EL 28/2014 Wollastonite Creek Annual Report

Exploration Lease: EL 28/2014

Report Type: Combined Annual for Years 1 &2

Period Covered: 18/03/2021 to 18/03/2023

Author: Tasmania Mines Pty Ltd

Licensee: Tasmania Mines Pty Ltd

Address: 683 Kara Rod, Hampshire, Tasmania 7321

Prepared: 5 August 2023

Map Datum: UTM 55G

1. Executive summary

EL 28/2014 was selected by Tasmania Mines Pty Ltd for exploration of Category 3 and 5 Minerals due to the close proximity to the existing Kara Mine site and associated processing facilities, occurrence of a known Wollastonite resource and presence of surface limestone/marble and basalt resources in close proximity to road and rail infrastructure in the north of the tenement.

Exploration activities completed include consultation with landowners, review of previous exploration, processing of open file geophysical surveys, ground truthing 1:25,000 geological mapping and market development activities.

Predevelopment assessment of tailings storage facilities requirements for the Kara Mine has also been undertaken and the submission of a mining lease application over prospective areas is underway.

Planned work during the next period includes ground work at Wollastonite Creek region and Reynolds Quarry region.

2. Table of contents

List of Figures

List of Attachments

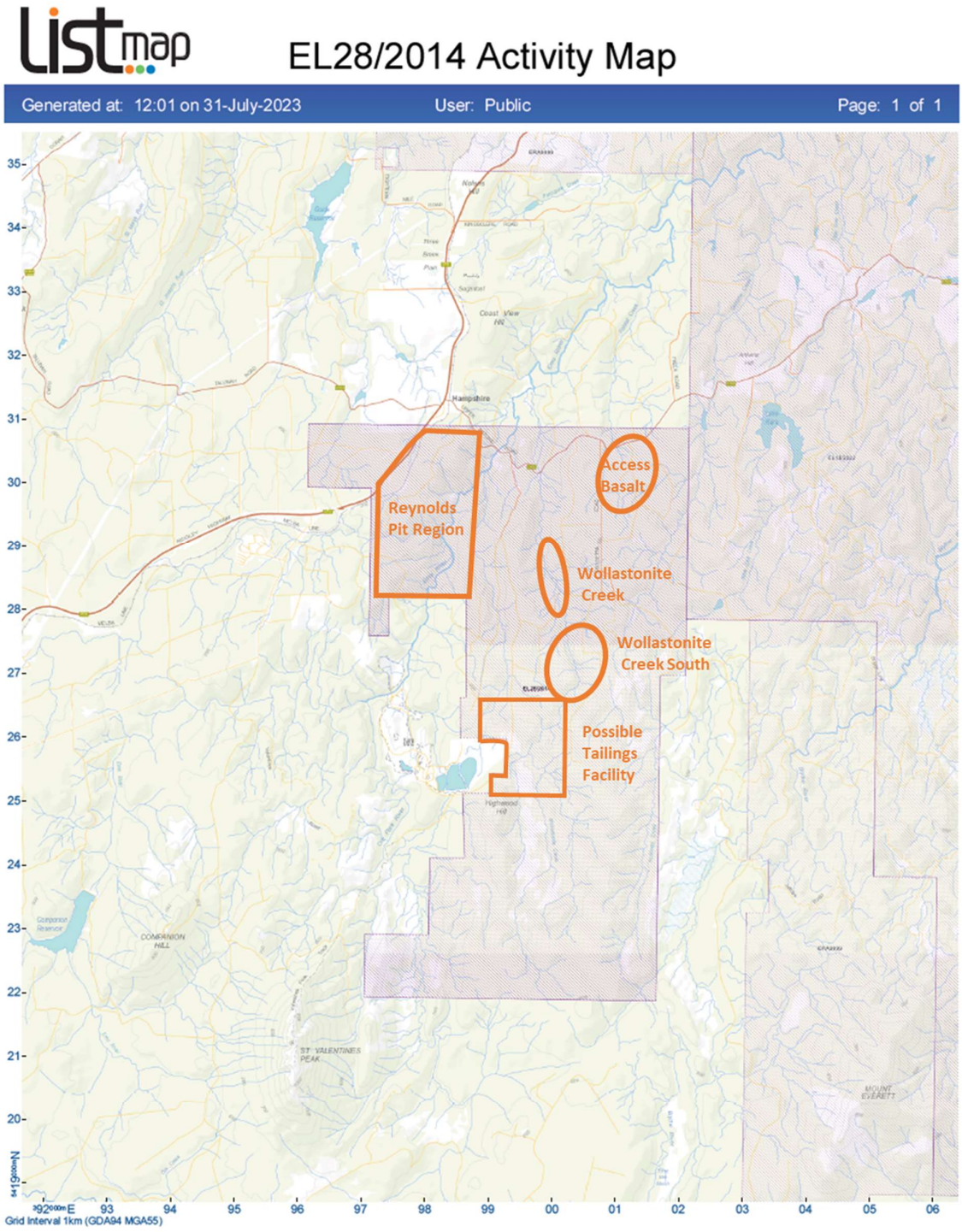


Figure 1 EL 28/2014 Activity Map

3. Introduction

EL 28/2014 'Wollastonite Creek' was applied for on 25th of February 2015 and formally granted 18th of March 2021 to Tasmania Mines Pty Ltd.

This report is the combined Annual Report for years 1 and 2.

The tenement is located approximately 35km south of Burnie in the Hampshire region (Figure 2). The region was considered prospective for economic Category 3 and 5 materials due to;

1. Proximity to the existing Kara Mine site and associated processing facilities.
2. Occurrence of a known Wollastonite resource.
3. Presence of surface limestone/marble and basalt resources in close proximity to road and rail infrastructure in the north of the tenement.

4. Regional geology

The Kara Mine is located on the western margin of the Dial Range Trough and is underlain by lithologies of the Late Proterozoic Oonah Formation, Owen Group Siliciclastics, Gordon Group Limestone, Devonian Granites and Tertiary Basalt. The regional geological 1:25,000 mapping is presented as Figure 3.

4.1 Oonah Formation

The oldest rocks in the district are the Proterozoic Oonah Formation, consisting of polydeformed quartzwacke, siltstone and pelite with lesser dolerite intrusives.

These are overlain by a sequence of pelite-carbonate with minor mafic volcanics and conglomerate.

4.2 Mt Read Volcanics

Mt Read Volcanic associations have been correlated with the felsic volcaniclastics of the Western Volcano-sedimentary sequence and the Tyndall Group quartz-feldspar phyric volcaniclastics.

4.3 Owen Group

The Late Cambrian to Ordovician Owen Group overlies the Mt Read Volcanics and is comprised dominantly of siliciclastic conglomerate and sandstone. Locally volcanic derived

conglomerates are associated with basal members. The Moina Sandstone, comprised of coarse to fine siliciclastic sandstone with minor intercalated conglomerate is the uppermost siliciclastic unit of the Owen Group and has a gradational contact with the overlying Gordon Group.

4.4 Gordon Group Limestone

Conformably overlying the Owen Group is the Gordon Group limestone and dolomite sequence. The stratigraphic thickness of the limestone is regionally variable ranging between 50-1,000m and may be suitable for local limestone supply.

4.5 Housetop Granite

The Housetop Granite crops out in sporadically to the west of the main batholith. It is believed to extend below much of the exploration area at a shallow depth that is evident by skarn type mineralisation and large areas of hornfels in the Kara District.

4.6 Tertiary Basalt

Basaltic flows are widespread throughout the area, flooding Tertiary palaeo-topographic lows. The basalts vary widely in thickness and frequently have a variable magnetic susceptibility creating difficulties for exploration below basaltic cover.

5. Review of previous exploration

Modern exploration in the region extends from approximately 1969 and has been undertaken by several parties primarily associated with Tasminex including; ANZECO from 1971 to 1974 and McIntyre Mines from 1997 to 1985. Other parties have included Pennzoil, Duval Mining Australia – Geopeko Limited, COMALCO – Shell joint venture, BHP, Delta. All parties have focussed activities on Category 1 minerals.

Exploration for Category 3 and 5 minerals has been limited to work undertaken by Tasminex and related parties including Tasmania Mines Ltd under RL 9001 on a Wollastonite resource situated in the valley of Wollastonite Creek.

The work completed included rock chip sampling, diamond drilling and petrological examination and metallurgical assessment of a wollastonite mineralisation hosted by limestones. The results of metallurgical test work indicated a simple flotation process could yield a 96% wollastonite product at 94% recovery.

Prior to granting of the tenement Tasmania Mines Pty Ltd undertook assessment of tailings storage facilities options in the region during 2019 to 2020. Criteria assessed included;

1. Water management to mitigate environmental impacts
2. Topography to enable construction of safe and stable landforms
3. Land holder and community impacts
4. Sites of environmental and cultural conservation significance
5. Proximity to Kara operations

A summary of tailings storage options are presented in Attachment 1.

6. Exploration completed during the reporting period

6.1 Review of open file airborne geophysical data and published mapping

Publicly available airborne geophysical surveys were compiled, processed and images interpreted to assist targeting of possible Category 3 and 5 resources;

1. Surface basalt materials
2. Limestone
3. Granite
4. High temperature mineral assemblages (hornfels) associated with alteration aureoles created by conditions in close proximity to the Housetop Granite.

Ground truthing of the geophysical interpretation was undertaken on public access to confirm the extent of rock types and the reliability of surface 1:25,000 mapping.

The results of identified 5 areas of interest (A to E, Figure 4);

A. The Reynolds Pit area in the north west corner of the tenement holds favourable magnetic, radiometric and surface geology to host economic resources of basalt and limestone.
B. The area to the east of the operating Kara Mine Site contains suitable host rocks and topography to be utilised for tailings storage and water management facilities. Based on preliminary engineering design a mining lease has been applied for in this region.
C. The Wollastonite Creek region hosts a known resource of wollastonite
D. The southern end of Wollastonite creek hosts a radiometric signature that suggests the presence of higher temperature mineral assemblages related to hornfels materials.

E. The north east corner of the tenement hosts a radiometric signature that suggests the presence of higher temperature mineral assemblages related to hornfels adjacent to basalt materials that are in close proximity to the Upper Natone Road.

6.2 Assessment of flora and fauna in future tailings storage sites

An assessment of possible flora and fauna impacts were undertaken in the area of interest for future tailings storage facilities. The results are presented in Attachment 2.

6.3 Consultation with landholders

Meetings with landholders including Forico and Sustainable Timber Tasmania have been undertaken to develop and understanding of Tasmania Mines Pty Ltd longer term requirements to sustain Kara operations and plans for exploration within EL28/2014.

Development of a suitable compensation agreement involving land utilisation for tailings storage facilities and local quarry production has commenced.

6.4 Lodgement of Mining lease application

Subsequent to engineering, environmental assessments and initial meetings with landholders a mining lease application (MLA) was registered on the 10th of September 2021. The MLA is intended for future tailings storage at the adjacent Kara Mine site. The MLA has been given reference number MLA2109P/M (Attachment 3).

7. Conclusions

A review of previous work, geophysical data and regional geological mapping has identified several areas of interest to host potentially economic category 3 and 5 minerals.

The review has also identified and area of interest for future construction of tailings storage facilities for the Kara Mine site.

A mining lease application has been submitted to cover the area of potential future tailings storage facilities. Preliminary engineering design and environmental surveys have been completed in the area.

8. Future exploration

Future exploration priorities include;

A. Assessment of borrow pit materials within the pending tailings dam ML application.

B. Follow up of Reynolds Pit region in the north west of the tenement.

C. Establishing access to Wollastonite Creek to assess Wollastonite resources

D. Assessment of Wollastonite Creek South area.

9. Environmental management

No significant disturbance of vegetation occurred during the period.

10. Expenditure

A summary of the estimated expenditure for EL282014 is presented below.

Expenditure item	18 Mar 2021 to 17 Mar 2022	18 Mar 2022 to 17 Mar 2023
Admin & Overheads	$ 14,136.00	$ 31,001.60
Drilling	$ -	$ -
Geology	$ 7,600.00	$ 7,600.00
Geophysics	$ -	$ 7,513.00
Geochemistry	$ -	$ -
Metallurgy	$ -	$ -
Engineering	$ -	$ 14,000.00
Environmental	$ -	$ 14,729.00
Total Estimated Expenditure	**$ 21,736.00**	**$ 74,843.60**

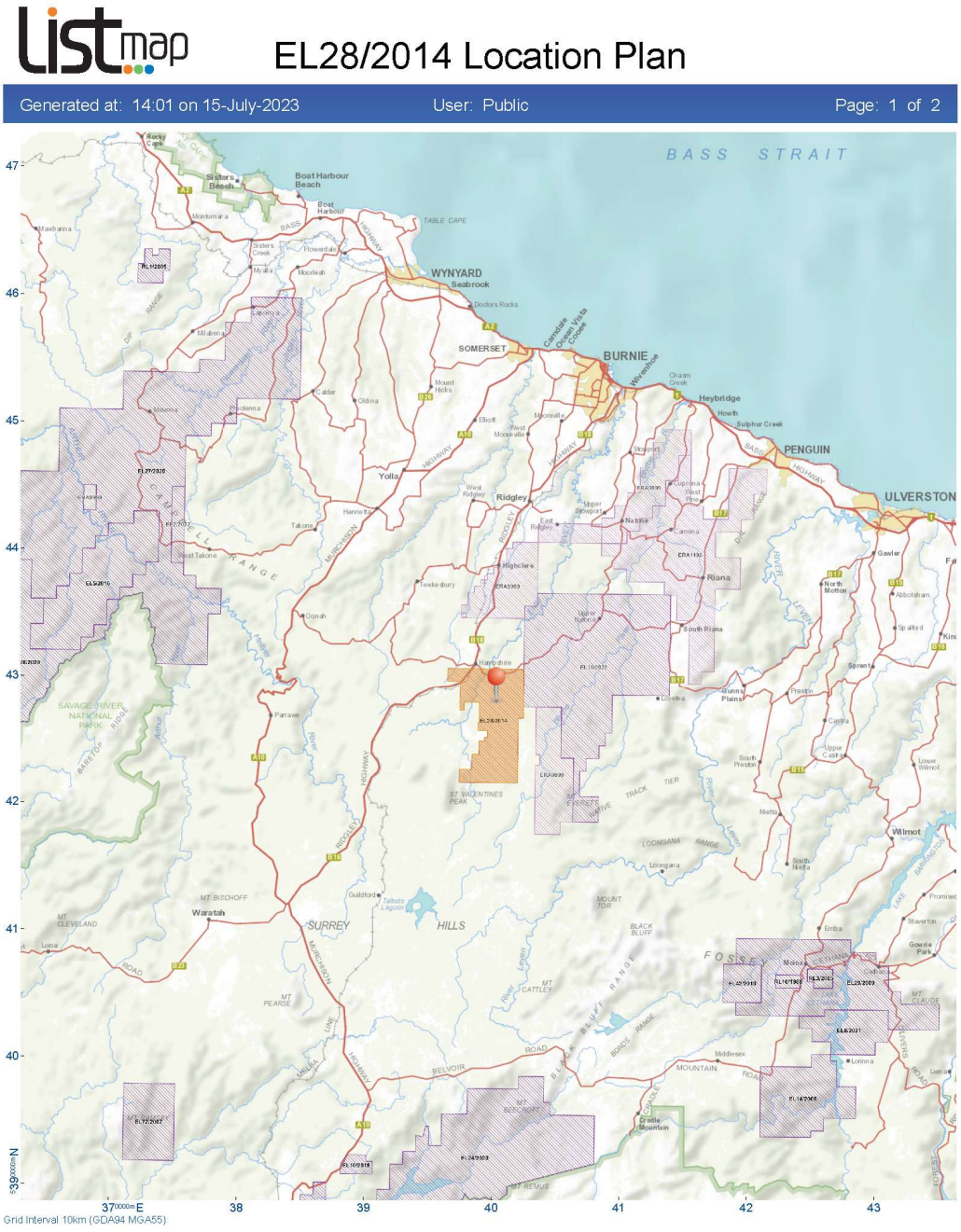


Figure 2 EL24/2014 Location plan

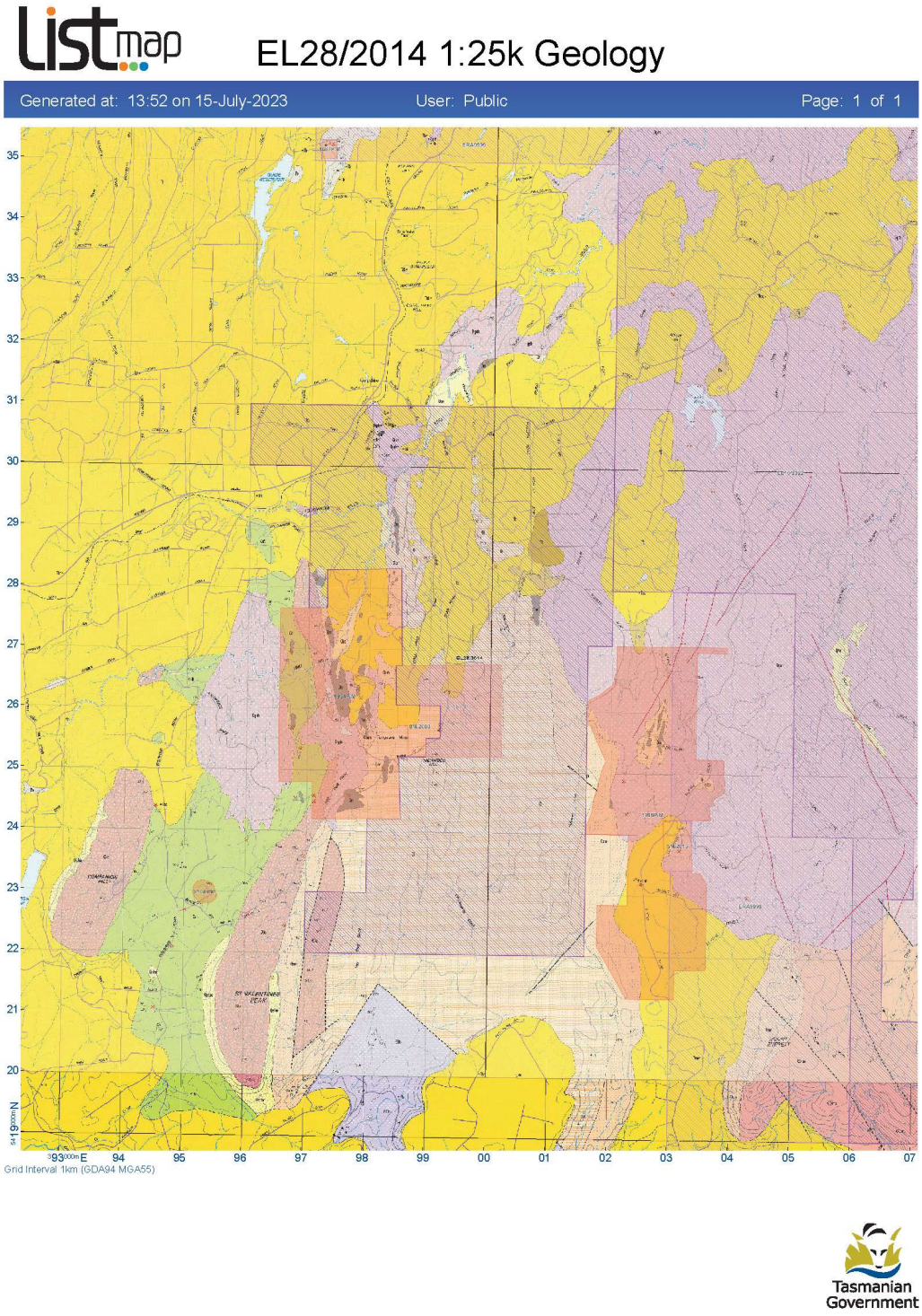


Figure 3 EL28/2014 1:125:000 Geological mapping

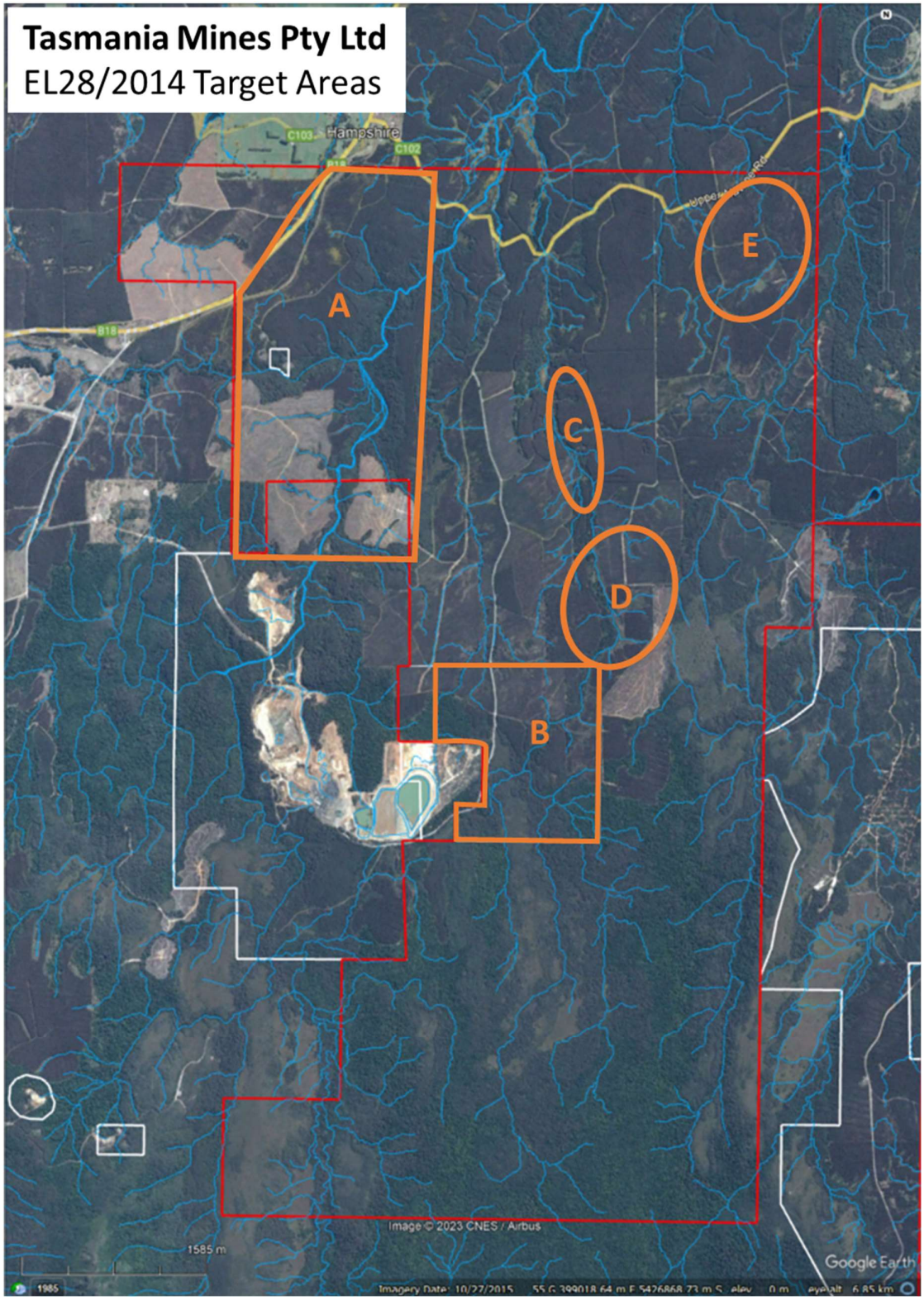


Figure 4 EL28/2014 Target areas

Attachment 1 Assessment of future tailings storage options

Tasmania Mines Limited

Kara New TSF Concept Study

Final Report

December 2020

Executive summary

GHD Pty Ltd (GHD) has been engaged by Tasmania Mines Ltd (Tasmines) to provide engineering services to undertake an options study for a suitable location for the new Tailings Storage Facility (TSF) for the Kara Mine operation.

The operation has a large resource relative to their mining rate with sustained pit ore supply, and therefore, a long potential mine life. Currently, the tailings are disposed in the Kara TSF which capacity is estimated to be exhausted by 2028. In this context, Tasmines are seeking new strategies for the disposal of tailings, as such the construction of a new TSF is a viable alternative. Thus, an options study is required to identify the potential sites and assess each site's suitability through the use of a multi criteria analysis.

This report details the finding of the site options assessment for potential sites including the engineering and environmental assessment, Multi criteria assessment (MCA) and forward planning.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout the Report.

The assessment of options includes consideration of storage volume, footprint, potential for expansion, construction methodology and haulage, rise rate constraints, flood risk, environmental, geotechnical, proximity to Mill and construction alternatives.

A low score or low ranking indicates a more favourable option. The preferred option is Option 3, followed by 2, 1 and 4. The preferred Option 3, is situated against Highwood Hill to the east of the existing TSF, considers the construction of a perimeter containment wall in a hillside style dam. The option takes the advantage the existing topography and terrain slope requiring less materials for the construction of the embankment in comparison to other options. The backup alternative option is Option 2, due to a major advantage being located directly adjacent to existing TSF. The results of the multi-criteria assessment are tabulated below:

Table 1-1 Multi criteria options assessment results

RSF Option	Weighted Score	Ranking
1	0.27	3
2	0.18	2
3	**0.15**	**1**
4	0.4	4

This report is in draft for comment until the MCA is reviewed and discussed with Tasmania Mines.

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Background

GHD Pty Ltd (GHD) has been engaged by Tasmania Mines Ltd (Tasmines) to provide engineering services to deliver a concept study for a suitable location for a new Tailings Storage Facility (TSF) for the Kara Mine operation. The Kara Mine is a Magnetite/Scheelite mine located near Hampshire, in North West Tasmania (Figure 1-1). The mine layout considers two stages of pit design where high grade weathered oxidised and fresh ore are mined, and a process plant.

Figure 1-1 Location of the Kara Mine operation.

The operation has a large resource relative to their mining rate with sustained pit ore supply, and therefore, a long potential mine life. Currently, the tailings are disposed in the Kara TSF, firstly constructed in 2015 and estimated to be exhausted by 2028 after a series of embankment raises. In this context, Tasmines is seeking for new strategies for the disposal of tailings, as such the construction of a new TSF is a viable alternative. Thus, an options study aimed to identify the potential sites and assess each site's suitability is a relevant milestone in the development of the new TSF. is the options study presented in this report includes a conceptual description of site alternatives, dam types and construction methodologies, and a rational comparison of options via a multi-criteria assessment (MCA).

1.2 Purpose of this report

This report details and discusses the findings of the site options assessment for the proposed potential TSF sites including the engineering and environmental assessment, as well as multi-criteria assessment (MCA) and forward planning.

1.3 Scope and limitations

The following general scope of works is proposed:

- Review production forecast and determine tailings storage requirements.
- Develop basis of design.
- Develop 4 No. concept locations for the new TSF targeting accessible locations around the operations maximizing topography and storage capacity. One option to be considered is the raising of the existing TSF.
- Based on the conceptual multi-criteria decision analysis, and following review from Tasmines relevant team, recommend a preferred site option.

1.4 Methodology adopted

The adopted approach for the development of the study is as follows:

- Review of relevant information related to tailings storage requirements, geological/geotechnical aspects, design reports, etc.
- Develop basis of design.
- Concept design, engineering and environmental assessment on each location.
- Comparative capital construction costing in the +/- 50% accuracy range.
- Carry out a MCA using a grading assessment criteria based on relevant aspects of tailings management from construction to closure, risk assessment, capital costs, among others.
- A forward work plan outlining the tasks and milestones that are required to be met prior to the commissioning of the new TSF.

1.5 Assumptions

The following assumptions have been used in the development of this report:

- Material for embankment construction will be won from the dam footprint, mine waste, or eventually from borrow pits (including coarse and fine-grained materials). This will be confirmed in the preliminary design stage following site geotechnical investigations.
- This is a high level cost estimate for comparative purposes only and therefore is a +/- 50% confidence with the total construction cost.

1.6 Limitations

This report: has been prepared by GHD for Tasmania Mines Limited and may only be used and relied on by Tasmania Mines Limited for the purpose agreed between GHD and the Tasmania Mines Limited as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Tasmania Mines Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (section 1.5). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Tasmania Mines Limited and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has prepared the preliminary cost estimate set out in section 5 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD

The Cost Estimate has been prepared for the purpose of comparative costing of the conceptual site options study and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the works/project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.
.

2. Basis of Design

2.1 Design study basis

The basis of design has been collated from a number of sources, including the Tasmines input, Kara TSF Pre-Construction report Raise Design, GHD site and industry experience. In addition, the design standards and technical references for the concept options study are as follows:

- Australian National Committee on Large Dams (ANCOLD) Guidelines on Tailings Dams (2019) and related ANCOLD guidelines.
- Relevant ICOLD Guidelines.

Whilst the majority of the parameters and design basis remain consistent throughout the TSF life, it is important to note that some will vary over time and should be checked and verified at each stage of the design, construction and operation. In some cases, various values for the same parameter has been sourced and included as an example. In each case, the most recent and updated source should be relied upon for current and future designs. A summary of the basis of design for the TSF is presented in .

Table 2-1.

Table 2-1 Basis of Design Table

Design Aspect	Design Basis	Design Source
Storage Capacity		
Facility Duration	10 years [2028 – 2038]	Tasmania Mines Limited
Annual Tailings Production Rate	400,000 tonnes/annum	Tasmania Mines Limited
Long-term Tailings Stored Dry Density	1.2-1.4 t/m^3	Previous design work experience
Rate of Rise	Nominally 2 m raise/annum	Industry Experience for upstream raising
Consequence Category (ANCOLD)	Significant	GHD reviewed
Embankment Arrangement		
Upstream Face	2:1 (H:V)	GHD Proposed
Downstream Face	3:1 (H:V)	GHD Proposed
Crest Width	Tasmania Mines Limited has confirmed minimum 4 m. crest width including safety bunds for single or dual lane arrangement for mining vehicles.	Tasmania Mines Limited to confirm
Construction Material	The embankment will be constructed using excavated material from the footprint of the new TSF and existing waste rock at the site.	Tasmania Mines Limited to confirm

Construction Fleet	The starter embankment will be initially constructed utilising a civil construction fleet with following raises via the mining fleet. It is envisaged the upstream clay would be placed by 40t Moxys.	Tasmania Mines Limited to confirm
Mining Fleet	Tasmania Mines Limited has confirmed mining fleet: 40-45t articulated dump trucks	Tasmania Mines Limited to confirm
Future Raise Arrangement	The embankment will be designed such that both upstream or centreline/downstream raise arrangements can be utilised during future raises.	As discussed with Tasmania Mines Limited
Hydrology		
Spillway	An emergency spillway will be provided to protect the TSF from overtopping and safely convey extreme floods up to at least the 1,000 year flood during operation and Probable Maximum Flood (PMF) on closure in accordance with ANCOLD (2019) requirements.	GHD Proposed
Residue Information and Infrastructure		
Residue Classification	Non-Acid Forming (NAF), pumped as a slurry at 5 % solids	Kara TSF Pre-Con report
Beach Angle	1V:100H	Kara TSF Pre-Con report
Deposition Infrastructure	Deposited from spigots on the perimeter pipe	Based on Existing TSF Design
Deposition Methodology	Sub-aerial tailings deposition	Based on Existing TSF Design
Water Recovery Infrastructure	Central Decant Tower or pumped arrangement. Decant pond kept as low as possible with water return to TSF 1.	Based on Existing TSF Design

Additional Tasmines comments to the BoD:

- Preference for local borrow pit – increased placement rate 2-3000 m^3/day.
- 5 month annual construction window during drier months.
- Allow time for test pits/drilling to confirm bedrock suitability.
- Timber clear burn period limited (1/year).
- Seepage reclaim to decant pond. Assume powered pump.
- Decant to be pumped to existing water dam.
- Not constrained by existing roads or lease boundaries.

3. TSF site options

3.1 Overview

The locations of TSFs are generally constrained by existing or planned infrastructure, exploration, mine lease boundaries, or areas already reserved for aspects of the mine operation. Other aspects such as TSF proximity to mine pits, location and depth of ore bodies, distance to production plants, the existence of protected natural areas or water bodies, can also constrain the delimitation of sites. Regarding this, GHD and Tasmania Mines have previously identified four site options, where: Option 1, 2, 3 will be new TSF locations around the existing operation; and Option 4 is to raise the existing Kara TSF.

For Option 1, 2 and 3, land acquisition and an increase in the mining lease, as well as a new EPA permit, is required. In addition, a new pipeline route for tailings delivery / water return, and a haul route from borrows would be required.

The sites under review are shown in Figure 3-1 and are briefly described in this section of the report.

3.2 Option 1

Option 1 is located in a V-shaped valley to the east the Kara open pit. To the west, the site option encounters the pit outline where several rock ramps and benches exist. Access to this point is guaranteed from internal roads that connect the pit with the polishing pond and the existing TSF. The site is suspected to be located over the ore body which may limit future mine expansion or further exploration.

The abrupt change in topography at the location can be advantageous as the sides of the valley provide lateral confinement to tailings. In addition, a single main embankment (eventually one or more saddle dam can be required) may store the targeted tailings volume optimizing storage capacity and minimising footprint.

3.3 Option 2

This option is located north of the existing TSF in a relatively flat terrain and moderate distance to the mill and pit. It connects to the north with the Chalk Road (a secondary road of the Upper Natone Rd, C102) and to the east with the Kara Rd. It has ample room for construction and the site can be incorporated into current mine operations due to proximity to the existing TSF. The flat topography would mean a relatively easy constructability, and disposal of tailings best suited to a perimeter containment wall (similar to a turkey nest style TSF) with a centrally or upstream located decant facility and spillway to the southwestern side. Under this configuration, additional benefits are expected during closure, e.g. landform integration with the existing TSF during operations (shared common wall) and for closure.

For the purpose of this option study, the new TSF will be considered as an independent single facility. However, the southern saddle dam may be integrated to the existing TSF north wall reducing operational complexity. In addition, Tasmines may also consider the disposal to a series of internal cells with disposal cycled between the paddocks to facilitate consolidation and drying. The centreline methodology is considered as plausible construction method for this option.

3.4 Option 3

This option is situated against Highwood Hill to the east of the existing TSF over the Wollastonite Creek, in the proximity of the Kara Road. The option takes the advantage the

existing topography and terrain slope requiring less materials for the construction of the embankment in comparison to flat terrain. It is the farthest option from the mill and process plant and may possess challenges when integrated to existing mine operation layout.

Due to similarities to Option 2, a perimeter containment dam is proposed. Due to topography, the volume of the embankment will increase to the north-east of the TSF.

3.5 Option 4

This option corresponds to a raise of the existing Kara TSF, beyond the current ultimate design height. During Stage 1 the dam was raised to RL558m between 2018 and 2019. The Stage 2, currently under detailed design by GHD, may raise the wall to RL562m. However, if capacity is exhausted during Stage 2, the TSF is approved to RL569 m. Thus, Option 4 is to further raise the TSF following an upstream or centreline sequence. This option may result in minor changes to mine layout, limited changes to the environmental approvals and reduced incremental operational complexity. However, as the height of the embankment increases risk management strategies must be clearly defined and implemented.

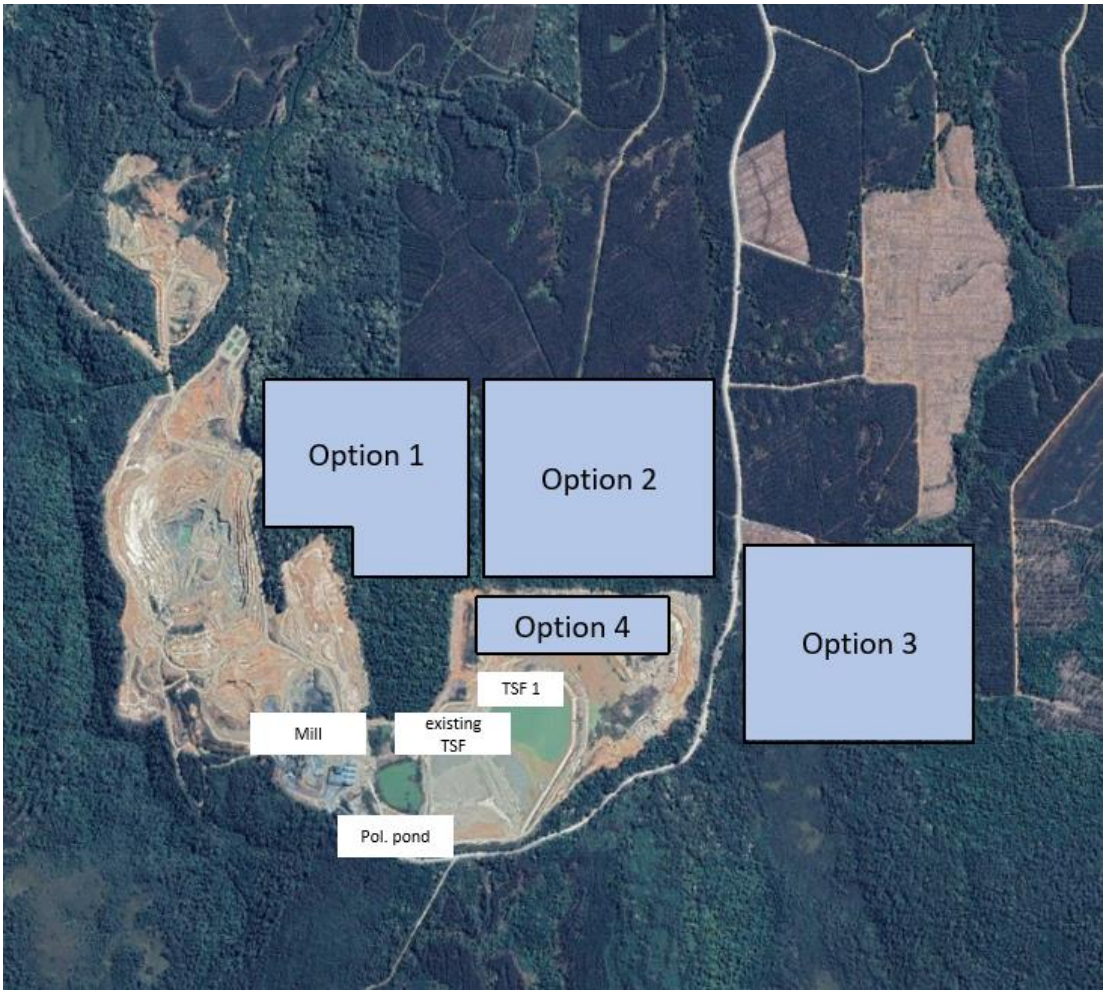


Figure 3-1 Proposed Locations

4. Engineering assessment

4.1 Construction methodology and rise rate constraints

The centreline construction methodology has been considered for Options 2, 3 and 4 except for Option 1 that was analysed under centreline and the downstream method due to it being a higher embankment should addition stability be required.

The upstream construction method has been disregarded at this stage due to uncertainties on the characteristics of tailings and borrow materials and the inherent risk of dam failure under this method, e.g. high rate of rise of the embankment can be subject contractive tailings resulting in potential for liquefaction phenomena, and or increasing shear stress demands on the containment structures. The same phenomena can be triggered in the centreline method if raises are not provided with adequate underlying soil bearing capacity. This must be considered in conceptual and detailing engineering design.

The Centreline construction method consists of raising the embankment vertically, by adding material to both the upstream and downstream shells, maintaining the original centreline of the starter dam. This method relies predominantly on the strength of the downstream foundation and in the control of hydraulic gradients upstream for stability. Generally, it requires increased fill material in comparison to dams constructed upstream. Typically the advantages of centreline raise construction are as follows:

- Reduced height requirements for the same starter embankment footprint (compared to upstream);
- Improved stability due to reliance on suitable downstream foundation;
- Reduced risk of failure by tailings liquefaction;
- Improved ability to utilise mining equipment for the construction of the downstream shell;
- Reduced risk if excess water storage occurs compared to upstream construction; and
- Less reliability on the tailings beach strength.

On the other hand, the downstream construction method, although more stable than centreline, may be disadvantageous requiring progressively more containment wall earthworks which increases construction time, costs and land use.

The raise heights for all the construction methods considered herein have been limited to 2 m per annum for optimal material placement and consolidation during operation.

4.2 Facility sizing requirements

The facility sizing requirements have been estimated based on the following assumptions:

- The TSF is required to store approximately 4 Mt of tailings at a production rate of 0.4 Mtpa, i.e. 10 total years storage. This equates to approximately 3.0 Mm^3 of stored tailings at an assumed settled density of 1.3 t/m^3; and
- Post starter dam the subsequent raises could be constructed in annual 2 m lifts.

The facility sizing requirements summarising the potential storage volume and the ultimate raise heights for each option are presented in Table 4-1. Proposed layouts of TSFs options can be reviewed in Appendix A.

Table 4-1 Facility sizing requirement summary

Option	Raise Method	TSF Surface Area (m^2)	TSF maximum height (m)[1]	Ultimate Crest (RL m)[3]
1	Centreline	242,418	73	536.0
	Downstream	242,418	74	537.0
2	Centreline	523,297	29.5	558.5
3	Centreline	463,521	23.5	558.5
4	Centreline	651,189	30.5	576.5

Note

1. Estimated based on the lowest foundation levels corresponding to each option and cross sections as defined in Appendix A.
2. As the foundation level varies for any given option, average foundation levels have been used to estimate the storage capacities for each option.
3. The ultimate crest height includes additional 0.5 m depth of storage to satisfy freeboard requirements (assumption).

4.3 Embankment construction volumes and materials

The embankment volumes were estimated for each option as summarised in Table 4-2. For Option 1, volumes for both the centreline and downstream methodology are presented. Embankment cross sections have not been conceptually designed (type of materials, geometry, etc.), with only the external geometry assumed based on engineering judgement, as such the volumes presented in the table are only indicative and should only be used for the purpose of comparison.

Table 4-2 RSF fill material volume comparison

Analysed options	Raise Method	Fill Volume (Mm^3)
Option 1	Centreline	0.85
	Downstream	1.08
Option 2	Centreline	0.92
Option 3	Centreline	0.27
Option 4	Centreline	1.03

In terms of materials for construction, the main embankments can be constructed using earth compacted materials, rockfill or classified tailings (i.e. the coarse fraction of the full stream tailings is classified and used to construct the dam). In the latter, a series of studies must be considered prior to conceptual evaluation, e.g. capacity of cyclones, soil fabric, etc.). In this report, it is assumed that earth fill will be the preferred material.

The source of the construction material is to be confirmed in later design stages following geotechnical investigations. It is envisaged that a portion of the construction material will be sourced from the TSF footprint using cut and fill to optimise the use of available material.

4.4 Hydrological considerations

4.4.1 Climate

The Kara open pit mine is located on the North West Coast Region of Tasmania and falls in a cool temperature climate zone with maximum and minimum temperatures in the range 3 to 19 °C. The mean annual rainfall in the area, according to the Bureau of Meteorology (Station Number 91040), shows a mean rainfall of 1510 mm/year with peak values of greater than 200 mm/month in the period June-August. Prevailing winds from the south west (30% of the time on annual average), followed by the north east (just below 20% of the time on an annual average)

4.4.2 Surface hydrology

Surface water drainages surrounding the mine site typically flows to the northeast of the mine site. The mine area is located near the Old Park River (13.1 km in length), a tributary of the Emu River located northwest of the mine site. The Emu River discharges into Bass Strait at Burnie (Emu Bay) after descending from St. Valentines Peak at an elevation of approximately 1100 m AHD. Several small tributaries run through the site linking to these rivers. Finally, the sites are not prone to flooding or landslip.

4.4.3 Catchment area

The Project area has a topography of low hills and valleys with high precipitation over the year. Only Options 1 and 3 would have a catchment area. For all the options, it is proposed to construct the TSF with requirement of spillway. According to TSFs as projected in Appendix A, the spillway configuration for operation and closure should consider:

- For Option 1 the spillway channel would be constructed through natural ground on the right abutment of the main dam. The channel is required to bypass the mine pit and operation facilities, discharging to the north into the Emu River. In addition, diversion drains, cut around the storage to divert external catchment runoff from entering the TSF, can be considered for this option. This will be defined during conceptual design.
- For Option 2, 3 and 4 the spillway channel would be constructed through natural ground and flow into natural drainage channel outside the operation area. Water storage dams may be considered for these options.

The design of the spillway needs to consider the Environmental Spill Consequence Category in accordance with ANCOLD (2019) in order to evaluate the effect of spilling of water from the dam during a flood event or extreme wet weather period.

4.5 Geotechnical and geological considerations

4.5.1 Area Geology

Available Minerals Resource Tasmania (MRT) geological mapping shows the current Kara TSF embankment footprint within a geological unit described as a “Shallow marine limestone sequence with minor siltstone and sandstone (Gordon Group)”. The mapping indicates Tertiary basalt extending across the north east of the TSF. No faults or other structures are shown in the area.

4.5.2 Geotechnical

A number of geotechnical investigations have been undertaken in the vicinity of the TSF. Investigations such as those conducted by Geoton Pty. Ltd. in 2010, found that the materials from within the TSF area (in depths ranging from surface to 4 m sourced from test pits) classified according to USCS as silty sand to sandy clay with predominantly non plastic fines. In

addition, investigations by GHD in 2014 and 2019, focused on tailings and embankment characterization. The results of a series of CPTu test conducted at the TSF indicate that sand-like and clay-like tailings (under a Soil Behaviour Type approach) are susceptible to cyclic liquefaction and cyclic softening, respectively, showing a predominant contractive behaviour. GHD also reported that static liquefaction is a plausible mechanism for the TSF, and thus, a critical state approach and a post-liquefaction scenario should be considered during design. This is relevant if Tasmines decide to adopt the upstream construction methodology.

In addition to the investigations listed above, samples were collected from the tailings beach in 2020 to assess the particle size distribution of the tailings. Results show that full stream tailings are predominantly sandy materials with clay contents greater than 10%.

4.5.3 Hydrogeology

Four differing potential aquifer systems may exist around the Project area, namely Tertiary Basalt, Devonian Granite, Moina Sandstone and Gordon Group Limestone. Permeability of these units is controlled by secondary porosity (i.e. faults, joints, fractures). These aquifers are expected to be low productive aquifers, although they correspond to the principle groundwater supply in the area.

4.6 Environmental review

A brief review of environmental issues has been undertaken at the potential TSF site locations. Department of Agriculture, Water and Environment Protected Matters Search Tool, have been used to determine whether matters of national environment significance or other matters protected by Environment Protection and Biodiversity Conservation Act 1990 are likely to occur in the Kara area. The reviewed information has been summarised in Table 4-3.

Table 4-3 Environmental review summary

Components reviewed	Likely Presence
World Heritage Properties	None
National Heritage Properties	None
Protected Areas	None
Ramsar or Nationally Important Wetlands	None
Regional Forest Agreements	Lies within a forestry reserve marked area.

Other relevant environmental aspects to be considered are:

- There are no known listed Aboriginal heritage sites in the immediate area of site according to a preliminary search in the Aboriginal Heritage Register database of the Tasmania Government. This needs to be supported by a field survey during the detailed design stage for the preferred option.

It must be noted that the information is indicative only, based on the available information and limited investigation, all options have been considered to have relatively similar environmental risk at this stage.

4.7 Lease extent and land ownership constraints

Based on GHD's understanding of the site and discussions with Tasmines all the options are outside of the mining lease and will require land acquisition and extension of the current mining lease.

4.8 Potential for expansion

Options 2 and 3 have potential for further expansion either dam height or footprint. Options 1 and 4 have significantly less expansion capability to that of Option 2 and 3 given their proximity to the existing open pit, infrastructure, topography, land availability and access for haulage of materials.

5. Comparative Cost Estimation

A concept level bill of quantities (+/-50%) has been prepared for the purpose of the comparing the four options in terms of construction fill volumes only. The volumes have been estimated by determining the height of the embankment at regular intervals and the average cross sectional area. Tasmines provided construction materials costs / rates which are expected to form the majority of the capex cost estimate.

The volumes and breakdown per option are shown in Table 5-1.

Table 5-1 Quantities

Analysed options	Raise Method	Fill Volume (Mm^3)	Embankment Capex Costs[1] (M$ exc GST)
Option 1	Centreline	0.85	6.81
	Downstream	1.08	8.68
Option 2	Centreline	0.92	7.37
Option 3	Centreline	0.21	1.74
Option 4	Centreline	1.03	8.23

1. At a unit direct cost $8/m^3$ for sourcing material, transportation, fill and compaction.

6. Comparison assessment

Based on the information provided a comparison summary of options is presented in Table 6-1.

Table 6-1 Engineering assessment comparison

Criteria	Option 1	Option 2	Option 3	Option 4
Facility Height*	73-74 m (crest RL536 m).	29.5 m crest to RL558.5 m	23.5 m Crest to RL558.5 m	30.5 m crest to RL576.5 m Kara Stage 2 to RL564 m
Proximity to Plant / Operations	Closest location to process plant. At a lowest RL to Mill. . Difficult access for haul route.	Moderate distance away from the Mill and process plant. At a lower RL than Mill. Easy access for haul route.	Farthest location although moderate distance to process plant. At a lower RL than Mill. Similar pump head to Option 2. Easy access for haul route.	Closest location to the Mill. Similar pumping strategy of the existing TSF. Easy access for haul route.
Lease extent and potential for Expansion	Limited potential for expansion (option to raise higher) due to complex topography and potential future mining exploration.	Good potential for expansion, increasing footprint to the north or east. Another alternative is to go higher on projected footprint.	Similar to Option 2, there is a potential expansion to northeast boundary at lower RL.	Very limited potential for expansion.
Construction Methodology and Raise Rate Constraints	A high starter dam should be considered at the deepest section of the valley. Harder to construct due to difficult access. Due to large height of the dam (+50 m), downstream methodology should be considered. This reduces rate of rise constraints.	Ample area for construction under centreline method. Possibilities to build a single or twin cell. Possibilities for TSF integrated to the existing TSF north wall. More cut/fill would be required when compared to Option 3.	Similar to Option 2. Ample area to build the dams. Relatively flat foundation area. Easy access for construction. Integration to existing TSF challenging or not viable. Site takes advantage of natural ground slope to increase capacity.	Increased dam height (+30 m) and rate of rise increases static liquefaction risk. Uncertainties on properties and state of underlaying materials. Potential need for a buttress.

Criteria	Option 1	Option 2	Option 3	Option 4
		Centreline suggested but possibilities for upstream. Rate constrains.		
Embankment construction volumes	0.85 Mm^3 centreline 1.08 Mm^3 Downstream	0.92 Mm^3 centreline	0.27 Mm^3 centreline	1.03 Mm^3 centreline
Hydrological (Flood Risk) Constraints	Requirement for operational spillway. Small external catchment area contributing to the storage. Seepage and infiltration towards open pit. This option requires increased drainage capacity in the embankments. Limited risk of floods. Decant pond should be located far from embankment.	Requirement for operational spillway. No external catchment area contributing to the storage. Low risk of floods. Low seepage gradients. Decant pond should be located in the centre of the TSF.	Requirement for operational spillway. Small external catchment area contributing to the storage. This site is more vulnerable to floods than Option 2, as the surface runoff from both the southern catchments would likely flow towards the proposed site. Decant pond should be located near southern TSF boundary.	Requirement for operational spillway. No external catchment area contributing to the storage. Low risk of floods. High potential seepage gradients. Need for a thorough drainage system (in existing TSF). Control on tailings consolidation and decant water needed. Decant pond should be located in the centre of the TSF.
Geotechnical considerations and	Adequate understanding of site geology. Further geotechnical investigation required to characterize foundation soil and borrow materials.	Similar to Option 1.	Similar to Option 1.	Similar to Option 1. Option 4 will require additional testing of the tailings stored within the TSF to confirm embankment geometry and stability. Additional buttressing may be required for post liquefaction cases.

Criteria	Option 1	Option 2	Option 3	Option 4
Associated Infrastructure and interferences.	New pipeline route for tailings required. Potential interferences with open pit.	If dam integrated to the existing TSF north wall, only an extension to existing tailings/water pipework would be required. Realignment of the Kara Road and inner roads.	Furthest location from the process plant. New pipeline route for tailings required. Realignment of the Kara Road or construction of underpass required.	Only an extension to existing tailings/water pipework would be required.
Health Safety and Environment*	High wall height but pit located immediately downstream. Emu River located at short distance. Expected significant Impact on the dam owner's business in the event of failure.	Liquefaction risk. Chalk Road. located downstream.	Similar height than Option 2. Liquefaction risk. Kara Road. located downstream.	High wall height. Expected significant Impact on the dam owner's business in the event of failure. Consequence category should be similar to existing TSF, i.e. Significant.

Note

* Based on the available information and limited investigations, all options have been considered to have relatively similar environmental risk and similar Population at Risk (PAR) at this stage.

7. Multi Criteria Analysis

Based on the information developed as part of the engineering and environmental assessment, a multi-criteria assessment has been undertaken to define a preferred location for TSF from a short-list of four options. The assessment criteria and weighting used in the assessment is as shown in Table 7-1.

Table 7-1 Assessment criteria

No.	Criteria	Description	Weighting %
1	Construction Complexity	• Facility height / sizing; • Ease of future expansion; and • Constructability;	30%
2	CAPEX	• Footprint size; • Embankment height; and • Costs	30%
3	Technical Risk	• Geotechnical and geological considerations • Construction and operation risks; • Dam safety risks; and • Water management.	20%
4	Health Safety and Environment	• Environmental impact; and • Closure and rehabilitation	20%

A weighted multi-criterion assessment was prepared to compare the advantages and disadvantages of the options, as described in Section 6, GHD has allocated preliminary scores and rankings to each criterion (noted above in Table 7-1) to reflect the relative sensitivity, likelihood or importance. Therefore, this scoring and ranking is subjective buts gives an indication of the most likely best option considering the various interests involved.

A low score or low ranking indicates a more favourable option. The preferred option is Option 3, followed by 2, 1 (either downstream or centreline) and 4. Mainly due to low volumes of fill materials, costs and low technical risks, when compared to the other options. This option is closely followed by Option 2, however, it presents significant larger costs in comparison to preferred option. Option 1 shows similarities between downstream and centreline methodology, with negligible differences in weighted score. The less advisable alternative is Option 4 mainly due to technical risk. The results of the multi-criterion assessment have been tabulated in Table 7-2 and Figure 7-1. Between brackets is shown the MCA for Option 1 under downstream methodology.

Table 7-2 Multi-criteria assessment matrix[1]

TSF Option	Construction Complexity	CAPEX	Technical Risk	HSE	Total weighted score	Ranking
1[2]	0.3	0.2	0.3	0.3	1.1	3
2	0.1	0.3	0.1	0.2	0.7	2
3	0.2	0.1	0.2	0.1	0.6	1

4	0.4	0.4	0.4	0.4	1.6	4

Note

1. Rankings and scores tabulated above are subject to change following Tasmania Mines review.
2. The option 1 considered centreline method. No changes in ranking under downstream.

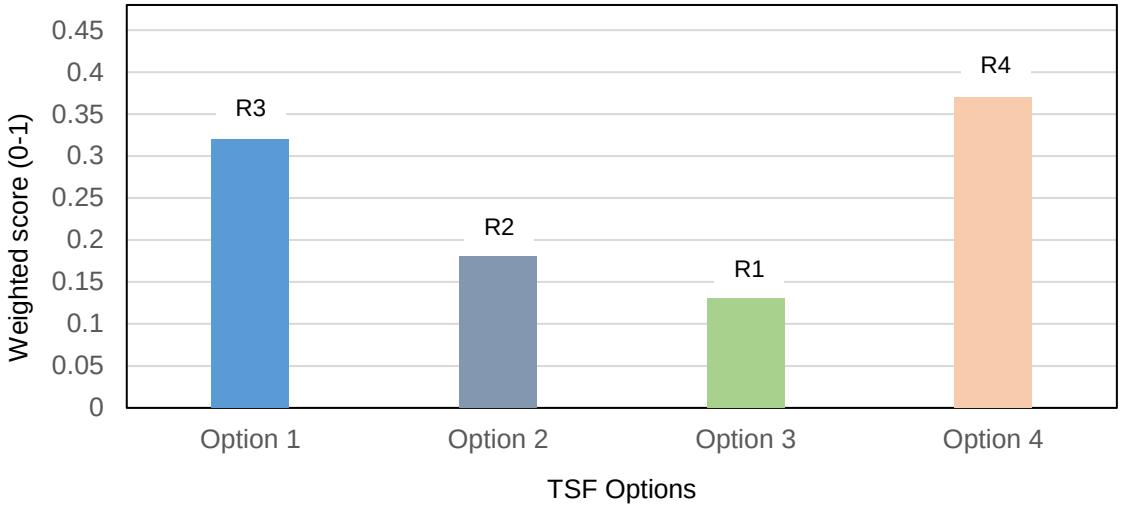


Figure 7-1 Multi criteria assessment summary

8. Conclusion and Recommendations

This report details the finding of the site options assessment for potential sites including the engineering and environmental assessment and multi-criteria assessment (MCA).

Based on this comparative assessment and preliminary MCA, GHD found Option 3 (three) to ranked first followed by 2 (two), 1 (one) and 4 (four). Option 3 takes the advantage the existing topography and terrain slope requiring less materials for the construction of the embankment in comparison to other options with lower technical risks.

The rankings and scoring are subjective and require input and confirmation by Tasmines, to mutually agree on the recommended option.

Following input from Tasmines on the preferred option, GHD will develop a forward work plan for Tasmines consideration for subsequent project stages.

Appendix A – Concept Drawings

N

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. BASE SURVEY COMBINATION OF PUBLICALLY AVAILABLE LIDAR AND SURVEY OF SITE PROVIDED BY CLIENT ON 5/8/2020.

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

TASMANIA MINES LIMITED
KARA NEW TSF CONCEPT STUDY

OPTION 1, 2 & 3 PLAN

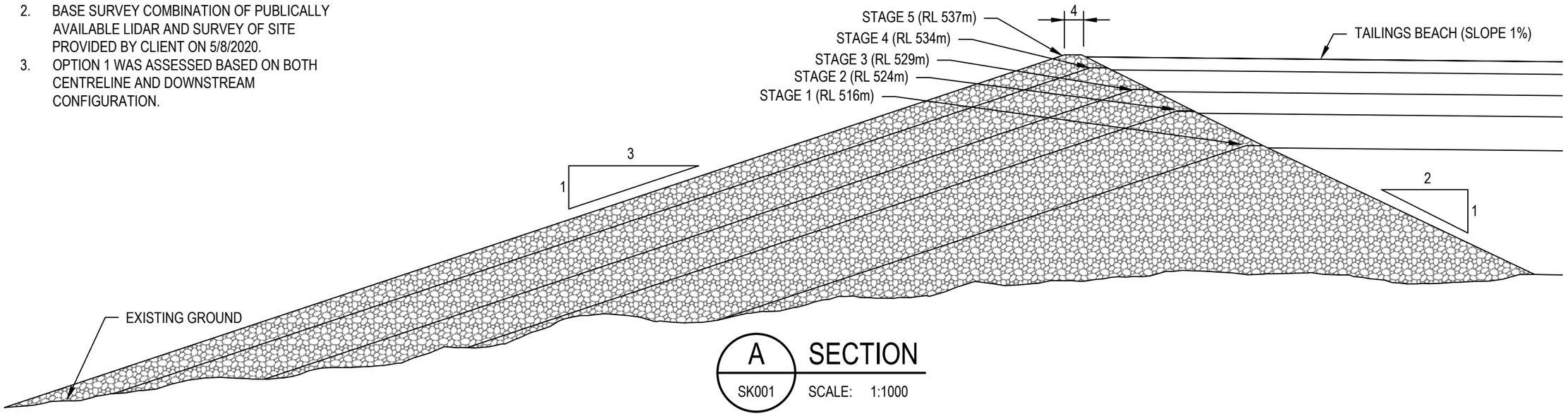
scale	AS SHOWN for A3	job no.	12534440
date	NOVEMBER 2020	rev no.	A

approved (PD) SK001

Plot Date: 25 November 2020 - 6:57 PM Plotted by: Wesley Herweynen Cad File No: G:\32\12534440\CADD\Drawings\12534440-SK001.dwg

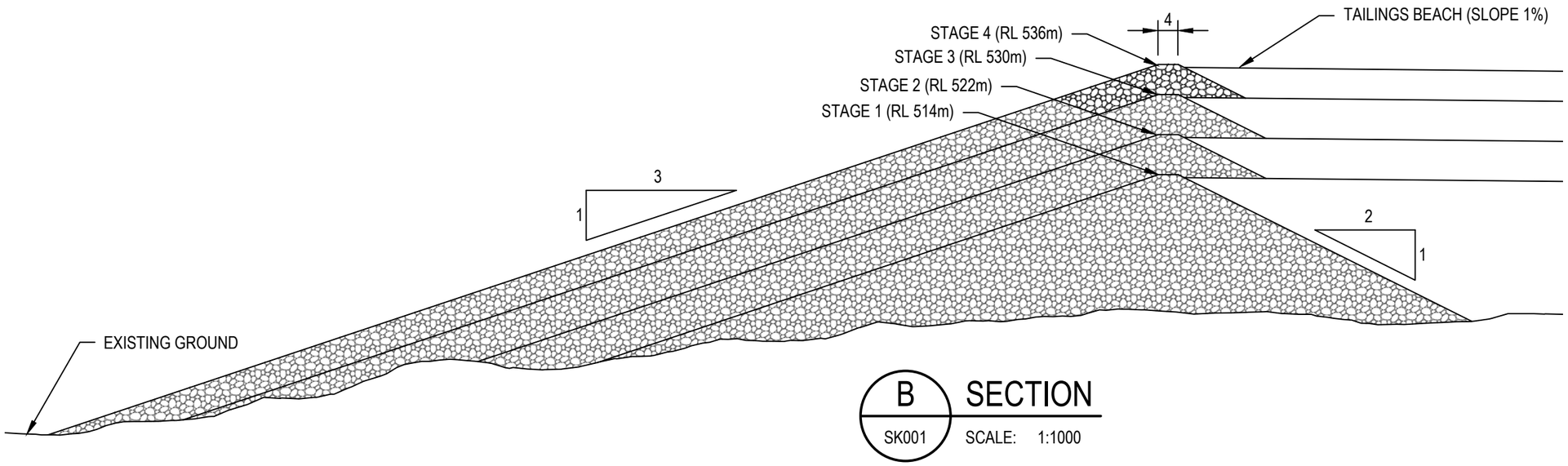
NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. BASE SURVEY COMBINATION OF PUBLICALLY AVAILABLE LIDAR AND SURVEY OF SITE PROVIDED BY CLIENT ON 5/8/2020.
3. OPTION 1 WAS ASSESSED BASED ON BOTH CENTRELINE AND DOWNSTREAM CONFIGURATION.



A SECTION

SK001 SCALE: 1:1000



B SECTION

SK001 SCALE: 1:1000

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

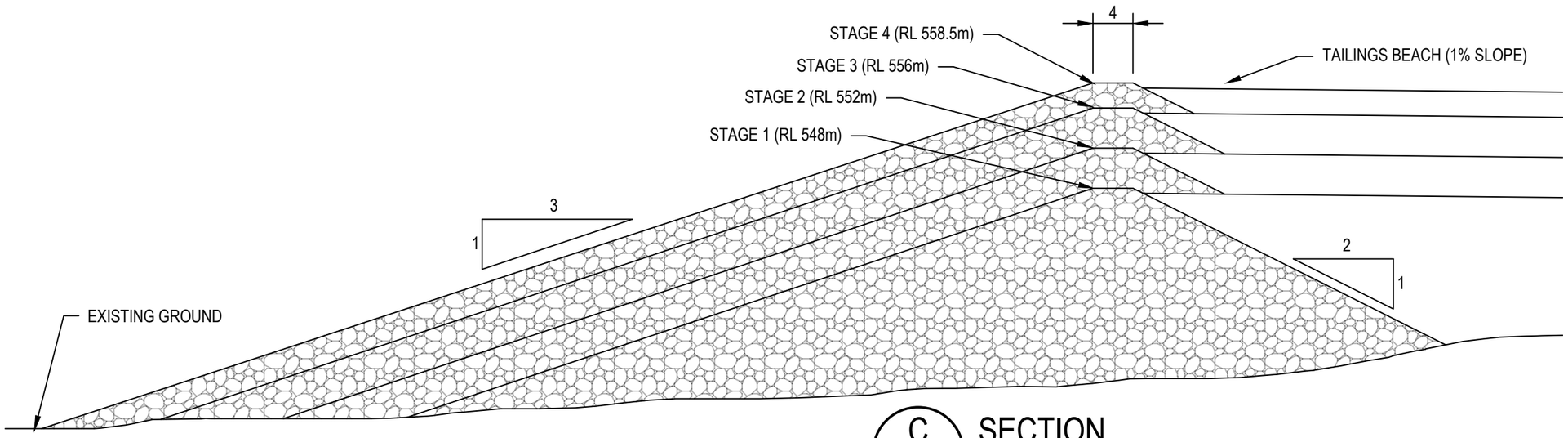
TASMANIA MINES LIMITED
KARA NEW TSF CONCEPT STUDY
OPTION 1
CROSS SECTION

scale AS SHOWN for A3 job no. 12534440
date NOVEMBER 2020 rev no. A

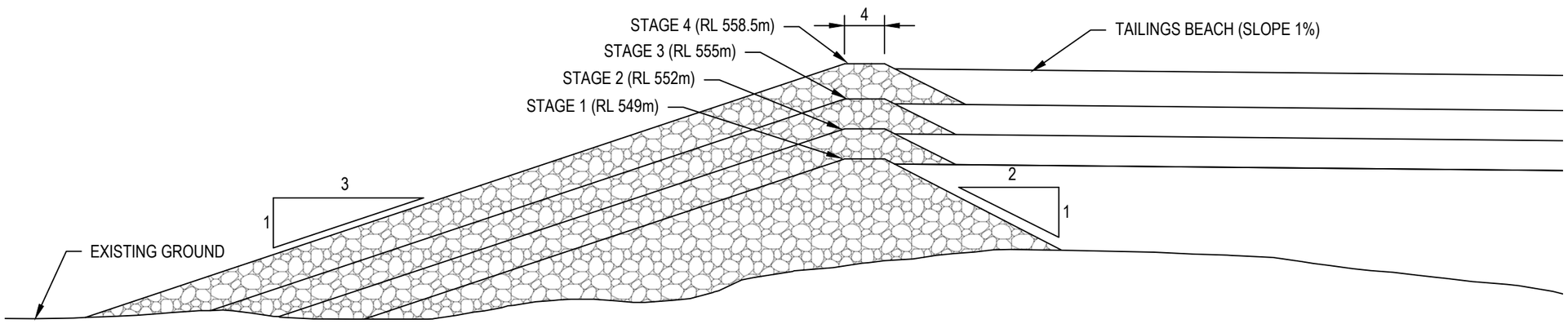
approved (PD) SK002

Plot Date: 25 November 2020 - 6:59 PM Plotted by: Wesley Herweynen Cad File No: G:\32\12534440\CADD\Drawings\12534440-SK002.dwg

NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. BASE SURVEY COMBINATION OF PUBLICALLY AVAILABLE LIDAR AND SURVEY OF SITE PROVIDED BY CLIENT ON 5/8/2020.



C SECTION
SK001 SCALE: 1:500



D SECTION
SK001 SCALE: 1:500

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

Tasmania Mines Limited
KARA NEW TSF CONCEPT STUDY
OPTIONS 2 & 3 CROSS SECTION

GHD

scale AS SHOWN for A3 job no. 12534440
date NOVEMBER 2020 rev no. A

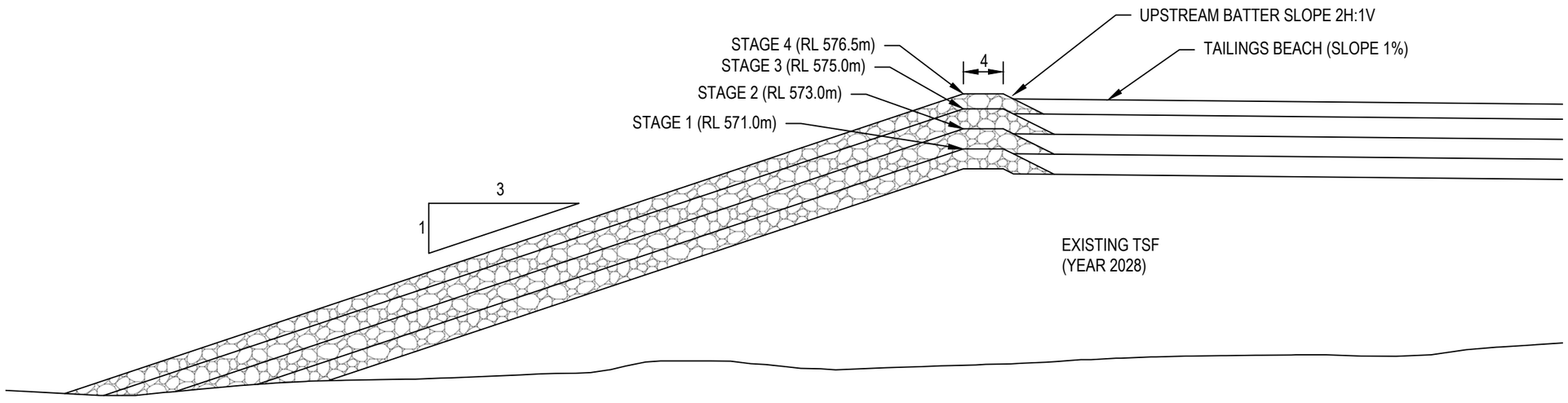
approved (PD) SK003

Plot Date: 25 November 2020 - 7:01 PM Plotted by: Wesley Herweynen Cad File No: G:\32\12534440\CADD\Drawings\12534440-SK003.dwg

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. BASE SURVEY COMBINATION OF PUBLICALLY AVAILABLE LIDAR AND SURVEY OF SITE PROVIDED BY CLIENT ON 5/8/2020.

OPTION 4 - PLAN



E SECTION

\- SCALE 1 : 500

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

TASMANIA MINES LIMITED
KARA NEW TSF CONCEPT STUDY
OPTION 4
PLAN AND CROSS SECTION

scale AS SHOWN for A3 job no. 12534440
date NOVEMBER 2020 rev no. A

approved (PD) SK004

Plot Date: 25 November 2020 - 7:04 PM Plotted by: Wesley Herweynen Cad File No: G:\32\12534440\CADD\Drawings\12534440-SK004.dwg

GHD

2 Salamanca Square
T: 61 3 6210 0600 F: 61 3 8732 7046 E: hbamail@ghd.com

24DJSZNHUEPC-1850682920-13/Document1

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	G.Suzao	C.Cahill		R,Longey		1/12/2020

www.ghd.com

Attachment 2 Flora and fauna assessment

TSF 2 & 3

Flora and Fauna Survey

February 2022

ABN: 92619520417
22 Malonga Drive
Shorewell Park TAS 7320
Ph: 0419253908

Document Control

Prepared & Published by:	FINN Environmental
Version:	Final
Contact:	Hamish Howe
Phone No:	0419 253 908
Prepared For:	Tasmania Mines Pty Ltd

Version	Prepared by	Company	Date
DRAFT 1	Hamish Howe	FINN	18/11/2021
FINAL	Hamish Howe	FINN	28/02/2022

Contents

List of Figures

List of Tables

List of Appendices

Appendix 1: BVD and NVA Reports

1 Summary of Flora and Fauna Assessment

This report provides the desktop and field flora and fauna assessment for the proposed tailings storage facility; options 2 and 3 (TSF2 and TSF3) as per the *Kara New TSF Concept Study; Final Report 2020*. This is located within the mining lease application 2109P/M held by Tasmania Mines Pty Ltd (Tas Mines). Tas Mines have plans to undertake preliminary investigation program within the TSF2 area in 2022. Both a desktop assessment and field assessment were undertaken within the footprint of the proposed investigation area (Figure 1), focusing on threatened species and communities within the TSF2 and TSF3 investigation area and the potential impacts from the proposal on those species and communities.

The study area for TSF 2 comprises approximately 58ha of hardwood plantation and *Nothofagus* forest. The study area for TSF 3 contains approximately 70ha of hardwood plantation, *Nothofagus* forest, wet Eucalypt forest and *Leptospermum*/Button Grass plain.

There are a number of small creeks and drainage lines throughout the study areas. The TSF 2 creeks are associated with an unnamed, north flowing tributary to the Emu River, while the TSF 3 creeks are primarily Wollastone Creek and its small tributaries. Wollastone Creek eventually flows into the Emu River.

There were no records of threatened species or communities found within the study area as listed under the *Tasmanian Threatened Species Conservation Act 1995* and/or the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999.*

2 Introduction

2.1 Background

FINN Environmental was commissioned by Tas Mines to undertake a flora and fauna survey of the area to be disturbed as part of the TSF2 and TSF3 preliminary site investigations. The aim of this report is to document the communities and species found in the TSF2 and TSF3 exploration footprint and the potential impacts of vegetation clearing as a part of the development.

2.2 TSF2 and TSF3 Study Area

Located within the Tasmanian Northern Slopes bioregion, TSF2 and TSF3 are approximately 30km south of Burnie and 5km south of Hampshire. As shown in Figure 2, the TSF2 and TSF 3 areas are bordered by hardwood plantation in the north and east and native forest and Kara Mine in the south and west. There are a number of small creeks and drainage lines throughout the study areas. The TSF 2 creeks are associated with an unnamed, north flowing tributary to the Emu River, while the TSF 3 creeks are primarily Wollastone Creek and its small tributaries. Wollastone Creek eventually flows into the Emu River. The underlying geology is shown in Figure 3.

Figure 1. Topographic image of TSF2 and TSF3 study area (inset) within general location in Tasmania.

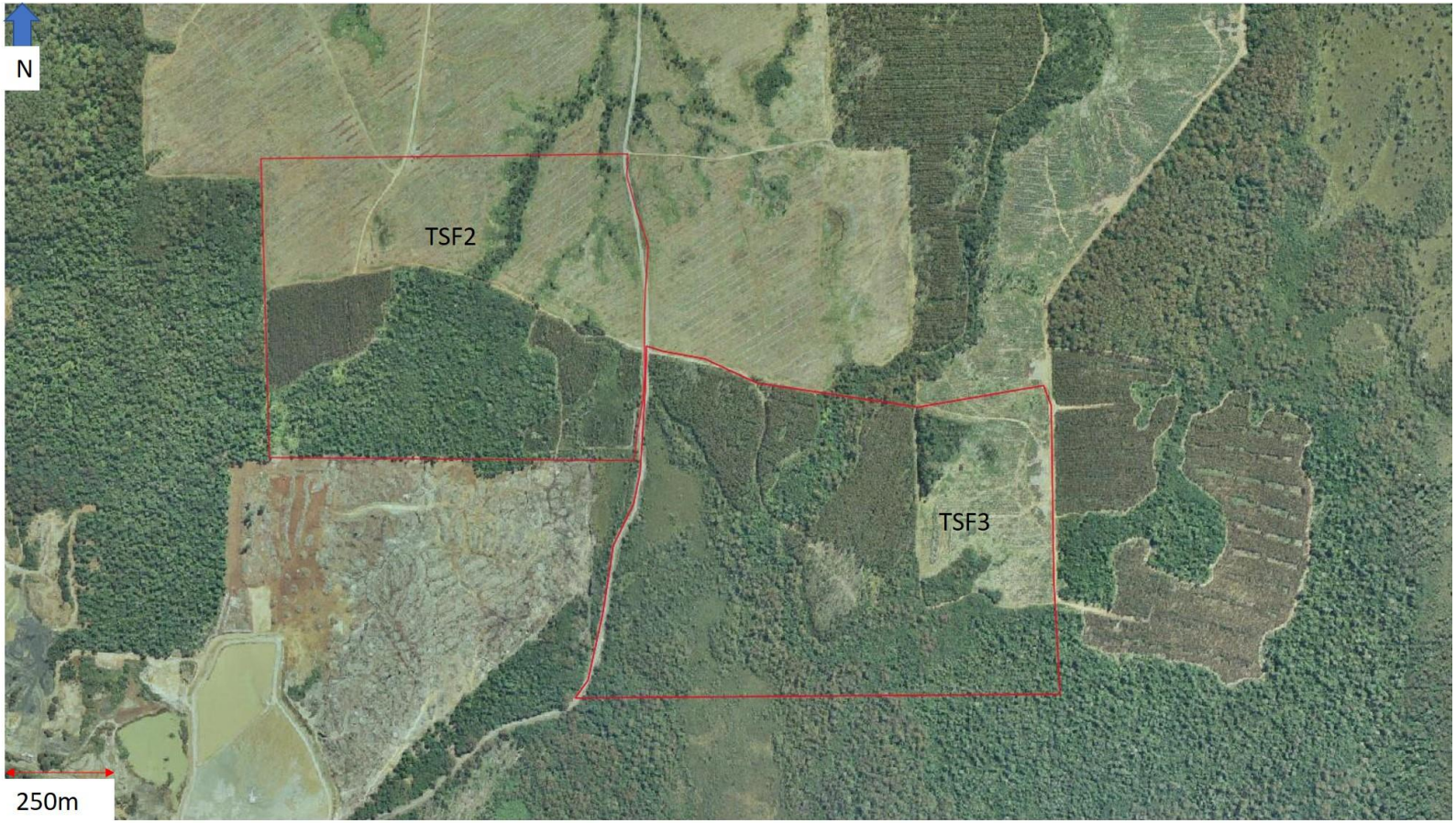


Figure 2. Aerial image of TSF2 and TSF3 study area (red outline).

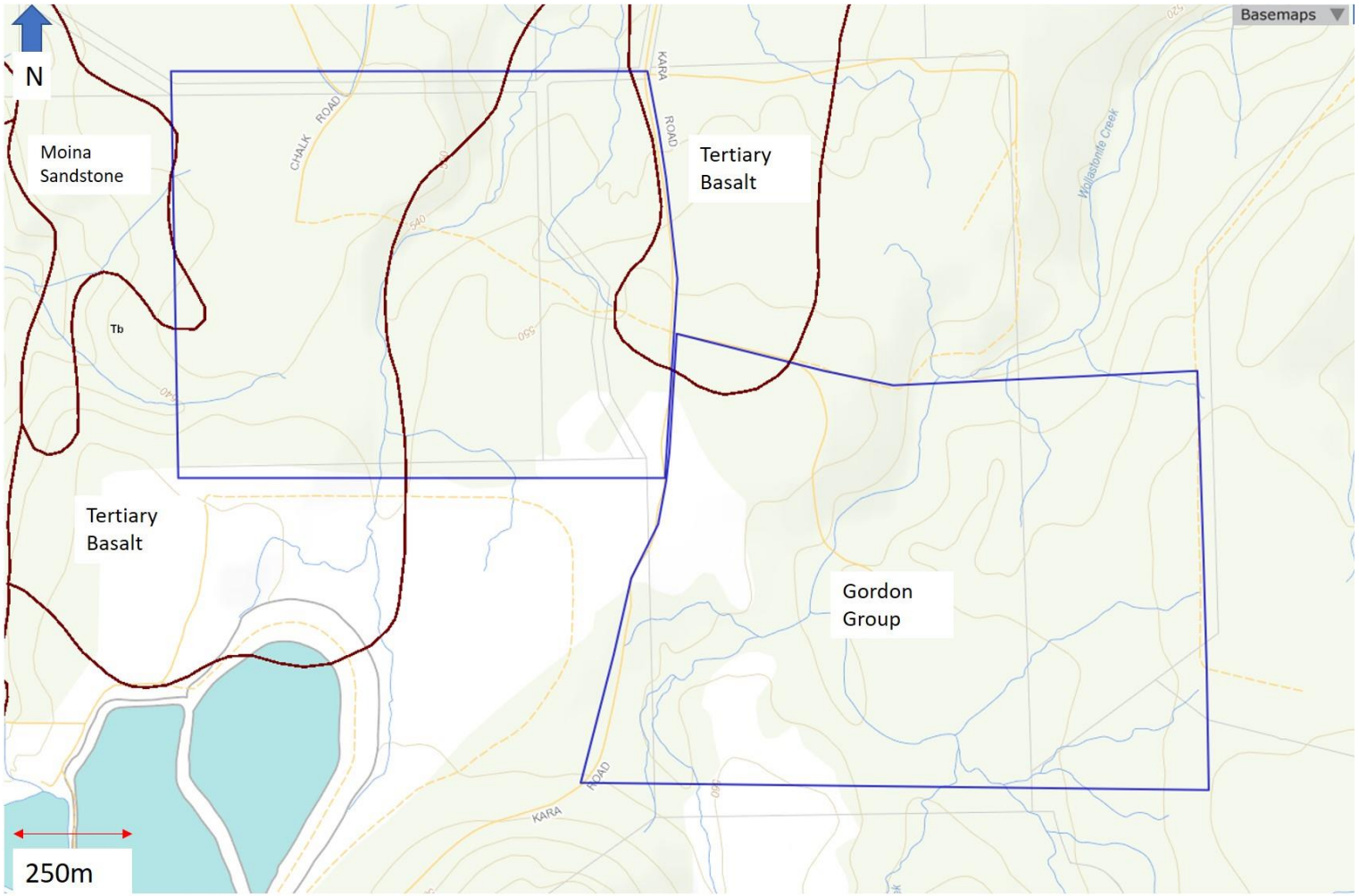


Figure 3. Description of the underlying geology of TSF2 and TSF. The blue outline shows the approximate study area. Maroon lines indicate the boundaries of the geological polygons. Gordon Group: Dark grey limestone, dolomite, calcareous mudstone, minor quartz sandstone and black clay weathering products. In part fossiliferous. Moina Sandstone: Pale grey to pink, commonly cross-bedded quartz sandstone, coarse and pebbly in places, tubicular trace fossils on some horizons. Ordovician fossils in places. Tertiary Basalt: Basalt (tholeiitic to alkalic) and related pyroclastic rocks.

2.3 Survey Limitations

It should be noted that no survey, regardless of the skill of the surveyor and the detail of the survey, can guarantee that all flora and fauna are categorized and recorded during a single visit. This is due to unintentional sampler bias, sampling techniques, seasonal and annual variation in abundance and the possible absence of fertile material for identification. Ephemeral species which may have been present includes; orchids, lilies, herbs grasses and other graminoids. However all significant species known to occur in the study areas and their environs have been considered in this report.

The survey area contains significant areas of dense vegetation, which prevents effective human movement. Therefore, overgrown vehicle tracks and other tracks were utilised where possible to enhance the efficiency of movement through the survey area, with short trips into the main vegetation.

3 Desktop Assessment

A desktop flora and fauna assessment of the study area is discussed henceforth. The desktop flora and fauna assessment was undertaken on 31/01/2022 by FINN Environmental. See Appendix 1 for Biodiversity Values Database (BVD) and Natural Values Atlas (NVA) records of threatened flora and fauna within 5km of TSF2 and TSF3 (centroid coordinates: 399263E 5425980N). Data sources for the desktop survey:

- Natural Values Atlas;
- Biodiversity Values Database; and
- TasVeg 4.0.
- Previous report for adjoining area south of TSF2 by Philip Milner Landscape Consultant, October 2018.

3.1 Flora

There were no records of any threatened flora located within 5000m of the TSF2 and TSF 3 centroid as per the BVD and NVA (Appendix 1). There are no threatened vegetation communities within the TSF2 study area, or that are likely to be impacted as a result of the proposed development. The TasVeg 4.0 mapping and descriptions are shown in Figure 3.

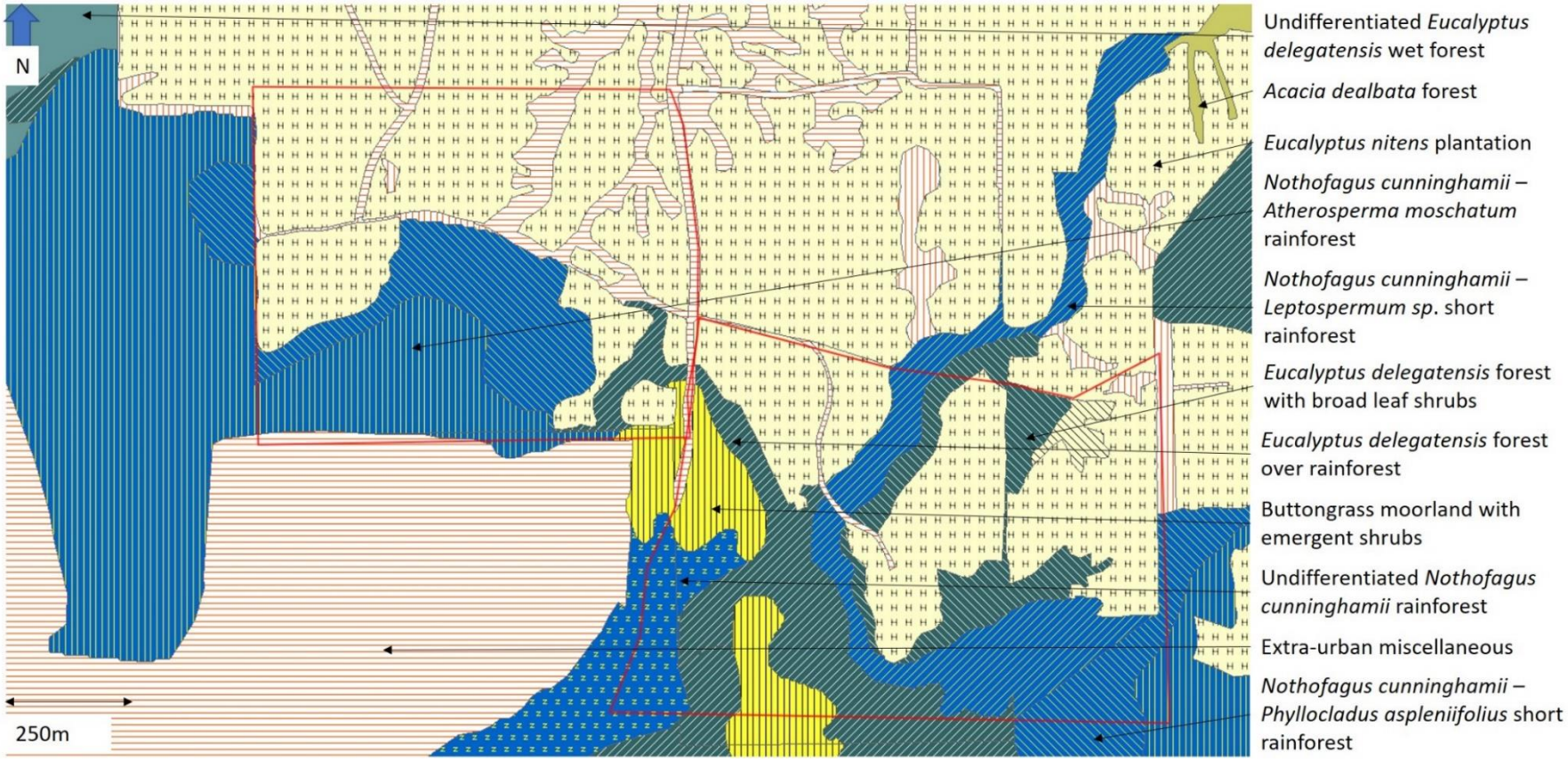


Figure 4. TasVeg 4.0 mapping of TSF2 and TSF3. The red outline shows the approximate study area.

3.2 Fauna

There are a number of records of threatened fauna within 5000m of TSF2 and TSF3 (Appendix 1 and Figure 5). As shown in Appendix 1, majority of the threatened fauna records are of *Sarcophilus harrisii* (Tasmanian Devil) and *Astacopsis gouldii* (Giant Freshwater Crayfish), which is to be expected given the significant amount of *S. harrisii* research being undertaken in the region surrounding Kara Mine. Other threatened fauna species recorded on the NVA and BVD are; *Aquila audax* subsp. *fleayi* (Tasmanian Wedge Tailed Eagle), *Dasyurus maculatus* subsp. *maculatus* (Spotted Tailed Quoll), *Dasyurus viverrinus* (Eastern Quoll) and *Beddomeia protuberata* (Emu River Hydrobiid Snail).

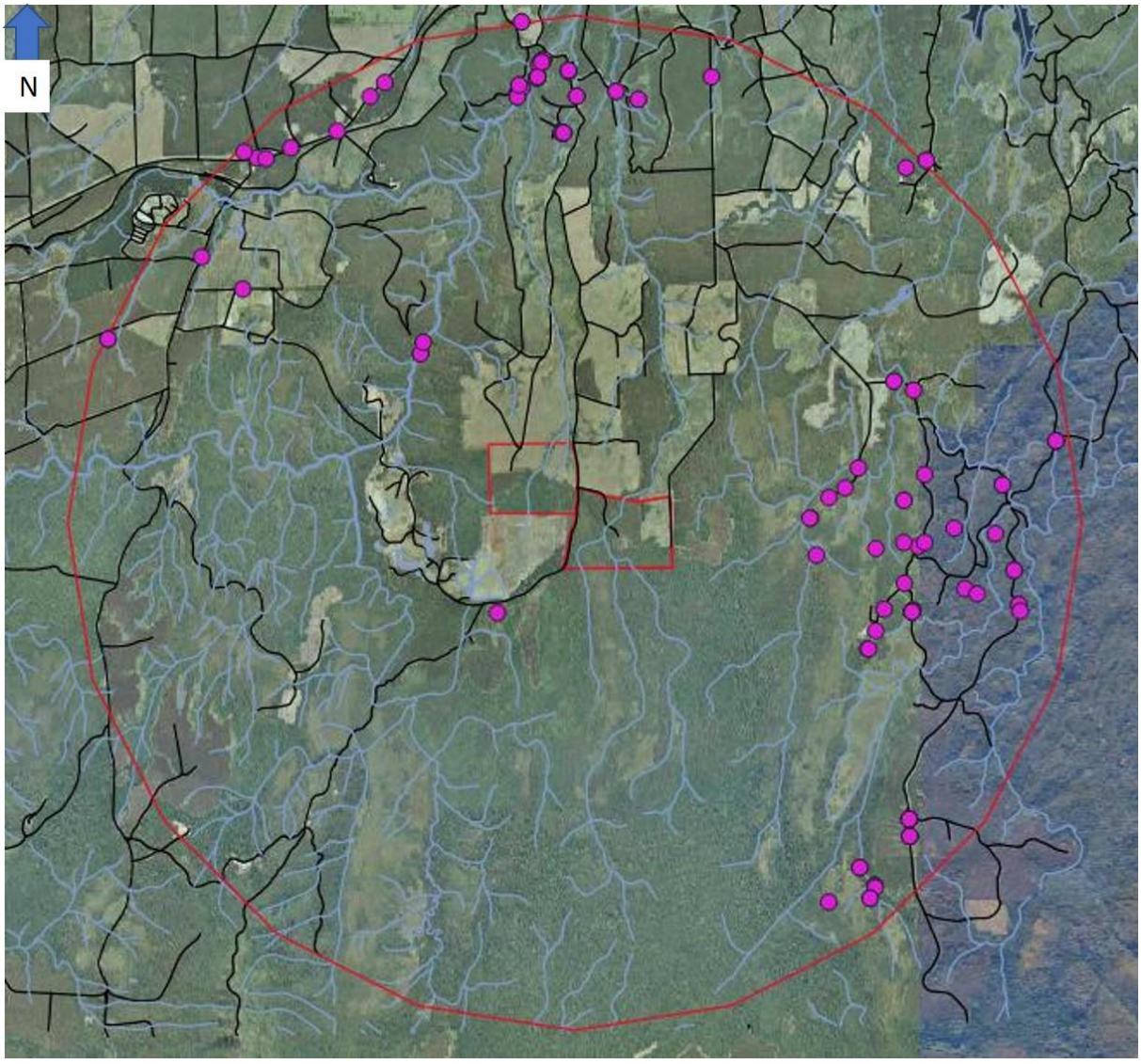


Figure 5. Aerial image of the threatened species records (pink dots) within 5000m of TSF2 and TSF3 centroid (399263E 5425980N) the red ring indicates 5000m from the centroid. Creeks are shown in blue and roads are shown in black.

Additional threatened species with the potential to occur within 5000m of TSF2 and TSF3 based on their range boundaries include;

- *Haliaeetus leucogaster* (White Bellied Sea Eagle);
- *Accipiter novaehollandiae* (Grey Goshawk);
- *Perameles gunnii* (Eastern Barred Bandicoot); and
- *Tyto novaehollandiae* (Masked Owl).

4 Flora and Fauna Field Assessment

A field survey of the proposed development area was undertaken by FINN Environmental on the 10/12/2021, with the focus of the field assessment on threatened and endangered species and communities. The survey method utilized was 'random meandering' throughout the study area as shown in Figure 6

Table 1. List of species found during the field survey conducted at TSF2 and TSF3 on the 10/12/2021. Note that animal species were confirmed by the presence of indicators (scats, calls, prints etc) also.

Species	
Binomial Name	Common Name
Acacia dealbata	Silver Wattle
Acacia melanoxylon	Blackwood
Acacia murconata	Narrow Leaved Wattle
Acaena novae-zealandiae	Buzzy
Andopetulum biglandulosum	Horizontal
Anopterus glandulosus	Native Laurel
Athenosperma moschatum	Sassafras
Banksia marginata	Banksia
Baurea rubioides	Baurea
Blechnum nudum	Fishbone Waterfern
Blechnum wattsii	Hard Water Fern
Cassina aculeata	Dollybush
Clematis aristata	Australian Clematis
Coprosma quadrifida	Prickly Box
Dianella tasmanica	Tasmanian Flax Lilly
Dicksonia antarctica	Manfern

Eucalyptus delegatensis	Gum Topped Stringy Bark
Eucalyptus nitens	Mountain Shining Gum
Eucalyptus nitida	Western Peppermint
Eucalyptus obliqua	Stringy Bark
Ghania grandis	Cutting Grass
Grammitis billardieri	Finger Fern
Gymnoschoenus sphaerocephalus	Buttongrass
Histiopteris incisa	Bat's Wing Fern
Juncus sp.	Rush
Leptocophylla juniperina	Mountain Pink Berry
Leptospermum lanigerum	Wooly Teatree
Leptospermum scoparium	Manuka
Melaleuca squarrosa	Scented Paperbark
Microsorum pustulatum	Kangaroo Fern
Monotoca glauca	Goldy Wood
Nematolepis squamea	Satinwood
Nothofagus cunninghamii	Myrtle
Phyllocladus asplenifolius	Celery Top Pine
Pimelea cinerea	Grey Pimelea
Pimelea drupacea	Cherry Riceflower
Pinus radiata	Radiata Pine
Pittosporum bicolor	Cheesewood
Poa sp.	Grass
Polystichum proliferum	Mother Shield Fern
Pomaderris apetela	Dogwood
Pteridium esculentum	Bracken
Pultenaea juniperina	Prickly Beauty
Rumohra adiantiformis	Leathery Shield Fern
Stackhousia monogyna	Creamy Candles
Styliaium graminatalium	Grass Trigger Plant
Tasmannia lanceolata	Tasmanian Mountain Pepper Berry
Telopea tuncata	Waratah
Ulex europaeus	Gorse
Zieria arborescens	Stinkwood
	Lichen
	Moss
Animal Species	
Crinia tasmaniensis	Tasmanian Froglet

Notamacropus ruforiseus	Rufus Wallaby
Notechis scutatus	Tiger Snake
Strepera fuliginosa	Black Currawong
Thylogale billardierii	Pademelon
Trichosurus vulpecula	Brush Tailed Possum
Vombatus ursinus Subsp. *tasmaniensis*	Wombat

4.1 Flora

There were no threatened flora species or communities found during the field survey. Descriptions of the communities present (as per *Forest to Fjaeldmark*[1]/TasVeg 4.0) in TSF2 are discussed henceforth.

4.1.1 TSF2

TSF two contained *E. nitens* plantation of varying ages years and both *N. cunninghamii – A. moschatum* tall rainforest and *N. cunninghamii – P. asplenifolius* short rainforest. Signs of prior harvesting; cut stumps and flagging tape, were observed within the rainforest areas, primarily the *N. cunninghamii – A. moschatum* tall rainforest. There were significant weed infestations within the plantations, primarily *U. europaeus.*

4.1.2 TSF 3

The forest communities found within TSF 2 primarily consisted of plantation *E. nitens* forest of varying ages, short rainforest, buttongrass moorland and *E. delegatensis* over rainforest and *leptospermum*. Within the plantation areas, there was significant disturbance, with little evidence of disturbance outside of the plantation boundaries. There were low levels of weeds present within the TSF2 area, most confined to road edges and the plantation areas.

4.1.3 E. delegatensis/E. obliqua over Leptospermum

E. delegatensis/E. obliqua forest over *Leptospermum* is a tall wet forest type characteristic of areas poor soils and drainage. The understory is dominated by tall *Leptospermum* and *Melaleuca* species. The ground cover primarily consisted of scattered *B. wattsii* and *D. antarctica,* particularly around Wollastone Creek in TSF3.

[1] Kitchener, A. & Harris, S. (2013). From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Edition 2. Department of Primary Industries, Parks, Water and Environment, Tasmania.

4.1.4 E. delegatensis/E. obliqua over rainforest

This is a tall *E. delegatensis* forest that transitions from the *E. delegatensis* over *Leptospermum* Forest. *N. cunninghamii* and *A. moschatum* dominate as the tallest understorey species *P. aspleniifolius* and *A. biglandulosum* are frequent mid story/shrub species. Commonly onsite, *M. squarrosa* is present as an understory species (Figure 6). In dryer soils, the lower shrub layer tends toward more scleromorphic species, such as *M. glauca, A. mucronata* and *N. squamea.* Ground ferns are common near drainage lines and creeks. *E. obliqua* and *E. nitida* are sporadically found in the canopy in some areas. This is the most common of the native Eucalypt forests within the TSF3 area and is found adjoining the plantation areas in most cases. It is likely that this was the dominant forest type prior to conversation to plantation.

Figure 6. *E. obliqua/E. delegatensis* over rainforest. This figure shows some *M. squarrosa* within the forest, a common occurance within that forest community onsite. Location: 399783E, 5425646N.

4.1.5 N. cunninghamii rainforest

There are two rainforest communities within the TSF2 area. The first community is *N. cunninghamii – A. moschatum* tall rainforest. This is primarily found in the south east. This forest community is characterized by a tall canopy of *N. cunninghamii, A. melanoxylon* and *A. moschatum,* with *A. moschatum* also present in the understory. There were very few shrubs, with sparse coverings of *B. wattsii* forming the main ground cover. This forest community is very open below the canopy and has potential for *A. novaehollandiae* foraging and nesting habitat.

The second rainforest community *N. cunninghamii – P. asplenifolius* short rainforest is found in the remaining TSF2 area. This is dominated by large, sparsely populated, senescing *N. cunninnghamii*, and in waterlogged flats of TSF3; *M. squarrosa.* Within the waterlogged areas, a dense shrub/understory layer of *A. biglandulosum* was present (Figure 7). Contrary to the *N. cunninghamii – A. moschatum* tall rainforest, below the canopy is very difficult to traverse due to the thick *A. biglandulosum.* This forest community was the primary rainforest community in TSF3.

Figure 7. *N. cunninghamii - P. asplenifolius* short rainforest (TSF2). Location: 398864E, 5426337N.

Figure 8. *N. cunninghamii - P. asplenifolius* short rainforest (TSF3). Location: 400076E, 5425630S.

4.1.6 Buttongrass moorland with emergent shrubs

The community is dominated by *G. sphaereocephalus* with moderate levels of *L. scoparium, B. marginata* and *M. squarrosa* emergent to a height of approx. 2.5-3m. The occasional *E. nitida* tree to approx. 5m was also present. This community is found adjacent to Kara Rd, within TSF 2.

Figure 9. Buttongrass moorland with emergent shrubs. Location 399295E, 5426038N.

4.1.7 Plantation Eucalyptus nitens

There are multiple Forico plantations of 3 distinct age classes; >11y, ~11y old (TSF2) and ~3 years old (TSF3). These plantations have a variety of shrub species present, however, the main factor within these plantations is the significant *U. europaeus* infestation.

4.2 Fauna

Within the TSF2 and TSF3 areas, there are a number of large, old growth *E. nitida, E. delegatensis, E. obliqua* and *N. cunninghamii* present. Given the nature of the community, there is some difficulty in assessing the presence of hollows, however, using size and senescence as a proxy, there is a high likelihood of hollows suitable for hollow dwelling species present or forming. Of the threatened fauna species observations listed in the BVD and NVA reports, there was no evidence of any threatened fauna within TSF2 and TSF3, however this does not discount the possibility of threatened fauna roaming through the TSF2 and TSF3 area.

There was no potential *A. audax* subsp. *fleayii* nesting habitat present within the TSF2 and TSF3 areas, with only a small area south of TSF3, within 500m of the boundary that contained moderate potential nesting habitat for *A. audax* subsp. *fleayii.* There are areas adjacent to the TSF2 and TSF3 areas that have moderate/high potential nesting habitat, which should be searched for nests prior to operations commencing between 500m and 1000m line of sight (LOS) of the potential habitat.

Due to the *E. nitens* plantations, there are a number of windrows present within them. Windrows provide potential denning habitat for *S. harrisii, D. maculatus* subsp. *maculatus* and *D. viverrinus.* Although no dens were found in windrows during the survey, not every windrow in the plantation areas was surveyed, as it would require a significant effort, outside of the scope of this survey, to achieve this. Therefore, there is moderate potential for Dasyuridae dens within the plantation areas. Outside the plantations, there is sub-optimal denning habitat due to the wet ground conditions primarily rainforest habitat.

There was no evidence of *T. novaehollandiae* subsp. *castanops* throughout the survey. However, as mentioned previously, there are a number of large eucalypts with hollows present or forming in them, which would provide potential nesting habitat for *T. novaehollandiae* subsp. *castanops.*

Generally, the locations of TSF2 and TSF3 are too elevated for *A. gouldii* to be present[2]. Furthermore, the creeks, with the exception of the main branch of Wollastone Creek, were often in poor/moderate potential habitat for *A. gouldii.* As both Wollastone Creek and the unnamed creek in TSF3 flow into the Emu River, there is some potential that *B. protuberata* may be present.

There were a number of *T. billardierii/N. ruforiseus* scratchings present throughout both TSF2 and TSF3. Given the surrounding vegetation and mine workings, it is unlikely these scratchings were a result of *Perameles gunnii.*

The calls of *C. tasmaniensis* and *S. fuliginosa* were heard frequently throughout the survey. Scats of *V. ursinus* subsp. *tasmaniensis* and *T. vulpecula* were also found within the TSF2 and TSF3 sites. Multiple observations of *N. scutatus* near the plantation edges on both sites. These are all common species and any works at TSF2 and/or TSF3 should have minimal impact on the species populations.

[2] T. Walsh pers coms, 9/11/2021.

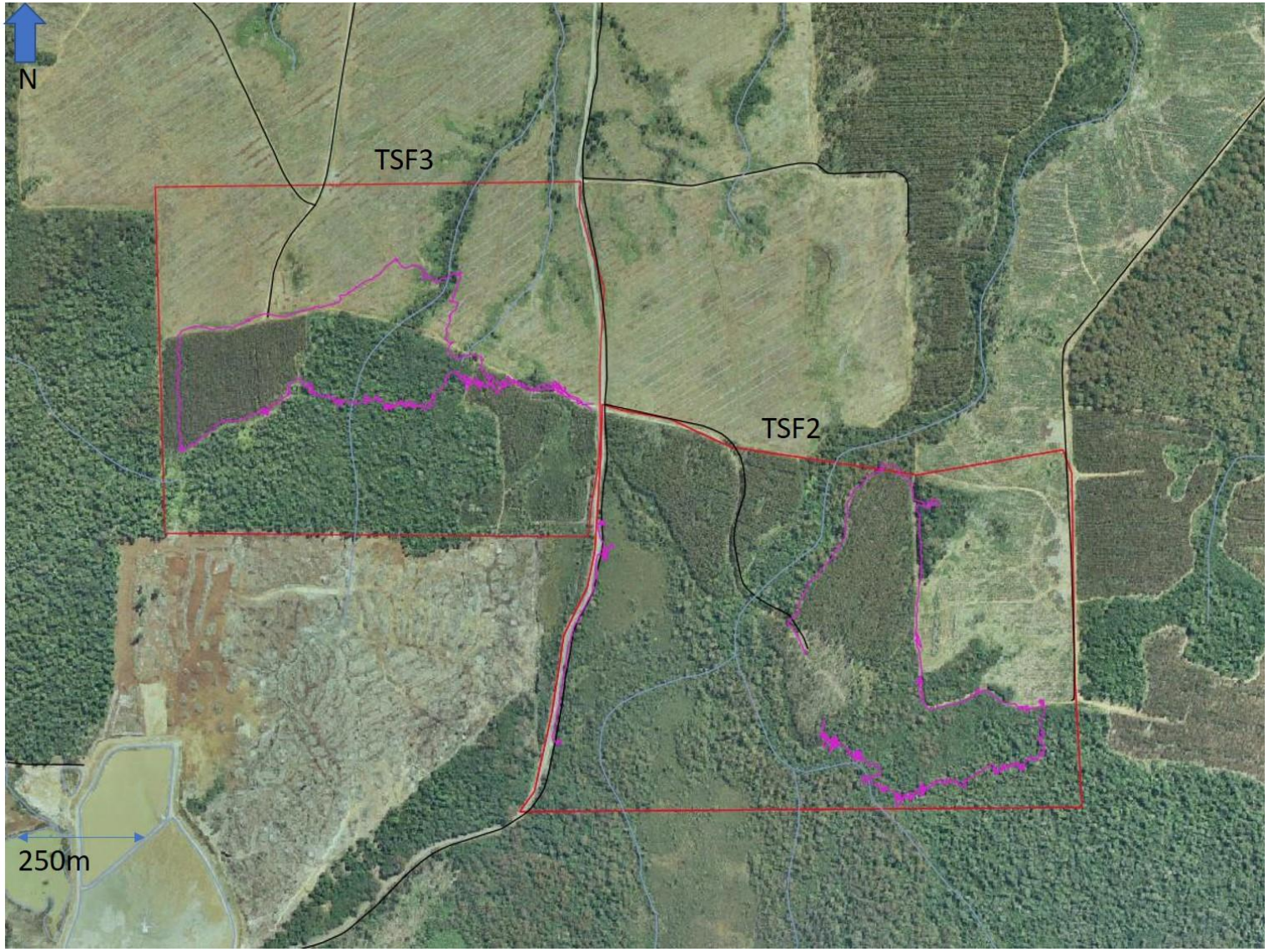


Figure 10.Survey route (pink) throughout the TSF2 and TSF3 areas. Note that the aerial image is from 2011.

4.3 Weeds and pathogens

Weeds are prominent within the plantation areas, particularly in TSF3. The main weed species is *U. europaeus,* however, *common* 'lawn' flat weeds were also present near the road edge.

There are *Phyphthora cinnamoni* susceptible species within the TSF2 area (*L. scoparium, M. squarrosa* and *A. glandulosus* for example), but no evidence of *P. cinnamoni* symptoms.

5 Conclusions and Recommendations

There were no threatened species or communities encountered during the field survey of the TSF2 area. There are numerous records of threatened species within 5000m of the TSF2 and TSF3 centroid. There were no nests of *Aquila audax* subsp. *fleayii, T. novaehollandiae* subsp. *castanops,* or *A. novaehillandiae* found in any of the trees within TSF2 and TSF3, nor were there any *S. harrisii* or *D. maculatus* subsp. *maculatus* dens. There was no evidence of any threatened flora or fauna within the proposed TSF2 exploration area that are likely to be impacted by the proposal, at the time the field survey was undertaken.

The following recommendations should be implemented as part of the TSF2 and TSF3 investigation program to minimize potential environmental risks:

- Minimise the exploration footprint by utilizing existing tracks where possible and keep the clearing footprint to a minimum;
- *U. europaeus* has the potential to become a significant issue on the Kara Mine site and within the TSF2 and TSF3 areas. A weed management plan should be developed (or incorporate into the Kara Mine weed management plan) for the TSF2 and TSF3 areas to prevent any further spread associated with investigation works;
- Weed and disease controls as per *Tasmanian Washdown Guidelines for Weed and Disease Control, 2004*;
- Large trees (>1m DBH), should not be felled without prior assessment for *T. novaehollandiae* subsp. *castanops* and other hollow dwelling species. Although there is limited *A. novaehillandiae* habitat within TSF2 and TSF3, large *A. melanoxylon* should be checked for nests prior to felling. If a suspected nest, roost site or suspected nesting activities (i.e. displaying male birds) are located within the TSF2 and TSF3 area during operations, all operations should cease within 100m of the site and notify the Tas Mines person in charge of the operations;
- An assessment of potential eagle nesting habitat within 500m and 1000m LOS of the TSF2 and TSF3 area should be conducted prior to operations commencing. If this is not feasible

due to timing constraints, then operations should be excluded from within 500m **and** 1000m LOS of the potential nesting habitat within the management constraint period (July to February inclusive). Outside the management constraint period (March to June inclusive), exclude operations beyond 500m;

- Avoid disturbance to historic windrows. Where windrows must be destroyed for access, then check for potential Dasyuridae dens prior to any destruction. If a suspected den site is found, notify the Tas Mines person in charge of the operation and keep activities at least 50m away; and

- Avoid disturbance to vegetation within 30m of the Wollastone Creek and within 10m of other creeks. Creek crossings should be minimized.

Hamish Howe BAntSc

6 References

Collier, P., Howells, C., Ellis, E., Kerrison P., Thomas, L., Frankcombe, N., and Hudspeth, P. (2012) *Alpine Wildflowers of Tasmania; Plant Identikit.* 2nd Ed. Australian Plants Society Tasmania Inc – Hobart Group, Hobart Tasmania 7001.

Collier, P., Howells, C., Ellis, E., Kerrison P. and Hudspeth, P. (2010) *Common Orchids of Tasmania; Plant Identikit.* Australian Plants Society Tasmania Inc – Hobart Group, Hobart Tasmania 7001.

Collier, P., Howells, C., Ellis, E., Kerrison P. and Hudspeth, P. (2007). *Rainforest Plants of Tasmania; Plant Identikit.* 2nd Ed. Australian Plants Society Tasmania Inc – Hobart Group, Hobart Tasmania 7001.

Collier, P., Howells, C., Ellis, E., Kerrison P., Frankcombe N. and Hudspeth, P. (2006) *Woodland Wildflowers of Tasmania; Plant Identikit.* Australian Plants Society Tasmania Inc – Hobart Group, Hobart Tasmania 7001.

Environmental Service and Design (2015). *Flora and Fauna Assessment Report; Powerline Clearance.* ES&D, 14 Cattley Street, Burnie, Tasmania 7320.

https://maps.thelist.tas.gov.au/listmap/app/list/map accessed multiple times between 8/10/2021 and 25/02/2022.

https://www.fpa.tas.gov.au/BVD/BVD_NVA.html accessed on 31/01/2022.

https://www.naturalvaluesatlas.tas.gov.au/#SpeciesObservationSearchPage accessed on 31/01/2022.

https://www.utas.edu.au/dicotkey/dicotkey/key.htm accessed multiple times between 8/10/2021 and 31/01/2022.

Kitchener, A. & Harris, S. (2013). *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation.* Edition 2. Department of Primary Industries, Parks, Water and Environment, Tasmania.

Milner, Philip (2018). *Flora and Fauna Habitat Survey of Proposed Clearance Areas, Tasmania Mines, Kara Lease 1934P/M.* 144 Allisons Rd, Lower Barrington, Tasmania 7310.

Todd Walsh personal communications, 9/11/2021.

Wiltshire, R. and Jordan, G. (2009). *Treeflip; Life-sized Guide to the Trees of Tasmania.* School of Plant Science, University of Tasmania and CRC for Forestry, Hobart, Tasmania 7001.

Wiltshire, R. and Potts, B. (2007). *Eucaflip; Life-sized Guide to the Eucalypts of Tasmania.* School of Plant Science, University of Tasmania and CRC for Forestry, Hobart, Tasmania 7001.

Appendix 1: BVD and NVA Reports within 5km of centroid.

Species Name	Common Name	Easting	Northing	Observation Date
Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	402233	5425736	25-Jul-2012
Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	402606	5427294	25-Jul-2012
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398931	5430531	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398954	5430554	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398931	5430531	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	398954	5430554	25-Mar-2020
Astacopsis gouldi	giant freshwater crayfish	397743	5427654	16-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	398888	5430373	17-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	17-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	398900	5430391	17-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	398940	5430527	17-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	398933	5430522	17-Oct-2020
Astacopsis gouldi	giant freshwater crayfish	397771	5427768	13-Mar-2021
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	22-Mar-2021
Astacopsis gouldi	giant freshwater crayfish	398743	5430276	22-Mar-2021

Astacopsis gouldi	giant freshwater crayfish	398698	5430186	22-Mar-2021
Astacopsis gouldi	giant freshwater crayfish	398911	5430504	22-Mar-2021
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	08-May-2021
Astacopsis gouldi	giant freshwater crayfish	398714	5430302	08-May-2021
Astacopsis gouldi	giant freshwater crayfish	398940	5430527	08-May-2021
Astacopsis gouldi	giant freshwater crayfish	398740	5430924	08-May-2021
Astacopsis gouldi	giant freshwater crayfish	397743	5427654	16/10/2020
Astacopsis gouldi	giant freshwater crayfish	397771	5427768	13/03/2021
Astacopsis gouldi	giant freshwater crayfish	398698	5430186	22/03/2021
Astacopsis gouldi	giant freshwater crayfish	398743	5430276	22/03/2021
Astacopsis gouldi	giant freshwater crayfish	398714	5430302	8/05/2021
Astacopsis gouldi	giant freshwater crayfish	398888	5430373	17/10/2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	17/10/2020
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	22/03/2021
Astacopsis gouldi	giant freshwater crayfish	398898	5430382	8/05/2021
Astacopsis gouldi	giant freshwater crayfish	398900	5430391	17/10/2020
Astacopsis gouldi	giant freshwater crayfish	398911	5430504	22/03/2021
Astacopsis gouldi	giant freshwater crayfish	398933	5430522	17/10/2020
Astacopsis gouldi	giant freshwater crayfish	398940	5430527	17/10/2020

Astacopsis gouldi	giant freshwater crayfish	398940	5430527	8/05/2021
Astacopsis gouldi	giant freshwater crayfish	398931	5430531	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398931	5430531	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398954	5430554	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398954	5430554	25/03/2020
Astacopsis gouldi	giant freshwater crayfish	398740	5430924	8/05/2021
Beddomeia protuberata	hydrobiid snail (emu river)	399131	5429830	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399671	5430239	04-Aug-2003
Beddomeia protuberata	hydrobiid snail (emu river)	399890	5430162	04-Aug-2003
Beddomeia protuberata	hydrobiid snail (emu river)	399283	5430192	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399202	5430446	01-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20-Jan-1982
Beddomeia protuberata	hydrobiid snail (emu river)	399131	5429830	20/01/1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20/01/1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20/01/1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20/01/1982
Beddomeia protuberata	hydrobiid snail (emu river)	399152	5429831	20/01/1982
Beddomeia protuberata	hydrobiid snail (emu river)	399283	5430192	20/01/1982

Beddomeia protuberata	hydrobiid snail (emu river)	399890	5430162	4/08/2003
Beddomeia protuberata	hydrobiid snail (emu river)	399671	5430239	4/08/2003
Beddomeia protuberata	hydrobiid snail (emu river)	399202	5430446	1/01/1982
Dasyurus maculatus	spotted-tail quoll	402730	5429558	17-Dec-2009
Dasyurus maculatus	spotted-tail quoll	402730	5429558	17/12/2009
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	402715	5425795	28-Nov-2012
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	401768	5422252	09-Dec-2012
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	402510	5426210	11-Dec-2012
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	403482	5426364	12-Dec-2012
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	403643	5425183	12-Dec-2012
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	403643	5425183	13-Dec-2012
Dasyurus viverrinus	eastern quoll	394662	5427798	10-Jul-2019
Dasyurus viverrinus	eastern quoll	394662	5427798	10/07/2019
Sarcophilus harrisii	tasmanian devil	403412	5425883	16-Jan-1991
Sarcophilus harrisii	tasmanian devil	400612	5430383	21-Jan-1992
Sarcophilus harrisii	tasmanian devil	402412	5427383	14-Dec-1992
Sarcophilus harrisii	tasmanian devil	402412	5427383	24-Jan-1994
Sarcophilus harrisii	tasmanian devil	401647	5425671	01-Aug-2010
Sarcophilus harrisii	tasmanian devil	402530	5429487	17-Dec-2009
Sarcophilus harrisii	tasmanian devil	402221	5422419	25-Jul-2012

Sarcophilus harrisii	tasmanian devil	402225	5422411	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402227	5422394	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402598	5425133	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	401930	5426333	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	401771	5426238	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	401590	5426035	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	401582	5426034	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402515	5425394	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402651	5425757	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402715	5426466	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402061	5426529	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402151	5424745	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402162	5424746	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402232	5424925	25-Jul-2012
Sarcophilus harrisii	tasmanian devil	402176	5422290	27-Nov-2012
Sarcophilus harrisii	tasmanian devil	402176	5422290	28-Nov-2012
Sarcophilus harrisii	tasmanian devil	402568	5422902	28-Nov-2012
Sarcophilus harrisii	tasmanian devil	403112	5425339	28-Nov-2012
Sarcophilus harrisii	tasmanian devil	403005	5425936	28-Nov-2012
Sarcophilus harrisii	tasmanian devil	403657	5425118	29-Nov-2012

Sarcophilus harrisii	tasmanian devil	402590	5425111	30-Nov-2012
Sarcophilus harrisii	tasmanian devil	402568	5422902	30-Nov-2012
Sarcophilus harrisii	tasmanian devil	402316	5425137	30-Nov-2012
Sarcophilus harrisii	tasmanian devil	402568	5422902	01-Dec-2012
Sarcophilus harrisii	tasmanian devil	403596	5425520	01-Dec-2012
Sarcophilus harrisii	tasmanian devil	402568	5422902	01-Dec-2012
Sarcophilus harrisii	tasmanian devil	403596	5425520	01-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	04-Dec-2012
Sarcophilus harrisii	tasmanian devil	402075	5422593	04-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	05-Dec-2012
Sarcophilus harrisii	tasmanian devil	403596	5425520	05-Dec-2012
Sarcophilus harrisii	tasmanian devil	402075	5422593	06-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	06-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	07-Dec-2012
Sarcophilus harrisii	tasmanian devil	403231	5425288	10-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	11-Dec-2012
Sarcophilus harrisii	tasmanian devil	403482	5426364	11-Dec-2012
Sarcophilus harrisii	tasmanian devil	402509	5425795	12-Dec-2012
Sarcophilus harrisii	tasmanian devil	402510	5426210	12-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	12-Dec-2012

Sarcophilus harrisii	tasmanian devil	402563	5423070	12-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	12-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	12-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	13-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	13-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	13-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	13-Dec-2012
Sarcophilus harrisii	tasmanian devil	402563	5423070	13-Dec-2012
Sarcophilus harrisii	tasmanian devil	402590	5425111	14-Dec-2012
Sarcophilus harrisii	tasmanian devil	395990	5428290	27-Feb-2018
Sarcophilus harrisii	tasmanian devil	395585	5428608	18-Feb-2008
Sarcophilus harrisii	tasmanian devil	397247	5430189	08-Dec-2007
Sarcophilus harrisii	tasmanian devil	399203	5430432	17-Dec-2007
Sarcophilus harrisii	tasmanian devil	396130	5429583	08-Dec-2007
Sarcophilus harrisii	tasmanian devil	396465	5429683	18-Nov-2009
Sarcophilus harrisii	tasmanian devil	396220	5429575	18-Nov-2009
Sarcophilus harrisii	tasmanian devil	396922	5429848	12-Feb-2010
Sarcophilus harrisii	tasmanian devil	397390	5430326	18-Mar-2011
Sarcophilus harrisii	tasmanian devil	398500	5425101	19-Feb-2013
Sarcophilus harrisii	tasmanian devil	396003	5429643	15-Nov-2015

Sarcophilus harrisii	tasmanian devil	404009	5426797	01-Dec-2007
Sarcophilus harrisii	tasmanian devil	404009	5426797	03-Dec-2007
Sarcophilus harrisii	tasmanian devil	404009	5426797	04-Dec-2007
Sarcophilus harrisii	tasmanian devil	404009	5426797	29-May-2008
Sarcophilus harrisii	tasmanian devil	404009	5426797	27-May-2008
Sarcophilus harrisii	tasmanian devil	404009	5426797	30-May-2008

Appendix 2: Field Observations

Attachment 3 MLA plans

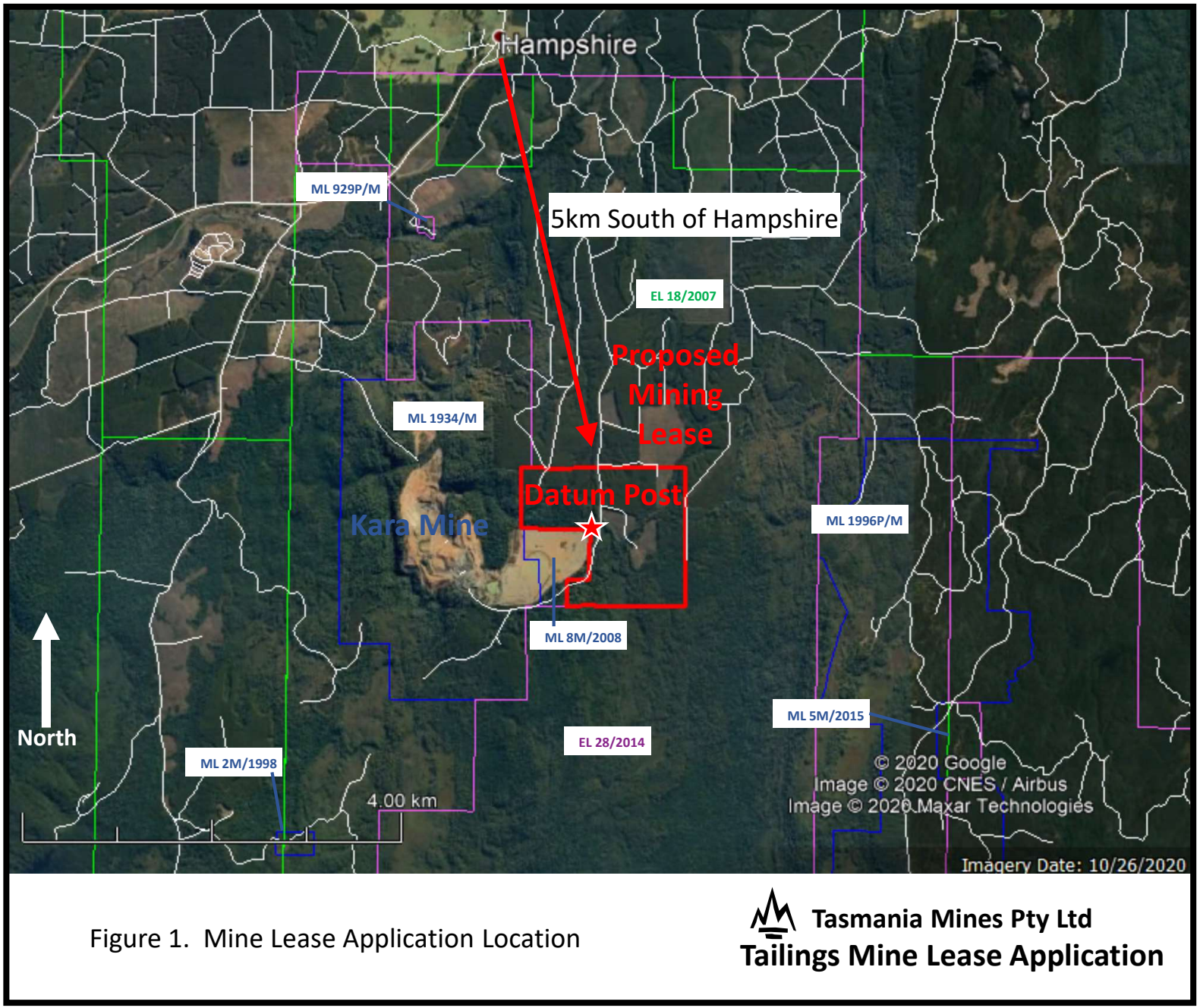


Figure 1. Mine Lease Application Location

Tasmania Mines Pty Ltd
Tailings Mine Lease Application

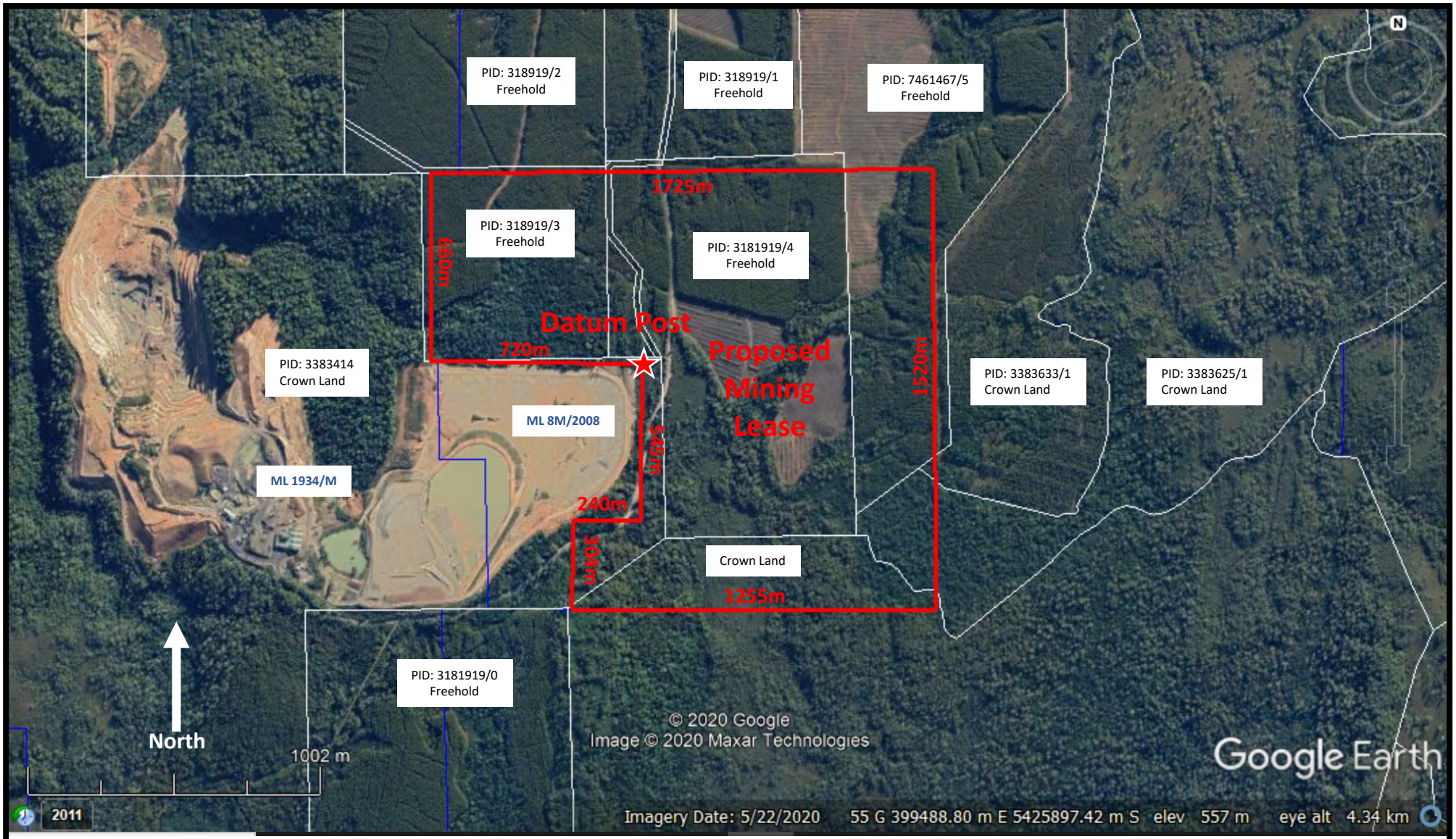


Figure 2. Mine Lease Application Cadastral Parcels

Tasmania Mines Pty Ltd
Tailings Mine Lease Application