

Our ref: 7480-2-R1 Rev1  
20 December 2024

Kosciuszko Thredbo Pty Ltd / EVT  
1 Friday Drive  
Thredbo NSW 2625

**Attention: Chloe Chalk**

Dear Chloe,

## **Geotechnical Assessment for Crackenback Ridge Water Supply Upgrade Thredbo NSW**

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### **1. Introduction**

This report presents the results of a geotechnical assessment for the proposed Crackenback Ridge Water Supply Upgrade in Thredbo NSW. The assessment was commissioned by Chloe Chalk of Kosciuszko Thredbo Pty Ltd / EVT, PO KTM0041722. The assessment was carried out in accordance with our proposal ref: 7480-P1; dated: 16 February 2024.

The site lies within an area designated as “G” as defined in the maps accompanying DIPNR’s “Geotechnical Policy – Kosciuszko Alpine Resorts”, November 2003, and therefore a geotechnical report is required to accompany the development application as per the requirements of the Geotechnical Policy.

This report must be read in conjunction with the attached “Important Information about your Geotechnical Report”.

### **2. Project Details**

Documents supplied to us for this investigation comprised:

- Plan Showing Detail & Level Survey, Crackenback Water Reservoir, Thredbo Village (prepared by Snowy Surveying, Job SS0208, revision A, dated 8/3/24).
- Site Plan (prepared by Kosciuszko Thredbo Pty Ltd, project GIS2415, revision A, dated 27/11/2024).
- Civil Plans (prepared by Gordon Gibson Nominees, client number KOSC01, drawing 3251, revision 3, dated 12/2024).
- Trench Cross Section (prepared by Kosciuszko Thredbo Pty Ltd, project 24007ES, revision 0, dated 2/12/2024).

The existing tank has an effective capacity of 105kL and was installed May 1995. The tank walls are 2.4m high with a peaked roof extending about 1.2m above the side wall.

It is proposed to install a second tank of similar proportions connected in series with the existing tank, with connecting pipework buried between the tanks and the existing water filtration plant and booster pump station. The pipework comprises a nominal 200mm PVC pipe laid in a trench nominally 0.7m wide by 0.725m minimum depth.

### 3. Assessment Procedure

The assessment comprised the following scope of work:

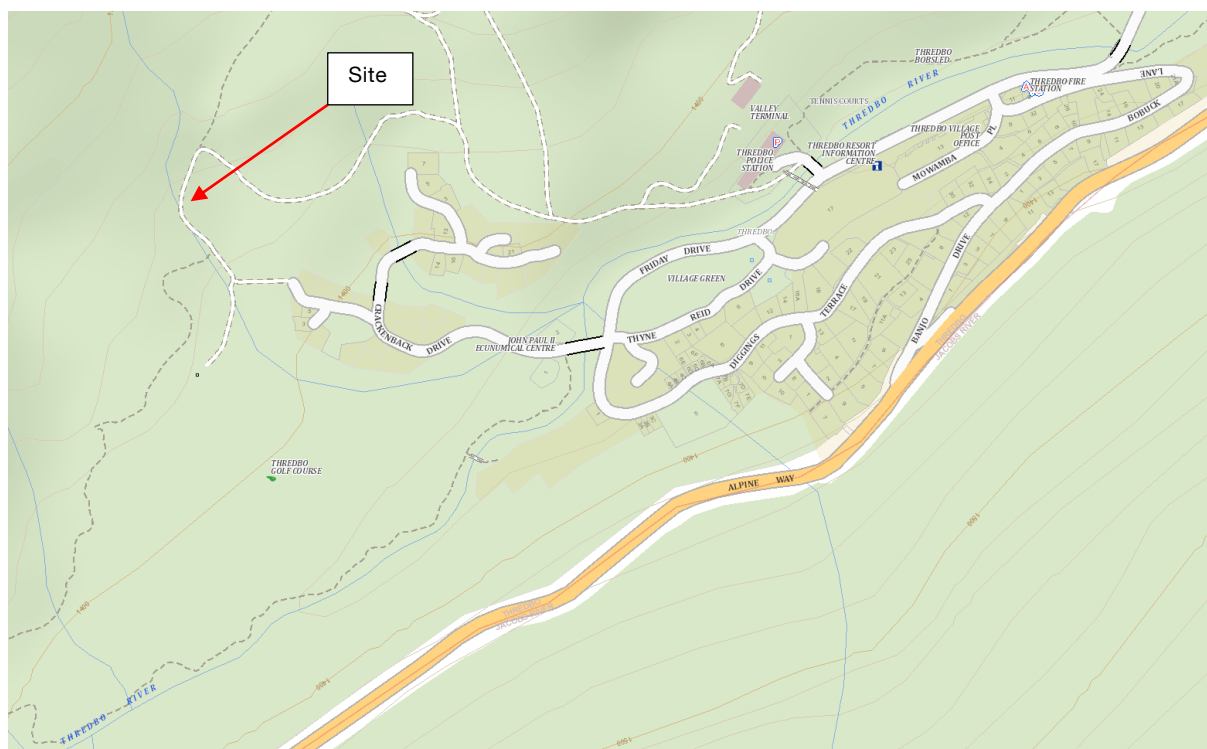
- A review of existing regional maps and reports relevant to the site held within our files.
- Visual observations of surface features by a Senior Principal Geotechnical Engineer on 15 March 2024.
- Engineering assessment and reporting.

### 4. Regional Topography

The regional topography comprises moderately to steeply sloping terrain flanking the north-easterly flowing Thredbo River, with ground slopes over the land flanking the river generally ranging from 10° to 30° and some locally steeper sections, and more gentle slopes over the river shoulders. Numerous drainage depressions and watercourses flow towards the river, with some of the persistent watercourses to the north of the river carved several metres into the underlying granite bedrock. Side slopes to creeks and watercourses are typically steeper at 20° to 35°, and typically include numerous granite boulders and cobbles.

### 5. Site Observations

The site is located on the northern side of the Thredbo River and northwest of Crackenback Drive in Thredbo as shown in Plate 1.



**Plate 1 - Site Locality (not to scale)**

The existing tank is situated on the eastern side of a gravel track that winds up the slope from Crackenback Drive, and on the side of a south-easterly facing slope of about 15°. The original slope has been cut up to about 2.5m depth to provide a level area for the tank construction, with the uphill part of the slope formed at about 30° to 35°. Photos 1 and 2 show the existing tank.

Vegetation comprises short thick grass around the base of the tank and with low shrubs and bushes on the slopes and some scattered small trees.

No granite exposures were observed across the development area. Variable subsurface conditions are expected to be encountered including minor fill on the downhill part of the existing slope, clay slope-wash soils, completely decomposed granite (sands), with granite cobbles and boulders interspersed throughout the profile, and occasionally granite bedrock is anticipated.

No obvious signs of slope instability were observed during the site inspection. No signs of surface seepage were observed.

## 6. Discussions & Recommendations

It is proposed to site another tank of similar dimensions adjacent to the existing tank, which will require cutting into the existing slope up to about 2.5m depth. The existing cut slope appears to be in good condition with no signs of slope movement and with good erosion protection provided by thick vegetation. Given the observed slope and good condition for the existing cut, which was formed nearly 30 years ago, it is likely that this cut is formed predominantly within weathered granite. We also note that there are no structures or services within 30m upslope of the proposed cut.

It is assessed that the proposed works will have 'minimal or no geotechnical impact' on the site, based on the good long-term performance of the existing cut, the lack of obvious signs of hillside instability observed or expected, the relatively small area of the development, and the lack of development upslope. We therefore consider that a geotechnical report prepared in accordance with the Geotechnical Policy for Kosciuszko Alpine Resorts (2003) is not required. A completed Form 4 – Minimal Impact Certification is attached to this report.

The following recommendations are provided for the development:

- Based on our site observations and previous test pitting in the general area, we expect that due to previous site disturbance and observed slopes, the site is Class 'P', in accordance with AS2870-2011 'Residential slabs and footings'.
- Excavation is anticipated to be predominantly within completely weathered granite and cobbles and boulders with some overlying soils. Excavation could be achieved by suitably sized excavator, with rock-breaking or blasting required if less weathered granite is encountered.
- Cuts should be limited to maximum 30° to 35° above horizontal to match the existing cut angle, and vegetated and covered to limit erosion.
- Filling is not recommended or required for the development.
- Foundations for the tank should be on the same stratum to limit differential movements. On the uphill side this is anticipated to be weathered granite which would provide an allowable bearing pressure of at least 200kPa. On the downhill side, deeper excavation may be required to reach the same stratum, which could be achieved by a strip / ring beam footing or piles beneath the ring beam.

## 7. Limitations

In addition to the limitations inherent in site investigations (refer to the attached Information Sheets), it must be pointed out that the recommendations in this report are based on assessed subsurface conditions from limited observations.

This report may have included geotechnical recommendations for design and construction of temporary works (e.g., temporary batter slopes or temporary shoring of excavations). Such temporary works are expected to perform adequately for a relatively short period only, which could range from a few days (for temporary batter slopes) up to six months (for temporary shoring). This period depends on a range of factors including but not limited to: site geology; groundwater conditions; weather conditions; design criteria; and level of care taken during construction. If there are factors which prevent temporary works from being completed and/or which require temporary works to function for periods longer than originally designed, further advice must be sought from the Geotechnical Engineer.

This report and details for the proposed development should be submitted to relevant regulatory authorities that have an interest in the property (e.g., Department of Planning) or are responsible for services that may be within or adjacent to the site for their review.

Asset accepts no liability where our recommendations are not followed or are only partially followed. The document "Important Information about your Geotechnical Report" in Appendix A provides additional information about the uses and limitations of this report.



For and on behalf of

**Asset Geotechnical Engineering Pty Ltd**



**Mark Bartel**

BE, MEngSc, GMQ, CPEng, RPEQ/NER(Civil), DEP/PRE (NSW)  
Managing Director | Senior Principal Geotechnical Engineer

Encl: Site Photos

Plan Showing Detail & Level Survey, Crackenback Water Reservoir, Thredbo Village  
Important Information about your Geotechnical Report  
Form 4



## Document Control

### Distribution Register

Copy	Media	Recipient	Location
1	Secure PDF	Chloe Chalk	Kosciuszko Thredbo Pty Ltd / EVT
2	Secure PDF	Mark Bartel	Asset Geotechnical Engineering

### Document Status

Rev	Revision Details	Date	Author	Reviewer	Approver
0	Initial issue	28 March 2024	MAB		MAB
1	Updated plans	20 December 2024	MAB		MAB



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ISO 14001:2015  
ISO 45001:2018 AS/NZS 4801:2001

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## Site Photos



**Photo 1 – View of tank and uphill slope.**



**Photo 2 – View of tank and downhill slope.**



LINE LEGEND

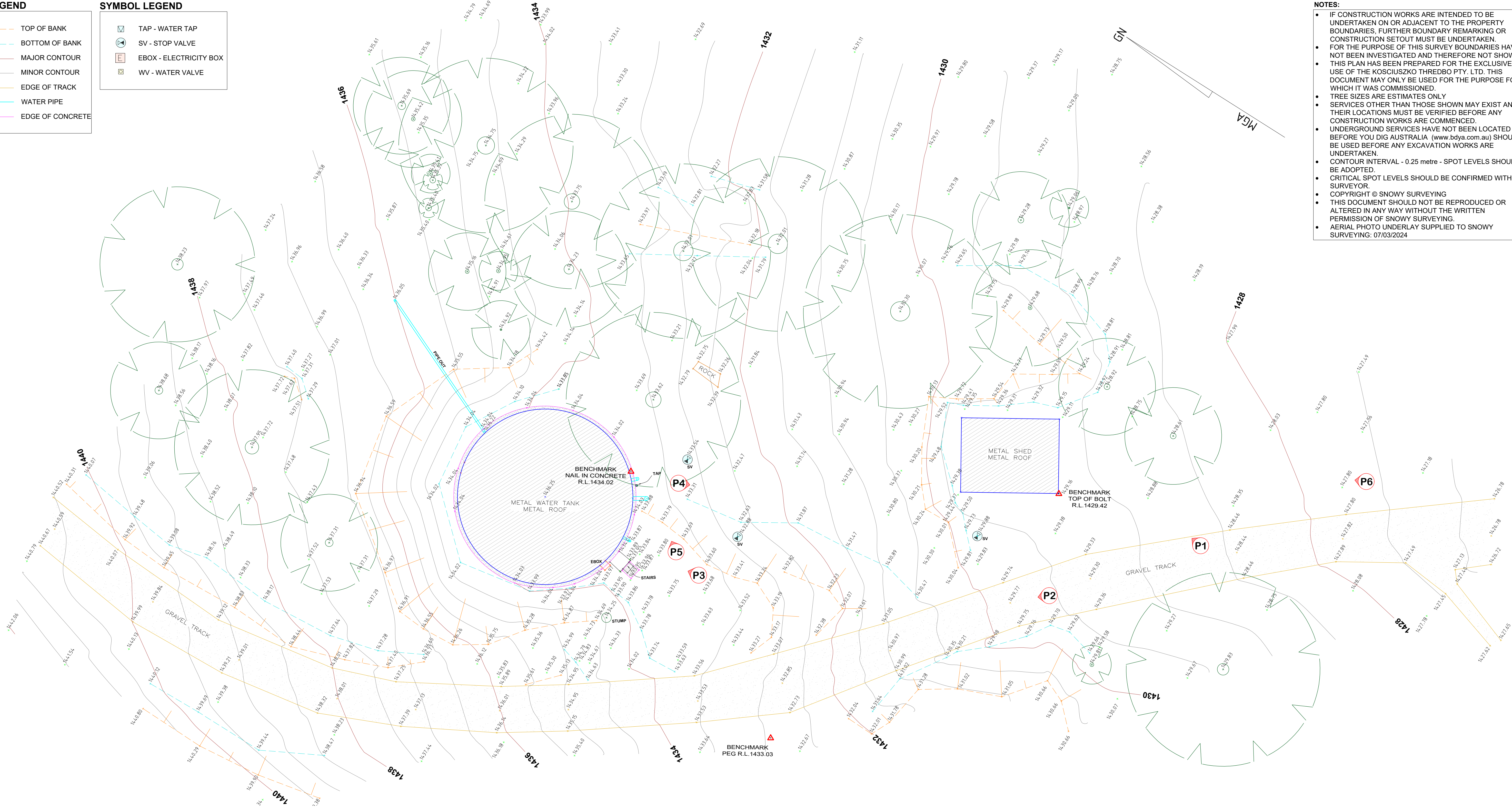
<span style="color: orange;">---</span>	TOP OF BANK
<span style="color: cyan;">---</span>	BOTTOM OF BANK
<span style="color: red;">---</span>	MAJOR CONTOUR
<span style="color: brown;">---</span>	MINOR CONTOUR
<span style="color: orange;">---</span>	EDGE OF TRACK
<span style="color: cyan;">---</span>	WATER PIPE
<span style="color: magenta;">---</span>	EDGE OF CONCRETE

SYMBOL LEGEND

	TAP - WATER TAP
	SV - STOP VALVE
	EBOX - ELECTRICITY BOX
	WV - WATER VALVE

NOTES:

- IF CONSTRUCTION WORKS ARE INTENDED TO BE UNDERTAKEN ON OR ADJACENT TO THE PROPERTY BOUNDARIES, FURTHER BOUNDARY REMARKING OR CONSTRUCTION SETOUT MUST BE UNDERTAKEN.
- FOR THE PURPOSE OF THIS SURVEY BOUNDARIES HAVE NOT BEEN INVESTIGATED AND THEREFORE NOT SHOWN.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE KOSCIUSZKO THREDBO PTY. LTD. THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED.
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- SERVICES OTHER THAN THOSE SHOWN MAY EXIST AND THEIR LOCATIONS MUST BE VERIFIED BEFORE ANY CONSTRUCTION WORKS ARE COMMENCED.
- UNDERGROUND SERVICES HAVE NOT BEEN LOCATED BEFORE YOU DIG AUSTRALIA (www.bdia.com.au) SHOULD BE USED BEFORE ANY EXCAVATION WORKS ARE UNDERTAKEN.
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- CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
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P1



P2



P3



P4



P5



P6

# SNOWY SURVEYING

LAND AND ENGINEERING SURVEYING SERVICES

Ph: 0403297791      ABN: 75270142975  
Email: max@snowsurveying.com.au      4 Lakeview Tce East Jindabyne NSW 2627

*Max Windshuttle*  
MAX WINDSHUTTLE  
REGISTERED SURVEYOR  
BOSSI NUMBER 8973

AZIMUTH: MGA	VERTICAL DATUM: AHD
COORDINATE SYSTEM: MGA 2020	B.M ADOPTED: CORSnet NSW
MARKS ADOPTED: CORSnet NSW	R.L. N/A
	SOURCE: CORSnet NSW

Scale @A1: 1:100
DO NOT SCALE DRAWING
Contour Interval 0.25m
Survey Date: 05/03/2024
LGA: SNOWY MONARO REGIONAL
Parish: THREDBO

Surveyed TB
Drafted PD
Checked MW

Client KOSCIUSZKO THREDBO PTY. LIMITED				
Title PLAN SHOWING DETAIL & LEVEL SURVEY CRACKENBACK WATER RESERVOIR, THREDBO VILLAGE				
Sheet No. 01/02	Paper Size A1	Drawing No. SS0208_CD_01_A	Job No. SS0208	Revision A



LINE LEGEND

	TOP OF BANK
	BOTTOM OF BANK
	MAJOR CONTOUR
	MINOR CONTOUR
	EDGE OF TRACK
	WATER PIPE
	EDGE OF CONCRETE

SYMBOL LEGEND

	TAP - WATER TAP
	SV - STOP VALVE
	EBOX - ELECTRICITY BOX
	WV - WATER VALVE

NOTES:

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A	CLIENT ISSUE	08/03/24
No.	DESCRIPTION	DATE
AMENDMENTS		

**SNOWY SURVEYING**  
LAND AND ENGINEERING SURVEYING SERVICES

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Email: max@snowysurveying.com.au      4 Lakeview Tce East Jindabyne NSW 2627

		MAX WINDSHUTTLE REGISTERED SURVEYOR BOSSI NUMBER 8973	
AZIMUTH: MGA		VERTICAL DATUM: AHD	
COORDINATE SYSTEM: MGA 2020		B.M ADOPTED: CORSnet NSW	
MARKS ADOPTED: CORSnet NSW		SOURCE: CORSnet NSW	
Scale @A1: 1:100		DO NOT SCALE DRAWING	
Contour Interval 0.25m		Survey Date: 05/03/2024	
LGA: SNOWY MONARO REGIONAL		Parish: THREDBO	

Surveyed TB	Client KOSCIUSZKO THREDBO PTY. LIMITED			
Drafted PD	Title PLAN SHOWING DETAIL & LEVEL SURVEY CRACKENBACK WATER RESERVOIR, THREDBO VILLAGE			
Checked MW	Sheet No. 02/02	Paper Size A1	Drawing No. SS0208_CD_01_A	Job No. SS0208
				Revision A



## Form 4 – Minimal Impact Certification

DA Number: \_\_\_\_\_

This form may be used where minor construction works which present minimal or no geotechnical impact on the site or related land are proposed to be erected within the “G” line area of the geotechnical maps.

A geotechnical engineer or engineering geologist must inspect the site and/or review the proposed development documentation to determine if the proposed development requires a geotechnical report to be prepared to accompany the development application. Where the geotechnical engineer determines that such a report is not required then they must complete this form and attach design recommendations where required. A copy of Form 4 with design recommendation, if required, must be submitted with the development application.

**Please contact the Alpine Resorts Team in Jindabyne for further information - phone 02 6456 1733.**

To complete this form, please place a cross in the appropriate boxes ☐ and complete all sections.

### 1. Declaration made by geotechnical engineer or engineering geologist in relation to a nil or minimal geotechnical impact assessment and site classification

I,  
 Mr ☒ Ms ☐ Mrs ☐ Dr ☐ Other

First Name	Family Name
Mark	Bartel

OF  
 Company/organisation

certify that I am a geotechnical engineer /engineering geologist as defined by the “Policy” and I have inspected the site and reviewed the proposed development known as

As a result of my site inspection and review of the following documentation

(List of documentation reviewed)

Plan Showing Detail & Level Survey, Crackenback Water Reservoir, Thredbo Village, Job SS0208, rev A, 8/3/24
Site Plan (prepared by Kosciuszko Thredbo Pty Ltd, project GIS2415, revision A, dated 27/11/2024).
Civil Plans (prepared by Gordon Gibson Nominees, client number KOSC01, dwg 3251, rev 3, dated 12/2024).
Trench Cross Section (prepared by Kosciuszko Thredbo Pty Ltd, project 24007ES, rev 0, dated 2/12/2024).

I have determined that;

- ☒ the current load-bearing capacity of the existing building will not be exceeded or adversely impacted by the proposed development, and
- ☒ the proposed works are of such a minor nature that the requirement for geotechnical advice in the form of a geotechnical report, prepared in accordance with the "Policy", is considered unnecessary for the adequate and safe design of the structural elements to be incorporated into the new works, and
- ☒ in accordance with AS 2870.1 Residential Slabs and Footings, the site is to be classified as a type  
(insert classification type)

Class P

- ☒ I have attached design recommendations to be incorporated in the structural design in accordance with this site classification.

I am aware that this declaration shall be used by the Department as an essential component in granting development consent for a structure to be erected within the "G" line area (as identified on the geotechnical maps) of Kosciuszko Alpine Resorts without requiring the submission of a geotechnical report in support of the development application.

## 2. Signatures

Signature

*Mark Bartel*

Chartered professional status

CPEng 35641 NER (Civil)

Name

Mark Bartel

Date

20 December 2024

## 3. Contact details

### Alpine Resorts Team

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Facsimile: 02 6456 1736

Email: alpineresorts@planning.nsw.gov.au