



# **EAST ARM ROAD QUARRY**

## **ENVIRONMENTAL NOISE MANAGEMENT PLAN**

DRAFT FOR PUBLIC CONSULTATION

**Version 2.0**

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**TABLE OF CONTENTS**

**Section 1 - Introduction.....6**

1.1 East Arm Road Quarry..... 6

1.2 Scope and Objectives ..... 6

1.3 Plan Structure..... 8

1.4 Plan Management Team ..... 8

**Section 2 – Legislative and relevant Management Plan context..... 10**

2.1 Context of Noise Management ..... 10

2.2 Permit Requirements ..... 11

2.3 Other Relevant Plans..... 11

2.4 Other Reports Plans ..... 12

**Section 3 – Existing Conditions and Predictive Modelling ..... 13**

3.1 Existing Conditions ..... 13

3.2 Potential and Additional Noise impacts..... 13

3.3 Existing Noise Monitoring Data..... 14

3.4 Predictive Modelling ..... 14

**Section 4 – Noise Management Controls ..... 18**

4.1 Awareness Training ..... 18

4.2 Operating Hours..... 18

4.3 Operational Controls..... 19

4.4 Road Traffic Noise Controls..... 19

**Section 5 – Environmental Noise Emission Limits and Monitoring ..... 21**

5.1 Environmental Noise Emission Limits ..... 21

5.2 Environmental Noise Survey Audits..... 21

5.3 Supplementary and Ad Hoc Environmental Noise Surveys ..... 23

5.4 Equipment Sound Power Levels..... 23

5.5 Meteorological Conditions..... 24

**Section 6 – Incident Responses ..... 25**

6.1 Exceedance of environmental Noise Limits ..... 25

6.2 Environmental Noise Complaints..... 26

**Section 7 – Records, Reporting and Review ..... 27**

7.1 Records..... 27

7.2 Reporting..... 27

7.3 Review ..... 28

**Section 8 - Attachments ..... 29**

Attachment 1 – Specialist Report (Tarkarri Engineering)..... 29

**TABLES**

Table 1. Noise management objectives and performance criteria ..... 7

Table 2. Structure of the Management Plan ..... 8

Table 3. Details for East Arm Resources Pty Ltd and the Quarry ..... 8

Table 4. Modelled equipment operational scenarios ..... 15

Table 5. Operating times for operational activities of the Quarry ..... 18

Table 6. Summary of noise emission limits ..... 21

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ACRONYMS	
<b>BMP</b>	Blast Management Plan
<b>EAR</b>	East Arm Resources Pty Ltd
<b>EMPCA</b>	<i>Environmental Management and Pollution Control Act 1994</i>
<b>ENMP</b>	Environmental Noise Management Plan
<b>EPA</b>	Environment Protection Authority
<b>ML</b>	Mining Lease
<b>MRT</b>	Mineral Resources Tasmania
<b>QCP</b>	<i>Tasmanian Quarry Code of Practice 2017</i>
<b>TE</b>	means Tarkarri Engineering Pty Ltd

TERMS	
<b>Council</b>	George Town Council
<b>Record</b>	means to write an observation. All records will be handed to the Quarry Manager and will be kept on file. All records are to be clearly legible.
<b>Quarry</b>	means East Arm Road Quarry

## SECTION 1 - INTRODUCTION

### 1.1 EAST ARM ROAD QUARRY

The East Arm Road Quarry is located at East Arm Road, north of Hillwood in the George Town municipality.

The resource being extracted occurs in low-relief terrain southwards of Fourteen Mile Creek. The activity is associated within Consolidated Mining Lease 2135 P/M.

Up to 2,500,000 cubic metres per annum (approximately 4,000,000 tonnes of product at a conversion factor of 1.6) is extracted per annum.

The Quarry includes the following activities:

- surface site preparation by tree-felling and stockpiling/mulching;
- soil and overburden removal and stockpiling;
- excavation and ripping of material;
- drilling and blasting by a licensed contractor;
- crushing and/or screening of material;
- stockpiling of material (processed and unprocessed);
- the loading of trucks with processed material from the stockpile area;
- rehabilitation of worked out areas;
- management of stormwater in and external to the Quarry; and
- installation and maintenance of drainage systems.

Drilling and blasting are carried out by qualified contractors in consultation with EAR to ensure the following:

- drilling is carried out to the specified design pattern;
- noise and vibration standards are met (both drilling and blasting activities);
- blasting activities are safe and meet workplace health and safety requirements; and
- blasting is adequate to achieve rock fracturing/fragmentation for both extraction by excavator and crushing.

### 1.2 SCOPE AND OBJECTIVES

The ENMP is a practical tool for the management of noise-related risks for Quarry. It has been prepared for a mixed audience of authorities, environmental regulators, and site personnel; the latter of which are responsible for implementing this plan as part of day-to-day operations.

The Scope of the ENMP is to broadly provide information on the following:

1. Blast management objectives, roles, and responsibilities;
2. Competence training and awareness;
3. The noise management context including the existing conditions for the operation;

4. The legal and other requirements associated with management of blast-related issues;
5. Noise management measures that would be implemented during the life of the Quarry;
6. Incident reporting and compliance management; and
7. Document review.

Blasted related impacts, such as air blast overpressure, are dealt with under the *Blast Management Plan*.

The ENMP provides the framework and guidance for the Quarry activities to be conducted in a manner whereby appropriate control measures are implemented to minimise the potential for adverse impacts on environment and to meet compliance requirements. Accordingly, the specific management objective and performance criteria for the ENMP are provided in **Table 1**.

This plan will be implemented once approved by the EPA.

**Table 1. Environmental noise management objectives and performance criteria**

Objectives	Key Performance Outcomes	ENMP Section
To ensure compliance with all relevant approval criteria and reasonable community expectations.	Compliance is achieved with all relevant criteria and reasonable community expectations.	4 and 5
To implement appropriate noise management and mitigation measures during all stages of the Quarry.	All identified noise management and mitigation measures are implemented to the extent required.	4
To implement an appropriate monitoring program to establish compliance or otherwise with relevant criteria during all stages of the Quarry.	All identified monitoring is undertaken in accordance with the relevant procedures and at the relevant intervals.	5
To implement an appropriate complaint handling and response protocol.	Complaints (if any) are handled and responded to in an appropriate and timely manner.	6
To implement continual improvement for investigating, implementing, and reporting on reasonable and feasible measures to reduce noise impacts.	An appropriate continual improvement program has been implemented.	7
To implement an appropriate incident reporting program, if required.	Incidents (if any) are reported in an appropriate and timely manner.	6

### 1.3 PLAN STRUCTURE

The structure of the Management Plan is outlined in **Table 2**.

**Table 2. Structure of the Management Plan**

Section	Content
1	Provides an overview of the Quarry, and objectives of the plan including roles, and responsibilities
2	Details the statutory requirements and permit conditions
3	Describes the existing environment and predictive modelling for noise related impacts
4	Describes the noise management actions in place and to be implemented at the quarry
5	Noise monitoring protocols and compliance assessment criteria
6	Outlines incident planning and responses
7	Outlines the reporting and review requirements
8	Lists references and attachments

### 1.4 PLAN MANAGEMENT TEAM

The ENMP is to be implemented by a team comprised of Quarry management and personnel, and consultant(s).

#### 1.4.1 EAST ARM RESOURCES PTY LTD

The East Arm Road Quarry is owned and operated by East Arm Resources Pty Ltd which is a company in the VSA Roads Group which includes Inroads, Centre State Asphalt, Western Quarries, Topcoat Asphalt and Primal Surfacing – see **Table 3**. The Quarry employs a team of machinery/equipment operators, HSEQ officers, laboratory personnel, and administration staff.

**Table 3. Details for East Arm Resources Pty Ltd and the Quarry**

Item	Details
Legal entity Name	East Arm Resources Pty Ltd

<b>Trading Name</b>	East Arm Resources Pty Ltd
<b>ACN</b>	636 993 783
<b>ABN</b>	41 636 993 783
<b>Registered Address</b>	Unit 2, 3-5 Gibbon Road, Winston Hills NSW 2153
<b>Postal Address</b>	9 Weddel Court, Laverton North VIC 3026
<b>Contact Persons</b>	Name – John Bell Andrews, General Manager, East Arm Road Quarry Email – <a href="mailto:jba@eastarmresources.com">jba@eastarmresources.com</a> Mobile – 0427 709 762
	Name – Rachel Andrews, Quarry Manager, East Arm Road Quarry Email – <a href="mailto:andrewsr@eastarmresources.com">andrewsr@eastarmresources.com</a> Mobile – 0460 309 720

The following roles in East Arm Resources Pty Ltd are to perform their required described tasks.

<b>General Manager</b>	Must ensure adequate resources are available to enable implementation of the ENMP.
<b>Quarry Manager</b>	Accountable for the overall environmental performance of the Quarry operations, including the implementation of (or the overseeing of others implementing) the following components of the ENMP: <ul style="list-style-type: none"> <li>• Implementation of the noise awareness part of the induction outlined in Section 4.2.2.</li> <li>• Noise monitoring as outlined in Section 5.</li> <li>• Complaints handling and response as outlined in Section 6.</li> <li>• Evaluation of compliance as outlined in Section 5 and related follow-up actions.</li> <li>• Incident reporting as outlined in Section 6.</li> <li>• Review of this Plan as outlined in Section 7.</li> </ul> Reports to General Manager.
<b>All personnel</b>	Ensure training and awareness induction has been undertaken. Compliance with this Plan. Report to Quarry Manager.

1.4.2 ENVIRONMENTAL ASSISTANCE AND ADVICE

Van Diemen Consulting Pty Ltd has been engaged to provide on-site assistance and advice with the preparation of the ENMP. Other specific services may be accessed from other consultants such as an acoustic engineer from time to time.

## SECTION 2 – LEGISLATIVE AND RELEVANT MANAGEMENT PLAN CONTEXT

### 2.1 CONTEXT OF NOISE MANAGEMENT

#### 2.1.1 QUARRY CODE OF PRACTICE

Key considerations included: -

- Under certain circumstances, it is appropriate for the regulatory authority to differentiate between certain activities taking place on the land;
- Enclosures may be required around crushing and screening plants;
- Solid barriers, such as bund walls and topographical features, provide the most effective 'in line' reduction of sound levels. Reliance on a barrier of vegetation alone will result in only marginal reduction in noise levels;
- Access tracks and haul roads should be well maintained to prevent corrugation that contributes to truck noise, and truck drivers should be encouraged, where possible, to use access roads which have the least impact on the community;
- Machinery should be well maintained and lubricated. Modern equipment is generally quieter than ageing machinery; and
- Compressors, noisy engines, pumps, generators, and exhausts and based on noise generation should be fitted with silencers, or if possible, enclosed.

#### 2.1.2 TASMANIAN ENVIRONMENT PROTECTION POLICY (NOISE) 2009

The objectives of this policy are –

- (a) to further the objectives of the Act as they relate to the acoustic environment; and
- (b) to protect the environmental values specified in clause 7.

The environmental values to be protected under the Noise EPP are the qualities of the acoustic environment that are conducive to:

- the wellbeing of the community or a part of the community, including its social and economic amenity; or
- the wellbeing of an individual, including the individual's –
  - health; and
  - opportunity to work and study and to have sleep, relaxation and conversation without unreasonable interference from noise.

The following Quarry relevant provisions and clauses are reproduced below from the policy.

**PART 4 – TRANSPORT INFRASTRUCTURE**

The policy recognises that although the operation or use of public roads, railways, ports or airports may prejudice protection of the environmental values, the function the transport network serves is necessary for the community’s economic, environmental and social wellbeing. Notwithstanding this, it is intended that –

- (a) transport planning initiatives for freight and passenger movement and new transport infrastructure be developed in a systematic way to achieve an optimal balance of economic, environmental and social benefits and costs with a major criterion of minimising the number of people exposed to noise levels that would prejudice protection of the environmental values; and
- (b) where environmental values are acutely prejudiced, existing transport infrastructure noise should be reduced to the greatest extent that is reasonably practical, consistent with achieving an optimal balance of economic, environmental and social benefits and costs.

**PART 5 – COMMERCIAL AND INDUSTRIAL ACTIVITIES**

Regulatory authorities should assess, manage and regulate proposed commercial and industrial activities that are sources of noise with the objective of protecting the environmental values. Best practice environmental management should be employed in every activity to reduce noise emissions to the greatest extent that is reasonably practical. Dominant or intrusive noise characteristics of noise emissions from an activity should be reduced to the greatest extent that is reasonably practical.

**2.2 PERMIT REQUIREMENTS**

The permit requirements are below.

Permit Conditions	
TBC	

**2.3 OTHER RELEVANT PLANS**

The following relevant plans need to be considered in the implementation of the ENMP.

Plans
Blast Management Plan TBC

Dust Management Plan TBC
TBC

2.4 OTHER REPORTS PLANS

The following relevant documents have been considered in the development of the ENMP.

Other Reports
<p><b>East Arm Road Quarry. Environmental noise, ground vibration and air blast overpressure assessment. November 2024.</b></p> <p>Prepared by Tarkarri Engineering Pty Ltd</p>
<p><b>East Arm Road Quarry. Air Quality Assessment. November 2024.</b></p> <p>Prepared by Tarkarri Engineering Pty Ltd</p>

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## SECTION 3 – EXISTING CONDITIONS AND PREDICTIVE MODELLING

### 3.1 EXISTING CONDITIONS

#### 3.1.1 EXTERNAL NOISE SOURCES

Noise sources in the landscape surrounding the Quarry include: -

- farm machinery operating on adjacent properties;
- vehicles and trucks using the East Tamar Highway and Batman Highway, smaller public roads (e.g., East Arm Road) and private roads;
- train use of the nearby rail network;
- wind in shelterbelts, plantation, native forest, and remnant trees;
- timber harvesting operations, reforestation activities, and forest management activities (e.g., fertiliser application, vermin control, tree pruning and thinning); and
- bird and insect life.

#### 3.1.2 QUARRY GENERATED NOISE SOURCES

Operations at the existing Quarry include the following: -

- drill rig operation and associated blasting operations;
- harvesting of trees and clearing of vegetation;
- stockpiling of soil into bunds and stripping of overburden;
- establishment of roads, tracks, sediment ponds and drains and associated Quarry drainage network;
- crushing, and screening of material; and
- use of ancillary equipment; excavators, crushers, screens (vibratory/mechanised), hydromulching machinery/equipment, loader, and truck movements.

### 3.2 POTENTIAL AND ADDITIONAL NOISE IMPACTS

All earth-moving operations have the potential to produce noise, and this can be a source of public disapproval of quarries. Where residences exist adjacent to a Quarry, as is the case with this Quarry, precautions are to be taken to reduce the impact of noise and vibration.

The major noise sources from the Quarry have been identified as follows: -

- drill rig operation and associated blasting operations;
- harvesting of trees and clearing of vegetation;
- stockpiling of soil into bunds and stripping of overburden;
- establishment of roads, tracks, sediment ponds and drains and associated Quarry drainage network;
- crushing, and screening of material; and

- use of ancillary equipment; excavators, crushers, screens (vibratory/mechanised), hydromulching machinery/equipment, loader, and truck movements.

Potential increased noise emissions from the intensified and expanded Quarry activity are as follows:

- Additional drill rig operation and associated blasting operations,
- Additional stockpiling of soil into bunds,
- Additional clearing, mulching, and stockpiling of vegetation,
- Additional crushing, and screening of material, and
- Additional use of ancillary equipment; loader and truck movements.

### 3.3 EXISTING NOISE MONITORING DATA

No noise monitoring has occurred at the Quarry other than for air blast overpressure associated with blasting events.

### 3.4 PREDICTIVE MODELLING

#### 3.4.1 SPECIALIST REPORT

Tarkarri Engineering (TE) conducted an environmental noise, ground vibration and air blast overpressure assessment for the Quarry (**Attachment 1**). Specifically, the potential impacts of haulage, drilling and blasting, and crushing/screening, were considered in the assessment and mitigation measures recommended.

The assessment report prepared by TE formed part of this EIS.

Blasted related impacts, such as air blast overpressure, are dealt with under the *Blast Management Plan*.

#### 3.4.2 IDENTIFICATION OF SENSITIVE RECEPTORS

The locations of the closest residences (used as environmental noise model receivers) are provided in Table 2-1 of **Attachment 1** (reproduced below).

The Numbers assigned to each sensitive receptor is used throughout the TE produced maps and tables in this Section reproduced from the TE.

Environmental noise measurement and model receiver positions		
Number	Location	Coordinates (MGA94, Zone 55 G)
R1	285 East Arm Rd	499790 / 5438998
R2	135 Youngs Rd	499879 / 5439993
R3	44 East Arm Rd	498147 / 5438648
R4	Lot 1 Archers Rd	496633 / 5439946

Table 2-1: Environmental noise measurement and model receiver positions.

Figure 2-1 of **Attachment 1** (reproduced below) presents the locations on an aerial view.

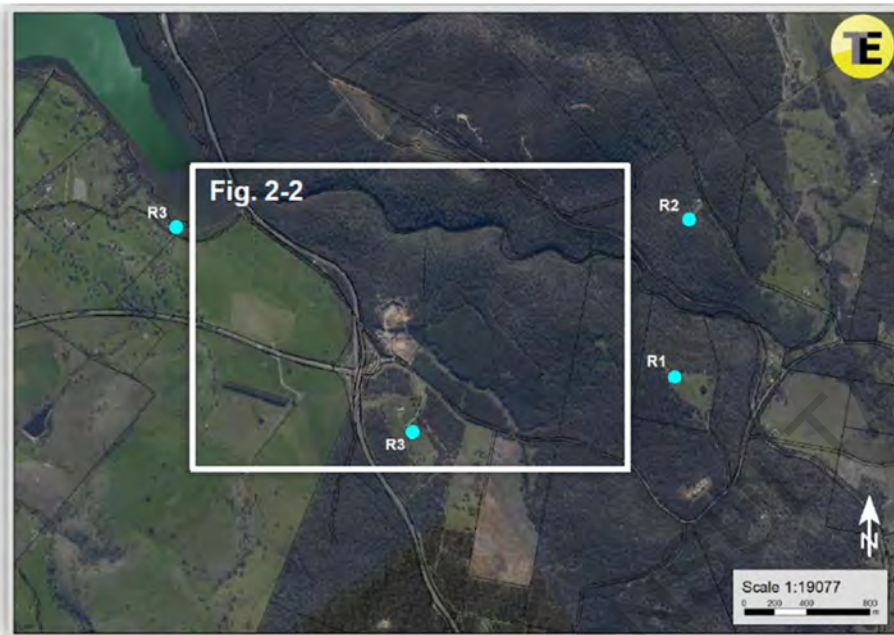


Figure 2-1: Aerial view of East Arm Quarry and surrounds with environmental noise model receivers marked.

### 3.4.3 ASSESSMENT SCENARIOS

**Table 4** lists the equipment operational scenarios modelled to represent conservative 10-minute  $LA_{eq}$  noise level generation from the quarry. Using the environmental noise model, noise contour maps were generated by TE to assist in the visualisation of noise propagation from the Quarry to the surrounding environment.

Noise contour maps were developed are provided at Figures 4-9 to 4-16 in **Attachment 1**.

**Table 4. Modelled equipment operational scenarios**

Quarry Stage	Description
8 Months	X2 excavator remove rubble from excavation sites on RLs 40 and 52 and load X2 ADTs which drive between the working faces and the crushing area. A crushing line including a jaw crusher, X2 cone crushers, impact crusher and X3 mobile screens is present (in its current location which is maintained). A dozer clears the land above the working face of RL 64 and a drill rig prepares for the next blast. An FEL loads the crusher line. An ADT is present near the stockpiles and an FEL loads two trucks near the product stockpiles. The trucks enter and leave the site via the weigh bridge and entry gate.
3.5 Years	X2 excavator remove rubble from excavation sites on RLs 40 and 64 and load X2 ADTs which drive between the working faces and the crushing area. A crushing line including a jaw crusher, X2 cone crushers, impact crusher and X3 mobile screens is present (in its current location which is maintained). A dozer clears the land above the working face of RL 64 and a drill rig prepares for the next blast. An

	FEL loads the crusher line. An ADT is present near the stockpiles and an FEL loads two trucks near the product stockpiles. The trucks enter and leave the site via the weigh bridge and entry gate.
5.5 Years	X2 excavator remove rubble from excavation sites on RLs 40 and 52 and load X2 ADTs which drive between the working faces and the crushing area. A crushing line including a jaw crusher, X2 cone crushers, impact crusher and X3 mobile screens is present (in its current location which is maintained). A dozer clears the land above the working face of RL 52 and a drill rig prepares for the next blast. An FEL loads the crusher line. An ADT is present near the stockpiles and an FEL load two trucks near the product stockpiles. The trucks enter and leave the site via the weigh bridge and entry gate.
5.5 Years	X2 excavator remove rubble from excavation sites on RL 40 and at the eastern most extent of the mining lease and load X2 ADTs which drive between the working faces and the crushing area. A crushing line including a jaw crusher, X2 cone crushers, impact crusher and X3 mobile screens is present (in its current location which is maintained). A dozer clears the land near the eastern boundary and a drill rig prepares for the next blast. An FEL loads the crusher line. An ADT is present near the stockpiles and an FEL loads two trucks near the product stockpiles. The trucks enter and leave the site via the weigh bridge and entry gate.
16.5 Years	X2 excavator remove rubble from excavation sites on RLs 40 and 50 and load X2 ADTs which drive between the working faces and the crushing area. A crushing line including a jaw crusher, X2 cone crushers, impact crusher and X3 mobile screens is present (in its current location which is maintained). A dozer clears the land at the working face of RL 50 and a drill rig prepares for the next blast. An FEL loads the crusher line. An ADT is present near the stockpiles and an FEL loads two trucks near the product stockpiles. The trucks enter and leave the site via the weigh bridge and entry gate.

Models used normal and worst-case weather scenarios to determine, as far as possible, the potential impact of noise emissions on surrounding sensitive uses.

Transport trucks accessing and transporting material from the Quarry to Bell Bay were modelled along the East Tamar Hwy.

3.4.4 MODELLING RESULTS

PREDICTED NOISE EMISSION LEVELS

Table 4-3 of **Attachment 1** (reproduced below) presents predicted LA<sub>eq</sub> noise emission levels at the receiver locations for each of the model scenarios. Where predicted noise levels exceed a day noise emission limit of 45 dBA they are highlighted.

Predicted sound pressure levels (dBA)								
Receiver	8 Months		3.5 Years		5.5 Years		16.5 Years	
	ISO	Worst case	ISO	Worst case	ISO	Worst case	ISO	Worst case
R1	32	35	33	35	40	42	32	38
R2	32	29	35	37	36	37	34	38
R3	43	48	43	48	43	47	44	48
R4	36	36	35	34	35	32	35	32

Predicted noise emission levels at all receivers are below the day period noise emission criterion of 45 dBA under the ISO prediction algorithm. Under the CONCAWE wcv prediction algorithm noise emission levels are also below 45 dBA except for receiver R3 where a 2 to 3 dB exceedance is predicted. The dominant noise source contributions at this location are from the crushing and screening line noise sources. Detailed examination of the modelling results indicates that the ISO and CONCAWE algorithms address the topographic shielding between the quarry crushing and screening line and R3 very differently. The ISO algorithm predicts 3 – 5 dB barrier attenuation from the sources in the crushing and screening line while the CONCAWE algorithm provides no barrier attenuation.

Predicted levels when C-weighted are less than 15 dB higher than the A-weighted results indicating that excessive low frequency noise isn't likely.

Impulsive noise can be generated by the drill rig when rattling (i.e. loosening a drill rod to allow installation of an extension), however, maximum noise levels generated by this action are expected to be no greater than 50 - 55 dBA at any receiver (based on a 126 dBA SWL).

Intermittency can be generated by vary mobile equipment operations; however, this is expected to be in accordance with traffic noise in the area. Engine firing frequency components from the mobile equipment have the potential to generate tonality in noise emission that could results in a 1 to 1.5 dB adjustment to an LAeq level measured, however, these are unlikely to be stable tonal components and again in accordance with traffic noise in the area. Modulation of noise from the site isn't expected to occur. Traffic noise on the East Tamar Hwy is expected to remain the dominant noise source at R3.

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#### PREDICTED ROAD TRAFFIC NOISE EMISSIONS

The following was assumed for a 10-minute prediction statistic:

- 6 trucks enter the quarry using the southbound slip lane off the East Tamar Hwy; and
- 6 trucks leave the site via the clove offramp to access the northbound onramp opposite the overpass.

Results indicate that predicted  $L_{Aeq,10min}$  levels from truck traffic would be  $\leq 30$  dBA at receivers R1 to R3 and 40 dBA at receiver R4. At this level these movements wouldn't contribute significantly to existing day ambient noise levels.

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#### 3.4.5 SUMMARY OF FINDINGS

The Quarry operates within QCP day hours, 0700 – 1900 hrs weekdays and 0800 – 1600 hrs on Saturdays with no operations Sundays and public holidays.

The assessment criterion of operational noise from the Quarry is based on the Quarry Code of Practice minimum daytime noise emission criterion of 45 dBA ( $L_{Aeq,10min}$ ).

At residential locations to the west and east of the quarry predicted noise levels are below the criterion level for this assessment (i.e. 45 dBA) and are unlikely to be significantly audible in a typical daytime ambient noise environment. Some potential tonality is predicted; however, the predicted tones are unlikely to be stable and would likely be masked by existing traffic noise in the area.

Increases in traffic flows on the East Tamar Hwy resulting from material carting to Bell Bay doesn't contribute significantly to existing ambient noise levels.

**SECTION 4 – NOISE MANAGEMENT CONTROLS**

**4.1 AWARENESS TRAINING**

All personnel and contractors and their employees will undergo Quarry specific inductions, incorporating basic noise management awareness training as part of the site induction program. The Quarry Manager is responsible for ensuring the appropriate noise management training for Quarry staff is included in the induction.

The following areas, as a minimum, will be covered in the induction:

- Use of only approved reversing alarms.
- Awareness of prevailing wind directions and their potential to increase noise emissions downwind.
- Awareness of the noise enhancing effects of temperature inversions and the times of day and meteorological conditions under which they may occur.
- Awareness of noise control measures.
- Awareness of operating hours.
- Awareness of surrounding neighbouring and residences.
- Awareness of the potential for noise impacts to neighbours and the location of the nearest privately-owned residences.

In addition, monthly toolbox meetings are held to discuss whole-of-site production, management, safety and environmental issues. Matters relating to noise are raised during these meetings, when necessary.

**4.2 OPERATING HOURS**

The Quarry comprises several operational activities that each have a time-relevant environmental impact risk profile (e.g., noise generated during Evening and Night periods, vibration, traffic). **Table 5** provides the operating times for the four operational activities undertaken at the Quarry.

**Table 5. Operating times for operational activities of the Quarry**

Activity 1	Activity 2	Activity 3	Activity 4
Clearing vegetation, ripping, stockpiling and associated earthworks	Crushing and/or vibratory screening	Loading and carting of product	Drilling and blasting
0700 to 1900 hrs Monday to Friday 0800 to 1600 hrs Saturday Not on Sunday and public holidays gazetted statewide	0700 to 1900 hrs Monday to Friday 0800 to 1600 hrs Saturday Not on Sunday and public holidays gazetted statewide	0700 to 1900 hrs Monday to Friday 0800 to 1600 hrs Saturday Not on Sunday and public holidays gazetted statewide	<u>Drilling</u> 0700 to 1900 hrs Monday to Friday 0800 to 1600 hrs Saturday

			<p>Not on Sunday and public holidays gazetted statewide</p> <p><u>Blasting</u></p> <p>1000 to 1600 hrs Monday to Friday</p> <p>Not on Saturday, Sunday and public holidays gazetted statewide</p>
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#### 4.3 OPERATIONAL CONTROLS

The following noise mitigation and management measures are currently implemented at the Quarry and would be continued over the life of the Quarry:

- All operations are undertaken in accordance with the approved hours of operation;
- Stockpiles and ancillary equipment are positioned to limit potential noise impacts;
- All equipment on site is maintained to adhere to existing noise standards and ensure that noise generated by equipment is not exacerbated;
- Earthen bunds are installed (even if they are temporary) to act as a noise attenuation barrier;
- Operations at exposed locations and under unfavourable weather conditions are modified, where necessary, to reduce potential noise-related impacts; and
- The internal road network is maintained to reduce body noise from empty trucks.

#### 4.4 ROAD TRAFFIC NOISE CONTROLS

Road traffic noise management measures that will be implemented over the life of the Quarry include the following:

- Compliance with the approved hours of operation for product loading and despatch (**Table 5**).
- All drivers would be required to review and sign a Driver’s Code of Conduct that directs driver behaviour during transportation activities. Issues addressed in the code of conduct would include:
  - advice for quiet driving practices and measures to reduce vehicle noise;
  - limiting the use of compression braking unless required for safety reasons;
  - advice for management of driver fatigue;
  - load covering for all laden vehicles;
  - timing for departure and arrival to remain within approved limits and avoid convoying;
  - management of breakdowns and incidents; and
  - awareness of school buses, school zones, pedestrians, and cyclists on roads.

- Ongoing maintenance of the condition of the Quarry Access Road to limit noise generated from potholes or edgewear.
- Maintenance of a complaints and incidents register for all traffic-related matters.

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## SECTION 5 – ENVIRONMENTAL NOISE EMISSION LIMITS AND MONITORING

This section details the environmental noise monitoring program and associated emission limits.

All noise measurements shall be accompanied by both qualitative description (including cloud cover) and quantitative measurements of local weather conditions throughout the survey period.

### 5.1 ENVIRONMENTAL NOISE EMISSION LIMITS

Noise emissions from the activity at any noise sensitive premises in other ownership and expressed as the equivalent continuous A-weighted sound pressure level must not exceed those listed in **Table 6**.

Any exceedance will be managed in accordance with the procedures in Section 6.1.

**Table 6. Summary of noise emission limits**

Parameter	Day	Night
Residence on other land	45 dB(A) between 0700 hours and 1900 hours	35 dB(A) between 1900 hours and 0700 hours

### 5.2 ENVIRONMENTAL NOISE SURVEY AUDITS

#### 5.2.1 MONITORING LOCATIONS

Monitoring locations representative of the surrounding sensitive receivers are to be used for evaluating and assessing noise emissions from the Quarry. These may change from time to time subject to the type of survey being conducted, and whether it is a scheduled environmental noise survey, or a survey being conducted to address a complaint from a resident living nearby. Nevertheless, EAR will ensure that the noise generated by the Quarry does not exceed the noise impact performance criteria (refer Section 3.4.2 IDENTIFICATION OF SENSITIVE RECEPTORS) at these residential receiver locations.

**Figure 1** shows the location of the 4 nearest sensitive residential receivers.

It should be noted that in instances where monitoring may not be conducted at residential receivers due to access limitations, noise levels may be measured at the nearest accessible point and extrapolated via calculation to the nearest residential receiver location for comparison to noise assessment criteria.

**Figure 1. Location of residential receiver locations around East Arm Road Quarry**



### 5.2.2 FREQUENCY OF MONITORING

Environmental noise emissions are to be monitored annually and consist of continuous unattended and operator attended noise monitoring.

### 5.2.3 ATTENDED NOISE MONITORING

Operator-attended noise measurements shall be conducted at sampling locations to quantify and characterise the maximum ( $LA_{max}$  or  $LA_1$ , 1minute) and energy equivalent ( $LA_{eq}$ ) noise levels from quarry operations over a 10-minute measurement period.

Measurements and data recorded during the survey must include:

- operational status of noise producing equipment and throughput of the activity;
- subjective descriptions of the sound at each location;
- details of meteorological conditions relevant to the propagation of noise; and
- record any significant noise sources (i.e. haul trucks, dozers, etc.).

Measurements are to be taken as per the following, unless otherwise altered or modified by a direction from the Quarry Manager:

- A minimum of three sequential 10-minute observed measurements at each measurement location during the day, measuring equivalent continuous ( $L_{eq}$ ) and  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$  and  $L_{99}$  A-weighted sound pressure levels.
- Minimum 1-minute 1/3-octave band and narrow band measurements at each measurement location during each observed measurement. Narrow band measurements would be taken across the following range:-
  - Narrow band data 0 to 1000 Hz (0.15625 Hz resolution)
  - Subjective description of the noise environment during each observed measurement and details of meteorological conditions relevant to noise propagation would be noted. The operational status of the equipment on-site will also be recorded during each observed measurement.
  - Logging of 10-minute unobserved equivalent continuous ( $L_{eq}$ ) and  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$  and  $L_{99}$  A-weighted sound pressure levels for the duration of the survey at each sampled location.

Noise levels from extraneous, ambient and background noise sources and emissions will be quantified and reported upon where necessary.

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#### 5.2.4 UNATTENDED NOISE MONITORING

To supplement the operator-attended measurements, unattended continuous noise monitoring may be undertaken to quantify overall ambient noise levels resulting from quarry operations as well as other industrial noise sources in the area. Data from unattended continuous noise logging will allow trends to be identified in ambient noise levels surrounding the quarry and the assessment of cumulative noise impacts from all industrial related noise sources in the area.

If conducted, the unattended ambient noise logger data from each monitoring location, together with the weather shall be presented in the annual noise monitoring report. Prior to further analysis, the ambient noise level data from each monitoring location which correlate with periods of unstable weather (i.e. rainfall greater than 0.5 mm or wind speed greater than 5 m/s) at the microphone shall be discarded.

It should be noted that the ambient noise levels do not necessarily reflect the contributed level of noise emissions from the quarry operations. The ambient noise level data quantifies the overall noise level at a given location independent of its source or character. The ambient noise monitoring data will provide indications of the cumulative noise emissions from all industrial noise sources and amenity levels.

### 5.3 SUPPLEMENTARY AND AD HOC ENVIRONMENTAL NOISE SURVEYS

In the event of a noise-related complaint, EAR may undertake supplementary attended noise surveys in accordance with the procedures described in Section 5.2.3.

### 5.4 EQUIPMENT SOUND POWER LEVELS

Regular noise measurements of acoustically significant plant and equipment will be conducted, to ensure that they remain within the specified design levels. It should also be noted that equipment used at the Quarry may

change from year to year as technology improves and equipment nears an age that requires replacement. This is common practice in quarrying operations.

To account for any equipment changes, at least once every 2 years, sound power levels of equipment used at the Quarry will be surveyed by a suitably experienced person. The data will provide a general indication of noise being produced by noise sources and demonstrate that equipment service to manufacturer's requirements is occurring and equipment isn't generating significantly more noise than was assumed for assessment.

## 5.5 METEOROLOGICAL CONDITIONS

### 5.5.1 INTRODUCTION

Real-time measurements of meteorological conditions are taken to support environmental monitoring activities and to identify weather conditions which may trigger the need to modify operations.

### 5.5.2 MONITORING EQUIPMENT

A solar-powered weather station is to be installed and maintained at a yet to be determined location in the Quarry. This station will consist of solar panels, a weatherproof enclosure which contains a data logger (which reads the sensors) and power supply, and sensors which continuously measure:

- rainfall;
- wind speed and direction (measured at three metres above ground level);
- relative humidity;
- temperature; and
- solar radiation.

The station will be equipped with a digital cell phone kit which retrieves data from the logger and transmits it directly to a computer at the site office. Software is to be used for automatically downloading the data and to create monitoring programs e.g. for calculations of evaporation and temperature inversion. The equipment facilitates real-time monitoring of weather conditions.

## SECTION 6 – INCIDENT RESPONSES

The objective of this section is to describe procedures for responding to impacts identified by the monitoring program. Responding to identified incidents and associated impacts is the responsibility of the Quarry Manager.

### 6.1 EXCEEDANCE OF ENVIRONMENTAL NOISE LIMITS

Following exceedance of the noise emission limits (**Table 6**) the following actions will be completed:

- a) The Quarry Manager will be notified of the potential non-compliance.
- b) The EPA would be notified of the potential non-compliance by email/phone call within 24 hrs from when the Quarry Manager became aware of the potential non-compliance.
- c) An investigation into the potential non-compliance would be instigated, with the objective of identifying the following, where appropriate:
  - i. the date and time of the non-compliance;
  - ii. the duration of the non-compliance;
  - iii. whether the non-compliance was directly related to operations within the Quarry or if any other factors contributed to the non-compliance;
  - iv. the primary cause of the non-compliance;
  - v. any contributing factors which led to the non-compliance;
  - vi. whether appropriate controls were implemented to prevent the non-compliance; and
  - vii. corrective and preventative measures that may be implemented to prevent a recurrence of the non-compliance.
- d) Within 21 days of the date of identifying the non-compliance EAR will provide a detailed report to the EPA. The report shall (at a minimum):
  - i. be made in writing;
  - ii. set out the condition(s) that the Quarry is non-compliant with
  - iii. why it does not comply and the reasons for the non-compliance (if known); and
  - iv. what actions have been, or will be, undertaken to address the non-compliance.

Following completion of the investigation, EAR will:

1. Provide a copy of the completed investigation report to the EPA.
2. Implement the corrective and preventative actions identified in the investigation report.

Any exceedance of the noise emission limits will be reported in the Annual Environmental Review.

## 6.2 ENVIRONMENTAL NOISE COMPLAINTS

A complaints register is used at the Quarry to record complaints received from the public, or communicated to the Quarry Manager via the EPA, MRT, Council or other source.

Complainants will be contacted within 24 hours of notification to assess the nature of the complaint, take details and the complainant will be notified at that time of further action to be taken.

With the permission of the complainant, subsequent monitoring at the site of the complainant may take place (e.g. 5.3 SUPPLEMENTARY AND AD HOC NOISE SURVEYS), and the results will be reported to both the complainant and the Quarry Manager.

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## SECTION 7 – RECORDS, REPORTING AND REVIEW

### 7.1 RECORDS

Compliance and corrective actions taken to address any non-compliances with the noise emission limits will be managed by operational management, which includes the collection and keeping of records.

#### 7.1.2 NOISE SURVEY RECORDS AND REPORT

Details of each noise monitoring events will be recorded, and those records retained for at least 5 years. The contractor engaged to conduct a noise survey is responsible for the preparation of the report.

Any noise survey report prepared under this ENMP must include the following:

- the results and interpretation of the measurements required by these conditions;
- a map of the area surrounding the activity;
- measurement locations, and noise sensitive premises clearly marked on the map;
- any other information that will assist with interpreting the results and whether the Quarry is compliant with the noise emission limits and in accordance with EMPCA; and
- recommendations of appropriate mitigation measures to manage any noise problems identified by the noise survey.

In addition, the operator shall obtain copies of the relevant fixed plant and mobile equipment operating shift logs that could be included in the noise monitoring report, if relevant.

### 7.2 REPORTING

#### 7.2.1 ANNUAL ENVIRONMENTAL REVIEW

Within 60 days of June 30 each year an Annual Environmental Review (AER) will be compiled reviewing the environmental performance of the development and will be made available to the EPA or member of the public on request.

Noise-related matters that will be reported in the AER include the following as relevant for the year of reporting.

- A summary of the outcomes of noise management for the period and that proposed for the following year.
- Any changes to noise management that occurred as part of operations during the year or that are proposed for the following year.
- The outcomes of all monitoring described in Section 5.
- A review of any incidents or complaints that relate to noise management, which may include any received from blasting activities as they relate to drill rig use and air blast overpressure generated by a blast.

- A statement regarding compliance with blast-related conditions of consent for the period.

## 7.3 REVIEW

### 7.3.1 CONTINUAL IMPROVEMENT

Opportunities for improvement of noise-related impacts will be discussed internally at toolbox meetings, in conjunction with all Quarry personnel. These opportunities would be presented to the Quarry Manager for consideration and any changes to operations as a result reported on as part of the Annual Environmental Review (AER) or, where relevant, reflected in an updated Plan.

In addition, general compliance, noise monitoring outcomes and the number of complaints would be used as an indication of the effectiveness of management. This includes issues identified through the AER preparation.

Incidents (as defined in Section 6) would trigger a brief review of the noise management system, where necessary.

### 7.3.2 PLAN REVIEW

The ENMP is to be reviewed within 3 months of:

- the submission of an incident report;
- the submission of an Annual Environmental Review;
- the approval of any modification of the conditions of this approval (unless the conditions require otherwise); or
- the issue of a direction from the EPA which requires a review.

A review may be of short duration and not result in any change to the ENMP, especially if there are no exceedances, non-compliances, or incidents to report.

If necessary, to either improve the environmental performance of the project, cater for a modification, or comply with a direction, this plan must be revised, to the satisfaction of the EPA and submitted to the Director for approval within six weeks of the review. EAR will continue to apply existing management plans, strategies, or monitoring programs prior to the determination of a modification until the approval of a similar plan, strategy, or program.

SECTION 8 - ATTACHMENTS

ATTACHMENT 1 – SPECIALIST REPORT (TARKARRI ENGINEERING)

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