1 INTRODUCTION

1.1 Background

Bis Industries proposes a southerly expansion to current quarrying operations at its Western Junction Quarry (WJQ; Maps 1 and 2 in Attachment 1).

In April 2021, the Tasmanian Environment Protection Authority (EPA) provided guidelines[1] for an Environmental Effects Report (EER) for the proposal. Section 2 of the Guidelines requires a description of *"the potential impacts to the receiving environment (surface water, groundwater, drinking water, stock water, and irrigation as relevant)."*

1.2 Purpose of this summary report

To assist others in addressing potential impacts on groundwater, the current summary report aims to provide a conceptual hydrogeological framework for the WJQ and environs, including the directions of groundwater flow and travel times for local, intermediate and regional scales.

It is expected that the current summary report will form an Appendix to the EER.

2 HYDROGEOLOGY

2.1 Groundwater fundamentals

The published geology of the district (Map 3 in Attachment 1) comprises Tertiary-age basaltic rocks on higher ground, overlying weakly to moderately consolidated Tertiary sediments (sand, clay, gravel, lignite, etc).

The basalt is a fractured hard-rock aquifer, where groundwater moves in secondary openings [2](mostly joints) between otherwise dry rock. The sediments constitute an intergranular aquifer, in which groundwater moves in primary openings (voids between individual mineral grains).

Based on general hydrogeological principles, published geology and records of drilled bores[3], at all scales the sediments and basalts in the general vicinity of the WJQ are regarded as a single, unconfined aquifer[4].

In such an environment, Figure 1 illustrates different components of the land-based part of the hydrological cycle[5] at the scale of a single catchment or smaller. Effective rain (precipitation less evapotranspiration) flows overland to surface streams, or infiltrates (at a rate determined by soil and rock permeability) through the unsaturated zone to the water table.

An important aspect of Figure 1 is the interconnectivity between surface water and groundwater.

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[1] EPA (2021). *Guidelines for an Extractive Industry Environmental Effects Report for Western Junction Quarry – Southern Expansion, Western Junction.* Prepared for lease holder D. N. Hughes, April 2021.

[2] Secondary openings were formed later than the rock. Primary openings formed at the same time as the rock. Basalt often has primary openings (vesicles) which are sometimes interconnected.

[3] Bore records include those in the DPIPWE Groundwater Information Access Portal, and the Mineral Resources Tasmania drillhole database. See the Maps in Attachment 1.

[4] Localised confined conditions may exist in the Tertiary sediments where low permeability beds or horizons exist.

[5] The *hydrological cycle* is the circulation of water in various phases through the atmosphere, over and under the earth, to the oceans, and back to the atmosphere. The cycle is solar-powered. Because water is a solvent it dissolves elements, and geochemistry is a fundamental part of the cycle, which is a flux for water, energy, and chemicals. Water enters the land-based cycle as precipitation; it leaves as surface streamflow (runoff) or evapotranspiration. The route which groundwater takes from a recharge point to a discharge point is a *flow path.*

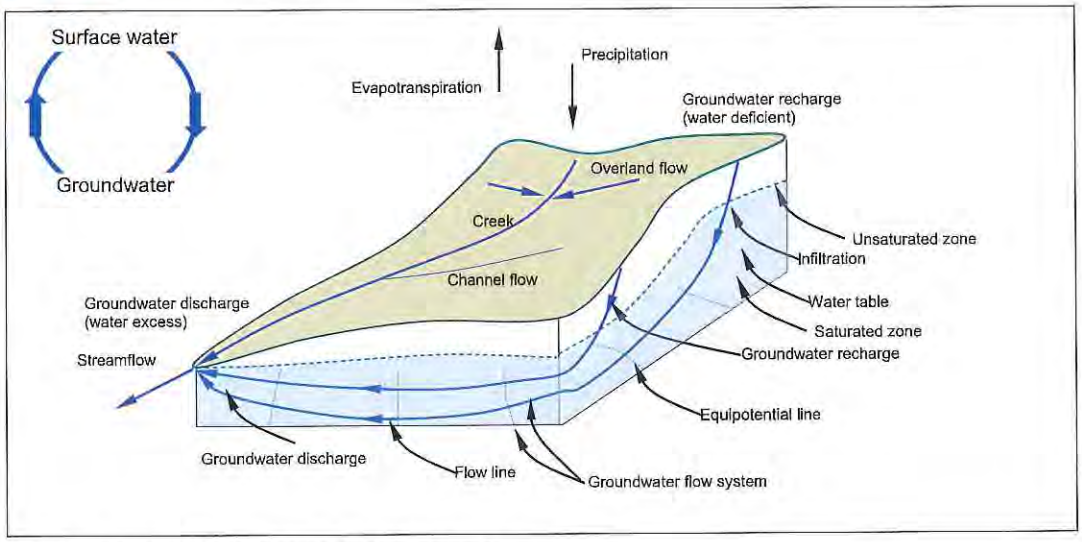


Figure 1. Aspects of the land-based hydrological cycle

The fundamentals of groundwater movement in an unconfined, gravity-driven groundwater flow system (GFS)[6] similar to that in the vicinity of the WJQ are depicted schematically in Figure 2. Important points are:

- the hydraulic heads in recharge areas are relatively high and decrease with depth. In discharge areas, the energy and flow conditions are reversed; heads are low and increase with depth. In between, the throughflow is almost horizontal as shown by the steeply dipping equipotential lines.
- the concept of a groundwater flow system (GFS[7]) is fundamental to understanding groundwater conditions. Given the moderate relief of the area, it can be expected that the near-surface dominant groundwater flows to depths of a few tens of metres or so will be as local systems, with recharge on most elevated areas discharging to minor streams like Kellys and Briarly Creeks. Some of the recharge will penetrate to depths of perhaps 50 – 100m or more, and will travel towards larger streams like Rose Rivulet. This scale of groundwater movement is regarded as intermediate.
- Still deeper groundwater infiltration results in regional systems discharging to major rivers (in this instance, the North Esk River) .

[6] GFSs are identified in the field based on geology and geomorphology. Examples are local-scale GFSs in moderate-high relief fractured rock (such as at the proposed composting facility), local- to intermediate-scale GFSs in low relief dolerite areas, local-scale GFSs in high relief dolerite, etc.

[7] Sophocleous (2004) cited in Figure 2 defines a GFS as "a set of groundwater flow paths with common recharge and discharge areas. Flow systems are dependent on the hydrogeologic properties of the soil/rock material, and landscape position. Areas of steep or undulating relief tend to have dominant *local flow systems* (discharging to nearby topographic lows such as ponds and streams). Areas of gently sloping or nearly flat relief tend to have dominant *regional flow systems* (discharging at much greater distances than local systems in major topographic lows or oceans)." A three-dimensional closed groundwater flow system that contains all the flow paths is called the *groundwater basin*.

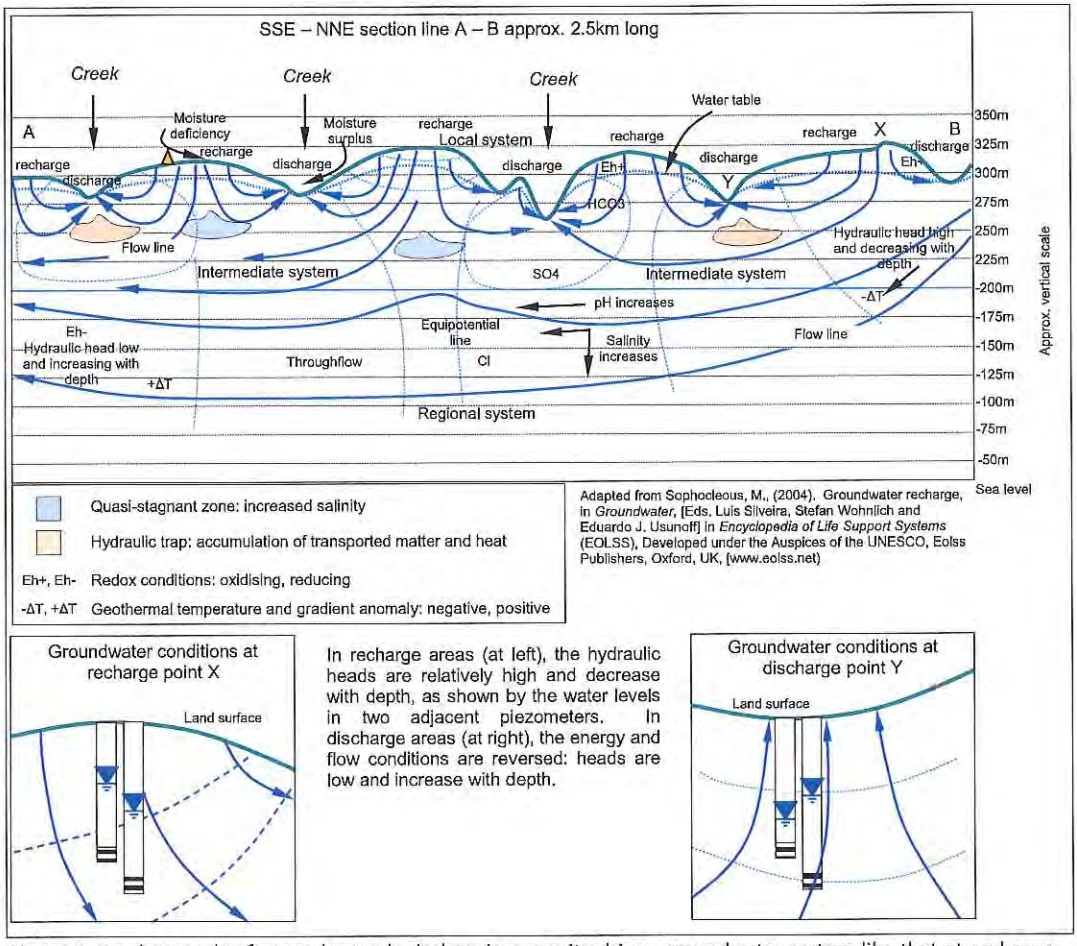


Figure 2. Fundamentals of groundwater hydrology in a gravity-driven groundwater system like that at and near the proposed composting facility. Vertical exaggeration for the top section is about 5.

2.2 Local, intermediate, and regional groundwater flow systems in the vicinity of WJQ

Hocking *et al* (2005[8]) have studied groundwater and salinity issues in the Tasmania southern Midlands, and have recognised many local- and intermediate-scale GFSs. Their generalised scale of GFSs is shown in Figure 3, together with adopted response times for groundwater flow through each system.

The scale of GFSs depends on topography and geology, with local, intermediate and regional systems defined by the sizes of sub-subcatchments, subcatchments and catchments respectively of surface drainage systems[9].

Accordingly, in the vicinity of the WJQ, the scale of local systems is reduced to nominally less than a kilometre or so, intermediate systems to 1 – 5km, and regional systems to >5km. The response times

[8] Hocking, M., Bastick, C., Hardie M., Dyson P. and Lynch, S. (2005). *Understanding Groundwater Flow Systems and processes causing salinity in the Southern Midlands and parts of the Clarence Municipalities.* NRM South and North and National Action Plan for Salinity and Water Quality, Tasmania. Report published by Southern Midlands Council.

[9] Sub-subcatchments ("CFEV River Section Catchments"), subcatchments and catchments are shown as overlays on www.thelist.tas.gov.au.

are similarly reduced in proportion, but these are only conceptual since they depend on bulk rock permeability and transmissivity which may change over orders of magnitude at all scales.

Map 1 in Attachment 2 depicts many sub-subcatchments (all un-named) within the Rose Subcatchment (84km^2) which contains the WJQ. Their sizes range from a few hectares up to about 300ha, and each defines a local GFS. At this scale, shallow groundwater flow is towards the watercourse within each sub-subcatchment. Local groundwater flows are therefore in all directions. Intermediate groundwater flows roughly northeast beneath these minor watercourses to Rose Rivulet. Still deeper regional groundwater flows NNE beneath Rose Rivulet to the North Esk River.

Some of these flow directions are depicted in the conceptual hydrogeological models (cross sections A – B and C – D) in Attachment 2.

The existing WJQ straddles several sub-subcatchments in which local flow is mainly towards Briarly Creek.

The proposed southern expansion will also straddle several sub-subcatchments ,and most local flow will report to Kelly's Creek.

Table 1 The geographical extent and response time of local, intermediate and regional scale GFSs

Category	Length of flow (km)		Response time (yr)
Local	<1km	<5	<30
Intermediate	1 – 5km	5-50	30-100
Regional	>5km	>50	>100

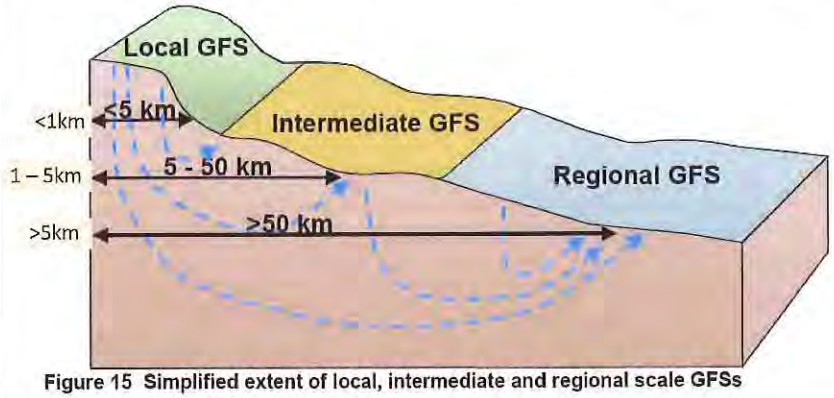


Figure 15 Simplified extent of local, intermediate and regional scale GFSs

Figure 3. Figure 15 and Table 1 from Hocking *et al* (2005). The scale are based on mainland Australian conditions, and are not regarded as appropriate for the geological complexity and moderate relief in the vicinity of the WJQ. Suggested modified scales are superimposed on the Figure and Table. Response times are conceptual only, depending on aquifer permeability and transmissivity at all scales.

2.3 Estimated groundwater travel times

Table 1 characterises regional, intermediate and local groundwater flow systems with respect to rock and material types in the vicinity of the WJQ, assigns permeabilities[10], effective porosities, lengths of

[10] Fractured rock types (basalt) in Table 1 are assigned a permeability of 0.01m/day. There is limited data available for permeabilities generally in Tasmania. However, values of 0.01m/day have been obtained from testing in fractured rocks in western Tasmania (W. C. Cromer unpublished data). For intergranular materials, permeabilities possibly range from <0.0001m/day to >0.1m/day for clay to silty fine sand respectively. Some clay layers may act

flow paths, and estimates rates of groundwater flow and the travel time within each groundwater system.

Estimated travel times for flow in local-scale, intermediate-scale and regional-scale systems are broadly in agreement with Figure 3. Depending mainly on the length of flow path and hydraulic gradient, travel times:

- for regional flow systems probably range from centuries to millennia,
- for intermediate flow systems probably range from decades to centuries, and
- for local systems probably range from years to decades.

2.4 Southerly quarry expansion and groundwater occurrence

2.4.1 Effects of quarrying on water table

Based on the modelling in this report, it is likely that quarrying operations in the proposed southern expansion will encounter groundwater[11] at a relatively early stage.

The initial effect will be to lower the water table in the immediate vicinity of the working face(s). Continued quarrying in a southerly direction will further lower the water table –causing groundwater flow directions (generally south to Kellys Creek) to reverse and gradually lowering the water table below creek level.

2.4.2 Future groundwater management during the southerly expansion

Groundwater quality and variations in water table elevation could be tracked in monitoring bores ahead of quarrying.

Depending on monitoring results, it may be appropriate to manage the depth to the water table ahead of quarrying. This could be done in a series of injection wells or trenches ("horizontal bores") with the aim of maintaining the water table above the level of Kellys Creek. The volume of water required to do this would be determined by pump testing the monitoring bores.

3 RECOMMENDATION

At least two groundwater monitoring/sampling bores should be installed before the southern expansion commences. Nominal bore locations are shown on the inset figure on Map 1 in Attachment 1. It is suggested that the bores be equipped with digital water level recorders.

as confining layers. An "average" or "bulk" permeability of 0.005m/day seems reasonable. In any case, the flow rates and travel times in Table 1 are intended to be indicative only, and should not be relied upon to reflect actual conditions at any site.

[11] Depending on permeability of the basalt, the groundwater may issue freely to the quarry floor (relatively high permeability) or may not be apparent (being evaporated from exposed joints at the same or higher rate than it enters the excavation).

Table 1. Regional, intermediate and local groundwater flow systems with respect to rock and material types in the vicinity of the WJQ, and estimated groundwater flow rates and travel times. The latter are indicative only.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Groundwater system	**Characteristics of flow paths**	**Aquifer**	**Example in the vicinity of WJQ**	**Aquifer permeability (m/day)**	**Head difference (m)**	**Length of flow path (m)**	**Hydraulic gradient**	**Flow volume (m3/day/ m2)**	**Flow volume (L/day/ m2)**	**Effective porosity**	**Flow rate (m/day)**	**Travel time (days; rounded)**	**Travel time (years; rounded)**	**Descriptor for travel time**
Regional	Irregular pathways through intersecting primary and secondary openings	Intergranular sediments	Tertiary sediments	0.005	150	10,000	0.02	0.0001	0.1	0.01	0.01	1,330,000	3,600	"Centuries to Millennia"
Intermediate		Fractured hard rock	Tertiary basalt	0.01	100	5,000	0.02	0.0002	0.2	0.01	0.02	250,000	700	"Decades to Centuries"
Intermediate		Intergranular sediments	Tertiary sediments	0.005	100	5,000	0.02	0.0001	0.1	0.01	0.01	500,000	1,400	
Local		Intergranular sediments	Tertiary sediments	0.005	20	250	0.08	0.0004	0.4	0.01	0.04	6,300	20	"Years to Decades"
Local		Fractured hard rock	Tertiary basalt	0.01	10	250	0.04	0.0004	0.4	0.01	0.04	6,300	17	

IMPORTANT: Inputs to this Table after Column 4 are rough estimates based on limited or no field data. Results should be treated with caution.

Notes for Columns

Column 1 Figures 2 and 3 in report; and Attachment 2 for hydrogeological cross sections
Column 2 Schematic, conceptual types of flow paths in the cross sections in Attachment 2
Column 3 Section 2 in report
Column 4 Published geology, interpreted cross sections; logs of bore holes
Column 5 0.01m/day is fairly typical of fractured rock aquifers in Tasmania.
Column 6 Based on Attachment 2 cross sections
Column 7 Based on Attachment 2 cross sections
Column 8 Column 6 divided by Column 7
Column 9 From Darcy's Law: Flow volume = Column 5 x Column 8
Column 10 Column 9 x 1000. The flow through unit area of aquifer.
Column 11 Reasonable estimates
Column 12 Column 9 divided by Column 11
Column 13 Column 7 divided by Column 12
Column 14 Column 13 divided by 365

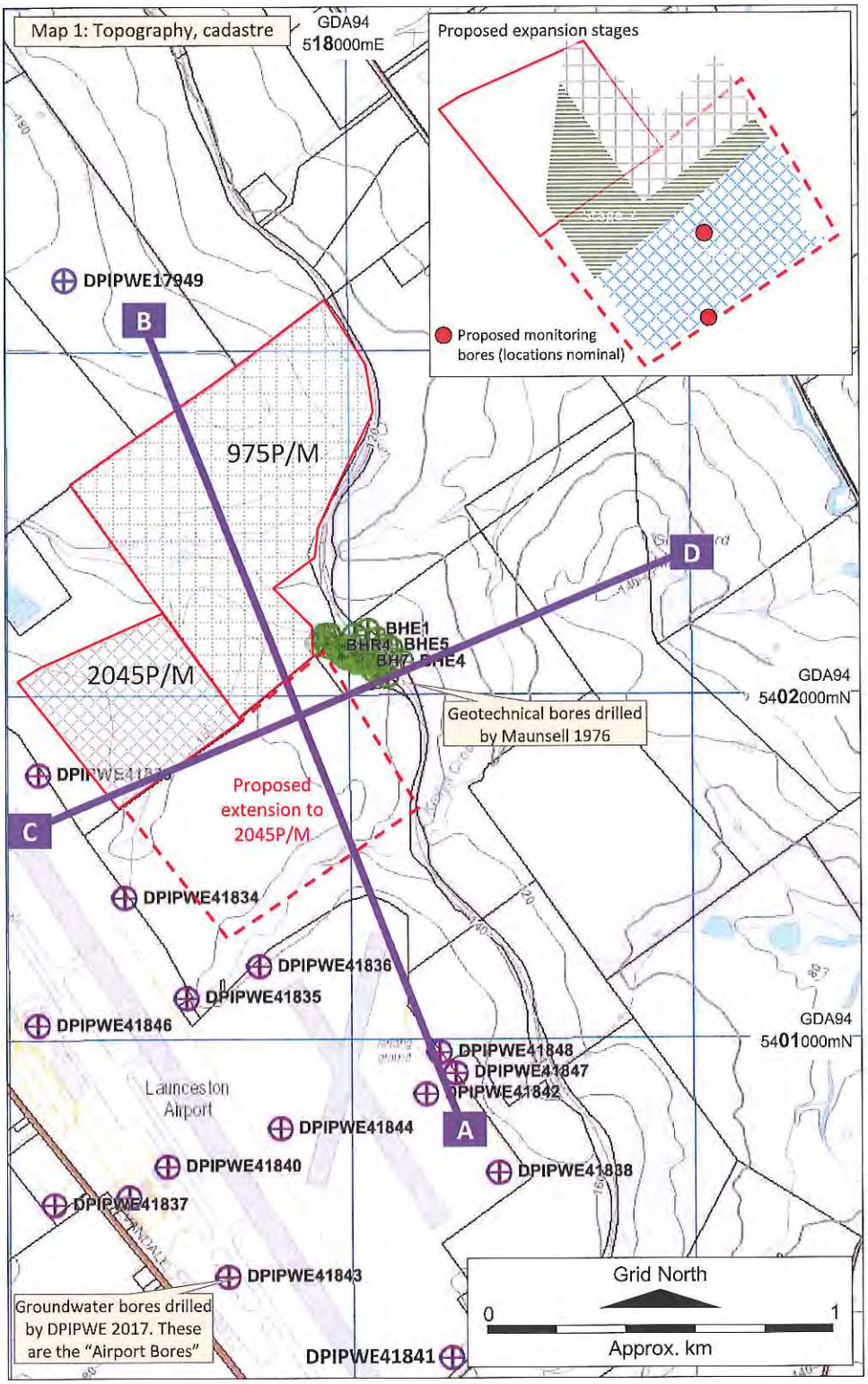
Attachment 1
(5 pages including this page)

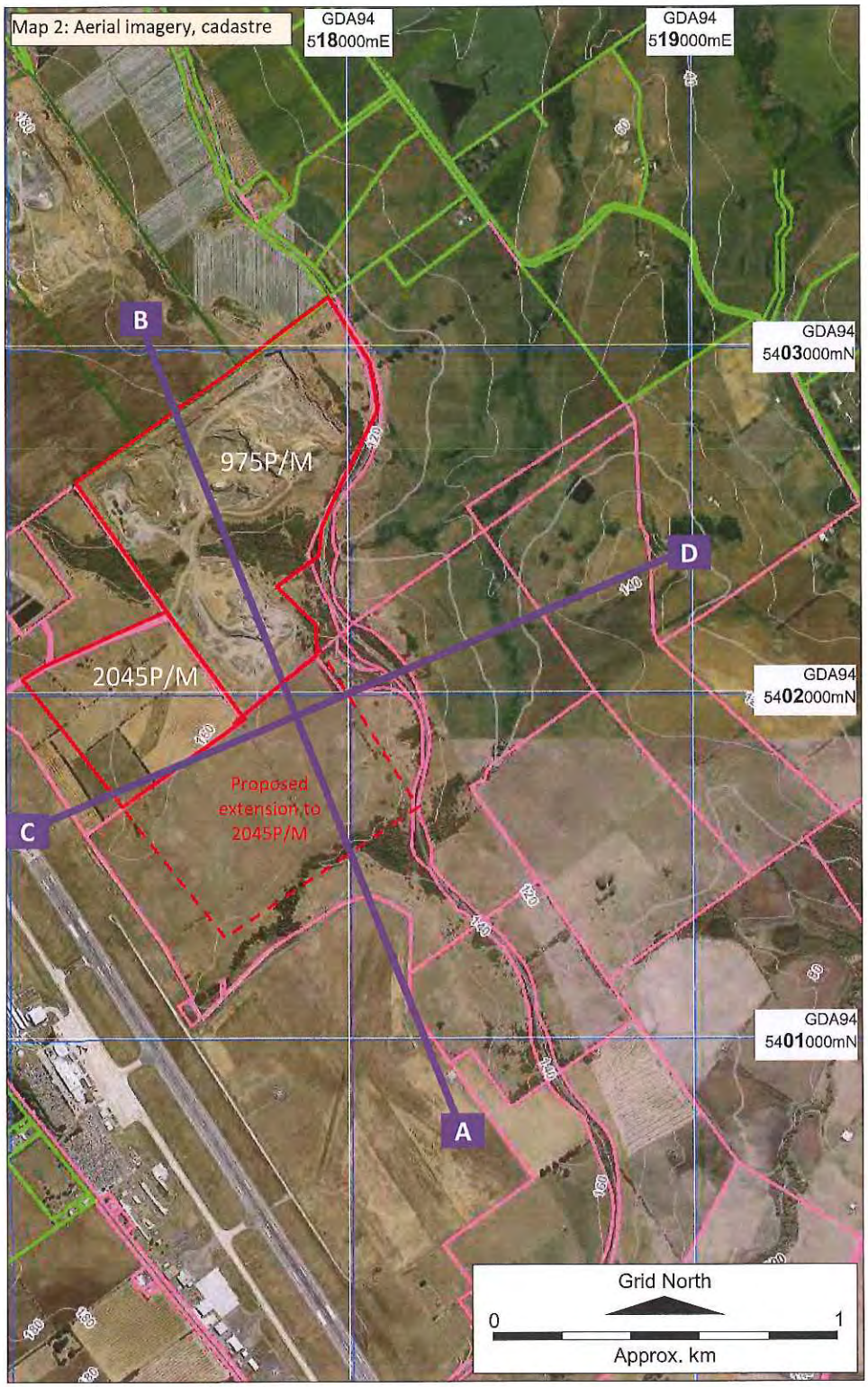
Maps from www.thelist.tas.gov.au

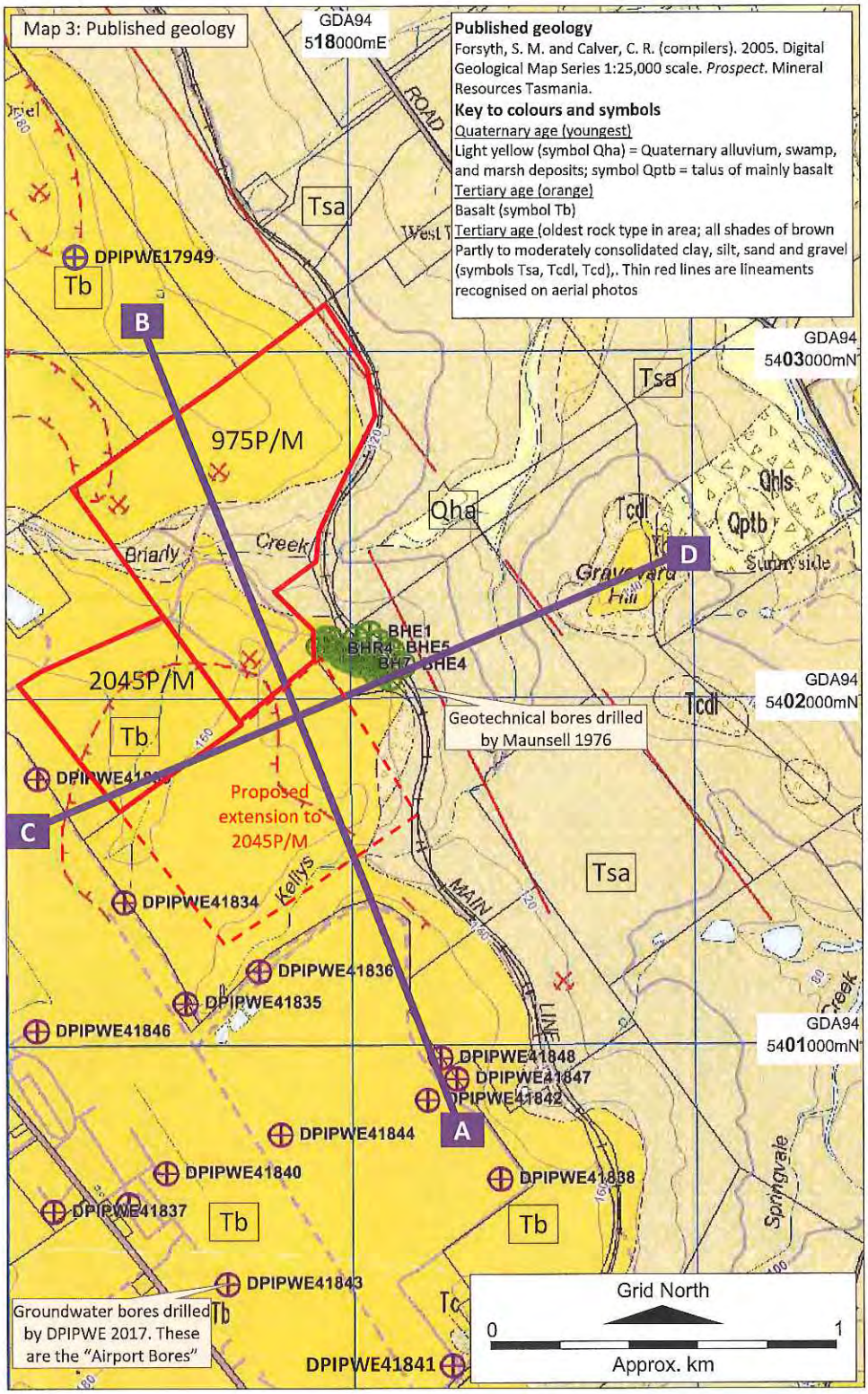
Map 1 Topography and cadastre
Map 2 Aerial imagery
Map 3 Published geology
Map 4 Hillshading

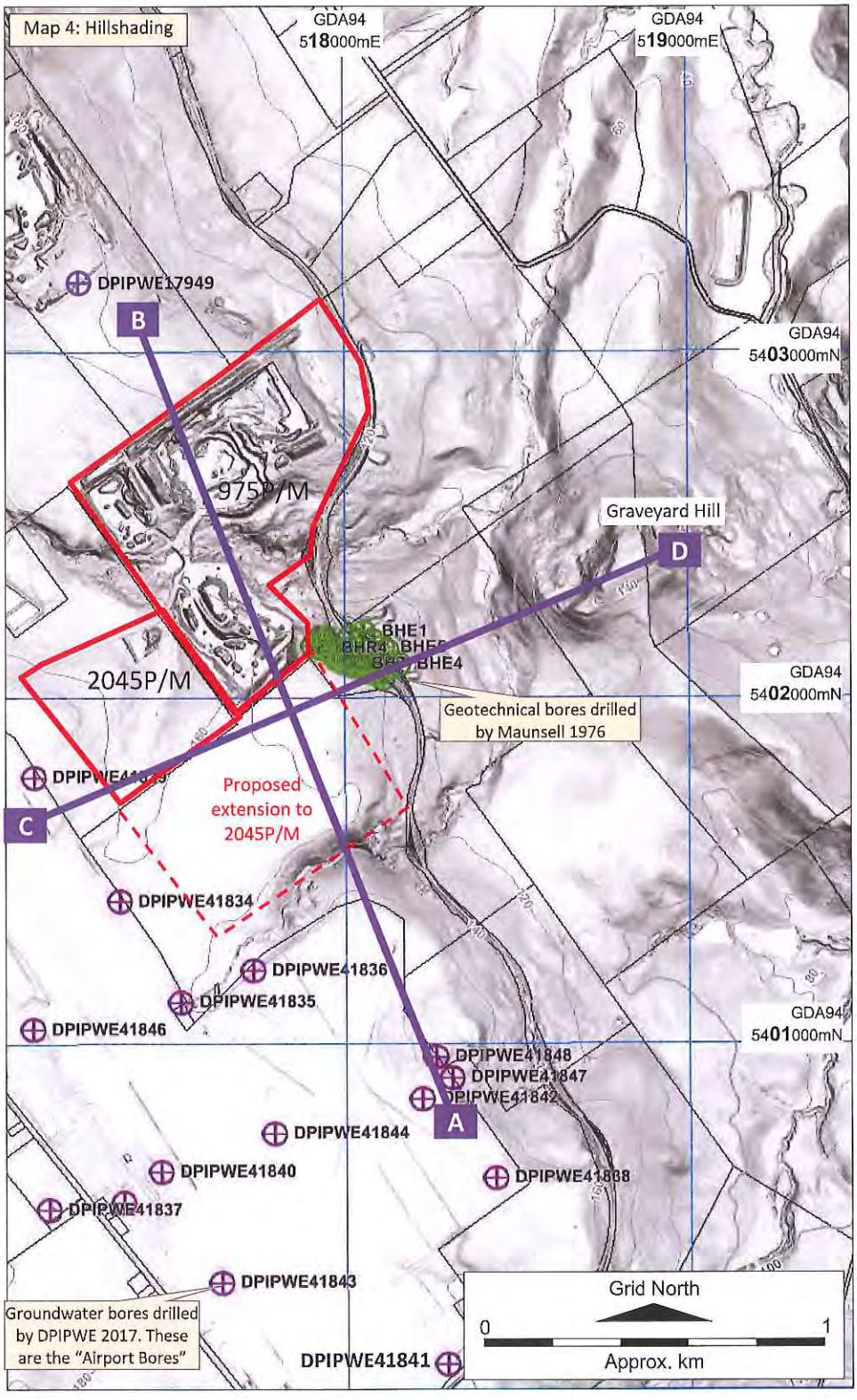
Some of the maps have the following overlays

- Existing Bis mining lease 975P/M and lease application 2045P/M
  - Proposed altered boundary to lease application 2045P/M
- Locations of water bores (Groundwater information access portal)
- Location of sections lines for conceptual hydrogeological models (cross sections) in Attachment 3


Map 1: Topography, cadastre
GDA94
518000mE
Proposed expansion stages
Proposed monitoring bores (locations nominal)
DPIPWE17949
B
975P/M
D
BHE1
BHR4
BHE5
BHE4
2045P/M
GDA94
5402000mN
Geotechnical bores drilled by Maunsell 1976
DPIPWE41833
Proposed extension to 2045P/M
C
DPIPWE41834
DPIPWE41836
DPIPWE41835
DPIPWE41846
GDA94
5401000mN
DPIPWE41848
DPIPWE41847
DPIPWE41842
Launceston Airport
DPIPWE41844
A
DPIPWE41840
DPIPWE41838
DPIPWE41837
DPIPWE41843
Groundwater bores drilled by DPIPWE 2017. These are the "Airport Bores"
DPIPWE41841
Grid North
0
1
Approx. km


Map 2: Aerial imagery, cadastre
GDA94 518000mE
GDA94 519000mE
GDA94 5403000mN
GDA94 5402000mN
GDA94 5401000mN
B
D
C
A
975P/M
2045P/M
Proposed extension to 2045P/M
Grid North
0
1
Approx. km


Map 3: Published geology
GDA94
518000mE
Published geology
Forsyth, S. M. and Calver, C. R. (compilers). 2005. Digital Geological Map Series 1:25,000 scale. Prospect. Mineral Resources Tasmania.
Key to colours and symbols
Quaternary age (youngest)
Light yellow (symbol Qha) = Quaternary alluvium, swamp, and marsh deposits; symbol Qptb = talus of mainly basalt
Tertiary age (orange)
Basalt (symbol Tb)
Tertiary age (oldest rock type in area; all shades of brown
Partly to moderately consolidated clay, silt, sand and gravel (symbols Tsa, Tcdl, Tcd),. Thin red lines are lineaments recognised on aerial photos
GDA94
5403000mN
GDA94
5402000mN
GDA94
5401000mN
Tsa
Tb
Qha
Qhls
Qptb
Tcdl
Tcd
975P/M
2045P/M
Briarly Creek
Sunnyside
Grave Yard Hill
DPIPWE17949
BHE1
BHR4
BHE5
BH7
BHE4
Geotechnical bores drilled by Maunsell 1976
Proposed extension to 2045P/M
DPIPWE41834
DPIPWE41836
DPIPWE41835
DPIPWE41846
DPIPWE41848
DPIPWE41847
DPIPWE41842
DPIPWE41844
DPIPWE41840
DPIPWE41838
DPIPWE41837
DPIPWE41843
DPIPWE41841
Groundwater bores drilled by DPIPWE 2017. These are the "Airport Bores"
A
B
C
D
Kellys
MAIN
LINE
Springvale
Grid North
0
1
Approx. km


Map 4: Hillshading
GDA94
518000mE
GDA94
519000mE
GDA94
5403000mN
GDA94
5402000mN
GDA94
5401000mN
DPIPWE17949
B
975P/M
2045P/M
Graveyard Hill
D
BHE1
BHE4
Geotechnical bores drilled by Maunsell 1976
Proposed extension to 2045P/M
C
DPIPWE41834
DPIPWE41836
DPIPWE41835
DPIPWE41846
DPIPWE41848
DPIPWE41847
DPIPWE41842
A
DPIPWE41844
DPIPWE41840
DPIPWE41838
DPIPWE41837
DPIPWE41843
DPIPWE41841
Groundwater bores drilled by DPIPWE 2017. These are the "Airport Bores"
Grid North
0
1
Approx. km

Attachment 2

(3 pages including this page)

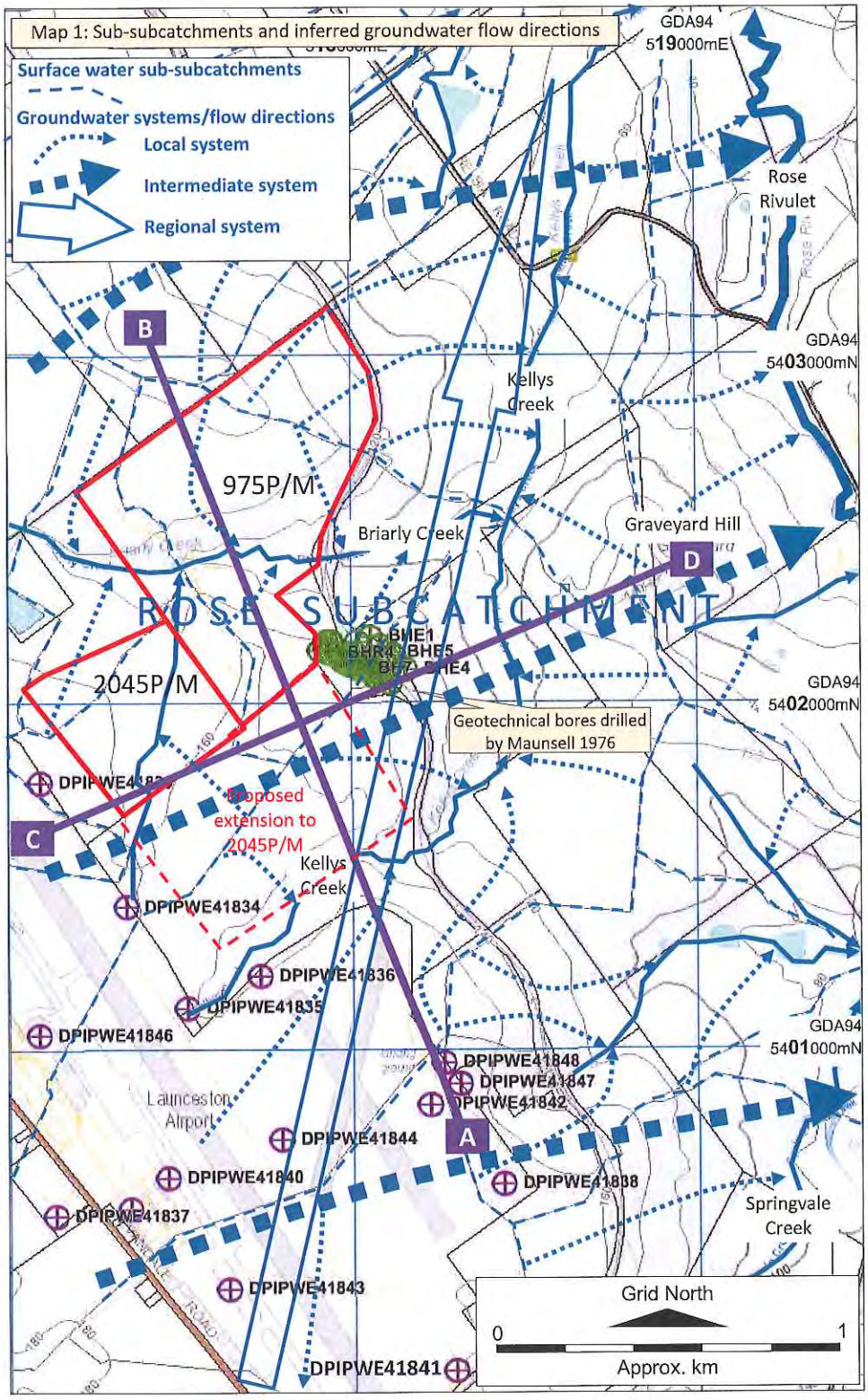
Inferred local- , Intermediate- , and regional groundwater flow directions in the vicinity of the WJQ

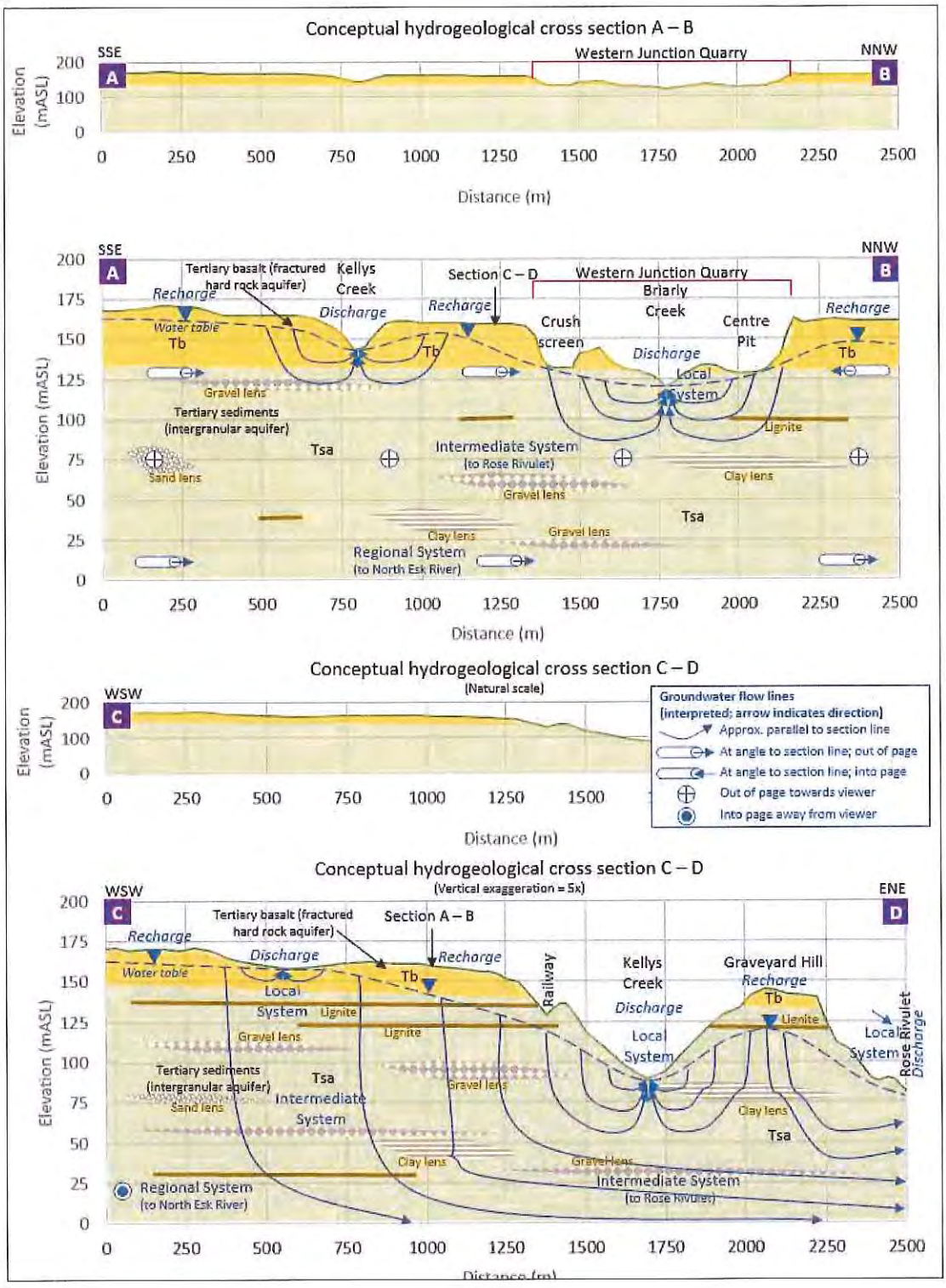
and

Conceptual hydrogeological models (cross sections A – B and C – D)

Notes for Map 1.

Local, intermediate, and regional groundwater flow directions are inferred from site observations, groundwater levels in bores, and groundwater fundamentals. Local flow (arrowed thin blue dotted lines) is in small sub-subcatchments ("CFEV River section subcatchments" on www.thelist.tas.gov.au) in all directions, intermediate flow (arrowed thicker dashed blue lines) is interpreted as ENE within the Rose Subcatchment (84km^2), and regional flow (thick open blue arrows) is mostly NNE in the North Esk Catchment (1063km^2) towards the North Esk River.


Map 1: Sub-subcatchments and inferred groundwater flow directions
Surface water sub-subcatchments
Groundwater systems/flow directions
Local system
Intermediate system
Regional system
GDA94
519000mE
Rose
Rivulet
GDA94
5403000mN
Kellys
Creek
975P/M
Briarly Creek
Graveyard Hill
ROSE SUBCATCHMENT
BHE1
BHE5
BHE4
2045P/M
GDA94
5402000mN
Geotechnical bores drilled
by Maunsell 1976
Proposed
extension to
2045P/M
Kellys
Creek
DPIPWE41834
DPIPWE41836
DPIPWE41835
DPIPWE41846
GDA94
5401000mN
DPIPWE41848
DPIPWE41847
DPIPWE41842
Launceston
Airport
DPIPWE41844
DPIPWE41840
DPIPWE41838
DPIPWE41837
Springvale
Creek
DPIPWE41843
DPIPWE41841
A
B
C
D
Grid North
0
1
Approx. km


Conceptual hydrogeological cross section A – B
SSE
NNW
Western Junction Quarry
A
B
Elevation (mASL)
Distance (m)
Tertiary basalt (fractured hard rock aquifer)
Kellys Creek
Section C – D
Briarly Creek
Crush screen
Centre Pit
Recharge
Discharge
Water table
Tb
Gravel lens
Tertiary sediments (intergranular aquifer)
Tsa
Intermediate System (to Rose Rivulet)
Sand lens
Clay lens
Lignite
Regional System (to North Esk River)
Local System
Conceptual hydrogeological cross section C – D
(Natural scale)
WSW
C
Groundwater flow lines
(interpreted; arrow indicates direction)
Approx. parallel to section line
At angle to section line; out of page
At angle to section line; into page
Out of page towards viewer
Into page away from viewer
Conceptual hydrogeological cross section C – D
(Vertical exaggeration = 5x)
ENE
D
Section A – B
Railway
Graveyard Hill
Rose Rivulet
Discharge
Regional System
(to North Esk River)
Intermediate System
(to Rose Rivulet)

D. N. Hughes

Western Junction Quarry Southern Extension

Development Proposal and Environmental Management Plan

APPENDIX E

NVC Noise Assessment

D. N. Hughes

Western Junction Quarry Extension

NVC
NOISE VIBRATION CONSULTING

John Miedecke & Partners Pty Ltd
41 Tasma Street
North Hobart TAS 7000

11 August 2021

Ref: 1201-2 Noise Assessment Addendum

Attention: John Miedecke

WESTERN JUNCTION QUARRY — SOUTHERN EXPANSION NOISE IMPACT ASSESSMENT ADDENDUM

BIS Industries currently operates within mining lease 975 P/M, and is expanding their operations into mining lease 2045 P/M. As part of the DPEMP process, a noise impact assessment for this expansion was conducted by NVC between October 2017 and April 2018, NVC document 5624_01[1]. Planning approval for this expansion was subsequently granted on the 20th November 2020.

Since that assessment was conducted, the quarry operator has acquired a parcel of land adjacent to the southern boundary of lease 2045 P/M, and is proposing to expand operations into this area. As such, NVC has updated the original noise assessment to include the new proposed area, the results of which are contained in this letter.

1. BACKGROUND

The site and surrounding area is shown in Figure 1, with the proposed expansion outlined in red.

FIGURE 1: SITE AND SURROUNDING AREA

[1] *BIS Western Junction Quarry Extension - Noise Impact Assessment*, NVC, 5264_01, 14 May 2018.

1.1. Surrounding Area

The original noise impact assessment[1] contains a detailed description of the topography of the surrounding area, and thus this section only details relevant changes from that description.

The nearest residence is 1280 m from the crusher and shown in Figure 1 as location B. Further residences typical of the surrounding area (locations A and C), are located 1310 and 1420 m respectively from the crusher location. Location A looks up the hill to its ridge line and has no clear view of the existing crushing plant, while location B has distant view of the crushing plant. Location C is the owner of the quarry land and has no clear view of the plant. The proposed southern expansion takes the working face further to the south, thereby taking it further from all three residences. Screening for all three residences to this new development area is either maintained or increased compared to the current working area location.

Launceston Airport is also included in the modelling at location D, as requested in the EPA EER guidelines[2]. Note this is not deemed a sensitive receiver. The proposed expansion takes the operating face of the quarry closer to the airport, however due to the location of the bunds and the aspect of the progressing quarry face, the airport is well screened from the equipment, aside from the drill rig whilst operating at existing ground level.

Particular details of the locations are given in Table 1. It is noted that the distances for the proposed expansion approximate the worst-case scenario, i.e. the nearest extents of the land area to each residence.

TABLE 1: NEAREST SENSITIVE RECEIVERS

	Location	Distance to Crusher (m)	Distance to Working Face (m)		
			Current	2045 P/M	Proposed
A	**578 Relbia Road**	1310	740	1500	1400
B	**55 Raeburn Road**	1280	1500	960	1200
C	**81 Evandale Road**	1420	1810	980	1200
D	**Launceston Airport**	1700	2000	900	800

1.2. Quarry Expansion

Quarry operations within the proposed extension area are to consist of an initial bench to the west of the current operation, to establish a working area. Topsoil / overburden are to be pushed to the north, to establish a bund on the northern side of the operating area. Once this area has been established, operations are to progress to the south-east.

The operation comprises, in general the following procedure:

- Overburden is removed via tracked dozer.
- Drilling and blasting is conducted to establish each bench.
- A tracked excavator loads blasted rock onto a haul truck for transport to the crushing plant.
- Crushed product is loaded (via wheel loader) onto trucks for transport off site.

The quarry is first to establish a bench at RL142, pushing south-west and south-east towards the site boundaries. A second bench is to follow behind this, at RL130. Overburden is initially to be stockpiled to the north of the progressing quarry. Once this area is full, the remaining overburden will be pushed towards the south-western and finally south-eastern boundaries.

The crushing plant is to be located in it's existing location for the duration of the quarry's life.

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[2] Extractive Industry Environmental Effects Report - Guidelines for D.N Hughes, Western Junction Quarry - Southern Expansion, Western Junction, April 2021, EPA Tasmania.

The various stages of the quarry's expansion are shown in figures 2 to 5.

Operating hours for the quarry are listed below and are to remain the same.

Crushing	0700 to 1700 hours Monday to Friday, 0700 to 1530 hours Saturday
Sales	0600 to 1700 hours Monday to Friday

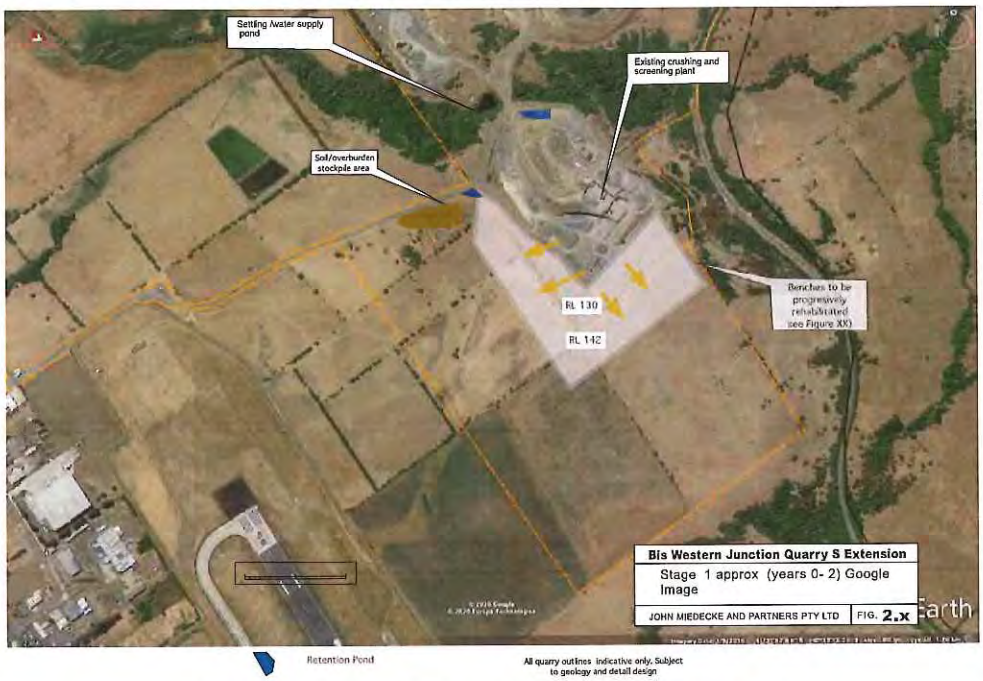


FIGURE 2: QUARRY EXPANSION STAGE 1 - YEARS 0 TO 2

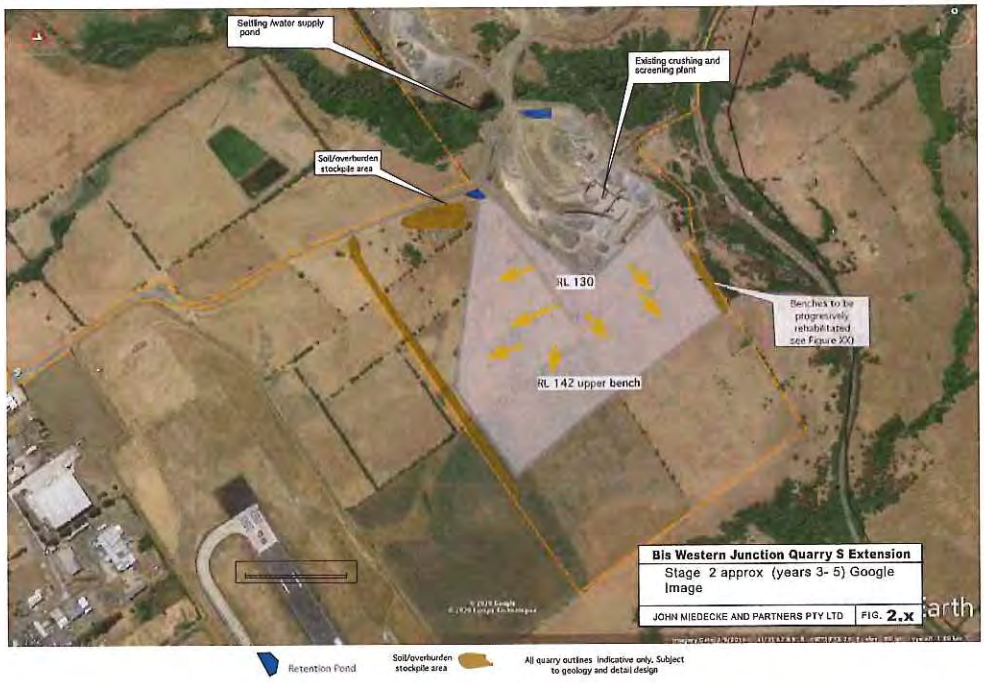


FIGURE 3: QUARRY EXPANSION STAGE 2 - YEARS 3 TO 5

FIGURE 4: QUARRY EXPANSION STAGE 3 - YEARS 5 TO 10

FIGURE 5: QUARRY EXPANSION FINAL STAGE - YEARS 15+

1.3. Quarry Noise Sources

From measurements conducted around the various pieces of plant (see original noise assessment[1]), their sound power has been calculated, as listed in Table 2. The original assessment contains further details of the equipment, and thus they are not reproduced in full here. It is noted that neither the original assessment nor this document contains any assessment of blasting. Such as assessment was conducted separately by Terrock.

TABLE 2: SOURCE SOUND POWER LEVELS

Source	Sound Power Level, dBA
Crushing Plant	120
Drill Rig	119
Tracked Excavator	112
Wheeled Loader	106
Haul Truck	105
Delivery Truck	103

2. CRITERIA

The quarry operates within mining leases 975P/M and 2045P/M under permit 9667, which specifies the following noise criteria under section N1 - Noise emission limits:

" 1. *Noise emissions from the activity when measured at any noise sensitive premises in other ownership and expressed as the equivalent continuous A-weighted sound pressure level must not exceed;*

1.1. 50 dBA between 0700 to 1800 hours (day time); and

1.2. 40 dBA from 1800 to 2200 hours (evening time); and

1.3. 35 dBA from 2200 to 0700 hours (night time).

2. *Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, this condition will no be considered to be breached unless the noise emissions fro the activity are audible and exceed the ambient noise levels by at least 5 dBA..."*

This criteria is therefore deemed likely to be applicable to the southern expansion of the quarry. For comparison, the Quarry Code of Practice (QCoP), is also referred to, which states the following pertaining to noise emissions from quarrying activities:

"Noise from quarrying and associated activities, including equipment maintenance, when measured at any neighbouring sensitive use must not exceed the greater of;

- *the A-weighted 10 minute L90, excluding noise from the quarry, plus 5 dBA, or,*
- *the following levels;*
  - *45 dBA from 0700 to 1900 hours (day time),*
  - *40 dBA from 1900 to 2200 hours (evening),*
  - *35 dBA from 2200 to 0700 hours (night time)."*

The quarrying operations occur within the day time only, and thus the tightest relevant criterion is 45 dBA, at the nearest residential receiver, under the QCoP. Should the criteria from permit 9667 apply, the criterion would be 50 dBA. It is noted that location D (Launceston Airport) is not deemed to be a sensitive use.

3. NOISE PREDICTIONS

Predictions of the quarry noise in the community were made using *iNoise* software to implement the ISO9613 algorithms. The model includes attenuation due to geometric divergence, atmospheric absorption, ground absorption, and screening due to barriers / bunds and topography.

The current operations were initially modelled and validated against noise measurements, as detailed in the original noise assessment[1]. Details are not reproduced here, however it is noted that the validation showed predicted noise levels were generally approximately 2dB higher than the measured levels. The model is therefore considered valid. It is slightly overestimating the noise levels (as it is predicting worst-case), and is thus considered to be conservative.

For this assessment, the model was re-configured to implement the proposed quarry plan for each stage. The following notes regarding the modelling are relevant:

- 1m topographic contours were taken from LIDAR data, and combined with detailed 0.2m contours obtained from BIS for the new lease area.
- All sources are assumed operating simultaneously and continuously, for the entire period, (excluding the drill rig, which is modelled separately).
- The haul truck is modelled as operating continuously, as a moving source operating between the crusher and the quarry pit.
- The dozer operates at existing ground level when stripping topsoil / overburden, and the drill rig also operates at existing ground level in establishing the first bench.
- Since the exact extents of the overburden bund are unknown, this bund is excluded from the model. This is extremely conservative, as the bund is likely to provide significant screening to locations B and C - i.e. the nearest residences to the proposed expansion.
- The crushing plant is modelled as a single source. Located between the jaw crusher and second stage crusher.
- The ground at the quarry is taken as hard (reflective - ground factor of 1), and at the receiver and intervening land medium (typical of pasture land with limited shrubs or bush - ground factor of 0.5).
- Delivery trucks were modelled in the original assessment, and as delivery truck operations are not to change, the modelling is not reproduced here. The levels shown in this section re taken directly from the original assessment.
- The ISO9613 algorithms are based on the receiver being downwind of the source in a light wind or with a mild temperature inversion in place – this is a worst-case scenario.
- Blasting is not included in the model.

The stages of the quarry expansion are thus modelled as follows:

Overburden and top soil removal

- A dozer is operating on the existing ground level to the west of the existing operation, to push material to the relevant edge of the quarry.
- Wheeled loaders, delivery and crushing operations all as currently.

Stage 1/2/3 A

- The drill rig operates at existing ground level to establish the first bench, just to the west of the operating area.
- The excavator and haul truck operate at the base of this bench, at RL142.
- Wheeled loaders, delivery and crushing operations all as currently.

Stage 1/2/3 B

- As per Stage 1/2/3 A above, except the drill rig operates at RL142, and the excavator and haul trucks operate at RL130.
- Operation at the lower bench provides additional screening to the residences, and is thus modelled to demonstrate the reduction in noise emissions caused by this.

A sample of the model inputs (here for Stage 1/2/3 B) are shown in Figure 6.

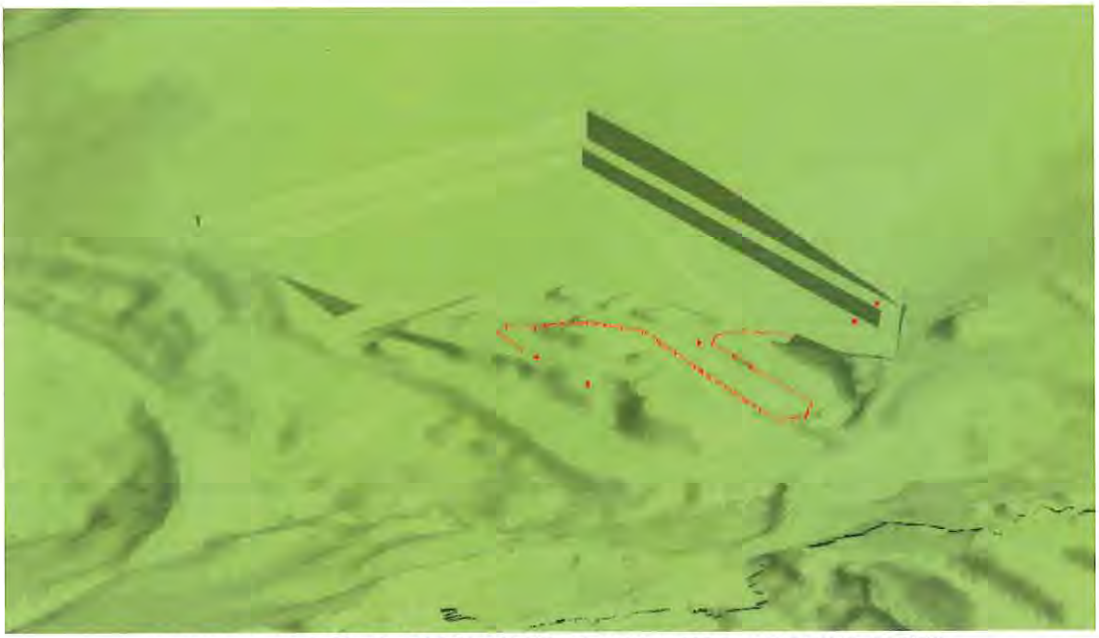


FIGURE 6: ACOUSTIC MODEL INPUT - STAGE 1/2/3 B - LOOKING SOUTH

For the duration of each stage, noise emissions to sensitive receivers will be strongest when the equipment is at the northern edge of the stage (i.e. closest to residences, and with the least screening) and this is the situation that has been modelled. The modelled cases are then the worst cases over the life of the quarry.

In each stage the following aspects of operations are separately modelled:

Normal operations - the haul trucks, excavator, loaders and crusher all operate continuously.

Drilling - the drill rig operates continuously in the most exposed location for that stage.

Delivery trucks - delivery trucks operate from the crusher to the weigh bridge (site boundary).

The predicted community noise levels are then as listed in Table 3 with noise contour maps for the various stages shown in figures 7 to 9.

TABLE 3: PREDICTED COMMUNITY NOISE LEVELS

Operation	Quarry Stage	Sound Pressure Level, dBA			
		Location A	Location B	Location C	Location D
Normal Operations	Current	39	42	36	35
	Overburden Removal	39	42	36	35
	Stage 1/2/3 A	37	42	36	36
	Stage 1/2/3 B	37	42	36	36
Drilling	Stage 1/2/3 A	36	40	39	39
	Stage 1/2/3 B	36	39	36	37
Delivery Trucks	All Stages	< 20	33	35	28

From the predicted noise levels, the following is noted:

- The crushing plant is the dominant noise source from the normal production operations at all receivers, for all quarry stages.
  - As its operation and location is to remain the same as currently, its noise emissions will not change.
- It is noted that noise levels from normal operations at location A are predicted to decrease slightly for the new operating area, due to the excavator and haul truck operating significantly further from this location. The crusher remains the dominant noise source here.
- The worst case for the drill rig is establishing the northern end of the initial bench.
  - As the drill rig moves south, it is further from the sensitive receivers, and thus the predicted noise levels are reduced.
  - As the drill rig progresses to establish the second bench (i.e. operates atop the first bench, at RL142) it is significantly more screened from the receivers, and thus the predicted noise levels are reduced. It is noted that the location used for the predictions is chosen as it exhibits the least screening within that stage, i.e. is worst-case. Predicted noise levels are thus likely to be lower than this for the majority of the drill rig's operation.
- The worst-case noise emissions under the original noise assessment[1] were 39, 49 and 43 dBA at locations A, B and C respectively. The revised proposed expansion plan results in moving the equipment further away from the receivers, with equivalent or improved screening, and as such results in reduced noise levels compared to that proposal.

4. ASSESSMENT

Quarry production is only to occur within the daytime hours stated in the Quarry Code of Practice, and hence only daytime noise levels are assessed. The current and predicted worst-case noise levels at the residences and the relevant criteria are summarised in Table 4.

The assessment shows that the quarry noise emissions, both for normal operations only, and for normal operations and drilling simultaneously, meet the QCoP and current permit criterion during all stages of the expansion. This is further demonstrated in the noise contour plots (figures 7 to 9), where all sensitive receivers in the area are seen to be well outside the 50dBA contour.

It is noted that the predicted noise emissions are strongest at the beginning of the expansion, when the drill rig is operating on existing ground level at the northern end of the proposed expansion. It is further noted that these predictions assume no overburden bund between the drill rig and the

residences at location B, C and D. The implementation of this bund, which is already part of the quarry plan, will further reduce the predicted noise levels at these locations.

TABLE 4: ASSESSMENT OF PREDICTED COMMUNITY NOISE LEVELS

Operation	Quarry Stage	Sound Pressure Level, dBA			
		Location A	Location B	Location C	Location D
Normal Operations	Current	39	42	36	35
	Stage 1/2/3 A/B	39	42	36	36
Normal Operations + Drilling	Stage 1/2/3 A	39	44	41	40
	Stage 1/2/3 B	39	43	39	39
Criteria	All Stages	45	45	45	–

The predicted noise emissions from the quarry, both from normal operation and from drilling, are below the relevant noise criterion at the nearest sensitive receivers, and are thus deemed acceptable.

Should you have any queries, please do not hesitate to contact me directly.

Kind regards,

Jack Pitt

NOISE VIBRATION CONSULTING

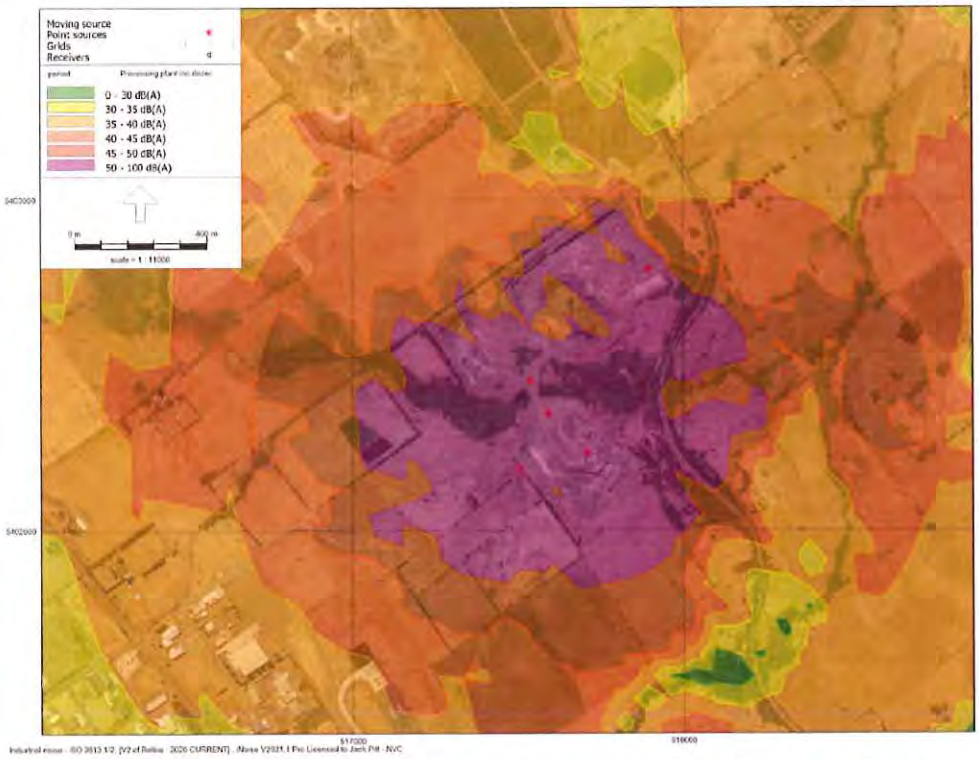


FIGURE 7: OVERBURDEN REMOVAL & PROCESSING PLANT - NOISE CONTOURS

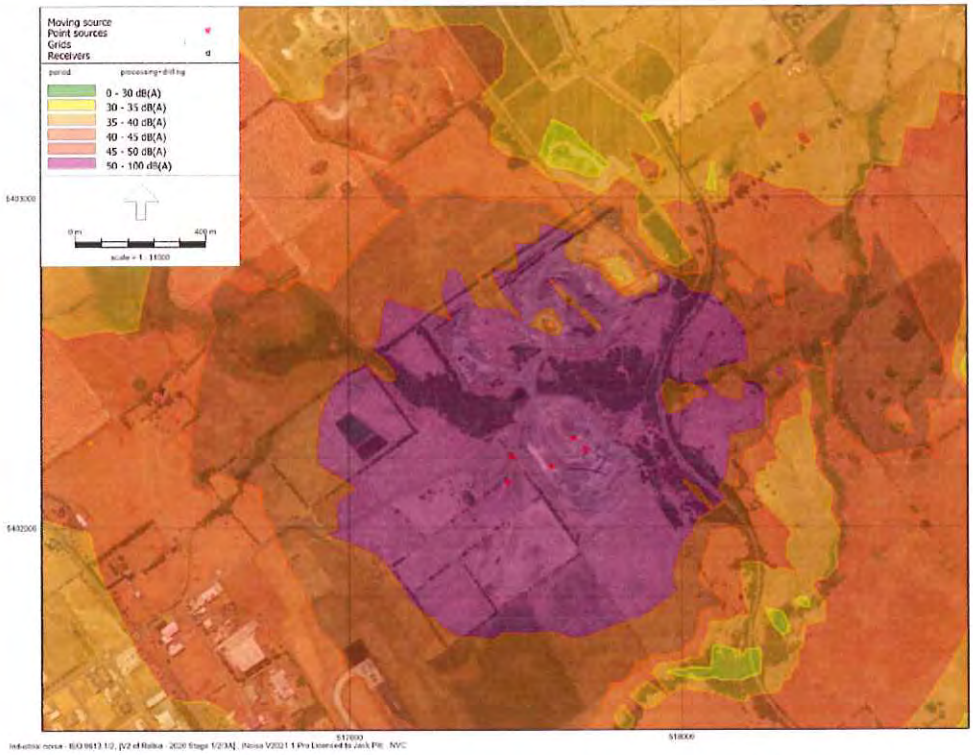


FIGURE 8: STAGE 1/2/3 A - PROCESSING PLANT & DRILL RIG - NOISE CONTOURS

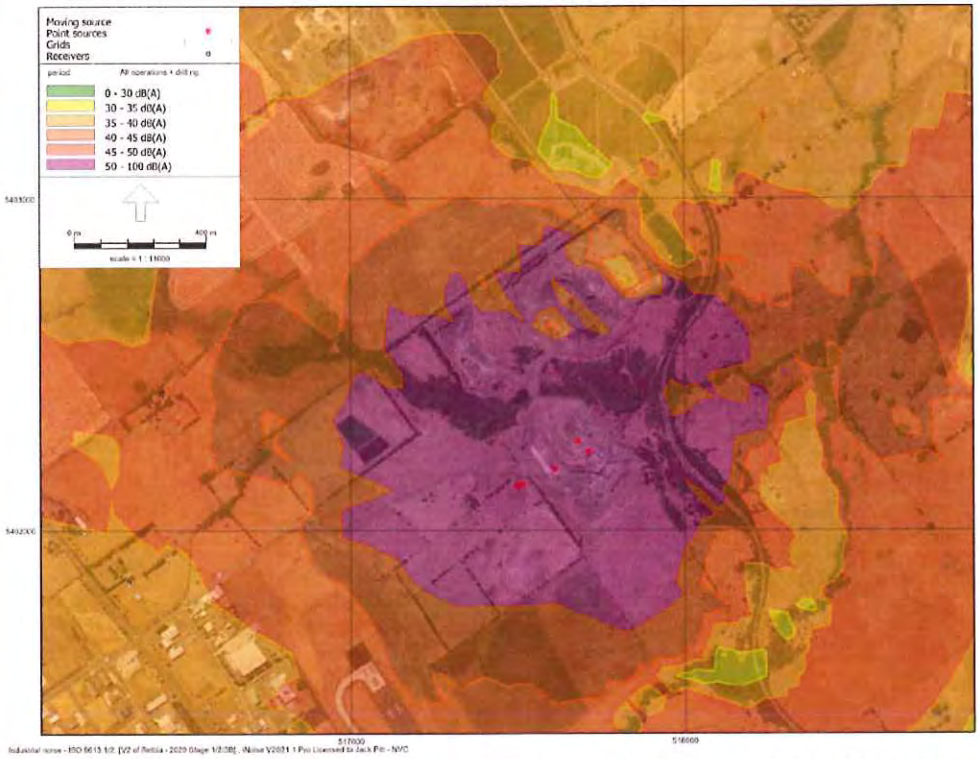


FIGURE 9: STAGE 1/2/3 B - PROCESSING PLANT & DRILL RIG - NOISE CONTOURS

D. N. Hughes

Western Junction Quarry Southern Extension

Development Proposal and Environmental Management Plan

APPENDIX F

Terrock Blasting Assessment

TERROCK
CONSULTING ENGINEERS

P O Box 829
Eltham Vic 3095
Phone: (03) 9431 0033
Fax: (03) 9431 1810
URL: http://terrock.com.au
Email: terrock@terrock.com.au
ABN: 99 005 784 841

Alan B. Richards
Ph.D, F.I.E.Aust., F.Aust.I.M.M.,F.I.Q.

Adrian J. Moore
Dip.C.E.,B.E.(Min.), M.Eng.Sc., M.I.E.Aust.

WESTERN JUNCTION QUARRY

QUARRY EXTENSION – EFFECTS OF BLASTING

1 INTRODUCTION

This report gives an assessment of the effects of blasting in the Western Junction Quarry Extension located near Launceston Airport, South of Launceston. The relative locations of the existing quarry and surrounds and the proposed extraction area are shown in **Figure 1.** It is proposed the extraction within the quarry will be carried out in six stages over the next 18 years. The stages are labelled **A-D** in **Appendix 2.**

Figure 1 – Western Junction Quarry site plan

The quarry is operated by Bis Industries and is a medium-scale operation currently permitted for 500,000 tonnes of crushed rock products per year. There is no increase to the production quantity with this new extension. The Western Junction Quarry has been utilising blasting for a period of approximately 40 years in order to remove overburden and break up the basalt for processing. The broken rock is loaded into trucks and carted to a stockpile area or dumped directly into a fixed crusher. Secondary breaking of oversize will be conducted by hydraulic impactor. The depth of the rock to be broken by blasting will be a maximum of 14 metres on each bench.

This report gives details of estimated blast vibration levels in the surrounding area from the main extraction stages. The report also recommends applicable control procedures to limit vibration and airblast from blasting in the proposed extension area to within the regulatory limits. This will be carried out for the life of the quarry at the nearby sensitive sites, as quarrying activities progress throughout the proposed extension. It is noted that the proposed extension area to the south, which will replace the approved extension area to the west, will result in decreased blasting impacts on existing sensitive uses

2 BLAST VIBRATION LIMITS

2.1 Ground Vibration

Ground vibration from blasting is barely noticed below 0.5 mm/s. The environmental ground vibration limits applied at the quarry are based on the Australian and New Zealand Environment Consultative Council (ANZECC) guidelines to minimise annoyance due to ground vibration from blasting and are set as a planning permit condition.

The environmental ground vibration limit is a peak vector particle velocity (PPV) of 5 mm/s at residences not owned or occupied by quarry personnel or at other sites with sensitive use. This limit may be exceeded on 5% of blasts in a 12 month period up to an absolute limit of 10 mm/s. For the industrial area and airport runway to the south west of the proposed extension, the limits can be higher as commercial structures are capable of withstanding higher forces. It is recommended that blast vibrations be kept under 10 mm/s for occupied commercial structures for all blasting by the quarry.

The prevention of damage to structures by blast vibration is a separate issue. 'Safe' levels for ground vibration limits to control damage to structures are recommended in Table J4.5(B) of Australian Standard 2187.2-2006, reproduced as **Table 1**.

Table 1 - Australian Standard 2187.2-2006 - Table J4.5(B) – Recommended Ground Vibration Limits for Control of Damage to Structures (see Note)

2.1.1.1.1 Category	Type of blasting operations	Peak component particle velocity (mm/s)
Other structures or architectural elements that include masonry, plaster and plasterboard in their construction	All blasting	Frequency-dependent damage limit criteria Tables J4.4.2.1 and J4.4.4.1
Unoccupied structures of reinforced concrete or steel construction	All blasting	100 mm/s maximum unless agreement is reached with the owner that a higher limit may apply
Service structures, such as pipelines, powerlines and cables	All blasting	Limit to be determined by structural design methodology

NOTE: Tables J4.5(A) and J4.5(B) do not cover high-rise buildings, buildings with long-span floors, specialist structures such as reservoirs, dams and hospitals, or buildings housing scientific equipment sensitive to vibration. These require special considerations, which may necessitate taking additional measurements on the structure itself, to detect any magnification of ground vibrations that might occur within the structure. Particular attention should be given to the response of suspended floors.

The proposed blasting practice will ensure that ground vibration levels do not exceed 5mm/s at any residential property and occupied industrial and airport buildings.

2.2 Air Vibration

Air vibration from blasting is barely noticed below 100 dBL. Air vibration limits applied at the quarry are based on guideline levels of the ANZECC guidelines to minimise annoyance due to blasting overpressure and are set as a planning permit condition. The air vibration limit at a residence or sensitive use site is a maximum of 115 dBL (peak), which may be exceeded on up to 5% of the total number of blasts over a twelve-month period, but should not exceed 120 dBL at any time.

This airblast limit is a human response limit intended to minimise the effect of airblast on people at sensitive sites, such as residences or schools and is not a limit to prevent possible damage. Australian Standard 2187.2-2006 states:

'From Australian and overseas research, damage (even of a cosmetic nature) has not been found to occur at airblast levels below 133 dBL..... A limit of 133 dBL is recommended as a safe level that will prevent structural/architectural damage from airblast.'

The proposed blasting practice will ensure that airblast overpressure levels do not exceed 115dBL at any residential property and occupied industrial and airport buildings.

3 DETERMINATION OF GROUND VIBRATION LEVELS

3.1 Basis for blast vibration level evaluations

The vibration from a blast in the quarry is continuously monitored by Maxam, with the results being used in this assessment. Recently blasting that will conform with the typical blasting of the extension have been used for these predictions.

The blasting specifications used in the blast vibration analysis are shown in **Table 2**. Currently and for future blasting, the explosives used will be the Maxam watergel RIOFLEX explosives, as its characteristics are better suited to the rock encountered.

As the quarry progresses through the proposed extension and working its way towards the airport in the later years of development, a reduced scale of blasting may be needed into order to keep levels under control but these changes will need to be reviewed and monitored as the quarry approaches the south western edge of the pit extension.

Table 2 – Blast specifications used in analysis

	Typical Blast Specifications
Bench height (m):	14
Hole depth (m):	15
Hole angle (°):	10
Blasthole diameter (mm):	89
Blasthole spacing (m)	2.8
Blasthole burden (m):	2.5
Front Row Burden (m)	3.6
Stemming height (m):	3
Explosive	RIOFLEX
Charge mass per m (kg)	8.1
Charge mass per delay (kg):	97
Powder factor (mg/m³):	1.012

3.2 Evaluation of maximum ground vibration levels

Ground vibration varies with distance from the blast, charge mass per delay, type of explosive, geological conditions, and blasting specifications. For similar geological conditions and blasting specifications, ground vibration varies with distance and charge mass per delay, according to the Site Law formula:

$$V = k_g \left(\frac{D}{\sqrt{W}} \right)^b \quad [1]$$

where:
- V = ground vibration as peak particle velocity (PPV) (mm/s)
- D = distance from blast (m)
- W = charge mass per delay (kg)
- b = site exponent or drop off (attenuation) rate
- k_g = site constant

The regression analysis of the previous ground vibration measurements taken in the Breadalbane area showed that conservative (worst case) site parameters are as follows:

Site exponent:-1.6

Site constant: 2400

Hence, the formula used for ground vibration prediction at the site is:

$$V = 2400 \left(\frac{D}{\sqrt{W}} \right)^{-1.6} \quad [2]$$

Ground vibration contours for a blast based on the above Site Law and a maximum charge mass per delay of 97 kg are shown in **Figure 2.** When the ground vibrations contours are superimposed on the site photo as an overlay and moved around the proposed extraction area for each stage, the effect of a blast anywhere in the planned extraction area can be readily seen. **Appendix 3** shows the predicted ground vibrations that would occur along the south western edge, closest to the identified sensitive sites.

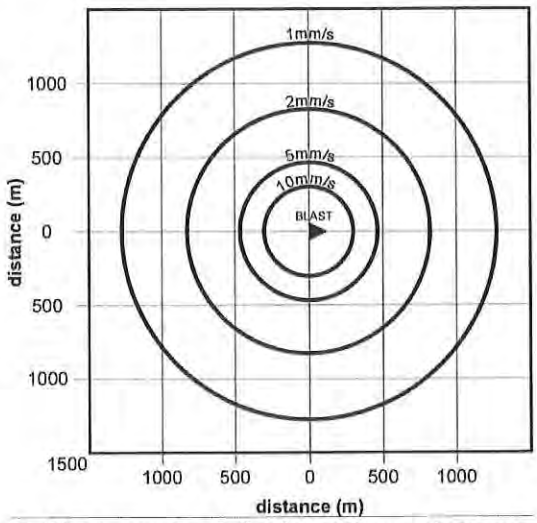


Figure 2 - Worst-case ground vibration contours – charge mass 97kg

Assuming worse-case vibration transmission, the milestone vibration levels occur at the predicted distances from a blast, as shown in **Table 3.**

Table 3 – Estimated ground vibration levels

PPV (mm/s)	Distance(m)
10	303
5	467
2	828
1	1277

The maximum extent of the 10, 5, and 2 mm/s contours for blasting using 97 kg of explosives is shown in **Appendix 3.** These represent the highest ground vibration levels in the area surrounding the quarry for any blast over the life of the quarry.

The closest residential property to the quarry is located 800m to the north west of the extension and at this distance the predicted ground vibrations level that would be generated by standard blasting practise would be 2.1 mm/s. This is below the limit of 5 mm/s and as this is the closest residential property, all residential properties beyond can be reasonably expected to be below this level. Therefore, the peak ground vibration at any residence will be less that 5mm/s.

Due to the proposed extraction limit of the new pit, blasting will potentially come within approximately 150m of the railway on the eastern side of the quarry. At a distance of 150m and using the planned blast design specifications, a maximum PPV level predicted for the railway line at its closest is 31mm/s. From the 2008 ACARP study "*Effect of Blasting on Infrastructure*" carried out by Terrock it was determined that conservative safe blasting limits for railway infrastructure was 100mm/s. Higher safe levels may be justified with further investigation, however, for the current plans at the Western Junction Quarry, blasting is not predicted to exceed these levels.

4. DETERMINATION OF AIRBLAST OVERPRESSURE LEVELS

4.1 Prediction of maximum air blast levels

The magnitude of airblast levels arriving at a point remote from the blast is a function of many parameters, including charge mass, confinement, burden, attenuation rate, shielding direction relative to the blast and meteorological conditions at the time of the blast. The attenuation rate for low frequency blast vibration has been found from experience to be a 9 dBL reduction with doubling of distance.

Analysis of blasting data from this and other quarries has permitted the relationship between maximum 120 dBL distance (the distance in front of the blast that the 120 dBL contours occurs), charge mass per delay and burden to be established.

The predictive model is:

$$D_{120} = \left(\frac{k_a \times d}{B}\right)^{2.5} \cdot \sqrt[3]{m} \qquad [3]$$

where:
- D_{120} = Distance to the 120 dBL air blast level (m)
- d = hole diameter (mm)
- B = burden (mm)
- m = charge mass (kg)
- k_a = site constant

For the empirical constant in quarries the following site constants are used:
In front of the face: $k_a = 250$
Behind the face: $k_a = 160$

For blasting in the proposed extension, from the analytical method, the 120 dBL distance for a 97 kg charge mass and a burden of 3 metres is a maximum of 688 metres in front of the blast. This equates to 115 dBL at 1070m in front of the blast face. For the airblast levels behind the face, the 115dBL distance is 540m.

Typical airblast levels radiate from a blast in an egg shape. This is due to the fact that the levels in front of a blast are 8-10 dBL higher than those behind a blast. The worst-case airblast contours from standard blasting practise are shown in **Figure 2.**

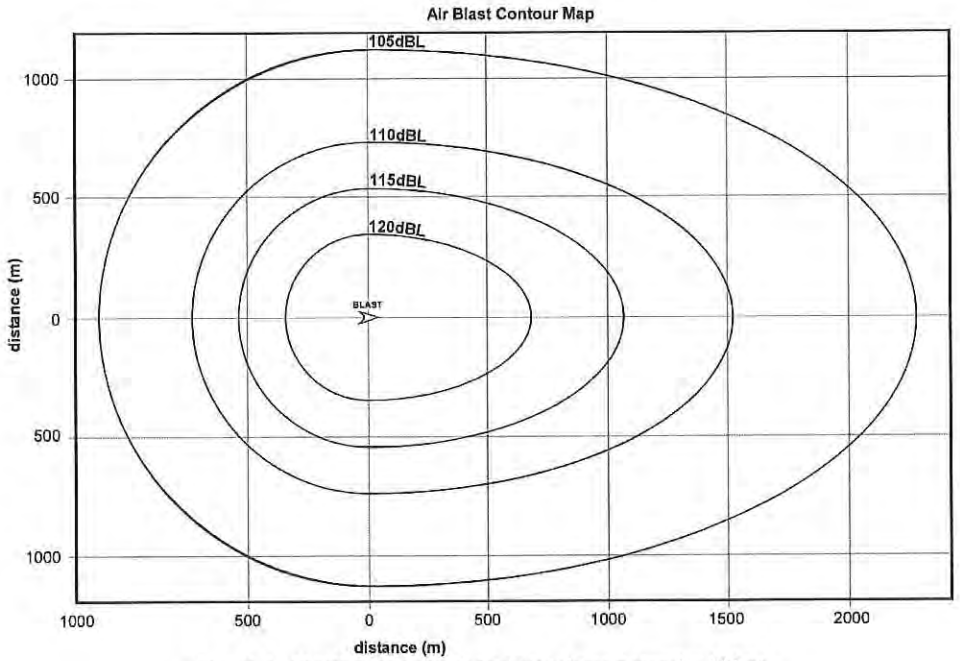


Figure 3- Worst-case airblast contours from a standard blast

4.1 Extent of airblast overpressure levels

An assessment was made based on blast specifications for 89 mm diameter blastholes, a face height of 14 metres, and a charge mass of 97 kg for blasting in the pit extension with the face direction looking to be north east, as shown in **Appendix 4.**
The distances to milestone airblast levels for future blasting practice and different orientations are shown in **Table 5.**

Table 5 - Distances to milestone airblast levels for standard specification blasts

Air Vibration Level (dBL)	Pit Extension Blasting	
	Distance in front (m)	Distance at side/behind (m)
120	688	347
115	1070	540
110	1529	732
105	2294	1118

The planned extraction sequence and resulting blast directions will enable air blast levels to be kept below the 115 dBL at any sensitive site for the remainder of the quarry's operation.

5 EFFECTIVE CONTROL OF BLASTS

5.1 GENERAL

Blasting in Tasmanian quarries is regulated by the EPA Division of the Department of Primary Industries, Water and Environment and Mineral Resources Tasmania through the Quarry Inspectorate. All quarries in Tasmania are required by law to record details of every blast in an official report book and these reports are available for official inspection. The report book includes a stocktaking section, which can be checked against official records which explosives suppliers are required to keep. Quarry Managers and shotfirers are also required to hold statutory certificates and permits and are liable to have these suspended or cancelled if they do not obey the regulations.

5.2 FLYROCK

Efficient blasting practice results in broken rock being left in a pile next to the blasting face, but the possibility of flyrock and its effective control must always be considered.
Flyrock is controlled by having the explosive charge confined by sufficient stemming and burden. Care and attention to detail during all stages of face survey, blast design and loading will ensure that ant rock throw will be contained within the Work Authority boundaries, and will present no danger to the public.

Flyrock distances for the proposed blast deign have been calculated using the Terrock Flyrock Model, that is widely used for flyrock control in Australian quarries.

The basic model for quarrying operations is:

$$L_{max} = \frac{k^2}{9.8} \cdot \left(\frac{\sqrt{m}}{B}\right)^{2.6} \quad [4]$$

where: L_{max} = maximum flyrock throw (m)
m = charge mass per metre (kg) = 8.1
B = burden or stemming height (m)
K = site constant

For the proposed blast design,

$$L_{max} = \frac{27^2}{9.8} \cdot \left(\frac{\sqrt{m}}{B}\right)^{2.6} \quad [5]$$

where: L_{max} = maximum flyrock throw (m)
m = charge mass per metre (kg) = 8.1
B = burden or stemming height (m) = 3

The maximum predicted rock throw in front of face for the proposed specifications is 65 metres. To this distance we recommend the application of two factors of safety for plant and equipment and personnel. For plant and equipment, a factor of safety of '2' should be applied to the potential maximum throw of flyrock. A factor of '4' should be applied for personnel and public. This clearance is applied in a 90° arc at 45° to the face of the blast.
In directions parallel to the face and behind the face, the possible flyrock mechanisms are cratering and rifling of the stemming (or gun barrelling). Providing the stemming height is greater than 20 hole diameters (1.8 metres), cratering will not occur. Rifling produces high trajectory flyrock with little horizontal projection.

For any direction behind the face or to the maximum flyrock throw will be 42 metres. The same recommended minimum clearance zones for plant & equipment and personnel & public are applied to each blast is shown in **Figures 3.**

Table 6 shows the breakdown of the maximum throw and the applicable clearance zones for that throw. As mentioned above, the factors of safety are '2' and '4' both in front and behind the face for all blasting.

Table 6 - Distances of Flyrock and Clearance Zones

	Distance in front (m)	Distance at behind (m)
Maximum Throw	65	42
Plant & Equipment	130	84
Personnel & Public	260	168

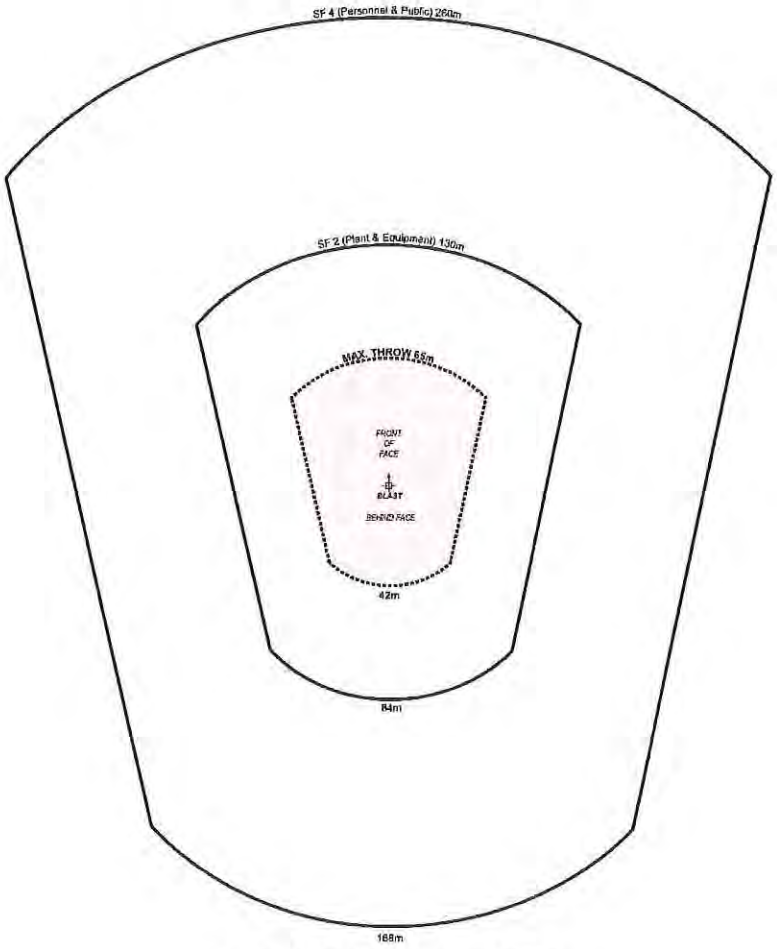


Figure 4 – Flyrock exclusions zones

The adoption of the minimum exclusion zones in **Figure 4** will prove conservative for most blasting. However, the determination of the exclusion zone is the responsibility of the quarry manager and shotfirer for each blast.

The maximum height that flyrock may reach with the standard blast design specifications proposed for the quarry's extension area are as follows:

Table 7 – Throw Distances of Flyrock

	Front of face	Behind/Side of blast
Max Horizontal Throw Distance	65m	42m
Max Vertical Throw Distance	21m	28m

Maximum throw occurs from rock fragments launched at 45° degrees (front of face) and 20° behind the blast site (blast hole angle of 10° + a dispersal allowance of 10°). It should be noted that the flyrock model predictions are conservative and provide an allowance for potential weaknesses in the rock mass and minor errors that may occur during hole loading.

A diagram of the predicted flyrock trajectory showing maximum horizontal and vertical throw distances is shown below in **Figure 5**.

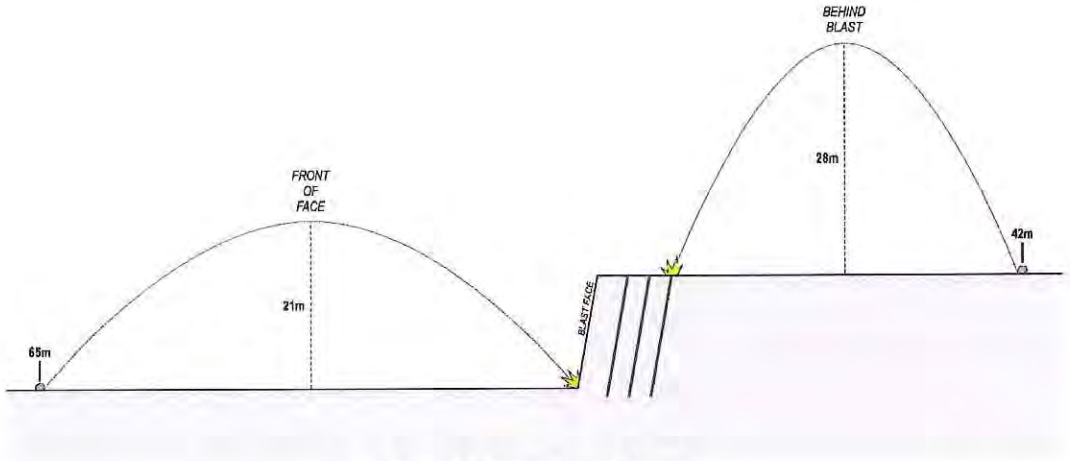


Figure 5 – Vertical flyrock throw

5.3 BLAST VIBRATION MANAGEMENT PROGRAM

Blasting must be carried out in accordance with the proposed blasting specifications and the applicable Explosives Use Regulations.

Compliance with vibration limits will be checked by the continuation of the monitoring regime conducted around the current working pit, modified as required to adequately monitor levels in the industrial area and airport terminal.

6 CONCLUSIONS

- Blasting can be carried out in the proposed quarry extension safely and in conformance with the Explosives Regulations 2012 of Tasmania and planning permit vibration limits, subject to compliance with the specifications and recommendations given in this report.

- People within the range of perceptible ground vibration will experience both air and ground vibration from blasting for less than four seconds on about 12 occasions per year, depending on the blast size. Beyond the range of perceptible ground vibration, the air vibration may be perceptible for less than two seconds for each blast.

- The peak ground vibration level will be less than 5 mm/s at residences in the surrounding area, as well as at industrial area and the airport terminal.

- Blast vibration levels resulting at the Launceston Airport runway will be less than 10 mm/s and at the exclusion distance of 400m, the levels are predicted to be 6.40 mm/s when blasting is at its closest to the runway.

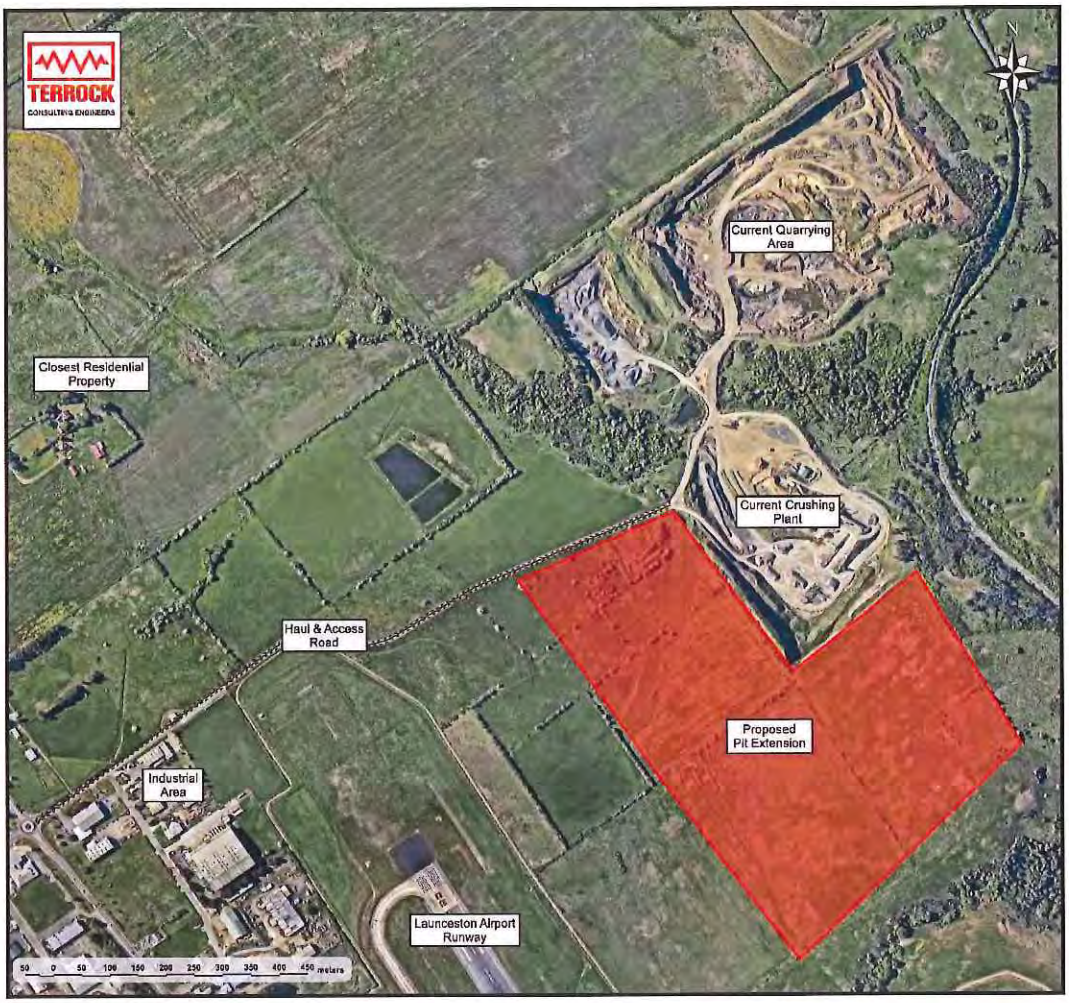
- A maximum PPV level of 31mm/s is predicted as the worst case for the railway line on the eastern side of the quarry. This is below the recommended safe level of 100mm/s as found in the Terrock ACARP study. Blasting should only be undertaken when the line is confirmed to be free of trains.

- Airblast overpressure levels at the surrounding sensitive sites will be less than 115 dBL, as shown in **Appendix 4.**

- Blasting activities are carried out in accordance with the "Blast Management Plan" and are video recorded with blast monitors for air blast overpressure and ground vibration. The monitors are set up at key locations including the airport and Taswater infrastructure. **Appendix 5** shows the monitor location for the western side of the quarry which includes the airport and the nearby industrial area.

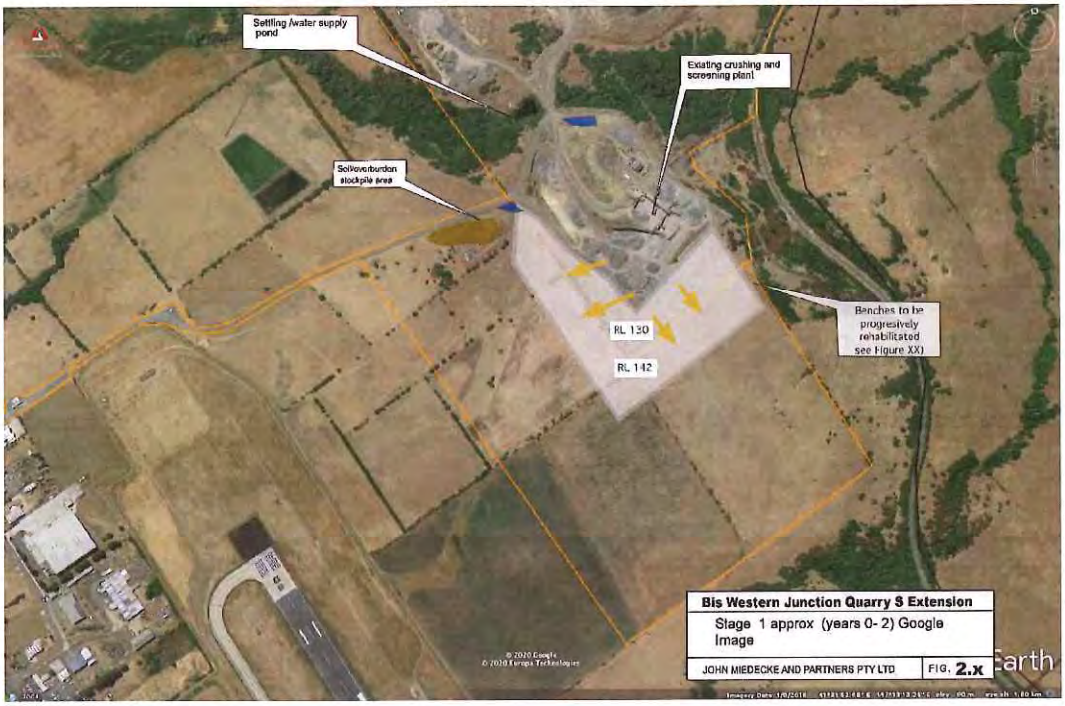
Revised
Dominic Hooton
14th July, 2021

7 APPENDIX 1 SITE PLAN

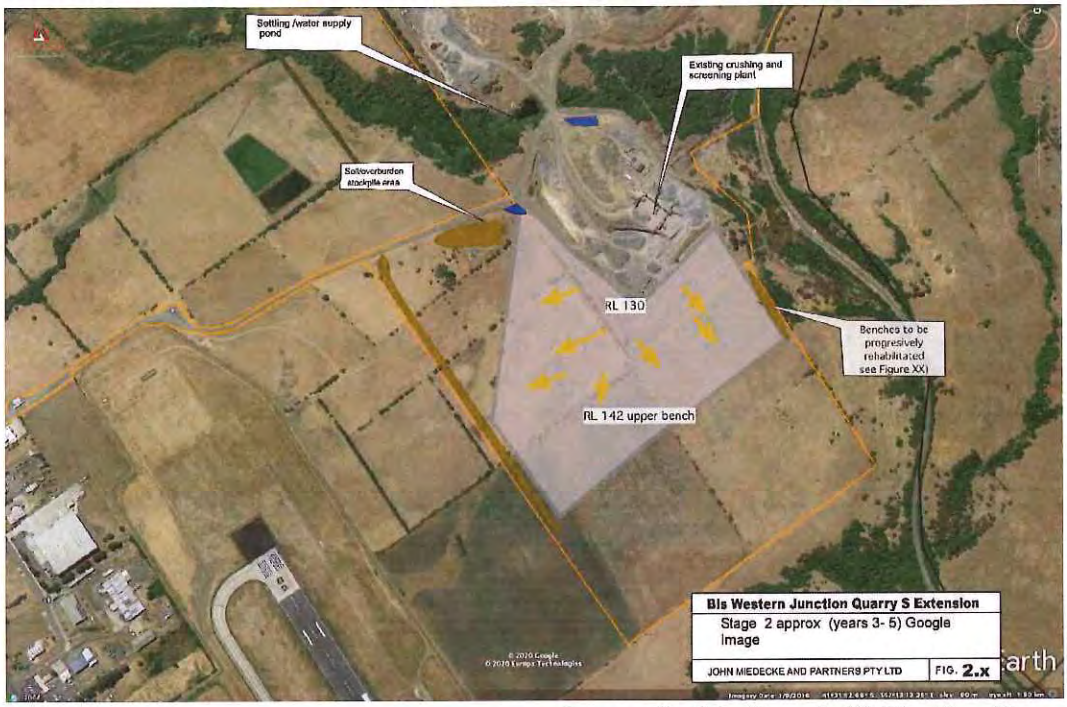


8 APPENDIX 2 – PROPOSED PIT EXTENSION STAGES

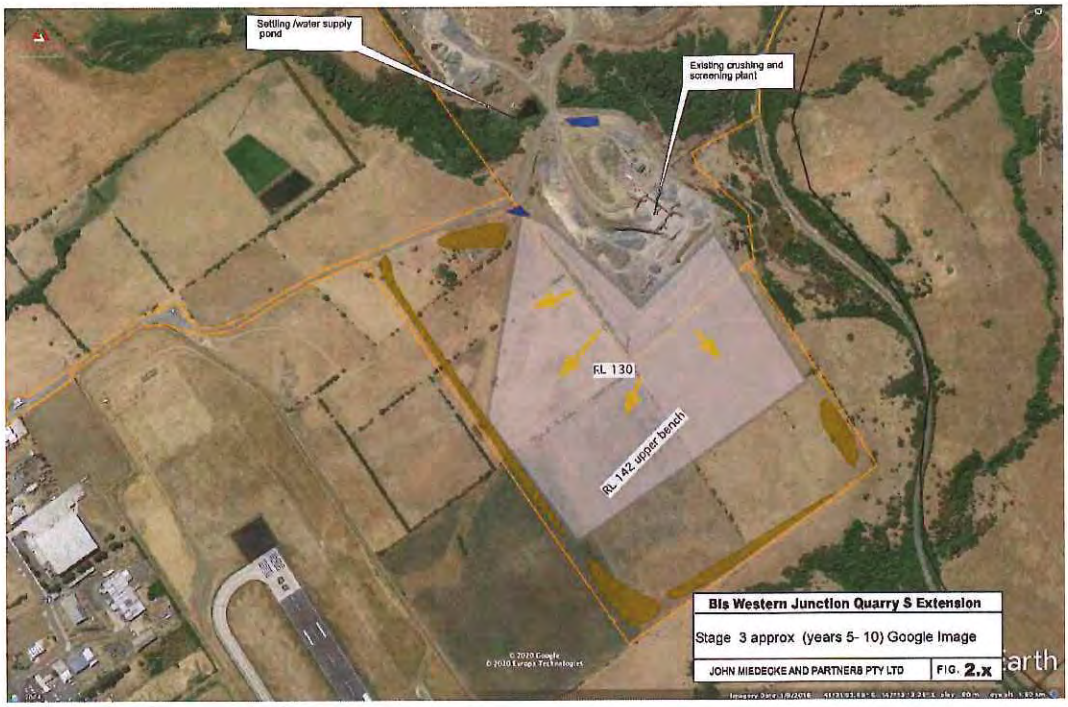
Appendix 2A - Year 0-2 Blasting Stage



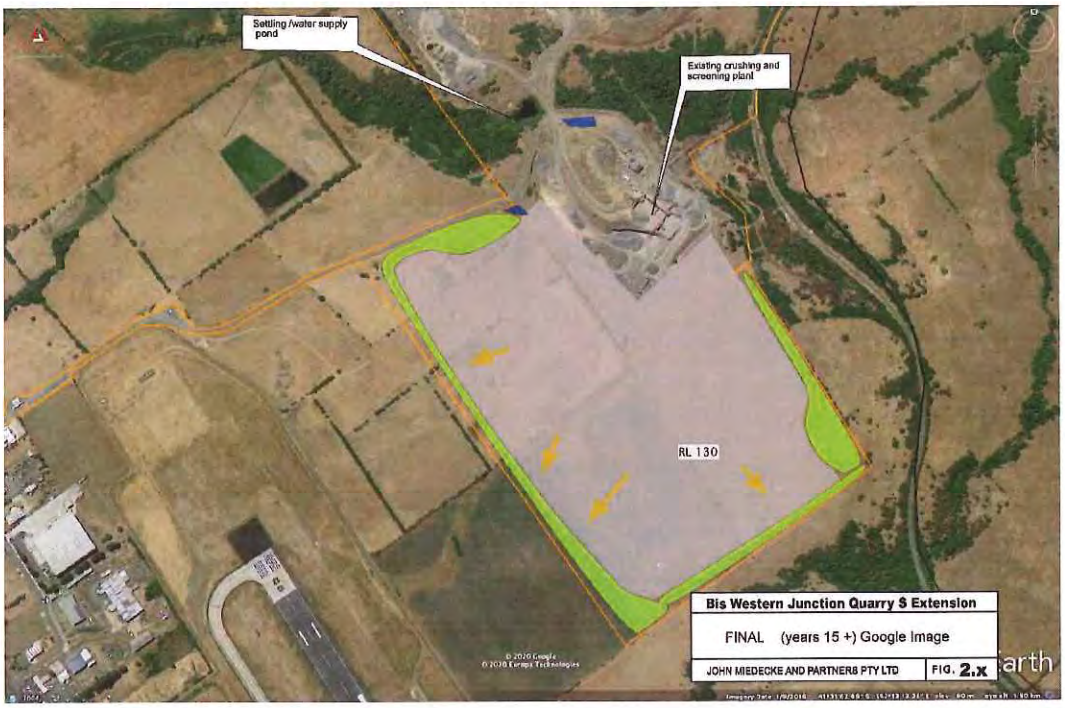
Appendix 2B - Year 3-5 Blasting Stage



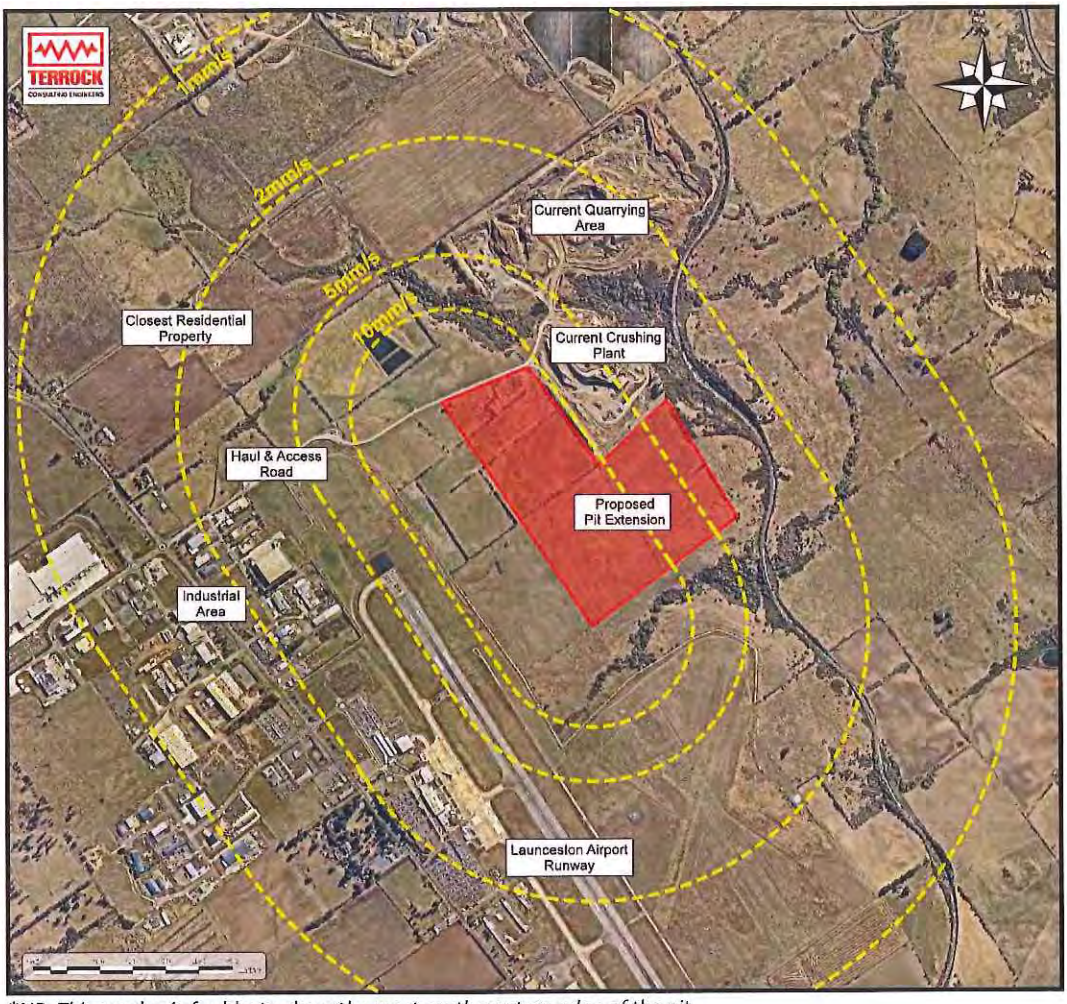
Appendix 2C - Year 5-10 Blasting Stage



Appendix 2D - Years 10+ Blasting Stage

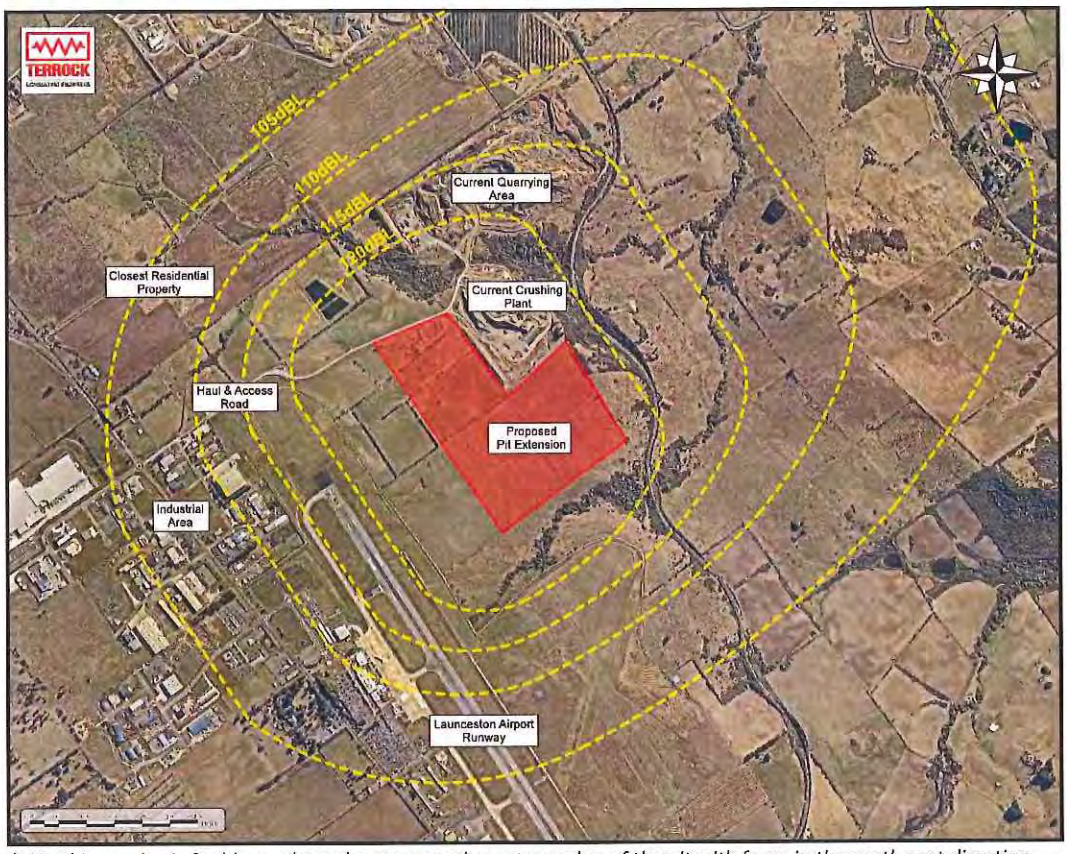


9 APPENDIX 3 – GROUND VIBRATION CONTOUR OVERLAY



**NB: This overlay is for blasts along the most south western edge of the pit*

10 APPENDIX 4 – AIRBLAST OVERPRESSURE CONTOUR OVERLAY*



**NB: This overlay is for blasts along the most south western edge of the pit with faces in the north east direction*

11 APPENDIX 5 – BLAST MONITORING LOCATION


Bis Western Junction Quarry
Blast Monitor Location

D. N. Hughes

Western Junction Quarry Extension

Development Proposal and Environmental Management Plan

APPENDIX G

Western Junction Blast Management Plan (EPA approved)

Blast Management Plan

Western Junction Quarry

2021

Contents

General Information

Forward

This Blast Management Plan (BMP) has been prepared to ensure all blasting activities at the Western Junction site have adequate control measures in place to prevent harm to people, equipment and the environment, this plan also ensures relevant Regulatory Conditions (Quarry code of practice, Site Mining Leases and site EPA permit) and other specified conditions within Tasmanian and National Regulations are being complied with.

This Blast Management plan must be used in conjunction with the Maxam DRILL AND BLAST MANAGEMENT PLAN D&B 001 2019 and the Tas Quarries Drill and Blast procedure bisDOCS #: 28116

This Blast Management Plans have been developed in conjunction with other stakeholders utilising site risk assessment, previous blast experiences/incidents learnings and subject matter expertise from Maxam and Maxfield, the preferred suppliers to Bis of blasting and drilling work.

The Site Risk profile bisDOCS # 30279 and Tas Quarries Impacts and Aspects Register bisDOCS # 32360 contains the relevant identification, assessment and controls of the risks at the site in regards to the drilling and blasting activities conducted.

The Western Junction Quarry has been utilising blasting in order to remove overburden and break up the basalt for processing. The broken rock is loaded into trucks and carted to a stockpile area or dumped directly into a fixed crusher. Secondary breaking of oversize will be conducted by hydraulic impactor. The depth of the rock to be broken by blasting will be a maximum of 14 metres on each bench.

This BMP gives details of estimated blast vibration levels in the surrounding area from the main extraction stages. It also contains the applicable control procedures to limit vibration to the regulatory limits, during the life of the quarry at the nearby sensitive areas, as the extraction area moves within the quarry.

The vibration from a blast in the quarry is continuously monitored by the sites blasting contractor Maxam, with the results being used to collect/record relevant data, prove the effectiveness of the plan and continuously improve the blasting process.

Definitions

Cultural site- A place where humans settled and used the land in a way that represents their culture can also be a cultural heritage site, especially if the area is affected by change that cannot be reversed.

Heritage site- a historical site, a building, or an area of the unspoilt natural environment, considered to be important to a country or area's heritage

Noise Sensitive Premises- means residences and residential zones (whether occupied or not), schools, hospitals, caravan parks and similar land uses involving the presence of individual people for extended periods, except in the course of their employment or for recreation

The Land- Means the land on which the activity to which this document relates may be carried out, and includes: buildings and other structures permanently fixed to land, any part of the land covered with water,

and any water covering the land. The land falls within the area defined by the mining leases specific to the site

Fly Rock- Flyrock, or wild fly rock, is rock that is ejected from the blast site in a controlled explosion in mining operations. The term refers in particular to rock that flies beyond the blast site, with the potential of causing injuries to people and damage to property.

Area Manager- the person who has overall responsibility and control over handling, storage and use of explosives when MAXAM are on site. They are also responsible for the scheduling of blast days and all compliance related issues.

BMP- Blast Management Plan

Bench - A ledge constructed in a batter or natural slope

OLS- the airspace surrounding an airport that must be protected from obstacles to ensure aircraft flying in good weather during the initial and final stages of flight, or in the vicinity of the airport, can do so safely.

EPA- Environment Protection Authority

Director- means the Director, Environment Protection Authority holding office under Section 18 of EMPCA and includes a delegate or person authorised in writing by the Director to exercise a power or function on the Director's behalf

Property Owner- Means David N Hughes mining lease holder and land owner of the site

MRT- Mineral Resources Tasmania (MRT)- is a Division of the Department of State Growth. The purpose of MRT is to give effect to government policy in relation to minerals and petroleum resources, and the Division provides essential information for land management in Tasmania.

Quarry Code of Practice- In this case, a practical guide issued by the Environment Protection Authority to the Quarry Industry to document acceptable and environmental guidelines for quarrying

Technical Services Officer and Technical Services Advisory team- the group of MAXAM technical specialists responsible for all aspects of blasting operations for the site. They report to the Area Manager.

Drill and Blast Supervisor- The Supervisor responsible for the day to day operations and management of loading and firing operations. Reports to the Area Manager.

Blast Controller- the person given ultimate responsibility, control and authority for the safety and coordination of each blast when initiated. Will generally be the Site Manager or site appointed person.

Blast hole- A hole that has been drilled or prepared for the purpose of being charged with explosives or has been charged with explosives.

Shotfirer- the person in charge of the security, loading and firing of the shot on blast day. The Blast Controller and Shotfirer shall not be the same person. Reports to the Drill and Blast Supervisor.

Blast Guard(s)- the individual(s) supporting the Blast Controller in ensuring clearance distances are observed and the clearance area is secure. Generally, will be a site familiar person who

reports to the Site.

Drill Rig Operator- Responsible for carrying out the drilling of the designed blast pattern. Reports to Bis

DGC- means the Australian Dangerous Goods Code.

AEC- means Australian Explosives Code.

Clearance Area- means the area to be evacuated of personnel and or plant not involved with the blasting activity, during blasting times. The area will change subject to the location of the blast and physical conditions.

Exclusion Zone- means the area immediately adjacent and surrounding the charging operations. Only personnel involved with firing, charging and tie-up are permitted in this area.

EMPCA- means the Environmental Management and Pollution Control Act 1994

Bis- is an abbreviation for Bis Industries. - Bis Quarries

JSA- means Job Safety Assessment which is used as a risk and hazard assessment and mitigation tool.

Measure- means to perform an action with the appropriate measurement tools. All personnel involved in an activity which requires measurement will be issued with the appropriate measurement tools.

PPV- means Peak Particle Velocity which is the maximum velocity of a particle at a point where vibration is being measured.

dB (A) The sound pressure level measured with the 'A-weighting' frequency response. The A-weighting response is an approximation to the frequency response of the human ear at moderate sound pressure levels.

Air blast- Air vibration or air blasts are the pressure or shock waves that radiate in air.

Overpressure- from an exploding charge. When a pressure wave passes a given point, the pressure of the air rises rapidly before returning to atmospheric pressure after a period of oscillations. The maximum pressure is the 'Air Blast Overpressure' measured in decibels (dB) or dB(Linear).

Record means to write an observation. All records/reports will be processed through the Area Manager, and will be kept on Bis, Maxfield or Maxam management system. All records will be clearly legible.

SOP means Standard Operating Procedure.

SSAN means Security Sensitive Ammonium Nitrate.

SSO- Site Senior Officer- appointed mine manger after assessment and authorisation from WorkSafe Tasmania

Locality and Location Plan

1. Mining Leases 975P/M and 2045P/M (The Land)

Figure 1 Locality plan of Western Junction Quarry showing existing lease boundaries (orange and pink lines) and notification boundaries for neighbours as per Permit conditions source: (Google Earth)

The locality plan above shows Western Junction Quarry blasting notification area outlined in white. Western Junction is a semi-rural locality and town in the local government area of Northern Midlands in the Central region of Tasmania. The closest residential towns are Perth 5.9 Km to the south, Evandale 5.3 Km to the south-east and 5.1 Km to Relbia north-west.

The nearest main highway is approximately 8.0 Km West of the Quarry running in a North/South direction.

The residential and properties monitored during blasting activities to the site have been marked in figure 1 with the respective land owners noted.

The table below lists all the property owners that are notified before a blast is undertaken.

Western Junction Quarry is contained on a land parcel owned by David N Hughes, Mr Hughes holds the mining lease for the quarry site and the boundaries of the lease, Bis mines the quarry under a royalty agreement in place with Mr Hughes that is reviewed and renewed as per the Mineral Resources Tasmania legislation.

List of neighbouring properties to be contacted within the 1km zone

Map Reference ID	Neighbour Name	Lot Number or Address
A	Routley Property	567 Relbia Road
B	Chugg Property	578 Relbia Road
C	Headlam Property	644 Relbia Road
D	Watering Downs	694 Relbia Road
E	Neighbour 1	643 Relbia Road
F	Hazell Bros Quarry	835 Hobart Road Breadalbane
G	Launceston Airport	201 Evandale Road Western Junction
H	Neighbour 2	196 Evandale Road Western Junction
I	Neighbour 3	60 Evandale Road Western Junction
J	Neighbour 4	62 Evandale Road Western Junction
K	Neighbour 5	198 Evandale Road Western Junction
L	Neighbour 6	51 Raeburn Road
M	Neighbour 7	53 Raeburn Road
N	Neighbour 8	55 Raeburn Road
O	Launceston Christiadelfian Acclesia	57 Raeburn Breadalbane
P	TasRail	TasRail – Rail Control

Sites Geological charecteristics

The predominant geological feature of the area:

High quality fresh basalt with thin yellow to brown skins along with the occasional thin weathered clayey seam

Core drilling and sampling reports are conducted regularly and petrographic analysis of source rock is undertaken periodically

Maximum Capacity of material to be processed yearly

The site must not extract or process more than 312,500 cubic metres of rocks, ores or minerals per year

Cultural or Historical History and sites to be preserved

There are no identified cultural or historical sites to be preserved on the site or adjacent to the quarry

Reference: Western Junction Quarry Extension Development Proposal and Environmental Management Plan March 2019 John Miedecke and Partners Pty Ltd

Drill and Blast Organisational

Table of Authorised Personnel and Service Providers

Drill and Blast Role	
Mine Manger/ SSO	• All SSO's shall have control and management of the work and worksite that necessitates the use of the explosive. • All SSO's shall have the control and management of the place where the explosive is used. • All SSO's who oversee blasting activities shall be familiar with and understand the key criteria included in the Maxam Best Practice Blasting Course • To maintain competency, SSO's that are expected to oversee blasting activities, need to monitor a minimum of one blast per year • Where required, delegate a site supervisor to supervise a drill and blast operation in accordance with the BMP. • SSO shall ensure the contracted Drilling Supervisor, Drill workers, Blast Supervisor and Shot Firer have been deemed competent to determine and undertake the drill pattern and perform the shot- Using the Bis Supplier Evaluation processes to document and record this information in the Bis Server and JDE maintenance system • Before each blast the SSO in conjunction with the site supervisor and blast supervisor, must be satisfied the conditions for air blast pressure, ground vibration and flyrock safety zones meet the requirements outlined in this plan and the blast design supplied by Maxam • Ensure the site conducts a robust investigation when a near miss or Incident occurs, to identify root cause/s and corrective actions to prevent re-occurrence
Site Supervisor	When delegated by the SSO the supervisor shall; • Have control and management of the work and worksite that necessitates the use of the explosive. • Have the control and management of the place where the explosive is used. • Oversee blasting activities in accordance to the BMP • To maintain competency, supervisors who are expected to oversee blasting activities need to conduct a minimum of one blast per year. As a minimum, this shall include being involved in auditing the blast design and loading and firing of the shot. • Refer to the Bis supplier evaluation system and ensure the contractor is authorised prior to engaging a drill or blast task on the site • Issue authority to work on the site • Review the safe system of work in conjunction with the Blast supervisor • Participate in investigations

Blast Design	• Plan and prepare the blast according to specific site requirements derived from site inspection, previous blast information, geological assessments, airblast and ground vibration limitations and Flyrock tolerance • Provide a written blast management design plan to the blast supervisor
Competent Persons to Handle Explosives	• Persons required to handle explosives shall possess the relevant licence and/or qualifications in accordance with the legislation.
Blast Guards	• Blast Guards shall be appointed in writing by the Blast Supervisor on the day of the blast. • Blast Guards shall have adequate knowledge of the site to locate the designated guard location and effectively communicate with the Shot Firer and Blast Supervisor. • Blast Guards shall be competent in undertaking the role.
Shot Firer	• A Shot Firer shall hold the national competency, a state explosive licence and a relevant statutory permit (this will need to include endorsement for the type of blast that they are going to conduct). • Once licensed by the statutory authority, a Shot Firer is not permitted to act in their own capacity until they have performed 12 blasts under the supervision of an experienced Shot Firer. • On obtaining the status of experienced Shot Firer, a Shot Firer shall perform their full duties at least once every year. • If they have not performed a blast for more than 12 months, another experienced Shot Firer will need to supervise and confirm they are still competent. • Accountability of Explosives • Must be familiar with the designed blast parameters and the results of blast design auditing (bore tracking). A copy of bore tracking results must be reviewed by the Shotfirer prior to blast hole loading and be available on the blast at all times during blast preparation • Prepare the blast in accordance with the recommendations in the Terrock Report "WESTERN JUNCTION QUARRY QUARRY EXTENSION – EFFECTS OF BLASTING" and Maxam blast engineering design plan/s
Driller	• A Driller shall hold the national competency (MNQOPS312A: Conduct Surface Drilling Operations), as a minimum.
Blast Supervisor	• The Blast Supervisor shall be authorised by the SSO to perform the role. • The Blast Supervisor shall be appointed by the SSO in writing to perform the role for each blast. • The Blast Supervisor shall hold a Shot Firer's Certificate of Competency issued by the statutory body (where they are required to do so). • The Blast Supervisor shall conduct a minimum of one blast per year (at any site). At a minimum, this shall include carrying out the blast design and supervising the loading and firing of the shot. • An experienced Shot Firer shall oversee this process and sign off before the Blast Supervisor is permitted to oversee any further drill and blast operations. • Provide "Rock on ground services"

Communications Officer	• Raise the alarm in event of an incident • Make all communications to third parties and record this in the blast diary • Ensure the blast diary is completed in full and signed off by relevant parties

Approved Operating Requirements

Western Junction Quarry operates drilling and blasting activities in accordance with a Ministerial consent granted in 31/03/1999, issued for the Environmental Protection Licence 9667 and the Mining Leases 975P/M and 2045P/M. The following table outlines the Regulatory Conditions which have been considered.

Lease/Licence Reference	Date of issue	Regulatory Conditions
975 P/M 2045P/M	• 31/03/1999 • 06/10/2020	**Mineral Resource's Development Act, 1995** **Quarries Code of Practice 2017** • Blasting must not take place unless specifically authorised in the Permit issued by the planning authority, and carried out in accordance with any conditions imposed therein. • Secondary breaking with explosives should not take place unless specifically authorised in a Permit issued by the planning authority. • Blasting must take place during the specified blasting hours within the Permit. • Blasting must be carried out such that, when measured at the curtilage of the nearest residence (or sensitive use) in other occupation or ownership, air blast and ground vibration comply with the following: 1. for 95% of blasts, air blast overpressure must not exceed 115 dB (Lin Peak); 2. air blast overpressure must not exceed 120 dB (Lin Peak) at all; 3. for 95% of blasts, ground vibration must not exceed 5 mm/s peak particle velocity; and d) ground vibration must not exceed 10 mm/s peak particle velocity at all. 4. All measurements of air blast overpressure and peak particle velocity must be carried out in accordance with the methods set down in Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration, Australian and New Zealand Environment Council, September 1990 and Australian Standard AS 2187.2 Explosives-Storage and use Part 2: Use of explosives.
EPA Licence 9667	06/10/2020	All Blasting on the premises shall be carried out in accordance with the regulations pursuant to the Mineral Resource's Development Act, 1995 Environmental Management and Pollution Control Act 1994 Land Use Planning and Approvals Act 1993 Blasting operations at the site may only take place: a) between 11:00 am and 16:00 pm Monday to Friday Inclusive;

		b) are limited to one blast per day c) at such other times as may be approved by EPA

Site Operating hours

Western Junction Quarry is a 5 day per week operation 06:00- 17:00

On an as needs basis the quarry will operate on Saturdays 06:00- 17:00

There is no requirement to notify the EPA for Saturdays- the site will not blast Saturdays

Blasting will only occur between 11:00 am and 16:00 pm Weekdays

The overview of the Blast Process Parameters

- No explosives will be stored at the site
- Development of a blast design by Maxam uses methods for ensuring compliance with air blast overpressure and ground vibration limits at noise sensitive premises The basis of the blast design is formulated by Maxam utilising their in-house engineering design and compliments the conditions recommended for blast control in the report by Terrock JMP-1801_04032019_Final conducted on the Western Junction quarry site.
- Dust generation from the blasts will be monitored to understand the impact on the visibility in the approach path after the blast. Any adverse observations recorded, a review of mitigations will be undertaken and corrective action implemented where identified.
- Blast Procedures will be updated to ensure that they limit the maximum throw of fly rocks in the horizontal and vertical direction so that the likelihood of any penetration of the OLS is minimised. It must be noted that the level identified in the Terrock documentation does not result in penetration to OLS. The blasting contractor will monitor each blast and include this information in each blast report. All blasts will be filmed and video footage reviewed to determine/confirm any potential exceedances
- The blasts will be conducted in the off-peak hours at the airport in order to minimise any potential for impact.
- The site will use the latest publicly accessible technology to identify the current status of flight movements at the airport and conduct blasts when there are no inbound or outbound movements at the time of the blast. As per current agreement the site will liaise with Air Services to notify and update current or proposed flight times and data prior to proposed blast and drill activities
- Blast monitoring and modelling will continue to provide guidance for future blasting plans and potential airblast and ground vibration contours have been generated and are used by the contractor and the site in the development and design of all blasting activities.
- Compliance with vibration limits will be checked by the continuation of the monitoring regime conducted around the current working pit, modified as required to adequately monitor levels in the industrial area and airport terminal.

- Using the assessment of impact by Terrock the site has concluded that blasting can be carried out in the quarry safely and in conformance with the Explosives Regulations 2012 of Tasmania and Environmental planning permit vibration limits, subject to compliance with the specifications and recommendations given in the Terrock report.

- People within the range of perceptible ground vibration will experience both air and ground vibration from blasting for less than four seconds on about 12 occasions per year, depending on the blast size. Beyond the range of perceptible ground vibration, the air vibration may be perceptible for less than two seconds for each blast. The peak ground vibration level will be less than 5 mm/s at residences in the surrounding area, as well as at the industrial areas and the airport terminal.

- Blast vibration levels resulting at the Launceston Airport runway will be less than 10 mm/s and at the exclusion distance of 400m, the levels are predicted to be 6.40 mm/s when blasting is at its closest to the runway.

- Airblast overpressure levels at the surrounding sensitive sites will be less than 115 dBL, as shown in Appendix 4 (Terrock Report).

Any blasting plans developed for the site by the contractor (Maxam) will ensure that ground vibration levels do not exceed 5mm/s at any residential property and occupied industrial and airport buildings.

	Typical Blast Specifications
Bench Height (m)	14
Hole depth (m):	15
Hole angle (o):	10
Blast hole diameter (mm):	89
Blast hole spacing (m)	2.8
Blast hole burden (m):	2.5
Front Row Burden (m)	3.6
Stemming height (m):	3
Explosive	RIOFLEX
Charge mass per m (kg)	8.1
Charge mass per delay (kg):	97
Powder factor (mg/m3):	1.012

Blast Exclusion Zone

The site conforms to the requirements outlined in the Terrock report (JMP-1801_04032019_Final) recommendations and Maxam blast design plans for each separate blasting activity to prepare and mark out blast exclusion zones

Engineered Exclusion Zones

An externally accredited blasting consultant (Terrock) has modified the default Exclusion Zone through a formal process which allows Maxam to;

- Considers geological information,
- Reviews drilling and blasting parameters to identify a "Maximum Loading Scenario" which takes into account Maximum Charge, Minimum Burden, Minimum Stemming and Hole Angle.
- Uses a scientific method to model and predict maximum throw and trajectory of flyrock.
- Calculates an exclusion Zone Based on the following Factors of Safety
- Protection of Buildings Plant and Equipment – Safety Factor 2.0
- Protection of People – Safety Factor 4.0
- Public or Critical Infrastructure – Safety Factor 4.0

The Blast Consultant has also identified the triggers that would force a review of the Engineered Exclusion Zone.

That is, any change to the sites Standard Blasting Parameters that extend the Maximum Loading Scenario as defined by Flyrock Modelling.

If there are technical concerns or if a hazard is discovered whilst loading the shot, and this hazard cannot be controlled with the placement of an artificial burden, a risk analysis is to be carried out to determine if the minimum safe distances need to be increased for the shot.

The Shot Firer shall ensure that the minimum distances are determined and communicated prior to the placement of blast guards.

	Distance in Front (m)	Distance at Behind (m)
Maximum Throw	65	42
Plant and Equipment	130	84
Personnel and Public	260	168

Table shows the breakdown of the maximum throw and the applicable clearance zones for that throw. As mentioned above, the factors of safety are '2' and '4' both in front and behind the face for all blasting.

Default Exclusion Zone Requirements

In the unlikely scenario of a formal risk analysis, undertaken by an externally accredited blasting consultant, the following minimum Exclusion Zone distances shall apply:

- For non-blast personnel 800m in front of the shot and 400m to the side and rear of the shot.
- Blast personnel must be positioned greater than 400 metres from the shot and not positioned in the direct line of fire and within retreat distance of a protective structure (i.e. fixed plant.)

- No mobile plant is to be within 300 metres of the initiation point without signed site manager's approval.
- Where a blast is to occur within 100 metres of fixed plant an appropriate blasting specialist shall be engaged to design and control the loading and firing process.

Blast Notification Protocols

Through ongoing consultation, a blast notification protocol has been developed.

The protocol will continue to be reviewed and amended were required.

Any amendments to this blast management plan are to be approved by the Mine Manager SSO.

The notification protocol is as follows:

1. In accordance with operational approvals, notifications are to be given to all persons/operations whom may be alarmed/effected by the blasting process.
2. A blast Sign is erected at the entrance to the Western Junction Quarry site. This sign details the next planned blast; ie "The Next Blast will occur on", "the date in full" and the Approximate "Time of Blast".
3. Trained blast guards will be directed to all the entrance points of the blast site to restrict access by unauthorized persons. Each blast guard will have an operating radio tuned to the required channel.
4. The blast guard is to notify the blast controller immediately if his position has been breached.
5. Blast guards have the authority and responsibility to stop any person from entering the area unless otherwise directed by the Blast controller.
6. Once guards are in position at their designated locations:
    - Prior to the blast the blast controller is to notify all site personnel via the designated channel for the Site, of the intention to commence the blast initiation sequence.
    - Roadway into the quarry is blocked using front end loaders
    - All people near the blast area are to be made aware of the planned blast and understand the meaning of the blast sirens and warning devices.
    - The blast controller to activate the blasting notification sequence
    - All blast guards are to confirm their position with the shotfirer and that their area is secure.
    - The shotfirer will inform the blast controller that the shot is ready for firing.
    - Once the blast guards are in position the blast controller shall ensure the area is free of personnel inside the clearance area.
    - The blast controller then informs the shotfirer that the area is clear and may run out the lead in line.
    - The shotfirer then confirms to the blast controller that the shot is ready to fire. The blast controller contacts the airport to confirm that the blast can be fired-authorization is given by the airport controllers to fire the blast.

- The blast controller then hands over control of the blast to the shotfirer.
- The shotfirer acknowledges then continues on with an agreed firing sequence.

Internal Notifications

Prior to the morning of the blast and also on the morning of the blast quarry Workers and relevant contractors Workers onsite are notified of the planned blast through the use of toolbox talks and discussions.

The communications officer conducts all communications with the site supervisor and the blast supervisor

Using the blast diary communication/ notification list sign off that all relevant parties have been communicated with about the upcoming blast

Once the blast has been declared successful the communications officer will advise the airport the blast is completed and complete the paper work required.

Neighbours

24 hours before the blast, the communications officer notifies the members of the Blast Diary Notification List.

The preferred method of contact either text message, email or phone call is used to notify the residence the approximate time of the impending blast. If required or requested further follow up calls are made before the blast.

External Blast Notification details are listed and coordinated for each blast using a Blast Diary Notification List. See Attachment C for details. This diary is amended as required, following updated contacts and as residents request notification.

Blast and Drilling Monitoring Program

All blast activities at Western Junction Quarry are visually recorded and monitored for air blast overpressure and ground vibration impacts at key locations around the quarry.

Results are used for continuous improvements for blasting and for investigation any un-expected exceedances. The placement of the detection device is to be in-accordance with the manufacturer's details (i.e. concrete plinth etc).

The Mine SSO (or their delegate) will retain all blast reports (for a minimum of four years) and prepare a monthly summary of all blast activity conducted. An annual summary of the blast monitoring results will be compiled and submitted to the EPA within the Annual Return for the Licence 9667

Monitoring Locations

Figure 2 Locality plan of Western Junction Quarry showing monitor positions. source: (Google Earth)

Map Reference ID	Monitor referance description
M1	Routley / Chugg Property
M2	Headlam Property
M3	Airport / Taswater

The table below details the parameters which are to be monitored

Parameter	Airblast Overpressure	Peak Particle Velocity	Allowable Exceedance
Criteria	115 dB(Lin Peak)	5 (mm/s)	5% of the total number of blasts over a period of 12 months
	120 dB(Lin Peak)	10 (mm/s)	0%
Frequency	During Every Blast	During Every Blast	-
Sampling Method	AS2187.2-1993	AS2187.2-1993	-

Complaints, near miss and incident handling

Incidents and Near misses will be controlled and investigated as per the Bis Safety and Sustainability Standard - Event Reporting and Investigation Document number 58305

The site will be quarantined in any event until released by SSO or in the cases of reportable events a WorkSafe Tasmania Inspector or other regulatory body involved.

All events are recorded in the Bis Risk Management System.

Any general complaint received relating to any blast will be managed in accordance with the following.

- Details of the complainant and complaint will be recorded within Biscom Risk Management System.
- Bis and Maxam representatives will liaise with the complainant to identify the nature and source of the issue and obtain supplementary information.
- Internal Investigation will be initiated to verify or otherwise the basis of the complaint.
- As required results of any investigation will be provided to the complainant and the Environmental Protection Authority, together with advice as to any changed blast management practices to be implemented as a consequence of the investigation.
- A sign shall be posted at the entrance of the quarry with contact details for complaints handling.
- Complaints will be reflected in the complaints register and a copy can be made available to stakeholders after review by the sites SSO and Bis Management team
- A summary of all blasts complaints will also be included in the Annual Management Review

Fly Rock Incident

1. In the event that fly rock penetrates the prescribed airspace, as described in the document entitled "Safety review report for proposed quarry extension – Launceston Airport "dated 2 March 2020 and prepared by Mott MacDonald, the Director EPA, Launceston Airport and the Civil Aviation Safety Authority must be notified within 24 hours
2. A Report must be provided to the Director within 7 days of the blast and must include, without limitation, the following:
    - The details of the blast, including meteorological conditions at the time of the Blast;
    - An assessment of why the fly rock travel distance was greater than expected; and
    - Recommendations to ensure that future blasts do not cause fly rock to penetrate prescribed airspace, including an updated Blast Management Plan for approval of the Director.

Miss fire Incident

Maxam the blasting contractor has provided the following instructions

Dealing with misfires

Only a Shotfirer may deal with and handle a misfire or a person under their direct supervision.
A misfire report must be completed for all misfires or suspected misfires.
The Shotfirer shall ensure all relevant misfires are reported to the site management and also to the relevant authority.

Misfire at time of firing

Where a misfire is found at the time of firing the shot no person may approach the shot for at least 5 minutes.
All Blast Guard s are to remain in their position and be notified of the misfire.
Shotfirer to assess the misfire and where practical, refire, following the standard firing procedures.
Where the misfire involves a surface connector, evidence shall be gathered and an investigation should be activated.
If the misfire cannot be refired, the location of the misfire shall be surveyed and demarcated then marked up on the digging plan.

Misfire discovered at time of digging

Where a misfire is found, work within 10 metres of the misfire will cease, the area shall be demarcated and the Shotfirer and site manager shall be notified.

Site will follow the coordinated directions of the Maxam blast supervisor until area declared safe.

Maxam supervisor will follow the requirements outlined in the

Dealing with a misfired charge

Where possible and safe to do so, a sample of the misfired product should be taken for further analysis.
The shock tube of the down hole delay shall be checked by the Shotfirer to determine whether it has fired.
Where possible wash product out with water and attempt to retrieve any detonators or boosters.
Do not place undue force on live lead lines. Secure lead line during flushing for easy retrieval.
If the down line is live, consider refiring, taking in consideration the lack of confinement on the misfired charge.
In all cases risk assessment should be carried out before re-firing a misfire.

Review and Continuous Improvement of the blast management plans

Bis will liaise with Maxam and Maxfield periodically but no less than annually, to review drilling and blasting operations to ensure a continuous improvement process is in place to improve onsite drilling and blasting practices

The Bis internal document management system will automatically remind SSO of review date pending.

The BMP will also be reviewed as required on a case by case basis if an incident, near miss or opportunity for improvement is identified.

Reference considered within the BMP

In addition to the above Regulatory Conditions, this DABMP aims to meet the requirements set out in:

- AS 2187.2:2006 Explosives – Storage and Use – Use of Explosives
- AS 2187.1 - 1998: Explosives – Storage, Transport and Use, Part 1 – Storage
- AS 2187.0 –1983: Storage transport and use – Terminology
- Australian Explosives Code – Third Edition – April, 2009
- Australian Code for the Transport of Explosives by Road or Rail (AEC).
- Code of Practice – Elevated Temperature and Reactive Ground, Australian Explosive Industry and Safety Group (AEISG), 2007
- Quarry Code of Practice 2017
- Western Junction Site Risk profile bisDOCS # 30279
- Explosives Act 2012- Tasmania
- Explosive Regulations 2012- Tasmania
- Code of Practice for Precursors for Explosives- Tasmania
- Maxam Drill and Blast Procedure OPS 007
- Guidance Note – Blast Management Plans- Edition 2 – May 2020 WorkSafe Victoria
- Permit Conditions/ Environmental licence number 9667
- Conditions in mining leases 2045P/M and 975P/M
- Development Proposal and Environmental Management Plan (DPEMP) Western junction quarry extension
- Environmental Management and Pollution Control Act 1994
- Mineral Resource's Development Act, 1995
- Land Use Planning and Approvals Act 1993
- Terrock blasting assessment JMP-1801_04032019
- Western Junction quarry extension development proposal and environmental management plan DPEMP
- Australian and New Zealand Environment Consultative Council (ANZECC) guidelines
- Australian Standard 2187.2-2006 - Table J4.5(B) – Recommended Ground Vibration Limits for Control of Damage to Structures
- Maxam - Title: Blast Management Plan- Bis Industries TAP 1/05/2014 Version No: A
- Maxam DRILL AND BLAST MANAGEMENT PLAN D&B 001 2019
- Maxam FIELD REQUIREMENTS TS 001 2019
- Maxam D&B 018 – Transport and Handling of Explosives 2019
- Maxam MANAGING MISFIRES AND MAINTAINING CHAIN OF CUSTODY OF UN-DETONATED EXPLOSIVES D&B 006 2019
- Australian Dangerous Goods Code.
- Impacts and Aspects Register Tas Quarries bisDOCS #: 32360
- Tas Quarries Drill and Blast Procedure bisDOCS #: 28116

D. N. Hughes

Western Junction Quarry Extension

Development Proposal and Environmental Management Plan

APPENDIX H

Western Junction Weed and Disease Management Plan (EPA approved)

Weed and Disease Management Plan Western Junction Quarry

Contents

1.Introduction

Bis understands it is essential to control weeds and diseases at the Western Junction site, as they have the potential to impact other properties in the wider area. The existing and proposed extensions to the quarry will increase the potential for weeds to multiply due to the disturbance of the soil and land from the mining activities.

A Weed and Disease Management Plan is required by legislation at the Western Junction Quarry site, it is a requirement under the conditions of the sites EPA Permit 9667

- Condition OP1 of Permit Conditions Environmental No.9667 contained in Permit No. PLN19-0071.

Weeds and Disease can have a devastating effect on native vegetation and impact significantly on animal habitat, create unwanted costs for other landowners, private enterprises and government agencies. If left uncontrolled weeds have the ability to multiply rapidly and therefore strict and timely monitoring and control is critical in maintaining a healthy mine site environment

It is most important that weed infestations be tackled quickly to prevent the build-up of a large seed bank, which may be very difficult to destroy and/or control

This Weed and Disease Management Plan objectives focus on:

- Minimising the weed establishment onsite to a reasonable and practical level
- Ensure existing weeds are either eradicated or controlled
- Existing weeds do not have the opportunity to contaminate raw materials and are subsequently transported off site and spread to other areas or taken offsite by natural conditions such as wind and water flowing through the site
- Ensuring any unidentified or emerging new weeds or diseases are identified early and control measures are taken within an adequate timeframe to control

2.Definitions

EPA- Environmental Protection Authority
DPIPWE- Department of Primary Industries, Parks, Water and Environment
PC- Phytophthora cinnamomi
WDMP- Weed and Disease Management plan
WJ- Western Junction
Declared weed- A weed species that has been 'declared' under the Weed Management Act 1999. Once 'declared', appropriate legal actions can then be taken against the person responsible for managing the plant species at a particular location.
Non-declared weed- weed species not listed under the Weed Management Act 1999
Code of Practice- In this case, a practical guide issued by the Environment Protection Authority to the Quarry Industry to document acceptable and environmental guidelines for quarrying.
Sustainable Timber Tasmania- Sustainable Timber Tasmania is a Tasmanian Government Business Enterprise responsible under State legislation for: sustainably managing approximately 800,000 hectares of public production forest (Permanent Timber Production Zone land) undertaking forest operations for the production and sale of forest products
The Weed Management Act 1999- an act of the Tasmanian parliament of primary legislation for the management of weeds
Commercial Operator Licence- this licence applies to any business that uses agricultural chemical products to control pests and diseases for fee or reward. Examples where this licence would be needed include: broad acre agricultural spraying. forestry spray contracting.
Waterbody- Includes natural watercourses (streams, creeks, rivers), natural wetlands, ponds, lagoons, constructed drainage channels, dams and ponds, reservoirs and lakes.
Permanently inundated/perennial- These areas have water all year round.
Occasionally inundated/ intermittent- These areas have water some time of the year.
Rarely inundated/ephemeral- These are areas that rarely contain water (eg areas that flood on rare occasions).
Toxicity- The inherent poisonous quality/qualities of a substance,
SDS- Safety Data Sheet
Riparian land- Any land that adjoins, directly influences, or is influenced by a body of water at any time of the year

3.Site Information

The Western Junction Quarry is a semi-rural locality and town in the local government area of Northern Midlands in the Central region of Tasmania. The closest residential towns are Perth 5.9 Km to the south, Evandale 5.3 Km to the south-east and 5.1 Km to Relbia north-west.

The nearest main highway is approximately 8.0 Km West of the Quarry running in a North/South direction.

There are government Infrastructure, farming, small business holdings, medium Industrial sites and residential properties in close proximity to the site.

Western Junction Quarry is contained on a land parcel owned by David N Hughes, Mr Hughes holds the mining leases (975 P/M and 2045P/M) for the quarry site and the boundaries of the lease, Bis mines the quarry under a royalty agreement in place with Mr Hughes that is reviewed and renewed as per the Mineral Resources Tasmania legislation.

4.Identification and Evaluation of Weed and Disease Impacts

4.1. Weeds

Mr Mike Trethewie and his associates of Woodlands Corp Aust Pty Ltd have been inspecting the Western Junction site on an ongoing and long term basis and are very familiar with the current lease areas and proposed developments, they are considered very experienced and reliable in weed management in the local industry

The Woodlands team have been executing the necessary requirements for weed management at the site for over a decade

The scope of work Woodlands undertakes, is to focus on monitoring existing native vegetation, monitor site for signs of Weeds and Disease, advise on suitable control measures, plan and execute the works in a compliant manner to the relevant legislation, at the site.

4.2. Declared and non-declared weeds

The weed inspections have identified several declared weed species present namely;

- Thistles
- Blackberries
- Gorse
- Broom
- Willows

Non-declared weeds

- Foxglove
- Hawthorn
- Various Broad leaf weeds
- Cactii
- Black thorn(Sloe)

4.3. Disease

Sue Jennings Biology & Conservation Branch Forestry Tasmania inspected the Western Junction site in 2010 The disease inspections focussed on Phytophthora Cinnamomi detection and likelihood of presence on the site, the Inspection lead to the confirmation that the site is free from Phytophthora Cinnamomi

Extract from Forestry Tasmania 2010 report

"Western Junction quarry is situated within an agricultural area and is surrounded by pasture. This vegetation contains no P. cinnamomi indicator or host species, and this is therefore, a very low risk quarry, both now and into the future."

4.4. Location of Weeds within the mining lease

Figure 1- Location of weed around the site

5.Actions to Assess and Mitigate Weed Spread

The site has developed a weed spraying program with a local contractor Woodlands, the program focusses on "Measures to control weeds and plant diseases" that are defined in the Quarry Code of Practice 3rd Edition 2017 and Weed and Disease Planning and Hygiene Guidelines
Section 7 – Environmental Management, 7.8 Control of declared weeds, non-declared weeds and plant diseases

- Maintaining good drainage to prevent mud building up in working areas
- Careful washing of any machinery that may carry soil onto or off of the site
- Provision of cut-off drains to prevent spores of Phytophthora cinnamomi washing into the pit from surrounding areas
- Careful stockpiling of topsoil so that water from the stockpile drains away from working areas
- Tracks provide corridors for the invasion of weeds. Weed management is applied along tracks and ensures that weed species are not introduced into new areas.

5.1. Weed types and potential impact

Table 1- describes weed types and potential impacts

Weed type	**Declared Weed Potential Impact on the site**			
	High Risk	Medium Risk	Low Risk	Comments
Thistles		X		Propagate and spread rapidly in disturbed soil
Blackberries			X	Minor footprint onsite and spreading potential low
Gorse	X			In control onsite potential to spread rapidly
Willow			X	Low potential to rapidly spread
Broom	X			In control onsite potential to spread rapidly
	Non-Declared Weed Potential Impact on the site			
Foxglove		X		Propagate and spread rapidly in disturbed soil
Various Broad leaf weeds		X		Propagate and spread rapidly in disturbed soil
Hawthorn			X	Low potential to rapidly spread
Cactii			X	Minor footprint onsite and spreading potential low
Black thorn(Sloe)			X	Low potential to rapidly spread

6.Keeping weeds and disease from entering site

6.1. External sources of weeds

Weeds can be found in a large variety of sources that enter the site;

- Hay Bales
- Seeds for rehabilitation

- Topsoil
- Materials from other sites
- Mulch or garden supplies for ground cover and landscaping

6.2. Inspect and assess materials

It is very important therefore to risk assess all materials being bought onto the site for the possibility the products contain weeds, weed seeds or diseases

- Always us native mulches and vegetation for landscaping and rehabilitation
- Never use hay bales for drainage, native reeds are preferred
- Topsoil and other products should never be bought onto site
- Other quarry products must be risk assessed and tested before being brought onto site and when onsite must be in quarantine bins and segregated from other products at all times

7.Native vegetation

7.1. Existing native flora

Maintain any native vegetation on the site and where practicable replace any native vegetation that has historically been removed

Native vegetation provides habitat and feed for native animals and any areas cleared will quickly be invaded by invasive weeds

8.Neighbours

The Code of Practice for Ground Spraying states that you should notify those neighbours that are occupying properties and buildings within 100 metres of the area to be sprayed (clause 21). You don't have to do it, but it is highly recommended.

8.1. Sensitive sites

The site has identified one sensitive neighbour site, Josef Chromy Wines.

The site communicates with the neighbour before weed application occurs within a 100 metres of the boundary.

The site has assessed the risk of residual effects and applications have been controlled to ensure the risk is as low as reasonably practicable.

Both parties have agreed on the controls in place and review when required.

The review of sensitive sites will occur annually during the review of this WDMP

REMEMBER
It's our responsibility to keep our chemical spray in the target area to avoid causing any "adverse effects" and to work cooperatively with our neighbours.

9.Weed and Chemical Control

The control and management of weeds near sensitive sites and waterbodies is a challenge faced by many landholders across Tasmania. Waterbodies are particularly sensitive to herbicide contamination, so the decision to apply herbicides in the vicinity must be taken with great care.

9.1. Timing of chemical applications

The time of year when herbicides will be most effective on the weed is a major influence on the make-up of this plan. Herbicides are generally most effective during the growing season of the weed rather than when it is dormant or approaching dormancy. The staged removal of weeds over several seasons will be less disturbing to our aquatic environment and minimise any adverse impact on fauna

9.2. Weed control near water bodies

Weed control near waterbodies requires a long-term commitment to eradication, perhaps 5–10 years or more, as the seed banks of many 'woody' weed species (eg blackberries, gorse) may remain viable for decades. Weeds can also spread along watercourses, making their control difficult. A staged, planned approach to weed control, alongside a program to re-establish native riparian species, is necessary to ensure the safe restoration of riparian areas. Restoring native vegetation helps to reduce the presence of weed species, ensures the stability of banks, shades the waterway (which helps prevent future weed invasion), and provides habitat for local fauna.

9.3. Chemical and Contractor control onsite

The Western Junction site must use an approved weed control company that has been evaluated and authorised to perform the work onsite (chemicals should only be applied by a qualified person under the Work Health and Safety Act 2012.)

The contractor and the site workers will inspect and monitor the weeds onsite and provide a schedule of chemical application that will minimise the chemicals used on the site and also provide control of all weeds through specific and targeted application of chemicals

The contractor will ensure all chemicals are used in accordance with Australian Pesticide and Veterinary Medicines Authority (APVMA) guidelines and strict Codes of Practice regarding aerial and ground-based applications which protect natural values, neighbours and water quality. In addition, the CSIRO-developed program, Pesticide Impact Rating Index (PIRI), is used to guide chemical application, particularly near water catchments.

The contractor will use the other subject matter experts (Agronomists) for guidance as required, the contractor will use and apply the principals contained in the Forest Practices code for all weed control on the site

Contractors applying registered agricultural chemical products and must maintain a record of spraying operations.
The records must include the;

- date
- location
- name of site owner
- Site Senior Officer

- types of chemicals used
- rates of any chemical products applied
- predominant weather on the day
- neighbour notifications
- other relevant information

The contractor will ensure the Safety Data Sheet requirements are understood and followed by the workers engaged in the Use, Handling, Transport and Storage of weed management related chemicals

9.4. Disposal

No chemicals are to be disposed of or stored onsite.

If the contractor does happen to have surplus spray mix or herbicide waste, the contractor shall label it with the herbicide name, including any risk and safety information displayed on the original label.

Store it offsite safely until it can be disposed of appropriately.

Contact a chemical collection organisation eg Chem Clear.

The contractor must follow label directions for the disposal of wastes and herbicide containers.

Only dispose of waste herbicides at authorised collection centres, such as licensed waste disposal centres.

Do not dispose herbicide waste:

- through sewerage systems, where it can interfere with the sewage treatment process
- down the drain or gutter, where it can pass through the stormwater system and into waterways
- to landfill via dumping or domestic waste, as it can contaminate soil and leach into groundwater and stormwater

9.5. Training and Qualifications

As a minimum the site requires all contractors to provide certificate of competency (Chem Cert) proof of

- Category 3 – Chemical User
- Commercial Applicators Licence

The contractor will ensure chemicals are controlled on the site and only applied in minimum quantities.

Site workers will have awareness training in weed and disease identification and reporting as a minimum

Site management team will have an awareness of the various codes or practice relating to weed and disease management

9.6. Herbicide classification

- *Pre-emergent (residual)*

  These herbicides are designed to inhibit the germination of pest plants. They are therefore applied before the pest plant germinates and are often residual in the soil for long periods. They are generally not considered to be safe for use near waterbodies and are not recommended for use due to their persistence in the environment.

- *Knockdown non-selective*

  These herbicides are designed to be applied directly to the target pest plant, either through being sprayed onto foliage or applied directly to the cambium layer using any of the direct application methods described in Table 3. They may vary in mode of action and some may persist as residues in the environment.

- *Selective*

  Selective herbicides are designed to act on only one type of pest plant. Generally, selective herbicides will control either broadleaf (eg capeweed), grasses (eg phalaris) or woody weeds (eg broom). These herbicides are useful when the focus may be on controlling a particular weed species (eg phalaris amongst native shrubs). These herbicides may persist as residues in the environment.

9.7. Strategies for managing weeds and disease spread

Table 2- Strategies for managing weeds and disease spread

Weed type	Treatment Plan/ Strategy	Control method and/or Herbicide used	Type / Method of application	Application frequency and what time of year	By Who
Thistles	Control and minimise No Hormonal products used onsite due to vineyard	Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor
Thistles on roads and fixed plant	Seasonal and come from offsite readily	Glyphosate		Year round	
Blackberries	Control and minimise Difficult to reach in creek area very close to sensitive water ways Easily introduced by birds into site Slow to spread easy to monitor	Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor

Gorse	Control and minimise Difficult to reach in creek area very close to sensitive water ways Slow to spread easy to monitor	Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor
Various Broad leaf weeds	Control and minimise Spread rapidly easily introduced to site by animals and general traffic	Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor
Hawthorn	Control and minimise Pre-existing onsite and bank stabiliser Controlled in areas of spread as required	Manual removal Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor
Foxglove	Control and minimise Rare onsite treat as identified	Conqueror Triclopyr/ Picloram	Hand application spray	All year	Contractor
Broom	Eradicate	Conqueror Triclopyr/ Picloram	Hand application spray	All year	Contractor
Cactii	Monitor Extremely slow growing Very difficult to access land slip area Negligible spread rate	Manual removal if required	N/A	N/A	N/A
Willow	Control and minimise Pre-existing onsite and bank stabiliser Controlled in areas of spread as required	Manual removal Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor
Black thorn(Sloe)	Control and minimise Pre-existing onsite and bank stabiliser Controlled in areas of spread as required	Manual removal Conqueror Triclopyr/ Picloram	Hand application spray	September – Oct and April Specific wait till leaf drop in vineyard	Contractor

10. Monitoring and Evaluation Strategies

The site in conjunction with the weed controlling contractor have developed a schedule for the monitoring of the site the following is considered in the monitoring schedule;

- record weed sites on the leases
- monitor the progress and success of the weed program
- identify and record any new weeds or disease on the site
- review and assess the control plan effectiveness and make alterations as data is analysed or new technology or products are introduced to the market place
- maintain a look ahead philosophy in any proposed areas of mining and develop plans to identify future risks
- maintain a photographic library to show weed control progress

Table 3- Monitoring plan

	Durations of inspections for all actual and potential weeds and disease onsite			
Type of monitoring	**Quarterly**	**6 Monthly**	**12 monthly (EOFY)**	**10 yearly**
Visual drive around by contractor to record results and monitor for new growth etc	X			
Visual walk around by contractor to inspect and record sensitive areas		X		
Targeted whole site inspection with site supervisor and contractor, to determine any additional factor to consider in the WDMP			X	
Review WDMP			X	
Site review for P. cinnamomi				X

The 12 monthly WDMP review will evaluate the success of the weed control program by considering the current extent of the weed problem and reviewing our control measures.

- Is the weed control work going to plan, or do our goals need reviewing?
- What is the appropriate weed control measure now?
- Is there a need for external (expert) assistance?

The site will follow up and re-implement weed control actions following the results of our monitoring and evaluation.

The site will continue to monitor the follow-up work, with a continuous improvement approach in the ongoing cycle of weed management.

11. References

- NRM- KEEPING IT CLEAN A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens March 2010
- Department of Primary Industries, Parks, Water and Environment (2015). *Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania.* (Eds.) Karen Stewart and Michael Askey-Doran. Department of Primary Industries, Parks, Water and Environment, Hobart, Tasmania.
- Quarry Code of Practice 3rd Edition 2017- EPA
- The Weed Management Act 1999
- Work Health and Safety Act 2012
- Australian Pesticide and Veterinary Medicines Authority (APVMA) guidelines
- AGVET CHEMICALS CODE OF PRACTICE Department of Primary Industries, Parks, Water & Environment BIOSECURITY TASMANIA Ground Spraying NOVEMBER 2014
- The Environmental Management and Pollution Control Act 1994 and regulations under this Act.
- The Dangerous Goods Act 1998 and regulations under this Act.
- Tas Quarries Weed and seed inspection Checklist bisDOCS # 64342- Rev 1
- AGVET CHEMICALS INFORMATION SHEET Department of Primary Industries, Parks, Water & Environment BIOSECURITY TASMANIA Neighbours and Spray Drift SEPTEMBER 2014
- Forest Practices Code 2020

APPENDIX I

Decommissioning and Rehabilitation Plan Western Junction

(Submitted for EPA approval)

DECOMMISSIONING AND REHABILITATION PLAN

Western Junction

Bis Industries

Tasmanian Quarries

Western Junction
Decommissioning and Rehabilitation Plan

Contents

1.Introduction

This Decommissioning and Rehabilitation Plan (DRP) is a plan which is an ongoing rehabilitation commitment and is completed as sections of the land become redundant and as additional rehabilitation is identified or areas are decommissioned.

The DRP covers the current and newly leased areas 975P/M and 2045P/M (The Land)

This DRP will including but not limited to those plans for

1. Rehabilitation
2. Site fixed plant and infrastructure removal
3. Weeds and disease
4. Flora and Fauna
5. Groundwater/ Surface water
6. Aboriginal Heritage
7. Historical Heritage
8. Monitoring
9. Reporting
10. Key Milestones

At quarry closure, the DRP will be the roadmap to final closure of the site from all mining activities, All stakeholders will be given regular updates of the plans timetable and key milestones achievements.

The DRP is subject to changes from influences and needs to be reviewed periodically (yearly at management review) to ensure the up to date information, processes, guidelines and requirements of all relevant parties changing into the future of the site are captured and planned.

2.Objectives of the Decommissioning and Rehabilitation Plan (DRP)

Objectives of the DRP;

- Ensure the area disturbed by the mining process is returned to a condition that is consistent with established end land use best practice principles.
- Repurpose the land for commercial use that is complimentary to the surrounding industrial sites in the area.
- Ensure legislative and public expectations are met.

3.The Parties

3.1. The Lease and Permit Holder

The Mining Lease and Permit holder for the quarry is the landowner,
Trading Name: Mr David Hughes.
Registered Address: RSD 619 Evandale Road, Breadalbane TAS 7258
Postal Address: As above
ABN: 79421242311
Contact Details: Tel-0438918134, Email- Daviejane@hotmail.com

Under an agreement, Bis is the operator.

3.2. The Operator

The operator is Bis Industries. Contact details are:
Bis Industries Grantly Hamilton – Site Manager - Tasmania
Western Junction Quarry, 1A Richard Street, Western Junction, TAS 7212
T +61 3 6398 9004 M 0457 546935
www.bisindustries.com
Email: Grantly.Hamilton@bisindustries.com

Bis Industries is a leading provider of specialised logistics and materials handling solutions to the world's biggest mining and resources companies. In Tasmania, operating under the wholly owned Bis Quarries Pty Ltd, they operate a number of major quarries and sand pits supplying the construction industry, State and Local Government.

3.3. Consultant engaged to assist to prepare Decommissioning and Rehabilitation Plan

John Miedecke and Partners Pty Ltd
Telephone number 0418130672
Email : John@johnmiedecke.com

4.Legislation

4.1. Acts, Regulations and guidance material

Acts, regulations and Codes that are relevant to the DRP

Legislation relating to DRP	Government Authority	DRP Role
Quarry Code of Practice 3rd Edition 2017- EPA	Mineral Resource's Tasmania (MRT)	Layman guidance for site
Mineral Resources Development Act 1995 (MRDA)	Mineral Resource's Tasmania (MRT)	Assessment, approvals and lifecycle management of mining leases Assess and approvals of Mineral royalties Trust fund management Quarry mining area rehabilitation approvals
Water Management Act 1999	DPIPWE	Manage water issues in Tasmania
The Weed Management Act 1999	DPIPWE	Manage weed associated issues in Tasmania
The Environmental Management and Pollution Control Act 1994 and regulations under this Act	Environmental Protection Authority (EPA)	Manage the Environment in Tasmania
The State Policy on Water Quality Management 1997	Environmental Protection Authority (EPA)	Manage water quality

Historic Cultural Heritage Act 1995	Department of Primary Industries, Parks, Water and the Environment (DPIPWE)	Monitor and advise on heritage at the site
Land Use Planning and Approvals Act 1993	Northern Midlands Council	Approval of land use
Aboriginal Relics Act 1975	DPIPWE	Monitor and advise on Aboriginal heritage at the site
WHS Act 2012	WorkSafe Tasmania	Workplace health and safety regulation and guidance for the site
Environment Protection and Biodiversity Conservation Act 1999	Department of Sustainability, Environment, Water, Population and Communities	Protection of native species
Threatened Species Protection Act 1995	DPIPWE	Protection of Threatened species

5.References

The DRP has been prepared in accordance with the following documents:

- *Decommissioning and Rehabilitation Plan (DRP) – a guideline for the Tasmanian Mining Industry, version 3, May 2011.* Preparation of
- Rehabilitation Plans GUIDELINE FOR MINING & PROSPECTING PROJECTS February 2020 | Version 1.0 Earth Resources Regulation
- Guidelines for Preparing Mine Closure Plans May 2015
- MINE CLOSURE Leading Practice Sustainable Development Program for the Mining Industry September 2016 INDUSTRY.GOV.AU | DFAT.GOV.AU
- INTEGRATED MINE CLOSURE Good Practice Guide, 2nd Edition
- Management of Acid and Metalliferous Drainage in Tasmania Good Practice Guidance 2020-2025

6.Background

The existing Western Junction Quarry at near Breadalbane in Northern Tasmania produces a wide range of construction materials. (**Figure 1**).

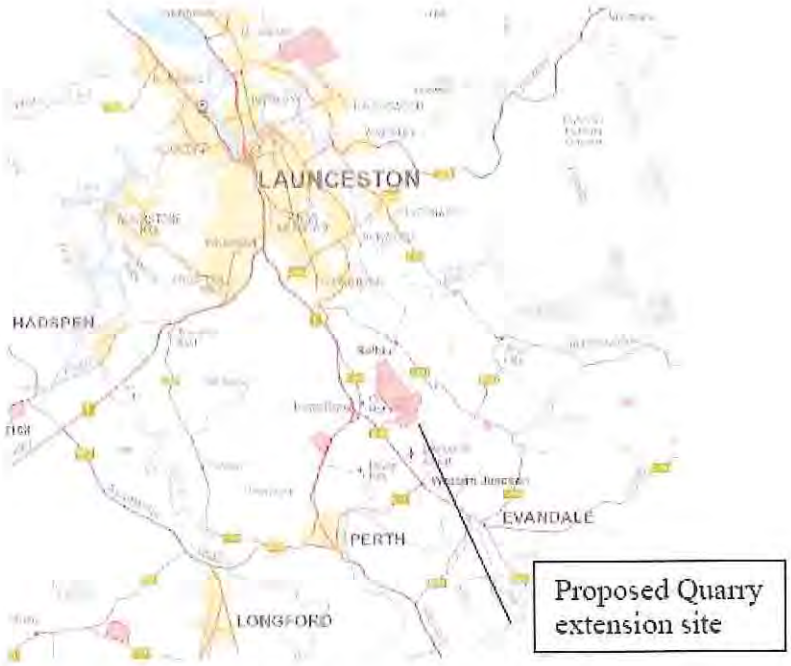


FIGURE 1: MINING LEASE 2045 P/M LOCATION – Western Junction Tasmania

Figure 1- MINING LEASES 975P/M and 2045 P/M LOCATION – Western Junction Tasmania

The quarry has been in operation for almost 40 years and provides a wide selection of construction and building materials. It well located being situated in close proximity to a major road network, close to Launceston, in an isolated area of private land well screened from residences and local views. It is an important supplier to the civil construction industry in Northern Tasmania and has supplied to both the North-West and East Coasts. The area currently has three operating quarries.

Mr D Hughes is a local landowner who has owned a quarry on his land since 1980. Since 1982 the quarry has been operated by Brambles (now Bis Quarries Pty Ltd) under an agreement between Brambles (now Bis) and Mr Hughes.

In March 2019, as basalt rock reserves were being depleted in the existing mining lease, Mr Hughes applied for planning approvals and additional mining lease (MLA 2045P/M (**Figure 2**) and planning approval to allow the continuation of the quarry activities to the west of the existing operations. These were closer to the Launceston Airport on land owned by Mr Hughes.

Planning approval (Planning Permit PLN-19-0071), including the EPA Permit Part B No. 9667 was granted on 20 November 2020. The planning approval is for 500,000 tonnes per annum.

During the application process the landowner to the south of the quarry, indicated that they were interested in selling part of the property to the immediate south of the quarry operations and Mr Hughes is purchasing the land. As this land has better rock reserves and also provides a greater separation distance from the Launceston Airport and residences to the North, Mr Hughes is now making a new planning application for the revised quarry location and revised Mining Lease Application (2045P/M).

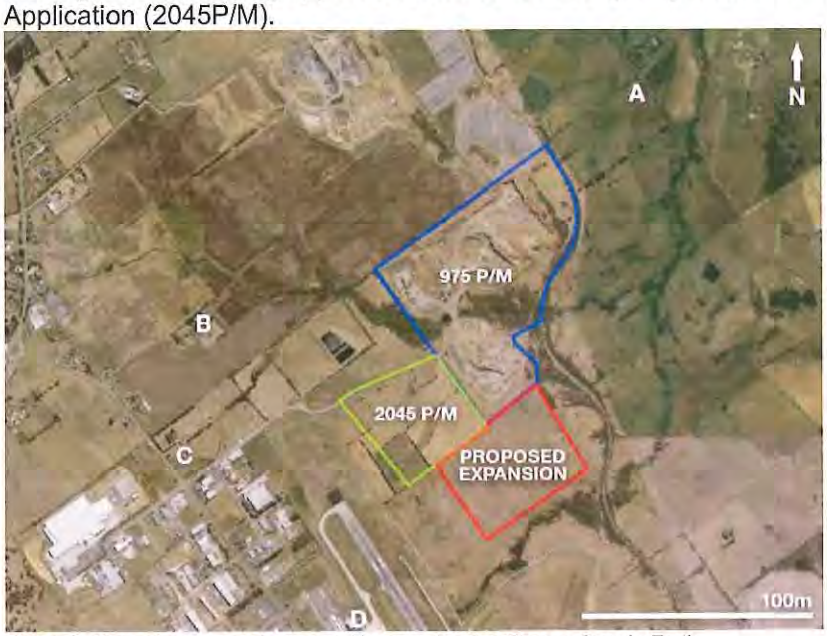


Figure 2- Current leases and proposed lease extension Source Google Earth

7.Site Layout and Development

The existing quarry is near Western Junction, NE of the Launceston Airport, the proposed extension to the south of the existing leases is also marked (**Figures 1 and 2**).

8.Topography

The topography is rolling hills, with an escarpment to the east and south
Rainfall falling on disturbed areas will be directed to a series of retention ponds prior to discharge to the water supply pond in Briarly Creek.

Figure 3- Topography map

9.Climate

9.1. Annual rainfall

is approximately 675 mm per year and winds from the North-West and West.

10. Geology

The quarry site is on a basalt flow overlying tertiary sediments Soils. The soils are mapped as Breadalbane Soil Association (Brown Clayey soils on Tertiary Basalt). They have moderate erodibility and dispersibility, there is no potential to encounter acid sulphate soils and or contaminated soil as the site is elevated and been used for sheep grazing.

11. Hydrology

The existing quarry has one permanent water catchment dam constructed on Briarly Creek and two over flow ponds installed for major flooding event potential. On the proposed lease area there are no permanent waterbodies on the site and will be designed to drain to the existing dam approximately 500m away.

12. Natural Values

The mining lease area is mapped as Agricultural Land by LIST and no endangered species were identified in the area. Therefore, no specific flora and fauna surveys were commissioned. Bis undertake regular weed surveys and these will be regularly treated till mine closure.

Quarry plans have been designed using SURPAC resource modelling and mining planning software to allow for an expected 20 years of operation (based on reserves and annual production at the Permit limits of 312,500 m3/year). Therefore, it is expected that the quarry will continue for well over 20 years.

Figures 4 and 6 shows the final plan after all rock is quarried. These are all simplified plans based on the modelling but will vary depending on the rock characteristics and thickness.

The plans have been designed for the maximum extraction of the basalt resource in accordance with the Mining Lease conditions, the Quarry Code of Practice and best practice environmental management.

Quarrying will commence on the western face of the existing pit (processing plant location) with the relocation of existing topsoil and overburden stockpiles. These will be relocated to the northern side and also the proposed buffer /stockpile area between the quarry and the aerodrome. The pit will then be developed in nominal 14 m benches (halved to 7m in final stage as shown in **Figure 5**) and progress to the South in stages, with topsoil and overburden removed in advance of the quarry activities of drilling and blasting, blasted rock removal by excavators and transport by truck (Cat rigid mine truck) to the existing processing plant.

Photograph 1 shows an example of existing quarry benches.

Photograph 1: Typical quarry bench operation. Quarry advances to the left

Figure 4- shows existing quarry rehabilitation plan

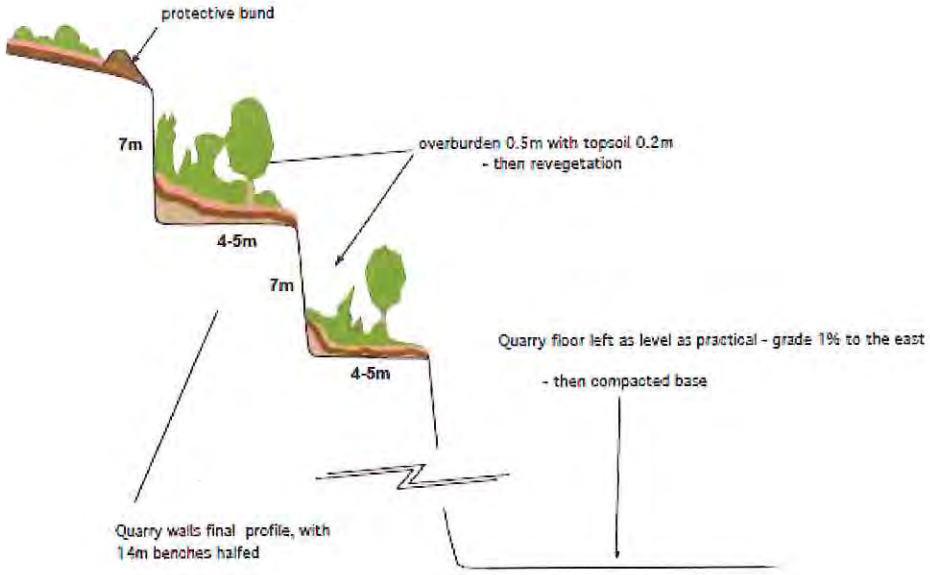


Figure 5- type of rehabilitation to be used for the site benches and floor

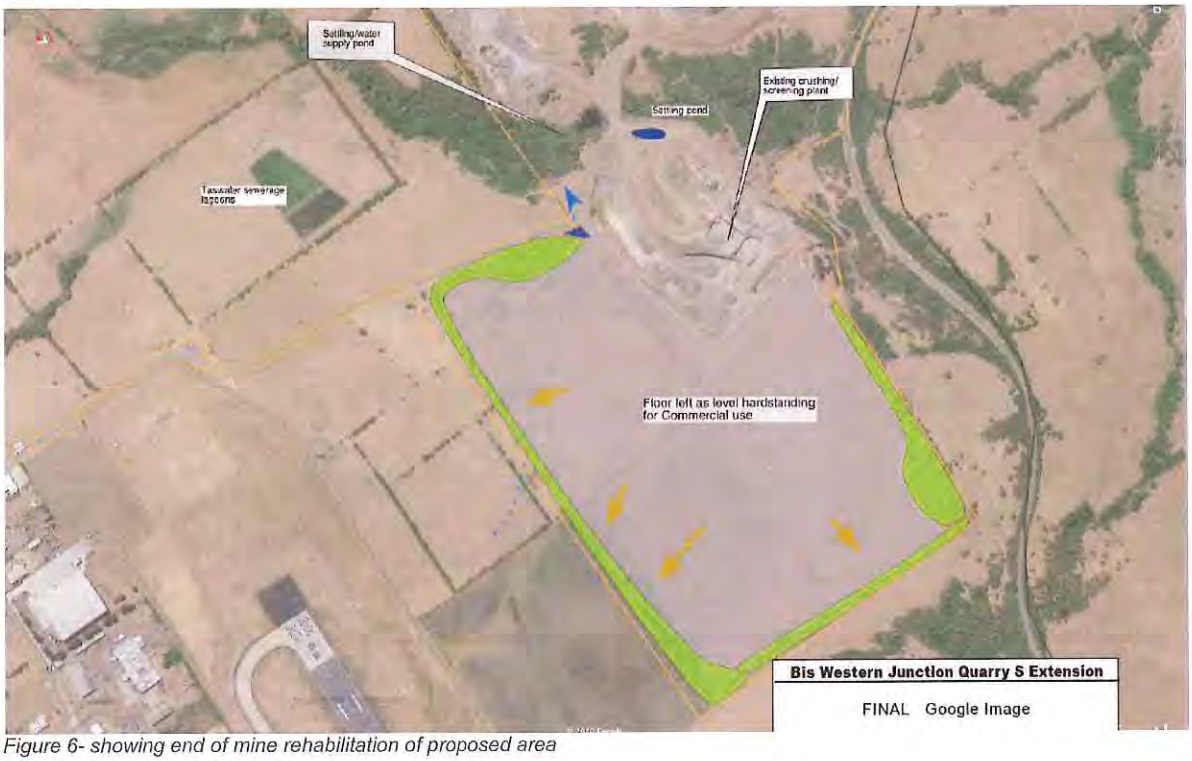


Figure 6- showing end of mine rehabilitation of proposed area

13. Decommissioning and Rehabilitation

13.1. Existing quarry operations

There has been little rehabilitation to date, as the past quarry activities were not designed for progressive rehabilitation and the existing pits are still active. The formal agreement between the operator and landowner has a requirement on timeframes for rehabilitation of the 975 P/M Far Pit on commencement of operating on 2045 P/M.

Large volumes of topsoils and overburden materials from quarry operations have been stockpiled in areas surrounding the pits and these are available for rehabilitation and revegetation. These are in excess to requirements.

The quarry plan is intended to progressively complete basalt extraction and rehabilitate the currently operating and operated quarries. These are the western pit and the current operating (Eastern Pit). The pit which is the site of the crushing plant and stockpile area is currently not planned for closure as it will remain in operation.

The existing operations are conducted in accordance with the Environmental Management Plan – Operations 2010 (Miedecke, 2012).

The approved closure and rehabilitation plan for the existing quarry is shown in **Figure 4** The rehabilitation plan is as follows (in accordance with the Quarry Code Of Practice):

- Salvage and recycling of redundant plant and equipment;
- Profile and contour ripping;

- Coverage with previously stockpiled materials from the stockpiles, and
- Planting of tree seedling, seed and fertilizer application.

13.2. Quarry extension

13.2.1. Land form and use

Because of the quarry design is a pit, with all quarry activities including material transport confined within the pit perimeters, there is little potential for alternative land use activities to be practiced until the quarry pit is completed. Areas ahead of the quarry operations will remain as grazing land until disturbed.

The pit walls will be progressively rehabilitated and after pit completion, the floor will be available for light industrial use.

The quarry extension area is in the form of a pit, with a relatively level base. The Quarry Plans show an advancing face with final benches formed on both the north and south edges being established. These are approx 7m high by 4-5m wide to allow effective rehabilitation and these can be progressively revegetated, these can be a mix of pasture and/or native vegetation.

Rehabilitation will not be possible on the pit floor until closure. It is planned that the quarry floor would be left as a level compacted surface suitable for industrial and/or commercial use. **Figure 6** shows a conceptual closure plan for the Pit.

In the event of cessation of the quarry, the quarry would be rehabilitated as described above, with the floor developed for industrial and/or commercial use.

13.3. Pasture revegetation

Parts of the site (level or gently sloping) will be revegetated to pasture. Once the topsoil has been re-spread it will need to be cultivated preferably with agricultural tines. Cultivation will occur in autumn, (two weeks following knock-down herbicide application) and immediately prior to sowing.

Rocks will be present and seed application will be completed using an agricultural spinner (also used for fertilizer application). Basalt soils, particularly sub-soils are acidic and Ag-Lime application will be required at the rate of 10 tonne /ha. Ag-Lime is best applied by spreader trucks . Once the lime, seed and fertilizer have been applied, the surface will be harrowed and follow up weed control in the pasture will be required.

The proposed pasture species to cope with freer draining basalt topsoil and subsoils mix is as follows:

- Cover Crop of Cereal Rye (ryecorn) 40 kg/ha
- Ryegrass var Victorian 12 kg/ha
- Ryegrass var Tama 08 kg/ha
- Cocksfoot var Porto 05 kg/ha
- White Clover var Huia 03 kg/ha
- Sub-Clover var Trikkala 02 kg/ha

The recommended fertilizer is 14:16:11 at 500 kg/ha initially. The fertilizer should be applied by tractor and spinner.
Follow-up maintenance lime and fertilizer requirements should be based on future soil analysis.

13.4. Tree and Grass Species suitable for planting

The following species are able to cope with the conditions created following quarry

development and final landform creation and will establish a self-sustaining stable community that will encourage a succession towards pre-disturbance vegetation. The method of establishment will be by direct planting of native seedlings.
The recommended seedling species is from the list below:

- *Acacia dealbata* Seedling
- *Acacia mearnsii* Seedling
- *Allocasuarina verticillata* Seedling
- *Bursaria spinosa* Seedling
- *Dodonea viscosa* Seedling
- *Eucalyptus amygdalina* Seedling
- *Eucalyptus globulus* Seedling
- *Eucalyptus viminalis* Seedling
- *Lomanadra longifolia* Plugs
- *Poa labillardierei* Plugs

All seedlings will be guarded, staked and fertilised when planted. If browsing by animals are a problem; tree guards will be utilised with all seedlings while animal disturbance is observed.

13.5. Fencing
Exclusion fencing can be utilised where it can be practically constructed.

13.6. Fertiliser
Fertiliser to be applied are a N:P:K fertiliser mix of 8:4:10 at 300 kg/ha. Based on annual monitoring inspections, maintenance fertilizer application may be required.

All grass plugs will be accompanied with 5 grams of Osmocote and seedlings should be planted with a 20 g Agriform fertiliser tablet or equivalent. Periodic inspection and maintenance will be required.

13.7. Weeds and Diseases
Weeds and diseases will continue to be monitored and treated utilising the existing sites weed and disease management plan up till and including mine closure.

At mine closure a final inspection and report will be commissioned to ensure adequate management has taken place and identify any ongoing management if required.

13.8. Flora
Flora assessments have not identified any significant vegetation communities identified on the site and no specific plan is required for preservation or replacement of these communities

13.9. Fauna
No specifically critical fauna species has been identified on the site, and no specific protection, relocation or habitat plans are required for fauna at the sites decommissioning.

13.10. Aboriginal Heritage
No Aboriginal heritage items have been identified or discovered at the site and this will continue to be monitored during mining activities, however it is extremely unlikely any Aboriginal sites will be identified and need preservation.

13.11. Historic Heritage
No Historical sites have been identified or discovered at the site and this will continue to be monitored during mining activities, however it is extremely unlikely any Aboriginal sites will be identified and need preservation.

13.12. Acid Drainage
There are no identified issues predicable for acid drainage.

13.13. Environmental Management Plans (EMP)
The site will continue to use the existing EMP's to control the identified aspects and impacts, these plans will include guidance and controls that mange the decommissioning and rehabilitation factors described in this plan.

13.14. Infrastructure Decommissioning
The site will continue to decommission and rehabilitate the land and ensure all existing and new infrastructure once redundant is decommissioned correctly and materials disposed of in a correct manner to support best practice recycling and re-use strategies available at the time.

The sites asbestos register has identified all asbestos containing materials and these will be removed and disposed of by a licenced contractor.

13.15. Infrastructure Area Rehabilitation
Infrastructure areas will be rehabilitated to become industrial hard stand and area that are raised from the floor level will be revegetated where practicable using the methods mentioned above in section 13.3 pasture revegetation.

14. Monitoring
The site will continue to monitor the rehabilitation requirements through the schedule established in this plan and the existing Environmental Management Plans and the current monitoring and improvement initiatives in place currently at the site.

Ongoing monitoring will be required on the land after mine closure and rehabilitation controls will need to be undertaken like weed management, water monitoring, dust and erosion monitoring.

15. Reporting
Bis will provide reports on the progress to the key milestones to the land owner and the relevant regulatory authority as per reporting guidelines.

16. Milestones
The table below shows the key milestones that areas of the land have been scheduled for decommissioning and rehabilitation.

The timeframes are based on estimations of source rock availability and calculations of production rates and the current/predicted supply need of the civil construction industry over the next 20 years.

As discussed earlier in the DRP timeframes will be subject to change based on operational requirements, un-planned events, business and market interruptions and emerging technologies eliminating current plant requirements.

Land area for decommissioning and rehabilitation	Predicted timing of decommissioning and rehabilitation works					
	2022-2025	2025-2028	2028- 2032	2032- 2035	2035-2038	2038- end of life
North East Pit 975P/M	X					
Centre Pit 975P/M		X				
Metal Bay 975P/M						X

Wash plant 975P/M						X
Pre coat 975P/M						X
Pug mill 975P/M						X
Workshop 975P/M						X
Oil storage 975P/M						X
Fuel tanks and bunding 975P/M			X			
Amenities/ crib room area 975P/M						X
Crushing and screening plant 975P/M						X
Stage 1 new development 2045 P/M					X	
End of mine 975P/M and 2045 P/M						X

From: "Jennifer Jarvis" <Jennifer.Jarvis@tasrail.com.au>
Sent: Thu, 17 Mar 2022 21:20:59 +1100
To: "NMC Planning" <planning@nmc.tas.gov.au>
Subject: Attention Planning Department
Attachments: V2021TasRail Standard Notes - Op Lines.docx

Your Reference7259605 – PLN-20-0316 81 Evandale Road Western Junction – Southern Extension to Quarry for extraction and processing of rock and gravel (Level 2 Activity)

Thank you for notifying TasRail of the above application which we acknowledge has also been subject to assessment by the EPA Board.

TasRail notes that the proposed extension to the southern extension of the quarry is on land that adjoins the operational rail corridor (State Rail Network land).

TasRail is therefore pleased to see the submitted DA documents confirmed the intent of BIS to continue to adhere to the TasRail required notification advice protocols and timelines that are designed to help manage the potential risks associated with blasting within proximity to a rail line. These risks include potential for a damage and/or a shift of the rail formation leading to derailment risk; potential for damage to rail assets; potential for harm to rail employees/contractor who may be working in close proximity to blasting activities or when a train is transiting through the area at the time of a blast. Each of these risks are exacerbated by the landslip status of the area.

TasRail confirms BIS currently complies with the above mentioned TasRail protocols for the existing quarry.

Given the above, TasRail has no objection to the proposal.

It would be appreciated if the attached TasRail Standard Notes be included with any permits issued so as to inform the applicant of matters relevant to operating next to an operational rail corridor.

Kind regards

Jennifer Jarvis

TASRAIL 150 YEARS OF RAIL IN TASMANIA

Group Property and Compliance Manager | Property
Phone: 03 6335 2603 | Mobile: 0428 139 238
11 Techno Park Drive, Kings Meadows, Tasmania, 7249
Jennifer.Jarvis@tasrail.com.au

TasRail Standard Notes (V2021)

- Where a building or other development is proposed to be located at a setback distance less than 50 metres from the boundary of the rail corridor, the occupants are likely to be exposed to train horn noise and vibration, noting that TasRail Freight Rail Services operate 24/7 and the configuration, frequency and time of these services is subject to change at any time.

- Landowners, builders/developers and prospective residents should undertake appropriate due diligence to ensure they are aware of potential exposure to train horn noise and vibration, particularly in relation to building design, material specifications and lifestyle. The train horn is a safety device that is required to be sounded twice per level crossing being on approach and on entry. The minimum duration of each train horn blow is one second. The train driver also has the discretion to sound the horn at any time he/she perceives a risk.

- Using or creating an unauthorised railway crossing or stock crossing is unsafe and strictly prohibited. If the proposed development interfaces with a rail crossing and/or rail corridor land it is recommended you contact property@tasrail.com.au to discuss the proposed interface ahead of the planning process. Consideration should also be given to the orientation and siting of above ground structures on adjoining land as well as landscaping to ensure there is no potential to obscure or obstruct the line of sight with respect to a railway crossing.

- Stormwater or effluent is not permitted to be discharged onto rail land or into the rail drainage system. Should there be a requirement for a service or asset to be installed on rail land in order to connect into an authorised stormwater or other outlet, a separate TasRail Permit is required and will only be approved subject to terms and conditions (costs apply). A Permit Application Form is available by contacting property@tasrail.com.au

- Any excavation within 3 metres of the rail boundary line requires a separate TasRail Permit from property@tasrail.com.au in accordance with s44 of the *Rail Infrastructure Act 2009*. A minimum of seven (7) business days notice is required, but earlier engagement is recommended

- Rail land is not for private use and should not be encroached for any purpose including for gardens, storage, keeping of animals etc. Dumping of rubbish including green waste into the rail corridor is not permitted.

- No obstruction, installation or works of any kind are permitted inside railway land for any purpose including for structures, unauthorised vehicles, drainage, water pipes, stormwater discharge, electrical or service infrastructure, storage of materials, vegetation clearing, inspections etc.

- As per the *Rail Infrastructure Act 2007*, the Rail Infrastructure Manager (TasRail) may remove and dispose of unauthorised or unlawful service infrastructure and take such other action as it sees fit. Where this occurs, TasRail may recover its costs of doing so as a debt due to TasRail from that person and retain if applicable any proceeds of disposal. No action lies against TasRail for removing or disposing of the unauthorised or unlawful service infrastructure.

- No persons should enter rail land without formal authorisation from TasRail in the form of a TasRail Permit issued by property@tasrail.com.au

- As railway land is Crown Land, the Rail Infrastructure Manager is not required to contribute to the cost of boundary fencing.

Australian Government

Department of Infrastructure, Transport, Regional Development and Communications

General Manager
Northern Midlands Council
PO Box 156
LONGFORD TAS 7301
via email to planning@nmc.tas.gov.au

Dear Sir/Madam

Planning Application PLN-20-00316 – Southern Extension to Existing Quarry (Level 2 activity) - 81 Evandale Road, Western Junction TAS 7212

Thank you for your email of 1 March 2022 seeking comments from the Department of Infrastructure, Transport, Regional Development and Communications (the Department) on planning application PL-20-00361 for the southern extension to the existing quarry at 81 Evandale Road, Western Junction TAS.

I note the subject site is located approximately 250-300 metres from Launceston Airport's runway 14R threshold. Given the close proximity of the proposed development to the runway threshold, development activities and operations on the site are subject to a number of considerations and constraints relating to airport safeguarding and airspace protection. In June 2019, the Department provided the Northern Midlands Council (Council) with comments on the original quarry expansion (your reference PLN-19-0071). The Department reiterates the importance of those comments from an aviation safety perspective.

Airspace Protection

I am informed that Council and the Proponent have previously engaged with Australia Pacific Airports (Launceston) Pty Ltd (APAL) and Airservices Australia (Airservices) on the proposal, particularly in relation to the potential impacts of blasting activities on aircraft operations into and out of Launceston Airport. The Department considers the Airservices' advice (dated 26 July 2019) remains relevant in the context of this current development application and encourages Council to continue to engage with Airservices and APAL on this matter.

In addition, under Part 12 of the *Airports Act 1996* any identified controlled activities (including structures, cranes, glare and plumes), that have the potential to penetrate prescribed airspace for the airport are required to be referred to APAL and assessed by the Department and relevant aviation agencies under the Airports (Protection of Airspace) Regulations 1996.

Please be advised, applications for controlled activities are subject to assessment processes that are separate to, and in addition to, development approvals issued by state or local governments. The Act and Regulations are administered by the Department and decisions under the Regulations can only be issued by an authorised delegate.

Airport Safeguarding

The National Airport Safeguarding Framework (NASF) is a national land use planning framework that aims to improve community amenity by minimising aircraft noise-sensitive developments near airports and improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning

GPO Box 594, Canberra ACT 2601, Australia
• telephone +61 (0)2 6274 7111 • websites infrastructure.gov.au | communications.gov.au | arts.gov.au