



Hy-Tec Industries Pty Limited

ABN: 90 070 100 702

Austen Quarry
Noise Management Plan

August 2019

Prepared by:



R.W. CORKERY & CO. PTY. LIMITED



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Noise Management Plan

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LIST OF ACRONYMS

dB(A)	Decibel A-weighting
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPL	Environment Protection Licence
LEP	Local Environmental Plan
RWC	R.W. Corkery & Co. Pty Limited
SSD	State Significant Development

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1. INTRODUCTION

The Austen Quarry Noise Management Plan (“the Plan”) has been prepared to satisfy *Condition 5* of Schedule 3 of Development Consent SSD 6084 (SSD 6084) and as an operational tool to assist in the management of noise related issues during the operation of the Austen Quarry (“the Quarry”). It will be used by Hy-Tec Industries Pty Limited (Hy-Tec) personnel as the first point of reference for noise related issues.

This plan synthesises the recommendations made during the assessments undertaken for the Stage 2 development of the Quarry which was approved in July 2015 and a subsequent modification to SSD 6084 approved in August 2018. The most recent assessment of predicted noise-related impacts associated with the Stage 2 development of the Quarry is provided in the Statement of Environmental Effects (RWC, 2018) and Noise and Vibration Impact Assessment (Muller Acoustic Consulting, 2018).

The approved layout is displayed in **Figure 1**. The land within the approved site boundary is referred to as the Quarry Site. The construction and development of Stage 2 of the Quarry involves an increase in depth and lateral extension of the Stage 1 extraction area along an adjacent southwest-northeast trending ridge and a lateral extension and elevation of the existing overburden emplacement. SSD 6084 was modified in August 2018 and in July 2019.

Noise generating activities principally relate to those operational activities required to clear vegetation and strip topsoil and subsoil, drill and blast extraction of raw materials, load and haul of materials for processing through crushing and screening or emplacement of overburden, stockpiling and transport of final products and miscellaneous equipment used within the Quarry.

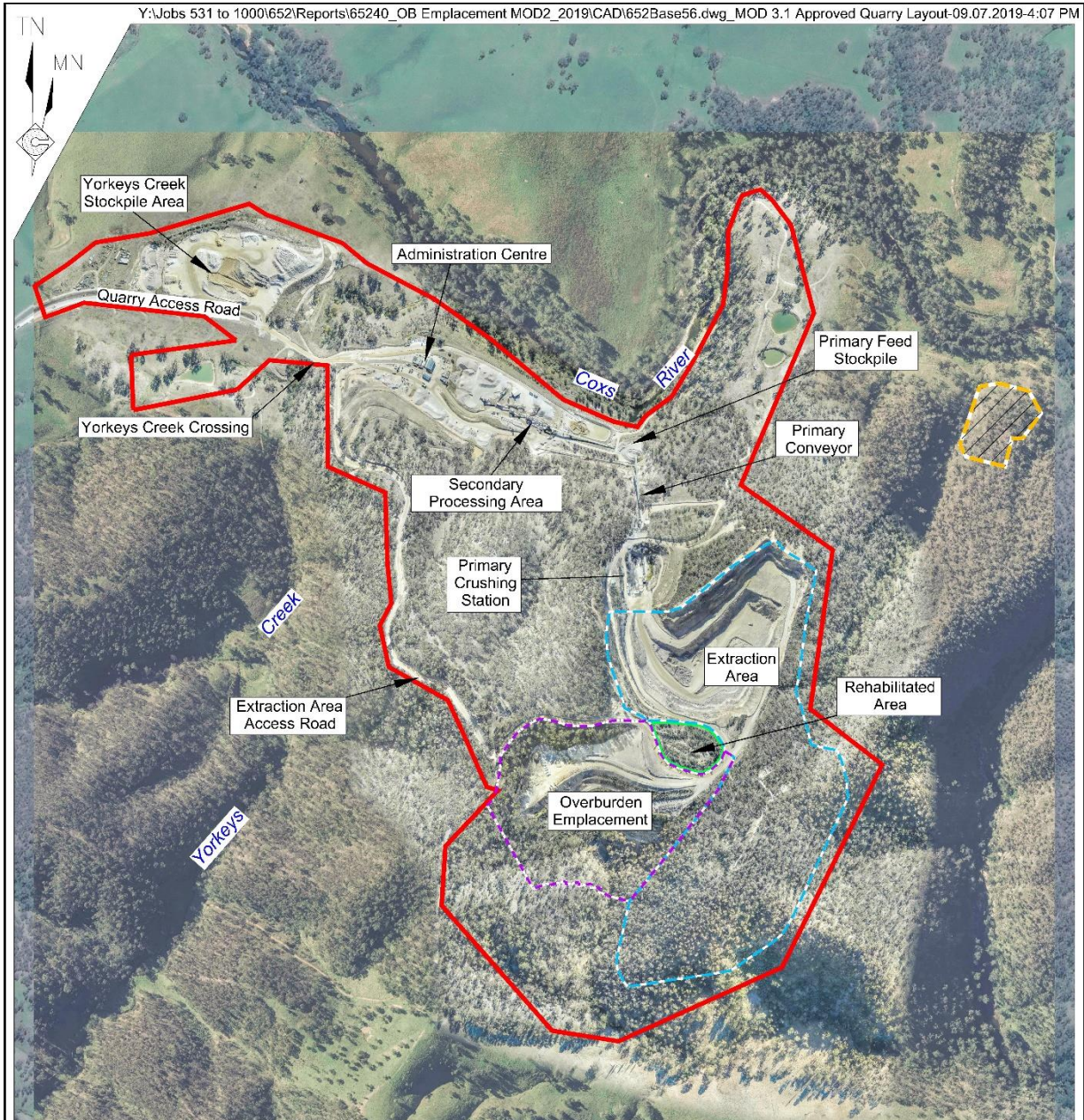
Condition 5(a) of Schedule 3 of SSD-6084 requires the NSW Environment Protection Authority (EPA) be consulted in the preparation of the Plan. A copy of this Plan was provided to the EPA for comment on 30 November 2018. The EPA confirmed that the Authority had no comments on the plan via email on 26 March 2019.

2. LEGAL AND OTHER REGULATORY REQUIREMENTS

Noise management at the Quarry Site is principally guided by the following sources.

- The relevant conditions of consent provided in SSD 6084.
- The relevant conditions of Environmental Protection Licence 12323.
- The commitments made in the planning documents that are summarised in the Statement of Commitments (Appendix 3 of SSD 6084).

The following subsections summarise the relevant noise-related conditions and commitments that are addressed in this plan.



Note: Some boundaries are coincident

- REFERENCE
- Quarry Site Boundary
 - - - Extraction Area Boundary
 - - - Overburden Emplacement Area Boundary
 - - - Rehabilitated Area (Offset for Clarity)
 - / / / / Conservation Area H

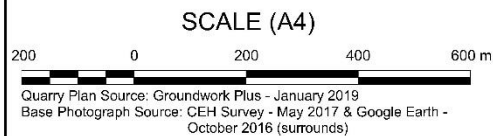


Figure 1
 APPROVED QUARRY SITE LAYOUT

2.2 DEVELOPMENT CONSENT SSD 6084

Noise management is guided by Conditions 1 to 5 of Schedule 3 of SSD 6084. More general requirements for the preparation of management plans are also provided by Condition 2 of Schedule 5 of SSD 6084, while Condition 5 and Condition 6 of Schedule 3 relate to incident and management and reporting requirements that influence noise management. **Table 1** identifies the noise-related conditional requirements and identifies where in the Plan individual requirements have been addressed.

Table 1
Noise Related Approval Conditions of SSD-6084

Page 1 of 3

Condition	Section										
Schedule 3											
<p>Condition 1 – Hours of Operation The Applicant must comply with the operating hours set out in Table 1.</p> <p>Table 1: Operating Hours</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Permissible Hours</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Extraction operations Processing operations Overburden Management Stockpile Management </td> <td> <ul style="list-style-type: none"> 6:00am to 10:00pm Monday to Friday; 6:00am to 3:00pm Saturday; and At no time on Sundays or public holidays. </td> </tr> <tr> <td> <ul style="list-style-type: none"> Blasting </td> <td> <ul style="list-style-type: none"> 10:00am to 3:00pm Monday to Friday (except public holidays). </td> </tr> <tr> <td> <ul style="list-style-type: none"> Loading and dispatch </td> <td> <ul style="list-style-type: none"> 4:00am to 10:00pm Monday to Friday; 5:00am to 3:00pm Saturdays; and At no time on Sundays or public holidays. </td> </tr> <tr> <td> <ul style="list-style-type: none"> Maintenance </td> <td> <ul style="list-style-type: none"> Anytime. </td> </tr> </tbody> </table>	Activity	Permissible Hours	<ul style="list-style-type: none"> Extraction operations Processing operations Overburden Management Stockpile Management 	<ul style="list-style-type: none"> 6:00am to 10:00pm Monday to Friday; 6:00am to 3:00pm Saturday; and At no time on Sundays or public holidays. 	<ul style="list-style-type: none"> Blasting 	<ul style="list-style-type: none"> 10:00am to 3:00pm Monday to Friday (except public holidays). 	<ul style="list-style-type: none"> Loading and dispatch 	<ul style="list-style-type: none"> 4:00am to 10:00pm Monday to Friday; 5:00am to 3:00pm Saturdays; and At no time on Sundays or public holidays. 	<ul style="list-style-type: none"> Maintenance 	<ul style="list-style-type: none"> Anytime. 	7.1.1
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<ul style="list-style-type: none"> Maintenance 	<ul style="list-style-type: none"> Anytime. 										
<p>Condition 2 – Hours of Operation The following activities may be carried out on the site outside the hours specified in condition 1: (a) delivery or dispatch of materials as requested by Police or other authorities; and (b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm. In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.</p>	7.2.2										
<p>Condition 3 – Noise Impact Assessment Criteria The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land Table 2: Noise criteria dB(A)</p> <table border="1"> <thead> <tr> <th>Receiver</th> <th>Day dB(A) L_{aq}(15mins)</th> <th>Evening dB(A) L_{aq}(15mins)</th> <th>Morning Shoulder dB(A) L_{aq}(15mins)</th> <th>Morning Shoulder (Sleep Disturbance) L_{Amax}</th> </tr> </thead> <tbody> <tr> <td>All privately-owned residences</td> <td style="text-align: center;">35</td> <td style="text-align: center;">35</td> <td style="text-align: center;">35</td> <td style="text-align: center;">52</td> </tr> </tbody> </table>	Receiver	Day dB(A) L _{aq} (15mins)	Evening dB(A) L _{aq} (15mins)	Morning Shoulder dB(A) L _{aq} (15mins)	Morning Shoulder (Sleep Disturbance) L _{Amax}	All privately-owned residences	35	35	35	52	
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All privately-owned residences	35	35	35	52							
<p>Noise generated by the development must be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the <i>NSW Noise Policy for Industry</i> (EPA, 2017). However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	6										

Table 1 (Cont'd)
Noise Related Approval Conditions of SSD-6084

Page 2 of 3

Condition	Section
Schedule 3 (Cont'd)	
<p>Condition 4 – Operating Conditions</p> <p>The Applicant must:</p> <ul style="list-style-type: none"> a) implement best practice management to minimise the operational and road transportation noise of the development; b) minimise the noise impacts of the development during noise-enhancing meteorological conditions; c) carry out attended noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent; and d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary. <p><i>Note: Required frequency of noise monitoring may be reduced if approved by the Secretary.</i></p>	<p>7.1</p> <p>7.2.2</p> <p>8</p> <p>7.2</p>
<p>Condition 5 – Noise Management Plan</p> <p>The Applicant must prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> a) be prepared in consultation with EPA; b) be submitted to the Secretary at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary; c) describe the measures that would be implemented to ensure: <ul style="list-style-type: none"> – compliance with the noise criteria in this consent; – best practice management is being employed; and – the noise impacts of the development are minimised during noise-enhancing meteorological conditions; d) describe the proposed noise management system; and e) include a monitoring program: <ul style="list-style-type: none"> – to be implemented to measure noise from the development against the noise criteria in Table 2; – that includes annual noise monitoring at R24A, unless otherwise agreed with the Secretary; and – which evaluates and reports on the effectiveness of the noise management system on site. <p>The Applicant must implement the Noise Management Plan as approved by the Secretary.</p>	<p>1</p> <p>2.1</p> <p>7, 8</p> <p>7, 14</p> <p>7.2.2</p> <p>7</p> <p>8</p>
Schedule 5	
<p>Condition 2 – Management Plan Requirements</p> <p>The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> a) summary of relevant background or baseline data; b) a description of: <ul style="list-style-type: none"> – the relevant statutory requirements (including any relevant approval, licence or lease conditions); – any relevant limits or performance measures/criteria; and – the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; 	<p>4</p> <p>2</p> <p>6</p> <p>6</p> <p>7, 8</p>

Table 1 (Cont'd)
Noise Related Approval Conditions of SSD-6084

Page 3 of 3

Condition	Section
Schedule 5 (Cont'd)	
d) a program to monitor and report on the: <ul style="list-style-type: none"> – impacts and environmental performance of the development; and – effectiveness of any management measures (see (c) above); 	8
e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	7.2
Condition 2 – Management Plan Requirements (Cont'd)	
f) a program to investigate and implement ways to improve the environmental performance of the development over time;	8.4.1, 12, 14
g) a protocol for managing and reporting any: <ul style="list-style-type: none"> – incidents; – complaints; – non-compliances with statutory requirements; and – exceedances of the impact assessment criteria and/or performance criteria; and 	7.2 7.2 10.1.2, 10.2 7.2.2
h) a protocol for periodic review of the plan.	14
<i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>	
Condition 5 – Revisions of Strategies, Plans & Programs	
Within 3 months of the submission of an: <ul style="list-style-type: none"> a) annual review under condition 4 above; b) incident report under condition 6 below; c) audit report under condition 8 below; and d) any modifications to this consent, the Applicant must review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.	
<i>Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.</i>	
Condition 6 – Incident Reporting	
The Applicant must immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	
	10

2.3 ENVIRONMENT PROTECTION LICENCE 12323

The following conditions of EPL 12323 guide noise management within the Quarry Site.

Noise limit conditions

L4.1 Noise from the premises must not exceed 35dB(A)LAeq (15 minute) at any time.

Where LAeq means the equivalent continuous noise level - the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

It is noted that the noise limit conditions are consistent with those provided in *Condition 3* of Schedule 3 in SSD-6084. Noise criteria are discussed in Section 6.

In addition, EPL 12323 currently includes two conditions relevant to the noise management as follows. These conditions may be subject to review by the EPA as a result of a pending variation. If the conditions are varied, the plan will be updated to reflect the change.

L4.2 To determine compliance with condition(s) L4.1 noise must be measured at, or computed for, any affected noise sensitive locations (such as a residence, school or hospital). A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "Environmental Noise Management - NSW Industrial Noise Policy (January 2000)".

L4.3 The noise emission limits identified in this licence apply under all meteorological conditions except:

- a) during rain and wind speeds (at 10m height) greater than 3m/s; and*
- b) under "non-significant weather conditions".*

Note: Field meteorological indicators for non-significant weather conditions are described in the NSW Industrial Noise Policy, Chapter 5 and Appendix E in relation to wind and temperature inversions.

In this context, “non-significant weather conditions” is assumed to relate to level of occurrence and frequency of meteorological conditions, specifically in relation to prevailing winds and temperature inversions. Prevailing meteorological conditions are described in more detail in Section 4.1.

EPL 12323 does not include specific noise monitoring requirements but includes conditions relating to the maintenance of monitoring records which have been reflected in Section 8.

The Noise Management Plan will be updated in accordance with any future variations of EPL 12323.

2.4 STATEMENT OF COMMITMENTS

The final Statement of Commitments is included as *Appendix 3* of SSD-6084. Noise-related commitments have been identified in **Table 2**.

Table 2
Noise-related Commitments of the Final Statement of Commitments

Desired Outcome	Action	Section
Noise emissions do not exceed intrusiveness criteria nor significantly impact on neighbouring landowners and/or residents.	11.1 Undertake processing operations with the current or equivalent crushing and screening plant.	7.1.2
	11.2 Ensure all equipment on Site has sound power levels at or below that nominated for noise modelling purposes (see <i>Table 5-1</i> of Benbow, 2014a).	7.1.2
	11.3 Limit transportation noise by ensuring: a) All trucks under control of Hy-Tec, or accredited contractors would comply at all times with RMS noise limits ¹ . b) All truck drivers would be required to sign a Code of Conduct that includes noise limiting behaviour. c) Comply with conditional limits on truck movements. d) The internal road network would be graded, as required, to limit body noise from empty trucks.	7.1.2
		7.1.2
		7.1.2
11.4 Maintenance work would be confined to standard daytime hours where practicable.	7.1.2	
Notes: 1 RMS noise limits apply to all equipment involved in implementing road projects and relate principally to exhaust noise.		

3. OBJECTIVES AND OUTCOMES

The primary objectives of noise management at the Quarry are to protect the acoustic environment and amenity of the surrounding rural setting and to minimise the likelihood of noise-related complaints. **Table 3** details the objectives and outcomes with respect to noise management of the Quarry Site.

Table 3
Objectives and Outcomes

Objectives	Outcomes
(a) To ensure compliance with the criteria of SSD-6084, EPL 12323 and reasonable community expectations.	(i) Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
(b) To implement appropriate noise management and mitigation measures during all stages of Quarry operation.	(ii) All identified noise management and mitigation measures implemented.
(c) To implement an appropriate noise monitoring program to establish compliance or otherwise with relevant criteria during all stages of Quarry operation.	(iii) All identified monitoring undertaken in accordance with the Plan.
(d) To implement an appropriate complaints handling and response protocol.	(iv) Complaints (if any) handled and responded to in an appropriate manner.
	(v) All complaints recorded and reported in accordance with annual reporting requirements.
(e) To implement appropriate corrective and preventative actions, if required.	(vi) Corrective and preventative actions implemented, if required.
(f) To implement an appropriate incident reporting program, if required.	(vii) Incidents (if any) reported in an appropriate manner.

4. LOCAL SETTING

4.1 CLIMATIC CONDITIONS

The climatic conditions of the Stage 2 Site are presented in Section 4.3 of RWC (2018). Wind and temperature inversions may affect the transmission of noise from source to surrounding receivers. A summary of the climatic conditions relevant for noise management are presented in this subsection.

Wind

Figure 2 presents a summary of wind patterns generated from meteorological data collected during the 2014 calendar year at the Quarry. The wind roses indicate that on an annual basis, prevailing winds are from the west-southwest with light winds from the south-southwest and south persistent throughout the year. The west-southwest winds are more commonly experienced in winter and spring and autumn with winds from the northeast more prevalent during summer. Only sporadic winds from the north, east and southeast are experienced locally throughout the year.

Temperature

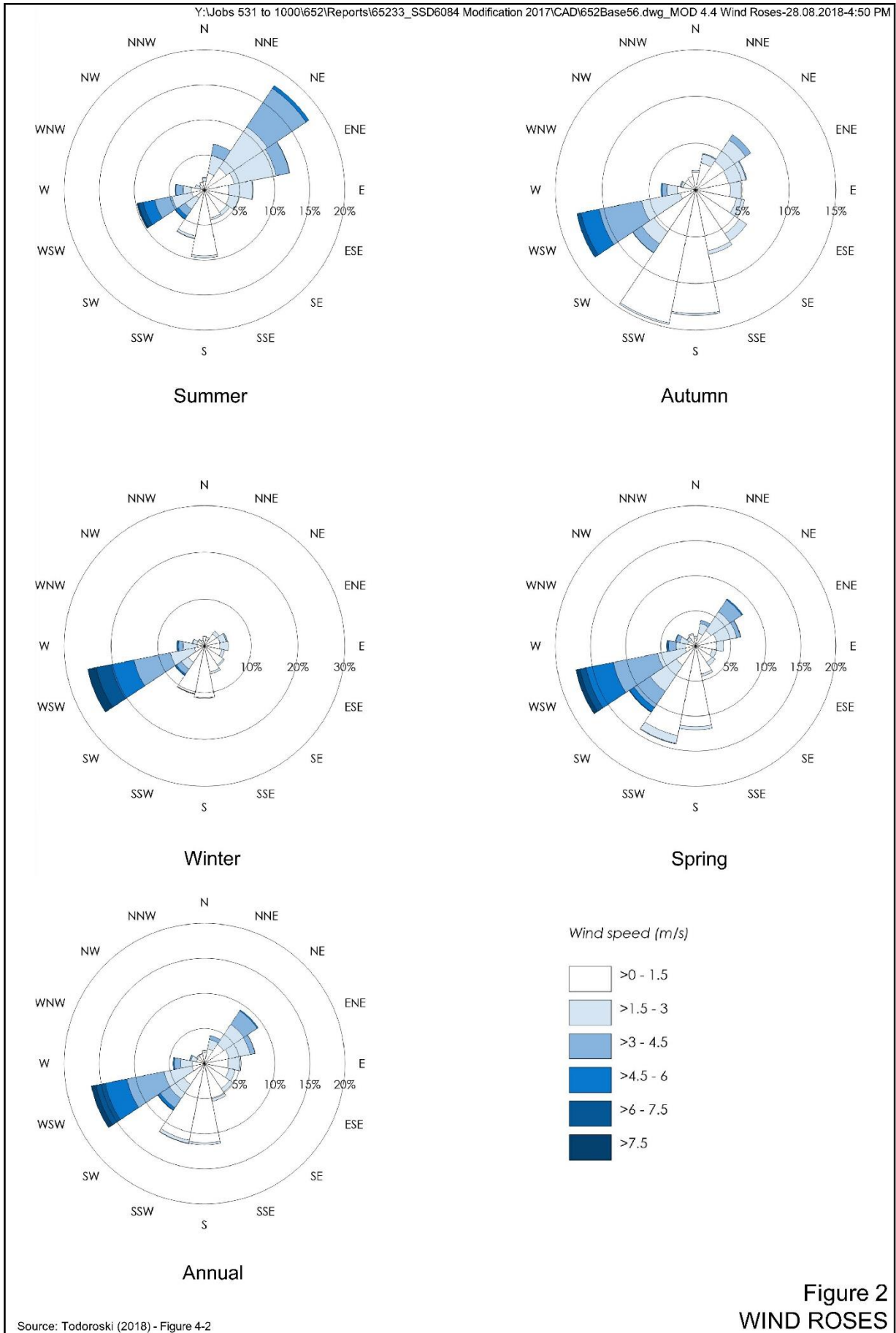
January is the hottest month, having the highest mean temperature of 25.5°C, with November, December, February and March all with mean annual temperatures exceeding 20°C and maximum temperatures exceeding 30°C. The lowest temperatures were evident through June to August with the lowest mean temperature in July of 0.7°C.

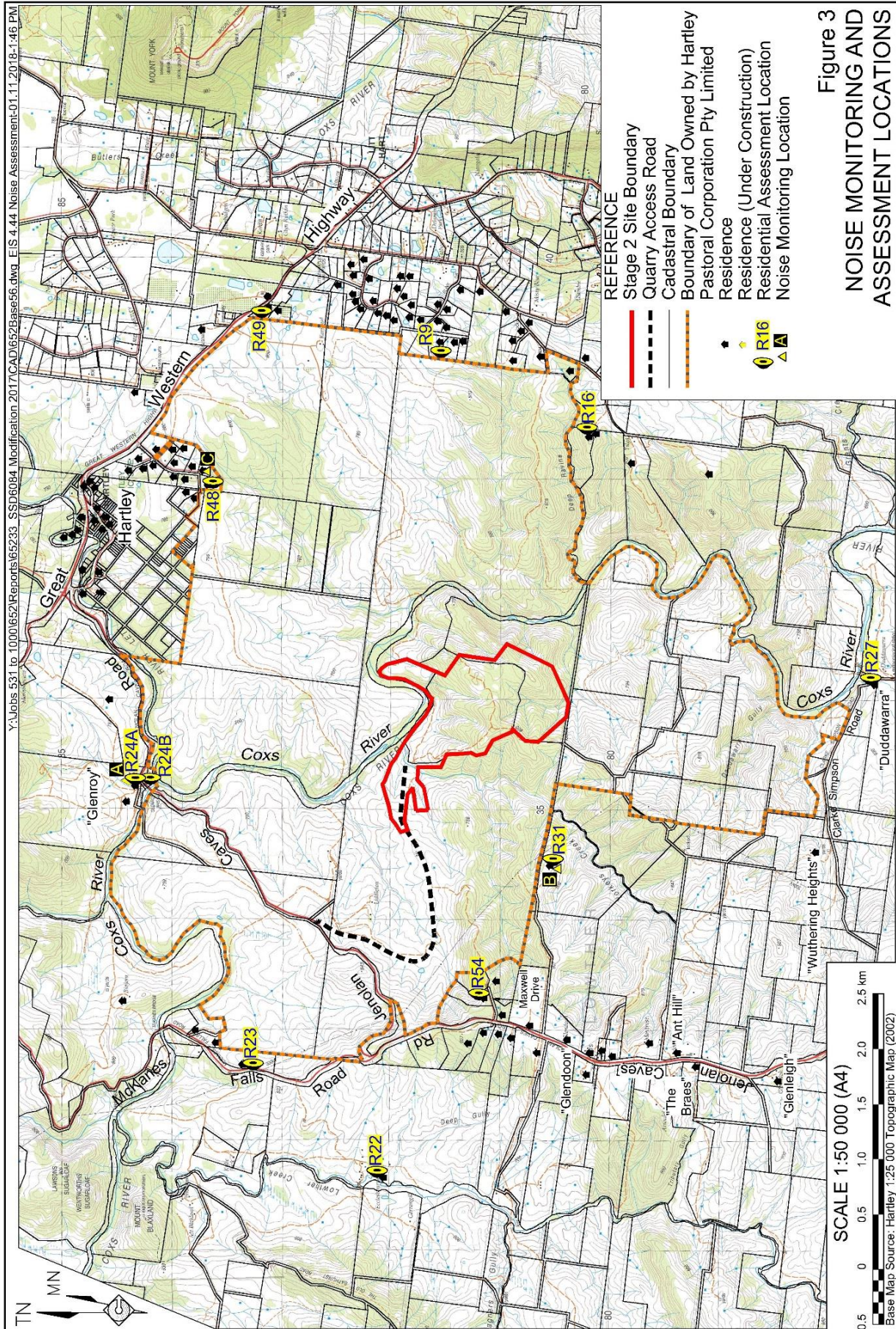
Temperature inversion conditions are experienced when warm air high in the atmosphere (stratosphere) traps a layer of cool air between the ground and the warmed air (in the troposphere) and causes sound waves to be refracted from the higher layer and perceived at different locations and in some cases, causes noise levels to be enhanced when compared to neutral conditions. Temperature inversions are generally experienced in the evening/night during stable or light wind conditions (F-G class stability conditions). Temperature inversion conditions have previously been predicted to occur on 60% of winter nights at the Quarry (RWC, 2014).

Residential and Other Sensitive Receivers

The Quarry Site is located on the large land holding of the Hartley Pastoral Corporation which provides a significant buffer to privately-owned residences. **Figure 3** presents the noise monitoring locations and residential receivers used for the assessment of the Stage 2 development of the Quarry and also includes identified vacant land at the time of the assessment.

The majority of land in the vicinity of the Quarry Site is land zoned Rural (General) 1a under the Lithgow *Local Environmental Plan* (LEP). The land owned by the Hartley Pastoral Corporation is operated as pastoral property and used primarily for cattle grazing, sheep grazing, cereal and fodder crops. Other nearby land uses include conservation areas, small rural holdings and limited recreation and tourism associated with Cox's River.





4.2 AMBIENT (BACKGROUND) AND PREDICTED NOISE

The ambient (background) noise levels surrounding the Quarry Site are described in detail in Section 5.3.2 of the SoEE (RWC, 2018). In summary, the ambient noise levels are influenced by a range of sources including traffic on Jenolan Caves Road and local roads, agricultural equipment, flow of the Coxs River, stock, wind in trees, wildlife, as well as noise associated with the Quarry.

MAC (2018) reviewed the background noise levels recorded for the noise impact assessment for the 2014 EIS (RWC, 2014 and Benbow, 2014). The background noise levels presented in **Table 4** are based on monitoring undertaken by Benbow (2014) and represent ambient noise predating the approval of the Stage 2 development.

The noise levels in **Table 4** were compared with the results of more recent operator-attended noise monitoring for the Quarry. Operator-attended monitoring undertaken since commencement of the Stage 2 Project has confirmed that Quarry noise contributions are less than 35dB(A) ($L_{Aeq,15min}$) at all receiver locations for all measurements undertaken during the morning shoulder/night period (4:00am to 7:00am), daytime period (7:00am to 6:00pm) and evening period (6:00pm to 10:00pm).

Table 4
Background Noise Levels

Location*	Measured Background Noise Level (L_{A90}) (dB(A))			Measured $L_{Aeq,15mins}$ (dB(A))		
	Day	Evening	Night	Day	Evening	Night
Location A 220 Jenolan Caves Road	39	39	38	63	58	56
Location B 770 Jenolan Caves Road	27	22	21	59	54	51
Location C 66 Dicker Drive, Little Hartley	35	34	30	47	46	41

Source: Modified after MAC (2018) – Table 4 * See **Figure 4.1**

The assessment undertaken by MAC (2018) predicted that noise levels at all times of day, evening, night and morning shoulder periods are predicted to remain within the existing noise limit of 35dB(A) at all privately-owned residences surrounding the Quarry. In addition, noise levels are also predicted to remain below the maximum noise level assessment trigger levels with maximum noise levels (LMAX) not predicted to exceed 46dB(A).

In addition, noise levels recorded in unattended noise monitoring in September 2017 were reviewed to establish what impact, if any, was occurring as a result of transport activities. Review of background noise levels identified that noise starts to increase between 4:00am and 5:00am due to traffic on the Great Western Highway and the local road network (consistent with the definition of a morning shoulder period) and fluctuates around 30dB(A).

Residence R24A at 200 Jenolan Caves Road was considered to be the most likely affected by road traffic noise. This conclusion was based on consultation with the residents and review of the proximity of the residence to the road by MAC (2018). Existing road noise levels assumed for the MAC (2018) assessment are presented in **Table 5** alongside predicted road traffic noise levels at Residence R24A.

Table 5
Assumed Existing Road Traffic Noise Levels

Period*	Assumed Existing Non-Quarry Road Traffic Noise (dB)	Predicted Cumulative Road Traffic Noise (dB)
Day (LA _{eq,15hr})	67.7	68.1
Night (LA _{eq,9hr})	57.5	58.1
* Day 7:00am to 10:00pm Night (10:00pm to 7:00am)		
Source: Modified after MAC (2018) – Table 22		

5. POTENTIAL NOISE IMPACTS AND RISKS

Potential noise impacts associated with quarry operations relate to blast-related noise, operational noise associated with operation of equipment and processing facilities and road traffic noise.

Blasting is considered within the *Blast Management Plan*. However, in summary, MAC (2018) assessed predicted blasting impacts and concluded that airblast overpressure and vibration levels would continue to meet the standard criteria at all assessed residences for blasts up to 170kg Maximum Instantaneous Charge in the extraction area.

The outcomes of the noise impact assessment for the recent modification (MAC, 2018) were as follows.

- Operational noise levels at all times of day, evening, night and morning shoulder periods are predicted to remain within the existing noise limit of 35dB(A) at all privately-owned residences surrounding the Quarry.
- Maximum operational noise levels are predicted to remain below 46dB(A) at all privately-owned residences surrounding the Quarry.
- Road noise level predictions (**Table 5**) demonstrate that transportation operations would result in a negligible change to road noise levels in the vicinity of the Quarry.
- Sleep disturbance from operational and transport noise is not predicted to result from operations under the Stage 2 development.

Attended and unattended noise monitoring undertaken following the commencement of Stage 2 operations have demonstrated compliance with noise criteria at all privately-owned residences, with Quarry contributions not audible or barely audible in most instances.

6. NOISE CRITERIA

Operational Noise

In accordance with *Condition 3* of Schedule 3 of SSD-6084, the noise criteria for all operations undertaken on the Quarry Site are provided by **Table 6**.

Table 6
Quarry Noise Criteria

Location	Day	Evening	Morning Shoulder	Morning Shoulder (Sleep Disturbance)
	L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _A max
All privately-owned residences	35	35	35	52

In accordance with Condition 3 of Schedule 3 of SSD-6084, these criteria do not apply if a written agreement is in place between Hy-Tec and the landowner that permits the limits to be exceeded and Hy-Tec has notified DPIE of the terms of the agreement in writing.

Condition 3 of Schedule 3 of SSD-6084 specifies that the monitoring of noise generated by the development must take into account the relevant procedures and exemptions (such as certain meteorological conditions) that are described in the *Noise Policy for Industry* (NPI) (EPA, 2017). These procedures and exemptions are described in Section 5.2 and Fact Sheet D of the NPI.

Condition L4.3 of EPL 12323 specifies that noise limits do not apply under the following conditions.

- During rain.
- When wind speeds (at 10m height) greater than 3m/s are occurring.
- Under "non-significant weather conditions" such as temperature inversion conditions that influence noise propagation but occur infrequently (i.e. on less than 30% of occurrences).

However, it is accepted that the conditions of SSD 6084 should prevail to the extent of any inconsistency and therefore, the matters and the methods specified in the NPI for determining the significance of noise-enhancing meteorological conditions will be considered during compliance noise monitoring activities (described in Section 8).

Road Traffic Noise

No traffic noise criteria have been established for the Quarry by SSD-6084. Measurements of road traffic noise will be reviewed against the predicted road traffic noise levels provided in **Table 5**.

7. NOISE MANAGEMENT SYSTEM

7.1 PROACTIVE MANAGEMENT MEASURES

7.1.1 Hours of Operation

All operations will be undertaken in accordance with the approved hours of operation presented in **Table 7**.

Table 7
Approved Operating Hours

Activity	Permissible Hours
<ul style="list-style-type: none"> Extraction operations Processing operations Overburden Management Stockpile Management 	<ul style="list-style-type: none"> 6:00am to 10:00pm Monday to Friday; 6:00am to 3:00pm Saturday; and At no time on Sundays or public holidays.
<ul style="list-style-type: none"> Blasting 	<ul style="list-style-type: none"> 10:00am to 3:00pm Monday to Friday (except public holidays).
<ul style="list-style-type: none"> Loading and Despatch 	<ul style="list-style-type: none"> 4:00am to 10:00pm Monday to Friday; 5:00am to 3:00pm Saturdays; and At no time on Sundays or public holidays.
<ul style="list-style-type: none"> Maintenance 	<ul style="list-style-type: none"> Any time
Source: SSD-6084 – Table 1	

7.1.2 Operational Designs and Controls

Stage 2 of Quarry development has been designed with an objective to minimise the noise generated by extraction, processing and transport activities. The design features and operational noise controls to meet this objective are as follows.

Design Features

- No additional processing equipment is proposed with all fixed plant to remain in current locations, i.e. noise from processing operations would remain the same as that currently generated.
- The continued operation of the primary conveyor between the primary crushing station and secondary processing area reduces noise emissions significantly by avoiding the requirement for truck movements between the extraction and processing areas.
- By sequencing the proposed Stage 2 extraction area to reduce the visual exposure of the extraction operations, noise attenuation is also provided.
- Stockpiles and ancillary equipment will be positioned to limit potential noise impacts.
- Ancillary equipment will be enclosed, where feasible.

Operational Safeguards

- All approved hours of operation would be strictly adhered to.
- Compliance with the maximum number of truck movements per day nominated in *Condition 8* of Schedule 2 of SSD-6084.
- All cartage contactors are required to sign a cartage agreement, which states -

The Contractors will ensure that the Contractor, and each member of the Contractor's Personnel, complies with all Laws, Approvals and Good Operating Practices relating to compliance with and management of Chain of Responsibility.

Further, all drivers are required to sign the Driver's Code of Conduct documentation requiring a high standard of driver performance, avoidance of using exhaust brakes in built-up areas and travel at the required speeds.

- The internal road network would be maintained to their current standard and if any new roads are proposed these would be constructed to similar standards to limit body noise from empty trucks.
- All equipment on site is to be serviced in accordance with Original Equipment Manufacture (OEM) requirements to ensure sound power levels of each item remains at or below that nominated for noise modelling purposes (see Table 5.1 of Benbow, 2014). All cartage contractors as per the Aus-10 (Hy-Tec) Cartage Agreement agree to maintain their vehicles in accordance with all requirements and regulations, including complying with relevant noise regulations.
- Operations at exposed locations and under unfavourable weather conditions will be modified, where necessary, to reduce potential noise-related impacts.
- Maintenance work on all plant and equipment may be carried out anytime as per approved maintenance hours.

Transport Operations

- All transportation contractors exiting the Quarry are requested to slow to 40km/hr on the approach to and when crossing the Glenroy Bridge, where it is safe and reasonable to do so.
- All transportation contractors must avoid unnecessary compression braking, unless required for safety reasons.

7.1.3 Noise Monitoring

A program of noise monitoring will be undertaken at nominated residences and the results and performance of the site operations discussed with local residents and landholders. Monitoring is further discussed in Section 8.

7.2 REACTIVE MANAGEMENT MEASURES

7.2.1 Triggers

Four triggers for reactive management will be applied.

- a) Noise Complaint. Any complaint received, either directly or via Council, EPA or other regulatory agency, will trigger the implementation of the response and corrective action measures described in Section 7.2.2.
- b) Exceedance of noise criteria established through noise monitoring. Any record of noise exceeding the criteria nominated in Section 9 will trigger the response and corrective action measures described in Section 7.2.2.

- c) Emergency Events. Any request from police or in the event of an emergency will result in the activation of reactive management measures described in Section 7.2.2.
- d) Extraordinary Weather Events. If extreme weather events are forecast or observed, reactive management measures will be triggered, as described in Section 7.2.2,

7.2.2 Response and Corrective Actions

Noise Complaint

Following receipt of a complaint appropriate action will be taken within two working days to determine the cause of the complaint and identify appropriate actions to remediate the complaint source.

The following details will be recorded following receipt of any noise-related complaint.

- a) The date and time of the complaint.
- b) The method by which the complaint was made.
- c) Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
- d) The nature of the complaint.
- e) The action taken in relation to the complaint, including any follow-up contact with the complainant.
- f) If no action was taken, the reasons why no action was taken.

All complaints will be investigated and a response provided to the complainant within seven days of the completion of the investigation. The investigation may include determination of the following.

- What activities (and / or equipment) were being carried out or operated at the time of the complaint.
- Whether at the time of the complaint, normal day-to-day activities were being conducted.
- Whether equipment or activities on-site were the potential source of complaint (or whether other activities in the locality may have contributed to the complaint).
- What actions may be carried out to resolve the complaint and / or minimise the likelihood of further complaints.

If monitoring is undertaken to investigate a complaint, the Quarry Production Manager may make the results of the monitoring available for viewing by the complainant, on request.

Noise Criteria Exceedance

If noise monitoring indicates that noise exceeds the approved criteria, the following response and action plan will be implemented.

1. After obtaining exceedance information from the acoustic consultant, the Quarry Production Manager (or delegated representative) will review meteorological conditions to assess whether these represent (very) noise-enhancing conditions that may have influenced the result.

2. If meteorological conditions were such that they enhanced noise propagation, the results will be compared to the meteorological conditions applied for assessment to determine whether the noise limits may be adjusted in accordance with Section 5 of the *Noise Policy for Industry* (EPA, 2017).
3. The Quarry Production Manager will immediately investigate the source of the noise, review the performance of equipment and, if necessary, make arrangements to alter the configuration of equipment, or stand down specific equipment, so that the noise levels are reduced.
4. As soon as is practical following a confirmed exceedance of noise criteria, the Quarry Production Manager will notify DPIE and EPA of the exceedance and actions being taken to remediate the source of excessive noise. This timing is consistent with that nominated in *Condition 6* of Schedule 5 of SSD-6084.
5. In accordance with Condition 1a of Schedule 4 of SSD 6084, the Quarry Production Manager will notify in writing any affected landowners or tenants as soon as practical after obtaining monitoring results that demonstrate the noncompliance.
6. Noise monitoring will be repeated to confirm compliance with the approved noise criteria.
7. Within 7 days of the date of the incident the Quarry Production Manager will provide a detailed report on the incident to DPIE and EPA.
8. Any exceedance of the approved noise criteria will be reported to EPA in the Annual Return and to DPIE in the Annual Review.

Emergency and Extraordinary Weather Events

In the event that deliveries or despatch are requested at unusual times by Police or other authorities or in the event of an emergency, the Quarry Production Manager will act appropriately to ensure the general safety of employees and the local community. It is noted that these events are permitted outside the hours of operation required by *Condition 1 of Schedule 3* in SSD-6084.

During times when extreme weather events (such as strong winds or heavy rain) are forecast or observed, the Quarry Production Manager will modify operations to minimise potential noise impacts as much as practically possible. This may include but is not limited to:

- turning off or limiting operations of mobile equipment or fixed plant;
- redirecting operations to more sheltered areas within the extraction area; and
- moving equipment to lower elevations to reduce the potential for noise to be carried over long distances.

8. NOISE MONITORING

8.1 INTRODUCTION

The following conditions of SSD-6084 specify the required nature and outcomes of noise monitoring for Stage 2 of the Quarry.

- Condition 4(c) of Schedule 3 requires that attended noise monitoring shall be carried out at least every 6 months to determine whether the development is complying with the relevant conditions of consent.

- Condition 5(e) of Schedule 3 requires that the Noise Management Plan include a monitoring program that measures compliance with the approved noise criteria, includes annual noise monitoring at R24A and evaluates and reports on the effectiveness of the noise management system (Section 7).

This subsection describes the noise monitoring program that will be implemented to meet these conditions of consent and assist Hy-Tec to protect the acoustic environment and amenity of the surrounding rural setting and to minimise the likelihood of noise-related complaints.

8.2 METEOROLOGICAL MONITORING

A meteorological station has been operated at the Quarry Site since 2003. *Condition 13* of Schedule 3 of SSD-6084 requires that a suitable meteorological station be operating in the vicinity of the Quarry Site in accordance with the requirements described in the *Approved Methods for Sampling of Air Pollutants in New South Wales*. In addition, Condition M8.1 of EPL 12323 requires monitoring of the parameters, units of measure, averaging period and frequency specified in **Table 8**.

Table 8
Meteorological Monitoring

Parameter	Units of Measure	Frequency	Averaging Period
Rainfall	mm	Continuous	24 hour
Sigma theta	°	Continuous	15 minute
Air Temperature	°C	Continuous	1 hour
Wind Direction at 10m	°	Continuous	15 minute
Wind Speed at 10m	m/s	Continuous	15 minute

Meteorological monitoring will be accompanied by a quantitative record of weather conditions during the monitoring period together with a qualitative description of weather conditions, including cloud cover, fog etc. This data will be used to correlate environmental conditions with noise levels and derive any relevant relationship between the two factors.

8.3 NOISE MONITORING LOCATIONS

Noise monitoring locations have been selected in order to demonstrate compliance with the criteria described in Section 6 and with consideration of the operational noise levels predicted by Benbow (2014). Attended noise monitoring will be undertaken at the locations presented in **Figure 3**. The locations are summarised in **Table 9**. Annual unattended noise monitoring will be undertaken at the Glenroy Property (Residence 24A) and location A in **Table 9**.

Table 9
Noise Monitoring Locations

Location ¹	Residence Identifier ¹	Property Reference (Lot, DP)	Address	Distance to the Quarry
A	R24A	10, 830372	200 Jenolan Caves Road	2 600m
B	R31	214, 757063	'Good Forest' 781 Jenolan Caves Road	1 000m
C	R48	6, 880798	64 Carroll Drive, Hartley	2 300m

Note 1: see **Figure 3**

8.4 NOISE MONITORING

8.4.1 Purpose

The purpose of the noise monitoring will be to confirm compliance with the criteria identified in Section 6.

Monitoring results will be continually reviewed in order that Hy-Tec may improve, where possible, the environmental performance of the development over time.

8.4.2 Methodology

Noise monitoring will be undertaken in accordance with the following documents.

- *NSW Noise Policy for Industry* (NPI)
- AS 1055.1-1997 “Acoustics – Description and Measurement of Environmental Noise – General Procedures”.

The monitoring will expressly seek to identify and quantify any relevant modification factors referred to in Fact Sheet C of the NPI and the presence of noise-enhancing meteorological conditions described in Fact Sheet D of the NPI.

All acoustic instrumentation employed throughout the monitoring program will comply with the requirements of AS IEC 61672 2004 “*Electroacoustics – Sound Level Meters*”, as amended, and will carry current NATA or manufacturer calibration certificates. Instrument calibration will be checked before and after each survey, with the variation in calibrated levels not exceeding $\pm 0.5\text{dB(A)}$.

Information that will be recorded during monitoring and about each location will include:

- the name of the person undertaking the monitoring;
- location(s) of the monitoring;
- recording intervals (date and times);
- meteorological conditions i.e. temperature, humidity, cloud cover, and wind speed and direction drawn from the on-site meteorological station;
- statistical noise level descriptors together with notes identifying the principal noise sources;
- instrument make, model, serial number and calibration details; and
- a brief description of activities occurring during the monitoring period.

The significance of noise-enhancing meteorological conditions and their relevance in determining compliance with noise limits will be determined in accordance with Section 5.2 and Fact Sheet D of the *Noise Policy for Industry* (EPA, 2017). Any conditions of SSD 6084 or EPL 12323 relating to noise-enhancing conditions will take precedence in determining significance in assessment of compliance. Meteorological conditions will be determined through review of data captured at the on-site meteorological station and surrounding Bureau of meteorology weather stations should this be required when reviewing the results of monitoring.

8.4.3 Attended Monitoring

Attended noise monitoring will be undertaken at locations A, B and C (see **Figure 3**) and (in accordance with *Condition 4(c)* of Schedule 3 of SSD-6084) and will occur at least every 6 months. Monitoring will take place over a single day and record representative noise levels covering the day, evening and night time periods.

Condition 4 of Schedule 3 of SSD-6084 includes a note that the required frequency of monitoring may be reduced if approved by the Secretary. After the first two years of monitoring under the modified consent, data recorded at the noise monitoring locations will be reviewed to determine if modifications to monitoring frequency are appropriate. If modified, this Plan will be updated to reflect the updated monitoring frequency.

Attended noise monitoring will be undertaken using a hand-held noise meter. The maximum (L_{Amax}), and the energy equivalent (L_{Aeq}) intrusive noise level over a 15 minute measurement period will be recorded. If necessary, other descriptors such as L_{A10} , L_{A50} , L_{A90} , L_{A99} and L_{Amin} could also be recorded. Wherever possible, the L_{A90} noise level (i.e. without contributions from Quarry activities) will be recorded to identify the prevailing background noise level.

8.4.4 Unattended Monitoring

Unattended monitoring will be undertaken annually at locations A and B (see **Figure 3**) for a minimum period of 5 days and cover the day, evening and night time periods.

A mobile unattended noise monitor will be programmed to record the following.

- Statistical noise parameters (including L_{A1} , L_{A10} ; L_{A90}).
- $L_{Aeq(15min)}$ in 1/3 octaves to enable frequency analysis.
- Periodic audio files (period nominally 1 minute per 15 minute period).

The unattended noise monitor will be calibrated against the results of the attended noise monitoring. Data from the unattended noise monitor will be retrieved via remote telemetry for the comparison with the noise criteria (Section 6).

8.5 SUPPLEMENTARY MONITORING

In the event of a noise-related complaint, Hy-Tec would review the results of the noise monitoring program and make the results of that monitoring and/or subsequent investigation available to the complainant. In the event that this does not resolve the complaint, the Company would undertake a supplementary attended noise survey if practicable

8.6 EVALUATION OF RESULTS

A noise monitoring report will be prepared by the person or company responsible for the monitoring and published on the Hy-Tec website. That report will include an assessment of the monitoring results against the criteria identified in *Condition 3* of Schedule 3 of SSD-6084. The monitoring report will be reviewed by the Quarry Production Manager and a copy included within the Annual Review.

In the event that the noise monitoring report identifies an exceedance of the relevant criteria, the procedures identified in Section 7.2.2 will be implemented.

9. COMPLAINTS HANDLING AND RESPONSE

Hy-Tec has established a complaints management system for the Quarry to ensure that any complaints are recorded, investigated and the feedback provided to the appropriate parties.

Complaints made be made via the following channels.

- Via phone directly to the Quarry on 02 6355 0268.
- Via the online ‘Contact Us’ portal on the Hy-Tec website (www.hy-tec.com.au/).
- Via a Government agency such as Lithgow City Council or the EPA.

The management of noise-related complaints is incorporated into the Noise Management System for the Quarry. The procedure for recording, investigating and responding to a noise related complaint is described in Section 7.2.2.

10. INCIDENT MANAGEMENT, NOTIFICATION AND REPORTING

SSD 6084 defines an incident as:

“An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance”

Further to this, SSD 6084 defines material harm as follows.

Material harm.....Is harm that:

- *involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or*
- *results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)*

This definition excludes “harm” that is authorised under either this consent or any other statutory approval’

An incident which causes or threatens to cause material harm to the environment (and may or may not result in an exceedance of noise criteria) is referred to as a **Pollution Incident**.

An incident which is only as a result of an exceedance of noise criterion, is referred to as a **Non-compliance Incident**.

10.1 INCIDENT MANAGEMENT AND NOTIFICATION

10.1.1 Pollution Incident

It is considered unlikely that a noise-related incident will classify as a Pollution Incident and notably, the EPA excludes noise pollution from the requirements of a Pollution Incident Response Management Plan.

In the event of a noise-related incident which is deemed a Pollution Incident (see Section 10.1), the Quarry Production Manager will be notified and the event will be reported to the EPA immediately at the first practical opportunity (and within 24 hours of the incident).

An investigation into the source of the offending noise will be immediately commenced and once identified the Quarry Production Manager or delegate will implement one or more of the corrective measures identified in the Noise Management System (see Section 7).

Within 7 days of the incident, the Company will submit a report to DPIE confirming the source of the offending noise, actions taken and ongoing management to prevent future incident to the regulatory authorities.

10.1.2 Non-Compliance Incident

On identification of a non-compliance against noise criteria, which may follow receipt of a complaint, the Quarry Production Manager will be notified and an investigation into the source of the non-compliance or complaint causing emissions commenced in accordance with the response and corrective actions described in Section 7.2.2 including the appropriate notification protocols.

10.2 INCIDENT REPORTING

Following implementation and review of the corrective measures, a short description of the incident, actions taken and results of the corrective actions will be documented by the Quarry Production Manager.

A summary of all incidents, including dates of occurrence, corrective measures taken and success of these measures will be compiled and reported in the Annual Review to the DPIE and Annual Return to the EPA.

11. DOCUMENTATION AND PUBLICATION OF MONITORING INFORMATION AND REPORTING

Hy-Tec will retain records of meteorological monitoring and noise monitoring for a minimum period of four years. Monitoring records will be made available to relevant government authorities following a written request.

Hy-Tec will include all attended noise monitoring reports as appendices to the Annual Review. That document, once approved by the relevant government agencies, would be published on the Company’s website.

In accordance with the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997*, each month Hy-Tec will publish a meaningful summary of all EPL required monitoring data on the Company’s website. The summary will be published within 14 days of the last sample for that period being collected. In addition, Hy-Tec will provide a copy of obtained data (the value of each individual monitoring sample) free of charge to a member of the public when requested in writing. The data will be provided in a format that includes raw data values if requested, is comprehensible by the general public and also includes all accompanying necessary information. These requirements are presented in detail in *Requirements for Publishing Pollution Monitoring Data” (EPA, 2013)*.

12. ROLES AND RESPONSIBILITIES

Table 10 outlines the roles and responsibilities of personnel with reference to management of noise.

Table 10
Roles and Responsibilities of Personnel with Respect to Management of Noise

Page 1 of 2

Role	Responsibilities
NSW Quarry Operations Manager	<p>Ensure compliance with the Noise Management Plan.</p> <p>Ensure adequate resources are available to implement the Noise Management Plan.</p> <p>Ensure suitably trained personnel are available to implement the responsibilities of the Quarry Production Manager during any time of the Quarry Production Manager’s absence from site.</p> <p>Coordinate the review of the Plan (see Section 14).</p>
Quarry Production Manager, or his/her nominee	<p>Ensure the implementation of the Noise Management Plan.</p> <p>Ensure noise monitoring results are regularly reviewed/evaluated and entered into the environmental database.</p> <p>Ensure reviews of meteorological forecasts are undertaken on a daily basis prior to the commencement of operations.</p> <p>Implementation of the Noise Management System (see Section 7).</p> <p>Relocate or postpone relevant activities in the event of adverse weather conditions, where practical.</p> <p>Provide primary contact for complaints and supply follow-up information to any complainant.</p> <p>Initiate investigations of complaints as received from the public or government agency.</p> <p>Prepare a report to government agencies or neighbours following a notifiable pollution incident (see Section 10).</p> <p>Inform the NSW Quarry Operations Manager of identified causes of elevated noise and any alterations to site operations that may or has influenced the noise environment.</p> <p>Ensure employees are competent through training and awareness programs.</p>

Table 10 (Cont'd)
Roles and Responsibilities of Personnel with Respect to Management of Noise

Page 2 of 2

Role	Responsibilities
All On-site Personnel	Operate in manner that minimises risks of incidents to themselves, fellow workers or the surrounding environment. Fully implement the relevant control measures within the Noise Management Plan. Report any anomalous noise or extraordinary events to the Quarry Production Manager. Follow any instructions provided by the Quarry Production Manager.
All Truck Drivers	Follow any instructions provided by any on-site personnel. Follow all requirements relating to management of noise within the Driver's Code of Conduct.

13. COMPETENCE TRAINING AND AWARENESS

All personnel and contractors working at the Quarry undergo an induction. This induction includes information on the management of noise while working on site.

After completing the induction, workers will sign the statement of induction and a record of this is kept in the administration office.

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.

14. PLAN REVIEW AND CONTINUAL IMPROVEMENT PROTOCOL

In accordance with Condition 5 of Schedule 5 of SSD-6084, the Plan will be internally reviewed within 3 months of submission of an Annual Review, an incident report resulting from a notifiable incident, each independent environmental audit and any modification to SSD-6084 to address feedback from these processes. Should changes to the Plan be required, approval for the modified plan would be sought from DPIE. A comprehensive review of all management plans will take place every three years and include review of all management measures to ensure these remain within best practice management. This will ensure the adequacy of the Plan and allow for opportunities of adaptive management and continual improvement. This will include a review of monitored noise levels and monitoring frequency and methods, as necessary. Each review will also evaluate the effectiveness of the overall noise monitoring program and whether it should be modified or scaled back.

15. REFERENCES

Benbow Environmental (2014). *Noise and Vibration Impact Assessment for the Austen Quarry Stage 2 Extension Project.* Prepared on behalf of Hy-Tec Industries Pty Limited.

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