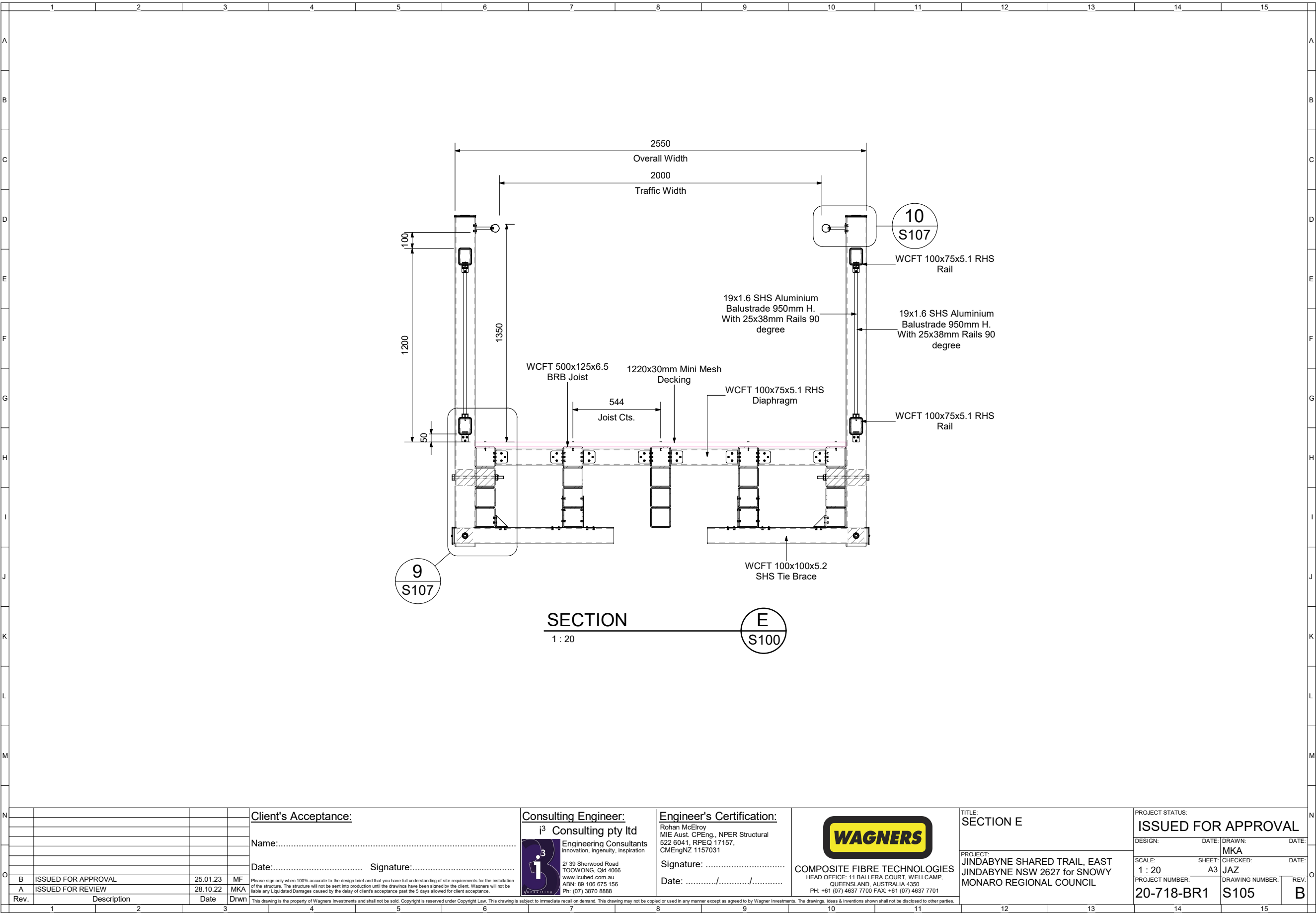


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Br2	Brace	WCFT 125x125x6.5 SHS	4	2150
Br3	Brace	WCFT 125x125x6.5 SHS	2	1930







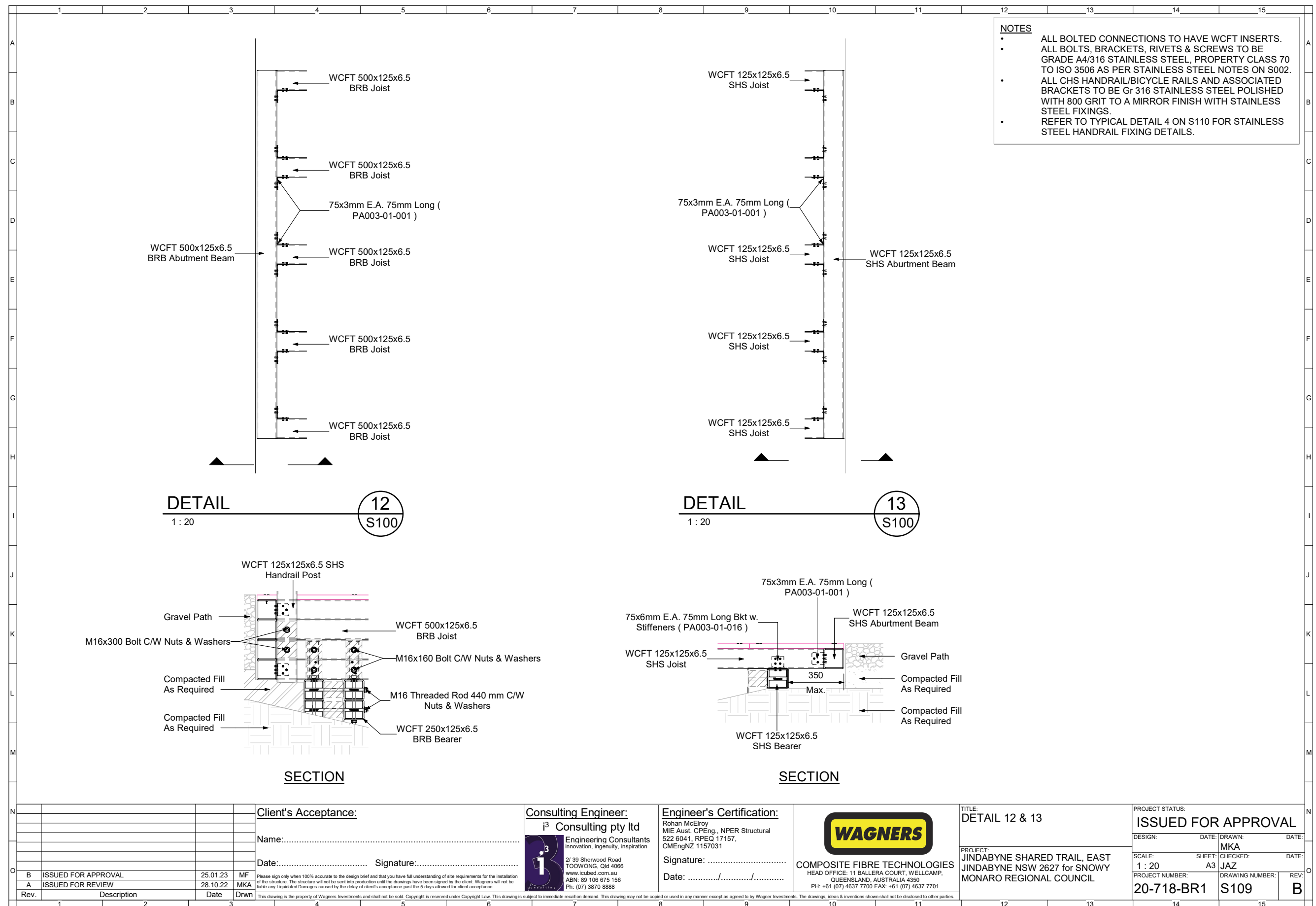




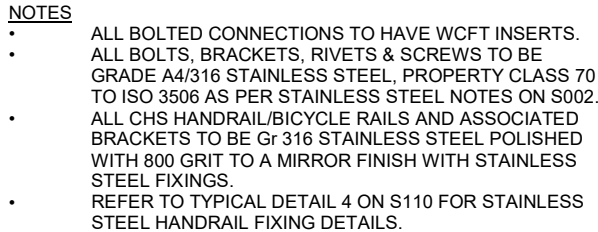














### TYPICAL DETAIL 6 - DRIVEN PILE BASE

## TYPICAL DETAIL 5 - PILE SPLICING

## TYPICAL SECTION APPROACH HANDRAIL

N										<b>Client's Acceptance:</b>			<b>Consulting Engineer:</b>			<b>Engineer's Certification:</b>						<b>TITLE:</b> TYPICAL DETAILS 2			<b>PROJECT STATUS:</b> ISSUED FOR APPROVAL			N
										Name:.....			i <sup>3</sup> Consulting Pty Ltd Engineering Consultants innovation, ingenuity, inspiration  2/ 39 Sherwood Road TOOWONG, Qld 4066 www.i3cled.com.au ABN: 89 106 875 156 Ph: (07) 3870 8888			Signature: ..... Date: .....			COMPOSITE FIBRE TECHNOLOGIES HEAD OFFICE: 11 BALERA COURT, WELLCAMP, QUEENSLAND, AUSTRALIA 4350 Ph: +61 (07) 4637 7700 FAX: +61 (07) 4637 7701			PROJECT: JINDABYNE SHARED TRAIL, EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL			DESIGN:..... DATE:..... DRAWN: MKA DATE:..... SCALE: As indicated A3 SHEET: A3 CHECKED: JAZZ DATE:..... PROJECT NUMBER: 20-718-BR1 DRAWING NUMBER: S111 REV: B			
O																												O
	B ISSUED FOR APPROVAL			25.01.23 MF																								
	A ISSUED FOR REVIEW			28.10.22 MKA																								
	Rev. Description			Date Drwn																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15													

AL COUNCIL

Shoreline Beach

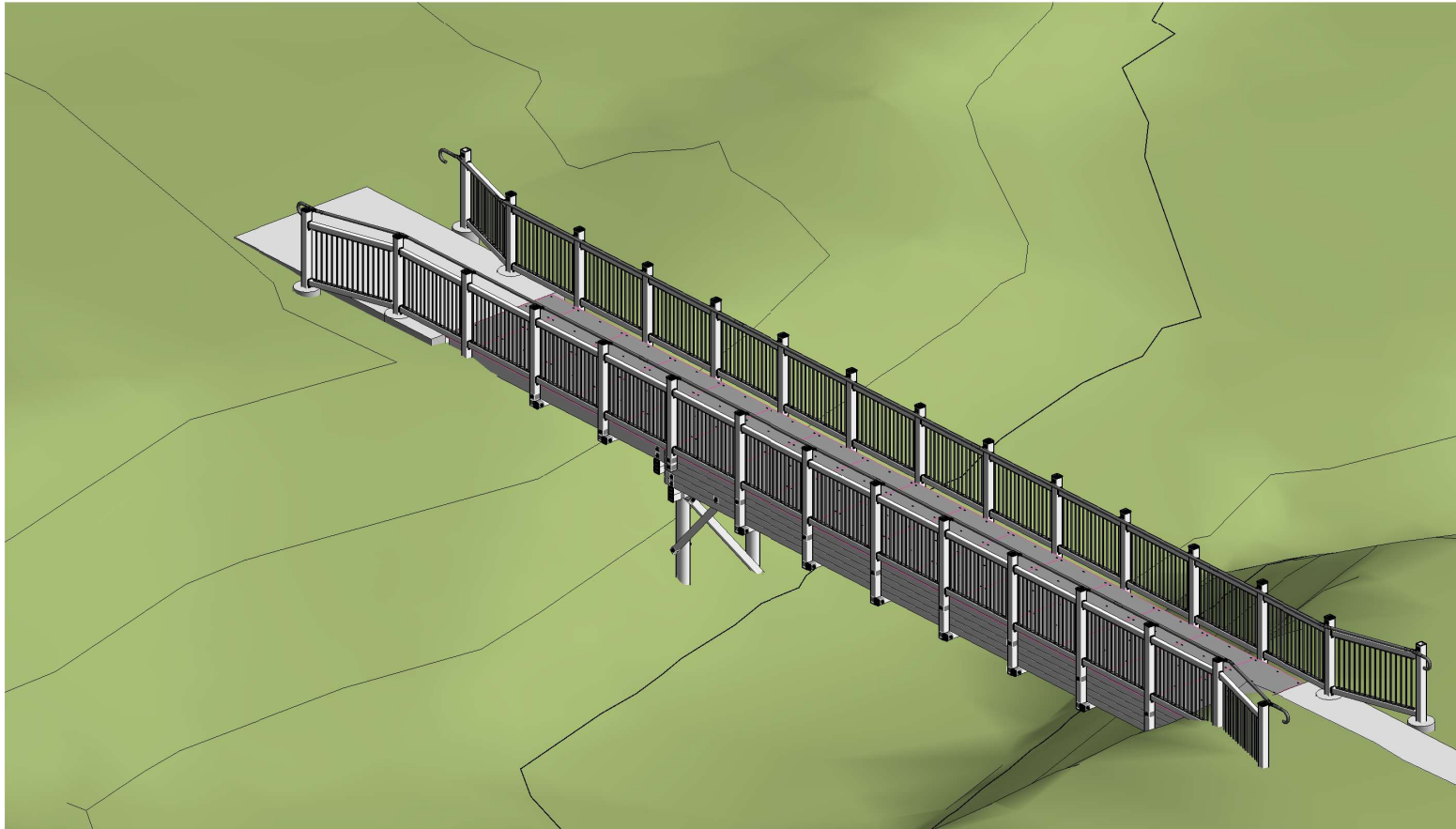
FOOTBRIDGE LOCATION

Willow Bay Lodge

Lakeview Terrace



# LOCALITY PLAN

NOT TO SCALE



## ISOMETRIC VIEW

<u><b>DRAWING SCHEDULE</b></u>	
<b>Sheet</b>	<b>Description</b>
S200	LOCALITY PLAN
S201	GENERAL NOTES
S202	GENERAL NOTES CONT'D
S203	LAYOUT PLAN
S204	STRUCTURAL SETOUT PLAN
S205	PILE SETOUT PLAN
S206	SECTION A & B
S207	SECTION C & D
S208	DETAIL 1 - 5
S209	DETAIL 6 - 10
S210	DETAIL 11 & 12
S211	TYPICAL DETAIL 1
S212	TYPICAL DETAIL 2

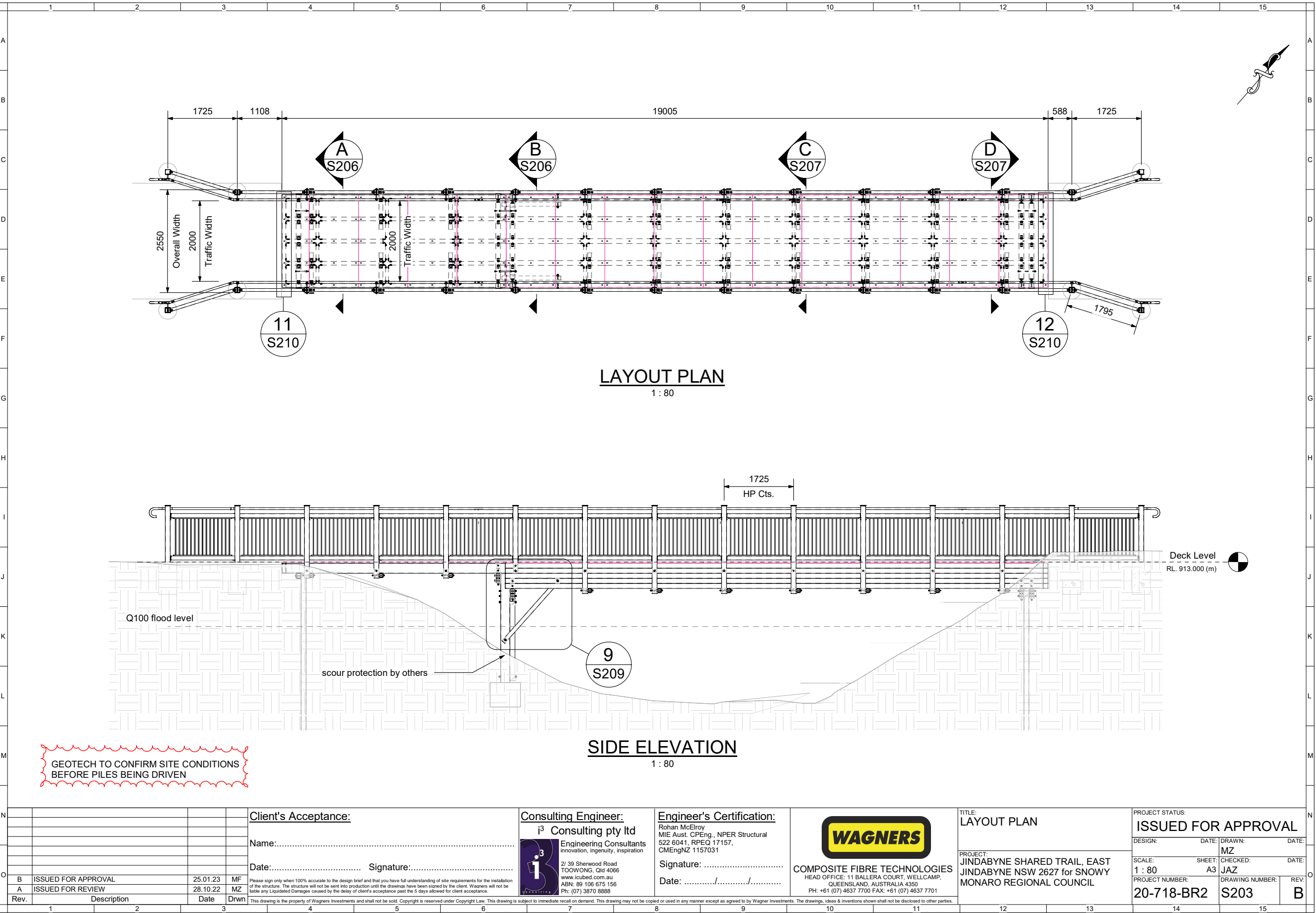
N				Client's Acceptance:			Consulting Engineer:			Engineer's Certification:						TITLE: LOCALITY PLAN			PROJECT STATUS: ISSUED FOR APPROVAL		
				Name:.....			 i <sup>3</sup> Consulting Pty Ltd Engineering Consultants innovation, ingenuity, inspiration			Rohan McElroy MIE Aust. CPEng., NPER Structural 522 6041, RPEQ 17157, CMEngNZ 1157031						PROJECT: JINDABYNE SHARED TRAIL, EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL			DESIGN:..... DATE:..... MZ		
				Date:..... Signature:.....			 2/ 39 Sherwood Road TOWONG, Qld 4066 www.i3consult.com.au ABN: 89 106 875 156 Ph: (07) 3870 8888			Signature: .....						SCALE:..... SHEET:..... A3					
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O	A ISSUED FOR REVIEW			28.10.22			MZ														
	Rev.			Description			Date			Drwn											
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	13			14			15			16			17			18					



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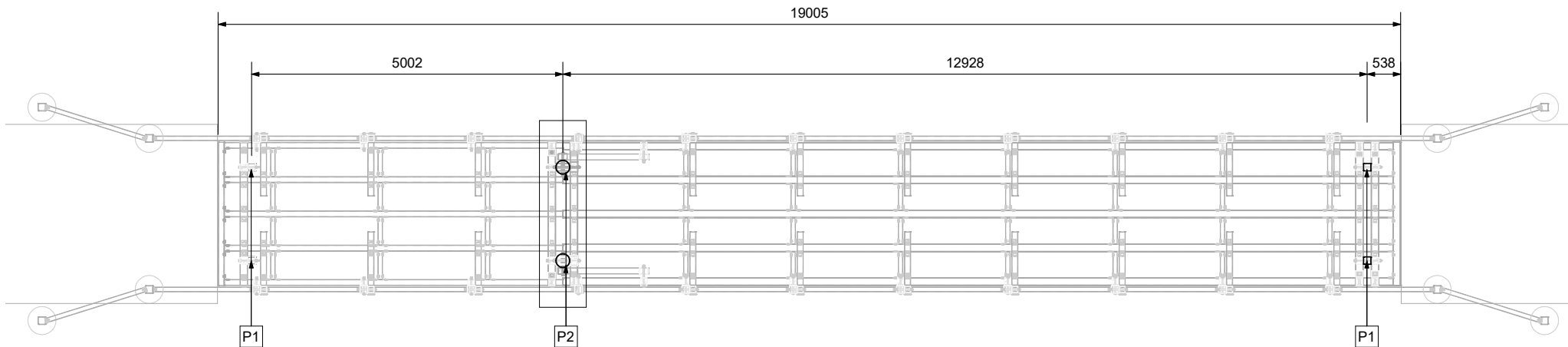


[illegible]

				<b>Client's Acceptance:</b> Name:..... Date:..... Signature:.....		<b>Consulting Engineer:</b> <b>i<sup>3</sup> Consulting Pty Ltd</b>  <b>Engineering Consultants</b> innovation, ingenuity, inspiration 2/ 39 Sherwood Road TOOWONG, Qld 4066 www.icubed.com.au ABN: 89 106 675 156 PH: (07) 3870 8888		<b>Engineer's Certification:</b> Rohan McElroy MIE Aust. CPEng., NPFR Structural 522 6041, RPEQ 17157, CMEngNZ 1157031 Signature: ..... Date: ...../...../.....		 <b>COMPOSITE FIBRE TECHNOLOGIES</b> HEAD OFFICE: 11 BALLERA COURT, WELLCAMP, QUEENSLAND, AUSTRALIA 4350 PH: +61 (07) 4637 7700 FAX: +61 (07) 4637 7701		<b>TITLE:</b> <b>STRUCTURAL SETOUT PLAN</b>  <b>PROJECT:</b> JINDABYNE SHARED TRAIL, EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL		<b>PROJECT STATUS:</b> <b>ISSUED FOR APPROVAL</b> DESIGN: DATE: DRAWN: DATE: SCALE: SHEET: CHECKED: DATE: 1 : 80 A3 JAZ PROJECT NUMBER: DRAWING NUMBER: REV: <b>20-718-BR2 S204 B</b>									
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A	ISSUED FOR REVIEW	28.10.22	DZ																				
Rev.	Description	Date	Drawn																				

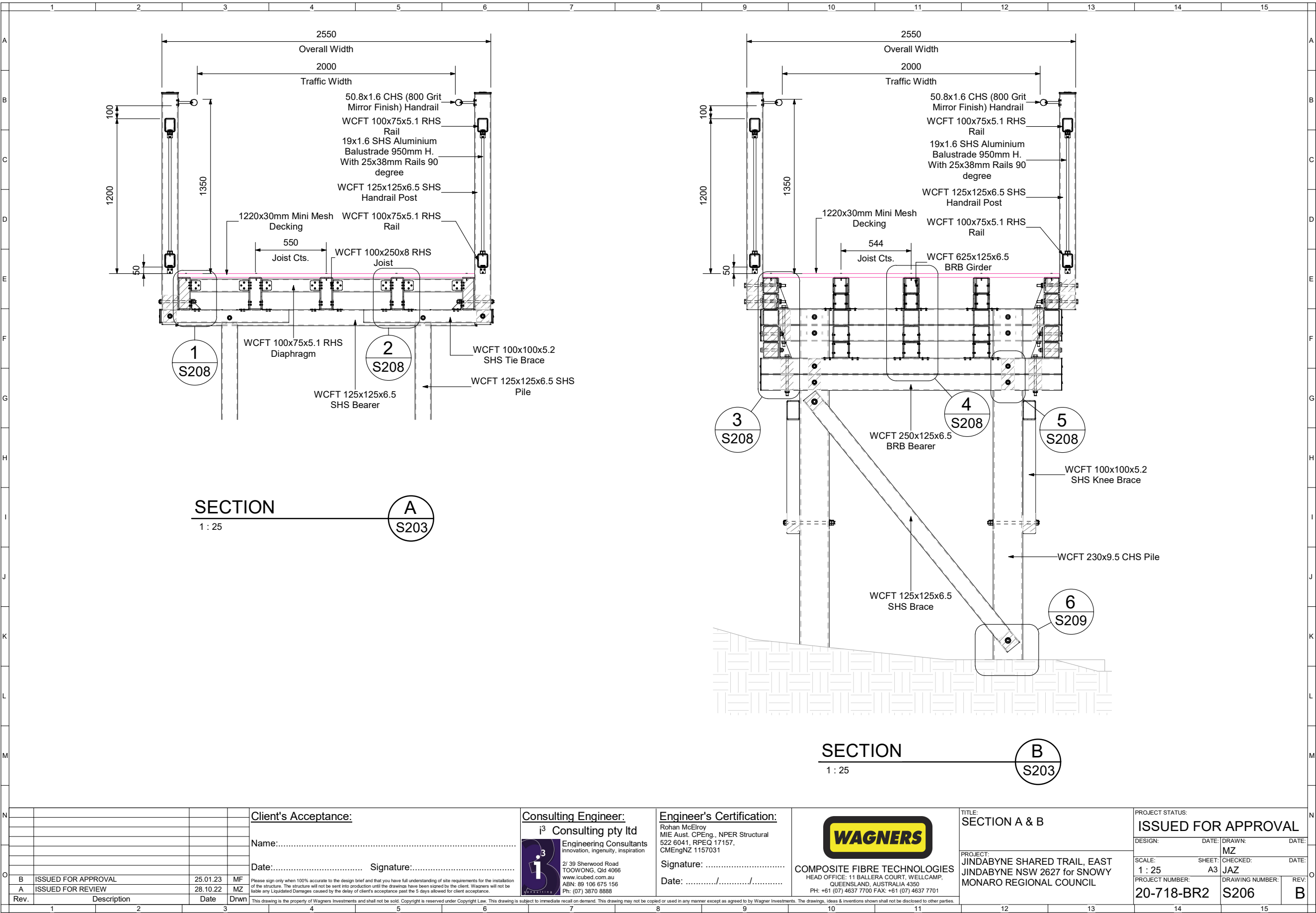
PILE SCHEDULE				
Member	Member Usage	Member Size	Quantity	Length (mm)
P1	Pile	WCFT 125x125x6.5 SHS	4	5000
P2	Pile	WCFT 230x9.5 CHS	2	3170

BRACE SCHEDULE				
Member	Member Usage	Member Size	Quantity	Length (mm)
Br2	Brace	WCFT 125x125x6.5 SHS	1	2510

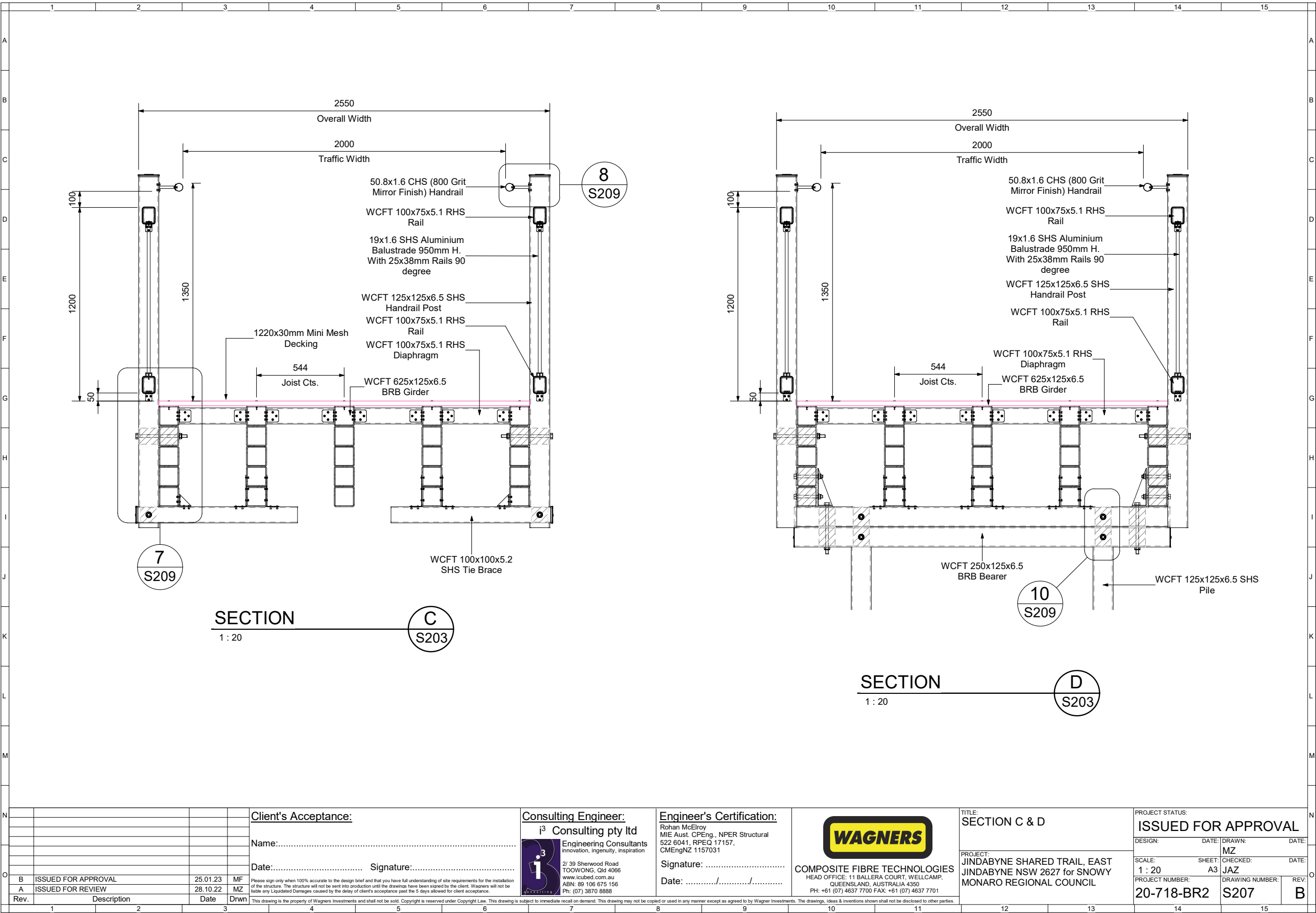


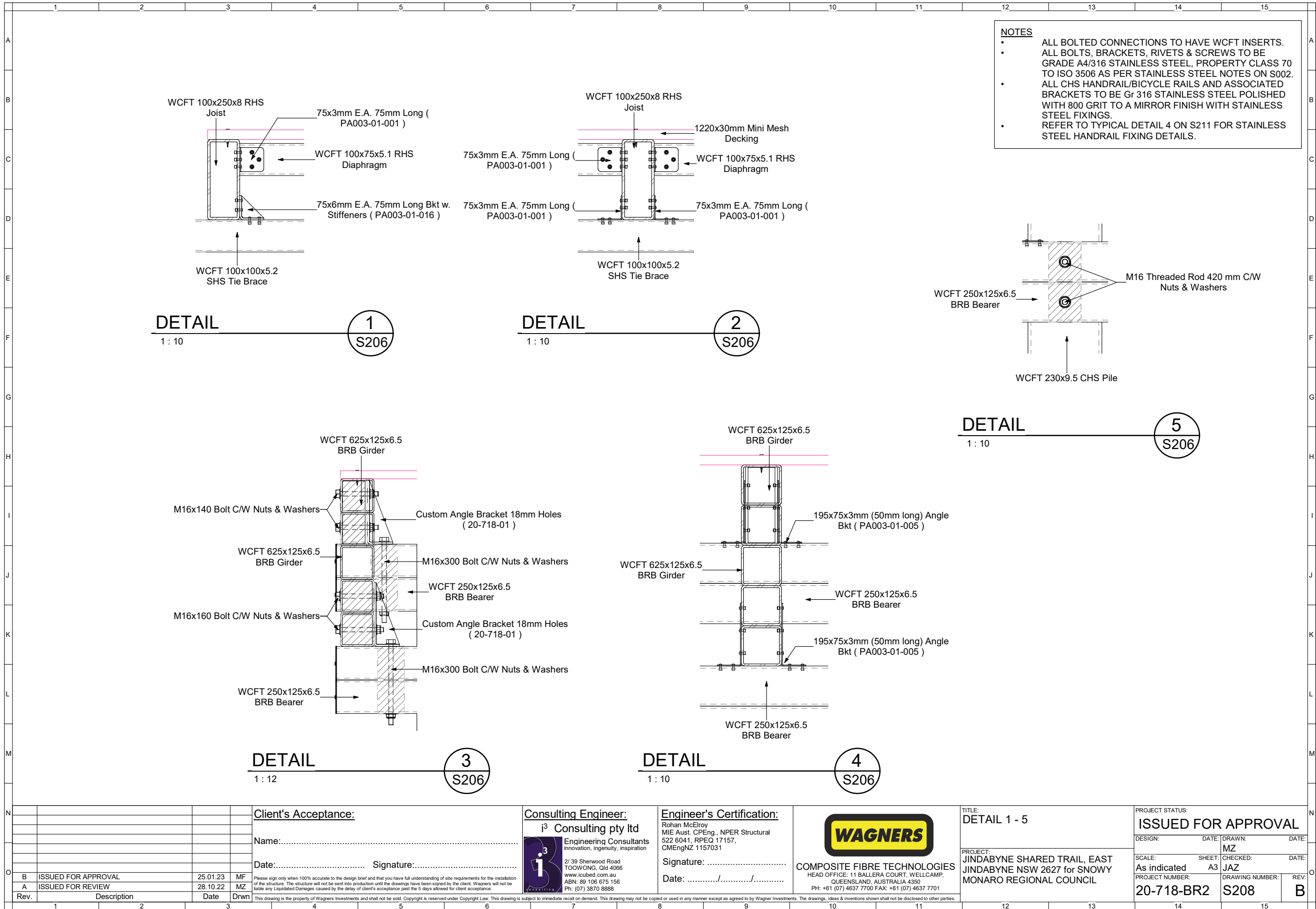
# PILE SETOUT PLAN

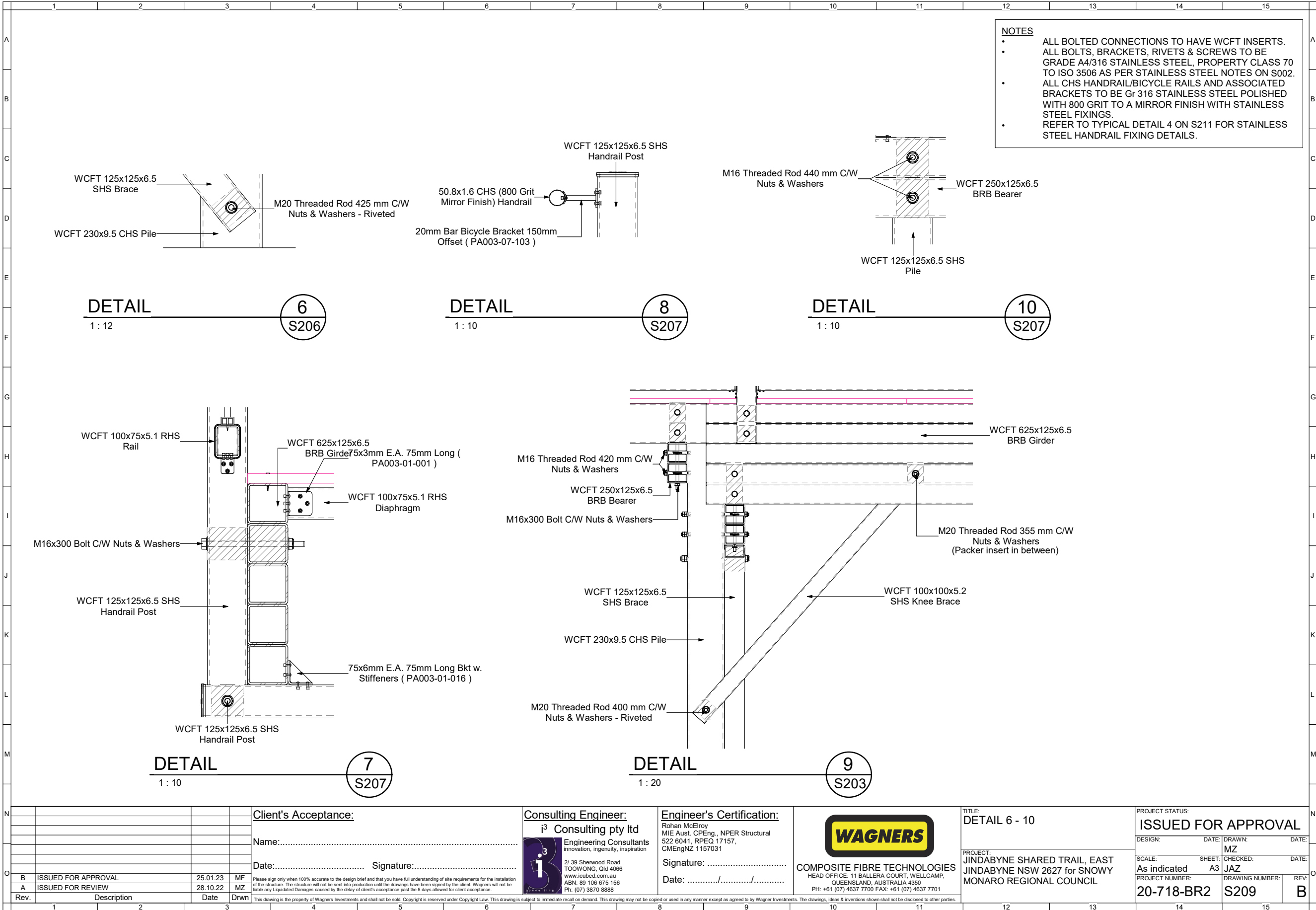
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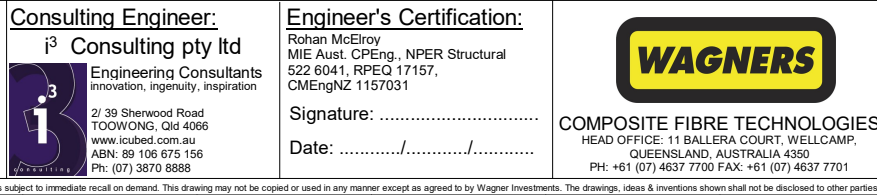






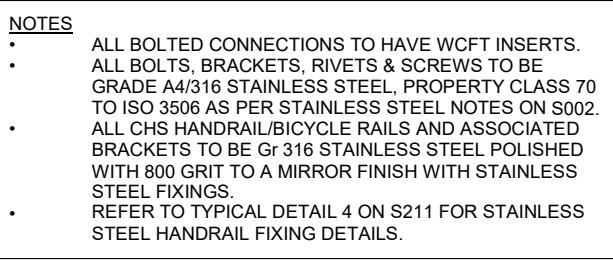




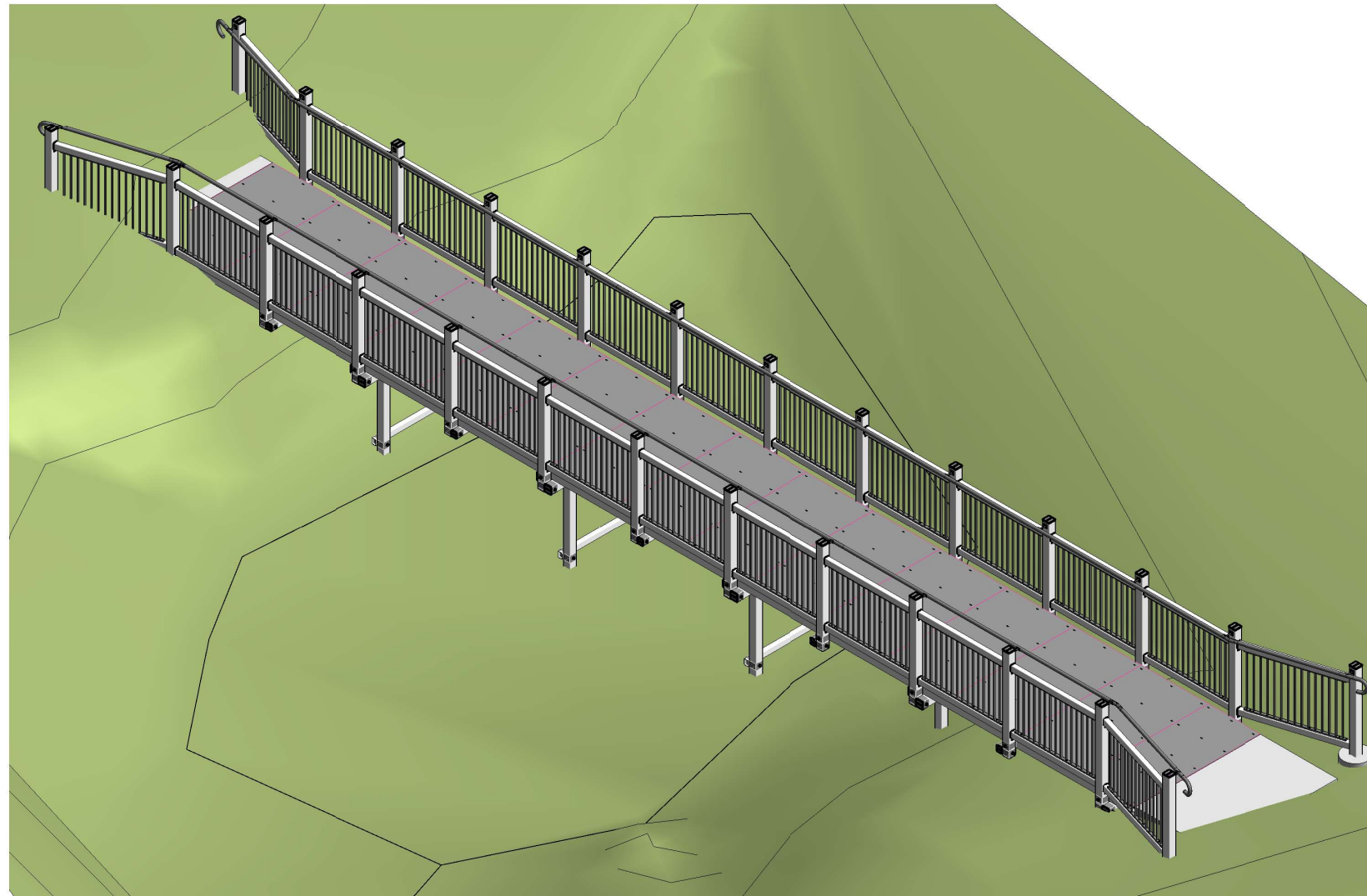








EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL



LOCALITY PLAN  
NOT TO SCALE



### ISOMETRIC VIEW

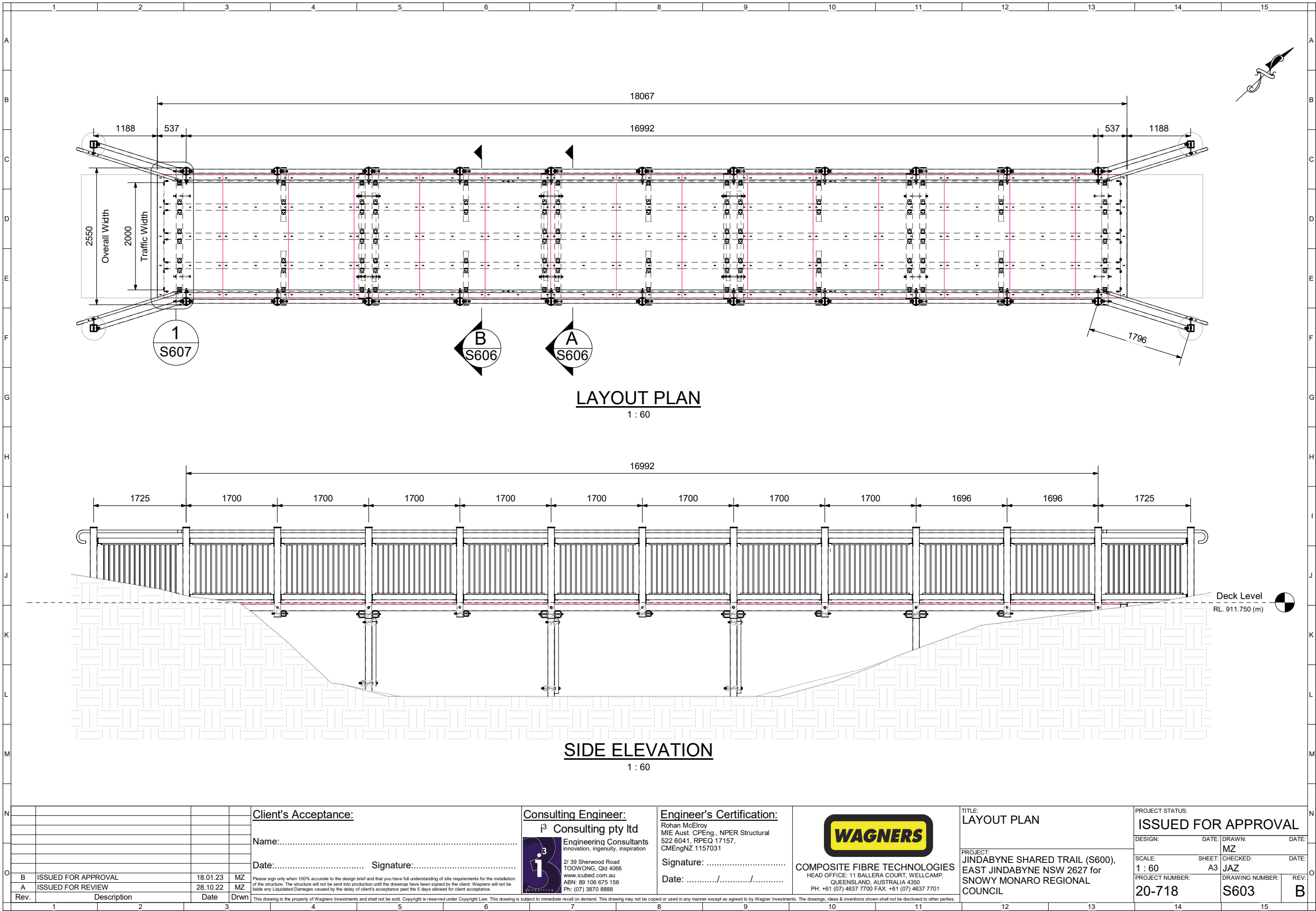
<u><b>DRAWING SCHEDULE</b></u>	
Sheet	Description
S600	LOCALITY PLAN
S601	GENERAL NOTES
S602	GENERAL NOTES CONT'D
S603	LAYOUT PLAN
S604	STRUCTURAL SETOUT PLAN
S605	PILE SETOUT PLAN
S606	SECTION A & B
S607	DETAIL 1 - 3
S608	DETAIL 4
S609	TYPICAL DETAIL

[illegible]





	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
A	FOUNDATION NOTES:															A		
	F1.	EXCAVATIONS SHALL BE KEPT FREE OF PONDED WATER BEFORE PLACING CONCRETE.																
	F2.	ALL FOOTING LOCATIONS TO BE CONFIRMED ON SITE BY THE SUPERVISING ENGINEER AND SURVEYOR UPON AWARD OF CONTRACT.																
	F3.	THE LOCATION OF THE EXISTING SERVICES AND INFRASTRUCTURE ARE TO BE CONFIRMED BY THE PROJECT SUPERINTENDENT PRIOR TO ON SITE FOUNDATION WORKS.																
B	F4.	EXPOSURE CLASSIFICATION = B2.														B		
	F5.	FOUNDATION DESIGN IS BASED UPON GEOTECHNICAL REPORT PREPARED BY ??? (REPORT NO. : ???, DATED : ???)																
	CONCRETE NOTES:																	
C	C1	ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL COMPLY WITH LOCAL STANDARDS AND SHALL HAVE THE FOLLOWING CHARACTERISTIC PROPERTIES U.N.O.=														C		
		ELEMENT	CONCRETE TYPE	SLUMP	MAX. AGG. SIZE (DENSE Wt)	F'c mPa (28 DAYS)												
		FOOTINGS	G.P.	80	20	N40												
D	C2.	REINFORCEMENT TO BE THE GRADE AS NOTED ON THE DRAWINGS. CLEAR COVER TO BE 0mm FOR FOOTINGS.														D		
	C3.	CHEMICAL ADDITIVES INCLUDING CALCIUM CHLORIDE SHALL NOT BE USED WITHOUT PRIOR APPROVAL OF THE ENGINEER.																
	C4.	THE CONTRACTOR SHALL ARRANGE FOR THE SUPERVISING ENGINEER TO INSPECT AND OBTAIN HIS APPROVAL PRIOR TO POURING CONCRETE.																
E	C5.	SPICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN WHERE LAP LENGTH IS NOT SHOWN. IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT. THE FOLLOWING MINIMUM SPLICE LENGTHS SHALL BE USED UNLESS NOTED OTHERWISE.														E		
		BAR	LAP LENGTH	BAR	LAP LENGTH													
		N12	450mm	N16	700mm													
		N20	950mm	N24	1250mm													
F		N28	1550mm	N32	1850mm											F		
		N36	2200mm	N40	2600mm													
	C6.	WELDING OF REINFORCEMENT WILL ONLY BE PERMITTED WITH THE PRIOR APPROVAL OF THE ENGINEER.																
	CONSTRUCTION NOTES:																	
G	CC1.	DRIVEN PILES; IT IS RECOMMENDED TO CORE A 200mm DIAMETER HOLE THROUGH THE GROUND'S CRUST 600 TO 1000mm DEEP BEFORE DRIVING WAGNERS COMPOSITE PILES. ALL WCFP PILES SHALL BE DRIVEN IN ACCORDANCE TO THE STANDARDS AND SHALL HAVE DRIVING RECORDS THAT CAN BE PROVIDED TO THE ENGINEER FOR CONFIRMATION DURING CONSTRUCTION.														G		
	CC2.	BORING/CORING OF DRIVEN PILES; CORING MAY ALSO BE REQUIRED WHERE THE DRIVEN PILE'S LATERAL AND UPLIFT CAPACITY HAS NOT BEEN MET SIMPLY BY THE DRIVEN DEPTH WHERE IT HAS REACHED ITS END BEARING CAPACITY. WHERE A DRIVEN PILE HAS REACHED ITS PILE SET PRIOR TO REACHING ITS MINIMUM EMBEDMENT THE CERTIFYING ENGINEER SHOULD BE CONSULTED TO CONFIRM OF ITS CAPACITY. ALL CORING SHALL BE BACKFILLED AFTER FINAL DRIVING WITH A 25mPa CONCRETE MIX WITH A HIGH SLUMP.																
H	CC3.	PILE SPLICES; PILE SPLICES WILL BE REQUIRED TO EXTEND THE LENGTH OF WAGNERS PILES TO ALLOW PILE TO REACH THE REQUIRED PILE SET IN THESE DRAWINGS. REFER TO THESE DRAWINGS FOR DETAILS ON PILE SPLICING.														H		
	CC4.	TRIMMING/CUTTING; WAGNERS WILL SUPPLY SOME MEMBERS OVERLENGTH (GENERALLY PILES, JOISTS & HANDRAILS) THESE ARE EXPECTED TO BE TRIMMED ON-SITE BY THE CONTRACTOR AND TO SEAL THE ENDS WITH A WAGNERS ENDCAP IF IT IS EXPOSED OF THE STRUCTURE, OTHERWISE SEALED WITH ENDUROSEAL.														I		
	CC5.	DRILLING; THE CONTRACTOR IS EXPECTED TO DRILL HOLES FOR SOME OF BOLTED CONNECTIONS WHERE SITE FLEXIBILITY IS REQUIRED AND ALL RIVETED CONNECTIONS. WHEN DRILLING BOLT HOLES USE A WAGNERS DRILL JIG, THESE CAN EITHER BE BOUGHT OUTRIGHT OR HIRED FOR THE PROJECT FROM WAGNERS. ALL HOLES WILL REQUIRE ENDUROSEAL TO THE SIDES OF THE HOLES.														J		
J	CC6.	INSERTS; ALL BOLTED CONNECTIONS WILL REQUIRE WAGNERS INSERTS, SOME OF THESE WILL COME ALREADY INSTALLED, WHEREAS OTHERS WILL BE SUPPLIED LOOSE TO ALLOW THE CONTRACTOR ON SITE SOME FLEXIBILITY AGAINST MISS-ALIGNMENT. LOOSE INSERTS WILL NEED TO BE PUSHED THROUGH THE PULTRUSION USING A WAGNERS PROPRIETARY INSERT PUSH TOOL OR A 75mm SQUARE LENGTH OF TIMBER.														J		
	CC7.	RIVETS; IT IS ESSENTIAL TO USE A PNEUMATIC RIVET GUN TO INSTALL ALL RIVETED CONNECTIONS.																
K	CC8.	ENDCAPS; ALL ENDCAPS WILL NEED TO BE FLAME TREATED USING A BUTANE BURNER TO REMOVE ANY PLASTIC RESIDUES. BEFORE INSTALLING ENDCAPS ON THE ENDS OF WAGNERS 125 AND 100 SHS PRODUCTS USE A WAGNERS ENDCAP GROOVING TOOL WHICH CAN BE BOUGHT OUTRIGHT OR HIRED FOR THE PROJECT FROM WAGNERS. APPLY ALL ENDCAPS WITH SIKAPLEX 521.														K		
	CC10.	DECK & TREAD FIXING; WHEN FIXING DECKING & STAIR TREADS REFER TO WAGNERS TYPICAL DETAILS FOR SCREW SIZE AND FIXING CENTERS. DRILL PILOT HOLES THROUGH WAGNERS PRODUCTS BEFORE USING ALL SELF TAPPING SCREWS.														L		
L																L		
M																M		
N						Client's Acceptance:		Consulting Engineer:		Engineer's Certification:		TITLE:		PROJECT STATUS:		N		
						Name:.....		i <sup>3</sup> Consulting pty ltd		Rohan McElroy MIE Aust. CPEng., NPER Structural 522 6041, RPEQ 17157, CMEngNZ 1157031		GENERAL NOTES CONT'D		ISSUED FOR APPROVAL				
						Date:..... Signature:.....				Signature: .....				DESIGN: DATE: DRAWN: DATE:				
								2/ 39 Sherwood Road TOOWONG, Qld 4006 www.icubed.com.au ABN: 89 106 675 156 Ph: (07) 3870 8888		Date: ...../...../.....		COMPOSITE FIBRE TECHNOLOGIES HEAD OFFICE: 11 BALLERA COURT, WELLCAMP, QUEENSLAND, AUSTRALIA 4350 PH: +61 (07) 4637 7700 FAX: +61 (07) 4637 7701		PROJECT: JINDABYNE SHARED TRAIL (S600), EAST JINDABYNE NSW 2627 for SNOWY MONARO REGIONAL COUNCIL		SCALE: SHEET: CHECKED: DATE: A3 JAZ		
O	B	ISSUED FOR APPROVAL		18.01.23	MZ	Please sign only when 100% accurate to the design brief and that you have full understanding of site requirements for the installation of the structure. The structure will not be sent into production until the drawings have been signed by the client. Wagners will not be liable any Liquidated Damages caused by the delay of client's acceptance past the 5 days allowed for client acceptance.								PROJECT NUMBER: 20-718		DRAWING NUMBER: S602	REV: B	O
	A	ISSUED FOR REVIEW		28.10.22	MZ													
	Rev.	Description		Date	Drwn	This drawing is the property of Wagners Investments and shall not be sold. Copyright is reserved under Copyright Law. This drawing is subject to immediate recall on demand. This drawing may not be copied or used in any manner except as agreed to by Wagners Investments. The drawings, ideas & inventions shown shall not be disclosed to other parties.												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			







1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

Gravel Path

Gravel Path

PILE SCHEDULE

Member	Member Usage	Member Size	Quantity	Length (mm)
P1	Pile	WCFT 125x125x6.5 SHS	12	2000

STRUT SCHEDULE

Member	Member Usage	Member Size	Quantity	Length (mm)
St1	Strut	WCFT 100x75x5.1 RHS	3	1655

BRACE SCHEDULE

Member	Member Usage	Member Size	Quantity	Length (mm)
Br1	Brace	WCFT 100x75x5.1 RHS	1	1996
Br2	Brace	WCFT 100x75x5.1 RHS	1	2106
Br3	Brace	WCFT 100x75x5.1 RHS	1	2100

PILE SETOUT PLAN

1 : 60

Client's Acceptance:

Name:.....

Date:..... Signature:.....

Consulting Engineer:

i<sup>3</sup> Consulting pty ltd

Engineering Consultants  
Innovation, ingenuity, inspiration

2/ 39 Sherwood Road  
TOOWONG, Qld 4066  
www.icubed.com.au  
ABN: 89 106 675 156  
Ph: (07) 3870 8888

Engineer's Certification:

Rohan McElroy  
MIE Aust, CPEng, NPER Structural  
522 6041, RPEQ 17157,  
CMEngNZ 1157031

Signature: .....

Date: ...../...../.....

COMPOSITE FIBRE TECHNOLOGIES

HEAD OFFICE: 11 BALLERA COURT, WELLCAMP,  
QUEENSLAND, AUSTRALIA 4350  
PH: +61 (07) 4637 7700 FAX: +61 (07) 4637 7701

TITLE:

PILE SETOUT PLAN

PROJECT:

JINDABYNE SHARED TRAIL (S600),  
EAST JINDABYNE NSW 2627 for  
SNOWY MONARO REGIONAL  
COUNCIL

PROJECT STATUS:

ISSUED FOR APPROVAL

DESIGN:..... DATE:..... DRAWN:..... DATE:.....

SHEET: MZ

CHECKED:..... DATE:.....

A3 JAZ

SCALE:

1 : 60

PROJECT NUMBER:

20-718

DRAWING NUMBER:

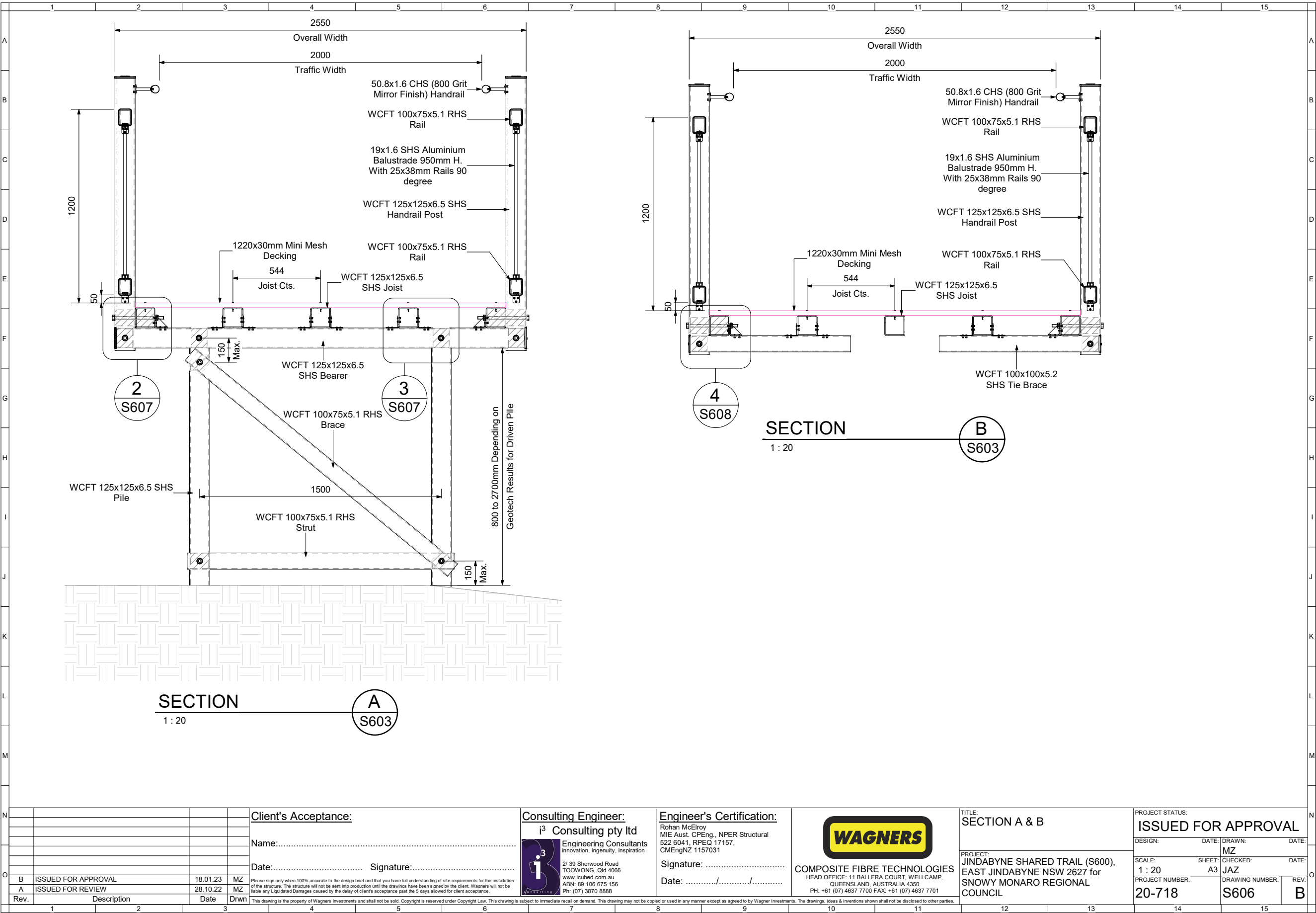
S605

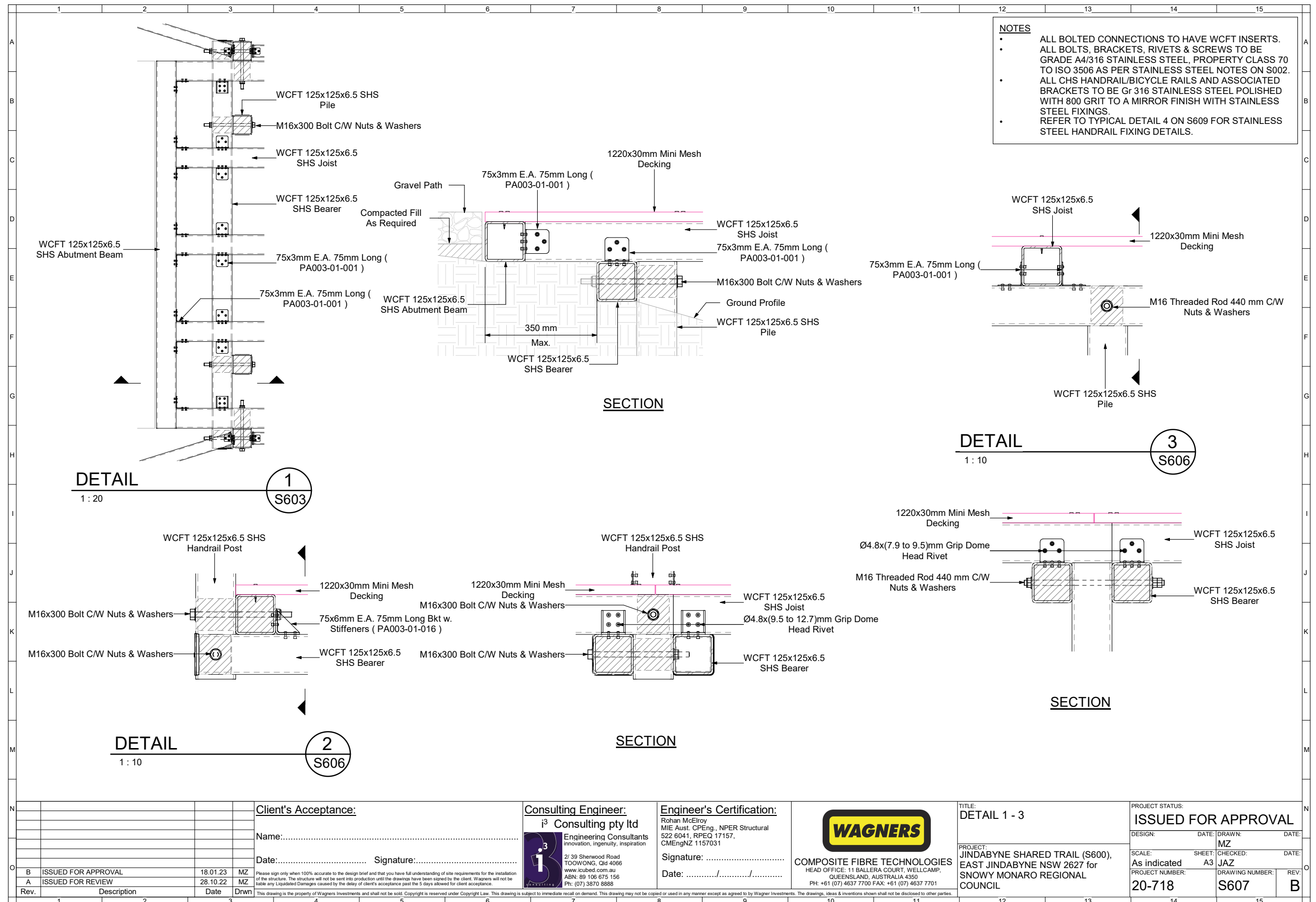
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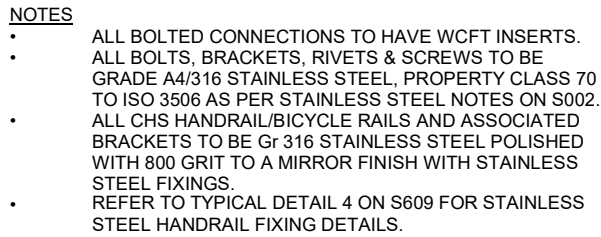
B

Rev.	Description	Date	Drwn
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A	ISSUED FOR REVIEW	28.10.22	MZ

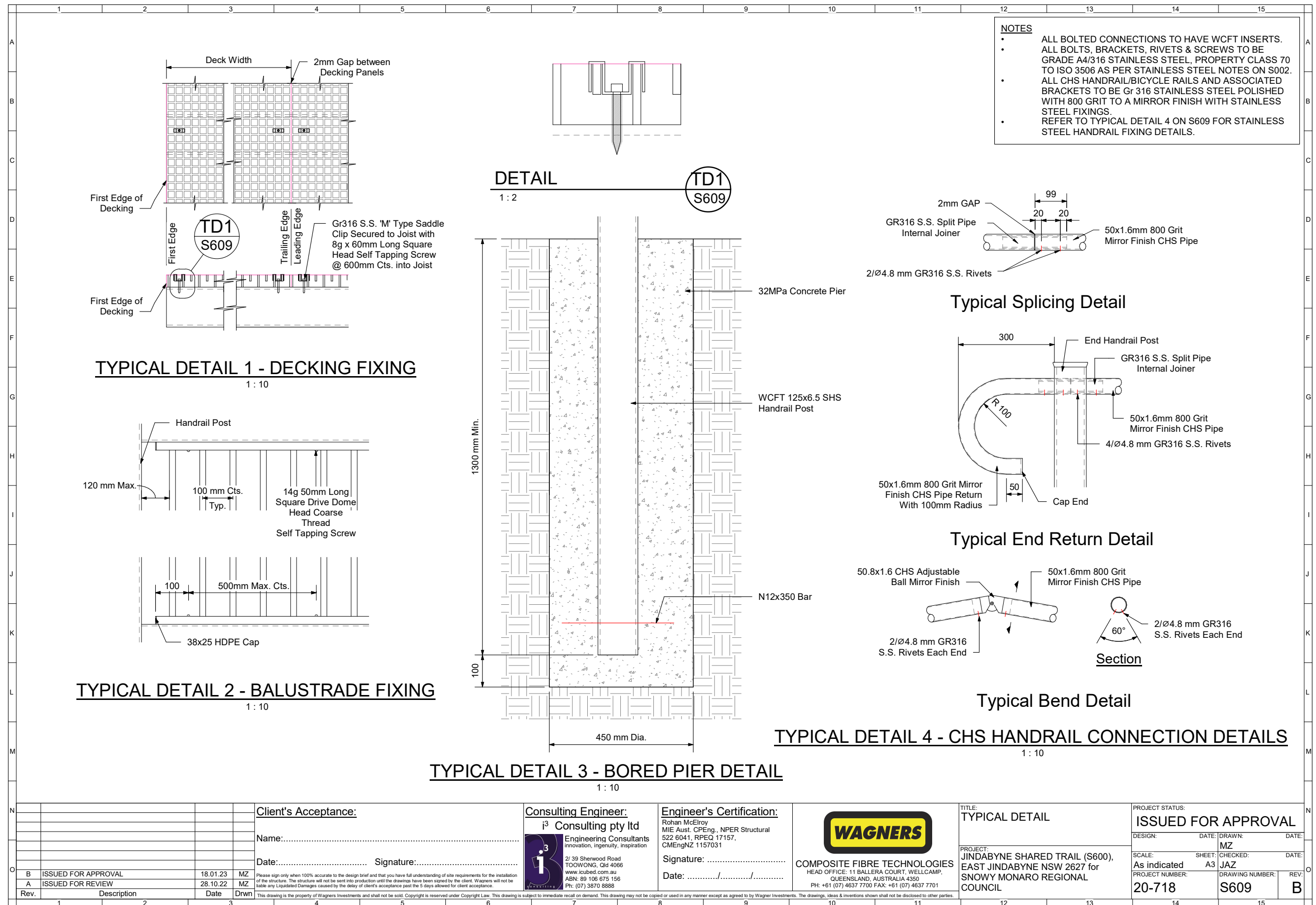
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[illegible]

A 3D perspective rendering of a long, multi-sectioned metal railing system. The railing consists of a series of rectangular panels connected by vertical posts, each topped with a horizontal handrail. The panels are supported by a base that appears to be bolted to the ground. The railing is installed on a green lawn, following a path that includes a curved section on the left and a straight section extending towards the right. The railing is designed to provide safety and guidance for pedestrians.

### ISOMETRIC VIEW

<u><b>DRAWING SCHEDULE</b></u>	
<b>Sheet</b>	<b>Description</b>
<b>S700</b>	<b>LOCALITY PLAN</b>
<b>S701</b>	<b>GENERAL NOTES</b>
<b>S702</b>	<b>GENERAL NOTES CONT'D</b>
<b>S703</b>	<b>LAYOUT PLAN</b>
<b>S704</b>	<b>STRUCTURAL SETOUT PLAN</b>
<b>S705</b>	<b>PILE SETOUT PLAN</b>
<b>S706</b>	<b>SECTION A &amp; B</b>
<b>S707</b>	<b>DETAIL 1 - 3</b>
<b>S708</b>	<b>DETAIL 4</b>
<b>S709</b>	<b>TYPICAL DETAIL</b>

[illegible]





	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15																					
A	<b>FOUNDATION NOTES:</b>															A																				
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	<b>CONCRETE NOTES:</b>																																			
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		<table><tr><th>ELEMENT</th><th>CONCRETE TYPE</th><th>SLUMP</th><th>MAX. AGG. SIZE (DENSE Wt)</th><th>F'c mPa (28 DAYS)</th></tr><tr><td>FOOTINGS</td><td>G.P.</td><td>80</td><td>20</td><td>N40</td></tr></table>														ELEMENT	CONCRETE TYPE	SLUMP	MAX. AGG. SIZE (DENSE Wt)	F'c mPa (28 DAYS)	FOOTINGS	G.P.	80	20	N40											
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O	B	ISSUED FOR APPROVAL	18.01.23	MZ	<div>Client's Acceptance:</div> <div>Name:.....</div> <div>Date:..... Signature:.....</div> <div><div><div><div>3</div><div>i</div><div>3</div></div><div><div>Engineering Consultants</div><div>innovation, ingenuity, inspiration</div></div></div><div><div>2/ 39 Sherwood Road</div><div>TOOWONG, Qld 4006</div><div>www.icubed.com.au</div><div>ABN: 89 106 675 156</div><div>Ph: (07) 3870 8888</div></div></div> <div>Please sign only when 100% accurate to the design brief and that you have full understanding of site requirements for the installation of the structure. The structure will not be sent into production until the drawings have been signed by the client. Wagners will not be liable any Liquidated Damages caused by the delay of client's acceptance past the 5 days allowed for client acceptance.</div> <div>This drawing is the property of Wagners Investments and shall not be sold. Copyright is reserved under Copyright Law. This drawing is subject to immediate recall on demand. This drawing may not be copied or used in any manner except as agreed to by Wagner Investments. The drawings, ideas &amp; inventions shown shall not be disclosed to other parties.</div>																															
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Consulting Engineer:

i<sup>3</sup> Consulting Pty Ltd

Name:.....

Date:..... Signature:.....

3

i

3

Engineering Consultants

innovation, ingenuity, inspiration

2/ 39 Sherwood Road

TOOWONG, Qld 4006

www.icubed.com.au

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Engineer's Certification:

Rohan McElroy

MIE Aust. CPEng., NPER Structural

522 6041, RPEQ 17157,

CMEngNZ 1157031

Signature: .....

Date: ...../...../.....

WAGNERS

COMPOSITE FIBRE TECHNOLOGIES

HEAD OFFICE: 11 BALLERA COURT, WELLCAMP,

QUEENSLAND, AUSTRALIA 4350

PH: +61 (07) 4637 7700 FAX: +61 (07) 4637 7701

TITLE:

GENERAL NOTES CONT'D

PROJECT:

JINDABYNE SHARED TRAIL (S700),

EAST JINDABYNE NSW 2627 for

SNOWY MONARO REGIONAL

COUNCIL

PROJECT STATUS:

ISSUED FOR REVIEW

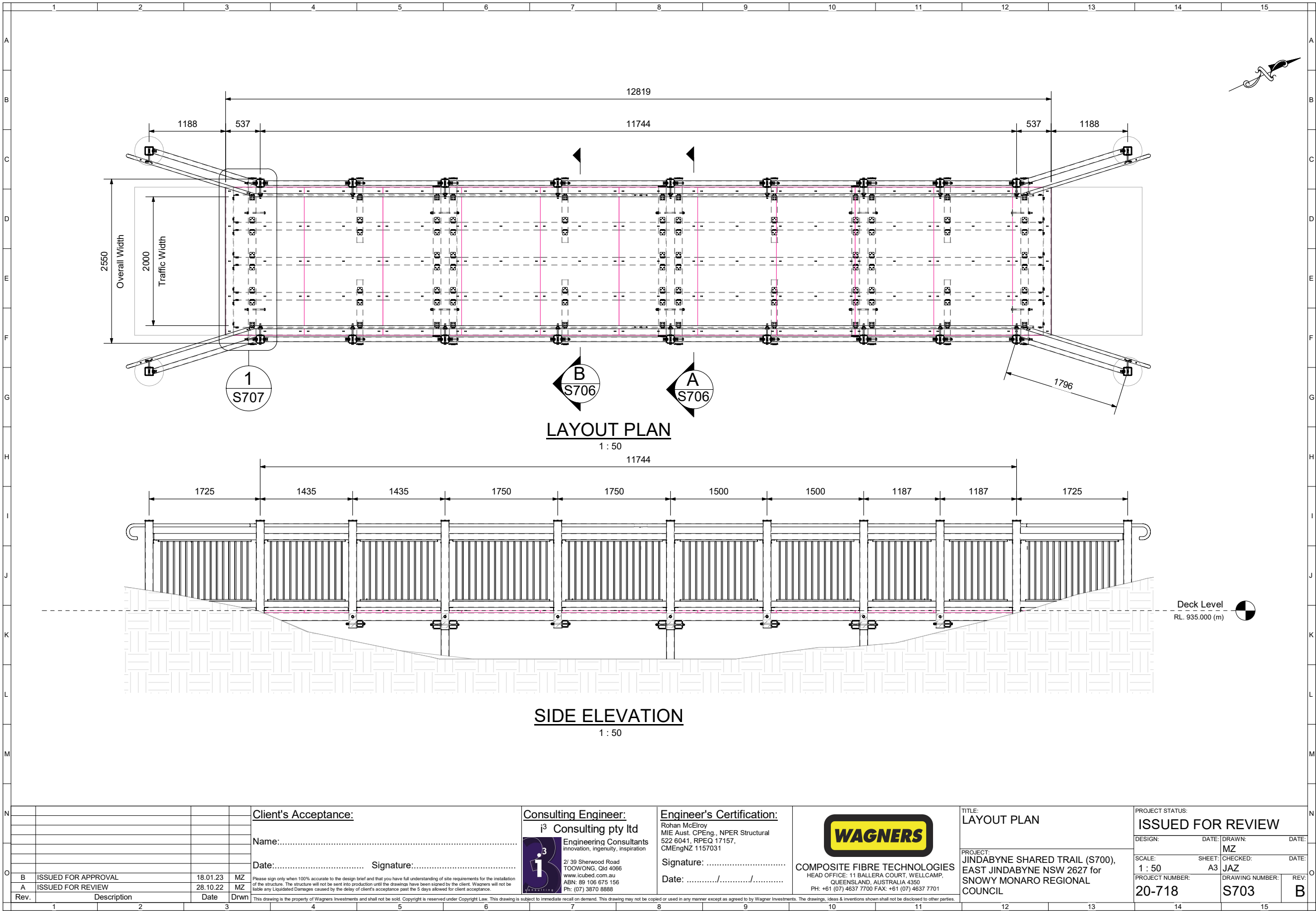
DESIGN:..... DATE:..... DRAWN:..... DATE:.....

SCALE:..... SHEET:..... CHECKED:..... DATE:.....

A3 JAZ

PROJECT NUMBER:..... DRAWING NUMBER:..... REV:.....

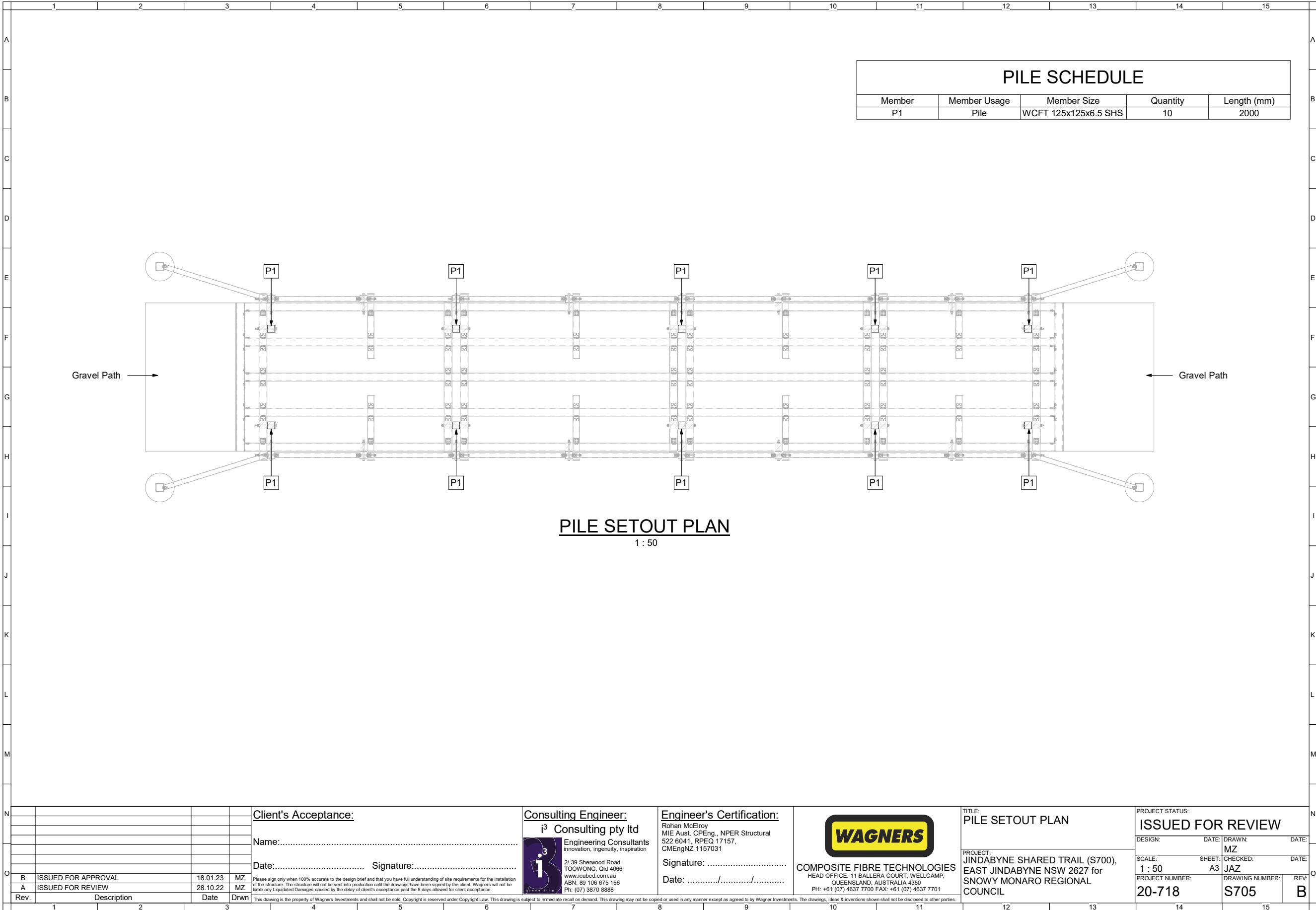
20-718 S702 B

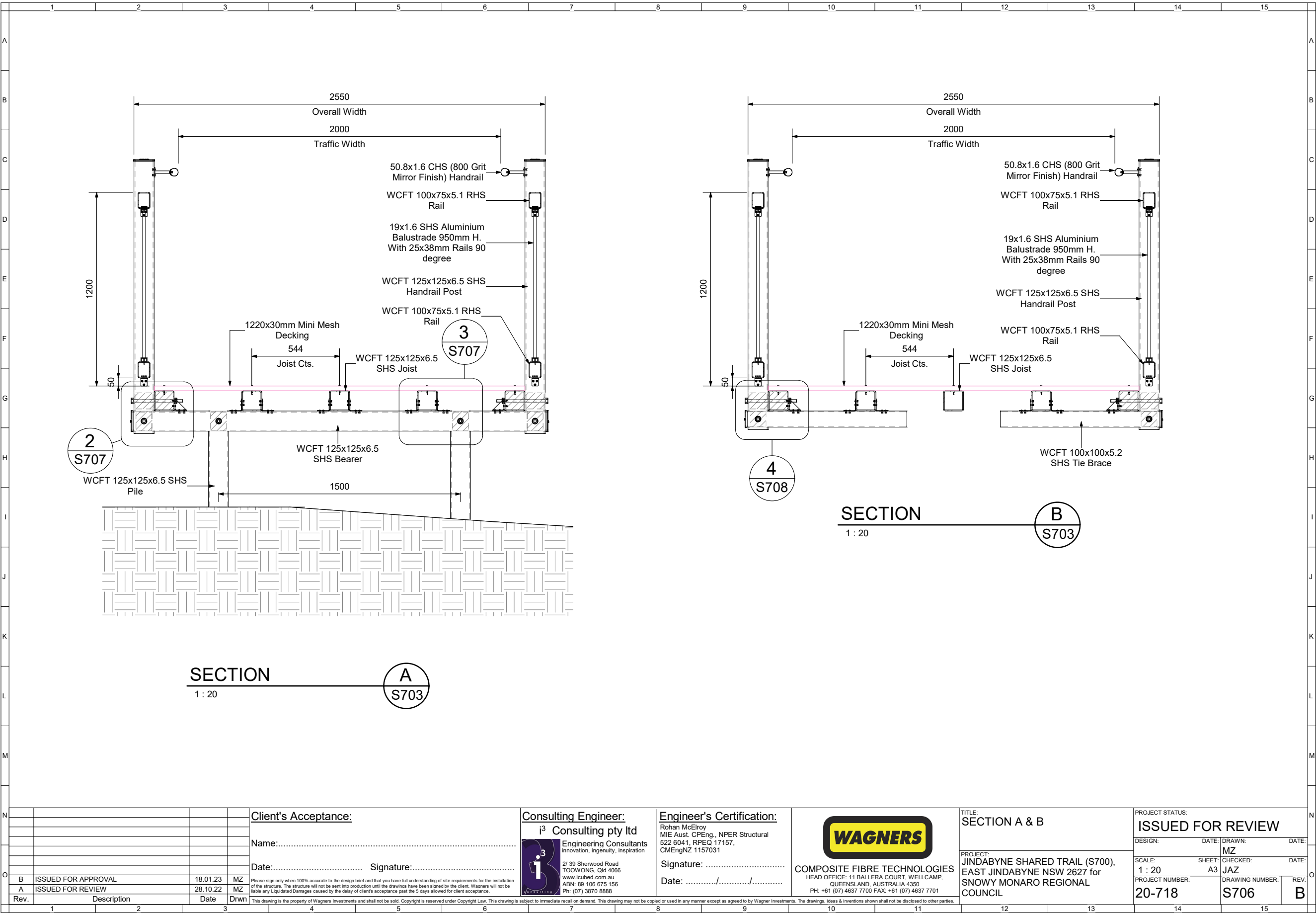


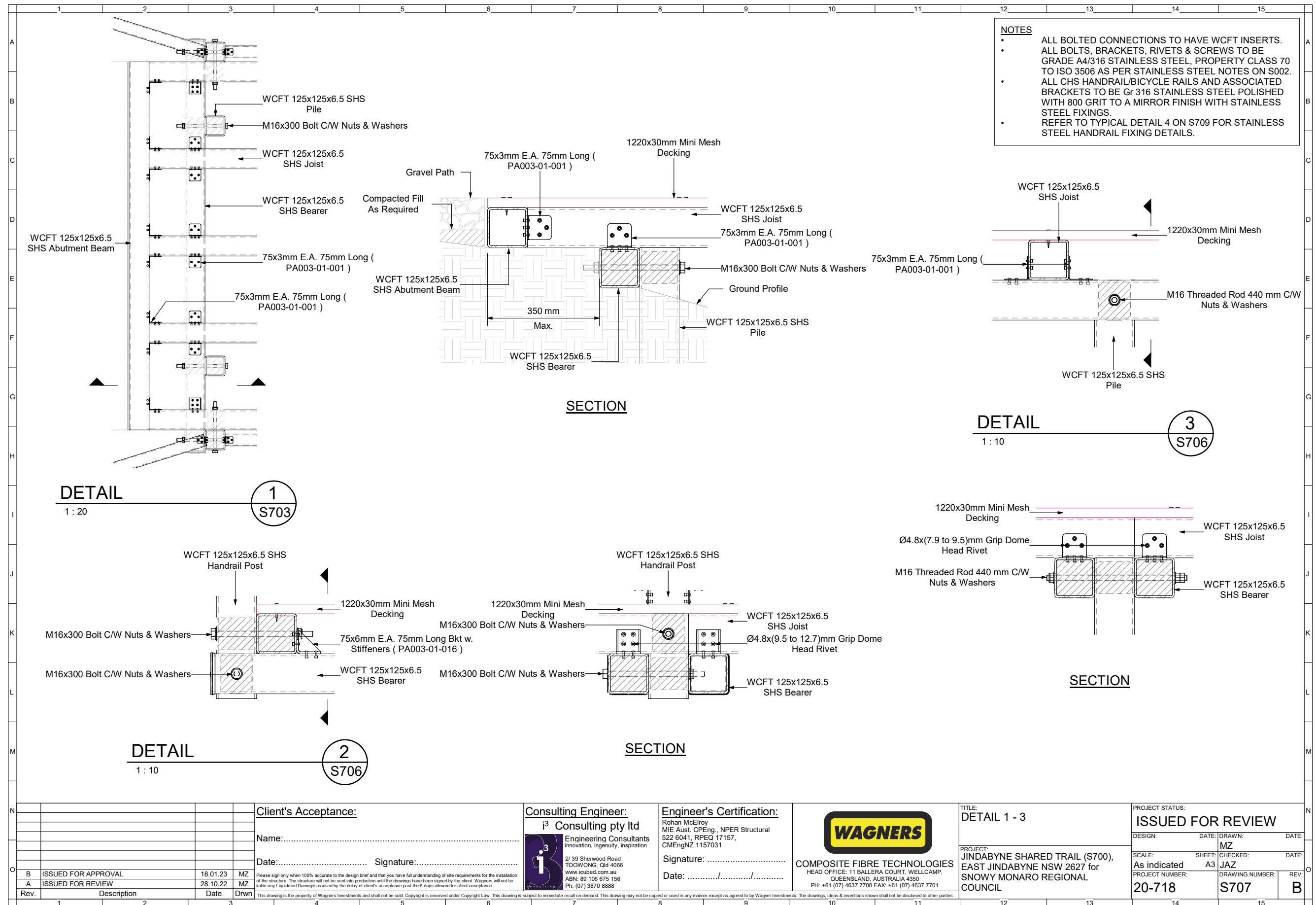


The diagram illustrates a 2D hexapod robot with 12 legs, arranged in three pairs. The robot's body is composed of several segments: a central torso (T1) and two main body segments (B1 and B2). The legs are connected to the body via hip joints (HP1, HP2, HP3). The diagram shows the robot's internal structure, including the arrangement of the legs and the segments they connect. The robot is shown in a symmetrical, elongated configuration.

[illegible]











[illegible]

[illegible]

A 3D perspective rendering of a long, elevated walkway or ramp system. The structure is composed of several rectangular platform sections connected by ramps, all supported by vertical posts. It is enclosed by a railing system with vertical balusters and horizontal rails. The walkway is set against a green, hilly background. The rendering shows the structural details and the layout of the path.

## ISOMETRIC VIEW

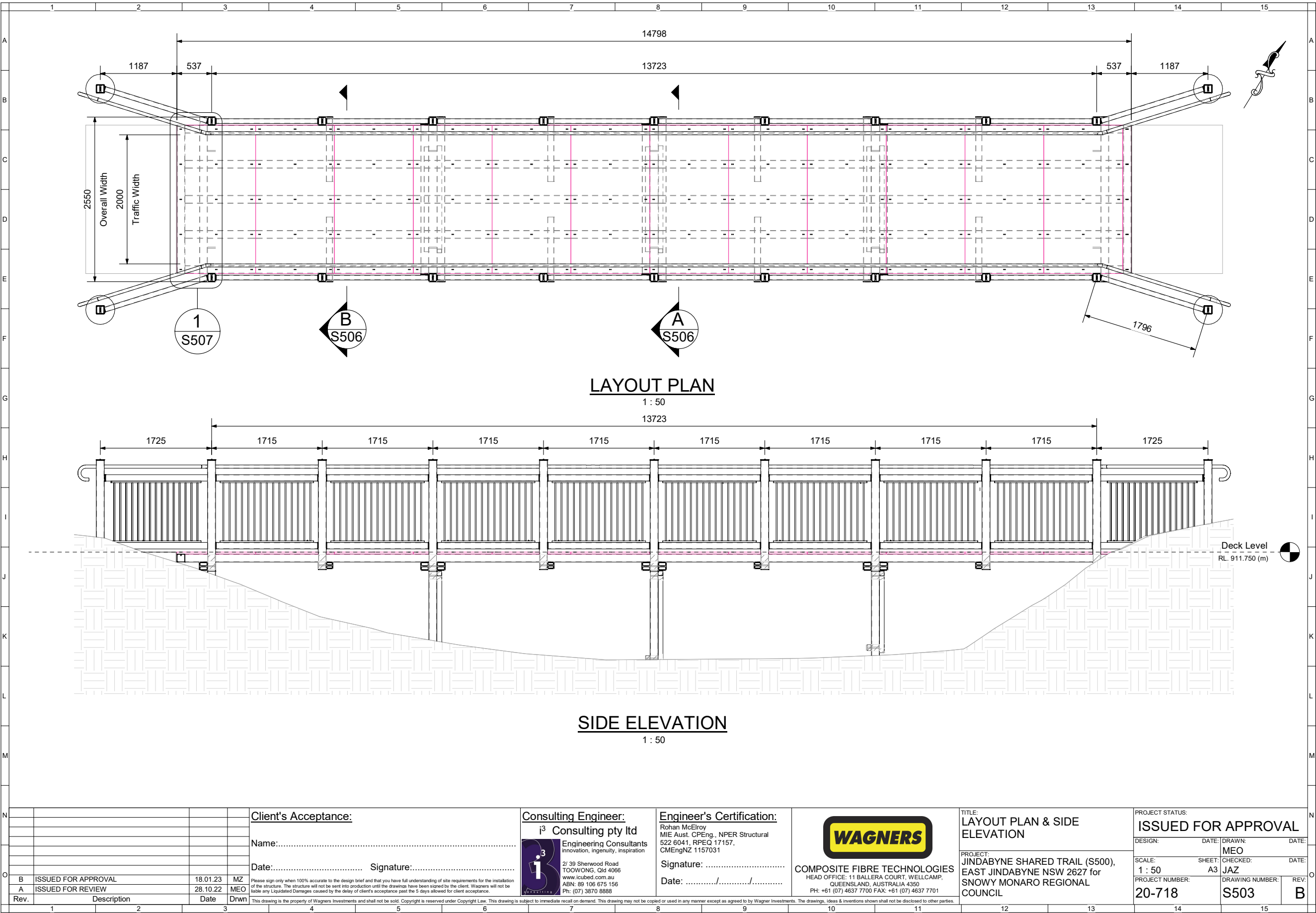
<u><b>DRAWING SCHEDULE</b></u>	
<b>Sheet</b>	<b>Description</b>
<b>S500</b>	<b>LOCALITY PLAN</b>
<b>S501</b>	<b>GENERAL NOTES</b>
<b>S502</b>	<b>GENERAL NOTES CONT'D</b>
<b>S503</b>	<b>LAYOUT PLAN &amp; SIDE ELEVATION</b>
<b>S504</b>	<b>STRUCTURAL SETOUT PLAN</b>
<b>S505</b>	<b>PILE SETOUT PLAN</b>
<b>S506</b>	<b>SECTION A &amp; B</b>
<b>S507</b>	<b>DETAIL 1 - 3</b>
<b>S508</b>	<b>DETAIL 4</b>
<b>S509</b>	<b>TYPICAL DETAIL</b>

[illegible]

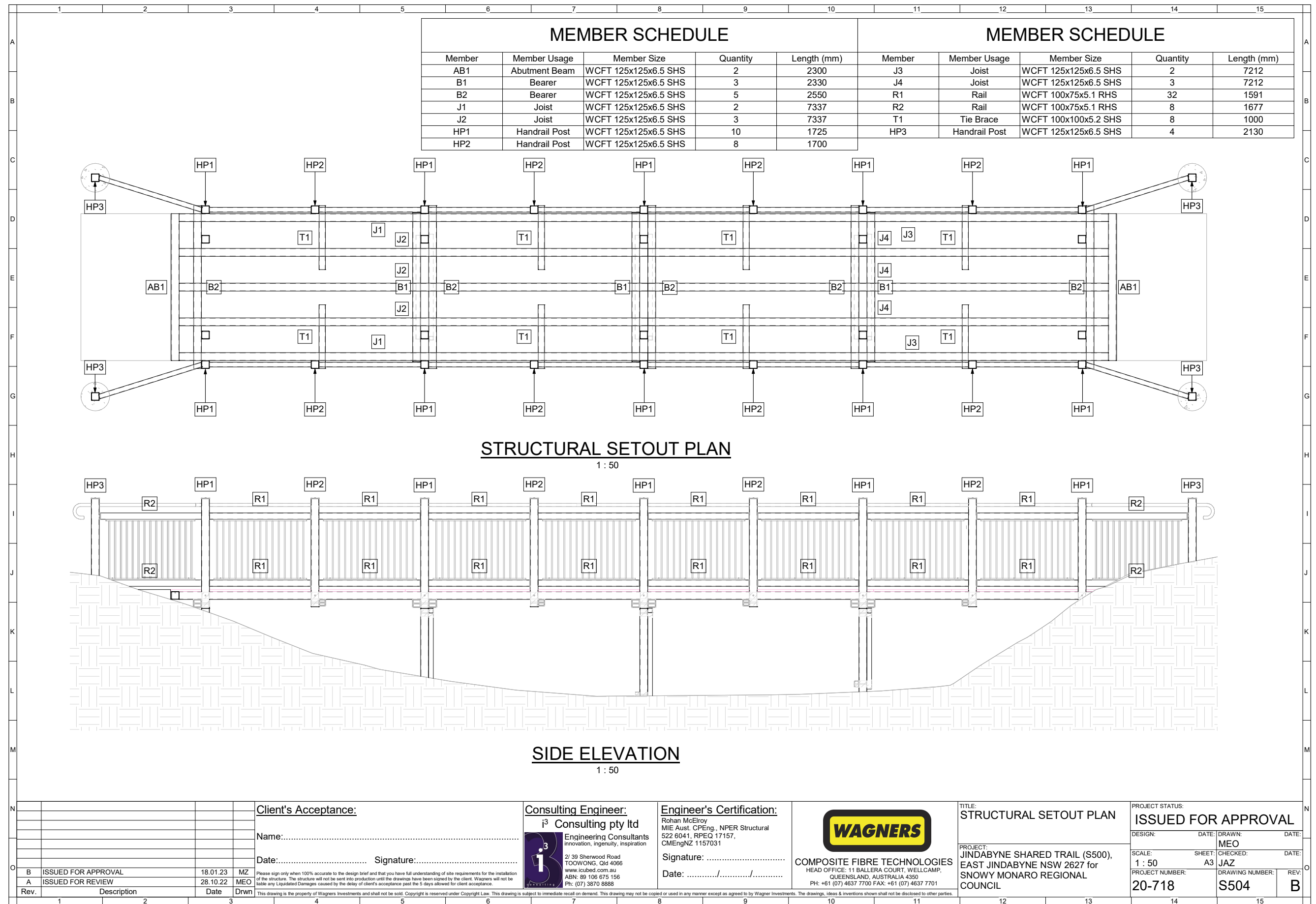




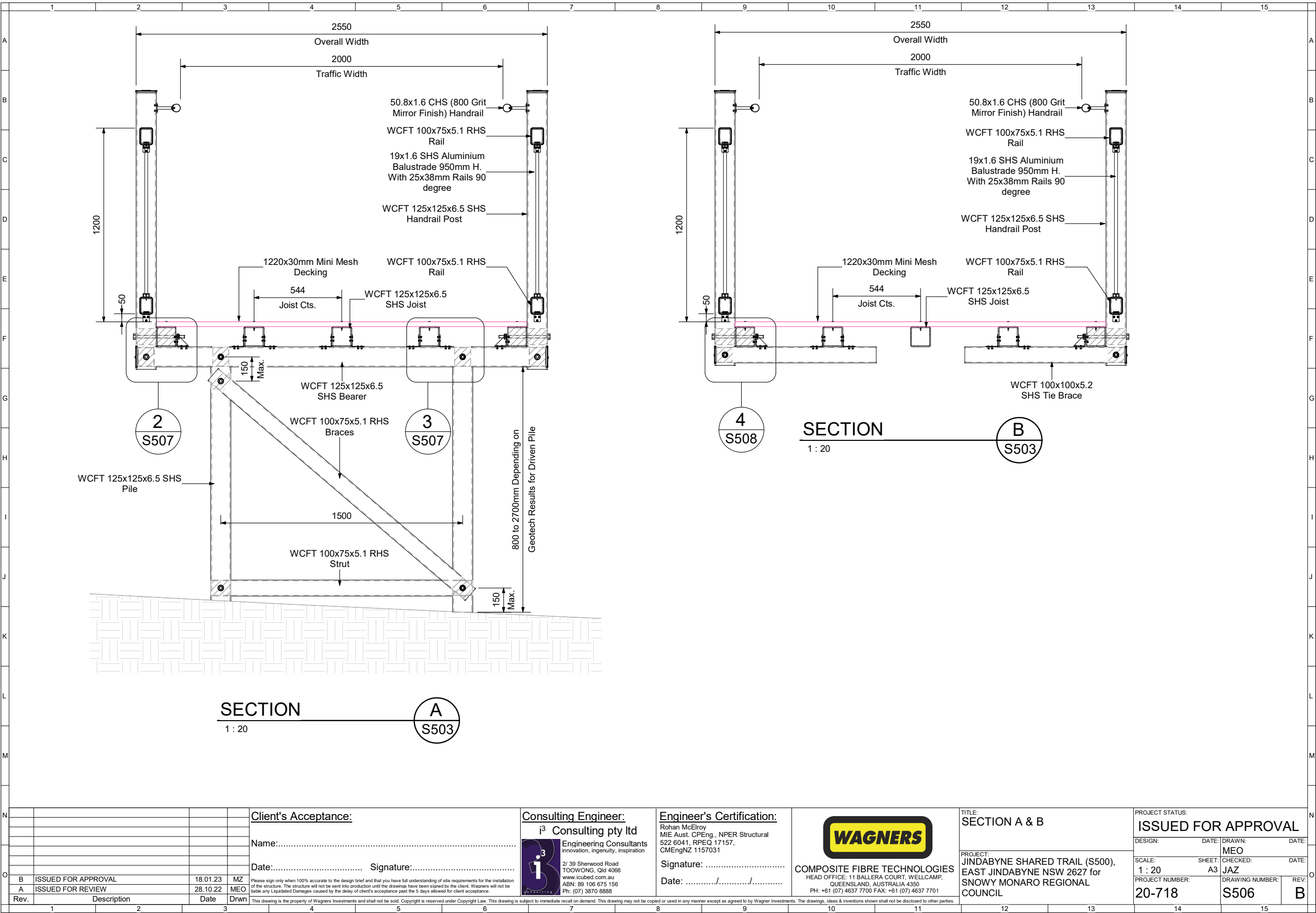
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A	<b>FOUNDATION NOTES:</b>															A																				
	F1.	EXCAVATIONS SHALL BE KEPT FREE OF PONDED WATER BEFORE PLACING CONCRETE.																																		
	F2.	ALL FOOTING LOCATIONS TO BE CONFIRMED ON SITE BY THE SUPERVISING ENGINEER AND SURVEYOR UPON AWARD OF CONTRACT.																																		
	F3.	THE LOCATION OF THE EXISTING SERVICES AND INFRASTRUCTURE ARE TO BE CONFIRMED BY THE PROJECT SUPERINTENDENT PRIOR TO ON SITE FOUNDATION WORKS.																																		
B	F4.	EXPOSURE CLASSIFICATION = B2.														B																				
	F5.	FOUNDATION DESIGN IS BASED UPON GEOTECHNICAL REPORT PREPARED BY TERRA INSIGHT (REPORT NO. : TERRA19350.REP.REV2, DATED : 43809)																																		
	<b>CONCRETE NOTES:</b>																																			
C	C1	ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL COMPLY WITH LOCAL STANDARDS AND SHALL HAVE THE FOLLOWING CHARACTERISTIC PROPERTIES U.N.O.=														C																				
		<table><tr><th>ELEMENT</th><th>CONCRETE TYPE</th><th>SLUMP</th><th>MAX. AGG. SIZE (DENSE Wt)</th><th>F'c mPa (28 DAYS)</th></tr><tr><td>FOOTINGS</td><td>G.P.</td><td>80</td><td>20</td><td>N40</td></tr></table>														ELEMENT	CONCRETE TYPE	SLUMP	MAX. AGG. SIZE (DENSE Wt)	F'c mPa (28 DAYS)	FOOTINGS	G.P.	80	20	N40											
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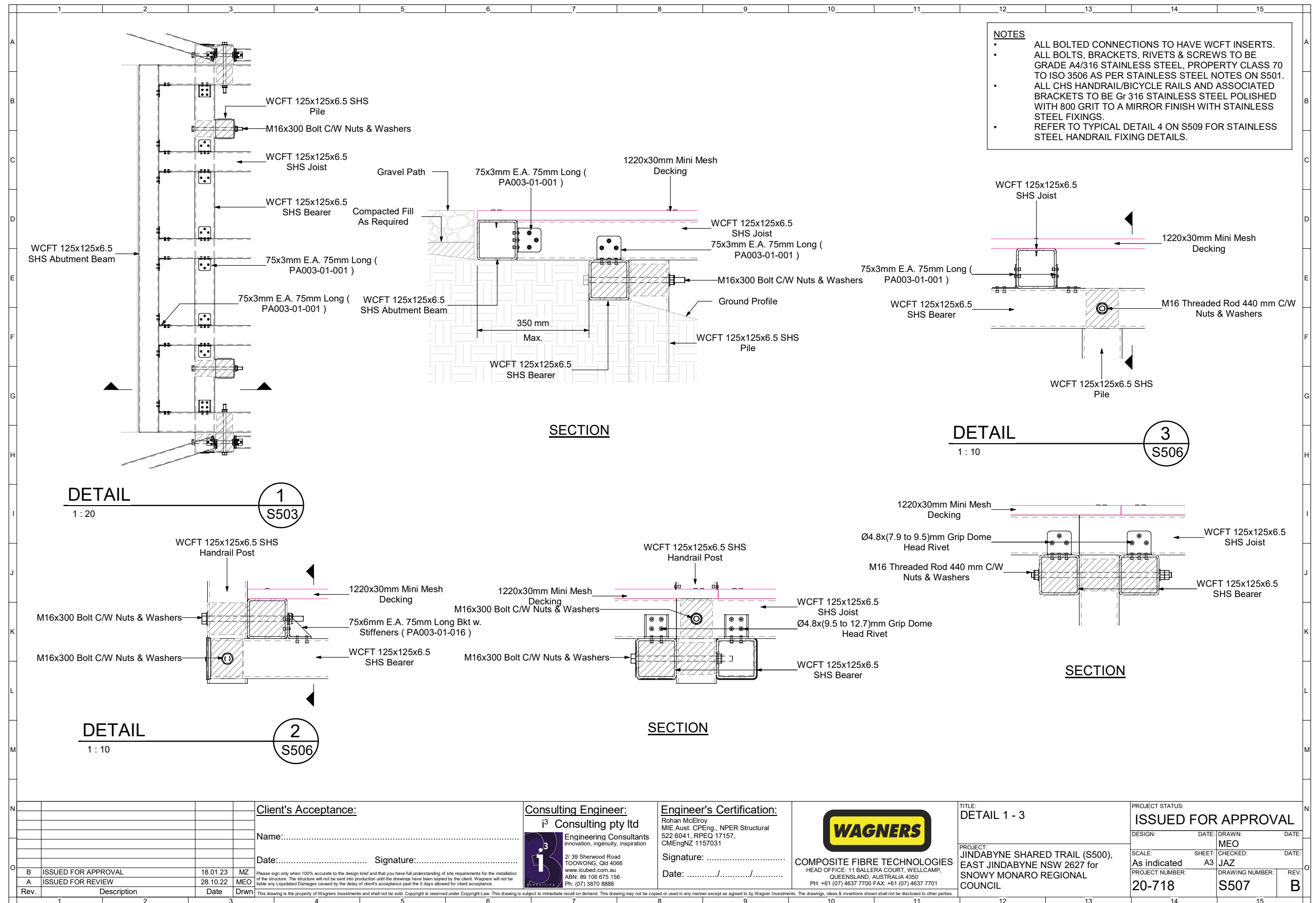


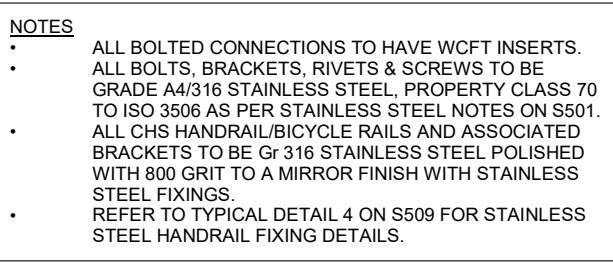




[illegible]













Department of Climate Change, Energy, the Environment and Water

Our ref: DOC24/909224

Tyron Bicknell  
Senior Project Manager  
Snowy Monaro Regional council

By email: [REDACTED]

Dear Tyron

**Subject: Biodiversity Development Assessment Reports, Jindabyne Shared Trails Project – Section 2.1 Kunama Estate to East Jindabyne**

The Biodiversity Conservation and Science South East Planning team have completed a review of the updated Biodiversity Development Assessment Report (BDAR) and associated Credit Reports for the Jindabyne Shared Trails Project – Section 2.1 Kunama Estate to East Jindabyne project.

BCS has no further comment regarding the biodiversity assessment. In **Attachment 1** of this letter, we have included a series of recommended conditions of approval relating to biodiversity matters that Council may wish to consider in any Development Application conditions should Council decide to approve this project.

We are also available upon request to assist Council in the review of any Biodiversity Management Plan(s) submitted in the future supporting construction and operation of the Kunama Estate to East Jindabyne project.

If you have any questions in relation to the above, please do not hesitate to contact Nat O'Rourke, Acting Team Leader Planning at [REDACTED]

Yours Sincerely

[REDACTED]

Allison Treweek  
**Senior Team Leader Planning – Regional Delivery  
Biodiversity, Conservation and Science**

13 November 2024

**Attachment 1: Recommended conditions of approval relating to biodiversity matters**

## Attachment 1: Recommended conditions of approval relating to biodiversity matters

### Kunama Estate to East Jindabyne

#### Recommended conditions of approval regarding biodiversity management during construction and operations

- Prior to the commencement of construction, provide a Biodiversity Management Plan prepared by a suitably qualified person for review and approval by Council stating commitments and harm minimisation measures to be implemented during construction. Works must not encroach into areas of retained native vegetation and habitat.
- A copy of the approved plan is kept on site at all times and made available to Council officers upon request.
- During ongoing use, all commitments in the approval Biodiversity Management Plan must be met.

#### Recommended condition of approval regarding offset obligations

##### Ecosystem credits

- Before the issue of a construction certificate, the class and number of ecosystem credits in the table of ecosystem credits required to be retired – like for like – non-threatened ecological community must be retired to offset the residual biodiversity impacts of the development.
- Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund must be provided to Council.

##### Ecosystem credits table – Kunama Estate to East Jindabyne

Impacted plant community type	Number of ecosystem credits	Hollow bearing trees	IBRA subregions from which credits can be used to offset the development	Trading group or like for like PCTs that can be used to offset the impacts from the development
1187-Snow Grass - Wallaby Grass - Kangaroo Grass - Common Everlasting - Corkscrew-grass dry tussock grassland in the Monaro Region of the South Eastern Highlands Bioregion	18	Nil	Monaro , Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	Trading Group: Temperate Montane Grasslands - ≥ 50% - < 70% cleared group (including Tier 3 or higher threat status).

**Ecosystem credits, threatened ecological community table – Kunama Estate to East Jindabyne**

Impacted plant community type	Number of ecosystem credits	Hollow bearing trees	IBRA subregions from which credits can be used to offset the development	Threatened ecological community that can be used to offset the impacts from the development
1191-Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	15	Yes	Monaro , Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion This includes PCT's: 679, 797, 802, 803, 804, 1100, 1101, 1191, 1197, 1199, 1229, 1295, 3341, 3413

**Species credits**

- Before the issue of a construction certificate, the class and number of species credits in the table of ecosystem credits required to be retired – like for like – non-threatened ecological community must be retired to offset the residual biodiversity impacts of the development.
- Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund must be provided to Council.

**Species credits table – Kunama Estate to East Jindabyne**

Impacted species credit species	Number of species credits	IBRA subregions from which credits can be used to offset the impacts from the development	Species that can be used to offset the impacts from the development
<i>Aprasia parapulchella</i>	15	Any in NSW	<i>Aprasia parapulchella</i>
<i>Cercartetus nanus</i>	6	Any in NSW	<i>Cercartetus nanus</i>
<i>Myotis macropus</i>	6	Any in NSW	<i>Myotis macropus</i>
<i>Phascolarctos cinereus</i>	6	Any in NSW	<i>Phascolarctos cinereus</i>

**Department of Climate Change,  
Energy, the Environment and Water**



Our ref: DOC24/372086-15

Mr Ross Campbell  
Council Assessing Officer  
Snowy Monaro Regional Council  
81 Commissioner Street  
COOMA NSW 2630

[REDACTED]  
Letter uploaded to the NSW Planning Portal

Address: 55 Rainbow Drive East, Jindabyne

**Proposal:** Proposed extension and upgrade of 3.8km of mountain bike trails within the Jindabyne Shared Trails Network and the construction of a 1.2m wide shared trail including five pedestrian bridges.

**Development Application no:** 10.2024.79.1, CNR-68571, A-82918

**Received:** 7 May 2024

---

**Subject: General Terms of Approval for Integrated Development Application, *National Parks and Wildlife Act 1974***

Dear Ross,

This letter contains our general terms of approval for the above integrated development application that will require an Aboriginal Heritage Impact Permit pursuant to s.90 of the *National Parks and Wildlife Act 1974*.

We have reviewed the Aboriginal Cultural Heritage Assessment Report, prepared by Apex Archaeology dated 14 April 2023. The report has identified that Aboriginal objects at sites 62-1-0064, 62-1-0124, 62-1-0202, 62-1-0371, 62-1-0416, 62-1-0412, 62-1-0413, 62-1-0414, 62-1-0415, 62-1-0419 will be impacted by the proposed development. Mitigation is proposed in the form of community collection under an Aboriginal Heritage Impact Permit.

Public submissions were uploaded to the portal on 25 September 2024. None of the public submissions referred to Aboriginal cultural heritage matters.

Considering the above, and in accordance with Section 4.47 of the *Environmental Planning and Assessment Act 1979*, the following general terms of approval are granted:

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[heritagemailbox@environment.nsw.gov.au](mailto:heritagemailbox@environment.nsw.gov.au)  
Locked Bag 5020, Parramatta NSW, 2124  
NSW Planning Portal reference: CNR-68571

[www.environment.nsw.gov.au/topics/heritage](http://www.environment.nsw.gov.au/topics/heritage)



### Approved development

Development must be in accordance with:

- a. Jindabyne, NSW Aboriginal Cultural Heritage Assessment Report (Apex Archaeology, 14 April 2023)
- b. Jindabyne, NSW Archaeological Report (Apex Archaeology, 14 April 2023)
- c. Pedestrian Bridges Site Plans 20-718; BR1, BR2, S500, S600, S700 (icubed consulting, January 2023) and Combined Stage 2.1 Site Plan (Stantec, 17 January 2024)
- d. Statement of Environmental Effects Jindabyne Shared Trails Project – Section 2.1 Kunama to East Jindabyne (The Environmental Factor, 14 November 2023)

### Except as amended by the following general terms of approval:

1. A s.90 Aboriginal Heritage Impact Permit for the proposed works must be sought and granted prior to the commencement of works.
2. The Aboriginal Heritage Impact Permit application must be accompanied by appropriate documentation and mapping as outlined in Applying for an Aboriginal Heritage Impact Permit: Guide for applicants (2011).
3. Consultation with the Aboriginal community undertaken as part of the Aboriginal Heritage Impact Permit application must be in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010.
4. The Aboriginal Heritage Impact Permit application must be completed with reference to the requirements of the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (2011).
5. The Aboriginal Heritage Impact Permit application must include complete records satisfying the requirements of the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (2010).
6. Long term management of Aboriginal objects must be considered as part of the Aboriginal Heritage Impact Permit application.

Please note that any modification of the above development that will result in impacts to Aboriginal cultural heritage must be referred to Heritage NSW to determine whether changes to these general terms of approval are required.

### Advice

It is recommended that the following is completed prior to or with the submission of the AHIP application:

1. Undertake an updated AHIMS search that is less than 12 months old
2. Attach the AHIMS cards for newly and previously identified Aboriginal cultural heritage sites
3. Update figures to show relevant DP/lots and any AHIMS registered or newly identified sites including their site extent
4. Finalise the long-term management of Aboriginal objects

5. As per the recommendation in the ACHAR a Plan of Management may be developed in consultation with the Aboriginal community for all stages of the proposed works.

**Aboriginal community consultation must be maintained**

Consultation with the registered Aboriginal parties must be maintained. We recommend updates on the project are provided to the registered Aboriginal parties every six months to ensure the consultation is continuous.

If you have any questions regarding these general terms of approval, please contact Kosta Contos, Senior Assessments Officer, at Heritage NSW on [kosta.contos@environment.nsw.gov.au](mailto:kosta.contos@environment.nsw.gov.au).

Yours sincerely



Tempe Beaven

Practice Lead, Heritage Referrals

Heritage NSW

Department of Climate Change, Energy, the Environment and Water

As Delegate under *National Parks and Wildlife Act 1974*

26 September 2024

## Department of Planning and Environment



Contact: Department of Planning and Environment-Water  
Phone: 1300081047  
Email: [waterlicensing.servicedesk@dpie.nsw.gov.au](mailto:waterlicensing.servicedesk@dpie.nsw.gov.au)

Our ref: IDAS-2024-10329  
Your ref: 10.2024.79.1

16 May 2024

The General Manager  
SNOWY MONARO REGIONAL COUNCIL  
81 COMMISSIONER STREET COOMA 2630

Attention: [REDACTED]

Uploaded to the ePlanning Portal

Dear Sir/Madam

**Re:** IDAS-2024-10329 - Controlled Activity Approval Exemption  
**Dev Ref:** 10.2024.79.1  
**Description:** Construction of a ~1.2m wide shared trail including five pedestrian bridges.  
**Location:** Lot 9, DP1216028, 55 RAINBOW DRIVE EAST JINDABYNE 2627

The Department of Planning and Environment-Water has reviewed documents for the above development application and considers that, for the purposes of the Water Management Act 2000 (WM Act), the proposed works are exempt from the need to obtain a controlled activity approval and no further assessment by this agency is necessary.

### Exemption

Water Management (General) Regulation 2018 s41 - Works undertaken by public authorities

If you have any questions regarding this correspondence, please use Water Assist to obtain further information or make an enquiry:  
<https://www.dpie.nsw.gov.au/water/water-assist>

Yours Sincerely



For  
**Patrick Pahlow**  
**Team Leader**  
**Licensing and Approvals**  
**Department of Planning and Environment-Water**

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**Ross Campbell**

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**From:**  
**Sent:** Monday, 3 June 2024 9:39 AM  
**To:** Records Snowy Monaro Regional Council  
**Subject:** DA 10.2024.79.1

The proposed shared trail will be immediately in front of my property.

I have 3 concerns

1)The designers of this trail were not aware that have a long term lease with Snowy Hydro of an area of land between my property and the lake. This must be taken into account when choosing the location of the trail rather than relying on my official boundary.

2)Potential noise, littering,anti-social behaviour and late-night use of the trail. I request that council please ensure the trail is moved 20m toward the lake to safe-guard me & my neighbours against this. Please note that we have a long term lease from Snowy Hydro of an area of land

3) The current lake vista is natural & unspoiled & should remain this way. I request council ensures there is no signage in front of, beside & in the immediate vicinity of my property & my neighbouring properties.

Kind Regards

Political Donations & Gift Disclosure Statement DA No.10.2024.79.1 Myself or any other person with financial interest in this development application have made NO political donation or gift within the last two years.

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**Ross Campbell**

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**From:**  
**Sent:** Wednesday, 12 June 2024 7:45 AM  
**To:** Records Snowy Monaro Regional Council  
**Subject:** submission re Development Application (10.2024.79.001) Jindabyne Shared Trail

Dear Sir/Madam

**We refer to Development Application (10.2024.79.001) Jindabyne Shared Trail  
Section 2.1 Kunama to East Jindabyne**

While supportive of the broader concept of a bike path connecting East Jindabyne to Jindabyne, we have 2 objections to this proposal - the proximity of the path to our house and the width of the path.

- It is obvious on the map that the path takes a turn toward our house in order to go around the trees that are near the water.

This brings the path much closer to us and our neighbouring house than other houses in the area.

Would it be at all possible for the path to go below the trees? Or at least wind through the trees?  
My father planted those trees 50 years ago in order to give us privacy.

- We also feel that 2m wide path (with 3m of clearing) is excessive for this area. Most of the 2 way bike paths in Sydney are not that wide.

While we are all hoping that the path is a beautiful tourist destination it will not be supporting the amount of high commuter traffic seen in large cities that these width recommendations are made for.

Also in the area of good quality bushland (between the Tyrolean Village and the dam) the width of the path also has a significant effect on the amount of native vegetation directly and indirectly impacted - 1.11ha and 6.49ha respectively.

We hope you will take these considerations seriously... and are happy to meet onsite to discuss.



*We have not made any political donations or gifts within the last 2 years, nor any associate.*

---

**Ross Campbell**

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**From:**  
**Sent:** Wednesday, 12 June 2024 10:02 PM  
**To:** Ross Campbell  
**Subject:** RE: DA 10.2024.79.1 - proposed trail adjustment  
**Attachments:** Willow Bay cycle path proposed (measured).JPG

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Ross,

Following up on your email could you please incorporate my feedback into the design work for this project. Whilst I strongly support the project to build a Jindabyne shared trail (Kunama to East Jindabyne) I believe the proposed location of the trail in front of the Willow Bay properties needs adjusting to provide the best outcome for the residents of Willow Bay and the users of the trail. Specifically, as shown in the attached markup:

- It seems that the proposed trail is less than 3 metres from Lot 8 front fence and yet over 39 metres from the lake shore line. And the distance to the water's edge is significantly greater for most of the year.
- Trail users would rather be closer to the natural beauty of the lake / water's edge than close to the front fences of house blocks.
- To preserve the quiet enjoyment of my property the noises generated by users of the trail traffic can be mitigated by adjusting the trail away from the property front fence line towards the lake.

Could you please consider adjusting the trail location in front of towards the lake shore, indicatively as per the attached.

Please feel free to contact me should you wish to discuss this in more detail.

Many thanks,

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**From:** Ross Campbell <[REDACTED]>  
**Sent:** Monday, 20 May 2024 10:06 AM  
**To:**  
**Subject:** DA 10.2024.79.1

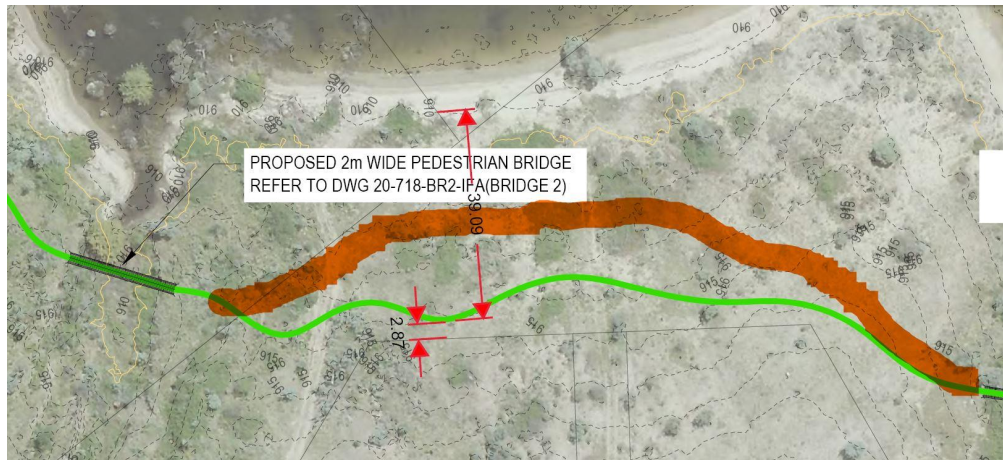
Following on from our phone conversation please see the attached file.

Kind regards,

**Ross Campbell**  
Town Planner



Picture below was attached with the submission above.  
Picture below demonstrates the submitters alternative path



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**Ross Campbell**

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**From:**  
**Sent:** Wednesday, 12 June 2024 10:43 PM  
**To:** Records Snowy Monaro Regional Council  
**Subject:** DA 10.2024.79.1 Kunama Shared Trail

REF; - DA 10.2024.79.

Dear Council,

I would like to make comment on the above DA that has been available for a few days ! As there has been no reply to my email seeking confirmation of extended time for submissions, I can only make minor comment with the time that the documents (Many Pages!) have been available.

In essence I am for this project & would like to see it started soon ready for next summer. It is unfortunate that this plan, difficult as it is to see(!) appears to have gone away from the original. I am especially concerned with the area near Lot 24 Lakeview Terrace. Originally this section was mapped as 2 large radius curves . It now shows as multiple "zig-zags" or trail reversals. I can only hope that the corners will be relatively "flat" & of reasonable radius so that all can enjoy this trail. This is especially necessary as this is to be a two way trail. Also there seems not to be the hoped for access to this path, (ie. from Lakeview Terrace?) in many places? This was a desire from the East Jindabyne community. Once the developments go ahead this path will be further isolated.

The script declares that this trail has to be inclusive as it is two way, "not every one has a mountain bike". Perhaps the trail should be graded by a variety of users before any signage or maps are made so that visitors are aware of what to expect. Saying it will be grade 3 walking trail is ambiguous as the paths to Mt. Kosciusko all grade 3 and very easy to walk or ride without having to watch the trail 95% of the time. If council seriously wants to attract visitors to the region, there needs to be trails that are suitable for leisurely recreation not just sport.

Regards

**Submission on DA 10.2024.79.1 Jindabyne Shared Trail Kunuma Drive to Rushes Bay East  
Jindabyne –**

**General comments :**

have been actively involved with many community projects through the Jindabyne East Residents Committee. These projects included numerous native vegetation planting areas, Rushes Creek restoration project, community cleanup days and the construction and maintenance of the current shared trail at the inception of the Shared Trail Committee c.2010. I have maintained the vegetation along the current trail verges in front of five adjoining properties for many years as those residents did not, often because they were absentee landowners or elderly.

I have therefore supported the current shared trail from it's inception to the present day and observed people's usage patterns fairly closely.

I generally support this proposal but have a number of concerns regarding the sections of the proposed route indicated in the SEE paralleling Jerrara Drive and the lack of clarity as to why the indicated route was chosen and site specific impacts were not identified.

**Deificencies in the SEE**

1. Doesn't provide a clear and detailed rationale or assessment of the route indicated and the site specific impacts.

The SEE should have shown the route at ground level broken down into sections to show the landscape types, the reason for that alignment and what vegetation would be removed or safeguarded as well as distances to affected adjoining residents. The indicated route from Siesta Villa Motel to Buronga St will remove a significant amount of vegetation that has been planted by residents for amenity and wind shielding. In my twenty years residing here I have planted many more to specifically create native habitat.

The stated objective in the SEE of minimising vegetation removal is not reflected in the route indicated in the SEE nor is there an adequate explanation of what is to be removed and why.

2. Doesn't recognise that much of the planted vegetation has been done by locals individually and as a community group effort

The figure below (Fig 1) indicates where the Jindabyne community has planted native vegetation as part of the Environmental Trust grant received in 2006. The planting areas have been in place since 2008 and have been moderately successful in reintroducing native shrubs, forbs and small trees into the local landscape where they would have most likely existed prior to European settlement but do not now. There have been losses due to mortalities and high lake levels but the planting areas still present good assemblages of native plants which are also showing natural propagation. However I feel that there are trail alignments through them which pose potential impact on the plantings that is not clearly identified.

Most of the mature tall trees of mixed native and exotics were planted along the notional extended property boundaries in the early days of the establishment of East Jindabyne as a buffer against the strong westerly winds that prevail along this section of the lake. These trees now provide substantial habitat for native birds and arboreal mammals for food, shelter, breeding sites and nocturnal roosts. This, of course, is a mixed blessing depending on which species are present and how they fit into the urban environment. The SEE should have identified which trees and shrubs are targeted for removal and a better assessment of the visual and ecological impact which I think has been inadequate in the SEE.





Figure 1 – 2008 community planting areas under the Environmental Trust grant

The following figure shows the area of native tree and shrub planting that I have undertaken over the last twenty years. The area of most concern is where the proposed route will destroy an area of dense shrubs that has been designed to provide habitat for small birds and a refuge for the native 'Jacky Lizard' which frequents this area and the foreshore below my property and does not appear to be listed in the SEE. I want to see this area protected and so propose an alternative route that reduces vegetation losses and still provides a good route for a shared path. This alternative would also address some of my loss of privacy concerns with the route proposed.

The northern side of the area of the land under the trees in the proposed route contains a natural occurrence of the native *Scleranthus sp* which is an unusual and attractive ground cover which does not appear to occur anywhere else in the locality. I am most anxious to preserve this as it has only just survived disturbance from earthworks on the adjoining frontage and is now gone from there. The proposed route will wipe out what remains of this plant here.

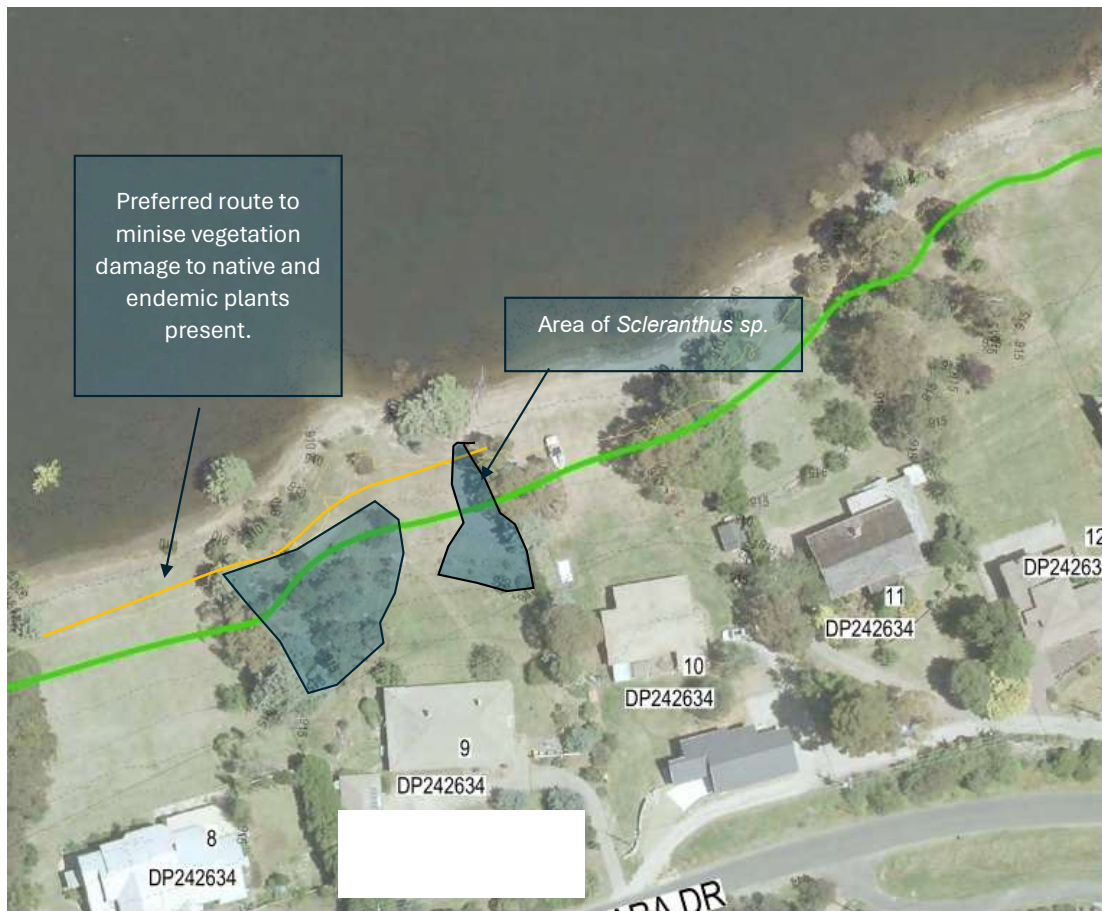


Figure 2 – Planted and native vegetation

The following photos show some of the vegetation that will be removed by the proposed route and my preferred route that minimises vegetation removal.



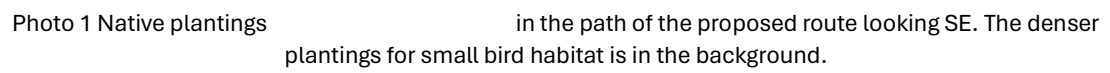






Photo 2 northern side of land looking NNW where *Scleranthus* is an understorey ground cover plant. These are windbreak trees planted before I resided here.





Photo 3 Preferred route looking SE which removes only a snowgum and part of two conifers and maybe one native shrub. This is above the previous 101% lake level plus wave push.

Another area of concern is the impact on the native vegetation on the point below Boronga Street. This is a good remnant of native snowgum woodland with a number of old trees featuring valuable tree-hollows. This adds a nice feature to the trail, particularly with the lake viewpoint as built into the original trail. This woodland has already been dissected by the current shared trail(s) and additional indiscriminant path creation by walkers and riders. The route here should aim to utilise the existing corridor, prevent further dissection and fragmentation of this patch and repair damage to unused or abandoned trail sections.

### 3. Inadequate recognition of privacy impacts on residents along the trail

The SEE does not assess the impacts of loss of privacy to residents along the proposed trail apart from a brief mention on P.77. I would not expect an environmental consultant to be competent to do this and this aspect should fall to Council to consider and address adequately. As stated above I have played a substantial part in creating and supporting the existing trail that passes in front of my residence and have lived quite comfortably with it despite early reservations about loss of privacy. The new trail proposed is significantly closer to my house and yard and will ultimately carry far more traffic than at present. This will result in a significant impairment to the use and enjoyment of my own property and can be mitigated satisfactorily by a more sensitive alignment as I have proposed.

My observation of trail users also indicates that users who currently comprise far more walkers than riders, prefer to walk as close to the lake as possible and if there are obstructed views of it they will simply make and use an obvious alternative such as sections of the existing trail when it is not submerged at the



Full Service Level of Lake Jindabyne is the 100% level. Any trails upslope of that will only be used occasionally and not as intended by Council. The alternative routes I have proposed along the foreshore in my locality also locates them above the highest lake levels plus wave push that I have observed in my twenty years here. This should provide adequate assurance that the new trail will be more secure than the current trail which has been inundated three times since 2010.

In conclusion, I object to the precise route proposed where indicated above and consider that there are more acceptable routes that provides a better user experience, a better environmental outcome and probably reduced cost. I also request to have a site meeting with the relevant officers to discuss my issues with the proposal before it is finalised.

12 June 2024

**Reference - DA 10.2024.79.1 Jindabyne Shared Trail – Tyrolean Village to East Jindabyne**

If there is any additional information you require from \_\_\_\_\_ to enable this project to proceed, please do not hesitate to reach out.



PO Box 492, Bega NSW 2550  
P. (02) 6499 2222  
F. (02) 6499 2200  
E. council@begavalley.nsw.gov.au  
www.begavalley.nsw.gov.au  
ABN. 26 987 935 332  
DX. 4904 Bega

Ref:

31 March 2025

Ross Campbell  
Divisional Manager Development Services  
PO Box 714  
Cooma NSW 2630

Dear Ross

**Peer Review Section 4.15 Assessment DEVELOPMENT APPLICATION 10.2024.79.1 - Construction of a 3.8km shared-use recreational trail and five (5) pedestrian bridges.**

I refer to your email dated 6 March 2025 seeking Council's assistance in undertaking a peer review of the Section 4.15 assessment of the Environmental Planning and Assessment Act 1979 for the above development application. The following provides a summary of the assessment process and key issues for Council's consideration in finalising its position on the assessment of the proposed development.

The application seeks approval for the construction of a 3.8km shared-use recreational trail and five (5) pedestrian bridges extending the existing shared trail from Kunama Estate to East Jindabyne NSW on Lot 19 DP 530537, Lot 1 DP 248100, Lot 30 DP 236875, Lot 26 DP 548802, Lot 21 DP 235881, Lot 28 DP 236875, Lot 29 DP 236875, Lot 2 DP 248100, Lot 24 DP 1089304, Lot 4 DP 232161, Lot 2 DP 816051 and Lot 9 DP 1216028.

The land is zoned SP1 Special Activities, C3 Environmental Management, RE1 Public Recreation, RU5 Village, RE2 Private Recreation and R5 Large Lot Residential as prescribed by the provisions of the Snowy River Local Environmental Plan 2013.

In carrying out the peer review, Bega Valley Shire Council was provided with the following information.

Council's Development Assessment Report drafted as at 6 March 2025
Draft Consent
Statement of Environmental Effects Report prepared by The Environment Factor dated November 2023 including as Appendices Concept Design, Aboriginal Cultural Heritage Assessment Report, Summary of Environmental Mitigation Measures and Biodiversity Development Assessment Report.
Aboriginal Heritage Assessment Report response from DCCEEW dated 07/05/2024
Biodiversity Assessment Report response from DCCEEW dated 13/11/2024
Water Management Act response from DPIE dated 13/11/2024
Submissions received Report



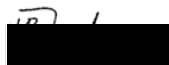
**Additional matters for consideration**

- Evidence of owner's consent from Snowy Monaro Regional Council and Private Landowner Consent was not included with the documentation provided for peer review. It is recommended that written evidence be provided to demonstrate that landowners consent to the lodgement of the development application before determination is made.
- The assessment report would benefit with some consideration of relevant SEPP provisions applying to fortify the Section 4.15 assessment:
  - It is recommended that the Assessment Report be updated to clarify whether there are any extractive industries in the immediate area of the development and demonstrate that Clause 2.19 of the State Environmental Planning Policy (Resources and Energy) 2021 has been considered and assessed.
  - It is recommended that the Assessment Report be updated to clarify Koala Habitat Protection 2020 and 2021 in Chapters 3 and 4 of the Statement and Environmental Effects (Biodiversity and Conservation) 2021 has been considered and assessed.
  - It is recommended that the BCD standard condition relating to the calculated offset credits be included in the draft consent as per the recommendations detailed in the Section 4.15 assessment.
- It is recommended that Clauses 2.47 or 2.48 of the State Environmental Planning Policy (Transport and Infrastructure) 2021 be addressed to ensure no impacts of Electricity Infrastructure and notification to Essential Energy is not required.
- The proposal has some minor discrepancies with LEP and DCP provisions, where evidence of consideration of why certain provisions may or may not apply in the Locality of Jindabyne is recommended, this will help fortify the 4.15 report.

On review, it is our opinion that your assessment to date is sound and has been undertaken in accordance with Council's obligations under the Environmental Planning and Assessment Act 1979. As detailed in the additional matters for consideration and the summary below, there are a few areas which, in our opinion, require clarification prior to final determination of the development application. As to whether the final assessment report is reflective of our input rests solely with Council's planning team and management.

The below table provides a summary of the key planning policies and development standards applicable to the proposed development and consideration of whether they have been addressed by the assessment report. If we can be of further assistance, please do not hesitate to contact Mark Fowler on [REDACTED]

Regards



Mark Fowler  
Planning Services Coordinator

#### State Legislation

Legislation/Policy (as relevant)	Addressed in Assessment Report
Biodiversity Conservation Regulation 2017	Yes
National Parks & Wildlife Act	No. Would be good to detail in the Section 4.15 assessment under "Other" legislation detailing that the development is integrated development.
Environmental Planning and Assessment Act 1979 (Clause 4.15)	Yes
Environmental Planning and Assessment Regulations 2000	Nil detailed
SEPP (Resilience and Hazards) 2021	Yes
SEPP (Biodiversity & Conservation) 2021	Applies, Nil Detailed
SEPP (Housing) 2021	NA
SEPP (Primary Production) 2021	NA
SEPP (Resources and Energy) 2021	Applies, Nil Detailed
SEPP (Industry and Employment) 2021	NA
SEPP (Transport and Infrastructure) 2021	Applies, Nil Detailed, Any Electricity infrastructure impacted upon?
SEPP (Planning Systems) 2021	NA as less than \$5 million

#### Local Legislation (as relevant)

Snowy River Local Environmental Plan 2013	Addressed in Assessment Report
Clause 1.3 Land to which Plan applies	Yes
Clause 2.1 Land Use Zone	Yes
Clause 2.2 Zoning of Land to which plan applies	Yes
Clause 2.3 Zone Objectives	Yes
Clause 4.3 Height of Buildings	NA
Clause 4.4 Floor space ratio	NA
Clause 4.6 Exceptions to development standards	NA
Clause 5.2 Classification/re-classification of public land	NA
Clause 5.4 Controls relating to miscellaneous permissible uses	NA



Clause 5.5 Controls relating to secondary dwellings on land in a rural zone	NA
Clause 5.6 Architectural roof features	NA
Clause 5.7 Development below mean high water mark	NA
Clause 5.10 Heritage conservation	Yes
Clause 5.12 Infrastructure development and use of existing buildings of the Crown	NA
Clause 5.13 Eco-tourist facilities	NA
Clause 5.21 Flood planning	NA
Clause 5.22 Special flood considerations	NA
Clause 6.2 Development control plans for land release areas	NA
Clause 7.2 Terrestrial biodiversity	Yes
Clause 7.3 Riparian land and watercourses	Yes
Clause 7.4 Wetlands	Yes
Clause 7.5 Active street frontages	NA
Clause 7.6 Development within the Lake Eucumbene and Lake Jindabyne scenic protection areas	Yes
Clause 7.7 Development within the eastern approaches to Kosciuszko National Park	Yes
Clause 7.8 Serviced apartments	NA
Clause 7.9 Essential services	Yes

Other Section 4.15 matters (as relevant)

<b>Snowy River Development Control Plan 2013</b>	<b>Addressed in Assessment Report</b>
A3 Public Notification	Yes
B1 Rural Locality Statements	Applies, Nil Detailed – Rural Locality Statement needs to be considered for land use and development Per Section 1.8. Jindabyne.
C2 Design	Applies, Nil detailed
C3 Car Parking, Traffic & Access	Yes
C4 Heritage	Yes
C5 Tree Preservation & Landscaping	Yes
C6 Signage & Advertising	Yes
C7 Natural Hazard Management	Yes
C8 Environmental Management	Yes
C9 Energy & Water Efficiency, Water Supply & Effluent Disposal	Yes
C10 Waste Management & Recycling	Yes

Other codes and Guidelines

Other Codes and Guidelines	Addressed in Assessment Report
Biodiversity Management Plan	Yes
Snowy Monaro Planning and Development Community Participation Plan 2019 (SMPDCPP)	Yes, used to address submissions.
Biodiversity Conservation Act 2016 (BC Act)	Yes